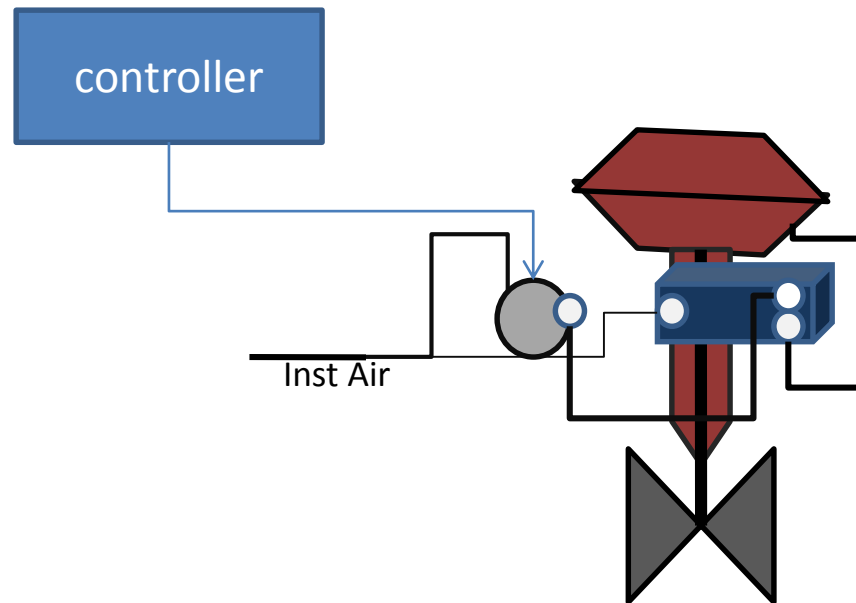


TODAY'S TOPIC

CONTROL VALVE



What is control valve?

Control valves are such type of valves which are controlled remotely to maintain flow rate, Level, pressure and temperature directly or indirectly as per requirement.

Application of CONTROL VALVE:

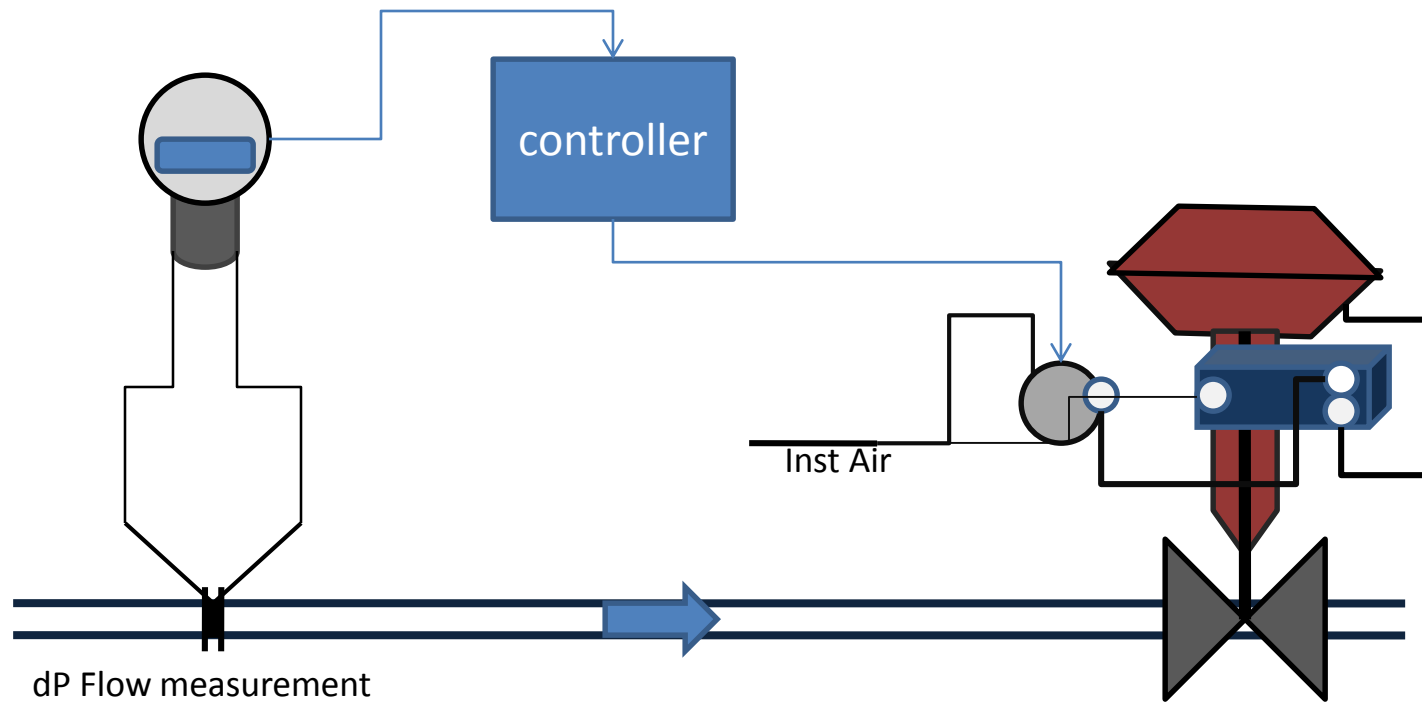
Flow rate control

Level control

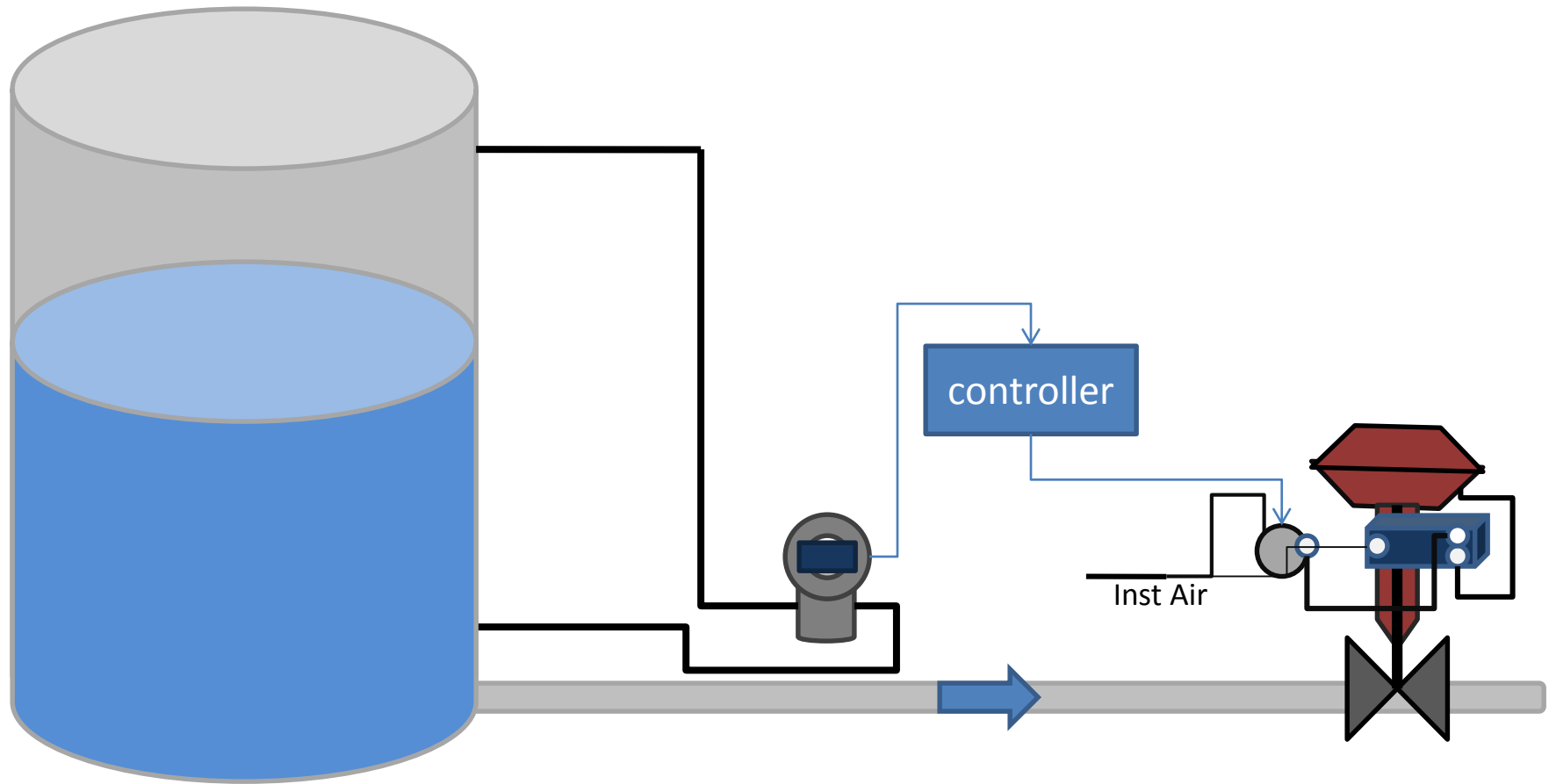
Pressure control

Temperature control

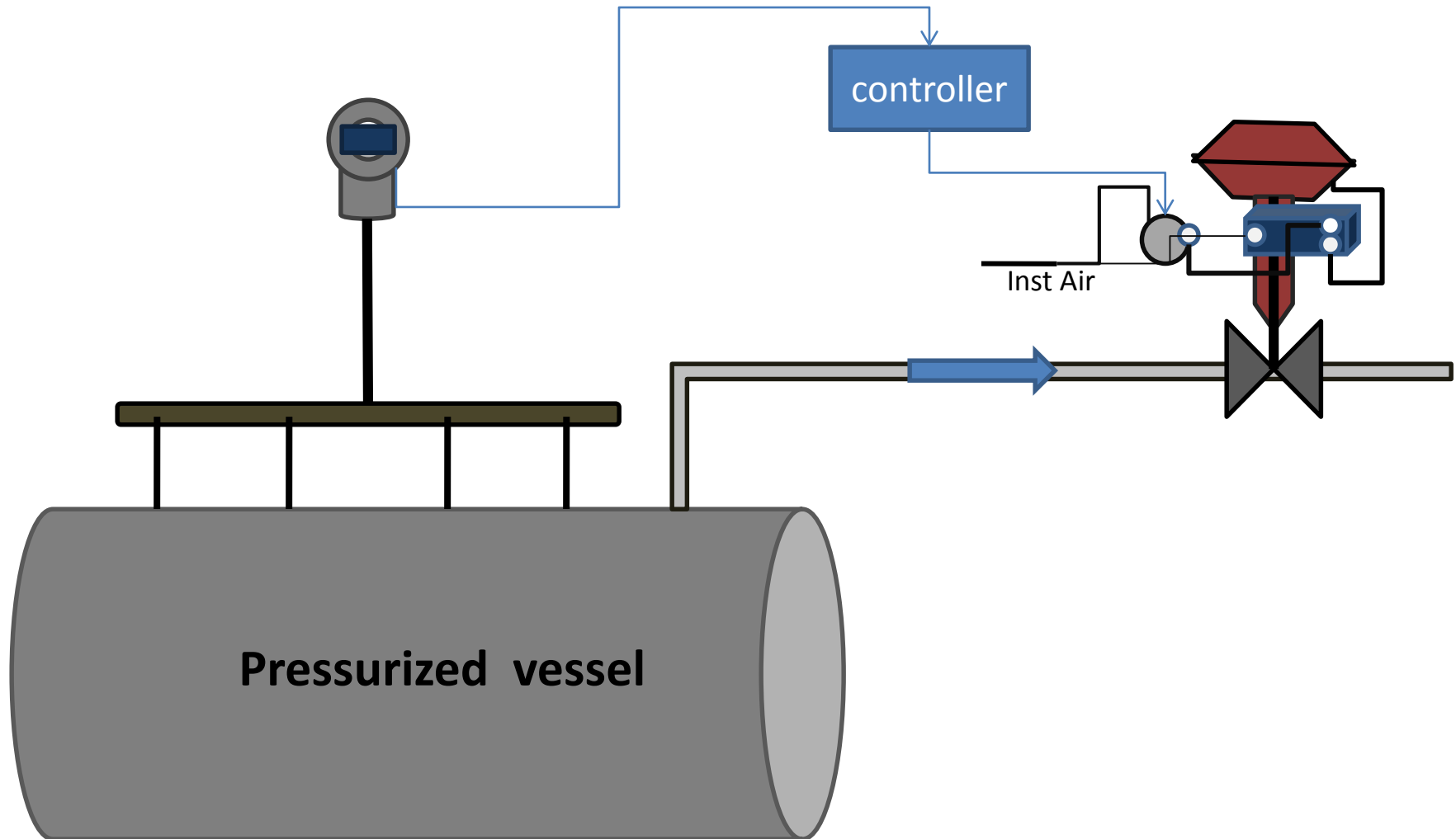
Control valve in FLOW CONTROL



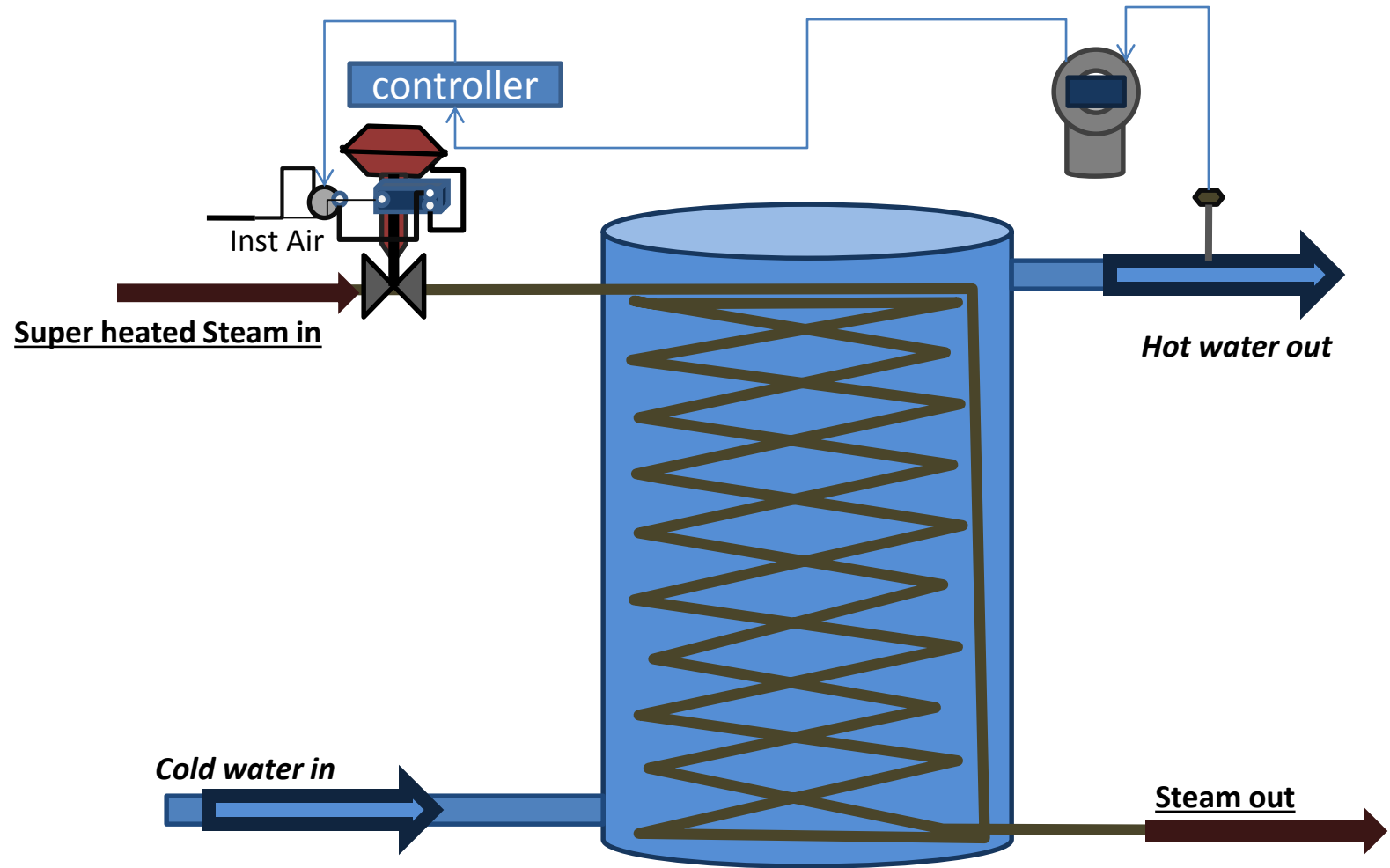
Control valve in LEVEL CONTROL



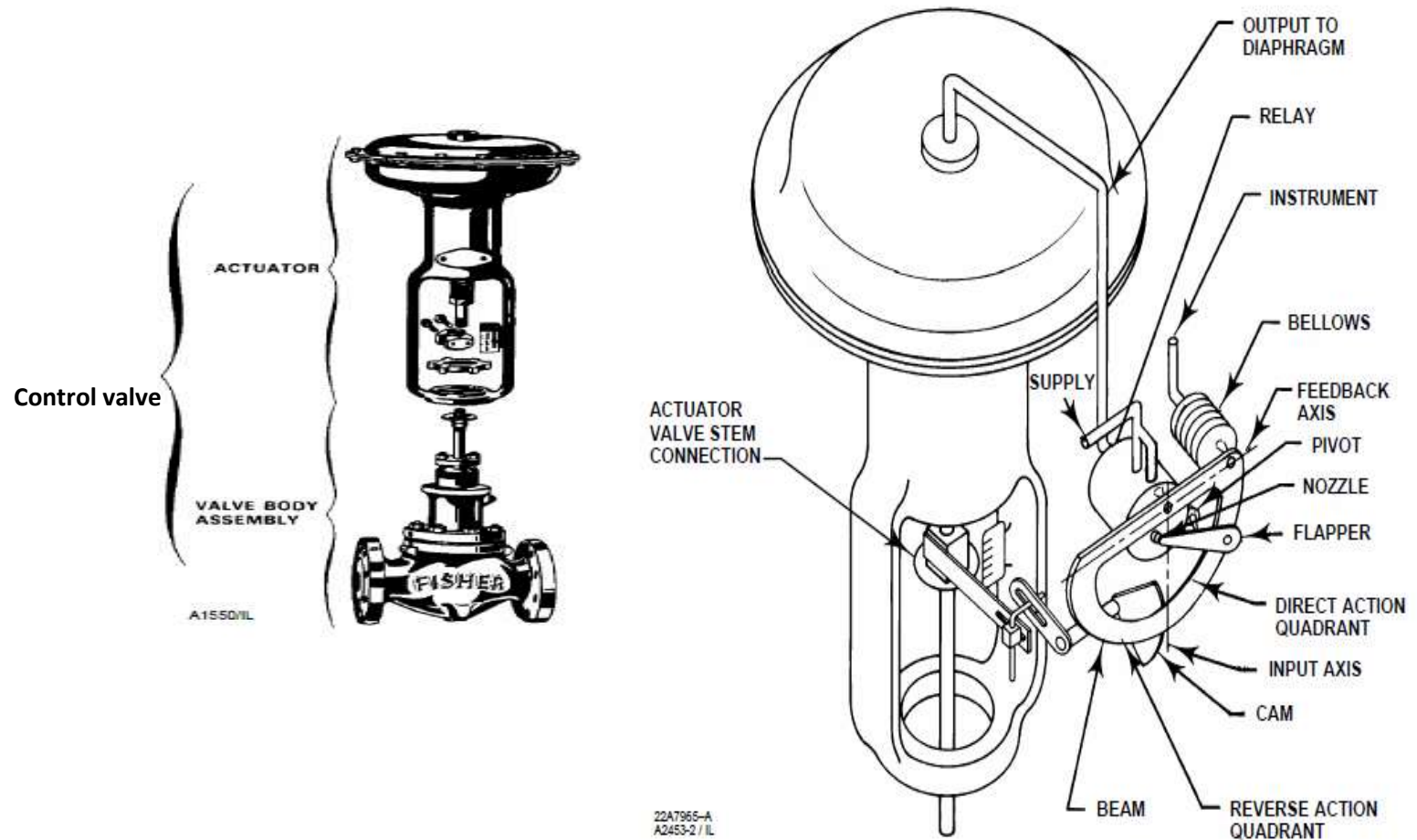
Control valve in PRESSURE CONTROL



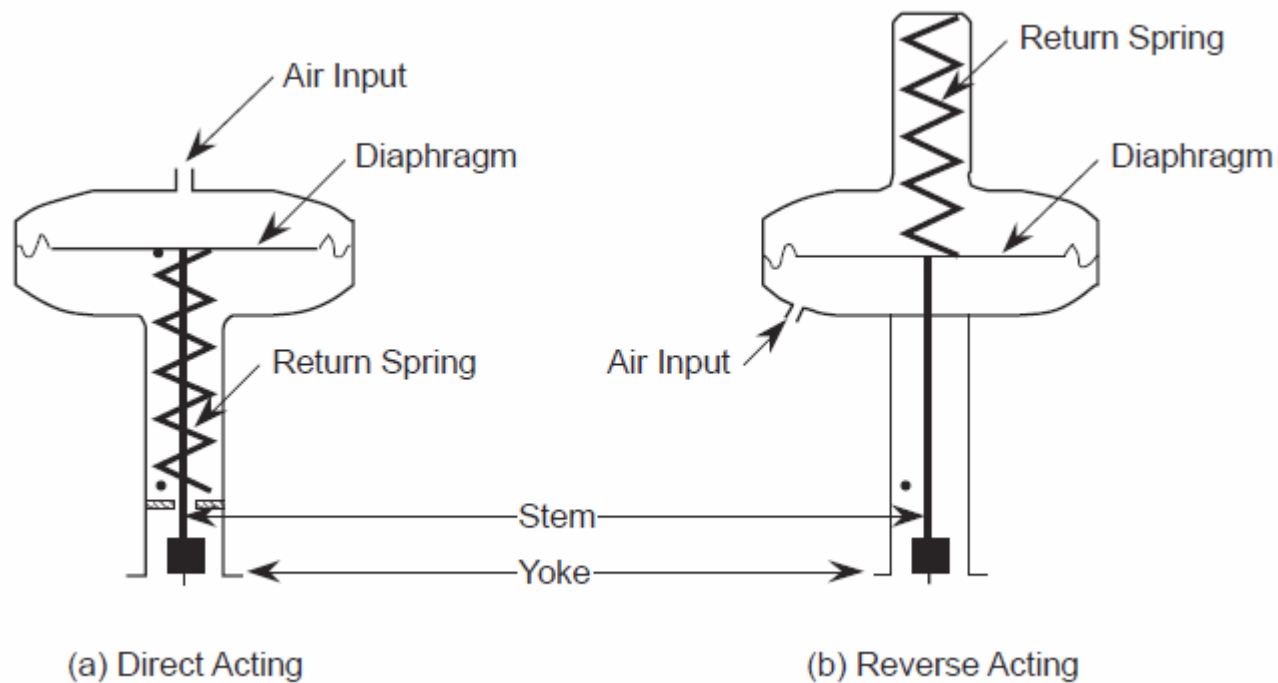
Control valve in Temperature Control



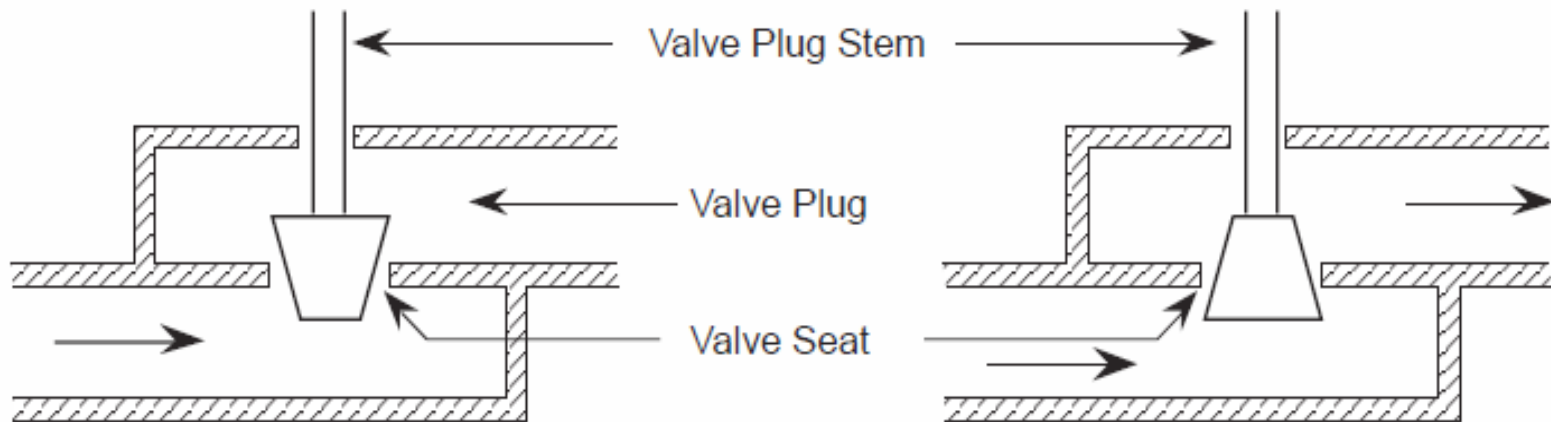
Relationship of major components of a control valve



Classification of control valve on the basis of actuator action



Classification of control valve on the basis of valve action



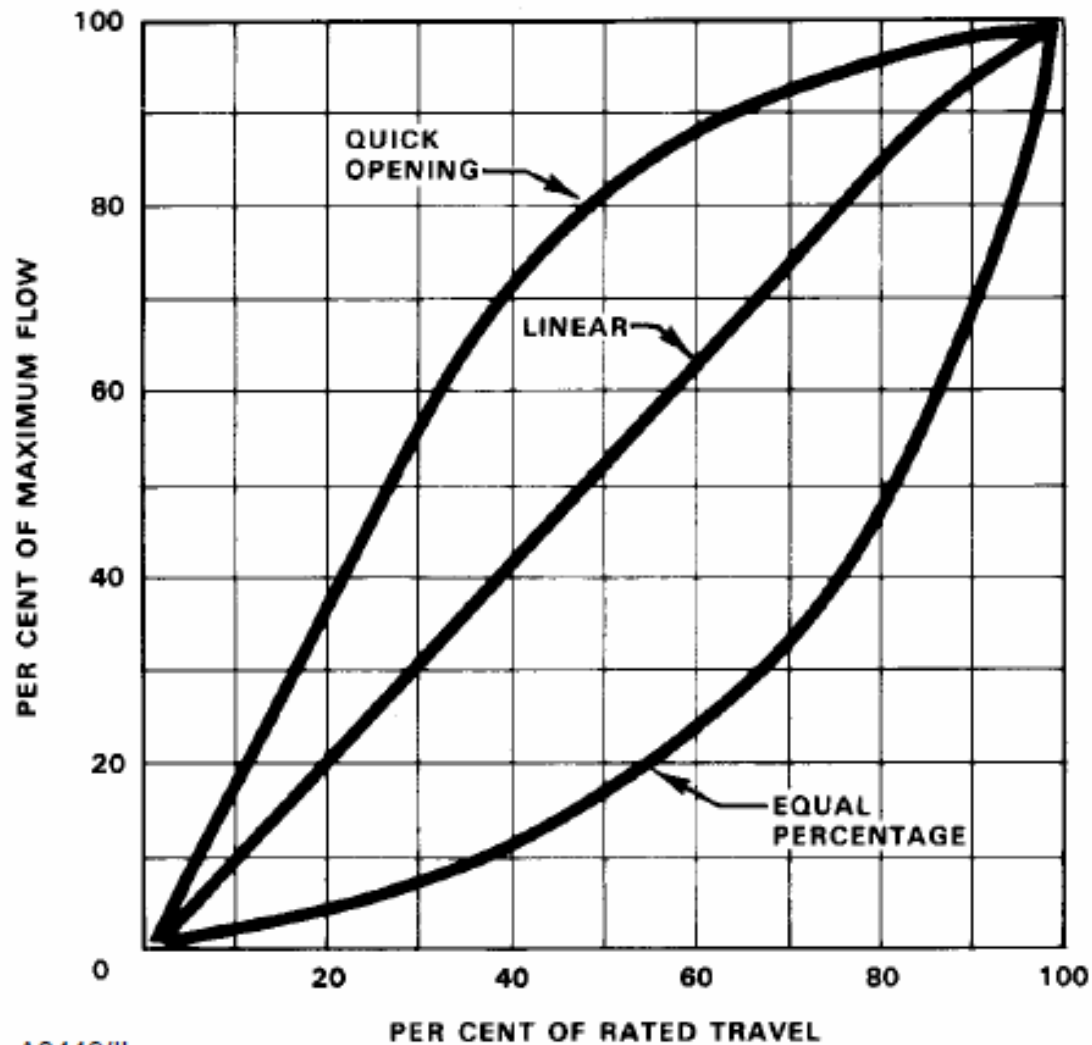
(a) Direct Acting

(b) Reverse Acting

Failure mode

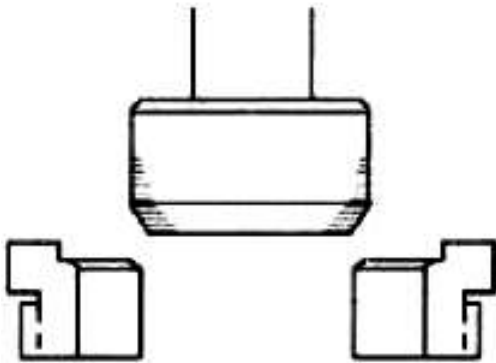
Actuator action	Valve body action	Control valve action	Failure mode	Valve Color
Direct	Direct	Air to close	<u>FAIL OPEN</u>	Green
Direct	Reverse	Air to open	<u>FAIL CLOSE</u>	Red
Reverse	Direct	Air to open	<u>FAIL CLOSE</u>	Red
Reverse	Reverse	Air to close	<u>FAIL OPEN</u>	Green

Characteristic of control valve

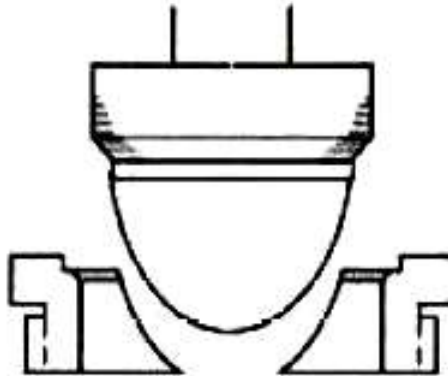


Characterized valve plugs

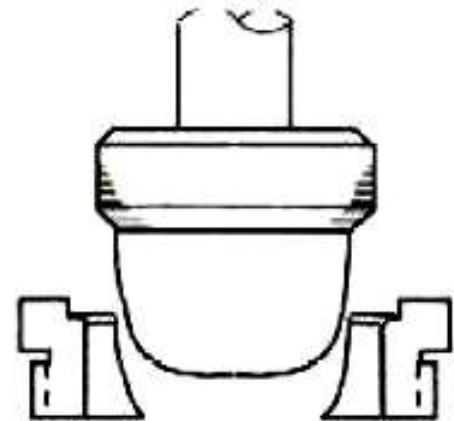
a) Quick Opening



b) Linear



c) Equal Percentage



Characterized cages for glove style valve bodies



W0958/1L

QUICK OPENING



W0959/1L

LINEAR



W0957/1L

EQUAL PERCENTAGE

Pictures of Few typical valves

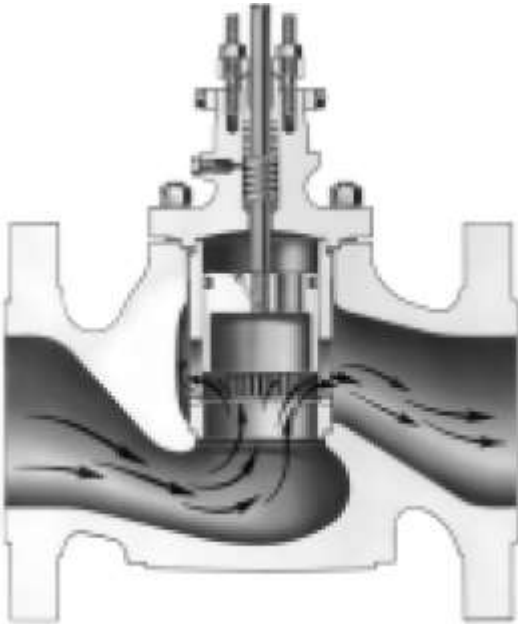
Glove valve



Angle valve and two port valve



Cage valve and aerodynamic noise reduction



W1257/IL



W6960/IL

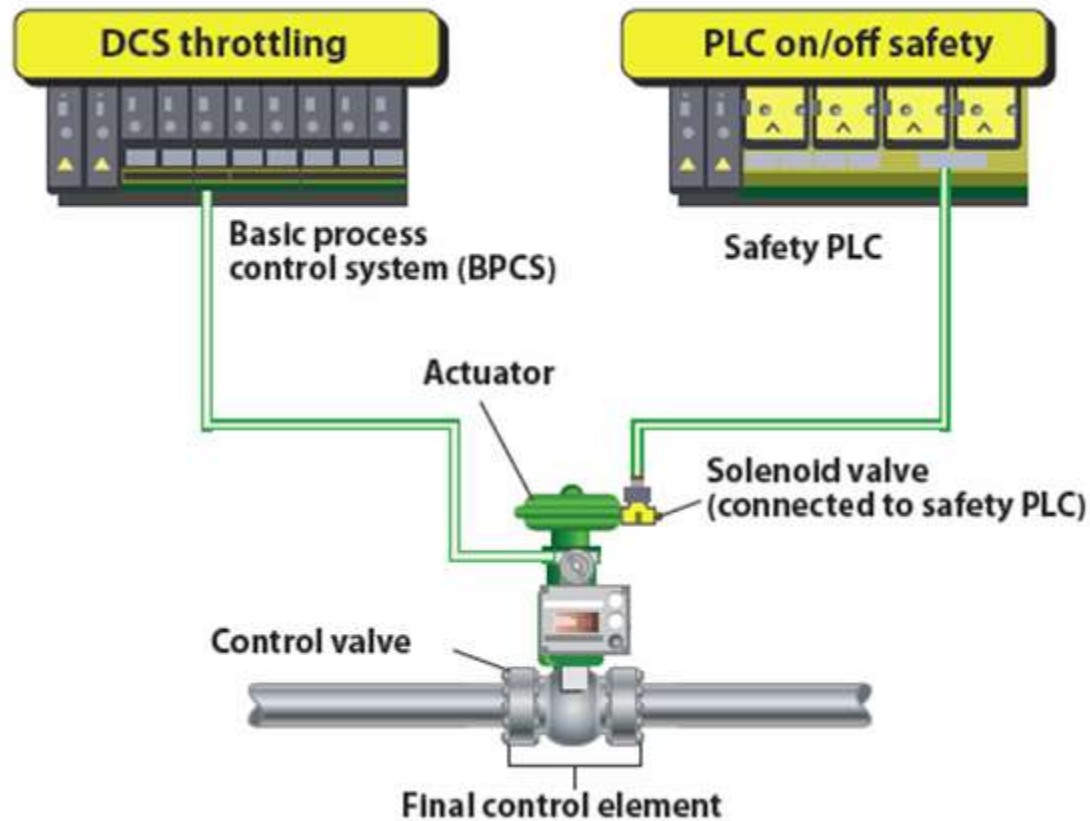
Butter fly valve



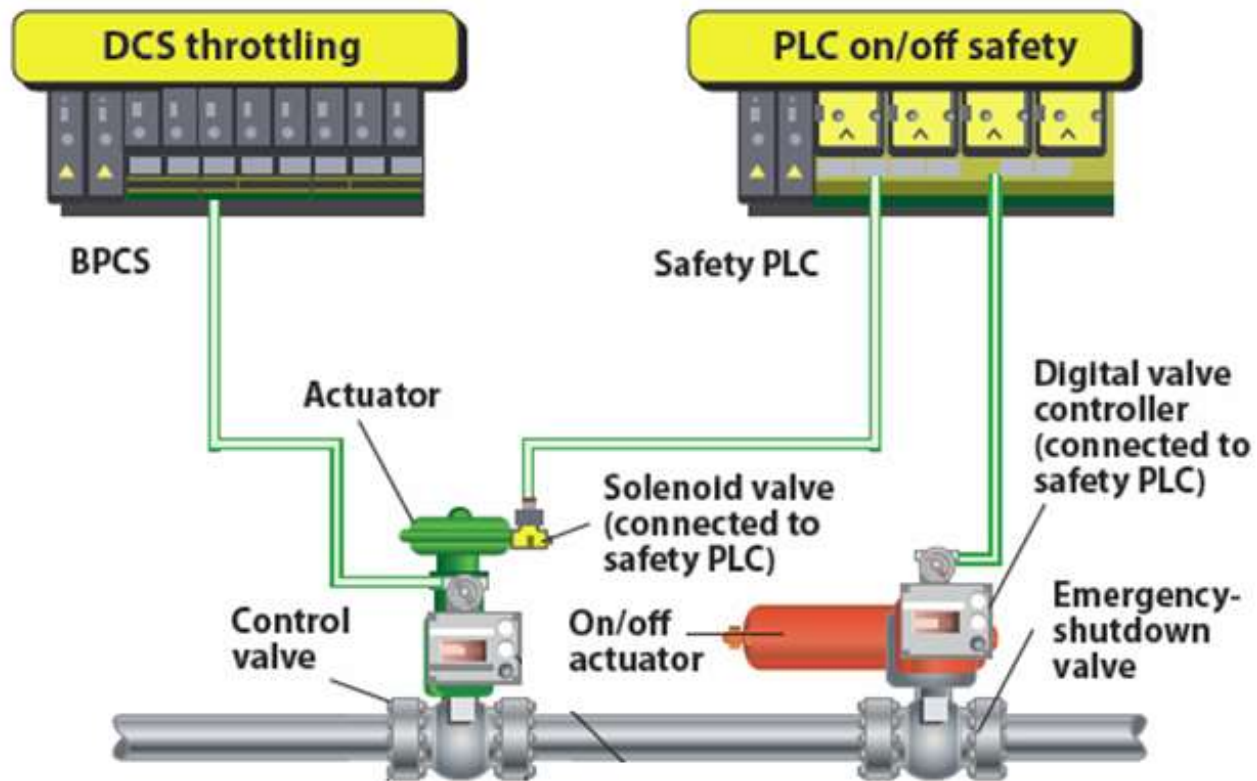
Ball valve



Control valve used as a shutdown valve



....and same arrangement with redundant.



Valve leakage

Valve leakage refers to flow through a valve which is set in the 'off' state

In the United States, the American National Standards Institute specifies six different leakage classes, with "leakage" defined in terms of the full open valve capacity:

- ☐ Class I, or 'dust-tight' valves, are intended to work but have not been tested
- ☐ Class II valves have no more than 0.5% leakage with 50psi (or less if operating pressure is less) of air pressure at the operating temperature
- ☐ Class III valves have no more than 0.1% leakage under those conditions; this may require soft valve seats, or lapped metal surfaces
- ☐ Class IV valves have no more than 0.01% leakage under those conditions; this tends to require multiple graphite piston rings or a single Teflon piston ring, and lapped metal seats.
- ☐ Class V valves leak less than $5/10^{12}$ cubic meters, per second, per bar of pressure differential, per millimeter of port diameter, of water when tested at the service pressure.

Valve leakage

□ Class VI valves are slightly different in that they , and are required (at 50psi or operating pressure, whichever is less) to have less than a specified leakage rate in milliliters of air per minute:

1 inch	0.15 ml/min
1.5 inch	0.30 ml/min
2 inch	0.45 ml/min
2.5 inch	0.60 ml/min
3 inch	0.90 ml/min
4 inch	1.70 ml/min
6 inch	4.00 ml/min
8 inch	6.75 ml/min
10 inch	9 ml/min
12 inch	11.5 ml/min

THANK YOU