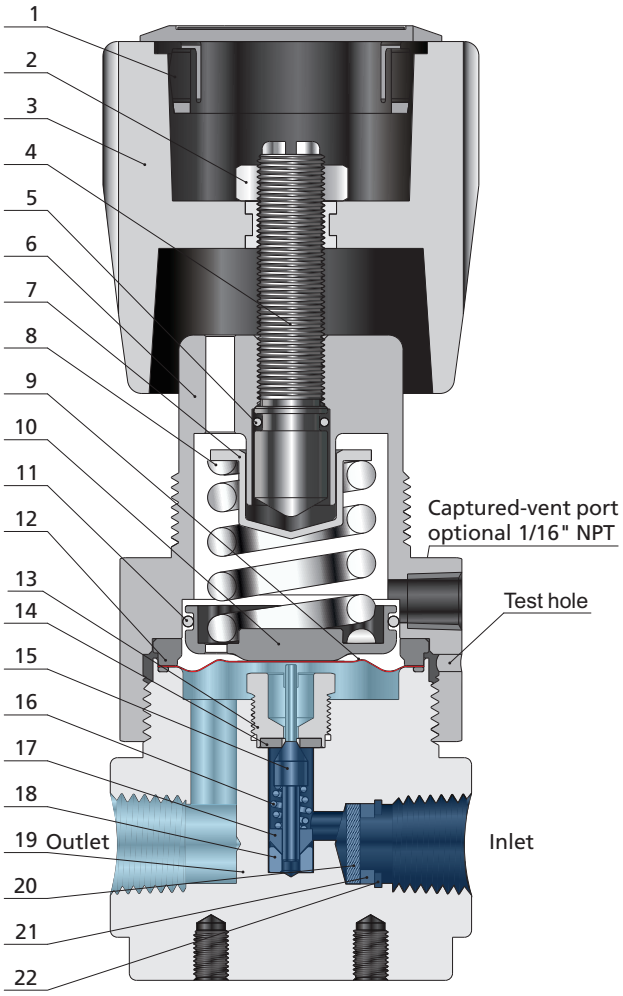
General Introduction

Typical Construction

Diaphragm Regulators

A pressure reducing regulator is positioned where the high pressure of a medium needs to be reduced and maintained to a lower and stable level. By turning the adjustment handle, the tension of range spring would be changed so as to control the outlet pressure of the regulator.



Component		Material/Specification
1	Hole Plug	ABS
2	Stem Nut	C36000/ASTM B16
3	Knob Handle	ABS
4	Stem	C36000/ASTM B16
5	O-ring	Buna-N
6	Bonnet	304 SS/ASTM A479 or Brass
7	Spring Button	304 SS/ASTM A276
8	Range Spring	Alloy
9	Diaphragm	Hastelloy
10	Spring Plate	Aluminium alloy
11	O-ring	Buna-N
12	Seal Ring	304 SS/ASTM A479
13	Seat Retainer	316L SS/ASTM A276
14	Seat	PCTFE/ASTM D1430
15	Lift Poppet	316L SS/ASTM A276
16	Poppet Spring	Alloy X-750
17	Poppet Damper	PTFE/ASTM D1710
18	Friction Sleeve	316L SS/ASTM A276
19	Body	316L SS/ASTM A479 or Brass
20	Filter	316L SS
21	Filter Ring	PTFE/ASTM D1710
22	Retaining Ring	316L SS

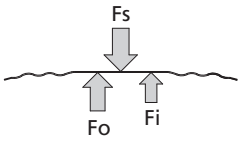
Features

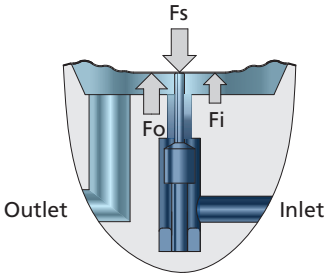
- ◎ Convoluted diaphragm to provide accurate pressure adjustment
- ◎ Spring loaded
- ◎ 316L SS filter installed at inlet
- ◎ Some regulators are fitted with captured-vent, such as FCR-1S, FLR-3 and FLR-5 series and self-venting FCR-2 and FLR-2 series
- ◎ Users can connect the captured vent port so that the media can be contained or redirected if self-vented or the diaphragm accidentally breaks
- ◎ Optional sealing material for different gases and purity class
- ◎ Hastelloy diaphragm to provide higher burst pressure and corrosion resistance
- ◎ Low leak rates
  Internal: $\leqslant 1x10^{-7}$ mbar·l/s helium
  External: $\leqslant 1x10^{-9}$ mbar·l/s helium

When the regulator is in operation, the inlet pressure (Fi) plus the out pressure (Fo) should be equal to the downward force on the diaphragm by the compressed spring (Fs), namely Fi+Fo=Fs to reach an equilibrium.

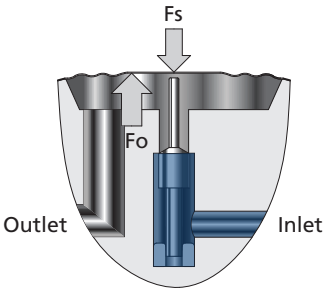
When the outlet pressure (Fo) is lower than the set pressure, the poppet would be pushed away from the seat by the excess downward force , allowing more high pressure gas to enter the chamber so as to increase the outlet pressure.

As soon as the outlet pressure (Fo) exceeds the set pressure, the excess upstream force shall lift the poppet back to the seat to limit high pressure gas entering, so as to reduce the outlet pressure.





Fs > Fo+Fi

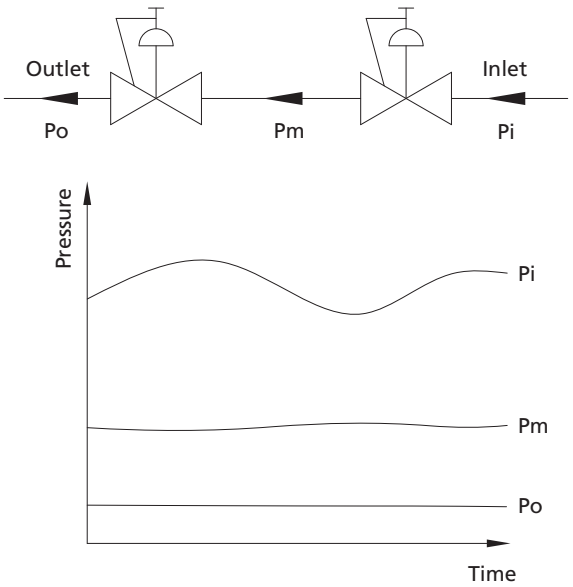


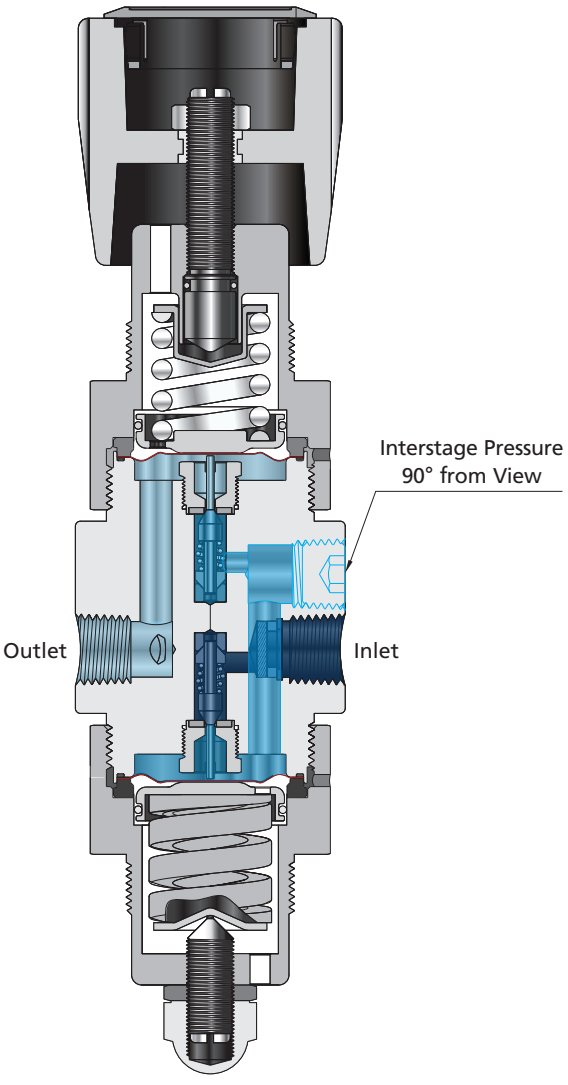
Fs < Fo+Fi
(in this figure, inlet pressure doesn't act on diaphragm)

Dual-stage Diaphragm Regulators

When the inlet pressure (Pi) decreases, the outlet pressure (Po) shall increase. Even though the increase may not be significant, the dual-stage regulator would be a better option when more stable pressure required, and the upstream pressure fluctuates violently.

The function of a dual-stage regulator is similar to that of two single-stage regulators in series. The 1st-stage regulator reduces the inlet pressure to an intermediate level for the 2nd-stage regulator to adjust to a constant output, which at the most extent ensures the stability of the outlet pressure.

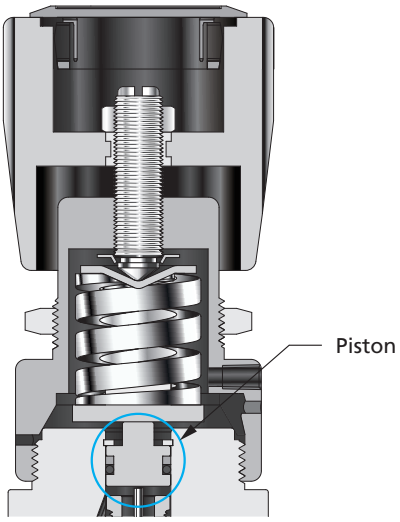




Piston Regulators

Although diaphragm regulators have many advantages such as precision, sealing effect, cleanliness and etc., in order to ensure sensitivity, the structural strength of the diaphragm regulators is low so as not being able to withstand high pressure. Therefore, it is recommended to utilize the piston regulators for high pressure applications.

A piston regulator has the same working principle as a diaphragm regulator. The key distinction is that the diaphragm is changed to a piston to satisfy the needs for high pressure applications. The inlet pressure of a piston regulator can reach 6000 psig. Its construction is simple and reliable with multiple options of O-rings to fulfill the various requirements of different media.



Series of Products

Cylinder Pressure Regulators (FCR)

Cylinder pressure regulators are designed to reduce the pressure of the cylinders to a lower level. The regulator is connected to the cylinder normally through a cylinder connection.

Line Pressure Regulators (FLR)

Line pressure regulators are used to further control the pressure in line.

Pressure Control Panels (FSR)

Pressure control panels are installed in the gas storage area (cylinder stock room or gas cabinet). They reduce cylinder or tank pressure to the desired line pressure for in-house use. Via the subsequent piping system, the gas will be guided to the point-of-use.

Changeover Systems (FDR)

There are manual changeover system and automatic changeover system.

Manual changeover system can connect with several independent gas sources at a time. When one gas source is depleted, it could be switched to another source quickly through a shutoff valve.

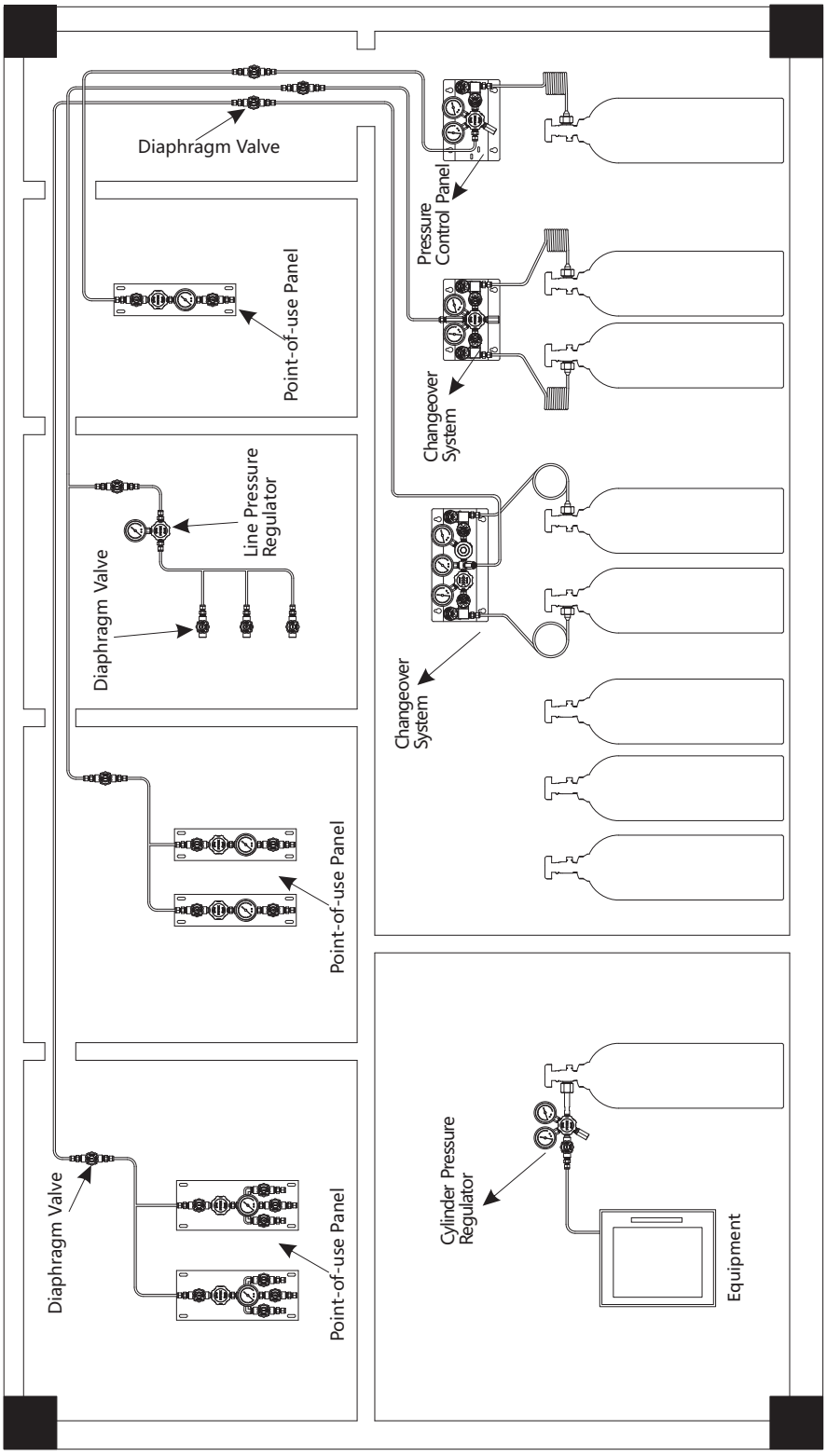
Automatic changeover system is installed onto gas pipelines which need continuous gas supply. It can connect with two independent gas sources at a time. When the gas source from one side is depleted, it can automatically switch to the gas source from the other side. Subsequently, replacing the exhausted gas source.

Point-of-use Panels (FPR)

Its function is to most precisely regulate the pressure and shut off at the point-of-use.

Products Practical Application

Gas Supply System



Selection Guide

		Series																
		FCR-1	FCR-1S	FCR-2	FCR-1D	FLR-1	FLR-2	FLR-3	FSR-1	FSR-2	FDR-1	FDR-2	FDR-1L	FDR-1T	FPR-1	FPR-1S	BPR-1	BPR-2
Material	Brass	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	SS	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Hastelloy	√			√	√									√			
Pressure Reduction Design	Diaphragm	√	√		√	√		√	√		√		√	√	√	√	√	
	Piston			√			√			√		√						√
	Preset												√				√	√
	Adjustable	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Single-Stage	√	√	√		√	√	√	√	√	√	√	√		√	√		
	Dual-Stage				√									√				
Regulator Type	Cylinder	√	√	√	√													
	In-Line					√	√	√										
	Control Panel								√	√	√	√	√	√				
	Point-of-use														√	√		
	Back Pressure																√	√
Maximum Inlet Pressure	6000 psig			√														
	4500 psig	√	√	√	√		√		√	√	√	√	√	√				
	3000 psig	√	√		√		√	√	√	√	√	√	√	√				
	1500 psig					√									√	√		
	500 psig					√		√										
Control Pressure Range	0~25 psig	√	√		√	√		√	√		√		See page A-50	√	√	√	√	
	0~50 psig	√	√		√	√		√	√		√			√	√	√	√	
	0~100 psig	√	√		√	√		√	√		√			√	√	√	√	
	0~150 psig		√		√			√						√		√		
	0~200 psig		√					√								√		
	0~250 psig	√			√	√	√		√		√				√		√	
	0~300 psig																	√
	0~500 psig	√					√		√		√				√			√
	0~750 psig			√			√			√		√						
	0~1000 psig						√											√
	0~1500 psig			√						√		√						
	0~2500 psig			√						√		√						
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