

Figure 5670

Pressure Relief/Sustaining Valve

Data Sheet: GA-5670-1216B

The GA Industries Figure 5670 Pilot Operated Pressure Relief / Pressure Sustaining Valve is designed for applications where it is critical to maintain a predetermined upstream pressure. The pilot assembly reacts to changes in upstream pressure allowing the main valve to modulate between the closed and open position, maintaining desired upstream set pressure. As long as the upstream pressure is below the set point of the pilot assembly, the main valve will stay in the closed position; however, once the upstream pressure exceeds the set point of the pilot assembly, the main valve will open to allow flow to the downstream side (sustaining) or to discharge excess pressure (relief).



Standards Compliance

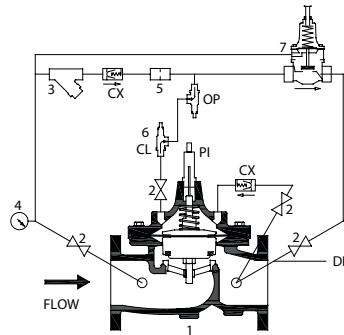
- ANSI/AWWA C530 Compliant
- NSF-61 Certified for Contact with Drinking Water
- NSF-372 Certified Lead Free (0.25% max weighted avg lead content)

Materials

Main Valve Body:	Ductile Iron ASTM A536
Main Valve Bonnet:	Ductile Iron ASTM A536
Disc Guide:	Stainless Steel
Seat:	Stainless Steel
Disc:	Buna-N Rubber
Diaphragm:	Nylon Reinforced Buna-N
Stem:	Stainless Steel
Spring:	Stainless Steel

Schematic Diagram

1. Main Valve
2. Isolation Valve
3. "Wye" Type Strainer
4. Pressure Gauge
5. Restriction Tube Fitting
6. Closing Speed Control
7. Pressure Relief Pilot



BODY CONFIGURATIONS		GLOBE BODY		ANGLE BODY
END CONNECTION	PRESSURE RATING	FULL PORT	REDUCED PORT	
Threaded	400 PSI	1 1/4"-3"	n/a	1 1/4"-3"
Flanged	ANSI Class 150, 250 PSI	1 1/2"-16"	3"-10"	1 1/2"-10"
	ANSI Class 300, 400 PSI			
MINIMUM INLET PRESSURE 10 PSI				

Standard Features

- Fusion Bond Epoxy Coated, NSF-61 Certified
- Pilot Assembly
 - Wye Strainer
 - Closing Speed Control (1-1/4" to 4")
 - Isolating Valves
 - Relief/Sustaining Pilot, 50-200 PSI
- Inlet Pressure Gauge
- Copper Tubing and Brass Fittings
- Water Temperature: 33° - 140°F

Options (Add suffix letters to Figure Number)

Example: Figure 5670-G-15-LB-LH

Body Configuration (See table for availability)

- A – Angle Body
- G – Globe Body
- R-G – Reduced Port Globe Body

Connections (See table for availability)

- 00 – NPT Threaded
- 15 – ANSI Class 150 Flanges
- 30 – ANSI Class 300 Flanges

Spring Ranges

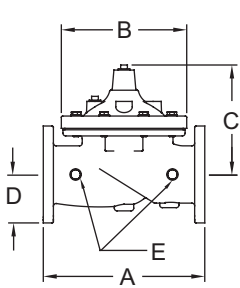
- L3 – Optional 5-15 PSI Relief/Sustained Pressure Range
- L2 – Optional 10-35 PSI Relief/Sustained Pressure Range
- LA – Optional 30-90 PSI Relief/Sustained Pressure Range
- LB – Standard 50-200 PSI Relief/Sustained Pressure Range
- LC – Optional 150-300 PSI Relief/Sustained Pressure Range

Optional Features

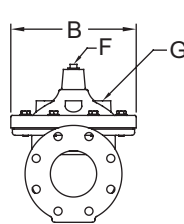
- CL – Closing Speed Control (Standard 1/4" to 4")
- CX – Pilot Check (closes valve upon pressure reversal)
- DR – Atmospheric Drain
- LG – Liquid Filled Gauges
- LH – Pilot System Mounted on Left Side Facing Inlet
- OP – Opening Speed Control
- PI – Indicator Rod
- S9 – All Stainless Steel Pilot and Piping (includes LG option)

Globe and Angle Main Valve Dimensions

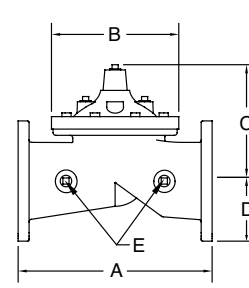
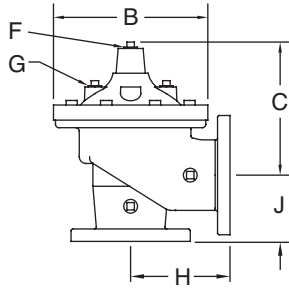
DIM	FULL PORT	VALVE SIZE INCHES (mm)											
		1 ¼ (32)	1 ½ (38)	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)
A	Threaded	7 ¼	7 ¼	9 ⅞	11	12 ½							
	Class 150 Flange		8 ½	9 ⅜	11	12	15	20	25 ⅜	29 ¾	34	39	41 ⅜
	Class 300 Flange		9	10	11 ⅝	13 ¼	15 ⅝	21	26 ⅞	31 ⅞	35 ½	40 ½	43 ½
B	Diameter	5 ⅝	5 ⅝	6 ¾	8	9 ⅜	11 ⅞	15 ¾	20 ⅞	23 ⅞	27 ½	31 ¾	34 ½
C	Maximum	5 ¾	5 ¾	6 ⅜	7 ⅝	8	10 ⅜	12 ⅝	15 ⅞	17 ⅝	20 ⅜	22 ⅞	25 ⅞
D	Threaded	1 ⅜	1 ⅜	1 ¾	2 ⅞	2 ⅞	3 ⅞	5	5	5 ⅞	6 ¾	8 ⅞	8 ⅞
	Class 150 Flange		2 ½	3	3 ½	3 ¾	4 ½	5 ½	6 ¾	8	9 ½	10 ½	11 ¾
	Class 300 Flange		3	3 ¼	3 ¾	4 ⅞	5	6 ¼	7 ½	8 ¾	10 ¼	11 ½	12 ¾
E	NPT Body Tap	⅜	⅜	⅜	½	½	¾	¾	1	1	1	1	1
F	NPT Cover Plug Tap	½	½	½	½	½	¾	¾	1	1	1	1	1
G	NPT Cover Tap	⅜	⅜	⅜	½	½	¾	¾	1	1	1	1	1
H	Threaded	3 ¼	3 ¼	4 ¾	5 ½	6 ¼							
	Class 150 Flange		4	4 ¾	5 ½	6	7 ½	10	12 ⅞	14 ⅞			
	Class 300 Flange		4 ¼	5	6	6 ⅞	8	10 ½	13 ¼	15 ⅞			
J	Threaded	1 ⅞	1 ⅞	3 ¼	4	4 ½							
	Class 150 Flange		4	3 ¼	4	4	5	6	8	8 ⅝			
	Class 300 Flange		4 ¼	3 ½	4 ⅞	4 ⅞	5 ⅞	6 ½	8 ½	9 ⅞			
Valve Stem Internal Thread		10-32	10-32	10-32	10-32	¼-20	¼-20	¼-20	⅜-16	⅜-16	⅜-16	⅜-16	⅜-16
Stem Travel (in)		⅞	¾	¾	¾	1	1 ⅜	1 ¾	2 ⅜	2 ⅞	3 ⅞	3 ⅞	4 ⅞
Approx. Weight (lbs)		22	26	36	55	70	130	240	440	720	820	1200	1550



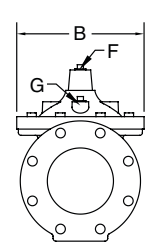
Globe Style Body



Angle Style Body



Reduced Port Body



Reduced Port Main Valve Dimensions

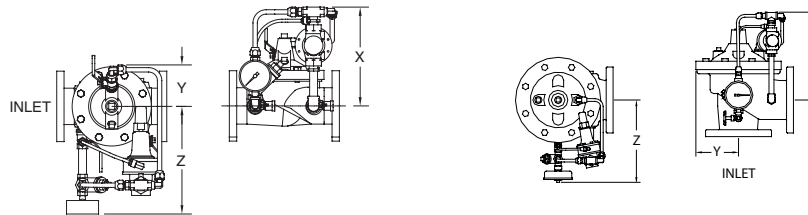
DIM		VALVE SIZE INCHES (mm)				
		3" (80)	4" (100)	6" (150)	8" (200)	10" (250)
A	Class 150 Flange	10 ¼	14	17 ¾	21 ⅞	26
	Class 300 Flange	11	14 ½	18 ⅞	22 ⅞	27 ⅞
B	Diameter	6 ¾	9 ⅜	11 ⅞	15 ¾	20 ⅞
C	Maximum	6 ⅝	8 ⅞	12 ⅝	13 ¼	16 ¾
D	Class 150 Flange	3 ¾	4 ½	5 ½	6 ¾	8
	Class 300 Flange	4 ⅞	5	6 ¼	7 ½	8 ¾
E	NPT Body Tap	⅜	½	¾	¾	1
F	NPT Cover Plug Tap	⅜	½	¾	¾	1
G	NPT Cover Tap	⅜	½	¾	¾	1
Valve Stem Internal Thread		10-32	¼-20	¼-20	⅜-16	⅜-16
Stem Travel (in)		¾	1	1 ⅞	1 ¾	2 ⅜
Approx. Weight (lbs)		35	80	140	275	480

Pilot System Dimensions

PILOT SYSTEM DIMENSIONS		VALVE SIZE INCHES (mm)											
		DIM	1-¼ (32)	1-½ (40)	2" (50)	2-½" (65)	3" (80)	4" (100)	6" (150)	8" (200)	10" (250)	12" (300)	14" (350)
Full Port Body	X	11 5/8	11 5/8	11 5/8	12 5/8	12 5/8	15 5/8	15 5/8	16 5/8	17 5/8	20	23	26
	Y	4	4	4	4	4 1/2	6	8	10	12	14	16	17 1/2
	Z	9 5/8	9 5/8	10	9 3/4	10 1/8	11 1/4	12 1/2	13 5/8	13 5/8	18	20	21 1/2
Reduced Port Body	X					11 5/8	12 5/8	15 5/8	15 5/8	16 5/8			
	Y					4	4 1/2	6	8	10			
	Z					10	10 1/8	11 1/4	12 1/2	13 5/8			
Angle Body	X	12	12	12	13	13	16	16	17	18			
	Y	5	5	5	5	5	6	8	10	12			
	Z	10	10	10 1/2	10 1/2	10 1/2	12	12 1/2	14	14			

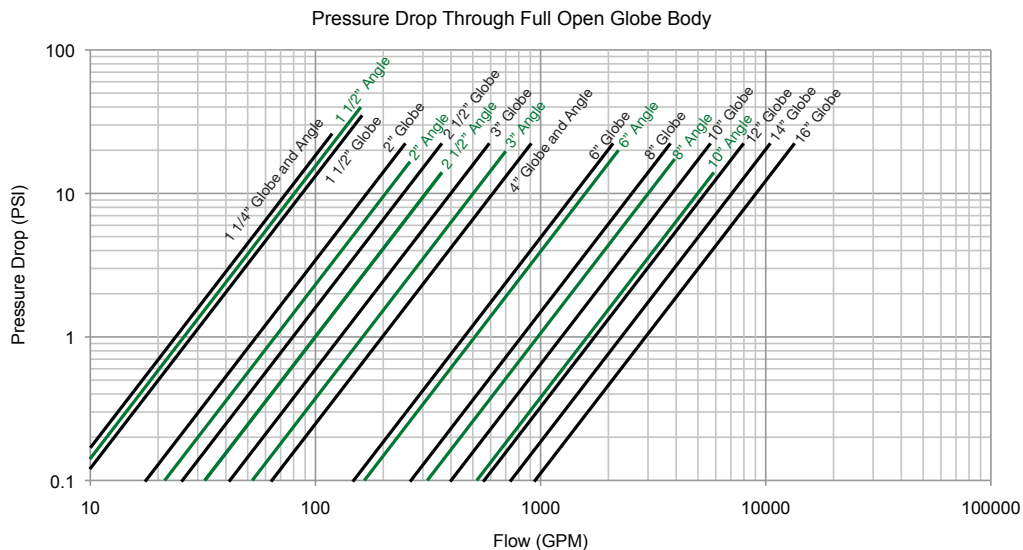
Globe Pilot System Dimensions

Angle Pilot System Dimensions



Operation

The GA Industries Figure 5670 Pilot Operated Pressure Relief / Pressure Sustaining Valve is designed to sense upstream pressure. The pilot piping contains a normally closed, direct acting, spring loaded pilot valve, which may be preset to the particular pressure requirements of the system (pilots are available in pressure ranges from 0 to 300 psi.). If upstream pressure does not exceed the preset on the pilot spring, the pilot and the main valve remain tightly closed. Should upstream pressure exceed the set point of the pilot, both the pilot and main valve will open, allowing flow through the valve. When upstream pressure returns to acceptable limits, the reverse action occurs.



Flow Characteristics (Pressure Sustaining)

Full Port Globe and Angle Valve size	inches (mm)	1 ¼ (32)	1 ½ (40)	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)
Reduced Port Globe Valve Size	inches (mm)			3 (80)		4 (100)	6 (150)	8 (200)	10 (250)				
Suggested Flow (GPM)	Max. Continuous	93	125	210	300	460	800	1800	3100	4900	7000	8400	11000
	Max Intermittent	120	160	260	375	600	1000	2250	4000	6150	8700	10500	13800
	Min. Continuous	10	10	15	20	30	50	115	200	300	435	530	690
Suggested Flow (Liters/sec)	Max. Continuous	6	8	13	19	29	50	113	195	309	550	665	870
	Max. Intermittent	7.6	10	16.4	23	37	62	142	246	388	440	530	95
	Min. Continuous	.6	.6	0.9	1.3	1.9	3.2	7.2	13	19	28	33	43

Suggested flow calculations are based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 ft./sec (6.1 meters/sec) & maximum intermittent is approx. 25 ft./sec (7.6 meters/sec) and minimum continuous flow is approx. 1.25 ft./sec (0.4 meters/sec). Many factors should be considered in sizing pressure relief/sustaining valves including inlet pressure, outlet pressure and flow rates.

How to Size Pressure Sustaining Valves

As long as the pressure at the valve's inlet is above the minimum set on its pilot and at least 10 PSI higher than the pressure at its outlet, size based on the "maximum continuous flow." At flow rates higher than the maximum continuous the inlet pressure must be greater than the outlet pressure by the friction loss at that flow rate. Should the inlet pressure to fall to the setting on its pilot, the valve will throttle to reduce the flow to the downstream system in order to sustain the minimum inlet pressure. Noise or damage may result if the valve operates for long periods of time at differential pressures in the "cavitation zone." (See Pressure Differential Limit Chart)

Example: A 4" globe body valve is to sustain a minimum of 40 PSI inlet (upstream) pressure while passing a maximum normal flow of 600 GPM and peak flow of 1,000 GPM from the high pressure zone to the low pressure zone. The maximum normal (continuous) flow is less than the rated 800 GPM so the valve will function properly as long as the inlet pressure is above 40 PSI and there is at least 10 PSI difference between the inlet and outlet pressures. However, the friction loss through a 4" globe valve at 1,000 GPM is 25 PSI so to pass the peak flow the inlet (upstream) pressure must be at least 40 PSI and 25 PSI higher than the outlet (downstream) pressure.

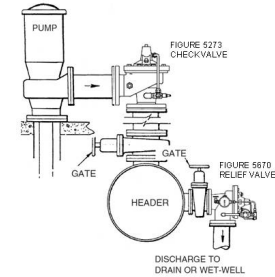
How to Size Pressure Relief Valves

Pressure relief valves are the same as pressure sustaining valves but installed on the side outlet of a tee with their outlet typically piped to atmosphere. In this application, the valve is normally closed and only opens infrequently and for a very short period of time to discharge excess pressure out of the system during a surge event resulting from a sudden stoppage of pumping or an abrupt valve closure. Since water is incompressible, the relief valve only needs to discharge a small portion of the system flow to limit a further rise in pressure. Many factors should be considered in sizing pressure relief valves including inlet pressure, outlet pressure and flow rates. The following relief valve sizing chart is for guidance purposes only, consult the factory for specific recommendations.

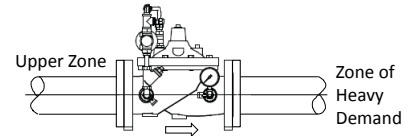
Pressure Relief Sizing Chart

Maximum System Flow (USGPM)	Figure 5670 Full Port
Less than 100	1 ½"
100 to 350	2"
350 to 650	2 ½"
650 to 1000	3"
1000 to 1750	4"
1750 to 4000	6"
4000 to 7000	8"
7000 to 11,000	10"
11,000 to 16,000	12"
16,000 to 22,000	14"
22,000 to 28,000	16"

Typical Pressure Relief Installation



Typical Pressure Sustaining Installation



PRESSURE DIFFERENTIAL LIMIT

