

# Parker LM-Pro Miniature Proportional Valve

## Linear Motor Proportional Valve



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 range from 0.5 to 540 slpm, pressure capability up to 100PSI (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/porting design make the LM-Pro valve an ideal solution for your dynamic flow control needs.



### Markets

- Respiratory
- Anesthesia
- Patient Therapy

### Applications

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

### Features

- Large linear flow control range spanning 70% of the controllable 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
- 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

<b>Valve Type:</b>
2-Way Normally Closed
<b>Media:</b>
Air, Oxygen, Nitrous Oxide, Carbon Dioxide, Heliox and other medical gases
<b>Operating Environment:</b>
32 to 131°F (0 to 55°C)
<b>Storage Temperature:</b>
-40 to 158°F (-40 to 70°C)
<b>Length:</b>
1.57 in (39.9 mm)
<b>Width:</b>
0.72 in (18.3 mm)
<b>Height:</b>
1.44 in (36.5 mm)
<b>Porting:</b>
Face Seal to Manifold with integrated FKM seal and optional inlet filter
<b>Weight:</b>
1.29 oz (36.6 g)

### Electrical

<b>Power:</b>
2.0 Watt Typical 3.0 Watt Maximum
<b>Voltage:</b>
5, 12 and 24 VDC See Table 2
<b>Electrical Termination:</b>
Latching Receptacle JST SM02B-PASS-TB

### Wetted Materials

<b>Valve Element:</b>
Aluminum FKM Elastomer Fluorosilicone Elastomer Stainless Steel
<b>Regulatory:</b>
Compliant with RoHS directive (2002/95/EC), REACH EC 1907/2006, ISO 15001:2010 and ISO 10993:2011 / ISO 18562

### Performance Characteristics

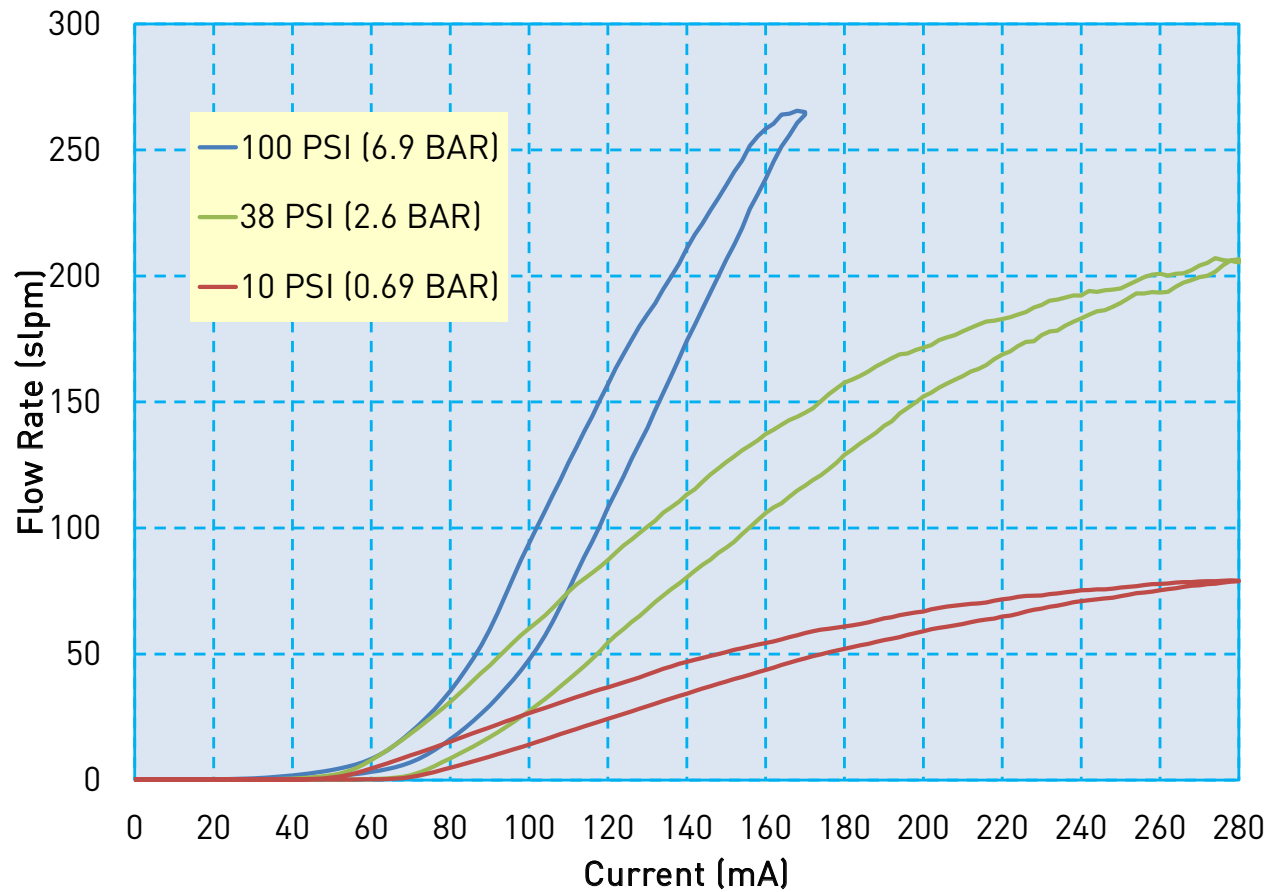
<b>Leak Rate: *</b>
Internal: 1 SCCM External: 1 SCCM <i>* The leakage shall not exceed the above values with Air at a differential pressure of 100 psid (6.9 barg).</i>
<b>Operating Pressure: See Table 1</b>
0 - 100 psig (6.9 barg)
<b>Vacuum:</b>
0 - 27 in Hg (0-686 mm Hg)
<b>Proof Pressure:</b>
150 psi (10.39 bar)
<b>Orifice Sizes:</b>
0.200 in (5.08 mm) 0.121 in (3.07 mm) effective
<b>Hysteresis:</b>
10% of full scale current (Typical) 15% of full scale current (Maximum)
<b>Optional Filtration:</b>
400 µm
<b>Response time:</b>
<10 ms Typical at 20°C
<b>Reliability:</b>
100 Million Cycles at rated pressure and 20°C 0.95 Reliability Factor 95% Confidence Interval



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

## Parker LM-Pro Linear Motor Proportional Valve Typical Flow Curve

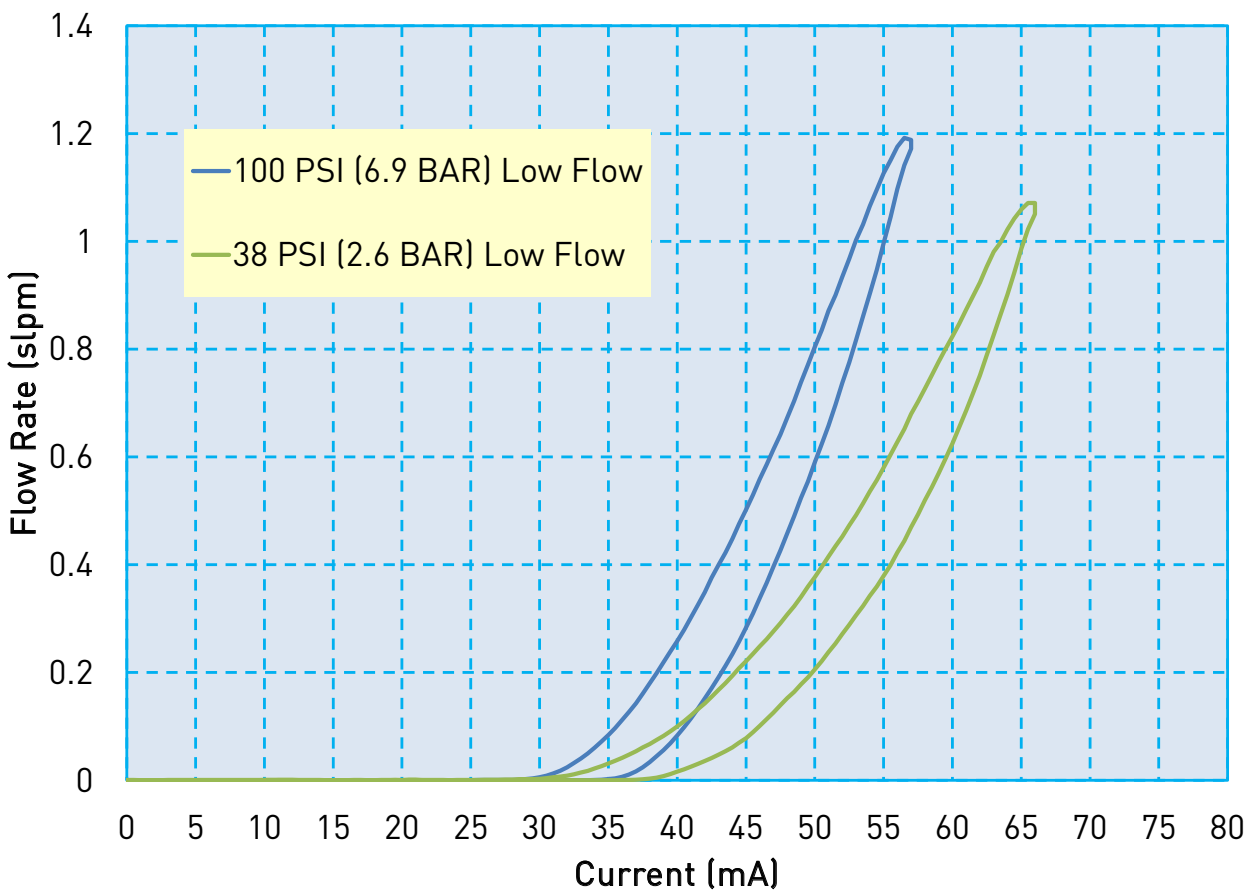
LM-Pro Model 2  
Typical Air Flow with 12 VDC Coil



## Parker LM-Pro Linear Motor Proportional Valve

### Typical Flow Curve

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

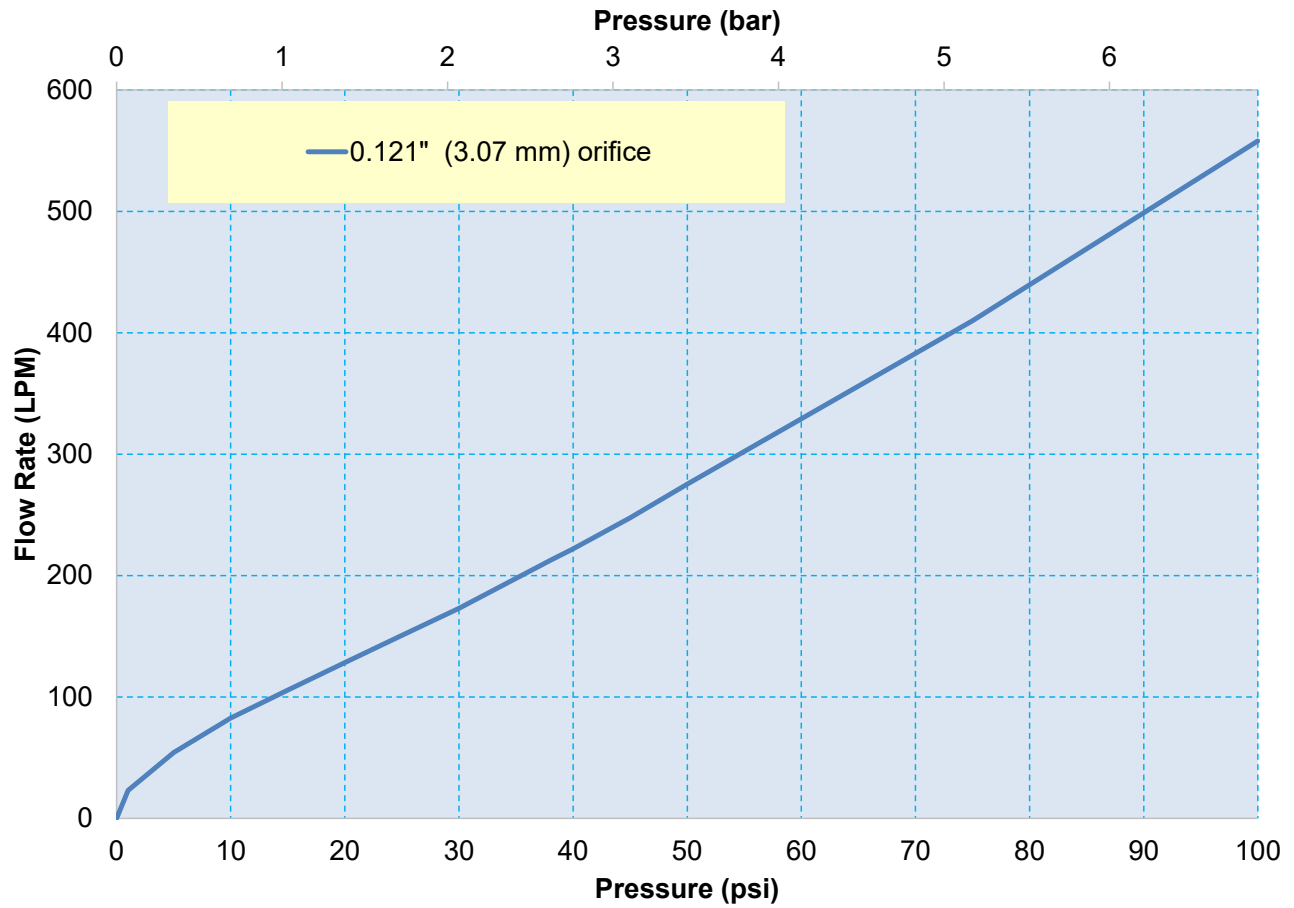


## Parker LM-Pro Linear Motor Proportional Valve

### Typical Flow Curve

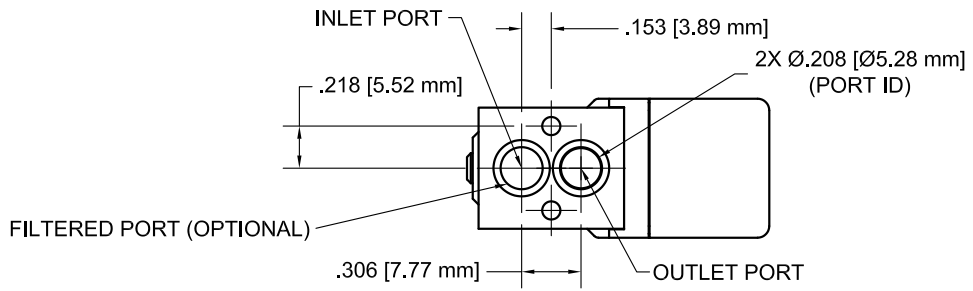
#### Pressure vs Flow Curve

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



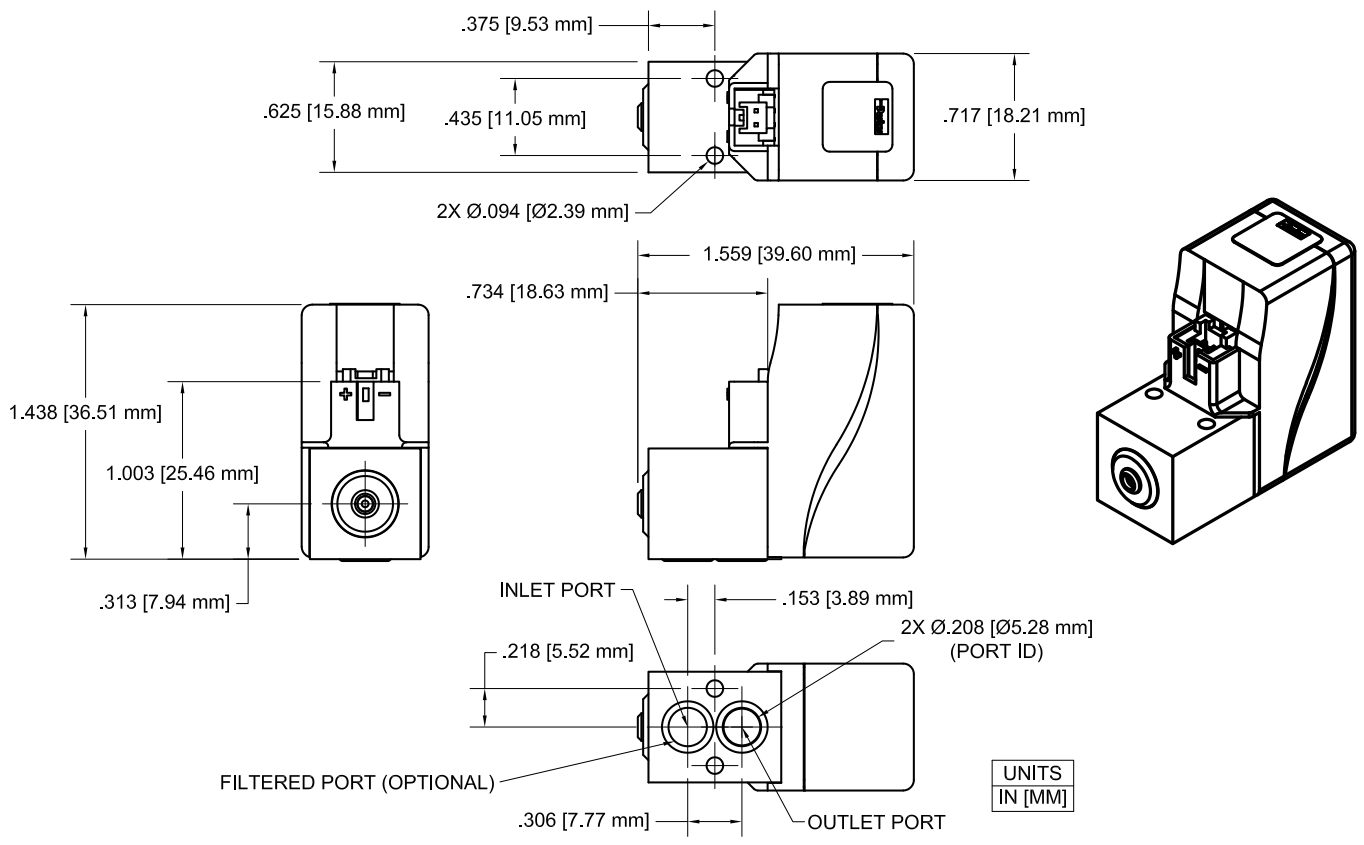
# Parker LM-Pro Linear Motor Proportional Valve Pneumatic Interface

## Parker LM-Pro Manifold Mount

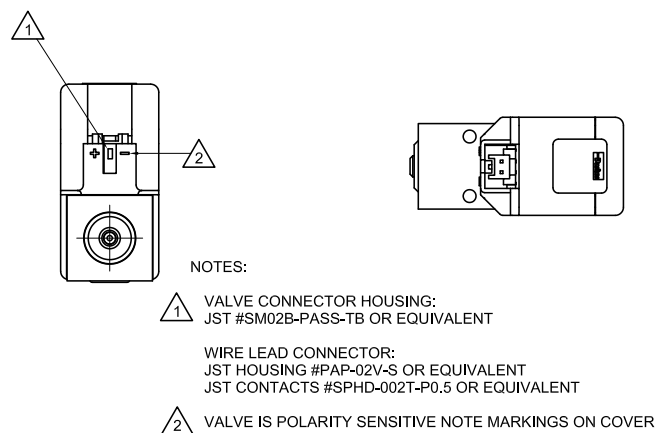


## Mechanical Integration Dimensions

### Parker Parker LM-Pro Basic Valve Dimensions



## Parker LM-Pro Linear Motor Proportional Valve Electrical Interface



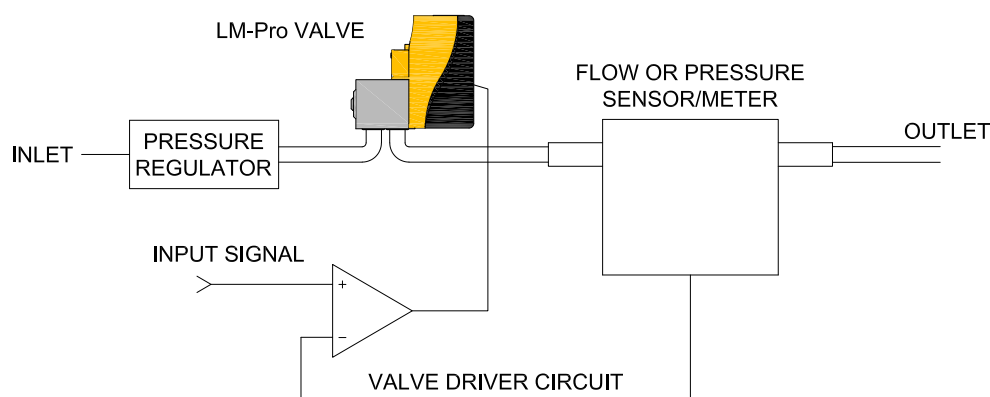
## Electrical Requirements

Table 2

Rated 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 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.

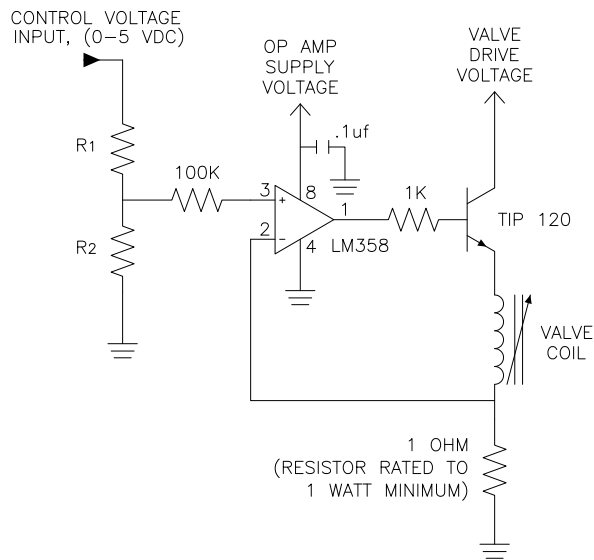
#### PWM Control:

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

## Parker LM-Pro Linear Motor Proportional Valve

### 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 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**

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

# Parker LM-Pro Linear Motor Proportional Valve

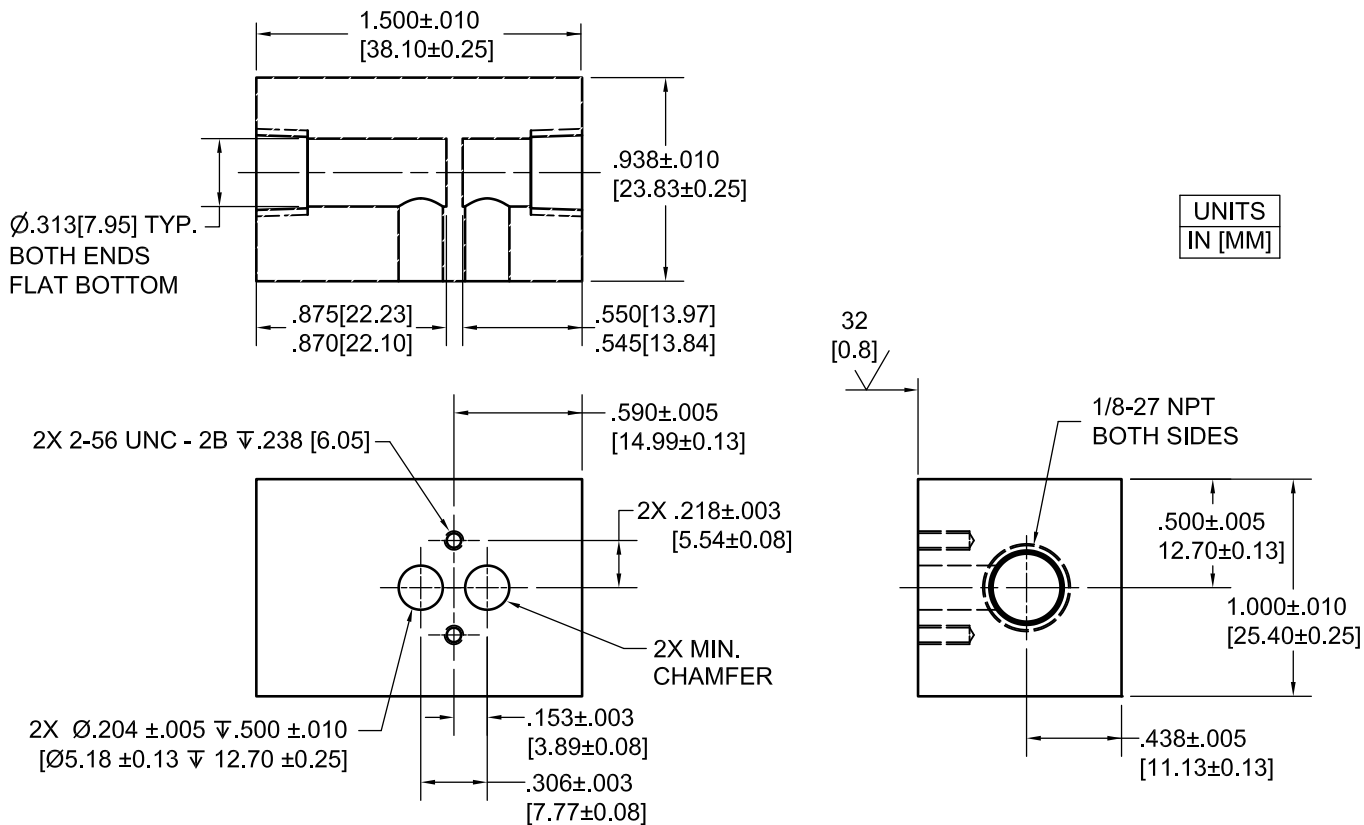
## Installation and Use

### Manifold & Dimensions & Design

Not shipped with valves.

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

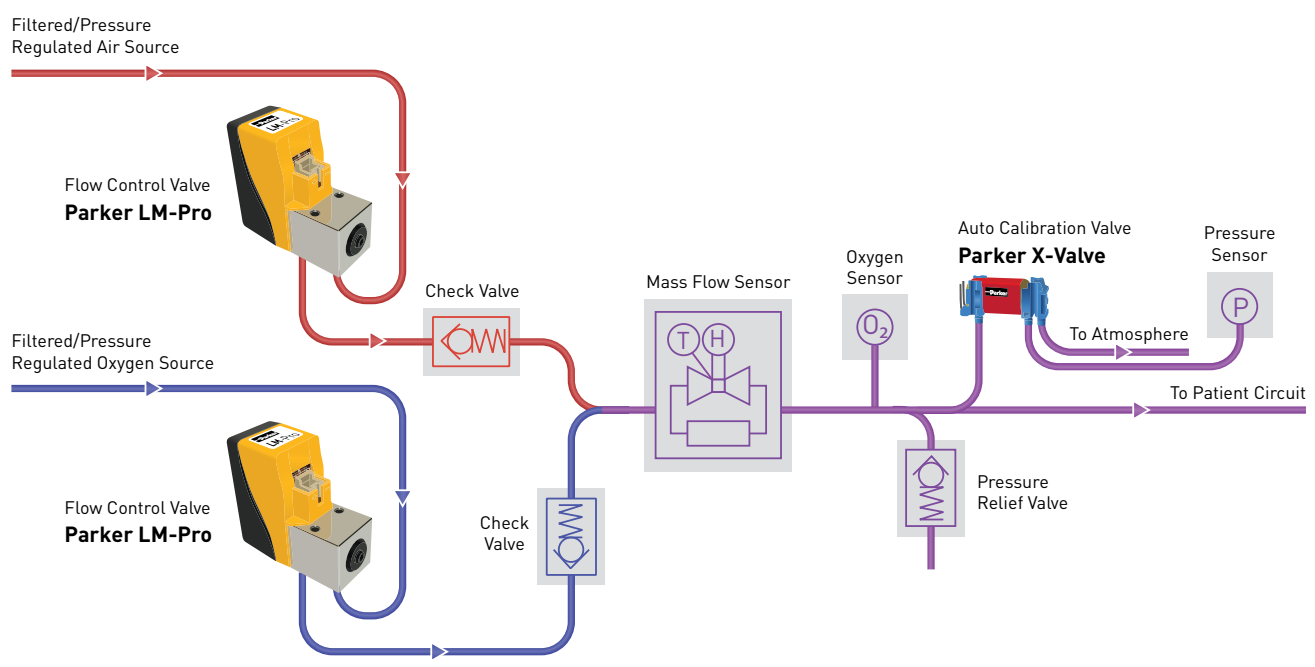
UNITS
IN [MM]



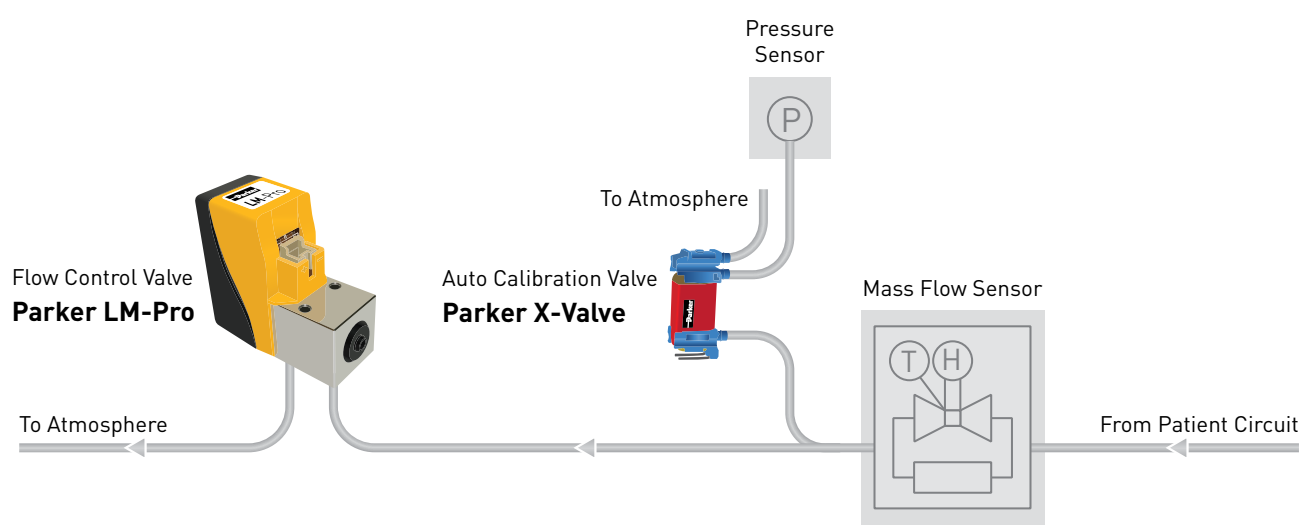


# Parker LM-Pro Linear Motor Proportional Valve

## 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	Elastomer	Voltage	Body Material	-	Pneumatic Interface	Electrical Interface
Options	937	-	02: 200 SLPM at 38PSIG	1: FKM Poppet and Fluorosilicone Diaphragm	05: 6 OHM 12: 24 OHM 24: 148 OHM	0: Aluminum	-	00: Manifold Mount No Inlet Filter 01: Manifold Mount W/ 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 RoHS	** 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



**Learn More at: [solutions.parker.com/LM-Pro](http://solutions.parker.com/LM-Pro)**

Please click on the Order On-line button to configure your Parker LM-Pro Proportional Valve (or go to [www.parker.com/precisionfluidics/LM-Pro](http://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.**

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For more information call +1 603 595 1500 or email [ppfinfo@parker.com](mailto:ppfinfo@parker.com)  
Visit [www.parker.com/precisionfluidics](http://www.parker.com/precisionfluidics)

