SNS COLLEGE OF TECHNOLOGY, Coimbatore - 641 035
(An Autonomous Institution)
Department of Mechatronics Engineering

UNIT I- FLUID POWER PRINCIPLES AND HYDRAULIC PUMPS

Fluid Power Principles

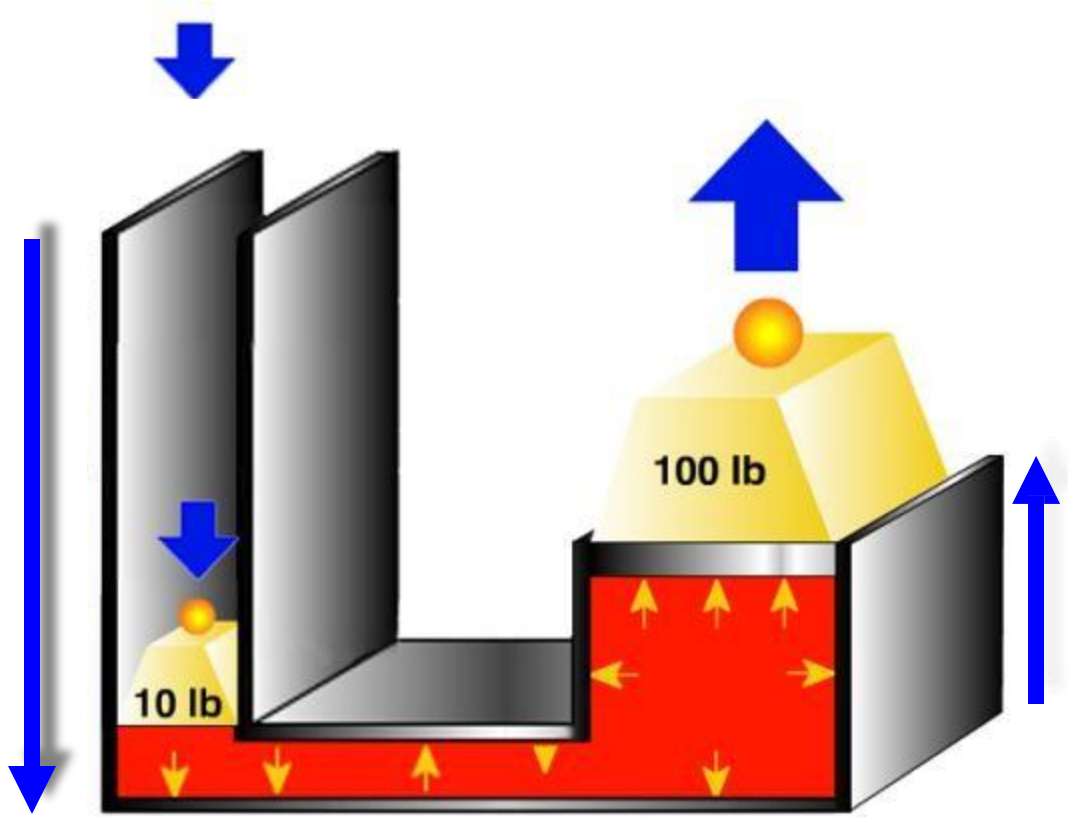
Pascal's Law

Hydraulic Press

10 lb can lift 100 lb

What is the tradeoff?

Distance



Fluid Power Schematics

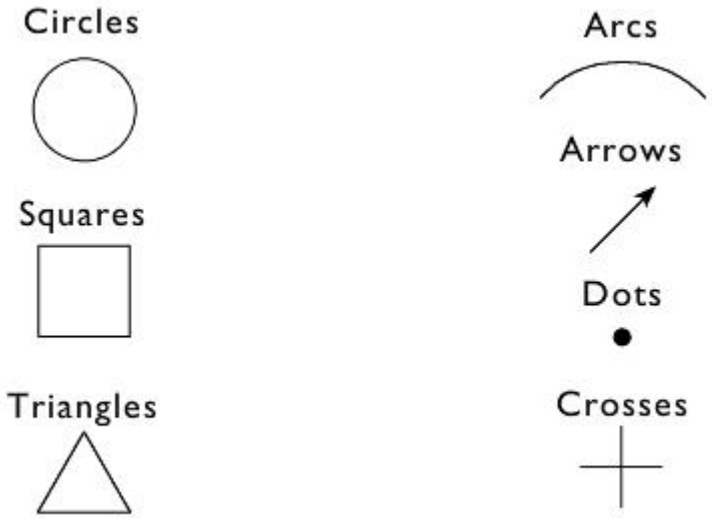
Symbols

Critical for technical communication

Not language-dependent

Emphasize function and methods of operation

Basic Symbols



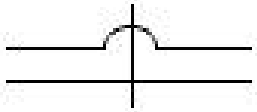
Fluid Power Schematics

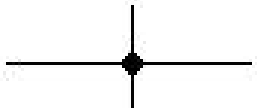
Lines

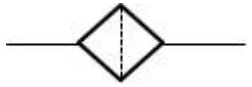
Continuous lines indicate working, pilot supply, return or electrical lines

Dashed lines indicate a pilot, drain, purge, or bleed line


Flexible lines indicate a hose which usually connects moving parts


Crossing lines use loops at cross over


Lines joining may use a dot at the junction

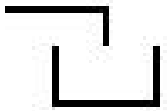

Components (like this filter) inserted into lines

Fluid Power Schematics

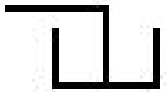
Reservoirs

Vented reservoirs are shown as rectangles without top lines

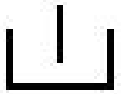
Pressurized reservoirs are shown as capsules



Above oil level return-line reservoir



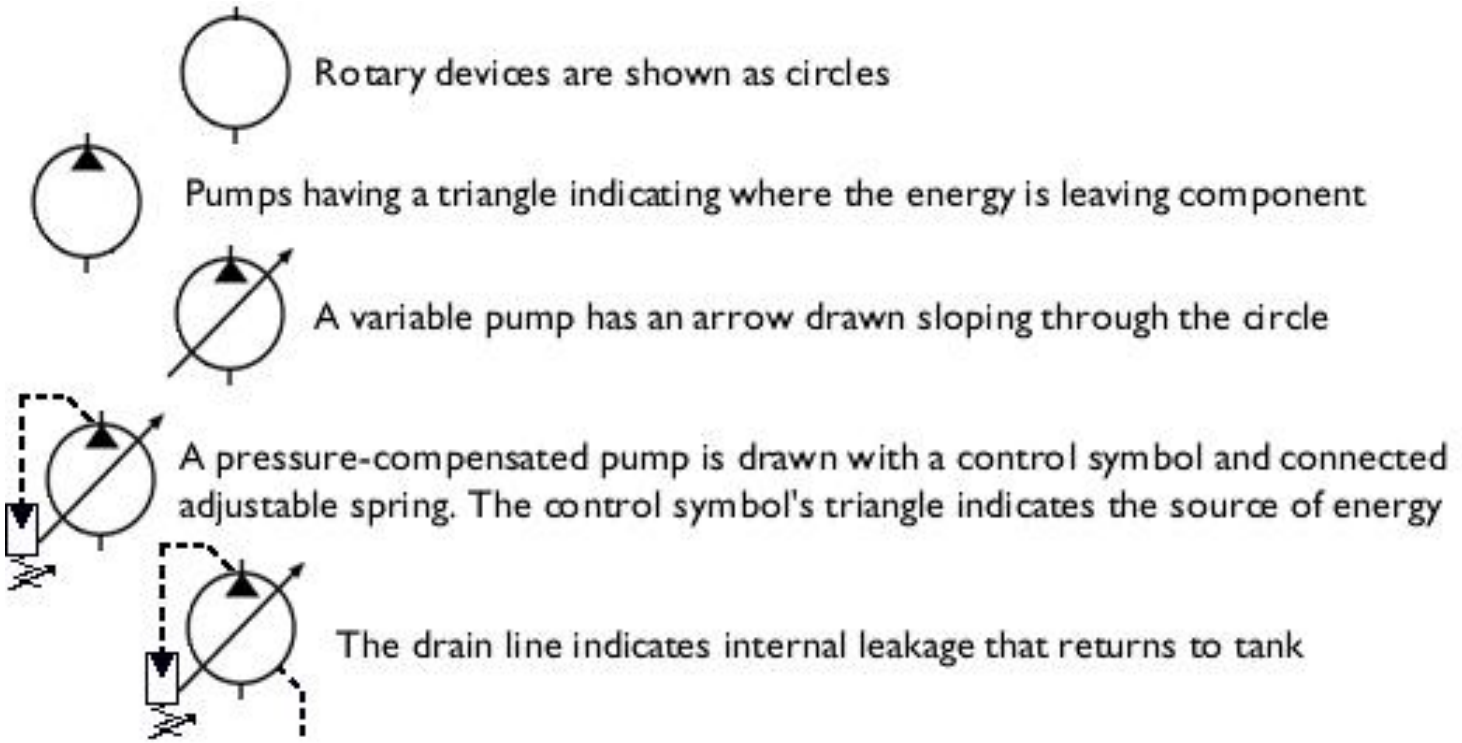
Below oil level return-line reservoir



Common reservoir symbol minimizes the need to draw a number of lines into one reservoir

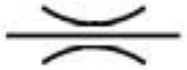
Fluid Power Schematics

Pumps



Fluid Power Schematics

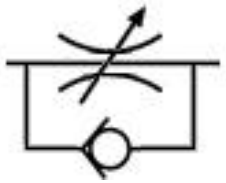
Flow Control Valves



An upper and lower arc symbolize a fixed orifice flow control valve

An arrow through the arcs indicate an adjustable orifice

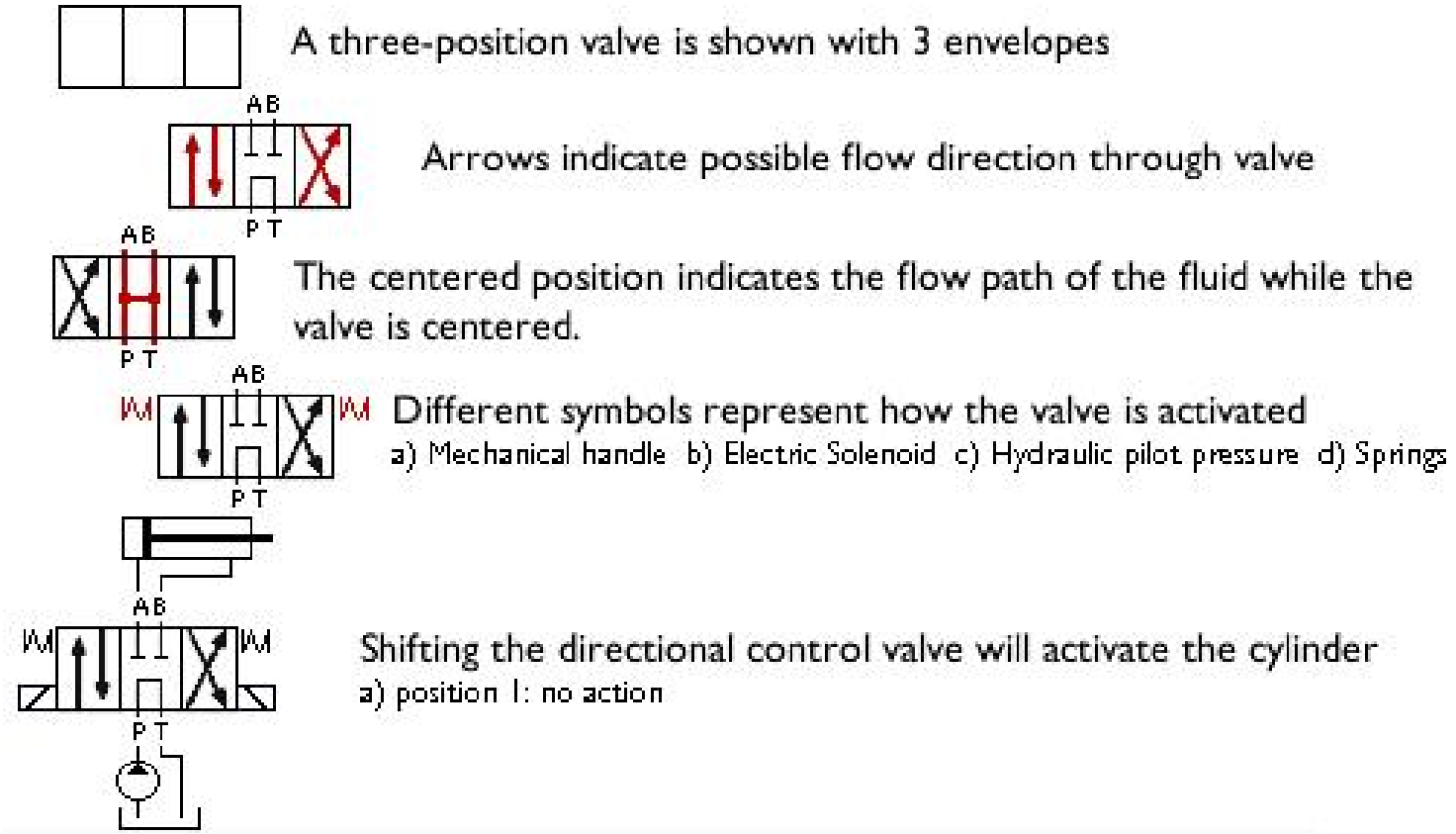
An arrow inside a control box indicates pressure compensated flow control



A check valves indicates reverse flow around the valve

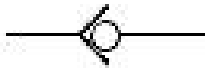
Fluid Power Schematics

Directional Control Valves

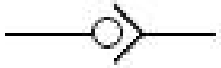


Fluid Power Schematics

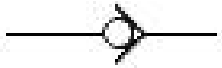
Check Valves



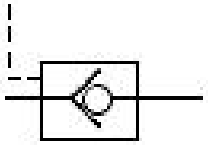
Check valves are drawn with small circles inside an open triangle



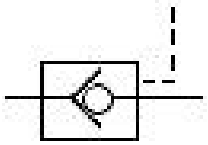
Free flow is opposite the direction the triangle is pointed



As the circle moves into the triangle, the flow is blocked



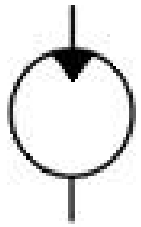
Pilot to open is indicated with a pilot line directed to the triangle



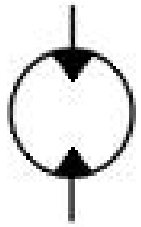
Pilot to close is indicated by directing pilot line to back of the circle

Fluid Power Schematics

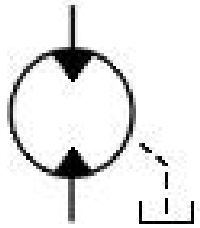
Motors



Energy triangle points into the circle indicating fluid energy entering



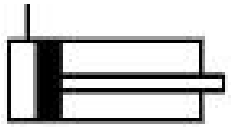
Two energy triangles indicate a bi-directional or reversible motor



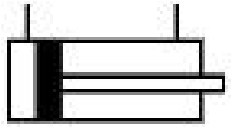
A dashed line leaving the circle indicates a drain line to tank

Fluid Power Schematics

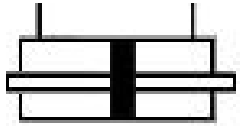
Cylinders



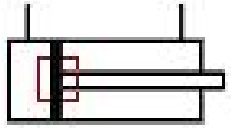
Single Acting (one line)



Double acting (two lines)



Double rod (two lines and two rods)



The internal rectangle indicates a cushion device at end of the stroke

If diameter of rod is larger than usual, the symbol must reflect it