

Turbonetics Installation Instructions



CAUTION: Failure to follow these installation instructions can result in premature turbocharger failure and loss of warranty eligibility

These installation instructions apply to all Turbonetics turbocharger models

When installing a new turbocharger, be certain check for the following:

- No foreign material in the air cleaner or intake ducting
- No foreign material in the exhaust manifold or pipes leading to the turbocharger

Alignment of end housings:

Note: Compressor housing, turbine housing and center housing can all turn independent of one another.

The factory assumed the re-orientation of end housing will be required so the bolts (or V-band clamps) that hold the end housings in place from the factory are only tightened to a snug condition to ease the re-orientation of housings upon installation. These bolts only need to be loosened approximately 1 ½ turns to re-orientate housings.

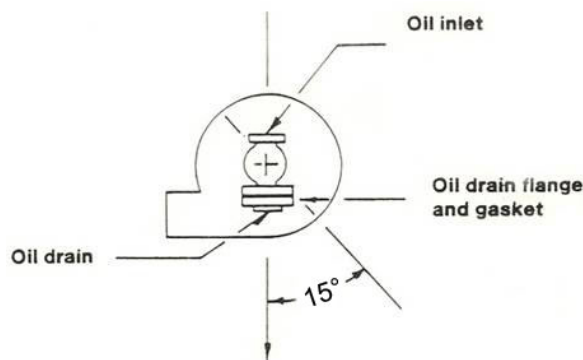
These bolts (or V-bands) need to be properly tightened once the final installation position has been established.

End Housing Hardware Torque Values

| | <u>T3, T4, T-Series</u> | <u>Mid-Frame</u> | <u>Y2K & Thumper</u> |
|--|-------------------------|------------------|--------------------------|
| Compressor Housing Bolts (or V-Band Nuts) | 110-130 in-lbs | 120 in-lbs | 120 in-lbs |
| Turbine Housing Bolts (or V-Band Nuts) | 110-130 in-lbs | 120 in-lbs | 120 in-lbs |

Oil drain positioning:

It is important to not exceed 15° in oil drain angle in order to allow proper drain of lube oil from the turbocharger back into the engine. The oil entering the turbocharger is pressure fed from the engine but relies on gravity to make it's way back to the engine, any greater angle can cause oil to back up into the turbocharger and leak past the seals.



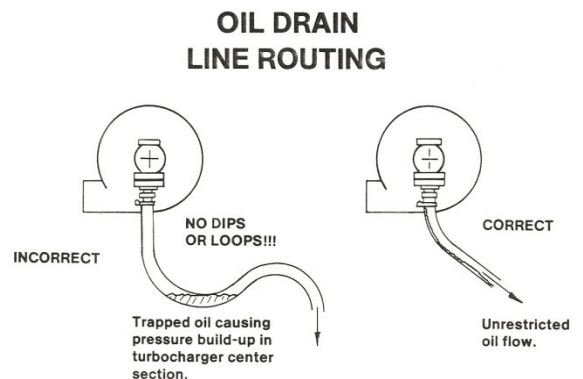
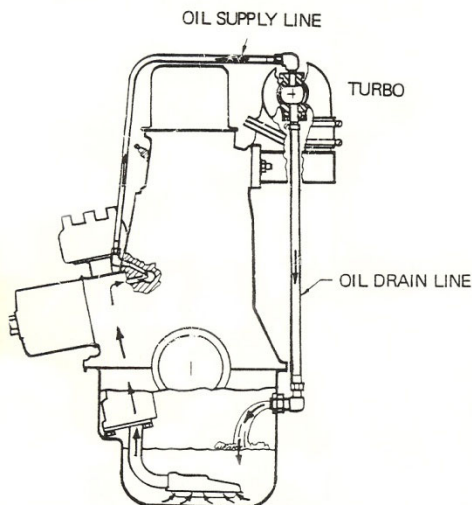


The turbocharger seals located at the compressor and turbine ends of the turbocharger have a primary purpose to keep pressurized air/exhaust gases from entering the turbocharger and then the crankcase. The fact that they also help control oil from entering the compressor and turbine housings is secondary.

The oil entering the turbocharger is pressure fed from the engine but relies on gravity to return it back to the engine. Any restrictions in the oil drain will cause the oil to backup inside the turbocharger and be forced past the seals so it's very important the oil returning from the turbocharger to the engine is free flowing with no restrictions. It is also important that the oil enters the crankcase above the oil level.

Oil leakage from the turbocharger seals can be caused from a number of conditions, below are the most common.

1. Excess engine cranks case pressure
 - A. due to poor crankcase ventilation like a plugged or improperly working PCV (positive crankcase ventilation) system or an open port from the intake manifold to the crankcase.
 - B. Excessive engine blow by due to worn engine components
2. Too small of an oil return line, preferably $\frac{3}{4}$ " to 1" minimum inside diameter
3. Oil return line routing is critical, there can be no sinks/traps and oil must return above the oil level in the crankcase.
4. Blocked oil drain at turbocharger or crankcase caused by incorrectly installed oil drain gasket or excessive use of silicone gasket material protruding into the oil drain flow path.
5. Air filter restrictions (too small or dirty) will cause a restriction and contributes to excessive amount of vacuum on the compressor end seal causing oil to be drawn past the seals.





Oil inlet line:

Clean filtered oil is part of the life support system for your turbocharger, it provides lubrication, cooling and vibration dampening of the rotating group as it accelerates through it's RPM range. The oil feed line size from the engine or oil supply source to the turbocharger is critical to provide an adequate amount of oil to the turbocharger without flooding it.

For turbocharger models:

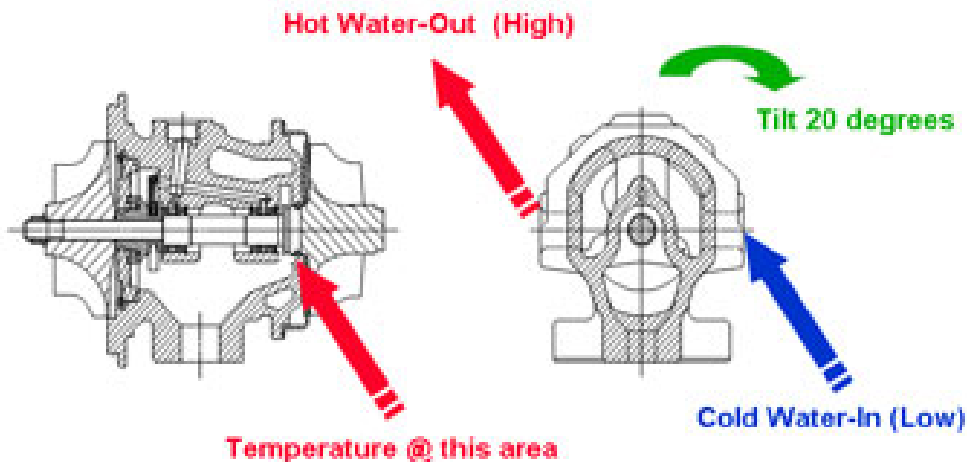
T-3 through T-Series use either -3 AN (1/8") or -4 AN (1/4")
Mid-Frame, Y2K and Thumper series require -4 AN (1/4")

Remove all protective cap plug closures from the oil inlet and drain as well as compressor inlet and discharge.

Water cooling :

A key design feature for improving durability of the turbo ,we recommend that if your turbo has water-cooling passages , to hook up the water lines. Water cooling eliminates the destructive ability of oil coking by utilizing the Thermal Siphon Effect to reduce the heat soak of high temperatures on the turbine side area after shut-down. In order to get the greatest benefit from your water-cooling system, avoid undulations in the water lines to maximize the Thermal Siphon Effect.

The turbocharger must be mounted below the upper most water level in the coolant system to ensure proper thermal siphoning and flow of water through the bearing housing. If the turbo is mounted above the water level of the coolant system, the siphoning effect can be ineffective after engine shut down.





Installation and pre-oiling of the turbocharger:

- 1.Oil inlet filter, If equipped from the factory DO NOT remove this filter it will it may result in premature turbocharger failure and loss of warranty eligibility.
- 2.Check to make sure oil feed line is new or in new condition, make sure to check that oil line is free from any obstruction.
- 3.Upon installation of a new or during the replacement of existing turbocharger the oil inlet filter/fitting and oil supply line needs to be filled with lubricating oil prior to connecting oil supply line to turbocharger.
- 4.Check for proper crankcase oil level
- 5.With the fuel and/or ignition disabled to prevent engine from starting, crank engine 10-15 seconds or until stable oil pressure is indicated on gauge and oil pressure is present.
- 6.Allow engine to idle for 5 minutes while checking for leaks

General Operating practice:

- 1.Start up: It can take up to 15 seconds for an engine's oil pressure to fully stabilize each time the engine is started and therefore is important not to take the engine above idle until oil pressure is stable.
- 2.Engine shut down is very important to the life of your turbocharger. The oil pressure and flow feeding your turbocharger from your engine stops as soon as the key is turned off, the turbine wheel can spin in excess of 100,000 RPM and can take a few minutes to return to slow down enough RPM to shut off the oil supply.
- 3.Air filter cleanliness is very important for the longevity of your turbocharger as well as the engine.
- 4.Clean engine oil is a cheap insurance policy for long turbocharger life, change every 3,000 miles.
- 5.Drive the vehicle easy for a the last few miles before reaching your final destination . Low boost and low revs will help lower oil temperature and heat soak, reducing the chances of oil coking and breakdown.
- 6.Let car idle for a minimum of 90 seconds before shutting off engine. This prolongs the life of the turbocharger by reducing oil "coking" which can build up on the bearing(s), turbine wheel shaft and seals from hot shut-downs.