

The **Smith Meter™ Flow Limiting Valves** are automatic, self-actuating, globe-pattern, flow-limiting valves. These valves are diaphragm or piston operated and are used primarily in systems with parallel meter runs to protect the meters against excessive flow rate when less than the maximum number of meter runs are operating.

Features

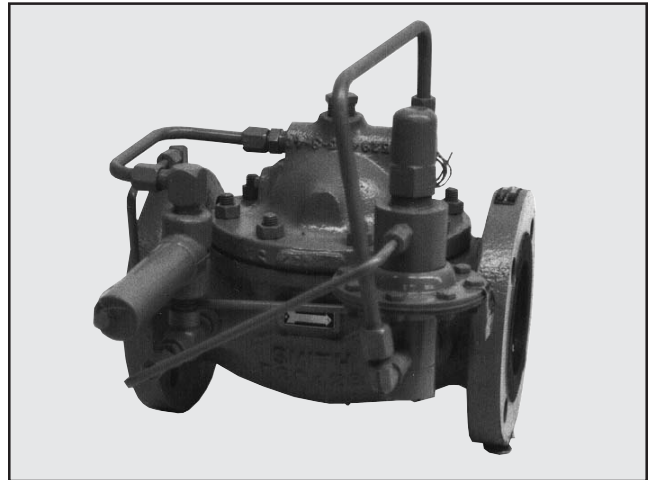
- **Automatic Operation**
- **Simple Construction** - Reduces maintenance costs and downtime.
- **Versatile** - Horizontal or vertical.
- **Application** - May be combined with other Smith pilots to provide multiple control functions.

Principle of Operation

The Smith Meter™ Flow Limiting Valves limit the maximum flow rate by sensing the differential pressure across an appropriately-sized integral orifice plate mounted on the inlet side of the valve.

Diaphragm-Operated Normally-Open Pilot Loop, Model 200-40A

With product flowing, the Flow Limiting Valve is held open by the differential pressure across the main valve (200) diaphragm (Figure 1). The pressure beneath the main valve diaphragm (inlet pressure) is greater than the pressure in the main valve cover chamber which is vertical through the normally-open 40A Rate of Flow Control Pilot (installed downstream of the pilot loop). The 40A pilot is held open by the spring in its cover chamber. As product flows through the valve, a pressure differential is created across the valve orifice plate. The higher pressure sensed on the upstream side of the orifice plate is transferred through a sense line to the pressure chamber beneath the 40A pilot diaphragm. The lower pressure sensed downstream of the orifice plate is transferred to the cover chamber of the 40A pilot. As the flow rate increases, the differential pressure across the orifice plate increases. This increase in differential pressure causes the 40A pilot stem assembly to close gradually, restricting the vent path of the main valve cover chamber through the 40A pilot orifice. As the flow rate approaches the maximum flow rate setting, the 40A pilot creates a gradual build-up of pressure in the cover chamber of the main valve, causing it to throttle. Thereby limiting flow through the valve. The flow rate limit setting is increased by screwing in the pilot adjusting screw on the 40A and increasing the spring force.



Model 200-40A

Diaphragm-Operated Normally-Closed Pilot Loop, Model 200-42A

The Model 200-42A valve operates using the same differential pressure principle as the 200-40A valve except that the normally-closed 42A pilot is located in the upstream side of the pilot loop (Figure 2). An increase in differential pressure across the valve orifice plate causes the 42A pilot to open, introducing system inlet pressure into the main valve (200) cover chamber and throttling the main valve to restrict product flow. The 200-42A configuration minimizes pressure drop when the valve is not throttling because the main valve cover chamber is closed off from high upstream pressure by the normally-closed 42A pilot.

Applications

The Smith Meter™ Models 200-40A and 200-42A limit liquid product flow through a system to a predetermined flow rate. The valves are field-adjustable within the design flow range (approximately 2:1 turndown) of the integral orifice plate, and provide excellent overspeed protection for meters or other system equipment.

The Model 200-40A is typically used for 2" through 4" valve sizes, while the Model 200-42A is used for 6" applications. All versions can be combined with other control functions such as back pressure, pressure reducing, check and thermal relief, and solenoid block.

Note: When a combination of flow limiting and solenoid block valve in any size is required, the 40A/30A pilot configuration is recommended.

Specifications

Nominal Flow Ratings

Size	Flow		Cv
	USGPM	L/min	
2"	130	492	50
3"	420	1,600	133
4"	600	2,250	204
6"	1,000	3,750	436

Maximum Product Viscosity
200 SSU (40 mPa·s¹). Above 200 SSU, consult factory.

Pressure Rating/Connections^{2,3}

Class 150 ASME, 285 psi (19.6 bar).
Class 300 ASME, 300 psi (20.7 bar).

Temperature Range

Valve Elastomer	Temperature Range ^{2,4}
Buna-N	-20°F to 200°F (-28°C to 93°C)
LS (Low Swell) Buna ⁵	-20°F to 200°F (-28°C to 93°C)
Viton	-20°F to 350°F (-28°C to 177°C)

Weight (Net)

Model	Size	lb (kg.)
200-40A	2"	47 (21)
	3"	84 (38)
	4"	137 (62)
200-42A	6"	259 (117)

Ordering Information

Operating Conditions	Liquid – name and specific gravity or API gravity, (critical to orifice plate sizing), temperature range ⁶ , viscosity range ⁶ , maximum working pressure and maximum flow rate setting.
Seals	Low Swell Buna, Viton, Buna-N.

Materials of Construction

Component	Body	Internals	Elastomers
Model 202	Cast Steel	Bronze, Stainless Steel, Carbon Steel, Ductile Iron Options: No Bronze Epoxy Coating	Low Swell Buna ⁵ , Viton, or Buna-N
09SC Strainer	Carbon Steel	304 Stainless Steel	—
13 Needle Valve	Carbon Steel	Stainless Steel, Carbon Steel	Teflon
40A/42A	Carbon Steel	300 Stainless Steel, Carbon Steel	Buna, Viton
03A	Carbon Steel	300 Stainless, Plated Carbon Steel	Teflon ⁶

Tubing/Fittings

Standard: Carbon steel.
Optional: 300 Series stainless steel.

¹ 1 mPa·s = 1 cP.

² Pressure ratings are based on temperatures of -20°F to 100°F (-28°C to 38°C). For operation at higher temperatures, the maximum working pressure may be derated.

³ PED requirements limit applications to liquids with maximum vapor pressures of .5 bar above atmospheric pressure, at maximum allowable temperature.

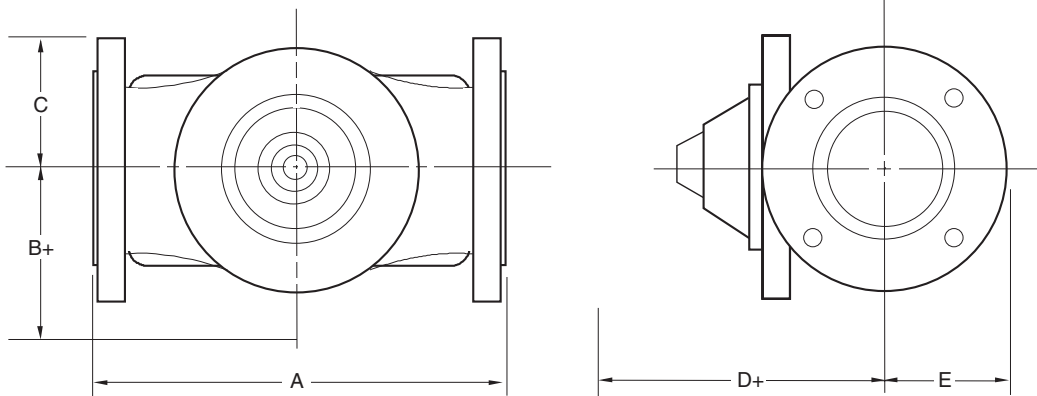
⁴ For temperature outside these ranges, consult factory.

⁵ Standard; for other elastomer material, consult factory.

⁶ Minimum, normal, maximum.

Dimensions

Inches (mm)



Model	Size	A Class 150 ASME Flange	A Class 300 ASME Flange	B ⁷	C	D ⁷	E
200-40A	2"	8.0 (203)	8.5 (216)	8.0 (203)	4.0 (102)	7.5 (140)	3.0 (76)
	3"	11.0 (279)	11.8 (299)	9.5 (241)	4.0 (102)	9.5 (241)	4.1 (105)
	4"	13.5 (343)	14.2 (362)	9.5 (241)	4.9 (124)	9.5 (241)	4.5 (114)
200-42A	6"	17.0 (432)	17.9 (454)	11.0 (279)	6.6 (168)	12.5 (318)	5.5 (140)

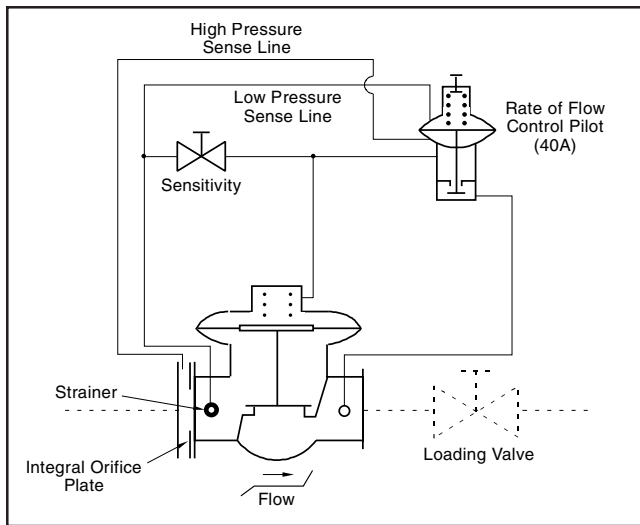


Figure 1—Model 200-40A

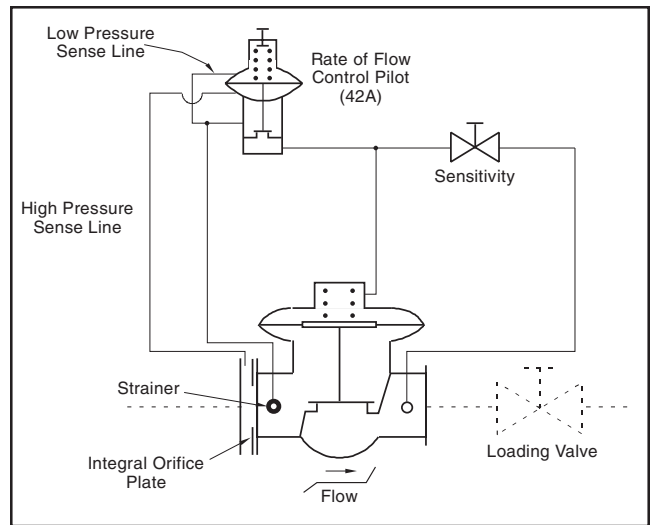


Figure 2—Model 200-42A

⁷ Pilots and tubing will be within these dimensions.

Revisions included in SS03013 Issue/Rev. 0.3 (2/03):

Page 1: Removed reference to 200P-42A-29/13 valves.

Page 2: Removed reference to 200P42A-29/13 and 8", 10" and 12" valves. Revised Temperature Range and Materials of Construction. Added footnote for PED.

Page 3: Removed reference to 8", 10" and 12" valves.

Page 4: Removed figure 3 reference to 200P-42A-29/13 valves.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

Headquarters:

1803 Gears Road, Houston, TX 77067 USA, Phone: 281/260-2190, Fax: 281/260-2191

Gas Measurement Products:

Houston, TX USA Phone 281/260-2190
Thetford, England Phone (44) 1842-82-2900
Kongsberg, Norway Phone (47) 32/286-700
Buenos Aires, Argentina Phone 54 (11) 4312-4736

Integrated Measurement Systems:

Corpus Christi, TX USA Phone 361/289-3400
Kongsberg, Norway Phone (47) 32/286-700
San Juan, Puerto Rico Phone 787/274-3760
United Arab Emirates, Dubai Phone 971 +4/331-3646

Liquid Measurement Products:

Erie, PA USA Phone 814/898-5000
Los Angeles, CA USA Phone 661/702-8660
Slough, England Phone (44) 1753-57-1515
Ellerbek, Germany Phone (49) 4101-3040
Barcelona, Spain Phone (34) 93/201-0989
Moscow, Russia Phone (7) 495/564-8705
Melbourne, Australia Phone (61) 3/9807-2818

Beijing, China Phone (86) 10/6500-2251
Singapore Phone (65) 6861-3011
Chennai, India Phone (91) 44/450-4400

Visit our website at www.fmctechnologies.com