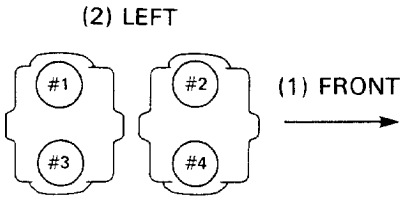
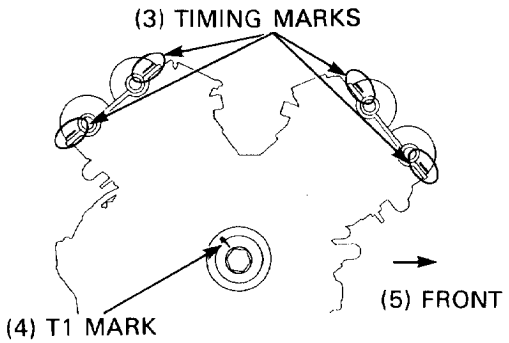
8. Cylinder Head/Valves

Service Information

- The front cylinder head can be removed with the engine in the frame.
- The rear cylinder head cannot be removed with the engine in the frame; however its camshafts and the cam drive gear case can be serviced with the engine in the frame.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head. Fill the cylinder head oil pockets with the clean engine oil of the proper type and viscosity.
- Clean all disassembled parts with non-flammable or high flash point cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Before reassembly, lubricate the camshaft journals and cam lobes with a molybdenum oil solution.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their proper locations.
- The cylinder numbering is given below:
- The crankshaft rotates clockwise and the camshafts rotate counterclockwise when viewed from the right.





Troubleshooting

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression or leak-down test, or by tracing noises in the top-end with a sounding rod or stethoscope.

NOTE

- For cylinder compression and leak-down test procedures, refer to section 3 of the Common Service Manual.

Rough idle
- Low cylinder compression

Low compression
- Incorrect valve shim adjustment (page 3-7)
- Burned or bent valves
- Incorrect valve timing
- Broken valve spring
- Uneven valve seating
- Leaking or damaged head gasket
- Warped or cracked cylinder head
- Loose spark plug
- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston

Compression too high
- Excessive carbon build-up on piston top or combustion chamber

Excessive smoke
- Worn valve stem or valve guide
- Damaged stem seal
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Excessive noise
- Incorrect valve shim adjustment (page 3-7)
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Damaged camshaft drive gear

Abnormal noise (piston)
- Worn cylinder and piston
- Worn piston pin or piston pin hole
- Worn connecting rod big end bearing