

Troubleshoot A Diesel Engine

Here at PF Jones we have invested over £500,000 in diagnosis and test equipment to be at the fore front of modern diesel fuel system technology. We also have highly skilled diesel technicians so if there is doubt with the diagnosis we will also have a fairly good idea of what is causing the fault on your vehicle.

Below is a trouble shooting chart that should guide you to what has potential causes of faults on your vehicle.

Probable Cause	Engine not starting	Hard to start engine	Runs rough at lower RPM	Lack of power	Diesel knock / pinking	Black smoke	White smoke	Blue smoke
Low compression	X	X					X	
Low fuel pressure	X	X	X	X		X	X	
Low cranking speed – flat battery	X	X						
Glow plugs or Glow Plug relay faulty	X	X					X	
Insufficient fuel supply	X	X	X	X			X	
Fuel Quality – petrol - contamination	X	X	X	X	X		X	
Air – vacuum in fuel supply	X	X	X	X				
Blocked fuel supply - filters	X	X	X	X	X			
Faulty Diesel Injector/s	X	X	X	X	X	X	X	
High Pressure Pump Faulty	X	X	X	X		X		
Faulty pressure regulator - sensor	X	X	X	X				
Low Pressure Supply Pump- Faulty	X	X	X	X				

Air intake restriction			X	X		X		
Turbo problems – waste gate				X		X	X	X
EGR problems				X		X	X	
Injector blow-by seat leaking			X	X	X	X		
Cam – crank sensor	X	X	X		X	X	X	
Injector wiring harness Faulty			X		X	X	X	
Internal engine problems	X	X	X	X				X

Low compression in a diesel engine

Low engine compression will result in not enough heat being produced to ignite the diesel fuel and cause hard starting.

To perform a diesel compression test, use the following procedures.

1. Make sure batteries are completely charged and the engine starter motor is in good working condition.
2. Check cylinder head bolts are tightened to specified torque. (120NM + Rotate to 90°).
3. Engine should be warmed up until the coolant temperature reaches 75° C to 85° C.
4. High pressure injector pipes and lines should all be removed.
5. The fuel shut-off solenoid should be disconnected to disable the fuel injection pump (Rotary).
6. Remove no:1 injector and crank the engine for a while to clear the gases from the cylinder.
7. Compression gauge adapter should be installed on the injector mounting hole and connect the compression gauge measurement tool.
8. Engine should be cranked for 3-4 seconds, write down the reading of compression gauge after maintaining the 200 – 300 RPM.
9. Steps 7 and 8 should be repeated for the remainder of the other cylinders

Diesel engine compression readings average approximately between 275 psi to 400 psi, depending on the design and compression ratio. Compression levels should not vary more than 10 to 15 percent (30 psi to 50 psi). Keep your eye out for variation between cylinders during an engine compression check. If say two cylinders have normal pressure readings and two have low readings, engine performance is reduced.

If two cylinders side by side read low, it is pointing to a blown head gasket between these two cylinders. If the compression pressure of a cylinder is reading low for the first few piston strokes and then increases to normal, it indicates that a valve is sticking. Indications of valve troubles by compression test will be confirmed by taking vacuum gauge readings.

[Purchase a Diesel Compression Tester Here](#)

Low fuel pressure in a diesel engine

Low Fuel pressure is where most problems occur for fuel supply. There are two faults that could be causing this, diesel injectors or diesel injector rail not holding the fuel within the system and poor fuel supply to the diesel injectors or diesel injector rail.

You should look at the two faults in these three areas:-

- Low pressure supply from the fuel tank to the high pressure pump - vehicles that don't have an electric fuel pump to lift the fuel from the tank to the high pressure pump, rely solely on the high pressure pump to lift the fuel from the diesel tank. Vehicles that do have an electrical fuel pump either in the tank or in the fuel line to aid the high pressure pump the bar between the diesel tank and the high pressure pump should be 2 - 5 bars.
- The pressure to deliver fuel from the high pressure pump to the rail/injectors at cranking is around 200 bars, at idle the pressure should be around 300 bars. When the vehicle is running the pressure ranges from 1200 bar to 2000 bar.
- Once the vehicle has reached the running stage the pressure should be maintained at the relevant pressure.

We sell a wide range of new and reconditioned [diesel fuel pumps](#) and [diesel injectors](#) so if you would like a quote please call or use the contact forms located on any of the pumps or injectors .

Low cranking speed in a diesel engine

If your vehicle is turning over slowly, your diesel pump can't generate enough fuel pressure to initialize fuel injection, causing hard starting problems. During the colder periods of the year low cranking speed is more common due the battery being flat or faulty. Get a quote on a battery by clicking on the online chat or alternatively use this contact form and we will get back to you ASAP.

Glow plug or glow plug relay faulty in a diesel engine

Glow plugs are important for cold starting. They are electrically controlled heaters which warm the engine prior to cold starts. Without glow plugs, a diesel engine would not start because the engine needs hot compressed air to ignite injected diesel. If your glow plugs are faulty it will make your vehicle not start, hard to start or when the engine is cold produce white smoke. Get a quote on glow plugs and glow plug relays by clicking on live chat or or alternatively use this contact form and we will get back to you ASAP.

Insufficient fuel supply in a diesel engine

The most common fault for insufficient fuel supply is that the fuel supply pipes are cracked or bent. The vehicle has an empty fuel tank.

Contamination in a diesel engine

Contamination either by petrol, water or any other foreign matter within the fuel system causes your diesel fuel pump and diesel injectors to fail. The internal parts within the diesel fuel pump and diesel injector get worn and one or a combination of the faults listed above in the trouble shooting chart occurs. If you have had contamination within your fuel system and you have had either your diesel injectors or diesel pump exchanged or repaired you must make sure you completely clean out the fuel system and replace your fuel filter before putting the replacement faulty parts back on to your vehicle. Here at PF Jones we can analyse your fuel for you for £45 + vat, you would receive a print out of the purity of the diesel fuel. We also sell diesel fuel filters if you would like a quote on your diesel injectors, diesel fuel pump or diesel filter click on the live chat link or alternatively use this contact form and we will get back to you ASAP.

Air - Vacuum in fuel supply and blocked fuel supply

Fuel Filters are important part of the diesel fuel injection system. The job of the fuel filter is to remove contaminants from the fuel system before it reaches the diesel injectors or diesel fuel pump. The life of a diesel filter depends on the quality of the fuel that passes through it. Normally the fuel filter would be changed at your annual service. If the diesel fuel filter is blocked before the usual service this indicates that the level of contaminants in the fuel is much higher than normal.

* Water Contamination - Water can enter the fuel tanks through air and at the right ambient temperature condense.

* Petrol Contamination - This is when the wrong fuel is put in your diesel fuel tank at the filling station.

Here at PF Jones we can analyse your fuel for you for £45 + VAT, you would receive a print out of the purity of the diesel fuel. We also sell diesel fuel filters. Click on the live chat link to get a quote or alternatively use this contact form and we will get back to you ASAP.

Fault fuel injectors in a diesel engine

The biggest result of Common rail diesel injector failure is due to excessive back leak or return flow. The cause of this would be internal worn parts ie your pilot valve, nozzles or seals. The faulty parts allow the fuel to travel back up the injector to the fuel system or diesel tank. The outcome of excessive back leakage is a drop in rail pressure, (see low fuel pressure), which in-turn results in your vehicle to have hard starting or will not start at all.

Internal worn parts can also cause a delay in the start of injection which results in your vehicle rough running at low RPM or your vehicle to not start at all.

Get a quote on you Diesel Injectors by clicking on the live chat link or alternatively use this contact form and we will get back to you ASAP.

Not sure if your diesel injectors are faulty? Click on the Diesel Injector Testing Form, fill it in and send the injectors to PF Jones and we will test and report back to you.

Bosch, Delphi and Denso Common Rail Testing Fee £17.63 each.

Bosch Unit Injector Testing Fee £52.88 each.

Mechanical Injector Testing Free of charge.

Faulty high pressure pump in a diesel engine

If your diesel high pressure fuel pump is faulty this will cause low pressure (see low fuel pressure). Normally the fuel pump fails due to internal parts being worn due to contamination (see Contamination) or by your fuel pump breaking up internally which causes metal swarf to enter the fuel system. If this happens your injectors will also become faulty and you will need to clean out the whole fuel system before replacing your diesel high pressure pump and injectors. Failure to do so will result in the failure of your diesel high pressure pump and diesel injectors again.

Get a quote on your Diesel High Pressure Pump by clicking on the live chat link or alternatively use this contact form and we will get back to you ASAP.

Not sure if your diesel pump is faulty? Click on the Diesel Pump Testing Form, fill it in and send the fuel pump to us, we will test and report back to you.

- Bosch VP30/44 Testing fee £52.88 (single plug only).
- Bosch High Pressure/Common rail Pump Testing Fee £52.88.
- Delphi/Denso Common Rail Pump Testing Fee £141.
- Mechanical Fuel Pump Testing Fee £45.00 each.

Faulty sensor/ pressure regulator in a diesel engine

On most vehicles today they have a pressure regulator fitted on the diesel high pressure pump and a sensor on the rail. If either of these go faulty your vehicle will have running issues such as:-

- * Hard Starting.
- * Uneven tick-over.
- * Vehicle cutting-out when the RPM is increased.

Get a quote on a Pressure Regulator or Rail Sensor by clicking on the live chat link or alternatively use this contact form and we will get back to you ASAP.

Faulty low pressure pump in a diesel engine

If your vehicle is fitted with a low pressure pump it can be located on the fuel pipe near the diesel tank or in the diesel tank. If your low pressure pump is faulty you will experience the same symptoms of a high pressure pump.

Get a quote on a Low Pressure Pump by clicking on the live chat link or alternatively use this contact form and we will get back to you ASAP.

Air intake restriction in a diesel engine

This could be due to your air filter or pipes being blocked. Some vehicles also have a butterfly valve which could be stuck. In addition, the faulty air flow sensor on the air intake will cause excessive black smoke and lack of power.

Diesel Turbo problems

With vehicles being produced with more and more horse power it has been putting a strain on the turbo's and so turbo failing has become more common. Reasons why turbo's are failing is a combination of not allowing the engine to idle when started or switching off, not replacing oil with the manufactures specification oil or poor maintenance.

As your turbo gets more and more wear, the waste gate sticks causing your vehicle to go into limp mode, smoke excessively or shut down.

If your vehicle has a variable vane turbo and your vehicle carbons up, you would experience black smoke, hesitation on acceleration and also lack of power. A good thing to check is that the sensors and vacuum pipes that operate the turbo are working correctly. Also if you check the air pipes to and from the inlet, inter cooler and turbo as if your clamps are loose or damaged this can also cause the above problems.

Diesel EGR Problems

The EGR valve, or Exhaust Gas Recirculation valve, is a vacuum controlled valve which allows a specific amount of your exhaust gas back into the intake manifold. This exhaust gas mixes with the intake air and cools the combustion process. The exhaust gas your EGR valve recirculates also prevents the formation of Nitrogen related gases. These are referred to as NOX emissions, and are a common cause for failing emissions testing on your MOT test. Unfortunately, your EGR valve can get stuck, causing NOX gases to build up. You'll know if your EGR valve is stuck or malfunctioning because your car will experience symptoms like rough idling, lack of power and will produce black or white smoke from your exhaust.

Diesel Injector blow-by Seat leaking

Diesel Injector blowing is caused by one or a combination of the following symptoms. Difficult or hard starting / un-even running / erratic tick over or idle / black smoke on acceleration or tick-over / black tar (carbon) around the injectors. Diesel injector blowing is caused when the diesel injector seal has not seated correctly against the cylinder head.

You can sometimes cure diesel injector blowing by removing the injector, cleaning the injector from carbon and fitting a new copper sealing washer and refitting the injector. On occasions this does not always rectify the diesel injector blowing due to the seat in the cylinder head being eroded by the escaping combustion gases resulting in the seat getting damaged. Luckily there is a seat cutting tool that can overcome this problem by gently refacing the seat. [Click here to purchase a seat cutting tool.](#)

Diesel Cam Sensor - Crank sensor

Firstly check that Cam Sensor or crank sensor are not cracked, damaged or loose. If you are in any doubt I would recommend changing the sensor as they are normally quite reasonable to buy.

Get a quote on a Cam Sensor or crank sensor by clicking on the live chat link or alternatively use this contact form and we will get back to you ASAP.

Diesel Injector Wiring Harness

Faults occur with injector wiring harness with vehicles that have cam driven injectors (Unit Injectors) under the rocker cover which allow engine oil to come into contact with the electrical connectors. Even with today's technology and diagnostic equipment that point to the injectors being faulty, this is not always the case and the fault is with the injector wiring harness.

Before having a diagnostic on your vehicle with the symptoms that that Injector wiring harness faults list above, check the electrical connections on the unit injectors have a good contact with the wiring harness.

Internal Diesel Engine Problems

There are numerous amounts of parts that could have gone faulty on your vehicle ranging from pistons, valves, bearings, oil pressure there are too many parts or faults to list. In this area I would advise you see a reputable engine specialist to diagnose your fault.

White smoke from a diesel exhaust

When there is white smoke emitting from your exhaust it usually means that the diesel fuel that is being injected into your cylinders is not burning correctly. Below are some ideas of what is causing your white smoke:-

- Engine Compression low.
- Petrol contamination or Water contamination in your diesel fuel.
- Pump Timing or Engine Timing out.
- Fuel starvation to the pump causing your fuel pumps timing to operate incorrectly.

Black Smoke from a diesel exhaust

Black smoke emitting from your exhaust is due to an air to fuel ratio imbalance. This occurs when the diesel fuel system is delivering either too much fuel into the engine or there is not enough air. Below are some ideas of what is causing your vehicle to emit black smoke:-

- Faulty Diesel Injectors.
- Dirty Air Filter.

- Faulty Diesel Pump.
- Valves clogged within cylinder head due to EGR being faulty.
- Intercooler or Turbo Charger faulty.

Blue Smoke from a diesel exhaust

When blue smoke is being emitted from your exhaust it indicates that your vehicle is burning engine oil.

Below are some ideas of what is causing your vehicle to emit blue smoke:-

- Faulty Diesel Injector Pump.
- Faulty Diesel Lift Pump.
- Too much engine oil in your vehicle.
- Piston rings or cylinders worn.
- Faulty valve stem seals or valves.