

# Reliable®

## Model PRV Pressure Regulating Valve

1-1/2" (40mm), 2" (50mm), 2-1/2" (65mm), 76mm,  
3" (80mm), 4" (100mm), 6" (150mm), 165mm

cULus Listed, FM Approved

### Features

- 400 psi (27.6 bar) rated pressure
- Compact trim
- No trim connections to valve cover
- Suitable for horizontal or vertical installation
- Adjustable pressure relief valve included with trim

### Product Description

The Model PRV Pressure Regulating valve is a cULus and FM Approved diaphragm-type valve available in 1-1/2" (40mm), 2" (50mm), 2-1/2" (65mm), 76mm, 3" (80mm), 4" (100mm), 6" (150mm), and 165mm nominal sizes with multiple end configurations (see Table A).

The valve diaphragm seals against a seat machined in the valve body. Water pressure in the chamber between the diaphragm and the cover presses the diaphragm against the seat to prevent water flow through the valve. The release of water pressure from the chamber allows the diaphragm to deform away from the seat allowing water to flow through the valve. A pressure regulator included in the trim allows the Model PRV valve to regulate the water pressure from the outlet of the valve.



Maintenance of the valve is simplified because all trim is connected to the valve body, and the diaphragm can be removed without disassembling the trim.

### End Configuration Options

Table A

GR x GR (ANSI/AWWA C606)	Class 150 FLG x FLG (ASME B16.5)	Class 300 FLG x FLG (ASME B16.5)	PN16 FLG x FLG (ISO 7005-2)	BS-E FLG x FLG (BS 10)	NPT THD x THD (ANSI/AMSE B1.20.1)	ISO 7/1 THD x THD
All Sizes	All Sizes (exc. 76 & 165mm)	All Sizes (exc. 76 & 165mm)	All Sizes (exc. 76 & 165mm)	All Sizes (exc. 76 & 165mm)	1-1/2", 2", 2-1/2", & 3" (40, 50, 65, & 80mm)	1-1/2", 2", 2-1/2", & 3" (40, 50, 65, & 80mm)

### Technical Data

Table B

Valve Size in (mm)	Maximum Pressure Rating psi (bar) <sup>(1)</sup>	Maximum Listed Flow gpm (L/min)		Regulated Outlet Pressure Range <sup>(2)(3)</sup> psi (bar)		Weight (Grooved Valve with Trim) lb (kg)
		cULus	FM	cULus	FM	
1-1/2" (40mm)	400 (27.6)	90 (341)	225 (1023)	100 - 200 (6.9-13.8)	50 - 210 (3.4 - 14.5)	18.5 (8.4)
2" (50mm)		175 (662)	250 (1137)			18.5 (8.4)
2-1/2" (65mm)		250 (946)	400 (1514)			29.5 (13.4)
76mm, 3" (80mm)		360 (1363)	400 (1514)			30 (13.6)
4" (100mm)		650 (2461)	1340 (5072)			41 (18.6)
6" (150mm), 165mm		1325 (5016)	3000 (11350)			89.5 (40.6)

### Notes:

1. Valves are intended to be installed on systems where the pressure does not exceed the working capabilities of the end configurations.
2. For cULus: Where inlet pressure is between 150 and 400 psi (10.3 and 27.6 bar), a regulated outlet pressure of 100 to 200 psi (6.9 to 13.8 bar) can be maintained within +/- 10% under flowing conditions for inlet pressures that are at least 50 psi (3.4 bar) greater than the outlet set pressure.
3. For FM Global: Where inlet pressure is between 85 and 300 psi (5.9 and 20.7 bar), a regulated outlet pressure of 50 to 210 psi (3.4 to 14.5 bar) can be maintained under flowing conditions with inlet pressures that are at least 35 psi (2.4 bar) greater than the outlet set pressure. Where inlet pressure is more than 300 psi (20.7 bar) and up to 400 psi (27.6 bar), a regulated outlet pressure of 50 to 210 psi (3.4 to 14.5 bar) can be maintained under flowing conditions with inlet pressures that are at least 50 psi (3.4 bar) greater than the outlet set pressure.

## Model PRV Pressure Regulating Valve

### Technical Specifications

**Maximum Pressure Rating:**  
400 psi (27.6 bar)

### Material Specifications

**Body & Cover:** Ductile Iron with Red Oxide Epoxy coating and Urethane external coating  
**Diaphragm:** Fabric reinforced EPDM

### End Connections

See Table A

### Installation Orientation

No restrictions

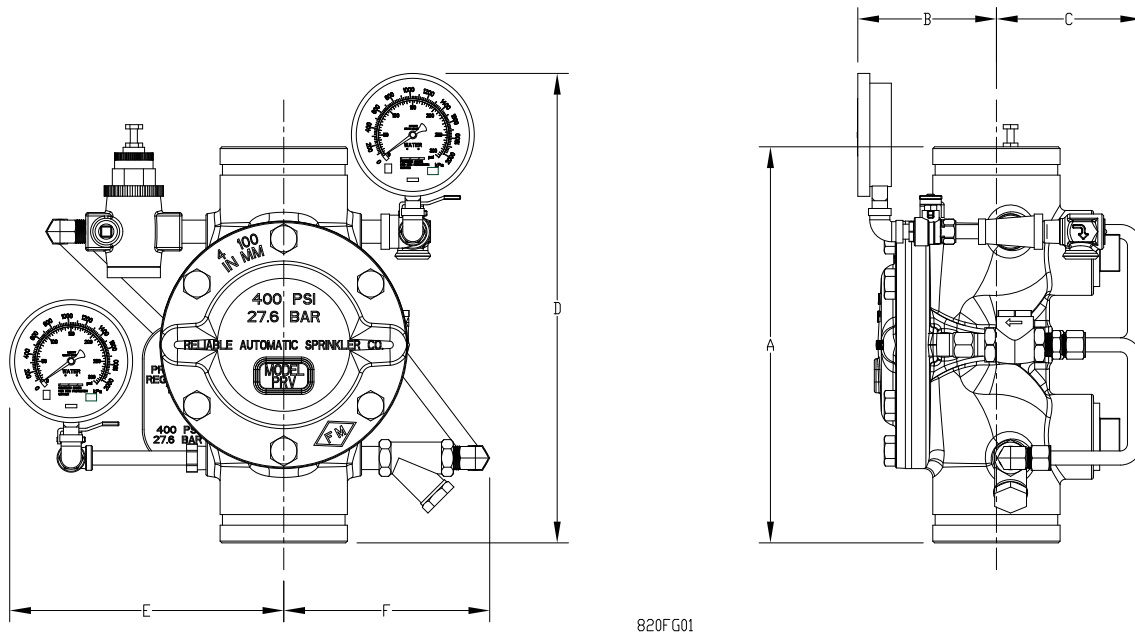
### Approvals

cULus Listed  
FM Approved



## Model PRV Pressure Regulating Valve Components and Dimensions

Figure 1



820FG01

Model PRV Pressure Regulating Valve Dimensions - in. (mm)

Table C

Valve Size	A	B	C	D	E	F
1-1/2" (40mm), 2" (50mm)	8 (203)	5-3/4 (146)	6-1/2 (165)	11-1/4 (286)	7-1/4 (184)	6-1/4 (159)
2-1/2" (65mm), 3" (80mm), & 76mm	11 (279)	6-1/4 (159)	5-1/2 (140)	13-1/4 (337)	8 (203)	7 (178)
4" (100mm)	14 (356)	4-3/4 (121)	5-1/4 (133)	16-1/2 (419)	8-1/2 (216)	7-1/2 (191)
6" (150mm), 165mm	18 (457)	6-1/2 (165)	5-1/4 (133)	18-1/2 (470)	10 (254)	9 (229)

# Model PRV Hydraulic Friction Loss Data

Table D

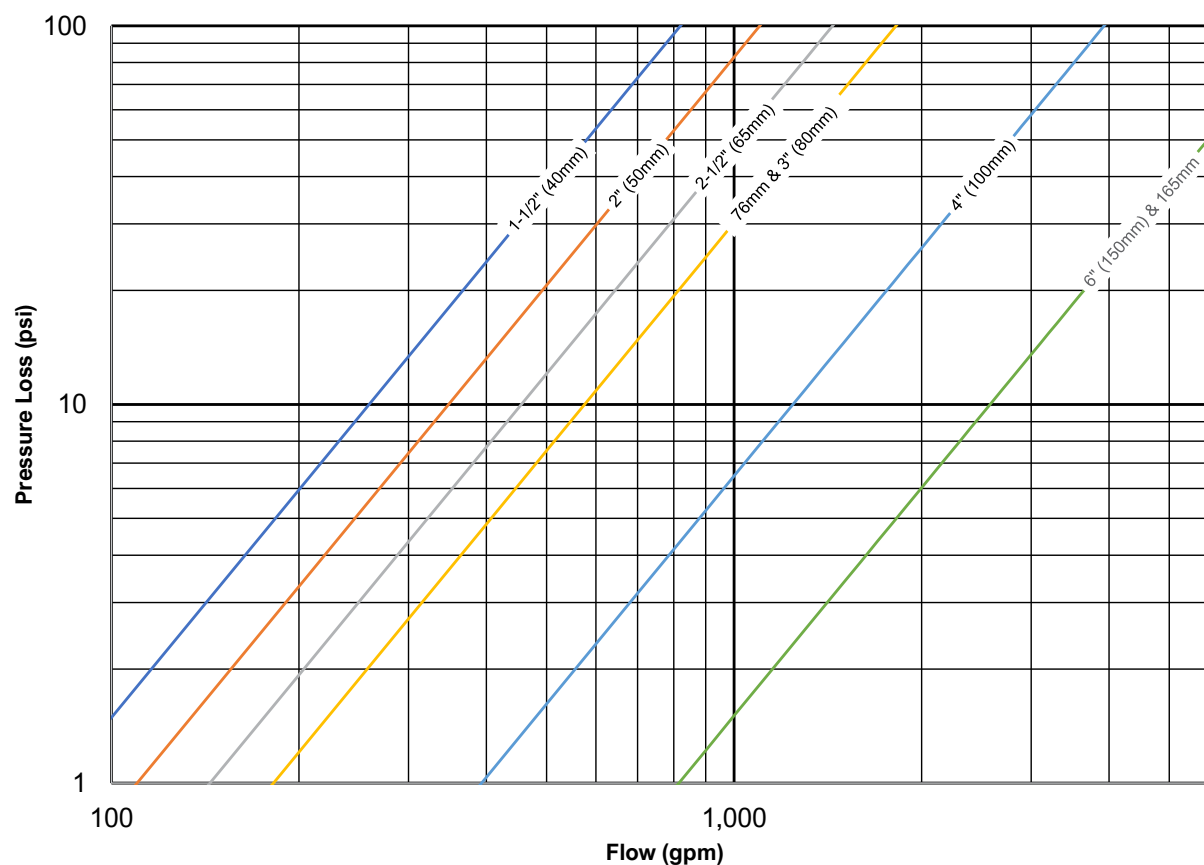
Valve Size	Cv Flow Coefficient gpm/(psi) <sup>1/2</sup>	Kv Flow Coefficient m <sup>3</sup> /h/(bar) <sup>1/2</sup>	Approximate Equivalent Length ft (m) C= 120 Sch 40 Steel Pipe	Approximate Equivalent Length ft (m) C= 100 Sch 40 Steel Pipe
1-1/2" (40mm)	82	71	4.6 (1.4)	3.3 (1.0)
2" (50mm)	110	95	8.8 (2.7)	6.3 (1.9)
2-1/2" (65mm)	144	124	12.9 (3.9)	9.2 (2.8)
76mm, 3" (80mm)	182	157	24.1 (7.3)	17.2 (5.2)
4" (100mm)	393	339	28.6 (8.7)	20.4 (6.2)
6" (150mm), 165mm	815	703	52.2 (15.9)	37.2 (11.3)

## Notes:

1. The Cv flow coefficient (amount of flow to generate a 1 psi loss) was used to calculate the approximate equivalent length.
2. The Hydraulic Friction Loss Data in Table D is the minimum friction loss through the valve when the pilot regulator is not maintaining pressure in the diaphragm chamber.
3. When the inlet pressure is greater than the set pressure of the pilot regulator, friction loss through the valve will be increased to reduce the outlet pressure.
4. The pilot regulator may maintain some pressure in the diaphragm chamber even when the inlet pressure is less than the set pressure of the pilot regulator, making the actual friction loss greater than the friction loss calculated using the data in Table D.

# Minimum Friction Loss through Valve

Figure 2



## Notes:

1. Minimum Friction Loss through Valve is the minimum friction loss through the valve when the pilot regulator is not maintaining pressure in the diaphragm chamber.
2. When the inlet pressure is greater than the set pressure of the pilot regulator, friction loss through the valve will be increased to reduce the outlet pressure.
3. The pilot regulator may maintain some pressure in the diaphragm chamber even when the inlet pressure is less than the set pressure of the pilot regulator, making the actual friction loss greater than the Minimum Friction Loss through Valve.

## General Operation

The Model PRV Pressure Regulating Valve is designed to control pressure in both flowing and non-flowing conditions. In a non-flowing condition, water pressure on the outlet side of the diaphragm reaches the preset level of the regulator, which then closes and allows pressure in the diaphragm chamber to build, forcing the diaphragm to seal against the seat. When pressure on the outlet side of the valve decreases, the pressure regulator senses the lower pressure and begins to open and relieve pressure from the diaphragm chamber. This in turn allows the diaphragm to move away from the seat and water to pass through the valve. The pressure regulator continues to sense the water pressure on the outlet side of the valve and adjusts to any increase or decrease in pressure to maintain close control of the flowing water pressure.

**Note:** The system pressure gauge on the PRV valve provides an indication of the pressure within the system, but accuracy may be affected by turbulence across the diaphragm created during water flow. Where a more accurate measurement of residual pressure is required, a pressure gauge should be installed downstream of the PRV valve on a straight run of pipe of sufficient length to provide an accurate reading of residual pressure.

## Pressure Adjustment

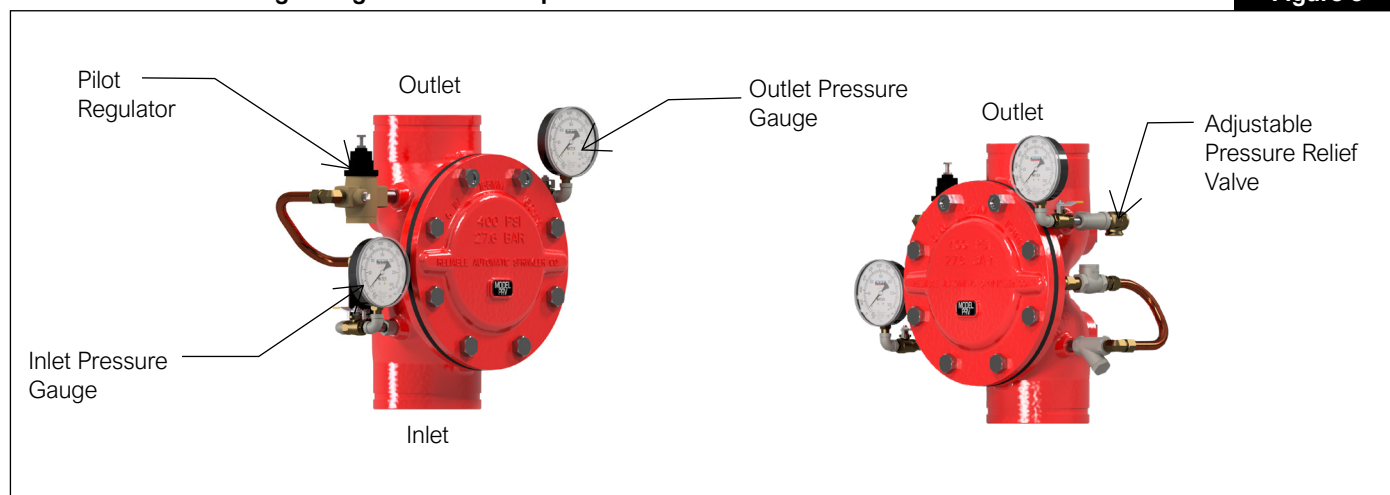
1. Loosen the lock nut on the adjustment screw.
2. Initiate water flow on the piping or system that is being regulated by the Model PRV Pressure Regulating Valve.
3. Turn the adjustment screw clockwise to increase outlet pressure, or counterclockwise to decrease outlet pressure of the Model PRV valve.
4. Adjust in no more than 1/2 turns and allow time for the valve to stabilize at the new set point.
5. When the desired outlet pressure is reached, securely tighten the lock nut.
6. Cause the water flow to stop, and verify that outlet pressure on the system is within the design limits.

## Warnings:

1. Always set the outlet pressure with water flowing through the PRV valve. While the outlet pressure can be adjusted without water flowing, this may not be representative of the outlet pressure under flowing conditions.
2. The PRV valve is designed to close slowly to help avoid water hammer. As the PRV valve closes, pressures in excess of the set outlet pressure may develop on the outlet side of the valve. A pressure relief valve is provided as part of the PRV valve trim to limit the outlet pressure as the PRV valve closes. The set pressure of the relief valve should be greater than the set outlet pressure of the PRV valve to prevent water from continuously flowing through the relief valve. The set pressure of the relief valve should be appropriate for the rated working pressure of the system and is generally 10 psi (0.7 bar) in excess of the maximum system pressure in accordance with NFPA 13.
3. The relief valve provided as part of the PRV valve trim is not a substitute for providing a relief valve on the system side of check valves. A relief valve is often required on wet pipe systems by installation standards, such as NFPA 13, to prevent excess pressures in a system due to a variety of causes, including thermal expansion. A check valve located between the PRV valve and the system will prevent the relief valve on the PRV valve trim from relieving excess pressure from the system.
4. For systems with a fire pump, the PRV valve outlet set pressure should be less than the start pressure of the fire pump. Setting the fire pump start pressure lower than the PRV outlet set pressure may allow excessive pressure in system upon fire pump start-up, because the PRV will be mostly or fully open when the fire pump starts.

Model PRV Pressure Regulating Valve and Components

Figure 3



Installation

The Model PRV valve should be installed with an indicating control valve on the inlet side of each Model PRV valve in accordance with NFPA 13, "Standard for the Installation of Sprinkler Systems," as well as the requirements of any authorities having jurisdiction. Flushing underground piping in accordance with NFPA 24 "Standard for the Installation of Private Fire Service Mains and Their Appurtenances", is also required before setting the Model PRV valve in service. Failure to follow installation instructions and/or revisions to the trim arrangement of the valve may void the warranty and/or listing of the valve.

Verify compatibility of the Model PRV valve materials with the water supply and the environment where the valve will be installed prior to installation. Do not apply lubricants, sealants, or other chemicals to the diaphragm or seat. The Model PRV valve must be installed in a location where the temperature is maintained at a minimum of 40°F (4°C) and the maximum temperature of the valve, including solar gain, must not exceed 120°F (49°C). The Model PRV valve shall not be installed in direct sunlight. Heat tracing of the valve and/or trim is not permitted.

Maintenance

The owner is responsible for maintaining the fire protection system in proper operating condition. Any system maintenance or testing that involves placing a control valve or detection/control system out of service may eliminate the fire protection that is provided by the fire protection system.

The Reliable Model PRV valve and associated equipment shall periodically be given a thorough inspection and test. NFPA 25, "Inspection, Testing and Maintenance of Water Based Fire Protection Systems," provides minimum maintenance requirements. System components shall be tested, operated, cleaned, and inspected at least annually, and parts replaced as required.

Reliable recommends that the diaphragm be replaced every 10 years or more frequently if inspections identify wear warranting more frequent replacement.

Recommended torque for cover plate bolts is as follows:

- 1-1/2" (40 mm) & 2" (50 mm) = 30 (+/- 5) ft-lb
- 2-1/2" (65 mm), 76 mm, & 3" (80 mm) = 50 (+/- 5) ft-lb
- 4" (100 mm) = 70 (+/- 5) ft-lb
- 6" (150 mm) & 165 mm = 130 (+/- 5) ft-lb

Guarantee

For Reliable Automatic Sprinkler Co., Inc. guarantee, terms, and conditions, visit [www.reliablesprinkler.com](http://www.reliablesprinkler.com).

Ordering Information

Specify the following when ordering:

Valve Model

- PRV

Valve Size

- 1-1/2" (40mm)
- 2" (50mm)
- 2-1/2" (65mm)
- 76mm
- 3" (80mm)
- 4" (100mm)
- 6" (150mm)
- 165mm

End Configuration

- Grooved, flanged, or threaded (reference Table A)

Model PRV Ordering Information Part Number

Figure 4

6507 V W 8 00 X

End Connections V	Valve Size W	Gauge X
0 = Red, Groove/Groove	0 = 1-1/2" (40mm) Valve	0 = 300 psi gauges
1 = Red, Flange/Flange Class 150	2 = 2" (50mm) Valve	2 = 600 psi gauges
2 = Red, Flange/Flange Class 300	1 = 2-1/2" (65mm) Valve	
3 = Red, Flange/Flange PNIG	7 = 76mm Valve	
4 = Red, Flange/Flange BS-E	3 = 3" (80mm) Valve	
5 = Red, Thread/Thread NPT	4 = 4" (100mm) Valve	
6 = Red, Thread/Thread ISO 7/1	6 = 6" (150mm) Valve	
	5 = 165mm Valve	