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Jaguar Fuel System Repairs: Jaguar Fuel Pumps & Fuel Injection Repairs

The electric fuel pump is the heart of every electronic fuel injection system. Let's review the basics of this critical fuel injection part.

Usually located inside or near the fuel tank, the fuel pump's job is twofold:

- 1) To push fuel from the tank to the injectors, and
- 2) To create sufficient pressure so the injectors will deliver the correct amount of fuel under all operating conditions.

The pressure developed by the pump, as well as the volume of fuel it flows, must both meet the vehicle manufacturers' requirements or engine performance, economy and emissions will suffer.

The amount of fuel pressure required for a given application will vary depending on the type of injection system (L-Jetronic, CIS, Motronic, etc.), the flow characteristics of the injectors and the engine's fuel requirements.

For example, certain Jaguar models with Bosch Motronic require 55 to 61 psi (3.8 to 4.2 BAR) of static pressure measured with the engine off. By comparison, a BMW may require 43 psi (3.0 BAR) on some models or 48 psi (3.3 BAR) on others. The differences may not seem like much, but a few pounds of fuel pressure can have a significant impact on engine performance and emissions.

Why Fuel Flow & Fuel Pressure Are So Important

A fuel pump that doesn't meet the OE minimum fuel flow or pressure requirements for your Jaguar can cause driveability and emissions problems.

A weak fuel pump or one that can't generate enough pressure can upset the calibration of your fuel system. This may cause the engine to run lean or starve for fuel under load, causing symptoms such as hard starting (hot or cold), poor idle quality, hesitation or stumbling when accelerating and a loss of high-speed power.

Low fuel pressure can also be a cause of lean misfire at idle and under load, which causes a dramatic increase in hydrocarbon (HC) emissions. A car experiencing this kind of problem usually won't pass an "enhanced" emissions test that measures exhaust emissions under simulated driving conditions on a dynamometer.

Low fuel pressure and/or lean misfire can also trigger the engine warning lamp on 1996 and newer cars equipped with OBD II (on-board diagnostics).

So, if the original fuel pump is weak or has failed, it's important to make sure your replacement fuel pump meets all Jaguar OE fuel performance specifications. Bosch pumps do match Jaguar OE requirements, but many brands don't - so beware when purchasing a new fuel pump for your Jaguar. Always remember - you get what you pay for. Is it really worth risking severe damage to your fuel injection system?

Why Fuel Pumps Fail

Electric fuel pumps run constantly, so after many years of service they can experience wear in the armature bushings, brushes and commutator. Pump vanes, rollers or gears can also wear causing a gradual loss of pressure and flow.

Accelerated wear may also occur if sediment or rust gets past the inlet filter sock. In some instances, a pump will fail because contaminants entered the pump and jammed it, causing the motor to overheat and burn out.

Your Jaguar's fuel pump relies on fuel passing through it for lubrication and cooling. Consequently, fuel starvation can be another factor that accelerates wear and may even cause pump damage under certain operating conditions.

Jaguar Fuel Pump Diagnosis

If your fuel pump stops working (no noise, no line pressure), the first thing that should be checked is the pump's voltage supply and electrical connections. An open relay, blown fuse or loose wire may be all that's preventing the pump from working. Low battery voltage can also reduce the pump's ability to generate pressure by reducing the speed of the pump motor.

Measuring static output pressure and fuel delivery are the two standard diagnostic tests that can be used to determine a pump's ability to deliver fuel.

Static pressure is measured with a gauge attached to the fuel rail or teed into the fuel supply line with the engine off and pump energized. Fuel flow is measured by disconnecting the fuel supply line, energizing the pump for a specified number of seconds (engine off) and measuring the volume of fuel delivered into a container.

If static pressure or the volume of fuel delivered is less than your car manufacturer's specifications, your fuel pump needs to be replaced. Replacement would also be required if the pump's check valve has failed (inability to hold residual pressure in the system after the ignition is turned off).

Jaguar Replacement Fuel Pump Precautions

Selecting the "right" replacement fuel pump involves more than looking up the year, make, model and engine size of your Jaguar. It also means choosing a pump that meets all Jaguar OE performance specifications and fits the same as your original - Bosch pumps do, but many other brands don't. Bosch is, of course, the company that pioneered fuel injection technology.

To maximize coverage with the fewest number of part numbers, some major aftermarket companies have taken consolidation to the extreme. They have over-consolidated their fuel pump applications by using only a few fuel pumps for a wide range of car applications.

Because of the many different performance requirements and pump designs used in today's cars, this often causes performance and fit

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problems. For example, when fuel pumps from three of Bosch's competitors were compared against the OE specifications for the cars the pumps supposedly fit, some glaring shortcomings were discovered:

Example #1: One pump from Competitor A covers 70 OEM part numbers, yet has a fuel delivery rate 42 to 50 percent less than the OE specifications.

Example #2: A pump from Competitor B also covers 70 OEM part numbers, but has a fuel delivery rate 25 percent less than OE specifications.

Example #3: One pump from Competitor C covers a whopping 153 OEM part numbers but has a fuel delivery rate 30 to 42 percent less than many OE specifications and exceeds OE electric consumption by 33 to 50 percent!

Example #4: Some Bosch competitors were found to be using fuel pumps that are a different size or type than the original. Competitor B uses a 38mm diameter pump for 51mm diameter pump applications. To make it fit, they include a rubber sleeve. To make matters worse, the pump's outlet pipe location is off-center, which causes the pump to jut out half an inch more than the OE fuel pump. The same company also substitutes an inner-gear style pump for cars that were originally equipped with a turbine pump, which can cause unwanted pressure fluctuations and noise.

Example #5: Another trick some competitors employ is to use the same inlet filter screen on a wide variety of cars. Companies A, B and C all use only one filter screen for more than 20 different OEM applications. This results in a poor fit on some cars because of variations in the shape of the fuel pot reservoir inside the tank.

Consequences of One-Size-Fits-All Fuel Pumps

So what are the consequences of over-consolidating pump applications? Inadequate fuel delivery is by far the most serious concern. Based on test comparisons with OE specifications, many of these aftermarket "one-size-fits-all" replacement fuel pumps do not meet OE performance specifications. Even though they may fit a particular vehicle application, they may not be capable of meeting the car's fuel needs under all driving conditions.

The result can be fuel starvation, lean misfire, hesitation, elevated emissions, poor fuel economy and poor driveability. This is especially critical with turbocharged engines that require a rapid increase in fuel flow under boost conditions. A pump that can't keep up may allow the mixture to go dangerously lean, resulting in deterioration and loss of power.

Something else to keep in mind is that fuel also helps cool the pump, so a pump with reduced flow capacity will run hotter and likely experience accelerated wear. Long-term durability may suffer as a result.

A replacement pump that is a different size and does not fit the same as the original can create installation problems as well. The pump may interfere with other components such as the fuel gauge sending unit, or it may not fit the pump bracket very well, resulting in noise and vibration. Bosch pumps, by comparison, look, fit and function exactly like the original. No installation hassles. No adapters. No problems.

Using a different type of replacement pump can also cause problems. Car manufacturers specify certain types of fuel pumps (roller-cell, inner-gear or turbine) for a specific reason. The pump is an integral part of the fuel system, so its pressure, flow and electrical characteristics must match the rest of the system. Substituting one type of pump for another may create a mismatch that results in driveability, durability or noise problems.

Trying to use "one-size-fits-all" filter inlet screens also means the sock may not fit right. If the filter screen is too large for the reservoir inside the tank, it may break allowing contaminants to enter the pump and fuel system. If the filter is too small, it may create a restriction or not take in enough fuel when cornering or when the tank is low and allow air to enter the pump. This may damage the pump or allow air to be sucked into the fuel line causing poor hot starting, vapor lock, lack of power or other driveability and performance problems. A poor-quality screen may not keep contaminants out of the pump and may fail to separate water from the fuel allowing water to enter the pump and fuel system.

By comparison, Bosch fuel pump inlet filters are designed to fit perfectly. A specifically designed, tightly woven filter mesh stops contaminants as small as 60 microns to extend pump life. Bosch filters also keep out water to prevent corrosion damage to the pump and other fuel system components.

Bosch (New) vs. Reman Pumps

Remanufactured fuel pumps are another concern. Their lower price may appeal to some buyers, but what do they get for their money? Not much. An analysis of remanufactured fuel pumps from a major aftermarket remanufacturer found that fuel delivery rates did not meet OE specifications. It was also found that carbon brushes and commutators inside the pump motor had not even been replaced! There was even rust on the surface of some pump housings.

Why take a chance on such a poor quality remanufactured fuel pump with questionable performance and reliability when you can buy a brand new quality-built Bosch fuel pump?

Bosch is the industry leader in fuel injection technology. Bosch developed the first fuel injection system with a high-pressure electric fuel pump in 1967 and continues to pioneer innovative designs and technology. Bosch currently manufactures more than 250 different fuel pumps that cover more than 95 percent of import and domestic applications and is a leading supplier of fuel pumps to vehicle manufacturers worldwide - Alfa Romeo, Jaguar, BMW, Chrysler, Ferrari, Fiat, Ford, General Motors, Honda, Hyundai, Isuzu, Jaguar, Kia, Mazda, Jaguar-Benz, Mitsubishi, Nissan, Opel, Peugeot, Jaguar, Renault, Rolls Royce, Rover, Saab, Subaru, Suzuki, Toyota, Volkswagen, and Volvo.

Bosch fuel pumps are second to none. State-of-the-art manufacturing and quality-control technology is used to make sure every Bosch pump meets or exceeds all OE specifications.

Bosch offers all three types of fuel pumps (roller-cell, inner-gear and turbine) in its pump line, so you can be sure the pump you get is the correct one for your vehicle application. No one-size-fits-all pumps. No doubts about whether or not the pump meets OE specifications. Bosch fuel pumps guarantee optimum performance required by each fuel injection system.

Features & Benefits of Bosch Fuel Pumps

Benefit #1: Field proven durability in more than 50 million vehicles worldwide!

Benefit #2: All Bosch fuel pumps are 100% new. No salvaged or remanufactured components.

Benefit #3: Superior product quality. State-of-the-art manufacturing technology and quality control ensure that every Bosch electric fuel pump produced meets or exceeds all OE requirements.

Benefit #4: Unlike some competitive pumps, all Bosch fuel pumps perform to OE flow rate specifications to ensure proper driveability and acceleration.

Benefit #5: Original equipment design looks, installs and functions exactly like the original.

A Few Important Things to Remember

Heed the following repair tips when installing a new fuel pump to avoid fuel system problems in your Jaguar:

Tip #1: Whether a fuel pump is mounted inside a fuel tank or externally, the inside of the tank should always be inspected and cleaned if rust or debris is found in the pump or filter. Replacing a pump without cleaning a dirty tank will doom the new pump to premature failure.

Tip #2: If you're replacing an in-tank fuel pump, always disconnect the battery to prevent any unwanted sparks. Then drain the tank before removing the tank straps and opening the pump's retaining collar. Keep all flames and sparks away!

Tip #3: When installing the new fuel pump, always replace the filter screen and use a new O-ring or gasket for the sealing collar.

Tip #4: Do not "test" a new pump before it has been installed by jumping it. Running a pump in a dry condition with no fuel to lubricate it risks damaging it. Do not run the pump until fuel has been added to the tank. Also, replace any braided or rubber fuel lines that are flaking or cracked with the correct type of EFI hose.

Your Jaguar Fuel Injection Parts Shopping List

Here is the list of fuel pump related parts you should consider when performing work on your Jaguar's fuel pump - some of these are subcomponents of other parts listed so you may not need to purchase the individual components. Also, not all cars are equipped with everything listed here:

- Fuel Pump (new not remanufactured and meeting OE specs) -
 - Fuel Pump Check Valve -
 - In-Tank Feed Pump (if applicable) -
 - Fuel Filter(s) -
 - Fuel Pressure Damper -
 - Fuel Pressure Accumulator (if applicable) -
 - Fuel Distributor -
- EHA Valve (Differential Pressure Regulator) -
 - Fuel Injectors & Fuel Injector Seals -
 - Cold Start Valve (if applicable) -
 - Fuel Injector Holders (if applicable) -
 - Frequency Valve (if applicable) -
- Fuel Pressure Regulator, Preset or Vacuum -
- Warm-Up Regulator, Electric (if applicable) -
 - Fuel Pump Relay(s) -
 - Fuses -
- Temperature Sensor(s) (Fuel Injector Computer) -
- Thermo-Time Switch (Cold Start Valve through ECU) -
 - Throttle Position Sensor (Throttle Switch) -
 - Position Sensor(s) (Crankshaft, Flywheel) -
 - Oxygen Sensor(s) -
 - Knock Sensor -
 - Air Flow Meter (Air Mass Sensor) -
- Auxiliary Air Valve (Idle Stabilizer, Idle Motor) -
 - Idle Control Unit (if applicable) -
 - Fuel Hose (Bulk or Preformed Hose) -
 - Breather Hose (Bulk or Preformed Hose) -
 - Intake Boot(s) -

Don't Forget:

Repair articles are added regularly.
Come back often to check for new maintenance topics.

These repair tips are designed only as a starting point.
Please seek the assistance of a professional Jaguar mechanic
for all repair problems beyond your capabilities.

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