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

### Performance Characteristics
- **Leak Rate:**
  - Internal: 1 SCCM
  - External: 1 SCCM
  - *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.
- **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

### Valve Specifications

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Power</th>
<th>Leakage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Way Normally Closed</td>
<td>2.0 Watt Typical</td>
<td>Internal: 1 SCCM</td>
</tr>
<tr>
<td>Media: Air, Oxygen, Nitrous Oxide, Carbon Dioxide, Heliox and other medical gases</td>
<td>3.0 Watt Maximum</td>
<td>External: 1 SCCM</td>
</tr>
<tr>
<td>Operating Environment: 32 to 131°F (0 to 55°C)</td>
<td>Voltage: 5, 12 and 24 VDC</td>
<td><em>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.</em></td>
</tr>
<tr>
<td>Storage Temperature: -40 to 158°F (-40 to 70°C)</td>
<td>Electrical Termination: Latching Receptacle JST SM02B-PASS-TB</td>
<td></td>
</tr>
<tr>
<td>Length: 1.57 in (39.9 mm)</td>
<td>Wetted Materials: Valve Element: Aluminium</td>
<td></td>
</tr>
<tr>
<td>Width: 0.72 in (18.3 mm)</td>
<td>Fluorosilicone Elastomer</td>
<td></td>
</tr>
<tr>
<td>Height: 1.44 in (36.5 mm)</td>
<td>Stainless Steel</td>
<td></td>
</tr>
<tr>
<td>Weight: 1.29 oz (36.6 g)</td>
<td>Parker is a registered trademark of Parker Hannifin Corporation. Patent pending with the United States Patent and Trademark Office (USPTO).</td>
<td></td>
</tr>
</tbody>
</table>
**Miniature Proportional Valves**

*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 Air Flow with 12 VDC Coil

- 100 PSI (6.9 BAR)
- 38 PSI (2.6 BAR)
- 10 PSI (0.69 BAR)

Flow Rate (lpm)

Current (mA)

LM-Pro Model 4*

Typical Air Flow with 12 VDC Coil

- 50 PSI (3.4 BAR)
- 25 PSI (1.7 BAR)
- 10 PSI (0.69 BAR)

Flow Rate (lpm)

Current (mA)

**Parker LM-Pro Linear Motor Proportional Valve**

**Typical Flow Curve**

LM-Pro Model 2

Typical Low Flow Control with 12 VDC Coil

- 100 PSI (6.9 BAR) Low Flow
- 38 PSI (2.6 BAR) Low Flow

Flow Rate (lpm)

Current (mA)

LM-Pro Model 4*

Typical Low Flow Control with 12 VDC Coil

- 50 PSI (3.4 BAR) Low Flow
- 25 PSI (1.7 BAR) Low Flow

Flow Rate (lpm)

Current (mA)

*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.

Pressure (bar)

Flow Rate (slpm)

0 0.1 0.2 0.3 0.4 0.5 0.6

0 100 200 300 400 500 600

--- Model 2
--- Model 4

Parker LM-Pro Linear Motor Proportional Valve

Pneumatic Interface

Mechanical Integration

Dimensions

Parker LM-Pro Basic Valve Dimensions

NOTES:

VALVE CONNECTOR HOUSING:
JST #SM02B-PASS-TB OR EQUIVALENT

WIRE LEAD CONNECTOR:
JST HOUSING #PAP-02V-S OR EQUIVALENT

JST CONTACTS #SPHD-002T-P0.5 OR EQUIVALENT

VALVE IS POLARITY SENSITIVE NOTE MARKINGS ON COVER

1. DIMENSIONS ARE FOR REFERENCE ONLY.
Miniature Proportional Valves

**Parker LM-Pro** Linear Motor Proportional Valve

**Electrical Interface**

![Diagram of Parker LM-Pro valve and electrical connections]

**Electrical Requirements**

<table>
<thead>
<tr>
<th>Related Voltage</th>
<th>Nominal Coil Resistance at 20°C</th>
<th>Control Current at Maximum Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 VDC</td>
<td>6 Ω</td>
<td>555 mA</td>
</tr>
<tr>
<td>12 VDC</td>
<td>24 Ω</td>
<td>280 mA</td>
</tr>
<tr>
<td>24 VDC</td>
<td>148 Ω</td>
<td>115 mA</td>
</tr>
</tbody>
</table>

**Installation and Use**

**Typical Valve Set-up**

![Diagram of typical valve setup]

**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.

**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 describes the recommended R1 and R2 resistor values based upon the full shut-off current.

**Related Voltage**

- 5 VDC
- 12 VDC
- 24 VDC

**Nominal Coil Resistance at 20°C**

- 6 Ω
- 24 Ω
- 148 Ω

**Control Current at Maximum Flow**

- 555 mA
- 280 mA
- 115 mA

**Table 2: Selectable Resistor Values for a Low Current (1 mA)**

<table>
<thead>
<tr>
<th>Valve Drive Voltage Input (VDC)</th>
<th>Valve Coil Voltage, Resulting (VDC)</th>
<th>Nominal Coil Resistance @ 20°C (Ohms)</th>
<th>Input Current for Full Flow (mA)</th>
<th>R1 (Ohms)</th>
<th>R2 (Ohms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7</td>
<td>6</td>
<td>555</td>
<td>3920</td>
<td>499</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
<td>24</td>
<td>280</td>
<td>3920</td>
<td>237</td>
</tr>
<tr>
<td>24</td>
<td>26</td>
<td>148</td>
<td>115</td>
<td>4320</td>
<td>102</td>
</tr>
</tbody>
</table>
Manifold Dimensions & Design
Not shipped with valves.
Parker Precision Fluidics recommends 24 in-oz (17 N-cm) of torque for the screws.

Installation and Use

Ventilator Inspiratory Flow

Ventilator Expiratory Flow

Auto Calibration Valve
Parker X-Valve

Pressure Sensor

To Atmosphere

To Patient Circuit

Mass Flow Sensor

From Patient Circuit

Flow Control Valve
Parker LM-Pro

Check Valve

Mass Flow Sensor

Oxygen Sensor

Pressure Sensor

To Atmosphere
**Parker LM-Pro** Linear Motor Proportional Valve

### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Series</th>
<th>Model Number</th>
<th>Elastomer</th>
<th>Voltage</th>
<th>Body Material</th>
<th>Pneumatic Interface</th>
<th>Electric Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5” Adapter Wire Leads</td>
<td>290-006061-004</td>
<td><strong>Not supplied with the valve</strong></td>
<td></td>
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<tr>
<td>Single Station Manifold</td>
<td>890-001184-001</td>
<td><strong>Not supplied with the valve</strong></td>
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</tr>
<tr>
<td>Screw #2-56 x 3/4” Socket Head Cap Screw</td>
<td>191-000112-417</td>
<td><strong>Supplied with valve</strong></td>
<td></td>
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<tr>
<td>Manifold O-Ring (FKM)</td>
<td>190-007063-001</td>
<td><strong>Not supplied with the valve. See valve mounting recommendations above</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Optional Filter</td>
<td>195-000291-001</td>
<td><strong>Supplied if selected option</strong></td>
<td></td>
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</table>

### Ordering Information

<table>
<thead>
<tr>
<th>Sample Part ID</th>
<th>Description</th>
<th>Series</th>
<th>Model Number</th>
<th>Elastomer</th>
<th>Voltage</th>
<th>Body Material</th>
<th>Pneumatic Interface</th>
<th>Electric Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>937-02</td>
<td>Options</td>
<td>937</td>
<td>-</td>
<td>02</td>
<td>01</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>290-006061-004</td>
<td>12.5 in (317.5 mm) Wire Leads</td>
<td><strong>Not supplied with the valve</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>890-001184-001</td>
<td>Manifold, Single Station</td>
<td><strong>Not supplied with the valve</strong></td>
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<tr>
<td>190-007063-001</td>
<td>Manifold O-Ring (FKM)</td>
<td><strong>Supplied with the valve</strong></td>
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<tr>
<td>191-000112-417</td>
<td>Screw #2-56 x 3/4, Socket Head Cap</td>
<td><strong>Not supplied with the valve. See valve mounting recommendations above</strong></td>
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**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 ppfinfoparker.com
Visit [www.parker.com/precisionfluidics](http://www.parker.com/precisionfluidics)