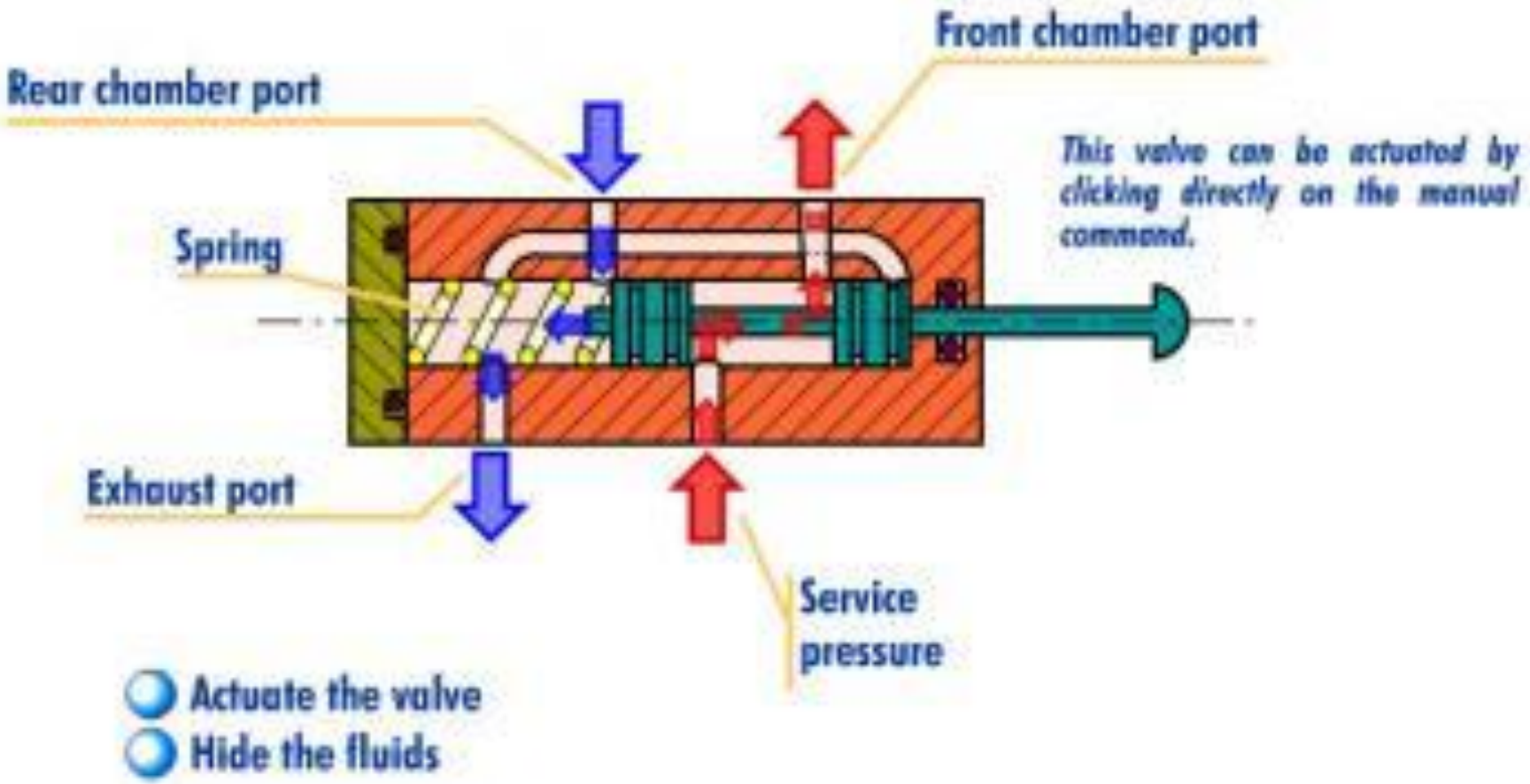
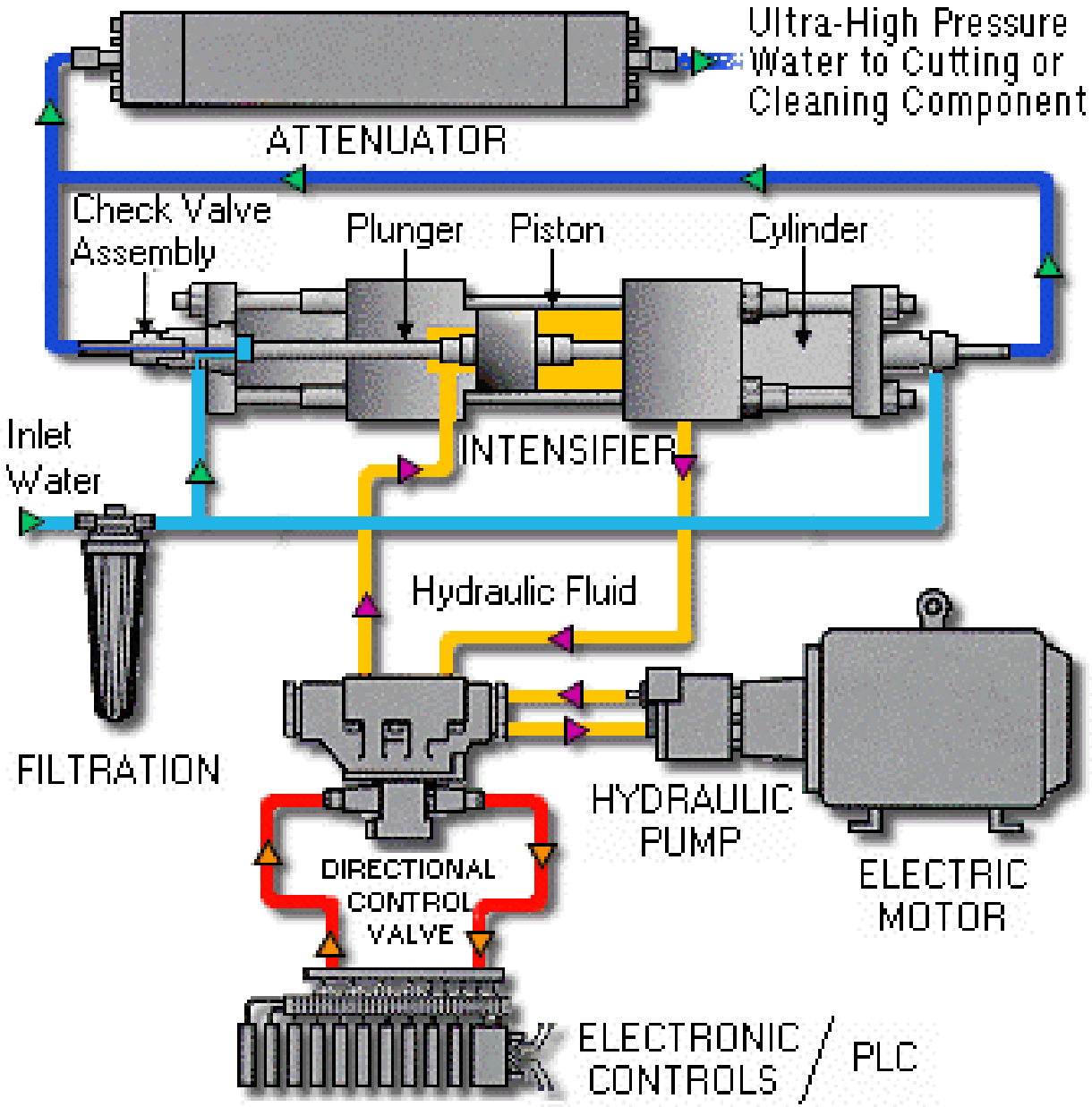
Hydraulic Systems

- **Direction Control Valves (DCV) are 'used for *distribution of energy to various actuators by* controlling the direction of flow *of the pressurized oil in the system.***
- ***Therefore, it has the direct* influence on start, stop and the flow direction of the actuators.**

Pneumatic Directional Control Valves





Newsletter Training Tools

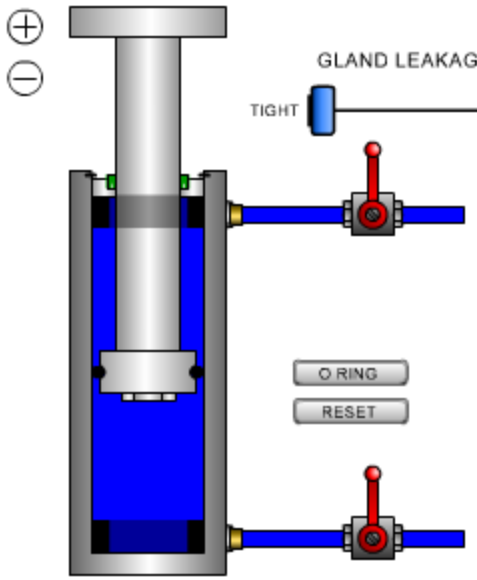
Differential Volume Exercise 2

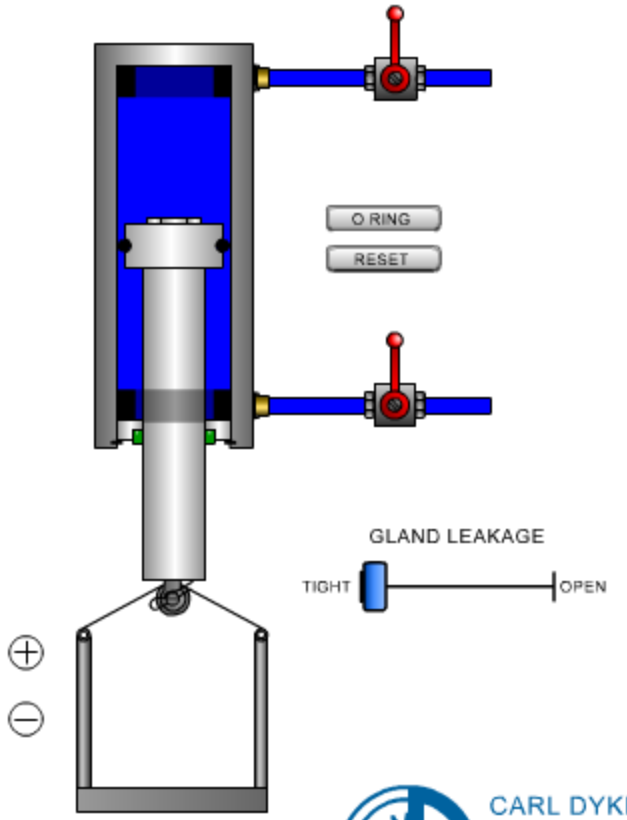
Media Menu

HELP

INTERACTIVE

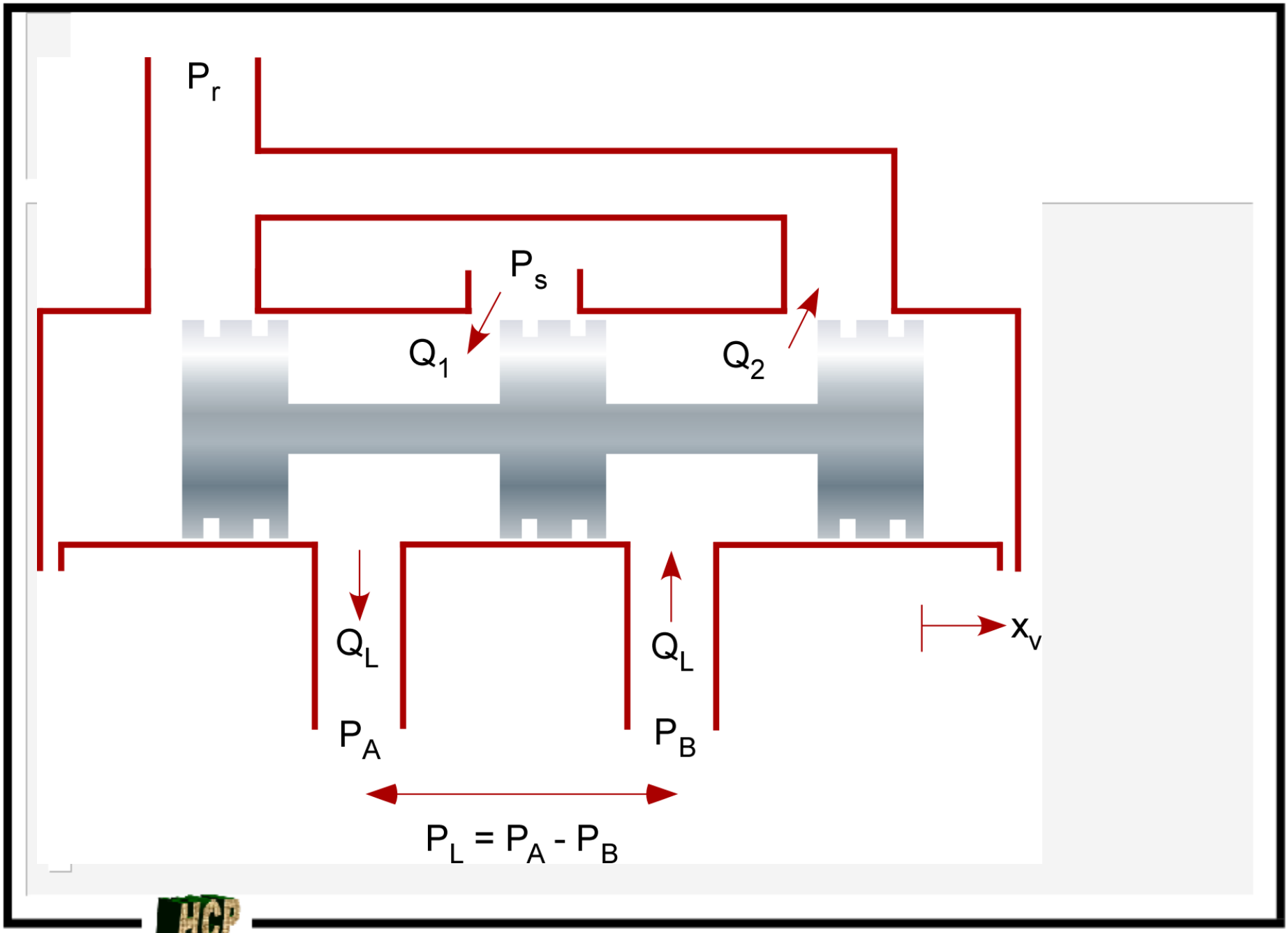
PARTIAL VACUUM
NEUTRAL PRESSURE
LOW PRESSURE
MEDIUM PRESSURE
HIGH PRESSURE

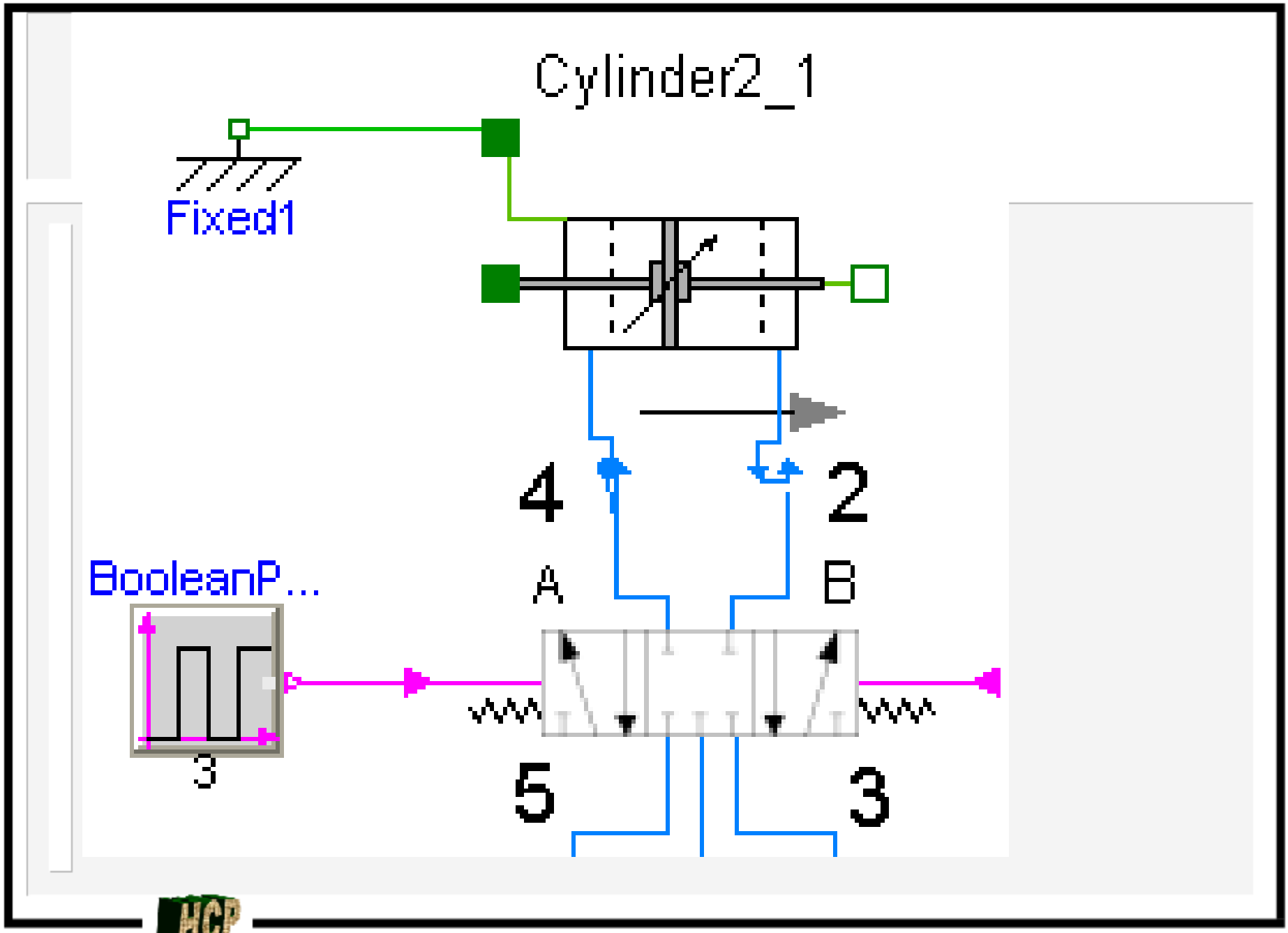


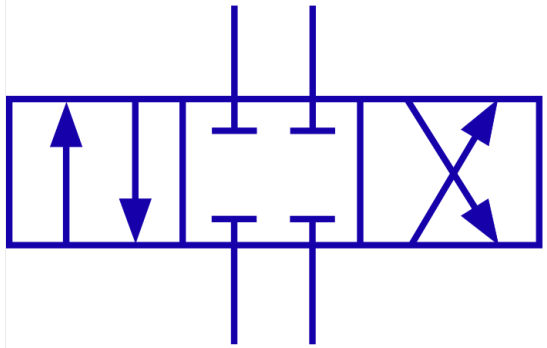


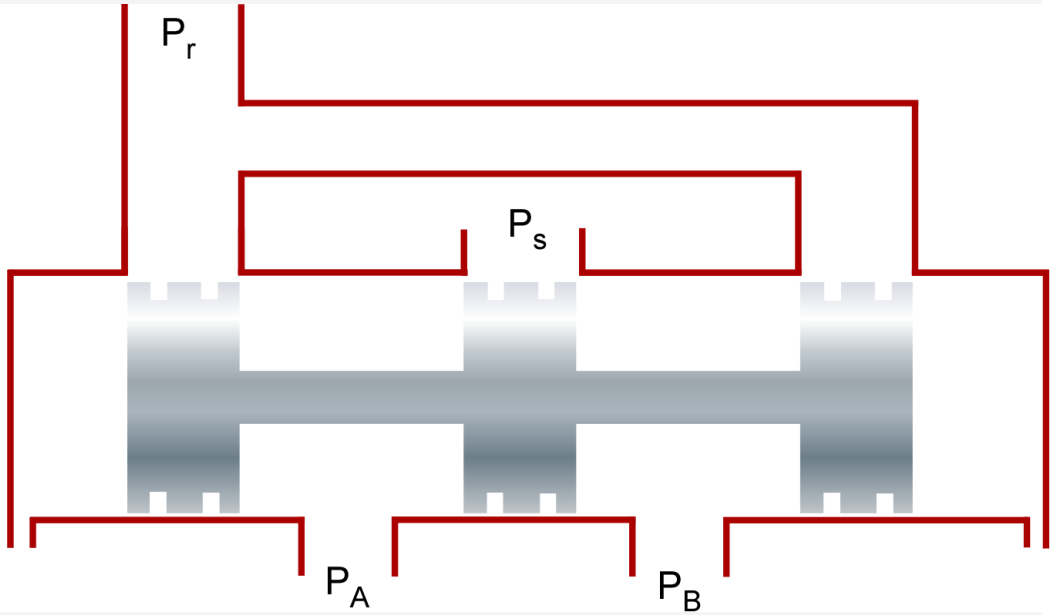
CARL DYKE
INDUSTRIAL CONSULTING
www.carldyke.com
Version: 04/08 © 2008

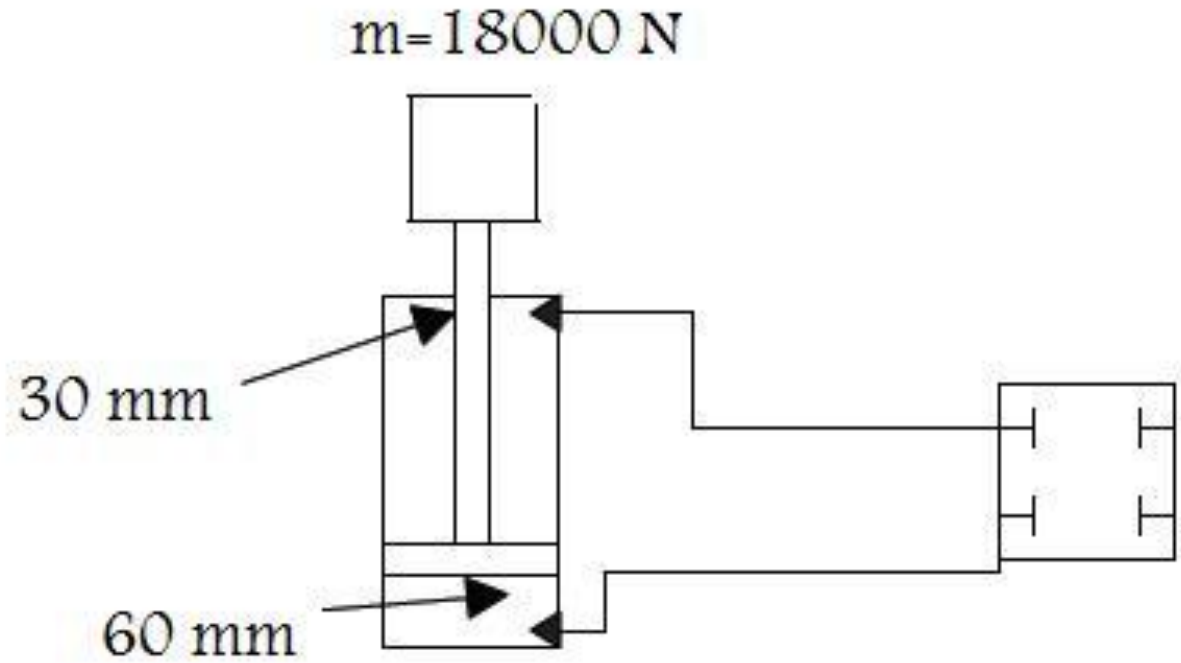
email : info@carldyke.com toll free : (866) 628-3224





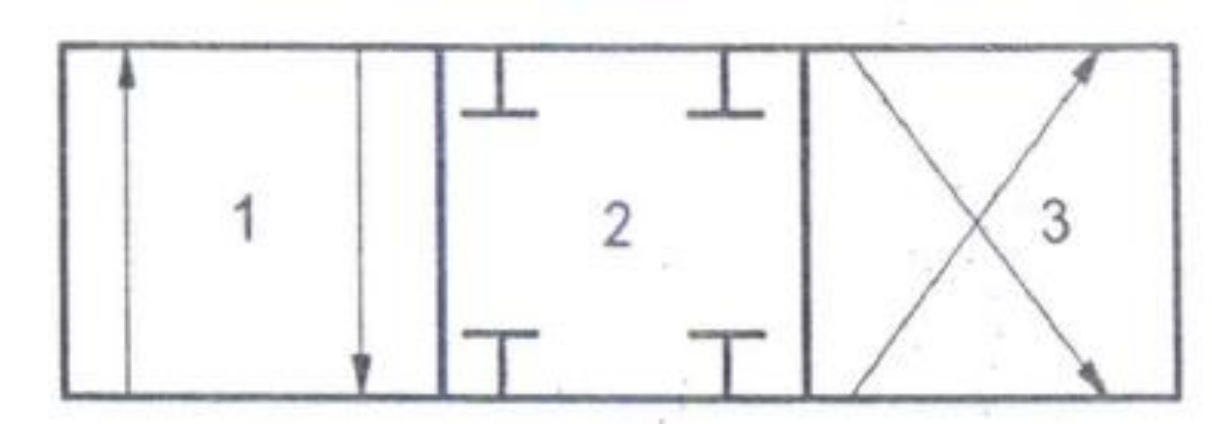






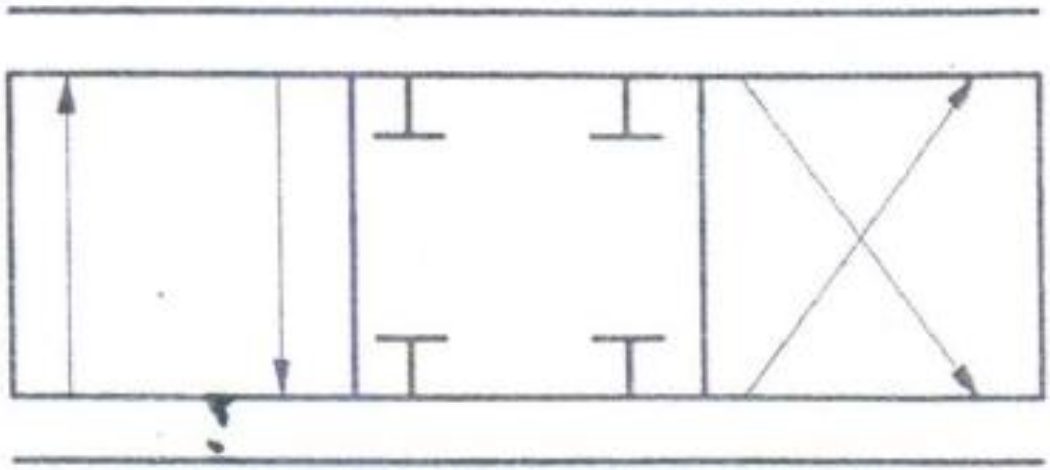
Non Throttling

- In this type of DCVs the switching positions are fixed. It means that the DCY can take only a particular discrete position and nothing in between.



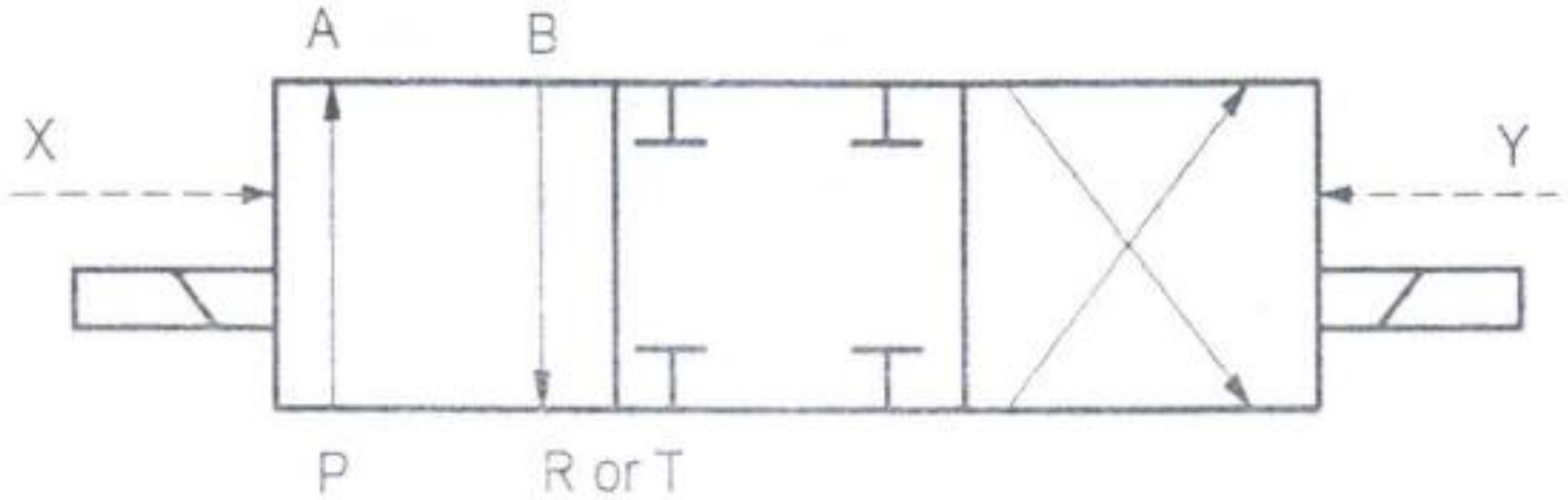
Throttling

- In this type of DCVs, the switching positions are not fixed.
- Therefore, the change of throttling type DCV from one position to the next one is gradual during which it passes through several intermediate positions.
- In other words, in switching over from one position to the other there is infinite number of intermediate positions.



- Null Position:
- Actuated Position:

conventions used in the DCV

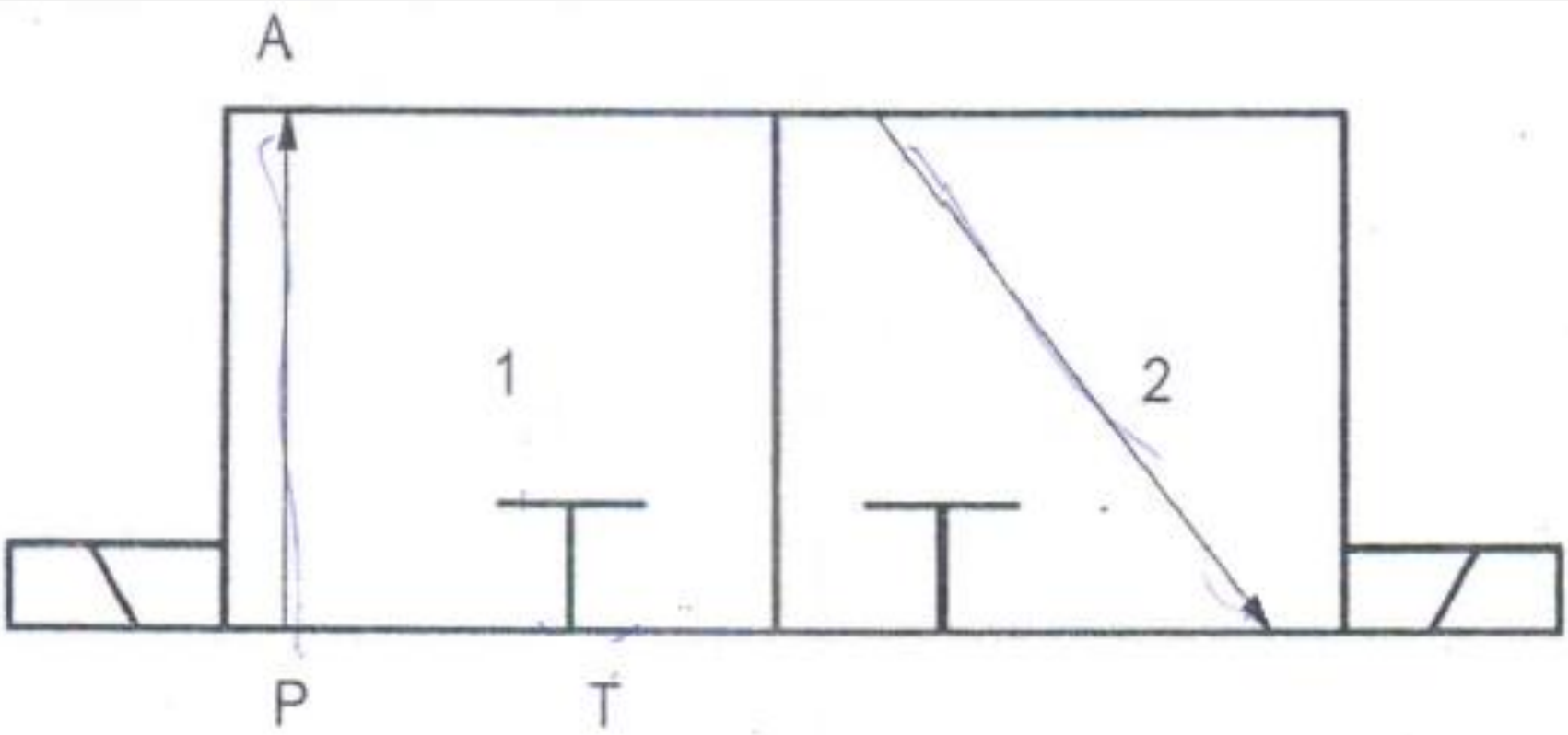


Standard Notations for DCV

The notations used are :

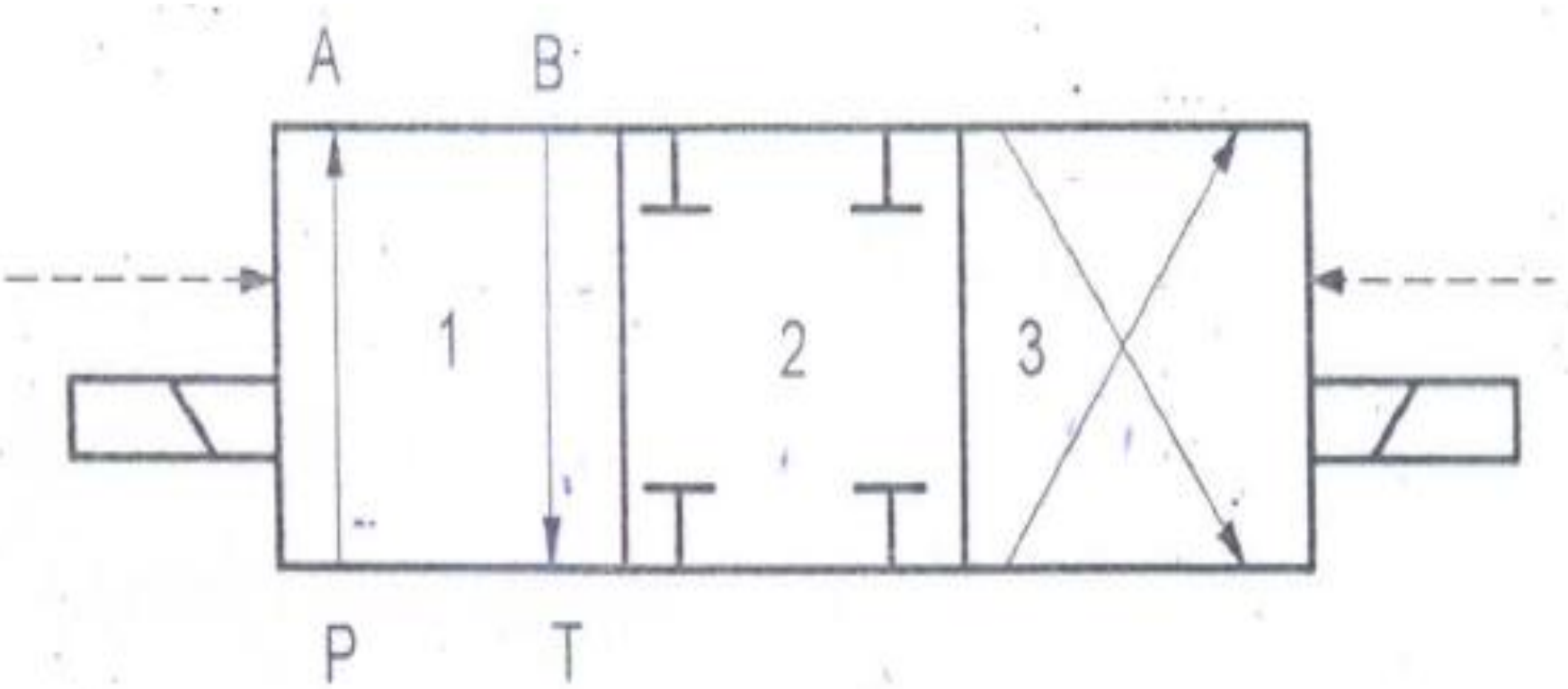
- P – Pressure Connections
- R or T – Return Lines
- A, B – Working Ports
- X, Y, Z …etc. – Control Ports

Three Way Two Position



Three Way Two Position DCV

Four Way Three Position DCV



Four Way Three Position DCV

Hydraulic Motors

- In fluid power, actuators are those devices which convert the fluid power into the mechanical power at the desired place.

1. Linear Actuators: to provide linear motion as output.
2. Rotary Actuators: to provide rotary motion as the output.

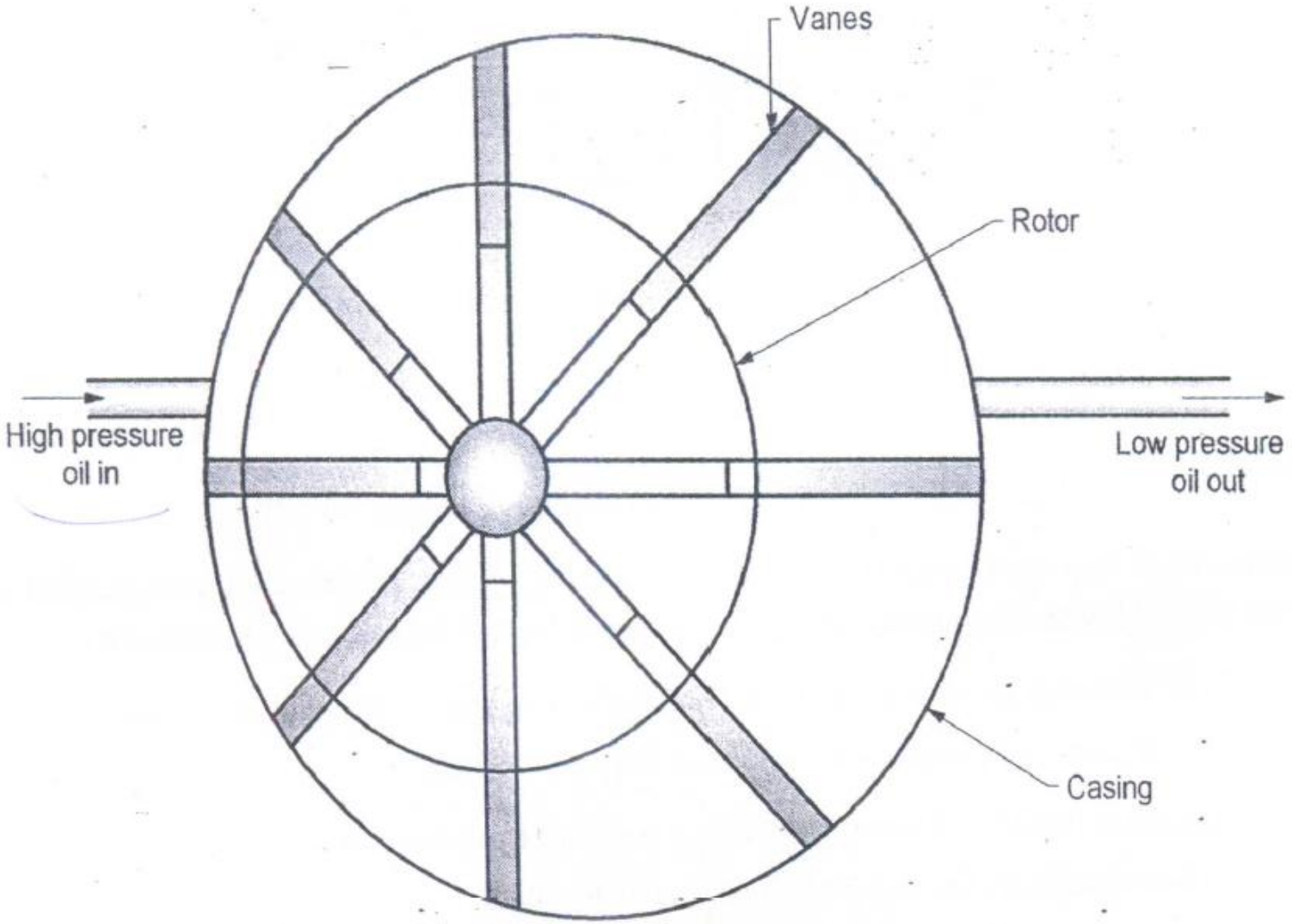
Linear Actuators

- Linear actuators provide linear motion to the working element. Examples are rams and cylinders.
- There are large varieties of cylinders which can be employed in performing a variety of functions. They differ in respect to the forces developed, speed of movement, the stroke provided etc.
- The force applied by hydraulic cylinders may vary from several mega Newton to few micro Newton where as the stroke provided may vary from several meters to few millimeters.

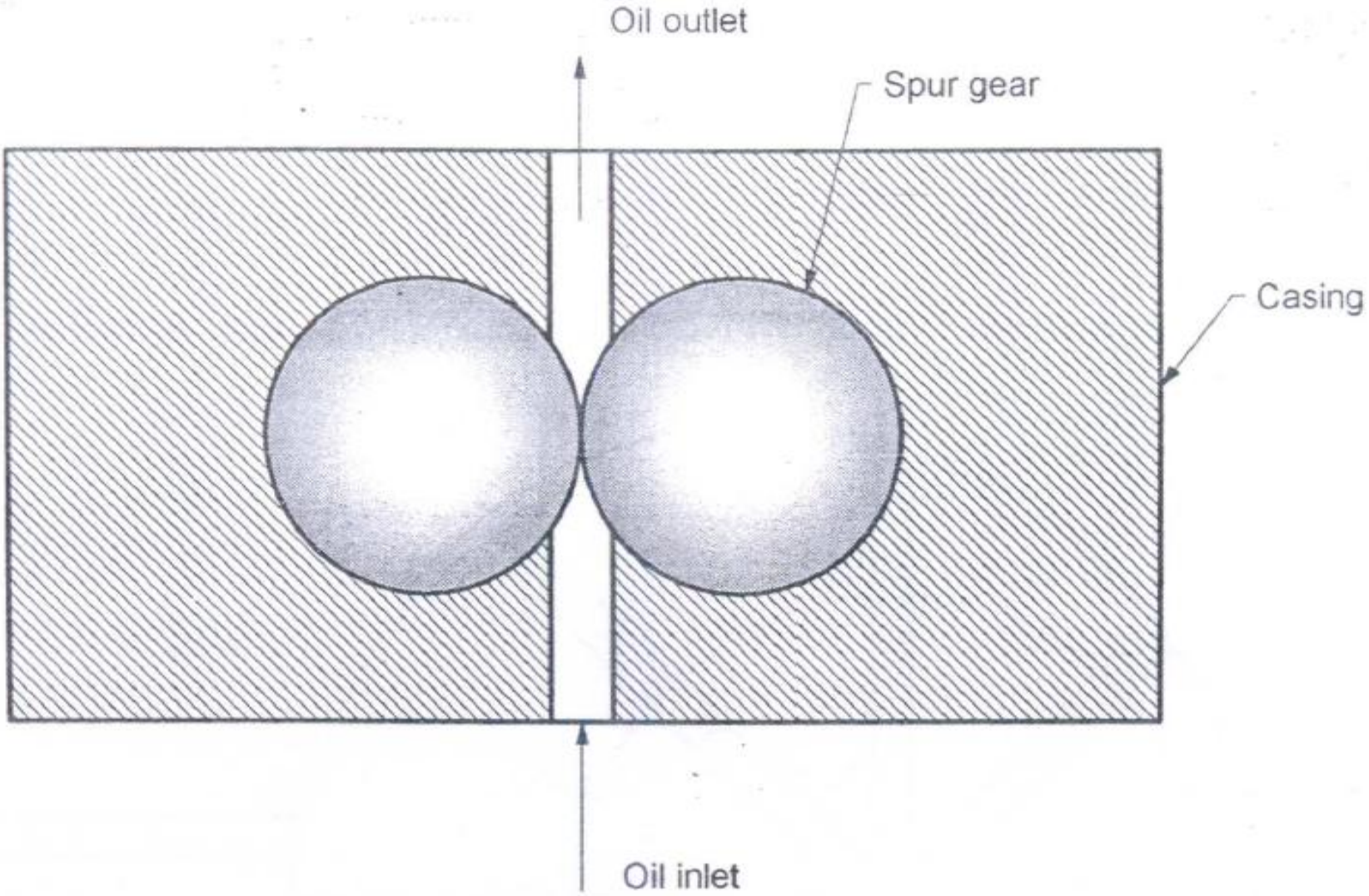
Rotary Actuators. (Hydraulic Motors)

- Rotary actuators are also called as **hydraulic motors.**
- There are large number of applications in fluid power systems where output motion is required in the form of a rotary motion.

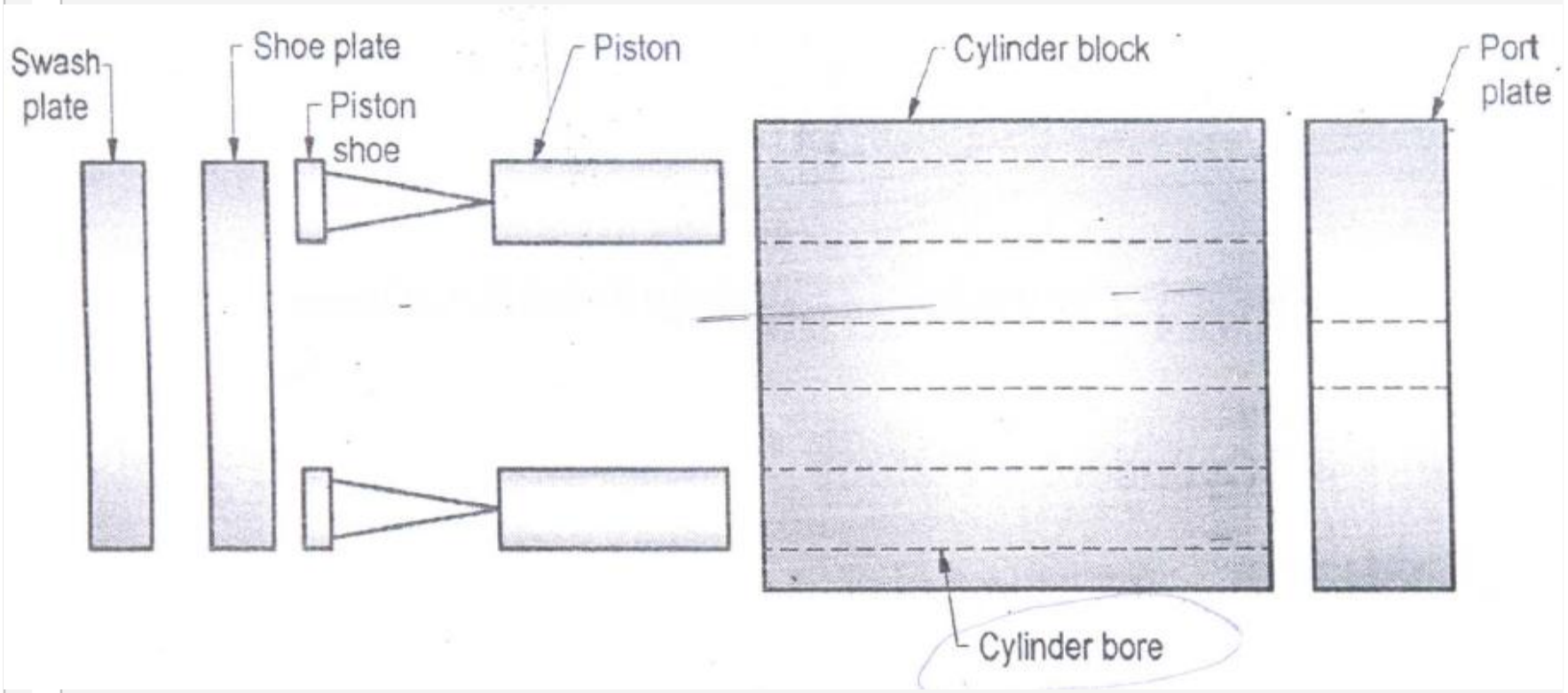
Vane motors



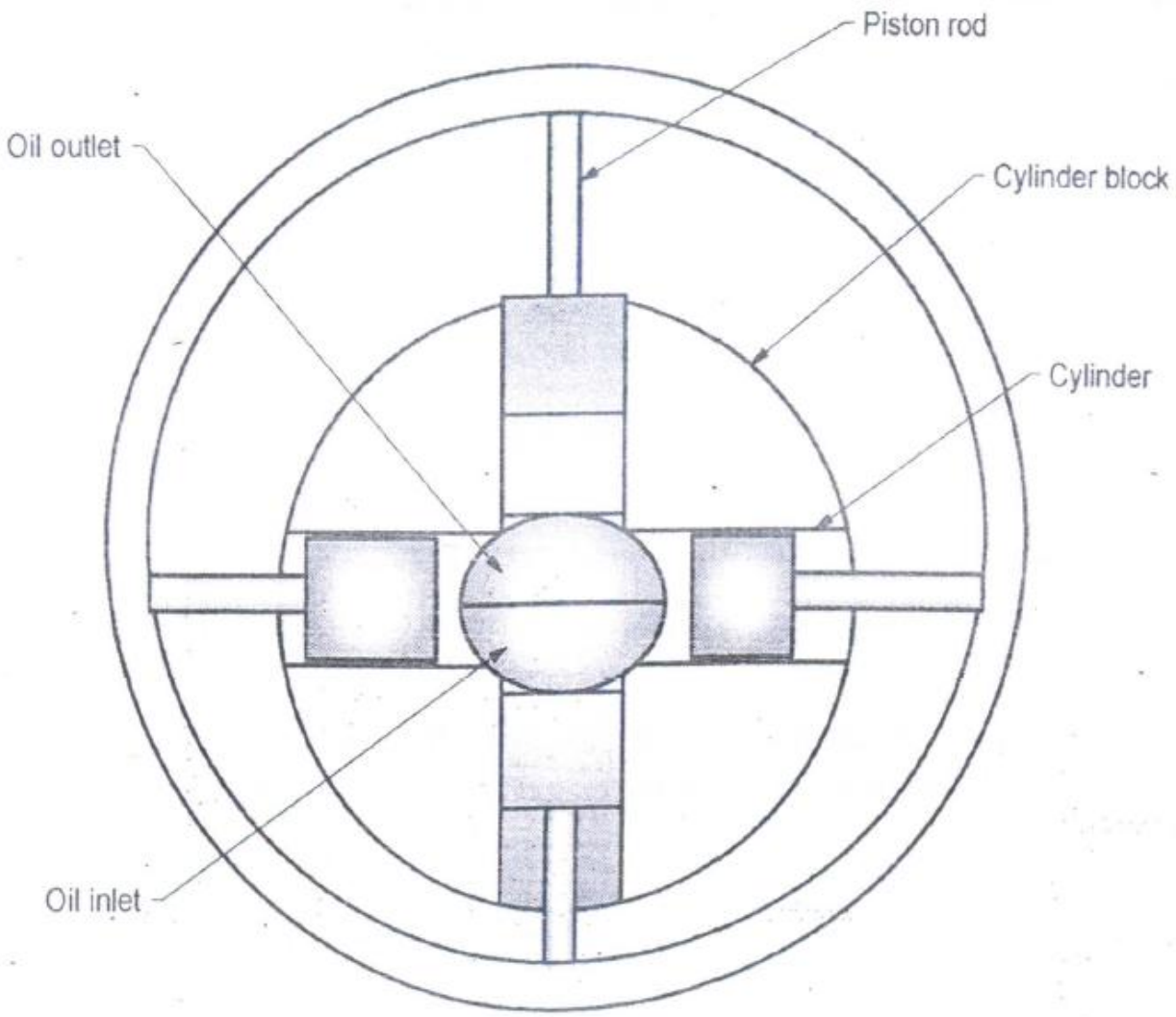
Spur Gear Motor



Axial Piston Motor



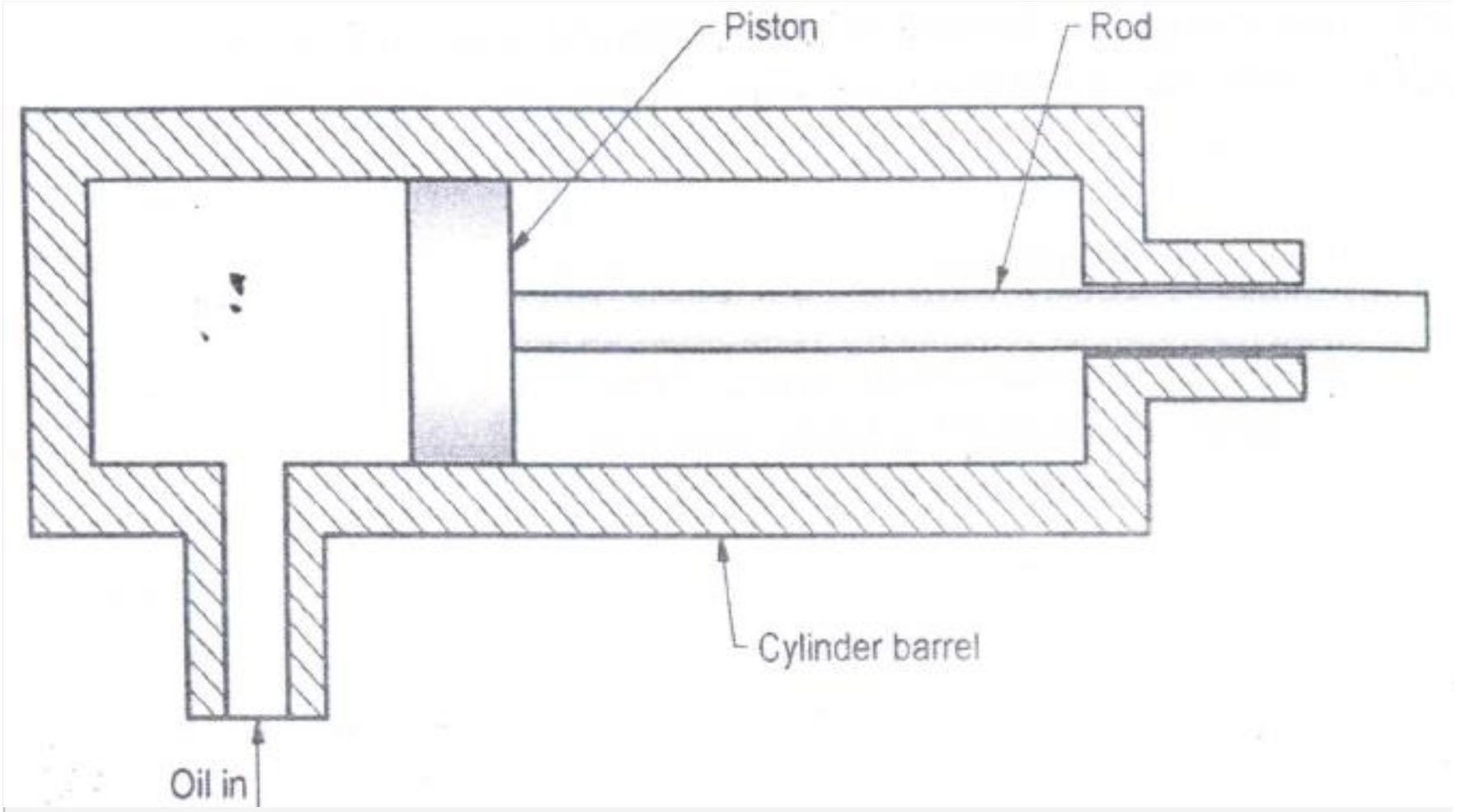
Radial Piston Motor



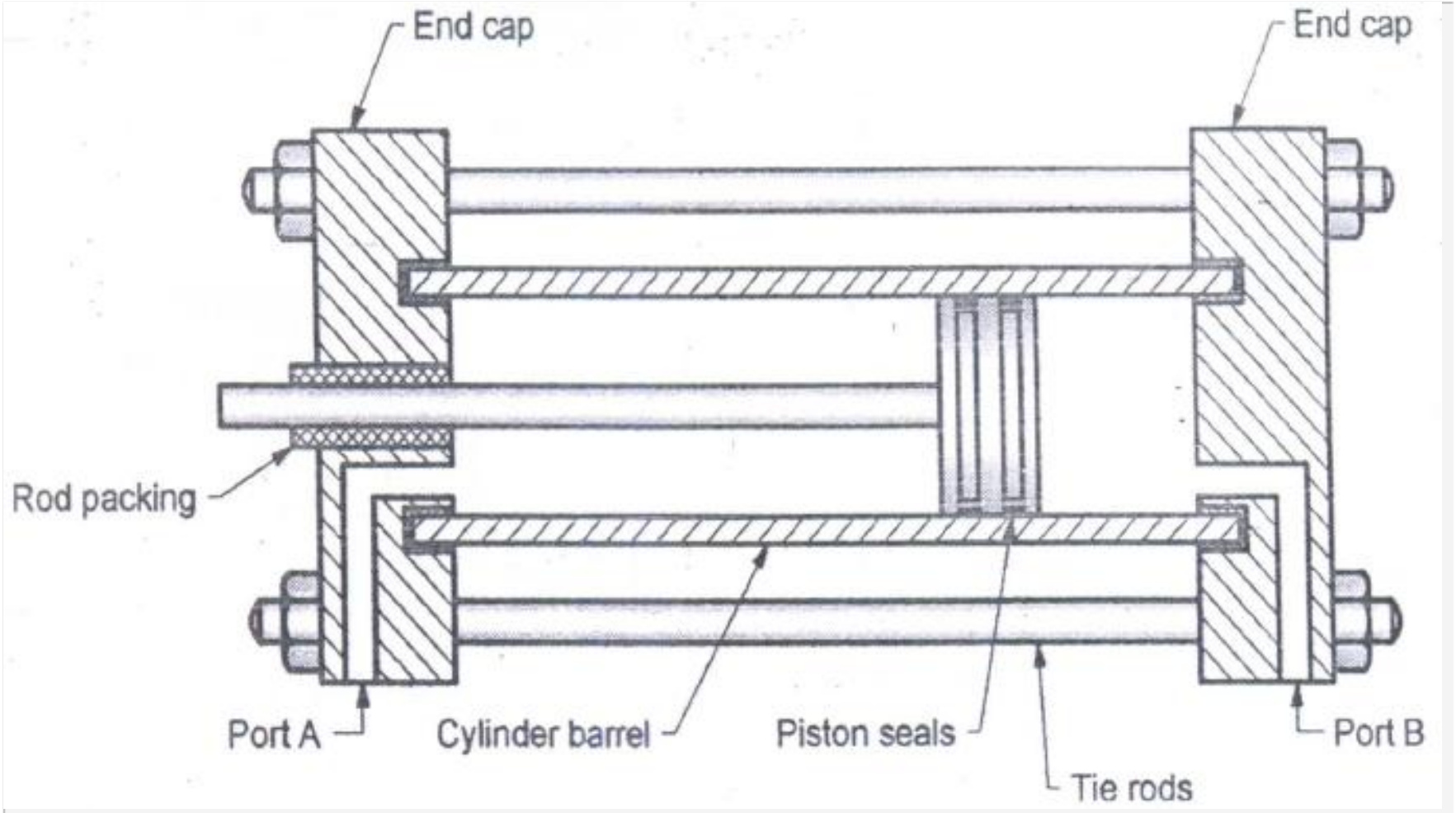
Hydraulic cylinders

- Single acting.
- Double acting.

Single Acting Cylinder

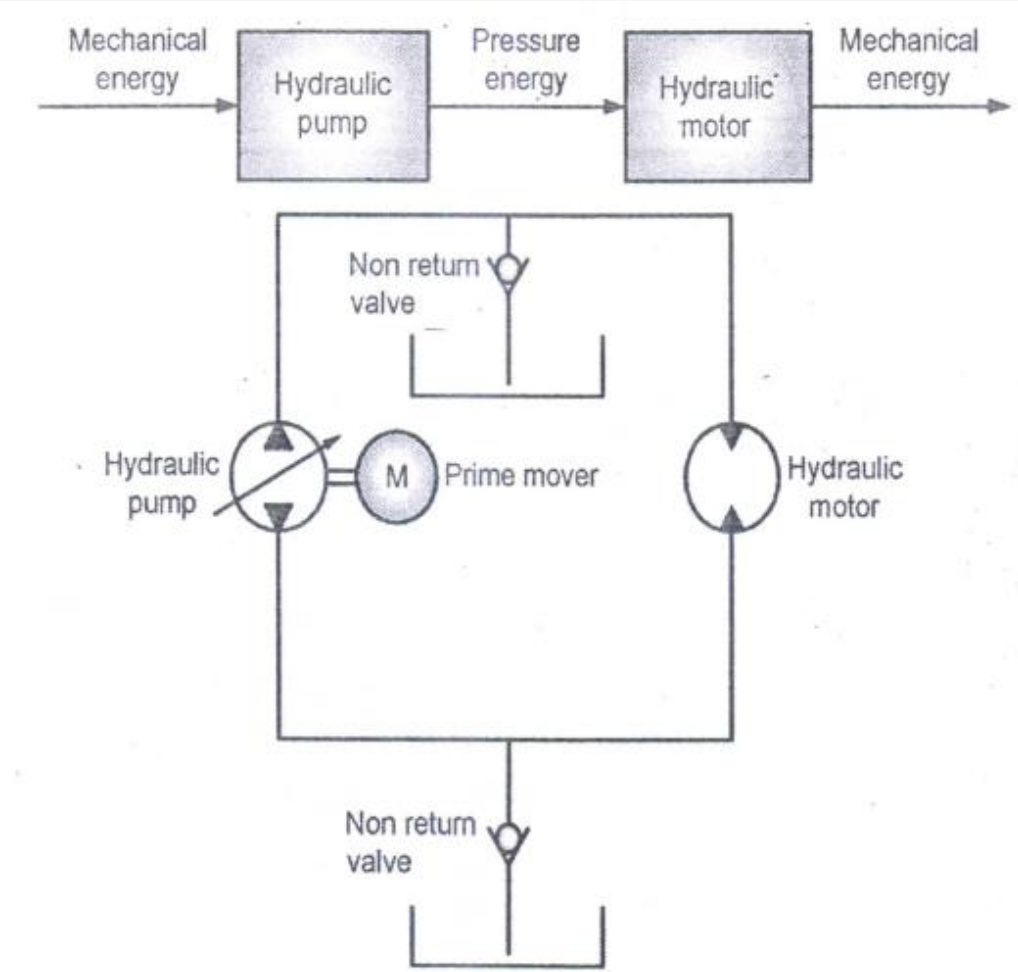


Double acting cylinder

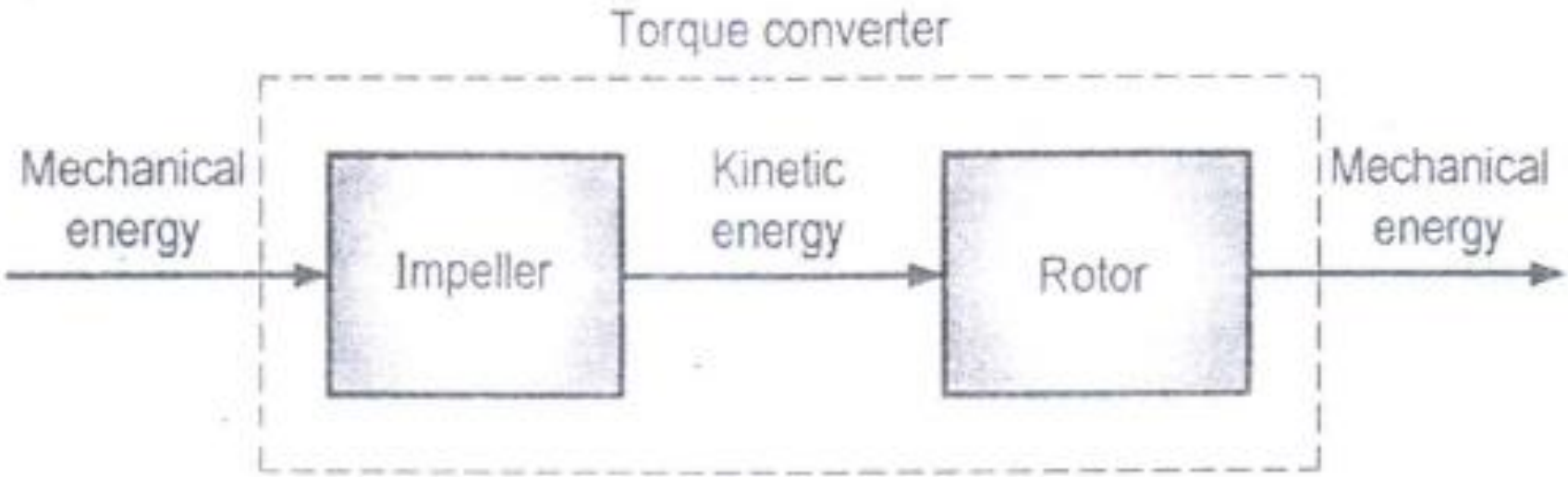


Hydraulic Transmission

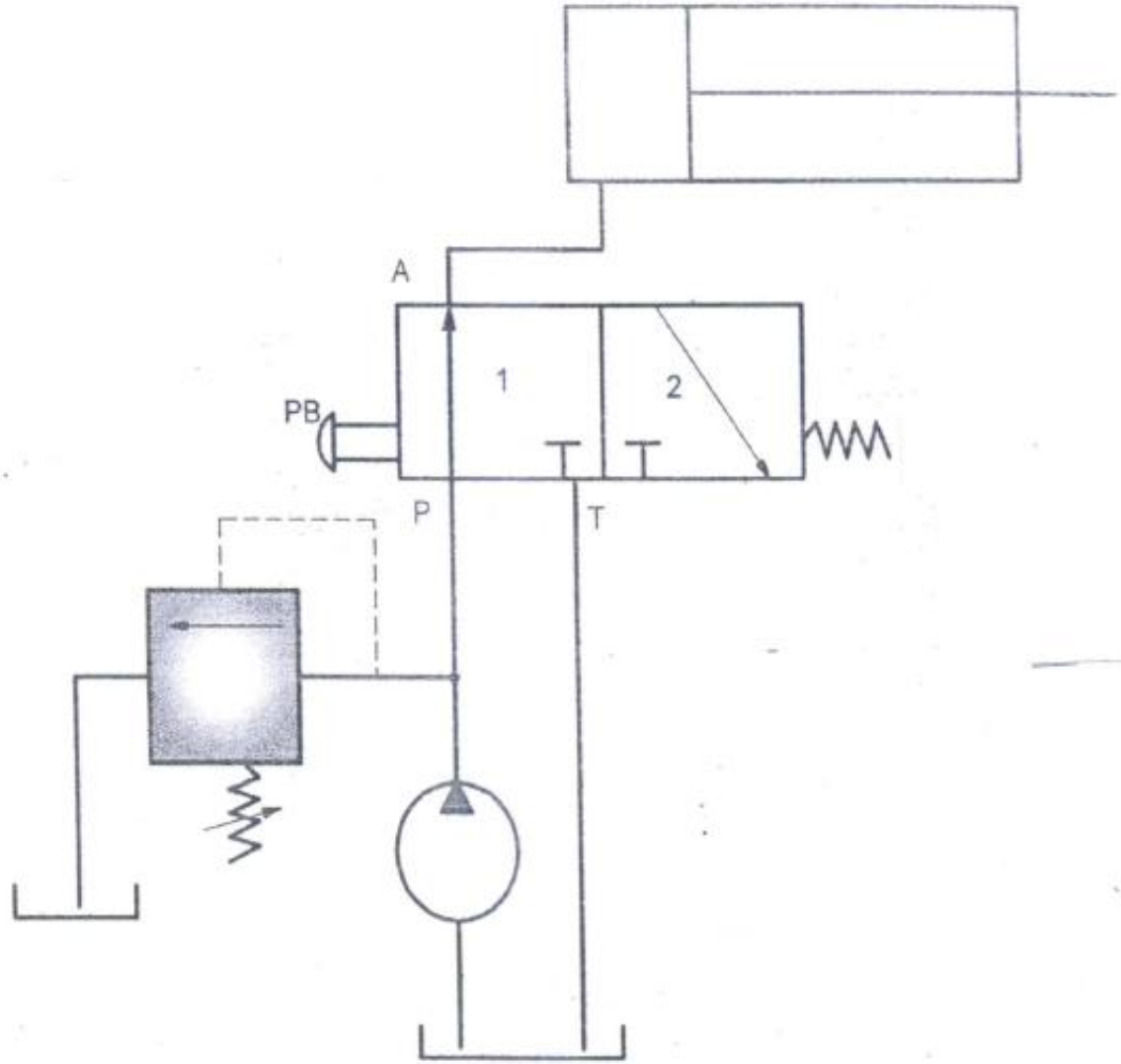
- hydrostatic transmission



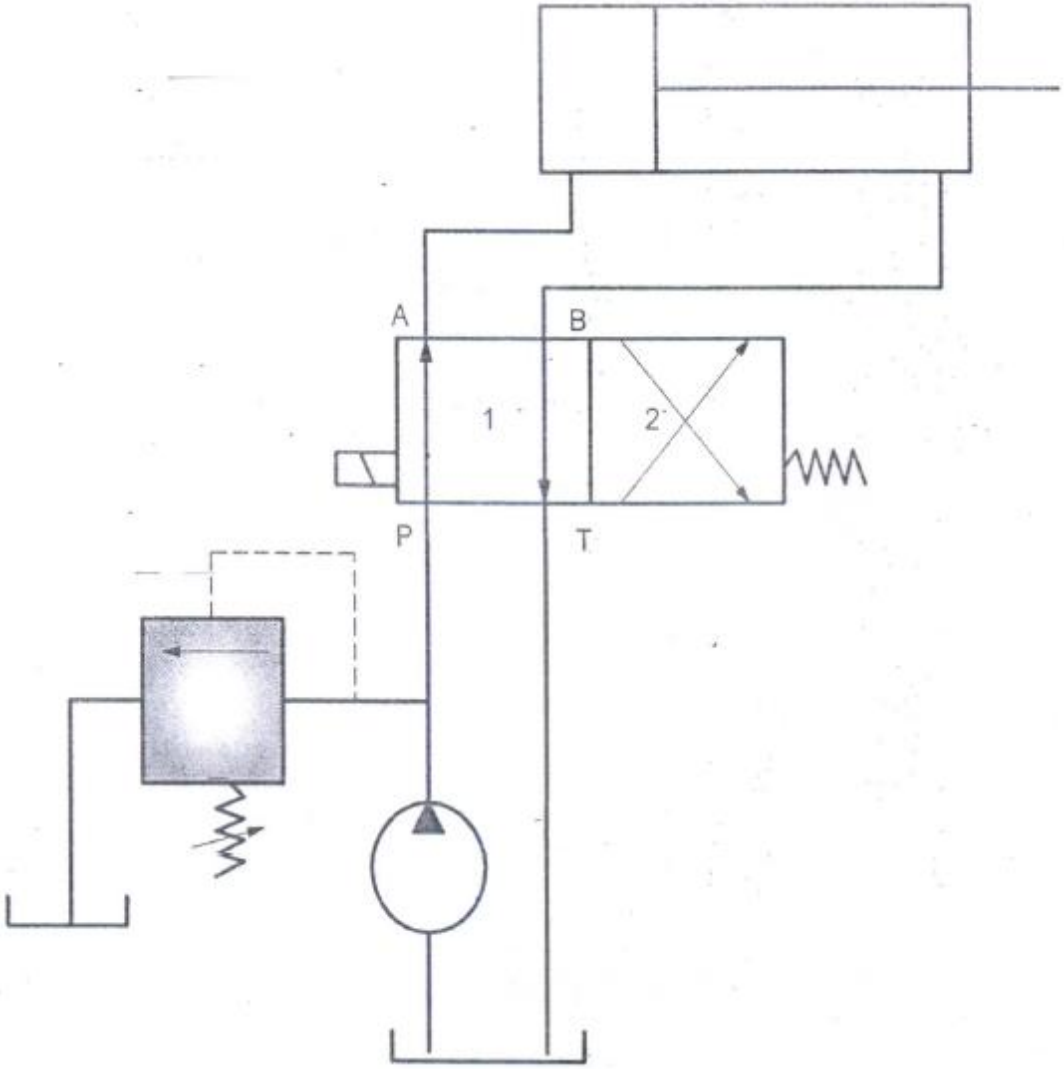
Hydrodynamic Transmission



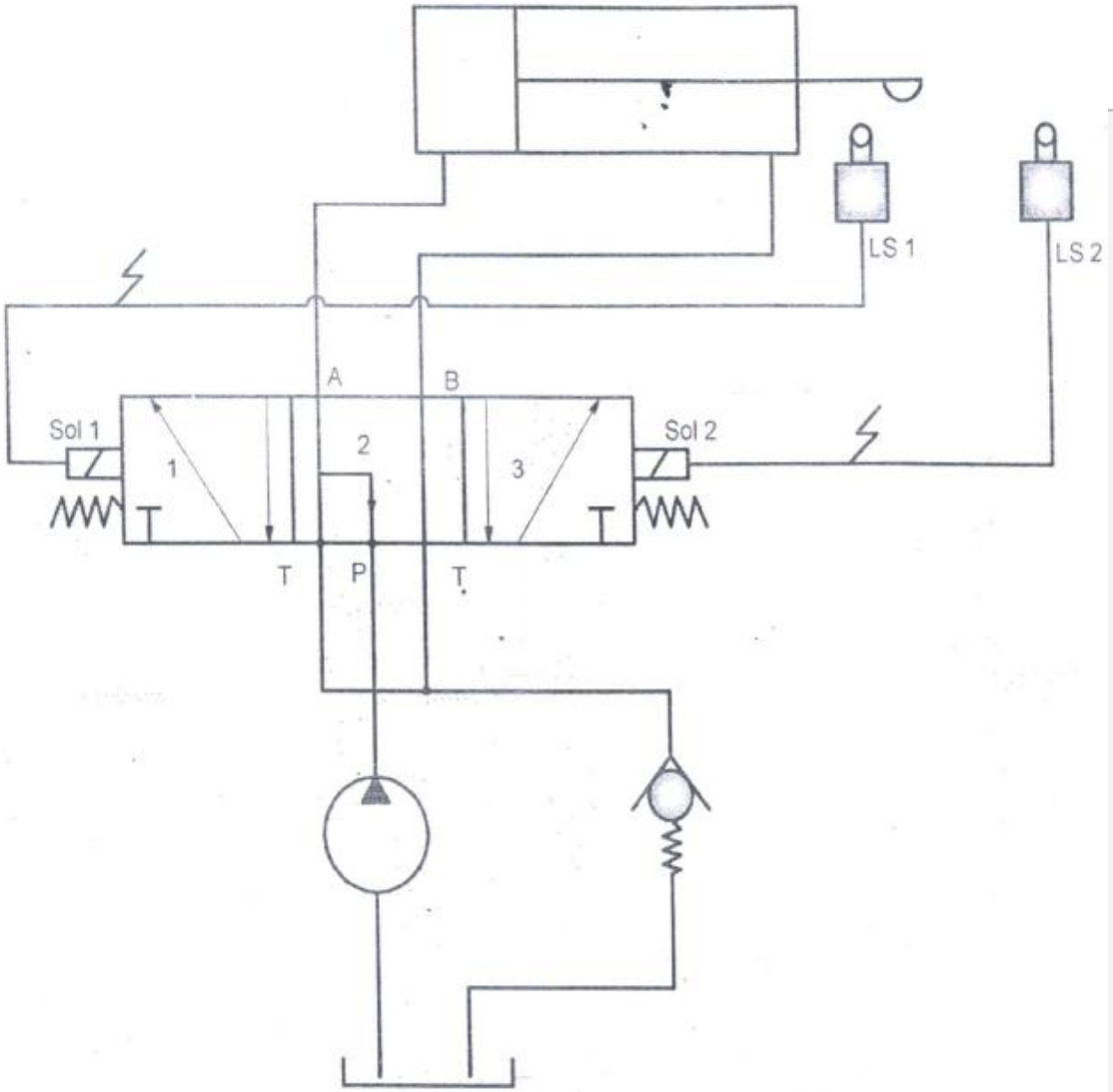
Circuit for Single Acting Cylinder



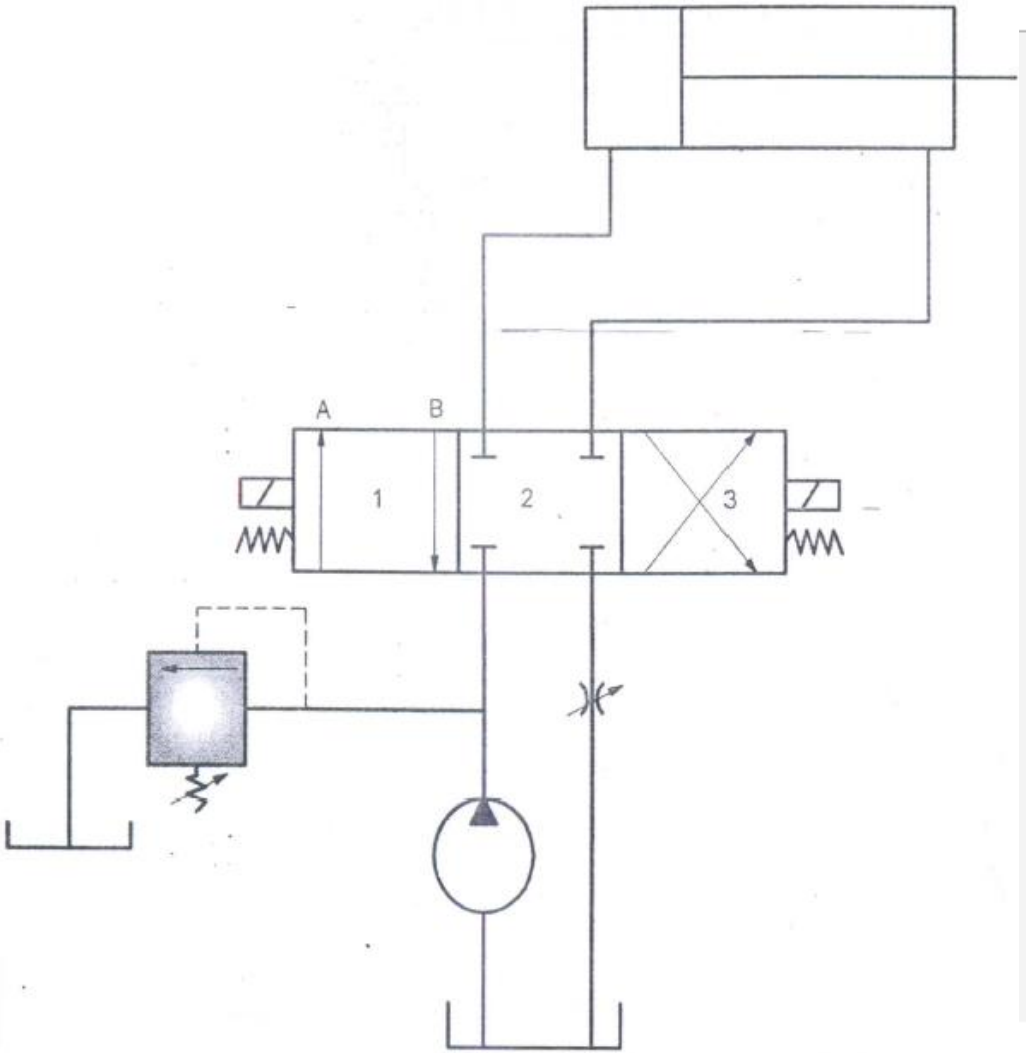
Circuit for Double Acting Cylinder



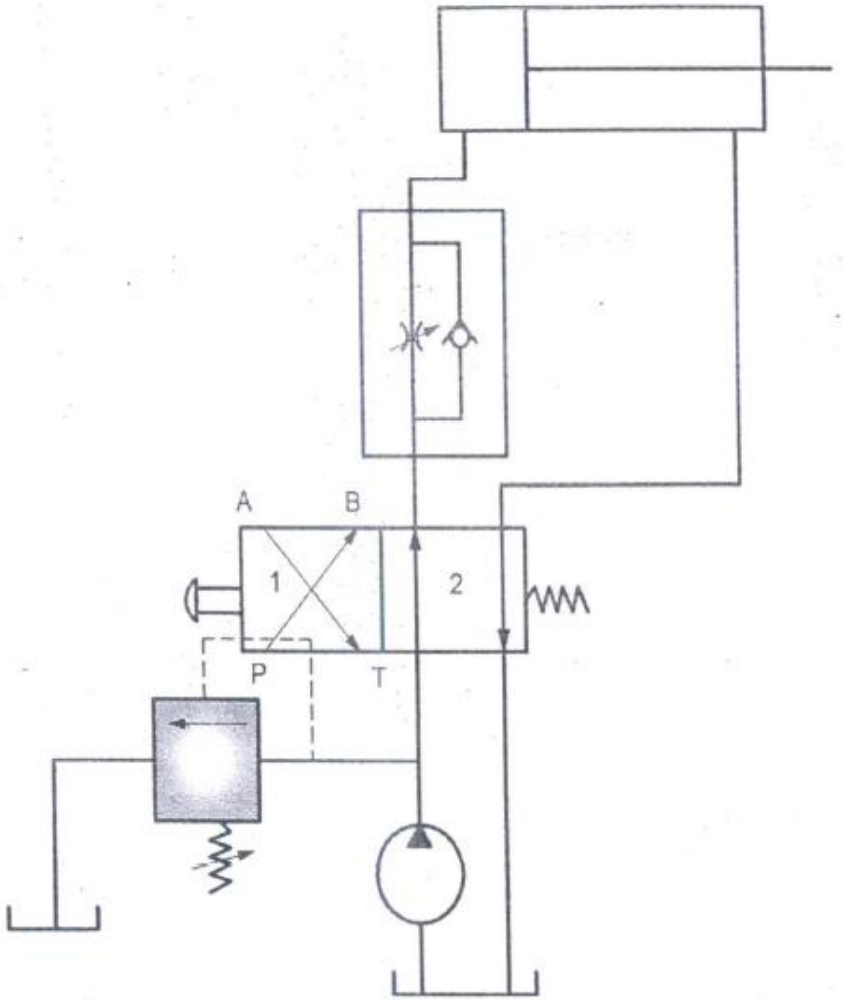
Solenoid Control of Double Acting Cylinder



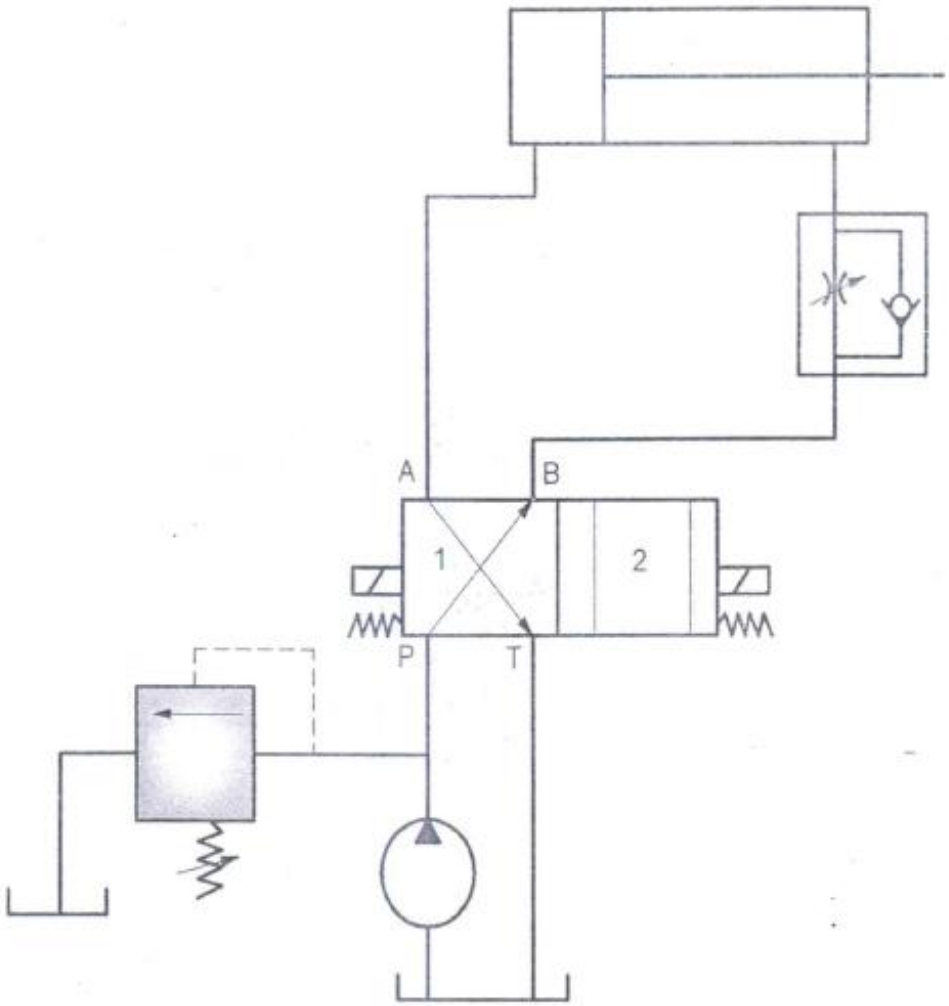
Throttle valve circuit used for speed Control



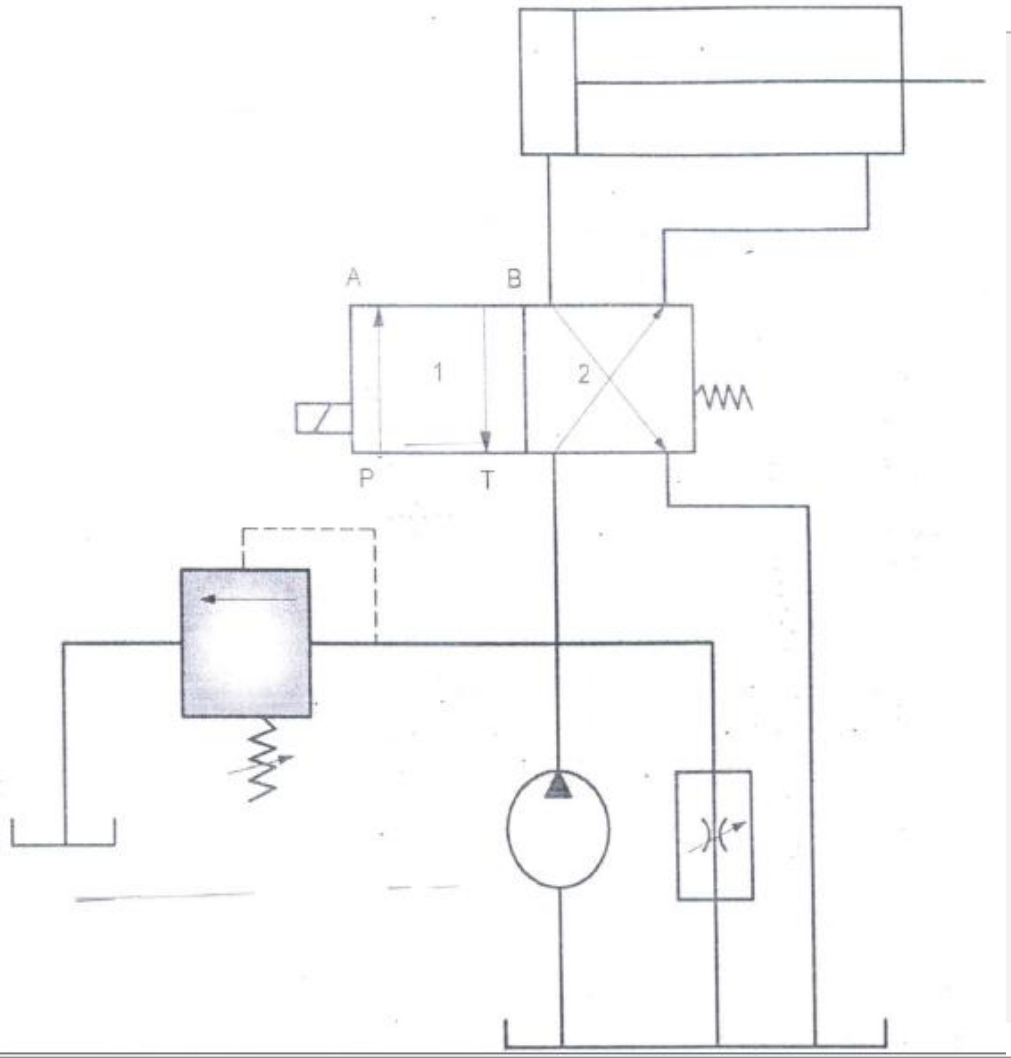
Meter In Circuit



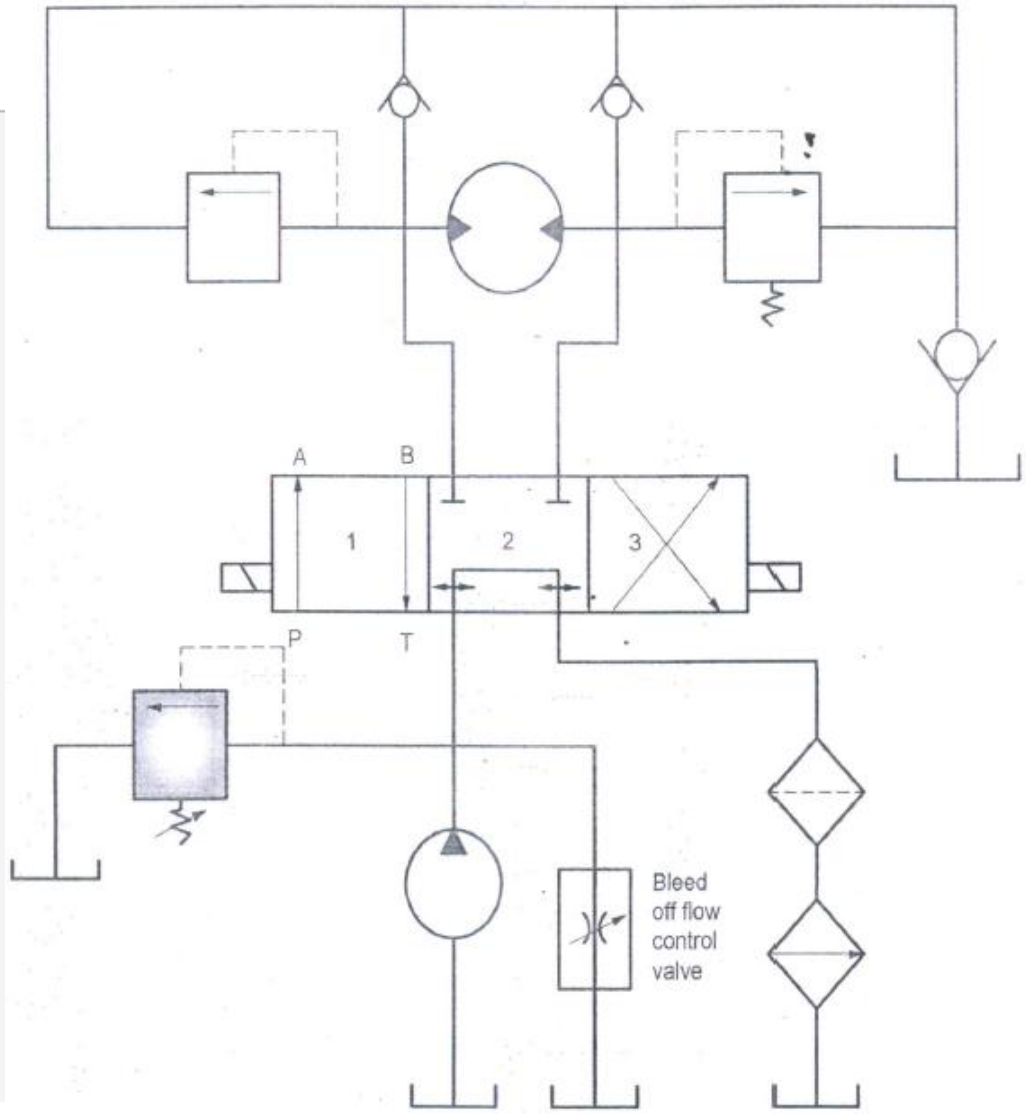
Meter Out Circuit



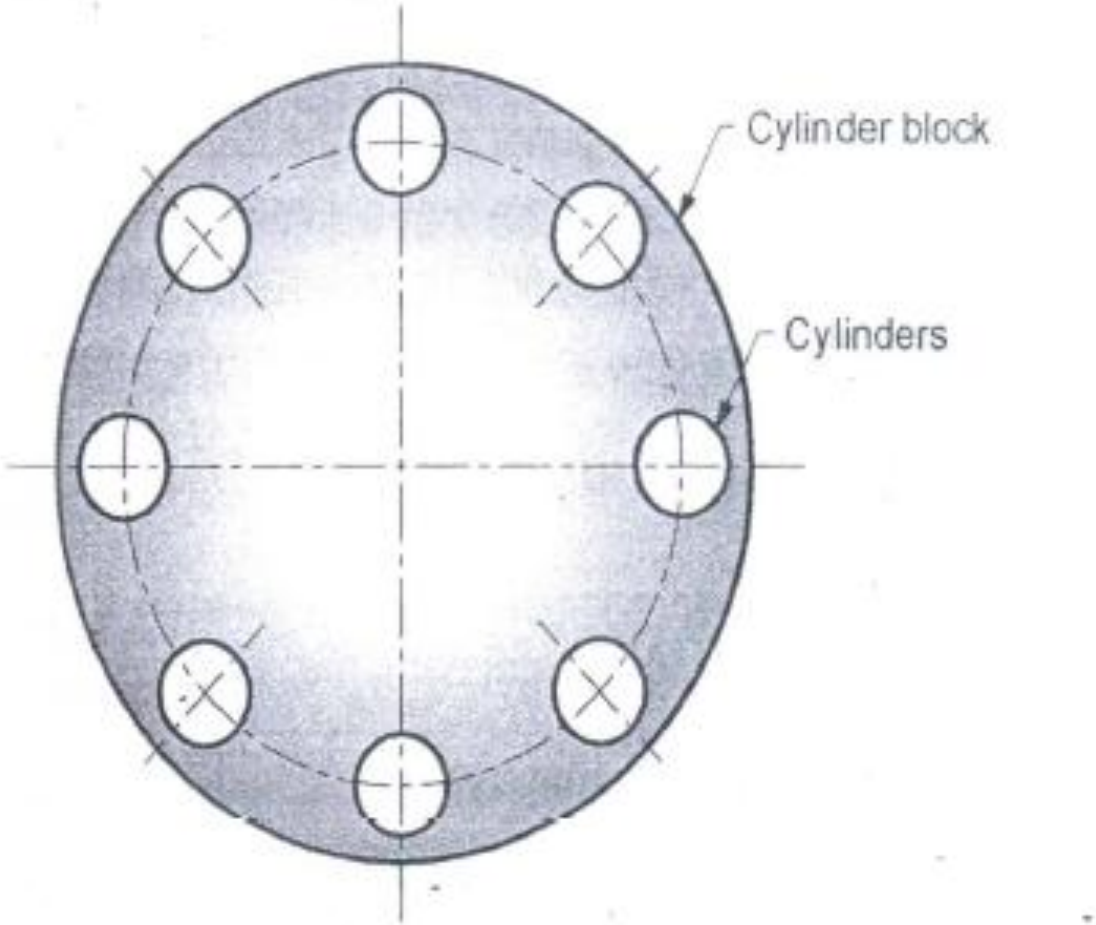
Bleed Off Circuit for Linear Actuators



Hydraulic Motor Speed Control using Bleed Off Circuit

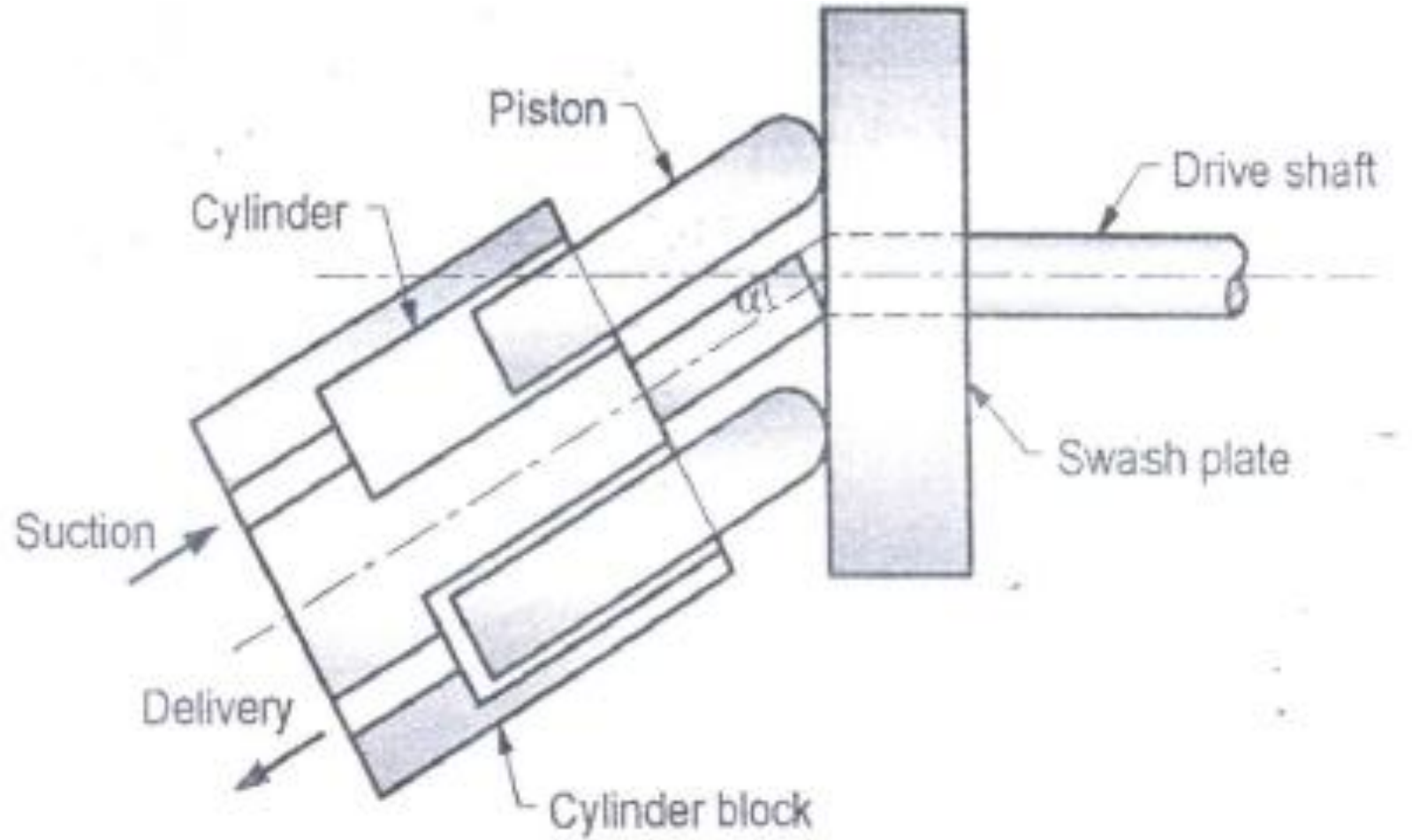


Pumps-Piston Pump

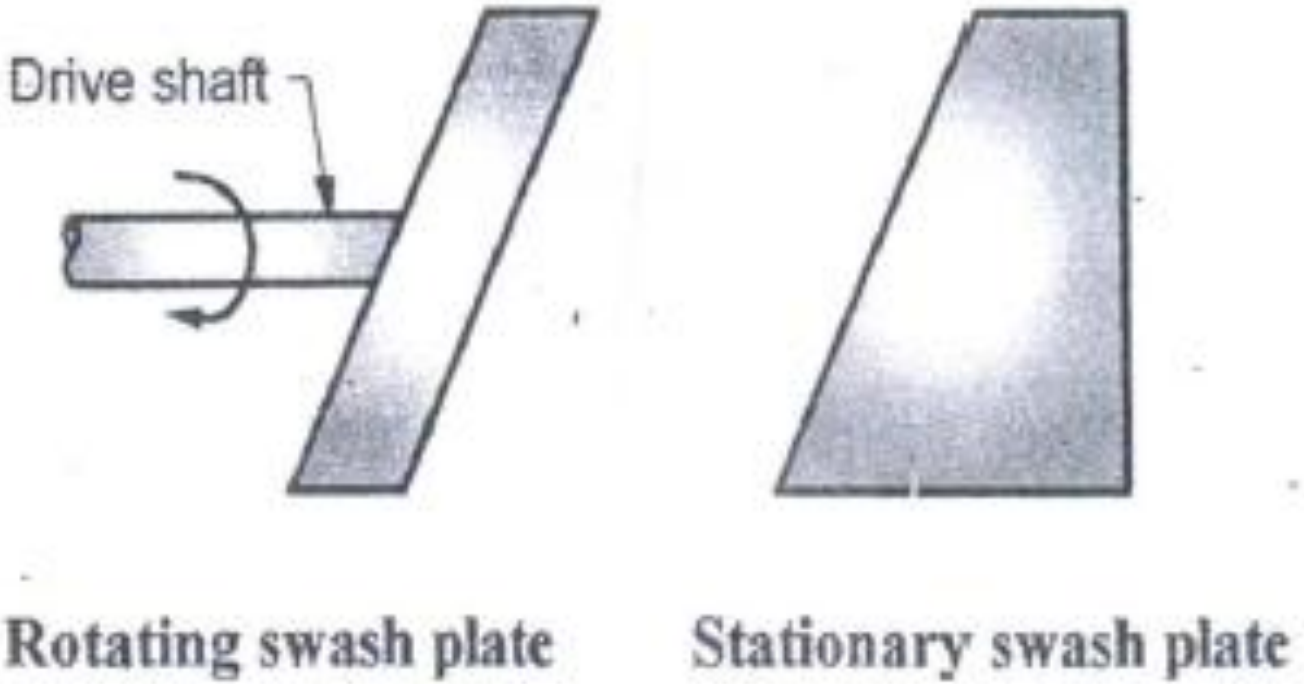


15.1: Arrangement of Cylinder in Axial Piston Pump

Bent Axis Type Axial Piston Pump



swash plate



Rotating swash plate Stationary swash plate

Fig. 9.15.3 : Swash Plate

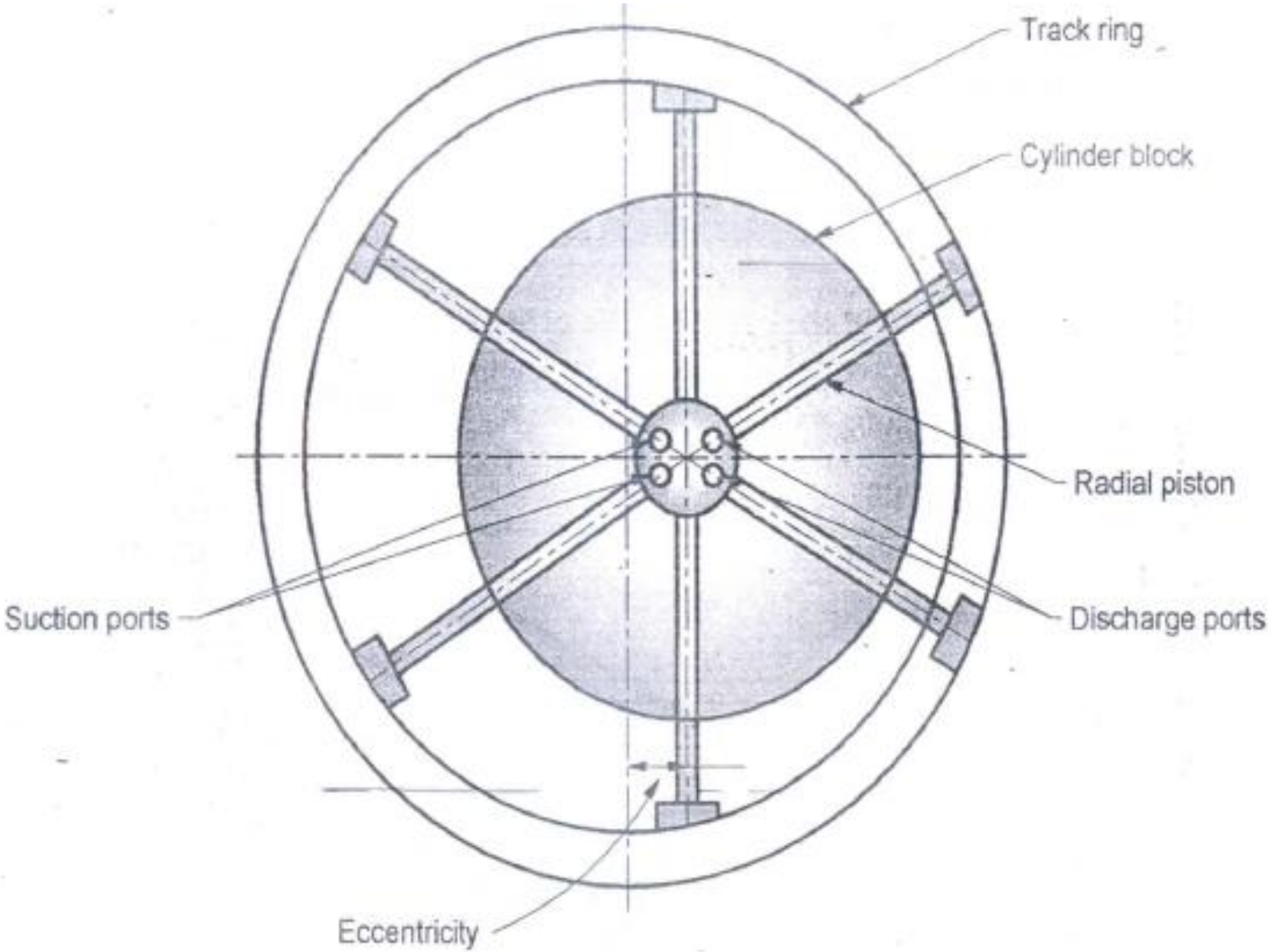


Fig. 9.15.4: Radial Piston Pump

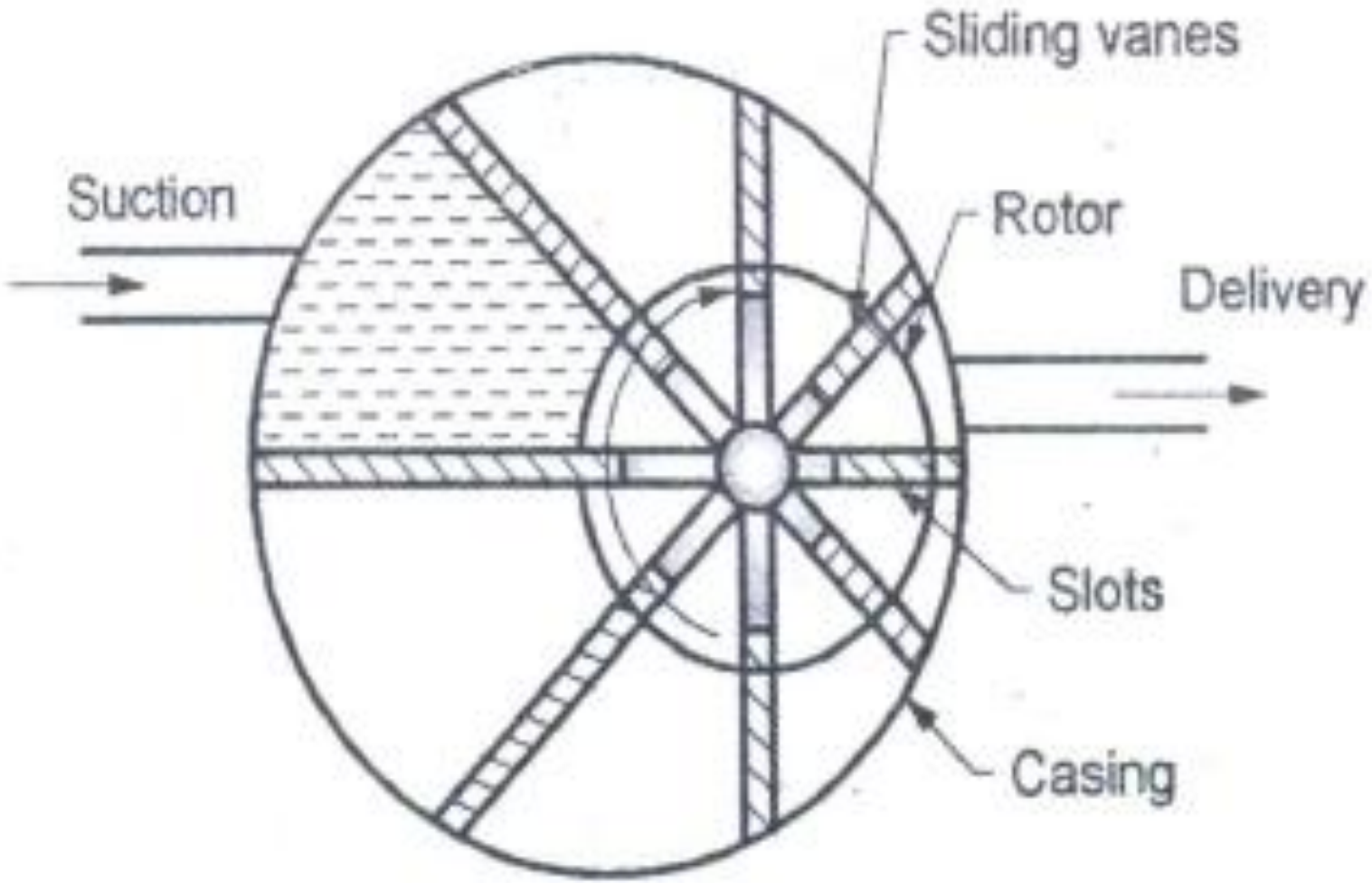
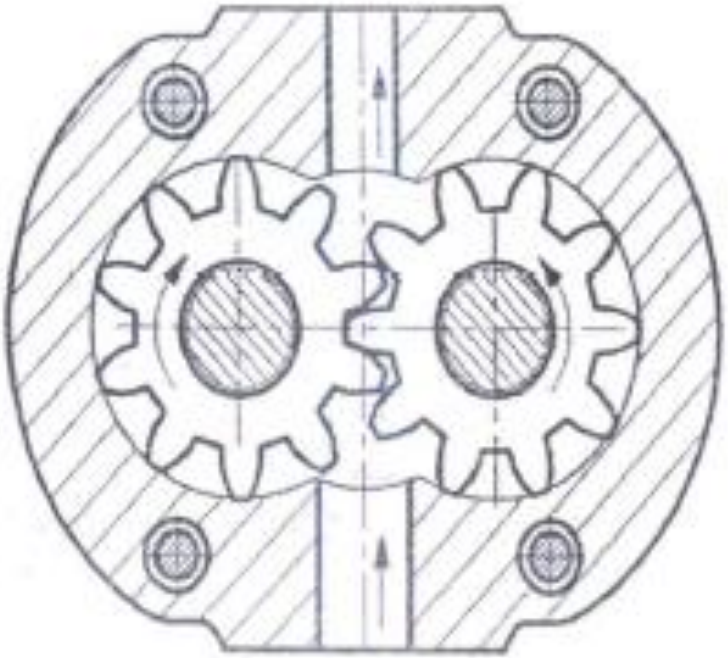


Fig. 9.16.1 : Components of a Vane Pump



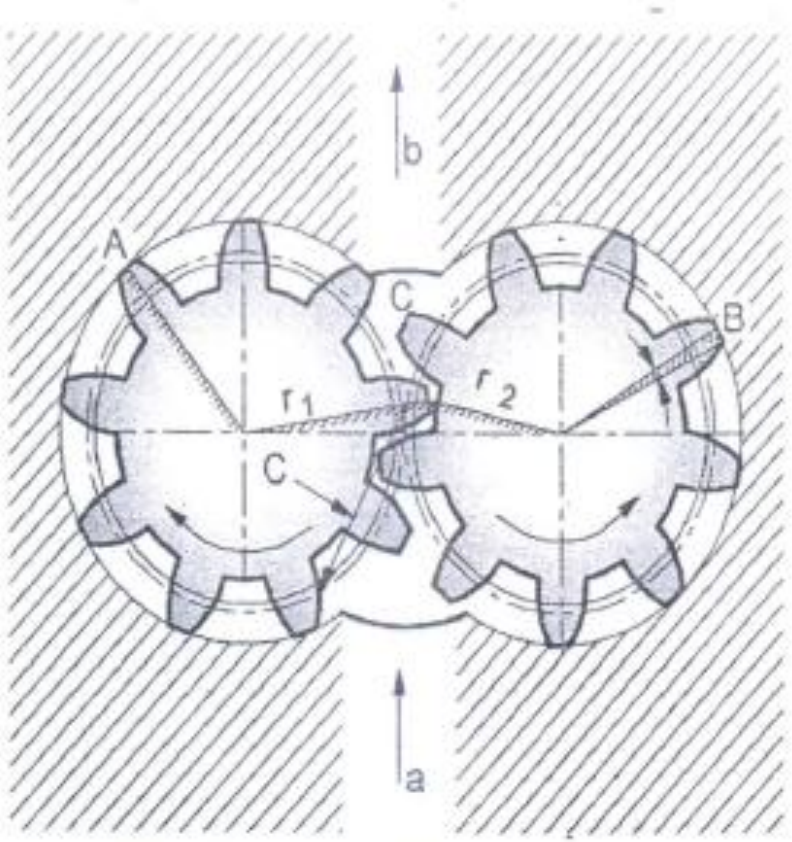
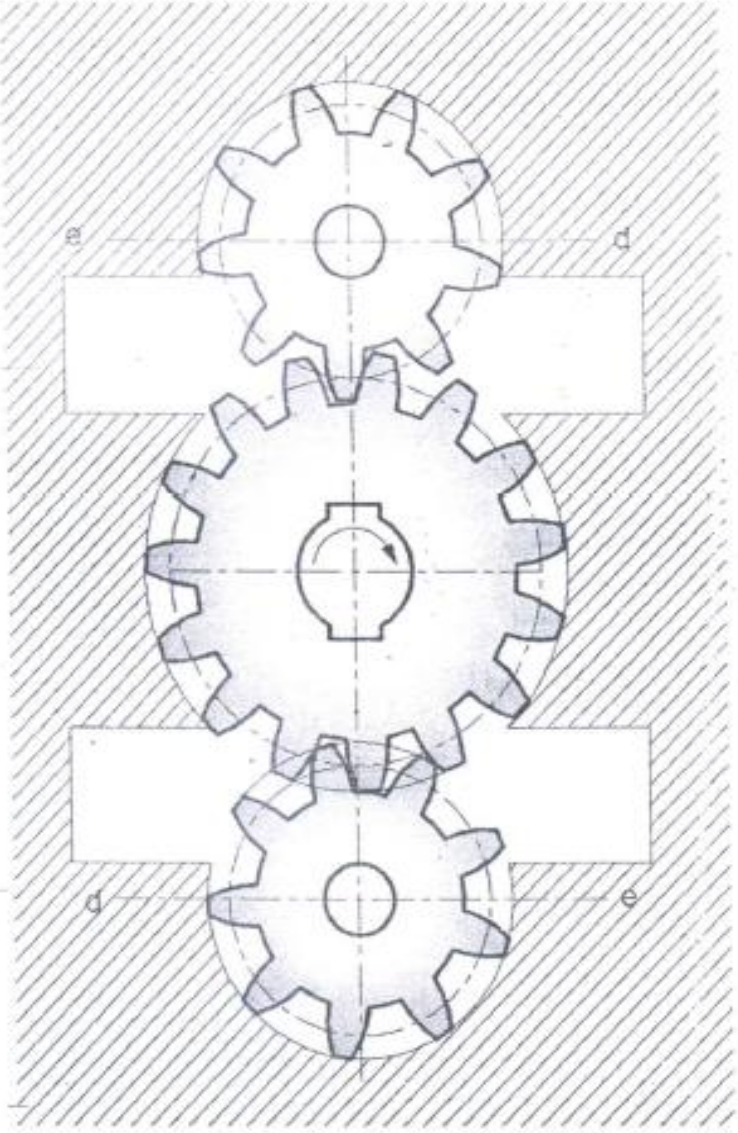


Fig. 9.17.1 : External Gear Pump (Spur Gear)



d = Suction side e = Pressure side

Fig. 9.17.2 : Three Gear Type External Gear Pump

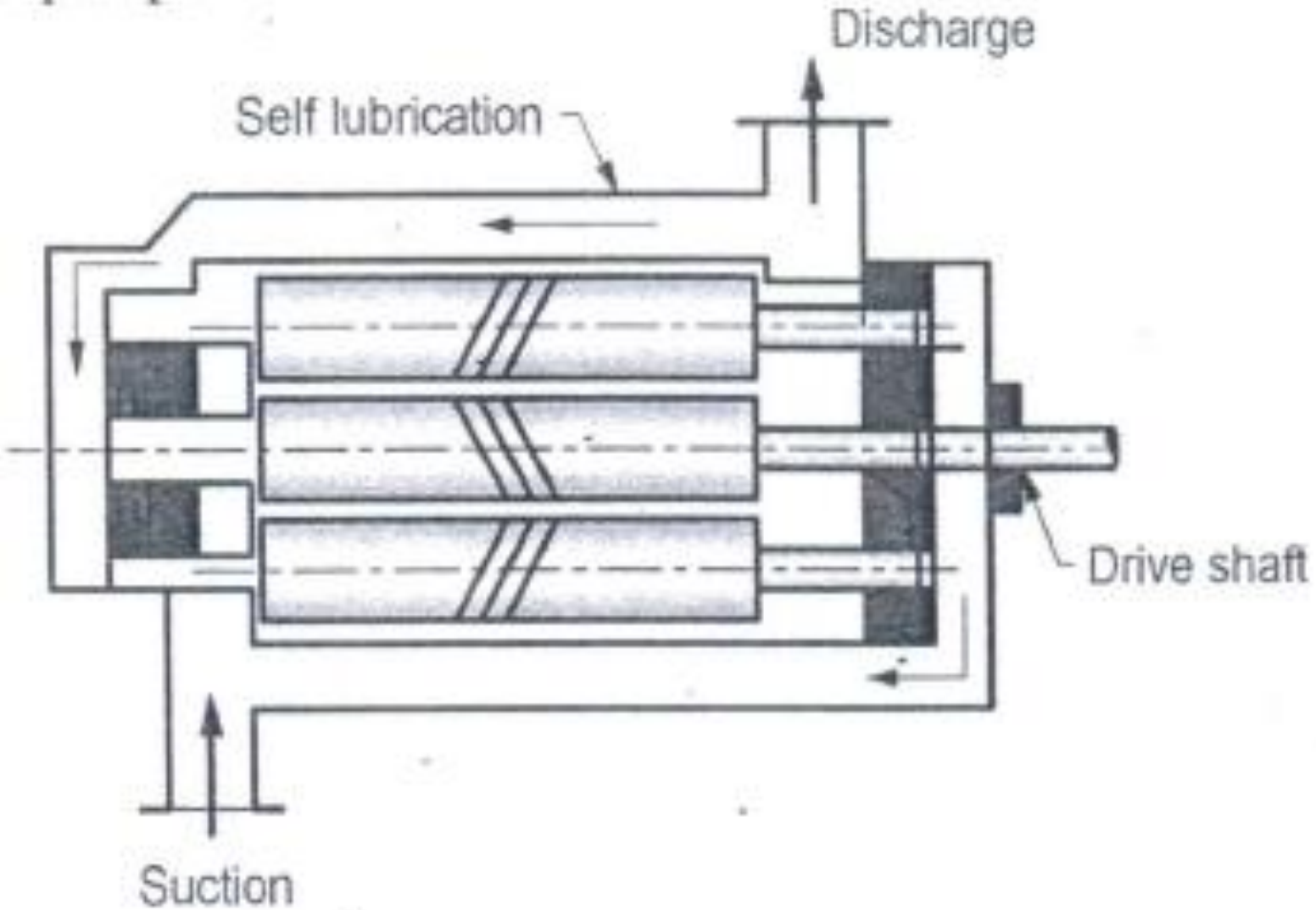


Fig. 9.18.1 : Screw Pump

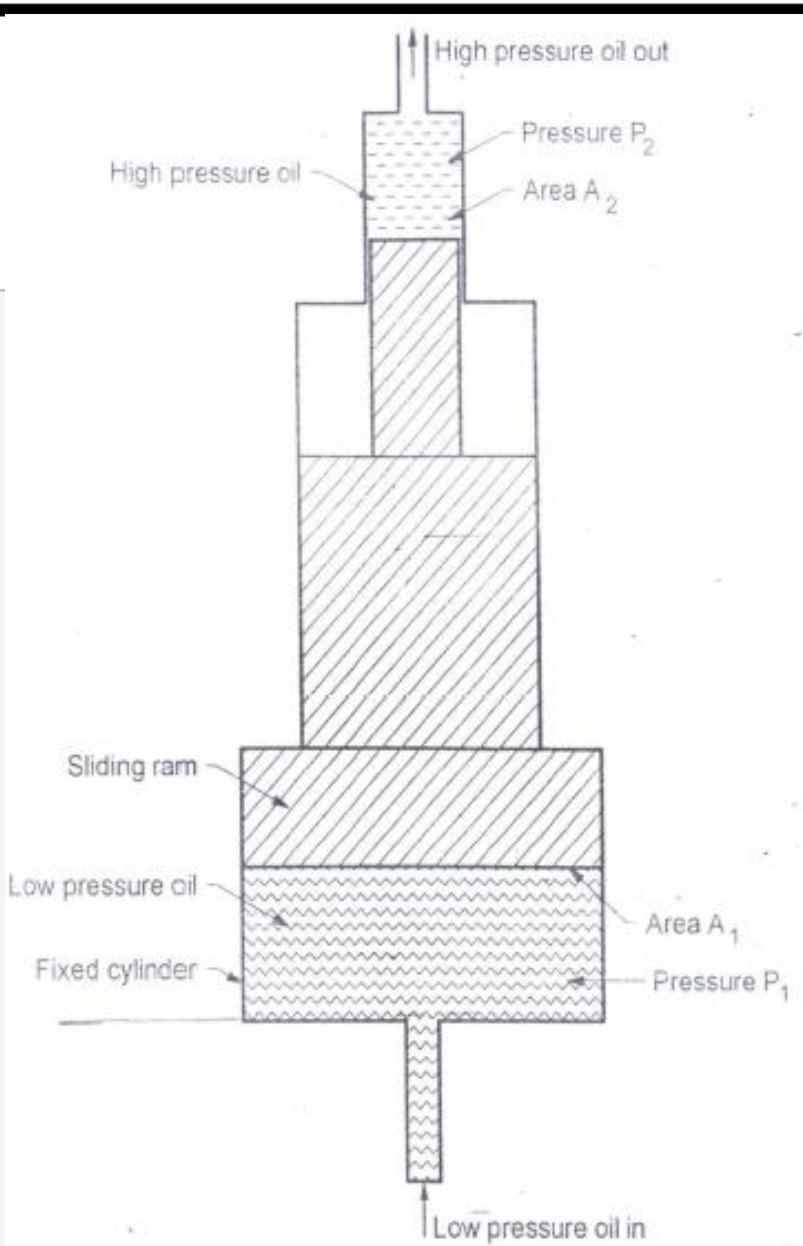


Fig. 9.19.1 : Pressure Intensifier

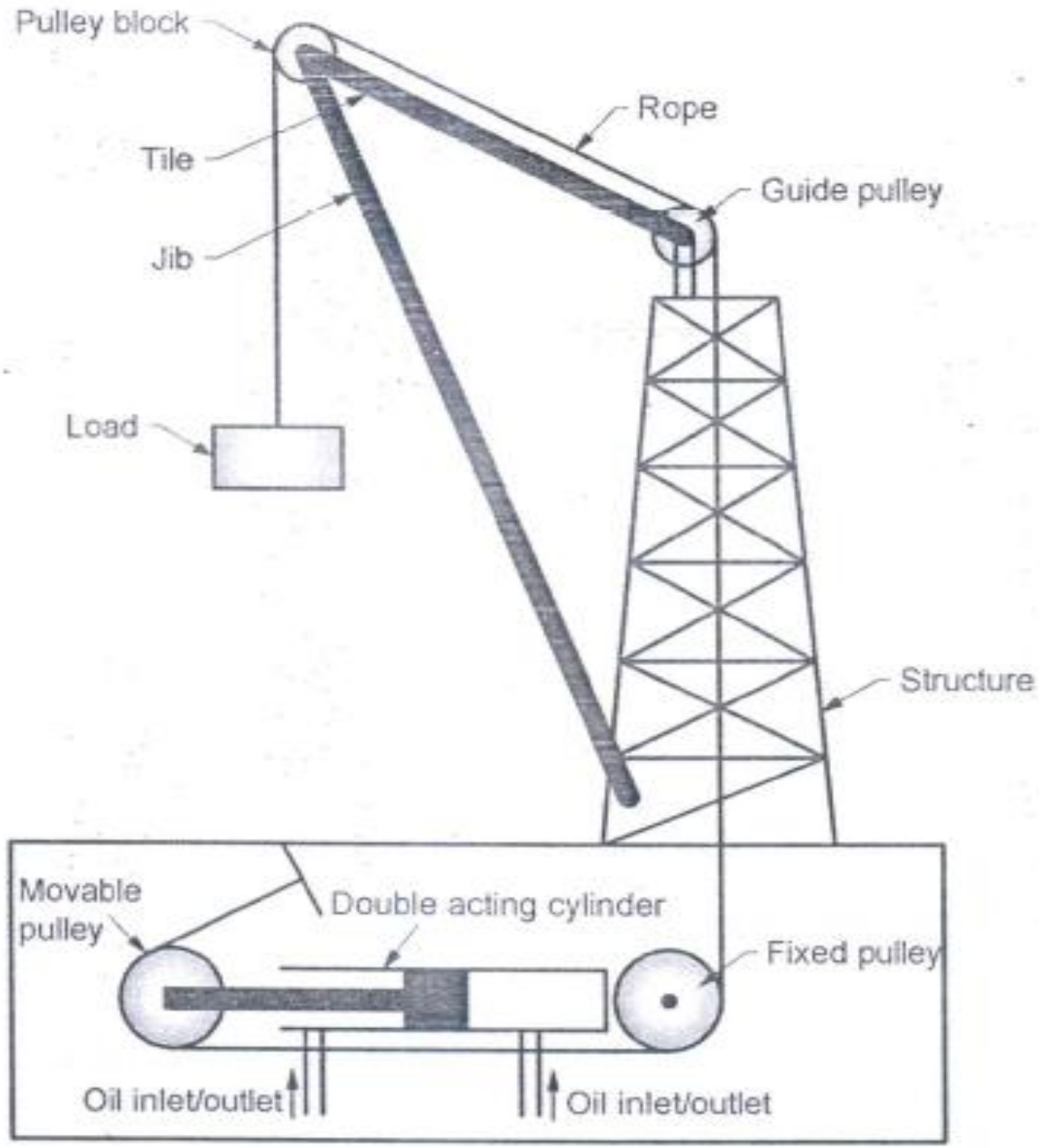


Fig. 9.20.1 : Hydraulic Crane

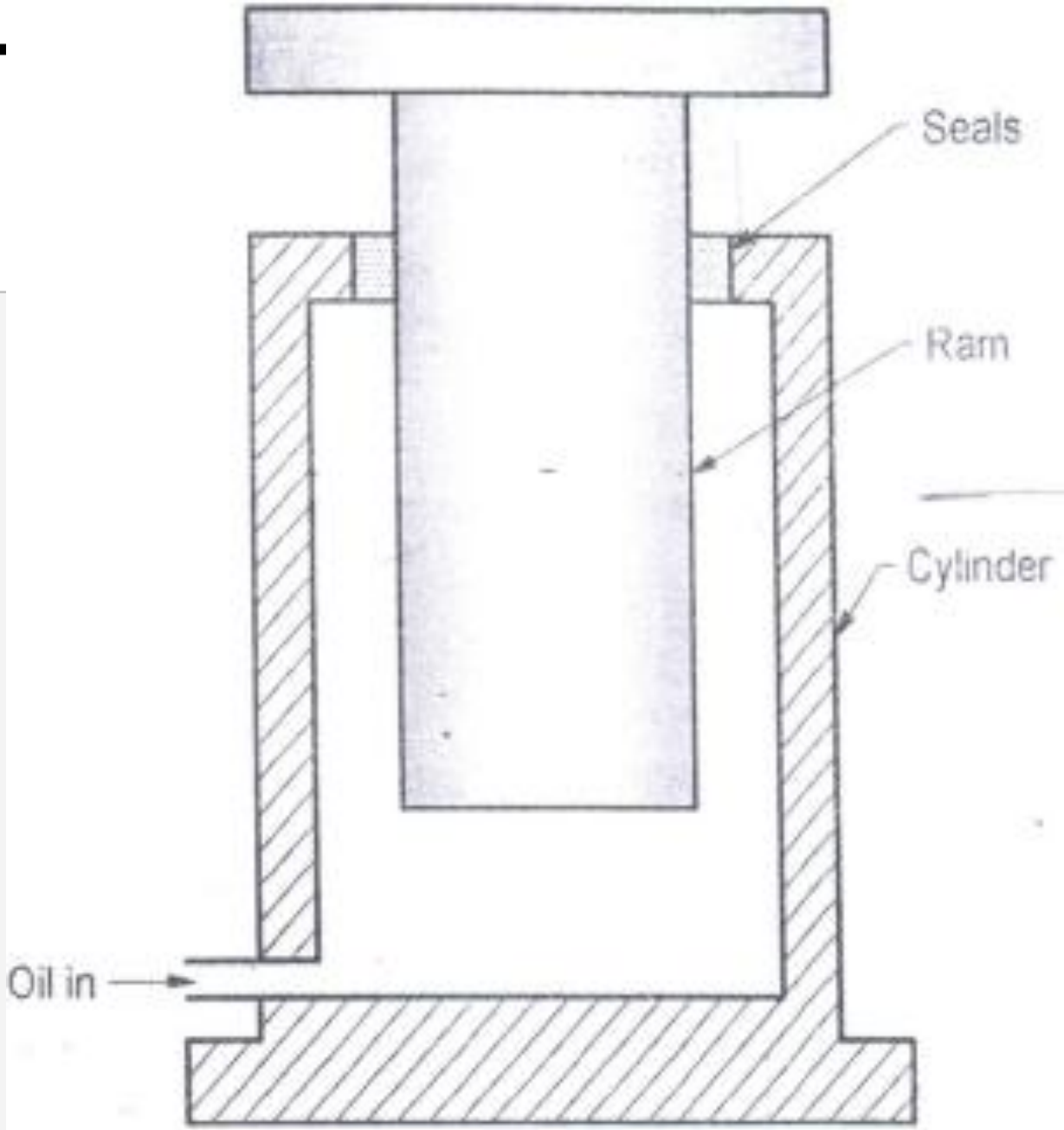


Fig. 9.21.1 : Single Acting Ram

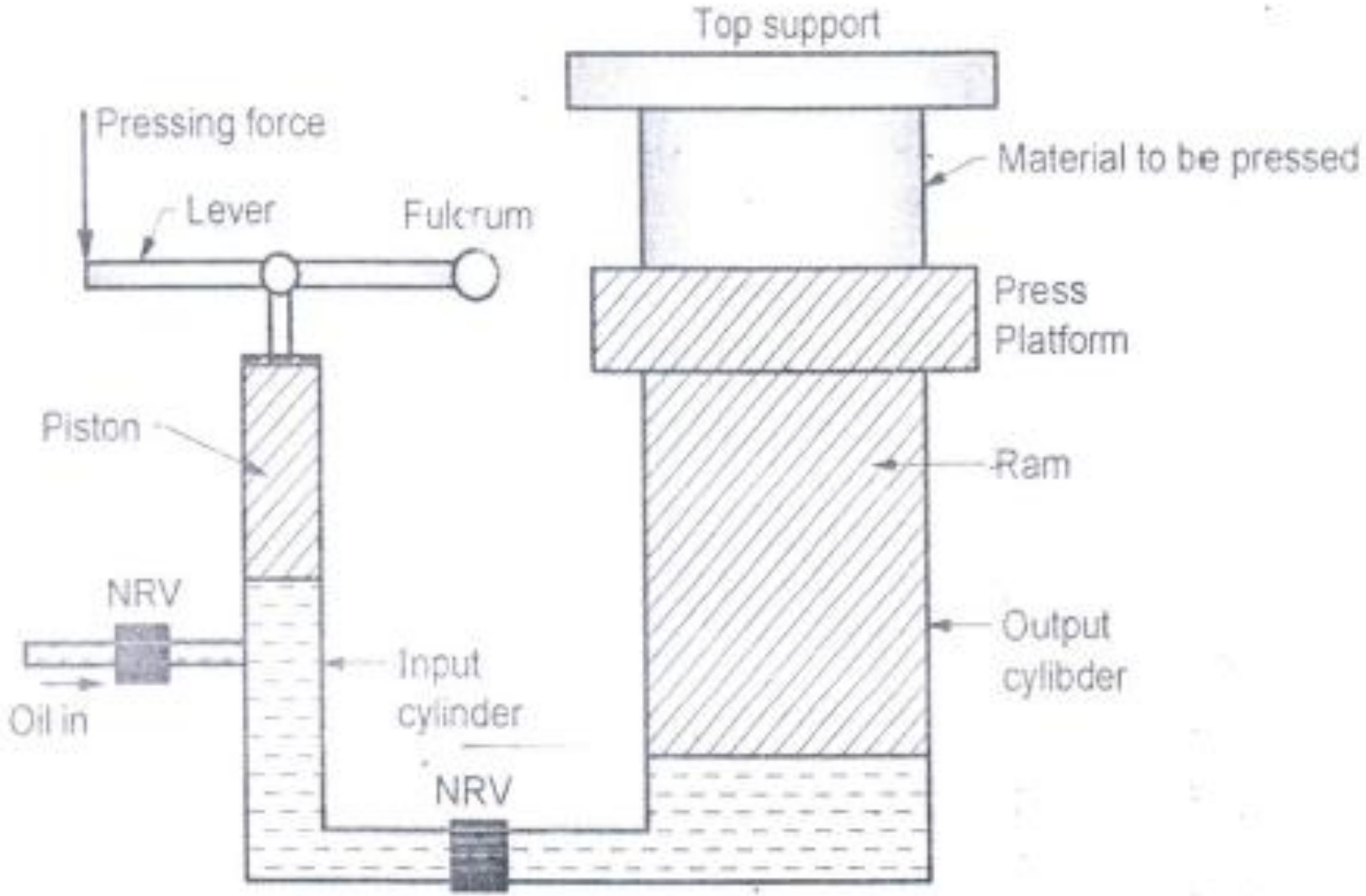


Fig. 9.22.1 : Hydraulic Press

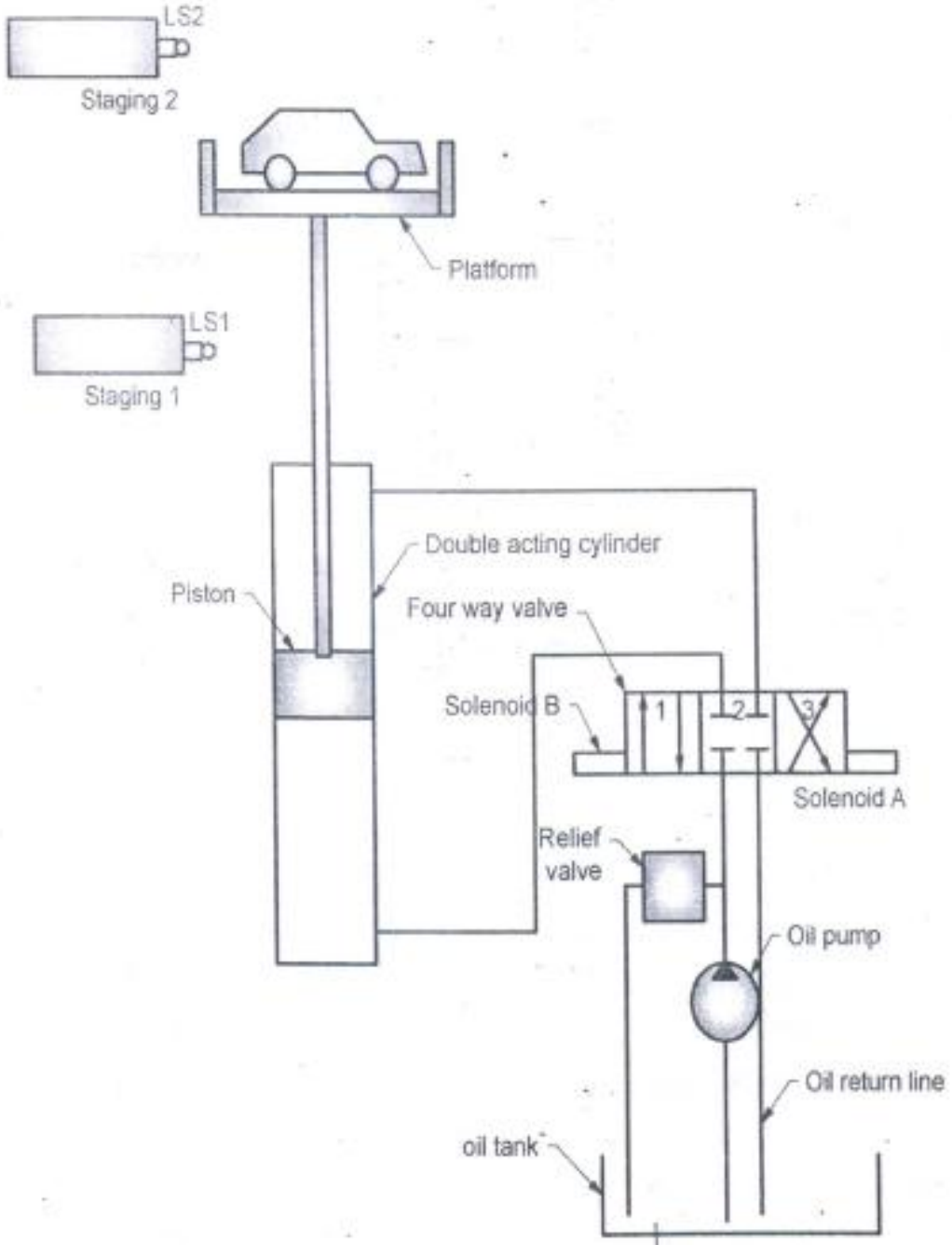


Fig. 9.23.1 : Hydraulic Lift

- Maintenance of Hydraulic Systems
- Fire Form Resistance
- Oxidation & Corrosion of Hydraulic Pipes
- Sealing Devices
- Filters regulators
- Problem Caused by Gas in Hydraulic Circuits
- Cooling of Power Packs