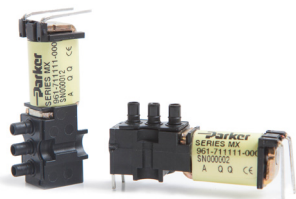


Series MX Miniature Pneumatic Solenoid Valve

10 mm Solenoid-Actuated Poppet Valve



Typical Markets

- Respiratory
- Patient Therapy

Typical Applications

- Oxygen Concentrators
 - Sieve bed switching/equalization
 - Oxygen delivery
- Deep Vein Thrombosis
 - Cuff Inflation/Deflation Control
- Negative Pressure Wound Therapy
 - High Volume Vacuum/Pressure Control

The Series MX is a miniature solenoid valve that delivers high flow at low pressure in a compact, 10 mm wide size. Using hit and hold control, the Series MX miniature solenoid consumes very little power helping medical device manufacturers increase battery life and reduce system weight without sacrificing performance. The universal design supports manifold or barbed-tube mounting and is available in 2-way and 3-way configurations. The Series MX solenoid valve is an ideal solution for portable medical devices with limited space and power.

Features

- Small, 10 mm size enables compact integration and reduces device size
- Highest flow to power consumption ratio increases device battery life
- Lightweight 0.317 oz (9g) design helps reduce portable device weight
- Universal barbed-tube or manifold mount eases valve integration
- CE and RoHS compliant



Product Specifications

Mechanical

Valve Type:

Solenoid-Actuated Poppet Style
 - 2 and 3-Way Normally Closed (NC)
 - 2 and 3-Way Normally Open (NO)
 - 3-Way Distributor (6 psid only)

Media: Non-Reactive gases

Operating Environment:

41 to 122°F (5 to 50°C)

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Dimensions:

- Length: 1.50 in (38.1 mm)
 - Width: 0.40 in (10.1 mm)
 - Height: 0.62 in (15.7 mm)
 to Barb End / 0.44 in (11.1 mm)
 to Manifold Face

Valve to Valve Spacing:

0.400 in (10 mm) center

Porting:

- Barbs for 3/32 in (2 mm)
 I. D. Tubing
 - Manifold Mount

Weight: 0.3175 oz (9 g)

Internal Volume:

0.017 in³ and 0.27 cm³

Filtration:

40 micron recommended

Electrical

Power Options (Hit/Hold):

6 psid model (1.0/0.25 Watt)
 30 psid model (3.0/0.75 Watts)

Voltage Options:

5, 12 or 24 VDC
 Series MX Model 7 is not rated for continuous duty at full rated voltage and must employ hit and hold control.

Electrical Connections:

2-Pin PCB (for PCB solder connection)
 2-Pin Up (for connector interface)
 0.30 in (7.6 mm) pin centers
 (Lead Wire/Connector Assembly available, see ordering information)

Wetted Materials

Body/Plunger:

PPE/PA
 (Polyphenylene Ether/Polyamide)

Armature:

430 FR Series Stainless Steel

Seal (Options):

FKM, Silicone

Other:

302, 303, 304 Stainless Steel
 EPDM (Manifold Gasket)

Performance Characteristics

Leak Rate: Tested with Air

<0.2 sccm

Response:

< 20 ms maximum cycling

Pressure/Vacuum:

0 to 6 psid (0.4 bar differential)
 0 to 30 psid (2.0 bar differential)

Proof Pressure:

100 psig (6.9 bar)

Typical Flow:

17.5 slpm @ 6 psid
 (0.4 bar differential)
 48 slpm @ 30 psid
 (2.0 bar differential)

Orifice Sizes/Equivalent Cv:

0.075 in (1.91 mm) / 0.072

Reliability:

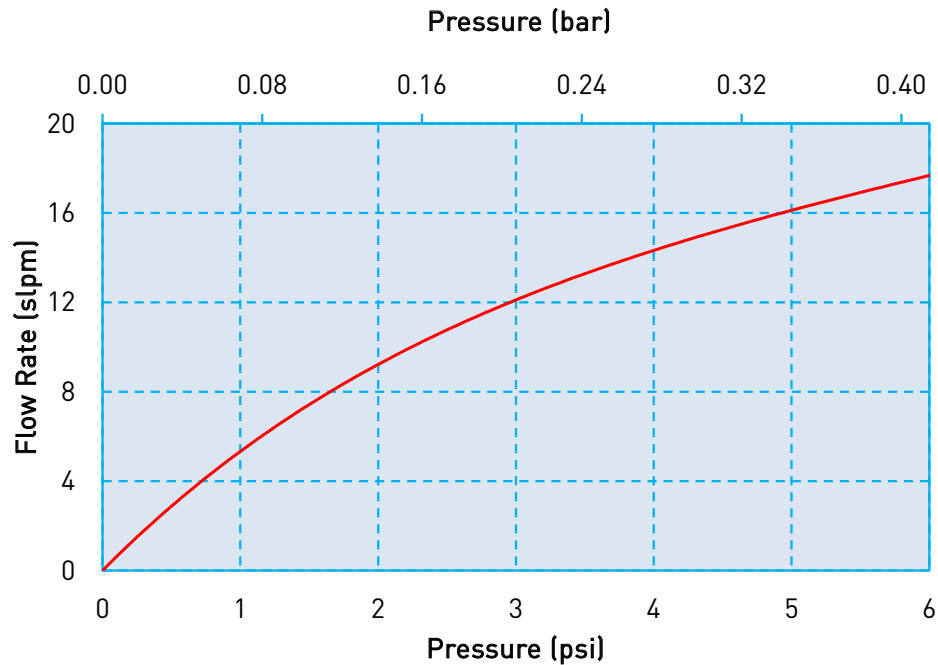
Life Cycle rating of 25 million
 (worst case tested)



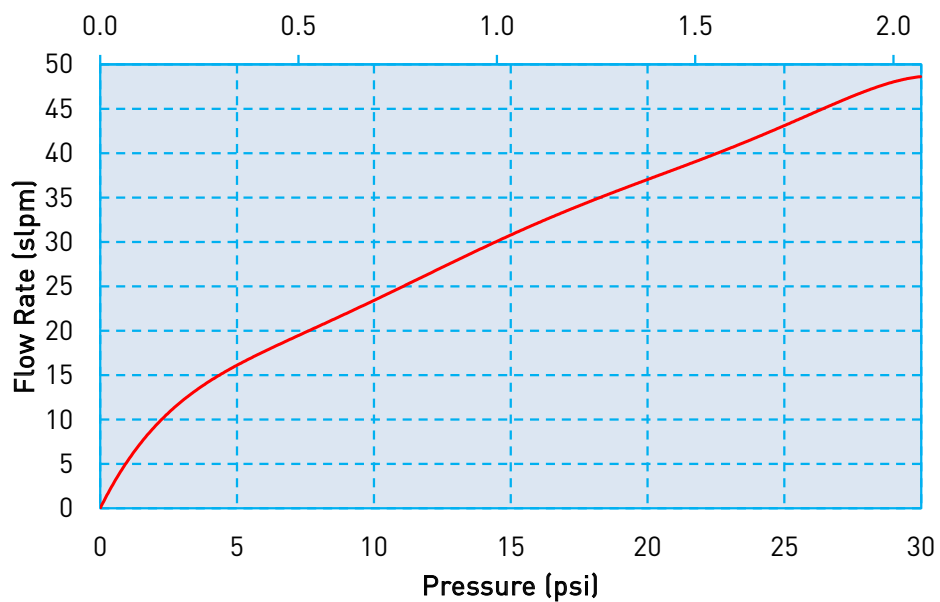
Series MX Miniature Pneumatic Solenoid Valve

Typical Flow Curve

6 PSID Model
(Tested w/air 20° C)



30 PSID Model
(Tested w/air 20° C)



Series MX Miniature Pneumatic Solenoid Valve

Pressure and Flow Capabilities

Model No.	Orifice Size	Maximum Operating Pressure Differential	Typical Flow at Rated Pressure	Nominal Cv
7	0.075 in (1.9 mm)	6 psid (0.4 bar)	17.5 slpm	0.06
		30 psid (2.0 bar)	48 slpm	0.072

Electrical Interface

2 Pin-PCB

(For Pin/PCB solder mount connection)



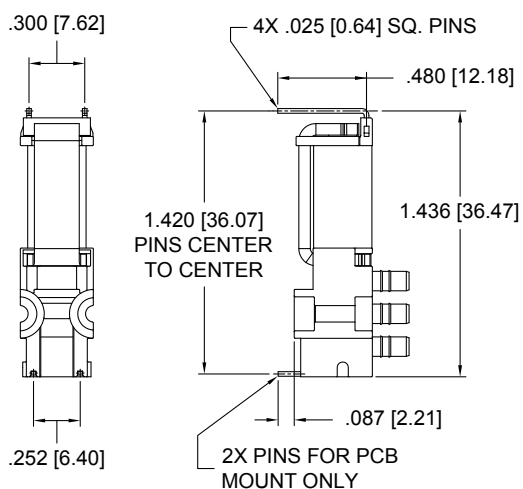
2 Pin-Up

(For Pin/Wire Lead or PCB Terminal Housing Connection)
[Reference Accessories section]

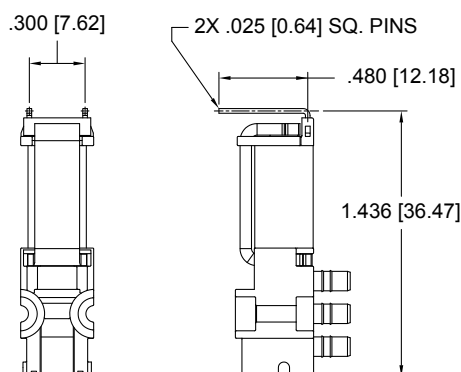


Coil Connections

2 PIN-PCB



2 PIN-UP



UNITS
IN [MM]

Electrical Connection Options:

Electrical terminals compatible with Molex 0511910400 (4 Position) Connector and Molex 0508029101 Crimp Terminal or equivalent.

Series MX Miniature Pneumatic Solenoid Valve

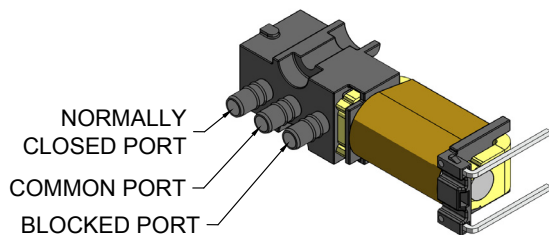
Electrical Requirements

Rated In-Rush Voltage Minimum of 50 msec* (VDC $\pm 5\%$)	Minimum Hold Voltage (VDC)	Hold Power, Typical @ 20°C (Watts)		Resistance @ 20°C (Ohms $\pm 5\%$)
		6 PSI	30 PSI	
5	2.5	0.25	0.75	24.5
12	6	0.25	0.75	145
24	12	0.25	0.75	567

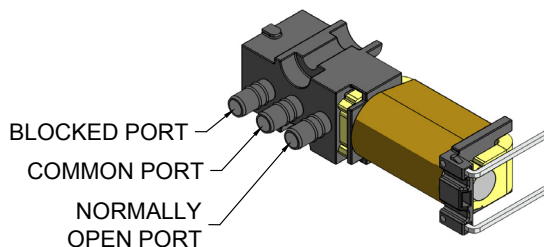
* Valve is not rated for continuous duty at rated voltage. Recommended minimum rated actuation time is 50 msecs. Rated actuation voltage time must not exceed 20 seconds.

Pneumatic Integration

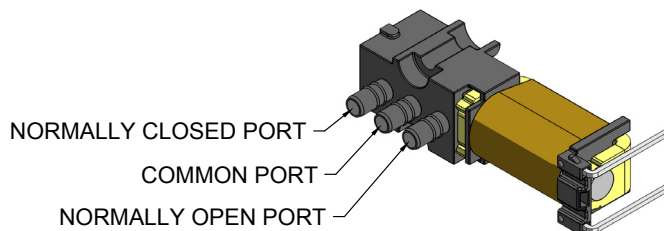
2-WAY NORMALLY CLOSED



2-WAY NORMALLY OPEN



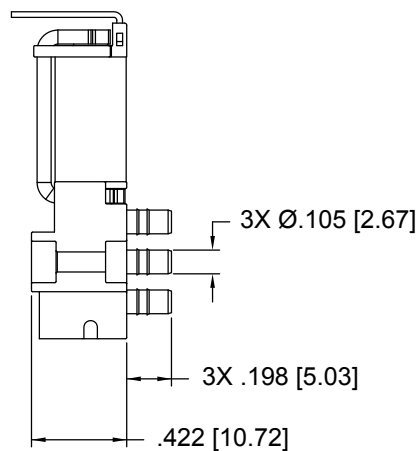
3-WAY NC, NO AND DISTRIBUTOR



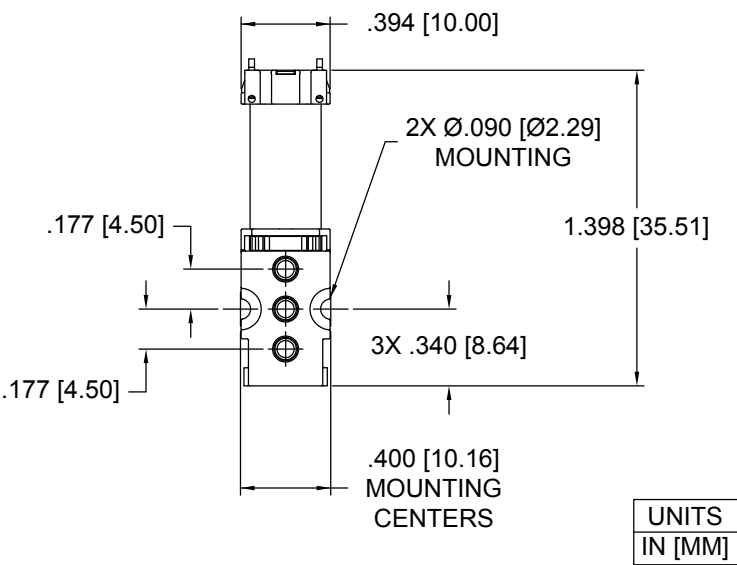
Series MX Miniature Pneumatic Solenoid Valve

Mechanical Integration

SIDE VIEW



BOTTOM VIEW



Mounting Requirements

Mounting Screw Sizes (Pan Head Machine Screw)*	Mounting Screw Torque
2-56 x 1/2"	10 to 12 in-oz
M2 x 14 mm	0.07 to 0.08 N-m

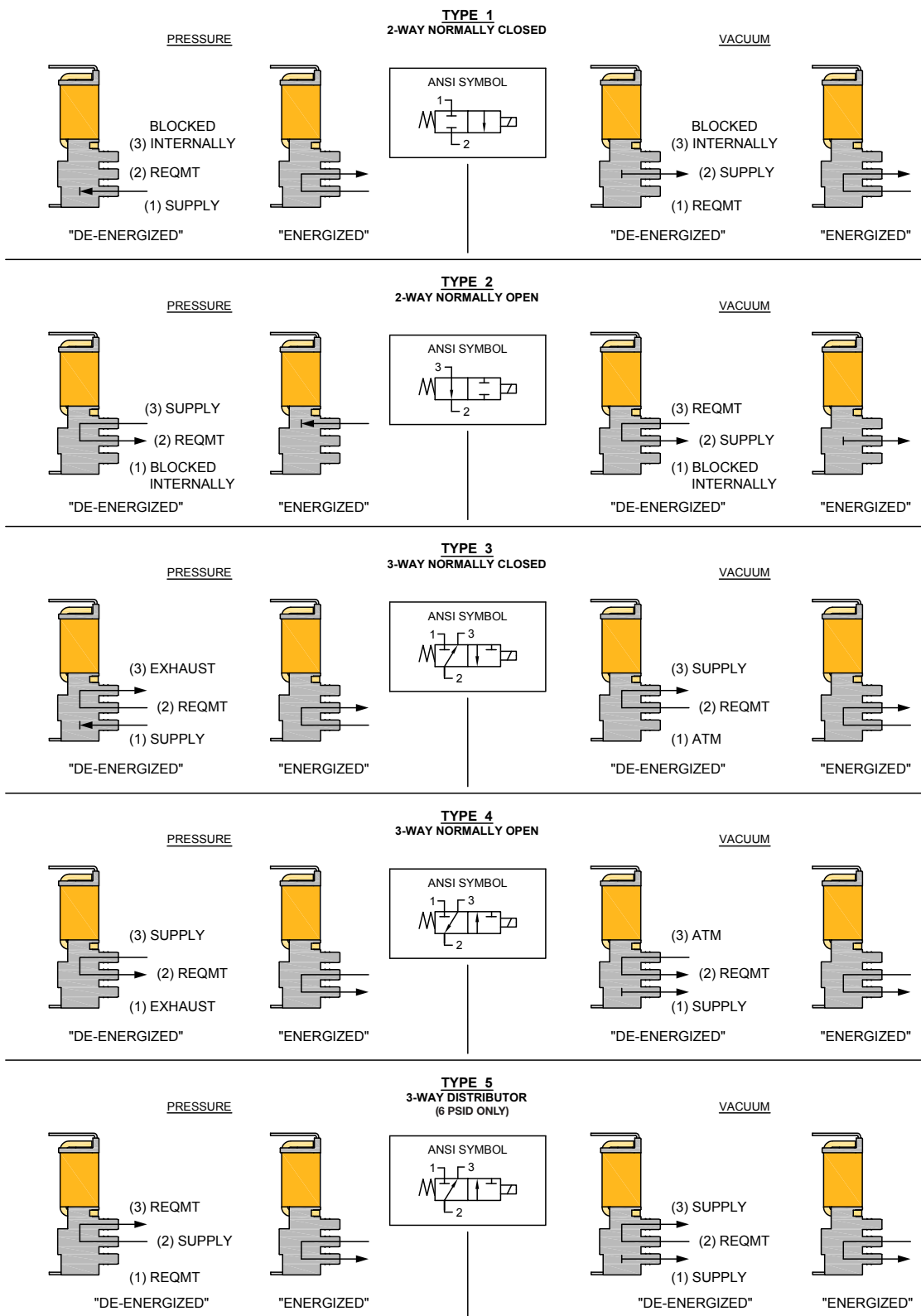
*Mounting screws are not provided with the valve. See Accessories

Series MX Miniature Pneumatic Solenoid Valve

ANSI Symbols

LEGEND:	
SUPPLY:	Pneumatic Source or Supply Pressure
EXHAUST:	Exhaust to Atmospheric Pressure
REQMT:	Customer Requirement or Application
ATM:	Atmospheric Pressure

Pneumatic Schematics by Valve Types



Series MX Miniature Pneumatic Solenoid Valve

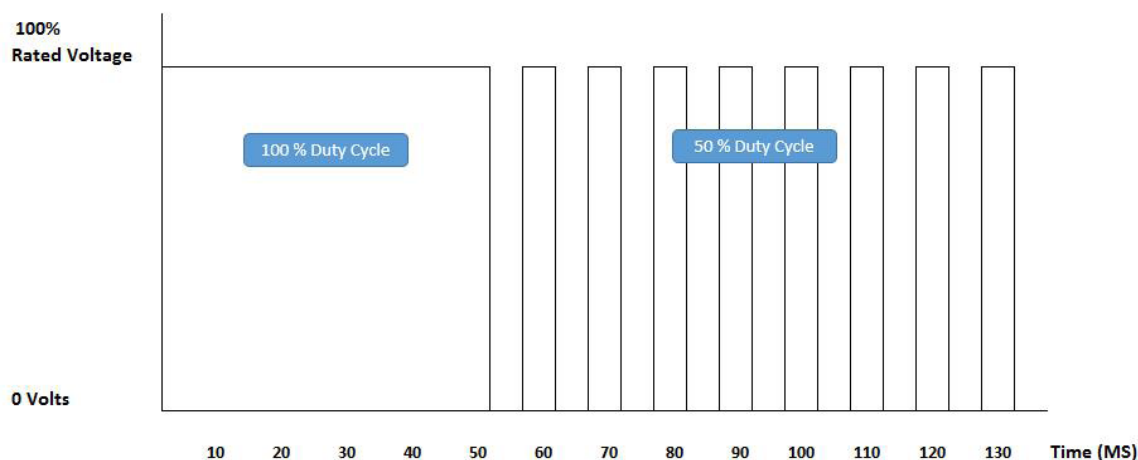
Installation and Use

Hit and Hold Specifications

The Series MX valve features a high flow to power usage ratio by utilizing a Hit and Hold control circuit that requires different voltages to actuate and hold the valve's position. The "Hit" state refers to the rated voltage required to actuate the valve. The "Hold" state is a substantial reduction in the rated voltage (typically 50% of the rated voltage) that maintains the valve in an actuated state resulting in a 75% reduction in power usage and reduction in heat.

Hit and Hold control can be incorporated using several different approaches, Pulse Wide Modulation (PWM) which is preferred and DC Voltage. There are several off the shelf offerings from major electronic component suppliers that incorporate PWM Hit and Hold control. The graph below illustrates Hit and Hold utilizing a PWM signal to manage the power supplied to the valve. PWM reduces power to the valve by applying a square wave instead of a constant voltage level. The ratio to on to off time is called the "duty cycle", and a 50% duty cycle is approximately equivalent to 50% of the supply voltage.

For the MX valve, the PWM frequency must be 5kHz or greater for proper operation, and Parker recommends using a PWM frequency above 15kHz to reduce audible noise from the coil.



This method greatly reduces power consumption because full power (Hit) is only applied to the valve for a short period of time making it ideal for applications with sensitive power budgets. Rated voltage must be applied to the Series MX valve for a minimum of 50 msec to ensure full valve actuation in all operating conditions. Then you can apply the reduced duty cycle to the valve to maintain its on state (Hold).

Series MX Miniature Pneumatic Solenoid Valve

Important Note:



- The Series MX valve is not designed for continuous use at rated voltage. Therefore, rated voltage should not be applied for greater than 20 seconds. Exceeding rated voltage for longer than 20 seconds will affect valve reliability. Contact factory for more details.
- 50% duty cycle is a general recommendation, some specific applications may require different values depending on application. Factors that could impact hit and hold voltage levels include vibration, shock, and pressure locations that are driven from specific usage. The system of the hit and hold circuit and valve need to be qualified for the specific application.

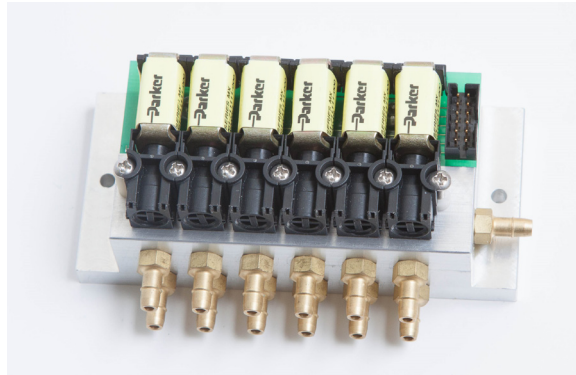
MX Hit and Hold Summary Table

Hit	
Hit Voltage Level	Rated Voltage
Minimum Hit Time	50 msec
Maximum Hit Time	20 Sec
Hold (PWM)	
(PWM) Frequency	5 kHz Minimum 15 kHz Recommended
Nominal Duty Cycle	50%

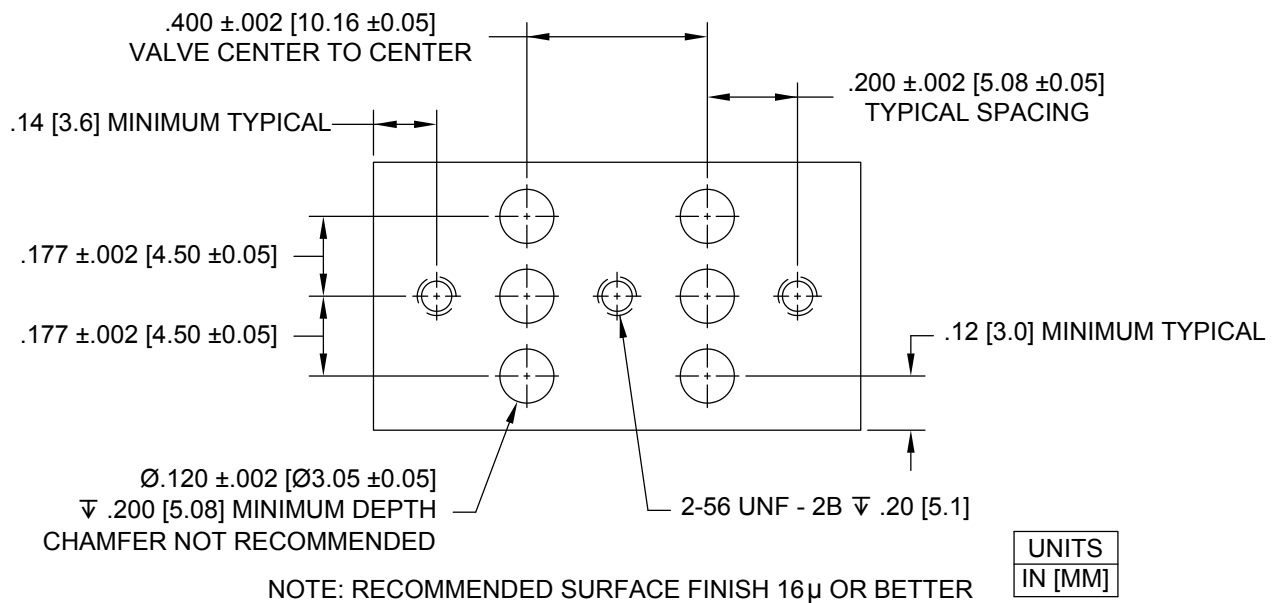
Series MX Miniature Pneumatic Solenoid Valve

Installation and Use

Recommended Series MX Mounting



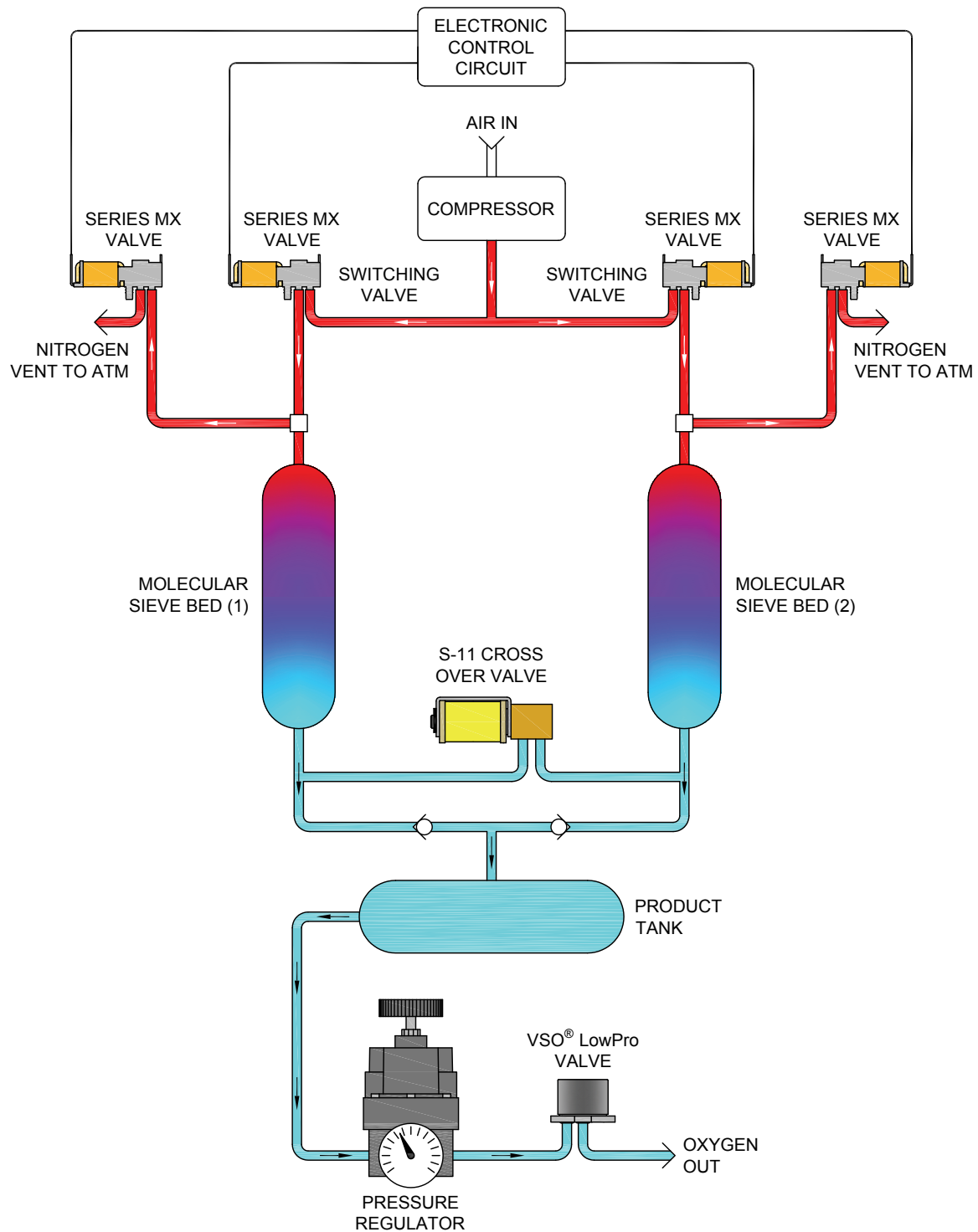
Series MX Manifold Mount Diagram



Series MX Miniature Pneumatic Solenoid Valve

Typical Flow Diagram

Oxygen Concentrator Application



Series MX Miniature Pneumatic Solenoid Valve Accessories

Manifold Rubber Gasket (EPDM)

00444-05-E099

(required for manifold mounting and supplied with each valve)



12" (30 cm) Wire Leads

290-006061-002

(for use with 2-Pin Up valve configuration)
Note: Not Included with valve

Screw 2-56 x 1/2"

Pan Head, Phillips

191-000112-008

(see valve mounting requirements above)

Note: Not Included with valve



Ordering Information

Sample Product ID	961	7	1	1	1	1	1	000
Description	Series	Model Number: Orifice Size	Voltage	Electrical Interface	Type	Pressure/ Power (Hold)	Elastomer	
Options	961	7: 0.075" (1.9 mm) Orifice	1: 5 VDC 2: 12 VDC 3: 24 VDC	1: 2 Pin-Up 2: 2 Pin-PCB	1: 2-Way NC 2: 2-Way NO 3: 3-Way NC 4: 3-Way NO 5: 3-Way Dist (6 psid only)	1: 6 psig / 0.25 Watt 3: 30 psig / 0.75 Watt	1: FKM (30 psid only) 2: Silicone (6 psid only)	

Accessories		
Part Number	Description	Comments
0044-05-E099	Manifold Rubber Gasket, EPDM	Manifold gasket is supplied with each valve. Used as a seal between the valve and manifold.
290-006061-002	Cable, 4 Position, 12" Wire Lead	Not supplied with the valve. Used to electrically interface with the 2 Pin-Up configured valve.
191-000112-008	Screw 2-56 x 1/2" Pan Head	Not supplied with the valve. Two (2) required for each valve.

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/mxvalve) to configure your Series MX-Model 7 Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to the following documents:

Document:

- Series MX-Model 7 Performance Specification
- 3-Way, 2 Pin-Up Line Drawing
- 2-Way NO, 2 Pin-Up Line Drawing
- 2-Way NC, 2 Pin-Up Line Drawing
- 3-Way, 2 Pin-PCB Line Drawing
- 2-Way NO, 2 Pin-PCB Line Drawing
- 2-Way NC, 2 Pin-PCB Line Drawing

Document Number

790-002435-001
890-003360-001
890-003360-002
890-003360-003
890-003361-001
890-003361-002
890-003361-003

PPF-MSV-002/US September 2016

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



NOTES
