

-28- resulting in temperatures exceeding the fuel's ignition point.

(C) Combustion Stroke (See Figure 2-3) With the intake valve S and exhaust valve E closed, fuel, pressurized by the fuel injector, is injected in atomized form near the end of the compression stroke, just before the crank reaches top dead center. This fuel then comes into contact with the high-temperature air and spontaneously ignites. The fuel undergoes explosive combustion within the cylinder, and the rapid expansion force of the combustion gas pushes the piston down, which, via the connecting rod, becomes the rotational force of the crankshaft. This stroke is called the combustion stroke or power stroke.

(D) Exhaust Stroke (See Figure 2-3) With the exhaust valve E opened, the piston rises after bottom dead center, expelling the combustion gas into the atmosphere and completing the expulsion when it reaches top dead center.

In the combustion stroke, slightly before the piston (P) reaches the bottom dead center of the crank, the cam opens the exhaust valve E.

[Diagram of 4-Stroke Engine Operation] (A) Intake Stroke (B) Compression Stroke P: Piston V1: Volume 1 V2: Volume 2

Figure 2-4 shows an indicator diagram (PV diagram) of a 4-stroke engine. It illustrates the state change of the gas inside the cylinder when gas is introduced into the cylinder and the piston is pushed in from position A to position B, or conversely, when the piston is pushed from position B to position A by the expansion force of the gas. Generally, pressure is represented by P on the vertical axis and volume is represented by V on the horizontal axis. The relationship between the two (changes in gas volume and pressure inside the cylinder) is represented graphically.

If the volume when the piston is at A is V1 and the pressure is P1, then the volume when pushed to B becomes V2 and the pressure is represented as P2. This diagram is called a PV diagram or indicator diagram.

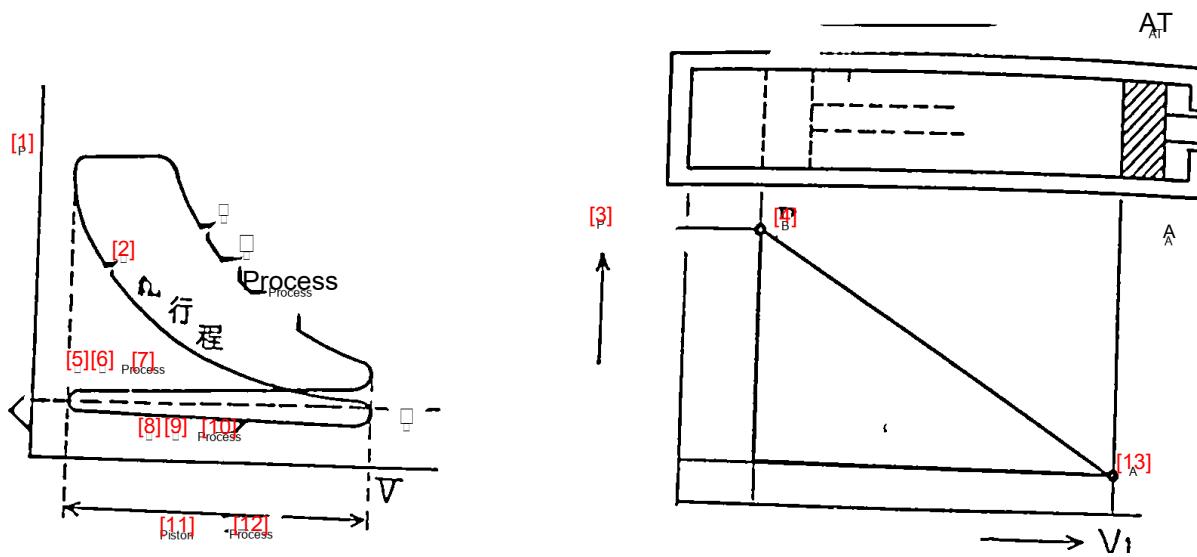


Diagram Key:

- [1] P
- [2] □
- [3] P
- [4] B
- [5] □
- [6] □
- [7] Process
- [8] □
- [9] □
- [10] Process
- [11] Piston
- [12] Process
- [13] A

As described above, the crankshaft rotates twice during the piston's (P) four strokes (two round trips), and the power stroke occurs only once during this period.

For V₁ [1] or Acupressure [2] [3] [4] [5] referred to as [6] *That Pressure [8] [9]* *[10] [1] [2]*

Diagram Key:

- [1] □
- [2] Acupressure
- [3] □
- [4] □
- [5] referred to as
- [6] □
- [7] from
- [8] □

[9] □

[10] □

[11] □

[12] □