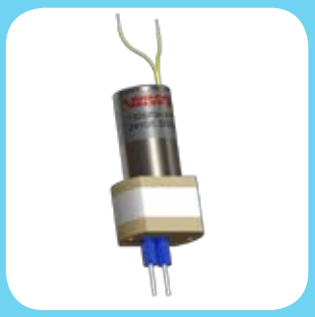
BIO-CHEM VALVE

# Solenoid Operated Micro-Pumps


130SP Series Micro-Pump



BIO-CHEM FLUIDICS
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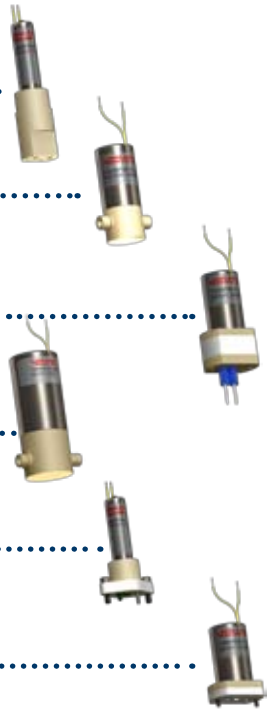
# INDEX

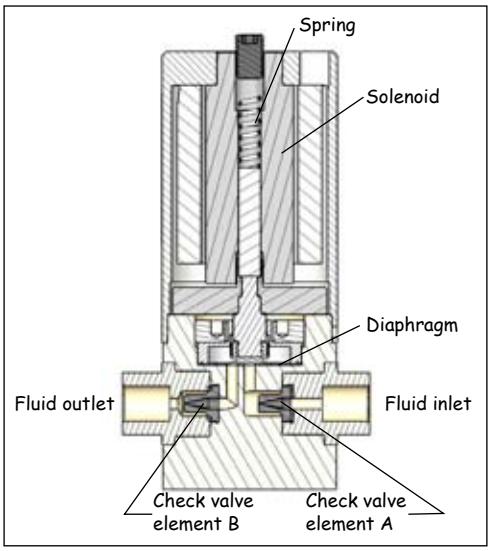




## MICRO-PUMPS GENERAL INFORMATION

### 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 18*).

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

Self-priming

At start-up, the pump is able to draw air. The suction created by the larger 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 4µl to 250µl per cycle. The pumps can be cycled at up to 4 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 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 (*5⁄16"-24 for 150SP*)
   - Manifold mount for use with manifolds (see page 16)

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.

**Ported**

| Volumetric output | | Body Material | | | |
|---|---|---|---|---|---|
| Discrete Dispense Vol (µl) | Max flow rate (ml/min) | PTFE | PPS | PEEK™ | POM |
| 4 | 0.96 | | 030SP (pg. 4) | | |
| 10 | 1.2 | | | | |
| 20 | 2.4 | | | | |
| 30 | 3.6 | 130SP (pg. 8) | 120SP (pg. 6) | 120SP (pg. 6) | 130SP (pg. 8) |
| 40 | 4.8 | | | | |
| 50 | 6.0 | | | | |
| 60 | 7.2 | | | | |
| 100 | 9.6 | | | | |
| 125 | 12.0 | | | | |
| 150 | 14.4 | | | | |
| 175 | 16.8 | | 150SP (pg. 10) | 150SP (pg. 10) | |
| 200 | 19.2 | | | | |
| 225 | 21.6 | | | | |
| 250 | 24.0 | | | | |

**Manifold mounted**

| Volumetric output | | Body Material | | | |
|---|---|---|---|---|---|
| Discrete Dispense Vol (µl) | Max flow rate (ml/min) | PTFE | PPS | PEEK™ | POM |
| 4 | 0.96 | | 039SP (pg. 12) | | |
| 10 | 1.2 | | | | |
| 20 | 2.4 | | | | |
| 30 | 3.6 | 139SP (pg. 14) | | 139SP (pg. 14) | 139SP (pg. 14) |
| 40 | 4.8 | | | | |
| 50 | 6.0 | | | | |
| 60 | 7.2 | | | | |

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 = polyphenelyne sulfide
PTFE = polytetrafluoroethylene.

# 030SP SERIES MICRO-PUMP

**For precise dispensing of 4µl and flow rates up to 0.96 ml/min**

- Self-priming
- 4µl discrete dispense volume
- 960µl/min maximum flow rate
- ¼"-28 UNF threaded ports

The 030SP 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.

Materials available for the wetted parts are:

- Body materials: PPS
- Diaphragm materials: PTFE
- Check valve materials: FKM

## 030SP series options

| PART NO. | VDC | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|---|
| **12 VDC; 4µl dispense** | | | | | |
| 030SP124-4TV | 12 | 4 | PPS | PTFE | FKM |
| **24 VDC; 4µl dispense** | | | | | |
| 030SP244-4TV | 24 | 4 | PPS | PTFE | FKM |

## ARRANGEMENT

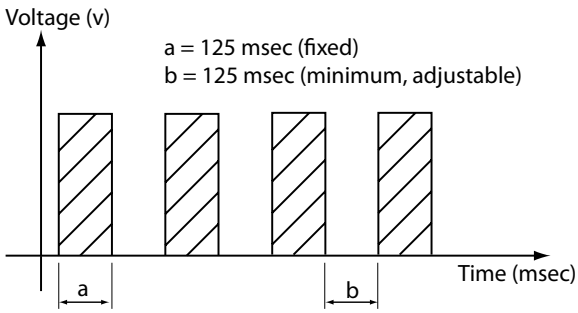

## SPECIFICATIONS

| 030SP Fluid Data | |
|---|---|
| Dispense Volume (µl) | 4 |
| Set-point accuracy | +/- 25% |
| Repeatability | +/- 5% |
| Max flow rate (µl/min) | 960 |
| Internal vol (µl) | 130 |

| 030SP Electrical Data | | | |
|---|---|---|---|
| Voltage | Power @70°F (21°C) | Current @70°F (21°C) | Effective continuous power @ max cycle rate |
| 12 VDC | 1.9 Watts | 0.22 amps | 0.9 Watts |
| 24 VDC | 1.9 Watts | 0.11 amps | 0.9 Watts |

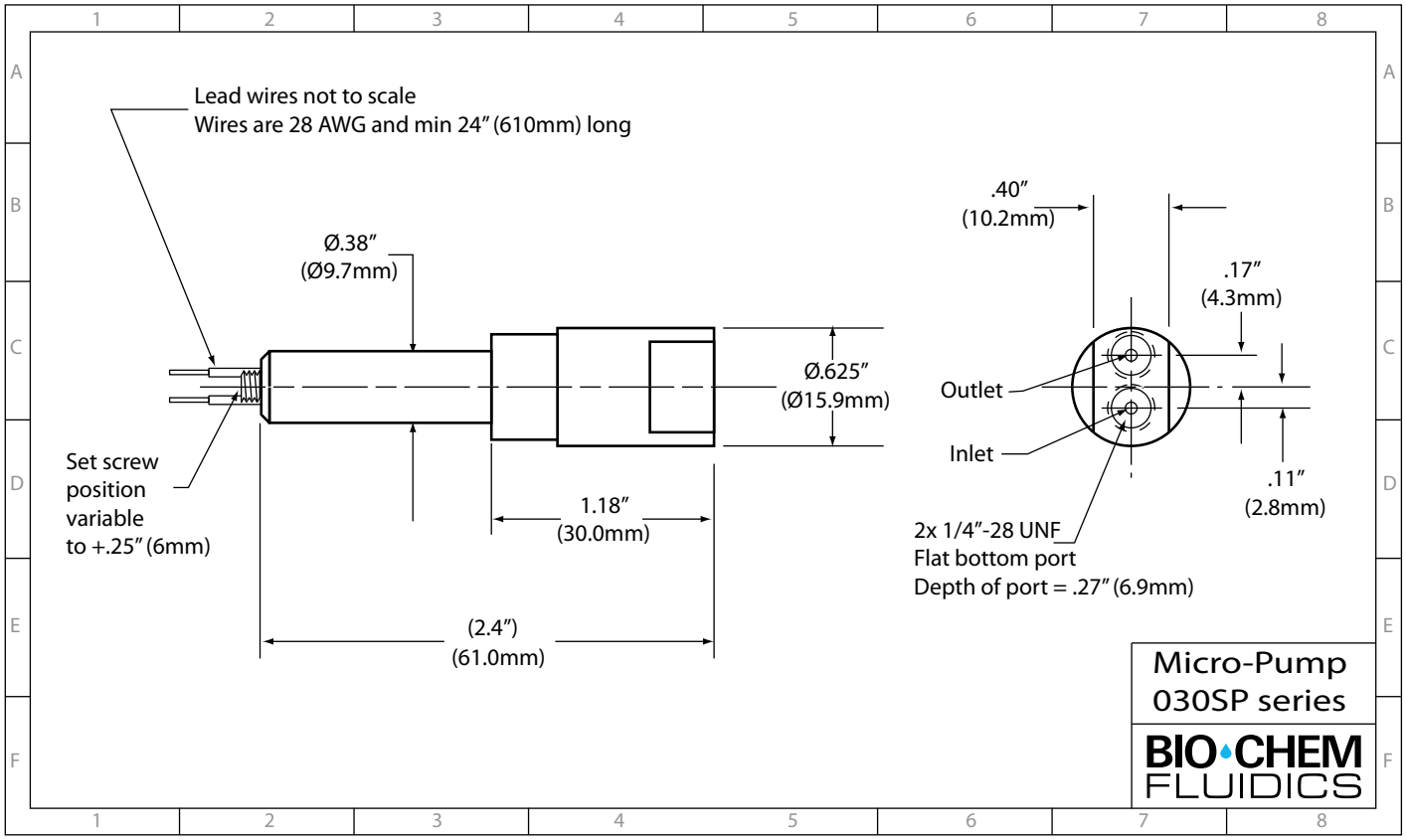
| 030SP Cycle Rates | | |
|---|---|---|
| Min "on" time | Min "off" time | Max cycle rate |
| 125 msec | 125 msec | 4.0 Hz |

030SP Micro-Pumps can be cycled at up to 4 Hz. To maintain pumping precision the voltage "on" time should remain fixed - the pumping rate can be changed by increasing the "off" time.




| Recommended tubing for 030SP |
|---|
| Inlet & outlet, 1/32" (0.80mm) ID, hardwall tubing, PART NO. 008T16-080 |

## INSTALLATION DRAWING



# 120SP SERIES MICRO-PUMP

**For precise dispensing between 10 and 60µl and flow rates up to 7.2 ml/min**

- Self-priming
- 10-60µl 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:

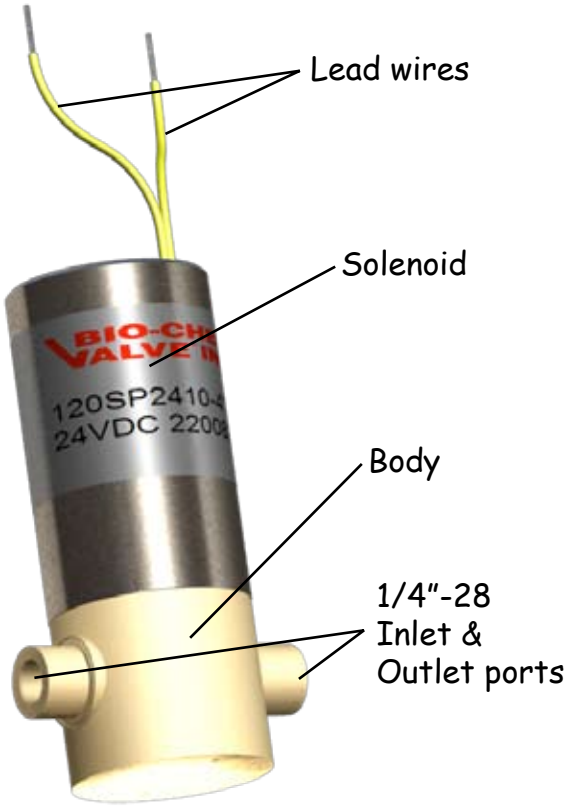
- Body materials: PPS, PEEK™
- Diaphragm materials: PTFE, EPDM
- Check valve materials: EPDM, FKM, FFKM

## 120SP series options

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

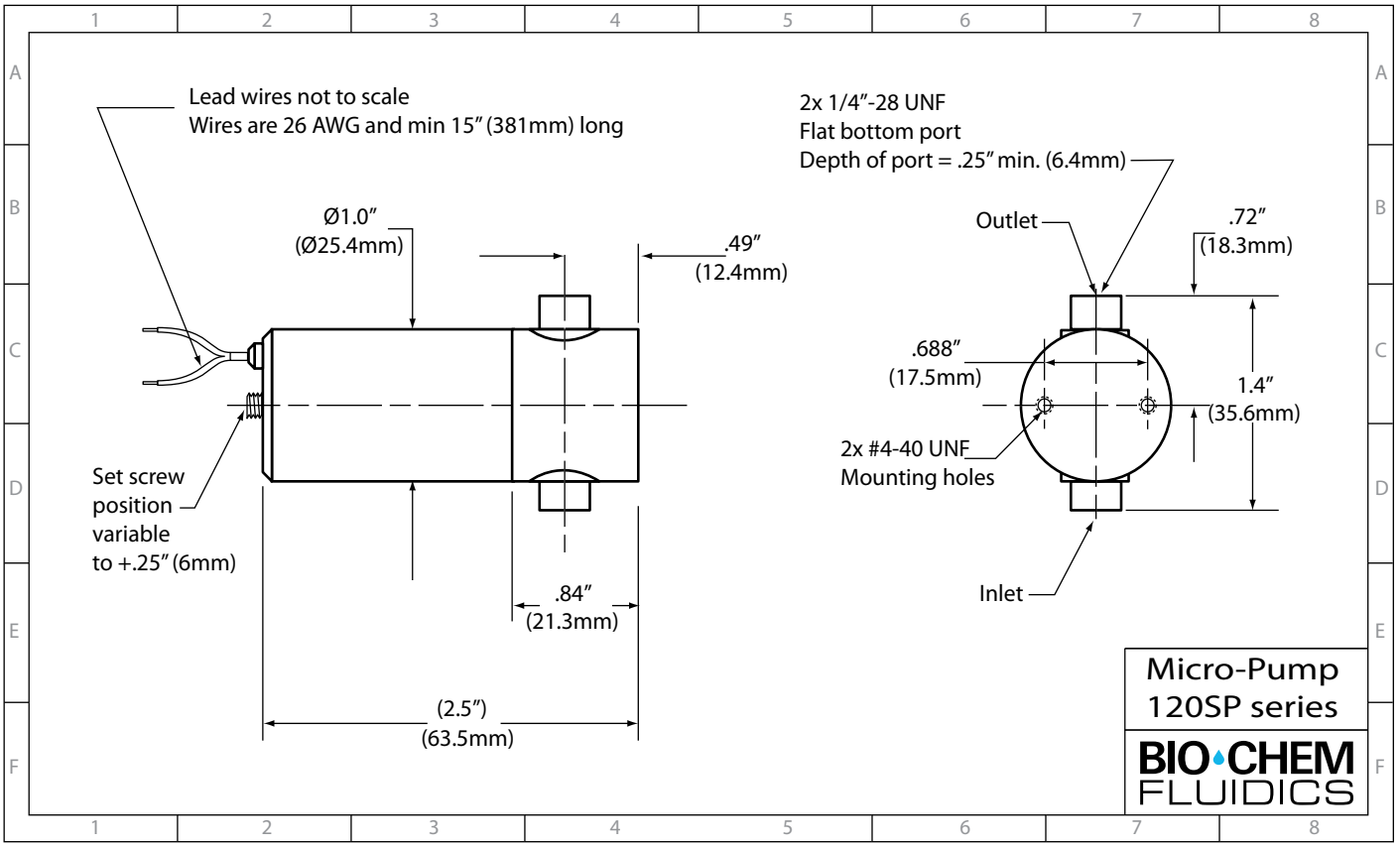
| PART NO. | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|
| **12 VDC; 10µl dispense** (Note: PTFE diaphragm for all 10 µl options) | | | | |
| 120SP1210-4TE | 10 | PPS | PTFE | EPDM |
| 120SP1210-4TV | 10 | PPS | PTFE | FKM |
| 120SP1210-4TP | 10 | PPS | PTFE | FFKM |
| 120SP1210-5TE | 10 | PEEK™ | PTFE | EPDM |
| 120SP1210-5TV | 10 | PEEK™ | PTFE | FKM |
| 120SP1210-5TP | 10 | PEEK™ | PTFE | FFKM |
| **12 VDC; 20µl dispense** | | | | |
| 120SP1220-4EE | 20 | PPS | EPDM | EPDM |
| 120SP1220-4TV | 20 | PPS | PTFE | FKM |
| 120SP1220-4TP | 20 | PPS | PTFE | FFKM |
| 120SP1220-5EE | 20 | PEEK™ | EPDM | EPDM |
| 120SP1220-5TV | 20 | PEEK™ | PTFE | FKM |
| 120SP1220-5TP | 20 | PEEK™ | PTFE | FFKM |
| **12 VDC; 30µl dispense** | | | | |
| 120SP1230-4EE | 30 | PPS | EPDM | EPDM |
| 120SP1230-4TV | 30 | PPS | PTFE | FKM |
| 120SP1230-4TP | 30 | PPS | PTFE | FFKM |
| 120SP1230-5EE | 30 | PEEK™ | EPDM | EPDM |
| 120SP1230-5TV | 30 | PEEK™ | PTFE | FKM |
| 120SP1230-5TP | 30 | PEEK™ | PTFE | FFKM |

## ARRANGEMENT




| PART NO. | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|
| **12 VDC; 40µl dispense** | | | | |
| 120SP1240-4EE | 40 | PPS | EPDM | EPDM |
| 120SP1240-4TV | 40 | PPS | PTFE | FKM |
| 120SP1240-4TP | 40 | PPS | PTFE | FFKM |
| 120SP1240-5EE | 40 | PEEK™ | EPDM | EPDM |
| 120SP1240-5TV | 40 | PEEK™ | PTFE | FKM |
| 120SP1240-5TP | 40 | PEEK™ | PTFE | FFKM |
| **12 VDC; 50µl dispense** | | | | |
| 120SP1250-4EE | 50 | PPS | EPDM | EPDM |
| 120SP1250-4TV | 50 | PPS | PTFE | FKM |
| 120SP1250-4TP | 50 | PPS | PTFE | FFKM |
| 120SP1250-5EE | 50 | PEEK™ | EPDM | EPDM |
| 120SP1250-5TV | 50 | PEEK™ | PTFE | FKM |
| 120SP1250-5TP | 50 | PEEK™ | PTFE | FFKM |
| **12 VDC; 60µl dispense** (Note: EPDM diaphragm for all 60 µl options) | | | | |
| 120SP1260-4EE | 60 | PPS | EPDM | EPDM |
| 120SP1260-5EE | 60 | PEEK™ | EPDM | EPDM |

## INSTALLATION DRAWING



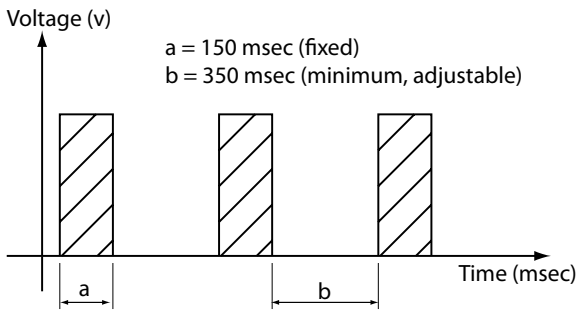

## SPECIFICATIONS

| 120SP Fluid Data | | | | | | |
|---|---|---|---|---|---|---|
| Dispense Volume (µl) | 10 | 20 | 30 | 40 | 50 | 60 |
| Set-point accuracy | +/- 4% | +/- 4% | +/- 3% | +/- 3% | +/- 2% | +/- 2% |
| Repeatability | +/- 3% | +/- 3% | +/- 3% | +/- 2% | +/- 2% | +/- 2% |
| Max flow rate (µl/min) | 1200 | 2400 | 3600 | 4800 | 6000 | 7200 |
| Internal vol (µl) | 105 | 105 | 105 | 105 | 105 | 105 |

| 120SP Electrical Data | | | | 120SP Cycle Rates | | |
|---|---|---|---|---|---|---|
| Voltage | Power @70°F (21°C) | Current @70°F (21°C) | Effective continuous power @ max cycle rate | Min "on" time | Min "off" time | Max cycle rate |
| 12 VDC | 4.0 Watts | 0.32 amps | 1.2 Watts | 150 msec | 350 msec | 2.0 Hz |
| 24 VDC | 4.0 Watts | 0.16 amps | 1.2 Watts | | | |

| Recommended tubing for 120SP |
|---|
| Inlet & outlet, 1/32" (0.80mm) ID, hardwall tubing, PART NO. 008T16-080 |

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.



## 130SP SERIES MICRO-PUMP

**For precise dispensing between 10 and 60µl and flow rates up to 7.2 ml/min**

- Self-priming
- 10-60µl 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:

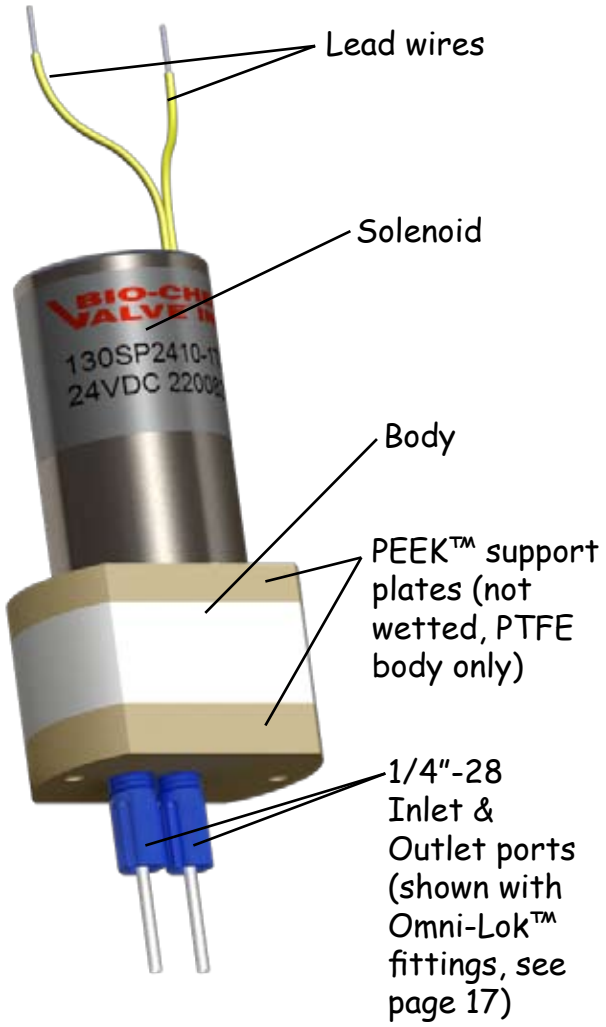
- Body materials: PTFE, POM
- Diaphragm materials: PTFE, EPDM
- Check valve materials: EPDM, FKM, FFKM

### 130SP series options

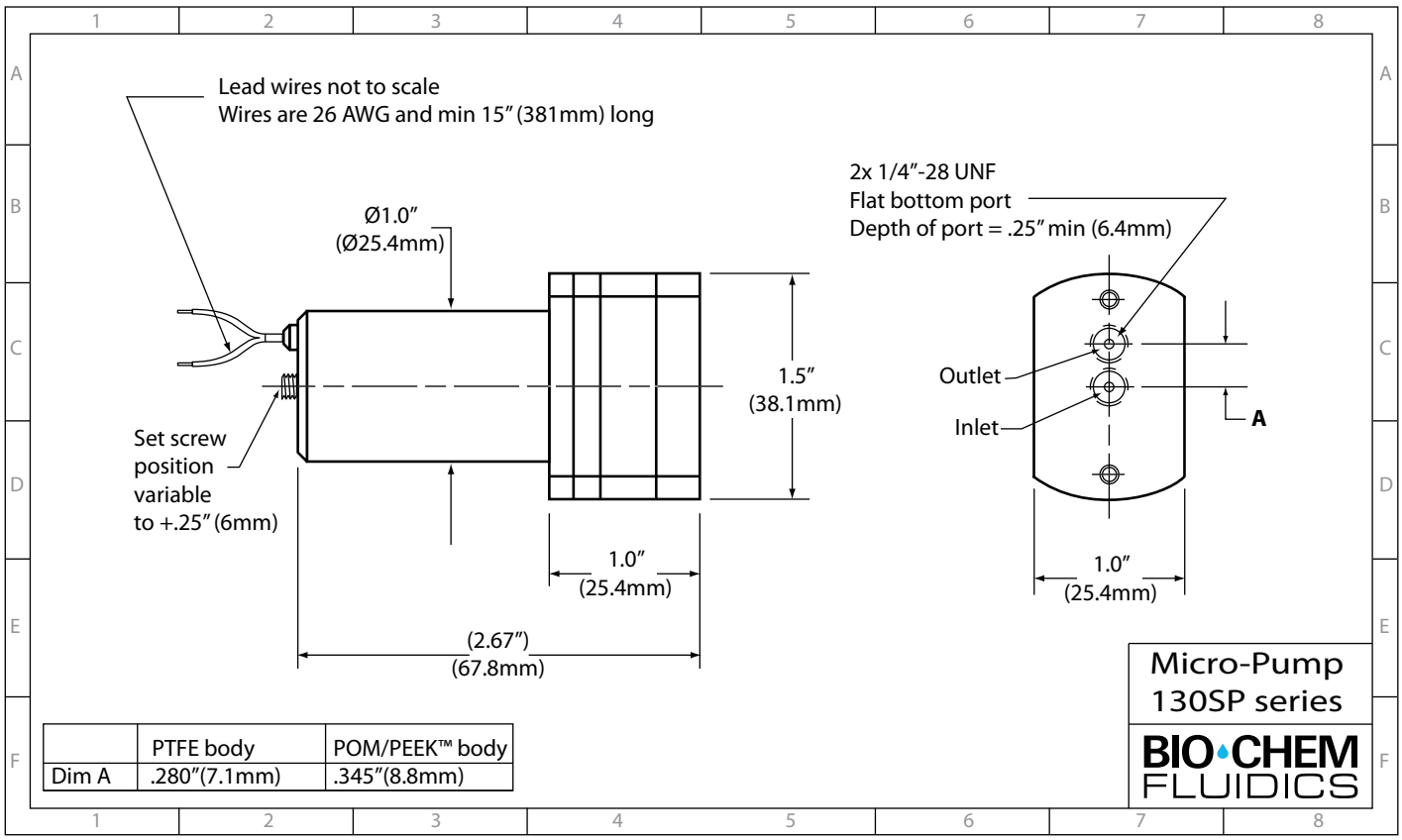
**NOTE: For 24 VDC, replace 130SP12 with 130SP24 in any of the part numbers listed.**

| PART NO. | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|
| **12 VDC; 10µl dispense** (Note: PTFE diaphragm for all 10 µl options) | | | | |
| 130SP1210-1TP | 10 | PTFE | PTFE | FFKM |
| 130SP1210-6TV | 10 | POM | PTFE | FKM |
| 130SP1210-6TE | 10 | POM | PTFE | EPDM |
| **12 VDC; 20µl dispense** | | | | |
| 130SP1220-1TP | 20 | PTFE | PTFE | FFKM |
| 130SP1220-6TV | 20 | POM | PTFE | FKM |
| 130SP1220-6EE | 20 | POM | EPDM | EPDM |
| **12 VDC; 30µl dispense** | | | | |
| 130SP1230-1TP | 30 | PTFE | PTFE | FFKM |
| 130SP1230-6TV | 30 | POM | PTFE | FKM |
| 130SP1230-6EE | 30 | POM | EPDM | EPDM |
| **12 VDC; 40µl dispense** | | | | |
| 130SP1240-1TP | 40 | PTFE | PTFE | FFKM |
| 130SP1240-6TV | 40 | POM | PTFE | FKM |
| 130SP1240-6EE | 40 | POM | EPDM | EPDM |
| **12 VDC; 50µl dispense** | | | | |
| 130SP1250-1TP | 50 | PTFE | PTFE | FFKM |
| 130SP1250-6TV | 50 | POM | PTFE | FKM |
| 130SP1250-6EE | 50 | POM | EPDM | EPDM |
| **12 VDC; 60µl dispense** | | | | |
| 130SP1260-6EE | 60 | POM | EPDM | EPDM |

### ARRANGEMENT



## INSTALLATION DRAWING




| | PTFE body | POM/PEEK™ body |
|---|---|---|
| Dim A | .280"(7.1mm) | .345"(8.8mm) |

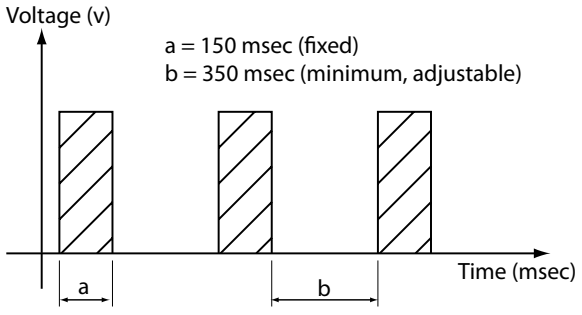
## SPECIFICATIONS

| 130SP Volumetric Data | | | | | | |
|---|---|---|---|---|---|---|
| Dispense Volume (µl) | 10 | 20 | 30 | 40 | 50 | 60 |
| Set-point accuracy | +/- 4% | +/- 4% | +/- 3% | +/- 3% | +/- 2% | +/- 2% |
| Repeatability | +/- 3% | +/- 3% | +/- 3% | +/- 2% | +/- 2% | +/- 2% |
| Max flow rate (µl/min) | 1200 | 2400 | 3600 | 4800 | 6000 | 7200 |
| Internal vol (µl) | 105 | 105 | 105 | 105 | 105 | 105 |

| 130SP Electrical Data | | | | 130SP Cycle Rates | | |
|---|---|---|---|---|---|---|
| Voltage | Power @70°F (21°C) | Current @70°F (21°C) | Effective continuous power @ max cycle rate | Min "on" time | Min "off" time | Max cycle rate |
| 12 VDC | 4.0 Watts | 0.32 amps | 1.2 Watts | 150 msec | 350 msec | 2.0 Hz |
| 24 VDC | 4.0 Watts | 0.16 amps | 1.2 Watts | | | |

| Recommended tubing for 130SP |
|---|
| Inlet & outlet, 1/32" (0.80mm) ID, hardwall tubing, PART NO. 008T16-080 |

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.



## 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

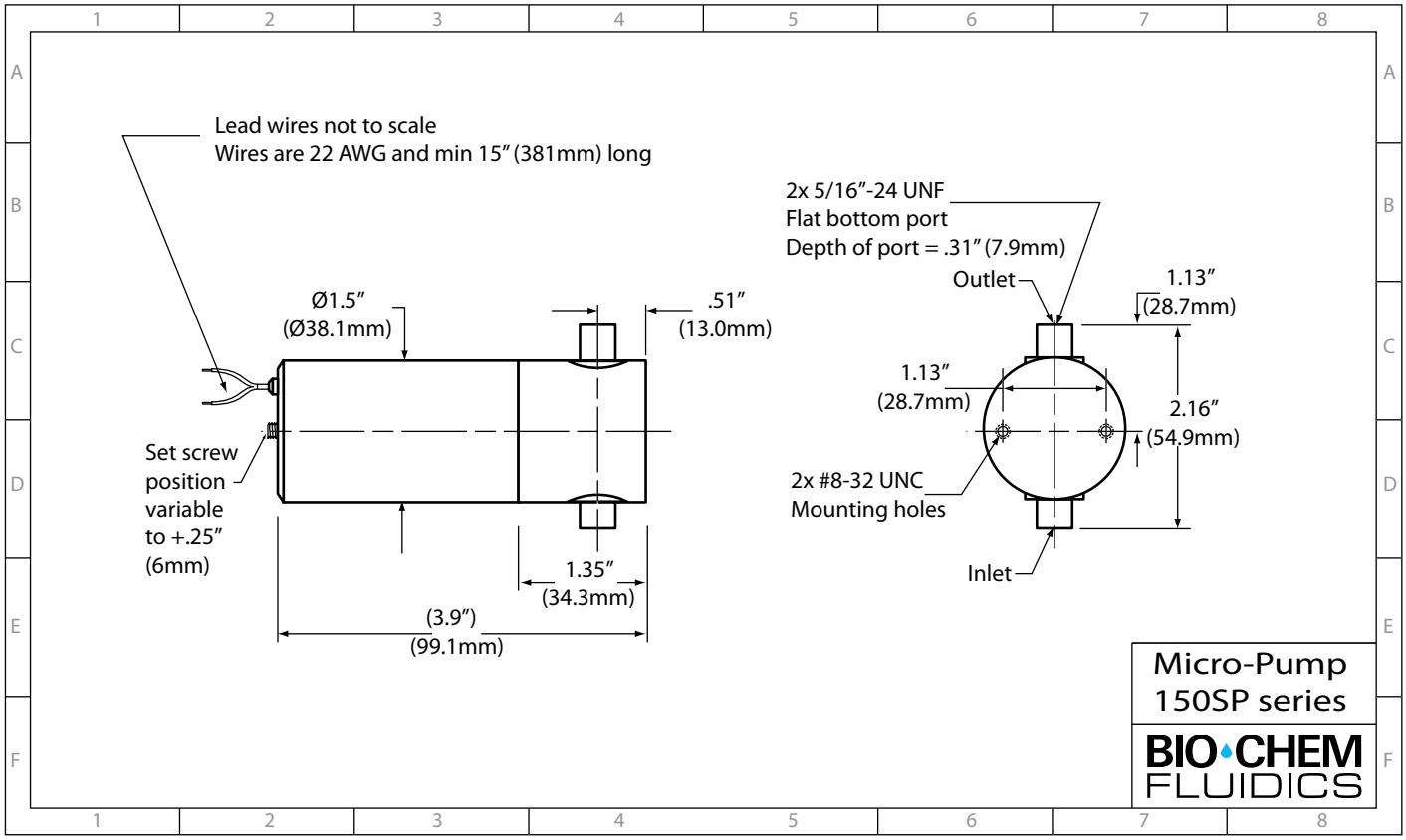
### 150SP series options

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

| PART NO. | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|
| **12 VDC; 100µl dispense** | | | | |
| 150SP12100-4EE | 100 | PPS | EPDM | EPDM |
| 150SP12100-5EE | 100 | PEEK™ | EPDM | EPDM |
| **12 VDC; 125µl dispense** | | | | |
| 150SP12125-4EE | 125 | PPS | EPDM | EPDM |
| 150SP12125-5EE | 125 | PEEK™ | EPDM | EPDM |
| **12 VDC; 150µl dispense** | | | | |
| 150SP12150-4EE | 150 | PPS | EPDM | EPDM |
| 150SP12150-5EE | 150 | PEEK™ | EPDM | EPDM |
| **12 VDC; 175µl dispense** | | | | |
| 150SP12175-4EE | 175 | PPS | EPDM | EPDM |
| 150SP12175-5EE | 175 | PEEK™ | EPDM | EPDM |
| **12 VDC; 200µl dispense** | | | | |
| 150SP12200-4EE | 200 | PPS | EPDM | EPDM |
| 150SP12200-5EE | 200 | PEEK™ | EPDM | EPDM |
| **12 VDC; 225µl dispense** | | | | |
| 150SP12225-4EE | 225 | PPS | EPDM | EPDM |
| 150SP12225-5EE | 225 | PEEK™ | EPDM | EPDM |
| **12 VDC; 250µl dispense** | | | | |
| 150SP12250-4EE | 250 | PPS | EPDM | EPDM |
| 150SP12250-5EE | 250 | PEEK™ | EPDM | EPDM |

### ARRANGEMENT

## INSTALLATION DRAWING



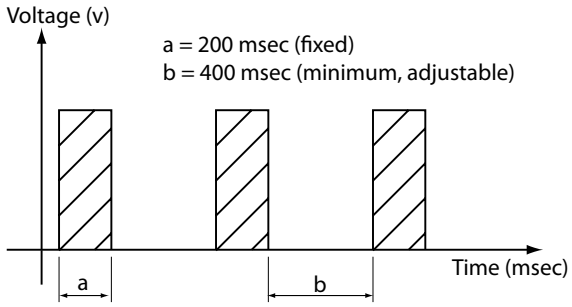

## SPECIFICATIONS

| 150SP Fluid Data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dispense Volume (µl) | 100 | 125 | 150 | 175 | 200 | 225 | 250 |
| Set-point accuracy | +/- 5% | +/- 5% | +/- 4% | +/- 4% | +/- 4% | +/- 3% | +/- 3% |
| Repeatability | +/- 1% | +/- 1% | +/- 1% | +/- 1% | +/- 0.5% | +/- 0.5% | +/- 0.5% |
| Max flow rate (µl/min) | 9600 | 12000 | 14400 | 16800 | 19200 | 21600 | 24000 |
| Internal vol (µl) | 710 | 710 | 710 | 710 | 710 | 710 | 710 |

| 150SP Electrical Data | | | | 150SP Cycle Rates | | |
|---|---|---|---|---|---|---|
| Voltage | Power @70°F (21°C) | Current @70°F (21°C) | Effective continuous power @ max cycle rate | Min "on" time | Min "off" time | Max cycle rate |
| 12 VDC | 8.0 Watts | 0.66 amps | 3.2 Watts | 200 msec | 400 msec | 1.6 Hz |
| 24 VDC | 8.0 Watts | 0.33 amps | 3.2 Watts | | | |

| Recommended tubing for 150SP |
|---|
| Inlet & outlet, 1/8" (3.2mm) ID, hardwall tubing, PART NUMBER 008T47-032 |

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.



# 039SP SERIES MICRO-PUMP

**For precise dispensing of 4µl and flow rates up to 0.96 ml/min in a manifold mountable design**

- Self-priming
- 4µl discrete dispense volume
- 960µl/min maximum flow rate
- Manifold mountable

This sibling to the 030SP 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 16).*

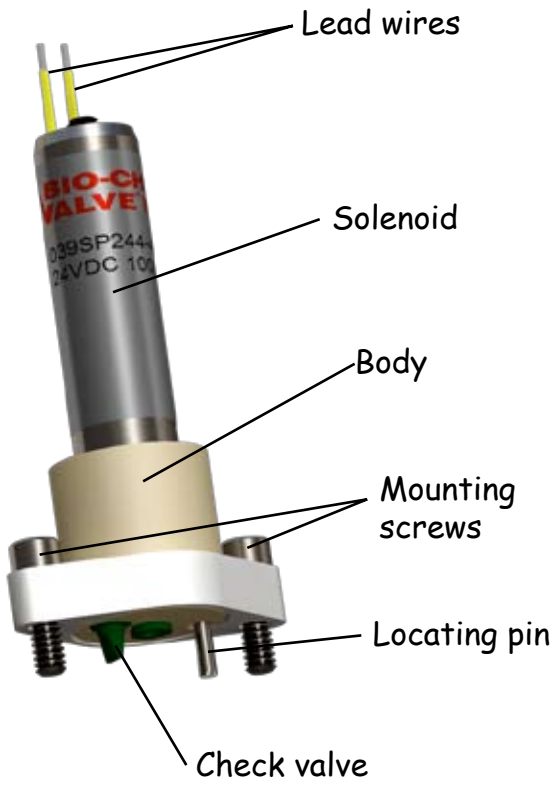
Materials available for the wetted parts of the pump are:

- Body materials: PPS
- Diaphragm materials: PTFE
- Check valve materials: FKM

## 039SP series options

| PART NO. | VDC | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|---|
| **12 VDC; 4µl dispense** | | | | | |
| 039SP124-4TV | 12 | 4 | PPS | PTFE | FKM |
| **24 VDC; 4µl dispense** | | | | | |
| 039SP244-4TV | 24 | 4 | PPS | PTFE | FKM |

## ARRANGEMENT



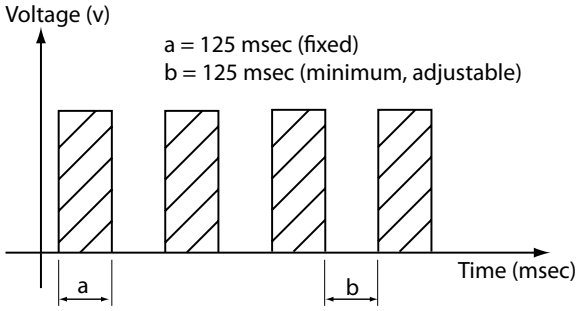

## SPECIFICATIONS

| 039SP Volumetric Data | |
|---|---|
| Dispense Volume (µl) | 4 |
| Set-point accuracy | +/- 25% |
| Repeatability | +/- 5% |
| Max flow rate (µl/min) | 960 |
| Internal vol (µl) | 130 |

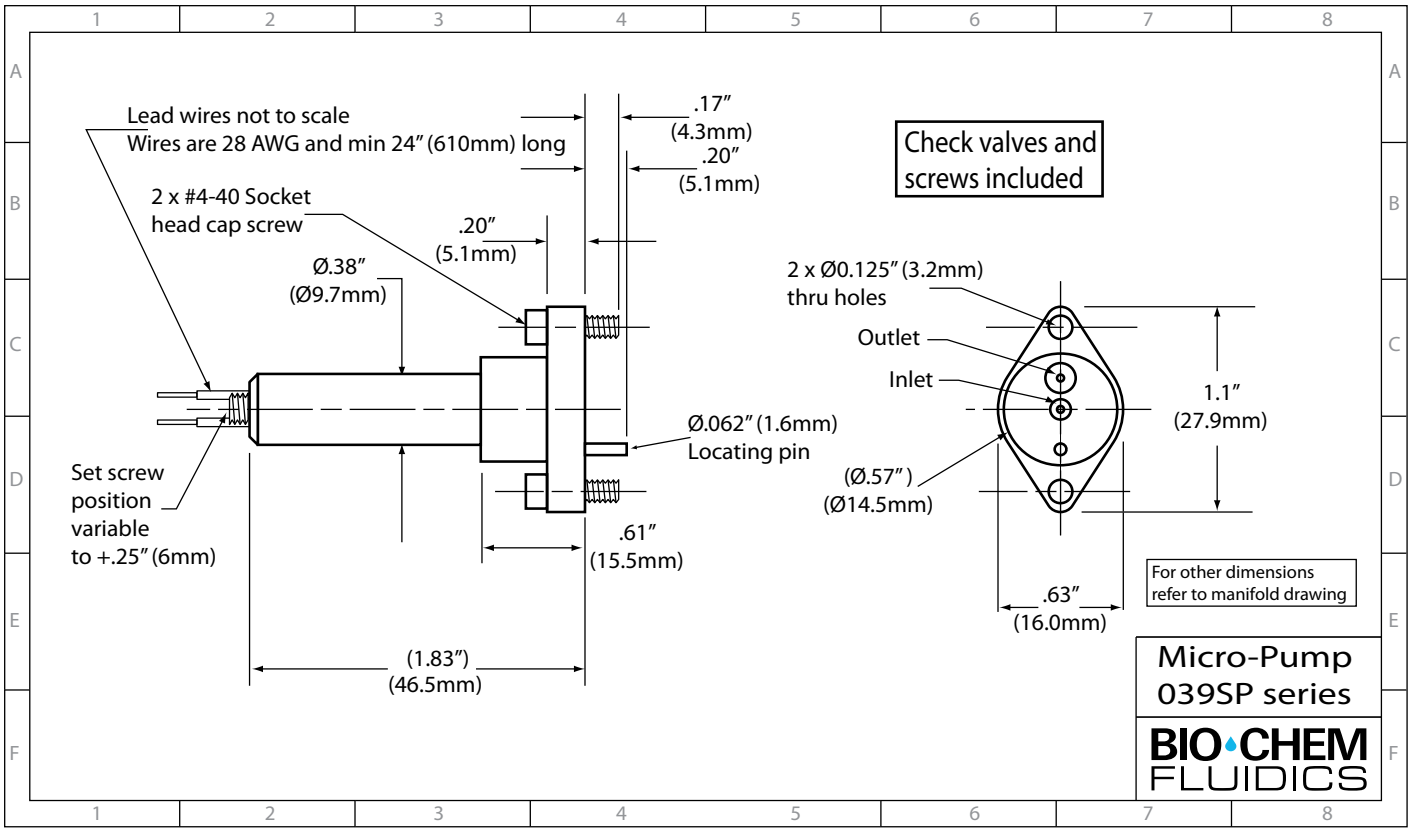
| 039SP Electrical Data | | | |
|---|---|---|---|
| Voltage | Power @70°F (21°C) | Current @70°F (21°C) | Effective continuous power @ max cycle rate |
| 12 VDC | 1.9 Watts | 0.22 amps | 0.9 Watts |
| 24 VDC | 1.9 Watts | 0.11 amps | 0.9 Watts |

| 039SP Cycle Rates | | |
|---|---|---|
| Min "on" time | Min "off" time | Max cycle rate |
| 125 msec | 125 msec | 4.0 Hz |

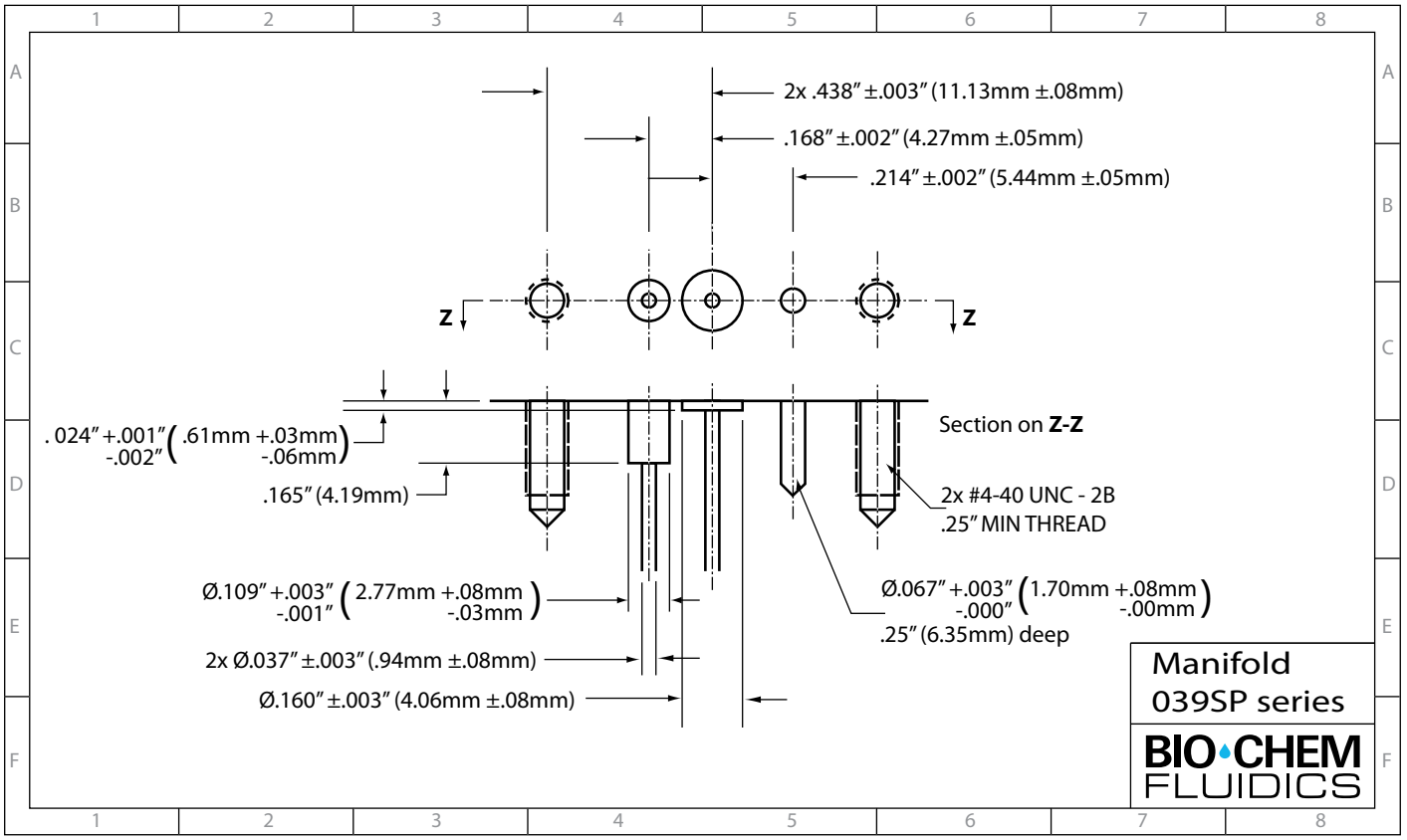
039SP Micro-Pumps can be cycled at up to 4 Hz. To maintain pumping precision the voltage "on" time should remain fixed - the pumping rate can be changed by increasing the "off" time.



## INSTALLATION DRAWING




## MANIFOLD INTERFACE DRAWING



# 139SP SERIES MICRO-PUMP

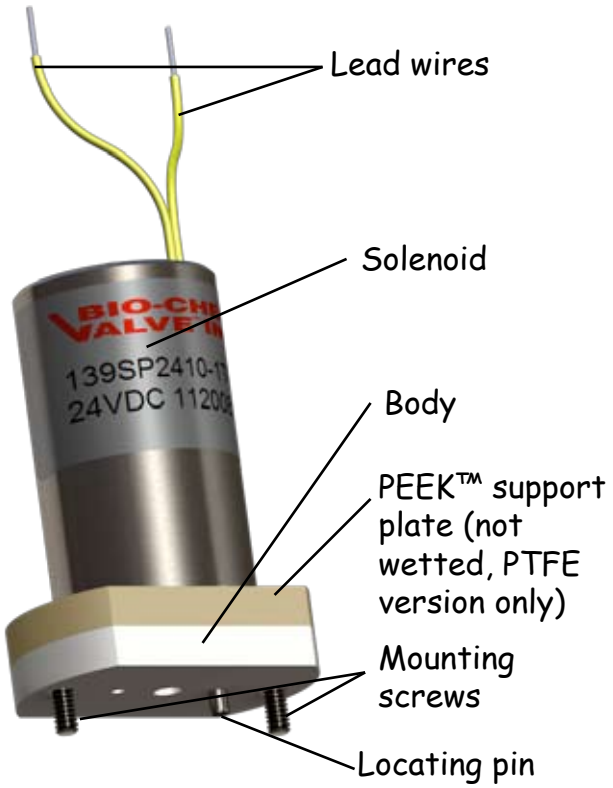
**For precise dispensing between 10 and 60µl and flow rates up to 7.2 ml/min in a manifold mountable design**

- Self-priming
- 10-60µl 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 16).* Materials available for the wetted parts are:

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

## ARRANGEMENT




## 139SP series options

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

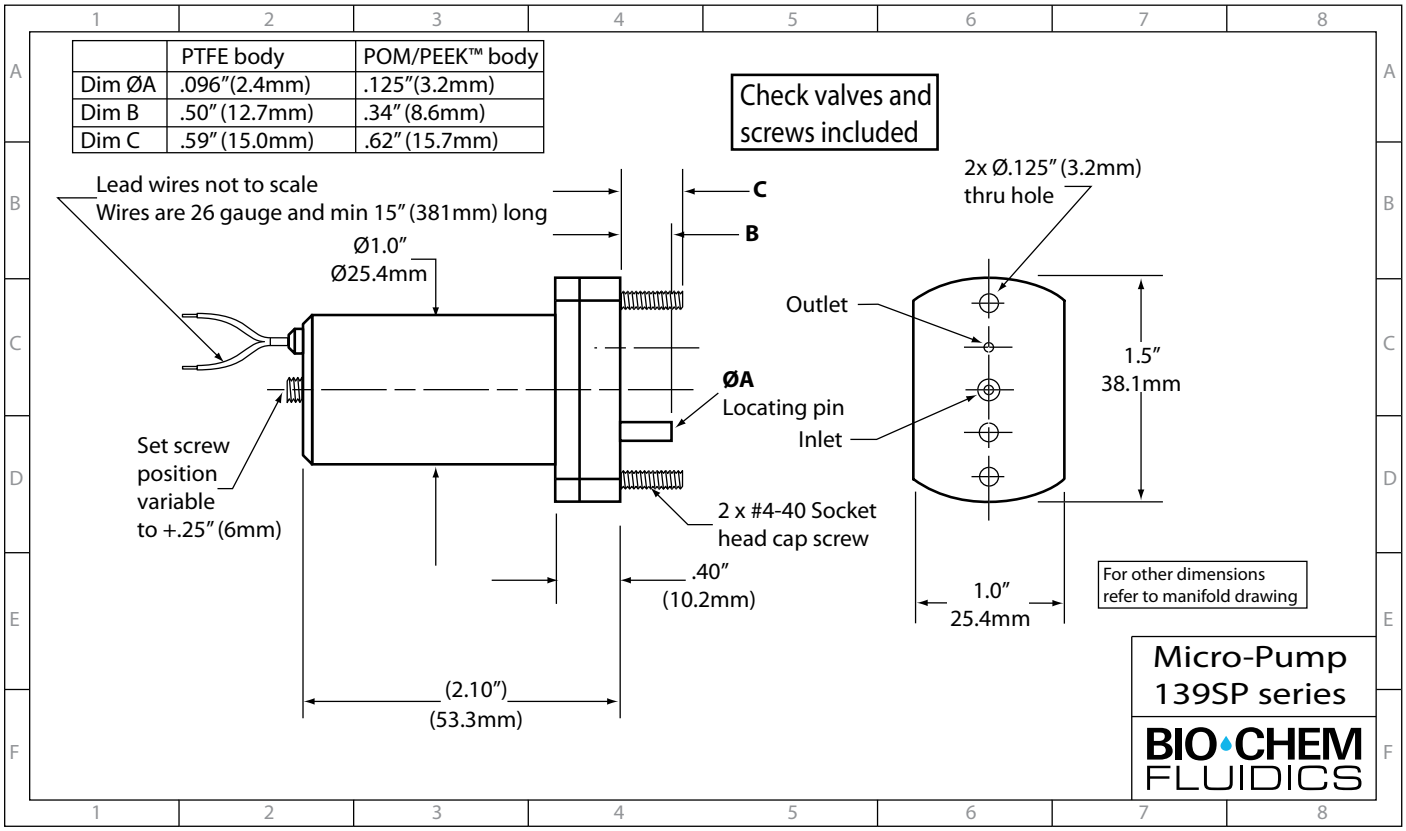
| PART NO. | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|
| **12 VDC; 10µl dispense** (Note: PTFE diaphragm for all 10 µl options) | | | | |
| 139SP1210-1TP | 10 | PTFE | PTFE | FFKM |
| 139SP1210-5TP | 10 | PEEK™ | PTFE | FFKM |
| 139SP1210-5TV | 10 | PEEK™ | PTFE | FKM |
| 139SP1210-5TE | 10 | PEEK™ | PTFE | EPDM |
| 139SP1210-6TV | 10 | POM | PTFE | FKM |
| 139SP1210-6TE | 10 | POM | PTFE | EPDM |
| **12 VDC; 20µl dispense** | | | | |
| 139SP1220-1TP | 20 | PTFE | PTFE | FFKM |
| 139SP1220-5TP | 20 | PEEK™ | PTFE | FFKM |
| 139SP1220-5TV | 20 | PEEK™ | PTFE | FKM |
| 139SP1220-5TE | 20 | PEEK™ | PTFE | EPDM |
| 139SP1220-6TV | 20 | POM | PTFE | FKM |
| 139SP1220-6EE | 20 | POM | EPDM | EPDM |
| **12 VDC; 30µl dispense** | | | | |
| 139SP1230-1TP | 30 | PTFE | PTFE | FFKM |
| 139SP1230-5TP | 30 | PEEK™ | PTFE | FFKM |
| 139SP1230-5TV | 30 | PEEK™ | PTFE | FKM |
| 139SP1230-5TE | 30 | PEEK™ | PTFE | EPDM |
| 139SP1230-6TV | 30 | POM | PTFE | FKM |
| 139SP1230-6EE | 30 | POM | EPDM | EPDM |

| PART NO. | DISPENSE VOL (µL) | BODY MATERIAL | DIAPHRAGM MATERIAL | CHECK VALVE MATERIAL |
|---|---|---|---|---|
| **12 VDC; 40µl dispense** | | | | |
| 139SP1240-1TP | 40 | PTFE | PTFE | FFKM |
| 139SP1240-5TP | 40 | PEEK™ | PTFE | FFKM |
| 139SP1240-5TV | 40 | PEEK™ | PTFE | FKM |
| 139SP1240-5TE | 40 | PEEK™ | PTFE | EPDM |
| 139SP1240-6TV | 40 | POM | PTFE | FKM |
| 139SP1240-6EE | 40 | POM | EPDM | EPDM |
| **12 VDC; 50µl dispense** | | | | |
| 139SP1250-1TP | 50 | PTFE | PTFE | FFKM |
| 139SP1250-5TP | 50 | PEEK™ | PTFE | FFKM |
| 139SP1250-5TV | 50 | PEEK™ | PTFE | FKM |
| 139SP1250-5TE | 50 | PEEK™ | PTFE | EPDM |
| 139SP1250-6TV | 50 | POM | PTFE | FKM |
| 139SP1250-6EE | 50 | POM | EPDM | EPDM |
| **12 VDC; 60µl dispense** | | | | |
| 139SP1260-6EE | 60 | POM | EPDM | EPDM |

## SPECIFICATIONS

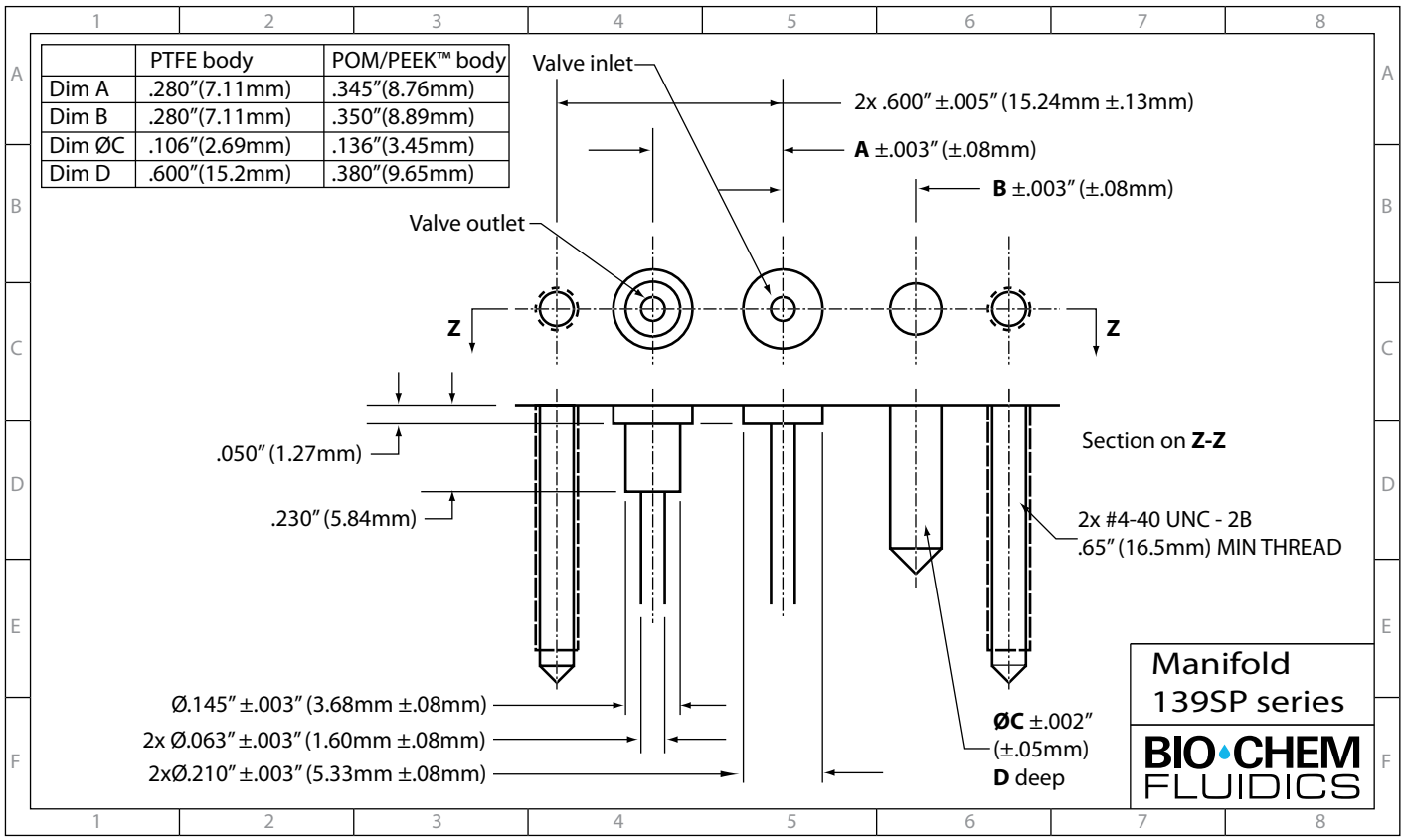
The 139SP has the same specifications as the 130SP (see page 7)

## INSTALLATION DRAWING




| | PTFE body | POM/PEEK™ body |
|---|---|---|
| Dim ØA | .096"(2.4mm) | .125"(3.2mm) |
| Dim B | .50" (12.7mm) | .34" (8.6mm) |
| Dim C | .59" (15.0mm) | .62" (15.7mm) |

## MANIFOLD INTERFACE DRAWING




| | PTFE body | POM/PEEK™ body |
|---|---|---|
| Dim A | .280"(7.11mm) | .345"(8.76mm) |
| Dim B | .280"(7.11mm) | .350"(8.89mm) |
| Dim ØC | .106"(2.69mm) | .136"(3.45mm) |
| Dim D | .600"(15.2mm) | .380"(9.65mm) |

## MANIFOLDS

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-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 (2) 139SP Micro-Pumps (not shown).

## FCD CONTROLLER

The Bio-Chem Fluidics' Fluid Control Device (FCD) Controller is designed to provide end-user programmed control signals to any combination of eight such devices, including the full Bio-Chem Valve™ range of Micro-Pumps and solenoid operated valves.

The controller uses intelligent part number recognition technology to take the guesswork out of programming – simply by entering the part number the controller will recognize the function of the FCD and will generate applicable control signals. For applications requiring more control, the FCD Controller has a user-friendly, symbol driven interface allowing for rapid programming of up to 999 steps. Built-in PC interface also allows for remote programming from any computer.

Features:

- Eight FCD's can be controlled, each can be programmed independently of the others.
- Supplied pre-loaded with control data for the complete range of Bio-Chem Valve™ valves and pumps. The standard USB interface ensures product data can be updated as needed.
- Stores up to 10 programs, each with up to 999 steps.
- LED's indicate the presence of a device and whether or not it is actuated.
- Adaptive power supply accepts either 115VAC or 230VAC
- RoHS compliant, CE marked.

FCD Controller to be released Summer 2009

**CONTROLLER**

| PART NUMBER | DESCRIPTION | QTY |
|---|---|---|
| BBX8 | 8-position FCD controller | 1 pk |

## TUBING

Inert PTFE tubing can be used with virtually all chemicals, solvents and corrosive materials, even at elevated temperatures. It can be sterilized in-line by steam, chemical methods, or autoclaving. This semi-rigid tubing is ideal for use with the Bio-Chem Valve™ range of Micro-Pumps.

**PTFE TUBING**

| PART NUMBER | OD | ID | LENGTH | QTY |
|---|---|---|---|---|
| 008T16-080-20 | 1.6mm (1⁄16") | 0.8mm (1⁄32") | 20m | ea |
| 008T16-080-200 | 1.6mm (1⁄16") | 0.8mm (1⁄32") | 200m | ea |
| 008T47-032-10 | 4.7mm (3⁄16") | 3.2mm (1⁄8") | 10m | ea |
| 008T47-032-100 | 4.7mm (3⁄16") | 3.2mm (1⁄8") | 100m | ea |

Other sizes are available and we also stock flexible, Silicone tubing for other applications (for example, Pinch Valves).
This PTFE tubing is the recommended tubing for use with our Omni-Lok™ fittings (see following page).

# OMNI-LOK™ INVERTED CONE FITTINGS

## Removable and reusable system for quick and convenient low-pressure connections

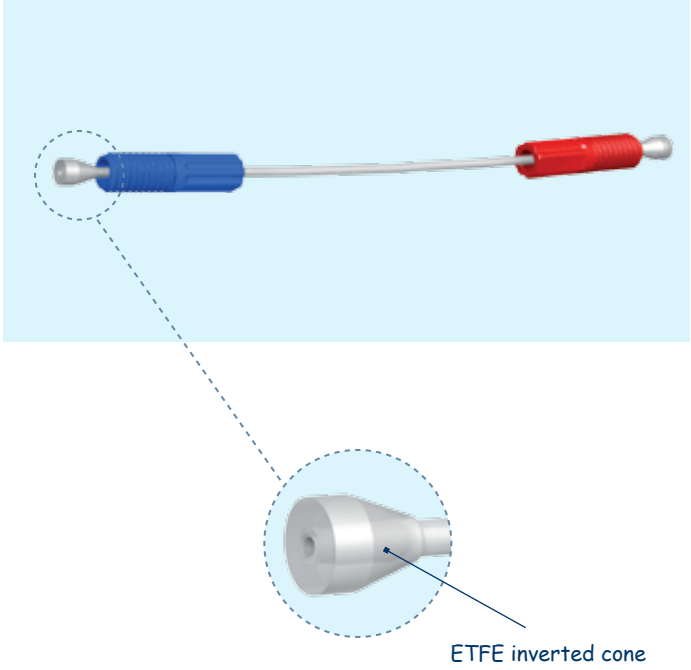
- Pressure rated up to 250psi (17 bar)
- For 1⁄16", 1⁄8" or 3⁄16" OD semi-rigid tubing e.g. PTFE, ETFE, FEP
- For flat-bottom 1⁄4"-28 UNF or 5⁄16"-24 UNF ports

Omni-Lok™ inverted cone fittings provide a simple, easy to use low-pressure connection. Only the ETFE cone and the tubing itself are in the fluid path.

No tools are required to assemble the flangeless fitting quickly and economically - just slip the fitting nut and the ETFE cone over the tubing and screw into the port. None of the parts are permanently attached to the tubing, so that the fitting nuts and inverted cones can easily be removed and re-used. A recess in the fitting nut houses the inverted cone. This allows maximum thread engagement with the port. The system seals up to 250psi (17 bar) pressure even in shallow PTFE ports. Note: The Omni-Lok™ inverted cone and fitting nut for 3⁄16" OD tubing and 5⁄16"-24 UNF flat-bottom ports is pressure rated up to 30 psi (2 bar).

Fitting nuts in robust, glass-filled polypropylene are available in a range of different colors for easy line identification. Nuts are also available in PEEK™ with standard and compact head designs (see the Omnifit® Fittings Systems Brochure for our full range).

## SPECIFICATIONS




## For 1⁄16" OD Tubing

### INVERTED CONES FOR 1⁄16" OD TUBING

| PART NUMBER | DESCRIPTION | QTY |
|---|---|---|
| 008CZ16 | ETFE inverted cone | 10pk |

### NUTS FOR 1⁄16" OD TUBING

| PART NUMBER | MATERIAL | COLOR | THREAD | QTY |
|---|---|---|---|---|
| 008NC16-YC5U | PP | Blue | 1⁄4•28 | 10pk |
| 008NC16-YC5G | PP | Green | 1⁄4•28 | 10pk |

## For 1⁄8" OD Tubing

### INVERTED CONES FOR 1⁄8" OD TUBING

| PART NUMBER | DESCRIPTION | QTY |
|---|---|---|
| 008CZ32 | ETFE inverted cone | 10pk |

### NUTS FOR 1⁄8" OD TUBING

| PART NUMBER | MATERIAL | COLOR | THREAD | QTY |
|---|---|---|---|---|
| 008NC32-YC5U | PP | Blue | 1⁄4•28 | 10pk |
| 008NC32-YC5G | PP | Green | 1⁄4•28 | 10pk |
| 008NC32-YC5N | PP | Orange | 1⁄4•28 | 10pk |
| 008NC32-YC5R | PP | Red | 1⁄4•28 | 10pk |
| 008NC32-YC5Y | PP | Yellow | 1⁄4•28 | 10pk |

**TECH TIP:**

### Need more connection options?

See the Omnifit® Fitting Systems Brochure for our full range of threaded fittings, connectors and adaptors.

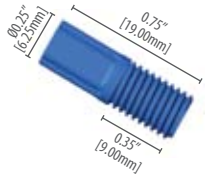
## For 3⁄16" OD Tubing

### INVERTED CONE FOR 3⁄16" OD TUBING

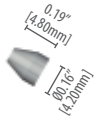
| PART NUMBER | DESCRIPTION | QTY |
|---|---|---|
| 008CZ47 | ETFE inverted cone | 10pk |

### NUTS FOR 3⁄16" OD TUBING

| PART NUMBER | MATERIAL | COLOR | THREAD | QTY |
|---|---|---|---|---|
| 008NC47-YC7U | PP | Blue | 5⁄16•24 | 10pk |

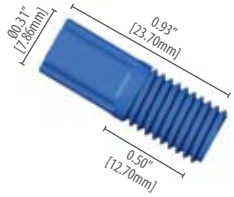



**008NC16-YC5U**
Nut for 1⁄16" OD tubing
1⁄4•28, blue

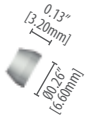



**008CZ16**
Omni-Lok™ inverted cone for 1⁄16" OD tubing

For use with 030SP, 120SP & 130SP series pumps




**008NC47-YC7U**
Nut for 3⁄16" OD tubing
5⁄16•24, blue




**008CZ47**
Omni-Lok™ inverted cone for 3⁄16" OD tubing

For use with 150SP series pumps

# MICRO-PUMP TECH TIPS

## OPERATING PARAMETERS

**Design Specifications:** Bio-Chem Fluidics' Micro-Pumps are chemically compatible with a wide range of liquids, by virtue of the materials of construction. Specifications detailed in this brochure were determined via testing with distilled water under precise conditions. This means that the dispense rate for your pump may vary depending on your specific liquid. Other factors that can have an impact on operation include:

- Orientation
- Vertical distance between fluid reservoir and pump and then between pump and collection vessel
- Bore and length of inlet and outlet tubing
- Operating temperature

*Please contact us to discuss your application and to get our recommendations for installation.*

**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.

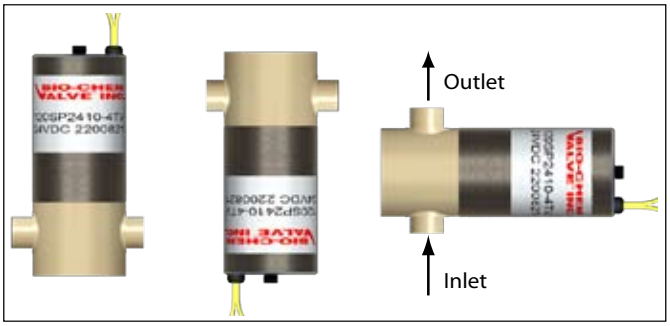
During the pump's up-stroke, suction is created on the inlet. Positive pressure is generated at the outlet during the down-stroke. When the pump is not actuated, it will shut-off flow as long as the pressure on the inlet does not exceed the maximum holding pressure. To ensure correct operation, pressure 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.

**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.

**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.

## INSTALLATION TIPS

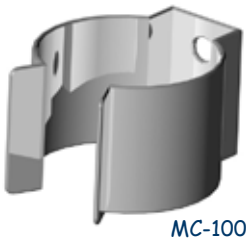
**Orientation:** Pumps should be installed with the solenoid portion of the pump pointing upwards, downwards or in a horizontal position with the outlet on top. This ensures that any air in the system will be evacuated quickly and also minimizes the effects of a pressure head acting to keep the check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




Preferred mounting positions

**Tubing:** Unlike centrifugal pumps where the outlet is normally larger than the inlet (to reduce the discharge head on the pump), our Micro-Pumps actually prefer to have the same sized tubing on the inlet and outlet. We recommend hardwall tubing for the connections and offer 1/16" OD x 1/32" ID (our part number 008T16-080) and 3/16" OD x 1/8" ID (008T47-032) PTFE tubing that can be installed using our Omni-Lok™ 1/4"-28 and 5/16"-24 fittings. For more details refer to pages 16 and 17.

**Mounting options:** The 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.



MC-100
Mounting clip

MR-100
Mounting ring

## 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. Over 90% of the Micro-Pumps we sell are customized to one extent or another. Customizable options include (but are not limited to):

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

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

## 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 our Bio-Chem Valve™ and Omnifit® brands 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 a world-class labware portfolio for the scientific community.

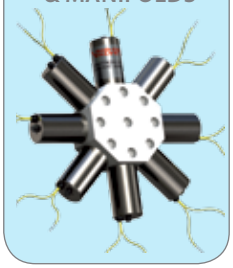
BIO-CHEM VALVE

### INERT SOLENOID VALVES AND PUMPS, ELECTRIC ROTARY VALVES

MICRO-PUMPS

ISOLATION VALVES

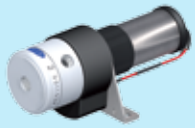
FLOW SELECTION VALVES & MANIFOLDS



PINCH VALVES

RELIEF VALVES

ELECTRIC ROTARY VALVES



Omnifit

### INERT FLUID HANDLING COMPONENTS AND LABWARE

FITTING SYSTEMS

BOTTLE CAPS & RESERVOIRS

CHROMATOGRAPHY COLUMNS

CONNECTORS & ADAPTORS

MANUAL ROTARY VALVES

FLOW CONTROL ACCESSORIES