



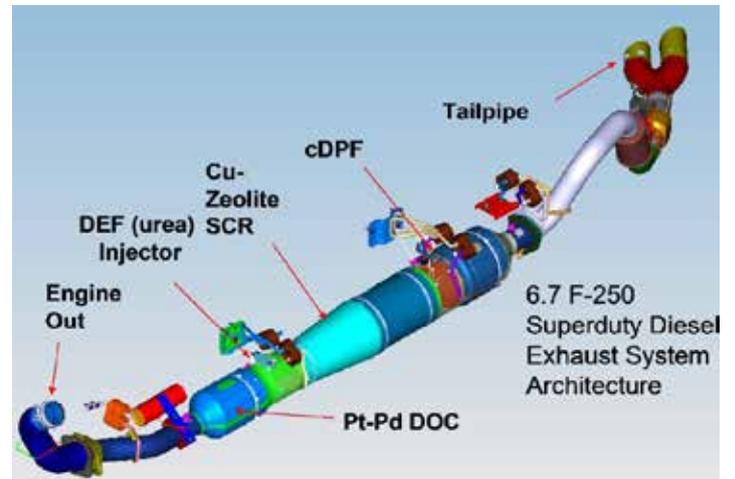
It's not a Ranger thing



By Clinton Brett, Diesel Help Australia

In 2016 Ford decided it was time to include a Diesel Particulate Filter (DPF) to their Ranger 3.2L, 5-cylinder engine. On the Ranger they use the basic run of the mill DPF system comprising of a Diesel Oxidization Catalyst (DOC) the Particulate filter, differential pressure sensor reading engine side pressure only whilst the other side open to atmosphere and temp sensors located on the DPF. It uses in-cylinder post injections via the main 5 injectors to create the regeneration. The 2016 UR Mazda BT50 3.2L on the other hand, uses a different system, the Down Stream Injection (DSI). Funnily enough this system is commonly found on other Ford models including Kuga, Mondeo, Focus and Transit.

US technical information for the 2017 Ranger and F series fitted with the 6.7L V8. These incorporate the AdBlue/UREA which is also referred to as Diesel Exhaust Fluid (DEF). Who knows, we might see this AdBlue system fitted to the new Ranger V6 power stroke??



DEF Adblue V8

In this article a common fault found on the Mazda BT50 DSI system is P244C Catalyst temp too low to perform DPF regeneration. Symptoms include the Malfunction Indicator Lamp (MIL) light shown on the instrument panel cluster and the car is experiencing poor performance. The poor performance being the limp mode for safe operation. Other than this, the vehicle tends to perform ok unless it has been ignored or misdiagnosed causing the DPF to completely block. At this point, do not use the scan tool force regeneration function.

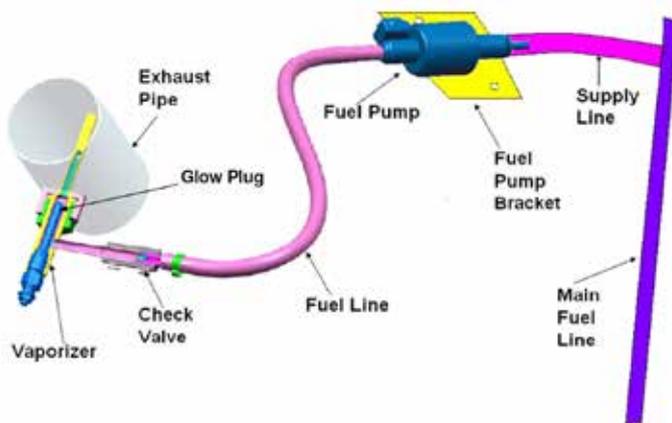
Typical DSI Vaporizer Glow Plug Circuit Continuity Check Entry Conditions:

Battery Voltage Minimum 9.0 V Maximum 16.3 V, Key On

A common failure related to this P244C code found in the Ford applications in the past, has been a blocked vaporizer. The vaporizer is physically blocked, or a blown fuse due to a vaporizer component internal short circuit caused by the vaporizer glow plug overheating. This can occur in the BT50 but the most common failure we see is the Vaporizer pump failure.



It common for people to mistake an issue with the temperature sensors when a code description like this is displayed- P244C Catalyst temp too low. This temperature sensor in fact is reading correctly and in turn, the correct signal is being sent to the engine computer unit. (ECU). For the DPF to perform a



The DSI system which is also known as the Selective Catalyst Reduction system (SCR) includes a Vaporizer, Glow Plug and a vaporizer pump. This is used to aid in DPF regeneration on the 3.2L engine so as to reduce oil dilution associated with in-cylinder post injections. This is similar to the Toyota Hilux design on the 1GDFTV but differs as it does incorporate in cylinder post injections as well as the 5th injector. You can see how manufacturers have done everything possible to confuse the hell out of mechanics.

Just to add to the confusion, in their expansive range of diesels, Ford also use another emission reduction system, AdBlue on its SUV family wagon, the Everest. Even though it's the Ranger 3.2L engine, the Everest has adapted the AdBlue system to meet Australian Design Rules (ADR) as this is specified as a passenger vehicle, non-commercial. It doesn't quite compute with me as the Ranger is also a passenger vehicle, it's just you can throw a load of dirt in the Ute compartment whereas the Everest is about carrying the little people covered in dirt.

Over the past few years our Diesel Help members have logged quite a few diagnostic jobs for diesels fitted with AdBlue on Mercedes, Iveco, Mazda, Scania and Landrover to name a few and they have all been of similar design. This has helped immensely with our diagnostics, and I have been fortunate to obtain the Ford



regeneration, the exhaust temperatures must be adequately increased to assist burning off the harmful emissions. When diesel is injected into the exhaust or post injection via the injectors, temperatures are increased thus adequate to perform the regen.

The DSI monitoring strategy includes circuit continuity checks for vaporizer pump and vaporizer glow plug, plausibility, check for vaporizer glow plug relay, and DSI leakage monitor. To begin diagnosis, first connect an analogue pressure gauge to the differential pressure sensor hose on the engine side to assist with confirmation the differential sensor is operating ok and the condition of the DPF- Is it blocked or not. By comparing to the scan tool, this will in turn confirm whether the DPF is blocked, and the differential sensor is working ok.

We recently released a DPF, Turbo Boost test kit to assist with testing DPFs. They were very popular, and the first batch was sold out before we could release them on the website. If you are interested in one of these tests or want to know more about them, send us a message <https://www.dieselhelp.com.au/contact/>



DPF Test Gauge & Hose

Gain access to the vaporizer, connect a vacuum pump (Mityvac) and see if the vaporizer holds a vacuum. If so, then the vaporizer is blocked and will need replacing. If the results come back showing it is not blocked, it still may be restricted and therefore worth removing for final inspection. If the fuse for the vaporizer glow plug or pump has blown, then test the glow plug resistance (Nominal 1.1 Ohms, if less than 0.8 Ohms or greater than 1.3 Ohms then the vaporizer glow plug is faulty and will need to be replaced).



Location Of Blocked Vaporizer

If the value is within spec, then disconnect the fuel line from the pump and place the end of the fuel line in a clean container and run the bleed/prime routine via the scan tool or as shown in HaynesPro, perform the test of the pump by briefly supplying power to the pump. If the pump is noisy, or does not run, then check the wiring to pump and that the fuel lines are not blocked.

HaynesPro | WorkshopData™
Component diagnosis : R63 - Fuel vaporiser system glow plug relay

Wiring diagram

Diagnosis 0/4

- 1: Check the coil supply voltage (pin 1).
- 2: Check the switch supply voltage (pin 3).
- 3: Check the coil ground (pin 2).
- 4: Check the relay operation

Vaporiser glow plug relay

glow plug

Glow Plug Test

If any pump related fault codes appeared, refer to the following DSI Vaporizer Pump Circuit Continuity Check Malfunction Thresholds:

HaynesPro | WorkshopData™
Component diagnosis : M33 - Fuel vaporiser system pump

Wiring diagram

Diagnosis 3/3

- 1: Check the pump supply voltage
- 2: Check the pump ground (pin 2).
- 3: Check the pump operation

Disconnect the fuel vaporiser system pump. Connect pin 2 to the negative battery terminal. Briefly connect pin 1 to the positive battery terminal. Is the pump running?

Yes No

Haynes Pump Test

Solution: Remove and replace vaporizer, pump and glow plug as a complete system. Be sure to confirm the condition of the DPF before quoting. Remove and clean fuel hoses from the main fuel tank to the vaporizer pump. Relearn the system when if required.

Special note: In several cases it was found after replacing a failed vaporizer, the DPF was too blocked, beyond cleaning and required replacement. To confirm DPF condition and operation, please refer to TB1087 DPF forced regeneration not required.

Most importantly I trust what you have picked up from this article- Establish what system is it you're working on.

To join the Diesel Help network or for more information go to www.dieselhelp.com.au