

(3) Operating Overview of 2-Stroke Engine

Engines are classified into 2-stroke and 4-stroke engines, and their operating states differ significantly. In a 2-stroke engine, the operations of compression and expansion are repeated in two strokes. Fuel explosion and expansion occur with each reciprocation of the piston, and power is transmitted with each revolution of the crankshaft, constituting the power stroke. As shown in Figure 2-5, the structure does not include intake or exhaust valves. Instead, intake and exhaust ports are provided in the lower part of the cylinder (near the bottom dead center of the piston stroke). The piston also serves as a valve, performing intake and exhaust actions. The operating overview is as follows:

(A) When cylinder compression (piston upward stroke) is completed, fuel is injected and ignited simultaneously, causing combustion and pushing the piston down. (Combustion stroke or power stroke)

(B) As the piston descends, the exhaust port on the lower side of the cylinder opens, and the combustion gas escapes.

(C) As the piston descends further due to the rotation of the crank, the intake port opens, and air sent separately by a pump enters the cylinder, completely scavenging the remaining exhaust gas. The compression of air begins in the next upward stroke. Thus, the 2-stroke engine has twice as many explosion strokes compared to the 4-stroke engine. Theoretically, it should produce twice the output, but in reality, it is about 1.5 times.

Exhaust port Intake port

(D) Expansion Compression Intake Open

Exhaust Close Intake Close Indicator diagram Crank circle

(Compression) Expansion α (Exhaust/Intake)

[Figure 2-5 Operation of a 2-Stroke Engine]

4. Terminology of Internal Combustion Engines

(1) Compression Ratio

The compression ratio indicates how much the air or air-fuel mixture drawn into the cylinder has been compressed. It is represented by A , the stroke volume when the piston moves from bottom dead center to top dead center, and the piston head when the piston reaches top dead center.

