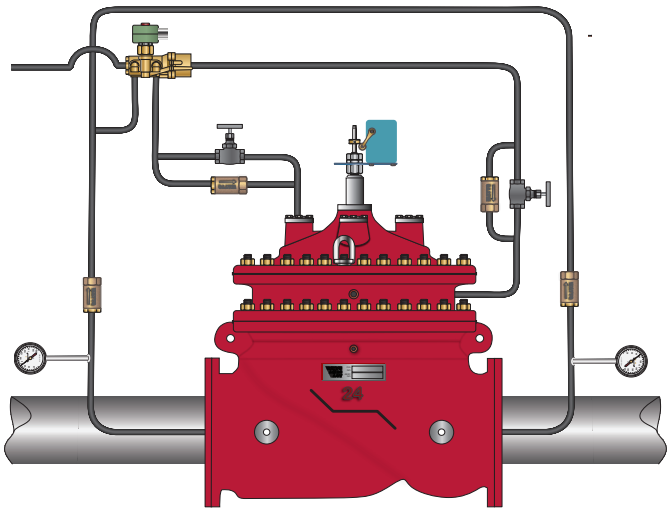
Submittal Package

Engineering Specification, Installation, Operation and Maintenance

Series LFM513-5 — Large

Pump Control Valve with Mechanical Check Feature

Sizes: 20 and 24"



⚠ WARNING

Read this Manual BEFORE using this equipment.

Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.

Keep this Manual for future reference.

⚠ WARNING

Local building or plumbing codes may require modifications to the information provided. You are required to consult the local building and plumbing codes prior to installation. If the information provided here is not consistent with local building or plumbing codes, the local codes should be followed. This product must be installed by a licensed contractor in accordance with local codes and ordinances.

⚠ WARNING

Need for Periodic Inspection/Maintenance: This product must be tested periodically in compliance with local codes, but at least once per year or more as service conditions warrant. All products must be retested once maintenance has been performed. Corrosive water conditions and/or unauthorized adjustments or repair could render the product ineffective for the service intended. Regular checking and cleaning of the product's internal and external components helps assure maximum life and proper product function.

If installed on a fire sprinkler system, all mechanical checks, such as alarm checks and backflow preventers, should be flow tested and inspected internally in accordance with NFPA 13 and NFPA 25.

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Engineering Specifications

Installation, Operation and Maintenance

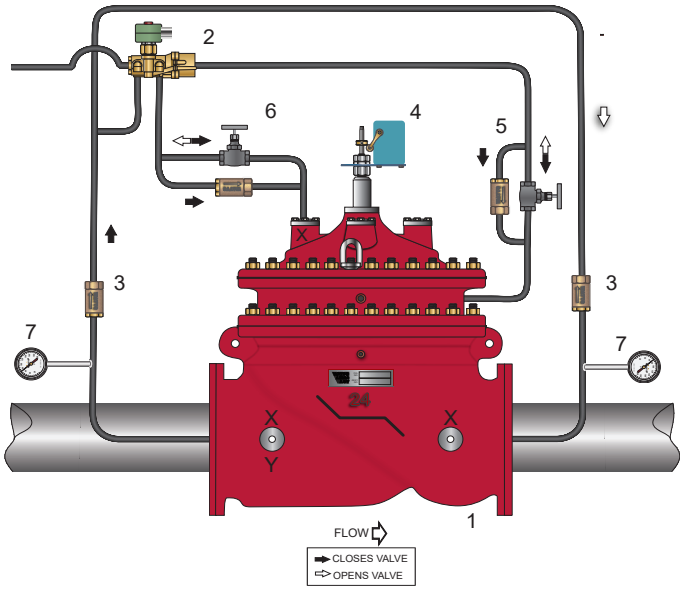
WATTS®

LEAD FREE*

Series LFM513-5 - Large

Pump Control Valve with Mechanical Check Feature

Full Port Ductile Iron Single Chamber Valve



Features

- Opens at adjustable rate on pump start-up
- Closes at adjustable rate on pump shut-off
- Limit Switch turns pump off when valve closes
- Built-in Mechanical Lift-Check Feature prevents flow reversal
- Solenoid equipped with Manual Operator

Standard Components

1— Main Valve - M518 Dual Chamber
2 — Four-Way Solenoid
3 — Check Valve
4 — Limit Switch
5 — ACS - Adjustable Closing Speed (Globe Valve)
6 — AOS - Adjustable Opening Speed (Globe with Check)
7 —Pressure Gauges
X — Isolation Cocks
Y — Wye strainer

Options and Accessories

O L Dual Limit Switch

Operation

The Pump Control Valve is designed to minimize the surges associated with the starting and stopping of pumps. The valve slowly opens and closes as required to control pumping related surges. The pump starts and stops against a closed valve.

Pump start up: When the pump is signaled to start, the 4-Way Solenoid is energized and directs fluid and pressure into the power chamber (below the diaphragm), and relieves fluid and pressure from the cover chamber (above the diaphragm). The fluid and pressure relieved from the cover chamber is vented to atmosphere or available floor drain. The valve opens at an adjustable rate, gradually admitting pumping pressure into the distribution system. Rate of valve opening is controlled by the adjustable opening speed control, which restricts the speed at which fluid and pressure evacuate the cover chamber. The valve remains fully open during the pumping cycle.

Pump shutdown: When the pump is signaled to shut-off, the 4-Way Solenoid is de-energized, and directs fluid and pressure into the cover chamber (above the diaphragm), and relieves fluid and pressure from the power chamber (below the diaphragm). The fluid and pressure relieved from the power chamber is vented to atmosphere or available floor drain. The valve closes at an adjustable rate, gradually reducing pumping pressure. Rate of valve closure is controlled by the adjustable closing speed control, which restricts the speed at which fluid and pressure evacuate the power chamber. When the valve reaches the closed position, the limit switch is actuated, turning the pump off.

Emergency Closure: The valve is equipped with a Mechanical Check Feature, which acts independent of diaphragm position, and provides immediate closure when flow ceases.

Manual Operation: Engaging the Solenoid Manual operator simulates power to the solenoid, manually opening the main valve. Disengaging the Solenoid Manual operator returns the valve to the closed position.

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

M Series Basic Valves

Pump Control Valve with Mechanical Check Feature

Full Port Ductile Iron Single Chamber Basic Valve

This Watts Automatic Control Valve (ACV) is a full port, single chamber basic valve that incorporates a one-piece disc and diaphragm assembly. This assembly is the only moving part within the valve allowing it to open, close, or modulate as commanded by the pilot control system.

Watts ACV Main Valves are Lead Free. The Watts ACV piloting system contains Lead Free* components, ensuring all of our configurations are Lead Free compliant.

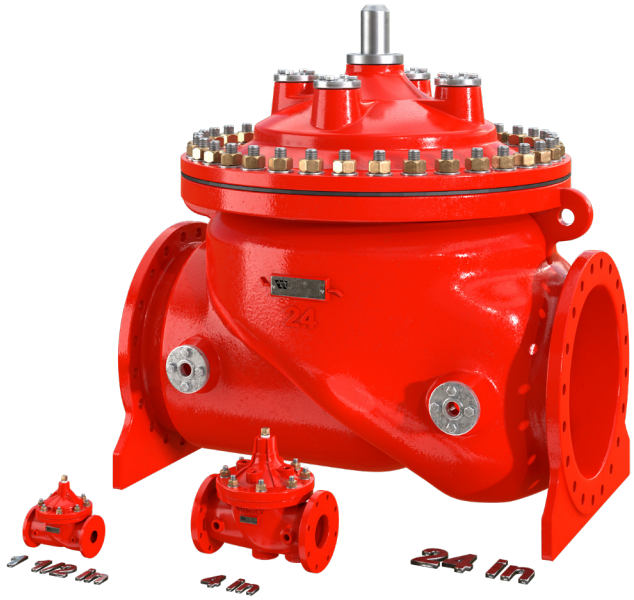
Globe Pattern Single Chamber Basic Valve (M100)

Standard Materials

Body and Cover:	Ductile Iron ASTM A536
Coating:	NSF Listed Fusion Bonded Epoxy Lined and Coated
Trim:	316 Stainless Steel
Elastomers:	Buna-N (standard)
Nut, Spring and Stem:	Stainless Steel
Anti-Scale:	Xylan Coated Stem and Seat (Optional)

NSF Certified to NSF/ANSI 61-G

Basic Valve Body Options



Globe Flanged

Operating Pressure

150# Flanged = 250psi (17.2 bar)
300# Flanged = 400psi (27.6 bar)

Operating Temperature

Buna-N: 160°F (71°C) Maximum
Epoxy Coating**: 225°F (107°C) Maximum

*** Valves can be provided without internal epoxy coating consult factory*

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

ACV Schematic - Series LFM513-5 - Large

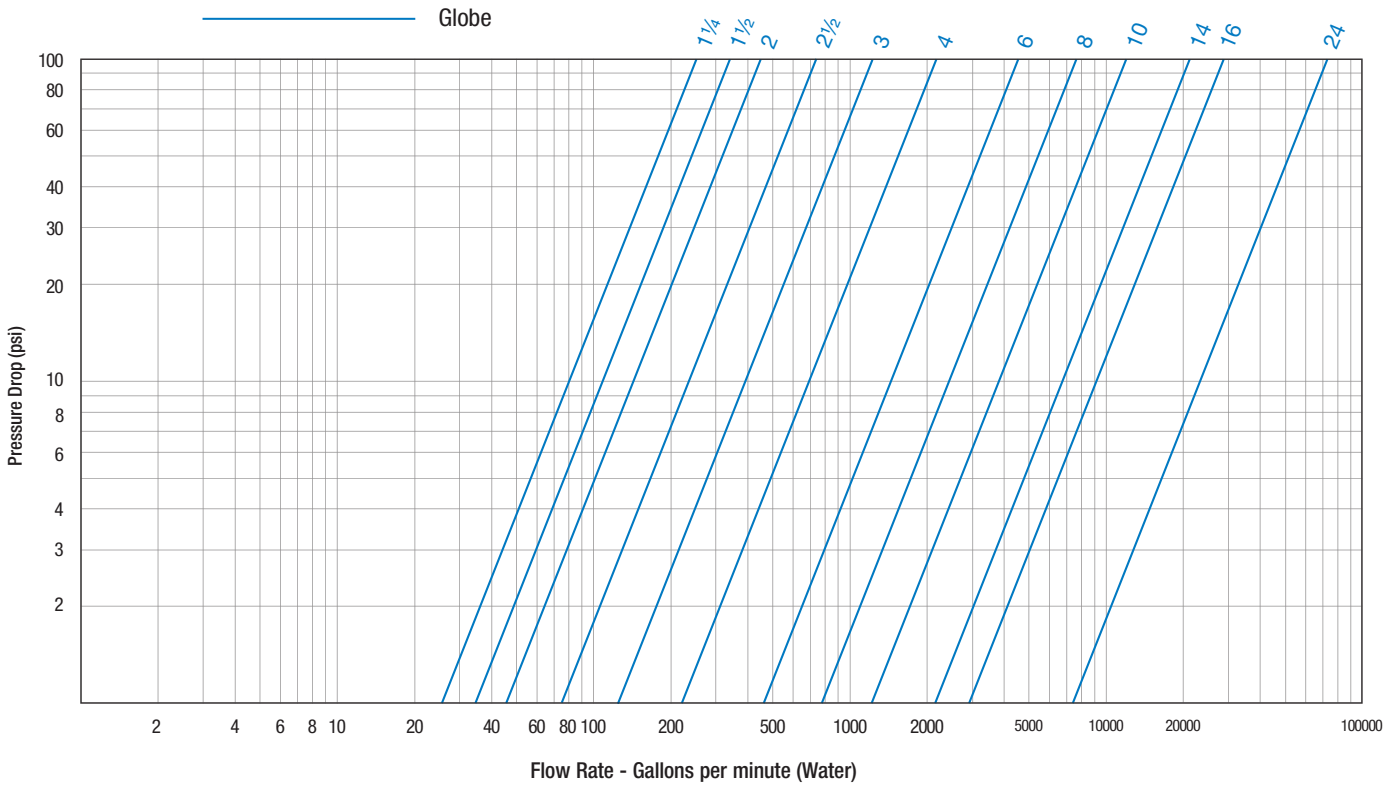
Flow Data

	Valve Size - Inches	1¼	1½	2	2½	3	4	6	8	10	12	14	16	20	24
Suggested	Maximum Continuous Flow Rate Gpm (Water)	95	130	210	300	485	800	1850	3100	5000	7000	8500	11100	19600	28200
	Maximum Intermittent Flow Rate Gpm (Water)	119	161	265	390	590	1000	2300	4000	6250	8900	10800	14100	24500	35250
	Minimum Flow Rate Gpm (Water)	3	5	6	9	15	16	17	25	55	70	190	400		315
Cv	CV Factor GPM (Globe)	26	26	48	75	112	188	387	764	1215	1734	2234	3131		7447
	CV Factor GPM (Angle)	26	27	57	91	125	207	571	889	1530	1945				

- Maximum continuous flow based on velocity of 20 ft. per second.
- Maximum intermittent flow based on velocity of 25 ft. per second.
- Minimum flow rates based on a 20-40 psi pressure drop.
- The C_v Factor of a value is the flow rate in US GPM at 60°F that will cause a 1psi drop in pressure.
- C_v factor can be used in the following equations to determine Flow (Q) and Pressure Drop (ΔP):

  Q (Flow) = $C_v\sqrt{\Delta P}$ **ΔP (Pressure Drop) = $(Q/C_v)^2$**

- The C_v factors stated are based upon a fully open valve.
- Many factors should be considered in sizing control valves including inlet pressure, outlet pressure and flow rates.
- For sizing questions including cavitation analysis consult Watts with system details.



Valve Cover Chamber Capacity - Dual

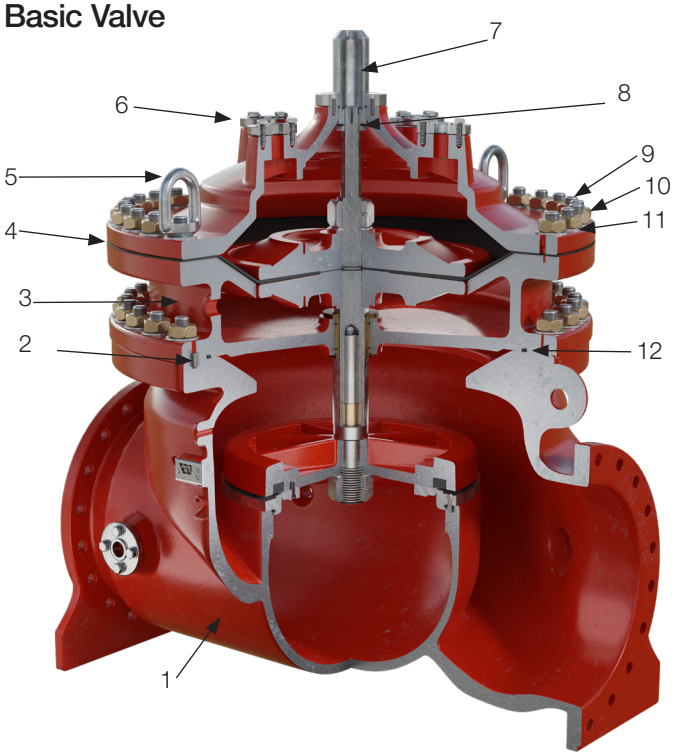
Valve Size - Inches	20	24
U.S. Gal	45	64.9
Liter	170.3	245.7

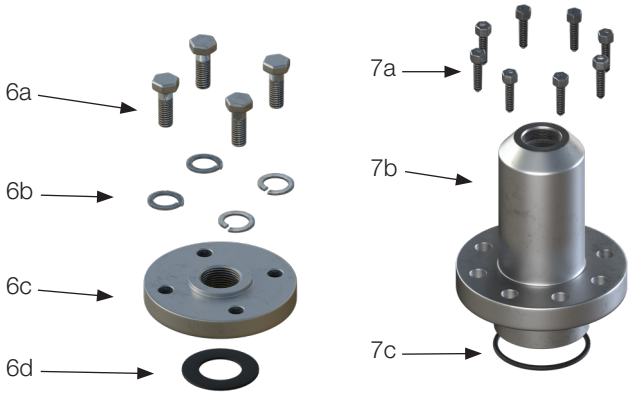
Valve Travel

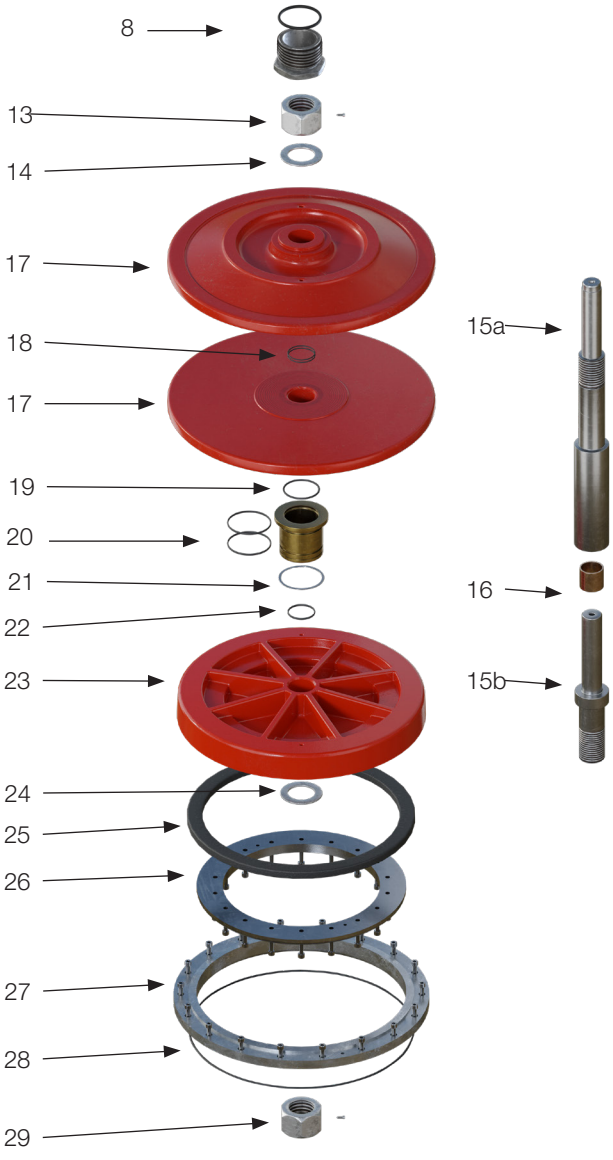
Valve Size - Inches	20		24	
	in.	*cm.*	*in.*	*cm.*
Travel - Inches	5.62	14.3	6.75	17.1

ACV Schematic - Series LFM513-5 - Large

Basic Valve







Item	Description	Material
1	150# Body	Epoxy Coated Ductile Iron - ASTM A536
2	Dowel Pin	Stainless Steel 18-8
3	Insert	Epoxy Coated Ductile Iron - ASTM A536
3	Cover	Epoxy Coated Ductile Iron - ASTM A536
4	Diaphragm	Buna-N
5	Nut Lifting Eye	Steel
6a	Flange Screws x4	Stainless Steel 18-8
6b	¾ Lock Washer	Stainless Steel 18-8
6c	Flange 1½ NPT, 300 CL	Stainless Steel - UNS S30400
6d	Gasket 1½ Pipe	Buna-N
7a	Guide Cover Screws	Stainless Steel 18-8
7b	Guide Cover	Stainless Steel - UNS S30400
7c	O-Ring	Buna-N - 70 DURO
8	Cover Bearing with O-Ring	ASTM A276 UNS S30400, Buna-N
9 - 10	Cover Stud, Hex Nut	ASTM A193 GRB7 Yellow Zinc PLT
11	Flat Washer	Carbon Steel Zinc Plated
12	Insert Gasket Seal	Buna-N
13	Stem Nut with Set Screw	Stainless Steel ASTM A276 304; Stainless Steel - 18-8
14	Stem Nut Washer	Stainless Steel - UNS S30400
15a - 15b	Upper Stem and Lower Stem	Xylan Coated Stainless Steel – UNS S30400
16	Sleeve Bearing	Bronze - SAE 841
17	Upper & Lower Diaphragm Washer	Ductile Iron ASTM A536 65-45-12
18	O-Rings x2	Buna-N
19	O-Ring	Buna-N
20	Stem Bearing with O-Rings	Brass; Buna N
21	Retaining Ring	Stainless Steel 18-8
22	O-Ring	Buna-N
23	Disc Retainer	Epoxy Coated Ductile Iron – ASTM A536
24	Stem Nut Washer	Stainless Steel 304
25	Disc	Buna-N
26	Disc Guide Plate with Screws	Stainless Steel - UNS S31600
27	Seat with Seat Screws	ASTM A743 CF8M; Stainless Steel 18-8
28	Seat O-Ring	Buna-N
29	Stem Nut with Screw	Stainless Steel ASTM A276 304; Stainless Steel - 18-8

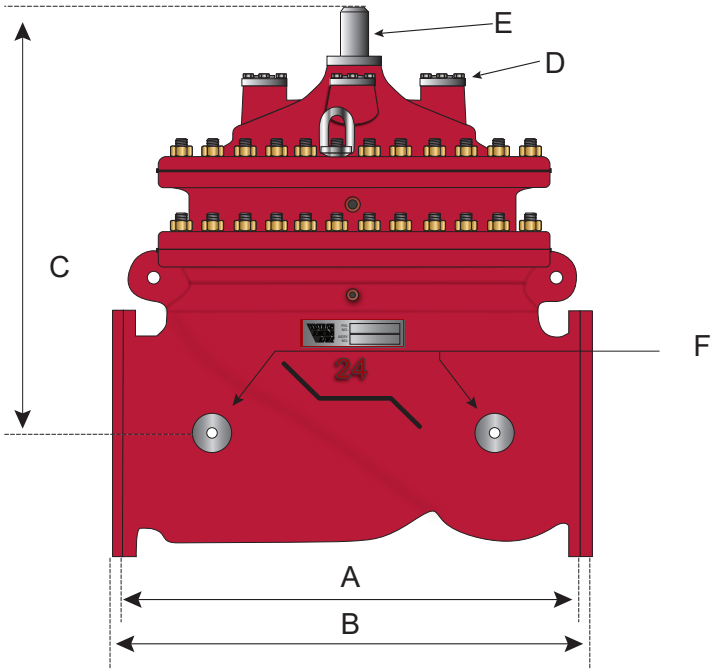
** Contained in Main Valve Repair Kit*

NOTICE

Installation: If unit is installed in any orientation other than horizontal (cover up) OR extreme space constraints exist, consult customer service prior to or at the time of order.

ACV Schematic - Series LFM513-5 - Large

Dimensions



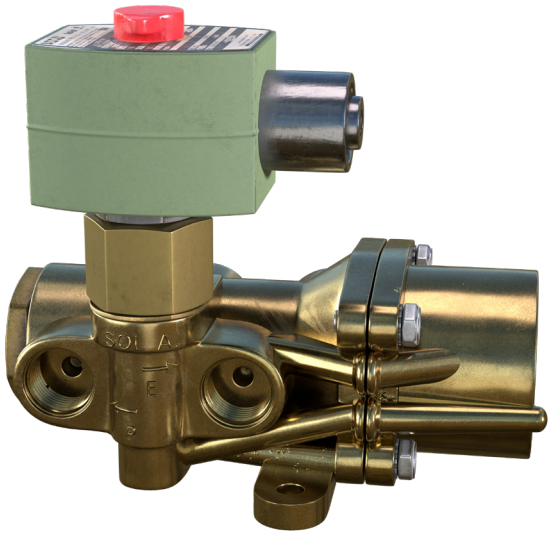
Valve Size	Globe 150#		Globe 300#		Cover To Center		Port Size NPT		Port Size NPT		Shipping Weights*	
	A		B		C		D		F			
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
20	52	1320.8	53⅜	1362.1	49½	1257.3	1½	38.1	1½	38.1	5803	2632.2
24	61½	1562.1	63¼	1606.5	57¼	1454.2	1½	38.1	1½	38.1	8411	3815.2

Model S4W

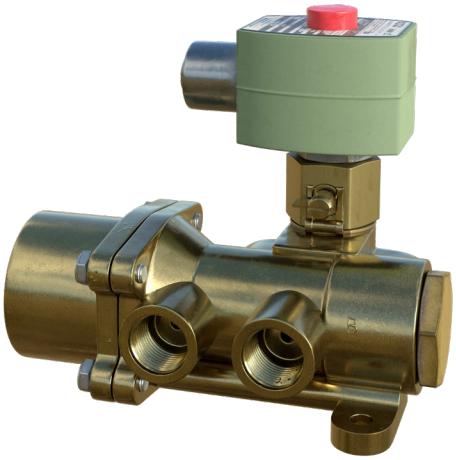
3-Way Solenoid

Size: ⅛" – ½" NPT

Model S4W are pilot system 4-way solenoids. The solenoids can control valves independently or in combination with other control circuit pilots or accessories. Product is available with a wide range of options including: voltage (24VDC, 24VAC or 120VAC), and a range of enclosures (general service to watertight to explosion proof).



Model S4W
Front View showing Ports P and E



Model S4W
Back View showing Ports A and B

Normal Position

Actuated Position

Specifications

Body Material:	Brass (standard)***
Elastomers:	Nitrile (standard) EPDM (optional) Viton™ (optional)
Voltage:	24VDC, 24VAC or 120VAC
Enclosure:	General Purpose – NEMA 4 (standard) Explosion Proof – NEMA 6, 6P, 7, 9 (optional)
Action:	4-Way Actuation

***Solenoid Action only. Main valve action (energize-to-open or energize-to-close) is dependent on the particulars of the pilot system.*

****Brass solenoids are not lead free and it is illegal to use them in potable services in the United States such as drinking water, handwashing, food preparation, and dishwashing. However, brass solenoids may be used as a replacement component in a lead free Watts ACV main valve, as the wetted surface of a lead free Watts ACV main valve including installed brass solenoids contains less than 0.25% of lead by weight.*

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LEAD FREE*

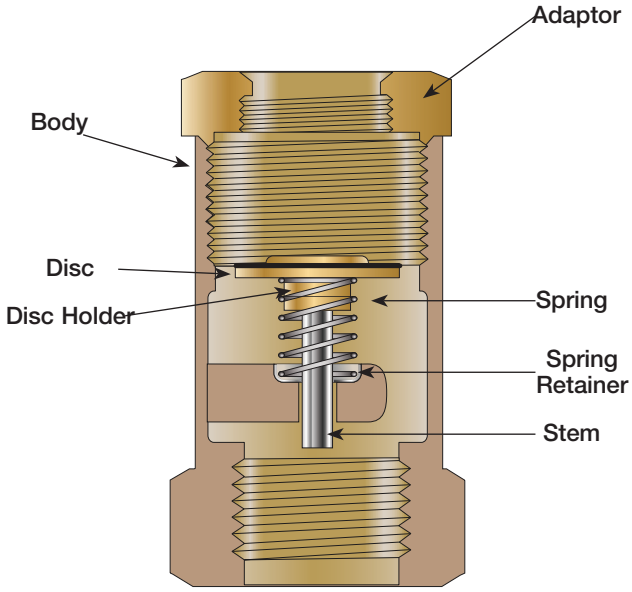
Model CK

Check Valve

Size: ¼" – 1" NPT

Model CK Check Valves are pilot line check valves. In typical applications these low cracking pressure in-line checks provide a hydraulic check feature to a pilot system. When the main valve outlet pressure exceeds inlet pressure, fluid is directed from the outlet to the main valve cover. This causes the main valve to close until inlet pressure is again greater than outlet.

Model LFCK



Specifications

Standard Material:	Brass Housing and Body Stainless Steel Indicating Rod
Optional Material:	Stainless Steel Housing and Body Disc Viton® (¼" – ½") PTFF (1")
Pressure Rating:	400psi (27.6 bar)

Viton® is a registered trademark of DuPont Dow Elastomers.

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

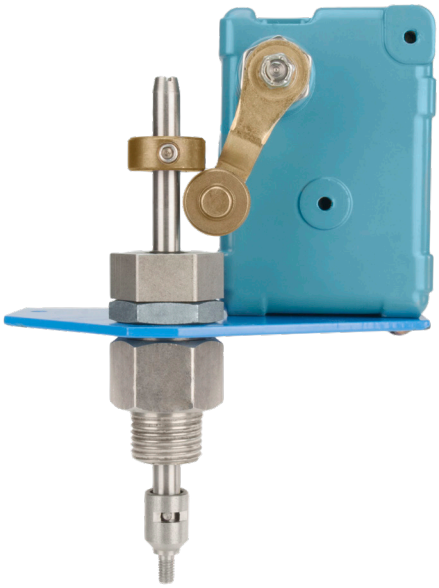
LEAD FREE*

Model 51

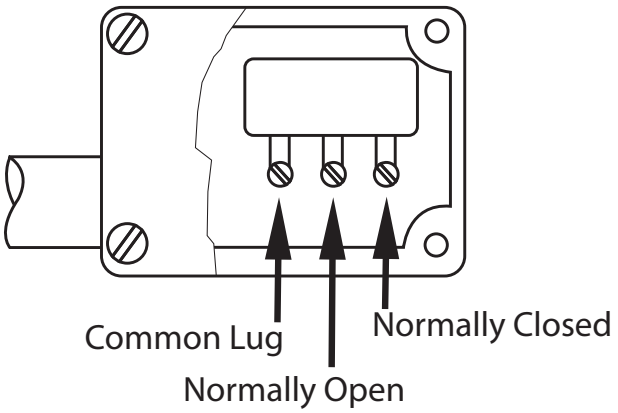
Single Limit Switch

The Model 51 Single Limit Switch provides visual indication of valve position, as well as remote electrical indication of "valve open" or "valve closed". The single pole double throw Micro-Switch can be connected to open or close an electrical circuit when the valve opens or closes.

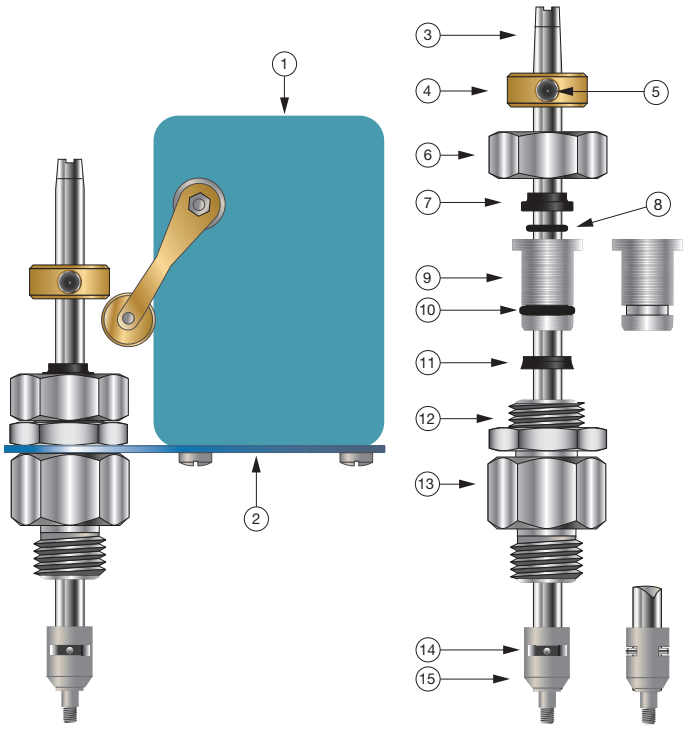
The adjustable collar is normally set to contact the trip arm when the main valve is closed. The collar can be positioned on the stem by loosening the set-screw to actuate the switch at the desired point of valve travel.



Model LF51



Single Pole Double Throw Switch



Specifications

Body Material:	Stainless Steel
Elastomers:	Buna-N (standard) EPDM (optional) Viton™ (optional)
Enclosure:	NEMA 1, 3, 4 and 13 General Purpose (standard) NEMA 1,7 and 9 Explosion Proof (optional)
Electrical:	Form C SPDT Switch 15 amp. 125, 250 or 480 VAC ½ amp. 125 VDC ¼ amp. 250 VDC ½" Conduit Connection

Viton™ is a trademark of The Chemours Company FC, LLC

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

Parts List

Item	Description
1	Limit Switch
2	Bracket
3	Stem
4	Trip collar
5	Set Screw
6	Cap
7	Wiper Ring*
8	O-Ring*
9	Guide
10	O-Ring*
11	Polypak*
12	Locknut
13	Body
14	Pin
15	Coupling

**Included in Repair Kit*

LEAD FREE*

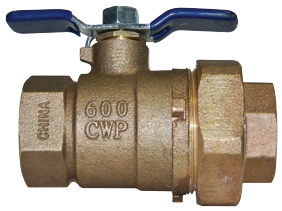
Series LF622F/FT/ UF/UFT

Lead Free* Bronze, Full Port Ball Valves

Size: ½" - 2"

Features

- The FEBCO Series LF622FT/LF622UFT available with tapped side outlet suitable for installation of pressure gauges or test cocks. LF622UF/UFT with Union Ends.
- Lead Free* construction to comply with Lead Free* installation requirements.
- Tee handle standard on ½" through 1¼" sizes (15mm – 32mm).
- Lever handle standard on 1½" through 2" sizes (40mm – 50mm).
- Full port design for low pressure drop.
- Pressure rated at 600psi (41.4 bar) WOG, (non-shock) ½"-2" (15mm – 50mm) (DN15-DN50) and 125psi (8.6 bar) saturated steam.
- Suitable for temperature from 0ºF to +350ºF (-18ºC to 177ºC) at 50psi (345 kPa).
- PTFE stem packing seal, thrust washer and seat.
- Plated carbon steel handle with vinyl insulator.
- Quarter-turn open or close operation. (Not intended for throttling applications.)
- Ideal for throttling and balancing applications of non-abrasive fluids where minimum flow is 20% to 100% of valve capacity.
- Low operating torque.
- Adjustable stem packing gland.
- Bottom loaded, pressure retaining stem.



Series LF622UF


Series LF622FT

Options

LF622F:	Full Port Thread x Thread Ball Valve
LF622FT:	Full Port Thread x Thread Ball Valve with Tapped Side Outlet
LF622 UF:	Full Port Thread x Thread Ball Valve with (1) Union End
LF622 UFT:	Full port Thread x Thread Ball Valve with (1) Union End with Tapped Side Outlet

Specification

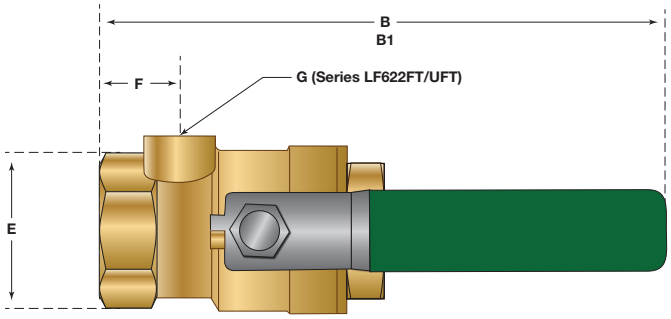
Approved valves shall have bottom loaded pressure retaining stems, PTFE seats and full port. Valve shall be pressure rated at 600psi (41.4 bar) WOG (non-shock), 125psi (8.6 bar) saturated steam. Valve must conform to Federal Specification WW-V-35C, Type II, Composition, BZ, Style 3, End Connection A. The Lead Free* copper silicon alloy full port ball valves shall comply with state codes and standards, where applicable, requiring reduced lead content. Valve shall be a FEBCO Series LF622F.

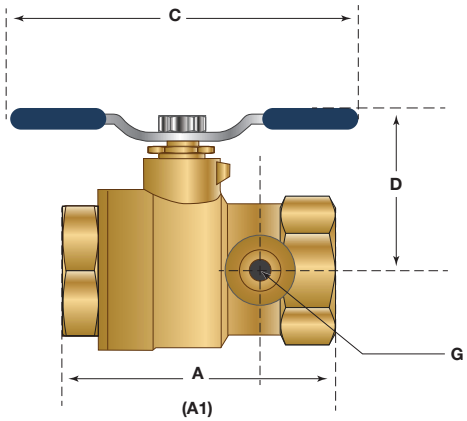
Series LF622F/FT/UF/UFT

Lead Free* Bronze, Full Port Ball Valves

Size: ½" - 2"

Dimensions – Weights





Size: ½" - 2"

Size	Series LF622FT / UFT Dimensions																		Weight			
	A		A1 (union)		B		B1 (union)		C		D		E		F		G		LF622FT		LF622UFT	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
½	2 3/8	61	3 1/2	79					3 1/8	79	1 7/16	36	1	25	5/8	16	1/8 - 27	n/a	.6	.3	.7	.3
¾	2 5/8	67	3 1/2	89					3 1/8	79	1 5/8	41	1 1/4	32	3/4	19	1/8 - 27	n/a	.8	.4	1.1	.5
1	3 1/8	79	4	102					3 9/16	91	2	51	1 1/2	38	13/16	20	1/8 - 27	n/a	1.3	.6	1.6	.7
1¼	3 5/8	92	4 9/16	116					3 9/16	91	2 1/16	53	1 13/16	46	13/16	21	¼ - 18	n/a	2.3	1.0	2.4	1.1
1½	3 7/8	99	5	129	8 1/2	216	9 1/2	241			3	76	2 3/16	55	13/16	21	¼ - 18	n/a	3.2	1.4	3.7	1.7
2	4 7/16	113	5 11/16	144	8 1/2	216	9 5/8	244			3 1/2	89	2 3/4	70	13/16	21	¼ - 18	n/a	5.6	2.5	6.4	2.9

Size: ½" - 2"

Size	Series LF622F / LF622UF Dimensions														Weight			
	A		A1		B		B1		C		D		E		LF622FT		LF622UFT	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
½	2 3/16	55	3	74					3 1/8	79	1 7/16	36	1	25	.6	.3	.7	.3
¾	2 3/8	61	3 1/4	82					3 1/8	79	1 5/8	41	1 1/4	32	.7	.3	1.0	.5
1	2 7/8	73	3 3/4	96					3 9/16	91	2	51	1 1/2	38	1.3	.6	1.6	.7
1¼	3 1/4	83	4 3/16	107					3 9/16	91	2 1/16	53	1 13/16	46	2.0	.9	2.4	1.1
1½	3 5/8	92	4 3/4	120	8	206	9	231			3	76	2 3/16	55	3.1	1.4	3.6	1.7
2	4 3/16	106	5 3/8	137	8 3/8	213	9 11/16	246			3 1/2	89	2 3/4	70	5.3	2.4	6.3	2.9

LEAD FREE*

Series LF777, LFS777

Wye-Pattern Lead Free* Bronze Strainers

Sizes: ¼" – 4"

Series LF777, LFS777 Wye-Pattern Lead Free* cast copper silicon alloy Strainers are designed to protect system components from dirt, rust and other damaging debris in the piping system. This series features a solid retainer cap with gasket. The LF777 and LFS777 features Lead Free* construction to comply with Lead Free* installation requirements.

LF777

LFS777

Features

- Lead Free* cast copper silicon alloy body
- Wye-pattern
- Solid retainer cap with gasket

Models

LF777	¼" – 4" threaded connections
LFS777	½" – 2" solder connections

Specifications

A wye-pattern Lead Free* cast copper silicon alloy strainer to be installed as indicated on the plans. The strainer must have a solid retainer cap with gasket. Strainer shall be rated to 400psi (27.6 bar) WOG @ 210ºF (99ºC); 125psi (8.6 bar) WSP @ 353ºF (178ºF) for sizes ¼" – 3" and 300psi (20.7 bar) WOG @ 210ºF (99ºC); 125psi (8.6 bar) @ 353ºF (178ºC) for size 4". Lead Free* Wye-Pattern cast copper silicon alloy Strainers shall be constructed using Lead Free* materials. Lead Free strainers shall comply with state codes and standards, where applicable, requiring reduced lead content. Strainer shall be a Watts Series LF777 (threaded ends) or LFS777 (solder ends).

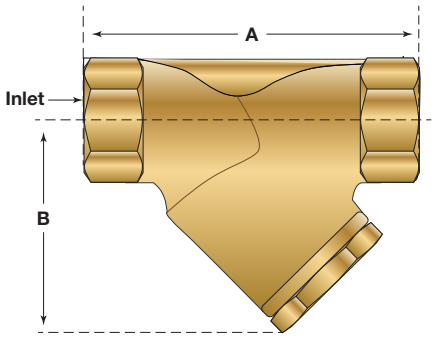
Materials

Body:	Lead Free* cast copper silicon alloy
Retainer Cap:	¼" – 4": Lead Free copper silicon alloy
Cap Seal:	¼" – 3": EPDM O-Ring 4": Garlock® gasket
Standard Screen:	½" – 2½": 304 stainless steel #20 mesh, 3": 3⁄64" (1.2mm) 304 stainless steel perforated screen 4": ⅛" (3mm) 304 stainless steel perforated screen

Series LF777, LFS777

Wye-Pattern Lead Free* Bronze Strainers

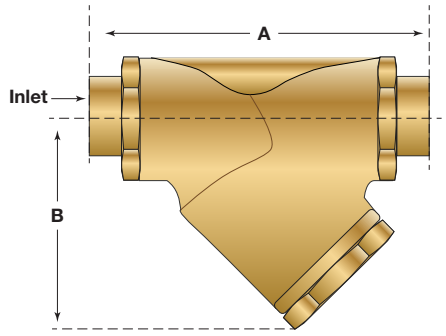
Dimensions – Weights



LF777

LF777

SIZE	DIMENSIONS				WEIGHT	
	A		B			
in.	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs*
¼	2 11/16	68	1 11/16	43	1.7	0.77
⅜	2 11/16	68	1 11/16	43	1.7	0.77
½	3	76	2	51	1.7	0.77
¾	3 5/16	84	2 5/16	59	1.7	0.77
1	4½	114	2 5/16	59	2.7	1.22
1¼	5⅛	130	3⅛	79	3.0	1.36
1½	5⅞	149	3¾	95	4.0	1.81
2	6 3/16	157	4⅞	124	7.4	3.36
2½	8⅛	206	4 15/16	125	12.0	5.44
3	10⅛	257	6 11/16	170	24.0	10.90
4	13	325	10½	267	41.0	18.60



LFS777

LFS777

SIZE	DIMENSIONS				WEIGHT	
	A		B			
in.	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs*
½	3⅜	86	2 1/16	52	1.5	0.68
¾	3¾	95	2 7/16	63	1.6	0.73
1	5	127	3	76	2.5	1.13
1¼	5⅝	143	3¼	82	2.8	1.25
1½	6 7/16	164	3 13/16	97	4.0	1.81
2	7½	191	4⅝	118	7.4	3.39

LEAD FREE*

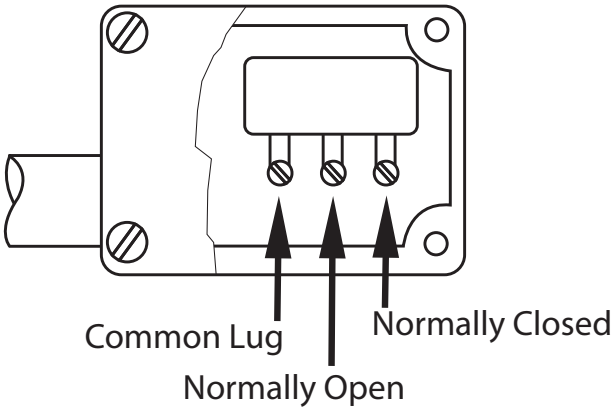
Model 51-1

Dual Limit Switch

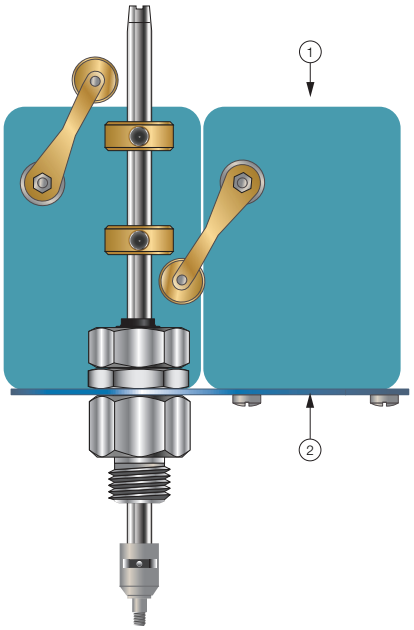
Size: 2" - 8" NPT

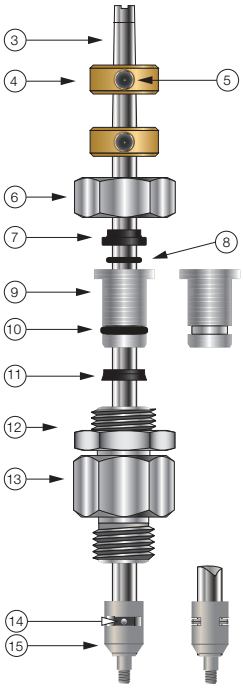
The Model 51-1 Dual Limit Switch provides visual indication of valve position, as well as remote electrical indication of "valve open" and "valve closed". The single pole double throw Micro-Switches can be connected to open or close an electrical circuit when the valve opens or closes.

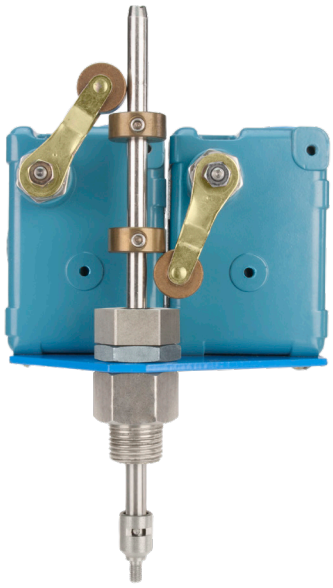
The adjustable collars are normally set to contact the trip arms to indicate "valve open" and "valve closed". The collars can be positioned on the stem by loosening the set-screws to actuate the switches at the desired point of valve travel.



Single Pole Double Throw Switch







Model LF51-1

Specifications

Body Material:	Stainless Steel
Elastomers:	Buna-N (standard) EPDM (optional) Viton™ (optional)
Enclosure:	NEMA 1, 3, 4 and 13 General Purpose (standard) NEMA 1,7 and 9 Explosion Proof (optional)
Electrical:	Form C SPDT Switch 15 amp. 125, 250 or 480 VAC ½ amp. 125 VDC ¼ amp. 250 VDC ½" Conduit Connection

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***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

Parts List

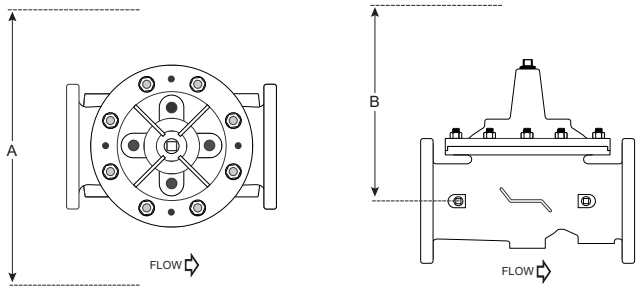
Item	Description
1	Limit Switch
2	Bracket
3	Stem
4	Trip collar
5	Set Screw
6	Cap
7	Wiper Ring*
8	O-Ring*
9	Guide
10	O-Ring*
11	Polypak*
12	Locknut
13	Body
14	Pin
15	Coupling

**Included in Repair Kit*

Installation

1. Prior to installation, flush line to remove debris.
2. Install valve so the flow arrow matches flow through the line, and gauges to monitor valve inlet and outlet pressures.
3. Install isolation valves upstream and downstream of the main valve.
4. Provide adequate clearance for valve servicing and maintenance. Refer to valve servicing dimensions on next page. Avoid installing valves 6" and larger in the vertical position (main valve stem horizontal). Automatic Control Valves (ACVs) are designed for horizontal in-line installation, with the cover facing up (main valve stem vertical). Slow operation or premature stem and guide wear may occur if valve is not installed according to factory recommendations. Consult factory for detailed engineering review prior to ordering if valve is to be installed other than horizontally in-line.
5. If valve is equipped with a pilot control system, extra precautions should be made during installation to protect the piping circuit from damage. Only remove the pilot control system from the valve if necessary. Tubing and fittings should be kept clean and replaced exactly as removed. Consult appropriate hydraulic schematic to ensure proper re-assembly.
6. Connect solenoid wiring leads to desired switching device, using safe, standard electrical practices.
7. Wire the limit switch contacts to the proper relay connections, using safe, standard electrical practices. Adjust the limit switch collar to the approximate make/break contact position.

Valve Servicing Dimensions



The following tables detail the recommended minimum valve servicing dimensions.

Globe

Size (in)	20		24	
	in.	*cm.*	*in.*	*cm.*
A (in)	82	209	82	209
B (in)	48	209	82	209

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