tyco
Flow Control

ANDERSON
GREENWOOD
CROSBY

Pilot operated pressure relief valves.

Features and Benefits

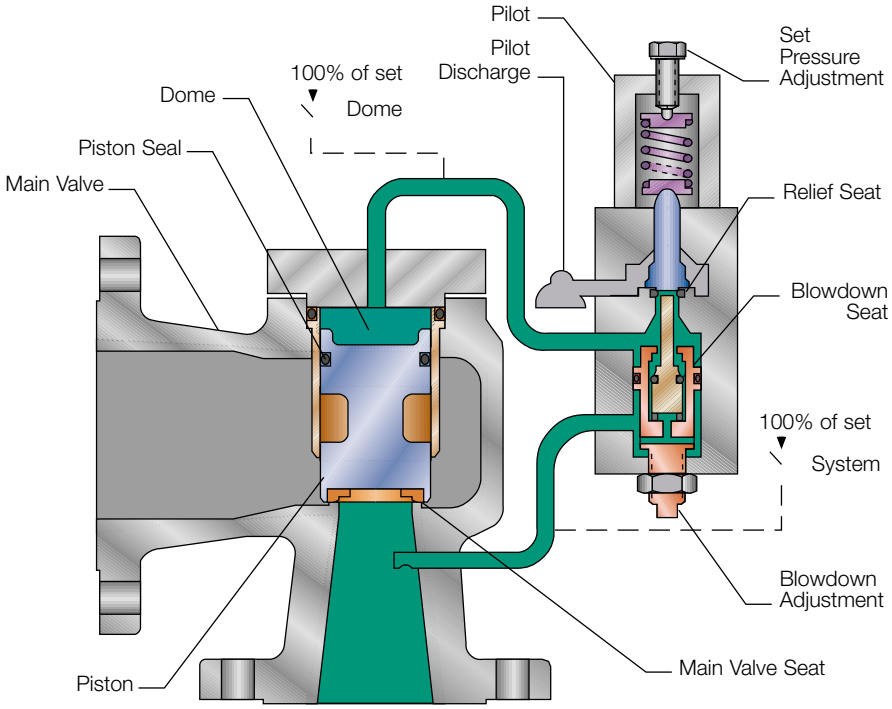
- **Soft Seat Design**
  Provides repeatable bubble-tight performance before and after each relief cycle.
- **Metal-to-Metal Seat Design**
  Provides pilot valve performance in high temperature service.
- **Bubble-tight Seats Near Set Pressure**
  Allows higher system operating pressure and, therefore, maximum process output; not as sensitive to vibrational and pulsating service; reduces product loss.
- **Pop Action Available**
  No main valve throttling, which helps prevent freeze-ups in cryogenic or refrigerant type services.
- **Modulation Action Available**
  Minimized product loss per relief situation; reduced environmental pollution; avoids oversizing consequences; not as sensitive to inlet pressure losses as pop action.
- **Field Test Connection**
  Quick simple verification of set pressure while valve remains in service.
- **Balanced Design**
  Lift not affected by back pressure; no expensive and fragile bellows required as with direct spring valves.
- **Externally Adjustable Blowdown**
  Allows blowdown adjustment with valve in service; no costly removal of valve or system shutdown required.
- **Patented, Piston Wedge Ring**
  Prevents resonant chatter; no resultant severe valve damage, lost product or hazard to personnel.
- **Full Lift at Set Pressure**
  No overpressure required for full lift when pop action is used.
- **Replaceable Soft Seats and Seals**
  All seats and seals are easily and quickly renewable; no expensive, timeconsuming lapping required.

Why Specify Pilot Operated Pressure Relief Valves?

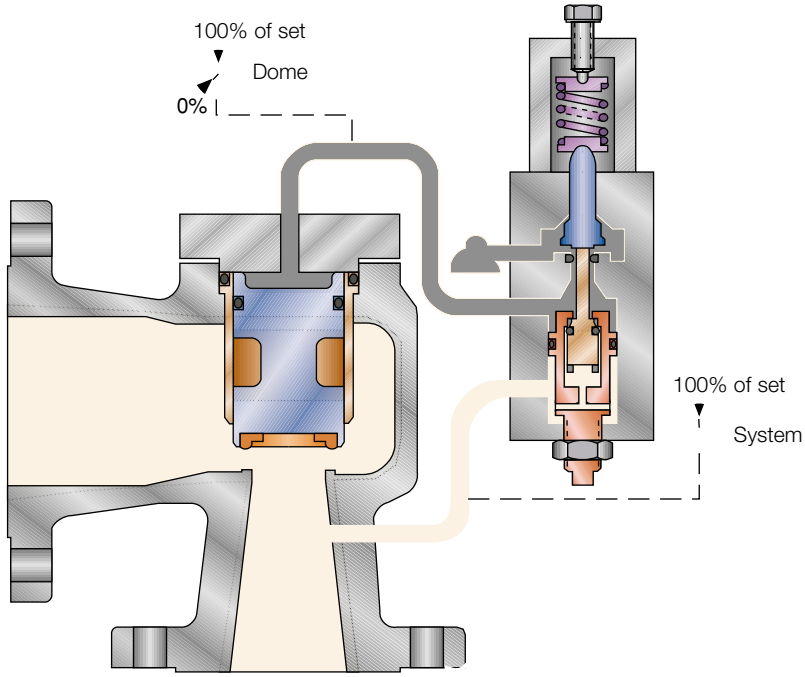
- Reduced Installation Costs
- Reduced Product Loss
- Increased Production Levels
- Reduced Maintenance Costs
- Reduced Environmental Pollution
- Increased Operating Income

Main application

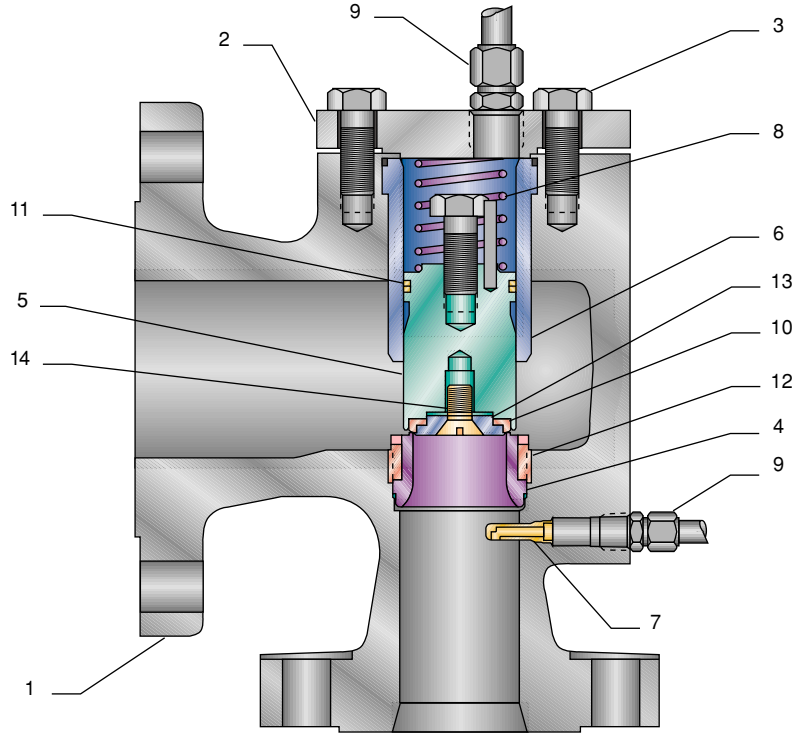
Premium pressure protection in oil and gas industries onshore and offshore, cryogenic applications (LNG, LPG, LIN, LOX...), chemical plant, marine, pul and paper industry, ...



Normal Closed Position



Relieving Position

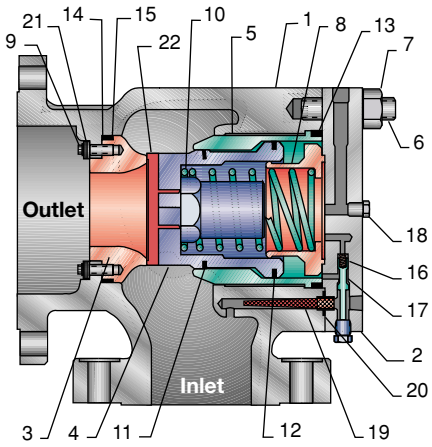


Materials of Construction

Item	Description	/S1 -29°C to +537°C[1] [-20°F to +1000°F[1]]	/S1/NACE -29°C to +537°C[1] [-20°F to +1000°F[1]]	/S -268°C to +816°C[1] [-450°F to +1500°F[1]]	/S/NACE -268°C to +816°C[1] [-450°F to +1500°F[1]]
1	Body	SA216-WCB/WCC CS	SA216-WCB/WCC CS	SA351-CF8M SS	SA351-CF8M SS
2	Cap	SA516-70	SA516-70	SA240-316	SA240-316
3	Cap Bolting	A449/A325 CS	A449/A325 CS	A193-B8M SS	A193-B8M SS
4	Nozzle	A479-316 or A351-CF8M SS	A479-316 or A351-CF8M SS	A479-316 or A351-CF8M SS	A479-316 or A351-CF8M SS
5	Piston	A564-630 (17-4 PH), A479-316 or A351-CF8M SS	A564-630 (17-4 PH), A479-316 or A351-CF8M SS	A564-630 (17-4 PH), A479-316 or A351-CF8M SS	A564-630 (17-4 PH), A479-316 orA351-CF8M SS
6	Liner	A479-316 or A351-CF8M	A479-316 or A351-CF8M	A479-316 or A351-CF8M SS	A479-316 or A351-CF8M SS
7	Dipper Tube	17-4 PH SS	17-4 PH SS	17-4 PH SS	17-4 PH SS
8	Dome Spring	316 SS	Not Used	316 SS	Not Used
9	Tube Fittings	A576 CS[2]	SA182-316 SS	SA182-316 SS	SA182-316 SS
10	Seat	see page 44	see page 44	see page 44	see page 44
11	Piston Seal	see page 44	see page 44	see page 44	see page 44
12	Nozzle Retainer	A747-CB7CU-1 SS or 17-4 PH SS	A747-CB7CU-1 SS or 17-4 PH SS	A747-CB7CU-1 SS or 17-4 PH SS	A747-CB7CU-1 SS or 17-4 PH SS
13	Seat Retainer	A479-316 SS	A479-316 SS	A479-316 SS	A479-316 SS
14	Seat Retainer Screw	316 SS	17-4 PH SS	316 SS	17-4 PH SS

Notes

1. Maximum temperature relates to fire case conditions. Continuous service temperature is limited by the choice of seat and seal materials.
2. SS for Series 500.



Materials of Construction

Item	Description	/S Ambient to 538°C [Ambient to 1000°F]	/S1 Ambient to 316°C [Ambient to 600°F]	/S2 318°C to 427°C [601°F to 800°F]	/S3 427°C to 538°C [801°F to 1000°F]
1	Body	SA351-CF8M SS	SA216-WCB CS	SA216-WCB CS	SA217-WC6 AS
2	Cap	SA240-316	SA516-70	SA516-70	SA387-11
3	Nozzle	A351-CF8M SS	A351-CF8M SS	A351-CF8M SS	A351-CF8M SS
4	Piston Assembly	A217CA-151	A217CA-151	A217CA-151	A217CA-151
5	Liner	A479-410	A479-410	A479-410	A479-410
6	Stud	A193-B7	A193-B7	A193-B7	A193-B7
7	Nut	A194-2H	A194-2H	A194-2H	A194-2H
8	Piston Damper	A479-410	A479-410	A479-410	A479-410
9	Retainer Screw	A574	A574	A574	A574
10	Dome Spring	Inconel®	Inconel®	Inconel®	Inconel®
11	Damper Ring with Centralizer Spring	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
12	Piston Seal Ring with Centralizer Spring	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
13	Liner Seal	GRAFOIL®	GRAFOIL®	GRAFOIL®	GRAFOIL®
14	Seal Extrusion Ring	1018	STL 1018	STL 1018	STL 1018
15	Nozzle Seal	Thermabraid SS	Thermabraid SS	Thermabraid SS	Thermabraid SS
16	Drain Spring	316 SS	316 SS	316 SS	316 SS
17	Drain Plunger	17-4 SS	17-4 SS	17-4 SS	17-4 SS
18	Pipe Plug, Hex HD	316 SS	316 SS	316 SS	316 SS
19	Filter Assembly	316 SS	316 SS	316 SS	316 SS
20	Pitot Tube Seal	GRAFOIL®	GRAFOIL®	GRAFOIL®	GRAFOIL®
21	Belleville Washer	17-7 SS	17-7 SS	17-7 SS	17-7 SS
22	Disc	718 Nickel Alloy	17-4 SS or 718 Nickel Alloy	718 Nickel Alloy	718 Nickel Alloy

Notes

1. Inconel® is a registered trademark of International Nickel Company.
2. GRAFOIL® is a registered trademark of UCAR Carbon.

Note

1. Maximum pressure is limited by main valve size.

Main Valve Seals

Valve Type	Material	Temperature, °C [°F] Minimum	Temperature, °C [°F] Maximum	Pressure, barg [psig] Minimum	Pressure, barg [psig] Maximum[1]
243/253/263	BUNA-N	-53 [-65]	135 [275]	1.72 [25]	425 [6170]
	Viton®	-28 [-20]	204 [400]	1.72 [25]	425 [6170]
	Ethylene Propylene	-53 [-65]	162 [325]	1.72 [25]	425 [6170]
	Aflas	-28 [-20]	232 [450]	1.72 [25]	425 [6170]
	Kalrez®	-18 [0]	288 [550]	1.72 [25]	102 [1480]
443/453/463	BUNA-N	-53 [-65]	135 [275]	1.03 [15]	102 [1480]
	Viton®	-28 [-20]	204 [400]	1.03 [15]	102 [1480]
	Ethylene Propylene	-53 [-65]	162 [325]	1.03 [15]	102 [1480]
	Aflas	-28 [-20]	232 [450]	6.90 [100]	102 [1480]
	Kalrez®	-18 [0]	288 [550]	6.90 [100]	102 [1480]
843/853/863	BUNA-N	-53 [-65]	135 [275]	102 [1481]	425 [6170]
	Viton®	-28 [-20]	204 [400]	102 [1481]	425 [6170]
	Ethylene Propylene	-53 [-65]	162 [325]	102 [1481]	425 [6170]
	Aflas	-28 [-20]	232 [450]	102 [1481]	425 [6170]
	Kalrez®	-18 [0]	288 [550]	102 [1481]	425 [6170]
546/566	Teflon®	-53 [-65]	268 [515]	1.03 [15]	49.6 [720]
249/259/269	Teflon®	-252 [-423]	135 [275]	1.72 [25]	102 [1480]

Pilot Valve Seat and Seals

Valve Type	Material	Temperature,°C [°F] Minimum	Temperature,°C [°F] Maximum	Pressure, barg [psig] Minimum	Pressure, barg [psig] Maximum[1]
243/253/263	BUNA-N	-53 [-65]	135 [275]	1.72 [25]	425 [6170]
	Viton®	-28 [-20]	204 [400]	1.72 [25]	425 [6170]
	Ethylene Propylene	-53 [-65]	162 [325]	1.72 [25]	425 [6170]
	Aflas	-28 [-20]	232 [450]	1.72 [25]	425 [6170]
	Kalrez®	-18 [0]	288 [550]	1.72 [25]	102 [1480]
443/453/463	BUNA-N	-53 [-65]	135 [275]	1.03 [15]	102 [1480]
	Viton®	-28 [-20]	204 [400]	1.03 [15]	102 [1480]
	Ethylene Propylene	-53 [-65]	162 [325]	1.03 [15]	102 [1480]
	Aflas	-28 [-20]	232 [450]	6.90 [100]	102 [1480]
	Kalrez®	-18 [0]	288 [550]	6.90 [100]	102 [1480]
843/853/863	BUNA-N	-53 [-65]	135 [275]	102 [1481]	425 [6170]
	Viton®	-28 [-20]	204 [400]	102 [1481]	425 [6170]
	Ethylene Propylene	-53 [-65]	162 [325]	102 [1481]	425 [6170]
	Aflas	-28 [-20]	232 [450]	102 [1481]	425 [6170]
	Kalrez®	-18 [0]	288 [550]	102 [1481]	425 [6170]
546/566	PEEK/Teflon®	-53 [-65]	268 [515]	1.03 [15]	49.6 [720]
249/259/269	BUNA-N	-252 [-423]	135 [275]	1.72 [25]	102 [1480]

Maximum Pressure Rating, barg [psig]

Flange Class	Material[1]	Temperature, °C [°F] -253 to -30 [-423 to -21]	-29 to 38 [-20 to 100]	93 [200]	149 [300]	205 [400]	260 [500]	316 [600]	371 [700]	427 [800]
150#	CS		19.7 [285]	17.9 [260]	15.9 [230]	13.8 [200]	11.7 [170]	9.66 [140]	7.59 [110]	5.52 [80]
	SS	19 [275]	19 [275]	16.6 [240]	14.8 [215]	13.5 [195]	11.7 [170]	9.66 [140]	7.59 [110]	5.52 [80]
300#	CS		51 [740]	46.6 [675]	45.2 [655]	43.8 [635]	41.4 [600]	37.9 [550]	36.9 [535]	28.3 [410]
	SS	49.6 [720]	49.7 [720]	42.8 [620]	38.6 [560]	35.5 [515]	33.1 [480]	31 [450]	29.7 [430]	28.6 [415]
600#	CS		102.1 [1480]	93.1 [1350]	90.7 [1315]	87.6 [1270]	82.8 [1200]	75.5 [1095]	73.4 [1065]	56.9 [825]
	SS	99.3 [1440]	99.3 [1440]	85.5 [1240]	77.2 [1120]	71 [1030]	65.9 [955]	62.4 [905]	59.7 [865]	57.2 [830]
900#	CS		153.1 [2220]	139.6 [2025]	135.8 [1970]	131 [1900]	123.8 [1795]	113.1 [1640]	110.3 [1600]	85.2 [1235]
	SS	149 [2160]	149 [2160]	128.3 [1860]	115.8 [1680]	106.2 [1540]	99 [1435]	93.5 [1355]	87.9 [1275]	85.9 [1245]
1500#	CS		255.5 [3705]	232.7 [3375]	226.2 [3280]	218.6 [3170]	206.6 [2995]			
	SS	248.2 [3600]	248.2 [3600]	213.4 [3095]	192.7 [2795]	177.2 [2570]	164.8 [2390]			
2500#	CS		425.4 [6170]	387.8 [5625]	377.2 [5470]	364.1 [5280]	344.1 [4990]			
	SS	413.7 [6000]	413.8 [6000]	355.8 [5160]	321.3 [4660]	295.1 [4280]	274.5 [3980]			

Notes

1. CS: SA216, Grade WCB.
   SS: SA351, Grade CF8M.
2. Ratings at temperatures at and above -29°C [-20°F] per ANSI B16.34.

Recommended Soft Good's Limits

All valves, excluding the Series 700 require the use of soft goods for their seats and seals. To assist in selecting an acceptable soft goods please note the following instructions:

1. Choose the main valve seat material based upon set pressure and relieving temperature (non-fire case) or operating temperature (fire case) from pages 45 - 49.
2. Choose the main valve seal based upon relieving temperature (non-fire case) or operating temperature (fire case) from page 50.
3. Choose the pilot valve seat and seal based upon set pressure and relieving temperature (non-fire case) or operating temperature (fire case) from page 50.
4. The final soft goods selected should be chemically compatible with the lading fluid.

Maximum Set Pressure Comparison

Valve in [mm]	Orifice Area cm^2 [in^2]	Direct Spring Operated, barg[psig]	Anderson Greenwood Pilot Operated, barg [psig]
8 x 10 Full Bore [200 x 250 Full Bore]	251.37[38.96]	N/A	102.0+[1480 +]
8T10 [200 x 500]	167.75 [26.00]	20.7 [300]	102.0+ [1480+]
6R8 [150 x 200]	103.23 [16.00]	20.7 [300]	102.0+ [1480+]
4P6 [100 x 150]	41.16 [6.38]	69.0 [1000]	255.5+ [3705+]
3K4 [80 x 100]	11.86 [1.83]	153.1 [2220]	255.5+ [3705+]

Higher Maximum Set Pressures

Anderson Greenwood Crosby's POPRVs are able to operate at considerably higher set pressures than is possible with spring loaded SRVs. In some cases one POPRV can replace five spring loaded SRVs thereby considerably reducing capital and installation costs.

Height Comparison

Valve in [mm]	Rating	Direct Spring Operated, mm [in]	Anderson Greenwood Pilot Operated, mm [in]	Height Saving
8 x 10 [200 x 250]	150# (PN 20)	1448 [57]	762 [30]	47%
6 x 8 [150 x 200]	300# (PN 50)	1092 [43]	660 [26]	40%
4 x 6 [100 x 150]	300# (PN 50)	940 [37]	584 [23]	38%
3 x 4 [80 x 100]	600# (PN 100)	864 [34]	508 [20]	41%
2 x 3 [50 x 80]	600# (PN 100)	584 [23]	483 [19]	19%

Lower Hzight Profile

Because the Anderson Greenwood Crosby POPRV does not use a spring to hold the main valve seat closed, considerable height savings are achieved in the valve design. The same pilot valve is used for all main valve sizes providing significant height savings particularly on larger and higher pressure valves. This enables the POPRVs to be used in situations where space is at a premium.

Weight Comparison

Valve in [mm]	Rating	Direct Spring Operated, kg [lb]	Anderson Greenwood Pilot Operated, kg [lb]	Weight Saving
8 x 10 [200 x 250]	150# (PN20)	341 [750]	191 [421]	44%
6 x 8 [150 x 200]	300# (PN50)	218 [480]	120 [264]	45%
4 x 6 [100 x 150]	300# (PN50)	104 [230]	73 [160]	30%
3 x 4 [80 x 100]	600# (PN100)	72 [160]	42 [92]	42%
2 x 3 [50 x 80]	600# (PN100)	32 [70]	24 [53]	24%

Weight Savings

As valve size and set pressure increases, a larger spring is needed to keep the seat of a spring loaded SRV closed - increasing the weight of the valve. Significant weight savings are provided by the Anderson Greenwood Crosby POPRV, which uses system pressure via the pilot valve to maintain seat tightness. These weight savings allow cost reductions on plant construction and, in particular, on offshore oil and gas platforms.

Options and Accessories Availability Table

Accessory/Option	Pilot Series				
	200	400	500	700	800
Field Test Connection	O	N/A	O	O	N/A
Field Test Connection w/Indicator	N/A	O	O[1]	N/A	O
Backflow Preventer	O	O	O	N/A	O
Remote Pressure Sense Connection	O	O	O	O	O
Manual Unloader[2]	O	O	O	O	O
Remote Unloader[3]	O	O	O	O	O
Pilot Supply Filter	O	O	O	S	O
Pilot Lift Lever	O	O	O	O	O
Pressure Spike Snubber	O	O[4]	N/A	S[5]	O[4]
NACE Trim	O	O	O	N/A	O
Remote Valve Lift Indicator[6]	O	O	O	O	O
Manifolded Dual Pilots	N/A	N/A	N/A	O	N/A
Valve Monitoring Device (VMD)[6]	O	O	N/A	N/A	O

Notes

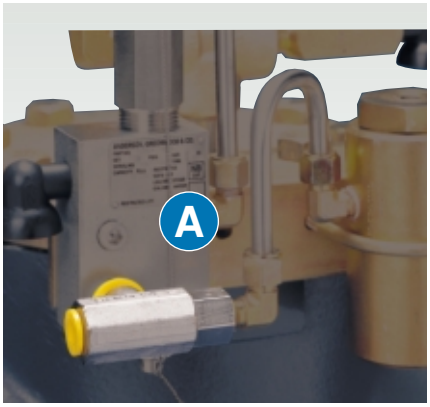
Option Codes

S	-	Standard
O	-	Optional: available upon request
N/A	-	Not available for this model valve.

Materials

Options and accessories will utilize materials of construction consistent with those of the main valve and pilot valve. Consult the factory representative for specific details.

1. This option is recommended whenever Field Test Connection is specified.
2. The effective CV of the unloader shall be at least 0.4 (KV = 0.35), including any associated tubing or piping.
3. Furnish full particulars. See option description on page 5.
4. Gas service only.
5. Standard for vapor service.
6. Furnish complete details on type of signal output desired and power supply available.



In addition to the beneficial features available through the use of pilot operated safety valves, a variety of accessories and options are available to provide additional functions. Some simplify the process of periodic testing, an important safety requirement today. Others assist in the successful operation of the safety valve under adverse or special applications. Please refer to the options and accessories availability table above. On request, other options may be available for some models for special situations, such as position indicators, purge connections, multiple pilots, differential pressure sensing, etc.

A. Field Test Connection

- In-service verification of set pressure.
- Simplifies the periodic testing of safety valves.

Anderson Greenwood pilot operated safety valves may be readily tested for verification of set pressure during normal system operation with this option. Field Test Connection is an option on most models. The customer furnishes a pressure source, plus a test gauge and metering valve for the portable field testing system. When test pressure is slowly admitted through a metering valve, the pilot and the main valve dome are pressurized, simulating an increased system pressure. When set pressure is reached (pop action pilots only), the pilot will actuate.

This actuation pressure may then be compared with the nameplate value. Depending upon the current system pressure, and the characteristics of the specific pilot, the main valve may also briefly open and close, or partially open and close, providing verification that the main valve piston is free to move.

When the Field Test Connection is used with the modulating type pilots, the pilot will begin cracking at a pressure just below the nameplate setting. In order to accurately establish the set pressure, another accessory, the Field Test Indicator, is recommended.

B. Field Test Indicator

- Simplifies verification of modulating pilot set pressures.
- Only one test connection and pressure gauge required.

This is a mechanical indicator, available only for modulating pilots, allowing for the accurate verification of set pressure.

Since the set pressure of all modulating safety valves in this catalogue are defined as the point when the dome pressure is reduced to 70 percent of set pressure, when system pressure reaches the nameplate setting, the indicator is activated. This gives positive verification that set pressure has been reached. The verification process for modulating pilots requires this option, in addition to the Field Test Connection.

C. Manifold Dual Pilot

- In-Service Replacement of Pilot.
- Extended Outage Cycle. The MDP is available both as an option and as a retrofit kit. The dual cartridge pilots are manifolded in a miniature safety selector valve which allows for in-service replacement of the pilot without shutting the system down while maintaining full system overpressure protection. Also, field test connection and manual blowdown are built into the manifold.

D. Backflow Preventer

- Prevents accidental reverse flow through safety valve.

This option, sometimes called a 'vacuum block,' prevents a pilot operated safety valve from reverse flow, when sufficient vacuum is present at the inlet flange. The backflow preventer also prevents reverse flow when the pressure at the outlet flange (superimposed back pressure) is greater than the current system pressure. Reverse flow will occur with any standard type or design of pilot operated safety valve, when sufficient reverse differential pressure exists. Reverse flow, should it be induced by a reverse differential pressure, will be prevented by this option. All backflow preventers operate by permitting the introduction of outlet pressure into the dome of the main valve, thereby holding the piston firmly onto the nozzle, overcoming the effect of a reverse differential pressure across the safety valve. The option also includes a built-in provision to prevent reverse flow through the pilot that would otherwise pass through the pilot supply line, back into the system.

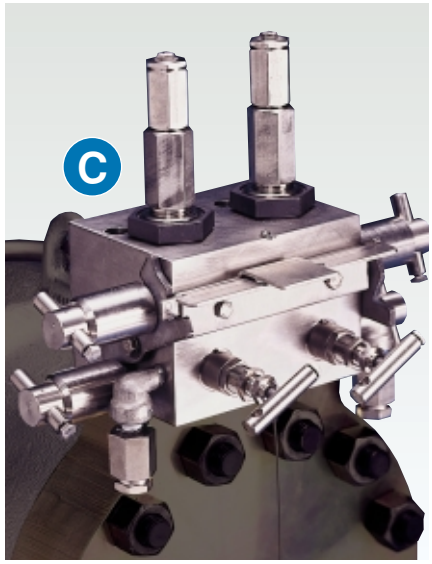
A Backflow Preventer should be specified whenever:

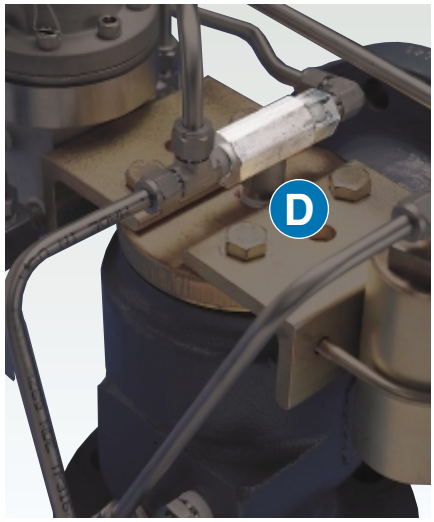
- A vacuum may be present at the inlet connection due to unusual operating conditions or a temporary vacuum condition that may occur under startup conditions.
- The discharge of the safety valve is connected to a downstream pressure vessel, where pressure may vary from time to time, in excess of the pressure in the upstream system.
- The discharge of multiple safety valves is combined into a single manifold or vent system, creating superimposed back pressures in excess of the current upstream system pressure.

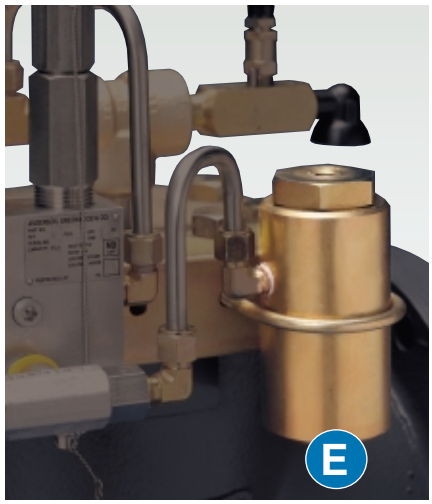
E. Pilot Supply Filter

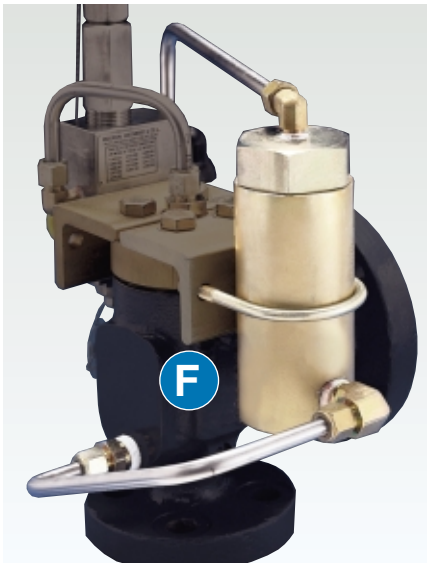
- Protects pilot from excessive particulate matter in flow stream.

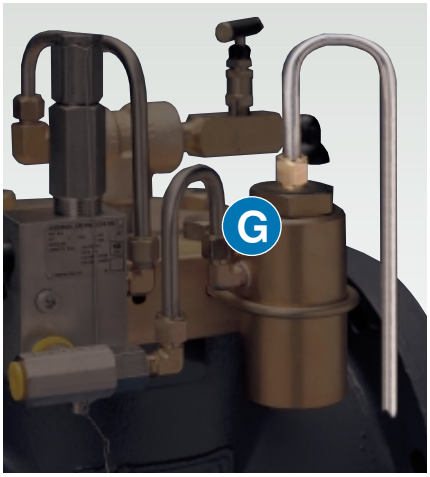
This is a mechanical filter that is available for gas and liquid applications where there is a possibility of large amounts of particulate matter in the fluid stream. The filter is optional for liquid or gas service for any pilot model. The pilot supply filter will be rigidly mounted to the main valve cap.

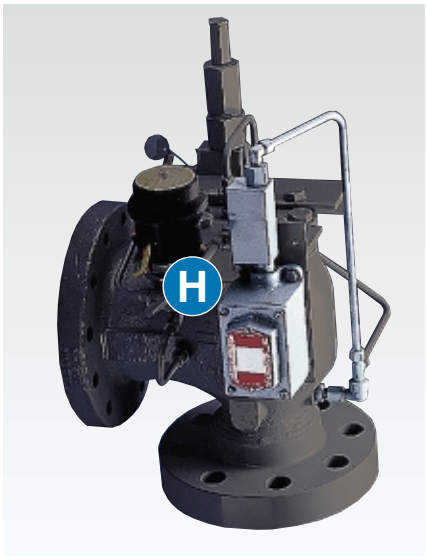












F. Pressure Spike Snubber

- Overcomes pressure 'spikes' in gas systems, that would cause premature actuation.

This option may be provided on the Series 200 or 400 non-flowing type pilots, only on gas applications. The snubber is recommended for use on pulsating gas compressor applications, where instantaneous pressure values (pressure spikes) approach or exceed the set pressure and may cause inadvertent valve actuation. The device acts as a pulsation dampener; consisting of a series of fixed orifices, combined with small volume chambers that dampen the transient pressure rises. The average static system pressure is unaffected, so no change in set pressure is experienced with this option. The pressure spike snubber is compact and is mounted to the main valve cap. Please note that it is to be applied only for gas applications.
For vapor applications, the Series 700 non-flowing pilot is supplied with pressure spike snubber as standard.

G. Remote Pressure Sense Connection

- Safety valve will respond to actual system pressure conditions.
- Eliminates undesirable cycling due to excessive inlet pressure losses.
- Improves safety, under adverse operating conditions.

This optional feature permits the pilot to sense system pressure at a location that most accurately reflects the actual operating pressure of the protected system.
A remote pressure sense connection eliminates the false system pressure indication that will occur during relieving conditions, due to pressure losses in the inlet piping to the safety valve. Most applicable codes recommend that the inlet piping system be designed for a maximum anticipated non-recoverable pressure loss of 3 percent. If this is not possible, the remote pressure sense connection should be specified.
Please note that the addition of a remote pilot sense line allows the pilot to correctly sense system pressure and to keep the valve from rapid cycling or chattering. With remote sensing the piston type, pilot operated safety valves described in this catalogue will remain stable against the effects of high inlet pressure loss phenomena. However, relieving capacity will be proportionately reduced whenever there is inlet pressure loss to the safety valve.
Please note that valves furnished for remote pilot sense, may be converted to integral sense, or vice versa, since the pressure pickup is installed in all instances, and the integral sense connection is closed off with a removable 1/2-inch NPT threaded pipe plug.

H. Remote Valve Lift Indicator

- Provides remote signal to allow the plant operator to know when a pressure relief valve has opened.

This feature consists of a differential pressure switch, actuated when the main valve has been operated. The switch is adjusted to sense the difference between the system pressure and the main valve dome pressure. Electrical indication is then available to a remote location. Furnish full particulars on electrical power available, the switch contact style and rating, the type of enclosure and hazard rating. The switch will be mechanically mounted to the main valve cap. External wiring enclosures are not normally furnished.

I. Manual Unloader
- Permits the safety valve to be opened to depressurize the system.
- Acts as manual override to normal pressure setting, but has no effect on the sealed pressure setting.

A manual unloader consists of a small hand valve connected to the dome line of the main valve. Opening of the hand valve vents the dome pressure faster than it can be recharged by the pilot supply. Sufficient dome pressure reduction results in piston lift, due to unbalanced forces, simulating pilot actuation. This option is used to allow the safety valve to be used, along with other valves, for the emergency reduction of system pressure due to potential safety hazards. When permitted, the manual unloader may be substituted for a mechanical lift lever.

J. Pilot Lift Lever
- Permits manual test of safety valve operation.

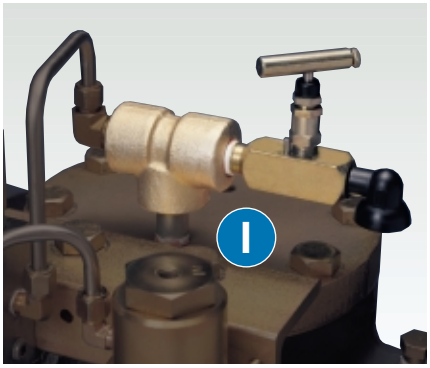
This feature is provided for those applications where the mechanical lifting of the pilot is required for verification of valve operation. Lifting of the pilot spindle will permit the main valve to lift when the system pressure is at least 75 percent or more of set pressure. The pilot lift lever is packed to prevent external leakage. Some safety regulations and codes require that a lift lever be furnished for air, hot water over 60°C [140°F] and steam applications.

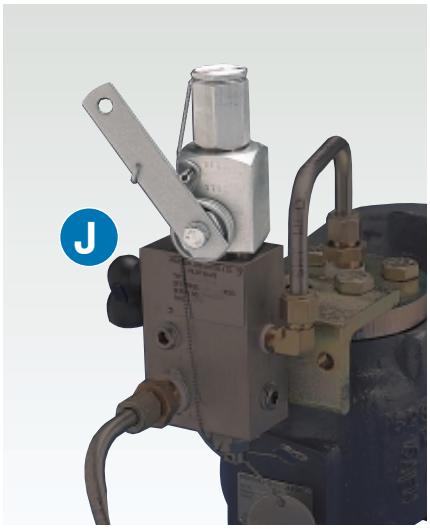
K. Valve Monitoring Device (VMD)
- Electronically monitors and stores valve data during overpressure events.
- Stores:
  - time, date, and event duration
  - opening, closing, and peak pressure
  - valve stability
  - total flow through valve
- Network compatible via RS-485 modem.
- Solid State “Alarm” relay provides “Valve Open” notification.
- Actual mass flow is based on programmable process data for each specific installation thus simplifying data.
- NEMA 4X enclosure.
- Accurate valve information leads to more cost effective asset management.
- Accurate event reporting helps to identify root causes of overpressure events.

Improve Safety
- Reduces personnel exposure
- Identifies hidden problems
- Detects valve chatter

Lower Operational Costs
- Saves time and lowers manpower requirements
- Eliminates over reported releases
- Reduces unnecessary valve maintenance costs

Process Optimization
- Maximizes production
- Minimizes product loss





Remote Unloader

- Permits the safety valve to be remotely opened to depressurize the system.

This is the same scheme as the manual unloader, except that the unloader valve is remotely operated. Either solenoid or pneumatic operation may be used. Please furnish full particulars of the type of unloader electro valve to be furnished, and the desired valve action: normally open or closed. For solenoid operation, specify the voltage and current (AC or DC). Furnish the frequency in Hertz for alternating current. The type of enclosure, such as explosion proof, splash proof, corrosion resistant, etc., must also be specified for electrical operators. Unless otherwise specified, no separate wiring enclosure is furnished.

If the remote unloader is supplied, it will be mechanically mounted to the safety valve with the pressure connection to the dome line of the main valve. Venting will be to the atmosphere through a weather fitting.

Pilot Valve Test Drum

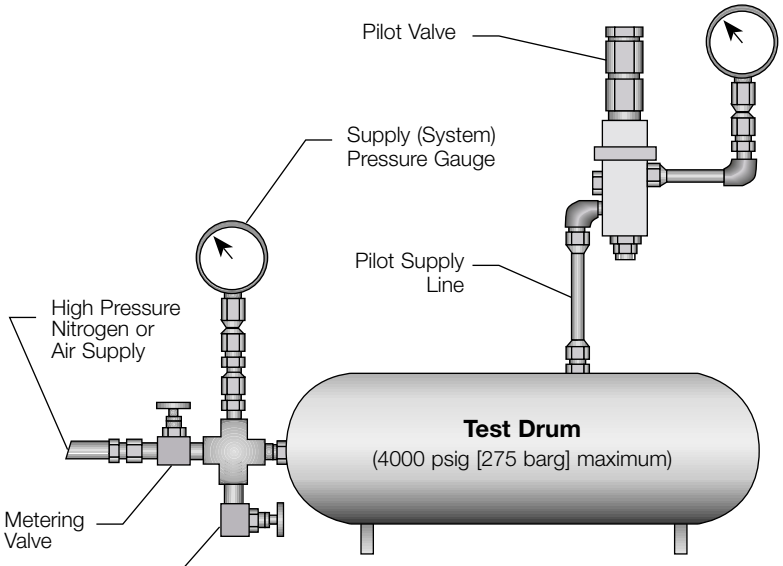
- Simplifies field and maintenance shop resetting and repair.

This is an option for the shop testing and resetting of the pilot, and is offered for customer maintenance and repair shops. It consists of a small accumulator, approximately 10 litres (0.25 cubic feet) volume, with the necessary fittings, valves and test gauges for mounting and testing of the pilot. The test drums are made to order for the pilot models specified. Please furnish the set pressure range and the pilot models to be tested. The customer furnishes the pressure supply to the accumulator. Tools for adjusting and servicing the pilot are not included.

NACE Option

- Essential option for sour gas service.

This is a material option to meet the stress corrosion problems associated with sour gas service. The materials in both the pilot and main valve will meet the requirements of NACE MR-01-75.



Pilot Valve test apparatus used to adjust set pressure and blowdown.

How to Select a Valve Type

To determine which pilot operated safety relief valve type is most appropriate for your application, please use the following guidelines:

1. In the Application Guide (below), note which valve types seem most appropriate for your application.
2. Read the associated descriptive and operating information in the catalog dedicated to that type of valve (Series 200, 400, 500, 700 or 800).
3. Using the formulas in Part 2, Sizing (page 25), determine the required orifice area for your service conditions and select the orifice area that suits your application.
4. If you have been able to determine a pilot operated valve type and orifice area that suits your application, refer to Part 3, Ordering (page 33), to select and order a specific model number. If you were not able to find a valve type to meet your application needs, please contact your Anderson Greenwood Crosby representative, or our factory direct, for assistance.

Application Guide

Options

Set Pressure		Valve Series				
barg	**[psig]**	**200**	**400**	**500**	**700**	**800**
1.03 - 49.7 [1]	[16 - 720]			X		
1.03 - 102	[16 - 1480]		X			
1.72 - 425.5 [3]	[26 - 6170]	X				
3.45 - 82.8	[51 - 1200]				X	
102.12 - 425.5	[1482 - 6170]					X
Valve Action						
Pop		X			X	
Modulating			X	X		X
Service						
Gas/Vapor		X	X	X	X	X
Liquid[2]			X	X		X
Steam				X	X	
Process Temperature, °C [°F]						
Ambient to +538	[Ambient to +1000]				X	
-54 to +260	[-65 to +500]		X			
-252 to +260	[-423 to +500]	X				
-54 to +268	[-65 to +515]			X		
-40 to +205	[-40 to +400]					X

Notes

1. 11/2-inch x 3-inch [40 x 80 mm] Type 546 has 1.72 barg [25 psig] minimum set.
2. Use Type 249, 259, 269 for cryogenic liquid (set pressure range for this valve type is 1.72 to 99.3 barg [25 to 1440 psig]).
3. Higher pressures available on special order.
4. Not all valves are available for service at the extreme limits for both temperature and pressure simultaneously.

4	4	3	10	J	23	/S1

Pilot Series

2 – Series 200
4 – Series 400
5 – Series 500
7 – Series 700
8 – Series 800

Main Valve Lift[1]

2 – Full Lift, API Orifice (Type 727 only)
4 – Full Lift, API Orifice
5 – Restricted, API Orifice
6 – Full Lift, Full Bore Orifice

Main Valve Piston Type

3 – Soft Seat/Seals
6 – Teflon® Soft Seat/Seals (Types 546, 566 only)
7 – Metal Seat/Seals (Type 727 only)
9 – Cryogenic Trim Soft Seat/Seals (Types 249, 259, 269 only)

Inlet Flange Rating, ANSI

05 – 150#
10 – 300#
12 – 600#
14 – 900#
16 – 1500#
18 – 2500#
N – FNPT

Orifice Designation

Letter – API Equivalent
— – Full Bore (Largest practical orifice area for a given valve inlet size)

Inlet x Outlet, Inches

Main Valve Materials

/S – SS Body and Trim
/S1 – CS Body, SS Trim
/S2 – CS Body, High-temperature Trim (Series 700 only)
/S3 – WC6 Alloy Steel Body, High-temperature Trim (Series 700 only)
/S1/NACE – CS Body and SS Trim Compliance With NACE MR0175
S/NACE – SS Body and Trim Compliance With NACE MR0175
/SPL – Special

Note

1. For a full lift valve, the area controlling the valve capacity is the main valve nozzle bore. For a restricted lift valve, the area controlling the valve capacity is the 'curtain area' between the main valve nozzle and the bottom of the lifted piston.