

Parker 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 longer stroke 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. This unrivaled performance capability combined with the simplicity of a face-mounted/ported design make the LM-Pro valve an ideal solution for 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 131°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 Watt Typical 3.0 Watt Maximum
Voltage:	5, 12 and 24 VDC See Table 1
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

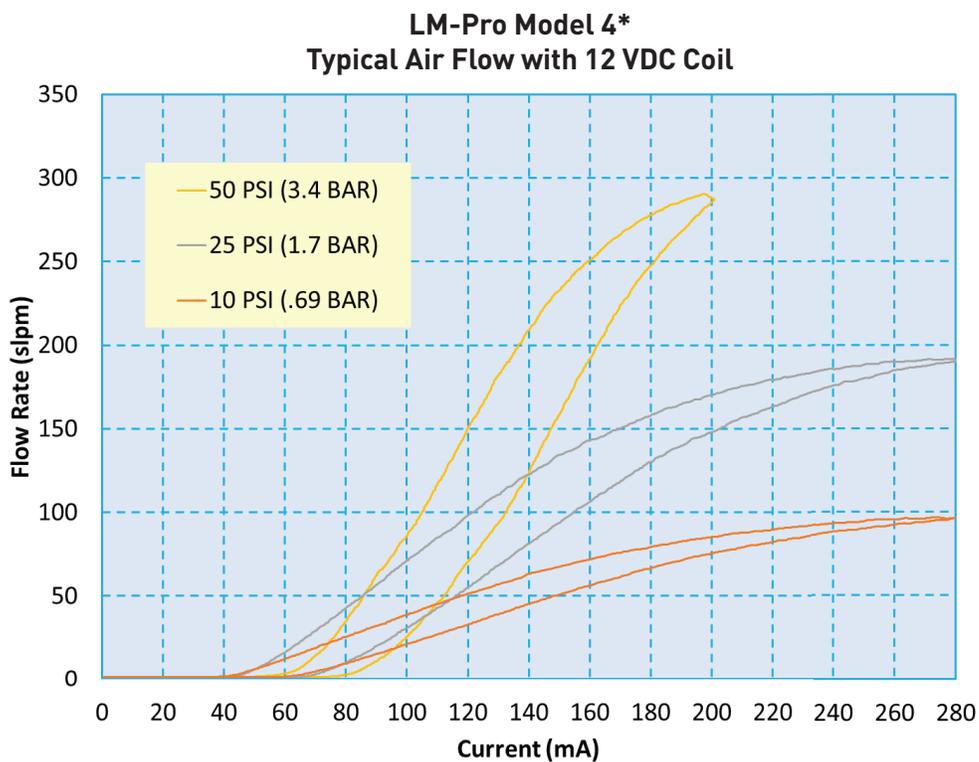
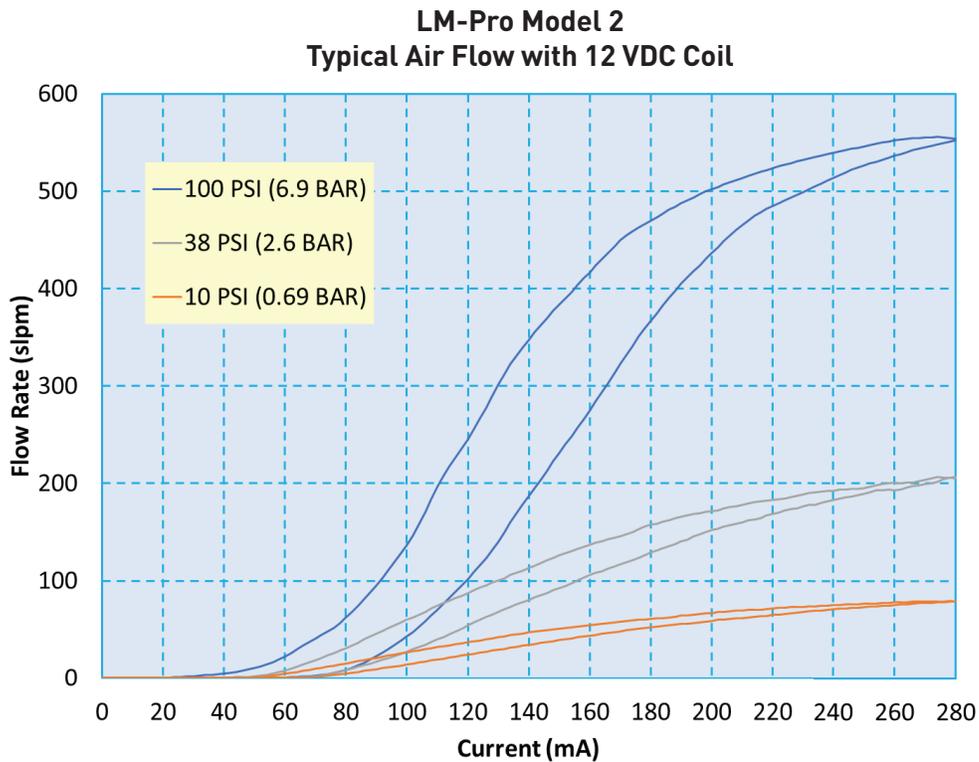
Leak Rate: *	Internal: 1 SCCM External: 1 SCCM <i>* The leakage shall not exceed the above values with Air at a rated pressure of 100 psid (6.9 bar) for Model 2 and 50 psid (3.45 bar) for Model 4.</i>
Operating Pressure:	Model 2: 0 - 100 psig (6.9 bar), Model 4: 0 - 50 psig (3.45 bar)
Vacuum:	0 - 27 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



LM-Pro is a registered trademark of Parker Hannifin Corporation.
Patented with the United States Patent and Trademark Office (USPTO) #US 10871239.

Parker LM-Pro Linear Motor Proportional Valve

Typical Flow Curve



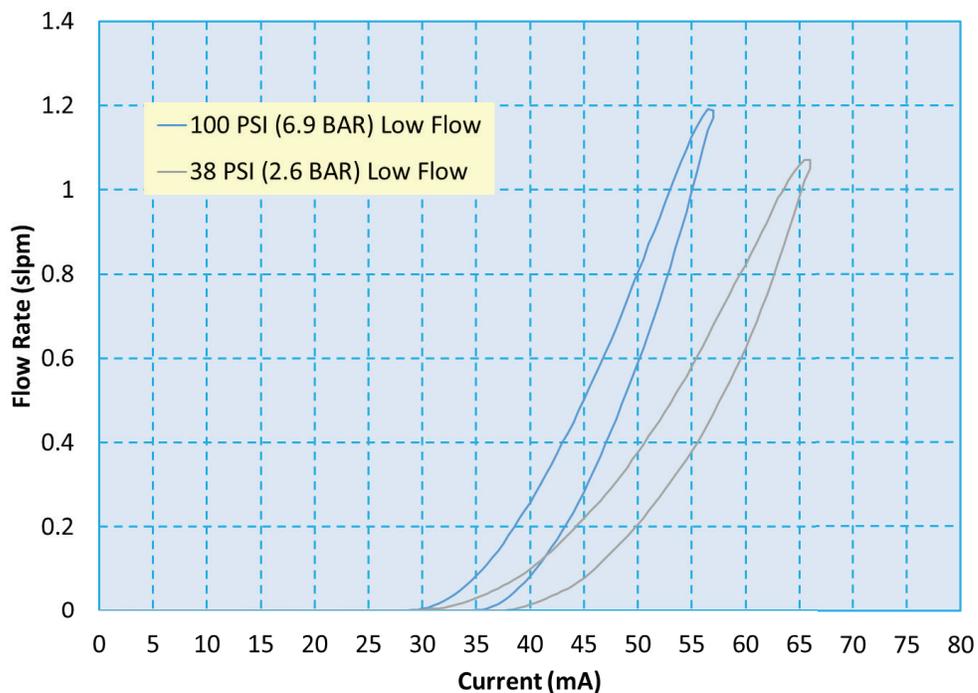
*During operation at 50psi, a flow shift of up to 5% over the life of the valve may occur.



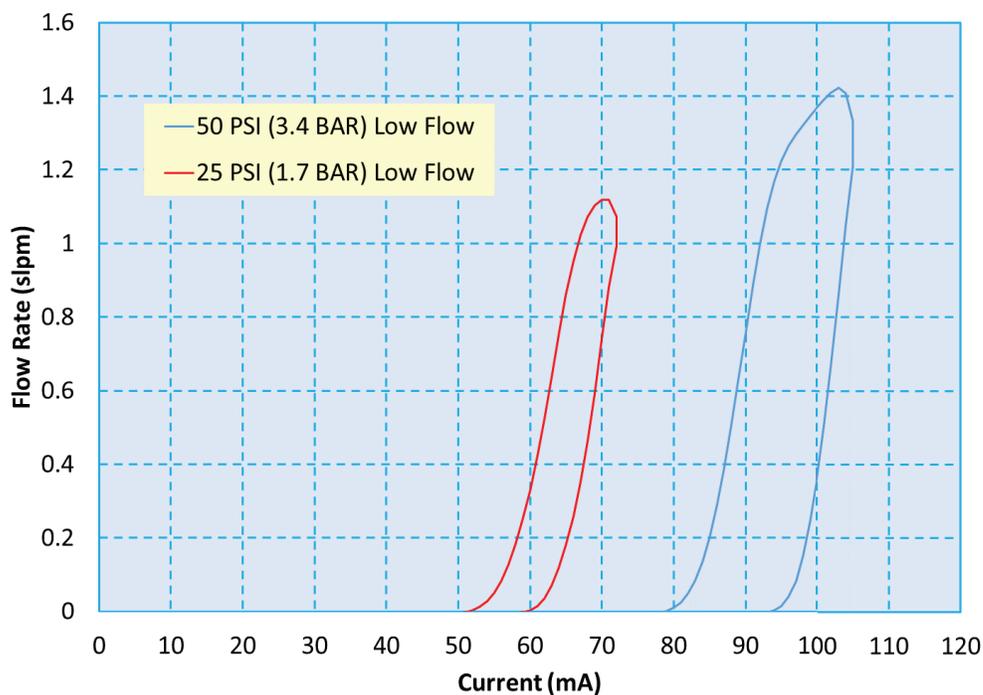
Parker LM-Pro Linear Motor Proportional Valve

Typical Flow Curve

LM-Pro Model 2
Typical Low Flow Control with 12 VDC Coil



LM-Pro Model 4*
Typical Low Flow Control with 12 VDC Coil



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

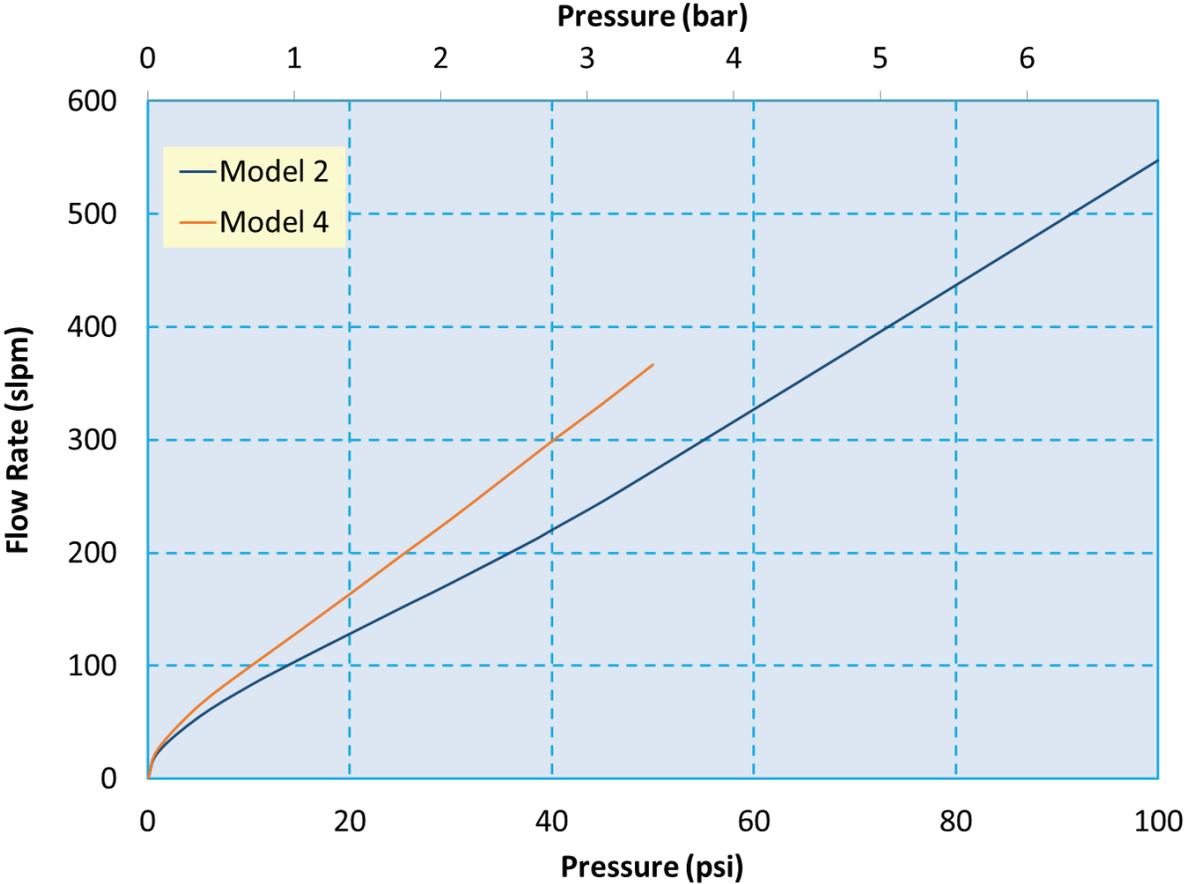


Parker LM-Pro Linear Motor Proportional Valve

Typical Flow Curve

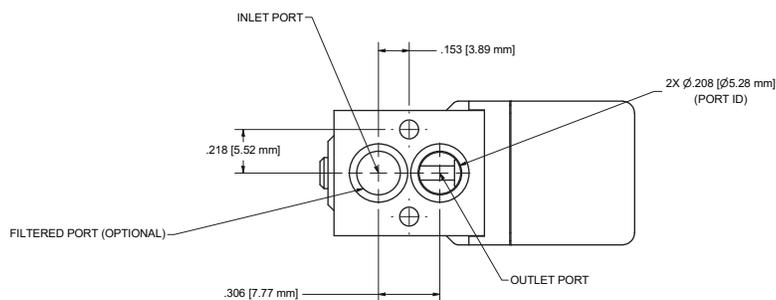
Pressure vs Flow Curve

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



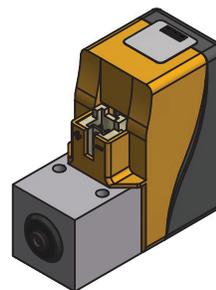
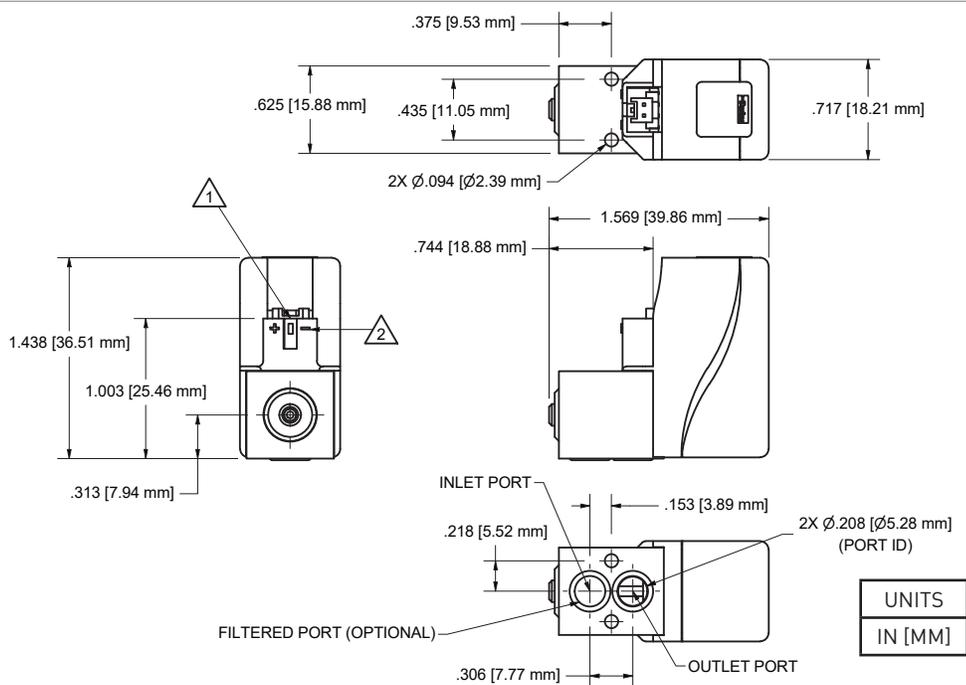
Parker LM-Pro Linear Motor Proportional Valve Pneumatic Interface

Parker LM-Pro Manifold Mount



Mechanical Integration Dimensions

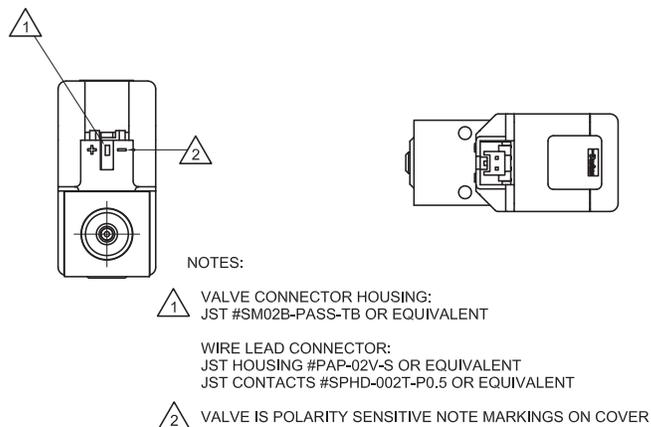
Parker Parker LM-Pro Basic Valve Dimensions



UNITS
IN [MM]

Parker LM-Pro Linear Motor Proportional Valve

Electrical Interface

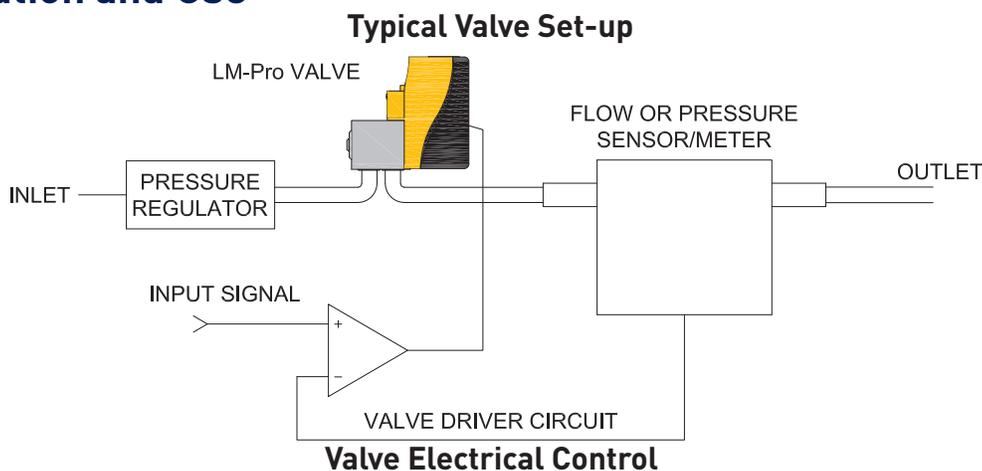


Electrical Requirements

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



Basic Control:

The Parker 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.

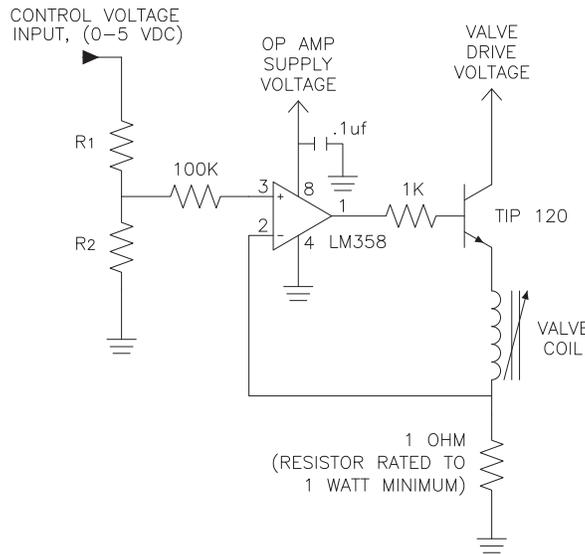
PWM Control:

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

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Installation and Use

Suggested Parker LM-Pro Current Driver Schematic



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

Table 2 (below) describes the recommended R1 and R2 resistor values based upon the full shut-off current.

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

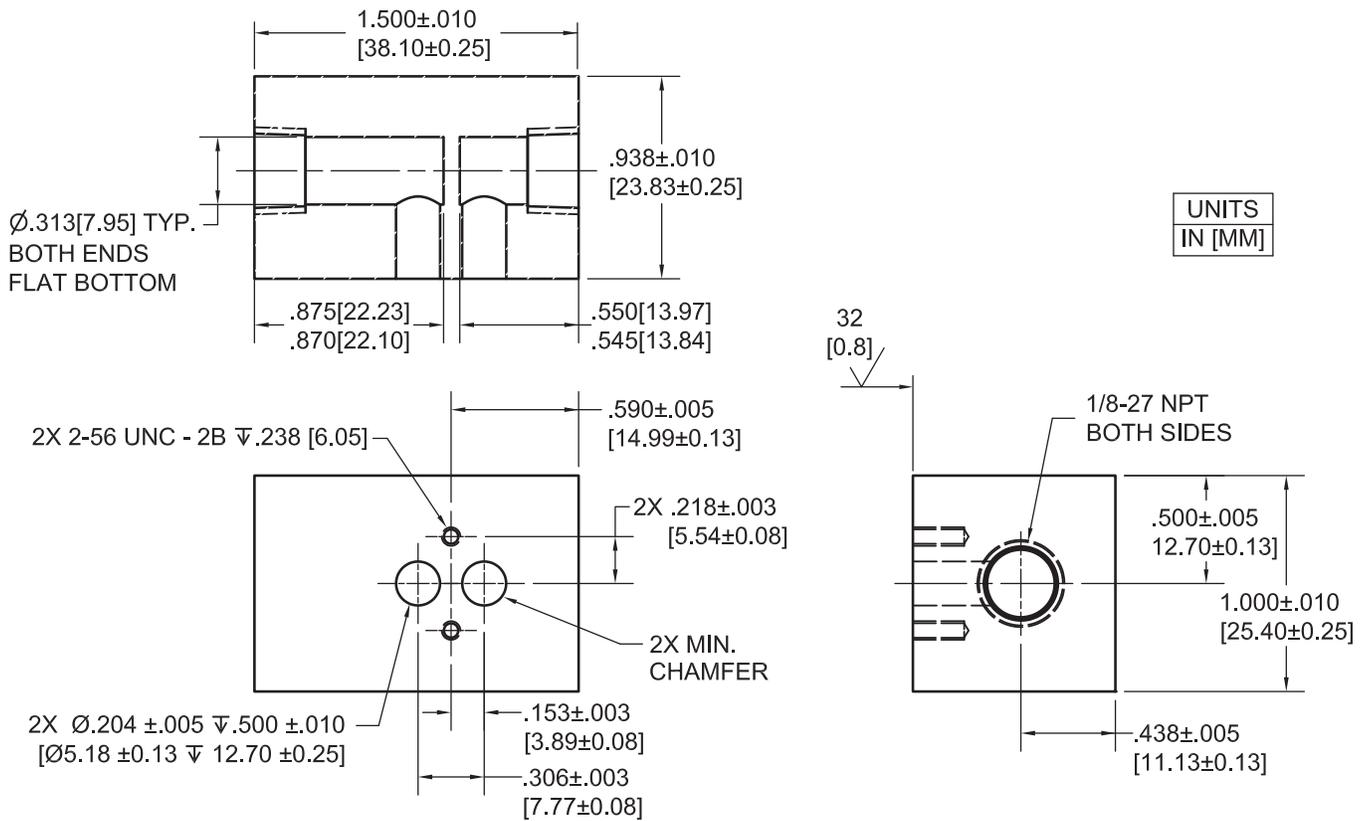
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Installation and Use

Manifold Dimensions & Design

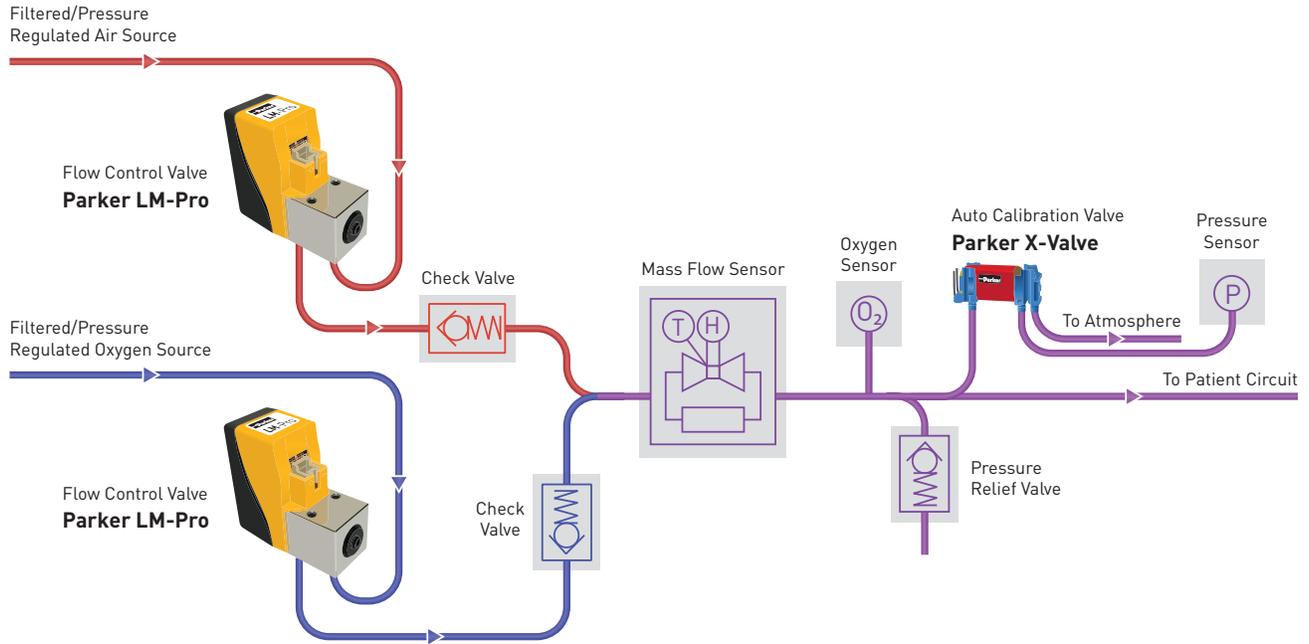
Not shipped with valves.

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

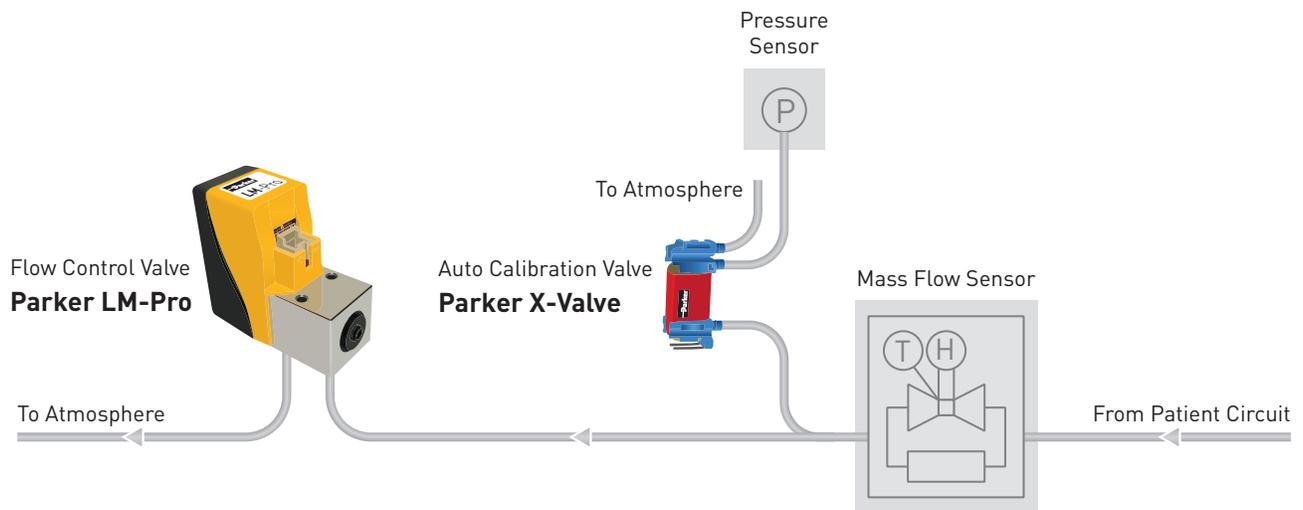


Parker LM-Pro Linear Motor Proportional Valve

Ventilator Inspiratory Flow



Ventilator Expiratory Flow



Parker LM-Pro Linear Motor 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
191-000112-417

(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 go to www.parker.com/precisionfluidics/LM-Pro. 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 ppfinfo@parker.com
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