

DMV-D(LE) 7../602 Dual Safety Shutoff Valve Installation Instructions



SPECIFICATIONS

DMV-D/602 Two normally closed safety shut off valves in one housing. Fast opening, fast closing. Adjustable max. flow on valve 2.

DMV-DLE/602 Two normally closed safety shut off valves in one housing. Valve 1 fast opening, fast closing. Valve 2 slow opening, fast closing. Adjustable max. flow and initial lift on valve 2.

Body size	Flange Size
DMV-D(LE) 701/602	1/2" - 1" NPT
DMV-D(LE) 702/602	1" - 2" NPT
DMV-D(LE) 703/602	1" - 2" NPT

Gases

Dry, natural gas, propane, butane; other noncorrosive gases. A "dry" gas has a dew point lower than +15 °F and its relative humidity is less than 60 %.

Maximum Operating Pressure
7 PSI (500 mbar)

Ambient / Fluid Temperature
-40 °F to +150 °F (-40 °C to +65 °C)

Electrical Ratings
110 to 120 Vac / 50 to 60 Hz ; 220 to 240 Vac / 50 to 60 Hz
24 Vac / 50 to 60 Hz ; 24 Vdc

Power Consumption: (Both valves inclusive)
DMV-D(LE) 701: 45 VA
DMV-D(LE) 702: 65 VA
DMV-D(LE) 703: 80 VA

Electrical Connection
DIN-Connector with 1/2" NPT conduit adapter

Operating Time
100 % duty cycle

Classification of Valve V1 and V2
Safety Shut Off Valve: UL 429, FM 7400
ANSI Z21.21 • CSA 6.5 C/I Valves

Closing Time (Valve 1 & Valve 2)
< 1 second

Opening Time

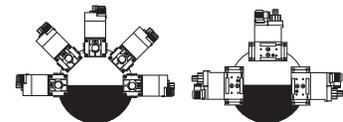
DMV-D/602: V1 & V2 < 1 sec.
DMV-DLE/602: V1 < 1 sec.; V2 10 to 20 sec. at 70 °F

Main Flow Setting (DMV-D/602 & DMV-DLE/602)
Adjustable on V2: <10 to 100% of total flow

Initial Lift Adjustment (DMV-DLE/602)
Adjustable on V2: 0 to 70 % of total flow

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 Port
G 1/8 ISO 228 taps available on both sides; upstream of V1, between V1 and V2, downstream of V2, and on both flanges

Position Indication (optional)
Visual Indicator and CPI 400 with visual indication and electrical valve switch (SPDT)

Approvals
UL Recognized Component: File No. MH16727
CSA Certified: File No.157406
FM Approved: ReportJ-1.1Z6A0-AF
Commonwealth of Massachusetts Approved Product
Approval code G1-1107-35



ATTENTION

- Read these instructions carefully.
- Failure to follow them and/or improper installation may cause explosion, property damage and injuries.
- 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.
- 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).

DMV/602 Installation Manual - 80119 - 01/10

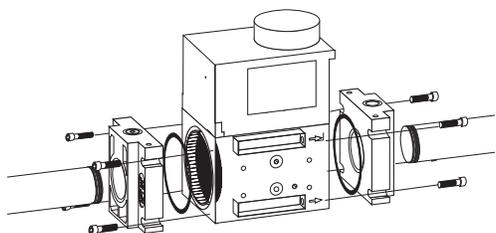
MOUNTING

Setup

- Examine the DMV-D(LE)/602 for shipping damage.
- The main gas supply must be shut off before starting the installation.
- The inside of the DMV-D(LE)/602, the flanges, and piping must be clean and free of dirt, remove all dirt and debris before installing the DMV-D(LE)/602. Failure to remove dirt/debris could result in valve damage or improper performance.

Recommended Procedure to Mount the Flanges

- Unpack the DMV-D(LE) valve and remove the 8 M6 (M8) socket cap head screws using a 5 mm (6 mm) Allen wrench.
- Remove the two white protective plastic covers from the DMV-D(LE) body.
- Make sure the o-rings and the grooves are clean and in good condition.
- Install the DMV-D(LE) with the gas flow matching the direction indicated by the arrows on the casting.
- Mount the DMV-D(LE) only with the solenoid vertical upright to horizontal.
- Clean the mounting surface of the flanges. Make sure they are in good condition.



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

- Attach the DMV-D(LE) to the flanges using the M6 (M8) socket cap screws supplied.
- Use a 5mm Allen wrench for the DMV-D(LE) 701
- Use a 6mm Allen wrench for the DMV-D(LE) 702/703.
- Tighten the screws in a crisscross pattern.
- Do not overtighten the screws. Follow the maximum torque values below.

Recommended Torque

M6	M8	Screw Size
62	134	[lb-in]

Recommended Piping Procedure

- 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 pipe sealant lodges on the valve seat, it will prevent proper operation. If using LP gas, use pipe sealant rated for use with LP gas.
- Do not thread pipe too far. Valve distortion and/or malfunction may result from excess pipe in the valve body.
- Apply counter pressure only a parallel jaw wrench only to the flats on the flange when screwing the pipe into the flanges.
- Do not overtighten the pipe. Follow the maximum torque values listed below.

Recommended Torque for Piping

1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	NPT pipe
375	560	750	875	940	1190	[lb-in]

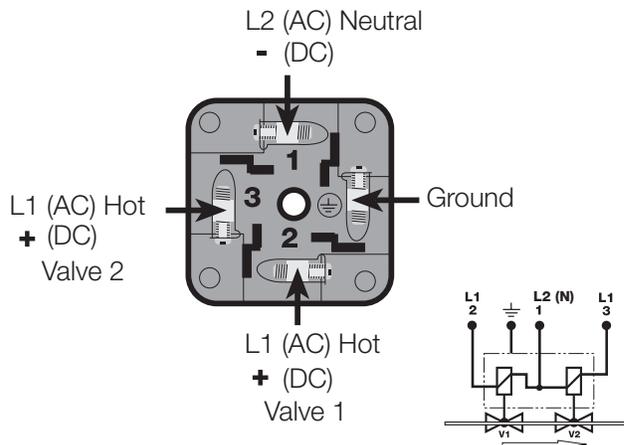
- After installation is complete, perform a leak test.

WIRING (VAC or VDC)

Wiring Procedure

- Disconnect all power to the valves before wiring to prevent electrical shock and equipment damage.
- Attach flexible 1/2" NPT conduit to the DIN connector.
- Route 14 or 16 gauge wire rated for at least 75°C (167°F) through the conduit and the DIN connector.
- Install a conduit plug at some point in the conduit run between the DIN connector and closest panel that contains sparking contacts or other sparking devices (see NFPA 86 requirements).
- Connect the wiring to the appropriate screw terminals in the DIN connector.
- Plug the DIN connector onto the terminals. Fasten the DIN connector with the screw supplied.

DIN Connector screw terminal connections



CAUTION: All wiring must comply with local electrical codes, ordinances and regulations. An ultimate electrical enclosure must be provided.

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 volatile organic components (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 proper shielding to protect against radiant heat.

MULTIPLE BURNER AND PULSE FIRED APPLICATIONS

On **multiple burner applications**, the following requirements apply:

- A manually operated shutoff valve shall be installed downstream of each individual burner safety shutoff valve.
- The backpressure on the individual burner safety shutoff valve shall be measured during the commissioning of the furnace to verify that while the all other burners are firing and the individual burner safety shutoff valve shall be de-energized, the backpressure does not exceed 2 PSI. Measuring the backpressure shall also be repeated during purge and post purge. A pressure gauge can be used to measure the backpressure.

When using these valves on **pulse fired applications**, the following apply:

- Before installing the valve, the inside of all gas piping upstream to the nearest filter shall be cleaned, and that filter shall have an insert with mesh no larger than 50 micron.
- The valve shall be installed in the upright position.
- The valve shall be applied within all of its ratings. The type of gas, the ambient temperature, and the cycle rate of the valve are critical.
- The valve shall be leak tested as least annually.
- After the cycle life has been exceeded, the valve shall be immediately replaced.

VALVE ADJUSTMENT

Flow Setting

- The valves are factory set with the flow adjustment fully open.
- Locate the flow adjustment knob on top of valve 2 on the DMV-D/602 (black knob). For DMV-DLE/602 it's the hydraulic brake. 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.

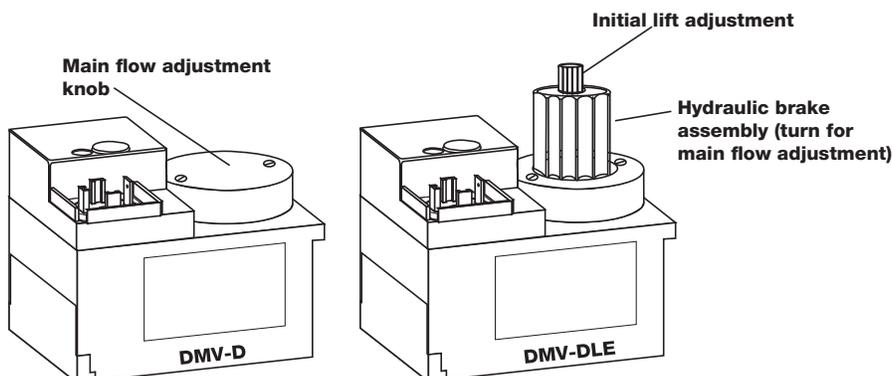
Initial Lift Adjustment (DMV-DLE/602 only)

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 25% of stroke. All DMV-DLE/602 valves are factory set with no initial lift. To adjust the lift proceed as follows:

- Unscrew the small black cap on top of the flow adjustment cap 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.



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



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 convenient length provides for a more accurate leakage measurement. However, a 45° cut at the end of the 1/4" flexible hose will suffice, but it will not likely be as accurate as the rigid tube.
- D) For detecting external leakages, an all purpose liquid leak detector solution or a soapy water solution is required.

LEAK TEST PROCEDURE

Use the illustration below as a reference.

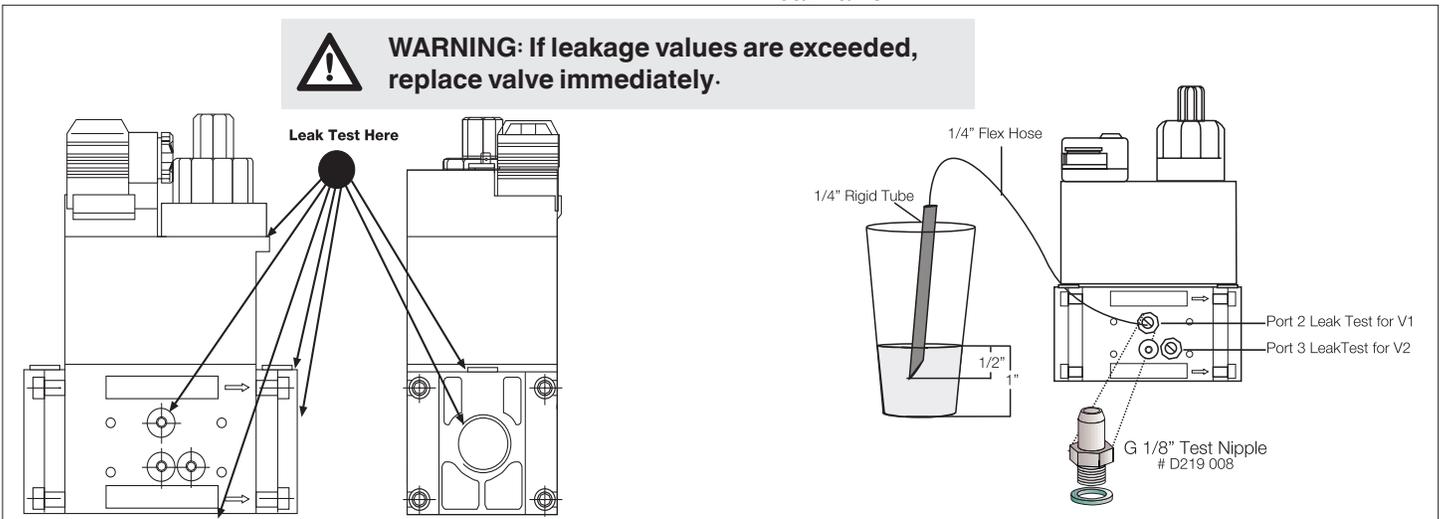
1. With the upstream ball valve open, the downstream ball valve closed and both valves energized, apply an all purpose liquid leak detector solution to the "External Leakage Test Areas" indicated in the illustration below, to any accessories mounted to the safety valve, and to all gas piping and gas 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 leak age.
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 3). (Energize terminal 2 on the DIN connector to open valve 1).

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.



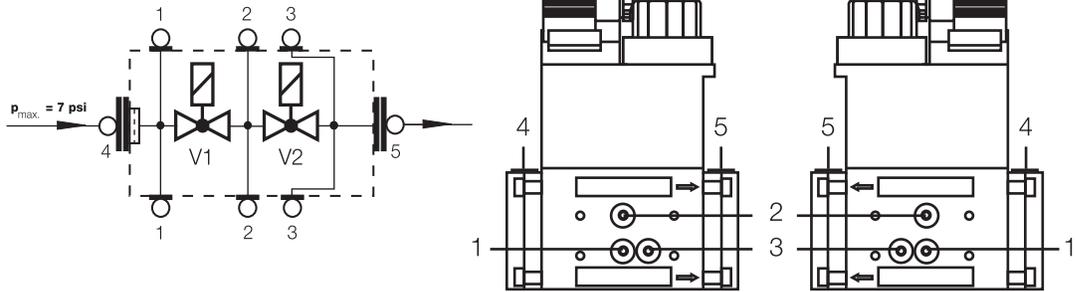
Type	Allowable Valve Seat Leakage*		# of Bubbles in 10 sec		
	for up to 7 PSI inlet	AIR	Natural Gas	LP	
DMV D(LE) 701/602	239 cc/hr		5	6	4
DMV D(LE) 702/602	464 cc/hr		9	11	7
DMV D(LE) 703/602	464 cc/hr		9	11	7

*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.

VALVE TEST PORTS

- Ports 1 and 4 are upstream both valves.
- Port 2 is inbetween both valves.
- Ports 3 and 5 are downstream both valves.

The ports are G 1/8 type threads conforming to the standard ISO 228 (fka BSP). The G 1/8 test nipple (# 219-008) can be screwed in any of these pressure tap ports.



Replacement Coils

	Mag. Type	Part # for 120Vac	Part # for 24Vac	Part # for 24Vdc
DMV-D(LE) 701/602	1111	232-401	238-554	238-829
DMV-D(LE) 702/602	1211	232-402	238-825	238-826
DMV-D(LE) 703/602	1212	232-403	238-822	238-823

Part is an assembly containing both coils, the printed wiring board, the clear (or black) cover and the tan coil housing.

Replacement Printed Wiring Board

	Part # for 120Vac	Part # for 24Vac	Part # for 24Vdc
DMV-D(LE) 701/602	238-803	238-803	238-804
DMV-D(LE) 702/602	238-806	238-806	238-807
DMV-D(LE) 703/602	238-806	238-806	238-807

Other Replacement Parts and Accessories

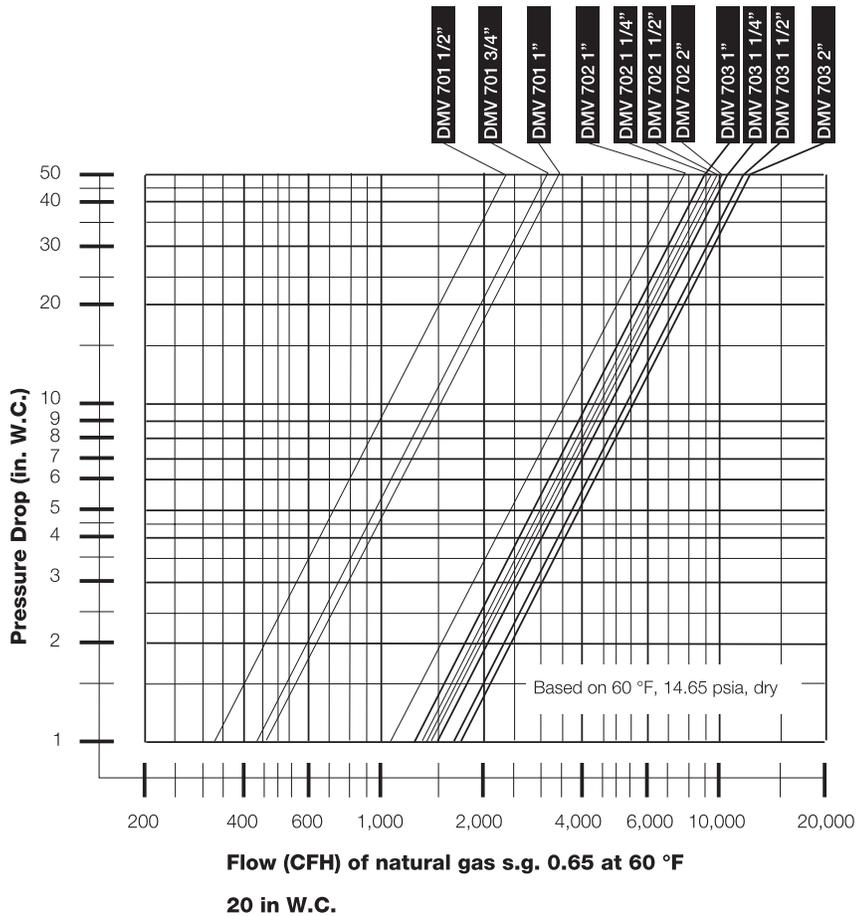
Accessories/Adapters	P/N	Accessories/Adapters	P/N
DIN-Electrical Connector (Hirschmann)	210-319	Hydraulic Brake	240-458
DIN-Electrical Connector (Burkert)	246-699	Main Flow Adj. Knob	240-457
M20 - 1/2" NPT Conduit Adapter	240-671		
Valve switch CPI 400	224-253A		
Visual indicator	217-665		
1/4" NPT port 1 or port 2 adapter (reduced port)	225-047		
1/2" NPT port 2 pilot gas adapter (reduced port)	225-043		
G 1/8" Test nipple	219-008		
Port 3 pressure switch mounting adapter	214-975		

Valve Description	Flange	NPT P/N	Rp P/N	Oring and bolt kit P/N*	FRI mounting Kit P/N**	Integral strainer and Filter replacement
DMV-701	1/2"	222-371	222-341	224-093	219-967	230-440
DMV-701	3/4"	222-368	222-342	224-093	219-967	230-440
DMV-701	1"	221-999	222-001	224-093	219-967	230-440
DMV-702 & 703	1"	222-369	222-343	224-094	219-968	230-441
DMV-702 & 703	1 1/4"	222-370	222-344	224-094	219-968	230-441
DMV-702 & 703	1 1/2"	222-003	221-884	224-094	219-968	230-441
DMV-702 & 703	2"	221-997	221-926	224-094	219-968	230-441

* Includes two orings for flanges and two sets of bolts (one set of four bolts for each flange).

** Includes four bolts and one oring.

FLOW CURVE



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.

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

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

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

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

RATED CAPACITY

Capacity in CFH at pressure drop of 1 inch water column; natural gas, sp.gr.=0.64

	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
DMV-D(LE) 701/602	345	429	457	-	-	-
DMV-D(LE) 702/602	-	-	1065	1277	1368	1430
DMV-D(LE) 703/602	-	-	1230	1532	1698	1795