Dual Modular Safety Shutoff Valves with Two-stage operation

DMV-ZRD/602 Series
DMV-ZRDLE/602 Series

DUNGS®
Combustion Controls

Two normally closed automatic shutoff valves in one housing; each with the following approvals.

UL Recognized
- UL 429
- File # MH16727

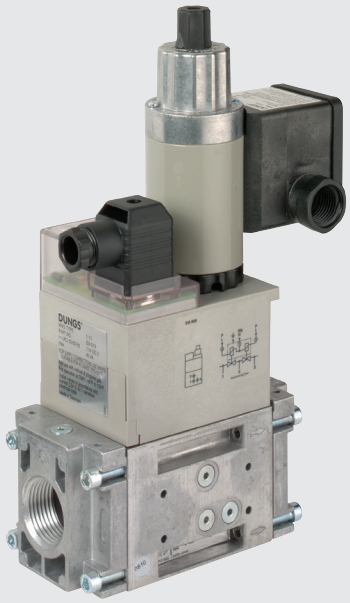
CSA Certified
- ANSI Z21.21 • CSA 6.5
- Marked C/I
- File # 1074737

FM Approved
- Class 7411
- Report # J.I. 3007653

Commonwealth of Massachusetts Approved Product
- Approval code G1-1107-35
- Gas safety shutoff valve

Codes and Standards:
This product is intended for installations covered by but not limited to ANSI Z83.4, ANSI Z83.18, ANSI Z21.13, or CSA B149.3.

DUNGS is an ISO 9001 manufacturing facility.



Description
The Two-Stage Dual Modular Valve (DMV-ZR) combines two safety shutoff valves in one compact housing, which can be wired independently or in parallel. Valve 2 incorporates two stages, which can be set at two different firing rates. Both firing rates are field adjustable and can modulate from high to low during burner operation.

Valve 1(V1) of the DMV-ZRD and DMV-ZRDLE series is fast opening and fast closing. Valve 2 (V2) is a two stage valve. V2 of the DMV-ZRD is fast opening, while V2 of the DMV-ZRDLE is slow-opening for smoother light-off. Max. flow adjustment on V2 provides variable main flow on both models.

Internal profiles and compact design optimize flow and provide a low pressure drop. Three body styles reduce inventory. Directly mounting the following accessories creates a compact valve train without additional piping: pressure regulator, high and low gas pressure switches, valve proving system, and vent line adapter.

Application
The DMV-ZR is recommended for industrial and commercial heating applications, where two automatic shutoff valves and modulating between two firing rates during burner operation are required. The DMV-ZR Dual Modular Valve two stage is suitable for natural gas, propane, butane, air and inert gases.

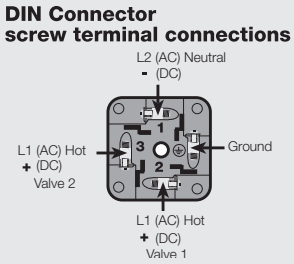
DMV-ZR.../602	Two normally closed safety shutoff valves in one housing. V1 and V2 are fast opening, fast closing. Two stage and adjustable max flow with V2.
DMV-ZRDLE.../602	Two normally closed safety shutoff valves in one housing. V1 fast opening, fast closing. V2 is a two stage, slow opening, fast closing valve. Adjustable max flow and adjustable initial lift with V2.

Specifications

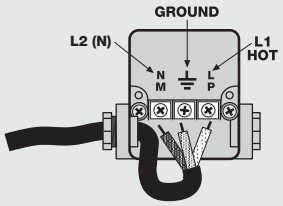
Body sizes pipe size / thread	DMV-ZRD(LE) 701 1/2" - 1" NPT	DMV-ZRD(LE) 702 1" - 2" NPT	DMV-ZRD(LE) 703 1" - 2" NPT
Max. operating pressure	7 PSI (500 mbar) UL; FM	5 PSI (360 mbar) CSA	
Max. body pressure	15 PSI (1000 mbar)		
Max. close-off pressure	10 PSI (750 mbar)		
Electrical ratings (+10% / -15%)	110 - 120 VAC/50 - 60 Hz		
Power ratings	DMV 701 is 70 VA DMV 702 is 85 VA DMV 703 is 115 VA Ratings shown are total power consumption for all valves inclusive. Inrush and full load current have the same VA rating.		
Enclosure rating	NEMA Type 12		
Electrical connection	DIN-connector with 1/2" NPT conduit adapter for valve 1 and valve 2, stage one. Screw terminals with 1/2" NPT conduit connection for valve 2, stage two. Use moisture-resistant No. 14 wire suitable for at least 194 °F (90 °C)		
Operating time	100 % duty cycle		
Closing time	< 1 s		
Opening time (to max. flow)	DMV-ZRD…/602 DMV-ZRDLE…/602	V1 & V2 < 1 s V1 < 1 s; V2 Adjustable to approx. 10 to 20s at 70°F	
Initial lift adjustment	Adjustable on V2 stage one, ZRDLE only: approx. 0 to 70 % of total flow		
Max. flow adjustment	Adjustable on V2, stage one: approx. 5 to 30 % of stroke Adjustable on V2, stage two: approx. 20 to 100 % of stroke		
Materials in contact with gas	Housing: Aluminium, Steel. Sealings on valve seats: NBR-based rubber		
Ambient temperature rating	-20 °F to +150 °F (-30 °C to +65 °C)		
Installation position	Safety valve upright vertical to horizontal		
Test ports / Pressure switch mounting ports	G 1/8 ISO 228 ports available on both sides. Each side has one port upstream V1, one between V1 and V2, one downstream V2, and one on each flange.		
Gas strainer (standard)	Installed in the housing upstream V1 (23 mesh)		
Position indication (order separately)	CPI 400 with indication lamps and SPDT interlock switch or visual indicator (VI) for mechanical indication.		
Valve proving system (optional)	VPS 504; mounts directly to either side of DMV-ZRD(LE)		

Electrical connection

Use moisture-resistant No. 14 wire suitable for at least 194 °F (90 °C)

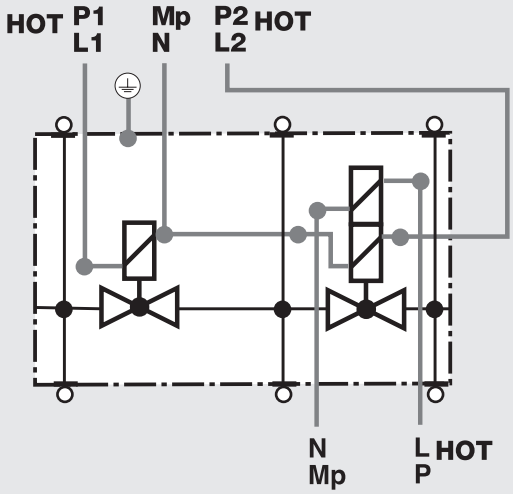


Valves V1 & V2
stage 1



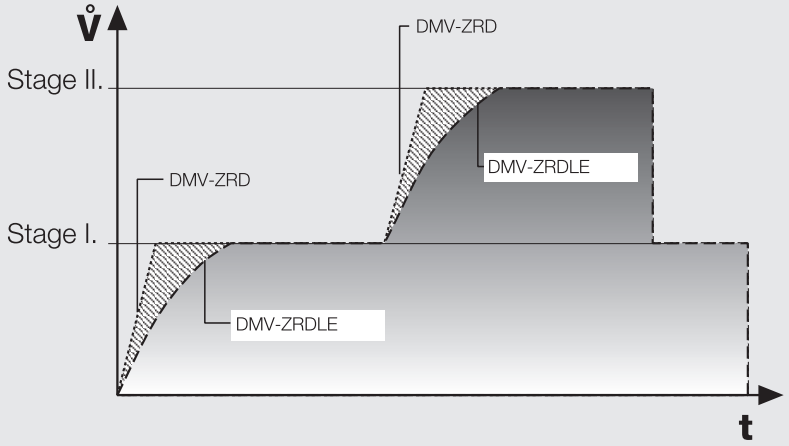
Valve V2
stage 2

Valves V1 & V2
stage 1



Valve V2
stage 2

Opening behavior DMV-ZRD(LE)/602



FRI Gas pressure regulator

Mounting the FRI series gas pressure regulator directly to the DMV dual safety shutoff valve is possible with a mounting kit.
The FRI pressure regulator can be installed upstream or downstream of the DMV dual safey shutoff valve depending on application requirements.

FRI mounting kit for DMV ZR

FRI 705 - 707/6 to DMV 701/602
Order No. 219-967

FRI 710-712/6 to DMV 702/602 & 703/602
Order No. 219-968

Additional Accesories

VPS 504

Valve proving system (approved by some authorities having jurisdiction in lieu of vent valve and “proof of closure” e.g. FM, IRI).

Integral gas filter (optional)

50 micron gas filter

Pre-Mount Filter (optional)

50 micron gas filter

GAO/GMH/GML A2 pressure switch

Valve Position Indication

CPI 400 with light indication lamps and SPDT interlock switch.

Visual Indicator (VI) for mechanical valve position indication.

Vent Line Adapter

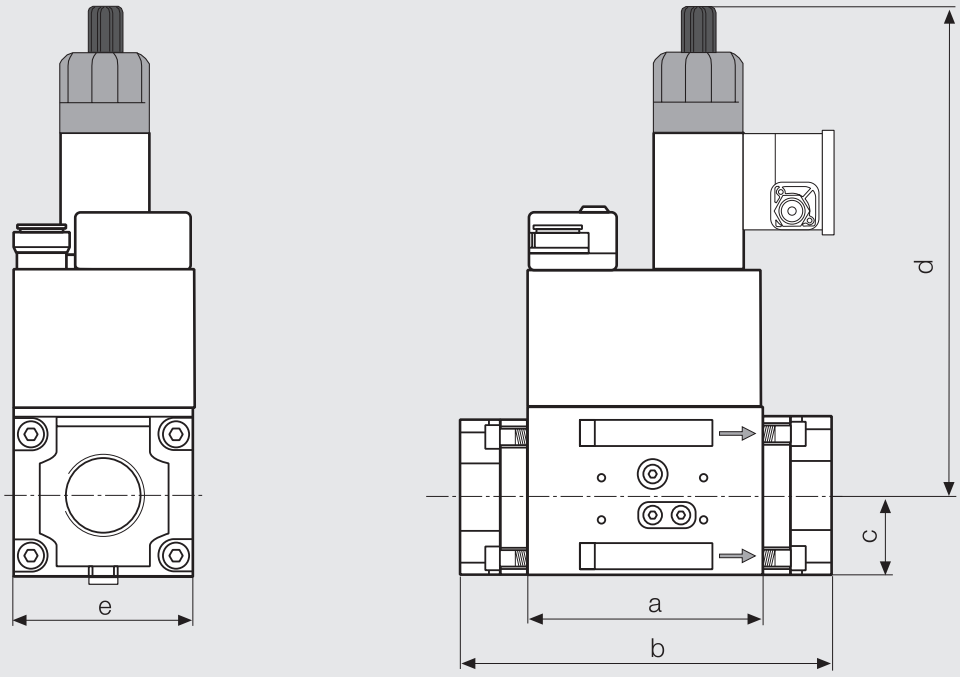
Factory installed vent line adapter which allows the installtion of a normally open vent valve and vent line connection between both safety valves.

Other Adapters

- 1/4” NPT adapter (225-047)
- 1/2” NPT Pilot gas adapter; Check flow requirements. (225-043)
- G 1/8” Test nipple (219-008)
- Port 3 Pressure switch mounting adapter (214-975)

When an accessory is added to the DMV, it may not be possible to mount other devices.

Dimensions inch (mm)



Type	Order No. 110-120 Vac 50-60 Hz	Power* [VA]	Dimensions [inch] Dimensions [mm] a	b**	c	d	e	Weight [lbs] [kg]
DMV-ZRD 701/602	231-844	70	**3.7** 93	**5.6** 141	**1.4** 35	**7.5** 190	**2.9** 73	**6.6** 3.0
DMV-ZRD 702/602	232-025	120	**4.9** 124	**6.9 / 7.9** 174 / 201	**1.8** 45	**10.0** 255	**3.9** 101	**14.3** 6.5
DMV-ZRD 703/602	232-079	135	**4.9** 124	**6.9 / 7.9** 174 / 201	**1.8** 45	**11.0** 280	**3.9** 101	**18.0** 8.2
DMV-ZRDLE 701/602	232-173	70	**3.7** 93	**5.6** 141	**1.4** 35	**8.5** 215	**2.9** 73	**6.8** 3.1
DMV-ZRDLE 702/602	232-214	120	**4.9** 124	**6.9 / 7.9** 174 / 201	**1.8** 45	**10.6** 270	**3.9** 101	**14.5** 6.6
DMV-ZRDLE 703/602	232-232	135	**4.9** 124	**6.9 / 7.9** 174 / 201	**1.8** 45	**13.0** 330	**3.9** 101	**18.3** 8.3

* Inrush current and full load current have the same VA rating.

** DMV 702/703 with 1" or 1 - 1/4" flange, "b" = 6.9". DMV 702/703 with 1 - 1/2" or 2" flange, "b" = 7.9".

DMV-ZRD(LE)/602 flanges and other accesories are interchangeable

Valve	Flange	NPT	Rp
DMV-ZRD(LE) 701	**1/2"**	222-371	222-341
DMV-ZRD(LE) 701	**3/4"**	222-368	222-342
DMV-ZRD(LE) 701	**1"**	221-999	222-001
DMV-ZRD(LE) 702 & 703	**1"**	222-369	222-343
DMV-ZRD(LE) 702 & 703	**1 1/4"**	222-370	222-344
DMV-ZRD(LE) 702 & 703	**1 1/2"**	222-003	221-884
DMV-ZRD(LE) 702 & 703	**2"**	221-997	221-926

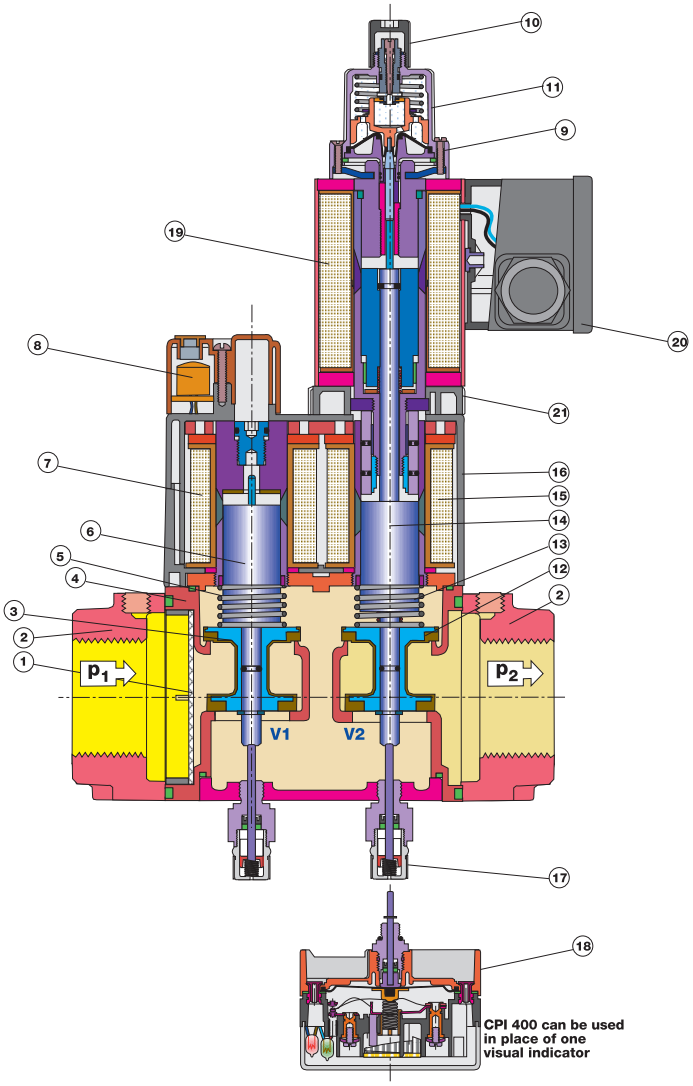
Please order flanges, position indicators and gas filters separately

Intergral Filter & Strainer

DMV-ZR 701	230-440
DMV-ZR 702	230-441
DMV-ZR 703	230-441

DIN-Connector	210-319
CPI 400 valve switch	224-253A
Visual indicator	217-665

DMV-ZRDLE



1	Strainer
2	Flange
3	Valve V1
4	Housing
5	Closing spring V1
6	Plunger V1
7	Solenoid V1
8	Electrical connection (V1 & stage 1 of V2)
9	Max flow adjustment (stage 2)
10	Initial lift adjustment (DMV-ZRDLE)
11	Hydraulic brake (DMV-ZRDLE)
12	Valve V2
13	Closing spring V2
14	Plunger V2
15	Solenoid V2 (stage 1)
16	Solenoid housing
17	Visual indicator (VI)
18	CPI 400 Interlock switch
19	Solenoid V2 (stage 2)
20	Electrical connection (stage 2 of V2)
21	Main flow adjustment (stage 1)

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 on the next page to determine pressure drop for propane.

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

f = correction factor to determine flow through valves with other gases.

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

Type of gas	Density [kg/m³]	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

Flow (CFH) of natural gas, s.g. 0.65 at 60 °F with 1 in. W.C. pressure drop

	1/2 “	3/4”	1”	1-1/4”	1-1/2”	2”
DMV-ZR 701	345	429	457	–	–	–
DMV-ZR 702	–	–	1065	1277	1368	1430
DMV-ZR 703	–	–	1230	1532	1698	1795

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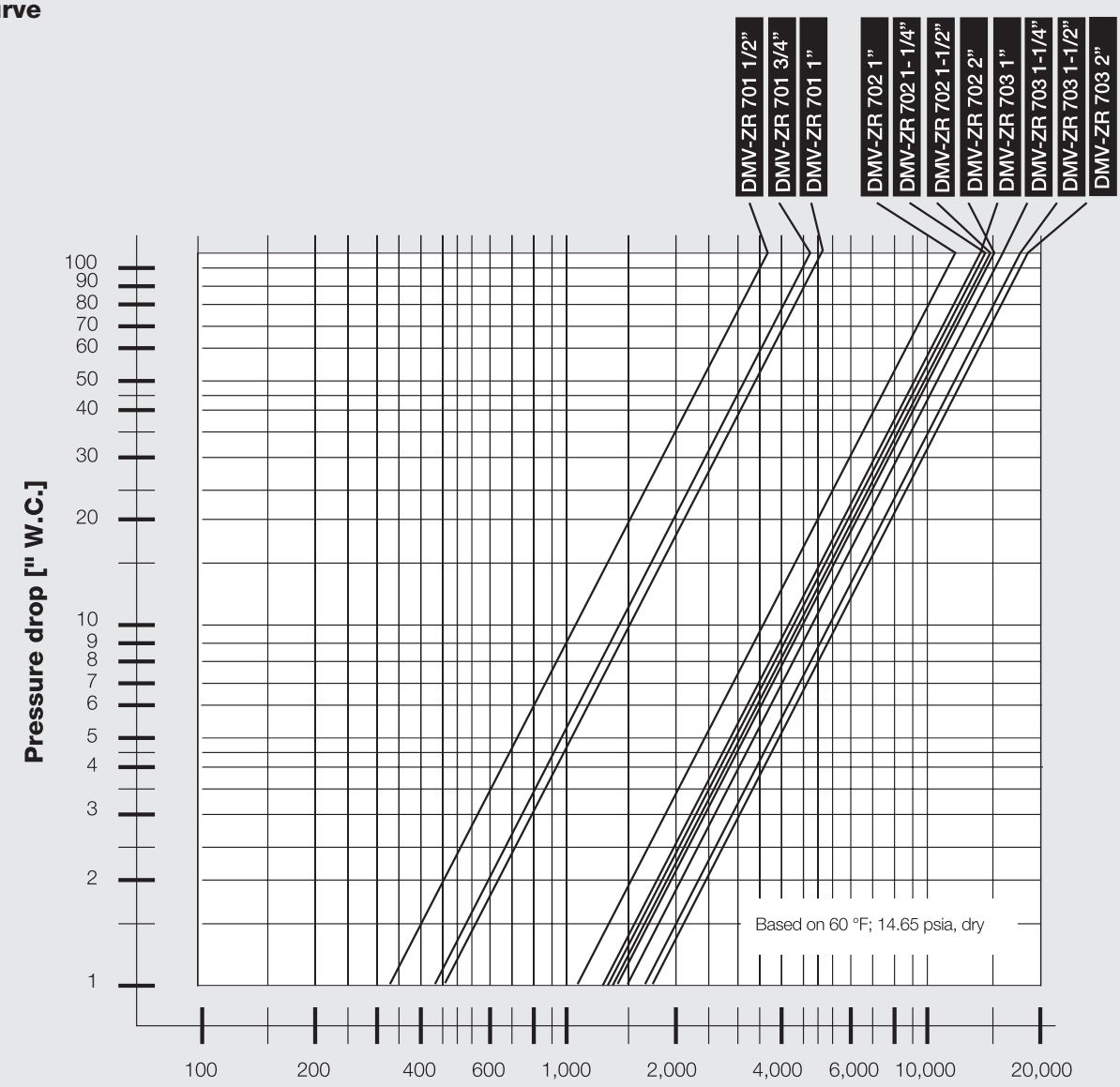
Flow curve



NOTE: Size valve for at least 2 in. W.C. of pressure drop or more if the inlet presure in the application is 15 in. W.C. or less. Otherwise, the difference in flow rate between stage 1 and stage 2 will be note be noticable.

We reserve the right to make any changes in the interest of technical progress.

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