Model 200-40A / 200-42A Flow Limiting Valves

Bulletin SS03013 Issue/Rev. 0.5 (8/17)

Smith Meter® Flow Limiting Valves

Smith Meter® Flow Limiting Valves are automatic, self-actuating, globe-pattern, flow-limiting valves. These valves are diaphragm 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.

Model 200-40A

Benefits

- **Automatic Operation**
- **Simple Construction** – Reduces maintenance costs and downtime
- **Versatile** – Horizontal or vertical
- **Application** – May be combined with other Smith Meter 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 vented through the normally-open 40A Rate of Flow Control Pilot (installed in the downstream 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; there by 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.

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 parameters of the sized orifice plate, specific gravity of product, and pilot's adjustable range. They 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 Ranges			
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·s[1]). Above 200 SSU, consult factory.

Pressure Rating / Connections[2,3,4]

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

Temperature Range	
Valve Elastomer	Temperature Range[2,5]
Buna-N	-20°F to 200°F (-28°C to 93°C)
LS (Low Swell) Buna[6]	-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" 3" 4"	47 (21) 84 (38) 137 (62)
200-42A	6"	259 (117)

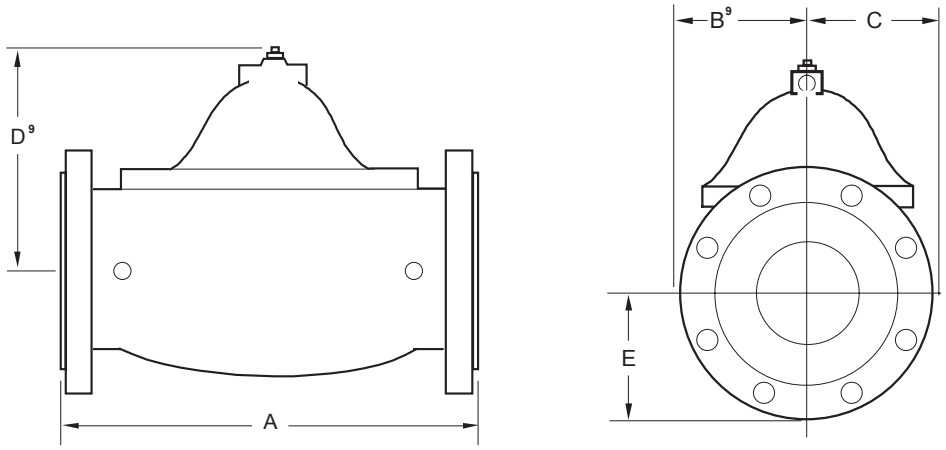
Ordering Information	
Operating Conditions	Liquid – name and specific gravity or API gravity, (critical to orifice plate sizing), temperature range[7], viscosity range[7], maximum working pressure and maximum flow rate setting.
Seals	Low Swell Buna, Viton, Buna-N

Materials of Construction			
Component	**Body**	**Internals**	**Elastomers**
Model 202	Cast Steel	Stainless Steel, Carbon Steel, Ductile Iron	Low Swell Buna[6], Viton, or Buna-N
09SC Strainer	Carbon Steel	304 Stainless Steel	–
13 Needle Valve	Carbon Steel	Stainless, Carbon Steel	Viton O-Ring with PTFE[8] backup
40A/42A	Carbon Steel	300 Stainless Steel, Carbon Steel	Buna, Viton
03A	Carbon Steel	300 Stainless Plated Carbon Steel	PTFE[6, 8]
Tubings/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 PED required for all European countries. Equipment must be manufactured in Ellerbek, Germany facility.
5 For temperature outside these ranges, consult factory.
6 Standard; for other elastomer material, consult factory.
7 Minimum, normal, maximum.
8 Polytetrafluoroethylene.

Dimensions

Inches (mm)



Model	Size	A Class 150 ASME Flange	A Class 300 ASME Flange	B[9]	C	D[9]	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)

Note: Inches to nearest tenth (millmetres to nearest mm), each independently dimensioned from respective engineering drawings.

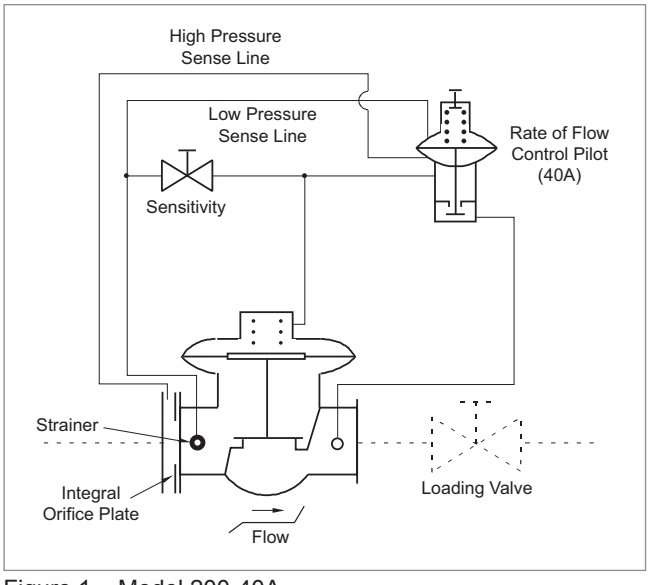


Figure 1 – Model 200-40A

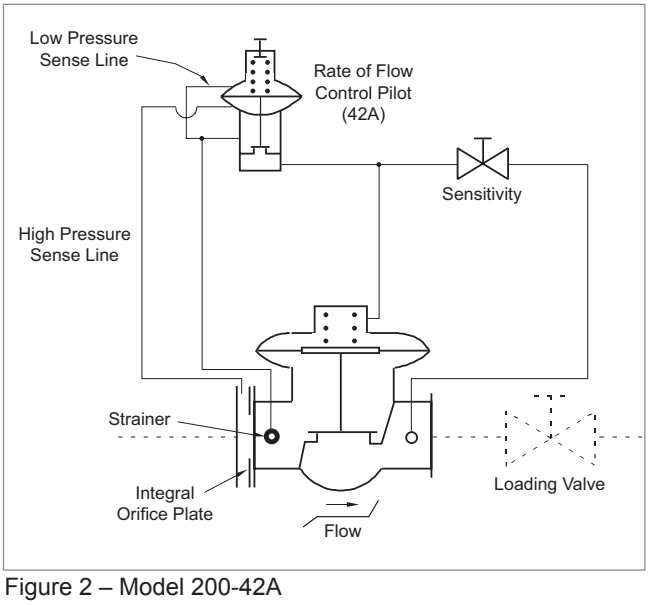


Figure 2 – Model 200-42A

9 Pilots and tubing will be within these dimensions.

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TechnipFMC
FMC Technologies
Measurement Solutions, Inc.
500 North Sam Houston Parkway West,
Suite 100
Houston, Texas 77067 USA
P:+1 281.260.2190

USA Operation
1602 Wagner Avenue
Erie, Pennsylvania 16510 USA
P:+1 814.898.5000

Germany Operation
Smith Meter GmbH
Regentstrasse 1
25474 Ellerbek, Germany
P:+49 4101.304.0