

Engineering Specification

LEAD FREE*

Series LFM115

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

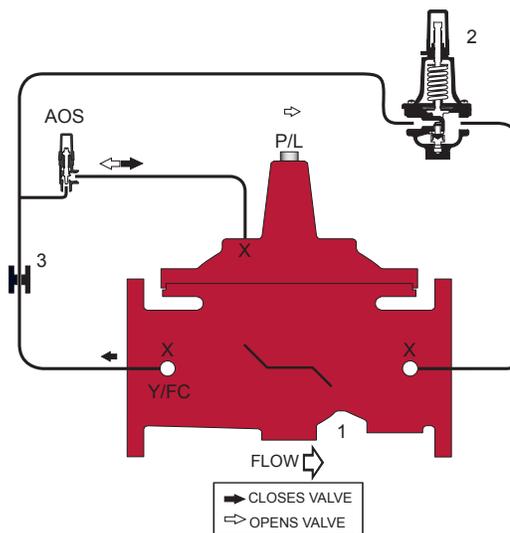
- 1—Main Valve (M100 - Single Chamber)
- 2—Pressure Reducing Control
- 3—Fixed Orifice
- X—Isolation Cocks

Options and Accessories

- FC Flo-Clean Strainer (Standard 1¼" – 4")
- Y Y-Strainer (Replaces Flo-Clean)
- ACS Adjustable Closing Speed (Replaces Fixed Orifice)
- AOS Adjustable Opening Speed (Standard 1¼" – 4")
- P Position Indicator
- L Limit Switch

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.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

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)

Angle Pattern Single Chamber Basic Valve (M1100)

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)
EPDM (optional)
Viton® (optional)

Nut, Spring and Stem: Stainless Steel

Anti-Scale (Optional): Xylan Coated Stem and Seat



Viton® is a registered trademark of DuPont Dow Elastomers.

Operating Pressure

Threaded = 400psi (27.6 bar)

150# Flanged = 250psi (17.2 bar)

300# Flanged = 400psi (27.6 bar)

Grooved End = 400psi (27.6 bar)

Operating Temperature

Buna-N: 160°F (71°C) Maximum

EPDM: 300°F (140°C) Maximum

Viton®: 250°F (121°C) Maximum

Epoxy Coating**: 225°F (107°C) Maximum

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

Basic Valve Body Options



Globe Flanged



Angle Flanged



Globe Grooved End



Angle Grooved End



Globe Threaded



Angle Threaded

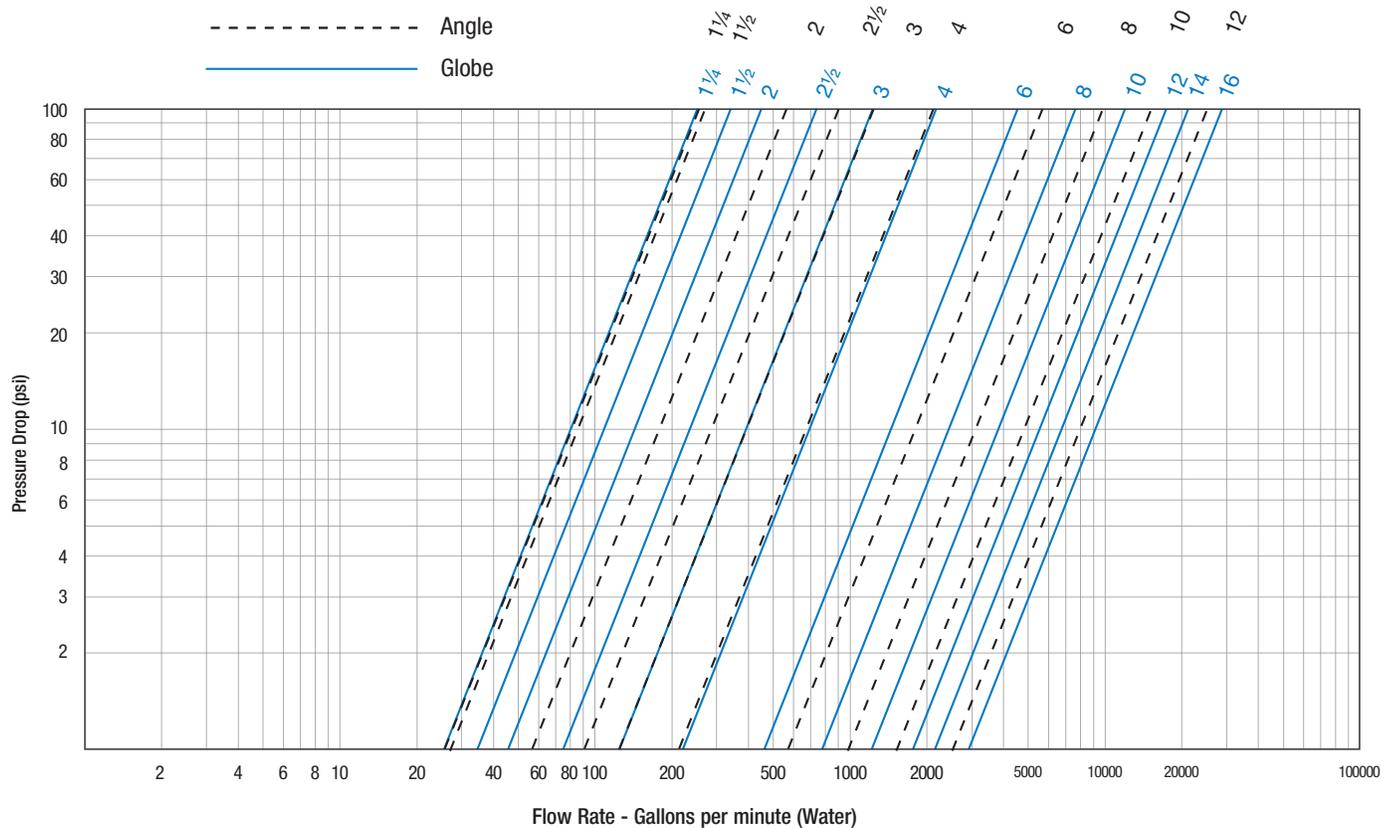
ACV Schematic - Series LFM115

Flow Data

| Valve Size - Inches | | 1/4 | 1/2 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
|---------------------|--|-----|-----|-----|-------|-----|------|------|------|------|------|-------|-------|
| Suggested | Maximum Continuous Flow Rate Gpm (Water) | 95 | 130 | 210 | 300 | 485 | 800 | 1850 | 3100 | 5000 | 7000 | 8500 | 11100 |
| | Maximum Intermittent Flow Rate Gpm (Water) | 119 | 161 | 265 | 390 | 590 | 1000 | 2300 | 4000 | 6250 | 8900 | 10800 | 14100 |
| | Minimum Flow Rate Gpm (Water) | 3 | 5 | 6 | 9 | 15 | 16 | 17 | 25 | 55 | 70 | 190 | 400 |
| Cv | Cv Factor GPM (Globe) | 26 | 26 | 48 | 75 | 112 | 188 | 387 | 764 | 1215 | 1734 | 2234 | 3131 |
| | 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

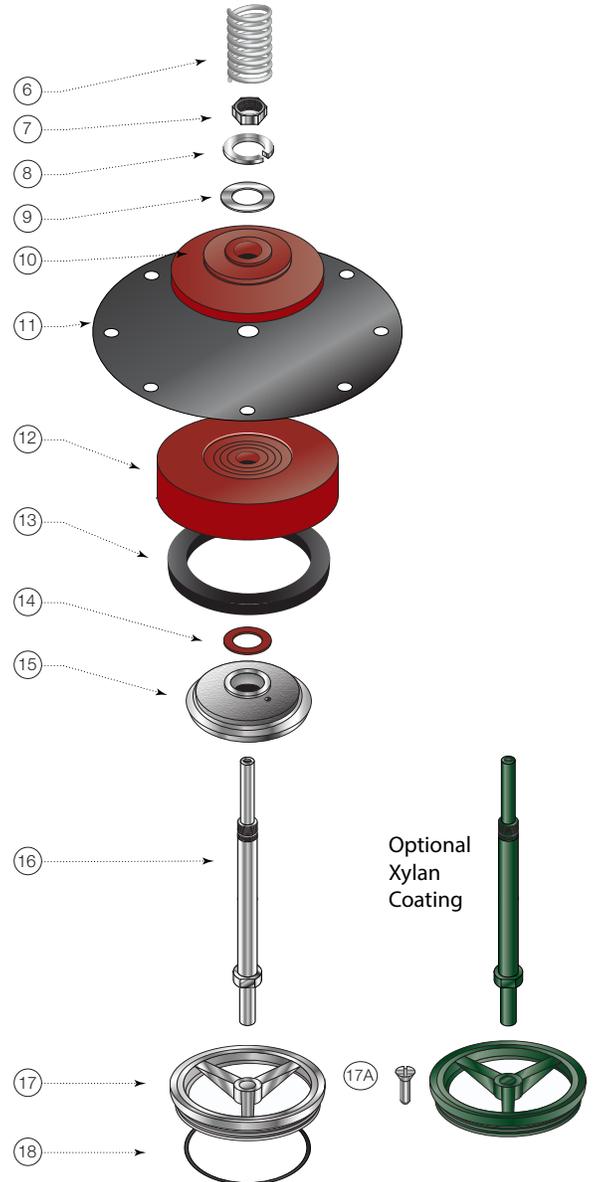
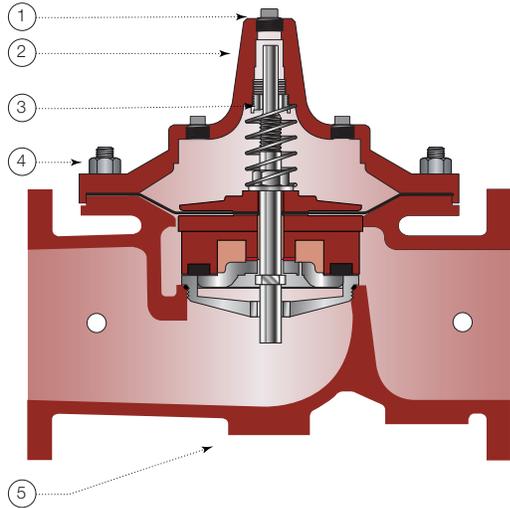
| Valve Size - Inches | 1/4 | 1/2 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
|---------------------|-----|-----|---|-------|----|----|----|-------|-------|----|-------|-------|
| fl.oz. | 4 | 4 | 4 | 10 | 16 | 22 | 70 | | | | | |
| U.S. Gal | | | | | | | | 1 1/4 | 2 1/2 | 4 | 6 1/2 | 9 1/2 |

Valve Travel

| Valve Size - Inches | 1/4 | 1/2 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
|---------------------|-----|-----|-----|-------|-----|---|-------|---|-------|----|-------|----|
| Travel - Inches | 3/8 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 |

ACV Schematic - Series LFM115

M100 Basic Valve



| Item | Description | Material |
|------|--------------------------------|--|
| 1 | Pipe Plug | Lead Free Brass |
| 2 | Cover | ASTM A536 65-45-12 Epoxy Coated Ductile Iron |
| 3 | Cover Bearing | ASTM A276 304 Stainless Steel |
| 4 | Stud with Cover Nut and Washer | ASTM A570 Gr.33 Zinc Plated Steel |
| 5 | Body | ASTM A536 65-45-12 Epoxy Coated Ductile Iron |
| 6 | Spring | ASTM A276 302 Stainless Steel |
| 7 | Stem Nut | ASTM A276 304 Stainless Steel |
| 8 | Lock Washer | ASTM A276 304 Stainless Steel |
| 9 | Stem Washer | ASTM A276 304 Stainless Steel |
| 10 | Diaphragm Washer | ASTM A536 65-45-12 Epoxy Coated Ductile Iron |
| 11 | Diaphragm* | Buna-N (Nitrile) |
| 12 | Disc Retainer | ASTM A536 65-45-12 Epoxy Coated Ductile Iron |
| 13 | Seat Disc* | Buna-N (Nitrile) |
| 14 | Spacer Washer* x5 | NY300 Fiber* |
| 15 | Disc Guide | ASTM A743 CF8M (316) Stainless Steel |
| 16 | Shaft | ASTM A276 304 Stainless Steel |
| 17 | Seat Ring** | ASTM A743 CF8M (316) Stainless Steel |
| 17A | Seat Screw** (8" and Larger) | ASTM A276 304 Stainless Steel |
| 18 | Seat Gasket* | Buna-N (Nitrile) |

* Contained in Main Valve Repair Kit

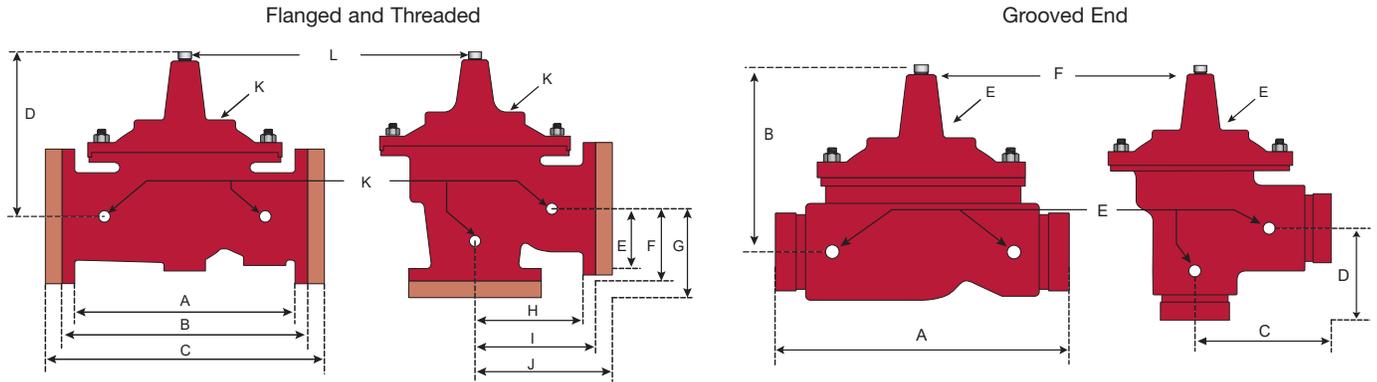
**Note: 6 inch and Smaller Valves, Seat Ring is threaded

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

Dimensions



Flanged and Threaded Dimensions

| Valve Size | Globe Thread | | Globe 150# | | Globe 300# | | Cover To Center | | Angle Thread | | Angle 150# | | Angle 300# | | Angle Thread | | Angle 150# | | Angle 300# | | Port Size NPT | Port Size NPT | Shipping Weights* | |
|------------|--------------|-----|------------|------|------------|------|-----------------|-----|--------------|-----|------------|-----|------------|-----|--------------|-----|------------|-----|------------|-----|---------------|---------------|-------------------|------|
| | A | B | C | D | E | F | G | H | I | J | K | L | | | | | | | | | | | | |
| in. | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | in. | lbs. | kgs. |
| 1¼ | 7¼ | 184 | | | | | 5½ | 140 | | | | | | | | | | | | | ¾ | ¼ | 20 | 9 |
| 1½ | 7¼ | 184 | 8½ | 216 | | | 5½ | 140 | ¾ | 83 | | | | | 1⅞ | 48 | | | | | ¾ | ¼ | 25 | 11 |
| 2 | 9⅞ | 238 | 9⅞ | 238 | 10 | 254 | 6¾ | 171 | 4¾ | 120 | 4¾ | 121 | 5 | 127 | 3¼ | 83 | 3¼ | 83 | 3½ | 89 | ¾ | ½ | 40 | 18 |
| 2½ | 11 | 279 | 11 | 279 | 11½ | 295 | 7½ | 191 | 5½ | 140 | 5½ | 140 | 5½ | 149 | 4 | 102 | 4 | 102 | 4⅞ | 110 | ½ | ½ | 65 | 29 |
| 3 | 12½ | 318 | 12 | 305 | 13¼ | 337 | 8¼ | 210 | 6¼ | 159 | 6 | 152 | 6¾ | 162 | 4½ | 114 | 4 | 102 | 4¾ | 111 | ½ | ½ | 95 | 43 |
| 4 | | | 15 | 381 | 15⅝ | 397 | 10⅝ | 270 | | | 7½ | 191 | 7⅞ | 200 | | | 5 | 127 | 5⅞ | 135 | ¾ | ¾ | 190 | 86 |
| 6 | | | 20 | 508 | 21 | 533 | 13 | 330 | | | 10 | 254 | 10½ | 267 | | | 6 | 152 | 6½ | 165 | ¾ | ¾ | 320 | 145 |
| 8 | | | 25⅜ | 645 | 26⅜ | 670 | 16 | 406 | | | 12¾ | 324 | 13¼ | 337 | | | 8 | 203 | 8½ | 216 | 1 | 1 | 650 | 295 |
| 10 | | | 29¾ | 756 | 31⅞ | 791 | 17 | 430 | | | 14⅞ | 378 | 15⅞ | 395 | | | 8⅞ | 219 | 9⅞ | 237 | 1 | 1 | 940 | 426 |
| 12 | | | 34 | 864 | 35½ | 902 | 20⅞ | 530 | | | 17 | 432 | 17¾ | 451 | | | 13¾ | 349 | 14½ | 368 | 1 | 1¼ | 1500 | 680 |
| 14 | | | 39 | 991 | 40½ | 1029 | 24¼ | 616 | | | | | | | | | | | | | 1 | 1½ | 1675 | 760 |
| 16 | | | 41⅜ | 1051 | 43½ | 1105 | 25¼ | 640 | | | | | | | | | | | | | 1 | 2 | 3100 | 1406 |

Grooved End Dimensions

| Valve Size | Globe Grooved | | Cover To Center | | Angle Grooved | | Angle Grooved | | Port Size (npt) | Port Size (npt) | Shipping Weights* | |
|------------|---------------|-----|-----------------|-----|---------------|-----|---------------|-----|-----------------|-----------------|-------------------|------|
| | A | B | C | D | E | F | | | | | | |
| in. | in. | mm | in. | mm | in. | mm | in. | mm | in. | in. | lbs. | kgs. |
| 1¼ | 8½ | 216 | 5½ | 140 | 4¼ | 108 | ¾ | 83 | ¾ | ¼ | 25 | 11 |
| 1½ | 8½ | 216 | 5½ | 140 | 4¼ | 108 | ¾ | 83 | ¾ | ¼ | 25 | 11 |
| 2 | 9 | 229 | 6½ | 165 | 4¾ | 121 | ¾ | 83 | ¾ | ½ | 40 | 18 |
| 2½ | 11 | 279 | 7½ | 191 | 5½ | 140 | 4 | 102 | ½ | ½ | 65 | 29 |
| 3 | 12½ | 318 | 8¼ | 210 | 6 | 152 | 4¼ | 108 | ½ | ½ | 95 | 43 |
| 4 | 15 | 381 | 10⅝ | 270 | 7½ | 191 | 5 | 127 | ¾ | ¾ | 190 | 86 |
| 6 | 20 | 508 | 13⅜ | 340 | | | | | ¾ | ¾ | 320 | 145 |
| 8 | 25⅜ | 645 | 16 | 406 | | | | | 1 | 1 | 650 | 295 |

LEAD FREE*

Model LFCP15

Pressure Reducing Pilot

Size: 3/8" NPT

The Model LFCP-15 is a direct acting, diaphragm actuated Pilot that automatically reduces a higher upstream (inlet) pressure to a constant downstream (outlet) pressure. It is normally held open by the force of the adjustable spring setting above the diaphragm.

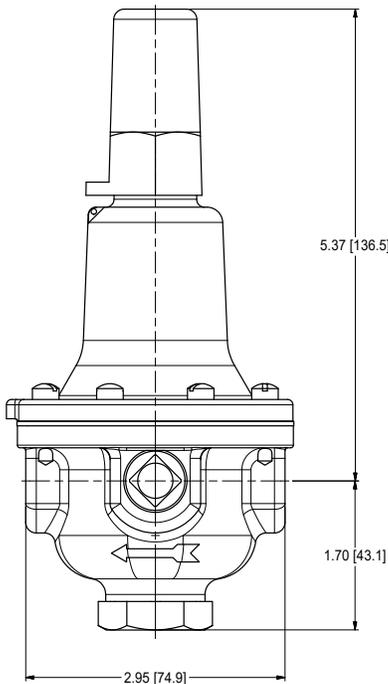
The Pilot modulates towards a closed position when outlet pressure exceeds the spring setpoint, lowering the delivery pressure. It modulates towards an open position when the outlet pressure falls below the spring setpoint, increasing the delivery pressure.

When a Model LFCP-15 is installed in the piping circuit of an Automatic Control Valve, its throttling action causes the Main Valve to throttle open or closed accordingly. Turning the adjustment screw clockwise raises the control setpoint, increasing main valve outlet pressure. Turning the adjustment screw counterclockwise lowers the control setpoint, decreasing Main Valve outlet pressure.

The Model LFCP-15 is equipped with one 3/8" NPT inlet and two outlet ports for ease of installation. The unused outlet port may be plugged or used as a pressure gauge connection.



Model LFCP15



Specifications

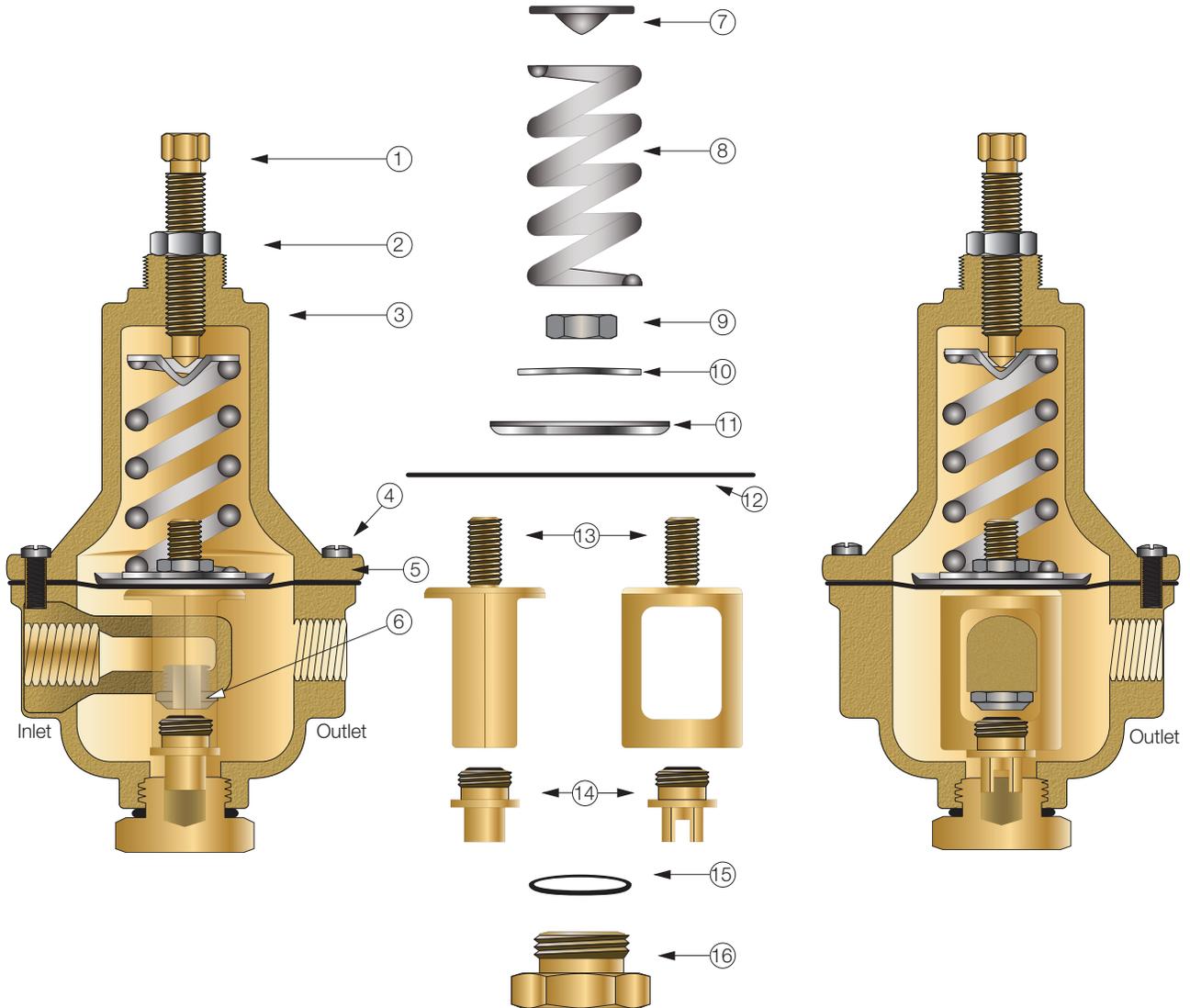
| | |
|-------------------------------|--|
| Body Material: | Lead Free Copper Silicon Alloy CF8M (316) Stainless Steel (optional) |
| Seat: | 316 Stainless Steel |
| Elastomers: | Buna-N (standard) Viton® (optional) EPDM (optional) |
| Inlet Pressure Rating: | 400psi (27.6 bar) maximum |
| Adjustment Range: | 30-300psi (2.1 - 20.7 bar) (standard) 2-30psi (0.15-2 bar) (optional) |

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.

Model LFCP15

Pressure Reducing Pilot



| Item | Description |
|------|-----------------------------|
| 1 | Adjusting Screw |
| 2 | Nut |
| 3 | Spring Housing |
| 4 | Cap Screw |
| 5 | Body |
| 6 | Seat |
| 7 | Spring Guide |
| 8 | Spring |
| 9 | Nut |
| 10 | Belleville Washer |
| 11 | Diaphragm Washer |
| 12 | Diaphragm* |
| 13 | Yoke |
| 14 | Disc and Retainer Assembly* |
| 15 | O-Ring* |
| 16 | Bottom Cap |

*Included in Repair Kit

LEAD FREE*

Model BV

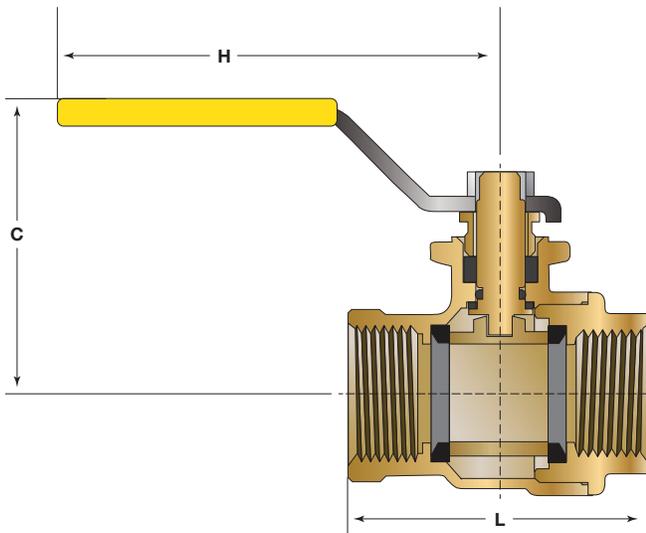
Ball Valve

Size: 1/4" - 1" NPT

Model BV Ball Valves are used in pilot lines to provide a positive shutoff in any override or maintenance situation for simple trouble shooting. This 2-piece, full port valve features: bottom loaded stems, PTFE seats and packing.



Lead Free Ball Valve



Specifications

Standard Material: Copper Silicon Alloy Body and Adaptor
Chrome Plated Ball

Optional Material: Stainless Steel Housing, Body and
Adaptor Stainless Steel Ball

Pressure Rating: 600psi (41 bar) Non Shock

Temp Rating: -40°F - 400°F

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

| Size | Dimensions | | | | | | Weight | |
|------|------------|----|--------|-----|--------|----|--------|-----|
| | C | | H | | L | | lbs. | kg. |
| in. | in. | mm | in. | mm | in. | mm | | |
| 1/4 | 1 13/16 | 46 | 3 7/16 | 87 | 1 3/4 | 45 | 0.4 | 0.2 |
| 3/8 | 1 13/16 | 46 | 3 7/16 | 87 | 1 3/4 | 45 | 0.4 | 0.2 |
| 1/2 | 1 13/16 | 46 | 3 7/16 | 87 | 1 5/16 | 50 | 0.4 | 0.2 |
| 3/4 | 2 1/4 | 57 | 4 | 101 | 2 9/16 | 59 | 0.8 | 0.3 |

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Model LF60

Flo-Clean Strainer

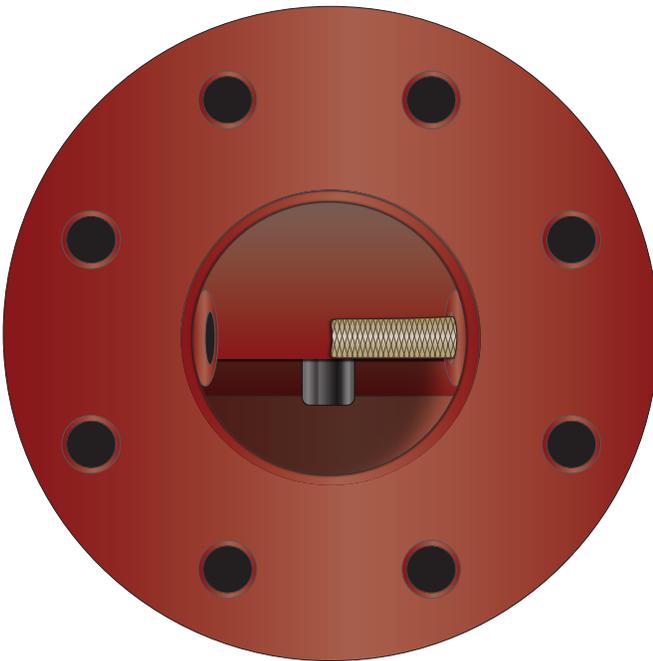
Size: 1/4" – 3/4" NPT

Model LF60 Flo-Clean Strainers are used to filter the fluid passing through the pilot circuit, and provide protection to pilot circuit speed controls and pilots. It is installed in the inlet body port of the Main Valve, exposing the strainer element to main line flow. The currents and flow across the screen create a self-scouring effect, cleaning the filter element.



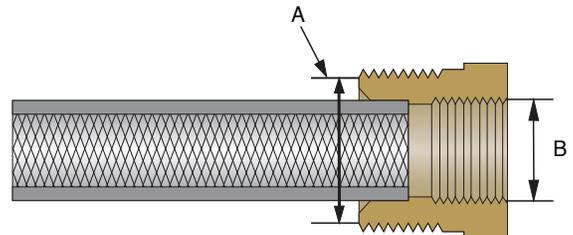
Model LF60

Valve inlet with Filter installed



Specifications

| | |
|-------------------------|--|
| Body Material: | Lead Free Brass (standard) Stainless Steel (optional) |
| Pressure Rating: | 400psi (27.6 bar) |
| Filter Element: | Monel |
| Screen Mesh: | 40 Mesh (standard) |



| A | B |
|------------------|--------------------|
| Male Pipe Thread | Female Pipe Thread |
| in. | in. |
| 1/4 | 1/8 |
| 3/8 | 1/4 |
| 1/2 | 3/8 |

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

LEAD FREE*

Model LF60-1

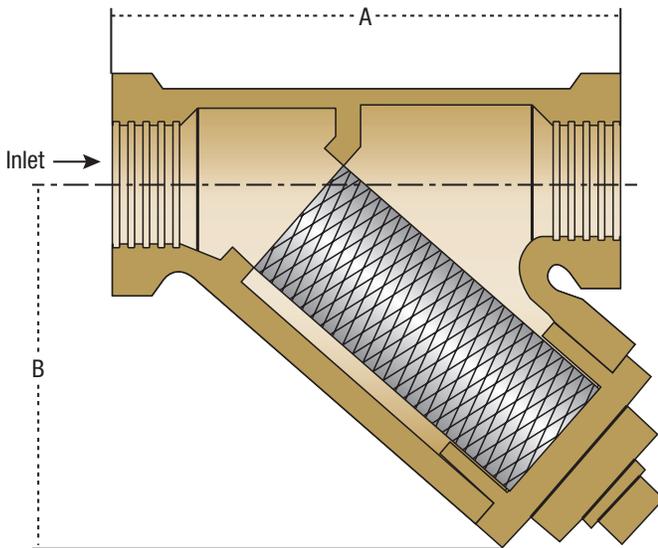
Y-Pattern Strainer

Size: 1/4" – 3/4" NPT

Model LF60-1 Y-Pattern Strainers are used to filter the fluid passing through the pilot circuit, and provide protection to pilot circuit speed controls and pilots. The filter element can be accessed for cleaning by removing the clean-out cap, or may be cleaned by installing an optional "blow-down" ball valve.



Model LF60-1



Specifications

- Body Material:** Lead Free Copper Silicon Alloy
CF8M (316) Stainless Steel (optional)
- Retainer Cap:** Lead Free Copper Silicon Alloy
- Cap Gasket:** EPDM
- Pressure Rating:** 400psi (27.6 bar)
- Filter Element:** 304 Stainless Steel
- Mesh Options:** 60 Mesh (standard)
100 Mesh (optional)

Dimensions

| SIZE | DIMENSIONS | | | | WEIGHT | |
|------|------------|----|--------|----|--------|------|
| | A | | B | | lbs. | kgs. |
| in. | in | mm | in | mm | | |
| 1/4 | 2 1/16 | 68 | 1 1/16 | 43 | 1.7 | 0.77 |
| 3/8 | 2 1/16 | 68 | 1 1/16 | 43 | 1.7 | 0.77 |
| 1/2 | 3 | 76 | 2 | 51 | 1.7 | 0.77 |
| 3/4 | 3 5/16 | 84 | 2 5/16 | 59 | 1.7 | 0.77 |

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LEAD FREE*

Model LFFC

Flow Control

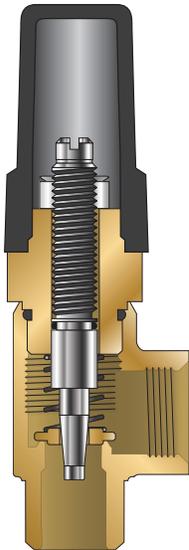
Size: 1/2" NPT

A Flow Control is an adjustable device used for tuning valve performance. It can be installed to either control the opening or closing the speed of the automatic control main valve. When the flow is in the direction of the needle the flow control is an adjustable restriction. In the free flow direction the seat moves out of the flow path to all unrestricted flow.

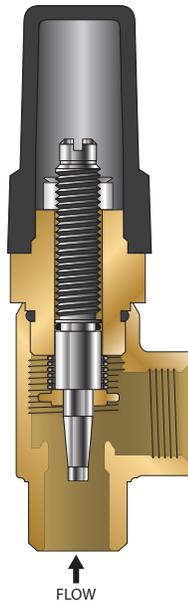


Model LFFC

CLOSED
Fluid Speed
Controlled by Needle



OPEN
Free Flow
Seat Full Open



Specifications

| | |
|-----------------------|---|
| Size: | 1/2" NPT |
| Body Material: | Lead Free Brass Stainless Steel (optional) |
| Seat: | Lead Free Brass |
| Needle: | Stainless Steel (304) |
| Elastomers: | Buna-N (standard) |

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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

Dimensions

| Valve Size (in) | Dimension (in) |
|-----------------|----------------|
| 1¼ - 1½ | 7¾ |
| 2 | 4¾ |
| 2½ | 4¾ |
| 3 | 4¾ |
| 4 | 5 |
| 6 | 5 |
| 8 | 5¾ |
| 10 | 5¾ |
| 12 | 7¼ |
| 14 | 7¼ |
| 16 | 7¼ |
| 18* | 7¼ |
| 20* | 7¼ |
| 24* | 7¼ |

*Reduced Port



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

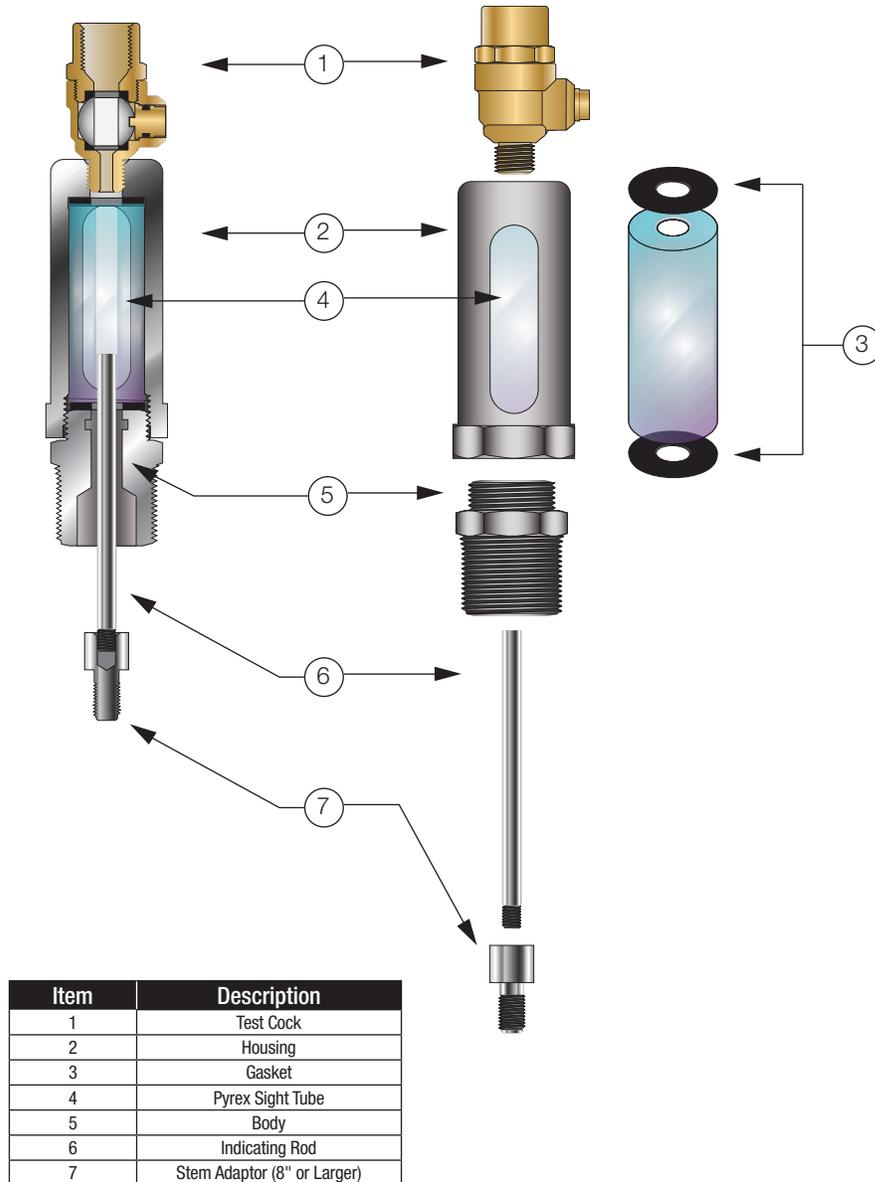
Pressure Rating:

400psi (27.6 bar)

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

Model 50

Position Indicator



LEAD FREE*

Model 51

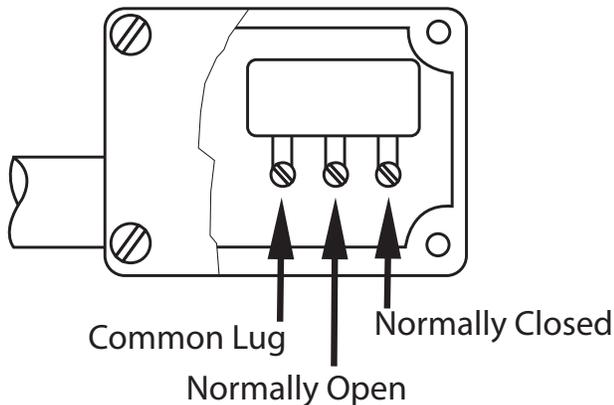
Single Limit Switch

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

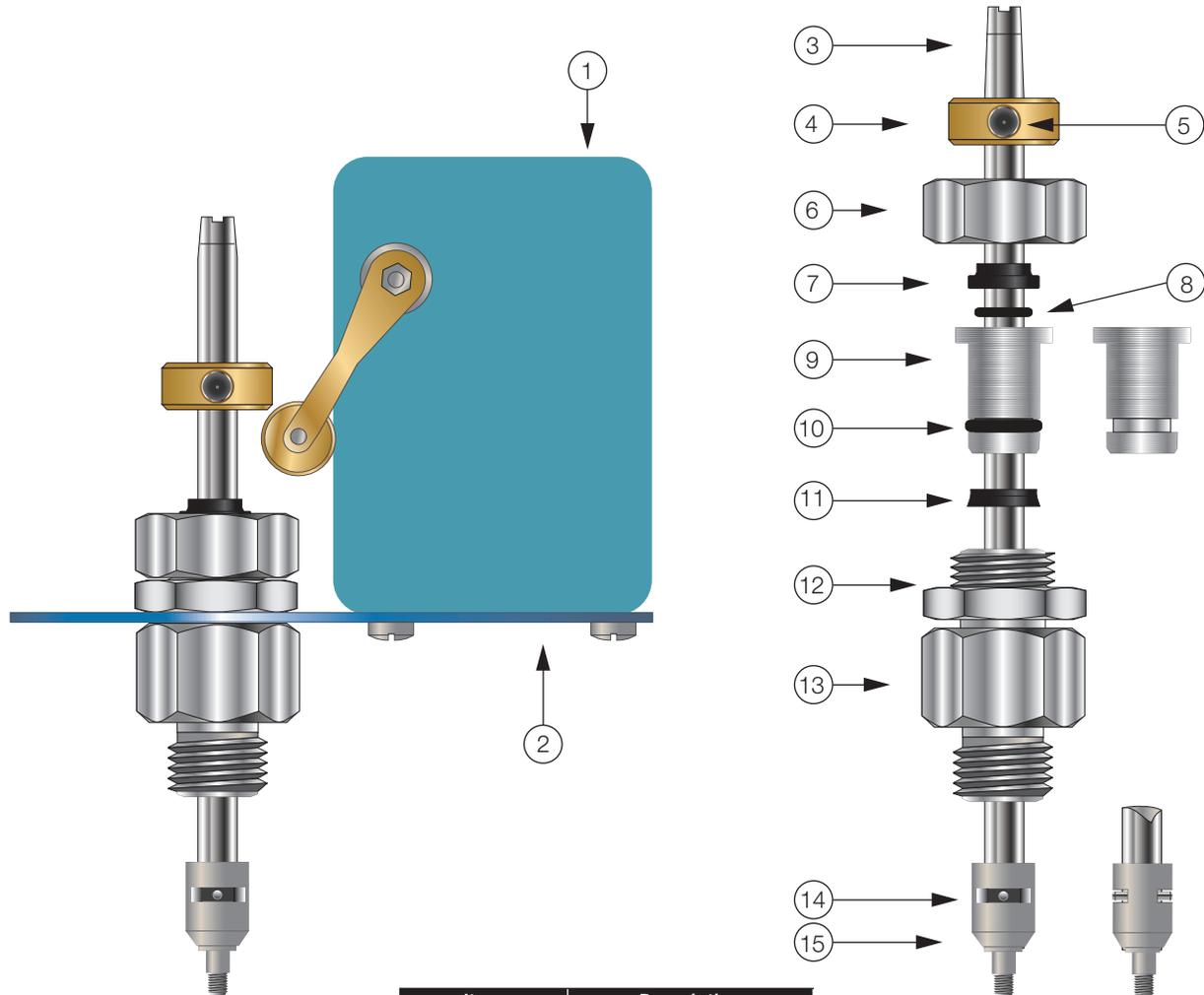
- Body Material:** Stainless Steel
- Elastomers:** Buna-N (standard)
EPDM (optional)
Viton® (optional)
- Enclosure:** NEMA 1, 3, 4 and 13 General Purpose (standard)
NEMA 1,7 and 9 Explosion Proof (optional)
- Electrical:** Form C SPDT Switch
15 amp. 125, 250 or 480 VAC
½ amp. 125 VDC
¼ amp. 250 VDC
½"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

Viton® is a registered trademark of DuPont Dow Elastomers.

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Model 51

Single Limit Switch



| 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



USA: T: (978) 689-6066 • F: (978) 975-8350 • Watts.com
 Canada: T: (888) 208-8927 • F: (905) 332-7068 • Watts.ca
 Latin America: T: (52) 55-4122-0138 • Watts.com