Pressure Regulators
RHPS Series

- Pressure-reducing models
- Back-pressure models
- Spring-, dome-, and air-loaded
- 1/4 to 4 in. end connections
- Working pressures up to 10 150 psig (700 bar)
- Temperatures from –4 to 176°F (–20 to 80°C)

Swagelok

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Back-Pressure Regulators

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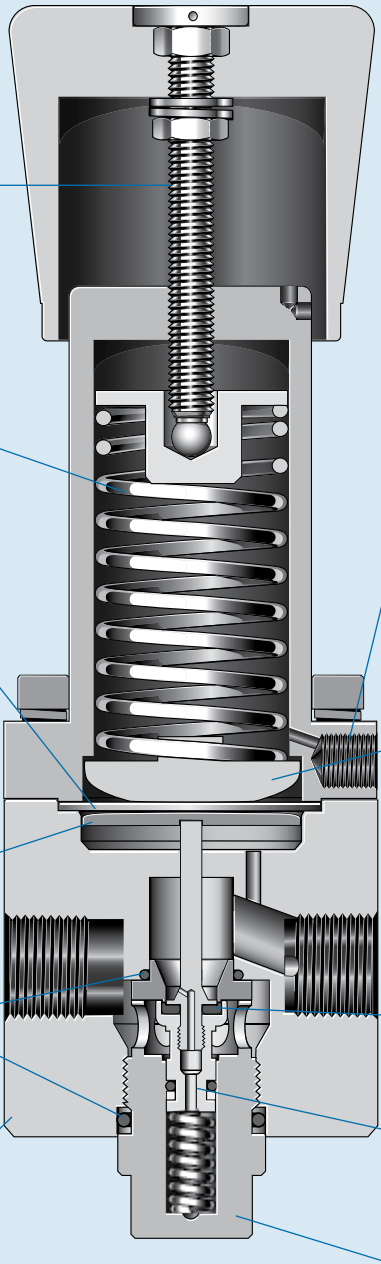
Contact your authorized Swagelok sales and service representative for information about dome-loaded, back-pressure regulators.

Features



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

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

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

Diaphragm Support Plate
- promotes diaphragm life.

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

Body Material
- 316L SS for improved corrosion resistance.

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

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

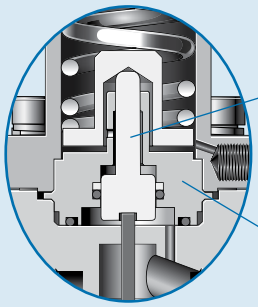
Bottom Spring Guide
- engages diaphragm to distribute forces evenly.
- protects diaphragm from premature failure.

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

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

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

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



Types of Regulators

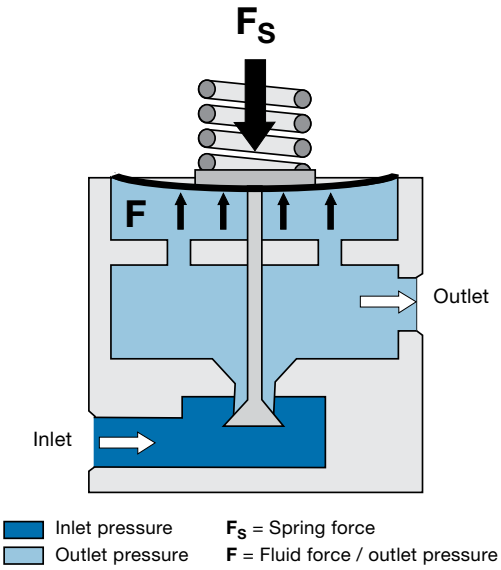
There are two types of RHPS series pressure regulators

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

How a Pressure Regulator Works

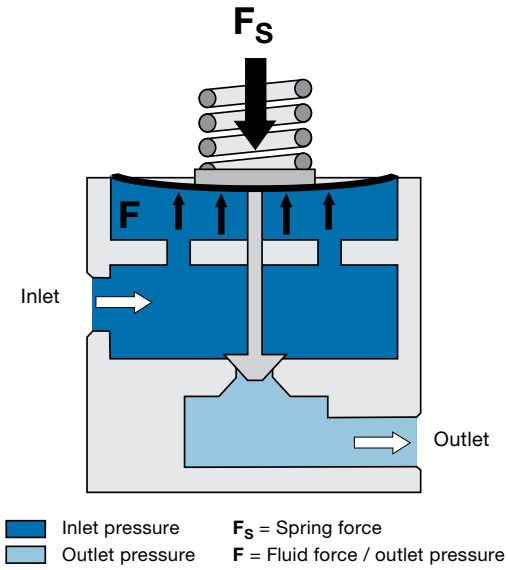
A pressure regulator has a sensing element (piston or diaphragm) which, on one side, is subjected to a load force (F_S) created by a spring (as shown below) or a gas pressure. On the other side, the sensing element is subject to the force (F) of the system fluid.

Pressure-Reducing Regulators



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

Back-Pressure Regulators



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

Terminology

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

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

Dependency—see supply pressure effect (SPE).

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

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

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

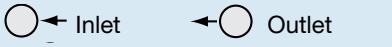
Sensitivity—the degree to which the regulator responds to force balance changes.

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

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

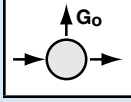
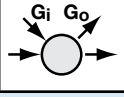
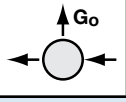
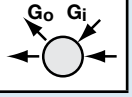
Threaded vent—a connection that allows monitoring of the diaphragm or piston sensing mechanism.

Gauge Connection Configuration Symbols



G_i = Inlet gauge G_o = Outlet gauge

Gauge Connection Configurations—Pressure-Reducing Regulators

Standard	GN2	GN4	GN5
			

Components

Every RHPS series pressure regulator has three common design components:

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

LoaENg Mechanism

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

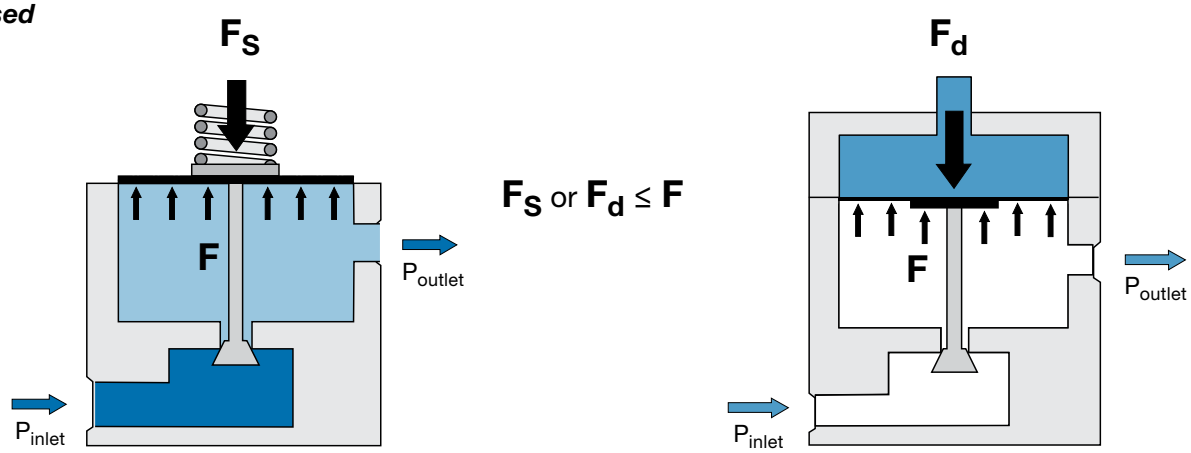
Spring-Loaded

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

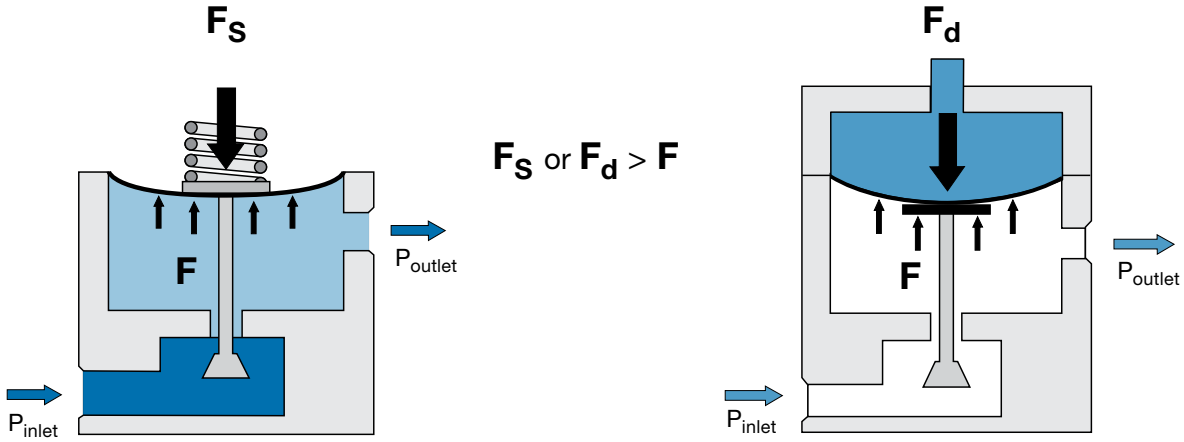
Dome-Loaded

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

Closed



Open



Combination Spring- and Dome-Loaded

The spring- and dome-loaded mechanisms can be used in combination with one another. The resulting effect provides the function of a differential pressure regulator. This regulator is designed to control pressure which is the sum of a reference pressure (provided by the dome) and a bias pressure (provided by the spring). See RD(H)6DP series on page 41 for details.

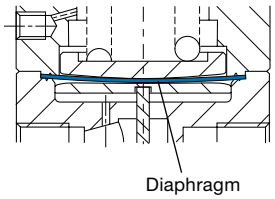
Components

Sensing Mechanisms

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

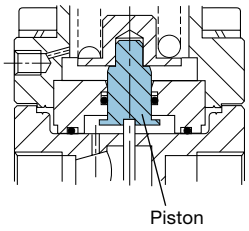
Diaphragm Sensing

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



Piston Sensing

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

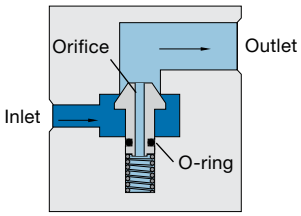


Controlling Mechanisms

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

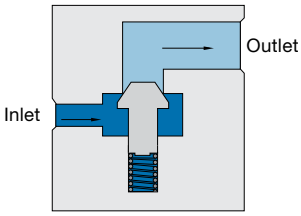
Balanced Poppet

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



Unbalanced Poppet

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

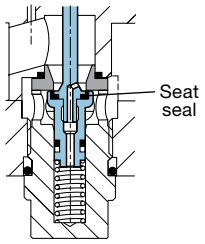


Seat Design

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

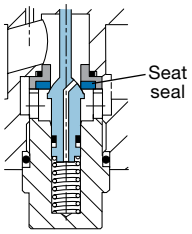
Soft Seat Seal

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



Hard Seat Seal

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



Testing

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

Cleaning and Packaging

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

Cleaning and packaging to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C is available.

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.

⚠ **RHPS series 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.**

⚠ **WARNING: Self-venting and threaded-vent regulators can release system fluid to atmosphere. Position the self-vent hole or the threaded vent connection away from operating personnel.**

Pressure-Reducing, Spring-Loaded Regulators—RS Series

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

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

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

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

Features

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

RS(H)2

RS(H)4, 6, 8

RS(H)10, 15, 20

LRS(H)4

LPRS4, 6, 8

LPRS10, 15

Pressure-Temperature Ratings

Seat Seal / O-Ring Material	PCTFE	PEEK		Fluorocarbon FKM①, Nitrile, EPDM, FFKM②		
Series	RS2 RSH4, 6, 8 RSH10 RSH15 RSH20 LRSH4	RS2, RSH4, 6, 8 RSH10, RSH15, RSH20 LRSH4	RSH2	RS4, 6, 8 RS10 RS15 RS20	LRS4	LPRS4 LPRS6 LPRS8 LPRS10 LPRS15
Temperature °F (°C)	Maximum Inlet Pressure / Working Pressure psig (bar)					
–4 (–20) to 95 (35)	5800 (400)	5800 (400)	10 150 (700)	1015 (70.0)	507 (35.0)	232 (16.0)
149 (65)	3987 (275)					
176 (80)	1812 (125)					

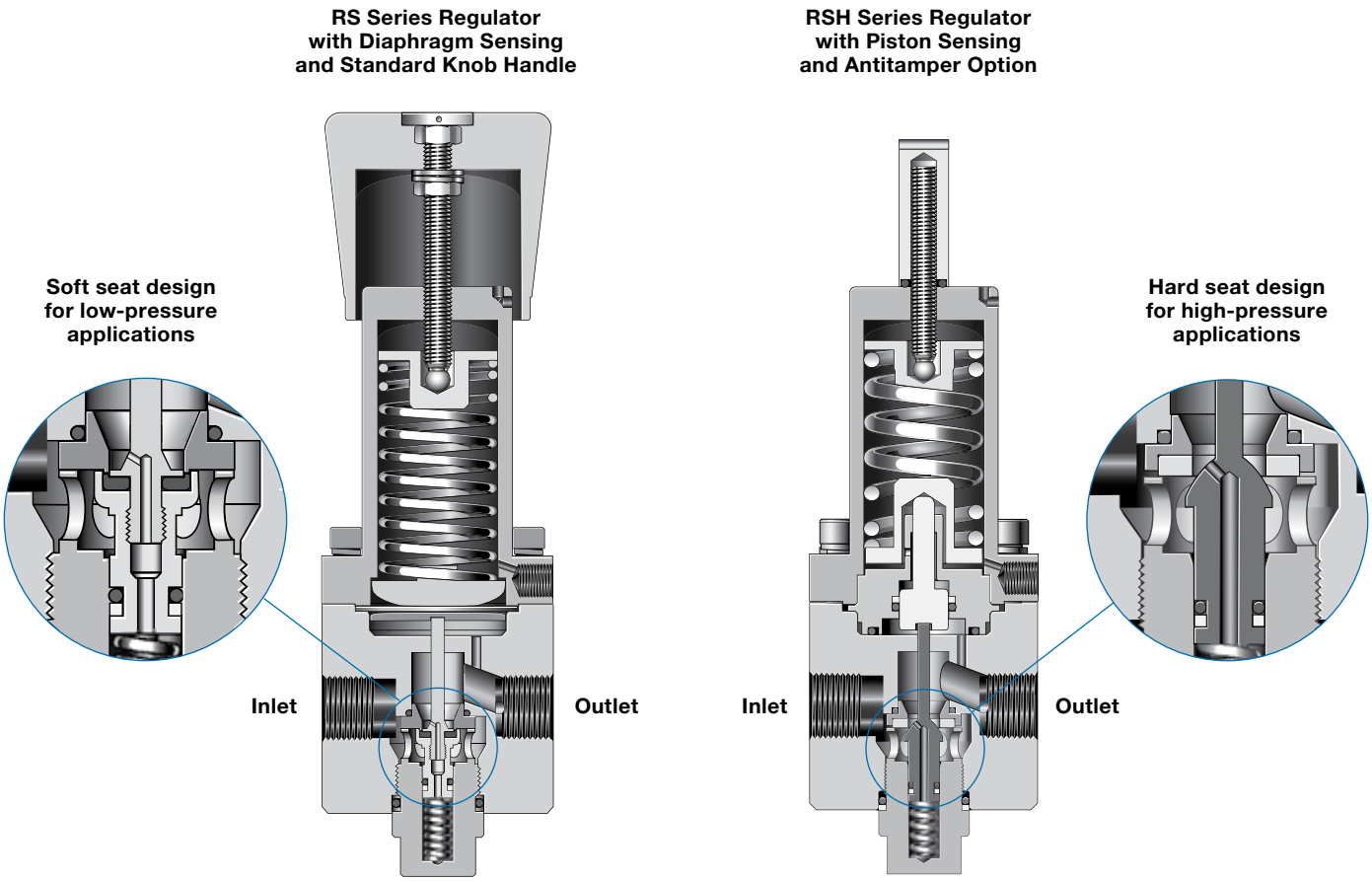
① Regulators with fluorocarbon FKM seat seal / O-ring materials limited to 5°F (–15°C).

② Regulators with FFKM seat seal / O-rings materials limited to 14°F (–10°C).

Technical Data—Performance

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Flow Coefficient (C_v)	Sensing Type	Flow Data on Page
RS2	5 800 (400)	5 075 (350)	0.05	Piston	11
RSH2	10 150 (700)	10 150 (700)			
RS4	1 015 (70.0)	406 (28.0) diaphragm 5 800 (400) piston	1.84	Diaphragm or piston	14
RSH4	5 800 (400)				
RS6	1 015 (70.0)	203 (14.0) diaphragm 5 800 (400) piston	1.95	Diaphragm or piston	15
RSH6	5 800 (400)				
RS8	1 015 (70.0)	203 (14.0) diaphragm 5 800 (400) piston	2.07	Diaphragm or piston	16
RSH8	5 800 (400)				
RS10	1 015 (70.0)	290 (20.0) diaphragm 3 625 (250) piston	3.79	Diaphragm or piston	19
RSH10	5 800 (400)				
RS15	1 015 (70.0)	290 (20.0) diaphragm 3 625 (250) piston	7.30	Diaphragm or piston	—
RSH15	5 800 (400)				
RS20	1 015 (70.0)	290 (20.0)	13	Diaphragm	—
RSH20	5 800 (400)				
LRS4	507 (35.0)	290 (20.0)	0.73	Diaphragm	22
LRSH4	5 800 (400)		0.10		23
LPRS4	232 (16.0)	43 (3.0)	1.84	Diaphragm	—
LPRS6			1.95		
LPRS8			2.07		
LPRS10	232 (16.0)	43 (3.0)	3.79	Diaphragm	29
LPRS15			7.30		29

Pressure-Reducing, Spring-Loaded Regulators—RS Series



Technical Data—Design

Series	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge Connection	Weight (Without Flanges) lb (kg)	More Information on Page
RS2	0.087 (2.2)	1/4 in. NPT	1/4 in. NPT	3.3 (1.5)	10
RSH2					
RS4	0.39 (10.0)	1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	7.7 (3.5)	13
RSH4					
RS6	0.39 (10.0)	3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	9.9 (4.5)	13
RSH6					
RS8	0.39 (10.0)	1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	9.9 (4.5)	13
RSH8					
RS10	0.55 (14.0)	1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT or ISO/BSP parallel thread	16.5 (7.5)	18
RSH10	0.53 (13.5)				
RS15	0.75 (19.0)	1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT or ISO/BSP parallel thread	22.0 (10.0)	18
RSH15					
RS20	0.98 (25.0)	2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT or ISO/BSP parallel thread	39.6 (18.0)	18
RSH20					
LRS4	0.23 (6.0)	1/2 in. NPT	1/4 in. NPT	5.7 (2.6)	21
LRSH4	0.087 (2.2)				
LPRS4	0.39 (10.0)	1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	11.0 (5.0)	25
LPRS6		3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges		12.1 (5.5)	
LPRS8		1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges		12.1 (5.5)	
LPRS10	0.55 (14.0)	1 in. NPT, ISO/BSP parallel thread, EN or ASME flange	1/4 in. NPT or ISO/BSP parallel thread	17.6 (8.0)	28
LPRS15	0.75 (19.0)	1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges		22.0 (10.0)	

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

Features

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

Options

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

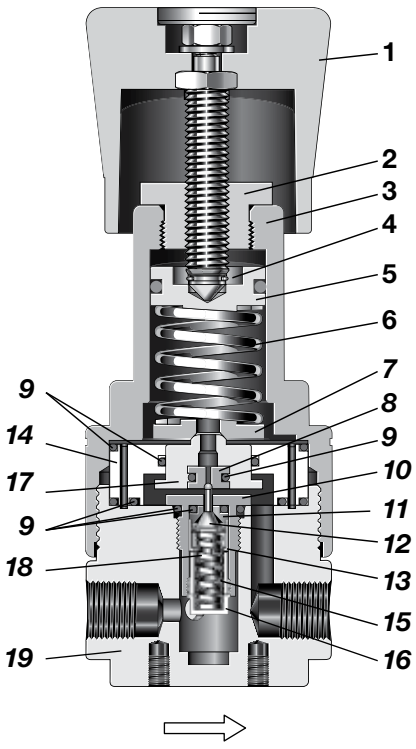
Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Vent Connections	Weight lb (kg)
RS2	5 800 (400)	5 075 (350)	Piston	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 8.	0.05	0.087 (2.2)	1/4 in. NPT	Gauge: 1/4 in. NPT Vent: 1/8 in. NPT	3.3 (1.5)
RSH2	10 150 (700)	10 150 (700)							

See page 11 for flow data.

Materials of Construction

RS2 Series Regulator with Cartridge Poppet Design



Component	Material / Specification
1 Knob assembly with adjusting screw, nuts, washer	Red ABS with A2-70
2 Spring housing cover	431 SS / A276
3 Spring housing	316L SS / A479 or EN10088
4 C-ring	A2
5 Spring guide	316L SS / A479 or EN10088
6 Set spring	CR50V4
7 Bottom spring guide	316L SS / A479 or EN10088
***8** Relief seat*	*PEEK or PCTFE*
***9** O-rings*	*EPDM, FKM, FFKM, or nitrile*
***10** Poppet housing*	*316L SS / A479 or EN10088*
***11** Seat*	*PEEK or PCTFE*
***12** Poppet*	*316L SS / A479 or EN10088*
***13** Seat retainer*	
***14** Piston plate*	
***15** Filter*	
***16** Plug*	
***17** Piston*	
***18** Poppet spring*	*302 SS / A240*
***19** Body*	*316L SS / A479 or EN10088*
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

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

Flow Data

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

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

RS2 Series

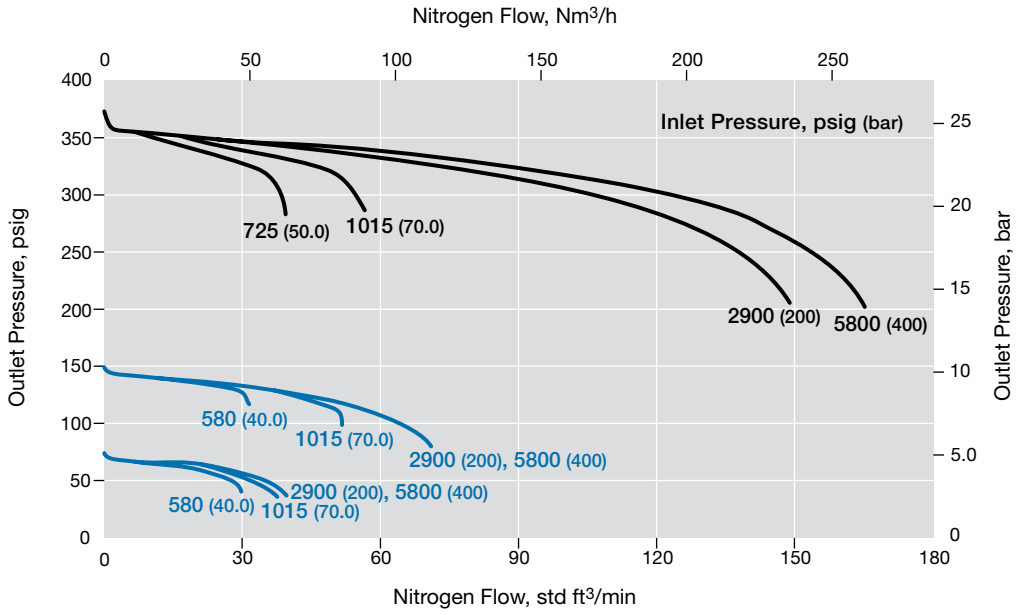
Flow Coefficient: 0.05

Maximum Inlet Pressure: RS2—5800 psig (400 bar)

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

Pressure Control Range

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



RS2 Series

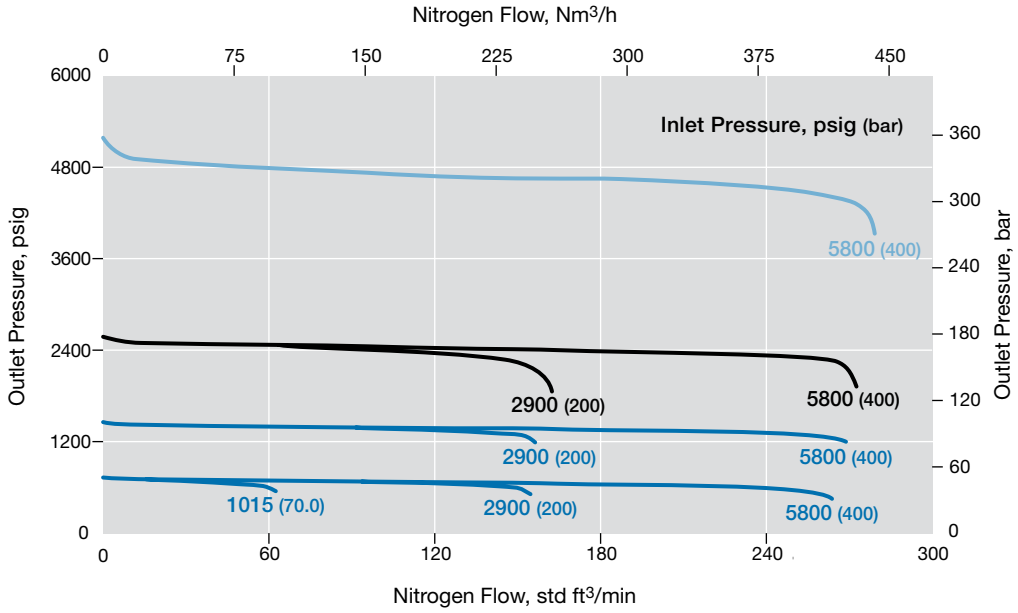
Flow Coefficient: 0.05

Maximum Inlet Pressure: RS2—5800 psig (400 bar)

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

Pressure Control Range

- 0 to 1450 psig (0 to 100 bar)
- 0 to 2537 psig (0 to 175 bar)
- 0 to 5075 psig (0 to 350 bar)

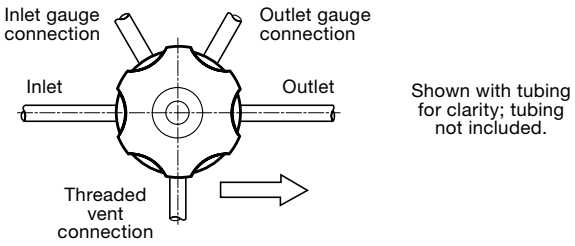


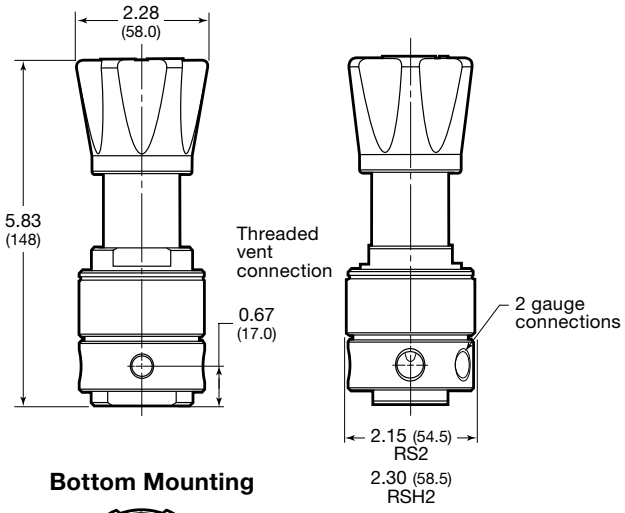
Dimensions

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

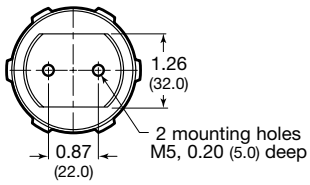
Configuration

Top

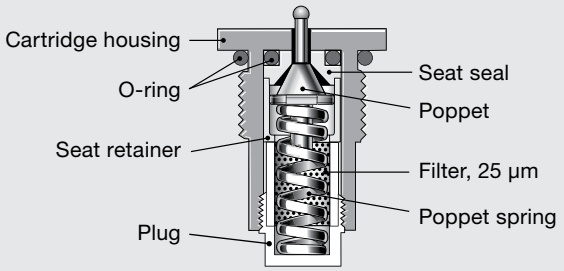




Bottom Mounting

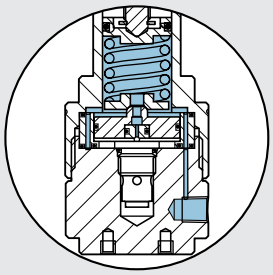


Cartridge Poppet Assembly Detail



Venting

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



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

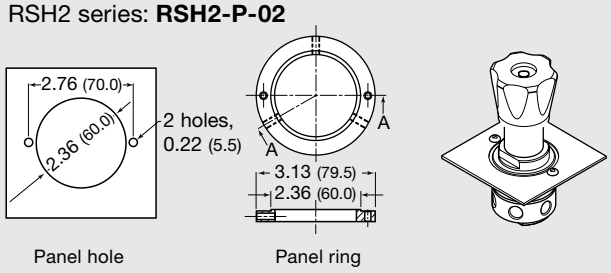
Panel Mounting Kit

No disassembly required when using panel mount kit.

Panel mounting kit ordering numbers:

RS2 series: **RS2-P-02**

RSH2 series: **RSH2-P-02**



Ordering Information

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

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

1 Series

RS = 5800 psig (400 bar) maximum inlet pressure

RSH = 10 150 psig (700 bar) maximum inlet pressure

2 Inlet / Outlet

N2 = 1/4 in. female NPT

3 Body Material

02 = 316L SS

4 Pressure Control Range

RS and RSH series

1 = 0 to 145 psig (0 to 10.0 bar)
2 = 0 to 362 psig (0 to 25.0 bar)
3 = 0 to 1450 psig (0 to 100 bar)
4 = 0 to 2537 psig (0 to 175 bar)
5 = 0 to 5075 psig (0 to 350 bar)

RSH series only

6 = 0 to 10 150 psig (0 to 700 bar)

5 Seal Material

V = Fluorocarbon FKM
N = Nitrile
E = EPDM
F = FFKM

6 Piston Seal Material

V = Fluorocarbon FKM
N = Nitrile
E = EPDM
F = FFKM

7 Seat Seal Material

K = PCTFE (RS only)
P = PEEK (RS and RSH)

8 Options

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

General-Purpose, Spring-Loaded Pressure-Reducing Regulators—RS(H)4, RS(H)6, and RS(H)8 Series

Features

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

Options

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

Technical Data

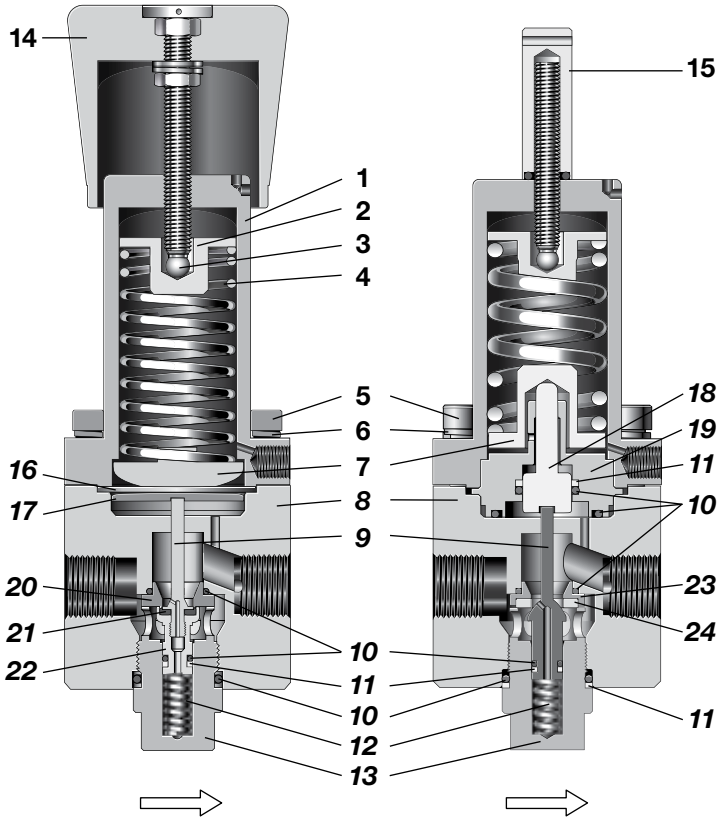
Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Connections			Weight (Without Flanges) lb (kg)
							Inlet and Outlet		Gauge and Vent	
							Size	Type		
RS(H)4	RS: 1015 (70.0) RSH: 5800 (400)	RS: 406 (28.0) RSH: 5800 (400)	Diaphragm: RS4: 0 to 406 psig (28.0 bar) RS6, 8: 0 to 203 psig (14.0 bar) Piston: 0 to 5800 psig (400 bar)	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 8.	1.84	0.39 (10.0)	1/2 in. DN15	NPT ISO/BSP parallel thread ASME or EN flange	Gauge: 1/4 in. NPT Vent: 1/8 in. ISO/BSP parallel thread	7.7 (3.5)
RS(H)6					1.95		3/4 in. DN20			9.9 (4.5)
RS(H)8					2.07		1 in. DN25			

See pages 14 to 16 for flow data.

Materials of Construction

RS Series Regulator with Diaphragm Sensing and Standard Knob

RSH Series Regulator with Piston Sensing and Antitamper Option



	Component		Material / Specification
Common Components	**1** Spring housing		316L SS / A479 or EN10088
	2 Spring guide		
	3 Ball		Commercial stainless steel
	4 Set spring		302 SS
	5 Cap screw		A4-80
	6 Washer		A4
	7 Bottom spring guide		316L SS / A479 or EN10088
	***8** Body*		*316L SS / A479 or EN10088*
	***9** Poppet*	*RS*	*316L SS / A479 or EN10088*
		RSH	*431 SS / A276*
	***10** O-rings*		*EPDM, FKM, or nitrile*
	***11** Backup ring*		*PTFE*
	***12** Poppet spring*		*302 SS / A240*
	***13** Body plug*		*316L SS / A479 or EN10088*
Actuation	**14** Knob assembly with adjusting screw, nuts, washers		Red ABS with A2-70
	15 Antitamper option with O-ring, set screw		316L SS, nitrile, A2-70
Sensing Mechanism	***Diaphragm Only***		
	***16** Diaphragm*		*EPDM, FKM, or nitrile*
	***17** Diaphragm plate*		*316L SS / A479 or EN10088*
	Piston Only		
	***18** Piston*		*316L SS / A479 or EN10088*
	***19** Piston plate*		*316L SS / A479 or EN10088*
RS Only	***20** Seat*		
	***21** Seat seal*		*EPDM, FKM, or nitrile*
	***22** Poppet housing*		*316L SS / A479 or EN10088*
RSH Only	***23** Seat*		
	***24** Seat seal*		*PEEK or PCTFE*
Wetted lubricant: Silicone-based, synthetic hydrocarbon-based			

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

Flow Data

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

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

RS4 Series

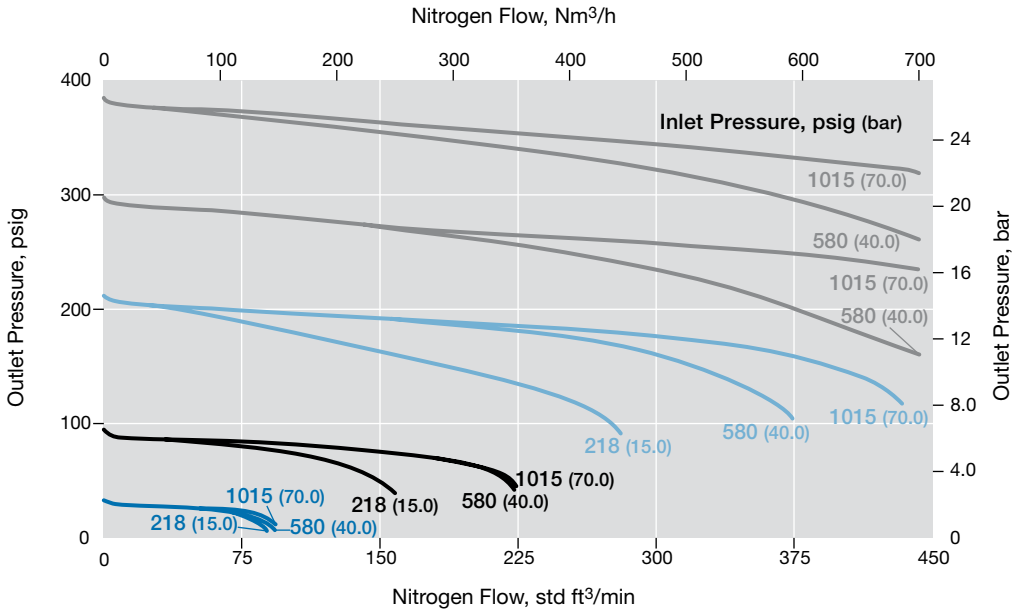
Flow Coefficient: 1.84

Maximum Inlet Pressure: RS4—1015 psig (70.0 bar)

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

Pressure Control Range

- 0 to 43 psig (0 to 3.0 bar)
- 0 to 101 psig (0 to 7.0 bar)
- 0 to 203 psig (0 to 14.0 bar)
- 0 to 406 psig (0 to 28.0 bar)



RS(H)4 Series

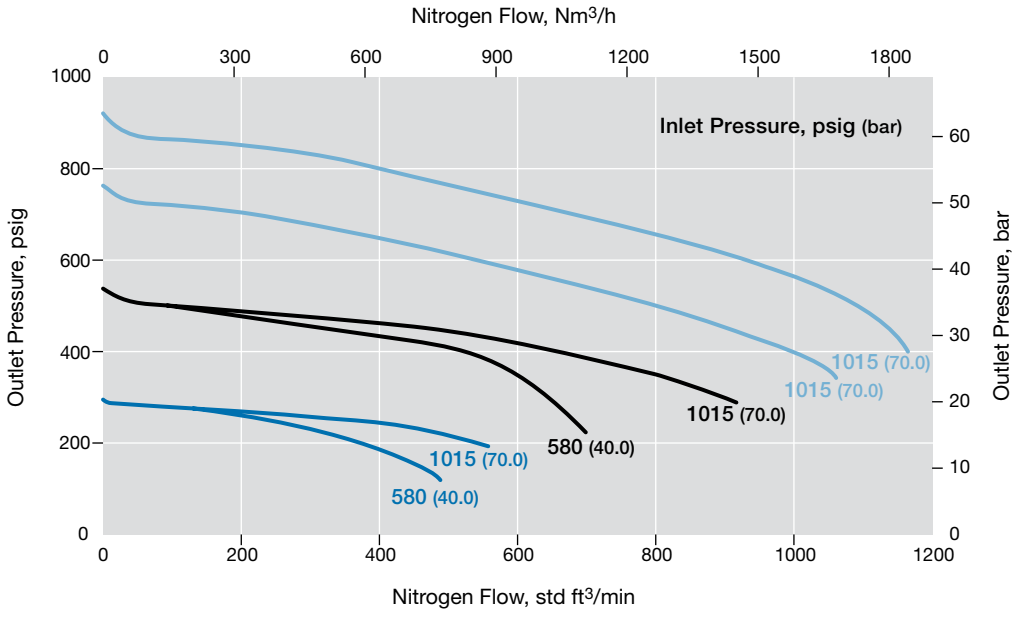
Flow Coefficient: 1.84

Maximum Inlet Pressure: RS4—1015 psig (70.0 bar); RSH4—5800 psig (400 bar)

Outlet Pressure Control Range: 0 to 1160 psig (0 to 80.0 bar)

Pressure Control Range

- 0 to 406 psig (0 to 28.0 bar)
- 0 to 580 psig (0 to 40.0 bar)
- 0 to 1160 psig (0 to 80.0 bar)



Flow Data

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

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

RS6 Series

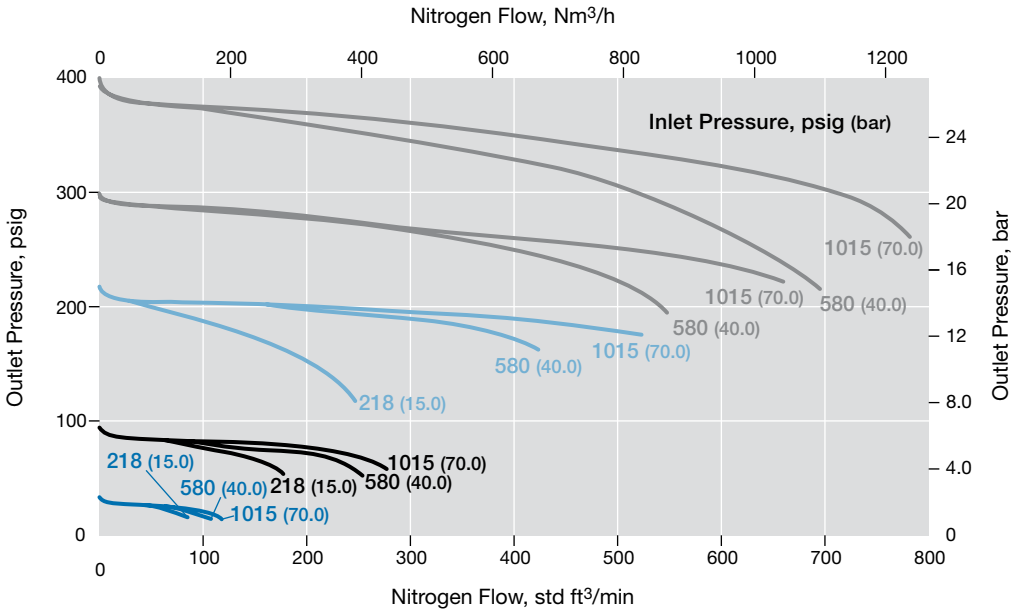
Flow Coefficient: 1.95

Maximum Inlet Pressure: RS6—1015 psig (70.0 bar)

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

Pressure Control Range

- 0 to 43 psig (0 to 3.0 bar)
- 0 to 101 psig (0 to 7.0 bar)
- 0 to 203 psig (0 to 14.0 bar)
- 0 to 406 psig (0 to 28.0 bar)



RS(H)6 Series

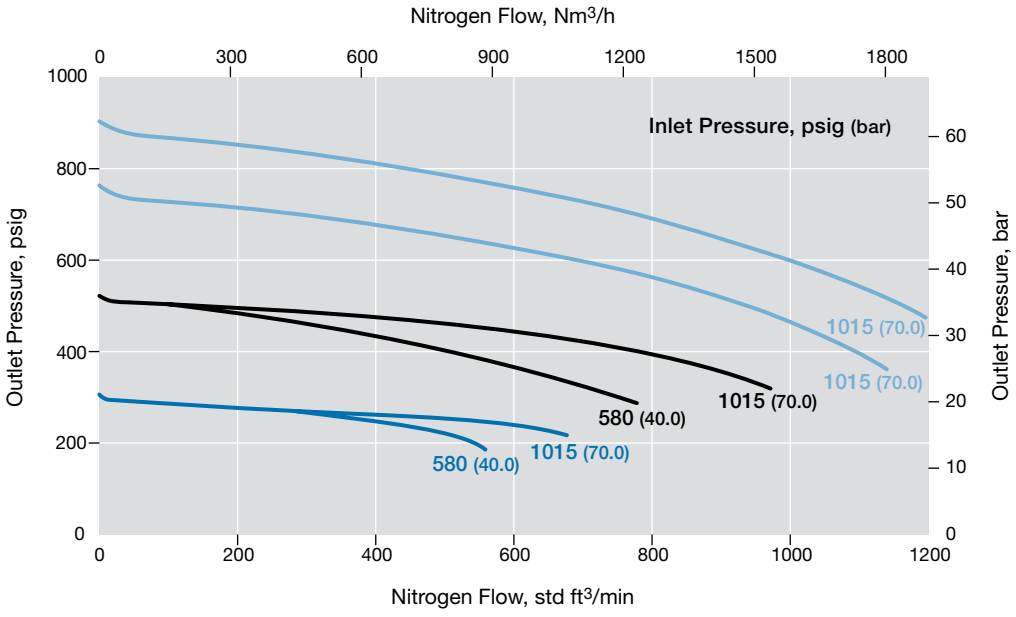
Flow Coefficient: 1.95

Maximum Inlet Pressure: RS6—1015 psig (70.0 bar); RSH6—5800 psig (400 bar)

Outlet Pressure Control Range: 0 to 1160 psig (0 to 80.0 bar)

Pressure Control Range

- 0 to 406 psig (0 to 28.0 bar)
- 0 to 580 psig (0 to 40.0 bar)
- 0 to 1160 psig (0 to 80.0 bar)



Flow Data

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

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

RS8 Series

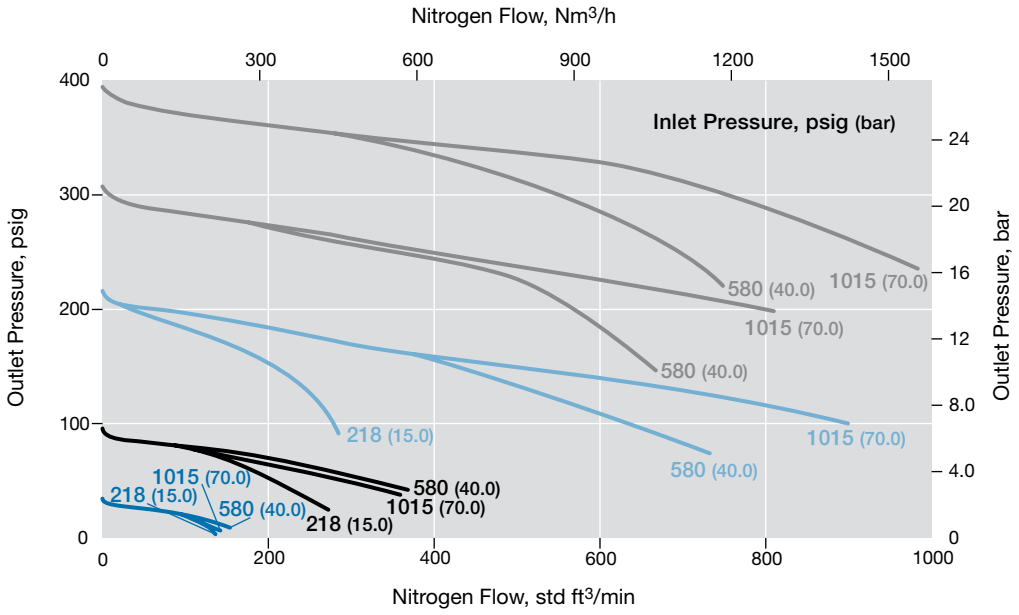
Flow Coefficient: 2.07

Maximum Inlet Pressure: RS8—1015 psig (70.0 bar)

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

Pressure Control Range

- 0 to 43 psig (0 to 3.0 bar)
- 0 to 101 psig (0 to 7.0 bar)
- 0 to 203 psig (0 to 14.0 bar)
- 0 to 406 psig (0 to 28.0 bar)



RS(H)8 Series

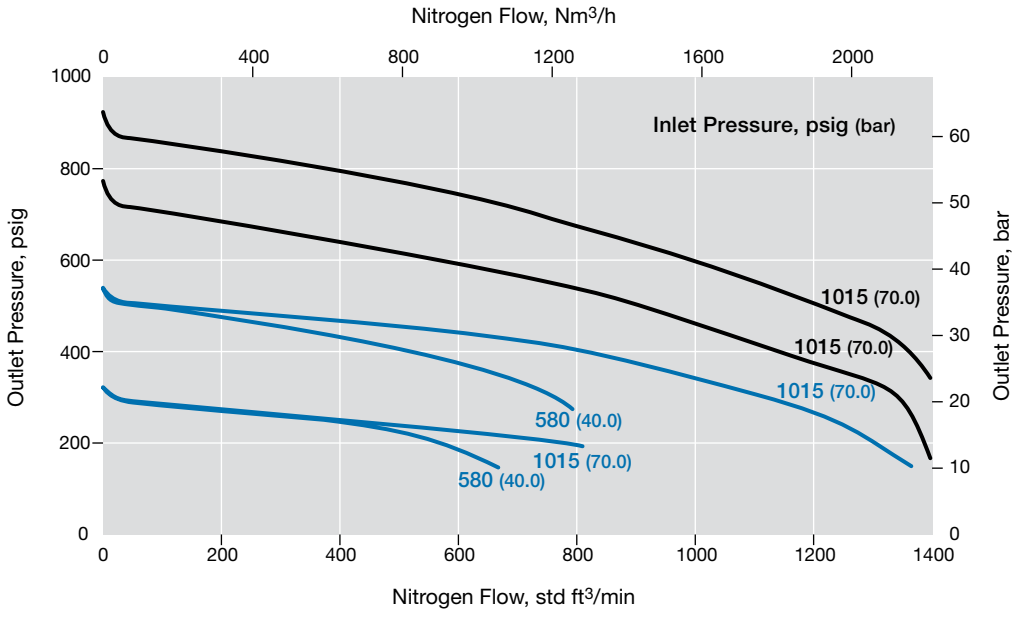
Flow Coefficient: 2.07

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

Outlet Pressure Control Range: 0 to 1160 psig (0 to 80.0 bar)

Pressure Control Range

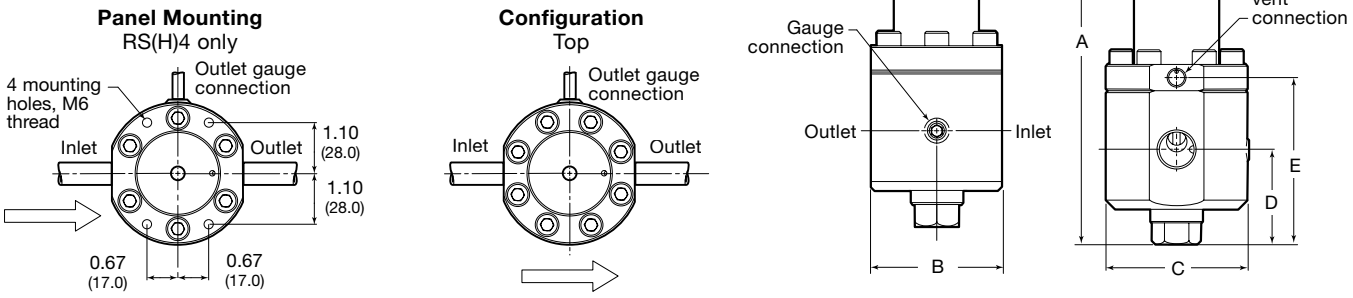
- 0 to 580 psig (0 to 40.0 bar)
- 0 to 1160 psig (0 to 80.0 bar)



Dimensions

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

Series	End Connection Size	Dimensions, in. (mm)				
		A	B	C	D	E
RS(H)4	1/2 in.	9.06 (230)	2.83 (72.0)	3.07 (78.0)	2.09 (53.0)	3.62 (92.0)
RS(H)6	3/4 in.	9.25 (235)	3.23 (82.0)	3.50 (89.0)	2.20 (56.0)	3.94 (100)
RS(H)8	1 in.	9.25 (235)	3.07 (78.0)	3.50 (89.0)	2.20 (56.0)	3.94 (100)



Shown with tubing for clarity; tubing not included.

Ordering Information

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

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

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

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

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

4 Pressure Class

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

5 Flange Facing

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

6 Body Material
- 02 = 316L SS

7 Pressure Control Range

Diaphragm sensing
- **1** = 0 to 43 psig (0 to 3.0 bar)
- **2** = 0 to 101 psig (0 to 7.0 bar)
- **3** = 0 to 203 psig (0 to 14.0 bar)
- **4** = 0 to 406 psig (0 to 28.0 bar)①

Piston sensing
- **4** = 0 to 406 psig (0 to 28.0 bar)②
- **5** = 0 to 580 psig (0 to 40.0 bar)
- **6** = 0 to 1160 psig (0 to 80.0 bar)
- **7** = 0 to 2175 psig (0 to 150 bar)
- **9** = 0 to 4060 psig (0 to 280 bar)
- **11** = 0 to 5800 psig (0 to 400 bar)

① RS(H)4 series only.
② RS(H)6 and RS(H)8 series only.

8 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

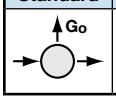
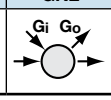
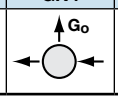
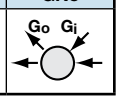
9 Diaphragm / Piston O-Rings
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

10 Seat Seal Material

RS series
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

RSH series
- **K** = PCTFE
- **P** = PEEK

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

Gauge Connection Configuration			
Standard	GN2	GN4	GN5
			

- **N** = NACE MR0175/ISO 15156
- **S** = Self-venting (with 1/8 in. NPT)
- **G93** = ASTM G93 Level C-cleaned

General-Purpose, Spring-Loaded Pressure-Reducing Regulators—RS(H)10, RS(H)15, and RS(H)20 Series

Features

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

Options

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

Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Connections			Weight (Without Flanges) lb (kg)
							Inlet and Outlet			
							Size	Type	Gauge	
RS(H)10	RS: 1015 (70.0) RSH: 5800 (400)	RS: 290 (20.0) RSH: 3625 (250)	Diaphragm: 0 to 290 psig (20.0 bar) Piston: 0 to 3625 psig (0 to 250 bar)	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 8.	3.79	RS: 0.55 (14.0) RSH: 0.53 (13.5)	1 in. DN25	NPT ISO/BSP parallel thread ASME or EN flange	1/4 in. NPT or ISO/BSP parallel thread①	16.5 (7.5)
RS(H)15					7.30	0.75 (19.0)	1 1/2 in. DN40			22.0 (10.0)
RS(H)20		290 (20.0)	Diaphragm		13	0.98 (25.0)	2 in. DN50			39.6 (18.0)

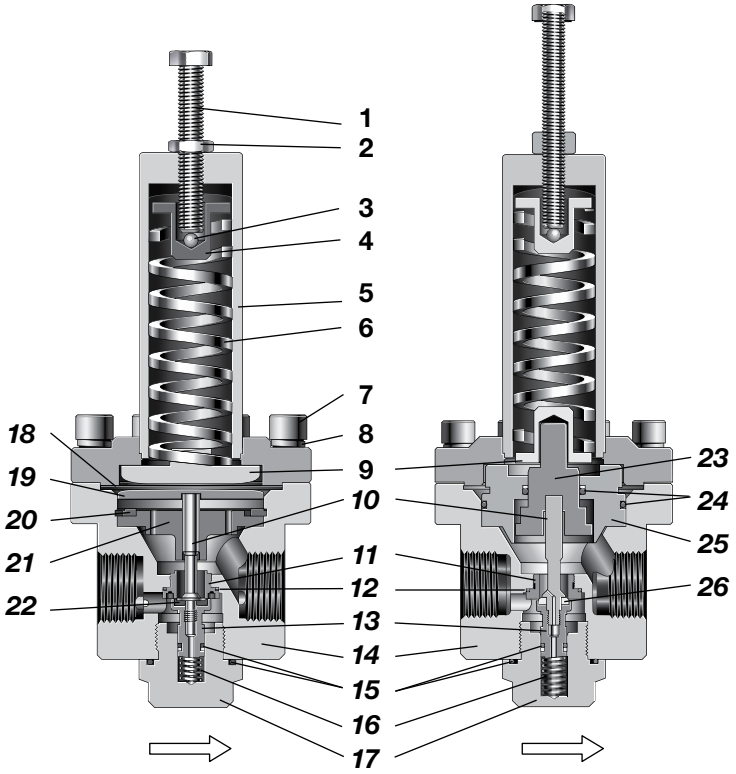
See page 18 for flow data.

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

Materials of Construction

RS Series Regulator with Diaphragm Sensing and Soft Seat Seal

RSH Series Regulator with Piston Sensing and Hard Seat Seal



	Component	Material / Specification
Common Components	**1** Adjusting screw	A2-70
	2 Nut	A2
	3 Ball	Commercial stainless steel
	4 Upper spring guide	316L SS / A479 or EN10088
	5 Spring housing assembly	316L SS / A479 or EN10088
	6 Set spring	CR50V4
	7 Cap screw	A4-80
	8 Washer	A4
	9 Bottom spring guide	316L SS / A479 or EN10088
	10 *Poppet*	*431 SS / A276*
	11 *Seat*	*316L SS / A479 or EN10088*
	12 *Seat O-ring*	*EPDM, FKM, or nitrile*
	13 *Poppet housing*	*316L SS / A479 or EN10088*
	14 *Body*	*316L SS / A479 or EN10088*
	15 *O-rings*	*EPDM, FKM, or nitrile*
	16 *Poppet spring*	*302 SS / A240*
	17 *Body plug*	*316L SS / A479 or EN10088*
Diaphragm	***18*** *Diaphragm*	*EPDM, FKM, or nitrile*
	19 *Diaphragm plate*	*316L SS / A479 or EN10088*
	20 *Retaining ring*	*Commercial stainless steel*
	21 *Body plate*	*316L SS / A479 or EN10088*
	22 *Seat seal*	*EPDM, FKM, or nitrile*
Piston	***23*** *Piston*	*316L SS / A479 or EN10088*
	24 *Piston O-rings*	*EPDM, FKM, or nitrile*
	25 *Piston plate*	*316L SS / A479 or EN10088*
	26 *Seat seal*	*PEEK or PCTFE*
Wetted lubricant: Silicone-based, synthetic hydrocarbon-based		

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

Flow Data

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

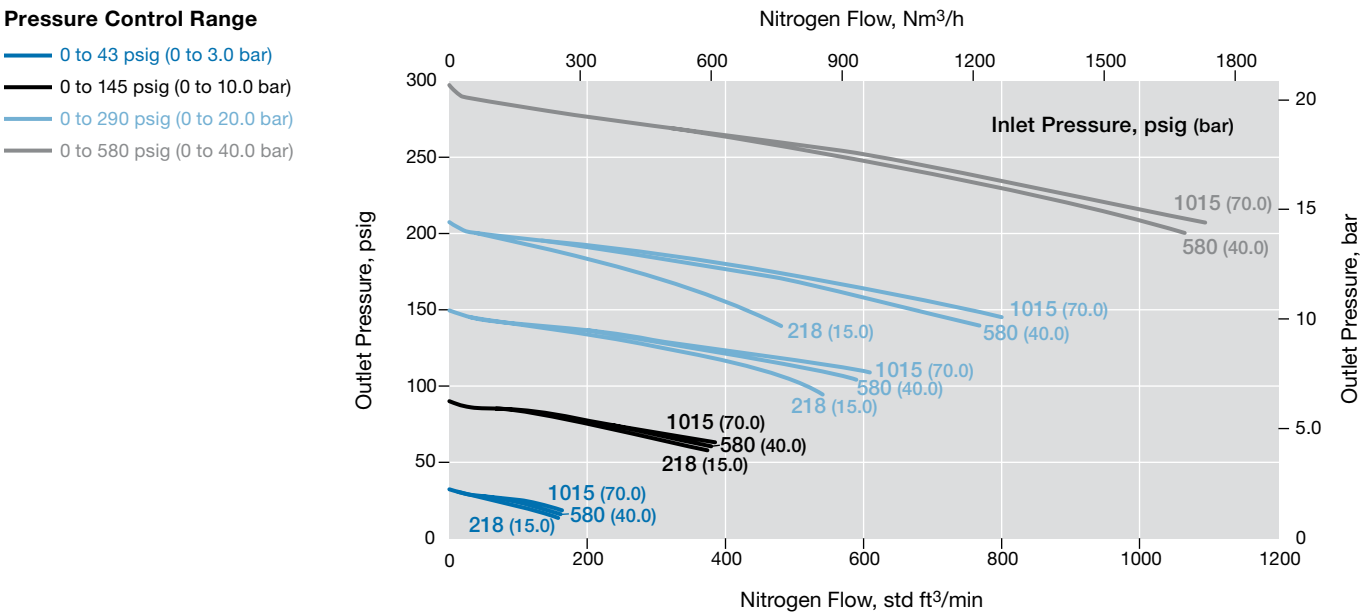
For more flow curve information, contact your authorized Swagelok representative.

RS10 Series

Flow Coefficient: 3.79

Maximum Inlet Pressure: RS10—1015 psig (70.0 bar)

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



RS15 Series and RS20 Series

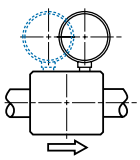
For flow curve information, contact your authorized Swagelok representative.

Dimensions

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

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

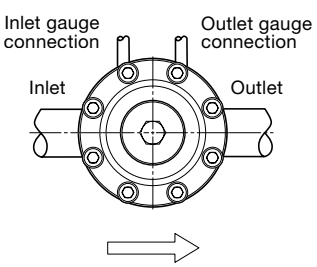
Gauge Connection

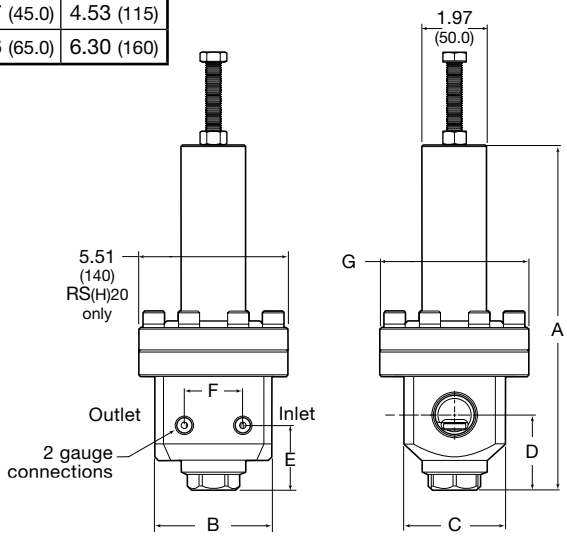


Only one gauge with a 50 mm (2 in.) or larger dial size fits directly into the body.

Configuration

Top





Shown with tubing for clarity; tubing not included.

Ordering Information

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

1	2	3	4	5		6	7	8	9	10	11
RS	**FA**	**10**	**A**	**1**	**-**	02	**- 1**	**- V**	**V**	**V**	**- G93**

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

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

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

4 Pressure Class

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

5 Flange Facing

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

6 Body Material
- 02 = 316L SS

7 Pressure Control Range

Diaphragm sensing
- **1** = 0 to 43 psig (0 to 3.0 bar)
- **2** = 0 to 72 psig (0 to 5.0 bar)
- **3** = 0 to 145 psig (0 to 10.0 bar)
- **4** = 0 to 290 psig (0 to 20.0 bar)

Piston sensing
- **5** = 0 to 580 psig (0 to 40.0 bar)①
- **6** = 0 to 1450 psig (0 to 100 bar)①
- **7** = 0 to 2610 psig (0 to 180 bar)①
- **8** = 0 to 3625 psig (0 to 250 bar)①

① RS(H)10 and RS(H)a5 series only.

8 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

9 Diaphragm / Piston O-Rings
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

10 Seat Seal Material

RS series
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

RSH series
- **K** = PCTFE
- **P** = PEEK

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

High-Sensitivity, Spring-Loaded Pressure-Reducing Regulators—LRS(H)4 Series

Features

- Diaphragm sensing
- Large diaphragm for higher accuracy
- Diaphragm materials: PTFE and 316L SS for most pressure control ranges
- Bottom mounting
- Low torque minimizes stem wear
- Nonventing
- Cartridge poppet assembly in LRSH4 for ease of service
- Panel mounting—no disassembly required

Options

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

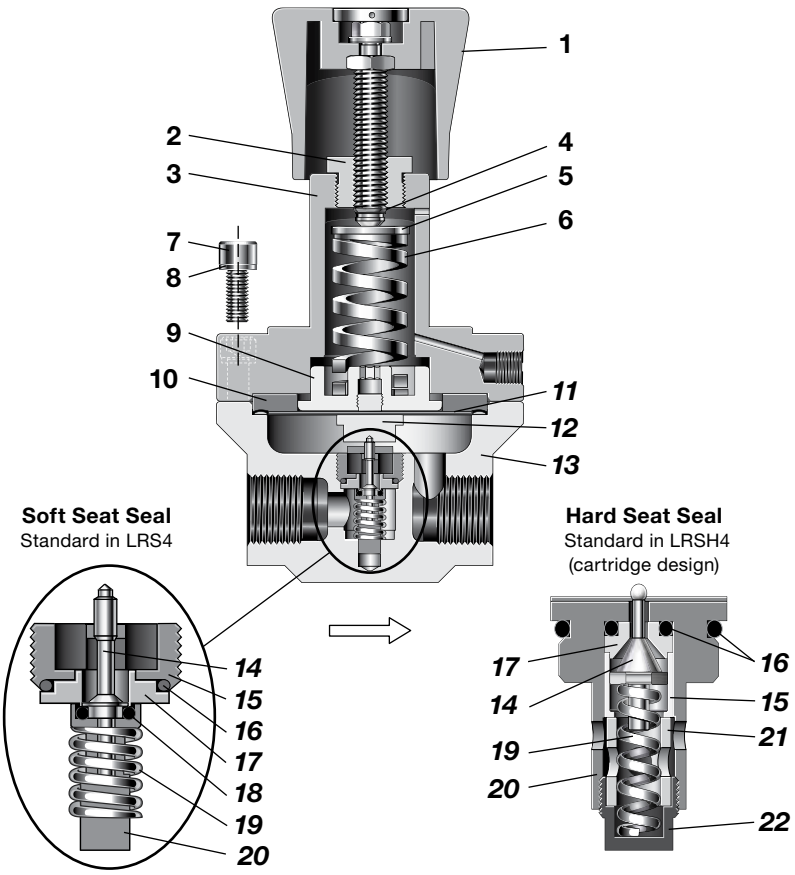
Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Vent Connections	Weight lb (kg)
LRS4	507 (35.0)	290 (20.0)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 8.	0.73	0.23 (6.0)	1/2 in. NPT	Gauge: 1/4 in. NPT Vent: 1/8 in. NPT	5.7 (2.6)
LRSH4	5800 (400)				0.10	0.087 (2.2)			

See pages 22 to 23 for flow data.

Materials of Construction

LRS Series Regulator with Soft Seat Seal



Component		Material / Specification
1 Knob assembly with adjusting screw, nuts		Red ABS with A2-70
2 Spring housing cover		431 SS / A276
3 Spring housing		316L SS / A479 or EN10088
4 C-ring		A2
5 Spring guide		316L SS / A479 or EN10088
6 Set spring		CR50V4
7 Cap screw		A4-80
8 Washer		A2
9 Bottom spring guide		316L SS / A479 or EN10088
10 Clamp ring		
***11** Diaphragm*		*PTFE or 316L SS*
***12** Diaphragm screw*		*316L SS / A479 or EN10088*
***13** Body*		
***14** Poppet*		
***15** Seat retainer*		
***16** O-ring*		*EPDM, FKM, or FFKM*
***17** Seat*	*LRS*	*316L SS / A479 or EN10088*
	LRSH	*PCTFE or PEEK*
***18** Seat seal (LRS only)*		*EPDM, FKM, or FFKM*
***19** Poppet spring*		*302 SS / A240*
***20** Poppet housing*		*316L SS / A479 or EN10088*
***21** Fluid case*		
***22** Cartridge plug*		
Wetted lubricants: Silicone-based, synthetic hydrocarbon-based		

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

Flow Data

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

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

LRS4 Series

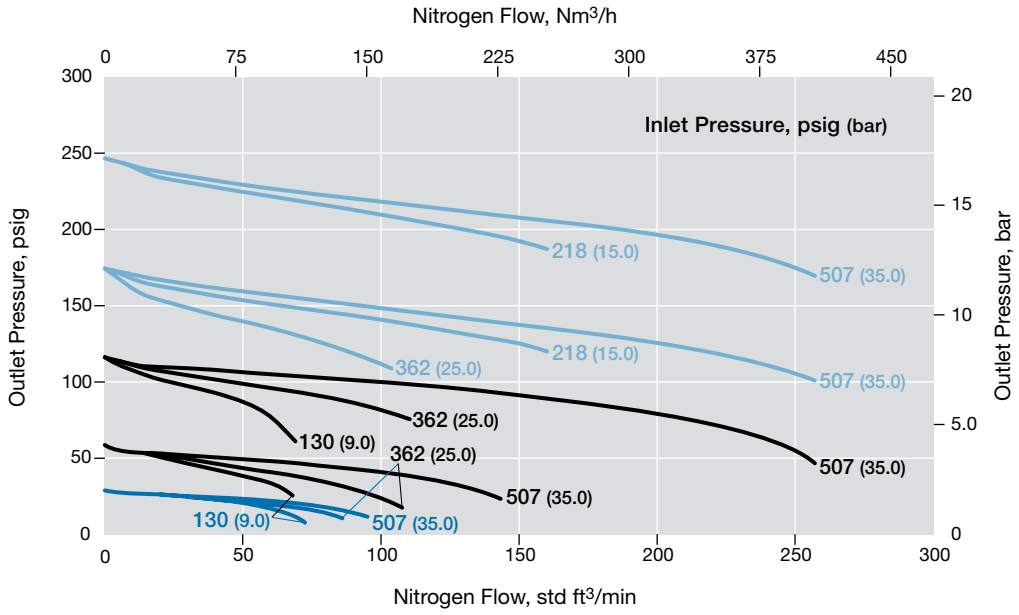
Flow Coefficient: 0.73

Maximum Inlet Pressure: LRS4—507 psig (35.0 bar)

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

Pressure Control Range

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



LRS4 Series with Optional External Feedback

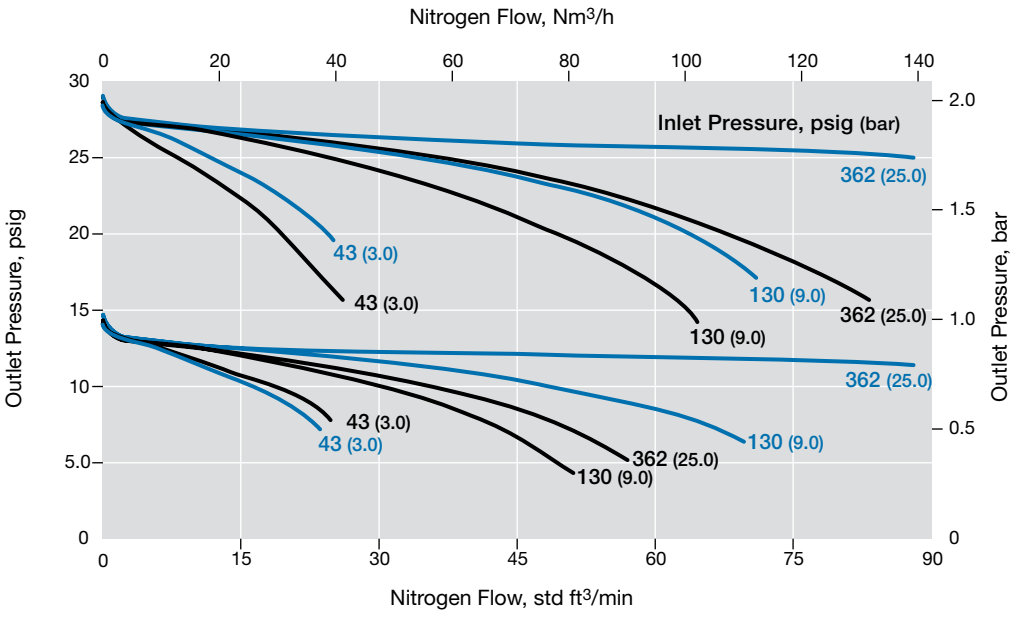
Flow Coefficient: 0.73

Maximum Inlet Pressure: LRS4—507 psig (35.0 bar)

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

Comparative Flow

- External Feedback
- Standard



Flow Data

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

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

LRS4 Series with Optional 316L SS Diaphragm

Flow Coefficient: 0.73

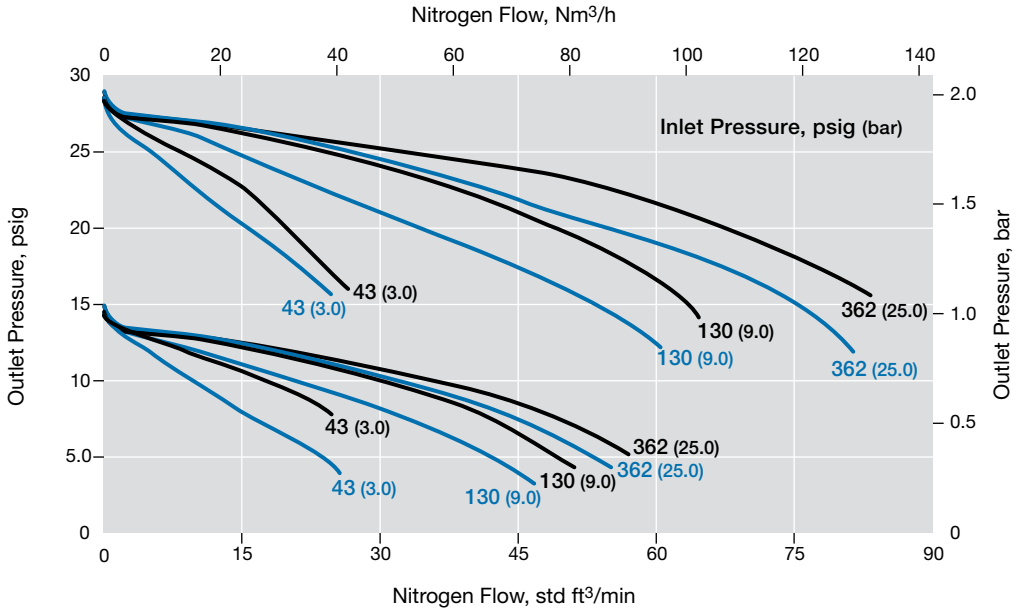
Maximum Inlet Pressure: LRS4—507 psig (35.0 bar)

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

Comparative Flow

316L SS Diaphragm

Standard



LRSH4 Series

Flow Coefficient: 0.10

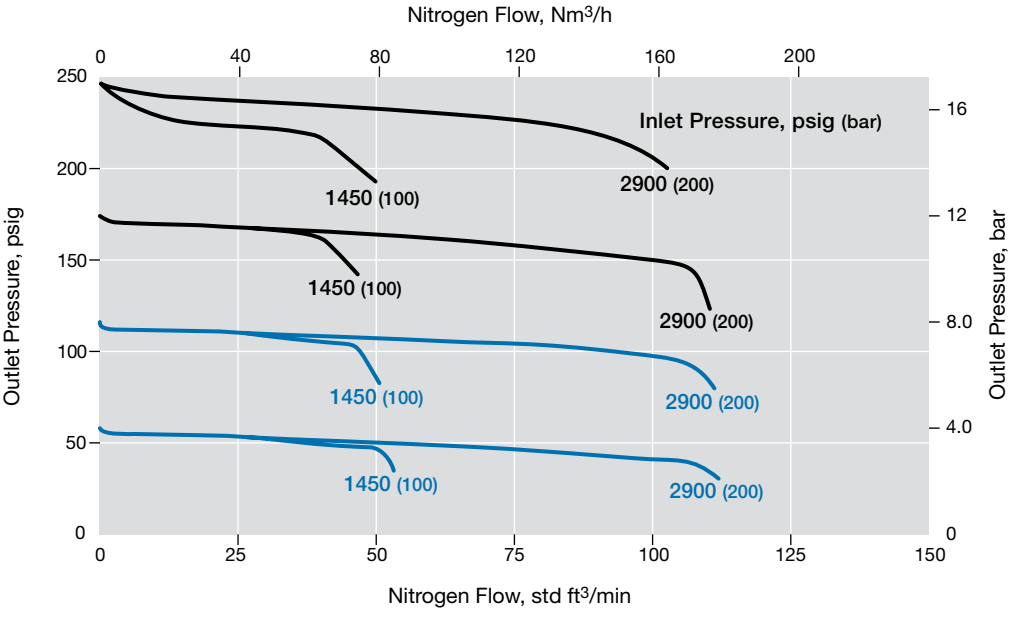
Maximum Inlet Pressure: LRSH4—5800 psig (400 bar)

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

Pressure Control Range

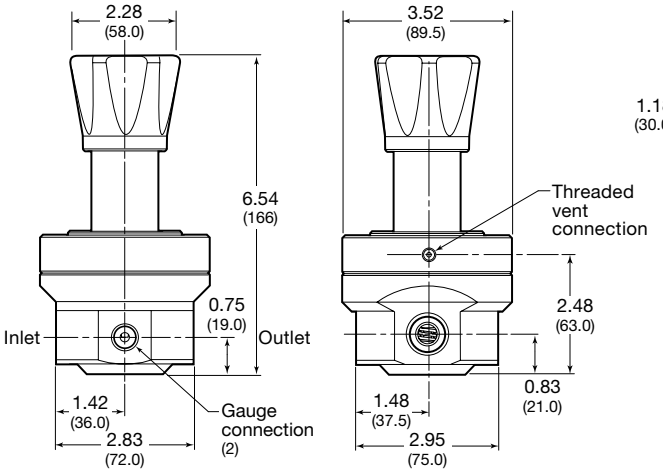
0 to 130 psig (0 to 9.0 bar)

0 to 290 psig (0 to 20.0 bar)

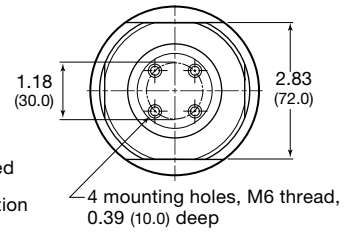


Dimensions

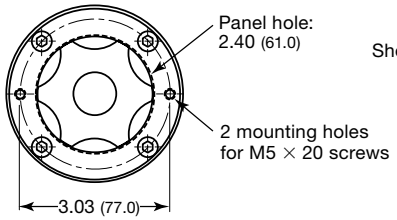
Dimensions, in inches (millimeters), are for reference only and are subject to change.



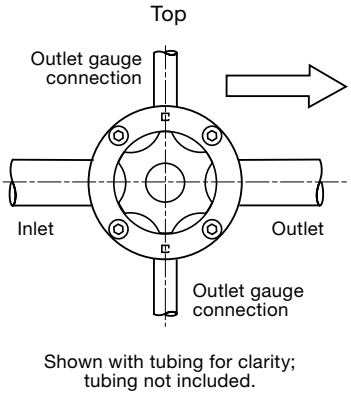
Bottom Mounting



Panel Mounting



Configuration

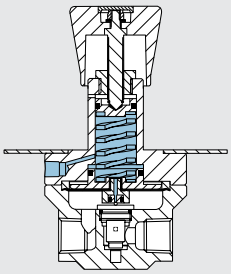


Shown with tubing for clarity; tubing not included.

Options

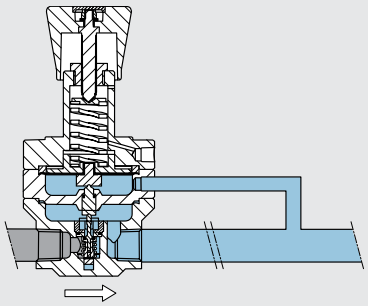
Self Venting

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



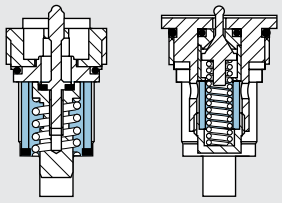
External Feedback

Compensates for pressure loss (droop).



25 µm Filter

Reduces potential seat damage; will reduce flow.



LRS4 series cartridge

LRSH4 series cartridge

Ordering Information

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

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

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

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

3 Body Material
- 02 = 316L SS

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

5 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

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

7 Seat Seal Material

LRS series (seat seal)
- **V** = Fluorocarbon FKM
- **E** = EPDM
- **F** = FFKM

LRSH series (seat)
- **K** = PCTFE
- **P** = PEEK

8 Options
- **EF** = External feedback
- **F** = Filter, 25 µm
- **N** = NACE MR0175/ISO 15156
- **S** = Self venting
- **G93** = ASTM G93 Level C-cleaned

High Sensitivity, Spring-Loaded Pressure-Reducing Regulators—LPRS4, LPRS6, and LPRS8 Series

Features

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

Options

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

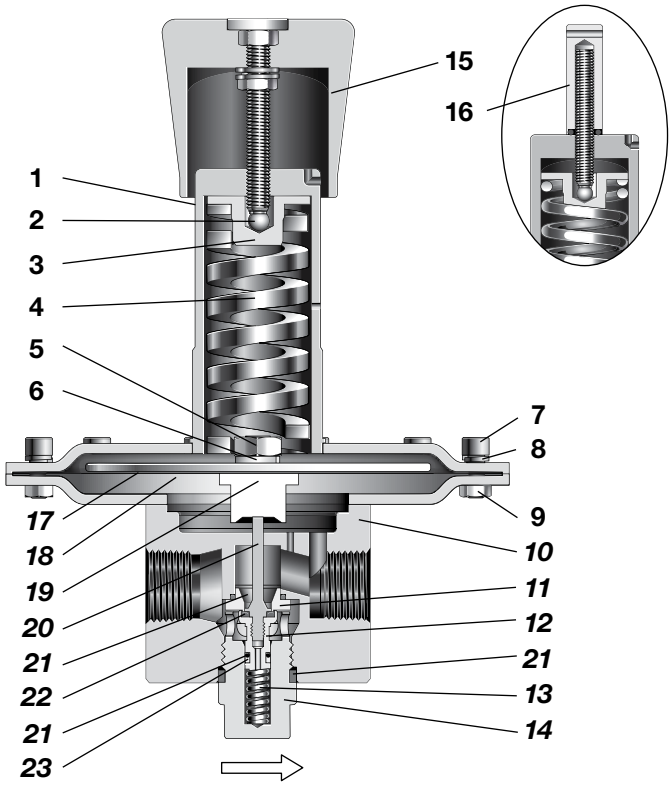
Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Connections			Weight
							Inlet and Outlet		Gauge	
							Size	Type		
LPRS4	232 (16.0)	43.0 (3.0)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 8.	1.84	0.39 (10.0)	1/2 in. DN15	NPT ISO/BSP parallel thread ASME or EN flange	1/4 in. NPT	See **Dimensions,** page 26.
LPRS6					1.95		3/4 in. DN20			
LPRS8					2.07		1 in. DN25			

Materials of Construction

LPRS Series Regulator with Standard Knob

Antitamper Option



Component	Material / Specification
1 Spring housing assembly	316L SS / A479 or EN10088
2 Ball	Commercial stainless steel
3 Spring guide	316L SS / A479 or EN10088
4 Set spring	CR50V4
5 Nut	A2
6 Washer	A4
7 Cap screw	A4-80
8 Washer	A2
9 Nut	A2
10 *Body*	*316L SS / A479 or EN10088*
11 *Seat*	
12 *Poppet housing*	
13 *Poppet spring*	*302 SS / A240*
14 *Body plug*	*316L SS / A479 or EN10088*
15 Knob assembly with adjusting screw, nuts	Red ABS with A2-70
16 Antitamper assembly with O-ring, adjusting screw	316L SS, nitrile, A2-70
17 *Diaphragm plate*	*316L SS / A479 or EN10088*
18 *Diaphragm*	*PTFE, EPDM, FKM, or nitrile*
19 *Diaphragm screw*	*316L SS / A479 or EN10088*
20 *Poppet*	
21 *O-rings*	*EPDM, FKM, or nitrile*
22 *Seat seal*	
23 *Backup ring*	*PTFE*
Wetted lubricants: Silicone-based, synthetic hydrocarbon-based	

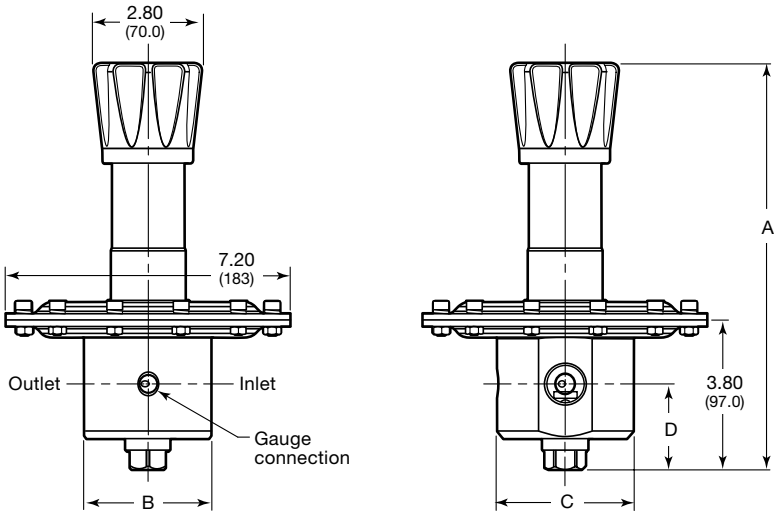
Wetted components listed in *italics.*
Gauge plugs (not shown): 431 SS / A276.

Dimensions

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

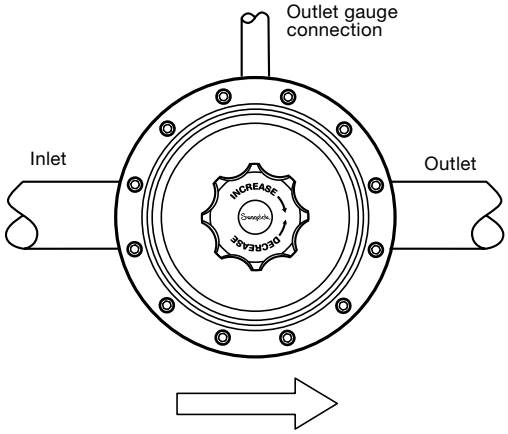
Series	End Connection Size and Type	Dimensions, in. (mm)				Weight lb (kg)
		A	B	C	D	
LPRS4	1/2 in. NPT or ISO/BSP parallel thread	10.2 (258)	2.83 (72.0)	3.07 (78.0)	2.09 (53.0)	11.0 (5.0)
	DN15 PN40—EN 1092		10.2 (260)			14.3 (6.5)
	1/2 in. ASME class 150—B16.5		11.0 (280)			
LPRS6	3/4 in. NPT or ISO/BSP parallel thread		3.23 (82.0)	3.50 (89.0)	2.20 (56.0)	12.1 (5.5)
	DN20 PN40—EN 1092		10.2 (260)			17.6 (7.8)
	3/4 in. ASME class 150—B16.5		11.2 (285)			
LPRS8	1 in. NPT or ISO/BSP parallel thread		3.07 (78.0)	3.50 (89.0)	2.20 (56.0)	12.1 (5.5)
	DN25 PN40—EN 1092		10.2 (260)			18.3 (8.3)
	1 in. ASME class 150—B16.5		11.5 (291)			

Regulators with Pipe Connections



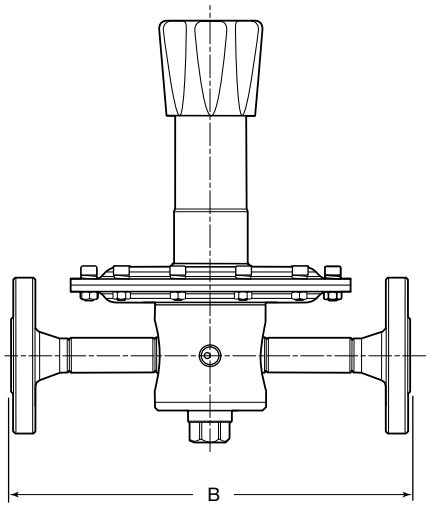
Standard Configuration

Top



Shown with tubing for clarity; tubing not included.

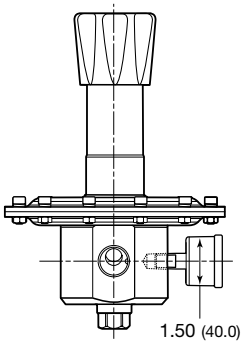
Regulators with Flange Connections



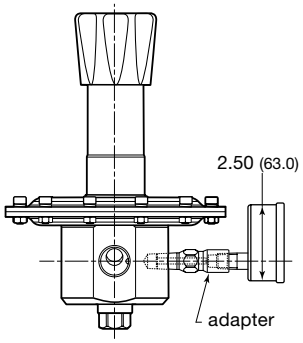
Gauges

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

RHPS Gauge Adapter



40 mm (1 1/2 in.) gauge dial size with center-back mount



63 mm (2 1/2 in.) or larger gauge dial size requires the use of an adapter.

Flow Table

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

Inlet Pressure P1 psig (bar)	Set Pressure P2 psig (bar)	Pressure Control Range psig (bar)	Flow std ft³/min (Nm³/h)
14.5 (1.0)	1.4 (0.10)	1.4 to 14.5 (0.10 to 1.0)	12.9 (22)
	4.3 (0.30)		17.6 (30)
43 (3.0)	1.4 (0.10)	1.4 to 14.5 (0.10 to 1.0)	12.9 (22)
	4.3 (0.30)		23.5 (40)
	11 (0.80)		35.3 (60)
	29 (2.0)	4.3 to 43 (0.30 to 3.0)	47.0 (80)①
72 (5.0)	1.4 (0.10)	1.4 to 14.5 (0.10 to 1.0)	12.9 (22)
	4.3 (0.30)		23.5 (40)
	11 (0.80)		35.3 (60)
	29 (2.0)	4.3 to 43 (0.30 to 3.0)	76.5 (130)①
145 (10.0)	4.3 (0.30)	1.4 to 14.5 (0.10 to 1.0)	23.5 (40)
	11 (0.80)		35.3 (60)
	29 (2.0)	4.3 to 43 (0.30 to 3.0)	76.5 (130)①
232 (16.0)	4.3 (0.30)	1.4 to 14.5 (0.10 to 1.0)	23.5 (40)
	11 (0.80)		35.3 (60)
	29 (2.0)	4.3 to 43 (0.30 to 3.0)	76.5 (130)①

① Droop is approximately 15 %.

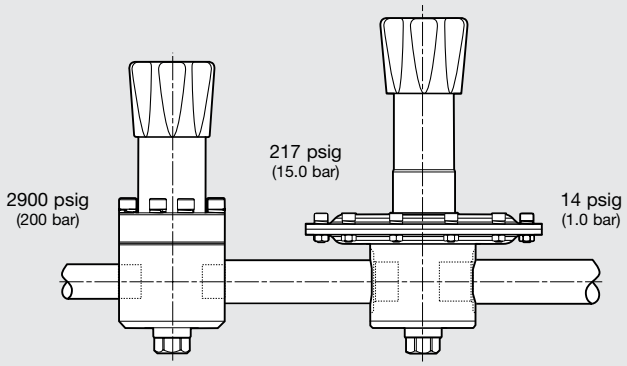
Droop

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

Flow

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

Typical 2-Stage Reduction
for improved set-pressure control



For flow curve information, contact your authorized Swagelok representative.

Ordering Information

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

1	2	3	4	5	6	7	8	9	10	11
LPRS	**FA**	**4**	**A**	**1**	**-** 02	**- 2**	**- V**	**V**	**V**	**- AGN2**

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

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

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

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

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

6 Body Material
02 = 316L SS

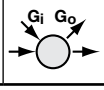
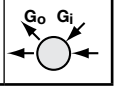
7 Pressure Control Range
2 = 1.4 to 14.5 psig (0.10 to 1.0 bar)
3 = 4.3 to 43 psig (0.30 to 3.0 bar)

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

9 Diaphragm
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

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

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

Gauge Connection Configuration			
Standard	GN2	GN4	GN5
			

N = NACE MR0175/ISO 15156
S = Self-venting (with 1/8 in. NPT)
G93 = ASTM G93 Level C-cleaned

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

Features

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

Options

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

Technical Data

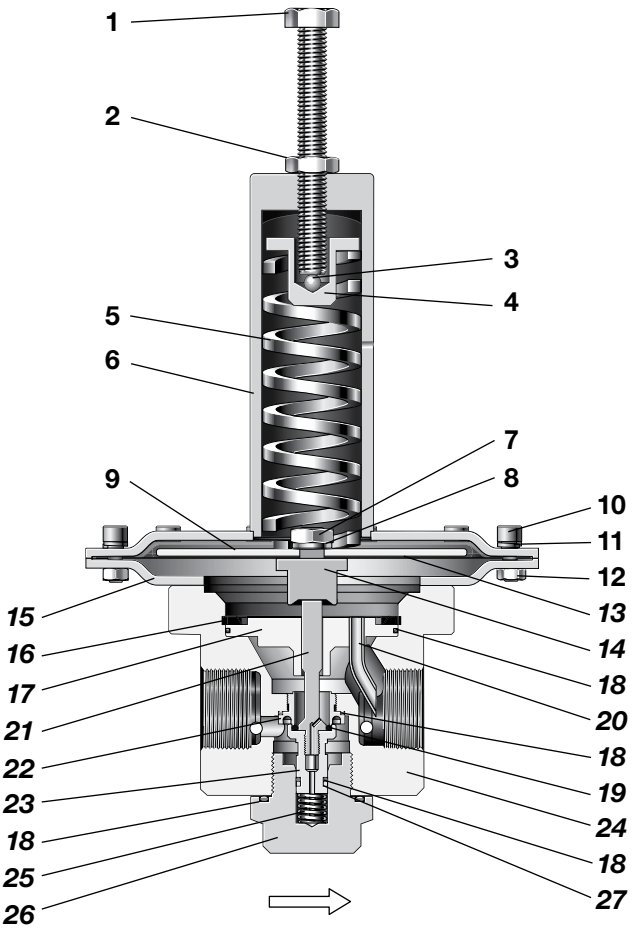
Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °C (°F)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Connections			Weight (Without Flanges) lb (kg)
							Inlet and Outlet			
							Size	Type	Gauge	
LPRS10	232 (16.0)	43.0 (3.0)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 8.	3.79	0.55 (14.0)	1 in. DN25	NPT ISO/BSP parallel thread ASME or EN flange	1/4 in. NPT or ISO/BSP parallel thread①	17.6 (8.0)
LPRS15					7.30	0.75 (19.0)	1 1/2 in. DN40			22.0 (10.0)

See pages 29 and 29 for flow data.

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

Materials of Construction

LPRS10 Series Regulator



Component	Material / Specification
1 Adjusting screw	A2-70
2 Nut	A2
3 Ball	Commercial stainless steel
4 Spring guide	316L SS / A479 or EN10088
5 Set spring	CR50V4
6 Spring housing assembly	316L SS / A479 or EN10088
7 Nut	A2
8 Washer	A4
9 Diaphragm plate	316L SS / A479 or EN10088
10 Cap screw	A4-80
11 Washer	A2
12 Nut	A2
***13** Diaphragm*	*PTFE, FKM, EPDM, or nitrile*
***14** Diaphragm screw*	*316L SS / A479 or EN10088*
***15** Bottom cover*	
***16** Retaining ring*	*Commercial stainless steel*
***17** Body plate*	*316L SS / A479 or EN10088*
***18** O-rings*	*EPDM, FKM, or nitrile*
***19** Seat seal*	
***20** Suction tube*	*316L SS / A479 or EN10088*
***21** Poppet*	
***22** Seat*	
***23** Poppet housing*	
***24** Body*	
***25** Poppet spring*	*302 SS / A240*
***26** Body plug*	*316L SS / A479 or EN10088*
***27** Backup ring*	*PTFE*
Wetted lubricant: Silicone-based, synthetic hydrocarbon-based	

Wetted components listed in *italics*.

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

Flow Data

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

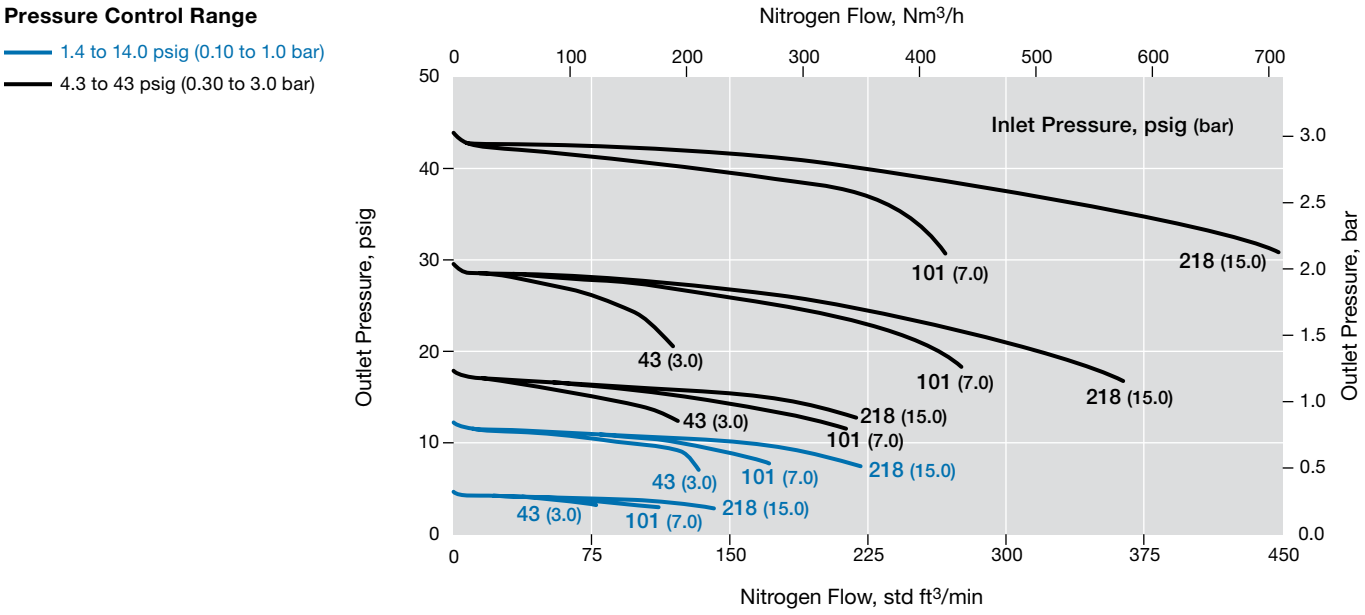
For more flow curve information, contact your authorized Swagelok representative.

LPRS10 Series

Flow Coefficient: 3.79

Maximum Inlet Pressure: LPRS10—232 psig (16.0 bar)

Outlet Pressure Control Range: 1.4 to 43 psig (0.10 to 3.0 bar)

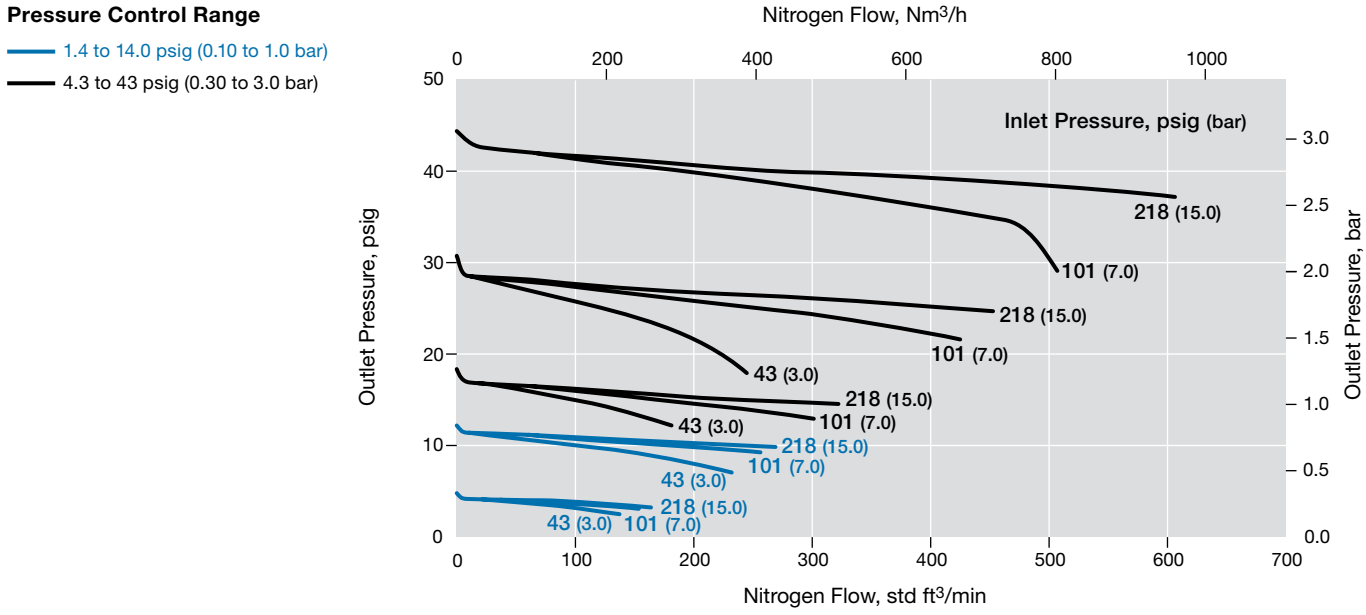


LPRS15 Series

Flow Coefficient: 7.3

Maximum Inlet Pressure: LPRS15—232 psig (16.0 bar)

Outlet Pressure Control Range: 1.4 to 43 psig (0.10 to 3.0 bar)

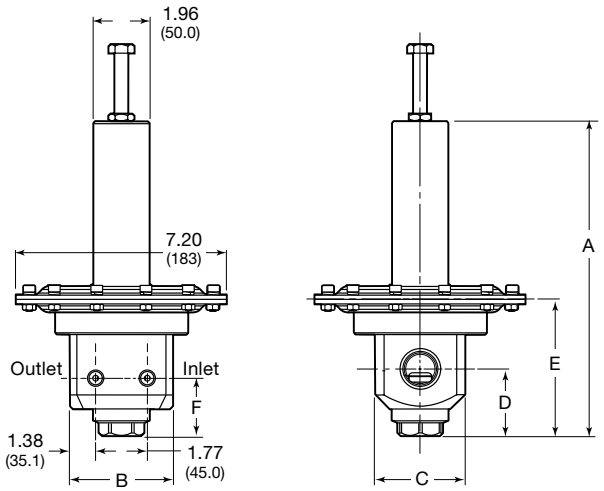


Dimensions

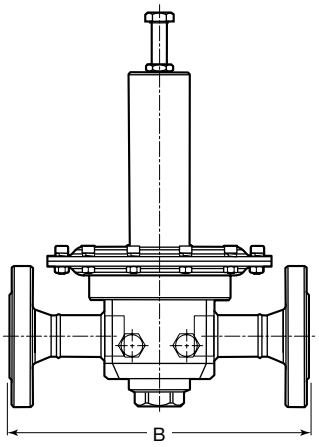
Dimensions, in inches (millimeters), are for reference only and are subject to change.

Series	End Connection Size and Type	Dimensions, in. (mm)					
		A	B	C	D	E	F
LPRS10	1 in. NPT or ISO/BSP parallel thread	10.8 (275)	3.54 (90.0)	3.07 (78.0)	2.28 (58.0)	4.69 (119)	2.00 (50.8)
	DN25 PN40—EN 1092		9.69 (246)				
	1 in. ASME class 150—B16.5		9.65 (245)				
LPRS15	1 1/2 in. NPT or ISO/BSP parallel thread	11.3 (286)	4.53 (115)	3.78 (96.0)	2.44 (62.0)	5.12 (130)	2.03 (51.6)
	DN40 PN40—EN 1092		11.0 (280)				
	1 1/2 in. ASME class 150—B16.5		12.4 (314)				

Regulators with Pipe Connections

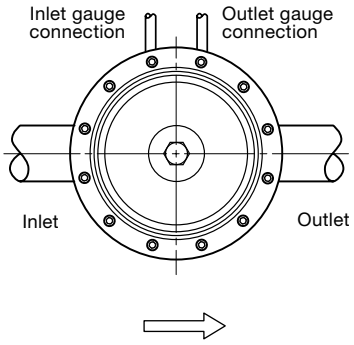


Regulators with Flange Connections



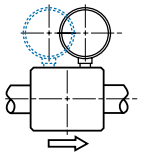
Configuration

Top



Shown with tubing for clarity; tubing not included.

Gauge Connection



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

Ordering Information

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

1	2	3	4	5	6	7	8	9	10	11
LPRS	**FA**	**10**	**A**	1	- 02	**- 2**	**- V**	**V**	**V**	**- G93**

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

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

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

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

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

6 Body Material
02 = 316L SS

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

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

9 Diaphragm
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

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

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

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

These pressure-reducing, dome-loaded and air-loaded regulators are suitable for most gases and liquids, incluENg acids and oils. These regulators feature various poppet designs, a pressure-sensing diaphragm (piston in RD2 series), and a choice of seat and seal materials to accommodate a variety of pressure, temperature, and flow conditions.

These regulators are available with a choice of threaded end connections from 1/4 to 2 in., and with flange end connections from 1/2 to 4 in.

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

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

Features

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

RD2

RD(H)6, 8

RD(H)10, 15

RD(H)6DP

RA4, 6, 8

RD(H)20, 25

RD(H)30, 40

LPRD25, 30, 40

Pressure-Temperature Ratings

Seat Seal / O-Ring Material	PCTFE	PEEK	Polyurethane	Fluorocarbon FKM①, Nitrile, EPDM, FFKM②	
Series	RD2 RDH6DP RDH6, 8 RDH10, 15 RDH20, 25 RA4, 6, 8	RD2 RDH6DP RDH6, 8 RDH10, 15 RDH20, 25 RA4, 6, 8	RDH30 RDH40	RD6DP RD6, 8 RD10, 15 RD20, 25 RD30, 40	LPRD20 LPRD25 LPRD30 LPRD40
Temperature °F (°C)	Maximum Inlet Pressure / Working Pressure psig (bar)				
–4 (–20) to 95 (35)	5800 (400)	5800 (400)	4060 (280)	1015 (70.0)	232 (16.0)
149 (65)	3987 (275)				
176 (80)	1812 (125)				

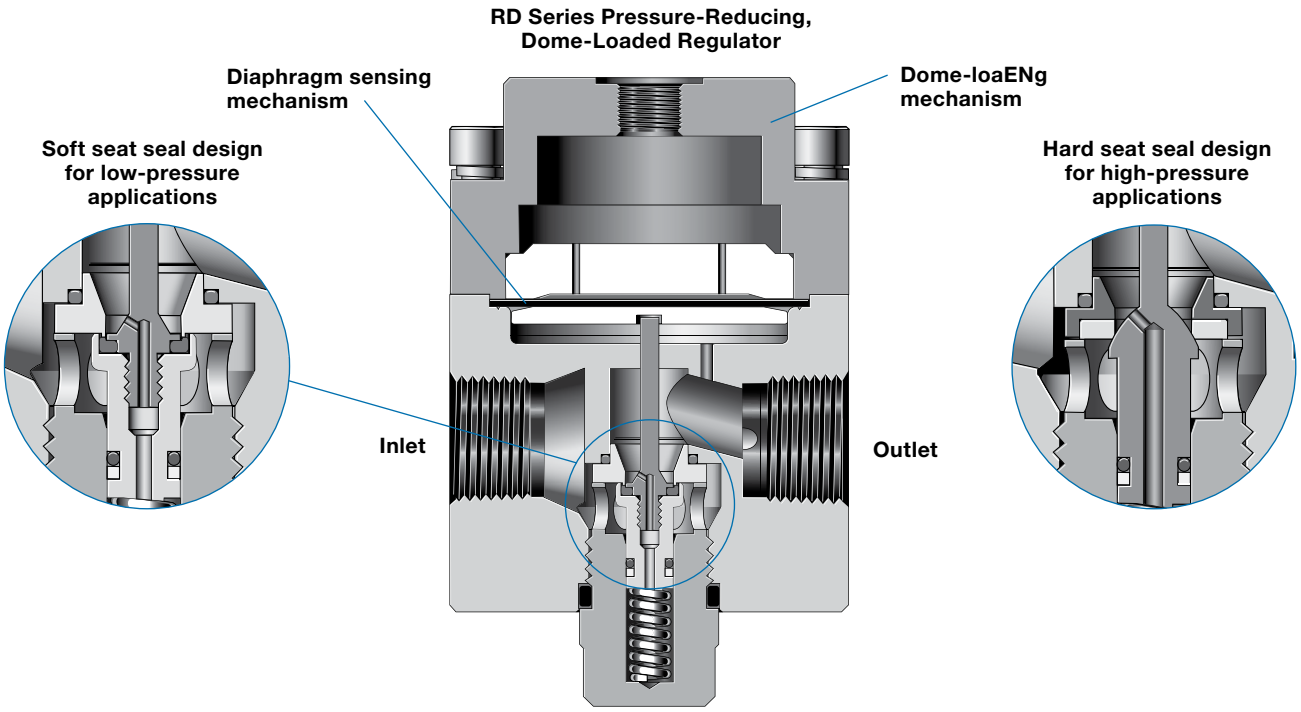
① Regulators with fluorocarbon FKM seat seal / O-ring materials limited to 5°F (–15°C).

② Regulators with FFKM seat seal / O-rings materials limited to 14°F (–10°C).

Technical Data—Performance

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Flow Coefficient (C_v)	Sensing Type	Flow Data on Page
RD2	5800 (400)	5800 (400)	0.05	Piston	35
RD6DP	1015 (70.0)	1015 (70.0)	1.95	Diaphragm	—
RDH6DP	5800 (400)	3335 (230)			
RD6	1015 (70.0)	1015 (70.0)	1.95	Diaphragm	39
RDH6	5800 (400)	5800 (400)			
RD8	1015 (70.0)	1015 (70.0)	2.07	Diaphragm	—
RDH8	5800 (400)	5800 (400)			
RD10	1015 (70.0)	1015 (70.0)	3.79	Diaphragm	45
RDH10	5800 (400)	3625 (250)			
RD15	1015 (70.0)	1015 (70.0)	7.30	Diaphragm	46, 47
RDH15	5800 (400)	3625 (250)			
RD20	1015 (70.0)	1015 (70.0)	13	Diaphragm	50, 51
RDH20	5800 (400)	2900 (200)			
RD25	1015 (70.0)	1015 (70.0)	21	Diaphragm	—
RDH25	4060 (280)	2900 (200)			
RD30	1015 (70.0)	1015 (70.0)	36	Diaphragm	—
RDH30	4060 (280)	2900 (200)			
RD40	1015 (70.0)	1015 (70.0)	73	Diaphragm	—
RDH40	4060 (280)	2900 (200)			
LPRD20	232 (16.0)	29 (2.0)	13	Diaphragm	—
LPRD25			21		
LPRD30			36		
LPRD40			73		
RA4	5800 (400)	5800 (400)	1.84	Diaphragm	—
RA6					
RA8					

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



Technical Data—Design

Series	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge Connection	Dome Connection	Weight (Without Flanges) lb (kg)	More Information on Page
RD2	0.087 (2.2)	1/4 in. NPT	1/4 in. NPT	1/8 in. NPT	3.1 (1.4)	34
RD6DP	0.39 (10.0)	3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	1/4 in. NPT	10.6 (4.8)	41
RDH6DP						
RD6	0.39 (10.0)	3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	1/4 in. ISO/BSP parallel thread	8.8 (4.0)	38
RDH6						
RD8	0.39 (10.0)	1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	1/4 in. ISO/BSP parallel thread	8.8 (4.0)	38
RDH8						
RD10	0.55 (14.0)	1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT or ISO/BSP parallel thread	1/4 in. ISO/BSP parallel thread	17.6 (6.0)	43
RDH10	0.53 (13.5)					
RD15	0.75 (19.0)	1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT or ISO/BSP parallel thread	1/4 in. ISO/BSP parallel thread	19.8 (9.0)	43
RDH15						
RD20	0.98 (25.0)	2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	Use P1 gauge connections on pilot regulator	1/4 in. ISO/BSP parallel thread	44.0 (20)	49
RDH20						
RD25	1.25 (32.0)	2 1/2 in. EN or ASME flanges	Use P1 gauge connections on pilot regulator	1/4 in. ISO/BSP parallel thread	88.0 (40)	49
RDH25						
RD30	1.65 (42.0)	3 in. EN or ASME flanges	Use P1 gauge connections on pilot regulator	1/4 in. ISO/BSP parallel thread	136 (62)	53
RDH30						
RD40	2.36 (60.0)	4 in. EN or ASME flanges	Use P1 gauge connections on pilot regulator	1/4 in. ISO/BSP parallel thread	183 (83)	53
RDH40						
LPRD20	0.98 (25.0)	2 in. EN or ASME flanges	Inlet and outlet gauges included	1/4 in. ISO/BSP parallel thread	Varies with model and end connection	55
LPRD25	1.25 (32.0)	2 1/2 in. EN or ASME flanges				55
LPRD30	1.65 (42.0)	3 in. EN or ASME flanges				55
LPRD40	2.36 (60.0)	4 in. EN or ASME flanges				55
RA4	0.39 (10.0)	1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	1/4 in. ISO/BSP parallel thread	12.5 (5.7)	57
RA6		3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges			13.6 (6.2)	
RA8		1 in. ISO/BSP parallel thread, EN or ASME flanges			13.6 (6.2)	

Compact, General-Purpose Dome-Loaded Pressure-Reducing Regulators—RD2 Series

Features

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

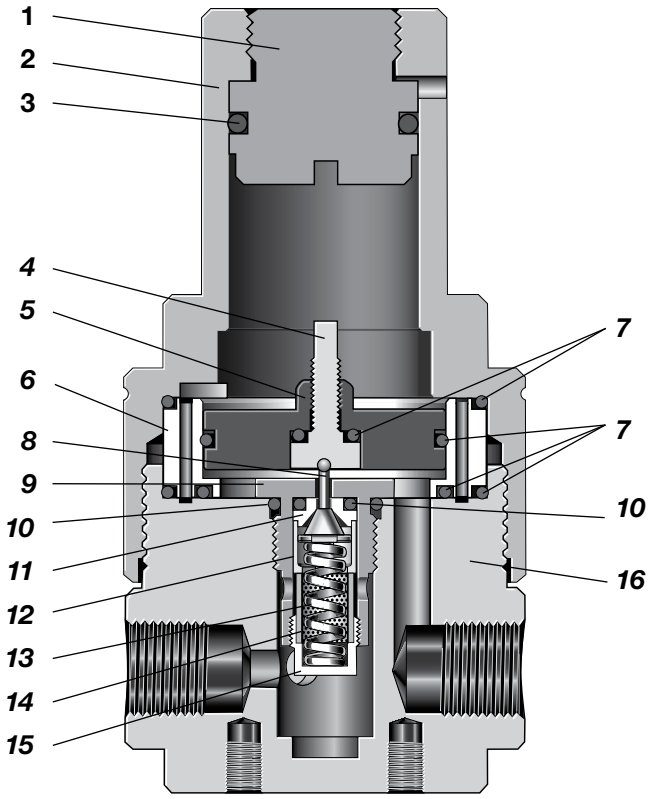
Options

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

Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Dome Connection	Weight lb (kg)
RD2	5800 (400)	5800 (400)	Piston	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	0.05	0.087 (2.2)	1/4 in. NPT	Gauge: 1/4 in. NPT Dome: 1/8 in. NPT	3.1 (1.4)

Materials of Construction



Component	Material / Specification
1 Dome plug	316L SS / A479 or EN10088
2 Dome	
3 Dome plug O-ring	FKM, EPDM, nitrile, or FFKM
4 *Non-relieving plug*	*316L SS / A479 or EN10088*
5 *Piston*	
6 *Piston plate*	
7 *Piston O-rings*	*FKM, EPDM, nitrile, or FFKM*
8 *Poppet*	*431 SS / A276 or EN10088*
9 *Poppet housing*	*316L SS / A479 or EN10088*
10 *O-rings*	*FKM, EPDM, nitrile, or FFKM*
11 *Seat*	*PEEK or PCFTE*
12 *Seat retainer*	*316L SS / A479 or EN10088*
13 *Poppet spring*	*302 SS / A240*
14 *Filter*	316L SS / A479 or EN10088
15 *Plug*	
16 *Body*	
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

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

Flow Data

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

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

RD2 Series

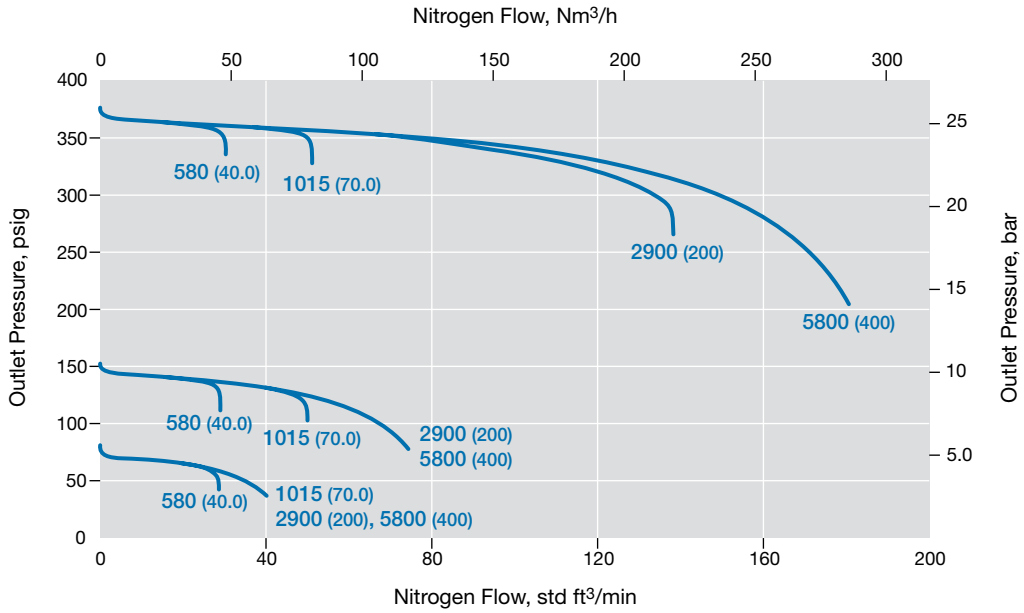
Flow Coefficient: 0.05

Maximum Inlet Pressure: RD2—5800 psig (400 bar)

Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)

Pressure Control Range

0 to 5800 psig (0 to 400 bar)



RD2 Series

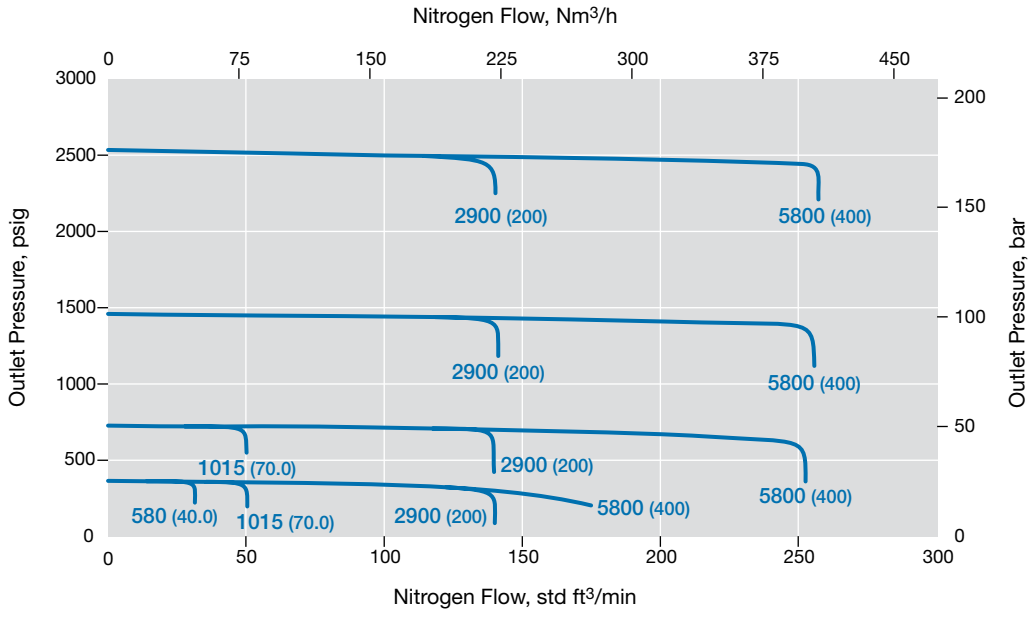
Flow Coefficient: 0.05

Maximum Inlet Pressure: RD2—5800 psig (400 bar)

Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)

Pressure Control Range

0 to 5800 psig (0 to 400 bar)



Flow Data

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

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

RD2 Series

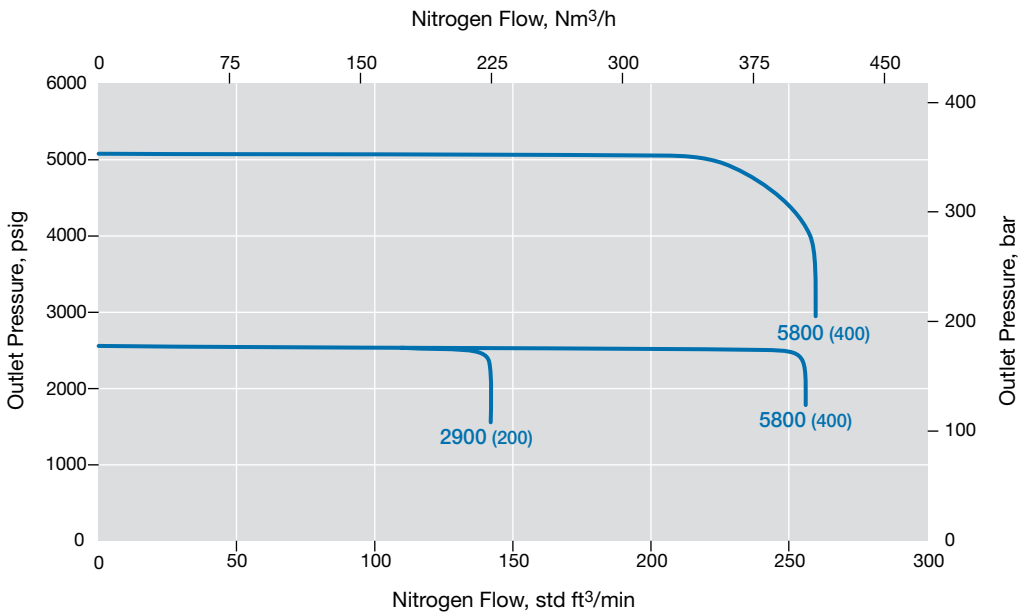
Flow Coefficient: 0.05

Maximum Inlet Pressure: RD2—5800 psig (400 bar)

Outlet Pressure Control Range: 0 to 5800 psig (0 to 400 bar)

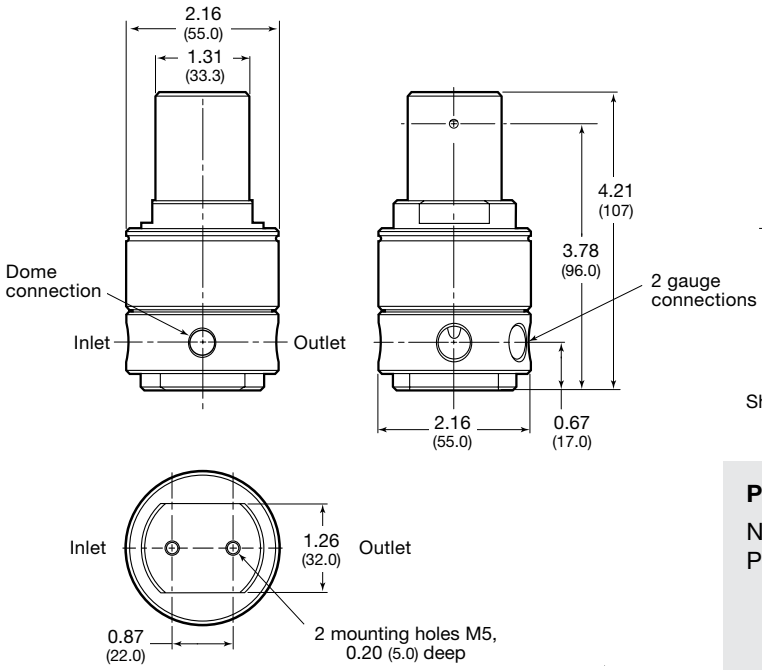
Pressure Control Range

0 to 5800 psig (0 to 400 bar)



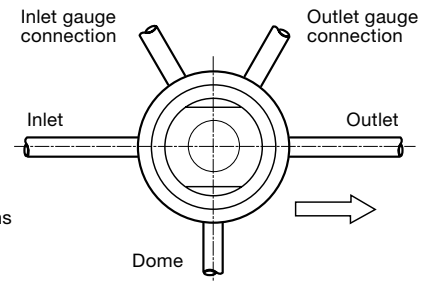
Dimensions

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



Configuration

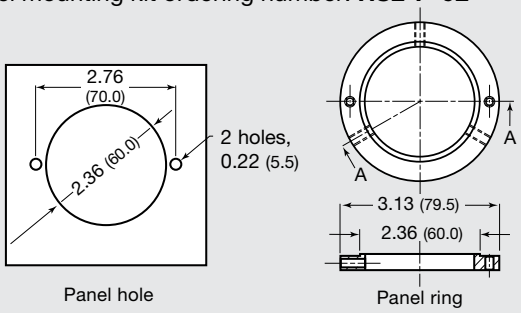
Top



Shown with tubing for clarity; tubing not included.

Panel Mounting Kit

No disassembly required when using panel mount kit.
Panel mounting kit ordering number: **RS2-P-02**



Ordering Information

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

1	2	3	4	5	6	7
RD	N2	- 02	- V	V	K	- L

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

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

3 Body Material
02 = 316L SS

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

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

6 Seat Material
K = PCTFE
P = PEEK

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

General-Purpose, Dome-Loaded Pressure-Reducing Regulators—RD(H)6 and RD(H)8 Series

Features

- Balanced poppet design
- Diaphragm sensing
- Dome-to-outlet pressure ratio approximately 1:1
- Outlet gauge connection: 1/4 in. female NPT

Options

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

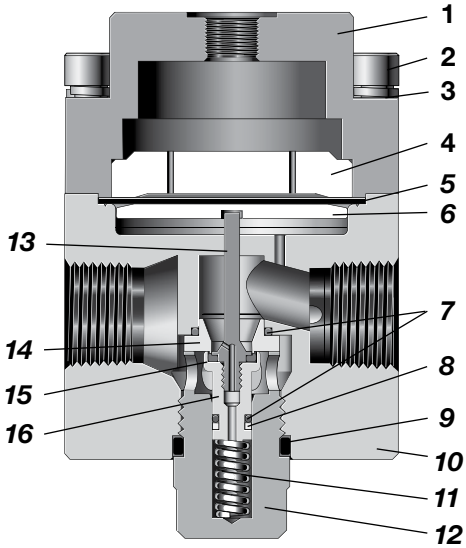
Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (C°)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Dome Connection	Weight (Without Flanges) lb (kg)
RD6 RDH6	RD: 1015 (70.0) RDH: 5800 (400)	RD: 1015 (70.0) RDH: 5800 (400) (2537 [175] with pilot regulator)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	1.95	0.39 (10.0)	3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flange	Gauge: 1/4 in. NPT; Dome: 1/4 in. ISO/BSP parallel thread	8.8 (4.0)
RD8 RDH8					2.07		1 in. NPT, ISO/BSP parallel thread, EN or ASME flange		

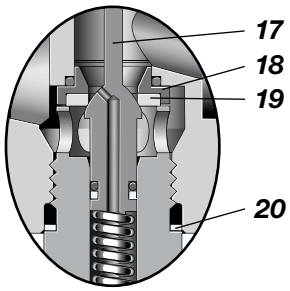
See page 39 for RD(H)6 flow data.

Materials of Construction

RD6 Series Regulator with Soft Seat Seal



RDH6 Series Regulator with Hard Seat Seal



Component	Material / Specification
1 Dome	316L SS / A479 or EN10088
2 Cap screw	A4-80
3 Washer	A4
4 Dome plate	316L SS / A479 or EN10088
5 *Diaphragm*	*EPDM, FKM, or nitrile*
6 *Diaphragm plate*	*316L SS / A479 or EN10088*
7 *O-ring*	*EPDM, FKM, or nitrile*
8 *Backup ring*	*PTFE*
9 *Plug O-ring*	*EPDM, FKM, or nitrile*
10 *Body*	*316L SS / A479 or EN10088*
11 *Poppet spring*	*302 SS / A240*
12 *Body plug*	*316L SS / A479* or EN10088
RD Series Only Components	
13 *Poppet*	*316L SS / A479* or EN10088
14 *Seat*	
15 *Seat seal*	*EPDM, FKM, or nitrile*
16 *Poppet housing*	*316L SS/ A479* or EN10088
RDH Series Only Components	
17 *Poppet*	*413 SS / A276*
18 *Seat*	*316L SS/ A479* or EN10088
19 *Seat seal*	*PCTFE or PEEK*
20 *Backup ring*	*PTFE*
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

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

Flow Data

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

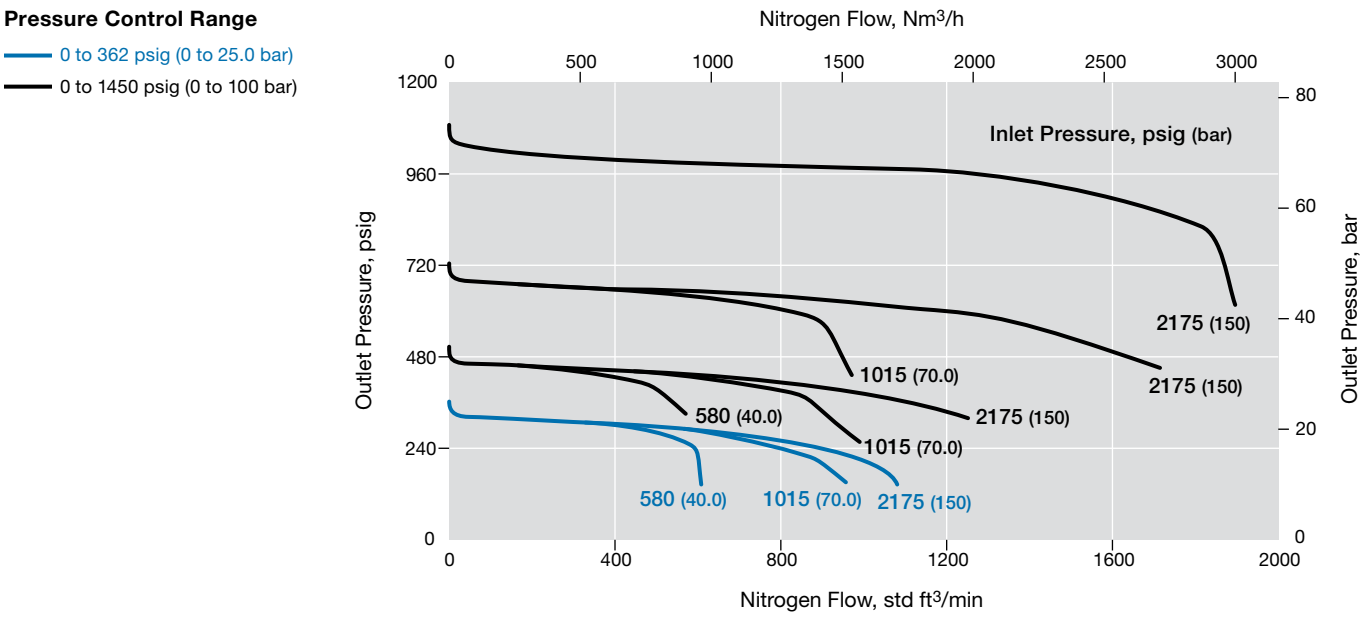
For more flow curve information, contact your authorized Swagelok representative.

RDH6 Series

Flow Coefficient: 1.95

Maximum Inlet Pressure: RDH6—5800 psig (400 bar)

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

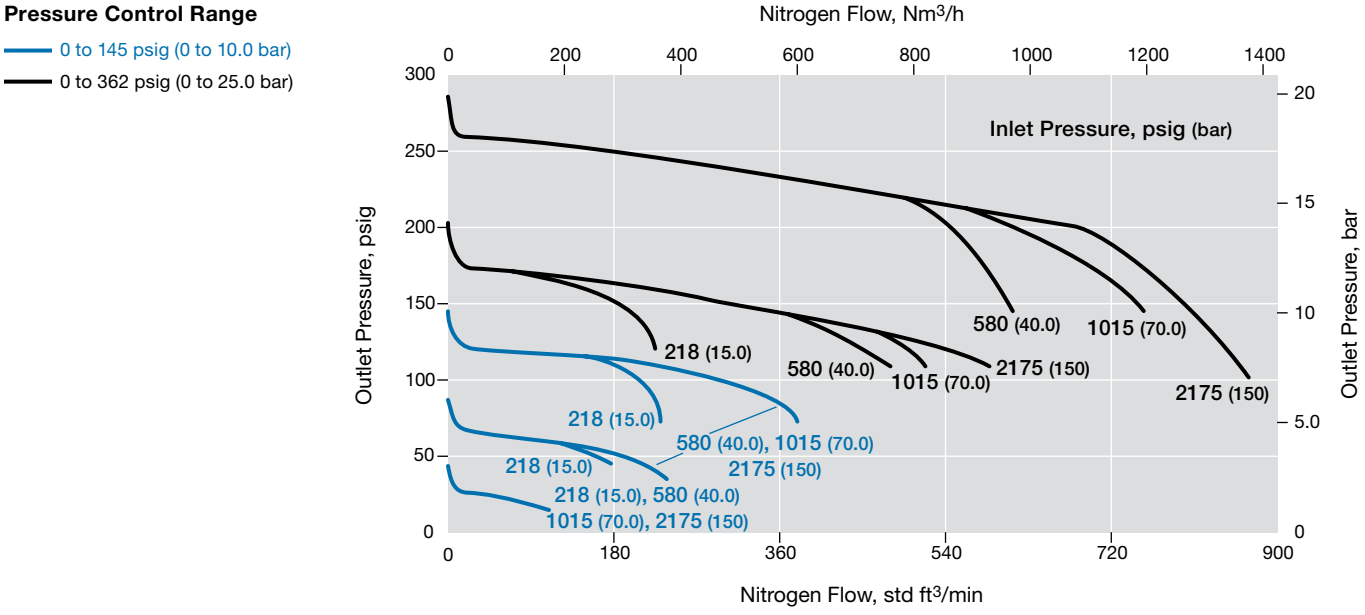


RDH6 Series

Flow Coefficient: 1.95

Maximum Inlet Pressure: RDH6—5800 psig (400 bar)

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



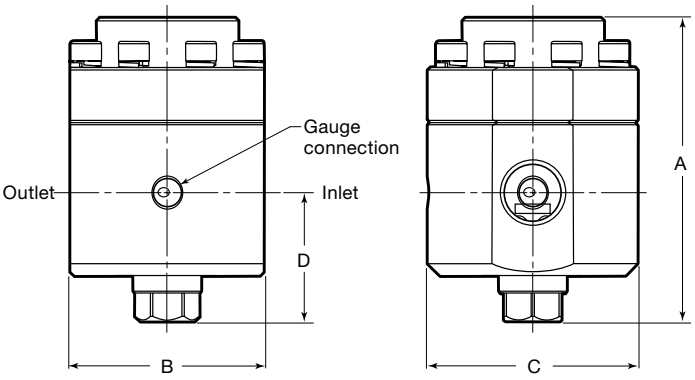
RD(H)8 Series

For flow curve information, contact your authorized Swagelok representative.

Dimensions

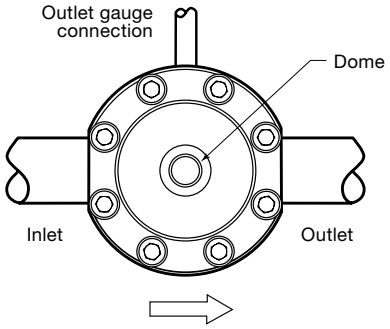
Dimensions, in inches (millimeters), are for reference only and are subject to change.

Series	End Connection Size	Dimensions, in. (mm)			
		A	B	C	D
RD(H)6	3/4 in.	5.12 (130)	3.22 (82.0)	3.50 (89.0)	2.16 (55.0)
RD(H)8	1 in.		3.07 (78.0)		



Standard Configuration

Top



Shown with tubing for clarity; tubing not included.

Ordering Information

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

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

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

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

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

4 Pressure Class

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

5 Flange Facing

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

6 Body Material
- 02 = 316L SS

7 Pressure Control Range
- **X** = No pilot regulator, standard

RD series with RS2 series pilot regulator
- **3** = 0 to 1015 psig (0 to 70.0 bar)

RDH series with RS2 series pilot regulator
- **4** = 0 to 145 psig (0 to 10.0 bar)
- **5** = 0 to 362 psig (0 to 25.0 bar)
- **6** = 0 to 1450 psig (0 to 100 bar)
- **7** = 0 to 2537 psig (0 to 175 bar)

For higher pressure control ranges with a pilot regulator, contact your authorized Swagelok representative for information.

8 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

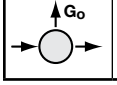
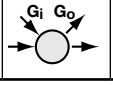
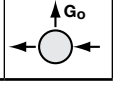
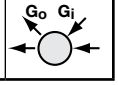
9 Diaphragm / Piston O-Rings
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

10 Seat Seal Material

RD series
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

RDH series
- **K** = PCTFE
- **P** = PEEK

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

Gauge Connection Configuration			
Standard	GN2	GN4	GN5
			

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

Differential Pressure, Dome-Loaded Pressure Reducing Regulators—RD(H)6DP Series

Features

- Balanced poppet design
- Diaphragm sensing
- Adjustable bias
- Dome-to-outlet pressure ratio approximately 1:1

Options

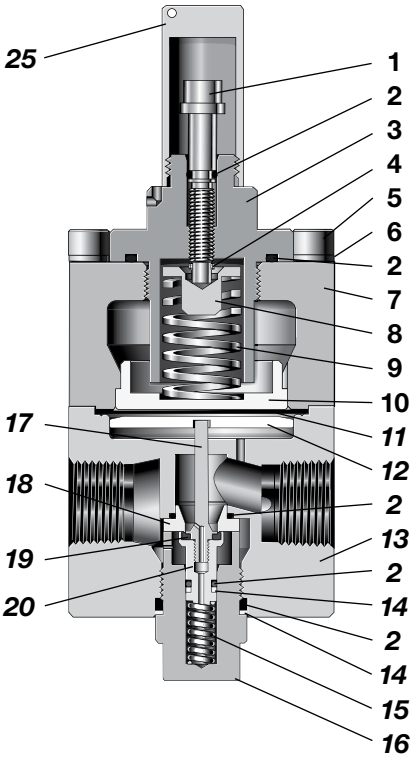
- Antitamper
- Gauge connection—choice of 4 configurations
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

Technical Data

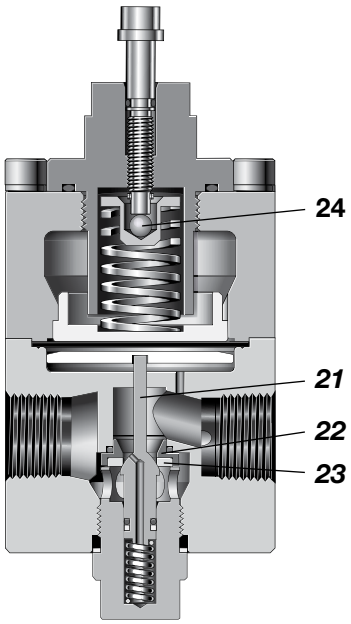
Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Bias Range psig (bar)	Temperature Range °F (C°)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Dome Connection	Weight (Without Flanges) lb (kg)
RD6DP	1015 (70.0)	1015 (70.0)	Diaphragm	14.5 to 145 (1.0 to 10.0)	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	1.95	0.39 (10.0)	3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flange	Gauge: 1/4 in. NPT; Dome: 1/4 in. NPT	10.6 (4.8)
RDH6DP	5800 (400)	3335 (230)								

Materials of Construction

RD6DP Series Regulator with Soft Seat Seal



RDH6DP Series Regulator with Hard Seat Seal



Component	Material / Specification
1 Adjustment screw	316L SS / A479 or EN10088
2 O-ring	EPDM, FKM, nitrile
3 Dome screw	316L SS / A479 or EN10088
4 Split pin	A2
5 Cap screw	A4-80
6 Washer	A4
7 Dome	316L SS / A479 or EN10088
8 Upper spring guide	316L SS / A479 or EN10088
9 Differential spring	CR50V4
10 Lower spring guide	316L SS / A479 or EN10088
***11** Diaphragm*	*EPDM, FKM, or nitrile*
***12** Diaphragm plate*	*316L SS / A479 or EN10088*
***13** Body*	
***14** Backup ring*	*PTFE*
***15** Poppet spring*	*302 SS / A240*
***16** Body plug*	*316L SS / A479 or EN10088*
RD Series Only Components	
***17** Poppet*	*316L SS / A479 or EN10088*
***18** Seat*	
***19** Seat seal*	*EPDM, FKM, or nitrile*
***20** Poppet housing*	*316L SS / A479 or EN10088*
RDH Series Only Components	
***21** Poppet*	*431 SS / A276*
***22** Seat*	*316L SS / A479 or EN10088*
***23** Seat seal*	*PCTFE or PEEK*
24 Ball	Commercial stainless steel
25 Antitamper cover, opt	316L SS / A479 or EN10088
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

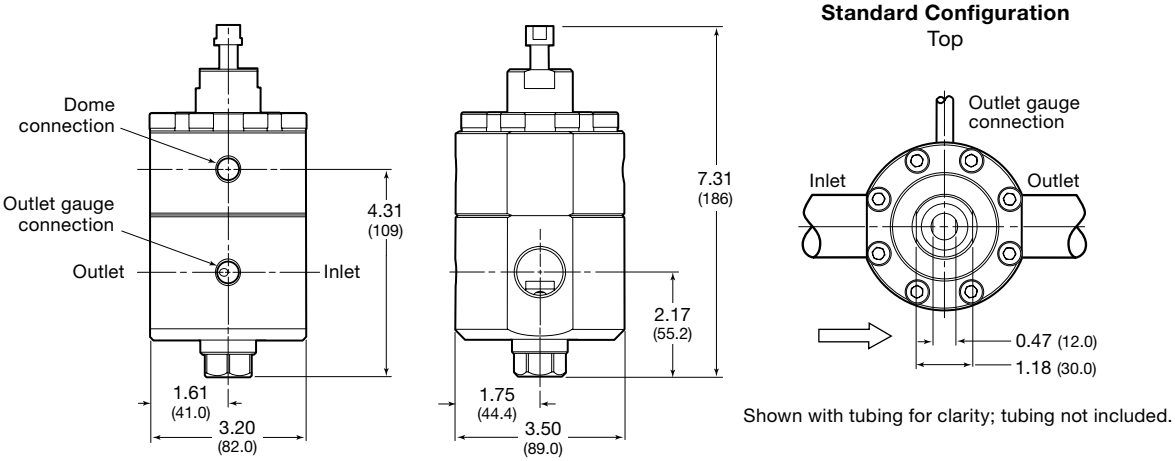
Wetted components listed in *italics.*
Gauge plugs (not shown): 431 SS / A276.

Flow Data

For flow curve information, contact your authorized Swagelok representative.

Dimensions

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



Shown with tubing for clarity; tubing not included.

Ordering Information

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

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

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

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

3 Size
- 6 = 3/4 in. / DN20

4 Pressure Class

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

5 Flange Facing

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

6 Body Material
- 02 = 316L SS

7 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

8 Diaphragm Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

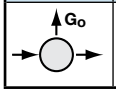
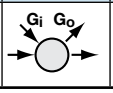
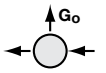
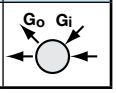
9 Seat Seal Material

RD series
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

RDH series
- **K** = PCTFE
- **P** = PEEK

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

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

Gauge Connection Configuration			
Standard	GN2	GN4	GN5
			

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

Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators—RD(H)10 and RD(H)15 Series

Features

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

Options

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

Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (C°)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections		Gauge / Dome Connection	Weight (Without Flanges and PR) lb (kg)
							Size	Type		
RD10 RDH10	RD: 1015 (70.0) (507 [35.0] with LRS4 pilot regulator) RDH: 5800 (400)	RD: 1015 (70.0) RDH: 3625 (250)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	3.79	0.55 (14.0) 0.53 (13.5)	1 in.	NPT, ISO/BSP parallel thread, EN or ASME flange	Gauge / pilot: 1/4 in. NPT or ISO/BSP parallel thread① Dome: 1/4 in. ISO/BSP parallel thread	17.6 (8.0)
RD15 RDH15					7.30	0.75 (19.0)	1 1/2 in.			19.8 (9.0)

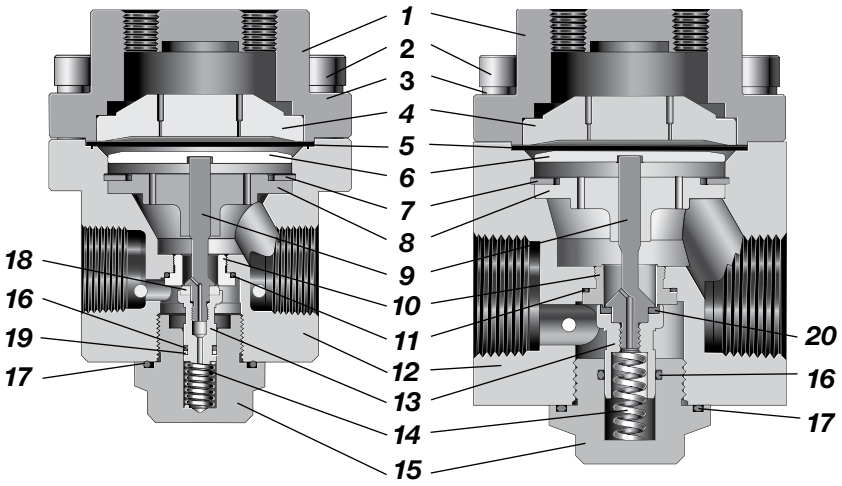
See pages 44 to 47 for flow data.

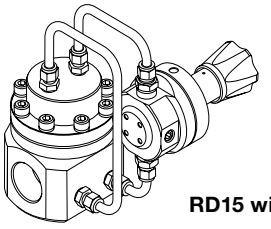
① Regulators with NPT inlet / outlet connections have 1/4 in. NPT gauge connections.

Materials of Construction

RDH10 Series Regulator with Hard Seat Seal

RD15 Series Regulator with Soft Seat Seal





RD15 with LRS4 pilot regulator

Component	Material / Specification
1 *Dome*	*316L SS / A479 or EN10088*
2 Cap screw	A4-80
3 Washer	A4
4 *Dome plate*	*316L SS / A479 or EN10088*
5 *Diaphragm*	*EPDM, FKM, or nitrile*
6 *Diaphragm plate*	*316L SS / A479 or EN10088*
7 *Retaining ring*	*Commercial stainless steel*
8 *Body plate*	*316L SS / A479 or EN10088*
9 *Poppet*	
10 *Seat*	
11 *O-ring*	*EPDM, FKM, or nitrile*
12 *Body*	*316L SS / A479 or EN10088*
13 *Poppet housing*	
14 *Poppet spring*	*302 SS / A240*
15 *Body plug*	*316L SS / A479 or EN10088*
16 *O-ring*	*EPDM, FKM, or nitrile*
17 *Plug O-ring*	
RD Series Only Components	
18 *Seat seal*	*EPDM, FKM, or nitrile*
RDH Series Only Components	
19 *Backup ring*	*PTFE*
20 *Seat seal*	*PCTFE or PEEK*
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

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

Flow Data

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

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

RD10 Series

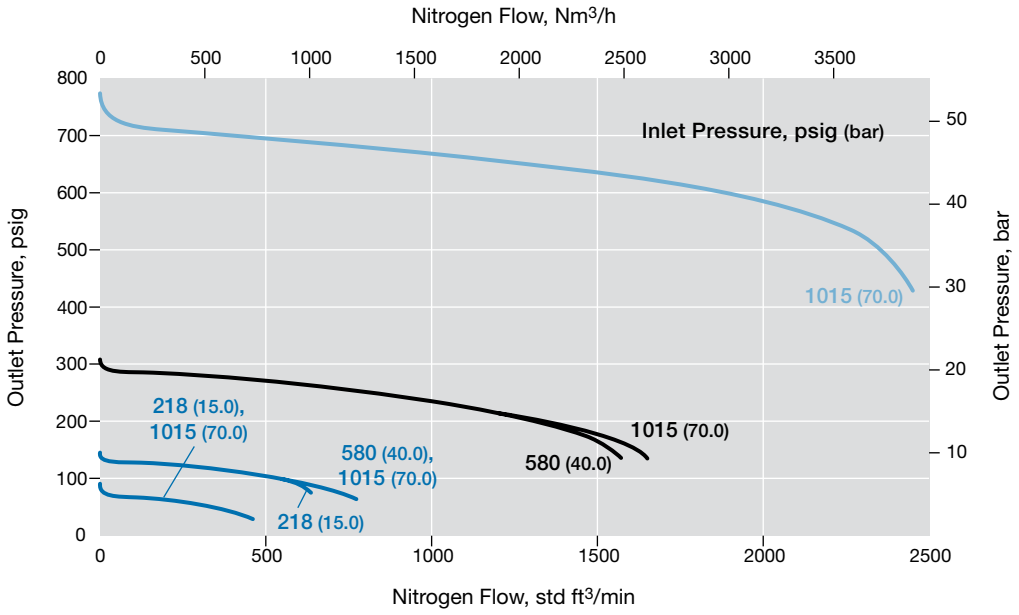
Flow Coefficient: 3.79

Maximum Inlet Pressure: 1015 psig (70.0 bar)

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

Pressure Control Range

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



RDH10 Series

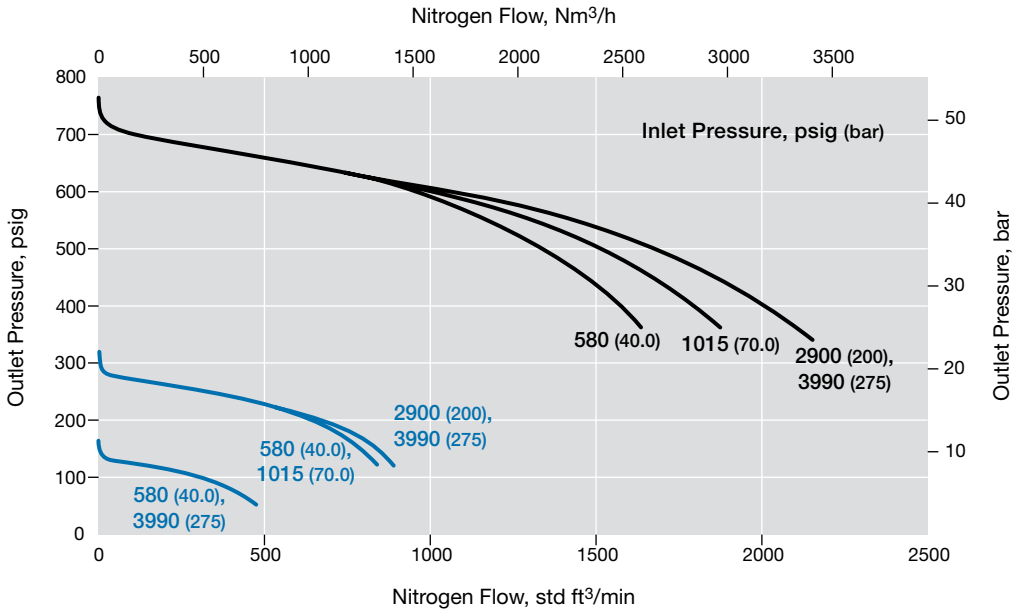
Flow Coefficient: 3.79

Maximum Inlet Pressure: 5800 psig (400 bar)

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

Pressure Control Range

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



Flow Data

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

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

RDH10 Series

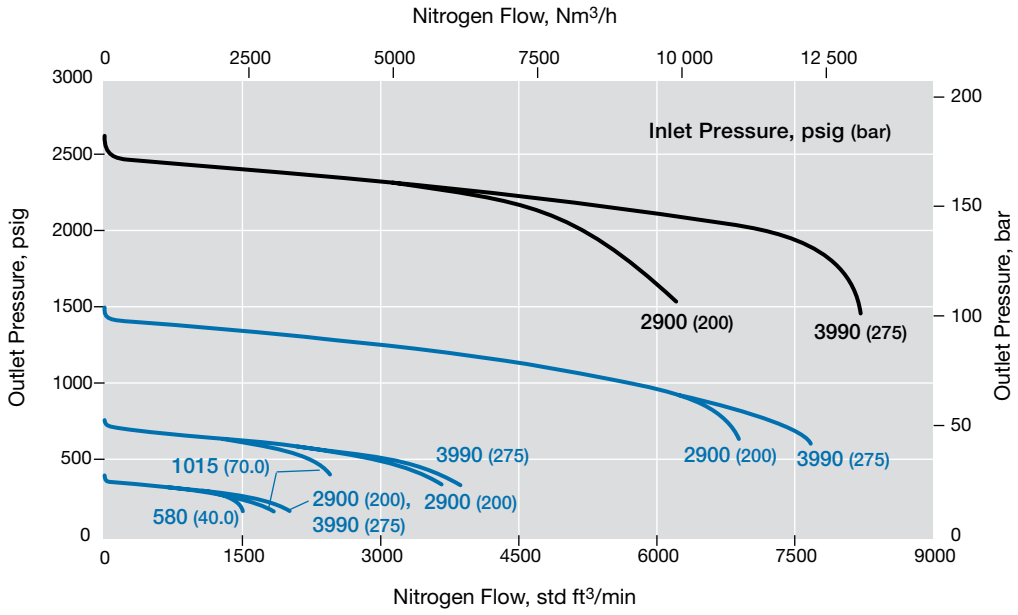
Flow Coefficient: 3.79

Maximum Inlet Pressure: 5800 psig (400 bar)

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

Pressure Control Range

- 0 to 1450 psig (0 to 100 bar)
- 0 to 2537 psig (0 to 175 bar)



RDH10 Series

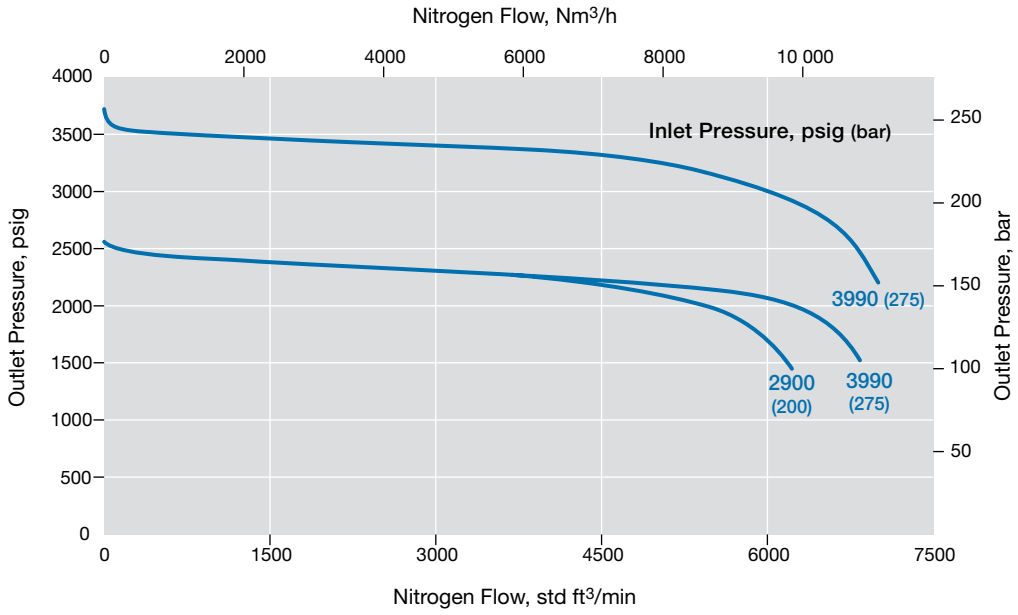
Flow Coefficient: 3.79

Maximum Inlet Pressure: 5800 psig (400 bar)

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

Pressure Control Range

- 0 to 3625 psig (0 to 250 bar)



Flow Data

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

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

RD15 Series

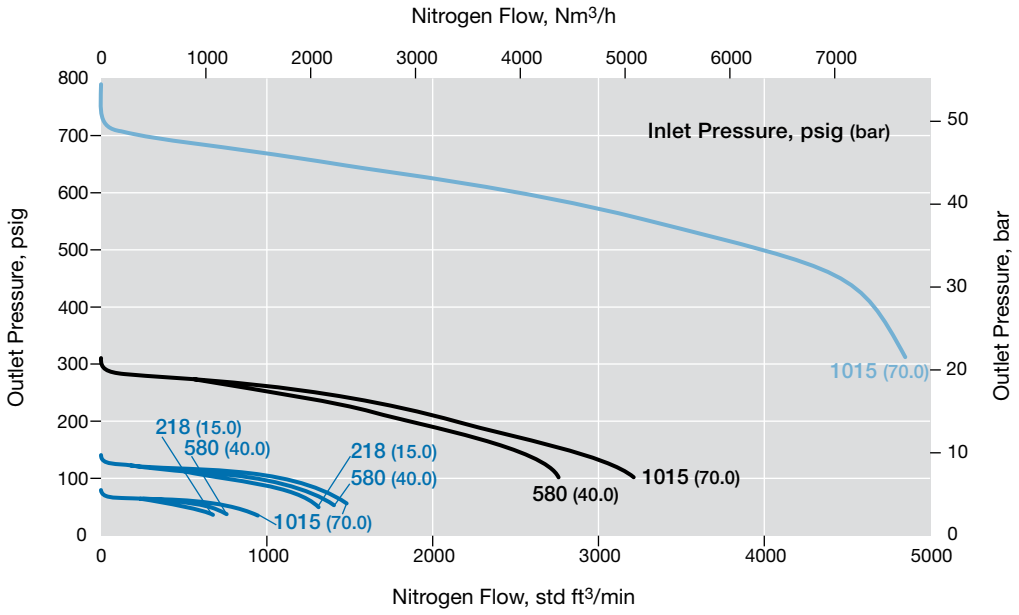
Flow Coefficient: 7.30

Maximum Inlet Pressure: 1015 psig (70.0 bar)

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

Pressure Control Range

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



RDH15 Series

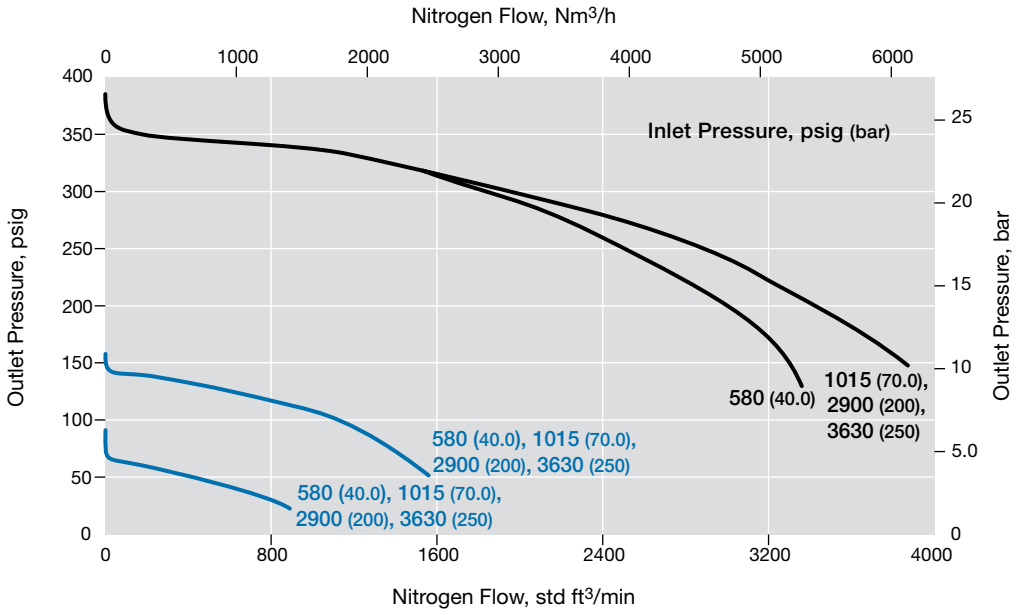
Flow Coefficient: 7.30

Maximum Inlet Pressure: 5800 psig (400 bar)

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

Pressure Control Range

- 0 to 145 psig (0 to 100 bar)
- 0 to 362 psig (0 to 25.0 bar)



Flow Data

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

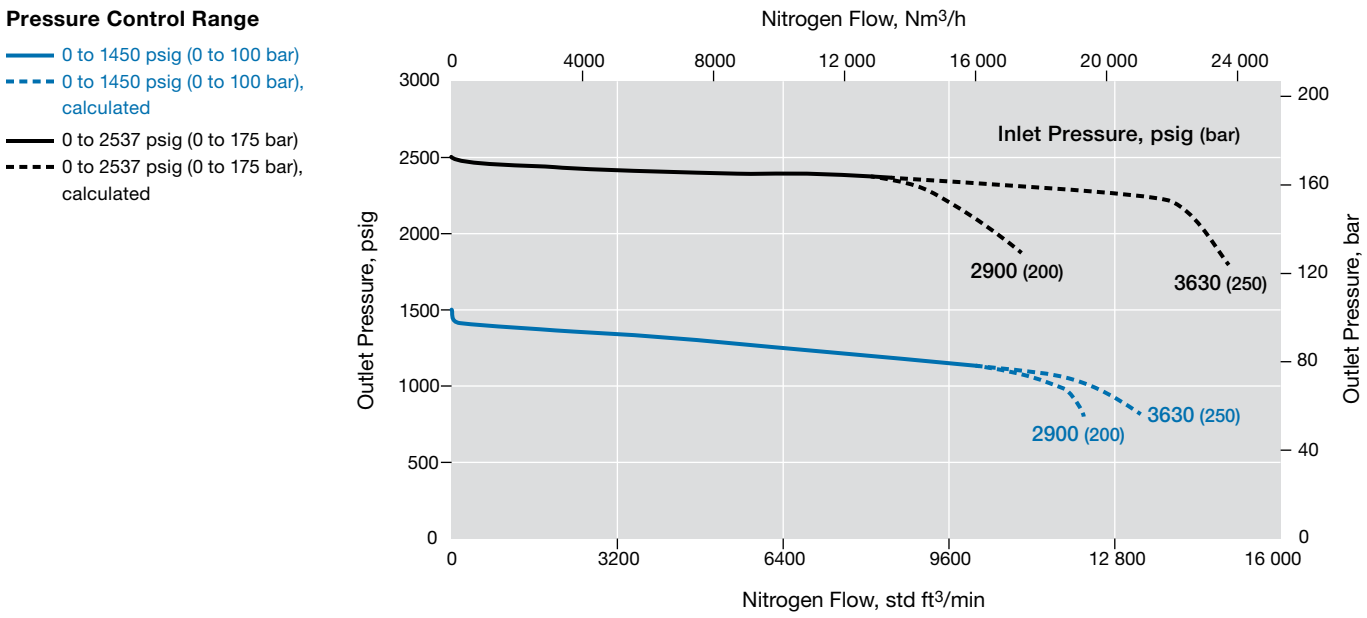
For more flow curve information, contact your authorized Swagelok representative.

RDH15 Series

Flow Coefficient: 7.30

Maximum Inlet Pressure: 5800 psig (400 bar)

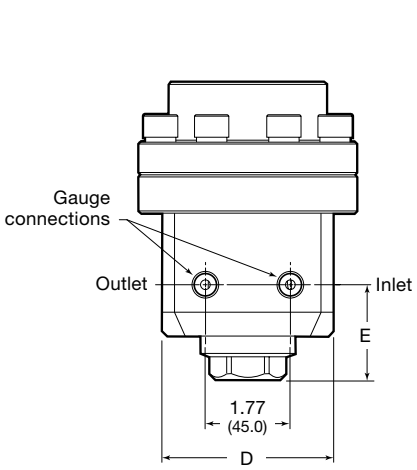
Outlet Pressure Control Range: 0 to 2537 psig (0 to 175 bar)

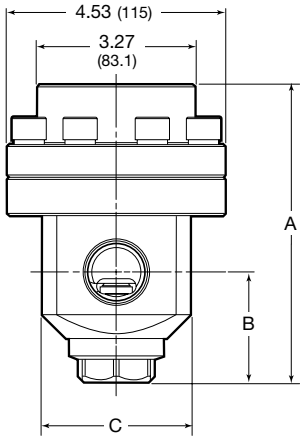


Dimensions

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

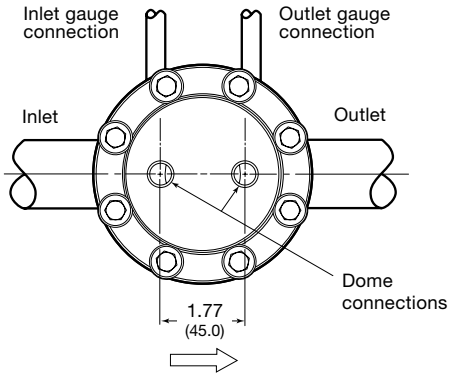
Series	End Connection Size	Dimensions, in. (mm)				
		A	B	C	D	E
RD(H)10	1 in.	6.18 (157)	2.28 (58.0)	3.07 (78.0)	3.54 (90.0)	1.97 (50.0)
RD(H)15	1 1/2 in.	6.61 (168)	2.44 (62.0)	3.78 (96.0)	4.53 (115)	2.03 (51.5)





Configuration

Top



Shown with tubing for clarity; tubing not included.

Ordering Information

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

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

1 Series

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

RDH = 5800 psig (400 bar) maximum inlet pressure

2 Inlet / Outlet

B = Female ISO/BSP parallel thread

N = Female NPT

FA = ASME B16.5 flange

FD = EN 1092 (DIN) flange

3 Size

10 = 1 in. / DN25

15 = 1 1/2 in. / DN40

4 Pressure Class

Omit designator if flanges are not ordered.

A = ASME class 150

B = ASME class 300

C = ASME class 600

E = ASME class 1500

F = ASME class 2500

M = DN class PN16

N = DN class PN40

5 Flange Facing

Omit designator if flanges are not ordered.

1 = Raised face smooth

3 = RTJ

6 Body Material

02 = 316L SS

7 Pilot Regulator Options

Pressure Control Range

X = No pilot regulator, optional

RD series with LRS4 series pilot regulator

0 = 0 to 43 psig (0 to 3.0 bar)

1 = 0 to 130 psig (0 to 9.0 bar)

2 = 0 to 290 psig (0 to 20.0 bar)

RD series with RS2 series pilot regulator

3 = 0 to 1015 psig (0 to 70.0 bar

RDH series with RS2 series pilot regulator

4 = 0 to 145 psig (0 to 10.0 bar)

5 = 0 to 362 psig (0 to 25.0 bar)

6 = 0 to 1450 psig (0 to 100 bar)

7 = 0 to 2537 psig (0 to 175 bar)

8 = 0 to 3625 psig (0 to 250 bar)

8 Seal Material

V = Fluorocarbon FKM

N = Nitrile

E = EPDM

9 Diaphragm Material

V = Fluorocarbon FKM

N = Nitrile

E = EPDM

10 Seat Seal Material

RD series

V = Fluorocarbon FKM

N = Nitrile

E = EPDM

RDH series

K = PCTFE

P = PEEK

11 Options

EF = External feedback to main regulator

EFP = External feedback to pilot regulator, limited to 290 psig (20.0 bar)

N = NACE MR0175/ISO 15156

G93 = ASTM G93 Level C-cleaned

Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators—RD(H)20 and RD(H)25 Series

Features

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

Options

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

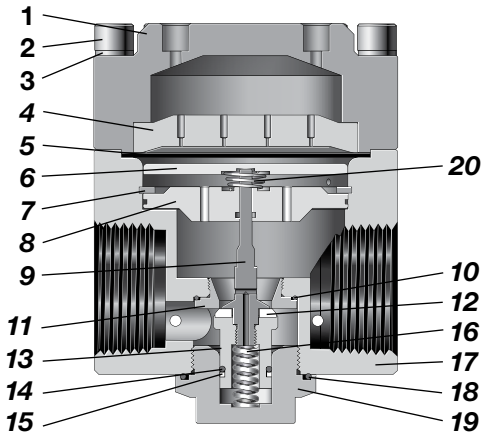
Technical Data

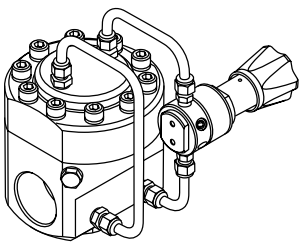
Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (C°)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Dome Connection	Weight (Without Flanges) lb (kg)
RD20 RDH20	RD: 1015 (70.0) (507 [35.0] with LRS4 pilot regulator) RDH: 5800 (400)	RD: 1015 (70.0) RDH: 2900 (200)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	13	0.98 (25.0)	2 in. NPT, ISO/BSP parallel thread, EN or ASME flange	Use P1 gauge connection of pilot regulator. Dome: 1/4 in. ISO/BSP parallel thread	44 (20)
RD25 RDH25	RD: 1015 (70.0) RDH: 4060 (280)				21	1.25 (32.0)	2 1/2 in. EN or ASME flange		88 (40)

See pages 50 and 50 for RD(H)20 flow data.

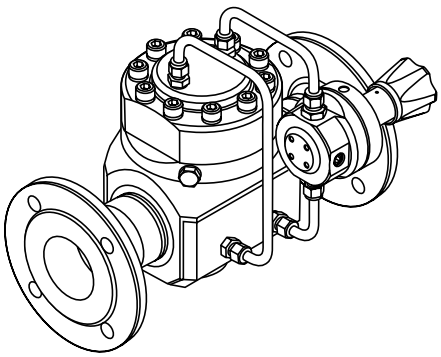
Materials of Construction

RDH20 Series Regulator with Hard Seat Seal





RDH20 with RS2 Pilot Regulator



RD25 with LRS4 Pilot Regulator

Component		Material / Specification
1 Dome		316L SS / A479 or EN10088
2 Cap screw		A4-80
3 Washer		A4
4 *Dome plate*		*316L SS / A479 or EN10088*
5 *Diaphragm*		*EPDM, FKM, or nitrile*
6 *Diaphragm plate*		*316L SS / A479 or EN10088*
7 *Retaining ring*		*Commercial stainless steel*
8 *Body plate*		*316L SS / A479 or EN10088*
9 *Poppet*		
10 *O-ring*		*EPDM, FKM, or nitrile*
11 *Seat*		*316L SS / A479 or EN10088*
12 *Seat seal*	*RD*	*EPDM, FKM, or nitrile*
	RDH	*PCTFE or PEEK*
13 *Poppet housing*		*316L SS / A479 or EN10088*
14 *O-ring*		*EPDM, FKM, or nitrile*
15 *Backup ring*		*PTFE*
16 *Poppet spring*		*302 SS / A240*
17 *Body*		*316L SS/ A479 or EN10088*
18 *Plug O-ring*		*EPDM, FKM, or nitrile*
19 *Body plug*		*316L SS / A479 or EN10088*
20 *Conical spring (RDH20 only)*		*302 SS / A240*
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based		

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

Flow Data

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

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

RD20 Series

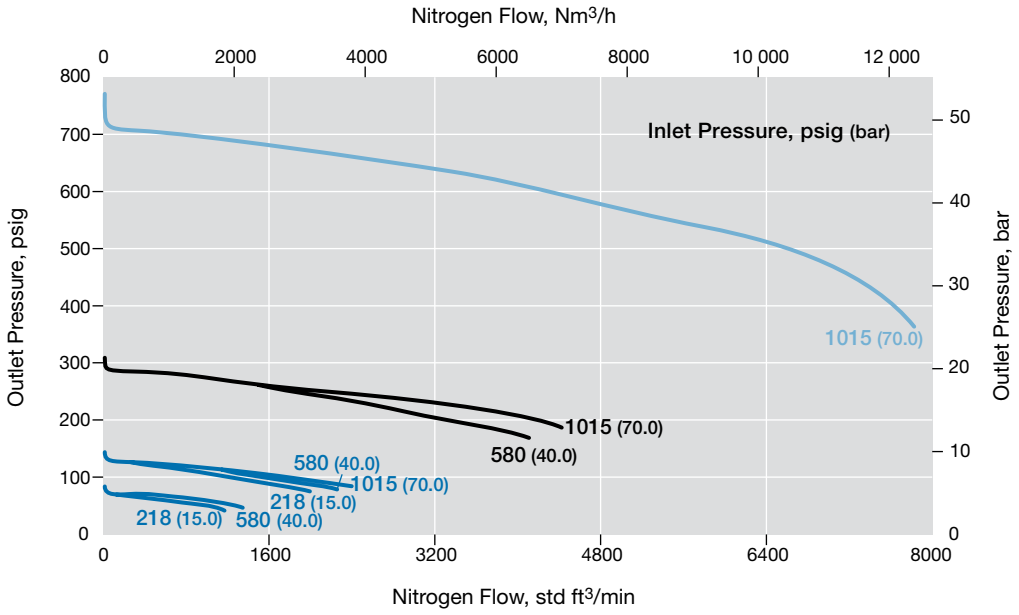
Flow Coefficient: 13

Maximum Inlet Pressure: 1015 psig (70.0 bar)

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

Pressure Control Range

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



RDH20 Series

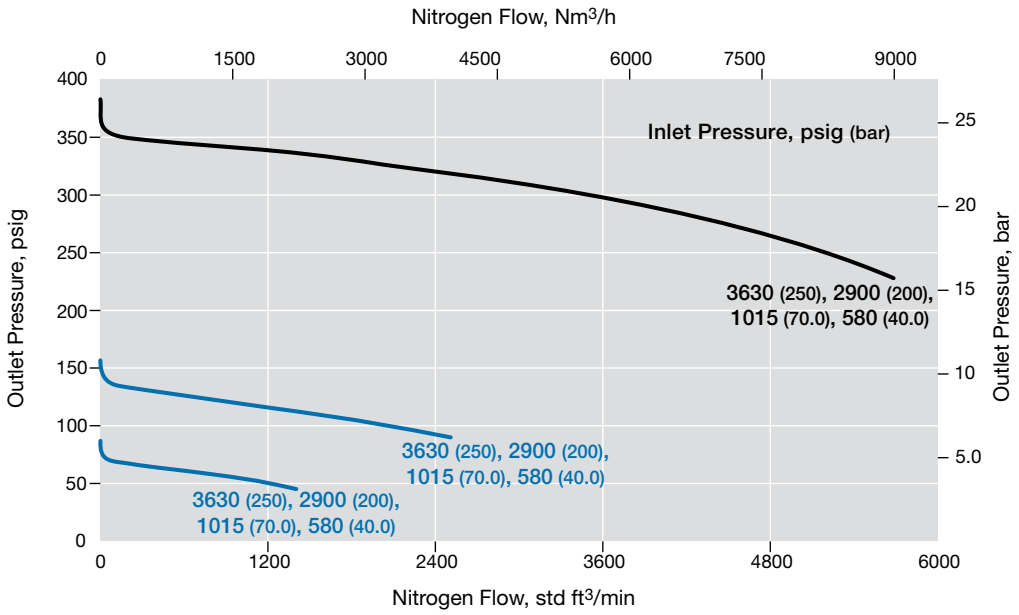
Flow Coefficient: 13

Maximum Inlet Pressure: 5800 psig (400 bar)

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

Pressure Control Range

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



Flow Data

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

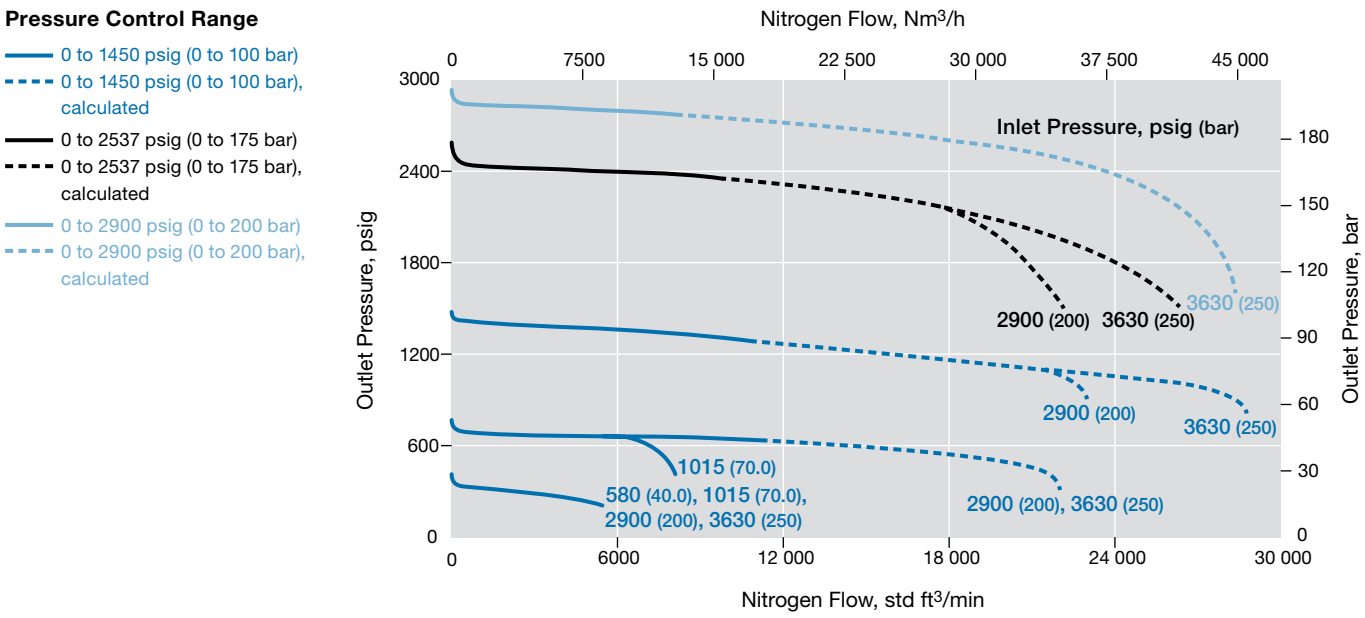
For more flow curve information, contact your authorized Swagelok representative.

RDH20 Series

Flow Coefficient: 13

Maximum Inlet Pressure: 5800 psig (400 bar)

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



RDH25 Series

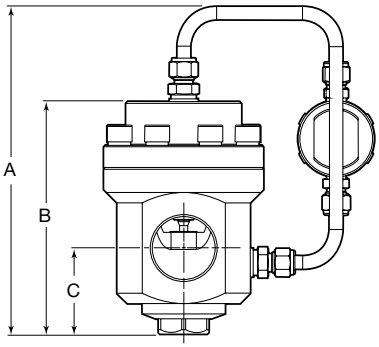
For flow curve information, contact your authorized Swagelok representative.

Dimensions

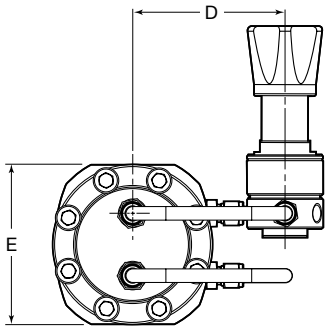
Dimensions, in inches (millimeters), are for reference only and are subject to change.

Series	End Connection Size	Dimensions, in. (mm)				
		A	B	C	D	E
RD(H)20	2 in.	9.33 (237)	7.28 (185)	2.44 (62.0)	4.33 (110)	5.51 (140)
RD(H)25	2 1/2 in.	11.8 (300)	9.25 (235)	3.42 (87.0)	4.92 (125)	6.69 (170)

Side



Top



Shown with RS2 series pilot regulator.

Ordering Information

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

1	2	3	4	5		6	7	8	9	10	11
RD	**FA**	**20**	**A**	**1**	**-**	02 **-**	**0**	**- V**	**V**	**V**	**- EF**

1 Series

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

2 Inlet / Outlet

B = Female ISO/BSP parallel thread①
N = Female NPT①
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange

① RD(H)20 only.

3 Size

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

4 Pressure Class

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

5 Flange Facing

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

6 Body Material

02 = 316L SS

7 Pilot Regulator Options

Pressure Control Range

X = No pilot regulator, optional

RD series with LRS4 series pilot regulator

0 = 0 to 43 psig (0 to 3.0 bar)
1 = 0 to 130 psig (0 to 9.0 bar)
2 = 0 to 290 psig (0 to 20.0 bar)

RD series with RS2 series pilot regulator

3 = 0 to 1015 psig (0 to 70.0 bar)

RDH series with RS2 series pilot regulator

4 = 0 to 145 psig (0 to 10.0 bar)
5 = 0 to 362 psig (0 to 25.0 bar)
6 = 0 to 1450 psig (0 to 100 bar)
7 = 0 to 2537 psig (0 to 175 bar)
8 = 0 to 2900 psig (0 to 200 bar

8 Seal Material

V = Fluorocarbon FKM
N = Nitrile
E = EPDM

9 Diaphragm Material

V = Fluorocarbon FKM
N = Nitrile
E = EPDM

10 Seat Seal Material

RD series

V = Fluorocarbon FKM
N = Nitrile
E = EPDM

RDH series

K = PCTFE
P = PEEK

11 Options

EF = External feedback to main regulator
EFP = External feedback to pilot regulator, limited to 290 psig (20.0 bar)
N = NACE MR0175/ISO 15156
G93 = ASTM G93 Level C-cleaned

Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators—RD(H)30 and RD(H)40 Series

Features

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

Options

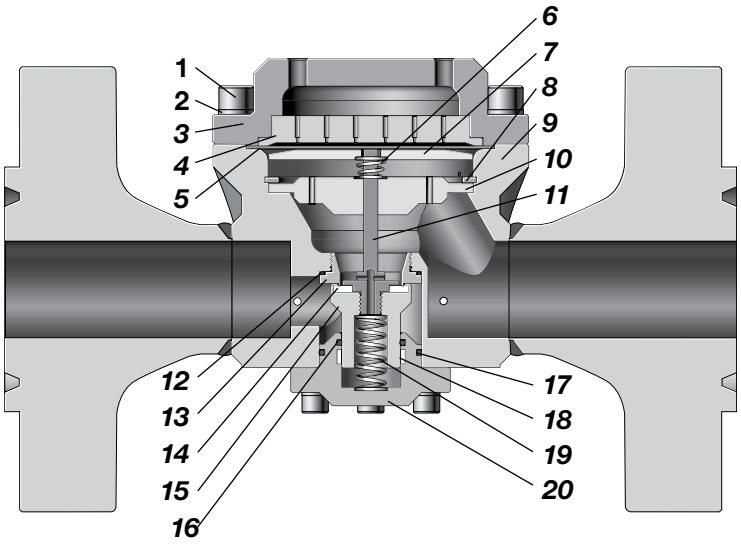
- External feedback (EF) for improved performance
  - EF to main regulator limited by standard outlet pressure range
  - EF to pilot regulator limited to 290 psig (20.0 bar)
- NACE MR0175/ISO 15156-compliant models
- Special cleaning to ASTM G93 Level C

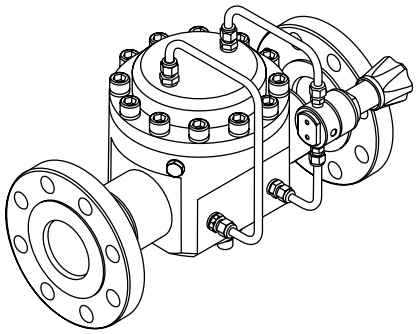
Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (C°)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Dome Connection	Weight (With Class 150 Flanges) lb (kg)
RD	1015 (70.0) (507 [35.0] with LRS4 pilot regulator)	1015 (70.0)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	RD(H)30: 36 RD(H)40: 73	RD(H)30: 1.65 (42.0) RD(H)40: 2.36 (60.0)	EN or ASME flanges— RD(H)30: 3 in. RD(H)40: 4 in.	Use P1 gauge connection of pilot regulator. Dome: 1/4 in. ISO/BSP parallel thread	RD(H)30: 136 (62) RD(H)40: 183 (83)
RDH	4060 (280)	2900 (200)							

Materials of Construction

RDH30 Series Regulator with Hard Seat Seal





RDH30 with RS2 Pilot Regulator

Component		Material / Specification
1 Cap screw		A4-80
2 Washer		A4
3 *Dome*		*316L SS / A479 or EN10088*
4 *Dome plate*		*316L SS / A479 or EN10088*
5 *Diaphragm*		*EPDM, FKM, or nitrile*
6 *Conical spring*		*302 SS / A240*
7 *Diaphragm plate*		*316L SS / A479 or EN10088*
8 *Retaining ring*		*Commercial stainless steel*
9 *Body assembly (body, reducers, flanges)*		*316L SS / A479 or EN10088*
10 *Body plate*		
11 *Poppet*		*316L SS / A479 or EN10088*
12 *O-ring*		*EPDM, FKM, or nitrile*
13 *Seat*		*316L SS / A479 or EN10088*
14 *Seat seal*	*RD*	*EPDM, FKM, or nitrile*
	RDH	*Polyurethane*
15 *Poppet housing*		*316L SS / A479 or EN10088*
16 *O-ring*		*EPDM, FKM, or nitrile*
17 *Plug O-ring*		
18 *Guide ring*		*PTFE*
19 *Poppet spring*		*302 SS / A240*
20 *Body plug*		*316L SS / A479 or EN10088*
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based		

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

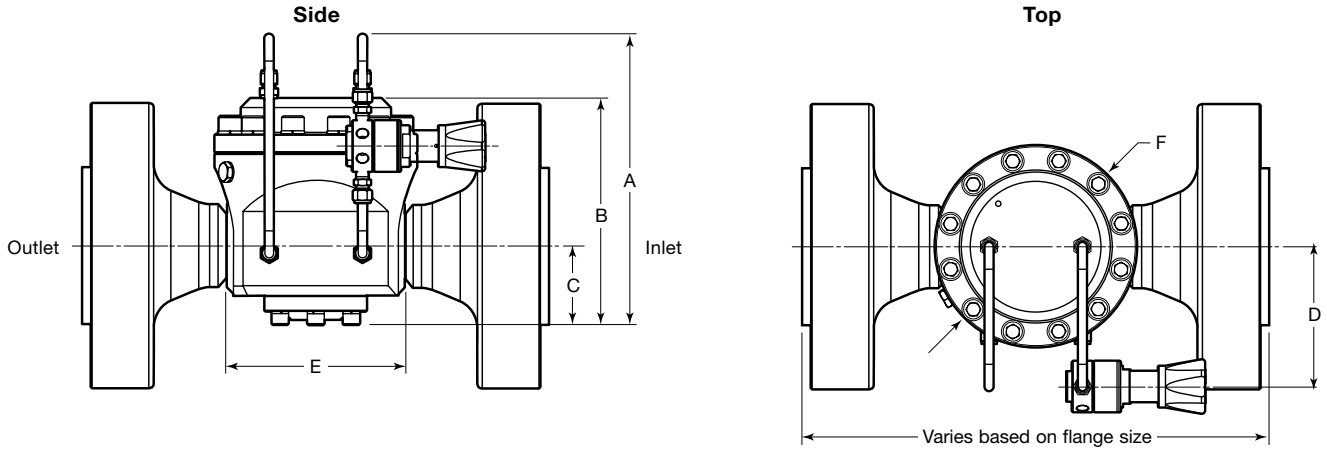
Flow Data

For flow curve information, contact your authorized Swagelok representative.

Dimensions

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

Series	End Connection Size	Dimensions, in. (mm)					
		A	B	C	D	E	F
RD(H)30	3 in.	12.2 (310)	9.55 (243)	3.33 (84.6)	5.91 (150)	7.48 (190)	8.50 (216)
RD(H)40	4 in.	14.0 (356)	11.4 (290)	4.37 (111)	5.91 (150)	8.27 (210)	8.50 (216)



Shown with RS2 series pilot regulator.

Ordering Information

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

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

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

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

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

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

5 Flange Facing
- **1** = Raised face smooth
- **3** = RTJ

6 Body Material
- 02 = 316L SS

7 Pilot Regulator Options

Pressure Control Range
- **X** = No pilot regulator, optional

RD series with LRS4 series pilot regulator
- **0** = 0 to 43 psig (0 to 3.0 bar)
- **1** = 0 to 130 psig (0 to 9.0 bar)
- **2** = 0 to 290 psig (0 to 20.0 bar)

RD series with RS2 series pilot regulator
- **3** = 0 to 1015 psig (0 to 70.0 bar

RDH series with RS2 series pilot regulator
- **4** = 0 to 145 psig (0 to 10.0 bar)
- **5** = 0 to 362 psig (0 to 25.0 bar)
- **6** = 0 to 1450 psig (0 to 100 bar)
- **7** = 0 to 2537 psig (0 to 175 bar)
- **8** = 0 to 2900 psig (0 to 200 bar

8 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

9 Diaphragm Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

10 Seat Seal Material

RD series
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

RDH series
- **PU** = Polyurethane

11 Options
- **EF** = External feedback to main regulator
- **EFP** = External feedback to pilot regulator
- **N** = NACE MR0175/ISO 15156
- **G93** = ASTM G93 Level C-cleaned

Integral Pilot-Operated, Dome-Loaded Pressure-Reducing Regulators, High Sensitivity—LPRD20, LPRD25, LPRD30, LPRD40 Series

Features

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

Options

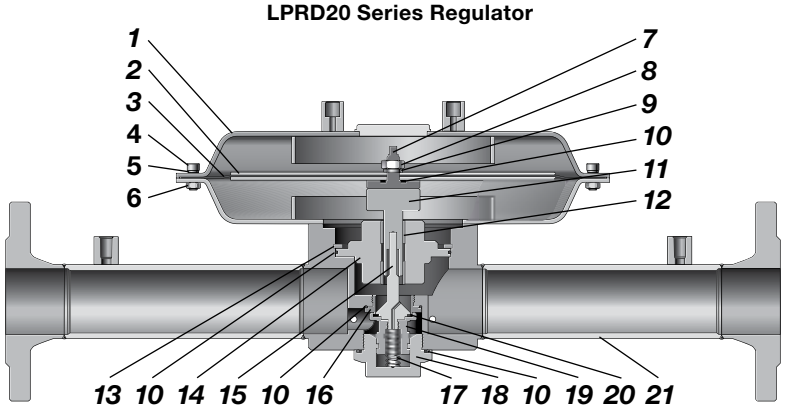
- Special cleaning to ASTM G93 Level C

Technical Data

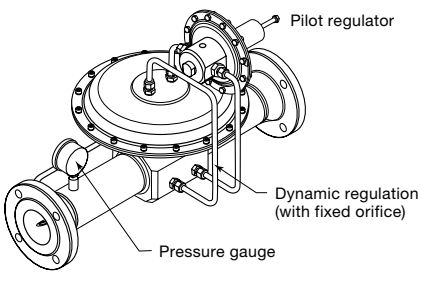
Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (C°)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauges / Dome Connection	Weight lb (kg)
LPRD	232 (16.0)	29.0 (2.0)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	LPRD20: 13 LPRD25: 21 LPRD30: 36 LPRD40: 73	LPRD20: 0.98 (25.0) LPRD25: 1.25 (32.0) LPRD30: 1.65 (42.0) LPRD40: 2.36 (60.0)	EN or ASME flanges— LPRD20: 2 in. LPRD25: 2 1/2 in. LPRD30: 3 in. LPRD40: 4 in.	Inlet and outlet gauges included. Dome: 1/4 in. ISO/BSP parallel thread	Varies with model and end connection

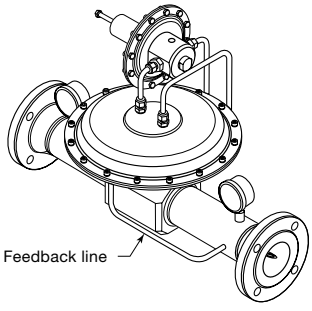
Materials of Construction

LPRD20 Series Regulator



LPRD20 with LPRS4 Pilot Regulator





Component	Material / Specification
1 *Dome assembly*	*316L SS / A479 or EN10088*
2 *Dome plate (2)*	
3 *Diaphragm*	*EPDM, FKM, or nitrile*
4 Cap screw	A4-80
5 Washer	A4
6 Nut	A2
7 *Diaphragm screw*	*316L SS / A479 or EN10088*
8 *Nut*	*A2*
9 *Washer*	*A4*
10 *O-ring*	*EPDM, FKM, or nitrile*
11 *Push rod*	*316L SS / A479 or EN10088*
12 *Guide bushing*	*PTFE*
13 *Retaining ring*	*Commercial stainless steel*
14 *Body plate*	*316L SS / A479 or EN10088*
15 *Poppet*	*431 SS / A276*
16 *Seat*	*316L SS / A479 or EN10088*
17 *Poppet spring*	*302 SS / A240*
18 *Body plug*	*316L SS / A479 or EN10088*
19 *Poppet housing*	
20 *Seat seal*	*EPDM, FKM, or nitrile*
21 *Body assembly*	*316L SS / A479 or EN10088*
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

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

Flow Data

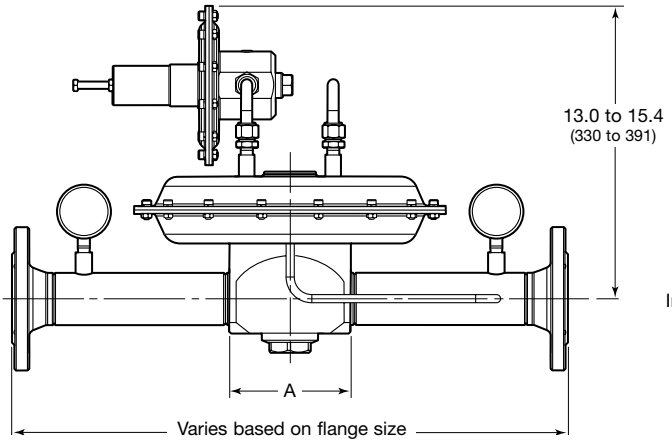
For flow curve information, contact your authorized Swagelok representative.

Dimensions

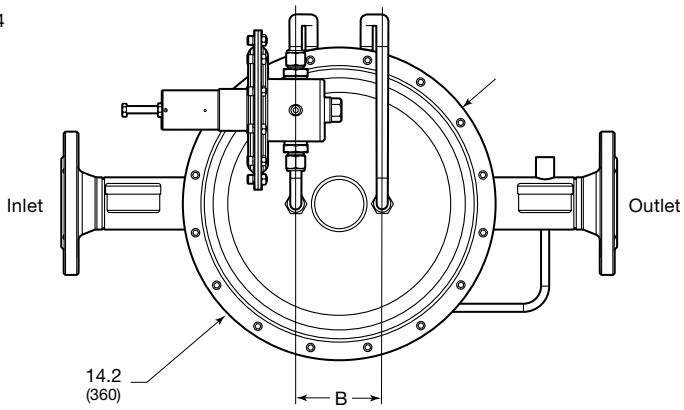
Dimensions, in inches (millimeters), are for reference only and are subject to change.

Series	End Connection Size	Dimensions, in. (mm)	
		A	B
LPRD20	2 in.	5.87 (149)	3.94 (100)
LPRD25	2 1/2 in.	7.01 (178)	2.56 (65.0)
LPRD30	3 in.	5.87 (149)	3.94 (100)
LPRD40	4 in.	8.66 (220)	3.94 (100)

Side



Top



Ordering Information

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

1	2	3	4	5	6	7	8	9	10	11
LPRD	**FA**	**20**	**A**	**1**	**-** 02	**- 2**	**- V**	**V**	**V**	**- G93**

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

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

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

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

5 Flange Facing
1 = Raised face smooth
3 = RTJ

6 Body Material
02 = 316L SS

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

8 Seal Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

9 Diaphragm Material
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

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

11 Options
G93 = ASTM G93 Level C-cleaned

Air-Loaded, Pressure-Reducing Regulators—RA Series

Features

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

Options

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

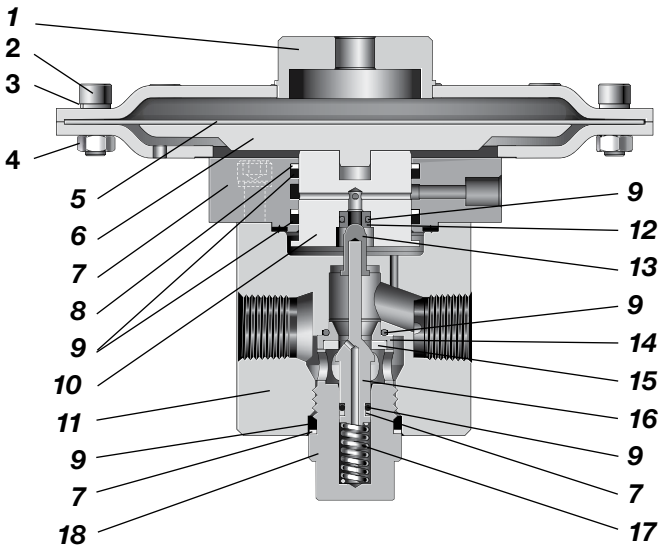
⚠ **WARNING: Self-venting regulators can release system fluid to atmosphere. Position the self-vent hole away from operating personnel.**

Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Outlet Control Pressure psig (bar)	Temperature Range °C (°F)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Dome / Vent Connections	Weight (Without Flanges) lb (kg)
RA4	5800 (400)	5800 (400)	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 32.	1.84	0.39 (10.0)	1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	Gauge: 1/4 in. NPT Dome: 1/4 in. ISO/BSP parallel thread Vent: 1/8 in. ISO/BSP parallel thread	12.5 (5.7)
RA6						3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges		13.6 (6.2)
RA8						1 in. ISO/BSP parallel thread, EN or ASME flanges		13.6 (6.2)

Materials of Construction

RA4 Series Regulator



Component	Material / Specification
1 *Dome assembly*	*316L SS / A479 or EN10088*
2 Cap screw	A4-80
3 Washer	A4
4 Nut	A2
5 *Diaphragm*	*EPDM, FKM, or nitrile*
6 *Diaphragm plate*	*316L SS / A479 or EN10088*
7 *Piston plate assembly*	*316L SS / A479 or EN10088*
8 *Backup ring*	*PTFE*
9 *O-ring*	*EPDM, FKM, or nitrile*
10 *Piston*	*316L SS / A479 or EN10088*
11 *Body*	
12 *Relief seat*	*PCTFE or PEEK*
13 *Venting poppet*	*316L SS/ A479* or EN10088
14 *Seat*	
15 *Seat seal*	*PCTFE or PEEK*
16 *Poppet*	*431 SS/ A276*
17 *Poppet spring*	*302 SS / A240*
18 *Body plug*	*316L SS / A479* or EN10088
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

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

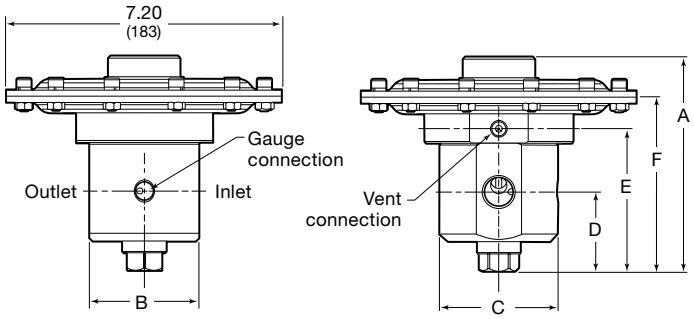
Flow Data

For flow curve information, contact your authorized Swagelok representative.

Dimensions

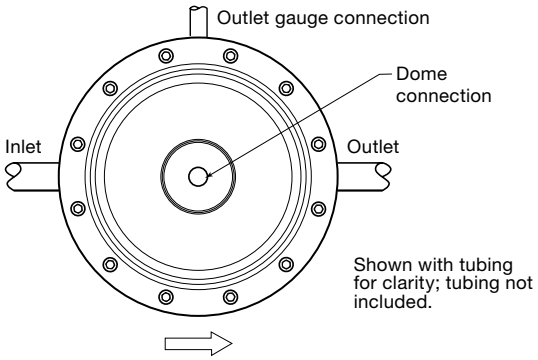
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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



Standard Configuration

Top



Ordering Information

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

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

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

2 Inlet / Outlet
B = Female ISO/BSP parallel thread
N = Female NPT①
FA = ASME B16.5 flange
FD = EN 1092 (DIN) flange
① Available in 1/2 and 3/4 in. sizes *only.*

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

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

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

6 Body Material
02 = 316L SS

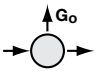
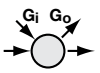
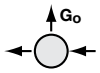
7 Seal Materials
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

8 Diaphragm Materials
V = Fluorocarbon FKM
N = Nitrile
E = EPDM

9 Seat Seal Materials
K = PCTFE
P = PEEK

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

11 Options
GN2 = Gauge connection, see below①
GN4 = Gauge connection, see below
GN5 = Gauge connection, see below①
None = Standard connection, see below

Gauge Connection Configuration			
Standard	GN2	GN4	GN5
			

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

① Not available in combination with flanges.

Back-Pressure, Spring-Loaded Regulators—BS Series

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

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

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

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

Features

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

Pressure-Temperature Ratings

Seal Material	PCTFE		PEEK			Fluorocarbon FKM①, Nitrile, EPDM, FFKM②	
Series	BS2 BS(H)4 BS(H)6, 8	BSH10 BSH15	BSH2	BS2 BS(H)4 BS(H)6, 8	BSH10 BSH15	BS10 BS15	LBS4
Temperature °F (°C)	Maximum Inlet Pressure / Working Pressure psig (bar)						
–4 (–20) to 95 (35)	5800 (400)	3625 (250)	10 150 (700)	5800 (400)	3625 (250)	1015 (70.0)	507 (35.0)
149 (65)	3987 (275)						
176 (80)	1812 (125)						

① Regulators with fluorocarbon FKM seat seal / O-ring materials limited to 5°F (–15°C).

② Regulators with FFKM seat seal / O-rings materials limited to 14°F (–10°C).

BS(H)2

BS(H)4, 6, 8

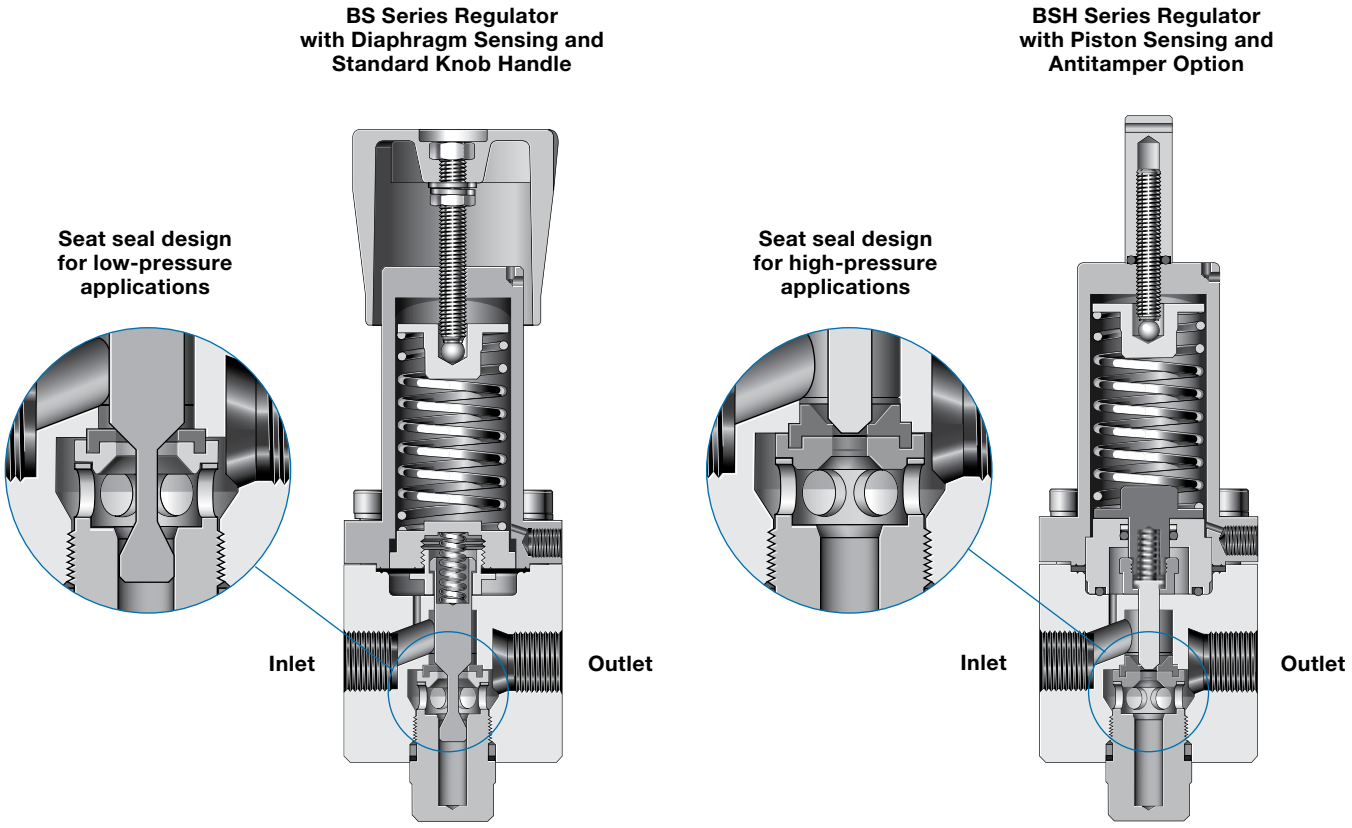
BS(H)10, 15

LBS4

Technical Data—Performance Ratings

Series	Maximum Inlet Pressure psig (bar)	Maximum Inlet Control Pressure psig (bar)	Flow Coefficient (C_v)	Sensing Type	Flow Data on Page
BS2	5 800 (400)	5 075 (350)	0.10	Piston	63
BSH2	10 150 (700)	10 150 (700)			
BS4	1 015 (70.0)	406 (28.0) diaphragm 5 220 (360) piston	1.84 (0.39 in. [10.0 mm] seat) 0.49 (0.19 in. [5.0 mm] seat)	Diaphragm or piston	66
BSH4	5 800 (400)				
BS6	1 015 (70.0)	203 (14.0) diaphragm 5 220 (360) piston	1.95 (0.39 in. [10.0 mm] seat) 0.49 (0.19 in. [5.0 mm] seat)	Diaphragm or piston	66
BSH6	5 800 (400)				
BS8	1 015 (70.0)	203 (14.0) diaphragm 5 220 (360) piston	2.07 (0.39 in. [10.0 mm] seat) 0.49 (0.19 in. [5.0 mm] seat)	Diaphragm or piston	67
BSH8	5 800 (400)				
BS10	1 015 (70.0)	290 (20.0) diaphragm 3 625 (250) piston	3.84	Diaphragm or piston	—
BSH10	3 625 (250)				
BS15	1 015 (70.0)	290 (20.0) diaphragm 3 625 (250) piston	7.3	Diaphragm or piston	—
BSH15	3 625 (250)				
LBS4	507 (35.0)	290 (20.0)	1.3	Diaphragm	72

Back-Pressure, Spring-Loaded Regulators—BS Series



Technical Data—Design

Series	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge Connection	Weight (Without Flanges) lb (kg)	More Information on Page
BS2 BSH2	0.087 (2.2)	1/4 in. NPT	1/4 in. NPT	3.3 (1.5)	62
BS4 BSH4	0.39 (10.0) or 0.19 (5.0)	1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	7.7 (3.5)	65
BS6 BSH6	0.39 (10.0) or 0.19 (5.0)	3/4 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	9.9 (4.5)	65
BS8 BSH8	0.39 (10.0) or 0.19 (5.0)	1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT	9.9 (4.5)	65
BS10 BSH10	0.53 (13.5)	1 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT or ISO/BSP parallel thread	16.7 (7.6)	69
BS15 BSH15	0.75 (19.0)	1 1/2 in. NPT, ISO/BSP parallel thread, EN or ASME flanges	1/4 in. NPT or ISO/BSP parallel thread	22.0 (10)	69
LBS4	0.31 (8.0)	1/2 in. NPT	1/4 in. NPT	5.7 (2.6)	71

Compact, General-Purpose, Spring-Loaded Back-Pressure Regulators—BS(H)2 Series

Features

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

Options

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

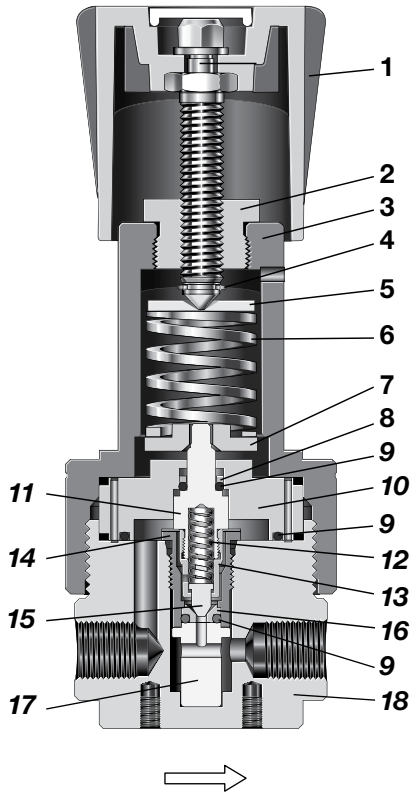
Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Inlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connections	Gauge / Vent Connection	Weight lb (kg)
BS2	5 800 (400)	5 075 (350)	Piston	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 60.	0.10	0.087 (2.2)	1/4 in. NPT	Gauge: 1/4 in. NPT Vent: 1/8 in. NPT	3.3 (1.5)
BSH2	10 150 (700)	10 150 (700)							

See page 63 for flow data.

Materials of Construction

BS2 Series Regulator with Standard Threaded Vent



Component	Material / Specification
1 Knob assembly with adjusting screw, nuts, washer	Blue ABS with A2-70
2 Spring housing cover	431 SS / A276
3 Spring housing	316L SS / A479 or EN10088
4 C-ring	A2
5 Spring guide	316L SS / A479 or EN10088
6 Set spring	CR50V4
7 Bottom spring guide	316L SS / A479 or EN10088
8 Backup ring (BSH only)	PTFE
***9** O-rings*	*EPDM, FKM, FFKM, or nitrile*
***10** Piston plate*	*316L SS / A479 or EN10088*
***11** Piston*	
***12** Overtravel spring*	*302 SS / A240*
***13** Piston screw*	*316L SS / A479 or EN10088*
***14** Body plug*	
***15** Poppet*	*431 SS / A276*
***16** Seat*	*PCTFE or PEEK*
***17** Seat retainer*	*316L SS / A479 or EN10088*
***18** Body*	*316L SS / A479 or EN10088*
Wetted lubricants: Silicone-based and synthetic hydrocarbon-based	

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

Flow Data

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

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

BS(H)2 Series

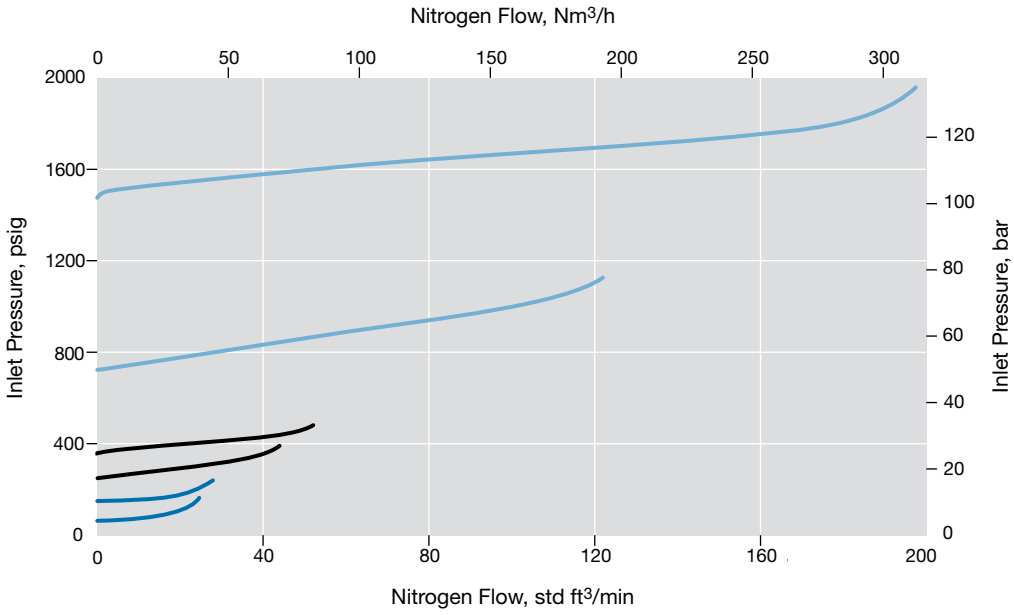
Flow Coefficient: 0.10

Maximum Inlet Pressure: BS2—5800 psig (400 bar); BSH2—10 150 psig (700 bar)

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

Pressure Control Range

- 0 to 145 psig (0 to 10.0 bar)
- 0 to 362 psig (0 to 25.0 bar)
- 0 to 1450 psig (0 to 100 bar)



BS(H)2 Series

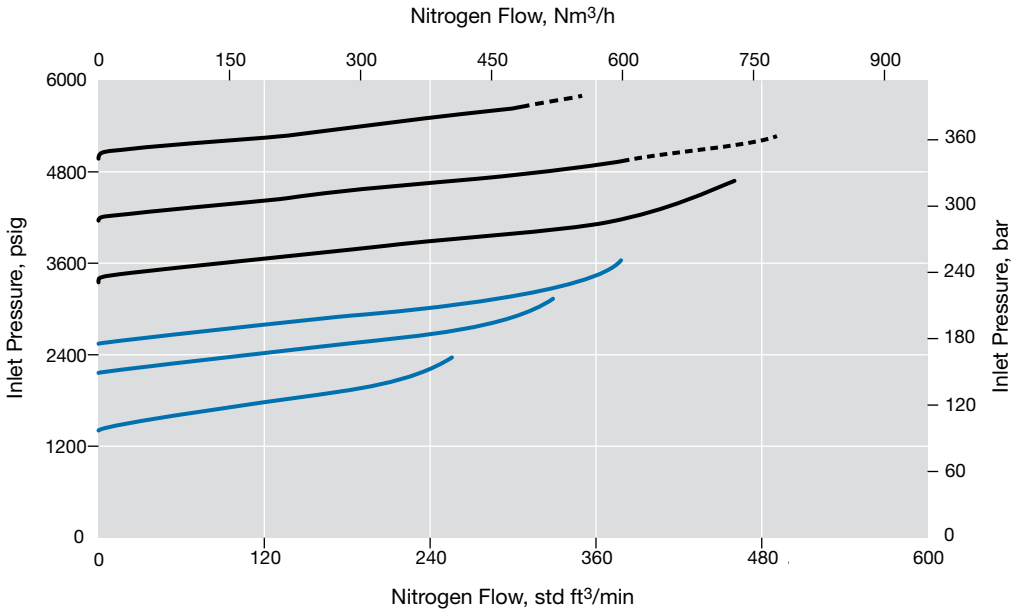
Flow Coefficient: 0.10

Maximum Inlet Pressure: BS2—5800 psig (400 bar); BSH2—10 150 psig (700 bar)

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

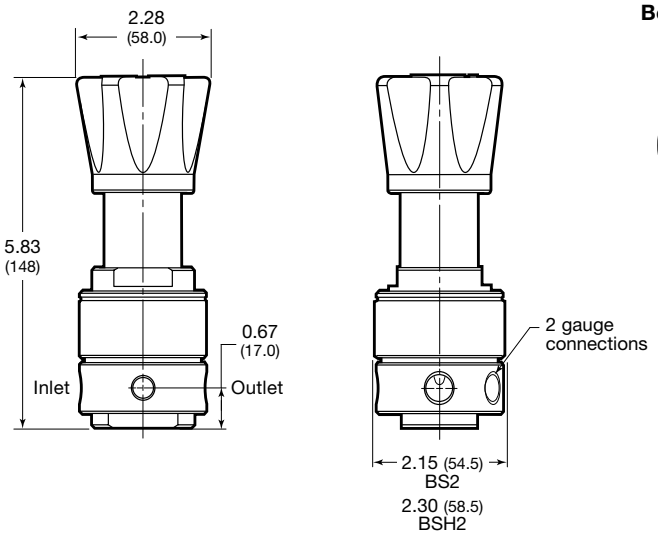
Pressure Control Range

- 0 to 2537 psig (0 to 175 bar)
- 0 to 5075 psig (0 to 350 bar)
- 0 to 5075 psig (0 to 350 bar), calculated

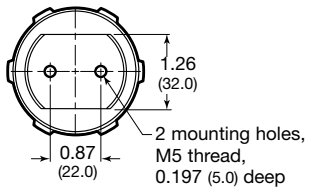


Dimensions

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

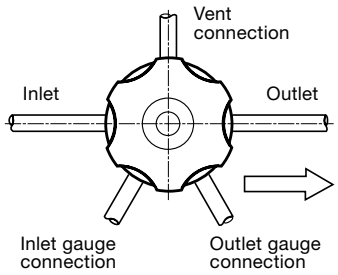


Bottom Mounting



Configuration

Top



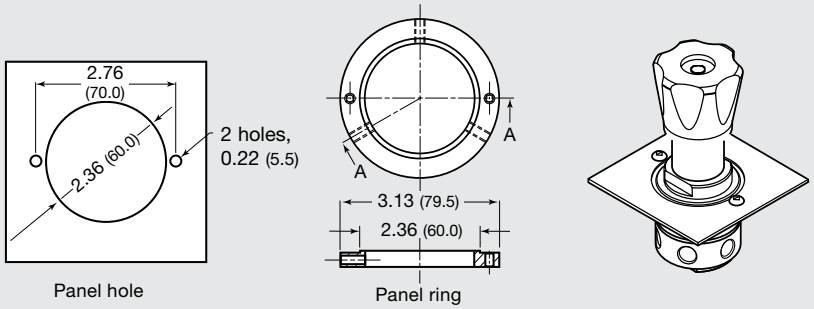
Shown with tubing for clarity; tubing not included.

Panel Mounting Kit

No disassembly required when using panel mount kit. Panel mounting kit ordering numbers:

BS2 series: **RS2-P-02**

BSH2 series: **RSH2-P-02**



Ordering Information

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

1	2	3	4	5	6	7	8
BS	N2	**-** 02	**-** **1**	**-** **V**	**V**	**K**	**-** **N**

1 Series

BS = 5800 psig (400 bar) maximum inlet pressure

BSH = 10 150 psig (700 bar) maximum inlet pressure

2 Inlet / Outlet

N2 = 1/4 in. female NPT

3 Body Material

02 = 316L SS

4 Pressure Control Range

BS and BSH series

1 = 0 to 145 psig (0 to 10.0 bar)
2 = 0 to 362 psig (0 to 25.0 bar)
3 = 0 to 1450 psig (0 to 100 bar)
4 = 0 to 2537 psig (0 to 175 bar)
5 = 0 to 5075 psig (0 to 350 bar)

BSH series only

6 = 0 to 10 150 psig (0 to 700 bar)

5 Seal Material

V = Fluorocarbon FKM
N = Nitrile
E = EPDM
F = FFKM

6 Piston Seals

V = Fluorocarbon FKM
N = Nitrile
E = EPDM
F = FFKM

7 Seat Material

BS series

K = PCTFE
P = PEEK

BSH series

P = PEEK

8 Options

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

General-Purpose, Spring-Loaded Back-Pressure Regulators—BS(H)4, BS(H)6, and BS(H)8 Series

Features

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

Options

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

Technical Data

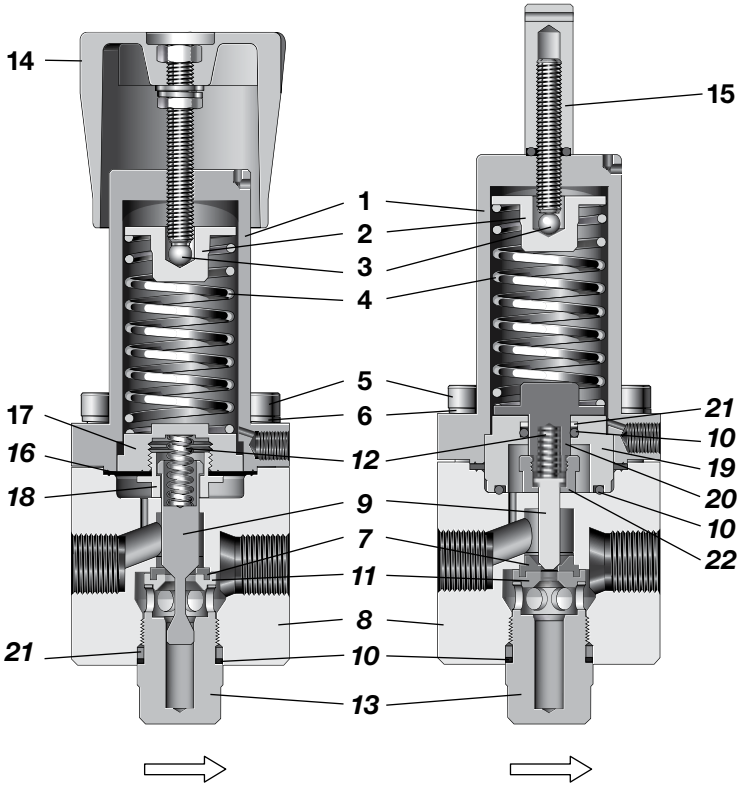
Series	Maximum Inlet Pressure psig (bar)	Maximum Inlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Connections: Inlet and Outlet Size	Connections: Inlet and Outlet Type	Connections: Gauge and Vent	Weight (Without Flanges) lb (kg)
BS(H)4	BS: 1015 (70.0) BSH: 5800 (400)	BS4: 0 to 406 psig (28.0 bar) BS6, 8: 0 to 203 psig (14.0 bar) BSH: 5220 (360)	Diaphragm: BS4: 0 to 406 psig (28.0 bar) BS6, 8: 0 to 203 psig (14.0 bar) Piston: 0 to 5220 psig (360 bar)	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 60.	BS4: 1.84 BS6: 1.95 BS8: 2.07 with 0.39 in. (10.0 mm) seat; All: 0.49 with 0.19 in. (5.0 mm) seat	0.39 (10.0) for up to 1160 psig (80.0 bar) 0.19 (5.0) for 2175 to 5220 psig (150 to 360 bar)	1/2 in. DN15	NPT ISO/BSP parallel thread ASME or EN flange	Gauge: 1/4 in. NPT Vent: 1/8 in. ISO/BSP parallel thread	7.7 (3.5)
BS(H)6							3/4 in. DN20			9.9 (4.5)
BS(H)8							1 in. DN25			

See pages 66 and 67 for flow data.

Materials of Construction

BS Series Regulator with Diaphragm Sensing and Standard Knob

BSH Series Regulator with Piston Sensing and Antitamper Option



	Component	Material / Specification
Common Components	**1** Spring housing	316L SS / A479 or EN10088
	2 Spring guide	
	3 Ball	Commercial stainless steel
	4 Set spring	302 SS
	5 Cap screw	A4-80
	6 Washer	A4
	***7** Seat seal*	*PCTFE or PEEK*
	***8** Body*	*316L SS / A479 or EN10088*
	***9** Poppet*	*431 SS / A276*
	***10** O-rings*	*EPDM, FKM, or nitrile*
	***11** Seat*	*316L SS / A479 or EN10088*
	***12** Overtravel spring*	*302 SS / A240*
	***13** Body plug*	*316L SS / A479 or EN10088*
Actuation	**14** Knob assembly with adjusting screw, nuts, washers	Blue ABS with A2-70
	15 Antitamper with O-ring, adjusting screw	316L SS and A2-70 (O-ring same as item **10**)
Sensing Mechanism	***Diaphragm Only***	
	***16** Diaphragm*	*EPDM, FKM, or nitrile*
	17 Diaphragm plate	316L SS / A479 or EN10088
	***18** Diaphragm screw*	*316L SS / A479 or EN10088*
	Piston Only	
	***19** Piston plate*	*316L SS / A479 or EN10088*
	***20** Piston*	
	***21** Backup ring*	*PTFE*
	***22** Piston screw*	*316L SS / A479 or EN10088*
Wetted lubricant: Silicone-based, synthetic hydrocarbon-based		

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

Flow Data

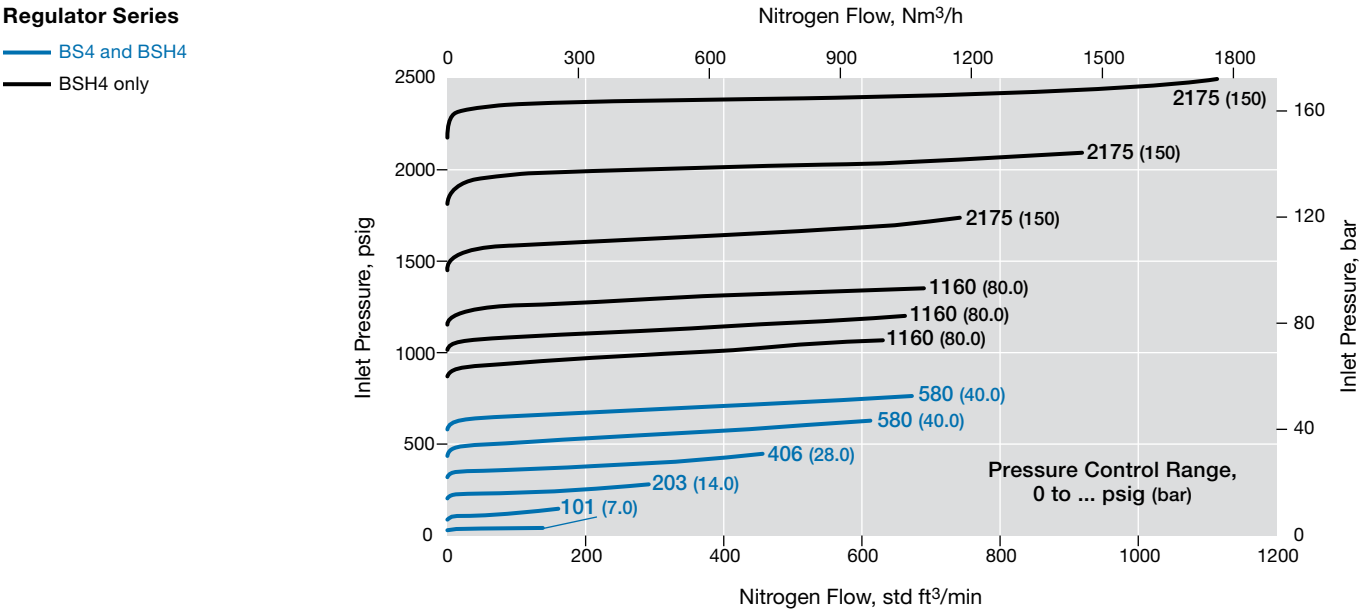
The graphs illustrate the change in inlet or outlet pressure as the flow rate increases.

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

BS(H)4 Series

Flow Coefficient: 1.84

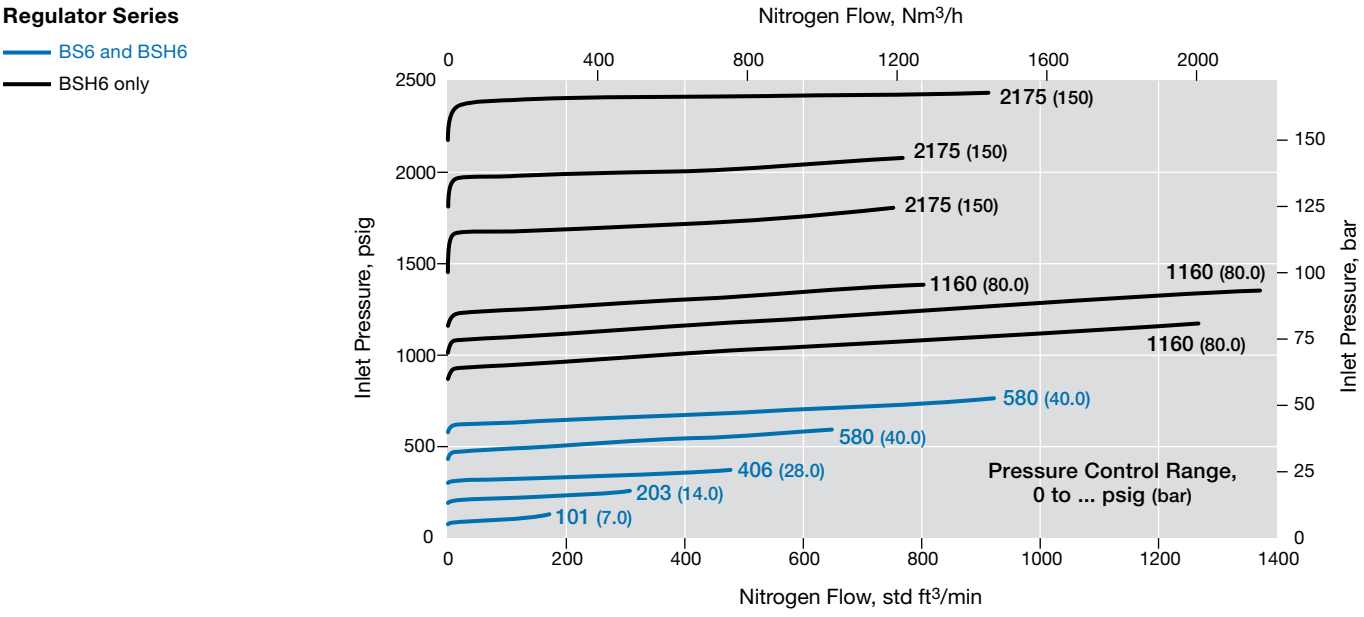
Maximum Inlet Pressure: BS4—1015 psig (70.0 bar); BSH4—5800 psig (400 bar)



BS(H)6 Series

Flow Coefficient:1.95

Maximum Inlet Pressure: BS6—1015 psig (70.0 bar); BSH6—5800 psig (400 bar)



Flow Data

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

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

BS(H)8 Series

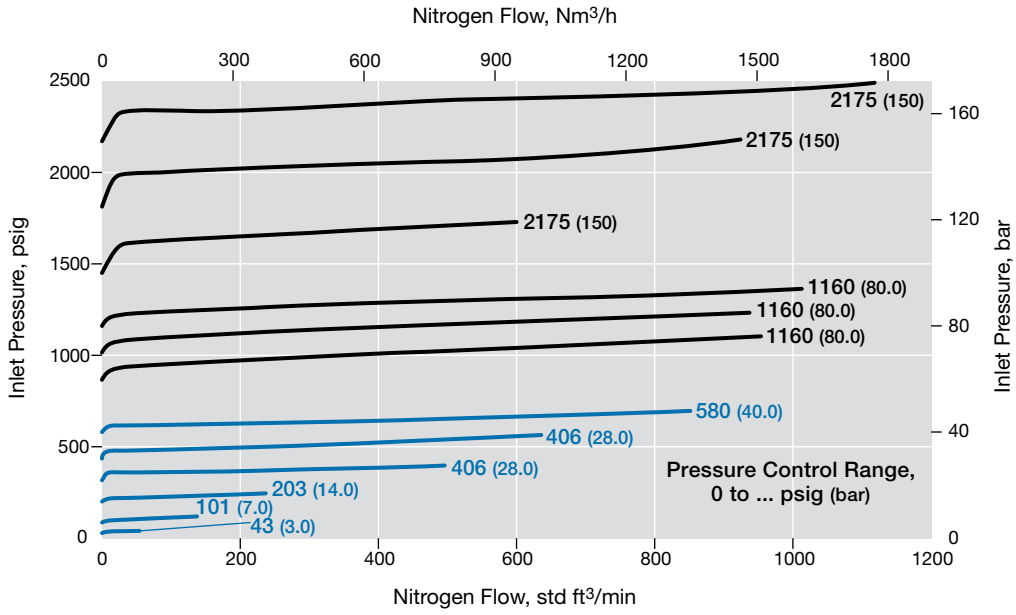
Flow Coefficient: 2.07

Maximum Inlet Pressure: BS8—1015 psig (70.0 bar); BSH8—5800 psig (400 bar)

Regulator Series

BS8 and BSH8

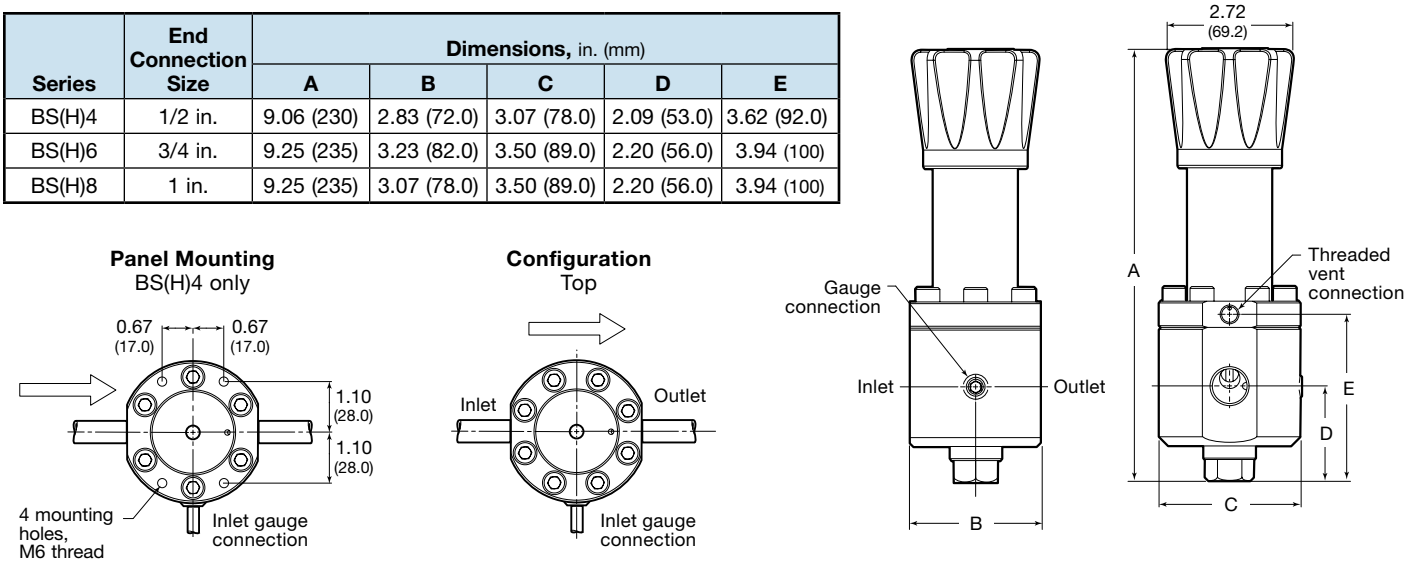
BSH8 only



Dimensions

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

Series	End Connection Size	Dimensions, in. (mm)				
		A	B	C	D	E
BS(H)4	1/2 in.	9.06 (230)	2.83 (72.0)	3.07 (78.0)	2.09 (53.0)	3.62 (92.0)
BS(H)6	3/4 in.	9.25 (235)	3.23 (82.0)	3.50 (89.0)	2.20 (56.0)	3.94 (100)
BS(H)8	1 in.	9.25 (235)	3.07 (78.0)	3.50 (89.0)	2.20 (56.0)	3.94 (100)



Shown with tubing for clarity; tubing not included.

Ordering Information

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

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

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

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

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

4 Pressure Class

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

5 Flange Facing

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

6 Body Material
- 02 = 316L SS

7 Pressure Control Range

Diaphragm sensing
- **1** = 0 to 43 psig (0 to 3.0 bar)
- **2** = 0 to 101 psig (0 to 7.0 bar)
- **3** = 0 to 203 psig (0 to 14.0 bar)
- **4** = 0 to 406 psig (0 to 28.0 bar)①

Piston sensing
- **4** = 0 to 406 psig (0 to 28.0 bar)②
- **5** = 0 to 580 psig (0 to 40.0 bar)
- **6** = 0 to 1160 psig (0 to 80.0 bar)
- **7** = 0 to 2175 psig (0 to 150 bar)
- **9** = 0 to 4060 psig (0 to 280 bar)
- **11** = 0 to 5220 psig (0 to 360 bar)

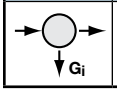
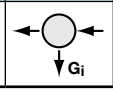
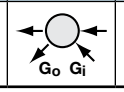
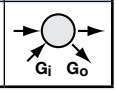
① BS(H)4 series only.
② BS(H)6 and BS(H)8 series only.

8 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

9 Diaphragm / Piston O-Rings
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

10 Seat Seal Material
- **K** = PCTFE
- **P** = PEEK

11 Options
- **A** = Antitamper
- **GN1** = Gauge connection, see below
- **GN2** = Gauge connection, see below
- **GN5** = Gauge connection, see below
- None = Standard connection, see below

Gauge Connection Configuration			
Standard	GN1	GN2	GN5
			

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

General-Purpose, Spring-Loaded Back-Pressure Regulators—BS(H)10 and BS(H)15 Series

Features

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

Options

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

Technical Data

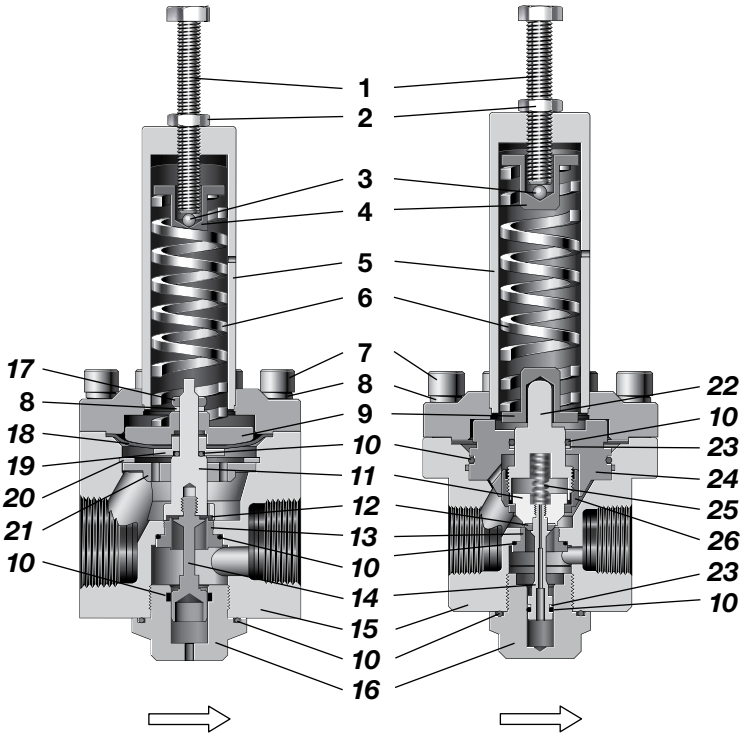
Series	Maximum Inlet Pressure psig (bar)	Maximum Inlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Connections			Weight (Without Flanges) lb (kg)
							Inlet and Outlet			
							Size	Type	Gauge	
BS(H)10	BS: 1015 (70.0)	BS: 290 (20.0)	Diaphragm: 0 to 290 psig (20.0 bar)	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 60.	3.84	0.53 (13.5)	1 in. DN25	NPT ISO/BSP parallel thread ASME or EN flange	1/4 in. NPT or ISO/BSP parallel①	16.7 (7.6)
BS(H)15	BSH: 3625 (250)	BSH: 3625 (250)	Piston: 0 to 3625 psig (0 to 250 bar)		7.3	0.75 (19.0)	1 1/2 in. DN40			22.0 (10.0)

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

Materials of Construction

BS Series Regulator with Diaphragm Sensing and Soft Seat Seal

BSH Series Regulator with Piston Sensing and Hard Seat Seal



Component			Material / Specification
Common Components	1 Adjusting screw		A2-70
	2 Set screw nut		A2
	3 Ball		Stainless steel
	4 Upper spring guide		316L SS / A479 or EN10088
	5 Spring housing assembly		
	6 Set spring		CR50V4
	7 Cap screw		A4-80
	8 Washer		A4
	9 Bottom spring guide		316L SS / A479 or EN10088
	10 O-ring		*EPDM, FKM, or nitrile*
	11 Poppet housing		*316L SS / A479 or EN10088*
	12 Seat seal	*BS*	*EPDM, FKM, or nitrile*
		BSH	*PCTFE or PEEK*
	13 Seat		*316L SS / A479 or EN10088*
	14 Poppet		*431 SS / A276 or EN10088*
	15 Body		*316L SS / A479 or EN10088*
	16 Body plug		
Diaphragm Only	17 Nut		A4
	18 Diaphragm		*EPDM, FKM, or nitrile*
	19 Clamp plate		*316L SS / A479 or EN10088*
	20 Retaining ring		
	21 Body plate		
Piston Only	*22 Piston*		*316L SS / A479 or EN10088*
	23 Backup ring		*PTFE*
	24 Piston plate		*316L SS / A479 or EN10088*
	25 Overtravel spring		*302 SS / A240*
	26 Piston screw		*316L SS / A479 or EN10088*
Wetted lubricant: Silicone-based, synthetic hydrocarbon-based			

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

Swagelok

Flow Data

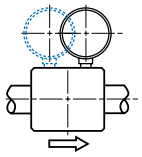
For flow curve information, contact your authorized Swagelok representative.

Dimensions

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

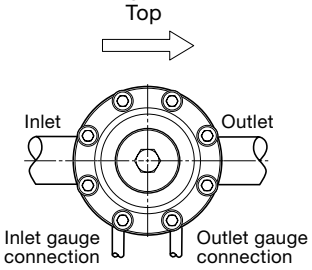
Series	End Connection Size	Dimensions, in. (mm)					
		A	B	C	D	E	F
BS(H)10	1 in.	10.5 (266)	3.54 (90.0)	3.07 (78.0)	2.28 (58.0)	1.97 (50.0)	1.77 (45.0)
BS(H)15	1 1/2 in.	10.8 (275)	4.53 (115)	3.78 (96.0)	2.44 (62.0)	2.01 (51.0)	1.77 (45.0)

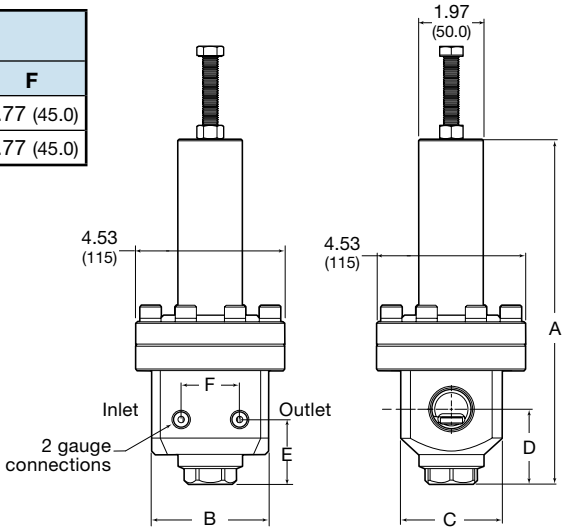
Gauge Connection



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

Configuration





Shown with tubing for clarity; tubing not included.

Ordering Information

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

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

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

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

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

4 Pressure Class

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

5 Flange Facing

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

6 Body Material
- 02 = 316L SS

7 Pressure Control Range

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

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

8 Seal Material
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

9 Diaphragm / Piston O-Rings
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

10 Seat Seal Material

BS series
- **V** = Fluorocarbon FKM
- **N** = Nitrile
- **E** = EPDM

BSH series
- **K** = PCTFE
- **P** = PEEK

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

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

Features

- Diaphragm sensing
- Bottom mounting and panel mounting

Options

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

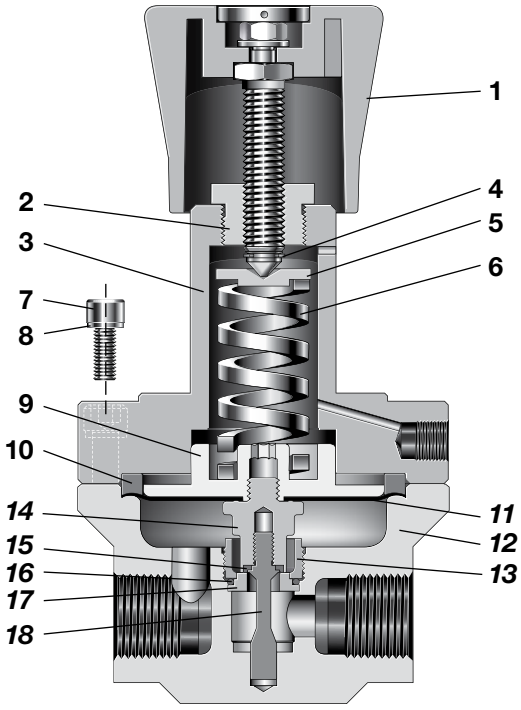
Technical Data

Series	Maximum Inlet Pressure psig (bar)	Maximum Inlet Control Pressure psig (bar)	Sensing Type	Temperature Range °F (°C)	Flow Coefficient (C_v)	Seat Diameter in. (mm)	Inlet and Outlet Connection	Gauge Connection	Weight lb (kg)
LBS4	507 (35.0)	290 (20.0)	Diaphragm	–4 to 176 (–20 to 80) See **Pressure-Temperature Ratings,** page 60.	1.3	0.31 (8.0)	1/2 in. NPT	1/4 in. NPT	5.7 (2.6)

See pages 72 and 72 for flow data.

Materials of Construction

LBS Series Regulator with Soft Seat



Component	Material / Specification
1 Knob assembly with adjusting screw, nuts	Blue ABS with A2-70
2 Spring housing cover	316L SS / A479 or EN10088
3 Spring housing	
4 C-ring	A2
5 Spring guide	316L SS / A479 or EN10088
6 Set spring	CR50V4
7 Cap screw	A4-80
8 Washer	A2
9 Bottom spring guide	316L SS / A479 or EN10088
10 Clamp ring	
***11** Diaphragm*	*PTFE or 316L SS*
***12** Body*	*316L SS / A479 or EN10088*
***13** Seat retainer*	
***14** Poppet housing*	
***15** Seat seal*	*FKM, FFKM, EPDM, or nitrile*
***16** O-ring*	*PTFE*
***17** Seat*	*316L SS / A479 or EN10088*
***18** Poppet*	*431 SS / A276*
Wetted lubricants: Silicone-based, synthetic hydrocarbon-based	

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

Flow Data

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

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

LBS4 Series

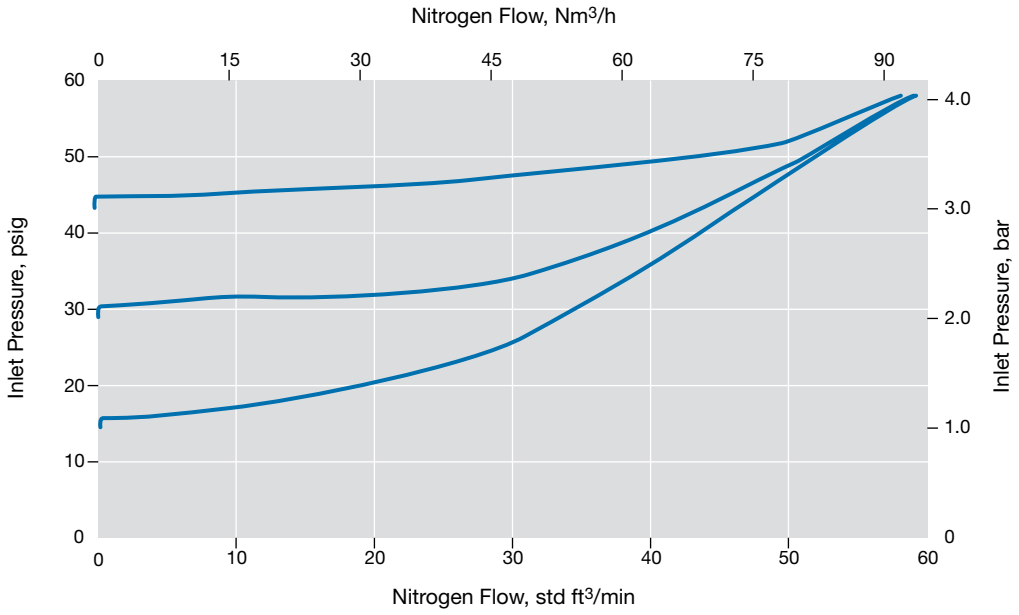
Flow Coefficient: 1.3

Maximum Inlet Pressure: LBS4—507 psig (35.0 bar)

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

Pressure Control Range

0 to 43 psig (0 to 3.0 bar)



LBS4 Series

Flow Coefficient: 1.3

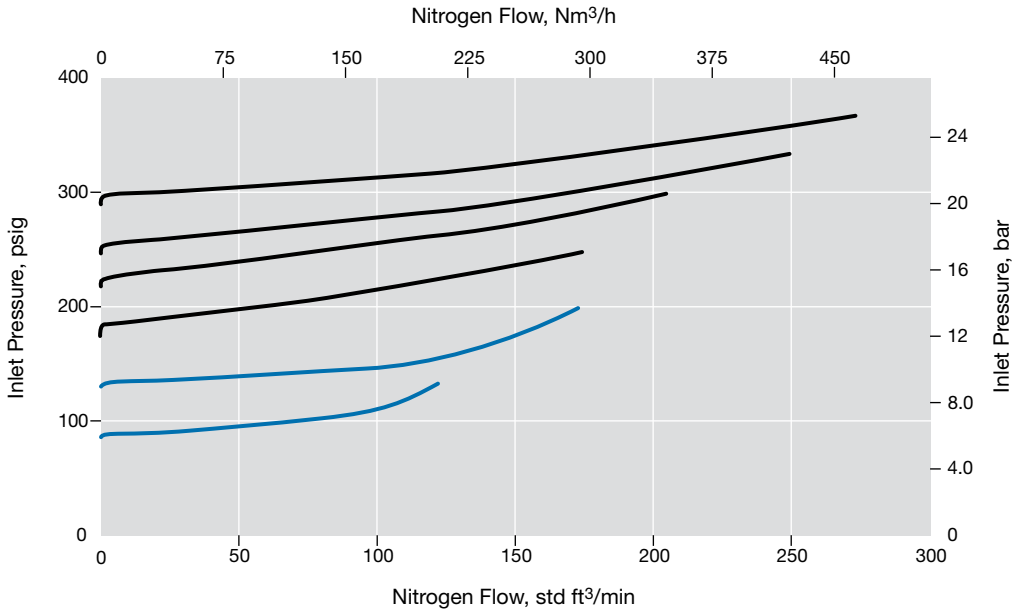
Maximum Inlet Pressure: LBS4—507 psig (35.0 bar)

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

Pressure Control Range

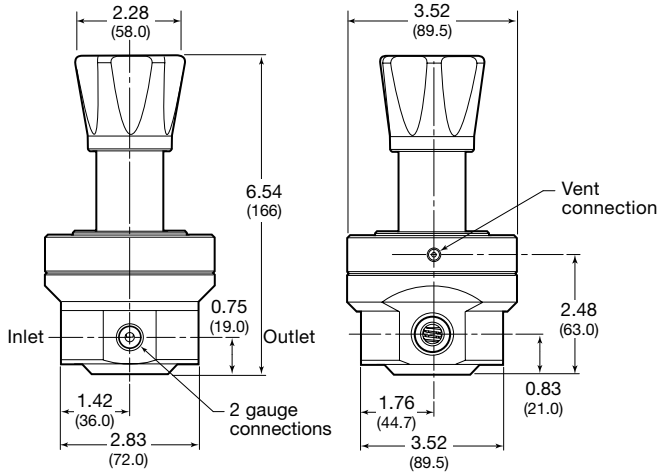
0 to 290 psig (0 to 20.0 bar)

0 to 130 psig (0 to 9.0 bar)



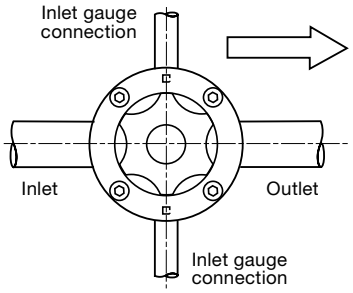
Dimensions

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



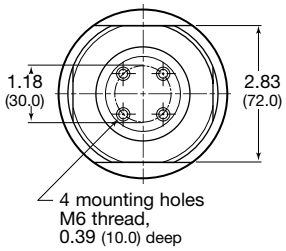
Configuration

Top

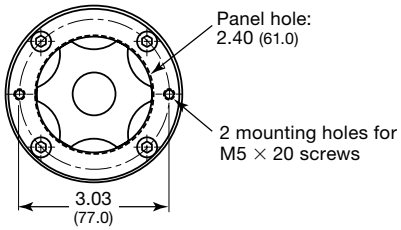


Shown with tubing for clarity; tubing not included.

Bottom Mounting



Panel Mounting



Ordering Information

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

1	2	3	4	5	6	7	8
LBS	N4	- 02	- **1**	- T	**T**	**V**	- **N**

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

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

3 Body Material
02 = 316L SS

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

5 Seal Material
T = PTFE

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

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

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

Additional Products

- For additional Swagelok pressure regulators, see the *Pressure Regulators catalog,* MS-02-230.

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

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

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

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

⚠ **RHPS series pressure regulators are not "Safety Accessories" as defined in the Pressure Equipment Directive 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.

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