Pressure Regulators
RHPS Series

- Pressure-reducing models
- Back-pressure models
- Spring-, dome-, and air-loaded
- 1/4 to 4 in. end connections
- Working pressures up to 10 150 psig (700 bar)
- Temperatures from –49 to 176°F (–45 to 80°C)
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</table>
Pressure Regulators—RHPS Series

**RHPS REGULATORS**

**Back-Pressure Regulators**

**Spring-Loaded—BS Series, 107**

- **BS Series Maintenance Kits, 128**
- **Compact, General-Purpose**
  - **BS(H)2 Series, 109**
- **General-Purpose**
  - **BS(H)4, 6, 8 Series, 113**
- **General-Purpose**
  - **BS(H)10, 15 Series, 118**
- **High-Sensitivity**
  - **LBS4 Series, 124**

**Contact your authorized Swagelok sales and service representative for information about dome-loaded, back-pressure regulators.**

**Back-Pressure Regulators**

**Dome-Loaded—BD Series**

**Integral Pilot-Operated, High-Sensitivity**

- **LPRD20, 25, 30, 40 Series, 99**

**Pressure-Reducing Regulators**

**Dome-Loaded—RD Series**

- **Integral Pilot-Operated**
  - **RD(H)30, 40 Series, 84**

**Air-Loaded**

- **RA4, 6, 8 Series, 101**

**BS Series Maintenance Kits, 128**

- **Compact, General-Purpose**
  - **BS(H)2 Series, 109**
- **General-Purpose**
  - **BS(H)4, 6, 8 Series, 113**
- **General-Purpose**
  - **BS(H)10, 15 Series, 118**
- **High-Sensitivity**
  - **LBS4 Series, 124**

**Contact your authorized Swagelok sales and service representative for information about dome-loaded, back-pressure regulators.**
Features

Regulator Adjusting Screw
Fine pitched threads provide improved adjustability and resolution when setting or adjusting pressure.

Set-Pressure Spring
- provides pressure control across a wide range of flow rates
- long spring improves droop performance.

Diaphragm Support Plate
- promotes diaphragm life.

Diaphragm Sensing Mechanism
- typically used in low outlet pressure applications
- provides greater accuracy in sensing changes in outlet pressure
- available in PTFE and a variety of elastomers
- designed with a short stroke to maximize cycle life.

Seal Materials
- available in a variety of materials for enhanced chemical compatibility in a wide range of applications.

Body Material
- 316L SS for improved corrosion resistance.

Body Plug
- allows for easy maintenance and more up-time.

Piston Sensing Mechanism
- typically used to regulate higher pressures than a diaphragm sensing mechanism
- more resistant to damage caused by pressure spikes
- designed with a short stroke to maximize cycle life.

Threaded Vent
- allows monitoring of the diaphragm or piston sensing mechanism.

**WARNING:** Threaded-vent regulators can release system fluid to atmosphere. Position the threaded vent connection away from operating personnel.

Bottom Spring Guide
- engages diaphragm to distribute forces evenly
- protects diaphragm from premature failure.

Outlet

Seat Seal Materials
- available in PCTFE, PEEK, and a variety of elastomers.

Balanced Poppet Design
- reduces supply-pressure effect and lockup.

Piston

Piston plate
**Types of Regulators**

There are two types of RHPS series pressure regulators

- **Pressure-reducing** regulators with spring or dome loading
- **Back-pressure** regulators with spring or dome loading

**How a Pressure Regulator Works**

A pressure regulator has a sensing element (piston or diaphragm) which, on one side, is subjected to a load force ($F_L$) created by a spring (as shown below) or a gas pressure. On the other side, the sensing element is subject to the force ($F$) of the system fluid.

**Pressure-Reducing Regulators**

The function of a pressure-reducing regulator is to reduce a pressure and to keep this pressure as constant as possible while the inlet pressure and the flow may vary. This is accomplished by the fluid force ($F$) being equal to or slightly lower than load force ($F_L$) causing the poppet to open.

**Back-Pressure Regulators**

The function of a back-pressure regulator is to keep inlet pressure below a set pressure. This means the regulator can either open in case of excess pressure or close when the pressure drops below a desired pressure. This is accomplished by the fluid force ($F$) being equal to or slightly lower than load force ($F_L$) causing the poppet to close.

**Terminology**

**Accumulation**—an increase in inlet pressure caused by an increase in flow rate to a back-pressure regulator.

**Creep**—an increase in outlet pressure typically caused by regulator seat leakage.

**Dependency**—see supply pressure effect (SPE).

**Droop**—a decrease in outlet pressure caused by an increase in flow rate to a pressure-reducing regulator.

**Lockup**—an increase in outlet pressure that occurs as the flow rate is decreased to zero.

**Self-venting**—a feature that reduces outlet pressure in a pressure-reducing regulator when the regulator set point is decreased and there is no flow through the regulator.

**Sensitivity**—the degree to which the regulator responds to force balance changes.

**Set pressure**—the desired outlet pressure of a pressure-reducing regulator, normally stated at a no-flow condition.

**Supply pressure effect (SPE)**—the effect on the set pressure of a pressure-reducing regulator as a result of a change in inlet pressure, normally experienced as an increase in outlet pressure due to a decrease in inlet pressure. Also known as Dependency.

**Threaded vent**—a connection that allows monitoring of the diaphragm or piston sensing mechanism.

**Gauge Connection Configuration Symbols**

\[ G_i = \text{Inlet gauge} \quad G_o = \text{Outlet gauge} \]

**Gauge Connection Configurations—Pressure-Reducing Regulators**

<table>
<thead>
<tr>
<th>Standard</th>
<th>GN2</th>
<th>GN4</th>
<th>GN5</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ \quad ]</td>
<td>[ \quad ]</td>
<td>[ \quad ]</td>
<td>[ \quad ]</td>
</tr>
</tbody>
</table>

![Diagram of Pressure Reducing Regulators](attachment:pressure_reducing_regulator_diagram.png)

![Diagram of Back-Pressure Regulators](attachment:back_pressure_regulator_diagram.png)
Components

Every RHPS series pressure regulator has three common design components:

- Loading mechanism (spring, dome, or combination spring and dome)
- Sensing mechanism (diaphragm or piston)
- Controlling mechanism (poppet)

Loading Mechanism

The loading mechanism is the component of the regulator that balances the force or pressure.

Spring-Loaded

In a spring-loaded regulator, a coil spring is used to generate a load \( F_S \) against the sensing mechanism. The amount of spring force or load can be adjusted by turning the handle or adjusting screw of the regulator.

\[
\begin{align*}
\text{Closed} \quad F_S & \quad F_S \text{ or } F_d \leq F \\
\text{Open} \quad F_S & \quad F_S \text{ or } F_d > F
\end{align*}
\]

Dome-Loaded

In a dome-loaded regulator, a gas is fed into the dome chamber above the sensing mechanism at a pressure equal to or slightly above the required outlet pressure. This volume of gas is used like a spring. The dome pressure \( F_d \) is typically supplied by a second regulator called a pilot regulator.

\[
\begin{align*}
\text{Closed} \quad F_d & \quad F_d \text{ or } F_S \leq F \\
\text{Open} \quad F_d & \quad F_d \text{ or } F_S > F
\end{align*}
\]

Combination Spring- and Dome-Loaded

The spring- and dome-loaded mechanisms can be used in combination with one another. The resulting effect provides the function of a differential pressure regulator. This regulator is designed to control pressure which is the sum of a reference pressure (provided by the dome) and a bias pressure (provided by the spring). See RD(H)6DP series on page 55 for details.
Components

Sensing Mechanisms
The sensing mechanism is the component separating the spring/dome force and the fluid force. It senses changes in pressure and allows the regulator to react and to try to restore the original set pressure.

- **Diaphragm Sensing**
  The diaphragm is a large, flat piece of material usually made of an elastomer, PTFE, or metal depending on the application. A diaphragm is normally used for low control-pressure applications in spring-loaded regulators and in all dome-loaded regulators.

- **Piston Sensing**
  A piston is a cylindrical metal component which is generally used to regulate higher control pressures than a spring-loaded regulator with a diaphragm. They are also more resistant to damage caused by pressure spikes.

Controlling Mechanisms
The controlling mechanism, also known as a poppet, acts to reduce a high inlet pressure to a lower outlet pressure. There are two designs used in RHPS regulators.

- **Balanced Poppet**
  In a balanced poppet design, the area on which the inlet pressure acts is reduced due to the orifice through the poppet and balancing O-ring. The advantages of this design are a reduced seat load, less sensitivity to SPE, and the ability to have a larger seat for more flow.

- **Unbalanced Poppet**
  In an unbalanced poppet design, the inlet pressure provides the majority of the shutoff force. Unbalanced poppets are generally used in small regulators or larger regulators in low-pressure applications.

Seat Design
The poppet within the RHPS series regulator can have a hard or soft seat seal depending on the pressure requirements of the application.

- **Soft Seat Seal**
  A soft seat seal is designed to regulate pressures up to 1015 psig (70.0 bar). The seat seal materials are generally elastomeric, and include fluorocarbon FKM, perfluorocarbon FFKM, nitrile, and EPDM.

- **Hard Seat Seal**
  A hard seat seal is designed to regulate pressures up to 10 150 psig (700 bar). The seat seal materials are PCTFE for pressures up to 5800 psig (400 bar) and PEEK for pressures up to 10 150 psig (700 bar).

Testing
Every RHPS series regulator is factory tested with nitrogen or air. Shell testing is performed to a requirement of no detectable leakage with a liquid leak detector.

Cleaning and Packaging
Every RHPS series regulator is cleaned and packaged in accordance with Swagelok Standard Cleaning and Packaging (SC-10) catalog, MS-06-62. Cleaning and packaging to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C is available.

Oxygen Service Hazards

⚠️ RHPS series pressure regulators are not “Safety Accessories” as defined in the Pressure Equipment Directive 2014/68/EU.

⚠️ Do not use the regulator as a shutoff device.

⚠️ WARNING: Self-venting and threaded-vent regulators can release system fluid to atmosphere. Position the self-vent hole or the threaded vent connection away from operating personnel.
Pressure-Reducing, Spring-Loaded Regulators—RS Series

The RS series pressure-reducing regulators are suitable for most gases and liquids. The RS series regulators feature various poppet designs, a choice of sensing types (diaphragm or piston), and seat and seal materials to accommodate a variety of pressure, temperature, and flow conditions.

The RS series regulators are available in sizes from 1/4 to 2 in. with a choice of threaded or flange end connections.

The RSH series regulators are a high-pressure version of the RS series regulators, and the LRS and LPRS series are low-pressure, high-accuracy versions of the RS series regulators.

The RS series regulators are available with many options, including a variety of gauge connection configurations, self venting, internal filter, external feedback, antitamper, special cleaning to ASTM G93 Level C, and NACE MR0175/ISO 15156-compliant models.

Features

- Spring-loaded pressure control
- Diaphragm or piston sensing mechanisms
- Red knob handle or screw adjustment
- 316L stainless steel materials of construction for corrosion resistance
- Maximum inlet pressure ratings: 232 to 10 150 psig (16.0 to 700 bar)
- Pressure control ranges: Up to 0 to 10 150 psig (0 to 700 bar)

Pressure-Temperature Ratings

<table>
<thead>
<tr>
<th>Seal Material</th>
<th>Temperature Range °F (°C)</th>
<th>Material Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorocarbon FKM</td>
<td>5 to 176 (–15 to 80)</td>
<td>V</td>
</tr>
<tr>
<td>Standard Nitrile</td>
<td>–4 to 176 (–20 to 80)</td>
<td>N</td>
</tr>
<tr>
<td>Low-Temp Nitrile</td>
<td>–49 to 176 (–45 to 80)</td>
<td>L</td>
</tr>
<tr>
<td>EPDM</td>
<td>–4 to 176 (–20 to 80)</td>
<td>E</td>
</tr>
<tr>
<td>FFKM</td>
<td>14 to 176 (–10 to 80)</td>
<td>F</td>
</tr>
</tbody>
</table>

Pressure-Temperature Ratings

<table>
<thead>
<tr>
<th>Temperature °F (°C)</th>
<th>Maximum Inlet Pressure / Working Pressure psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>–49 to –40 (–45 to –40)</td>
<td>– / –</td>
</tr>
<tr>
<td>–40 to –4 (–40 to –20)</td>
<td>5800 (400) / 5800 (400)</td>
</tr>
<tr>
<td>95 (35)</td>
<td>10 150 (700) / 10 150 (700)</td>
</tr>
<tr>
<td>149 (85)</td>
<td>3987 (275) / 3987 (275)</td>
</tr>
<tr>
<td>176 (80)</td>
<td>1812 (125) / 1812 (125)</td>
</tr>
</tbody>
</table>

Technical Data—Performance

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Flow Coefficient Cᵥ</th>
<th>Sensing Type</th>
<th>Flow Data on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS2</td>
<td>5 800 (400)</td>
<td>5 075 (350)</td>
<td>0.05</td>
<td>Piston</td>
<td>11</td>
</tr>
<tr>
<td>RSH2</td>
<td>10 150 (700)</td>
<td>10 150 (700)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS4</td>
<td>1 015 (70.0)</td>
<td>406 (28.0) diaphragm 5 800 (400) piston</td>
<td>1.84</td>
<td>Diaphragm or piston</td>
<td>15</td>
</tr>
<tr>
<td>RSH4</td>
<td>5 800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS6</td>
<td>1 015 (70.0)</td>
<td>203 (14.0) diaphragm 5 800 (400) piston</td>
<td>1.95</td>
<td>Diaphragm or piston</td>
<td>17</td>
</tr>
<tr>
<td>RSH6</td>
<td>5 800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS8</td>
<td>1 015 (70.0)</td>
<td>203 (14.0) diaphragm 5 800 (400) piston</td>
<td>2.07</td>
<td>Diaphragm or piston</td>
<td>20</td>
</tr>
<tr>
<td>RSH8</td>
<td>5 800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS10</td>
<td>1 015 (70.0)</td>
<td>290 (20.0) diaphragm 3 625 (250) piston</td>
<td>3.79</td>
<td>Diaphragm or piston</td>
<td>23</td>
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<tr>
<td>RSH10</td>
<td>5 800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS15</td>
<td>1 015 (70.0)</td>
<td>290 (20.0) diaphragm 3 625 (250) piston</td>
<td>7.30</td>
<td>Diaphragm or piston</td>
<td>–</td>
</tr>
<tr>
<td>RSH15</td>
<td>5 800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>RS20</td>
<td>1 015 (70.0)</td>
<td>290 (20.0)</td>
<td>13</td>
<td>Diaphragm</td>
<td>–</td>
</tr>
<tr>
<td>RSH20</td>
<td>5 800 (400)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>LRS4</td>
<td>507 (35.0)</td>
<td>290 (20.0)</td>
<td>0.73</td>
<td>Diaphragm</td>
<td>30</td>
</tr>
<tr>
<td>LRSH4</td>
<td>5 800 (400)</td>
<td></td>
<td>0.10</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>LPRS4</td>
<td>232 (16.0)</td>
<td>43 (3.0)</td>
<td>1.84</td>
<td>Diaphragm</td>
<td>–</td>
</tr>
<tr>
<td>LPRS5</td>
<td></td>
<td></td>
<td>1.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPRS8</td>
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<td></td>
<td>2.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPRS10</td>
<td>232 (16.0)</td>
<td>43 (3.0)</td>
<td>3.79</td>
<td>Diaphragm</td>
<td>39</td>
</tr>
<tr>
<td>LPRS15</td>
<td>232 (16.0)</td>
<td></td>
<td>7.30</td>
<td></td>
<td>39</td>
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</tbody>
</table>

1 Regulator pressure rating may be limited by end connection type.
Pressure-Reducing, Spring-Loaded Regulators—RS Series

Technical Data—Design

<table>
<thead>
<tr>
<th>Series</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge Connection</th>
<th>Weight (Without Flanges) lb (kg)</th>
<th>More Information on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS2</td>
<td>0.087 (2.2)</td>
<td>1/4 in. NPT</td>
<td>1/4 in. NPT</td>
<td>3.3 (1.5)</td>
<td>10</td>
</tr>
<tr>
<td>RS4</td>
<td>0.39 (10.0)</td>
<td>1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>7.7 (3.5)</td>
<td>14</td>
</tr>
<tr>
<td>RSH4</td>
<td>0.39 (10.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>9.9 (4.5)</td>
<td>14</td>
</tr>
<tr>
<td>RS6</td>
<td>0.39 (10.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>9.9 (4.5)</td>
<td>14</td>
</tr>
<tr>
<td>RSH6</td>
<td>0.39 (10.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>9.9 (4.5)</td>
<td>14</td>
</tr>
<tr>
<td>RS8</td>
<td>0.39 (10.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>16.5 (7.5)</td>
<td>22</td>
</tr>
<tr>
<td>RSH8</td>
<td>0.55 (14.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>22.0 (10.0)</td>
<td>22</td>
</tr>
<tr>
<td>RS10</td>
<td>0.55 (14.0)</td>
<td>1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>39.6 (18.0)</td>
<td>22</td>
</tr>
<tr>
<td>RSH10</td>
<td>0.53 (13.5)</td>
<td>2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>47.6 (21.5)</td>
<td>28</td>
</tr>
<tr>
<td>RS15</td>
<td>0.75 (19.0)</td>
<td>2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>65.6 (29.7)</td>
<td>29</td>
</tr>
<tr>
<td>RSH15</td>
<td>0.98 (25.0)</td>
<td>2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>83.6 (37.9)</td>
<td>30</td>
</tr>
<tr>
<td>RS20</td>
<td>0.087 (2.2)</td>
<td>1/2 in. NPT</td>
<td>1/4 in. NPT</td>
<td>5.7 (2.6)</td>
<td>29</td>
</tr>
<tr>
<td>RSH4</td>
<td>0.39 (10.0)</td>
<td>1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>11.0 (5.0)</td>
<td>33</td>
</tr>
<tr>
<td>LPR56</td>
<td>0.39 (10.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>12.1 (5.5)</td>
<td>33</td>
</tr>
<tr>
<td>LPR58</td>
<td>0.55 (14.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>12.1 (5.5)</td>
<td>33</td>
</tr>
<tr>
<td>LPR510</td>
<td>0.55 (14.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>17.6 (8.0)</td>
<td>38</td>
</tr>
<tr>
<td>LPR515</td>
<td>0.75 (19.0)</td>
<td>1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>22.0 (10.0)</td>
<td>38</td>
</tr>
</tbody>
</table>
Pressure Regulators and Filters

Compact, General-Purpose, Spring-Loaded Pressure-Reducing Regulators—RS(H)2 Series

Features
- Bottom mounting
- Sealed spring housing
- Low-friction piston for better control
- Cartridge poppet assembly with 25 μm filter for ease of service
- Self-venting
- Threaded vent below panel for safety

Options
- No filter—for liquid applications
- NACE MR0175/ISO 15156-compliant models (nonventing and no-filter models only)
- Nonventing
- Special cleaning to ASTM G93 Level C
- Panel mounting kit sold separately—no disassembly required

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (C_v)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Vent Connections</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS2</td>
<td>5 800 (400)</td>
<td>5 075 (350)</td>
<td>Piston</td>
<td>-40 to 176 (~40 to 80)</td>
<td>0.05</td>
<td>0.087 (2.2)</td>
<td>1/4 in. NPT</td>
<td>Gauge: 1/4 in. NPT Vent: 1/8 in. NPT</td>
<td>3.3 (1.5)</td>
</tr>
<tr>
<td>RSH2</td>
<td>10 150 (700)</td>
<td>10 150 (700)</td>
<td>Piston</td>
<td>-4 to 176 (~20 to 80)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Pressure-Temperature Ratings, page 8, for ratings. See Flow Data, pages 11 to 12.

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Knob assembly with adjusting screw, nuts, washer</td>
<td>Red ABS with 431 SS</td>
</tr>
<tr>
<td>2 Spring housing cover</td>
<td>431 SS / A276</td>
</tr>
<tr>
<td>3 Spring housing</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>4 C-ring</td>
<td>A2</td>
</tr>
<tr>
<td>5 Spring guide</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>6 Set spring</td>
<td>50CRV4</td>
</tr>
<tr>
<td>7 Bottom spring guide</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>8 Relief seat</td>
<td>PEEK or PCTFE</td>
</tr>
<tr>
<td>9 O-rings</td>
<td>EPDM, FKM, FFKM, or nitrile</td>
</tr>
<tr>
<td>10 Poppet housing</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>11 Seat</td>
<td>PEEK or PCTFE</td>
</tr>
<tr>
<td>12 Poppet</td>
<td>S17400 SS or 431 SS</td>
</tr>
<tr>
<td>13 Seat retainer</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>14 Piston plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>15 Filter</td>
<td>316L SS</td>
</tr>
<tr>
<td>16 Plug</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>17 Piston</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>18 Poppet spring</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>19 Body</td>
<td>316L SS / A479</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
Gauge plugs (not shown): 431 SS / A276.
**Flow Data**

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RS2 Series**

*Flow Coefficient: 0.05*

*Maximum Inlet Pressure: 5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

**Pressure Control Range**

- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

**RS2 Series**

*Flow Coefficient: 0.05*

*Maximum Inlet Pressure: 5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 5075 psig (0 to 350 bar)*

**Pressure Control Range**

- 0 to 5075 psig (0 to 350 bar)
- 0 to 2537 psig (0 to 175 bar)
- 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RSH2 Series
Flow Coefficient: 0.05
Maximum Inlet Pressure: 10 150 psig (700 bar)
Outlet Pressure Control Range: 0 to 10 150 psig (0 to 700 bar)

Pressure Control Range

Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.
Ordering Information

Build an RS2 or RSH2 series regulator ordering number by combining the designators in the sequence shown below.

1 2 3 4 5 6 7 8
RS N2 - 02 - 1 - V V K - LNV

1 Series
- RS = 5800 psig (400 bar) maximum inlet pressure
- RSH = 10 150 psig (700 bar) maximum inlet pressure

2 Inlet / Outlet
- N2 = 1/4 in. female NPT

3 Body Material
- 02 = 316L SS

4 Pressure Control Range
- RS and RSH series
  - 1 = 0 to 145 psig (0 to 10.0 bar)
  - 2 = 0 to 362 psig (0 to 25.0 bar)
  - 3 = 0 to 1450 psig (0 to 100 bar)
  - 4 = 0 to 2537 psig (0 to 175 bar)
  - 5 = 0 to 5075 psig (0 to 350 bar)
- RSH series only
  - 6 = 0 to 10 150 psig (0 to 700 bar)

5 Seal Material
- RS and RSH series
  - V = Fluorocarbon FKM
  - N = Nitrile
  - E = EPDM
  - F = FFKM
- RSH series only
  - L = Low temperature Nitrile

6 Piston Seal Material
- RS and RSH series
  - V = Fluorocarbon FKM
  - N = Nitrile
  - E = EPDM
  - F = FFKM
- RS series only
  - L = Low temperature Nitrile

7 Seat Seal Material
- RS series
  - K = PCTFE
  - P = PEEK
- RSH series
  - L = PEEK

8 Options
- L = No filter
- N = NACE MR0175/ISO 15156
- NV = Nonventing
- G93 = ASTM G93 Level C-cleaned

**Note:**
- Self-venting is standard.
- Threaded vent connection is below panel for safety.
- A nonventing option is available.

**WARNING:** Self-venting regulators can release system fluid to atmosphere. Position the self-vent hole away from operating personnel.
General-Purpose, Spring-Loaded Pressure-Reducing Regulators—RS(H)4, RS(H)6, and RS(H)8 Series

Features
- Balanced poppet design
- Diaphragm or piston sensing
- Threaded vent to monitor sensing seal integrity

Options
- Antitamper
- Gauge connections—choice of 4 configurations
- NACE MR0175/ISO 15156-compliant models
- Self-venting
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Connections</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS(H)4</td>
<td>RS: 1015 (70.0)</td>
<td>RS: 406 (28.0)</td>
<td>Diaphragm: 406 psig (28.0 bar)</td>
<td>–49 to 176 (-45 to 80)</td>
<td>1.84</td>
<td>1/2 in. DN15</td>
<td>NPT ISO/BSP parallel thread</td>
<td>7.7 (3.5)</td>
</tr>
<tr>
<td>RS(H)6</td>
<td>RSH: 5800 (400)</td>
<td>RSH: 5800 (400)</td>
<td>Diaphragm: 203 psig (14.0 bar)</td>
<td>–49 to 176 (-45 to 80)</td>
<td>1.95</td>
<td>3/4 in. DN20</td>
<td>ASME or EN flange</td>
<td>9.9 (4.5)</td>
</tr>
<tr>
<td>RS(H)8</td>
<td>RSH: 5800 (400)</td>
<td></td>
<td>Piston: 0 to 5800 psig (400 bar)</td>
<td>–49 to 176 (-45 to 80)</td>
<td>2.07</td>
<td>1 in. DN25</td>
<td>ISO/BSP parallel thread</td>
<td></td>
</tr>
</tbody>
</table>

See pages 15 to 20 for flow data.

Materials of Construction

Wetted components listed in italics.
Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RS4 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 406 psig (0 to 28.0 bar)

RS(H)4 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: RS4—1015 psig (70.0 bar); RSH4—5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 1160 psig (0 to 80.0 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RSH4 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)

Pressure Control Range
- 0 to 5800 psig (0 to 400 bar)
- 0 to 4060 psig (0 to 280 bar)
- 0 to 2175 psig (0 to 150 bar)

Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RS6 Series
Flow Coefficient: 1.95
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 406 psig (0 to 28.0 bar)

RS(H)6 Series
Flow Coefficient: 1.95
Maximum Inlet Pressure: RS6—1015 psig (70.0 bar); RSH6—5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 1160 psig (0 to 80.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RSH6 Series
Flow Coefficient: 1.95
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RS8 Series
*Flow Coefficient: 2.07*

*Maximum Inlet Pressure: 1015 psig (70.0 bar)*

*Outlet Pressure Control Range: 0 to 406 psig (0 to 28.0 bar)*

RS(H)8 Series
*Flow Coefficient: 2.07*

*Maximum Inlet Pressure: RS8—1015 psig (70.0 bar); RSH8—5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 1160 psig (0 to 80.0 bar)*
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RSH8 Series
Flow Coefficient: 2.07
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS(H)4</td>
<td>1/2 in.</td>
<td>9.06 (230) 2.83 (72.0) 3.07 (78.0) 2.09 (53.0) 3.62 (92.0)</td>
</tr>
<tr>
<td>RS(H)6</td>
<td>3/4 in.</td>
<td>9.25 (235) 3.23 (82.0) 3.50 (89.0) 2.20 (56.0) 3.94 (100)</td>
</tr>
<tr>
<td>RS(H)8</td>
<td>1 in.</td>
<td>9.25 (235) 3.07 (78.0) 3.50 (89.0) 2.20 (56.0) 3.94 (100)</td>
</tr>
</tbody>
</table>

Ordering Information

Build an RS(H)4, RS(H)6, and RS(H)8 series regulator ordering number by combining the designators in the sequence shown below.

1 2 3 4 5 6 7 8 9 10 11
RS FA 4 A 1 - 02 - 1 - V V V - GN2

1 Series
RS = 1015 psig (70.0 bar) maximum inlet pressure
RSH = 5800 psig (400 bar) maximum inlet pressure

2 Inlet / Outlet
B = Female ISO/BSP parallel thread
N = Female NPT
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange

3 Size
4 = 1/2 in. / DN15
6 = 3/4 in. / DN20
8 = 1 in. / DN25

4 Pressure Class
Omit designator if flanges are not ordered.
A = ASME class 150
B = ASME class 300
C = ASME class 600
E = ASME class 1500
F = ASME class 2500
M = EN class PN16
N = EN class PN40

5 Flange Facing
Omit designator if flanges are not ordered.
1 = Raised face smooth
3 = RTJ

6 Body Material
02 = 316L SS

7 Pressure Control Range
Diaphragm sensing
1 = 0 to 43 psig (0 to 3.0 bar)
2 = 0 to 101 psig (0 to 7.0 bar)
3 = 0 to 203 psig (0 to 14.0 bar)
4 = 0 to 406 psig (0 to 28.0 bar)

Piston sensing
4 = 0 to 406 psig (0 to 28.0 bar)
5 = 0 to 580 psig (0 to 40.0 bar)
6 = 0 to 1160 psig (0 to 80.0 bar)
7 = 0 to 2175 psig (0 to 150 bar)
9 = 0 to 4060 psig (0 to 280 bar)
11 = 0 to 5800 psig (0 to 400 bar)

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

9 Diaphragm / Piston O-Rings
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

10 Seat Seal Material
RS series
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile
RSH series
K = PCTFE
P = PEEK

11 Options
A = Antitamper
GN2 = Gauge connection, see below
GN4 = Gauge connection, see below
GN5 = Gauge connection, see below
None = Standard connection, see below

Gauge Connection Configuration

GN2 = Gauge connection, see below
GN4 = Gauge connection, see below
GN5 = Gauge connection, see below
None = Standard connection, see below

N = NACE MR0175/ISO 15156
S = Self-venting (with 1/8 in. NPT)
G93 = ASTM G93 Level C-cleaned
General-Purpose, Spring-Loaded Pressure-Reducing Regulators—RS(H)10, RS(H)15, and RS(H)20 Series

Features
- Balanced poppet design
- RS(H)10 and RS(H)15—diaphragm or piston sensing
- RS(H)20—diaphragm sensing only

Options
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Connections</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS(H)10</td>
<td>RS: 1015 (70.0)</td>
<td>RS: 290 (20.0)</td>
<td>Diaphragm</td>
<td>–49 to 176 (~45 to 80)</td>
<td>3.79</td>
<td>0.55 (14.0)</td>
<td>1 in. DN25</td>
<td>16.5 (7.5)</td>
</tr>
<tr>
<td></td>
<td>RSH: 5800 (400)</td>
<td>RSH: 3625 (250)</td>
<td>Piston:</td>
<td></td>
<td></td>
<td>0.53 (13.5)</td>
<td>NPT ISO/BSP parallel thread ASME or EN flange</td>
<td></td>
</tr>
<tr>
<td>RS(H)15</td>
<td></td>
<td>Diaphragm</td>
<td></td>
<td></td>
<td></td>
<td>0.75 (19.0)</td>
<td>1 1/2 in. DN40</td>
<td>22.0 (10.0)</td>
</tr>
<tr>
<td>RS(H)20</td>
<td>290 (20.0)</td>
<td>Diaphragm</td>
<td></td>
<td></td>
<td>13</td>
<td>0.98 (25.0)</td>
<td>2 in. DN50</td>
<td>39.6 (18.0)</td>
</tr>
</tbody>
</table>

See pages 23 to page 27 for flow data.
1. Regulators with NPT inlet / outlet connections have 1/4 in. NPT gauge connections.
2. All RS(H)20 regulators will have 1/4 in. ISO/BSP gauge ports.

Materials of Construction

RS Series Regulator with Diaphragm Sensing and Soft Seat Seal

RSH Series Regulator with Piston Sensing and Hard Seat Seal

Options
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Adjusting screw</td>
<td>A2-70</td>
</tr>
<tr>
<td>2 Nut</td>
<td>A2</td>
</tr>
<tr>
<td>3 Ball</td>
<td>420 SS (Hardened)</td>
</tr>
<tr>
<td>4 Upper spring guide</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>5 Spring housing assembly</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>6 Set spring</td>
<td>50CRV4</td>
</tr>
<tr>
<td>7 Cap screw</td>
<td>A4-80</td>
</tr>
<tr>
<td>8 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>9 Bottom spring guide</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>10 Poppet</td>
<td>S17400 SS or 316L SS</td>
</tr>
<tr>
<td>11 Seat</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>12 Seat O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>13 Poppet housing</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>14 Body</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>15 O-rings</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>16 Poppet spring</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>17 Body plug</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>18 Diaphragm</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>19 Diaphragm plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>20 Retaining ring</td>
<td>Commercial stainless steel</td>
</tr>
<tr>
<td>21 Body plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>22 Seat seal</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>23 Piston</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>24 Piston O-rings</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>25 Piston plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>26 Seat seal</td>
<td>PEEK or PCTFE</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RS10 Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 406 psig (0 to 28.0 bar)

Pressure Control Range
- 0 to 580 psig (0 to 40.0 bar)
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 145 psig (0 to 10.0 bar)
- 0 to 43 psig (0 to 3.0 bar)

RSH10 Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)

Pressure Control Range
- 0 to 3625 psig (0 to 250 bar)
- 0 to 2610 psig (0 to 180 bar)
- 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RS15 Series

Flow Coefficient: 7.30
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 72 psig (0 to 5.0 bar)

Pressure Control Range
- 0 to 72 psig (0 to 5.0 bar)
- 0 to 43 psig (0 to 3.0 bar)

RS15 Series

Flow Coefficient: 7.30
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 145 psig (0 to 10.0 bar)

Pressure Control Range
- 0 to 145 psig (0 to 10.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RS15 Series

Flow Coefficient: 7.30
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 580 psig (0 to 40.0 bar)

Pressure Control Range

- 0 to 580 psig (0 to 40.0 bar)
- 0 to 290 psig (0 to 20.0 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RSH15 Series

*Flow Coefficient: 7.30*

*Maximum Inlet Pressure: 5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 580 psig (0 to 40.0 bar)*

Pressure Control Range

- 0 to 580 psig (0 to 40.0 bar)

---

RSH15 Series

*Flow Coefficient: 7.30*

*Maximum Inlet Pressure: 5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)*

Pressure Control Range

- 0 to 3625 psig (0 to 250 bar)
- 0 to 2610 psig (0 to 180 bar)
- 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RS20 Series
Flow Coefficient: 13
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Pressure Control Range
- 0 to 72 psig (0 to 5.0 bar)
- 0 to 43 psig (0 to 3.0 bar)

RS20 Series
Flow Coefficient: 13
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Pressure Control Range
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 145 psig (0 to 10.0 bar)
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS(H)10</td>
<td>1 in.</td>
<td>10.5 (266)</td>
<td>3.54 (90.0)</td>
<td>3.07 (78.0)</td>
<td>2.28 (58.0)</td>
<td>1.97 (50.0)</td>
<td>1.77 (45.0)</td>
<td>4.53 (115)</td>
</tr>
<tr>
<td>RS(H)15</td>
<td>1 1/2 in.</td>
<td>10.8 (275)</td>
<td>4.53 (115)</td>
<td>3.78 (96.0)</td>
<td>2.44 (62.0)</td>
<td>2.01 (51.0)</td>
<td>1.77 (45.0)</td>
<td>4.53 (115)</td>
</tr>
<tr>
<td>RS(H)20</td>
<td>2 in.</td>
<td>11.3 (288)</td>
<td>5.51 (140)</td>
<td>3.93 (100)</td>
<td>2.44 (62.0)</td>
<td>1.85 (47.0)</td>
<td>2.56 (65.0)</td>
<td>6.30 (160)</td>
</tr>
</tbody>
</table>

Ordering Information

Build an RS(H)10, RS(H)15, and RS(H)20 series regulator ordering number by combining the designators in the sequence shown below.

1 Series
RS = 1015 psig (70.0 bar) maximum inlet pressure
RSH = 5800 psig (400 bar) maximum inlet pressure

2 Inlet / Outlet
B = Female ISO/BSP parallel thread
N = Female NPT
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange

3 Size
10 = 1 in. / DN25
15 = 1 1/2 in. / DN40
20 = 2 in. / DN50

4 Pressure Class
Omit designator if flanges are not ordered.
A = ASME class 150
B = ASME class 300
C = ASME class 600
E = ASME class 1500
F = ASME class 2500
M = EN class PN16
N = EN class PN40

5 Flange Facing
Omit designator if flanges are not ordered.
1 = Raised face smooth
3 = RTJ

6 Body Material
02 = 316L SS

7 Pressure Control Range
Diaphragm sensing
1 = 0 to 43 psig (0 to 3.0 bar)
2 = 0 to 72 psig (0 to 5.0 bar)
3 = 0 to 145 psig (0 to 10.0 bar)
4 = 0 to 290 psig (0 to 20.0 bar)
Piston sensing
5 = 0 to 580 psig (0 to 40.0 bar)①
6 = 0 to 1450 psig (0 to 100 bar)①
7 = 0 to 2610 psig (0 to 180 bar)①
8 = 0 to 3625 psig (0 to 250 bar)①

① RS(H)10 and RS(H)15 series only.

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

9 Diaphragm / Piston O-Rings
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

10 Seat Seal Material
RS series
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile
RSH series
K = PCTFE
P = PEEK

11 Options
N = NACE MR0175/ISO 15156
G93 = ASTM G93 Level C-cleaned
High-Sensitivity, Spring-Loaded Pressure-Reducing Regulators—LRS(H)4 Series

Features
- Diaphragm sensing
- Large diaphragm for higher accuracy
- Diaphragm materials: PTFE or 316L SS for most pressure control ranges
- Bottom mounting
- Low torque minimizes stem wear
- Nonventing
- Cartridge poppet assembly in LRSH4 for ease of service

Options
- External feedback
- Filter, 25 μm
- NACE MR0175/ISO 15156-compliant models
- Self-venting
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Vent Connections</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRS4</td>
<td>507 (35.0)</td>
<td>290 (20.0)</td>
<td>Diaphragm</td>
<td>–49 to 176 (~45 to 80)</td>
<td>0.73</td>
<td>0.23 (6.0)</td>
<td>1/2 in. NPT</td>
<td>Gauge: 1/4 in. NPT Vent: 1/8 in. NPT</td>
<td>5.7 (2.6)</td>
</tr>
<tr>
<td>LRSH4</td>
<td>5800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See pages 30 to 31 for flow data.

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knob assembly with adjusting screw, nuts</td>
</tr>
<tr>
<td>2</td>
<td>Spring housing cover</td>
</tr>
<tr>
<td>3</td>
<td>Spring housing</td>
</tr>
<tr>
<td>4</td>
<td>C-ring</td>
</tr>
<tr>
<td>5</td>
<td>Spring guide</td>
</tr>
<tr>
<td>6</td>
<td>Set spring</td>
</tr>
<tr>
<td>7</td>
<td>Cap screw</td>
</tr>
<tr>
<td>8</td>
<td>Washer</td>
</tr>
<tr>
<td>9</td>
<td>Bottom spring guide</td>
</tr>
<tr>
<td>10</td>
<td>Clamp ring</td>
</tr>
<tr>
<td>11</td>
<td>Diaphragm</td>
</tr>
<tr>
<td>12</td>
<td>Diaphragm screw</td>
</tr>
<tr>
<td>13</td>
<td>Body</td>
</tr>
<tr>
<td>14</td>
<td>Poppet</td>
</tr>
<tr>
<td>15</td>
<td>Seat retainer</td>
</tr>
<tr>
<td>16</td>
<td>O-ring</td>
</tr>
<tr>
<td>17</td>
<td>Seat</td>
</tr>
<tr>
<td>18</td>
<td>Seat seal (LRS only)</td>
</tr>
<tr>
<td>19</td>
<td>Poppet spring</td>
</tr>
<tr>
<td>20</td>
<td>Fluid case</td>
</tr>
</tbody>
</table>

Wetted lubricants: Silicone-based, synthetic hydrocarbon-based

Wetted components listed in italics.

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

LRS4 Series
Flow Coefficient: 0.73
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Pressure Control Range
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 145 psig (0 to 10.0 bar)
- 0 to 43 psig (0 to 3.0 bar)

LRS4 Series with Optional External Feedback
Flow Coefficient: 0.73
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Comparative Flow
- Standard
-External Feedback
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

LRS4 Series with Optional 316L SS Diaphragm

Flow Coefficient: 0.73
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Comparative Flow

<table>
<thead>
<tr>
<th>Flow Coefficient</th>
<th>Maximum Inlet Pressure</th>
<th>Outlet Pressure Control Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10</td>
<td>5800 psig (400 bar)</td>
<td>0 to 290 psig (0 to 20.0 bar)</td>
</tr>
<tr>
<td>0.73</td>
<td>507 psig (35.0 bar)</td>
<td>0 to 290 psig (0 to 20.0 bar)</td>
</tr>
</tbody>
</table>

LRSH4 Series

Flow Coefficient: 0.10
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Pressure Control Range

<table>
<thead>
<tr>
<th>Pressure Control Range</th>
<th>Nitrogen Flow, Nm³/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 290 psig (0 to 20.0 bar)</td>
<td>0 to 290 psig (0 to 20.0 bar)</td>
</tr>
<tr>
<td>0 to 130 psig (0 to 9.0 bar)</td>
<td>0 to 130 psig (0 to 9.0 bar)</td>
</tr>
</tbody>
</table>
### Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

#### Bottom Mounting
- Threaded vent connection: 0.39 (10.0) deep
- 4 mounting holes, M6 thread
- Panel hole: 2.40 (61.0)

#### Panel Mounting
- 2 mounting holes for M5 × 20 screws
- 3.03 (77.0)

### Options

#### Self Venting
Threaded vent connection is below the panel in self-venting version.

#### External Feedback
Compensates for pressure loss (droop).

#### 25 µm Filter
Reduces potential seat damage; will reduce flow.

### Ordering Information
Build an LRS4 or LRSH4 series regulator ordering number by combining the designators in the sequence shown below.

```
1  2  3  4  5  6  7  8
LRS N4 - 02 - 1 - V T V - S
```

#### 1 Series
- **LRS** = 507 psig (35 bar) maximum inlet pressure
- **LRSH** = 5800 psig (400 bar) maximum inlet pressure

#### 2 Inlet / Outlet
- **N4** = 1/2 in. female NPT

#### 3 Body Material
- **02** = 316L SS

#### 4 Pressure Control Range
- **1** = 0 to 43 psig (0 to 3.0 bar)
- **2** = 0 to 130 psig (0 to 9.0 bar)
- **3** = 0 to 290 psig (0 to 20.0 bar)

#### 5 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM
- **F** = FFKM
- **L** = Low temperature Nitrile

#### 6 Diaphragm
- **T** = PTFE
- **M** = 316L SS: only for 0 to 43 psig (0 to 3.0 bar) and 0 to 130 psig (0 to 9.0 bar) pressure control ranges
- **L** = Low temperature Nitrile

#### 7 Seat Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM
- **F** = FFKM
- **L** = Low temperature Nitrile

#### 8 Options
- **EF** = External feedback
- **F** = Filter, 25 µm
- **N** = NACE MR0175/ISO 15156
- **V** = Self venting
- **S** = Self venting
- **G93** = ASTM G93 Level C-cleaned
High Sensitivity, Spring-Loaded Pressure-Reducing Regulators—LPRS4, LPRS6, and LPRS8 Series

Features
- Balanced poppet design
- Diaphragm sensing
- Large diaphragm for higher accuracy
- Suction tube for reduced droop
- Ideal as second-stage regulator

Options
- Antitamper
- Gauge connections—choice of 4 configurations
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient ((C_v))</th>
<th>Seat Diameter In. (mm)</th>
<th>Connections Inlet and Outlet</th>
<th>Connections Gauge</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPRS4</td>
<td>232 (16.0)</td>
<td>43.0 (3.0)</td>
<td>Diaphragm</td>
<td>–49 to 176 (~–45 to 80)</td>
<td>1.84</td>
<td>0.39 (10.0)</td>
<td>1/2 in. DN15</td>
<td>NPT</td>
<td></td>
</tr>
<tr>
<td>LPRS6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.95</td>
<td></td>
<td>3/4 in. DN20 parallel thread</td>
<td>ISO/BSP</td>
<td></td>
</tr>
<tr>
<td>LPRS8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.07</td>
<td></td>
<td>1 in. DN25</td>
<td>ASME or EN flange</td>
<td></td>
</tr>
</tbody>
</table>

See pages 34 to 35 for flow data.

Materials of Construction

![LPRS Series Regulator with Standard Knob](image)

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Spring housing assembly</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>2 Ball</td>
<td>Commercial stainless steel</td>
</tr>
<tr>
<td>3 Spring guide</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>4 Set spring</td>
<td>50CRV4</td>
</tr>
<tr>
<td>5 Nut</td>
<td>A2</td>
</tr>
<tr>
<td>6 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>7 Cap screw</td>
<td>A4-80</td>
</tr>
<tr>
<td>8 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>9 Nut</td>
<td>A4-80</td>
</tr>
<tr>
<td>10 Body</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>11 Seat</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>12 Poppet housing</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>13 Poppet spring</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>14 Body plug</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>15 Knob assembly with adjusting screw, nuts</td>
<td>Red ABS with A2-70</td>
</tr>
<tr>
<td>16 Antitamper assembly with O-ring, adjusting screw</td>
<td>316L SS, nitrile, A2-70</td>
</tr>
<tr>
<td>17 Diaphragm plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>18 Diaphragm</td>
<td>PTFE, EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>19 Diaphragm screw</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>20 Poppet</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>21 O-rings</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>22 Seat seal</td>
<td></td>
</tr>
<tr>
<td>23 Backup ring</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

Wetted lubricants: Silicone-based, synthetic hydrocarbon-based

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

LPRS4 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: 218 psig (15.0 bar)
Outlet Pressure Control Range: 1.4 to 43 psig (0.10 to 3.0 bar)

Pressure Control Range
- 4.3 to 43 psig (0.30 to 3.0 bar)
- 1.4 to 14.5 psig (0.10 to 1.0 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

LPRS8 Series
Flow Coefficient: 2.07
Maximum Inlet Pressure: 218 psig (15.0 bar)
Outlet Pressure Control Range: 1.4 to 43 psig (0.10 to 3.0 bar)

Pressure Control Range
- 4.3 to 43 psig (0.30 to 3.0 bar)
- 1.4 to 14.5 psig (0.10 to 1.0 bar)
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size and Type</th>
<th>Dimensions, in. (mm)</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>LPRS4</td>
<td>1/2 in. NPT or ISO/BSP parallel thread</td>
<td>2.83 (72.0)</td>
<td>10.2 (260)</td>
</tr>
<tr>
<td></td>
<td>DN15 PN40—EN 1092</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/2 in. ASME class 150—B16.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPRS6</td>
<td>3/4 in. NPT or ISO/BSP parallel thread</td>
<td>3.23 (82.0)</td>
<td>10.2 (260)</td>
</tr>
<tr>
<td></td>
<td>DN20 PN40—EN 1092</td>
<td>10.2 (258)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/4 in. ASME class 150—B16.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPRS8</td>
<td>1 in. NPT or ISO/BSP parallel thread</td>
<td>3.07 (78.0)</td>
<td>10.2 (260)</td>
</tr>
<tr>
<td></td>
<td>DN25 PN40—EN 1092</td>
<td>10.2 (258)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 in. ASME class 150—B16.5</td>
<td>11.5 (291)</td>
<td></td>
</tr>
</tbody>
</table>

Regulators with Pipe Connections

Regulators with Flange Connections

Gauges

Due to the size of the diaphragm enclosure it is not possible to fit a gauge without an adapter, unless a gauge with 40 mm (1 1/2 in.) dial and center-back mount is used.

RHPS Gauge Adapter

Shown with tubing for clarity; tubing not included.
### Flow Table

**1/2 in. DN15, 3/4 in. DN20, 1 in. DN25 Connections**

<table>
<thead>
<tr>
<th>Inlet Pressure P1 psig</th>
<th>Set Pressure P2 psig</th>
<th>Pressure Control Range psig</th>
<th>Flow std ft³/min (Nm³/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5 (1.0)</td>
<td>1.4 (0.10)</td>
<td>1.4 to 14.5 (0.10 to 1.0)</td>
<td>12.9 (22)</td>
</tr>
<tr>
<td></td>
<td>4.3 (0.30)</td>
<td></td>
<td>17.6 (30)</td>
</tr>
<tr>
<td>43 (3.0)</td>
<td>1.4 (0.10)</td>
<td>1.4 to 14.5 (0.10 to 1.0)</td>
<td>12.9 (22)</td>
</tr>
<tr>
<td></td>
<td>4.3 (0.30)</td>
<td></td>
<td>23.5 (40)</td>
</tr>
<tr>
<td></td>
<td>11 (0.80)</td>
<td></td>
<td>35.3 (60)</td>
</tr>
<tr>
<td></td>
<td>29 (2.0)</td>
<td>4.3 to 43 (0.30 to 3.0)</td>
<td>47.0 (80)</td>
</tr>
<tr>
<td>72 (5.0)</td>
<td>1.4 (0.10)</td>
<td>1.4 to 14.5 (0.10 to 1.0)</td>
<td>12.9 (22)</td>
</tr>
<tr>
<td></td>
<td>4.3 (0.30)</td>
<td></td>
<td>23.5 (40)</td>
</tr>
<tr>
<td></td>
<td>11 (0.80)</td>
<td></td>
<td>35.3 (60)</td>
</tr>
<tr>
<td></td>
<td>29 (2.0)</td>
<td>4.3 to 43 (0.30 to 3.0)</td>
<td>76.5 (130)</td>
</tr>
<tr>
<td>145 (10.0)</td>
<td>4.3 (0.30)</td>
<td>1.4 to 14.5 (0.10 to 1.0)</td>
<td>23.5 (40)</td>
</tr>
<tr>
<td></td>
<td>11 (0.80)</td>
<td></td>
<td>35.3 (60)</td>
</tr>
<tr>
<td></td>
<td>29 (2.0)</td>
<td>4.3 to 43 (0.30 to 3.0)</td>
<td>76.5 (130)</td>
</tr>
<tr>
<td>232 (16.0)</td>
<td>4.3 (0.30)</td>
<td>1.4 to 14.5 (0.10 to 1.0)</td>
<td>23.5 (40)</td>
</tr>
<tr>
<td></td>
<td>11 (0.80)</td>
<td></td>
<td>35.3 (60)</td>
</tr>
<tr>
<td></td>
<td>29 (2.0)</td>
<td>4.3 to 43 (0.30 to 3.0)</td>
<td>76.5 (130)</td>
</tr>
</tbody>
</table>

① Droop is approximately 15 %.

### Droop

Due to the working of the suction tube, LPRS series regulators show little or no droop.

### Flow

If the flows given in the table are exceeded, the set pressure P2 may rise above the original setting.

---

**Typical 2-Stage Reduction for improved set-pressure control**

---

### Ordering Information

Build an LPRS4, LPRS6, and LPRS8 series regulator ordering number by combining the designators in the sequence shown below.

```
1  2  3  4  5  6  7  8  9  10 11
LPRS  FA  A  1 - 02 - 2 - V  V  V - GN2
```

<table>
<thead>
<tr>
<th>Designator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPRS</td>
<td>Series</td>
</tr>
<tr>
<td>1</td>
<td>1/2 in. / DN15</td>
</tr>
<tr>
<td>2</td>
<td>3/4 in. / DN20</td>
</tr>
<tr>
<td>3</td>
<td>1 in. / DN25</td>
</tr>
<tr>
<td>4</td>
<td>Body Material</td>
</tr>
<tr>
<td>5</td>
<td>Body Material</td>
</tr>
<tr>
<td>6</td>
<td>Pressure Class</td>
</tr>
<tr>
<td>7</td>
<td>Pressure Class</td>
</tr>
<tr>
<td>8</td>
<td>Pressure Control Range</td>
</tr>
<tr>
<td>9</td>
<td>Flange Facing</td>
</tr>
<tr>
<td>10</td>
<td>Seat Seal Material</td>
</tr>
<tr>
<td>11</td>
<td>Options</td>
</tr>
</tbody>
</table>

---

**Flange Facing**

Omit designator if flanges are not ordered.
- 1 = Raised face smooth

**Body Material**

| 02 | 316L SS |

**Pressure Control Range**

| 2 | 1.4 to 14.5 psig (0.10 to 1.0 bar) |
| 3 | 4.3 to 43 psig (0.30 to 3.0 bar) |

**Seal Material**

| V | Fluorocarbon FKM |
| N | Nitrile |
| E | EPDM |
| L | Low temperature Nitrile |

**Diaphragm**

| V | Fluorocarbon FKM |
| N | Nitrile |
| E | EPDM |
| L | Low temperature Nitrile |

**Options**

| A | Antitamper |
| GN2 | Gauge connection, see below |
| GN4 | Gauge connection, see below |
| GN5 | Gauge connection, see below |
| None | Standard connection, see below |

---

**Standard**

| GN2 | GN4 | GN5 |
| G93 |    |    |

**Gauge Connection Configuration**

- N = NACE MR0175/ISO 15156
- G93 = ASTM G93 Level C-cleaned

---

**Swagelok**
High-Sensitivity, Spring-Loaded Pressure-Reducing Regulators—LPRS10 and LPRS15 Series

Features
- Balanced poppet design
- Diaphragm sensing
- High flow and high accuracy
- Suction tube for reduced droop
- Ideal as second-stage regulator

Options
- Antitamper
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °C (°F)</th>
<th>Flow Coefficient ((C_v))</th>
<th>Seat Diameter in. (mm)</th>
<th>Connections</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPRS10</td>
<td>232 (16.0)</td>
<td>43.0 (3.0)</td>
<td>Diaphragm</td>
<td>49 to 176 (~45 to 80)</td>
<td>3.79</td>
<td>0.55 (14.0)</td>
<td>1 in. DN25</td>
<td>NPT ISO/BSP parallel thread</td>
</tr>
<tr>
<td>LPRS15</td>
<td></td>
<td></td>
<td></td>
<td>See Pressure-Temperature Ratings, page 887.</td>
<td>7.30</td>
<td>0.75 (19.0)</td>
<td>1 1/2 in. DN40</td>
<td>ASME or EN flange</td>
</tr>
</tbody>
</table>

See page 39 for flow data.

Regulators with NPT inlet / outlet connections have 1/4 in. NPT gauge connections.

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adjusting screw A2-70</td>
</tr>
<tr>
<td>2</td>
<td>Nut A2</td>
</tr>
<tr>
<td>3</td>
<td>Ball Commercial stainless steel</td>
</tr>
<tr>
<td>4</td>
<td>Spring guide 316L SS / A479</td>
</tr>
<tr>
<td>5</td>
<td>Set spring 50CRV4</td>
</tr>
<tr>
<td>6</td>
<td>Spring housing assembly 316L SS / A479</td>
</tr>
<tr>
<td>7</td>
<td>Nut A2</td>
</tr>
<tr>
<td>8</td>
<td>Washer A4</td>
</tr>
<tr>
<td>9</td>
<td>Diaphragm plate 316L SS / A479</td>
</tr>
<tr>
<td>10</td>
<td>Cap screw A4-80</td>
</tr>
<tr>
<td>11</td>
<td>Washer A2</td>
</tr>
<tr>
<td>12</td>
<td>Nut A2</td>
</tr>
<tr>
<td>13</td>
<td>Diaphragm PTFE, FKM, EPDM, or nitrile</td>
</tr>
<tr>
<td>14</td>
<td>Diaphragm screw 316L SS / A479</td>
</tr>
<tr>
<td>15</td>
<td>Bottom cover 316L SS / A479</td>
</tr>
<tr>
<td>16</td>
<td>Retaining ring Commercial stainless steel</td>
</tr>
<tr>
<td>17</td>
<td>Body plate 316L SS / A479</td>
</tr>
<tr>
<td>18</td>
<td>O-rings EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>19</td>
<td>Seat seal Commercial stainless steel</td>
</tr>
<tr>
<td>20</td>
<td>Suction tube 316L SS / A479</td>
</tr>
<tr>
<td>21</td>
<td>Poppet 316L SS / A479</td>
</tr>
<tr>
<td>22</td>
<td>Seat 316L SS / A479</td>
</tr>
<tr>
<td>23</td>
<td>Poppet housing 316L SS / A479</td>
</tr>
<tr>
<td>24</td>
<td>Body 316L SS / A479</td>
</tr>
<tr>
<td>25</td>
<td>Poppet spring 302 SS / A313</td>
</tr>
<tr>
<td>26</td>
<td>Body plug 316L SS / A479</td>
</tr>
<tr>
<td>27</td>
<td>Backup ring PTFE</td>
</tr>
</tbody>
</table>

Wetted lubricant: Silicone-based, synthetic hydrocarbon-based

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

LPRS10 Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 232 psig (16.0 bar)
Outlet Pressure Control Range: 1.4 to 43 psig (0.10 to 3.0 bar)

LPRS15 Series
Flow Coefficient: 7.3
Maximum Inlet Pressure: 232 psig (16.0 bar)
Outlet Pressure Control Range: 1.4 to 43 psig (0.10 to 3.0 bar)
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size and Type</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>LPRS10</td>
<td>1 in. NPT or ISO/BSP parallel thread</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DN25 PN40—EN 1092</td>
<td>10.8 (275)</td>
</tr>
<tr>
<td></td>
<td>1 in. ASME class 150—B16.5</td>
<td></td>
</tr>
<tr>
<td>LPRS15</td>
<td>1 1/2 in. NPT or ISO/BSP parallel thread</td>
<td>11.3 (286)</td>
</tr>
<tr>
<td></td>
<td>DN40 PN40—EN 1092</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 1/2 in. ASME class 150—B16.5</td>
<td></td>
</tr>
</tbody>
</table>

Regulators with Pipe Connections

Regulators with Flange Connections

Configuration

Top

Outlet gauge connection

Outlet

Outlet gauge connection

Outlet

Inlet

Inlet gauge connection

Gauge Connection

Only one gauge with a 50 mm (2 in.) or larger dial size fits directly into the body.

Shown with tubing for clarity; tubing not included.
Ordering Information

Build an LPRS10 and LPRS15 series regulator ordering number by combining the designators in the sequence shown below.

1 Series
   LPRS = 232 psig (16.0 bar) maximum inlet pressure

2 Inlet / Outlet
   B = Female ISO/BSP parallel thread
   N = Female NPT
   FA = ASME B16.5 flange
   FD = EN 1092 (DIN) flange

3 Size
   10 = 1 in. / DN25
   15 = 1 1/2 in. / DN40

4 Pressure Class
   Omit designator if flanges are not ordered.
   A = ASME class 150
   N = EN class PN40

5 Flange Facing
   Omit designator if flanges are not ordered.
   1 = Raised face smooth

6 Body Material
   02 = 316L SS

7 Pressure Control Range
   2 = 1.4 to 14.5 psig (0.10 to 1.0 bar)
   3 = 4.3 to 43 psig (0.30 to 3.0 bar)

8 Seal Material
   V = Fluorocarbon FKM
   N = Nitrile
   E = EPDM
   L = Low temperature Nitrile

9 Diaphragm
   V = Fluorocarbon FKM
   N = Nitrile
   E = EPDM
   L = Low temperature Nitrile

10 Seat Seal Material
    V = Fluorocarbon FKM
    N = Nitrile
    E = EPDM
    L = Low temperature Nitrile

11 Options
    A = Antitamper
    N = NACE MR0175/ISO 15156
    G93 = ASTM G93 Level C-cleaned
Pressure-Reducing Regulators  
Spring-Loaded—RS Series Maintenance Kits

Regular maintenance of pressure regulator components is an important part of keeping pressure regulators operating successfully. Swagelok offers several maintenance kit options to help keep components and systems performing well. Outlined below are the standard maintenance kit offerings and an example of which parts are included in each kit. For more detailed information of which parts will be included within a kit for a specific regulator model, please reference the appropriate owner’s manual or contact your authorized Swagelok Sales and Service center.

<table>
<thead>
<tr>
<th>Designator</th>
<th>Kit Type</th>
<th>Diaphragm Sensing Typical Contents</th>
<th>Piston Sensing Typical Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Valve kit</td>
<td>Poppet and housing (9, 21, 22), O-rings (10a, 10b), Back-up ring (11a), Seat (20)</td>
<td>Poppet (9), O-rings (10a, 10b), Back-up rings (11a), Seat (23), Seat seal (24)</td>
</tr>
<tr>
<td>A2</td>
<td>Soft valve kit</td>
<td>Poppet and housing (9, 21, 22), O-ring (10b), Back-up ring (11a)</td>
<td>O-ring (10a), Seat (23), Seat seal (24)</td>
</tr>
<tr>
<td>B1</td>
<td>Service kit</td>
<td>Poppet and housing (9, 21, 22), O-rings (10a, 10b, 10c), Back-up ring (11a), Diaphragm (16), Seat (20)</td>
<td>Poppet (9), O-rings (10a, 10b, 10c, 10d, 10e), Back-up rings (11a, 11b, 11c), Seat (23), Seat seal (24)</td>
</tr>
<tr>
<td>B2</td>
<td>Seal kit</td>
<td>O-rings (10a, 10b, 10c), Back-up ring (11a), Diaphragm (16)</td>
<td>O-rings (10a, 10b, 10c, 10d, 10e), Back-up rings (11a, 11b, 11c)</td>
</tr>
<tr>
<td>C1</td>
<td>Overhaul kit</td>
<td>Spring guides (2, 7), Ball (3), Set spring (4), Poppet and housing (9, 21, 22), O-rings (10a, 10b, 10c), Back-up ring (11a), Poppet spring (12), Body plug (13), Diaphragm (16),Diaphragm plate (17), Seat (20)</td>
<td>Spring guide (2), Ball (3), Set spring (4), Poppet (9), O-rings (10a, 10b, 10c, 10d, 10e), Back-up rings (11a, 11b, 11c), Poppet spring (12), Body plug (13), Piston (18), Piston plate (19), Seat (23), Seat seal (24)</td>
</tr>
<tr>
<td>C2</td>
<td>Body plug kit</td>
<td>O-ring (10c), Body plug (13)</td>
<td>O-ring (10c), Body plug (13), Back-up ring (11b)</td>
</tr>
<tr>
<td>C3</td>
<td>Sensing kit</td>
<td>Diaphragm (16)</td>
<td>Piston (18), Piston plate (19), O-rings (10d, 10e), Back-up ring (11c)</td>
</tr>
<tr>
<td>C4</td>
<td>Range spring kit</td>
<td>Range spring (4)</td>
<td>Range spring (4)</td>
</tr>
<tr>
<td>C5</td>
<td>Poppet spring kit</td>
<td>Poppet spring (12)</td>
<td>Poppet spring (12)</td>
</tr>
<tr>
<td>D1</td>
<td>Handle kit</td>
<td>Handle assembly (14)</td>
<td>Handle assembly (14)</td>
</tr>
<tr>
<td>E1</td>
<td>Hardware kit</td>
<td>Bolts (5), Washers (6)</td>
<td>Bolts (5), Washers (6)</td>
</tr>
</tbody>
</table>

Ordering Information
To order a maintenance kit, add the kit type designator to the regulator ordering number. Example: RSN4-02-1-VVV-B1
Pressure-Reducing, Dome-Loaded and Air-Loaded Regulators—RD and RA Series

These pressure-reducing, dome-loaded and air-loaded regulators are suitable for most gases and liquids, including acids and oils. These regulators feature various poppet designs, a pressure-sensing diaphragm (piston in RD2 series), and a choice of seat and seal materials to accommodate a variety of pressure, temperature, and flow conditions. These regulators are available with a choice of threaded end connections from 1/4 to 2 in., and with flange end connections from 1/2 to 4 in.

The RDH series regulators are high-pressure versions of the RD series regulators, and the LPRD series are low-pressure, high-accuracy versions of the RD series regulators. The RA series regulators are air-loaded regulators.

These regulators are available with many options, including a variety of gauge connection configurations, a pilot regulator (RD series only), external feedback (RD series only), special cleaning to ASTM G93 Level C, and NACE MR0175/ISO 15156-compliant models.

Features
- Dome-loaded and air-loaded pressure control
- Diaphragm sensing design except RD2 series
- 316L stainless steel materials of construction for corrosion resistance
- Maximum inlet pressure ratings:
  - 1015 to 5800 psig (70.0 to 400 bar)
- Outlet pressure control ranges:
  - Up to 0 to 5800 psig (0 to 400 bar)
**Pressure Regulators and Filters**

**Pressure-Reducing, Dome-Loaded and Air-Loaded Regulators—RD and RA Series**

### Pressure-Temperature Ratings

<table>
<thead>
<tr>
<th>Seal Material</th>
<th>Temperature Range °F (°C)</th>
<th>Material Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorocarbon FKM</td>
<td>5 to 176 (−15 to 80)</td>
<td>V</td>
</tr>
<tr>
<td>Standard Nitrile</td>
<td>−4 to 176 (−20 to 80)</td>
<td>N</td>
</tr>
<tr>
<td>Low-Temp Nitrile</td>
<td>−49 to 176 (−45 to 80)</td>
<td>L</td>
</tr>
<tr>
<td>EPDM</td>
<td>−4 to 176 (−20 to 80)</td>
<td>E</td>
</tr>
<tr>
<td>FFKM</td>
<td>14 to 176 (−10 to 80)</td>
<td>F</td>
</tr>
</tbody>
</table>

### Seat Material

<table>
<thead>
<tr>
<th>Temperature °F (°C)</th>
<th>PCTFE</th>
<th>PEEK</th>
<th>Fluorocarbon FKM, Nitrile, EPDM, FFKM</th>
</tr>
</thead>
<tbody>
<tr>
<td>−49 to −40 (−45 to −40)</td>
<td>−</td>
<td>−</td>
<td></td>
</tr>
<tr>
<td>−40 to 95 (−40 to 35)</td>
<td>5 800 (400)</td>
<td>5 800 (400)</td>
<td>1015 (70.0)</td>
</tr>
<tr>
<td>149 (85)</td>
<td>3987 (275)</td>
<td>3987 (275)</td>
<td>1015 (70.0)</td>
</tr>
<tr>
<td>176 (80)</td>
<td>1812 (125)</td>
<td>1812 (125)</td>
<td>1015 (70.0)</td>
</tr>
</tbody>
</table>

### Technical Data—Performance

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure (psig)</th>
<th>Maximum Outlet Control Pressure (psig)</th>
<th>Flow Coefficient ($C_v$)</th>
<th>Sensing Type</th>
<th>Flow Data on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD2</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td>0.05</td>
<td>Piston</td>
<td>47</td>
</tr>
<tr>
<td>RD6DP</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>1.95</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RD6H6DP</td>
<td>5800 (400)</td>
<td>3335 (230)</td>
<td>2.07</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RD6</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>2.07</td>
<td>Diaphragm</td>
<td>51</td>
</tr>
<tr>
<td>RDH6</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td>3.79</td>
<td>Diaphragm</td>
<td>61</td>
</tr>
<tr>
<td>RD8</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>7.30</td>
<td>Diaphragm</td>
<td>66, 70</td>
</tr>
<tr>
<td>RD10</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>13</td>
<td>Diaphragm</td>
<td>73, 74</td>
</tr>
<tr>
<td>RD15</td>
<td>5800 (400)</td>
<td>3625 (250)</td>
<td>36</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RD15H10</td>
<td>5800 (400)</td>
<td>3625 (250)</td>
<td>36</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RD20</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>21</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RDH20</td>
<td>5800 (400)</td>
<td>2900 (200)</td>
<td>73</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RD25</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>73</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RDH25</td>
<td>4060 (280)</td>
<td>2900 (200)</td>
<td>21</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RD30</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>36</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RDH30</td>
<td>4060 (280)</td>
<td>2900 (200)</td>
<td>36</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RD40</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>73</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RDH40</td>
<td>4060 (280)</td>
<td>2900 (200)</td>
<td>73</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>LPRD20</td>
<td>232 (16.0)</td>
<td>29 (2.0)</td>
<td>13</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>LPRD25</td>
<td>21 (2.0)</td>
<td>21 (2.0)</td>
<td>—</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>LPRD30</td>
<td>36 (2.0)</td>
<td>36 (2.0)</td>
<td>—</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>LPRD40</td>
<td>73 (2.0)</td>
<td>73 (2.0)</td>
<td>—</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RA4</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td>1.84</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RA6</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td>1.84</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
<tr>
<td>RA8</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td>1.84</td>
<td>Diaphragm</td>
<td>—</td>
</tr>
</tbody>
</table>

(Regulator pressure rating may be limited by connection type.)
Pressure Regulators—RHPS Series

Pressure-Reducing, Dome-Loaded and Air-Loaded Regulators—RD and RA Series

Technical Data—Design

<table>
<thead>
<tr>
<th>Series</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge Connection</th>
<th>Dome Connection</th>
<th>Weight (Without Flanges) lb (kg)</th>
<th>More Information on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD2</td>
<td>0.087 (2.2)</td>
<td>1/4 in. NPT</td>
<td>1/4 in. NPT</td>
<td>1/8 in. NPT</td>
<td>3.1 (1.4)</td>
<td>46</td>
</tr>
<tr>
<td>RD6DP</td>
<td>0.39 (10.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>1/4 in. NPT</td>
<td>10.6 (4.8)</td>
<td>55</td>
</tr>
<tr>
<td>RD6</td>
<td>0.39 (10.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>8.8 (4.0)</td>
<td>50</td>
</tr>
<tr>
<td>RD8</td>
<td>0.39 (10.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>8.8 (4.0)</td>
<td>50</td>
</tr>
<tr>
<td>RD10</td>
<td>0.55 (14.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT or ISO/BSP parallel thread</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>17.6 (6.0)</td>
<td>59</td>
</tr>
<tr>
<td>RD15</td>
<td>0.75 (19.0)</td>
<td>1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT or ISO/BSP parallel thread</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>19.8 (9.0)</td>
<td>59</td>
</tr>
<tr>
<td>RD20</td>
<td>0.98 (25.0)</td>
<td>2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>Use P1 gauge connections on pilot regulator</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>44.0 (20)</td>
<td>72</td>
</tr>
<tr>
<td>RD25</td>
<td>1.25 (32.0)</td>
<td>2 1/2 in. EN or ASME flanges</td>
<td>Use P1 gauge connections on pilot regulator</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>88.0 (40)</td>
<td>72</td>
</tr>
<tr>
<td>RD30</td>
<td>1.65 (42.0)</td>
<td>3 in. EN or ASME flanges</td>
<td>Use P1 gauge connections on pilot regulator</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>136 (62)</td>
<td>84</td>
</tr>
<tr>
<td>RD40</td>
<td>2.36 (60.0)</td>
<td>4 in. EN or ASME flanges</td>
<td>Use P1 gauge connections on pilot regulator</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>183 (83)</td>
<td>84</td>
</tr>
<tr>
<td>LPRD20</td>
<td>0.98 (25.0)</td>
<td>2 in. EN or ASME flanges</td>
<td>Inlet and outlet gauges included</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>Varies with model and end connection</td>
<td>99</td>
</tr>
<tr>
<td>LPRD25</td>
<td>1.25 (32.0)</td>
<td>2 1/2 in. EN or ASME flanges</td>
<td>Inlet and outlet gauges included</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>Varies with model and end connection</td>
<td>99</td>
</tr>
<tr>
<td>LPRD30</td>
<td>1.65 (42.0)</td>
<td>3 in. EN or ASME flanges</td>
<td>Inlet and outlet gauges included</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>Varies with model and end connection</td>
<td>99</td>
</tr>
<tr>
<td>LPRD40</td>
<td>2.36 (60.0)</td>
<td>4 in. EN or ASME flanges</td>
<td>Inlet and outlet gauges included</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>Varies with model and end connection</td>
<td>99</td>
</tr>
<tr>
<td>RA4</td>
<td>0.39 (10.0)</td>
<td>1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>12.5 (5.7)</td>
<td>101</td>
</tr>
<tr>
<td>RA6</td>
<td>0.39 (10.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>13.6 (6.2)</td>
<td>101</td>
</tr>
<tr>
<td>RA8</td>
<td>1 in. ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>1/4 in. ISO/BSP parallel thread</td>
<td>13.6 (6.2)</td>
<td>101</td>
<td></td>
</tr>
</tbody>
</table>
Compact, General-Purpose Dome-Loaded Pressure-Reducing Regulators—RD2 Series

Features
- Piston sensing
- Integral 25 μm filter
- Cartridge poppet assembly for ease of service
- Bottom mounting

Options
- No filter—for liquid applications
- NACE MR0175/ISO 15156-compliant models (nonventing and no-filter models only)
- Special cleaning to ASTM G93 Level C
- Panel mounting kit sold separately—no disassembly required

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Dome Connection</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD2</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td>Piston</td>
<td>–40 to 95 (–40 to 35)</td>
<td>0.05</td>
<td>0.087 (2.2)</td>
<td>1/4 in. NPT</td>
<td>1/4 in. NPT</td>
<td>3.1 (1.4)</td>
</tr>
</tbody>
</table>

See page 47 to 48 for flow data.

Materials of Construction

Component | Material / Specification
---|-------------------
1 Dome plug | 316L SS / A479
2 Dome | 316L SS / A479
3 Dome plug O-ring | FKM, EPDM, nitrile, or FFKM
4 Non-relieving plug | 316L SS / A479
5 Piston | 316L SS / A479
6 Piston plate | 316L SS / A479
7 Piston O-rings | FKM, EPDM, nitrile, or FFKM
8 Poppet | 431 SS / A276
9 Poppet housing | 316L SS / A479
10 O-rings | FKM, EPDM, nitrile, or FFKM
11 Seat | PEEK or PCFTE
12 Seat retainer | 316L SS / A479
13 Poppet spring | 302 SS / A313
14 Filter | 316L SS
15 Plug | 316L SS / A479
16 Body | 316L SS / A479

Wetted components listed in italics.
Gauge plugs (not shown): 431 SS / A276.

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RD2 Series
Flow Coefficient: 0.05
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)

Pressure Control Range

0 to 5800 psig (0 to 400 bar)

RD2 Series
Flow Coefficient: 0.05
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)

Pressure Control Range

0 to 5800 psig (0 to 400 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RD2 Series
*Flow Coefficient: 0.05*
*Maximum Inlet Pressure: 5800 psig (400 bar)*
*Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)*
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

Ordering Information

Build an RD2 series regulator ordering number by combining the designators in the sequence shown below.

1 Series
RD = 5800 psig (400 bar) maximum inlet pressure

2 Inlet / Outlet
N2 = 1/4 in. female NPT

3 Body Material
02 = 316L SS

4 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
F = FFKM
L = Low temperature Nitrile

5 Piston Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
F = FFKM
L = Low temperature Nitrile

6 Seat Material
K = PCTFE
P = PEEK

7 Options
L = No filter
N = NACE MR0175/ISO 15156
G93 = ASTM G93 Level C-cleaned

Panel Mounting Kit

No disassembly required when using panel mount kit. Panel mounting kit ordering number: RS2-P-02
General-Purpose, Dome-Loaded Pressure-Reducing Regulators—RD(H)6 and RD(H)8 Series

**Features**
- Balanced poppet design
- Diaphragm sensing
- Dome-to-outlet pressure ratio approximately 1:1

**Options**
- Antitamper
- Pilot regulator (not shown)
- Gauge connections—choice of 4 configurations
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

**Technical Data**

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Dome Connection</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD6</td>
<td>RD: 1015 (70.0)</td>
<td>RD: 1015 (70.0)</td>
<td>Diaphragm</td>
<td>–49 to 176 (~45 to 80)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flange</td>
<td>0.39 (10.0)</td>
<td>See Pressure-Temperature Ratings, page 921.</td>
<td></td>
<td>8.8 (4.0)</td>
</tr>
<tr>
<td>RDH6</td>
<td>RD: 5800 (400)</td>
<td>RD: 5800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RD8</td>
<td>RD: 1015 (70.0)</td>
<td>RD: 1015 (70.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDH8</td>
<td>RD: 5800 (400)</td>
<td>RD: 5800 (400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See page 51 to 53 for flow data.

**Materials of Construction**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Dome</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>2 Cap screw</td>
<td>A4-80</td>
</tr>
<tr>
<td>3 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>4 Dome plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>5 Diaphragm</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>6 Diaphragm plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>7 O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>8 Backup ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>9 Plug O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>10 Body</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>11 Poppet spring</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>12 Body plug</td>
<td>316L SS / A479</td>
</tr>
</tbody>
</table>

**RD Series Only Components**
- 13 Poppet
- 14 Seat
- 15 Seat seal
- 16 Poppet housing

**RDH Series Only Components**
- 17 Poppet
- 18 Seat
- 19 Seat seal
- 20 Backup ring

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH6 Series

Flow Coefficient: 1.95
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)

Pressure Control Range
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

RDH6 Series

Flow Coefficient: 1.95
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

Pressure Control Range
- 0 to 1450 psig (0 to 100 bar)
- 0 to 362 psig (0 to 25.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RDH6 Series
Flow Coefficient: 1.95
*Maximum Inlet Pressure: 3990 psig (275 bar)*
*Outlet Pressure Control Range: 0 to 2537 psig (0 to 175 bar)*

RD8 Series
Flow Coefficient: 2.07
*Maximum Inlet Pressure: 2900 psig (200 bar)*
*Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)*
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RDH8 Series
*Flow Coefficient: 2.07*
*Maximum Inlet Pressure: 2175 psig (150 bar)*
*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

![Graph RDH8 Series Flow Coefficient: 2.07](image)

RDH8 Series
*Flow Coefficient: 2.07*
*Maximum Inlet Pressure: 3990 psig (275 bar)*
*Outlet Pressure Control Range: 0 to 2537 psig (0 to 175 bar)*

![Graph RDH8 Series Flow Coefficient: 2.07](image)
Pressure Regulators and Filters

**Dimensions**

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>RD(H)6</td>
<td>3/4 in.</td>
<td>5.12 (130)</td>
</tr>
<tr>
<td>RD(H)8</td>
<td>1 in.</td>
<td></td>
</tr>
</tbody>
</table>

**Ordering Information**

Build an RD(H)6 and RD(H)8 series regulator ordering number by combining the designators in the sequence shown below.

1. **Series**
   - RD = 1015 psig (70.0 bar) maximum inlet pressure
   - RDH = 5800 psig (400 bar) maximum inlet pressure
2. **Inlet / Outlet**
   - B = Female ISO/BSP parallel thread
   - N = Female NPT
   - FA = ASME B16.5 flange
   - FD = EN 1092 (DIN) flange
3. **Size**
   - 6 = 3/4 in. / DN20
   - 8 = 1 in. / DN25
4. **Pressure Class**
   - Omit designator if flanges are not ordered.
   - A = ASME class 150
   - B = ASME class 300
   - C = ASME class 600
   - E = ASME class 1500
   - F = ASME class 2500
   - M = EN class PN116
   - N = EN class PN40
5. **Flange Facing**
   - Omit designator if flanges are not ordered.
   - 1 = Raised face smooth
   - 3 = RTJ
6. **Body Material**
   - 02 = 316L SS
7. **Pressure Control Range**
   - X = No pilot regulator, standard
   - RD series with RS2 series pilot regulator
     - 3 = 0 to 1015 psig (0 to 70.0 bar)
   - RDH series with RS2 series pilot regulator
     - 4 = 0 to 145 psig (0 to 10.0 bar)
     - 5 = 0 to 362 psig (0 to 25.0 bar)
     - 6 = 0 to 1450 psig (0 to 100 bar)
     - 7 = 0 to 237 psig (0 to 175 bar)
   - For higher pressure control ranges with a pilot regulator, contact your authorized Swagelok representative for information.
8. **Seal Material**
   - V = Fluorocarbon FKM
   - N = Nitrile
   - E = EPDM
   - L = Low temperature Nitrile
9. **Diaphragm / Piston O-Rings**
   - V = Fluorocarbon FKM
   - N = Nitrile
   - E = EPDM
   - L = Low temperature Nitrile
10. **Seat Seal Material**
    - RD series
      - V = Fluorocarbon FKM
      - N = Nitrile
      - E = EPDM
      - L = Low temperature Nitrile
    - RDH series
      - K = PCTFE
      - P = PEEK
11. **Options**
    - A = Antitamper
    - GN2 = Gauge connection, see below
    - GN4 = Gauge connection, see below
    - GN5 = Gauge connection, see below
    - None = Standard connection, see below

**Gauge Connection Configuration**

<table>
<thead>
<tr>
<th>Standard</th>
<th>GN2</th>
<th>GN4</th>
<th>GN5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Go</td>
<td>Go</td>
<td>Go</td>
</tr>
</tbody>
</table>

Standard (GN1) and GN4 only available with no pilot.

- N = NACE MR0175/ISO 15156
- G93 = ASTM G93 Level C-cleaned
Differential Pressure, Dome-Loaded Pressure Reducing Regulators—RD(H)6DP Series

Features

- Balanced poppet design
- Diaphragm sensing
- Adjustable bias
- Dome-to-outlet pressure ratio approximately 1:1
- Antitamper and anti-blowout stem

Options

- Gauge connection—choice of 4 configurations
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Bias Range psig (bar)</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Dome Connection</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD6DP</td>
<td>1015 (70.0)</td>
<td>1015 (70.0)</td>
<td>Diaphragm</td>
<td>14.5 to 145 (1.0 to 10.0)</td>
<td>-49 to 176 (-45 to 80)</td>
<td>1.95</td>
<td>0.39 (10.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flange</td>
<td>Gauge: 1/4 in. NPT; Dome: 1/4 in. NPT</td>
<td>11.2 (5.1)</td>
</tr>
<tr>
<td>RDH6DP</td>
<td>5800 (400)</td>
<td>3335 (230)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See page 56 to 57 for flow data.

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adjustment screw 316L SS / A479</td>
</tr>
<tr>
<td>2</td>
<td>Backup ring PTFE</td>
</tr>
<tr>
<td>3</td>
<td>O-ring EPDM, FKM, nitrile</td>
</tr>
<tr>
<td>4</td>
<td>Cap screw A4-80</td>
</tr>
<tr>
<td>5</td>
<td>Washer A4</td>
</tr>
<tr>
<td>6</td>
<td>Dome 316L SS / A479</td>
</tr>
<tr>
<td>7</td>
<td>Upper spring guide 316L SS / A479</td>
</tr>
<tr>
<td>8</td>
<td>Differential spring 50CRV4</td>
</tr>
<tr>
<td>9</td>
<td>Lower spring guide 316L SS / A479</td>
</tr>
<tr>
<td>10</td>
<td>Diaphragm EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>11</td>
<td>Diaphragm plate 316L SS / A479</td>
</tr>
<tr>
<td>12</td>
<td>Body 316L SS / A479</td>
</tr>
<tr>
<td>13</td>
<td>Poppet spring 302 SS / A313</td>
</tr>
<tr>
<td>14</td>
<td>Body plug 316L SS / A479</td>
</tr>
<tr>
<td>15</td>
<td>Antitamper cover 316L SS / A479</td>
</tr>
<tr>
<td>16</td>
<td>Lock Nut A4-80</td>
</tr>
<tr>
<td>17</td>
<td>Poppet 316L SS / A479</td>
</tr>
<tr>
<td>18</td>
<td>Seat 316L SS / A479</td>
</tr>
<tr>
<td>19</td>
<td>Seat seal EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>20</td>
<td>Poppet housing 316L SS / A479</td>
</tr>
<tr>
<td>21</td>
<td>Poppet S17400 / A276 or 431 SS</td>
</tr>
<tr>
<td>22</td>
<td>Seat 316L SS / A479</td>
</tr>
<tr>
<td>23</td>
<td>Seat seal PCTFE or PEEK</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
Gauge plugs (not shown): 431 SS / A276.
Lockwire and lead seal for anti-tamper (not shown): 304 LEAD.

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RD6DP Series
Flow Coefficient: 1.95
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range
0 to 1015 psig (0 to 70.0 bar)
All curves 29 psig (2 bar) bias

RD6DP Series
Flow Coefficient: 1.95
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range
0 to 1015 psig (0 to 70.0 bar)
All curves 116 psig (8 bar) bias
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH6DP Series

Flow Coefficient: 1.95

Maximum Inlet Pressure: 3990 psig (275 bar)

Outlet Pressure Control Range: 0 to 3335 psig (0 to 230 bar)

Pressure Control Range

RDH6DP Series

Flow Coefficient: 1.95

Maximum Inlet Pressure: 3990 psig (275 bar)

Outlet Pressure Control Range: 0 to 3335 psig (0 to 230 bar)
Pressure Regulators and Filters

Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

![Diagram of Pressure Regulator Dimensions]

- **Outlet gauge connection**: 0.47 (12.0) in., 1.18 (30.0) in.
- **Inlet**: 4.3 (109.3) in., 3.50 (89.0) in.
- **Outlet**: 3.23 (82.0) in., 3.50 (89.0) in.
- **Dome connection**: 1.61 (41.0) in., 1.75 (44.5) in.
- **Standard Configuration**:
  - Inlet
  - Outlet

Shown with tubing for clarity; tubing not included.

Ordering Information

Build an RD(H)6DP series regulator ordering number by combining the designators in the sequence shown below:

```
1  2  3  4  5   6   7   8   9  10  11
RD FA 6 A 1 - 02 - V V V DP2 - GN2
```

1. **Series**
   - **RD**: 1015 psig (70.0 bar) maximum inlet pressure
   - **RDH**: 5800 psig (400 bar) maximum inlet pressure

2. **Inlet / Outlet**
   - **B**: Female ISO/BSP parallel thread
   - **N**: Female NPT
   - **FA**: ASME B16.5 flange
   - **FD**: EN 1092 (DIN) flange

3. **Size**
   - **6**: 3/4 in. / DN20
   - **8**: 1 in. / DN25

4. **Pressure Class**
   - Omit designator if flanges are not ordered.
   - **A**: ASME class 150
   - **B**: ASME class 300
   - **C**: ASME class 600
   - **E**: ASME class 1500
   - **F**: ASME class 2500
   - **M**: EN class PN16
   - **N**: EN class PN40

5. **Flange Facing**
   - Omit designator if flanges are not ordered.
   - **1**: Raised face smooth
   - **3**: RTJ

6. **Body Material**
   - **02**: 316L SS

7. **Seal Material**
   - **V**: Fluorocarbon FKM
   - **N**: Nitrile
   - **E**: EPDM
   - **L**: Low temperature Nitrile

8. **Diaphragm Material**
   - **V**: Fluorocarbon FKM
   - **N**: Nitrile
   - **E**: EPDM
   - **L**: Low temperature Nitrile

9. **Seat Seal Material**
   - **RD series**
     - **V**: Fluorocarbon FKM
     - **N**: Nitrile
     - **E**: EPDM
     - **L**: Low temperature Nitrile
   - **RDH series**
     - **K**: PCTFE
     - **P**: PEEK

10. **Differential Pressure**
    - **DP2**: 0 to 43 psig (0 to 3.0 bar) bias
    - **DP3**: 0 to 145 psig (0 to 10.0 bar) bias

11. **Options**
    - **GN2**: Gauge connection, see below
    - **GN4**: Gauge connection, see below
    - **GN5**: Gauge connection, see below
    - **None**: Standard connection, see below

<table>
<thead>
<tr>
<th>Gauge Connection Configuration</th>
<th>Standard</th>
<th>GN2</th>
<th>GN4</th>
<th>GN5</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G93</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* N = NACE MR0175/ISO 15156
* G93 = ASTM G93 Level C-cleaned
Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators—RD(H)10 and RD(H)15 Series

**Features**
- Balanced poppet design
- Diaphragm sensing
- Integral pilot regulator with dynamic regulation
- Dome-to-outlet pressure ratio approximately 1:1
- Large dome for improved stability
- Pilot regulator for improved performance

**Options**
- External feedback (EF) for improved performance
  - EF to main regulator limited by standard outlet pressure range
  - EF to pilot regulator limited to 290 psig (20.0 bar)
- Gauge connections
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

**Technical Data**

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Dome Connection</th>
<th>Weight (Without Flanges and PR) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD10</td>
<td>1015 (70.0) (507 [35.0] with LRS4 pilot regulator)</td>
<td>RD10: 1015 (70.0) RDH: 3625 (250)</td>
<td>Diaphragm</td>
<td>–49 to 176 (~45 to 80)</td>
<td>3.79</td>
<td>0.55 (14.0) 0.53 (13.5)</td>
<td>1 in.</td>
<td>NPT, ISO/BSP parallel thread, EN or ASME flange</td>
<td>17.6 (8.0)</td>
</tr>
<tr>
<td>RDH10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dome: 1/4 in. ISO/BSP parallel thread</td>
<td></td>
</tr>
<tr>
<td>RD15</td>
<td>7.30</td>
<td></td>
<td></td>
<td></td>
<td>7.30</td>
<td>0.75 (19.0)</td>
<td>1 1/2 in.</td>
<td>Gauge / pilot: 1/4 in. NPT or ISO/BSP parallel thread</td>
<td>19.8 (9.0)</td>
</tr>
<tr>
<td>RDH15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See pages 60 to 70 for flow data.

➀ Regulators with NPT inlet / outlet connections have 1/4 in. NPT gauge connections.

**Materials of Construction**

![RDH10 Series Regulator with Hard Seat Seal](image1)

![RD15 Series Regulator with Soft Seat Seal](image2)

**Component**

1. Dome
2. Cap screw
3. Washer
4. Dome plate
5. Diaphragm
6. Diaphragm plate
7. Retaining ring
8. Body plate
9. Poppet
10. Seat
11. O-ring
12. Body
13. Poppet housing
14. Poppet spring
15. Body plug
16. O-ring
17. Plug O-ring
18. Seat seal
19. Backup ring (RDH10 only)
20. Seat seal

**Material / Specification**

- Dome: 316L SS / A479
- Cap screw: A4-80
- Washer: A4
- Dome plate: 316L SS / A479
- Diaphragm: EPDM, FKM, or nitrile
- Diaphragm plate: 316L SS / A479
- Retaining ring: Commercial stainless steel
- Body plate: 316L SS / A479
- Poppet: 316L SS / A479
- Seat: 316L SS / A479
- O-ring: EPDM, FKM, or nitrile
- Body: 316L SS / A479
- Poppet housing: 302 SS / A313
- Poppet spring: 302 SS / A313
- Body plug: 316L SS / A479
- O-ring: EPDM, FKM, or nitrile
- Plug O-ring: EPDM, FKM, or nitrile
- Seat seal: EPDM, FKM, or nitrile
- Backup ring: PTFE
- Seat seal: PCTFE or PEEK

Wetted components listed in italics.

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD10 Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 43 psig (0 to 3.0 bar)

RD10 Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH10 Series

**Flow Coefficient: 3.79**

**Maximum Inlet Pressure: 5800 psig (400 bar)**

*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

**Pressure Control Range**
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

**RDH10 Series**

**Flow Coefficient: 3.79**

**Maximum Inlet Pressure: 5800 psig (400 bar)**

*Outlet Pressure Control Range: 0 to 2537 psig (0 to 175 bar)*

**Pressure Control Range**
- 0 to 2537 psig (0 to 175 bar)
- 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH10 Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)

RD10-EF Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 580 psig (40.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)
Flow Data

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.

For more flow curve information, contact your authorized Swagelok representative.

RD10-EF Series

Flow Coefficient: 3.79

Maximum Inlet Pressure: 580 psig (40.0 bar)

Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

RDH10-EF Series

Flow Coefficient: 3.79

Maximum Inlet Pressure: 5800 psig (400 bar)

Outlet Pressure Control Range: 0 to 145 psig (0 to 10.0 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RDH10-EF Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

Pressure Control Range
- 0 to 1450 psig (0 to 100 bar)
- 0 to 362 psig (0 to 25.0 bar)

RDH10-EF Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD10-EFP Series
Flow Coefficient: 3.79
Maximum Inlet Pressure: 218 psig (15.0 bar)
Outlet Pressure Control Range: 0 to 500 psig (0 to 34.5 bar)

Pressure Control Range

Inlet Pressure, psig (bar)
Nitrogen Flow, Nm³/h
Outlet Pressure, psig
Nitrogen Flow, std ft³/min
Flow Coefficient: 3.79
Maximum Inlet Pressure: 218 psig (15.0 bar)
Outlet Pressure Control Range: 0 to 500 psig (0 to 34.5 bar)
Flow Data

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD15 Series

*Flow Coefficient: 7.30*

*Maximum Inlet Pressure: 508 psig (35.0 bar)*

*Outlet Pressure Control Range: 0 to 43 psig (0 to 3.0 bar)*

**Pressure Control Range**

- 0 to 43 psig (0 to 3.0 bar)

**Flow Data**

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD15 Series

*Flow Coefficient: 7.30*

*Maximum Inlet Pressure: 1015 psig (70.0 bar)*

*Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)*

**Pressure Control Range**

- 0 to 1015 psig (0 to 70.0 bar)
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 130 psig (0 to 9.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH15 Series
Flow Coefficient: 7.30
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)

Pressure Control Range
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

Nitrogen Flow, std ft³/min
Outlet Pressure, psig
Outlet Pressure, bar
Nitrogen Flow, Nm³/h

RDH15 Series
Flow Coefficient: 7.30
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 2537 psig (0 to 175 bar)

Pressure Control Range
- 0 to 2537 psig (0 to 175 bar)
- 0 to 2537 psig (0 to 175 bar), calculated
- 0 to 1450 psig (0 to 100 bar)
- 0 to 1450 psig (0 to 100 bar), calculated

Nitrogen Flow, std ft³/min
Outlet Pressure, psig
Outlet Pressure, bar
Nitrogen Flow, Nm³/h

Flow Coefficient: 7.30
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 2537 psig (0 to 175 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RDH15 Series
Flow Coefficient: 7.30
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)

Pressure Control Range

Flow Data

For more flow curve information, contact your authorized Swagelok representative.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD15-EF Series
Flow Coefficient: 7.30
Maximum Inlet Pressure: 508 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range
0 to 1015 psig (0 to 70.0 bar)

RD15-EF Series
Flow Coefficient: 7.30
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range
0 to 1015 psig (0 to 70.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RDH15-EF Series**

*Flow Coefficient: 7.30*

*Maximum Inlet Pressure: 5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)*

Pressure Control Range

<table>
<thead>
<tr>
<th>Nitrogen Flow, std ft³/min</th>
<th>Nitrogen Flow, Nm³/h</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>500</td>
<td>1000</td>
<td>5800 (400)</td>
</tr>
<tr>
<td>1000</td>
<td>1500</td>
<td>5800 (400)</td>
</tr>
<tr>
<td>1500</td>
<td>2000</td>
<td>5800 (400)</td>
</tr>
<tr>
<td>2000</td>
<td>2500</td>
<td>5800 (400)</td>
</tr>
<tr>
<td>2500</td>
<td>3000</td>
<td>5800 (400)</td>
</tr>
<tr>
<td>3000</td>
<td>3500</td>
<td>5800 (400)</td>
</tr>
<tr>
<td>3500</td>
<td>4000</td>
<td>5800 (400)</td>
</tr>
</tbody>
</table>

**RD15-EFP Series**

*Flow Coefficient: 7.30*

*Maximum Inlet Pressure: 508 psig (35.0 bar)*

*Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)*

Pressure Control Range

<table>
<thead>
<tr>
<th>Nitrogen Flow, std ft³/min</th>
<th>Nitrogen Flow, Nm³/h</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>500</td>
<td>1000</td>
<td>508 (35.0)</td>
</tr>
<tr>
<td>1000</td>
<td>1500</td>
<td>508 (35.0)</td>
</tr>
<tr>
<td>1500</td>
<td>2000</td>
<td>508 (35.0)</td>
</tr>
<tr>
<td>2000</td>
<td>2500</td>
<td>508 (35.0)</td>
</tr>
<tr>
<td>2500</td>
<td>3000</td>
<td>508 (35.0)</td>
</tr>
<tr>
<td>3000</td>
<td>3500</td>
<td>508 (35.0)</td>
</tr>
</tbody>
</table>

Nitrogen Flow, std ft³/min

Outlet Pressure, psig

Outlet Pressure, bar

Outlet Pressure, MPa
**Dimensions**

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>RD(H)10</td>
<td>6.18 (157)</td>
<td>2.28 (58.0)</td>
</tr>
<tr>
<td>RD(H)15</td>
<td>6.61 (168)</td>
<td>2.44 (62.0)</td>
</tr>
</tbody>
</table>

**Ordering Information**

Build an RD(H)10 and RD(H)15 series regulator ordering number by combining the designators in the sequence shown below.

1. **Series**
   - RD = 1015 psig (70.0 bar) maximum inlet pressure (507 psig [35.0 bar] with pilot regulator, options 0, 1, or 2)
   - RDH = 5800 psig (400 bar) maximum inlet pressure

2. **Inlet / Outlet**
   - B = Female ISO/BSP parallel thread
   - N = Female NPT
   - FA = ASME B16.5 flange
   - FD = EN 1092 (DIN) flange

3. **Size**
   - 10 = 1 in. / DN25
   - 15 = 1 1/2 in. / DN40

4. **Pressure Class**
   - Omit designator if flanges are not ordered.
   - A = ASME class 150
   - B = ASME class 300
   - C = ASME class 600
   - E = ASME class 1500
   - F = ASME class 2500
   - M = EN class PN16
   - N = EN class PN40

5. **Flange Facing**
   - Omit designator if flanges are not ordered.
   - 1 = Raised face smooth
   - 3 = RTJ

6. **Body Material**
   - 02 = 316L SS

7. **Pilot Regulator Options**
   - **Pressure Control Range**
     - X = No pilot regulator, optional
     - RD series with LRS4 series pilot regulator
       - 0 = 0 to 43 psig (0 to 3.0 bar)
       - 1 = 0 to 130 psig (0 to 9.0 bar)
       - 2 = 0 to 290 psig (0 to 20.0 bar)
     - RD series with RS2 series pilot regulator
       - 3 = 0 to 1015 psig (0 to 70.0 bar)
     - RDH series with RS2 series pilot regulator
       - 4 = 0 to 145 psig (0 to 10.0 bar)
       - 5 = 0 to 362 psig (0 to 25.0 bar)
       - 6 = 0 to 1450 psig (0 to 100 bar)
       - 7 = 0 to 2537 psig (0 to 175 bar)
       - 8 = 0 to 3625 psig (0 to 250 bar)

8. **Seal Material**
   - V = Fluorocarbon FKM
   - N = Nitrile
   - E = EPDM
   - L = Low temperature Nitrile

9. **Diaphragm Material**
   - V = Fluorocarbon FKM
   - N = Nitrile
   - E = EPDM
   - L = Low temperature Nitrile

10. **Seat Seal Material**
    - RD series
      - V = Fluorocarbon FKM
      - N = Nitrile
      - E = EPDM
      - L = Low temperature Nitrile
    - RDH series
      - K = PCTFE
      - P = PEEK

11. **Options**
    - EF = External feedback to main regulator
    - EFP = External feedback to pilot regulator, limited to 290 psig (20.0 bar)
    - N = NACE MR0175/ISO 15156
    - G93 = ASTM G93 Level C-cleaned
Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators—RD(H)20 and RD(H)25 Series

Features
- Balanced poppet design
- Diaphragm sensing
- Integral pilot regulator with dynamic regulation
- Dome-to-outlet pressure ratio approximately 1:1
- Large dome for improved stability

Options
- External feedback (EF) for improved performance
- EF to main regulator limited by standard outlet pressure range
- EF to pilot regulator limited to 290 psig (20.0 bar)
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (C_v)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Dome Connection</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD20</td>
<td>RD: 1015 (70.0) (507 [35.0] with LRS4 pilot regulator)</td>
<td>RDH: 5800 (400)</td>
<td>Diaphragm</td>
<td>–49 to 176 (-45 to 80)</td>
<td>13</td>
<td>0.98 (25.0)</td>
<td>Dome: 1/4 in. ISO/BSP parallel thread, EN or ASME flange</td>
<td>Use P1 gauge connection of pilot regulator.</td>
<td>44 (20)</td>
</tr>
<tr>
<td>RDH20</td>
<td>RD: 1015 (70.0) RDH: 2900 (200)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RD25</td>
<td>RD: 1015 (70.0) (507 [35.0] with LRS4 pilot regulator)</td>
<td>RDH: 4060 (280)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDH25</td>
<td>RD: 1015 (70.0) RDH: 2900 (200)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See pages 73 to 82 for flow data.

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Dome</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>2 Cap screw</td>
<td>A4-80</td>
</tr>
<tr>
<td>3 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>4 Dome plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>5 Diaphragm</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>6 Diaphragm plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>7 Retaining ring</td>
<td>Commercial stainless steel</td>
</tr>
<tr>
<td>8 Body plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>9 Poppet</td>
<td></td>
</tr>
<tr>
<td>10 O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>11 Seat</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>12 Seat seal RD</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>12 Seat seal RDH</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>13 Poppet housing</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>14 O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>15 Backup ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>16 Poppet spring</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>17 Body</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>18 Plug O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>19 Body plug</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>20 Conical spring (RDH20 only)</td>
<td>302 SS / A313</td>
</tr>
</tbody>
</table>

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based

Wetted components listed in italics.

Gauge plugs (not shown): 431 SS / A276.
**Flow Data**

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RD20 Series**

**Flow Coefficient: 13**

**Maximum Inlet Pressure: 507 psig (35.0 bar)**

**Outlet Pressure Control Range: 0 to 43 psig (0 to 3.0 bar)**

**Pressure Control Range**

- 0 to 43 psig (0 to 3.0 bar)

**RD20 Series**

**Flow Coefficient: 13**

**Maximum Inlet Pressure: 1015 psig (70.0 bar)**

**Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)**

**Pressure Control Range**

- 0 to 1015 psig (0 to 70.0 bar)
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 130 psig (0 to 9.0 bar)
**Flow Data**

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RDH20 Series**

*Flow Coefficient: 13*

*Maximum Inlet Pressure: 5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

**Pressure Control Range**

- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

**RDH20 Series**

*Flow Coefficient: 13*

*Maximum Inlet Pressure: 5800 psig (400 bar)*

*Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)*

**Pressure Control Range**

- 0 to 2900 psig (0 to 200 bar)
- 0 to 2537 psig (0 to 175 bar), calculated
- 0 to 1450 psig (0 to 100 bar), calculated

Swagelok
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD20-EF Series
Flow Coefficient: 13
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Pressure Control Range
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 130 psig (0 to 9.0 bar)
- 0 to 43.0 psig (0 to 3.0 bar)

RD20-EF Series
Flow Coefficient: 13
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range
- 0 to 1015 psig (0 to 70.0 bar)
- 0 to 130 psig (0 to 9.0 bar)
- 0 to 43.0 psig (0 to 3.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RD(H)20-EF Series
Flow Coefficient: 13
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

Pressure Control Range
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

RD(H)20-EF Series
Flow Coefficient: 13
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

Pressure Control Range
- 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD(H)20-EF Series
Flow Coefficient: 13
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)

Pressure Control Range
- 0 to 2900 psig (0 to 200 bar)
- 0 to 2537 psig (0 to 175 bar)

RD20-EFP Series
Flow Coefficient: 13
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Pressure Control Range
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 130 psig (0 to 9.0 bar)
- 0 to 43.0 psig (0 to 3.0 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RD25 Series
Flow Coefficient: 21
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)

RD25 Series
Flow Coefficient: 21
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH25 Series
Flow Coefficient: 21
**Maximum Inlet Pressure:** 4060 psig (280 bar)
**Outlet Pressure Control Range:** 0 to 362 psig (0 to 25.0 bar)

**Pressure Control Range**
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

RDH25 Series
Flow Coefficient: 21
**Maximum Inlet Pressure:** 4060 psig (280 bar)
**Outlet Pressure Control Range:** 0 to 2900 psig (0 to 200 bar)

**Pressure Control Range**
- 0 to 2900 psig (0 to 200 bar)
- 0 to 2537 psig (0 to 175 bar)
- 0 to 1450 psig (0 to 100 bar)
**Flow Data**
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RD25-EF Series**

*Flow Coefficient: 21*

*Maximum Inlet Pressure: 507 psig (35.0 bar)*

*Outlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)*

**Pressure Control Range**
- 0 to 130 psig (0 to 9.0 bar)
- 0 to 43.0 psig (0 to 3.0 bar)

**RD25-EF Series**

*Flow Coefficient: 21*

*Maximum Inlet Pressure: 1015 psig (70.0 bar)*

*Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)*

**Pressure Control Range**
- 0 to 1015 psig (0 to 70.0 bar)
- 0 to 290 psig (0 to 20.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

**RDH25-EF Series**

*Flow Coefficient: 21*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)*

<table>
<thead>
<tr>
<th>Pressure Control Range</th>
<th>Nitrogen Flow, Nm³/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 2900 psig (0 to 200 bar)</td>
<td>0 to 2537 psig (0 to 175 bar)</td>
</tr>
<tr>
<td>0 to 1450 psig (0 to 100 bar)</td>
<td>0 to 1450 psig (0 to 100 bar)</td>
</tr>
</tbody>
</table>

![Pressure Control Range Diagram](image1)

<table>
<thead>
<tr>
<th>Flow Data</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>580 (40.0)</td>
<td>1015 (70.0)</td>
</tr>
<tr>
<td>2900 (200), 4060 (280)</td>
<td></td>
</tr>
</tbody>
</table>

**RDH25-EF Series**

*Flow Coefficient: 21*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)*

<table>
<thead>
<tr>
<th>Pressure Control Range</th>
<th>Nitrogen Flow, std ft³/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 2900 psig (0 to 200 bar)</td>
<td>0 to 2537 psig (0 to 175 bar)</td>
</tr>
<tr>
<td>0 to 1450 psig (0 to 100 bar)</td>
<td>0 to 1450 psig (0 to 100 bar)</td>
</tr>
</tbody>
</table>

![Pressure Control Range Diagram](image2)

<table>
<thead>
<tr>
<th>Flow Data</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>580 (40.0)</td>
<td>1015 (70.0)</td>
</tr>
<tr>
<td>2900 (200), 4060 (280)</td>
<td></td>
</tr>
</tbody>
</table>

---

*Flow Coefficient: 21*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

<table>
<thead>
<tr>
<th>Flow Data</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 362 psig (0 to 25.0 bar)</td>
<td>0 to 1450 psig (0 to 100 bar)</td>
</tr>
<tr>
<td>0 to 1450 psig (0 to 100 bar)</td>
<td>0 to 1450 psig (0 to 100 bar)</td>
</tr>
</tbody>
</table>

![Pressure Control Range Diagram](image3)

<table>
<thead>
<tr>
<th>Flow Data</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>580 (40.0)</td>
<td>1015 (70.0)</td>
</tr>
<tr>
<td>2900 (200), 4060 (280)</td>
<td>280 (4060)</td>
</tr>
</tbody>
</table>

---

*Flow Coefficient: 21*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

<table>
<thead>
<tr>
<th>Flow Data</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 362 psig (0 to 25.0 bar)</td>
<td>0 to 1450 psig (0 to 100 bar)</td>
</tr>
<tr>
<td>0 to 1450 psig (0 to 100 bar)</td>
<td>0 to 1450 psig (0 to 100 bar)</td>
</tr>
</tbody>
</table>

![Pressure Control Range Diagram](image4)

<table>
<thead>
<tr>
<th>Flow Data</th>
<th>Inlet Pressure, psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>580 (40.0)</td>
<td>1015 (70.0)</td>
</tr>
<tr>
<td>2900 (200), 4060 (280)</td>
<td>280 (4060)</td>
</tr>
</tbody>
</table>
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RD25-EFP Series**

*Flow Coefficient: 21*

*Maximum Inlet Pressure: 507 psig (35.0 bar)*

*Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)*

**Pressure Control Range**
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 130 psig (0 to 9.0 bar)
- 0 to 43.0 psig (0 to 3.0 bar)
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>RD(H)20</td>
<td>2 in.</td>
<td>9.33 (237)</td>
</tr>
<tr>
<td>RD(H)25</td>
<td>2 1/2 in.</td>
<td>11.8 (300)</td>
</tr>
</tbody>
</table>

Shown with RS2 series pilot regulator.

Ordering Information

Build an RD(H)20 and RD(H)25 series regulator ordering number by combining the designators in the sequence shown below.

1 Series
RD = 1015 psig (70.0 bar) maximum inlet pressure (507 psig [35.0 bar] with pilot regulator, options 0, 1, or 2)
RDH = 5800 psig (400 bar) maximum inlet pressure (RDH20); 4060 psig (280 bar) maximum inlet pressure (RDH25)

2 Inlet / Outlet
B = Female ISO/BSP parallel thread
N = Female NPT
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange
RD(H)20 only.

3 Size
20 = 2 in. / DN50
25 = 2 1/2 in. / DN65

4 Pressure Class
Omit designator if flanges are not ordered.
A = ASME class 150
B = ASME class 300
C = ASME class 600
E = ASME class 1500
F = ASME class 2500
M = EN class PN16
N = EN class PN40

5 Flange Facing
Omit designator if flanges are not ordered.
1 = Raised face smooth
3 = RTJ

6 Body Material
02 = 316L SS

7 Pilot Regulator Options
Pressure Control Range
X = No pilot regulator, optional
RD series with LRS4 series pilot regulator
0 = 0 to 43 psig (0 to 3.0 bar)
1 = 0 to 130 psig (0 to 9.0 bar)
2 = 0 to 290 psig (0 to 20.0 bar)
RD series with RS2 series pilot regulator
3 = 0 to 1015 psig (0 to 70.0 bar)
RDH series with RS2 series pilot regulator
4 = 0 to 145 psig (0 to 10.0 bar)
5 = 0 to 362 psig (0 to 25.0 bar)
6 = 0 to 1450 psig (0 to 100 bar)
7 = 0 to 2537 psig (0 to 175 bar)
8 = 0 to 2900 psig (0 to 200 bar)

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

9 Diaphragm Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

10 Seat Seal Material
RD series
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile
RDH series
K = PCTFE
P = PEEK

11 Options
EF = External feedback to main regulator
EFP = External feedback to pilot regulator, limited to 290 psig (20.0 bar)
N = NACE MR0175/ISO 15156
G93 = ASTM G93 Level C-cleaned
**Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators—RD(H)30 and RD(H)40 Series**

**Features**
- Balanced poppet design
- Diaphragm sensing
- Integral pilot regulator with dynamic regulation
- Dome-to-outlet pressure ratio approximately 1:1
- Large dome for stability
- Floating seat for improved sealing reliability (patent pending)

**Options**
- External feedback (EF) for improved performance
  - EF to main regulator limited by standard outlet pressure range
  - EF to pilot regulator limited to 290 psig (20.0 bar)
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

**Technical Data**

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (C_v)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Dome Connection</th>
<th>Weight (With Class 150 Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD</td>
<td>1015 (70.0) (507 [35.0] with LRS4 pilot regulator)</td>
<td>1015 (70.0)</td>
<td>Diaphragm</td>
<td>–49 to 176 (–45 to 80)</td>
<td>RD[H]30: 36</td>
<td>RD[H]40: 73</td>
<td>Use P1 gauge connection of pilot regulator.</td>
<td>Dome: 1/4 in. ISO/BSP parallel thread</td>
<td>RD(H)30: 136 (62) RD(H)40: 183 (83)</td>
</tr>
<tr>
<td>RDH</td>
<td>4060 (280) 2900 (200)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See pages 85 to 97 for flow data.

**Materials of Construction**

**Component**  | **Material / Specification**
---|---
1 Cap screw  | A4-80
2 Washer  | A4
3 Dome  | 316L SS / A479
4 Dome plate  | 316L SS / A479
5 Diaphragm  | EPDM, FKM, or nitrile
6 Conical spring (RD[H]30 only)  | 302 SS / A313
7 Diaphragm plate  | 316L SS / A479
8 Retaining ring  | Commercial stainless steel
9 Body assembly (body, reducers, flanges)  | 316L SS / A479
10 Body plate  | 316L SS / A479
11 Poppet  | 316L SS / A479
12 O-ring  | EPDM, FKM, or nitrile
13 Seat  | 316L SS / A479
14 Seat seal  | RD EPDM, FKM, or nitrile RDH PEEK
15 Poppet housing  | 316L SS / A479
16 O-ring  | EPDM, FKM, or nitrile
17 Guide ring  | PTFE
18 Plug O-ring  | EPDM, FKM, or nitrile
19 Poppet spring  | 302 SS / A313
20 Body plug  | 316L SS / A479
21 Washer  | A4
22 Cap Screw  | A4-80

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based.

Wetted components listed in italics.

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD30 Series
Flow Coefficient: 36
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)

RD30 Series
Flow Coefficient: 36
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)
Flow Data
The graphs illustrate the change or "droop" in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

**RDH30 Series**

*Flow Coefficient: 36*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

**Pressure Control Range**
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

**Nitrogen Flow, Nm³/h**

**Outlet Pressure, psig**

**Inlet Pressure, psig (bar)**

Flow Coefficient: 36
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)

**RDH30 Series**

*Flow Coefficient: 36*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)*

**Pressure Control Range**
- 0 to 1450 psig (0 to 100 bar)

**Nitrogen Flow, Nm³/h**

**Outlet Pressure, psig**

**Inlet Pressure, psig (bar)**

Flow Coefficient: 36
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH30 Series
Flow Coefficient: 36
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD30-EF Series
Flow Coefficient: 36
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)

Pressure Control Range
- 0 to 130 psig (0 to 9.0 bar)
- 0 to 43.0 psig (0 to 3.0 bar)

RD30-EF Series
Flow Coefficient: 36
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range
- 0 to 1015 psig (0 to 70.0 bar)
- 0 to 290 psig (0 to 20.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

**RDH30-EF Series**

*Flow Coefficient: 36*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)*

**Pressure Control Range**
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

**Nitrogen Flow, std ft³/min**
**Outlet Pressure, psig**

**Nitrogen Flow, Nm³/h**
**Outlet Pressure, bar**

**RDH30-EF Series**

*Flow Coefficient: 36*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)*

**Pressure Control Range**
- 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RDH30-EF Series
Flow Coefficient: 36
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)

Pressure Control Range
- 0 to 2900 psig (0 to 200 bar)
- 0 to 2537 psig (0 to 175 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RD30-EFP Series
Flow Coefficient: 36
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

RD30-EFP Series
Flow Coefficient: 36
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD40 Series
Flow Coefficient: 73
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)

Pressure Control Range
- 0 to 130 psig (0 to 9.0 bar)
- 0 to 43.0 psig (0 to 3.0 bar)

RD40 Series
Flow Coefficient: 73
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range
- 0 to 1015 psig (0 to 70.0 bar)
- 0 to 290 psig (0 to 20.5 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH40 Series
Flow Coefficient: 73
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)

Pressure Control Range
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 145 psig (0 to 10.0 bar)

RDH40 Series
Flow Coefficient: 73
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

Pressure Control Range
- 0 to 1450 psig (0 to 100 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RDH40 Series
Flow Coefficient: 73
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)

Nitrogen Flow, Nm³/h
Inlet Pressure, psig (bar)
Outlet Pressure, psig
Outlet Pressure, bar
Nitrogen Flow, std ft³/min

RD40-EF Series
Flow Coefficient: 73
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RD40-EF Series
Flow Coefficient: 73
Maximum Inlet Pressure: 1015 psig (70.0 bar)
Outlet Pressure Control Range: 0 to 1015 psig (0 to 70.0 bar)

Pressure Control Range

RDH40-EF Series
Flow Coefficient: 73
Maximum Inlet Pressure: 4060 psig (280 bar)
Outlet Pressure Control Range: 0 to 362 psig (0 to 25.0 bar)
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RDH40-EF Series**

*Flow Coefficient: 73*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)*

---

**RDH40-EF Series**

*Flow Coefficient: 73*

*Maximum Inlet Pressure: 4060 psig (280 bar)*

*Outlet Pressure Control Range: 0 to 2900 psig (0 to 200 bar)*

---
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RD40-EFP Series
Flow Coefficient: 73
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

RD40-EFP Series
Flow Coefficient: 73
Maximum Inlet Pressure: 507 psig (35.0 bar)
Outlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>RD(H)30</td>
<td>3 in.</td>
<td>12.2 (310)</td>
</tr>
<tr>
<td>RD(H)40</td>
<td>4 in.</td>
<td>14.0 (356)</td>
</tr>
</tbody>
</table>

Ordering Information
Build an RD(H)30 and RD(H)40 series regulator ordering number by combining the designators in the sequence shown below.

1 2 3 4 5 6 7 8 9 10 11
RD FA 30 A 1 - 02 - 0 - V V V - EF

1 Series
RD = 1015 psig (70.0 bar) maximum inlet pressure (507 psig [35.0 bar] with pilot regulator, options 0, 1, or 2)
RDH = 4060 psig (280 bar) maximum inlet pressure

2 Inlet / Outlet
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange

3 Size
30 = 3 in. / DN80
40 = 4 in. / DN100

4 Pressure Class
A = ASME class 150
B = ASME class 300
C = ASME class 600
E = ASME class 1500
F = ASME class 2500
M = EN class PN16
N = EN class PN40

5 Flange Facing
1 = Raised face smooth
3 = RTJ

6 Body Material
02 = 316L SS

7 Pilot Regulator Options
Pressure Control Range
X = No pilot regulator, optional
RD series with LRS4 series pilot regulator
0 = 0 to 43 psig (0 to 3.0 bar)
1 = 0 to 130 psig (0 to 9.0 bar)
2 = 0 to 290 psig (0 to 20.0 bar)
RD series with RS2 series pilot regulator
3 = 0 to 1015 psig (0 to 70.0 bar)
RDH series with RS2 series pilot regulator
4 = 0 to 145 psig (0 to 10.0 bar)
5 = 0 to 362 psig (0 to 25.0 bar)
6 = 0 to 1450 psig (0 to 100 bar)
7 = 0 to 2537 psig (0 to 175 bar)
8 = 0 to 2900 psig (0 to 200 bar)

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

9 Diaphragm Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

10 Seat Seal Material
RD series
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile
RDH series
P = PEEK

11 Options
EF = External feedback to main regulator
EFP = External feedback to pilot regulator [outlet pressure limited to 290 psig (20.0 bar)]
N = NACE MR0175/ISO 1516
G93 = ASTM G93 Level C-cleaned
Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators, High Sensitivity—LPRD20, LPRD25, LPRD30, LPRD40 Series

Features
- Balanced poppet design
- Diaphragm sensing
- Integral pilot regulator (LPRS4 series) with dynamic regulation
- High flow
- Large diaphragm for high accuracy
- Integral feedback line
- Inlet and outlet gauges

Options
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauges / Dome Connection</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPRD20</td>
<td>232 (16.0)</td>
<td>29.0 (2.0)</td>
<td>Diaphragm</td>
<td>49 to 176 (45 to 89)</td>
<td>LPRD20: 13</td>
<td>LPRD20: 0.98 (25.0)</td>
<td>EN or ASME flanges—LPRD20: 2 in.</td>
<td>Inlet and outlet gauges included. Dome: 1/4 in. ISO/BSP parallel thread</td>
<td>Varies with model and end connection</td>
</tr>
<tr>
<td>LPRD25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LPRD25: 21</td>
<td>LPRD25: 1.25 (32.0)</td>
<td>LPRD25: 2 1/2 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPRD30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LPRD30: 36</td>
<td>LPRD30: 1.65 (42.0)</td>
<td>LPRD30: 3 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPRD40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LPRD40: 73</td>
<td>LPRD40: 2.36 (60.0)</td>
<td>LPRD40: 4 in.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Dome assembly</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>2 Dome plate (2)</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>3 Diaphragm</td>
<td>A4-80</td>
</tr>
<tr>
<td>4 Cap screw</td>
<td>A4</td>
</tr>
<tr>
<td>5 Nut</td>
<td>A2</td>
</tr>
<tr>
<td>6 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>7 Diaphragm screw</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>8 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>9 O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>10 Push rod</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>11 Guide bushing</td>
<td>PTFE</td>
</tr>
<tr>
<td>13 Retaining ring</td>
<td>Commercial stainless steel</td>
</tr>
<tr>
<td>14 Body plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>15 Poppet</td>
<td>431 SS / A276</td>
</tr>
<tr>
<td>16 Seat</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>17 Poppet spring</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>18 Body plug</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>19 Poppet housing</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>20 Seat seal</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>21 Body assembly</td>
<td>316L SS / A479</td>
</tr>
</tbody>
</table>

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based.

Wetted components listed in italics.

Gauge plugs (not shown): 431 SS / A276.
Flow Data
For flow curve information, contact your authorized Swagelok representative.

Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>Connection Size</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPRD20</td>
<td>2 in.</td>
<td>A: 5.87 (149)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B: 3.94 (100)</td>
</tr>
<tr>
<td>LPRD25</td>
<td>2 1/2 in.</td>
<td>A: 7.01 (178)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B: 2.56 (65.0)</td>
</tr>
<tr>
<td>LPRD30</td>
<td>3 in.</td>
<td>A: 5.87 (149)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B: 3.94 (100)</td>
</tr>
<tr>
<td>LPRD40</td>
<td>4 in.</td>
<td>A: 8.66 (220)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B: 3.94 (100)</td>
</tr>
</tbody>
</table>

Ordering Information
Build an LPRD series regulator ordering number by combining the designators in the sequence shown below.

1 Series
LPRD = 232 psig (16.0 bar) maximum inlet pressure

2 Inlet / Outlet
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange

3 Size
20 = 2 in. / DN50
25 = 2 1/2 in. / DN65
30 = 3 in. / DN80
40 = 4 in. / DN100

4 Pressure Class
A = ASME class 150
N = EN class PN40

5 Flange Facing
1 = Raised face smooth
3 = RTJ

6 Body Material
02 = 316L SS

7 Pressure Control Range
2 = 1.4 to 14.5 psig (0.10 to 1.0 bar)
3 = 4.3 to 29 psig (0.30 to 2.0 bar)

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

9 Diaphragm Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

10 Seat Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

11 Options
G93 = ASTM G93 Level C-cleaned
Air-Loaded, Pressure-Reducing Regulators—RA Series

Features
- Balanced poppet design
- Diaphragm sensing
- Air-loaded pressure control with a choice of pilot-to-outlet pressure ratios.
- Remote control
- Captured self-vent
- Choice of dome-to-outlet pressure ratios: 1:15, 1:40, or 1:70
- Pneumatic actuation by spring-loaded regulator or proportional regulator

Options
- Gauge connection—choice of 4 configurations
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

WARNING: Self-venting regulators can release system fluid to atmosphere. Position the self-vent hole away from operating personnel.

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Outlet Control Pressure(1) psig (bar)</th>
<th>Temperature Range °C (°F)</th>
<th>Flow Coefficient ($C_v$)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge / Dome / Vent Connections</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA4</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td>–40 to 176 (–40 to 80)</td>
<td>1.84</td>
<td>0.39 (10.0)</td>
<td>1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>Gauge: 1/4 in. NPT Dome: 1/4 in. ISO/BSP parallel thread Vent: 1/8 in. ISO/BSP parallel thread</td>
<td>12.5 (5.7)</td>
</tr>
<tr>
<td>RA6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td></td>
<td>13.6 (6.2)</td>
</tr>
<tr>
<td>RA8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 in. ISO/BSP parallel thread, EN or ASME flanges</td>
<td></td>
<td>13.6 (6.2)</td>
</tr>
</tbody>
</table>

See pages 102 to 104 for flow data.

(1) Outlet control limited to 2175 psig (150 bar) for RA series with dome-to-pressure ratio of 1:15.

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Dome assembly</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>2 Cap screw</td>
<td>A4-80</td>
</tr>
<tr>
<td>3 Washer</td>
<td>A4</td>
</tr>
<tr>
<td>4 Nut</td>
<td>A2</td>
</tr>
<tr>
<td>5 Diaphragm / support</td>
<td>EPDM, FKM, or nitrile / PTFE</td>
</tr>
<tr>
<td>6 Diaphragm plate</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>7 Piston plate assembly</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>8 Backup ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>9 O-ring</td>
<td>EPDM, FKM, or nitrile</td>
</tr>
<tr>
<td>10 Piston</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>11 Body</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>12 Relief seat</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>13 Venting poppet</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>14 Seat</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>15 Seat seal</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>16 Poppet</td>
<td>431 SS / A276</td>
</tr>
<tr>
<td>17 Poppet spring</td>
<td>302 SS / A313</td>
</tr>
<tr>
<td>18 Body plug</td>
<td>316L SS / A479</td>
</tr>
</tbody>
</table>

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based.

Wetted components listed in italics.
Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

RA4 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Ratio: 1:15, 1:40, 1:70

Pressure Ratio

Nitrogen Flow, std ft³/min
Outlet Pressure, psig
Nitrogen Flow, Nm³/h
Outlet Pressure, bar

Nitrogen Flow, Nm³/h
Outlet Pressure, psig
Outlet Pressure, bar
Nitrogen Flow, std ft³/min

Pressure Ratio

Nitrogen Flow, std ft³/min
Outlet Pressure, psig
Nitrogen Flow, Nm³/h
Outlet Pressure, bar

Nitrogen Flow, Nm³/h
Outlet Pressure, psig
Outlet Pressure, bar
Nitrogen Flow, std ft³/min

Flow Coefficient: 1.84
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Ratio: 1:15, 1:40, 1:70
Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

RA4 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Ratio: 1:40, 1:70

RA6 and RA8 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: 5800 psig (400 bar)
Outlet Pressure Ratio: 1:15, 1:40, 1:70
**Flow Data**

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

**RA6 and RA8 Series**

*Flow Coefficient: 1.84*  
*Maximum Inlet Pressure: 5800 psig (400 bar)*  
*Outlet Pressure Ratio: 1:15, 1:40, 1:70*

![Graph showing nitrogen flow against outlet pressure for RA6 and RA8 Series](image)

**RA6 and RA8 Series**

*Flow Coefficient: 1.84*  
*Maximum Inlet Pressure: 5800 psig (400 bar)*  
*Outlet Pressure Ratio: 1:40, 1:70*

![Graph showing nitrogen flow against outlet pressure for RA6 and RA8 Series](image)
## Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA4</td>
<td>1/2 in.</td>
<td>A: 2.83 (72.0) B: 3.07 (78.0) C: 2.13 (54.0) D: 3.72 (94.6) F: 5.75 (146)</td>
</tr>
<tr>
<td>RA6</td>
<td>3/4 in.</td>
<td>A: 3.20 (82.0) B: 3.50 (89.0) C: 2.20 (56.0) D: 3.72 (94.6) F: 4.56 (116)</td>
</tr>
<tr>
<td>RA8</td>
<td>1 in.</td>
<td>A: 3.07 (78.0) B: 3.50 (89.0) C: 2.20 (56.0) D: 4.02 (102)</td>
</tr>
</tbody>
</table>

### Standard Configuration

![Standard Configuration Diagram]

Outlet gauge connection
Dome connection

Outlet control range limited to 2175 psig (150 bar).

### Ordering Information

Build an RA series regulator ordering number by combining the designators in the sequence shown below.

```
1  2  3  4  5  6  7  8  9  10  11
RA FA 4 A 1  - 02  - V  V  K  - 15  - GN2
```

#### 1 Series
RA = 5800 psig (400 bar) maximum inlet pressure

#### 2 Inlet / Outlet
- B = Female ISO/BSP parallel thread
- N = Female NPT
- FA = ASME B16.5 flange
- FD = EN 1092 (DIN) flange

#### 3 Size
- 4 = 1/2 in. / DN15
- 6 = 3/4 in. / DN20
- 8 = 1 in. / DN25

#### 4 Pressure Class
Omit designator if flanges are not ordered.
- A = ASME class 150
- B = ASME class 300
- C = ASME class 600
- E = ASME class 1500
- F = ASME class 2500
- M = EN class PN16
- N = EN class PN40

#### 5 Flange Facing
Omit designator if flanges are not ordered.
- 1 = Raised face smooth
- 3 = RTJ

#### 6 Body Material
- 02 = 316L SS

#### 7 Seal Materials
- V = Fluorocarbon FKM
- N = Nitrile
- E = EPDM
- L = Low temperature Nitrile

#### 8 Diaphragm Materials
- V = Fluorocarbon FKM
- N = Nitrile
- E = EPDM
- L = Low temperature Nitrile

#### 9 Seat Seal Materials
- K = PCTFE
- P = PEEK

#### 10 Ratio (Dome-to-Outlet Pressure)
- 15 = 1:15
- 40 = 1:40
- 70 = 1:70

#### 11 Options
- GN2 = Gauge connection, see below
- GN4 = Gauge connection, see below
- GN5 = Gauge connection, see below
- None = Standard connection, see below

### Gauge Connection Configuration

![Gauge Connection Configuration Diagram]

N = NACE MR0175/ISO 15156
G93 = ASTM G93 Level C-cleaned

\(^1\) Not available in combination with flanges.
\(^2\) Outlet control range limited to 2175 psig (150 bar).
Pressure-Reducing Regulators
Dome-Loaded—RD Series Maintenance Kits

Regular maintenance of pressure regulator components is an important part of keeping pressure regulators operating successfully. Swagelok offers several maintenance kit options to help keep components and systems performing well. Outlined below are the standard maintenance kit offerings and an example of which parts are included in each kit. For more detailed information of which parts will be included within a kit for a specific regulator model, please reference the appropriate owner’s manual or contact your authorized Swagelok Sales and Service center.

<table>
<thead>
<tr>
<th>Designator</th>
<th>Kit Type</th>
<th>Typical Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Valve kit</td>
<td>Poppet and housing (9, 13, 18 or 20), O-rings (11, 16a), Back-up rings (19), Seat (10)</td>
</tr>
<tr>
<td>A2</td>
<td>Soft valve kit</td>
<td>Poppet and housing (9, 13, 18 or 20), O-rings (16a), Back-up rings (19)</td>
</tr>
<tr>
<td>B1</td>
<td>Service kit</td>
<td>Poppet and housing (9, 13, 18 or 20), O-rings (11, 16a, 16b, 17, 21, 22), Back-up rings (19), Diaphragm (5), Seat (10)</td>
</tr>
<tr>
<td>B2</td>
<td>Seal kit</td>
<td>O-rings (11, 16a, 16b, 17, 21, 22), Back-up rings (19), Diaphragm (5)</td>
</tr>
<tr>
<td>C1</td>
<td>Overhaul kit</td>
<td>Poppet and housing (9, 13, 18 or 20), O-rings (11, 16a, 16b, 17, 21, 22), Back-up rings (19), Poppet spring (14), Body plug (15), Diaphragm (5), Diaphragm plate (6), Seat (10)</td>
</tr>
<tr>
<td>C2</td>
<td>Body plug kit</td>
<td>O-ring (17, 16b), Body plug (15)</td>
</tr>
<tr>
<td>C3</td>
<td>Sensing kit</td>
<td>Diaphragm (5)</td>
</tr>
<tr>
<td>C5</td>
<td>Poppet spring kit</td>
<td>Poppet spring (14)</td>
</tr>
<tr>
<td>E1</td>
<td>Hardware kit</td>
<td>Bolts (2), Washers (3)</td>
</tr>
</tbody>
</table>

Ordering Information
To order a maintenance kit, add the kit type designator to the regulator ordering number.
Example: RDN10-02-2-VVV-C1
Back-Pressure, Spring-Loaded Regulators—BS Series

The BS series back-pressure regulators are suitable for most gases and liquids. The BS series regulators feature a choice of sensing types (diaphragm or piston), and seat and seal materials to accommodate a variety of pressure, temperature, and flow conditions.

The BS series regulators are available in sizes from 1/4 to 1 1/2 in. with a choice of threaded or flange end connections.

The BSH series regulators are high-pressure versions of the BS series regulators, and the LBS series are low-pressure, high-accuracy versions of the BS series regulators.

The BS series regulators are available with several options, including a variety of gauge connection configurations, antitamper, special cleaning to ASTM G93 Level C, and NACE MR0175/ISO 15156-compliant models.

Features
- Spring-loaded pressure control
- Diaphragm or piston sensing types
- Blue knob or screw adjustment
- 316L SS materials of construction for corrosion resistance
- Maximum inlet pressure rating: 507 to 10 150 psig (35.0 to 700 bar)
- Inlet control pressure range: Up to 0 to 10 150 psig (0 to 700 bar)

Pressure Regulators—RHPS Series

Pressure-Temperature Ratings

<table>
<thead>
<tr>
<th>Seal Material</th>
<th>Temperature Range °F [°C]</th>
<th>Material Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorocarbon FKM</td>
<td>5 to 176 (~15 to 80)</td>
<td>V</td>
</tr>
<tr>
<td>Standard Nitrile</td>
<td>-4 to 176 (~20 to 80)</td>
<td>N</td>
</tr>
<tr>
<td>Low temperature Nitrile</td>
<td>-49 to 176 (~45 to 80)</td>
<td>L</td>
</tr>
<tr>
<td>EPDM</td>
<td>-4 to 176 (~20 to 80)</td>
<td>E</td>
</tr>
<tr>
<td>FFKM</td>
<td>14 to 176 (~10 to 80)</td>
<td>F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seat Material</th>
<th>PCTFE</th>
<th>PEEK</th>
<th>Fluorocarbon FKM, Nitrile, EPDM, FFKM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature °F [°C]</td>
<td>Maximum Inlet Pressure / Working Pressure psig (bar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-49 to -40 (-45 to -40)</td>
<td>-</td>
<td>-</td>
<td>1015 (70.0)</td>
</tr>
<tr>
<td>-40 to -4 (-40 to -20)</td>
<td>5800 (400)</td>
<td>5800 (400)</td>
<td></td>
</tr>
<tr>
<td>95 (35)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>149 (65)</td>
<td>3987 (275)</td>
<td>3987 (275)</td>
<td></td>
</tr>
<tr>
<td>176 (80)</td>
<td>1812 (125)</td>
<td>1812 (125)</td>
<td></td>
</tr>
</tbody>
</table>

Technical Data—Performance Ratings

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure (psig)</th>
<th>Maximum Inlet Control Pressure (psig)</th>
<th>Flow Coefficient $C_v$</th>
<th>Sensing Type</th>
<th>Flow Data on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS2</td>
<td>5 800 (400)</td>
<td>5 075 (350)</td>
<td>0.10</td>
<td>Piston</td>
<td>110</td>
</tr>
<tr>
<td>BSH2</td>
<td>10 150 (700)</td>
<td>10 150 (700)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS4</td>
<td>1 015 (70.0)</td>
<td>406 (28.0) diaphragm 5 220 (360) piston</td>
<td>1.84 (0.39 in. [10.0 mm] seat)</td>
<td>Diaphragm or piston</td>
<td>114</td>
</tr>
<tr>
<td>BSH4</td>
<td>5 800 (400)</td>
<td>5 220 (360) piston</td>
<td>0.49 (0.19 in. [5.0 mm] seat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS6</td>
<td>1 015 (70.0)</td>
<td>203 (14.0) diaphragm 5 220 (360) piston</td>
<td>1.95 (0.39 in. [10.0 mm] seat)</td>
<td>Diaphragm or piston</td>
<td>115</td>
</tr>
<tr>
<td>BSH6</td>
<td>5 800 (400)</td>
<td>5 220 (360) piston</td>
<td>0.49 (0.19 in. [5.0 mm] seat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS8</td>
<td>1 015 (70.0)</td>
<td>203 (14.0) diaphragm 5 220 (360) piston</td>
<td>(0.39 in. [10.0 mm] seat)</td>
<td>Diaphragm or piston</td>
<td>116</td>
</tr>
<tr>
<td>BSH8</td>
<td>5 800 (400)</td>
<td>5 220 (360) piston</td>
<td>0.49 (0.19 in. [5.0 mm] seat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS10</td>
<td>1 015 (70.0)</td>
<td>290 (20.0) diaphragm 3 625 (250) piston</td>
<td>3.84 (0.39 in. [10.0 mm] seat)</td>
<td>Diaphragm or piston</td>
<td>—</td>
</tr>
<tr>
<td>BSH10</td>
<td>3 625 (250)</td>
<td>3 625 (250) piston</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS15</td>
<td>1 015 (70.0)</td>
<td>290 (20.0) diaphragm 3 625 (250) piston</td>
<td>7.3 (0.39 in. [10.0 mm] seat)</td>
<td>Diaphragm or piston</td>
<td>—</td>
</tr>
<tr>
<td>BSH15</td>
<td>3 625 (250)</td>
<td>3 625 (250) piston</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LBS4</td>
<td>507 (35.0)</td>
<td>290 (20.0)</td>
<td>1.3</td>
<td>Diaphragm</td>
<td>125</td>
</tr>
</tbody>
</table>

① Regulator pressure rating may be limited by connection type.
**Back-Pressure, Spring-Loaded Regulators—BS Series**

![BS Series Regulator with Diaphragm Sensing and Standard Knob Handle](image1)

![BSH Series Regulator with Piston Sensing and Antitamper Option](image2)

**Technical Data—Design**

<table>
<thead>
<tr>
<th>Series</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge Connection</th>
<th>Weight (Without Flanges) lb (kg)</th>
<th>More Information on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS2</td>
<td>0.087 (2.2)</td>
<td>1/4 in. NPT</td>
<td>1/4 in. NPT</td>
<td>3.3 (1.5)</td>
<td>109</td>
</tr>
<tr>
<td>BSH2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS4</td>
<td>0.39 (10.0) or 0.19 (5.0)</td>
<td>1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>7.7 (3.5)</td>
<td>113</td>
</tr>
<tr>
<td>BSH4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS6</td>
<td>0.39 (10.0) or 0.19 (5.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>9.9 (4.5)</td>
<td>113</td>
</tr>
<tr>
<td>BSH6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS8</td>
<td>0.39 (10.0) or 0.19 (5.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>9.9 (4.5)</td>
<td>113</td>
</tr>
<tr>
<td>BSH8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS10</td>
<td>0.53 (13.5)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT or ISO/BSP parallel thread</td>
<td>16.7 (7.6)</td>
<td>118</td>
</tr>
<tr>
<td>BSH10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS15</td>
<td>0.75 (19.0)</td>
<td>1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT or ISO/BSP parallel thread</td>
<td>22.0 (10)</td>
<td>118</td>
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<tr>
<td>BSH15</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LBS4</td>
<td>0.31 (8.0)</td>
<td>1/2 in. NPT</td>
<td>1/4 in. NPT</td>
<td>5.7 (2.6)</td>
<td>124</td>
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**Technical Data—Design (cont.)**

<table>
<thead>
<tr>
<th>Series</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Gauge Connection</th>
<th>Weight (Without Flanges) lb (kg)</th>
<th>More Information on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS2</td>
<td>0.087 (2.2)</td>
<td>1/4 in. NPT</td>
<td>1/4 in. NPT</td>
<td>3.3 (1.5)</td>
<td>109</td>
</tr>
<tr>
<td>BSH2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS4</td>
<td>0.39 (10.0) or 0.19 (5.0)</td>
<td>1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>7.7 (3.5)</td>
<td>113</td>
</tr>
<tr>
<td>BSH4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS6</td>
<td>0.39 (10.0) or 0.19 (5.0)</td>
<td>3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>9.9 (4.5)</td>
<td>113</td>
</tr>
<tr>
<td>BSH6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS8</td>
<td>0.39 (10.0) or 0.19 (5.0)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT</td>
<td>9.9 (4.5)</td>
<td>113</td>
</tr>
<tr>
<td>BSH8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS10</td>
<td>0.53 (13.5)</td>
<td>1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT or ISO/BSP parallel thread</td>
<td>16.7 (7.6)</td>
<td>118</td>
</tr>
<tr>
<td>BSH10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS15</td>
<td>0.75 (19.0)</td>
<td>1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges</td>
<td>1/4 in. NPT or ISO/BSP parallel thread</td>
<td>22.0 (10)</td>
<td>118</td>
</tr>
<tr>
<td>BSH15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LBS4</td>
<td>0.31 (8.0)</td>
<td>1/2 in. NPT</td>
<td>1/4 in. NPT</td>
<td>5.7 (2.6)</td>
<td>124</td>
</tr>
</tbody>
</table>
Compact, General-Purpose, Spring-Loaded Back-Pressure Regulators—BS(H)2 Series

Features
- Piston sensing
- Bottom mounting
- Low-friction piston for better control

Options
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C
- Panel mounting kit sold separately—no disassembly required

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Inlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (Cv)</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connections</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS2</td>
<td>5 800 (400)</td>
<td>5 075 (350)</td>
<td>Piston</td>
<td>–40 to 176 (~–40 to 80)</td>
<td>0.10</td>
<td>0.087 (2.2)</td>
<td>1/4 in. NPT</td>
<td>3.3 (1.5)</td>
</tr>
<tr>
<td>BSH2</td>
<td>10 150 (700)</td>
<td>10 150 (700)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knob assembly with adjusting screw, nuts, washer Blue ABS with 431 SS</td>
</tr>
<tr>
<td>2</td>
<td>Spring housing cover 431 SS / A276</td>
</tr>
<tr>
<td>3</td>
<td>Spring housing 316L SS / A479</td>
</tr>
<tr>
<td>4</td>
<td>C-ring A2</td>
</tr>
<tr>
<td>5</td>
<td>Spring guide 316L SS / A479</td>
</tr>
<tr>
<td>6</td>
<td>Set spring 50CRV4</td>
</tr>
<tr>
<td>7</td>
<td>Bottom spring guide 316L SS / A479</td>
</tr>
<tr>
<td>8</td>
<td>Backup ring (BSH only) PTFE</td>
</tr>
<tr>
<td>9</td>
<td>O-rings EPDM, FKM, FFKM, or nitrile</td>
</tr>
<tr>
<td>10</td>
<td>Piston plate 316L SS / A479</td>
</tr>
<tr>
<td>11</td>
<td>Piston 316L SS / A479</td>
</tr>
<tr>
<td>12</td>
<td>Overtravel spring 302 SS / A313</td>
</tr>
<tr>
<td>13</td>
<td>Piston screw 316L SS / A479</td>
</tr>
<tr>
<td>14</td>
<td>Body plug 316L SS / A479</td>
</tr>
<tr>
<td>15</td>
<td>Poppet 431 SS / A276</td>
</tr>
<tr>
<td>16</td>
<td>Seat PCTFE or PEEK</td>
</tr>
<tr>
<td>17</td>
<td>Seat retainer 316L SS / A479</td>
</tr>
<tr>
<td>18</td>
<td>Body 316L SS / A479</td>
</tr>
</tbody>
</table>

Wetted lubricants: Silicone-based and synthetic hydrocarbon-based

Wetted components listed in italics.
Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

BS(H)2 Series
Flow Coefficient: 0.10
Maximum Inlet Pressure: BS2—5800 psig (400 bar); BSH2—10 150 psig (700 bar)
Inlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

BS(H)2 Series
Flow Coefficient: 0.10
Maximum Inlet Pressure: BS2—5800 psig (400 bar); BSH2—10 150 psig (700 bar)
Inlet Pressure Control Range: 0 to 5075 psig (0 to 350 bar)
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

BSH2 Series
Flow Coefficient: 0.10
Maximum Inlet Pressure: 10 150 psig (700 bar)
Inlet Pressure Control Range: 0 to 10 150 psig (0 to 700 bar)
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

Panel Mounting Kit
No disassembly required when using panel mount kit. Panel mounting kit ordering numbers:
BS2 series: RS2-P-02
BSH2 series: RSH2-P-02

Ordering Information
Build a BS2 or BSH2 series regulator ordering number by combining the designators in the sequence shown below.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
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<td>-</td>
<td>02</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>V</td>
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<tr>
<td>BS</td>
<td>N2</td>
<td>-</td>
<td>02</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>BS</td>
<td>N2</td>
<td>-</td>
<td>02</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>BS</td>
<td>N2</td>
<td>-</td>
<td>02</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>V</td>
</tr>
</tbody>
</table>

1. Series
   BS = 5800 psig (400 bar) maximum inlet pressure
   BSH = 10 150 psig (700 bar) maximum inlet pressure

2. Inlet / Outlet
   N2 = 1/4 in. female NPT

3. Body Material
   02 = 316L SS

4. Pressure Control Range
   BS and BSH series
   1 = 0 to 145 psig (0 to 10.0 bar)
   2 = 0 to 362 psig (0 to 25.0 bar)
   3 = 0 to 1450 psig (0 to 100 bar)
   4 = 0 to 2537 psig (0 to 175 bar)
   5 = 0 to 5075 psig (0 to 350 bar)
   BSH series only
   6 = 0 to 10 150 psig (0 to 700 bar)

5. Seal Material
   BS and BSH series
   V = Fluorocarbon FKM
   N = Nitrile
   E = EPDM
   F = FFKM
   BSH series only
   L = Low temperature Nitrile

6. Piston Seals
   BS and BSH series
   V = Fluorocarbon FKM
   N = Nitrile
   E = EPDM
   F = FFKM
   BSH series only
   L = Low temperature Nitrile

7. Seat Material
   BS series
   K = PCTFE
   P = PEEK
   BSH series
   P = PEEK

8. Options
   N = NACE MR0175/ISO 15156
   G93 = ASTM G93 Level C-cleaned
General-Purpose, Spring-Loaded Back-Pressure Regulators—BS(H)4, BS(H)6, and BS(H)8 Series

Features
- Diaphragm sensing: 0 to 406 psig (0 to 28.0 bar)
- Piston sensing: 0 to 5220 psig (0 to 360 bar)
- Threaded vent to monitor seal integrity

Options
- Antitamper
- Gauge connections — choice of 4 configurations
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Material / Specification</th>
<th>Weight (Without Flanges)</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L SS / A479</td>
<td>7.7 (3.5)</td>
</tr>
<tr>
<td>316L SS and A2-70</td>
<td>9.9 (4.5)</td>
</tr>
</tbody>
</table>

Materials of Construction

BS Series Regulator with Diaphragm Sensing and Standard Knob

BSH Series Regulator with Piston Sensing and Antitamper Option

Component | Material / Specification |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Spring housing</td>
<td></td>
</tr>
<tr>
<td>2 Spring guide</td>
<td></td>
</tr>
<tr>
<td>3 Ball</td>
<td></td>
</tr>
<tr>
<td>4 Set spring</td>
<td></td>
</tr>
<tr>
<td>5 Cap screw</td>
<td></td>
</tr>
<tr>
<td>6 Washer</td>
<td></td>
</tr>
<tr>
<td>7 Seat seal</td>
<td></td>
</tr>
<tr>
<td>8 Body</td>
<td></td>
</tr>
<tr>
<td>9 Poppet</td>
<td></td>
</tr>
<tr>
<td>10 O-rings</td>
<td></td>
</tr>
<tr>
<td>11 Seat</td>
<td></td>
</tr>
<tr>
<td>12 Overtravel spring</td>
<td></td>
</tr>
<tr>
<td>13 Body plug</td>
<td></td>
</tr>
<tr>
<td>14 Knob assembly with adjusting screw, nuts, washers</td>
<td></td>
</tr>
<tr>
<td>15 Antitamper with O-ring, adjusting screw</td>
<td></td>
</tr>
<tr>
<td>16 Diaphragm</td>
<td></td>
</tr>
<tr>
<td>17 Diaphragm plate</td>
<td></td>
</tr>
<tr>
<td>18 Diaphragm screw</td>
<td></td>
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<tr>
<td>19 Piston plate</td>
<td></td>
</tr>
<tr>
<td>20 Piston</td>
<td></td>
</tr>
<tr>
<td>21 Backup ring</td>
<td></td>
</tr>
<tr>
<td>22 Piston screw</td>
<td></td>
</tr>
</tbody>
</table>

Common Components

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Actuation

Diaphragm Only

16 Diaphragm EPDM, FKM, or nitrile
17 Diaphragm plate 316L SS / A479
18 Diaphragm screw 316L SS / A479

Piston Only

19 Piston plate 316L SS / A479
20 Piston 316L SS / A479
21 Backup ring PTFE
22 Piston screw 316L SS / A479

Wetted lubricant: Silicone-based, synthetic hydrocarbon-based

See pages 114 and 116 for flow data.
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

BS(H)4 Series
Flow Coefficient: 1.84
Maximum Inlet Pressure: BS4—1015 psig (70.0 bar); BSH4—5800 psig (400 bar)

BSH4 Series
Flow Coefficient: 0.49
Maximum Inlet Pressure: 5800 psig (400 bar)
Inlet Pressure Control Range: 0 to 5220 psig (0 to 360 bar)
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

BS(H)6 Series
Flow Coefficient: 1.95
Maximum Inlet Pressure: BS6—1015 psig (70.0 bar); BSH6—5800 psig (400 bar)

Pressure Control Range
0 to 5220 psig (360 bar)

BSH6 Series
Flow Coefficient: 0.49
Maximum Inlet Pressure: 5800 psig (400 bar)
Inlet Pressure Control Range: 0 to 5220 psig (0 to 360 bar)
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

BS(H)8 Series
Flow Coefficient: 2.07
Maximum Inlet Pressure: BS8—1015 psig (70.0 bar); BSH8—5800 psig (400 bar)

BSH8 Series
Flow Coefficient: 0.49
Maximum Inlet Pressure: 5800 psig (400 bar)
Inlet Pressure Control Range: 0 to 5220 psig (0 to 360 bar)
## Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS(H)4</td>
<td>1/2 in.</td>
<td>9.06 (230) 2.83 (72.0) 3.07 (78.0) 2.09 (53.0) 3.62 (92.0)</td>
</tr>
<tr>
<td>BS(H)6</td>
<td>3/4 in.</td>
<td>9.25 (235) 3.23 (82.0) 3.50 (89.0) 2.20 (56.0) 3.94 (100)</td>
</tr>
<tr>
<td>BS(H)8</td>
<td>1 in.</td>
<td>9.25 (235) 3.07 (78.0) 3.50 (89.0) 2.20 (56.0) 3.94 (100)</td>
</tr>
</tbody>
</table>

**Panel Mounting**

*BS(H)4 only*

- 4 mounting holes, M6 thread
- Inlet gauge connection

**Configuration**

*Top*

- Inlet connection
- Outlet connection

*Inlet gauge connection*

**Gauge Connection Configuration**

- Standard: GN1, GN2, GN5
- GN93 = ASTM G93 Level C-cleaned

**Gauge Connection Configuration**

- GN = NACE MR0175/ISO 15156

---

**Ordering Information**

Build a BS(H)4, BS(H)6, and BS(H)8 series regulator ordering number by combining the designators in the sequence shown below.

1 BS 4 1 - 02 - 1 - V V K - GN2

**1 Series**

- BS = 1015 psig (70.0 bar) maximum inlet pressure
- BSH = 5800 psig (400 bar) maximum inlet pressure

**2 Inlet / Outlet**

- B = Female ISO/BSP parallel thread
- N = Female NPT
- FA = ASME B16.5 flange
- FD = EN 1092 (DIN) flange

**3 Size**

- 4 = 1/2 in. / DN15
- 6 = 3/4 in. / DN20
- 8 = 1 in. / DN25

**4 Pressure Class**

- Omit designator if flanges are not ordered.
- A = ASME class 150
- B = ASME class 300
- C = ASME class 600
- E = ASME class 1500
- F = ASME class 2500
- M = EN class PN16
- N = EN class PN40

**5 Flange Facing**

- Omit designator if flanges are not ordered.
- 1 = Raised face smooth
- 3 = RTJ

**6 Body Material**

- 02 = 316L SS

**7 Pressure Control Range**

- Diaphragm sensing
  - 1 = 0 to 43 psig (0 to 3.0 bar)
  - 2 = 0 to 101 psig (0 to 7.0 bar)
  - 3 = 0 to 203 psig (0 to 14.0 bar)
  - 4 = 0 to 406 psig (0 to 28.0 bar)\(^\dagger\)
- Piston sensing
  - 4 = 0 to 406 psig (0 to 28.0 bar)\(^\dagger\)
  - 5 = 0 to 580 psig (0 to 40.0 bar)
  - 6 = 0 to 1160 psig (0 to 80.0 bar)
  - 7 = 0 to 2175 psig (0 to 150 bar)
  - 9 = 0 to 4060 psig (0 to 280 bar)
  - 11 = 0 to 5220 psig (0 to 360 bar)

**8 Seal Material**

- V = Fluorocarbon FKM
- N = Nitrile
- E = EPDM
- L = Low temperature Nitrile

**9 Diaphragm / Piston O-Rings**

- V = Fluorocarbon FKM
- N = Nitrile
- E = EPDM
- L = Low temperature Nitrile

**10 Seat Seal Material**

- K = PCTFE
- P = PEEK

**11 Options**

- A = Antitamper
- GN1 = Gauge connection, see below
- GN2 = Gauge connection, see below
- GN5 = Gauge connection, see below
- None = Standard connection, see below
General-Purpose, Spring-Loaded Back-Pressure Regulators—BS(H)10 and BS(H)15 Series

Features
■ Balanced poppet design
■ Diaphragm sensing: 0 to 290 psig (0 to 20.0 bar)
■ Piston sensing: 0 to 3625 psig (0 to 250 bar)
■ High flow capacity

Options
■ NACE MR0175/ISO 15156-compliant models
■ Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Inlet Control Pressure psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (C_v)</th>
<th>Seat Diameter In. (mm)</th>
<th>Connections</th>
<th>Weight (Without Flanges) lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS(H)10</td>
<td>BS: 1015 (70.0) BSH: 3625 (250)</td>
<td>BS: 290 (20.0) BSH: 3625 (250)</td>
<td>Diaphragm: 0 to 290 psig (20.0 bar)</td>
<td>–49 to 176 (~–45 to 80)</td>
<td>3.84</td>
<td>0.53 (13.5)</td>
<td>1 in. DN25</td>
<td>NPT ISO/BSP parallel thread ASME or EN flange</td>
</tr>
<tr>
<td>BS(H)15</td>
<td></td>
<td></td>
<td>Piston: 0 to 3625 psig (0 to 250 bar)</td>
<td></td>
<td></td>
<td>0.75 (19.0)</td>
<td>1 1/2 in. DN40</td>
<td></td>
</tr>
</tbody>
</table>

See pages 119 to 122 for flow data.
① Regulators with NPT inlet / outlet connections have 1/4 in. NPT gauge connections.

Materials of Construction

[Description of materials used in the construction of the regulators, with specific components listed and their specifications.]

Wetted lubricant: Silicone-based, synthetic hydrocarbon-based

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

BS10 Series
Flow Coefficient: 3.84
Maximum Inlet Pressure: 1015 psig (70 bar)
Inlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

Pressure Control Range
- 0 to 290 psig (0 to 20.0 bar)
- 0 to 145 psig (0 to 10.0 bar)
- 0 to 72 psig (0 to 5.0 bar)
- 0 to 43 psig (0 to 3.0 bar)
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

BSH10 Series
Flow Coefficient: 3.84
Maximum Inlet Pressure: 3625 psig (250 bar)
Inlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

BSH10 Series
Flow Coefficient: 3.84
Maximum Inlet Pressure: 3625 psig (250 bar)
Inlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

BS15 Series
Flow Coefficient: 7.3
Maximum Inlet Pressure: 1015 psig (70 bar)
Inlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

BSH15 Series
Flow Coefficient: 7.3
Maximum Inlet Pressure: 3625 psig (250 bar)
Inlet Pressure Control Range: 0 to 1450 psig (0 to 100 bar)

Pressure Control Range
- 0 to 1450 psig (0 to 100 bar)
- 0 to 580 psig (0 to 40.0 bar)

Nitrogen Flow, Nm³/h

BSH15 Series
Flow Coefficient: 7.3
Maximum Inlet Pressure: 3625 psig (250 bar)
Inlet Pressure Control Range: 0 to 3625 psig (0 to 250 bar)

Pressure Control Range
- 0 to 3625 psig (0 to 250 bar)
- 0 to 2610 psig (0 to 180 bar)
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Series</th>
<th>End Connection Size</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>BS(H)10</td>
<td>1 in.</td>
<td>10.5 (266)</td>
</tr>
<tr>
<td>BS(H)15</td>
<td>1 1/2 in.</td>
<td>10.8 (275)</td>
</tr>
</tbody>
</table>

Gauge Connection
Only one gauge with a 50 mm (2 in.) or larger dial size fits directly into the body.

Configuration
Top

Ordering Information
Build a BS(H)10 and BS(H)15 series regulator ordering number by combining the designators in the sequence shown below.

1  2  3  4  5  6  7  8  9  10  11
BS FA 10 A 1 - 02 - 1 - V V V - N

1 Series
BS = 1015 psig (70.0 bar) maximum inlet pressure
BSH = 3625 psig (250 bar) maximum inlet pressure

2 Inlet / Outlet
B = Female ISO/BSP parallel thread
N = Female NPT
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange

3 Size
10 = 1 in. / DN25
15 = 1 1/2 in. / DN40

4 Pressure Class
Omit designator if flanges are not ordered.
A = ASME class 150
B = ASME class 300
C = ASME class 600
E = ASME class 1500
F = ASME class 2500
M = EN class PN16
N = EN class PN40

5 Flange Facing
Omit designator if flanges are not ordered.
1 = Raised face smooth
3 = RTJ

6 Body Material
02 = 316L SS

7 Pressure Control Range
Diaphragm sensing (BS series only)
1 = 0 to 43 psig (0 to 3.0 bar)
2 = 0 to 72 psig (0 to 5.0 bar)
3 = 0 to 145 psig (0 to 10.0 bar)
4 = 0 to 290 psig (0 to 20.0 bar)

Piston sensing (BSH series only)
5 = 0 to 580 psig (0 to 40.0 bar)
6 = 0 to 1450 psig (0 to 100 bar)
7 = 0 to 2610 psig (0 to 180 bar)
8 = 0 to 3625 psig (0 to 250 bar)

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

9 Diaphragm / Piston O-Rings
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

10 Seat Seal Material
BS series
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
L = Low temperature Nitrile

BSH series
K = PCTFE
P = PEEK

11 Options
N = NACE MR0175/ISO 15156
G93 = ASTM G93 Level C-cleaned

Swagelok
High-Sensitivity, Spring-Loaded Back-Pressure Regulators—LBS4 Series

Features
- Diaphragm sensing
- Bottom mounting and panel mounting

Options
- NACE MR0175/ISO 15156-compliant model
- Special cleaning to ASTM G93 Level C

Technical Data

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum Inlet Pressure psig (bar)</th>
<th>Maximum Inlet Control Pressure(^\circ) psig (bar)</th>
<th>Sensing Type</th>
<th>Temperature Range °F (°C)</th>
<th>Flow Coefficient (C(_v))</th>
<th>Seat Diameter in. (mm)</th>
<th>Inlet and Outlet Connection</th>
<th>Gauge Connection</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBS4</td>
<td>507 (35.0)</td>
<td>290 (20.0)</td>
<td>Diaphragm</td>
<td>–49 to 176 (–45 to 80)</td>
<td>1.3</td>
<td>0.31 (8.0)</td>
<td>1/2 in. NPT</td>
<td>1/4 in. NPT</td>
<td>5.7 (2.6)</td>
</tr>
</tbody>
</table>

See pages 125 and 126 for flow data.

\(^\circ\) Maximum inlet control pressure limited to 130 psig (9.0 bar) for regulators built with 316SS diaphragms.

Materials of Construction

LBS Series Regulator with Soft Seat

<table>
<thead>
<tr>
<th>Component</th>
<th>Material / Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Knob assembly with adjusting screw, nuts</td>
<td>Blue ABS with 431 SS</td>
</tr>
<tr>
<td>2 Spring housing cover</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>3 Spring housing</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>4 C-ring</td>
<td>A2</td>
</tr>
<tr>
<td>5 Spring guide</td>
<td>50CRV4</td>
</tr>
<tr>
<td>6 Set spring</td>
<td>FKM, FFKM, EPDM, or nitrile</td>
</tr>
<tr>
<td>7 Cap screw</td>
<td>A4-80</td>
</tr>
<tr>
<td>8 Washer</td>
<td>A2</td>
</tr>
<tr>
<td>9 Bottom spring guide</td>
<td>A4-80</td>
</tr>
<tr>
<td>10 Clamp ring</td>
<td>A2</td>
</tr>
<tr>
<td>11 Diaphragm</td>
<td>PTFE or 316L SS</td>
</tr>
<tr>
<td>12 Body</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>13 Seat retainer</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>14 Poppet housing</td>
<td>316L SS / A479</td>
</tr>
<tr>
<td>15 Seat seal</td>
<td>431 SS / A276</td>
</tr>
<tr>
<td>16 O-ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>17 Seat</td>
<td>FKM, FFKM, EPDM, or nitrile</td>
</tr>
</tbody>
</table>

Wetted lubricants: Silicone-based, synthetic hydrocarbon-based

Wetted components listed in italics.

Gauge plugs (not shown): 431 SS / A276.
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases.
For more flow curve information, contact your authorized Swagelok representative.

LBS4 Series
Flow Coefficient: 1.3
Maximum Inlet Pressure: 507 psig (35.0 bar)
Inlet Pressure Control Range: 0 to 43 psig (0 to 3.0 bar)

![Diagram showing nitrogen flow and pressure control range for LBS4 Series]

LBS4 Series
Flow Coefficient: 1.3
Maximum Inlet Pressure: 507 psig (35.0 bar)
Inlet Pressure Control Range: 0 to 290 psig (0 to 20.0 bar)

![Diagram showing nitrogen flow and pressure control range for LBS4 Series]
Flow Data
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases. For more flow curve information, contact your authorized Swagelok representative.

LBS4 Series
Flow Coefficient: 1.3
Maximum Inlet Pressure: 507 psig (35.0 bar)
Inlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)

Pressure Control Range

Option 316L SS Diaphragm

LBS4 Series
Flow Coefficient: 1.3
Maximum Inlet Pressure: 507 psig (35.0 bar)
Inlet Pressure Control Range: 0 to 130 psig (0 to 9.0 bar)

Pressure Control Range

Option 316L SS Diaphragm
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

Ordering Information

Build an LBS4 series regulator ordering number by combining the designators in the sequence shown below.

1 Series
LBS = 507 psig (35.0 bar) maximum inlet pressure

2 Inlet / Outlet
N4 = 1/2 in. female NPT

3 Body Material
02 = 316L SS

4 Pressure Control Range
1 = 0 to 43 psig (0 to 3.0 bar)
2 = 0 to 130 psig (0 to 9.0 bar)
3 = 0 to 290 psig (0 to 20.0 bar)

5 Seal Material
T = PTFE
L = Low temperature Nitrile

6 Diaphragm
T = PTFE
M = 316L SS: only for 0 to 43 psig (0 to 3.0 bar) and 0 to 130 psig (0 to 9.0 bar) pressure control ranges
L = Low temperature Nitrile

7 Seat Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM
F = FFKM
L = Low temperature Nitrile

8 Options
N = NACE MR0175/ISO 15156
G93 = ASTM G93 Level C-cleaned

Shown with tubing for clarity; tubing not included.
Regular maintenance of pressure regulator components is an important part of keeping pressure regulators operating successfully. Swagelok offers several maintenance kit options to help keep components and systems performing well. Outlined below are the standard maintenance kit offerings and an example of which parts are included in each kit. For more detailed information of which parts will be included within a kit for a specific regulator model, please reference the appropriate owner’s manual or contact your authorized Swagelok Sales and Service center.

### Designator | Kit Type | Diaphragm Sensing Typical Contents | Piston Sensing Typical Contents
--- | --- | --- | ---
A1 | Valve kit | Poppet (9), Seat seal (7) | Poppet (9), Seat seal (7)
A2 | Soft valve kit | Seat seal (7) | Seat seal (7)
B1 | Service kit | Poppet (9), O-ring (10a), Diaphragm (16), Seat seal (7) | Poppet (9), O-rings (10a, 10b, 10c, 10d), Back-up rings (21a, 21b, 21c), Seat seal (7)
B2 | Seal kit | O-ring (10a), Diaphragm (16) | O-rings (10a, 10b, 10c, 10d), Back-up rings (21a, 21b, 21c)
C1 | Overhaul kit | Spring guide (2), Ball (3), Set spring (4), Poppet (9), O-ring (10a), Overtorque spring (12), Body plug (13), Diaphragm (16), Diaphragm plate (17), Diaphragm screw (18), Seat seal (7), Seat (11) | Spring guide (2), Ball (3), Set spring (4), Poppet (9), O-rings (10a, 10b, 10c, 10d), Back-up rings (21a, 21b, 21c), Overtorque spring (12), Body plug (13), Piston (20), Piston plate (19), Piston screw (22), Seat seal (7), Seat (11)
C2 | Body plug kit | Body plug (13), O-ring (10a) | Body plug (13), O-ring (10a), Back-up ring (21a)
C3 | Sensing kit | Diaphragm (16) | Piston (20), Piston plate (19), O-rings (10c, 10d), Back-up ring (21c)
C4 | Range spring kit | Range spring (4) | Range spring (4)
C5 | Poppet spring kit | Overtorque spring (12) | Overtorque spring (12)
D1 | Handle kit | Handle assembly (14) | Handle assembly (14)
E1 | Hardware kit | Bolts (5), Washers (6) | Bolts (5), Washers (6)

**Ordering Information**

To order a maintenance kit, add the **kit type designator** to the regulator ordering number. Example: BSN4-02-2-VVK-C1
Additional Products

- For additional Swagelok pressure regulators, refer to *Pressure Regulators catalog*, MS-02-230.

- For tank blanketing regulators, refer to *Tank Blanketing Pressure Regulators, RHPS Series* catalog, MS-02-431.

- For Swagelok pressure gauges, refer to *Industrial and Process Pressure Gauges* catalog, MS-02-170.

- For sanitary pressure regulators, refer to *Sanitary Pressure Regulators, RHPS Series* catalog, MS-02-436.

- For Swagelok tube fittings products, refer to *Gaugeable Tube Fittings and Adapter Fittings* catalog, MS-01-140.

⚠️ **RHPS series pressure regulators are not “Safety Accessories” as defined in the Pressure Equipment Directive 2014/68/EU.**

⚠️ **Do not use the regulator as a shutoff device.**

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**Caution:** Do not mix or interchange parts with those of other manufacturers.
Introduction

Since 1947, Swagelok has designed, developed, and manufactured high-quality, general-purpose and specialty fluid system products to meet the evolving needs of global industries. Our focus is on understanding our customers’ needs, finding timely solutions, and adding value with our products and services.

We are pleased to provide this global edition of the book-bound Swagelok Product Catalog, which compiles more than 100 separate product catalogs, technical bulletins, and reference documents into one convenient, easy-to-use volume. Each product catalog is up to date at the time of printing, with its revision number shown on the last page the individual catalog; for example, the Swagelok Gaugable Tube Fittings and Tube Adapters catalog is MS-01-140, RevW. Subsequent revisions will supersede the printed version and will be posted on the Swagelok website and in the Swagelok electronic Desktop Technical Reference (eDTR) tool.

For more information, visit your Swagelok website or contact your authorized Swagelok sales and service representative.

Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Caution: Do not mix or interchange parts with those of other manufacturers.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

Swagelok, Ferrule-Pak, Goop, Hinging-Collecting, IGC, Kenmac, Micro-Fit, Nupro, Snoop, Sno-Trik, SWAK, VCO, VCR, Ultra-Torr, Whitley—TM Swagelok Company
15-7 PH—TM AK Steel Corp.
AccuTrak, Beacon, Westlock—TM Tyco International Services
Aflas—TM Asahi Glass Co., Ltd.
ASCO, El-O-Matic—TM Emerson
AutoCAD—TM Autodesk, Inc.
CSA—TM Canadian Standards Association
Crawfit, DuPont, Kairez, Krytox, Tefolon, Viton—TM E.I. duPont Nemours and Company
DeviceNet—TM ODVA
Dyneon, Elgiloy, TFM—TM Dyneon
Elgiloy—TM Elgiloy Specialty Metals
FM—TM FM Global
Grafoil—TM GrafTech International Holdings, Inc.
Honeywell, MICRO SWITCH—TM Honeywell
MAC—TM MAC Valves
Microsoft, Windows—TM Microsoft Corp.
NACE—TM NACE International
PH 15-7 Mo, 17-7 PH—TM AK Steel Corp
picofast—Hans Tuck KG
Pillar—TM Nippon Pillar Packing Company, Ltd.
Raychem—TM Tyco Electronics Corp.
Sandvik, SAF 2507—TM Sandvik AB
Simriz—TM Freudenberg-NOK
SolidWorks—TM SolidWorks Corporation
UL—Underwriters Laboratories Inc.
Xylan—TM Whitford Corporation
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