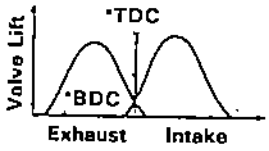
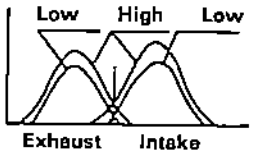
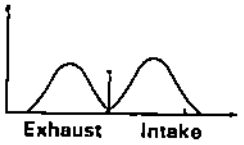
Cylinder Head

Variable Valve Timing and Lift Electronic Control System

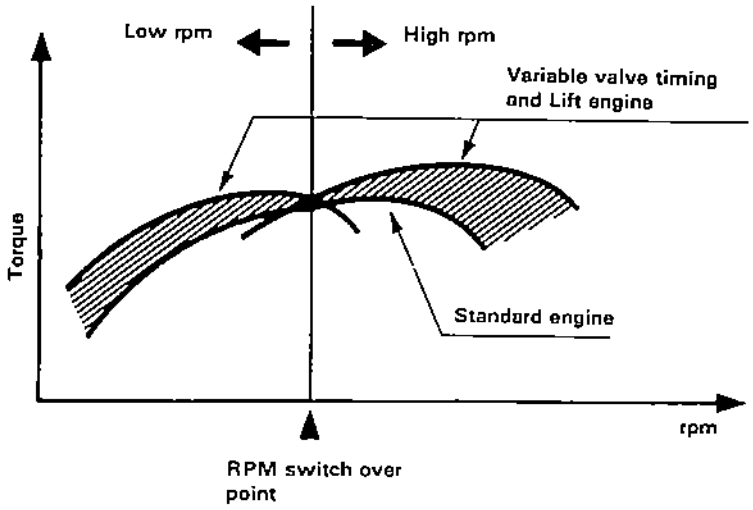
In general, it would be ideal if the high rpm performance of a racing engine and the low rpm performance of a standard passenger car engine could be combined in a single engine. This would result in a maximum performance engine with a wide power band. Two of the major differences between racing engine and standard engines are the timing of the intake/exhaust valves and the degree of valve lift. Racing engines have longer intake/exhaust timing and a longer valve lift than standard engine. The Honda' Variable Valve Timing and Lift Electronic Control System takes this into account. It also can provides the valve timing and valve lift of a standard engine. When valve actuation is adjusted for low rpm timing lift, low rpm torque is better than in a standard engine. When valve actuation is then adjusted for high rpm timing and lift, output also improves to the extent the racing engine can offer. Until now, few variable valve timing systems have been commercialized. In those that have, only the time that both valves are open (intake/exhaust overlap) could be changed. Honda's system is the first in the world in which both the valve timing and the degree of valve lifs can be changed as needed, making it the most advanced valve train mechanism available.

Comparison of Valve Lift of Racing Engines vs. Mass Produced Engines

	Racing Engine	Variable Timing & Lift Engine	Standard Engine
Valve Timing (exhaust/intake) Valve Lift			
Max. Power	○	○	
Low rpm Torque		○	○
Idling Stability		○	○

*TDC = Top Dead Center *BDC = Bottom Dead Center
○ = Optimum P

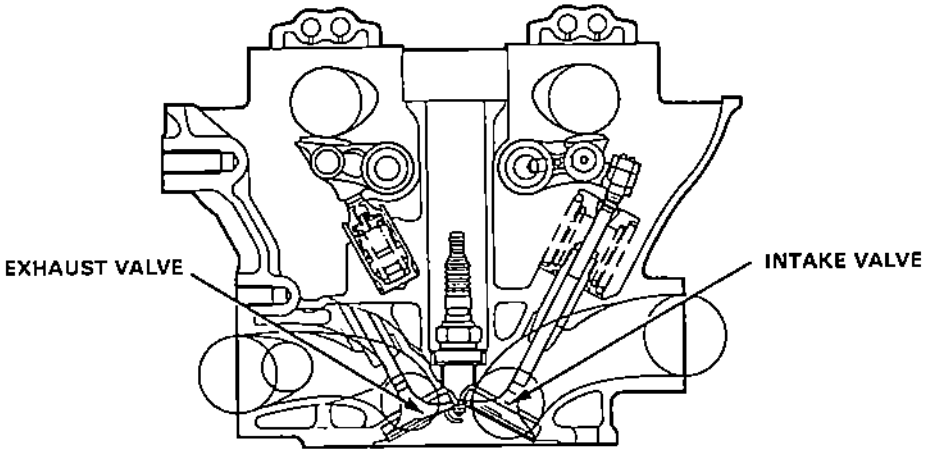
The engine is equipped with two valve timing and lift setting which change according to driving conditions.

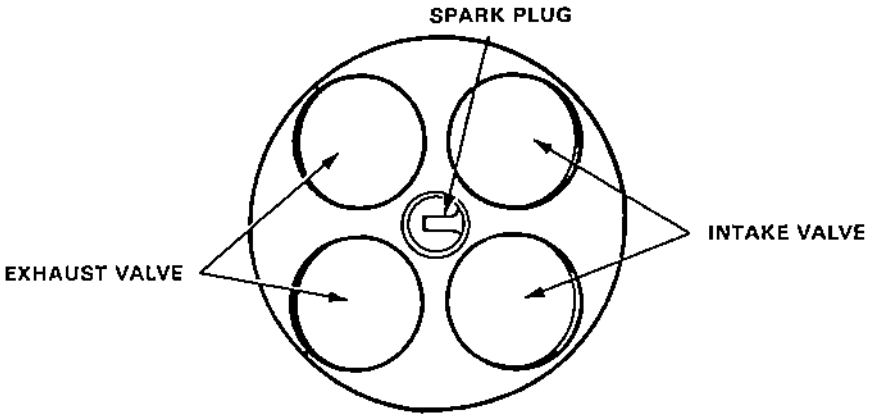


Cam/Valve Mechanism

Cylinder Head :
The cylinder head is a light-weight aluminum alloy one-piece cast head with an excellent heat transmission property. The head is mounted one the cylinder block with a gasket placed between.

Combustion Chamber :
The combustion chamber is a compact center-plug type of pentroof design. Two intake valves and two exhaust valves are positioned to permit cross-flow ventilation. This, together with optimum engine specifications, including ideal values for best ignition timing, compression ratio, and valve timing result in high intake and exhaust efficiency and improved combustion efficiency.

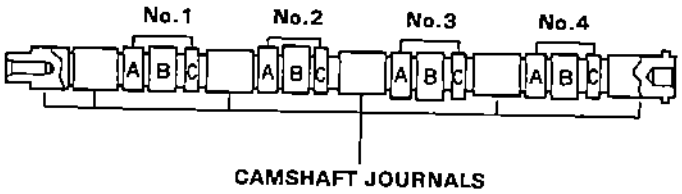




Cylinder Head

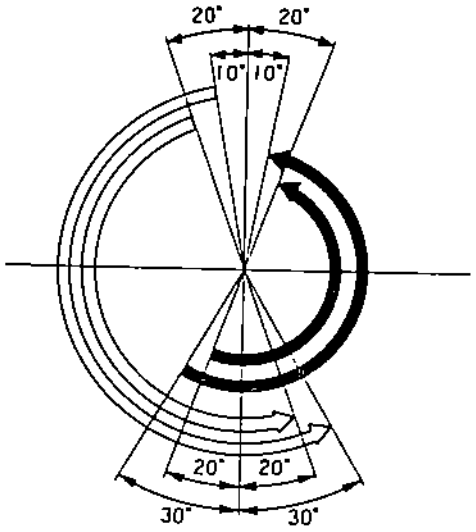
Camshaft

The camshaft is a cast piece. By improving dimensional accuracy, it became possible to achieve minimum space between cams, thus allowing a more campact cylinder head. Main bearings are supported on six journals with forced lubrication. On the left end of each camshaft is a driven pulley. On the right end of the intake camshaft a distributor mounted, and on the exhaust camshaft a spool valve is attached to effect switching between valve lift and timing. The exhaust and intake cycles require a total of 24 cams to open and close the valves.

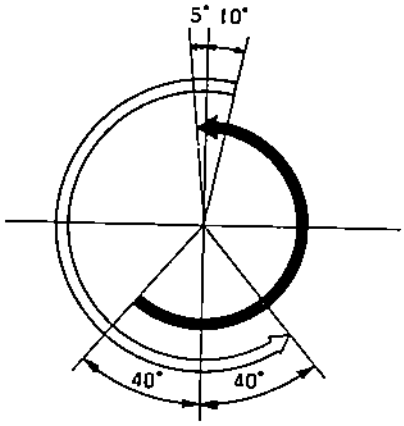


	EX	IN
A	Secondary	Primary
B	Mid	Mid
C	Primary	Secondary

Top dead center



Low-speed valve timing



High-speed valve timing

Bottom dead center

⇦ : Intake valve open
⇦ : Exhaust valve open

Valves

The valves are open and closed by rocker arms driven by the camshaft. The rocker arm lever ratio is set to the optimum value, keeping cam lift to the minimum while increasing valve lift, thus improving intake/exhaust efficiency.

Valve specifications unit: mm (in)

ITEM \ VALVE	INTAKE	EXHAUST
HEAD DIAMETER	ϕ33 (1.30)	ϕ28 (1.10)
SHAFT DIAMETER	5.5 (0.22)	5.5 (0.22)
OVERALL LENGTH	102.35 (4.03)	102.55 (4.04)
VALVE LIFT	8.0/5.0/*10.4 (0.31/0.20/*0.41)	7.5/4.5/*9.4 (0.30/0.18/*0.37)

*indicates high-speed valve