

# C7 Valve Miniature Cartridge Solenoid Valve

7 mm Miniature 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 and 3-way configurations, the valve is manifold mounted utilizing a simple securing system reducing assembly time.


## Markets

- Respiratory and Anesthesia
- Patient Therapy
- Patient Monitoring
- Analytical Chemistry
- Clinical Diagnostics

## Applications

- Portable/Transport Ventilators Gas Control
- Negative Pressure Wound Therapy
- Air Over Liquid Dispense
- Sidestream CO<sub>2</sub> measurement
- Portable/Hand held environmental monitoring

## 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

|                                   |
|-----------------------------------|
| <b>Valve Type:</b>                |
| Solenoid Cartridge Valve          |
| 2-Way Normally Closed (NC)        |
| 3-Way Normally Closed (NC)        |
| <b>Media:</b> Gases and Liquids*  |
| (see details in liquid datasheet) |
| <b>Operating Environment:</b>     |
| 32°F to 122°F (0°C to 50°C)       |
| <b>Storage Environment:</b>       |
| -40°F to 158°F (-40°C to 70°C)    |
| <b>Dimensions:</b>                |
| - Diameter: 0.28 in (7 mm)        |
| - Length: 0.79 in (20 mm)         |
| <b>Porting:</b>                   |
| Cartridge Seal                    |
| <b>Weight:</b>                    |
| 0.11 oz (3.1 g)                   |
| <b>Internal Volume:</b>           |
| 2-Way 81 µL                       |
| 3-Way 90 µL                       |

| 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) |       |       |
|-----------------------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------|
| Type                  | 2-Way             | 3-Way | 2 Way             | 3 Way | 2 Way             | 3 Way | 2 Way             | 3 Way |       |
| Max Vacuum & Pressure | PSI               | 145   | 145               | 116   | 87                | 73    | 36.3              | 43.5  | 21.8  |
|                       | Bar               | 10    | 10                | 8     | 6                 | 5     | 2.5               | 3     | 1.5   |
|                       | Cv                | 0.003 | 0.004             | 0.007 | 0.01              | 0.009 | 0.014             | 0.015 | 0.015 |
|                       | SLPM (air)        | 7     | 7                 | 14    | 11                | 12    | 10                | 13    | 7     |
|                       |                   |       |                   |       |                   |       |                   |       |       |

### Electrical

|  |
|--|
| <b>Voltage (VDC):</b>                  |
| 12 and 24 VDC ± 5%                     |
| (Other voltages available on request.) |
| <b>Electrical Connections:</b>         |
| 3.2" (80 mm) Flying Leads [28 AWG]     |
| <b>Power:</b>                          |
| Typical 0.5W - 1.2W                    |
| (Please see Table 1 for more details)  |

### Wetted Materials

|                                       |
|---------------------------------------|
| <b>Body:</b>                          |
| Stainless Steel Series 300 and 400    |
| <b>Seals: (Internal and External)</b> |
| FKM, EPDM                             |

### Performance Characteristics

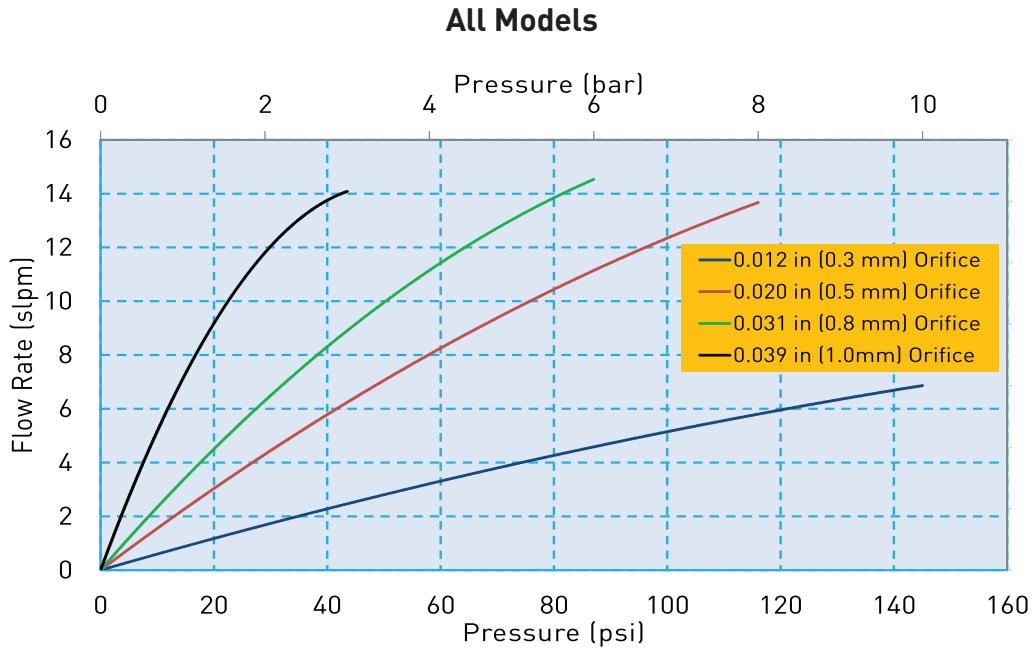
|                                  |
|----------------------------------|
| <b>Response:</b>                 |
| 10 ms Maximum, Cycling           |
| <b>Recommended Filtration:</b>   |
| 0.3 mm Orifice                   |
| 5 µm                             |
| 0.5 mm, 0.8 mm, & 1.0 mm Orifice |
| 10 µm                            |
| <b>Reliability:</b>              |
| 2-Way 130 Million                |
| 3-Way 55 Million                 |
| 0.90 Reliability Factor          |
| 95% Confidence                   |



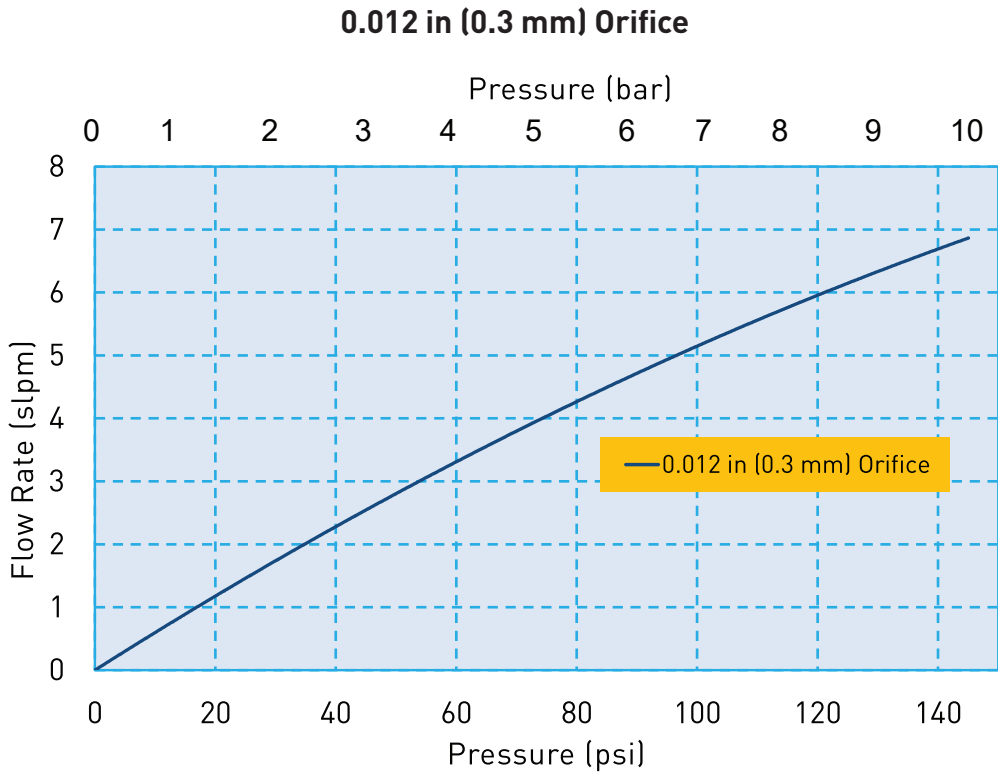
\*Please contact factory for additional details on liquid compatibility.

# C7 Miniature Cartridge Valve

## Flow Curve

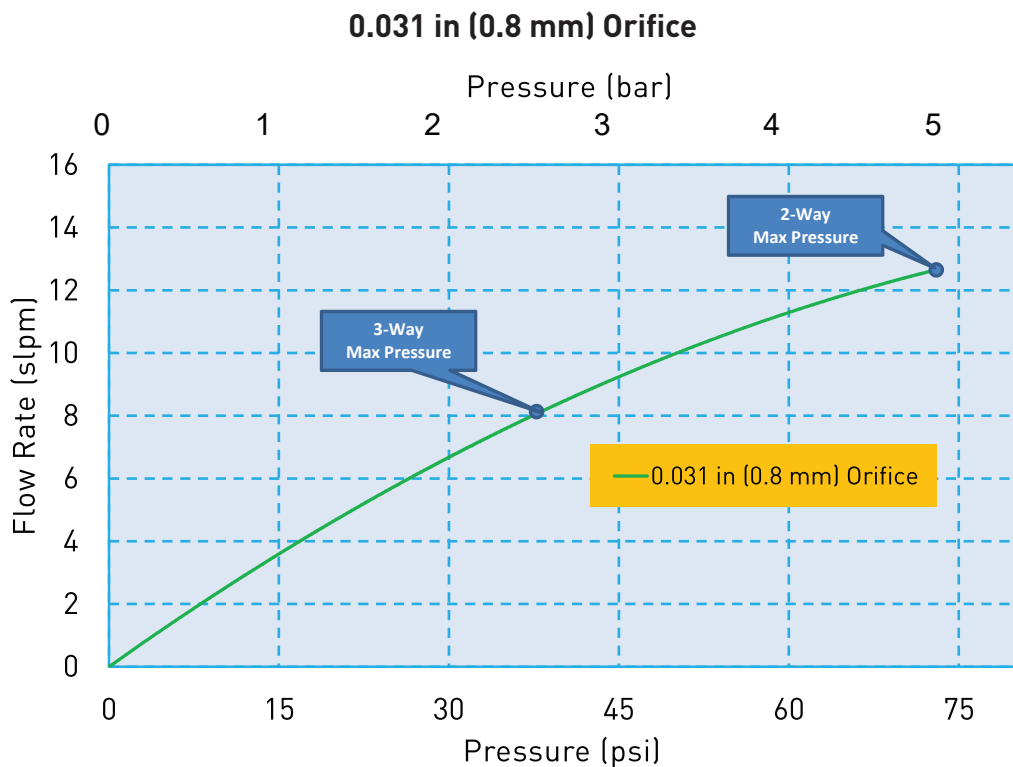
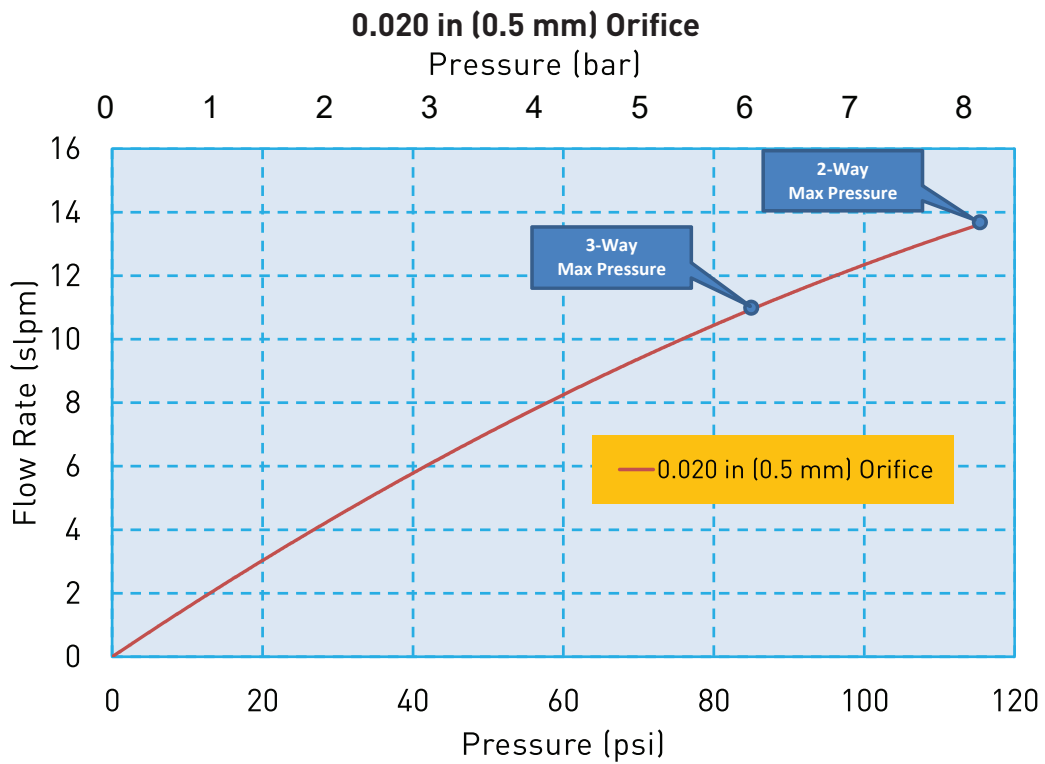


## Flow Curve



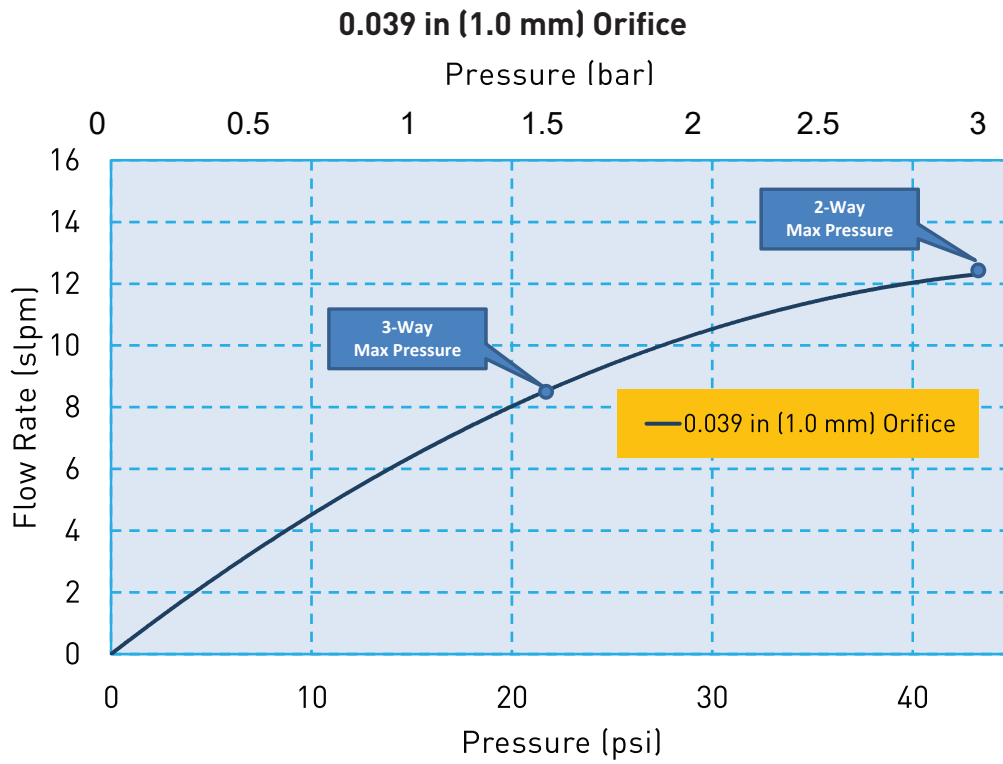
# C7 Miniature Cartridge Valve

## Flow Curve



## C7 Miniature Cartridge Valve

### Flow Curve



### Electrical Interface



Wire Leads

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

## C7 Miniature Cartridge Valve

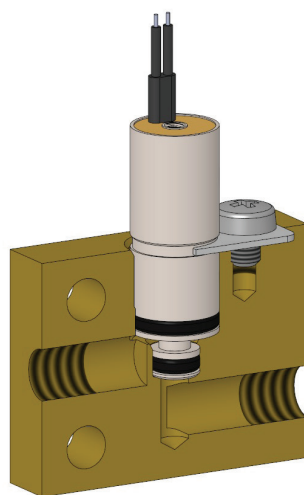
### Electrical Requirements

**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             |     | 3-Way |     | 2-Way             |      | 3-Way |     | 2-Way             |     | 3-Way |     | 2-Way             |     | 3-Way |     |
| Voltage (VDC)*     | 12V               | 24V | 12V   | 24V | 12V               | 24V  | 12V   | 24V | 12V               | 24V | 12V   | 24V | 12V               | 24V | 12V   | 24V |
| Power (Watts)      | 0.5               | 0.6 | 1     | 1.2 | 1                 | 0.85 | 1     | 1.2 | 1                 | 1.2 | 1     | 1.2 | 1                 | 1.2 | 1     | 1.2 |
| Resistance (Ohm)** | 288               | 995 | 140   | 495 | 140               | 700  | 140   | 495 | 140               | 495 | 140   | 495 | 140               | 495 | 140   | 495 |

\* ± 5%, other voltages available on request  
 \*\* ±5% @ 68°F, 20°C

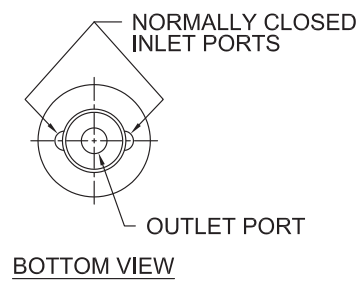
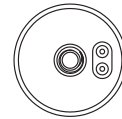
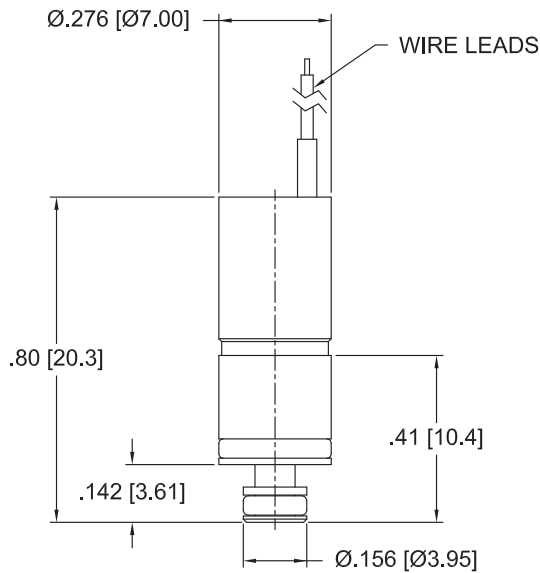
### Pneumatic Interface/Mechanical Integration



# C7 Miniature Cartridge Valve

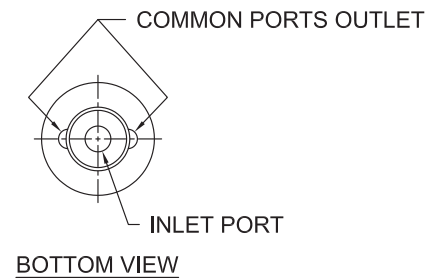
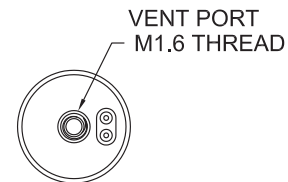
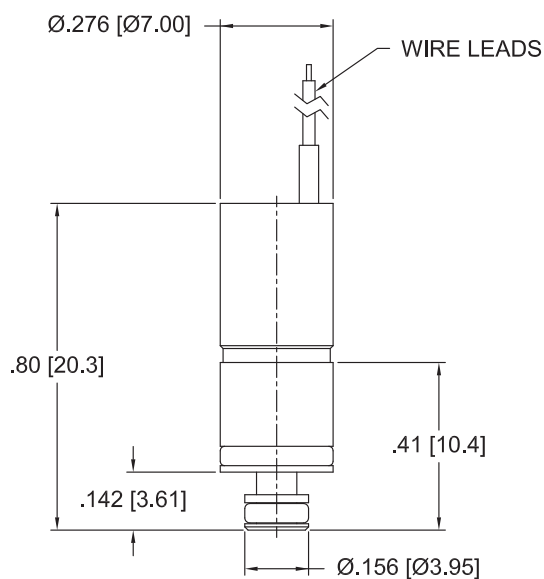
## Dimensions

### 2-Way



UNITS  
IN [MM]

### 3-Way



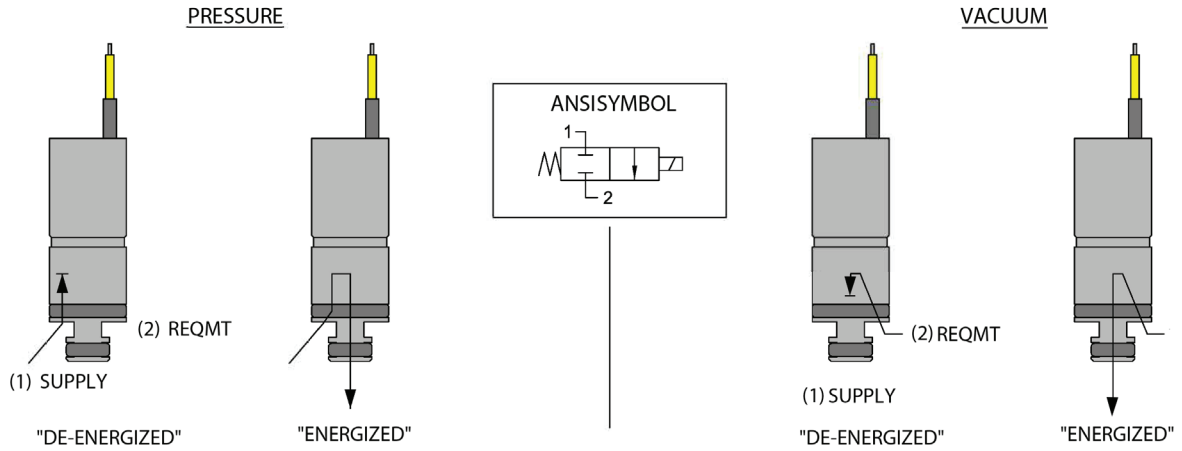
UNITS  
IN [MM]



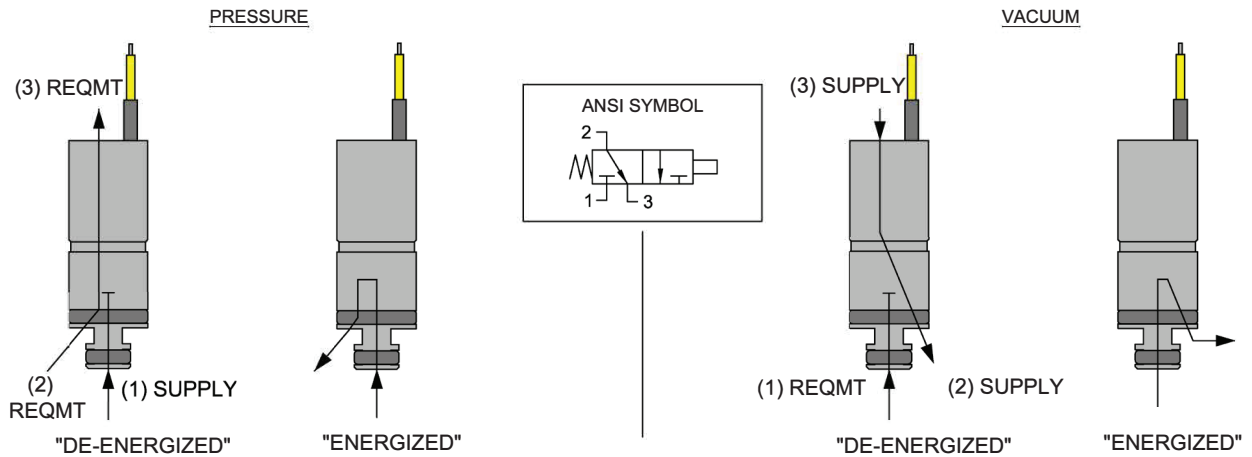
# C7 Miniature Cartridge Valve

## ANSI Symbols

### 2-Way Normally Closed



### 3-Way Option

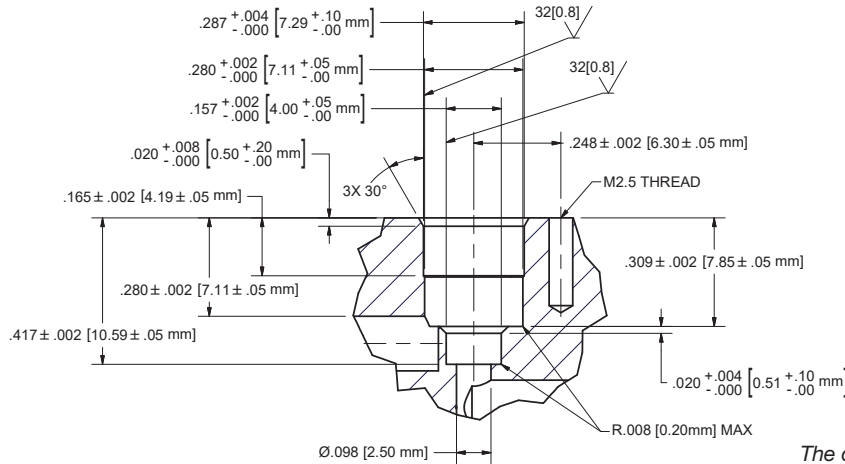


# C7 Miniature Cartridge Valve

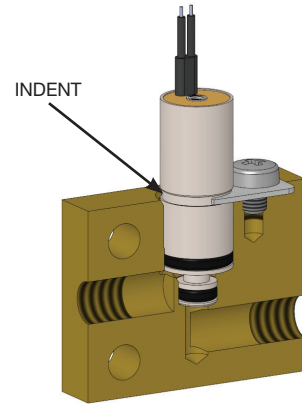
## Installation and Use

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

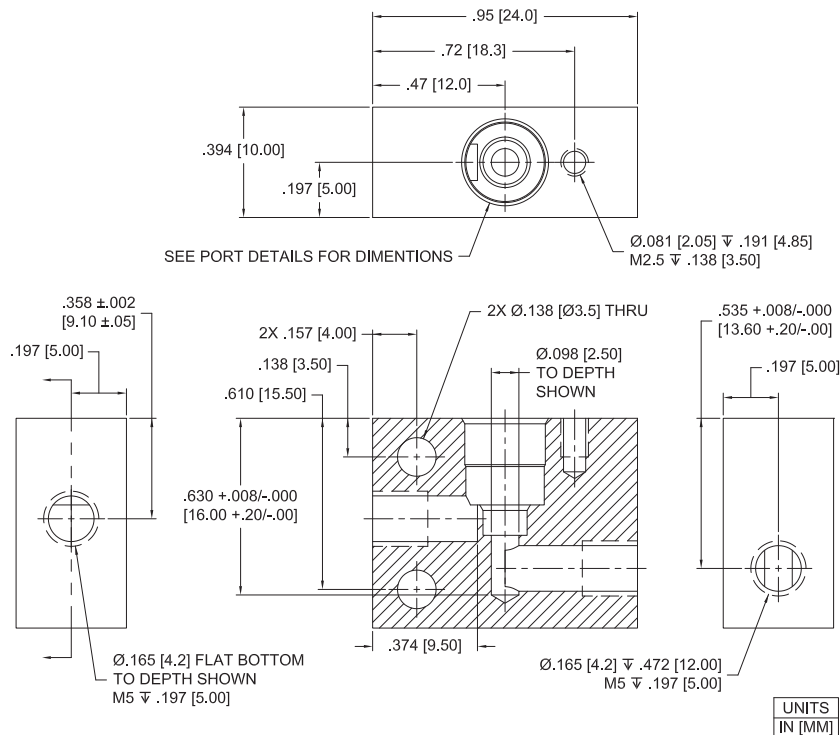


The correct location to use when holding the valve in place in the manifold is the indent at the middle of the valve body. If the top of the valve is used to hold the valve in place, the working pressure the valve will receive, can push the valve upward and exceed the maximum insertion force for the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

## Installation and Use

### C7 Evaluation Manifold Dimensions and Design

#### C07-MCS



UNITS  
IN [MM]





# C7 Miniature Cartridge Valve

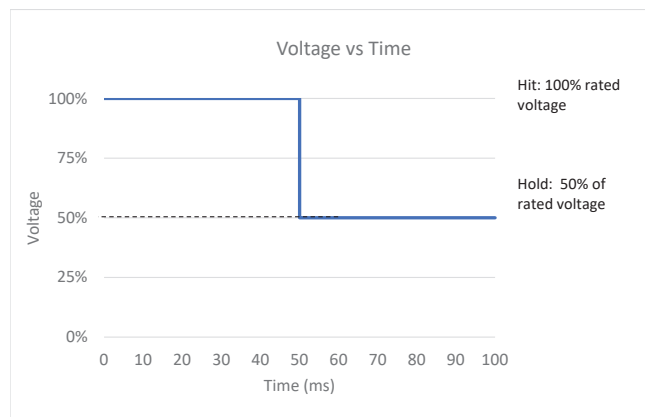
## Installation and Use

### 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)       | min. 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.

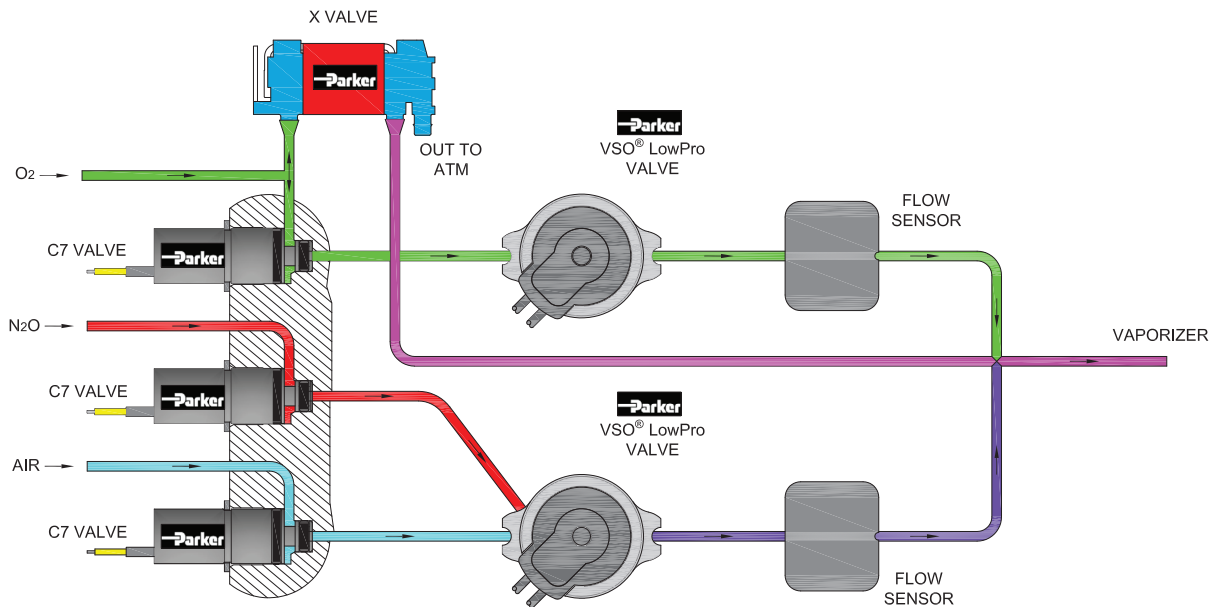
Note: 50% duty cycle is a general recommendation; therefore, it is recommended that specific application testing is completed to verify the proper “hold” requirement. Factors that could impact hit and hold voltage levels include vibration, shock, pressure variation and pressure locations that are driven 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 Cartridge Valve

## Typical Flow Diagram

### Anesthesia Gas Blending Circuit

NORMAL SYSTEM



## 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 FKM O-Ring for C7 Valve, Large**  
C07-LG



**Replacement FKM O-Ring for C7 Valve, Small**  
C07-SM



# C7 Miniature 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   | EP: EPDM  | 03: 0.012 in (0.3 mm) | F: Face Seal   | F: 3.2 in (80 mm) flying lead | 000: Standard |   |     |
|                |                           | 3: 3-Way      | 24: 24 VDC   | FK: FKM   | 05: 0.020 in (0.5 mm) |                |                               |               |   |     |
|                |                           |               |              |           | 08: 0.031 in (0.8 mm) |                |                               |               |   |     |
|                |                           |               |              |           | 10: 0.039 in (1.0 mm) |                |                               |               |   |     |

### 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\\_GasCartridgeValve](http://www.parker.com/precisionfluidics/C7_GasCartridgeValve)), call (603.595.1500) or email at [ppfinfo@parker.com](mailto:ppfinfo@parker.com).

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

For more information call +1 603 595 1500 or email [ppfinfo@parker.com](mailto:ppfinfo@parker.com)  
Visit [www.parker.com/precisionfluidics](http://www.parker.com/precisionfluidics)

