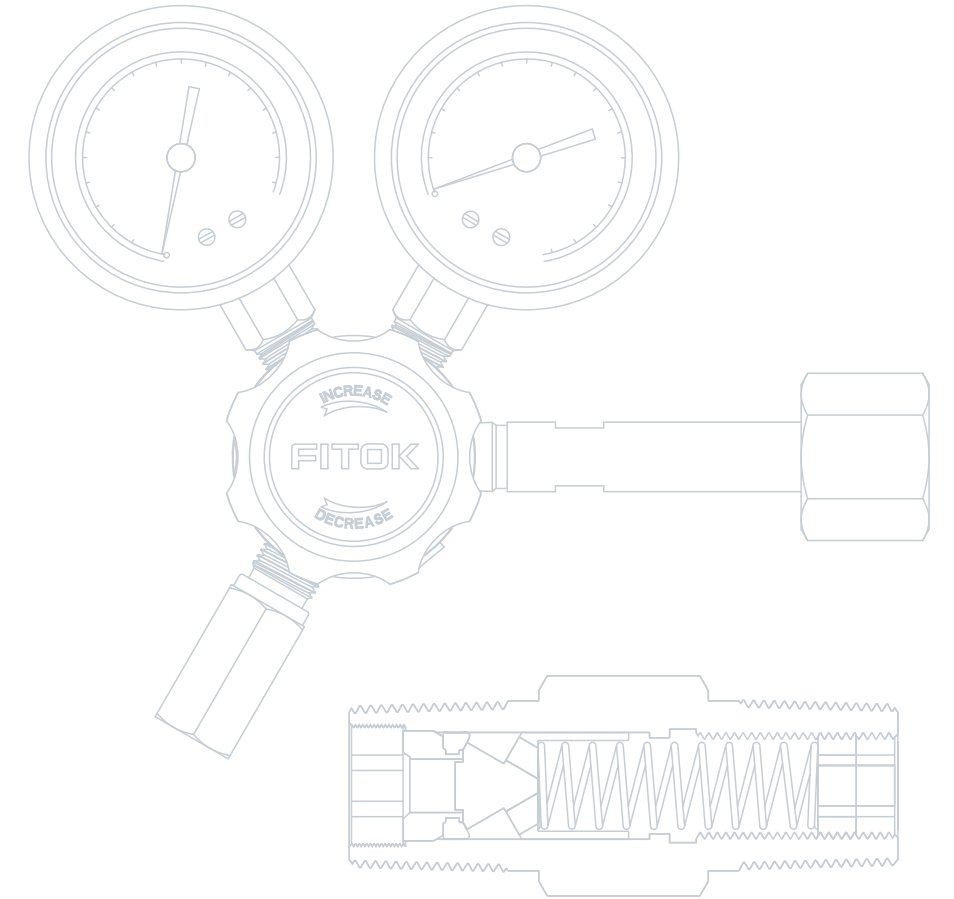
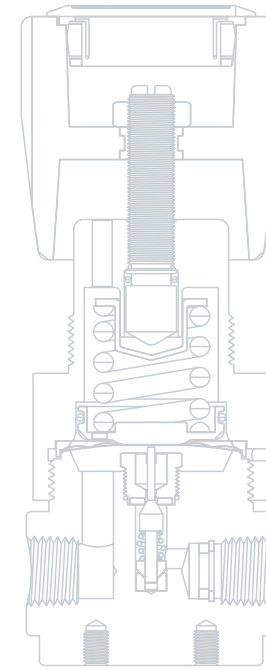


Full Technical Catalog For Specialty Gas Application



# FITOK

Valves and Fittings

Full Technical Catalog  
For Specialty Gas Application

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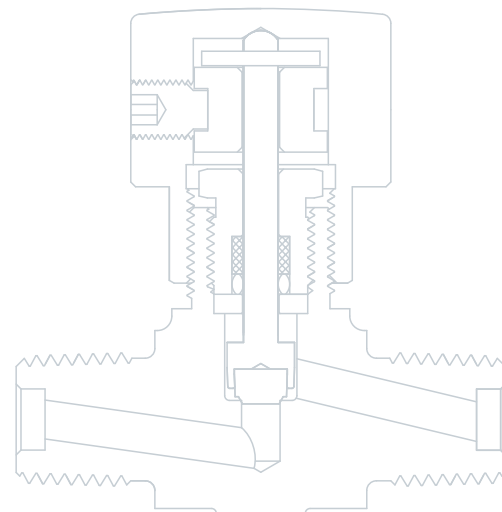
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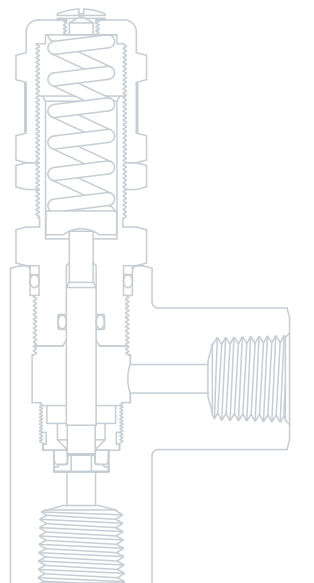
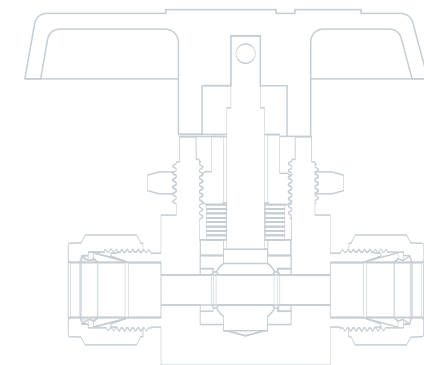
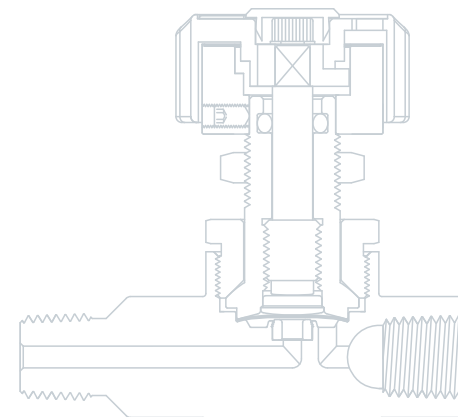
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**FITOK**  
Valves and Fittings



FITOK Full Technical Catalog  
For Specialty Gas Application

Cylinder Pressure Regulators



Line Pressure Regulators



Diaphragm Valves



Ball Valves



Needle Valves



Point-of-use Panels



Check Valves



Relief Valves



Filters



Pressure Control Panels



Purge Assemblies



Fittings



Cylinder Connections



A

Gas Control Equipments

B

Other Applicable Products

C

Technical References

A

Gas Control Equipments





# Contents

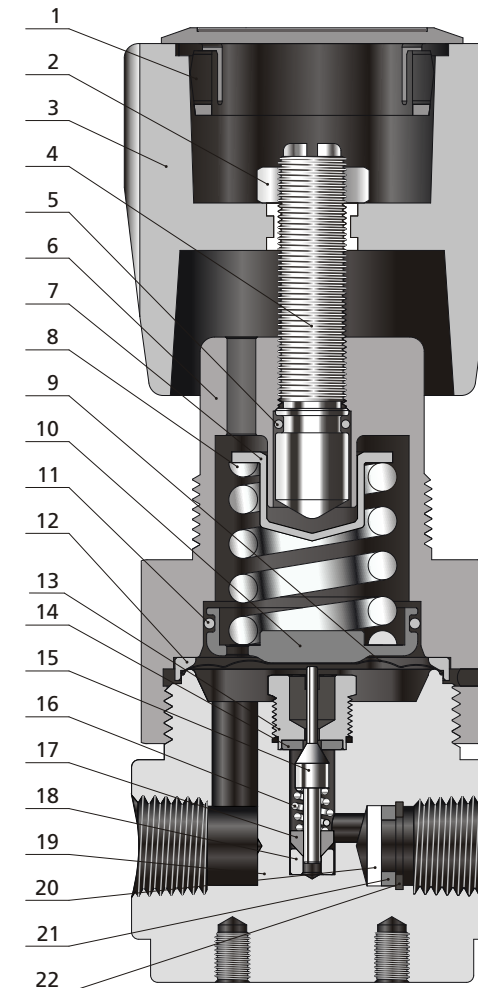
General Introduction	A-03
<b>Cylinder Pressure Regulators</b>	
FCR-1 Series General Diaphragm Regulator	A-08
FCR-1S Series Sensitive Diaphragm Regulator	A-11
FCR-2 Series High Pressure Piston Regulator	A-14
FCR-1D Series Dual-stage Diaphragm Regulator	A-17
<b>Line Pressure Regulators</b>	
FLR-1 Series Compact Diaphragm Regulator	A-20
FLR-2 Series Piston Regulator	A-23
FLR-3 Series Medium Flow Diaphragm Regulator	A-26
<b>Pressure Control Panels</b>	
FSR-1 Series Pressure Control Panel for Single Cylinder	A-29
FSR-2 Series High Pressure Control Panel for Single Cylinder	A-32
<b>Changeover System</b>	
FDR-1 Manual Changeover System (up to 500 psig)	A-35
FDR-2 Manual Changeover System (up to 2500 psig)	A-38
FDR-1L Series Automatic Changeover System without Line Pressure Regulator	A-41
FDR-1T Series Automatic Changeover System with Line Pressure Regulator	A-45
<b>Point-of-use Panels</b>	
FPR-1 Series Compact Regulator for Low Pressure	A-49
FPR-1S Series Sensitive Regulator for Low Pressure	A-52
<b>Back Pressure Regulators</b>	
BPR-1 Series Back Pressure Diaphragm Regulator	A-55
BPR-2 Series Back Pressure Piston Regulator	A-59

# General Introduction

## Construction

### Diaphragm Regulator

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	
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/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	S17400/A564
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	Retainer-ring	PTFE/ASTM D1710
22	Stretch block	316L SS

### Features

- ⦿ Convoluted diaphragm to provide accurate pressure adjustment
- ⦿ Metal-to-metal diaphragm seal
- ⦿ Spring loaded
- ⦿ With 316L SS filter installed at inlet
- ⦿ Choice of sealing material depending on the gas specifications and its purity requirements
- ⦿ Better protection against burst and corrosion can be achieved by using Hastelloy as diaphragm material
- ⦿ Low leak rates  
Internal:  $\leq 1 \times 10^{-7}$  mbar-l/s Helium  
External:  $\leq 1 \times 10^{-9}$  mbar-l/s Helium

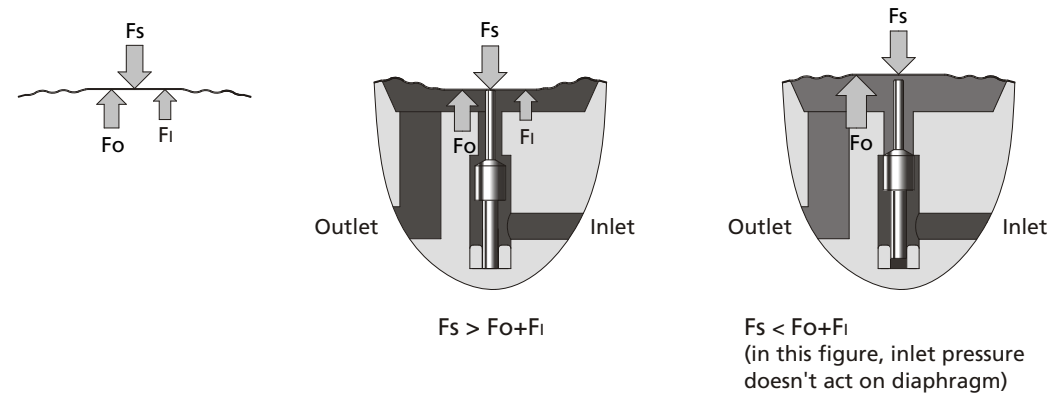
Gas Control Equipments  
Other Applicable Products  
Technical References

Gas Control Equipments  
Other Applicable Products  
Technical References

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

When the outlet pressure ( $F_o$ ) 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 thus to increase the outlet pressure.

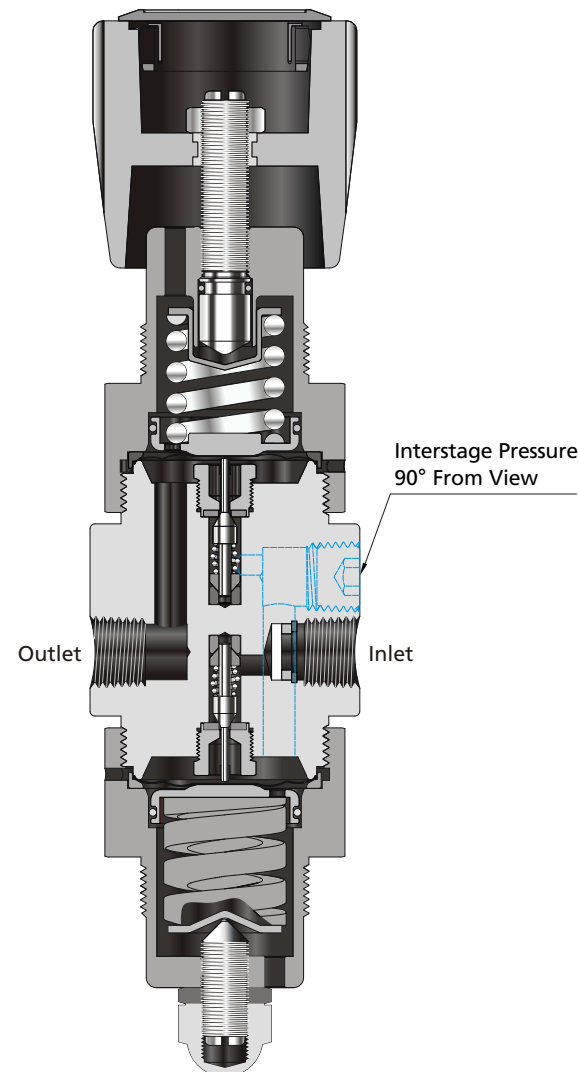
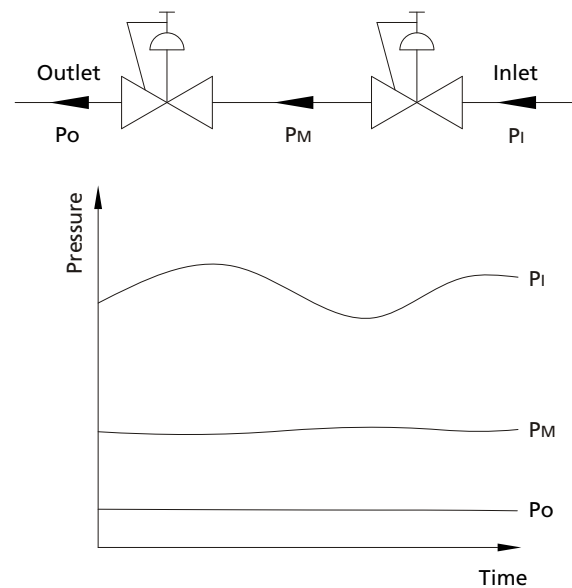
As soon as the outlet pressure ( $F_o$ ) exceeds the set pressure, the excess upstream force shall lift the poppet back to the seat to prevent the gas from entering.



### Dual-stage Diaphragm Regulators

When the inlet pressure ( $F_i$ ) decreases, the outlet pressure ( $F_o$ ) shall increase. Even if this increasement may not be significant, The dual-stage regulator may be a better option when more stable pressure required, and the upstream pressure fluctuates violently.

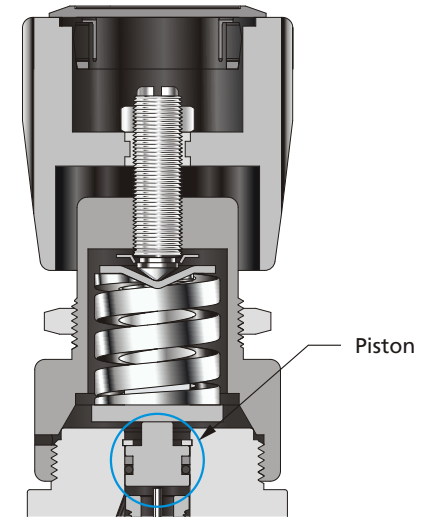
The function of a dual-stage regulator is similar to that of two single-stage regulators in series. The 1st-stage regulator would reduce the inlet pressure to an intermediate level for the 2nd-stage regulator to adjust to a constant output, which at the most extent ensures the stability of the outlet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



### Piston Regulator

Although diaphragm regulators have many advantages such as its precision, sealing effect, cleanliness and etc., in order to ensure its 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-ring to fulfill the various requirements of different media.



### Series of Products

#### Cylinder Pressure Regulators (FCR)

Cylinder regulators are designed to reduce the pressure of the cylinders to lower levels. The regulator is connected to the cylinder mostly 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 System(FDR)

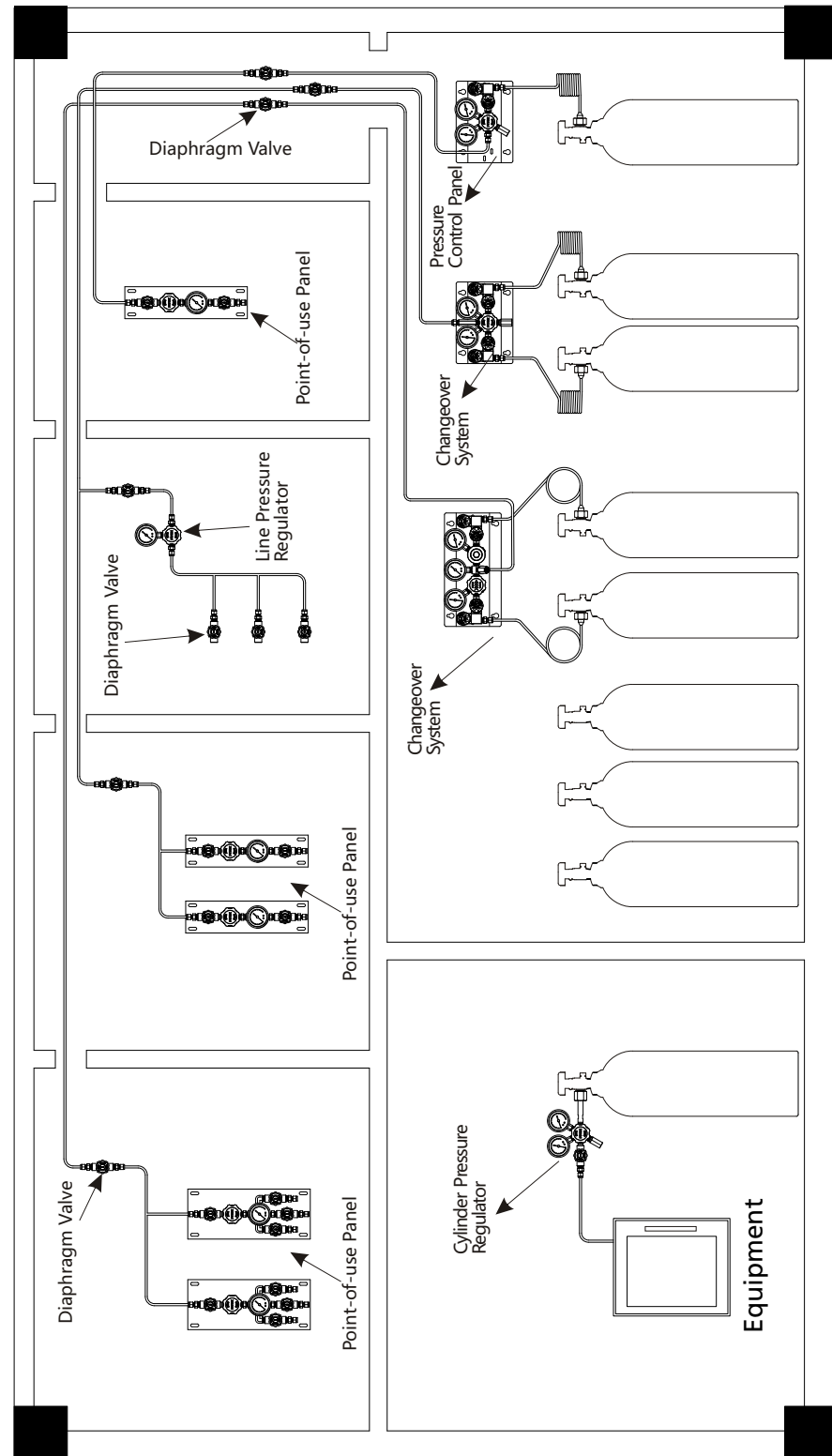
Manual changeover system can connect with several independent gas sources at a time. When one gas source is depleted, it could be switched to other source quickly through a shut-off valve. Automatic changeover system is installed onto gas pipelines which need continuous gas supply. It can connect with two independent gas sources at a time. When gas source from one side is depleted, it can automatically switch to the gas source from the other side. Subsequently, replace 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
Materials	Brass	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Stainless Steel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	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	✓	✓		✓	✓		✓	✓		✓			✓	✓	✓	✓	
	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			✓							✓		✓					
	Page NO.		A-08	A-11	A-14	A-17	A-20	A-23	A-26	A-29	A-32	A-35	A-38	A-41	A-44	A-47	A-50	A-53

# Cylinder Pressure Regulators

## FCR-1 Series General Diaphragm Regulator

### Features

- Metal to metal seal to ensure minimum external leak
- Convoluted diaphragm design to improve regulation precision and cycle life
- Applicable to corrosive or toxic gases
- With special cleaning and packaging, applicable to oxygen-enriched environments
- Adjustable relief pressure
- 20 µm filter installed at inlet

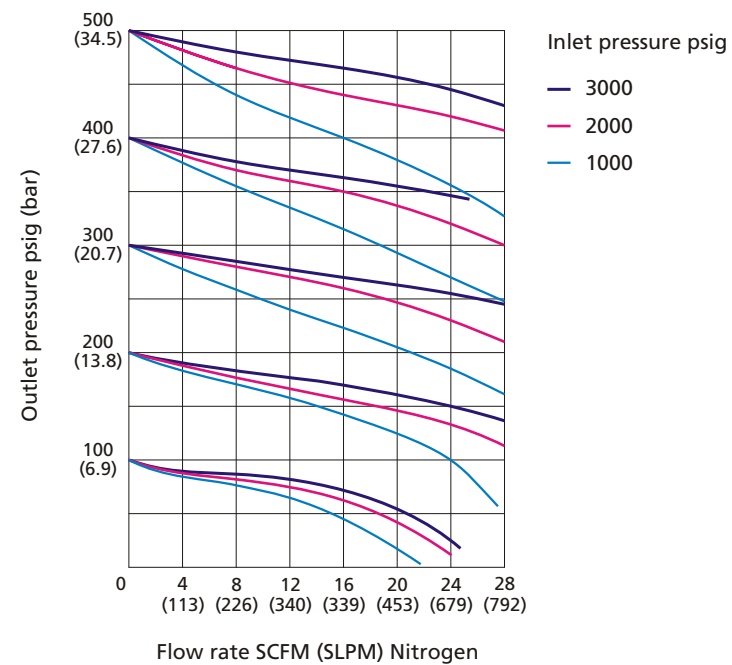


Model: FCR-16L-30-100-C330-B-B-00-R-P

### Technical Data

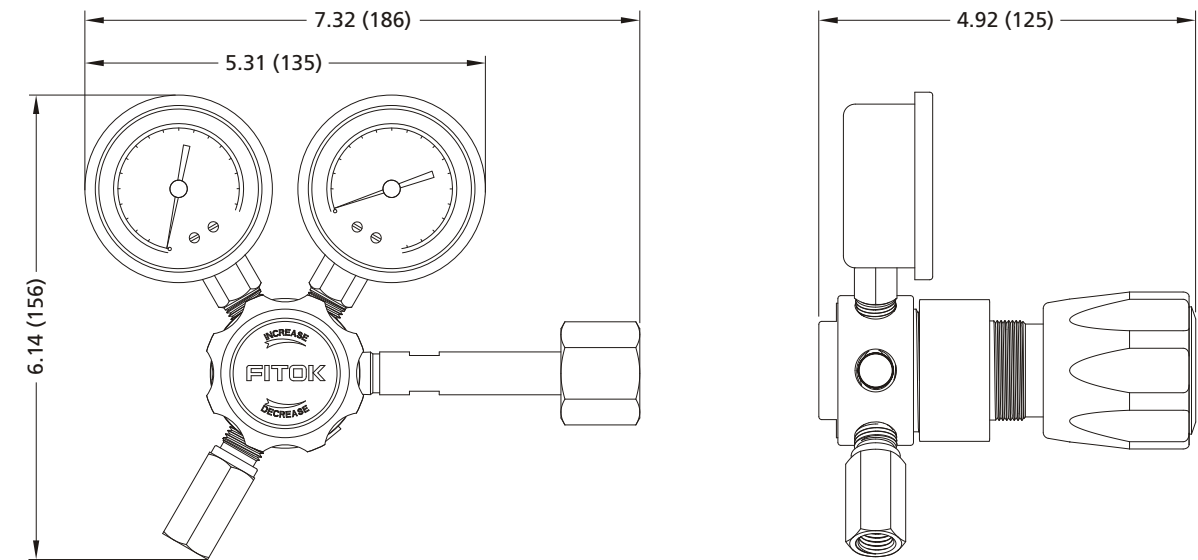
- Single-stage regulator
- Maximum inlet pressure: 3000 or 4500 psig
- Outlet pressure range: 0~25, 0~50, 0~100, 0~250 or 0~500 psig
- Materials of the internal components:
  - Seat: PCTFE
  - Diaphragm: Hastelloy
  - Filter: 316L
- Temperature: -40°F~+165°F (-40°C~+74°C)
- Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- Flow coefficient (Cv): 0.06
- Weight (regulator only):  $\approx 1.98$  lbs (0.9 kg)
- Body ports: 1/4" female NPT for inlet, outlet, gauge and relief valve

### Flow Chart

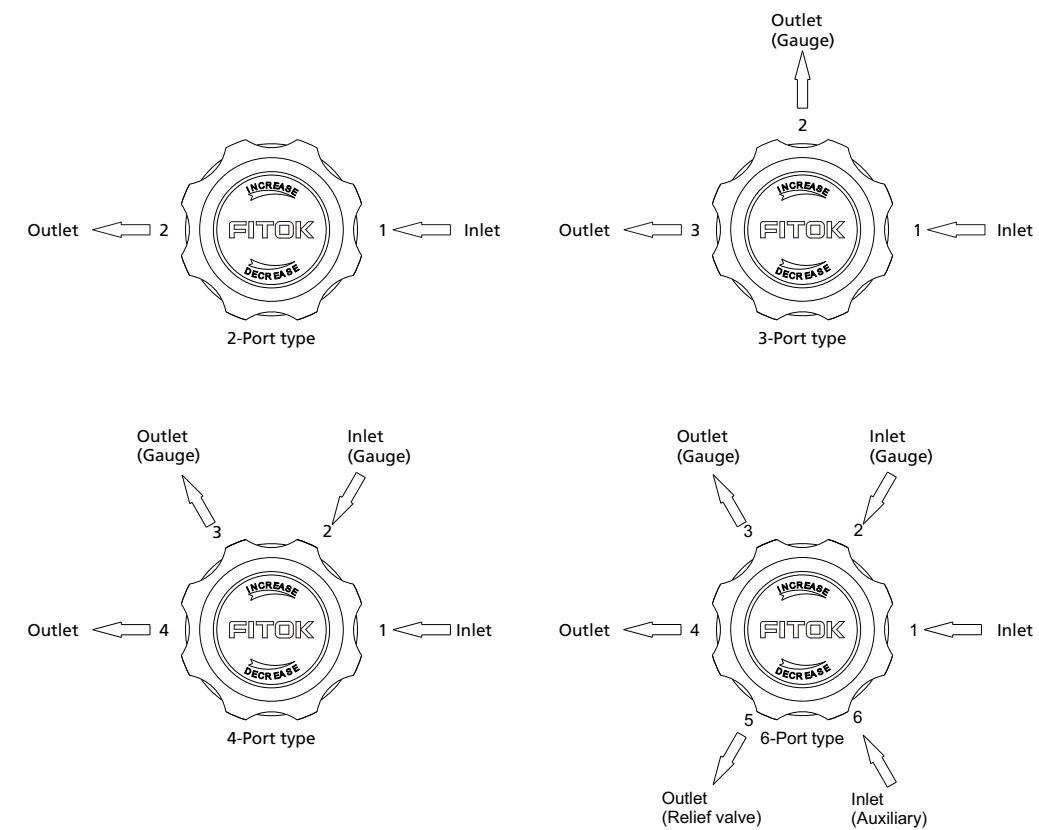


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



### Porting Configurations





### Part Number Description

FCR - 16L - 30 - 100 - C580 - M - M - 32 - R - P

Body Material	Connection 1	Connection 2	Connection 4	Connection 6
6L 316L SS	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	Same as Connection 5
SS 316 SS	C_ _ _ CGA Number (USA)	M With Gauge (MPa)	01 1/4" NPT (Male)	
A22 Hastelloy C-22	DIN_ DIN Number (Germany)	P Plug	10 1/4" Tube Fitting	Connection 5
B Brass (Nickel-plated)	Refer to pg.B-28 for cylinder connections, according to the specific gas type. Cylinder connections compliant to other standards are upon request. Please contact FITOK for detail.	Others refer to Connection 4	11 3/8" Tube Fitting	R Relief Valve
Inlet Pressure P1		Connection 3	20 6 mm Tube Fitting	P Plug
30 3000 psig		Same as Connection 2	21 8 mm Tube Fitting	00 1/4" NPT (Female)
45 4500 psig			30 Diaphragm Valve with 1/4" NPT (Female)	
Outlet Pressure Range P2			31 Diaphragm Valve with 1/4" NPT (Male)	
25 0~25 psig			32 Diaphragm Valve with 1/4" Tube Fitting	
50 0~50 psig			33 Diaphragm Valve with 3/8" Tube Fitting	
100 0~100 psig			34 Diaphragm Valve with 6 mm Tube Fitting	
250 0~250 psig			35 Diaphragm Valve with 8 mm Tube Fitting	
500 0~500 psig			Other connections are available upon requests	

Note: Most configurations are available.

Examples for part number description:

- a. 2-port type (1 in, 1 out): FCR-16L-45-100-C580-00
- b. 3-port type (1 in, 2 out): FCR-1SS-30-500-C330-B-00
- c. 4-port type (2 in, 2 out): FCR-1B-45-250-00-B-B-34

## Cylinder Pressure Regulators

### FCR-1S Series Sensitive Diaphragm Regulator

#### Features

- ⦿ Large diameter convoluted diaphragm to ensure extreme sensitiveness and minimum pressure drop
- ⦿ Metal to metal seal
- ⦿ 316L SS and Nickel-plated Brass available for valve body, Nickel-plated Brass for bonnet
- ⦿ Die spring for stable outlet pressure
- ⦿ 20 µm filter installed at inlet

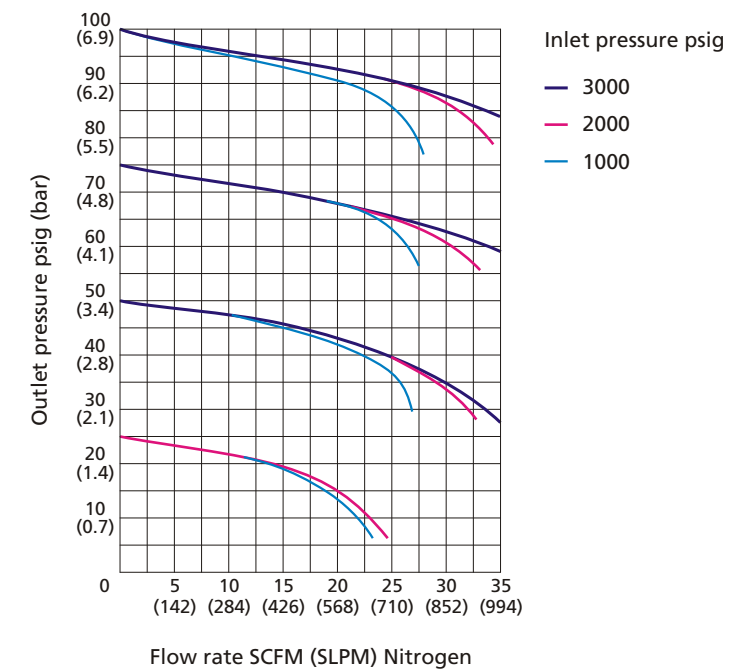


Model: FCR-1S6L-30-50-C580-B-B-00-R-P

#### Technical Data

- ⦿ Single-stage regulator
- ⦿ Maximum inlet pressure: 3000 or 4500 psig
- ⦿ Outlet pressure range: 0~25, 0~50, 0~100, 0~150 or 0~200 psig
- ⦿ Materials of the internal components:
  - Seat: PCTFE
  - Diaphragm: 316L
  - Filter: 316L
- ⦿ Temperature: -40°F~+165°F (-40°C~+74°C)
- ⦿ Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- ⦿ Flow coefficient (Cv): 0.06
- ⦿ Weight (regulator only):  $\approx 2.87$  lbs (1.3 kg)
- ⦿ Body ports: 1/4" female NPT for inlet, outlet, gauge and relief valve

#### Flow Chart

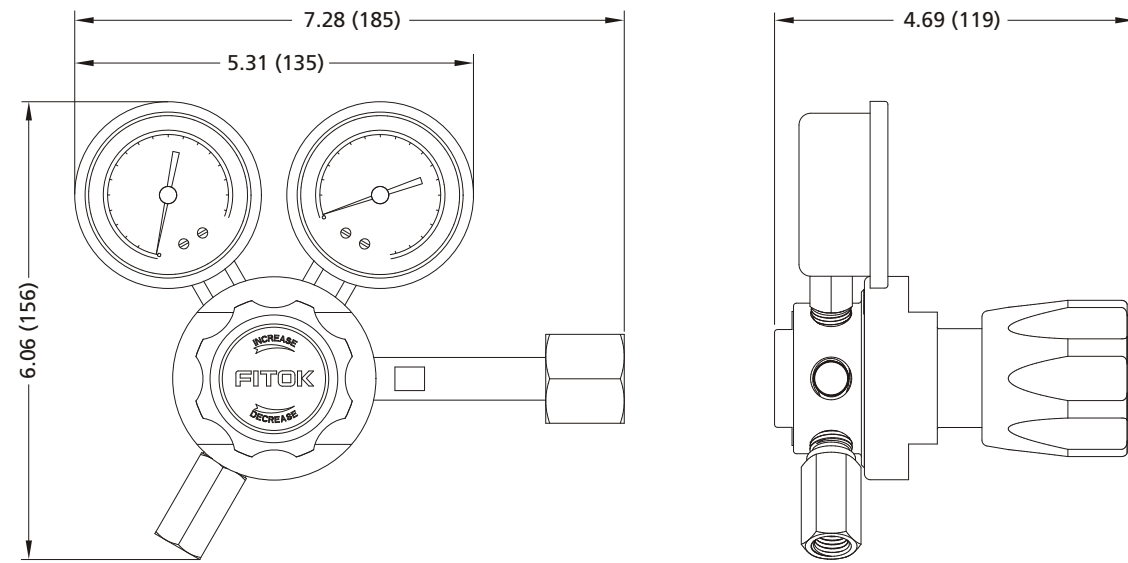


Gas Control Equipments  
Other Applicable Products  
Technical References

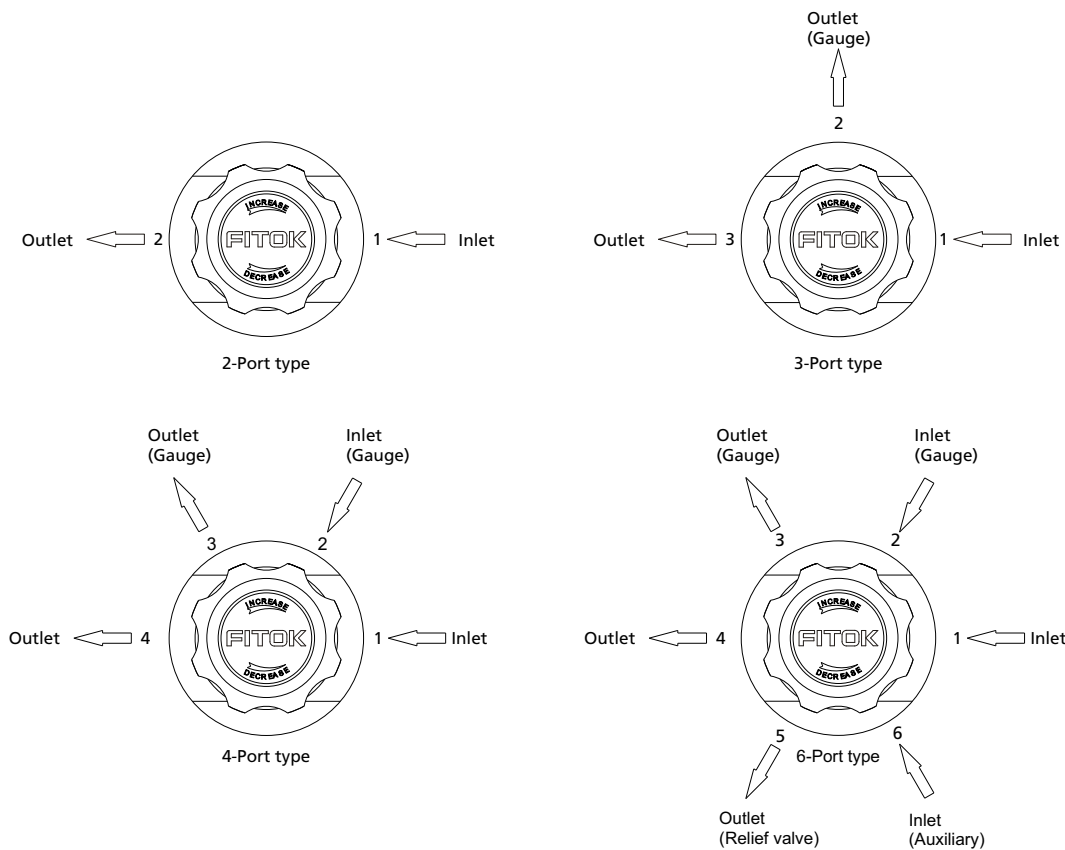
Gas Control Equipments  
Other Applicable Products  
Technical References

### Dimensions

Dimensions, in inches (millimeters), are for reference only.



### Porting Configurations



### Part Number Description

FCR - 1S6L - 30 - 50 - DIN1 - M - M - 30 - R - P				
<b>Body Material</b>	<b>Connection 1</b>	<b>Connection 2</b>	<b>Connection 4</b>	<b>Connection 6</b>
6L 316L SS	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	Same as Connection 5
B Brass (Nickel-plated)	C_ CGA Number (USA)	M With Gauge (MPa)	01 1/4" NPT (Male)	
	DIN_ DIN Number (Germany)	P Plug	10 1/4" Tube Fitting	<b>Connection 5</b>
	Refer to pg.B-28 for cylinder connections, according to the specific gas type. Cylinder connections compliant to other standards are upon request. Please contact FITOK for detail.	Others refer to Connection 4	11 3/8" Tube Fitting	R Relief Valve
<b>Inlet Pressure P1</b>		<b>Connection 3</b>	20 6 mm Tube Fitting	P Plug
30 3000 psig		Same as Connection 2	21 8 mm Tube Fitting	00 1/4" NPT (Female)
45 4500 psig			30 Diaphragm Valve with 1/4" NPT (Female)	
			31 Diaphragm Valve with 1/4" NPT (Male)	
<b>Outlet Pressure Range P2</b>			32 Diaphragm Valve with 1/4" Tube Fitting	
25 0~25 psig			33 Diaphragm Valve with 3/8" Tube Fitting	
50 0~50 psig			34 Diaphragm Valve with 6 mm Tube Fitting	
100 0~100 psig			35 Diaphragm Valve with 8 mm Tube Fitting	
150 0~150 psig			Other connections are available upon requests	
200 0~200 psig				

Note: Most configurations are available.

Examples for part number description:

- a. 2-port type (1 in, 1 out): FCR-1S6L-45-25-C580-00
- b. 3-port type (1 in, 2 out): FCR-1SB-30-150-C330-B-00
- c. 4-port type (2 in, 2 out): FCR-1SB-45-200-00-00-00

# Cylinder Pressure Regulators

## FCR-2 Series High Pressure Piston Regulator

### Features

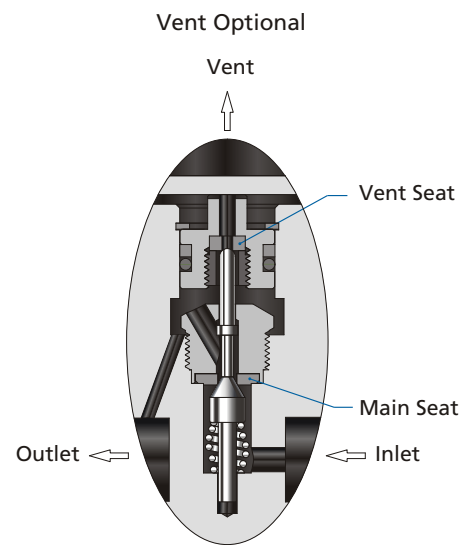
- For high pressure system
- Robust piston-sensed design to provide safety and reliability
- 316L SS or Nickel-plated Brass body optional
- For non-corrosive gases (due to seal limit)
- Optional venting model
- 20 µm filter installed at inlet



Model: FCR-26L-45-750-DIN8-B-B-00-P-P

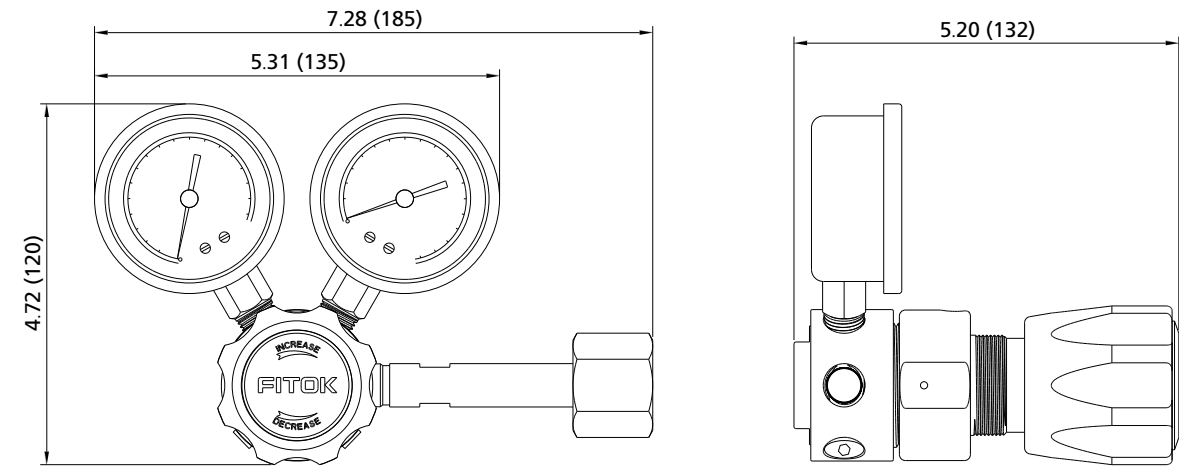
### Technical Data

- Single-stage regulator
- Maximum inlet pressure: 4500 or 6000 psig
- Outlet pressure range: 0~750, 0~1500 or 0~2500 psig
- Materials of the internal components:
  - Seat: PCTFE
  - Piston: 316L
  - O-ring: Viton or Kalrez
  - Filter: 316L
- Temperature: -15°F~+165°F (-26°C~+74°C)
- Leak rates:
  - Internal: Bubble-tight
  - External: Bubble-tight
- Flow coefficient(Cv):
  - Without vent: 0.06
  - Vent: 0.1
- Weight (regulator only): ≈ 1.98 lbs (0.9 kg)
- Body ports: 1/4" female NPT for inlet, outlet and gauge

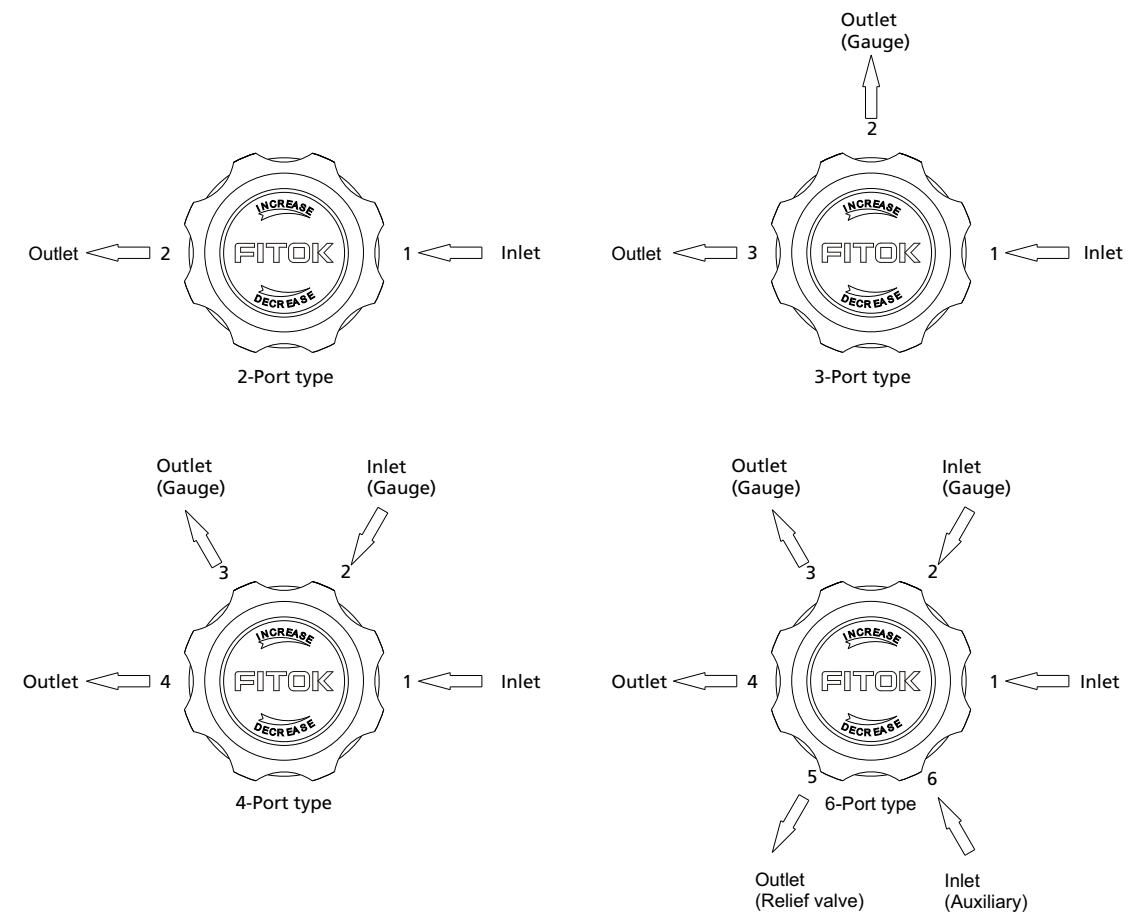


### Dimensions

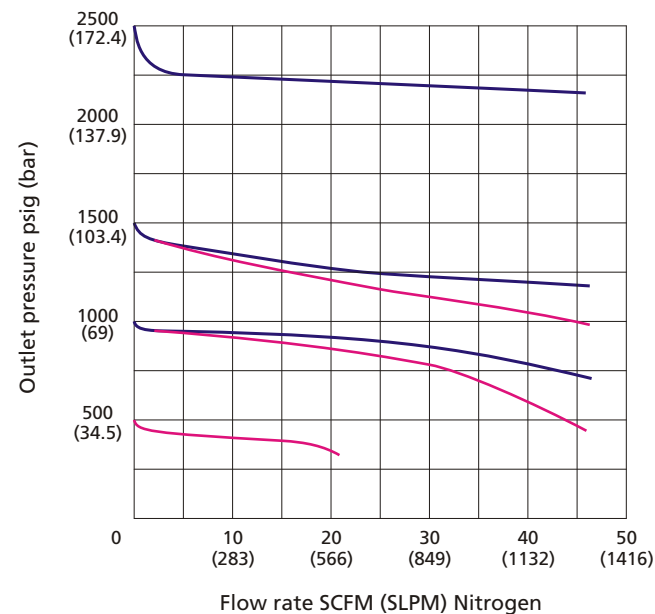
Dimensions, in inches (millimeters), are for reference only.



### Porting Configurations



### Flow Chart



### Part Number Description

FCR - 2V Z 6L - 45 - 750 - DIN6 - M - M - 00 - P - P		
<b>Vent Option</b>	<b>Inlet Pressure P1</b>	
Without	45 4500 psig	
V With	60 6000 psig	
<b>O-ring Material</b>	<b>Outlet Pressure Range P2</b>	
Viton	750 0~750 psig	
Z Kalrez	1500 0~1500 psig	
	2500 0~2500 psig	
<b>Body Material</b>	<b>Connection 1</b>	
6L 316L SS	00 1/4" NPT (Female)	
SS 316 SS	C_ CGA Number (USA)	
B Brass (Nickel-plated)	DIN_ DIN Number (Germany)	
	Refer to pg.B-28 for cylinder connections, according to the specific gas type. Cylinder connections compliant to other standards are upon request. Please contact FITOK for detail.	
	<b>Connection 2</b>	<b>Connection 4</b>
	B With Gauge (psi/bar)	00 1/4" NPT (Female)
	M With Gauge (MPa)	01 1/4" NPT (Male)
	P Plug	10 1/4" Tube Fitting
	Others refer to Connection 4	11 3/8" Tube Fitting
	<b>Connection 3</b>	20 6 mm Tube Fitting
	Same as Connection 2	21 8 mm Tube Fitting
		30 Diaphragm Valve with 1/4" NPT (Female)
		31 Diaphragm Valve with 1/4" NPT (Male)
		32 Diaphragm Valve with 1/4" Tube Fitting
		33 Diaphragm Valve with 3/8" Tube Fitting
		34 Diaphragm Valve with 6 mm Tube Fitting
		35 Diaphragm Valve with 8 mm Tube Fitting
		Other connections are available upon requests
	<b>Connection 5</b>	<b>Connection 6</b>
	P Plug	Same as Connection 5
	00 1/4" NPT (Female)	

Note: Most configurations are available.

Examples for part number description:

- a. 2-port type (1 in, 1 out): FCR-26L-45-1500-C580-00
- b. 3-port type (1 in, 2 out): FCR-2VB-45-750-C660-00-00
- c. 4-port type (2 in, 2 out): FCR-2VZSS-60-2500-00-B-B-32

## Cylinder Pressure Regulators

### FCR-1D Series Dual-stage Diaphragm Regulator

#### Features

- ⦿ Compact design
- ⦿ Dual-stage pressure reducing construction to provide more accurate and stable pressure
- ⦿ 20µm filter installed at inlet
- ⦿ With special cleaning and packaging, applicable to oxygen-enriched environments

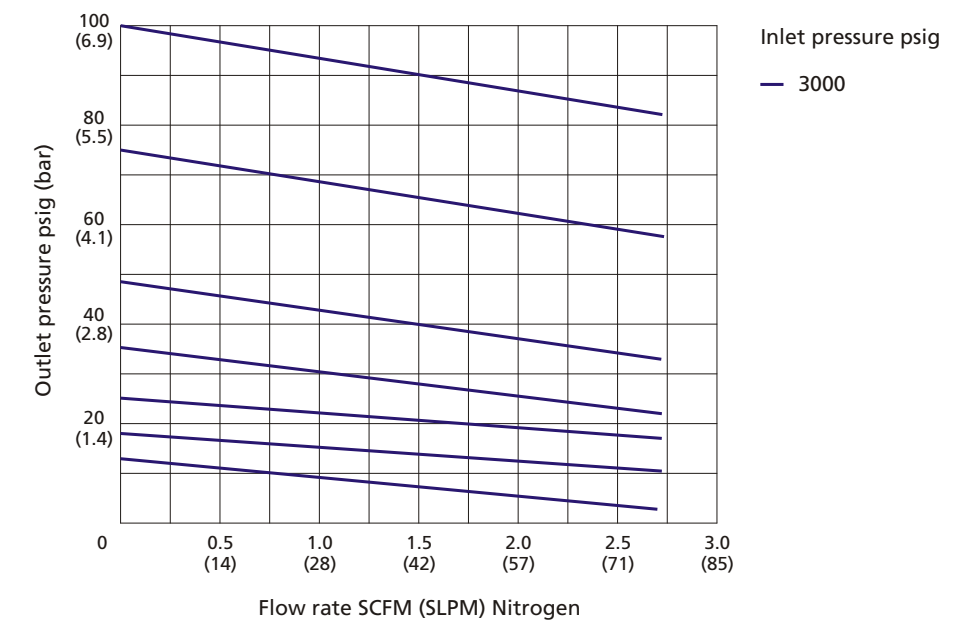
#### Technical Data

- ⦿ Maximum inlet pressure: 3000 or 4500 psig
- ⦿ Outlet pressure range: 0~25, 0~50, 0~100, 0~150 or 0~250 psig
- ⦿ Materials of the internal components:
  - Seat: PCTFE
  - Diaphragm: Hastelloy
  - Filter: 316L
- ⦿ Temperature: -40°F~+165°F (-40°C~+74°C)
- ⦿ Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- ⦿ Flow coefficient (Cv): 0.05
- ⦿ Weight (regulator only):  $\approx 3.3$  lbs (1.5 kg)
- ⦿ Body ports: 1/4" female NPT for inlet, outlet, gauge and relief valve



Model: FCR-1D6L-30-100-C660-B-B-00-R-P

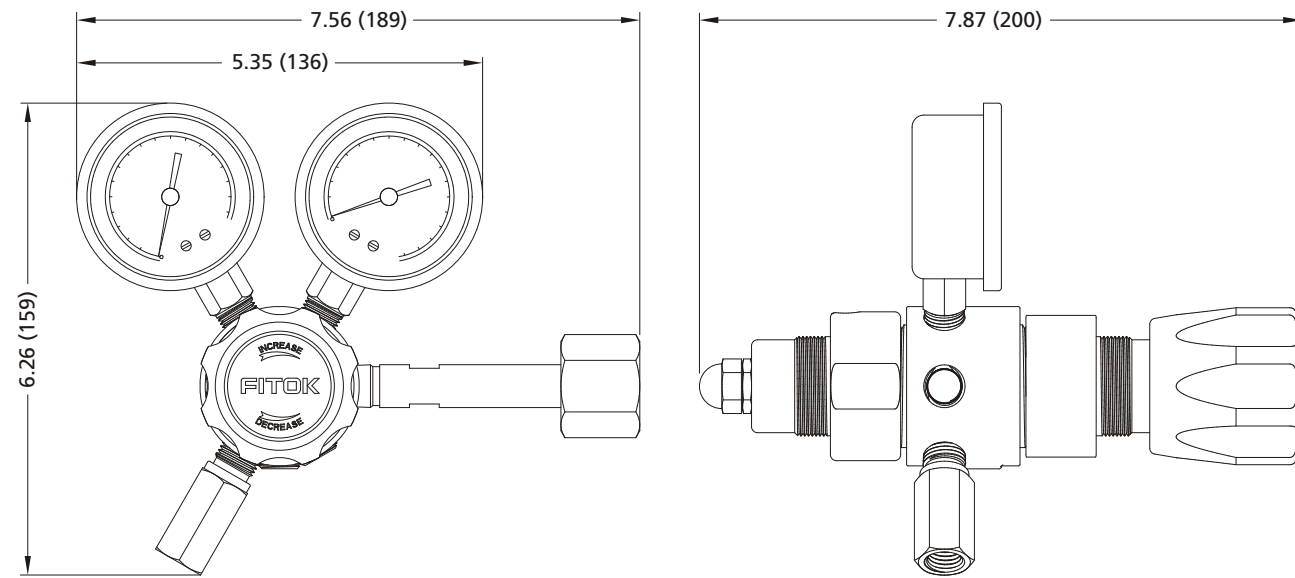
#### Flow Chart



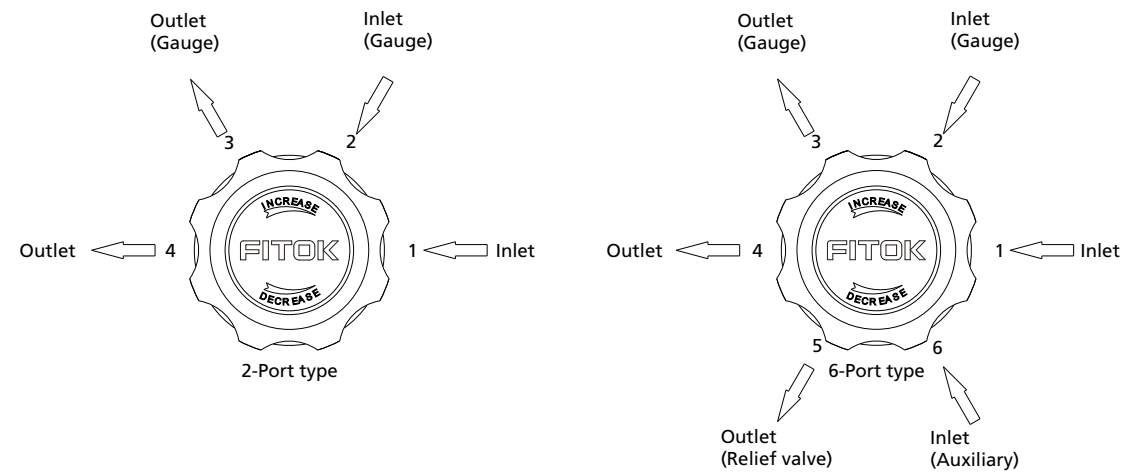


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



### Porting Configurations



### Part Number Description

FCR - 1D6L - 30 - 100 - C350 - B - B - 30 - R - P

Body Material	Connection 1	Connection 2	Connection 4	Connection 6
6L 316L SS	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	Same as Connection 5
SS 316 SS	C--- CGA Number (USA)	M With Gauge (MPa)	01 1/4" NPT (Male)	
A22 Hastelloy C-22	DIN_ DIN Number (Germany)	P Plug	10 1/4" Tube Fitting	Connection 5
B Brass (Nickel-plated)	Refer to pg.B-28 for cylinder connections, according to the specific gas type. Cylinder connections compliant to other standards are upon request. Please contact FITOK for detail.	00 1/4" NPT (Female)	11 3/8" Tube Fitting	R Relief Valve
			20 6 mm Tube Fitting	P Plug
			21 8 mm Tube Fitting	00 1/4" NPT (Female)
			30 Diaphragm Valve with 1/4" NPT (Female)	
			31 Diaphragm Valve with 1/4" NPT (Male)	
			32 Diaphragm Valve with 1/4" Tube Fitting	
			33 Diaphragm Valve with 3/8" Tube Fitting	
			34 Diaphragm Valve with 6 mm Tube Fitting	
			35 Diaphragm Valve with 8 mm Tube Fitting	
			Other connections are available upon requests	

Inlet Pressure P1	Outlet Pressure Range P2
30 3000 psig	25 0~25 psig
45 4500 psig	50 0~50 psig
	100 0~100 psig
	150 0~150 psig
	250 0~250 psig

Note: Most configurations are available.

Examples for part number description:

- a. 4-port type (2 in, 2 out): FCR-1DB-45-150-DIN1-B-B-30
- b. 6-port type (3 in, 3 out): FCR-1DSS-30-50-C580-B-B-00-R-P

# Line Pressure Regulators

## FLR-1 Series Compact Diaphragm Regulator

### Features

- Similar to the FITOK FCR-1 Series Regulator with valve seat of bigger orifice to provide larger flow capacity
- 2-port, 3-port and 4-port configurations available
- 316L SS body for corrosive or toxic gases  
Nickel-plated brass body for non-corrosive gases
- Standard configuration with filter installed at inlet
- Panel mounted or installed with screw at the bottom

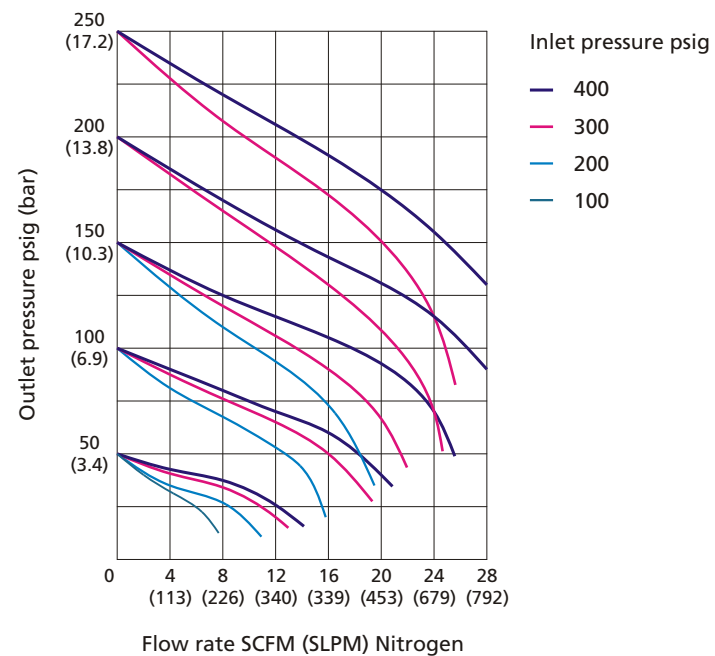


Model: FLR-16L-15-100-00-00

### Technical Data

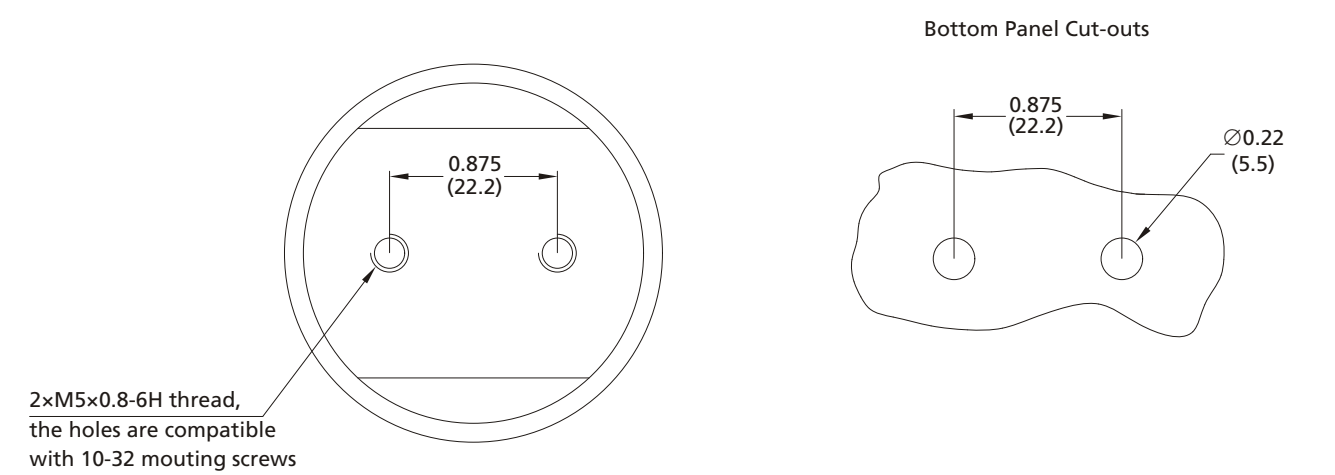
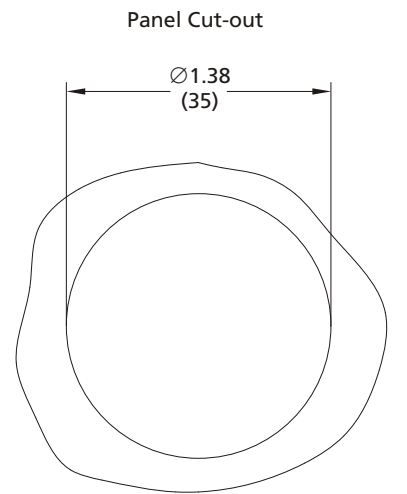
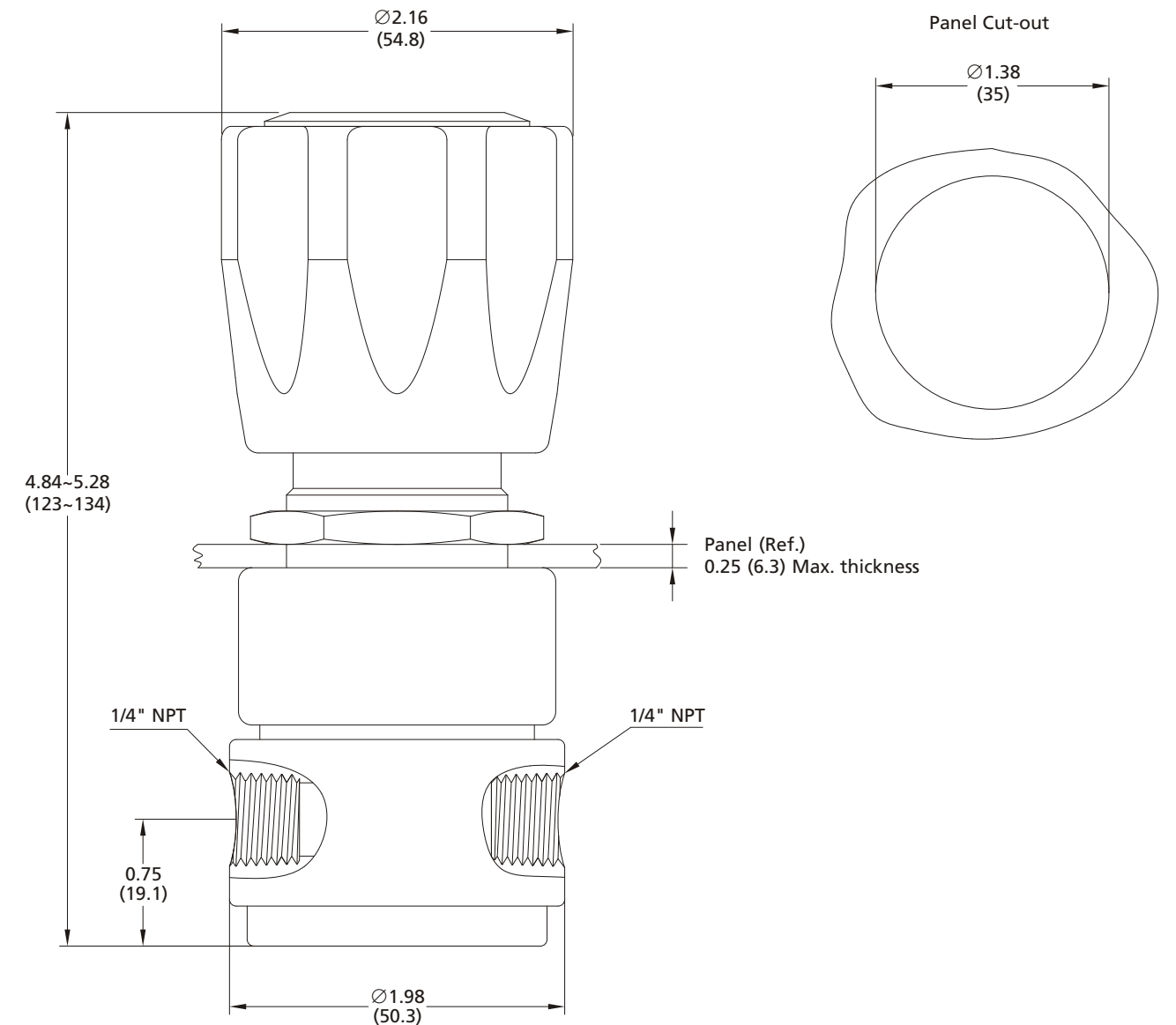
- Single-stage regulator
- Maximum inlet pressure: 500 or 1500 psig
- Outlet pressure range: 0~25, 0~50, 0~100 or 0~250 psig
- Materials of the internal components:
  - Seat: PCTFE
  - Diaphragm: Hastelloy
  - Filter: 316L
- Temperature: -40°F~+165°F (-40°C~+74°C)
- Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- Flow coefficient(Cv): 0.14
- Weight (regulator only):  $\approx 1.98$  lbs (0.9 kg)
- Body ports: 1/4" female NPT for inlet, outlet and gauge

### Flow Chart

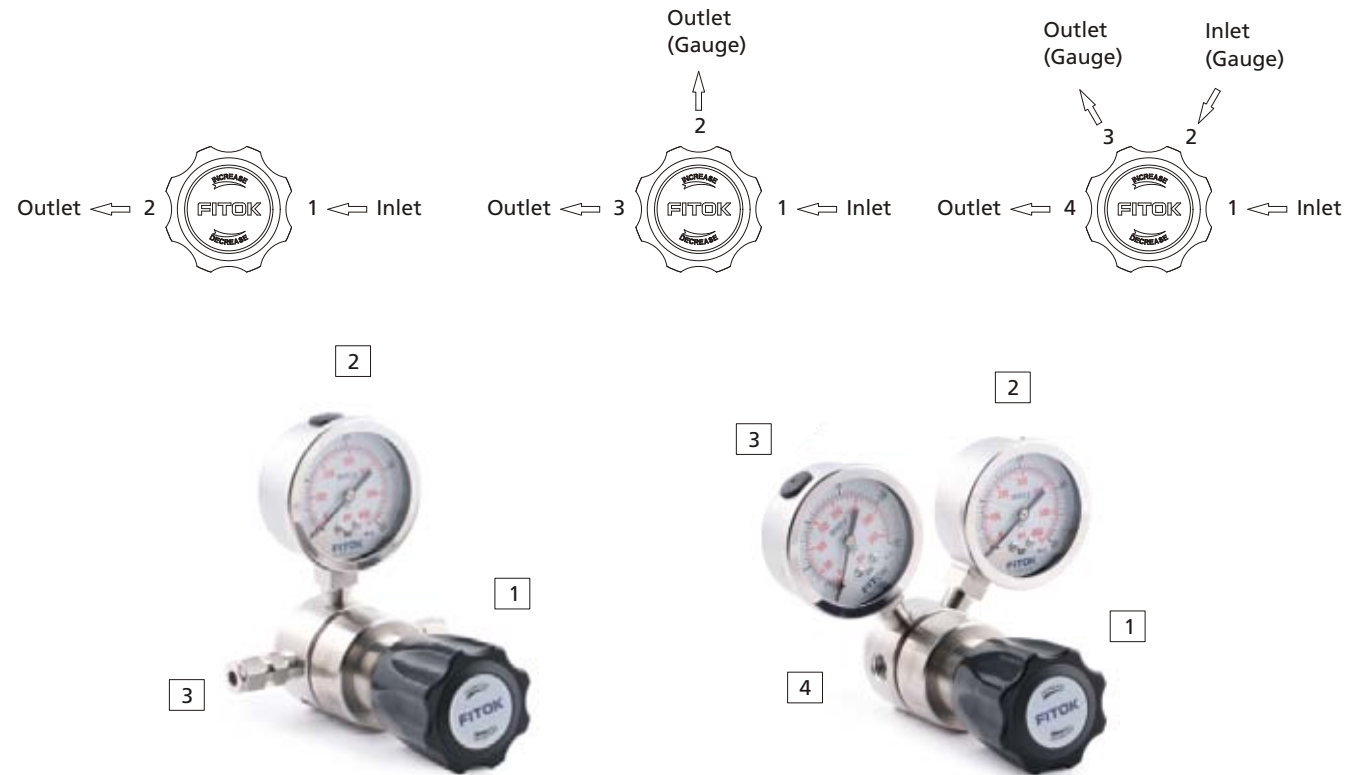


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



## Porting Configurations



## Part Number Description

FLR - 16L - 15 - 100 - 00 - B - B - 00 - Z

Body Material	Inlet Pressure P1	Connection 1	Connection 2	Connection 3	Connection 4	Installation Type
6L 316L SS	05 500 psig	00 1/4" NPT (Female)	B With Gauge (psi/bar)	Same as Connection 2	Same as Connection 1	No
SS 316 SS	15 1500 psig	01 1/4" NPT (Male)	M With Gauge (MPa)			Z Installed with one panel nut
A22 Hastelloy C-22		10 1/4" Tube Fitting	P Plug			N Installed with screw at the bottom
B Brass (Nickel-plated)		11 3/8" Tube Fitting	00 1/4" NPT (Female)			
		20 6 mm Tube Fitting	01 1/4" NPT (Male)			
		21 8 mm Tube Fitting	10 1/4" Tube Fitting			
		Other connections are available upon requests	11 3/8" Tube Fitting			
			20 6 mm Tube Fitting			
			21 8 mm Tube Fitting			
			Other connections are available upon requests			

Note: Most configurations are available.

Examples for part number description:

- a. 2-port type (1 in, 1 out): FLR-16L-15-25-00-00
- b. 3-port type (1 in, 2 out): FLR-16L-05-100-00-B-00

# Line Pressure Regulators

## FLR-2 Series Piston Regulator

### Features

- ⦿ Applicable to non-corrosive gases or low-viscosity liquids
- ⦿ Easy to assemble and disassemble, convenient replacement of springs with different output ranges
- ⦿ Robust piston-sensed design to provide safety and reliability
- ⦿ Three porting configurations for valve body available
- ⦿ Panel mounted or installed with screws at the bottom

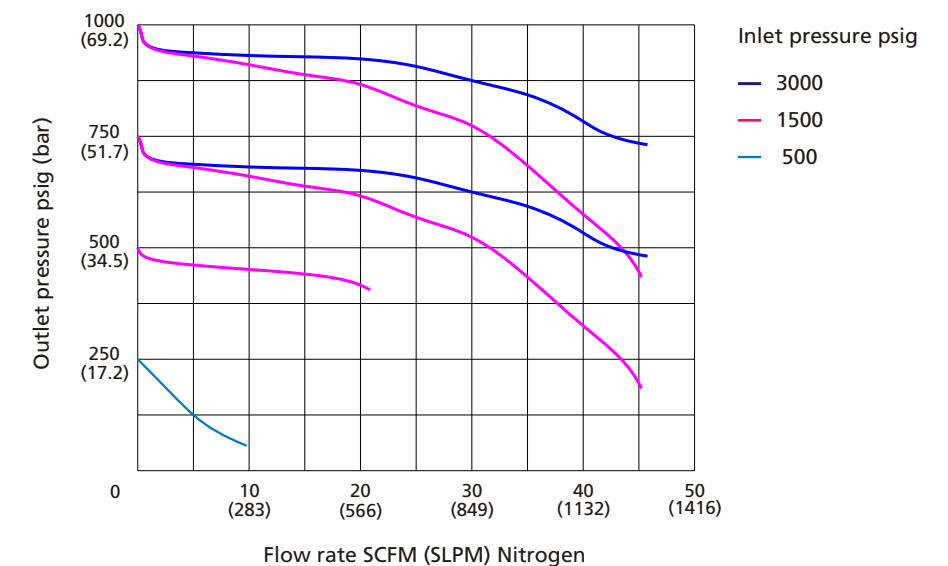
### Technical Data

- ⦿ Single-stage regulator
- ⦿ Maximum inlet pressure: 3000 or 4500 psig
- ⦿ Outlet pressure range: 0~250, 0~500, 0~750 or 0~1000 psig
- ⦿ Materials of the internal components:
  - Seat: PCTFE
  - Piston: 316L
  - O-ring: Viton or Kalrez
  - Filter: 316L
- ⦿ Temperature: -15°F~+165°F (-26°C~+74°C)
- ⦿ Leak rates:
  - Internal: Bubble-tight
  - External: Bubble-tight
- ⦿ Flow coefficient (Cv): 0.06
- ⦿ Weight (regulator only): ≈1.98 lbs (0.9 kg)
- ⦿ Body ports: 1/4" female NPT for inlet, outlet and gauge



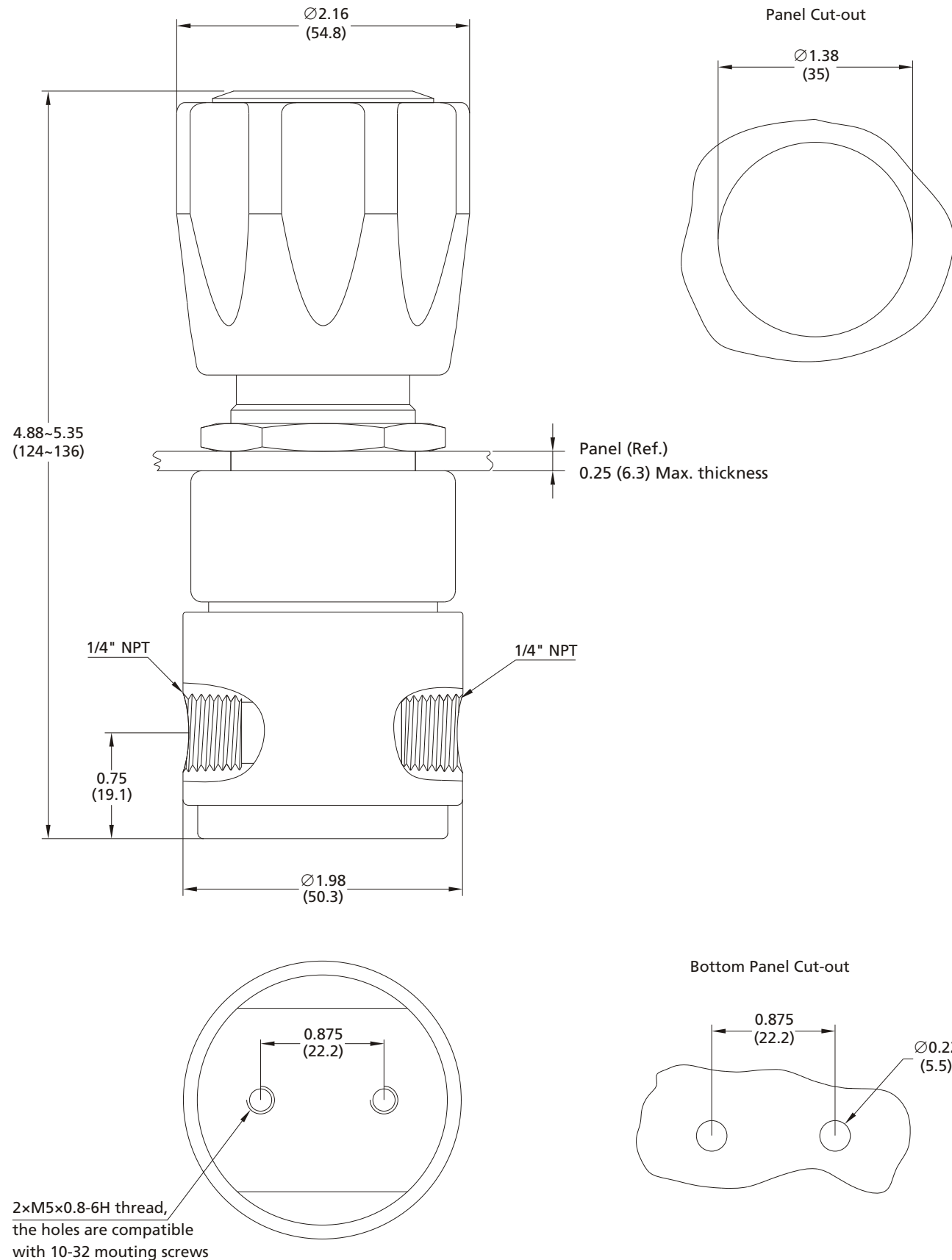
Model: FLR-25S-45-1000-00-00

### Flow Chart

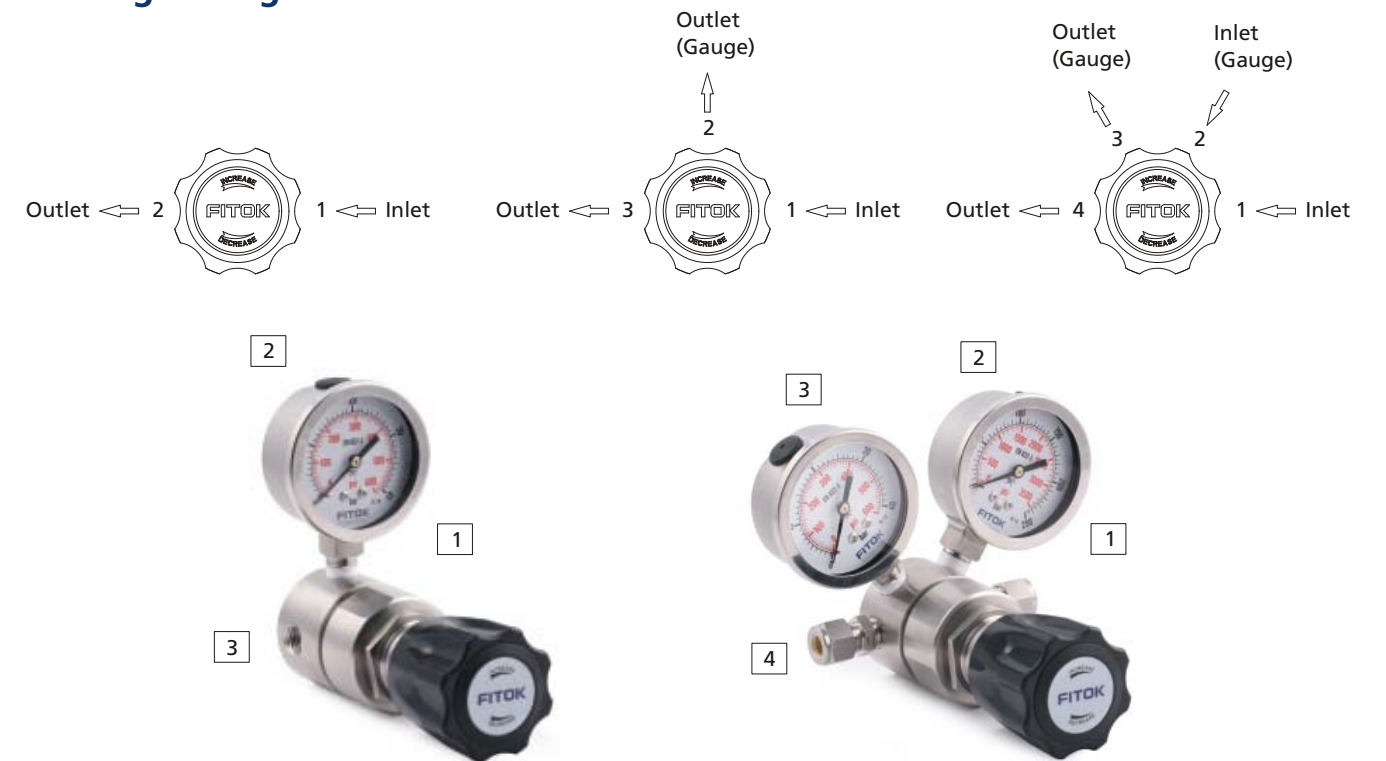


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



### Porting Configurations



### Part Number Description

FLR - 2V Z 6L - 45 - 500 - 10 - B - B - 10 - Z

Vent Option	Inlet Pressure P1	Connection 1	Connection 2	Connection 3	Connection 4	Installation Type
Without	30 3000 psig	00 1/4" NPT (Female)	B With Gauge (psi/bar)	Same as Connection 2	Same as Connection 1	No
V With	45 4500 psig	01 1/4" NPT (Male)	M With Gauge (MPa)			Z Installed with one panel nut
		10 1/4" Tube Fitting	P Plug			N Installed with screw at the bottom
		11 3/8" Tube Fitting	00 1/4" NPT (Female)			
		20 6 mm Tube Fitting	01 1/4" NPT (Male)			
		21 8 mm Tube Fitting	10 1/4" Tube Fitting			
		Other connections are available upon requests	11 3/8" Tube Fitting			
			20 6 mm Tube Fitting			
			21 8 mm Tube Fitting			
			Other connections are available upon requests			

Note: Most configurations are available.

Examples for part number description:

- a. 2-port type (1 in, 1 out): FLR-26L-30-250-00-00
- b. 3-port type (1 in, 2 out): ,FLR-25S-45-1000-00-00-00



# Line Pressure Regulators

## FLR-3 Series Medium Flow Diaphragm Regulator

### Features

- For high inlet pressure applications, designed with balanced poppet
- With large flow to minimize outlet pressure change when inlet pressure reduces
- Large diameter convoluted diaphragm to increase pressure sensitivity
- 316L SS body for corrosive or toxic gases, brass body for non-corrosive gases
- Three porting configurations for valve body available
- Panel mounted or installed with screws at the bottom

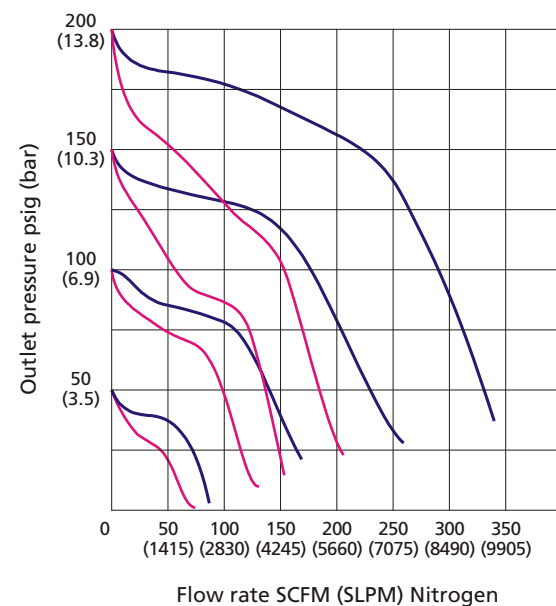


Model: FLR-3SS-30-100-04-04

### Technical Data

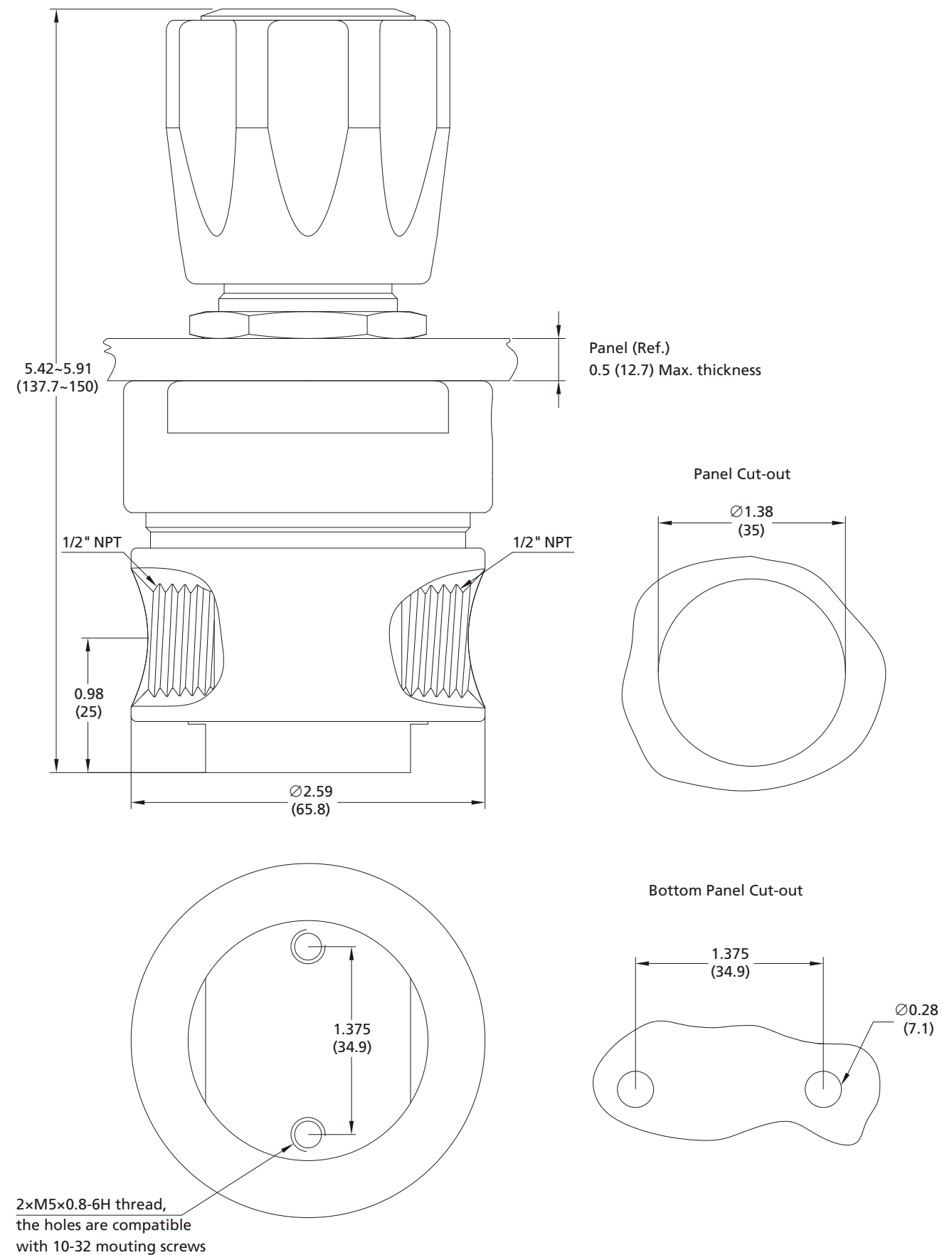
- Single-stage regulator
- Maximum inlet pressure: 500 or 3000 psig
- Outlet pressure range: 0~25, 0~50, 0~100, 0~150 or 0~200 psig
- Materials of the internal components:
  - Seat: PCTFE
  - Diaphragm: 316L
- Temperature: -40°F~+140°F (-40°C~+60°C)
- Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- Flow coefficient (Cv): 1.0
- Weight (regulator only):  $\approx 3.53$  lbs (1.6 kg)
- Body ports: 1/2" female NPT for inlet, outlet  
1/4" female NPT for gauge

### Flow Chart

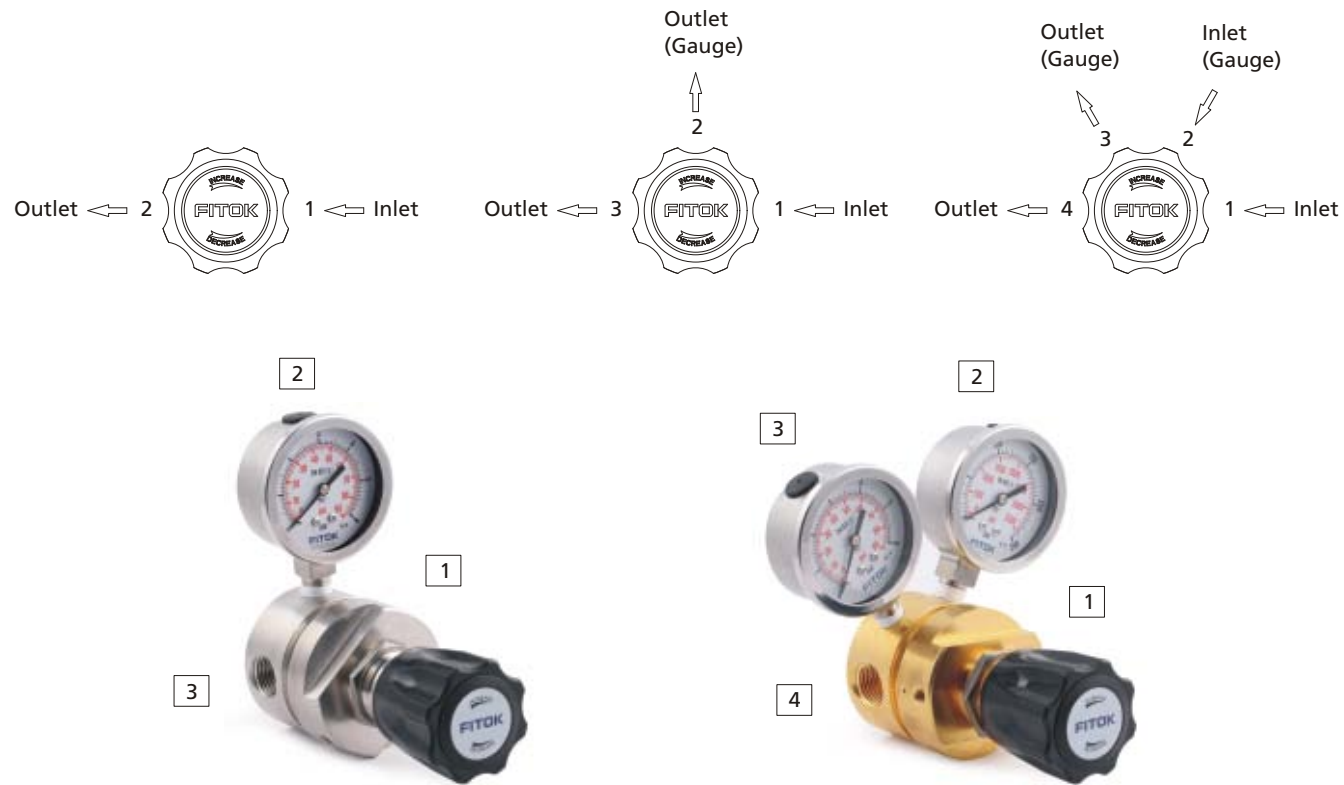


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



## Porting Configurations



## Part Number Description

FLR - 3B - 30 - 100 - 04 - B - B - 04 - Z

Body Material	Inlet Pressure P1	Connection 1	Connection 2	Connection 3	Connection 4	Installation Type
6L 316L SS	05 500 psig	04 1/2" NPT (Female)	B With Gauge (psi/bar)	3 ports same as connection 1	same as connection 1	No
SS 316 SS	30 3000 psig	11 3/8" Tube Fitting	M With Gauge (MPa)	4 ports same as connection 2		Z Installed with one panel nut
B Brass		12 1/2" Tube Fitting	P Plug			M Installed with two panel nuts
	<b>Outlet Pressure Range P2</b>	22 10 mm Tube Fitting	00 1/4" NPT (Female)			N Installed with screw at the bottom
	25 0~25 psig	23 12 mm Tube Fitting	01 1/4" NPT (Male)			
	50 0~50 psig	Other connections are available upon requests	10 1/4" Tube Fitting			
	100 0~100 psig		11 3/8" Tube Fitting			
	150 0~150 psig		20 6 mm Tube Fitting			
	200 0~200 psig		21 8 mm Tube Fitting			
			Other connections are available upon requests			

Note: Most configurations are available.

Examples for part number description:  
 a. 2-port type (1 in, 1 out): FLR-36L-30-150-04-04  
 b. 3-port type (1 in, 2 out): FLR-3SS-05-200-04-00-04

## Pressure Control Panels

### FSR-1 Series Pressure Control Panel for Single Cylinder

#### Features

- With the FITOK FCR-1 Series Regulator, vent valve and shut-off valve
- Maximum inlet pressure up to 4500psig
- With vent valve to relieve residual pressure quickly, easy and safe to remove and replace gas source
- Aluminium alloy anodized panel
- Standard mounting bracket

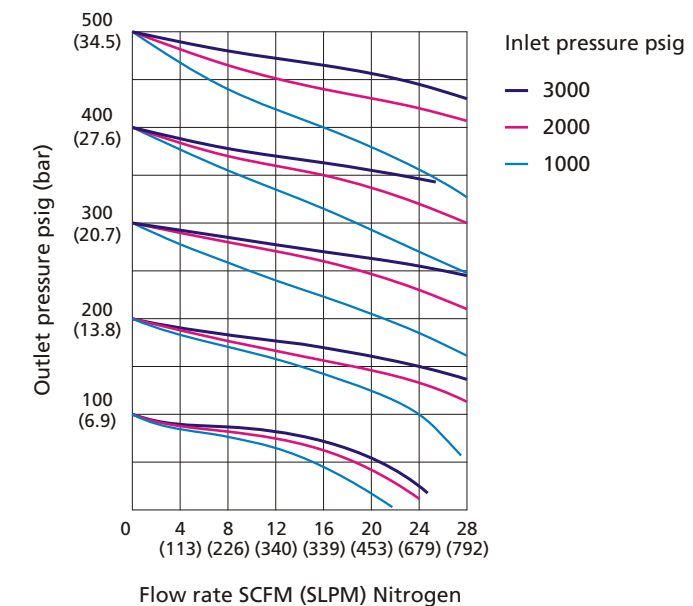


Model: FSR-16L-45-100-00-B-B-00-R-P

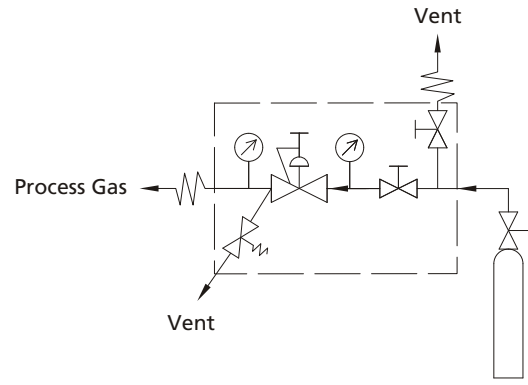
#### Technical Data

- Maximum inlet pressure: 3000 or 4500 psig
- Outlet pressure range: 0~25, 0~50, 0~100, 0~250 or 0~500 psig
- Materials of the main components:  
 Seat: PCTFE (Regulator and Diaphragm valve)  
 Diaphragm: Hastelloy (Regulator), Elgiloy (Diaphragm valve)  
 Diaphragm valve body: 316L  
 Filter: 316L
- Temperature: -10°F~+150°F (-23°C~+65°C)
- Leak rates:  
 Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium  
 External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- Flow coefficient (Regulator Cv): 0.06

#### Flow Chart

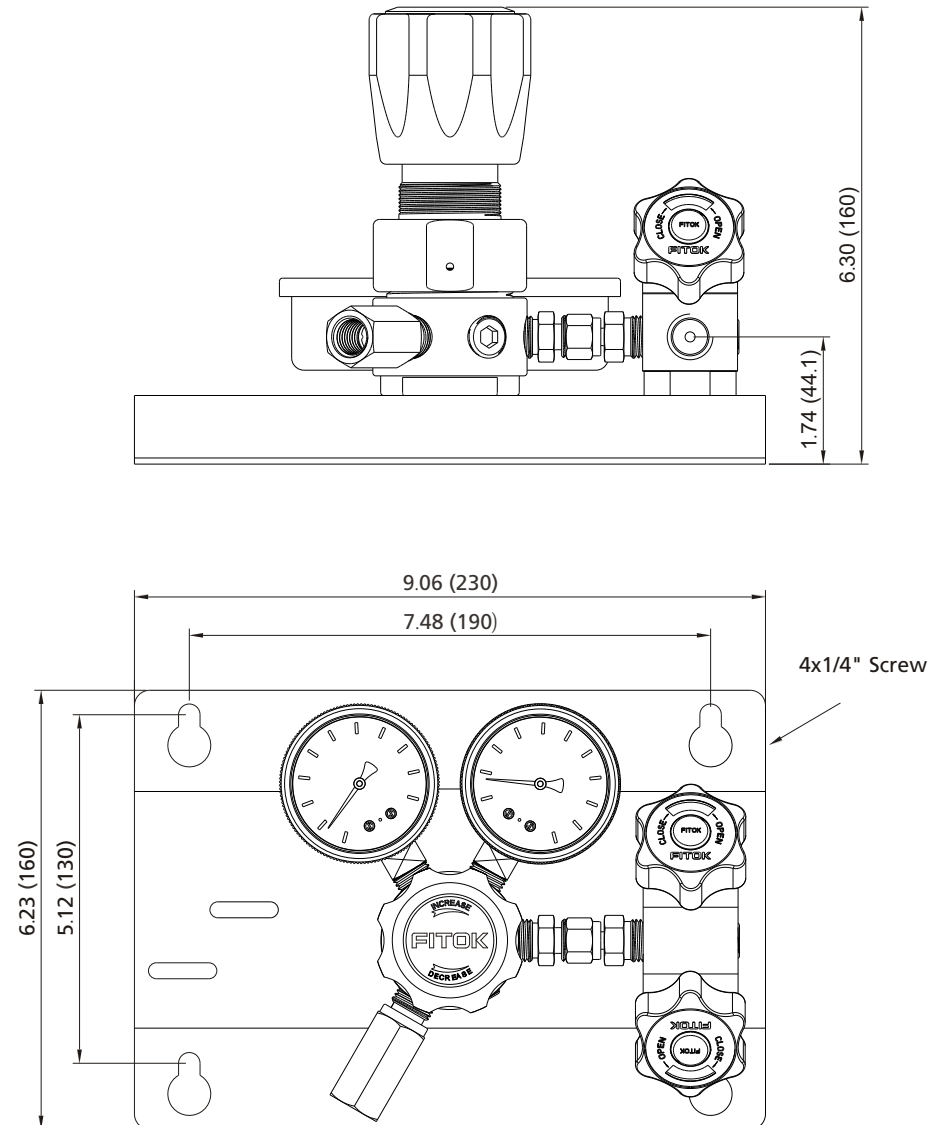


Flow Schematic

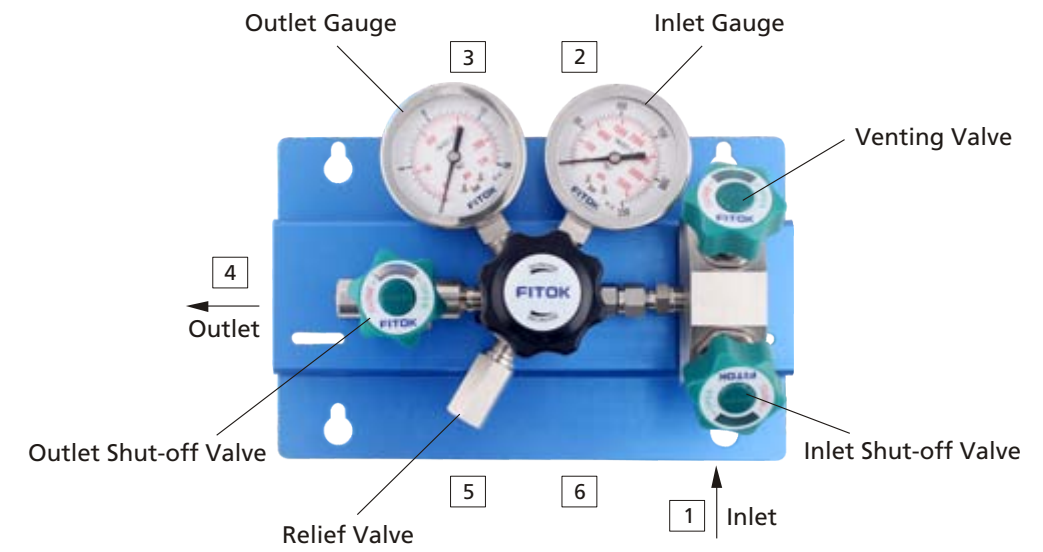


Dimensions

Dimensions, in inches (millimeters), are for reference only.



Component Introduction



Part Number Description

FSR - 16L - 30 - 50 - 00 - B - B - 30 - R - P

Body Material (Regulator)	Connection 1	Connection 2	Connection 4	Connection 6
6L 316L SS	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	Same as Connection 5
SS 316 SS	01 1/4" NPT (Male)	M With Gauge (MPa)	01 1/4" NPT (Male)	
A22 Hastelloy C-22	10 1/4" Tube Fitting	P Plug	10 1/4" Tube Fitting	
B Brass (Nickel-plated)	11 3/8" Tube Fitting	00 1/4" NPT (Female)	11 3/8" Tube Fitting	
	20 6 mm Tube Fitting		20 6 mm Tube Fitting	
	21 8 mm Tube Fitting		21 8 mm Tube Fitting	
		Connection 3		Connection 5
		Same as Connection 2		R Relief Valve
				P Plug
				00 1/4" NPT (Female)

Inlet Pressure P1	Outlet Pressure Range P2
30 3000 psig	25 0~25 psig
45 4500 psig	50 0~50 psig
	100 0~100 psig
	250 0~250 psig
	500 0~500 psig

Connection 4
30 Diaphragm Valve with 1/4" NPT (Female)
31 Diaphragm Valve with 1/4" NPT (Male)
32 Diaphragm Valve with 1/4" Tube Fitting
33 Diaphragm Valve with 3/8" Tube Fitting
34 Diaphragm Valve with 6 mm Tube Fitting
35 Diaphragm Valve with 8 mm Tube Fitting
Other connections are available upon requests

Note: Most configurations are available.

# Pressure Control Panels

## FSR-2 Series High Pressure Control Panel for Single Cylinder

### Features

- With the FITOK FCR-2 Series Regulator, vent valve and shut-off valve
- Applicable to non-corrosive gases or low-viscosity liquids
- With vent valve to relieve residual pressure quickly, easy and safe to remove and replace gas source
- Venting model optional
- Anodized aluminium panel
- Bracket mounting standard

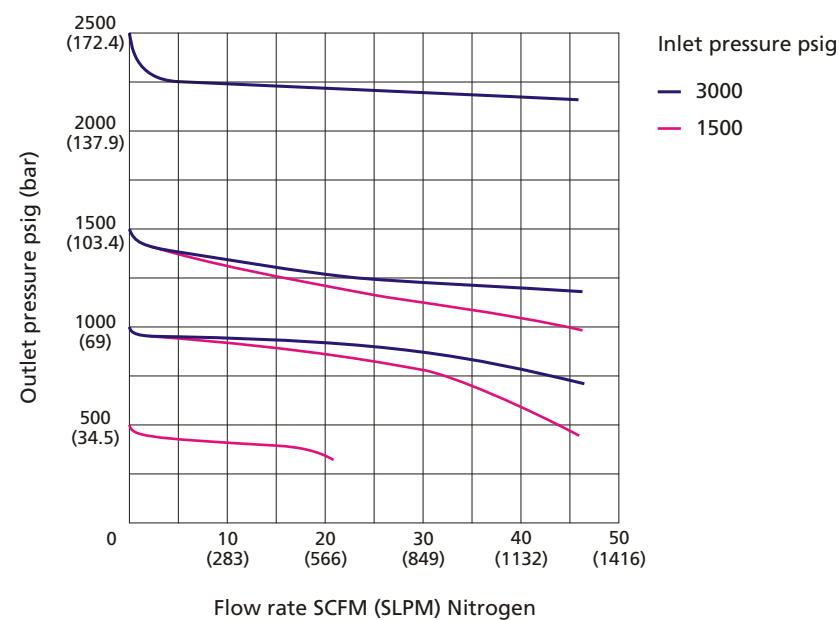


Model: FSR-2Z6L-45-750-00-B-B-00-P-P

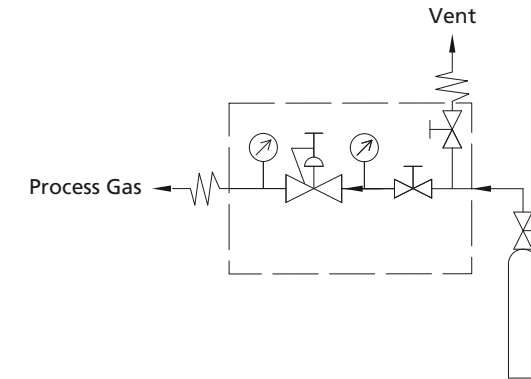
### Technical Data

- Maximum inlet pressure: 3000 or 4500 psig
- Outlet pressure range: 0~750, 0~1500 or 0~2500 psig
- Materials of the main components:
  - Seat: PCTFE (Regulator and Diaphragm valve)
  - Piston: 316L
  - Diaphragm: Elgiloy (Diaphragm valve)
  - Diaphragm valve body: 316L
  - O-ring: Viton or Kalrez
  - Filter: 316L
- Temperature: -10°F~+150°F (-23°C~+65°C)
- Leak rates:
  - Internal: Bubble-tight
  - External: Bubble-tight
- Flow coefficient (Regulator Cv):
  - Without vent: 0.06
  - With vent: 0.1

### Flow Chart

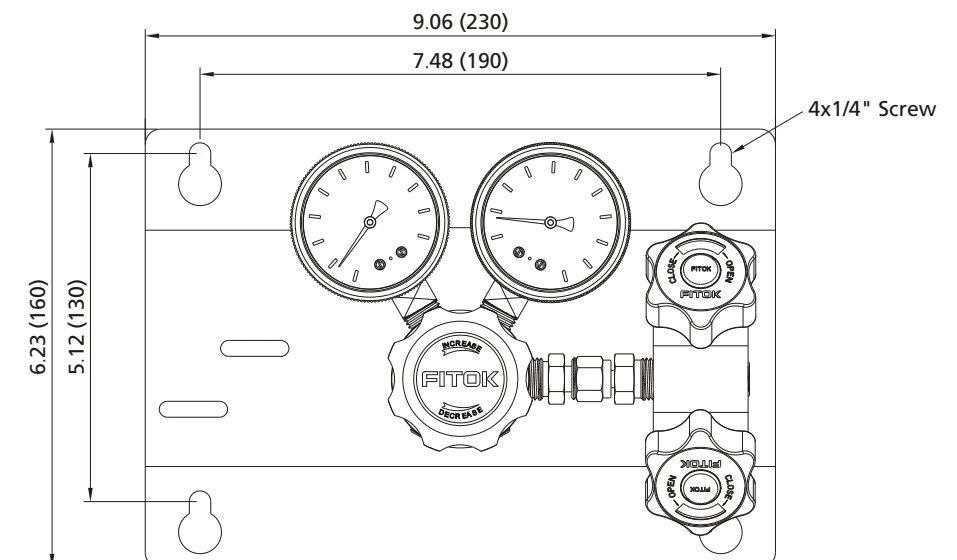
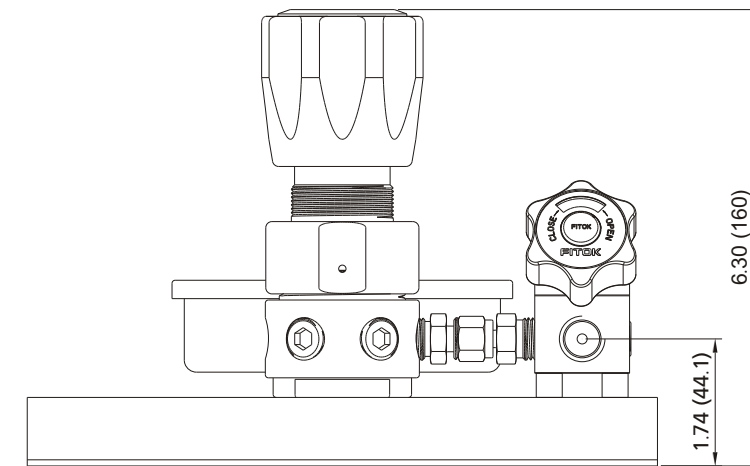


### Flow Schematic



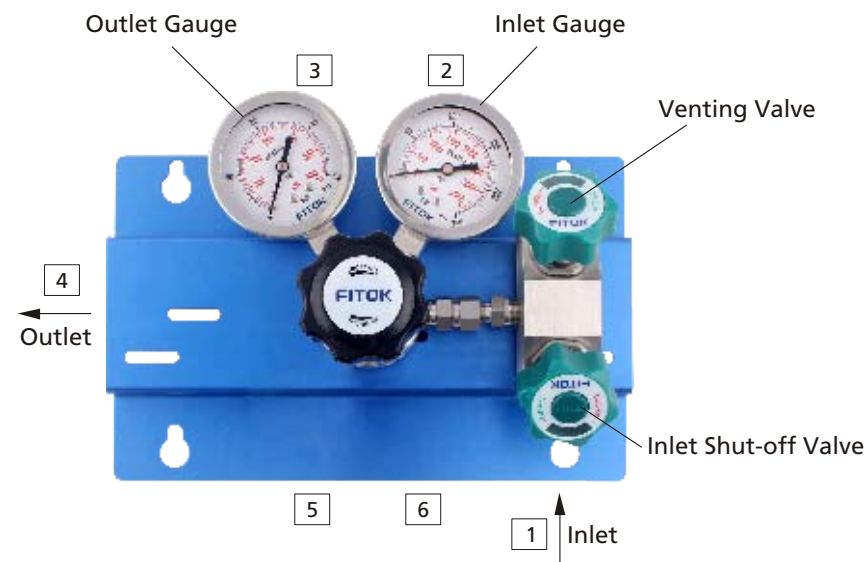
### Dimensions

Dimensions, in inches (millimeters), are for reference only.





## Component Introduction



## Part Number Description

FSR - 2V Z 6L - 30 - 1500 - 00 - B - B - 30 - P - P

Part	Description
<b>Vent Option</b>	Without: 30, 4500 psig; With: V, 45, 4500 psig
<b>O-ring Material</b>	Viton: 750, 0~750 psig; Kalrez: Z, 1500, 0~1500 psig; 2500, 0~2500 psig
<b>Body Material (Regulator)</b>	6L: 316L SS; SS: 316 SS; B: Brass (Nickel-plated)
<b>Inlet Pressure P1</b>	30: 3000 psig; 45: 4500 psig
<b>Outlet Pressure Range P2</b>	750: 0~750 psig; 1500: 0~1500 psig; 2500: 0~2500 psig
<b>Connection 1</b>	00: 1/4" NPT (Female); 01: 1/4" NPT (Male); 10: 1/4" Tube Fitting; 11: 3/8" Tube Fitting; 20: 6 mm Tube Fitting; 21: 8 mm Tube Fitting
<b>Connection 2</b>	B: With Gauge (psi/bar); M: With Gauge (MPa); P: Plug; 00: 1/4" NPT (Female)
<b>Connection 3</b>	Same as Connection 2
<b>Connection 4</b>	00: 1/4" NPT (Female); 01: 1/4" NPT (Male); 10: 1/4" Tube Fitting; 11: 3/8" Tube Fitting; 20: 6 mm Tube Fitting; 21: 8 mm Tube Fitting; 30: Diaphragm Valve with 1/4" NPT (Female); 31: Diaphragm Valve with 1/4" NPT (Male); 32: Diaphragm Valve with 1/4" Tube Fitting; 33: Diaphragm Valve with 3/8" Tube Fitting; 34: Diaphragm Valve with 6 mm Tube Fitting; 35: Diaphragm Valve with 8 mm Tube Fitting
<b>Connection 5</b>	R: Relief Valve; P: Plug; 00: 1/4" NPT (Female)
<b>Connection 6</b>	Same as Connection 5

Note: Most configurations are available.

# Changeover System

## FDR-1 Series Manual Changeover System (up to 500 psig)

### Features

- ⦿ A small manual changeover system with a regulator similar to the FITOK FCR-1 Series, vent valves and shut-off valves
- ⦿ Connecting with two independent gas sources at a time, gas source selected through diaphragm valves
- ⦿ Applicable to corrosive or toxic gases
- ⦿ With vent valve to relieve residual pressure quickly, easy and safe to remove and replace gas source
- ⦿ Anodized aluminium panel

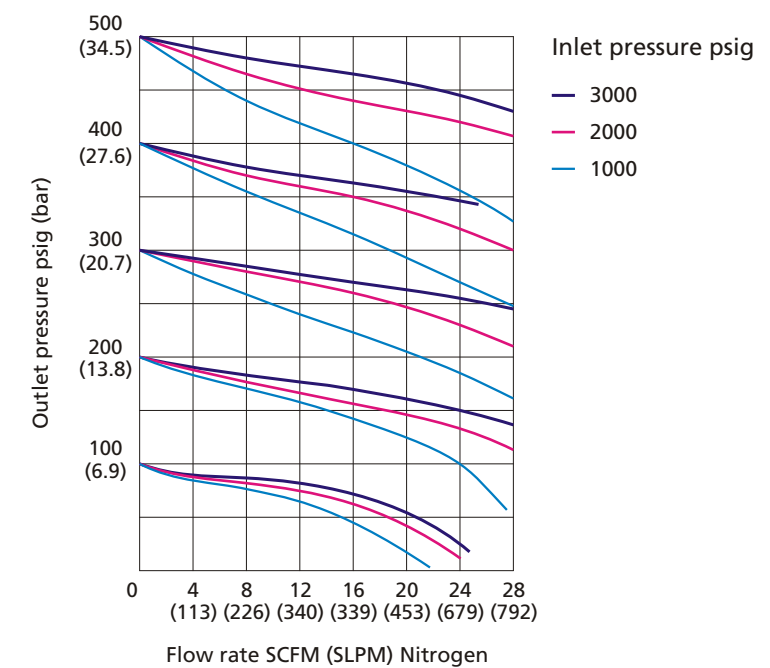


Model: FDR-16L-30-500-00-B-B-01-00-R

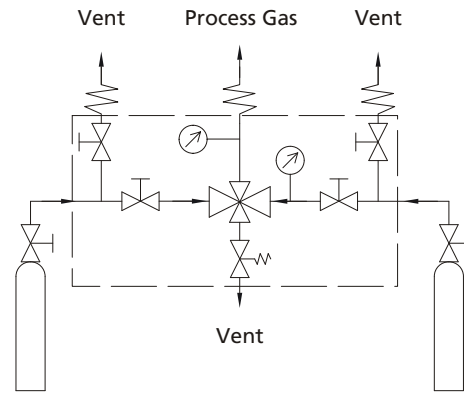
### Technical Data

- ⦿ Maximum inlet pressure: 3000 or 4500 psig
- ⦿ Outlet pressure range: 0~25, 0~50, 0~100, 0~250 or 0~500 psig
- ⦿ Materials of the main components:  
 Seat: PCTFE (Regulator and Diaphragm valve)  
 Diaphragm: Hastelloy (Regulator), Elgiloy (Diaphragm valve)  
 Diaphragm valve body: 316L  
 O-ring: Viton
- ⦿ Temperature: -10°F~+150°F (-23°C~+65°C)
- ⦿ Leak rates:  
 Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium  
 External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- ⦿ Flow coefficient (Regulator Cv): 0.06

### Flow Chart

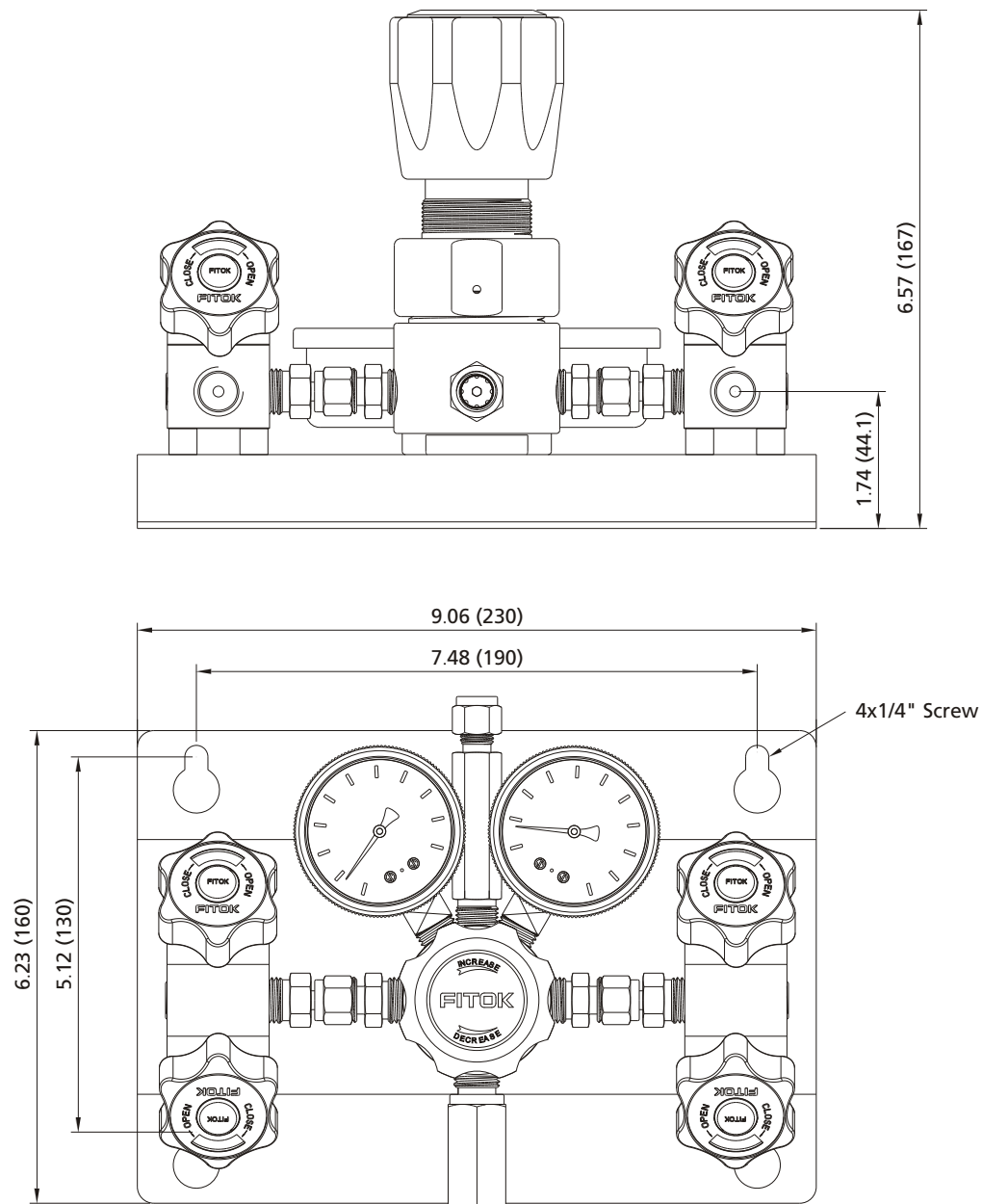


### Flow Schematic

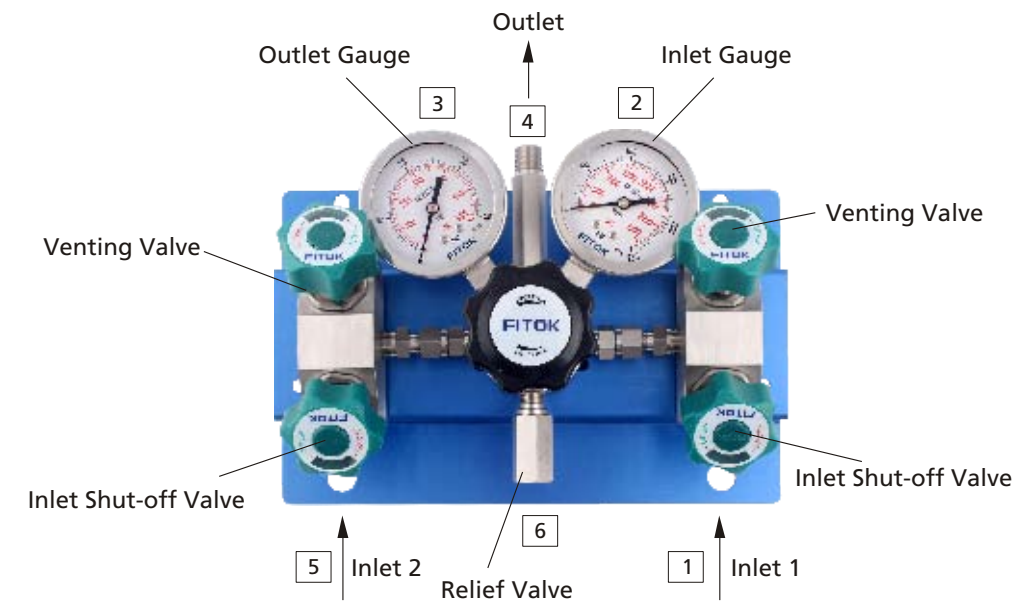


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



### Component Introduction



### Part Number Description

FDR - 16L - 30 - 250 - 00 - B - B - 01 - 00 - R

Body Material (Regulator)	Connection 1	Connection 2	Connection 4	Connection 6
6L 316L SS	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	R Relief Valve
SS 316 SS	01 1/4" NPT (Male)	M With Gauge (MPa)	01 1/4" NPT (Male)	P Plug
A22 Hastelloy C-22	10 1/4" Tube Fitting	P Plug	10 1/4" Tube Fitting	00 1/4" NPT (Female)
B Brass (Nickel-plated)	11 3/8" Tube Fitting	00 1/4" NPT (Female)	11 3/8" Tube Fitting	
	20 6 mm Tube Fitting		20 6 mm Tube Fitting	
	21 8 mm Tube Fitting		21 8 mm Tube Fitting	
	Other connections are available upon requests		Other connections are available upon requests	
		Connection 3		Connection 5
		Same as Connection 2		Same as Connection 1

Inlet Pressure P1
30 3000 psig
45 4500 psig

Outlet Pressure Range P2
25 0~25 psig
50 0~50 psig
100 0~100 psig
250 0~250 psig
500 0~500 psig

Gas Control Equipments  
Other Applicable Products  
Technical References

Gas Control Equipments  
Other Applicable Products  
Technical References

# Changeover System

## FDR-2 Series Manual Changeover System (up to 2500 psig)

### Features

- A small manual changeover system with a regulator similar to the FITOK FCR-2 Series, vent valves and shut-off valves
- Connecting with two independent gas sources at a time, gas sources switched through diaphragm valves
- Applicable to non-corrosive gases
- Venting model optional
- Anodized aluminium panel

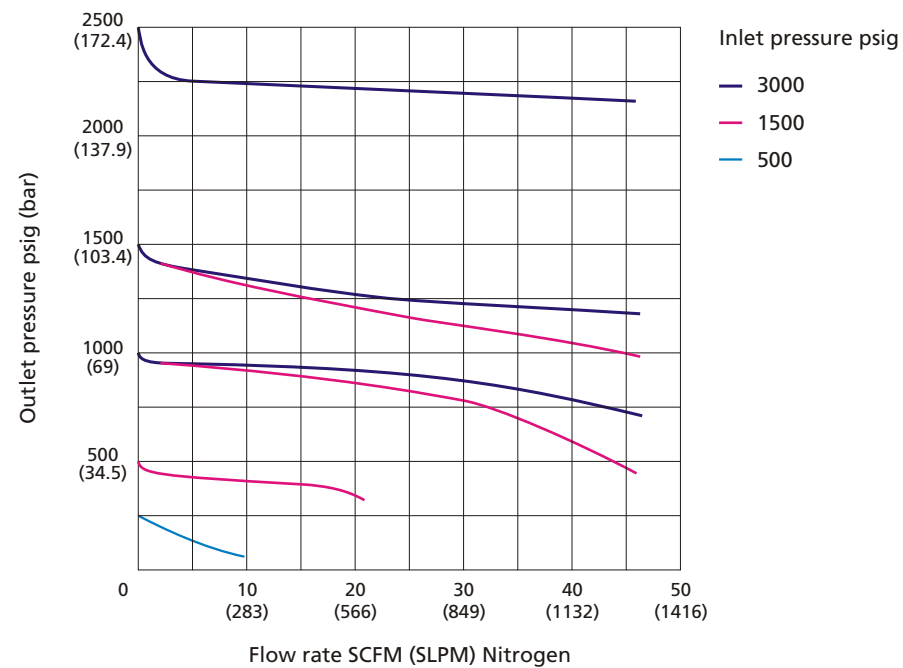


Model: FDR-2VSS-45-2500-00-B-B-01-00

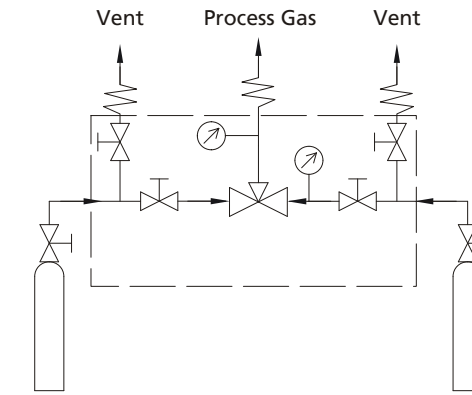
### Technical Data

- Maximum inlet pressure: 3000 or 4500 psig
- Outlet pressure range: 0~750, 0~1500 or 0~2500 psig
- Materials of the main components:
  - Seat: PCTFE (Regulator and Diaphragm)
  - Piston: 316L
  - Diaphragm: Elgiloy (Diaphragm valve)
  - Diaphragm valve body: 316L
  - O-ring: Viton or Kalrez
  - Filter: 316L
- Temperature: -10°F~+150°F (-23°C~+65°C)
- Leak rates:
  - Internal: Bubble-tight
  - External: Bubble-tight
- Flow coefficient (Regulator Cv):
  - Without vent: 0.06
  - Vent: 0.1

### Flow Chart

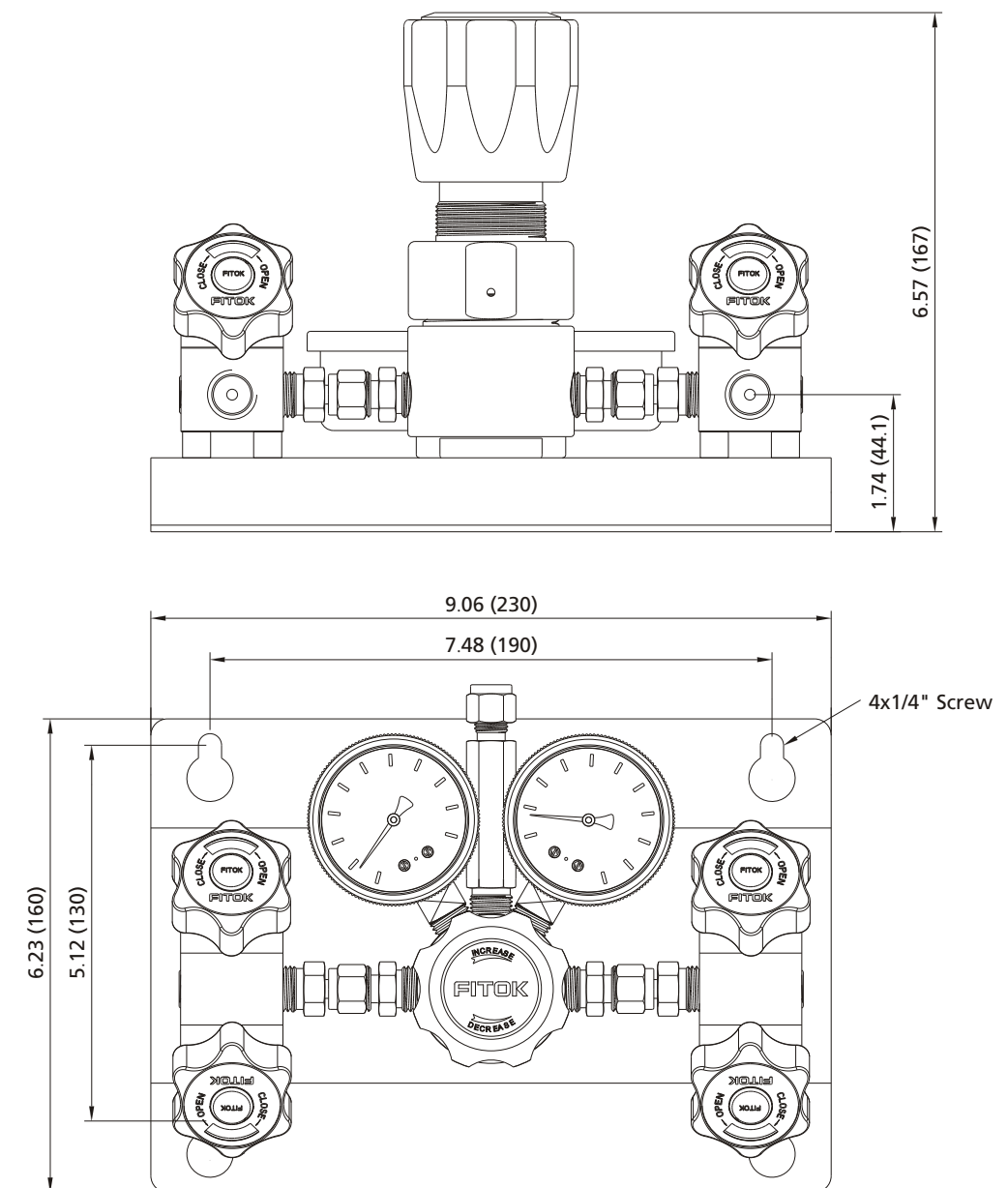


### Flow Schematic

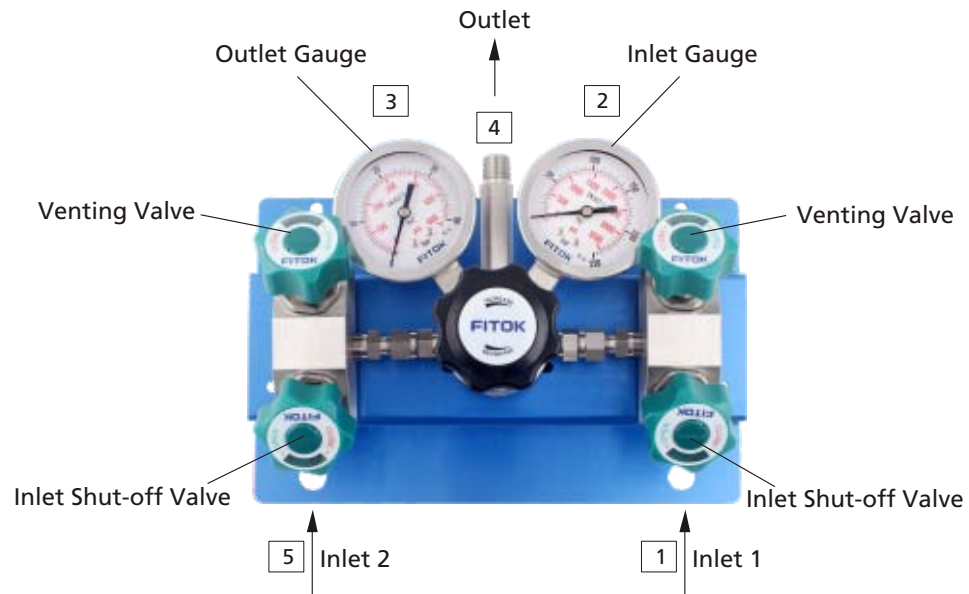


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



### Component Introduction



### Part Number Description

FDR - 2V Z 6L - 30 - 750 - 00 - B - B - 01 - 00

<b>Vent Option</b>	<b>Inlet Pressure P1</b>	<b>Connection 1</b>	<b>Connection 2</b>	<b>Connection 4</b>	<b>Connection 5</b>
Without	30 3000 psig	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	Same as Connection 1
V With	45 4500 psig	01 1/4" NPT (Male)	M With Gauge (MPa)	01 1/4" NPT (Male)	
		10 1/4" Tube Fitting	P Plug	10 1/4" Tube Fitting	
<b>O-ring Material</b>	<b>Outlet Pressure Range P2</b>	11 3/8" Tube Fitting	00 1/4" NPT (Female)	11 3/8" Tube Fitting	
Viton	750 0~750 psig	20 6 mm Tube Fitting		20 6 mm Tube Fitting	
Z Kalrez	1500 0~1500 psig	21 8 mm Tube Fitting	<b>Connection 3</b>	21 8 mm Tube Fitting	
	2500 0~2500 psig	Other connections are available upon requests	Same as Connection 2	Other connections are available upon requests	
<b>Body Material (Regulator)</b>					
6L 316L SS					
SS 316 SS					
B Brass (Nickel-plated)					

## Changeover System

### FDR-1L Series Automatic Changeover System without Line Pressure Regulator

#### Features

- With a regulator, similar to the FITOK FCR-1 Series Regulator for pressure control
- Anodized Aluminium box with clearly marked panel for easy operation
- With vent valve to relieve residual pressure quickly, easy and safe to remove and replace gas source
- Automatic switching of gas source to ensure continuous gas supply
- Four fixed-output pressure ranges available
- Applicable to oxygen-enriched environments

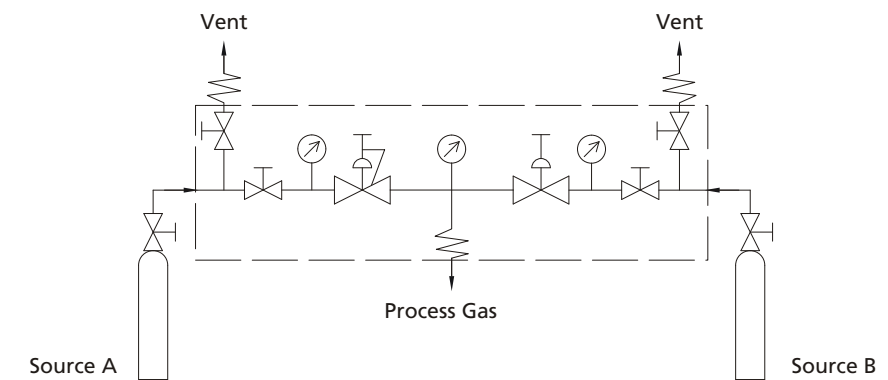


Model: FDR-1LSS-45-25-00-B-B-00-00

#### Technical Data

- Maximum inlet pressure: 3000 or 4500 psig
- Outlet pressure range: 85~115, 135~165, 185~215 or 235~265 psig
- Materials of the main components:
  - Seat: PCTFE (Regulator and Diaphragm valve)
  - Diaphragm: Hastelloy (Regulator), Elgiloy (Diaphragm valve)
  - Diaphragm valve body: 316L
- Temperature: -10°F~+150°F (-23°C~+65°C)
- Leak rate:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- Flow coefficient (Regulator Cv): 0.06

#### Flow Schematic





### Operation Overview

The FDR-1L Series Changeover System is mainly comprised of one adjustable outlet pressure regulator together with one fixed outlet pressure regulator.

1. Open the 2 inlets at the same time. The one side that the "IN SERVICE" arrow pointing at by turning the handle would be the 1st source for gas supply.

Fig. 1 When the "In Service" arrow is pointing at side B, side B would be the gas source. Because at this time, the fixed outlet pressure of side B is higher than the set pressure of side A. Consequently, the diaphragm of side A regulator is off from the stem to close the regulator.

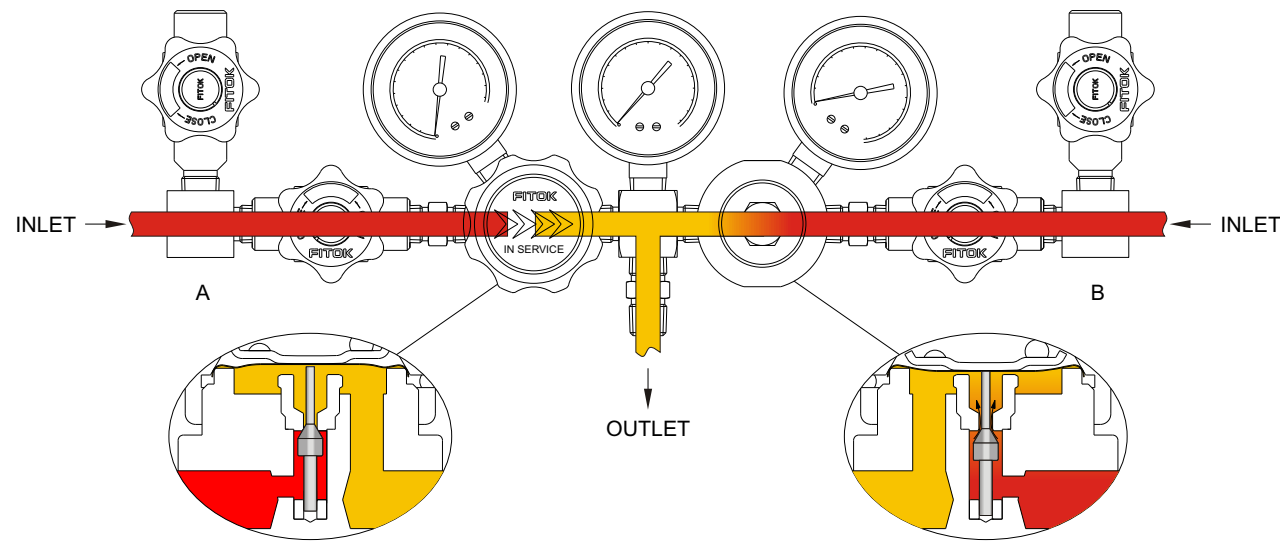


Fig. 1

Fig. 2 If side A is chosen as the gas source, the handle should be turned clockwise until the "IN SERVICE" arrow pointing at side A. Because at this time, the set pressure of side A is higher than the fixed outlet pressure of side B, Consequently, the diaphragm of side B regulator is off from the stem to close the regulator.

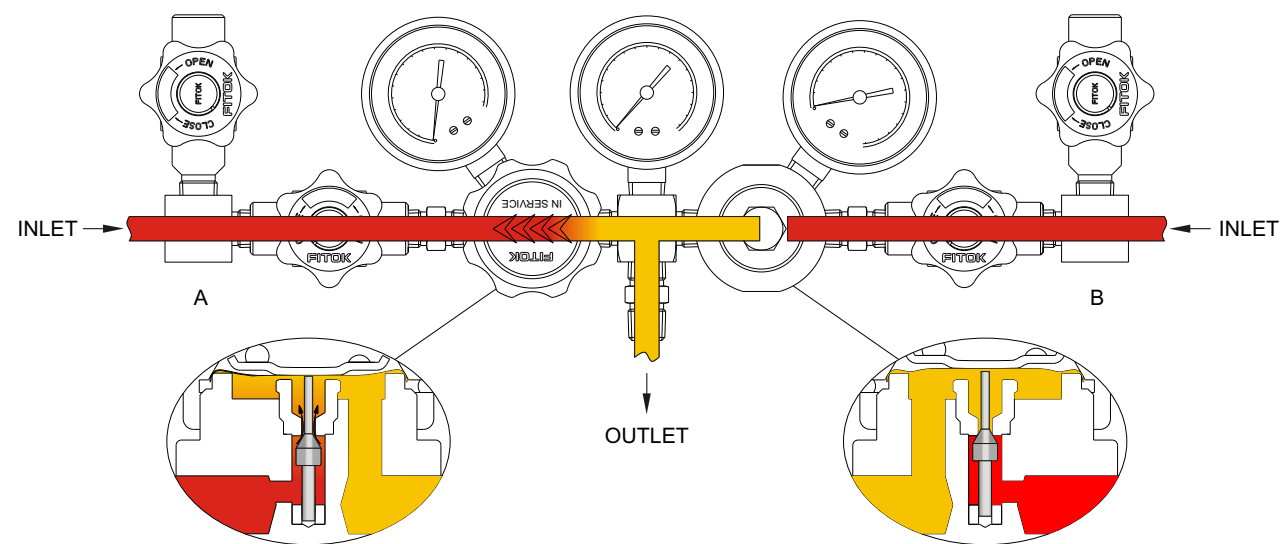


Fig. 2

2. Automatically change to another side when gas source of one side is depleted.

Fig. 3 When "IN SERVICE" arrow is pointing at side B, but gas source of side B is depleted, its outlet pressure shall decrease to be lower than the set pressure of side A. By the force of spring, side A regulator shall be opened to begin gas supply. Meanwhile, gas from side A shall flow back into side B. At this moment, before replacing new gas source of side B, the diaphragm valve should be first turned off, with the vent valve open to exhaust remaining pressure. After replacement, if the "IN SERVICE" arrow still points at side B, side B would be the gas source. If the arrow is turned towards side A, side A would then be the gas source.

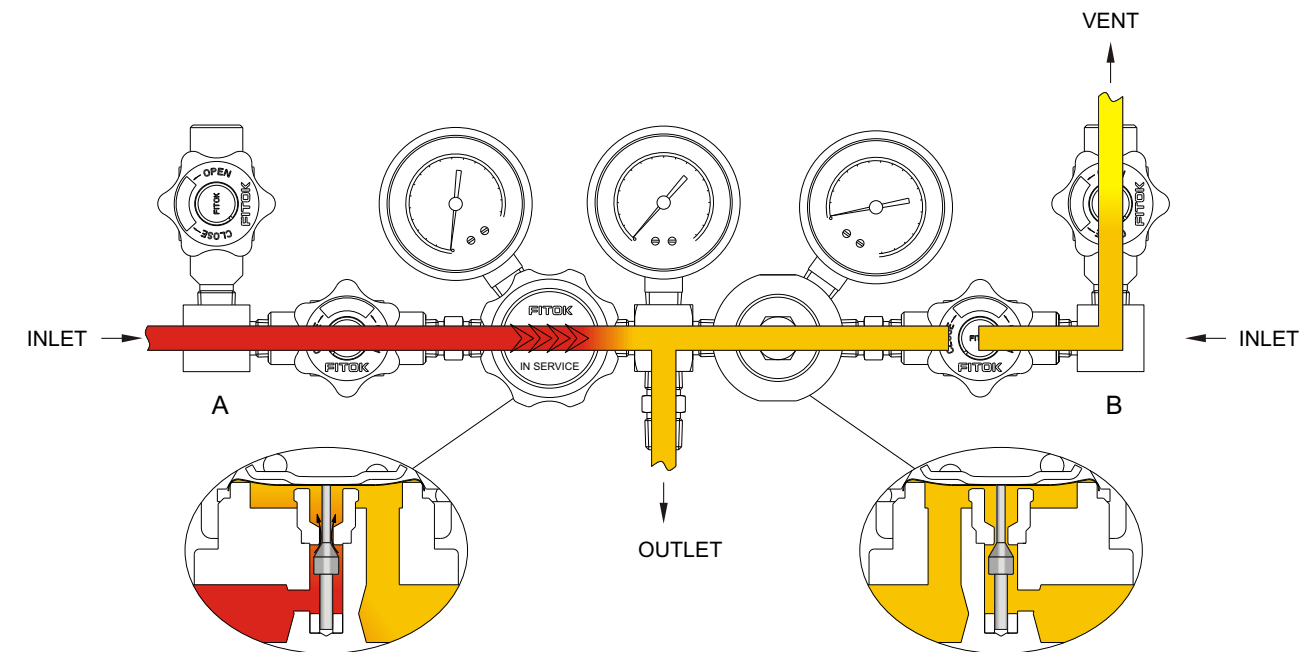
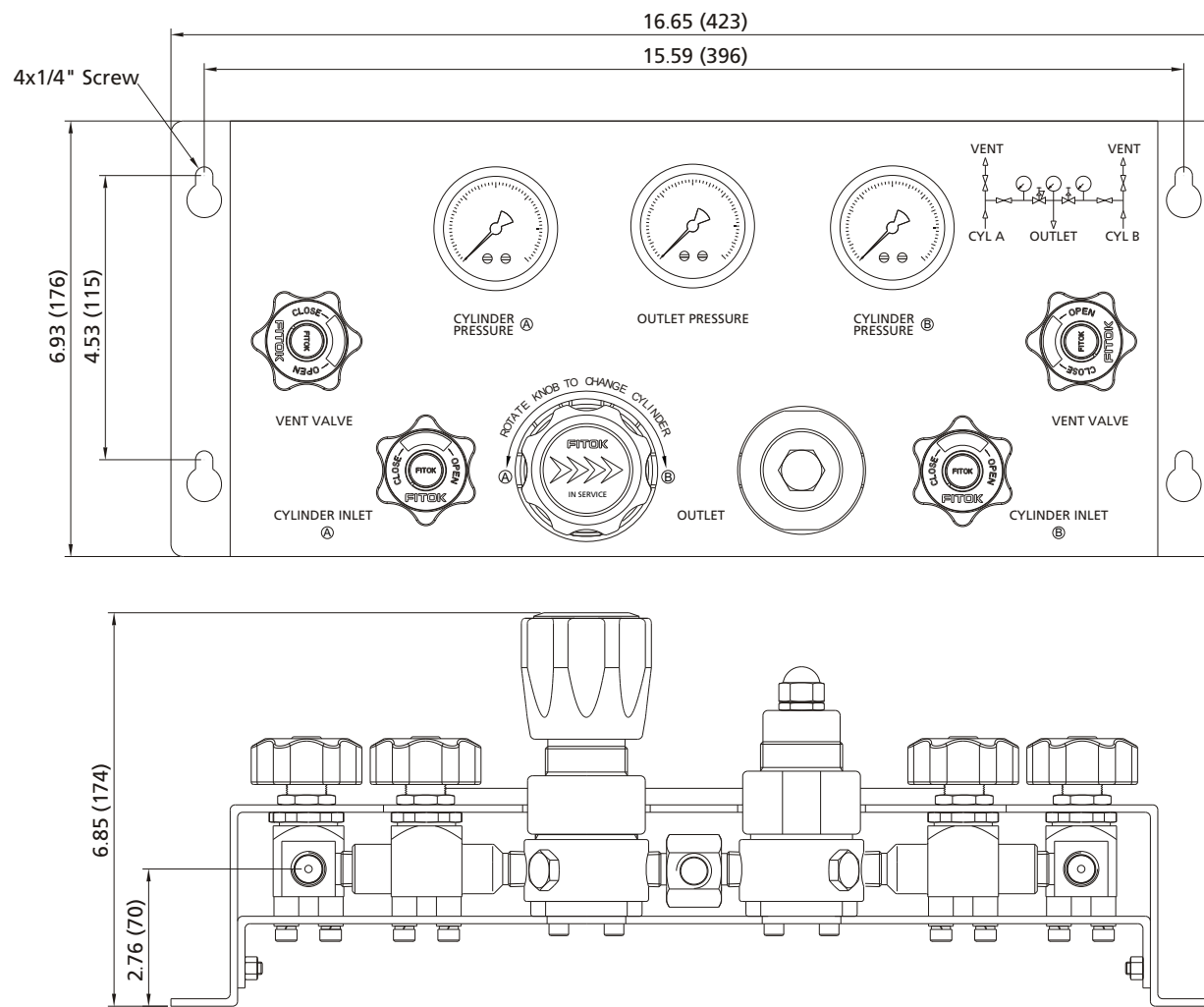


Fig. 3

## Dimensions

Dimensions, in inches (millimeters), are for reference only.



## Part Number Description

FDR - 1L6L -		30	-	20	-	10	-	00	-	00
Body Material (Regulator)	Inlet Pressure P1	Outlet Pressure Range P2		Inlet A		Inlet B	Outlet			
6L 316L SS	30 3000 psig	10	85~115 psig	00	1/4" NPT (Female)	Same as Inlet A	Same as Inlet A			
SS 316 SS	45 4500 psig	15	135~165 psig	01	1/4" NPT (Male)					
A22 Hastelloy C-22		20	185~215 psig	10	1/4" Tube Fitting					
B Brass (Nickel-plated)		25	235~265 psig	11	3/8" Tube Fitting					
				20	6 mm Tube Fitting					
				21	8 mm Tube Fitting					
Other connections are available upon requests										

# Changeover System

## FDR-1T Series Automatic Changeover System with Line Pressure Regulator

### Features

- With the FITOK FCR-1 and FLR-1 Series Line Pressure Regulator to enable outlet pressure adjustment
- Anodized Aluminium box with clearly marked panel for easy operation
- With vent valve to relieve residual pressure quickly, easy and safe to remove and replace gas source
- Automatic switching of gas source to ensure continuous gas supply
- Applicable to oxygen-enriched environments

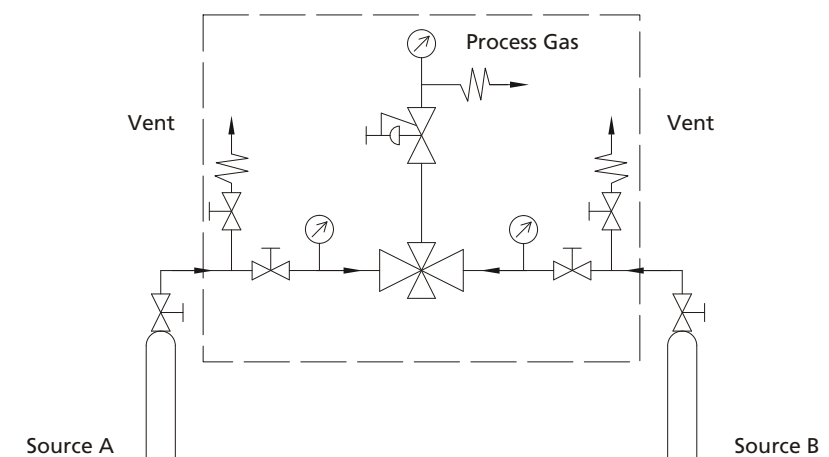


Model: FDR-1T6L-45-150-00-B-B-00-00

### Technical Data

- Maximum inlet pressure: 3000 or 4500 psig
- Outlet pressure range: 0~25, 0~50, 0~100 or 0~150 psig
- Materials of the main components:
  - Seat: PCTFE (Regulator and Diaphragm valve)
  - Diaphragm: Hastelloy (Regulator), Elgiloy (Diaphragm valve)
  - Diaphragm valve body: 316L
- Temperature: -10°F~+150°F (-23°C~+65°C)
- Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar·l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar·l/s Helium
- Flow coefficient (Regulator Cv): 0.05

### Flow Schematic



### Operation Overview

The FDR-1T Series Changeover System is mainly comprised of one adjustable outlet pressure regulator and one fixed outlet pressure regulator, together with a line pressure regulator on the outlet port.

1. Open the 2 inlets at the same time. The one side that the "IN SERVICE" arrow pointing at by turning the handle would be the 1st source for gas supply.

Fig. 1 When the "In Service" arrow is pointing at side B, side B would be the gas source. Because at this time, the fixed outlet pressure of side B is higher than the set pressure of side A. Consequently, the diaphragm of side A regulator is off from the stem to close the regulator.

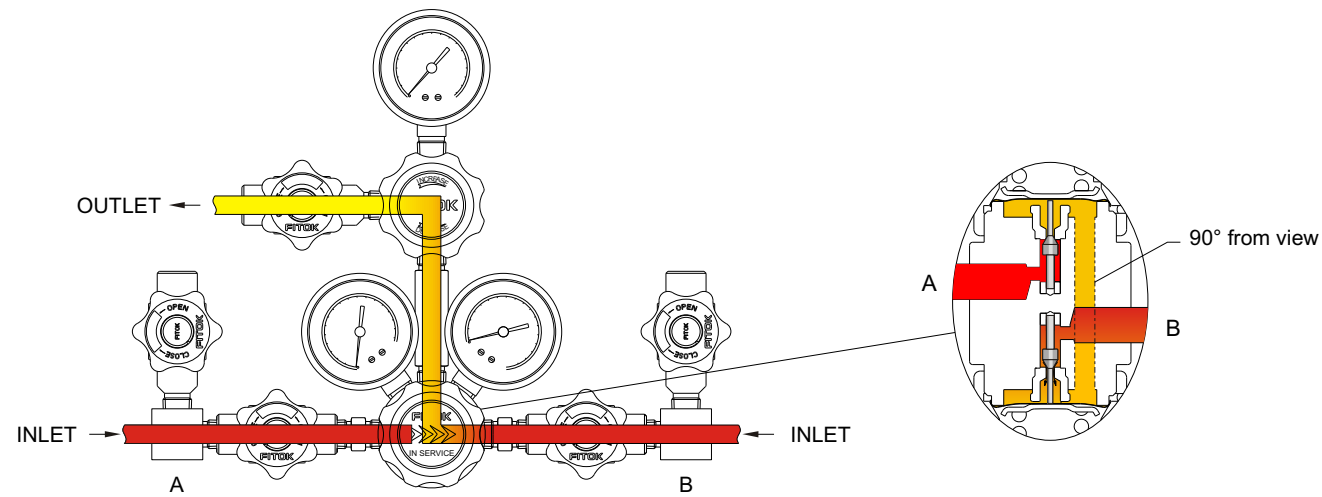


Fig. 1

Fig. 2 If side A is chosen as the gas source, the handle should be turned clockwise until the "IN SERVICE" arrow pointing at side A. Because at this time, the set pressure of side A is higher than the fixed outlet pressure of side B, Consequently, the diaphragm of side B regulator is off from the stem to close the regulator.

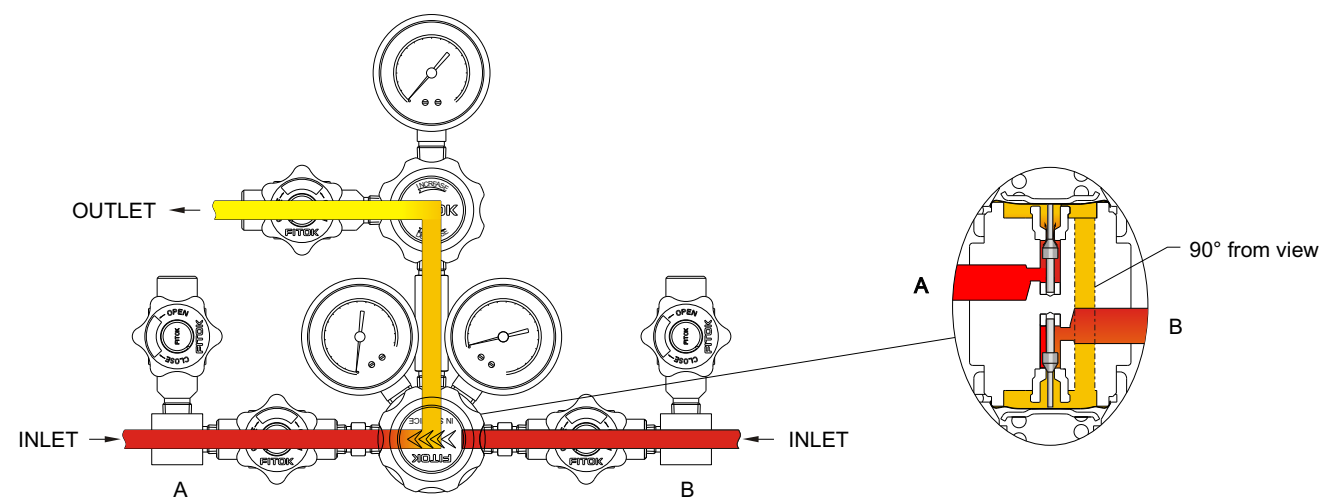


Fig. 2

2. Automatically change to another side when gas source of one side is depleted.

Fig. 3 When "IN SERVICE" arrow is pointing at side B, but gas source of side B is depleted, its outlet pressure shall decrease to be lower than the set pressure of side A. By the force of spring, side A regulator shall be opened to begin gas supply. Meanwhile, gas from side A shall flow back into side B. At this moment, before replacing new gas source of side B, the diaphragm valve should be first turned off, with the vent valve open to exhaust remaining pressure. After replacement, if the "IN SERVICE" arrow still points at side B, side B would be the gas source. If the arrow is turned towards side A, side A would then be the gas source.

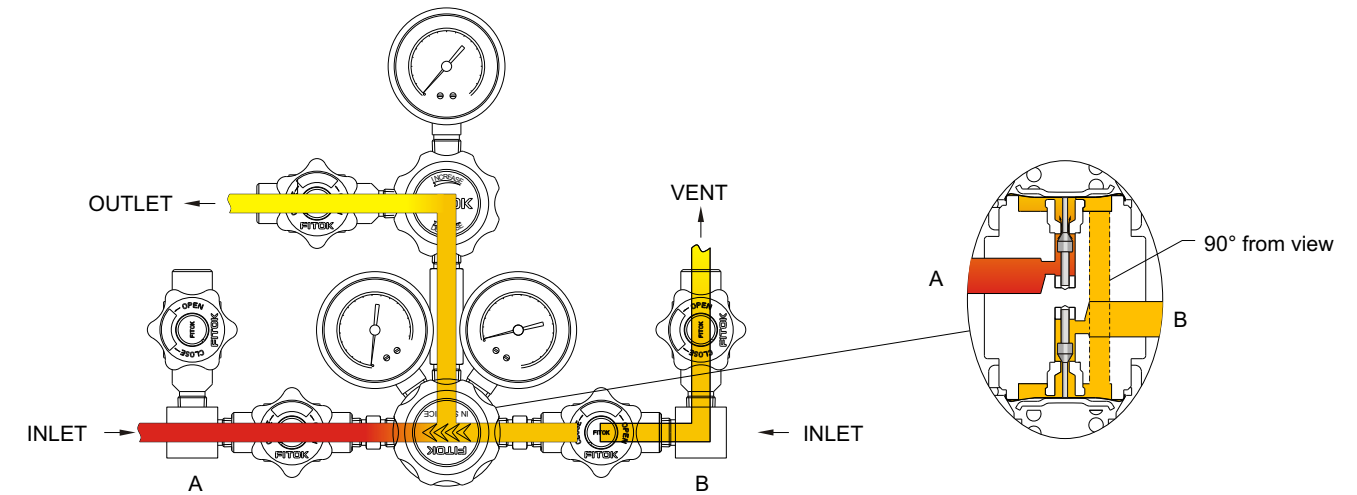
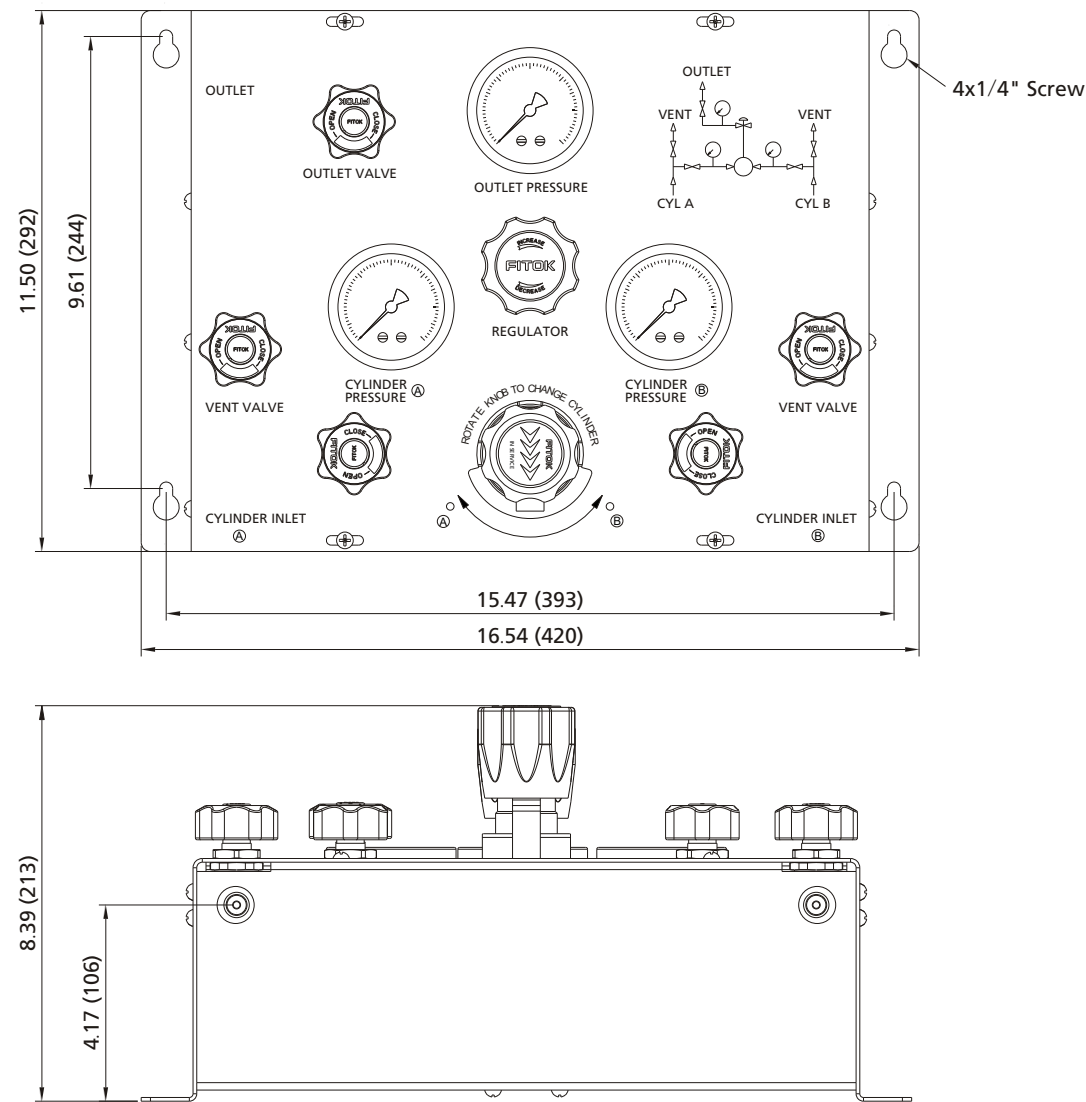


Fig. 3

## Dimensions

Dimensions, in inches (millimeters), are for reference only.



## Part Number Description

FDR - 1T6L - 30 - 25 - 10 - 00 - 00

Body Material (Regulator)	Inlet Pressure P1	Outlet Pressure Range P2	Inlet A	Inlet B	Outlet
6L 316L SS	30 3000 psig	25 0~25 psig	00 1/4" NPT (Female)	Same as Inlet A	Same as Inlet A
SS 316 SS	45 4500 psig	50 0~50 psig	01 1/4" NPT (Male)		
A22 Hastelloy C-22		100 0~100 psig	10 1/4" Tube Fitting		
B Brass (Nickel-plated)		150 0~150 psig	11 3/8" Tube Fitting		

Other connections are available upon requests

# Point-of-use Panels

## FPR-1 Series Compact Regulator for Low Pressure

### Features

- With the FITOK FLR-1 Series Regulator and shut-off valve
- With metal diaphragm regulator
- Shut-off valve for quick opening and closing with visible window
- Anodized Aluminium panel, easy to install
- Valve body of 316L SS or Brass optional
- Three configurations available

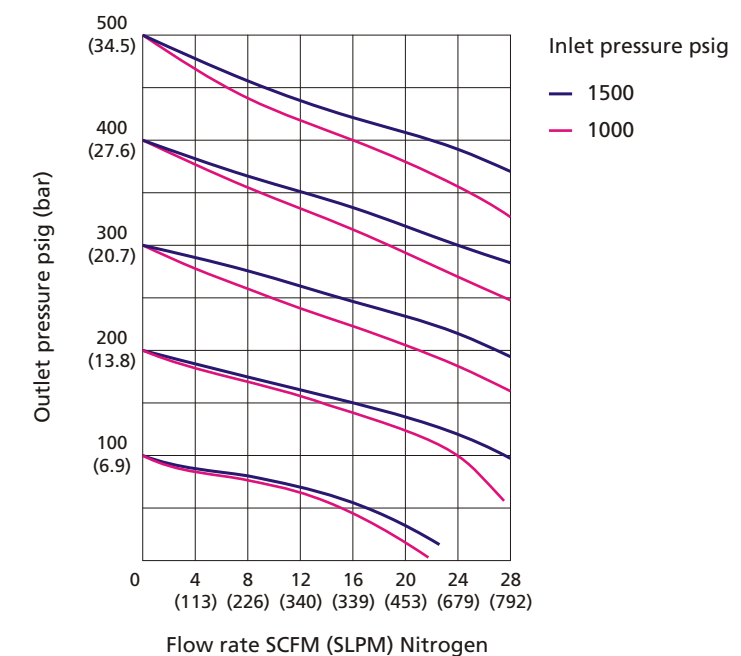
### Technical Data

- Maximum inlet pressure: 1500 psig
- Outlet pressure range: 0~25, 0~50, 0~100, 0~250 or 0~500 psig
- Materials of the main components:
  - Seat: PCTFE (Regulator and Diaphragm valve)
  - Diaphragm: Hastelloy (Regulator), Elgiloy (Diaphragm valve)
  - Diaphragm valve body: 316L
  - Filter: 316L
- Temperature: -10°F~+150°F (-23°C~+65°C)
- Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar-l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar-l/s Helium
- Flow coefficient (Regulator Cv): 0.14



Model: FPR-1U6L-15-50-11-B-11

### Flow Chart

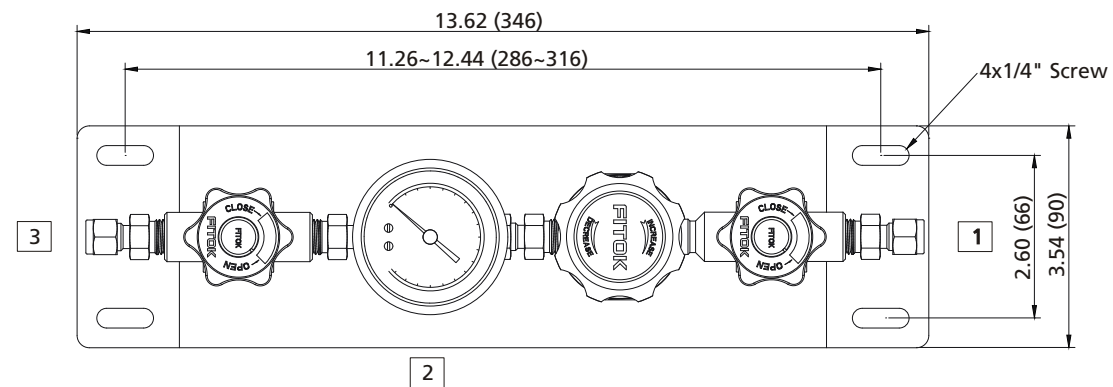




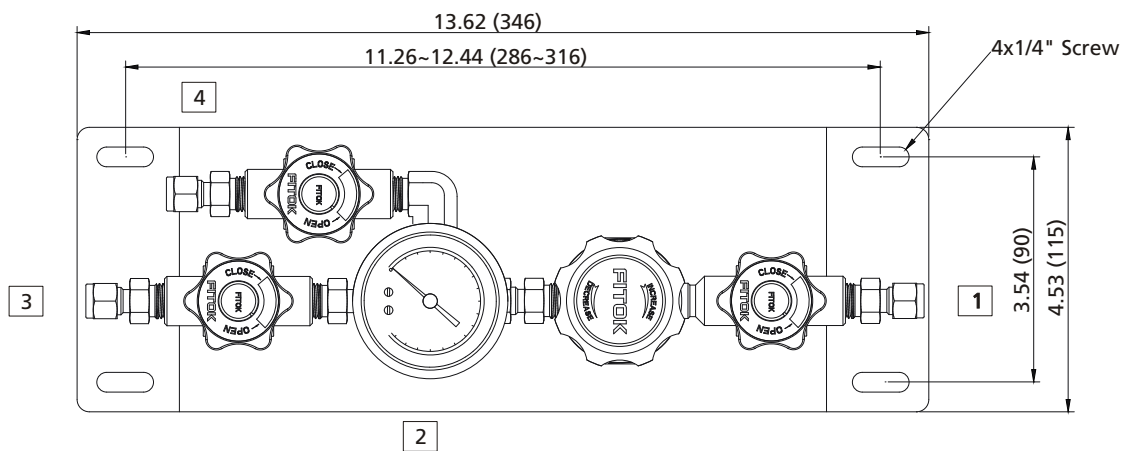
### Dimensions

Dimensions, in inches (millimeters), are for reference only.

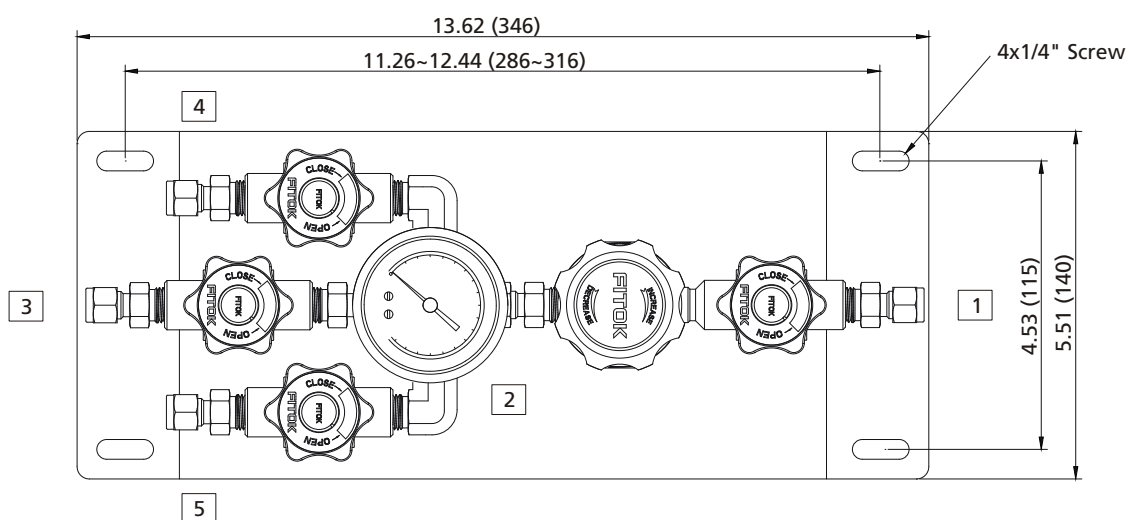
Single Outlet



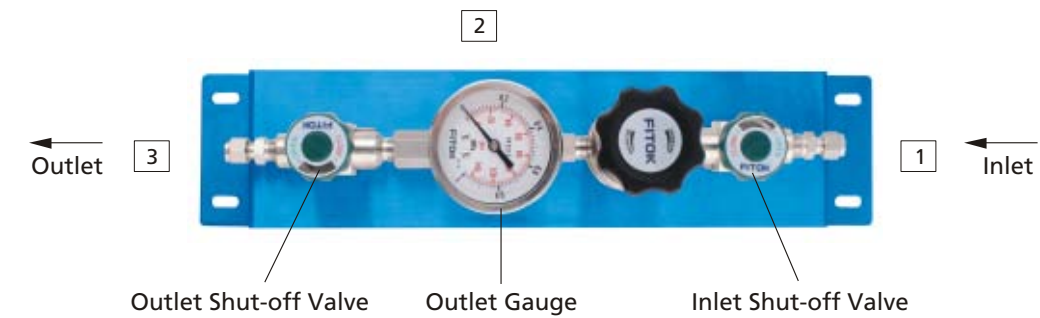
Dual Outlet



Triple Outlet



### Component Introduction



### Part Number Description

FPR - 1C 6L - 15 - 100 - 10 - M - 10 - 00 - 00

Outlet Option	Inlet Pressure P1	Connection 1	Connection 2	Connection 3	Connection 5
U Single Outlet	15 1500 psig	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	Same as Connection 1
T Dual Outlet		01 1/4" NPT (Male)	M With Gauge (MPa)	01 1/4" NPT (Male)	
C Triple Outlet		10 1/4" Tube Fitting	P Plug	10 1/4" Tube Fitting	Connection 4
		11 3/8" Tube Fitting	00 1/4" NPT (Female)	11 3/8" Tube Fitting	Same as Connection 1
		20 6 mm Tube Fitting		20 6 mm Tube Fitting	
		21 8 mm Tube Fitting		21 8 mm Tube Fitting	
		Other connections are available upon requests		Other connections are available upon requests	

Body Material (Regulator)	Outlet Pressure Range P2
6L 316L SS	25 0~25 psig
SS 316 SS	50 0~50 psig
A22 Hastelloy C-22	100 0~100 psig
B Brass (Nickel-plated)	250 0~250 psig
	500 0~500 psig

Examples for part number description:

- a. 2-port type (1 in, 1 out): FPR-1U6L-15-50-11-B-11
- b. 3-port type (1 in, 2 out): FPR-1TSS-15-100-00-B-00-00

# Point-of-use Panels

## FPR-1S Series Sensitive Regulator for Low Pressure

### Features

- With the FITOK FCR-1S Series Regulator and shut-off valves
- Large diameter convoluted diaphragm to increase pressure sensitivity
- With metal diaphragm regulator
- Shut-off valve for quick opening and closing with visible window
- Anodized aluminium panel, easy to install
- Three configurations are available

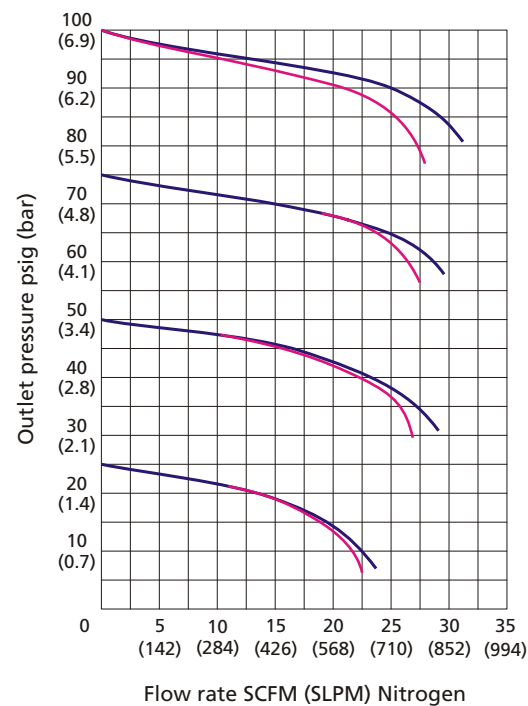


Model: FPR-1SUSS-15-50-10-B-10

### Technical Data

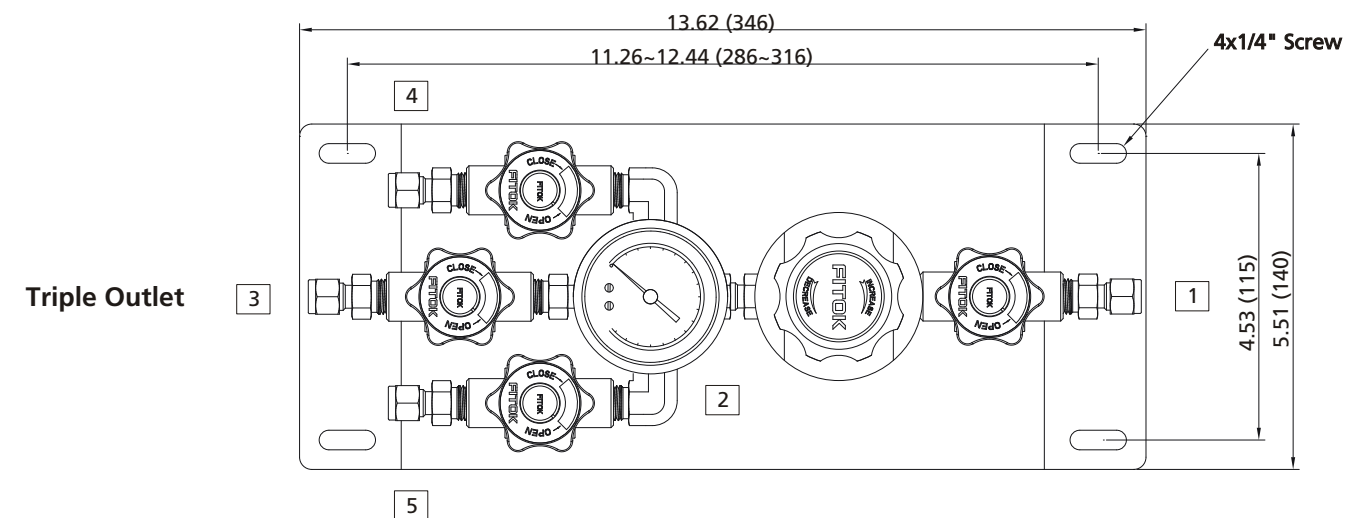
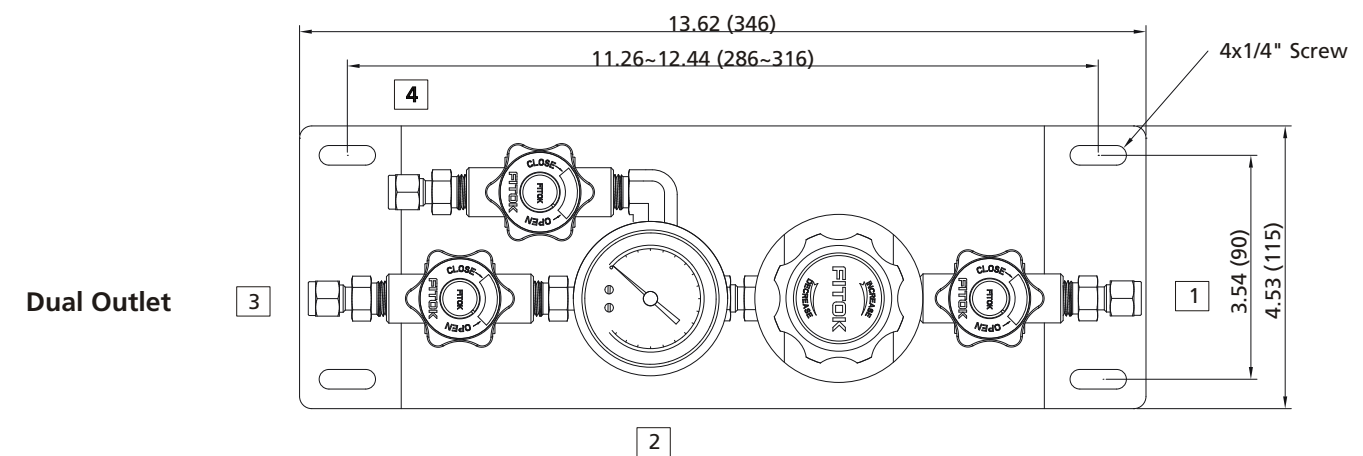
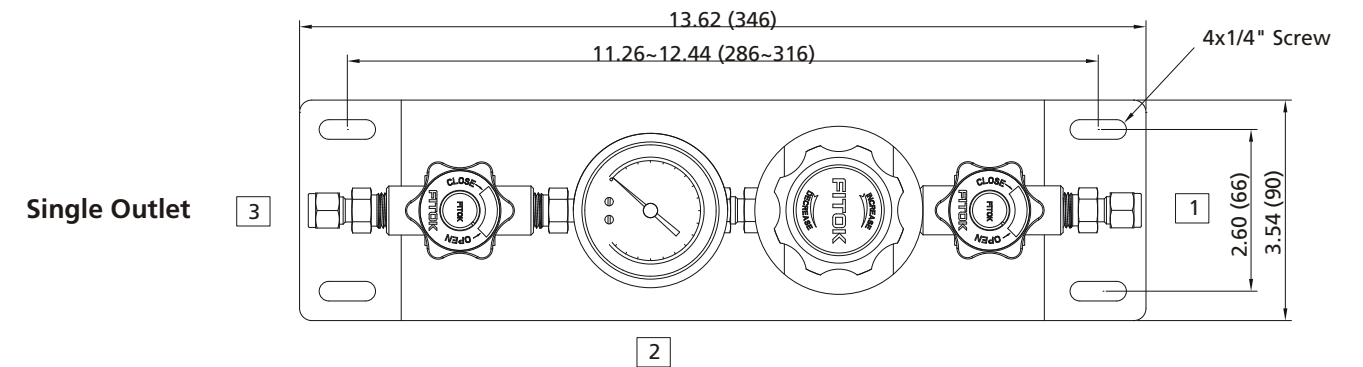
- Maximum inlet pressure: 1500 psig
- Outlet pressure range: 0~25, 0~50, 0~100, 0~150 or 0~200 psig
- Materials of the main components:
  - Seat: PCTFE (Regulator and Diaphragm valve)
  - Diaphragm: 316L (Regulator), Elgiloy (Diaphragm valve)
  - Diaphragm valve body: 316L
  - Filter: 316L
- Temperature: -10°F~+150°F (-23°C~+65°C)
- Leak rates:
  - Internal:  $\leq 1 \times 10^{-7}$  mbar-l/s Helium
  - External:  $\leq 1 \times 10^{-9}$  mbar-l/s Helium
- Flow coefficient (Regulator Cv): 0.06

### Flow Chart

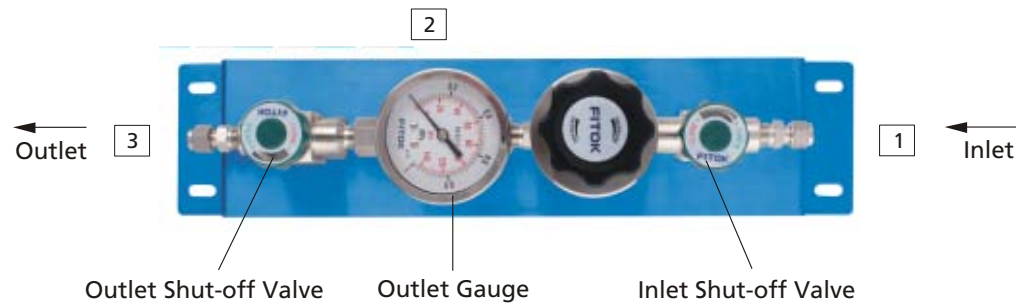


### Dimensions

Dimensions, in inches (millimeters), are for reference only.



## Component Introduction



## Part Number Description

FPR - 1SC 6L - 15 - 100 - 10 - M - 10 - 00 - 00

Outlet Option	Inlet Pressure P1	Connection 1	Connection 2	Connection 3	Connection 5
U Single Outlet	15 1500 psig	00 1/4" NPT (Female)	B With Gauge (psi/bar)	00 1/4" NPT (Female)	Same as Connection 1
T Dual Outlet		01 1/4" NPT (Male)	M With Gauge (MPa)	01 1/4" NPT (Male)	
C Triple Outlet		10 1/4" Tube Fitting	P Plug	10 1/4" Tube Fitting	
Body Material (Regulator)	Outlet Pressure Range P2				Connection 4
6L 316L SS	25 0~25 psig	11 3/8" Tube Fitting	00 1/4" NPT (Female)	11 3/8" Tube Fitting	Same as Connection 1
SS 316 SS	50 0~50 psig	20 6 mm Tube Fitting		20 6 mm Tube Fitting	
B Brass (Nickel-plated)	100 0~100 psig	21 8 mm Tube Fitting		21 8 mm Tube Fitting	
	150 0~150 psig				
	200 0~200 psig				

Other connections are available upon requests

Examples for part number description:  
 a. 2-port type (1 in, 1 out): FPR-1SU6L-15-25-00-B-20  
 b. 3-port type (1 in, 2 out): FPR-1STB-15-200-10-M-10-10

# Back Pressure Regulators

## BPR-1 Series Back Pressure Diaphragm Regulator

### Features

- ⦿ Metal to metal seal with convoluted diaphragm
- ⦿ Sensitive to pressure, low crack to reseat deviation
- ⦿ Fixed diaphragm to provide safety assurance
- ⦿ Panel mounting available

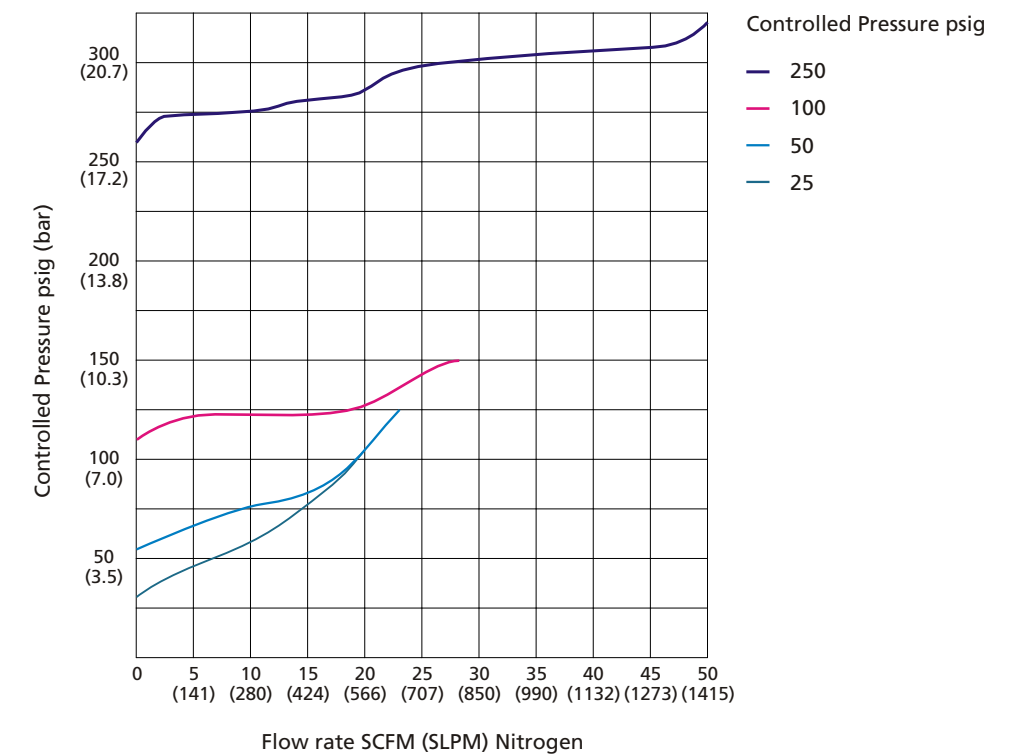
### Technical Data

- ⦿ Maximum control pressure: 250 psig
- ⦿ Controlled pressure range: 0~25, 0~50, 0~100 or 0~250 psig
- ⦿ Materials of the main components:  
 Seat: PCTFE  
 Diaphragm: Hastelloy
- ⦿ Temperature: -15°F~+165°F (-26°C~+74°C)
- ⦿ Leak rates:  
 Internal: Bubble-tight  
 External:  $\leq 1 \times 10^{-9}$  mbar · l/s Helium
- ⦿ Flow coefficient (Cv): 0.3
- ⦿ Weight:  $\approx 1.98$  lbs (0.9 kg)
- ⦿ Body ports: 1/4" female NPT for inlet, outlet and gauge



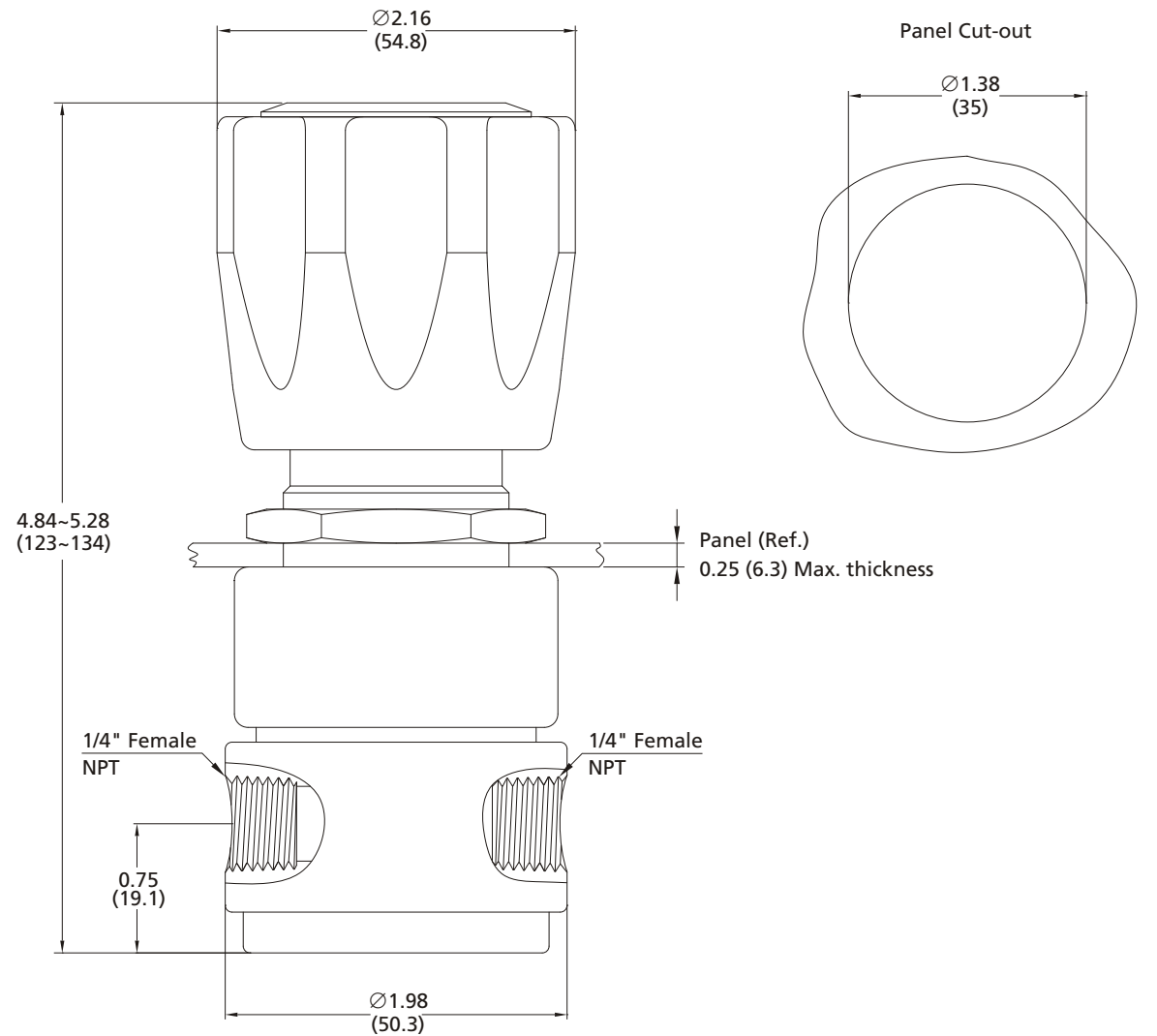
Model: BPR-16L-250-00-00

### Flow Chart

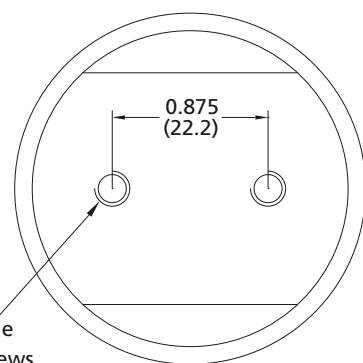


## Dimensions

Dimensions, in inches (millimeters), are for reference only.

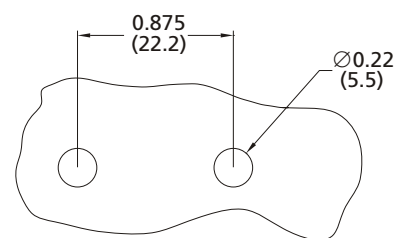


Bottom View



2xM5x0.8-6H thread, the holes are compatible with 10-32 mounting screws

Bottom Panel Cut-out



## Porting Configurations

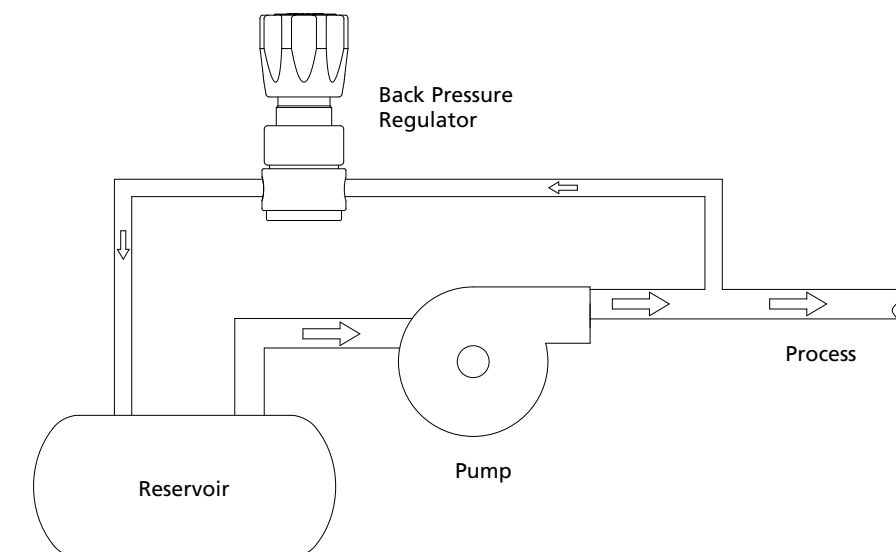


## Introduction of the Application

The design of a back pressure regulator is similar to a pressure reducing regulator. However, its function is to control the upstream pressure, while the purpose of the latter is to control its downstream.

When the system pressure is lower than the set pressure, the regulator is shut off to obstruct the flow;

When the system pressure is higher than the set pressure, the diaphragm compresses the inner spring so as to allow the medium flowing through to exhaust the excess pressure of the system.





### Part Number Description

BPR - 16L - 100 - 10 - 11 - M

Body Material	Control Pressure Range P	Connection 1	Connection 2	Connection 3
6L 316L SS	25 0~25 psig	00 1/4" NPT (Female)	B With Gauge (psi/bar)	Same as connection 1
SS 316 SS	50 0~50 psig	01 1/4" NPT (Male)	M With Gauge (MPa)	
B Brass (Nickel-plated)	100 0~100 psig	10 1/4" Tube Fitting	P Plug	
	250 0~250 psig	11 3/8" Tube Fitting	00 1/4" NPT (Female)	
		20 6 mm Tube Fitting	01 1/4" NPT (Male)	
		21 8 mm Tube Fitting	10 1/4" Tube Fitting	
		Other connections are available upon requests		

Example for part number description:  
 a. 2-port type (1 in, 1 out): BPR-16L-25-00-00

## Back Pressure Regulators

### BPR-2 Series Back Pressure Piston Regulator

#### Features

- ⦿ Durable piston sensor design
- ⦿ Close pressure differential between crack and reseal
- ⦿ Low operating torque
- ⦿ Panel mounting optional

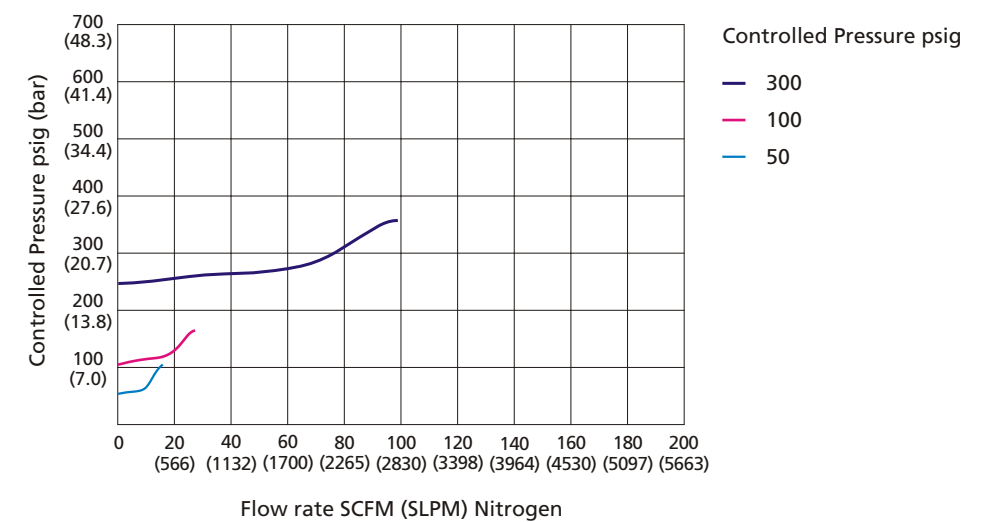
#### Technical Data

- ⦿ Maximum control pressure: 1000 psig
- ⦿ Controlled pressure range: 50~300, 100~500 or 200~1000 psig
- ⦿ Materials of the main components:
  - Piston: 316L
  - O-rings: Viton or Kalrez
- ⦿ Temperature: -15°F~+165°F (-26°C~+74°C)
- ⦿ Leak rates:
  - Internal: Bubble-tight
  - External: Bubble-tight
- ⦿ Flow coefficient (Cv): 0.3
- ⦿ Weight: ≈ 1.98 lbs (0.9 kg)
- ⦿ Body ports: 1/4" female NPT for inlet, outlet and gauge



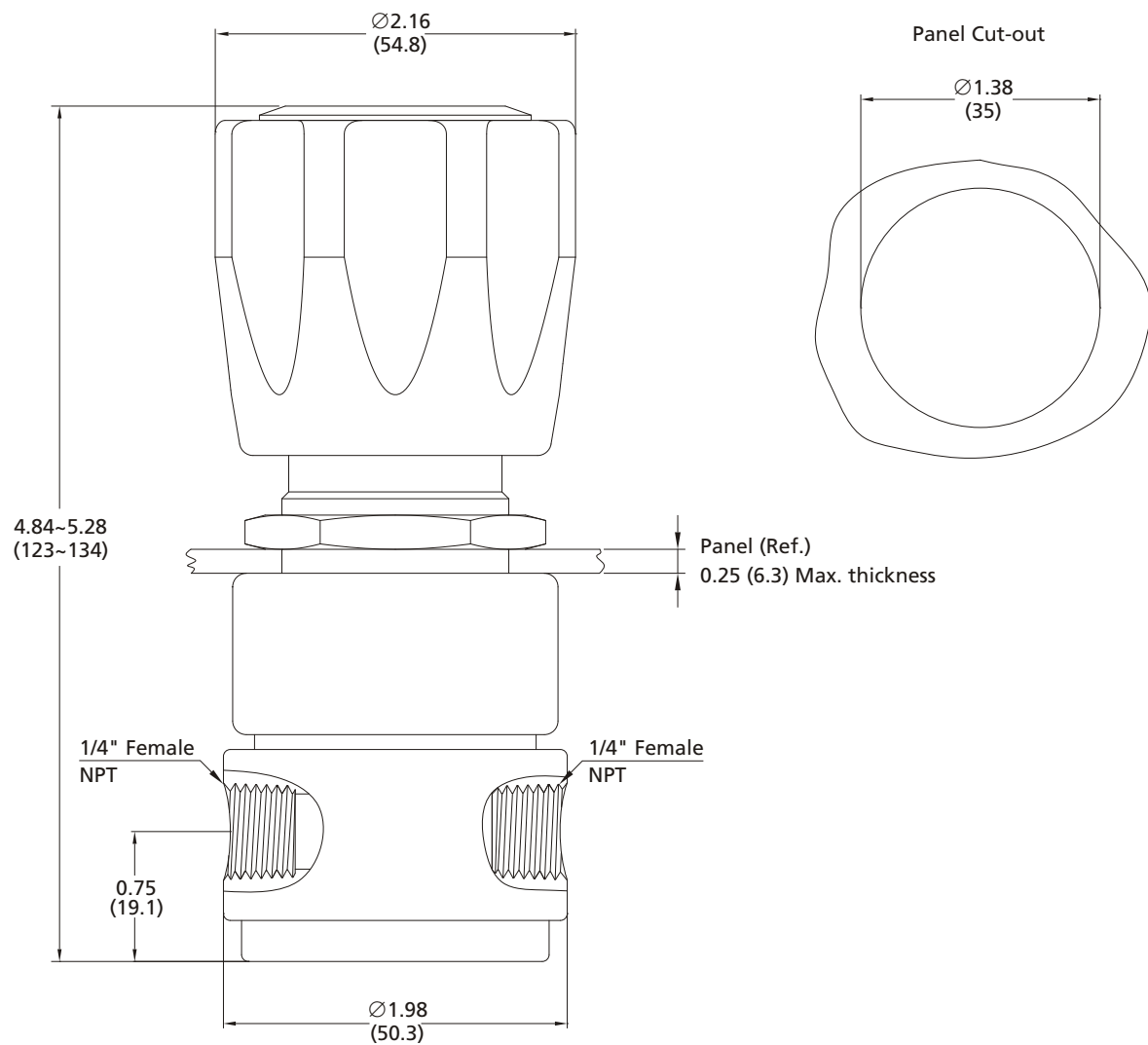
Model: BPR-26LZ-300-00-00

#### Flow Chart

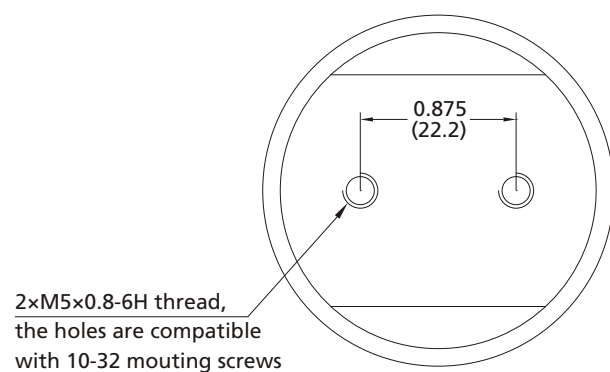


### Dimensions

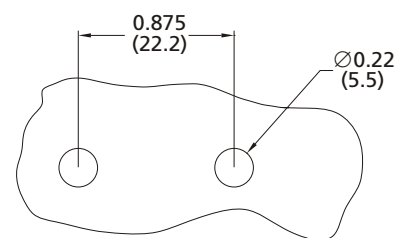
Dimensions, in inches (millimeters), are for reference only.



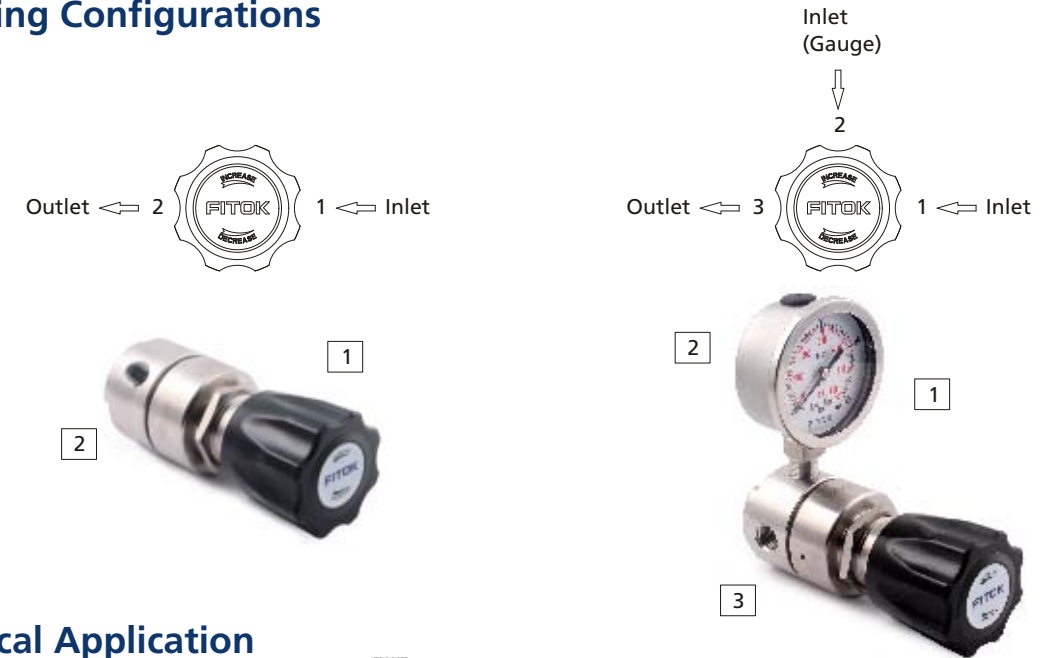
Bottom View



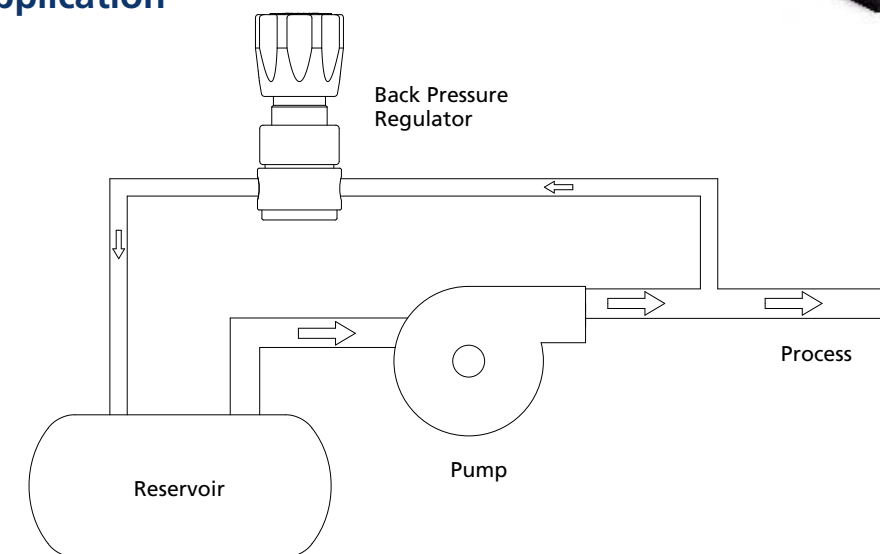
Bottom Panel Cut-out



### Porting Configurations



### Typical Application



### Part Number Description

BPR - 26L Z - 300 - 10 - 11 - M

Body Material		Control Pressure Range P	Connection 1	Connection 2	Connection 3			
6L	316L SS	300	50~300 psig	00	1/4" NPT (Female)	B	With Gauge (psi/bar)	Same as connection 1
SS	316 SS	500	100~500 psig	01	1/4" NPT (Male)	M	With Gauge (MPa)	
B	Brass (Nickel-plated)	1000	200~1000 psig	10	1/4" Tube Fitting	P	Plug	
O-ring Material				11	3/8" Tube Fitting	00	1/4" NPT (Female)	
	Viton			20	6 mm Tube Fitting	01	1/4" NPT (Male)	
	Z			21	8 mm Tube Fitting	10	1/4" Tube Fitting	

Other connections are available upon requests

Example for part number description:  
a. 2-port type (1 in, 1 out): BPR-2SS-500-00-00

# B

## Other Applicable Products

- Purge Assemblies . . . . . B-02
- Diaphragm Valves . . . . . B-04
- Ball Valves . . . . . B-05
- Needle Valves . . . . . B-06
- Check Valves . . . . . B-07
- Relief Valves . . . . . B-08
- Filters . . . . . B-09
- Fittings . . . . . B-10
- Metal Flexible Hoses . . . . . B-13
- Cylinder Connections . . . . . B-14

## Purge Assemblies

### FPV-1 Series

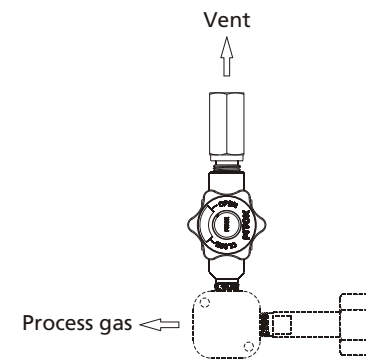
#### Technical Data

- ⦿ Maximum working pressure: 4500 psig
- ⦿ Materials of the main components:  
 Seat: PCTFE (Diaphragm valve)  
 Diaphragm: Elgiloy (Diaphragm valve)
- ⦿ Temperature: -10°F~+150°F (-23°C~+65°C)
- ⦿ Leak rates:  
 Internal:  $\leq 1 \times 10^{-9}$  mbar l/s Helium  
 External:  $\leq 1 \times 10^{-9}$  mbar l/s Helium
- ⦿ Minimum Orifice:  $\Phi 0.13$ " (3.2 mm)

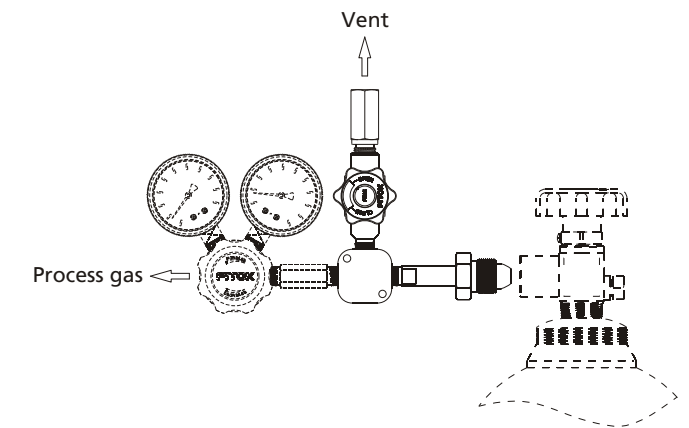
#### Product Types

- ⦿ Straight Purge Assemblies  
 Connecting the Inlet (auxiliary) port of the regulator or in between the regulator and the cylinder to allow the corrosive or toxic gas to be vented through to a safe place.

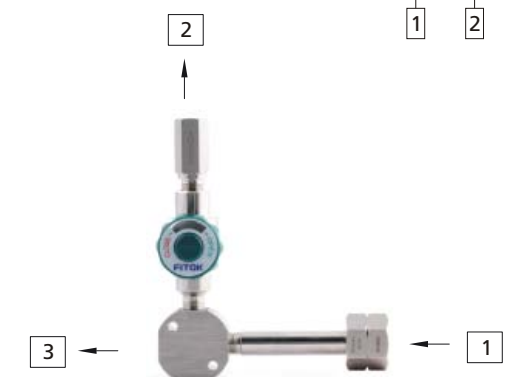
- ⦿ Tee Purge Assemblies  
 Connecting the cylinder with the regulator, allowing process gas flowing through to purge out the contamination remaining in between the cylinder and the regulator to prevent the high purity gas system from atmospheric contamination.



Port Encoding Example: FPV - 1S6L - 01 - 00  
1 2



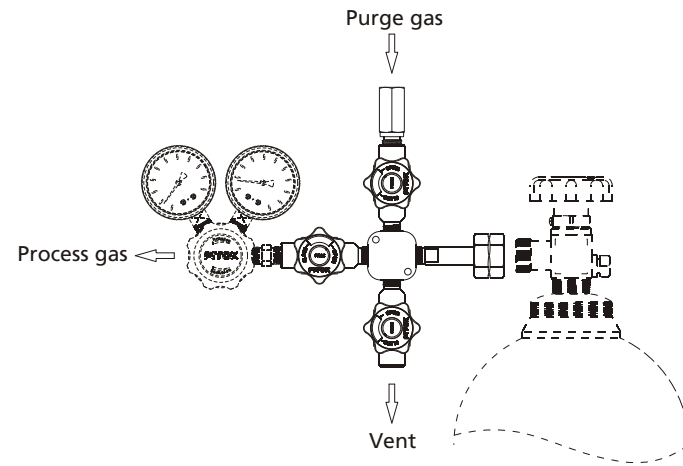
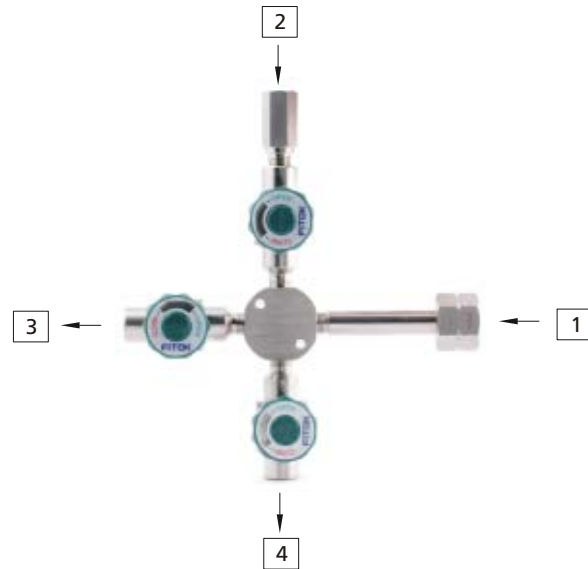
Port Encoding Example: FPV - 1T6L - C580 - 00 - 00  
1 2 3



⦿ Cross Purge Assemblies

Connecting the cylinder and the regulator; with an additional shut-off diaphragm valve to the Tee Purge Assemblies to utilize inert gas from the outside to purge out the contamination in between the cylinder and the regulator.

Port Encoding Example: FPV - 1C6L - DIN6 - 00 - 00 - 00



# Diaphragm Valves

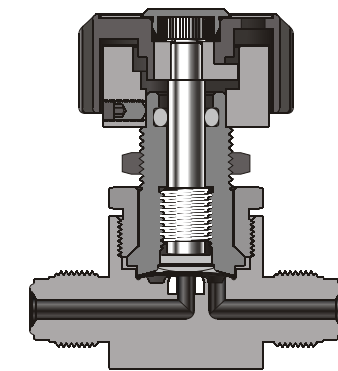
## DS Series

### Features

- ⦿ Reduced inner capacity
- ⦿ Packless diaphragm seal design for high purity
- ⦿ Component parts are reduced to minimum
- ⦿ Manual and pneumatic actuators available
- ⦿ Increased operation speed using aluminum piston

### Technical Data

- ⦿ Maximum working pressure: 4500 psig
- ⦿ Materials of the internal components:  
Seat: PCTFE or Vespel  
Diaphragm: Elgiloy
- ⦿ Temperature:  
PCTFE: -10°F~+150°F (-23°C~+65°C)  
Vespel: -10°F~+250°F (-23°C~+121°C)
- ⦿ Leak rates:  
Internal:  $\leq 1 \times 10^{-9}$  mbar l/s Helium  
External:  $\leq 1 \times 10^{-9}$  mbar l/s Helium
- ⦿ Flow coefficient (Cv): 0.17



### Part Number Description

FPV - 1C	6L	-	DIN1	-	00	-	00	-	00
Product Types	Body Material	Connection 1		Connection 2		Connection 3		Connection 4	
S Straight Purge Assemblies	6L 316L SS	00	1/4" NPT (Female)	00	1/4" NPT (Female)	Same as Connection 2		Same as Connection 2	
T Tee Purge Assemblies	SS 316 SS	01	1/4" NPT (Male)	01	1/4" NPT (Male)				
C Cross Purge Assemblies		C_	CGA Number (USA)	10	1/4" Tube Fitting				
		DIN_	DIN Number (Germany)	20	6 mm Tube Fitting				
			Refer to pg.B-28 for cylinder connections, according to the specific gas type. Cylinder connections compliant to other standards are upon request. Please contact FITOK for detail.	21	8 mm Tube Fitting				
				Other connections are available upon requests					

### Part Number Description

DS	6L	-	NS	4	-	FNS	4	-	R	V	F2
Body Material	Inlet Type	Inlet Size	Outlet Size	Actuator Type		Technology Grade		Seat			
6LW 316L VIM-VAR	TB Fractional Tube Butt Weld	4 1/4"	Same as Inlet	R Handle	General purpose		PCTFE				
6L 316L SS	MTB Metric Tube Butt Weld	6 6 mm or 3/8"	Specify in the same way as inlet size	C Pneumatic normally close	F2 Special cleaning and packing		V Vespel				
SS 316 SS	FR Male FR Fitting	8 8 mm		O Pneumatic normally open	F3 Ultrahigh-purity						
	FFR Female FR Fitting										
	FL Fractional Tube Fitting										
	ML Metric Tube Fitting										
	NS Male NPT										
	FNS Female NPT										
		Outlet Type									
		Same as Inlet									
		Specify in the same way as inlet type									

Note: Most configurations are available.



# Ball Valves

## BO Series

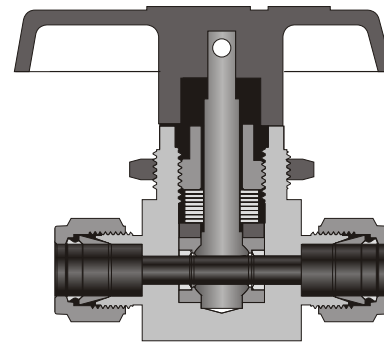
### Features

- One-piece body and one-piece ball stem
- No dead zone, such as in the area between the ball and valve chamber
- In-line inspection and repair with top entry design
- Thermal cycle performance improved and wear compensated by live-loaded design
- Any reasonable connections available
- Pneumatic and electric actuators available



### Technical Data

- Maximum working pressure: 3000 psig (207 bar)
- Temperature: -65°F to 300°F (-54°C to 148°C)
- Materials:  
Seat: PTFE



### Part Number Description

BO 6L - NS 4 - FNS 4 - H03 - V A - F2

Body Material		Connection 1 Type		Connection 2 Type		Orifice Size		Flow Pattern		Technology Grade	
6L	316L SS	FNS	Female NPT	Same as Connection 1		02	0.09" (2.4 mm)	Straight		General purpose	
SS	316 SS	NS	Male NPT	Specify in the same way as inlet type		03	0.13" (3.2 mm)	A Angle		F2	Special cleaning and packing
B	Brass	FR	Male FR Fitting			05	0.19" (4.8 mm)				
		FL	Fractional Tube Fitting								
		ML	Metric Tube Fitting								
Connection 1 Size		Connection 2 Size		Seat Material		Handle					
4	1/4"	Same as Connection 1		PTFE	Black Nylon						
6	6 mm or 3/8"	Specify in the same way as inlet size		H UHMWPE	C Red Nylon						
8	8 mm or 1/2"			A PFA	F Green Nylon						
					J Blue Nylon						
					U Black Aluminium						

# Needle Valves

## ND Series

### Features

- One-piece forged body
- Straight and angle pattern
- Compact design
- Non-rotating stem
- Specially designed handle to stop contamination from entering into the valve



### Technical Data

- Maximum working pressure: 3000 psig (207 bar)
- Temperature:  
PTFE stem tip: -20°F to 200°F (-28°C to 93°C)  
PEEK stem tip: -20°F to 450°F (-28°C to 232°C)

### Part Number Description

ND SS - FNS 4 - NS 4 - 7 P E - A F2

Body Material		Inlet Type		Outlet Type		Tip Material		Flow Pattern		Technology Grade	
6L	316L SS	FNS	Female NPT	Same as Inlet Type		PCTFE		Straight		General purpose	
SS	316 SS	NS	Male NPT	Specify in the same way as inlet type		P	PEEK	A Angle		F2	Special cleaning and packing
B	Brass	FL	Fractional Tube Fitting								
		ML	Metric Tube Fitting								
Inlet Size		Outlet Size		Orifice Size		O-ring Material					
4	1/4"	Same as Inlet Size		5	0.08" (2.0 mm)	FKM					
6	6 mm or 3/8"	Specify in the same way as inlet size		7	0.16" (4.0 mm)	B	Buna-N				
8	8 mm or 1/2"			8	0.22" (5.6 mm)	E	Ethylene propylene				

# Check Valves

## CV, CO and COA Series

### Features

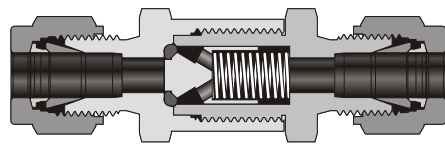
- Resilient O-ring seat design for leak-free sealing
- Maximum working pressure: 3000 psig (207 bar)
- Temperature: -10°F to 375°F (-23°C to 190°C)
- PTFE coated spring optional



### CV Series

#### Fixed cracking pressure

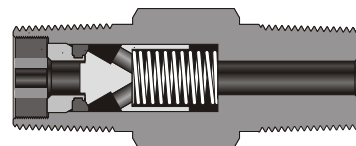
- Cracking pressure: 1/3 to 25 psig (0.02 to 1.7 bar)



### CO Series

#### Fixed cracking pressure

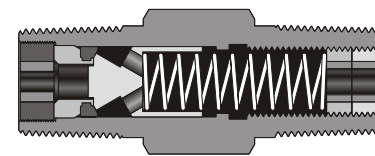
- Compact design with one-piece body
- Cracking pressure: 1/3 to 25 psig (0.02 to 1.7 bar)



### COA Series

#### Adjustable cracking pressure, a variety of springs available

- Cracking pressure: 3 to 600 psig (0.02 to 41.4 bar)



## Part Number Description

CV	SS	-	FNS	4	-	NS	4	-	B	-	A	F2
Series	Inlet Type		Inlet Size	Outlet Size		Cracking Pressure		Technology Grade				
CV	FNS	Female NPT	4 1/4"	Same as Inlet Size		3 psig	CV and CO	General purpose				
CO	NS	Male NPT	6 6 mm or 3/8"	Specify in the same way as inlet size		1 1/3 psig		F2	Special cleaning and packing			
COA	FL	Fractional Tube Fitting (only for CV series)	8 8 mm or 1/2"	Specify in the same way as inlet size		2 1 psig	COA					
	ML	Metric Tube Fitting (only for CV series)		Specify in the same way as inlet type		3 10 psig						
	FR	Male FR Fitting (only for CV series)		Specify in the same way as inlet type		4 25 psig						
				Specify in the same way as inlet type		5 3 to 50 psig						
				Specify in the same way as inlet type		6 50 to 150 psig						
				Specify in the same way as inlet type		7 150 to 350 psig						
				Specify in the same way as inlet type		8 350 to 600 psig						
Body Material	Inlet Type		Outlet Type	Seal Material		Technology Grade						
6L 316L SS	ML	Metric Tube Fitting (only for CV series)	Same as Inlet Type	FKM		General purpose						
SS 316 SS	FR	Male FR Fitting (only for CV series)	Specify in the same way as inlet type	B Buna-N		Special cleaning and packing						
B Brass			Specify in the same way as inlet type	N Neoprene								
			Specify in the same way as inlet type	E Ethylene propylene								
			Specify in the same way as inlet type	Z Kalrez								

# Relief Valves

## RUV and RV Series

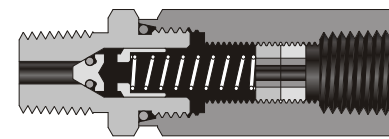
### Introduction

Relief Valve opens when system pressure reaches the set pressure, allowing the medium to flow out and to relieve the system pressure. The valve closes when the system pressure is down to the resealing pressure.

### Features

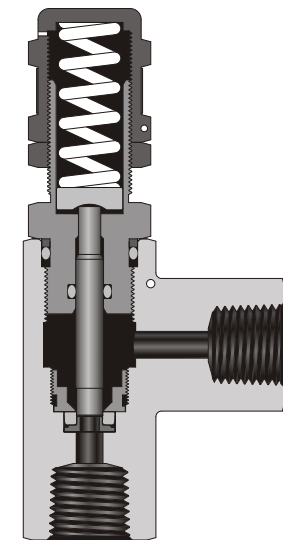
#### RUV Series

- Compact design with one-piece body
- Standard seat: FKM
- Temperature: -10°F to 300°F (-23°C to 148°C)
- Cracking pressure: 25 to 500 psig (1.7 to 34.5 bar)
- Set pressure by nut adjustment and springs replacement



#### RV Series

- Working temperature: -10°F to 300°F (-23°C to 148°C)
- Cracking pressure: 50 to 6000 psig
- Adjustable bonnet cap for pressure setting
- Lead-seal line protected



## Temperature Range of Sealing Materials

O-ring Material	Temperature Ranges °F (°C)
Fluorocarbon Rubber	25 to 250 (-4 to 121)
Buna-N Rubber	0 to 250 (-17 to 121)
Neoprene Rubber	-10 to 300 (-23 to 148)
Ethylene Propylene Rubber	30 to 250 (-1 to 121)

## Part Number Description

RV	SS	-	FNS	4	-	NS	4	-	6	B	-	1	F2
Series	Inlet Type		Outlet Type	Orifice Size		Set Pressure		Technology Grade					
RUV	FNS	Female NPT	Same as Inlet Type	0.14" (3.6 mm) RUV series		1 25 to 100 psig	RUV	General purpose					
RV	NS	Male NPT	Specify in the same way as inlet type	6 0.14" (3.6 mm) RV series		2 100 to 250 psig		F2	Special cleaning and packing				
	FL	Fractional Tube Fitting (only for RV series)	Specify in the same way as inlet type			3 250 to 500 psig	RV						
	ML	Metric Tube Fitting (only for RV series)	Specify in the same way as inlet type			F 50 to 300 psig							
			Specify in the same way as inlet size			O 300 to 700 psig							
			Specify in the same way as inlet size			Y 700 to 1500 psig							
			Specify in the same way as inlet size			p 1500 to 2500 psig							
			Specify in the same way as inlet size			W 2500 to 3500 psig							
			Specify in the same way as inlet size			J 3500 to 4500 psig							
			Specify in the same way as inlet size			C 4500 to 6000 psig							
Body Material	Inlet Type		Outlet Size	Seal Material		Technology Grade							
6L 316L SS	ML	Metric Tube Fitting (only for RV series)	Same as Inlet Size	FKM		General purpose							
SS 316 SS			Specify in the same way as inlet size	B Buna-N		Special cleaning and packing							
			Specify in the same way as inlet size	N Neoprene									
			Specify in the same way as inlet size	E Ethylene propylene									
			Specify in the same way as inlet size	Z Kalrez									

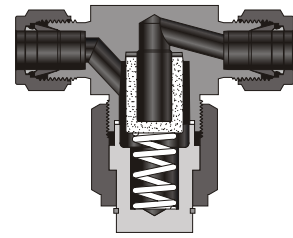
# Filters

## FT, FB, FI and FW Series

### FT Series

#### Tee-type Filters

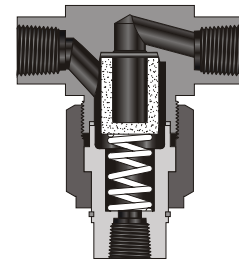
- Maximum working pressure: 6000 psig (414 bar)
- Temperature: -20 °F to 900 °F (-28°C to 482 °C)
- Filter element replaceable without removing body from system



### FB Series

#### Bypass Filters

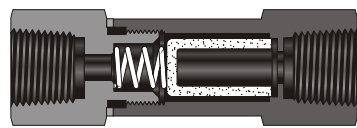
- Maximum working pressure: 6000 psig (414 bar)
- Temperature: -20 °F to 900 °F (-28°C to 482 °C)
- Bypass port at filter bottom for the ease of sampling or purging



### FI Series

#### In-line Filters

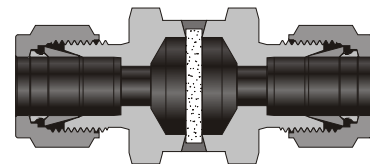
- Maximum working pressure: 3000 psig (207 bar)
- Temperature: -20 °F to 900 °F (-28°C to 482 °C)
- Compact and space-saving design



### FW Series

#### All-welded In-line Filters

- Maximum working pressure: 6000 psig (414 bar)
- Temperature: -20 °F to 900 °F (-28°C to 482 °C)
- Large filtration area and high flow coefficient
- All-welded construction for elimination of leakage



## Part Number Description

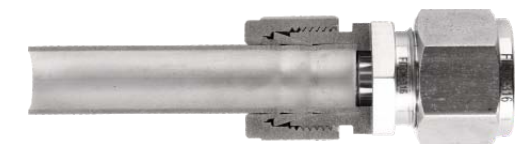
Series	Inlet Type	Outlet Type	Element Type	Pore Size (µm)	Bypass Port (for FB series only)	Body Material	Inlet Size	Outlet Size	Gasket Material	Technology Grade
FT	FNS Female NPT	Same as Inlet Type	Sintered	05	1/8" Female NPT	6L 316L SS	4 1/4"	Same as Inlet Size	Silver-plated 316 SS for FT, FB, FI	General purpose
FB	NS Male NPT	Specify in the same way as inlet type	S Strainer	2	FL 4 1/4" Fractional Tube Fitting	SS 316 SS	6 6 mm or 3/8"	Specify in the same way as inlet size	PTFE-plated 316 SS for FT, FB, FI	F2 Special cleaning and packing
FI	FL Fractional Tube Fitting			7	TS 4 1/4" Tube Socket Weld		8 8 mm or 1/2"		Aluminum for FT, FB, FI	
FW	ML Metric Tube Fitting			15	FL 6 3/8" Fractional Tube Fitting				No-plated 316 SS for FT, FB, FI	
	FR Male FR Fitting			40						
				60						
				80						
				100						
				150						
				250						
				400						

# Fittings



## Features

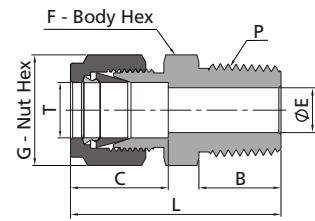
- Sizes range from 1/4" to 1/2" and 6 mm to 12 mm
- Diverse materials and configurations available
- Precision machined components to ensure perfect deformation of the ferrules and tubing
- Hardened threads with smooth surface finish to avoid galling and to help extend the fitting service life
- Silver-plated female nut threads to reduce the friction against the body threads
- Radius junction design with elbows to provide smooth flow path
- Every fitting stamped with size, material and heat code



## Ordering Information and Dimensions

Dimensions are shown with FITOK nuts finger-tight.

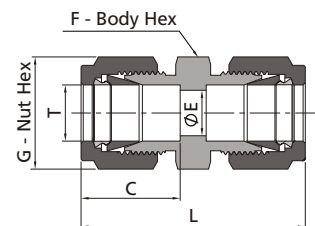
### Male Connectors



Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimension, in. (mm)						
			L	B	C	E	G	F	
1/4	1/4	-CM-FL4-NS4	1.49(37.8)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.56(14.3)	
3/8	3/8	-CM-FL6-NS6	1.57(39.9)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.69(17.5)	
1/2	1/2	-CM-FL8-NS8	1.93(49.0)	0.75(19.1)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)	

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimension, mm (in.)						
			L	B	C	E	G	F	
6	1/4	-CM-ML6-NS4	37.9(1.49)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)	
8	3/8	-CM-ML8-NS6	39.3(1.55)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	18.0(0.71)	
10	3/8	-CM-ML10-NS6	40.9(1.61)	14.2(0.56)	17.2(0.68)	7.9(0.31)	19.0(0.75)	18.0(0.71)	
12	1/2	-CM-ML12-NS8	49.0(1.93)	19.1(0.75)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	

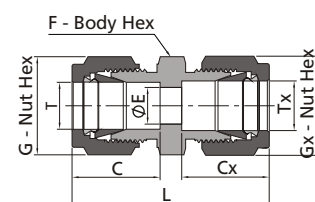
### Unions



Fractional Tube			NPT Thread				
T-Tube O.D. (in.)	Basic Ordering Number		Dimension, in. (mm)				
			L	C	G	F	E
1/4	-U-FL4		1.61(40.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)
3/8	-U-FL6		1.77(45.0)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)
1/2	-U-FL8		2.02(51.3)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)

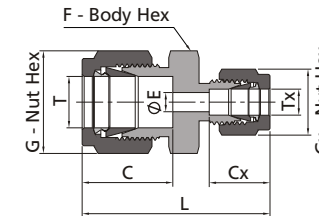
Metric Tube			NPT Thread				
T-Tube O.D. (mm)	Basic Ordering Number		Dimension, mm (in.)				
			L	C	G	F	E
6	-U-ML6		41.0(1.61)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)
8	-U-ML8		43.2(1.70)	16.2(0.64)	16.0(0.63)	15.0(0.59)	6.4(0.25)
10	-U-ML10		46.2(1.82)	17.2(0.68)	19.0(0.75)	18.0(0.71)	7.9(0.31)
12	-U-ML12		51.2(2.02)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)

### Conversion Unions



Metric Tube			Fractional Tube						
T-Tube O.D. (mm)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimension, mm (in.)						
			L	C	G	F	E	Cx	Gx
6	1/4	-U-ML6-FL4	41.0(1.61)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)	15.2(0.60)	14.3(0.56)
8	1/4	-U-ML8-FL4	42.3(1.67)	16.2(0.64)	16.0(0.63)	15.0(0.59)	4.8(0.19)	15.2(0.60)	14.3(0.56)
8	3/8	-U-ML8-FL6	44.3(1.74)	16.2(0.64)	16.0(0.63)	16.0(0.63)	6.4(0.25)	16.8(0.66)	17.5(0.69)
10	1/4	-U-ML10-FL4	44.5(1.75)	17.2(0.68)	19.0(0.75)	18.0(0.71)	4.8(0.19)	15.2(0.60)	14.3(0.56)
10	3/8	-U-ML10-FL6	45.9(1.81)	17.2(0.68)	19.0(0.75)	18.0(0.71)	7.1(0.28)	16.8(0.66)	17.5(0.69)
12	3/8	-U-ML12-FL6	48.4(1.91)	22.8(0.90)	22.0(0.87)	22.0(0.87)	7.1(0.28)	16.8(0.66)	17.5(0.69)
12	1/2	-U-ML12-FL8	51.2(2.02)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)	22.9(0.90)	22.2(0.87)

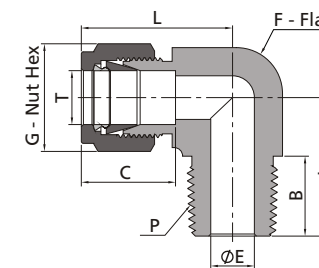
### Reducing Unions



Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimension, in. (mm)						
			L	C	G	F	E	Cx	Gx
3/8	1/4	-U-FL6-FL4	1.70(43.2)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.19(4.8)	0.60(15.2)	0.56(14.3)
1/2	1/4	-U-FL8-FL4	1.85(47.0)	0.90(22.8)	0.87(22.2)	0.81(20.6)	0.19(4.8)	0.60(15.2)	0.56(14.3)
1/2	3/8	-U-FL8-FL6	1.91(48.5)	0.90(22.8)	0.87(22.2)	0.81(20.6)	0.28(7.1)	0.66(16.8)	0.69(17.5)

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	Tx-Tube O.D. (mm)	Basic Ordering Number	Dimension, mm (in.)						
			L	C	G	F	E	Cx	Gx
8	6	-U-ML8-ML6	42.3(1.67)	16.3(0.64)	16.0(0.63)	15.0(0.59)	4.8(0.19)	15.3(0.60)	14.0(0.55)
10	8	-U-ML10-ML8	45.1(1.78)	17.2(0.68)	19.0(0.75)	18.0(0.71)	6.4(0.25)	16.3(0.64)	16.0(0.63)
12	10	-U-ML12-ML10	48.7(1.92)	22.8(0.90)	22.0(0.87)	22.0(0.87)	7.9(0.31)	17.2(0.68)	19.0(0.75)

### Male Elbows



Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimension, in. (mm)						
			L	C	G	F	E	B	Lx
1/4	1/4	-LM-FL4-NS4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.56(14.2)	0.92(23.4)
3/8	3/8	-LM-FL6-NS6	1.23(31.2)	0.66(16.8)	0.69(17.5)	0.69(17.5)	0.28(7.1)	0.56(14.2)	1.03(26.2)
1/2	1/2	-LM-FL8-NS8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.75(19.1)	1.30(33.0)

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimension, mm (in.)						
			L	C	G	F	E	B	Lx
6	1/4	-LM-ML6-NS4	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	14.2(0.56)	23.4(0.92)
8	3/8	-LM-ML8-NS6	30.6(1.20)	16.2(0.64)	16.0(0.63)	17.5(0.69)	6.4(0.25)	14.2(0.56)	26.2(1.03)
10	3/8	-LM-ML10-NS6	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.9(0.31)	14.2(0.56)	26.2(1.03)
12	1/2	-LM-ML12-NS8	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	19.1(0.75)	33.0(1.30)

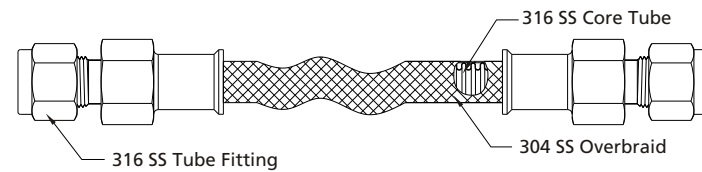


# Metal Flexible Hoses

## MH, MM Series

### Features

- ⦿ Core tube and fitting material: 316 SS
- ⦿ Overbraid material: 304 SS
- ⦿ For vacuum and positive pressure applications
- ⦿ Maximum working pressure: 3100 psig (213 bar)
- ⦿ Hose size: 1/4" to 1"
- ⦿ Temperature: -325°F to 800°F (-200°C to 426°C)
- ⦿ End connections:
  - 1/8 to 1 thread
  - 3/16" to 1" and 6 mm to 22 mm tube fitting
- ⦿ Welded fitting-to-hose construction to ensure reliable seal
- ⦿ Standard and custom-length available



### Hose Technical Data (MH Series)

Nominal Hose Size	Inside Diameter	Min. Bend Radius		Temperature Range	Working Pressure at 70°F (20°C)	Burst Pressure at 70°F (20°C)	Hose Series
		Static	Dynamic				
in. (mm)	in. (mm)	in. (mm)	in. (mm)	°F (°C)	psig (bar)	psig (bar)	
1/4 (6.4)	0.28 (7.1)	2.25 (57.2)	10.0 (254)	-325 to 800 (-200 to 426)	3100 (213)	12400 (854)	MH4
3/8 (9.7)	0.42 (10.6)	3.00 (76.2)	12.0 (305)		2000 (137)	8000 (551)	MH6
1/2 (12.7)	0.53 (13.5)	4.50 (114)	16.0 (406)		1800 (124)	7200 (496)	MH8
3/4 (19.0)	0.80 (20.3)	6.00 (152)	17.0 (432)		1500 (103)	6000 (413)	MH12
1 (25.4)	1.03 (26.0)	6.75 (171)	20.0 (508)		1200 (82.6)	4800 (330)	MH16

### Hose Technical Data (MM Series)

Nominal Hose Size	Inside Diameter	Min. Bend Radius		Temperature Range	Working Pressure at 70°F (20°C)	Burst Pressure at 70°F (20°C)	Hose Series
		Static	Dynamic				
in. (mm)	in. (mm)	in. (mm)	in. (mm)	°F (°C)	psig (bar)	psig (bar)	
1/4 (6.4)	0.25 (6.4)	0.75 (19.0)	4.33 (110)	-325 to 800 (-200 to 426)	1600 (110)	6400 (440)	MM4
3/8 (9.7)	0.38 (9.5)	0.87 (22.1)	5.91 (150)		1470 (101)	6000 (413)	MM6
1/2 (12.7)	0.50 (12.7)	1.04 (26.4)	6.50 (165)		1110 (76.4)	4500 (310)	MM8
3/4 (19.0)	0.75 (19.0)	1.61 (40.9)	8.86 (225)		860 (59.2)	3500 (241)	MM12
1 (25.4)	1.00 (25.4)	1.89 (48.0)	10.2 (259)		680 (46.8)	2680 (184)	MM16

# Cylinder Connections



### CGA DISS Series

B-16

### CGA Series

B-20

### DIN Series

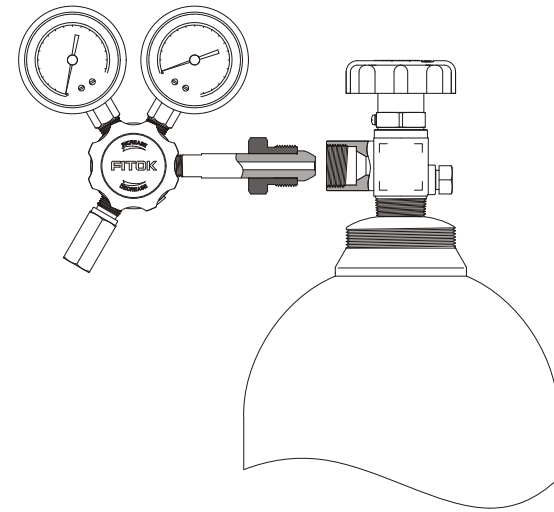
B-27

### Gas Connection Assignment Table

B-28

### Features

- 100% visual inspection of critical surfaces
- Diverse materials and configurations available
- Silver-plated nut threads to reduce installation torque
- Every fitting stamped with size, material and heat code
- Cleaned and packaged for Oxygen and Ultra High Purity service available
- Customized solutions available



### Materials

Series	Component	Material	Designator
CGA DISS	Nipples	316L SS	6L
	Nuts	304 SS	S4
	Gaskets	Nickel 200	NI
		PCTFE	K
		Aluminum	AL
	Plugs	316L SS	6L
	Adapters	316L SS	6L
Caps	316L SS	6L	
CGA DIN JIS	Nipples	316L SS	6L
	Nuts	304 SS	S4
	Gaskets	PTFE	T
		PCTFE	K
	Plugs, Caps	316L SS	6L
Adapters	316LSS	6L	

- Nickel gasket heat treated; surface hardness <HV 80
- 316L SS in compliance with SEMI F20

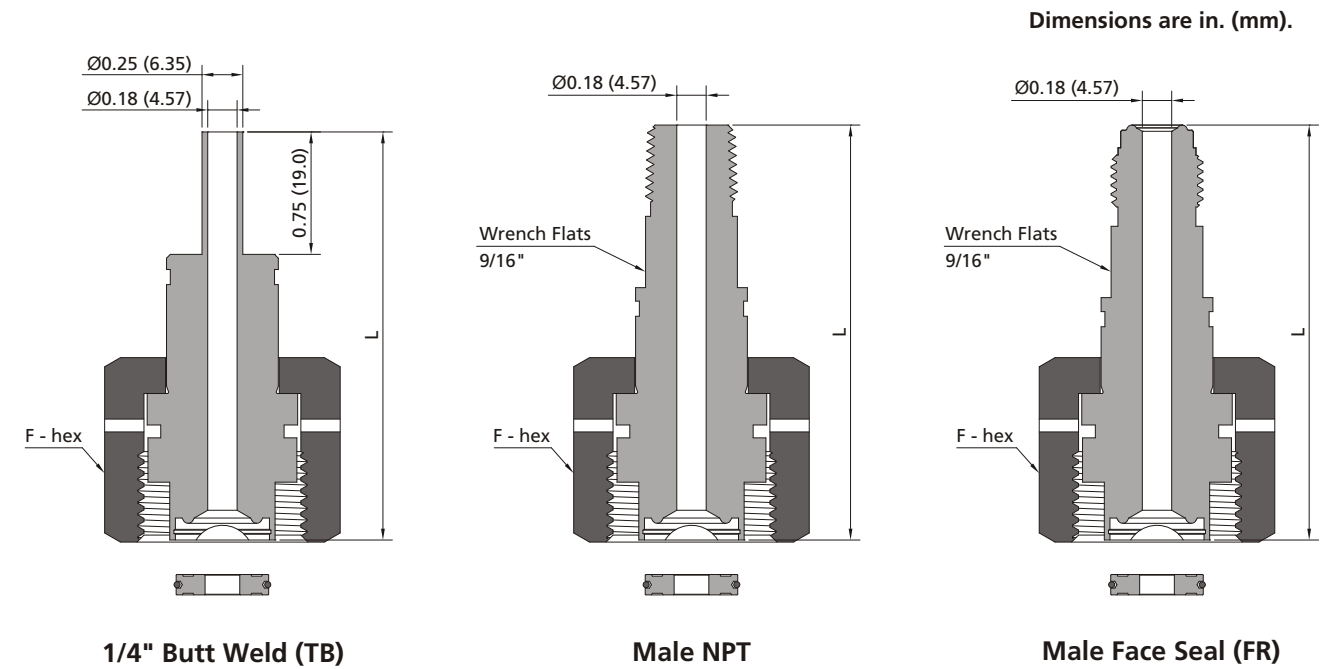
### Information of the Encoding System

- Add material designator as a prefix to the basic ordering number to get the complete ordering number.  
Example: 6L-C634-L-FR4.
- CGA, DIN, JIS series  
PTFE is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number.  
Example: 6L-C350-NS4-K.
- CGA DISS series  
Nickel is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number.  
Example: 6L-C632-FR4-K.

### CGA DISS Series

- Non-rotating design
- Nipple with TB or FR fitting electropolished, the internal surface roughness Ra finished to an average of Ra 9 μin. (0.23 μm)
- Cleaned for Ultra High Purity Service; packaged in a Class 100 clean room
- Test with helium (maximum allowable leak rate: 1 x 10<sup>-9</sup> mbar · l/s)

### Cylinder Connections (Including Nipple, Nut and Gasket)



CGA Number	End Connection	Assembly Basic Ordering Number	Nipple Basic Ordering Number	Nut Basic Ordering Number	Gasket Basic Ordering Number	Dimensions, in. (mm)	
						L	F
632	1/4" TB	-C632-TB4	-C632-L-TB4	-C630-N	-C630-GT	2.5 (63.5)	1 1/4 (31.8)
	1/4" FR	-C632-FR4	-C632-L-FR4			3 (76.2)	1 1/4 (31.8)
	1/4" NPT	-C632-NS4	-C632-L-NS4			3 (76.2)	1 1/4 (31.8)
634	1/4" TB	-C634-TB4	-C634-L-TB4	-C630-N	-C630-GT	2.5 (63.5)	1 1/4 (31.8)
	1/4" FR	-C634-FR4	-C634-L-FR4			3 (76.2)	1 1/4 (31.8)
	1/4" NPT	-C634-NS4	-C634-L-NS4			3 (76.2)	1 1/4 (31.8)
636	1/4" TB	-C636-TB4	-C636-L-TB4	-C630-N	-C630-GT	2.5 (63.5)	1 1/4 (31.8)
	1/4" FR	-C636-FR4	-C636-L-FR4			3 (76.2)	1 1/4 (31.8)
	1/4" NPT	-C636-NS4	-C636-L-NS4			3 (76.2)	1 1/4 (31.8)
638	1/4" TB	-C638-TB4	-C638-L-TB4	-C630-N	-C630-GT	2.5 (63.5)	1 1/4 (31.8)
	1/4" FR	-C638-FR4	-C638-L-FR4			3 (76.2)	1 1/4 (31.8)
	1/4" NPT	-C638-NS4	-C638-L-NS4			3 (76.2)	1 1/4 (31.8)

Gas Control Equipments  
Other Applicable Products  
Technical References

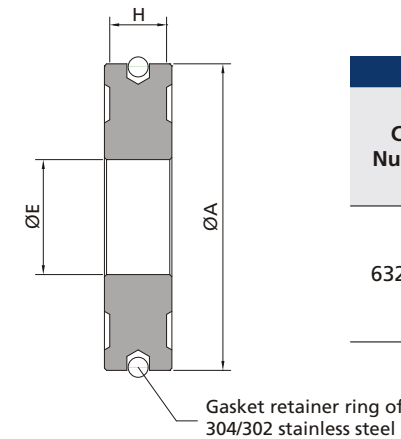
Gas Control Equipments  
Other Applicable Products  
Technical References

### Cylinder Connections (Including Nipple, Nut and Gasket)

CGA Number	End Connection	Assembly Basic Ordering Number	Nipple Basic Ordering Number	Nut Basic Ordering Number	Gasket Basic Ordering Number	Dimensions, in. (mm)	
						L	F
640	1/4" TB	-C640-TB4	-C640-L-TB4	-C630-N	-C630-GT	2.5 (63.5)	1 1/4 (31.8)
	1/4" FR	-C640-FR4	-C640-L-FR4			3 (76.2)	1 1/4 (31.8)
	1/4" NPT	-C640-NS4	-C640-L-NS4			3 (76.2)	1 1/4 (31.8)
642	1/4" TB	-C642-TB4	-C642-L-TB4	-C630-N	-C630-GT	2.5 (63.5)	1 1/4 (31.8)
	1/4" FR	-C642-FR4	-C642-L-FR4			3 (76.2)	1 1/4 (31.8)
	1/4" NPT	-C642-NS4	-C642-L-NS4			3 (76.2)	1 1/4 (31.8)
712	1/4" TB	-C712-TB4	-C712-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C712-FR4	-C712-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C712-NS4	-C712-L-NS4			3 (76.2)	1 3/8 (34.9)
714	1/4" TB	-C714-TB4	-C714-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C714-FR4	-C714-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C714-NS4	-C714-L-NS4			3 (76.2)	1 3/8 (34.9)
716	1/4" TB	-C716-TB4	-C716-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C716-FR4	-C716-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C716-NS4	-C716-L-NS4			3 (76.2)	1 3/8 (34.9)
718	1/4" TB	-C718-TB4	-C718-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C718-FR4	-C718-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C718-NS4	-C718-L-NS4			3 (76.2)	1 3/8 (34.9)
720	1/4" TB	-C720-TB4	-C720-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C720-FR4	-C720-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C720-NS4	-C720-L-NS4			3 (76.2)	1 3/8 (34.9)
722	1/4" TB	-C722-TB4	-C722-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C722-FR4	-C722-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C722-NS4	-C722-L-NS4			3 (76.2)	1 3/8 (34.9)
724	1/4" TB	-C724-TB4	-C724-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C724-FR4	-C724-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C724-NS4	-C724-L-NS4			3 (76.2)	1 3/8 (34.9)
726	1/4" TB	-C726-TB4	-C726-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C726-FR4	-C726-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C726-NS4	-C726-L-NS4			3 (76.2)	1 3/8 (34.9)
728	1/4" TB	-C728-TB4	-C728-L-TB4	-C710-N	-C630-GT	2.5 (63.5)	1 3/8 (34.9)
	1/4" FR	-C728-FR4	-C728-L-FR4			3 (76.2)	1 3/8 (34.9)
	1/4" NPT	-C728-NS4	-C728-L-NS4			3 (76.2)	1 3/8 (34.9)

\* Nickel is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number.  
Example: 6L-C638-TB4-K.

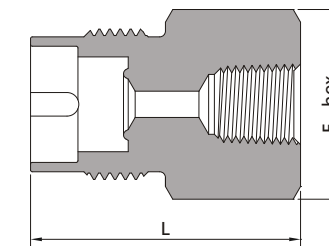
### Gaskets



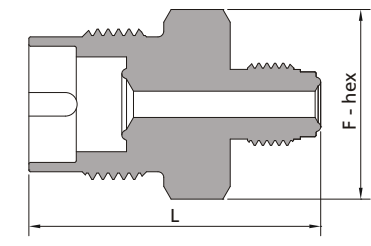
CGA Number	Gasket Ordering Number	Material	Dimensions					
			A		E		H	
			in.	mm	in.	mm	in.	mm
632-728	NI-C630-GT	Nickel 200	0.56	14.3	0.21	5.4	0.105	2.7
	K-C630-GT	PCTFE	0.56	14.3	0.21	5.4	0.125	3.2
	AL-C630-GT	Aluminum	0.56	14.3	0.21	5.4	0.105	2.7

### Outlet Adaptors

Female NPT



Male Face Seal (FR)



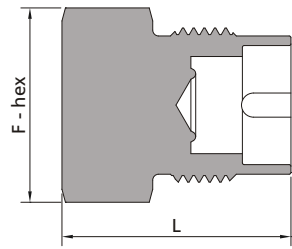
CGA Number	Basic Ordering Number	Dimensions, in. (mm)	
		L	F
632	-C632-A-NS4	1.85 (47.0)	1 1/8 (28.6)
634	-C634-A-NS4	1.85 (47.0)	1 1/8 (28.6)
636	-C636-A-NS4	1.85 (47.0)	1 1/8 (28.6)
638	-C638-A-NS4	1.85 (47.0)	1 1/8 (28.6)
640	-C640-A-NS4	1.85 (47.0)	1 1/8 (28.6)
642	-C642-A-NS4	1.85 (47.0)	1 1/8 (28.6)
712	-C712-A-NS4	1.85 (47.0)	1 1/4 (31.8)
714	-C714-A-NS4	1.85 (47.0)	1 1/4 (31.8)
716	-C716-A-NS4	1.85 (47.0)	1 1/4 (31.8)
718	-C718-A-NS4	1.85 (47.0)	1 1/4 (31.8)
720	-C720-A-NS4	1.85 (47.0)	1 1/4 (31.8)
722	-C722-A-NS4	1.85 (47.0)	1 1/4 (31.8)
724	-C724-A-NS4	1.85 (47.0)	1 1/4 (31.8)
726	-C726-A-NS4	1.85 (47.0)	1 1/4 (31.8)
728	-C728-A-NS4	1.85 (47.0)	1 1/4 (31.8)

CGA Number	Basic Ordering Number	Dimensions, in. (mm)	
		L	F
632	-C632-A-FR4	2.0 (50.8)	1 1/8 (28.6)
634	-C634-A-FR4	2.0 (50.8)	1 1/8 (28.6)
636	-C636-A-FR4	2.0 (50.8)	1 1/8 (28.6)
638	-C638-A-FR4	2.0 (50.8)	1 1/8 (28.6)
640	-C640-A-FR4	2.0 (50.8)	1 1/8 (28.6)
642	-C642-A-FR4	2.0 (50.8)	1 1/8 (28.6)
712	-C712-A-FR4	2.0 (50.8)	1 1/4 (31.8)
714	-C714-A-FR4	2.0 (50.8)	1 1/4 (31.8)
716	-C716-A-FR4	2.0 (50.8)	1 1/4 (31.8)
718	-C718-A-FR4	2.0 (50.8)	1 1/4 (31.8)
720	-C720-A-FR4	2.0 (50.8)	1 1/4 (31.8)
722	-C722-A-FR4	2.0 (50.8)	1 1/4 (31.8)
724	-C724-A-FR4	2.0 (50.8)	1 1/4 (31.8)
726	-C726-A-FR4	2.0 (50.8)	1 1/4 (31.8)
728	-C728-A-FR4	2.0 (50.8)	1 1/4 (31.8)

Gas Control Equipments  
Other Applicable Products  
Technical References

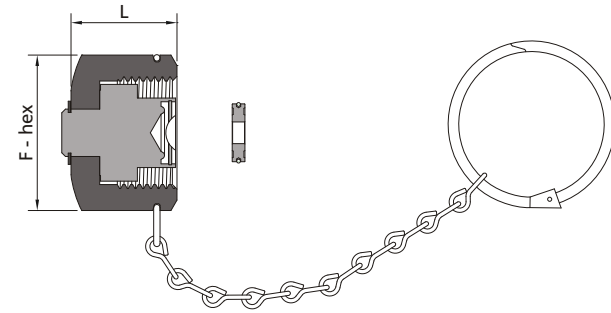
Gas Control Equipments  
Other Applicable Products  
Technical References

### Blank Plugs



CGA Number	Basic Ordering Number	Dimensions, in. (mm)	
		L	F
632	-C632-BP	1.53 (38.9)	1 1/8 (28.6)
634	-C634-BP	1.53 (38.9)	1 1/8 (28.6)
636	-C636-BP	1.53 (38.9)	1 1/8 (28.6)
638	-C638-BP	1.53 (38.9)	1 1/8 (28.6)
640	-C640-BP	1.53 (38.9)	1 1/8 (28.6)
642	-C642-BP	1.53 (38.9)	1 1/8 (28.6)
712	-C712-BP	1.53 (38.9)	1 1/4 (31.8)
714	-C714-BP	1.53 (38.9)	1 1/4 (31.8)
716	-C716-BP	1.53 (38.9)	1 1/4 (31.8)
718	-C718-BP	1.53 (38.9)	1 1/4 (31.8)
720	-C720-BP	1.53 (38.9)	1 1/4 (31.8)
722	-C722-BP	1.53 (38.9)	1 1/4 (31.8)
724	-C724-BP	1.53 (38.9)	1 1/4 (31.8)
726	-C726-BP	1.53 (38.9)	1 1/4 (31.8)
728	-C728-BP	1.53 (38.9)	1 1/4 (31.8)

### Valve Outlet Caps (Including Chain, Ring and Gasket)



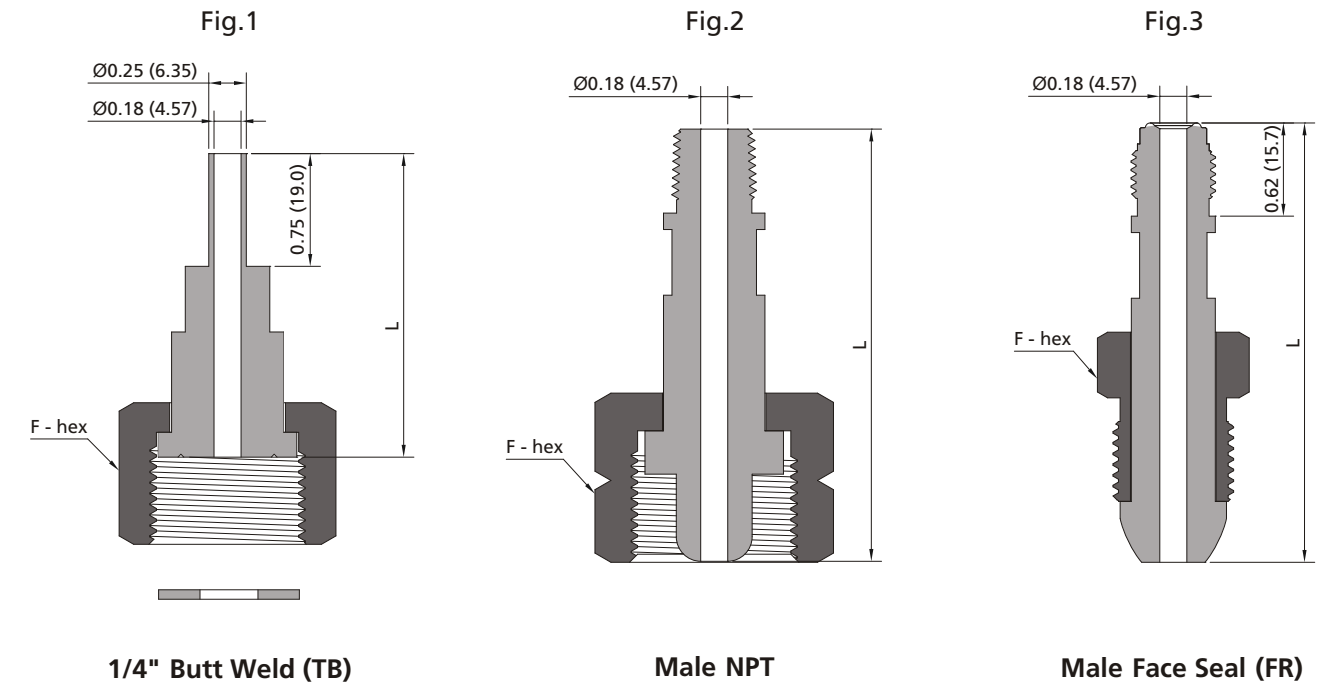
CGA Number	Basic Ordering Number	Dimensions, in. (mm)	
		L	F
632	-C632-CP	0.98 (24.9)	1 1/4 (31.8)
634	-C634-CP	0.98 (24.9)	1 1/4 (31.8)
636	-C636-CP	0.98 (24.9)	1 1/4 (31.8)
638	-C638-CP	0.98 (24.9)	1 1/4 (31.8)
640	-C640-CP	0.98 (24.9)	1 1/4 (31.8)
642	-C642-CP	0.98 (24.9)	1 1/4 (31.8)
712	-C712-CP	0.98 (24.9)	1 3/8 (34.9)
714	-C714-CP	0.98 (24.9)	1 3/8 (34.9)
716	-C716-CP	0.98 (24.9)	1 3/8 (34.9)
718	-C718-CP	0.98 (24.9)	1 3/8 (34.9)
720	-C720-CP	0.98 (24.9)	1 3/8 (34.9)
722	-C722-CP	0.98 (24.9)	1 3/8 (34.9)
724	-C724-CP	0.98 (24.9)	1 3/8 (34.9)
726	-C726-CP	0.98 (24.9)	1 3/8 (34.9)
728	-C728-CP	0.98 (24.9)	1 3/8 (34.9)

\* Nickel is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number.  
eExample: 6L-C632-CP-K.

### CGA Series

- CGA V-1-2005 compliant
- Nipple with TB or FR fitting electropolished, the internal surface roughness Ra finished to an average of Ra 9 µin. (0.23 µm)
- Test with helium (maximum allowable leak rate: 1 x 10<sup>-9</sup> mbar · l/s)

### Cylinder Connections (Including Nipple, Nut and Gasket)



CGA Number	Ref. Fig.	End Connection	Assembly Basic Ordering Number	Nipple Basic Ordering Number	Nut Basic Ordering Number	Gasket Basic Ordering Number	Dimensions, in. (mm)		
							L	F	
170	Fig.1	1/4" TB	-C170-TB4	-C170-L-TB4	-C170-N	-C170-GT	1.25 (31.8)	11/16 (17.5)	
		1/8" NPT	-C170-NS2	-C170-L-NS2				3/4 (19.1)	
180	Fig.1	1/4" TB	-C180-TB4	-C180-L-TB4	-C180-N	-C180-GT	1.25 (31.8)	3/4 (19.1)	
		1/8" NPT	-C180-NS2	-C180-L-NS2					1.75 (44.5)
290	Fig.2	1/4" TB	-C290-TB4	-C290-L-TB4	-C290-N	—	2.63 (66.7)	1 (25.4)	
		1/4" NPT	-C290-NS4	-C290-L-NS4					2.25 (57.2)
296	Fig.3	1/4" TB	-C296-TB4	-C296-L-TB4	-C296-N	—	2.63 (66.7)	7/8 (22.3)	
		1/4" NPT	-C296-NS4	-C296-L-NS4					3.5 (88.9)
		1/4" FR	-C296-FR4	-C296-L-FR4					2.75 (69.9)



### Cylinder Connections (Including Nipple, Nut and Gasket)

CGA Number	Ref. Fig.	End Connection	Assembly Basic Ordering Number	Nipple Basic Ordering Number	Nut Basic Ordering Number	Gasket Basic Ordering Number	Dimensions, in. (mm)	
							L	F
320	Fig.1	1/4" TB	-C320-TB4	-C320-L-TB4	-C320-N	-C320-GT	1.75 (44.5)	1 1/8 (28.6)
		1/4" NPT	-C320-NS4	-C320-L-NS4			3.5 (88.9)	
		1/4" FR	-C320-FR4	-C320-L-FR4			2.75 (69.9)	
326	Fig.2	1/4" TB	-C326-TB4	-C326-L-TB4	-C320-N	—	2.25 (57.2)	1 1/8 (28.6)
		1/4" NPT	-C326-NS4	-C326-L-NS4			3.0 (76.2)	
		1/4" FR	-C326-FR4	-C326-L-FR4			2.25 (57.2)	
330	Fig.1	1/4" TB	-C330-TB4	-C320-L-TB4	-C330-N	-C320-GT	1.75 (44.5)	1 1/8 (28.6)
		1/4" NPT	-C330-NS4	-C320-L-NS4			2.5 (63.5)	
		1/4" FR	-C330-FR4	-C320-L-FR4			1.75 (44.5)	
346	Fig.2	1/4" TB	-C346-TB4	-C346-L-TB4	-C320-N	—	2.31 (58.7)	1 1/8 (28.6)
		1/4" NPT	-C346-NS4	-C346-L-NS4			3.0 (76.2)	
		1/4" FR	-C346-FR4	-C346-L-FR4			2.25 (57.2)	
350	Fig.2	1/4" TB	-C350-TB4	-C350-L-TB4	-C330-N	—	2.31 (58.7)	1 1/8 (28.6)
		1/4" NPT	-C350-NS4	-C350-L-NS4			3.0 (76.2)	
		1/4" FR	-C350-FR4	-C350-L-FR4			2.25 (57.2)	
510	Fig.3	1/4" TB	-C510-TB4	-C510-L-TB4	-C510-N	—	2.63 (66.7)	1 1/8 (28.6)
		1/4" NPT	-C510-NS4	-C510-L-NS4			3.5 (88.9)	
		1/4" FR	-C510-FR4	-C510-L-FR4			2.75 (69.9)	
540**	Fig.2	1/4" TB	-C540-TB4	-C540-L-TB4	-C540-N	—	2.25 (57.2)	1 1/8 (28.6)
		1/4" NPT	-C540-NS4	-C540-L-NS4			3.0 (76.2)	
		1/4" FR	-C540-FR4	-C540-L-FR4			2.25 (57.2)	
580	Fig.3	1/4" TB	-C580-TB4	-C510-L-TB4	-C580-N	—	2.63 (66.7)	1 1/8 (28.6)
		1/4" NPT	-C580-NS4	-C510-L-NS4			3.5 (88.9)	
		1/4" FR	-C580-FR4	-C510-L-FR4			2.75 (69.9)	
590	Fig.3	1/4" TB	-C590-TB4	-C510-L-TB4	-C590-N	—	2.5 (63.5)	1 1/8 (28.6)
		1/4" NPT	-C590-NS4	-C510-L-NS4			3.5 (88.9)	
		1/4" FR	-C590-FR4	-C510-L-FR4			2.75 (69.9)	

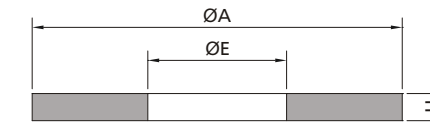
### Cylinder Connections (Including Nipple, Nut and Gasket)

CGA Number	Ref. Fig.	End Connection	Assembly Basic Ordering Number	Nipple Basic Ordering Number	Nut Basic Ordering Number	Gasket Basic Ordering Number	Dimensions, in. (mm)	
							L	F
660	Fig.1	1/4" TB	-C660-TB4	-C660-L-TB4	-C660-N	-C660-GT	2.19 (55.6)	1 1/4 (31.8)
		1/4" NPT	-C660-NS4	-C660-L-NS4			2.5 (63.5)	
		1/4" FR	-C660-FR4	-C660-L-FR4			1.88 (47.6)	
670	Fig.1	1/4" TB	-C670-TB4	-C660-L-TB4	-C670-N	-C660-GT	2.19 (55.6)	1 1/4 (31.8)
		1/4" NPT	-C670-NS4	-C660-L-NS4			2.5 (63.5)	
		1/4" FR	-C670-FR4	-C660-L-FR4			1.88 (47.6)	
678	Fig.1	1/4" TB	-C678-TB4	-C678-L-TB4	-C678-N	-C678-GT	2.5 (63.5)	1 1/4 (31.8)
		1/4" NPT	-C678-NS4	-C678-L-NS4			2.5 (63.5)	
		1/4" FR	-C678-FR4	-C678-L-FR4			2.0 (50.8)	
679	Fig.1	1/4" TB	-C679-TB4	-C679-L-TB4	-C670-N	-C679-GT	2.5 (63.5)	1 1/4 (31.8)
		1/4" NPT	-C679-NS4	-C679-L-NS4			3.0 (76.2)	
		1/4" FR	-C679-FR4	-C679-L-FR4			2.0 (50.8)	

\* PTFE is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number.  
Example: 6L-C170-FR4-K.

\*\*Cleaned and packaged for Oxygen service.

### Gaskets



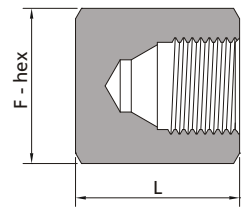
CGA Number	Gasket Basic Ordering Number	Dimensions					
		A		E		H	
		in.	mm	in.	mm	in.	mm
170	-C170-GT	0.43	11.0	0.19	4.8	0.10	2.5
180	-C180-GT	0.44	11.2	0.32	8.1	0.09	2.3
320, 330	-C320-GT	0.72	18.3	0.26	6.6	0.09	2.3
660, 670	-C660-GT	0.94	23.9	0.38	9.7	0.06	1.6
678	-C678-GT	0.61	15.5	0.30	7.6	0.06	1.6
679	-C679-GT	0.53	13.5	0.31	7.9	0.06	1.6

Gas Control Equipments  
Other Applicable Products  
Technical References

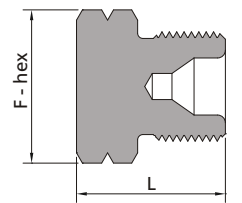
Gas Control Equipments  
Other Applicable Products  
Technical References

### Outlet Adaptors, Blank Caps and Plugs

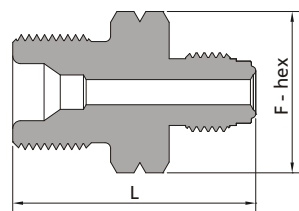
**Blank Caps**  
CGA 580



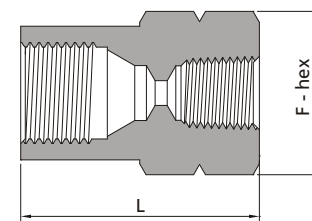
**Blank Plugs**  
CGA 350



**Male Face Seal (FR)**  
CGA 350



**Female NPT**  
CGA 350

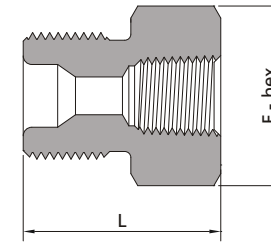


CGA Number	End Connection	Assembly Basic Ordering Number	Dimensions, in. (mm)	
			L	F
180	1/4" NPT (F)	-C180-A-FNS4	1.38 (35.0)	3/4 (19.1)
296	Blank Cap	-C296-BC	1.37 (34.8)	1 1/8 (28.6)
	1/4" NPT (F)	-C296-FNS4	2.0 (50.8)	
	1/4" FR	-C296-A-FR4	2.0 (50.8)	
320	Blank Plug	-C320-BP	1.12 (28.4)	1 (25.4)
	1/4" NPT (F)	-C320-FNS4	1.12 (28.4)	
	1/4" FR	-C320-A-FR4	1.74 (44.2)	
326	Blank Plug	-C326-BP	1.12 (28.4)	1 (25.4)
	1/4" NPT (F)	-C326-FNS4	1.31 (33.3)	
	1/4" FR	-C326-A-FR4	1.74 (44.2)	
330	Blank Plug	-C330-BP	1.12 (28.4)	1 (25.4)
	1/4" NPT (F)	-C330-FNS4	1.31 (33.3)	
	1/4" FR	-C330-A-FR4	1.74 (44.2)	
346	Blank Plug	-C346-BP	1.12 (28.4)	1 (25.4)
	1/4" NPT (F)	-C346-FNS4	1.31 (33.3)	
	1/4" FR	-C346-A-FR4	1.88 (47.8)	
350	Blank Plug	-C350-BP	1.12 (28.4)	1 (25.4)
	1/4" NPT (F)	-C350-FNS4	1.31 (33.3)	
	1/4" FR	-C350-A-FR4	1.88 (47.8)	
510	Blank Cap	-C510-BC	1.37 (34.8)	1 1/4 (31.8)
	1/4" NPT (F)	-C510-FNS4	2.0 (50.8)	
	1/4" FR	-C510-A-FR4	2.0 (50.8)	
540**	Blank Plug	-C540-BP	1.12 (28.4)	1 (25.4)
	1/4" NPT (F)	-C540-FNS4	1.25 (31.8)	
	1/4" FR	-C540-A-FR4	1.87 (47.5)	
580	Blank Cap	-C580-BC	1.37 (34.8)	1 1/4 (31.8)
	1/4" NPT (F)	-C580-FNS4	2.0 (50.8)	
	1/4" FR	-C580-A-FR4	2.0 (50.8)	

\*\*Cleaning and packaging for Oxygen service.

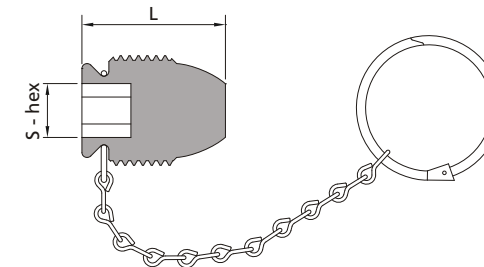
### Outlet Adaptors, Blank Caps and Plugs

**Female NPT**  
CGA 350



CGA Number	End Connection	Assembly Basic Ordering Number	Dimensions, in. (mm)	
			L	F
590	Blank Cap	-C590-BC	1.37 (34.8)	1 1/4 (31.8)
	1/4" NPT (F)	-C590-FNS4	2.0 (50.8)	
	1/4" FR	-C590-A-FR4	2.0 (50.8)	
660	Blank Plug	-C660-BP	0.88 (22.4)	1 1/8 (28.6)
	1/4" NPT (F)	-C660-FNS4	1.25 (31.8)	
	1/4" FR	-C660-A-FR4	1.5 (38.1)	
670	Blank Plug	-C670-BP	0.88 (22.4)	1 1/8 (28.6)
	1/4" NPT (F)	-C670-FNS4	1.25 (31.8)	
	1/4" FR	-C670-A-FR4	1.5 (38.1)	
678	Blank Plug	-C678-BP	1.0 (25.4)	1 1/8 (28.6)
	1/4" NPT (F)	-C678-FNS4	1.38 (35.1)	
	1/4" FR	-C678-A-FR4	1.5 (38.1)	
679	Blank Plug	-C679-BP	0.88 (22.4)	1 1/8 (28.6)
	1/4" NPT (F)	-C679-FNS4	1.25 (31.8)	
	1/4" FR	-C679-A-FR4	1.75 (44.5)	

### Cylinder Valve Outlet Plugs

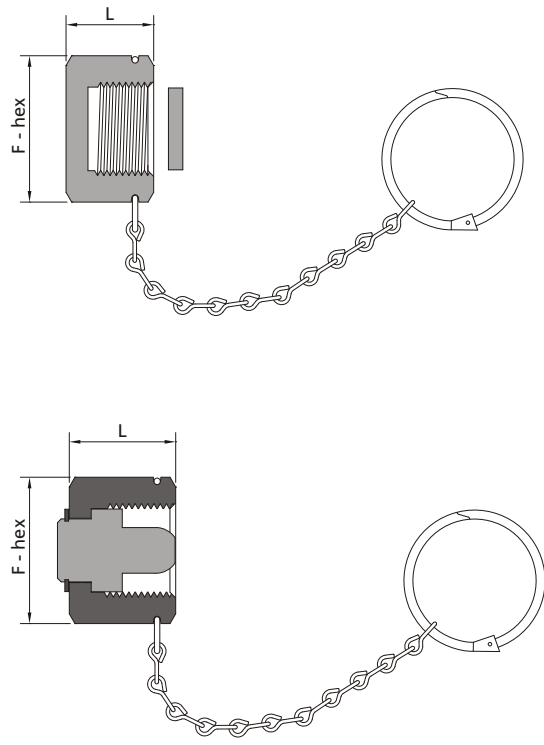


CGA Number	Basic Ordering Number	Dimensions, in. (mm)	
		L	S
510	-C510-PG	1.0 (25.4)	3/8 (9.5)
580	-C580-PG	1.0 (25.4)	
590	-C590-PG	1.0 (25.4)	

Gas Control Equipments  
Other Applicable Products  
Technical References

Gas Control Equipments  
Other Applicable Products  
Technical References

### Cylinder Valve Outlet Caps



CGA Number	Basic Ordering Number	Dimensions, in. (mm)	
		L	F
320	-C320-CP	0.54 (13.7)	1 (25.4)
326	-C320-CP	0.54 (13.7)	
330	-C330-CP	0.54 (13.7)	
346	-C320-CP	0.54 (13.7)	
660	-C660-CP	0.54 (13.7)	1 1/4 (31.8)
670	-C670-CP	0.54 (13.7)	
678	-C670-CP	0.54 (13.7)	
679	-C670-CP	0.54 (13.7)	

\* PTFE is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number. Example: S4-C330-CP-K.

\* The caps listed above are only intended to keep valve outlets clean and protect its threads. They must not be used to contain pressure if the valve leaks or is opened by mistake.

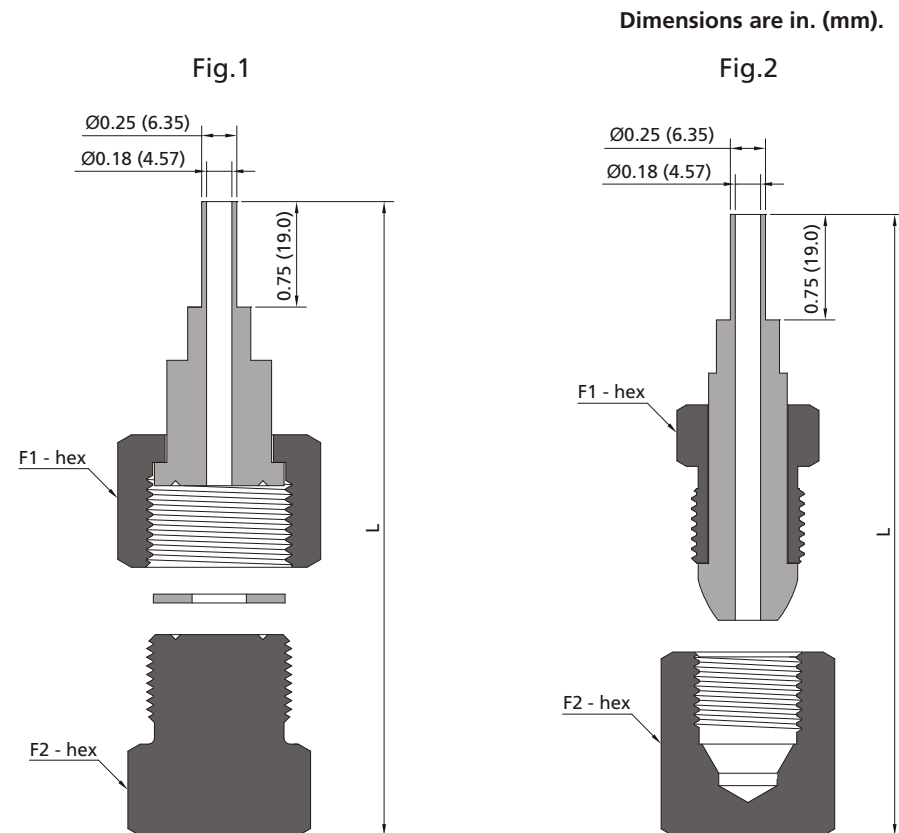
CGA Number	Basic Ordering Number	Dimensions, in. (mm)	
		L	F
350	-C350-CP	0.82 (20.8)	1 1/8 (28.6)

CGA Number	Ref. Fig.	Assembly Basic Ordering Number	Gasket Basic Ordering Number	Dimensions, in. (mm)		
				L	F1	F2
296	Fig.2	-C296-TB4-A	---	3.03 (77.0)	7/8 (22.3)	1 1/8 (28.6)
320	Fig.1	-C320-TB4-A	-C320-GT	2.96 (75.2)	1 1/8 (28.6)	1 (25.4)
326	Fig.1	-C326-TB4-A	---	3.01 (76.5)		
330	Fig.1	-C330-TB4-A	-C320-GT	2.96 (75.2)		
346	Fig.1	-C346-TB4-A	---	2.97 (75.4)		
350	Fig.1	-C350-TB4-A	---	2.96 (75.2)		
510	Fig.2	-C510-TB4-A	---	3.03 (77.0)		
540**	Fig.1	-C540-TB4-A	---	2.96 (75.2)		
580	Fig.2	-C580-TB4-A	---	3.03 (77.0)		
590	Fig.2	-C590-TB4-A	---	3.03 (77.0)		
660	Fig.1	-C660-TB4-A	-C660-GT	2.96 (75.2)		
670	Fig.1	-C670-TB4-A	-C660-GT	2.96 (75.2)		
678	Fig.1	-C678-TB4-A	-C678-GT	3.08 (78.2)		
679	Fig.1	-C679-TB4-A	-C679-GT	2.96 (75.2)		

\* PTFE is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number. Example: 6L-C330-TB4-A-K.

\*\*Cleaned and packaged for Oxygen service.

### Complete Pigtail Connections (Including Nipple, Nut, Gasket and Blank Plug or Cap)



### Assembly Torque For CGA Cylinder Connections

CGA NO.	Recommended Torque		CGA NO.	Recommended Torque	
	ft-lb	N-m		ft-lb	N-m
170*	10~15	14~20	510	35~50	47~68
180*	10~15	14~20	540	40~60	54~81
290	30~45	41~61	580	40~60	54~81
296	35~50	47~68	590	40~60	54~81
320*	20~30	27~41	660*	30~45	41~61
326	25~35	34~47	670*	30~45	41~61
330*	20~30	27~41	678*	25~35	34~47
346	35~50	47~68	679*	25~35	34~47
350	35~50	47~68			

CGA DISS NO.	Recommended Torque		Gasket Material
	ft-lb	N-m	
632-728	35~40	47~53.8	Nickel
	12~15	16~20.1	PCTFE

Note:

\*Gasket for seal: PTFE or PCTFE.

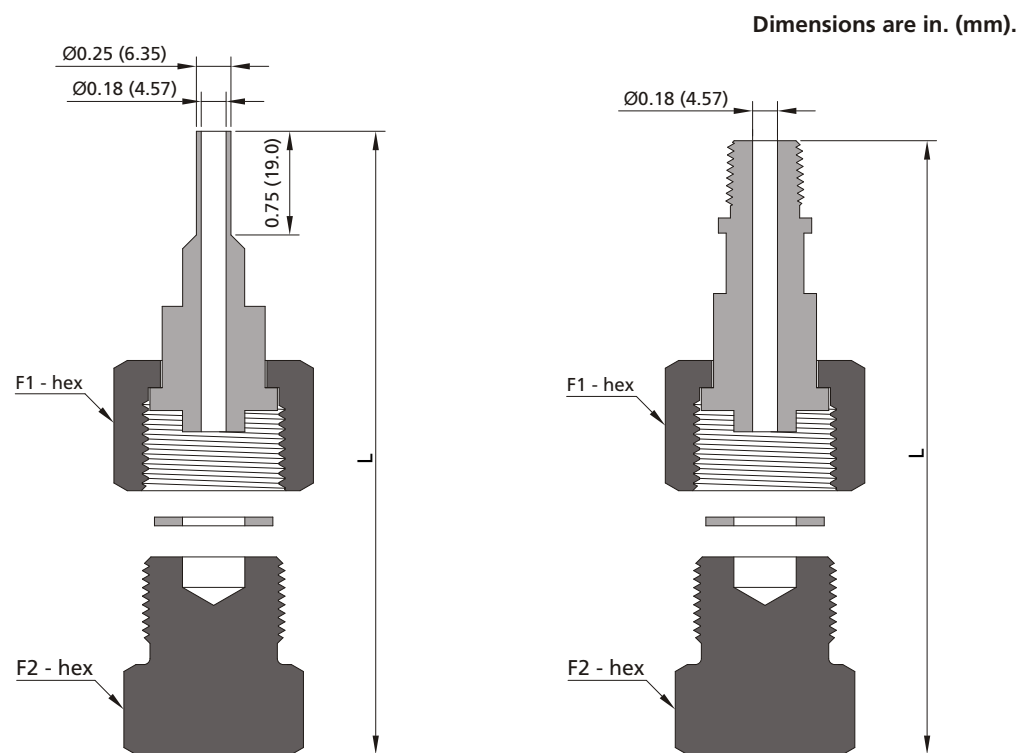
Gas Control Equipments  
Other Applicable Products  
Technical References

Gas Control Equipments  
Other Applicable Products  
Technical References

# DIN Series

- ⦿ DIN 477-1 compliant
- ⦿ Nipple with TB fitting electropolished, the internal surface roughness Ra finished to an average of Ra 9 µin. (0.23 µm)
- ⦿ Test with helium at a maximum leak rate of 1 x 10<sup>-9</sup> mbar · l/s

## Complete Pigtail Connections (Including Nipple, Nut, Gasket and Blank Plug)



1/4" Butt Weld (TB)

Male NPT

DIN Number	Assembly Basic Ordering Number	Gasket Basic Ordering Number	Dimensions, in.(mm)				
			L	F1	F2		
1	-DIN1-TB4-A	-DIN1-GT	2.96 (75.2)	1 1/4 (31.8)	1 1/4 (31.8)		
	-DIN1-NS4-A		4.25 (108)				
5	-DIN5-TB4-A	-DIN5-GT	3.09 (78.5)				
	-DIN5-NS4-A		4.41 (112)				
6	-DIN6-TB4-A	-DIN1-GT	2.96 (75.2)				
	-DIN6-NS4-A		4.25 (108)				
8	-DIN8-TB4-A	-DIN5-GT	3.09 (78.5)				
	-DIN8-NS4-A		4.41 (112)				
11	-DIN11-TB4-A	-DIN11-GT	2.88 (73.2)			7/8 (22.3)	11/16 (17.5)
	-DIN11-NS4-A		4.14 (105.2)				
14	-DIN14-TB4-A		-DIN11-GT	2.88 (73.2)	1 1/16 (27.0)	7/8 (22.3)	
	-DIN14-NS4-A			4.15 (105.5)			

\* Above components can be ordered separately.

\* PTFE is standard material for gasket. If PCTFE is required, please add a suffix of "-k" to the ordering number. Example: 6L-D1N1-TB4-A-K.

# Gas Connection Assignment Table\*\*

GAS	Formula	UHP CGA	CGA	DIN	JIS
Ammonia	NH <sub>3</sub>	720	705	DIN6	22-R
Argon	Ar	718	580	DIN6	22-R or 23-R
Arsenic Pentafluoride	AsF <sub>5</sub>	642	—	—	—
Arsine	AsH <sub>3</sub>	632	350	—	22-L
Boron Trichloride	BCl <sub>3</sub>	634	660	DIN8	—
Boron Trifluoride	BF <sub>3</sub>	642	330	DIN8	22-L
Carbon Dioxide	CO <sub>2</sub>	716	320	DIN6	—
Carbon Monoxide	CO	724	350	DIN5	22-L
Chlorine	Cl <sub>2</sub>	728	—	DIN8	26-R
Diborane	B <sub>2</sub> H <sub>6</sub>	632	350	—	22-L
Dichlorosilane	SiH <sub>2</sub> Cl <sub>2</sub>	636	678*	DIN5	—
Diethylzinc	Zn(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>	726	510*	—	—
Diethyltelluride	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> Te	726	—	—	—
Dimethylzinc	(CH <sub>3</sub> ) <sub>2</sub> Zn	726	—	—	—
Disilane	Si <sub>2</sub> H <sub>6</sub>	632	—	—	—
Germane	GeH <sub>4</sub>	632	350 or 660	—	—
Halocarbon 11	CCl <sub>3</sub> F	716	660	—	—
Halocarbon 115	ClCF <sub>2</sub> CF <sub>3</sub>	716	660	DIN6	—
Halocarbon 12	CCl <sub>2</sub> F <sub>2</sub>	716	660	DIN6	—
Halocarbon 13	ClCF <sub>3</sub>	716	660	DIN6	—
Halocarbon 14	CF <sub>4</sub>	716	320 or 580	DIN6	—
Halocarbon 23	CHF <sub>3</sub>	716	660	DIN6	—
Halocarbon 116	F <sub>3</sub> CCF <sub>3</sub>	716	660	—	—
Helium	He	718	580	DIN6	22-R or 23-R
Hydrogen	H <sub>2</sub>	724	350	DIN1	22-L
Hydrogen Bromide	HBr	634	330	DIN8	26-R
Hydrogen Chloride	HCl	634	330	DIN8	26-R
Hydrogen Fluoride	HF	638	660 or 670	—	26-R
Hydrogen Sulfide	H <sub>2</sub> S	722	330	DIN5	—
Krypton	Kr	718	580	DIN6	22-R or 23-R
Neon	Ne	718	580	DIN6	22-R or 23-R
Nitrogen	N <sub>2</sub>	718	580	DIN10	22-R or 23-R
Nitrogen Trifluoride	NF <sub>3</sub>	640	330 or 670	DIN8	—
Nitrous Oxide	N <sub>2</sub> O	712	326	DIN8	—
Oxygen	O <sub>2</sub>	714	540	DIN9	22-R or 23-R
Perfluoropropane	CF <sub>2</sub> (CF <sub>3</sub> )	716	660	—	—
Phosphine	PH <sub>3</sub>	632	350 or 660	DIN1	—
Phosphorus Pentafluoride	PF <sub>5</sub>	642	330 or 660	—	—
Silane	SiH <sub>4</sub>	632	350	—	—
Silicon Tetrachloride	SiCl <sub>4</sub>	636	—	—	—
Silicon Tetrafluoride	SiF <sub>4</sub>	642	330	—	22-L
Sulphur Hexafluoride	SF <sub>6</sub>	716	590	DIN6	26-R
Trichlorosilane	SiHCl <sub>3</sub>	636	—	—	—
Triethylaluminum	(C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> Al	726	510*	—	—
Tungsten Hexafluoride	WF <sub>6</sub>	638	670	DIN8	—
Xenon	Xe	718	580	DIN6	22-R

\* Consult CGA, DIN, JIS or ISO organization specification for pressure limits.

\*\* Information in this table was obtained from reliable sources. It shall be used for reference only. Actual gas assignments are subject to periodic change and may differ based on pressure range. The user must verify all information in this table at the time of use. For verification, contact the compressed gas association offices.



# C

## Technical References

Common Terms and Definitions . . . . . C-02

Gas Purity Values . . . . . C-03

How to Use Flow Charts . . . . . C-04

Conversion Factors . . . . . C-05

Material Compatibility for Gases . . . . . C-06

Ordering Details for Specialty Gas Equipments . . . . C-08

## Common Terms and Definitions

### Inlet Pressure

The pressure of media of gas or liquid on the inlet port of the regulator or valve; Typical units of measure: psig, bar and MPa.

### Outlet Pressure

The pressure of media of gas or liquid on the outlet port of the regulator or valve.

### Accuracy

The variation in control pressure which occurs under steady state conditions within the control range of a regulator.

### Sensitivity

The ability of a pressure regulator to respond to change in discharge conditions: pressure, flow, temperature, etc.

### Flow Coefficient (Cv)

A flow coefficient that is numerically equal to the number of U.S. Gallons of water at 60°F/16°C that will flow through a valve or regulator in one minute when the pressure differential between the inlet and outlet is 1 psi. When gas is used instead of liquid, the equation is modified to account for the use of a compressible fluid. For a regulator, Cv is determined when the regulator is wide open and not regulating. When determining flow performance use actual flow curves.

### Leakage - External

The loss of fluid from the external surfaces or joints of a regulator or valve. Example: From the body-bonnet-diaphragm joint. Leakage to atmosphere. The leakage rate is measured in mbar l/s Helium.

### Leakage - Internal

The loss of fluid through a regulator or valve, between pressure zones normally expected to be sealed. Example: Between the inlet pressure and the outlet pressure zones.

### Load Element

One of the three basic elements of a pressure reducing regulator. It provides the means by which the operator can set the force that determines the control pressure of a regulator. This element includes the spring and the stem.

### Sensing Element

One of the three basic elements of a pressure reducing regulator. It senses the changes of the outlet pressure and acts as a physical connection between the load element and control element.

### Control Element

One of the three basic elements of a pressure regulator to reduce the high inlet pressure to a stable lower outlet pressure by adjusting the orifice.

### Diaphragm

One type of sensing elements, which is sensitive in reacting to outlet pressure change, normally used for gas media. Common materials include elastomeric and metallic.

### Piston

One type of sensing element. Used in high pressure regulators. Normally with O-ring seals.

### Unbalanced Main Valve

Inlet pressure provides the majority of the shut-off force. The function of the main valve is to reduce the high inlet pressure to a lower outlet pressure.

### Balanced Valve

A main valve designed to relief the inlet force loading on the seat.

### Venting

When the load pressure is relieved, the vent valve shall be opened by the downstream force to vent the downstream pressure.

## Gas Purity Values

Gas type	Purity (degrees)	Purity	Max. Contamination (ppm)
Pure	2.5	99.5%	5000
	3.0	99.9%	1000
High purity	3.5	99.95%	500
	4.0	99.99%	100
	4.5	99.995%	50
	5.0	99.999%	10
	5.5	99.9995%	5
Ultra high purity	6.0	99.9999%	1.0
	7.0	99.99999%	0.1

## How to Use Flow Chart

A FITOK Flow Chart is a graphic representation of test results, in curves, showing the changes in outlet pressure of a regulator with the varying flow rate basing on different inlet pressures. The regulator is so designed that at the time the outlet pressure reaches the set pressure, the flow rate would be zero. The inlet pressure is indicated on the right end of each curve.

To use the FITOK Flow Charts, the first step is to select the chart that fits the following:

- Regulator model
- Expected flow range
- Inlet pressure range
- Outlet pressure range

Subsequently, select a curve, if available, plotted for the exact inlet pressure and set pressure of the outlet (zero flow). Locate the set pressure on the vertical axis. Follow the curve until it crosses the vertical line corresponding to the desired flow rate. Read horizontally from the cross point to the vertical axis to locate the actual working pressure for this flow rate. If no curve is plotted for the exact pressure, extrapolate a new curve between and referring to the two closest existing curves.

Note:

- 1.The performance of regulator is more accurate in the range where the curve is comparatively flat.
- 2.All test results on the FITOK Flow Charts are based on utilization of Nitrogen as a medium in standard testing conditions. Please contact FITOK for more information needed.

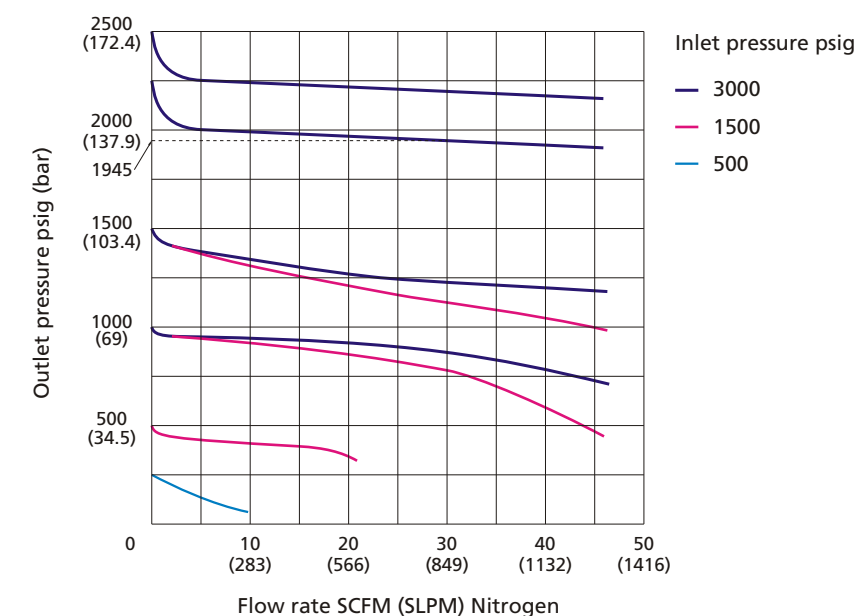
### Example:

Using the flow chart on the right to determine the pressure drop (from the set pressure to the outlet pressure at 30 SCFM condition).

Given Conditions: Inlet pressure=3000 psig,  
Set pressure=2250 psig

- 1). Locate the set pressure (2250 psig) with zero flow on the vertical axis;
- 2). Follow the curve until it crosses the vertical line corresponding to 30 SCFM;
- 3). Read horizontally from the cross point to the vertical axis. The corresponding pressure read is 1945 psig. Therefore, the pressure drop is 305 psig.

### Flow Chart



# Conversion Factors

## Pressure

TO CONVERT FROM TO	Psi	bar	atm	KPa	ft. of H <sub>2</sub> O	in. of H <sub>2</sub> O	mm of Hg	in. of Hg	Kg/cm <sup>2</sup>
Psi	1	0.068948	0.06805	6.89465	2.3089	27.708	51.175	2.036	0.070307
bar	14.5038	1	0.98692	100	33.4883	401.8596	750.062	29.53	1.0197
atm	14.696	1.01325	1	101.3171	33.932	407.1827	760	29.921	1.0332
KPa	0.14504	0.010	0.00987	1	0.33456	4.01472	7.5006	0.29613	0.0102
ft. of H <sub>2</sub> O	0.433107	0.029891	0.02947	2.989	1	12	22.4198	0.882646	0.03048
in. of H <sub>2</sub> O	0.03609	0.002499	0.00246	0.0249089	0.08333	1	1.86832	0.073556	0.00254
mm of Hg	0.019337	0.001333	0.00132	0.133322	0.044603	0.535240	1	0.03937	0.00136
in. of Hg	0.49115	0.033864	0.03342	3.376895	1.134	13.6	25.4	1	0.034532
Kg/cm <sup>2</sup>	14.22334	0.980665	0.9678	98.03922	32.8084	393.7008	735.5592	28.95903	1

## Flow

TO CONVERT FROM TO	cm <sup>3</sup> /min	cm <sup>3</sup> /sec	ft <sup>3</sup> /hr	ft <sup>3</sup> /min	m <sup>3</sup> /hr	m <sup>3</sup> /min	L/hr	L/min
cm <sup>3</sup> /min	1	0.0166667	0.0021189	0.0000353	0.00006	0.000001	0.06	0.001
cm <sup>3</sup> /sec	60	1	0.127134	0.0021189	0.0036	0.00006	3.6	0.06
ft <sup>3</sup> /hr	471.9474	7.86579	1	0.0166667	0.0283168	0.0004719	28.31685	0.4719474
ft <sup>3</sup> /min	28316.85	471.9474	60	1	1.699008	0.0283168	1699.008	28.31686
m <sup>3</sup> /hr	16666.67	277.7778	35.31467	0.5885777	1	0.0166667	1000	16.66667
m <sup>3</sup> /min	1000000	16666.67	2118.876	35.31467	60	1	60000	1000
L/hr	16.66667	0.2777778	0.0353147	0.0005885	0.001	0.0000167	1	0.0166667
L/min	1000	16.66667	2.118876	0.0353147	0.06	0.001	60	1

## Density

TO CONVERT FROM TO	gms/cm <sup>3</sup>	kg/m <sup>3</sup>	lbs/ft <sup>3</sup>	lbs/in <sup>3</sup>	lbs/U.S. gal
gms/cm <sup>3</sup>	1	1000	62.428	0.0361273	8.3454
kg/m <sup>3</sup>	0.001	1	0.062428	3.61273×10 <sup>-5</sup>	0.0083454
lbs/ft <sup>3</sup>	0.0160185	16.018463	1	5.78704×10 <sup>-4</sup>	0.13368
lbs/in <sup>3</sup>	27.679905	27679.9	1728	1	231
lbs/U.S. gal	0.1198264	119.8264	7.4805195	0.004329	1

# Material Compatibility for Gases

Materials Media	Metals						Plastics				Elastomers	
	Copper	Brass	Aluminum	Stainless Steel	Hastelloy C 22	Monet	PCTFE	Teflon PTFE	PEEK	Vespel	Viton	Buna-N
Acetylene	3	2	1	1	1	1	1	1	4	4	1	1
Ammonia	3	3	2	1	1	1	1	1	4	3	3	2
Argon	1	1	1	1	1	1	1	1	1	1	1	1
Argon/Methane	1	1	1	1	1	1	1	1	1	1	1	1
Arsine	3	2	3	1	1	1	1	1	4	4	1	4
Boron Trichloride	3	3	3	2	1	1	1	1	4	4	4	3
Boron Trifluoride	3	3	3	2	1	1	1	1	4	4	4	3
N-Butane	1	1	1	1	1	1	1	1	1	1	1	1
Carbon Dioxide	1	1	1	1	1	1	1	1	1	1	1	1
Carbon Monoxide	1	1	1	1	1	1	1	1	4	4	1	1
Chlorine	3	3	3	2	1	1	1	1	4	2	1	3
Deuterium	1	1	1	1	1	1	1	1	1	1	1	1
Diborane	1	1	1	1	1	1	1	1	1	1	1	3
Ethane	1	1	1	1	1	1	1	1	1	1	1	1
Ethylene	1	1	1	1	1	1	1	1	1	1	1	1
Fluorine	2	3	2	3	3	1	2	1	3	3	3	3
Hydrogen	1	1	1	1	1	1	1	1	1	1	1	1
Hydrogen Chloride	3	3	3	2	1	1	1	1	4	2	2	3
Hydrogen Flouride	3	3	3	3	2	1	1	1	4	4	4	3
Hydrogen Sulphide	3	3	3	1	1	4	4	4	4	4	1	4
Hydrogen Iodide	3	3	3	4	4	4	4	4	4	4	4	4
Helium	1	1	1	1	1	1	1	1	1	1	1	1
Hexafluoro Ethane	1	1	1	1	1	1	2	1	4	4	4	4

## Codes

- 1 Recommended
- 2 Use with Limitations
- 3 Not Applicable
- 4 Insufficient Data

Gas Control Equipments  
Other Applicable Products  
Technical References

Gas Control Equipments  
Other Applicable Products  
Technical References

# Ordering Details for Specialty Gas Equipments

Materials Media	Metals						Plastics				Elastomers	
	Copper	Brass	Aluminum	Stainless Steel	Hastelloy C 22	Monet	PCTFE	Teflon PTFE	PEEK	Vespel	Viton	Buna-N
Isobutene	1	1	1	1	1	1	1	1	1	1	1	1
Isobutane	1	1	1	1	1	1	1	1	1	1	1	1
Krypton	1	1	1	1	1	1	1	1	1	1	1	1
Methane	1	1	1	1	1	1	1	1	1	1	1	1
Methyl Chloride	4	4	3	1	1	4	4	1	4	4	1	3
Methyl Mercaptan	3	2	1	1	4	4	1	1	4	4	4	4
Neon	1	1	1	1	1	1	1	1	1	1	1	1
Nitrogen	1	1	1	1	1	1	1	1	1	1	1	1
Nitrous Oxide	1	1	1	1	1	1	2	1	1	1	1	1
Nitrogen Dioxide	4	2	2	1	4	2	1	1	4	4	4	4
Nitrogen Trifluoride	2	4	4	2	4	1	4	4	4	4	4	4
Nitrogen Monoxide	3	3	1	1	1	3	1	1	4	4	4	4
Phosphine	2	1	2	1	1	1	1	1	4	4	2	4
Propane	1	1	1	1	1	1	1	1	1	1	1	1
Propylene	1	1	1	1	1	1	1	1	1	1	1	3
Oxygen	1	1	1	1	1	1	1	1	1	1	1	1
Sulphur Dioxide	2	2	2	1	1	4	4	1	4	4	3	3
Sulphur Hexafluoride	1	1	1	1	1	1	1	1	1	1	1	1
Silane	1	1	1	1	1	1	1	1	4	4	1	4
Synthetic Air	1	1	1	1	1	1	1	1	1	1	1	1
Tetrafluoro Methane	1	1	1	1	1	1	1	1	4	4	1	4
Trifluoro Methane R23	1	1	1	1	1	1	1	1	4	4	4	4
Xenon	1	1	1	1	1	1	1	1	1	1	1	1

### Codes

- 1 Recommended
- 2 Use with Limitations
- 3 Not Applicable
- 4 Insufficient Data

<b>Company</b> _____ <b>Name</b> _____ <b>Tel</b> _____ <b>E-mail</b> _____
<b>Application Information</b> Gas _____ Chemical formula _____ Purity _____ Upstream pressure _____ psig, _____ bar, _____ Mpa Downstream pressure range _____ psig, _____ bar, _____ Mpa Temperature _____ °C _____ °F Cv or flow rate _____ Application _____ _____
<b>Pressure Regulator Data</b> Single-stage <input type="checkbox"/> Dual-stage <input type="checkbox"/> Material (mostly gas type dependent): Stainless steel <input type="checkbox"/> Brass <input type="checkbox"/> Hastelloy <input type="checkbox"/> <input type="radio"/> Cylinder pressure regulator <input type="checkbox"/> Cylinder connection Yes <input type="checkbox"/> No <input type="checkbox"/> Purge unit Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="radio"/> Panel and line pressure regulator <input type="checkbox"/> 2 ports <input type="checkbox"/> 3 ports <input type="checkbox"/> 4 ports <input type="checkbox"/> <input type="radio"/> Pressure control panel <input type="checkbox"/> Purge unit Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="radio"/> Changeover system <input type="checkbox"/> with line regulator Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="radio"/> Point-of-use panel <input type="checkbox"/>

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