



FLOW SAFE, Inc.

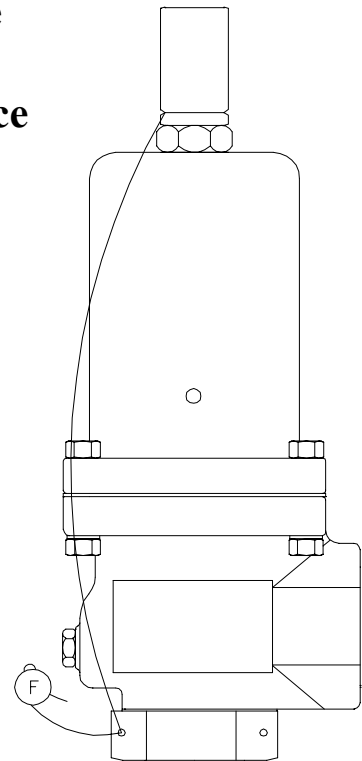
"Environmental Performance for Industry"

F88 BALANCED SAFETY RELIEF VALVE

"Precision Overpressure Protection"

FEATURES

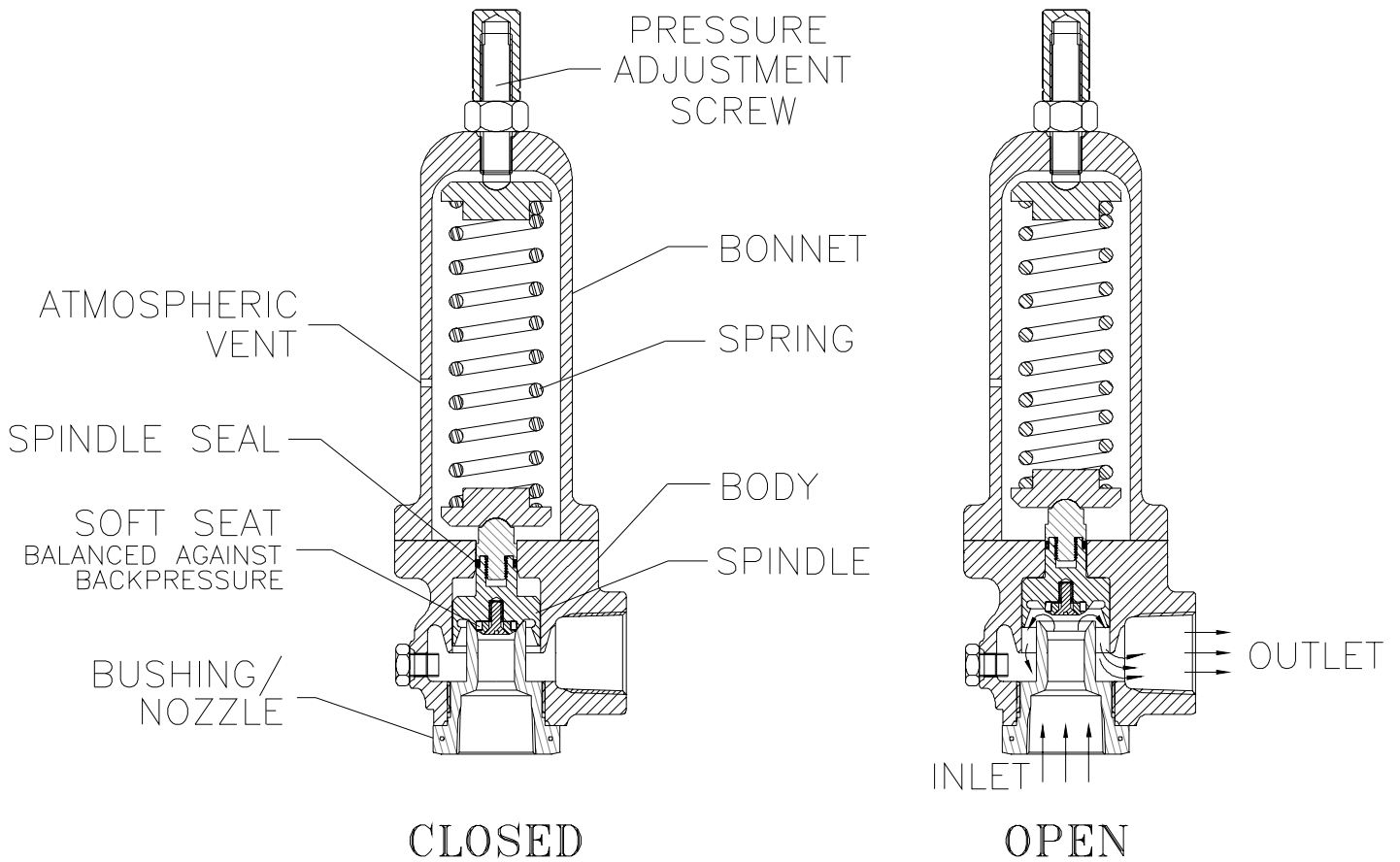
- **Balanced against the effects of backpressure without use of bellows**
- **For gas, vapor, liquid, or mixed-phase service**
- **ASME "UV"-stamped**
- **Bubble-tight, repeatable seating**
- **All plastic (PTFE, Vespel, etc.) seats & seals for maximum process compatibility**
- **High-capacity nozzles**
- **Set pressures to 4292 psig**
- **-423 to 400 °F temperature range**
- **Fixed blowdown**
- **Available in a variety of materials and connections, including threaded (NPT, Mil-Spec, SAE), flanged, Grayloc, etc.**
- **Standard 316/316L SS trim for superior corrosion resistance**



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Need balanced overpressure protection? The F88 is the answer!



When there is backpressure at the outlet of a pressure relief valve, caused by either superimposed pressure existing in the outlet piping or built-up pressure during a discharge, the effects on A) set pressure, B) flow capacity, and C) backflow must be considered. If the relief valve is unbalanced, as in the case of a conventional safety valve, each PSI of superimposed backpressure will increase set pressure by one PSI. Backpressure greater than approximately 50% of set pressure will reduce the relief valve flow capacity.

Flow Safe has designed the F88 balanced spring-style safety relief valve to handle these challenging applications involving backpressure, particularly in applications where customers require a very accurate, repeatable, and leak-tight valve.

Below the set point, pressure acting upon the valve spindle seat surface generates a lifting force; i.e., $F = P \times A$. This opening force is opposed by the spring closing force. At set point, as the spindle lifts off the valve seat, additional boost force is created through turbulence within the oversized huddling chamber in the spindle, allowing the valve to achieve full lift within 10% overpressure. Stability is achieved through the use of a pressurized seal ring on the valve spindle. This ring actually dampens the movement of the spindle, allowing the valve to flow, stable and smooth, without chatter.

The top of the spindle utilizes a dynamic seal of the same diameter as the seat. This high-pressure seal balances the valve against the effects of backpressure and prevents bonnet leakage when outlet pressure is applied before inlet pressure. Bellows are not needed; these are very costly and do not offer reliable long-term performance.

CAPACITIES

F88 SERIES

ASME Capacity Coefficients

Gas: F88-4: Slope = 1.87 scfm/psia; equivalent $K_d = 0.878$
 F88-8: Slope = 4.20 scfm/psia; equivalent $K_d = 0.878$
 Liquid: F88-4: Slope = 3.79 gpm/(psid)^{1/2}; equivalent $K_d = 0.859$
 F88-8: $K_d = 0.798$

Set Pressure, psig	Orifice Size (Area)			
	F88-4 (0.116 sq in)		F88-8 (0.261 sq in)	
	SCFM Air ¹	GPM Water ²	SCFM Air ¹	GPM Water ²
50	130	28	292	58
60	150	31	339	64
70	171	33	385	69
80	191	35	431	74
90	212	37	477	79
100	232	39	523	83
150	335	48	754	101
200	438	56	985	117
300	643	69	1447	144
400	848	79	1909	166
500	1053	89	2371	185
1000	2080	125	4680	262
2000	4132	177	9298	371
3000	6185	217	13917	454
4000	8238	251	18535	525
4292	8837	260	19884	544

Refer to API RP 520 Part I for pressure relief valve sizing formulas.

¹ Capacities based on critical flow conditions (backpressure < 53% of inlet pressure), 60 °F, 10% overpressure
 (For air, lbs/hr = 4.59 x scfm)

² Capacities based on zero backpressure, 70 °F, 10% overpressure

SPECIFICATIONS

Pressure range	50 to 4292 psig (CS, SS) / 2600 psig (Brass)
Blowdown	Fixed: approx. 20%, 100 psig and up; 30 – 40%, below 100 psig
Temperature range	-423 to 400 °F
Valve body material	CS, 316/316L SS (CF8M or CF3M casting), Brass *
Trim (wetted part) material	316/316L SS or Brass *
Seat material	PTFE (Teflon), PCTFE (Kel-F), or Vespel
Spindle seal material	PTFE (Teflon) w/ SS* spring
Spring material	302 / 304 / 17-7PH SS

* Other materials available upon request

PART NUMBERS / ACCESSORIES

F88 SERIES

Item	Part Number	
	F88-4	F88-8
Valve assembly, Brass, 3/4" female NPT inlet	88-1158F-201 *	88-1160F-201 *
Valve assembly, CS, 3/4" female NPT inlet	88-1158F-202	88-1160F-202
Valve assembly, SS, 3/4" female NPT inlet	88-1158F-203	88-1160F-203
Valve assembly, Brass, 1" female NPT inlet	88-1158F-301	88-1160F-301
Valve assembly, CS, 1" female NPT inlet	88-1158F-302	88-1160F-302
Valve assembly, SS, 1" female NPT inlet	88-1158F-303	88-1160F-303
Softgoods kit: (X = Seat mat'l) T (Teflon), 50 – 900 psig K (Kel-F), 901 – 1500 psig W (Vespel), 1501 – 4292 psig	F88-4-XT	F88-8-XT
Lift lever kit	Contact factory	

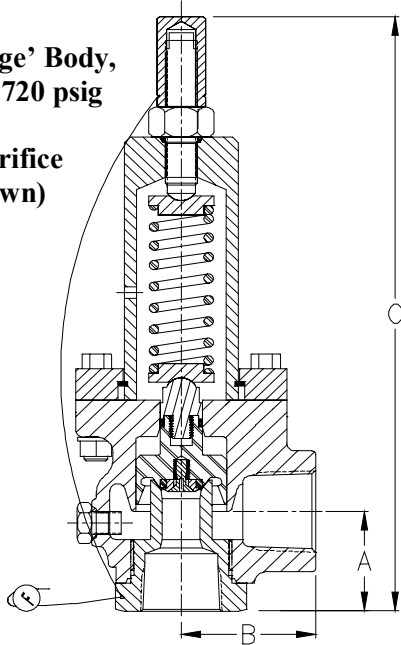
* Assembly part number suffixes shown for "Large" body; use -211, -212, etc., for high-pressure "X-Large" body.

DIMENSIONS / WEIGHTS

SIZE	Weight (lbs.)	Standard Connections		Approx. Dimensions (in.)		
		Inlet	Outlet	A	B	C
F88-4, -8 ('Large' body)	8.0	3/4" or 1" FNPT	1" FNPT	1.61	2.07	9.8
F88-4, -8 ('X-Large' body)	12.5	3/4" or 1" FNPT	1" FNPT	1.61	2.07	12.1

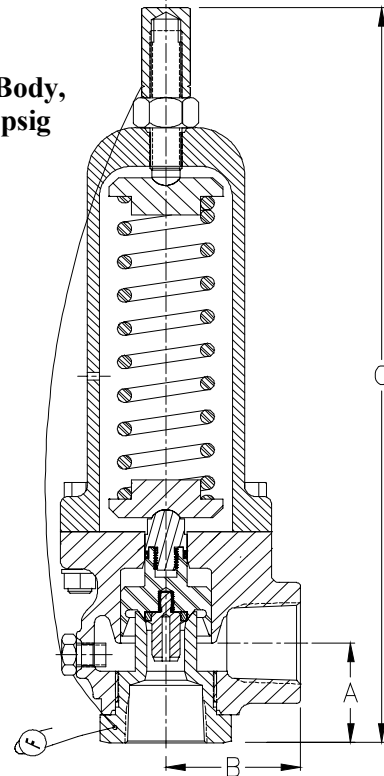
'Large' Body,
50 – 720 psig

(-8 orifice
shown)



'X-Large' Body,
721 – 4292 psig

(-4 orifice
shown)



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