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.

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

Typical Applications

- Liquid CO₂ Dispense
- Surgical Refrigerant Dispense
- Semiconductor Refrigerant Dispense

Product Specifications

Physical Properties

- **Valve Type:** Inert Non-Isolation Valve
- **Valve Configuration (Type):** 2-Way Normally Closed or 3-Way
- **Media:** Liquids (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)
- **Internal Volume (μL):** 354.5 to 593.8 micro liter (Contact factory for details)

Electrical

- **Voltage (VDC):** 12
- **Power (Watts):** 12
- **Current (mA):** 1000
- **Resistance (Ohm):** 24
- **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

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
- **Leak Rate:** 1 x 10⁻⁸ cc/sec/atm Helium
- **Response Time:**
  - <5 ms (0.76 mm)
  - <5 ms 0.060” (1.52 mm)
  - <6 ms 0.116” (2.95 mm)
- **Recommended Filtration:** 40 μm max

* See Chemical Compatibility Page

Consult factory for other options
**Series 99**  Miniature High Speed and Pressure Liquid Dispense Valve

**Typical Flow Curve**

**All Models**
[Tested w/water 24° C]

<table>
<thead>
<tr>
<th>Pressure (psig)</th>
<th>Flow Rate (sccm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>40</td>
<td>200</td>
</tr>
<tr>
<td>60</td>
<td>300</td>
</tr>
<tr>
<td>80</td>
<td>400</td>
</tr>
<tr>
<td>100</td>
<td>500</td>
</tr>
</tbody>
</table>

0.030” (0.76 mm) Orifice

<table>
<thead>
<tr>
<th>Pressure (bar)</th>
<th>Flow Rate (sccm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>120</td>
</tr>
<tr>
<td>4</td>
<td>160</td>
</tr>
<tr>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
<td>240</td>
</tr>
</tbody>
</table>

0.030” (2.5 mm) Orifice

0.114” (2.95 mm) Orifice

O.060” (1.52 mm) Orifice

0.030” (0.76 mm) Orifice
Series 99  Miniature High Speed and Pressure Liquid Dispense Valve

0.060” (1.52 mm) Orifice
Pressure (bar)

Flow Rate (sccm)

0 2000 4000 6000
0 200 400 600

0 2 4 6

Pressure (psig)

0.116” (2.95 mm) Orifice
Pressure (bar)

Flow Rate (sccm)

0 5000 4000 3000
0 1000 2000 3000

0 2 4 6

Pressure (psig)

Electrical Interface

Wire leads

PTFE INSULATED LEAD WIRES #26 AWG X 12” [304.8] LONG.

Custom connections available upon request
Series 99 Miniature High Speed and Pressure Liquid Dispense Valve

Mechanical Integration

Dimensions

Series 99: 2-Way Cross-Section
Wetted Material and Dimensions

END PLATE (STAINLESS STEEL)

COIL ASSEMBLY

ARMATURE
(PTFE COATED STAINLESS STEEL)

POPPET (VESPEL)

SPRING (STAINLESS STEEL)

PORT 2
(OVER SEAT)

GASKETS
(NICKEL PLATED SILVER)

PORT 1
(UNDER SEAT)

BODY (STAINLESS STEEL)

A-LOK® FITTING
(STAINLESS STEEL)

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

PTFE INSULATED LEAD WIRES
#26 AWG X 12" [304.8] LONG.

Ø.69 [Ø17.5]

1.64 [41.7]

.33 [8.4]

2X .44 [11.2]

.67 [17.0]

.437 ±.010
[11.10 ±0.25] CENTRAL

.75 [19.1] SQ.

2X 1/16" A-LOK® TUBE FITTINGS

2X #4-40 UNC-2B X .25 [6.4] MIN. DP.

CENTRAL

NUTS AND FERRULES SUPPLIED

BOTTOM VIEW

UNITS
IN. [mm.]
**Series 99** Miniature High Speed and Pressure Liquid Dispense Valve

**Mechanical Integration**

**Dimensions**

*Series 99: 2-Way Cross-Section*

Wetted Material and Dimensions

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

![Diagram of 2-Way Valve]

- PTFE Insulated Lead Wires
  - #26 AWG X 12" [304.8] LONG.
  - Ø.69 [Ø17.5]
- Dimensions:
  - 2X .58 [14.7]
  - .70 [17.8]
- 2X #4-40 UNC-2B X .25 [6.4] MIN. DP.
- 2X 1/8" A-LOK® TUBE FITTINGS
- Nuts and Ferrules Supplied
- Bottom View

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

![Diagram of 3-Way Valve]

- PTFE Insulated Lead Wires
  - #26 AWG X 12" [304.8] LONG.
  - Ø.69 [Ø17.5]
- Dimensions:
  - 2X .58 [14.7]
  - .67 [17.0]
- 2X #4-40 UNC-2B X .25 [6.4] MIN. DP.
- 2X 1/8" A-LOK® TUBE FITTINGS
- Nuts and Ferrules Supplied
- Bottom View

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**UNITS**

IN. [mm.]

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

Mechanical Integration

Dimensions

Series 99: 2-Way Cross-Section

Wetted Material and Dimensions

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

PTFE INSULATED LEAD WIRES
#26 AWG X 12” [304.8] LONG.

2X SIZE 4 VACUSEAL® FITTINGS
WITH FEMALE NUTS

2X #4-40 UNC-2B X .20 [5.1] MIN. DP.

.440 ±0.010 [11.18 ±0.25] CENTRAL

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

PTFE INSULATED LEAD WIRES
#26 AWG X 12” [304.8] LONG.

2X SIZE 4 VACUSEAL® FITTINGS
WITH FEMALE NUTS

2X #4-40 UNC-2B X .20 [5.1] MIN. DP.

.440 ±0.010 [11.18 ±0.25] CENTRAL

UNITS
IN. [mm.]

Parker
Series 99  Miniature High Speed and Pressure Liquid Dispense Valve

ANSI Symbols

Pressure

2-WAY (1/8" A-LOK® FITTINGS SHOWN)

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"

3-WAY (1/8" A-LOK® FITTINGS SHOWN)

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"  "DE-ENERGIZED"  "ENERGIZED"

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"  "DE-ENERGIZED"  "ENERGIZED"

Vacuum

2-WAY (1/8" A-LOK® FITTINGS SHOWN)

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"

3-WAY (1/8" A-LOK® FITTINGS SHOWN)

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"  "DE-ENERGIZED"  "ENERGIZED"

PORT 1 (UNDER SEAT)  PORT 2 (OVER SEAT)
"DE-ENERGIZED"  "ENERGIZED"  "DE-ENERGIZED"  "ENERGIZED"
**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.

<table>
<thead>
<tr>
<th>Rated Voltage (volts)</th>
<th>3-way</th>
<th>2-way</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hold Voltage</td>
<td>Hold Power</td>
</tr>
<tr>
<td>24</td>
<td>12 volts</td>
<td>3 watts</td>
</tr>
<tr>
<td>12</td>
<td>6 volts</td>
<td>3 watts</td>
</tr>
</tbody>
</table>

**Note:** Other voltages available

![Hold Voltage Graph](image)
## Series 99 Miniature High Speed and Pressure Liquid Dispense 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>Vesel</td>
<td>Silver Plated Nickel</td>
</tr>
<tr>
<td>0.030&quot; (0,76mm) orifice version</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>or 0.040&quot; (1,02mm) and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.114&quot; (2,91mm) orifice version</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*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.
## Ordering Information

<table>
<thead>
<tr>
<th>Orifice Size</th>
<th>Seal Material</th>
<th>Pressure</th>
<th>Valve Type</th>
<th>Voltage</th>
<th>Porting</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.030&quot; (0.76mm)</td>
<td>Vespel, Silver Plated Nickel</td>
<td>Vac-1250psig (86.2 bar)</td>
<td>2 Way NC</td>
<td>12V</td>
<td>1/16&quot; (1.6 mm) A-Lok®</td>
<td>099-0051-900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24V</td>
<td>1/16&quot; (1.6 mm) A-Lok®</td>
<td>099-0340-900</td>
</tr>
<tr>
<td>0.060&quot; (1.52mm)</td>
<td>FKM,Silver Plated Nickel</td>
<td>Vac-250psig (17.2 bar)</td>
<td>2 Way NC</td>
<td>24V</td>
<td>1/8&quot; (3.2 mm) A-Lok®</td>
<td>099-0080-900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vac-100psig (6.89 bar)</td>
<td>3 Way</td>
<td>12V</td>
<td>1/8&quot; (3.2 mm) A-Lok®</td>
<td>099-0075-900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24V</td>
<td>1/8&quot; (3.2 mm) A-Lok®</td>
<td>099-0135-900</td>
</tr>
<tr>
<td>0.116&quot; (2.95mm)</td>
<td>FKM,Silver Plated Nickel</td>
<td>Vac-100psig (6.89 bar)</td>
<td>2 Way NC</td>
<td>24V</td>
<td>1/4&quot; (6.4 mm) Female VacuSeal®</td>
<td>099-0167-900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24V</td>
<td>1/4&quot; (6.4 mm) Female VacuSeal®</td>
<td>099-0107-900</td>
</tr>
</tbody>
</table>

**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.