



ANDERSON GREENWOOD MLCP PRESSURE RELIEF VALVES

MODULATING LARGE CAPACITY PILOT OPERATED

A simple, high performance, cost effective internally-sensed modulating large capacity pilot (MLCP) operated valve



FEATURES

- Rigid integral pilot mounting eliminates the need for mounting brackets and lowers the center of gravity.
- FKM soft seats and seals reduce emissions and product loss while minimizing maintenance costs.
- Simple design helps reduce maintenance time.
- Full bore orifices provide for maximum capacity, reducing valve and associated piping.
- Internal sensing helps reduce maintenance time, provides for a more compact design and eliminates tubing and fittings.
- Modulating action helps reduce product loss and maintains pressure stability in the system.
- Full rated capacity at 10% overpressure allows for increased set pressures and/or a smaller valve in a given application.
- Manual blowdown via field test connection.
- Normally-closed solenoid valve at field test connection for remote valve opening (optional).

GENERAL APPLICATION

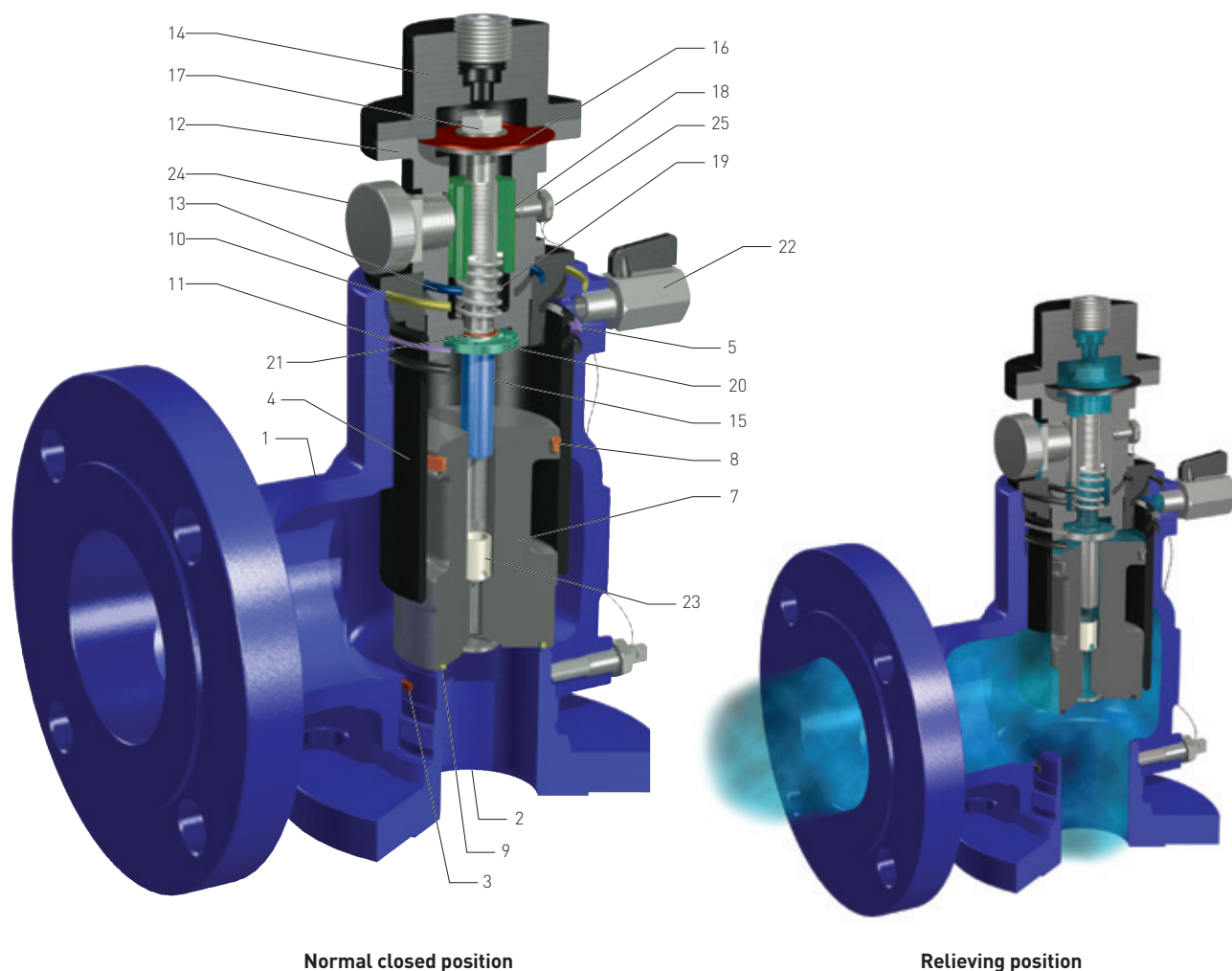
The MLCP is a modulating pilot operated valve designed for gas and vapor service which is ideal to protect gas distribution pipelines, positive displacement blowers and for applications that normally require spring loaded conservation vents.

TECHNICAL DATA

Sizes:	2" x 3" to 6" x 8" (50 mm to 150 mm)
Orifices:	3.141 to 28.274 in ² (20.6 to 182.41 cm ²)
Inlet ratings:	ANSI Class 150
Temperature range:	-20 to 400°F (-29 to 205°C)
Set pressures:	3 to 14.99 psig (0.207 to 1.03 barg)

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Normal closed position

Relieving position

PARTS AND MATERIALS

No.	Part	Material
1	Body	WCB
2	Inlet flange	CS
3	Inlet flange seal	FKM
4	Liner	Steel
5	Retaining ring	CS
6	Backup ring ¹	FKM
7	Piston	Aluminum/ anodized
8	Piston seal	FKM
9	Piston seat	FKM
10	M.V. cap	Aluminum/ anodized
11	M.V. cap seal	FKM
12	Pilot body	Aluminum/ anodized
13	Pilot body seal	FKM
14	Pilot caps	Aluminum/ anodized

No.	Part	Material
15	Sense tube	SS
16	Diaphragm	FKM
17	Seal nut	SS/FKM
18	Spring adjustment nut	Aluminum
19	Spring	SS
20	Pilot seat retainer	SS
21	Pilot seat	FKM
22	Ball valve	Brass/chrome plated
23	Internal sense shuttle	PEEK
24	Pilot vent	Aluminum
25	Pilot adjustment lock screw	SS

NOTES

1. 6" valve only (not shown)
2. U.S. patent number 6.318.406

Body sizes and ANSI flange ratings

- 2" 150# x 3" 150#
- 3" 150# x 4" 150#
- 4" 150# x 6" 150#
- 6" 150# x 8" 150#

Recommended soft goods limits

- Material: FKM
- Continuous process temperature: -20°F to +400°F (-29°C to +204°C)
- Pressure range: 3 to 14.99 psig (0.207 to 1.03 barg)

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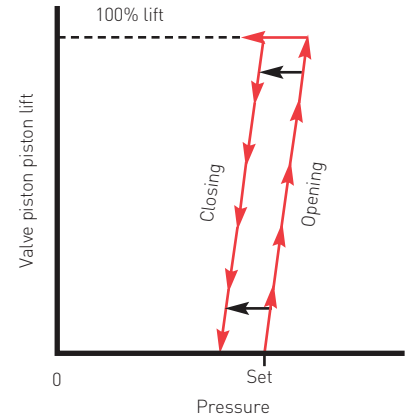
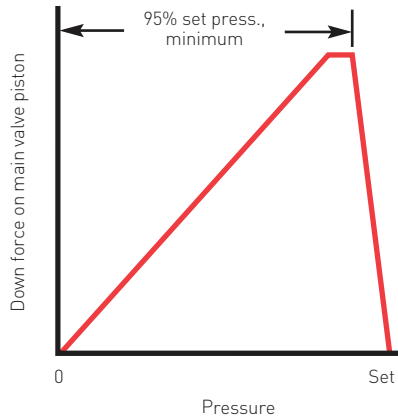
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OPERATION

In the normal closed position, full system pressure is sensed through the bottom of the piston and seen on top of the piston or in the dome area. As the area on top of the piston is greater than the seat area, the piston is held closed. The same system pressure is sensed through the sense tube up into the pilot's sense cavity, acts down on the pilot sense diaphragm and is opposed by a spring.

Just prior to set pressure, the system pressure working down on the sense diaphragm will be enough to compress the spring and open the pilot seat, creating dome pressure reduction. The pressure in the dome will continue to be reduced to the point where the force created by the system pressure acting up on the piston is equal to the force created by the dome pressure acting down on the piston. Any increase in system pressure will lift the piston and allow the pressure to vent through the main valve. This occurs at set pressure.

Once the system pressure is reduced, dome pressure recovers, pushing the piston into the closed position.



SIZING DATA

Sizing formulas

English units

$$A = \frac{V \sqrt{MTZ}}{4645 K_b P_1 F}$$

Metric units

$$A = \frac{V \sqrt{MTZ}}{12.510 K_b P_1 F}$$

Subsonic flow factor

$$F = \sqrt{\frac{k}{k-1} \left[\left(\frac{P_2}{P_1} \right)^{\frac{2}{k}} - \left(\frac{P_2}{P_1} \right)^{\frac{k+1}{k}} \right]}$$

Subsonic flow coefficient

$$K_d = 0.717 \left(\frac{P_2}{P_1} \right)^{-0.290}$$

For 6" valve only

$$K_d = 0.6958 \left(\frac{P_2}{P_1} \right)^{-0.2189}$$

NOMENCLATURE

Symbol	Description	English units	Metric units
A	Calculated orifice area	in ²	cm ²
V	Required capacity	SCFM	Nm ³ /hr
M	Molecular weight	-	-
T	Relieving temperature (°R = °F + 460 or °K = °C + 273)	°R	°K
Z	Compressibility factor	-	-
P	Set pressure	psig	barg
P ₁	Inlet flowing pressure (P + allowable overpressure - inlet pressure loss + atmospheric pressure)	psia	bara
P ₂	Outlet flowing pressure	psia	bara
K _b	Back pressure correction factor	-	-
k	Ratio of specific heats (k = C _p /C _v)	-	-

ORIFICE AREAS

Valve size		Orifice area	
in	mm	in ²	cm ²
2 x 3	50 x 80	3.141	20.26
3 x 4	80 x 100	7.069	45.60
4 x 6	100 x 150	12.567	81.07
6 x 8	150 x 200	28.274	182.41

AIR CAPACITIES*

Valve size, in	2 x 3	3 x 4	4 x 6	6 x 8
Orifice size, in ²	3.141	7.069	12.567	28.274
Set pressure				
3	624	1405	2497	5375
4	731	1646	2926	6271
5	829	1865	3316	7079
6	920	2069	3679	7824
7	1005	2262	4022	8523
8	1087	2446	4349	9185
9	1166	2623	4663	9815

*SCFM, 10 percent overpressure, 60°F, Z = 1.00

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SELECTION GUIDE

Example:	MLCP	06	A	1	A	1	D	1	V	0	C	S
Size												
02												
2 x 3 full bore												
03												
3 x 4 full bore												
04												
4 x 6 full bore												
06												
6 x 8 full bore												
Inlet pressure class												
A												
ANSI Class 150 inlet flange												
X												
Special pressure class												
Inlet flange face												
1												
Raised face (spiral serrations)												
X												
Special flange face												
Outlet pressure class												
A												
ANSI Class 150 outlet flange												
X												
Special pressure class												
Outlet flange face												
1												
Raised face (spiral serrations)												
X												
Special flange face												
Pressure setting ranges												
A												
3.00 to 4.99 psig setting range												
B												
5.00 to 7.99 psig setting range												
C												
8.00 to 10.99 psig setting range												
D												
11.00 to 14.99 psig setting range												
Material of construction												
1												
Carbon steel/stainless steel/aluminum												
Soft goods material												
V												
FKM												
X												
Special elastomer material												
Design revision												
0												
Current design revision code												
Accessories												
N												
No accessories required												
A												
Remote sense												
B												
Remote blowdown												
C												
Remote sense and blowdown												
Valve profile												
S												
Standard valve (no "X" codes in model number)												
X												
Special valve ("X" codes in model number)												