


Submittal Package

Engineering Specification, Installation, Operation and Maintenance Series LFM115 - Large

Pressure Reducing Control Valve

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.

THINK SAFETY FIRST

⚠ 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.

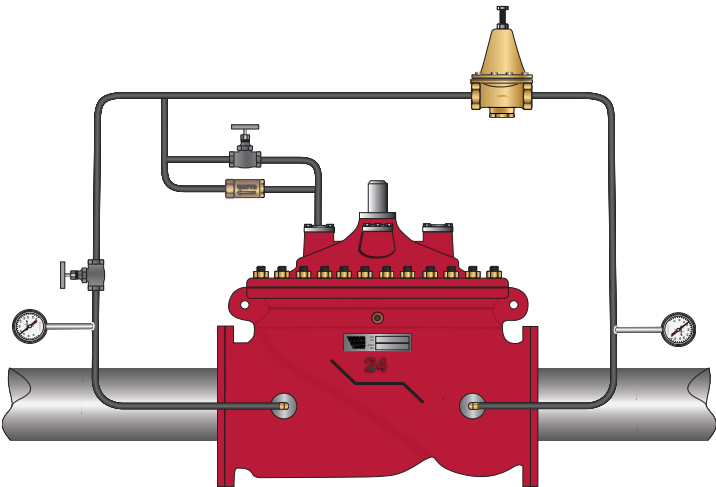


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Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



LEAD FREE*

Series LFM115 - Large

Pressure Reducing Control Valve

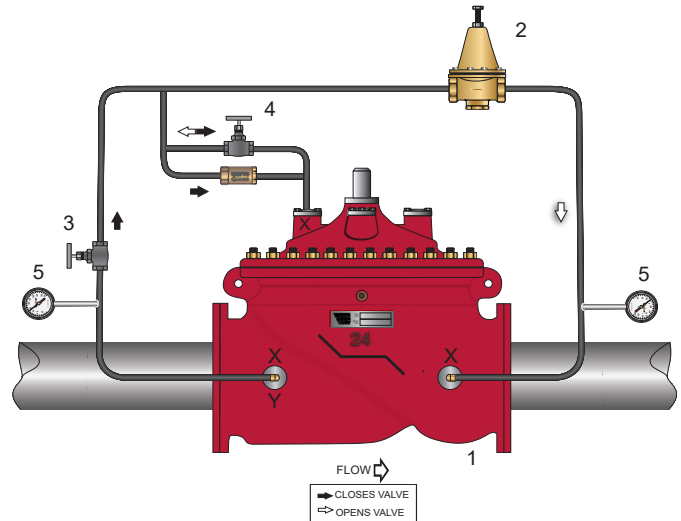
Full Port Ductile Iron Single Chamber Valve

Features

- Throttles to reduce high upstream pressure to constant lower downstream pressure
- Reducing setpoint is adjustable

Standard Components

- 1 — Main Valve - M100 Single Chamber
- 2 — Pressure Reducing Control - LF223
- 3 — ACS - Adjustable Closing Speed (Globe Valve)
- 4 — AOS - Adjustable Opening Speed (Globe with Check)
- 5 — Pressure Gauges
- X — Isolation Cocks
- Y — Y-Strainer



Options and Accessories

- L Limit Switch
- P Position Indicator

Operation

The Pressure Reducing Automatic Control Valve (ACV) is designed to automatically reduce a fluctuating higher upstream pressure to a constant lower downstream pressure regardless of varying flow rates. It is controlled by a normally open, pressure reducing pilot designed to: 1) Open (allowing fluid out of the main valve cover chamber) when downstream pressure is below the adjustable setpoint, and 2) Close (allowing fluid to fill the main valve cover chamber) when downstream pressure is above the adjustable setpoint. A decrease in downstream pressure causes the valve to modulate toward an open position, raising downstream pressure. An increase in downstream pressure causes the valve to modulate toward a closed position, lowering downstream pressure.

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

M Series Basic Valves

Pressure Reducing Control Valve

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.

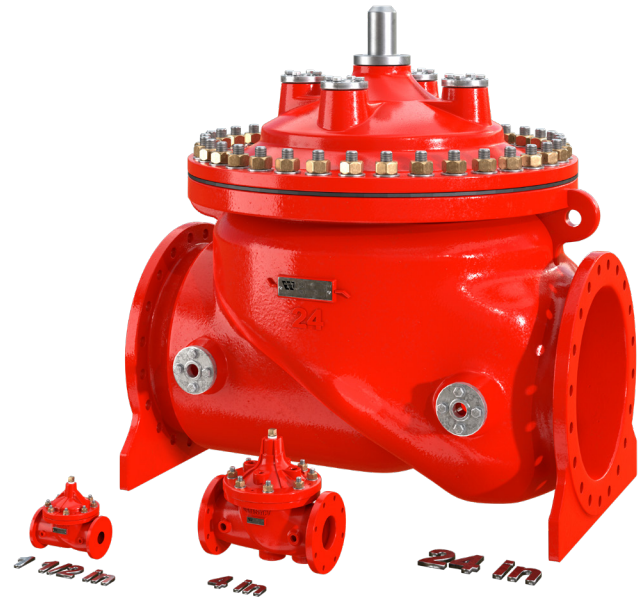
Globe Pattern Single Chamber Basic Valve (M100)

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)



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

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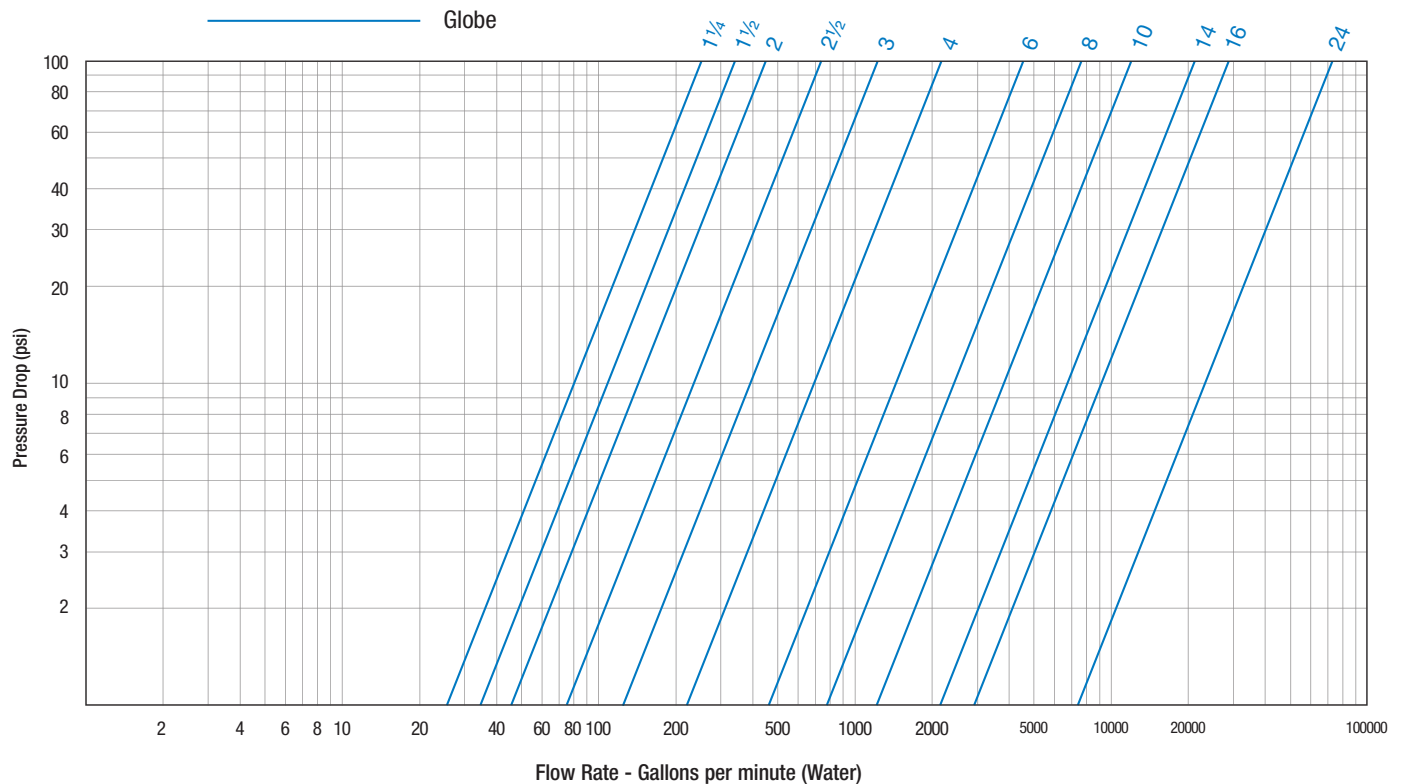
ACV Schematic - Series LFM115 - Large

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
C _v	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 valve 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):

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



Valve Cover Chamber Capacity

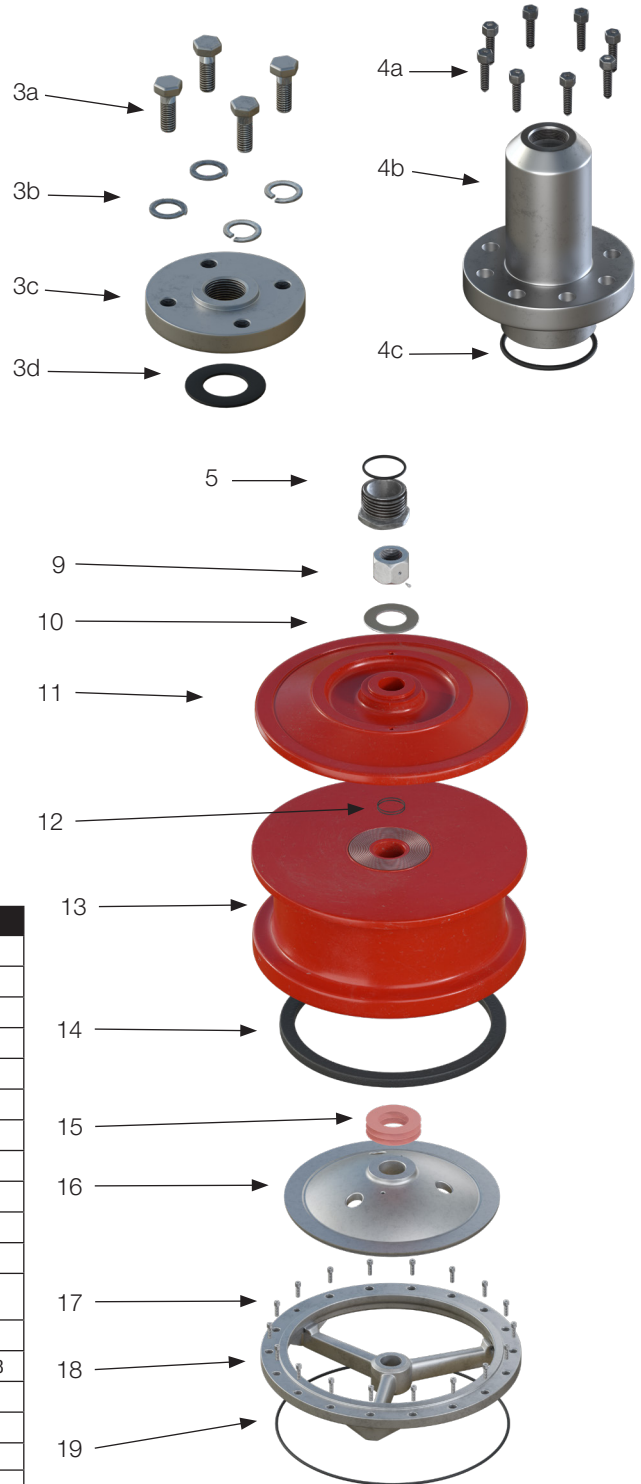
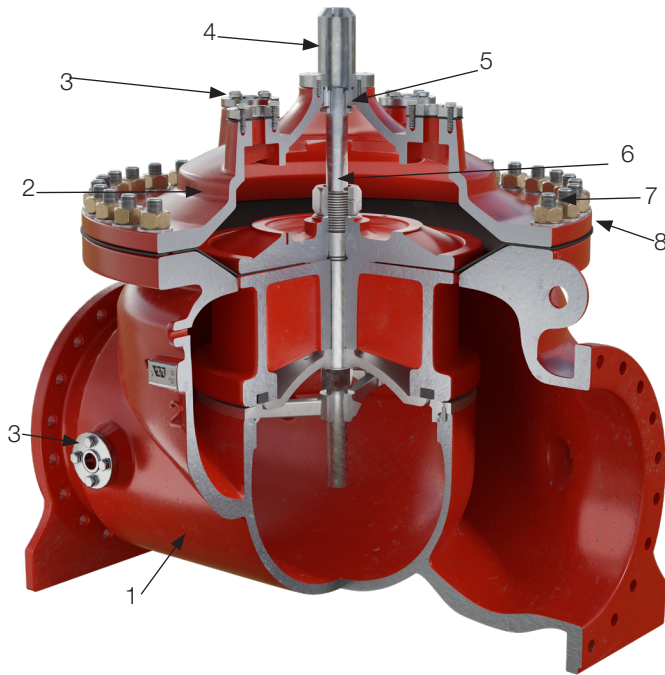
Valve Size - Inches	20	24
U.S. Gal	25.5	37.1
Liter	96.5	140.4

Valve Travel

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

ACV Schematic - Series LFM115 - Large

Basic Valve



Item	Description	Material
1	150# Body	Epoxy Coated Ductile Iron - ASTM A536
2	Cover	Epoxy Coated Ductile Iron - ASTM A536
3a	Flange Screws x4	Stainless Steel 18-8
3b	3/4 Lock Washer	Stainless Steel - UNS S30400
3c	Flange 1 1/2 NPT, 300 CL	Stainless Steel 18-8
3d	Gasket 1 1/2 Pipe	Buna-N
4a	Guide Cover Screws	Stainless Steel 18-8
4b	Guide Cover	Stainless Steel - UNS S30400
4c	O-Ring	Buna-N - 70 DURO
5	Cover Bearing with O-Ring	ASTM A276 UNS S30400, Buna-N - 70 DURO
6	Stem	Xylan Coated Stainless Steel - UNS S30400
7	Cover Stud with Hex Nut and Flat Washer	ASTM A193 GRB7 Yellow Zinc PLT; ASTM A194 GR2H Yellow Zinc PLT; Carbon Steel Zinc Plated
8	Diaphragm	Buna-N
9	Stem Nut with Set Screw	Stainless Steel ASTM A276 304; Stainless Steel - 18-8
10	Stem Nut Washer	Stainless Steel - UNS S30400
11	Diaphragm Washer	Epoxy Coated Ductile Iron - ASTM A536
12	O-Rings x2	Buna-N
13	Disc Retainer	Epoxy Coated Ductile Iron - ASTM A536
14	Disc	Buna-N
15	Spacer Washer x3	Vulcanized Fiber
16	Disc Guide	CF8M
17	Seat Screws x18	Stainless Steel 18-8
18	Seat	ASTM A743 CF8M
19	O-Ring	Buna-N

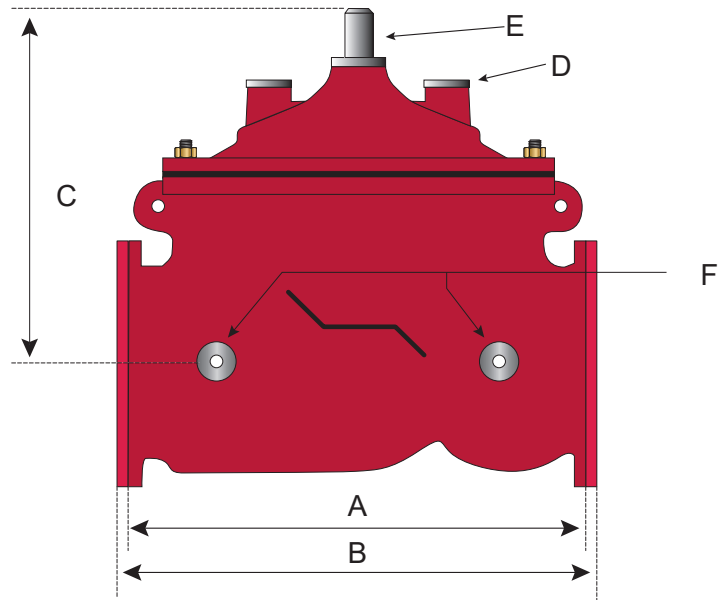
* Contained in Main Valve Repair Kit

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 LFM115 - Large

Dimensions



Valve Size	Globe 150#		Globe 300#		Cover To Center		Port Size NPT		Port Size NPT		Port Size NPT		Shipping Weights*	
	A		B		C		D		E		F		lbs.	kgs.
<i>in.</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>		
20	52	1320.8	53%	1361.9	39%	1000	1½	38.1	1½	38.1	1½	38.1	4312	1955.9
24	61½	1562.1	63¼	1606.3	47	1192.8	1½	38.1	1½	38.1	1½	38.1	6629	3006.9

LEAD FREE*

LF223, LF223-S

High Capacity Water Pressure Reducing Valves*

Sizes: ½" – 2 ½" NPT

Series 223 and 223-S High Capacity Water Pressure Reducing Valves are designed to reduce incoming water pressure to a sensible level to protect plumbing system components and reduce water consumption. This series is suitable for water supply pressures up to 300psi (20.7 bar) and may be adjusted from 25 – 75psi (172 – 517 kPa). The standard setting is 50psi (345 kPa). Series 223 features an enlarged diaphragm, spring cage and seat orifice for high capacity performance. Series 223-S has the same options as the 223, except it is furnished with a strainer. All parts are quickly and easily serviceable without removing the valve from the line. The optional bypass feature permits the flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply.



Standard Materials

- Body:** ½" – 2" Bronze
2 ½" Iron
- Seat:** Replaceable stainless steel
- Diaphragm:** Reinforced Buna-N
- Valve Disc:** EPDM

Specifications

A Lead Free Water Pressure Reducing Valve shall be installed on the water service pipe near its entrance to the building where supply main pressure exceeds 60psi (413 kPa) to reduce it to 50psi (345 kPa) or lower. The water pressure reducing valve shall be constructed using Lead Free* materials. Lead Free* regulators shall comply with state codes and standards, where applicable, requiring reduced lead content. Sill cocks and outside wall hydrants may be left on full main pressure at the option of the owner. Provision shall be made to permit the bypass flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply. Pressure reducing valves with builtin bypass check valves and strainer will be acceptable. Approved valves shall comply with ASSE 1003. Valve shall be a Watts Series LF223 or LF223S (with strainer)

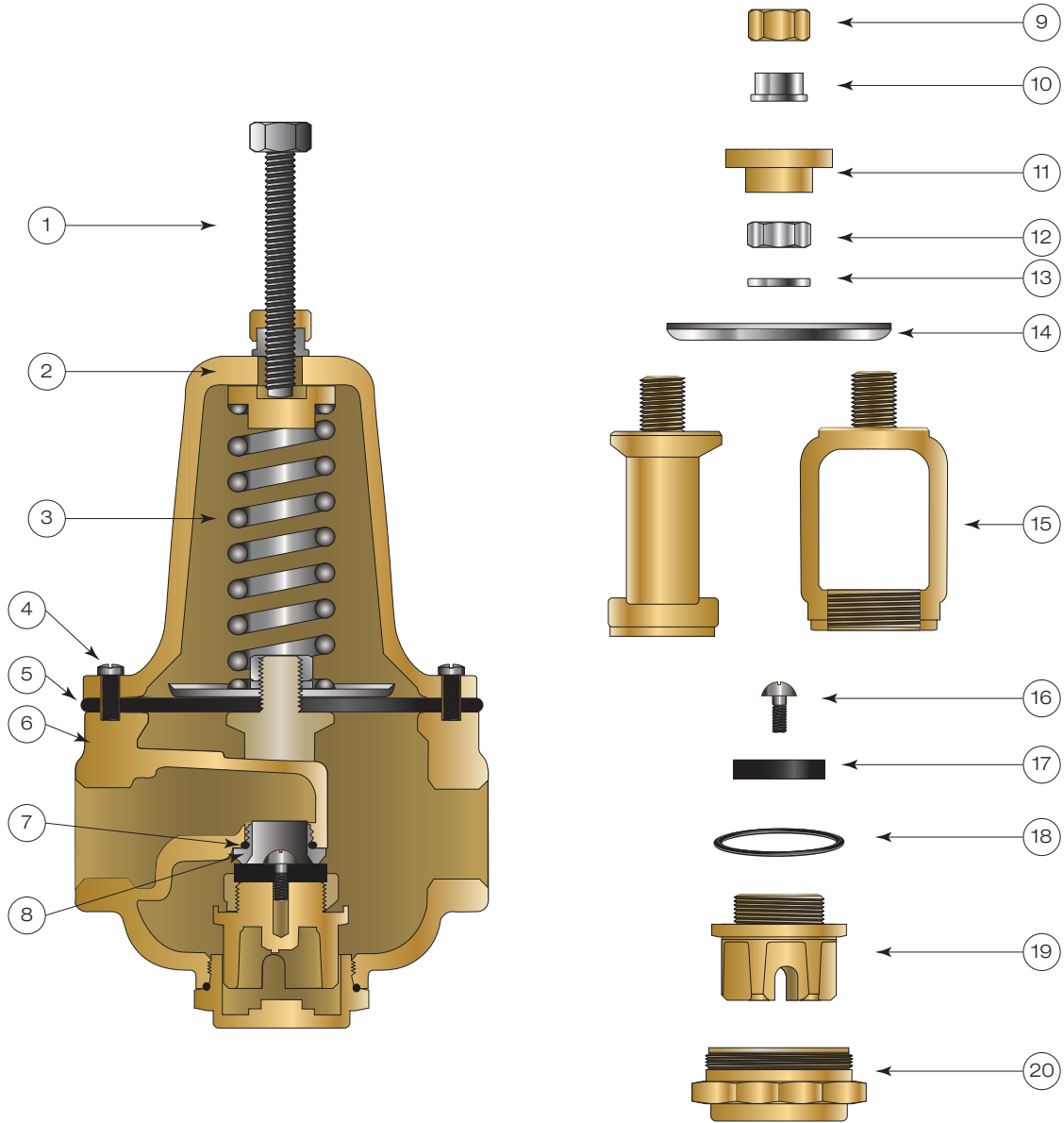
*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Dimensions – Weights

SIZE		DIMENSIONS								WEIGHT				
in.	A (LF223)		As (LF223S)		C		D		N (LF223S)		LF223		LF223S	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs	lbs.	kgs
½	4¼	108	9	229	6¼	159	2	50	2½	64	4.5	2.0	6	2.7
¾	4¼	108	9	229	6¼	159	2	50	2½	64	5	2.3	6.5	2.9
1	4¾	121	10 ¹⁵ / ₁₆	262	6½	165	2½	54	2 ¹⁵ / ₁₆	75	7	3.2	9.5	4.3
1¼	5	127	11 ¹⁵ / ₁₆	287	6¾	172	2¾	70	3	76	9	4.1	12	5.4
1½	6¾	171	14¾	375	9⅞	251	2¾	70	3 ⁷ / ₁₆	87	19.5	8.8	23.5	10.7
2	8	203	16¾	425	10¾	273	3⅝	86	4	102	30	13.6	37.5	17.0
2½	9	229	20⅞	511	10¾	273	3⅝	86	5	127	32.5	14.8	59	26.8

LF223, LF223-S

High Capacity Water Pressure Reducing Valves*



Item	Description
1	Adjusting Screw
2	Spring Housing
3	Spring
4	Cap Screw
5	Diaphragm
6	Body
7	Bypass Gasket
8	Seat
9	Nut
10	Locking Seal

Item	Description
11	Spring Guide
12	Nut
13	Washer
14	Diaphragm Washer
15	Yoke
16	Disc Screw?
17	Disc
18	O-Ring
19	Disc Holder
20	Bottom Plug

LEAD FREE*

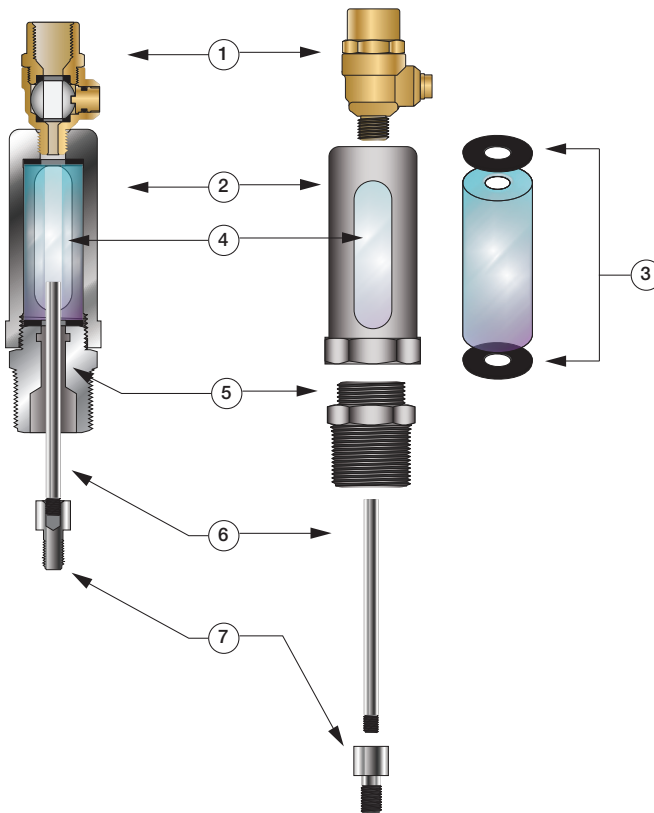
Model 50
Position Indicator

When specified as an option on a Control Valve, the Model 50 Position Indicator is installed in the topmost cover port of the Main Valve and allows for visual indication of valve position. The Model 50 is also very useful during valve start-up and troubleshooting procedures.

A stainless steel indicating rod threads into the tapped portion of the Main Valve stem and moves inside of a cylindrical Pyrex sight tube. The indicating rod travels up and down, following Main Valve stem movement. The housing protects the sight tube and indicating rod, and allows visibility on two sides. The screw driver operated test cock installed on the top of the Model 50 housing provides a controlled method of removal of air from the cover chamber during start-up or troubleshooting of the Main Valve.



Model LF50



Item	Description
1	Test Cock
2	Housing
3	Gasket
4	Pyrex Sight Tube
5	Body
6	Indicating Rod
7	Stem Adaptor (8" or Larger)

Specifications

- Standard Material:** Stainless Steel Housing and Body
Stainless Steel Indicating Rod
Lead Free Test Cock
Pyrex Sight Tube
- Optional Material:** Stainless Steel Test Cock

Pressure Rating: 400psi (27.6 bar)

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Dimensions

Valve Size (in)	Dimension (in)
1½ - 1½	7¾
2	4¾
2½	4¾
3	4¾
4	5
6	5
8	5½
10	5¾
12	7¼
14	7¼
16	7¼
18*	7¼
20*	7¼
24*	7¼

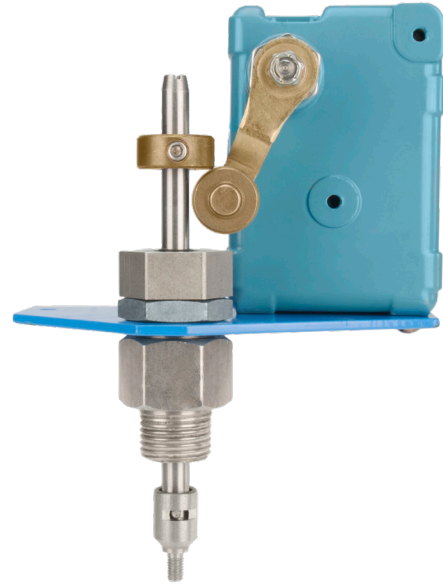
*Reduced Port

LEAD FREE*

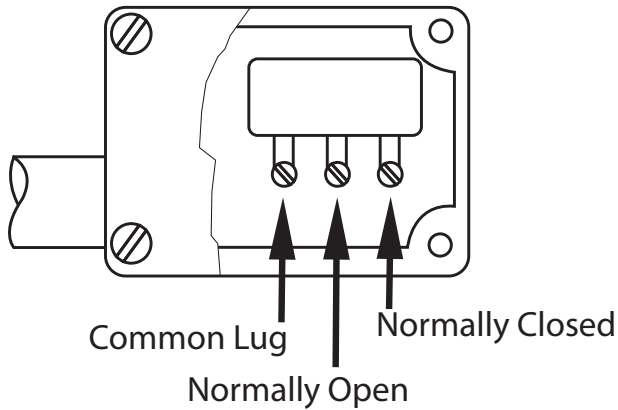
Model 51 Single Limit Switch

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.

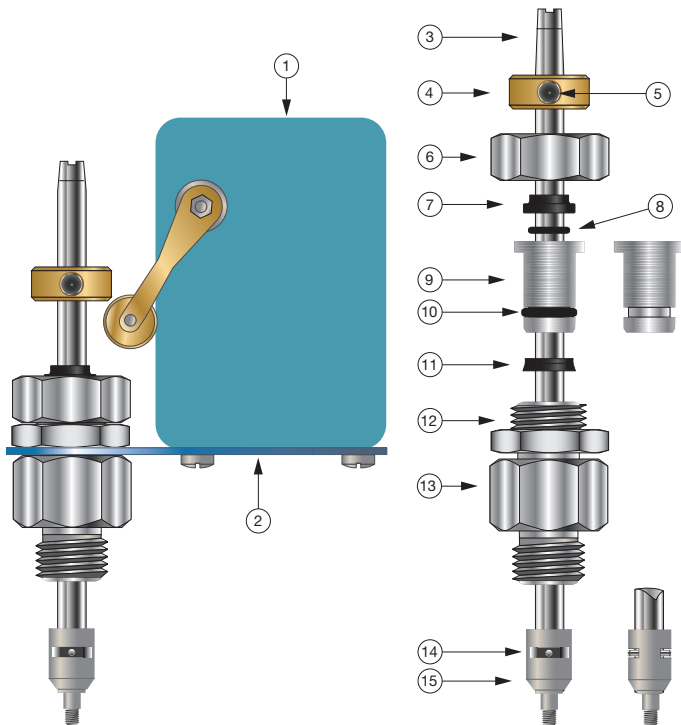
The adjustable collar is normally set to contact the trip arm when the main valve is closed. The collar can be positioned on the stem by loosening the set-screw to actuate the switch at the desired point of valve travel.



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

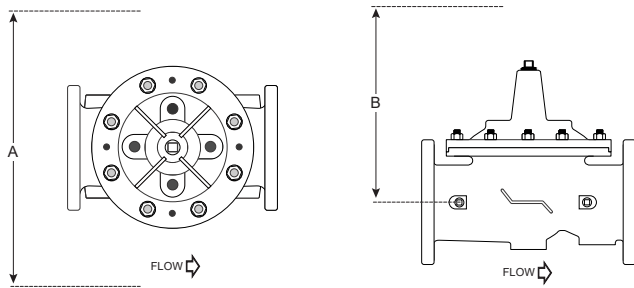
Installation

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. A Position Indicator can be installed to provide visual indication of valve position and operation without disassembly.
3. Install isolation valves upstream and downstream of the main valve.

Note: If using butterfly valves, ensure valve disc does not contact the main valve.

4. Provide adequate clearance for valve servicing and maintenance. Refer to valve servicing dimensions on next page.
5. 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.
6. 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.

Valve Servicing Dimensions



The following tables detail the recommended minimum valve servicing dimensions.

Globe

Size (in)	20		24	
	<i>in.</i>	<i>cm.</i>	<i>in.</i>	<i>cm.</i>
A (in)	82	209	82	209
B (in)	48	209	82	209

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The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

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