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 assembly time.

**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**

<table>
<thead>
<tr>
<th>Valve Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solenoid Cartridge Valve</td>
</tr>
<tr>
<td>2-Way Normally Closed (NC)</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Orifice [in (mm)]</th>
<th>0.020</th>
<th>0.040</th>
<th>0.060</th>
<th>0.080</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure (PSI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSI</td>
<td>145</td>
<td>116</td>
<td>58</td>
<td>22</td>
</tr>
<tr>
<td>Bar</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td>Cv</td>
<td>0.01</td>
<td>0.032</td>
<td>0.058</td>
<td>0.093</td>
</tr>
<tr>
<td>SCCM (water)</td>
<td>400</td>
<td>1160</td>
<td>1670</td>
<td>1640</td>
</tr>
</tbody>
</table>

**Response:**

- 10 ms Maximum, Cycling

**Performance Characteristics**

**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
  - FFKM, EPDM
  - FFKM available on request

**Typical Markets**

- Analytical Chemistry
- Clinical Diagnostics
- Environmental Monitoring
- Print

**Typical Applications**

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

*Please contact factory for additional details on gas compatibility.
C15 Miniature Liquid Cartridge Valve

Flow Curve

All Models (Water)

Pressure (bar)

0 1 2 3 4 5 6 7 8 9 10

Pressure (psi)

0 20 40 60 80 100 120 140

Flow (sccm)

0 500 1000 1500 2000 2500

0.02 in (0.5 mm) Orifice

0.04 in (1.0 mm) Orifice

0.06 in (1.5 mm) Orifice

0.08 in (2.0 mm) Orifice

Flow Curve

0.020 in (0.5 mm) Orifice (Water)

Pressure (bar)

0 2 4 6 8 10

Pressure (psi)

0 20 40 60 80 100 120 140

Flow (sccm)

0 50 100 150 200 250 300 350 400 450

2-Way NC 0.02 in (0.5 mm) Orifice
C15 Miniature Liquid Cartridge Valve

Flow Curve

0.040 in (1.0 mm) Orifice (Water)

Pressure [bar]

Flow [scm]

2-Way NC 0.04 in (1.0 mm) Orifice

0.060 in (1.5 mm) Orifice (Water)

Pressure [bar]

Flow [scm]

2-Way NC 0.06 in (1.5 mm) Orifice

Miniature Liquid Valves
C15 Miniature Liquid Cartridge Valve

Flow Curve

0.080 in (2.0 mm) Orifice (Water)

Electrical Interface

Wire Leads
Standard: 3.2 in (80 mm) Wire Leads, stripped at end
C15 Miniature Liquid Cartridge Valve

Electrical Requirements

<table>
<thead>
<tr>
<th>Orifice</th>
<th>0.02 in (0.5 mm)</th>
<th>0.04 in (1.0 mm)</th>
<th>0.06 in (1.5 mm)</th>
<th>0.08 in (2.0 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Type</td>
<td>2-Way</td>
<td>2-Way</td>
<td>2-Way</td>
<td>2-Way</td>
</tr>
<tr>
<td>Voltage (VDC)*</td>
<td>12</td>
<td>24</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Power (Watts)</td>
<td>1.1</td>
<td>1.1</td>
<td>1.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Resistance (Ohm)**</td>
<td>132</td>
<td>525</td>
<td>85</td>
<td>361</td>
</tr>
</tbody>
</table>

* ± 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

WIRE LEADS

TOP VIEW

NORMALLY CLOSED INLET PORTS

OUTLET PORT

BOTTOM VIEW

UNITs
IN [MM]

ANSI Symbols

2-Way Normally Closed

PRESSURE

(1) SUPPLY

(2) REQMT

“DE-ENERGIZED”

“ENERGIZED”

2-WAY NORMALLY CLOSED

VACUUM

(1) REQMT

(2) SUPPLY

“DE-ENERGIZED”

“ENERGIZED”

ANSI SYMBOL
**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**

- 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 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.
**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.

![Voltage vs Time Graph](image)

**C15 Hit and Hold Specification**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hit Voltage Level</td>
<td>Rated Voltage</td>
</tr>
<tr>
<td>Hold Voltage Level</td>
<td>50% of Rated Voltage</td>
</tr>
<tr>
<td>Minimum Hit Time</td>
<td>100 ms</td>
</tr>
<tr>
<td>Maximum Hit Time</td>
<td>N/A</td>
</tr>
<tr>
<td>PWM Frequency (Minimum)</td>
<td>1 kHz</td>
</tr>
<tr>
<td>Hold Nominal Duty Cycle</td>
<td>50%</td>
</tr>
</tbody>
</table>

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*

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Seal Options</th>
<th>Other Wetted Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FFKM</td>
<td>FKM</td>
</tr>
<tr>
<td>DI Water</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Methanol</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Isopropanol</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ethanol</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Acetonitrile</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Tetrahydrofuran</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Toluene</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MEK</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Organic Acids - Dilute</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Non Organic Acids - Dilute</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bases - Dilute</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Saline</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bleach 12%</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Sodium Hydroxide 20%</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

*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**

<table>
<thead>
<tr>
<th>Description</th>
<th>Series</th>
<th>Configuration</th>
<th>Coil Voltage</th>
<th>Elastomer</th>
<th>Orifice</th>
<th>Mounting Style</th>
<th>Electrical Interface</th>
<th>Custom</th>
</tr>
</thead>
<tbody>
<tr>
<td>C15-MCS:  C15 Evaluation Manifold with Clip and Screw, Not supplied with the valve.</td>
<td>C15: 15 mm Cartridge Valve</td>
<td>2-Way</td>
<td>12: 12 VDC</td>
<td>EPDM</td>
<td>0.000 in (0.0 mm)</td>
<td>F: Face Seal</td>
<td>000: Standard</td>
<td></td>
</tr>
<tr>
<td>C15-C: Replacement Clip used on C15-MCS*</td>
<td></td>
<td></td>
<td>24: 24 VDC</td>
<td>FK: FK</td>
<td>0.004 in (0.0 mm)</td>
<td>05: FFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15-S: Replacement Screw used on C15-MCS*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.006 in (1.5 mm)</td>
<td>15: FFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15-LG: Spare O-Ring for C15 Valve, FKM, Large**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.008 in (2.0 mm)</td>
<td>20: FFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15-LGE: Spare O-Ring for C15 Valve, EPDM, Large**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.004 in (0.0 mm)</td>
<td>10: FFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15-SM: Spare O-Ring for C15 Valve, FKM, Small**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.004 in (0.0 mm)</td>
<td>05: FFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15-SME: Spare O-Ring for C15 Valve, EPDM, Small**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.004 in (0.0 mm)</td>
<td>10: FFC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**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.

For more information call +1 603 595 1500 or email ppfinfo@parker.com

Visit www.parker.com/precisionfluidics