Repeated Turbo Failure

Hyundai iLoad/iMax TQ 2008 - 2015 2.5L D4CB Turbo Diesel

VNT (Variable Nozzle Turbine) Type Turbocharger Failure Information

Precautions & Recommendations when Replacing

Turbocharger failures on the Hyundai iLoad D4CB engine are now becoming commonplace and a few lessons have been learnt. Turbo failure seems to occur between 150,000 and 190,000 kilometres.

Caution: Always determine the cause of the turbocharger failure before fitting a new unit.

If the cause is not obvious, then it may help to carefully inspect the failed unit. It may be due to a foreign object hitting the blades, dirty or insufficient oil, carbon build up or turbo over-speed. Over-speed can cause blades to fracture and break off, and can be produced by leaks in the intercooler or intake hoses, in addition to the following items.

If a turbo has failed, there are a number of extra items that must be checked and/or replaced. Failure to carry out these steps may cost your workshop another turbocharger, lost labour in rework and damage your reputation.

1. Intercooler

The intercooler should be removed and checked. The failure of the turbo could be caused by a leaking intercooler and will certainly need to be removed, checked and cleaned. Engine oil may be stored inside the intercooler, due to the turbo failure. It is possible the engine will run on the excessive oil trapped in the intercooler, the engine may not shut down, will rev up uncontrollably and could damage the engine and overheat injector nozzles.

This could have also happened prior to the vehicle arriving to your workshop, so question your customer and check the engine condition and injectors prior to replacing the turbo. For example, carry out compression and cylinder leak down tests, check valve train condition and listen for unusual noises when cranking the engine, along with a bench test of the injectors.

Note: First remove the injector electrical connections and intake hose from the intake manifold before attempting to crank the engine.

2. Air Mass Sensor / Meter

The air mass sensor must be replaced. Oil fumes from the engine breather circuit, feeding back into the intake pipe before the turbo contaminates the sensor. This will give an incorrect voltage signal back to the engine ECU, which can cause the engine to over-fuel and over-boost, contributing to turbo failures.

Note: Do not just clean the sensor, it can damage the sensor even with the applicable cleaning products and cleaning them is not recommended under any circumstances.

3. Oxygen Sensor

The oxygen sensor must be replaced when the turbocharger fails. This is located in the exhaust behind the turbo and will be damaged from oil entering the exhaust system.

Note: Check the catalytic converter for blockage and possible pieces of the turbine wheel in the exhaust.

A turbocharger failure is expensive to repair. That is why it is especially important to spend a little extra time and money to ensure it doesn't shortly fail again.

The following information has been provided by Robert Lomas from MTQ Engine Systems to help ensure workshops carry out durable repairs.

4. Turbo Vacuum Control Solenoid

The turbo speed and boost pressure is controlled by the turbo vacuum control solenoid and it's now fitted with a small accumulator box for storage of vacuum for the valve. There has been no information or reason found so far for this modification, but we recommend this valve be replaced, as we have had one turbo failure due to this valve being faulty and its performance cannot be tested successfully.

5. Injectors And Seat Washers

Injector seat washers have been found to be an issue and can cause engine oil contamination due to leakage of excessive carbon into the engine oil. It is recommended the injectors be removed and injector seat washers be checked for combustion leakage. If combustion leakage is found, the seats in the cylinder head should be thoroughly inspected and rectified to obtain a good sealing surface. The injector seat washers must also be replaced. Injectors also need to be tested to insure their correct operation, as this has also been a factor in turbocharger failures, due to over fuelling.

6. Oil Supply

The oil supply must be tested. Oil pressure and flow must be tested, as well as how quickly it builds up. A 2 to 5 second period during cranking seems to be normal, and if this is exceeded the engine oil pump will need to be checked. The oil supply line needs to be removed and cleaned or replaced. It is also recommended, that the oil pan/sump be removed and the oil pump pick up screen be inspected for blockages. If a blockage is found, you should also check the engine crankshaft bearings shells. We have also found bearing damage and large amounts of metal in the oil pan due to oil pick up screen blockages.

7. EGR Valve Operation

Exhaust gas recirculation valve operation needs to be tested, as this can also contribute to an over-fuelling issue and turbocharger over-speed problems.

8. Boost Pressure Sensor

The turbo boost sensor should also be replaced. It is prone to contamination and damage from excessive oil inside the intercooler when the turbocharger fails.

Note: The turbo boost sensor is located on the L/H corner of the intercooler. If a new intercooler is ordered, it comes with the new intercooler assembly, so there is no need to order a separate sensor.

9. Turbocharger

Turbo boost pressure should not exceed 18 to 18.5 psi. The usual fitment checks and procedures should be done when fitting a new turbo, such as engine oil and filter change, air filter replacement, and priming the turbocharger oil supply line and turbocharger. It helps to disconnect the injectors and crank the engine until the turbo oil supply is primed and the oil pressure light goes out, before starting the engine.

10. Dawes Valve

As an extra precaution we fit a Dawes valve. This valve is connected to a turbo boost pressure source and connected via a tee piece to the turbo VNT vacuum supply hose. In the event of an over-boost situation, the Dawes valve will dump vacuum away from the turbo and put the turbo vanes into the low boost position. MTQ stock this valve and a brass barbed 1/8" BSP fitting needs to be tapped into the front of the intake manifold to supply the turbo boost pressure source for the Dawes valve. Adjust the Dawes valve to 16 psi break off point on a Dyno or by road testing and this will help prevent future failures.

For more information about these tips call MTQ Engine Systems on 03 8346 9800 or go to mtqes.com.au