Solenoid Operated Micro-Pumps

130SP Series Micro-Pump
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**MICRO-PUMPS GENERAL INFORMATION**

**What is a Micro-Pump?**

A Micro-Pump is a solenoid operated device designed to provide a precise, repeatable and discrete dispensed volume of fluid. The flow path is isolated from the operating mechanism by a flexible diaphragm. When the solenoid is energized, the diaphragm is retracted creating a partial vacuum within the pump body. This pulls liquid through the inlet check valve (A) and simultaneously closes the outlet check valve (B). When the solenoid is de-energized a spring pushes the diaphragm down, expelling a discrete volume of liquid through check valve B while simultaneously closing check valve A. Micro-Pumps require a complete on-off cycle for each discrete dispense. Repeatedly cycling the solenoid creates a pulsed flow (refer to “Accurate discrete dispense volumes” in next column).

**Features of the Bio-Chem Valve™ Micro-Pump**

Inert materials

Our pumps provide a non-metallic inert fluid path for the dispensing of high purity or aggressive fluids. There is a range of different materials available for all the wetted parts of the pumps - body, diaphragm and check valve. Material combinations can be chosen to suit the application (refer to individual product selection pages for standard combinations - custom combinations are available, refer to page 14).

Body materials: PPS, PTFE, PEEK™, POM  
Diaphragm materials: EPDM, PTFE  
Check valve materials: EPDM, FKM, FFKM

Self-priming

At start-up, pumps are able to draw air. The suction created by the pumps is sufficient to pull liquids from an unpressurized container located up to 4’ 3” (1.3m) beneath the pump. Once the pump is primed, it is able to generate around 5psi (0.3bar) pressure, equating to 11' 6” (3.5m) of water.

Continuous duty

The pumps are capable of continuous duty. They are suitable for up to 20 million actuations, corresponding to nearly 3,000 hours of continuous use at a 2 Hz cycle rate.

Accurate discrete dispense volumes

Dispense volumes range from 20µl to 250µl per cycle. The pumps can be cycled at up to 2 Hz for the smallest version and 1.6 Hz for the largest. Pumps can be operated at less than the maximum cycle rate by increasing the length of the “off” time. The “on” time should remain unchanged to retain dispense accuracy.
Micro-Pump Applications

Waste effluent removal

Many types of analytical instruments incorporate a waste sump or container that collects any liquids that may have leaked inside the instrument. These waste streams can have many constituents and could be regarded as a biohazard if allowed to collect in the bottom of the instrument.

Bio-Chem Fluidics Micro-Pumps lend themselves to this application because they offer a completely inert flow path capable of handling the most aggressive of effluents, while maintaining repeatable and consistent pumping rates.

A Micro-Pump can be hooked up to the level control sensor and be cycled as necessary to empty the sump to an external waste solvent container.

Chemical dosing

In this application Bio-Chem Fluidics Micro-Pumps are used to pre-treat a liquid stream prior to analysis. The pumps are capable of pumping highly aggressive chemical reagents from a remote location (outside of the instrument) and accurately dispense predetermined volumes of the reagents directly into the main liquid stream.

This eliminates the need for an intermediate mixing step inside the instrument.

Micro-Pumps can be used in either continuous or intermittent mode depending on the demands of the instrument.

Sterilizing application

Sterilizing solution can be of a very high purity which almost always translates to additional expense. In this application a Bio-Chem Fluidics Micro-Pump takes small amounts of the sterilizing liquid from a reservoir and dispenses very accurate “drips” onto a heating panel inside a sterilizing chamber. When the liquid hits the panel, it instantly vaporizes forming a “sterilizing vapor” inside the chamber. The vapor is very efficient at sterilizing the internals of complicated components.

The Micro-Pumps provide highly repeatable and consistent delivery of the sterilizing fluid into the chamber. This safe and cost effective method of pumping high purity liquids has proved very successful.
**Micro-Pump Selection Guide**

1. Select pump style; either Ported or Manifold mount and work from the appropriate table:
   - Ported for direct connection with ¼”-28 fittings (⅜”-24 for 150SP)
   - Manifold mount for use with manifolds (see page 13)

Then:

2. Locate the volumetric characteristics that best suit your needs
3. Choose your preferred body material depending on the level of chemical inertness you require
4. Turn to the pages indicated to see full details and ordering information for each pump.

<table>
<thead>
<tr>
<th>Volumetric output</th>
<th>Body Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrete Dispense</td>
<td>PTFE</td>
</tr>
<tr>
<td>Vol (µl)</td>
<td>Max flow rate (ml/min)</td>
</tr>
<tr>
<td>20</td>
<td>2.4</td>
</tr>
<tr>
<td>30</td>
<td>3.6</td>
</tr>
<tr>
<td>40</td>
<td>4.8</td>
</tr>
<tr>
<td>60</td>
<td>7.2</td>
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<tr>
<td>100</td>
<td>9.6</td>
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<tr>
<td>125</td>
<td>12.0</td>
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<td>150</td>
<td>14.4</td>
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<td>175</td>
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<td>200</td>
<td>19.2</td>
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<tr>
<td>225</td>
<td>21.6</td>
</tr>
<tr>
<td>250</td>
<td>24.0</td>
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</table>

<table>
<thead>
<tr>
<th>Volumetric output</th>
<th>Body Material</th>
</tr>
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<tr>
<td>Manifold mounted</td>
<td>PTFE</td>
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<tr>
<td>Discrete Dispense</td>
<td>PTFE</td>
</tr>
<tr>
<td>Vol (µl)</td>
<td>Max flow rate (ml/min)</td>
</tr>
<tr>
<td>20</td>
<td>2.4</td>
</tr>
<tr>
<td>30</td>
<td>3.6</td>
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<tr>
<td>40</td>
<td>4.8</td>
</tr>
<tr>
<td>50</td>
<td>6.0</td>
</tr>
<tr>
<td>60</td>
<td>7.2</td>
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</tbody>
</table>

**Polymers referenced in this brochure:**

- EPDM = ethylene-propylene-diene
- ETFE = ethylene tetrafluoroethylene
- FEP = fluorinated ethylene propylene
- FKM = fluorinated elastomer
- FFKM = perfluoro elastomer
- PEEK™ = polyetheretherketone
- POM = polyoxymethylene (Acetal resin)
- PPS = polyphehylene sulfide
- PTFE = polytetrafluoroethylene.

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120SP SERIES MICRO-PUMP

For precise dispensing between 20 and 60µl and flow rates up to 7.2 ml/min

- Self-priming
- 20-60µl discrete dispense volumes
- Up to 7.2 ml/min maximum flow rate
- ¼”-28 UNF threaded ports

The 120SP series Micro-Pumps are solenoid operated, with the operating mechanism isolated from the flow path by a diaphragm. Check valves situated at the inlet and outlet of the pump control the direction of flow. The combination of materials for each component can be selected to best suit your specific application.

Materials available for the wetted parts are:

- Body materials: PPS, PEEK™
- Diaphragm materials: PTFE, EPDM
- Check valve materials: EPDM, FKM, FFKM

120SP series options

NOTE: For 24 VDC, replace 120SP12 with 120SP24 in any of the part numbers listed.

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DISPENSE VOL (µL)</th>
<th>BODY MATERIAL</th>
<th>DIAPHRAGM MATERIAL</th>
<th>CHECK VALVE MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>120SP1220-4EE</td>
<td>20</td>
<td>PPS</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td>120SP1220-4TV</td>
<td>20</td>
<td>PPS</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>120SP1220-5EE</td>
<td>20</td>
<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td>120SP1220-5TV</td>
<td>20</td>
<td>PEEK™</td>
<td>PTFE</td>
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<tr>
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<td>FFKM</td>
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12 VDC; 20µl dispense

<table>
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<th>PART NO.</th>
<th>DISPENSE VOL (µL)</th>
<th>BODY MATERIAL</th>
<th>DIAPHRAGM MATERIAL</th>
<th>CHECK VALVE MATERIAL</th>
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<tbody>
<tr>
<td>120SP1230-4EE</td>
<td>30</td>
<td>PPS</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td>120SP1230-4TV</td>
<td>30</td>
<td>PPS</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>120SP1230-4TP</td>
<td>30</td>
<td>PPS</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>120SP1230-5EE</td>
<td>30</td>
<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td>120SP1230-5TV</td>
<td>30</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FKM</td>
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<tr>
<td>120SP1230-5TP</td>
<td>30</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FFKM</td>
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</table>

120SP1230-5TP 30 PEEK™ PTFE FFKM

12 VDC; 30µl dispense

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DISPENSE VOL (µL)</th>
<th>BODY MATERIAL</th>
<th>DIAPHRAGM MATERIAL</th>
<th>CHECK VALVE MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>120SP1250-4EE</td>
<td>50</td>
<td>PPS</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
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<td>PPS</td>
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<td>120SP1250-4TP</td>
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<td>PPS</td>
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<td>FFKM</td>
</tr>
<tr>
<td>120SP1250-5EE</td>
<td>50</td>
<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td>120SP1250-5TV</td>
<td>50</td>
<td>PEEK™</td>
<td>PTFE</td>
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<tr>
<td>120SP1250-5TP</td>
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<td>PEEK™</td>
<td>PTFE</td>
<td>FFKM</td>
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120SP1250-5TP 50 PEEK™ PTFE FFKM

12 VDC; 50µl dispense

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DISPENSE VOL (µL)</th>
<th>BODY MATERIAL</th>
<th>DIAPHRAGM MATERIAL</th>
<th>CHECK VALVE MATERIAL</th>
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<tr>
<td>120SP1260-4EE</td>
<td>60</td>
<td>PPS</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td>120SP1260-5EE</td>
<td>60</td>
<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
</tbody>
</table>

12 VDC; 60µl dispense (Note: EPDM diaphragm for all 60 µl options)
**SPÉCIFICATIONS**

### 120SP Fluid Data

<table>
<thead>
<tr>
<th>Dispense Volume (μl)</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set-point accuracy</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
</tr>
<tr>
<td>Max flow rate (μl/min)</td>
<td>2400</td>
<td>3600</td>
<td>4800</td>
<td>6000</td>
<td>7200</td>
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<tr>
<td>Internal vol (μl)</td>
<td>105</td>
<td>105</td>
<td>105</td>
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</table>

### 120SP Electrical Data

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Power @ 70°F (21°C)</th>
<th>Current @ 70°F (21°C)</th>
<th>Effective continuous power @ max cycle rate</th>
<th>Fixed &quot;on&quot; time</th>
<th>Min &quot;off&quot; time</th>
<th>Max cycle rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 VDC</td>
<td>4.0 Watts</td>
<td>0.32 amps</td>
<td>1.2 Watts</td>
<td>150 msec</td>
<td>350 msec</td>
<td>2.0 Hz</td>
</tr>
<tr>
<td>24 VDC</td>
<td>4.0 Watts</td>
<td>0.16 amps</td>
<td>1.2 Watts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Recommended tubing for 120SP**

Inlet & outlet, 1/32" (0.80mm) ID, hardwall tubing

**120SP Micro-Pumps can be cycled at up to 2 Hz. To maintain pumping precision the voltage "on" time should remain fixed - the pumping rate can be changed by increasing the "off" time.**

Voltage (v)

\[
a = 150 \text{ msec (fixed)} \\
\]

\[
b = 350 \text{ msec (minimum, adjustable)} \\
\]

Time (msec)
130SP SERIES MICRO-PUMP

For precise dispensing between 20 and 60µl and flow rates up to 7.2 ml/min

- Self-priming
- 20-60µl discrete dispense volumes
- Up to 7.2 ml/min maximum flow rate
- ¼"-28 UNF threaded ports
- Most inert body material for harshest applications

The 130SP series Micro-Pumps are solenoid operated, with the operating mechanism isolated from the flow path by a diaphragm. Check valves situated at the inlet and outlet of the pump control the direction of flow. The combination of materials for each component can be selected to best suit your specific application.

Materials available for the wetted parts are:

- Body materials: PTFE, POM
- Diaphragm materials: PTFE, EPDM
- Check valve materials: EPDM, FKM, FFKM

130SP series options

**NOTE:** For 24 VDC, replace 130SP12 with 130SP24 in any of the part numbers listed.

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DISPENSE VOL (µl)</th>
<th>BODY MATERIAL</th>
<th>DIAPHRAGM MATERIAL</th>
<th>CHECK VALVE MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 VDC; 20µl dispense</td>
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<tr>
<td>130SP1220-1TP 20 PTFE PTFE FFKM</td>
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</tr>
<tr>
<td>130SP1220-6TV 20 POM PTFE FKM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130SP1220-6EE 20 POM EPDM EPDM</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12 VDC; 30µl dispense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130SP1230-1TP 30 PTFE PTFE FFKM</td>
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<td></td>
</tr>
<tr>
<td>130SP1230-6TV 30 POM PTFE FKM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130SP1230-6EE 30 POM EPDM EPDM</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12 VDC; 40µl dispense</td>
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</tr>
<tr>
<td>130SP1240-1TP 40 PTFE PTFE FFKM</td>
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<td>130SP1240-6TV 40 POM PTFE FKM</td>
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<td>130SP1240-6EE 40 POM EPDM EPDM</td>
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<tr>
<td>12 VDC; 50µl dispense</td>
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<tr>
<td>130SP1250-1TP 50 PTFE PTFE FFKM</td>
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<td>130SP1250-6EE 50 POM EPDM EPDM</td>
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<td>12 VDC; 60µl dispense</td>
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<tr>
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</tbody>
</table>
**Micro-Pump 130SP series**

**INSTALLATION DRAWING**

- Lead wires not to scale
- Wires are 26 AWG and min 24" (610mm) long
- Ø1.0” (Ø25.4mm)
- Depth of port = .25” min (6.4mm)
- 2x 1/4"-28 UNF
- Flat bottom port
- Set screw position variable to +.25” (6mm)
- Outlet
- Inlet

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**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>130SP Volumetric Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispense Volume (μl)</td>
<td>20</td>
</tr>
<tr>
<td>Set-point accuracy</td>
<td>+/- 10%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>+/- 5%</td>
</tr>
<tr>
<td>Max flow rate (μl/min)</td>
<td>2400</td>
</tr>
<tr>
<td>Internal vol (μl)</td>
<td>105</td>
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</table>

<table>
<thead>
<tr>
<th>130SP Electrical Data</th>
<th>130SP Cycle Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Power @70°F (21°C)</td>
</tr>
<tr>
<td>12 VDC</td>
<td>4.0 Watts</td>
</tr>
<tr>
<td>24 VDC</td>
<td>4.0 Watts</td>
</tr>
</tbody>
</table>

- Recommended tubing for 130SP
  - Inlet & outlet, 1/32” (0.80mm) ID, hardwall tubing

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130SP Micro-Pumps can be cycled at up to 2 Hz. To maintain pumping precision the voltage “on” time should remain fixed - the pumping rate can be changed by increasing the “off” time.

Voltage (v)
- a = 150 msec (fixed)
- b = 350 msec (minimum, adjustable)

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150SP SERIES MICRO-PUMP

For precise dispensing between 100 and 250µl and flow rates up to 24 ml/min

- Self-priming
- 100-250µl discrete dispense volumes
- Up to 24 ml/min maximum flow rate
- 5/16”-24 UNF threaded ports

The 150SP series Micro-Pumps are solenoid operated, with the operating mechanism isolated from the flow path by a diaphragm. Check valves situated at the inlet and outlet of the pump control the direction of flow. The combination of materials for each component can be selected to best suit your specific application.

Materials available for the wetted parts are:

- Body materials: PPS, PEEK™
- Diaphragm materials: EPDM
- Check valve materials: EPDM

150SP series options

NOTE: For 24 VDC, replace 150SP12 with 150SP24 in any of the part numbers listed.

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>Dispense VOL (µl)</th>
<th>BODY MATERIAL</th>
<th>DIAPHRAGM MATERIAL</th>
<th>CHECK VALVE MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 VDC; 100µl dispense</td>
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<tr>
<td>150SP12100-4EE 100</td>
<td>PPS</td>
<td>EPDM</td>
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<td>150SP12100-5EE 100</td>
<td>PEEK™</td>
<td>EPDM</td>
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<td>12 VDC; 125µl dispense</td>
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<td>150SP12125-4EE 125</td>
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<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
<td></td>
</tr>
<tr>
<td>12 VDC; 200µl dispense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150SP12200-4EE 200</td>
<td>PPS</td>
<td>EPDM</td>
<td>EPDM</td>
<td></td>
</tr>
<tr>
<td>150SP12200-5EE 200</td>
<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
<td></td>
</tr>
<tr>
<td>12 VDC; 225µl dispense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150SP12225-4EE 225</td>
<td>PPS</td>
<td>EPDM</td>
<td>EPDM</td>
<td></td>
</tr>
<tr>
<td>150SP12225-5EE 225</td>
<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
<td></td>
</tr>
<tr>
<td>12 VDC; 250µl dispense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150SP12250-4EE 250</td>
<td>PPS</td>
<td>EPDM</td>
<td>EPDM</td>
<td></td>
</tr>
<tr>
<td>150SP12250-5EE 250</td>
<td>PEEK™</td>
<td>EPDM</td>
<td>EPDM</td>
<td></td>
</tr>
</tbody>
</table>
**150SP Fluid Data**

<table>
<thead>
<tr>
<th>Dispense Volume (μl)</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>175</th>
<th>200</th>
<th>225</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set-point accuracy</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
<td>+/- 10%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
<td>+/- 5%</td>
</tr>
<tr>
<td>Max flow rate (μl/min)</td>
<td>9600</td>
<td>12000</td>
<td>14400</td>
<td>16800</td>
<td>19200</td>
<td>21600</td>
<td>24000</td>
</tr>
<tr>
<td>Internal vol (μl)</td>
<td>710</td>
<td>710</td>
<td>710</td>
<td>710</td>
<td>710</td>
<td>710</td>
<td>710</td>
</tr>
</tbody>
</table>

**150SP Electrical Data**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Power @ 70°F (21°C)</th>
<th>Current @ 70°F (21°C)</th>
<th>Effective continuous power @ max cycle rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 VDC</td>
<td>8.0 Watts</td>
<td>0.66 amps</td>
<td>3.2 Watts</td>
</tr>
<tr>
<td>24 VDC</td>
<td>8.0 Watts</td>
<td>0.33 amps</td>
<td>3.2 Watts</td>
</tr>
</tbody>
</table>

**150SP Cycle Rates**

<table>
<thead>
<tr>
<th>Fixed &quot;on&quot; time</th>
<th>Min &quot;off&quot; time</th>
<th>Max cycle rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 msec</td>
<td>400 msec</td>
<td>1.6 Hz</td>
</tr>
</tbody>
</table>

**Micro-Pump 150SP series**

Lead wires not to scale
Wires are 22 AWG and min 15" (381mm) long

2x 5/16"-24 UNF
Flat bottom port
Depth of port = .31" (7.9mm)

Outlet
1.13" (28.7mm)

Inlet
1.13" (28.9mm)

Outlet
2x #8-32 UNC
Mounting holes

Internal vol = 710 μl

150SP Micro-Pumps can be cycled at up to 1.6 Hz. To maintain pumping precision the voltage "on" time should remain fixed - the pumping rate can be changed by increasing the "off" time.

Voltage (v)

\[ a = 200 \text{ msec (fixed)} \]
\[ b = 400 \text{ msec (minimum, adjustable)} \]
**139SP SERIES MICRO-PUMP**

For precise dispensing between 20 and 60 µl and flow rates up to 7.2 ml/min in a manifold mountable design

- Self-priming
- 20-60 µl discrete dispense volumes
- Up to 7.2 ml/min maximum flow rate
- Manifold mountable

This sibling to the 130SP Micro-Pump duplicates the performance characteristics but is supplied ready for mounting in your manifold. Please contact us if you would like us to supply the manifold (see page 13). Materials available for the wetted parts are:

- Body materials: PTFE, POM, PEEK™
- Diaphragm materials: PTFE, EPDM
- Check valve materials: EPDM, FKM, FFKM

### 139SP series options

**NOTE:** For 24 VDC, replace 139SP12 with 139SP24 in any of the part numbers listed.

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DISPENSE VOL (µl)</th>
<th>BODY MATERIAL</th>
<th>DIAPHRAGM MATERIAL</th>
<th>CHECK VALVE MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12 VDC; 20µl dispense</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>139SP1220-1TP</td>
<td>20</td>
<td>PTFE</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1220-5TP</td>
<td>20</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1220-5TV</td>
<td>20</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1220-5TE</td>
<td>20</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>EPDM</td>
</tr>
<tr>
<td>139SP1220-6TV</td>
<td>20</td>
<td>POM</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1220-6EE</td>
<td>20</td>
<td>POM</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td><strong>12 VDC; 30µl dispense</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>139SP1230-1TP</td>
<td>30</td>
<td>PTFE</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1230-5TP</td>
<td>30</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1230-5TV</td>
<td>30</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1230-5TE</td>
<td>30</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>EPDM</td>
</tr>
<tr>
<td>139SP1230-6TV</td>
<td>30</td>
<td>POM</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1230-6EE</td>
<td>30</td>
<td>POM</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td><strong>12 VDC; 40µl dispense</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>139SP1240-1TP</td>
<td>40</td>
<td>PTFE</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1240-5TP</td>
<td>40</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1240-5TV</td>
<td>40</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1240-5TE</td>
<td>40</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>EPDM</td>
</tr>
<tr>
<td>139SP1240-6TV</td>
<td>40</td>
<td>POM</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1240-6EE</td>
<td>40</td>
<td>POM</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td><strong>12 VDC; 50µl dispense</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>139SP1250-1TP</td>
<td>50</td>
<td>PTFE</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1250-5TP</td>
<td>50</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FFKM</td>
</tr>
<tr>
<td>139SP1250-5TV</td>
<td>50</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1250-5TE</td>
<td>50</td>
<td>PEEK™</td>
<td>PTFE</td>
<td>EPDM</td>
</tr>
<tr>
<td>139SP1250-6TV</td>
<td>50</td>
<td>POM</td>
<td>PTFE</td>
<td>FKM</td>
</tr>
<tr>
<td>139SP1250-6EE</td>
<td>50</td>
<td>POM</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td><strong>12 VDC; 60µl dispense</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>139SP1260-6EE</td>
<td>60</td>
<td>POM</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
</tbody>
</table>

### SPECIFICATIONS

The 139SP has the same specifications as the 130SP (see page 7)
**Installation Drawing**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTFE body</td>
<td>Dim ØA .096&quot;(2.4mm)</td>
</tr>
<tr>
<td></td>
<td>Dim B .50&quot;(12.7mm)</td>
</tr>
<tr>
<td></td>
<td>Dim C .59&quot;(15.0mm)</td>
</tr>
</tbody>
</table>

- **Check valves and screws included**
- **2x Ø.125" (3.2mm) thru hole**
- **2 x #4-40 Socket head cap screw**
- **Outlet 1.5" (38.1mm)**
- **Inlet .40" (10.2mm)**
- **(2.10" (53.3mm))**
- **ø.25.4mm**

**Lead wires not to scale**

**Wires are 26 gauge and min 24" (610mm) long**

**Set screw position variable to +.25" (6mm)**

**For other dimensions refer to manifold drawing**

**Manifold Interface Drawing**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTFE body</td>
<td>Dim A .280&quot;(7.11mm)</td>
</tr>
<tr>
<td></td>
<td>Dim B .280&quot;(7.11mm)</td>
</tr>
<tr>
<td></td>
<td>Dim ØC .106&quot;(2.69mm)</td>
</tr>
<tr>
<td></td>
<td>Dim D .600&quot;(15.2mm)</td>
</tr>
</tbody>
</table>

- **Valve inlet**
- **2x .600" ±.005" (15.24mm ±.13mm)**
- **A ±.003" (±.08mm)**
- **B ±.003" (±.08mm)**

- **Valve outlet**
- **.050" (1.27mm)**
- **.230" (5.84mm)**

**Section on Z-Z**

**2x #4-40 UNC - 2B**

**.65" (16.5mm) MIN THREAD**

**ØC ±.002" (±.05mm)**

**D deep**

**Manifold 139SP series**

www.biochemfluidics.com
MANIFOLDS

Custom-built manifolds are used to organize multiple Micro-Pumps and other Fluid Control Devices such as Isolation Valves into an efficient, pre-assembled, space-saving module that is designed to meet your specific flow needs. Manifolds can range from simple blocks for two devices to complex shapes with intricate flow paths for many devices. Bio-Chem Fluidics has produced complex manifolds for as many as 84 Micro-Pumps on a single block.

Features:
- Reduction of internal equipment space requirements.
- Allows for the combining of valves, tubing, pumps and connectors into a single, pre-assembled component.
- Elimination of unsightly and unmanageable wiring and tubing.
- Helps to reduce inventory.
- Reduces production time and costs associated with testing, handling and assembling multiple components.
- Materials of construction to suit fluid characteristics including, but not limited to; PTFE, POM, PEEK™, acrylic and PPS.

Please contact your local Bio-Chem Fluidics facility to discuss your manifold requirements with one of our engineers.

Custom manifold for (1) 139SP Micro-Pump (shown) and (3) isolation valves (not shown). Blue lines indicate the fluid path; the red dots are ruby balls used as plugs.

Custom manifold for (2) 139SP Micro-Pumps (not shown).

MOUNTING OPTIONS

Bio-Chem Valve™ Solenoid Operated Micro-Pumps can be installed into your equipment with a variety of mounting options including mounting clips, rings and flanges. Some of the pumps can be mounted directly via mounting holes that are drilled into the pump body. For more details refer to the "Mounting Accessories & Options" spec sheet.

**MU-Series Mounting Flange**
- Constructed from sturdy, glass-filled Polypropylene
- Spring steel retainer ring and set screw ensure a secure fit
- Surface withstands alcohol, bleaches and other common cleaning agents
- Can be bulkhead mounted, inside or outside
- Screw hole orientation relative to tubing can be adjusted to fit available system space

**MC-Series Mounting Clip**
- Constructed from Spring Steel
- Simple construction - no tools required to secure pump into position
- Holds pump securely inside instrument

**MR-Series Mounting Ring**
- Constructed from Aluminum
- Tightening screw secures ring firmly to pump but can be loosened for re-positioning
- Can be bulkhead mounted, inside or outside
- Screw hole orientation relative to tubing can be adjusted to fit available system space

**Integral Mounting Holes**
- Threaded mounting holes in the base of the pump provide a more permanent way to mount directly to a plate or base
- Mounting holes are standard on 120SP and 150SP Micro-Pumps
**MICRO-PUMP TECH TIPS**

**OPERATING PARAMETERS & INSTALLATION TIPS**

**Output volume and accuracy:** A number of factors influence the output volume of our pumps. In our factory the pump’s setpoint is determined using the following test conditions:

- Fluid: De-ionized water at 70°F/21°C
- Fittings: Omni-Lok™ ¼”-28 inverted cone fittings for the 120SP and 130SP pump families and ⅜”-24 inverted cone fittings for the 150SP pumps.
- Tubing: PTFE tubing with the following dimensions:
  - 120SP and 130SP pump families: Internal diameter of ¼”, 3/8cm ≤ tubing length ≤ 14”/35cm.
  - 150SP pumps: Internal diameter of ⅜” on the inlet and ⅛” on the outlet, 3/8cm ≤ tubing length ≤ 10”/25cm
- Pressure: Negligible pressure on both the inlet and outlet ports.
- Cycle rates:
  - 120SP & 130SP pump families: 250ms on / 350ms off
  - 150SP pump family: 250ms on / 750ms off
- No air or gas bubbles in the line once the priming process is complete. (See the Priming section on right)

If your application parameters deviate significantly from the above, you may experience dispense rates that are different from the setpoint. In that case, please contact Bio-Chem Fluidics to discuss your application and we will make appropriate adjustments for you.

**Pressure limits:** Although Micro-Pumps are capable of producing outlet pressures of up to 5 psi (0.35 bar) while a dispense is taking place, for optimal dispense accuracy, the pressure on both the inlet and the outlet side of the pump should be kept between ± 0.5 psi (0.035 bar), equivalent to a head of ± 12” (300mm) water.

During the pump’s up-stroke, suction is created on the inlet. Positive pressure is generated at the outlet during the down-stroke. When the pump is not actuated, it will shut-off flow as long as the pressure on the inlet does not exceed the maximum holding pressure. To ensure correct operation, pressure on the inlet side should never exceed 2 psi (0.14 bar) even when the pump is in the closed position. The check valves in the pump prevent fluid from flowing against the intended flow direction.

**Orientation:** Pumps should be installed with the solenoid portion of the pump pointing upwards, downwards or in a horizontal position with the outlet on top. This ensures that any air in the system will be evacuated quickly and also minimizes the effects of a pressure head acting to keep the check elements open when they should be closed.

**Lead Wires:** As a standard all lead wires are PTFE coated. Lead wires are provided with stripped ends for easy wiring into your control system - refer to drawings on product pages for more details. Different lengths and terminal connectors can be provided - refer to customization notes below.

**Priming:** Micro-Pumps must be fully primed prior to operation to ensure that all air is removed from the pump cavity. Priming is achieved by cycling the pump until no air bubbles are seen in the dispense. This normally takes 30-60 seconds. Excessive air bubbles in the dispense are generally caused by air leaks due to loose fittings - check all the fittings in the system and tighten accordingly.

---

**CUSTOMIZED SOLUTIONS**

We understand that many applications require customized solutions. Our design and prototyping expertise enables us to offer simple modifications of standard products as well as completely customized designs. Many of the Micro-Pumps we sell are customized to one extent or another. Customizable options include (but are not limited to):

- Materials of construction
- Dispense volume
- Mounting options
- Tagging / labeling
- Length and/or style of connecting leads
- Electrical terminations
- Custom manifolds

We look forward to working with you to meet your design engineering objectives!

www.biochemfluidics.com
THE BIO-CHEM FLUIDICS BRAND FAMILY

Bio-Chem Fluidics is dedicated to providing instrument manufacturers and laboratories with the industry’s best choice of inert, miniature fluid handling components.

Under the Bio-Chem Valve™ brand name we offer a complete fluid system solution for a wide range of industries including analytical chemistry, clinical diagnostics and medical device manufacturers as well as the scientific community.

INERT SOLENOID VALVES AND PUMPS, ELECTRIC ROTARY VALVES

MICRO-PUMPS

ISOLATION VALVES

FLOW SELECTION VALVES

PINCH VALVES

ELECTRIC ROTARY VALVES

MANIFOLD ASSEMBLIES

ACCESSORIES

CUSTOMIZATION SERVICES

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