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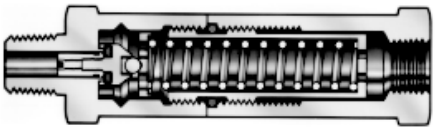
CIRCLE SEAL CONTROLS, INC.
A division of CIRCOR International, Inc.



5100 Series
Inline Relief Valve
10 to 2,400 PSIG

Features

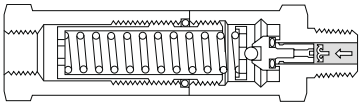
- Zero Leakage to 95% of Cracking Pressure
- Positive Reseal at a High Percentage of Cracking Pressure
- Accurate Set Pressure
- Wide Range of Cracking Pressure
- Tamper Proof Adjustment

Technical Data

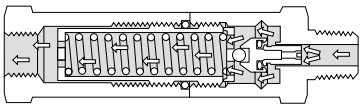
Body Construction Materials:	• Brass, Steel, 303 or 316 Stainless Steel
O-ring Materials:	• Buna N, EPR, Neoprene, Teflon® and Viton®
Spring Material:	• 17-7 PH Stainless Steel
Operating Pressure:	• 0 to 2,400 PSIG (166 BAR)
Proof Pressure:	• 3,750 PSIG (259 BAR)
Burst Pressure:	• Over 5,000 PSIG (345 BAR)
Temperature Range:	• 320° F to +400° F (-196° C to +204° C) Based on o-ring material, see “How to Order”
Connection Sizes:	• 1/8 inch to 1-1/4 inch

NOTE: Proper filtration is recommended to prevent damage to sealing surfaces.

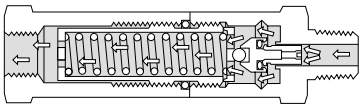
How it Works



CLOSED
The spring load is carried by a metal-to-metal stop. The o-ring provides a leak tight seal. Sealing efficiency increases as the pressure increases up to the cracking pressure.



CRACKING
The ports in poppet open fully and eliminate rapid increase in the pressure. The flow is throttled between the poppet shoulder and the seat, which provides regularly increasing flow area with increasing flow rates.



OPEN
The inline construction and full flow ports permit maximum flow with minimum increase in the system pressure.

5100 Series 10 to 2,400 PSIG

CRACKING PRESSURE SPRING RANGES
Consult your local distributor or the factory for replacement spring part numbers.
(Please have your complete valve part number ready when calling.)

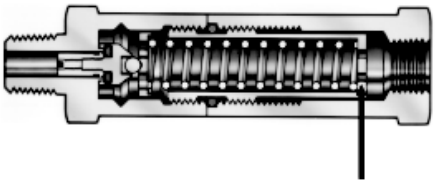
C.P. Range	C.P. Range	C.P. Range	C.P. Range
10–15	82–117	346–450	1201–1400
16–24	118–162	451–575	1401–1900
25–41	163–230	576–710	1901–2400
42–57	231–285	711–999	—
58–81	286–345	1000–1200	—

ADJUSTMENT
The 5100 Series Relief Valve is adjustable to ±15% of its nominal cracking pressure, as follows:

1. Remove discharge line (in-line mounted unit) or override ring & rod (ASME type).
2. "Break" body joint by wrenching hexes. DO NOT USE PIPE WRENCH.
3. Insert proper size hex wrench (see table) into the outlet end and turn clockwise to increase the cracking pressure or counter clockwise to decrease.
4. After adjustment, hold the hex wrench stationary relative to the inlet end and turn the body to tighten the joint.
5. Test adjusted unit for cracking pressure.

HEX WRENCH SIZE (see Adjustment)

Size	Nominal Cracking Pressure	
	450 & Under	451 & Over
1/8"	7/32	7/32
1/4"	5/16	1/4
3/8"	5/16	1/4
1/2"	1/2	3/8
3/4"	9/16	1/2
1"	9/16	1/2
1-1/4"	3/4	3/4



Hex Adjustment Screw

For Your Safety
It is the sole 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 here in can cause personal injury or property damage.

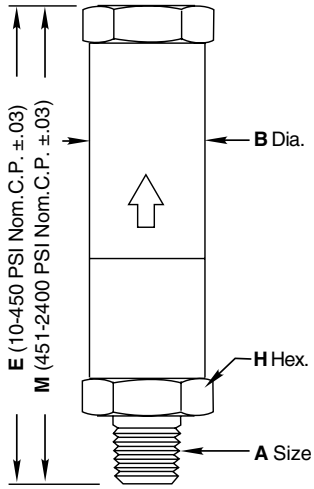
Repair Kits
In normal service the only part(s) which may require replacement is(are) the seal(s). A repair kit may be ordered by placing a K/ in front of the complete part number, (i.e. K/ 5159B-2MP-20).

5100 Series 10 to 2,400 PSIG

Replacement Parts

Dimensions (Inches)

MP

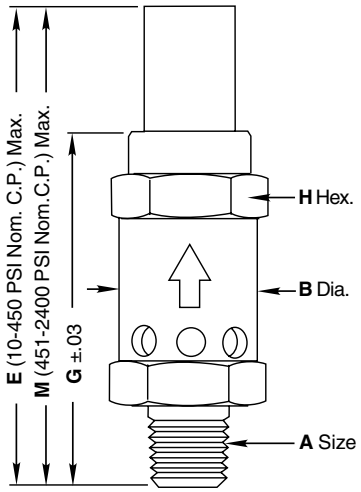


MP - 5100 SERIES INLINE

Prod. No.	A Size	E	M	B Dia. H Hex.
1MP	1/8"	2.89	3.49*	.81*
2MP	1/4"	3.34	4.24	1.00
3MP	3/8"	3.36	4.26	1.00
4MP	1/2"	4.15	5.05	1.25
6MP	3/4"	5.61	7.11	1.50
8MP	1"	5.79	7.29*	1.50
10MP	1-1/4"*	7.46	10.22	2.00

*1/8" size; for C.P. 1201-2400 PSIG, "M" is 3.95, "B" and "H" are1.00; 1" size; for C.P. 1201-2400 PSIG, "M" is 7.32, 1-1/4" size, not available above1200 PSIG.

M



M - 5100 SERIES POPOFF

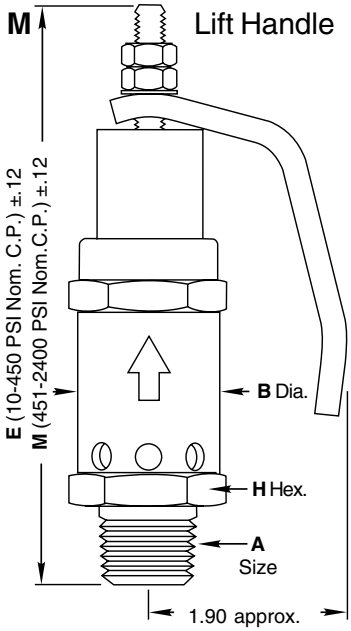
Prod. No.	A Size	E	M	G	B Dia. H Hex.
1M	1/8"	2.56	3.16*	2.39*	.81*
2M	1/4"	2.87	3.77	2.65	1.00
3M	3/8"	2.89	3.79	2.74	1.00
4M	1/2"	3.59	4.49	3.27	1.25
6M	3/4"	5.00	6.50	4.16	1.50
8M	1"	5.18	6.68	4.34	1.50
10M	1-1/4"	6.70	8.65	4.96	2.00

* Exceptions: 1/8" size; for C.P. 1201-2400 psi "M" is 3.58, "G" is 2.48. "B" is 1.00; 1-1/4", not available above 1200 PSIG.

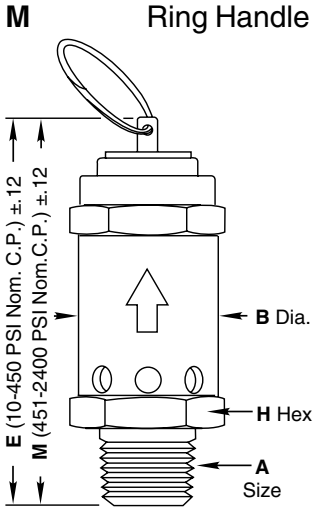
5100 Series 10 to 2,400 PSIG

Replacement Parts

Dimensions (Inches)



For 1/2″ with cracking pressures of 451–2400 PSI and 3/4″ through 1-1/4″ with cracking pressures of 451–1200 PSI.



For 1/8″ through 3/8″ with cracking pressures of 10–2400 PSI and 1/2″ through 1-1/4″ with cracking pressures of 10–450 PSI.

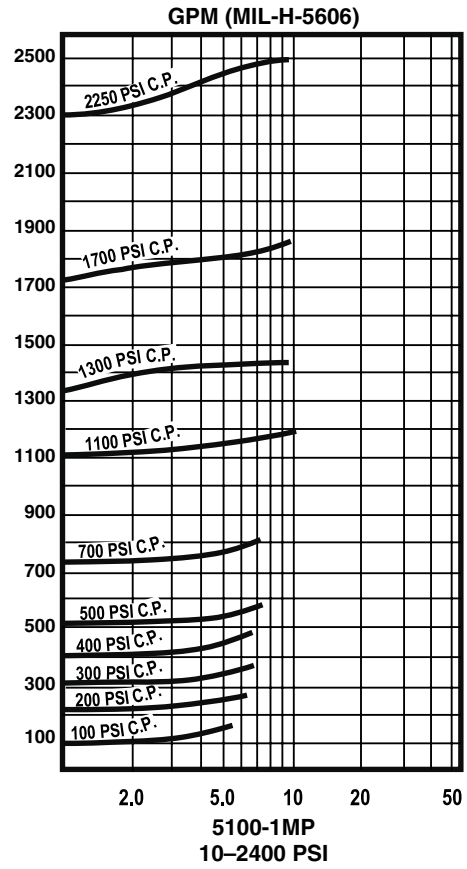
M - M5100 SERIES POPOFF WITH MANUAL OVERRIDE

Prod. No.	A Size	E	M	B Dia. H Hex.
1M	1/8"	2.84	3.45*	.81*
2M	1/4"	3.16	4.06	1.00
3M	3/8"	3.19	4.09	1.00
4M	1/2"	3.86	5.51	1.25
6M	3/4"	5.41	7.54	1.50
8M	1"	5.59	7.72	1.50
10M	1-1/4"*	6.95	10.42	2.00

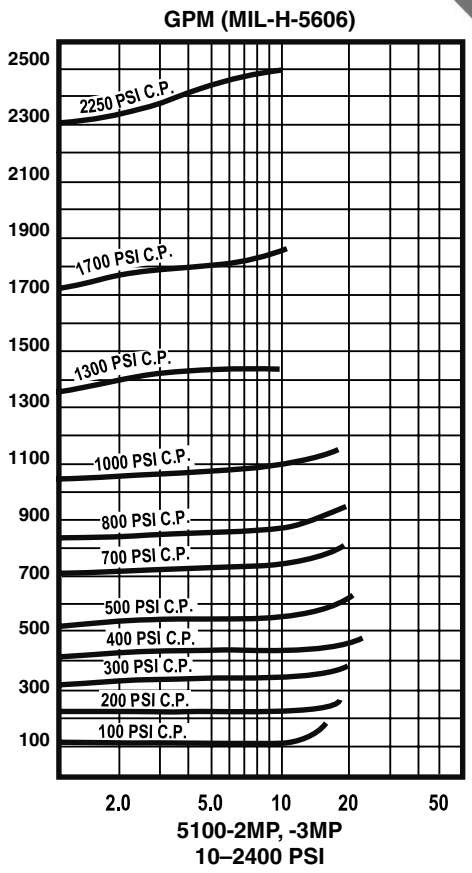
* Exceptions: 1/8" size; C.P. 1201-2400 psi "M" is 3.84, "H" and "B" are 1.00; 1-1/4" size, not available above 1200 psi

5100 Series 10 to 2,400 PSIG

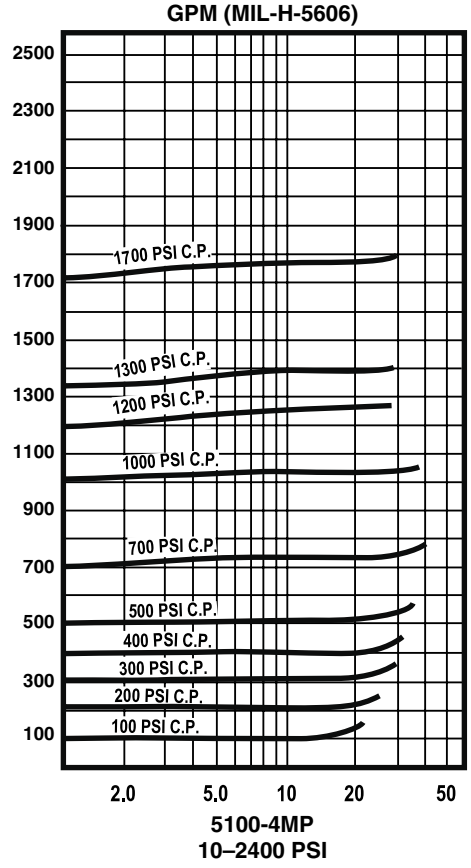
Hydraulic Flow Curves



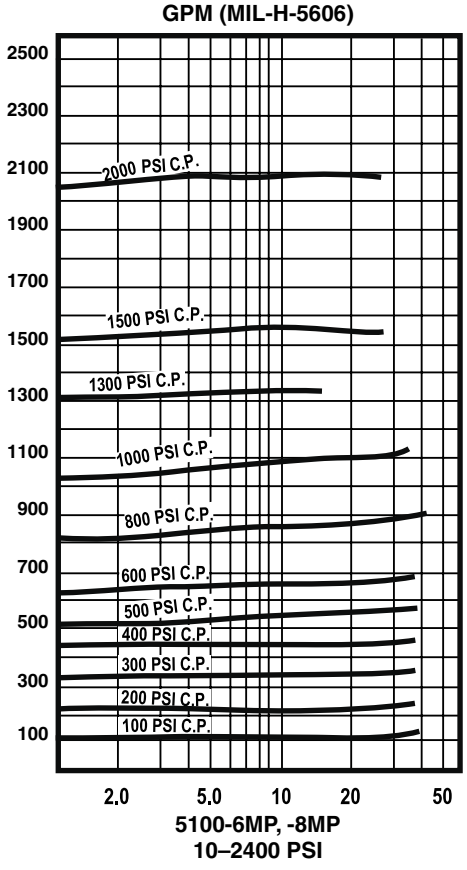
5100-1MP
10–2400 PSI



5100-2MP, -3MP
10–2400 PSI



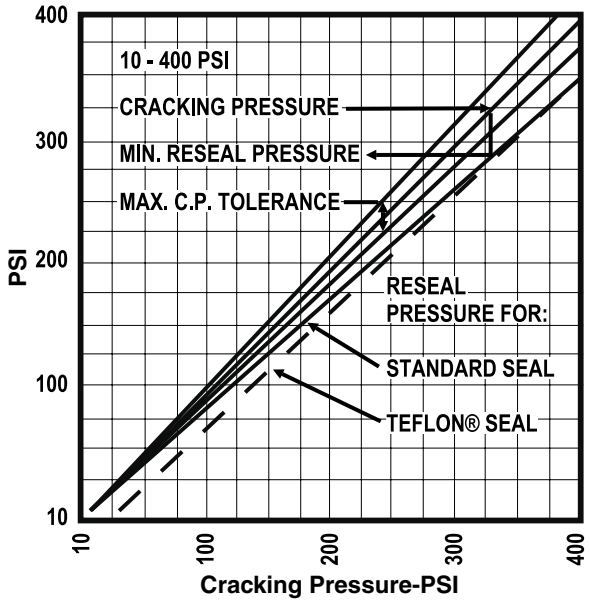
5100-4MP
10–2400 PSI

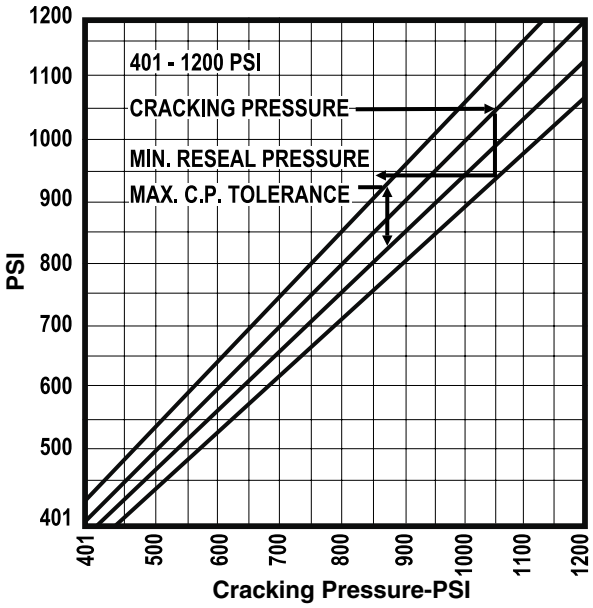


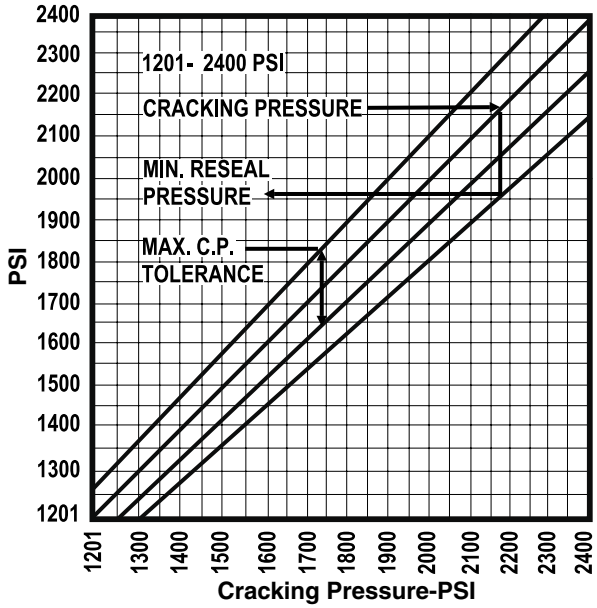
5100-6MP, -8MP
10–2400 PSI

5100 Series 10 to 2,400 PSIG

Cracking & Reseal Pressure







Definitions

1. **Cracking pressure** is defined as 5cc/min. with gas (0.2 scfm for model 5120).
2. **Reseat point** is the point at which the valve closes, cutting off virtually all flow.
3. The **reseal point** is the point at which the valve seals absolutely tight so that there is no leakage detectable by normal means of measurement.

Air Flow Rates – (5100-MP)

Inline valves 1/8″–1″

Crack Pressure PSIG	Percent Over Pressure Beyond Cracking (SCFM air at room temperature)							
	10%				25%			
	1MP	2MP/3MP	4MP	6MP/8MP	1MP	2MP/3MP	4MP	6MP/8MP
15	1.0	1.5	5.0	9.0	3.0	5.0	50	52
20	1.5	2.0	10	12	4.0	5.0	60	63
25	2.0	2.7	25	27	5.4	6.5	65	67
30	2.4	4.6	30	36	6.2	13	68	71
40	3.0	5.5	34	55	6.5	25	72	100
50	3.0	10.5	40	65	8.0	29	74	110
75	4.2	18	50	70	13	38	80	114
100	6.0	25	54	90	17	55	90	130
125	8.5	32	70	120	22	58	110	136
150	10	36	72	150	27	78	115	200
200	13	40	135	190	40	96	250	375
250	16	50	150	210	43	115	280	450
300	20	60	180	225	52	127	400	600
400	25	80	270	270	68	150	600	900
500	36	46	110	190	108	120	320	700
750	45	58	130	210	90	130	420	1200
1000	47	64	170	210	160	160	620	1280
1200	67	74	240	250	200	200	1000	1500
1400	84	84	450	3950	—	—	—	—
1600	110	110	720	4050	—	—	—	—
1800	160	160	810	5100	—	—	—	—
2000	190	190	850	5150	—	—	—	—
2200	220	220	900	5200	—	—	—	—
2400	240	240	990	6750	—	—	—	—

5100 Series 10 to 2,400 PSIG

How to Order

M 51 59 B – 2 MP (L) – 20

VARIATION
- **K** - Cryogenic Service, special cleaning and testing (Stainless Steel valves only)
- **M** - Manual override
- **R** - Right angle configuration

BASIC MODEL NUMBER
- **5100** Series

O-RING MATERIAL, TEMPERATURE & CRACKING PRESSURE RANGE

59 - Buna N	-40° F to +250° F
62 - Ethylene Propylene	-40° F to +300° F
33 - Neoprene	-40° F to +250° F
32 - Viton®	-20° F to +400° F
20 - Teflon® (5120)	-100° F to +400° F
20* - Teflon® (K5120)	-320° F to +165° F
80* - Teflon® (5180)	-320° F to +165° F

BODY MATERIAL
- **B** - Brass
- **S** - Steel
- **T** - 303 Stainless Steel
- **T1** - 316 Stainless Steel

VALVE SIZE
(Pipe sizes in 1/8″ increments)

2 - 1/4″	**5** - 3/4″
3 - 3/8″	**6** - 1″
4 - 1/2″	**8** - 1-1/4″

CONNECTIONS – Inlet/Outlet
- **M** - Popoff Male pipe
- **MP** - Inline Male Pipe by Female Pipe

SPECIAL CHARACTERISTICS
- **L** - Lockwire
- **R** - Resonance dampener (std. for 1201-2400 C.P.'s with elastomeric seals)

CRACKING PRESSURE
Specify cracking pressure setting in PSIG
- **20** - 20 PSIG

Notes:
* Unit is not rated for liquid Cryogenic Service below -100° F.
O-rings of Teflon® - Minimum cracking pressure is 20 psi; not available for use above 1200 psi in 3/4″ and larger sizes.

Teflon® and Viton® are registered trademarks of Dupont.

Cracking Pressure Tolerance ±5%
Cracking pressures below 20 PSIG have a tolerance of ±20%.

Flow at Cracking Pressure

Elastomeric Seals	5cc/minute
Teflon® Seals	.02 SCFM

Reseal Pressure**	**Crack Pressure**	**Reseal Pressures**
Elastomeric Seals	CP >100 PSI	90% of CP
	CP <100 PSI	70% to 89% of CP
Teflon® Seals	CP >450 PSI	90% of CP
	CP <450 PSI	52% to 90% of CP

Leakage

Elastomeric Seals	Ascending Pressure – zero up to 95% of CP Descending Pressure – zero at reseal and below
Teflon® Seals	Ascending Pressure – zero up to reseal pressure, then 10cc/min between reseal and CP Descending Pressure – zero @ reseal except with cracking pressure below 451 PSI then 1cc/min max

First Crack Pressure After Standing Unactuated for a Prolonged Period:

Set Pressure	5 – 19 PSI	125% of CP
	20 – 29 PSI	120% of CP
	30 – 49 PSI	115% of CP
	50 PSI & higher	110% of CP

**The reseal point is the point at which the valve seals absolutely tight so that there is no leakage detectable by normal means of measurement. The point at which the valve closes, cutting off virtually all flow, is called the reseat point. The reseat point is substantially above reseal.