

# R9 Valve

## 9 mm Miniature Diaphragm Isolation Valve



### Markets




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

### Typical Applications

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

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.

### 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

|  |  |
|--|--|
| <b>Valve Type:</b>                                   | Diaphragm Rocker Isolation Valve   |
| <b>Valve Configuration:</b>                          | 3-Way Universal<br>2-Way Normally Closed   |
| <b>Media:</b> Liquids                                |  |
| <b>Operating Environment/<br/>Media Temperature:</b> | EPDM 32 to 122F (0 to 50c)<br>FFKM High Pressure (100psi, 40psi versions) 50 to 122F(10-50c)<br>FFKM Standard Pressure (60psi, 20psi versions) 59 to 122F (15-50c) |
| <b>Storage Temperature:</b>                          | -4 to 158°F (-20 to 70°C)  |
| <b>Dimensions:</b>                                   | Width: 0.34" (8.7 mm)<br>Depth: 1.46" (37 mm)<br>Length: 2.71" (68.8 mm)   |
| <b>Weight:</b>                                       | Face Seal Version: 1.35 oz. (38.4g)<br>1/4-28 or M6 version: 1.63 oz. (46.1g)  |
| <b>Porting:</b>                                      | Face Seal, 1/4-28 & M6   |
| <b>Internal Volume:</b>                              | Face Seal: 39.4µL<br>1/4-28 or M6: 116.6µL   |

### Electrical

|  |      |             |            |            |            |             |            |            |            |
|--|------|-------------|------------|------------|------------|-------------|------------|------------|------------|
| <b>Voltage (VDC):</b> 12 and 24 VDC ± 5%               |      |             |            |            |            |             |            |            |            |
| <b>Orifice:</b> 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)  |      | <b>12V</b>  | <b>24V</b> | <b>12V</b> | <b>24V</b> | <b>12V</b>  | <b>24V</b> | <b>12V</b> | <b>24V</b> |
|  | 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  |            |
| <b>Max (mA):</b>                                       |      | 592         | 296        | 375        | 200        | 592         | 296        | 375        | 200        |
| <b>Resistance: (Ohms)**:</b>                           |      | 20.5        | 81         | 32         | 120        | 20.5        | 81         | 32         | 120        |
| <b>Connections:</b>                                    |      |             |            |            |            |             |            |            |            |
| 2.54 mm pitch male pins, 18" (46 cm) Flying            |      |             |            |            |            |             |            |            |            |
| *Requires hit and hold circuit                         |      |             |            |            |            |             |            |            |            |
| **(Ω±5% @ 68°F, 20°C)                                  |      |             |            |            |            |             |            |            |            |

### Wetted Materials\*

|  |                             |
|--|-----------------------------|
| <b>Seals:</b>  | EPDM or FFKM                |
| <b>Base:</b>   | PEEK (polyetheretherketone) |
| <b>1/4-28 / M6 Sub Base Manifold</b>                                   | PEEK (polyetheretherketone) |
| * See Chemical Compatibility Page<br>Consult factory for other options |                             |

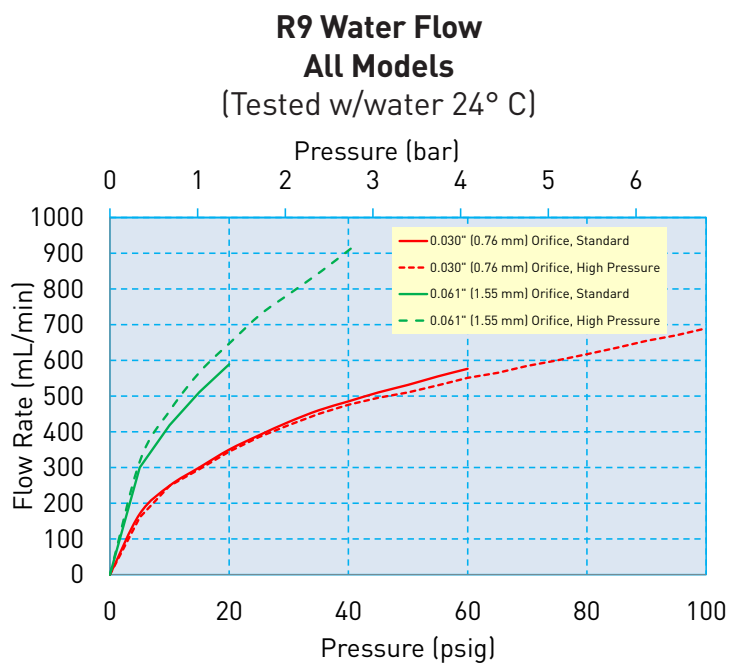
### Performance Characteristics

|                                  |  |
|----------------------------------|--|
| <b>Operating Proof Pressure:</b> | Face Seal 200 PSI (13.8 bar)<br>1/4-28 and M6 150 PSI (10.3 bar) |
| <b>Leak Rate:</b>                | Bubble Tight   |
| <b>Response Time:</b>            | 18 msec max  |
| <b>Recommended Filtration:</b>   | 5 µm   |
| <b>Reliability:</b>              | 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)

Locator 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.



1/4 - 28 Ports  
 (Threaded Connector)



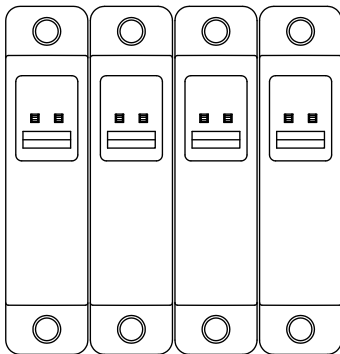
M6 Ports  
 (Threaded Connector)

## R9 Miniature Diaphragm Isolation Valve

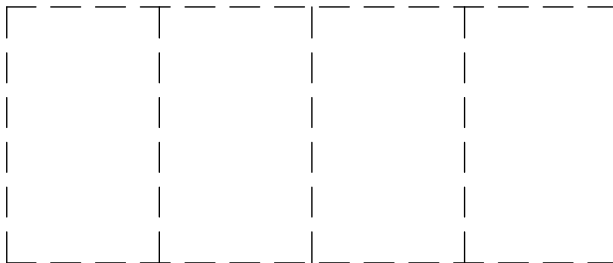


R9

### Footprint Comparison to 16 mm Valve

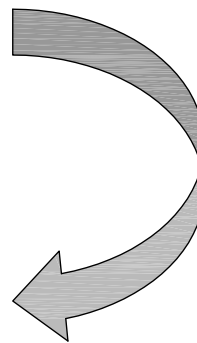


FOOTPRINT OF 4 R9 VALVES



FOOTPRINT OF 4 16mm VALVES

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

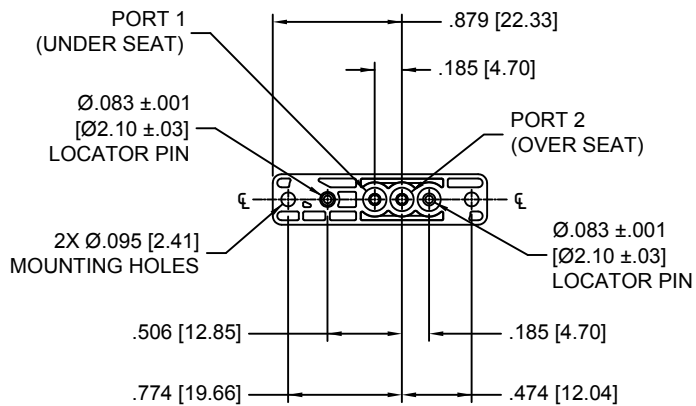
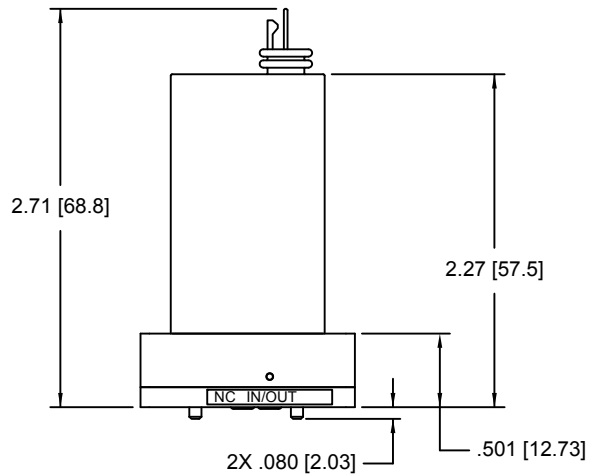
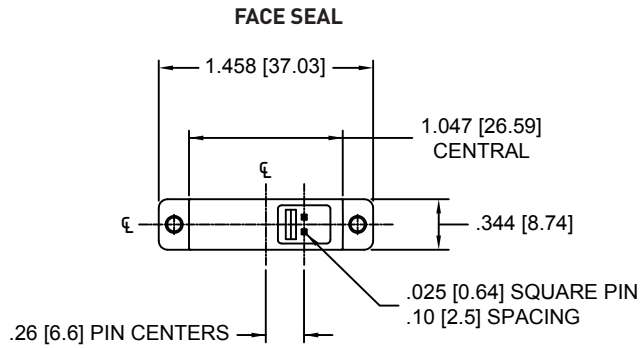


# R9 Miniature Diaphragm Isolation Valve

## Mechanical Integration

### Dimensions

#### 2-Way Dimensions



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

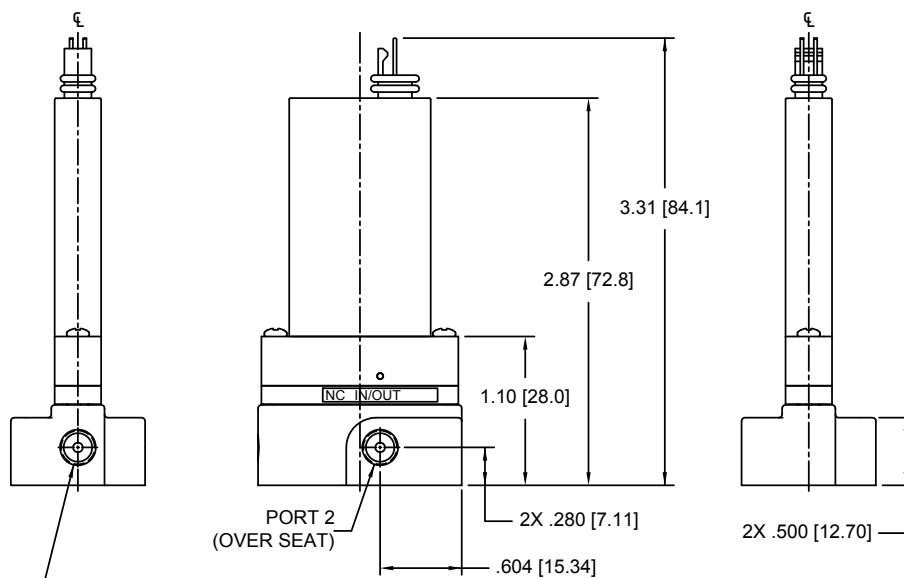
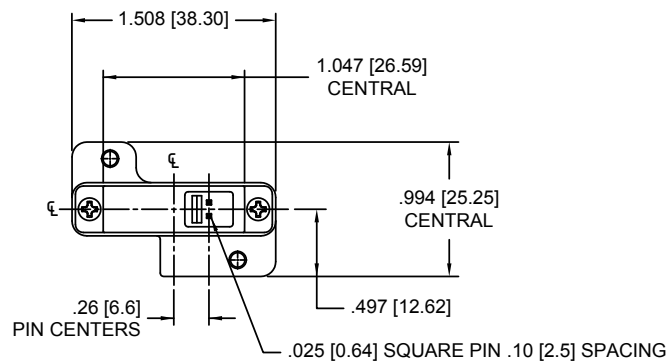
# R9 Miniature Diaphragm Isolation Valve

## Mechanical Integration

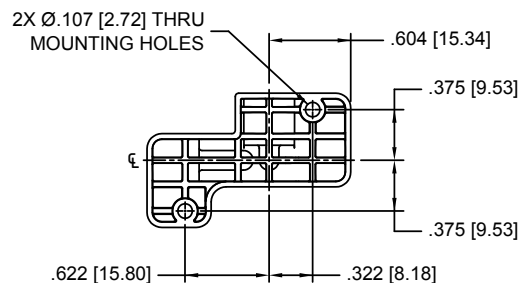
### Dimensions

#### 2-Way Dimensions

1/4-28 OR M6 SUB BASE



FLAT BOTTOM PORTS  
2X 1/4-28 UNF-2B  $\nabla$  .320  $\pm$ .002 MIN .24 THREAD DEPTH  
OR [M6X1 - 6H  $\nabla$  8.89  $\pm$ 0.05 MIN 7.1] THREAD DEPTH  
PORT 1 (UNDER SEAT)



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

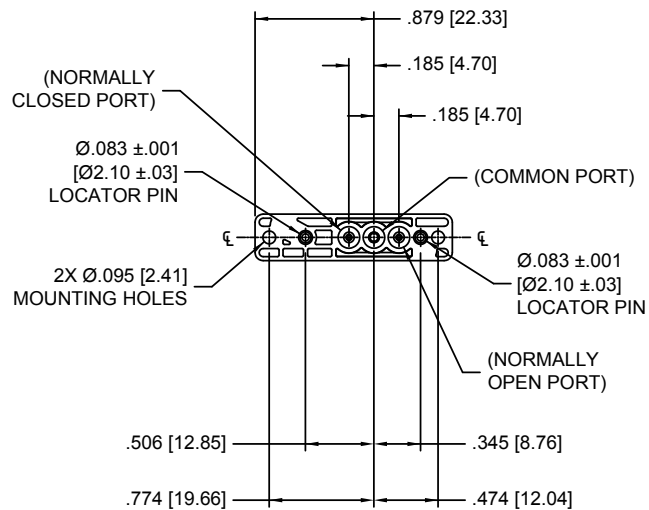
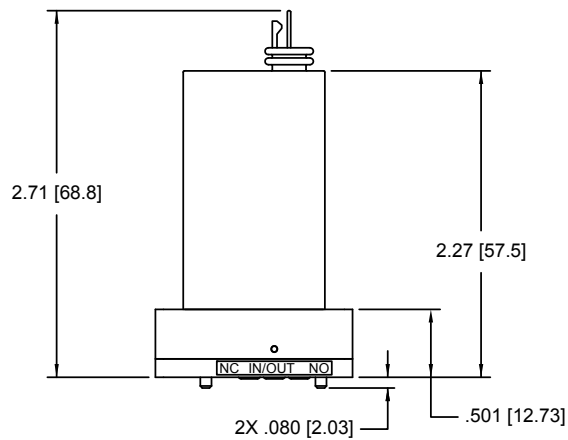
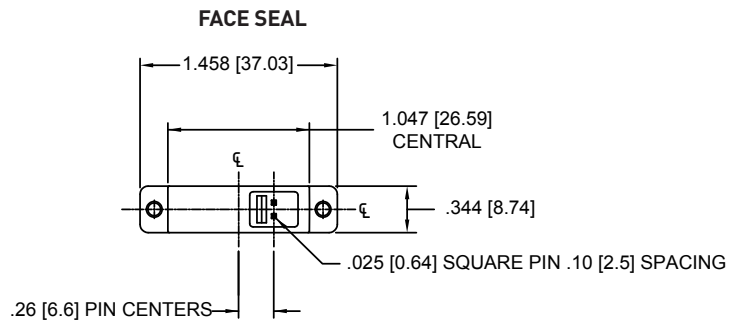


# R9 Miniature Diaphragm Isolation Valve

## Mechanical Integration

### Dimensions

#### 3-Way Dimensions



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

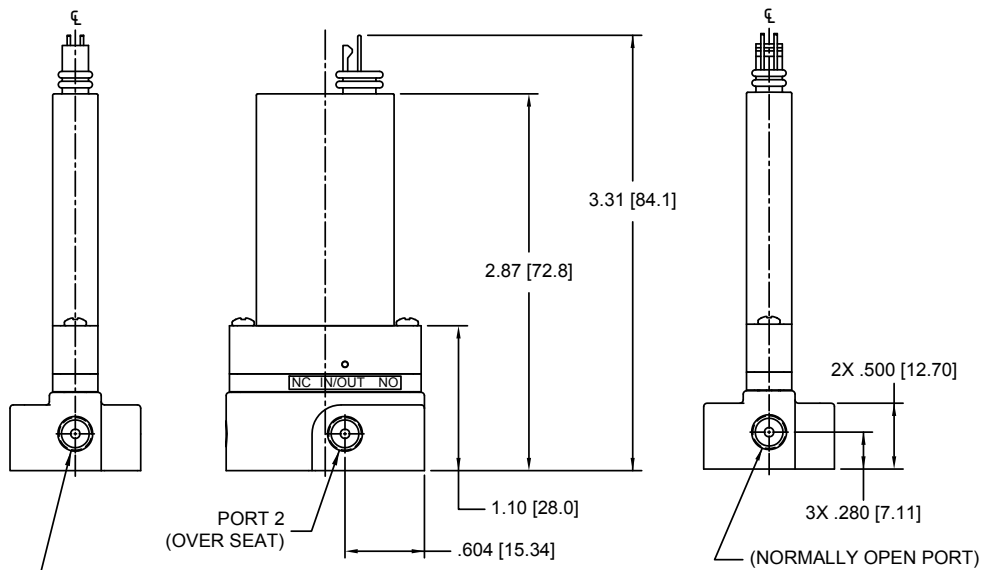
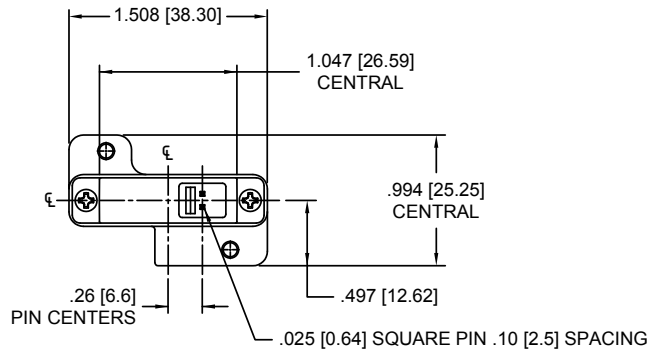
# R9 Miniature Diaphragm Isolation Valve

## Mechanical Integration

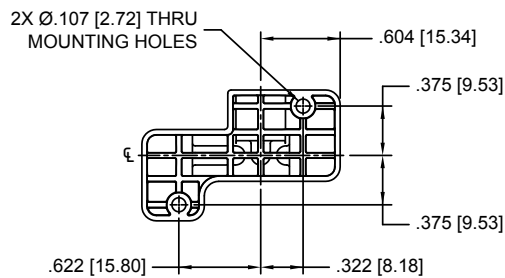
### Dimensions

#### 3-Way Dimensions

1/4 -28 OR M6



FLAT BOTTOM PORTS  
2X 1/4-28 UNF-2B  $\nabla$  .320  $\pm$  .002 MIN .24 THREAD DEPTH  
OR [M6X1 - 6H  $\nabla$  8.89  $\pm$  0.05 MIN 7.1] THREAD DEPTH  
PORT 1 (UNDER SEAT)



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

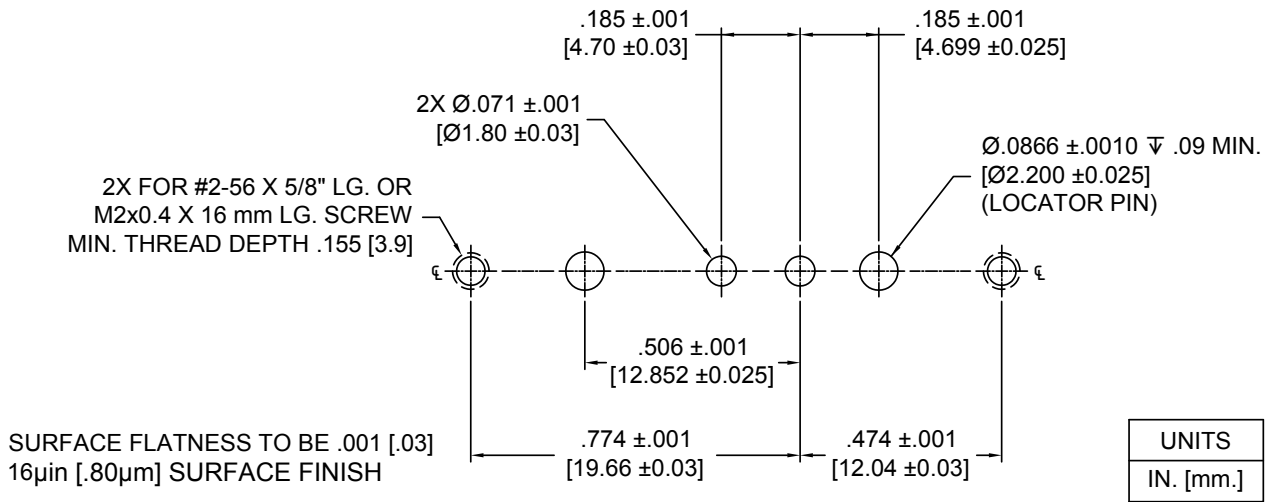


# R9 Miniature Diaphragm Isolation Valve

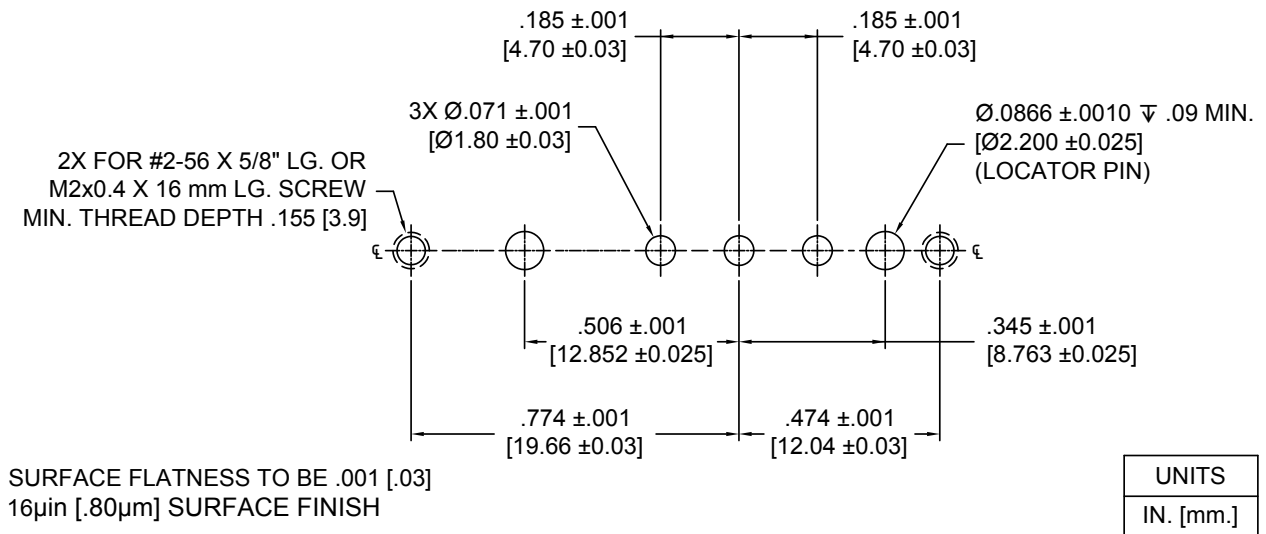
## Installation and Use

### R9 Manifold Interface Recommended R9 Valve Mounting

#### R9 2-WAY MANIFOLD INTERFACE



#### R9 3-WAY MANIFOLD INTERFACE

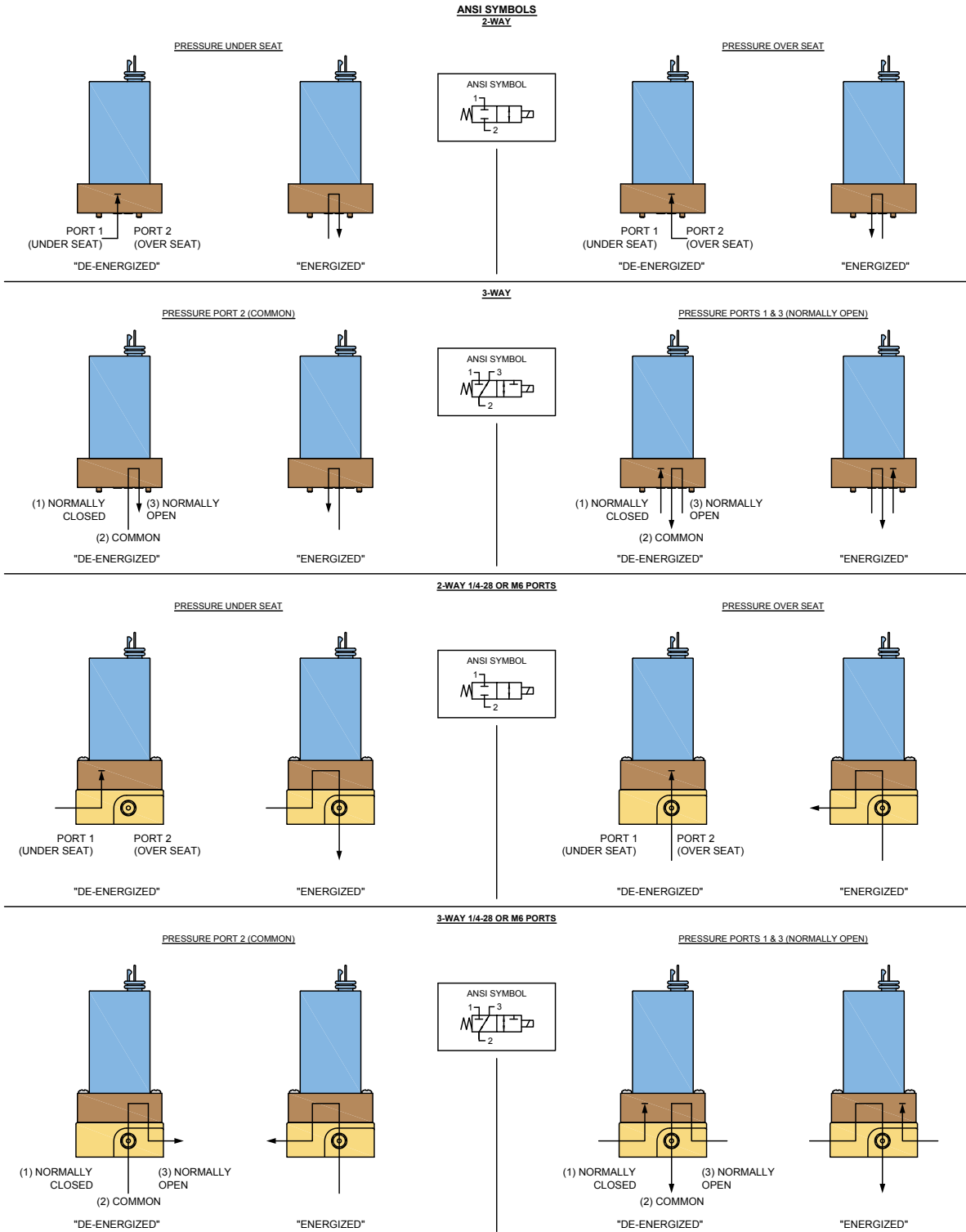




# R9 Miniature Diaphragm Isolation Valve

## ANSI Symbols

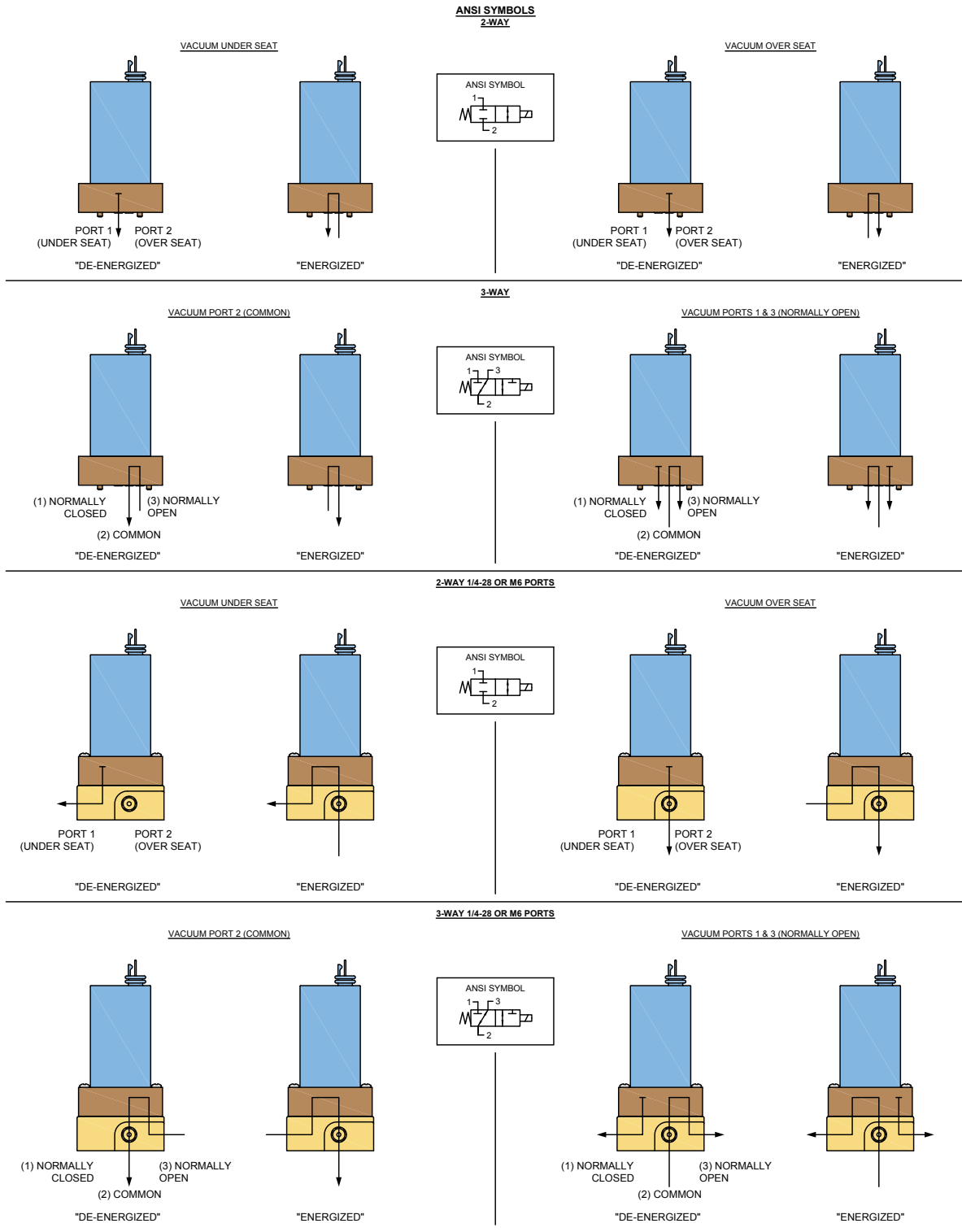
### Pressure



# R9 Miniature Diaphragm Isolation Valve

## ANSI Symbols

### Vacuum



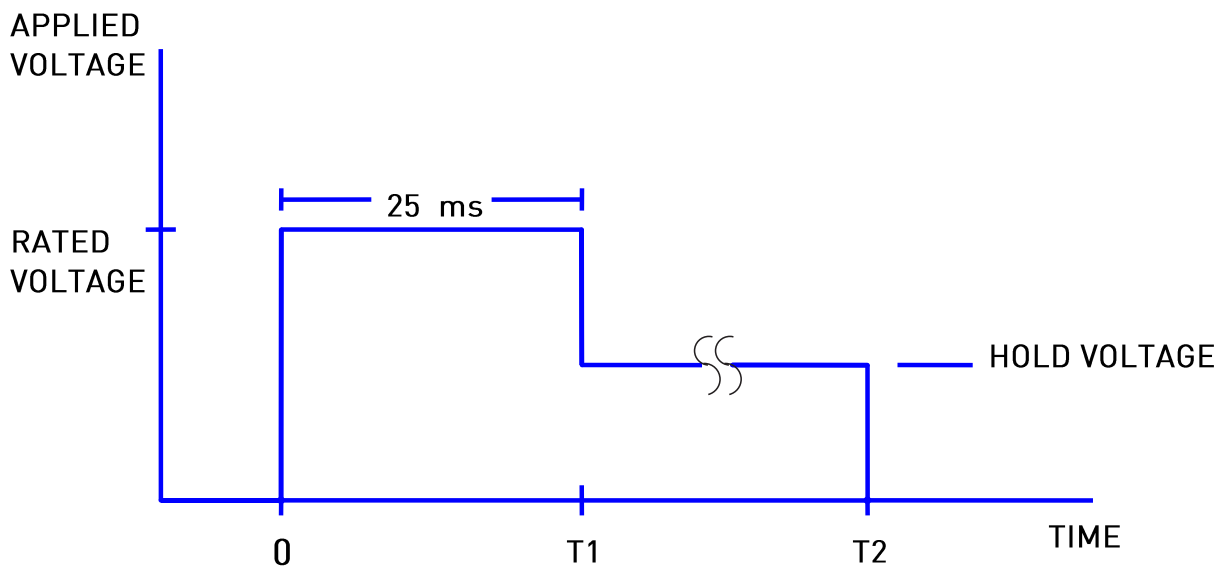
## R9 Miniature Diaphragm Isolation Valve

### 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*<br>100 PSI (6.9 bar) &<br>40 PSI (2.8 bar) Max |            | Standard Versions<br>60 PSI(4.1 bar) &<br>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\*

| Chemical                   | Diaphragm Options |         | Other Wetted Materials |   |
|----------------------------|-------------------|---------|------------------------|---|
|                            | 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 |

#### 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

##### 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

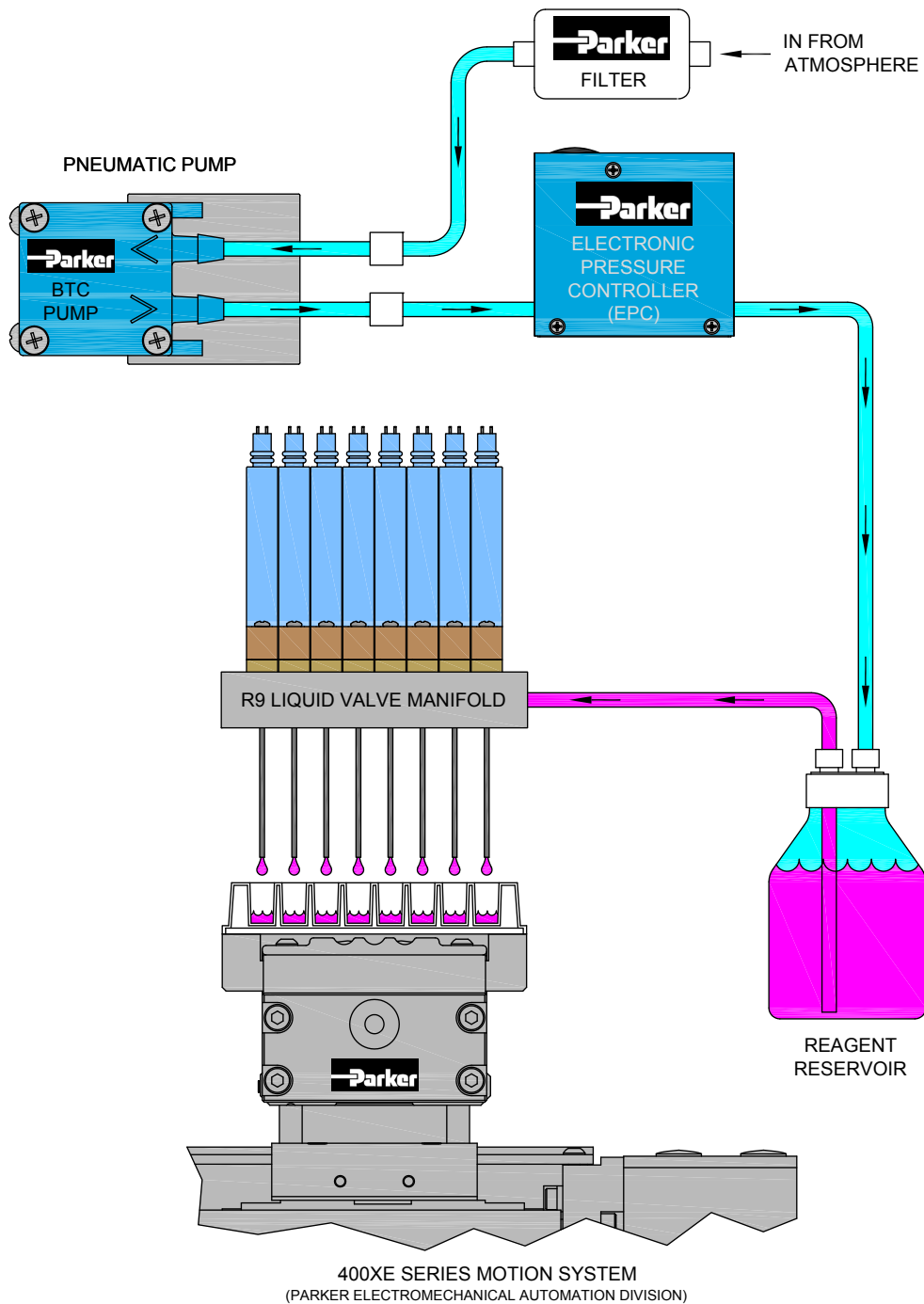
RoHS Directive (2002/95/EC) 

REACH EC 1907/2006 

# R9 Miniature Diaphragm Isolation Valve

## Typical Flow Diagram

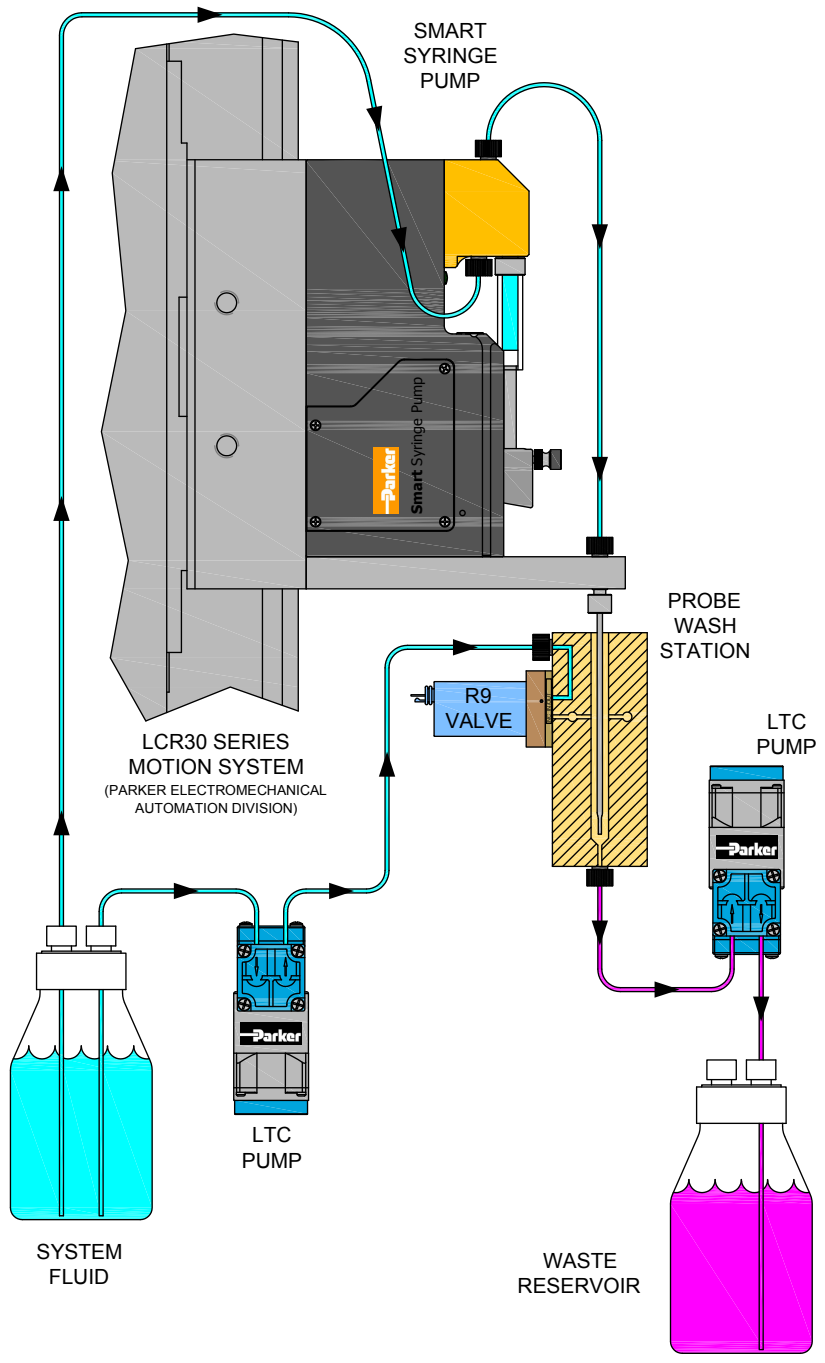
### 9 mm on Center Dispense Application



# R9 Miniature Diaphragm Isolation Valve

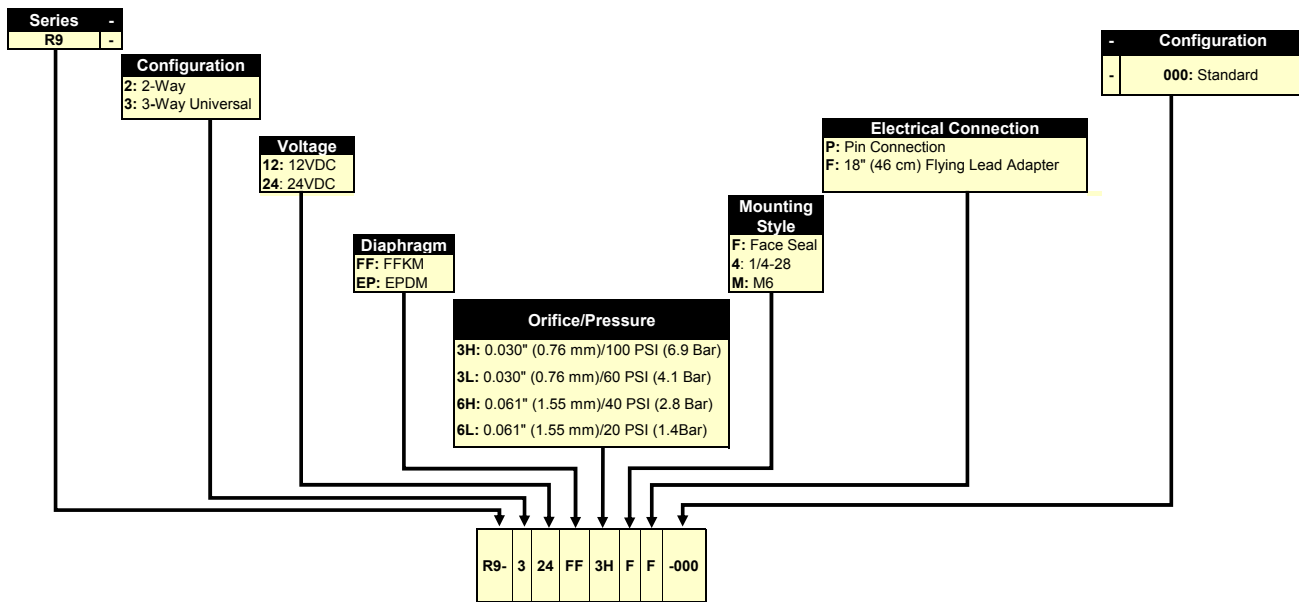
## Typical Flow Diagram

### 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](http://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.

## NOTES

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