Industrial Regulators

The industry standard for pressure regulators and flow control products.

FISHER®

EMERSON™
Process Management

Conversion Tables

TEMPERATURE CONVERSION FORMULAS

From Farenheit (°F) to Celsius (°C)	(°F - 32) x 5/9
From Farenheit (°F) to Kelvin (K)	(°F + 459.67) / 1.8
From Celsius (°C) to Farenheit (°F)	(°C x 9/5) + 32
From Celsius (°C) to Kelvin (K)	(°C + 273.15)
From Kelvin (K) to Farenheit (°F)	(1.8 x K) - 459.67
From Kelvin (K) to Celsius (°C)	(K - 273.15)

PRESSURE CONVERSION

FROM	TO							
	bar	kPa	mm Hg (0°C)	mm H_2O (4°C)	kg/cm²	in H_2O (4°C)	psi	in Hg (32°C)
bar	1	100	750.064	10197.443	1.02	401.474	14.504	29.53
kPa	0.01	1	7.501	101.974	0.01	4.015	0.145	0.295
mm Hg (0°C)	0.001	0.133	1	13.595	0.001	0.535	0.019	0.039
mm H_2O (4°C)	0.0001	0.01	0.074	1	0.0001	0.039	0.001	0.003
kg/cm²	0.981	98.067	735.561	10000.275	1	393.712	14.223	28.959
in H_2O (4°C)	0.002	0.249	1.868	25.4	0.003	1	0.036	0.074
psi	0.069	6.895	51.715	703.089	0.07	27.681	1	2.036
in Hg (32°C)	0.034	3.386	25.4	345.324	0.035	13.595	0.491	1

VOLUMETRIC GAS FLOW CONVERSION

FROM	TO				
	Nm³/hr	SCFH	SCFM	in³/min	Nliters/min
Nm³/hr	1	35.31	0.59	1,017	16.67
SCFH	0.03	1	0.02	28.8	0.47
SCFM	1.7	60	1	1,728	28.32
in³/min	0.001	0.03	0.0006	1	0.02
Nliters/min	0.06	2.12	0.04	61.02	1

VOLUMETRIC LIQUID FLOW CONVERSION

FROM	TO							
	liters/sec	liters/min	m³/h	ft³/min	ft³/hr	US gallon/min	UK gallon/min	barrels (petroleum)/min
liters/sec	1	60	3.6	2.12	127.1	15.85	13.2	0.38
liters/min	0.02	1	0.06	0.04	2.12	0.26	0.22	0.01
m³/h	0.28	16.67	1	0.59	35.31	4.4	3.67	0.1
ft³/min	0.47	28.32	1.7	1	60	7.48	6.23	0.18
ft³/hr	0.01	0.47	0.03	0.02	1	0.12	0.1	0.003
US gal/min	0.06	3.79	0.23	0.13	8.02	1	0.83	0.02
UK gal/min	0.08	4.55	0.27	0.16	9.63	1.2	1	0.03
barrels (petroleum)/min	2.65	159	9.54	5.62	336.9	42	34.97	1

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INTRODUCTION

Regulators

Air

Steam

Tank Blanketing/Vapor Recovery

Liquids

Process Gas

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Pressure Reducing Regulators

Direct-Operated
Pilot-Operated

Regulators are self-contained, control devices which use energy from the controlled system to operate whereas control valves require external power sources, transmitting instruments, and control instruments.

Pressure Reducing Regulators

A pressure reducing regulator maintains a desired outlet pressure while providing the required fluid flow to satisfy a downstream demand. The pressure which the regulator maintains is the outlet pressure setting (setpoint) of the regulator.

Pressure Reducing Regulator Type

The two main types of regulators:
1. Direct-Operated
2. Pilot-Operated

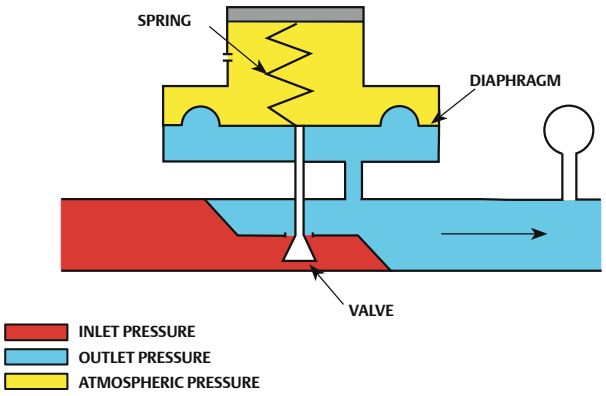


Figure 1. Direct-Operated Regulator

Direct-Operated Regulators

Direct-Operated regulators are the simplest style of the regulators. At low set pressures, typically below 1 psig / 0.07 bar, they can have very accurate (±1%) control. At high control pressures, up to 500 psig / 34.5 bar, 10% to 20% control is typical.

In operation, a direct-operated, pressure reducing regulator senses the downstream pressure through either internal pressure registration or 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.

Direct-operated regulators have many commercial and residential uses. Typical applications include industrial, commercial, and domestic gas service or instrument air.

Pilot-Operated Regulators

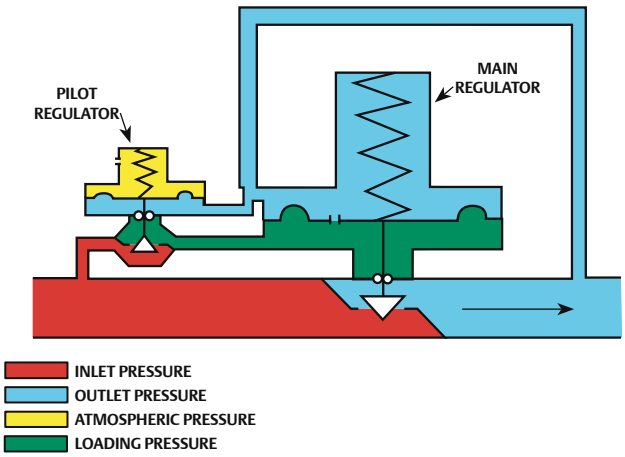


Figure 2. Pilot-Operated Regulator

Pilot-Operated regulators are preferred for high flow rates or where precise pressure control is required. A popular type of pilot-operated system uses 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 plug position. At the same time, the pilot diaphragm diverts some of the reduced inlet pressure to the other side of the main valve diaphragm to control the final positioning of the main valve plug. Two-path control results in fast response and accurate control.

Pressure Reducing Regulator Selection

The majority of applications require a pressure reducing regulator. Assuming the application calls for a pressure reducing regulator. The following parameters must be determined:

- Outlet pressure to be controlled
- Inlet pressure to the regulator
- Capacity required
- Shut-off capability required
- Process fluid
- Process fluid temperature
- Accuracy required
- Pipe size required
- End connection style
- Material requirements
- Control line needed
- Overpressure protection

Relief Valve / Backpressure Regulator

Relief Valve
Backpressure Regulator

Relief Valves and Backpressure Regulators

A pressure relief valve is a control device that opens to relieve fluid to atmosphere during an overpressure occurrence. A backpressure regulator is a control device that maintains a constant upstream pressure throughout a given flow range.

Relief Valve Types

Relief valves are available in four general types: pop type, direct-operated, pilot-operated, and internal relief valves.

Direct-Operated Relief Valves

System pressure is referenced under a diaphragm and opposed by a spring. As system pressure increases past the setpoint, the relief valve opens which allows fluid to escape and protects the system. The increase in pressure above the relief setpoint that is required to produce more flow through the relief valve is referred to as pressure buildup.

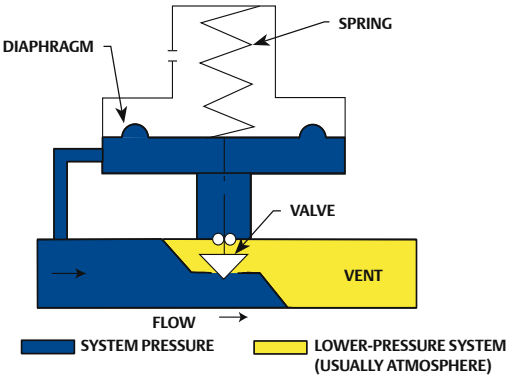


Figure 3. Direct-Operated Relief Valve

Direct-Operated relief valves are commonly used in industry to protect industrial furnaces and other equipment.

Pilot-Operated Relief Valves

In normal operation, when system pressure is below setpoint of the relief valve, the pilot remains closed. This allows loading pressure to register on top of the main relief valve diaphragm. Loading pressure on top of the diaphragm is opposed by an equal pressure (inlet pressure) on the bottom side of the diaphragm. With little or no pressure differential across the diaphragm, the spring keeps the valve seated. When the system pressure increases past the setpoint, the pilot opens and exhausts the loading pressure from the top of the relief valve main diaphragm which allows the main valve to open.

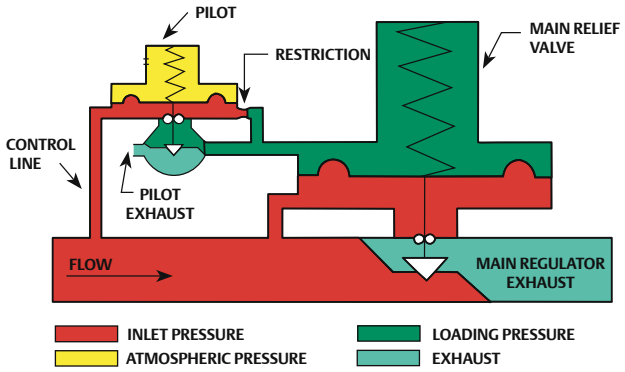


Figure 4. Pilot-Operated Relief Valve

Pilot-operated relief valves are used in applications requiring high-capacity and low-pressure buildup.

Internal Relief

The regulator shown in Figure 5 includes an internal relief valve. The relief valve has a measuring element (the main regulator diaphragm), a loading element (a light spring), and a restricting element (a valve seat and disk).

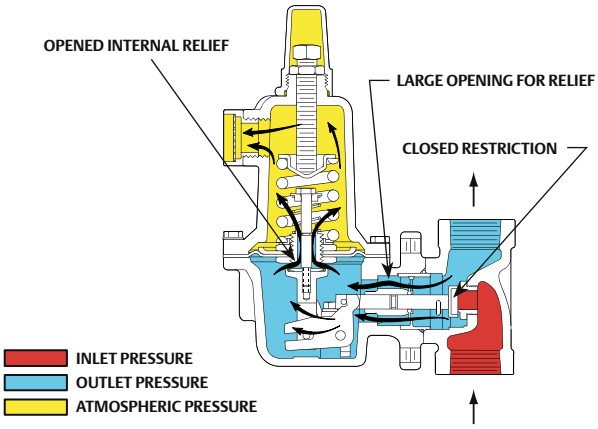


Figure 5. Internal Relief

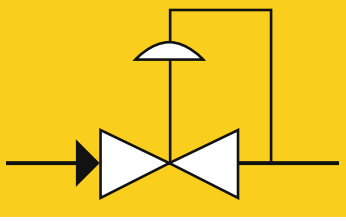
The relief valve assembly is located in the center of the regulator diaphragm. Internal relief is often used in industrial applications where atmospheric exhaust is acceptable, and low buildup is not required.

Backpressure Regulator Selection

Backpressure regulators control the inlet pressure rather than the outlet pressure. The selection criteria for the backpressure regulator is the same as for a pressure reducing regulator.

Industrial Regulators Selection Table

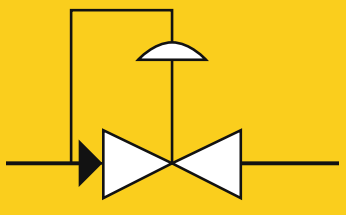
Pressure Reducing Regulators



OUTLET PRESSURE RANGE*, psig / bar	Air	Steam	Tank Blanketing	Liquid	Process Gas	Fuel Gas	TYPE OR SERIES	OPERATION METHOD	BODY SIZE, NPS	MAXIMUM INLET PRESSURE, psig / bar	MAXIMUM FLOW CAPACITY, SCFH / Nm³/h	REFERENCES	
												PAGE	BULLETIN NO.
0-125 / 0-8.6	■				■	■	67C	Direct	1/4	250 / 17.2	4350 / 117	10	71.1:67C
0-150 / 0-10.3	■			■	■	■	67CS	Direct	1/4	400 / 27.6	4350 / 117	-	71.1:67C
0-150 / 0-10.3	■				■	■	67D	Direct	1/2	400 / 27.6	20,900 / 560	11	71.1:67D
10-500 / 0.69-34.5	■	■		■	■	■	1301	Direct	1/4	6000 / 414	4500 / 121	11	71.1:1301
2-400 / 0.14-27.6	■	■		■	■	■	95	Direct	1/4 to 2	600 / 41.4	12,000 lbs/h / 5443 kg/h	13	71.1:95
2-135 / 0.14-9.3	■	■		■	■	■	SR5	Direct	1/2 to 3	210 / 14.5	6820 lbs/h / 3096 kg/h	13	71:1:SR5
2-250 / 0.14-17.2		■					92B	Pilot	1, 1-1/2, 2, 3, and 4	300 / 20.7	42,400 lbs/h / 19,234 kg/h	12	71.2:92B
2-250 / 0.14-17.2		■					92S	Pilot	1 to 6 x 4	300 / 20.7	45,100 lbs/h / 20,457 kg/h	12	71.2:92S
5-250 / 0.34-17.2		■		■			92C	Pilot	1/2, 3/4, and 1	300 / 20.7	3600 lbs/h / 1633 kg/h	13	71.2:92C
20-80 / 1.4-5.5				■			75A	Direct	1/2 to 2-1/2	200 / 13.8	260 gpm / 984 l/min	17	71.1:75A
2-250 / 0.14-17.2				■			92W	Pilot	1 to 4	300 / 20.7	960 gpm / 3720 l/min	17	71.2:92W
5-500 / 0.34-34.5	■				■	■	627	Direct	3/4, 1, and 2	2000 / 138	162,000 / 4342	11	71.1:627
10-500 / 0.69-34.5				■			627W	Direct	3/4, 1, and 2	900 / 62.1	82 gpm / 310 l/min	-	71.1:627W
5 to 300 / 0.34 to 20.7	■			■	■	■	MR105	Direct	1, 2, 3, and 4	400 / 27.6	1650 gpm / 6240 l/min	16	71.1:MR105
4"wc-300 / 10 mbar-20.7	■		■	■	■	■	1098-EGR	Pilot	1 to 12 x 6	400 / 27.6	11,934 gpm / 45,170 l/min	16	71.2:1098-EGR
0.25"wc-7 / 0.6 mbar-0.48	■		■		■		1190	Pilot	1, 2, 3, 4, 6, 8 x 6, and 12 x 6	400 / 27.6	2,811,000 / 75,335	15	74.1:1190
2"wc-100 / 5 mbar-6.9	■		■		■	■	99	Pilot	2	1000 / 69.0	265,000 / 7102	21	71.2:99
2"wc-5 / 5 mbar-0.34	■		■		■	■	66	Direct	2, 3, and 4	10 / 0.69	49,000 / 1313	-	71.1:66
1"wc-7 / 2 mbar-0.48	■		■		■	■	Y690A	Direct	3/4 and 1	150 / 10.3	6067 / 163	14	74.1:Y690A/ 71.1:Y690A
1"wc-10 / 2 mbar-0.69	■		■		■	■	Y692	Direct	1-1/2 and 2	150 / 10.3	19,820 / 531	15	74.1:Y692
0.5"wc-10 / 1 mbar-0.69	■		■		■	■	Y693	Direct	1-1/2 and 2	150 / 10.3	26,700 / 716	14	74.1:Y693
2"wc-60 / 5 mbar-4.1	■		■		■	■	133	Direct	2	150 / 10.3	170,000 / 4556	21	71.1:133
-5"wc-1.5 / -12 mbar-0.10			■				ACE95	Pilot	3/4, 1, and 1 x 2	200 / 13.8	499,600 / 13,390	14	74.1:ACE95
-5"wc-1.5 / -12 mbar-0.10			■				ACE95jr	Direct	1/2, 1 x 1/2, and 1	200 / 13.8	3330 / 89.2	-	74.1:ACE95jr
-5"wc-1.5 / -12 mbar-0.10			■				ACE95sr	Pilot	2	200 / 13.8	499,600 / 13,390	-	74.1:ACE95
Pad: 0.5"wc-2.2 / 1 mbar-0.15 Depad: 4"wc-2 / 10 mbar-0.14			■				ACE97	Pilot	Pad: 1/2, 1, and 2 and Depad: 1-4	200 / 13.8	Pad: 499,600 / 13,389 De-pad: 106,200 / 2846	-	74.3:ACE97
6"wc-1000 / 15 mbar-69.0	■		■		■	■	EZR	Pilot	1 to 8	1500 / 103	26,138,000 / 700,498	20	71.2:EZR
3.5"wc-60 / 9 mbar-4.1	■				■	■	299H	Pilot	1-1/4, 1-1/2, and 2	175 / 12.1	108,120 / 2898	-	71.2:299H
15-150 / 1-10.3				■			LR125	Pilot	1, 2, 3, and 4	300 / 20.7	2052 gpm / 7769 l/min	17	71.2:LR125

Selection Table

Backpressure Regulators
Relief Valve

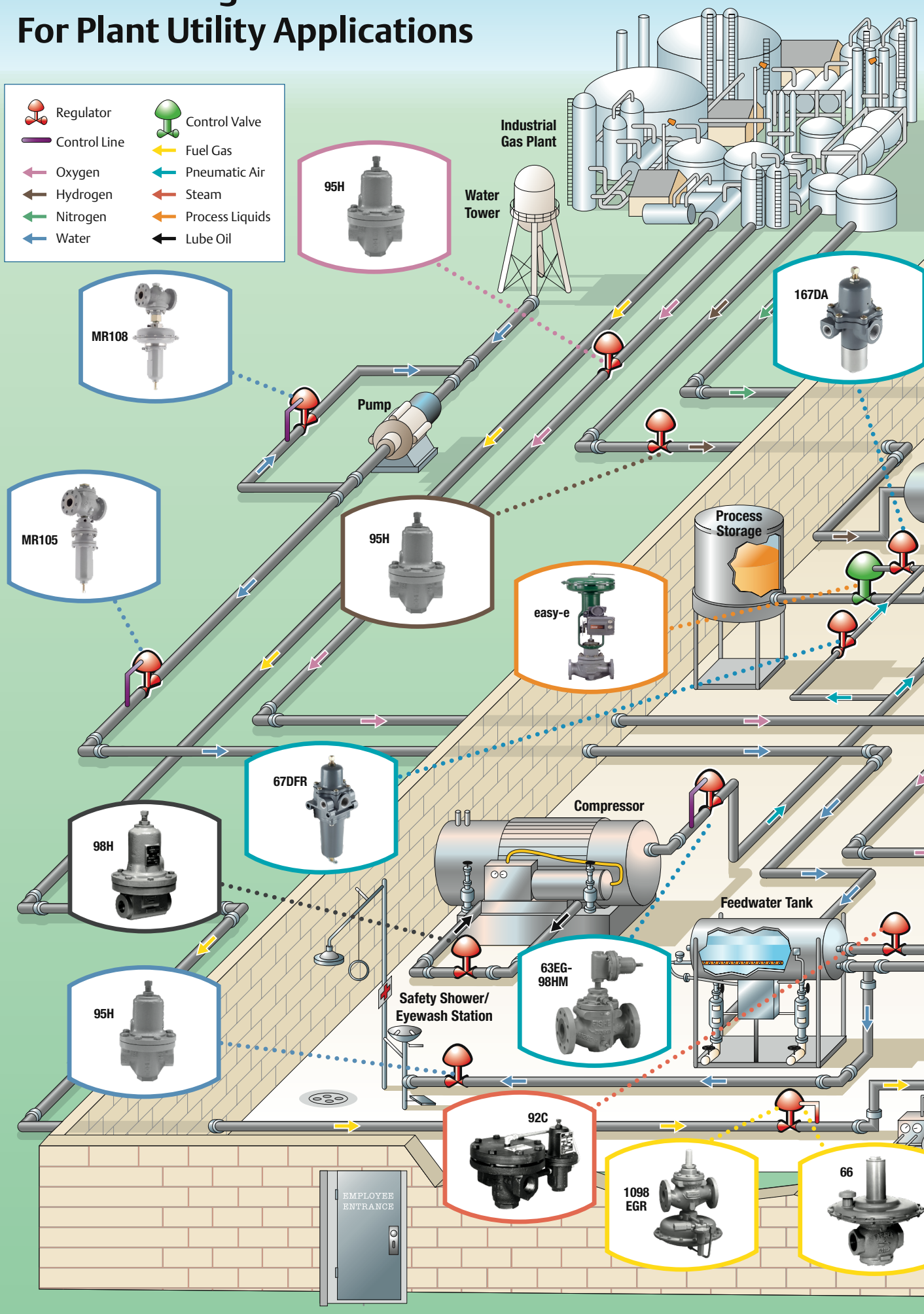


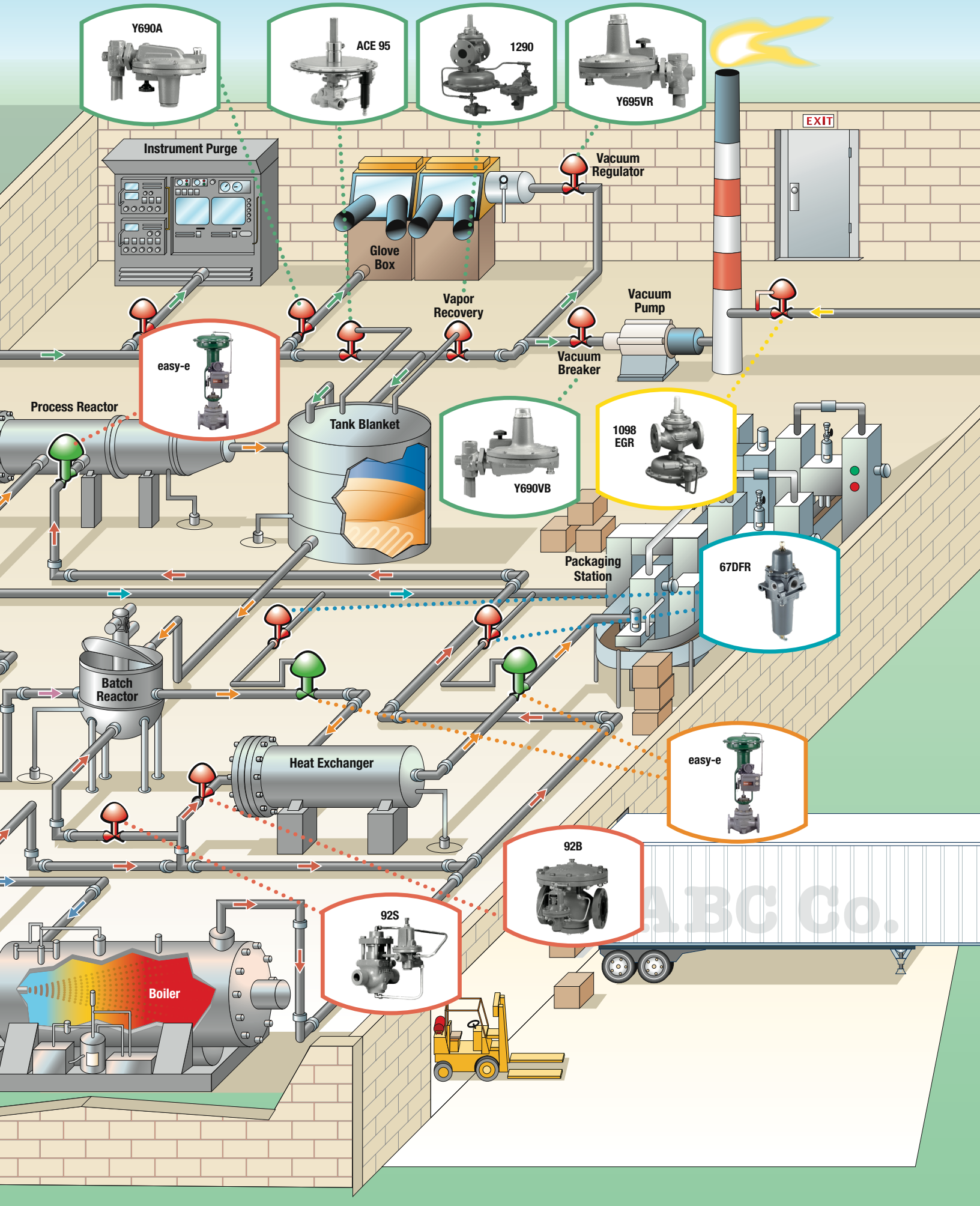
OUTLET PRESSURE RANGE*, psig / bar	Air	Steam	Tank Blanketing	Liquid	Process Gas	Fuel Gas	TYPE OR SERIES	OPERATION METHOD	BODY SIZE, NPS	MAXIMUM INLET PRESSURE, psig / bar	MAXIMUM FLOW CAPACITY, SCFH / Nm³/h	REFERENCES	
												PAGE	BULLETIN NO.
4"w.c. to 7 psig / 10 mbar to 0.48 bar	■		■		■	■	Y600A	Direct	3/4 and 1	150 / 10.3	6660 / 178	20	71.1:Y600A
2"wc-10 / 5 mbar-0.69	■				■	■	CS800	Direct	1-1/4 ,1-1/2, and 2	125 / 8.6	36,270 / 974	-	71.1:CS800
14.5-1160 / 1.0-80.0	■				■	■	EZH	Pilot	1 to 4	1500 / 103	13,833,000 / 370,724	21	71.2:EZH and EZHSO
3-500 / 0.21-34.5	■				■	■	630	Direct	1 and 2	1500 / 103	96,000 / 2573	-	71.1:630
10-700 / 0.69-48.3	■				■	■	310A	Pilot	1 to 4 x 6	1500 / 103	21,170,000 / 567,356	20	71.2:310A
5"wc-75 / 12 mbar-5.2	■				■	■	289	Direct	1/4, 3/4, 1, and 2	100 / 6.9	120,000 / 3216	-	71.4:289
3-125 / 0.21-8.6	■			■	■	■	1808	Pilot	2	150 / 10.3	298,000 / 7986	-	71.4:1808
15-375 / 1.0-25.9	■			■	■	■	63EG-98HM	Pilot	2 to 6 and 8 x 6	450 / 31.0	4900 gpm / 18,547 l/min	17	71.4:63EG-98HM
2-375 / 0.14-25.9	■	■		■	■	■	98	Direct	1/4 to 2	400 / 27.6	240 gpm / 908 l/min	17	71.4:98
5 to 300 / 0.34 to 20.7	■			■	■	■	MR108	Direct	1, 2, 3, and 4	400 / 27.6	1460 gpm / 5530 l/min	16	71.4:MR108
2-125 / 0.14-8.6	■	■		■	■	■	SR8	Direct	1/2 to 3	210 / 14.5	5460 lbs/h / 2479 kg/h	-	71.4:SR8
10-400 / 0.69-27.6	■				■	■	63EG	Pilot	1 to 6 and 8 x 6	400 / 27.6	8,795,000 / 235,706	11	71.4:63EG
2"wc-5 / 5 mbar-0.34	■		■		■	■	66R	Direct	2, 3, and 4	8 / 0.55	115,000 / 3082	-	71.4:66
2"wc-7 / 5 mbar-0.48	■		■		■		Y695A	Direct	3/4 and 1	150 / 10.3	2470 / 66.2	15	74.2:Y695A
2"wc-7 / 5 mbar-0.48	■		■		■		Y696	Direct	1-1/2 and 2	15 / 1.0	13,100 / 351	-	74.2:Y696
0.5"wc-7 / 1 mbar-0.48	■		■		■		1290	Pilot	1, 2, 3, 4, 6, 8 x 6, and 12 x 6	12.5 / 0.86	327,400 / 8774	15	74.2:1290
3-60 / 0.21-4.1	■						119	Direct	3/4, 1, and 1-1/4	150 / 10.3	----	-	71.1:119
3-150 / 0.21-10.3	■						167D	Direct	1/4 and 1/2	400 / 27.6	----	-	71.7:167D
14-125 / 0.97-8.6	■						167DA	Direct	1/4 and 1/2	125 / 8.6	----	-	71.7:167D
2-150 / 0.14-10.3	■						168	Direct	1/4	150 / 10.3	----	-	71.7:168
0-5 / 0-0.35 vacuum	■		■		■		Y690VB	Direct	3/4 and 1	150 / 10.3	2910 / 78	19	71.3:Y690VB
1"wc-3 / 2 mbar-0.21	■		■		■		Y692VB	Direct	1-1/2 and 2	30 / 2.1	2500 / 67	-	71.3:Y692VB
0-12.8 / 0-0.88	■		■		■		Y695VR	Direct	3/4 and 1	Full Vacuum	1650 / 44.2	-	71.3:Y695VR
1"wc-3 / 2 mbar-0.21	■		■		■		Y696VR	Direct	1-1/2 and 2	Full Vacuum	6953 / 186	-	71.3:Y696VR

*Inlet/Outlet Pressure Range and Maximum Inlet Pressure are indicated as psig/bar or inches w.c./mbar.

This catalog is a brief overview of the Fisher® product line.
Please visit www.fisherregulators.com to view the entire Fisher offering.

Industrial Regulators
For Plant Utility Applications




Y690A
ACE 95
1290
Y695VR
EXIT
Instrument Purge
Vacuum Regulator
Glove Box
Vapor Recovery
Vacuum Pump
Vacuum Breaker
easy-e
Process Reactor
Tank Blanket
Y690VB
1098 EGR
Packaging Station
67DFR
Batch Reactor
Heat Exchanger
easy-e
92B
92S
Boiler
ABC Co.

Air

- **Compact**
- **Rugged Construction**
- **Integral Filters**
- **Wide Selection**
- **Built to Last**
- **Time-Proven Design**

Manufacturing and process plants use compressed air as a power supply for many devices within the plant. Plant air, also called shop air, is used for cooling and as a power source for pneumatic tools, sand blasters, sprayers, conveyors, robotics, and other mechanical tools. Instrument air is used to power instruments, such as controllers, positioners, switching valves, panel loaders, and volume boosters.

Plant air or shop air runs from compressor throughout the plant. Pressure reducing regulators control the pressure to devices at each point of use of the air line.

Instrument air can come from the plant air line, or they may be separate air lines throughout the plant. In either case, the air supplied to the instruments must be cleaned and dried before it enters the instruments. Filters and dryers remove dust, moisture, and other debris from the air.

Pressure Reducing

95 Series

Body Size	NPS 1/4, 1/2, 3/4, 1, 1-1/2, and 2 / DN 15, 20, 25, 40, and 50
Outlet Pressure Range	2 to 400 psig / 0.14 to 27.6 bar
Maximum Inlet Pressure	600 psig / 41.4 bar
Maximum Capacity	280,000 SCFH / 7504 Nm^3/h
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, Stainless Steel, Hastelloy® C, and Monel®
Bulletin No.	71.1:95

The 95 Series is a versatile, compact, high-capacity direct-operated regulator capable of solving the toughest pressure control applications. Typical applications include instrument air supply for large actuators, test fixtures, and general pneumatic supply. The regulator is available with differential pressure control, high temperature, and high-pressure optional constructions.

Pressure Reducing

67C Series

Body Size	NPS 1/4
Outlet Pressure Range	0 to 150 psig / 0 to 10.3 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	4350 SCFH / 117 Nm^3/h
Operation Method	Direct-Operated
Body Material	Aluminum and Stainless Steel
Bulletin No.	71.1:67C

The 67C Series is a compact, high accuracy instrument air regulator designed for use with today's digital valve controllers. The unit is available with a 5 or 40 micron filter for protection of the instrument being supplied. The Smart Bleed™ option and leak proof internal relief minimize loss of supply air improving system integrity. Other options include outlet gauge, high and low temperature, and panel mounting.

Pressure Reducing

1301 Series

Body Size	NPS 1/4
Outlet Pressure Range	10 to 500 psig / 0.69 to 34.5 bar
Maximum Inlet Pressure	6000 psig / 414 bar
Maximum Capacity	4500 SCFH / 121 Nm³/h
Operation Method	Direct-Operated
Body Material	Brass and Stainless Steel
Bulletin No.	71.1:1301

The 1301 Series regulators are high-pressure regulators designed to reduce supply pressure of instrument air supply regulators and pilots. The units have options for spring case with tapped vents and adjusting screw closing cap.

Pressure Reducing

627 Series

Body Size	NPS 3/4, 1, and 2 / DN 20, 25, and 50
Outlet Pressure Range	5 to 500 psig / 0.34 to 34.5 bar
Maximum Inlet Pressure	2000 psig / 138 bar
Maximum Capacity	162,000 SCFH / 4342 Nm³/h
Operation Method	Direct-Operated
Body Material	Ductile Iron, Steel, and Stainless Steel
Bulletin No.	71.1:627

The 627 Series direct-operated pressure reducing regulators are for low and high-pressure systems. Typical air applications include high-capacity air supply to large valve actuators.

Pressure Reducing

67D Series

Body Size	NPS 1/2 / DN 15
Outlet Pressure Range	0 to 150 psig / 0 to 10.3 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	20,900 SCFH / 560 Nm³/h
Operation Method	Direct-Operated
Body Material	Aluminum and Stainless Steel
Bulletin No.	71.1:67D

The 67D Series regulators are typically used to deliver constant reduced pressure of gaseous fluids to pilot-operated controllers and other pneumatic instrumentation.

Relief/Backpressure

63EG Series

Body Size	NPS 1, 2, 3, 4, 6, and 8 x 6 / DN 25, 50, 80, 100, 150, and 200 x 150
Outlet Pressure Range	10 to 400 psig / 0.69 to 27.6 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	8,795,000 SCFH / 235,706 Nm³/h
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Bulletin No.	71.4:63EG

The 63EG Series is a compact, fast response, high accuracy backpressure / relief valve which is suitable for gas or liquid service. The valve's design allows easy maintenance and is available with noise reducing trim.

Steam

- **High Turndown**
- **Rugged Construction**
- **Noise Reduction**
- **Low Maintenance**
- **Accurate**
- **Reliable**
- **Long Service Life**

Steam is used throughout industries for process and space heating. Within the process industries, steam is used in oil refineries; pulp and paper mills; chemical production, such as ethylene and ammonia; food and grain processing; and textiles.

Refineries and chemical plants use steam tracing to reduce pumping costs of viscous material and prevent freezing of process piping. Steam is used for heat exchangers and reactors to assist or create process chemical or thermal reactions. Paper mills utilize major steam generation systems to generate power and to dry paper products. Steam is widely used for district energy systems found in major municipalities and central plants of universities and hospitals.

To minimize piping cost, steam is generated and distributed at much higher pressures and temperatures than required by the process load. Fisher® regulators are utilized in these applications to reduce the steam pressure to a usable level and to accurately maintain process fluid temperatures.

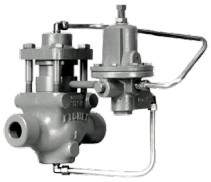
Pressure Reducing

Type 92B

Body Size	NPS 1, 1-1/2, 2, 3, and 4 / DN 25, 40, 50, 80, and 100
Outlet Pressure Range	2 to 250 psig / 0.14 to 17.2 bar
Maximum Inlet Pressure	300 psig / 20.7 bar
Maximum Temp Capacity	600°F / 316°C*
Maximum Capacity	42,400 lbs/h / 19,234 kg/h
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Bulletin No.	71.2:92B

The Type 92B regulator is ideal for use as a main Pressure Reducing Valve in industrial process heating applications such as heat exchangers, evaporators, digesters, and reactors. Commercial applications include district energy systems and hot water heat exchangers.

Pressure Reducing



Type 92S

Body Size	NPS 1, 1-1/2, 2, 2-1/2, 3, 4, and 6 × 4 / DN 25, 40, 50, 65, 80, 100, and 150 x 100
Outlet Pressure Range	2 to 250 psig / 0.14 to 17.2 bar
Maximum Inlet Pressure	300 psig / 20.7 bar
Maximum Temp Capacity	650°F / 343°C*
Maximum Capacity	45,100 lbs/h / 20,457 kg/h
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Bulletin No.	71.2:92S

The Type 92S regulator is piston actuated for high cycle steam service with hardened trim for improved durability. This valve should be used with clear, dry, or superheated steam. Noise reduction trim is available.

**Maximum temperature limitation may vary according to body and construction materials. Please refer to the product Bulletin or local Sales Office for further information.*

Pressure Reducing

Type SR5

Body Size	NPS 1/2, 3/4, 1, 1-1/2 x 1, 1-1/2, 2, and 3 / DN 15,20, 25, 40 x 25, 40, 50, and 80
Outlet Pressure Range	2 to 135 psig / 0.14 to 9.3 bar
Maximum Inlet Pressure	210 psig / 14.5 bar
Maximum Temp Capacity	400°F / 204°C*
Maximum Capacity	6820 lbs/h / 3096 kg/h
Operation Method	Direct-Operated
Body Material	316L Stainless Steel, 20 µin / 0.5 µm Ra
Bulletin No.	71.1:SR5

The Type SR5 regulator is a compact, large capacity, direct-operated pressure reducing regulator. It is designed for use in applications where a sanitary design is essential, such as pharmaceutical, biotech, or food and beverage industries. A backpressure regulator is also available in Type SR8.

Pressure Reducing

Type 92C

Body Size	NPS 1/2, 3/4, and 1 / DN 15, 20, and 25
Outlet Pressure Range	5 to 250 psig / 0.34 to 17.2 bar
Maximum Inlet Pressure	300 psig / 20.7 bar
Maximum Temp Capacity	650°F / 343°C*
Maximum Capacity	3600 lbs/h / 1633 kg/h
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Bulletin No.	71.2:92C

The Type 92C regulator is an economical cast iron, steel, or stainless steel pilot-operated pressure reducing used in steam, liquid, or hot air service. Its compact design and high-capacity make it ideal for packaged skid systems.

Pressure Reducing

95 Series

Body Size	NPS 1/4, 1/2, 3/4, 1, 1-1/2, and 2 / DN 15, 20, 25, 40, and 50
Outlet Pressure Range	2 to 400 psig / 0.14 to 27.6 bar
Maximum Inlet Pressure	600 psig / 41.4 bar
Maximum Temp Capacity	650°F / 343°C*
Maximum Capacity	12,000 lbs/h / 5443 kg/h
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, Stainless Steel, Hastelloy® C, and Monel®
Bulletin No.	71.1:95

The 95 Series is a versatile, compact, high-capacity direct-operated regulator capable of the toughest pressure control applications. Typical applications include fuel oil steam atomization, superheated steam, boiler feed water, steam tracing, and sterilizers.

Relief/Backpressure

98 Series

Body Size	NPS 1/4, 1/2, 3/4, 1, 1-1/2, and 2 / DN 15, 20, 25, 40, and 50
Relief Pressure Range	2 to 375 psig / 0.14 to 25.9 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Temp Capacity	450°F / 232°C*
Maximum Capacity	6750 lbs/h / 3062 kg/h
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, Stainless Steel, Hastelloy® C, and Monel®
Bulletin No.	71.4:98

The 98 Series is used in a variety of steam backpressure/relief applications, such as power generation, heating and cooling systems, and process system. The unit is available with differential pressure control and high-pressure optional constructions.

**Maximum temperature limitation may vary according to body and construction materials. Please refer to the product Bulletin or local Sales Office for further information.*

Tank Blanketing

- Fully Balanced System
- High-Capacity
- High Sensitivity
- Tight Shutoff
- Low Setpoints
- In-line Maintenance
- Broad Material Selection

Tank Blanketing, or padding, is the process and practice of covering the surface of a stored commodity, usually a liquid, with an inert gas. If that commodity is volatile or toxic, tank blanketing can prevent it from harming workers, equipment, and the environment. When the commodity is a food or other substance, blanketing protects it from oxidation or contamination through exposure to air or moisture. In most cases, tank blanketing gas is pure, dry nitrogen.

Blanketing can prevent liquids from vaporizing into the atmosphere and can maintain the tank's vapor space above a flammable or combustible liquid to reduce potential ignition while pumping. It can make up the volume of liquid displaced in or out of a tank, or it can make up volume caused by thermal changes of the tank's contents, preventing the creation of a vacuum or excess operating pressure that could damage the tank.

Vapor recovery systems are mainly used to prevent toxic vapors from escaping into the atmosphere. When adding liquid to the tank or when the outside temperature rises, causing the vapor inside the tank to expand, the vapor recovery system senses the increase in tank pressure and vents the excessive tank pressure to a vapor recovery system.

Tank Blanketing

ACE95 Series

Body Size	NPS 3/4, 1, 1 x 2, and 2 / DN 20, 25, 25 x 50, and 50
Control Pressure Range	-5-inch w.c. to 1.5 psig / -12 mbar to 0.10 bar
Maximum Inlet Pressure	200 psig / 13.8 bar
Body Orientation	In-line or Angle
Flow up to	499,600 SCFH / 13,390 Nm^3/h of Nitrogen
Operation Method	Pilot-Operated
Body Material	Stainless Steel
Bulletin No.	74.1:ACE95

The ACE95 Series is ideal for accurate pressure control on low-pressure blanketing systems. The oversized actuator offers high sensitivity to changes in tank pressure and high accuracy to pressure control. The ACE97 Series utilizes a single pilot to control both the tank blanketing and vapor recovery minimizing the issues with overlapping setpoints.

Tank Blanketing

Y690A Series

Body Size	NPS 3/4 and 1 / DN 20 and 25
Control Pressure Range	1-inch w.c. to 7 psig / 2 mbar to 0.48 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Flow up to	6067 SCFH / 163 Nm^3/h of Nitrogen
Operation Method	Direct-Operated
Body Material	Ductile Iron and Stainless Steel
Bulletin No.	74.1:Y690A

The Y690A Series is a compact tank blanketing regulator ideal for blanketing small tanks and vessels. The unit is easy to install and to maintain.

For larger applications, the Type Y692 is available in NPS 1-1/2 and 2 / DN 40 and 50 sizes.

Tank Blanketing

Type Y693

Body Size	NPS 1-1/2 and 2 / DN 40 and 50
Control Pressure Range	0.5-inch w.c. to 10 psig / 1 mbar to 0.69 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Flow up to	26,700 SCFH / 716 Nm^3/h of Nitrogen
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Bulletin No.	74.1:Y693

The Type Y693 utilizes a balanced trim design and large diaphragm area to provide the accuracy of a pilot-operated regulator in a direct-operated design. The design also provides minimal hysteresis and low inlet pressure sensitivity.

Tank Blanketing

Type 1190

Body Size	NPS 1, 2, 3, 4, 6, 8 x 6, and 12 x 6 / DN 25, 50, 80, 100, 150, 200 x 150, and 300 x 150
Control Pressure Range	0.25-inch w.c. to 7 psig / 0.6 mbar to 0.48 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Flow up to	2,811,000 SCFH / 75,335 Nm^3/h of Nitrogen
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Bulletin No.	74.1:1190

The Type 1190 provides very accurate pressure control on low-pressure blanketing systems. The regulator helps to control emissions and provides protection against any contamination from atmospheric conditions.

Vapor Recovery

Type Y695A

Body Size	NPS 3/4 and 1 DN 20 and 25
Control Pressure Range	2-inches w.c. to 7 psig / 5 mbar to 0.48 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Flow up to	2470 SCFH / 66.2 Nm^3/h of Nitrogen
Operation Method	Direct-Operated
Body Material	Ductile Iron, Stainless Steel, and Hastelloy® C
Bulletin No.	74.2:Y695A

The Type Y695A is ideal for small vapor recovery systems. The unit may also be utilized as a backpressure or relief valve. A larger NPS 1-1/2 and 2 DN 40 and 50 units are available in the Type Y696.

Tank Blanketing

Type Y692

Body Size	NPS 1-1/2 and 2 / DN 40 and 50
Control Pressure Range	1-inch w.c. to 10 psig / 2 mbar to 0.69 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Body Orientation	In-line or Angle
Flow up to	19,820 SCFH / 531 Nm^3/h of Nitrogen
Operation Method	Direct-Operated
Body Material	Cast Iron, WCC Steel, and Stainless Steel
Bulletin No.	74.1:Y692

The Type Y692 is a direct-operated regulator used for accurate pressure control on very low-pressure blanketing systems. The downstream pressure is sensed directly by the diaphragm through the pitot tube providing quick response. Large diaphragm areas provide more precise control even at low-pressure settings and the pilot tube also creates a dynamic boost that helps provide greater capacity.

Vapor Recovery

Type 1290

Body Size	NPS 1, 2, 3, 4, 6, 8 x 6, 12 x 6 / DN 25, 50, 80, 100, 150, 200 x 150, and 300 x 150
Control Pressure Range	0.5-inch w.c. to 7 psig / 1 mbar to 0.48 bar
Maximum Inlet Pressure	12.5 psig / 0.86 bar
Flow up to	327,400 SCFH / 8774 Nm^3/h of Nitrogen
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Bulletin No.	74.2:1290

The Type 1290 vapor recovery valve is a very accurate high-capacity which monitors the tank vapor pressure and opens when the tank pressure increases above the desired setpoint. The unit is ideal for use with vapor recovery systems because it is not affected by changes in pressure of the recovery system.

Liquid

- **Highest Quality Construction**
- **Best Product Selection**
- **Large Turndown Ratios**
- **Excellent Fluid Capability**
- **Quick and Easy Maintenance**
- **Application Experience**

Any substance that is capable of flowing or of being poured is known as a liquid. One of the most common liquids that we come in contact with on a daily basis is water. Other liquids include detergents, paints, aqueous chemicals, fuels, and oil.

Liquids differ from gases as they are incompressible and viscous. Because of these characteristics, special consideration must be given when selecting a regulator. All regulator parts that touch the fluid must be compatible with the fluid. The regulator design may require modifications or special materials.

Pressure Reducing

Type MR105

Body Size	NPS 1, 2, 3, and 4 / DN 25, 50, 80, and 100
Outlet Pressure Range	5 to 300 psig / 0.34 to 20.7 bar
Maximum Inlet Pressure	400 psig / 276 bar
Maximum Capacity	1650 gpm / 6240 l/min
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Maximum Temp Capability	250°F / 121°C*
Bulletin No.	71.1:MR105

The Type MR105 is fast-response, high-capacity, direct-operated multi-purpose regulator designed to handle different applications and flow media. It is available in linear and quick opening trim cages and is designed to meet API 614 as required by lube oil manufacturers.

Relief/Backpressure

Type MR108

Body Size	NPS 1, 2, 3, and 4 / DN 25, 50, 80, and 100
Backpressure Control Range	5 to 300 psig / 0.34 to 20.7 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	1460 gpm / 5530 l/min
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, and Stainless Steel
Maximum Temp Capability	250°F / 121°C*
Bulletin No.	71.4:MR108

The Type MR108 regulators are direct-operated, backpressure, high-capacity, multi-purpose regulators. It provides a simple, reliable, and economical backpressure control in multi-purpose applications suitable for different flow media including liquid, air, and gas. Applications include lube oil systems and any application where speed of response is critical, minimum differential pressure is a requirement, or fluid is not free of impurities.

Pressure Reducing

Type 1098-EGR

Body Size	NPS 1, 2, 3, 4, 6, 8 x 6, and 12 x 6 / DN 25, 50, 80, 100, 150, 200 x 150, and 300 x 150
Outlet Pressure Range	4 inches w.c. to 300 psig / 10 mbar to 20.7 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	11,934 gpm / 45,170 l/min
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, Stainless Steel
Bulletin No.	71.2:1098-EGR

The Type 1098 regulators are capable of providing accurate, fast response, and high-capacities in low-pressure drop systems. Typical applications include: inert gas and plant air headers.

**Maximum temperature limitation may vary according to body and construction materials. Please refer to the product Bulletin or local Sales Office for further information.*

Pressure Reducing

Type 92W

Body Size	NPS 1, 1-1/2, 2, 2-1/2, 3, and 4 / DN 25, 40, 50, 65, 80, and 100
Outlet Pressure Range	2 to 250 psig / 0.14 to 17.2 bar
Maximum Inlet Pressure	300 psig / 20.7 bar
Maximum Capacity	960 gpm / 3720 l/min
Operation Method	Pilot-Operated
Body Material	Cast Iron and Steel
Bulletin No.	71.2:92W

The Type 92W regulator is piston actuated for high cycle liquid service. The design utilizes hardened stainless steel trim for durability.

Relief/Backpressure

Type 63EG-98HM

Body Size	NPS 2, 3, 4, 6, and 8 × 6 / DN 50, 80, 100, 150 and 200 x 150
Relief Pressure Range	15 to 375 psig / 1.0 to 25.9 bar
Maximum Inlet Pressure	450 psig / 31.0 bar
Maximum Capacity	4900 gpm / 18,547 l/min
Operation Method	Pilot-Operated
Body Material	Steel, Stainless Steel, Hastelloy® C, Monel®, and Alloy 20
Bulletin No.	71.4: 63EG-98HM

The Type 63EG-98HM is a compact, fast response, high accuracy relief valve/backpressure which is suitable for gas or liquid service. The valve's design makes it ideal for pump recirculation especially in skid packages where space is limited. Available constructions include units suitable for sea water applications.

Pressure Reducing

95 Series

Body Size	NPS 1/4, 1/2, 3/4, 1, 1-1/2, and 2 / DN 15, 20, 25, 40, and 50
Outlet Pressure Range	2 to 400 psig / 0.14 to 27.6 bar
Maximum Inlet Pressure	600 psig / 41.4 bar
Maximum Capacity	290 gpm / 1098 l/min
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, Stainless Steel, Hastelloy® C, and Monel®
Bulletin No.	71.1:95

The 95 Series is a versatile, compact, high-capacity direct-operated regulator capable of solving the toughest pressure control applications. Typical applications include fuel oil steam atomization, sea water, fire water systems, and boiler feed water. The regulator is available with differential pressure control, high temperature, and high-pressure optional constructions.

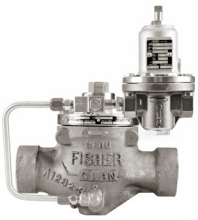
Relief/Backpressure

98 Series

Body Size	NPS 1/4, 1/2, 3/4, 1, 1-1/2, and 2 / DN 15, 20, 25, 40, and 50
Relief Pressure Range	2 to 375 psig / 0.14 to 25.9 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	240 gpm / 908 l/min
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, Stainless Steel, Hastelloy® C, and Monel®
Bulletin No.	71.4:98

The 98 Series is used in a variety of liquid relief/backpressure applications, such as pump recirculation, lube oil skids, heating and cooling systems, and process system. The unit is available with a remote control line, differential pressure control and high-pressure optional constructions.

Pressure Reducing



Type LR125

Body Size	NPS 1, 2, 3, 4 / DN 25, 50, 80, and 100
Outlet Pressure Range	15 to 150 psig / 1 to 10.3 bar
Maximum Inlet Pressure	300 psig / 20.7 bar
Maximum Capacity	2052 gpm / 7769 l/min
Operation Method	Pilot-Operated
Body Material	WCC Steel, CF8M or CF3M Stainless Steel
Maximum Temp Capacity	250°F / 121°C*
Bulletin No.	71.2:LR125

The Type LR125 pilot-operated, pressure reducing regulator is designed for liquid industrial/commercial applications. The Type LR125 provides smooth operation, tight shutoff and long life, even in dirty service. Its internally actuated metal plug eliminates disadvantages associated with boot-style regulators, and the specially engineered flow path deflects debris, protecting the seat from damage and erosion. The Type LR125 is used in conjunction with a Type 95H pilot and Type 112 restrictor. An internal inlet strainer prevents large particles from entering the main valve, limiting damage to internal parts.

**Maximum temperature limitation may vary according to body and construction materials. Please refer to the product Bulletin or local Sales Office for further information.*

Pressure Reducing

Type 75A

Body Size	NPS 1/2, 3/4, 1, 1-1/2, 2, and 2-1/2 / DN 15, 20, 25, 40, 50, and 65
Outlet Pressure Range	20 to 80 psig / 1.4 to 5.5 bar
Maximum Inlet Pressure	200 psig / 13.8 bar
Maximum Capacity	260 gpm / 984 l/min
Operation Method	Direct-Operated
Body Material	Bronze
Maximum Temp Capacity	150°F / 66°C*
Bulletin No.	71.1:75A

The 75A regulator is designed to reduce domestic or industrial water pressure, thus protecting plumbing fixtures and meters from high pressure surges. Type 75A is self-contained, requiring no external control line for operation. Downstream pressure is directly registered under the diaphragm. As the downstream pressure increases, the diaphragm force overcomes the spring compression, causes the valve disk to rise, and reduces flow through the regulator.

Process Gas

- **Fully Balanced System**
- **High-Capacity**
- **High Sensitivity**
- **Tight Shutoff**
- **Low Setpoints**
- **In-line Maintenance**
- **Broad Material Selection**

Gases are used in chemical and industrial processes, such as analytical instrumentation, environmental compliance, electronic manufacturing, chemical production, reference gases, and medical uses. All the devices in these systems must be compatible to prevent complications, such as corrosion, unwanted chemical reactions, ignition, or explosion. Also, some of these process systems operate at very high or very low temperatures. Regulators must be constructed to withstand these temperatures.

The regulators and relief/backpressure regulators covered in this section are available in materials that are chemically compatible with most process gases. The products shown in the Air, Liquids, and Sanitary sections may also be used in your system if the materials are compatible.

Pressure Reducing

Type 1098-EGR

Body Size	NPS 1, 2, 3, 4, 6, 8 x 6, and 12 x 6 / DN 25, 50, 80, 100, 150, 200 x 150, 300 x150
Outlet Pressure Range	4 inches w.c. to 300 psig / 10 mbar to 20.7 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	11,331,000 SCFH / 303,671 Nm^3/h
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, Stainless Steel
Bulletin No.	71.2:1098-EGR

The Type 1098 regulators are capable of providing accurate, fast response, and high-capacities in low-pressure drop systems. Typical applications include: inert gas and plant air headers.

Relief/Backpressure

98 Series

Body Size	NPS 1/4, 1/2, 3/4, 1, 1-1/2, and 2 / DN 15, 20, 25, 40, and 50
Relief Pressure Range	2 to 375 psig / 0.14 to 25.9 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	157,000 SCFH / 4208 Nm^3/h
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, Stainless Steel, Hastelloy® C, and Monel®
Bulletin No.	71.4:98

The 98 Series is used in a variety of process gas backpressure and relief applications including corrosive gases and cryogenic applications. The unit is available with a remote control line, differential pressure control and high-pressure optional constructions.

Pressure Reducing

95 Series

Body Size	NPS 1/4, 1/2, 3/4, 1, 1-1/2, and 2 / DN 15, 20, 25, 40, and 50
Outlet Pressure Range	2 to 400 psig / 0.14 to 27.6 bar
Maximum Inlet Pressure	600 psig / 41.4 bar
Maximum Capacity	288,000 SCFH / 7504 Nm^3/h
Operation Method	Direct-Operated
Body Material	Cast Iron, Steel, Stainless Steel, Hastelloy® C, and Monel®
Bulletin No.	71.1:95

The 95 Series is a versatile, compact, high-capacity direct-operated regulator capable of solving the toughest pressure control applications. Possible applications include oxygen systems, inert gas systems, and corrosive gas service. The regulator is available with cryogenic materials, differential pressure control, high temperature, and high-pressure optional constructions.

Relief/Backpressure

Type Y695A

Body Size	NPS 3/4 and 1 / DN 20 and 25
Control Pressure Range	2-inches w.c. to 7 psig / 5 mbar to 0.48 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Maximum Capacity	2470 SCFH / 66.2 Nm^3/h
Operation Method	Direct-Operated
Body Material	Ductile Iron, Stainless Steel, and Hastelloy® C
Bulletin No.	74.2:Y695A

The Type Y695A is ideal for relief or backpressure applications in small systems. The unit may also be utilized as a vapor recovery valve. A larger NPS 1-1/2 and 2 / DN 40 and 50 unit is available in the Type Y696.

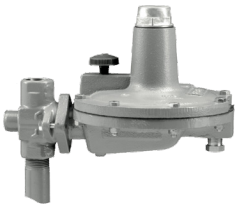
Pressure Reducing

Y690A Series

Body Size	NPS 3/4 and 1 / DN 20 and 25
Control Pressure Range	1-inch w.c. to 7 psig / 2 mbar to 0.48 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Maximum Capacity	7688 SCFH / 206 Nm^3/h
Operation Method	Direct-Operated
Body Material	Ductile Iron, Stainless Steel, and Hastelloy® C
Bulletin No.	71.1:Y690A

The Y690A Series is a compact regulator idea for accurate control of low-pressure systems. The unit is easy to install and maintain. For larger applications the Type Y692 is available in NPS 1-1/2 and 2 / DN 40 and 50 sizes.

Vacuum Breaker



Y690VB Series

Body Size	NPS 3/4 and 1 / DN 20 and 25
Control Pressure Range	0 to 5 psig vacuum / 0 to 0.35 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Maximum Capacity	2910 SCFH / 78 Nm^3/h
Operation Method	Direct-Operated
Body Material	Ductile Iron, Stainless Steel, and Hastelloy® C
Bulletin No.	71.3:Y690VB

The Y690VB Series vacuum breaker provides accurate vacuum protection with its large diaphragm area. An external registration option is available for systems requiring a control line. The Y692VB Series is available for larger systems needing a NPS 1-1/2 or 2 / DN 40 or 50 unit. For Vacuum Regulator applications, the Y695VR and Y696VR Series are available.

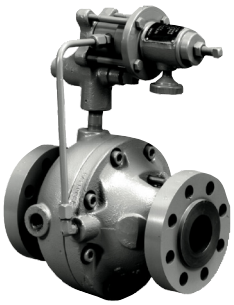
Fuel Gas

- **High speed response**
- **High-Capacity**
- **Flexibility**
- **Control Accuracy**
- **Easy Maintenance**
- **Safe Operation**

Natural gas (methane) is a clean-burning fuel gas used for many residential, commercial, and industrial applications. This colorless, naturally occurring gas can be found in many countries around the world.

For industrial applications, natural gas is used as a feedstock for making chemicals, such as anhydrous ammonia, and as a fuel for boilers and furnaces.

Pressure Reducing



Type 310A

Body Size	NPS 1, 2, 3, 4, and 4 x 6 / DN 25, 50, 80, 100, and 100 x 150
Outlet Pressure Range	10 to 700 psig / 0.69 to 48.3 bar
Maximum Inlet Pressure	1500 psig / 103 bar
Maximum Capacity	21,170,000 SCFH / 567,356 Nm^3/h
Operation Method	Pilot-Operated
Body Material	WCC Steel
Bulletin No.	71.2:310A

The Type 310A pilot-operated high-pressure regulator is used where high-capacity , fast response, and accurate control are essential. Typical applications include turbine startup and power plant fuel supply.

Pressure Reducing

Type EZR

Body Size	NPS 1, 1-1/4 x 1, 2 x 1, 2, 3, 4, 6, and 8 / DN 25, 32 x 25, 50 x 25, 50, 80, 100, 150, and 200
Outlet Pressure Range	6-inches w.c. to 1000 psig / 15 mbar to 69.0 bar
Maximum Inlet Pressure	1500 psig / 103 bar
Maximum Capacity	26,138,000 SCFH / 700,498 Nm^3/h
Operation Method	Pilot-Operated
Body Material	Cast Iron and WCC or LCC Steel
Bulletin No.	71.2:EZR

The Type EZR pilot-operated, pressure reducing regulator is designed for natural gas transmission/distribution systems and industrial/commercial applications. The Type EZR provides smooth, quiet operation, and tight shutoff.

Pressure Reducing

Y600A Series

Body Size	NPS 3/4 and 1 / DN 20 and 1
Outlet Pressure Range	4-inches w.c. to 7 psig / 10 mbar to 0.48 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Maximum Capacity	6660 SCFH / 178 Nm^3/h of Natural Gas
Operation Method	Direct-Operated
Body Material	Cast Iron
Bulletin No.	71.1:Y600A

Y600A Series direct-operated, spring-loaded regulators provide economical pressure-reducing control for a variety of residential, commercial, and industrial applications. The large diaphragm area provides more accurate control at low-pressure settings. The pitot tube of regulators also creates a dynamic boost that helps provide greater capacity.

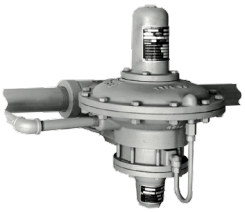
Pressure Reducing

Type 1098-EGR

Body Size	NPS 1, 2, 3, 4, 6, 8 x 6, and 12 x 6 / DN 25, 50, 80, 100, 150, 200 x 150, and 300 x 150
Outlet Pressure Range	4 inches w.c. to 300 psig / 10 mbar to 20.7 bar
Maximum Inlet Pressure	400 psig / 27.6 bar
Maximum Capacity	11,331,000 SCFH / 303,671 Nm^3/h
Operation Method	Pilot-Operated
Body Material	Cast Iron, Steel, Stainless Steel
Bulletin No.	71.2:1098-EGR

The Type 1098 regulators are capable of providing accurate, fast response and high-capacities in low-pressure drop systems. Typical applications include: natural gas distribution systems; fuel gas supply to industrial boilers, furnaces, ovens, and mixers; and large commercial/industrial establishments.

Pressure Reducing

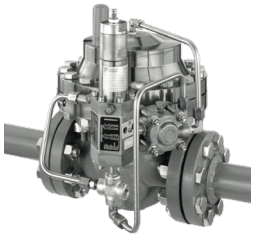


Type 99

Body Size	NPS 2 / DN 50
Outlet Pressure Range	2-inches w.c. to 100 psig / 5 mbar to 6.9 bar
Maximum Inlet Pressure	1000 psig / 69.0 bar
Maximum Capacity	265,000 SCFH / 7102 Nm^3/h
Operation Method	Pilot-Operated
Body Material	Cast Iron and Steel
Bulletin No.	71.2:99

The Type 99 regulator is ideal for systems requiring accurate pressure control and fast response. Typical applications include fuel supply to industrial boiler, gas engines, furnaces, ovens, industrial burners, and dryers.

Pressure Reducing



EZH and EZHSO Series

Body Size	NPS 1, 2, 3, and 4 / DN 25, 50, 80, and 100
Outlet Pressure Range	14.5 to 1160 psig / 1 to 80.0 bar
Maximum Inlet Pressure	1500 psig / 103 bar
Maximum Capacity	13,833,000 SCFH / 370,724 Nm^3/h
Operation Method	Pilot-Operated
Body Material	Steel
Bulletin No.	71.2:EZH and EZHSO

The EZH and EZHSO Series regulators are accurate pilot-operated, pressure balanced, and soft seated regulators. They are designed for use in large capacity distribution systems and power plant feeds. They provide smooth, reliable operation, tight shutoff, and long life.

Pressure Reducing

133 Series

Body Size	NPS 2 / DN 50
Outlet Pressure Range	2-inches w.c. to 60 psig / 5 mbar to 4.1 bar
Maximum Inlet Pressure	150 psig / 10.3 bar
Maximum Capacity	170,000 SCFH / 4556 Nm^3/h
Operation Method	Direct-Operated
Body Material	Cast Iron and Steel
Bulletin No.	71.1:133

The 133 Series is a high-capacity regulator with fast response ideal for snap-acting boiler applications. The nit's balanced trim design enables the regulator to provide accurate control of gas pressure for maximum combustion efficiency despite varying inlet pressure conditions.

Regulator Tips

All regulators should be installed and used in accordance with federal, state, and local codes and regulations.

PRESSURE

- 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.
- When a regulator appears unable to pass the published flow rate, be sure to check the inlet pressure measured at the regulator body inlet connection. Piping up to and away from regulators can cause significant flowing pressure losses.
- When adjusting setpoint, the regulator should be flowing at least five percent of the normal operating flow.
- 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.
- A disk with a cookie cut appearance probably means you had an overpressure situation. Thus, investigate further.

SPEED OF RESPONSE AND ACCURACY

- If two or more available springs have published pressure ranges that include the desired pressure setting, use the spring with the lower range for better accuracy.
- Direct-operated regulators generally have faster response to quick flow changes than pilot-operated regulators.
- Speed of regulator response, in order:
  - Direct-operated
  - Two-path pilot-operated
  - Unloading pilot-operated
  - Control valve

Note: Although direct-operated regulators give the fastest response, all types provide quick response.

- The full advertised range of a spring can be utilized without sacrificing performance or spring life.

SIZING

- 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.
- Do not oversize regulators. Pick the smallest orifice size or regulator that will work. Keep in mind when sizing a station that most restricted trims that do not reduce the main port size do not help with improved low flow control.
- 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.
- Do not undersize the monitor set. It is important to realize that the monitor regulator, even though it is wide-open, will require pressure drop for flow. Using two identical regulators in a monitor set will yield approximately 70 percent of the capacity of a single regulator.

TEMPERATURE

- Most regulators shown in this handbook are generally suitable for temperatures to 180°F / 82°C. With high temperature Fluorocarbon (FKM) (if available), the regulators can be used for temperatures to 300°F / 149°C. Check the temperature capabilities to determine materials and temperature ranges available. Use stainless steel diaphragms and seats for higher temperatures, such as steam service.
- For every 15 psid / 1.0 bar, differential pressure differential across the regulator, expect approximately one degree drop in gas temperature due to the natural refrigeration effect. Freezing is often a problem when the ambient temperature is between 30°F / -1°C and 45°F / 7°C.

Regulator Tips (continued)

INSTALLATION

- 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.
- Use control lines of equal or greater size than the control tap on the regulator. If a long control line is required, make it bigger. A rule of thumb is to use the next nominal pipe size for every 20 feet / 6.1 meters of control line. Small control lines cause a delayed response of the regulator, leading to increased chance of instability. 3/8-Inch OD tubing is the minimum recommended control line size.
- When using relief valves, be sure to remember that the reseat point is lower than the start-to-bubble point. To avoid seepage, keep the relief valve setpoint far enough above the regulator setpoint.
- 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.
- When installing a working monitor station, get as much volume between the two regulators as possible. This will give the upstream regulator more room to control intermediate pressure.

For more Regulator Tips, turn to page 664 of the Industrial Application Guide Edition VI or log-on to www.fisherregulators.com

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