

PRESSURE CONTROL SERIES

Proportional Relief Valves

RA3 | RA4 | RL3 | RL4 SERIES



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Proportional Relief Valves

RA and RL Series

Features

High-Pressure Valves (RA Series)

- Service up to 6000 psig (413 bar)
- 7 color-coded springs available for a wide range of set pressures
- Valves available factory-set to a special set pressure
- 1/4 in. and 6 and 8 mm end connections—**RA3 series**
- 1/2 in. and 12 mm end connections—**RA4 series**

Low-Pressure Valves (RL Series)

- Service up to 300 psig (20.6 bar)
- One spring for the full set pressure range
- Valves available factory-set to a special set pressure
- 1/4 in. and 6 and 8 mm end connections—**RL3 series**
- 1/2 in. and 12 mm end connections—**RL4 series**

Applications

Relief valves are proportional relief valves that open gradually as the pressure increases. Consequently, they do not have a capacity rating at a given pressure rise (accumulation), and they are not certified to ASME or any other codes.

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

! Beyond Fluid proportional relief valves should never be used as ASME Boiler and Pressure Vessel Code safety relief devices.

! Beyond Fluid proportional relief valves are not “Safety Accessories” as defined in the Pressure Equipment Directive 2014/68/EU.

Operation

Relief valves OPEN when system pressure reaches the set pressure and CLOSE when system pressure falls below the set pressure.

- High-pressure RA3 and RA4 series—select and install the spring that covers the required set pressure; apply the matching label to the cap.
- Low-pressure RL3 and RL4 series—the spring is already installed.
- ! For valves not actuated for a period of time, initial relief pressure may be higher than the set pressure.

Set Pressure and Resealing Pressure

- Set pressure is the upstream pressure at which the first indication of flow occurs. Set pressure of each valve after initial relief is repeatable within
 - ±3.0 psig (0.20 bar) or ±5% (whichever is greater) of the initial set pressure at 60 to 80°F (15 to 26°C)
 - ±6.0 psig (0.40 bar) or ±20% (whichever is greater) of the initial set pressure below 60°F (15°C) and above 80°F (26°C).
- Resealing pressure is the upstream pressure at which there is no indication of flow. Resealing pressure is always lower than set pressure.

Testing

Every proportional relief valve is tested for set and resealing performance.

Series	Test Set Pressure psig (bar)	Minimum Resealing Pressure as a Percentage of Set Pressure, %
RA3, RA4	100 to 200 (6.8 to 13.7)	50
	850 to 1000 (58.5 to 68.9)	84
RL3, RL4	10 to 20 (0.7 to 1.3)	50
	175 to 225 (12.0 to 15.5)	91

Back Pressure

High-Pressure Valves (RA3 and RA4 Series)

The effect of system back pressure is minimized by the design of these high-pressure valves.

Low-Pressure Valves (RL3 and RL4 Series)

System back pressure increases the set pressure of the valve. To compensate, multiply the back pressure by 0.8 and subtract the result from the desired set pressure. Use the result to pre-set the valve while back pressure is equal to atmospheric pressure.

Technical Data

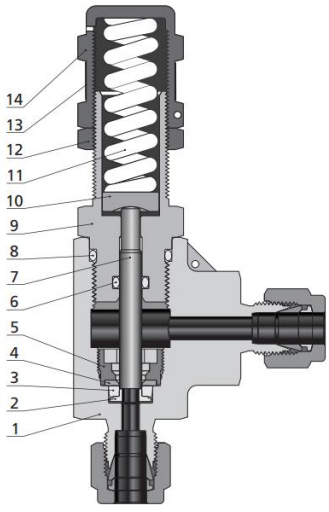
Pressure-Temperature Ratings

Series	RA3					RA4				RL3, RL4			
Inlet Working Pressure	6000 psig (413 bar); up to 8000 psig (551 bar) during relief					6000 psig (413 bar)				300 psig (20.6 bar)			
Outlet Working Pressure	1500 psig (103 bar)					2500 psig (172 bar)				225 psig (15.5 bar)			
Set Pressure	50 to 6000 psig (3.5 to 413 bar)					50 to 1500 psig (3.5 to 103 bar)				10 to 225 psig (0.7 to 15.5 bar)			
Seal Material	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene	Perfluoro carbon FFKM	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene

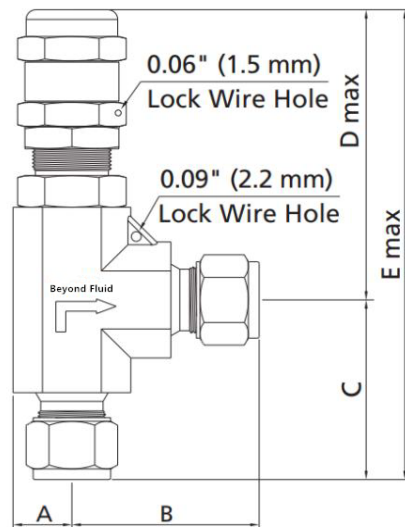
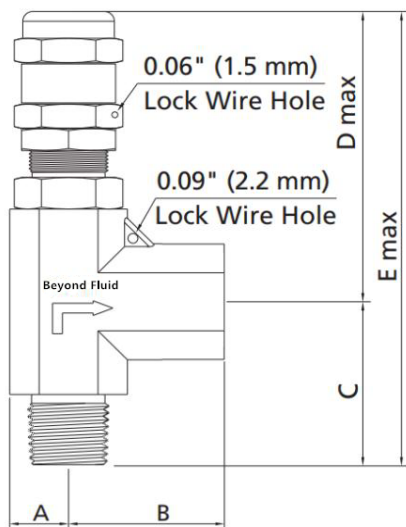
Temperature °F (°C)	Maximum Set Pressure psig (bar)												
-40 (-40)	—	—	—	—	—	—	—	—	—	—	—	—	—
-30 (-34)													
-10 (-23)													
0 (-17)													
10 (-12)													
25 (-4)	6000 (413)	6000 (413)	6000 (413)	6000 (413)	2500 (172)	6000 (413)	1500 (103)	1500 (103)	1500 (103)	225 (15.5)	225 (15.5)	225 (15.5)	225 (15.5)
30 (-1)													
40 (4)													
50 (10)													
70 (20)													
150 (65)	5580 (384)	5580 (384)	5580 (384)	5580 (384)	3000 (207)	1500 (103)	150 0 (10 3)	1500 (103)	1500 (103)	225 (15.5)	225 (15.5)	225 (15.5)	225 (15.5)
200 (93)	5160 (355)	5160 (355)	5160 (355)	5160 (355)	1500 (103)								
250 (121)	4910 (338)	4910 (338)	4910 (338)	4910 (338)	—								
275 (135)	—	—	4660 (321)	—	—	—	—	—	—	—	—	—	—
300 (148)													

Note: Outlet pressure should not exceed inlet pressure.

Standard Materials of Construction (RA3 Series)

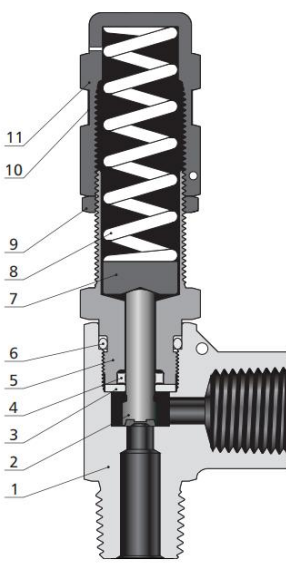
	NO.	Component	Material
	1	Body	316 SS/A182
	2	Seat	316 SS/A479
	3	O-ring	Fluorocarbon FKM
	4	Gasket	PEEK
	5	Seat Retainer	316 SS/A479
	6	O-ring	Fluorocarbon FKM
	7	Stem	316 SS/A479
	8	O-ring	Fluorocarbon FKM
	9	Bonnet	316 SS/A479
	10	Spring Support	316 SS/A479
	11	Spring	S17700 SS/AMS 5678
	12	Lock Nut	17-4PH
	13	Label	Polyester
	14	Bonnet Cap	316 SS/A479

Dimensions (RA3 Series)

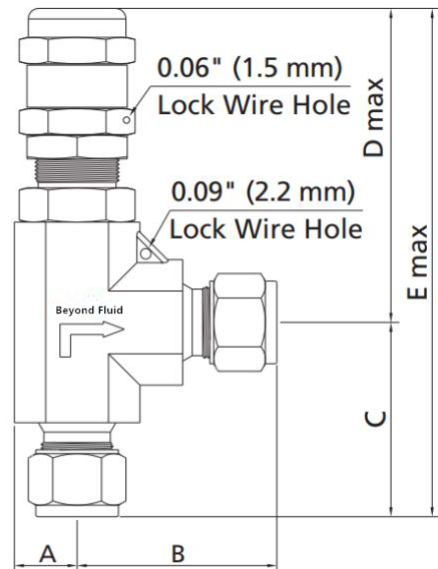
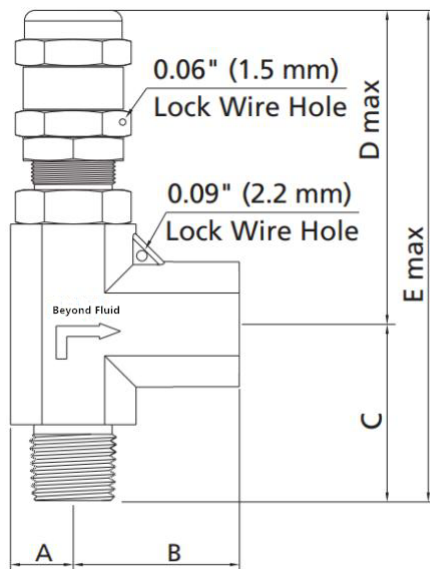


Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Dimension, in.(mm)				
	Inlet	Outlet		A	B	C	D	E
-RA3-FN4	1/4 Female NPT	1/4 Female NPT	0.14 (3.6)	0.46 (11.9)	1.17 (29.7)	1.27 (32.2)	2.70 (68.6)	4.00 (102)
-RA3-MN4	1/4 Male NPT	1/4 Male NPT		0.46 (11.9)	1.17 (29.7)	1.27 (32.2)	2.70 (68.6)	4.00 (102)
-RA3-MN4-FN4	1/4 Male NPT	1/4 Female NPT		0.46 (11.9)	1.17 (29.7)	1.27 (32.2)	2.70 (68.6)	4.00 (102)
SS-RA3-FT4	1/4 Tube Fitting	1/4 Tube Fitting	0.14 (3.6)	0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105)
SS-RA3-FT6	3/8 Tube Fitting	3/8 Tube Fitting		0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105)
SS-RA3-FT8	1/2 Tube Fitting	1/2 Tube Fitting		0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	4.09 (104)	5.91 (150)
SS-RA3-MT6	6mm Tube Fitting	6mm Tube Fitting	0.14 (3.6)	0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105)
SS-RA3-MT10	10mm Tube Fitting	10mm Tube Fitting		0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105)
SS-RA3-MT12	12mm Tube Fitting	12mm Tube Fitting		0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	4.09 (104)	5.91 (150)

Standard Materials of Construction (RA4 Series)

	NO.	Component	Material
	1	Body	316 SS/A182
	2	Seat	316 SS/A479
	3	Retainer	316 SS/A479
	4	Square sealing piece	Fluorocarbon FKM
	5	Bonnet	316 SS/A479
	6	O-ring	Fluorocarbon FKM
	7	Spring Support	316 SS/A479
	8	Spring	S17700 SS/AMS 5678
	9	Lock Nut	17-4PH
	10	Label	Polyester
	11	Bonnet Cap	316 SS/A479

Dimensions (RA4 Series)

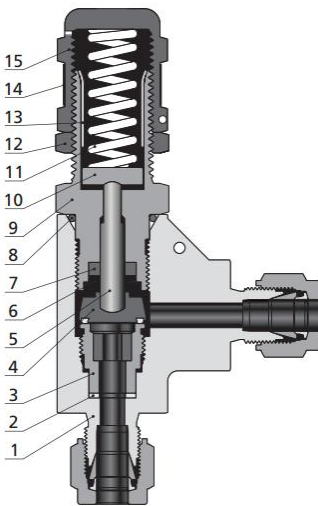


Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Dimension, in.(mm)				
	Inlet	Outlet		A	B	C	D	E
-RA4-FN8	1/2 Female NPT	1/2 Female NPT	0.25 (6.4)	0.58 (14.7)	1.44 (36.6)	1.44 (36.6)	3.87 (98.4)	5.31 (135.0)
-RA4-MN8	1/2 Male NPT	1/2 Male NPT		0.54 (13.7)	1.44 (36.6)	1.44 (36.6)	3.87 (98.4)	5.31 (135.0)
-RA4-MN8-FN8	1/2 Male NPT	1/2 Female NPT		0.58 (14.7)	1.44 (36.6)	1.44 (36.6)	3.87 (98.4)	5.31 (135.0)
-RA4-FT8	1/2 Tube Fitting	1/2 Tube Fitting	0.25 (6.4)	0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	3.87 (98.4)	5.31 (135.0)
-RA4-MT12	12mm Tube Fitting	12mm Tube Fitting		0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	3.87 (98.4)	5.31 (135.0)

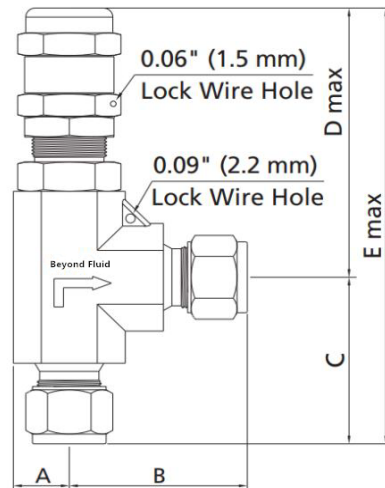
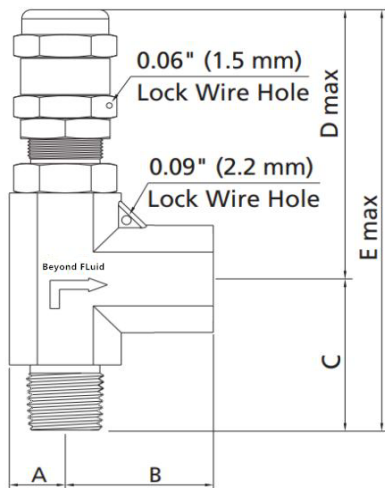
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Beyond Fluid

Standard Materials of Construction (RL3/RL4 Series)

	NO.	Component	Material
	1	Body	316 SS/A182
	2	Gasket	316 SS/A479
	3	Seat	316 SS/A479
	4	Bonnet Disc	316 SS/A479+FKM
	5	Stem	316 SS/A479
	6	Retainer	316 SS/A479
	7	Quad Seal	Fluorocarbon FKM
	8	O-ring	Fluorocarbon FKM
	9	Bonnet	316 SS/A479
	10	Spring Support	316 SS/A479
	11	Spring	S17700 SS/AMS 5678
	12	Lock Nut	17-4PH
	13	Sleeve	304SS/A240
	14	Label	Polyester
	15	Bonnet Cap	316 SS/A479

Dimensions (RL3/RL4 Series)



Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Dimension, in.(mm)				
	Inlet	Outlet		A	B	C	D	E
-RL3-FN4	1/4 Female NPT	1/4 Female NPT	0.19 (4.8)	0.46 (11.9)	1.17 (29.7)	1.38 (34.9)	2.70 (68.6)	4.08 (103.5)
-RL3-MN4	1/4 Male NPT	1/4 Male NPT		0.46 (11.9)	1.17 (29.7)	1.38 (34.9)	2.70 (68.6)	4.08 (103.5)
-RL3-MN4-FN4	1/4 Male NPT	1/4 Female NPT		0.46 (11.9)	1.17 (29.7)	1.38 (34.9)	2.70 (68.6)	4.08 (103.5)
-RL3-FT4	1/4 Tube Fitting	1/4 Tube Fitting	0.19 (4.8)	0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105)
-RL3-FT6	3/8 Tube Fitting	3/8 Tube Fitting		0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105)
-RL3-MT6	6mm Tube Fitting	6mm Tube Fitting		0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105)
-RL4-FN4	1/2 Female NPT	1/2 Female NPT	0.25 (6.4)	0.58 (14.7)	1.44 (36.6)	1.44 (36.6)	3.87 (98.4)	5.31 (135.0)
-RL4-MN4	1/2 Male NPT	1/2 Male NPT		0.54 (13.7)	1.44 (36.6)	1.44 (36.6)	3.87 (98.4)	5.31 (135.0)
-RL4-MN4-FN4	1/2 Male NPT	1/2 Female NPT		0.58 (14.7)	1.44 (36.6)	1.44 (36.6)	3.87 (98.4)	5.31 (135.0)
-RL4-FT8	1/2 Tube Fitting	1/2 Tube Fitting	0.25 (6.4)	0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	3.87 (98.4)	5.31 (135.0)
-RL4-MT12	12mm Tube Fitting	12mm Tube Fitting		0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	3.87 (98.4)	5.31 (135.0)

Manual Override Handles

Lift the aluminum handle with hand to open the proportional relief valve without changing the set pressure. For use on the following valves :

RA3 Series: set pressure range 50~1500 psig

RA4 Series: set pressure range 50~300 psig

RL3/RL4 Series: set pressure range 10~225 psig

To order, add “-MO” to the valve ordering number. Example: SS-RA3-FT4-MO

Ordering Information

Low-Pressure Valves (RL3 and RL4 Series)

Valve contains spring; set pressure must be adjusted. Select a valve ordering number.

Factory-Set Valves

RL3 and RL4 series valves are available with springs factory-set to a specified set pressure. Valves are set, tested, locked, and tagged with the set pressure; certificates of test are included. To order, add “-SET” to the valve ordering number and specify the desired set pressure. Example: SS-RA3-FT4-SET

Replacement Spring Kits

Spring kits include spring and installation instructions. Select a spring kit ordering number.

Series	Spring Kit Ordering Number	Set Pressure Range psig (bar)
RL3	SK-RL3	10 to 225 (0.7 to 15.5)
RL4	SK-RL4	

High-Pressure Valves (R3A and R4 Series)

Valve does not contain spring. Select a valve ordering number and a spring kit ordering number.

Spring Kits

Spring kits include spring, label, 302 SS lock wire with seal, spring support, and installation instructions. Select a spring kit basic ordering number and add the spring designator for the desired set pressure range. Examples: SK-A-RA3 or SK-C-RA4

Series	Set pressure psig (bar)						
	A	B	C	D	E	F	G
RA3	50-300 (3.5-20.7)	300-700 (20.7-48.3)	700-1500 (48.3-103.4)	1500-2500 (103.4-172.4)	2500-3500 (172.4-241.4)	3500-4500 (241.4-310.3)	4500-6000 (310.3-413.8)
RA4	50-300 (3.5-20.7)	300-700 (20.7-48.3)	700-1500 (48.3-103.4)	/	/	/	/
Color	Green	Orange	Yellow	Purple	White	Blue	Red

Options and Accessories

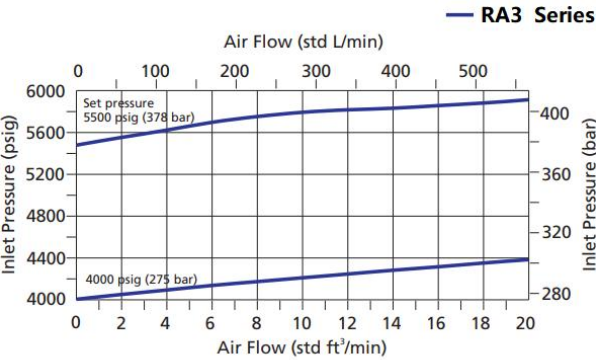
Sealing Kits

Series	Sealing Kit Basic Ordering Number					Sealing Kit Content
	FKM	Buna-N	Neoprene	EPDM	FFKM	
RA3	VI-RA3	BN-RA3	N-RA3	E-RA3	Z-RA3	O-ring (3)
RA4	SS-VI-RA4	SS-BN-RA4	SS-N-RA4	SS-E-RA4	SS-Z-RA4	O-ring, square sealing piece, stem
RL3	SS-VI-RL3	SS-BN-RL3	SS-N-RL3	SS-E-RL3	SS-Z-RL3	O-ring, square sealing piece, adhesive disc, retainer
RL4	SS-VI-RL4	SS-BN-RL4	SS-N-RL4	SS-E-RL4	SS-Z-RL4	O-ring, square sealing piece, adhesive disc

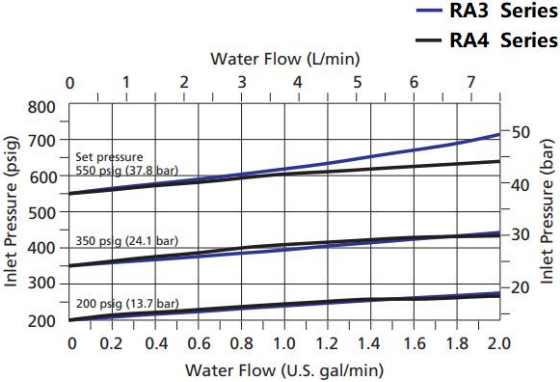
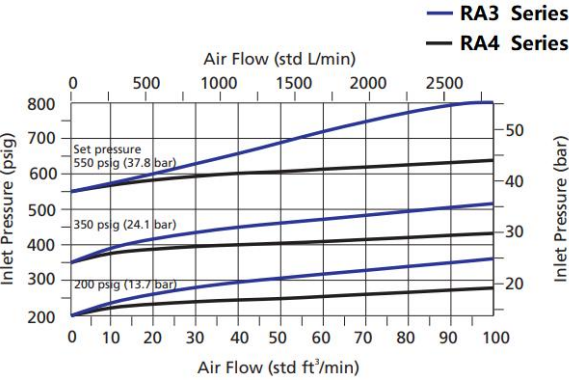
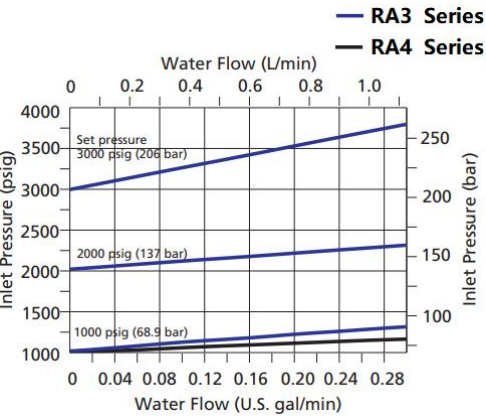
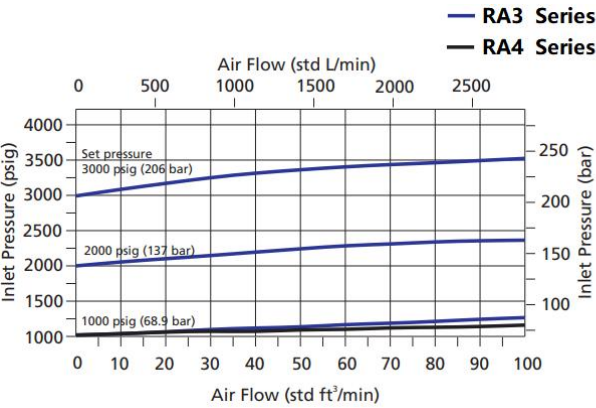
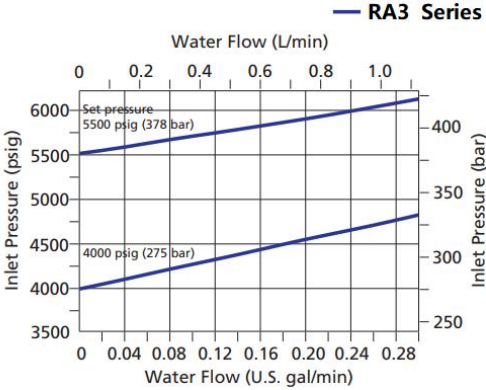
The basic ordering number of the listed RA and RL series sealing kits specifies 316 stainless steel.

Flow Data at 70°F (20°C)
RA3 and RA4 Series

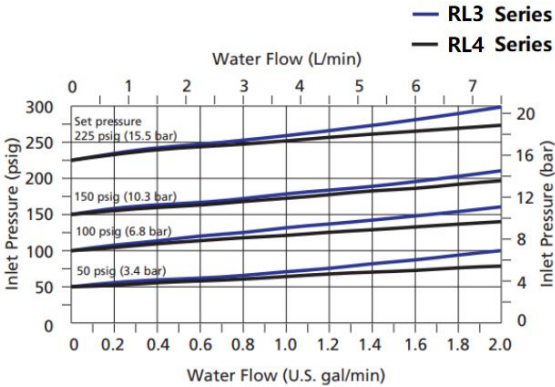
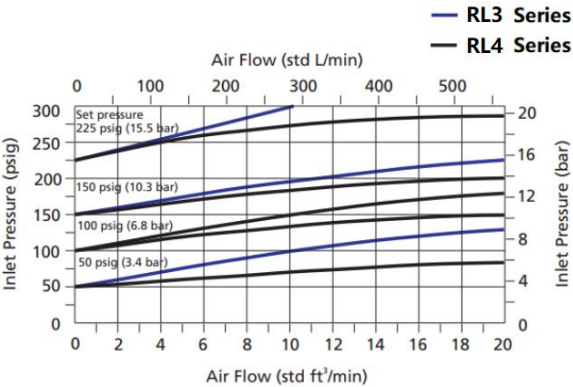
Air



Water



RL3 and RL4 Series





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