Proportional Relief Valves

**FloLok®**

R Series

- Liquid or Gas Service
- Set Pressures: 10 to 6000 psig (0.7 to 413 bar)
- Variety of Seal Materials
- Variety of End Connections
- 1/4 and 1/2 in. (6, 8 and 12 mm)

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At SSP, we are proud to be an American manufacturing success story.

100% of our products are made in America. All of our manufacturing is performed in our 165,000 sq. ft. facility located near Cleveland, Ohio. Our facility is the largest vertically integrated, single-site operation in the industry. In addition to manufacturing and assembly, we have closed die forging, tool & die design, product engineering and testing operations under the same roof with customer service and management.

Made in America is good business. Not only do we make everything in America, we use American suppliers too. Buying American allows us to have better quality control and a more reliable supply chain. We can work more closely within our walls and with our suppliers to improve quality, reduce costs, and shorten lead times, which means faster service and better products for you.

Support where it counts. SSP products and services are supported by more than 4000 people and 350 distributor locations around the globe. For a distributor near you, contact SSP Customer Service or visit www.mySSP.com/distributors.
R Series
Proportional Relief Valves

R Series proportional relief valves are designed to protect pressure sensitive equipment by diverting flow in order to relieve pressure upstream of pressure sensitive equipment such as analyzers and flow meters. They open when the upstream pressure exceeds the closing force exerted by the spring, permitting flow through the valve. Flow through the valve increases and decreases proportionately in response to changes in upstream pressure. Proportional relief valves reseal at a pressure lower than the cracking pressure.

Specifications

High-Pressure Valves
- Maximum Working Pressure: 6000 psig (413 bar)
- Set Pressure: 50 to 6000 psig (3.4 to 413 bar)
- Multiple springs for a selection of set pressure ranges improve accuracy and reduce hysteresis
- End Connections:
  - RH3: 1/4 in., 6 mm and 8 mm tube ends
  - 1/4 in. NPT and BSPT pipe ends
  - RH4: 1/2 in. and 12 mm tube ends
  - 1/2 in. NPT pipe ends

Low-Pressure Valves
- Maximum Working Pressure: 300 psig (20.6 bar)
- Set Pressure: 10 to 225 psig (0.7 to 15.5 bar)
- One spring for the full set pressure range
- End Connections:
  - RL3: 1/4 in., 6 mm and 8 mm tube ends
  - 1/4 in. NPT and BSPT pipe ends
  - RL4: 1/2 in. and 12 mm tube ends
  - 1/2 in. NPT pipe ends

General Specifications
- Temperature Range: -40 to 300°F (-40 to 148°C)
- Valves preset to a specified set pressure are available
- Wide range of O-ring and seat materials
- Choice of Duolok, Griplok and Unilok tube end connections
- 316 SS valve bodies

Applications
R Series valves are used in gas or liquid systems in upstream and downstream oil & gas, chemical, pharmaceutical and laboratory applications. They are often used downstream from pumps and regulators to ensure protection from pressure spikes due to failures upstream of the valve or blockages downstream of the valve. Other applications include test labs, steam cleaning and sterilization systems, heating lines, dispensing and filling systems.
Product Design

1. **CAP**  
   Allows easy external set pressure adjustment.

2. **SPRING**  
   Adjusts to provide set pressure. Springs are color coded to indicate the set pressure range.

3. **LABEL**  
   Identifies spring set pressure range. Label colors are matched with the spring colors.

4. **LOCKNUT**  
   Maintains cap position to lock in the pressure setting.

5. **LOCK WIRE CAPABILITY**  
   Secures cap to maintain set pressure.

6. **STEM SEAL**  
   Quad seal reduces friction for greater accuracy.

7. **O-RING**  
   Fully supported O-ring provides durable elastomer seal for positive shutoff. See below for other designs.

Meets ASME B31.3 design pressure calculations

**RH Series**

1. RH3
2. RH4
3. RL3
4. RL4

Series
Technical Information

Resealing Pressure

The resealing pressure is the upstream pressure at which the valve closes and flow stops. It is always lower than set pressure.

Every R series proportional relief valve is tested for set and resealing performance. The chart below provides parameters for resealing values within specific pressure ranges.

<table>
<thead>
<tr>
<th>Series</th>
<th>Test Set Pressure psig (bar)</th>
<th>Minimum Resealing Pressure % of Set Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH3, RH4</td>
<td>100 to 200 (6.8 to 13.7)</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>850 to 1000 (58.5 to 68.9)</td>
<td>85</td>
</tr>
<tr>
<td>RL3, RL4</td>
<td>10 to 20 (0.7 to 1.3)</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>175 to 225 (12.0 to 15.5)</td>
<td>90</td>
</tr>
</tbody>
</table>

Note: Valves that have not been actuated for a period of time may have higher initial cracking pressures.

Cleaning and Packaging

R Series relief valves are cleaned and packaged according to SSP Standard Cleaning and Packaging Processes. Cleaning in accordance with ASTM G93 Level C, Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments is also available.
Technical Information

Materials of Construction

<table>
<thead>
<tr>
<th>ID</th>
<th>Component</th>
<th>Body Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plug</td>
<td>Nickel-Plated Steel</td>
</tr>
<tr>
<td>2</td>
<td>Cap</td>
<td>316 SS / A479</td>
</tr>
<tr>
<td>3</td>
<td>Label</td>
<td>Polyester</td>
</tr>
<tr>
<td>4</td>
<td>Lock Nut</td>
<td>316 SS / A479</td>
</tr>
<tr>
<td>5</td>
<td>Spring</td>
<td>S17700 / AMS 5678</td>
</tr>
<tr>
<td>6</td>
<td>Spring Support</td>
<td>316 SS / A479</td>
</tr>
<tr>
<td>7</td>
<td>Bonnet</td>
<td>316 SS / A479</td>
</tr>
<tr>
<td>8</td>
<td>O-ring</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>9</td>
<td>Quad Seal</td>
<td>Low-Friction Coated Fluorocarbon FKM</td>
</tr>
<tr>
<td>10</td>
<td>Retainer</td>
<td>316 SS / A666</td>
</tr>
<tr>
<td>11</td>
<td>Stem</td>
<td>316 SS / A276</td>
</tr>
<tr>
<td>12</td>
<td>Sealing Disc</td>
<td>Fluorocarbon FKM and 316 SS / A479</td>
</tr>
<tr>
<td>13</td>
<td>Seat</td>
<td>316 SS / A479</td>
</tr>
<tr>
<td>14</td>
<td>Gasket</td>
<td>PTFE-Coated 316 SS / A479</td>
</tr>
<tr>
<td>15</td>
<td>Seat Retainer</td>
<td>316 SS / A479</td>
</tr>
<tr>
<td>16</td>
<td>O-ring</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>17</td>
<td>Insert</td>
<td>316 SS / A479</td>
</tr>
<tr>
<td>18</td>
<td>Body</td>
<td>316 SS / A182</td>
</tr>
<tr>
<td></td>
<td>Lubricant</td>
<td>Molybdenum Disulfide-Based Dry Film and PTFE-Based</td>
</tr>
</tbody>
</table>

*Wetted Components

⚠️ Selection and Application

It is the system designer’s responsibility to determine the requirements for their application and whether R Series relief valves conform to the codes.

In some systems, relief valves are required to meet specific safety codes which require valves to open completely at a set pressure. R series proportional relief valves open gradually as the pressure increases. Therefore they cannot be certified to ASME, PED, or any other codes for safety relief valves.

SSP proportional relief valves should never be used as ASME Boiler and Pressure Vessel Code safety relief devices or as “Safety Accessories” defined in the Pressure Equipment Directive 97/23/EC.
Flow Data
(70°F/20°C)

RH3 & RH4 Series

**Air Flow**

![Graph showing Air Flow data for RH3 & RH4 Series](image1)

**Water Flow**

![Graph showing Water Flow data for RH3 & RH4 Series](image2)

RL3 & RL4 Series

**Air Flow**

![Graph showing Air Flow data for RL3 & RL4 Series](image3)

**Water Flow**

![Graph showing Water Flow data for RL3 & RL4 Series](image4)
Ordering Information

To order, locate the Basic Part Number for the valve for your application from the tables below, then add the required options and accessories from pages 9.

Basic Part Numbers and Dimensions

RH3 and RH4 Series High Pressure Valves

Note: RH Series valves are shipped standard without springs. To order spring kits, valves with springs installed, or factory set valves, see the instructions on page 9.

<table>
<thead>
<tr>
<th>Inlet/Outlet</th>
<th>Basic Part Number</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>A</td>
</tr>
<tr>
<td>Fractional Tube Fitting&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1/4 in.</td>
<td>RH3D4</td>
</tr>
<tr>
<td>Metric Tube Fitting&lt;sup&gt;1&lt;/sup&gt;</td>
<td>6 mm</td>
<td>RH3DM6</td>
</tr>
<tr>
<td>Male NPT to Tube&lt;sup&gt;2&lt;/sup&gt;</td>
<td>8 mm</td>
<td>RH3DM8</td>
</tr>
<tr>
<td>Male NPT to Female NPT</td>
<td>1/4 in.</td>
<td>RH34PM4PF</td>
</tr>
</tbody>
</table>

Orifice 0.14 (3.6 mm), Set Pressures from 50 to 6000 psig (3.4 to 413 bar)

| Fractional Tube Fitting<sup>1</sup> | 1/2 in. | RH4D8 | 4.09 (104) | 1.83 (46.5) | 1.83 (46.5) | 0.47 (11.9) | 5.92 (150) | 5.37 (136) |
| Metric Tube Fitting<sup>1</sup> | 12 mm | RH4DM12 | 4.09 (104) | 1.83 (46.5) | 1.83 (46.5) | 0.47 (11.9) | 5.92 (150) | 5.37 (136) |
| Male NPT to Tube Fitting<sup>2</sup> | 1/2 in. | RH48PM8PF | 4.09 (104) | 1.43 (36.3) | 1.43 (36.3) | 0.47 (11.9) | 5.52 (140) | 5.37 (136) |

Orifice 0.25 (6.4 mm), Set Pressures from 50 to 1500 psig (3.4 to 103 bar)

| Fractional Tube Fitting<sup>1</sup> | 1/4 in. | RL3D4 | 2.70 (68.6) | 1.44 (36.6) | 1.60 (40.6) | 0.41 (10.4) | 4.14 (105) | 4.09 (104) |
| Metric Tube Fitting<sup>1</sup> | 6 mm | RL3DM6 | 2.70 (68.6) | 1.44 (36.6) | 1.60 (40.6) | 0.41 (10.4) | 4.14 (105) | 4.09 (104) |
| Male NPT to Tube Fitting<sup>2</sup> | 8 mm | RL3DM8 | 2.70 (68.6) | 1.44 (36.6) | 1.60 (40.6) | 0.41 (10.4) | 4.14 (105) | 4.09 (104) |
| Male NPT to Female NPT | 1/4 in. | RL34PMD4 | 2.70 (68.6) | 1.19 (30.2) | 1.17 (29.7) | 0.41 (10.4) | 3.89 (98.8) | 4.09 (104) |

RL3 and RL4 Series Low Pressure Valves

Note: RL Series valves are shipped standard with springs installed in the valve.

<table>
<thead>
<tr>
<th>Inlet/Outlet</th>
<th>Basic Part Number</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>A</td>
</tr>
<tr>
<td>Fractional Tube Fitting&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1/4 in.</td>
<td>RL4D8</td>
</tr>
<tr>
<td>Metric Tube Fitting&lt;sup&gt;1&lt;/sup&gt;</td>
<td>12 mm</td>
<td>RL4DM12</td>
</tr>
<tr>
<td>Male NPT to Tube Fitting&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1/2 in.</td>
<td>RL48PMD8</td>
</tr>
<tr>
<td>Male NPT to Female NPT</td>
<td>1/2 in.</td>
<td>RL48PM8PF</td>
</tr>
</tbody>
</table>

Orifice 0.19 (4.8 mm), Set Pressures from 10 to 225 psig (0.7 to 15.5 bar)

| Fractional Tube Fitting<sup>1</sup> | 1/2 in. | RL4D8 | 4.09 (104) | 1.83 (46.5) | 1.83 (46.5) | 0.47 (11.9) | 5.92 (150) | 5.37 (136) |
| Metric Tube Fitting<sup>1</sup> | 12 mm | RL4DM12 | 4.09 (104) | 1.83 (46.5) | 1.83 (46.5) | 0.47 (11.9) | 5.92 (150) | 5.37 (136) |
| Male NPT to Tube Fitting<sup>2</sup> | 1/2 in. | RL48PMD8 | 4.09 (104) | 1.43 (36.3) | 1.43 (36.3) | 0.47 (11.9) | 5.52 (140) | 5.37 (136) |
| Male NPT to Female NPT | 1/2 in. | RL48PM8PF | 4.09 (104) | 1.43 (36.3) | 1.43 (36.3) | 0.47 (11.9) | 5.52 (140) | 5.37 (136) |

Orifice 0.25 (6.4 mm), Set Pressures from 10 to 225 psig (0.7 to 15.5 bar)

<sup>1</sup>Dimensions are for reference only and subject to change.
<sup>2</sup>Basic part numbers specify Duolok two-ferrule tube ends. For Unilok single-ferrule or Griplok dual ferrule, see page 9.
Options & Accessories

Spring Options

RL Series valves are shipped with springs installed.

RH Series valves are shipped standard without springs. To order RH Series valves with factory installed springs locate the required pressure range from the table below then insert the spring designator into the part number.

Example: RH3D4-316-C

<table>
<thead>
<tr>
<th>Set Pressure Range (psig)</th>
<th>Spring Designator</th>
<th>Spring Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 to 350 (3.4 to 24.1)</td>
<td>-A</td>
<td>Blue</td>
</tr>
<tr>
<td>350 to 750 (24.1 to 51.7)</td>
<td>-B</td>
<td>Yellow</td>
</tr>
<tr>
<td>750 to 1500 (51.7 to 103)</td>
<td>-C</td>
<td>Purple</td>
</tr>
<tr>
<td>1500 to 2250 (103 to 155)</td>
<td>-D</td>
<td>Orange</td>
</tr>
<tr>
<td>2250 to 3000 (155 to 206)</td>
<td>-E</td>
<td>Brown</td>
</tr>
<tr>
<td>3000 to 4000 (206 to 275)</td>
<td>-F</td>
<td>White</td>
</tr>
<tr>
<td>4000 to 5000 (275 to 344)</td>
<td>-G</td>
<td>Red</td>
</tr>
<tr>
<td>5000 to 6000 (344 to 413)</td>
<td>-H</td>
<td>Green</td>
</tr>
</tbody>
</table>

RH4

<table>
<thead>
<tr>
<th>Set Pressure Range (psig)</th>
<th>Spring Designator</th>
<th>Spring Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 to 350 (3.4 to 24.1)</td>
<td>-A</td>
<td>Blue</td>
</tr>
<tr>
<td>350 to 750 (24.1 to 51.7)</td>
<td>-B</td>
<td>Yellow</td>
</tr>
<tr>
<td>750 to 1500 (51.7 to 103)</td>
<td>-C</td>
<td>Purple</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Height (Closed Position)</th>
<th>Kit Part#</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH3, RL3</td>
<td>5.16 in. (131 mm)</td>
<td>R3-MOK</td>
</tr>
<tr>
<td>RH4, RL4</td>
<td>6.78 in. (172 mm)</td>
<td>R4-MOK</td>
</tr>
</tbody>
</table>

Handle diameter is 1.50 in. (38.1 mm).

Factory Set Valves

R Series valves are available preset to a specified set pressure. Valves are set, tested, locked, and tagged with the set pressure. Certificates of testing are included. To order preset RH Series valves, add the spring designator and the desired set pressure to the part number. For RL Series valves include the set pressure only.

Example RH4D8-316-C850 or RH4D8-316-C59BAR

RL3D4-316-100 or RL4D8-316-7BAR

Tube Fitting End Connections

SSP offers three tube fitting designs. Duolok two-ferrule tube fittings are standard. To specify a different design, select the designator from the table below, then substitute it for the “D” in the part number. Example: RL3U4-316

<table>
<thead>
<tr>
<th>Design</th>
<th>Description</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duolok</td>
<td>2-Ferrule</td>
<td>D</td>
</tr>
<tr>
<td>Unilok</td>
<td>1-Ferrule</td>
<td>U</td>
</tr>
<tr>
<td>Griplok</td>
<td>2-Ferrule</td>
<td>G</td>
</tr>
</tbody>
</table>

Seal Materials

The standard seal material for R Series valves is Fluorocarbon FKM. To order non-standard seals, add the designator to the part number.

Example: RH3D4-316-BN

Seal Replacement Kits

To order a replacement seal kit, add a seal material designator from the seal material table into the seal kit basic ordering number from the table below.

Example: RL3-RK-316-V

<table>
<thead>
<tr>
<th>Seal Material</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorocarbon FKM</td>
<td>-V</td>
</tr>
<tr>
<td>Nitrile Rubber</td>
<td>-BN</td>
</tr>
<tr>
<td>Ethylene Propylene</td>
<td>-EP</td>
</tr>
<tr>
<td>Perfluoroelastomer FFKM</td>
<td>-FFKM</td>
</tr>
</tbody>
</table>

Special Cleaning

Valves are available cleaned in compliance with ASTM G93 Level C and CGA G-4.1, Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments. To specify, add -XP98 to the part number. Example: RH3D4-316-XP98

For more information about other types of special cleaning, please contact SSP Customer Service.
Special Orders

The Basic Part Numbers and Dimensions tables contain only the most popular valve configurations; many more are available. If the required valve configuration is not in the Basic Part Numbers and Dimensions tables, use the chart below to build part numbers for quotation purposes.

<table>
<thead>
<tr>
<th>Series/Size</th>
<th>Inlet</th>
<th>Outlet</th>
<th>Body Material</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH3</td>
<td>4PM</td>
<td>4PF</td>
<td>-316</td>
<td>-C825-EP-MO</td>
</tr>
</tbody>
</table>

**A SERIES / SIZE**
- RL3 0.19 Orifice
- RL4 0.25 Orifice
- RH3 0.14 Orifice
- RH4 0.25 Orifice

**B INLET**
- D Duolok® Tube Fitting
- U Unilok® Tube Fitting
- G Griplok® Tube Fitting
- PF Female NPT
- PM Male NPT
- FRT Female BSPT
- MRT Male BSPT

**C OUTLET**
- 1 1/4 in.
- 8 1/2 in.

**D BODY MATERIAL**
- 316 316 SS

**E OPTIONS**

**SPRINGS**
- RL3 & RL4 Series
  - Blank: 10 to 225 (0.7 to 15.5)
- RH3 Series
  - Blank: No Spring
  - A: 50 to 350 (3.4 to 24.1)
  - B: 350 to 750 (24.1 to 51.7)
  - C: 750 to 1500 (51.7 to 103)
  - D: 1500 to 2250 (103 to 155)
  - E: 2250 to 3000 (155 to 206)
  - F: 3000 to 4000 (206 to 275)
  - G: 4000 to 5000 (275 to 344)
  - H: 5000 to 6000 (344 to 413)
- RH4 Series
  - Blank: No Spring
  - A: 50 to 350 (3.4 to 24.1)
  - B: 350 to 750 (24.1 to 51.7)
  - C: 750 to 1500 (51.7 to 103)

**FACTORY SET PRESSURE**
Add the actual set pressure desired. See page 9 for more information.

**SEAL MATERIALS**
- Blank: Fluorocarbon FKM
- BN: Nitrile
- EP: Ethylene Propylene
- FFKM: Perfluoroelastomer

**OTHER OPTIONS**
- XP98: Special Cleaning per ASTM G93, Level C and CGA G-4.1
- MO: Manual override handle. See notes on page 9 for limitations.

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1 Tube fitting end connection part numbers are formatted Type followed by Size. Example: D4
Pipe ends are formatted Size followed by Type. Example: 4PF
If both ends are the same, use only one end connection designator. Example: RL3D4-316

2 Add options designators to the end of the Basic Part Number in alphabetical order.

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SSP Limited Lifetime Warranty
SSP valves are backed by the SSP Limited Lifetime Warranty. This warranty is available from your local distributor or at www.mySSP.com.

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**Important Information**

IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE PERSONAL INJURY AND PROPERTY DAMAGE. It is the sole responsibility of the system designers and users to properly select and use products for their specific applications. This document has been provided to users with technical expertise as a reference for further investigation to determine specific product needs relative to their design requirements.
More SSP Products

**Tube Fittings**
Duolok and Griplok two-ferrule and Unilok® single ferrule tube fittings provide leak-tight installation even when intermixed with Swagelok®, Hoke Gyrolok® and Parker CPI™ fittings.

**Valves**
The FloLok valve offering includes ball, check, metering, needle, toggle, plug, bleed, and purge valves for pressures up to 10,000 psig.

**Tubing**
SSP offers straight and coiled seamless 316 stainless steel instrumentation tubing for instrumentation, process and utility applications.

**Pipe Fittings**
TruFit and TruFit 10K pipe fittings are available in a wide range of weld, threaded and flared connections.

**Filters**
FloLok in-line and tee-type filters trap particles to clean sample fluids and protect sensitive process and analytical instrumentation components and equipment.

**Hose**
TruFit PTFE-lined and flexible metal core hose assemblies are used in a variety of instrumentation, utility, biopharm and other applications.

**Tools & Accessories**
SSP TurnPro professional hand tools, power tools and installation training make quality tube system installation faster and easier.

**Quick Connects**
SSP offers single-end shutoff, double-end shut off, and full-flow quick connects for instrumentation and process applications.
Founded 1926
Privately owned, third generation business
Modern single-site vertically integrated manufacturing facility
DFARS-compliant raw material
ISO 9001 quality management system
Limited Lifetime Warranty

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