MD PRO Miniature Proportional Valve

Non-Thermally Compensated Proportional Valve

The MD PRO is a miniature 2-way normally closed (NC) proportional valve that controls gas flow proportionaly to input current for flow rates up to 56 slpm. When used with closed loop feedback, the MD PRO is an economical solution that provides repeatable pressure and flow control. The MD PRO is ideal for applications such as respiratory therapy, anaesthesia delivery and patient monitoring devices.

Typical Applications

- O_2 Concentrators/Conservers
- Ventilators
- Anaesthesia Delivery
- Pressure & Flow Control
- Patient Monitors

Features

- Provides repeatability across its operating range for improved accuracy
- Offers a superior combination of value and performance to reduce system cost
- Available Oxygen and Analytical Service use clean
- Proven performance tested to 10 million life cycles
- RoHs compliant

Physical Properties

Valve Type:	
2-Way Normally Closed	
Media:	
Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others	
Operating Environment:	
32 to 140°F (0 to 60°C)	
Storage Temperature:	
-40 to 158°F (-40 to 70°C)	
Length:	
1.79 in (45.3 mm)	
Width:	
0.63 in (15.9 mm)	
Height:	
0.67 in (17.0 mm)	
Porting:	
1/8" (3 mm) barbs; manifold mount	
Weight:	
2.2 oz (63 grams)	
Internal Volume:	
0.031 in^3 (0.508 cm^3)	
Filtration (Suggested and Available)**:**	
40 micron	
Flow Direction:	
Inlet Port	Port 2
Outlet Port	Port 1

Electrical

Power:
2.0 Watts maximum
Voltage:
See table 2
Electrical Termination:
18.5” (47 cm) Wire Leads, PC Mount, Quick Disconnect Spade

Wetted Materials

Body:
360 HO_2 Brass
Stem Base:
430 FR Stainless Steel and Brass 360 HT
All Others:
FKM; 430 FR Stainless Steel; 300 Series Stainless Steel

Performance Characteristics

Leak Rate:
The leakage shall not exceed the following values:
Internal 0.2 SCCM of air with a differential pressure of 1 psid, 25 psid and 150 psid
External 0.016 SCCM of air at 150 psi
Pressure:
0 to 50 psi (3.45 bar) 0 to 75 psi (5.17 bar) 0 to 100 psi (6.89 bar) *See Table 1*
Vacuum:
0-27 in Hg (0-686 mm Hg)
Orifice Sizes:
0.040 in (1.02 mm) 0.050 in (1.27 mm) 0.065 in (1.65 mm)
Hysteresis:
7% of full scale current (Typical) 15% of full scale current (Max)

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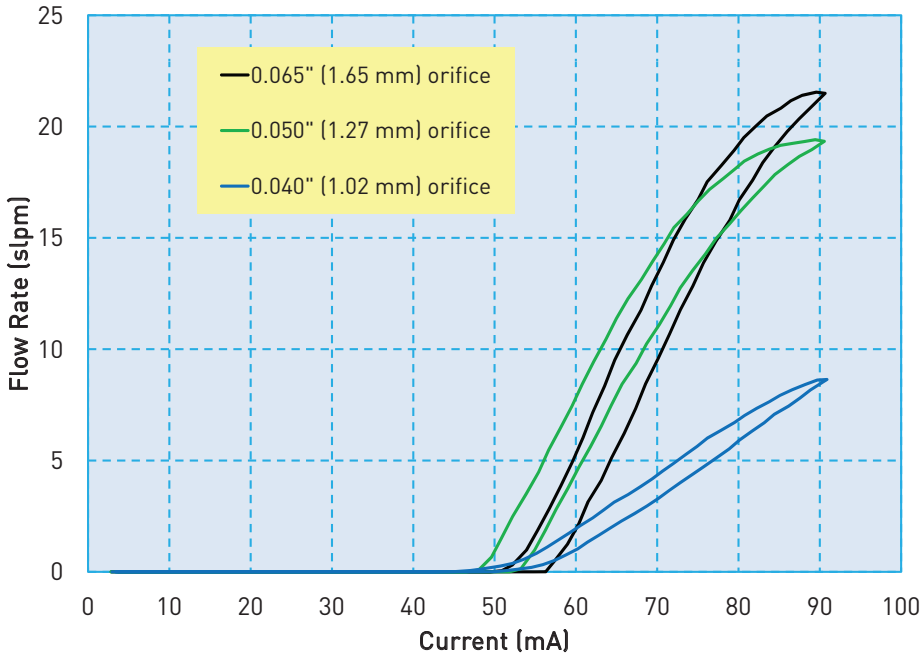
Typical Air Flow with 20 VDC Coil @ 25psid (1.7 bar)



MD PRO Pressure vs Flow Curves Model 4-6

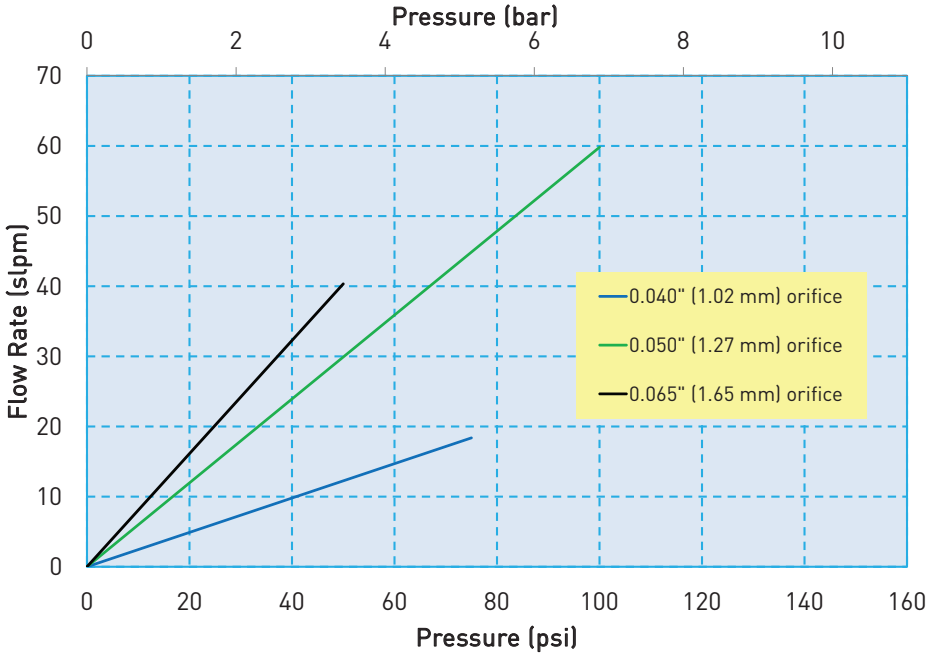
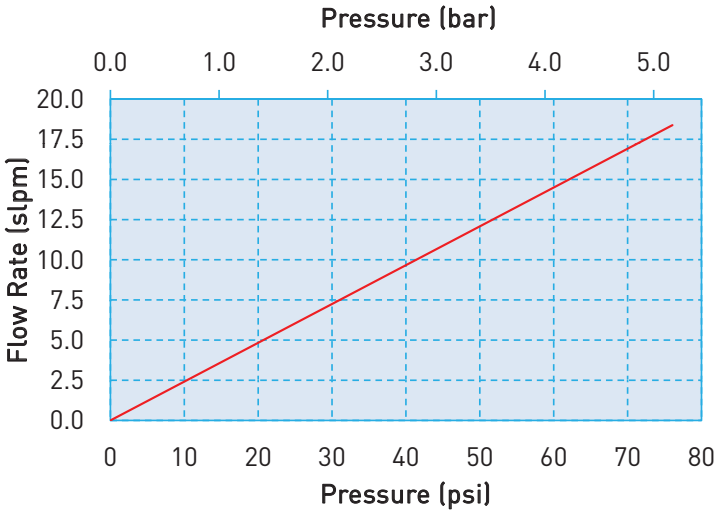


Table 1: Pressure Capabilities

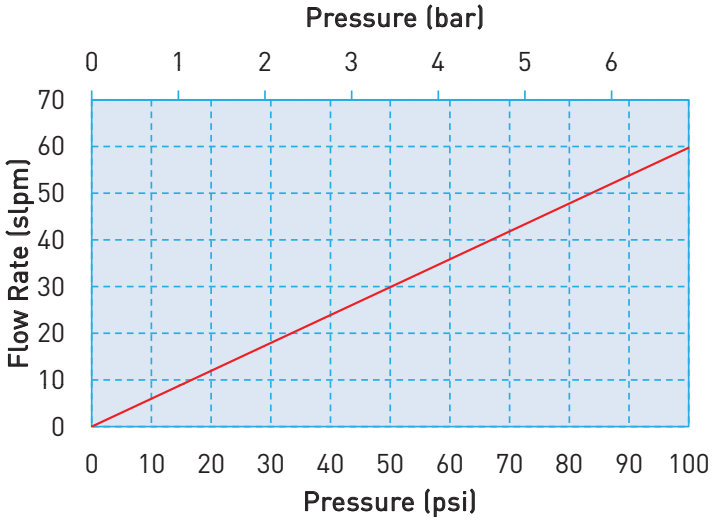
Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.040 in (1.02 mm)	150 psig (10.34 bar)	75 psid (5.17 bar)
0.050 in (1.27 mm)	150 psig (10.34 bar)	100 psid (6.89 bar)
0.065 in (1.65 mm)	150 psig (10.34 bar)	50 psid (3.45 bar)

MD PRO Sizing Charts

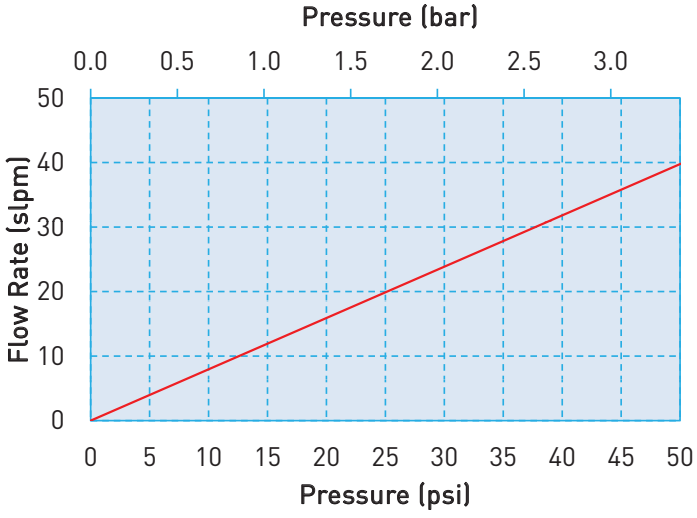
Model 4 - 0.040" (1.02 mm) Orifice



Model 5 - 0.050" (1.27 mm) Orifice



Model 6 - 0.065" (1.65 mm) Orifice



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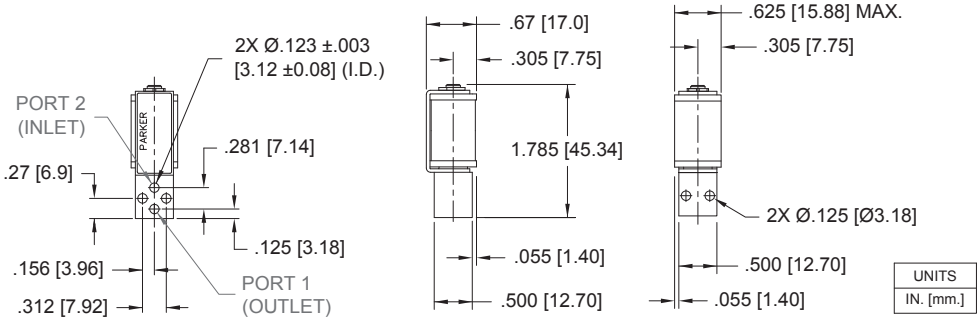
Pneumatic Interface

MD PRO
Manifold Mount

MD PRO Basic Valve Dimensions



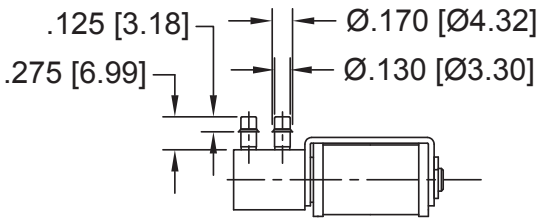
Pneumatic Interface

MD PRO
Barbed

Barb Options

1/8" (3 mm) Barbs

(For 1/8" (3 mm) I.D. Tubing)



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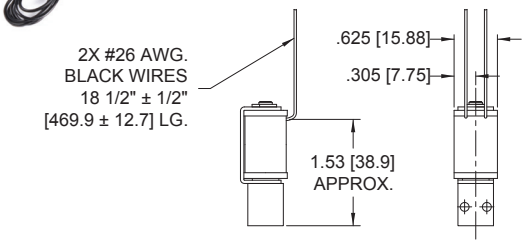
Electrical Interface

Coil Type: Wire Leads



Coil Type: Quick Connect Spade

Coil Type: 4 PC Pin

PCB Pin Layout (Coil Type 4 PC Pin)

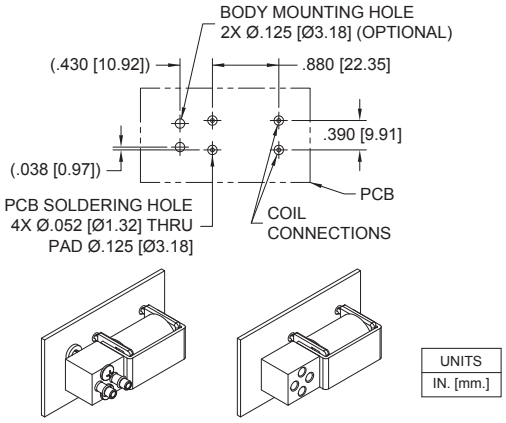


Table 2: Electrical Requirements

Minimum Available Voltage (VDC)	Nominal Coil Resistance @ 20°C (Ohms)
5.5	11
8.0	23
11.5	47
13.5	68
20.0	136
29.0	274

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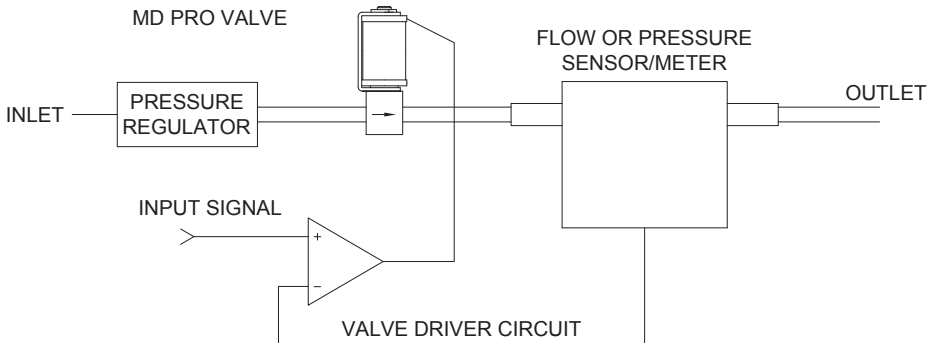
MD PRO Installation and Use

Typical Valve Set-up



Valve Electrical Control

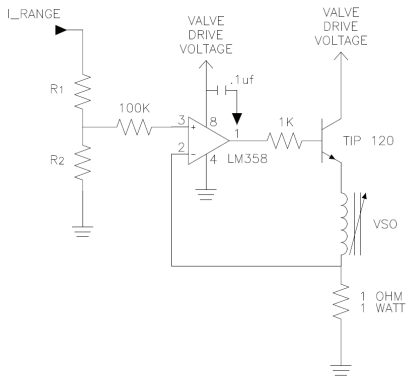
Basic Control:

The MD PRO valve can be controlled by either voltage or current; however, it is highly recommended that current control be employed to ensure the most repeatable valve flow performance.

PWM Control:

For PWM control, the signal applied to the valve should have a frequency between 5-12kHz. Optimum frequency will be application dependent.

Suggested MD PRO Current Driver Schematic



This simple current driver circuit draws only 1 mA at the input control (0-5VDC) and provides control for any MD PRO configuration regardless of valve voltage or resistance.

Table 3 (below) describes the recommended R1 and R2 resistor values based upon the full shut-off current.

Table 3: Selectable Resistor Values for a Low Current (1 mA) LM358-Based Current Driver

Minimum Available Voltage (VDC)	Valve Drive Voltage (VDC)	Nominal Coil Resistance @ 20˚C (Ohms)	Input Current for Full Flow (mA)	R1 (Ohms)	R2 (Ohms)
5.5	7.5	11	304	5100	330
8.0	10.0	23	212	4990	221
11.5	13.5	47	152	5100	160
13.5	15.5	68	125	4420	113
20.0	22.0	136	91	4420	82
29.0	31.0	274	66	4990	66.5

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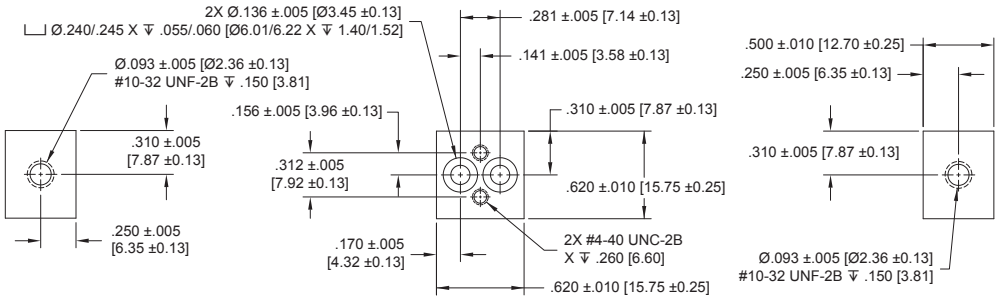
Manifold & O-Ring Dimensions & Design

Not shipped with valves.

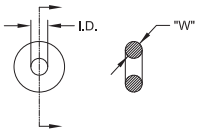


Accessories

O-Ring (Manifold Seal) Dimensions

190-007024-002 (2 required for each valve)

I.D. = Ø.114 ±.005 [Ø2.90 ±0.13]
W = .070 ±.003 [1.78 ±0.08]
O.D. = Ø.254 [Ø6.45] REFERENCE



Screw 4-40 x 5/8" Pan Head, Phillips

191-000115-010 (2 required for each valve)

Ordering Information

Sample Part ID	MDPRO	4	V	A	F	8	S
Description	**Standard**	**Model Number: Maximum Operating Pressure / Orifice Size**	**Elastomer/ Body Material**	**Coil Voltage/Coil Resistance/Coil Current***	**Electrical Interface**	**Pneumatic Interface**	
Options		4: 75 psi / 0.040" (1.02 mm) 5: 100 psi / 0.050" (1.27 mm) 6: 50 psi / 0.065" (1.65 mm)	V: FKM / Brass	A: 5.5 VDC / 11 Ohm / 0.304 Amp B: 8 VDC / 23 Ohm / 0.212 Amp C: 11.5 VDC / 47 Ohm / 0.152 Amp D: 13.5 VDC / 68 Ohm / 0.125 Amp E: 20 VDC / 136 Ohm / 0.091 Amp F: 29 VDC / 274 Ohm / 0.066 Amp *Maximium voltage for continuous full flow, ambient temperture 55°C	F: Wire Leads, 18.5" (47 cm) P: PC Board Mount, 4 Pin Q: Quick Connect, Spade	1: Manifold Mount w/screens* 8: 1/8" (3 mm) Barbs *40 Micron Screen (Port 2)	S: Standard Cleaning O: Oxygen Service

Accessories	
190-007024-002: O-ring, FKM, 0.114" ID x 0.070" Thick*	*Not supplied with the valve. Used as a seal between the valve body and manifold.
191-000115-010: Screw 4-40 x 5/8" Pan Head**	**Not supplied with the valve. Used to mount the valve to a manifold.

ORDER ON-LINE

NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media & Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/mdpro) to configure your MD PRO® Non-Thermally Compensated Proportional Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002206-001 and Drawings #890-003022-001 and #890-003022-003.

For more information call +1 603 595 1500 or email ppfinfo@parker.com
Visit www.parker.com/precisionfluidics

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