DOWNSTREAM PRESSURE REGULATING VALVE

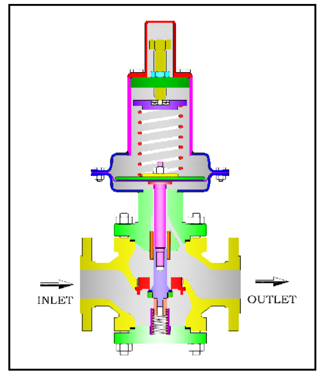
INTRODUCTION

Downstream Pressure Regulating Valve is self contained, self Operated control device, which automatically reduce a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate and varying inlet pressure. It utilizes energy from the controlled system.

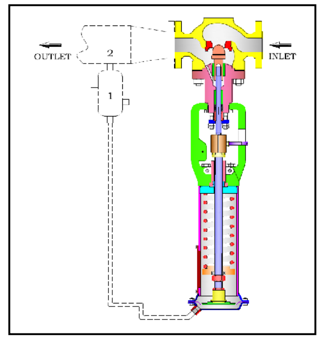
The regulator operates on the simple principal of force balance. A Downward opening force is exerted by the actuator spring, which is balanced by the upward force exerted by the controlled outlet pressure acting below the diaphragm. Any drop in controlled outlet Pressure due to consumption of Fluid, disturbs the force balance and due to spring force diaphragm and stem move down pushing the valve plug away from seat. This results in the increased flow.

The pressure reducing regulators are manufactured in a variety to manage downstream system pressures in low, medium, high flow application; model features a diaphragm/Piston type or combination of both to suit different applications.

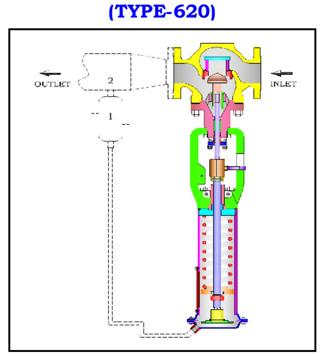
These regulators find applications throughout many industries including the Oil & Gas, Pulp & Paper, Power Generation and chemicals processing industries etc.



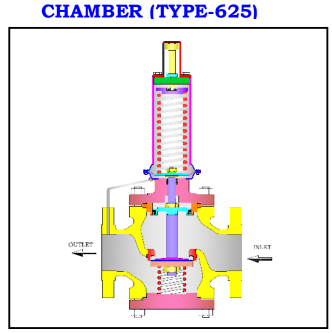
DIRECT OPERATED VALVE (TYPE-610)



STEAM PRV WITH CONDENSATE CHAMBER (TYPE-620)



STEAM PRV WITH MULTI STAGE PRESSURE REDUCTION TRIM & CONDENSATE CHAMBER (TYPE-625)


DIRECT OPERATED CONTOURED DESIGN VALVE (TYPE-630)

SPECIFICATIONS

Design : ASME B16.34

Type : 1) Direct Operated (Type 610)
2) Steam PRV with Condensate Chamber (Type620)
3)Steam PRV with Multi Stage Pressure Reduction Trim & CondensateChamber(Type 625)
4) Direct Operated with Balanced Design Valve (Type 630)
5) Pilot Operated (Type 640)

Body Form : Globe.

Size : 15 to 300 mm (1/2” to 12”)

Rating : 150# and 300# ANSI.
Higher Rating on Request.

End Connection : Flanged – 15mm to 300mm (1/2” to 12”)
Screwed – 15mm to 50mm (1/2” to 2”)

Body Material : A216 Gr. WCB, A351CF8, CF8M Other on Request.

Trim Material : Stainless Steel, Alloy20, Monel, Hastelloy B/C, Stellite Hard Facing.

Max.Temp : As per the diaphragm limitations.

Seat Leakage : As per FCI-70.02 (ANSI B 16.104)
Class IV, V and VI
(STANDARD LEAKAGE RATES)
Metal to Soft Seating – Bubble tight
(Zero Leakage)

PVCT-600

DESIGN FEATURES

- Models are available for Steam, air, gas or liquid service with internal or external sensing.
- Reduces higher inlet Pressure to a constant lower outlet pressure.
- Moulded sensing diaphragm provide a good proportional band and registration of outlet pressure on the diaphragm allows excellent control sensitivity.
- Glandless Construction where positive zero gland leakage is required, the design scores over conventional solutions such as Bellow seal etc., as the gland itself is eliminated and hence there can't be gland leakage. Glandless construction eliminates hystersis, resulting in improvement of sensitivity and repeatability of the valve.
- Outlet pressure is accurate over wide range of flow.
- Pilot-Operated main valve is not subjected to pressure fall off Characteristic of direct-acting PRV's.
- Outlet pressure is adjustable over complete range of control spring.
- Operates automatically off line pressure.
- Heavy-duty, nylon-reinforced diaphragm.
- Round-shaped, soft seat seal provide drip-tight class VI closure.
- Diaphragm assembly guided top and bottom.
- Throttling seat retainer for flow and pressure stability.
- Easily maintained without removal from the line.
- Pressure adjustment by single adjusting screw.
- Replaceable seat ring.
- Range of Body & Diaphragm material combinations to meet majority of requirements.
- IBR certification in From III C available.
- Designed ruggedly to withstand shocks.
- Simple and economic design.

QUALITY AND PERFORMANCE GUARANTEE

- Produced with Quality Systems accredited to ISO 9001: 2008 by Bureau Veritas.
- Full material certification available for all major component Parts.
- Full guarantee on design and Performance.
- All testing performed to the requirements of ANSI B16.34.

VALVE SIZING CO-EFFICIENT Cv RATING. (Table 1)

VALVE SIZE	Inch	½	¾	1	1.1/2	2	3	4	6	8	10	12
	mm	15	20	25	40	50	80	100	150	200	250	300
Cv		4	5	9	18	25	50	100	300	400	600	800

PVCT-600

PRINCIPLE OF OPERATION

All type of regulators generally fit into one of the following two basic categories.

1) Direct Operated

2) Pilot Operated

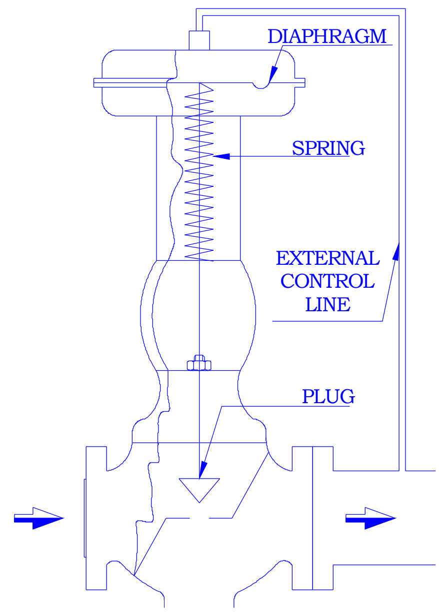
The specific considerations peculiar to your control needs is to be carefully studied and understood to determine which method of control is the better choice. Regulators when compared to control Valve/Instrument package have their advantage and limitations.

The operational principal of both types of regulator is explained as follows.

A) DIRECT OPERATED

In operation, a direct-operated, pressure reducing regulator senses the downstream pressure through either internal pressure registration or an external control line. This downstream pressure opposes a spring which moves the diaphragm and valve plug to change the size of the flow path through the regulator.

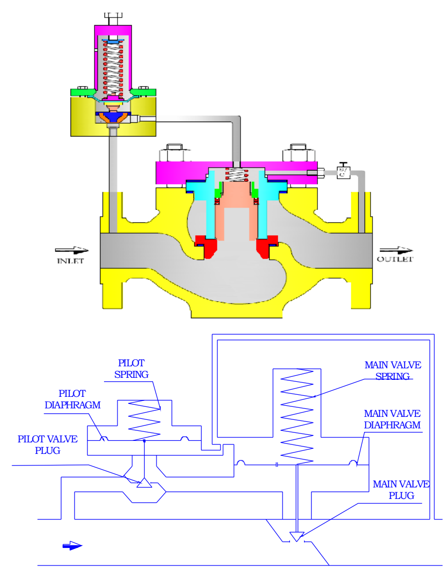
Characteristically direct operator regulator are adequate for narrow-range control, and where the allowable change in output pressure can be 10 to 20% of the outlet pressure setting. This 10 to 20% is typical although finer control can be achieved depending on the specific application requirement.



B) PILOT OPERATED

A pilot-operated system uses a two-path control. In two path control, the main valve diaphragm responds quickly to downstream pressure changes, causing an immediate correction in the main valve position. At the same time, the pilot diaphragm diverts some of the reduced inlet pressure to the other side of the valve diaphragm, which controls the final positioning of the main valve plug. Two-path controls result in fast response.

Pilot-operated regulators are preferred for broad-range control, or where the allowable change in outlet pressure is required to be less than 10 percent of the outlet pressure setting. They are also commonly used when remote set point adjustment is required for a regulator application.



PILOT OPERATED (TYPE 640)

GUIDELINES ON OPERATION & INSTALATION

- All regulators should be installed and used in accordance with applicable standard and local codes and regulations.
- Adequate overpressure protection should be installed to protect the regulator from overpressure. Adequate overpressure protection should also be installed to protect all downstream equipment in the event of regulator failure.
- Downstream pressures significantly higher than the regulator's pressure setting may damage soft seats and other internal parts.
- The recommended selection for orifice diameters is the smallest orifice that will handle the flow.
- Regulator body size should never be larger than the pipe size. In many cases, the regulator body is one size smaller than the pipe size.
- When adjusting set point, the regulator should be flowing at least five percent of the normal operating flow.
- Direct-operated regulators generally have faster response to quick flow changes than pilot-operated regulators.
- Droop is the reduction of outlet pressure experienced by pressure-reducing regulators as the flow rate increases. It is stated as a percent, in inches of water column (mbar) or in pounds per square inch (bar) and indicates the difference between the outlet pressure setting made at low flow rates and the actual outlet pressure at the published maximum flow rate. Droop is also called offset or proportional band.
- Downstream pressure always changes to some extent when inlet pressure changes.
- Most soft-seated regulators will maintain the pressure within reasonable limits down to zero flow. Therefore, a regulator sized for a high flow rate will usually have a turndown ratio sufficient to handle pilot-light loads during off cycles.
- Diaphragms leak a small amount due to migration of gas through the diaphragm material. To allow escape of this gas, be sure casing vents (where provided) remain open.
- A disk with a cut appearance probably means you had an overpressure situation. Thus, investigate further.
- When using relief valves, be sure to remember that the reset point is lower than the start-to-bubble point. To avoid seepage, keep the relief valve set point far enough above the regulator set point.
- Vents should be pointed down to help avoid the accumulation of water condensation or other materials in the spring case.
- Make control line connections in a straight run of pipe about 10 pipe diameters downstream of any area of turbulence, such as elbows, pipe swages, or block valves.
- Do not use needle valves in control lines; use full – open valves. Needle valves can cause instability.

BUREAU VERITAS Certification 1828

UKAS QUALITY MANAGEMENT

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