



*Keys Courses*

# **Time to Learn Car Fault Diagnostics**



# Car

Part of learning to take yourself is learning about entails.

[Grab your reader's attention with a great quote from the document or use this space to emphasize a key point. To place this text box anywhere on the page, just drag it.]

# Diagnostics

care of your vehicle diagnostics and what that

A diagnosis is a deep dive into what is wrong with your car and can be as simple as finding where a peculiar noise is coming from (check my e-book (AAArrrgggh what's that noise, "download now") to using an electronic device that plugs into your car.

Here we will go through the various methods:

You don't need to be a mechanic to diagnose a problem with your car, now you might not be able to diagnose the exact problem but you should be able to get a reasonable idea of where the problem is.

The first thing to do here is describe the problem to yourself and perhaps write it down.

When it comes to noises it could be helpful to have someone else with you who can help pinpoint where the noise is coming from.

So you have discover a problem with your vehicle.

What is the problem?

Is it –

- A noise
- A rumble
- Is the car not accelerating like it should
- Does it not brake like it should
- Does it not idle properly (run smoothly when standing still)
- Does it run rough when driving
- Does it rattle or shake when driving all the time or only at certain speeds
- Does it seem to swerve easily when driving
- Does the temperature gauge get hot
- Will it not start at all
- Has the check engine light come on
- There is smoke coming out of the exhaust
- You can see some sort of fluid on the ground
- It won't change gears properly

Noises, What kind of noise is it?

It is important that you can describe the noise in plain language so others can understand

Check my e-book to diagnose noises

Acceleration problems.

If your car is not accelerating properly there are a few areas that need to be looked at.

**Car hesitates when accelerating from stop** or when driving uphill is truly frustrating, and it can be dangerous in certain situations like entering and exiting the highway, where acceleration might be necessary to merge with traffic. This happens generally because your engine is not generating enough power to facilitate the increase in speed, however, the exact culprit can require some time and knowledge to pinpoint.

This article includes a comprehensive list of 11 common reasons why for car hesitates when accelerating. Move from each to rule out one by one the actual culprit and perform the required replacement or [maintenance](#) right away to enjoy smooth and safe driving.

### **Car Hesitates When Accelerating From Stop: 11 Common Reasons**

In essence, delay or hesitation of the engine during acceleration happens when the engine does not get enough power, and it needs more power to accelerate from a dead stop than when maintaining the speed of a moving vehicle.

The engine generates power by creating combustions in its chamber. The input for such combustions, or explosions, is a mixture of air and fuel at a fixed optimal ratio, which is ignited by the spark plug. The engine houses multiple cylinders, and combustions take place in these cylinders in a continuous order so that a continuous supply of energy is generated to run the engine.

Therefore, if there is any issue with any of the engine components that control such a mechanism for igniting the fuel and airflow supply, the engine will not get enough power when needed, thus making the car hesitate when accelerating from stop.

The reasons for this issue can be quite a long list. Inspect the following components in turn when you experience the issue.

## 1. The air filter



clogged air filter will impede air flow into the engine's combustion chamber . (Photo: Alamy)

One of the most common reasons that makes your car hesitate when accelerating from a stop, and the easiest one to fix, is a dirty air filter. Your engine needs a constant supply of air to run, and the air part of that equation can be affected quite a bit if the air filter is dirty and clogged with dust buildup.

A clogged air filter means the engine will not get enough air to produce optimal combustion, thus generating less power than what is needed to accelerate the car. If prolonged, this small problem will smother the engine and negatively affect fuel economy as well as your driving experience and safety. Fortunately, if this is the culprit, you simply need to take the air filter out of the air box , inspect it, and replace it with a new one.

## 2. Mass airflow sensor

This is the next component to inspect after you've ruled out the air filter.

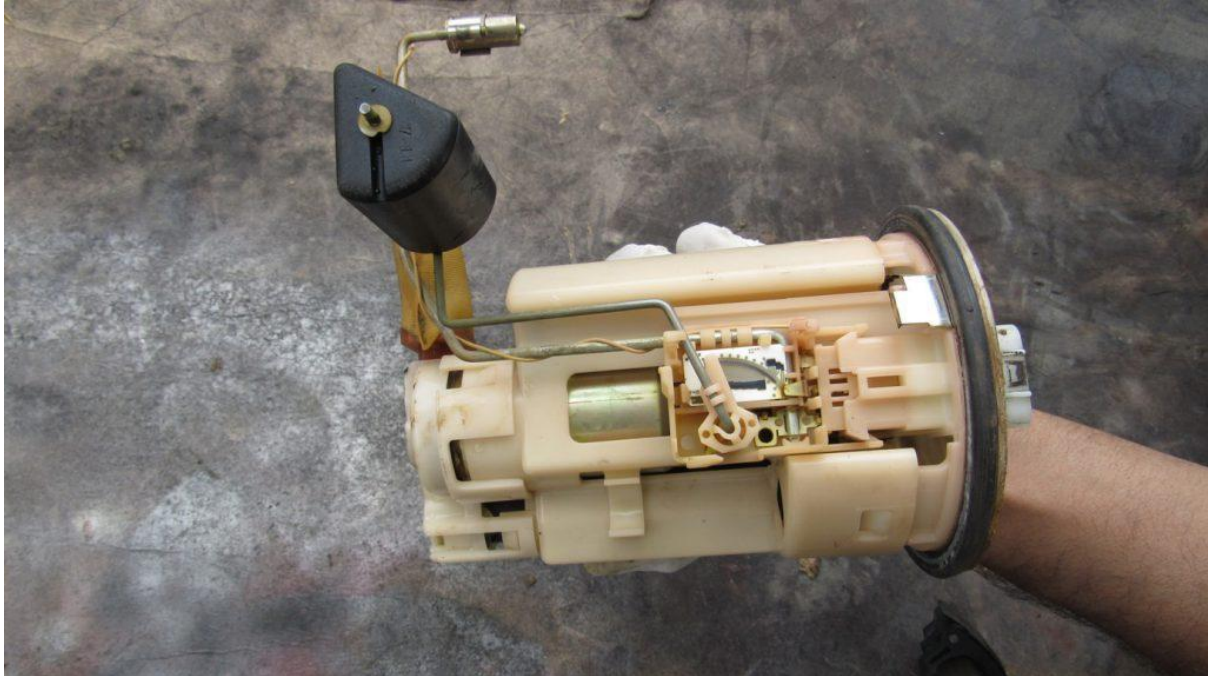
The mass airflow sensor keeps track of the volume of air entering the engine and reports the information to the ECU (Engine Control Unit). The computer uses that information to decide the corresponding amount of fuel the fuel injectors should deliver.

A failing or stuck sensor relays the wrong information, so the engine does not get the correct amount of fuel it needs, resulting in suboptimal energy generation and thus will cause the car to hesitate during acceleration from a stop or while driving uphill. Do note that if the mass airflow sensor is the reason, it may or may not trigger a trouble code.

### 3. Fuel pump

While your engine needs air and fuel to be injected into the combustion chamber, fuel is stored in the fuel tank.

Therefore, a fuel pump, also referred to as a “fuel transfer pump”, is needed to transfer gasoline or diesel from the fuel tank to the engine, specifically to the carburetors or fuel injectors, depending on the type of vehicle you have. The carburetors or fuel injectors then disperse fuel into the combustion chambers of the engine.



A faulty fuel pump means the engine will not get the correct amount of fuel at the right time. (Photo: youtube)

It goes without saying that when the fuel pump in your vehicle malfunctions, the engine will not get the correct amount of fuel at the right time, thus its performance will be impeded.

A dirty or damaged fuel pump can trigger a handful of issues. A clogged or faulty fuel pump means the engine is not getting enough fuel at a given time to generate enough energy, thus making the car hesitate when accelerating from stop.

### 4. Fuel injectors

As stated above, after the fuel pump transfers fuel from the fuel tank to the engine, the fuel injectors then spritz fuel into the cylinder. The fuel then gets mixed with air at a certain ratio and then gets ignited by a spark plug to create combustion.

Like the air filter and fuel pump, the fuel injector is also prone to accumulating dirt and sludge over time, which affects its capacity to supply the correct amount of fuel for the combustion. As a result, the engine fails to produce enough power to take off smoothly after a dead stop.



faulty fuel injector will not be able to supply the correct amount of fuel for the combustion.  
(Photo: CarParts.com)

## 5. Fuel filter

Similar to the air filter, the fuel filter is prone to becoming dirty or clogged. This problem can cause loss of power or even a no-start condition, as the engine doesn't receive enough fuel at a given time for optimal performance, thus making your car hesitate when accelerating from stop or when the vehicle is heading up an incline. Suboptimal engine performance of course will also result in poor fuel economy.

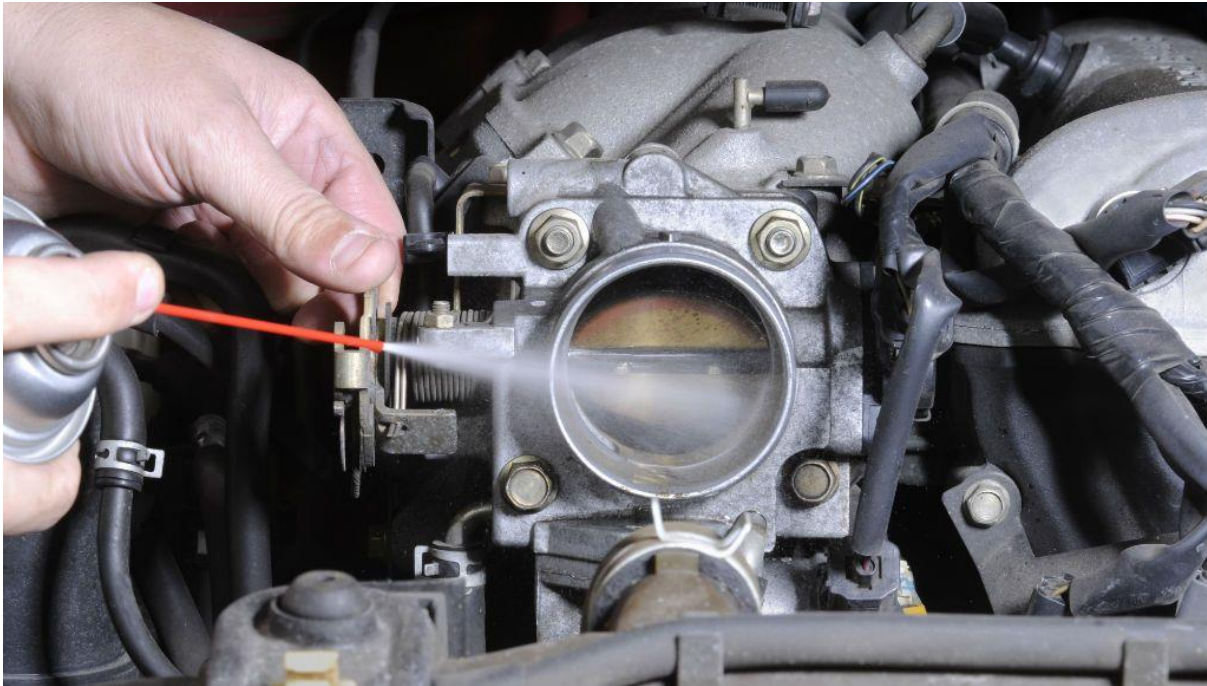
The fuel filter is located in the fuel tank on most newer vehicles and will require a trip to the shop for inspection if you're not familiar with handling it. If your vehicle has an external fuel filter, it's straightforward and inexpensive to replace it.

## 6. The accelerator pump

If you are driving an old vehicle with a carburetor, it must have the accelerator pump. The lagging could be the result of the pump being worn out or needing a fix. It is a plunger rod with a rubber-sealed piston that squirts a small amount of raw gas into the carburetor. The surge of fuel and air triggers the engine to be more responsive to acceleration.

When the rubber seal gets worn out, it sends a large volume of air with little or no gas to the plunger cylinder. As a result, the car hesitates when accelerating from a stop. You have to replace the pump along with cleaning or replacing the fuel filter to fix the trouble.

## 7. Throttle position sensor



The throttle position sensor is located between the engine's intake manifold and the air filter. (Photo: Pinterest)

The [throttle position sensor](#) is a component of your car's throttle body system. It is located between the engine's intake manifold and the air filter.

The job of the throttle position sensor is to make sure the engine receives the correct amount of air and fuel for optimal combustion.

Each time you press down on the gas pedal, the throttle butterfly valve rotates to let a precise amount of air enter through the engine's intake manifold into the combustion chamber. As you press the pedal farther in, the valve opens more.

At the same time, the throttle position sensor sends out signals to the Engine Control Unit to report the position of the throttle butterfly valve. Simultaneously, the ECU uses that information to adjust the amount of fuel to be instilled into the chamber at any specific time, creating the ideal conditions for the combustion to take place.

It is common for the throttle position sensor to malfunction since it consists of mechanical parts that may become worn and require replacement. A malfunctioning throttle position sensor will relay wrong data to your car's computer.

A malfunctioning sensor won't send the correct information, resulting in depriving the engine of enough fuel and air it needs to run smoothly when speeding up.

There are other signs that you can look for to make sure that a faulty throttle position sensor is the culprit. In most situations, when there is an issue with the throttle position sensor, the Check Engine Light will turn on. Additionally, most carmakers supply a "limp home" mode of operation with decreased power if there is a failure in your engine. This is made to enable a driver to get off a crowded highway more safely.

If a faulty throttle position sensor is indeed the culprit that makes your car hesitate when accelerating from stop, you should have it inspected right away. When your engine is not receiving the correct air-fuel ratio for proper function, it is working below optimal efficiency. The result is inevitably lower fuel economy and will cause damage to your engine, reducing its lifespan.

### **8. Exhaust gas recirculation (EGR) valve**

The role of the EGR valve is to recirculate exhaust generated during the engine's combustion back into the combustion cycle to be burned, thereby reducing the engine's temperature and lowering the production of poisonous nitrous oxide.

EGR valves open and close to control the gas flow. Over time, the exhaust builds up a hard and thick wall of carbon, locking the EGR valve open or closed. This will block system passages and cause incorrect data to be sent to the engine computer, resulting in an incorrect amount of air and fuel being injected into the engine chamber, thus causing delayed acceleration.

A stuck or faulty EGR valve also increases emissions as well as the engine's temperature, and a heated engine will never perform optimally or will not last very long. This problem can over time lower your car's mileage and shorten the lifespan of the engine. That's why car manufacturers recommend cleaning the EGR valve and passages every 50,000 miles or fewer.

### **9. Coil pack**



ECU-electronically controlled coil packs. (Photo: Rippmods.com)

From the year 2000 onward, newer vehicles' engines come equipped with a more advanced pack of ignition coils that sit directly on top of each engine cylinder's spark plug to fire the plug directly. These coil packs are electronically controlled by the car's engine computer. Coil

packs usually create a hotter and stronger spark, which in turn produces better combustion and horsepower in a car's engine, compared to the older firing mechanism that requires an ignition coil, mechanical distributor, and plug wires.

Needless to say, when a coil pack starts to fail, it will affect the firing of spark plugs, thus impeding ignition and combustion. Therefore, the engine will not generate enough power, making your car stall when accelerating from a stop, in rough-running conditions, or the engine stumbling and surging. Fortunately, coil packs are easy to access and replace, usually requiring nothing more than a screwdriver or a small nut driver.

## 10. Oxygen sensor

The job of the oxygen sensors or O2 sensors is to monitor the oxygen content of the exhaust in proportion to the other gases and send this data to the engine control unit for emissions control and fuel-metering decisions. This component is located in the exhaust stream, usually with one closer to the exhaust manifold and one further down the exhaust pipe.

In other words, the data from the oxygen sensor contributes to precise engine timing, combustion intervals, and correct air-to-fuel ratio.

Therefore, a failed O2 sensor will throw off fuel calculation and delivery, causing your engine to run rich, that is the engine is receiving too much fuel and too little air. Such an incorrect air-fuel ratio will affect the engine's ability to generate enough power to accelerate smoothly. Another symptom of a failed O2 sensor is a strong smell of gasoline, especially when idling, and possibly an illuminated Check Engine Light.

Reference <https://carfromjapan.com/article/car-maintenance/car-hesitates-when-accelerating-from-stop/>

## Problems with braking

Most drivers will only have their brakes inspected when they run into a problem; hence many rotors, pads and other components are kept beyond their proper and safe use-by dates. Regular inspection provides greater safety for motorists

Here's a quick review of some of the more common brake problems:

**LOW BRAKE FLUID** Usually indicates a leak in the brake system, which poses a serious safety hazard. The calipers, wheel cylinders, brake hoses, brake lines, and master cylinder all need to be inspected. If a leak is found, the defective component must be replaced. The vehicle should not be driven until the repairs can be made because a leak may lead to brake failure.

**LOW BRAKE PEDAL** Can result if shoe adjusters on drum brakes stick and fail to compensate for normal friction material wear. Adjusting them may restore a full pedal, but unless the adjusters are cleaned or replaced the problem will return as the friction linings wear. Other causes include worn friction material or a fluid leak.

**SPONGY OR SOFT PEDAL** Means there's air in the brake system either as a result of improper bleeding, fluid loss or a very low fluid level. The cure is to bleed the brakes using the **sequence**

recommended for the specific vehicle. Another possible cause is a rubber brake hose that is “ballooning” when the brakes are applied.

**EXCESSIVE PEDAL TRAVEL** Possible causes include worn friction material, misadjusted drum brakes, and air in the brake lines. Potentially dangerous because the system may run out of pedal before the vehicle can be safely stopped.

**PEDAL SINKS TO FLOOR** A dangerous condition caused by worn internal rubber seals in the master cylinder or a leak in the hydraulic system will not allow the brakes to hold pressure.

**PEDAL PULSATION** A jerking or pulsing brake pedal indicates DTV (Disc Thickness Variation), and the brake rotor needs to be resurfaced or replaced. The faces of a rotor must be parallel (within 0.0005inch / 0.0127mm on most cars) and flat (no more than about 0.002 inches or 0.050 mm of runout). Don't forget the wheel bearings (if serviceable) - they will need to be cleaned, inspected, and repacked with grease. New grease seals will also be needed.

**STEERING WHEEL VIBRATION** Indicates a torque variation in the brakes. This is commonly associated with friction material deposits on the brake rotors causing a grab and release motion. The intermittent torque from left to right pulls on the steering rack and transfers to the steering wheel. Steering wheel vibration can also indicate DTV when combined with a pedal pulsation. Check for friction material deposits (dark patches) first.

**CHATTER** Vibrations and noise through the brake pedal and/or steering wheel under braking. Commonly caused by rotors that have been machined incorrectly. **SCRAPING NOISE** Commonly caused by vibrations between the brake pads and caliper, which may be cured by resurfacing or replacing the rotors, installing new pads and pad shims, or applying brake grease or noise compound to the back of the pads.

**SQUEALS** Commonly caused by vibrations between the brake pads and caliper, which may be cured by resurfacing or replacing the rotors, installing new pads and pad shims, or applying brake grease or noise compound to the back of the pads.

**GRABBY BRAKES** Oil, grease or brake fluid on the friction surface will cause them to grab. The cure is to identify and eliminate the source of contamination, and then replace the linings. Badly scored drums or rotors can also grab. Resurfacing or replacement may be needed. **DRAGGING BRAKES** May create a steering pull and/or increased fuel consumption. Caused by weak or broken retracting springs on drum brakes, a jammed or corroded caliper piston, a floating caliper with badly corroded mounting pins or bushings. Brake calipers should be overhauled or replaced every 60,000 kms. Dragging brakes cause extreme wear, excessive temperature and can mean lower performance in emergencies.

**BRAKES PULL TO ONE SIDE** Can be caused by contaminated friction surfaces, misadjusted brakes, a bad wheel cylinder or caliper, dragging brakes on one side, or loose wheel bearings. Can also be caused by a side-to-side mismatch of friction materials on the front brakes, or differences in rotor thickness, type or condition. **'HARD' PEDAL** Lack of power assist may be due to low engine vacuum, a leaky vacuum hose or a defective booster. Sometimes a faulty

check valve will allow air to enter the vacuum in the booster, causing a hard pedal when the brakes are applied. This condition can be diagnosed by letting the vacuum out of the system while the engine is switched off, then start the engine while the brake pedal is depressed. If there is a sinking feeling when the engine is started, the power assist booster is working. After trying this if there is no pedal drop, the power assist booster may need attention, or there may be a blocked vacuum hose, or a new check valve is needed.

**BRAKE FLUID** Is hygroscopic, which means it absorbs moisture. If this happens, the boiling point of the brake fluid drops dramatically, which causes the fluid to boil, resulting in a loss of braking. Fluid should be replaced every 2 years or 60,000 kms. When flushing new brake fluid through the system, make sure the master cylinder reservoir has been cleaned so not to flush any contamination through the brake system.

Reference [https://dba.com.au/wp-content/uploads/2023/03/Technical\\_Bulletin\\_DBA\\_Common-Brake-Problems.pdf](https://dba.com.au/wp-content/uploads/2023/03/Technical_Bulletin_DBA_Common-Brake-Problems.pdf)

## Poor Idle

### How To Tell If A Vehicle Is Idling Rough

If your vehicle is experiencing rough idling, you'll probably know it immediately. While some cases are less severe than others, a rough idle is usually identifiable by a shaking and bouncing sensation in the vehicle.

You may also notice odd sounds, as well as inconsistent RPM counts. Normally, a vehicle should have a smooth and consistent RPM rate of around 1,000. If your vehicle is falling below or rising above this you may be dealing with an idling issue.

Read on to learn a few of the reasons why your engine may have a rough idle, how to identify them and some simple fixes to try.

## 4 Common Reasons Why Your Engine May Be Idling Rough

### 1. Vacuum Leak

Most vehicles have a maze of hoses throughout which create a vacuum for both fuel and air. In older engines with a carburetor, this vacuum pulls the fuel into the engine. Most newer vehicles, however, have a throttle to regulate engine speed and airflow through the system. This also creates a vacuum within the intake manifold. These hoses can wear out over time and a leak may develop. If too much air gets mixed in with the fuel, it will cause your engine to misfire. This will result in a rough idle, usually at a higher RPM.

### 2. Spark Plugs

A rough idling engine can be caused by spark plugs or spark plug wires. Spark plugs use the electrical current received from ignition coils to ignite the air/fuel mixture within the combustion chamber. A plug that is damaged or installed incorrectly can result in fuel being burned at an inconsistent rate. If the damage is bad enough, you may also notice your engine

running rough while driving. Pay attention to any jerks or stutters, particularly while accelerating under a load, as a symptom.

### **3. Dirty Fuel Injector**

Sometime dirty parts can also be the root cause of a rough idling engine. Fuel injectors disperse fuel into your vehicle's engine at a precise angle and quantity, to ensure optimal performance. That being said, dirty fuel injectors are also a major contributor to poor gas mileage. Using an injector cleaner gas additive can be a simple way to prevent this problem and keep your engine running smoothly and efficiently.

### **4. Carburetor Problems**

Older vehicles utilize a carburetor rather than a fuel injector. Black exhaust smoke is a common indicator of a problem with the carburetor. A carbureted system that is running well shouldn't produce excessive amounts of black smoke, so look out for this as a sign that something is wrong. Using a carburetor cleaner is a simple step to help dissolve these carbon deposits and keep them clean in order to prevent or decrease a current rough idle.

An engine which is operating properly should run smooth without any excess noise. If it begins to idle 'rough,' there are a number of possible causes. How your engine idles is a good indicator of its overall health; addressing the problem sooner rather than later and checking all potential causes is important. If you're unsure what the problem is, it is always a good idea to call in the professionals for a diagnosis. The underlying issue can also affect your vehicle's overall performance in the long term, meaning it's a good idea to get it resolved as fast as possible.

Reference <https://www.berrymanproducts.com/vehicle-idling-rough/>

### **Vehicle swerving**

Does your car constantly feel like it's pulling to one side even though you're just trying to drive straight ahead? If it does, then you'll have to put all of your road trip plans on hold until you can figure out what's causing it.

Note: While "swerving" technically refers to what a driver does to take evasive action while driving, in this article, we'll use it to describe a vehicle that pulls to one side, which is what happens when there's something wrong with it.

#### **What Causes a Car To Swerve or Pull to One Side?**

Figuring out exactly what's causing your car's steering to pull can be tricky, but here are some possibilities. In this context, a steering pull would be when the car wants to go to the right or left and you have to keep steering against the pull to keep the vehicle going straight. Another concern would be if the car suddenly "darts" to one side or another.

One outside factor that can cause this kind of thing would be a strong, steady crosswind.

Another cause of steering pull would be a road with excessive “road crown,” where the road is paved so that the center is a lot higher than the shoulder, which causes the vehicle to “fall away” from the road crown simply because of gravity.

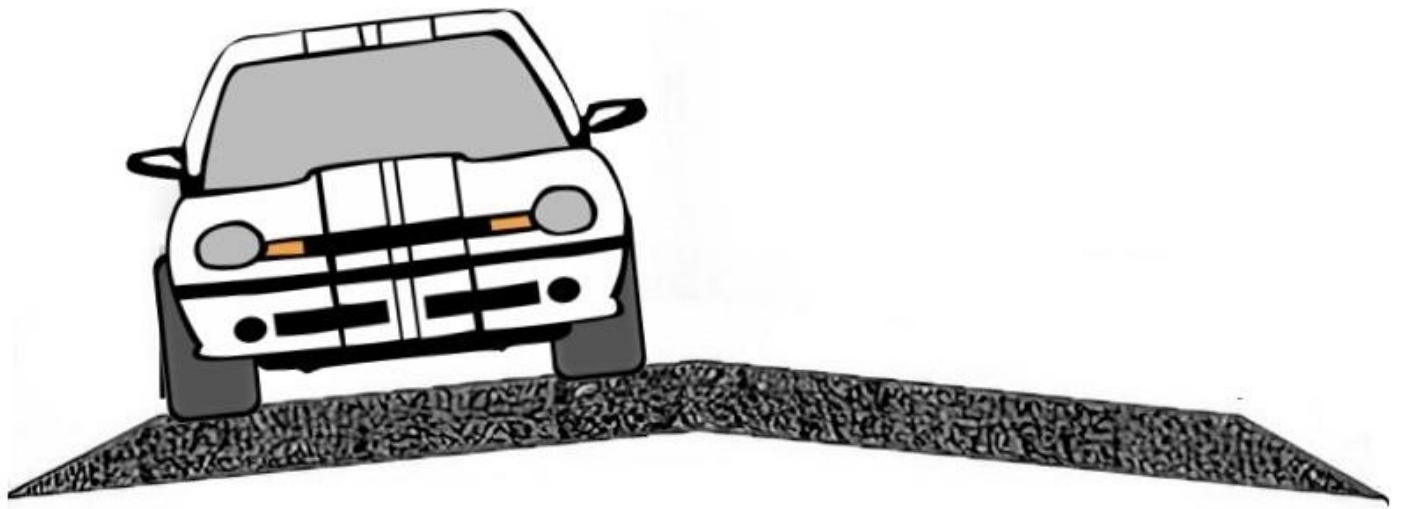


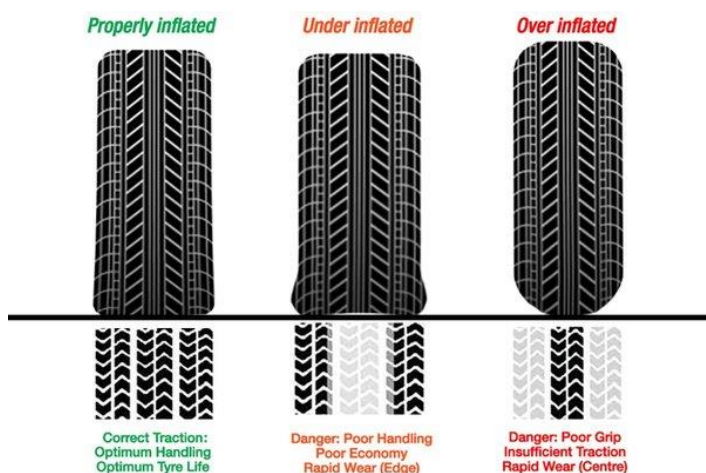
Illustration showing a road with excessive “road crown” causing the vehicle to pull to one side because of gravity

These issues don’t represent a problem with the vehicle. But when there is a problem with the vehicle itself, meaning, the pull is always there regardless of outside factors, here are a few possible causes to consider.

### Uneven Tire Pressure or Tire Wear

Uneven tire pressure is one of the biggest culprits behind steering pull but it’s also the easiest one to solve. One of your tires might not have enough air, causing your car to favor one side over the other when you’re driving.

Inside the door jam should be the size of tyre and the inflation level for your vehicle, if it is not there check your vehicles manual.



**Pro Tip:** Uneven tire pressure can cause a car to pull to one side but it won’t cause it to dart suddenly.

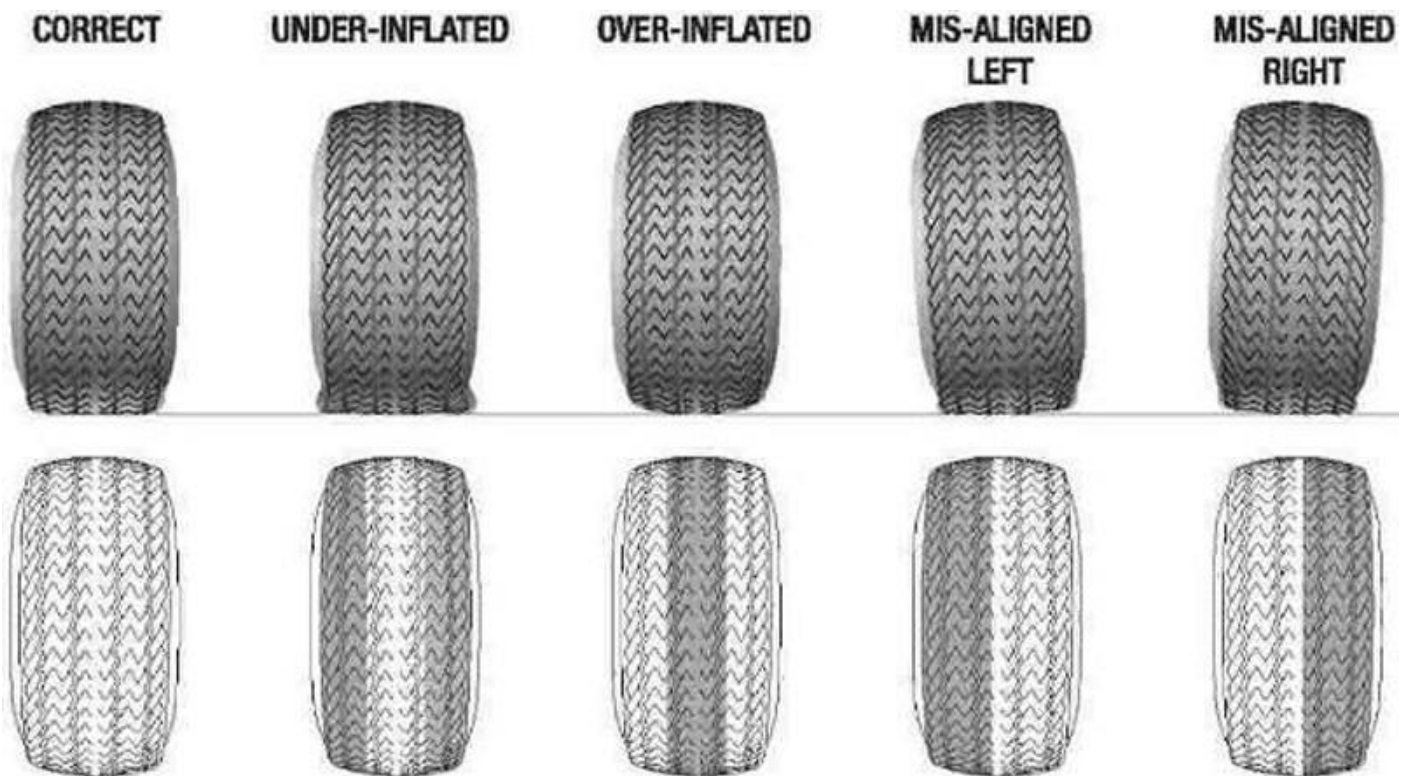
**Note:** There are some tires that look good and have the right air pressure but just don't want to roll freely. A tire can cause a pull even if it's the same size as all the other tires, looks good, and is fully inflated. To find out, rotate the tires from side to side (first the front ones, then the rear) and drive the car to see if it pulls the opposite direction.

Sometimes you can look at the tires and see the reason for a tire pull, particularly if you can put the tires side by side.

You also need to check the pressure in all four tires with a reliable gauge and compare it to the tire information label, which is usually on the B pillar and is visible when you open the driver's door. Remember not to go by the pressure listed on the tires because this is the maximum for the tire, not the recommended pressure for the vehicle. Second, make sure the tires that are on the vehicle are all the same size. If they're not, you'll need to fix this before going any further.

### Poor Wheel Alignment

Even if uneven tire pressure or wear has been eliminated as the cause, poor wheel alignment can also cause your car to pull to one side. Wheel alignment angles are referred to as caster, camber, and toe, with toe and camber being most likely alignment angles to cause a steering pull.

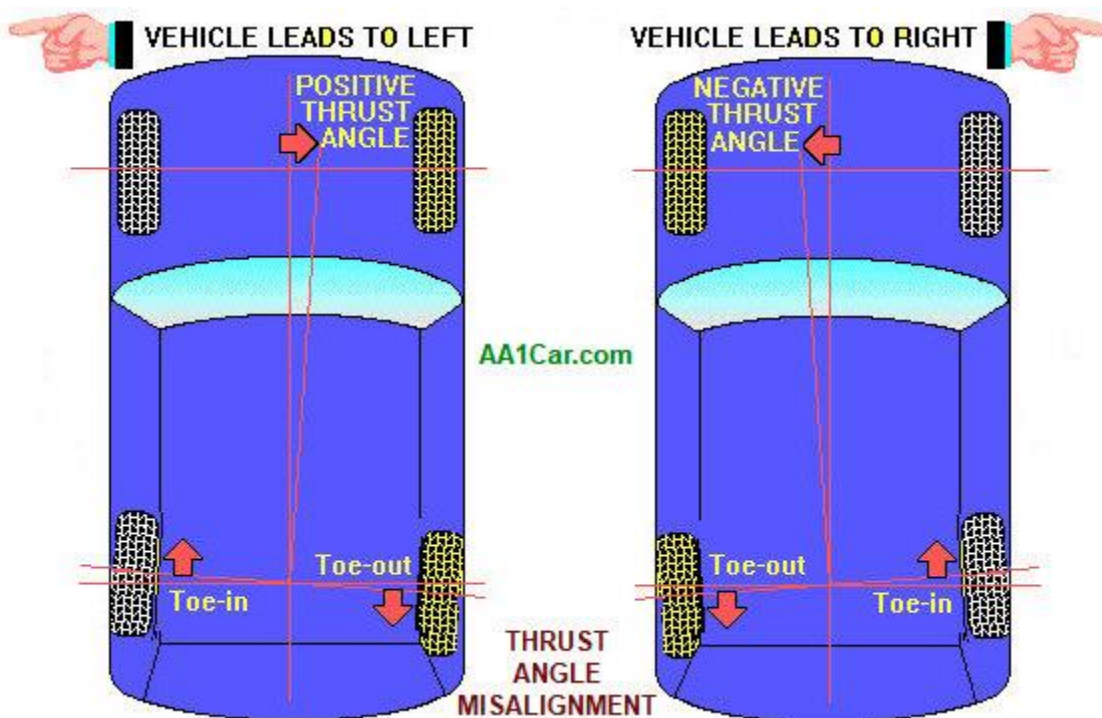


**Pro Tip:** Negative caster can cause steering pull but it's not as likely as positive camber or incorrectly adjusted toe.

If the rear axle is crooked under the vehicle it can cause the thrust angle to be off, which will seem like a pull because the steering wheel will be badly off-center and the vehicle will travel down the road “dog tracking.”

Your car’s wheels should all point in the same direction at all times. Even if just one wheel slips out of alignment, your entire car will swerve to one side, and you’ll have a hard time steering your vehicle until you get your tires fixed.

To check if poor wheel alignment is the issue, inspect the wear patterns on your tires. If one tire seems more worn out than the others, then your wheels might not be aligned properly.



If the rear axle is misaligned due to hitting a pothole or a heavy object that causes damage, the vehicle will “dog track” and the steering wheel will be very crooked. Caster is a measurement of the steering axis that must be done using a special procedure and tools. Negative caster on one side can cause steering pull.

## Worn Control Arm Bushings

In some cases, the issue with your suspension might not be the ball joints, but the bushings attached to them. Badly worn control arm bushing can cause your car to pull or dart to the side as your front wheels slip out of alignment.

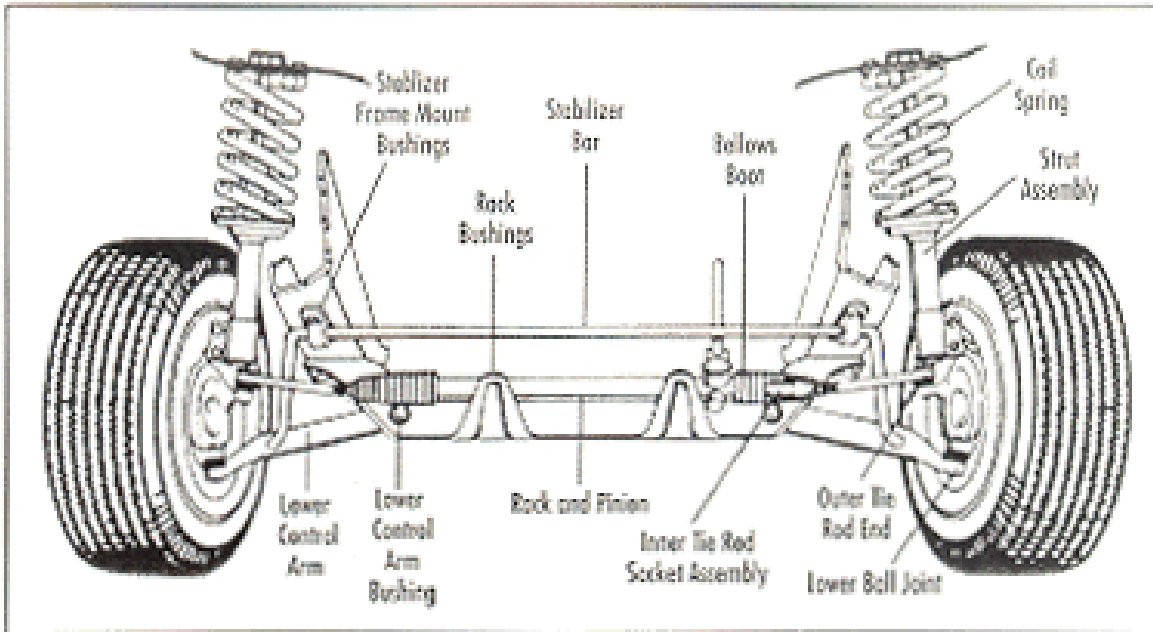


Diagram showing the location of control arm bushings

Similar to control arm bushings, a steering rack bushing can also cause your wheels to slip out of alignment. A steering rack bushing, also known as a rack and pinion bushing, eases the vibrations from the suspension to the steering system. These bushings, if they fail, can allow the steering rack to move laterally, causing steering pull and darting.

A worn or loose steering rack bushing can also cause your steering wheel to feel inconsistent and clunky. It can cause poor wheel alignment and send your car swerving off the road.



## Other Suspension Issues

Your car constantly relies on your suspension for a smooth and comfortable ride. If any part of your front or rear suspension is worn or damaged, your entire suspension system becomes compromised. You'll most likely lose control of your car as it pulls to one side while you're driving.

## Brake System Issues

Does your car pull to one side whenever you hit the brakes? If the answer's yes, then you might have finally found your culprit. A stuck caliper or worn brake pads can cause your car to swerve every time you hit the brakes or release the pedal.

### Can Loose Ball Joints Cause a Vehicle to Pull to One Side?

If your car's suspension is suffering from loose or worn ball joints, then your car won't likely pull to one side but might make noises while you turn or go over bumps. If the boots on the ball joints haven't burst and the ball joints don't have detectable play from wear, the ball joints are regarded as okay. Note that special procedures are needed to determine ball joint wear. If the ball joints have busted boots and the grease is gone, they can become very tight and cause the steering to feel strange.



### Is It Safe To Drive a Pulling or Swerving Car?

Some drivers might think, "Well, my car only swerves left and right sometimes, so it's probably not a big deal," but they couldn't be more wrong. A swerving car is a big red flag you shouldn't ignore, especially because it's typically a sign that there's something wrong with your vehicle.

Reference <https://www.carparts.com/blog/why-is-my-car-swerving-common-causes-and-prevention-tips/#:~:text=Issues%20such%20as%20uneven%20tire,can%20swerve%20into%20other%20cars.>

## Temp gauge getting hot

Your engine works hard to produce power and with that power, it heats up to nearly 250 degrees Fahrenheit and that's just an average temperature day. In the summer, the heat of your engine, paired with the summer sun, and heat rising from the asphalt, can reach temperatures close to 500 degrees Fahrenheit. The radiator circulating coolant throughout the engine is the only defense your vehicle has to prevent it from overheating. Luckily, your temperature gauge keeps you informed of the current temperature to let you know if your engine is getting too hot and if it's time to pull over.



## What is a Temperature Gauge?

A car temp gauge indicates the current temperature of the coolant in your vehicle's engine. It lets you know if the coolant is cool, normal, or hot. Coolant circulates through the entire engine and absorbs the heat

produced by the combustion within the cylinders. The heat is then released into the atmosphere, as it moves through the radiator. The temperature gauge utilizes a sensor, located near or in the thermostat housing, to send an electrical signal through the vehicle's internal computer corresponding to the specific coolant temperature, giving the gauge on your dashboard an accurate reading of the temperature.

## Temperature Matters

Whether the temperature gauge is telling you the coolant is cool, normal, or hot, it's always a good idea to keep your eye on it while driving. Any number of things can change the temperature of your vehicle almost instantly.

## Temperature Gauge is Cold

While the average driver of a modern vehicle won't have to worry about the engine running cold, certain high-performance vehicles may limit RPMs until the motor has warmed up. Even in winter's coldest temperatures, it's unnecessary to warm up your car. Most vehicles today are fuel-injected and special sensors work in conjunction with your vehicle's internal

computer to produce the correct air to fuel mixture regardless of the temperature. If your car has sat immobile for a few hours, it's normal for the temperature gauge to show a cold reading for a few minutes after start-up. Of course, it may take a bit longer for it to come up to a normal temperature in extremely cold temperatures. However, if the temperature gauge remains cold for a significant amount of time after you've been driving, something may be wrong. While the severity of the problem is much less than an overheating engine, it's should still be looked at by a technician. You may get a cold reading if you have a faulty temperature gauge or the thermostat is stuck in an open position. If it's the latter, your vehicle may not be able to produce enough heat to use the defroster or heater, which can be dangerous in severe winter weather.

### **Temperature Gauge is Normal**

When the engine is functioning, and the coolant is doing its job, the temperature gauge needle should be somewhere in the middle between the hot and cold indicators. "Normal" temperature reading can vary from vehicle to vehicle so don't be alarmed where yours settles. As long as the needle is somewhere in the middle, it's normal. Even if the engine is being cooled properly, there are days depending on the condition where the vehicle may run hotter than usual. This is often due to stop and go driving in hotter temperatures, especially during the summer. You may also notice an uptick in temperature if you're towing or hauling a heavy load and running the air conditioning at the maximum speed. Keep your eye on the needle and monitor it closely. You do not want your car temperature gauge hot.

### **Temperature Gauge Running Hot**

Is your car temperature gauge high? Your car may be dangerously close to overheating. The key to avoiding an overheating vehicle is prevention. Allowing your vehicle to overheat repeatedly can cause severe and permanent damage to the engine which may result in costly repairs or replacement. Engines that run too hot also cause other components to warp or crack. Once you have identified that the temperature gauge is continuing to rise, you can attempt to prevent your car from overheating by:

1. Turning off the air conditioning and roll down the windows.
2. Turn on the heater. Turning on the heater works by transferring heat away from the engine. For best results, use the floor vents and turn the blower on full blast.
3. Pull your vehicle over to the side of the road and turn off the engine. Open the hood and allow the open-air to aid in releasing some of the heat. Be careful, though, as the hood may be hot to the touch.
4. Call for a professional to help.

Reference <https://www.sundevilauto.com/is-it-hot-in-here/>

## **My car won't start**

Wondering "why won't my car start"? A few things to note before we get started.

It's most likely your car's battery. The cold weather can drain your power.

If your vehicle won't start and you keep turning the key in the ignition over and over you'll create a flooded engine. There are several possible reasons why your car won't start but there are a few easy troubleshooting steps that will get you back on the road.

### **1. Dead Car Battery**



#### **Batteries die more often in the winter.**

The most common reason for your car not starting is the car battery. The battery is a necessary working piece of the electrical part of the car.

It's required to function! Your starter relies on an electrical trigger so your engine won't start unless there is functioning battery connections.

Cold weather can give you battery problems. Cold weather also makes winter fix ups nearly impossible without a garage.

You won't need to go to a mechanic to get your dead battery working again. Just jump start your vehicle with another vehicle using jumper cables or battery cables.

If you manage to jump start your car, head to a quick fix auto shop like an to get your battery tested for little to no cost.

If your battery terminals are in good condition, make sure it is charged up before setting off again. If your battery is in bad condition, you'll need to replace it.

Clean Battery terminals



Poor battery terminals



## 2. Bad Battery Connection

If its not a battery problem, the next thing to check is your battery cables. If they look damaged or loose, the car might not be able to pull electrical power to start the car engine.

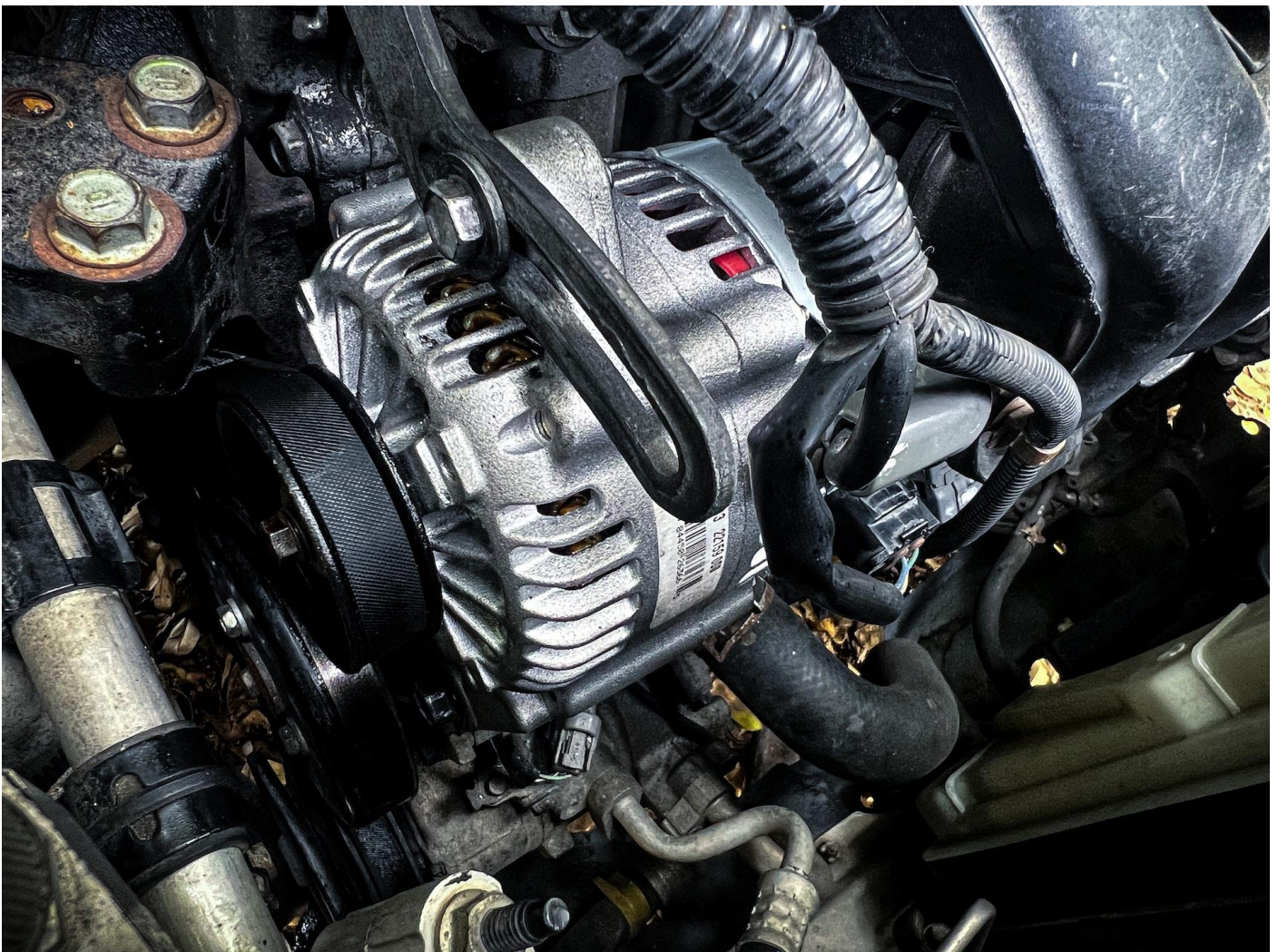
There is also the possibility of a corroded battery terminals. If you see a lot of brown/white/blue/green discharge around the battery connectors, you'll need to get this cleaned. We recommend you go to a professional but here is where you can find out how to clean battery terminals.

Make sure your car is OFF before touching the battery area.

## 3. Bad Alternator

Your alternator and its charging systems works with your battery to power the vehicle. Since your car needs a lot of electricity every time it drives on the road, your car needs a fast way to recharge your battery every day.

The alternator charges your battery after your car starts, it gets its power from the turning of your tires when you're on the road. It turns that mechanical energy into power for your battery.



## **Alternator and Ground Wire**

If your alternator is not functioning properly, your battery will eventually die and not have a way to recharge itself. One of the easiest ways to tell if your car won't start or has a bad alternator is to let the car run after you have jumped it.

Drive it around a parking lot for the best results, your car will eventually die if the alternator is the culprit. Difficulty replacing the alternator varies based on make/model of your car. We recommend replacing this part at a mechanic shop.

## **4. Your Car Isn't In Park Or Neutral**

If your car won't start, it might not be in park or neutral. It could be that your car is in gear. Try to push on the brake pedal and move the car into park. IF YOUR VEHICLE IS ALREADY MOVING SHIFT THE CAR TO NEUTRAL then attempt to start the car again.



## **5. You've Gotten Your Steering Wheel Jammed & Locked**

If you can't even turn your key, you've probably got a jammed steering wheel. This function helps anti-theft when someone tries to turn your steering wheel without the car running. This will activate the steering lock.

To get out of a steering lock, wiggle the steering wheel and gently try to turn the key again. Once you turn the car on the steering wheel will become unlocked. This action does not negatively effect the car, your car should be working fine after this.

## **6. Dead Key Fob Battery**

On newer vehicle models that require a key fob to start the engine, sometimes the vehicle won't recognize the fob if the fob is dead. Vehicles where you turn the key don't have these starting problems.

You'll need to replace the battery in the fob before you can start your car.

## **7. Malfunctioning Immobilizers**

If your key fob battery is low, your vehicle might not recognize it as you. A malfunctioning immobilizer can restrict your vehicle from starting.

Cars might not allow you to drive because it thinks you do not have the fab. This is part of the anti-theft mechanism. You should notice flashing lights to indicate that your key fab battery is low or that you have no key fab at all.

## **8. Empty Fuel Tank**

This one seems like a no-brainer but if you do not have an empty fuel tank, your car will not start. If your gas gauge is broken you might run out of gas before you even know you were running low.

If your car is out of gas, get a gas can and walk to the nearest gas station. Try to get at least two gallons of gas. You might need a jump to get your car started after it dies from lack of fuel.

If your gas gauge is broken, try setting the mile counter to zero (not the odometer) and tracking your fuel usage that way until you can get a fix.

## **9. Your Starter Motor Is Bad**

One of the most common reasons why your car won't start a bad starter motor The starter motor is the part of the car that receives the electrical signal to crank the engine. If it is damaged your car won't start.

To tell if your starter motor is the reason that your car won't start, turn the key. If your lights come on and you can hear a clicking sound you've probably got a bad starter motor. Check for other electrical problems once you've turned the key. If you keep turning the key, there might be some smoke from a blown fuse.

You'll need to call a tow truck and take it to the mechanic shop if you've got a faulty starter.

## **10. Faulty Fuse**

If your car won't start it may be due to a bad fuse. Car fuses are easily accessible and can be found under the hood and beneath the steering wheel of your car. The car's electrical system all runs through the fuse boxes.

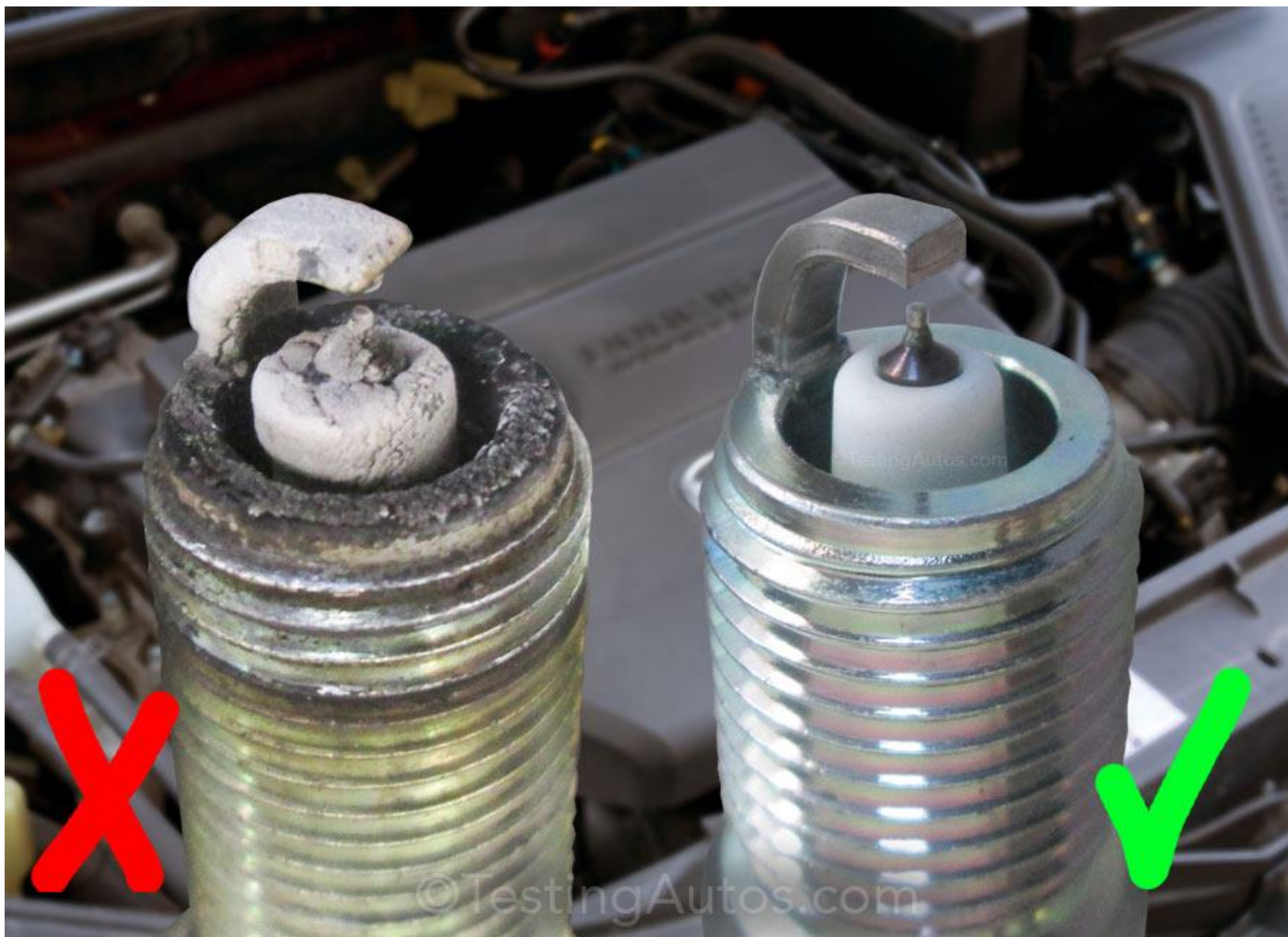
You can replace a blown fuse but if the blown fuse is bad enough, some of the wiring might be damaged. This can prevent cars from starting. You can find the map to your vehicle's fuse box in the owners manual.

## **11. Faulty Ignition Switch**

Another piece of equipment involved in starting your vehicle is the ignition switch. To diagnose this problem, check for flickering dashboard lights or other electrical issues.

The ignition key may also be hard to turn. You won't even hear the starter motor turn the engine. Usually a car cranks, if there is no crank this is also a good indicator of a bad ignition switch.

## 12. Old Spark Plugs



This is what a spark plug looks like.

Spark plugs are a common culprit of why a car won't start. Defective spark plugs lead to misfires, low gas efficiency, and other car problems.

If your car is running awkwardly before you notice that it won't start. This could be a good indicator that it is the spark plugs. If the engine cranks & you here a clicking sound but the engine doesn't turn over, this could be defective spark plugs.

## 13. Failed Fuel Pump Relay

The car's fuel system is paramount to the engine starting. If you don't hear noise from the fuel pump in the fuse box, the fuel pump could be the reason why your car won't start.

A small fuse from the fuse box controls this function.

If you have trouble starting your vehicle and have these signs there might not be enough fuel drawn to the combustion chamber.

Replace the fuel pump relay fuse or swap it with a different relay fuse and check if the engine turns this time. If it starts, take it to a mechanic to make sure that was the only thing wrong. You can find the fuse box in the owner's manual.

#### **14. Broken Distributor Cap**



Its not always your starter motor or spark plugs as the reasons why your car won't start. Common reasons include a broken distributor cap. This routes electricity after ignition back to the spark plugs. If your car starts you can still have a faulty cap.

If you hear noises, see a check engine light, or your engine is misfiring, have your mechanic check your distributor cap and all your car starting parts.

#### **15. Bad Timing Belt**

Strange noises in the engine after ignition and misfiring can reveal a bad timing belt. Your engine may not even turn over. You'll need this timing belt to start your car and fire cylinders at the right times.

## 16. Clogged Fuel Filter

You may have trouble reaching ignition if fuel can't get to the combustion chamber. A vehicle on it's last legs might have fuel filter issues.

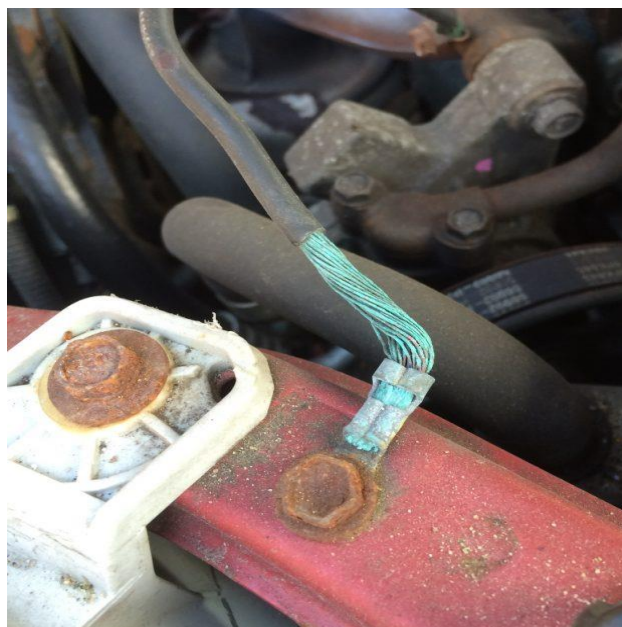


The fuel filter is typically buried under a lot of other parts. You may only be able to change with a professional.

Change out the fuel filter every 30,000 miles. Common symptoms of a clogged filter are bad gas mileage and rougher vehicle running.

## 17. Cable Wiring Problem

There is a large cable that directs electricity to the car's body. All cars have these ground wires that run through the body of the vehicle.



Common symptoms may include hard starting, there may be a dead battery, the engine can feel off, there may be flickering dome light, a damaged throttle, sporadic sensor failure, and more if there's a ground cable issue You'll typically be able to see a large damaged wire near the car's engine.

## 18. Low AdBlue

Some modern vehicles require Adblue to restart the engine. Some models need this in order to operate the vehicle's software.

Reference <https://www.wheelsforwishes.org/news/why-wont-my-car-start/>

## Check engine light is on

These pages have been randomly selected as a reference for Diagnostic OBDII codes that you may find when checking your vehicle.

Note: Vehicles before 2006 are sometimes more difficult to use a OBDII tool, sometimes they work and sometimes they don't even though they have a port to plug into.

<https://www.kbb.com/obd-ii/>

[https://www.carparts.com/blog/search-obd2-codes-list/?srsltid=AfmBOoksv6Mswtm\\_zmaflazgRf8in\\_Grpe8bRWkHpf6pG3FjRw4elwY](https://www.carparts.com/blog/search-obd2-codes-list/?srsltid=AfmBOoksv6Mswtm_zmaflazgRf8in_Grpe8bRWkHpf6pG3FjRw4elwY)

<https://www.autozone.com/diy/diagnostic-trouble-codes/obd-2-code-list?srsltid=AfmBOoqQmDa86v-XiBiQxLnfi5yiF4hLPmXSHBqiLgBem2yg-EfMlrdt>

<https://www.klavkarr.com/data-trouble-code-obd2.php>

<https://whiparound.com/dtc-codes/>

<https://haynes.com/en-us/tips-tutorials/what-are-diagnostic-trouble-codes>





The OBD1 and OBD2 Diagnostic tools both look similar

What Is OBD1?

Very often we get questions based on OBD1 & OBD2. What is my car and will this tool work my car.

OBD stands for On-board diagnostics. The two main types of diagnostic systems in vehicles is OBD1 and OBD2. OBD1 was used in vehicles up to as late as 2006 and anything newer will be OBD2.

As for your car and what protocol it is varies from every make and model (we do have a list of cars to confirm yours click the link below

<https://premium-diagnostics.com.au/pages/obd2-car-list>

If your car is newer than 2006 your vehicle will be OBD2

Some vehicles manufactured earlier than 2006 are still OBD2 For example: You own a 2003 Toyota Corolla, this is OBD1. If you owned a 2004 Toyota Corolla this will be OBD2.

Meanwhile, when considering their manufacturing dates, OBD1s were introduced long before the OBD2 models. OBD2 is a better system, in the sense that it provides standardised trouble codes and more information is available from the on board diagnostics system.

If your vehicle is OBD1 you will require a more comprehensive tool to communicate with your vehicle. Cheap OBD2 readers will not work. If a scan tool is compatible with OBD1 protocols then it will always read OBD2 also.

If the scan tool is for OBD2 only it will not work with an OBD1 car even with an adapter. Common confusion around adapters and compatibility. Just because you have brought an adapter, this does not mean your car is now OBD2 or OBD2 capable, you still need an OBD1 capable scan tool.

Also some vehicles with a standard OBD2 shaped 16 pin plug are not OBD2 compliant, they still run an OBD1 protocol and a OBD2 reader will not work with your vehicle.

Please ensure you confirm what OBD protocol your vehicle is and ensure the scan tool is suitable to this protocol.

Some vehicles that run OBD1 will require an adapter cable. The easiest way to find out if you need an adapter is to check your cars OBD port. With OBD1 most of the ports are located under the dash on the drivers side. Some OBD1 ports are located in the engine bay.

Reference

[https://premium-diagnostics.com.au/blogs/news/what-is-obd1?srsId=AfmBOoen-8r5\\_mGC0z6UpLZw2loL6keZpgFBFkpex5JC\\_RDC6fg3Wtm](https://premium-diagnostics.com.au/blogs/news/what-is-obd1?srsId=AfmBOoen-8r5_mGC0z6UpLZw2loL6keZpgFBFkpex5JC_RDC6fg3Wtm)

The 10 most common problems that trigger a check engine light include:



1. Oxygen sensor failure
2. Loose fuel cap
3. Catalytic converter failure
4. Spark plug/ignition coil issues
5. Bad spark plug
6. Mass airflow sensor failure
7. Issues with an aftermarket alarm
8. Vacuum leak
9. Exhaust gas recirculation valve failure
10. Dead battery

Keep in mind that the fault code that caused the light to turn on in the first place is stored in your car's onboard computer, and you can retrieve it using a simple device to get a precise idea of what exactly is wrong under the hood. Doing this on your own will save you money in the long run.

## 1. Oxygen sensor failure



A failing oxygen sensor will usually trigger your car's check engine light. The oxygen sensor (sometimes called an [O2 sensor](#)) measures the amount of unburnt oxygen in a car's exhaust system. It sends data to the vehicle's computer, which uses it to regulate the mixture of air and fuel that enters the cylinders. An engine will keep running even if an O2 sensor needs to be replaced, but it will burn more fuel than usual. In the long run, a bad O2 sensor can damage components like spark plugs and the catalytic converter. It may also cause a car to fail an emissions test.

On average, a quality O2 sensor will set you back about \$175, but the cost of labor will vary greatly depending on the vehicle's make and model, as well as your geographical location. Finally, keep in mind that most late-model cars have more than one O2 sensor.

## 2. Loose fuel cap

A loose fuel cap is one of the most common reasons why the check engine light turns on. The cap is a crucial part of a car's fuel delivery system. It notably prevents gasoline fumes from leaving the fuel tank, and it helps keep the whole system under the correct pressure.

If your check engine light turns on immediately after a fill-up, pull over and make sure the cap isn't loose — or still on your car's roof. Sometimes the cap needs to be replaced, but it's not a problem that's going to hit your wallet hard. Most auto parts stores carry universal-fit gas caps that cost somewhere in the vicinity of \$15.

### 3. Catalytic converter failure



A catalytic converter failure can also cause your car's check engine light to turn on. The catalytic converter is integrated into a vehicle's exhaust system. It turns the carbon monoxide generated during the combustion process into carbon dioxide. It's a fairly simple part, and its failure can often be prevented. That's good news because a new one costs between \$200 and \$600 depending on the make and model. Every late-model car that runs on gasoline has a catalytic converter.

Performing regular maintenance (such as oil changes) on time is key to keeping your car's catalytic converter in working order. If you live in the city and mostly drive short distances, take your car on the highway every now and then to ensure the catalytic converter doesn't get clogged. And as always, keep your eyes and ears open for unusual sounds or discolored smoke coming from the exhaust.

#### 4. Spark plug/ignition coil issues



Spark plug/ignition coil issues can trigger your car's check engine light as well. Put simply, an ignition coil generates the electricity the spark plugs need to ignite the fuel and air mixture in the cylinders. Classic cars have a single coil, but many modern vehicles use one coil per cylinder (it's often called a coil pack). If your ride has a V8 under the hood, you could have eight separate coils. No matter how many you have though, a malfunctioning coil will almost certainly trigger the check engine light, but remember, if your car burns diesel, you have neither ignition coils nor spark plugs.

Speaking of spark plugs, worn or fouled plugs can cause a variety of issues including an engine misfire and hesitation under heavy acceleration. A worn coil can exhibit the same symptoms, and it can cause the car to shut off unexpectedly. A quality spark plug costs between \$10 and \$20, while a coil is generally in the \$50 range. Changing your own spark plugs is also easier than it sounds.

## 5. Bad spark plug wires



A bad spark plug wire can and will make your check engine light turn on. As its name implies, a spark plug wire transfers electricity from the coil to the spark plug. Without it, the fuel and air mixture in the cylinders wouldn't ignite. The vast majority of cars use a single wire per cylinder, but there are models with two spark plugs per cylinder and, consequently, two wires. Keep in mind that most newer cars do not use spark plug wires, however.

Symptoms of bad spark plug wires include a rough idle, a noticeable drop in engine performance, and lower gas mileage. Expect to spend about \$50 on a set of plug wires. Swapping them out is easy — it takes a few minutes and requires no special tools or knowledge.

## 6. Mass airflow sensor failure



The mass airflow ([MAF](#)) sensor can trigger your car's check engine light. The MAF [monitors](#) how much air enters the engine. It's a part of the engine-management system, so your car wouldn't be able to adjust to changes in altitude without it. Symptoms of an MAF failure include a rough idle, trouble starting, and a sudden change in the position of the throttle pedal. Reduced gas mileage and stalling can also indicate a MAF problem.

## 7. Issues with an aftermarket alarm

An aftermarket alarm system can wreak havoc on your car—and consequently make your check engine light turn on—if it's not installed properly. It can drain the battery, trigger the check engine light, or even prevent the vehicle from starting. Then, when you least expect it, it'll go off in the middle of the night because a leaf from an oak tree fell on the hood.

If the above issues sound familiar, you'll need to have the alarm fixed, reinstalled, or replaced entirely by a competent mechanic. Getting it done right in the first place might cost a little bit more, but the peace of mind that comes with having a fully functional alarm is priceless.

## 8. Vacuum leak



This is an extreme case, it is difficult to show minor leaks

A misfiring vacuum system can trigger your car's check engine light. Every car has a vacuum system that performs a wide variety of functions. The brake booster is vacuum-operated, and the vacuum system also helps lower emissions by routing the fumes as gasoline evaporates through the engine. If your car's idle begins to surge or settles at an unusually high rpm, a vacuum leak could be the culprit.

Vacuum hoses can dry out and crack as they age, especially if they're exposed to intense heat or extreme cold. This is the most common cause of vacuum leaks. Other common issues include cracked fittings and loose connections. Vacuum lines cost just a few bucks each, but tracing the source of the leak can be time-consuming — and expensive if you're not performing the work yourself.

## 9. Exhaust gas recirculation valve failure



The exhaust gas recirculation (EGR) system lowers the amount of nitrogen oxide that comes out of the car's engine and helps it run more efficiently. It directs the hot exhaust gases back into the combustion chambers, which makes fuel easier to burn. It also reduces emissions. A clogged or failing EGR can make your car's check engine light turn on.

If you're even slightly mechanically inclined, you can remove the valve, clean it, and reinstall it in a relatively short amount of time.

## 10. Dead battery

A dead battery may not only cause the battery light on your car's front panel to turn on, but your check engine light as well.

The car battery is as simple as it is important; without it, your car won't start. Today's batteries last much longer than before and they're maintenance-free.

Changing or charging a battery on your own is a relatively easy task, but keep in mind that in some late-model cars, it's buried under countless plastic covers, and it might be a little difficult to access. Also, note that disconnecting the battery will often reset your stereo system. If you don't have the code, ask your local dealer for it before you unbolt the positive and negative terminals. Otherwise, you'll be driving in silence.

My check engine light is on. Now what?

Modern cars are brimming with high-tech bells and whistles, but you inexplicably still need a separate, aftermarket device to decipher why the check engine light is on. Most motorists simply take their car to the dealership. That's the easy way out, but it's also the most

expensive route to take. If you want to skip a trip to the repair shop, invest in a OBD II scanner as discussed previously

Reference <https://www.digitaltrends.com/cars/check-engine-light-explanation/>

## **There is smoke coming from my exhaust**

Why is there smoke coming out of my exhaust?

What does it mean, and should I be worried?

A bit of white smoke from your car exhaust on a cold morning may just mean steam which is nothing to worry about.

What, then, is an abnormal amount of smoke and when should you be worried?

Cars shouldn't be blowing lots of smoke from the exhaust (especially newer models fitted with all sorts of filters in the engine to prevent pollution) and if you've been properly servicing your vehicle regularly this issue should have already been addressed or prevented.

There are three colours of smoke that could indicate a problem with your engine, any of which you should take note of if your car is produces an excess of.

### **White Smoke**

White smoke coming from your exhaust could mean many things, but this is typically a problem related to an engine running too hot. Your mechanic may first inspect your cooling system components because if this is the cause of the problem and it is left untreated, your engine maybe run into much more serious problems.

Remember: A little bit of white smoke when you start the car could just be the engine warming up and getting rid of condensation but a lot of smoke when the car is running may be a sign that something is wrong under the hood. As soon as you notice any signs, it's best to book in your vehicle for a service appointment ASAP.



## Blue Smoke

Blue smoke typically points to an issue with oil. Although it is called “Blue Smoke”, this can also be perceived as purple, grey, or very light blue smoke. Aside from the smoke itself, you may also notice a loss of power or the car struggling to accelerate.

If you have a turbo charged car putting out blue smoke, these indicators may be more likely to occur to your car as blue smoke often means there’s an issue with the turbo charger.

With regular petrol fuelled vehicles, blue smoke most likely points to burning oil – however this isn’t always the reason. This can lead to oil going to places under the hood that it shouldn’t go which could potentially catch fire.

In any instance, if you’ve got blue smoke coming from your exhaust, the best course of action is to pull over and call for roadside assistance. Continuing to drive can be dangerous for you, your car and other road users.

Black



Smoke

Black smoke from the exhaust indicates an issue with the fuel. This would mean that the fuel is contaminated or mixing too much with the engine oil.

If you only ever notice a small burst of black smoke, there most likely isn’t a serious problem but it is still worth mentioning to your mechanic. However, if you’re experiencing a large amount of black smoke rushing out of your exhaust, then this issue should be taken very seriously.

Your sensors or injection/fuel system may not be working properly, which any of these need to be addressed by your mechanic ASAP. Ignoring or putting this off for too long could

potentially result in your car no longer being road worthy and marked as a hazard to other drivers.



### **How to Fix**

Diagnosing or isolating the problem is essential. The sooner you speak with your service department and the more information you can give them, the better. Start by taking notes of what colour the smoke is, how much is bursting out of the exhaust, any loss of power, unusual sounds or change in performance.

To avoid any further damage to your vehicle, it is best to have it towed to a service centre.

Reference <https://www.bigboxcars.com.au/blog/bigbox-service-tips/why-is-there-smoke-coming-out-of-my-exhaust>