Pressure Regulators
K Series

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

Stop Plate
This disc provides positive backup to the diaphragm in case of diaphragm overpressure.

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.

Inlet Outlet

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.

Gauze Inlet Filter
Regulators are susceptible to damage from system particles. Swagelok pressure-reducing regulators include a 25 µm filter held in the inlet port by a retaining ring. It can be removed easily for cleaning or to use the regulator in liquid service.

Retaining Ring
Filter Ring

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 should a diaphragm or piston rupture.

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

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.

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

### Supply-Pressure Effect

Supply-pressure effect (SPE) or dependency is a ratio describing the change in outlet pressure per 100 psi (6.8 bar) change in inlet pressure. In other words, for every 100 psi (6.8 bar) drop in inlet pressure, the outlet pressure will increase by \( X \) psi. \( X \) is the SPE.

For standard pressure-reducing regulators, the outlet pressure increases as supply pressure decreases. The opposite is true as supply pressure increases. This effect can also be realized on system startup or shutdown.

The regulator should be set to the “off” position before turning the supply pressure on or off to prevent overpressurization of regulator diaphragms, outlet pressure gauges, or other equipment downstream.

---

**K Series 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>
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</thead>
<tbody>
<tr>
<td>KPR</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>6000 (413)</td>
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<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td>✓</td>
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<td>3600 (248)</td>
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<td>✓</td>
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<td>✓</td>
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<td>3600 (248)</td>
</tr>
</tbody>
</table>

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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.

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**Swagelok**
When selecting an antitamper model, it is important to make sure that SPE will not cause excessive overpressurization on opening and closing of the supply pressure.

**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.

⚠️ Self-venting and captured-venting regulators can release system fluid to atmosphere. Position the self-vent hole or the captured vent connection away from operating personnel. See Venting Options, page 2, for more information.

### Testing

Every Swagelok K series pressure regulator is pressure tested with nitrogen.

### Cleaning and Packaging

Every Swagelok K series pressure 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 brass and stainless steel Swagelok regulators.

Cleaning and packaging in accordance with Swagelok Special Cleaning and Packaging (SC-11), MS -06-63, to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C is available for select KPR, KCY, KCP, KBP, and KCB 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.
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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)
■ 6000 psig (413 bar) with PEEK seat

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

Flow Coefficient (Cv)
■ 0.06 and 0.20
See page 41 for flow graphs.
■ 0.02 and 0.50 also available

Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient (Cv)</th>
<th>Pressure Control Range</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 100 psig (6.8 bar)</td>
<td>250 psig (17.2 bar) and Higher</td>
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<tr>
<td>0.02</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>0.06</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>0.20</td>
<td>1.7</td>
<td>2.5</td>
</tr>
<tr>
<td>0.50</td>
<td>2.3</td>
<td>3.3</td>
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</tbody>
</table>

Maximum Operating Temperature
■ 176°F (80°C) with PCTFE seat
■ 392°F (200°C) with PEEK seat
■ 212°F (100°C) with PEEK seat and maximum inlet pressure greater than 3600 psig (248 bar)

Weight
■ 2.4 lb (1.1 kg)

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>316 SS</th>
<th>Brass CW721R</th>
<th>Alloy 400</th>
<th>Alloy C-276</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Knob handle, cover</td>
<td></td>
<td>Nylon with 316 SS insert</td>
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<tr>
<td>Spring button</td>
<td></td>
<td>Zinc-plated steel</td>
<td></td>
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</tr>
<tr>
<td>Spring stabilizer(1)</td>
<td></td>
<td>301 SS</td>
<td></td>
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</tr>
<tr>
<td>Range spring</td>
<td></td>
<td>316 SS or zinc-plated steel, depending on configuration</td>
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</tr>
<tr>
<td>Stem, stem nut, cap ring, stop plate, body cap, panel nuts(2)</td>
<td>316 SS</td>
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<tr>
<td>VCR nuts(2)</td>
<td>316 SS</td>
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<tr>
<td>Nonwetted lubricant</td>
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<td>Hydrocarbon-based</td>
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<tr>
<td>Seat retainer</td>
<td>316 SS</td>
<td>Alloy 400</td>
<td>Alloy C-276</td>
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</tr>
<tr>
<td>Seat</td>
<td>PCTFE or PEEK</td>
<td></td>
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<tr>
<td>Filter, retaining ring</td>
<td>316 SS</td>
<td>Alloy C-22</td>
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<tr>
<td>Diaphragm(3)</td>
<td>Alloy X-750 or alloy C-276</td>
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</tr>
<tr>
<td>Poppet</td>
<td>S17400 SS</td>
<td>Alloy 400</td>
<td>Alloy C-276</td>
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<tr>
<td>Poppet spring</td>
<td>Alloy X-750</td>
<td>Alloy C-276</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poppet damper, filter ring</td>
<td>PTFE</td>
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<tr>
<td>Self-vent seal(2)</td>
<td>Fluorocarbon FKM</td>
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<tr>
<td>Body</td>
<td>316 SS</td>
<td>Brass CW721R</td>
<td>Alloy 400</td>
<td>Alloy C-276</td>
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<tr>
<td>Tube butt weld ports, VCR gland ports(2)</td>
<td>316L SS</td>
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<td>Wetted lubricant</td>
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<td>PTFE-based</td>
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</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.

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

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<td>Body Material</td>
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</tbody>
</table>

Pressure Control Range
C = 0 to 10 psig (0 to 0.68 bar)\(^1\)
D = 0 to 25 psig (0 to 1.7 bar)\(^1\)
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\(^1\)
F = 100 psig (6.8 bar)
J = 500 psig (34.4 bar)
L = 1000 psig (68.9 bar)
P = 3000 psig (206 bar)\(^2\)
R = 3600 psig (248 bar)\(^3\)
T = 4351 psig (300 bar)\(^3\)
W = 6000 psig (413 bar)\(^3\)

Port Configuration
A, B, C, E, F, H, K, L, M, N
See Port Configurations, page 52.

Ports
4 = 1/4 in. female NPT
T = 1/4 in. × 0.035 in. tube butt weld\(\text{\textcircled{1}}\)
V = 1/4 in. VCR gland, no nuts\(\text{\textcircled{2}}\)
X = 1/4 in. rotatable female VCR fitting\(\text{\textcircled{1}}\)
Y = 1/4 in. rotatable male VCR fitting\(\text{\textcircled{1}}\)

Flow Coefficient (Cv)
1 = 0.02
2 = 0.06
5 = 0.20
7 = 0.50

Sensing Mechanism, Vent
A = Alloy X-750 diaphragm, no vent
C = Alloy X-750 diaphragm, self vent\(\text{\textcircled{5}}\)
E = Alloy X-750 diaphragm, captured vent, no self vent
F = Alloy X-750 diaphragm, self and captured vent\(\text{\textcircled{5}}\)
H = Alloy C-276 diaphragm, no vent

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

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

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

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

Options
0 = No options
H = Inboard helium leak test to a maximum leak rate of \(1 \times 10^{-5} \text{ std cm}^3/\text{s}\)\(\text{\textcircled{1}}\)
3 = 3 ft, 1/4 in. FM series metal flexible hose, 1/4 in. female NPT inlet\(\text{\textcircled{2}}\)
4 = 3 ft, 1/4 in. TH series PTFE-lined, stainless steel braided hose, 1/4 in. female NPT inlet\(\text{\textcircled{2}}\)

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
- High-flow, dual-gauze type filter positively retained in inlet port

Technical Data

Maximum Inlet Pressure
- 3600 psig (248 bar)
- 6000 psig (413 bar) with PEEK seat

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

Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient ($C_v$)</th>
<th>Pressure Control Range</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 100 psig (6.8 bar)</td>
<td>250 psig (17.2 bar) and Higher</td>
</tr>
</tbody>
</table>

- 0.06 0.01 0.02
- 0.20 0.02 0.06
- 0.50 0.05 0.13

Maximum Operating Temperature
- 176°F (80°C) with PCTFE seat
- 392°F (200°C) with PEEK seat
- 212°F (100°C) with PEEK seat and maximum inlet pressure greater than 3600 psig (248 bar)

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>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
</tr>
<tr>
<td>Spring buttons</td>
<td>316 SS (1st stage)</td>
</tr>
<tr>
<td></td>
<td>Zinc-plated steel (2nd stage)</td>
</tr>
<tr>
<td>Spring stabilizer</td>
<td>301 SS</td>
</tr>
<tr>
<td>Range springs</td>
<td>316 SS</td>
</tr>
<tr>
<td>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>Stems, stem nut, cap</td>
<td>316 SS</td>
</tr>
<tr>
<td>rings, stop plates, body</td>
<td>316 SS</td>
</tr>
<tr>
<td>caps, panel nuts, antitamper nut</td>
<td></td>
</tr>
<tr>
<td>Seats</td>
<td>PCTFE (0 to 100 psig control ranges)</td>
</tr>
<tr>
<td>Seats</td>
<td>PEEK (0 to 250 and 0 to 500 psig control ranges)</td>
</tr>
<tr>
<td>Diaphragms, poppet springs</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Poppets</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet dampers, filter ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Interstage port plug</td>
<td>316 SS with PTFE tape</td>
</tr>
<tr>
<td>Self-vent 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 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>
<tbody>
<tr>
<td>KCY</td>
<td>1</td>
<td>F</td>
<td>R</td>
<td>F</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>A</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</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

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
P = 3000 psig (206 bar)\(^1\)
R = 3600 psig (248 bar)\(^2\)
T = 4351 psig (300 bar)\(^2\)\(^3\)\(^4\)
W = 6000 psig (413 bar)\(^2\)\(^3\)\(^4\)
\(^1\) Available for regulators assembled with CGA cylinder connection or inlet hose only.
\(^2\) Not available for regulators assembled with CGA cylinder connection or inlet hose.
\(^3\) Available only with 316 SS body material and PEEK seat material. Not available with SC-11 cleaning.
\(^4\) Not available for regulators assembled with isolation valves.

7 Port Configuration
A, B, C, E, F, H, K, L, M, N

8 Ports
4 = 1/4 in. female NPT

9 Seat Material
1 = PCTFE
2 = PEEK

10 Flow Coefficient \(C_v\)
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\(^5\)
E = Alloy X-750 diaphragm, captured vent, no self vent
F = Alloy X-750 diaphragm, self and captured vent\(^5\)
\(^5\) Available with 0.06 and 0.2 \(C_v\) only. Self vent through second stage only.

12 Handle, Mounting\(^6\)
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

14 Cylinder Connections
0 = No connections

15 Gauges
0 = No gauges

16 Options
0 = No options
3 = 3 ft, 1/4 in. FM series metal flexible hose, 1/4 in. female NPT inlet\(^7\)
4 = 3 ft, 1/4 in. TH series PTFE-lined, stainless steel braided hose, 1/4 in. female NPT inlet\(^7\)

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

<table>
<thead>
<tr>
<th>Flow Coefficient ((C_v))</th>
<th>Pressure Control Range</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 10 psig (0.68 bar)</td>
<td>25 psig (1.7 bar) and Higher</td>
</tr>
<tr>
<td>0.02</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>0.06</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>0.20</td>
<td>0.7</td>
<td>0.9</td>
</tr>
<tr>
<td>0.50</td>
<td>1.0</td>
<td>1.4</td>
</tr>
</tbody>
</table>

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(^\d)</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(^\d)</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,(^\d) 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.
\(^\d\) Not required in all configurations.
\(^\d\) Not shown.
\(^\d\) 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.

4 Body Material
1 = 316 SS
A = 316 SS, ASTM G93 Level E-cleaned

5 Pressure Control Range
B = 0 to 2.0 psig (0 to 0.13 bar)\(^1\)
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)
\(^1\) Available with 15 psig (1.0 bar) maximum inlet pressure only.

6 Maximum Inlet Pressure\(^2\)
C = 15 psig (1.0 bar)\(^2\)
F = 100 psig (6.8 bar)
J = 500 psig (34.4 bar)
L = 1000 psig (68.9 bar)
P = 3000 psig (206 bar)\(^3\)
R = 3600 psig (248 bar)\(^4\)
\(^1\) Available with 0 to 2.0 psig (0 to 0.13 bar) pressure control range only.
\(^2\) Available for regulators assembled with CGA cylinder connection or inlet hose only.
\(^3\) Not available for regulators assembled with CGA cylinder connection or inlet hose.

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

8 Ports
4 = 1/4 in. female NPT

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
E = Alloy X-750 diaphragm, captured vent, no self vent

12 Handle, Mounting
2 = Knob
3 = 316 SS antitamper nut
6 = Knob, panel mount
7 = 316 SS antitamper nut, panel mount
For knob handle color options, see page 56.

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

14 Cylinder Connections
0 = No connection
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\(^5\)
4 = 3 ft, 1/4 in. TH series PTFE-lined, stainless steel braided hose, 1/4 in. female NPT inlet\(^5\)
For more information about hoses, see page 56.
\(^5\) Hoses are not available for ASTM G93 Level E-cleaned regulators.
High-Flow, High-Sensitivity Diaphragm-Sensing, Pressure-Reducing Regulators (KHF Series)

The KHF series combines the high-flow capabilities 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
- 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.

Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient ($C_v$)</th>
<th>Pressure Control Range Up to 50 psig (3.4 bar)</th>
<th>100 psig (6.8 bar) and Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Supply Pressure Effect, %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>

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&lt;sup&gt;①&lt;/sup&gt;</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&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, 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&lt;sup&gt;②&lt;/sup&gt;</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&lt;sup&gt;®&lt;/sup&gt;</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 250 psig (0 to 17.2 bar) control range.
<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.

![Dimensions diagram]

### Ordering Information
Build a KHF 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><strong>Body Material</strong></td>
<td>1 = 316 SS</td>
<td>A = 316 SS, ASTM G93 Level E-cleaned</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pressure Control Range</strong></td>
<td>C = 0 to 10 psig (0 to 0.68 bar)</td>
<td>D = 0 to 25 psig (0 to 1.7 bar)</td>
<td>E = 0 to 50 psig (0 to 3.4 bar)</td>
<td>F = 0 to 100 psig (0 to 6.8 bar)</td>
<td>G = 0 to 250 psig (0 to 17.2 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Inlet Pressure</strong></td>
<td>F = 100 psig (6.8 bar)</td>
<td>J = 500 psig (34.4 bar)</td>
<td>L = 1000 psig (68.9 bar)</td>
<td>R = 3600 psig (248 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

| **Port Configuration** | A, B, C, E, F, H, K, L, M, N |
| **See Port Configurations**, page 52. |
| **Ports** | 8 = 1/2 in. female NPT inlet and outlet; 1/4 in. female NPT gauge port |
| **Seat Material** | 1 = PCTFE | 2 = PEEK |
| **Flow Coefficient ($C_v$)** | 8 = 1.0 |
| **Sensing Mechanism, Vent** | A = Alloy X-750 diaphragm, no vent | E = Alloy X-750 diaphragm, captured vent, no self vent |
| **Handle, Mounting** | 2 = Knob | 3 = 316 SS antitamper nut | 6 = Knob, panel mount | 7 = 316 SS antitamper nut, panel mount |

For knob handle color options, see page 56.

| **Isolation and Relief Valves** | 0 = No valves |

For isolation and relief valve options, see page 54.

| **Cylinder Connections** | 0 = No connections |

| **Gauges** | 0 = No gauges |

For inlet and outlet gauge options, see page 54.

| **Options** | 0 = No options |

---

**Notes:**
- 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)
- 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

---

**Diagram notes:**
- 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)
## 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

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

#### Pressure Control Ranges
- 0 to 10 psig (0.68 bar) through 0 to 1500 psig (103 bar)

#### Flow Coefficient \( (C_v) \)
- 0.06 and 0.20
- 0.02 and 0.50 also available
- See page 45 for flow graphs.

### Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient ((C_v))</th>
<th>Pressure Control Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 250 psig (17.2 bar)</td>
</tr>
<tr>
<td></td>
<td>Supply Pressure Effect, %</td>
</tr>
<tr>
<td>0.02</td>
<td>0.4</td>
</tr>
<tr>
<td>0.06</td>
<td>1.3</td>
</tr>
<tr>
<td>0.20</td>
<td>2.1</td>
</tr>
<tr>
<td>0.50</td>
<td>3.0</td>
</tr>
</tbody>
</table>

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

### Weight
- 1.0 lb (0.45 kg)

### Ports
- 1/8 in. female NPT inlet, outlet, and gauge ports
- MPC platform

### Materials of Construction

#### Wetted components listed in italics.

<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,(^{\text{†}}) cover(^{\text{‡}})</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(^{\text{†}})</td>
<td>316 SS</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, seat retainer, piston, filter,(^{\text{‡}}) retaining ring(^{\text{‡}})</td>
<td>316 SS</td>
</tr>
<tr>
<td>Piston seal</td>
<td>Fluorocarbon FKM or Kalrez(^{\text{§}})</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(^{\text{‡}})</td>
<td>PTFE</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

\(^{\text{†}}\) Not shown.
\(^{\text{‡}}\) MPC platform regulator does not contain a filter.

---

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

Dimensions sketch

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

KCP 1 F R A 2 A 2 P 1 0 0 0 0

4 Body Material
1 = 316 SS
A = 316 SS, ASTM G93 Level E-cleaned
C = 316 SS, 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)
L = 0 to 1000 psig (0 to 68.9 bar)
M = 0 to 1500 psig (0 to 103 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)

7 Port Configuration
A, B, C, E, F, H, K, L, M, N, 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

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
For knob handle color options, see page 56.

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

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

Not available with MPC platform port configuration.
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**

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

**Pressure Control Ranges**
- 0 to 1000 psig (68.9 bar) through 0 to 3600 psig (248 bar)

**Flow Coefficient** ($C_v$)
- 0.02 and 0.06

See page 48 for flow graphs.

**Supply-Pressure Effect**

<table>
<thead>
<tr>
<th>Flow Coefficient ($C_v$)</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02</td>
<td>2.2</td>
</tr>
<tr>
<td>0.06</td>
<td>7.2</td>
</tr>
</tbody>
</table>

**Maximum Operating Temperature**
- 392°F (200°C) with 2000 psig (137 bar) maximum inlet pressure
- 212°F (100°C) with maximum inlet pressure greater than 2000 psig (137 bar)

**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)</td>
</tr>
<tr>
<td></td>
<td>Zinc-plated steel (all other ranges)</td>
</tr>
<tr>
<td>Spring stabilizer$^②$</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$^③$</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 spring, body seal spring</td>
<td>Elgiloy</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.

<table>
<thead>
<tr>
<th>KPP</th>
<th>1</th>
<th>L</th>
<th>W</th>
<th>A</th>
<th>4</th>
<th>2</th>
<th>2</th>
<th>P</th>
<th>2</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
</table>

### 4 Body Material
- 1 = 316 SS
- A = 316 SS, ASTM G93 Level E-cleaned

### 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)
- R = 0 to 3600 psig (0 to 248 bar)

#### Notes:
- Not available with 2000 psig (137 bar) maximum inlet pressure.

### 6 Maximum Inlet Pressure
- N = 2000 psig (137 bar)
- S = 4000 psig (275 bar)
- W = 6000 psig (413 bar)

#### Notes:
- For better resolution and control, select a pressure that closely matches system pressure.

### 7 Port Configuration
- A, B, C, E, F, H, K, L, M, N

See *Port Configurations*, page 52.

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

### 9 Seat, Seal Material
- 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, no self vent

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

For knob handle color options, see page 56.

### 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 (Cv = 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 (Cv)**
- 1.0

See page 44 for flow graphs.

### Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient (Cv)</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>5.3</td>
</tr>
</tbody>
</table>

### 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

**Component** | **Material**
--- | ---
Knob handle, cover | Nylon with 316 SS insert
Spring button | 316 SS (0 to 3000 and 0 to 4000 psig range) Zinc-plated steel (all other ranges)
Spring stabilizer<sup>1</sup> | 301 SS
Range spring | Zinc-plated steel
Stem, stem nut, cap ring, body cap, panel nuts<sup>2</sup> | 316 SS
Nonwetted lubricant | Hydrocarbon-based
Body, spring retainer, seat retainer, filter, retaining ring, piston, piston guide, poppet seal retainer | 316 SS
Seat, piston seal retainer | PCTFE or PEEK
Poppet | S17400 SS
Poppet spring | 302 SS
Filter ring, piston seal, poppet seal | PTFE
Piston seal spring, poppet seal spring | Elgiloy
Body seal | Fluorocarbon FKM
Wetted lubricant | PTFE-based

<sup>1</sup> Not included in regulators with 316 SS spring button.
<sup>2</sup> 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.

```
KPF 1 L W A 8 A 8 P 2 0 0 0 0
```

4 Body Material
   1 = 316 SS
   A = 316 SS, ASTM G93 Level E-cleaned

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, E, F, H, K, L, M, N
   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, Body Seal Material
   A = PCTFE, fluorocarbon FKM
   C = PEEK, fluorocarbon FKM

10 Flow Coefficient ($C_v$)
    8 = 1.0

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

12 Handle, Mounting
   2 = Knob
   3 = 316 SS antitamper nut
   6 = Knob, panel mount
   7 = 316 SS antitamper nut, panel mount
   For knob handle color options, see page 56.

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.

Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient ($C_v$)</th>
<th>Pressure Control Range</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 2500 psig (172 bar)</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>3600 and 6000 psig (248 and 413 bar)</td>
<td>0.25</td>
</tr>
</tbody>
</table>

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

<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, body cap</td>
<td>316 SS</td>
</tr>
<tr>
<td>Vent screw spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Vent rod</td>
<td>431 SS</td>
</tr>
<tr>
<td>Stem</td>
<td>CZ114 bronze</td>
</tr>
<tr>
<td>Range spring</td>
<td>Chrome vanadium steel</td>
</tr>
<tr>
<td>Piston seal backup ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</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>Seat, self-vent seat</td>
<td>PEEK</td>
</tr>
<tr>
<td>Poppet, self-vent poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet spring</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Poppet damper, filter ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Self-vent poppet spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Body seal, piston seal</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</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 KHP 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>KHP</td>
<td>T</td>
<td>X</td>
<td>A</td>
<td>4</td>
<td>C</td>
<td>2</td>
<td>S</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

4 Body Material
1 = 316 SS
A = 316 SS, ASTM G93 Level E-cleaned

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 (68.8 to 103 bar)
U = 15 to 2500 psig (101.6 to 172 bar)
V = 25 to 3600 psig (172 to 248 bar)
W = 50 to 6000 psig (344 to 413 bar)
X = 100 to 10 000 psig (689 bar)

6 Maximum Inlet Pressure
X = 10 000 psig (689 bar)

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

8 Ports
4 = 1/4 in. female NPT

9 Seat, Seal Material
C = PEEK, fluorocarbon FKM

10 Flow Coefficient (Cv)
2 = 0.06
6 = 0.25

11 Sensing Mechanism, Vent
P = 316 SS piston, no vent
S = 316 SS piston, self vent

12 Handle, Mounting
2 = Knob
6 = Knob, panel mount
For knob handle color options, see page 56.

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, 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)

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

**Weight**
- 6.1 lb (2.75 kg)

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

**Supply-Pressure Effect**

<table>
<thead>
<tr>
<th>Flow Coefficient ($C_v$)</th>
<th>Pressure Control Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 2500 psig (172 bar)</td>
</tr>
<tr>
<td></td>
<td>Supply Pressure Effect, %</td>
</tr>
<tr>
<td>0.06</td>
<td>1.0</td>
</tr>
<tr>
<td>0.25</td>
<td>3.3</td>
</tr>
</tbody>
</table>

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

**Materials of Construction**

- Knob handle retainer
- Knob handle
- Vent screw
- Thrust roller bearing
- Upper spring button
- Stem
- Stem nuts
- Vent rod
- Piston
- Piston seal backup ring
- Self-vent poppet
- Self-vent poppet spring
- Self-vent seat retainer
- Seat retainer
- Seat
- Filter ring, filter, retaining ring
- Body cap
- Lower spring button
- Vent rod nut
- Piston seals
- Piston guide
- Self-vent seat
- Body seals
- Poppet
- Poppet spring
- Poppet damper
- Captured vent port (shown off center for clarity)

<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 spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Vent rod</td>
<td>431 SS</td>
</tr>
<tr>
<td>Stem</td>
<td>CZ114 bronze</td>
</tr>
<tr>
<td>Thrust roller bearing</td>
<td>Hardened carbon steel</td>
</tr>
<tr>
<td>Range spring</td>
<td>Chrome vanadium steel</td>
</tr>
<tr>
<td>Piston seal backup ring</td>
<td>PEEK</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</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>Self-vent seat</td>
<td>PEEK</td>
</tr>
<tr>
<td>Seat</td>
<td>PEEK or 316 SS</td>
</tr>
<tr>
<td>Poppet, self-vent poppet</td>
<td>S17400 SS</td>
</tr>
<tr>
<td>Poppet spring</td>
<td>Alloy X-750</td>
</tr>
<tr>
<td>Poppet damper, filter ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Self-vent poppet spring</td>
<td>302 SS</td>
</tr>
<tr>
<td>Body seals, piston seals</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

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

Panel-mount assembly shown

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>
<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>4 Body Material</td>
<td>5 Pressure Control Range</td>
<td>6 Maximum Inlet Pressure</td>
<td>7 Port Configuration</td>
<td>8 Ports</td>
<td>9 Seat, Seal Material</td>
<td>10 Flow Coefficient ($C_v$)</td>
<td>11 Sensing Mechanism, Vent</td>
<td>12 Handle, Mounting</td>
<td>13 Isolation Valves</td>
<td>14 Cylinder Connections</td>
<td>15 Gauges</td>
<td>16 Options</td>
</tr>
<tr>
<td>1 = 316 SS</td>
<td>J = 0 to 500 psig (0 to 34.4 bar)</td>
<td>X = 10 000 psig (689 bar)</td>
<td>A, B, C, F, M</td>
<td>4 = 1/4 in. female NPT</td>
<td>C = PEEK, fluorocarbon FKM</td>
<td>2 = 0.06</td>
<td>U = 316 SS piston, self and captured vent</td>
<td>2 = Knob</td>
<td>0 = No valves</td>
<td>0 = No connections</td>
<td>0 = No options</td>
<td></td>
</tr>
<tr>
<td>A = 316 SS, ASTM G93 Level E-cleaned</td>
<td>K = 0 to 750 psig (0 to 51.6 bar)</td>
<td>10 to 32, 0.33 deep (M5 x 0.8, 8.5 deep)</td>
<td>See Port Configurations, page 52.</td>
<td>6 = Knob, panel mount</td>
<td>J = 316 SS, fluorocarbon FKM⁠</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T = 10 to 1500 psig (0.68 to 103 bar)</td>
<td>U = 15 to 2500 psig (1.0 to 172 bar)</td>
<td>Not suitable for gas service.</td>
<td>0 = No valves</td>
<td>11</td>
<td>10 to 1500 psig (0.68 to 103 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U = 15 to 2500 psig (1.0 to 172 bar)</td>
<td>V = 25 to 3600 psig (1.7 to 248 bar)</td>
<td>For isolation valve options, see page 54.</td>
<td>0 = No connections</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W = 50 to 6000 psig (3.4 to 413 bar)</td>
<td>X = 100 to 10 000 psig (6.8 to 689 bar)⁠</td>
<td>For inlet and outlet gauge options, see page 54.</td>
<td>0 = No gauges</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X = 100 to 10 000 psig (6.8 to 689 bar)⁠</td>
<td>Not available for regulators assembled with isolation valves.</td>
<td>0 = No options</td>
<td>0 = No options</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**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 (all body materials)
- 1/4 in. tube butt weld 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>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knob handle, cover</td>
<td>Nylon with 316 SS insert</td>
<td></td>
</tr>
<tr>
<td>Spring button</td>
<td>316 SS (0 to 500 psig range)</td>
<td>Zinc-plated steel (all other ranges)</td>
</tr>
<tr>
<td>Spring stabilizer$^\text{(1)}$</td>
<td>301 SS</td>
<td></td>
</tr>
<tr>
<td>Range spring</td>
<td>Zinc-plated steel (0 to 10 through 0 to 50 psig control ranges)</td>
<td>316 SS (0 to 500 psig control ranges)</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring, stop plate, body cap, panel nuts$^\text{(2)}$</td>
<td>316 SS</td>
<td></td>
</tr>
<tr>
<td>VCR nuts$^\text{(2)}$</td>
<td>316 SS</td>
<td></td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
<td></td>
</tr>
<tr>
<td>Seat retainer</td>
<td>316 SS</td>
<td></td>
</tr>
<tr>
<td>Retainer seal</td>
<td>PCTFE or PEEK</td>
<td></td>
</tr>
<tr>
<td>Seat</td>
<td>Fluorocarbon FKM or Kairez</td>
<td></td>
</tr>
<tr>
<td>Diaphragm$^\text{(3)}$</td>
<td>Alloy X-750</td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>316 SS</td>
<td>Brass CW721R</td>
</tr>
<tr>
<td>Tube butt weld ports$^\text{(2)}$</td>
<td>316L SS</td>
<td></td>
</tr>
<tr>
<td>VCR gland ports$^\text{(2)}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
<td></td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

$^\text{(1)}$ Not included in regulators with 0 to 500 psig (0 to 34.4 bar) control range.

$^\text{(2)}$ Not shown.

$^\text{(3)}$ 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 KBP series regulator ordering number by combining the designators in the sequence shown below.

<table>
<thead>
<tr>
<th>Body Material</th>
<th>Ports</th>
<th>Seat, Seal Material</th>
<th>Flow Coefficient ((C_v))</th>
<th>Sensing Mechanism, Vent</th>
<th>Handle, Mounting</th>
<th>Valves</th>
<th>Cylinder Connections</th>
<th>Gauges</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>KBP 1 F 0 D 4 A 5 A 2 0 0 0 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 = 316 SS</td>
<td>4 = 1/4 in. female NPT</td>
<td>A = Fluorocarbon FKM, PCTFE</td>
<td>5 = 0.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 = Brass CW721R</td>
<td>T = 1/4 in. (\times 0.035) in. tube butt weld(^\text{①})</td>
<td>B = Kalrez, PCTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A = 316 SS, ASTM G93 Level E-cleaned</td>
<td>V = 1/4 in. VCR gland, no nuts(^\text{②})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B = Brass, ASTM G93 Level E-cleaned</td>
<td>X = 1/4 in. rotatable female VCR fitting(^\text{③})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C = 316 SS, SC-11-cleaned</td>
<td>Y = 1/4 in. rotatable male VCR fitting(^\text{③})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D = Brass, SC-11-cleaned</td>
<td>① Available only with 316 SS body material in A port configuration. Not available ASTM G93 Level E-cleaned.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C = 0 to 10 psig (0 to 0.68 bar)</td>
<td>② For use with VCR split-nuts, which can be ordered separately. See the Swagelok VCR Metal Gasket Face Seal Fittings catalog, MS-01-24.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D = 0 to 25 psig (0 to 1.7 bar)</td>
<td>③</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E = 0 to 50 psig (0 to 3.4 bar)</td>
<td>③</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F = 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>
</tr>
<tr>
<td>G = 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>
</tr>
<tr>
<td>J = 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>
</tr>
<tr>
<td>0 = Not applicable (equal to pressure control range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Available only with 316 SS body material in A port configuration. Not available ASTM G93 Level E-cleaned.
- For use with VCR split-nuts, which can be ordered separately. See the Swagelok VCR Metal Gasket Face Seal Fittings catalog, MS-01-24.
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></td>
<td>Zinc-plated steel (all other ranges)</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></td>
<td>Zinc-plated steel (0 to 50 through 0 to 250 psig control ranges)</td>
</tr>
<tr>
<td>Stem, stem nut, cap ring,</td>
<td>316 SS</td>
</tr>
<tr>
<td>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
  - A = 316 SS, ASTM G93 Level E-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)

- **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 (Cv)**
  - 8 = 1.0

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

- **12 Handle, Mounting**
  - 2 = Knob
  - 3 = 316 SS antitamper nut
  - 6 = Knob, panel mount
  - 7 = 316 SS antitamper nut, panel mount
  - For knob handle color options, see page 56.

- **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>
</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 (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
A = 316 SS, ASTM G93 Level E-cleaned
C = 316 SS, 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)
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, Retainer 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

For knob handle color options, see page 56.

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

① Not available with 0 to 375 psig (0 to 25.8 bar) pressure control range.
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$^\dagger$</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$^\dagger$</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>Piston seal retainer</td>
<td>PEEK</td>
</tr>
<tr>
<td>Stem</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>
</tr>
<tr>
<td>Piston seal spring, body seal spring</td>
<td>Eligiloy</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 3000 psig (0 to 206 bar) and 0 to 4000 psig (0 to 275 bar) control ranges.
$^\ddagger$ 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.

```
KPB 1 L 0 A 4 2 2 P 2 0 0 0 0
```

4 Body Material
1 = 316 SS
A = 316 SS, ASTM G93 Level E-cleaned

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
0 = Not applicable (equal to pressure control range)

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

8 Ports
4 = 1/4 in. female NPT

9 Seat, Seal Material
1 = PCTFE
2 = PEEK

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

11 Sensing Mechanism
P = 316 SS piston

12 Handle, Mounting
2 = Knob
3 = 316 SS antitamper nut
6 = Knob, panel mount
7 = 316 SS antitamper nut, panel mount
For knob handle color options, see page 56.

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
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**

<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</td>
<td>316 SS</td>
</tr>
<tr>
<td>Stem</td>
<td>CZ114 bronze</td>
</tr>
<tr>
<td>Thrust roller bearing</td>
<td>Hardened carbon steel</td>
</tr>
<tr>
<td>Range spring</td>
<td>Chrome vanadium steel</td>
</tr>
<tr>
<td>Piston seal backup ring</td>
<td>PEEK</td>
</tr>
<tr>
<td>Nonwetted lubricant</td>
<td>Hydrocarbon-based</td>
</tr>
<tr>
<td>Body, poppet retainer, seat retainer, seat support, piston, piston guide</td>
<td>316 SS</td>
</tr>
<tr>
<td>Seat</td>
<td>PEEK or 316 SS</td>
</tr>
<tr>
<td>Poppet retainer seal</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, seat support seal</td>
<td>Fluorocarbon FKM</td>
</tr>
<tr>
<td>Wetted lubricant</td>
<td>PTFE-based</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.
## Pressure Regulators, K Series

### Dimensions

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

![Panel-mount assembly shown](image)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting holes</td>
<td>10-32, 0.33 deep (M5 × 0.8, 8.5 deep)</td>
</tr>
<tr>
<td>Clearance hole dia</td>
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<td>Panel cutout minimum dia</td>
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<td>2.20 (56.0)</td>
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<td>0.96 (24.8)</td>
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<td>7.36 (187)</td>
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<tr>
<td>3.94 to 5.20 (100 to 132)</td>
<td>allowable</td>
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</tbody>
</table>

### Ordering Information

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

![Diagram](image)

<table>
<thead>
<tr>
<th>KHB</th>
<th>4</th>
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<td>Body Material</td>
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<tr>
<td>1</td>
<td>316 SS</td>
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<tr>
<td>J</td>
<td>0 to 500 psig (0 to 34.4 bar)</td>
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<td>U</td>
<td>15 to 2500 psig (1.0 to 172 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 10000 psig (6.8 to 689 bar)</td>
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<td>Seats, Piston/Body/Seat Support Seal Material</td>
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<td>C</td>
<td>PEEK, fluorocarbon FKM</td>
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<tr>
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<td>For knob handle color options, see page 56.</td>
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<tr>
<td>For inlet gauge options, see page 54.</td>
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</tbody>
</table>

**Swagelok**
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

Maximum 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 (Cv)

- 0.06

Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient (Cv)</th>
<th>Pressure Control Range</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.06</td>
<td>Up to 100 psig (6.8 bar)</td>
<td>0.01</td>
</tr>
<tr>
<td>0.06</td>
<td>250 psig (17.2 bar)</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Maximum Operating Temperature

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

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 psig (bar)</th>
<th>Supply 1 Depletion Pressure psig (bar)</th>
<th>Supply 2 Depletion Pressure psig (bar)</th>
</tr>
</thead>
<tbody>
<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.

The Swagelok KCA series continuous gas delivery system is a panel-mounted gas changeover assembly that can be configured for many applications. For more information, see the Swagelok KCA Series Continuous Gas Delivery System catalog, MS-18-01.
**Dimensions**

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

**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>( \text{G}_0 )</td>
<td>Inlet from selector regulator</td>
<td>( \text{G}_0 )</td>
<td>Inlet from selector regulator</td>
<td>( \text{L} )</td>
</tr>
<tr>
<td>[ \text{B} ]</td>
<td>[ \text{C} ]</td>
<td>[ \text{L} ]</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ordering Information**

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

KCM 1 F F B 4 1 2 A D 0 0 1 0

4 **Body Material**
- 1 = 316 SS
- A = 316 SS, ASTM G93 Level E-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)

- Not available with 100 psig (6.8 bar) changeover pressure.
- Only available with 500 psig (34.4 bar) changeover pressure.

6 **Nominal Changeover Pressure**
- F = 100 psig (6.8 bar)
- G = 250 psig (17.2 bar)
- J = 500 psig (34.4 bar)

- Inlet pressure must exceed changeover pressure for automatic switching to occur.

7 **Port Configuration**
- B, C, L

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

9 **Seat Material**
- 1 = PCTFE
- 2 = PEEK

10 **Flow Coefficient \( C_v \)**
- 2 = 0.06

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, no self vent
- F = Alloy X-750 diaphragm, self and captured vent

- Self and captured vent options on line regulator only.

12 **Line Regulator Handle**
- D = Knob
- E = 316 SS antitamper nut

 Selector regulator has knob handle. For knob handle color options, see page 56.

13 **Isolation and Relief Valves**
- 0 = No valves

 For isolation and relief valve options, see page 54.

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

 Cylinder connections available only with hose option. For CGA cylinder connection options, see page 53.

15 **Gauge Scale**
- 1 = psig (bar) (North America only)
- 2 = bar (psig)
- 3 = psig (bar)
- 4 = MPa
- 5 = psig (kPa)

 For more information, 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.

- Hoses are not available for ASTM G93 Level E-cleaned regulators.

**Swagelok**
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

Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient ($C_v$)</th>
<th>Pressure Control Range</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 100 psig (6.8 bar)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250 psig (17.2 bar) and Higher</td>
<td></td>
</tr>
<tr>
<td>0.06</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>0.20</td>
<td>1.5</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Maximum Steam Pressure and Temperature
- 650 psig (44.7 bar) and 500°F (260°C)

Maximum Regulator Operating Temperature
- 392°F (200°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

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

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.

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</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>4</td>
<td>Body Material</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>1</td>
<td>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>
</tr>
<tr>
<td>A</td>
<td>316 SS, ASTM G93 Level E-cleaned</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>

| 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) |

| 7 | Port Configuration |
| 1, 4 | See Port Configurations, right. |

| 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, no self 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 |

Port Configurations

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>Configuration</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet in bottom of body</td>
<td>1</td>
<td>Inlet in bottom of body</td>
<td>4</td>
</tr>
</tbody>
</table>

Steam tubes
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, IECEx, and CSA certified for critical/hazardous environments
- T3 temperature classification for all heater ranges
- CE conformity: 89/336/EEC (EMC)
- 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 (Cv)
- 0.02 or 0.06

#### Supply-Pressure Effect

<table>
<thead>
<tr>
<th>Flow Coefficient (Cv)</th>
<th>Pressure Control Range</th>
<th>Supply Pressure Effect, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02</td>
<td>Up to 100 psig (6.8 bar)</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>250 and 500 psig (17.2 and 34.4 bar)</td>
<td>0.5</td>
</tr>
<tr>
<td>0.06</td>
<td>1000 psig (68.9 bar) and Higher</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.2</td>
</tr>
</tbody>
</table>

#### 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—50, 100, 150, and 200 W
- Control temperature range—75 to 380°F (23 to 193°C)
- Explosive atmosphere/hazardous location certification:
  - ATEX (Europe) and IECEx (international)—Group II, Category 2G, Exd IIB+H2; T3
  - CSA (Canada and U.S.A.)—Class I, Div 1, Groups B, C, and D; T3; CSA Encl Type 4

- Ambient temperatures: –4 to 140°F (–20 to 60°C)
- 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)
**Materials of Construction**

- Antitamper nut
- Cap ring
- Spring stabilizer
- Stop plate
- Body cap
- Poppet
- Range spring
- Seat retainer
- Body
- Heater sheath
- Retainer nut
- Flange (bolts not shown)
- Lock nut
- Connector tube

**Piston Sensing Mechanism**

- Piston seal and spring
- Piston guide
- Piston seal retainer

**Dimensions**

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

**Base-Mounted**

Side-Mounted

<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>Seat</td>
<td>PEEK</td>
</tr>
<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: PTFE
- Piston, piston guide: 316 SS
- Piston seal retainer: PEEK
- Piston seal spring, body seal spring: Elgiloy

Wetted components listed in italics.

- Not included in regulators with piston sensing mechanism.
- Not shown.
- Not required in all configurations.
- 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.

| KEV | 1 | F | R | A | 3 | 2 | 2 | A | X | 0 | 0 | 0 | G |

4. **Body Material**
   - 1 = 316 SS
   - A = 316 SS, ASTM G93 Level E-cleaned

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**
   - F = 100 psig (6.8 bar)
   - J = 500 psig (34.4 bar)
   - L = 1000 psig (68.9 bar)
   - R = 3600 psig (248 bar)
   ① For better resolution and control, select a pressure that closely matches system pressure. ② Available with diaphragm sensing mechanism only.

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 \(C_v\)**
    - 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 380°F (23 to 193°C), 120 V
      - G = 50 W
      - H = 100 W
      - J = 150 W
      - K = 200 W
    - 75 to 380°F (23 to 193°C), 240 V
      - 6 = 50 W
      - 7 = 100 W
      - 8 = 150 W
      - 9 = 200 W

---

**Port Configurations**

Outlet and auxiliary ports on the same face.

### Side-Mount View

**Designator** | **Configuration**
---|---
1 | ![Base inlet](image1)
2 | ![Base inlet](image2)
A | ![Base inlet](image3)
X | ![Base inlet](image4)

Regulator is rotatable 360° in relation to terminal box.

### Base-Mount View

**Designator** | **Configuration**
---|---
Y | ![Aux](image5)
Z | ![](image6)
A | ![Aux](image7)
X | ![Aux](image8)
B | ![Aux](image9)
K Series Pressure-Reducing Regulator Flow Data

The graphs illustrate the change or “droop” in outlet pressures as the flow rate increases. See the Swagelok Pressure-Reducing Regulator Flow Curves Technical Bulletin, MS-06-114, for an overview of how to read regulator flow curves and for additional inlet pressures and flow coefficients.

**KPR Series**

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

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

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

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

Swagelok®
**K Series 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)

#### Nitrogen Flow, std ft³/min vs. Outlet Pressure, psig

![Graph](image)

#### Nitrogen Flow, std L/min vs. Outlet Pressure, bar

![Graph](image)

### 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)

#### Nitrogen Flow, std ft³/min vs. Outlet Pressure, psig

![Graph](image)

#### Nitrogen Flow, std L/min vs. Outlet Pressure, bar

![Graph](image)
K Series 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)

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

**Pressure Control Range**

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

**Inlet Pressure**

- 8000 psig (551 bar)
- 5000 psig (344 bar)
- 1000 psig (68.9 bar)

**Outlet Pressure, psig**

- 2000 psig (137 bar)
- 1500 psig (103 bar)
- 1000 psig (68.9 bar)

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 25 to 3600 psig (1.7 to 248 bar)

**Inlet Pressure**

- 5000 psig (344 bar)
- 3500 psig (241 bar)
- 8000 psig (551 bar)

**Outlet Pressure, psig**

- 2500 psig (172 bar)
- 2000 psig (137 bar)

**Outlet Pressure, bar**

- 172 bar
- 137 bar

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 100 to 10 000 psig (6.8 to 689 bar)

**Inlet Pressure**

- 9000 psig (620 bar)
- 8000 psig (551 bar)

**Outlet Pressure, psig**

- 8000 psig (551 bar)
- 7500 psig (517 bar)

**Outlet Pressure, bar**

- 551 bar
- 420 bar

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 50 to 6000 psig (3.4 to 413 bar)

**Inlet Pressure**

- 5000 psig (344 bar)
- 3500 psig (241 bar)
- 8000 psig (551 bar)

**Outlet Pressure, psig**

- 4500 psig (310 bar)
- 4000 psig (276 bar)

**Outlet Pressure, bar**

- 310 bar
- 276 bar

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 100 to 10 000 psig (6.8 to 689 bar)

**Inlet Pressure**

- 9000 psig (620 bar)
- 8000 psig (551 bar)

**Outlet Pressure, psig**

- 8000 psig (551 bar)
- 7500 psig (517 bar)

**Outlet Pressure, bar**

- 551 bar
- 420 bar

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 25 to 3600 psig (1.7 to 248 bar)

**Inlet Pressure**

- 5000 psig (344 bar)
- 3500 psig (241 bar)
- 8000 psig (551 bar)

**Outlet Pressure, psig**

- 2500 psig (172 bar)
- 2000 psig (137 bar)

**Outlet Pressure, bar**

- 172 bar
- 137 bar

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 100 to 10 000 psig (6.8 to 689 bar)

**Inlet Pressure**

- 9000 psig (620 bar)
- 8000 psig (551 bar)

**Outlet Pressure, psig**

- 8000 psig (551 bar)
- 7500 psig (517 bar)

**Outlet Pressure, bar**

- 551 bar
- 420 bar

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 25 to 3600 psig (1.7 to 248 bar)

**Inlet Pressure**

- 5000 psig (344 bar)
- 3500 psig (241 bar)
- 8000 psig (551 bar)

**Outlet Pressure, psig**

- 2500 psig (172 bar)
- 2000 psig (137 bar)

**Outlet Pressure, bar**

- 172 bar
- 137 bar

**Water Flow, U.S. gal/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Outlet Pressure, bar**

- 137 bar
- 103 bar

**Nitrogen Flow, std ft³/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Nitrogen Flow, std L/min**

- 0 to 10
- 10 to 20
- 20 to 30

**Pressure Control Ranges**

- 100 to 10 000 psig (6.8 to 689 bar)
K Series 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)**

<table>
<thead>
<tr>
<th>Inlet Pressure</th>
<th>Nitrogen Flow, std ft³/min</th>
<th>Outlet Pressure, psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 psig</td>
<td>0 to 1000 psig (0 to 68.9 bar)</td>
<td>0 to 1000 psig (0 to 68.9 bar)</td>
</tr>
<tr>
<td>2000 psig</td>
<td>0 to 2000 psig (0 to 137 bar)</td>
<td>0 to 2000 psig (0 to 137 bar)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Inlet Pressure</th>
<th>Nitrogen Flow, std ft³/min</th>
<th>Outlet Pressure, psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 psig</td>
<td>0 to 3000 psig (0 to 206 bar)</td>
<td>0 to 3000 psig (0 to 206 bar)</td>
</tr>
<tr>
<td>5000 psig</td>
<td>0 to 5000 psig (0 to 344 bar)</td>
<td>0 to 5000 psig (0 to 344 bar)</td>
</tr>
</tbody>
</table>

**Flow Coefficient 0.06; Maximum Inlet Pressure 4000 psig (275 bar)**

<table>
<thead>
<tr>
<th>Inlet Pressure</th>
<th>Nitrogen Flow, std L/min</th>
<th>Outlet Pressure, bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 psig</td>
<td>0 to 1000 psig (0 to 68.9 bar)</td>
<td>0 to 1000 psig (0 to 68.9 bar)</td>
</tr>
<tr>
<td>2000 psig</td>
<td>0 to 2000 psig (0 to 137 bar)</td>
<td>0 to 2000 psig (0 to 137 bar)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Inlet Pressure</th>
<th>Nitrogen Flow, std L/min</th>
<th>Outlet Pressure, bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 psig</td>
<td>0 to 1000 psig (0 to 68.9 bar)</td>
<td>0 to 1000 psig (0 to 68.9 bar)</td>
</tr>
<tr>
<td>2000 psig</td>
<td>0 to 2000 psig (0 to 137 bar)</td>
<td>0 to 2000 psig (0 to 137 bar)</td>
</tr>
</tbody>
</table>
K Series Back-Pressure Regulator Flow Data

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

**KBP Series**

*Flow Coefficient 0.20*

![Graph showing nitrogen flow vs. inlet pressure for KBP Series with flow coefficient 0.20.](image)

- **Pressure Control Range**: 0 to 500 psig (0 to 34.4 bar)
- **Nitrogen Flow, std ft³/min**: 0 to 250 psig (0 to 17.2 bar)
- **Inlet Pressure, psig**: 0 to 100 psig (0 to 6.8 bar)
- **Inlet Pressure, bar**: 0 to 100 psig (0 to 6.8 bar)

**KFB Series**

*Flow Coefficient 1.0*

![Graph showing nitrogen flow vs. inlet pressure for KFB Series with flow coefficient 1.0.](image)

- **Pressure Control Range**: 0 to 100 psig (0 to 6.8 bar)
- **Nitrogen Flow, std ft³/min**: 0 to 50 psig (0 to 3.4 bar)
- **Inlet Pressure, psig**: 0 to 100 psig (0 to 6.8 bar)
- **Inlet Pressure, bar**: 0 to 100 psig (0 to 6.8 bar)

**KCB Series**

*Flow Coefficient 0.20*

![Graph showing nitrogen flow vs. inlet pressure for KCB Series with flow coefficient 0.20.](image)

- **Pressure Control Range**: 0 to 375 psig (0 to 25.8 bar)
- **Nitrogen Flow, std ft³/min**: 0 to 250 psig (0 to 17.2 bar)
- **Inlet Pressure, psig**: 0 to 100 psig (0 to 6.8 bar)
- **Inlet Pressure, bar**: 0 to 100 psig (0 to 6.8 bar)
K Series Back-Pressure Regulator Flow Data

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

KPB Series

Flow Coefficient 0.06

Flow Coefficient 0.20

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

Pressure Control Range
0 to 3000 psig (0 to 206 bar)

Pressure Control Range
0 to 4000 psig (0 to 275 bar)
K Series Back-Pressure Regulator Flow Data

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

KHB Series

**Flow Coefficient 0.06**

- Pressure Control Range
  - 10 to 1500 psig (0.68 to 103 bar)
  - 0 to 750 psig (0 to 51.6 bar)
  - 0 to 500 psig (0 to 34.4 bar)

**Flow Coefficient 0.25**

- Pressure Control Range
  - 25 to 3600 psig (1.7 to 248 bar)
  - 10 to 1500 psig (0.68 to 103 bar)
  - 0 to 500 psig (0 to 34.4 bar)
### Port Configurations

Port configurations are available as shown in the regulator ordering information pages. The symbols indicate the port location of factory-assembled accessories. For alternative accessory locations, contact your authorized Swagelok representative.

#### Port Configuration Symbols

- Inlet
- Filtered inlet
- Outlet
- Inlet gauge
- Outlet gauge
- Relief valve
- Outlet gauge or relief valve

Factory-assembled cylinder connections are placed on a filtered inlet port; isolation valves are placed on an outlet port 180° from the cylinder connection.

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

### Pressure-Reducing Regulators

#### Right-to-Left Flow

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>A</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>H</th>
<th>L</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
</tr>
</tbody>
</table>

#### Left-to-Right Flow

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>A</th>
<th>B</th>
<th>E</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
</tr>
</tbody>
</table>

### Back-Pressure Regulators

#### Right-to-Left Flow

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>A</th>
<th>D</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
</tr>
</tbody>
</table>

#### Left-to-Right Flow

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>A</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
<td>G / R</td>
</tr>
</tbody>
</table>

### MPC Port Configurations

#### Pressure Reducing

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>2-Port</th>
<th>3-Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet Outlet</td>
<td>Outlet Outlet + + Inlet + + Outlet Inlet + + Outlet Inlet + + Outlet Inlet + +</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Back Pressure

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Designator</th>
<th>2-Port</th>
<th>3-Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet Inlet</td>
<td>Inlet Inlet + + Inlet + + Outlet Inlet + + Outlet Inlet + + Outlet Inlet + +</td>
<td>7</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</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>

These cylinder connections are rated to 3000 psig (206 bar) maximum, so the maximum inlet pressure designator P must be used in the ordering number when a regulator is assembled with a cylinder connection. See the ordering information for each regulator for details.

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

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.

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.

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

Cleaning
Gauges assembled to ASTM G93 Level E or SC-11–cleaned regulators are cleaned in accordance with ASME 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 (secondary unit)</th>
<th>Gauge Designator</th>
<th>Gauge Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>psig (bar) (North America only)</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>psig (bar)</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>psig (kPa)</td>
<td>5</td>
<td>E</td>
</tr>
<tr>
<td>bar (psig)</td>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>MPa</td>
<td>4</td>
<td>D</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.

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.
Options and Accessories

Kenmac Adjustable Regulator Relief Valves (KVV Series)

Provide nonsafety-related pressure protection for Swagelok regulators

Technical Data

Relief Pressure Ranges

Based on the regulator control range

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

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

Component | Material
---|---
Body, poppet, spring button, adjusting screw | 316 SS
Seal | Fluorocarbon FKM
Range spring | 302 SS

Wetted components listed in *italics*.

Testing

Every KVV series regulator relief valve is factory tested at its maximum rated pressure, then set to zero when assembled to the regulator.

Reset relief pressure to the desired value before pressurizing the system.

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</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>psig (bar)</td>
<td></td>
</tr>
<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>

For valves not actuated for a period of time, initial relief pressure may be higher than the set pressure.

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.

Kenmac adjustable regulator relief valves should never be used as ASME Boiler and Pressure Vessel Code safety relief devices.

Kenmac adjustable regulator relief valves are not “Safety Accessories” as defined in the Pressure Equipment Directive 97/23/EC.
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 and Flexible Tubing catalog, MS-01-180, for more information.

Cleaning

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

Handles

Knob, thumbwheel, and antitamper handles are available. The green plastic knob handle is standard for most Swagelok regulators. Other colors are available; add a handle color designator to a regulator ordering number.

<table>
<thead>
<tr>
<th>Color</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>BK</td>
</tr>
<tr>
<td>Blue</td>
<td>BL</td>
</tr>
<tr>
<td>Orange</td>
<td>OG</td>
</tr>
<tr>
<td>Red</td>
<td>RD</td>
</tr>
<tr>
<td>Yellow</td>
<td>YW</td>
</tr>
</tbody>
</table>

Example: KPR1FRF412A200000BK

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.

Wall Mounting Bracket Kits

<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, and KHB Series Mounting Bracket</td>
<td>9R0079</td>
</tr>
<tr>
<td>KCY</td>
<td>9R0149</td>
</tr>
</tbody>
</table>

Maintenance Kits

Filter Replacement Kits

Filter replacement kits are available for KPR, KCM, KCP, KCY, KPP, KHP, KLF, KHR, KHF, and KPF 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>
<tr>
<td>KHF, KPF</td>
<td>1/2 in. NPT</td>
<td>REG-FILTER-8-KIT5</td>
</tr>
</tbody>
</table>
Maintenance Kits

KPR, KCP, AND KBP Series Maintenance Kits

Maintenance kits include:

- all wetted components, except for the regulator body and piston, if applicable
- wetted lubricant with MSDS
- instructions.

KCY series regulators can be rebuilt with two KPR series maintenance kits.

- The second-stage kit should be configured for the desired pressure control range.
- The first-stage kit should specify designator J for the pressure control range and designator 0 for the ports (filter size). All other options should match those of the second-stage kit.

Ordering Information

Build a maintenance kit ordering number by combining the designators in the sequence shown below.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</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>K</td>
<td>P</td>
<td>R</td>
<td>1</td>
<td>D</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>A</td>
<td>0</td>
<td>-</td>
<td>K</td>
<td>I</td>
<td>T</td>
</tr>
</tbody>
</table>

1. **Regulator Series**
   - KPR = KPR
   - KCP = KCP
   - KBP = KBP

2. **Body Material, Cleaning**
   - 1 = 316 SS and brass
   - C = 316 SS and brass, SC-11 cleaned

3. **Pressure Control Range**
   - **KPR and KBP Series**
     - D = 0 to 10 psig (0 to 0.68 bar) and 0 to 25 psig (0 to 1.7 bar)
     - F = 0 to 50 psig (0 to 3.4 bar) and 0 to 100 psig (0 to 6.8 bar)
     - J = 0 to 250 psig (0 to 17.2 bar) and 0 to 500 psig (0 to 34.4 bar)
   - **KCP Series**
     - G = 0 to 10 psig (0 to 0.68 bar), 0 to 25 psig (0 to 1.7 bar),
       - 0 to 50 psig (0 to 3.4 bar), 0 to 100 psig (0 to 6.8 bar), and 0 to 250 psig (0 to 17.2 bar)
     - M = 0 to 500 psig (0 to 34.4 bar), 0 to 1000 psig (0 to 68.9 bar), and 0 to 1500 psig (0 to 103 bar)
   - **KBF Series**
     - 0 = Not applicable

4. **Ports (Filter Size)**
   - **KPR Series**
     - 4 = 1/4 in. female NPT
   - **KCP Series**
     - 2 = 1/8 in. female NPT
   - **KBF Series**
     - M = MPC platform

5. **Seat, Seal Material**
   - **KPR Series**
     - 1 = PCTFE
   - **KBF Series**
     - A = Fluorocarbon FKM, PCTFE
     - C = Fluorocarbon FKM, PEEK
   - **KBF Series**
     - D = Kalrez, PEEK

6. **Maximum Inlet Pressure**
   - 0 = Not applicable

7. **Port Configuration**
   - 0 = Not applicable

8. **Flow Coefficient (Cv)**
   - 1 = 0.02
   - 2 = 0.06
   - 5 = 0.20
   - 7 = 0.50

9. **Sensing Mechanism, Vent**
   - **KPR Series**
     - A = Alloy X-750 diaphragm, no-vent models and captured-vent models
     - C = Alloy X-750 diaphragm, self- and captured-vent models
   - **KBF Series**
     - A = Alloy X-750 diaphragm, all models
   - **KBP Series**
     - P = 316 SS piston

10. **Handle, Mounting**
    - 0 = Not applicable

Maintenance Instructions

Maintenance instructions for all Swagelok regulators are available at swagelok.com.

Maintenance Tools

Specially designed tools and tool kits are available to assist in the service and repair of Swagelok regulators. Contact your authorized Swagelok representative for more information.
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.

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.

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.