

-28- This results in a high temperature exceeding the ignition point of the fuel.

(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 from just before the end of the compression stroke, i.e., just before the crank reaches top dead center, to the beginning of this stroke, and spontaneously ignites 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 is converted into rotational force of the crankshaft via the connecting rod. 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, it exhausts the combustion gas into the atmosphere, completely finishing the exhaust when it reaches top dead center. In the combustion stroke, just before the piston (P) reaches the bottom dead center of the crank, the cam opens [unclear label].

[Diagram of 4-stroke engine]

Figure 2-4 Indicator Diagram of 4-Cycle Engine

As described above, the crankshaft rotates twice during the 4 strokes (2 reciprocations) of the piston (P), and the power stroke occurs only once during this period.

Figure 2-4 shows the indicator diagram (PV diagram) of a 4-cycle 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 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, showing the relationship between the two (the change in gas volume and pressure inside the cylinder) in a diagram.

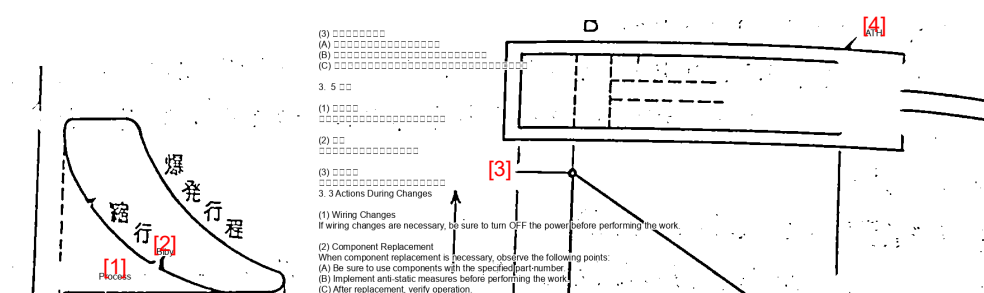


Diagram Key:

[1] Process

[2] Biby

[3] -28- 3. 3 (1) OFF (2)

[4] ATH

If the volume when pushed in is  $V_2$  and its pressure is represented by  $P_2$ , then if the volume

when the piston is at A is  $V_1$  and the pressure is  $P_1$  at B, this diagram is called a PV diagram or indicator diagram.