

The **Smith Meter® Model 296-40A Valve** is typically used in conjunction with Smith Meter Preset Counters for preset loading control at loading racks, bulk plants, or processing installations.

Features

- Simple control loop.
- Horizontal or vertical applications.
- Full range of optional control functions.

Operation

The Smith Meter Model 296-40A Valve consists of a Smith Meter 200 Series Valve with two solenoid controls, a position stem switch, a sensitivity adjustment needle valve, and a flow limiting pilot (see Figure 1). It is typically controlled by a mechanical set-stop counter with microswitch assembly mounted in the accessory stack of a positive displacement meter.

The normally-open (N.O.) and normally-closed (N.C.) solenoids, located in the upstream and downstream portions of the control loop, respectively, control the opening and closing of the valve. The solenoids are controlled

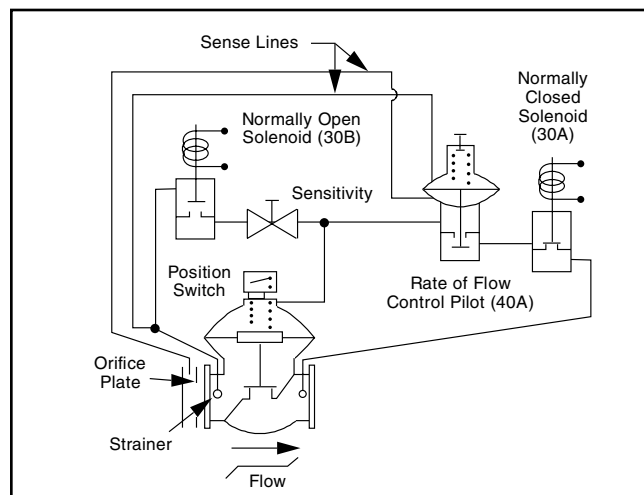
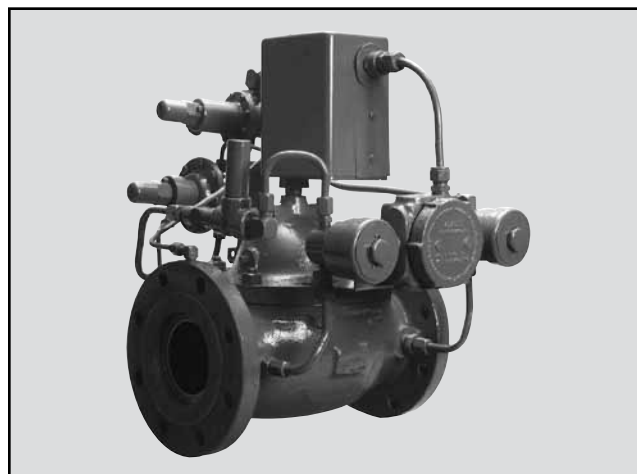


Figure 1 – Model 296-40A Valve (Shown Closed)

by the microswitch assembly of the mechanical set-stop counter and the stem switch mounted on the valve cover. When the set-stop counter is in the “off” position, the solenoids are de-energized. The position stem switch is closed. Actuating the set-stop counter energizes both the N.O. and N.C. solenoids. With the solenoids energized, high upstream pressure is blocked, allowing the product in the cover to vent to low, downstream pressure, opening the 296 Valve. This action allows the 296 Valve to approach a full-open position. As the 296 Valve opens, the stem switch is opened by an adjustable



296-50B-40A

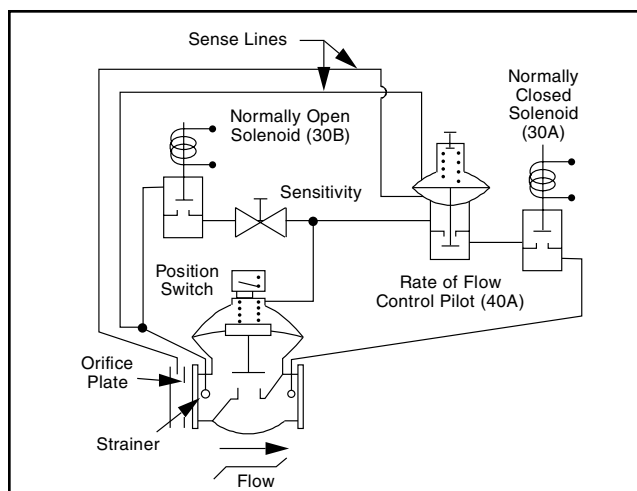


Figure 2 – Model 296-40A Valve (Shown Full Open)

cam attached to the positioner stem. This de-energizes the N.O. solenoid, allowing the 296 Valve to go into a “modulating” mode of operation (see Figure 2).

The maximum rate of flow is limited by the setting of the rate of flow pilot control which senses differential pressure across an integrally-mounted orifice plate. As the flow rate approaches the maximum flow setting, the differential pressure sensed across the orifice plate causes the rate of flow pilot control to partially close, causing a pressure to build up in the cover of the main valve, forcing it to modulate, limiting the flow rate.

When the first stage trip point is reached on the set-stop counter, the first stage switch de-energizes, closing the N.C. solenoid. This allows the 296 Valve cover to become pressurized, causing the valve to begin to close. As the valve closes, the valve positioner stem switch is closed, energizing the N.O. solenoid. With both solenoids closed (the N.C. solenoid de-energized, the N.O. solenoid energized), the 296 Valve is locked open hydraulically in a low-flow mode (see Figure 3).

When the set-stop counter reaches the final stage trip point, the second stage switch opens, de-energizing the N.O. solenoid. With both solenoids de-energized, the 296 Valve automatically closes.

Specifications

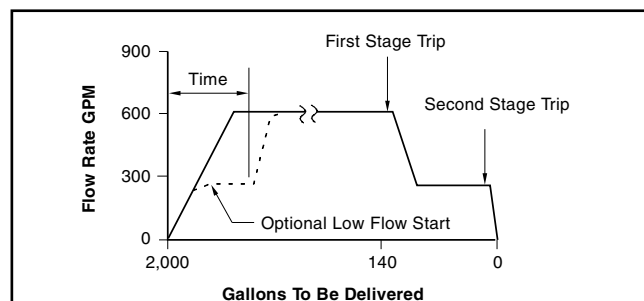


Figure 3 – Typical Load Cycle

Maximum Viscosity

Up to 200 SSU (40 cP/40 mPa•s).
Above 200 SSU (40 cP/40 mPa•s), refer to Model 215, Bulletin SS03010.

Pressure Rating

Size and Connection	Maximum Operating Pressure psig (kPa)		
	Standard	Optional	Optional
2"-6" Class 150 ANSI	115 (793)	150 (1,034)	285 (1,965)
2"-6" Class 300 ANSI	115 (793)	150 (1,034)	300 (2,068)

Note: The above maximum operating pressures are restricted by the solenoids used to operate the valve.

Nominal Flow Rates

Size	USGPM	L/min
2"	130	492
3"	420	1,600
4"	600	2,250
6"	1,000	3,750

Options

The 296-40A can be supplied with a number of options including:

- 15AXM Low Flow Start Timer
- Pre-Wired Junction Box
- Check/Thermal Relief
- Model 03A Manual Override
- Control Loop Isolation
- Model 64A Truck Manifold Pressure Limiting (Bottom Loading)
- Pressure reducing control

Editorial Change: 11/13 - Seal reference was changed to PTFE.

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Temperature Range

-20°F to 160°F (-29°C to 71°C) Buna-N Elastomers.
10°F to 350°F (-12°C to 177°C) Viton Elastomers.

Voltage (Solenoids)

Standard: 102 - 120 Vac, 60 Hz.
94 - 110 Vac, 50 Hz.

Optional: 204 - 240 Vac, 60 Hz.
118 - 220 Vac, 50 Hz.
24 Vdc.

Other voltages, consult factory.

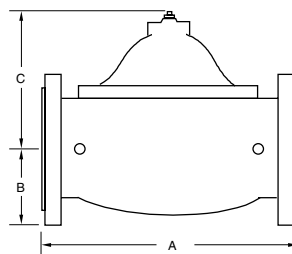
Materials of Construction

	Housing	Internals	Seals
Main Valve	Cast Steel	Stainless Steel, Steel, Ductile Iron	Buna-N, Viton
Solenoid Valves	Stainless Steel	Stainless Steel	Viton, Buna-N, or Chemraz
Needle Valve	Steel	Chrome Plated Steel	PTFE ²
Tubing and Fittings	—	Steel	—
Pilot Valve(s)	Carbon Steel	300 Stainless, Carbon Steel	Viton, Buna-N

Dimensions

Inches (mm)

Size	A Class 150	B Class 150	C	Weight lb (kg)
2"	8.0" (203)	3.0" (76)	5.5" (140)	46" (21)
3"	11.0" (279)	3.8" (97)	7.0" (178)	83" (38)
4"	13.5" (343)	4.5" (114)	8.0" (203)	136" (62)
6"	17.0" (432)	5.5" (140)	10.8" (274)	258" (117)



Note: Dimensions – Inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

1 Consult factory for larger sizes.
2 Polytetrafluoroethylene (PTFE).

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.

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