

ANDERSON GREENWOOD AED SERIES 800 PILOT OPERATED PRESSURE RELIEF VALVE

SUPPLEMENTAL DATASHEET FOR AED SERIES 800 POPRV

Series 800 modulating safety relief valve with Anti-Explosive Decompression (AED) seals



GENERAL APPLICATION

The AED Series 800 modulating POPRV is designed to provide dependable overpressure protection in oil and gas high pressure applications where explosive decompression is a concern.

TECHNICAL DATA

Sizes:	1" x 2" to 4" x 6"
Orifices:	0.110 to 9.489 in ² (0.710 to 61.21 cm ²)
Inlet ratings:	ANSI Class 900 to 2500
Temperature:	-40° to +400°F ^[1] (-40° to +205°C)
Set pressures:	1481 to 6170 psig (102.1 to 425.5 barg)
Code:	ASME VIII

NOTE

1. Consult factory for lower or higher temperature requirements.

FEATURES

- Reduced unplanned downtime assured through seals in plastics and NORSOX certified elastomers that are resistant to explosive decompression and greatly extend service life.
- High set pressure capability provides modulating, non-flowing pilot valve performance to 6170 psig (425.42 barg).
- Unique field test capability allows accurate set pressure verification with valve in service with minimal amount of test gas. All connections provided with an indication for accurate and easy set pressure testing.
- Reduced product loss and pollution through soft seats for premium tightness before and after relief cycles. Modulating action relieves minimum product to prevent overpressure.
- Extremely rigid pilot bracket mounting (not nipple mounted) protects against vibration and careless handling.
- Modulating action minimizes flow and resultant noise during normal system upset, reducing noise abatement costs.
- Increased system output with total valve tightness to 98% of set pressure without leakage.

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MODEL OVERVIEW

The AED Series 800 modulating valve is resistant to the effects of explosive decompression at high operating pressures.

Explosive decompression occurs when a high pressure gas permeates into low durometer O-ring seals' internal structure. In a rapid decompression scenario such as a pressure relief event or rapid decrease in system pressure, the trapped gas will try to match the lower external O-ring pressure and expand at a rate greater than the materials ability to contain the gas. In these situations the elastomers are damaged, requiring the seals to be replaced.

To avoid this undesirable effect, the AED Series 800 uses explosive decompression resistant seals in both the main and pilot valves: NORSOOK M-710 certified elastomers and a plastic (PEEK) main valve seat; the pilot has spring energized Teflon™ dynamic seals and NORSOOK M-710 certified elastomers for the static seals.

Since the pilot is modulating, the main valve lifts proportionally according to required flow (relief demand), restricting product loss to the mass required to prevent the process pressure from exceeding the code allowance. The AED Series 800 can also be used in liquids, gases or mixed phase lading fluids, including dirty and/or wet services.

SPECIFICATIONS

- Anti-Explosive Decompression compatible.
- Modulating non-flowing pilot.
- High operating pressure capability.
- Balanced design (no bellows).
- Single-point set pressure adjustment.
- ASME Section VIII code stamp for gas and liquid service.
- Lettered orifice valves meet API standard 526 dimension requirements.

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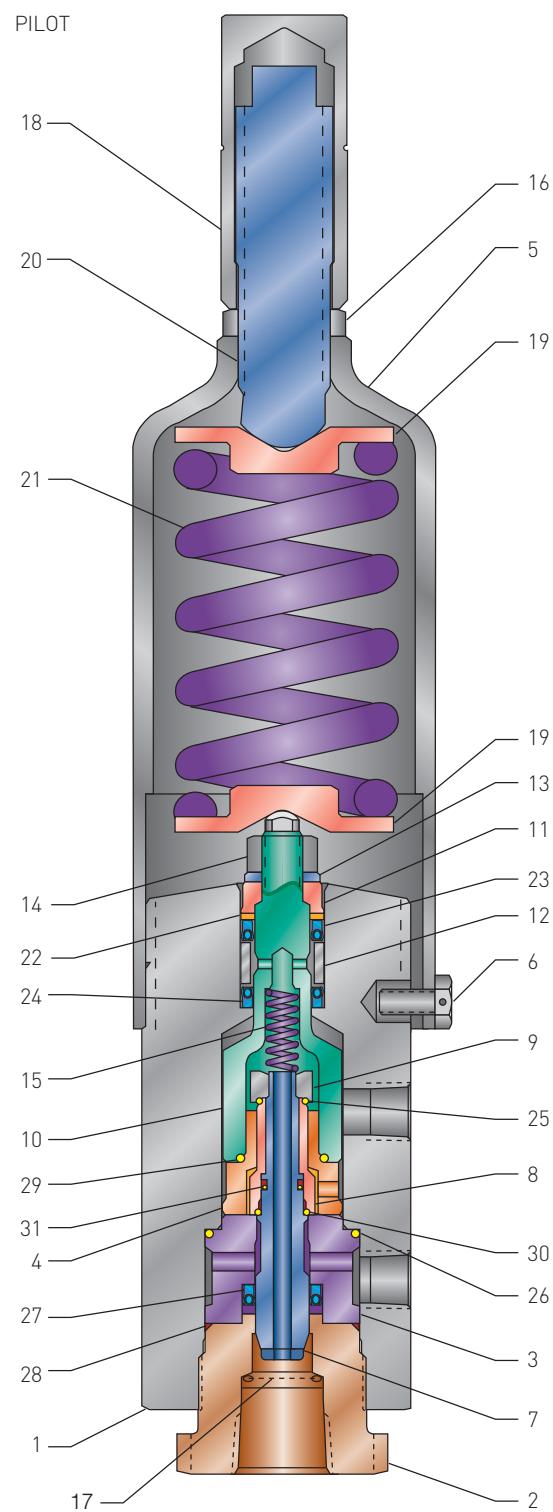
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MATERIALS OF CONSTRUCTION

Item	Description	/S1, /S, /S1/N, /S/N
1	Body	A564-630 H1150 17-4 SS
2	Inlet bushing	A564-630 H1150 17-4 SS
3	Outlet nozzle	A564-630 H1150 17-4 SS
4	Inlet nozzle	A564-630 H1150 17-4 SS
5	Bonnet	A351-CF8M SS
6	Bonnet lock bolt	316 SS
7	Inner spool	A564-630 H1150 17-4 SS
8	Outer spool	A564-630 H1150 17-4 SS
9	Spool nut	A564-630 H1150 17-4 SS
10	Feedback piston	A564-630 H1150 17-4 SS
11	Sense piston	A564-630 H1150 17-4 SS
12	Feedback spacer	A269-316 SS
13	Lock washer	316 SS
14	Hex nut	A194-8M SS
15	Spool spring	Inconel™ X-750
16	Lock nut	A479-316 SS
17	Screen assembly	316 SS
18	Cap	A582-303 SS
19	Spring washer	A479-316 SS
20	Pressure set screw	A564-630 H1150 17-4 SS
21	Set spring	316 SS
22	Piston seal backup ring	Parker VG109-90 ^{[2][3]}
23	Sense seal	Teflon™ ^[2]
24	Feedback seal	Teflon™ ^[2]
25	Inlet seat	Parker VG109-90 ^{[2][3]}
26	Outlet nozzle seal	Parker VG109-90 ^{[2][3]}
27	Spool seal	Teflon™ ^[2]
28	Inlet bushing seal	Parker VG109-90 ^{[2][3]}
29	Inlet nozzle seal	Parker VG109-90 ^{[2][3]}
30	Outlet seat	Parker VG109-90 ^{[2][3]}
31	Inner spool seal	Parker VG109-90 ^{[2][3]}

NOTES

1. Pilot accessories' elastomers will be Parker VG109-90.
2. Items are new soft goods only available to the AED pilot.
3. See Seal Options soft goods table below.



SEAL OPTIONS

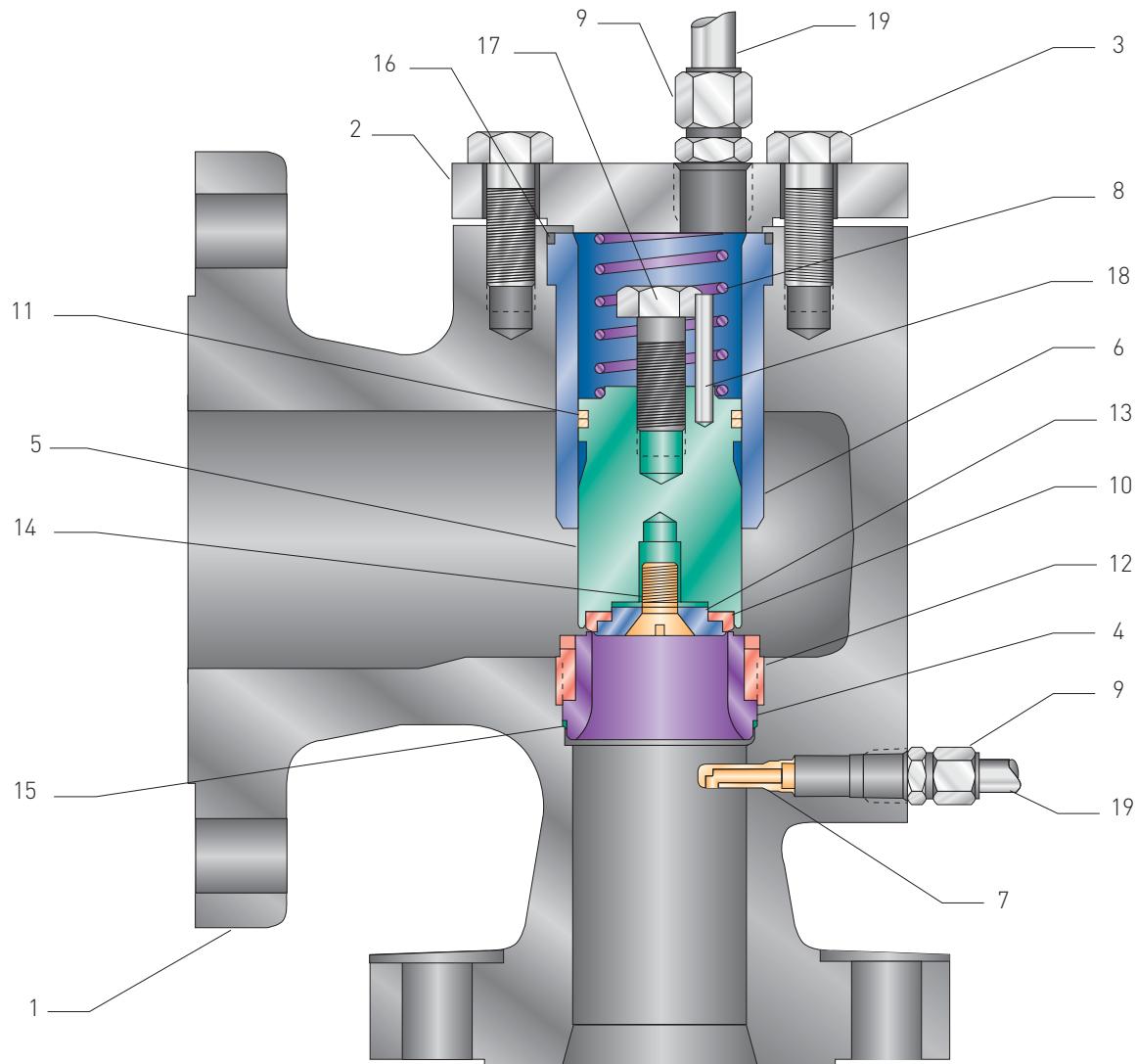
Valve type	Material	Temperature, °F (°C)		Pressure, psig (barg)		NOROK M-710 Rating
		Minimum	Maximum	Minimum	Maximum ^[1]	
843/853/863	Parker VG109-90	-40 [-40]	400 [205]	1481 [102]	6170 [425]	0000
	James Walker FR25-90	-22 [-30]	392 [200]	1481 [102]	6170 [425]	0000

NOTE

1. Maximum pressure is limited by main valve size.

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STANDARD MAIN VALVE



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MATERIALS OF CONSTRUCTION

Item	Description	/S1 -20°F to +1000°F ^[1] [-29°C to +537°C ^[1]]	/S1/N -20°F to +1000°F ^[1] [-29°C to +537°C ^[1]]	/S -450°F to +1500°F ^[1] [-268°C to +816°C ^[1]]	/S/N -450°F to +1500°F ^[1] [-268°C to +816°C ^[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 or A351-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	CS ^[2]	316 SS	316 SS	316 SS
10	Seat	PEEK	PEEK	PEEK	PEEK
11 ^[4]	Piston seal	Parker VG109-90 ^[5]	Parker VG109-90 ^[5]	Parker VG109-90 ^[5]	Parker VG109-90 ^[5]
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
15	Nozzle seal	Filled Teflon™	Filled Teflon™	Filled Teflon™	Filled Teflon™
16 ^[4]	Liner seal	Teflon™	Teflon™	Teflon™	Teflon™
17	Lift adj. bolt ^[3]	A193-B8M SS	A193-B8M SS	A193-B8M SS	A193-B8M SS
18	Lock pin ^[3]	302 SS	302 SS	302 SS	302 SS
19	Tubing	304 SS	316 SS	316 SS	316 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 316 ferrules.
3. Not required 4" and larger Series 60 valve sizes.
4. Items are only available for the AED Series 800
5. See Seal Options soft goods table below.

SEAL OPTIONS

Valve type	Material	Temperature, °F (°C)		Pressure, psig (barg)		NORSOCK M-710 Rating
		Minimum	Maximum	Minimum	Maximum ^[1]	
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OPERATION

With no system pressure, the pilot inlet seat is open and the outlet seat is closed. As pressure is admitted to the main valve inlet, it enters the pilot through a filter screen.

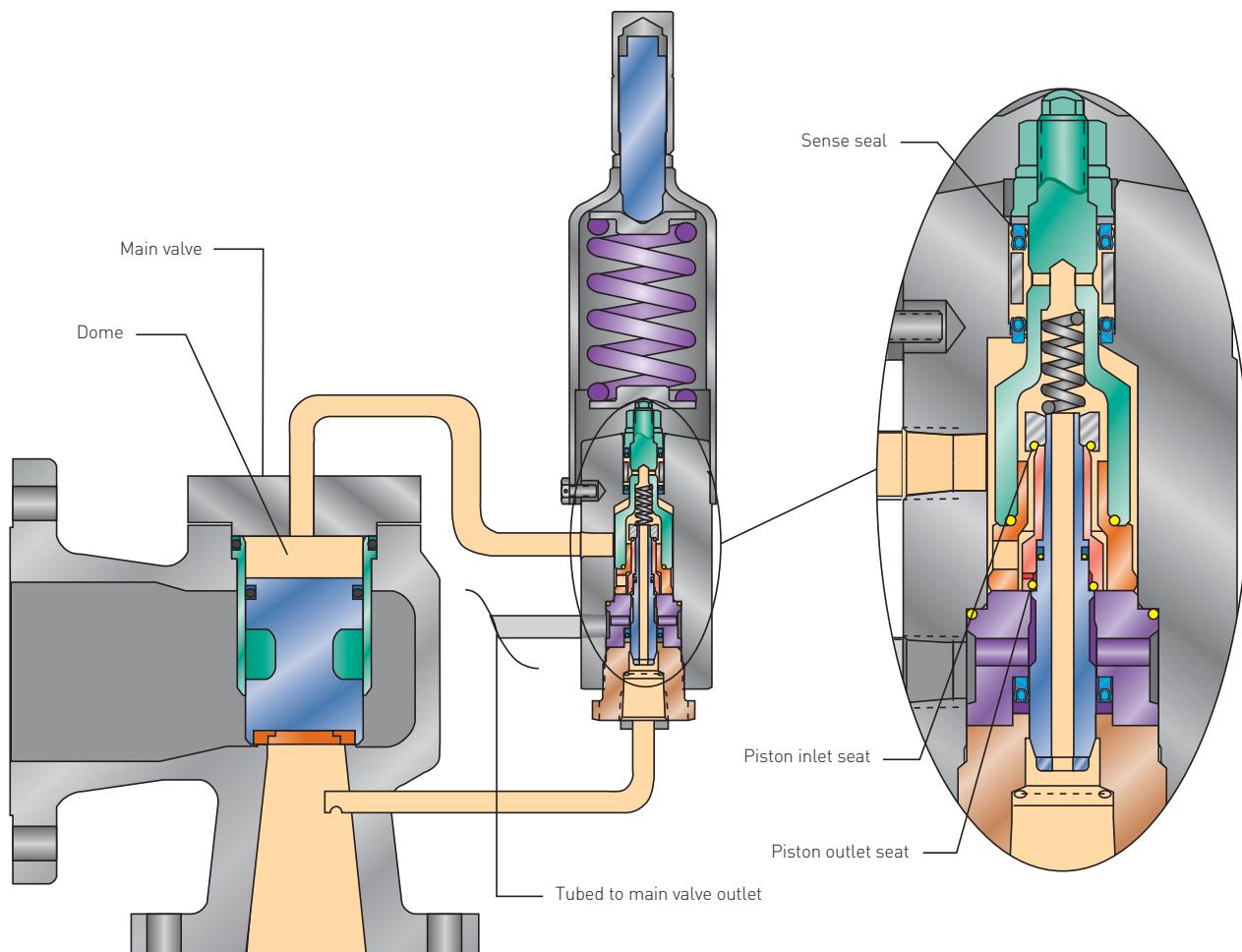
Pressure is then transmitted through passages in the feedback piston, past the inlet seat, into the main valve dome, which causes the main valve piston to remain closed.

As system pressure increases and approaches valve set pressure, it acts upward on the sense seal, with the feedback piston moving upward to close the inlet seat. This seals in the main valve dome pressure since, at this point, the outlet seat is also closed. A small, further increase in system pressure opens the outlet seat, partially venting the main valve dome pressure.

This reduced dome pressure acts on the unbalanced feedback piston to reduce feedback piston lift, tending to 'lock in' the dome pressure. Thus, at any stable inlet pressure, there will be no pilot flow (i.e., zero leakage).

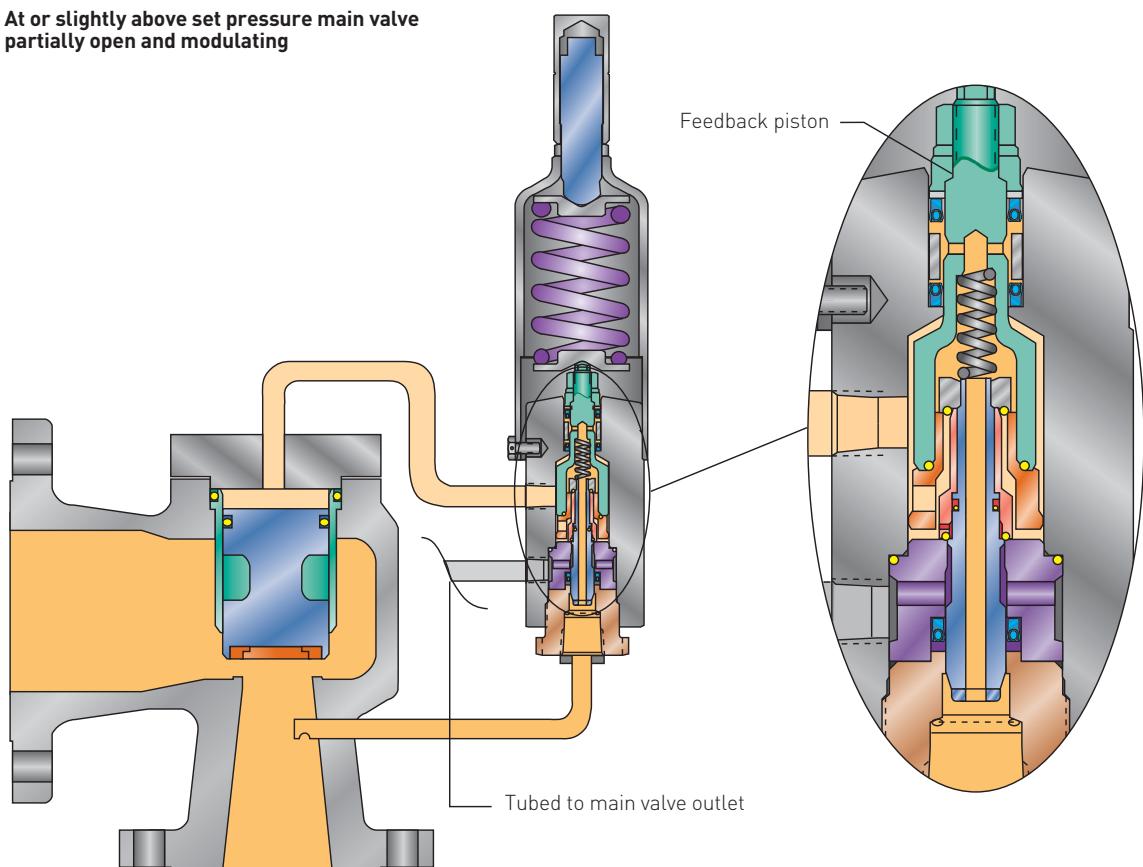
As inlet pressure rises above set pressure, dome pressure reduction will provide modulating action of the main valve piston proportional to the process upset. The spool/feedback piston combination will move, responding to system pressure, to alternately allow pressure in the main valve dome to increase or decrease. This moves the main valve piston to the exact lift that will keep system pressure constant at the required flow. Full main valve lift, and therefore full flow, is achieved with relatively little overpressure. As system pressure decreases below set pressure, the feedback piston moves downward and opens the inlet seat to admit system pressure to the dome. This closes the main valve. The pilot exhaust is always discharged to the main valve outlet.

Below set pressure with main valve closed

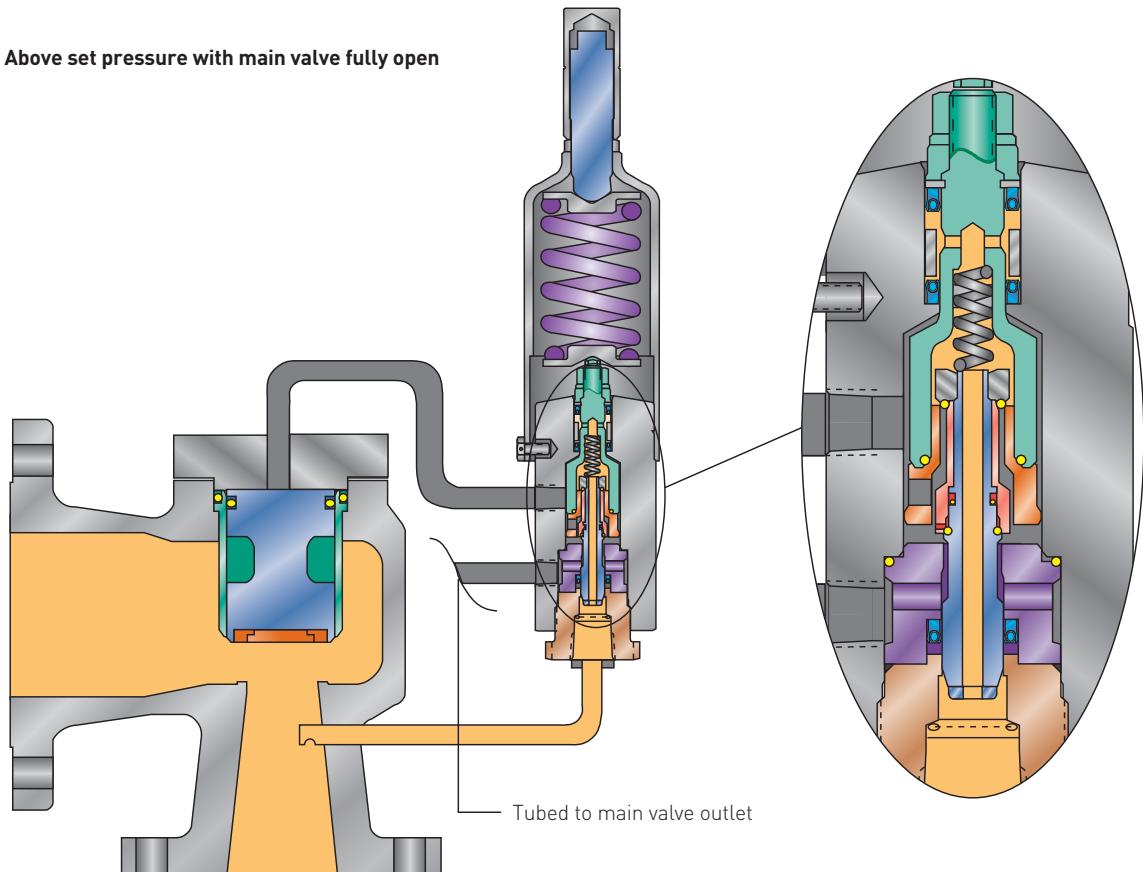


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At or slightly above set pressure main valve partially open and modulating



Above set pressure with main valve fully open



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SELECTION GUIDE

Example:	8	4	3	14	J	23	/S1	/AED
Pilot series								
8	Series 800							
Main valve lift⁽¹⁾								
4	Full lift, API orifice							
5	Restricted, API orifice							
6	Full lift, full bore orifice							
Main valve piston type								
3	Soft seat/seals							
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/N	CS body and SS trim compliance with NACE MR0175 (2002 Edition)							
/L1	Low temperature CS body, SS trim							
S/N	SS body and trim compliance with NACE MR0175 (2002 Edition)							
/SPL	Special							
Soft goods material								
/AED	ED resistant soft goods							

NOTES

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.

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