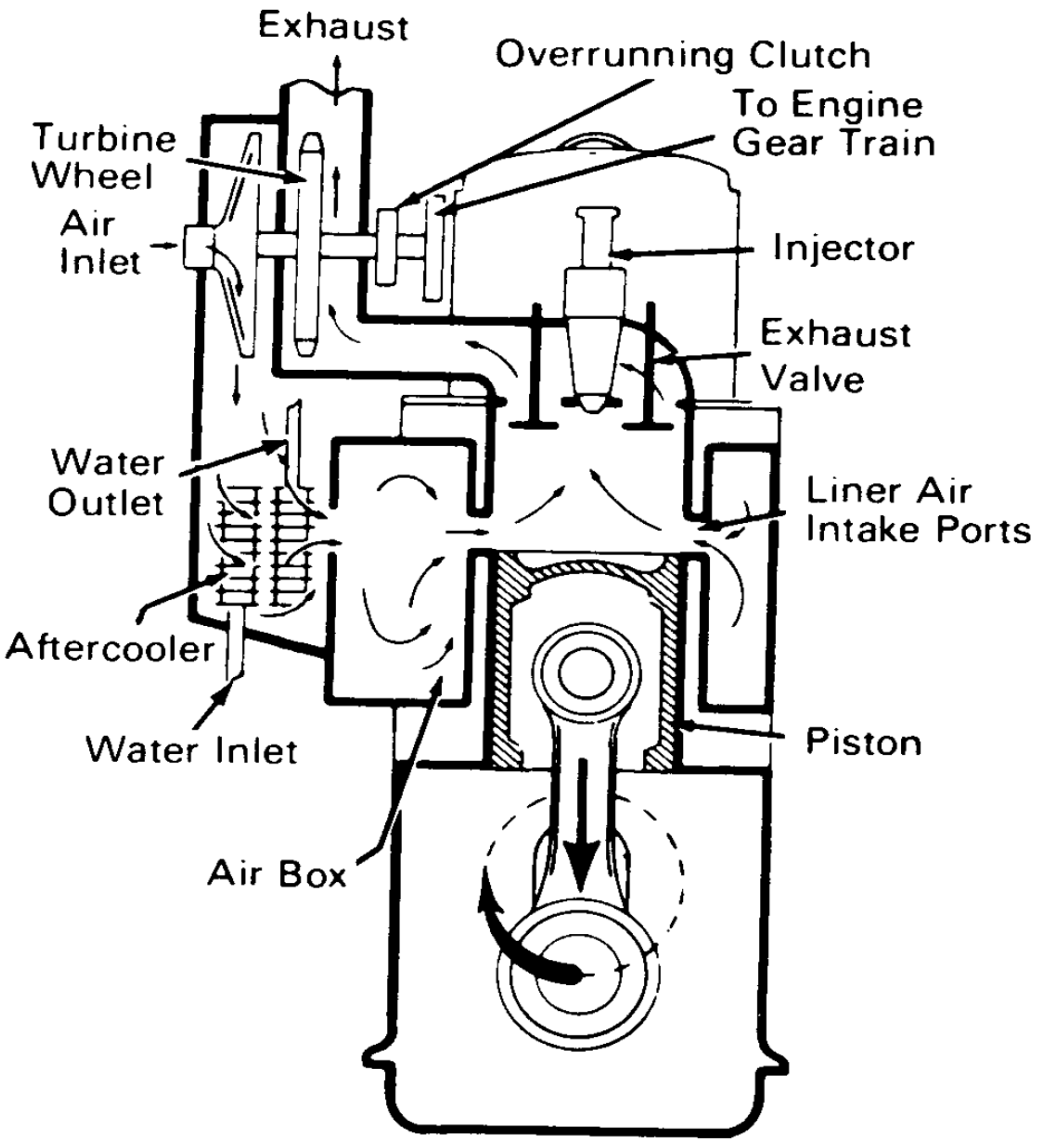
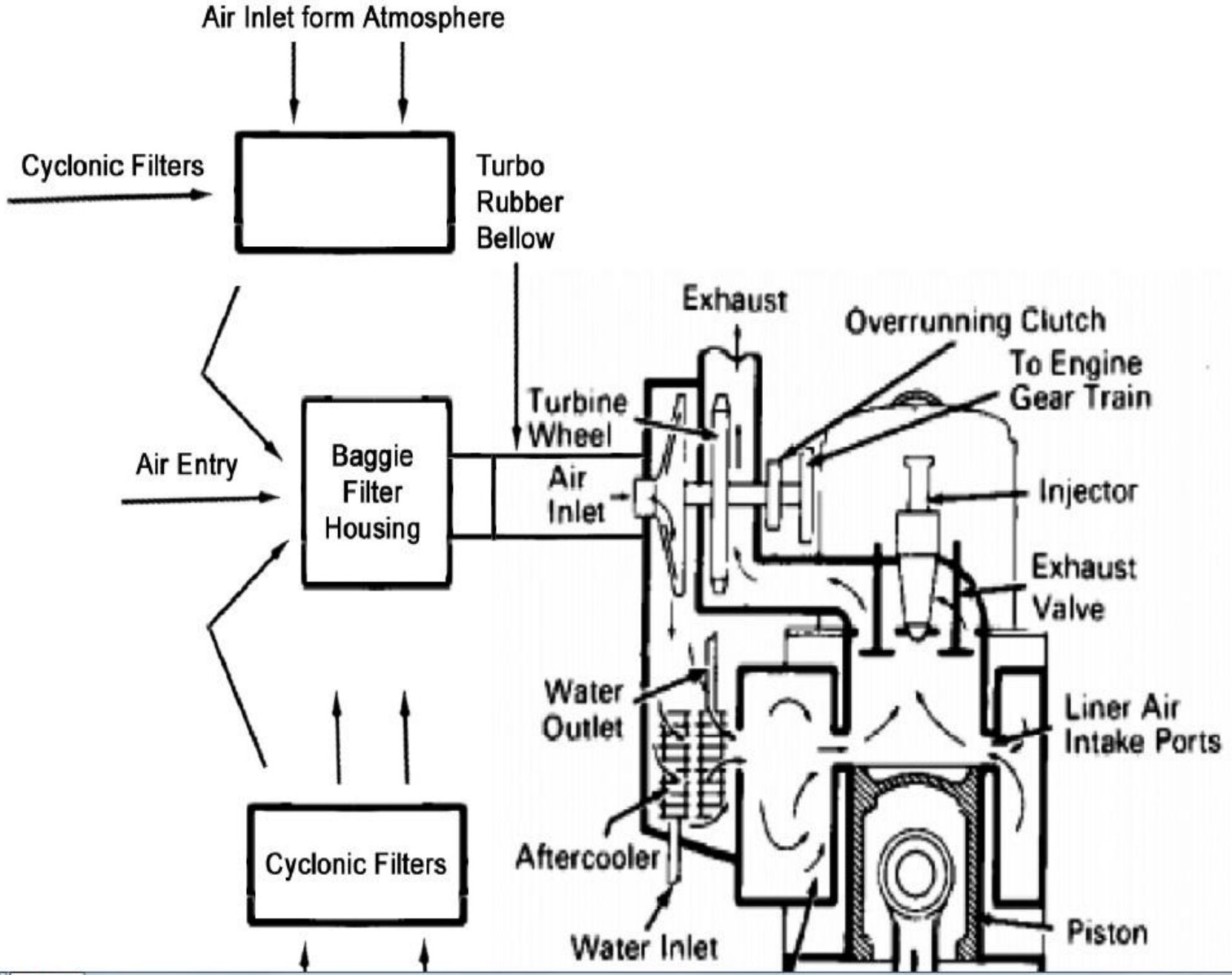
# GM TSC

# AIR INTAKE SYSTEM

- Air intake system consists of the following components.
- Turbo charger,
- Inertial air intake filters,
- Baggie type fiber glass air intake filters,
- After cooler

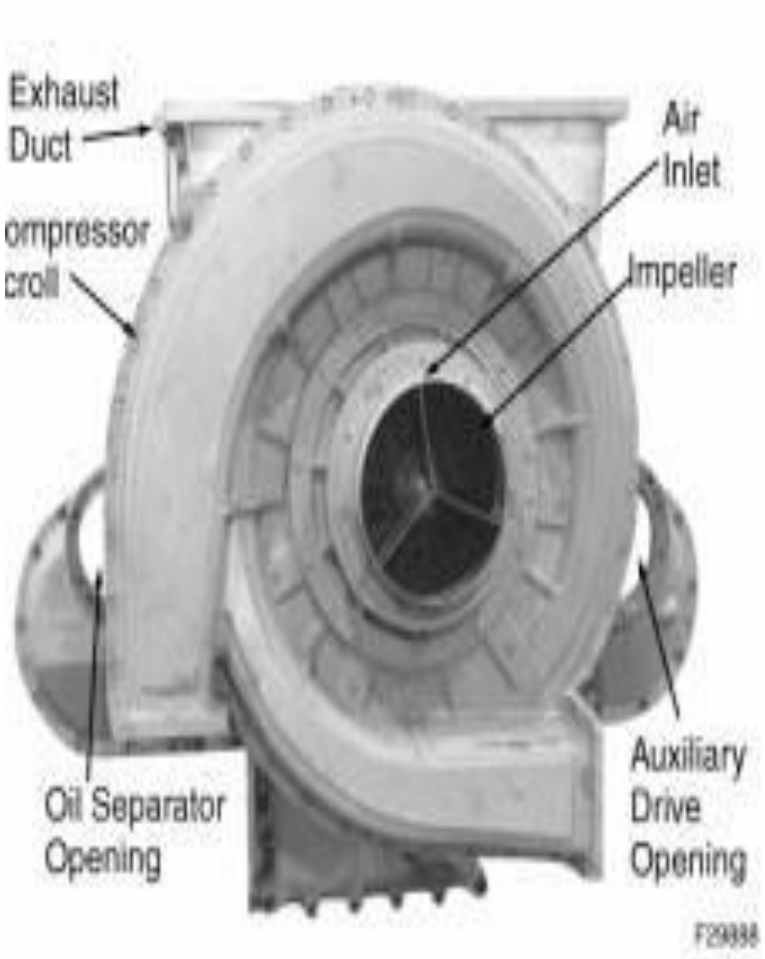
# ENGINE WORKING SCHEMATIC

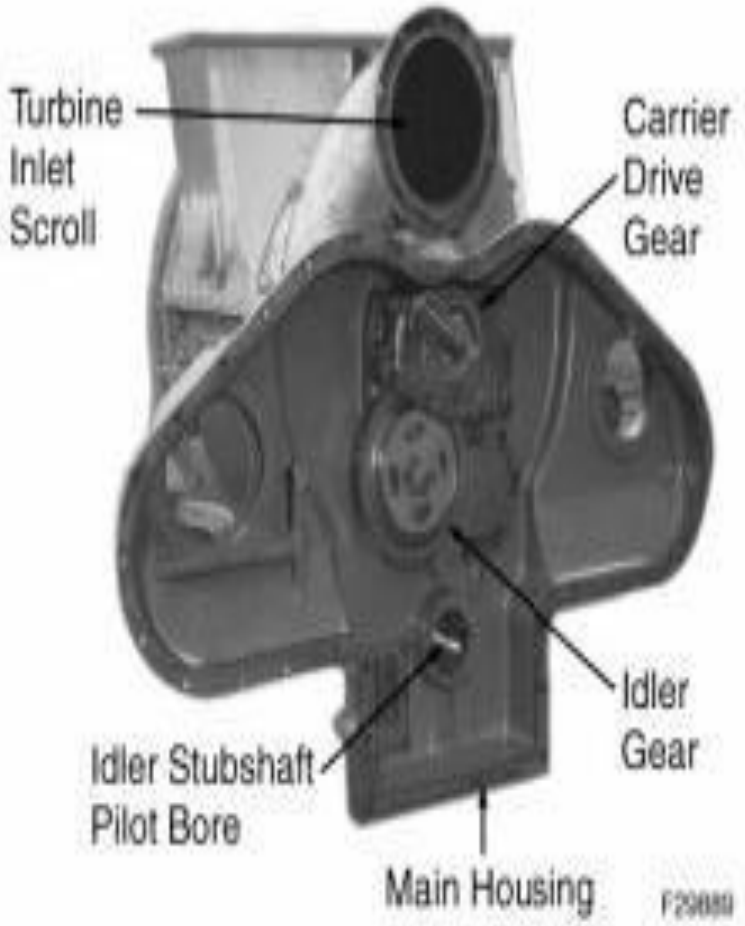



Air Inlet form Atmosphere
Cyclonic Filters
Turbo
Rubber
Bellow
Exhaust
Overrunning Clutch
To Engine
Gear Train
Turbine
Wheel
Air Entry
Baggie
Filter
Housing
Air
Inlet
Injector
Exhaust
Valve
Water
Outlet
Liner Air
Intake Ports
Cyclonic Filters
Aftercooler
Water Inlet
Piston

# TSC

- The turbocharger assembly is primarily used to increase engine horse power and provide better fuel economy through the utilization of exhaust gases. Turbocharger has a single stage turbine with a connecting gear train. The connecting gear train is necessary for engine starting, light load operation and rapid acceleration.


Exhaust
Duct
ompressor
croll
Air
Inlet
Impeller
Oil Separator
Opening
Auxiliary
Drive
Opening


Turbine
Inlet
Scroll
Carrier
Drive
Gear
Idler
Gear
Idler Stubshaft
Pilot Bore
Main Housing

- Under these conditions there is insufficient exhaust heat energy to drive the turbine fast enough to supply the necessary air for combustion and the engine actually driving the turbocharger through the gear train assisted by exhaust gas energy.
- When the engine approaches full load, the heat energy in the exhaust , which reaches temperatures approaching $538^0$c  ($1000^0$F) is sufficient to drive the turbocharger without any help from the engine. At this point, an overrunning clutch in the drive train disengages and the turbocharger drive is mechanically disconnected from the engine gear train.

# Turbocharger assembly

- On turbocharger for 16/2o cylinder engines, the turbine shaft is driven by the engine gear train through a series of gears in the turbocharger.
- A turbocharger drive  gear , which is part of the clutch drive gear assembly, meshes with the turbocharger idler gear, driving the carrier drive  gear

- The carrier shaft drives the sun gear on the turbine shaft through the three planet gears When the turbocharger is being driven by the engine. The sun gear meshes with the planet gears which in turn, mesh with a fixed ring gear in the carrier shaft support assembly. When the turbine is being driven entirely by exhaust energy, the direction of torque transmitted back through the gears in the turbocharger unlocks the overrunning clutch.

- The overrunning clutch consists of 16 rollers in tapered slots. The slots are formed by the combination of a clutch drive support and the pockets in a cam plate. The cam plate, a clutch support and a cam plate retainer are doweled and bolted together, and rotate as a unit. The unit in turn bolts to the turbocharger drive gear. The clutch drive support is bolted to the No.2 idler gear.

- When the engine is driving the turbine, the rollers are wedged in the small side of the cam plate pockets, as a result of the direction of torque, locking the cam plate to the clutch drive support(Turbocharger drive gear to the No.2 idler gear).
- Because the planet gear shafts are driven as a part of the carrier shaft, the planet gears rotate in the fixed ring gear to drive the sun gear on the turbine shaft. When the exhaust energy becomes great enough to drive the turbine without help from the engine, the torque back through the turbocharger gears reverses direction. This causes the rollers to move to the wide end of the cam plate pocket, unlocking the clutch, permitting it to overrun. From this point on, with in increased load and speed, The turbocharger overruns the engine drive.