

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

(C) Combustion Stroke (See Figure 2-3) With the intake valve S and exhaust valve E closed, the high-pressure fuel, atomized by the fuel injector, is injected from shortly before the piston (P) reaches top dead center at the end of the compression stroke to the beginning of this stroke. Upon contact with the high-temperature air, the fuel 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.

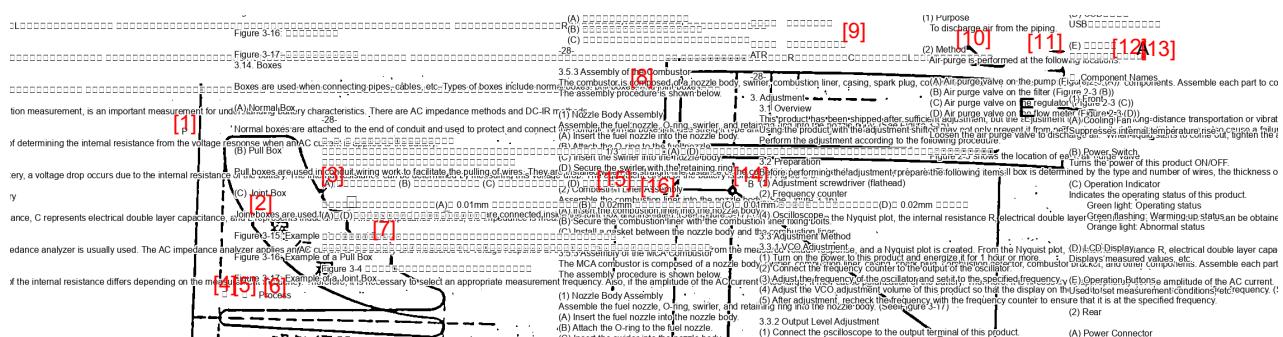
(D) Exhaust Stroke (See Figure 2-3 (1)) If the exhaust valve E is opened, as the piston rises past bottom dead center, the combustion gas is discharged into the atmosphere, completing the exhaust process when the piston reaches top dead center.

[Diagram: unclear, retaining possible labels] BOS) ATR (A) a P □ PP2 B □ Exhaust Stroke Intake Stroke P1 V2 (1) SA →V1 Piston stroke stopped

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

As a result, the crankshaft makes two rotations during the piston's (P) four strokes (two reciprocations), 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 represents the state change of the gas within the cylinder when the gas is introduced into the cylinder and the piston is sequentially pushed 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, pressure is represented by P on the vertical axis, and volume is represented by V on the horizontal axis. The diagram illustrates the relationship between the two (changes in gas volume and pressure within the cylinder).



### Diagram Key:

- [1] P
  - [2] □
  - [3] □
  - [4] □
  - [5] □

## [6] Process

[7] Process

[10] -28-  
[10] -28-

[11] ATR-28-

[12] )-28-\*\*2.3.1.1 Air Purge\*\* (1) Purpose To discharge air from the piping. (2) Method ...

[13]-28-□□□□□(1)□□□□□(A)□□□□□(B)□□□□□ON/OFF□□□□□(C)□□□□□

[14] B

[15] P

If the volume when pushed in is  $V_2$  and the pressure is represented by  $P_2$ , and if the volume when the piston is at A is  $V_1$  and the pressure is  $P_1$ , this diagram is called a PV diagram or indicator diagram.