

R6000 Series

Right Angle Relief Valve



Available in low, medium, high and extra high pressure models, R6000 right angle relief valves provide users with high accuracy and consistency of cracking and reseal pressures. Furthermore, narrow pressure ranges (cracking pressures) for each model can be factory pre-set according to customer specifications. PED certification and CE marking are standard for all models. All R6000 relief valves are offered with multiple end connections to ensure application versatility.

Typical Applications

- Beverage dispensing equipment
- Gas pilot plants
- Petrochemical test labs
- Offshore oil platform heating lines
- Pharmaceutical sterilization and packaging systems

Features & Benefits

Low Pressure (5 – 550 psig)*

Zero friction poppets

- Increases accuracy of cracking pressure and reseal pressure.
- Improves consistency of cracking pressure and reseal pressure.

Encapsulated Seat Seal

- Maintains small surface area contact.
- Protects seat from erosion due to flow.

Raised seal lip on poppet minimizes contact with seat, eliminating friction and preventing overstressing of the O-ring

6 pressure spring ranges improves accuracy

Caps and bonnets are pre-drilled for lock wire

Multiple end connections available

High Pressure (150–6000 psig)

3 models available:

- Medium (150–2500 psig)—6 spring ranges improve accuracy
- High (150–5000 psig)—7 spring ranges improve accuracy
- Extra High (5000–6000 psig)—one spring

Delta stem seal design prevents friction which increases accuracy of cracking pressure and reseal pressure.

Balanced poppet design allows cracking pressure to stay the same regardless of backup pressure.

Orifice sizes: 0.082", 0.094", 0.188"

Multiple end connections available.

Optional manual override handle

Circle Seal Controls

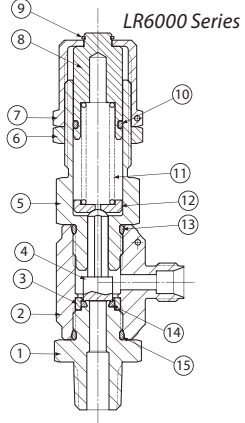
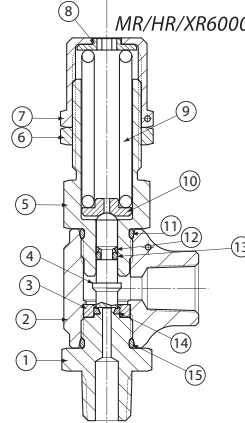
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 Phone (951) 270-6200 Fax (951) 270-6201
 www.circle-seal.com

* Back pressure affects cracking pressure on low pressure version

relief valves

R6000 Series

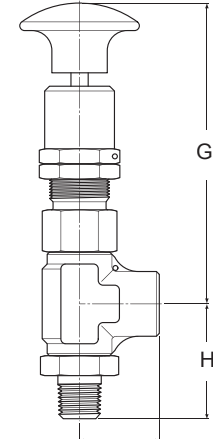
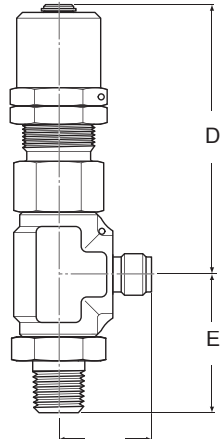
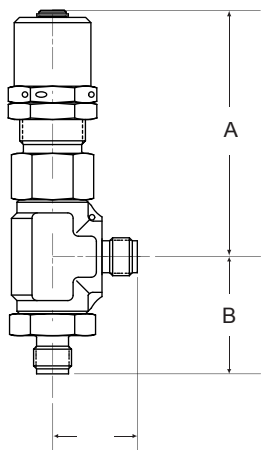
Materials of Construction

LR		LR6000 Series		MR/HR/XR		MR/HR/XR6000 Series	
1	End			1	End		
2	Body			2	Body		
3	Shroud ring			3	Shroud ring		
4	Poppet			4	Poppet		
5	Bonnet			5	Bonnet		
6	Jam nut			6	Jam nut		
7	Cap			7	Cap		
8	Spring holder			8	Spring holder		
9	Retaining ring			9	Spring		
10	O-ring			10	Spring equalizer		
11	Spring			11	O-ring		
12	Spring equalizer			12	Delta ring		
13	O-ring			13	O-ring		
14	Seat o-ring			14	Seat o-ring		
15	O-ring			15	O-ring		

Specifications	
BODY CONSTRUCTION	316 stainless steel
SPRING MATERIAL	17-7PH CRES
SEAL MATERIAL	Neoprene • Viton® • Buna N • EPR • Kalrez® • Silicone (not available for the XR Series)
CONNECTION SIZES	¼"
ORIFICE SIZE	LR6000, MR6000: 0.188" HR6000: 0.094" XR6000: 0.082"

Dimensions

Model No.	¼" Gyrolok x ¼" Gyrolok			¼" Male NPT x ¼" Gyrolok			¼" Male NPT x ¼" Female NPT		
	A	B	C	D	E	F	G	H	J
LR	3.10" max (7.87cm)	1.34" (3.40cm)	0.97" (2.39cm)	3.10" max (7.87cm)	1.44" (3.66cm)	0.97" (2.39cm)	n/a	1.44" (3.66cm)	1.00" (2.54cm)
MR	2.94" max. (7.47cm)	1.34" (3.40cm)	0.97" (2.39cm)	2.94" max. (7.47cm)	1.44" (3.66cm)	0.97" (2.39cm)	2.94" max. (7.47cm)	1.44" (3.66cm)	1.00" (2.54cm)
HR	2.94" max. (7.47cm)	1.34" (3.40cm)	0.97" (2.39cm)	2.94" max. (7.47cm)	1.44" (3.66cm)	0.97" (2.39cm)	2.94" max. (7.47cm)	1.44" (3.66cm)	1.00" (2.54cm)
XR	2.94" max. (7.47cm)	1.34" (3.40cm)	0.97" (2.39cm)	2.94" max. (7.47cm)	1.44" (3.66cm)	0.97" (2.39cm)	n/a	1.44" (3.66cm)	1.00" (2.54cm)



R6000 Series

Operating Pressures

Pressures	LR6000	MR6000	HR6000	XR6000
Cracking Pressure	5–550 psig (.34–37.9 bar)	150–2500 psig (10.3–172.4 bar)	150–5000 psig (10.3–344.8 bar)	5000–6000 psig (344.8–413.8 bar)
Maximum Operating Pressure	5–700 psig (.34–48.2 bar)	150–6000 psig (10.3–413.8 bar)	150–7000 psig (10.3–481.8 bar)	5000–7000 psig (344.8–481.8 bar)
Proof	1050 psig (72.3 bar)	9000 psig (619.5 bar)	9000 psig (619.5 bar)	9000 psig (619.5 bar)
Burst	Over 2800 psig (192.8 bar)	Over 24,000 psig (1652 bar)	Over 24,000 psig (1652 bar)	Over 24,000 psig (1652 bar)
Reseat Pressure	85% of CP > 10 psi 70% of CP < 10 psi	85% of CP	85% of CP	85% of CP

C_v Ratings

Model Orifice	C _v LR6000 0.188"		C _v MR6000 0.188"		C _v HR6000 0.094"		C _v XR6000 0.082"	
	Air	Water	Air	Water	Air	Water	Air	Water
PSI								
5	0.63	0.17	—	—	—	—	—	—
25	0.63	0.17	—	—	—	—	—	—
26	0.64	0.11	—	—	—	—	—	—
80	0.64	0.11	—	—	—	—	—	—
81	0.4	0.07	—	—	—	—	—	—
150	0.4	0.07	—	—	—	—	—	—
151	0.42	0.06	0.79	0.06	0.25	0.03	—	—
250	0.42	0.06	0.79	0.06	0.25	0.03	—	—
251	0.3	0.05	0.79	0.06	0.25	0.03	—	—
350	0.3	0.05	0.79	0.06	0.25	0.03	—	—
351	0.35	0.04	0.61	0.04	0.27	0.03	—	—
550	0.35	0.04	0.61	0.04	0.27	0.03	—	—
650	—	—	0.61	0.04	0.27	0.03	—	—
651	—	—	0.38	0.03	0.27	0.03	—	—
700	—	—	0.38	0.03	0.27	0.03	—	—
701	—	—	0.38	0.03	0.2	0.02	—	—
1001	—	—	0.37	0.02	0.2	0.02	—	—
1300	—	—	0.37	0.02	0.2	0.02	—	—
1301	—	—	0.37	0.02	0.21	0.02	—	—
1500	—	—	0.37	0.02	0.21	0.02	—	—
1501	—	—	0.28	0.02	0.21	0.02	—	—
2000	—	—	0.28	0.02	0.21	0.02	—	—
2001	—	—	0.24	0.02	0.19	0.02	—	—
2500	—	—	0.24	0.02	0.19	0.02	—	—
3000	—	—	—	—	0.19	0.02	—	—
3001	—	—	—	—	0.15	0.01	—	—
4000	—	—	—	—	0.15	0.01	—	—
5000	—	—	—	—	—	—	0.15	0.009
6000	—	—	—	—	—	—	0.12	0.006

R6000 Series

Pressure/Temperature Ratings

Low Pressure

Valve No.	Seal Material	Temperature °F (°C)	Pressure Range psi (bar)
LR6033	Neoprene	-40° to +300° (-40° to +350°)	Up to 25 (Up to 1.72) 26–350 (1.79–24.14) 351–550 (24.20–37.93)
LR6032	Viton®	-20° to +400° (-29° to +204°)	Up to 25 (Up to 1.72) 26–350 (1.79–24.14) 351–550 (24.20–37.93)
LR6077	Buna-N	-65° to +275° (-54° to +135°)	Up to 25 (Up to 1.72) 26–350 (1.79–24.14) 351–550 (24.20–37.93)
LR6062	Ethylene Propylene	-65° to +300° (-54° to +149°)	Up to 25 (Up to 1.72) 26–350 (1.79–24.14) 351–550 (24.20–37.93)
LR6065	Kalrez®	-40° to +550° (-40° to +288°)	Up to 25 (Up to 1.72) 26–350 (1.79–24.14) 351–550 (24.20–37.93)
LR6024	Silicone	-70° to +450° (-57° to +232°)	Up to 25 (Up to 1.72) 26–350 (1.79–24.14) 351–550 (24.20–37.93)

Medium Pressure

Valve No.	Seal Material	Temperature °F (°C)	Pressure Range psi (bar)
MR6033	Neoprene	-40° to +300° (-40° to +350°)	150–350 (10.34–24.14) 351–2500 (24.21–172.41)
MR6032	Viton®	-20° to +400° (-29° to +204°)	150–350 (10.34–24.14) 351–2500 (24.21–172.41)
MR6077	Buna-N	-65° to +275° (-54° to +135°)	150–350 (10.34–24.14) 351–2500 (24.21–172.41)
MR6062	Ethylene Propylene	-65° to +300° (-54° to +149°)	150–350 (10.34–24.14) 351–2500 (24.21–172.41)
MR6065	Kalrez®	-40° to +550° (-40° to +288°)	150–350 (10.34–24.14) 351–2500 (24.21–172.41)
MR6024	Silicone	-70° to +450° (-57° to +232°)	150–350 (10.34–24.14)

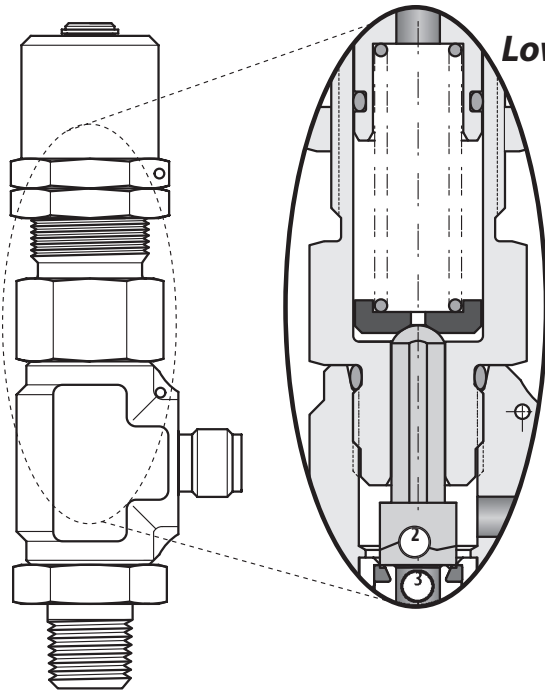
High Pressure

Valve No.	Seal Material	Temperature °F (°C)	Pressure Range psi (bar)
HR6033	Neoprene	-40° to +300° (-40° to +350°)	150–300 (10.34 to 20.69) 301–5000 (20.76 to 344.83)
HR6032	Viton®	-20° to +400° (-29° to +204°)	150–300 (10.34 to 20.69) 301–5000 (20.76 to 344.83)
HR6077	Buna-N	-65° to +275° (-54° to +135°)	150–300 (10.34 to 20.69) 301–5000 (20.76 to 344.83)
HR6062	Ethylene Propylene	-65° to +300° (-54° to +149°)	150–300 (10.34 to 20.69) 301–5000 (20.76 to 344.83)
HR6065	Kalrez®	-40° to +550° (-40° to +288°)	150–300 (10.34 to 20.69) 301–5000 (20.76 to 344.83)
HR6024	Silicone	-70° to +450° (-57° to +232°)	150–300 (10.34 to 20.69)

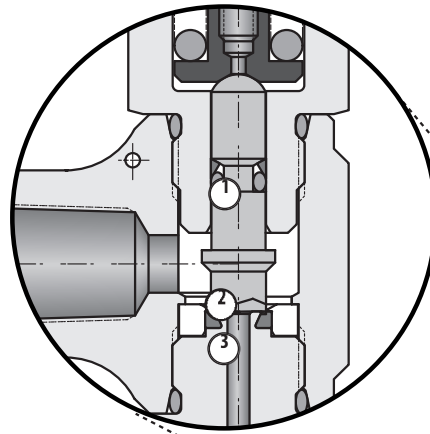
Extra High Pressure

Valve No.	Seal Material	Temperature °F (°C)	Pressure Range psi (bar)
XR6033	Neoprene	-40° to +300° (-40° to +350°)	5000–6000 (344.83–413.79)
XR6032	Viton®	-20° to +400° (-29° to +204°)	5000–6000 (344.83–413.79)
XR6077	Buna-N	-65° to +275° (-54° to +135°)	5000–6000 (344.83–413.79)
XR6062	Ethylene Propylene	-65° to +300° (-54° to +149°)	5000–6000 (344.83–413.79)
XR6065	Kalrez®	-40° to +550° (-40° to +288°)	5000–6000 (344.83–413.79)

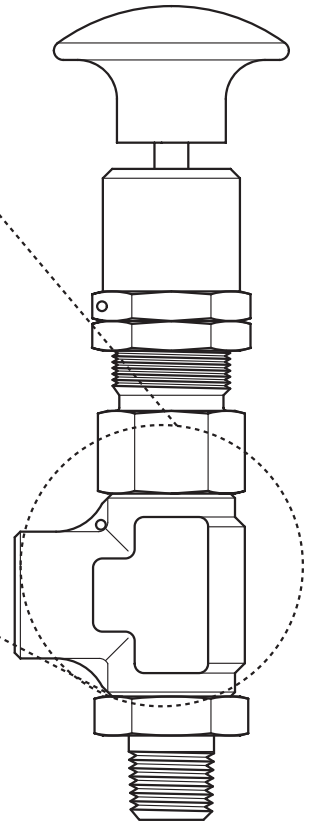
R6000 Series



Low Pressure (5–550 psig)

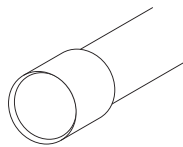


High Pressure (150–5,000 psig)
Extra High Pressure (5,000–6,000 psig)



O-ring & Delta backup ring

Raised seal lip



Fully encapsulated seat seal

R6000 Series

Crack Pressure Range

Select appropriate code

Low Pressure		Medium Pressure		High Pressure		Extra High Pressure	
Code	Range in PSI (BAR)	Code	Range in PSI (BAR)	Code	Range in PSI (BAR)	Code	Range in PSI (BAR)
A	5–25 (.34–1.72)	B	150–350 (10.34–24.14)	A	150–300 (10.34–20.69)	A	5000–6000 (344.83–413.79)
B	26–80 (1.79–5.52)	C	351–650 (24.21–44.83)	B	301–700 (20.76–48.28)		
C	81–150 (5.58–10.34)	D	651–1000 (44.90–68.96)	C	701–1300 (48.34–89.65)		
D	151–250 (10.41–17.24)	E	1001–1500 (69.03–103.45)	D	1301–2000 (89.72–137.93)		
E	251–350 (17.31–24.14)	F	1501–2000 (103.52–137.93)	E	2001–3000 (138.00–206.90)		
F	351–550 (24.20–37.93)	G	2001–2500 (138.00–172.41)	F	3001–4000 (206.96–275.86)		
				G	4001–5000 (275.93–344.83)		

How to Order

LR60 24 – 2MP – A C M

BASIC MODEL NUMBER

- LR60** Low pressure
5–550 psi
- MR60** Medium pressure
150–2500 psi
- HR60** High pressure
150–5000 psi
- XR60** Extra high pressure
5,000–6000 psi

SEAL MATERIAL

- 24** Silicone*
- 32** Viton®
- 33** Neoprene
- 62** Ethylene propylene
- 65** Kalrez®
- 77** Buna-N

MANUAL OVERRIDE
(optional, not available for LR or XR series)
MR series only available up to 350 psi.
HR series only available up to 700 psi.

SPRINGS
See Crack Pressure table above**

PORT SIZE

	Inlet	Outlet
2MP	¼" male NPT	¼" female NPT
2M4G	¼" male NPT	¼" Gyrolok®
4G	¼" Gyrolok®	¼" Gyrolok®
6Z	6mm Gyrolok®	6mm Gyrolok®
8Z	8mm Gyrolok®	8mm Gyrolok®
12Z	12mm Gyrolok®	12mm Gyrolok®

CE 0035/PED certification is standard for all R6000 valves

- * Not available for XR series.
- * MR series only available up to 350 psi.
- * HR series only available up to 300 psi.

** Customer can request a specific cracking pressure when ordering. Otherwise, the factory sets the valve at the midpoint of the cracking pressure range selected. Valves with specific cracking pressure come standard with factory installed lockwire.

For Your Safety

It is solely the responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation, and maintenance of these products. Material compatibility, product ratings and application details should be considered in the selection. Improper selection or use of products described herein can cause personal injury or property damage.