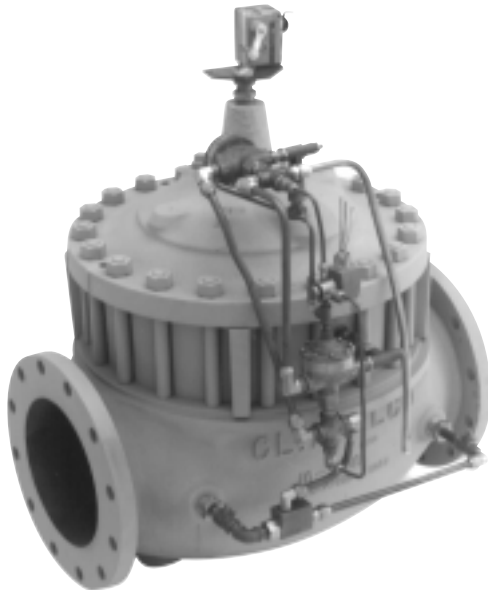




—MODEL— **60-19**
660-19 ✂

Booster Pump Control Valve

with High Capacity Pilot System



- **Designed for Larger Sized Pump Stations**
- **Low Head Loss**
- **Built-in Check Valve**
- **Opening and Closing Rates Can Be Separately Adjusted**
- **Proven Reliable Design**

The Cla-Val Model 60-19/660-19 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.

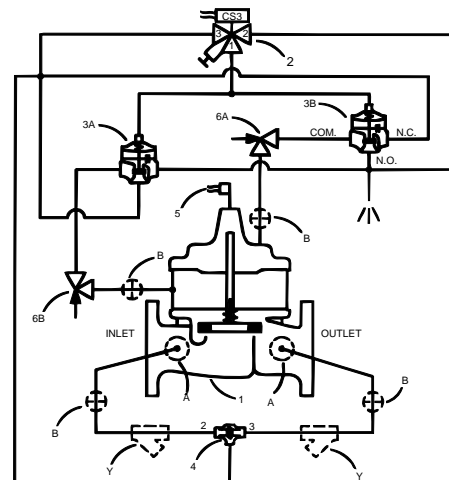
Should a power failure occur, a built-in lift-type check valve closes the moment flow stops, preventing reverse flow regardless of solenoid or diaphragm assembly position.

Schematic Diagram

Item	Description
1	Powercheck (Main Valve)
2	CS3M Solenoid Control
3	102C-3H 3-Way Valve
4	CVS-1 Shuttle Valve
5	X105LCW Switch Assembly
6	CV Flow Control

Optional Features

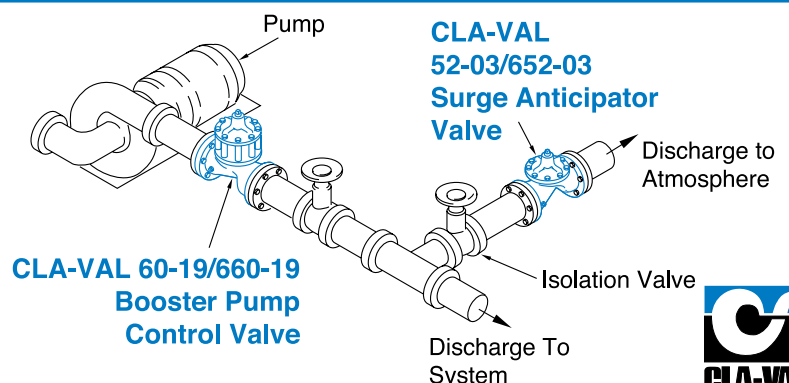
Item	Description
A	X46A Flow Clean Strainer
B	CK2 Cock (Isolation Valve)
Y	X43 "Y" Strainer




















Typical Installation

Install Model 60-19/660-19 valve as shown. Flexible conduit should be used for electrical connections to the solenoid control and the limit switch. A Model 52-02/652-03 Surge Anticipator Valve is recommended for power failure protection.

Note: For optimum operation of built-in check feature, installation must be with valve stem vertically up.



Valve Selection

		These Symbols  and  Indicate Available Sizes							
		Inches	10	12	14	16	18	20	24
		mm	250	300	350	400	450	500	600
		End Detail	Flanged						
Model 60-19	Basic Valve 100-03	Globe							
		Angle							
	Suggested Flow (GPM)	Max. Continuous	4900	7000	8400	11000			
		Max. Intermittent	6150	8720	10540	13700			
	Suggested Flow (Liters/sec)	Max. Continuous	309	441	529	693			
		Max. Intermittent	387	549	664	863			
Model 660-19	Basic Valve 100-22	Globe							
		Angle							
	Suggested Flow (GPM)	Max. Continuous	4100	6400	9230	9230	16500	16500	16500
	Suggested Flow (Liters/sec)	Max. Continuous	258	403	581	581	1040	1040	1040

* **660-19 is the reduced internal port size version of the 60-19.**

For 100-03 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 100-22 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.

Valve Sizing

Sizing Model 60-19 or 660-19 Booster Pump Control Valves is similar to sizing non-modulating type valves. Simply select the smallest size valve that will handle the pump output at an acceptable head loss for the application.

Do not oversize. Oversizing a Booster Pump Control Valve will nullify its ability to prevent surges caused by the starting and/or stopping of the pump. Maximum flow values are given in the selection table above. For further information on flow characteristics of these valves, see the 100-03 (60-19) or 100-22 (660-19) technical data sheets in the main valve section of catalog.

Cla-Val offers the most complete line of automatic control valves for virtually any type of pump control system available. Please call your Cla-Val regional office or sales agent for complete design assistance. Our goal is to provide the best automatic control valve solution for each application.

Example:

A booster pump station with a rated output of 1000 GPM and 3 psi is an acceptable head loss for the application. The flow chart for the 100-22 (660-11) indicates that a 10" globe valve has less than a 3 psi pressure drop at 1000 GPM.

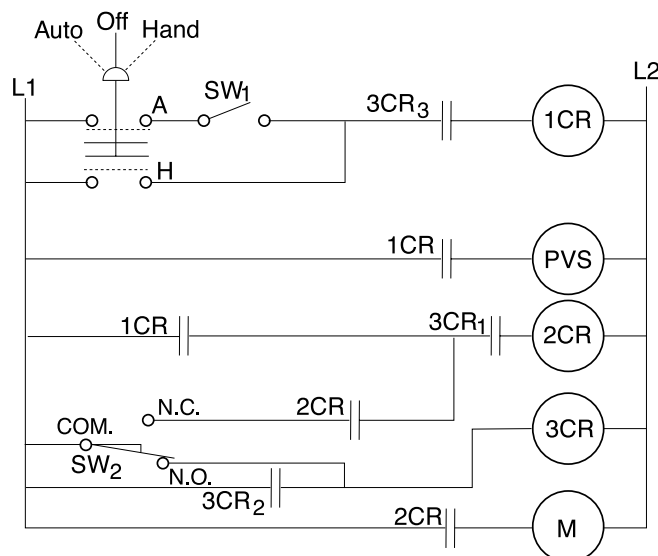
Drain Provisions

Each time the valve opens or closes, water is discharged from the solenoid exhaust port, the amount varying with the valve size. Provisions should be made for the disposal of this water. Exhaust tube must be free of any back pressure. Provide an air gap between the solenoid exhaust tube and drain facility.

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: SW₂ and PVS supplied by Cla-Val. All other electrical items supplied by customer. SW₂ is included in the X105L switch assembly which is mounted on the pump control valve cover.

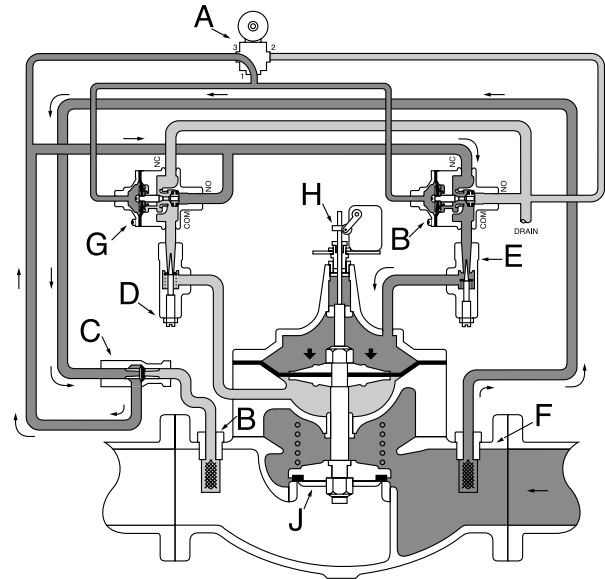


Sequence Of Operation

Pump Off...

With pump off, static line pressure is transmitted through strainer F, shuttle valve C, solenoid control A, three way valve B, and speed control E to the chamber above the diaphragm, thus holding the valve shut.

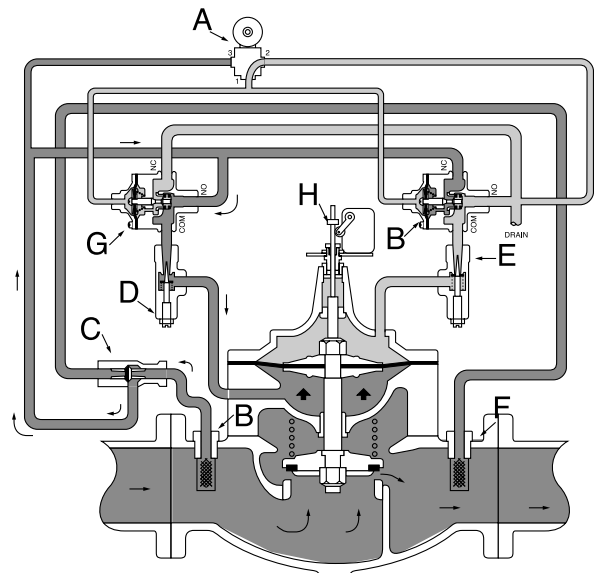
If power failure occurs when valve is open, the built-in check valve J closes immediately to prevent reverse flow.



Starting Cycle...

Starting switch closes, pump starts, solenoid control A energizes and shifts allowing fluid from three-way valves G and B to drain to atmosphere. High pressure fluid from pump enters strainer B and shifts shuttle valve C, which always supplies the highest pressure from either strainer B or F. High pressure fluid is transmitted to the lower diaphragm chamber through three-way valve G and opens the valve.

The opening speed of the valve is controlled by speed control E, which limits the rate fluid is relieved from above the diaphragm to drain.

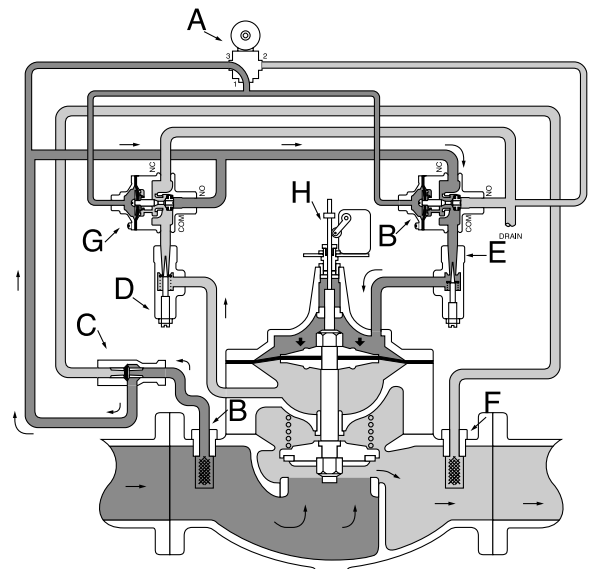


Stopping Cycle...

Starting switch opens, solenoid control A de-energizes and shifts, pump continues to run. High pressure fluid from the pump is directed above the diaphragm through three-way valve B to close the valve.

The valve closes slowly as fluid from the lower diaphragm chamber is gradually released to atmosphere through speed control D and three-way valve G.

When the valve closes fully, the limit switch H shuts off the pump.



Model 60-19 (Uses Basic Valve Model 100-03)

Specifications

Available Sizes

Pattern	Flanged
Globe	10" - 16"
Angle	10" - 16"

Operating Temp. Range

Fluids
-40° to 180° F

Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens or Closes	
Valve Size	Displacement
10"	2.51 gal
12"	4.00 gal
14"	6.50 gal
16"	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.				

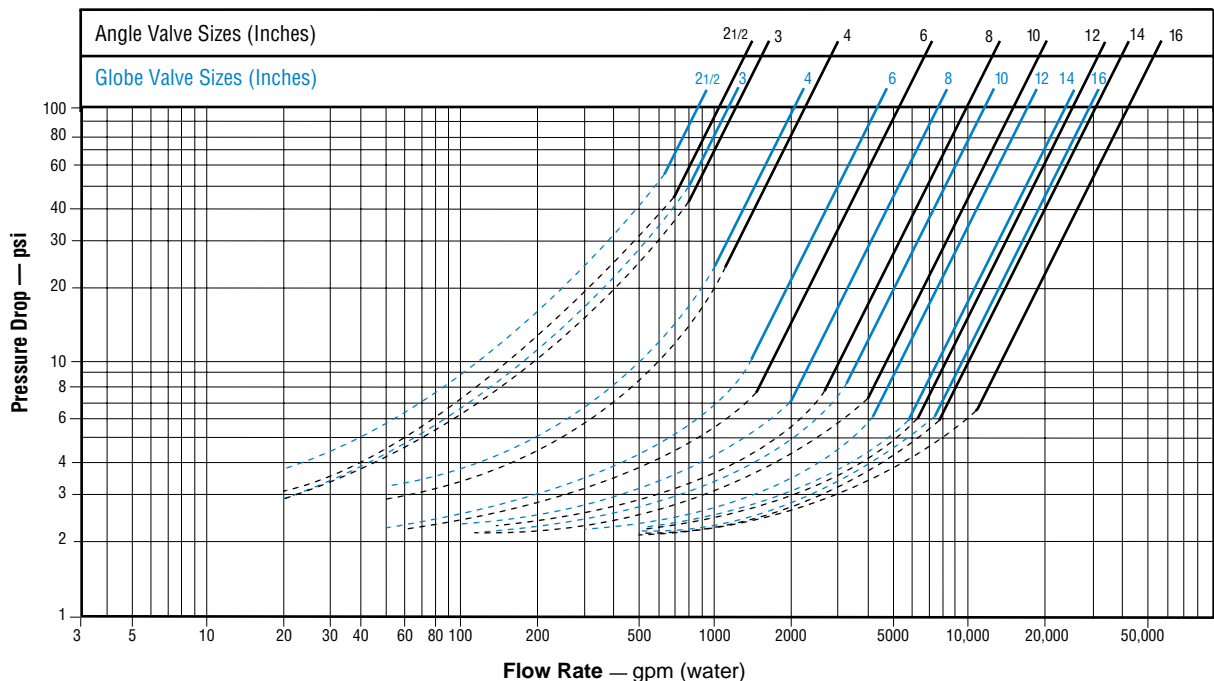
Materials

Component	Material Options						
Body, Cover & Powerunit Body	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum		
Available Sizes	10" - 16"	10" - 16"	10" - 16"	10" - 16"	10" - 16"		
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum		
Trim: Disc Guide, Seat, Cover Bearing & Stem 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 100-03 Globe Pattern

Model 60-19 Flow Chart (Based on normal flow through a wide open valve.)



Model 660-19 (Uses Basic Valve Model 100-22)

Specifications

Available Sizes

Pattern	Flanged
Globe	10"- 24"
Angle	

Operating Temp. Range

Fluids
-40° to 180° F

Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens			
Valve Size	Displacement	Valve	Displacement
10"	1.20 gal	20"	9.57 gal
12"	2.51 gal	24"	9.57 gal
16"	4.00 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
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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.

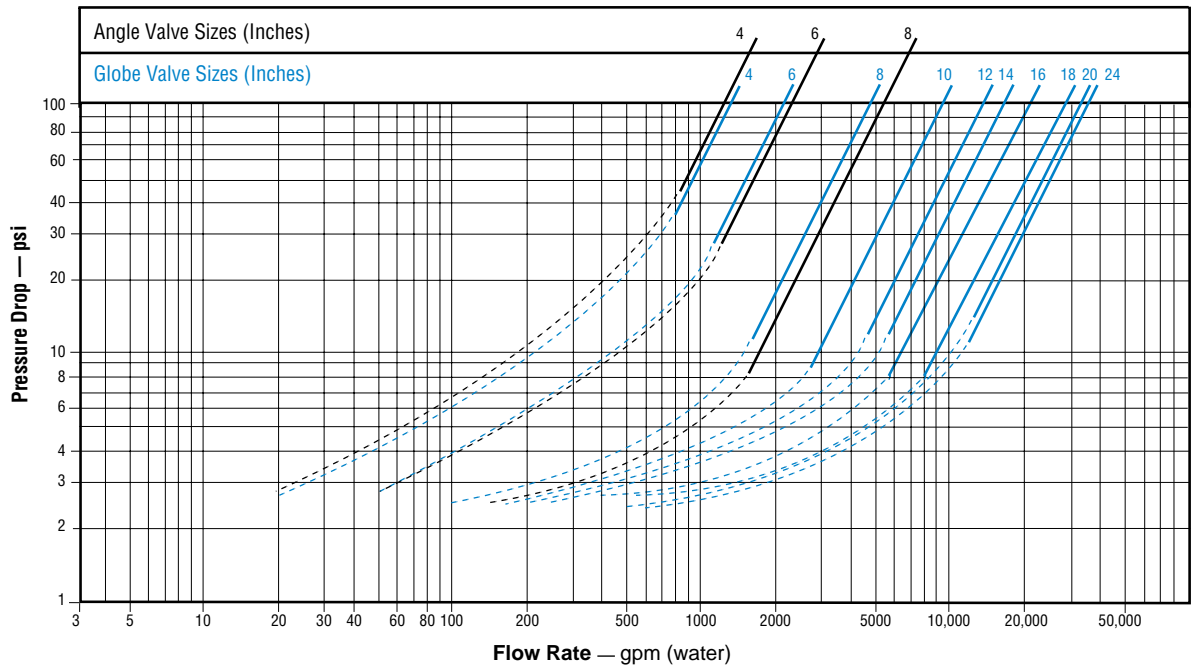
Materials

Component	Material Options				
Body, Cover & Powerunit Body	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	10" - 24"	10" - 24"	10" - 16"	10" - 16"	10" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Trim: Disc Guide, Seat & Cover Bearing Stem 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 100-22 Globe Pattern

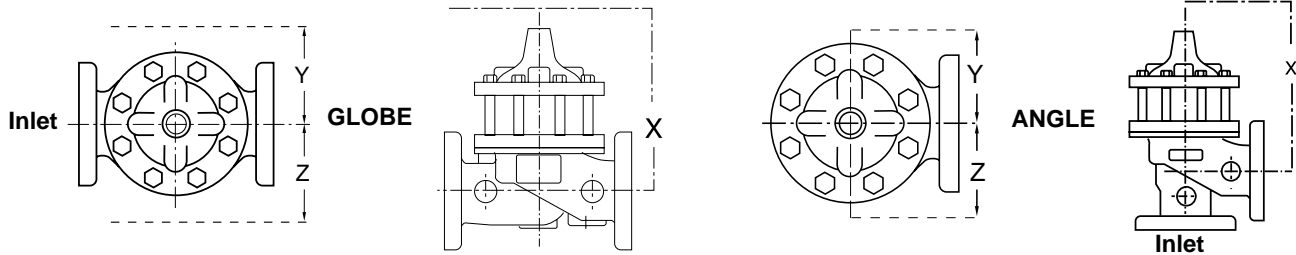
Model 660-19 Flow Chart (Based on normal flow through a wide open valve.)



Pilot System Dimensions (In Inches)

We recommend providing adequate space around valve for maintenance work

VALVE SIZE		10"	12"	14"	16"	18"	20"	24"	30"
X	Max.	26.75	33.50	39.00	42.25	42.25	46.00	50.00	50.00
Z	Max.	17.00	19.00	22.00	23.00	23.00	23.00	30.00	30.00
Y	Max.	12.00	14.25	16.75	18.00	18.00	18.00	30.00	30.00



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 Specifications

Body:

Brass ASTM B283

Enclosure:

NEMA Type 1,2,3,3S,4,4X

general purpose watertight

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

When Ordering, Please Specify

1. Catalog No. 60-19 or No. 660-19
2. Valve Size
3. Pattern -Globe or Angle
4. Pressure Class
5. Trim Material
6. Electrical Selection
7. Desired Options
8. When Vertically Installed

Note: For main valve option descriptions, refer to the 100-03 (60-19) or 100-22 (660-19) Technical Data Sheet.



E-60-19/660-19 (R-11/01)

CLA-VAL

PO Box 1325 Newport Beach CA 92659-0325
Phone: 949-722-4800 • Fax: 949-548-5441

CLA-VAL CANADA, LTD.

4687 Christie Drive
Beamsville, Ontario
Canada LOR 1B4
Phone: 905-563-4963
Fax: 905-563-4040

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CLA-VAL SA

Chemin des Mesanges 1
CH-1032 Romanel/
Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50

www.cla-val.com

Represented By: