Turbo Charging Pontiac Fiero

Chuck Wessel


Fiero GT

☞ **RULE:** Turbos make torque, and torque makes fun.

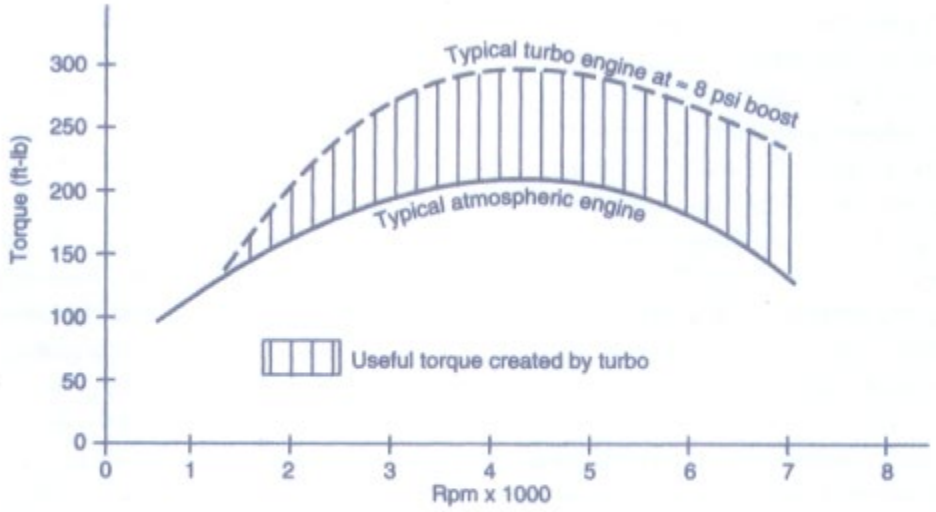


Fig. 1-8. *One typical example of the difference in torque curves for a turbocharged and an atmospheric engine.*

Turbo Size

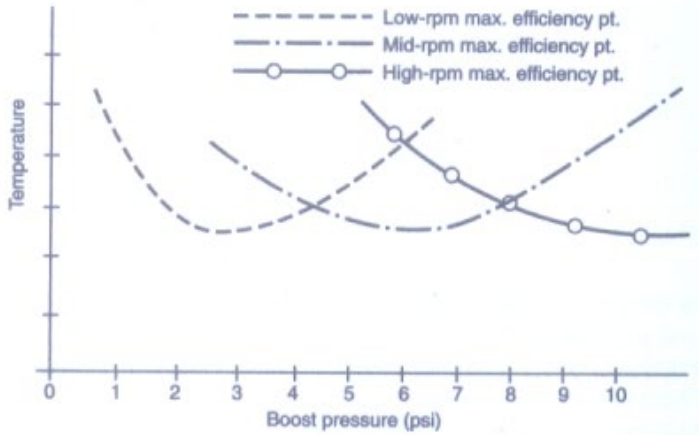


Fig. 3-2. *With a small turbo, the maximum efficiency point peaks early, and temperatures will be lowest at low boost pressures. To keep temperatures down at high power outputs, a large turbo is clearly necessary.*

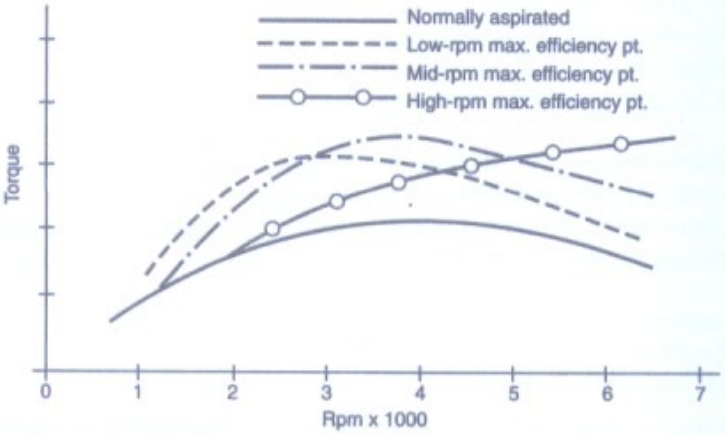


Fig. 3-3. *As the maximum efficiency point occurs at higher and higher rpm, cooler temperatures also occur. Cooler temperatures mean denser air, which keeps torque peaks at higher rpm.*

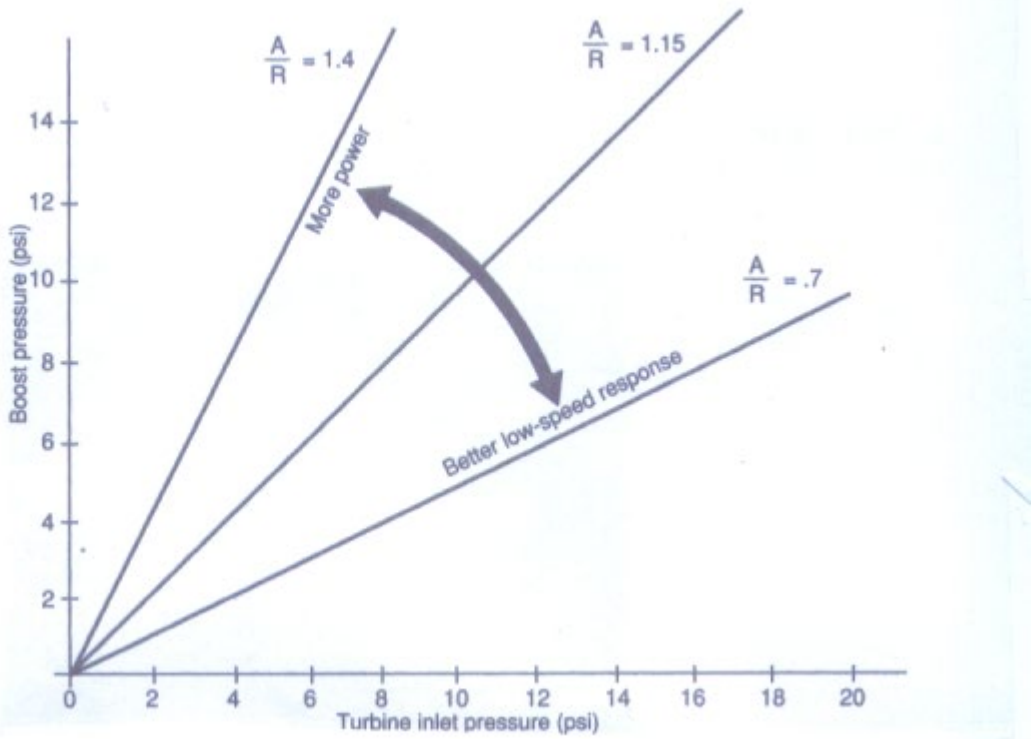
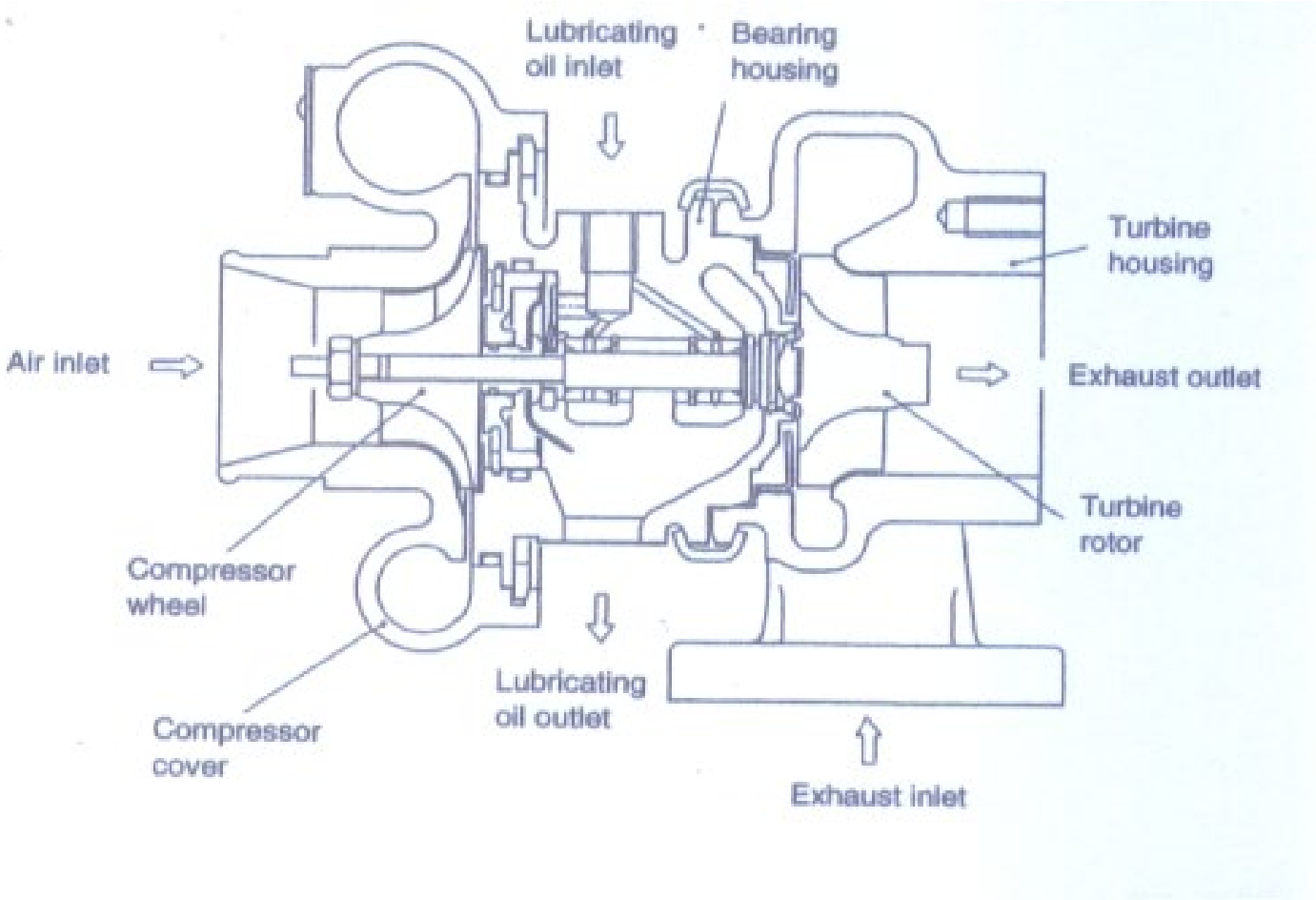


Fig. 3-13. *The effect of varying the A/R ratio, all other factors remaining constant*

Basic Turbo Design

Fig. 3-1. The classic turbocharger: a very simple, highly engineered, high-quality, precisely manufactured air pump.



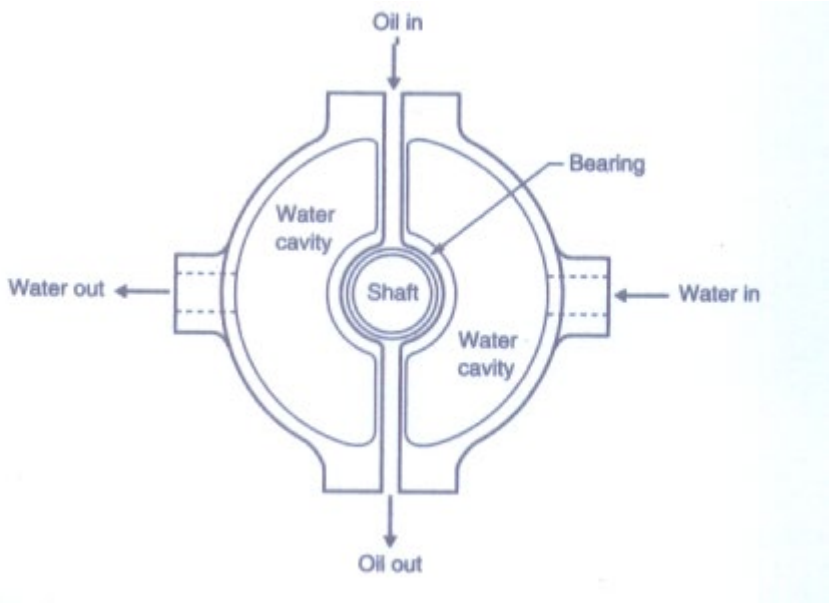
Oil Considerations

- Too much oil pressure will create problems with a turbo.
  - Too much pressure will overpower the seal and is evident with frequent if not quite constant smoking problem.
  - Pressure not to exceed 65-70 lbs.
  - At max load 25 lbs mininium.

- Oil drainage from turbo is critical.
  - Oil seals in the turbo do not operate well if they are completely bathed in oil.
  - Oil drainage is gravity feed to the pain since there is no pressure after the bearings.
  - Drain hose should be ½ inch ID.
  - Drain hose with no sharp bends.

Water Cooling

A water jacket incorporated into the turbo bearing housing and connected to the engine cooling system carries away most of the heat that migrates from the exhaust side to the bearing section. Lubricating oil is guarded from temperature levels high enough to cause coking.



Water Cooled Bearing is a feature that extends the average turbo useful life by a factor of two.

The presence of water flow though a jacket surrounding the bearing chamber greatly reduces temperature rise of the lubricating oil as it passes through the bearings.

Map Sensor

- The logic module uses the manifold absolute pressure (MAP) sensor to determine the absolute pressure (not the relative to atmospheric pressure) of the air inside the intake manifold and the atmosphere (barometric pressure).
  This information is used to determine the density of the air entering the combustion chamber (in conjunction with the IAT(Intake Air temperature) sensor), which is used when calculating the proper air/fuel mixture for the engine, especially at WOT since the system is not in closed-loop at this time.
  It is also used to help adjust the IAC(Idle Air Control) motor during idle.

Types of Map Sensors

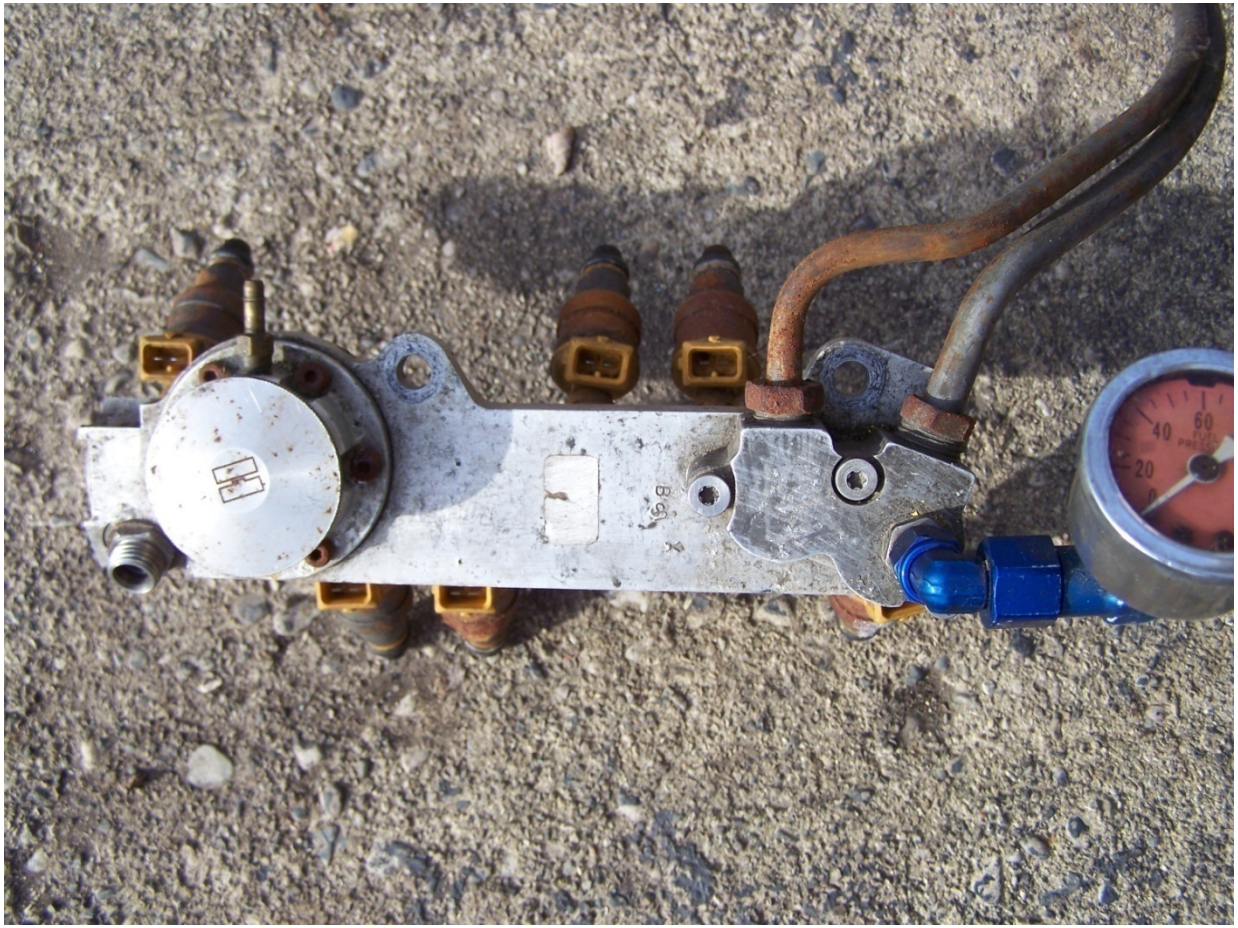
1 Bar MAP sensors are used on NA(naturally asperated) vehicles.

2 Bar MAP Sensors are used on forced induction vehicles(Turbo & Supercharged). They can measure up to 2x the apmospheric pressure(29.4psi), so that means it can measure up to 14.7psi boost(the atmosphere is 14.7psi + 14.7psi from the turbo/supercharger).

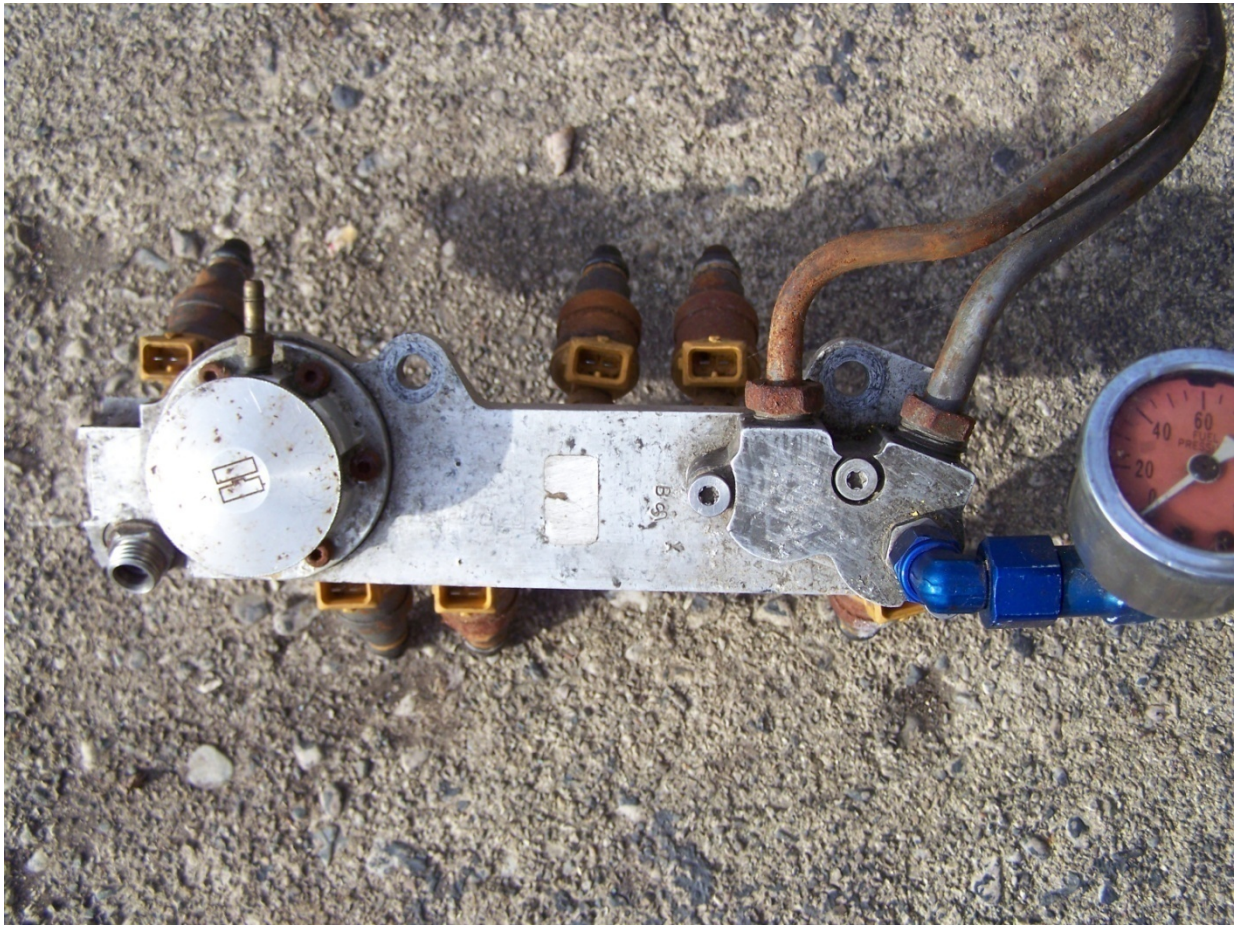
3 Bar MAP sensors can measure up to 44.1psi, which translates to 29.7psi boost from a Turbo/supercharger.

Bosch 280 150 762 Injectors

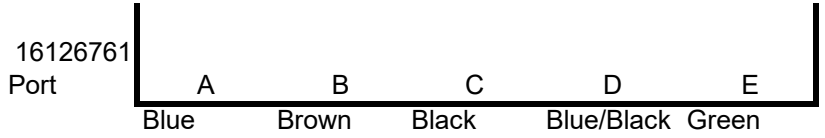
21 Lbs At 43Lbs Pressure



HOLLEY ADJUSTABLE FUEL PRESSURE REGULATOR

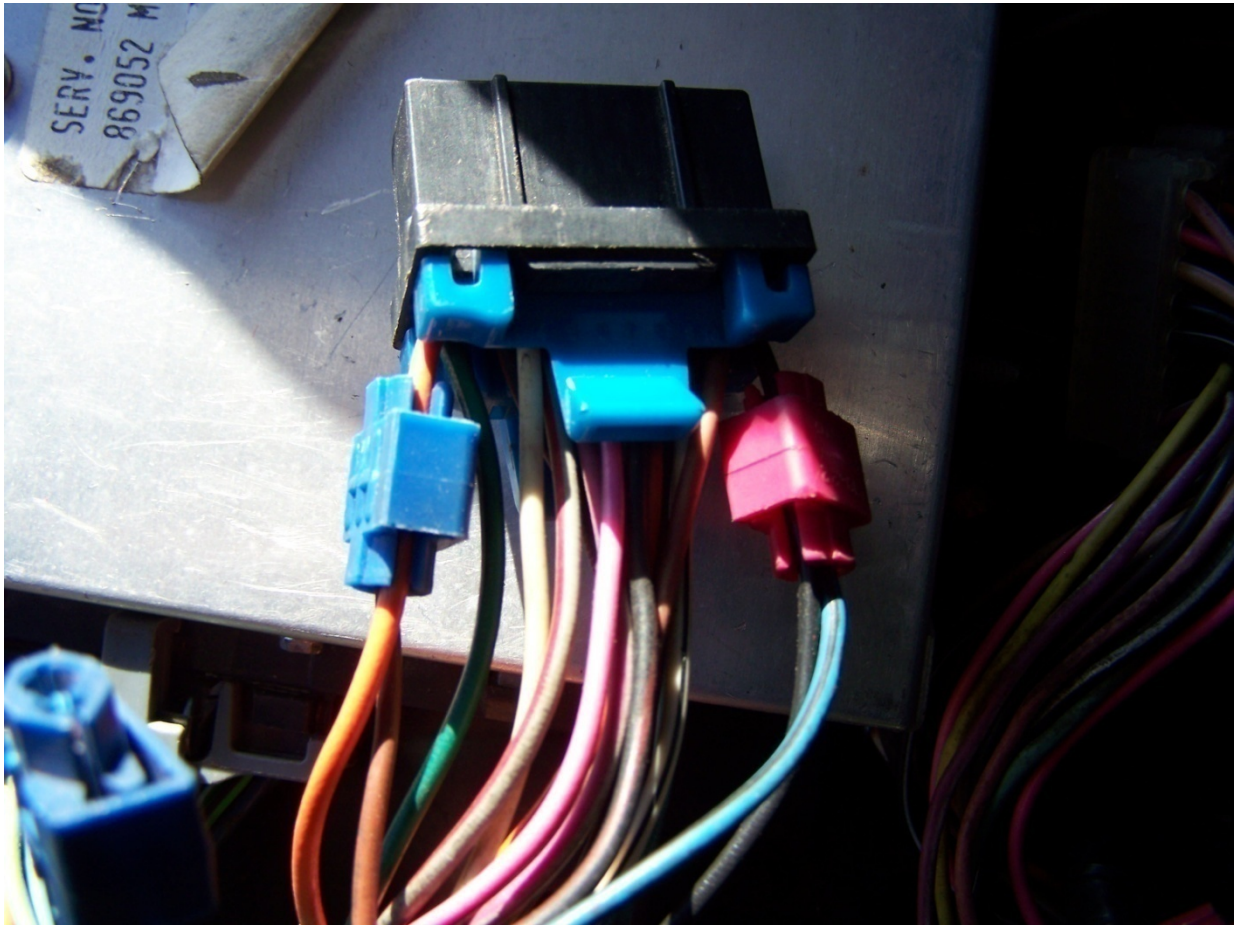


Wiring of Knock Module

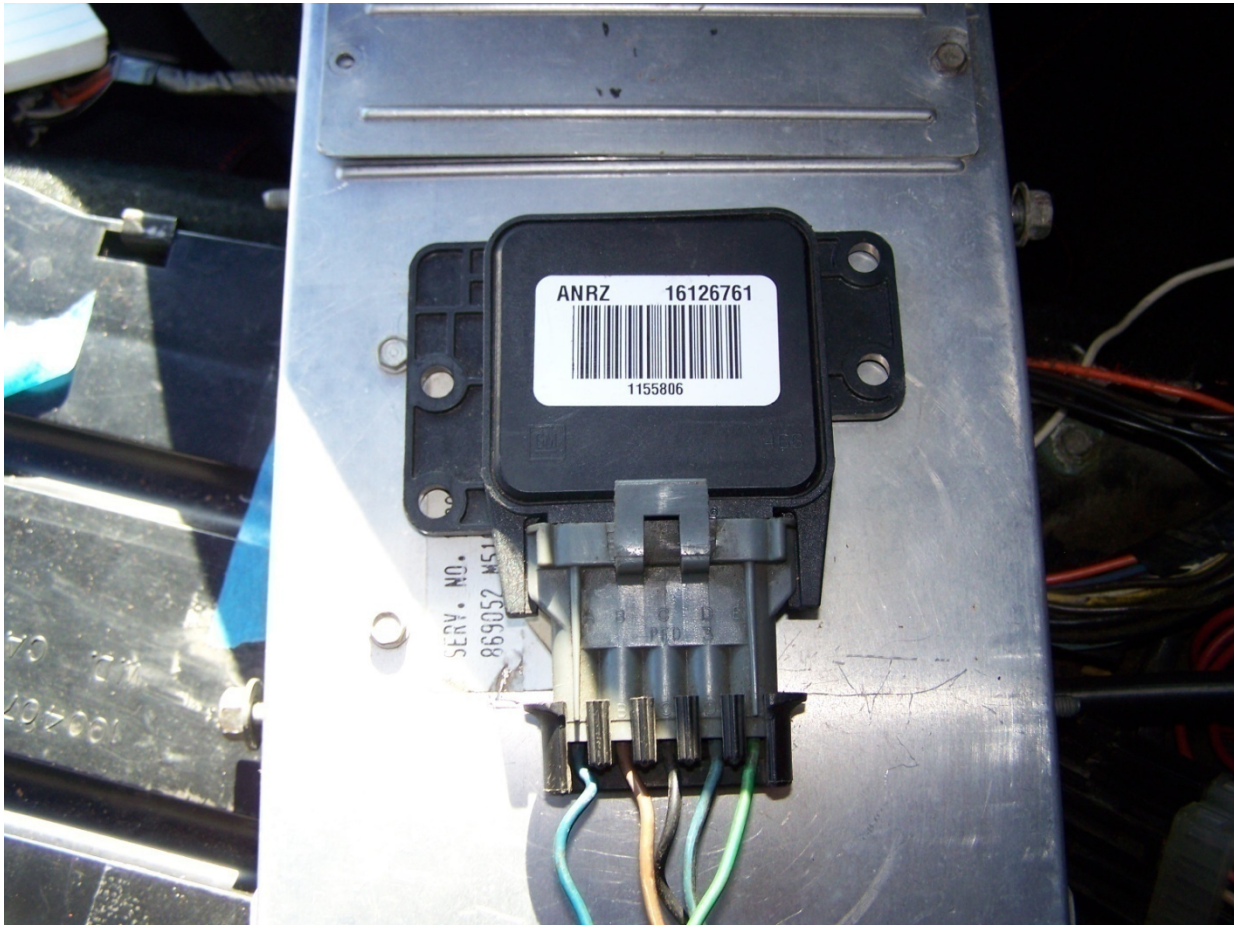


	B1	A12	B7	Sensor
24 Pin Connector ECM	Orange (Battery)	Black (Ground)	ADDED WIRE TO HARNESS	

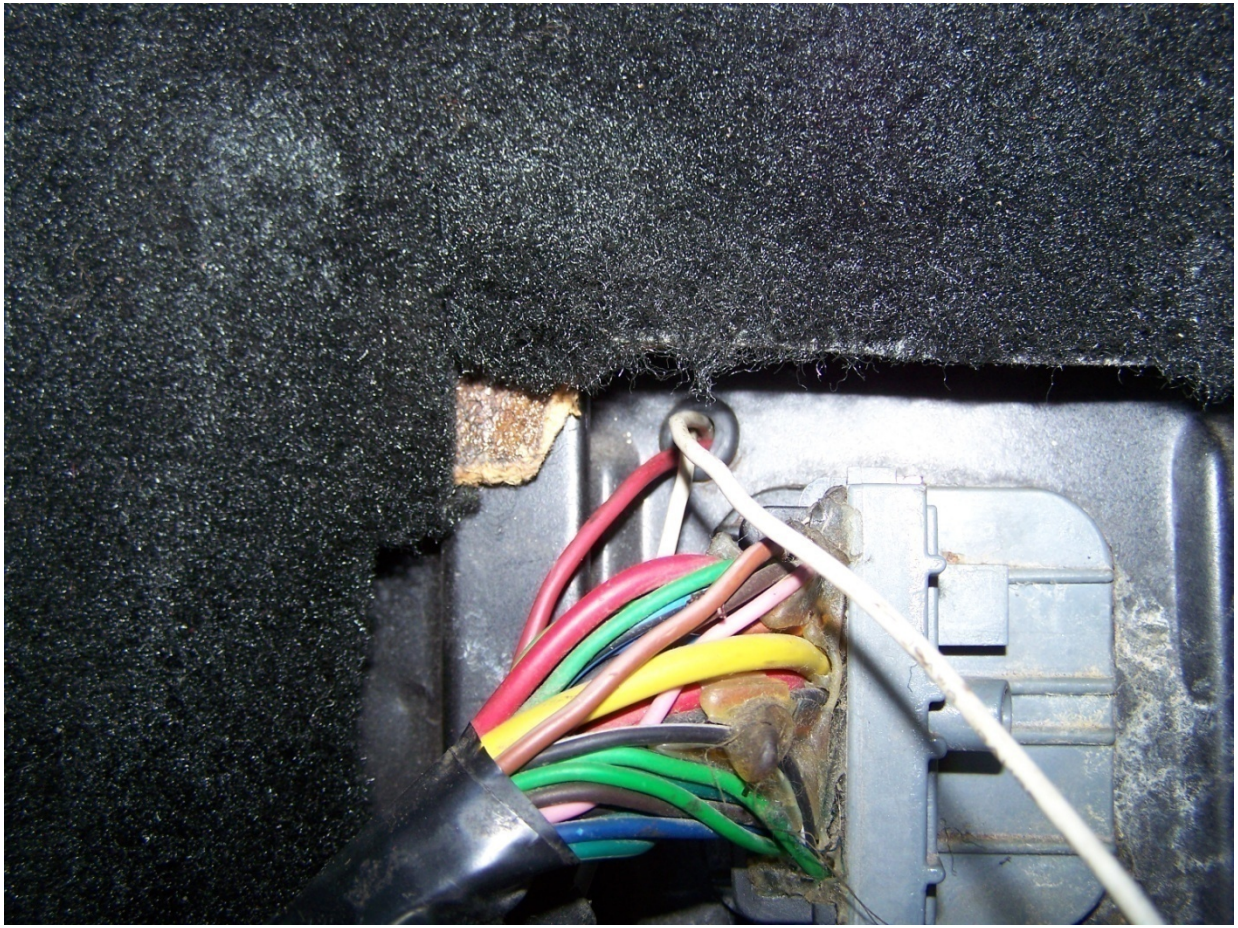
Picture A/B ECM Plug



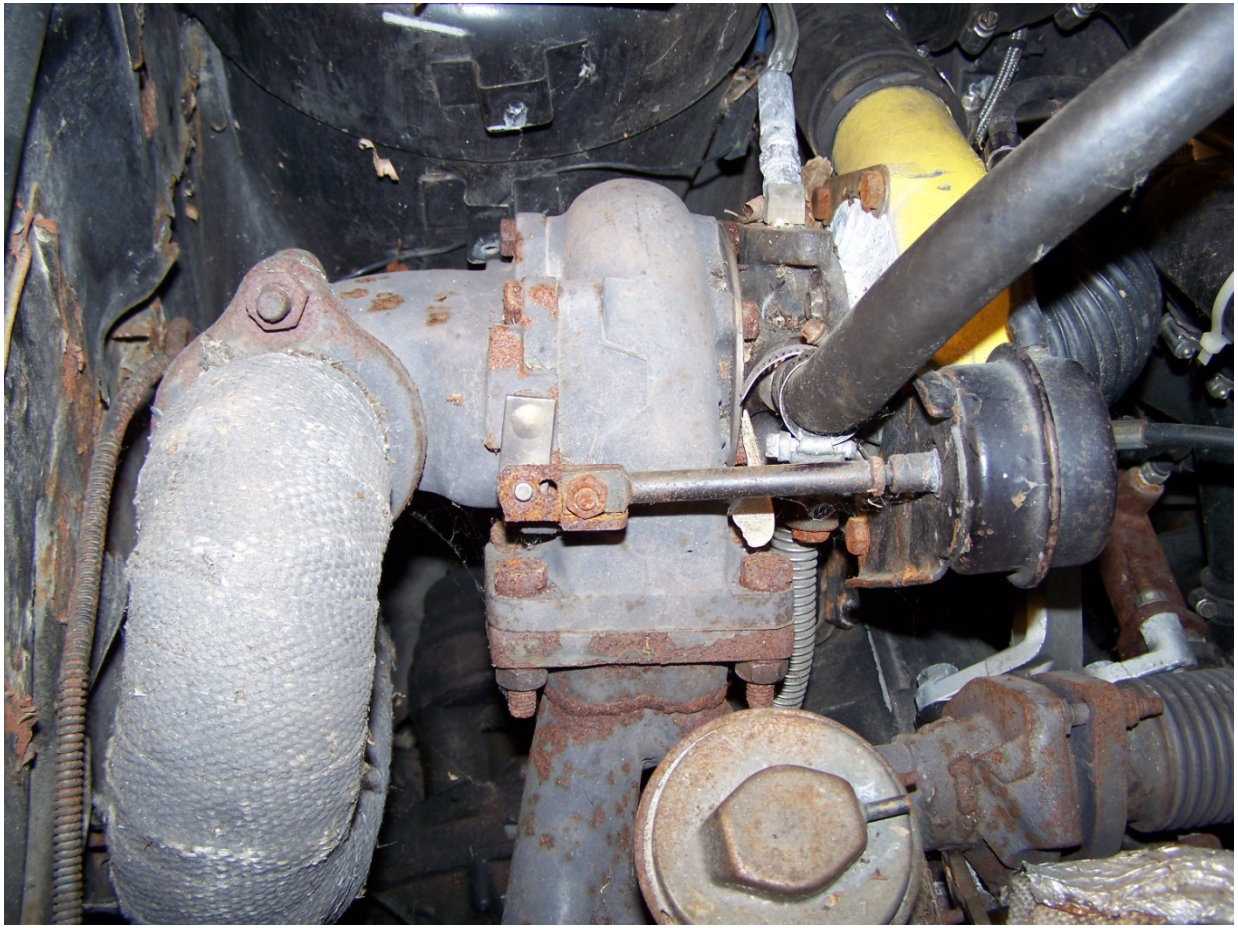
Picture of Knock Module



Added Wires on Firewall

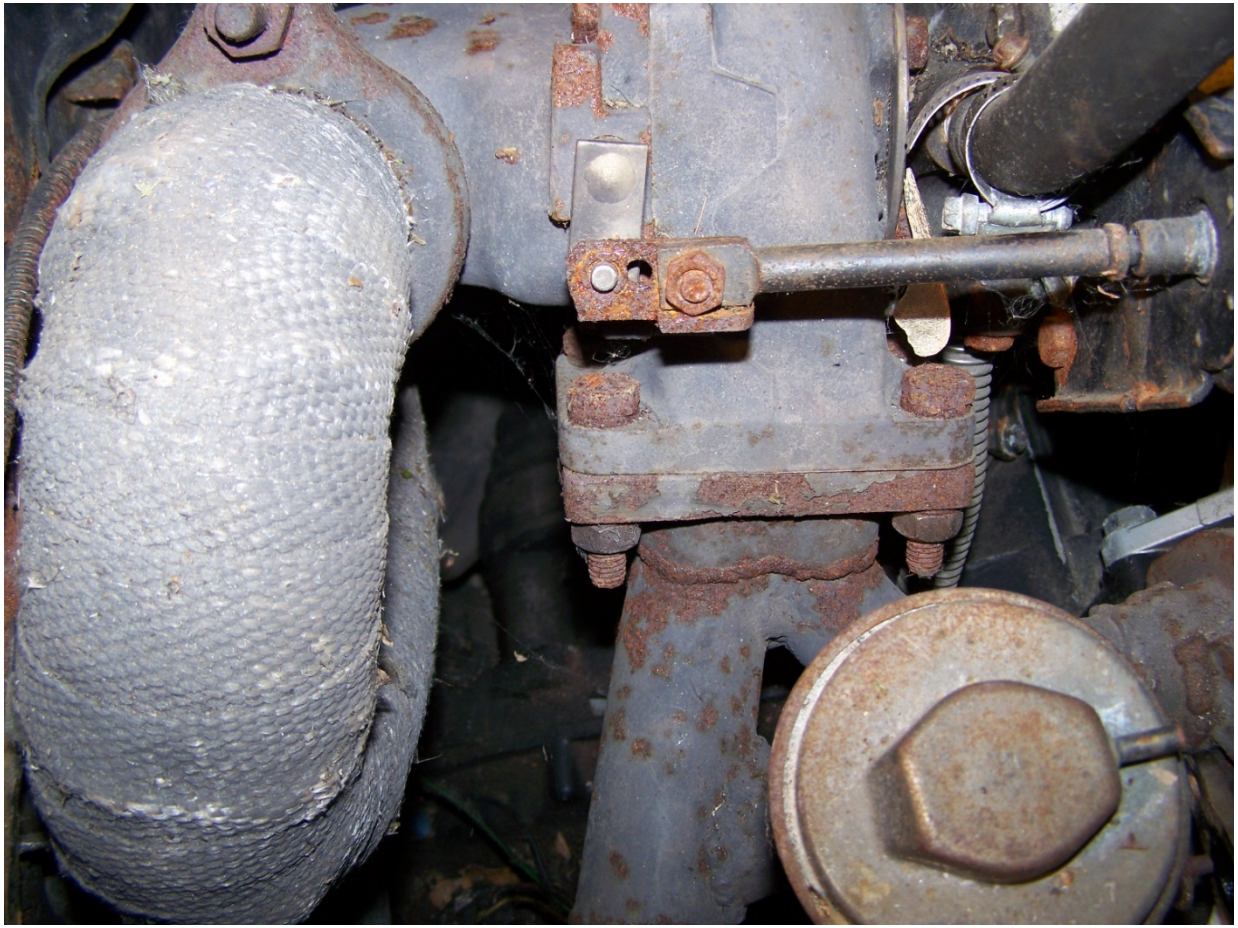


Turbo Mounting

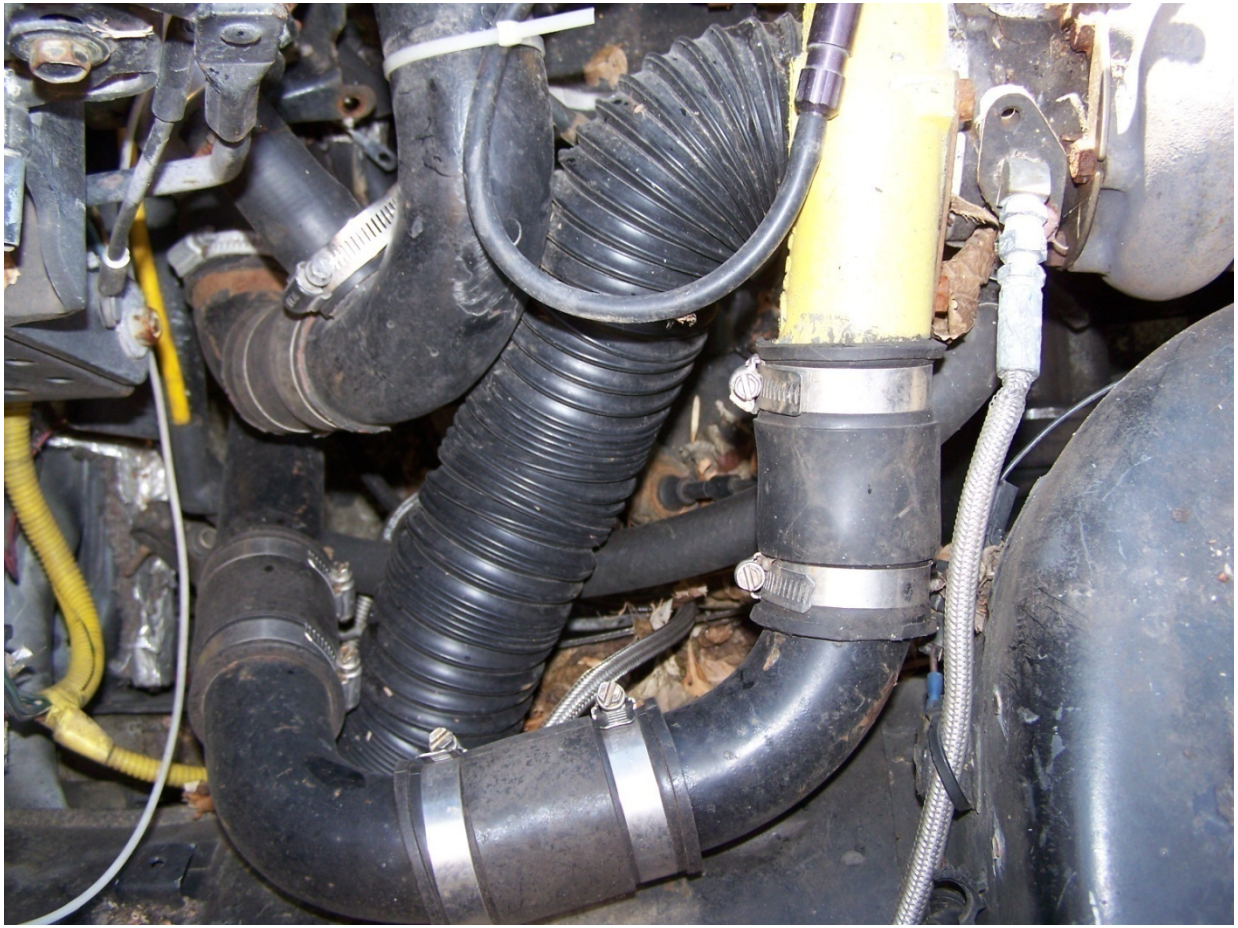


Crossover Connection

Turbo Flange



Intake air Plumbing



References

- Maximum Boost
  - Bentley Publishing