"I've replaced a fuel filter on a common rail diesel (CRD) and now it won't start."

By Clinton Brett

"All diesel's are not fond of air in the fuel system and will not compress the air"

According to diesel diagnostics and aftermarket training Guru Clinton Brett from (www.dieseldoat.com), issues following the replacement of diesel fuel filters are increasing.

Other scenarios outside of failure to start include vehicles starting or idling for a short time, then stalling and not restarting, stalling soon after a Road Test, and then not restarting, and a repeating start/stall cycle.

The reason for this is that all diesels are not fond of air in the fuel system, whether they are CRD or early non-CRD, and will not compress the air. At the same time, it does not help with the lubrication of the moving diesel components. The diesel fuel is a lubricant based liquid fuel that provides lubrication to the high pressure pump and injectors ensuring correct operation and reliability. Just like an engine requiring oil to lubricate moving components.

The most popular diesel on the road today is the CRD, which has finer tolerances and very little or no bleeding outlets – this means that without the knowledge and correct equipment, it can be difficult to bleed the air from a CRD system.

By carrying out the following guidelines and having the correct low-cost equipment, this somewhat difficult process – and some very expensive repairs - can be avoided. Low cost equipment can include a manual rubber bulb type hand primer, clear PVC hose and the correct quick release fittings to connect directly to the factory plumbing of the fuel system. A great adaptable kit is the Optimus Primer. An innovation created by DIESEL DO AT which includes 34 aftermarket quick release fittings which are adaptable to both diesel & petrol as well as some water cooling applications. The kit also contains a rubber bulb type hand primer, 6, 8, 10mm clear PVC hose, reducing barbs, hose clamps and dust caps.

1. The fuel system must be bled free of air before attempting to crank the engine or cycle the electric primer pump (only if fitted).
2. Carry out the fuel filter replacement after the oil has been changed and the vehicle test driven.
3. Ensure there is more than a quarter of a tank of diesel and the vehicle is on level ground. The electric in-tank pump (only if fitted) has been known to fail in certain vehicles if the fuel level is too low. When disconnecting pipes, the fuel drains back below the pick-up, thus starving the electric pump which can also cause it to fail.
4. Before any work is carried out on a fuel system, it should be cleaned by spraying brake cleaner on the fittings and then blowing with compressed air.
5. When removing pipes from the filter head assembly, place blanking caps immediately onto pipes and fittings to reduce as much 'drain back' as possible.
6. Install the new filter (preferably genuine) and check all seals are clean and free of cuts or nicks and lubricate with rubber grease prior to installation.

7. Reconnect cleaned fuel fittings.
8. Bleed the air - the most efficient procedure of bleeding the air is with a removable bulb type hand primer with non-return valve (BHP) fitted to the return outlet of the high pressure pump. Remember, some CRD systems are not fitted with a hand primer. It is recommended to all mechanics to have one readily available in your tool kit. These hand primers are available as part of the Optimus primer diesel filter replacement kit.

9. With or without a manual or electric primer pump (in tank or out of tank) it is still recommended to draw the fuel through using a hand primer. As I mentioned earlier it is difficult to compress the air through the system especially with no bleed screws.

10. Do not 'crack' or loosen any high pressure pipes in the process to look for fuel and air escaping. These pipes are high pressure components and must not loosened unless absolutely necessary.

11. Using quick release fittings just like the factory fittings or barbed connectors and clear PVC hoses, connect the BHP to the most accessible return outlet of the high pressure pump. The clear lines will assist in seeing the system is free of air whilst working the BHP.

12. In extreme cases when a mechanic has been unsuccessful with drawing fuel from the vehicles own system, connect a clean separate fuel supply with clear tube directly to the inlet of the pump and returning back to the separate supply. *Using its own inbuilt feed/transfer pump, the CRD fuel pump has the capability to draw fuel from the tank.

13. In cases where the vehicle electric pump is activated whilst cycling the ignition, connect the outlet pipe of the fuel filter assembly to feed into the separate supply and blank off any exposed pipes to avoid air and contamination.

14. Ensure there is sufficient battery voltage to the starter motor (may require jump pack).

15. After using the clear tube to assist in checking the system is free of air, remove the BHP and fit a clear pipe to the return to separate supply and crank and the engine. It may take two to three cranks up to approximately six seconds at a time with 10 second breaks (avoid overheating the starter motor).

16. Once the engine is running, give the engine a quick couple of revs above idle (approximately 2000 rpm) to assist the venting process.

17. Remove the separate fuel supply and refit the original without exposing too much air in the system. The engine will restart and repeat the quick high revving of the engine. The fuel will continue to bleed and vent through the system whilst fine air bubbles maybe present quite some time which is not a major concern as the engine will continue to run and eventually completely vent.

Finally, DIESEL DO AT strongly advises to maintain above-idle revs as the vehicle is taken on a test drive – without breaking the law or damaging the vehicle of course. This final step ensures the air will be eventually vented from the system thus the vehicle will remain running without stalling & surging.

In following issues of this trade journal we propose to cover:-

- Engineering overlook or saving money? Injector washer failure = engine failure
- Suck it and see- Fault code P0093 Suction control valve (SCV). 'I've replaced the SCV and the fault re-appears. Find out how a $2 part that takes 5 minutes to rectify this star fault.
- Hot summer diesel- My Nissan Patrol Common rail diesel ZD30 hard to start hot, intermittently loses power and Fault code P1089 (Fuel pump). Do I have to replace the fuel pump at 100k?
- Diesel trucks get a million km's don't they? Serviceable items overlooked. Fault code P2623-001 (CHARGE AIR SYSTEM OFFSET DRIFT UNDER ENGINE LOAD). Turbo fault?

These are just a few of the tip and fixes offered during DIESEL DO AT's CRD diagnostic courses which has been delivered to more than 400 mechanics nationally over the last few years alone.

DIESEL DO AT – (Diesel Diagnostics & Aftermarket Training)

Clinton Brett has more than 20 years' experience as a diesel fuel injection specialist solving real life diesel faults daily. In each issue he will share his knowledge diagnosing electronic diesel faults mechanically and not just relying on computer scantools, demonstrating how to test injectors, fuel pumps & rails without removing from the engine and more.

For more detailed information about Diesel Diagnostic Training for common rail diesels or 'Diesel Help' membership, contact Clinton Brett on 0432 738003 or email clinton.brett@dieseldoat.com & visit www.dieseldoat.com