

The Turbocharged Engine

It is important to appreciate that the turbocharger is an integral part of the engine and that the whole power unit is fully developed for performance and reliability by the engine manufacturer. The quality of oil, changing of oil filters and the adherence to oil change periods, are essential to the maintenance of a satisfactory operating life of the engine/turbocharger combination.

High quality oils have been developed to meet the greater thermal load conditions of turbocharged engines and the engine manufacturer's recommendations must be closely followed. If inferior oil is used, carbon deposits can be formed at the turbine end of the turbocharger causing excessive wear of the sealing ring.

While the bearing assembly will operate indefinitely with minor scores, the continuous induction of dirt in this area will result in eventual failure.

A shortage of oil will also have serious consequences. Any drop in oil level or blockage causing a delay in the oil reaching the bearing assembly, especially on starting the engine must be corrected.

To ensure the turbocharger operates at optimum efficiency, it is essential to service the turbocharger along with your engine according to the manufacturer's guidelines.

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[Breathing *Life* into the Machine]

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Turbocharger Failure Diagnosis



Turbocharger Fault Finding

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Loss of power, excess smoke, high fuel consumption, overheating, high exhaust temperatures and oil leakages from the turbocharger are all symptoms that could indicate turbocharger malfunction. However, these faults are often wrongly attributed to the turbocharger because defects in other components can produce the same symptoms. The turbocharger performance can only be impaired by mechanical damage or blockage caused by dirt.

This guide provides a comprehensive list of the most common symptoms related to turbocharger failure. BEFORE replacing a turbocharger, verify the problem by consulting the chart below. If after taking the appropriate action problems still persist, please contact your nearest approved agent for advice.

	Engine Running Hot	Poor Transient Response	Smoke	Engine Lacks Power	Black Exhaust Smoke	Blue Exhaust Smoke	High Oil Consumption	Turbocharger Noisy	Cyclic Sound from the Turbocharger	Oil Leak from Compressor Seal	Oil Leak from Turbine Seal
Dirty air cleaner Clean or replace element according to manufacturer's recommendations	●	●	●	●	●	●	●	●	●	●	●
Restricted compressor intake duct Remove restriction or replace damaged parts as required	●	●	●	●	●	●	●	●	●	●	●
Restricted air duct from compressor to intake manifold Remove restriction or replace damaged parts as required	●	●	●	●	●	●	●	●	●	●	●
Restricted intake manifold Refer to engine manufacturer's manual and remove restriction	●	●	●	●	●	●	●	●	●	●	●
Air leak in feed from air cleaner to compressor Replace seals, gaskets or tighten fasteners as required	●	●	●	●	●	●	●	●	●	●	●
Air leak in feed from compressor to intake manifold Replace seals, gaskets or tighten fasteners as required	●	●	●	●	●	●	●	●	●	●	●
Air leak between intake manifold and engine Refer to engine manufacturer's manual and replace gaskets or tighten fasteners as required	●	●	●	●	●	●	●	●	●	●	●
Foreign object in exhaust manifold (from engine) Refer to engine manufacturer's manual and remove obstruction	●	●	●	●	●	●	●	●	●	●	●
Restricted exhaust system Remove restriction or replace damaged parts as required	●	●	●	●	●	●	●	●	●	●	●
Exhaust manifold cracked, gaskets blown or missing Refer to engine manufacturer's manual and replace gaskets or damaged parts as required	●	●	●	●	●	●	●	●	●	●	●
Gas leak at turbine inlet/exhaust manifold joint Replace gasket or tighten fasteners as required	●	●	●	●	●	●	●	●	●	●	●
Gas leak in ducting after turbine outlet Refer to engine manufacturer's manual and repair leak	●	●	●	●	●	●	●	●	●	●	●
Restricted turbocharger oil drain line Remove restriction or replace damaged parts as required	●	●	●	●	●	●	●	●	●	●	●
Restricted engine crankcase breather Refer to engine manufacturer's manual, clear restriction	●	●	●	●	●	●	●	●	●	●	●
Turbocharger bearing housing sludged or coked Change engine oil and oil filter, overhaul or replace turbocharger as required	●	●	●	●	●	●	●	●	●	●	●
Fuel injection pump or fuel injector's incorrectly set Refer to engine manufacturer's manual and replace or adjust faulty components as required	●	●	●	●	●	●	●	●	●	●	●
Engine valve timing incorrect Refer to engine manufacturer's manual for correct settings and adjust as required	●	●	●	●	●	●	●	●	●	●	●
Worn engine piston rings or liners Refer to engine manufacturer's manual and repair as required	●	●	●	●	●	●	●	●	●	●	●
Burnt valves and/or pistons Refer to engine manufacturer's manual and repair as required	●	●	●	●	●	●	●	●	●	●	●
Excessive dirt build-up on compressor wheel and/or diffuser vanes Clean in accordance with details in the appropriate Holset publication	●	●	●	●	●	●	●	●	●	●	●
Turbocharger damaged Find and correct cause of failure, repair or replace turbocharger as necessary	●	●	●	●	●	●	●	●	●	●	●
Failed diaphragm Replace using correct Actuator Service Kit	●	●	●	●	●	●	●	●	●	●	●
Sized valve Free valve/replace complete turbine housing sub-assembly	●	●	●	●	●	●	●	●	●	●	●
Leaking hose Replace hose and clips	●	●	●	●	●	●	●	●	●	●	●
Wastegate mechanism set incorrectly Contact approved agent for correct setting details	●	●	●	●	●	●	●	●	●	●	●

