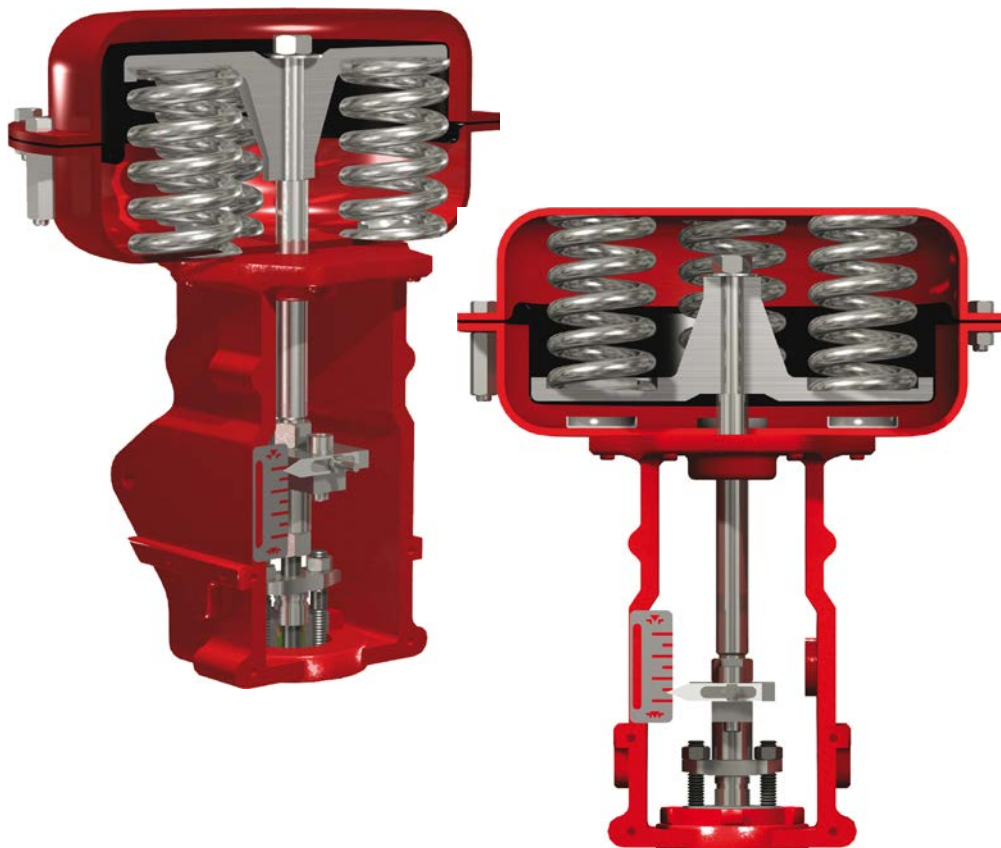


Masoneilan™ 87/88 Series Actuators

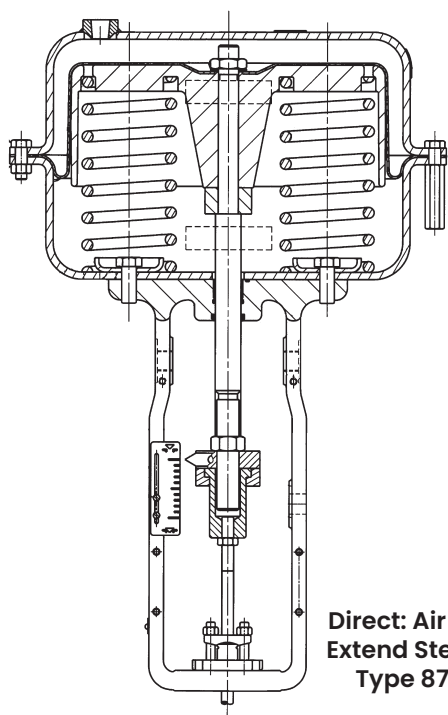
Pneumatic Multi-Spring Diaphragm Actuators



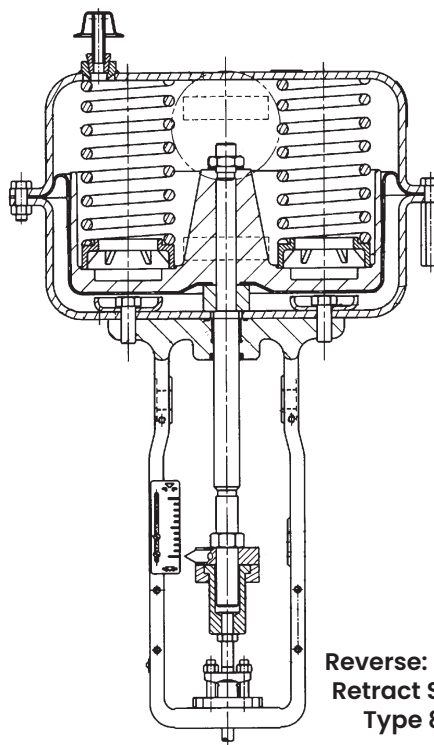
Numbering System

| | |
|-----|-----|
| 1st | 2nd |
| 8 | |

| |
|-----------------|
| Actuator Type |
| 87 Air to Close |
| 88 Air to Open |

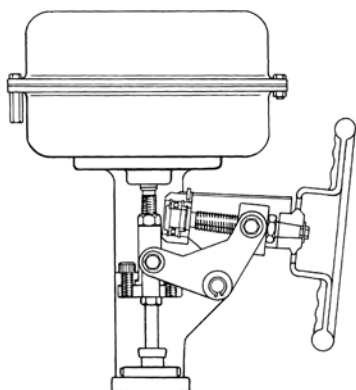


Direct: Air to Extend Stem
Type 87



Reverse: Air to Retract Stem
Type 88

Handwheel



| Actuator Size | Maximum Travel | | Equivalent Air Supply | | Number of Turns |
|---------------|----------------|-----|-----------------------|-----|-----------------|
| | Inches | mm | psi | bar | |
| 6 | 0.8 | 20 | 60 | 4.1 | 5 |
| 10 | 1.5 | 38 | 60 | 4.1 | 9 |
| 16 | 2.5 | 63 | 60 | 4.1 | 17 |
| 23 | 2.5 | 63 | 60 | 4.1 | 25 |
| 23L | 4.0 | 102 | 60 | 4.1 | 440 |

Specifications

| Actuator Size | Diaphragm Effective Area | | Stem Travel | | Max Supply | |
|---------------|--------------------------|---------|-----------------------|-------------------|------------|-----|
| | sq. in. | sq. cm. | inches | mm | psi | bar |
| 6 | 60 | 387 | 0.8 | 20 | 60 | 4.1 |
| 10 | 100 | 645 | 0.8 / 1.5 | 20 / 38 | 60 | 4.1 |
| 16 | 160 | 1032 | 0.8 / 1.5 / 2.0 / 2.5 | 20 / 38 / 50 / 63 | 60 | 4.1 |
| 23 | 230 | 1484 | 0.8 / 1.5 / 2.0 / 2.5 | 20 / 38 / 50 / 63 | 60 | 4.1 |
| 23L | 230 | 1484 | 3.0 / 3.5 / 4.0 | 76 / 89 / 102 | 60 | 4.1 |

Alternate Design Temperature Ranges

| Standard Temperature Range | | | | Extended Temperature Range | | | | Ultra-Low Temperature Range | | | |
|----------------------------|-----|----------|-------|----------------------------|-----|----------|-----|-----------------------------|-----|----------|-----|
| Min Temp | | Max Temp | | Min Temp | | Max Temp | | Min Temp | | Max Temp | |
| °C | °F | °C | °F | °C | °F | °C | °F | °C | °F | °C | °F |
| -30 | -22 | 83 | 181.4 | -40 | -40 | 100 | 212 | -50 | -58 | 100 | 212 |

Note: See Materials Table for Alternative Substitutions

Standard Springs

Actuator Size 6, 10, 16, and 23

| Spring Type | Spring Qty | Placement |
|-------------|------------|-------------|
| 3-15 | 3 | Lower Level |
| 6-30 | 6 | Lower Level |
| 11-23 | 3 | Upper Level |
| 21-45 | 6 | Upper Level |

Actuator Size 23L

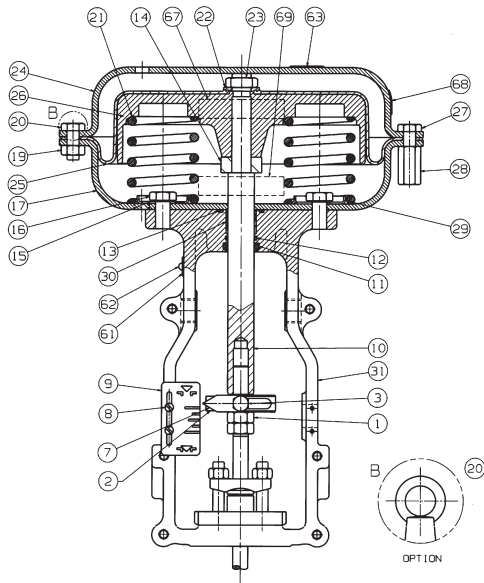
| Actuator Model | Stem Travel | | Spring Type | Spring Qty | Placement |
|----------------|-------------|-----|-------------|-------------|-------------|
| | Inches | mm | | | |
| 87 | 4 | 102 | 3-15 | 3 | Lower Level |
| | | | 6-30 | 6 | Lower Level |
| | | | 11-23 | 3 | Upper Level |
| | | | 21-45 | 6 | Upper Level |
| | 3.5 | 89 | 6-27 | 6 | Lower Level |
| | 3 | 76 | 6-24 | 6 | Lower Level |
| 88 | 4 | 102 | 3-15 | 3 | Lower Level |
| | | | 6-30 | 6 | Lower Level |
| | | | 11-23 | 3 | Upper Level |
| | | | 21-45 | 6 | Upper Level |
| | 3.5 | 89 | 9-30 | 6 | Lower Level |
| | | | 24-45 | 6 | Upper Level |
| | 3 | 76 | 12-30 | 6 | Lower Level |
| 27-45 | | | 6 | Upper Level | |

Air Connections

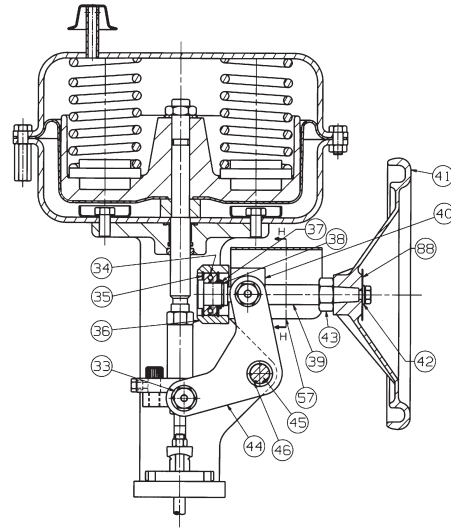
Standard: 1/4" NPT - Size 6, 10 1/2" NPT - Size 16, 23

Optional: 1/2" NPT - Size 6, 10

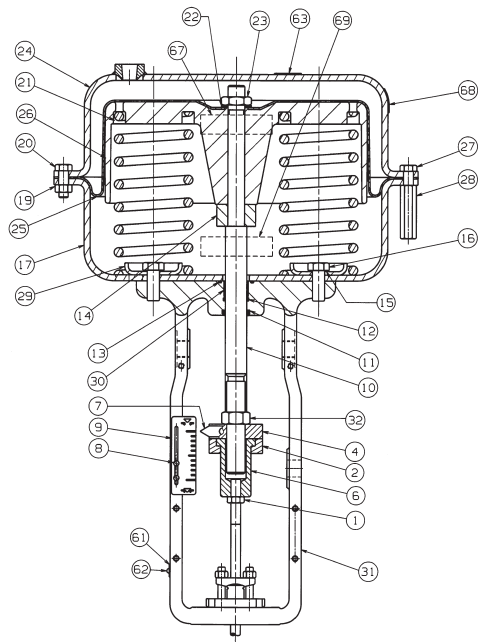
Materials



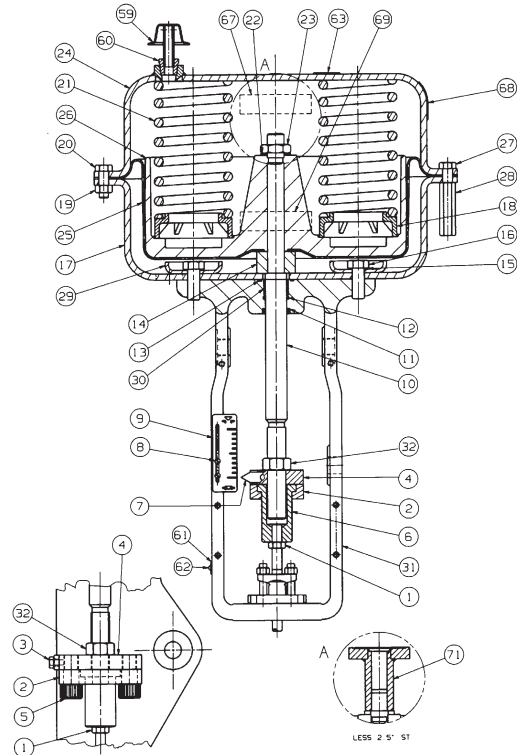
Size 6 Actuator



**Size 10 Actuator
with Optional Handwheel**

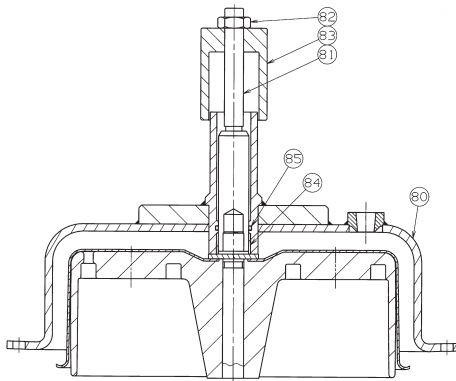


**Size 16 Actuator Air to Close
(Model 87)**

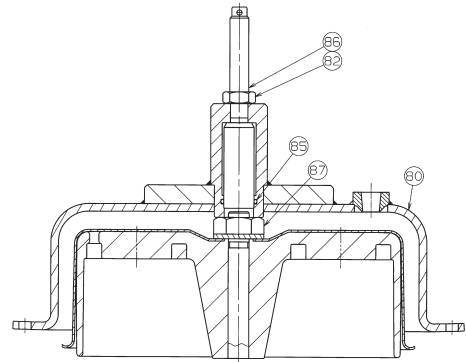


**Size 16 Actuator Air to Open
(Model 88)**

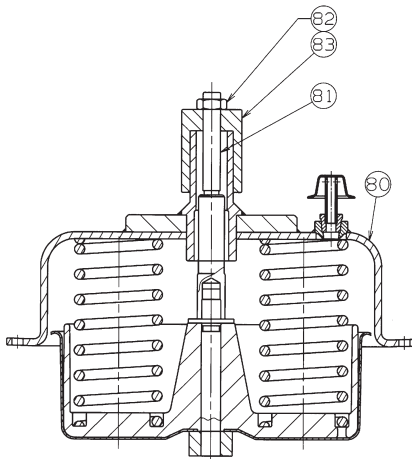
Materials



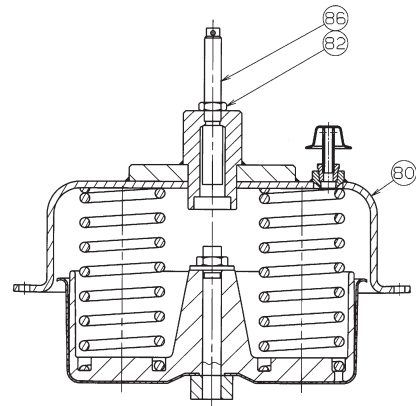
Model 87 - Down Stop
Optional Adjustable Limit Stop



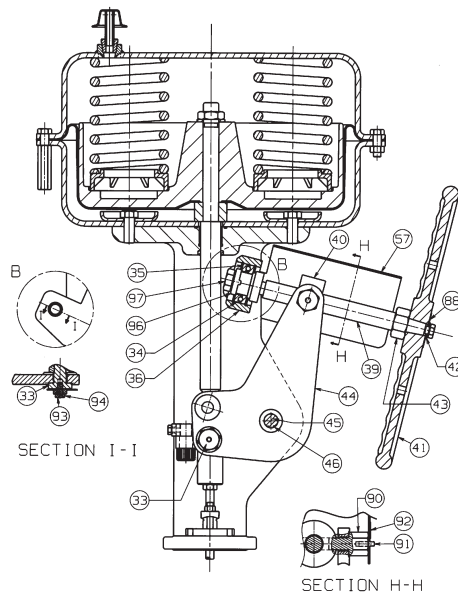
Model 87 - Up Stop
Optional Adjustable Limit Stop



Model 88 - Down Stop
Optional Adjustable Limit Stop



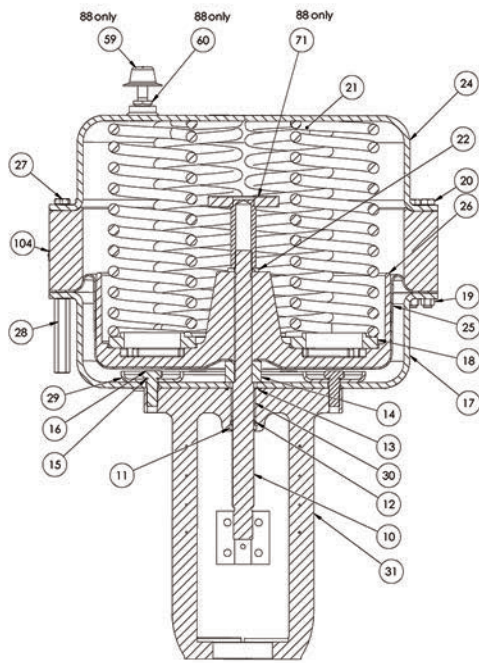
Model 88 - Up Stop
Optional Adjustable Limit Stop



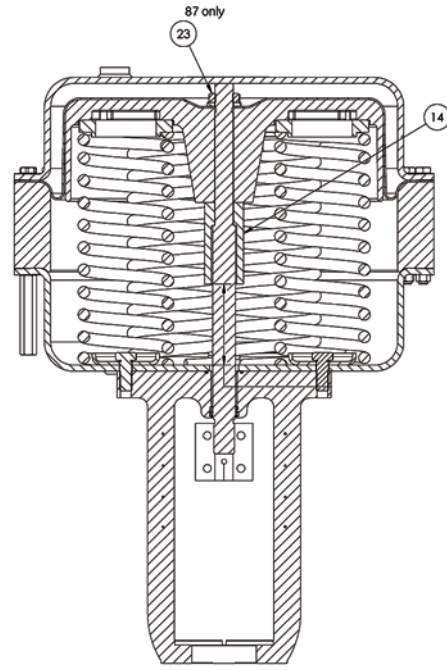
Size 23 Actuator with Optional Handwheel

Materials

Size 23L Without Optional Handwheel

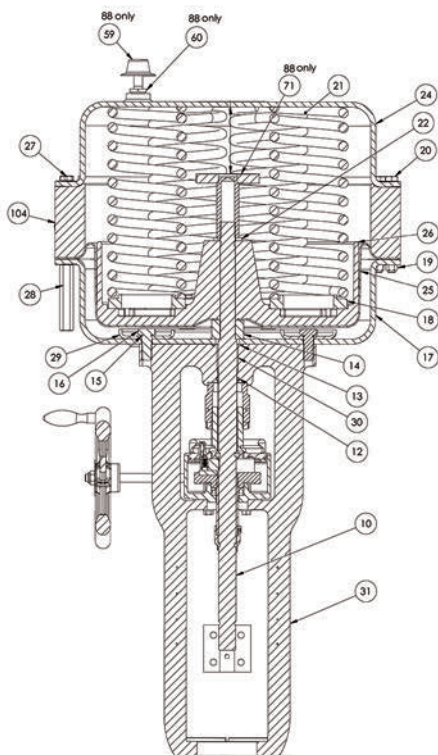


Model 88

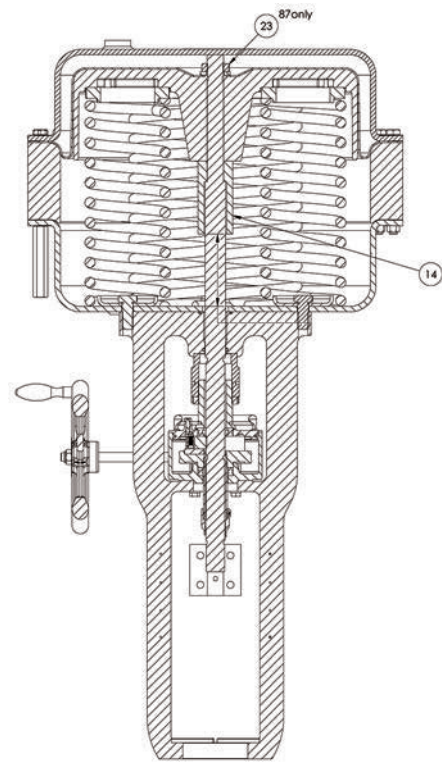


Model 87

With Optional Handwheel



Model 88



Model 87

Materials

Parts Reference for Actuator Sizes 6, 10, 16, 23 and 23L

| Ref No. | Description | Standard Temp Range Material | Extended Temp Range Material ⁽³⁾ | Ultra-Low Temp Range Material ⁽³⁾ |
|---------|-----------------------|------------------------------|---|---|
| 1 | Lock Nut | Carbon Steel | (2) | (2) |
| 2 | Stem Connector-Bottom | Carbon Steel, Zinc Plate | (2) | (2) |
| 3 | Cap Screw-Pointer | Carbon Steel | (2) | (2) |
| 4 | Stem Connector-Top | Carbon Steel, Zinc Plate | (2) | (2) |
| 5 | Cap Screw-Connector | Carbon Steel | (2) | ASTM A193 Cr B8 Cl 2 ⁽¹⁾ |
| 6 | Connector Insert | Carbon Steel, Zinc Plate | (2) | (2) |
| 7 | Pointer | Stainless Steel | (2) | (2) |
| 8 | Screw-Pan Head | Carbon Steel | (2) | (2) |
| 9 | Scale-Travel | Stainless Steel | (2) | (2) |
| 10 | Actuator Stem | Stainless Steel | (2) | (2) |
| 10a | Actuator Stem | Stainless Steel | (2) | (2) |
| 11 | Stem Wiper | Polyurethane | (2) | (2) |
| 12 | O-ring | Buna-N | Silicone ⁽¹⁾ | Silicone ⁽¹⁾ |
| 13 | O-ring | Buna-N | Silicone ⁽¹⁾ | Silicone ⁽¹⁾ |
| 14 | Spacer | Carbon Steel, Zinc Plate | (2) | (2) |
| 15 | Seal Washer | Steel & Rubber | (2) | (2) |
| 16 | Cap Screw-Yoke | Carbon Steel | (2) | (2) |
| 17 | Lower Diaphragm Case | Carbon Steel | (2) | (2) |
| 18 | Spring Spacer | Carbon Steel | (2) | (2) |
| 19 | Hex Nut | Carbon Steel | (2) | (2) |
| 20 | Cap Screw-Hex Head | Carbon Steel | (2) | (2) |
| 21 | Spring | Carbon Steel | (2) | (2) |
| 22 | Washer Flat | Carbon Steel | (2) | (2) |
| 23 | Nut-Jam | Carbon Steel | (2) | (2) |
| 24 | Upper Diaphragm Case | Carbon Steel | (2) | (2) |
| 25 | Diaphragm | Buna-N/Polyester | Silicone Rubber with Dacron Fabric ⁽¹⁾ | Silicone Rubber with Dacron Fabric ⁽¹⁾ |
| 26 | Diaphragm Plate | Aluminum Alloys | (2) | (2) |
| 27 | Cap Screw-Comp | Carbon Steel | (2) | (2) |
| 28 | Compression Nut | Carbon Steel | (2) | (2) |
| 29 | Spring Guide | Carbon Steel | (2) | (2) |
| 30 | Bushing | PTFE/Steel | (2) | (2) |
| 31 | Yoke | Cast Iron | ASTM A352 Gr. LCC Hrc 22 Max ⁽¹⁾ | ASTM A352 Gr. LC1 Hrc 22 Max ⁽¹⁾ |
| 32 | Lock Nut | Carbon Steel | (2) | (2) |
| 33 | Pivot Pin | Carbon Steel, Zinc Plate | (2) | (2) |
| 34 | Thrust Bearing | Carbon Steel | (2) | (2) |
| 36 | HW Pivot | Carbon Steel | (2) | (2) |
| 37 | Bearing Ring | Carbon Steel | (2) | (2) |
| 38 | Retaining Ring | Carbon Steel | (2) | (2) |

1. Alternative Materials
2. Same as Standard
3. Refer to Alternative Temperature Range under Specifications on page 3 for full range details.

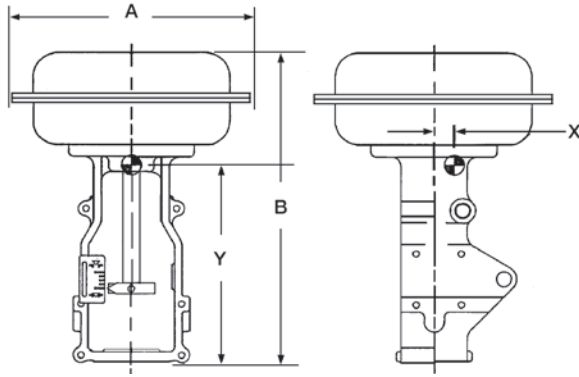
Materials (Cont.)

Parts Reference for Actuator Sizes 6, 10, 16, 23 and 23L

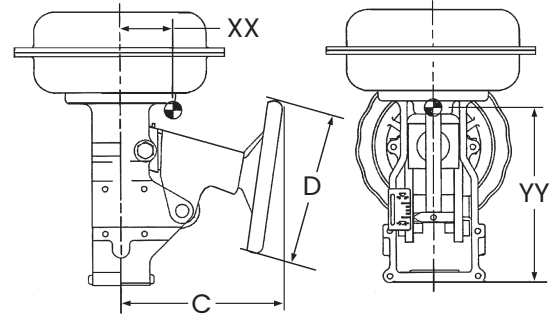
| Ref No. | Description | Standard Temp Range Material | Extended Temp Range Material ⁽³⁾ | Ultra-Low Temp Range Material ⁽³⁾ |
|---------|--------------------------|------------------------------|---|--|
| 39 | H/W Stem | Carbon Steel, Zinc Plate | (2) | (2) |
| 40 | Traveling Nut | Leaded Steel | (2) | (2) |
| 41 | Handwheel | Cast Iron | (2) | (2) |
| 42 | Washer-Flat | Carbon Steel | (2) | (2) |
| 43 | HW Limitation Nut | Carbon Steel, Zinc Plate | (2) | (2) |
| 44 | HW Lever | Carbon Steel | (2) | (2) |
| 45 | Lever Pin | Carbon Steel, Zinc Plate | (2) | (2) |
| 46 | Retaining Ring-Lever Pin | Carbon Steel | (2) | (2) |
| 57 | HW Cover | Carbon Steel | (2) | (2) |
| 59 | Vent Plug | Carbon Steel | (2) | (2) |
| 60 | Pipe Fitting | Carbon Steel, Zinc Plate | (2) | (2) |
| 63 | Information Label | Vinyl | (2) | (2) |
| 67 | Warning Label | Vinyl | (2) | (2) |
| 68 | Warning Label | Vinyl | (2) | (2) |
| 69 | Warning Label | Vinyl | (2) | (2) |
| 71 | Travel Stop | Carbon Steel, Zinc Plate | (2) | (2) |
| 80 | Upper Diaphragm Case | Carbon Steel | (2) | (2) |
| 81 | Stem Extension | Stainless Steel | (2) | (2) |
| 82 | Lock Nut | Stainless Steel | (2) | (2) |
| 83 | Limit Stop | Stainless Steel | (2) | (2) |
| 84 | Bushing | Steel/ PTFE Lined | (2) | (2) |
| 85 | O-ring | Buna-N | Silicone ⁽¹⁾ | Silicone ⁽¹⁾ |
| 86 | Stop | Stainless Steel | (2) | (2) |
| 87 | Stop | Carbon Steel | (2) | (2) |
| 88 | Plate-Rotation Arrow | Stainless Steel | (2) | (2) |
| 90 | Pivot Pin-HW Lock | Carbon Steel, Zinc Plate | (2) | (2) |
| 91 | Handwheel Lock Pin | Stainless Steel | (2) | (2) |
| 92 | Information Plate-HW | Vinyl | (2) | (2) |
| 93 | Cap Screw-Hex Head | Carbon Steel | (2) | (2) |
| 94 | Washer-Flat | Carbon Steel | (2) | (2) |
| 96 | End Flange | Carbon Steel, Zinc Plate | (2) | (2) |
| 97 | Cap Screw-HW Stem | Carbon Steel | (2) | (2) |
| 105 | Recessed Head Screw | Carbon Steel | (2) | (2) |
| 106 | Indicator Plate | Carbon Steel | (2) | (2) |
| 107 | Indicator Arm | Carbon Steel | (2) | (2) |
| 108 | Spring Lockwasher | Carbon Steel, Zinc Plate | (2) | (2) |
| 109 | Split Clamp | Carbon Steel | (2) | (2) |
| 110 | Hexagon Bolt | Carbon Steel, Zinc Plate | | |

1. Alternative Materials
2. Same as Standard
3. Refer to Alternative Temperature Range under Specifications on page 3 for full range details.

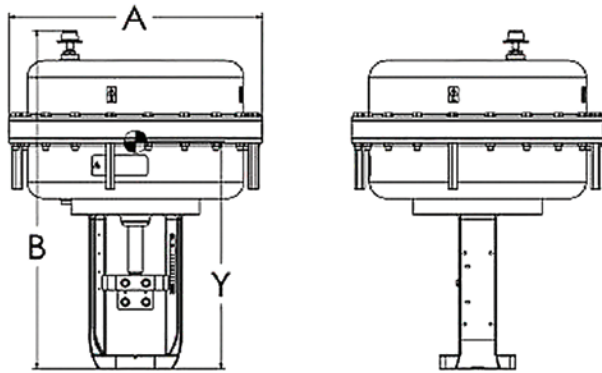
Dimensions and Weights (U.S.)



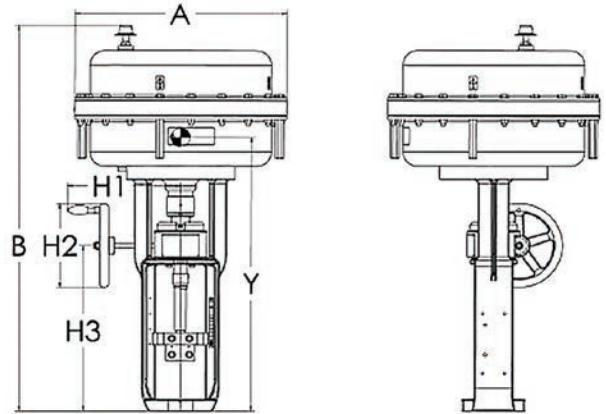
Shown without optional Handwheel



Shown with optional Handwheel



23L Shown without optional Handwheel



23L Shown with optional Handwheel

Dimensions and Weights

| Actuator Size | Spring Range | Actuator Dimensions (inches) | | | | H1 | H2 | H3 | Weights (lbs.) | |
|--------------------|--------------|------------------------------|---------------|-------|----|-------|-------|-------|----------------|-------------|
| | | A | B | C | D | | | | STD | W/HANDWHEEL |
| 6 | All | 11.89 | 15.55 (17.52) | 10 | 9 | - | - | - | 44 | 59.5 |
| 10 | All | 14.68 | 19.56 (21.53) | 10.90 | 12 | - | - | - | 86 | 105.8 |
| 16 | All | 18.74 | 28.22 (30.78) | 14 | 18 | - | - | - | 209 | 244.7 |
| 23 | All | 21.61 | 30.70 (33.26) | 16 | 18 | - | - | - | 264.5 | 319.6 |
| 23L ⁽¹⁾ | 3-15, 6-30 | 21.61 | 27.79 (30) | - | - | - | - | - | 374.8 | - |
| 23L ⁽¹⁾ | 11-23, 21-45 | 21.61 | 30.74 (32.95) | - | - | - | - | - | 507 | - |
| 23L ⁽²⁾ | 3-15, 6-30 | 21.61 | 38.54 (40.74) | - | - | 11.49 | 11.02 | 17.44 | - | 416.6 |
| 23L ⁽²⁾ | 11-23 | 21.61 | 41.49 (43.70) | - | - | 11.49 | 11.02 | 17.44 | - | 548.9 |
| 23L ⁽²⁾ | 21-45 | 26.81 | 56.57 (53.34) | - | - | - | - | - | - | 612.9 |

Actuator Removal Clearance = 6 inches

- 1. Without handwheel
- 2. With handwheel

Center of Gravity (inches)

Without Handwheel

| Size | X | Y |
|--------------------|-----|------|
| 6 | 0.2 | 9.8 |
| 10 | 0.0 | 12.9 |
| 16 | 0.1 | 18.5 |
| 23 | 0.1 | 21.1 |
| 23L ⁽³⁾ | 0.0 | 20.1 |
| 23L ⁽⁴⁾ | 0.0 | 21.9 |

With Handwheel

| Size | XX | YY |
|--------------------|-----|------|
| 6 | 1.3 | 9.1 |
| 10 | 0.9 | 12.0 |
| 16 | 1.4 | 16.7 |
| 23 | 1.4 | 19.0 |
| 23L ⁽³⁾ | 0.0 | 28.9 |
| 23L ⁽⁴⁾ | 0.0 | 30.7 |

- 3. Nominal spring ranges 3-15 & 6-30
- 4. Nominal spring ranges 11-23 & 21-45

Dimensions and Weights (U.S.)

Limit Stops (inches)

Up Stop

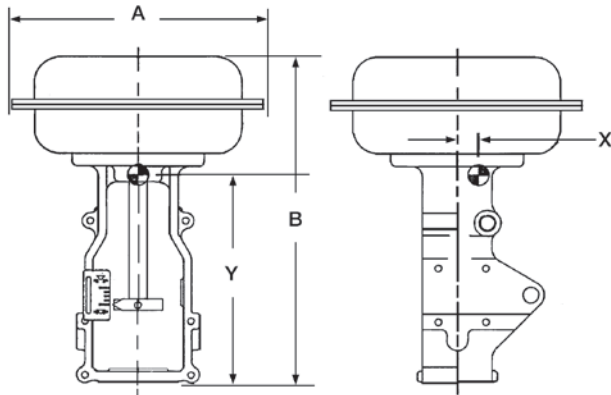
| Size | Spring Range | Model | Overall Height B |
|------------------|--------------|-------|------------------|
| 6 | All | 87 | 19.5 |
| 10 | All | | 25.4 |
| 16 | All | | 36.4 |
| 23 | All | | 38.8 |
| 23L ¹ | 3-15, 6-30 | | 38.4 |
| 23L ¹ | 11-23, 21-45 | | 41.3 |
| 23L ² | 3-15, 6-30 | | 49.1 |
| 23L ² | 11-23, 21-45 | | 52.1 |
| 6 | All | 88 | 19.2 |
| 10 | All | | 25.1 |
| 16 | All | | 35.5 |
| 23 | All | | 35.5 |
| 23L ¹ | 3-15, 6-30 | | 38.4 |
| 23L ¹ | 11-23, 21-45 | | 41.3 |
| 23L ² | 3-15, 6-30 | | 49.1 |
| 23L ² | 11-23, 21-45 | | 52.1 |

Down Stop

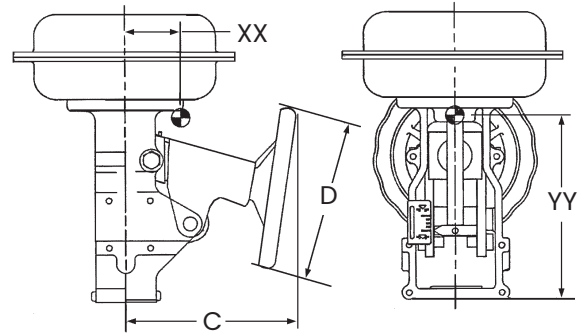
| Size | Spring Range | Model | Overall Height B |
|------------------|--------------|-------|------------------|
| 6 | All | 87 | 19.8 |
| 10 | All | | 26.0 |
| 16 | All | | 37.2 |
| 23 | All | | 39.9 |
| 23L ¹ | 3-15, 6-30 | | 39.9 |
| 23L ¹ | 11-23, 21-45 | | 42.8 |
| 23L ² | 3-15, 6-30 | | 50.6 |
| 23L ² | 11-23, 21-45 | | 53.6 |
| 6 | All | 88 | 19.7 |
| 10 | All | | 25.9 |
| 16 | All | | 37.5 |
| 23 | All | | 40.3 |
| 23L ¹ | 3-15, 6-30 | | 39.9 |
| 23L ¹ | 11-23, 21-45 | | 42.8 |
| 23L ² | 3-15, 6-30 | | 50.6 |
| 23L ² | 11-23, 21-45 | | 53.6 |

1. Without Handwheel
2. With Handwheel

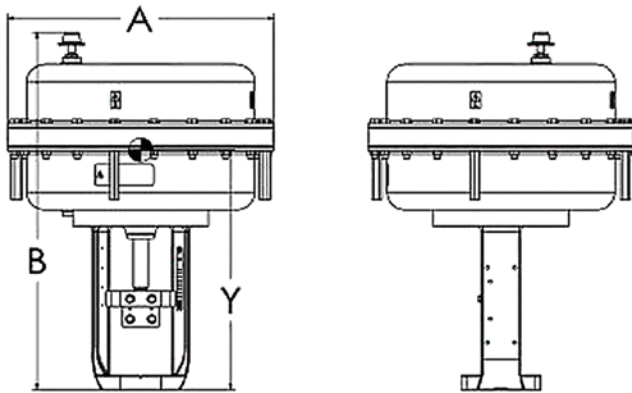
Dimensions and Weights (Metric)



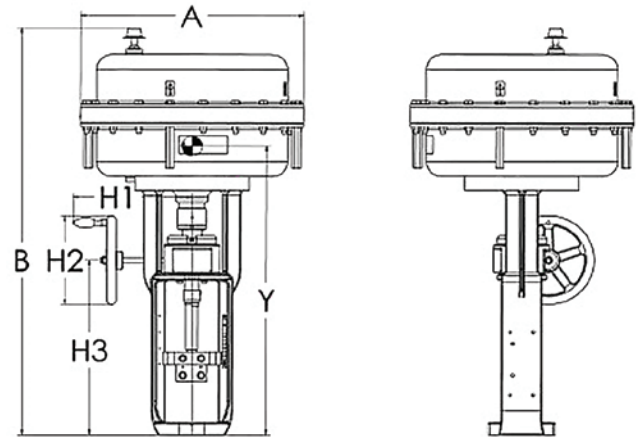
Shown without optional Handwheel



Shown with optional Handwheel



23L Shown without optional Handwheel



23L Shown with optional Handwheel

Dimensions and Weights

| Actuator Size | Spring Range | Actuator Dimensions (inches) | | | | H1 | H2 | H3 | Weights (lbs.) | |
|--------------------|--------------|------------------------------|-------------|-----|-----|-----|-----|-----|----------------|-------------|
| | | A | B | C | D | | | | STD | W/HANDWHEEL |
| 6 | All | 302 | 395 (445) | 254 | 229 | - | - | - | 20 | 27 |
| 10 | All | 373 | 497 (547) | 277 | 305 | - | - | - | 39 | 48 |
| 16 | All | 476 | 717 (782) | 356 | 457 | - | - | - | 95 | 111 |
| 23 | All | 549 | 780 (845) | 406 | 457 | - | - | - | 120 | 145 |
| 23L ⁽¹⁾ | 3-15, 6-30 | 549 | 706 (762) | - | - | - | - | - | 170 | - |
| 23L ⁽¹⁾ | 11-23, 21-45 | 549 | 781 (837) | - | - | - | - | - | 230 | - |
| 23L ⁽²⁾ | 3-15, 6-30 | 549 | 979 (1035) | - | - | 292 | 280 | 443 | - | 189 |
| 23L ⁽²⁾ | 11-23 | 549 | 1054 (1110) | - | - | 292 | 280 | 443 | - | 249 |
| 23L ⁽²⁾ | 21-45 | 681 | 1437 (1355) | - | - | - | - | - | - | 278 |

Actuator Removal Clearance = 6 inches

- 1. Without handwheel
- 2. With handwheel

Center of Gravity (mm)

Without Handwheel

| Size | X | Y |
|--------------------|---|-----|
| 6 | 5 | 248 |
| 10 | 0 | 327 |
| 16 | 3 | 470 |
| 23 | 2 | 537 |
| 23L ⁽³⁾ | 0 | 511 |
| 23L ⁽⁴⁾ | 0 | 557 |

With Handwheel

| Size | XX | YY |
|--------------------|----|-----|
| 6 | 32 | 232 |
| 10 | 22 | 305 |
| 16 | 35 | 425 |
| 23 | 35 | 483 |
| 23L ⁽³⁾ | 0 | 734 |
| 23L ⁽⁴⁾ | 0 | 780 |

3. Nominal spring ranges 3-15 & 6-30

4. Nominal spring ranges 11-23 & 21-45

Dimensions and Weights (Metric)

Limit Stops (mm)

Up Stop

| Size | Spring Range | Model | Overall Height B | |
|------------------|--------------|-------|------------------|-----|
| 6 | All | 87 | 494 | |
| 10 | All | | 646 | |
| 16 | All | | 925 | |
| 23 | All | | 987 | |
| 23L ¹ | 3-15, 6-30 | | 975 | |
| 23L ¹ | 11-23, 21-45 | | 1050 | |
| 23L ² | 3-15, 6-30 | | 1248 | |
| 23L ² | 11-23, 21-45 | | 1323 | |
| 6 | All | | 88 | 487 |
| 10 | All | | | 636 |
| 16 | All | 901 | | |
| 23 | All | 982 | | |
| 23L ¹ | 3-15, 6-30 | 975 | | |
| 23L ¹ | 11-23, 21-45 | 1050 | | |
| 23L ² | 3-15, 6-30 | 1248 | | |
| 23L ² | 11-23, 21-45 | 1323 | | |

1. Without Handwheel
2. With Handwheel

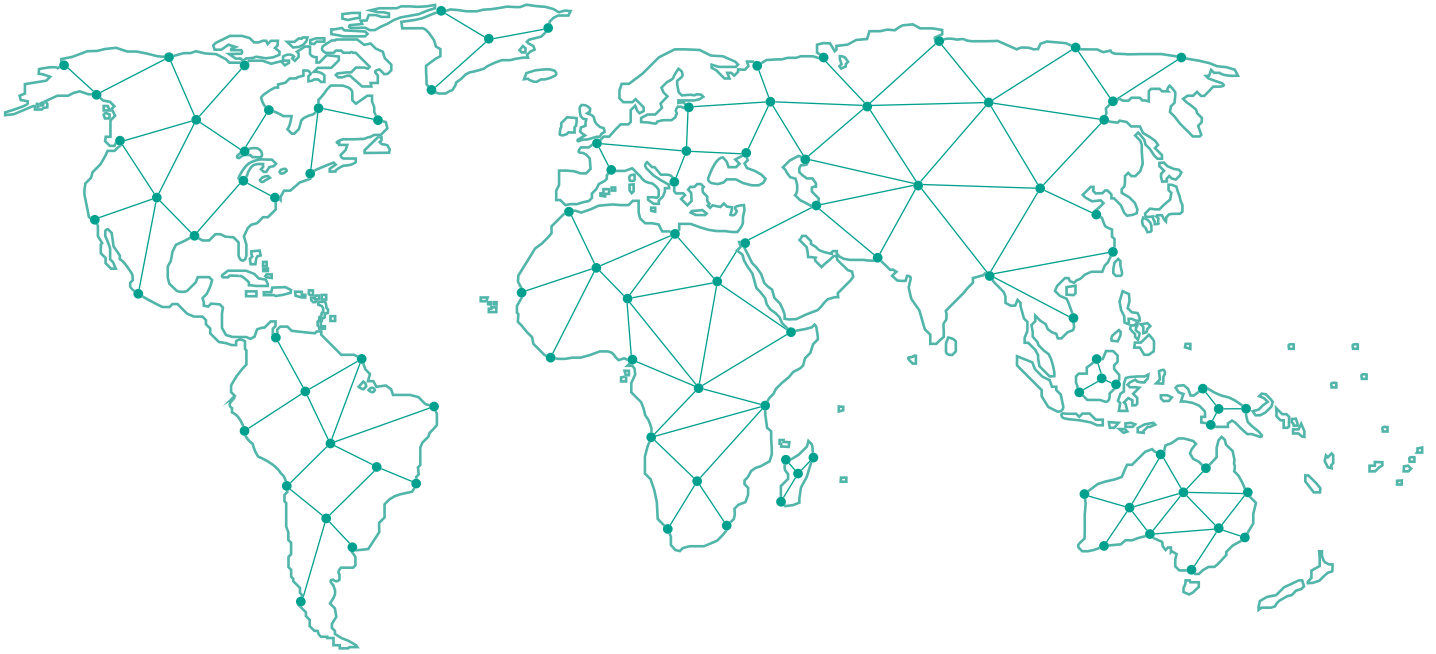
Down Stop

| Size | Spring Range | Model | Overall Height B | |
|------------------|--------------|-------|------------------|-----|
| 6 | All | 87 | 503 | |
| 10 | All | | 660 | |
| 16 | All | | 945 | |
| 23 | All | | 1014 | |
| 23L ¹ | 3-15, 6-30 | | 1013 | |
| 23L ¹ | 11-23, 21-45 | | 1088 | |
| 23L ² | 3-15, 6-30 | | 1286 | |
| 23L ² | 11-23, 21-45 | | 1361 | |
| 6 | All | | 88 | 501 |
| 10 | All | | | 657 |
| 16 | All | 952 | | |
| 23 | All | 1024 | | |
| 23L ¹ | 3-15, 6-30 | 1013 | | |
| 23L ¹ | 11-23, 21-45 | 1088 | | |
| 23L ² | 3-15, 6-30 | 1286 | | |
| 23L ² | 11-23, 21-45 | 1361 | | |

Notes:

Find the nearest local Channel Partner in your area:

valves.bakerhughes.com/contact-us



Tech Field Support & Warranty:

Phone: +1-866-827-5378

valvesupport@bakerhughes.com

valves.bakerhughes.com

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