Pressure Regulators

- Pressure-reducing models
- Back-pressure models
- Gas cylinder changeover model
- Vaporizing models
Swagelok® Pressure Regulator Features

**Stop Plate**
The disc is braced by the cap shoulder to protect against a ruptured diaphragm.

**Range Spring**
Turning the handle compresses the spring, pushing the poppet away from the seat and increasing outlet pressure.

**Two-Piece Cap**
The two-piece design provides linear load on the diaphragm seal when the cap ring is tightened, eliminating torque damage to the diaphragm during assembly.

**Poppet Damper**
The poppet damper keeps the poppet aligned and reduces vibration and resonance.

**Stem**
Fine-pitch threads enable precise spring adjustment with low torque.

**Convoluted Diaphragm**
The all-metal diaphragm acts as the sensing mechanism between the inlet pressure and the range spring. The convoluted, nonperforated design ensures greater sensitivity and longer life. A piston sensing mechanism (shown below) can accommodate higher pressures.

**Inlet Outlet**
**Gauze Inlet Filter**
Regulators are susceptible to damage from system particles. Swagelok pressure-reducing regulators include a 25 μm filter that is held in the inlet port with a retaining ring to prevent it from accidentally falling out. It can be removed easily for cleaning or to use the regulator in liquid service.

**Venting Options**
The self-vent option allows excess outlet pressure to vent through the body cap. This can occur when downstream flow is suddenly reduced or when the handle is adjusted to a lower pressure with little or no flow downstream.

The captured-vent option includes a 1/8 in. female NPT connection and stem seal in the body cap to allow monitoring of the diaphragm or piston sensing mechanism. It also allows containment of hazardous gas or liquid media.

**Self-vent and captured-vent** options can be ordered together so that hazardous gas or liquid media can be contained if vented.

The captured-vent port is in the bottom of the KHR series body.

**Piston Sensing Mechanism**
Piston sensing mechanisms typically are used to regulate higher pressures than a diaphragm can withstand. They are also more resistant to damage caused by pressure spikes and have a short stroke to maximize cycle life.

**Fully-Contained Piston**
The piston is contained by a shoulder in the regulator body cap to prevent piston blowout if the regulator outlet is overpressurized.
Pressure Regulator Operation

Regulators reduce the pressure of a gas or liquid from a source, such as a cylinder or compressor, to a lower value needed by a device, such as an analyzer. A pressure regulator provides better resolution and control when its inlet and control range pressures closely match the pressure requirements of the fluid handling system. Resolution is the number of handle turns needed to adjust a regulator from its lowest to highest outlet pressure setting. Control is the ability of the regulator to hold a given outlet pressure set point.

Pressure-Reducing Regulators

Pressure-reducing regulators control outlet pressure by balancing an adjustable spring force against the forces caused by inlet and outlet pressures. The spring force is adjusted by turning the stem/handle, which sets the desired outlet pressure.

As inlet pressure decreases, the force balance changes. To compensate, outlet pressure will increase. This supply-pressure effect (SPE) is a function of the design and type of regulator. If a regulator is subjected to fluctuating inlet pressure, and outlet pressure variations are not desirable, a two-stage regulator is available.

Specialty Pressure-Reducing Regulators

Gas Cylinder Changeover

A two-stage gas cylinder changeover model automatically switches between two sources.

Vaporizing

Vaporization regulators are available with electric and steam heat to vaporize liquid samples or to preheat gas samples.

Pressure Regulator Selection

<table>
<thead>
<tr>
<th>Series</th>
<th>Diaphragm Sensing</th>
<th>Piston Sensing</th>
<th>2 Stage</th>
<th>Gas Cylinder Changeover</th>
<th>Electrical Vaporizing</th>
<th>Steam Vaporizing</th>
<th>Compact, MPC Platform</th>
<th>Maximum Inlet Pressure (psig) (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPR</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 to ....</td>
</tr>
<tr>
<td>KCY</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6000 (413)</td>
</tr>
<tr>
<td>KLF</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 000 (689)</td>
</tr>
<tr>
<td>KCP</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPP</td>
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</tr>
<tr>
<td>KPF</td>
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<tr>
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<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KHR</td>
<td>✓</td>
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<td></td>
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<td>KCM</td>
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<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6000 (413)</td>
</tr>
<tr>
<td>KSV</td>
<td>✓</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KEV</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>KBP</td>
<td>✓</td>
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<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Outlet pressures up to 500 psig (34.4 bar) require diaphragm sensing mechanism; outlet pressures above 500 psig (34.4 bar) require piston sensing mechanism.
Back-Pressure Regulators
Back-pressure regulators control inlet pressure by balancing an adjustable spring force against the force of the inlet pressure. The spring force is adjusted by turning the stem/handle, which sets the desired inlet pressure.

When the force caused by the inlet pressure rises above the force of the spring, the regulator opens until the spring force and inlet pressure are balanced again.

⚠️ Swagelok pressure regulators are not “Safety Accessories” as defined in the Pressure Equipment Directive 97/23/EC.

⚠️ Do not use the regulator as a shutoff device.

Cleaning and Packaging
Every Swagelok regulator is cleaned and packaged in accordance with Swagelok Standard Cleaning and Packaging (SC-10), MS-06-62.

Cleaning and packaging to ensure compliance with product cleanliness requirements stated in ASTM G93 Level E is available for KPR and KCY series regulators.

Oxygen Service Hazards
For more information about hazards and risks of oxygen-enriched systems, see the Swagelok Oxygen System Safety technical report, MS-06-13.
General-Purpose Diaphragm-Sensing, Pressure-Reducing Regulators (KPR Series)

The KPR series is a compact regulator with excellent accuracy, sensitivity, and set-point pressure stability.

Features
- Convoluted, nonperforated diaphragm
- Metal-to-metal diaphragm seal
- Low internal volume
- Two-piece cap design provides linear load on the diaphragm seal
- High-flow, dual-gauze type filter positively retained in inlet port

Technical Data

Maximum Inlet Pressure
- 3600 psig (248 bar)

Pressure Control Ranges
- 0 to 10 psig (0.68 bar) through 0 to 500 psig (34.4 bar)

Flow Coefficient ($C_v$)
- 0.06 and 0.20
  
  See page 41 for flow graphs.
- 0.02 and 0.50 also available

Maximum Operating Temperature
- 176°F (80°C) with PCTFE seat
- 392°F (200°C) with PEEK seat

Weight
- 2.4 lb (1.1 kg)

Ports
- 1/4 in. female NPT inlet, outlet, and gauge ports (all body materials)
- 1/4 in. tube stub inlet, outlet, and gauge ports (316 SS body material only)
- 1/4 in. VCR® inlet, outlet, and gauge ports (316 SS body material only)

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>316 SS</th>
<th>Brass CW721R</th>
<th>Alloy 400/R-405</th>
<th>Alloy C-276</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring button</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring stabilizer(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range spring</td>
<td></td>
<td></td>
<td>316 SS or zinc-plated steel, depending on configuration</td>
<td></td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, stop plate, body cap, panel nuts(2)</td>
<td>316 SS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VCR nuts(2)</td>
<td>316 SS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat retainer</td>
<td>316 SS</td>
<td></td>
<td>Alloy 400/ R-405</td>
<td>Alloy C-276</td>
</tr>
<tr>
<td>Seat</td>
<td>PCTFE or PEEK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter, retaining ring</td>
<td>316 SS</td>
<td></td>
<td>Alloy C-276</td>
<td></td>
</tr>
<tr>
<td>Diaphragm(2)</td>
<td>Alloy X-750 or alloy C-276</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
<td></td>
<td>Alloy 400/ R-405</td>
<td>Alloy C-276</td>
</tr>
<tr>
<td>Poppet spring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poppet damper, filter ring</td>
<td>PTFE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-vent seal(2)</td>
<td></td>
<td>Fluorocarbon FKM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>316 SS</td>
<td></td>
<td>Alloy 400/ R-405</td>
<td>Alloy C-276</td>
</tr>
<tr>
<td>Tube stub ports(2)</td>
<td>316L SS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VCR gland ports(2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
(1) Not required in all configurations.
(2) Not shown.
(3) Regulators with control ranges higher than 0 to 100 psig (0 to 6.8 bar) are assembled with two diaphragms.
Dimensions

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

Panel 0.39 (10.0) thick maximum with 2 lock nuts
Panel 0.63 (16.0) thick maximum with 1 lock nut
Panel cutout 1.38 (35.0) dia

Mounting holes
10-32, 0.33 deep
(M5 × 0.8, 8.5 deep)

2.13
(54.0)
dia

0.75
(19.0)

0.75
(19.0)

5.00
(127)

2.16
(55.0)
dia

3.00
(76.2)

3.70
(94.0)

0.84
(21.3)

0.84
(21.3)

Ordering Information

Build a KPR series regulator ordering number by combining the designators in the sequence shown below.

4 5 6 7 8 9 10 11 12 13 14 15 16

KPR 1 F R F 4 1 2 A 2 0 0 0 0

4 Body Material
1 = 316 SS
2 = Brass CW721R
4 = Alloy 400/R-405
5 = Alloy C-276
A = 316 SS, ASTM G93 Level E-cleaned
B = Brass, ASTM G93 Level E-cleaned
C = 316 SS, SC-11–cleaned
D = Brass, SC-11–cleaned

5 Pressure Control Range
C = 0 to 10 psig (0 to 0.68 bar)
D = 0 to 25 psig (0 to 1.7 bar)
E = 0 to 50 psig (0 to 3.4 bar)
F = 0 to 100 psig (0 to 6.8 bar)
G = 0 to 250 psig (0 to 17.2 bar)
J = 0 to 500 psig (0 to 34.4 bar)

6 Maximum Inlet Pressure
F = 100 psig (6.8 bar)
J = 500 psig (34.4 bar)
L = 1000 psig (68.9 bar)
P = 3000 psig (206 bar) 
R = 3600 psig (248 bar)

7 Port Configuration
A, B, C, F, H, K, L

See Port Configurations, page 52.

8 Ports
4 = 1/4 in. female NPT
T = 1/4 in. × 0.035 in. tube stub
V = 1/4 in. VCR gland, no nuts
X = 1/4 in. rotatable female VCR fitting
Y = 1/4 in. rotatable male VCR fitting

9 Seat Material
1 = PCTFE
2 = PEEK

10 Flow Coefficient ($C_v$)
1 = 0.02
2 = 0.06
5 = 0.20
7 = 0.50

11 Sensing Mechanism, Vent
A = Alloy X-750 diaphragm, no vent
C = Alloy X-750 diaphragm, self vent
E = Alloy X-750 diaphragm, captured vent
F = Alloy X-750 diaphragm, self and captured vent
H = Alloy C-276 diaphragm, no vent

12 Handle, Mounting
2 = Knob
3 = 316 SS antitamper nut
6 = Knob, panel mount
7 = 316 SS antitamper nut, panel mount

13 Isolation and Relief Valves
0 = No valves
For isolation and relief valve options, see page 54.

14 Cylinder Connections
0 = No connections
For CGA cylinder connection options, see page 53.

15 Gauges
0 = No gauges
For inlet and outlet gauge options, see page 54.

16 Options
0 = No options
H = Inboard helium leak test to a maximum leak rate of $1 \times 10^{-5}$ std cm$^3$/s
3 = 3 ft, 1/4 in. FM series metal flexible hose, 1/4 in. female NPT inlet
4 = 3 ft, 1/4 in. TH series PTFE-lined, stainless steel braided hose, 1/4 in. female NPT inlet

Select KPR series regulators are available that meet the testing requirements of ASTM G175, “Standard Test Method for Evaluating the Ignition Sensitivity and Fault Tolerance of Oxygen Regulators Used for Medical and Emergency Applications.” Contact your authorized Swagelok sales and service representative.
Two-Stage Diaphragm-Sensing, Pressure-Reducing Regulators (KCY Series)

The KCY series is designed for use in applications requiring constant outlet pressure even with wide variations in inlet pressure. This two-stage regulator is comparable to two single-stage regulators connected in series. The first stage is factory set to reduce the inlet pressure to 500 psig (34.4 bar). The second stage can be adjusted with the handle to achieve the required outlet pressure.

This two-stage arrangement minimizes the supply-pressure effect caused by fluctuating inlet pressure, such as with a depleting gas cylinder. As inlet pressure drops below the setting of the first stage, the regulator then functions as a single-stage regulator. The first-stage pressure setting can be reduced while monitoring the pressure at the interstage port, but lower flow may result.

Features
- Convoluted, nonperforated diaphragm
- Metal-to-metal diaphragm seal
- Excellent set-point stability
- Supply-pressure effect of approximately 0.01%
- High-flow, dual-gauze type filter positively retained in inlet port

Technical Data

Maximum Inlet Pressure
- 3600 psig (248 bar)

Pressure Control Ranges
- 0 to 10 psig (0.68 bar) through 0 to 500 psig (34.4 bar)

Flow Coefficient ($C_v$)
- 0.06 and 0.20
- See page 42 for flow graphs.
- 0.50 also available

Maximum Operating Temperature
- 176°F (80°C) with PCTFE seat
- 392°F (200°C) with PEEK seat

Weight
- 4.2 lb (1.9 kg)

Ports
- 1/4 in. female NPT inlet, outlet, and gauge ports

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>316 SS</th>
<th>Brass CW721R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knob handle, cover</td>
<td>Nylon</td>
<td>316 SS</td>
</tr>
<tr>
<td>Spring buttons</td>
<td>316 SS (1st stage)</td>
<td>Zinc-plated steel (2nd stage)</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
<td></td>
</tr>
<tr>
<td>Range springs</td>
<td>316 SS (0 to 10 through 0 to 100 psig control ranges)</td>
<td>Zinc-plated steel (0 to 250 and 0 to 500 psig control ranges)</td>
</tr>
<tr>
<td>Seats</td>
<td>PCTFE or PEEK</td>
<td></td>
</tr>
<tr>
<td>Diaphragms,® poppet springs</td>
<td>Alloy X-750</td>
<td></td>
</tr>
<tr>
<td>Poppets</td>
<td>S17400 SS®</td>
<td></td>
</tr>
<tr>
<td>Poppet dampers, filter ring</td>
<td>PTFE</td>
<td></td>
</tr>
<tr>
<td>Interstage port plug</td>
<td>316 SS with PTFE tape</td>
<td></td>
</tr>
<tr>
<td>Self-vent seal®,</td>
<td>Fluorocarbon FKM</td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>316 SS</td>
<td></td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
<td></td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
1. Not required in all configurations.
2. Regulators with control range 0 to 100 psig (0 to 6.8 bar) and 0.20 $C_v$ have zinc-plated steel range spring.
3. Not shown.
4. Regulators with control ranges higher than 0 to 100 psig (0 to 6.8 bar) are assembled with two diaphragms.
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
</table>
| 4 | Body Material | 1 = 316 SS  
2 = Brass CW721R  
A = 316 SS, ASTM G93 Level E-cleaned  
B = Brass, ASTM G93 Level E-cleaned  
C = 316 SS, SC-11--cleaned  
D = Brass, SC-11--cleaned |
| 8 | Ports | 4 = 1/4 in. female NPT |
| 9 | Seat Material | 1 = PCTFE  
2 = PEEK |
| 10 | Flow Coefficient (Cv) | 2 = 0.06  
5 = 0.20  
7 = 0.50 |
| 11 | Sensing Mechanism, Vent | A = Alloy X-750 diaphragm, no vent  
C = Alloy X-750 diaphragm, self vent  
E = Alloy X-750 diaphragm, captured vent |
| 12 | Handle, Mounting | 2 = Knob  
3 = Antitamper nut  
6 = Knob, second-stage panel mount  
7 = Antitamper nut, second-stage panel mount  
9 = Knob, first-stage panel mount |
| 13 | Isolation and Relief Valves | 0 = No valves  
For isolation and relief valve options, see page 54. |
| 14 | Cylinder Connections | 0 = No connections  
For CGA cylinder connection options, see page 53. |
| 15 | Gauges | 0 = No gauges  
For inlet and outlet gauge options, see page 54. |
| 16 | Options | 0 = No options  
3 = 3 ft, 1/4 in. FM series metal flexible hose, 1/4 in. female NPT inlet  
4 = 3 ft, 1/4 in. TH series PTFE-lined stainless steel braided hose, 1/4 in. female NPT inlet  
For more information about hoses, see page 56. |

Select KCY series regulators are available that meet the testing requirements of ASTM G175, “Standard Test Method for Evaluating the Ignition Sensitivity and Fault Tolerance of Oxygen Regulators Used for Medical and Emergency Applications.” Contact your authorized Swagelok representative.
### High-Sensitivity Diaphragm-Sensing, Pressure-Reducing Regulators (KLF Series)

The KLF series provides high-sensitivity pressure control of gases or liquids with minimum droop in both low-flow and low-pressure applications.

#### Features
- Large-diameter convoluted, nonperforated diaphragm for increased pressure sensitivity
- Metal-to-metal diaphragm seal
- High-flow, dual-gauze type filter positively retained in inlet port

#### Technical Data

**Maximum Inlet Pressure**
- 3600 psig (248 bar)

**Pressure Control Ranges**
- 0 to 2.0 psig (0.13 bar) through 0 to 250 psig (17.2 bar)

**Flow Coefficient ($C_v$)**
- 0.02 and 0.06
  
  *See page 43 for flow graphs.*
- 0.20 and 0.50 also available

**Maximum Operating Temperature**
- 176°F (80°C) with PCTFE seat
- 392°F (200°C) with PEEK seat

**Weight**
- 4.0 lb (1.8 kg)

**Ports**
- 1/4 in. female NPT inlet, outlet, and gauge ports

#### Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>Zinc-plated steel</td>
</tr>
<tr>
<td>Spring stabilizer&lt;sup&gt;1&lt;/sup&gt;</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS or zinc-plated steel, depending on configuration</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, stop plate, body cap, panel nuts&lt;sup&gt;2&lt;/sup&gt;</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, filter, retaining ring</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Diaphragm, poppet spring</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet damper, filter ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

<sup>1</sup> Not required in all configurations.
<sup>2</sup> Not shown.
<sup>3</sup> Regulators with control range 0 to 250 psig (0 to 17.2 bar) are assembled with two diaphragms.
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Material</td>
<td>1 = 316 SS</td>
<td></td>
<td></td>
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<tr>
<td>Pressure Control Range</td>
<td>B = 0 to 2.0 psig (0 to 0.13 bar)(^{(1)})</td>
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<tr>
<td></td>
<td>C = 0 to 10 psig (0 to 0.68 bar)</td>
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<tr>
<td></td>
<td>D = 0 to 25 psig (0 to 1.7 bar)</td>
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<tr>
<td></td>
<td>E = 0 to 50 psig (0 to 3.4 bar)</td>
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<tr>
<td></td>
<td>F = 0 to 100 psig (0 to 6.8 bar)</td>
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<tr>
<td></td>
<td>G = 0 to 250 psig (0 to 17.2 bar)</td>
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</tr>
<tr>
<td>Maximum Inlet Pressure (^{(2)})</td>
<td>C = 15 psig (1.0 bar)</td>
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<td></td>
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<tr>
<td></td>
<td>F = 100 psig (6.8 bar)</td>
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<tr>
<td></td>
<td>J = 500 psig (34.4 bar)</td>
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<tr>
<td></td>
<td>L = 1000 psig (68.9 bar)</td>
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<tr>
<td></td>
<td>P = 3000 psig (206 bar) (^{(3)})</td>
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<tr>
<td></td>
<td>R = 3600 psig (248 bar) (^{(4)})</td>
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<tr>
<td>Port Configuration</td>
<td>A, B, C, F, L</td>
<td></td>
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<tr>
<td></td>
<td>A = Alloy X-750 diaphragm, no vent</td>
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<tr>
<td></td>
<td>E = Alloy X-750 diaphragm, captured vent</td>
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<tr>
<td>Flow Coefficient ((C_v))</td>
<td>1 = 0.02</td>
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<tr>
<td></td>
<td>2 = 0.06</td>
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<td></td>
<td>5 = 0.20</td>
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<tr>
<td></td>
<td>7 = 0.50</td>
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<tr>
<td>Sensing Mechanism, Vent</td>
<td>A = Alloy X-750 diaphragm, no vent</td>
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<tr>
<td></td>
<td>E = Alloy X-750 diaphragm, captured vent</td>
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</tr>
<tr>
<td>Handle, Mounting</td>
<td>2 = Knob</td>
<td></td>
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<tr>
<td></td>
<td>3 = 316 SS antitamper nut</td>
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<td></td>
<td>6 = Knob, panel mount</td>
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<tr>
<td></td>
<td>7 = 316 SS antitamper nut, panel mount</td>
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<tr>
<td>Isolation and Relief Valves</td>
<td>0 = No valves</td>
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</tr>
<tr>
<td></td>
<td>For isolation and relief valve options, see page 54.</td>
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<td></td>
</tr>
<tr>
<td>Cylinder Connections</td>
<td>0 = No connection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>For CGA cylinder connection options, see page 53.</td>
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<tr>
<td>Gauges</td>
<td>0 = No gauges</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>For inlet and outlet gauge options, see page 54.</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td>0 = No options</td>
<td></td>
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<tr>
<td></td>
<td>3 = 3 ft, 1/4 in. FM series metal flexible hose, 1/4 in. female NPT inlet</td>
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<tr>
<td></td>
<td>4 = 3 ft, 1/4 in. TH series PTFE-lined, stainless steel braided hose, 1/4 in. female NPT inlet</td>
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<tr>
<td></td>
<td>For more information about hoses, see page 56.</td>
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</tbody>
</table>
High-Flow, High-Sensitivity Diaphragm-Sensing, Pressure-Reducing Regulators (KHF Series)

The KHF series combines the high-flow capabilities—1.0 $C_v$—of a bulk distribution regulator with the high sensitivity and accuracy of a point-of-use regulator.

**Features**
- Large-diameter convoluted, nonperforated diaphragm for increased pressure sensitivity
- Metal-to-metal diaphragm seal
- Balanced poppet for supply-pressure effect of approximately 0.2 %
- High-flow dual-gauze type filter positively retained in inlet port

**Technical Data**

**Maximum Inlet Pressure**
- 3600 psig (248 bar)

**Pressure Control Ranges**
- 0 to 10 psig (0.68 bar) through 0 to 250 psig (17.2 bar)

**Flow Coefficient ($C_v$)**
- 1.0

*See page 44 for flow graphs.*

**Maximum Operating Temperature**
- 176°F (80°C) with PCTFE seat
- 392°F (200°C) with PEEK seat

**Weight**
- 4.4 lb (2.0 kg)

**Ports**
- 1/2 in. female NPT inlet and outlet;
  1/4 in. female NPT gauge port

---

**Materials of Construction**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS (0 to 250 psig range)</td>
</tr>
<tr>
<td>Spring stabilizer$\dagger$</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS (0 to 10 and 0 to 25 psig control ranges)</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, stop plate, body cap, panel nuts$\dagger$</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, spring retainer, seat retainer, filter retaining ring, poppet seal retainer</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Diaphragm$\dagger$</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Poppet seal, filter ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Poppet seal spring</td>
<td>Eligiloy $\circledR$</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

$\dagger$ Not included in regulators with 0 to 250 psig (0 to 17.2 bar) control range.

$\circledR$ Not shown.

$\dagger$ Regulators with control range 0 to 250 psig (0 to 17.2 bar) are assembled with two diaphragms.
Dimensions

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

![Diagram showing dimensions and cutout]

Ordering Information

Build a KHF series regulator ordering number by combining the designators in the sequence shown below.

\[
\text{KHF 1 F R F 8 1 8 A 2 0 0 0 0}
\]

- **4 Body Material**: 1 = 316 SS
- **5 Pressure Control Range**: C = 0 to 10 psig (0 to 0.68 bar) D = 0 to 25 psig (0 to 1.7 bar) E = 0 to 50 psig (0 to 3.4 bar) F = 0 to 100 psig (0 to 6.8 bar) G = 0 to 250 psig (0 to 17.2 bar)
- **6 Maximum Inlet Pressure**: R = 3600 psig (248 bar)
- **7 Port Configuration**: A, B, C, F, L
  - See Port Configurations, page 52.
- **8 Ports**: 8 = 1/2 in. female NPT inlet and outlet; 1/4 in. female NPT gauge port
- **9 Seat Material**: 1 = PCTFE 2 = PEEK
- **10 Flow Coefficient \( (C_v) \)**: 8 = 1.0
- **11 Sensing Mechanism, Vent**: A = Alloy X-750 diaphragm, no vent E = Alloy X-750 diaphragm, captured vent
- **12 Handle, Mounting**: 2 = Knob 3 = 316 SS antitamper nut 6 = Knob, panel mount 7 = 316 SS antitamper nut, panel mount
- **13 Isolation and Relief Valves**: 0 = No valves
  - For isolation and relief valve options, see page 54.
- **14 Cylinder Connections**: 0 = No connections
- **15 Gauges**: 0 = No gauges
  - For inlet and outlet gauge options, see page 54.
- **16 Options**: 0 = No options
**Compact, Piston-Sensing, Pressure-Reducing Regulators (KCP Series)**

The KCP series is a compact, piston-sensing pressure regulator with a short stroke to minimize wear in high-cycling applications.

**Features**
- Low internal volume
- Fully contained piston
- High-flow, dual-gauze type filter positively retained in inlet port
- ANSI/ISA 76.00.02-compliant modular platform component (MPC) configuration available; MPC platform regulator does not contain a filter

**Technical Data**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum Inlet Pressure</strong></td>
<td>3600 psig (248 bar)</td>
</tr>
<tr>
<td><strong>Pressure Control Ranges</strong></td>
<td>0 to 10 psig (0.68 bar) through 0 to 1500 psig (103 bar)</td>
</tr>
<tr>
<td><strong>Flow Coefficient ($C_v$)</strong></td>
<td>0.06 and 0.20; 0.02 and 0.50 also available</td>
</tr>
<tr>
<td><strong>Maximum Operating Temperature</strong></td>
<td>176°F (80°C) with PCTFE seat; 392°F (200°C) with PEEK seat</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>1.0 lb (0.45 kg)</td>
</tr>
<tr>
<td><strong>Ports</strong></td>
<td>1/8 in. female NPT inlet, outlet, and gauge ports; MPC platform</td>
</tr>
</tbody>
</table>

**Materials of Construction**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thumbwheel handle</td>
<td>Anodized aluminum</td>
</tr>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>Zinc-plated steel</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS or zinc-plated steel, depending on configuration</td>
</tr>
<tr>
<td>Stem, stem nut, body cap, panel nuts</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, piston, filter, retaining ring</td>
<td>316 SS</td>
</tr>
<tr>
<td>Piston seal</td>
<td>Fluorocarbon FKM or Kalrez®</td>
</tr>
<tr>
<td>Seat</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Filter ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in *italics.*
- Not shown.
- MPC platform regulator does not contain a filter.
**Pressure Regulators**

Panel 0.50 (12.7) thick maximum between two nuts
Panel cutout 1.38 (35.0) dia

**Dimensions**

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

![Dimensions Diagram]

**Ordering Information**

Build a KCP series regulator ordering number by combining the designators in the sequence shown below.

```
   4  5  6  7  8  9  10  11  12  13  14  15  16
KCP 1  F  R  A  2  A  2  P  1  0  0  0  0
```

4 **Body Material**
   1 = 316 SS

5 **Pressure Control Range**
   C = 0 to 10 psig (0 to 0.68 bar)
   D = 0 to 25 psig (0 to 1.7 bar)
   E = 0 to 50 psig (0 to 3.4 bar)
   F = 0 to 100 psig (0 to 6.8 bar)
   G = 0 to 250 psig (0 to 17.2 bar)
   J = 0 to 500 psig (0 to 34.4 bar)
   L = 0 to 1000 psig (0 to 68.9 bar)
   M = 0 to 1500 psig (0 to 103 bar)
   ➀ Not available with MPC platform port configuration.

6 **Maximum Inlet Pressure**
   F = 100 psig (6.8 bar)
   J = 500 psig (34.4 bar)
   L = 1000 psig (68.9 bar)
   R = 3600 psig (248 bar)
   ➁ For better resolution and control, select a pressure that closely matches system pressure.
   ➂ Not available with MPC platform port configuration.

7 **Port Configuration**
   A, B, C, 5, 6
   See Port Configurations, page 52.

8 **Ports**
   2 = 1/8 in. female NPT
   M = MPC platform

9 **Seat, Seal Material**
   A = PCTFE, fluorocarbon FKM
   B = PCTFE, Kalrez
   C = PEEK, fluorocarbon FKM
   D = PEEK, Kalrez

10 **Flow Coefficient (C_v)**
   1 = 0.02
   2 = 0.06
   5 = 0.20
   7 = 0.50
   ➀ Not available with MPC platform port configuration.

11 **Sensing Mechanism**
   P = 316 SS piston

12 **Handle, Mounting**
   1 = Thumbwheel
   2 = Knob
   3 = 316 SS antitamper nut
   5 = Thumbwheel, panel mount
   6 = Knob, panel mount
   7 = 316 SS antitamper nut, panel mount

13 **Isolation Valves**
   0 = No valves
   For isolation valve options, see page 54.

14 **Cylinder Connections**
   0 = No connections

15 **Gauges**
   0 = No gauges
   For inlet and outlet gauge options, see page 54.

16 **Options**
   0 = No options
Medium- to High-Pressure Piston-Sensing, Pressure-Reducing Regulators (KPP Series)

The KPP series meets the demands of a wide range of gas or liquid applications in a lightweight, compact installation footprint. These features make the KPP pressure regulator an ideal pressure control solution within high-density OEM equipment.

**Features**
- Lightweight, compact design
- Live-loaded body seals
- Low internal volume
- High-flow, dual-gauze type filter positively retained in inlet port

**Technical Data**

<table>
<thead>
<tr>
<th>Maximum Inlet Pressure</th>
<th>Pressure Control Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000 psig (413 bar)</td>
<td>0 to 1000 psig (68.9 bar) through 0 to 3600 psig (248 bar)</td>
</tr>
</tbody>
</table>

**Flow Coefficient ($C_v$)**
- 0.02 and 0.06
  
  See page 48 for flow graphs.

**Maximum Operating Temperature**
- 392°F (200°C)

**Weight**
- 2.5 lb (1.2 kg)

**Ports**
- 1/4 in. female NPT inlet, outlet, and gauge ports

**Materials of Construction**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS (0 to 3000 and 0 to 3600 psig range) Zinc-plated steel (all other ranges)</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>Zinc-plated steel</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, body cap, panel nuts</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, filter, retaining ring, piston, piston guide</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat, piston seal retainer</td>
<td>PEEK</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet spring</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Piston seal ring, body seal spring</td>
<td>Eligiloy</td>
</tr>
<tr>
<td>Poppet damper, filter ring, piston seal, body seal</td>
<td>PTFE</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

1. 316 SS in regulators with 0 to 2000 psig (0 to 137 bar) control range with 6000 psig (413 bar) inlet pressure and regulators with 0 to 2000 psig (0 to 137 bar) control range, 4000 psig (275 bar) inlet pressure, and 0.06 $C_v$.
2. Not included in regulators with 316 SS spring button.
3. Not shown.
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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

| KPP | L | W | A | 4 | 2 | 2 | P | 2 | 0 | 0 | 0 | 0 |

4 Body Material
1 = 316 SS

5 Pressure Control Range
L = 0 to 1000 psig (0 to 68.9 bar)
M = 0 to 1500 psig (0 to 103 bar)
N = 0 to 2000 psig (0 to 137 bar)
P = 0 to 3000 psig (0 to 206 bar)\(^{\circ}\)
R = 0 to 3600 psig (0 to 248 bar)\(^{\circ}\)
\(^{\circ}\) Not available with 2000 psig (137 bar) maximum inlet pressure.

6 Maximum Inlet Pressure\(^{\circ}\)
N = 2000 psig (137 bar)
S = 4000 psig (275 bar)
W = 6000 psig (413 bar)
\(^{\circ}\) For better resolution and control, select a pressure that closely matches system pressure

7 Port Configuration
A, B, C, F, H, K, L
See Port Configurations, page 52.

8 Ports
4 = 1/4 in. female NPT

9 Seat, Seal Materials
2 = PEEK, PTFE

10 Flow Coefficient \((C_v)\)
1 = 0.02
2 = 0.06

11 Sensing Mechanism, Vent
P = 316 SS piston, no vent
V = 316 SS piston, captured vent

12 Handle, Mounting
2 = Knob
3 = 316 SS antitamper nut
6 = Knob, panel mount
7 = 316 SS antitamper nut, panel mount

13 Isolation Valves
0 = No valves
For isolation valve options, see page 54.

14 Cylinder Connections
0 = No connections

15 Gauges
0 = No gauges
For inlet and outlet gauge options, see page 54.

16 Options
0 = No options
High-Flow Piston-Sensing, Pressure-Reducing Regulators (KPF Series)

The KPF series provides minimum droop across the flow range with high accuracy of outlet pressure.

Features
- High flow coefficient \( (C_v = 1.0) \)
- Balanced poppet for minimal supply-pressure effect
- High-flow, dual-gauze type filter positively retained in inlet port

Technical Data

**Maximum Inlet Pressure**
- 6000 psig (413 bar)

**Pressure Control Ranges**
- 0 to 1000 psig (68.9 bar) through
- 0 to 4000 psig (275 bar)

**Flow Coefficient \( (C_v) \)**
- 1.0

See page 44 for flow graphs.

**Maximum Operating Temperature**
- 176°F (80°C) with PCTFE seat
- 392°F (200°C) with PEEK seat

**Weight**
- 4.5 lb (2.1 kg)

**Ports**
- 1/2 in. female NPT inlet and outlet;
- 1/4 in. female NPT gauge ports

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS (0 to 3000 and 0 to 4000 psig range) Zinc-plated steel (all other ranges)</td>
</tr>
<tr>
<td>Spring stabilizer(^1)</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>Zinc-plated steel</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, body cap, panel nuts(^2)</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, spring retainer, seat retainer, filter, retaining ring, piston, piston guide, poppet seal retainer</td>
<td>316 SS</td>
</tr>
<tr>
<td>Poppet seat retainer</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Filter ring, piston seal, poppet seal</td>
<td>PTFE</td>
</tr>
<tr>
<td>Piston seal spring</td>
<td>Elgiloy</td>
</tr>
<tr>
<td>Body seal</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
1. Not included in regulators with 316 SS spring button.
2. Not shown.
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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

4 Body Material
1 = 316 SS

5 Pressure Control Range
L = 0 to 1000 psig (0 to 68.9 bar)
N = 0 to 2000 psig (0 to 137 bar)
P = 0 to 3000 psig (0 to 206 bar)
S = 0 to 4000 psig (0 to 275 bar)

6 Maximum Inlet Pressure
W = 6000 psig (413 bar)

7 Port Configuration
A, B, C, F, L
See Port Configurations, page 52.

8 Ports
8 = 1/2 in. female NPT inlet and outlet; 1/4 in. female NPT gauge ports

9 Seat, Seal Material
A = PCTFE, fluorocarbon FKM
C = PEEK, fluorocarbon FKM

10 Flow Coefficient (Cv)
8 = 1.0

11 Sensing Mechanism, Vent
P = 316 SS piston, no vent
V = 316 SS piston, captured vent

12 Handle, Mounting
2 = Knob
3 = 316 SS antitamper nut
6 = Knob, panel mount
7 = 316 SS antitamper nut, panel mount

13 Isolation Valves
0 = No valves
For isolation valve options, see page 54.

14 Cylinder Connections
0 = No connections

15 Gauges
0 = No gauges
For inlet and outlet gauge options, see page 54.

16 Options
0 = No options
High-Pressure Piston-Sensing, Pressure-Reducing Regulators (KHP Series)

The KHP series provides control of supply pressures up to 10 000 psig (689 bar). The self-venting capability enables downstream pressure reduction in closed-loop systems.

Features
- Thrust roller bearing eases operation
- Panel-mounting configuration available
- High-flow, dual-gauze type filter positively retained in inlet port

Technical Data

**Maximum Inlet Pressure**
- 10 000 psig (689 bar)

**Pressure Control Ranges**
- 0 to 500 psig (34.4 bar) through 100 to 10 000 psig (6.8 to 689 bar)

**Flow Coefficient \( (C_v) \)**
- 0.06 and 0.25

See page 46 and 47 for flow graphs.

**Maximum Operating Temperature**
- 212°F (100°C)

**Weight**
- 5.7 lb (2.6 kg)

**Ports**
- 1/4 in. female NPT inlet, outlet, and gauge ports

Materials of Construction

Wetted components listed in italics.

### Component | Material
--- | ---
Knob handle, cover | Nylon with 316 SS insert
Upper spring button set screw, knob handle retainer, vent screw, stem nuts, body cap | 316 SS
Vent screw spring | 302 SS
Vent rod | 431 SS
Stem | CZ114 bronze
Thrust roller bearing | Hardened carbon steel
Range spring | Chrome vanadium steel
Piston seal backup ring | PTFE
Nonwetted lubricant | Hydrocarbon-based
Body, seat retainer, filter, retaining ring, piston, piston guide, self-vent seat retainer | 316 SS
Seat, self-vent seat | PEEK
Poppet, self-vent poppet | S17400 SS
Poppet spring | Alloy X-750
Poppet damper, filter ring | PTFE
Self-vent poppet spring | 302 SS
Body seal, piston seal | Fluorocarbon FKM
Wetted lubricant | PTFE-based

Wetted components listed in italics.
Dimensions

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

Ordering Information

Build a KHP series regulator ordering number by combining the designators in the sequence shown below.

<table>
<thead>
<tr>
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<th>5</th>
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<th>8</th>
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<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Material</td>
<td>Pressure Control Range</td>
<td>Port Configuration</td>
<td>Ports</td>
<td>Seat, Seal Material</td>
<td>Flow Coefficient ( C_v )</td>
<td>Sensing Mechanism, Vent</td>
<td>Handle, Mounting</td>
<td>Isolation Valves</td>
<td>Cylinder Connections</td>
<td>Gauges</td>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>1 = 316 SS</td>
<td>( J = 0 ) to 500 psig (0 to 34.4 bar)</td>
<td>( \text{A, B, F, H, L} )</td>
<td>4 = 1/4 in. female NPT</td>
<td>( C = \text{PEEK, fluorocarbon FKM} )</td>
<td>2 = 0.06</td>
<td>( P = 316 \text{ SS piston, no vent} )</td>
<td>2 = Knob</td>
<td>0 = No valves</td>
<td>0 = No connections</td>
<td>0 = No gauges</td>
<td>0 = No options</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>( K = 0 ) to 750 psig (0 to 51.6 bar)</td>
<td>( \text{See Port Configurations, page 52.} )</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>10</td>
<td>( T = 10 ) to 1500 psig (0.68 to 103 bar)</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>S</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<tr>
<td>15</td>
<td>( U = 15 ) to 2500 psig (1.0 to 172 bar)</td>
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<td></td>
<td>( W = 50 ) to 6000 psig (3.4 to 413 bar)</td>
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<tr>
<td>20</td>
<td>( V = 25 ) to 3600 psig (1.7 to 248 bar)</td>
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<td></td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
</tr>
<tr>
<td>25</td>
<td>( W = 50 ) to 6000 psig (3.4 to 413 bar)</td>
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<td></td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<tr>
<td>30</td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<td></td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<tr>
<td>35</td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<td></td>
<td></td>
<td></td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<tr>
<td>40</td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
</tr>
<tr>
<td>45</td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
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<td></td>
<td></td>
<td></td>
<td>( X = 100 ) to 10 000 psig (6.8 to 689 bar)</td>
</tr>
</tbody>
</table>

**Notes:**
- \( P \) = 316 SS piston, no vent
- \( S \) = 316 SS piston, self vent
- Not available with factory-installed isolation valves.
- For isolation valve options, see page 54.
High-Pressure Piston-Sensing, Hydraulic Pressure-Reducing Regulators (KHR Series)

The KHR series provides control of pressures up to 10 000 psig (689 bar) for both liquid and gas applications. Metal or polymer seats are available.

Features
- Self-venting
- Captured vent port in bottom of body
- Panel-mounting configuration available
- Thrust roller bearing eases operation
- High-flow, dual-gauze type filter positively retained in inlet port

Technical Data

Maximum Inlet Pressure
- 10 000 psig (689 bar)

Pressure Control Ranges
- 0 to 500 psig (34.4 bar) through 100 to 10 000 psig (6.8 to 689 bar)

Flow Coefficient ($C_v$)
- 0.06
  - See page 47 for flow graphs.
- 0.25 also available

Maximum Operating Temperature
- 212°F (100°C)

Weight
- 6.1 lb (2.75 kg)

Ports
- 1/4 in. female NPT inlet, outlet, vent, and gauge ports

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring buttons, upper spring button set screw, knob handle retainer, vent screw, stem nuts, vent rod nut, body cap</td>
<td>316 SS</td>
</tr>
<tr>
<td>Vent screw</td>
<td></td>
</tr>
<tr>
<td>Thrust roller bearing</td>
<td></td>
</tr>
<tr>
<td>Upper spring button</td>
<td></td>
</tr>
<tr>
<td>Stem</td>
<td></td>
</tr>
<tr>
<td>Stem nuts</td>
<td></td>
</tr>
<tr>
<td>Vent rod</td>
<td></td>
</tr>
<tr>
<td>Piston</td>
<td></td>
</tr>
<tr>
<td>Piston seal backup ring</td>
<td></td>
</tr>
<tr>
<td>Self-vent poppet</td>
<td></td>
</tr>
<tr>
<td>Self-vent poppet spring</td>
<td></td>
</tr>
<tr>
<td>Self-vent seat retainer</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat</td>
<td></td>
</tr>
<tr>
<td>Seat retainer</td>
<td></td>
</tr>
<tr>
<td>Body, seat retainer, filter, retaining ring, piston, piston guide, self-vent seat retainer</td>
<td>316 SS</td>
</tr>
<tr>
<td>Vent rod nut</td>
<td></td>
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<tr>
<td>Range spring</td>
<td></td>
</tr>
<tr>
<td>Piston seal backup ring</td>
<td></td>
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<tr>
<td>Nonwetted lubricant</td>
<td></td>
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<tr>
<td>Body seals</td>
<td></td>
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<tr>
<td>Poppet</td>
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<tr>
<td>Poppet spring</td>
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<tr>
<td>Self-vent poppet spring</td>
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<tr>
<td>Self-vent poppet</td>
<td></td>
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<tr>
<td>Self-vent poppet spring</td>
<td></td>
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<tr>
<td>Poppet damper, filter ring</td>
<td></td>
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<tr>
<td>Poppet, self-vent poppet</td>
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<tr>
<td>Poppet spring</td>
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<tr>
<td>Self-vent poppet spring</td>
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<tr>
<td>Poppet damper</td>
<td>PTFE</td>
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<tr>
<td>Body seals, piston seals</td>
<td></td>
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<tr>
<td>Wetted lubricant</td>
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<tr>
<td>Captured vent port</td>
<td></td>
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<tr>
<td>(shown off center for clarity)</td>
<td></td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
Dimensions

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

Ordering Information

Build a KHR series regulator ordering number by combining the designators in the sequence shown below.

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
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<th>8</th>
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</tr>
<tr>
<td>Pressure Control Range</td>
<td>J</td>
<td>0 to 500 psig (0 to 34.4 bar)</td>
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<td></td>
<td>K</td>
<td>0 to 750 psig (0 to 51.6 bar)</td>
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<td></td>
<td>T</td>
<td>10 to 1500 psig (68.6 to 103 bar)</td>
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<td>15 to 2500 psig (1.0 to 172 bar)</td>
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<td>V</td>
<td>25 to 3600 psig (1.7 to 248 bar)</td>
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<td>W</td>
<td>50 to 6000 psig (3.4 to 413 bar)</td>
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<td>X</td>
<td>100 to 10 000 psig (6.8 to 689 bar)</td>
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<td>See Port Configurations, page 52.</td>
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<td>Ports</td>
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<td>&amp;</td>
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<td>4 = 1/4 in. female NPT</td>
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<td>Seat, Seal Material</td>
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<td>&amp;</td>
<td>C = PEEK, fluorocarbon FKM</td>
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<td>&amp;</td>
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<td>&amp;</td>
<td>&amp;</td>
<td>J = 316 SS, fluorocarbon FKM</td>
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<td>&amp;</td>
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<td>Sensing Mechanism, Vent</td>
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<td>&amp;</td>
<td>U = 316 SS piston, self and captured vent</td>
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<td>Flow Coefficient (Cv)</td>
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<td>Handle, Mounting</td>
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<td>2 = Knob</td>
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<td>6 = Knob, panel mount</td>
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<td>For isolation valve options, see page 54.</td>
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<td>Cylinder Connections</td>
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<td>Gauges</td>
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<td></td>
</tr>
<tr>
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<td>&amp;</td>
<td>&amp;</td>
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<td></td>
</tr>
<tr>
<td>&amp;</td>
<td>&amp;</td>
<td>&amp;</td>
<td>&amp;</td>
<td>For inlet and outlet gauge options, see page 54.</td>
<td></td>
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<td>&amp;</td>
<td>0 = No options</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

① Not available with factory-installed isolation valves.
General-Purpose Diaphragm-Sensing Back-Pressure Regulators (KBP Series)

The KBP series is a high-sensitivity, general-purpose regulator designed to control back-pressure levels in analytical or process systems upstream of the regulator. The convoluted diaphragm provides excellent sensitivity and set-point repeatability. The metal-to-metal diaphragm seal minimizes the potential for leakage.

Features
- Convoluted, nonperforated diaphragm
- Metal-to-metal diaphragm seal
- Low internal volume
- Two-piece cap design provides linear load on the seal

Technical Data

Maximum Inlet Pressure
- Equal to pressure control range

Pressure Control Ranges
- 0 to 10 psig (0.68 bar) through 0 to 500 psig (34.4 bar)

Flow Coefficient ($C_v$)
- 0.20

See page 49 for flow graphs.

Maximum Operating Temperature
- 176°F (80°C) with PCTFE retainer seal
- 392°F (200°C) with PEEK retainer seal

Weight
- 2.4 lb (1.1 kg)

Ports
- 1/4 in. female NPT inlet, outlet, and gauge ports

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS (0 to 500 psig range)</td>
</tr>
<tr>
<td></td>
<td>Zinc-plated steel (all other ranges)</td>
</tr>
<tr>
<td>Spring stabilizer&lt;sup&gt;1&lt;/sup&gt;</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS (0 to 10 through 0 to 50 psig control ranges)</td>
</tr>
<tr>
<td></td>
<td>Zinc-plated steel (0 to 100 through 0 to 500 psig control ranges)</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, stop plate, body cap, panel nuts&lt;sup&gt;2&lt;/sup&gt;</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer</td>
<td>316 SS</td>
</tr>
<tr>
<td>Retainer seal</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Seat</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>Diaphragm&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

<sup>1</sup> Not included in regulators with 0 to 500 psig (0 to 34.4 bar) control range.
<sup>2</sup> Not shown.
<sup>3</sup> Regulators with control ranges higher than 0 to 100 psig (0 to 6.8 bar) are assembled with two diaphragms.
### Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

#### Body Material
1 = 316 SS

#### Pressure Control Range
C = 0 to 10 psig (0 to 0.68 bar)
D = 0 to 25 psig (0 to 1.7 bar)
E = 0 to 50 psig (0 to 3.4 bar)
F = 0 to 100 psig (0 to 6.8 bar)
G = 0 to 250 psig (0 to 17.2 bar)
J = 0 to 500 psig (0 to 34.4 bar)

#### Maximum Inlet Pressure
0 = Not applicable (equal to pressure control range)

#### Port Configuration
A, D, G, V
See Port Configurations, page 52.

#### Ports
4 = 1/4 in. female NPT

#### Seat, Seal Material
A = Fluorocarbon FKM, PCTFE
C = Fluorocarbon FKM, PEEK

#### Flow Coefficient ($C_v$)
5 = 0.20

#### Sensing Mechanism, Vent
A = Alloy X-750 diaphragm, no vent
E = Alloy X-750 diaphragm, captured vent

#### Handle, Mounting
2 = Knob
3 = 316 SS antitamper nut
6 = Knob, panel mount
7 = 316 SS antitamper nut, panel mount

#### Valve Options
0 = No valves

#### Cylinder Connections
0 = No connections

#### Gauges
0 = No gauges  
For inlet gauge options, see page 54.

#### Options
0 = No options
High-Flow, High-Sensitivity Diaphragm-Sensing Back-Pressure Regulators (KFB Series)

The KFB series regulator is designed to maintain back-pressure control in high-flow applications with a $C_v$ of 1.0.

**Features**
- Large-diameter convoluted, nonperforated diaphragm for increased pressure sensitivity
- Metal-to-metal diaphragm seal

**Technical Data**

**Maximum Inlet Pressure**
- Equal to pressure control range

**Pressure Control Ranges**
- 0 to 10 psig (0.68 bar) through 0 to 250 psig (17.2 bar)

**Flow Coefficient ($C_v$)**
- 1.0
  
  *See page 49 for flow graphs.*

**Maximum Operating Temperature**
- 176°F (80°C) with PCTFE retainer seal
- 392°F (200°C) with PEEK retainer seal

**Weight**
- 4.4 lb (2.0 kg)

**Ports**
- 1/2 in. female NPT inlet and outlet;
  - 1/4 in. female NPT gauge port

**Materials of Construction**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS (0 to 250 psig range)</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS (0 to 10 and 0 to 25 psig control ranges)</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, stop plate, body cap, panel nuts</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer</td>
<td>316 SS</td>
</tr>
<tr>
<td>Retainer seal</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Seat</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>Diaphragm®</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

*Wetted components listed in italics.*

1. Not included in regulators with 0 to 250 psig (0 to 17.2 bar) control range.
2. Not shown.
3. Regulators with control range 0 to 250 psig (0 to 17.2 bar) are assembled with two diaphragms.
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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

KFB 1 F 0 D 8 A 8 A 1 0 0 0 0

4 Body Material
1 = 316 SS

5 Pressure Control Range
C = 0 to 10 psig (0 to 0.68 bar)
D = 0 to 25 psig (0 to 1.7 bar)
E = 0 to 50 psig (0 to 3.4 bar)
F = 0 to 100 psig (0 to 6.8 bar)
G = 0 to 250 psig (0 to 17.2 bar)

6 Maximum Inlet Pressure
0 = Not applicable (equal to pressure control range)

7 Port Configuration
A, D, G, V
See Port Configurations, page 52.

8 Ports
8 = 1/2 in. female NPT inlet and outlet; 1/4 in. female NPT gauge port

9 Seat, Seal Material
A = Fluorocarbon FKM, PCTFE
C = Fluorocarbon FKM, PEEK

10 Flow Coefficient ($C_v$)
8 = 1.0

11 Sensing Mechanism, Vent
A = Alloy X-750 diaphragm, no vent
E = Alloy X-750 diaphragm, captured vent

12 Handle, Mounting
2 = Knob
3 = 316 SS antitamper nut
6 = Knob, panel mount
7 = 316 SS antitamper nut, panel mount

13 Valves
0 = No valves

14 Cylinder Connections
0 = No connections

15 Gauges
0 = No gauges
For inlet gauge options, see page 54.

16 Options
0 = No options
Compact Piston-Sensing Back-Pressure Regulators (KCB Series)

The KCB series provides high sensitivity back-pressure control of sampling conditioning systems. It is ideally suited for use in portable or laboratory analytical systems as well as being embedded in the instrument bays of OEM equipment or sampling cabinets.

Features
■ Low internal volume
■ Fully contained piston
■ Excellent flow characteristics with a $C_v$ of 0.20
■ ANSI/ISA 76.00.02-compliant modular platform component (MPC) configuration available

Technical Data

Maximum Inlet Pressure
■ Equal to pressure control range

Pressure Control Ranges
■ 0 to 10 psig (0.68 bar) through 0 to 375 psig (25.8 bar)

Flow Coefficient ($C_v$)
■ 0.20
   See page 49 for flow graphs.
■ 0.10 also available with MPC platform

Maximum Operating Temperature
■ 176°F (80°C) with PCTFE retainer seal
■ 392°F (200°C) with PEEK retainer seal

Weight
■ 1.0 lb (0.5 kg)

Ports
■ 1/8 in. female NPT inlet and outlet(s)
■ MPC platform

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
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<tbody>
<tr>
<td>Thumbwheel handle</td>
<td>Anodized aluminum</td>
</tr>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>Zinc-plated steel</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS (0 to 10 through 0 to 50 and 0 to 375 psig control ranges) Zinc-plated steel (all other control ranges)</td>
</tr>
<tr>
<td>Stem, stem nut, body cap, panel nuts</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, piston</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat, piston seal</td>
<td>Fluorocarbon FKM or Kalrez</td>
</tr>
<tr>
<td>Retainer seal</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
① Not shown.
**Dimensions**

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

**Ordering Information**

Build a KCB series regulator ordering number by combining the designators in the sequence shown below.

```
| KCB | 1 | F | 0 | D | 2 | A | 5 | P | 1 | 0 | 0 | 0 | 0 |
```

- **4 Body Material**
  1 = 316 SS

- **5 Pressure Control Range**
  C = 0 to 10 psig (0 to 0.68 bar)
  D = 0 to 25 psig (0 to 1.7 bar)
  E = 0 to 50 psig (0 to 3.4 bar)
  F = 0 to 100 psig (0 to 6.8 bar)
  G = 0 to 250 psig (0 to 17.2 bar)
  H = 0 to 375 psig (0 to 25.8 bar)

- **6 Maximum Inlet Pressure**
  0 = Not applicable (equal to pressure control range)

- **7 Port Configuration**
  A, D, G, V, 7, 8

  See *Port Configurations*, page 52.

- **8 Ports**
  2 = 1/8 in. female NPT
  M = MPC platform

- **9 Seat, Seal Material**
  A = Fluorocarbon FKM, PCTFE
  B = Kalrez, PCTFE
  C = Fluorocarbon FKM, PEEK
  D = Kalrez, PEEK

- **10 Flow Coefficient ($C_v$)**
  4 = 0.10 (MPC platform only)
  5 = 0.20 (1/8 in. female NPT ports only)

- **11 Sensing Mechanism**
  P = 316 SS piston

- **12 Handle, Mounting**
  1 = Thumbwheel
  2 = Knob
  3 = 316 SS antitamper nut
  5 = Thumbwheel, panel mount
  6 = Knob, panel mount
  7 = 316 SS antitamper nut, panel mount

  † Not available with 0 to 375 psig (0 to 25.8 bar) pressure control range.

- **13 Valves**
  0 = No valves

- **14 Cylinder Connections**
  0 = No connections

- **15 Gauges**
  0 = No gauges

  *For inlet gauge options, see page 54.*

- **16 Options**
  0 = No options

---

*Panel 0.50 (12.7) thick maximum between two nuts Panel cutout 1.38 (35.0) dia*
Medium- to High-Pressure Piston-Sensing Back-Pressure Regulators (KPB Series)

The KPB series provides back-pressure control in gas or liquid applications. This compact and lightweight regulator provides an ideal pressure-control solution within high-density compact OEM equipment, as well as other applications.

**Features**
- Integral high-pressure overrange protection
- Lightweight, compact design

**Technical Data**

- **Maximum Inlet Pressure**
  - Equal to pressure control range

- **Pressure Control Ranges**
  - 0 to 1000 psig (68.9 bar) through 0 to 4000 psig (275 bar)

- **Flow Coefficient ($C_v$)**
  - 0.06 and 0.2
  
  See page 50 for flow graphs.

- **Maximum Operating Temperature**
  - 176°F (80°C) with PCTFE seat
  - 392°F (200°C) with PEEK seat

- **Weight**
  - 2.5 lb (1.2 kg)

- **Ports**
  - 1/4 in. female NPT inlet, outlet, and gauge ports

**Materials of Construction**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS (0 to 500 psig range)</td>
</tr>
<tr>
<td>Spring stabilizer$^\text{1}$</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS (0 to 3000 and 0 to 4000 psig range)</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, body cap, panel nuts$^\text{2}$</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, seat support, poppet retainer, piston, piston guide</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat, seat retainer seal</td>
<td>PCTFE or PEEK</td>
</tr>
<tr>
<td>Pistol seal retainer</td>
<td>PEEK</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Piston seal, body seal</td>
<td>PTFE</td>
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<tr>
<td>Piston seal spring, body seal spring</td>
<td>Eligloy</td>
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<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

$^1$ Not included in regulators with 0 to 3000 psig (0 to 206 bar) and 0 to 4000 psig (0 to 275 bar) control ranges.

$^2$ Not shown.
Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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

```
4 5 6 7 8 9 10 11 12 13 14 15 16
KPB 1 L 0 A 4 2 2 P 2 0 0 0 0
```

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<tr>
<th>4</th>
<th>Body Material</th>
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<td>1</td>
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<thead>
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<tr>
<td>L</td>
<td>0 to 1000 psig (0 to 68.9 bar)</td>
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<tr>
<td>N</td>
<td>0 to 2000 psig (0 to 137 bar)</td>
</tr>
<tr>
<td>P</td>
<td>0 to 3000 psig (0 to 206 bar)</td>
</tr>
<tr>
<td>S</td>
<td>0 to 4000 psig (0 to 275 bar)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>6</th>
<th>Maximum Inlet Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not applicable (equal to pressure control range)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>7</th>
<th>Port Configuration</th>
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</thead>
<tbody>
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<td>A, D, G, V</td>
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</tr>
</tbody>
</table>

See Port Configurations, page 52.

<table>
<thead>
<tr>
<th>8</th>
<th>Ports</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>1/4 in. female NPT</td>
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<table>
<thead>
<tr>
<th>9</th>
<th>Seat, Seal Material</th>
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</thead>
<tbody>
<tr>
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</tr>
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<td>PEEK</td>
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<table>
<thead>
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<th>Flow Coefficient ($C_v$)</th>
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<tbody>
<tr>
<td>2</td>
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</tr>
<tr>
<td>5</td>
<td>0.20</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>11</th>
<th>Sensing Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>316 SS piston</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12</th>
<th>Handle, Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Knob</td>
</tr>
<tr>
<td>3</td>
<td>316 SS antitamper nut</td>
</tr>
<tr>
<td>6</td>
<td>Knob, panel mount</td>
</tr>
<tr>
<td>7</td>
<td>316 SS antitamper nut, panel mount</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13</th>
<th>Valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No valves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14</th>
<th>Cylinder Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No connections</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15</th>
<th>Gauges</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No gauges</td>
</tr>
</tbody>
</table>

For inlet gauge options, see page 54.

<table>
<thead>
<tr>
<th>16</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No options</td>
</tr>
</tbody>
</table>

Panel 0.39 (10.0) thick maximum with 2 lock nuts
Panel 0.63 (16.0) thick maximum with 1 lock nut
Panel cutout 1.38 (35.0) dia

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

Mounting holes 10-32, 0.33 deep (M5 x 0.8, 8.5 deep)
High-Pressure Piston-Sensing Back-Pressure Regulators (KHB Series)

The KHB series provides control of back pressures up to 10 000 psig (689 bar) with high sensitivity across the control range.

**Features**
- Thrust roller bearing eases operation
- Panel-mounting configuration available

**Technical Data**

**Maximum Inlet Pressure**
- Equal to pressure control range

**Pressure Control Ranges**
- 0 to 500 psig (34.4 bar) through 100 to 10 000 psig (6.8 to 689 bar)

**Flow Coefficient** ($C_v$)
- 0.06 and 0.25
  
  *See page 51 for flow graphs.*

**Maximum Operating Temperature**
- 212°F (100°C)

**Weight**
- 5.7 lb (2.6 kg)

**Ports**
- 1/4 in. female NPT inlet, outlet, and gauge ports

**Materials of Construction**

```
Component                   Material
--------------------------------------------------
Knob handle, cover           Nylon with 316 SS insert
Spring buttons,              316 SS
  upper spring button
  set screw, knob handle
  retainer, stem nuts, body
  cap
Thrust roller bearing        Hardened carbon steel
Stem                         CZ114 bronze
Stem nuts                    Chrome vanadium steel
Piston                       316 SS
Piston seal backup ring      PEEK
Nonwetted lubricant          Hydrocarbon-based
  Body, poppet retainer, seat retainer, seat support, piston, piston guide
  316 SS
Seat, poppet retainer seal   PEEK or 316 SS
  Poppet                       S17400 SS
  Poppet spring                302 SS
  Piston seal, body seal, seat support seal
  Fluorocarbon FKM
  Wetted lubricant             PTFE-based
```

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

<table>
<thead>
<tr>
<th>Body Material</th>
<th>Ports</th>
<th>Seat, Seal Material</th>
<th>Sensing Mechanism</th>
<th>Handle, Mounting</th>
<th>Pressure Control Range</th>
<th>Flow Coefficient ($C_v$)</th>
<th>Cylinder Connections</th>
<th>Gauges</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>KHB 10 4 5 6 7 8 9 10 11 12 13 14 15 16</td>
<td>4 = 1/4 in. female NPT</td>
<td>C = PEEK, fluorocarbon FKM</td>
<td>P = 316 SS piston</td>
<td>2 = Knob, panel mount</td>
<td>4 = 0 to 1000 psig (0 to 6.8 bar)</td>
<td>2 = 0.06</td>
<td>0 = No connections</td>
<td>0 = No gauges</td>
<td>0 = No options</td>
</tr>
</tbody>
</table>

5 Pressure Control Range
- J = 0 to 500 psig (0 to 34.4 bar)
- K = 0 to 750 psig (0 to 51.6 bar)
- T = 10 to 1500 psig (0.68 to 103 bar)
- U = 15 to 2500 psig (1.0 to 172 bar)
- V = 25 to 3600 psig (1.7 to 248 bar)
- W = 50 to 6000 psig (3.4 to 413 bar)
- X = 100 to 10 000 psig (6.8 to 689 bar)

6 Maximum Inlet Pressure
- 0 = Not applicable (equal to pressure control range)

7 Port Configuration
- A, D, V

See Port Configurations, page 52.

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

### Ordering Information

<table>
<thead>
<tr>
<th>Designator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Body Material</td>
</tr>
<tr>
<td>5</td>
<td>Pressure Control Range</td>
</tr>
<tr>
<td>6</td>
<td>Port Configuration</td>
</tr>
<tr>
<td>7</td>
<td>Clearances</td>
</tr>
<tr>
<td>8</td>
<td>Ports</td>
</tr>
<tr>
<td>9</td>
<td>Seat, Seal Material</td>
</tr>
<tr>
<td>10</td>
<td>Sensing Mechanism</td>
</tr>
<tr>
<td>11</td>
<td>Handle, Mounting</td>
</tr>
<tr>
<td>12</td>
<td>Mounting</td>
</tr>
<tr>
<td>13</td>
<td>Valves</td>
</tr>
<tr>
<td>14</td>
<td>Cylinder Connections</td>
</tr>
<tr>
<td>15</td>
<td>Gauges</td>
</tr>
<tr>
<td>16</td>
<td>Options</td>
</tr>
</tbody>
</table>

- **Body Material**
  - 1 = 316 SS

- **Pressure Control Range**
  - J = 0 to 500 psig (0 to 34.4 bar)
  - K = 0 to 750 psig (0 to 51.6 bar)
  - T = 10 to 1500 psig (0.68 to 103 bar)
  - U = 15 to 2500 psig (1.0 to 172 bar)
  - V = 25 to 3600 psig (1.7 to 248 bar)
  - W = 50 to 6000 psig (3.4 to 413 bar)
  - X = 100 to 10 000 psig (6.8 to 689 bar)

- **Clearances**
  - Clearances hole dia 0.31 (8.0)
  - Panel cutout minimum dia 2.25 (57.2)

- **Ports**
  - 4 = 1/4 in. female NPT

- **Seat, Seal Material**
  - C = PEEK, fluorocarbon FKM
  - J = 316 SS, fluorocarbon FKM

- **Not suitable for gas service.**

- **Sensing Mechanism**
  - P = 316 SS piston

- **Handle, Mounting**
  - 2 = Knob
  - 6 = Knob, panel mount

- **Valves**
  - 0 = No valves

- **Cylinder Connections**
  - 0 = No connections

- **Gauges**
  - 0 = No gauges

- **Options**
  - 0 = No options

For inlet gauge options, see page 54.
Gas Cylinder Changeover Regulator (KCM Series)

The KCM series is a two-stage gas delivery system that ensures continuous flow of gases in critical applications. When one supply drops below the changeover pressure, the selector regulator automatically switches the gas feed from the depleted supply to an alternate supply. The automatic operation of the KCM series eliminates costly system downtime and maintenance expense of continuously monitoring the gas supply.

Features
- Convoluted, nonperforated diaphragm for strength and improved pressure response
- Metal-to-metal diaphragm seals on all stages
- Supply-pressure effect of approximately 0.01 %
- Bracket mount

Technical Data

Maximal Inlet Pressure
- 3600 psig (248 bar)
- 3000 psig (206 bar) with hose and cylinder connection option

Pressure Control Ranges
- 0 to 10 psig (0.68 bar) through 0 to 500 psig (34.4 bar)

Nominal Changeover Pressures
- 100, 250, and 500 psig (6.8, 17.2, and 34.4 bar)

Flow Coefficient ($C_v$)
- 0.06

Maximum Operating Temperature
- 176°F (80°C) with PCTFE seat
- 392°F (200°C) with PEEK seat

Weight
- 7.25 lb (3.3 kg)

Ports
- 1/4 in. female NPT inlet, outlet, and gauge ports

Operation

The KCM series can be ordered to switch from one supply to another at one of three different inlet pressures—100, 250, and 500 psig (6.8, 17.2, and 34.4 bar)—called changeover pressures.

The selector regulator (first stage) is factory-set to reduce the supply pressure to the nominal changeover pressure ordered. The line regulator (second stage) can be adjusted with the handle to achieve the required system pressure. This two-stage arrangement minimizes the supply-pressure effect caused by depleting gas supplies (cylinders, tank farm, etc.).

When one supply drops below the changeover pressure, the selector regulator automatically switches the gas feed from the depleted supply to an alternate supply. If both supplies drop below the changeover pressure, the assembly functions as a single-stage regulator, depleting both supplies at the same time. See the Approximate Supply Depletion Pressures table at right for pressures at which this occurs.

Materials of Construction

The KCM series gas changeover uses Swagelok KPR series pressure-reducing regulators. For more information, see General-Purpose Diaphragm Sensing, Pressure-Reducing Regulators (KPR Series), page 6.

The table below lists additional components not shown in the KPR series section.

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstage fitting</td>
<td>316 SS with PTFE tape</td>
</tr>
<tr>
<td>Line-regulator mounting block</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Line-regulators mounting screws, mounting bracket</td>
<td>316 SS</td>
</tr>
</tbody>
</table>

Wetted components listed in *italics*.

Approximate Supply Depletion Pressures

<table>
<thead>
<tr>
<th>Nominal Changeover Pressure</th>
<th>Supply 1 Depletion Pressure</th>
<th>Supply 2 Depletion Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>psig (bar)</td>
<td>psig (bar)</td>
<td>psig (bar)</td>
</tr>
<tr>
<td>100 (6.8)</td>
<td>150 (10.3)</td>
<td>90 (6.2)</td>
</tr>
<tr>
<td>250 (17.2)</td>
<td>300 (20.6)</td>
<td>230 (15.8)</td>
</tr>
<tr>
<td>500 (34.4)</td>
<td>500 (34.4)</td>
<td>450 (31.0)</td>
</tr>
</tbody>
</table>

Supply 2 can deplete below some of the available pressure control range limits. Setting the line regulator near the nominal changeover pressure will cause flow to the system to decrease or stop as the supply nears depletion.
## Dimensions

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

![Diagram of Pressure Regulators]

## Ordering Information

Build a KCM series regulator ordering number by combining the designators in the sequence shown below.

<table>
<thead>
<tr>
<th>KCM</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Material</td>
<td>4</td>
<td>F</td>
<td>F</td>
<td>B</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>A</td>
<td>D</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Pressure Control Range</td>
<td>1 = 316 SS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal Changeover Pressure</td>
<td>2 = 0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ports</td>
<td>3 = 1/4 in. female NPT</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat Material</td>
<td>4 = 100 psig (6.8 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Coefficient ($C_v$)</td>
<td>5 = 25 psig (1.7 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensing Mechanism, Vent</td>
<td>6 = 50 psig (3.4 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line Regulator Handle</td>
<td>1 = PCTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation and Relief Valves</td>
<td>2 = PEEK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cylinder Connections</td>
<td>3 = Alloy X-750 diaphragm, no vent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gauge Scale</td>
<td>4 = 0 to 10 psig (0 to 0.68 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td>5 = 0 to 25 psig (0 to 1.7 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>6 = 0 to 50 psig (0 to 3.4 bar)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 = 0 to 100 psig (0 to 6.8 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 = 0 to 250 psig (0 to 17.2 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9 = 0 to 500 psig (0 to 34.4 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 = 0 to 100 psig (0 to 6.8 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11 = 0 to 250 psig (0 to 17.2 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 = 0 to 500 psig (0 to 34.4 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lesson regulator has knob handle.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For isolation and relief valve options, see page 54.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Port Configurations

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>Configuration</th>
<th>Designator</th>
<th>Configuration</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet from selector regulator</td>
<td>$G_{o/R}$</td>
<td>Inlet from selector regulator</td>
<td>$G_{o/R}$</td>
<td>Inlet from selector regulator</td>
<td>$G_{o/R}$</td>
</tr>
<tr>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
</tr>
<tr>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
</tr>
<tr>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
<td>$G_{o/R}$</td>
</tr>
</tbody>
</table>

$G_{o/R}$ = Outlet gauge. 
$G_{o/R}$ = Outlet gauge or relief valve. 
$R$ = Relief valve. 
$I$ = Isolation valve.
Steam-Heated Vaporizing, Diaphragm-Sensing Pressure-Reducing Regulator (KSV Series)

The KSV series is a steam-heated vaporizing regulator with a low internal volume. It can be used to vaporize liquid samples or to preheat gas samples to prevent them from condensing.

**Features**
- Convoluted, nonperforated diaphragm
- Metal-to-metal diaphragm seal
- Low internal volume

**Technical Data**

**Maximum Inlet Pressure**
- 3600 psig (248 bar)

**Outlet Pressure Ranges**
- 0 to 10 psig (0.68 bar) through 0 to 500 psig (34.4 bar)

**Flow Coefficient** ($C_v$
- 0.06 or 0.20

**Maximum Steam Pressure**
- 650 psig (44.7 bar)

**Maximum Operating Temperature**
- 500°F (260°C)

**Weight**
- 3.3 lb (1.5 kg)

**Ports**
- 1/8 in. female NPT inlet; 1/4 in. female NPT outlet(s)
- Steam tube 1/2 in. outside diameter, 0.049 in. wall

**Materials of Construction**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antitamper nut, stem, cap ring, stop plate, body cap, panel nuts</td>
<td>316 SS</td>
</tr>
<tr>
<td>Spring button</td>
<td>Zinc-plated steel</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS or zinc-plated steel, depending on configuration</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, steam tube</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat</td>
<td>PEEK</td>
</tr>
<tr>
<td>Diaphragm, poppet spring</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

1. Not shown.
2. Not required in all configurations.
3. Regulators with control ranges higher than 0 to 100 psig (0 to 6.8 bar) are assembled with two diaphragms.
**Dimensions**

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

**Ordering Information**

Build a KSV series regulator ordering number by combining the designators in the sequence shown below.

```
KSV 1 F R 1 3 2 2 A 3 0 0 0 0
```

4 Body Material
1 = 316 SS

5 Pressure Control Range
C = 0 to 10 psig (0 to 0.68 bar)
D = 0 to 25 psig (0 to 1.7 bar)
E = 0 to 50 psig (0 to 3.4 bar)
F = 0 to 100 psig (0 to 6.8 bar)
G = 0 to 250 psig (0 to 17.2 bar)
J = 0 to 500 psig (0 to 34.4 bar)

6 Maximum Inlet Pressure
F = 100 psig (6.8 bar)
J = 500 psig (34.4 bar)
L = 1000 psig (68.9 bar)
R = 3600 psig (248 bar)

5 For better resolution and control, select a pressure that closely matches system pressure.

8 Ports
3 = 1/8 in. female NPT inlet; 1/4 in. female NPT outlet(s)

9 Seat Material
2 = PEEK

10 Flow Coefficient \( C_v \)
2 = 0.06
5 = 0.20

11 Sensing Mechanism, Vent
A = Alloy X-750 diaphragm, no vent
E = Alloy X-750 diaphragm, captured vent

12 Handle, Mounting
3 = Antitamper nut
7 = Antitamper nut, panel mount

13 Valves
0 = No valves

14 Cylinder Connections
0 = No connections

15 Gauges
0 = No gauges

16 Options
0 = No options

7 Port Configuration
1, 4

See Port Configurations, below.

**Port Configurations**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>Configuration</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="bottom" alt="Steam tubes" /></td>
<td>1</td>
<td><img src="bottom" alt="Steam tubes" /></td>
<td>4</td>
</tr>
</tbody>
</table>
Electrically Heated Vaporizing Pressure-Reducing Regulator (KEV Series)

The KEV series is an electrically heated vaporizing regulator with a low internal volume. It can be used to vaporize liquid samples or to preheat gas samples to prevent them from condensing. It features a heating element that is in direct contact with the process fluid for maximum thermal efficiency and is removable for easy cleaning. The KEV regulator has an integral temperature controller and is rated for use in hazardous areas, as identified below.

Features
- Convoluted, nonperforated diaphragm for control ranges up to 500 psig (34.4 bar)
- Stainless steel piston for control ranges from 1000 to 3600 psig (68.9 to 248 bar)
- ATEX (CENELEC) and CSA certified for critical/hazardous environments
- T3 temperature classification for all heater ranges
- Horizontally or vertically mounted
- One-piece body eliminates potential leak paths
- Low-volume vapor chamber for fast response
- Heater in direct contact with process media for maximum thermal efficiency
- Removable heater simplifies cleaning
- Side and base inlet options

Technical Data

Maximum Inlet Pressure
- 3600 psig (248 bar)

Pressure Control Ranges
- 0 to 10 psig (0.68 bar) through 0 to 3600 psig (248 bar)

Flow Coefficient ($C_v$)
- 0.02 or 0.06

Weight
- Side mounted—8.8 lb (4.0 kg)
- Base mounted—7.7 lb (3.5 kg)

Ports
- 1/8 in. female NPT inlet; 1/4 in. female NPT outlet

Electrical
- Supply—120 and 240 V (ac) (± 10 %), 50/60 Hz
- Heater ratings—40, 50, 100, 150, and 200 W
- Control temperature range—75 to 220°F (23 to 104°C) or 215 to 380°F (102 to 193°C)
- Explosive environment certification:
  - CSA (Canada and U.S.A.)—Class I, Div 1, Groups B, C, and D; T3; CSA Encl Type 4. Ambient temperatures: −58 to 122°F (−50 to 50°C)
  - ATEX (CENELEC)—Group II, Category 2G, EExd IIB+H2; T3. Ambient temperatures: −4 to 122°F (−20 to 50°C)
Materials of Construction

- Antitamper nut
- Stem
- Spring stabilizer
- Stop plate
- Cap ring
- Diaphragm
- Seat

Inlet
- Heater sheath
- Connector tube seal
- Flange (bolts not shown)
- Lock nut
- Connector tube

Outlet
- Retainer nut
- Body

Piston Sensing Mechanism
- Piston seal and spring
- Piston
- Piston guide
- Piston seal retainer
- Body seal and spring

Dimensions

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

Base-Mounted

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<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antitamper nut, stem, cap ring, stop plate, body cap, retainer nut, flange, flange bolts, lock nut, connector tube, panel nuts</td>
<td>316 SS</td>
</tr>
<tr>
<td>Spring button</td>
<td>Zinc-plated steel</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range spring</td>
<td>316 SS or zinc-plated steel, depending on configuration</td>
</tr>
<tr>
<td>Connector tube seal</td>
<td>Nitrile</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, heater sheath</td>
<td>316 SS</td>
</tr>
<tr>
<td>Heater sheath seal</td>
<td>Alloy 718</td>
</tr>
<tr>
<td>Seals</td>
<td>PEEK</td>
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<tr>
<td>Diaphragm</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Piston Sensing Components

- Piston seal, body seal
- Piston, piston guide
- Piston seal retainer
- Piston seal spring, body seal spring

Wetted components listed in italics.

1. Not included in regulators with piston sensing mechanism.
2. Not shown.
3. Not required in all configurations.
4. Regulators with control ranges 0 to 250 psig (0 to 17.2 bar) and 0 to 500 psig (0 to 34.4 bar) are assembled with two diaphragms.
Ordering Information

Build a KEV series regulator ordering number by combining the designators in the sequence shown below.

<table>
<thead>
<tr>
<th>KEV</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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<th>16</th>
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<tbody>
<tr>
<td></td>
<td>F</td>
<td>R</td>
<td>A</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>A</td>
<td>X</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

4. Body Material
1 = 316 SS

5. Pressure Control Range

Diaphragm Sensing
C = 0 to 10 psig (0 to 0.68 bar)
D = 0 to 25 psig (0 to 1.7 bar)
E = 0 to 50 psig (0 to 3.4 bar)
F = 0 to 100 psig (0 to 6.8 bar)
G = 0 to 250 psig (0 to 17.2 bar)
J = 0 to 500 psig (0 to 34.4 bar)

Piston Sensing
L = 0 to 1000 psig (0 to 68.9 bar)
M = 0 to 1500 psig (0 to 103 bar)
N = 0 to 2000 psig (0 to 137 bar)
P = 0 to 3000 psig (0 to 206 bar)
R = 0 to 3600 psig (0 to 248 bar)

6. Maximum Inlet Pressure

① For better resolution and control, select a pressure that closely matches system pressure.
② Available with diaphragm sensing mechanism only.

F = 100 psig (6.8 bar)
J = 500 psig (34.4 bar)
L = 1000 psig (68.9 bar)
R = 3600 psig (248 bar)

7. Port Configuration

Side Mount—A, X, 1, 2
Base Mount—A, B, X, Y, Z

See Port Configurations, below.

8. Ports
3 = 1/8 in. female NPT inlet;
1/4 in. female NPT outlet(s)

9. Seat Material
2 = PEEK

10. Flow Coefficient (Cv)
1 = 0.02
2 = 0.06

11. Sensing Mechanism
A = Alloy X-750 diaphragm
(outlet pressures up to 500 psig [34.4 bar])
P = 316 SS piston
(outlet pressures above 500 psig [34.4 bar])

12. Handle, Mounting
W = Antitamper nut, side mount
X = Antitamper nut, base mount

13. Valves
0 = No valves

14. Cylinder Connections
0 = No connections

15. Gauges
0 = No gauges

16. Heater, Controller

75 to 220°F (23 to 104°C), 120 V
A = 40 W
B = 50 W
C = 100 W
D = 150 W
E = 200 W

215 to 380°F (102 to 193°C), 120 V
F = 40 W
G = 50 W
H = 100 W
J = 150 W
K = 200 W

75 to 220°F (23 to 104°C), 240 V
0 = 40 W
1 = 50 W
2 = 100 W
3 = 150 W
4 = 200 W

215 to 380°F (102 to 193°C), 240 V
5 = 40 W
6 = 50 W
7 = 100 W
8 = 150 W
9 = 200 W

Port Configurations

Outlet and auxiliary ports on the same face.

Regulator is rotatable 360° in relation to terminal box.
Pressure Regulators 41

Pressure-Reducing Regulator Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.

KPR Series

**Flow Coefficient 0.06; Maximum Inlet Pressure 3600 psig (248 bar)**

Pressure Control Ranges

<table>
<thead>
<tr>
<th>Nitrogen Flow, std ft³/min</th>
<th>Outlet Pressure, psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  2  4  6  8  10</td>
<td>0  5  10  15  20</td>
</tr>
<tr>
<td>0  10  20  30  40  50</td>
<td>0  50  100  150  200</td>
</tr>
</tbody>
</table>

Inlet Pressure

- 100 psig (6.8 bar)
- 500 psig (34.4 bar)

**Flow Coefficient 0.20; Maximum Inlet Pressure 3600 psig (248 bar)**

Pressure Control Ranges

<table>
<thead>
<tr>
<th>Nitrogen Flow, std ft³/min</th>
<th>Outlet Pressure, psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  2  4  6  8  10</td>
<td>0  5  10  15  20</td>
</tr>
<tr>
<td>0  10  20  30  40  50</td>
<td>0  50  100  150  200</td>
</tr>
</tbody>
</table>

Inlet Pressure

- 100 psig (6.8 bar)
- 500 psig (34.4 bar)
Pressure-Reducing Regulator Flow Data

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

**KCY Series**

**Flow Coefficient 0.06; Maximum Inlet Pressure 3600 psig (248 bar)**

![Graph showing pressure control ranges and outlet pressures for KCY Series with flow coefficient 0.06 and maximum inlet pressure 3600 psig.](image)

**Flow Coefficient 0.20; Maximum Inlet Pressure 3600 psig (248 bar)**

![Graph showing pressure control ranges and outlet pressures for KCY Series with flow coefficient 0.20 and maximum inlet pressure 3600 psig.](image)
Pressure-Reducing Regulator Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.

KLF Series

**Flow Coefficient 0.02; Maximum Inlet Pressure 3600 psig (248 bar)**

![Graph 1: Pressure Control Range 0 to 10 psig (0 to 0.68 bar)](image1)

![Graph 2: Pressure Control Range 0 to 250 psig (0 to 17.2 bar)](image2)

**Flow Coefficient 0.06; Maximum Inlet Pressure 3600 psig (248 bar)**

![Graph 3: Pressure Control Range 100 psig (6.8 bar)](image3)

![Graph 4: Pressure Control Range 500 psig (34.4 bar)](image4)
Pressure Regulators

Pressure-Reducing Regulator Flow Data
The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases.

**KHF Series**
*Flow Coefficient 1.0; Maximum Inlet Pressure 3600 psig (248 bar)*

**Pressure Control Ranges**
- 0 to 10 psig (0 to 0.68 bar)
- 0 to 25 psig (0 to 1.7 bar)

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**Outlet Pressure, psig**
- 0 to 50 psig (0 to 3.4 bar)
- 0 to 100 psig (0 to 6.8 bar)

**Inlet Pressure**
- 2200 psig (151 bar)
- 1000 psig (68.9 bar)
- 500 psig (34.4 bar)

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**Nitrogen Flow, std ft³/min**
- 0 to 250 psig (0 to 17.2 bar)
- 0 to 500 psig (0 to 34.4 bar)

**Outlet Pressure, bar**
- 0 to 3000 psig (0 to 206 bar)
- 0 to 4000 psig (0 to 275 bar)

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**KPF Series**
*Flow Coefficient 1.0; Maximum Inlet Pressure 6000 psig (413 bar)*

**Pressure Control Ranges**
- 0 to 1000 psig (0 to 68.9 bar)
- 0 to 2000 psig (0 to 137 bar)

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**Outlet Pressure, psig**
- 0 to 1000 psig (0 to 68.9 bar)
- 0 to 2000 psig (0 to 137 bar)

**Inlet Pressure**
- 3000 psig (206 bar)
- 5000 psig (344 bar)
- 2000 psig (137 bar)

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**Nitrogen Flow, std ft³/min**
- 0 to 3000 psig (0 to 206 bar)
- 0 to 4000 psig (0 to 275 bar)

**Outlet Pressure, bar**
- 0 to 3000 psig (0 to 206 bar)
- 0 to 5000 psig (0 to 344 bar)

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**Pressure Control Ranges**
- 0 to 3000 psig (0 to 206 bar)
- 0 to 4000 psig (0 to 275 bar)

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**Outlet Pressure, psig**
- 0 to 3500 psig (0 to 241 bar)
- 0 to 5000 psig (0 to 344 bar)

**Inlet Pressure**
- 3000 psig (206 bar)
- 5000 psig (344 bar)
- 3500 psig (241 bar)

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**Nitrogen Flow, std ft³/min**
- 0 to 250 psig (0 to 17.2 bar)
- 0 to 500 psig (0 to 34.4 bar)

**Outlet Pressure, bar**
- 0 to 2200 psig (0 to 151 bar)
- 0 to 500 psig (0 to 34.4 bar)

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**Pressure Control Range**
- 0 to 250 psig (0 to 17.2 bar)

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---

**Outlet Pressure, psig**
- 0 to 2200 psig (0 to 151 bar)
- 0 to 500 psig (0 to 34.4 bar)

**Inlet Pressure**
- 1000 psig (68.9 bar)
**Pressure-Reducing Regulator Flow Data**

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

**KCP Series**

*Flow Coefficient 0.06; Maximum Inlet Pressure 3600 psig (248 bar)*

![Graph 1](image1.png)

![Graph 2](image2.png)

*Flow Coefficient 0.20; Maximum Inlet Pressure 3600 psig (248 bar)*

![Graph 3](image3.png)

![Graph 4](image4.png)
Pressure Regulators

Pressure Reducing Regulator Flow Data

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

KHP Series

Flow Coefficient 0.06; Maximum Inlet Pressure 10 000 psig (689 bar)
Pressure Reducing Regulator Flow Data

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

**KHP Series**

*Flow Coefficient 0.25; Maximum Inlet Pressure 10 000 psig (689 bar)*

<table>
<thead>
<tr>
<th>Pressure Control Range</th>
<th>Nitrogen Flow, std L/min</th>
<th>Nitrogen Flow, std ft³/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 to 3600 psig (1.7 to 248 bar)</td>
<td>Inlet Pressure 5000 psig (344 bar)</td>
<td>8000 psig (551 bar)</td>
</tr>
<tr>
<td>100 to 10 000 psig (6.8 to 689 bar)</td>
<td>Inlet Pressure 9000 psig (620 bar)</td>
<td>8000 psig (551 bar)</td>
</tr>
</tbody>
</table>

**KHR Series**

*Flow Coefficient 0.06; Maximum Inlet Pressure 10 000 psig (689 bar)*

<table>
<thead>
<tr>
<th>Pressure Control Range</th>
<th>Water Flow, L/min</th>
<th>Water Flow, U.S. gal/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 500 psig (0 to 34.4 bar)</td>
<td>Inlet Pressure 8000 psig (551 bar)</td>
<td>5000 psig (344 bar)</td>
</tr>
<tr>
<td>0 to 750 psig (0 to 51.6 bar)</td>
<td>Inlet Pressure 8000 psig (551 bar)</td>
<td>5000 psig (344 bar)</td>
</tr>
<tr>
<td>0 to 1500 psig (0.68 to 103 bar)</td>
<td>Inlet Pressure 8000 psig (551 bar)</td>
<td>5000 psig (344 bar)</td>
</tr>
<tr>
<td>15 to 2500 psig (1.0 to 172 bar)</td>
<td>Inlet Pressure 8000 psig (551 bar)</td>
<td>5000 psig (344 bar)</td>
</tr>
</tbody>
</table>
Pressure-Reducing Regulator Flow Data

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

**KPP Series**

**Flow Coefficient 0.02; Maximum Inlet Pressure 2000 psig (137 bar)**

- **Pressure Control Range**
  - 0 to 1000 psig (0 to 68.9 bar)

**Flow Coefficient 0.06; Maximum Inlet Pressure 2000 psig (137 bar)**

- **Pressure Control Ranges**
  - 0 to 1000 psig (0 to 68.9 bar)
  - 0 to 1500 psig (0 to 103 bar)
  - 0 to 2000 psig (0 to 137 bar)

**Flow Coefficient 0.02; Maximum Inlet Pressure 4000 psig (275 bar)**

- **Pressure Control Range**
  - 0 to 2000 psig (0 to 137 bar)

**Flow Coefficient 0.06; Maximum Inlet Pressure 6000 psig (413 bar)**

- **Pressure Control Ranges**
  - 0 to 3000 psig (0 to 206 bar)
  - 0 to 3600 psig (0 to 248 bar)

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Swagelok
Back-Pressure Regulator Flow Data

The graphs illustrate the change in inlet pressure as the flow rate increases.

KBP Series
Flow Coefficient 0.20

<table>
<thead>
<tr>
<th>Nitrogen Flow, std ft³/min</th>
<th>Inlet Pressure, psig</th>
<th>Inlet Pressure, bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>50</td>
<td>0 to 250 psig (0 to 17.2 bar)</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
<td>0 to 500 psig (0 to 34.4 bar)</td>
</tr>
<tr>
<td>15</td>
<td>150</td>
<td>0 to 100 psig (0 to 6.8 bar)</td>
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<tr>
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<td>25</td>
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<td>30</td>
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<td>350</td>
<td>0 to 100 psig (0 to 6.8 bar)</td>
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<tr>
<td>40</td>
<td>400</td>
<td>0 to 100 psig (0 to 6.8 bar)</td>
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<tr>
<td>45</td>
<td>450</td>
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<tr>
<td>50</td>
<td>500</td>
<td>0 to 100 psig (0 to 6.8 bar)</td>
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</tbody>
</table>

Pressure Control Range
0 to 500 psig (0 to 34.4 bar)
0 to 100 psig (0 to 6.8 bar)

KFB Series
Flow Coefficient 1.0

<table>
<thead>
<tr>
<th>Nitrogen Flow, std ft³/min</th>
<th>Inlet Pressure, psig</th>
<th>Inlet Pressure, bar</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>50</td>
<td>0 to 50 psig (0 to 3.4 bar)</td>
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<tr>
<td>10</td>
<td>100</td>
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<tr>
<td>50</td>
<td>500</td>
<td>0 to 100 psig (0 to 6.8 bar)</td>
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</table>

Pressure Control Range
0 to 100 psig (0 to 6.8 bar)

KCB Series
Flow Coefficient 0.20

<table>
<thead>
<tr>
<th>Nitrogen Flow, std ft³/min</th>
<th>Inlet Pressure, psig</th>
<th>Inlet Pressure, bar</th>
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<tbody>
<tr>
<td>0</td>
<td>50</td>
<td>0 to 50 psig (0 to 3.4 bar)</td>
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<td>10</td>
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</tr>
<tr>
<td>50</td>
<td>500</td>
<td>0 to 100 psig (0 to 6.8 bar)</td>
</tr>
</tbody>
</table>

Pressure Control Range
0 to 375 psig (0 to 25.8 bar)
0 to 250 psig (0 to 17.2 bar)
0 to 100 psig (0 to 6.8 bar)
Back-Pressure Regulator Flow Data

The graphs illustrate the change in inlet pressure as the flow rate increases.

**KPB Series**

*Flow Coefficient 0.06*

![Graph 1](#)

*Flow Coefficient 0.20*

![Graph 2](#)
Back-Pressure Regulator Flow Data
The graphs illustrate the change in inlet pressure as the flow rate increases.

KHB Series

**Flow Coefficient 0.06**

- **Nitrogen Flow, std ft³/min**
- **Inlet Pressure, psig**
- **Inlet Pressure, bar**

- **Pressure Control Range**
  - 10 to 1500 psig
    - (0.68 to 103 bar)
  - 0 to 500 psig
    - (0 to 34.4 bar)

- **Nitrogen Flow, std ft³/min**
- **Inlet Pressure, psig**
- **Inlet Pressure, bar**

- **Pressure Control Range**
  - 25 to 3600 psig
    - (1.7 to 248 bar)
  - 10 to 1500 psig
    - (0.68 to 103 bar)

**Flow Coefficient 0.25**

- **Nitrogen Flow, std ft³/min**
- **Inlet Pressure, psig**
- **Inlet Pressure, bar**

- **Pressure Control Range**
  - 25 to 3600 psig
    - (1.7 to 248 bar)
  - 10 to 1500 psig
    - (0.68 to 103 bar)

- **Nitrogen Flow, std ft³/min**
- **Inlet Pressure, psig**
- **Inlet Pressure, bar**

- **Pressure Control Range**
  - 100 to 10 000 psig
    - (6.8 to 689 bar)
  - 10 to 1500 psig
    - (0.68 to 103 bar)
Port Configurations

Select regulators are available on special order with additional port configurations. Contact your authorized Swagelok representative for more information.

Port Configuration Symbols

These symbols indicate the port location of factory-assembled accessories.

- GI: Inlet gauge
- GO: Outlet gauge
- I: Isolation valve
- GO/R: Outlet gauge or relief valve
- GI/O: Outlet gauge or relief valve
- C: Cylinder connection
- R: Relief valve
- F: Flow direction
- Filtered inlet ports

Pressure-Reducing Regulators

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
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</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>A</td>
</tr>
<tr>
<td><img src="image2" alt="Diagram" /></td>
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<tr>
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Back-Pressure Regulators

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>A</td>
</tr>
<tr>
<td><img src="image2" alt="Diagram" /></td>
<td>B</td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td>C</td>
</tr>
<tr>
<td><img src="image4" alt="Diagram" /></td>
<td>D</td>
</tr>
<tr>
<td><img src="image5" alt="Diagram" /></td>
<td>E</td>
</tr>
<tr>
<td><img src="image6" alt="Diagram" /></td>
<td>F</td>
</tr>
<tr>
<td><img src="image7" alt="Diagram" /></td>
<td>G</td>
</tr>
<tr>
<td><img src="image8" alt="Diagram" /></td>
<td>H</td>
</tr>
<tr>
<td><img src="image9" alt="Diagram" /></td>
<td>K</td>
</tr>
</tbody>
</table>

MPC Port Configurations

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>5</td>
</tr>
<tr>
<td><img src="image2" alt="Diagram" /></td>
<td>6</td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td>7</td>
</tr>
<tr>
<td><img src="image4" alt="Diagram" /></td>
<td>8</td>
</tr>
</tbody>
</table>
**Options and Accessories**
Regulator accessories are available separately or mounted on Swagelok regulators. Some accessories limit regulator pressure or temperature ratings. Additional materials, options, and accessories are available. Contact your authorized Swagelok representative for more information.

**Cylinder Connections**
- Available in a variety of CGA connections
- Stainless steel construction
Insert a designator into the ordering number as shown in the appropriate regulator ordering information pages.

**Cylinder Gases and Connections**

<table>
<thead>
<tr>
<th>Gas</th>
<th>CGA Connection</th>
<th>Connection Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air, industrial</td>
<td>590</td>
<td>H</td>
</tr>
<tr>
<td>Ammonia, anhydrous</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Argon</td>
<td>580</td>
<td>G</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>320</td>
<td>B</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>350</td>
<td>D</td>
</tr>
<tr>
<td>Chlorine</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Ethane</td>
<td>350</td>
<td>D</td>
</tr>
<tr>
<td>Ethylene</td>
<td>350</td>
<td>D</td>
</tr>
<tr>
<td>Helium</td>
<td>580</td>
<td>G</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>350</td>
<td>D</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>330</td>
<td>C</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>330</td>
<td>C</td>
</tr>
<tr>
<td>Krypton</td>
<td>580</td>
<td>G</td>
</tr>
<tr>
<td>Methane, natural gas</td>
<td>350</td>
<td>D</td>
</tr>
<tr>
<td>Methyl chloride</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Methyl mercaptan</td>
<td>330</td>
<td>C</td>
</tr>
<tr>
<td>Neon</td>
<td>580</td>
<td>G</td>
</tr>
<tr>
<td>Nitric oxide</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>580</td>
<td>G</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Oxygen</td>
<td>540</td>
<td>F&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Phosgene</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Refrigerant--14</td>
<td>580</td>
<td>G</td>
</tr>
<tr>
<td>Refrigerant--22</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Sulfur dioxide</td>
<td>660</td>
<td>J</td>
</tr>
<tr>
<td>Sulfur hexafluoride</td>
<td>590</td>
<td>H</td>
</tr>
<tr>
<td>Xenon</td>
<td>580</td>
<td>G</td>
</tr>
</tbody>
</table>

<sup>1</sup> Available only on select KPR and KCY series regulators. Contact your authorized Swagelok representative.

DIN, BS, and JIS cylinder connections are also available. Contact your authorized Swagelok representative for more information.
Isolation Valves

- Allow isolation from downstream equipment
- Working pressures up to 5000 psig (344 bar)
- 316 stainless steel construction
- Swagelok integral-bonnet needle valve (1 series)
- Used in conjunction with an adjustable regulator relief valve

See the Swagelok Integral-Bonnet Needle Valves catalog, MS-01-164, for more information.

Isolation Valve and Relief Valve Ordering Information

Isolation valves are available factory assembled on KCP, KPP, KPF, KHP, KHR, and KHB series regulators. Isolation and adjustable regulator relief valves are available factory assembled on KPR, KCY, KCM, KLF, and KHF series regulators.

To order a regulator factory assembled with an isolation valve or isolation valve and adjustable regulator relief valve, insert a designator from the table below into the ordering number as shown in the appropriate regulator ordering information pages.

### Cleaning

Gauges assembled to ASTM G93 Level E or SC-11—cleaned regulators are cleaned in accordance with ASTM B40.1 level IV.

### Ordering Information

To order a regulator assembled with gauges, insert a designator from the table below into the ordering number as shown in the appropriate regulator ordering information pages. The maximum gauge pressures are appropriate for the maximum inlet pressure and/or control pressure ordered.

<table>
<thead>
<tr>
<th>Gauge Scale (primary unit)</th>
<th>Gauge Designator</th>
<th>Valve Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>psig (bar) (North America only)</td>
<td>1 A G C</td>
<td>Kenmac® KVV series adjustable regulator relief valve</td>
</tr>
<tr>
<td>psig (bar)</td>
<td>3 C J B</td>
<td>1/4 in. male NPT inlet angle pattern isolation valve</td>
</tr>
<tr>
<td>psig (kPa)</td>
<td>5 E L C</td>
<td>1/4 in. Swagelok tube fitting angle pattern isolation valve</td>
</tr>
<tr>
<td>bar (psig)</td>
<td>2 B H B</td>
<td>1/4 in. male NPT inlet angle pattern isolation valve</td>
</tr>
<tr>
<td>MPa</td>
<td>4 D K B</td>
<td>1/4 in. Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
</tr>
</tbody>
</table>

1. KCP and KCB series regulators are assembled with M model gauges.
2. Not available for KCP and KCB series regulators.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Description</th>
<th>Valve Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenmac®</td>
<td>KVV series adjustable regulator relief valve</td>
<td>1 A G C</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. male NPT inlet angle pattern isolation valve</td>
<td>1</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. Swagelok tube fitting inlet angle pattern isolation valve</td>
<td>2</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. female NPT outlet angle pattern isolation valve</td>
<td>3</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
<td>4</td>
</tr>
<tr>
<td>Swagelok</td>
<td>6 mm Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
<td>5</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. female NPT outlet straight pattern isolation valve</td>
<td>6</td>
</tr>
<tr>
<td>Swagelok</td>
<td>3/8 in. Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
<td>7</td>
</tr>
</tbody>
</table>

### Options and Accessories

Pressure Regulators

- Provides measure of inlet pressure, outlet pressure, or both
- 2 1/2 in. (63 mm) dial size with 1/4 in. male NPT connection
- 1 1/2 in. (40 mm) dial size with 1/8 in. male NPT connection
- Stainless steel cases and wetted components

See the Swagelok Pressure Gauges, Industrial and Process catalog, MS-02-170, for more information.

Pressure Gauges

- Provides measure of inlet pressure, outlet pressure, or both
- 2 1/2 in. (63 mm) dial size with 1/4 in. male NPT connection
- 1 1/2 in. (40 mm) dial size with 1/8 in. male NPT connection
- Stainless steel cases and wetted components

See the Swagelok Pressure Gauges, Industrial and Process catalog, MS-02-170, for more information.

Cleaning

Gauges assembled to ASTM G93 Level E or SC-11—cleaned regulators are cleaned in accordance with ASTM B40.1 level IV.

Ordering Information

To order a regulator assembled with gauges, insert a designator from the table below into the ordering number as shown in the appropriate regulator ordering information pages. The maximum gauge pressures are appropriate for the maximum inlet pressure and/or control pressure ordered.

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<th>Gauge Scale (primary unit)</th>
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<td>1 A G C</td>
<td>Kenmac® KVV series adjustable regulator relief valve</td>
</tr>
<tr>
<td>psig (bar)</td>
<td>3 C J B</td>
<td>1/4 in. male NPT inlet angle pattern isolation valve</td>
</tr>
<tr>
<td>psig (kPa)</td>
<td>5 E L C</td>
<td>1/4 in. Swagelok tube fitting angle pattern isolation valve</td>
</tr>
<tr>
<td>bar (psig)</td>
<td>2 B H B</td>
<td>1/4 in. male NPT inlet angle pattern isolation valve</td>
</tr>
<tr>
<td>MPa</td>
<td>4 D K B</td>
<td>1/4 in. Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
</tr>
</tbody>
</table>

1. KCP and KCB series regulators are assembled with M model gauges.
2. Not available for KCP and KCB series regulators.

<table>
<thead>
<tr>
<th>Manufacturer</th>
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<tbody>
<tr>
<td>Kenmac®</td>
<td>KVV series adjustable regulator relief valve</td>
<td>1 A G C</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. male NPT inlet angle pattern isolation valve</td>
<td>1</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. Swagelok tube fitting inlet angle pattern isolation valve</td>
<td>2</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. female NPT outlet angle pattern isolation valve</td>
<td>3</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
<td>4</td>
</tr>
<tr>
<td>Swagelok</td>
<td>6 mm Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
<td>5</td>
</tr>
<tr>
<td>Swagelok</td>
<td>1/4 in. female NPT outlet straight pattern isolation valve</td>
<td>6</td>
</tr>
<tr>
<td>Swagelok</td>
<td>3/8 in. Swagelok tube fitting inlet and outlet straight pattern isolation valve</td>
<td>7</td>
</tr>
</tbody>
</table>

1. Not available on KPR, KCY, KCM, KLF, and KHF series regulators, because a relief valve is needed to protect the diaphragm sensing mechanism.
2. Includes male NPT to Swagelok tube adapter fitting (required for regulators with 1/8 and 1/2 in. female NPT ports).

The adjustable regulator relief valve pressure range is based on the regulator pressure control range chosen, as shown at right.

<table>
<thead>
<tr>
<th>Regulator Control Range psig (bar)</th>
<th>KVV Series Adjustable Regulator Relief Valve Pressure Range psig (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10 (0 to 0.68)</td>
<td>0 to 100 (0 to 6.8)</td>
</tr>
<tr>
<td>0 to 25 (0 to 1.7)</td>
<td>50 to 200 (3.4 to 13.7)</td>
</tr>
<tr>
<td>0 to 50 (0 to 3.4)</td>
<td>0 to 100 (0 to 6.8)</td>
</tr>
<tr>
<td>0 to 250 (0 to 17.2)</td>
<td>0 to 500 (0 to 34.4)</td>
</tr>
<tr>
<td>0 to 500 (0 to 34.4)</td>
<td>150 to 500 (10.3 to 34.4)</td>
</tr>
</tbody>
</table>
Options and Accessories

Kenmac Adjustable Regulator Relief Valves (KVV Series)
■ Provide nonsafety-related pressure protection for Swagelok regulators

Technical Data

Relief Pressure Ranges
■ 0 to 100, 50 to 200, and 150 to 500 psig (0 to 6.8, 3.4 to 13.7, and 10.3 to 34.4 bar)

Maximum Operating Temperature
■ 392°F (200°C)

Weight
■ 0.26 lb (0.12 kg)

Ports
■ 1/4 in. NPT male inlet and female outlet

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body, poppet, spring button,</td>
<td>316 SS</td>
</tr>
<tr>
<td>adjusting screw</td>
<td></td>
</tr>
<tr>
<td>Seal</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>Range spring</td>
<td>302 SS</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

Flow Data

The graph illustrates the discharge characteristics of the Kenmac adjustable regulator relief valve.

Ordering Information

To order a KVV adjustable regulator relief valve separately, select an ordering number from the table below.

<table>
<thead>
<tr>
<th>Relief Pressure Range psig (bar)</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 100 (0 to 6.8)</td>
<td>KVV11DE1</td>
</tr>
<tr>
<td>50 to 200 (3.4 to 13.7)</td>
<td>KVV11DG1</td>
</tr>
<tr>
<td>150 to 500 (10.3 to 34.4)</td>
<td>KVV11DI1</td>
</tr>
</tbody>
</table>

⚠ Kenmac adjustable regulator relief valves are not “safety accessories” as defined in the Pressure Equipment Directive 97/23/EC.

⚠ Some system applications require relief valves to meet specific safety codes. The system designer and user must determine when such codes apply and whether these relief valves conform to them.
Options and Accessories

Hoses

Hoses are available assembled to the inlet of the regulator to allow connection to remote gas cylinders.

Hose options, rated to 3000 psig (206 bar), include:

- 3 ft long Swagelok 1/4 in. high-pressure, metal flexible hose (FM series), 1/4 in. female NPT inlet, 1/4 in. male NPT outlet connected to regulator: SS-FM4PM4PF4-36

- 3 ft long Swagelok 1/4 in. PTFE-lined, stainless steel braided hose (TH series), 1/4 in. female NPT inlet, 1/4 in. male NPT outlet connected to regulator: SS-TH4PM4PF4-36

See the Swagelok, Hose—Hose Assemblies, Bulk Hose, and End Connections catalog, MS-01-167, for more information.

Cleaning

Hoses assembled to ASTM G93 Level E or SC-11–cleaned regulators are not specially cleaned.

Handles

Knob, thumbwheel, and antitamper handles are available.

The plastic knob handle is standard for most Swagelok regulators.

The metal thumbwheel handle is available for the compact KCB and KCP series regulators.

The metal antitamper nut is available to prevent inadvertent pressure adjustment.

Wall Mounting Brackets

Stainless steel wall mounting brackets are available for many Swagelok regulators.

<table>
<thead>
<tr>
<th>Regulator Series</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPR, KLF, KHF, KCP, KPP, KPF, KHP, KBP, KFB, KCB, KPB, KHB</td>
<td>9R0079</td>
</tr>
<tr>
<td>KCY</td>
<td>9R0149</td>
</tr>
</tbody>
</table>

KCY Series Mounting Bracket

Requires 1st stage panel-mount option. See page 8.

KPR, KLF, KHF, KCP, KPP, KPF, KHP, KBP, KFB, KCB, KPB, and KHB Series Mounting Bracket
Maintenance Kits

Filter Replacement Kits
Filter replacement kits are available for KPR, KCM, KCP, KCY, KPP, KHP, KLF, and KHR series regulators. Filter replacement kits include:
- five sets of filters, filter rings, and filter retaining rings
- instructions.

<table>
<thead>
<tr>
<th>Regulator Series</th>
<th>Inlet Size</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCP</td>
<td>1/8 in. NPT</td>
<td>REG-FILTER-2-KIT5</td>
</tr>
<tr>
<td>KPR, KCM, KCY, KPP, KHP, KLF, KHR</td>
<td>1/4 in. NPT</td>
<td>REG-FILTER-4-KIT5</td>
</tr>
</tbody>
</table>

KPR Series Maintenance Kits
Maintenance kits listed below are for KPR series regulators with stainless steel or brass bodies, PCTFE seat material, 0.06 flow coefficient, and no vent or a captured vent. For other materials and options, contact your authorized Swagelok representative.

KPR series maintenance kits include:
- all wetted components, except for the regulator body
- wetted lubricant with MSDS
- instructions.

KCY series regulators can be rebuilt with one KPR1J00412A0-KIT for the first stage and another KPR series maintenance kit appropriate for the pressure control range of the second stage.

<table>
<thead>
<tr>
<th>Pressure Control Range</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>psig</td>
<td>bar</td>
</tr>
<tr>
<td>0 to 10 (0 to 0.68) and 0 to 25 (0 to 1.7)</td>
<td>KPR1D00412A0-KIT</td>
</tr>
<tr>
<td>0 to 50 (0 to 3.4) and 0 to 100 (0 to 6.8)</td>
<td>KPR1F00412A0-KIT</td>
</tr>
<tr>
<td>0 to 250 (0 to 17.2) and 0 to 500 (0 to 34.4)</td>
<td>KPR1J00412A0-KIT</td>
</tr>
</tbody>
</table>

Additional Products

Filters
Swagelok offers a variety of filters, filter elements, and sizes.
- 316 SS and brass materials
- Sintered and strainer elements
- Tee type, inline, and all-welded models
For more information about Swagelok filters, see the Filters—FW, F, and TF Series catalog, MS-01-92.

Transducers
Swagelok industrial pressure transducers electronically monitor fluid system pressure in a variety of analytical and process applications.
- Accurate and repeatable readings
- Swagelok tube adapter end connections available for ease of installation and maintenance
- CE compliant
For more information about Swagelok industrial pressure transducers, see the Industrial Pressure Transducers catalog, MS-02-225.
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 pressure regulators are not “Safety Accessories” as defined in the Pressure Equipment Directive 97/23/EC.
⚠ Do not use the regulator as a shutoff device.