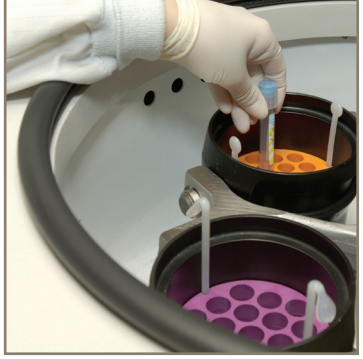
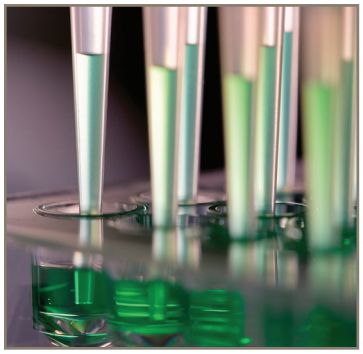




aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding


# Miniature Liquid Control Valves

## Precision Fluidics

ENGINEERING YOUR SUCCESS.

# Innovative solutions for health care success

## ENGINEERING YOUR SUCCESS.

When you partner with the global leader in motion and control technologies, expect to move your business and the world forward. From miniature solenoid valves to highly integrated automation systems, our innovations are critical to life-saving medical devices and scientific instruments used for drug discovery and pathogen detection. Not to mention, critical to decreasing time to market and lowering your overall cost of ownership. So partner with Parker, and get ready to move, well, anything.

Parker

www.parker.com/precisionfluidics 1 603 595-1500

# Table of Contents

# Ultra Low Carryover

Miniature Liquid Valve

The Ultra Low Carryover Valve features both unrivaled low carryover and the ability to reduce fluidic circuit complexity by replacing multiple valves with a single valve. The valve uses a patent pending new approach to increase throughput and decrease liquid waste by reducing wash times. Additionally, the Ultra Low Carryover Valve offers superior performance as a gradient proportioning valve for HPLC, HbA1c and other life science applications.

### Markets

- Clinical Diagnostics
- Analytical Chemistry
- Agent Detection
- Environmental Monitoring

### Applications

- Sampling
- Reagent Addition
- Flow Control
- Gradient Proportioning

### Features

Best in class low carryover performance

Four modes of operation: flow off, flow channel A, flow channel B, flow channel A + B.

Simplifies OEM instrument design by using fewer valves

Low internal volume of 4.3 µL (diaphragm seal to common port)

CE, IP-54 Rating, REACH and RoHS compliant

## Product Specifications

### Physical Properties

| | |
|---|---|
| **Valve Type:** | |
| 3 Ports with Four Modes | |
| **Media:** | |
| Liquid | |
| **Operating Environment/ Media Temperature:** | |
| 15°C to 50°C | |
| **Storage Temperature:** | |
| -20°C to 70°C | |
| **Face Seal Design** | |
| **Length:** | 1.71 in (43.4 mm) |
| **Width:** | 0.79 in (20.1 mm) |
| **Height:** | 0.66 in (16.6 mm) |
| **Weight:** | 1.53 oz (43.5g) |
| **Porting:** | Face Seal with Keying Feature |
| **¼ - 28 Design** | |
| **Length:** | 1.71 in (43.3 mm) |
| **Width:** | 1.19 in (30.2 mm) |
| **Height:** | 0.66 in (16.6 mm) |
| **Weight:** | 1.61 oz (45.6g) |
| **Porting:** | ¼ - 28 Threaded Female |

### Electrical

| | | |
|---|---|---|
| **Voltage (VDC):** | **12** | **24** |
| **Power (Watts):** | 3.0 | 3.7 |
| **Current (mA):** | 250 | 155 |
| **Resistance (Ohm):*** | 48 | 154 |

*Ω ± 10% @ 68 °F, 20 °C
Note: For actuation exceeding 100ms Hit & Hold is required.

| | |
|---|---|
| **Electrical Termination:** | Leads 4.5 in (114.3 mm) in (6.35 mm) Terminated with Molex Housing #50-57-9402 |

### Wetted Materials*

| | |
|---|---|
| **Seals:** | FFKM or EPDM |
| **Body:** | PEEK (polyetheretherketone) |
| **Regulatory:** | ROHS, REACH IP-54 Ingress Protection |
| **Mounting Options:** | Face Seal Design<br>¼ - 28 Threaded Female Design |

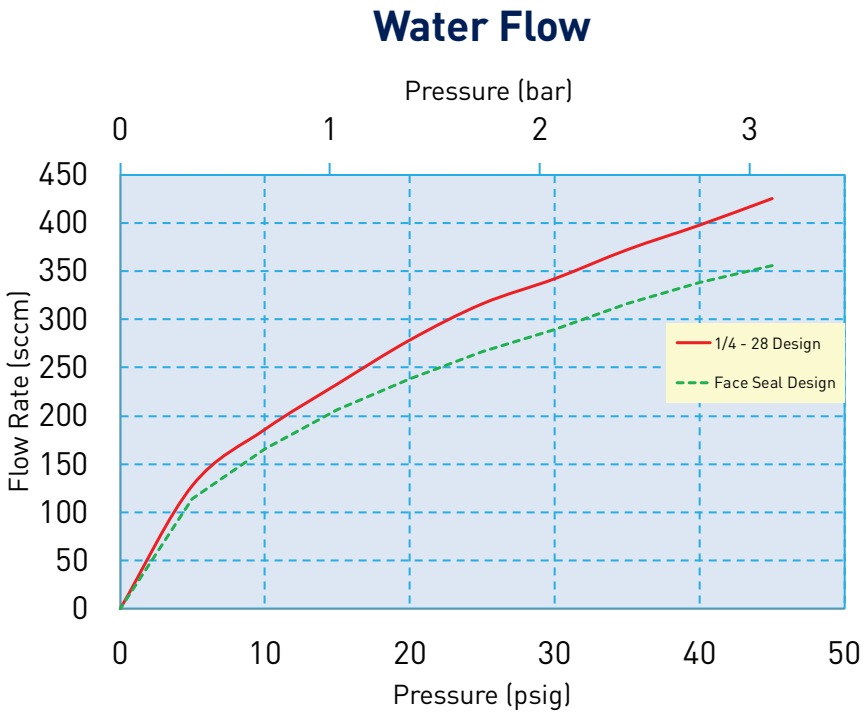
### Performance Characteristics

| | |
|---|---|
| **Leak Rate:** | |
| Bubble Tight | |
| **Operating Pressure:** | |
| 45 psig (3.1 bar) | |
| **Response Time:** | |
| <25 msec | |
| **Recommended Filtration:** 16 µm | |
| **Reliability:** 10 Million Cycles | |
| **Face Seal Design** | |
| **Internal Volume:** | 23.2 µL Port-to-Port<br>13.2 µL Diaphragm seal to common port |
| **Flow Rate:** | Water flow of 320 mL/ min @ 45 psig (3.1 bar) |
| **¼ - 28 Design** | |
| **Internal Volume:** | 14.0 µL Port-to-Port<br>4.3 µL Diaphragm seal to common port |
| **Flow Rate:** | Water flow of 395 mL/ min @ 45 psig (3.1 bar) |

*Other materials available upon request

# **Ultra Low Carryover** Miniature Liquid Valve

## Typical Flow Curve




## Electrical Interface

Wire Leads
4.5 in (114.3 mm) ±0.25 in (6.35 mm)
Terminated with Molex Housing #50-57-9402

## Liquid Interface

1/4 - 28 Design
(Threaded Connectors)

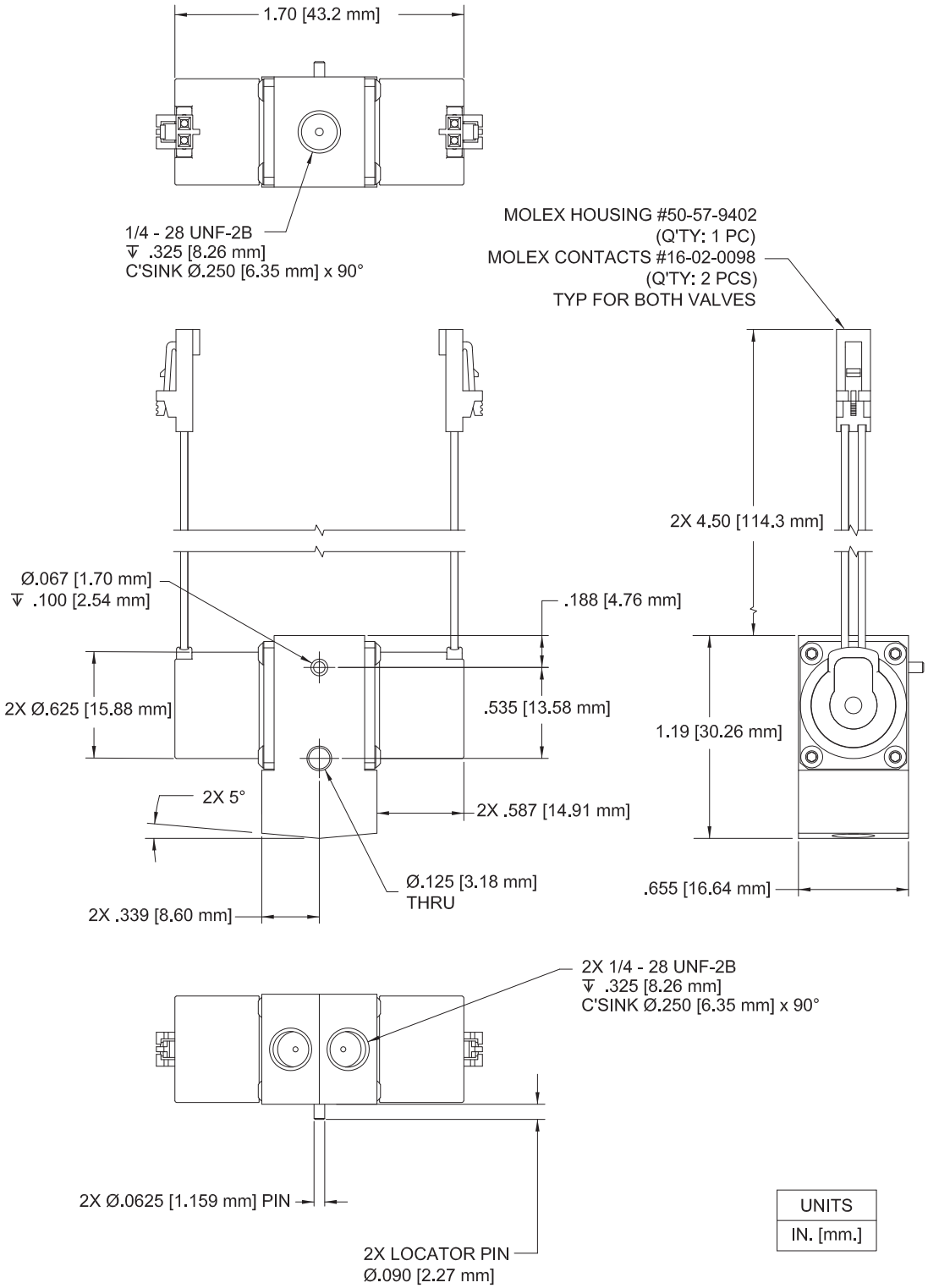
Face Seal Design
(Manifold Mount)

# **Ultra Low Carryover** Miniature Liquid Valve

## Mechanical Integration

### Dimensions

### 1/4 - 28 Design

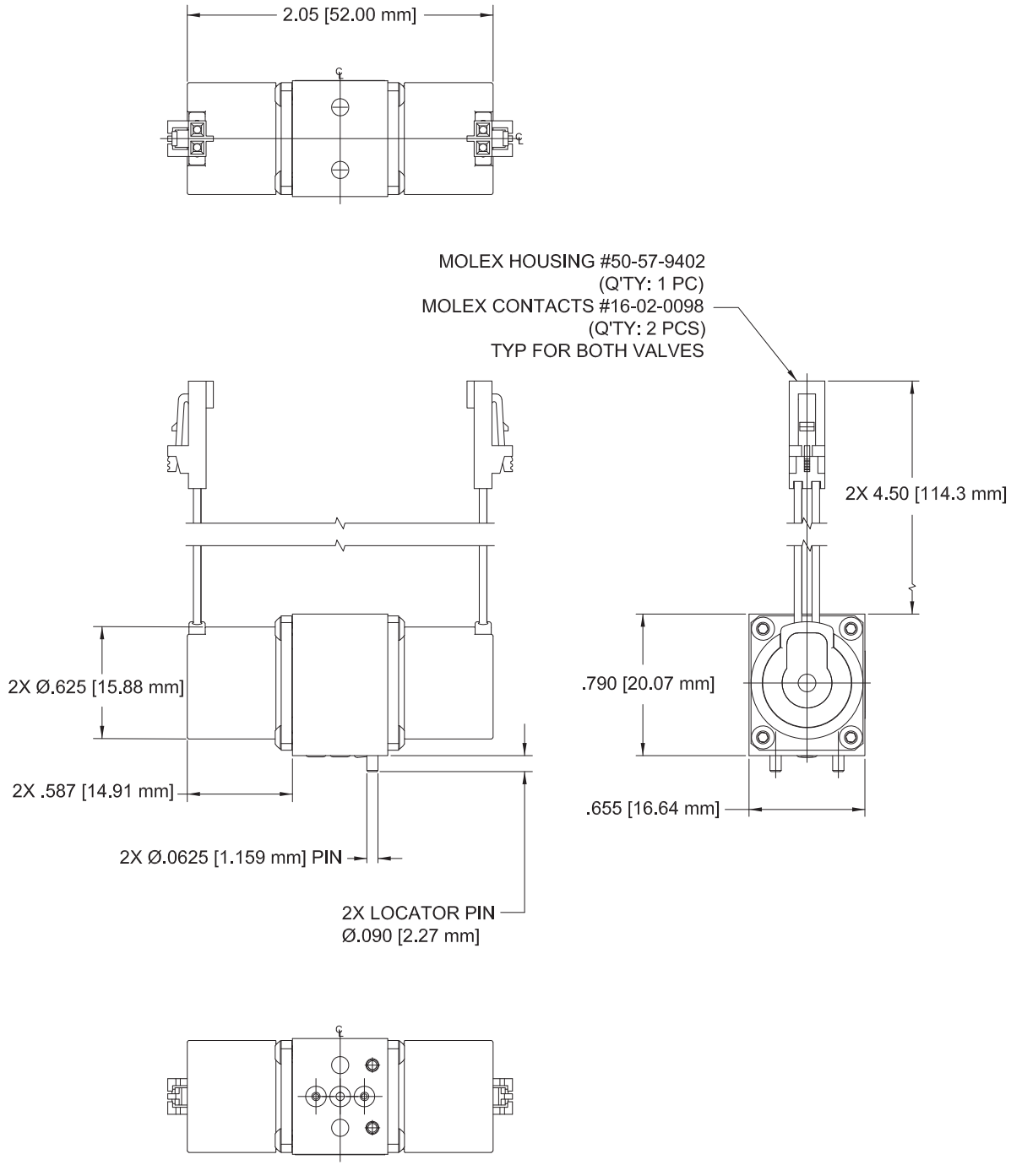


# Ultra Low Carryover Miniature Liquid Valve

## Mechanical Integration

### Dimensions

### Face Seal Design

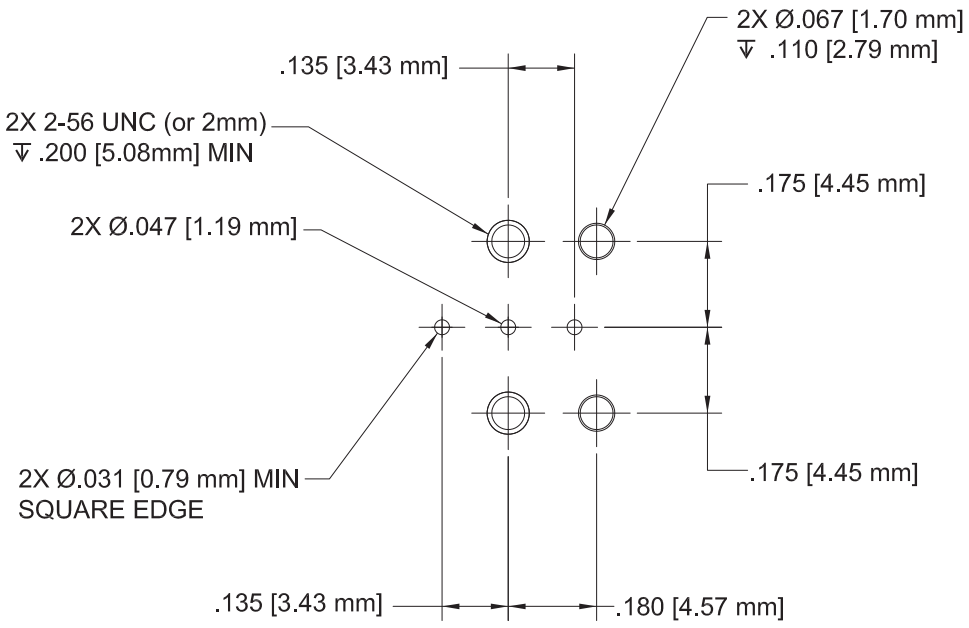



| UNITS |
| --- |
| IN. [mm.] |

# **Ultra Low Carryover** Miniature Liquid Valve

## Installation and Use

### Manifold Interface




| UNITS |
| --- |
| IN. [mm.] |

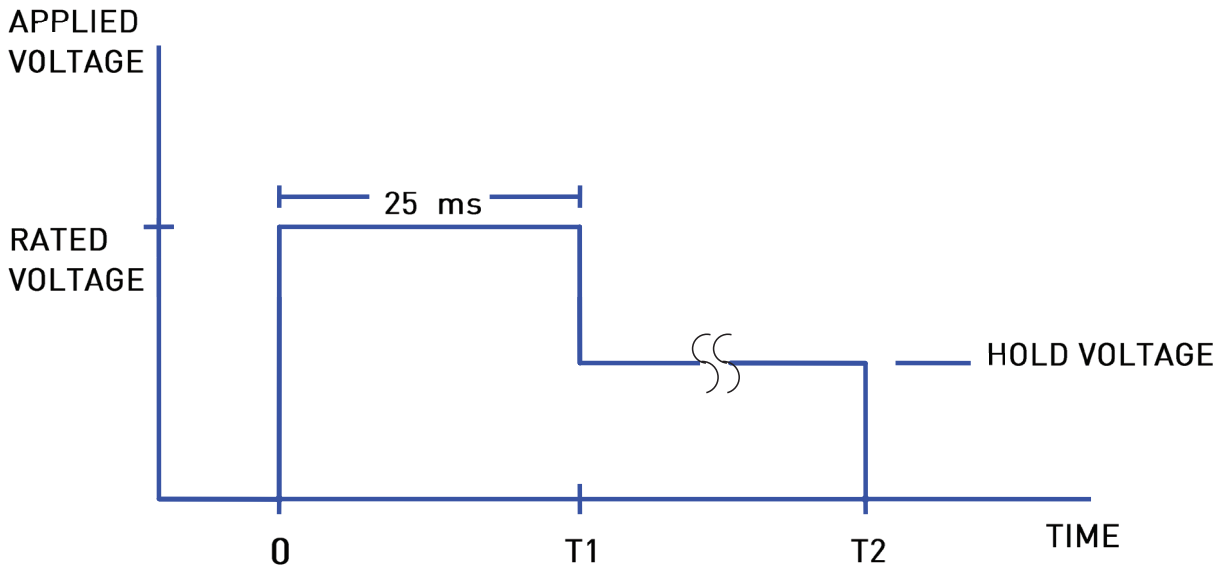
# **Ultra Low Carryover** Miniature Liquid Valve

## Hit and Hold Specifications

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24 VDC solenoids. A hit and hold circuit is required for use with actuation exceeding 100ms.

| Rated Voltage (VDC) | Hold Voltage (VDC) | Hold Power |
|---|---|---|
| 24 | 12 | 1.8 watts |
| 12 | 6 | 1.5 watts |

**Note:** Other voltages available




*Hold Voltage Graph*

# **Ultra Low Carryover** Miniature Liquid Valve

## Chemical Compatibility Chart

| | Diaphragm | | | Other Wetted Materials |
|---|---|---|---|---|
| Chemical | FFKM | or | EPDM | PEEK |
| DI Water | 1 | | 1 | 1 |
| Methanol | 1 | | 1 | 1 |
| Isopropanol | 1 | | 1 | 1 |
| Ethanol | 1 | | 1 | 1 |
| Acetonitrile | 1 | | 1 | 1 |
| Tetrahydrofuran | 2 | | 4 | 1 |
| Toluene | 1 | | 4 | 1 |
| MEK | 1 | | 1 | 1 |
| Organic Acids - Dilute | 1 | | 1 | 1 |
| Non Organic Acids - Dilute | 1 | | 1 | 1 |
| Bases - Dilute | 1 | | 1 | 1 |
| Saline | 1 | | 1 | 1 |
| Bleach 12% | 2 | | 1 | 1 |
| Sodium Hydroxide 20% | 1 | | 1 | 1 |

### Compatibility Legend

1. EXCELLENT
   Minimal or no effect
2. GOOD
   Possible swelling and or loss of physical properties
3. DOUBTFUL
   Moderate or severe swelling and loss of physical properties
4. NOT RECOMMENDED
   Severe effect and should not be considered

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for additional information.

**Regulatory** CE
**ENG61010 - 1:2010**

**IP-54 Rating** - Contact Factory For Details

**RoHS Directive** Compliant - Contact Factory For Details

**REACH** Compliant - Contact Factory For Details

# **Ultra Low Carryover** Miniature Liquid Valve

## Ordering Information

**1/4 - 28 Design**

**Face Seal Design**

**Face Seal Manifold**

| ULC- | 3 | 24 | FF | 3 | F | F | -000 |
|---|---|---|---|---|---|---|---|
| Series | Configuration | Voltage | Seal Material | Orifice | Mounting | Electrical Connection | Config |
| **ULC-** | **3**: 3 - Port / 4 - Mode | **12:** 12 VDC<br>**24:** 24VDC | **FF:** FFKM<br>**EP:** EPDM | **3:** 0.030" (0.76mm) | **F:** Face Seal<br>**4**: ¼ - 28 | **F:** Flying leads | **- 000** |

| Accessories | | |
|---|---|---|
| **Part Number** | **Description** | **Comments** |
| 890-001198-001 | ¼ - 28 Female Threaded Face Seal Manifold, 3 - Port | Allows connection of ¼ - 28 fittings to Face Seal Design |
| 191-000272-001 | 18-8 Stainless Steel Mounting Screws, #2-56 x 1" | |

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 and Media Temperature Range
- Ambient Temperature Range

For more detailed information, visit us on the Web, or call 603-595-1500.

# R9 Valve

9 mm Miniature Diaphragm Isolation Valve

The R9 delivers the liquid flow capabilities of a 16 mm valve with a 9 mm envelope. A 44% reduction in width with unrivaled flows and pressures to 100 psi. Designed to offer low carryover performance with particulate and crystallization resistance, this valve is ideally suited for today's demanding liquid handling applications. The R9 supports the performance requirements of current and future laboratory and portable instrumentation.

## Markets

- Clinical Diagnostics
- Analytical Chemistry
- Agent Detection
- Environmental Monitoring

## Applications

- Sampling
- Reagent Addition
- Flow Control
- Wash
- Waste

## Features

- High pressure options available up to 100 PSI (6.9 bar)
- Easy mounting on 9 mm centers side to side, accommodating dispense over 96 well microplates
- Low unswept volume to minimize carryover
- Particulate and crystallization resistant
- 100% tested leak rate ensures a leak tight seal on every valve
- CE, REACH,and RoHS compliant

# Product Specifications

## Physical Properties

**Valve Type:**
Diaphragm Rocker Isolation Valve

**Valve Configuration:**
3-Way Universal
2-Way Normally Closed

**Media:** Liquids

**Operating Environment/ Media Temperature:**
EPDM 32 to 122F (0 to 50c)
FFKM High Pressure (100psi, 40psi versions) 50 to 122F(10-50c)
FFKM Standard Pressure (60psi, 20psi versions) 59 to 122F (15-50c)

**Storage Temperature:**
-4 to 158°F (-20 to 70°C)

**Dimensions:**
Width: 0.34" (8.7 mm)
Depth: 1.46" (37 mm)
Length: 2.71" (68.8 mm)

**Weight:**
Face Seal Version: 1.35 oz. (38.4g)
1/4-28 or M6 version: 1.63 oz. (46.1g)

**Porting:**
Face Seal, 1/4-28 & M6

**Internal Volume:**
Face Seal: 39.4µL
1/4-28 or M6: 116.6µL

## Electrical

**Voltage (VDC):** 12 and 24 VDC ± 5%

| **Orifice:** | | **0.030" (0.76 mm)** | | | | **0.061" (1.55 mm)** | | | |
|---|---|---|---|---|---|---|---|---|---|
| MAX PRESSURE | **PSI** | Vac to 100* | | Vac to 60 | | Vac to 40* | | Vac to 20 | |
| | **BAR** | Vac to 6.9* | | Vac to 4.1 | | Vac to 2.8* | | Vac to 1.4 | |
| POWER (WATTS) | | **12V** | **24V** | **12V** | **24V** | **12V** | **24V** | **12V** | **24V** |
| | **HIT** | 7.1* | | 4.5 | 4.8 | 7.1* | | 4.5 | 4.8 |
| | **HOLD** | 1.8 | | 1.1 | 1.2 | 1.8 | | 1.1 | 1.2 |
| **Max (mA):** | | 592 | 296 | 375 | 200 | 592 | 296 | 375 | 200 |
| **Resistance: (Ohms)**:** | | 20.5 | 81 | 32 | 120 | 20.5 | 81 | 32 | 120 |

**Connections:**
2.54 mm pitch male pins, 18" (46 cm) Flying Lead Connector

*Requires hit and hold circuit
**(Ω±5% @ 68°F, 20°C)

## Wetted Materials*

**Seals:**
EPDM or FFKM

**Base:**
PEEK (polyetheretherketone)

**1/4-28 / M6 Sub Base Manifold**
PEEK (polyetheretherketone)

* See Chemical Compatibility Page
Consult factory for other options

## Performance Characteristics

**Operating Proof Pressure:**
Face Seal 200 PSI (13.8 bar)
1/4-28 and M6 150 PSI (10.3 bar)

**Leak Rate:** Bubble Tight

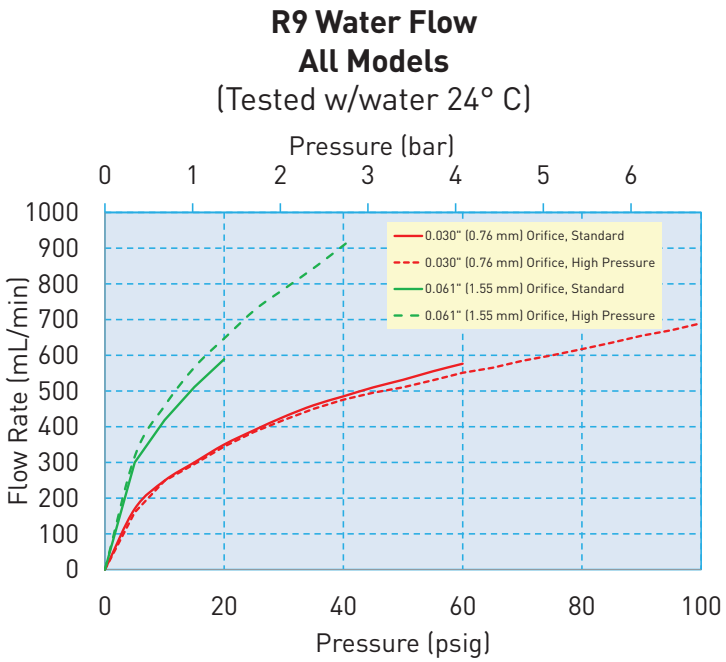
**Response Time:** 18 msec max

**Recommended Filtration:** 5 µm

**Reliability:** 10 Million Cycles

# **R9** Miniature Diaphragm Isolation Valve

## Typical Flow Curve




## Electrical Interface

Male Pins
(2.54 mm pitch male pins)

Wire Leads*
18" (46 cm)

*Custom lead length available.

## Liquid Interface

Face Seal
(Manifold Mount)

1/4 - 28 Ports
(Threaded Connector)

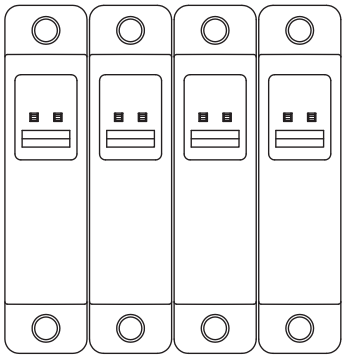
M6 Ports
(Threaded Connector)

Locater pins help prevent mounting the valve backwards and ensure proper alignment of the ports to the fluid passageways in the manifold. Pins prevent a 2-way valve from being mounted in the place of a 3-way valve and vice versa.
Molex® Connector Female P/N 22-01-2027 / Molex® Terminal Crimp Socket P/N 08-52-0105 or P/N 08-52-0106

# **R9** Miniature Diaphragm Isolation Valve

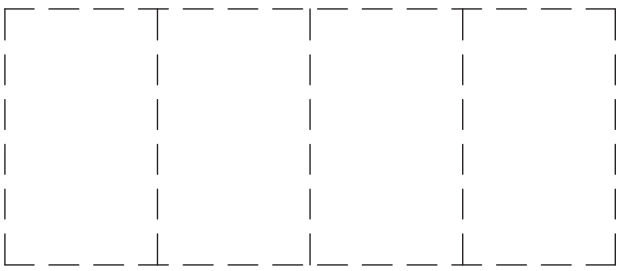
R9

**Footprint Comparison to 16 mm Valve**



FOOTPRINT OF 4 R9 VALVES

44% REDUCTION IN
WIDTH RESULTS IN 39%
REDUCTION IN AREA



FOOTPRINT OF 4 16mm VALVES

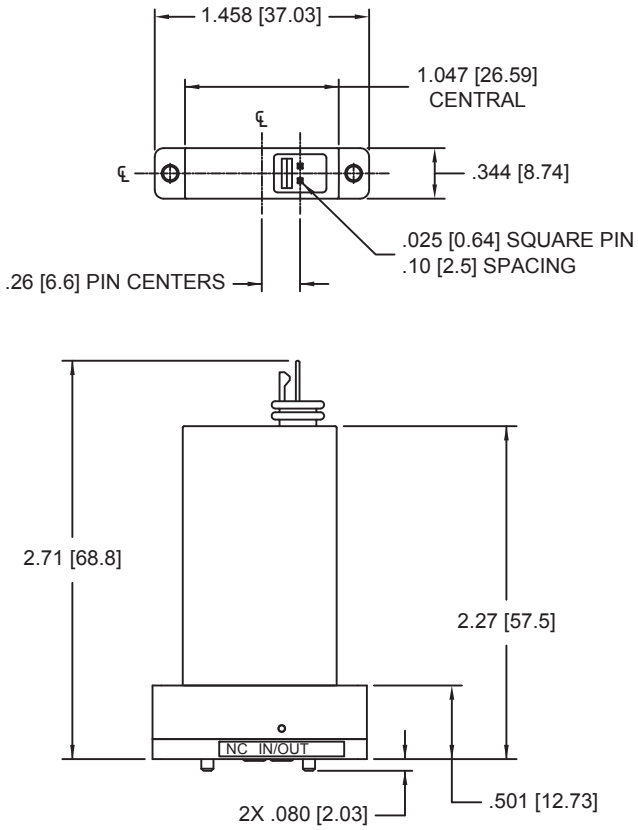
# **R9** Miniature Diaphragm Isolation Valve

## Mechanical Integration

### Dimensions

**2-Way Dimensions**

**FACE SEAL**




| UNITS |
| --- |
| IN. [mm.] |

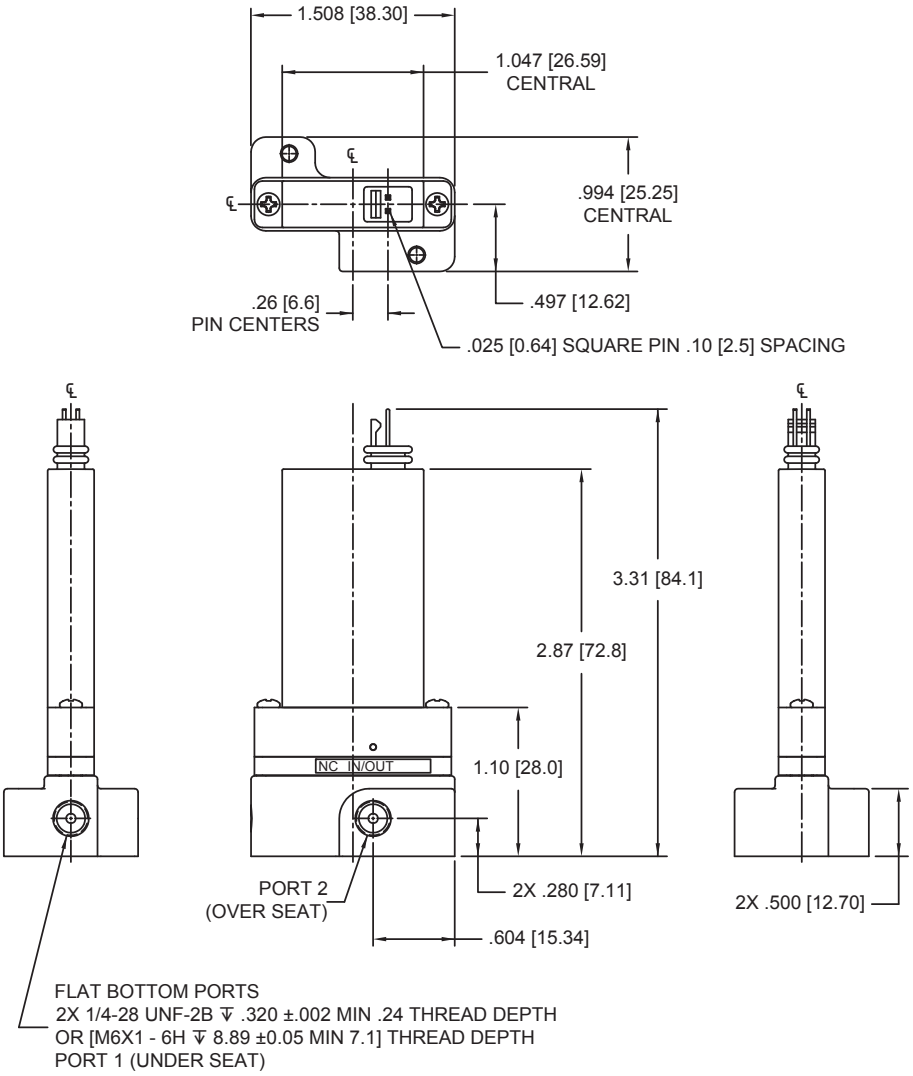
# **R9** Miniature Diaphragm Isolation Valve

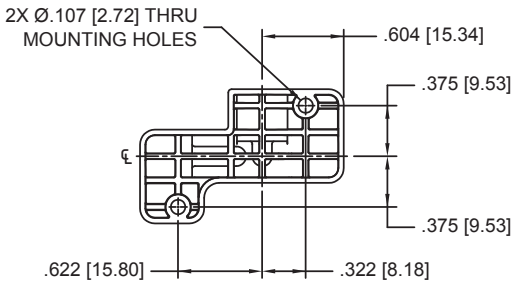
## Mechanical Integration

### Dimensions

#### 2-Way Dimensions

**1/4-28 OR M6 SUB BASE**




| UNITS |
| --- |
| IN. [mm.] |

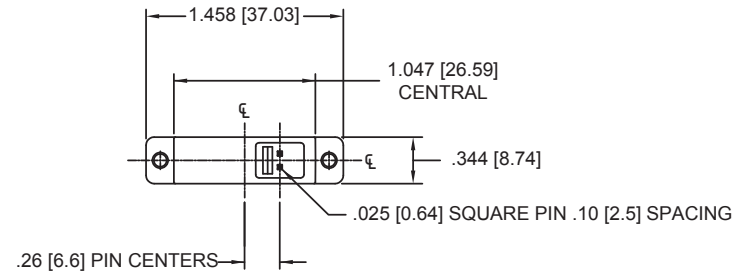
# **R9** Miniature Diaphragm Isolation Valve

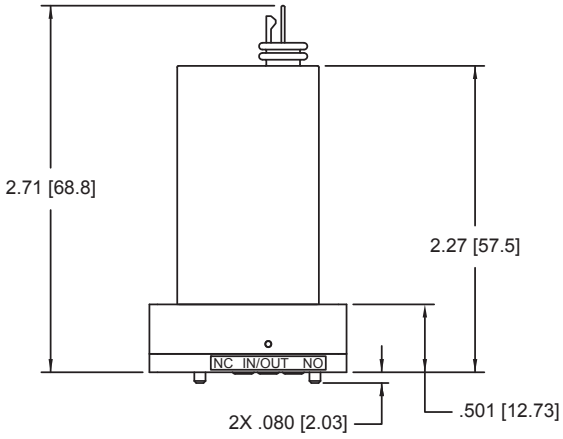
## Mechanical Integration

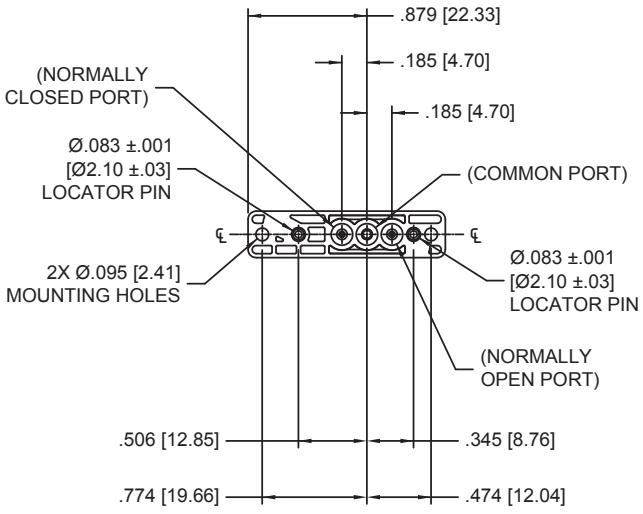
### Dimensions

### 3-Way Dimensions

**FACE SEAL**




| UNITS |
| --- |
| IN. [mm.] |

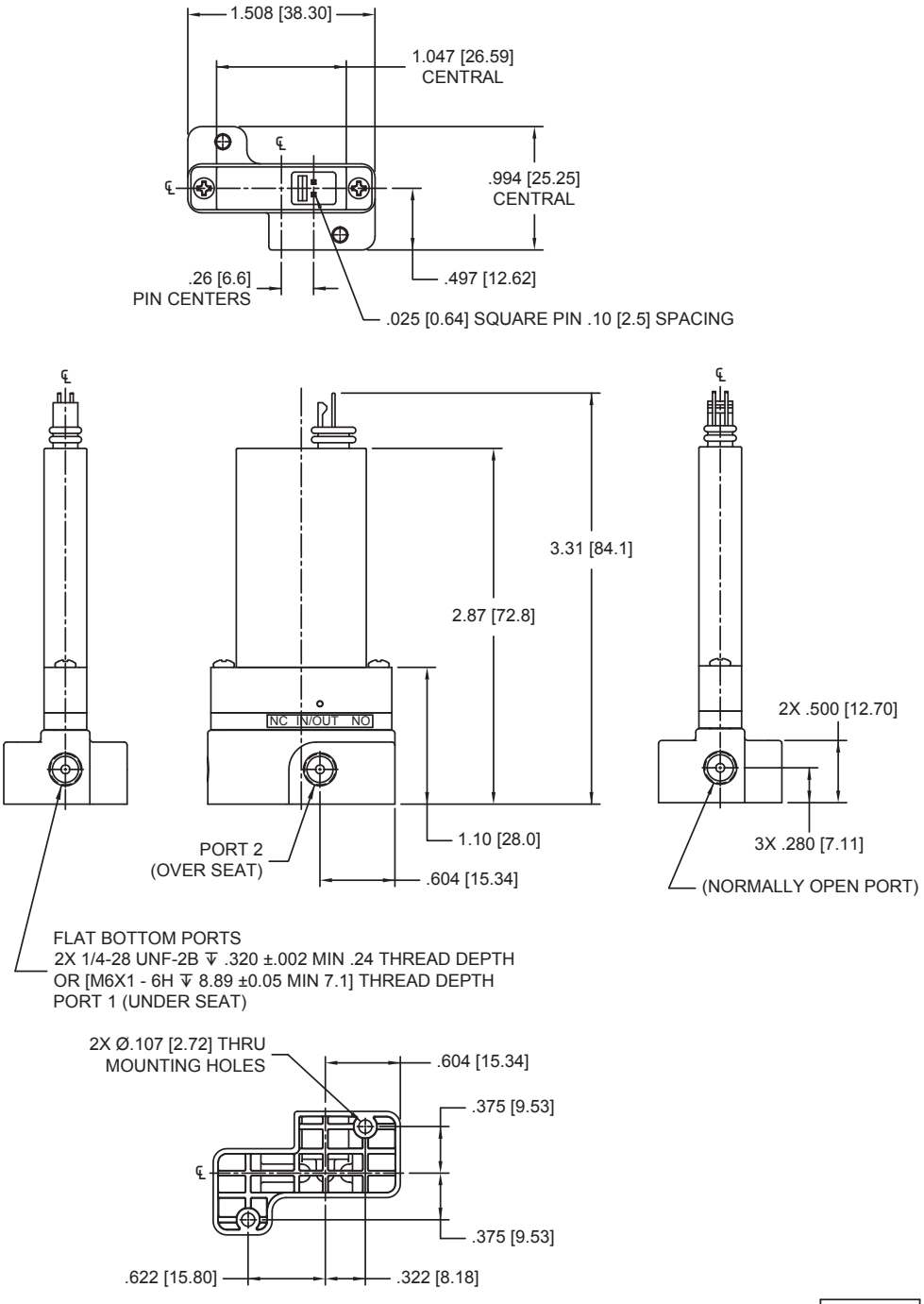
# **R9** Miniature Diaphragm Isolation Valve

## Mechanical Integration

### Dimensions

**3-Way Dimensions**

**1/4 -28 OR M6**



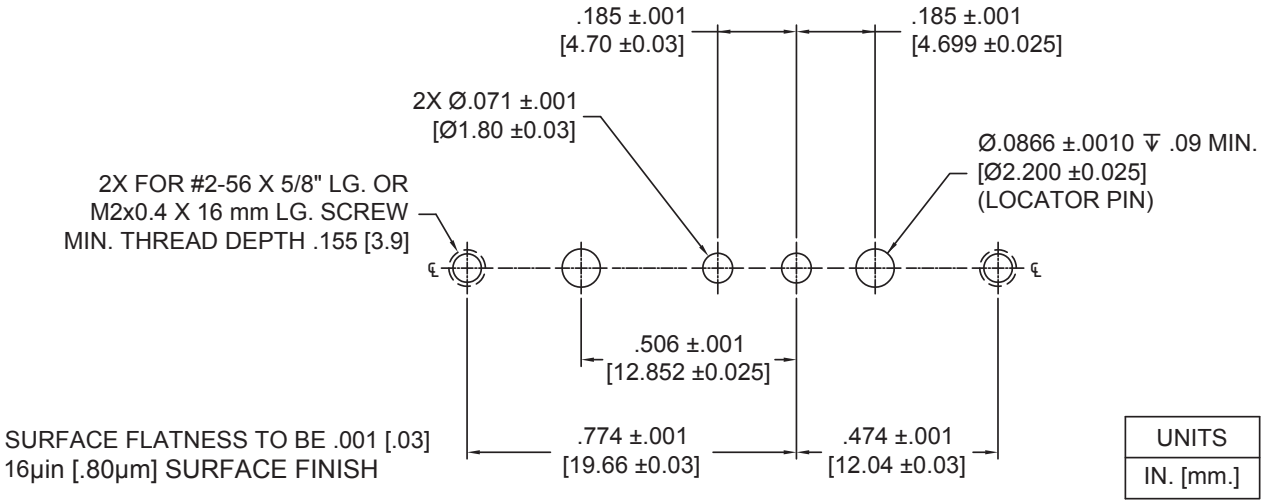

| UNITS |
| --- |
| IN. [mm.] |

# **R9** Miniature Diaphragm Isolation Valve

## Installation and Use

### R9 Manifold Interface
### Recommended R9 Valve Mounting

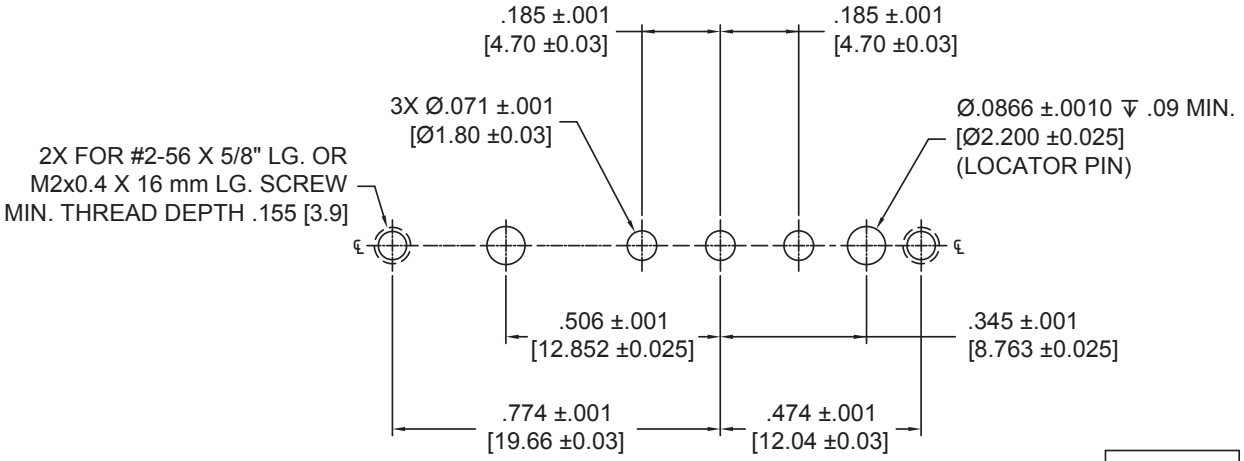
#### R9 2-WAY MANIFOLD INTERFACE




SURFACE FLATNESS TO BE .001 [.03]
16µin [.80µm] SURFACE FINISH

| UNITS |
|---|
| IN. [mm.] |

#### R9 3-WAY MANIFOLD INTERFACE



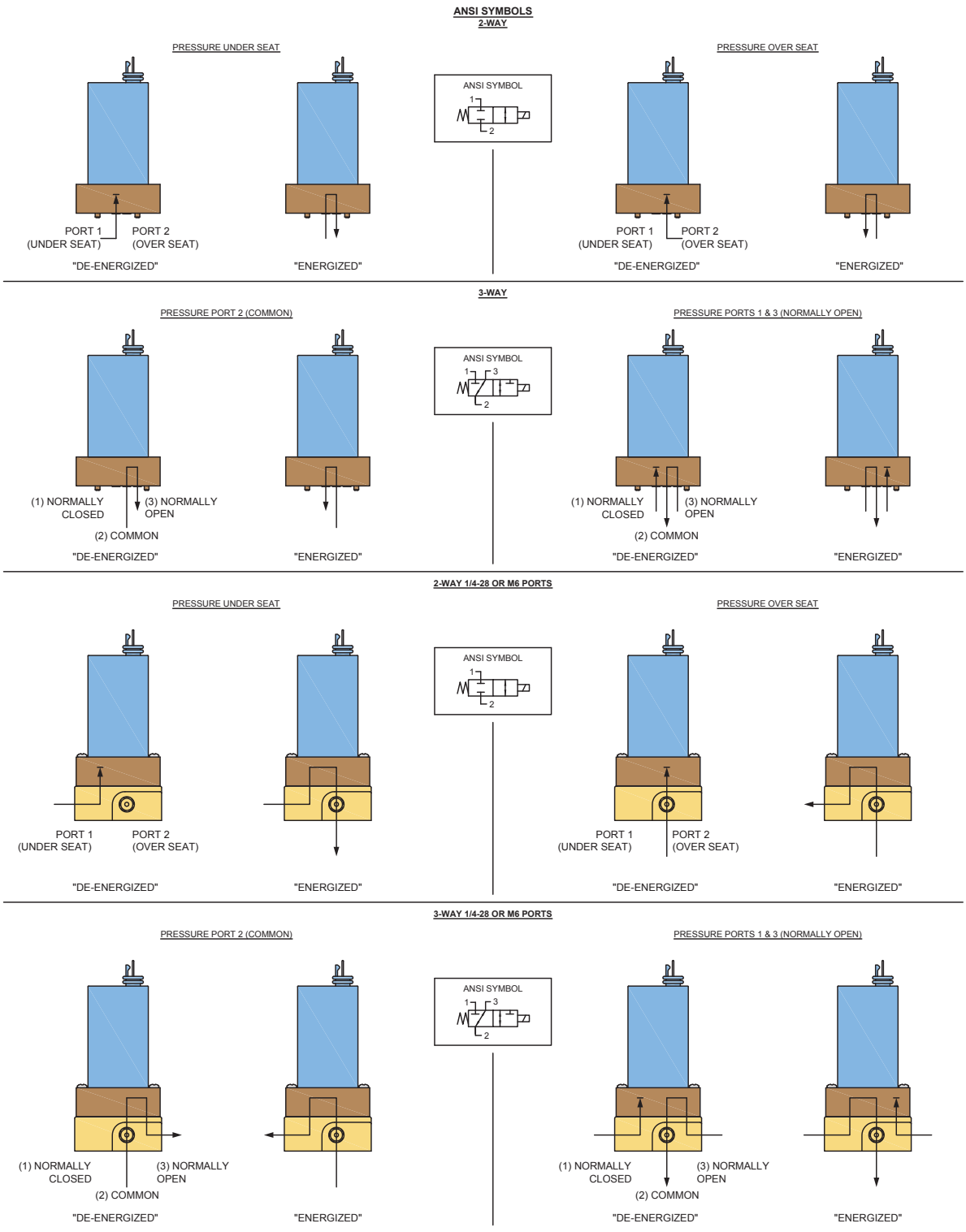

SURFACE FLATNESS TO BE .001 [.03]
16µin [.80µm] SURFACE FINISH

| UNITS |
|---|
| IN. [mm.] |

# **R9** Miniature Diaphragm Isolation Valve

## ANSI Symbols

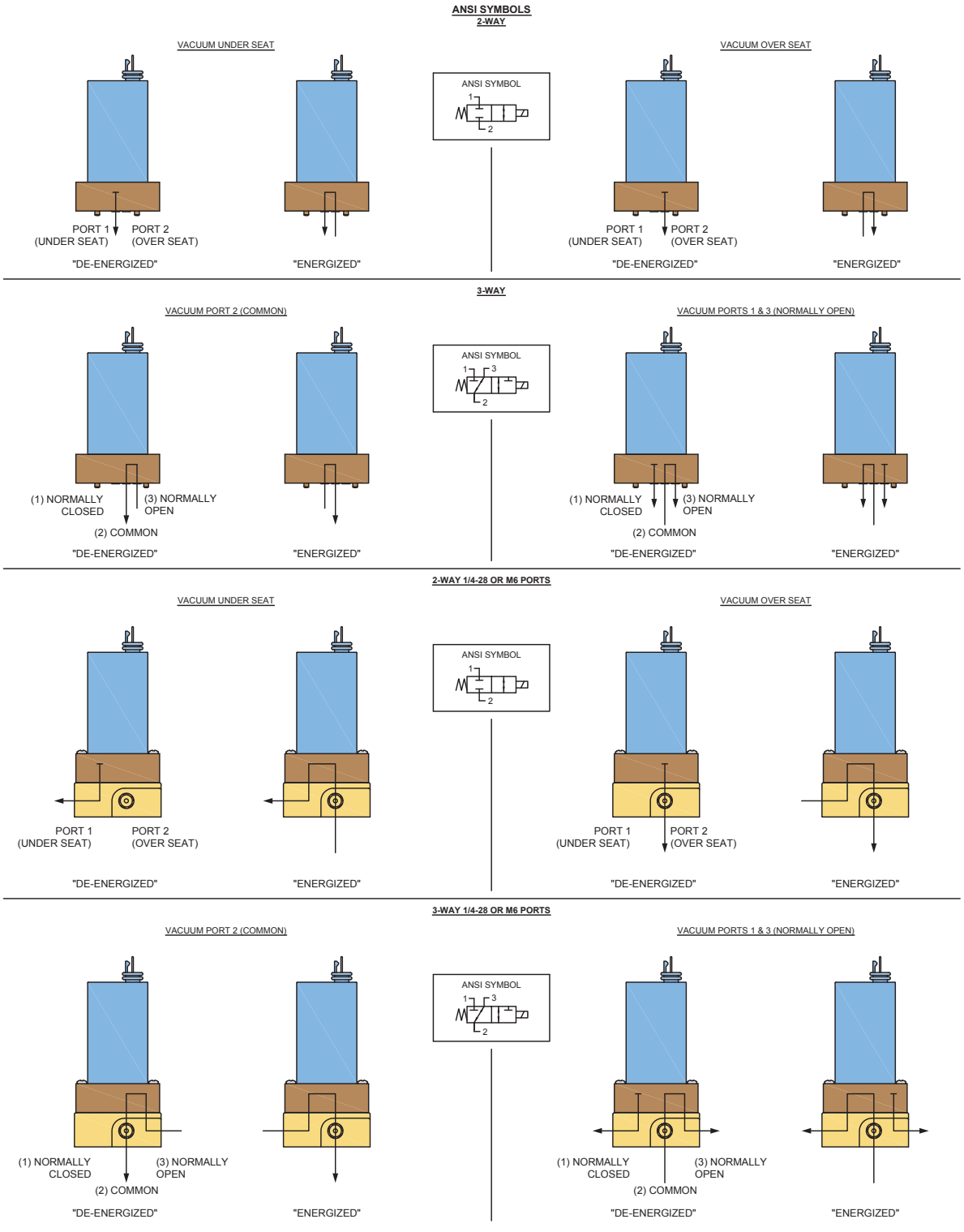
### Pressure



# **R9** Miniature Diaphragm Isolation Valve

## ANSI Symbols

### Vacuum



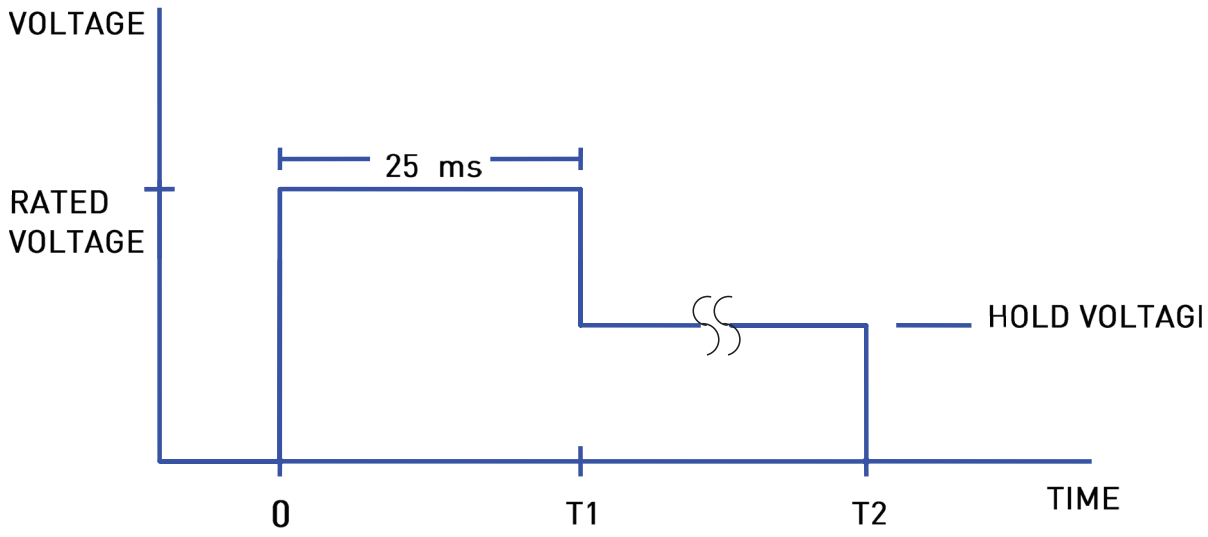
# **R9** Miniature Diaphragm Isolation Valve

## Hit and Hold Specifications

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24 VDC solenoids. A hit and hold circuit is required for use with the high pressure version.

| Rated Voltage (VDC) | High Pressure Versions* 100 PSI (6.9 bar) & 40 PSI (2.8 bar) Max | | Standard Versions 60 PSI(4.1 bar) & 20 PSI (1.4 bar)Max | |
|---|---|---|---|---|
| | Hold Voltage | Hold Power | Hold Voltage | Hold Power |
| 24 | 12VDC | 1.8 watts | 12VDC | 1.2 watts |
| 12 | 6VDC | 1.8 watts | 6VDC | 1.1 watts |

*Requires hit and hold circuit




*Hold Voltage Graph*

# **R9** Miniature Diaphragm Isolation Valve

## Chemical Compatibility Chart*

| | Diaphragm | | | Other Wetted Materials |
|---|---|---|---|---|
| Chemical | FFKM | or | EPDM | PEEK |
| DI Water | 1 | | 1 | 1 |
| Methanol | 1 | | 1 | 1 |
| Isopropanol | 1 | | 1 | 1 |
| Ethanol | 1 | | 1 | 1 |
| Acetonitrile | 1 | | 1 | 1 |
| Tetrahydrofuran | 2 | | 4 | 1 |
| Toluene | 1 | | 4 | 1 |
| MEK | 1 | | 1 | 1 |
| Organic Acids - Dilute | 1 | | 1 | 1 |
| Non Organic Acids - Dilute | 1 | | 1 | 1 |
| Bases - Dilute | 1 | | 1 | 1 |
| Saline | 1 | | 1 | 1 |
| Bleach 12% | 2 | | 1 | 1 |
| Sodium Hydroxide 20% | 1 | | 1 | 1 |

### Compatibility Legend

1. EXCELLENT
   Minimal or no effect
2. GOOD
   Possible swelling and or loss of physical properties
3. DOUBTFUL
   Moderate or severe swelling and loss of physical properties
4. NOT RECOMMENDED
   Severe effect and should not be considered

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for additional information.

**Regulatory** CE
**EMC Directive:**
IEC61000-4-2: 2008-12 ESD - Criterion A
IEC61000-4-3: 2010-04 Radiated Susceptibility - Criterion A
CISPR11: 2010-05 Radio Frequency Emission - Class B

**Low Voltage Directive**
IEC61010-1: 3rd 2010-06 Sec. 10.1 Surface temperature limits for protection against burns

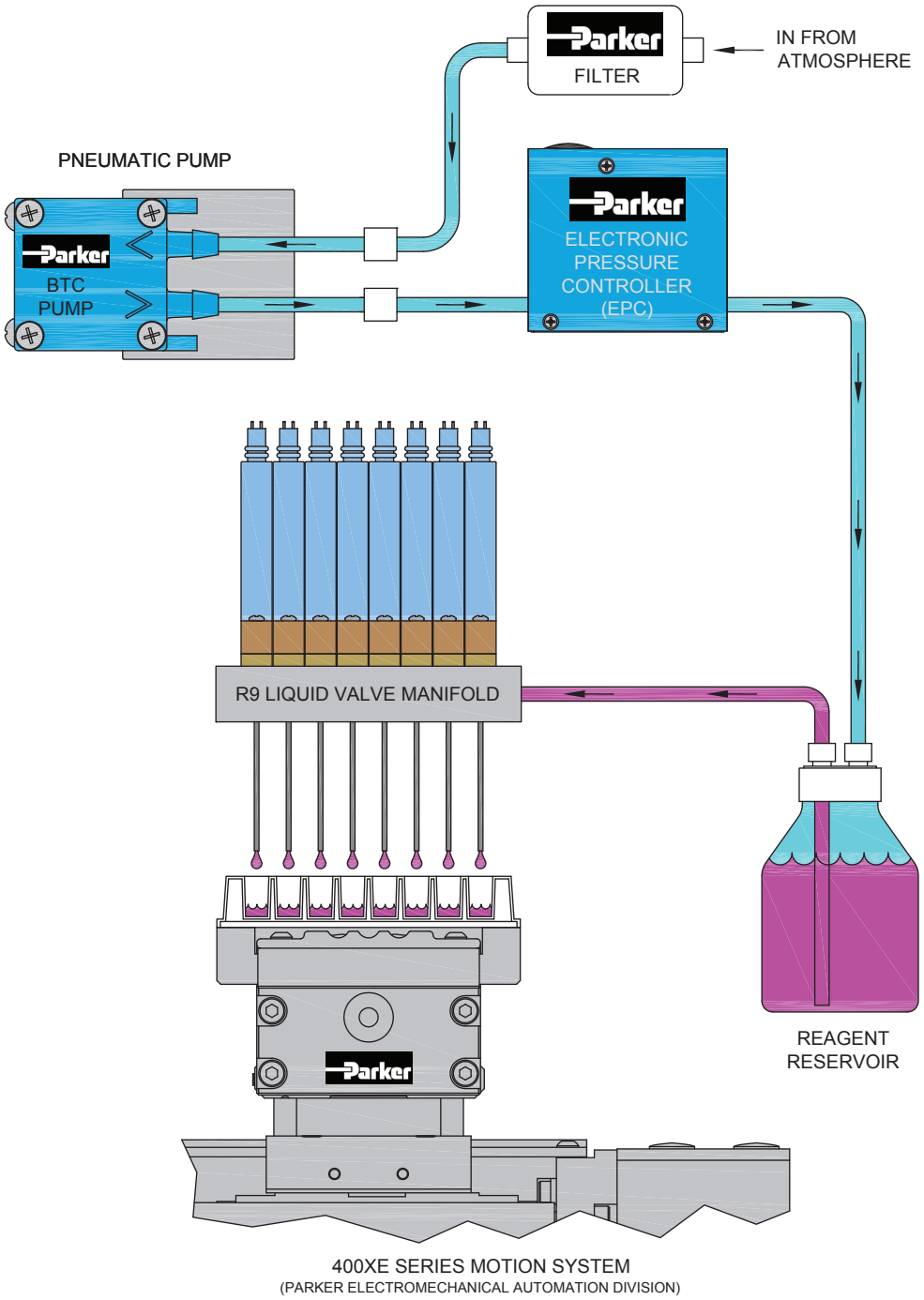
**RoHS Directive (2002/95/EC)** RoHS

**REACH EC 1907/2006** REACH

# **R9** Miniature Diaphragm Isolation Valve

## Typical Flow Diagram

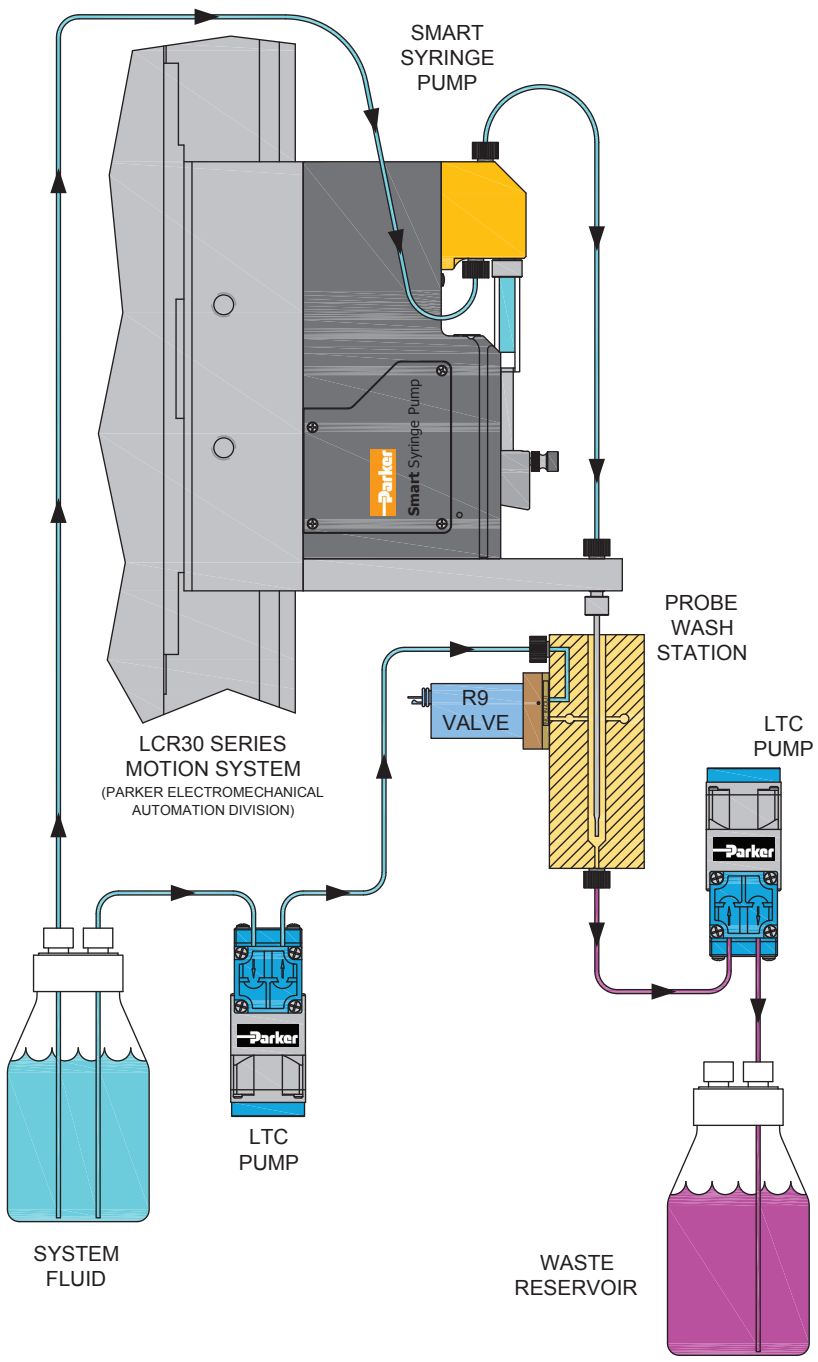
### 9 mm on Center Dispense Application



# **R9** Miniature Diaphragm Isolation Valve

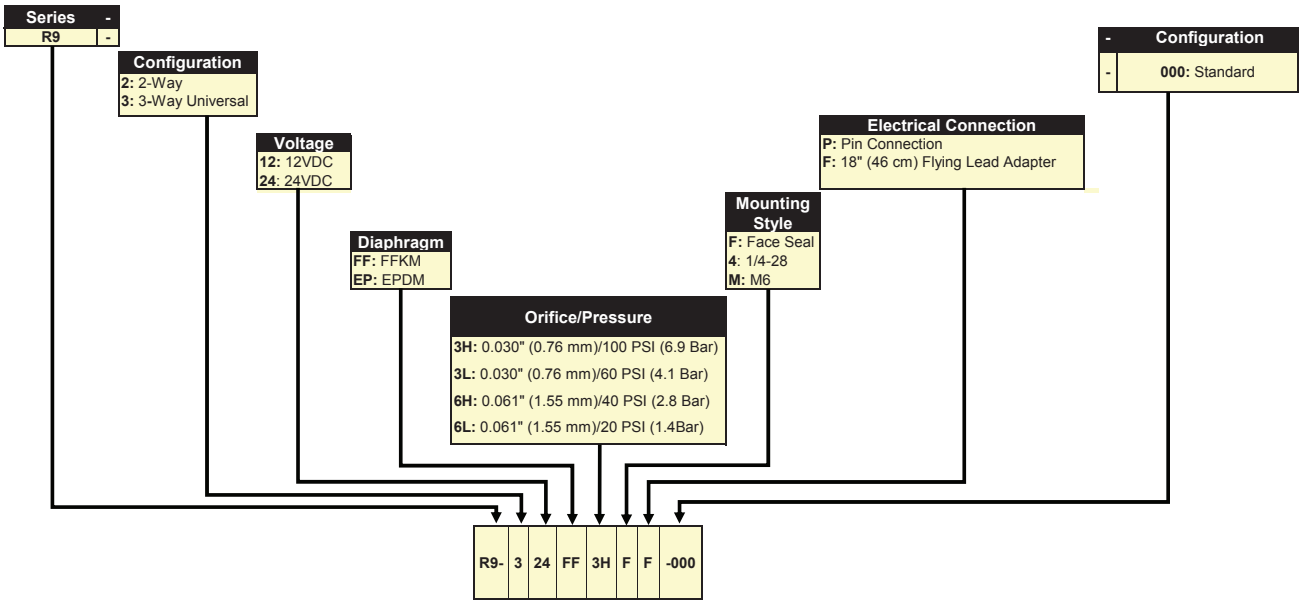
## Typical Flow Diagram

**Probe Wash Station**



# **R9** Miniature Diaphragm Isolation Valve

## Ordering Information




**Example Part Number** — **Three way, 24 Volt, FFKM Diaphragm/seals, 0.030" (0.76 MM) orifice, 100PSI (6.9 Bar) Max Pressure, Face Seal, 18"(46 cm) flying lead adapter. (Screws sold separately)**

| Accessories | |
|---|---|
| **Part Number** | **Description** |
| R9-0003-016 | 1/4 - 28 Female Threaded Sub Base Manifold, 2-Way |
| R9-0001-016 | 1/4 - 28 Female Threaded Sub Base Manifold, 3-Way |
| R9-0004-016 | M6 Female Threaded Sub Base Manifold, 2-Way |
| R9-0002-016 | M6 Female Threaded Sub Base Manifold, 3-Way |
| LQX-0001-290-001 | 18" (46 cm) Flying Lead Adapter |
| M2-0004-630-PNPH | Mounting Screw, SST 18-8, Metric, 16 MM LG (2 Required) |
| 002-0056-625PNPH | Mounting Screw, SST 18-8, 2-56, 5/8" LG (2 Required) |
| R9-0001-300 | FFKM O-Ring |
| R9-0002-300 | EPDM O-Ring |

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 and Media Temperature Range
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/R9) to configure your R9 Miniature Diaphragm Isolation Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# C7 Valve **Miniature Cartridge Liquid Valve**

7 mm Miniature Liquid Cartridge Valve

The Series C7 is a miniature cartridge style solenoid valve with a compact 7 mm diameter. This unique design combines small size, light weight and low power consumption with high flow repeatability and fast response time over an exceptionally long life, up to 130 million cycles. Available in 2-way configurations, the valve is manifold mounted utilizing a simple securing system reducing assembly time.

## Markets

- Analytical Chemistry
- Clinical Diagnostics
- Environmental Monitoring
- Print

## Applications

- Reagent Addition
- Wash
- Waste
- Flow Control
- Large format Inkjet systems

## Features

- Variety of orifice sizes with pressures up to 145 PSI (10 bar).
- Floating frictionless plunger enables reliable and repeatable operation up to 130 Million cycles.
- Low power design reduces heat and energy consumption.
- Cartridge configuration enables compact integration saving space and weight.
- Simple mechanical fastening prevents valve being dislodged due to vibration or pressure spikes.
- RoHS & REACH compliant.

# Product Specifications

## Mechanical

**Valve Type:**
Solenoid Cartridge Valve
2-Way Normally Closed (NC)

**Media:** Gases* and Liquids
(For gas performance see the Gas datasheet)

**Operating Environment:**
32°F to 122°F (0°C to 50°C)

**Storage Environment:**
-40°F to 158°F (-40°C to 70°C )

**Dimensions:**
- Diameter: 0.28 in (7 mm)
- Length: 0.79 in (20 mm)

**Porting:**
- Cartridge Seal

**Weight:** 0.11 oz (3.1 g)

**Internal Volume:**
2-Way: 81µL

| Orifice | | 0.012 in (0.3 mm) | 0.020 in (0.5 mm) | 0.031 in (0.8 mm) | 0.039 in (1.0 mm) |
|---|---|---|---|---|---|
| Max Vacuum & Pressure | Type | 2-Way | 2-Way | 2-Way | 2-Way |
| | PSI | 145 | 116 | 73 | 43.5 |
| | Bar | 10 | 8 | 6 | 3 |
| | SCCM (water) | 146 | 260 | 429 | 415 |

## Electrical

**Voltage (VDC):**
12 and 24 VDC ± 5%
(Other voltages available on request.)

**Electrical Connections:**
3.2 in (80 mm) Flying Leads

**Power:**
Typical 0.5W - 1.2W
*(Please see Table 1 for more details)*

## Wetted Materials

**Body:**
Stainless Steel Series 300 and 400

**Seals: (Internal and External)**
FKM, EPDM
FFKM on request

## Performance Characteristics

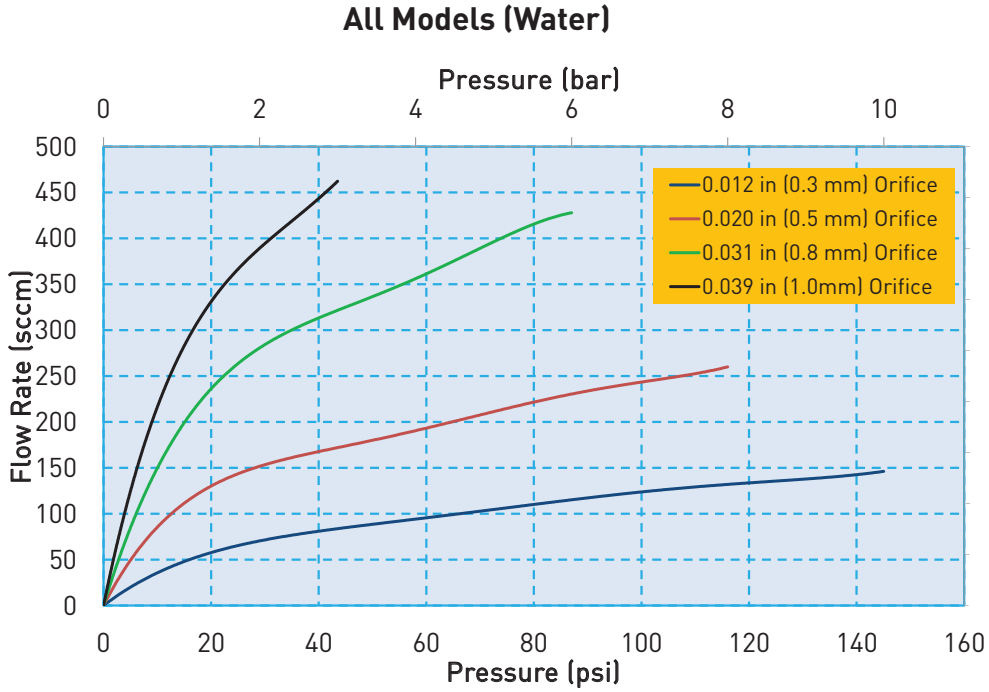
**Response:**
10 ms Maximum, Cycling

**Recommended Filtration:**
0.3 mm Orifice
5 µm
0.5 mm, 0.8 mm, & 1.0 mm Orifice
10 µm

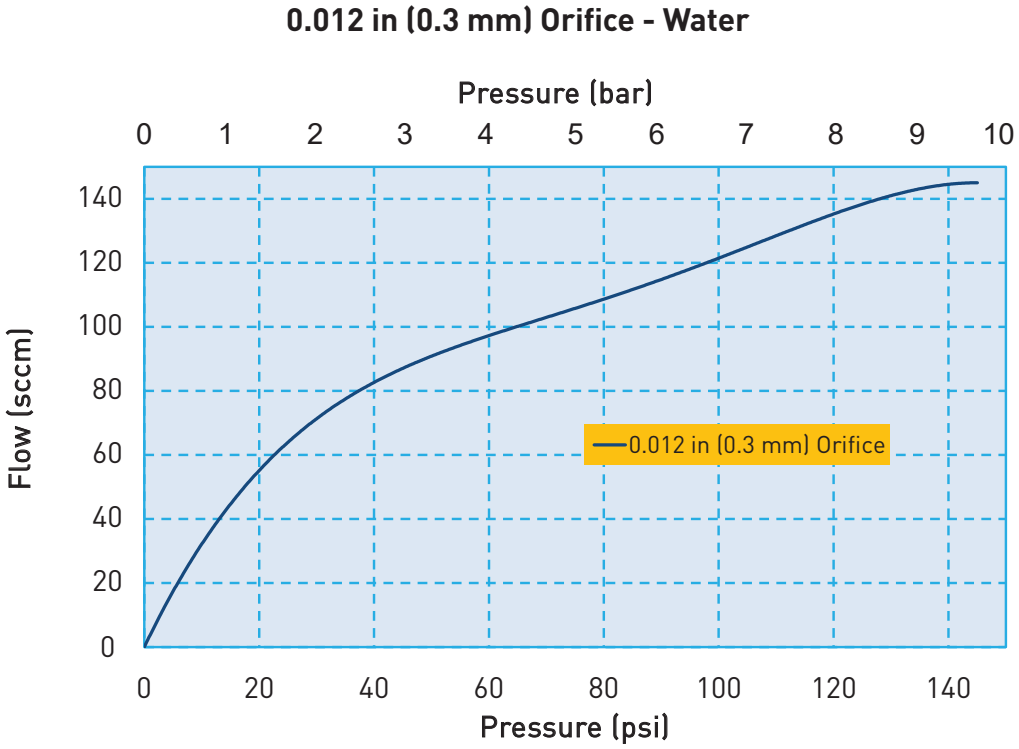
**Reliability:**
2-Way: 130 Million Cycles
0.90 Reliability Factor
95% Confidence

# **C7** Miniature Liquid Cartridge Valve

## Flow Curve

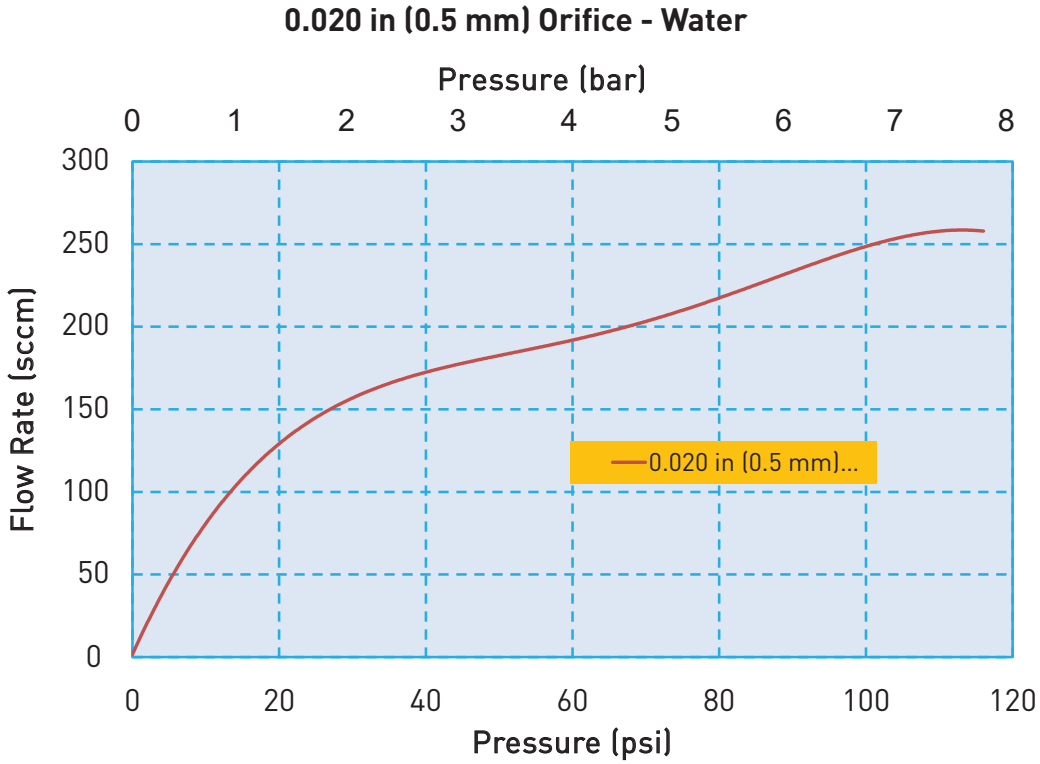


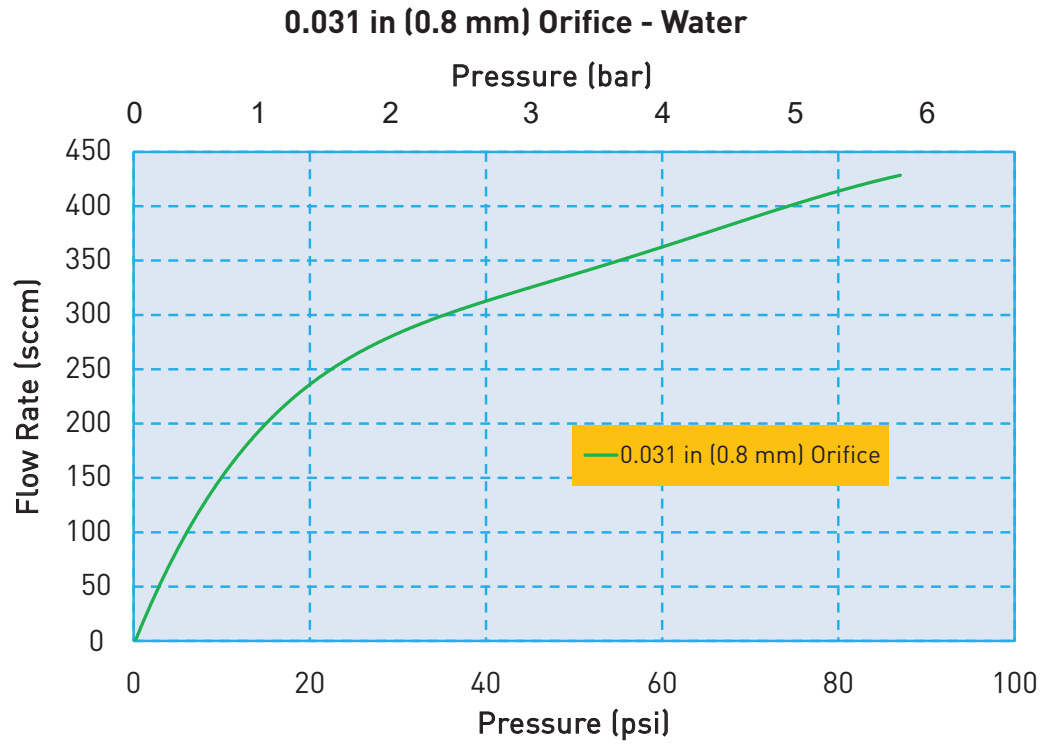

## Flow Curve



# **C7** Miniature Liquid Cartridge Valve

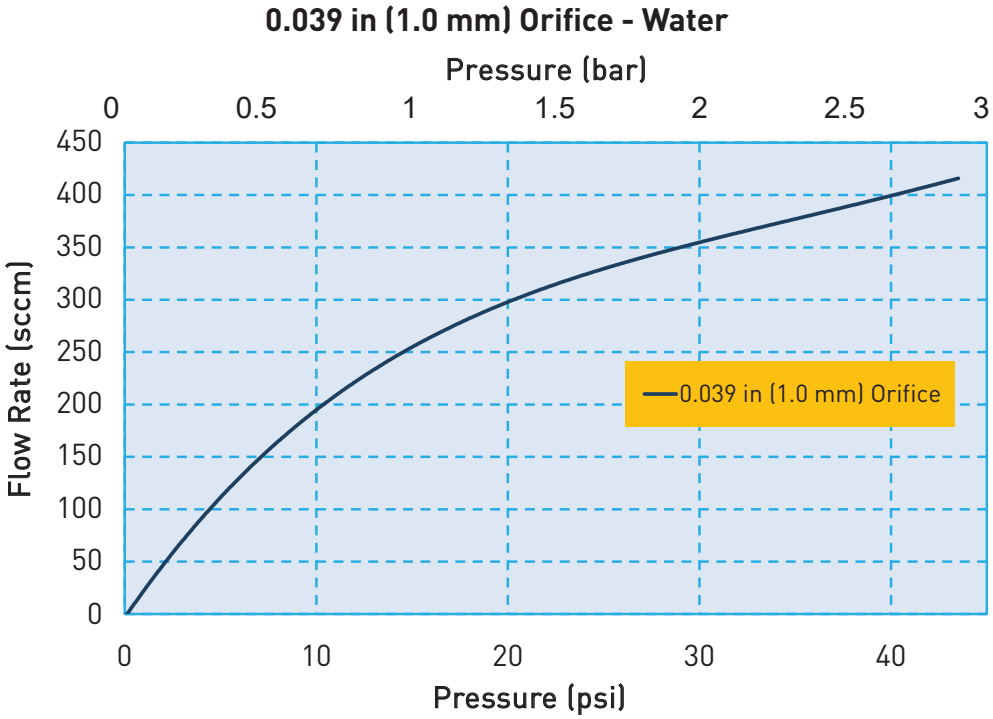
## Flow Curve



# **C7** Miniature Liquid Cartridge Valve

## Flow Curve




## Electrical Interface

**Wire Leads**
**Standard: 3.2 in (80 mm) Wire Leads, stripped at end**

# **C7** Miniature Liquid Cartridge Valve

## Electrical Requirements

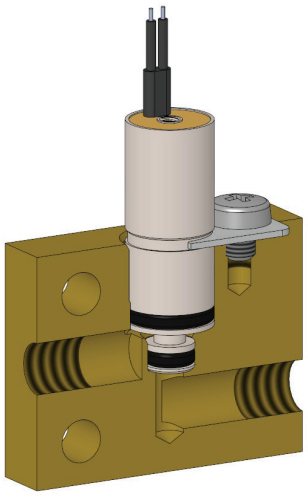
**Table 1**

| Orifice | 0.012 in (0.3 mm) | | 0.020 in (0.5 mm) | | 0.031 in (0.8 mm) | | 0.039 in (1.0 mm) | |
|---|---|---|---|---|---|---|---|---|
| Valve Type | 2-Way | | 2-Way | | 2-Way | | 2-Way | |
| Voltage (VDC)* | 12 | 24 | 12 | 24 | 12 | 24 | 12 | 24 |
| Power (Watts) | 0.5 | 0.6 | 1 | 0.85 | 1 | 1.2 | 1 | 1.2 |
| Resistance (Ohm)** | 288 | 995 | 140 | 700 | 140 | 495 | 140 | 495 |

* ± 5%, other voltages available on request

** ±5% @ 68°F, 20°C

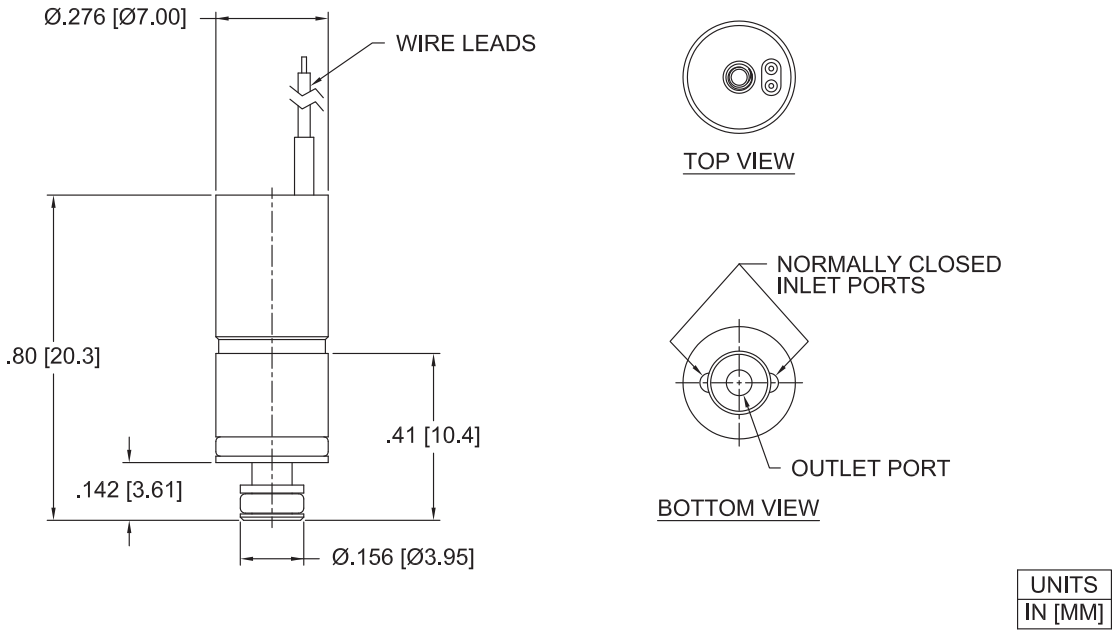
## Liquid Interface/Mechanical Integration



# **C7** Miniature Liquid Cartridge Valve

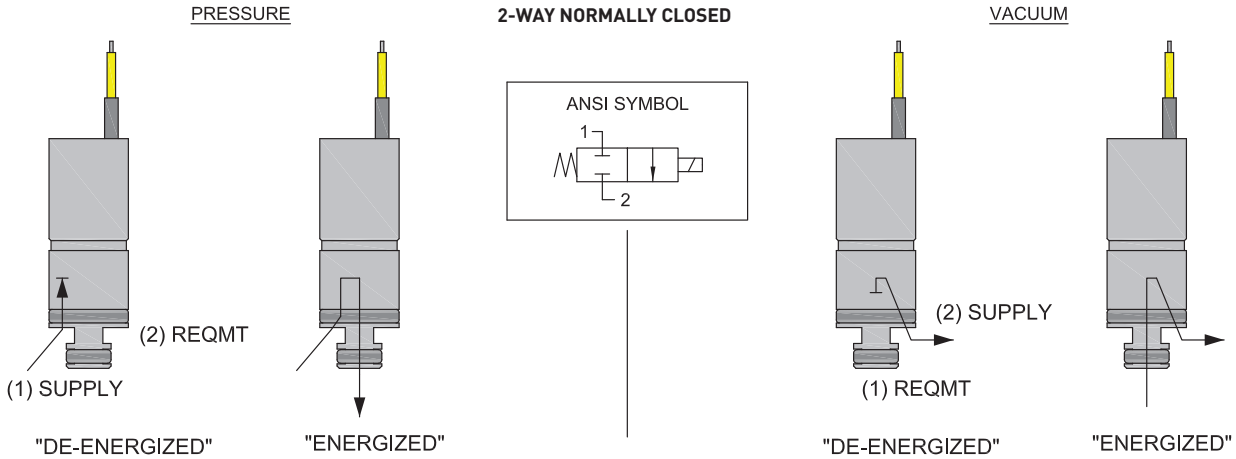
## Dimensions

### 2-Way Valve Configuration




## ANSI Symbols

### 2-Way Normally Closed

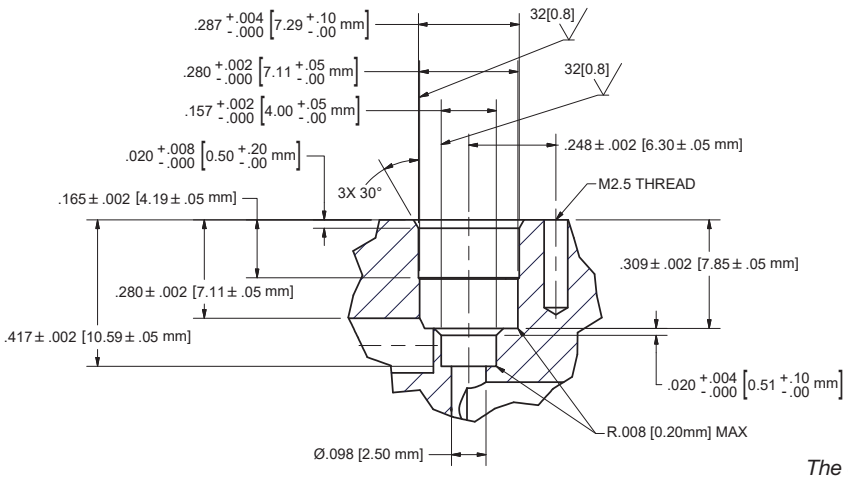


# **C7** Miniature Liquid Cartridge Valve

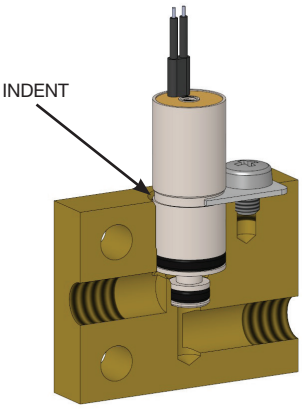
## Installation and Use

During installation of the C7 valve, the maximum force allowed to press it into the manifold is: 6.74 lbf (30 N)
Lubrication is recommended (I.E. alcohol or DI water depending on compatibility constraints)

### Recommended Valve Manifold Dimensions



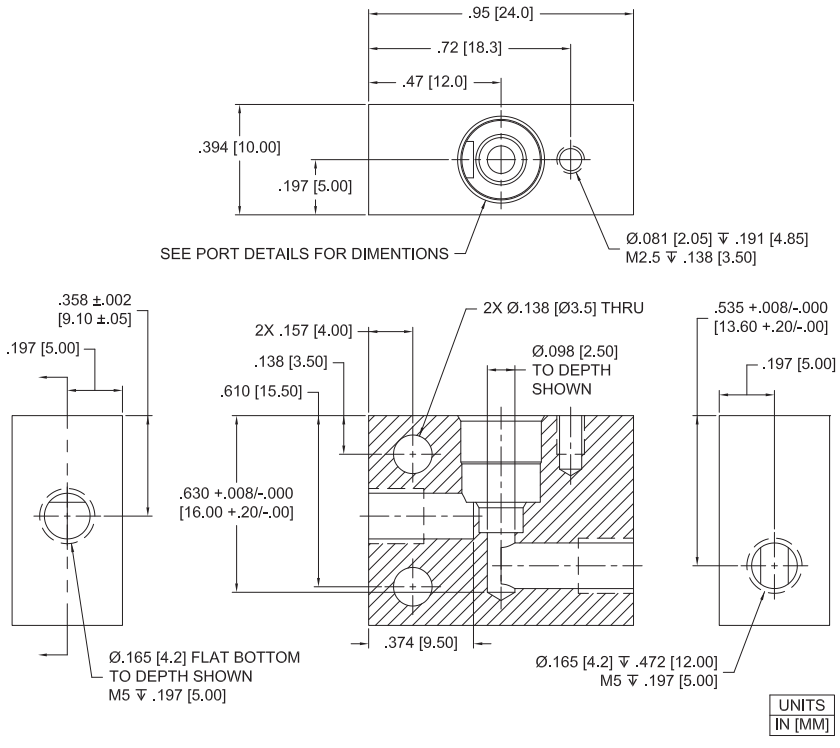

### Recommended Valve Mounting




*The correct location to use when holding the valve in place in the manifold is the indent at the middle of the valve body. If the top of the valve is used to hold the valve in place, the working pressure the valve will see, can push the valve upward and exceed the maximum insertion force for the valve. This could damage the valve.*

## Installation and Use

### C7 Evaluation Manifold Dimensions and Design
### C07-MCS



# **C7** Miniature Liquid Cartridge Valve

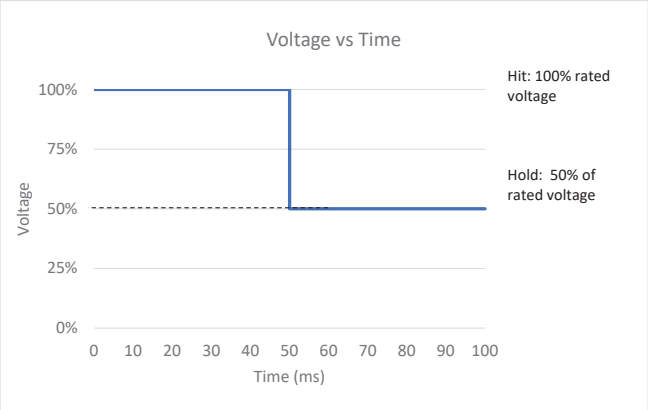
## Installation and Use

### Optional Reduced Power Control Method

"Hit and Hold" is an optional control method to increase power efficiency for the C7 series valves.

Hit and Hold is a common control method used to reduce component power consumption and heat generation without sacrificing performance. The "Hit" or "Spike" state refers to the rated voltage required to actuate the valve. The "Hold" state is a substantial reduction in the rated voltage (normally 50% of the rated voltage) that maintains the valve in an actuated state.

Hit and Hold control can be incorporated using several different approaches, including discrete component circuits or programmable logic. The graph below illustrates a voltage "Hit" and "Hold" control method, however pulse width modulation (PWM) is also an acceptable control method.




| C7 Hit and Hold Specification | |
|---|---|
| Hit Voltage Level | Rated Voltage |
| Hold Voltage Level | 50% of Rated Voltage |
| Minimum Hit Time | 50 ms |
| Maximum Hit Time | N/A |
| PWM Frequency (Minimum) | 1 kHz |
| Hold Nominal Duty Cycle | 50% |

This method greatly reduces power consumption because the valve only draws full current for a short period of time making it ideal for applications with sensitive power budgets.

Note: 50% duty cycle is a general recommendation; therefore, it is recommended that specific application testing is completed to verify the proper "hold" requirement. Factors that could impact hit and hold voltage levels include vibration, shock, pressure variation and pressure locations that are driven from specific usage. The hit and hold circuit design, combined with Parker's valve, need to be validated for each specific application to ensure the valve will actuate under all usage conditions. **Contact Factory for more details**.

# **C7** Miniature Liquid Cartridge Valve

## Chemical Compatibility Chart*

| | Seal Options | | | Other Wetted Materials |
|---|---|---|---|---|
| Chemical | FFKM | FKM | EPDM | Stainless Steel |
| DI Water | 1 | 1 | 1 | 1 |
| Methanol | 1 | 4 | 1 | 2 |
| Isopropanol | 1 | 1 | 1 | 1 |
| Ethanol | 1 | 3 | 1 | 1 |
| Acetonitrile | 1 | 4 | 1 | |
| Tetrahydrofuran | 1 | 4 | 4 | |
| Toluene | 1 | 2 | 4 | 1 |
| MEK | 4 | 1 | 1 | 3 |
| Organic Acids - Dilute | 1 | 1 | 1 | 4 |
| Non Organic Acids - Dilute | 1 | 1 | 1 | 2 |
| Bases - Dilute | 1 | 1 | 1 | 1 |
| Saline | 1 | 1 | 1 | 2 |
| Bleach 12% | 2 | 1 | 1 | 4 |
| Sodium Hydroxide 20% | 1 | 2 | 1 | 2 |

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for additional information.

### Compatibility Legend

1. EXCELLENT
   Minimal or no effect
2. GOOD
   Possible swelling and or loss of physical properties
3. DOUBTFUL
   Moderate or severe swelling and loss of physical properties
4. NOT RECOMMENDED
   Severe effect and should not be considered

## Accessories

**C7 Evaluation Manifold with clip and screw (Valve not included)**
C07-MCS

**Replacement Clip for C07-MCS**
C07-C

**Replacement Screw for C07-MCS**
C07-S

**Replacement O-Ring for C7 Valve, Large**
C07-LG (FKM)
C07-LGE (EPDM)

**Replacement FKM O-Ring for C7 Valve, Small**
C07-SM (FKM)
C07-SME (EPDM)

# **C7** Miniature Liquid Cartridge Valve

## Ordering Information

| Sample Part ID | C07 | - | 2 | 24 | FK | 03 | F | F | - | 000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Description** | **Series** | | **Configuration** | **Coil Voltage** | **Elastomer** | **Orifice** | **Mounting Style** | **Electrical Interface** | | **Custom** |
| Options | C07: 7 mm Cartridge Valve | | 2: 2-Way | 12: 12 VDC<br>24: 24 VDC | EP: EPDM<br>FK: FKM | 03: 0.012 in (0.3 mm)<br>05: 0.020 in (0.5 mm)<br>08: 0.031 in (0.8 mm)<br>10: 0.039 in (1.0 mm) | F: Face Seal | F: 3.2 in (80 mm) flying lead | | 000: Standard |

| Accessories |
|---|
| C07-MCS: C07 Evaluation Manifold with Clip and Screw, Not supplied with the valve. |
| C07-C: Replacement Clip used on C07-MCS* |
| C07-S: Replacement Screw used on C07-MCS* |
| C07-LG: Spare O-Ring for C07 Valve, FKM, Large** |
| C07-LGE: Spare O-Ring for C07 Valve, EPDM, Large** |
| C07-SM: Spare O-Ring for C07 Valve, FKM, Small** |
| C07-SME: Spare O-Ring for C07 Valve, EPDM, Small** |
| * Not Supplied with Valve, Replacement Part for C07-MCS ** Supplied with Valve |

**NOTE: For Evaluation - Please Add C07-MCS To Your Sample Order. All Valves Ship With O-Rings Installed**

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


Please click on the Order On-line button to configure your C7 valve. For CAD models and more detailed information, please visit us on the Web (www.parker.com/precisionfluidics/C7_LiquidCartridgeValve), call (+1.603.595.1500) or email at ppfinfo@parker.com.

Parker Hannifin Precision Fluidics Division reserves the right to make changes. Drawings are for reference only.

# C15 Valve **Miniature Cartridge Liquid Valve**

15 mm Miniature Liquid Cartridge Valve

The Series C15 is a miniature cartridge style solenoid valve with a unique design that combines small size, light weight and low power consumption with high flow repeatability and fast response time over an exceptionally long life, up to 500 million cycles. Available in a 2-way configuration, the valve is manifold mounted utilizing a simple securing system reducing assembly time.

## Markets

- Analytical Chemistry
- Clinical Diagnostics
- Environmental Monitoring
- Print

## Applications

- Reagent Addition
- Wash
- Waste
- Flow Control
- Large format Inkjet systems

## Features

- Variety of orifice sizes with pressures up to 145 PSI (10 bar).
- Floating frictionless plunger enables reliable and repeatable operation up to 500 Million cycles.
- Low power design reduces heat and energy consumption.
- Cartridge configuration enables compact integration saving space and weight.
- Simple mechanical fastening prevents valve being dislodged due to vibration or pressure spikes.
- RoHS & REACH compliant.

# Product Specifications

## Mechanical

**Valve Type:**
Solenoid Cartridge Valve
2-Way Normally Closed (NC)

**Media:** Gases* and Liquids
(See details in gas datasheet)

**Operating Environment:**
32°F to 122°F (0°C to 50°C)

**Storage Environment:**
-40°F to 158°F (-40°C to 70°C )

**Dimensions:**
- Diameter: 0.59 in (15 mm)
- Length: 1.14 in (29 mm)

**Porting:**
- Cartridge Seal

**Weight:** 0.78 oz (22 g)

**Internal Volume:**
2-Way: 391 µL

| Orifice | | 0.020 in (0.5 mm) | 0.040 in (1.0 mm) | 0.060 in (1.5 mm) | 0.080 in (2.0 mm) |
|---|---|---|---|---|---|
| Type | | 2-Way | 2-Way | 2-Way | 2-Way |
| Max Vacuum & Pressure | PSI | 145 | 116 | 58 | 22 |
| | Bar | 10 | 8 | 4 | 1.5 |
| | Cv | 0.01 | 0.032 | 0.058 | 0.093 |
| | SCCM (water) | 400 | 1160 | 1670 | 1640 |

## Electrical

**Voltage (VDC):**
12 and 24 VDC ± 5%
(Other voltages available on request.)

**Electrical Connections:**
3.2 in (80 mm) Flying Leads

**Power:**
Typical 1.1W - 1.7W
*(Please see Table 1 for more details)*

## Wetted Materials

**Body:**
Stainless Steel Series 300 and 400

**Seals: (Internal and External)**
FKM, EPDM
FFKM available on request

## Performance Characteristics

**Response:**
10 ms Maximum, Cycling

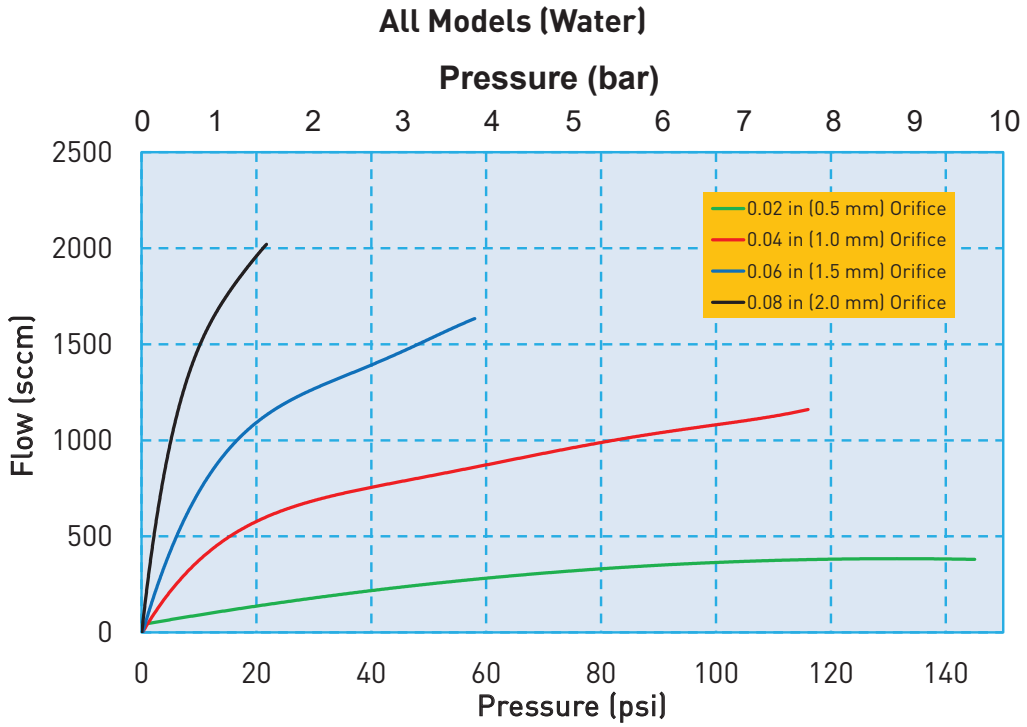
**Proof Pressure:**
120% of Rated Maximum Pressure

**Recommended Filtration:**
10 µm

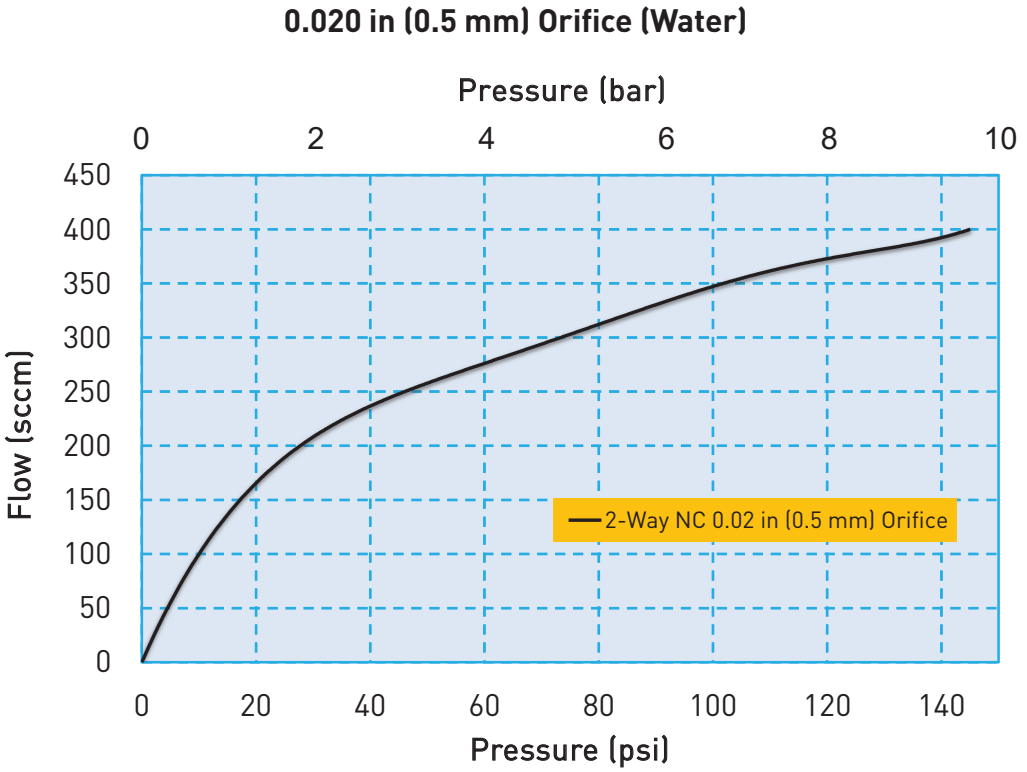
**Reliability:**
2-Way: 500 Million Cycles
0.90 Reliability Factor
95% Confidence

# **C15** Miniature Liquid Cartridge Valve

## Flow Curve

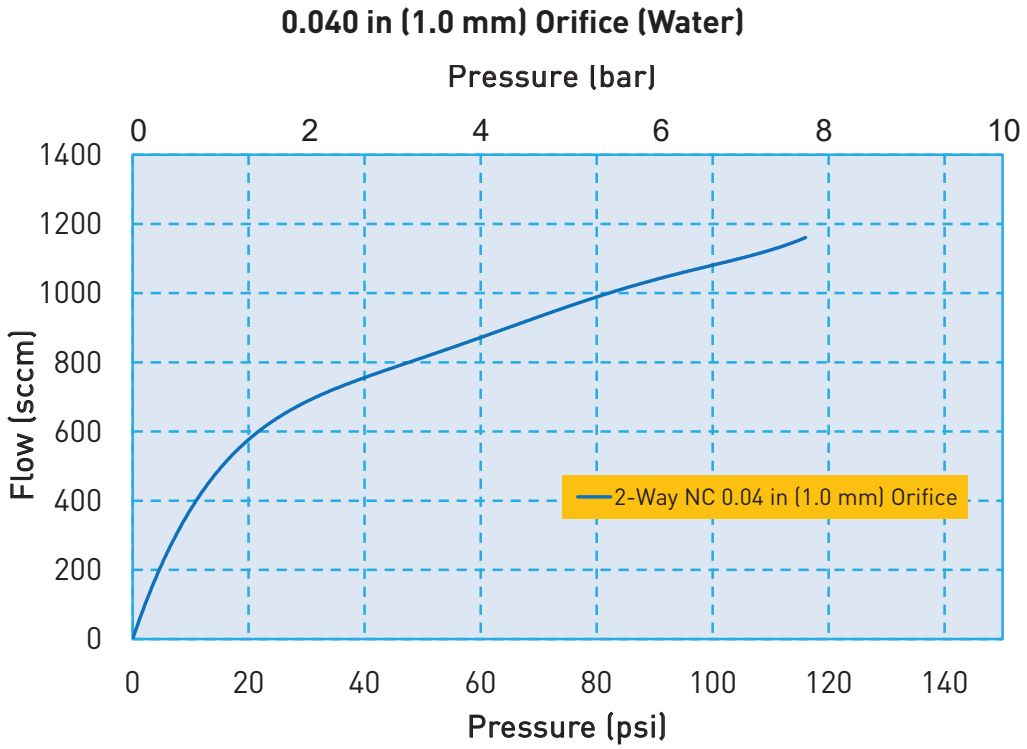


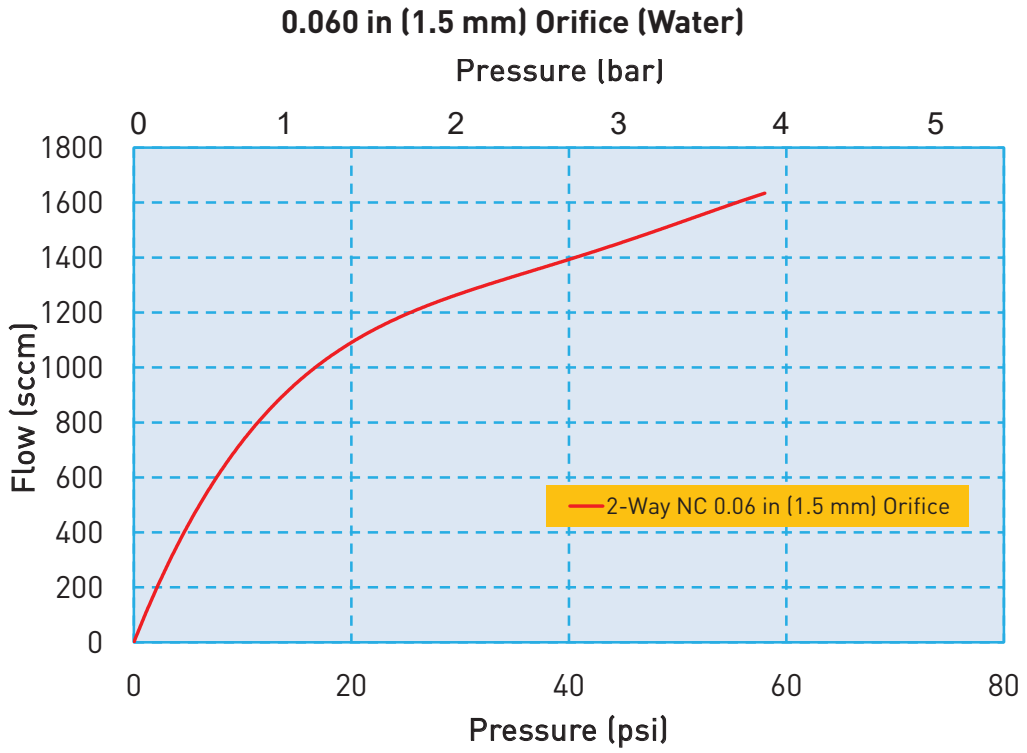

## Flow Curve



# **C15** Miniature Liquid Cartridge Valve

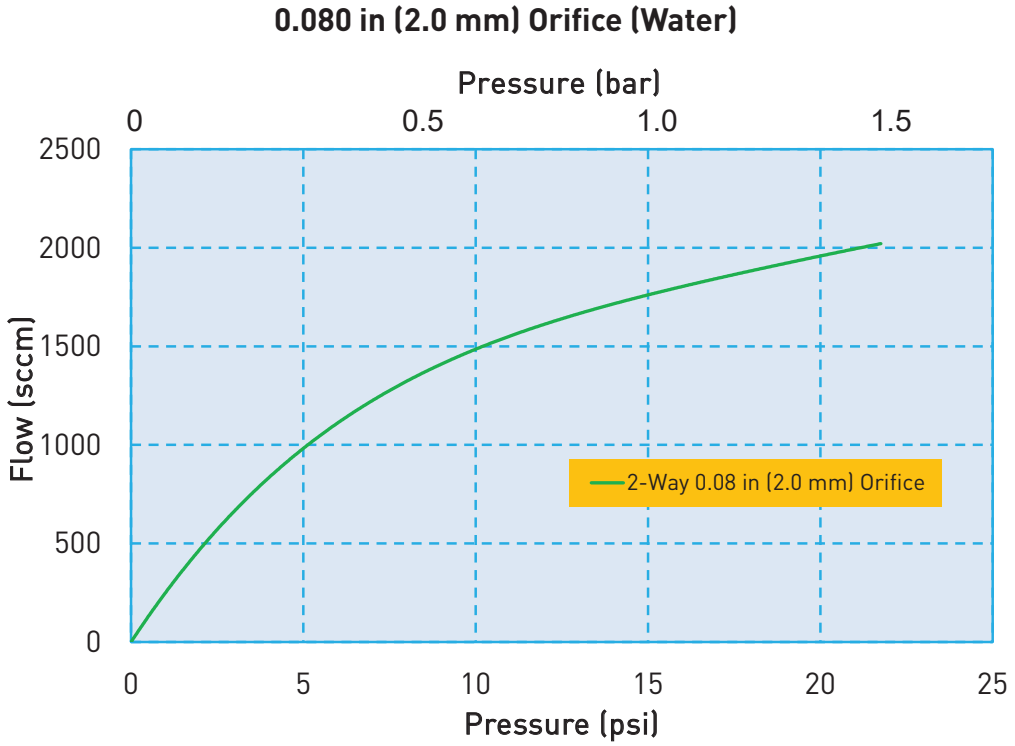
## Flow Curve



# **C15** Miniature Liquid Cartridge Valve

## Flow Curve




## Electrical Interface


**Wire Leads**
**Standard: 3.2 in (80 mm) Wire Leads, stripped at end**

# **C15** Miniature Liquid Cartridge Valve

## Electrical Requirements

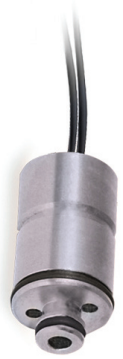
**Table 1**

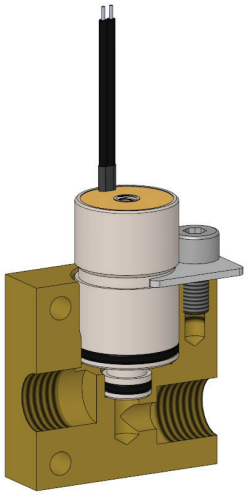
| Orifice | 0.02 in (0.5 mm) | | 0.04 in (1.0 mm) | | 0.06 in (1.5 mm) | | 0.08 in (2.0 mm) | |
|---|---|---|---|---|---|---|---|---|
| Valve Type | 2-Way | | 2-Way | | 2-Way | | 2-Way | |
| Voltage (VDC)* | 12 | 24 | 12 | 24 | 12 | 24 | 12 | 24 |
| Power (Watts) | 1.1 | 1.1 | 1.7 | 1.6 | 1.7 | 1.6 | 1.7 | 1.6 |
| Resistance (Ohm)** | 132 | 525 | 85 | 361 | 85 | 361 | 85 | 361 |

* ± 5%, other voltages available on request

** ±5% @ 68°F, 20°C

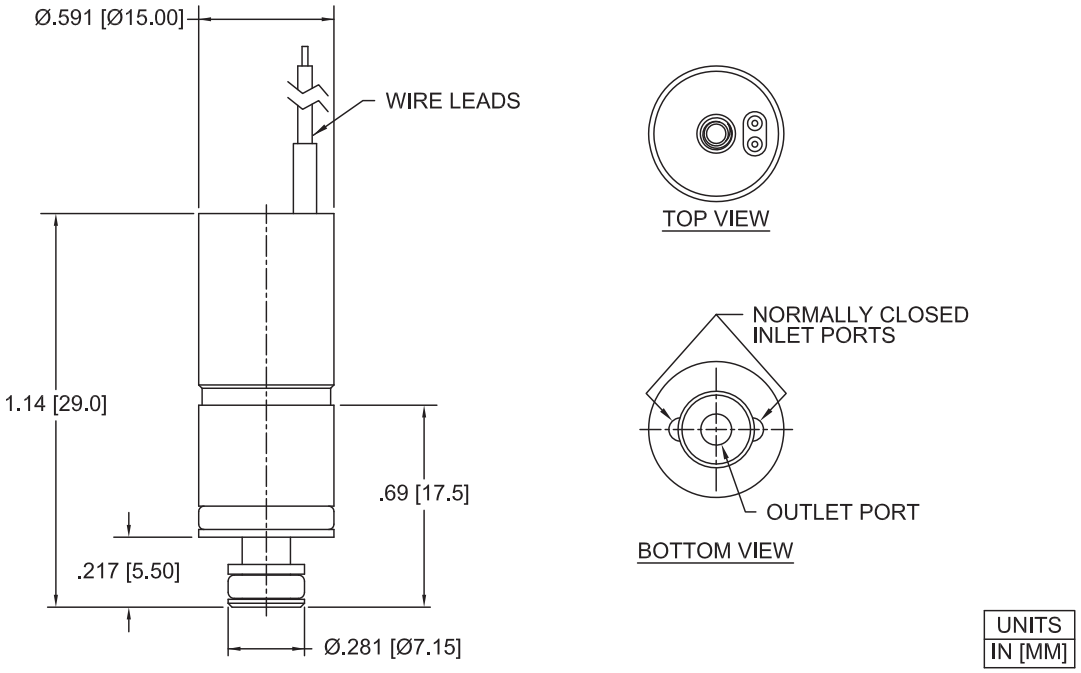
## Liquid Interface/Mechanical Integration





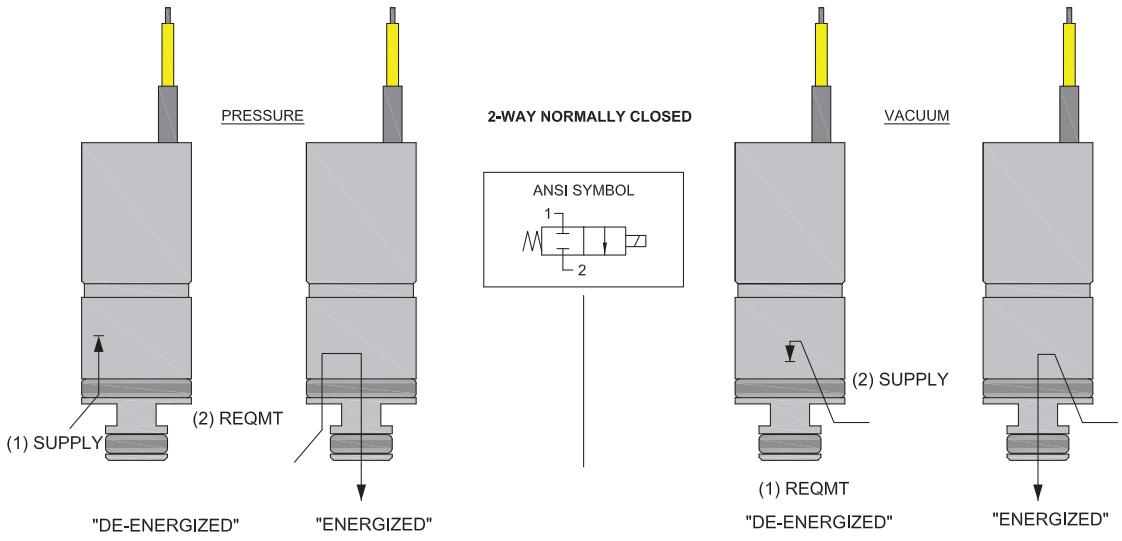
# **C15** Miniature Liquid Cartridge Valve
# **Dimensions**

### 2-Way Valve Configuration




## ANSI Symbols

### 2-Way Normally Closed

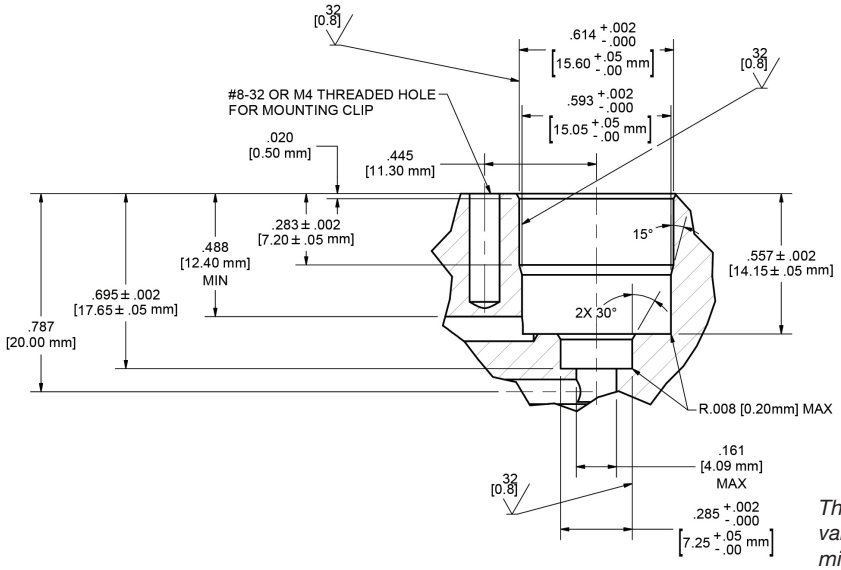


# **C15** Miniature Liquid Cartridge Valve

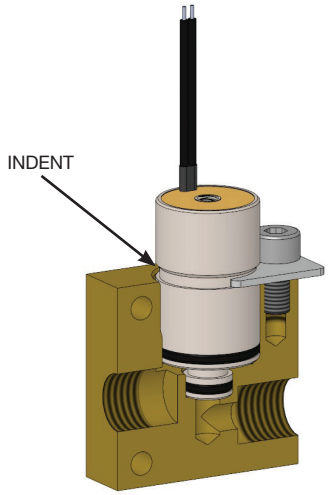
## Installation and Use

During installation of the C15 valve, the maximum force allowed to press it into the manifold is: 22.48 lbf (100 N)
Lubrication is recommended (I.E. alcohol or DI water depending on compatibility constraints)

### Recommended Valve Manifold Dimensions



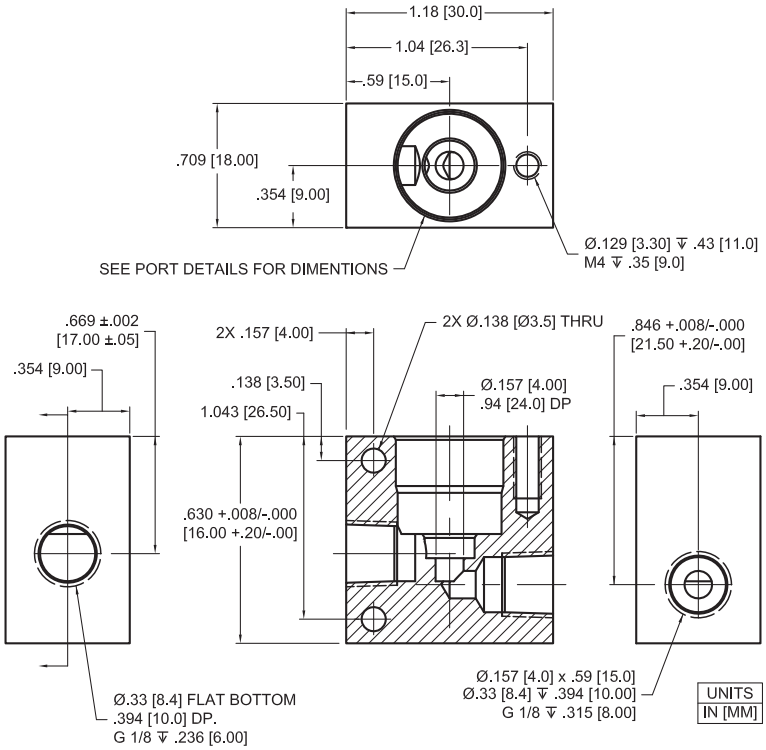

### Recommended Valve Mounting




*The correct location to use when holding the valve in place in the manifold is the indent at the middle of the valve body. If the top of the valve is used to hold the valve in place, the working pressure the valve will see, can push the valve upward and exceed the maximum insertion force for the valve. This could damage the valve.*

## Installation and Use

### C15 Evaluation Manifold Dimensions and Design
### C15-MCS



# **C15** Miniature Liquid Cartridge Valve

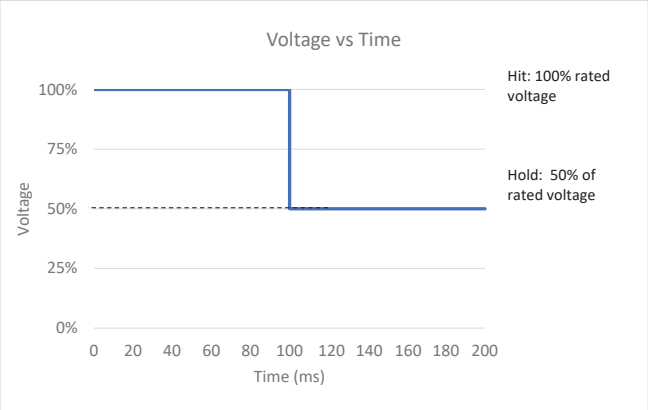
## Installation and Use

### Optional Reduced Power Control Method

"Hit and Hold" is an optional control method to increase power efficiency for the C15 series valves.

Hit and Hold is a common control method used to reduce component power consumption and heat generation without sacrificing performance. The "Hit" or "Spike" state refers to the rated voltage required to actuate the valve. The "Hold" state is a substantial reduction in the rated voltage (normally 50% of the rated voltage) that maintains the valve in an actuated state.

Hit and Hold control can be incorporated using several different approaches, including discrete component circuits or programmable logic. The graph below illustrates a voltage "Hit" and "Hold" control method, however pulse width modulation (PWM) is also an acceptable control method.




| C15 Hit and Hold Specification | |
|---|---|
| Hit Voltage Level | Rated Voltage |
| Hold Voltage Level | 50% of Rated Voltage |
| Minimum Hit Time | 100 ms |
| Maximum Hit Time | N/A |
| PWM Frequency (Minimum) | 1 kHz |
| Hold Nominal Duty Cycle | 50% |

This method greatly reduces power consumption because the valve only draws full current for a short period of time making it ideal for applications with sensitive power budgets.

Note: 50% duty cycle is a general recommendation; therefore, it is recommended that specific application testing is completed to verify the proper "hold" requirement. Factors that could impact hit and hold voltage levels include vibration, shock, pressure variation and pressure locations that are driven from specific usage. The hit and hold circuit design, combined with Parker's valve, need to be validated for each specific application to ensure the valve will actuate under all usage conditions. **Contact Factory for more details**.

# **C15** Miniature Liquid Cartridge Valve
## Chemical Compatibility Chart*

| | Seal Options | | | Other Wetted Materials |
|---|---|---|---|---|
| Chemical | FFKM | FKM | EPDM | Stainless Steel |
| DI Water | 1 | 1 | 1 | 1 |
| Methanol | 1 | 4 | 1 | 2 |
| Isopropanol | 1 | 1 | 1 | 1 |
| Ethanol | 1 | 3 | 1 | 1 |
| Acetonitrile | 1 | 4 | 1 | |
| Tetrahydrofuran | 1 | 4 | 4 | |
| Toluene | 1 | 2 | 4 | 1 |
| MEK | 4 | 1 | 1 | 3 |
| Organic Acids - Dilute | 1 | 1 | 1 | 4 |
| Non Organic Acids - Dilute | 1 | 1 | 1 | 2 |
| Bases - Dilute | 1 | 1 | 1 | 1 |
| Saline | 1 | 1 | 1 | 2 |
| Bleach 12% | 2 | 1 | 1 | 4 |
| Sodium Hydroxide 20% | 1 | 2 | 1 | 2 |

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for additional information.

### Compatibility Legend

1. EXCELLENT
   Minimal or no effect
2. GOOD
   Possible swelling and or loss of physical properties
3. DOUBTFUL
   Moderate or severe swelling and loss of physical properties
4. NOT RECOMMENDED
   Severe effect and should not be considered

## Accessories

**C15 Evaluation Manifold with clip and screw (Valve not included)**
C15-MCS

**Replacement Clip for C15-MCS**
C15-C

**Replacement Screw for C15-MCS**
C15-S

**Replacement O-Ring for C15 Valve, Large**
C15-LG (FKM)
C15-LGE (EPDM)

**Replacement FKM O-Ring for C15 Valve, Small**
C15-SM (FKM)
C15-SME (EPDM)

# **C15** Miniature Liquid Cartridge Valve

## Ordering Information

| Sample Part ID | C15 | - | 2 | 24 | FK | 05 | F | F | - | 000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Description** | **Series** | | **Configuration** | **Coil Voltage** | **Elastomer** | **Orifice** | **Mounting Style** | **Electrical Interface** | | **Custom** |
| Options | C15: 15 mm Cartridge Valve | | 2: 2-Way | 12: 12 VDC<br>24: 24 VDC | EP: EPDM<br>FK: FKM | 05: 0.020 in (0.5 mm)<br>10: 0.040 in (1.0 mm)<br>15: 0.060 in (1.5 mm)<br>20: 0.080 in (2.0 mm) | F: Face Seal | F: 3.2 in (80 mm) flying lead | | 000: Standard |

### Accessories

C15-MCS: C15 Evaluation Manifold with Clip and Screw, Not supplied with the valve.

C15-C: Replacement Clip used on C15-MCS*

C15-S: Replacement Screw used on C15-MCS*

C15-LG: Spare O-Ring for C15 Valve, FKM, Large**

C15-LGE: Spare O-Ring for C15 Valve, EPDM, Large**

C15-SM: Spare O-Ring for C15 Valve, FKM, Small**

C15-SME: Spare O-Ring for C15 Valve, EPDM, Small**

* Not Supplied with Valve, Replacement Part for C15-MCS ** Supplied with Valve

**NOTE: For Evaluation - Please Add C15-MCS To Your Sample Order. All Valves Ship With O-Rings Installed**

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


Please click on the Order On-line button to configure your C15 valve. For CAD models and more detailed information, please visit us on the Web (www.parker.com/precisionfluidics/C15_LiquidCartridgeValve), call (+1.603.595.1500) or email at ppfinfo@parker.com.

Parker Hannifin Precision Fluidics Division reserves the right to make changes. Drawings are for reference only.

# C21 Valve **Miniature Cartridge Liquid Valve**

21 mm Miniature Liquid Cartridge Valve

The Series C21 is a miniature cartridge style solenoid valve with a compact 21 mm diameter. This unique design combines compact size, light weight and low power consumption with high flow repeatability and fast response time over an exceptionally long life up to 20 million cycles. Available in 2-way configuration, the valve is manifold mounted utilizing a simple securing system reducing assembly time.

## Markets

- Analytical Chemistry
- Clinical Diagnostics
- Agent Detection
- Print

## Applications

- Large format Inkjet systems
- Reagent Addition
- Wash
- Waste
- Flow Control

## Features

- Variety of orifice sizes with pressures up to 145 PSI (10 bar).
- Floating frictionless plunger enables reliable and repeatable operation up to 20 Million cycles.
- Low power design reduces heat and energy consumption.
- Compact reduces space and weight.
- 100% calibrated ensuring minimal valve to valve variation.
- RoHS & REACH compliant.

# Product Specifications

## Mechanical

**Valve Type:**
Solenoid Cartridge Valve
2-Way Normally Closed (NC)

**Media:** Gases* and Liquids
(See more Information in Gas Datasheet)

**Operating Environment:**
32°F to 122°F (0°C to 50°C)

**Storage Environment:**
-40°F to 158°F (-40°C to 70°C )

**Dimensions:**
- Diameter: 0.83 in (21 mm)
- Length: 1.54 in (39 mm)

**Porting:**
- Cartridge Seal

**Weight:** 2.17 oz (60 g)

**Internal Volume:**
2-Way: 1173µL

| Orifice | | 0.040 in (1.0 mm) | 0.080 in (2.0 mm) | 0.12 in (3.0 mm) | 0.16 in (4.0 mm) |
|---|---|---|---|---|---|
| Type | | 2-Way | 2-Way | 2-Way | 2-Way |
| Max Vacuum & Pressure | PSI | 145 | 116 | 58 | 29 |
| | Bar | 10 | 8 | 4 | 2 |
| | Cv | 0.03 | 0.08 | 0.13 | 0.18 |
| SCCM (water) | | 1480 | 3350 | 3770 | 3630 |

## Electrical

**Voltage (VDC):**
12 and 24 VDC ± 5%
(Other voltages available on request.)

**Electrical Connections:**
3.2 in (80 mm) Flying Leads

**Power:**
Typical 2.5W - 2.6W
*(Please see Table 1 for more details)*

## Wetted Materials

**Body:**
Stainless Steel

**Seals: (Internal and External)**
FKM, EPDM
FFKM available on request

## Performance Characteristics

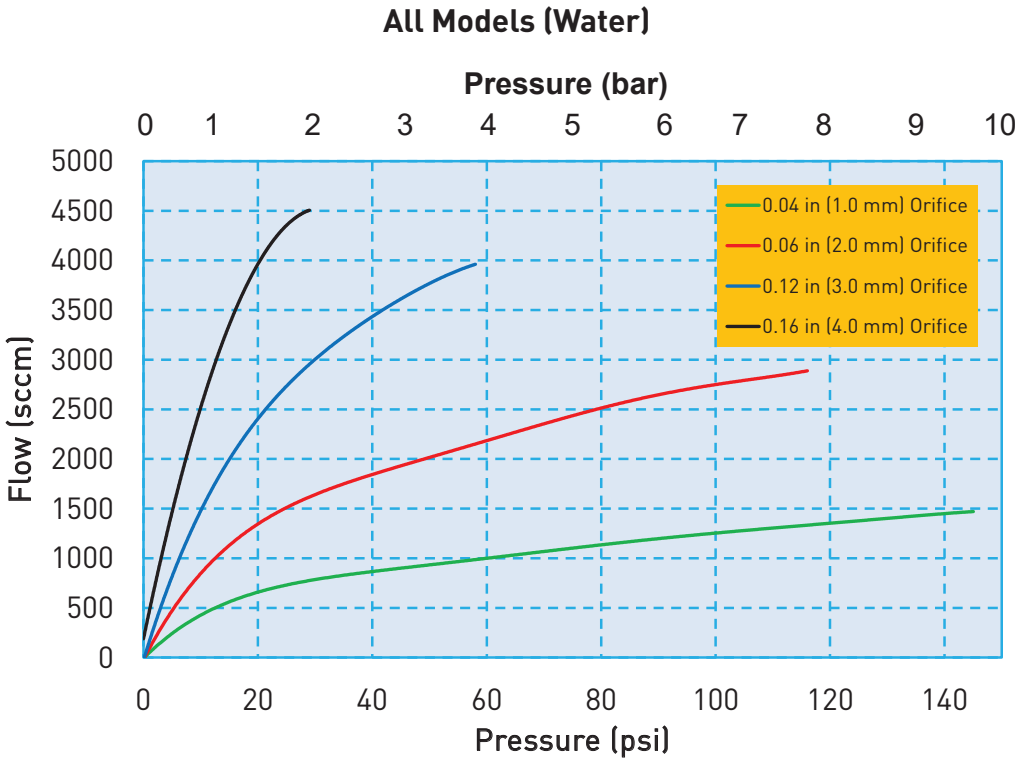
**Response:**
10 ms Maximum, Cycling

**Recommended Filtration:**
10 µm

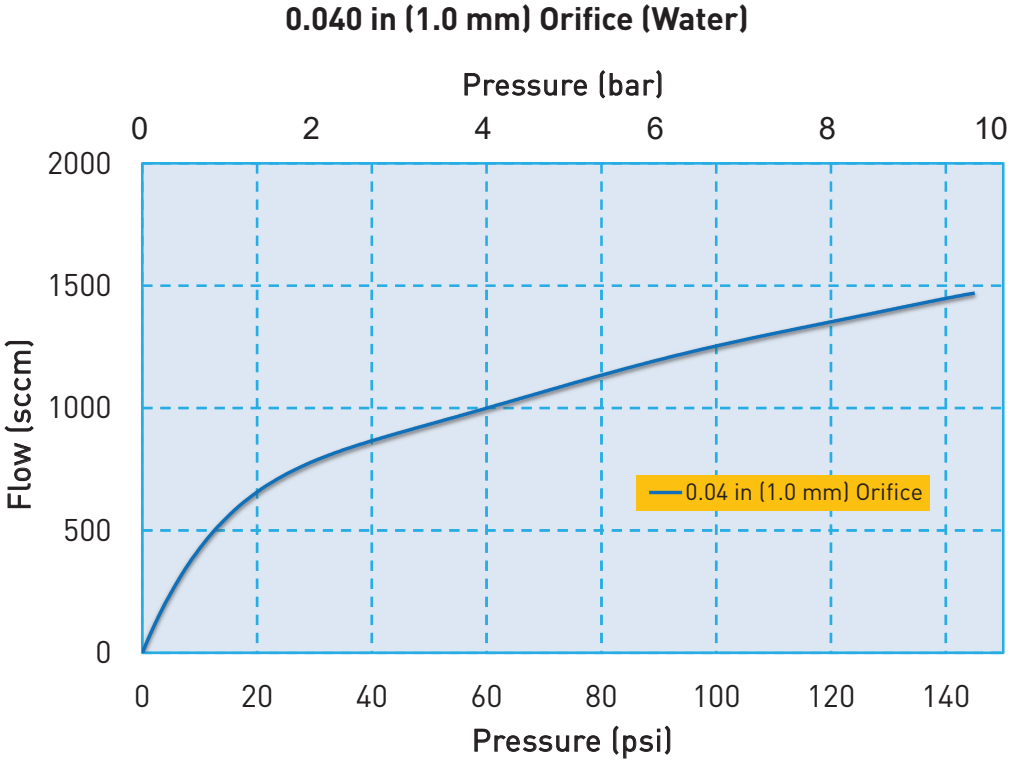
**Reliability:**
2-Way: 20 Million Cycles
0.90 Reliability Factor
95% Confidence

# **C21** Miniature Liquid Cartridge Valve

## Flow Curve

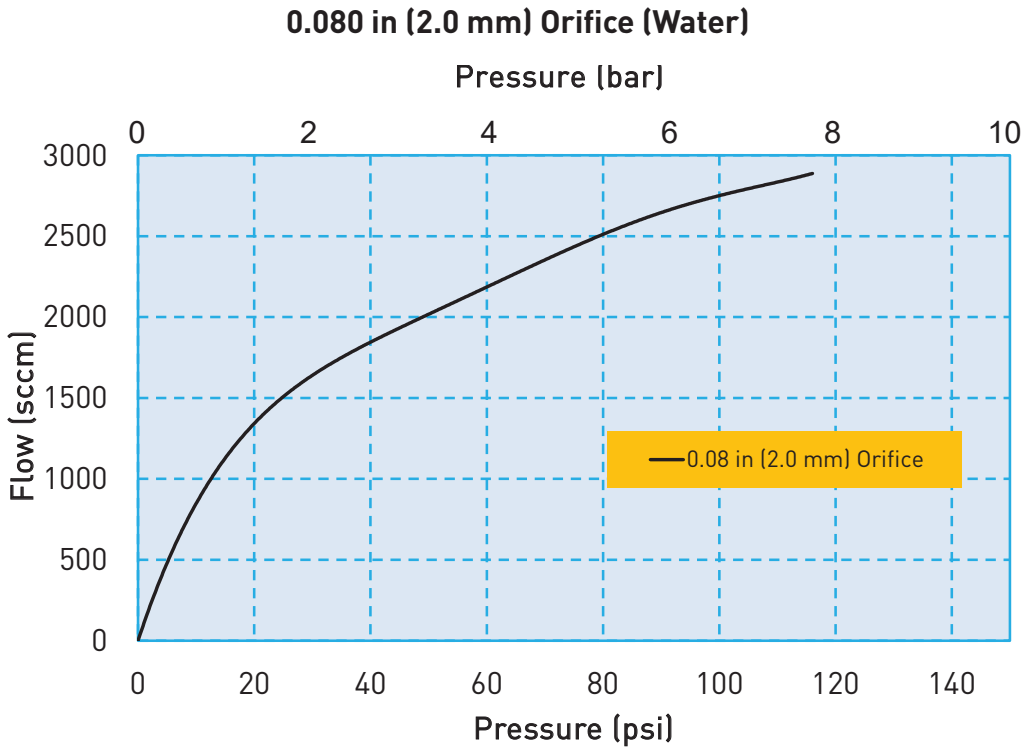


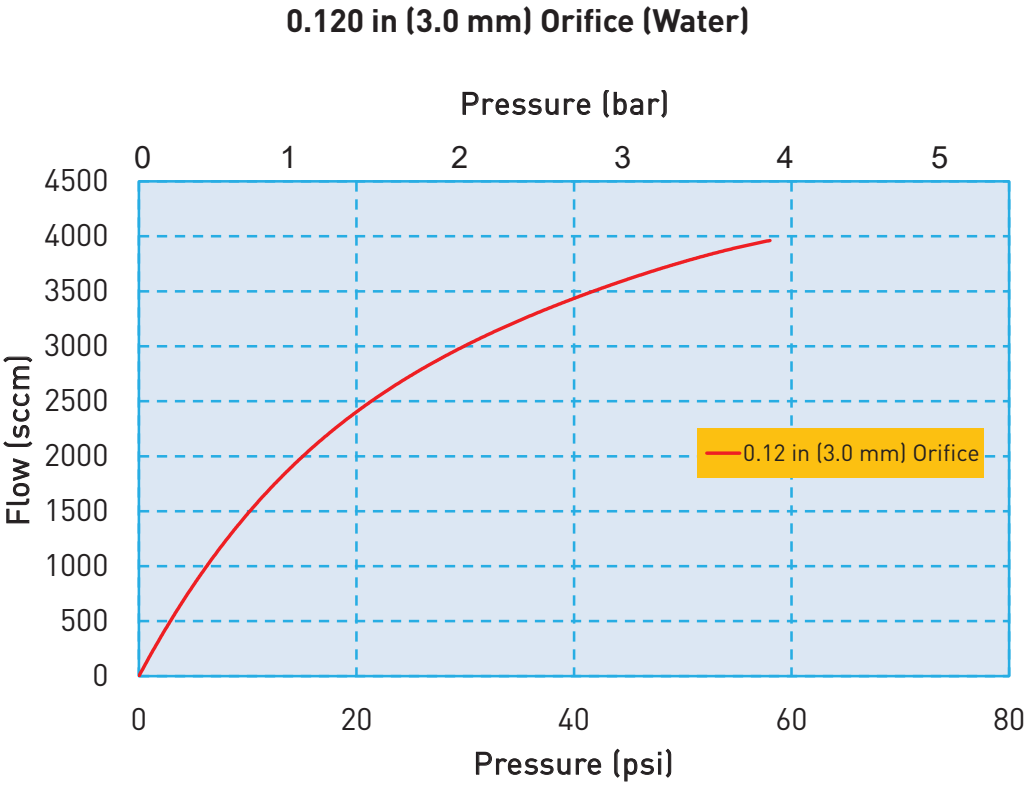

## Flow Curve



# **C21** Miniature Liquid Cartridge Valve

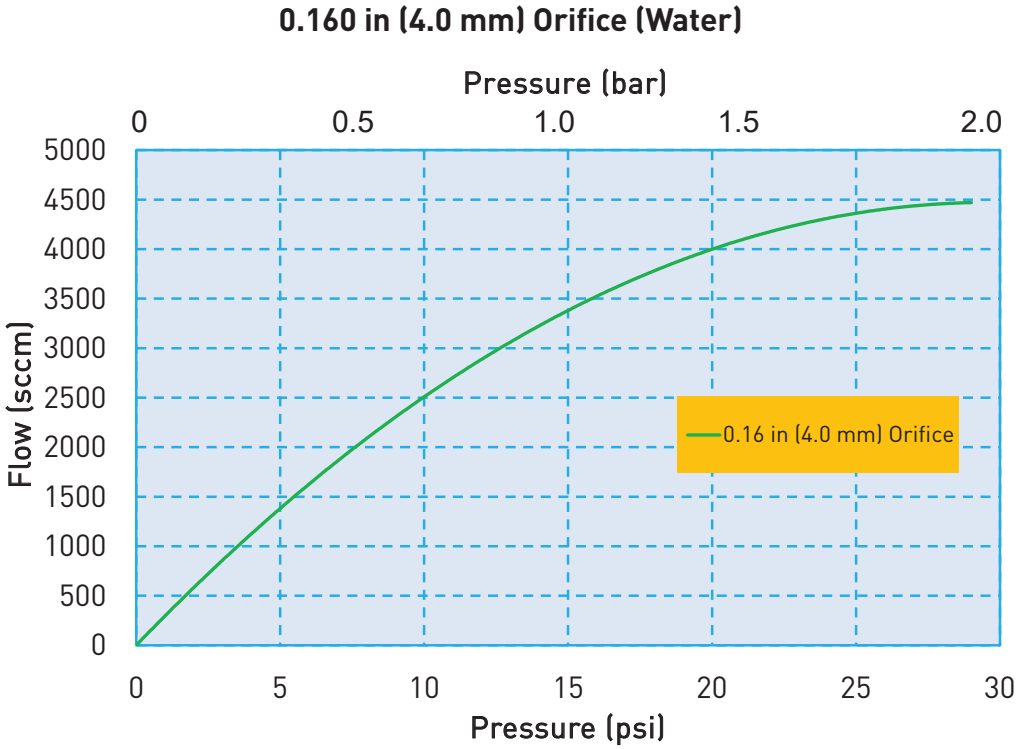
## Flow Curve



# **C21** Miniature Liquid Cartridge Valve

## Flow Curve




## Electrical Interface

**Wire Leads**
**Standard: 3.2 in (80 mm) Wire Leads, stripped at end**

# **C21** Miniature Liquid Cartridge Valve

## Electrical Requirements

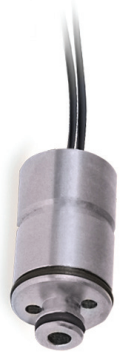
**Table 1**

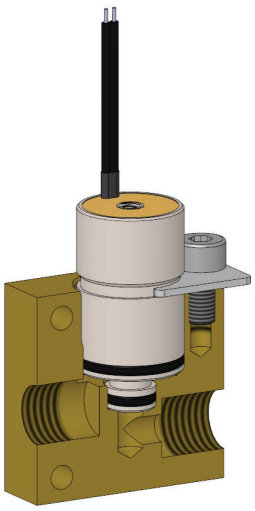
| Orifice | 0.040 in (1.0 mm) | | 0.080 in (2.0 mm) | | 0.12 in (3.0 mm) | | 0.16 in (4.0 mm) | |
|---|---|---|---|---|---|---|---|---|
| Valve Type | 2-Way | | 2-Way | | 2-Way | | 2-Way | |
| Voltage (VDC)* | 12 | 24 | 12 | 24 | 12 | 24 | 12 | 24 |
| Power (Watts) | 2.6 | 2.5 | 2.6 | 2.5 | 2.6 | 2.5 | 2.6 | 2.5 |
| Resistance (Ohm)** | 56 | 235 | 56 | 235 | 56 | 235 | 56 | 235 |

* ± 5%, other voltages available on request

** ±5% @ 68°F, 20°C

## Liquid Interface/Mechanical Integration

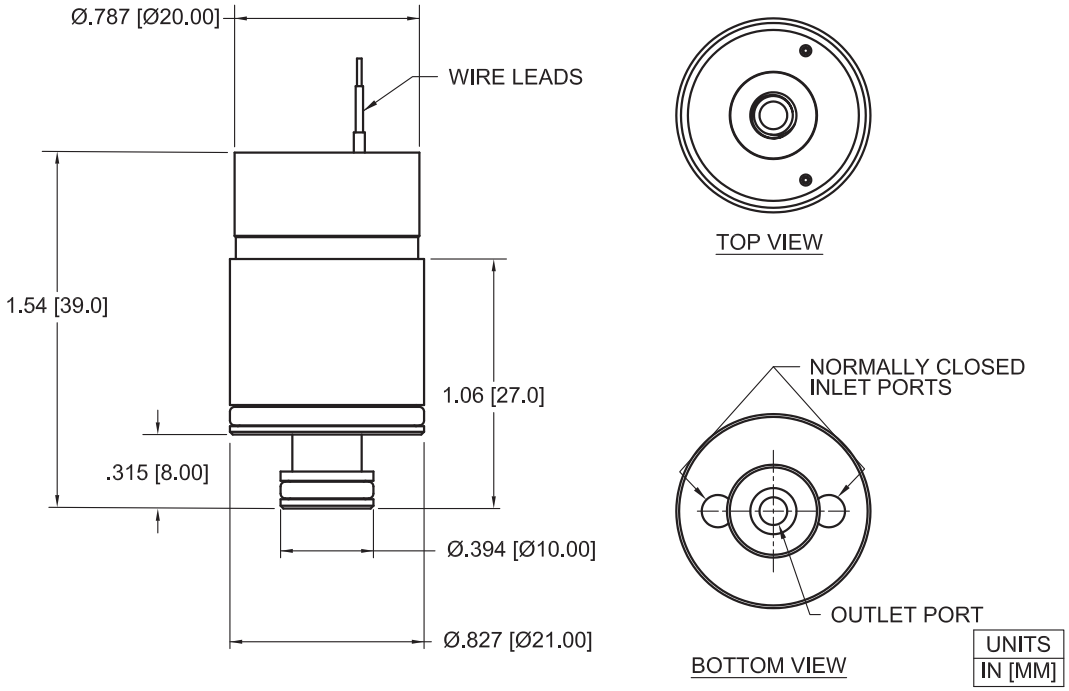




# **C21** Miniature Liquid Cartridge Valve

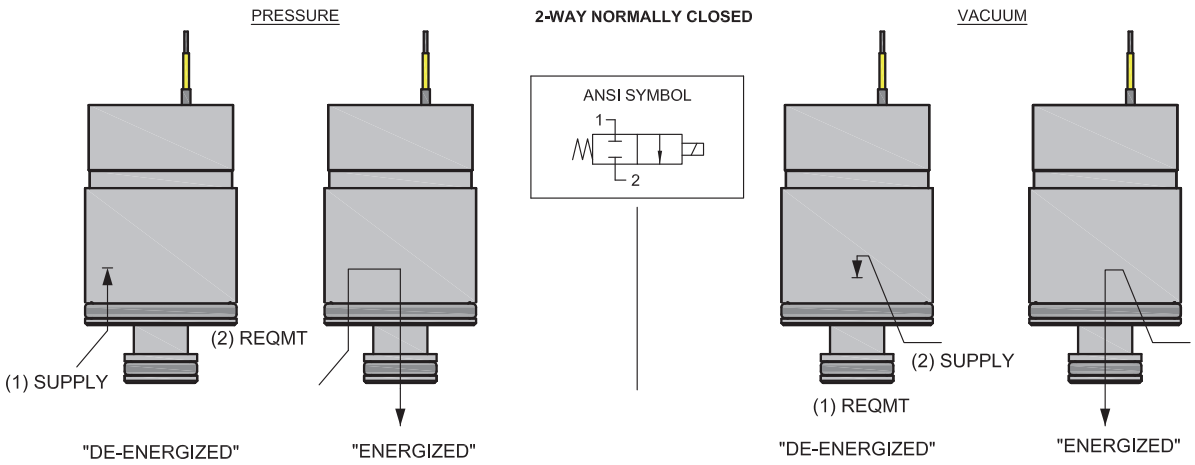
## Dimensions

### 2-Way Valve Configuration




## ANSI Symbols

### 2-Way Normally Closed

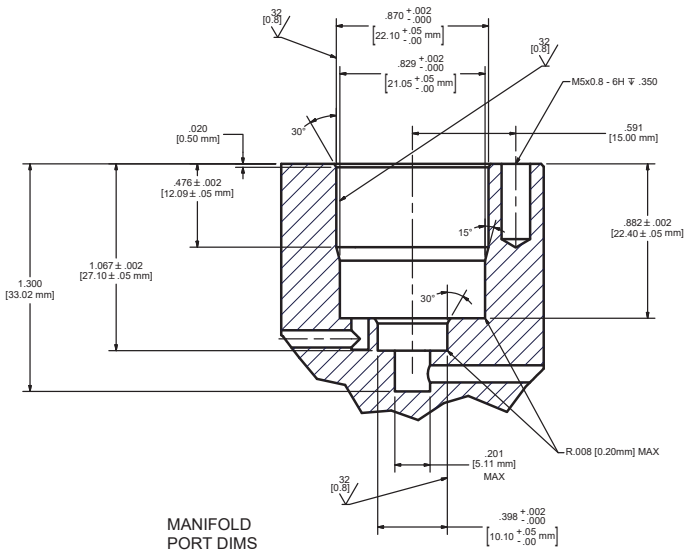


# **C21** Miniature Liquid Cartridge Valve

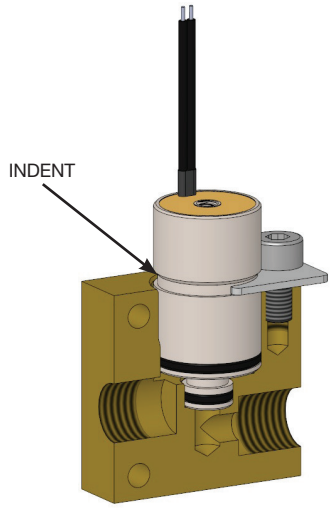
## Installation and Use

During installation of the C21 valve, the maximum force allowed to press it into the manifold is: 44.96 lbf (200 N)
Lubrication is recommended (I.E. alcohol or DI water depending on compatibility constraints)

### Recommended Valve Manifold Dimensions



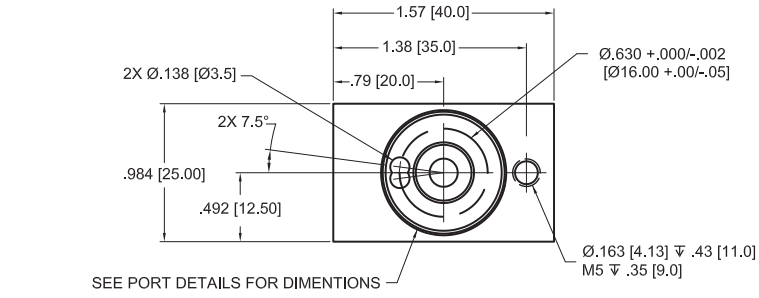

### Recommended Valve Mounting

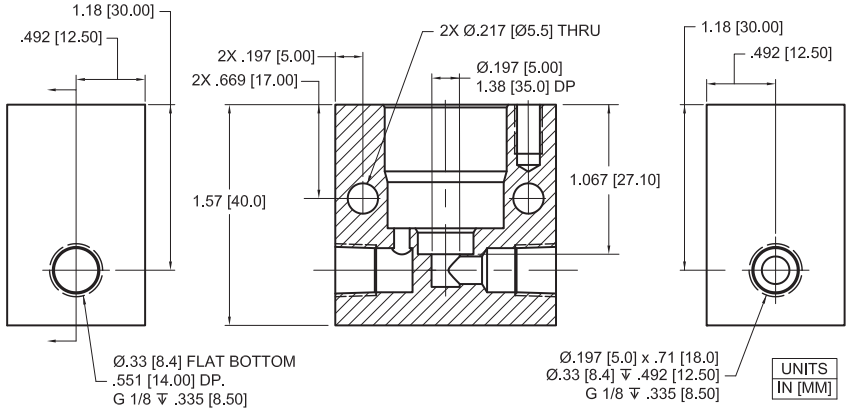



*The correct location to use when holding the valve in place in the manifold is the indent at the middle of the valve body. If the top of the valve is used to hold the valve in place, the working pressure the valve will see, can push the valve upward and exceed the maximum insertion force for the valve. This could damage the valve.*

## Installation and Use

### C21 Evaluation Manifold Dimensions and Design
### C21-MCS



# **C21** Miniature Liquid Cartridge Valve

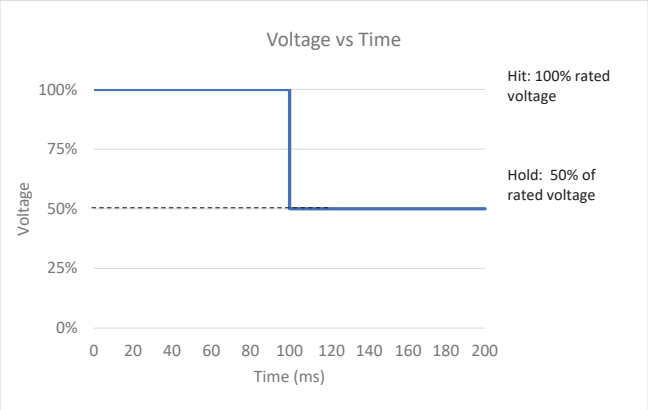
## Installation and Use

### Optional Reduced Power Control Method

"Hit and Hold" is an optional control method to increase power efficiency for the C21 series valves.

Hit and Hold is a common control method used to reduce component power consumption and heat generation without sacrificing performance. The "Hit" or "Spike" state refers to the rated voltage required to actuate the valve. The "Hold" state is a substantial reduction in the rated voltage (normally 50% of the rated voltage) that maintains the valve in an actuated state.

Hit and Hold control can be incorporated using several different approaches, including discrete component circuits or programmable logic. The graph below illustrates a voltage "Hit" and "Hold" control method, however pulse width modulation (PWM) is also an acceptable control method.




| C21 Hit and Hold Specification | |
|---|---|
| Hit Voltage Level | Rated Voltage |
| Hold Voltage Level | 50% of Rated Voltage |
| Minimum Hit Time | 100 ms |
| Maximum Hit Time | N/A |
| PWM Frequency (Minimum) | 1 kHz |
| Hold Nominal Duty Cycle | 50% |

This method greatly reduces power consumption because the valve only draws full current for a short period of time making it ideal for applications with sensitive power budgets.

Note: 50% duty cycle is a general recommendation; therefore, it is recommended that specific application testing is completed to verify the proper "hold" requirement. Factors that could impact hit and hold voltage levels include vibration, shock, pressure variation and pressure locations that are driven from specific usage. The hit and hold circuit design, combined with Parker's valve, need to be validated for each specific application to ensure the valve will actuate under all usage conditions. **Contact Factory for more details**.

# **C21** Miniature Liquid Cartridge Valve

## Chemical Compatibility Chart*

| | Seal Options | | | Other Wetted Materials |
|---|---|---|---|---|
| Chemical | FFKM | FKM | EPDM | Stainless Steel |
| DI Water | 1 | 1 | 1 | 1 |
| Methanol | 1 | 4 | 1 | 2 |
| Isopropanol | 1 | 1 | 1 | 1 |
| Ethanol | 1 | 3 | 1 | 1 |
| Acetonitrile | 1 | 4 | 1 | |
| Tetrahydrofuran | 1 | 4 | 4 | |
| Toluene | 1 | 2 | 4 | 1 |
| MEK | 4 | 1 | 1 | 3 |
| Organic Acids - Dilute | 1 | 1 | 1 | 4 |
| Non Organic Acids - Dilute | 1 | 1 | 1 | 2 |
| Bases - Dilute | 1 | 1 | 1 | 1 |
| Saline | 1 | 1 | 1 | 2 |
| Bleach 12% | 2 | 1 | 1 | 4 |
| Sodium Hydroxide 20% | 1 | 2 | 1 | 2 |

### Compatibility Legend

1. EXCELLENT
   Minimal or no effect
2. GOOD
   Possible swelling and or loss of physical properties
3. DOUBTFUL
   Moderate or severe swelling and loss of physical properties
4. NOT RECOMMENDED
   Severe effect and should not be considered

## Accessories

**C21 Evaluation Manifold with clip and screw (Valve not included)**
C21-MCS

**Replacement Clip for C21-MCS**
C21-C

**Replacement Screw for C21-MCS**
C21-S

**Replacement O-Ring for C21 Valve, Large**
C21-LG (FKM)
C21-LGE (EPDM)

**Replacement FKM O-Ring for C21 Valve, Small**
C21-SM (FKM)
C21-SME (EPDM)

# **C21** Miniature Liquid Cartridge Valve

## Ordering Information

| Sample Part ID | C21 | - | 2 | 24 | FK | 10 | F | F | - | 000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Description** | **Series** | | **Configuration** | **Coil Voltage** | **Elastomer** | **Orifice** | **Mounting Style** | **Electrical Interface** | | **Custom** |
| Options | C21: 15 mm Cartridge Valve | | 2: 2-Way | 12: 12 VDC<br>24: 24 VDC | EP: EPDM<br>FK: FKM | 10: 0.040 in (1.0 mm)<br>20: 0.080 in (2.0 mm)<br>30: 0.12 in (3.0 mm)<br>40: 0.16 in (4.0 mm) | F: Face Seal | F: 3.2 in (80 mm) flying lead | | 000: Standard |

### Accessories

C21-MCS: C21 Evaluation Manifold with Clip and Screw, Not supplied with the valve.

C21-C: Replacement Clip used on C21-MCS*

C21-S: Replacement Screw used on C21-MCS*

C21-LG: Spare O-Ring for C21 Valve, FKM, Large**

C21-LGE: Spare O-Ring for C21 Valve, EPDM, Large**

C21-SM: Spare O-Ring for C21 Valve, FKM, Small**

C21-SME: Spare O-Ring for C21 Valve, EPDM, Small**

* Not Supplied with Valve, Replacement Part for C21-MCS ** Supplied with Valve

**NOTE: For Evaluation - Please Add C21-MCS To Your Sample Order. All Valves Ship With O-Rings Installed**

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
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Please click on the Order On-line button to configure your C21 valve. For CAD models and more detailed information, please visit us on the Web (www.parker.com/precisionfluidics/C21_LiquidCartridgeValve), call (+1.603.595.1500) or email at ppfinfo@parker.com.

Parker Hannifin Precision Fluidics Division reserves the right to make changes. Drawings are for reference only.

# Series 1 & 2 Miniature Inert PTFE Isolation Valves

2-Way and 3-Way Solenoid Valves


The 2-Way & 3-Way inert Series 1 & 2 valves have been designed for systems where chemical compatibility is most important. The wetted path is isolated from the solenoid and only PTFE and borosilicate glass are in contact with the media passing through the valve. Low internal volume and fast response time ensure repeatable, accurate volumes. Valves will actuate without any pressure or vacuum applied.

## Features

- Provides unsurpassed chemical compatibility for a wide range of media with PTFE and borosilicate glass as the only wetted parts
- 100% continuous duty rating in ambient temperatures up to 66°C
- Low power for reduced heat generation and power consumption
- Fast response times for accurate repeatable results
- Direct acting: does not require pressure or vacuum to operate
- 100% tested leak rate provides assurance of a quality seal
- Provides reliable operation for the life of your instrument
- RoHS compliant

## Applications

- Reagent Control
- Solvent Management
- Aggressive Liquid Control

# Product Specifications

### Physical Properties

| |
|---|
| **Valve Type:** |
| Diaphragm Isolation Valve |
| **Valve Configuration:** |
| 3-Way (Series 1) |
| 2-Way, Normally Closed (Series 2) |
| **Media:** |
| Liquids |
| **Operating Environment:** |
| 40 to 150°F (4 to 66°C) |
| **Dimensions:** |
| Width: 1.0” (25.4 mm) |
| Height: 2.1” (53.34 mm) |
| Length: 1.0”(25.4 mm) |
| **Porting:** |
| 1/4-28 Threaded Ports |
| **Weight:** |
| 2.7 oz (76.5 g) |
| **Internal Volume (µL):** |
| 96 (3-Way) |
| 49 (2-Way) |

### Electrical

| | | |
|---|---|---|
| **Voltage (VDC):** | 12 | 24 |
| **Power (Watts):** | 2.5 | 4.2 |
| **Current (mA):** | 211 | 173 |
| **Resistance (Ohm):** | 57 | 139 |
| (Ω±5% @ 70°F, 21.1°C) | | |
| **Connections:** | | |
| 12” Lead Wire Standard | | |
| 26 AWG, PTFE Insulated | | |

### Wetted Materials*

| |
|---|
| **Seals:** |
| PTFE |
| **Body Options:** |
| PTFE |
| **All Others:** |
| Borosilicate Glass (3 - Way only) |

* See Chemical Compatibility Page
Consult factory for other options

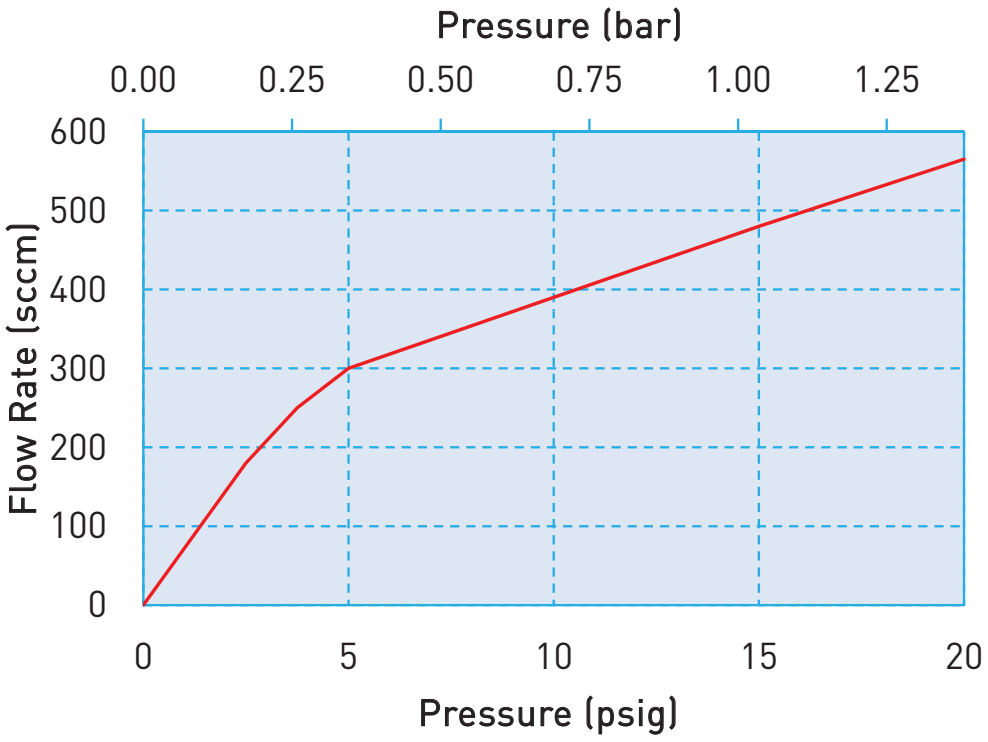
### Performance Characteristics

| |
|---|
| **Operating Pressure/ Orifice Diameters:** |
| Vacuum - 20 psig (1.4 bar) / 0.060” (1.52 mm) |
| **Proof Pressure:** |
| 1.5X rated pressure |
| **Leak Rate:** |
| Bubble Tight |
| **Response Time:** |
| 3-Way: <12 ms cycling |
| 2-Way: <20 ms cycling |
| **Recommended Filtration:** |
| 10 µm min |
| **Reliability:** |
| Life Cycle Rating of 10 million (Application dependent) |

## **Series 1 & 2** Miniature Inert PTFE Isolation Valves

### Typical Flow Curve

**All Models**
**Orifice: 0.060" (1.52 mm)**
(Tested w/water 24° C)

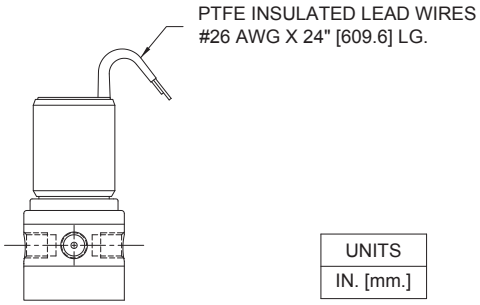


# **Series 1 & 2** Miniature Inert PTFE Isolation Valves

## Electrical Interface

### Series 1: 3-Way

### Wire leads


| UNITS |
|---|
| IN. [mm.] |

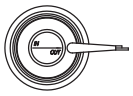
Custom connections available upon request

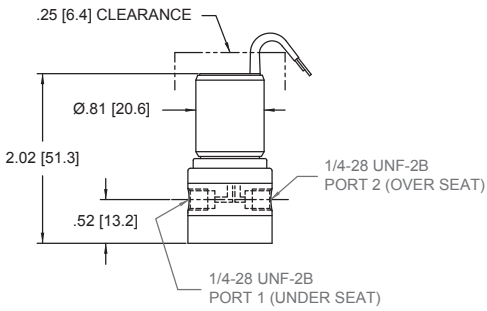
## Mechanical Integration

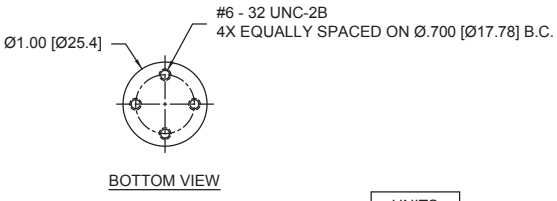
### Dimensions

### Series 1: 3-Way

### 3-Way, 0.060" (1.52 mm) Orifice





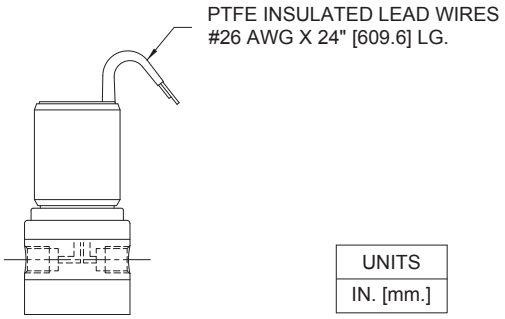

| UNITS |
|---|
| IN. [mm.] |

# **Series 1 & 2** Miniature Inert PTFE Isolation Valves

## Electrical Interface

### Series 2: 2-Way

### Wire leads




| UNITS |
| --- |
| IN. [mm.] |

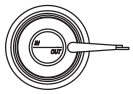
Custom connections available upon request

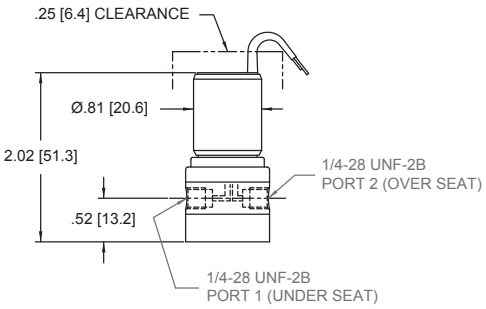
## Mechanical Integration

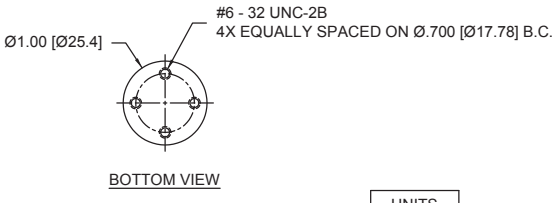
### Dimensions

### Series 2: 2-Way

### 2-Way, 0.060" (1.52 mm) Orifice





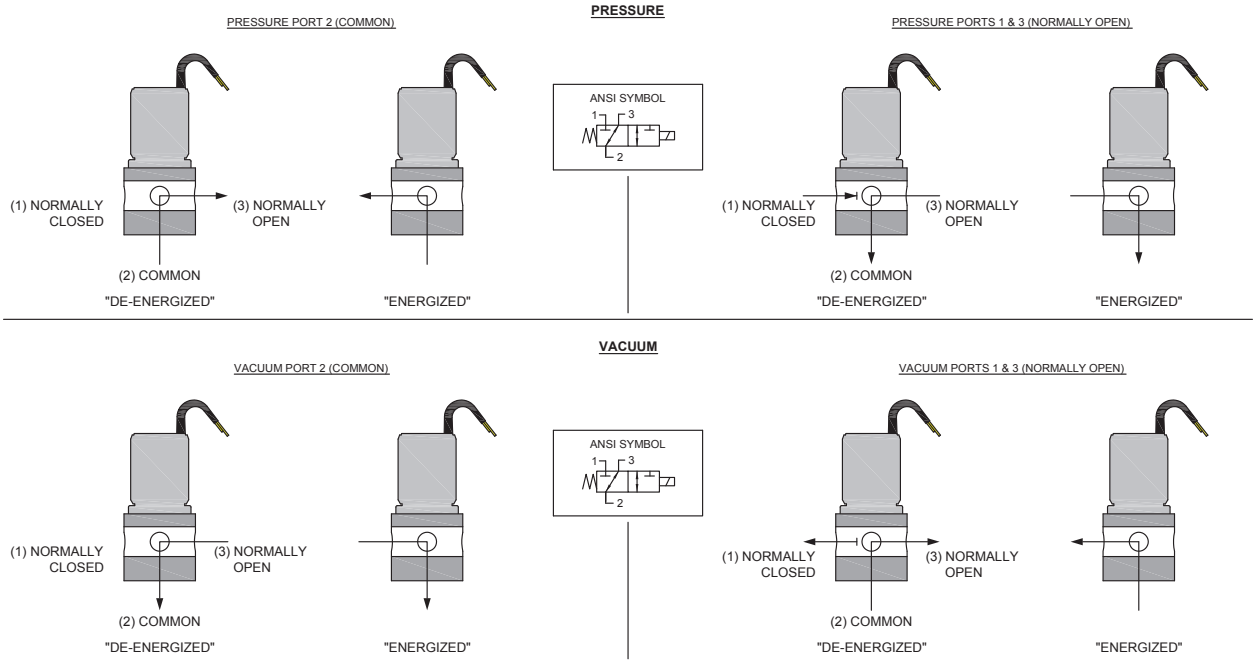




| UNITS |
| --- |
| IN. [mm.] |

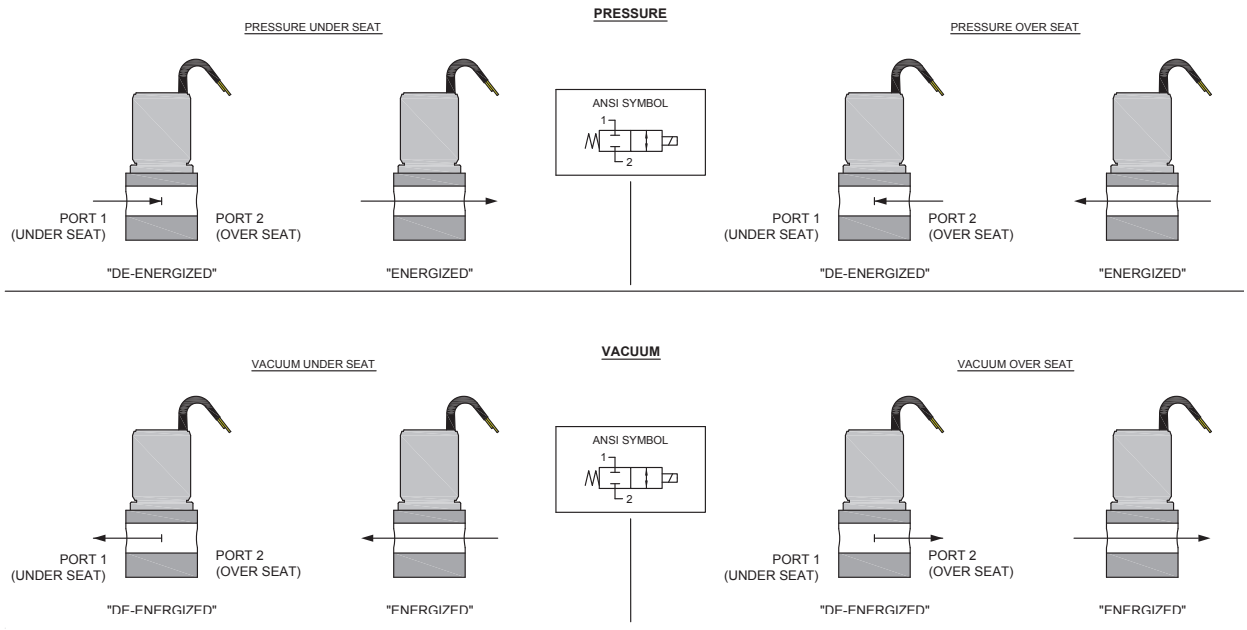
# **Series 1 & 2** Miniature Inert PTFE Isolation Valves

## ANSI Symbols

### Series 1




### Series 2



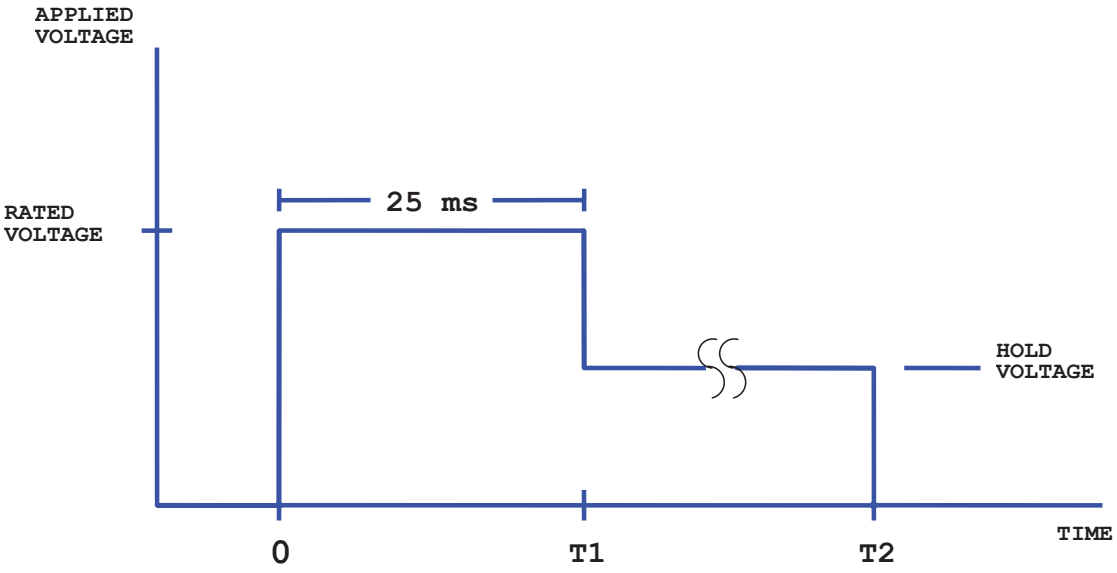
# **Series 1 & 2** Miniature Inert PTFE Isolation Valves

## Hit and Hold Specifications

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24 VDC solenoids.

| *Rated Voltage (volts)* | *3-way* | | *2-way* | |
|---|---|---|---|---|
| | *Hold Voltage* | *Hold Power* | *Hold Voltage* | *Hold Power* |
| 24 | 12 volts | 1.04 watts | 8 volts | 0.46 watts |
| 12 | 6 volts | 0.63 watts | 5 volts | 0.44 watts |

**Note:** Other voltages available




*Hold Voltage Graph*

# **Series 1 & 2** Miniature Inert PTFE Isolation Valves

## Chemical Compatibility Chart*

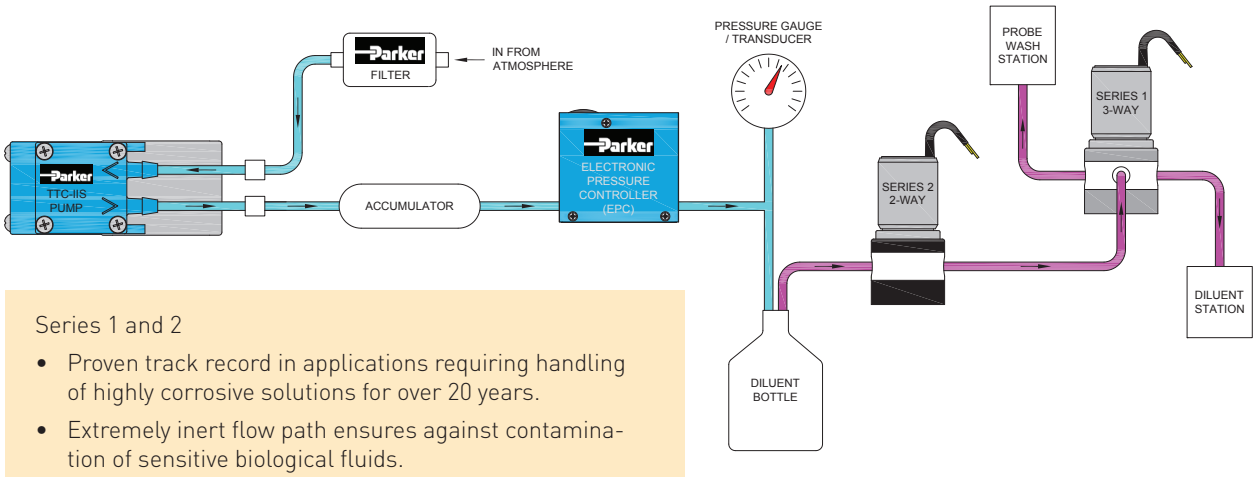
| | Diaphragm and Body | Other Wetted Materials |
|---|---|---|
| Chemical | PTFE | Borosilicate Glass (3-way version only) |
| DI Water | 1 | 1 |
| Methanol | 1 | 1 |
| Isopropanol | 1 | 1 |
| Ethanol | 1 | 1 |
| Acetonitrile | 1 | 1 |
| Tetrahydrofuran | 1 | 1 |
| Toluene | 1 | 4 |
| Organic Acids - Dilute | 1 | 1 |
| Non Organic Acids - Dilute | 1 | 1 |
| Bases - Dilute | 1 | 1 |
| Saline | 1 | 1 |
| Bleach 12% | 1 | 1 |
| Sodium Hydroxide 20% | 1 | 4 |

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for a complete list.

| COMPATIBILITY LEGEND | | |
|---|---|---|
| 1 | EXCELLENT | Minimal or no effect |
| 2 | GOOD | Possible swelling and/or loss of physical properties |
| 3 | DOUBTFUL | Moderate or severe swelling and loss of physical properties |
| 4 | NOT RECOMMENDED | Severe effect and should not be considered |

## Typical Flow Diagram

### Air Pressure Over Reagent




Series 1 and 2

- Proven track record in applications requiring handling of highly corrosive solutions for over 20 years.
- Extremely inert flow path ensures against contamination of sensitive biological fluids.
- Low internal volume reduces carryover and sample/reagent waste.

Highlight test results when available.

# **Series 1 & 2** Miniature Inert PTFE Isolation Valves

## Ordering Information

| Orifice Size | Pressure | Seal Material | Valve Type | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|
| 0.060"(1.52mm) | Vac-20psig (1.38 bar) | PTFE | 3-Way | 12V | 1/4"-28 | 001-0017-900 |
| | | | | 24V | 1/4"-28 | 001-0028-900 |
| | | PTFE | 2-Way NC | 12V | 1/4"-28 | 002-0017-900 |
| | | | | 24V | 1/4"-28 | 002-0010-900 |

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

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/series1and2) to configure your Series 1 and 2 Miniature Inert PTFE Isolation Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# Series 3 Miniature Inert Valves

2-Way and 3-Way Liquid Solenoid Valve


The Series 3 solenoid valve is constructed of inert materials suitable for liquids including bleach and saline, for applications in analytical chemistry, clinical diagnostics and ink jet printing. These 2-Way and 3-Way valves handle high flow in a small valve with pressures up to 100 psi and no metal-to-metal sliding surfaces, ensuring long life and trouble free operation. Series 3 also offers a higher pressure rating than most diaphragm isolation valves.

## Applications

Control of:

- Bleach
- Wash solutions
- Waste removal
- Reagents
- Inks
- Other aggressive media

## Features

- Wetted parts are inert plastic (PEEK, PTFE), stainless steel, and elastomer (FKM or EPDM)
- Chemically resistant to moderate acids, bases, bleach and saline
- Leak safe design ensures that fluids are contained within the valve preventing damage to the other components in the instrument
- High flow in small package while providing fast cycle times
- Resistant to crystallization and particulates
- No sliding metal-to-metal surfaces minimizes wear of moving parts
- Direct-acting design does not require pressure or vacuum to operate
- RoHS compliant

# Product Specifications

## Physical Properties

| |
|---|
| **Valve Type:** |
| Inert Non-Isolation Valve |
| **Valve Configuration:** |
| 2-Way Normally Closed, 3-Way |
| **Media:** Liquids |
| **Operating Environment:** |
| 40 to 150°F (4 to 66°C) |
| **Dimensions:** *See page 3* |
| **Porting (Orifice Dependent):** |
| Barbs for 1/16” (1.6 mm) ID tubing<br>Barbs for 1/8” (3.2 mm) ID tubing<br>Barbs for 3/16” (4.8 mm) ID tubing<br>Manifold Mount (Contact factory for options) |
| **Weight:** |
| 1.8 - 2.0 oz (51 - 56 g) |
| **Internal Volume (µL):** |
| 238 (1/16" Barb Option)<br>326 (1/8" Barb Option)<br>516 (3/16" Barb Option)<br>208 (Manifold Option) |

## Electrical

| | | |
|---|---|---|
| **Voltage (VDC):** | 12 | 24 |
| **Power (Watts):** | 2.5 | 4.2 |
| **Current (mA):** | 211 | 173 |
| **Resistance (Ohm):** | 57 | 139 |
| (Ω±5% @ 70°F, 21.1°C) | | |
| **Connections:** | | |
| 12" Lead Wires Standard<br>26 AWG, PTFE Insulated | | |

## Wetted Materials*

| |
|---|
| **Seal:** |
| FKM, EPDM |
| **Body:** |
| PEEK |
| **All Others:** |
| PTFE, Stainless Steel |

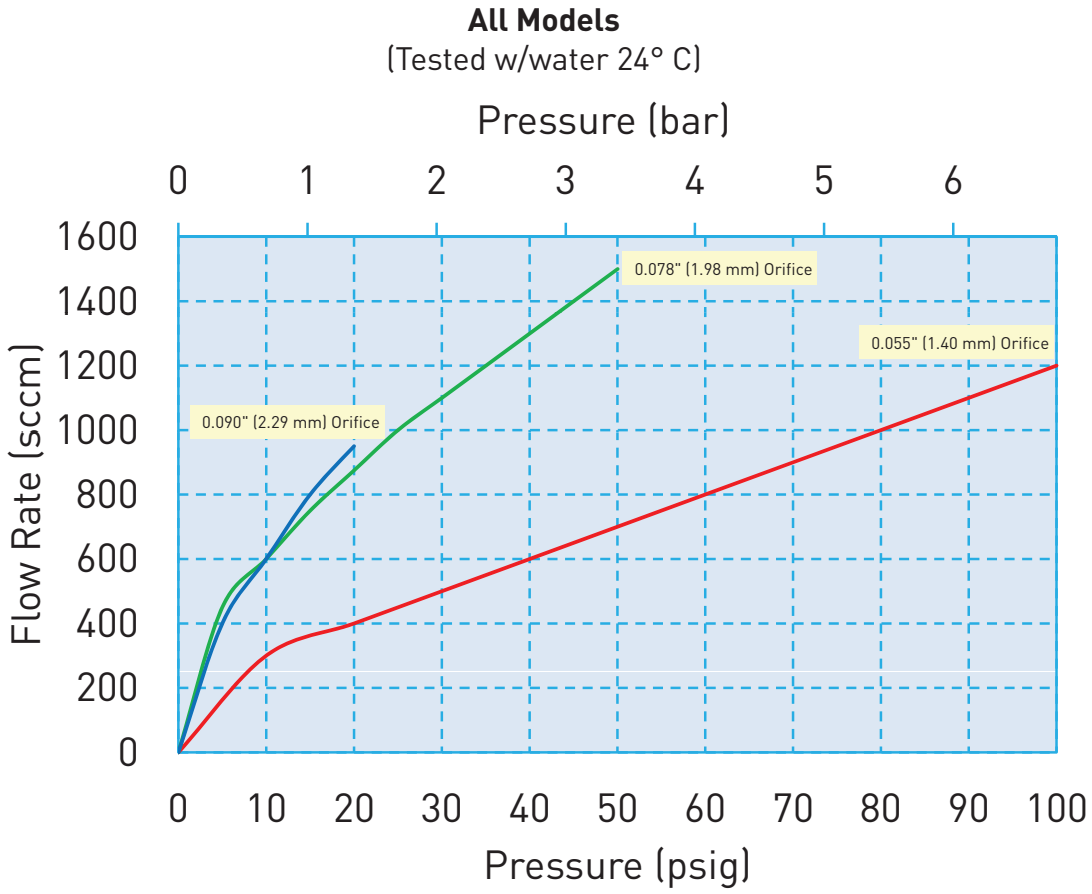
* See Chemical Compatibility Page
Consult factory for other options

## Performance Characteristics

| |
|---|
| **Operating Pressure/ Orifice Diameters:** |
| Vac-100 psig (6.89 bar)/ 0.055” (1.40 mm)<br>Vac-50 psig (3.44 bar)/ 0.078” (1.98 mm)<br>Vac-20 psig (1.36 bar)/ 0.090” (2.29 mm) |
| **Proof Pressure:** |
| 1.5X rated pressure |
| **Leak Rate:** |
| Bubble Tight |
| **Response Time:** |
| < 12 ms cycling |
| **Recommended Filtration:** |
| 40 µm max |
| **Reliability:** |
| Life Cycle Rating of 10 million (Application dependent) |

# **Series 3** Miniature Inert Valves

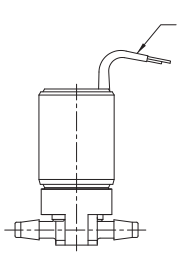
## Typical Flow Curve



# **Series 3** Miniature Inert Valves

## Electrical Interface

### Wire leads


| UNITS |
| --- |
| IN. [mm.] |

Custom connections available upon request

## Liquid Interface

### Manifold Mount

### Barbed

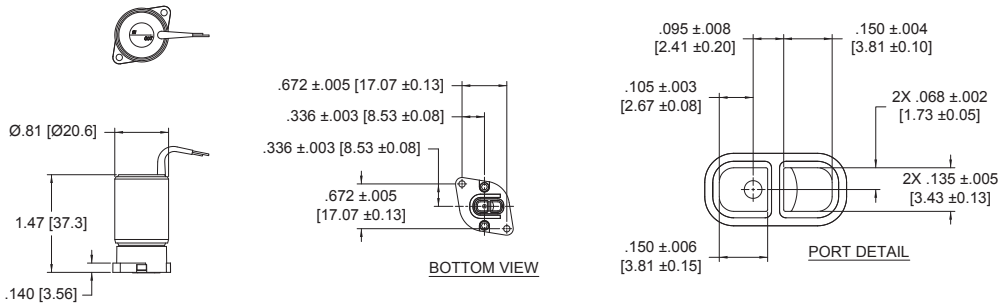

## Mechanical Integration

### Dimensions

**Series 3: 2-Way Manifold Mount**

**Dimensions**

**2-WAY, 0.055" (1.40 mm) ORIFICE, MANIFOLD MOUNT**



# **Series 3** Miniature Inert Valves

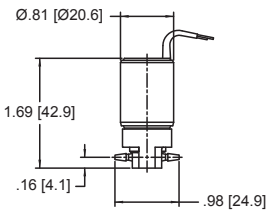
## Mechanical Integration

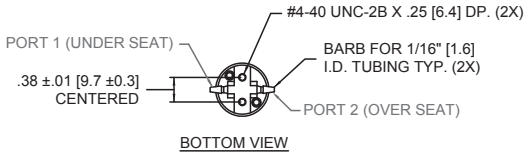
### Dimensions

### Series 3: 2-Way Barb

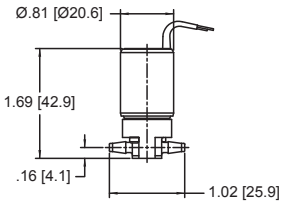
### Dimensions

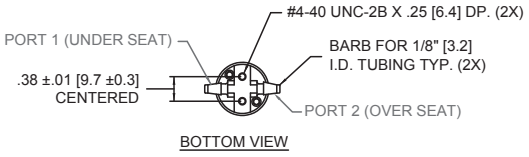
**2-WAY, 0.055" (1.40 mm) ORIFICE, 1/16" (1.6 mm) BARB**



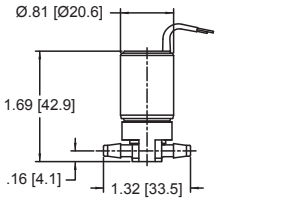



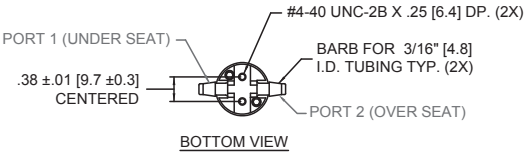

**2-WAY, 0.078" (1.98 mm) ORIFICE, 1/8" (3.2 mm) BARB**




**2-WAY, 0.090" (2.29 mm) ORIFICE, 3/16" (4.8 mm) BARB**



# **Series 3** Miniature Inert Valves

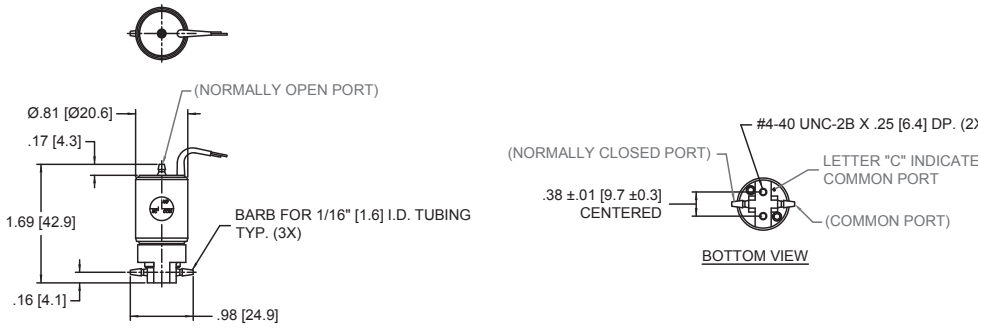
## Mechanical Integration

### Dimensions

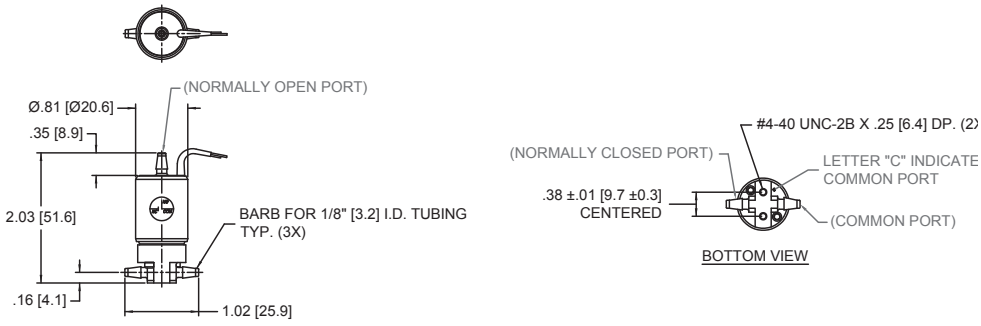
### Series 3: 3-Way Barb

### Dimensions

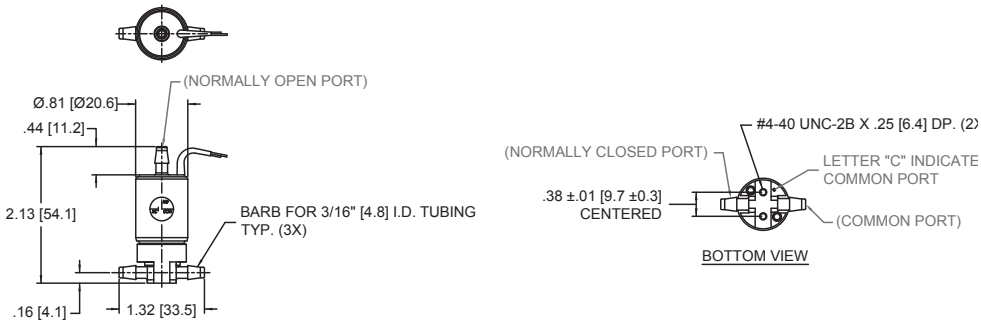
**3-WAY, 0.055" (1.40 mm) ORIFICE, 1/16" (1.6 mm) BARB**




**3-WAY, 0.078" (1.98 mm) ORIFICE, 1/8" (3.2 mm) BARB**



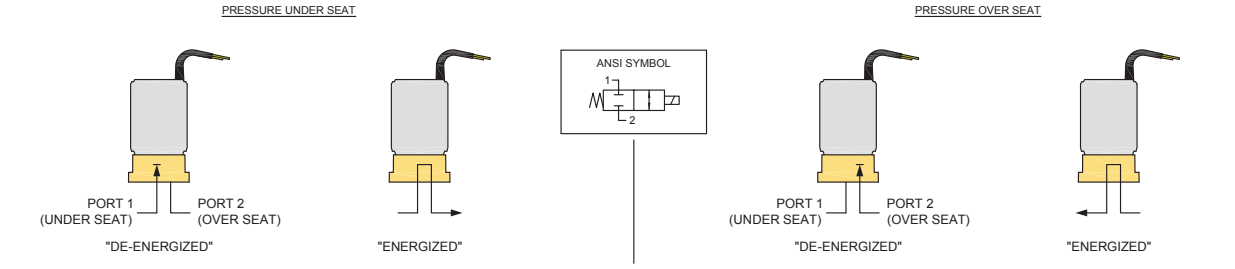

**3-WAY, 0.090" (2.29 mm) ORIFICE, 3/16" (4.8 mm) BARB**



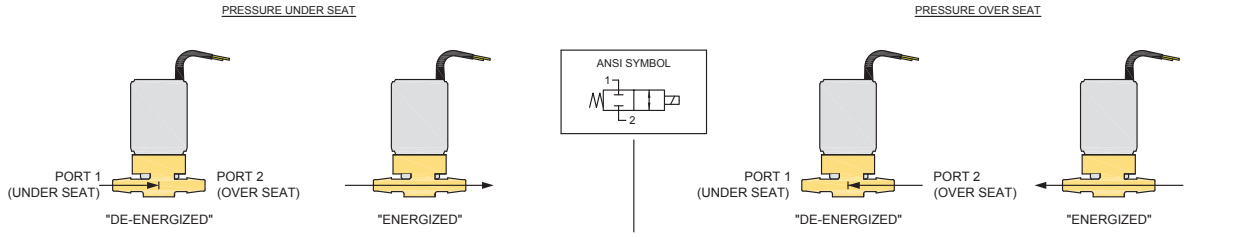
# **Series 3** Miniature Inert Valves

## ANSI Symbols

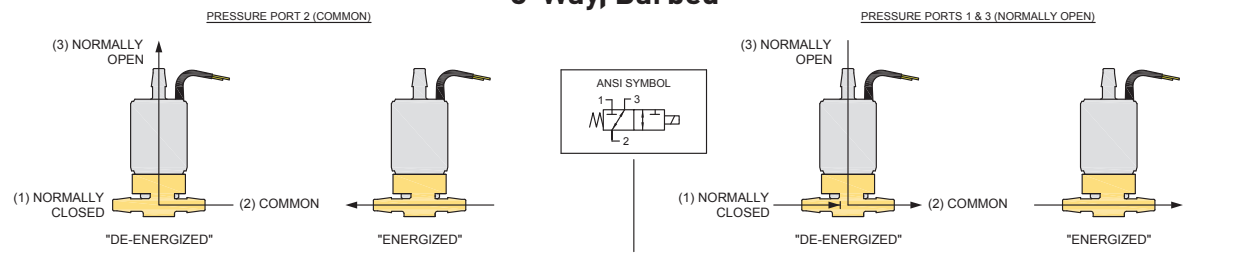
### Pressure
### 2-Way, Manifold Mount




### 2-Way, Barbed



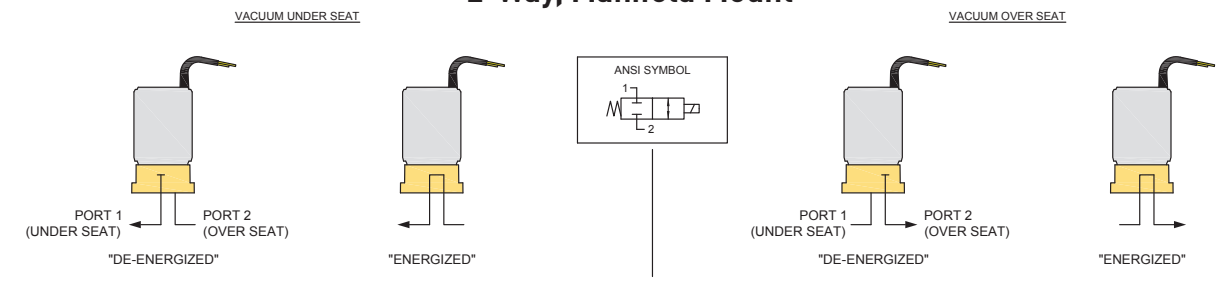

### 3-Way, Barbed



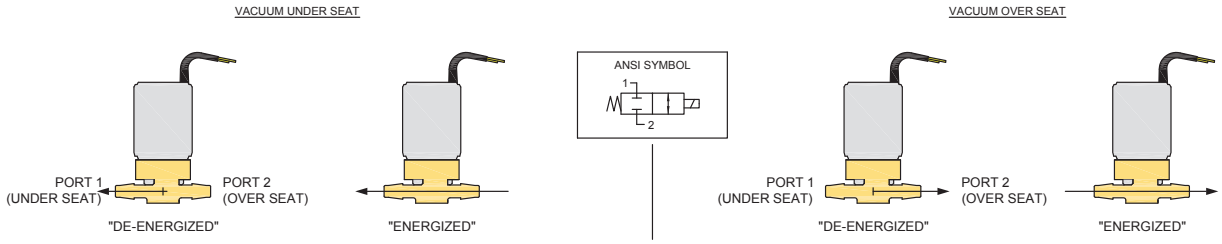
# **Series 3** Miniature Inert Valves

## ANSI Symbols

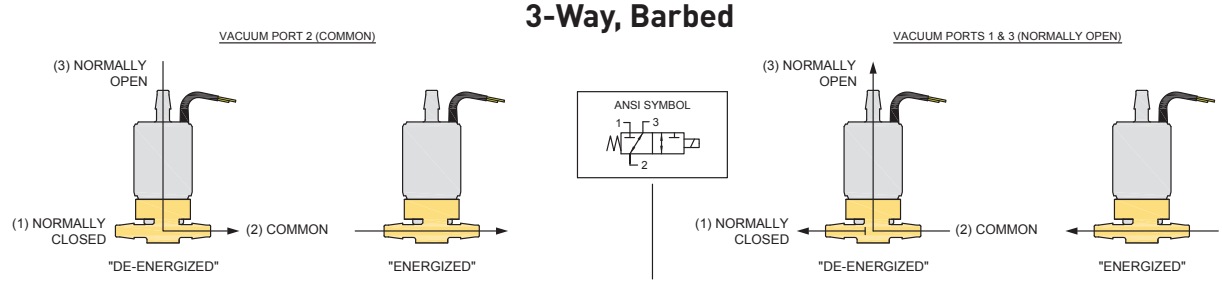
### Vacuum
### 2-Way, Manifold Mount




### 2-Way, Barbed




### 3-Way, Barbed



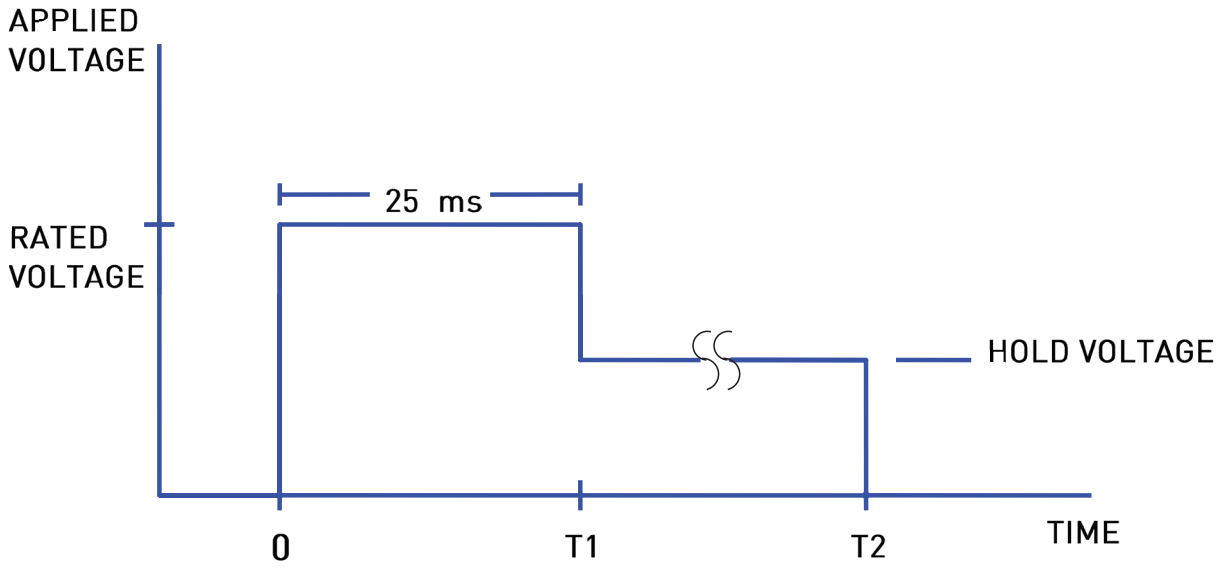
# **Series 3** Miniature Inert Valves

## Hit and Hold Specifications

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24 VDC solenoids.

| *Rated Voltage (volts)* | *3-way* | | *2-way* | |
|---|---|---|---|---|
| | *Hold Voltage* | *Hold Power* | *Hold Voltage* | *Hold Power* |
| 24 | 12 volts | 1.04 watts | 8 volts | 0.46 watts |
| 12 | 6 volts | 0.63 watts | 5 volts | 0.44 watts |

**Note:** Other voltages available




*Hold Voltage Graph*

# **Series 3** Miniature Inert Valves

## Chemical Compatibility Chart*

| Chemical | Seal Options FKM | or | EPDM | Other Wetted Materials PEEK, PTFE & Stainless Steel |
|---|---|---|---|---|
| DI Water | 1 | | 1 | 1 |
| Methanol | 4 | | 1 | 1 |
| Isopropanol | 1 | | 1 | 1 |
| Ethanol | 3 | | 1 | 1 |
| Acetonitrile | 4 | | 1 | 1 |
| Tetrahydrofuran | 4 | | 4 | 1 |
| Toluene | 2 | | 4 | 1 |
| Organic Acids - Dilute | 1 | | 1 | 1 |
| Non Organic Acids - Dilute | 1 | | 1 | 1 |
| Bases - Dilute | 1 | | 1 | 1 |
| Saline | 1 | | 1 | 1 |
| Bleach 12% | 1 | | 1 | 1 or 2** |
| Sodium Hydroxide 20% | 2 | | 1 | 1 |

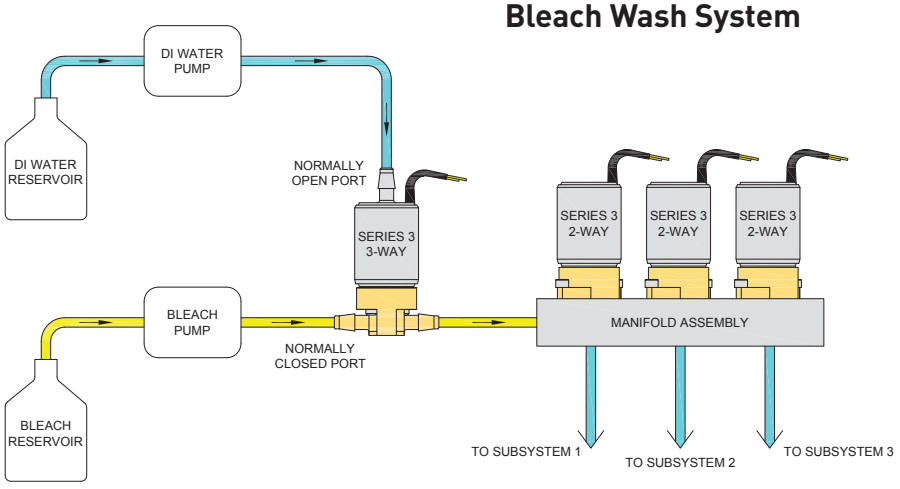
*The above is an Abbreviated Chemical Compatibility Chart and is for reference purposes only. Please consult factory for a complete list.

**See Ordering Information: 1 = Bleach Part Number 2 = Non Bleach Part Number

| COMPATIBILITY LEGEND | | |
|---|---|---|
| 1 | EXCELLENT | Minimal or no effect |
| 2 | GOOD | Possible swelling and/or loss of physical properties |
| 3 | DOUBTFUL | Moderate or severe swelling and loss of physical properties |
| 4 | NOT RECOMMENDED | Severe effect and should not be considered |

## Typical Flow Diagram

### Bleach Wash System




Proven Performance:

- The Series 3 Bleach Valve has been successfully tested to more than six million cycles with no degradation of components.
- Tested with standard bleach concentration used in IVD instrumentation
- Passed specifications for
  - Response time
  - Internal leakage
  - External leakage

The Series 3 Bleach Valve has a proven track record in Clinical Diagnostic Instrumentation for over 25 years.

# **Series 3** Miniature Inert Valves

## Ordering Information

| Orifice Size | Pressure | Valve Type | Seal Material | Bleach Compatible | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|---|
| 0.055" (1.40 mm) | Vac-100 psig (6.89 bar) | 2 Way NC | FKM | Yes | 12V | 1/16" (1.6 mm) Barb | 003-0860-900 |
| | | | | | | Manifold Mount | 003-0872-900 |
| | | | | | 24V | 1/16" (1.6 mm) Barb | 003-0861-900 |
| | | | | | | Manifold Mount | 003-0873-900 |
| | | | | No | 12V | 1/16" (1.6 mm) Barb | 003-0137-900 |
| | | | | | | Manifold Mount | 003-0874-900 |
| | | | | | 24V | 1/16" (1.6 mm) Barb | 003-0096-900 |
| | | | | | | Manifold Mount | 003-0875-900 |
| | | | EPDM | No | 12V | 1/16" (1.6 mm) Barb | 003-0218-900 |
| | | | | | 24V | 1/16" (1.6 mm) Barb | 003-0264-900 |
| | | 3 Way | FKM | Yes | 12V | 1/16" (1.6 mm) Barb | 003-0862-900 |
| | | | | | 24V | 1/16" (1.6 mm) Barb | 003-0863-900 |
| | | | | No | 12V | 1/16" (1.6 mm) Barb | 003-0130-900 |
| | | | | | 24V | 1/16" (1.6 mm) Barb | 003-0194-900 |
| | | | EPDM | No | 12V | 1/16" (1.6 mm) Barb | 003-0214-900 |
| | | | | | 24V | 1/16" (1.6 mm) Barb | 003-0241-900 |

| Orifice Size | Pressure | Valve Type | Seal Material | Bleach Compatible | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|---|
| 0.078" (1.98 mm) | Vac-50 psig (3.44 bar) | 2 Way NC | FKM | Yes | 12V | 1/8" (3.2 mm) Barb | 003-0864-900 |
| | | | | | 24V | 1/8" (3.2 mm) Barb | 003-0865-900 |
| | | | | No | 12V | 1/8" (3.2 mm) Barb | 003-0141-900 |
| | | | | | 24V | 1/8" (3.2 mm) Barb | 003-0111-900 |
| | | | EPDM | No | 12V | 1/8" (3.2 mm) Barb | 003-0260-900 |
| | | | | | 24V | 1/8" (3.2 mm) Barb | 003-0257-900 |
| | | 3 Way | FKM | Yes | 12V | 1/8" (3.2 mm) Barb | 003-0866-900 |
| | | | | | 24V | 1/8" (3.2 mm) Barb | 003-0867-900 |
| | | | | No | 12V | 1/8" (3.2 mm) Barb | 003-0120-900 |
| | | | | | 24V | 1/8" (3.2 mm) Barb | 003-0165-900 |
| | | | EPDM | No | 12V | 1/8" (3.2 mm) Barb | 003-0356-900 |
| | | | | | 24V | 1/8" (3.2 mm) Barb | 003-0258-900 |

| Orifice Size | Pressure | Valve Type | Seal Material | Bleach Compatible | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|---|
| 0.090" (2.29 mm) | Vac-20 psig (1.36 bar) | 2 Way NC | FKM | Yes | 12V | 3/16" (4.8 mm) Barb | 003-0868-900 |
| | | | | | 24V | 3/16" (4.8 mm) Barb | 003-0869-900 |
| | | | | No | 12V | 3/16" (4.8 mm) Barb | 003-0175-900 |
| | | | | | 24V | 3/16" (4.8 mm) Barb | 003-0359-900 |
| | | | EPDM | No | 12V | 3/16" (4.8 mm) Barb | 003-0189-900 |
| | | | | | 24V | 3/16" (4.8 mm) Barb | 003-0376-900 |
| | | 3 Way | FKM | Yes | 12V | 3/16" (4.8 mm) Barb | 003-0870-900 |
| | | | | | 24V | 3/16" (4.8 mm) Barb | 003-0871-900 |
| | | | | No | 12V | 3/16" (4.8 mm) Barb | 003-0328-900 |
| | | | | | 24V | 3/16" (4.8 mm) Barb | 003-0421-900 |
| | | | EPDM | No | 12V | 3/16" (4.8 mm) Barb | 003-0347-900 |
| | | | | | 24V | 3/16" (4.8 mm) Barb | 003-0461-900 |

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

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/s3) to configure your Series 3 Miniature Inert Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# Series 9 Miniature High Speed and Pressure Liquid Dispense Valve

2-Way and 3-Way Solenoid Valve

Series 9 solenoid valves offer outstanding precision control in liquid analysis. Combining high speed, ultra low leak rate, high flow, high pressure and high temperature capability in a small size. This rugged valve operates with extreme repeatability and is constructed of non-corroding, passivated stainless steel. Series 9 coils are rated for continuous duty and are potted to exclude the environment.

## Applications

- Process Analysis of Liquids
- High Pressure Liquid Control
- Radioactive Liquids in Medical Imaging
- Cooling Circuits

## Features

- Smallest footprint and highest performance in its class
- High speed response times of less than 6 ms
- 100% tested to leak-tight 1 x $10^{-7}$ cc/sec/atm Helium
- Pressures up to 1250 psi (86.2 bar)
- 100% duty cycle in environmental temperatures of up to 221°F (105°C)
- Available with a variety of fittings, orifices, seals, and voltages to match your application
- RoHS compliant

# Product Specifications

## Physical Properties

| |
|---|
| **Valve Type:** |
| Inert Non-Isolation Valve |
| **Valve Configuration:** |
| 2-Way Normally Closed or 3-Way |
| **Media:** |
| Liquids<br>*(also capable of handling gasses, for details see the Series 9 Gas datasheet)* |
| **Operating Environment:** |
| 40 to 221°F (4 to 105°C) |
| **Dimensions:** |
| See pages 4, 5, 6 & 7 |
| **Porting (Orifice Dependent):** |
| A-LOK® 1/4 - 28 FNPT |
| compression fittings, VacuSeal |
| **Weight:** |
| 3.1 oz (87.9 g) |
| [3-Way, 1/8" NPT Body Option] |
| **Internal Volume (µL):** |
| 342.7 to 540.6 |
| (Contact factory for details) |

## Electrical

| | | |
|---|---|---|
| **Voltage (VDC):** | 12 | 24 |
| **Power (Watts):** | 12 | 12 |
| **Current (mA):** | 1000 | 500 |
| **Resistance (Ohm):** | 12 | 48 |
| (Ω±5% @ 70°F, 21°C) | | |
| **Connections:** | | |
| 12" Lead Wires Standard | | |
| 24 AWG, PTFE Insulated | | |
| (Custom connectors are available) | | |

## Wetted Materials*

| |
|---|
| **Seals:** |
| FKM or FKM & Vespel |
| **Body:** |
| 316 Stainless Steel |
| **All Others:** |
| PTFE, Stainless Steel, FKM |

* See Chemical Compatibility Page
Consult factory for other options

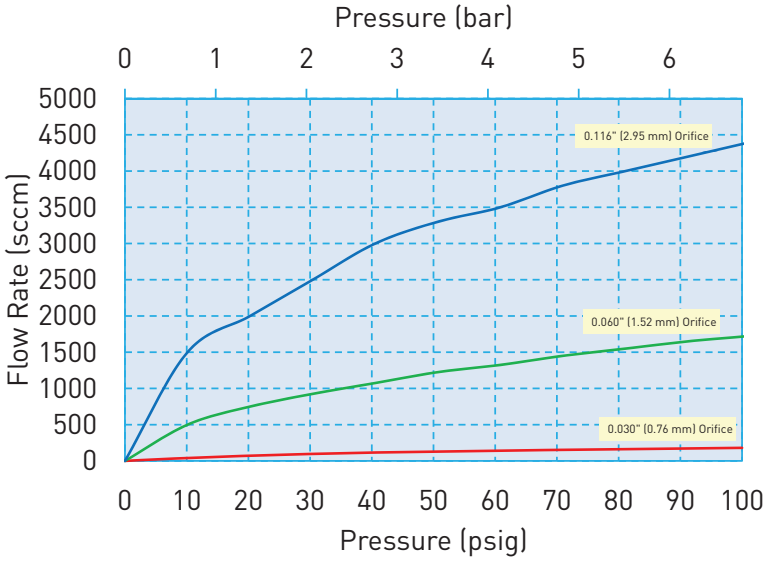
## Performance Characteristics

| |
|---|
| **Orifice Diameters/ Operating Pressure:** |
| 0.030" (0.76 mm) / 1x10-5 Torr -1250 psig (86.2 bar) |
| 0.060" (1.52 mm) / 1x10-5 Torr - 250 psig (17.2 bar) |
| 0.116" (2.95 mm) / 1x10-5 Torr - 100 psig (6.9 bar) |
| **Proof Pressure:** |
| 1.5X rated pressure |
| **Response Time:** |
| <5 ms 0.030" (0.76 mm) |
| <5 ms 0.060" (1.52 mm) |
| <6 ms 0.116" (2.95 mm) |
| **Leak Rate:** |
| 1 x $10^{-7}$ cc/sec/atm Helium |
| **Recommended Filtration:** |
| 40 µm max |

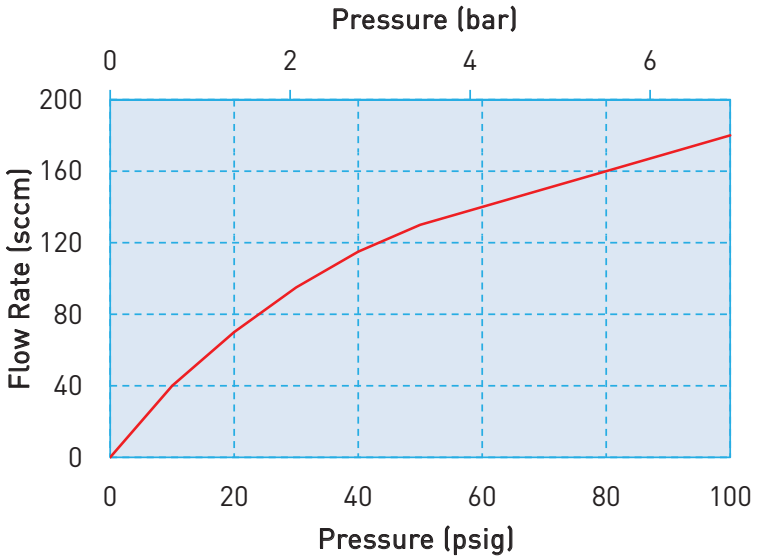
# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Typical Flow Curve

**All Models**
(Tested w/water 24° C)

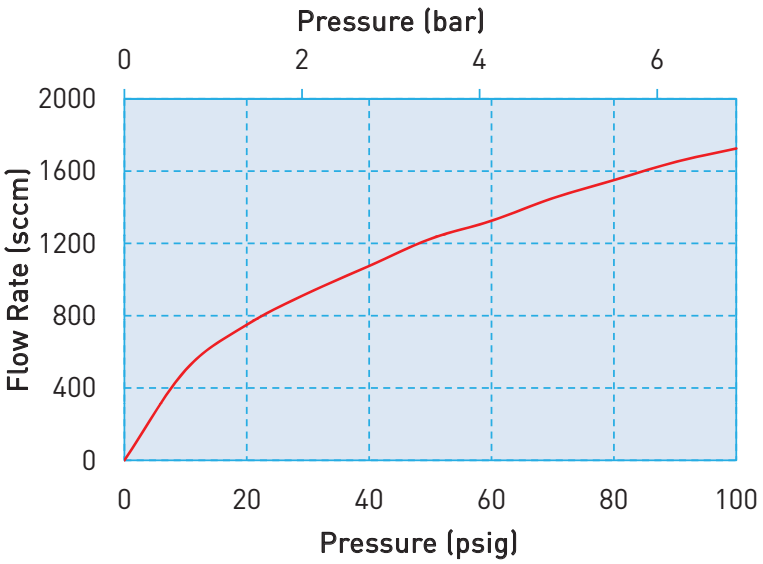



**0.030" (0.76 mm) Orifice**

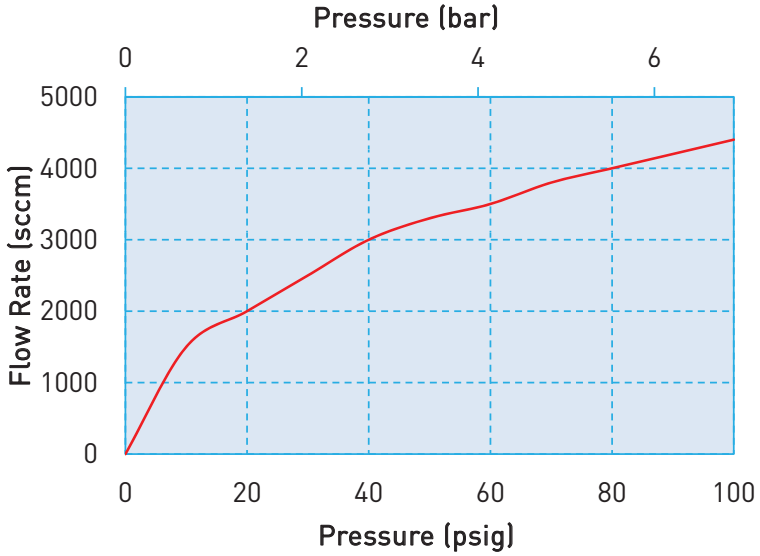


# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

**0.060" (1.52 mm) Orifice**

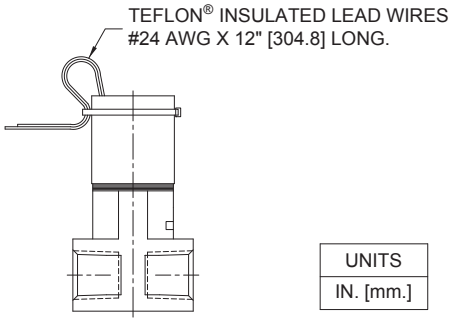



**0.116" (2.95 mm) Orifice**




## Electrical Interface

**Wire leads**




Custom connections available upon request

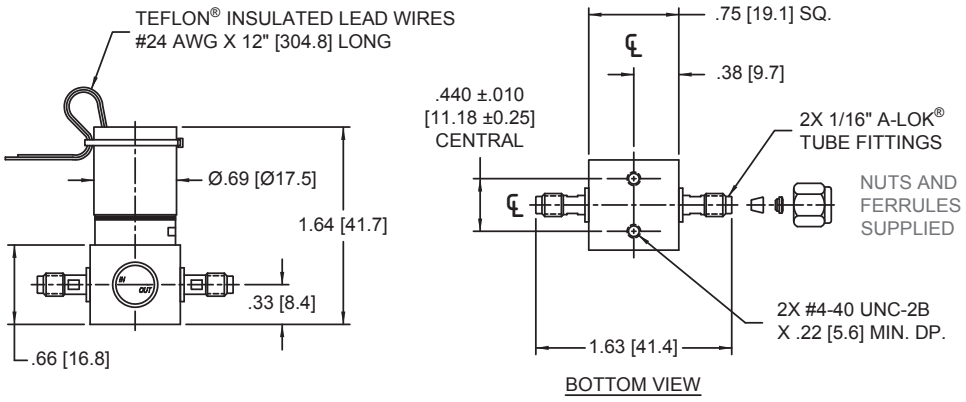
# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Mechanical Integration

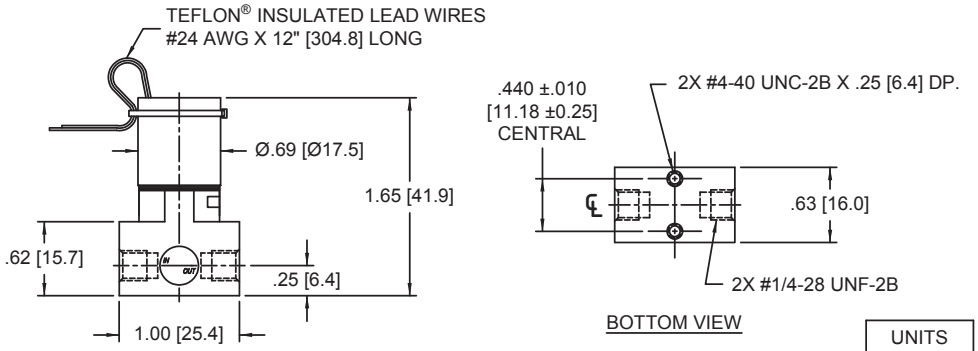
### Dimensions

**Series 9: 2-Way**
**Dimensions**

**2-WAY, 0.030" [0.76 mm] ORIFICE, 1/16" [1.6 mm] A-LOK®**




**2-WAY, 0.030" [0.76 mm] ORIFICE, 1/4-28 UNF-2B**




| UNITS |
| --- |
| IN. [mm.] |

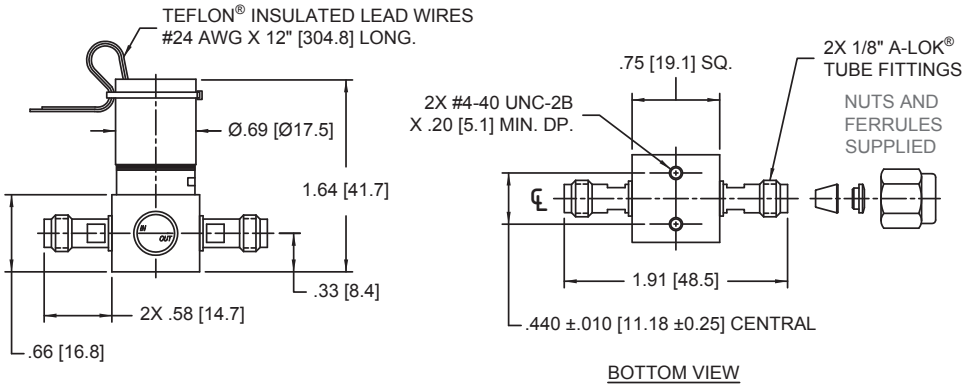
# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Mechanical Integration

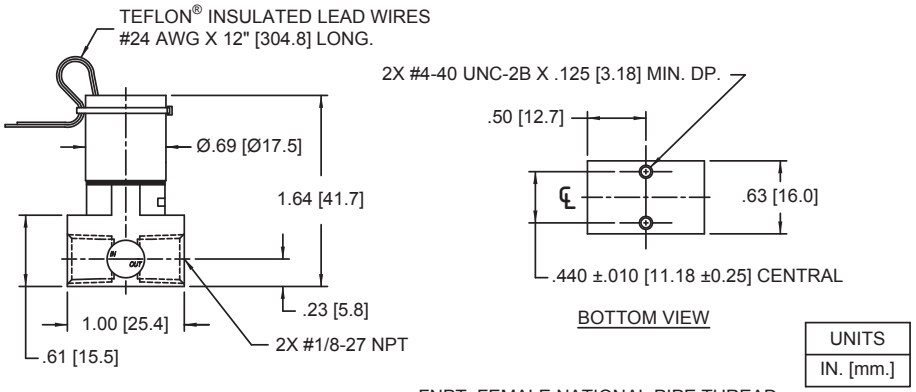
### Dimensions

**Series 9: 2-Way**
**Dimensions**

**2-WAY, 0.060" [1.52 mm] ORIFICE, 1/8" [3.18 mm] A-LOK®**




**2-WAY, 0.060" [1.52 mm] ORIFICE, 1/8" [3.18 mm] FNPT**




| UNITS |
| --- |
| IN. [mm.] |

FNPT: FEMALE NATIONAL PIPE THREAD

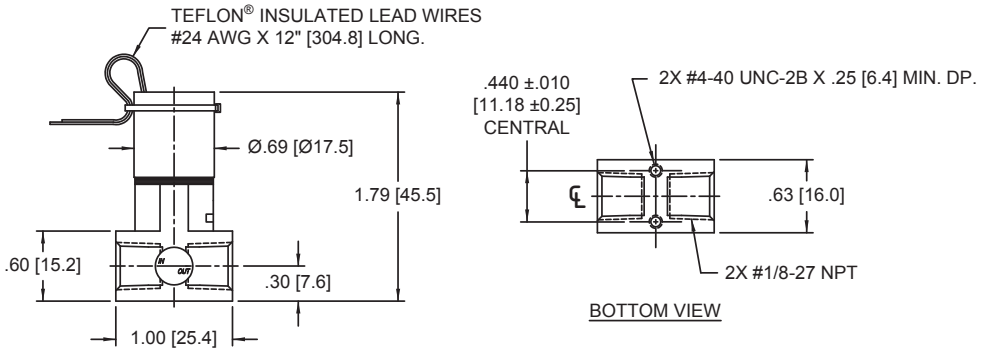
# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Mechanical Integration

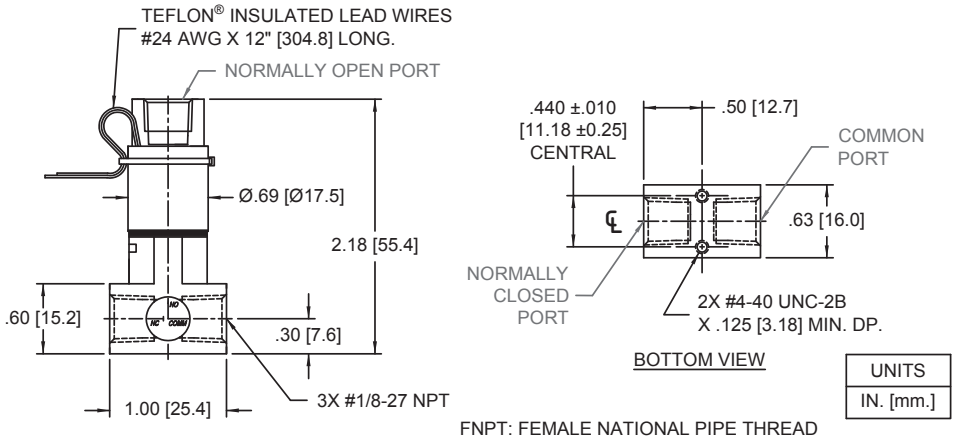
### Dimensions

**Series 9: 2-Way**
**Dimensions**

**2-WAY, 0.116" [2.95 mm] ORIFICE, 1/8" [3.18 mm] FNPT**




**3-WAY, 0.116" [2.95 mm] ORIFICE, 1/8" [3.18 mm] FNPT**




FNPT: FEMALE NATIONAL PIPE THREAD

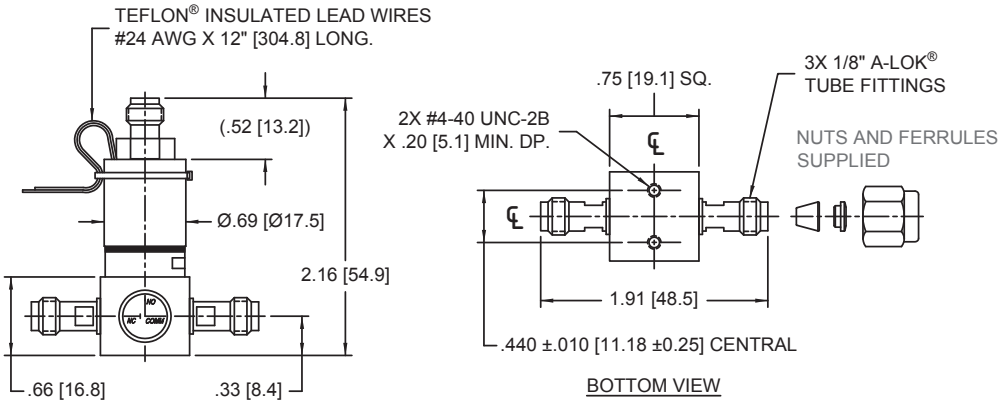
# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Mechanical Integration

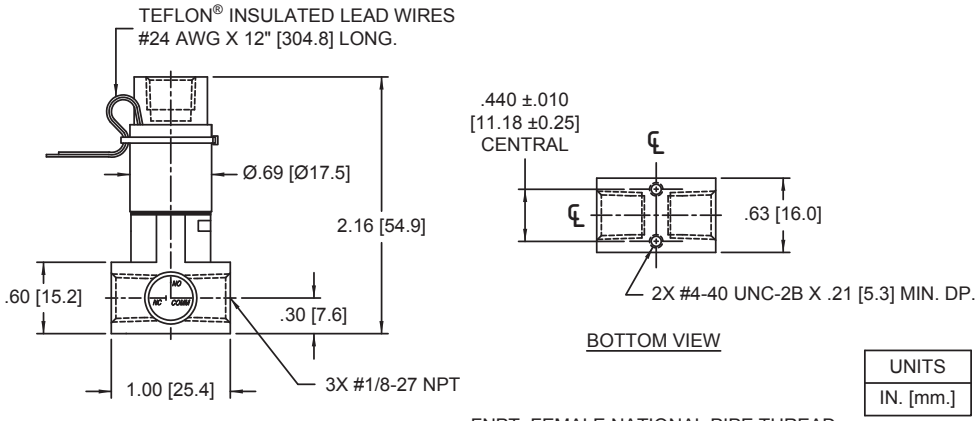
### Dimensions

**Series 9: 3-Way Dimensions**

**3-WAY, 0.060" [1.52 mm] ORIFICE, 1/8" [3.18 mm] A-LOK®**




**3-WAY, 0.060" [1.52 mm] ORIFICE, 1/8" [3.18 mm] FNPT**



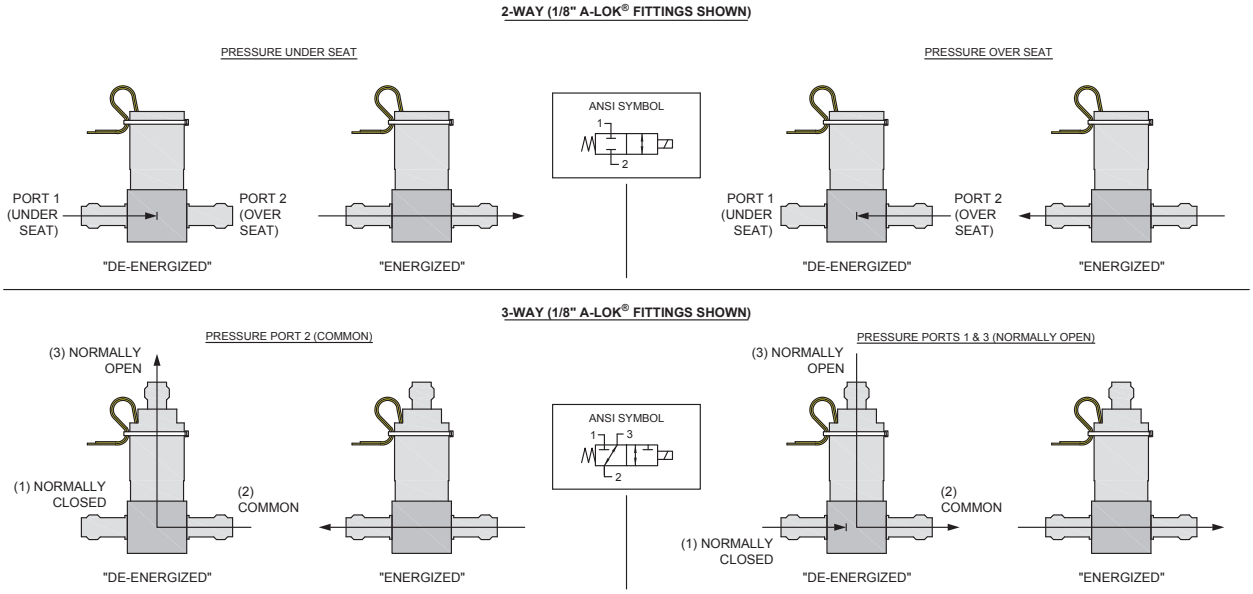

| UNITS |
| --- |
| IN. [mm.] |

FNPT: FEMALE NATIONAL PIPE THREAD

# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

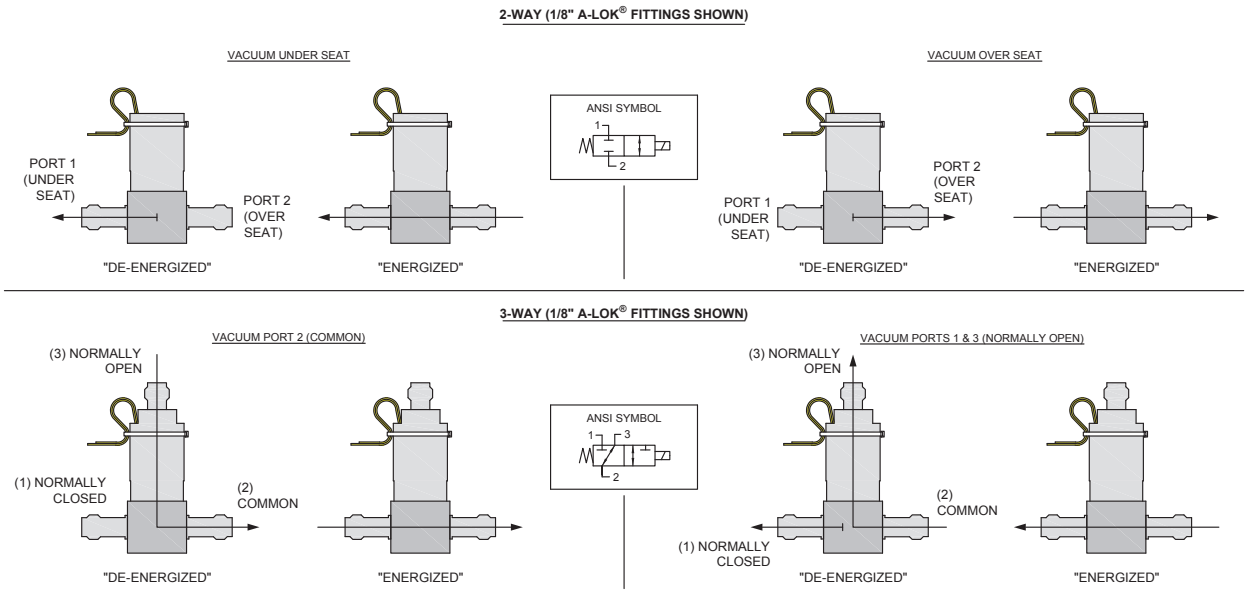
## ANSI Symbols

### Pressure




## ANSI Symbols

### Vacuum



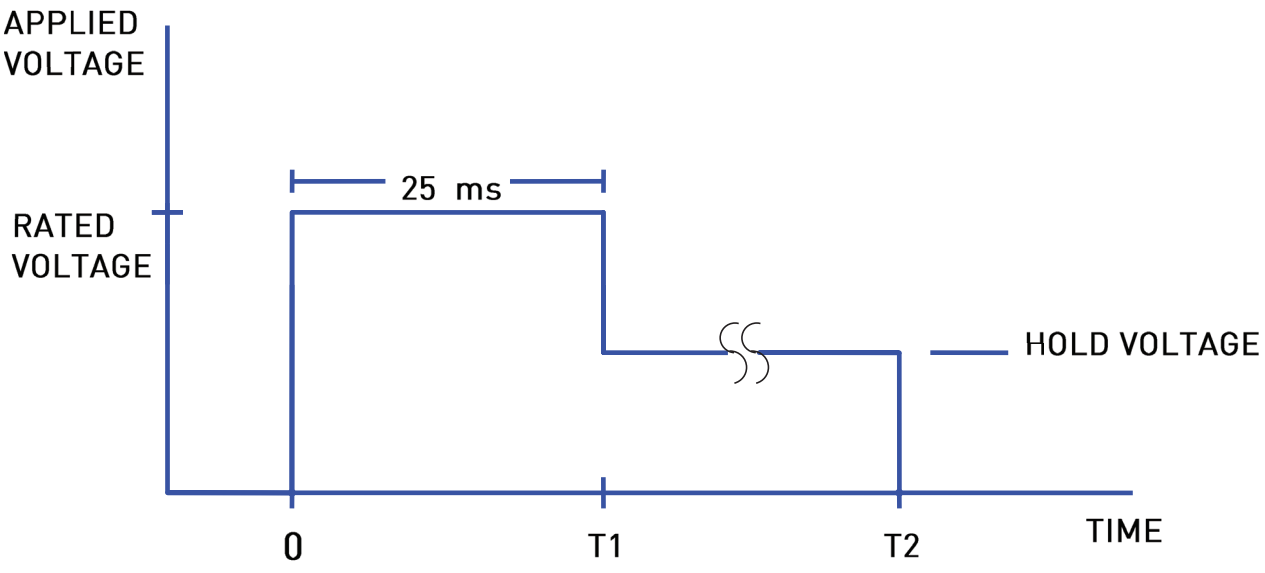
# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Hit and Hold Specifications (12-Watt coils):

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24VDC solenoids.

| Rated Voltage (volts) | 3-way | | 2-way | |
|---|---|---|---|---|
| | Hold Voltage | Hold Power | Hold Voltage | Hold Power |
| 24 | 12 volts | 3 watts | 5 volts | 0.52 watts |
| 12 | 6 volts | 3 watts | 5 volts | 2.1 watts |

**Note:** Other voltages available




*Hold Voltage Graph*

# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Chemical Compatibility Chart*

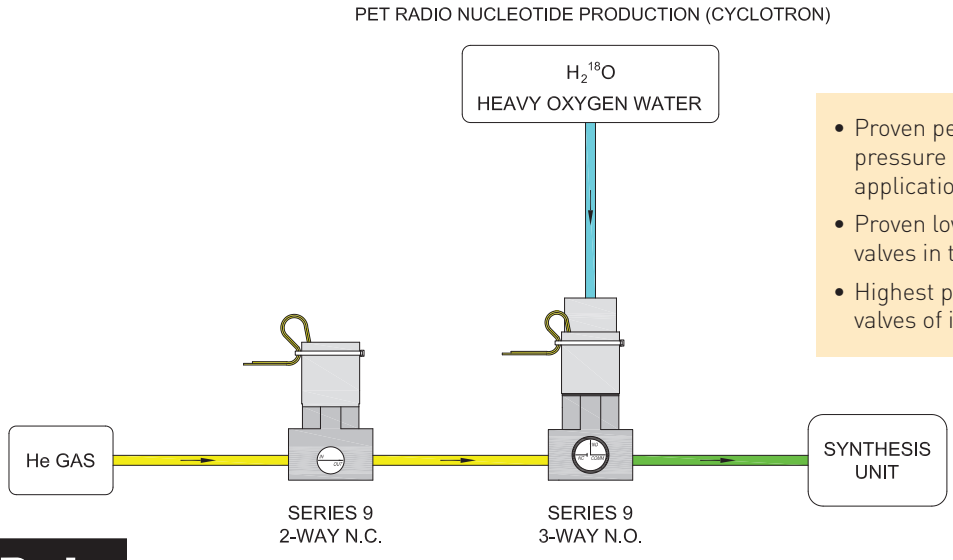
| | Seal Options | | | | Other Wetted Materials | |
|---|---|---|---|---|---|---|
| Chemical | FKM and Vespel | | or | FKM | PTFE | Stainless Steel |
| DI Water | 1 | 2 | | 1 | 1 | 1 |
| Methanol | 4 | 1 | | 4 | 1 | 1 |
| Isopropanol | 1 | 2 | | 1 | 1 | 1 |
| Ethanol | 3 | 1 | | 3 | 1 | 1 |
| Acetonitrile | 4 | 1 | | 4 | 1 | 1 |
| Tetrahydrofuran | 4 | 3 | | 4 | 1 | 1 |
| Toluene | 2 | 1 | | 2 | 1 | 1 |
| Organic Acids - Dilute | 1 | 1 | | 1 | 1 | 1 |
| Non Organic Acids - Dilute | 1 | 1 | | 1 | 1 | 1 |
| Bases - Dilute | 1 | 1 | | 1 | 1 | 1 |
| Saline | 1 | 1 | | 1 | 1 | 1 |
| Bleach 12% | 1 | 4 | | 1 | 1 | 2 |
| Sodium Hydroxide 20% | 2 | 4 | | 2 | 1 | 1 |

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for a complete list.

| COMPATIBILITY LEGEND | | |
|---|---|---|
| 1 | **EXCELLENT** | Minimal or no effect |
| 2 | **GOOD** | Possible swelling and/or loss of physical properties |
| 3 | **DOUBTFUL** | Moderate or severe swelling and loss of physical properties |
| 4 | **NOT RECOMMENDED** | Severe effect and should not be considered |

## Typical Flow Diagram

### Typical Sample Control for Mass Spec




- Proven performance in high pressure and low leak applications using liquids
- Proven lowest leak rate among valves in this form factor.
- Highest pressure capacity in valves of its size.

# **Series 9** Miniature High Speed and Pressure Liquid Dispense Valve

## Ordering Information

| Orifice Size | Seal Material | Pressure | Valve Type | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|
| 0.030" (0.76 mm) | Vespel, FKM | Vac-1250 psig (86.2 bar) | 2-Way NC | 12V | 1/16"(1.6mm) A-Lok® | 009-0100-900 |
| | | | | 24V | 1/16"(1.6mm) A-Lok® | 009-0172-900 |
| | | | | 24V | 1/4"(6.4mm)-28 | 009-0272-900 |

| Orifice Size | Seal Material | Pressure | Valve Type | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|
| 0.060" (1.52 mm) | FKM | Vac-250 psig (17.2 bar) | 2-Way NC | 24V | 1/8"(3.2mm) A-Lok® | 009-0270-900 |
| | | | | 24V | 1/8"(3.2mm) FNPT | 009-0631-900 |
| | | Vac-100psig (6.89 bar) | 3-Way | 12V | 1/8"(3.2mm)FNPT | 091-0094-900 |
| | | | | 24V | 1/8"(3.2mm)A-Lok® | 009-0269-900 |
| | | | | 24V | 1/8"(3.2mm)FNPT | 009-0933-900 |

| Orifice Size | Seal Material | Pressure | Valve Type | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|
| 0.116" (2.95 mm) | FKM | Vac-100 psig (6.89 bar) | 2-Way NC | 24V | 1/8"(3.2mm)FNPT | 009-0089-900 |
| | | | 3-Way | 12V | 1/8"(3.2mm) FNPT | 009-0207-900 |
| | | | | 24V | 1/8"(3.2mm) FNPT | 009-0143-900 |

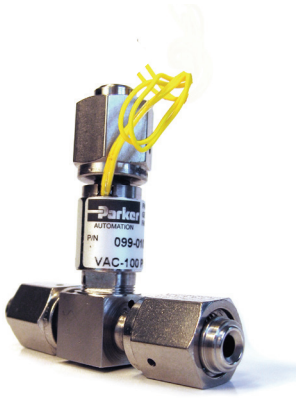
NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:


- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/s9) to configure your Series 9 Miniature High Speed and Pressure Liquid Dispense Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# Series 99 Miniature High Speed and Pressure Liquid Dispense Valve

2- and 3-Way Liquid Solenoid Valve



Series 99 solenoid valves offer outstanding potential for precision control in liquid analysis. Combining high speed, ultra low leak rate, high flow, high pressure and high temperature capability, in a small size. This rugged valve operates with extreme repeatability and is constructed of non-corroding, passivated stainless steel. Series 99 coils are rated for continuous duty and are potted to exclude the environment.

## Applications

- Liquid $CO_2$ Dispense
- Surgical Refrigerant Dispense
- Semiconductor Refrigerant Dispense

## Features

- Smallest footprint and highest performance in its class
- 100% duty cycle in environmental temperatures of up to 221°F (105°C)
- High speed response times of less than 5 ms eliminate delays in the system
- 100% tested to leak-tight 1 x $10^{-8}$ cc/sec/atm Helium
- Pressures up to 1250 PSI (86.2 bar)
- Available with a variety of fittings, orifices, seals, and voltages to match your application
- RoHS compliant

# Product Specifications

## Physical Properties

| |
|---|
| **Valve Type:** |
| Inert Non-Isolation Valve |
| **Valve Configuration (Type):** |
| 2-Way Normally Closed or 3-Way |
| **Media:** |
| Liquids<br>(also capable of handling gasses, for details see the Series 9 Gas datasheet) |
| **Operating Environment:** |
| 40 to 221°F (4 to 105°C) |
| **Dimensions:** |
| See pages 4, 5 & 6 |
| **Porting (Orifice Dependent):** |
| A-LOK® compression fittings, VacuSeal |
| **Weight:** |
| 3.1 oz (88.9 g)<br>[3-Way, 1/8" NPT Body Option] |
| **Internal Volume (µL):** |
| 354.5 to 593.8 micro liter<br>(Contact factory for details) |

## Electrical

| | | |
|---|---|---|
| **Voltage (VDC):** | 12 | 24 |
| **Power (Watts):** | 12 | 12 |
| **Current (mA):** | 1000 | 500 |
| **Resistance (Ohm):** | 12 | 48 |
| (Ω±5% @ 70°F, 21°C) | | |
| **Connections:** | | |
| 12" Lead Wires Standard 24 AWG, PTFE Insulated | | |

## Wetted Materials*

| |
|---|
| **Seals:** |
| Vespel & Silver-Plated Nickel or FKM & Silver-Plated Nickel |
| **Body:** |
| 316 Stainless Steel |
| **All Others:** |
| PTFE, Stainless Steel, Body, Seals |

* See Chemical Compatibility Page
Consult factory for other options

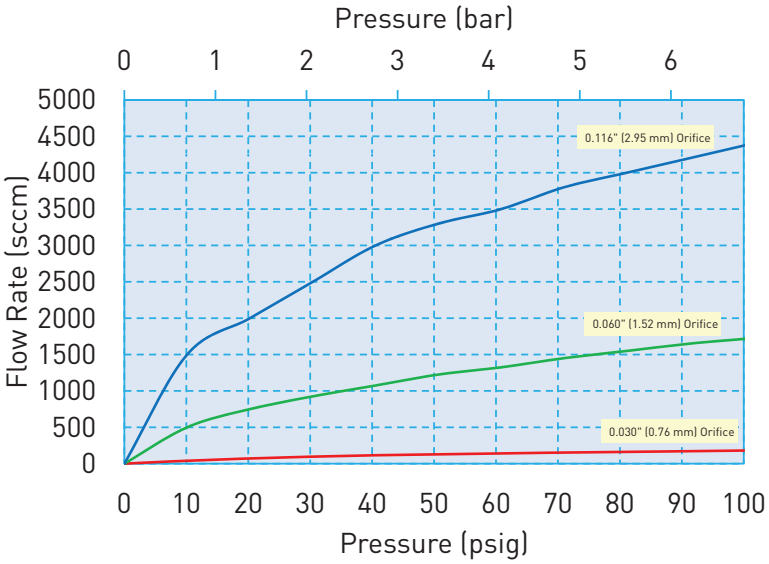
## Performance Characteristics

| |
|---|
| **Orifice Diameters/ Operating Pressure:** |
| 0.030" (0.76 mm) /<br>1x10-5 Torr -1250 psig (86.2 bar) |
| 0.060" (1.52 mm) /<br>1x10-5 Torr - 250 psig (17.2 bar) |
| 0.116" (2.95 mm) /<br>1x10-5 Torr - 100 psig (6.9 bar) |
| **Proof Pressure:** |
| 1.5X rated pressure |
| **Leak Rate:** |
| 1 x $10^{-8}$ cc/sec/atm Helium |
| **Response Time:** |
| <5 ms 0.030" (0.76 mm) |
| <5 ms 0.060" (1.52 mm) |
| <6 ms 0.116" (2.95 mm) |
| **Recommended Filtration:** |
| 40 µm max |

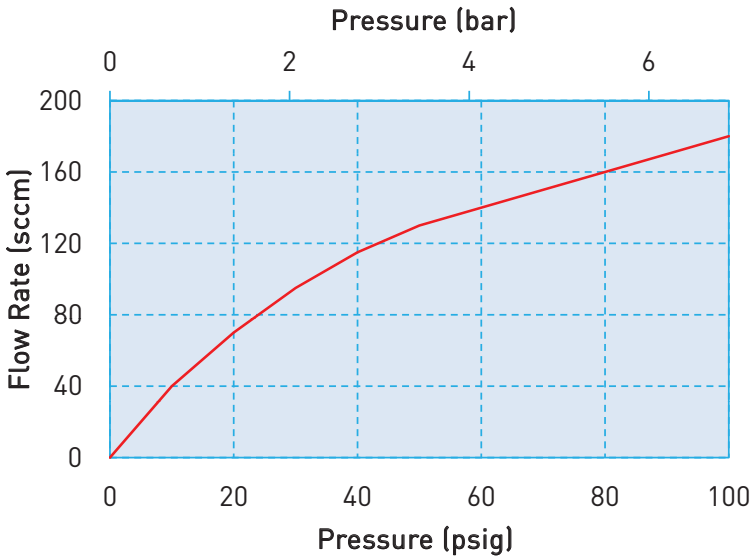
# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

## Typical Flow Curve

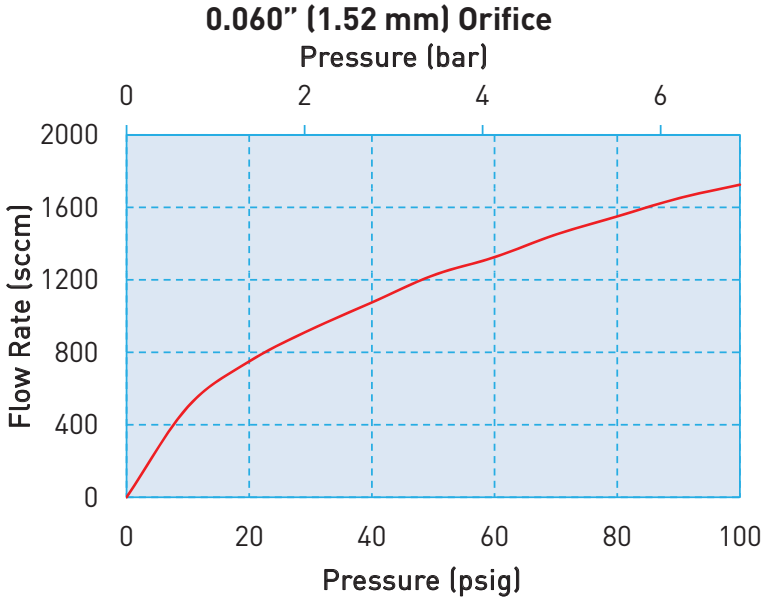
**All Models**
(Tested w/water 24° C)

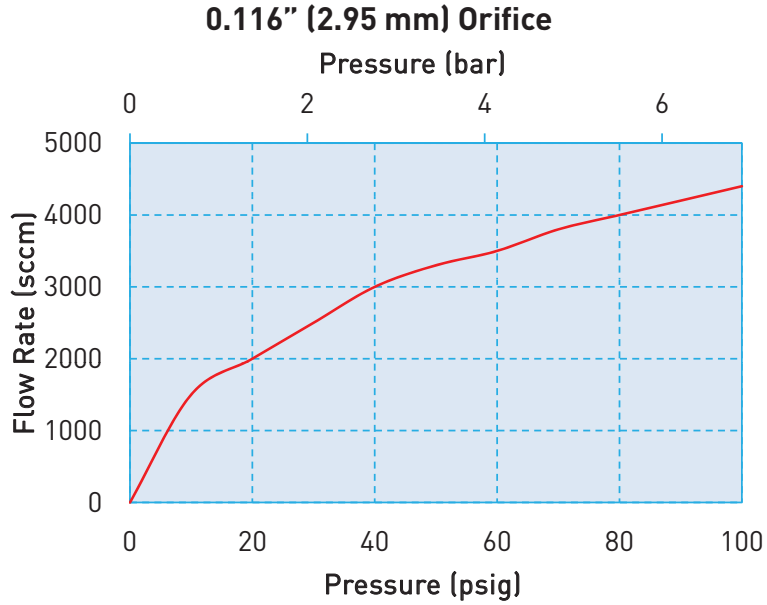



**0.030" (0.76 mm) Orifice**



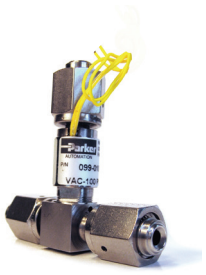
# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

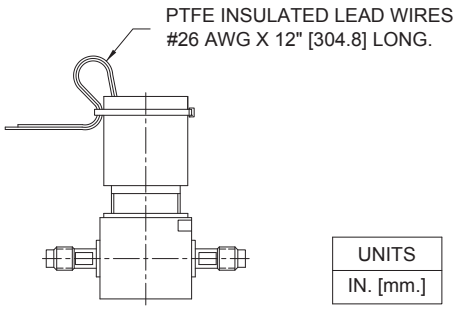



## Electrical Interface

### Wire leads






| UNITS |
| --- |
| IN. [mm.] |

Custom connections available upon request

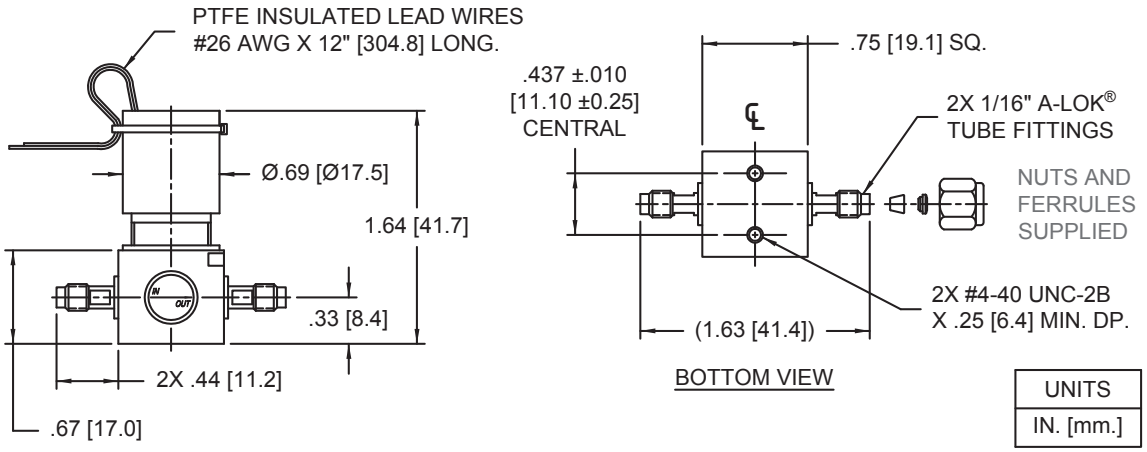
# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

## Mechanical Integration

### Dimensions

**Series 99: 2-Way**
**Dimensions**

**2-WAY, 0.030" [0.76 mm] ORIFICE, 1/16" [1.6 mm] A-LOK®**



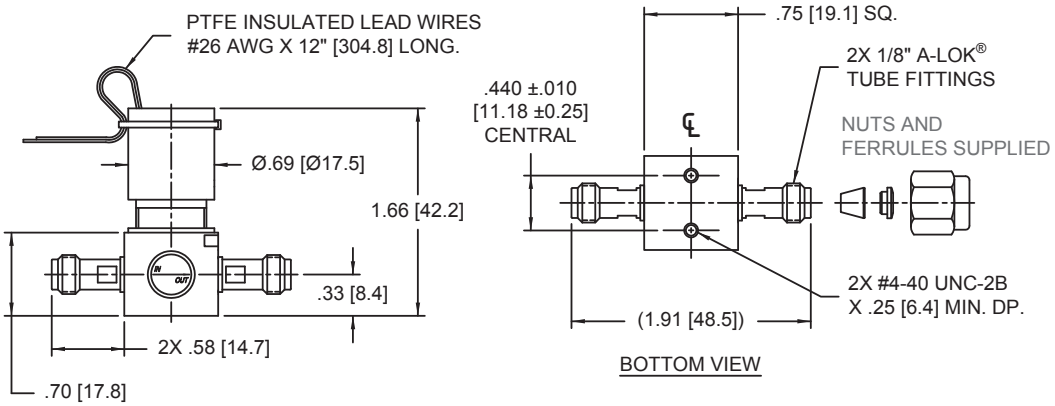
# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

## Mechanical Integration

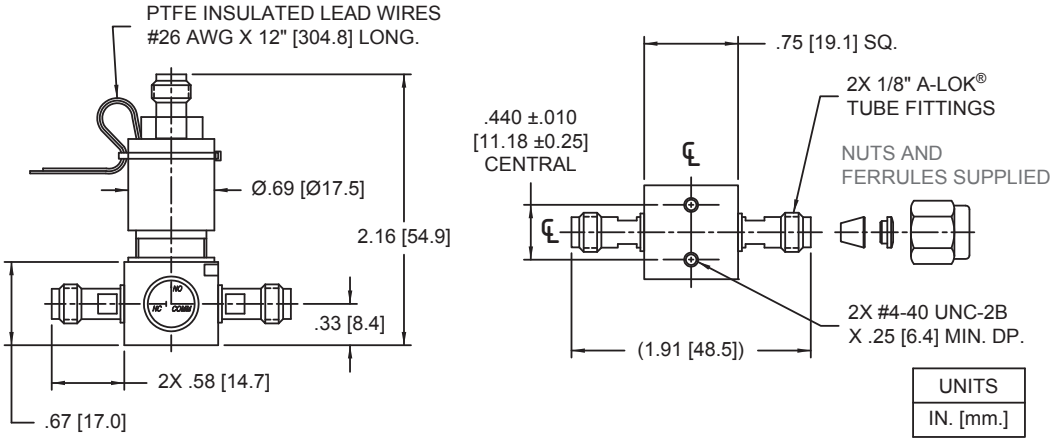
### Dimensions

**Series 99: 2-Way**
**Dimensions**

**2-WAY, 0.060" [1.52 mm] ORIFICE, 1/8" [3.18 mm] A-LOK®**




**3-WAY, 0.060" [1.52 mm] ORIFICE, 1/8" [3.18 mm] A-LOK®**



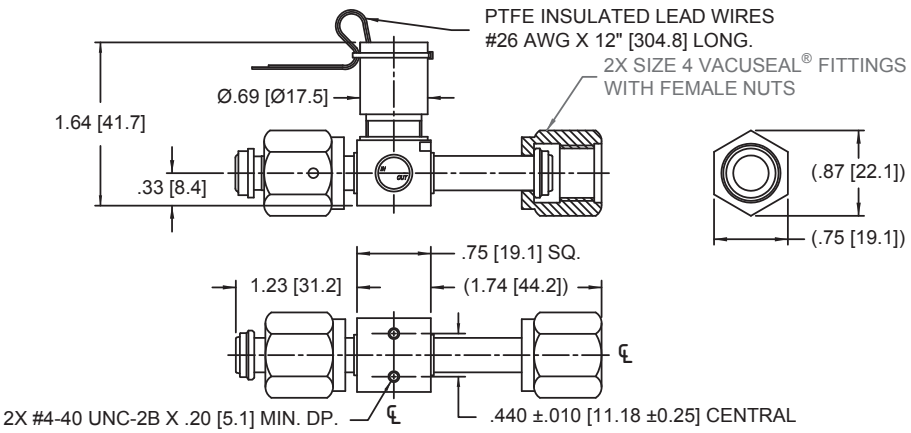
# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

## Mechanical Integration

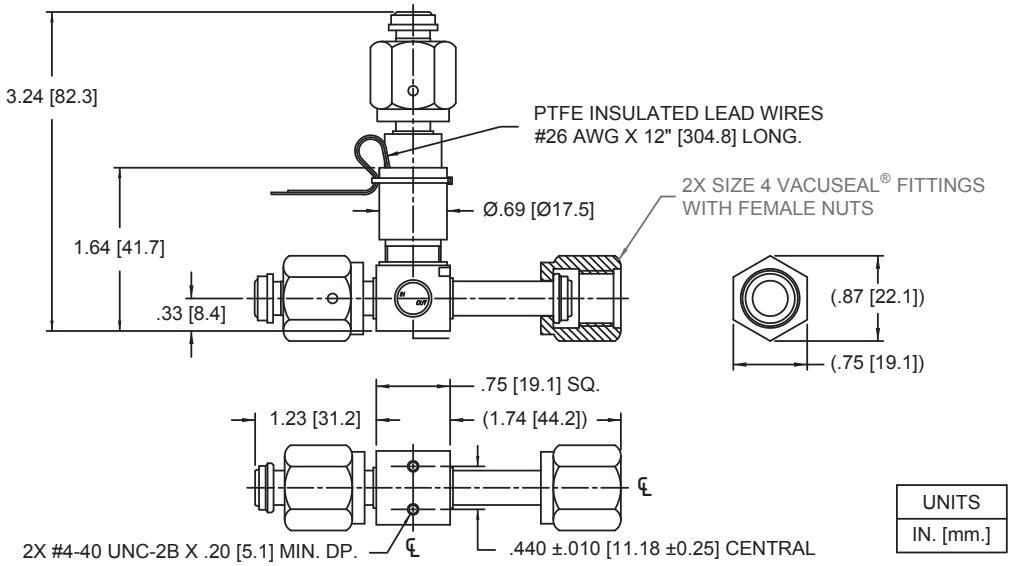
### Dimensions

**Series 99: 2-Way**
**Dimensions**

**2-WAY, 0.116" [2.95 mm] ORIFICE, 1/4" [6.35 mm] VACUSEAL®**




**3-WAY, 0.116" [2.95 mm] ORIFICE, 1/4" [6.35 mm] VACUSEAL®**

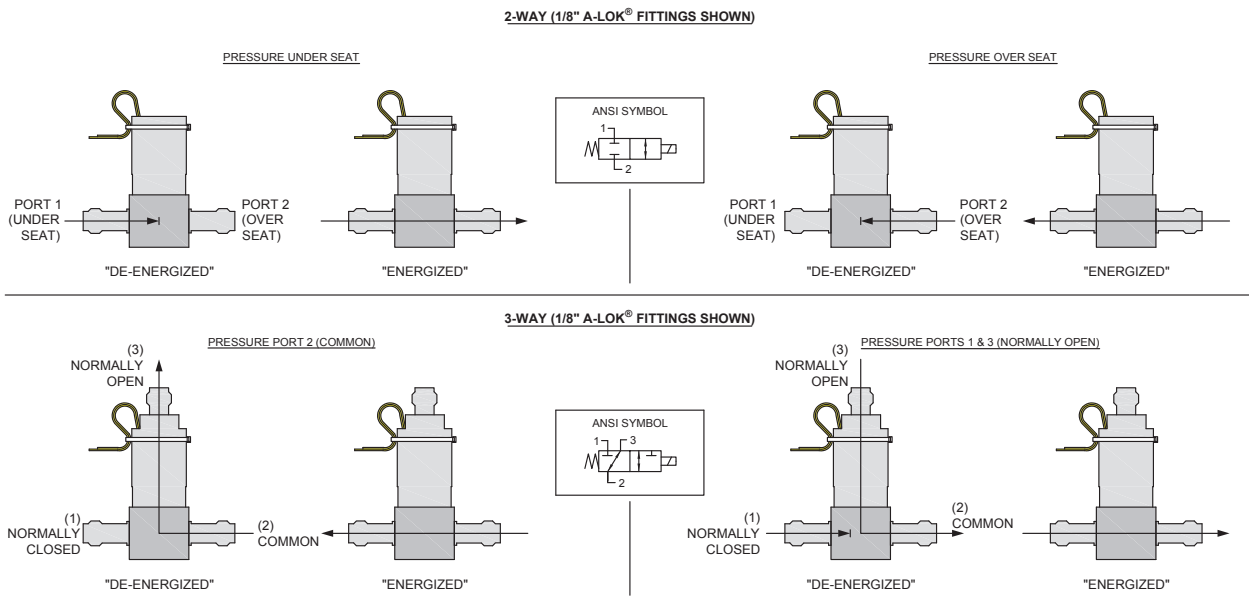



| UNITS |
| --- |
| IN. [mm.] |

# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

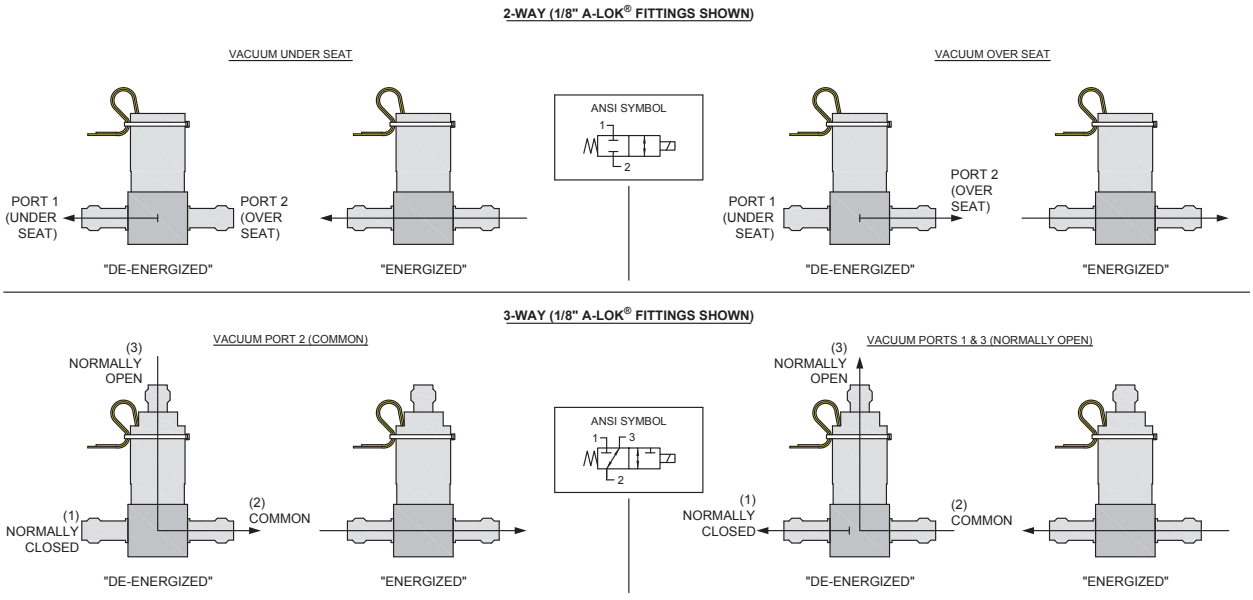
## ANSI Symbols

### Pressure




## ANSI Symbols

### Vacuum



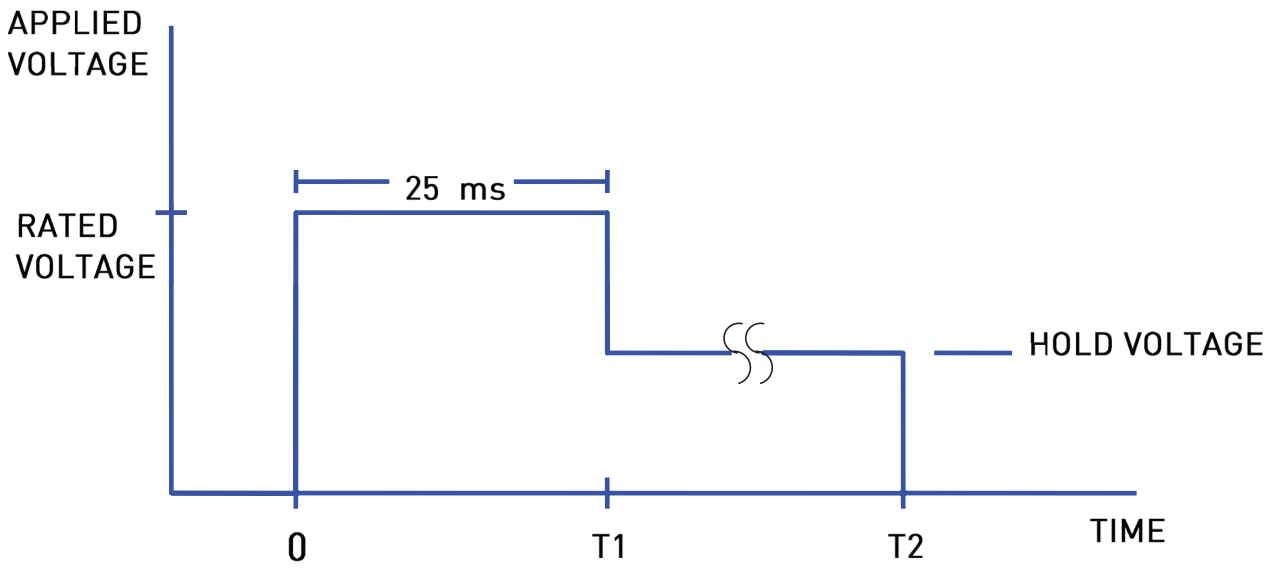
# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

## Hit and Hold Specifications (12-Watt coils):

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24VDC solenoids.

| Rated Voltage (volts) | 3-way | | 2-way | |
|---|---|---|---|---|
| | Hold Voltage | Hold Power | Hold Voltage | Hold Power |
| 24 | 12 volts | 3 watts | 5 volts | 0.52 watts |
| 12 | 6 volts | 3 watts | 5 volts | 2.1 watts |

**Note:** Other voltages available




*Hold Voltage Graph*

# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

## Chemical Compatibility Chart*

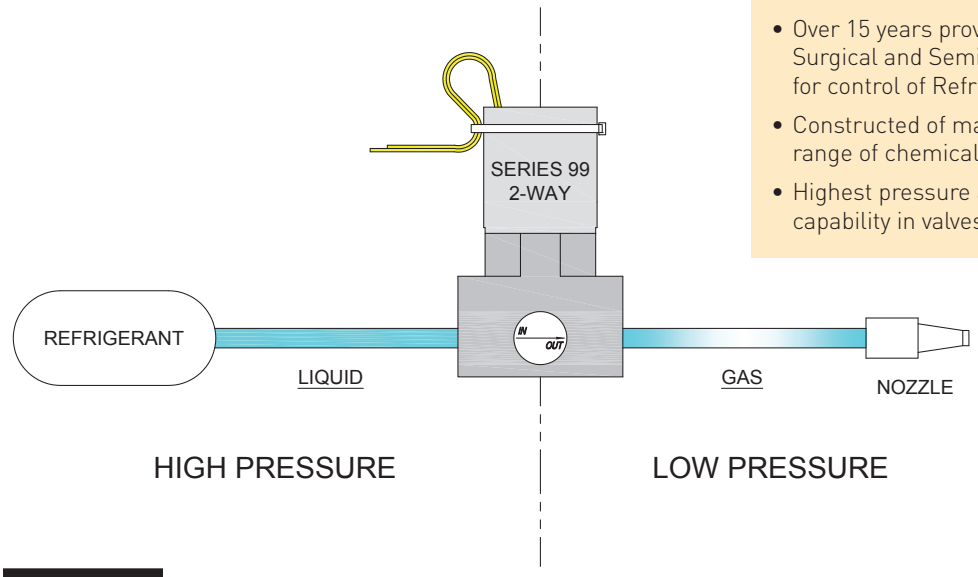
| | Seal Options | | | | | | | Other Wetted Materials | |
|---|---|---|---|---|---|---|---|---|---|
| | 0.030" (0.76mm) orifice version | | | or | 0.060" (1.52mm) and 0.116" (2.95mm) orifice versions | | | PTFE | Stainless Steel |
| Chemical | Vespel | and | Silver Plated Nickel | | FKM | and | Silver Plated Nickel | | |
| DI Water | 2 | | 1 | | 1 | | 1 | 1 | 1 |
| Methanol | 1 | | 1 | | 4 | | 1 | 1 | 1 |
| Isopropanol | 2 | | 1 | | 1 | | 1 | 1 | 1 |
| Ethanol | 1 | | 1 | | 3 | | 1 | 1 | 1 |
| Acetonitrile | 1 | | | | 4 | | | 1 | 1 |
| Tetrahydrofuran | 3 | | | | 4 | | | 1 | 1 |
| Toluene | 1 | | 1 | | 2 | | 1 | 1 | 1 |
| Organic Acids - Dilute | 1 | | 1 | | 1 | | 1 | 1 | 1 |
| Non Organic Acids - Dilute | 1 | | 1-4 | | 1 | | 1-4 | 1 | 1 |
| Bases - Dilute | 1 | | 1 | | 1 | | 1 | 1 | 1 |
| Saline | 1 | | | | 1 | | | 1 | 1 |
| Bleach 12% | 4 | | | | 1 | | | 1 | 2 |
| Sodium Hydroxide 20% | 4 | | 1 | | 2 | | 1 | 1 | 1 |

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for a complete list.

| COMPATIBILITY LEGEND | | |
|---|---|---|
| 1 | **EXCELLENT** | Minimal or no effect |
| 2 | **GOOD** | Possible swelling and/or loss of physical properties |
| 3 | **DOUBTFUL** | Moderate or severe swelling and loss of physical properties |
| 4 | **NOT RECOMMENDED** | Severe effect and should not be considered |

## Typical Flow Diagram

### Typical Sample Control of Refrigerant Dispensing




- Over 15 years proven track record in Surgical and Semiconductor applications for control of Refrigerant Dispensing.
- Constructed of materials to handle wide range of chemicals.
- Highest pressure and temperature capability in valves of its size.

# **Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

## Ordering Information

| Orifice Size | Seal Material | Pressure | Valve Type | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|
| 0.030" (0.76mm) | Vespel, Silver Plated Nickel | Vac-1250psig (86.2 bar) | 2 Way NC | 12V | 1/16" (1.6 mm) A-Lok® | 099-0051-900 |
| | | | | 24V | 1/16" (1.6 mm) A-Lok® | 099-0340-900 |

| Orifice Size | Seal Material | Pressure | Valve Type | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|
| 0.060" (1.52mm) | FKM,Silver Plated Nickel | Vac-250psig (17.2 bar) | 2 Way NC | 24V | 1/8" (3.2 mm) A-Lok® | 099-0080-900 |
| | | Vac-100psig (6.89 bar) | 3 Way | 12V | 1/8" (3.2 mm) A-Lok® | 099-0075-900 |
| | | | | 24V | 1/8" (3.2 mm) A-Lok® | 099-0135-900 |

| Orifice Size | Seal Material | Pressure | Valve Type | Voltage | Porting | Part Number |
|---|---|---|---|---|---|---|
| 0.116" (2.95mm) | FKM,Silver Plated Nickel | Vac-100psig (6.89 bar) | 2 Way NC | 24V | 1/4" (6.4 mm) Female VacuSeal® | 099-0167-900 |
| | | | 3 Way | 24V | 1/4" (6.4 mm) Female VacuSeal® | 099-0107-900 |

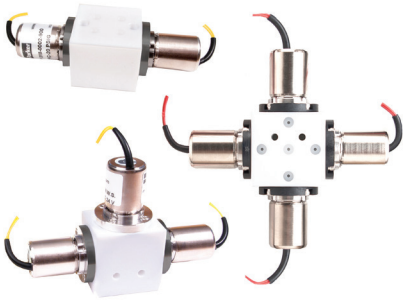
NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/s99) to configure your Series 99 Miniature High Speed and Pressure Dispense Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# Series 18 Chemically Inert Manifold Liquid Valve

Isolation Manifold



The Series 18 is designed for compact installation in multi-liquid systems. Available with multiple inlets and one outlet (or vice-versa), the Series 18 features all wetted parts of PTFE. Tubing and connections between discrete valves are eliminated and dead volume is reduced. Repeatability and rapid response time make the Series 18 ideally suited for controlling small percentages of low flow liquids.

## Applications

- Liquid Chromatography Gradient Generation
- Liquid Selection and Mixing Valve

## Features

- Provides unsurpassed chemical compatibility for a wide range of media with all wetted parts of PTFE.
- Low internal volume for reduced delay volume
- 100% continuous duty rating in ambient temperatures up to 66°C
- Low power for reduced heat generation and power consumption
- Fast response times for accurate, repeatable results
- Symmetrical design ensures fluid path length and timing is identical for each fluid channel
- 100% tested tight leak rate provides assurance of a quality seal
- Provides reliable operation for the life of your instrument
- RoHS compliant

# Product Specifications

## Physical Properties

**Valve Type:**
Multi Station Diaphragm Isolation Valve

**Valve Configuration:**
2-Way Normally Closed

**Media:**
Liquids

**Operating Environment:**
40 to 150°F (4 to 66°C)

**Dimensions:**
See pages 3, 4 & 5

**Weight:**
8 oz (226 g) [2 Station]
10.2 oz (289 g) (3 Station]
12.4 oz (352 g) [4 Station]

**Porting:**
1/4-28 Threaded ports

**Internal Volume (µL):**

| | Valve | Inlet Path | Outlet Path |
|---|---|---|---|
| 2 station | 12.6 | 25.2 | 42.4 |
| 3 station | 12.6 | 25.2 | 42.4 |
| 4 station | 12.6 | 25.2 | 57.1 |

## Electrical

| | | | |
|---|---|---|---|
| **Voltage (VDC):** | 9 | 12 | 24 |
| **Power (Watts):** | 2.5 | 2.5 | 4.2 |
| **Current (mA):** | 273 | 211 | 173 |
| **Resistance (Ohm):** | 33 | 57 | 139 |

(Ω±5% @ 70°F, 21°C)

**Connections:**
12” Lead Wires Standard
26 AWG, PTFE Insulated

## Wetted Materials*

**Seals:**
PTFE

**Body:**
PTFE

* See Chemical Compatibility Page
Consult factory for other options

## Performance Characteristics

**Operating Pressure/ Orifice Diameters:**
Vacuum - 20 psig (1.4 bar) / 0.060” (1.52 mm)

**Proof Pressure:**
1.5X rated pressure

**Leak Rate:**
Bubble Tight

**Response Time:**
<12 ms

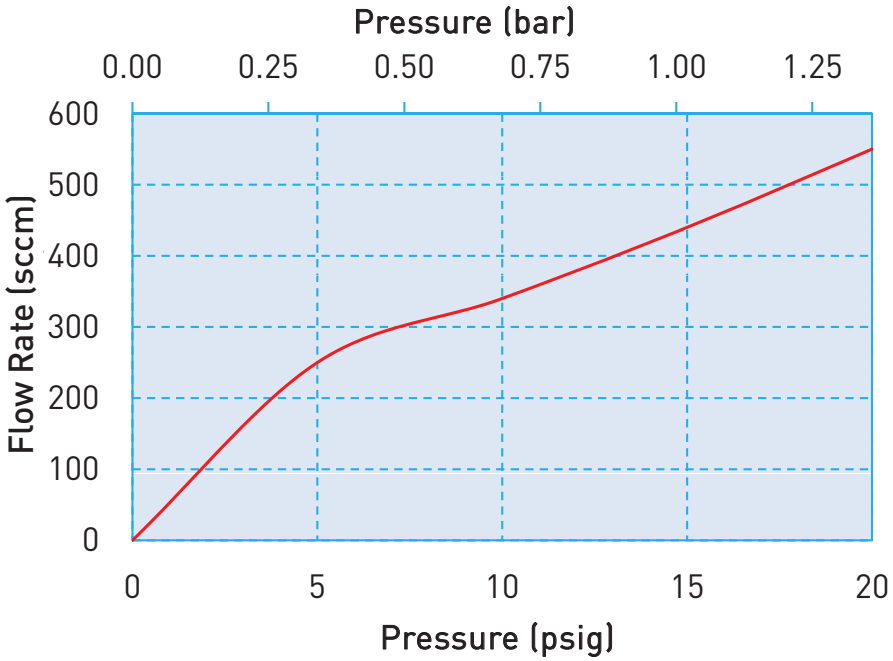
**Recommended Filtration:**
10 µm max

**Reliability:**
Life Cycle Rating of 10 million (Application dependent)

# **Series 18** Chemically Inert Manifold Liquid Valve

## Typical Flow Curve

**All Models**
**Orifice: 0.060" (1.52mm)**
(Tested w/water 24° C)

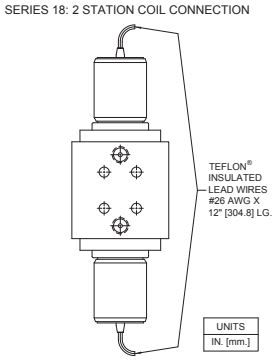


# **Series 18** Chemically Inert Manifold Liquid Valve

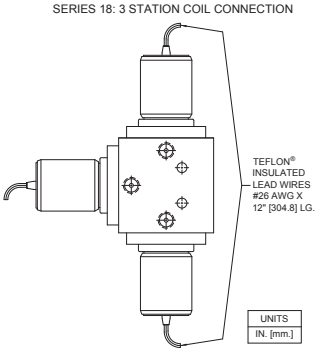
## Electrical Interface

**Wire leads**

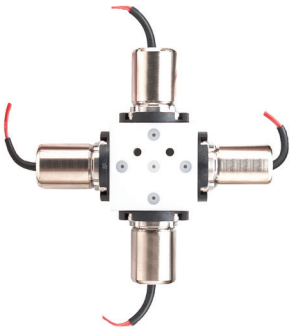
### 2 Station

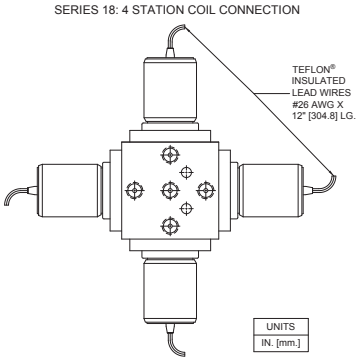



### 3 Station




### 4 Station





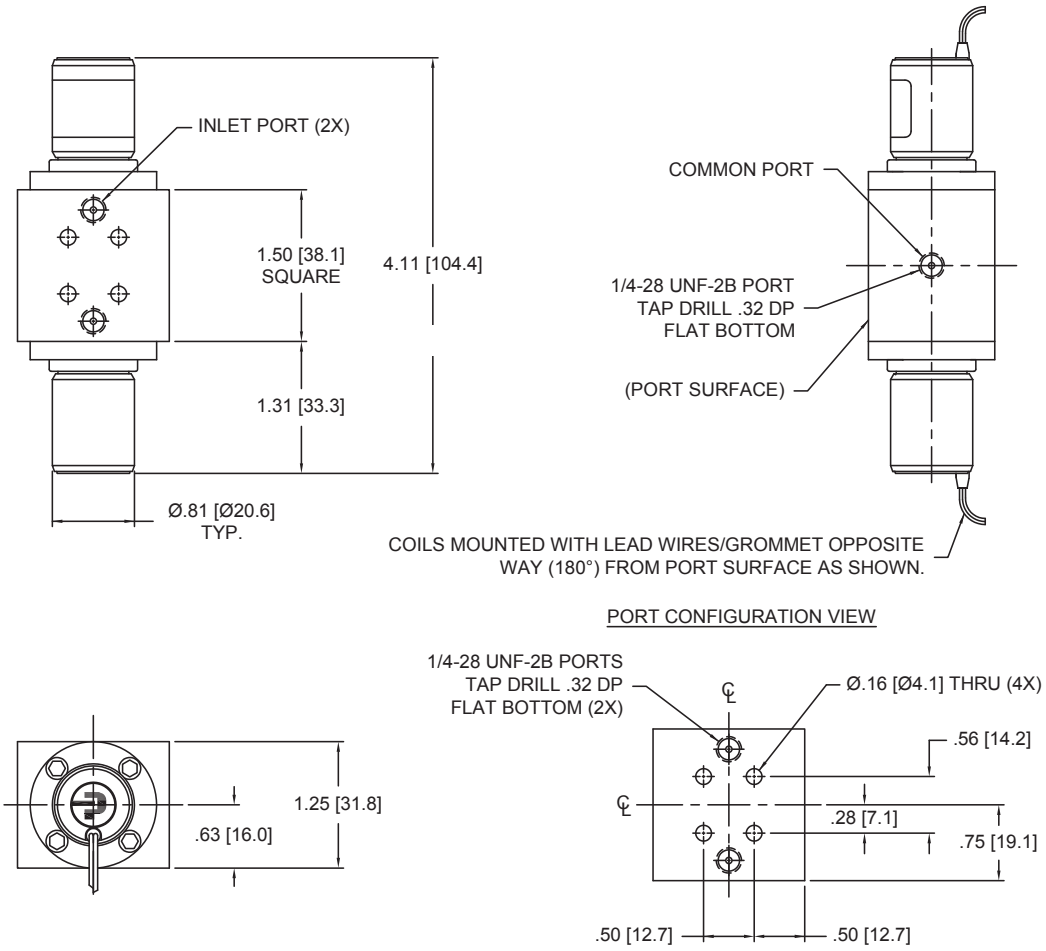

Note: Custom configurations available please contact the factory.

# **Series 18** Chemically Inert Manifold Liquid Valve

## Mechanical Integration

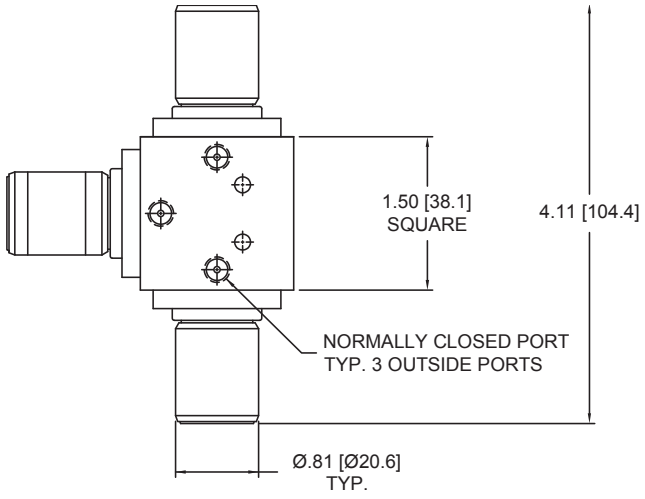
### Dimensions

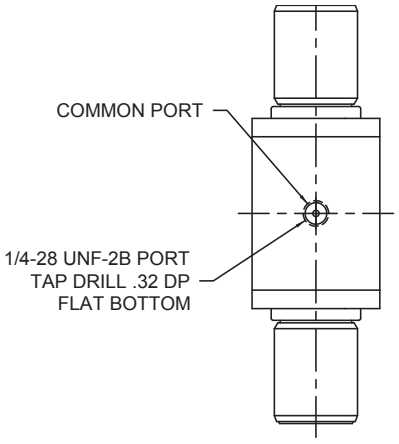
**Series 18: 2 Station Dimensions**

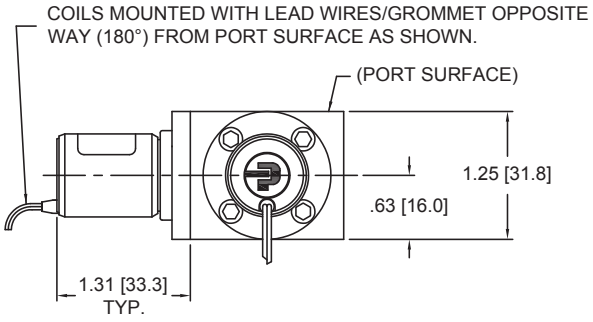


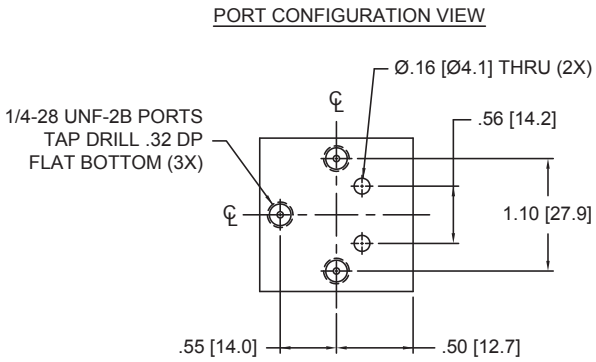
# **Series 18** Chemically Inert Manifold Liquid Valve

## Series 18: 3 Station Dimensions



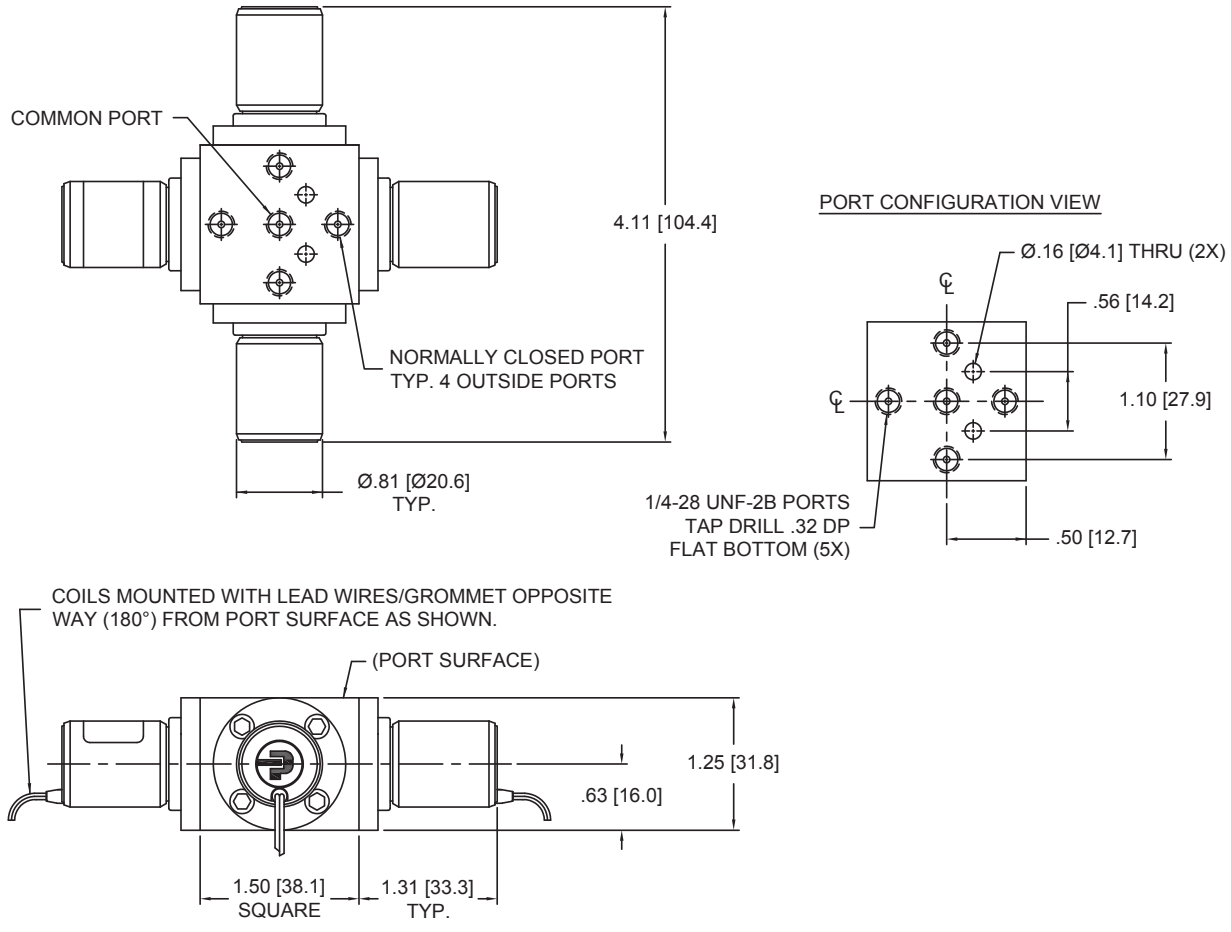



# **Series 18** Chemically Inert Manifold Liquid Valve

## Series 18: 4 Station Dimensions



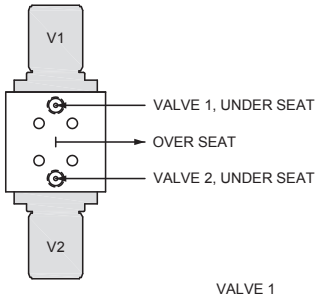
# **Series 18** Chemically Inert Manifold Liquid Valve

## ANSI Symbols

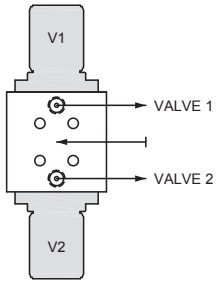
### Pressure

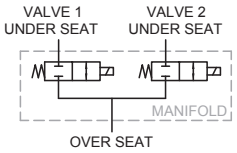
**2 STATION, 2-WAY**

**GRADIENT GENERATION / FLOW MIXING**

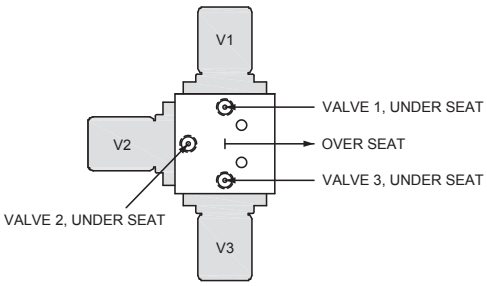


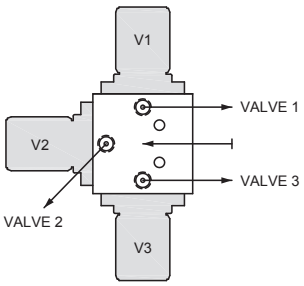

**FLOW SELECTION / STREAM SPLITTING**

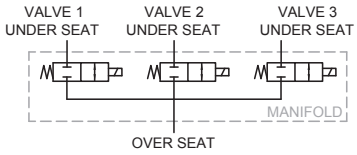


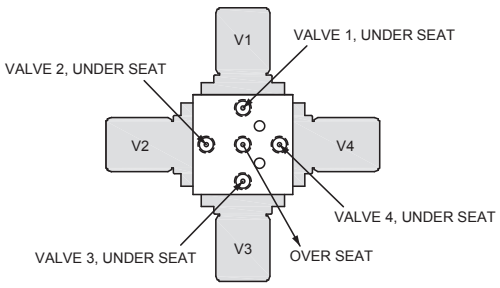

**3 STATION, 2-WAY**

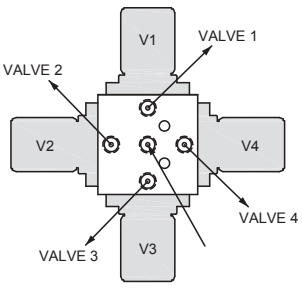


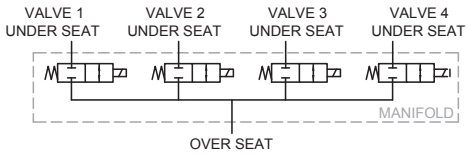




**4 STATION, 2-WAY**



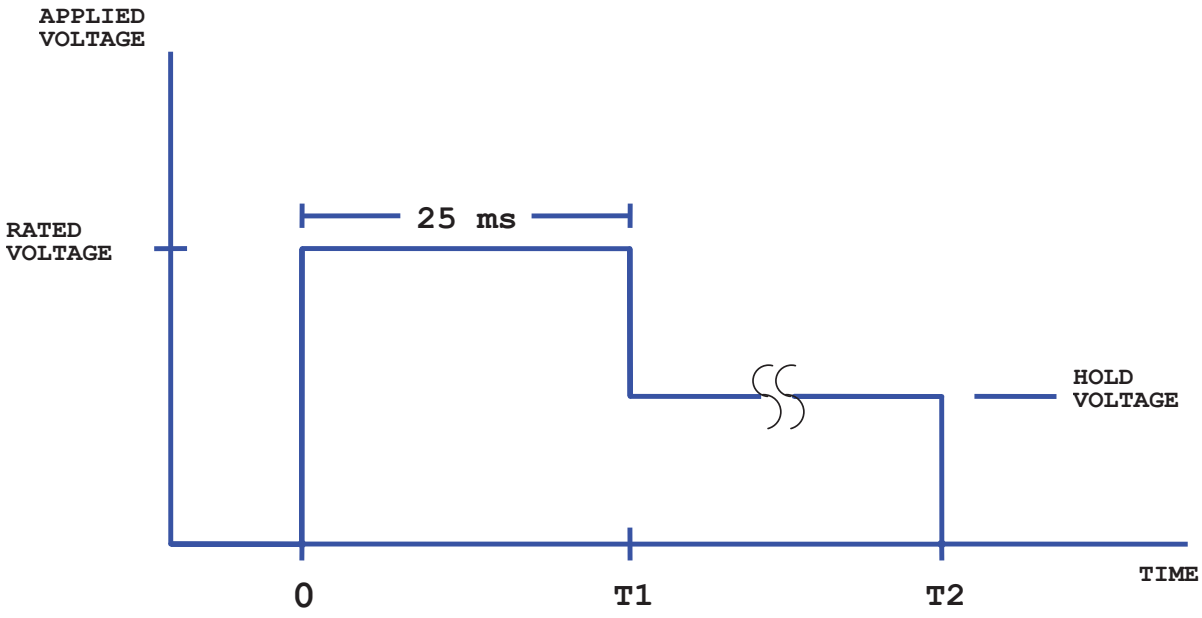
# **Series 18** Chemically Inert Manifold Liquid Valve

## Hit and Hold Specifications:

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24VDC solenoids.

| *Rated Voltage (volts)* | *Hold Voltage* | *Hold Power* |
|---|---|---|
| 24 | 8 volts | 0.46 watts |
| 12 | 5 volts | 0.44 watts |

**Note:** Other voltages available




*Hold Voltage Graph*

# **Series 18** Chemically Inert Manifold Liquid Valve

## Chemical Compatibility Chart*

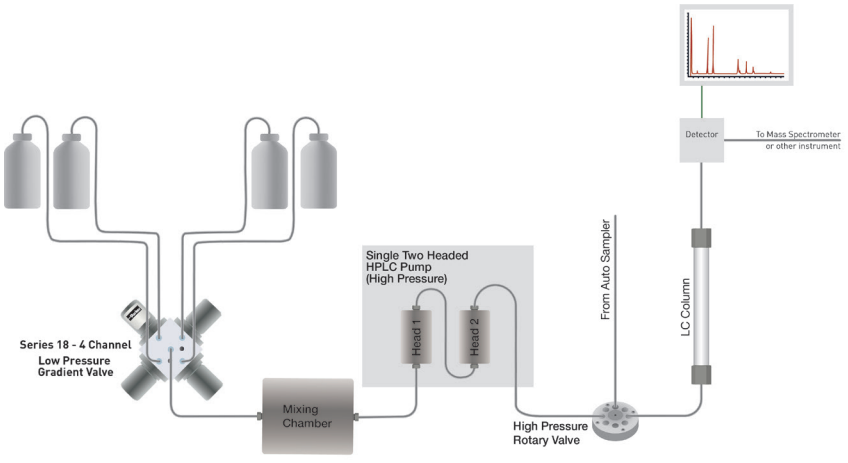
| Chemical | Seals and Body TEFLON® (PTFE) |
|---|---|
| DI Water | 1 |
| Methanol | 1 |
| Isopropanol | 1 |
| Ethanol | 1 |
| Acetonitrile | 1 |
| Tetrahydrofuran | 1 |
| Toluene | 1 |
| Organic Acids - Dilute | 1 |
| Non Organic Acids - Dilute | 1 |
| Bases - Dilute | 1 |
| Saline | 1 |
| Bleach 12% | 1 |
| Sodium Hydroxide 20% | 1 |

* The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for a complete list.

| COMPATIBILITY LEGEND | | |
|---|---|---|
| 1 | EXCELLENT | Minimal or no effect |
| 2 | GOOD | Possible swelling and/or loss of physical properties |
| 3 | DOUBTFUL | Moderate or severe swelling and loss of physical properties |
| 4 | NOT RECOMMENDED | Severe effect and should not be considered |

## Typical Flow Diagram

**Quaternary Gradient HPLC Flow Diagram**




Proven Performance:

- The Series 18 Valve has been successfully tested to more than ten million cycles with no degradation of components afterwards Passing specifications for:
  - Response time
  - Internal leakage
  - External leakage
  - Repeatability
- Can achieve mix ratios from 99:1 to 1:99 with high accuracy and repeatability.
- The Series 18 Valve has a proven track record in Analytical Instrumentation for over 25 years.

# **Series 18** Chemically Inert Manifold Liquid Valve

## Ordering Information

| Orifice Size | Pressure | Valve Type | Number of Stations | Voltage | Part Number |
|---|---|---|---|---|---|
| 0.062"(1.57 mm) | Vac-20 psig ( 1.38 bar) | 2 Way NC | 4 | 9V | 018-0301-900 |
| | | | | 12V | 018-0074-900 |
| | | | | 24V | 018-0048-900 |
| | | | 3 | 12V | 018-0083-900 |
| | | | | 24V | 018-0003-900 |
| | | | 2 | 12V | 018-0012-900 |
| | | | | 24V | 018-0002-900 |

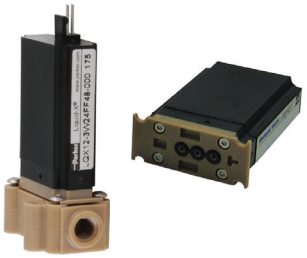
NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/s18) to configure your Series 18 Chemically Inert Manifold Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# LQX12

12 mm Miniature Diaphragm Isolation Valve



LQX12 is a high-performance 2-way and 3-way universal isolated diaphragm valve. This highly flexible design is 12 mm wide and offers two different elastomer options. LQX12 supports the pressure and flow requirements needed by today's analytical, bio-analytical, and clinical diagnostic OEMs.

## Applications

- Clinical Diagnostics Instrumentation
- Hematology
- Automated Slide Stainers
- DNA/RNA Synthesis
- Environmental Analyzers
- VOC/TOC

## Features

- EPDM or FFKM elastomers for particulate tolerance and reliability in a wide range of liquid media
- 100% tested leak rate ensures a tight seal on every valve
- 12 mm width allows for reduced system sizes and efficient packaging
- Designed to be manifold mounted side-to-side on 12 mm centers
- Low internal unswept volume to minimize carryover and cross-contamination
- Secure electrical termination to female connectors with friction-locked latching electrical connection
- Optional ¼-28 ported sub-base for stand alone operation or testing
- RoHS compliant

# Product Specifications

## Physical Properties

| |
|---|
| **Valve Type:** |
| Diaphragm Rocker Isolation Valve |
| **Valve Configuration:** |
| 3-Way Universal |
| 2-Way Normally Closed |
| **Media:** Liquids |
| **Operating Environment:** |
| 32 to 122°F (0 to 50°C) |
| **Storage Temperature:** |
| -40 to 158°F (-40 to 70°C) |
| **Dimensions:** |
| Width: 0.47" (12 mm) |
| Height: 1.57" (39.88 mm) |
| Length: 1.16" (29.46 mm) |
| **Weight:** |
| Face seal: 0.86 oz (24.7 g) with 1/4-28 sub-base 1.1 oz (31.7g) |
| **Porting:** |
| Face seal, 1/4-28 sub-base |
| **Internal Volume (µL):** |
| 32 manifold interface<br>61.5 with sub base manifold |

## Electrical

| | | |
|---|---|---|
| **Voltage (VDC):** | | |
| 12 and 24 VDC ± 5% | | |
| **Power (Watts):** 2.0 Max | | |
| | **12V** | **24V** |
| **Current (mA):** | 162 | 76 |
| **Resistance (Ohm):** | 74.2 | 316 |
| (Ω±5% @ 70°F, 21.1°C) | | |
| **Connections:** | | |
| 2.54 mm pitch male pins | | |
| 18" (46 cm) Lead Wire Connector Assembly | | |
| *(Accessory, see ordering info.)* | | |

## Wetted Materials

| |
|---|
| **Seals:** |
| EPDM or FFKM |
| **Body:** |
| PEEK (polyetheretherketone) |
| **Manifold:** |
| PEEK (polyetheretherketone) |

See Chemical Compatibility Page
Consult factory for other options

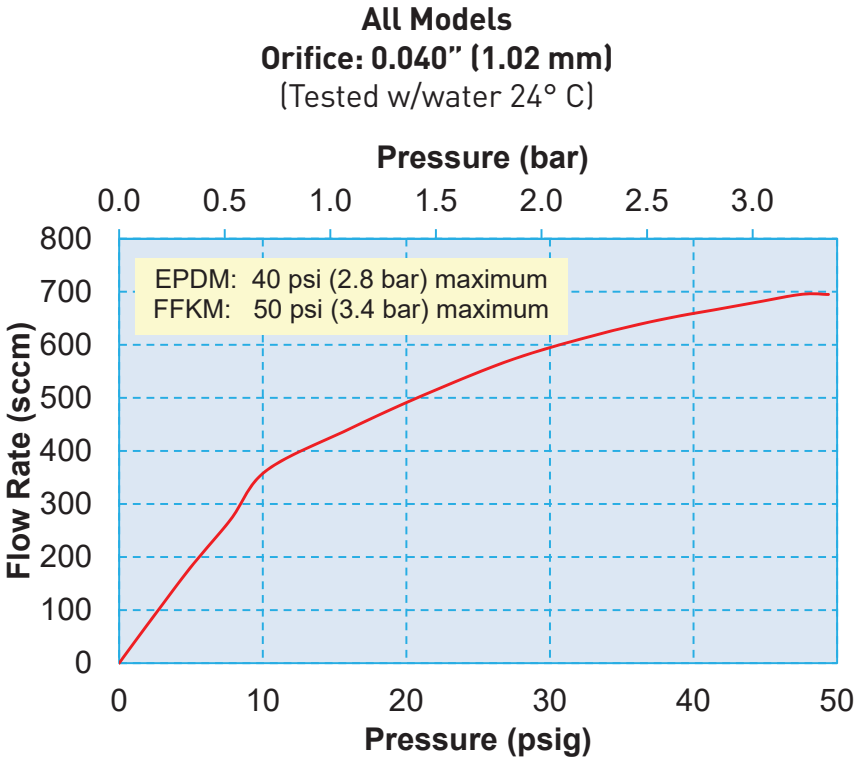
## Performance Characteristics

| |
|---|
| **Operating Pressure/ Orifice Diameters:** |
| Vacuum - 40 psi (2.8 bar), EPDM |
| Vacuum - 50 psi (3.4 bar), FFKM |
| 0.040" (1.02 mm) |
| **Proof Pressure:** |
| 100 psig (6.9 bar) |
| **Leak Rate:** |
| Bubble Tight |
| **Response Time:** |
| 20 ms maximum closed - open |
| **Recommended Filtration:** |
| 40 micron |
| **Reliability*:** |
| Life Cycle Rating of 10 million (EPDM [pressure and vacuum] and FFKM [pressure]) |
| Life Cycle Rating of 5 million (FFKM [vacuum]) |

*Application dependent

# **LQX12** Miniature Diaphragm Isolation Valve

## Typical Flow Curve




## Electrical Interface

Male Pins

Wire Leads*
18" (46 cm)
*Custom lead length available.

## Liquid Interface

1/4" - 28 Ports
(Threaded Connector)

Face Seal
(Manifold Mount)

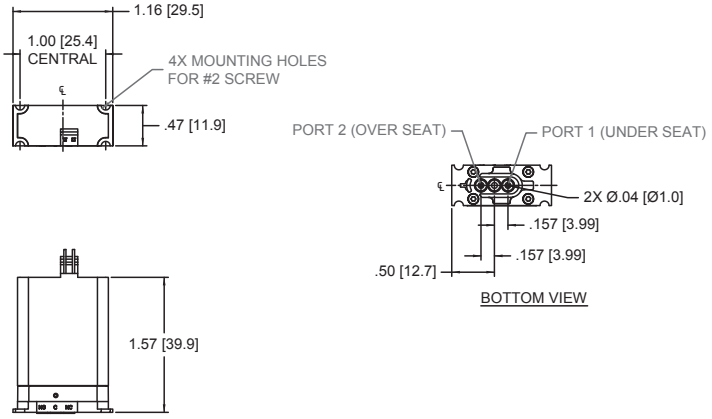
# **LQX12** Miniature Diaphragm Isolation Valve

## Mechanical Integration

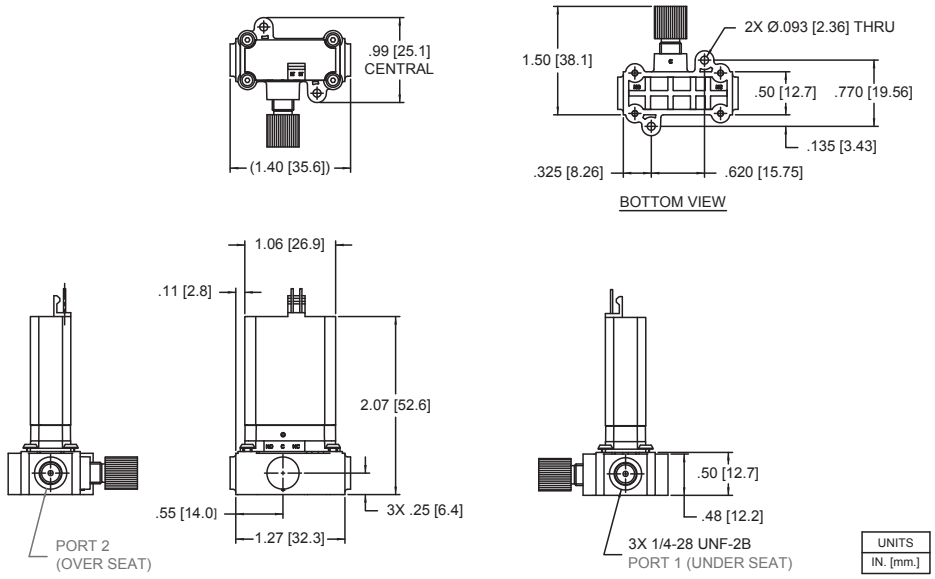
### Dimensions

### LQX 12: 2 -Way Dimensions

DIMENSIONS:
2-WAY FACE SEAL




2-WAY MANIFOLD 1/4-28 SUB BASE



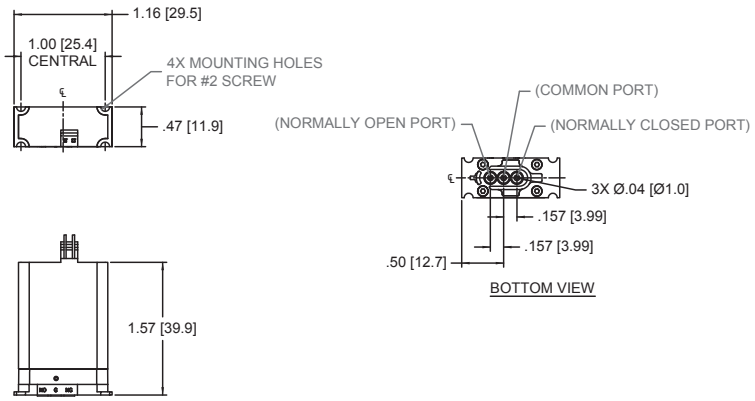
# **LQX12** Miniature Diaphragm Isolation Valve

## Mechanical Integration

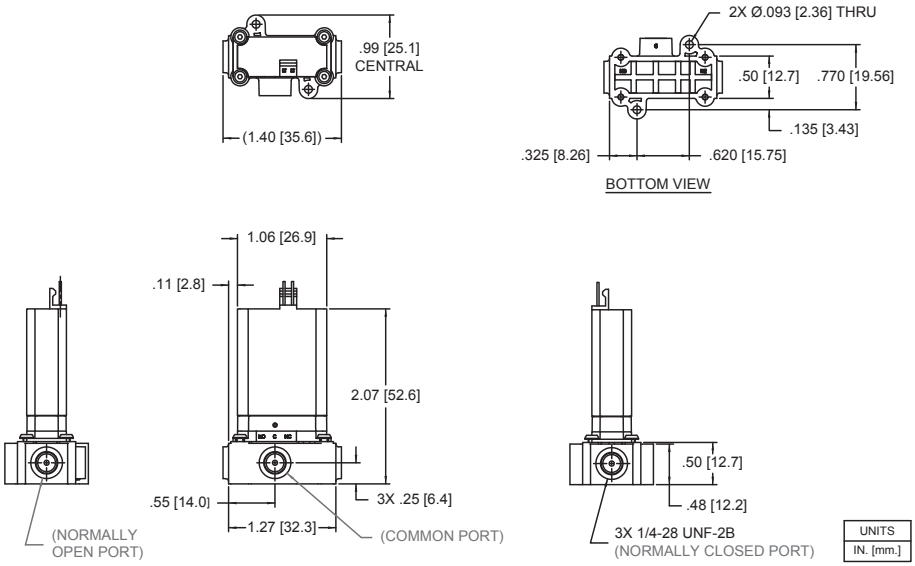
### Dimensions

### LQX 12: 3 -Way Dimensions

DIMENSIONS:
3-WAY FACE SEAL



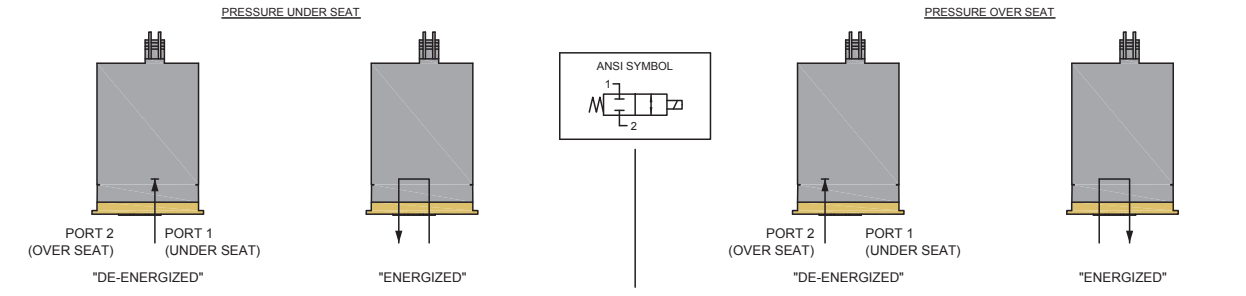

3-WAY MANIFOLD 1/4-28 SUB BASE



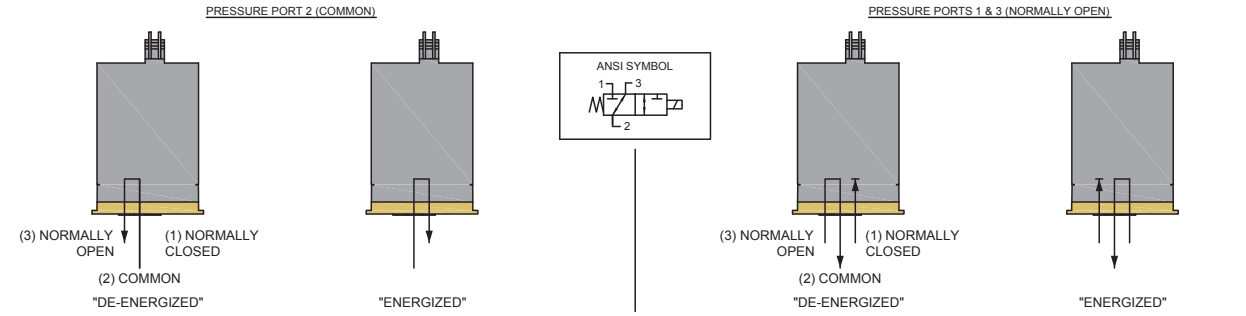
# **LQX12** Miniature Diaphragm Isolation Valve

## ANSI Symbols

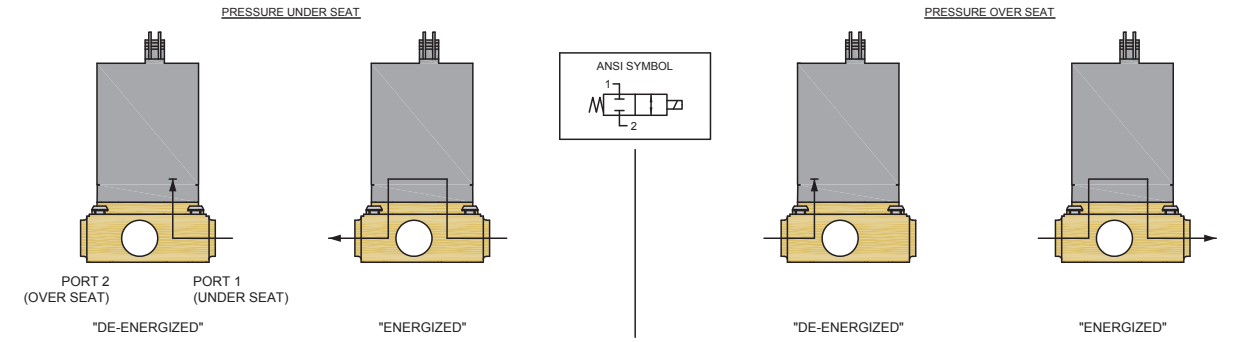
### Pressure



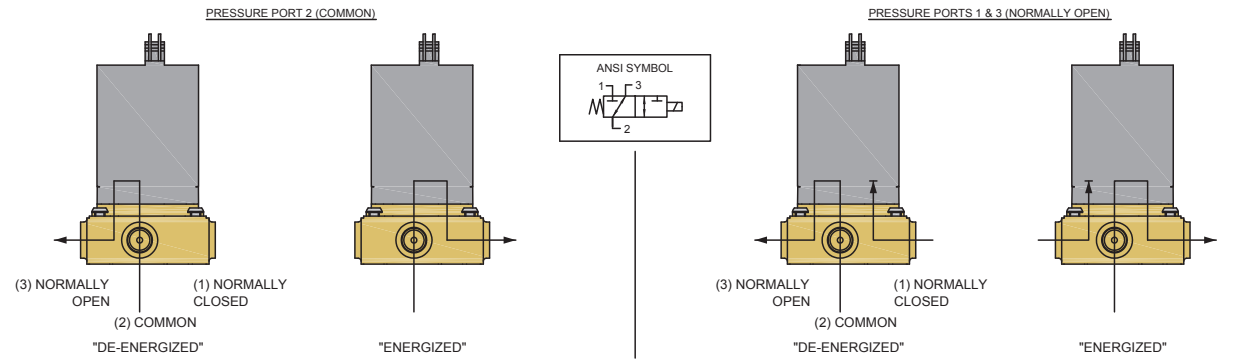

**LQX, 3-WAY**




**LQX, 2-WAY MANIFOLD OPTION**



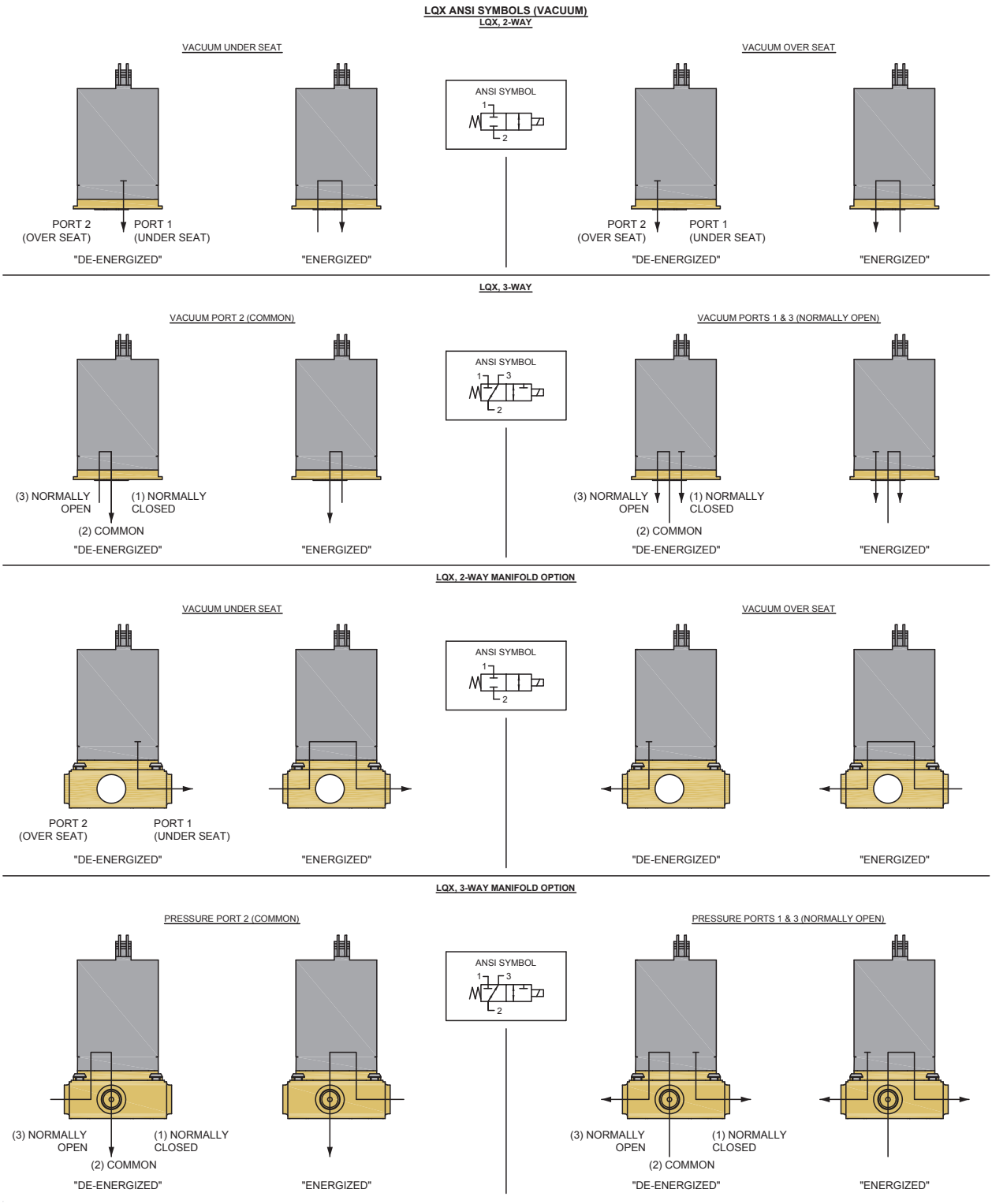

**LQX, 3-WAY MANIFOLD OPTION**



# **LQX12** Miniature Diaphragm Isolation Valve

## ANSI Symbols

### Vacuum

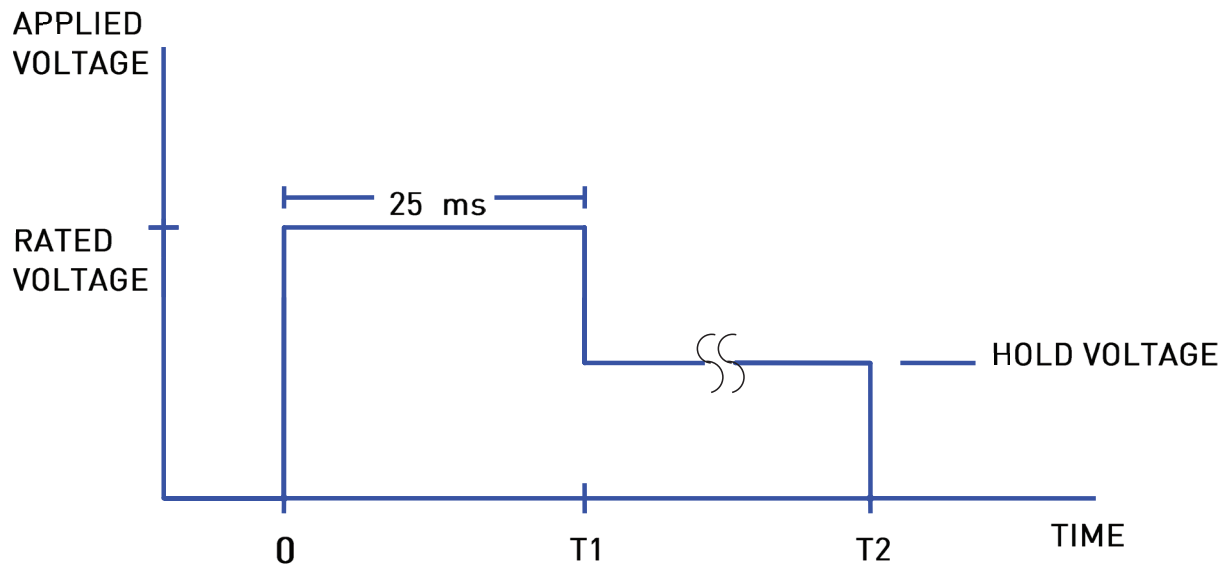


# **LQX12** Miniature Diaphragm Isolation Valve

## Hit and Hold Specifications

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24 VDC solenoids.

| Rated Voltage (VDC) | 2-way | | 3-way | |
|---|---|---|---|---|
| | Hold Voltage | Hold Power | Hold Voltage | Hold Power |
| 24 | 8 VDC | 0.46 watts | 12 VDC | 1.04 watts |
| 12 | 5 VDC | 0.44 watts | 6 VDC | 0.63 watts |




*Hold Voltage Graph*

# **LQX12** Miniature Diaphragm Isolation Valve

## Chemical Compatibility Chart*

| | Diaphragm Options | | | Other Wetted Materials |
|---|---|---|---|---|
| Chemical | FFKM | or | EPDM | PEEK |
| DI Water | 1 | | 1 | 1 |
| Methanol | 1 | | 1 | 1 |
| Isopropanol | 1 | | 1 | 1 |
| Ethanol | 1 | | 1 | 1 |
| Acetonitrile | 1 | | 1 | 1 |
| Tetrahydrofuran | 1 | | 4 | 1 |
| Toluene | 1 | | 4 | 1 |
| Organic Acids - Dilute | 1 | | 1 | 1 |
| Non Organic Acids - Dilute | 1 | | 1 | 1 |
| Bases - Dilute | 1 | | 1 | 1 |
| Saline | 1 | | 1 | 1 |
| Bleach 12% | 2 | | 1 | 1 |
| Sodium Hydroxide 20% | 1 | | 1 | 1 |

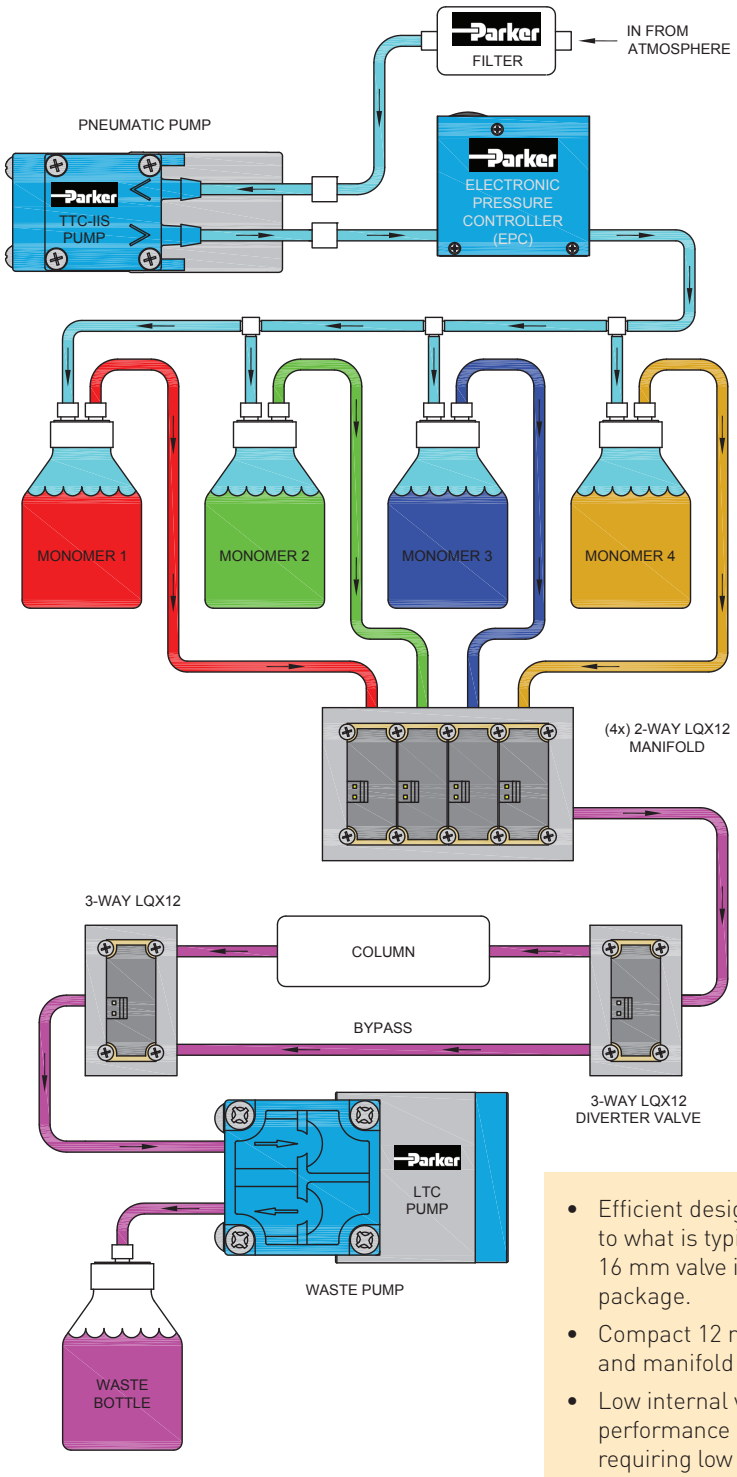
*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for a complete list.

| COMPATIBILITY LEGEND | | |
|---|---|---|
| 1 | **EXCELLENT** | Minimal or no effect |
| 2 | **GOOD** | Possible swelling and/or loss of physical properties |
| 3 | **DOUBTFUL** | Moderate or severe swelling and loss of physical properties |
| 4 | **NOT RECOMMENDED** | Severe effect and should not be considered |

# **LQX12** Miniature Diaphragm Isolation Valve

## Typical Flow Diagram

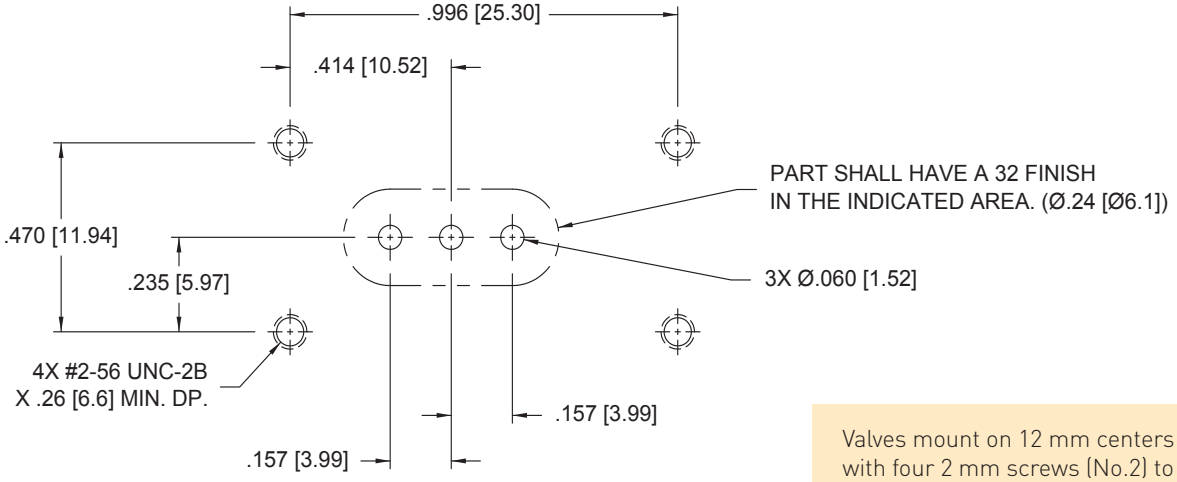
### Oligonucleotide Synthesis Application




- Efficient design provides flow close to what is typically expected in a 16 mm valve in a 12 mm wide package.
- Compact 12 mm size saves space and manifold costs
- Low internal volume and high performance is ideal for applications requiring low carryover compared to the industry leading 16 mm valve

# **LQX12** Miniature Diaphragm Isolation Valve

## Recommended LQX Valve Mounting

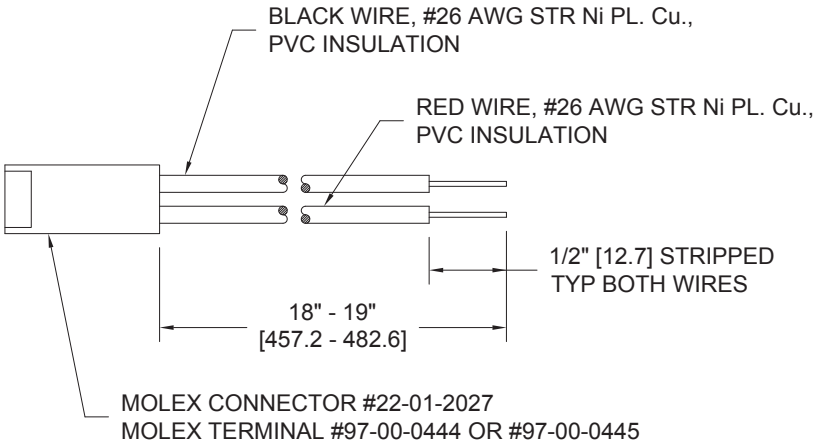



UNITS
IN [MM]

Valves mount on 12 mm centers with four 2 mm screws (No.2) to a maximum torque of 0.11N-m (15 in-oz).

## Accessories

**LQX12 18" (46 cm) Cable Assembly**
LQX-0001-290-001



# **LQX12** Miniature Diaphragm Isolation Valve

## Ordering Information

| Valve Type | Seal Material | Pressure | Voltage | Electrical Connection | Porting | Part Number |
|---|---|---|---|---|---|---|
| 2- Way NC | FFKM | Vac-50psig (3.4 bar) | 12V | 2.54mm male pins | Manifold Mount | LQX12-2W12FFFS-000 |
| | | | | | 1/4 - 28 | LQX12-2W12FF48-000 |
| | | | | Flying leads | Manifold Mount | LQX12-2W12FFFS-001 |
| | | | | | 1/4 - 28 | LQX12-2W12FF48-001 |
| | | | 24V | 2.54mm male pins | Manifold Mount | LQX12-2W24FFFS-000 |
| | | | | | 1/4 - 28 | LQX12-2W24FF48-000 |
| | | | | Flying leads | Manifold Mount | LQX12-2W24FFFS-001 |
| | | | | | 1/4 - 28 | LQX12-2W24FF48-001 |
| | EPDM | Vac-40psig (2.8 bar) | 12V | 2.54mm male pins | Manifold Mount | LQX12-2W12EPFS-000 |
| | | | | | 1/4 - 28 | LQX12-2W12EP48-000 |
| | | | | Flying leads | Manifold Mount | LQX12-2W12EPFS-001 |
| | | | | | 1/4 - 28 | LQX12-2W12EP48-001 |
| | | | 24V | 2.54mm male pins | Manifold Mount | LQX12-2W24EPFS-000 |
| | | | | | 1/4 - 28 | LQX12-2W24EP48-000 |
| | | | | Flying leads | Manifold Mount | LQX12-2W24EPFS-001 |
| | | | | | 1/4 - 28 | LQX12-2W24EP48-001 |
| 3-Way | FFKM | Vac-50psig (3.4 bar) | 12V | 2.54mm male pins | Manifold Mount | LQX12-3W12FFFS-000 |
| | | | | | 1/4 - 28 | LQX12-3W12FF48-000 |
| | | | | Flying leads | Manifold Mount | LQX12-3W12FFFS-001 |
| | | | | | 1/4 - 28 | LQX12-3W12FF48-001 |
| | | | 24V | 2.54mm male pins | Manifold Mount | LQX12-3W24FFFS-000 |
| | | | | | 1/4 - 28 | LQX12-3W24FF48-000 |
| | | | | Flying leads | Manifold Mount | LQX12-3W24FFFS-001 |
| | | | | | 1/4 - 28 | LQX12-3W24FF48-001 |
| | EPDM | Vac-40psig (2.8 bar) | 12V | 2.54mm male pins | Manifold Mount | LQX12-3W12EPFS-000 |
| | | | | | 1/4 - 28 | LQX12-3W12EP48-000 |
| | | | | Flying leads | Manifold Mount | LQX12-3W12EPFS-001 |
| | | | | | 1/4 - 28 | LQX12-3W12EP48-001 |
| | | | 24V | 2.54mm male pins | Manifold Mount | LQX12-3W24EPFS-000 |
| | | | | | 1/4 - 28 | LQX12-3W24EP48-100 |
| | | | | Flying leads | Manifold Mount | LQX12-3W24EPFS-001 |
| | | | | | 1/4 - 28 | LQX12-3W24EP48-101 |

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

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/lqx12) to configure your Liquid X Miniature Diaphragm Isolation Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# **LQX12** Miniature Diaphragm Isolation Valve

## Ordering Information

| Accessories |
| --- |
| LQX-0001-290-001: LQX 18" (46 cm) Cable Assembly |

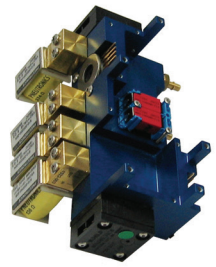
NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/lqx12) to configure your Liquid X Miniature Diaphragm Isolation Valve. For more detailed information, visit us on the Web, or call 603-595-1500.

# Value Added Application-Specific Solutions

### Gassing Control System

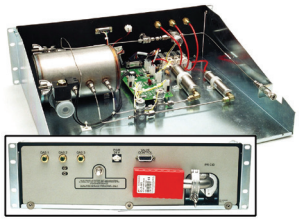


- Mixed gassing logic design includes VSO® proportional valves, X-Valve®, pressure switch, pressure sensors, and PCB interface

### Pneumatic Module

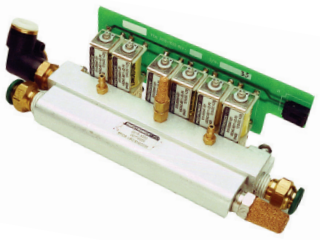
- **Integrated valve manifold**
- **Compact design**
- **Single electrical connection**
- **Valves configured per specifications**

### Vacuum Gas Control Module



- Tested to 1 x $10^{-7}$ cc/sec/atm Helium
- Assembly tested on mass spectrometer

### 6 Position VSO® Proportional Valve Pneumatic Manifold Assembly



- Quick connect fittings
- Circuit board with mass electrical termination

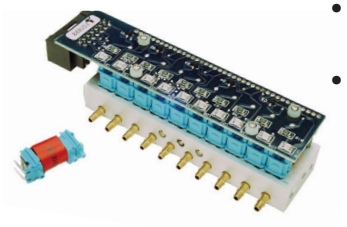
### Magnum Manifold Assembly

- **Integrated circuit board with single connection**
- **Compact design**
- **Easily adaptable**
- **2 way and 3 way designs**

### 8 Position SRS Model Pneumatic Manifold

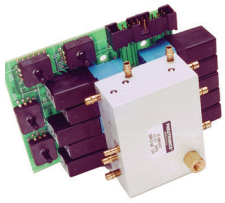
- Integrated circuit board mounting
- Mass electrical termination

### 10 Position X-Valve® Pneumatic Manifold



- Mixed pneumatic logic design
- Ultra-miniature design with PCB for mass termination

### 10 Position SRS Model Pneumatic Manifold



- Circuit board with transducers
- Pressed in barbed fittings

**For more information call +1 603 595 1500 or email ppfinfo@parker.com**
**Visit www.parker.com/precisionfluidics**

# WARNING

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