

-28- resulting in a high temperature 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 sprayed in a mist form just before the end of the compression stroke, that is, from when the crank reaches Top Dead Center (TDC) to the beginning of this stroke. This fuel comes into contact with the high-temperature air and ignites spontaneously. 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 (1))

With the exhaust valve E open, as the piston rises past Bottom Dead Center (BDC), it exhausts the combustion gas into the atmosphere, completely finishing the exhaust when it reaches Top Dead Center (TDC).

Figure 2-4: Four-Stroke Engine Indicator Diagram

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

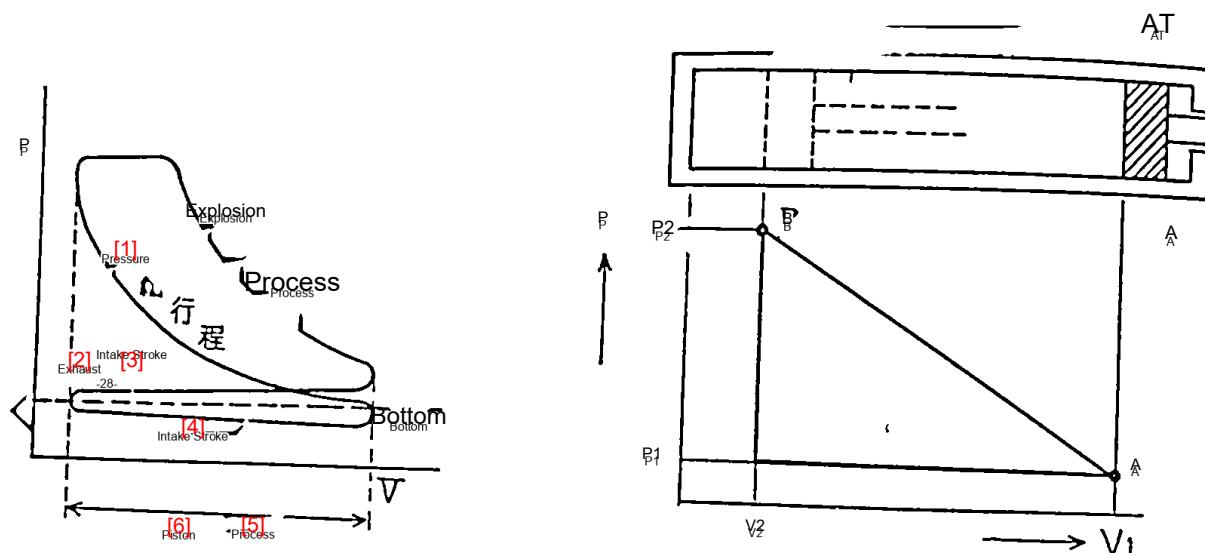


Diagram Key:

- [1] Pressure
- [2] Exhaust
- [3] Intake Stroke
- [4] Intake Stroke
- [5] Process

## [6] Piston

Figure 2-4 shows the indicator diagram (PV diagram) of a four-stroke engine. This diagram illustrates the state change of the gas inside the cylinder when gas is introduced into the cylinder and the piston is pushed sequentially 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. In general, the pressure is represented by P on the vertical axis and the volume is represented by V on the horizontal axis, and the relationship between the two (change in gas volume and pressure inside the cylinder) is shown in the diagram.

If the volume when the piston is at A is  $V_1$  and the pressure is  $P_1$ , then when it is at B, the volume becomes  $V_2$  and the pressure is represented by  $P_2$ . This diagram is called a PV diagram or indicator diagram.

I' V<sub>1</sub> figure or  
V<sub>2</sub> figure  
Acupressure  
Pressure  
Title  
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P<sub>1</sub> Pressure  
P<sub>2</sub> Pressure  
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