



Isuzu Exhaust Brake Failure Causes DPF Fault



By Clinton Brett

Isuzu trucks have had their fair share of DPF issues over the years with many ending up at workshops with technicians throwing their hands up in the air and giving up on which is generally a reliable and simple system. In some instances fault codes can lead the mech in the wrong direction often replacing components with the fault only to reappear again. Technicians that attend our Diesel Help training courses learn to use fault codes as a guide.

Before anyone puts a tool on the engine, first you must have a good understanding of the diesel engine operation. Where does the heat come from? How does combustion take place and what is the function of each component? Abbreviations and different terminology for components (eg DPF's etc) can catch technicians off-guard so to begin with this article, I want to enlighten you on what is a DPD?

Some OEM's call a DPF a Diesel Particulate Diffuser. Yes, in other words a DPF (Diesel Particulate Filter). In all our training courses and articles like this I like to keep things simple, so I use DPF as most people are more familiar with this than DPD.

In this article the model we are working with is the Isuzu N series fitted with the 4JJ1-TCC engine 2009 to 2018.

In this instance the Fault/Symptoms include: Truck is unable to perform a DPF regeneration via the button on the dash or a passive regeneration on the road. Fault codes include P242F -Diesel/petrol particulate filter restriction caused by ash accumulation, P2458-Diesel/petrol particulate filter regeneration



Isuzu N series truck

Image used for reference purpose only.

duration and P1455 -PM Over Accumulation/DPF restriction not regenerable.

A misunderstanding of a DPF fault codes can easily send repairers down the pathway of replacing components rather than looking at all possibilities. In this instance a not so common DPF code was found in this truck, P242F-Diesel/petrol particulate filter restriction caused by ash accumulation.

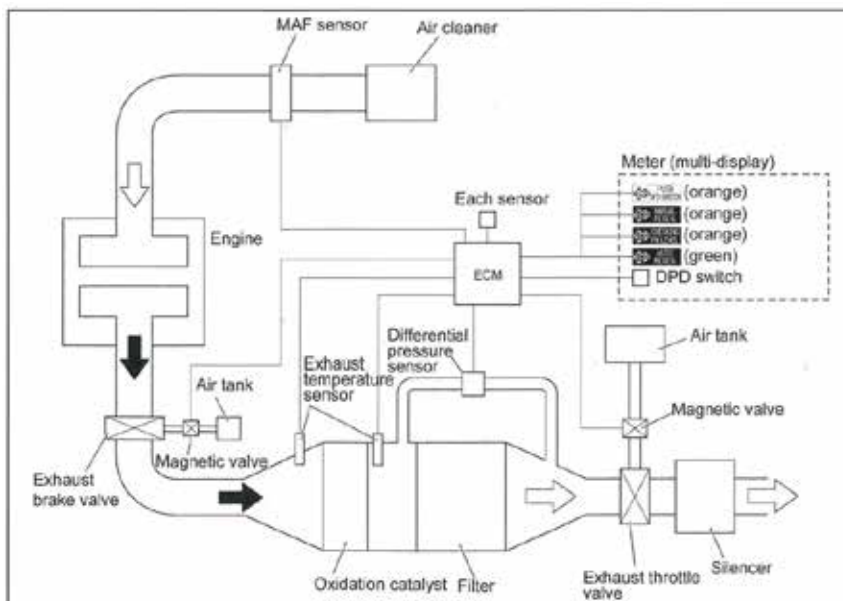
Looking at the Isuzu flow chart could be a costly exercise and lead the technician in a different direction. There is not one mention about testing the individual components such as the Exhaust Brake.

The failure in this case was the diaphragm in the exhaust brake. The system has 2 exhaust brakes. One at the front and one at the rear. The failed unit was the one located in front of the DPD which required complete replacement of the exhaust brake assembly.

So, what prompted the mech to check the coolant temperature?

Our Diesel Help member checked the coolant temperature on the scan tool but also used an alternative temperature tester to confirm it was remaining at 84 degrees meaning the engine was not getting hot enough to trigger a regen. A good technician who has knowledge on how the DPF/DPD system works would bring us to check this.

We've experienced thermostats sticking open and causing DPF and AdBlue related faults in the past. In this instance the thermostat was checked for operation and passed ok. Our Diesel help member also tested the DPF differential pressure with a reliable DPF test gauge, which was showing slightly below 1Kpa which means it is a little blocked. We were confident that as soon as we found the cause of a failed regeneration, we would be able to perform a passive regen and get the DPF pressure back down



Isuzu DPD System



to the specified range which is preferably below 0.5 Kpa. We also checked MAF and EGR values to confirm there are no issues in this area.

The next step was to test and confirm all sensors were ok. From here we pursued the exhaust brakes, because after all most experienced diesel mechanics would know that a restricted exhaust increases combustion temperatures but also a good specialist understands that too much restriction is not a good combination. So, the only thing remaining was to confirm both exhaust brake valve and exhaust throttle valve are activated to assist.

Basically, exhaust brakes are used to assist slowing down the truck by restricting the exhaust when you let the foot off the accelerator pedal. This pedal has a microswitch beneath and would activate. There is also a similar switch located on manual gearboxes beneath the clutch pedal, so that whenever you applied the clutch to change gears, this switch would momentarily disengage the exhaust brake preventing the engine from stalling.

These days the exhaust brake has additional functions, and the system has not one but 2 exhaust brakes.

The additional exhaust brake is located before the DPF (Diesel Particulate Filter) and the another is located after the DPF. Like all emissions systems, when one part of the system is not operating to its full potential, the entire system stops operating and often either a fault code will appear or the engine will derate and in some cases with later emissions systems such as AdBlue, the engine will no longer start when a fault is present.



DPF EGR Flyer DPF Test

Overview Of DPD/DPF Operation

The engine ECU detects the condition of the Particulate matter by monitoring the exhaust differential pressure sensor along with the DPF temperature sensors and other sensors such as MAP and MAF sensors. The ECU will also request a regeneration when a predetermined distance is travelled since the previous regeneration has exceeded. When either of these has been reached, automatic regeneration commences. If at any time an automatic regeneration cannot be completed for some reason, a manual regen may be requested to the drive via the flashing DPF (DPD Isuzu terminology) light on the instrument cluster.



Exhaust Brake

During this regeneration, temperatures in the filter are raised and the accumulated PM is burned off. To assist with reaching the optimum temperature, a Diesel oxidation catalyst is used, and sensors also inform the ECU when appropriate to inject more fuel post fuel injection but also the exhaust brake valve and exhaust throttle valve are activated to assist.

ISSUE HAS BEEN RECTIFIED

A new exhaust brake was fitted and a successful regeneration was able to be performed, with truck reportedly running well.

For more information about our services visit www.dieselhelp.com.au

Philips WeatherVision LED Globes

Designed to colour match halogen bulbs but jam-packed with LED performance technology, Philips Ultinon WeatherVision LED delivers the classic warmth of a 3500k light while using less energy and providing 80% more light on the road for better visibility.

With the reliability you would expect from one of the world's top 50 global brands known for its lighting innovation, Ultinon WeatherVision bulbs are meticulously manufactured to OEM standards and are fitted with quality Lumileds LED chips.

Philips Sales and Business Development Manager ANZ, Reece Walker says the compact design of the range makes it a great plug and play alternative to halogen. "Similar to our Ultinon Access product range, WeatherVision LED's feature an easy to fit centre ring the same size as a halogen making them compatible with a wide range of car makes and models".

Ultinon WeatherVision LED bulbs provide the same luminous flux as standard ECE halogen bulbs but significantly improve beam performance using less energy. They deliver better visibility on the road and shine significantly brighter than competitor products of its category.

Projecting an elegant, halogen-like glow at 3500 Kelvin, Ultinon WeatherVision gives vehicles a timeless style while offering the extra brightness of LED. This translates to more comfortable vision in difficult weather conditions, such as rain and fog, thanks to reduced glare.

Powerful LEDs produce more heat, which can reduce light output and shorten bulb life. The best LED lamps manage heat effectively. Ultinon WeatherVision LEDs are a direct-fit bulb that are equipped with AirCool, an advanced heat management system created by Philips, featuring an innovative heatsink design. AirCool



dissipates heat fast, giving the bulbs up to 1500 hours' lifetime and providing problem-free performance.

Similar to the newly launched Ultinon Access LED range, Ultinon WeatherVision come with Philips two-year, no fuss warranty and are available through Philips resellers nationwide.