

How it Works: Turbochargers

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TECH TIP

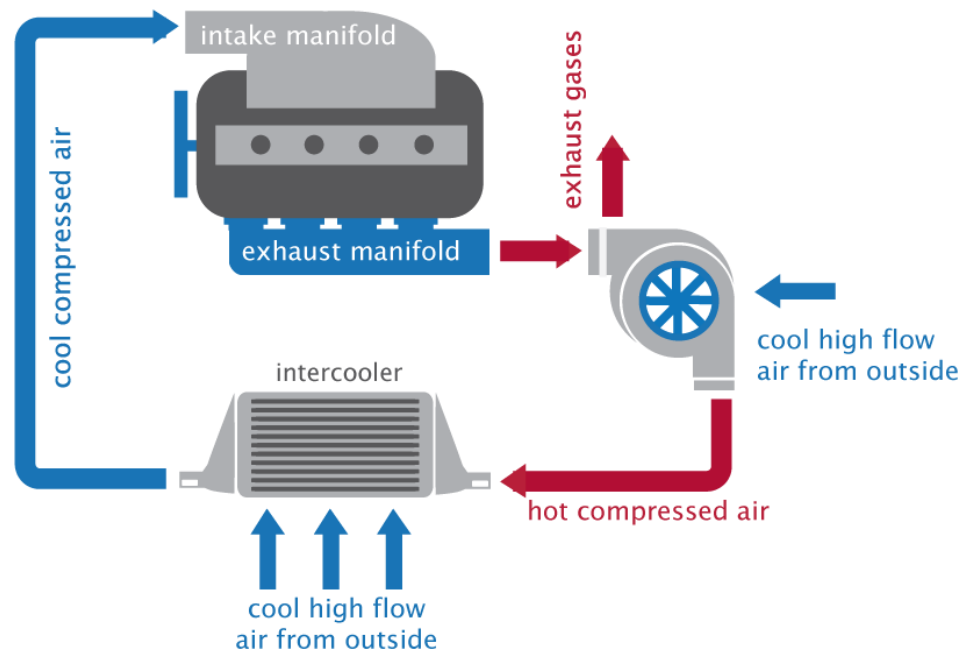
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Turbochargers (“turbos”) are a turbine–driven device that uses engine exhaust gas to engage an internal compressor that compresses ambient air and pushes it into the engine combustion chamber. This increases engine power and efficiency.

To achieve the turbo “boost”, the internal turbine and consequently internal compressor wheel spin at approximately 150,000 rpm. This means adequate lubrication is crucial for proper turbo function. The oil inlet line and the oil return line are generally located between the compressor and turbine sections. These lines allow engine oil to constantly cycle through the turbo’s bearings, valves, and fans. Ideally, internal components in motion should be coated in a film of oil and operate in a “free floating” state.

Many systems with a turbo or supercharger operate with an intercooler. Refer to gpd Tech Tip #97, ‘How it Works: Intercoolers’. The intercooler is a heat exchanger similar in function to the radiator. The intercooler cycles and cools charged air from the turbo’s compressor air discharge before it enters the engine’s combustion chamber. Like the radiator, the intercooler uses coolant to absorb heat.



Common Reasons for Turbocharger Failure:

- Lack of lubrication. Due to leaks in intake/return lines or excess pressure in the crankcase. Too much oil can also cause failure.
- Contaminants/foreign objects can damage internal fans. Generally, if the turbine or compressor wheel are stuck/blocked, the turbo will overheat.
- Clogged air filter can increase pressure and temperature.
- Improper installation or wear and tear of seals and gaskets can also cause turbo failure.

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