



Technical Information

Testing and Cleaning Diesel Fuel Systems

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Diesel engines are extremely dependable and trouble free if properly maintained. It is critical to follow manufacturer's recommendations for oil and oil filter change intervals. Use of clean filtered fuel is imperative.

If an engine becomes hard to start, misses, loses power or quits under load the fuel system may be at fault.

This procedure will apply to most diesel portable air compressors, generators, pumps or other diesel powered equipment using high pressure Bosch, Diesel Kiki, Stanadyne or Roosa Master injector pumps. Detroit Diesels and Cummins PT systems use low pressure fuel delivery to mechanically operated injectors which require different procedures from the pump to the injectors, and require adjusting or "timing" the injector rack.

The first step in trouble shooting a fuel system is observation. If the engine is running, is the exhaust smoke blue grey, black or clean? Exhaust may be clean if an injector is clogged or pump pressure is low. Blue/grey smoke is an indication of over fueling which could be from a damaged pump or failed injector. Before working on the fuel system, check the air cleaner and turbocharger. With engine stopped, remove air cleaner connection at inlet of turbo. With one finger, check turbo wheel for movement. It should rotate freely, have no end play and very little radial play. If possible, check discharge side of turbo. There should be no oil in duct. IF turbo has a waste gate, check for free movement. It is also a good idea to check engine valve adjustment. A tight valve can cause low compression. If turbo and valve adjustment are OK, proceed to fuel system check.

1. Check for "dead" cylinder: With engine cold, start engine and observe exhaust manifold temperature at each exhaust port where manifold connects to head. An infrared thermometer works well, however, with caution, you can feel with your hands until manifold is too hot to touch comfortably. If one cylinder is much colder than the others, that cylinder is not firing. Possibly replacing that injector may cure your problem. If not, proceed to fuel system service below:
2. Clean fuel tank: Remove tank if possible. Drain fuel remove plugs, gauges and pick-up and return tubes. Flush interior with pressure washer. Drain and inspect. Remove all traces of water with vacuum or cotton rags.
3. Remove filters, disconnects lines and blow out lines. Do not blow through mechanical lift pump.
4. Replace filters and lines, leaving line disconnected from injector pump. Replace plugs and fuel gauges and fill tank with clean diesel fuel.
5. Pressurize tank to no more than 5 PSI to force fuel through system and fill lines and filters. When a clean solid stream of fuel comes out of line at injector pump, release pressure and reconnect to pump.
6. Bleed air from fuel system: Loosen high pressure fuel lines at injectors one turn. **WARNING:** Wear eye protection to prevent injury from high pressure fuel spray. Do not crank engine over 30 seconds. Wait 15 minutes for starter to cool before retrying.
7. Retighten lines when fuel appears at injectors.
8. Start engine: Do not over crank!
9. Check Injectors :If engine is not running properly, remove injectors and have them tested or replace them.
10. Check engine cylinder compression: while injectors are out. Pressure should be over 200 PSI..
11. Injector Pump: If engine is still not running properly and compression is good, You probably have a bad injector pump.
12. R&R Injector Pump: Turn the engine to Top Dead Center (TDC) on #1 cylinder. On some pumps there is a window held in place with 2 screws located near the front and on the side away from the engine. Remove that plate and turn engine until grooves are aligned on fixed and moving parts inside of window. This is TDC. Note position of pump on it's mount. This is the basic timing, and when replaced, pump must be reinstalled in same position. Most pumps have a nut on end of input shaft which holds timing gear. This nut is accessed through a plug or plate on front of timing cover. Be cautious not to drop nut or washer. A puller may be required to remove gear. Refer to engine repair manual for specific instructions for your engine. Pump must be serviced by an authorized repair station.
13. Reinstall and bleed per instructions above.

These instructions are meant as a guide. Only qualified mechanics should attempt service on diesel fuel systems. This guide is based on the simplest procedures first, with the most complicated or costliest last. Many variables can affect engine performance. This guide does not attempt to address all of them.