-28- The temperature becomes higher than the ignition point of the fuel. Furthermore,

(C) Combustion Stroke (See Figure 2-3) With the intake valve S and exhaust valve E closed, as the piston (P) approaches the end of the compression stroke, i.e., shortly before the crank reaches top dead center, high-pressure fuel is injected in a mist form by the fuel injector. This fuel ignites spontaneously upon contact with the high-temperature air. 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.

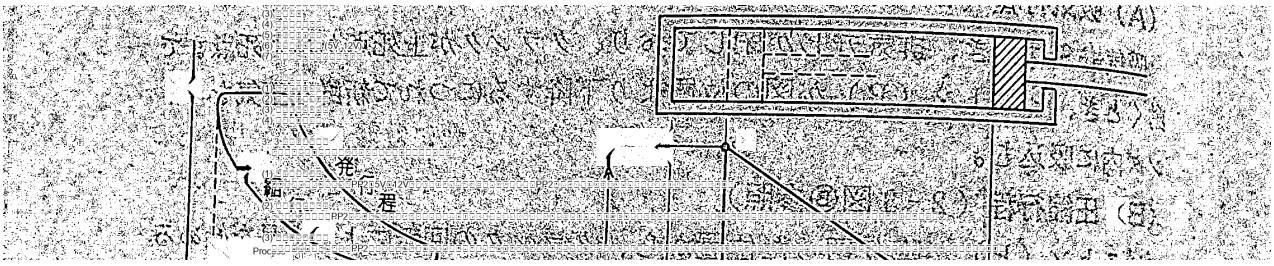
(D) Exhaust Stroke (See Figure 2-3 (1)) With the exhaust valve E opened, as the piston passes bottom dead center and rises, it exhausts the combustion gas into the atmosphere, completing the exhaust when it reaches top dead center.

[Diagram labels from Figure 2-3 (1)] BOS) ATR (A) a P Explosion PP2 B Exhaust Stroke Intake Stroke P1 V2 SA →V1 (1) Piston Stroke Stop

Figure 2-4 Indicator Diagram of a 4-Stroke Engine

Figure 2-4 shows the indicator diagram (PV diagram) of a 4-stroke engine. It illustrates the change in the state of the gas within 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, the pressure is represented by P on the vertical axis, and the volume is represented by V on the horizontal axis. The diagram shows the relationship between the two (the change in gas volume and pressure within the cylinder).

If the volume when pushed in is V2 and the pressure is represented by P2, then if the volume when the piston is at A is V1 and the pressure is P1, this diagram is called the PV diagram or indicator diagram.



In summary, the crankshaft rotates twice during the piston's (P) four strokes (two reciprocations), and the power stroke occurs only once during this period.