



General representation



OCV 110-29

Two-Stage Differential Control Valve

The two-stage differential control valve shall open in one stage and close in two stages based on signals from the preset register. Additionally, in liquid fuel systems, the valve will close as necessary when air is sensed in the air eliminator so as to prevent air from passing through the meter. In LPG systems, the valve will modulate as necessary to keep the valve inlet pressure (meter outlet pressure) a predetermined amount above vapor pressure to ensure that only liquid passes through the meter. The OCV 110-29 is specifically designed for fuel loading systems and performs the following functions:

- Full flow delivery with two stage shutdown
- In liquid fuel systems, prevents air from passing through meter
- In LPG systems, prevents flashing through meter

FEATURES & BENEFITS

- Opens on signal from preset register
- Closes in two stages based on signals from preset register (mechanical or electronic)
- Can be maintained without removal from the line

TYPICAL APPLICATIONS



Metering Systems



Loading Terminals



Storage Tanks



Truck/Rail Car Loading & Unloading Systems

CERTIFICATION & COMPLIANCE



- NSF-ISO Quality System (9001)
- Technical Standards & Safety Authority
- ABS Type Approval
- American-Made: American Recovery & Reinvestment
- Pressure Equipment Directive Certified 97/23/EC
- CE (Conformité Européenne) Compliance

- Factory tested
- Explosion-proof, pre-wired junction box available
- Two-stage opening (timer) available



OPERATION

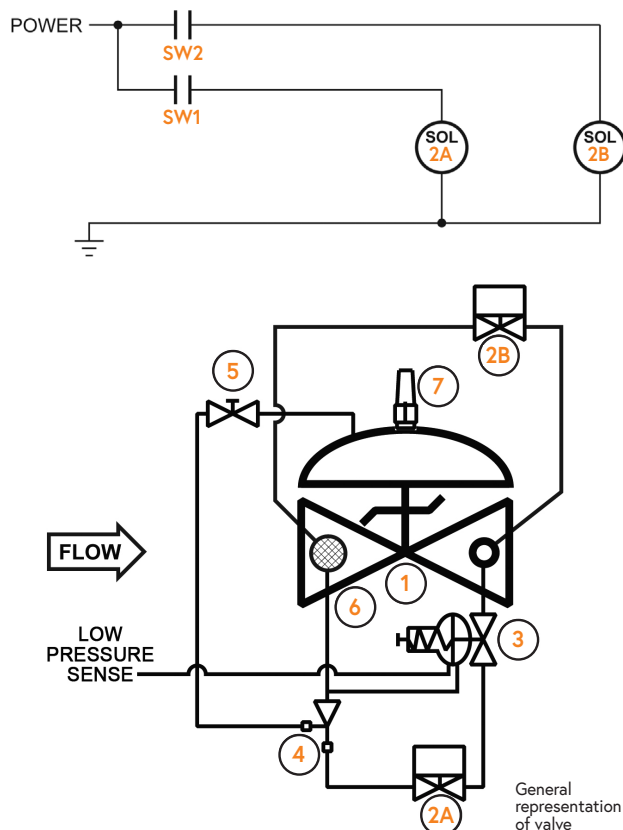
On start-up, **SW1** and **SW2** both close, energizing both solenoids in the preset (**2A** and **2B**), allowing the main valve to open and admit full flow.

During the full flow mode, the valve will tend to close when air is sensed in the air eliminator (liquid fuel systems) or modulate as necessary to keep valve inlet pressure a predetermined amount above vapor pressure (LPG systems).

A predetermined number of gallons before the end of the loading run, **SW1** opens to remove power from solenoid **1A**, causing the main valve to close, but allowing low flow through solenoid **2B**. At the conclusion of the load, **SW2** opens, deenergizing and closing solenoid **2B** and stopping all flow.

The OCV 110-29 consists of the following components, arranged as shown on the schematic diagram:

- ① Model 65 Basic Valve (fail closed)
- ②A Two-Way Solenoid Pilot, N.C. (high flow)
- ②B Two-Way Solenoid Pilot, N.C. (low flow)
- ③ Differential Control Pilot
- ④ Ejector
- ⑤ Needle Valve
- ⑥ Inline Strainer
- ⑦ Visual Indicator (optional)



PRESSURE TABLE

END CONNECTIONS	DUCTILE IRON	STEEL/SST	ALUMINUM
STANDARD (Maximum Working Pressures at 100°F)			
THREADED	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 38°C)			
THREADED	44.1 bar	44.1 bar	19.7 bar
GROOVED	20.7 bar	20.7 bar	13.8 bar
150# FLANGED	17.2 bar	19.7 bar	19.7 bar
300# FLANGED	44.1 bar	51.0 bar	--

Based on ANSI flange ratings.

FLOW CHART

STANDARD SIZE	1 1/4"- 1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	24"
MAX. FLOW (GPM)	100 - 130	210	300	470	800	1800	3150	4950	7000	8450	11100	25100
METRIC SIZE	DN32 - DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250	DN300	DN350	DN400	DN600
MAX. FLOW (M3/HR)	23 - 30	48	68	107	182	409	715	1124	1589	1918	2520	5698

The OCV 110-29 is normally sized to match the meter size; however, in no case should the maximum velocity exceed 20 ft/sec (metric: 6 meters/sec).

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



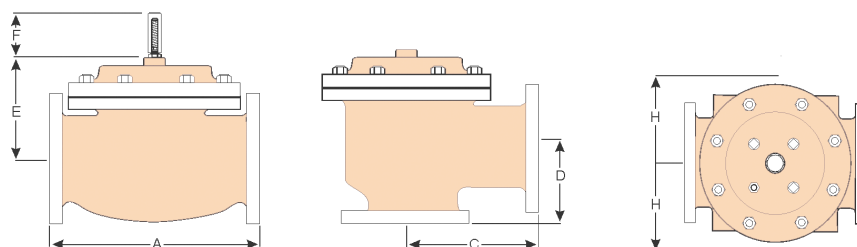
TYPICAL MATERIALS

DESCRIPTION	STANDARD
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

DIM	END CONN.	1 1/4" - 1 1/2" (DN32-40)	2" (DN50)	2 1/2" (DN65)	3" (DN80)	4" (DN100)	6" (DN150)	8" (DN200)	10" (DN250)	12" (DN300)	14" (DN350)	16" (DN400)	24" (DN600)
A	SCREWED	8 3/4 (222)	9 7/8 (251)	10 1/2 (267)	13 (330)	--	--	--	--	--	--	--	--
	GROOVED	8 3/4 (222)	9 7/8 (251)	10 1/2 (267)	13 (330)	15 1/4 (387)	20 (508)	--	--	--	--	--	--
	150# FLGD	8 1/2 (216)	9 3/8 (238)	10 1/2 (267)	12 (305)	15 (381)	17 3/4 (451)	25 3/8 (645)	29 3/4 (756)	34 (863)	39 (991)	40 3/8 (1026)	62 (1575)
	300# FLGD	8 3/4 (222)	9 7/8 (251)	11 1/8 (283)	12 3/4 (324)	15 5/8 (397)	18 5/8 (473)	26 3/8 (670)	31 1/8 (791)	35 1/2 (902)	40 1/2 (1029)	42 (1067)	63 3/4 (1619)
C ANGLE	SCREWED	4 3/8 (111)	4 3/4 (121)	6 (152)	6 1/2 (165)	--	--	--	--	--	--	--	--
	GROOVED	4 3/8 * (111*)	4 3/4 (121)	6 (152)	6 1/2 (165)	7 5/8 (194)	--	--	--	--	--	--	--
	150# FLGD	4 1/4 (108)	4 3/4 (121)	6 (152)	6 (152)	7 1/2 (191)	10 (254)	12 11/16 (322)	14 7/8 (378)	17 (432)	--	20 13/16 (529)	--
	300# FLGD	4 3/8 (111)	5 (127)	6 3/8 (162)	6 3/8 (162)	7 13/16 (198)	10 1/2 (267)	13 3/16 (335)	15 9/16 (395)	17 3/4 (451)	--	21 5/8 (549)	--
D ANGLE	SCREWED	3 1/8 (79)	3 7/8 (98)	4 (102)	4 1/2 (114)	--	--	--	--	--	--	--	--
	GROOVED	3 1/8* (79*)	3 7/8 (98)	4 (102)	4 1/2 (114)	5 5/8 (143)	--	--	--	--	--	--	--
	150# FLG	3 (76)	3 7/8 (98)	4 (102)	4 (102)	5 1/2 (140)	6 (152)	8 (203)	11 3/8 (289)	11 (279)	--	15 11/16 (398)	--
	300# FLGD	3 1/8 (79)	4 1/8 (105)	4 3/8 (111)	4 3/8 (111)	5 13/16 (148)	6 1/2 (165)	8 1/2 (216)	12 1/16 (306)	11 3/4 (298)	--	16 1/2 (419)	--
E	ALL	6 (152)	6 (152)	7 (178)	6 1/2 (165)	8 (203)	10 (254)	11 7/8 (302)	15 3/8 (391)	17 (432)	18 (457)	19 (483)	27 (686)
F (opt)	ALL	3 7/8 (98)	3 7/8 (98)	3 7/8 (98)	3 7/8 (98)	3 7/8 (98)	3 7/8 (98)	6 3/8 (162)	6 3/8 (162)	6 3/8 (162)	6 3/8 (162)	6 3/8 (162)	8 (203)
H	ALL	10 (254)	11 (279)	11 (279)	11 (279)	12 (305)	13 (330)	14 (356)	17 (432)	18 (457)	20 (508)	20 (508)	28 1/2 (724)

Metric Sizes shown in parenthesis (). *Grooved End not available in 1 1/4" (DN32).



General
representation
of valve



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 two-stage differential control 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 pilot system shall be furnished complete, installed on the main valve and include differential control pilot, two solenoid pilots, a needle valve and an inline strainer. The two-stage differential control 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. Solenoid pilots shall be Stainless Steel, as shall the needle valve and control line tubing. The solenoid enclosure shall be explosion-proof and suitable for operation on <voltage> (see Technical Data section). The two-stage differential control valve shall be suitable for operation at <X> psi (see Pressure Table) at flow rates up to <X> gpm (see Flow Chart). The two-stage differential control valve shall be an OCV 110-29, as manufactured by OCV, Tulsa, OK, USA.

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