DMV-D(LE) 704/6x4
Dual Modular NEMA 4x Safety Shutoff Valves with Proof of Closure
Installation Instructions

DUNGS®
Combustion Controls

SPECIFICATIONS

DMV-D/624 Two normally closed automatic shutoff valves in one housing. Valve 2 (V2) incorporates proof of closure. V1 and V2 are fast opening, fast closing. Adjustable max. flow with V2.

DMV-DLE/624 Two normally closed automatic shutoff valves in one housing. Valve 2 (V2) incorporates proof of closure. V1 fast opening, fast closing. V2 is slow opening, fast closing. Adjustable max. flow and Adjustable initial lift with V2.

DMV-D/634 Two normally closed automatic shutoff valves in one housing. Both valves incorporate proof of closure. V1 and V2 are fast opening, fast closing. Adjustable max flow with V2.

DMV-DLE/634 Two normally closed automatic shutoff valves in one housing. Both valves incorporate proof of closure. V1 fast opening, fast closing. V2 is slow opening, fast closing. Adjustable max. flow and Adjustable initial lift with V2.

Body size Flange Size
DMV-D(LE) 704/6x4 2" NPT/Rp

Gases
Natural gas, Propane, Butane; & Noncorrosive gases

Maximum Operating Pressure
7 PSI (500 mbar) 5 PSI (360 mbar) CSA

Maximum Close-off Pressure
10 PSI (750 mbar)

Ambient / Fluid Temperature
-20°F to +140°F; (-30°C to +60°C)

Electrical Ratings
110 to 120 Vac /50 to 60 Hz

Power Consumption with all coils energized
DMV-D(LE) 704 90 VA

Electrical Connection
Screw terminals with 1/2" NPT conduit connection

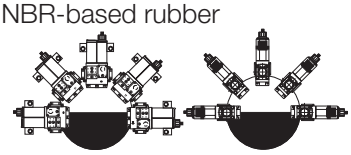
Enclosure Rating
NEMA Type 4x

Max. Flow Setting (DMV-D & DMV-DLE)
Adjustable on V2: < 10 to 100 % of total flow

Initial Lift Adjustment (DMV-DLE) only
Adjustable on V2: 0 to 70 % of total flow; 0 to 35% of stroke

Materials in contact with Gas
Housing: Aluminum, Steel: free of nonferrous metals.
Sealings on valve seats: NBR-based rubber

Mounting Position
Solenoid upright vertical
to solenoid horizontal



Strainer
23 Mesh, installed in the housing upstream V1

Test Ports
Taps available on both sides upstream of V1, between V1 and V2 and downstream of V2, and on both flanges. See page 3.

Proof of Closure Switch with visual indication
SPDT switch rated at 10 A res, 8 FLA, 48 LRA @120 V

Position Indication (optional for valve 1 of /624 only)
Visual Indicator

Classification of Valve V1 and V2
Safety Shut Off Valve:
ANSI Z21.21 • CSA 6.5 C/I Valves

Approvals:
CSA: Certified File No.112901
Commonwealth of Massachusetts Approved Product
Approval code G1-1107-35

C SP US

ATTENTION

- Read these instructions carefully.
- Failure to follow them and/or improper installation may cause explosion, property damage and injuries.
- The system must meet all applicable national and local code requirements such as but not limited to the following fuel gas codes: NFPA 54, IFGC (International Fuel Gas Code), or CSA B149.1 (for Canada) or the following equipment codes and standards: CSD-1, NFPA 86, NFPA 37, ANSI Z83.4/CSA 3.7, ANSI Z83.18, ANSI Z21.13/ CSA 4.9, or CSA B149.3 (for Canada).
- Installation must be done with the supervision of a licensed burner technician.
- Check the ratings in the specifications to make sure that they are suitable for your application.
- Never perform work if gas pressure or power is applied, or in the presence of an open flame.
- Once installed, perform a complete checkout including leak testing.
- Verify proper operation after servicing.

Power Equipment Company
2011 Williamsburg Road Richmond, VA 23231 USA
Phone: 804.236.3800 Fax: 804.236.3882 E-Mail: sales@peconet.com

PAINTING VALVE

- It is not recommended that this valve be painted. Painting covers date codes and other labels that identify this valve.
- If the valve needs to be painted, a paint free of volitile organic componants (VOC's) must be used. VOC's can damage valve o-rings, resulting in external gas leakage over time.
- During the painting process, use measures that will allow the valve's date code and other labeling information to be legible after the paint is dry.

PROTECTION FROM RADIANT HEAT

- Radiant heat must be considered as a heat source that could result in an ambient temperature higher than the rating of this valve.
- Provide propor shielding to protect against radiant heat.

MOUNTING

DMV 704/6x4 Flange Mounting Procedure

- Remove the bolts that are holding the protective covers on the inlet and outlet of the DMV using a 13 mm wrench.
- Remove the two protective covers from the valve body.
- Make sure the O-rings and the grooves are clean and in good condition. Clean if neccessary.
- Attach the flanges using the bolts supplied.
- Tighten the screws in a crisscross pattern.
- Do not overtighten the screws. Follow the maximum torque values below.

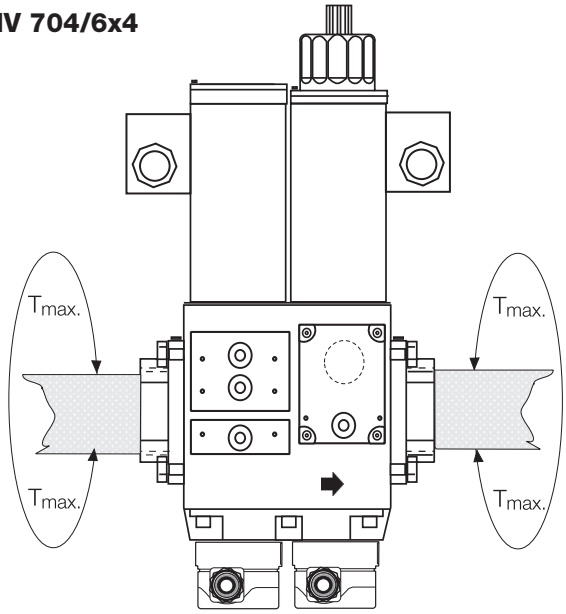
Recommended Torque Screws

M8	Bolt Size
134	[lb-in]

DMV 704/6x4 Pipe Mounting Procedure

- Install the valve with the gas flow matching the direction indicated by the arrows on the casting.
- Mount the DMV 704/6x4 with the solenoid vertical or horizontal.
- Use new, properly reamed and threaded pipe free of chips.
- Apply good quality pipe sealant, putting a moderate amount on the male threads only. If using LP gas, use pipe sealant rated for use with LP gas.
- Do not thread pipe too far. DMV 704/6x4 distortion and/or malfunction may result from excess pipe in the valve body.
- Apply counter pressure with a parallel jaw wrench only to the flats of the DMV 704/6x4 when installing pipe.
- Do not overtighten the pipe. Follow the maximum torque of 1190 lb-in.
- After installation is complete, perform a complete leak test.

DMV 704/6x4



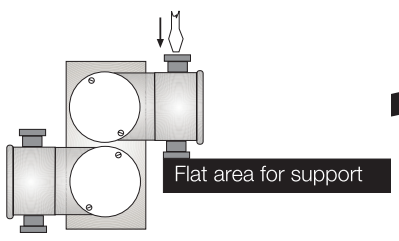
CAUTION: If the flow is not in the same direction of the arrows, the valves will not operate properly.

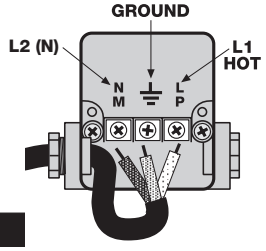
WIRING

NOTE: Use 14 or 16 guage wire rated for 95˚C(200˚F).

- Remove the wiring box cover and knock out only one of the conduit connections on the side of the terminal box you wish to make your conduit connection to.
- Make electrical connections to the valve, replace cover.

CAUTION: All wiring must comply with local electrical codes, ordinances and regulations.

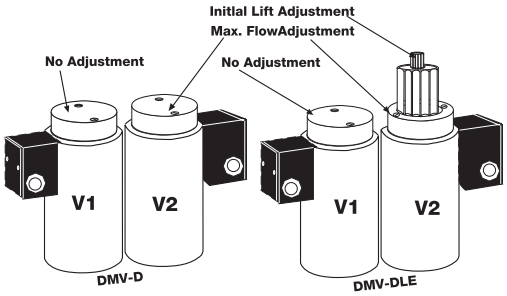




VALVE ADJUSTMENT

DMV 704/6x4 Flow Setting

- The valve is factory set with the flow adjustment fully open.
- Locate the flow adjustment on top of valve 2. There are two screws, the holding screw is recessed and has a blue sealing compound on it, while the pan head screw protrudes from the cap. Loosen the pan head screw until you can freely rotate the flow adjustment. Turn clockwise for less gas or counterclockwise for more gas Check the flow at the burner with an orifice or flow meter.
- Tighten the pan head screw on the adjustment cap.

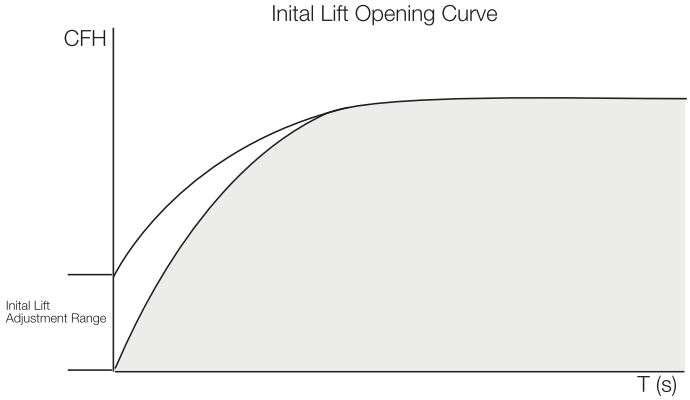


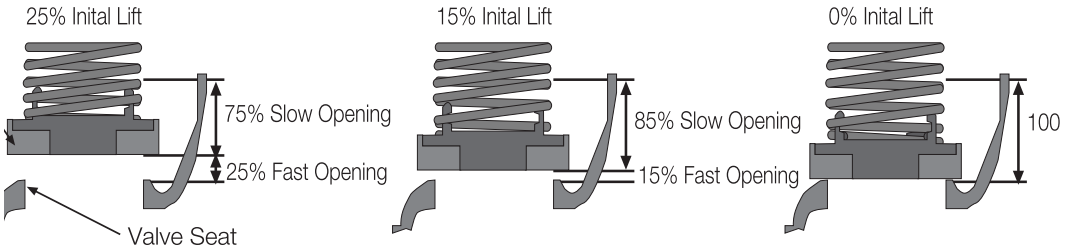
Do not adjust or remove any screws or bolts which are sealed with a Red colored compound. Doing so will void all approvals and warranties.

Initial Lift Adjustment (DMV-DLE only)

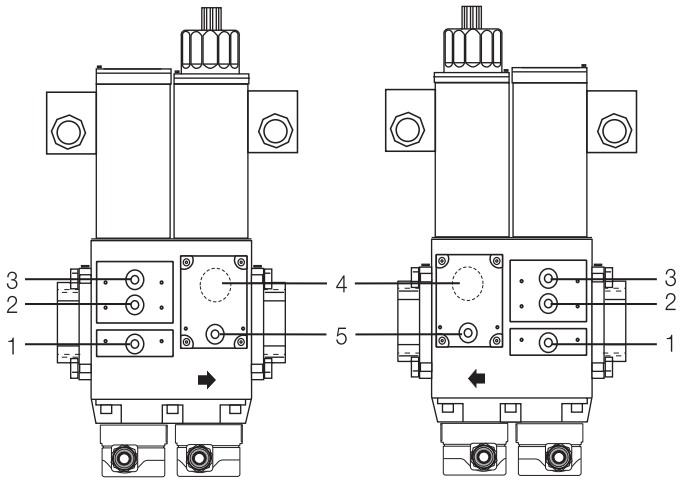
The initial lift adjustment varies the initial gas flow through the valve as the valve seat begins to open. This adjustment can vary the initial flow between 0 % and 70% of the total gas flow; 0 to 35% of stroke. All DMV-DLE valves are factory set with no initial lift. To adjust the lift proceed as follows:

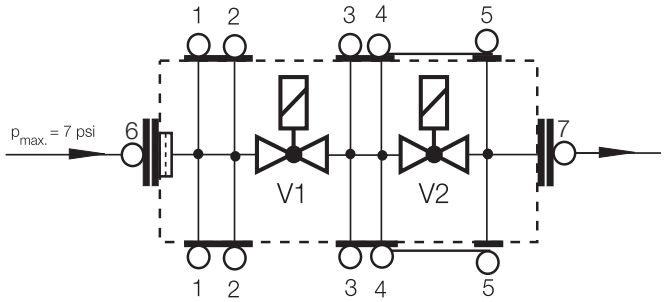
- Unscrew the small black cap on top of the silver hydraulic brake to expose the initial lift adjustment knob.
- The black cap also serves as tool; turn the cap over and insert it on the slot on the adjustment knob.
- Turn the knob clockwise for a min. initial lift or counterclockwise for a max. initial lift.
- Once the desired initial fast lift has been achieved, reinstall the black cap.





SIDE TAPS





VALVE LEAKAGE TEST

This leak test procedure tests the external sealing and valve seat sealing capabilities of the DMV automatic safety shutoff valve. Only qualified personnel should perform this test.

It is required that this test be done on the initial system start-up, and then repeated at least annually. Possibly more often depending on the application, environmental parameters, and the requirements of the authority having jurisdiction.

SETUP

This test requires the following:

A) Test nipples installed in the downstream pressure tap port of each automatic safety shutoff valve to make the required 1/4" hose connection in step 4.

B) A transparent glass of water filled at least 1 inch from the bottom.

C) A proper leak test tube. An aluminum or copper 1/4" rigid tube with a 45° cut at the end that is then connected to a 1/4" flexible hose of some conven

LEAK TEST PROCEDURE

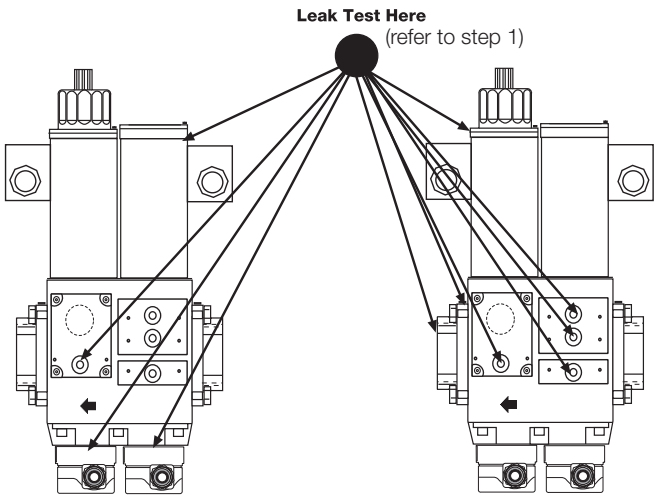
Use the illustration below as a reference.

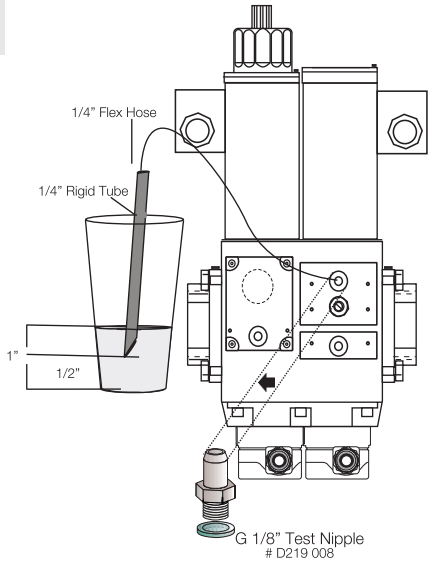
1. With the upstream ball valve open, the downstream ball valve closed and both valves energized, apply an all purpose liquid leak detector solution to the "External Leakage Test Areas" indicated in the illustration below, to any accessories mounted to the safety valve, and to all gas piping and gas components downstream the equipment isolation valve, and the inlet and outlet gas piping of the automatic safety shutoff valve. The presence of bubbles indicates a leak, which needs to be rectified before proceeding.
2. Then, de-energize the burner system and verify that both automatic safety shutoff valves are closed.
3. Close the upstream and downstream manual ball valve.
4. Using a screwdriver, slowly open the V1 test nipple (port 3) by turning it counter clockwise to depressurize the volume between the two valves, and connect the 1/4" flexible hose to the test nipple.
5. Slowly open the upstream manual ball valve, and then provide for some time to allow potential leakage to charge the test chamber before measuring the valve seat leakage.
6. Immerse the 1/4 in. tube vertically 1/2 in. (12.7 mm) below the water surface. If bubbles emerge from the 1/4" tube and after the leakage rate has stabilized, count the number of bubbles appearing during a 10 second period. (See chart below for allowable leakage rates.)
7. Repeat the same procedure for valve V2 (port 5), except that valve #1 needs to be opened.

After completing the above tests proceed as follows:

8. Verify that the downstream manual ball valve is closed, and both automatic safety shutoff valves are de-energized.
9. Remove the flexible hose, and close all test nipples.
10. With the upstream manual ball valve open, energize both automatic safety shutoff valves.
11. Use soapy water to leak test all test nipples to ensure that there are no leaks.
12. If no leakage is detected, de-energize all automatic safety shutoff valves, and open the downstream manual ball valve.

WARNING: If leakage values are exceeded, replace valve immediately.





Type	Allowable Valve Seat Leakage* for up to 7 PSI inlet	# of Bubbles in 10 sec AIR	Natural Gas	LP
DMV D(LE) 704/6x4	628 cc/hr	12	15	9

*Based on air, and test conditions per UL 429 Section 29. (Air or inert gas at a pressure of 1/4 psig and also at a pressure of one and one-half times maximum operating pressure differential, but not less than 1/2 psig. This test shall be applied with the valve installed in its intended position.) Volume of bubble defined in Table 2 of FCI 70-2-1998.

PROOF OF CLOSURE

Location

The proof of closure switch is factory installed on each valve of the DMV; it visually and electrically indicates valve position. When the valve is closed (NO position) an orange light is visible, when the valve is open (NC position) a green light is visible.

Conduit Connection

- Before connecting conduit to the proof of closure switch, position the proof of closure switch so that there is no torque from the wiring or conduit. If the switch needs to be rotated, loosen the slotted set screw on the side. The switch may be removed from the brass adapter for wiring, however, **DO NOT** turn the proof of closure switch after tightening the slotted set screw.
- Tighten the slotted set screw so that the proof of closure switch housing is secure. (16 lb-in torque)

Wiring

- Do not exceed the electrical ratings given in the proof of closure switch specifications.
- Use 14 or 16 guage wire for at least 75˚C (167˚F).
- Connect wire to the appropriate terminal of the proof of closure switch (see the wiring diagram).
  COM to the L1, Ground to ground, NO to the Proof of Closure terminal of the Flame Safeguard and N to L2.
  The ORANGE light shall be on when the valve is closed,
  The GREEN light shall be on when the valve is open (FM requirement).

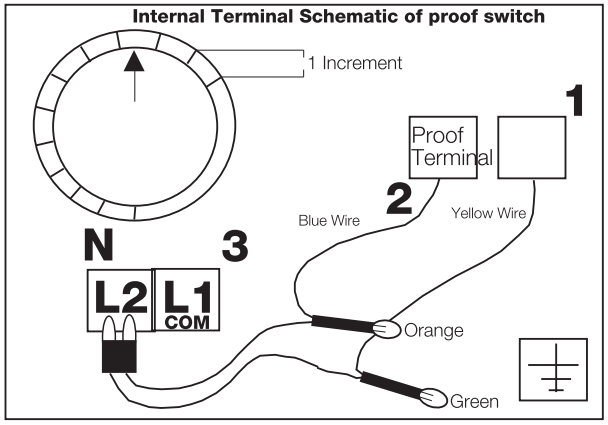
⚠ CAUTION: All wiring must comply with local electrical codes, ordinances and regulations.

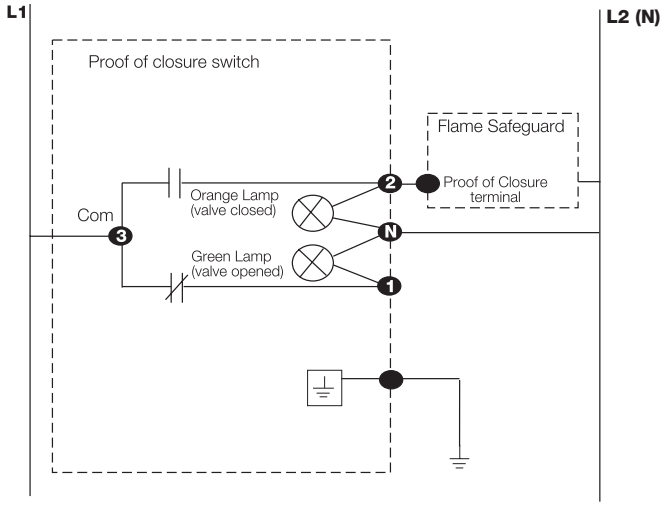
Annual Testing

- Perform a switch continuity test at least annually to verify that the proof of closure switch is working properly.
- Make sure that there is no power to the proof of closure switch.
- Shut the upstream ball valve to stop the flow of gas into the valve train.
- With the valve de-energized, use a multimeter and verify that there is continuity between the switch contacts 3 (COM) and 2 (NO). Then verify that there is no continuity between the switch contacts 3 (COM) and 1 (NC).
- Energize the valve that the proof of closure switch is mounted to. Use a multimeter and verify that there is continuity between the switch contacts 3 (COM) and 1 (NC). Then verify that there is no continuity between the switch contacts 3 (COM) and 2 (NO).
- If you experience a problem, contact DUNGS.
- De-energize the valve and replace the cover on the proof of closure switch.
- Open the upstream ball valve.

Proof of Closure Switch Specifications

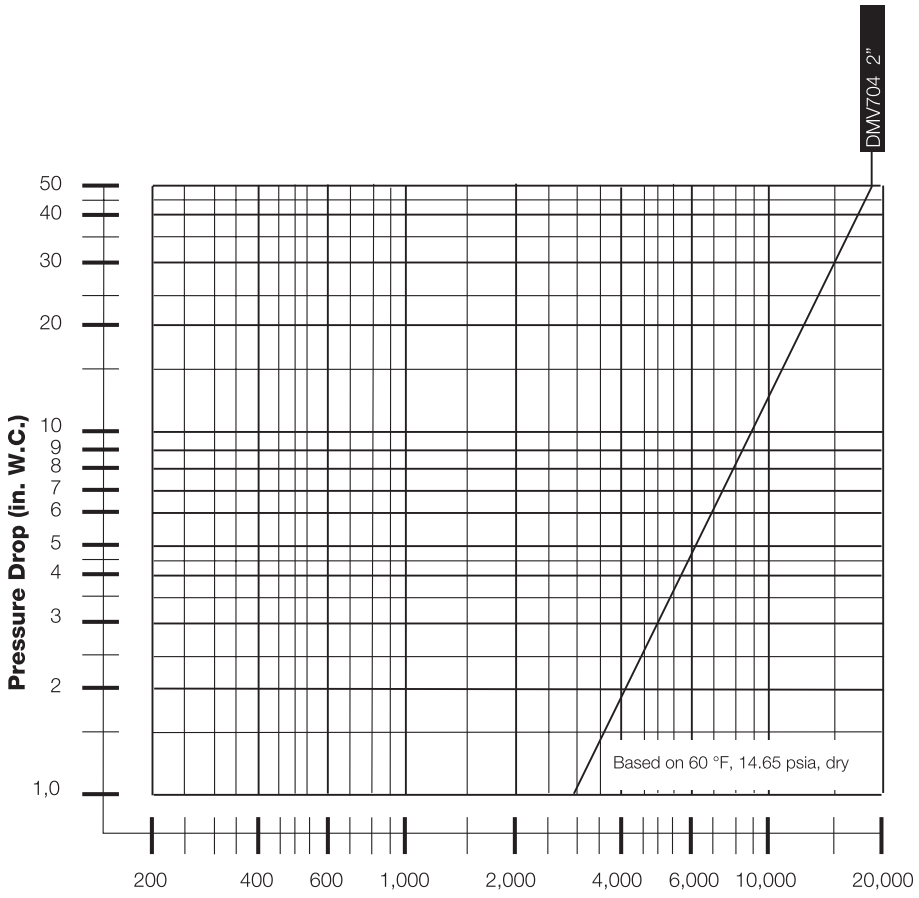
Switch
SPDT
Switch Action
Valve open: Switch in NC position, Green light on.
Valve closed: Switch in NO position, Orange light on.
Contact Rating
10 A res, 8 FLA, 48 LRA @120 Vac
Enclosure
NEMA Type 4
Ambient/Fluid Temperature
-40° F to 150° F





⚠ **Do not wire the valve switch to close a circuit that will directly power another safety shutoff valve. Doing so could result in a safety valve being energized and opened rather than remaining closed.**

FLOW CURVE



Flow (CFH) of natural gas s.g. 0.65 at 60 °F

PRESSURE DROP FOR OTHER GASES

To determine the pressure drop when using a gas other than natural gas, use the flow formula below and f value located in the chart below to determine the "corrected" flow rate in CFH through the valve for the other gas used. For example, when using propane, divide the volume (CFH) of propane required for the application by the calculated value f (f = 0.66 for propane). Use this "corrected" flow rate and the flow curve above to determine pressure drop for propane.

$$\dot{V}_{gas\ used} = \dot{V}_{Natural\ Gas} \times f$$

Use this formula to calculator the f factor for other gases not listed on the table.

$$f = \sqrt{\frac{\text{Spec. gravity of Natural Gas}}{\text{Spec. gravity of gas used}}}$$

Type of gas used	Density [kg/m^3]	sg	f
Natural gas	0.81	0.65	1.00
Butane	2.39	1.95	0.58
Propane	1.86	1.50	0.66
Air	1.24	1.00	0.80

ACCESSORIES AND REPLACEMENT PARTS

Replacement Coil (120Vac)
246-517 (Mag. Type 201)
Replacement gasket for flange
231-574
Vent Line Adapter (1" NPT)
243-760
Replacement Flange (2" NPT)
232-407
Replacement Flange (2" Rp)
215-384
G1/8" test nipple
219-008
Visual Indicator
217-665
CPI 400 Valve Switch
224-253A