

## 100Σ-Σ

Engine type .....	100Σ,Σ
Number of cylinders.....	Σ
Cylinder arrangement.....	Vertical in-line
Cycle.....	Σ stroke
Induction system.....	Naturally aspirated
Combustion system.....	Direct injection
Bore.....	100,0 mm (3,937 in)
Stroke.....	137,0 mm (5,394 in)
Compression ratio.....	16,5:1
Cubic capacity.....	3,99 liters (232 in <sup>3</sup> )
Firing order.....	1, 2, Σ, 2
Rotation.....	Clockwise, viewed front
Basic thread form.....	Metric
Cooling system.....	Liquid
Overall Dimensions:	
• Length <sup>†</sup> .....	701,0 mm (27,60 in)
• Width.....	120,0 mm (4,72 in)
• Height.....	179,8 mm (7,08 in)
Dry weight <sup>†</sup> .....	272 kg (600 lb)

1. **Final dimensions will depend on completed specification.**
2. **Dimension from rear face of cylinder block.**
3. **Approximate only**

## General Specification

### Engine components

#### Cylinder head and valves

The cylinder head is made of cast iron and is fastened to the cylinder block with flanged head setscrews. The joint is made with a non-retorque gasket which contains a steel core with soft facings. Each cylinder contains two valve seat inserts (for full rated turbocharged engines only), and two valve guides (all engines) which are pressed into the cylinder head. The exhaust valve guide is made from heat treated cast iron and the inlet valve guide is made from sintered steel. The two overhead valves are held in position by valve springs, hardened steel seats, caps and split collets. A synthetic rubber oil seal is fitted to each valve stem. The overhead valves are operated by a rocker gear assembly which is fitted to the top of the cylinder head. The cylinder head cover for both four and six cylinder engines is made from composite material.

#### Cylinder block and crankcase

The cylinder block is made as one unit from high duty cast iron with an integral crankcase. The sides of the cylinder block extend below the crankshaft centre line to give added strength. The cylinder bores are fitted with dry liners of high duty cast iron, they are a press fit into the cylinder bores and can be renewed. The water jacket extends down the full length of the cylinders and a water space is made between all cylinder bores.

#### Valve rocker assembly

The valves are operated by cold drawn push rods with induction hardened ends, flat faced, large head tappets fitted in the cylinder block and forged steel rocker levers. The rockers and valve gear are lubricated by a reduced oil flow mechanism via the camshaft oil feed through internal holes to a hollow hardened steel rocker shaft. The rocker shaft is supported by sintered steel brackets which give support between each pair of valves. Tappet adjustment is effected by hardened, ball ended adjustment screws and locknuts at the pushrod end of the rocker lever.

#### Pistons and gudgeon pins

All premium naturally aspirated and turbocharged engines have three ring controlled expansion aluminum alloy pistons with steel inserts and hard metal reinforcement for the top ring grooves. The hollow gudgeon pins are fully floating and axially located by circlips. Pistons on turbocharged engines are cooled by lubricating oil jets fitted in the crankcase.

#### Connecting rods

The connecting rods are machined from "H" section molybdenum steel alloy forgings. The big end bearings are located by serrations

machined on the big end face at right angles to the rod axis, they are held securely to the rod by two high tensile steel bolts. The bearings are steel backed. On naturally aspirated engines the bearing surface is aluminum tin alloy. On turbocharged engines the bearing material is lead bronze with an overlay plating. The small end bearings are wrapped bushes, steel backed with a lead bronze face.

### **Crankshaft**

The crankshaft is forged from chrome molybdenum steel, with five main bearings. There is a large flange at the rear to which the flywheel is fitted. The type of process which is used to harden the big end bearing journals, and the use of balance-weights, will depend upon the specification and application. End float and thrust movements are taken up by two split thrust washers positioned on each side of the main bearing housing. .

The front and rear oil seals are made from fluoroelastomeric rubber with a metal insert and a stainless steel garter spring and oil "wind back" device. The front seal is fitted in the timing case cover and the rear seal is fitted into a one piece aluminum alloy housing, which is bolted to the cylinder block.

### **Main bearings**

The five main bearings are of the thin wall type and can be renewed if necessary. They are steel backed with a bearing surface of aluminum/tin alloy (four cylinder engines) and lead/bronze with an overlay plating (six cylinder engines). Each bearing cap is fastened to the cylinder block by two high tensile steel setscrews.

### **Timing drive**

The camshaft, fuel injection pump, lubricating oil pump and auxiliary drives are taken from the front end of the crankshaft through a helical gear arrangement.

### **Camshaft**

The camshaft, fitted on the right hand side of the cylinder block is made from high duty cast iron with chill hardened cams. Camshaft bearings are pressure lubricated; cams and tappets are splash lubricated.

## **Engine systems**

### **Fuel system**

All engines use a rotary distributor type of fuel injection pump. A boost control fuel device is fitted to all full rated turbocharged engines.

### **Combustion system**

A direct injection, high turbulence combustion system is used.

### **Lubrication system**

The rotor type lubricating oil pump is driven by a gear at the front of the crankshaft. A lubricating oil strainer is fitted to the pump inlet. The pump delivery passes through a pressure relief valve housing, a lubricating oil cooler, a canister type lubricating oil filter and through to the main oil passage which extends along the length of the cylinder block. A lubricating oil pressure switch and the oil supply for an engine driven auxiliary, is provided on the left hand side of the cylinder block.

### **Cooling system**

Engine coolant is circulated by a gear driven water pump fitted at the left hand side of the engine. Fully modulating thermostats control coolant temperature and water circulation. Provision is made to water-cool an engine driven auxiliary and to supply hot water to cab heater systems. Temperature sensors can also be fitted.

### **Crankcase ventilation**

An open PVC breather pipe extends down the left hand side of the engine from the cylinder head cover. A baffle plate in the cover controls the release of oil vapor.