

General representation



Fueling

Terminal
Services

Rate of Flow/Solenoid Shut-Off Valve

Description

The rate of flow/solenoid shut-off valve shall function to control or limit the flow rate, regardless of fluctuations in upstream or downstream pressure. The valve shall be equipped with a two-way solenoid valve that will allow the valve to open when energized/de-energized. The OCV 120-1 has a wide range of applications - anywhere the flow rate must be controlled or limited, combined with a need for an on/off electrical operation. Typical examples include:

- Pump systems
- Truck loading terminals

Features & Benefits

- Controls or limits flow to a predetermined rate
- Built-in orifice plate for sensing flow rate
- Electrically operated solenoid allows valve to open (control flow rate) or shut-off (close)
- Extra-sensitive differential pilot
- Flow rate is adjustable with single screw
- Adjustable response speed
- Can be maintained without removal from the line
- Factory tested and can be preset to your requirements

Certification & Compliance

NSF-ISO Quality System (9001)



ABS Type Approval



Technical Standards & Safety Authority



American-Made: American Recovery & Reinvestment



Pressure Equipment Directive Certified 2014/68/EU



CE (Conformité Européenne) Compliance



Typical Applications

Metering Systems



Loading Terminals



Storage Tanks



Truck/Rail Car Loading & Unloading Systems



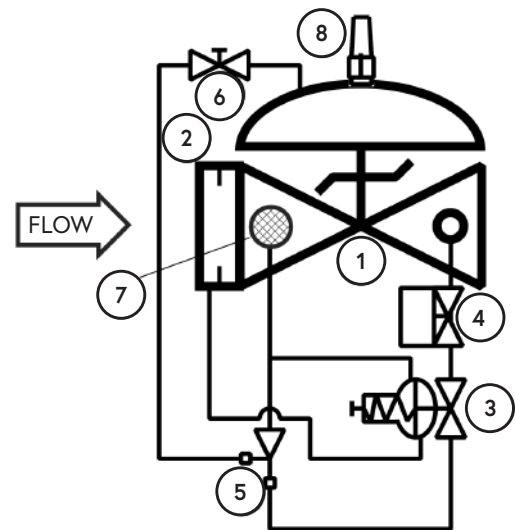
Operation

A two-way solenoid acts as an override and when closed, causes the main valve to close. Opening the solenoid allows the normally open, spring loaded rate of flow control pilot to take over. The pilot, sensing the increased differential flow rate, works to close the pilot and main valve, whereas decreased differential works to open them. The net result is a constant modulating action of the pilot and main valve to hold the differential, hence the flow rate, constant. The pilot system is equipped with a needle valve that fine tunes the valve's response to the system variables. The solenoid can be supplied normally closed (energize to enable) or normally open (energize to close).

Components

The OCV 120-1 consists of the following components, arranged as shown on the schematic diagram:

- 1 Model 65 Basic Valve (fail closed)
- 2 Orifice Plate
- 3 Model 2450 Rate of Flow Control Pilot
- 4 Model 451 Two-Way Solenoid Pilot
- 5 Model 126 Ejector
- 6 Model 141-2 Needle Valve
- 7 Model 123 Inline Strainer
- 8 Model 155 Visual Indicator (optional)



Pressure Table

| End Connections | Ductile Iron | STEEL/SST | STEEL LCB | STEEL WCB | Aluminum |
|---|--------------|-----------|-----------|-----------|----------|
| Standard (Maximum Working Pressures at 100°F) | | | | | |
| Screwed | 640 psi | 640 psi | -- | -- | 285 psi |
| Grooved | 300 psi | 300 psi | -- | -- | 200 psi |
| 150# Flanged | 250 psi | 285 psi | -- | -- | 285 psi |
| 300# Flanged | 640 psi | 740 psi | -- | -- | -- |
| Metric (Maximum Working Pressures at 37.78°C) | | | | | |
| Screwed | 44.1 bar | 44.1 bar | 44.1 bar | 44.1 bar | 19.7 bar |
| Grooved | 20.7 bar | 20.7 bar | 20.7 bar | 20.7 bar | 13.8 bar |
| 150# Flanged | 17.2 bar | 19.0 bar | 18.4 bar | 19.7 bar | 19.7 bar |
| 300# Flanged | 44.1 bar | 49.6 bar | 48.0 bar | 51.0 bar | -- |

Based on ANSI flange ratings.

Flow Chart

| Standard Size Max. Flow (GPM) | 1 1/4" | 1 1/2" | 2" | 2 1/2" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 24" |
|---|--------|--------|------|--------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 7.5 FT/SEC (Military) | 40 | 50 | 80 | 120 | 180 | 300 | 680 | 1200 | 1850 | 2650 | 3200 | 4150 | 5250 | 6550 | 9400 |
| 15 FT/SEC (Max. Recommended) | 70 | 100 | 160 | 230 | 350 | 600 | 1350 | 2350 | 3700 | 5250 | 6350 | 8300 | 10500 | 13100 | 18800 |
| 20 FT/SEC (Max. Continuous) | 100 | 130 | 210 | 300 | 470 | 800 | 1800 | 3150 | 4950 | 7000 | 8450 | 11100 | 14000 | 17400 | 25100 |
| Metric Size Max. Flow (m ³ /hr) | DN32 | DN40 | DN50 | DN65 | DN80 | DN100 | DN150 | DN200 | DN250 | DN300 | DN350 | DN400 | DN450 | DN500 | DN600 |
| 2.29 M/SEC (Military) | 9 | 11 | 18 | 27 | 41 | 68 | 154 | 272 | 420 | 602 | 726 | 942 | 1192 | 1487 | 2134 |
| 4.57 M/SEC (Max. Recommended) | 16 | 23 | 36 | 52 | 79 | 136 | 306 | 533 | 840 | 1192 | 1441 | 1884 | 2384 | 2974 | 4268 |
| 6.10 M/SEC (Max. Continuous) | 23 | 30 | 48 | 68 | 107 | 182 | 409 | 715 | 1124 | 1589 | 1918 | 2520 | 3178 | 3950 | 5698 |

The OCV 120-1 is normally sized to match the meter size; however, in no case should the maximum velocity exceed 20 ft/sec (metric: 6.10 meters/sec).

Resetting, maintenance and periodic testing instructions must be followed as described in detail in the applicable OCV IOM (Installation, Operation & Maintenance) Manual.

Typical Materials

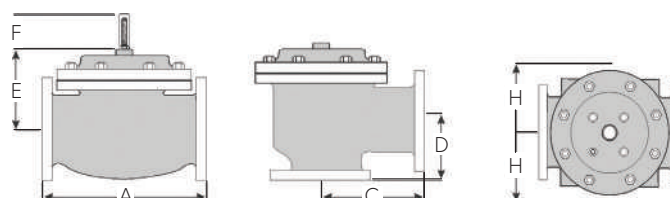
| Part | Standard Material |
|-------------------------------|---|
| Body/Bonnet | Ductile Iron (epoxy coated), Carbon Steel (epoxy coated), Stainless Steel, Aluminum |
| Seat Ring | Stainless Steel, Bronze |
| Stem | Stainless Steel, Monel |
| Spring | Stainless Steel |
| Diaphragm | Buna-N, Viton (Nylon reinforced) |
| Seat Disc | Buna-N, Viton |
| Pilot | Stainless Steel, Bronze |
| Other Pilot System Components | Stainless Steel, Bronze/Brass |
| Tubing & Fittings | Stainless Steel, Copper/Brass |

General Arrangement & Dimensions

| Standard Sizes | | | | | | | | | | | | | |
|----------------|-----------|-----------------|-------|--------|--------|---------|--------|----------|---------|--------|--------|----------|--------|
| DIM | END CONN. | 1 1/4" - 1 1/2" | 2" | 2 1/2" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 24" |
| A | SCREWED | 8 3/4 | 9 7/8 | 10 1/2 | 13 | --- | --- | --- | --- | --- | --- | --- | --- |
| | GROOVED | 8 3/4 | 9 7/8 | 10 1/2 | 13 | 15 1/4 | 20 | --- | --- | --- | --- | --- | --- |
| | 150# FLGD | 8 1/2 | 9 3/8 | 10 1/2 | 12 | 15 | 17 3/4 | 25 3/8 | 29 3/4 | 34 | 39 | 40 3/8 | 62 |
| | 300# FLGD | 8 3/4 | 9 7/8 | 11 1/8 | 12 3/4 | 15 5/8 | 18 5/8 | 26 3/8 | 31 1/8 | 35 1/2 | 40 1/2 | 42 | 63 3/4 |
| C ANGLE | SCREWED | 4 3/8 | 4 3/4 | 6 | 6 1/2 | --- | --- | --- | --- | --- | --- | --- | --- |
| | GROOVED | 4 3/8* | 4 3/4 | 6 | 6 1/2 | 7 5/8 | --- | --- | --- | --- | --- | --- | --- |
| | 150# FLGD | 4 1/4 | 4 3/4 | 6 | 6 | 7 1/2 | 10 | 12 11/16 | 14 7/8 | 17 | --- | 20 13/16 | --- |
| | 300# FLGD | 4 3/8 | 5 | 6 3/8 | 6 3/8 | 7 13/16 | 10 1/2 | 13 3/16 | 15 9/16 | 17 3/4 | --- | 21 5/8 | --- |
| D ANGLE | SCREWED | 3 1/8 | 3 7/8 | 4 | 4 1/2 | --- | --- | --- | --- | --- | --- | --- | --- |
| | GROOVED | 3 1/8* | 3 7/8 | 4 | 4 1/2 | 5 5/8 | --- | --- | --- | --- | --- | --- | --- |
| | 150# FLGD | 3 | 3 7/8 | 4 | 4 | 5 1/2 | 6 | 8 | 11 3/8 | 11 | --- | 15 11/16 | --- |
| | 300# FLGD | 3 1/8 | 4 1/8 | 4 3/8 | 4 3/8 | 5 13/16 | 6 1/2 | 8 1/2 | 12 1/16 | 11 3/4 | --- | 16 1/2 | --- |
| E | ALL | 6 | 6 | 7 | 6 1/2 | 8 | 10 | 11 7/8 | 15 3/8 | 17 | 18 | 19 | 27 |
| F (OPT) | ALL | 3 7/8 | 3 7/8 | 3 7/8 | 3 7/8 | 3 7/8 | 3 7/8 | 6 3/8 | 6 3/8 | 6 3/8 | 6 3/8 | 6 3/8 | 8 |
| H | ALL | 10 | 11 | 11 | 11 | 12 | 13 | 14 | 17 | 18 | 20 | 20 | 28 1/2 |

| Metric Sizes | | | | | | | | | | | | | |
|--------------|-----------|---------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| DIM | END CONN. | DN32-40 | DN50 | DN65 | DN80 | DN100 | DN150 | DN200 | DN250 | DN300 | DN350 | DN400 | DN600 |
| A | SCREWED | 222 | 251 | 267 | 330 | --- | --- | --- | --- | --- | --- | --- | --- |
| | GROOVED | 222 | 251 | 267 | 330 | 387 | 508 | --- | --- | --- | --- | --- | --- |
| | 150# FLGD | 216 | 238 | 267 | 305 | 381 | 451 | 645 | 756 | 863 | 991 | 1026 | 1575 |
| | 300# FLGD | 222 | 251 | 283 | 324 | 397 | 473 | 670 | 791 | 902 | 1029 | 1067 | 1619 |
| C ANGLE | SCREWED | 111 | 121 | 152 | 165 | --- | --- | --- | --- | --- | --- | --- | --- |
| | GROOVED | 111* | 121 | 152 | 165 | 194 | --- | --- | --- | --- | --- | --- | --- |
| | 150# FLGD | 108 | 121 | 152 | 152 | 191 | 254 | 322 | 378 | 432 | --- | 529 | --- |
| | 300# FLGD | 111 | 127 | 162 | 162 | 198 | 267 | 335 | 395 | 451 | --- | 549 | --- |
| D ANGLE | SCREWED | 79 | 98 | 102 | 114 | --- | --- | --- | --- | --- | --- | --- | --- |
| | GROOVED | 79* | 98 | 102 | 114 | 143 | --- | --- | --- | --- | --- | --- | --- |
| | 150# FLGD | 76 | 98 | 102 | 102 | 140 | 152 | 203 | 289 | 279 | --- | 398 | --- |
| | 300# FLGD | 79 | 105 | 111 | 111 | 148 | 165 | 216 | 306 | 298 | --- | 419 | --- |
| E | ALL | 152 | 152 | 178 | 165 | 203 | 254 | 302 | 391 | 432 | 457 | 483 | 686 |
| F (OPT) | ALL | 98 | 98 | 98 | 98 | 98 | 98 | 162 | 162 | 162 | 162 | 162 | 203 |
| H | ALL | 254 | 279 | 279 | 279 | 305 | 330 | 356 | 432 | 457 | 508 | 508 | 724 |

*Grooved End not available in 1 1/4" (DN32).



Technical Data

| Temperature (Elastomers) | |
|---|--|
| Buna-N | -40°F to 180°F |
| Viton | 20°F to 230°F |
| Fluorosilicone | -40°F to 150°F |
| EPDM | 0°F to 230°F |
| Sizes | |
| Screwed Ends | 1-1/4" - 3" |
| Grooved Ends | 1-1/2" - 6" (globe & angle) |
| Flanged Ends | 1-1/4" - 24" (globe); 1-1/4" - 16" (angle) |
| Pressure Rating (ANSI at 100°F) | |
| 250psi for Class 150# ANSI Flanged Ductile Iron | |
| 285psi for Steel/Stainless Steel & Aluminum | |
| 300# ANSI Flanges are available | |
| Solenoid Voltage | |
| Enclosure | Explosion Proof NEMA 4X, 6P, 7, 9 |
| Body | Brass, Stainless Steel |
| Voltages | 24, 120, 240, 480 VAC; 12, 24 VDC |

| Body & Cover Material |
|-----------------------------------|
| Ductile Iron |
| Carbon Steel |
| Stainless Steel |
| Aluminum |
| Trim Material |
| Bronze/Brass |
| Stainless Steel |
| Copper |
| Optional Components |
| Two-Stage Opening |
| Visual Indicator |
| Pre-Wired Junction Box |
| Items to Specify |
| Fluid Type |
| Model Number |
| Size |
| Body & Trim Material |
| Solenoid Voltage |
| Globe or Angle |
| Special Installation Requirements |

Engineering Specifications

The rate of flow control/solenoid shut-off valve shall be a single-seated, line pressure operated, diaphragm actuated, pilot controlled globe valve. The valve shall seal by means of a corrosion-resistant seat and a resilient, rectangular seat disc. These, and other parts, shall be replaceable without removing the valve from the line. The stem of the main valve shall be guided top and bottom by integral bushings. Alignment of the body, bonnet and diaphragm assembly shall be by precision dowel pins. The diaphragm shall not be used as a seating surface, nor shall the pistons be used as an operating means. The orifice plate shall be integrally installed in the valve inlet flange. The pilot system shall be furnished complete, installed on the main valve and include an opening speed control, an inline strainer and solenoid valve. The rate of flow control/solenoid shut-off valve

shall be operationally and hydrostatically tested prior to shipment. The main valve body and bonnet shall be ductile iron. All ferrous surfaces shall be coated with 4 mils of epoxy. The main valve seat ring shall be stainless steel. Elastomers (diaphragms, resilient seats and o-rings) shall be Buna-N. The control pilot shall be stainless steel, while the opening speed control and control line tubing shall be stainless steel. The orifice plate shall also be stainless steel. The solenoid shall have an explosion-proof enclosure. The rate of flow control/solenoid shut-off valve shall be suitable for operation at <X> psi (see Pressure Table) at flow rates up to <X> gpm (see Flow Chart). The rate of flow control/solenoid shut-off valve shall be an OCV 120-1, as manufactured by OCV, Tulsa, OK, USA.