

Motor Vehicle Design & Technology (Engines) – Underpinning Knowledge

Key words and definitions					
Combustion	the process of burning an air/fuel mixture	Compression ignition (CI)	a diesel-powered engine	Spark ignition (SI)	a petrol-powered engine
Capacity	the volume of a cylinder when its piston is at the bottom of its stroke	Stroke	the movement of the piston as it travels up and down	Valve train	a series of mechanisms used to open and close the inlet and exhaust valves
Driving shaft	a rotating rod that powers movement	TDC	top-dead-centre	BDC	bottom-dead-centre
Bore	the diameter of an engine cylinder	Multi-cylinder	an engine with more than one piston	Firing order	the order in which the cylinders receive the sparks as the crankshaft rotates
Ring gear	a large toothed gear around the edge of the flywheel	Scavenging	the process in the combustion chamber that helps remove exhaust gases with the aid of the incoming air charge	Valve lead	where a valve opens early
Ignition advance	the automatic bringing forward of the ignition spark in relation to the engine speed	Valve overlap	the period when both inlet and exhaust valves are open at the same time	Valve lag	where a valve (inlet or exhaust) closes late



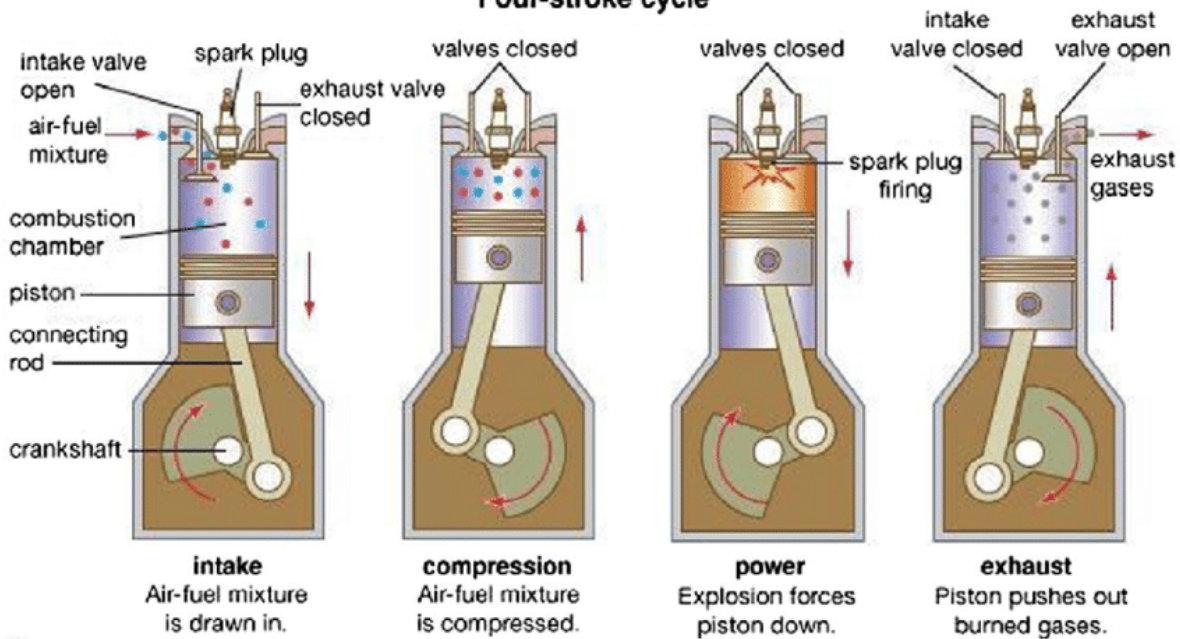
Cylinder head

The cylinder head is the top part of the engine. It contains the **inlet and exhaust valves**. It may also house the valve drive mechanism. The components of the components of the valve drive mechanism can include:

- camshaft followers
- rocker arms
- valve springs

The valve drive mechanism is often called the **valve train**.

Four-stroke cycle



Key terms and definitions of the four-stroke operating cycle of a spark ignition (SI) petrol engine	
Induction	As the piston moves downwards, air and fuel are sucked into the cylinder through the open inlet valve.
Compression	As the piston reaches the bottom of its stroke, the inlet valve closes and the piston begins to move up the bore. Air and fuel are squeezed into the combustion chamber. Just before top-dead-centre the spark plug ignites the mixture.
Power (Combustion)	The burning air/fuel mixture expands and creates a very high pressure, pushing the piston downwards (bang). This downward movement turns the crankshaft.
Exhaust	When the piston reaches the bottom of its power stroke, the exhaust valve opens and the piston moves upwards, blowing exhaust gas out of the cylinder.
Did you know?	If an engine is running at 6000 rpm, the piston will move down the bore and back up again 100 times a second.

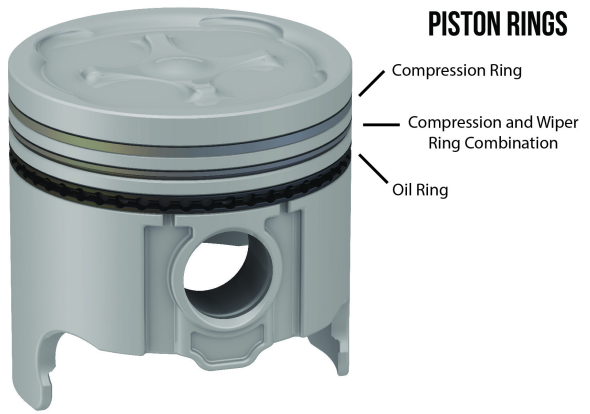
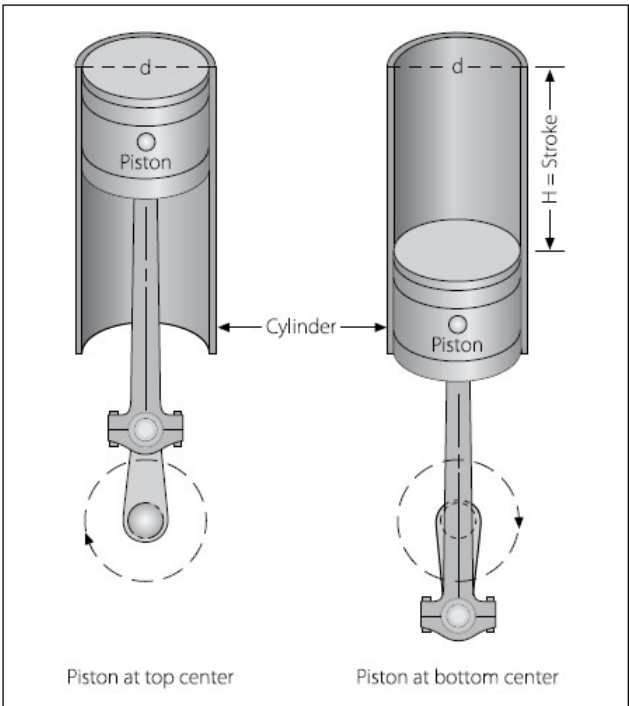


Figure 1-27. Cylinder displacement.

