



# MODEL 652-03 Pressure Relief & Surge Anticipator Valve



- Protects Against Water Hammer Surges
- Opens on Initial Low Pressure Wave
- Closes Slowly to Prevent Subsequent Surges
- Adjustable Over a Wide Range of Settings

The Cla-Val Model 652-03 Surge Anticipator Valve is indispensable for protecting pumps, pumping equipment and all applicable pipelines from dangerous pressure surges caused by rapid changes of flow velocity within a pipeline.

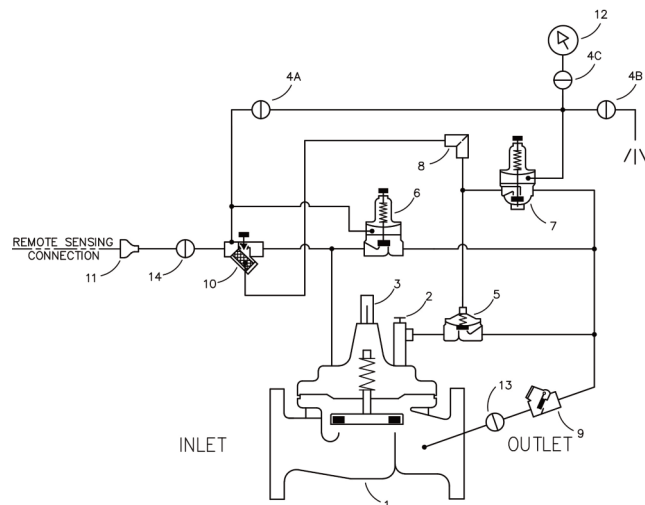
When pumping systems are started and stopped gradually, harmful surges do not occur. Should a power failure take place, however the abrupt stopping of the pump can cause dangerous surges in the system which could result in severe equipment damage.

Power failure to a pump will usually result in a down surge in pressure, followed by an up surge in pressure. The surge control valve opens on the initial low pressure wave, diverting the returning high pressure wave from the system.\*In effect, the valve has anticipated the returning high pressure wave and is open to dissipate the damage causing surge. The valve will then close slowly without generating any further pressure surges.

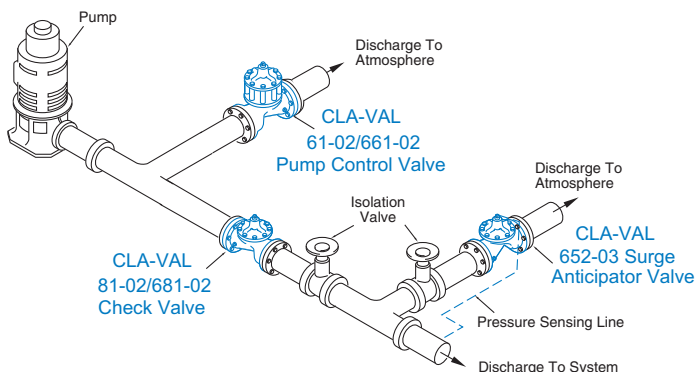
\* An adjustable hydraulic flow control limits the valve opening for a controlled initial surge relief.

## Schematic Diagram

Item	Description
1	100-20 Hytrol Main Valve
2	X102F Flow Limiter
3	X101 Valve Position Indicator *
4	CK2 Isolation Valve
5	100-01 Hytrol (Reverse Flow)
6	CRL-60 Pressure Relief Control
7	CRA Pressure Reducing Control
8	X58B Restriction Tube Assembly
9	CSC Swing Check Valve
10	X42N-3 Strainer Needle Valve
11	Bell Reducer
12	Pressure Gage
13	CK2 Isolation Valve
14	CK2 Isolation Valve



\*Note: X101 or X105L Accessories not available in 4" size.



## Typical Application

The Model 652-03 discharges to atmosphere from a tee in the pump discharge header. The valve anticipates surges caused by power failure as well as acting as a standard overpressure relief valve.

**Note:** The remote pressure sensing line should be 3/4" minimum I.D. installed from the valve to the pipeline to avoid air pockets.

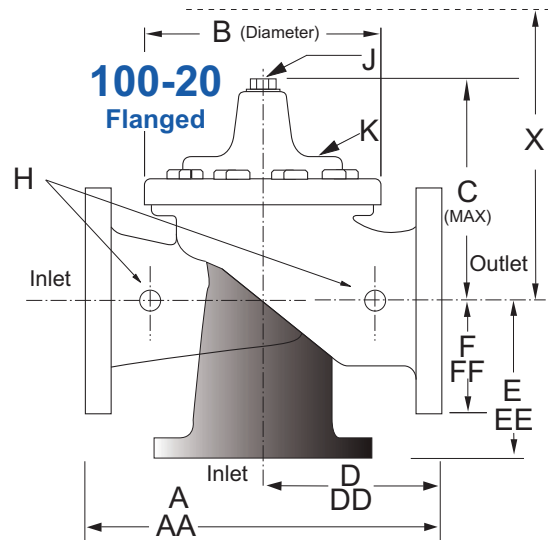
**Note:** We recommend protecting tubing and valve from freezing temperatures.

## Model 652-03 (Uses 100-20 Hytrol Main Valve)

### Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class		
		Flanged		
Grade	Material	ANSI Standards*	150 Class	300 Class
ASTM A536	Ductile Iron	B16.42	250	400
ASTM A216-WCB	Cast Steel	B16.5	285	400
UNS 87850	Bronze	B16.24	225	400

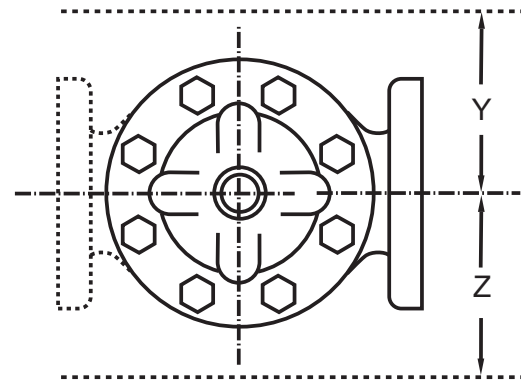
Note: \* ANSI standards are for flange dimensions only.  
Flanged valves are available faced but not drilled.  
**Valves for higher pressure are available; consult factory for details**



### Materials

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	4" - 24"	4" - 16"	4" - 16"
	80 - 600 mm	80 - 400 mm	80 - 400 mm
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

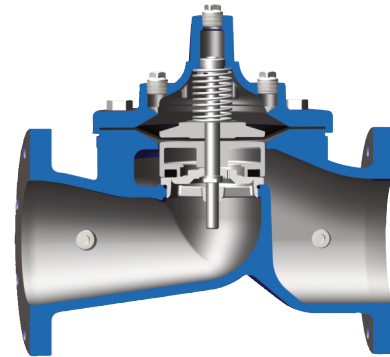
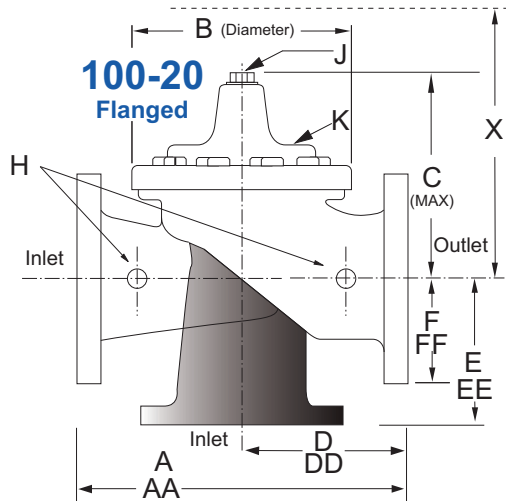
For material options not listed, consult factory.  
Cla-Val manufactures valves in more than 50 different alloys.



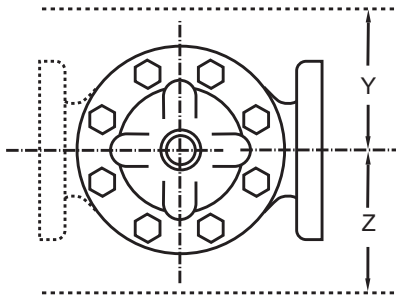
### Model 652-03 Dimensions (In Inches)

Valve Size (Inches)	4	6	8	10	12	14	16	18	20	24
A 150 ANSI	13.88	17.75	21.38	26.00	30.00	34.25	35.00	42.12	48.00	48.00
AA 300 ANSI	14.50	18.62	22.38	27.38	31.50	35.75	36.62	43.63	49.62	49.75
B Diameter	9.12	11.50	15.75	20.00	23.62	27.47	28.00	35.44	35.44	35.44
C Maximum	8.62	11.62	15.00	17.88	21.00	20.88	25.75	25.00	31.50	31.50
D 150 ANSI	6.94	8.88	10.69	12.75	14.94	—	—	20.93	21.06	—
DD 300 ANSI	7.25	9.38	11.19	—	—	—	—	—	—	—
E 150 ANSI	5.50	6.75	7.25	8.06	8.68	—	—	15.81	15.94	—
EE 300 ANSI	5.81	7.25	7.75	—	—	—	—	—	—	—
F 150 ANSI	4.50	5.50	6.75	8.00	9.50	11.00	11.75	15.88	14.56	17.00
FF 300 ANSI	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.88	16.06	19.00
H NPT Body Tapping	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00
J NPT Cover Center Plug	0.50	0.75	0.75	1.00	1.00	1.25	1.25	2.00	2.00	2.00
K NPT Cover Tapping	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Stem Travel	0.80	1.10	1.70	2.30	2.80	3.40	4.50	4.50	4.50	6.50
Approx. Ship Weight (lbs)	85	195	330	625	900	1250	1380	2365	2551	2733
Approx. X Pilot System	15	27	30	33	36	36	41	40	46	55
Approx. Y Pilot System	11	18	20	22	24	26	26	30	30	30
Approx. Z Pilot System	11	18	20	22	24	26	26	30	30	30

**Model 652-03 Metric Dimensions** (Uses 100-20 Hytrol Main Valve)



**Model 100-20 Reduced Port Hytrol Main Valve**



**Model 652-03 Dimensions** (mm)

Valve Size (mm)	100	150	200	250	300	350	400	450	500	600
A 150 ANSI	353	451	543	660	762	870	889	1070	1219	1219
AA 300 ANSI	368	473	568	695	800	908	930	1108	1260	1263
B Diameter	232	292	400	508	600	698	711	900	900	900
C Maximum	219	295	381	454	533	530	654	635	800	800
D 150 ANSI	176	226	272	324	380	—	—	532	535	—
DD 300 ANSI	184	238	284	—	—	—	—	—	—	—
E 150 ANSI	140	171	184	205	349	—	—	402	405	—
EE 300 ANSI	148	184	197	—	—	—	—	—	—	—
F 150 ANSI	114	140	171	203	241	279	289	403	370	432
FF 300 ANSI	127	159	191	222	260	292	324	403	408	483
H NPT Body Tapping	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00
J NPT Cover Center Plug	0.50	0.75	0.75	1.00	1.00	1.25	1.25	2.00	2.00	2.00
K NPT Cover Tapping	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Stem Travel	20	28	43	58	71	86	86	114	114	114
Approx. Ship Weight (kgs)	39	89	150	284	409	568	627	681	1157	1249
Approx. X Pilot System	381	686	762	839	915	915	1042	1016	1169	1397
Approx. Y Pilot System	280	458	508	559	610	661	661	762	762	762
Approx. Z Pilot System	280	458	508	559	610	661	661	762	762	762

652-03 Valve Selection	100-20 Pattern: Globe (G), Angle (A), End Connections: Flanged (F) Indicate Available Sizes										
	Inches	4	6	8	10	12	14	16	18	20	24
	mm	100	150	200	250	300	350	400	450	500	600
Main Valve 100-20	Pattern	G, A	G, A	G, A	G	G	G	G	G	G	G
	End Detail	F	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	580	1025	2300	4100	6400	9230	9230	16500	16500	16500
	Maximum Surge	990	1760	3970	7050	11000	15900	15900	28200	28200	28200
Suggested Flow (Liters/Sec)	Maximum	37	65	145	258	403	581	581	1040	1040	1040
	Maximum Surge	62	111	250	444	693	1002	1002	1777	1777	1777

100-20 Series is the reduced internal port size version of the 100-01 Series.

**Sizing Information:** Because of the many variable conditions that generally exist in any given system, proper sizing is important. Incorrect valve sizing will nullify the ability of the Surge Anticipator Valve. For valve sizing assistance, contact Cla-Val with the following specific pump and system information: number and type of pumps; shutoff head; flow rate; discharge static head and pumping head; pipe size; length; thickness and material.



**CRL-60 Pilot Control**  
Direct-acting, spring loaded, diaphragm type relief pilot capable of opening and closing within very close pressure limits.



**CRA Pilot Control**  
Automatically reduces a higher inlet pressure to a lower outlet pressure. Direct acting, spring loaded, diaphragm type - hydraulic or pneumatic operation.

### Adjustment Ranges

#### High Pressure Pilot (CRL-60)

- 0 to 75 psi
- 20 to 200 psi \*
- 100 to 300 psi
- 250 to 600 psi

#### Low Pressure Pilot (CRA)

- 2 to 30 psi
- 15 to 75 psi
- 30 to 300 psi \*

\*Supplied unless otherwise specified  
Other ranges available, please consult factory

### Temperature Range

Water: to 180°F

### Materials

#### Standard Pilot System Materials

- Pilot Control: Low Lead Bronze
- Trim: Stainless Steel 303
- Rubber: Buna-N® Synthetic Rubber


#### Optional Pilot System Materials

Pilot systems are available with optional Aluminum, Stainless Steel or Monel materials.


### When Ordering, Specify:

1. Catalog No. 652-03
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded or Flanged
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed


### Valve Options




X141 Pressure Gauge




X101AR Valve Position Indicator with Air Release




X101 Valve Position Indicator



X144 e-FlowMeter



X43H Strainer



Stainless Steel Pilot