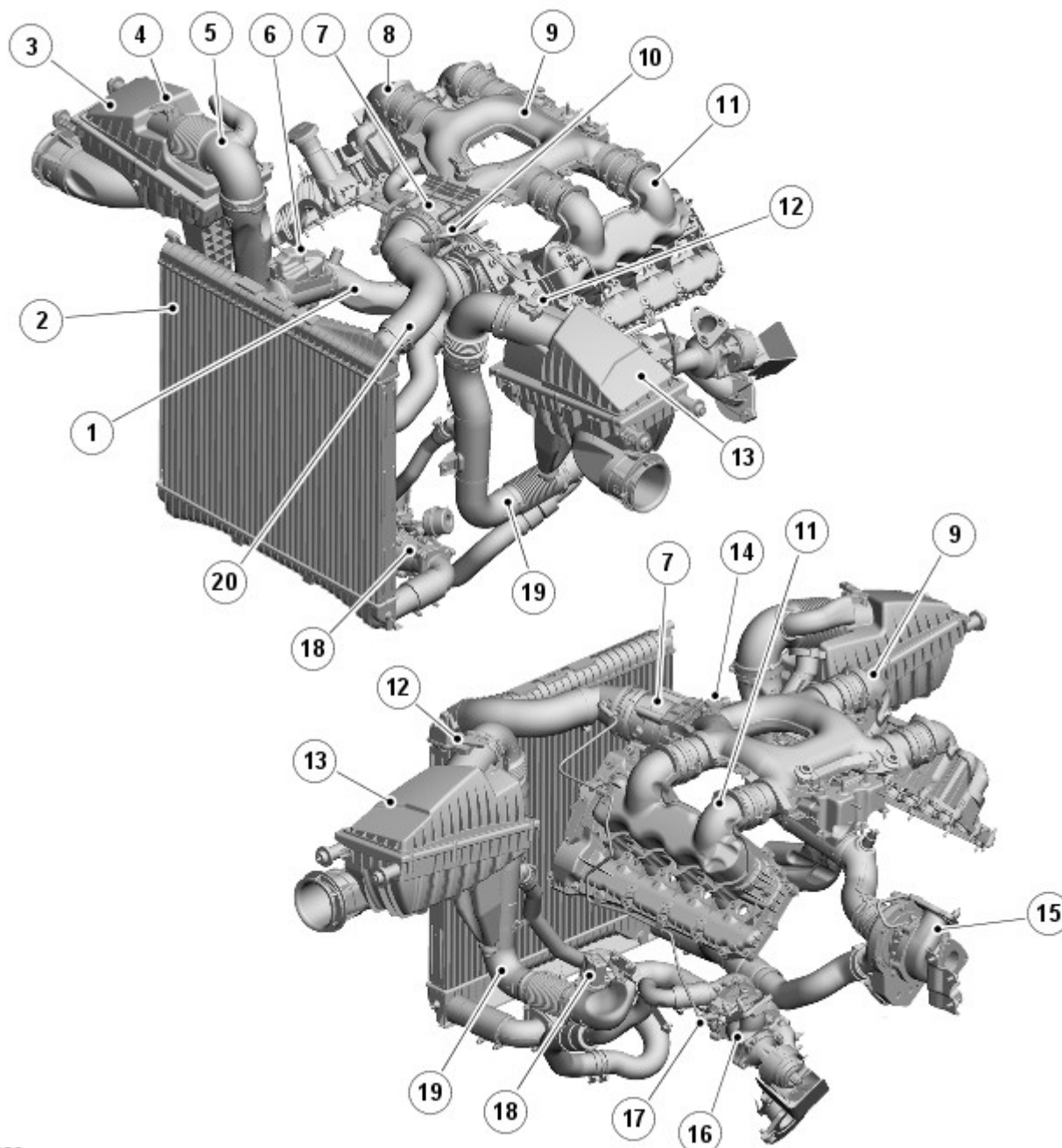


Intake Air Distribution and Filtering - TDV8 4.4L Diesel - Intake Air Distribution and Filtering

Description and Operation

COMPONENT LOCATION



E130809

Item	Description
1	Clean air duct to variable vane turbocharger
2	Charge air cooler
3	Right Hand (RH) air cleaner assembly
4	RH Mass Air Flow and Temperature (MAFT) sensor
5	RH air cleaner to clean air duct connection elbow
6	Resonator assembly
7	Electric throttle actuator
8	RH cylinder bank intake manifold assembly
9	Charge air manifold
10	Clean air boost supply pipe to fixed vane turbocharger

11	Left Hand (LH) cylinder bank intake manifold assembly
12	LH Mass Air Flow and Temperature (MAFT) sensor
13	LH air cleaner assembly
14	Manifold Absolute Pressure and Temperature (MAPT) sensor
15	Variable vane turbocharger
16	Fixed vane turbocharger
17	Clean air boost supply pipe from charge air supply pipe
18	Turbocharger inlet valve
19	Clean air duct to fixed vane turbocharger
20	Cooled clean air supply pipe from charge air cooler to intake manifold

OVERVIEW

The intake air distribution system comprises:

- Two Mass Air Flow and Temperature (MAFT) sensors
- Two air cleaner assemblies
- Charge air cooler
- Fixed vane turbocharger
- Variable vane turbocharger.

DESCRIPTION

The 2 air cleaner assemblies are located behind the headlamps. Each air filter housing contains a water drain valve to allow any water or moisture drawn into the filter assembly to drain through a valve in the base of the housing. Each air filter housing also provides the location for a [MAFT \(mass air flow and temperature\)](#) sensor which measures the air flow and air temperature passing through the filters into the intake system. A paper type corrugated filter prevents particulate matter entering the air intake system beyond the filters.

The [LH \(left-hand\)](#) air filter assembly supplies intake air to the fixed vane turbocharger compressor which is located on the [LH](#) side of the engine, below the exhaust manifold. The [RH \(right-hand\)](#) air filter assembly supplies intake air to the variable vane turbocharger which is located on the [RH](#) side of the engine, below the exhaust manifold.

From each filter the intake air is ducted into the respective turbocharger compressor. The variable vane turbocharger compressor is connected via ducting directly to the charge air cooler. The fixed vane turbocharger compressor is connected via ducting to the turbocharger inlet valve, which mounted in front of the engine, at the bottom of the charge air cooler.

The turbocharger inlet valve has two outlets; one directs compressed air from the fixed vane turbocharger back into the compressor inlet ducting at a controlled rate, the second outlet directs compressed air from the fixed vane turbocharger into the charge air cooler. Operation of the turbocharger inlet valve is dependant on operating conditions.

For additional information, refer to: [Turbocharger](#) (303-04B Fuel Charging and Controls - Turbocharger - TDV8 4.4L Diesel, Description and Operation).

Compressed air is cooled and passed from the charge air cooler into the electric throttle which controls the air entering the intake manifold. The intake manifold contains a [MAPT \(manifold absolute pressure and temperature\)](#) sensor which measures the air pressure and temperature of the air passing from the throttle to the charge air manifold.

The intake air is directed within the charge air manifold to the cylinder intake manifold for each cylinder bank. Each cylinder intake manifold is an integral part of the cylinder head camshaft cover.

OPERATION

Air is drawn into each air filter assembly through an intake duct which is mounted on each inner wing in the engine compartment. The air is passed through the air filter which removes particulate debris which remains trapped within the filter. The intake air then passes past a [MAFT](#) sensor located in each air filter housing. The sensor measures the air flow and temperature and passes the information to the [ECM \(engine control module\)](#) .

From the [LH](#) air filter assembly the air is drawn through ducting into the compressor of the fixed vane turbocharger. The air is compressed and is passed via ducting to the charge air inlet valve. Dependant on operating conditions, the air can either be passed back into the intake ducting to the compressor or directed into ducting which passes the compressed air into the charge air cooler.

From the [RH](#) air filter assembly the air is drawn into the compressor of the variable vane turbocharger. The air is compressed and passed via ducting directly into the charge air cooler.

The compressed air is cooled in the charge air cooler and passes via a single duct to the electric throttle. The electric throttle is controlled by the [ECM](#) which controls the position of the throttle butterfly to allow the correct amount of air into the charge air manifold. The butterfly is normally fully open during engine operation, but closes on engine shut down to prevent engine shake and also partially closes under certain operating conditions to increase [EGR \(exhaust gas recirculation\)](#) gas flow. The charge air manifold houses a [MAPT](#) sensor which monitors the air pressure and temperature and passes the information to the [ECM](#) .

The cooled and compressed intake air is split within the charge air manifold and directed into each of the cylinder intake manifolds where it is forced into the cylinders via the inlet valves.