1982 Turbocharging Systems

PEUGEOT DIESEL

505 Turbo Diesel, 604 Turbo Diesel

DESCRIPTION

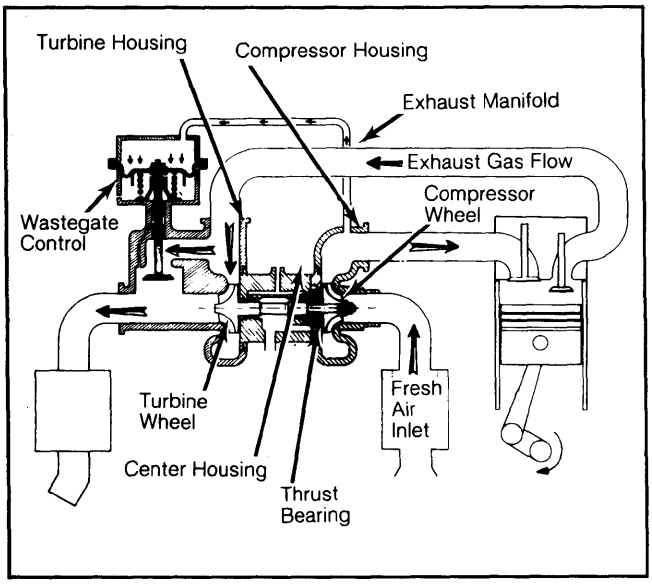
The turbocharger used on Peugeot 505 diesel models is mounted on the passenger side of the engine. Components include the turbine, compressor wheel, rotor shaft, bearings and housing.

A wastegate valve prevents excessive boost pressure. Modifications made to the XD2 diesel engine to accept the turbocharger are as follows:

New intake and exhaust manifolds were designed. Cylinder heads have new valve seat material, brass valve guides, special swirl chambers and new head bolts. Oil spraying jets were added to cylinder block to help cool inner piston skirts. Crank pin diameter was increased by .19" (5 mm).

Connecting rod diameter on both ends was increased. Pistons have a new clover design in the crown and wrist pin diameter was increased by .07" (2 mm). An oil cooler and oil pump with increased output were also added.

Fig. 1: Peugeot Turbocharging System



OPERATION

The turbocharger is driven by exhaust gases being expelled from the cylinder combustion chambers. At idle speeds there is no pressurization of incoming air and the engine operates like a normally aspirated engine. When the peugeot diesel engine reaches approximately 1000 RPM, turbo boost begins with approximately 1.45 psi (.10 kg/cm^2).

As engine RPM increases, turbo boost pressure increases, depending upon engine load. The greater the load, the higher the boost. Maximum boost pressure is approximately 8.7 psi (.61 kg/cm^2). Turbine speed depends upon engine RPM and temperature. Higher temperatures create more exhaust gas pressure, resulting in higher turbine speeds.

As the cylinders receive their full capacity of incoming air, boost pressure opens the wastegate valve, diverting exhaust gases into the exhaust pipe away from the turbine. This lessens thrust on the turbine and slows it down.

TROUBLE SHOOTING

If the wastegate fails to open, it will create a high manifold pressure (up to 31 psi) at approximately 3500 RPM. This will cause the engine to misfire since compression pressure is now greater than injection pressure (22 psi).

If the wastegate valve fails to close, there will be a noticeable loss of power between 1000 and 2000 RPM, because boost pressure will not exist.

TESTING

NO LOAD PRESSURE TEST

1) Install a suitable pressure gauge in hose between intake manifold and injector pump control unit.

2) Accelerate engine, then run it at a steady 3000 RPM.

3) Pressure gauge should indicate pressure just above idle speed, and read at least 5.8 psi (.40 kg/cm^2) at speeds above 2000 RPM.

4) Full load boost pressure cannot be measured in shop test without a dynamometer.