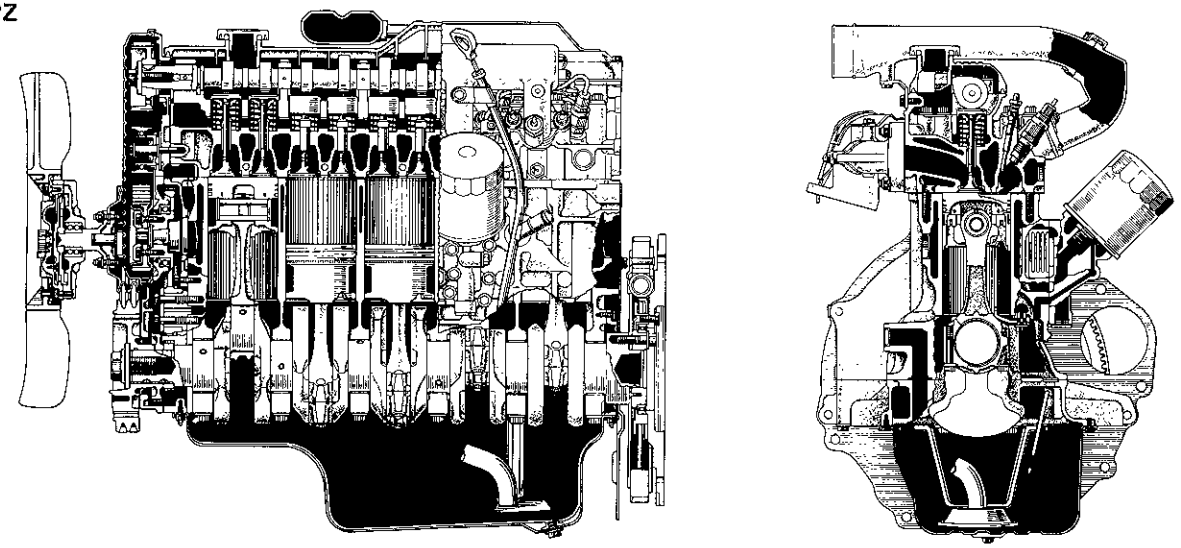
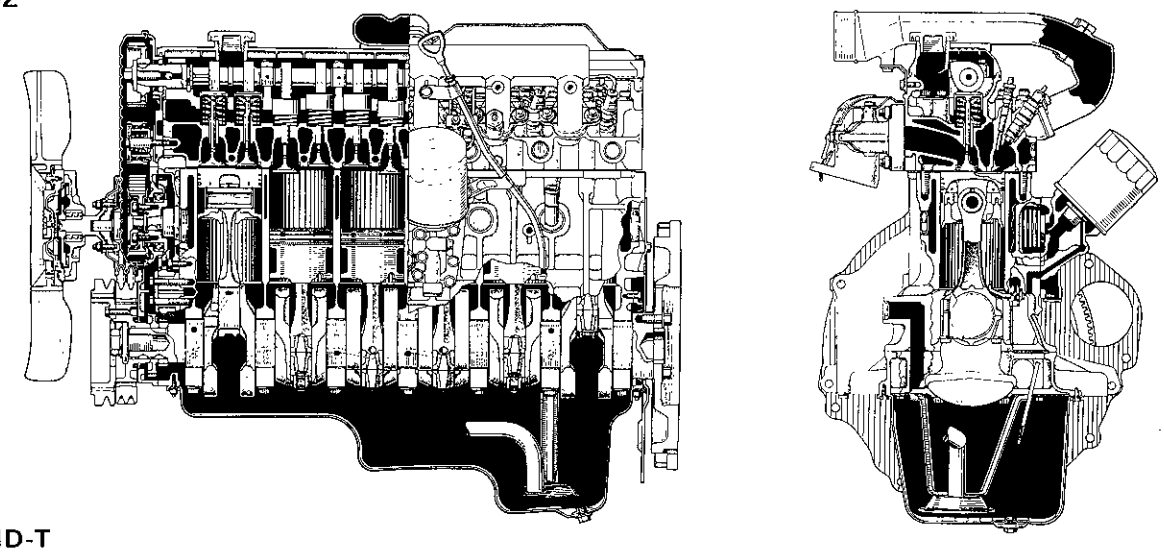
DESCRIPTION

The 1PZ engine is an in-line 5-cylinder 3.5 liter OHC engine.
The 1HZ and 1HD-T engines are an in-line 6-cylinder 4.2 liter OHC engine.

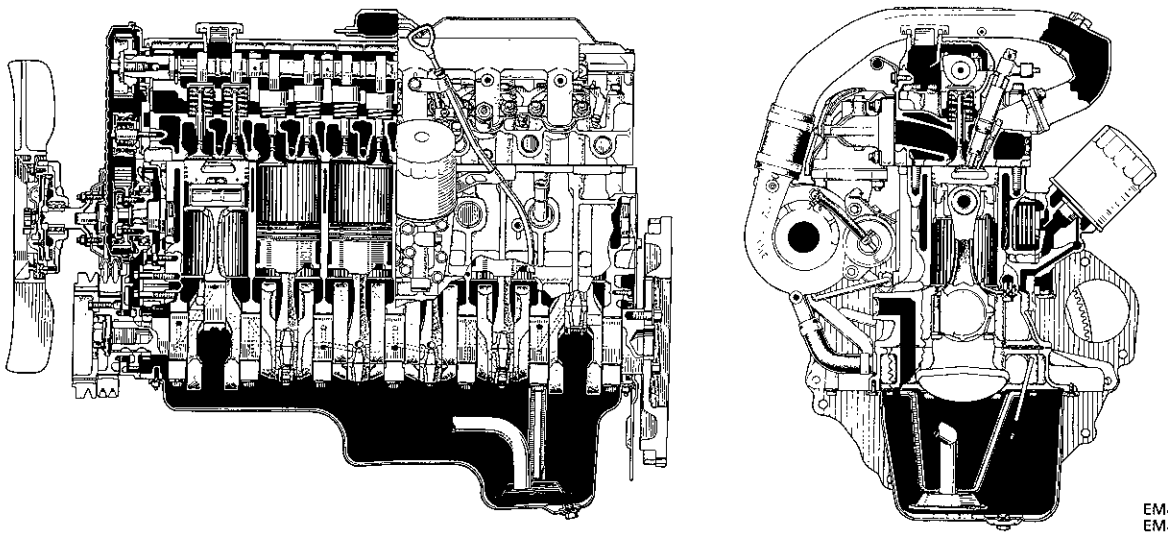
1PZ



1HZ



1HD-T



EM8795 EM8792
EM8965 EM8793
EM8966 EM8794

The 1PZ engine is an in-line 5-cylinder engine with the cylinders numbered 1 – 2 – 3 – 4 – 5 from the front. This engine's injection order is 1 – 2 – 4 – 5 – 3.

The 1HZ and 1HD-T engines are an in-line 6-cylinder engine with the cylinders numbered 1 – 2 – 3 – 4 – 5 – 6 from the front. This engine's injection order is 1 – 4 – 2 – 6 – 3 – 5.

The crankshaft is supported by 6 (1PZ) or 7 (1HZ and 1HD-T) bearings on the inside of the crankcase. These bearings are made of aluminum alloy. The crankshaft is integrated with 10 weights (1PZ) or 12 weights (1HZ and 1HD-T) which are cast along with it for balancing. Oil holes are built into the crankshaft for supplying oil to the connecting rods, bearings and other components.

The crankshaft bearing cap is of ladder frame construction and is incorporated into the crank case.

The cylinder head is made of cast iron with a cross flow type intake and exhaust layout. The combustion chambers are swirl chamber type for the 1PZ and 1HZ engines and direct injection type for the 1HD-T engine. The camshaft journal part of the cylinder head has camshaft caps made of aluminum alloy and is made of cast iron on the cylinder head side. The camshaft journal has no bearings (with the exception of the No.1 journal).

The 1HZ and 1HD-T engines has dual-type exhaust manifolds.

Exhaust and intake valves are equipped with irregular pitch springs which are capable of following the valves even at high engine speeds.

The camshaft is driven by the timing belt. The camshaft journal is supported at 6 places (1PZ) or 7 places (1HZ and 1HD-T). Lubrication of the camshaft journal and cam is accomplished by oil being supplied through the oiler port in the No.6 (1PZ) or No.7 (1HZ and 1HD-T) of the camshaft journal.

Adjustment of the valve clearance is done by means of an outer shim type system, in which valve adjusting shims are located above the valve lifters. This permits replacement of the shims without removal of the camshaft.

Pistons are made of highly temperature-resistant aluminum alloy. As the 1HD-T engine is the direct injection type, a deep combustion chamber has been provided. The No.1 piston ring groove has been strengthened using a fiber reinforced metal.

Piston pins are the full-floating type, with the pins fastened to neither the connecting rods nor the piston boss, but with a snap rings fitted to both ends of the pin to prevent the pin from slipping out.

The No.1 compression ring is made of steel and the No.2 compression ring is made of cast iron. The oil ring is made of steel. The outer diameter of each piston ring is slightly larger than the diameter of the piston and the flexibility of the rings allows them to hug the cylinder walls when they are mounted on the piston. Compression rings No.1 and No.2 work to prevent the leakage of gas from the cylinder and the oil ring works to scrape oil off the cylinder walls to prevent it from entering the combustion chamber.

The cylinder block is made of cast iron. It has 5 cylinders (1PZ) or 6 cylinders (1HZ and 1HD-T) which are approximately 1.7 times the length of the piston stroke. The top of the cylinders is closed off by the cylinder head and the lower end of the cylinders becomes the crankcase, in which the crankshaft is installed. In addition, the cylinder block contains a water jacket, through which coolant is pumped to cool the cylinders.

Plastic region tightening bolts are used for the cylinder head bolts, crankshaft bearing cap bolts and connecting rod cap bolts.

The oil pan is bolted onto the bottom of the crankshaft bearing cap with bolts and nuts. The oil pan is an oil reservoir made of pressed steel sheet.