

**YANBU ARAMCO SINOPEC REFINING COMPANY
(YASREF) Ltd.**



Control Valves

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Training & Development

Objectives

- ***By the end of this training you should :-***
 - - Define control valve .
 - - Be aware about control valve types.
 - - Be aware about control valve internal components.
 - - know control valve accessories.
 - - Be aware about the problems that impact control valve.

About Instrumentation

Instrumentation is a Nerve & Brain of Yasref



Evaluation



Control Valve
(Final control element)

Measurement

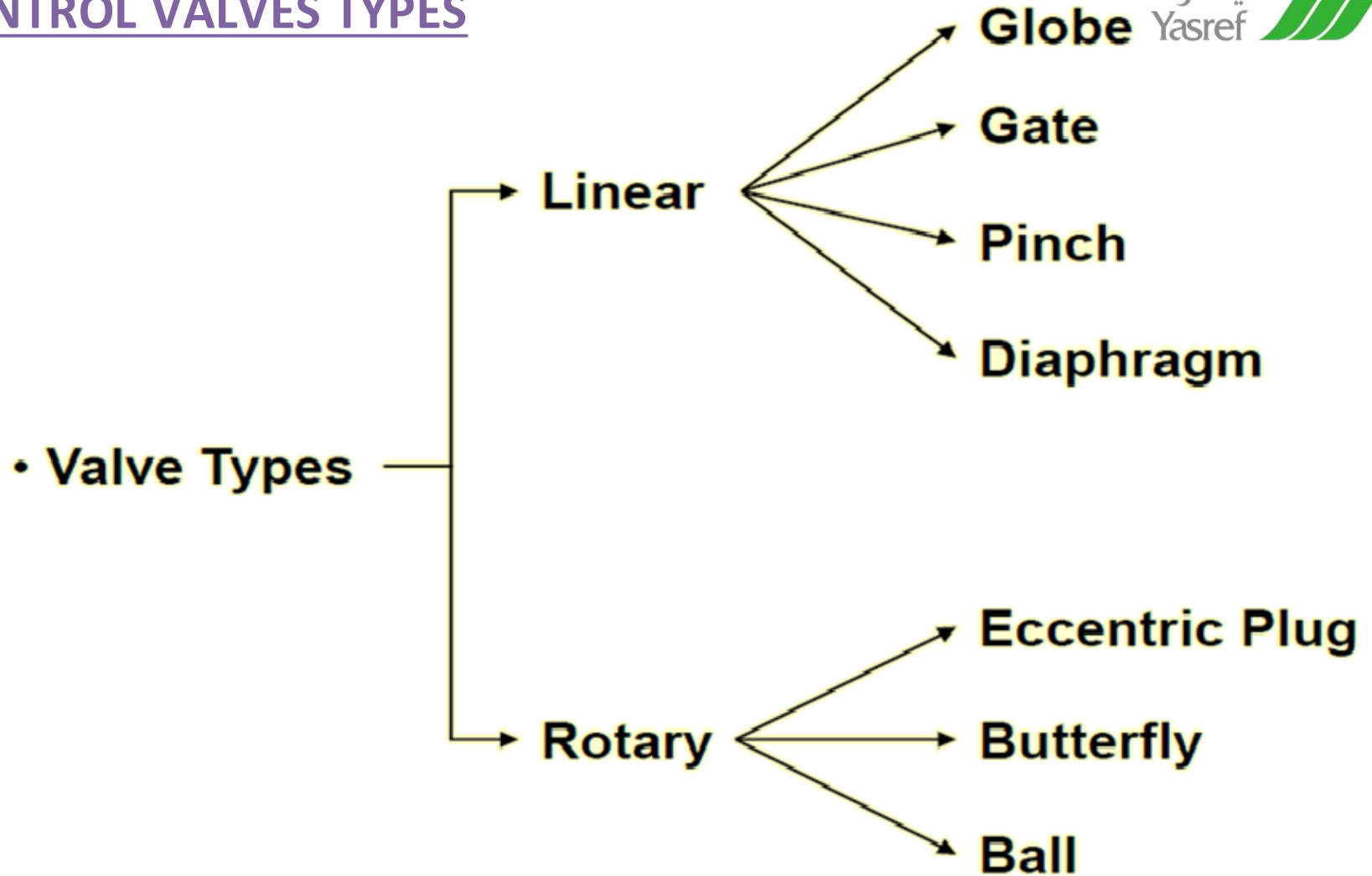


Final control Element (Control Valve)

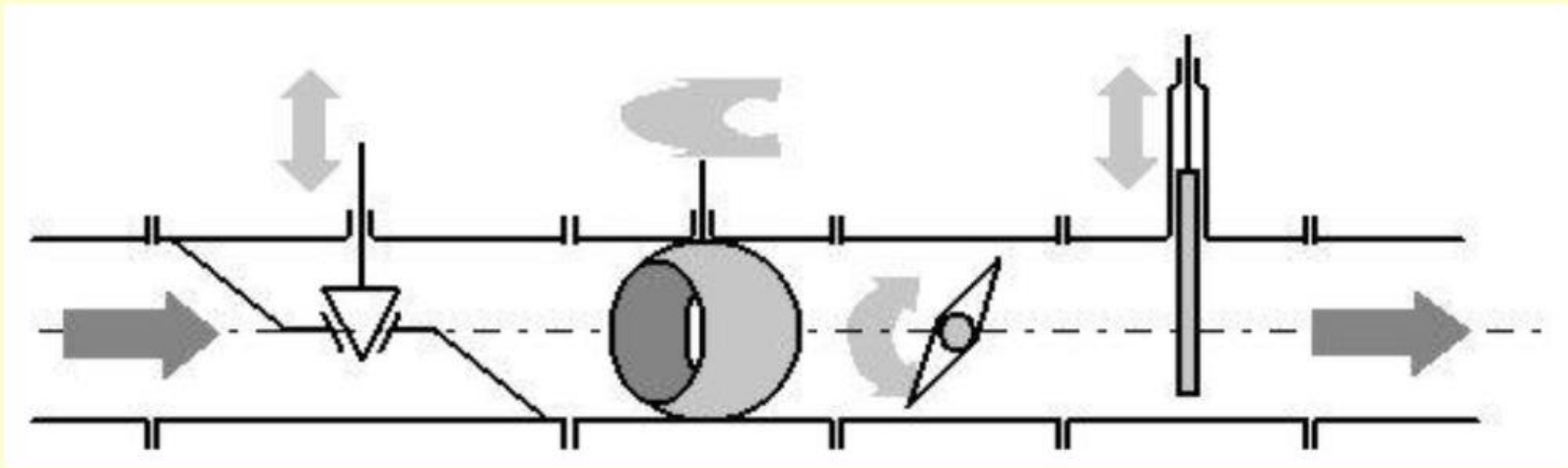
control valve is simply a variable orifice that is used to regulate the flow of a process fluid according to the requirements of the process.



CONTROL VALVES TYPES



Schematic diagrams for different types of control valves

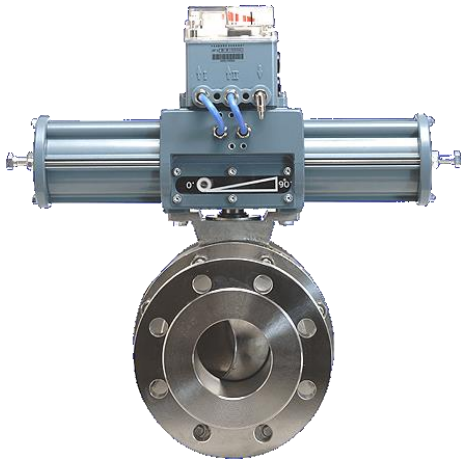


Plug valve

Ball valve

Butterfly
valve

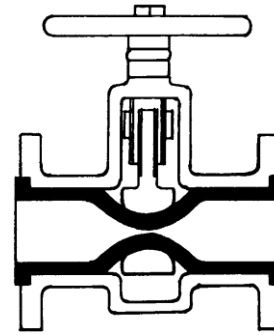
Gate valve



Ball Valve



Globe Valve



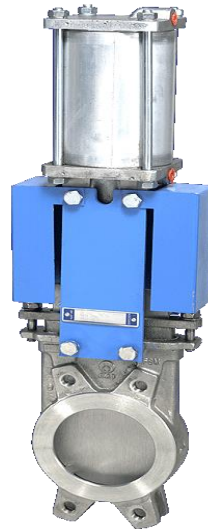
pinch Valve



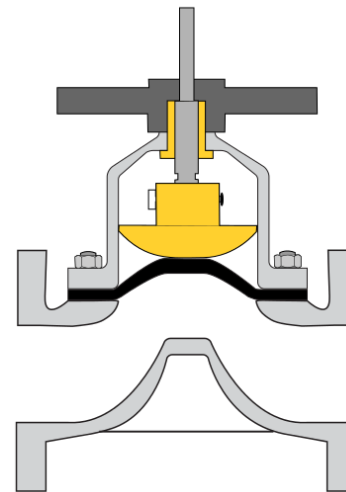
Plug Valve



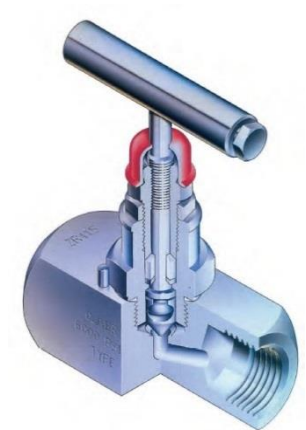
Butterfly Valve



Gate Valve

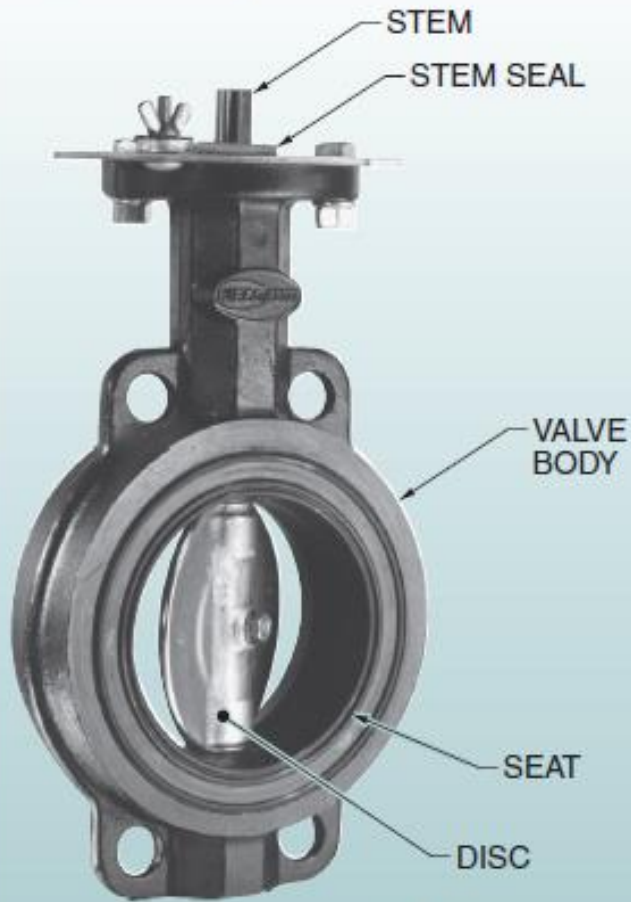


Diaphragm Valve



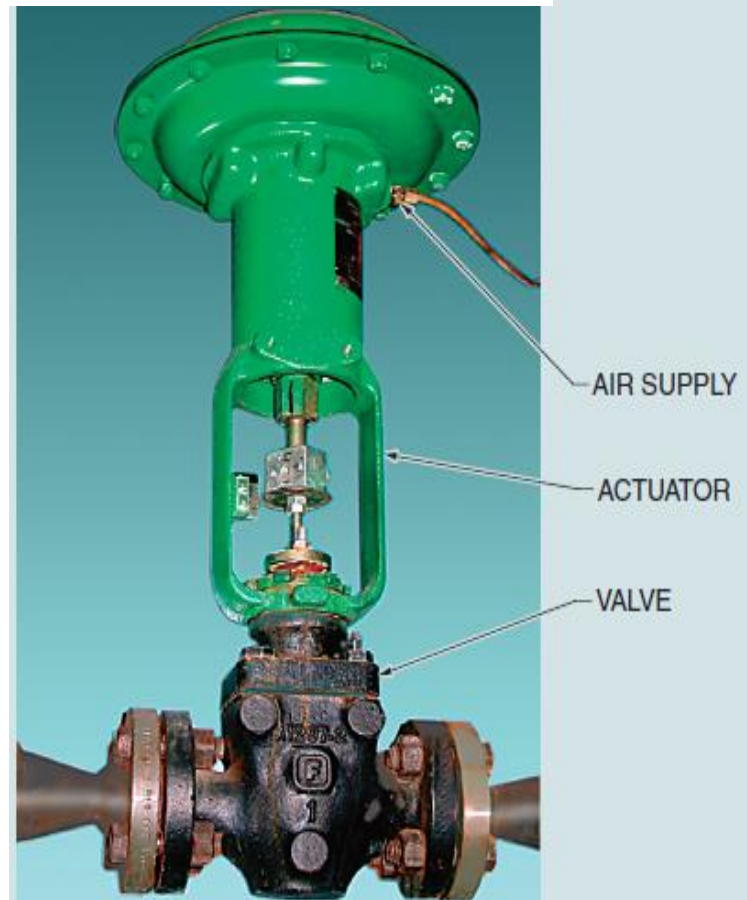
Needle Valve

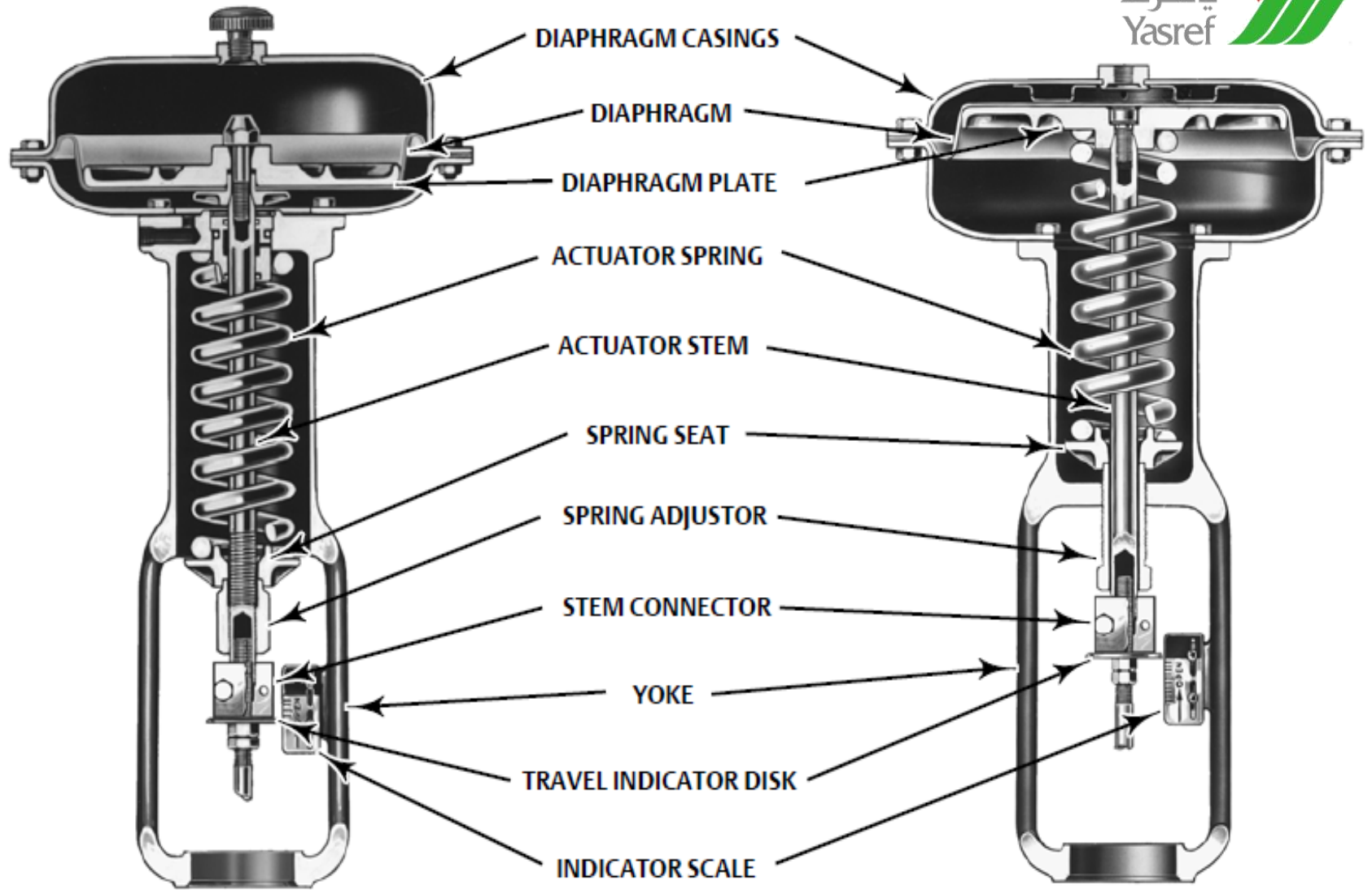
Butterfly Control Valves



Watts Regulator Company

Throttling Control Valves





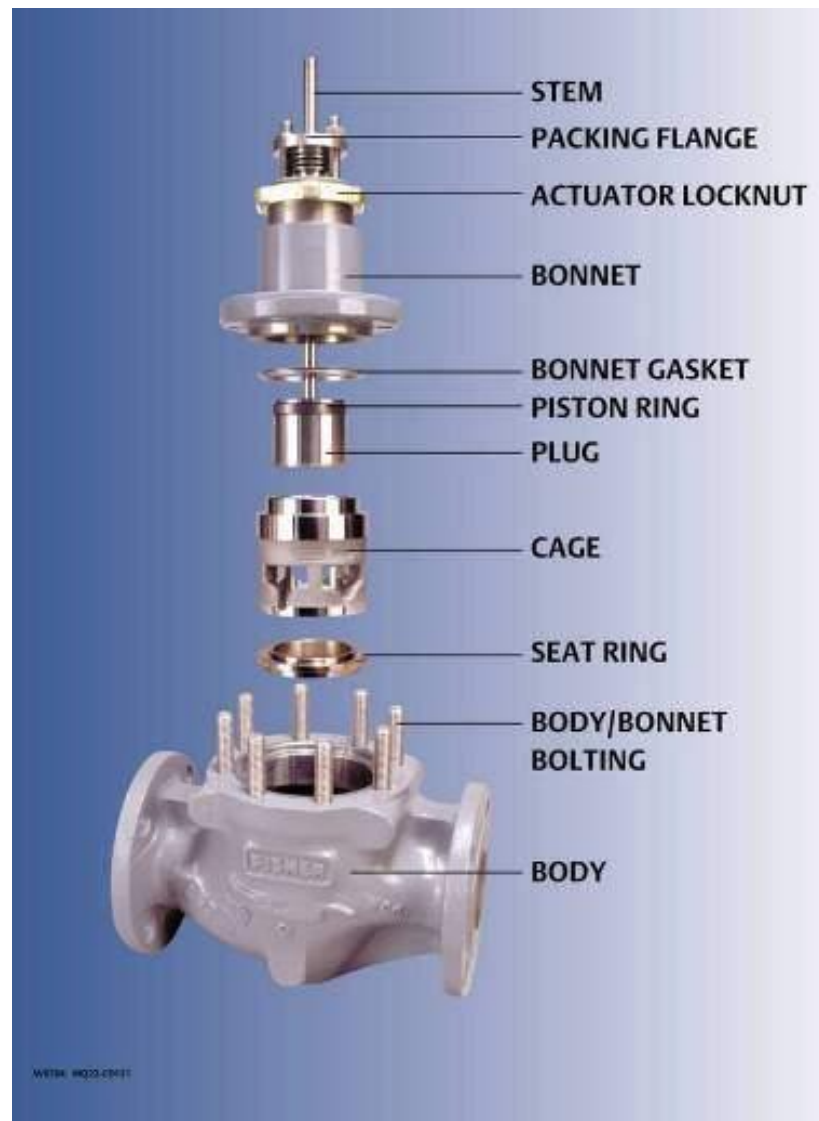
Air to open

Air to close

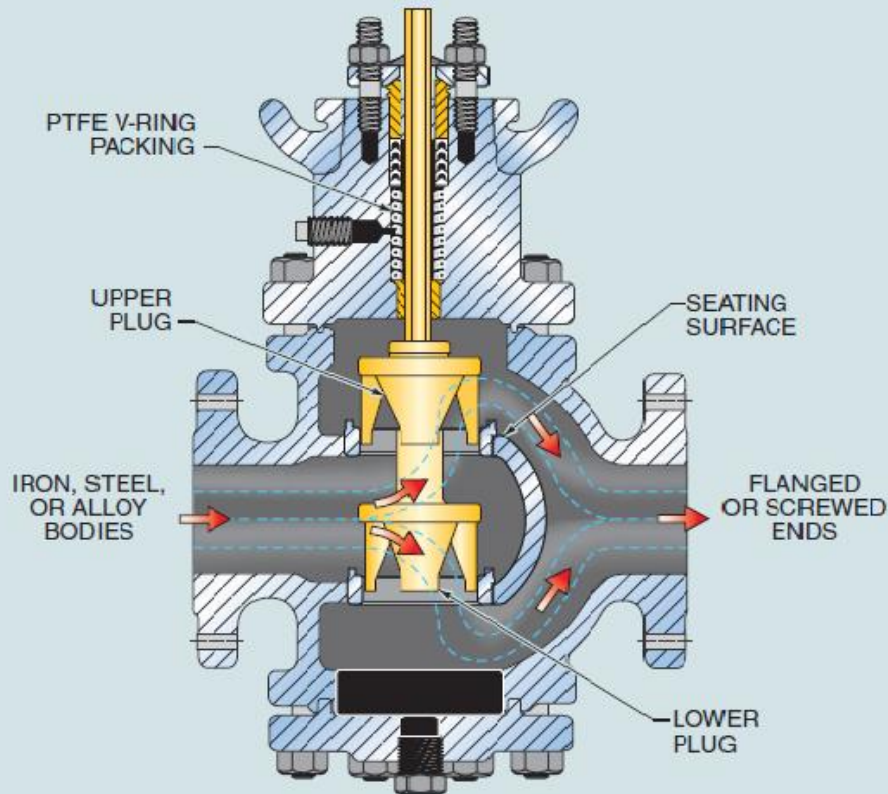
Valve Body Assembly



Valve Body Assembly – Components Names

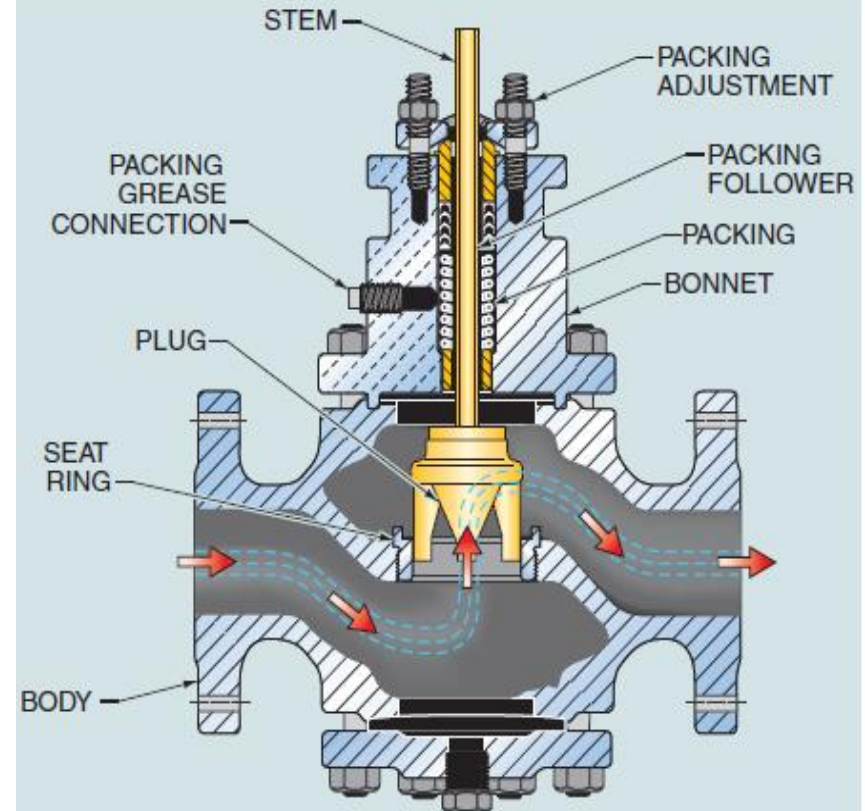


Double-Port Globe Valves



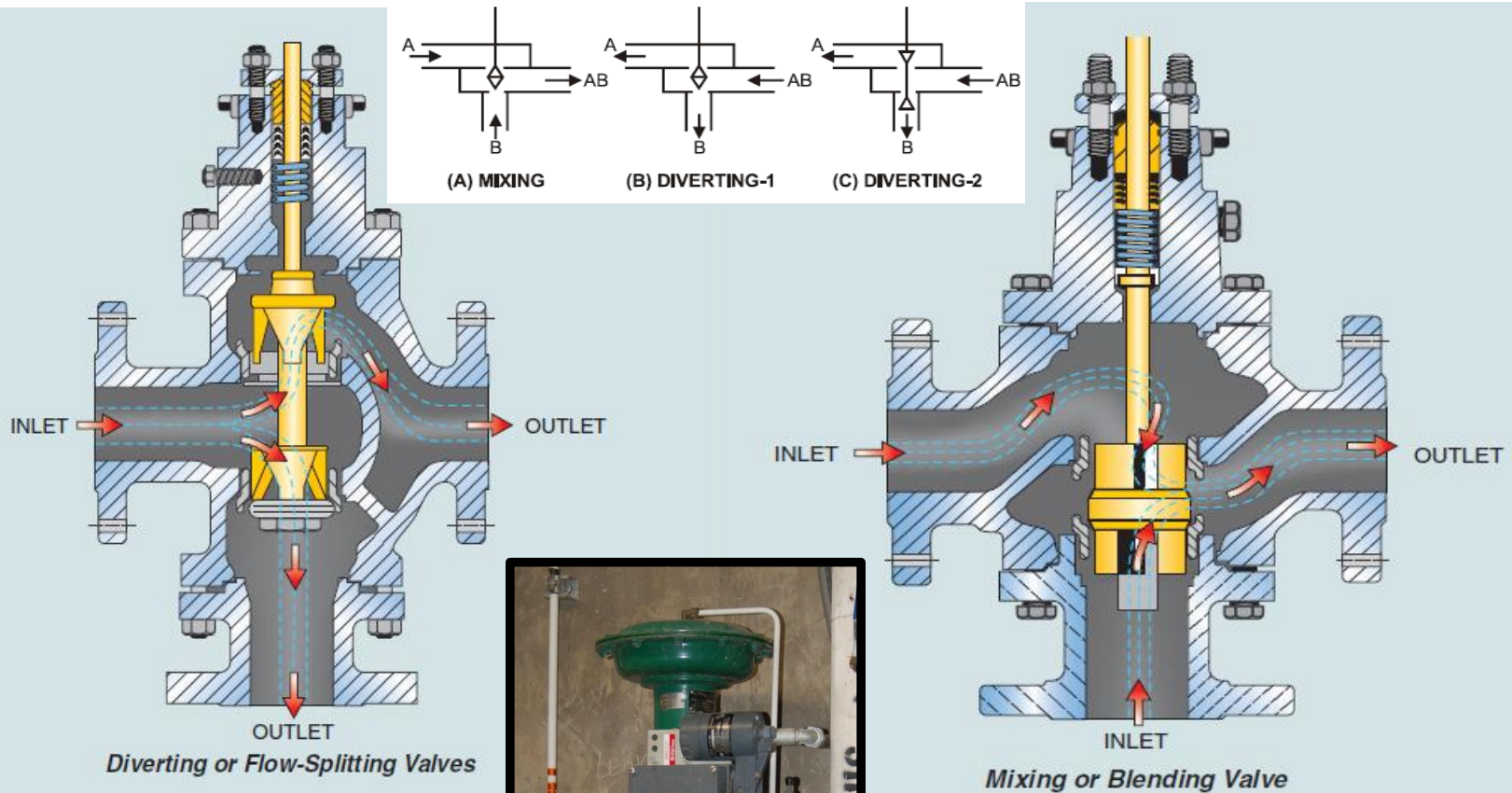
A double-port globe valve has two paths through the valve to reduce forces on the valve plug.

Single-Port Globe Valves



single-port globe valve has one path through the valve.

Three-Way Globe Valves

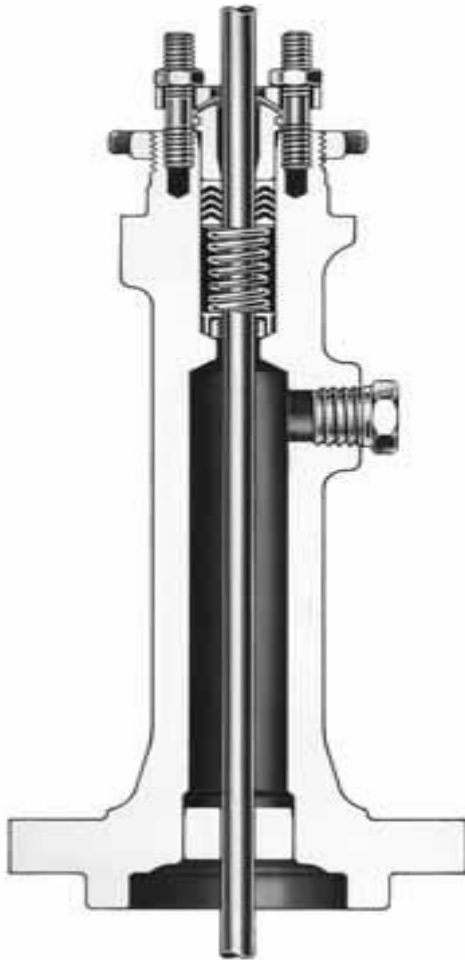




• *Video & Coffee break ???*



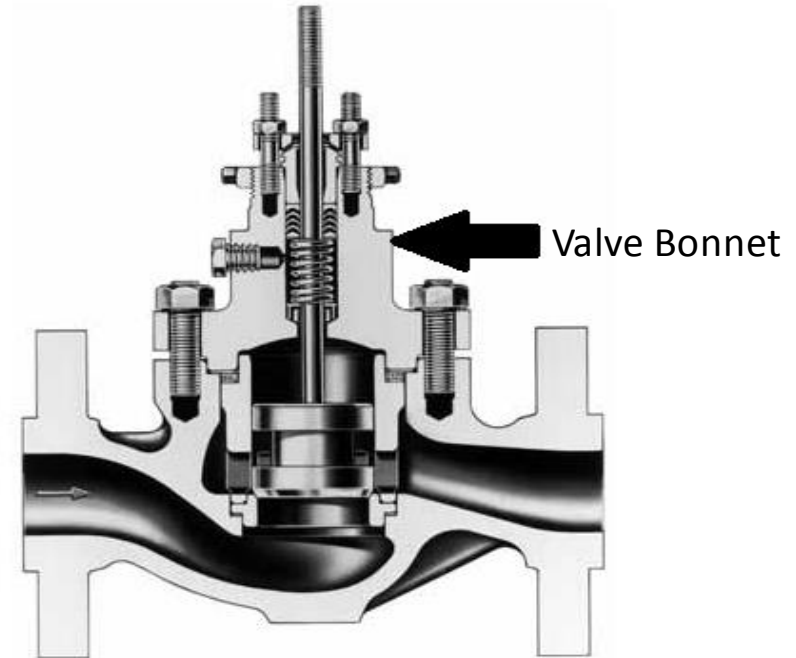
Why Extended Bonnet?



Extension Bonnet



Extension Bonnet: A bonnet with greater dimension between the packing box and bonnet flange for hot or cold service.



Control Valve Actuators & Accessories

Control valve actuators translate a control signal (normally 3-to-15 psi or 4-to-20 mA) into the large force or torque that is needed to manipulate valve.

Three common types of actuators used :

- 1- pneumatic actuators (Diaphragms & Pistons)*
- 2- Electric actuators.*
- 3- Hydraulic actuators*



Electrical Actuator



Hydraulic Actuator



Diaphragm Actuator



Piston Actuator

SOLENOID VALVE

▶ Solenoid Valve is electrical actuated valve categorized to three types:

- 1- *Direct acting* .
- 2- *Manual reset* .
- 3- *Pilot operated* .



Pilot operated solenoid used to switch the flow of air



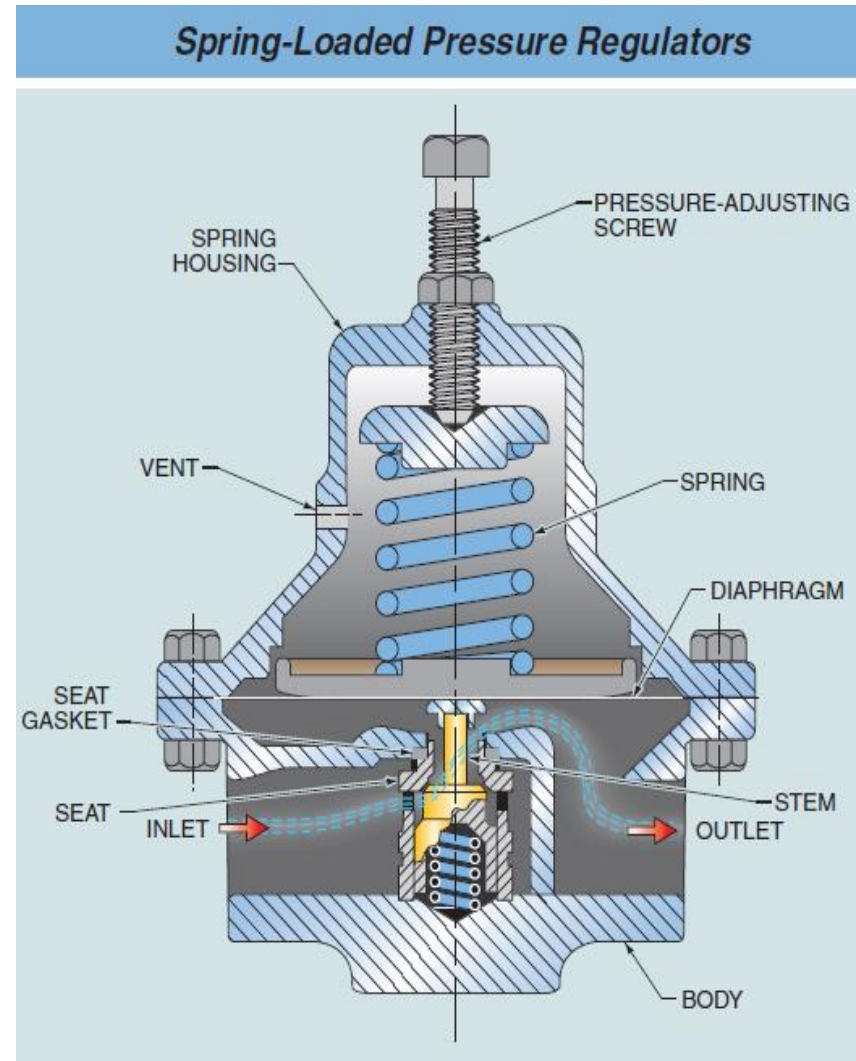
Manual Reset



Direct acting simple ON/OFF Operation

Pressure regulators

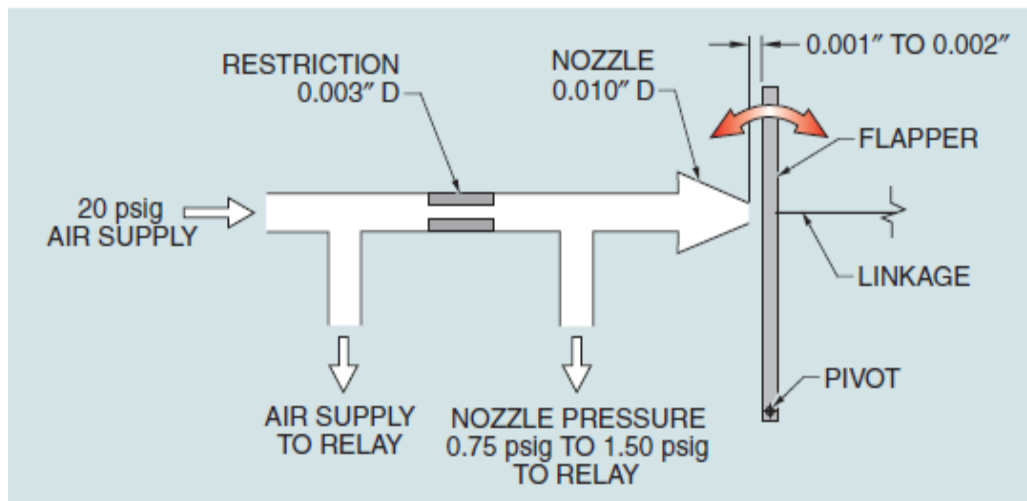
A pressure regulator is an adjustable valve that is designed to automatically control the pressure downstream of the regulator.



Positioners

A positioner is a device used to ensure positive position of a valve or damper actuator. All positioners have a feedback link from the valve shaft, providing accurate valve position information. Positioners can work with linear or rotary actuation and can be used to increase the actuation power

Pneumatic Flappers and Nozzles



A flapper and nozzle arrangement is the basic element in all pneumatic devices and is the element that initiates the pneumatic signals.



Linear positioner



Rotary positioner

Flashing & Cavitation

Cavitation is a condition that occurs in liquid flow where the internal pressure of the liquid at some point falls below the vapor pressure and vapor bubbles form and at some other point downstream rises above the vapor pressure again. As this pressure recovers so that the bubbles collapse, and cavitation takes place.

Flashing is a condition that occurs with liquid flow where the pressure falls below the vapor pressure and remains below it. There are then two phases flowing (i.e. liquid and vapor) downstream. Severe damage can occur inside a valve due to erosion caused by the impact of liquid droplets traveling at high speeds



Typical Appearance of Flashing Damage



Typical Appearance of Cavitation Damage

Flashing and cavitation cause wear and damage to internal valve parts

QUESTIONS



Any Questions???

لكم خالص
الشكر
والتقدير

Thanks???