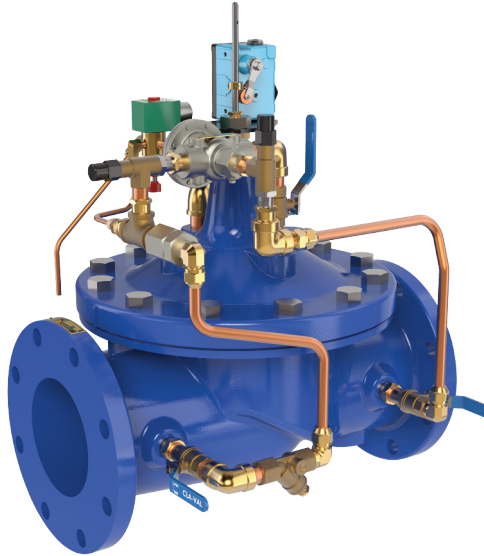




— MODEL — **660-32**

# Combination Pump Control and Back Pressure Valve (4" and Larger)



- Built-in Check Valve
- Accurate Pressure Control
- Low Head Loss
- Smooth Control of Pump Surges
- Easy Maintenance Design

The Cla-Val Model 660-32 Combination Pump Control and Back Pressure Valve is a pilot-operated control valve designed for booster pump discharge installation to eliminate pipeline surges caused by starting and stopping of pump and to provide adjustable back pressure on pump while it is running. The valve features a modified globe-design with diaphragm-actuation, and hydraulic operation for smooth, reliable automatic operation during pump starting and stopping. A built-in lift-type check feature automatically closes valve on electric power failure or any time pressure reversal occurs to protect pump from back spinning.

In operation, when pump is off, the pump control valve is closed by downstream system pressure. When pump is started, the solenoid control is energized and valve opens slowly to gradually increase pump flow and line pressure to desired back pressure setting for pumping conditions. When pump is signaled to shut-off, the solenoid control is de-energized and the valve begins to slowly close, gradually reducing flow while pump continues to run. When valve is closed, the included limit switch assembly turns off pump. Adjustable flow controls are included to easily regulate valve opening and closing speed to prevent surges. Using Cla-Val wiring diagram (see page 4) ensures safe electrical interlock control of pump and valve.

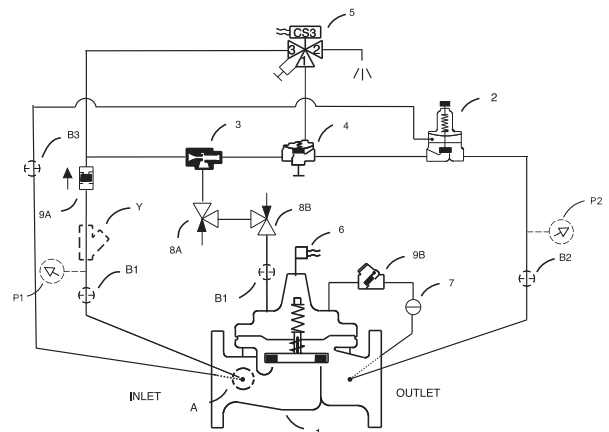
## Schematic Diagram

Item	Description
1	Hycheck Main Valve 100-23
2	CRL Pressure Relief Control
3	X47A Ejector
4	100-01 Hytrol (Reverse Flow)
5	CS3M Solenoid Control
6	X105LCW Switch Assembly
7	CK2 Isolation Valve
8	CV Flow Control (Opening and Closing Speed)
9	CDC/CSC Check Valve

## Optional Features

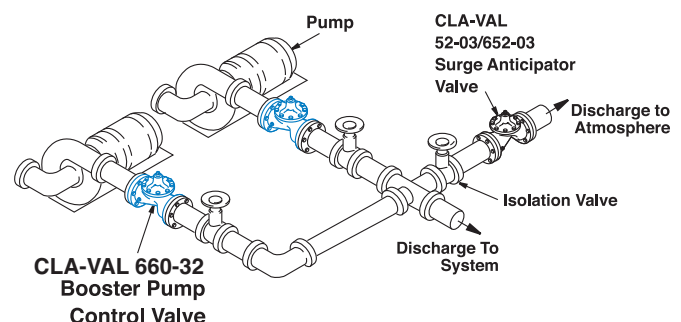
Item	Description
A	X46A Flow Clean Strainer
B	CK2 Isolation Valve
P	X141 Pressure Gauge
Y	X43 "Y" Strainer

Note: For main valve option descriptions, refer to the 100-23 (660-32) Engineering Data Sheet



## Typical Application

Install Model 660-32 valve as shown in multiple pump applications. Flexible water-tight conduit should be used for electrical connections to the solenoid control and the limit switch. A Model 52-03/652-03 Surge Anticipator Valve is recommended for power failure protection.



## Pressure Ratings (Recommended Maximum Pressure - psi)

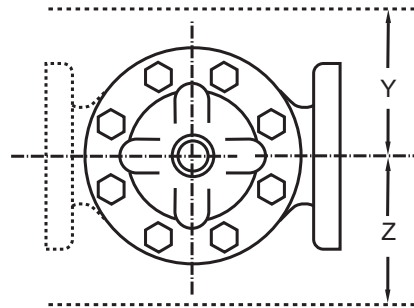
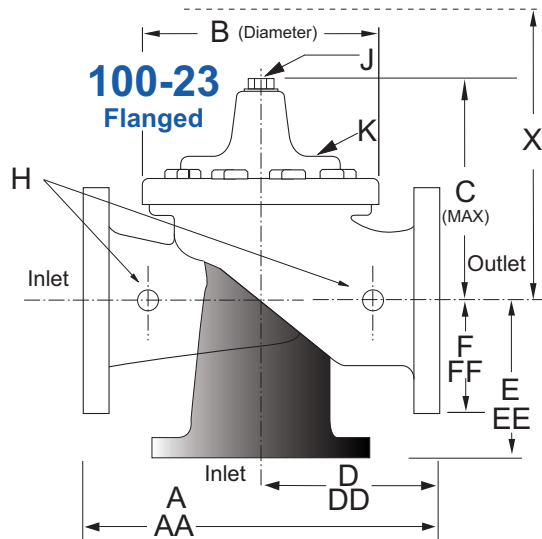
Valve Body & Cover		Pressure Class		
		Flanged		
Grade	Material	ANSI Standards*	150 Class	300 Class
ASTM A536	Ductile Iron	B16.42	250	400
ASTM A216-WCB	Cast Steel	B16.5	285	400
UNS 87850	Bronze	B16.24	225	400

Note: \* ANSI standards are for flange dimensions only.  
Flanged valves are available faced but not drilled.

## Materials

Component	Standard Material Combinations		
	Ductile Iron	Cast Steel	Bronze
Body & Cover	Ductile Iron	Cast Steel	Bronze
100-23 Sizes (inches)	4" - 24"	4" - 16"	4" - 16"
100-23 Sizes (mm)	100 - 600 mm	100 - 400 mm	100 - 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		

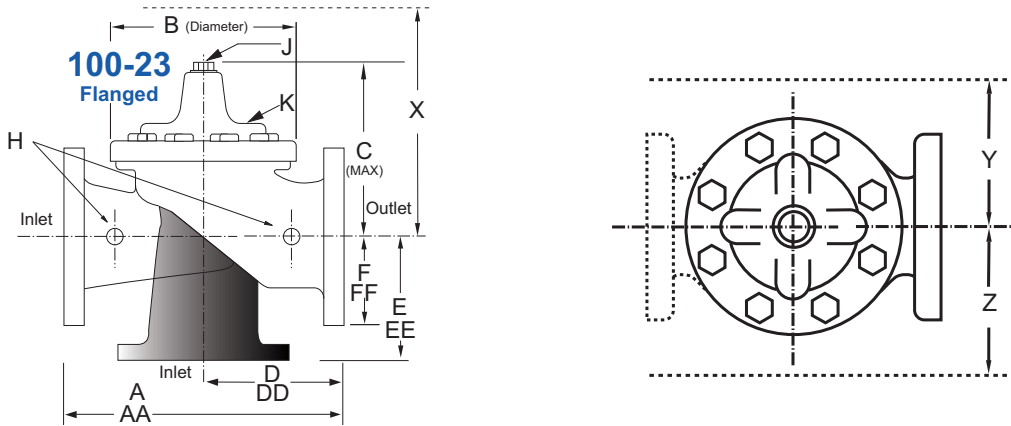
For material options not listed, consult factory.  
Cla-Val manufactures valves in more than 50 different alloys.



## 660-32 Series Dimensions (Full Internal Port 100-23 (inches))

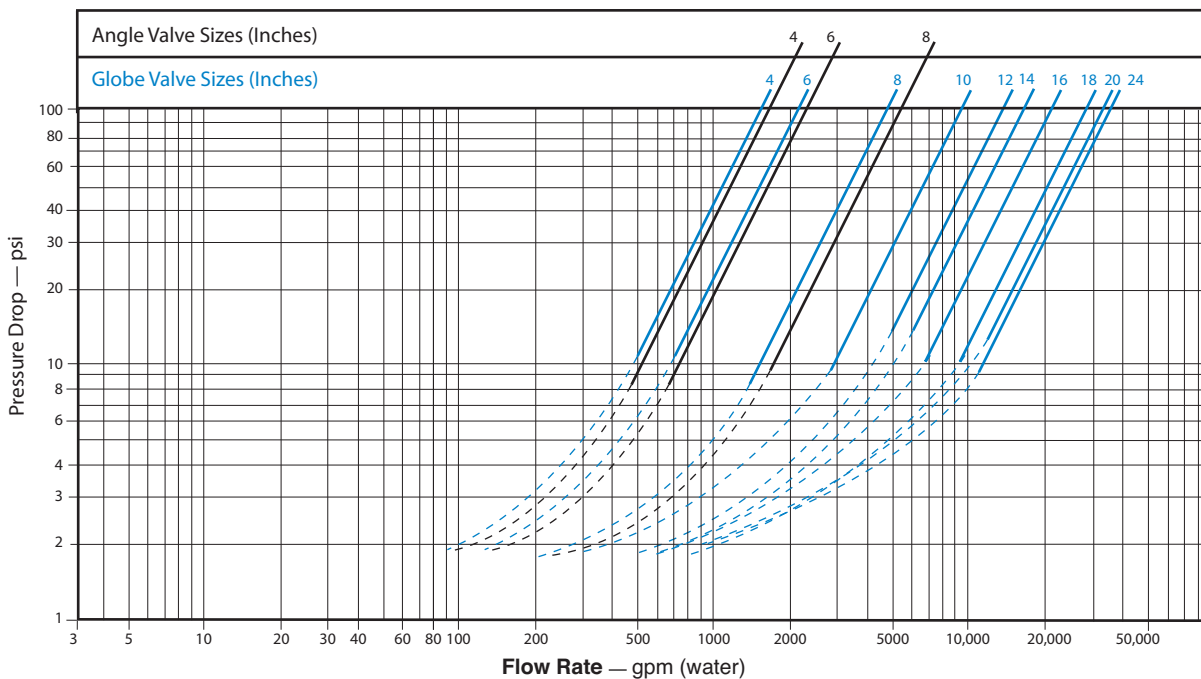
Valve Size (Inches)	4	6	8	10	12	14	16	18	20	24
A 150 ANSI	13.88	17.75	21.38	26.00	30.00	34.25	35.00	42.12	48.00	48.00
AA 300 ANSI	14.50	18.62	22.38	27.38	31.50	35.75	36.62	43.63	49.62	49.75
B Diameter	9.12	11.50	15.75	20.00	23.62	27.47	28.00	35.44	35.44	35.44
C Maximum	8.62	11.62	15.00	17.88	21.00	20.88	25.75	25.00	31.50	31.50
D 150 ANSI	6.94	8.88	10.69	—	—	—	—	—	—	—
DD 300 ANSI	7.25	9.38	11.19	—	—	—	—	—	—	—
E 150 ANSI	5.50	6.75	7.25	—	—	—	—	—	—	—
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	—	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	3.40	4.50	4.50	4.50
Approx. Ship Weight (lbs)	85	195	330	625	900	1250	1380	2365	2551	2733
Approx. X Pilot System	15.00	27.00	30.00	33.00	36.00	36.00	41.00	40.00	46.00	55.00
Approx. Y Pilot System	11.00	18.00	20.00	22.00	24.00	26.00	26.00	30.00	30.00	30.00
Approx. Z Pilot System	11.00	18.00	20.00	22.00	24.00	26.00	26.00	30.00	30.00	30.00

## 660-32 Series Dimensions (Full Internal Port 100-23) (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	CF*	CF*	CF*	CF*	CF*	CF*	CF*
DD 300 ANSI	184	238	284	CF*	CF*	CF*	CF*	CF*	CF*	CF*
E 150 ANSI	140	171	184	CF*	CF*	CF*	CF*	CF*	CF*	CF*
EE 300 ANSI	148	184	197	CF*	CF*	CF*	CF*	CF*	CF*	CF*
F 150 ANSI	114	140	171	203	241	279	298	403	370	432
FF 300 ANSI	127	159	191	222	260	—	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	86	114	114
Approx. Ship Weight (kgs)	39	89	150	284	409	568	627	681	1157	1249
Approx. X Pilot System	381	686	762	838	914	914	1041	1016	1168	1397
Approx. Y Pilot System	279	457	508	559	610	660	660	762	762	762
Approx. Z Pilot System	279	457	508	559	610	660	660	762	762	762

## Model 660-32 Flow Chart (Uses Main Valve Model 100-23)



### Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens or Closes

Valve Size	Displacement
4"	.169 gal
6"	.531 gal
8"	1.26 gal
10"	2.51 gal
12"	4.00 gal
14"	6.50 gal
16"	9.57 gal
18"	11.00 gal
20"	12.00 gal
24"	29.00 gal

660-32 Valve Selection	100-23 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 100-23	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	37	65	145	258	403	581	581	1040	1040	1040

**100-23 Series is the reduced internal port size version of the 100-04 Series.**

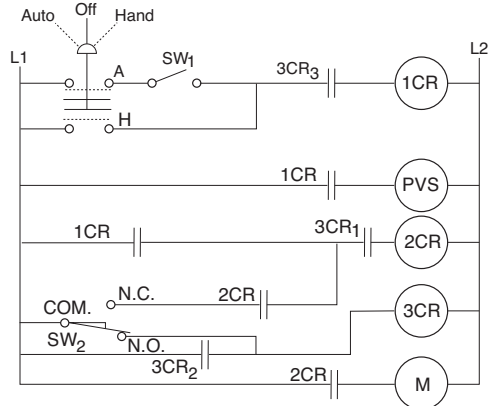
## Wiring Diagram

Auto-Off-Hand = Selector Switch  
 1CR = Relay, DPST Normally Open  
 2CR = Relay, DPST Normally Open  
 3CR = Relay, TPST Normally Open  
 SW<sub>1</sub> = Switch, Remote Start/ Stop  
 SW<sub>2</sub> = Switch, SPDT, Valve Limit Switch  
 PVS = Pilot Valve Solenoid  
 M = Pump Motor Starter

**Note:** SW<sub>2</sub> and PVS supplied by Cla-Val Co. All other electrical items supplied by customer. SW<sub>2</sub> is included in the X105L switch assembly which is mounted on the pump control valve cover.

Shown In Pump Off Position

Optional Model PC-1 Pump Control Panel has flexible control settings for maximum electrical interlock control. It is pre-wired and ready for easy field hook-up wiring. See E-PC-1 data sheet.



## Pilot System Specifications

### Adjustment Ranges

0 to 75 psi  
 20 to 105 psi  
 20 to 200 psi\*  
 100 to 300 psi

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

**Temperature Range** Water: to 180°F Max

### Materials

#### Standard Pilot System Materials

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

#### Optional Pilot System Materials

Pilot Systems are available with optional  
 Stainless Steel or Monel materials

### Solenoid Control

Body:  
 Brass ASTM B283

Enclosure:  
 General Purpose, Watertight 1,2,3,3S,4,4X  
 Optional: Class I, Division 2, Hazardous Locations  
 and Watertight Type 3, 3S, 4, 4X

### Voltages:

100-240V / 50-60 Hz AC or DC  
 24-99V / 50-60Hz AC or DC  
 2-24VDC

Manual Operator Standard  
 Max. operating pressure differential: 350 psi

### Coil:

Insulation molded Class F  
 Watts AC 2

### When Ordering, Please Specify

1. Catalog No. 660-32
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class (Flanged)
5. Trim Material
6. Electrical Selection
7. Desired Options
8. When Vertically Installed (Flow Direction)

Note: For optimum operation of built-in check feature, installation with valve stem vertically position is recommended.