

while the engine is not operating. Piston ring-like oil seals are used on the compressor wheel shaft to prevent the lubricating oil from entering the turbine and compressor housings from the center housing.

The position of the waste gate is controlled by adjusting the oil pressure in the waste gate actuator. Several different types of controllers are used to provide the correct pressure in the waste gate actuator. This is done either by restricting the oil flow or by allowing the oil to return to the engine. The more the oil is restricted, the more pressure is in the waste gate actuator and the more closed the waste gate is. This causes the exhaust gases to pass through the turbine, increasing the speed of the compressor raising the inlet pressure. The reverse happens if the oil is not restricted by the controllers and boost is reduced. The pressure from the outlet of the compressor of the turbocharger to the throttle is referred to as deck pressure or upper deck pressure.

A Typical Turbosupercharger System

Figure 3-18 is a schematic of a sea level booster turbosupercharger system. This system used widely is automatically regulated by three components:

- Exhaust bypass valve assembly
- Density controller
- Differential pressure controller

By regulating the waste gate position and the “fully open” and “closed” positions, a constant power output can be maintained. When the waste gate is fully open, all the exhaust gases are directed overboard to the atmosphere, and no air is compressed and delivered to the engine air inlet. Conversely, when the waste gate is fully closed, a maximum volume of exhaust gases flows into the turbocharger turbine, and maximum supercharging is accomplished. Between these two extremes of waste gate position, constant power output can be achieved below the maximum altitude at which the system is designed to operate. An engine with a critical altitude of 16,000 feet cannot produce 100 percent of its rated manifold pressure above 16,000 feet. Critical altitude means

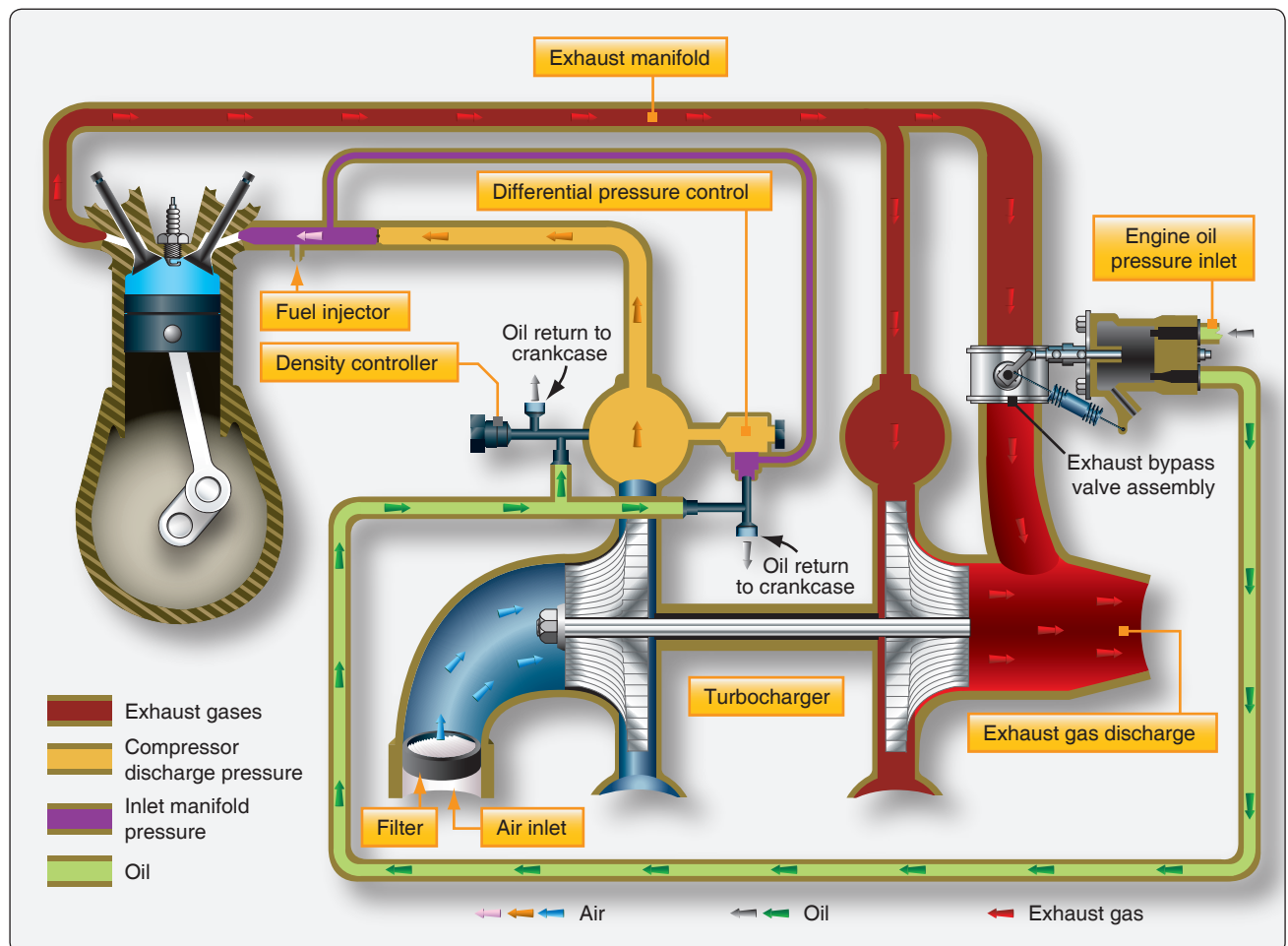


Figure 3-18. Sea level booster turbosupercharger system.