MODEL 60-31
660-31

Booster Pump Control Valve

- **Simple Hydraulic Operation**
- **Low Head Loss**
- **Built-in Check Valve**
- **Proven Reliable Design**

The Cla-Val Model 60-31/660-31 Booster Pump Control valve is a pilot-operated valve designed for installation on the discharge of booster pumps to eliminate pipeline surges caused by the starting and stopping of the pump.

The pump starts against a closed valve. When the pump is started, the solenoid control is energized and the valve begins to open slowly, gradually increasing line pressure to full pumping head. When the pump is signaled to shut-off, the solenoid control is de-energized and the valve begins to close slowly, gradually reducing flow while the pump continues to run. When the valve is closed, a limit switch assembly, which serves as an electrical interlock between the valve and the pump, releases the pump starter and the pump stops.

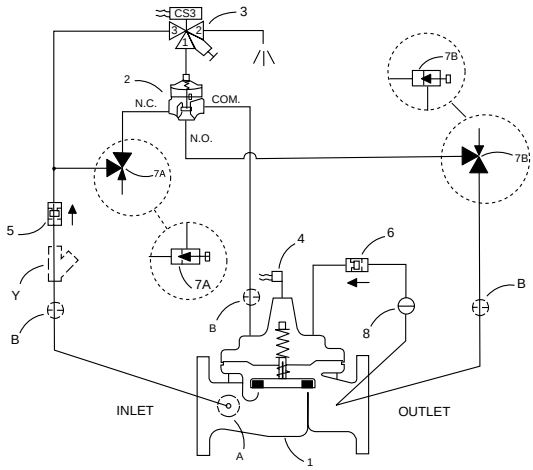
The Model 60-31/660-31 is an automatic valve of a modified globe-type design with a built-in, lift type, check feature. It is hydraulically operated and diaphragm-actuated. A three-way solenoid valve controls the valve operation. Flow control valves located in the pilot control system provide regulation of both the opening and closing rate. Self-cleaning strainers insure that the pilot control supply is clean.

Schematic Diagram

Item	Description
1	Hycheck (Main Valve)
2	102C-3H Three Way Hytrol
3	CS3SM Solenoid Control
4	X105LCW Switch Assembly
5	CDC Disk Check Valve
6	CDC/CSC Check Valve
7	CNA Angle Valve
8	CK2 Cock (Isolation Valve)

Item	Description
A	X46A Flow Clean Strainer
B	CK2 Cock (Isolation Valve)
Y	X43 "Y" Strainer

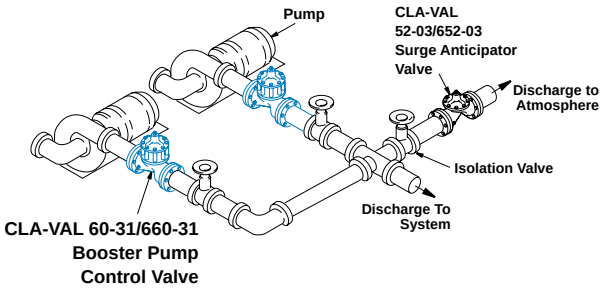
Note: For main valve option descriptions, refer to the 100-04 (60-31) or 100-23 (660-31) Technical Data Sheet.



Typical Application

Install Model 60-31/660-31 valve as shown. Flexible 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.

Designed for multiple pump applications.



Model 60-31 (Uses Basic Valve Model 100-04)
Specifications

Available Sizes

Pattern	Flanged
Globe	4" - 16"
Angle	4" - 16"

Operating Temp. Range

Fluids
-40° to 180° F

Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens			
Valve Size	Displacement	Valve Size	Displacement
4"	.169 gal	12"	4.00 gal
6"	.531 gal	14"	6.50 gal
8"	1.26 gal	16"	9.57 gal
10"	2.51 gal	24"	9.57 gal

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class		
		Flanged		
Grade	Material	ANSI Standards*	150 lb.	300 lb.
ASTM A536	Ductile Iron	B16.42	250	400
ASTM A216-WCB	Cast Steel	B16.5	285	400
ASTM B62	Bronze	B16.24	225	400
ASTM A743	Stainless Steel	B16.5	285	400
356-T6	Aluminum	B16.1	275	—

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

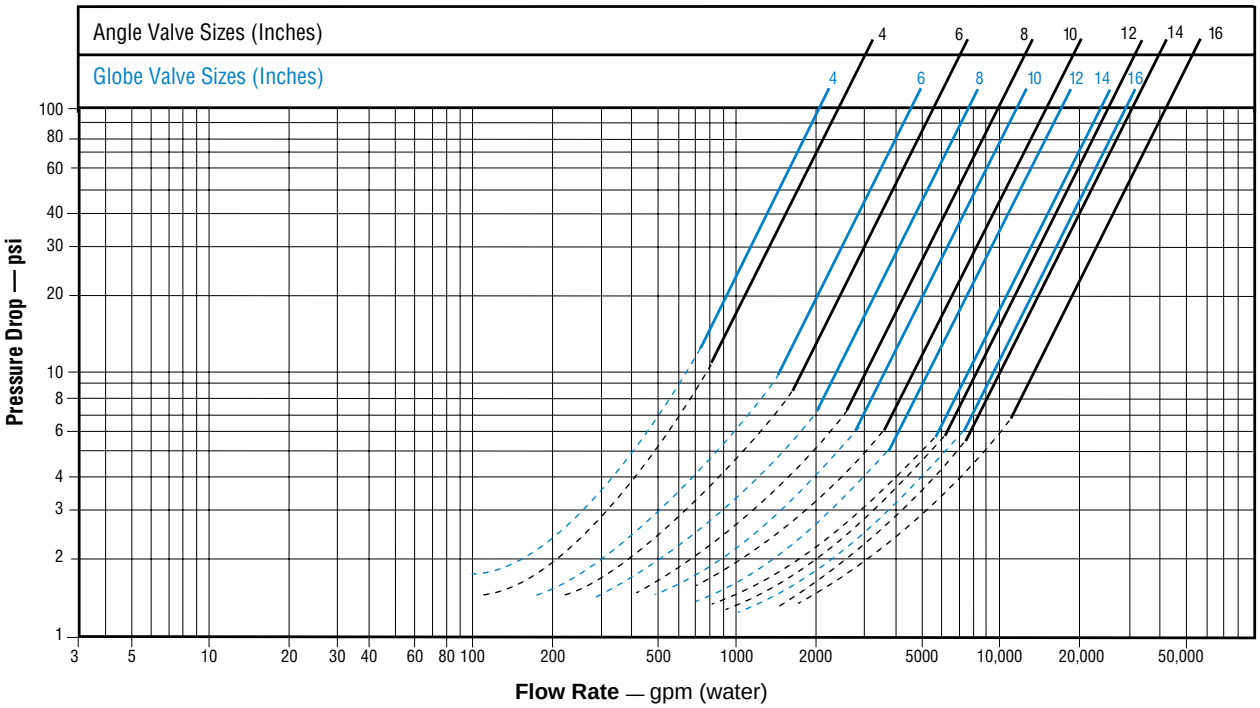
4" Globe, Flanged

12" Globe, Flanged

Materials

Component	Material Options				
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	4" - 16"	4" - 16"	4" - 16"	4" - 16"	4" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Trim: Disc Guide, Seat & Cover Bearing	Bronze is standard. Stainless Steel is optional.			Stainless Steel is standard.	
Disc	Buna-N® Rubber				
Diaphragm	Nylon Reinforced Buna-N® Rubber				
Stem, Nut & Spring	Stainless Steel				

Model 60-31 Flow Chart (Based on normal flow through a wide open valve.)



Model 660-31 (Uses Basic Valve Model 100-23)

Specifications

Available Sizes

Pattern	Flanged
Globe	6" - 24"
Angle	6", 8"

Operating Temp. Range

Fluids
-40° to 180° F

Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens			
Valve Size	Displacement	Valve Size	Displacement
6"	.169 gal	12"	2.51 gal
8"	.531 gal	16"	4.00 gal
10"	1.26 gal	20"	9.57 gal
		24"	9.57 gal

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class		
		Flanged		
Grade	Material	ANSI Standards*	150 lb.	300 lb.
ASTM A536	Ductile Iron	B16.42	250	400
ASTM A216-WCB	Cast Steel	B16.5	285	400
ASTM B62	Bronze	B16.24	225	400
ASTM A743	Stainless Steel	B16.5	285	400
356-T6	Aluminum	B16.1	275	—

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

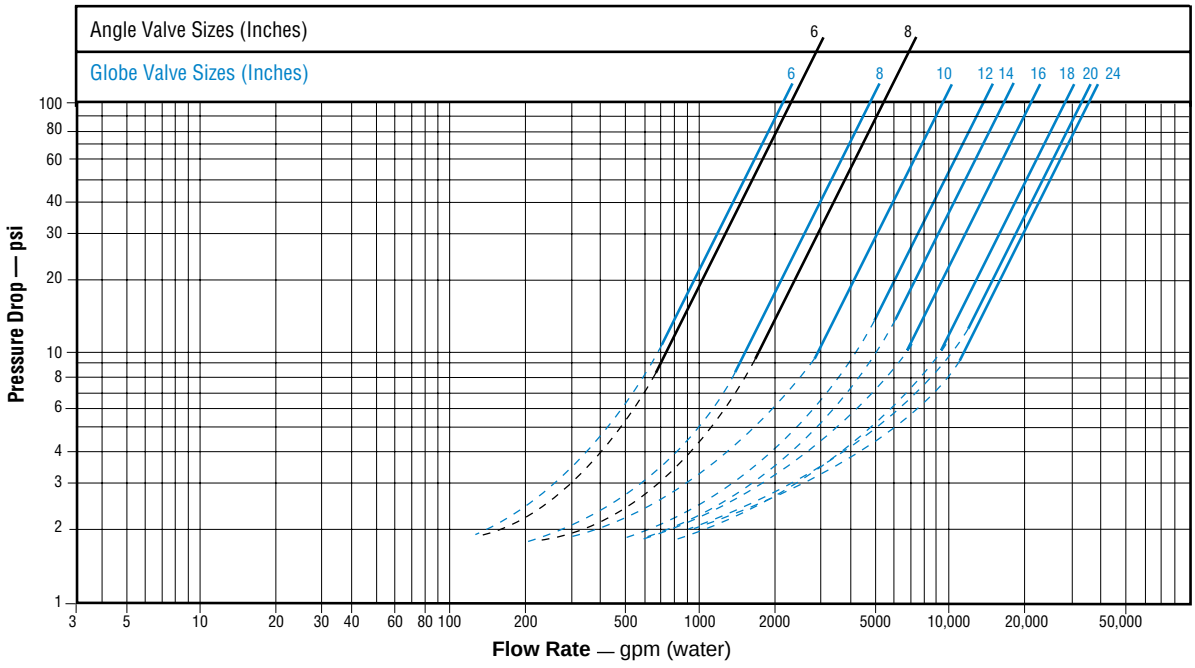
Materials

Component	Material Options				
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	6" - 24"	6" - 24"	6" - 16"	6" - 16"	6" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Trim: Disc Guide, Seat & Cover Bearing	Bronze is standard. Stainless Steel is optional.			Stainless Steel is standard.	
Disc	Buna N® Rubber				
Diaphragm	Nylon Reinforced Buna N® Rubber				
Stem, Nut & Spring	Stainless Steel				

6" Globe, Flanged

12" Globe, Flanged

Model 660-31 Flow Chart (Based on normal flow through a wide open valve.)



Valve Selection

		These Symbols ▲ and ▲ 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
	End Detail	Flanged									
Model 60-31	Basic Valve 100-04	Globe	▲	▲	▲	▲	▲	▲	▲			
		Angle	▲	▲	▲	▲	▲	▲	▲			
	Suggested Flow (GPM)	Max. Continuous	800	1800	3100	4900	7000	8400	11000			
		Max. Intermittent	990	2250	3900	6150	8720	10540	13700			
	Suggested Flow (Liters/sec)	Max. Continuous	50	113	195	309	441	529	693			
		Max. Intermittent	62	142	246	387	549	664	863			
Model 660-31	Basic Valve 100-23	Globe		▲	▲	▲	▲	▲	▲	▲	▲	▲
		Angle		▲	▲							
	Suggested Flow (GPM)	Max. Continuous		1025	2300	4100	6400	9230	9230	16500	16500	16500
	Suggested Flow (Liters/sec)	Max. Continuous		65	145	258	403	581	581	1040	1040	1040

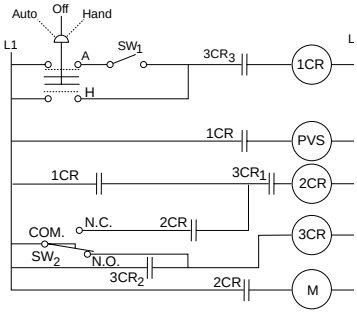
660-31 is the reduced internal port size version of the 60-31.

For 100-04 basic valves suggested flow calculations were 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). For 100-23 basic valves suggested flow calculations were based on flow through the valve seat. Approx. 26 ft/sec (7.9 meters/sec) is used for maximum continuous flow.

Wiring Diagram

Auto-Off-Hand = Selector Switch
1CR = Relay, DPST Normally Open
2CR = Relay, DPST Normally Open
3CR = Relay, TPST Normally Open
SW_1 = Switch, Remote Start, Automatic
SW_2 = Switch, SPDT, Valve Limit Switch Connect to N.C. Terminal
PVS = Pilot Valve Solenoid
M = Pump Motor Starter

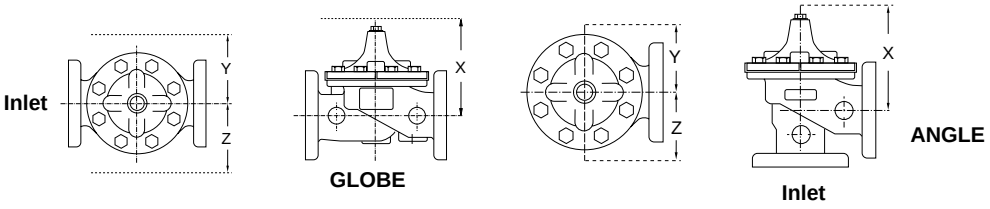
Note: SW_2 and PVS supplied by Cla-Val Co. All other electrical items supplied by customer. SW_2 is included in the X105L switch assembly which is mounted on the pump control valve cover.



Pilot System Dimensions (In Inches)

We recommend providing adequate space around valve for maintenance work.

Valve Size	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
X Max.	20.00	23.75	26.75	33.50	39.00	42.25	46.00	46.00	50.25	50.25
Y Max.	6.00	8.00	10.25	12.00	14.25	16.75	18.00	18.00	18.00	18.00
Z Max.	11.00	13.00	15.00	17.00	19.00	22.00	23.00	23.00	23.00	23.00



Pilot System Specifications

Temperature Range
Water: to 180°F Max

Materials
Standard Pilot System Materials
Pilot Control:Bronze ASTM B62
Trim:Stainless Steel Type 303
Rubber:Buna-N® Synthetic Rubber
Optional Pilot System Materials
Pilot Systems are available with optional Aluminum, Stainless Steel or Monel materials at extra cost.

Solenoid Control
Body:
Brass ASTM B283

Enclosure:
NEMA Type 1,2,3,3S,4,4X general purpose
NEMA Type 6,6P,7,9 watertight Explosion Proof available at extra cost

Voltages:
110, 220, -50Hz Ac
24, 120, 240, 480 - 60Hz AC
6, 12, 24, 120, 240 - DC
Others available at extra cost

Max. operating pressure differential: 200 psi*

Coil:

Insulation molded Class	F
Watts AC	6
AC Volt Amps Inrush	30
AC Volt Amps Holding	16
Watts DC	10.6

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

When Ordering, Please Specify

1. Catalog No. 60-31 or No. 660-31
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Screwed or Flanged
6. Trim Material
7. Electrical Selection
8. Desired Options
9. When Vertically Installed

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