

LM Pro Miniature Proportional Valve

Linear Motor Proportional Valve



Markets

- Respiratory
- Anesthesia
- Patient Therapy

Applications

- Ventilators (Gas Blending & Delivery)
- Insufflators
- Anesthesia Delivery
- Pressure and Flow Control

The Parker LM Pro miniature proportional valve provides unparalleled flow control capabilities to meet your OEM application needs. The LM Pro uses a patent pending linear motor actuation technology that provides exceptional resolution over a wider flow range and lower power consumption than traditional solenoid or voice coil actuation. With a linear controllable flow up to 540 slpm, pressure capability up to 100 PSIG (6.9 Bar), and typical power consumption of less than 2 Watts, the LM Pro is a true, one-size-fits-all proportional valve. The wide range of high-resolution flow control meets breathing circuit requirements from neonate up to adult. With unrivaled performance capability combined with the simplicity of a face-mounted/porting design, the LM Pro valve is an ideal solution for all your dynamic flow control needs.

Features

- Large linear flow control range spanning 70% of the current rating enabling accurate low and high flow rate control
- Low power consumption: Typical operation under 2 Watts
- Proven performance: Life cycle rated to 100 million cycles (.95 Reliability factor. 95% confidence interval)
- Face mount porting and optional integrated filter simplifies integration and reduces manifold complexity
- Cleaned for Oxygen use per ISO15001:2010 and meets ISO10993 Biocompatibility
- Reach and RoHS compliant



Product Specifications

Physical Properties

Valve Type:
2-Way Normally Closed
Media:
Air, Oxygen, Nitrous Oxide, Carbon Dioxide, Heliox and other medical gases
Operating Environment:
32 to 140°F (0 to 55°C)
Storage Temperature:
-40 to 158°F (-40 to 70°C)
Length:
1.57 in (39.9 mm)
Width:
0.72 in (18.3 mm)
Height:
1.44 in (36.5 mm)
Porting:
Face Seal to Manifold with integrated FKM seal and optional inlet filter
Weight:
1.29 oz (36.6 g)

Electrical

Power:
2.0 Watts Nominal 3.0 Watts Maximum
Voltage:
5, 12 and 24 VDC <i>See Table 1 on page 6</i>
Electrical Termination:
Latching Receptacle JST SM02B-PASS-TB

Wetted Materials

Valve Element:
Aluminum FKM Elastomer Fluorosilicone Elastomer Stainless Steel
Regulatory:
Compliant with RoHS directive (2002/95/EC), REACH EC 1907/2006, ISO 15001:2010 and ISO 10993:2010 / ISO 18562

Performance Characteristics

Leak Rate:
Internal: 1 SCCM External: 1 SCCM LM Pro Valve meets leak specification across entire operational pressure range.
Operating Pressure:
Model 2: 0 - 100 psig (6.9 bar), Model 4: 0 - 50 psig (3.45 bar)
Vacuum:
0 - 27 in Hg (0-686 mm Hg)
Proof Pressure:
Model 2: 150 psig (10.39 bar), Model 4: 110 psig (7.6 bar)
Orifice Sizes:
Model 2: 0.121 in (3.07 mm) effective, Model 4: 0.134 in (3.40 mm) effective
Hysteresis:
10% of full scale current (Typical) 15% of full scale current (Maximum)
Optional Filtration:
400 µm
Response time:
<10 ms Typical at 20°C

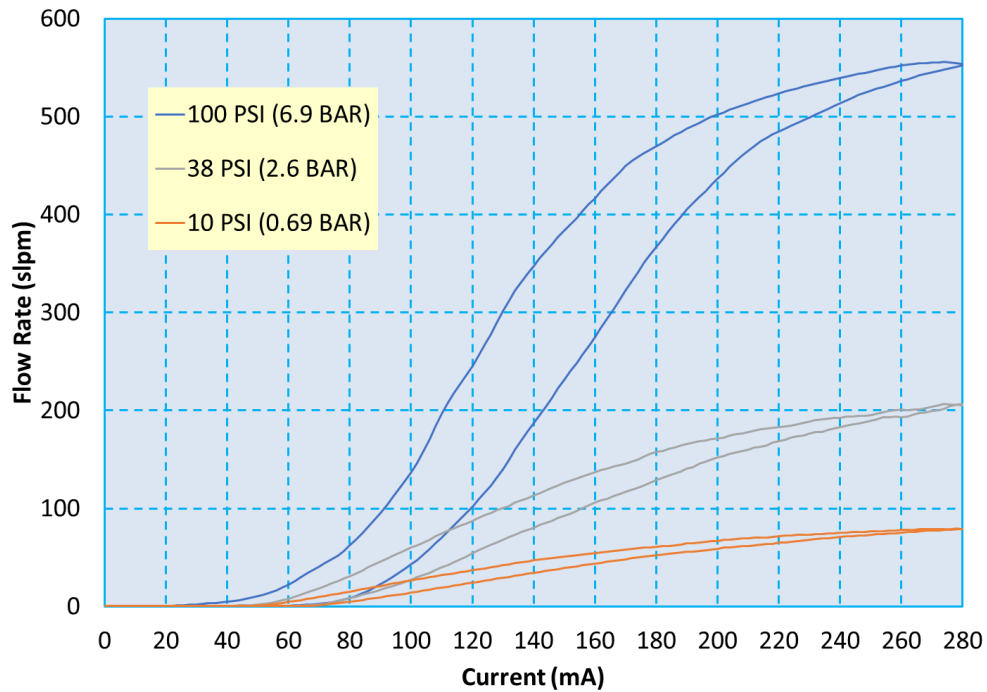


Parker is a registered trademark of Parker Hannifin Corporation.
Patent pending with the United States Patent and Trademark Office (USPTO).

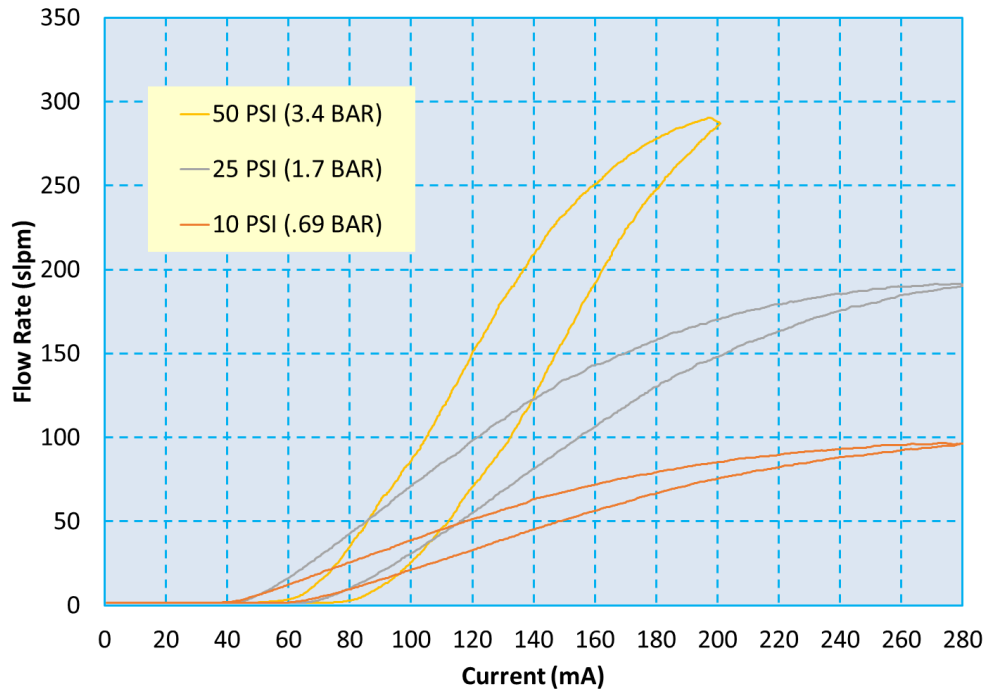
LM Pro Miniature Proportional Valve

Typical Flow Curve

LM Pro Model 2
Typical Air Flow with 12 VDC Coil



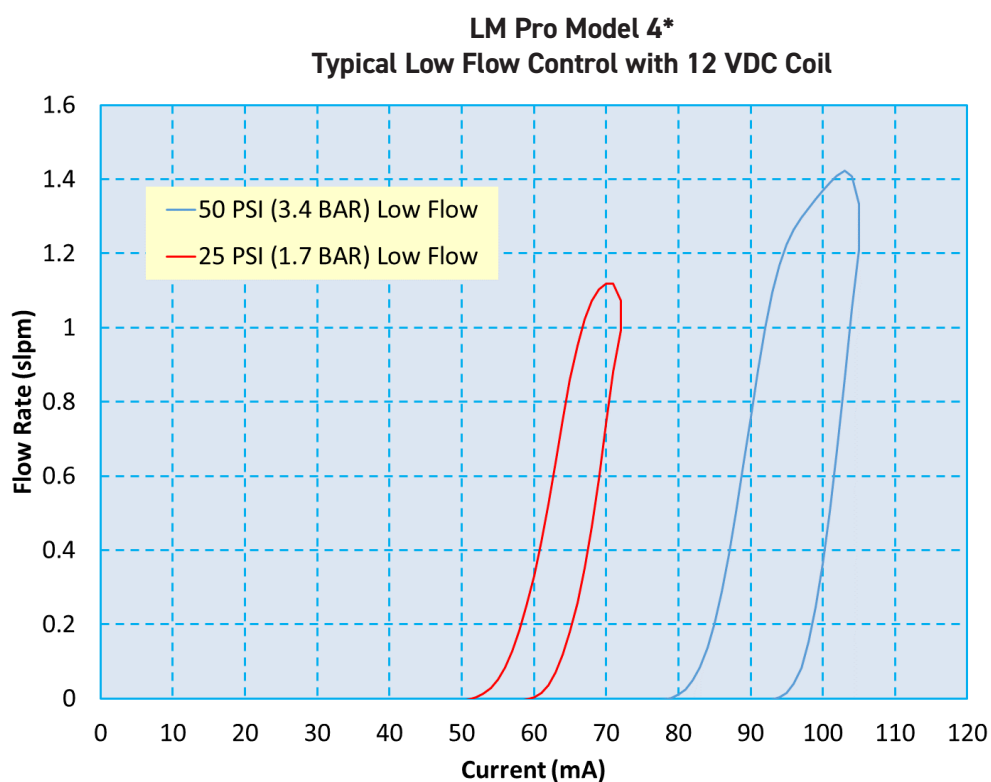
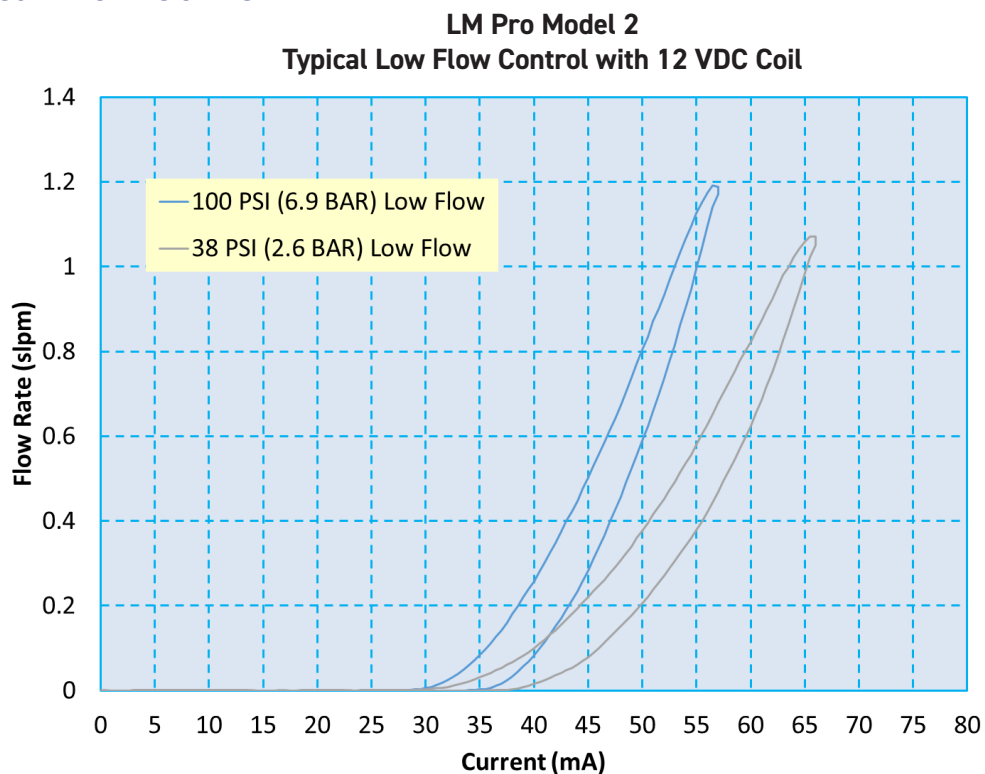
LM Pro Model 4*
Typical Air Flow with 12 VDC Coil



*During operation at 50psi, a flow shift of up to 5% over the life of the valve may occur.

LM Pro Miniature Proportional Valve

Typical Flow Curve



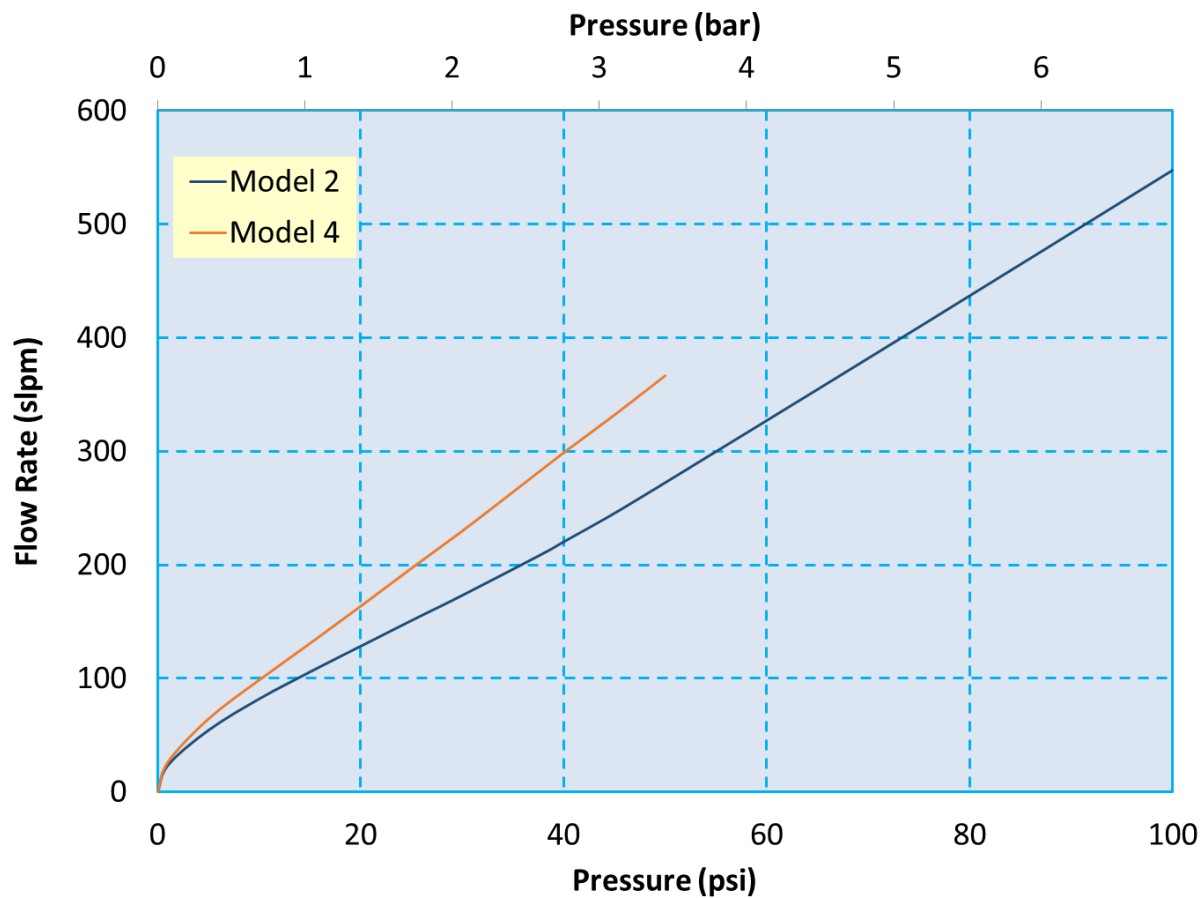
*During operation at 50psi, a flow shift of up to 5% over the life of the valve may occur.

LM Pro Miniature Proportional Valve

Typical Flow Curve

Pressure vs Flow Curve

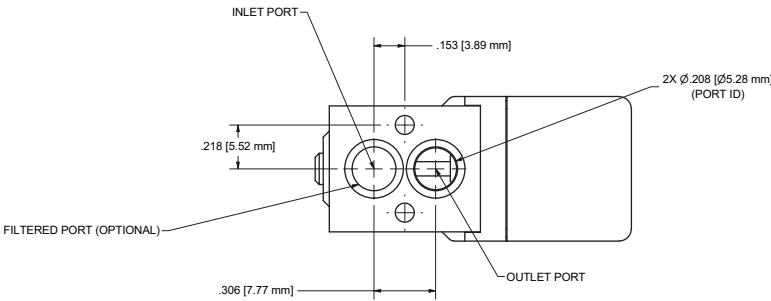
The curve below shows the typical output flow rate at maximum rated current as a function of inlet pressure.



LM Pro Miniature Proportional Valve

Pneumatic Interface

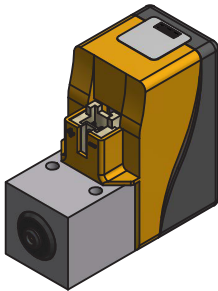
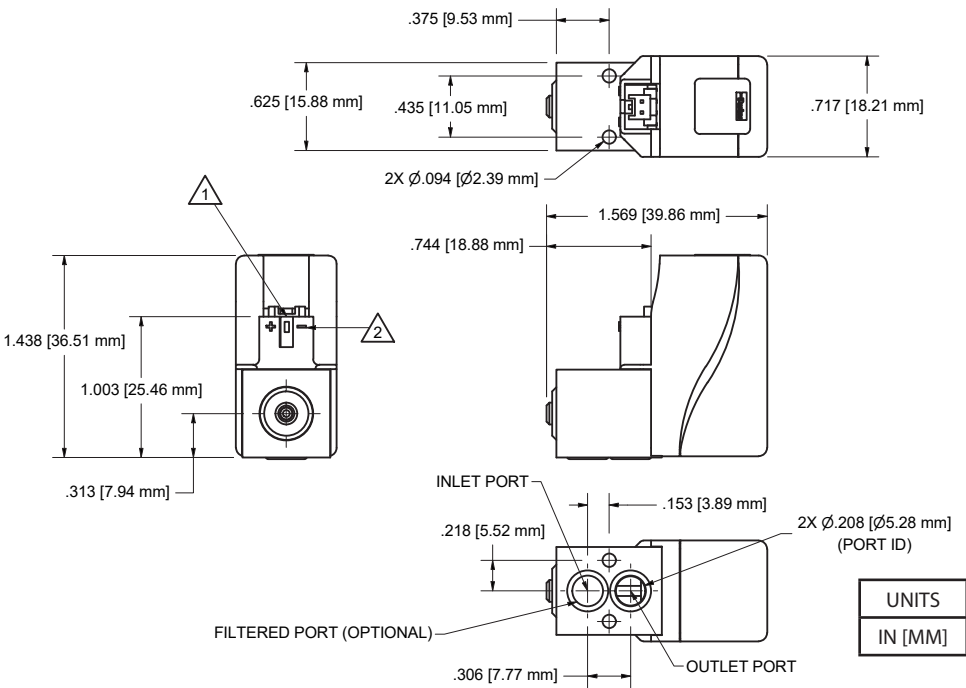
Parker LM Pro Manifold Mount



Mechanical Integration

Dimensions

Parker Parker LM Pro Basic Valve Dimensions

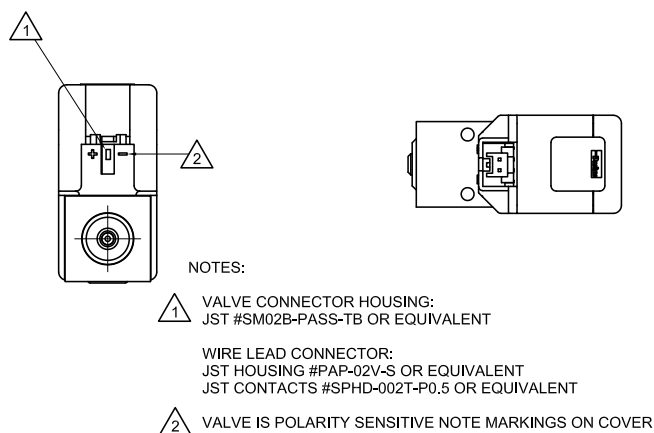


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LM Pro Miniature Proportional Valve

Electrical Interface



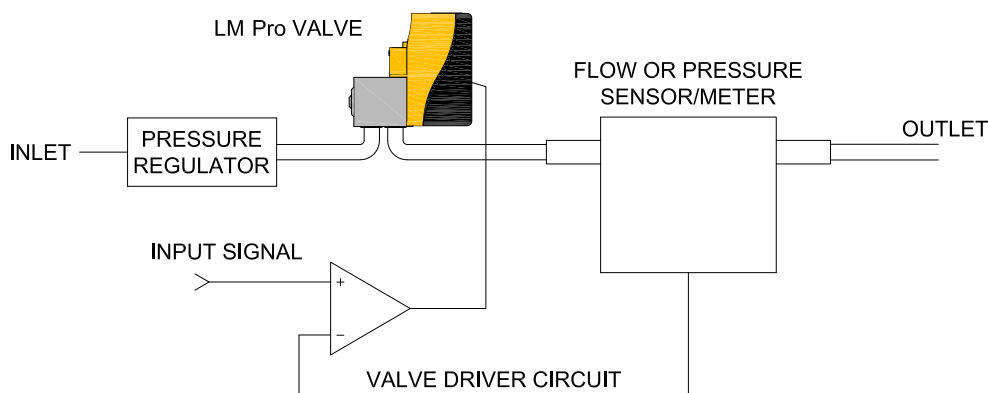
Electrical Requirements

Table 1

Related Voltage	Nominal Coil Resistance at 20°C	Control Current at Maximum Flow
5 VDC	6 Ω	555 mA
12 VDC	24 Ω	280 mA
24 VDC	148 Ω	115 mA

Installation and Use

Typical Valve Set-up



Valve Electrical Control

Basic Control:

The LM 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.

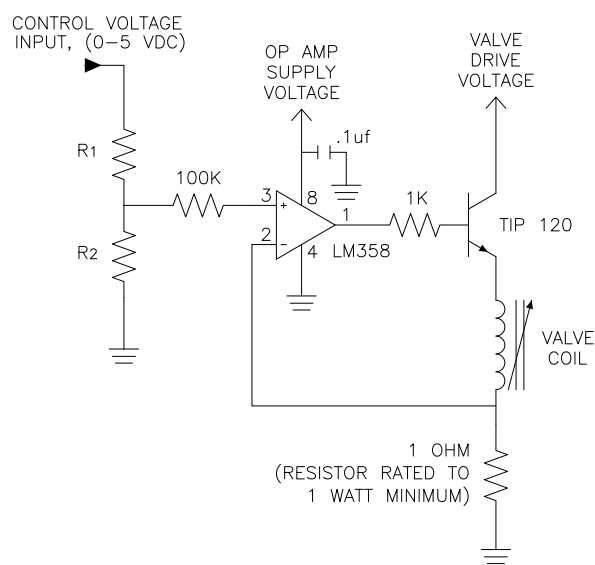
PWM Control:

For PWM control, the signal applied to the valve should have a frequency of 5 kHz or greater. Optimum frequency will be application dependent.

LM Pro Miniature Proportional Valve

Installation and Use

Suggested Parker LM Pro Current Driver Schematic



This simple driver circuit provides a constant current to the LM Pro valve where a 0-5 Volt input signal equals the full current range of the LM Pro.

Table 2 (below) provides the R1 and R2 resistor values based on the individual LM Pro model being tested.

**Table 2: Selectable Resistor Values for a Low Current (1 mA)
LM358-Based Current Driver**

Valve Drive Voltage Input (VDC)	Valve Coil Voltage, Resulting (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)	R1 (Ohms)	R2 (Ohms)
5	7	6	555	3920	499
12	14	24	280	3920	237
24	26	148	115	4320	102

LM Pro Miniature Proportional Valve

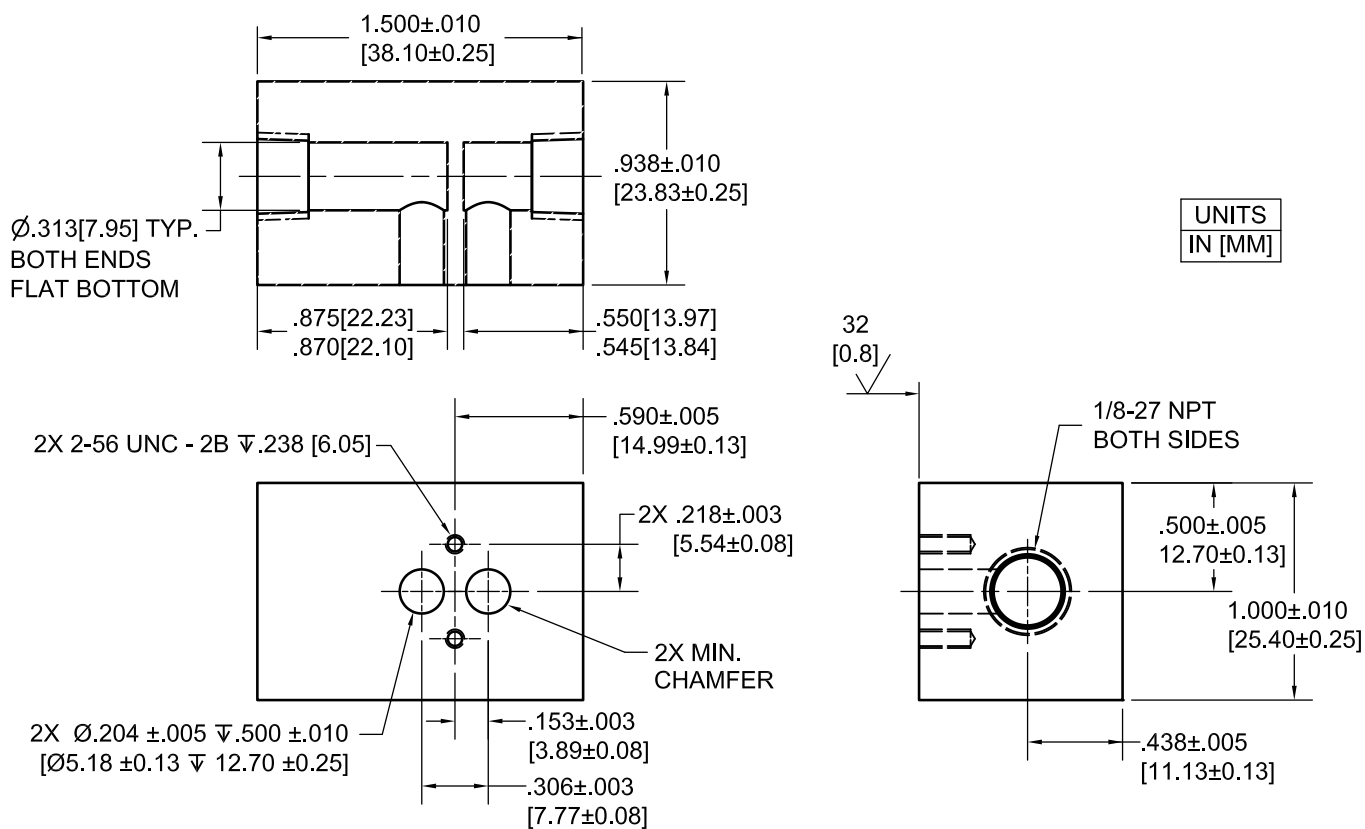
Installation and Use

Manifold Dimensions & Design

Not shipped with valves.

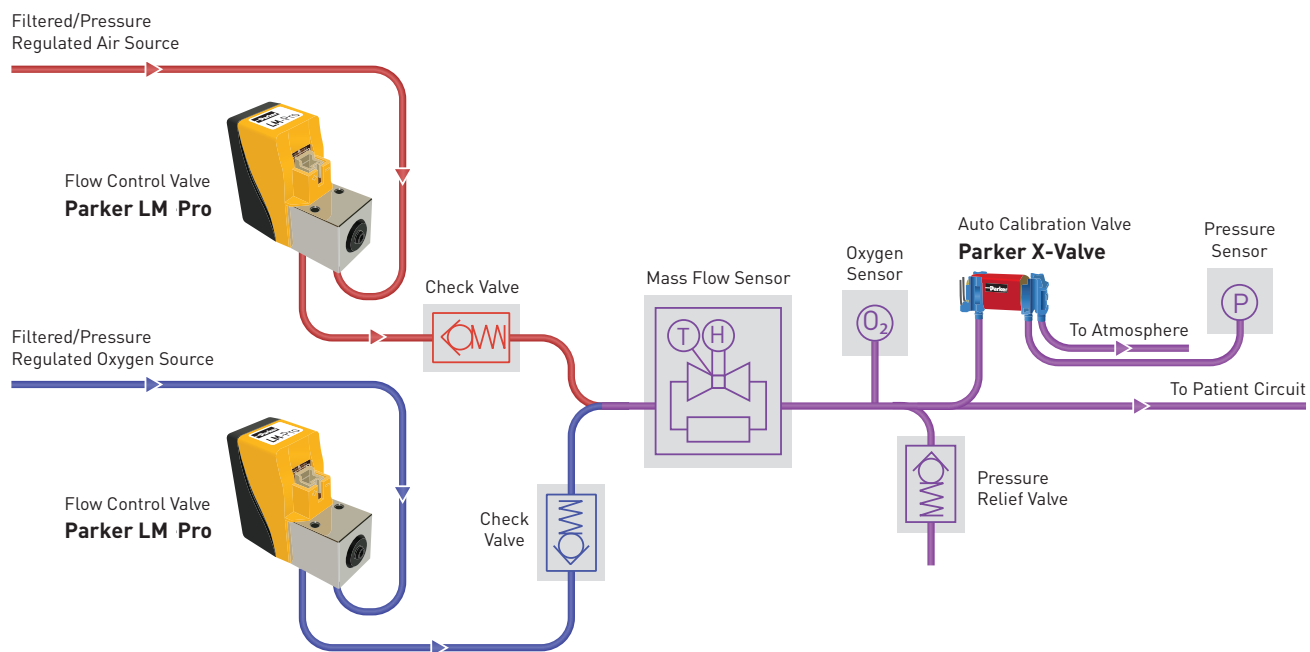
Parker Precision Fluidics recommends 24 in-oz (17 N-cm) of torque for the screws.

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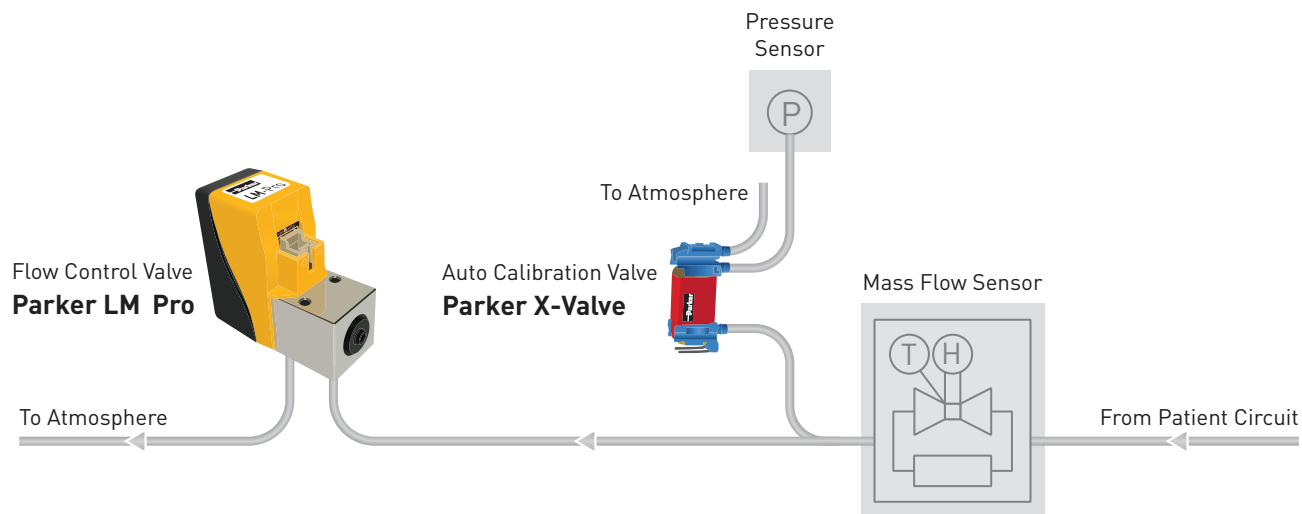


LM Pro Miniature Proportional Valve

Ventilator Inspiratory Flow



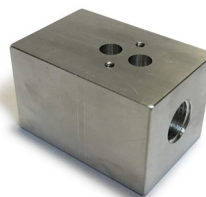
Ventilator Expiratory Flow



LM Pro Miniature Proportional Valve Accessories



12.5" Adapter Wire Leads
290-006061-004



Single Station Manifold
890-001184-001



Screw #2-56 x 3/4"
Socket Head Cap Screw
(see valve mounting recommendations above)



Manifold O-Ring (FKM)
190-007063-001
(supplied with valve)



Optional Filter
195-000291-001

Ordering Information

Sample Part ID	937	-	02	1	12	0	-	01	0
Description	Series	-	Model Number	Elastomer	Voltage	Body Material	-	Pneumatic Interface	Electric Interface
Options	937	-	02: 100psi/0.121 in (3.07 mm) 04: 50 psi/0.135 in (3.43 mm)	1: FKM Poppet and Fluorosilicone Diaphragm	05: 5 VDC 12: 12 VDC 24: 24 VDC	0: Aluminum	-	00: Manifold Mount No Inlet Filter 01: Manifold Mount with Filter	0: No Wire Leads

Accessories	
290-006061-004: 12.5 in (317.5 mm) Wire Leads	** Not supplied with the valve
890-001184-001: Manifold, Single Station	** Not supplied with the valve
190-007063-001: Manifold O-Ring (FKM)	** Supplied with the valve
191-000112-417: Screw #2-56 x 3/4, Socket Head Cap	** Not supplied with the valve. See valve mounting recommendations above
195-000291-001: Optional Filter	** Supplied if selected option

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

To order online, please [visit our website](#). For more detailed information, visit us on the Web, or call and refer to Parker LM Pro Performance Spec. 790-002627-001.

Parker Hannifin Precision Fluidics Division reserves the right to make changes. Drawings are for reference only.

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

