

ANDERSON GREENWOOD

Product Overview

The Anderson Greenwood MLCP (Modulating Large Capacity Pilot Valve) is one of the first internal sensed pilot operated pressure relief valves to be released to the market. The MLCP provides many of the benefits of more complex valves, but in a simple, high performance, cost effective design.

The MLCP is a modulating pilot operated valve designed for gas and vapor service. It is ideal to protect gas distribution pipelines and positive displacement blowers. Moreover, with a set pressure range of 3 psig to 14.99 psig [0.2 to 1.03 barg], it is perfect for applications that normally require spring loaded conservation vents.

The MLCP will maintain zero leakage in excess of 92% of set pressure, while conservation vents will show leakage at 70% of set pressure.

Features and Benefits

- Rigid Pilot Mounting – The MLCP pilot, being integral to the main valve, helps eliminate the need for mounting brackets and lowers the center of gravity.
- Viton® Soft Seats and Seals – Helps reduce emissions and product loss, while minimizing maintenance costs.
- Simple Design – Helps reduce maintenance time.
- Full Bore Orifices – Provide for maximum capacity in a given size, often reducing the size of the valve required and the size of associated piping.
- Internal Sensing – Helps reduce maintenance time, provides for a more compact design, and eliminates concerns related to tubing and fittings.

A simple, high performance and cost effective pilot operated valve.

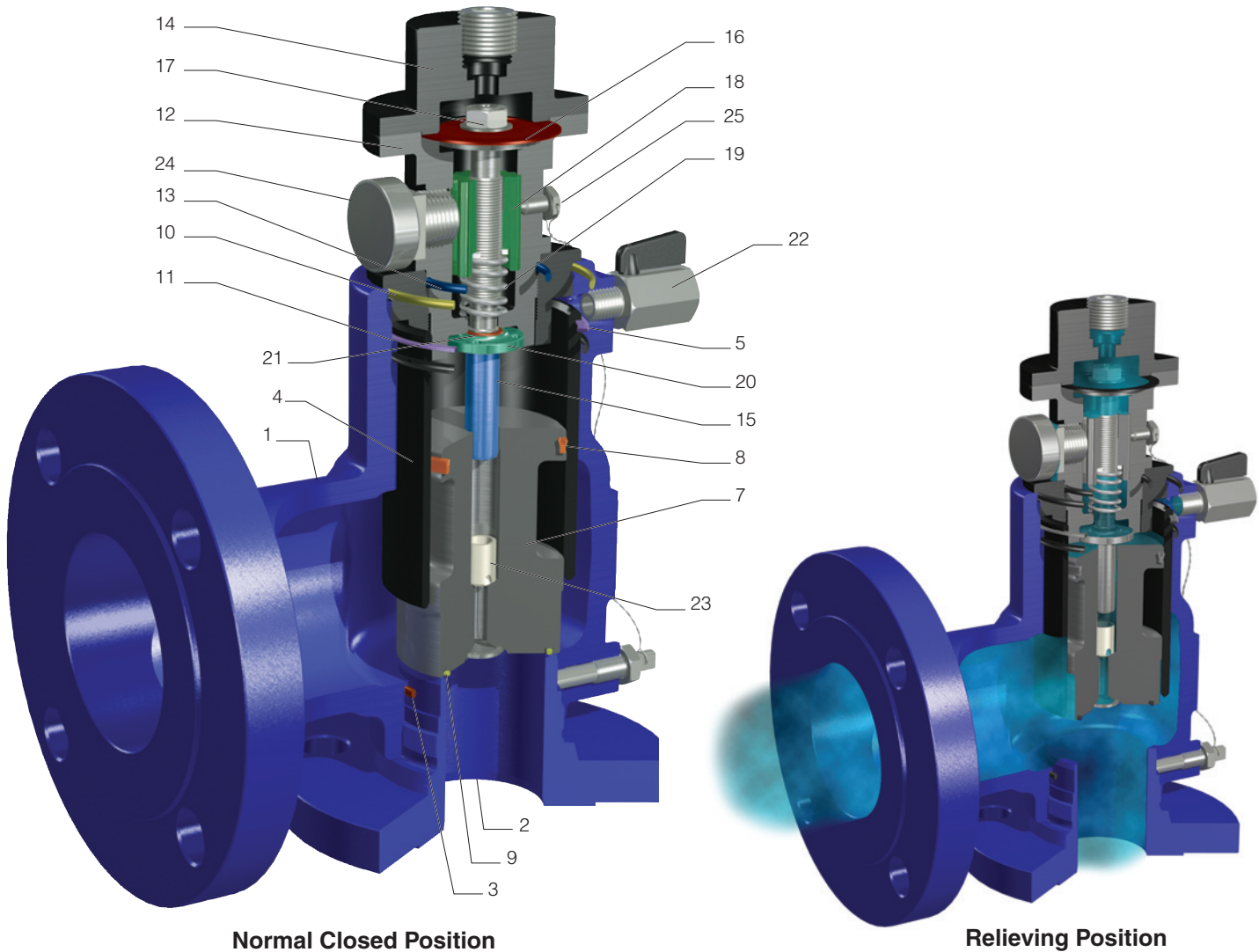


- Modulating Action – Helps reduce product loss and maintains pressure stability in the system.
- Full Rated Capacity at 10% Overpressure – Allows for increased set pressures and/or a smaller valve in a given application.

Options

- Field test connection (standard).
- Manual blowdown via field test connection.
- Provide normally-closed solenoid valve at field test connection to remotely open the valve.

Anderson Greenwood MLCP Modulating Large Capacity Pilot Valve



Normal Closed Position

Relieving Position

Parts and Materials

No.	Part	Material	No.	Part	Material
1	Body	WCB	15	Sense Tube	SS
2	Inlet Flange	CS	16	Diaphragm	Viton®
3	Inlet Flange Seal	Viton®	17	Seal Nut	SS/Viton®
4	Liner	Steel		Spring	
5	Retaining Ring	CS	18	Adjustment Nut	Aluminum
6	Backup Ring1	Viton®	19	Spring	SS
7	Piston	Aluminum/ Anodized	20	Pilot Seat Retainer	SS
8	Piston Seal	Viton®	21	Pilot Seat	Viton®
9	Piston Seat	Viton®	22	Ball Valve	Brass/Chrome Plated
10	M.V. Cap	Aluminum/ Anodized	23	Internal Sense Shuttle	PEEK
11	M.V. Cap Seal	Viton®	24	Pilot Vent	Aluminum
12	Pilot Body	Aluminum/ Anodized	25	Pilot Adjustment Lock Screw	SS
13	Pilot Body Seal	Viton®			
14	Pilot Caps	Aluminum/ Anodized			

Notes: 1. 6" valve only (not shown)
2. U.S. Patent Number 6,318,406

Operating Pressures and Temperatures

Set pressure ranges are from 3 to 14.99 psig [0.207 to 1.03 barg].

Operating temperature is between -20°F to 400°F [-29 to +204°C].

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: Viton®

Continuous Process Temperature: -20°F to +400°F [-29°C to +204°C]

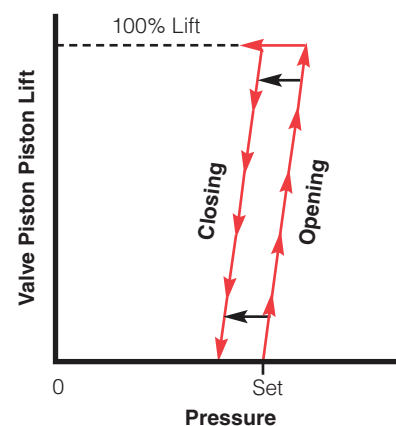
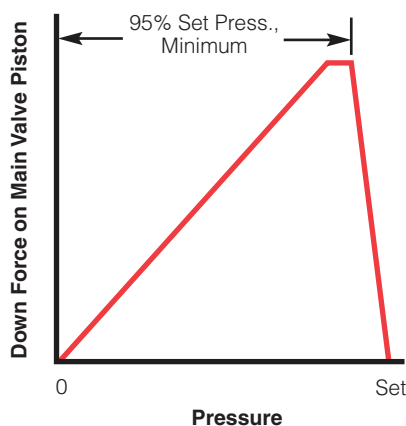
Pressure Range: 3 to 14.99 psig [0.207 to 1.03 barg]

Operation

In the normal closed position, full system pressure is sensed through the bottom of the piston. This pressure is seen on top of the piston or in the dome area. The area on top of the piston is greater than the seat area and thus, the piston is held closed. The same system pressure is sensed through the sense tube up into the sense cavity of the pilot. This pressure 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 great 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 will be equal to the force created by the dome pressure acting down on the piston. Then any increase in the

system pressure will lift the piston and allow the system pressure to vent through the main valve. This piston lift 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

$$K_d = 0.6958 \left(\frac{P_2}{P_1} \right)^{-0.290}$$

Orifice Areas

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

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)	-	-

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
10	1241	2793	4966	10420
11	1315	2958	5259	11003
12	1386	3118	5544	11566
13	1455	3274	5822	12112
14	1523	3427	6093	12643
15	1589	3576	6358	13160

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

