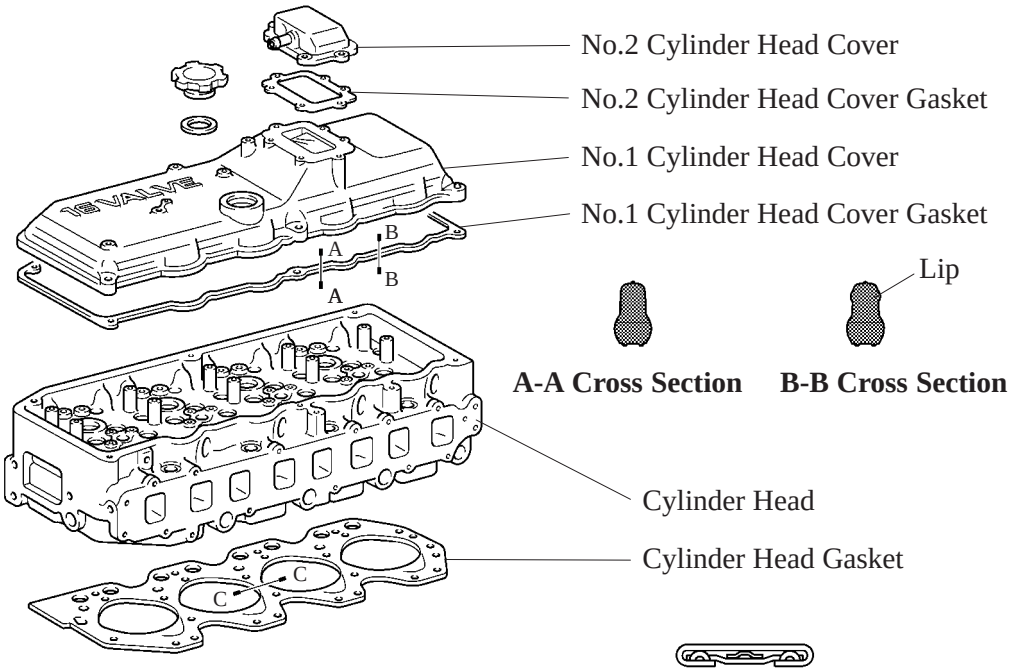
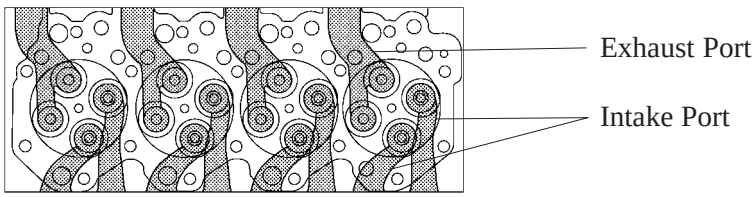
■ENGINE PROPER

1. Cylinder Head

- The cylinder head cover is a two-way split type that is made of lightweight aluminum alloy. Through the provision of a No. 2 cylinder head cover, a PCV chamber with ample capacity has been provided in order to thoroughly remove the oil mist from the blowby gas.
- The No. 1 cylinder head cover gasket contains 11 slip-proof lips to ensure the proper serviceability and reliability.
- The cylinder head is made of cast iron. The wall thickness of various areas and the layout of the water jackets have been optimized to ensure the proper balance of rigidity and cooling performance. Two intake and two exhaust valves per cylinder have been provided, and the shape of their ports has been optimized. The intake port, which consists of a combination of two different shapes, realizes an optimal swirl ratio and ensures sufficient intake volume. In addition, the shape of the inlet has been optimized to minimize the swirl variances between cylinders.
- Sintered valve guides with superior oil retentiveness have been adopted to improve their seizure resistance and wear resistance. The amount of oil leakage through the valve stem oil seal has been minimized to reduce oil consumption and improve exhaust emission performance.
- The cylinder head gasket is a steel laminate type that ensures the proper sealing performance and durability.

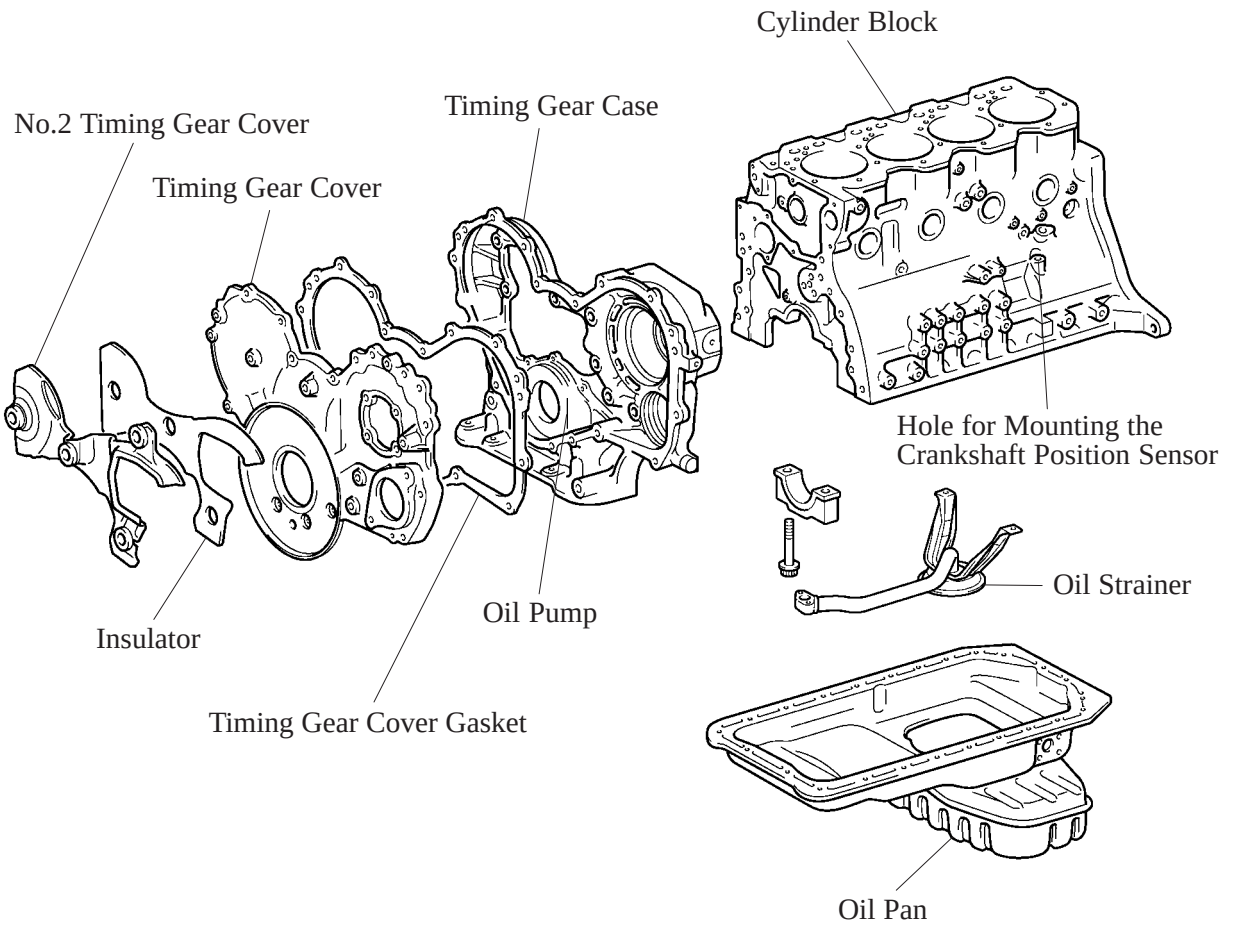




Port Shapes

2. Cylinder Block and Oil Pan

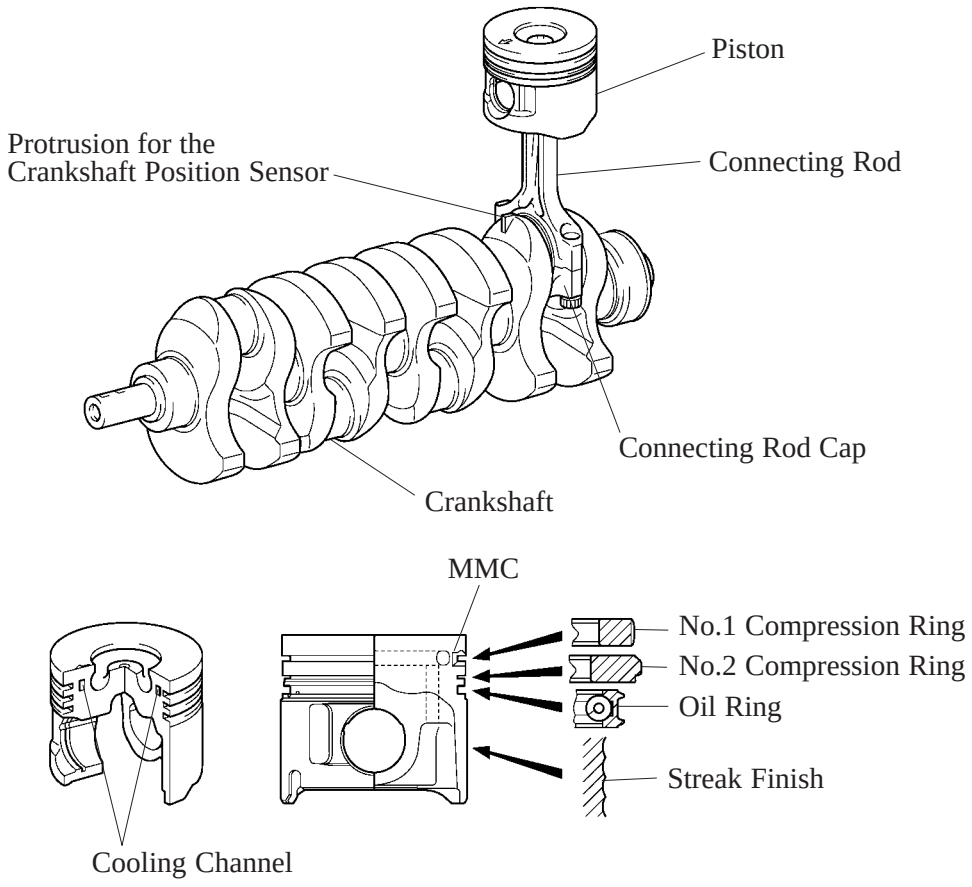
- The cylinder block, which is made of cast iron that provides high strength and superior wear resistance, has a linerless construction. In contrast to the conventional 15B-FT engine, the skirt portion has been reinforced to enhance the rigidity of the cylinder block, in order to support the high power output of the engine. Along with the adoption of the electronic control, a hole for mounting a crankshaft position sensor has been provided on the left side of the cylinder block.
- The oil pan is made of vibration-damping sheet steel. Its bottom has been curved to increase its rigidity and reduce vibrations. The oil pan gasket is a fluid, FIPG (Formed-In-Place Gasket) that offers superior sealing performance.
- Both the timing gear case and the gear cover are made of lightweight aluminum alloy. The oil pump is integrated in the timing gear case.
- A No. 2 timing gear cover has been provided. Thus, the three-layer construction consisting of the timing gear cover, the insulator, and the No. 2 timing gear cover helps to reduce noise.



3. Piston, Connecting Rod and Crankshaft

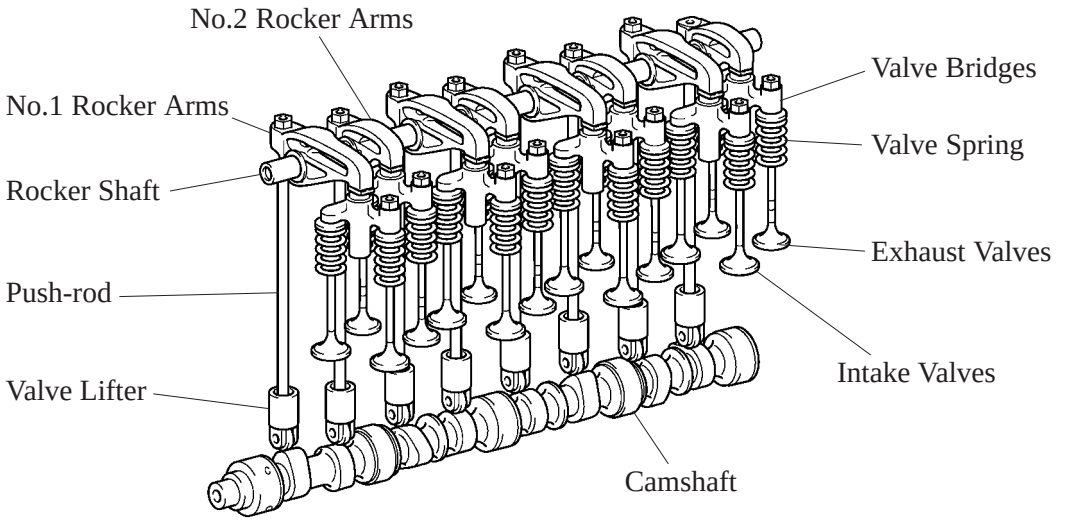
- The piston is made of high-pressure cast aluminum alloy that is lightweight and provides high-temperature strength. The groove portion for the top ring uses MMC* (Metal Matrix Composites) to improve the wear resistance of the piston. The shape of the combustion chamber has been newly developed to improve durability and exhaust emission performance.
- The piston pin is made of chromium steel. Compared to the one used in the previous 15B-FT engine, the piston pin in the new 15B-FTE engine has a larger diameter and a longer overall length in order to ensure the proper rigidity.
- The piston ring has been optimized in terms of its material, shape, and surface treatment.
- The connecting rod is made of special carbon steel that is lightweight and excels in durability. Compared to the one used in the previous 15B-FT engine, the connecting rod in the new 15B-FTE engine has a larger bore in both its big and small ends, and its column has been made thicker to improve rigidity.
- The nuts for attaching the connecting rod cap have been discontinued. The connecting rod cap is now attached through the use of bolts for improved serviceability.
- The crankshaft has 5 journals and 8 balance weights. Compared to the one used in the previous 15B-FT engine, the crankshaft in the new 15B-FTE engine has been made more rigid by increasing the diameter of the pins and journals. Along with the adoption of electronic control, a protrusion has been adopted for the crankshaft position sensor.

*: MMC (Metal Matrix Composites): A composite material containing a metal matrix that provides high strength, high elasticity, and low thermal expansion. Furthermore, this material is a good thermal conductor that helps to dissipate the heat of the piston to the cylinder block via the piston rings.



4. Valve Mechanism

- In the 4-valve OHV system, the camshaft moves the pushrods, rocker arms, and valve bridges to open and close the valves.
- The pushrod, which is made of carbon steel pipe, is hardened at the area where it comes in contact with the rocker arm in order to ensure the proper wear resistance.
- Both the roller and the base of the valve lifter are made of chromium steel.
- The rocker arm is made of aluminum alloy. A sintered material is used in its pad portion to ensure the proper wear resistance.
- The valve bridge, which is made of spheroidal graphite cast iron, is hardened at the area where it comes in contact with the valve in order to ensure the proper wear resistance.
- Both the intake and exhaust valves are made of heat-resistant steel. The stem and the stem end are nitro-carburized to ensure the proper wear resistance.
- The valve timing and the valve lift have been optimized.



5. Timing Gear Train

- The movement of the crankshaft timing gear transfers to the idle gear in order to drive the camshaft timing gear and the injection pump drive gear.
- The vacuum pump drive gear, which is driven by the injection pump drive gear, simultaneously transmits power to the power steering vane pump gear that is located coaxially.
- A scissors type idler gear is used to reduce gear noise.

