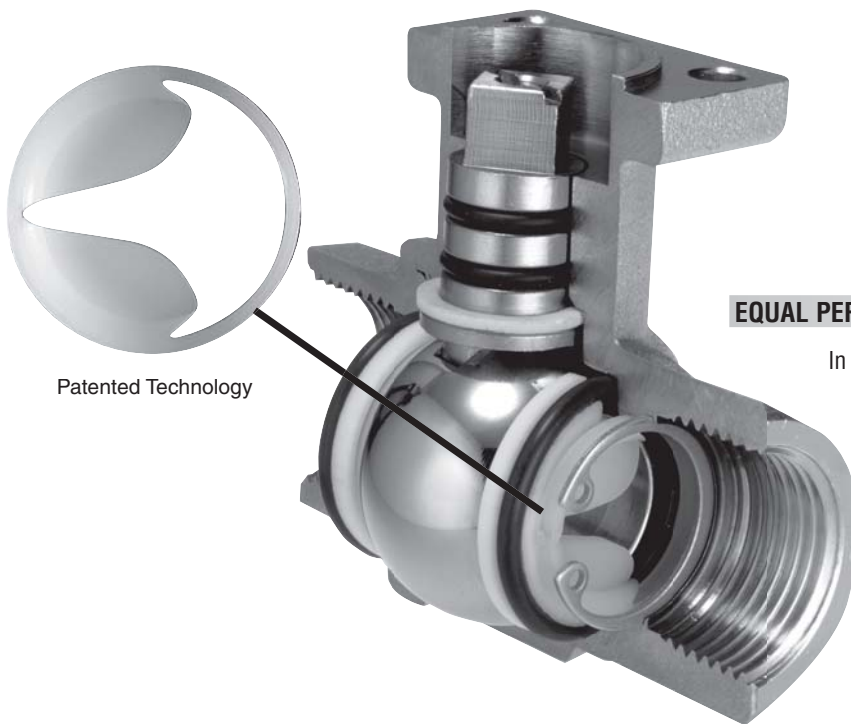


Features and Benefits



EQUAL PERCENTAGE VALVE CHARACTERISTIC

In order to ensure good stability of control, it is essential for a control valve to have an equal percentage characteristic. This type of characteristic produces a linear variation in thermal output according to the amount of opening of the valve (also known as the system characteristic). Under normal testing conditions a conventional ball valve exhibits an S-shaped characteristic. When it is installed in a real system, however, this characteristic is seriously deformed because, compared with its nominal size, a ball valve possesses an extremely high flow coefficient. Whether used with or without pipe reducers or a reduced bore, they do not normally allow stable regulation of the thermal capacity.

BENEFIT OF THE BELIMO CHARACTERIZING DISC

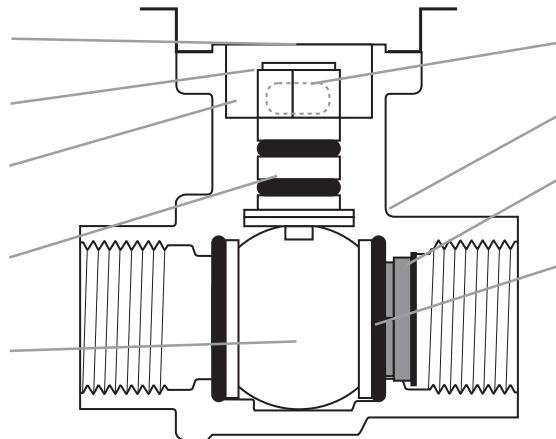
- Equal percentage flow characteristic.
- Excellent control stability assured with the characterizing disc.
- C_v values equal to C_v values of globe valves the same size.
- The need for multiple pipe reduction is usually eliminated.
- Better control prevents “hunting” of the control loop, increasing life span of actuator and valve.

Belimo’s unique Characterized Control Valve™ (CCV) is very different. A special characterizing disc inside the valve gives it an equal percentage characteristic which is comparable with that of a globe valve of the same nominal size. The flow (the C_v value) is reduced to the required value by a combination of the hole in the ball and the shaped aperture in the disc. The increase in flow as the valve is opened is very slow and controlled.

This produces better part-load behavior and improved stability of control while also optimizing energy consumption.

FEATURES

- Thermal isolating adapter between flange and actuator.
- Easy direct coupling of actuator with a single screw.
- Perpendicular mounting flange and square drive head eliminate lateral forces on the stem.
- Blow-out proof stem with thrust-bearing Teflon® disc and double O-ring design for long service life.*
- Non-corroding chrome-plated brass or stainless ball.



- Vent holes reduce condensation build-up.
- Forged brass valve body — no pin-hole leaks.
- Characterizing disc — made of Tefzel® known for excellent strength and chemical resistance.
- Teflon® seats with O-rings provide constant seating force against the ball and reduce torque requirement.
- Actuator can be mounted in four different positions.

* Designed for service life of over 100,000 full cycles.
Teflon® and Tefzel® are both registered trademarks of Dupont.

COORDINATED MOTORIZED OPERATION

The optimum functionality of the Belimo CCV is assured by properly coordinating its actuation with MFT. Specially developed rotary actuators provide the necessary precision for modulating, floating-point, and on/off methods of control.

All CCVs are supplied with the appropriate rotary actuator to provide the close-off and operation desired.

OPTIMIZED FOR CONTROL

The Belimo CCV marries known technology with an innovative development – the unique characterizing disc.

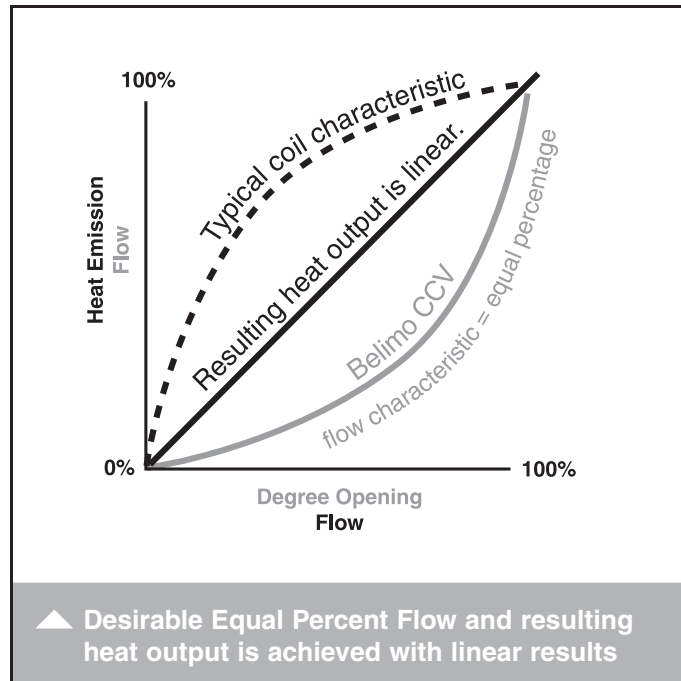
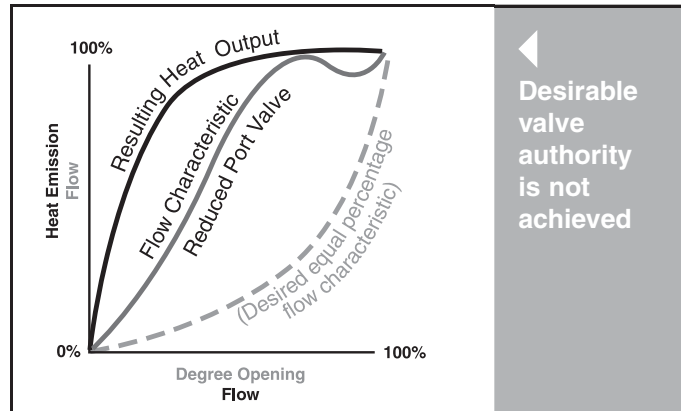
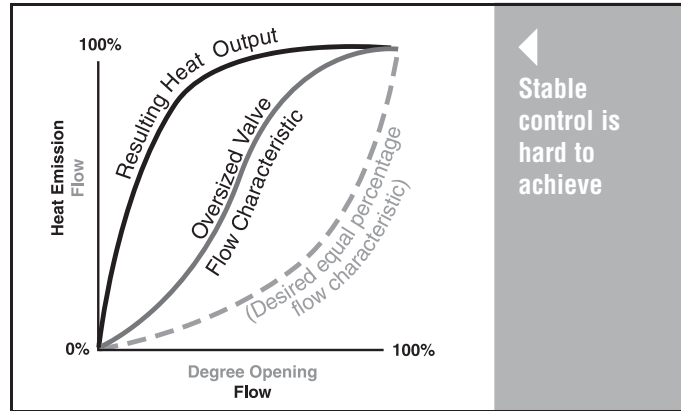
The marriage of CCV and MFT technologies has produced a range of valuable features which surpass the capabilities of globe valves at a very attractive price level:

- An equal-percentage valve characteristic
- Unlike a globe valve, no sudden change in inlet flow upon opening
- Excellent stability of control
- C_v values comparable with those of globe valves of the same size or larger
- Higher close-off ratings than standard globe valves
- 100% tight shut-off on two-way valves means NO leak-by unlike globe valves that have ANSI IV shutoff (leakage rate of 0.01% of the C_v rating)
- Three-way valve can be piped in mixing or diverting application

| | |
|----------------------------|---|
| B2 Series | Two-way ½" to 3" |
| B3 Series | Three-way ½" to 2" Mixing*/Diverting |
| B6 Series | Two-way Flanged 2½" to 6" |
| Service: | Chilled/hot water, 60% glycol |
| C_v Range | 0.3-240 |
| Material: | Stainless trim or Brass trim |
| Control: | On/Off, Floating, 2-10 VDC Multi-Function Technology® Spring Return or Non-Spring Return |

Mixing* (Not for use in change over applications)

Flow Characteristics of Conventional Ball Valves versus BELIMO CHARACTERIZED CONTROL VALVES



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2-Way Valve Flow Rate for Water Applications (Gallons Per Minute, GPM)

| C _v Maximum Rating | Inches | DN mm | 2-Way CCV | Pressure Drop Across the Valve | | | | | | | | | |
|-------------------------------------|--------|----------|--------------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| | | | | 1 psi | 2 psi | 3 psi | 4 psi | 5 psi | 6 psi | 7 psi | 8 psi | 9 psi | 10 psi |
| 0.3 | ½" | 15 | B207(B) | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.9 | 0.9 |
| 0.46 | ½" | 15 | B208(B) | 0.5 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| 0.8 | ½" | 15 | B209(B) | 0.8 | 1.1 | 1.4 | 1.6 | 1.8 | 2.0 | 2.1 | 2.3 | 2.4 | 2.5 |
| 1.2 | ½" | 15 | B210(B) | 1.2 | 1.7 | 2.1 | 2.4 | 2.8 | 2.9 | 3.2 | 3.4 | 3.6 | 3.8 |
| 1.9 | ½" | 15 | B211(B) | 1.9 | 2.7 | 3.3 | 3.8 | 4.2 | 4.7 | 5.0 | 5.4 | 5.7 | 6.0 |
| 3 | ½" | 15 | B212(B) | 3.0 | 4.2 | 5.2 | 6.0 | 6.8 | 7.3 | 7.9 | 8.5 | 9.0 | 9.5 |
| 4.7 | ½" | 15 | B213(B) | 4.7 | 6.6 | 8.1 | 9.4 | 11 | 12 | 12 | 13 | 14 | 15 |
| 7.4 | ½" | 15 | B214(B) | 7.4 | 10 | 13 | 15 | 17 | 18 | 20 | 21 | 22 | 23 |
| 10 | ½" | 15 | B215(B)* | 10 | 14 | 17 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| 14 | ½" | 15 | B216(B)* | 14 | 20 | 24 | 28 | 31 | 34 | 37 | 40 | 42 | 44 |
| 4.7 | ¾" | 20 | B217(B) | 4.7 | 6.6 | 8.1 | 9.4 | 11 | 12 | 12 | 13 | 14 | 15 |
| 7.4 | ¾" | 20 | B218(B) | 7.4 | 10 | 13 | 15 | 17 | 18 | 20 | 21 | 22 | 23 |
| 10 | ¾" | 20 | B219(B) | 10 | 14 | 17 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| 14 | ¾" | 20 | B220(B)* | 14 | 20 | 24 | 28 | 31 | 34 | 37 | 40 | 42 | 44 |
| 24 | ¾" | 20 | B221(B)* | 24 | 34 | 42 | 48 | 54 | 59 | 63 | 68 | 72 | 76 |
| 7.4 | 1" | 25 | B222 | 7.4 | 10 | 13 | 15 | 17 | 18 | 20 | 21 | 22 | 23 |
| 10 | 1" | 25 | B223 | 10 | 14 | 17 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| 19 | 1" | 25 | B224 | 19 | 27 | 33 | 38 | 42 | 47 | 50 | 54 | 57 | 60 |
| 30 | 1" | 25 | B225* | 30 | 42 | 52 | 60 | 67 | 73 | 79 | 85 | 90 | 95 |
| 10 | 1¼" | 32 | B229 | 10 | 14 | 17 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| 19 | 1¼" | 32 | B230* | 19 | 27 | 33 | 38 | 42 | 47 | 50 | 54 | 57 | 60 |
| 25 | 1¼" | 32 | B231 | 25 | 35 | 43 | 50 | 56 | 61 | 66 | 71 | 75 | 79 |
| 37 | 1¼" | 32 | B232* | 37 | 52 | 64 | 74 | 83 | 91 | 98 | 105 | 111 | 117 |
| 19 | 1½" | 40 | B238 | 19 | 27 | 33 | 38 | 42 | 47 | 50 | 54 | 57 | 60 |
| 29 | 1½" | 40 | B239 | 29 | 41 | 50 | 58 | 65 | 71 | 77 | 82 | 87 | 92 |
| 37 | 1½" | 40 | B240* | 37 | 52 | 64 | 74 | 83 | 91 | 98 | 105 | 111 | 117 |
| 29 | 2" | 50 | B248 | 29 | 41 | 50 | 58 | 65 | 71 | 77 | 82 | 87 | 92 |
| 46 | 2" | 50 | B249 | 46 | 65 | 80 | 92 | 103 | 113 | 122 | 130 | 138 | 145 |
| 57 | 2" | 50 | B250* | 57 | 81 | 99 | 114 | 127 | 140 | 151 | 161 | 171 | 180 |
| 65 | 2" | 50 | B251 | 65 | 92 | 113 | 130 | 145 | 159 | 170 | 194 | 195 | 206 |
| 85 | 2" | 50 | B252 | 85 | 120 | 147 | 170 | 190 | 208 | 225 | 240 | 255 | 269 |
| 120 | 2" | 50 | B253 | 120 | 170 | 208 | 240 | 268 | 294 | 318 | 339 | 360 | 380 |
| 240 | 2" | 50 | B254* | 240 | 339 | 416 | 480 | 537 | 588 | 635 | 679 | 720 | 759 |
| 60 | 2½" | 65 | B261 | 60 | 85 | 104 | 120 | 134 | 147 | 159 | 170 | 180 | 190 |
| 75 | 2½" | 65 | B262 | 75 | 106 | 130 | 150 | 168 | 194 | 198 | 212 | 225 | 237 |
| 110 | 2½" | 65 | B263 | 110 | 156 | 191 | 220 | 246 | 269 | 291 | 311 | 330 | 348 |
| 150 | 2½" | 65 | B264 | 150 | 212 | 260 | 300 | 335 | 367 | 397 | 424 | 450 | 474 |
| 210 | 2½" | 65 | B265* | 210 | 297 | 364 | 420 | 470 | 514 | 556 | 594 | 630 | 664 |
| 70 | 3" | 80 | B277 | 70 | 99 | 121 | 140 | 157 | 172 | 185 | 198 | 210 | 221 |
| 130 | 3" | 80 | B278 | 130 | 194 | 225 | 260 | 290 | 318 | 344 | 368 | 390 | 411 |
| 170 | 3" | 80 | B280* | 170 | 240 | 294 | 340 | 380 | 416 | 450 | 481 | 510 | 538 |
| 70 | 2½" | 65 | B6250S-070 | 70 | 99 | 121 | 140 | 157 | 171 | 185 | 198 | 210 | 221 |
| 110 | 2½" | 65 | B6250S-110 | 110 | 156 | 191 | 220 | 244 | 266 | 282 | 296 | 312 | 320 |
| 110 | 3" | 80 | B6300S-110 | 110 | 156 | 191 | 220 | 244 | 266 | 282 | 296 | 312 | 320 |
| 186 | 4" | 100 | B6400S-186 | 186 | 263 | 322 | 372 | 416 | 456 | 492 | 526 | 558 | 588 |
| 290 | 5" | 125 | B6500S-290 | 290 | 410 | 502 | 580 | 648 | 710 | 767 | 820 | 870 | 917 |
| 400 | 6" | 150 | B6600S-400 | 400 | 566 | 693 | 800 | 894 | 980 | 1058 | 1131 | 1200 | 1265 |

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$GPM = C_v \times \sqrt{\Delta p}$

*Models with no characterizing disc.

The influence of the pipe geometry due to reduced flow is negligible for all valves 57 C_v and below with characterizing discs.

3-Way Valve Flow Rate for Water Applications (Gallons Per Minute, GPM)

| C _v Maximum Rating | Inches | DN mm | 3-Way CCV | Pressure Drop Across the Valve | | | | | | | | | |
|-------------------------------------|--------|----------|--------------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| | | | | 1 psi | 2 psi | 3 psi | 4 psi | 5 psi | 6 psi | 7 psi | 8 psi | 9 psi | 10 psi |
| 0.3 | ½" | 15 | B307(B) | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.9 | 0.9 |
| 0.46 | ½" | 15 | B308(B) | 0.5 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| 0.8 | ½" | 15 | B309(B) | 0.8 | 1.1 | 1.4 | 1.6 | 1.8 | 2.0 | 2.1 | 2.3 | 2.4 | 2.5 |
| 1.2 | ½" | 15 | B310(B) | 1.2 | 1.7 | 2.1 | 2.4 | 2.8 | 2.9 | 3.2 | 3.4 | 3.6 | 3.8 |
| 1.9 | ½" | 15 | B311(B) | 1.9 | 2.7 | 3.3 | 3.8 | 4.2 | 4.7 | 5.0 | 5.4 | 5.7 | 6.0 |
| 3 | ½" | 15 | B312(B) | 3.0 | 4.2 | 5.2 | 6.0 | 6.8 | 7.3 | 7.9 | 8.5 | 9.0 | 9.5 |
| 4.7 | ½" | 15 | B313(B) | 4.7 | 6.6 | 8.1 | 9.4 | 11 | 12 | 12 | 13 | 14 | 15 |
| 10 | ½" | 15 | B315(B)* | 10 | 14 | 17 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| 14 | ½" | 15 | B316(B)* | 14 | 20 | 24 | 28 | 31 | 34 | 37 | 40 | 42 | 44 |
| 4.7 | ¾" | 20 | B317(B) | 4.7 | 6.6 | 8.1 | 9.4 | 11 | 12 | 12 | 13 | 14 | 15 |
| 7.4 | ¾" | 20 | B318(B) | 7.4 | 10 | 13 | 15 | 17 | 18 | 20 | 21 | 22 | 23 |
| 14 | ¾" | 20 | B320(B)* | 14 | 20 | 24 | 28 | 31 | 34 | 37 | 40 | 42 | 44 |
| 24 | ¾" | 20 | B321(B)* | 24 | 34 | 42 | 48 | 54 | 59 | 63 | 68 | 72 | 76 |
| 7.4 | 1" | 25 | B222 | 7.4 | 10 | 13 | 15 | 17 | 18 | 20 | 21 | 22 | 23 |
| 10 | 1" | 25 | B223 | 10 | 14 | 17 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| 30 | 1" | 25 | B325* | 30 | 42 | 52 | 60 | 67 | 73 | 79 | 85 | 90 | 95 |
| 10 | 1¼" | 32 | B329 | 10 | 14 | 17 | 20 | 22 | 25 | 27 | 28 | 30 | 32 |
| 19 | 1¼" | 32 | B330 | 19 | 27 | 33 | 38 | 43 | 47 | 50 | 54 | 57 | 60 |
| 25 | 1¼" | 32 | B331 | 25 | 35 | 43 | 50 | 56 | 61 | 66 | 71 | 75 | 79 |
| 19 | 1½" | 40 | B338 | 19 | 27 | 33 | 38 | 43 | 47 | 50 | 54 | 57 | 60 |
| 29 | 1½" | 40 | B339 | 29 | 41 | 50 | 58 | 65 | 71 | 77 | 82 | 87 | 92 |
| 37 | 1½" | 40 | B340 | 37 | 52 | 64 | 74 | 83 | 91 | 98 | 105 | 111 | 117 |
| 46 | 1½" | 40 | B341 | 46 | 65 | 80 | 92 | 103 | 113 | 122 | 130 | 138 | 146 |
| 29 | 2" | 50 | B347 | 29 | 41 | 50 | 58 | 65 | 71 | 77 | 82 | 87 | 92 |
| 37 | 2" | 50 | B348 | 37 | 52 | 64 | 74 | 83 | 91 | 98 | 105 | 111 | 117 |
| 46 | 2" | 50 | B349 | 46 | 65 | 80 | 92 | 103 | 113 | 122 | 130 | 138 | 146 |
| 57 | 2" | 50 | B350 | 57 | 81 | 99 | 114 | 128 | 140 | 151 | 161 | 171 | 180 |
| 68 | 2" | 50 | B351 | 68 | 96 | 118 | 136 | 152 | 167 | 180 | 192 | 204 | 215 |
| 83 | 2" | 50 | B352 | 83 | 117 | 144 | 166 | 186 | 204 | 220 | 235 | 249 | 263 |

GPM = C_v × √Δp * = Models with no characterizing disc.
 The influence of the pipe geometry due to reduced flow is negligible for all valves 83 C_v and below with characterizing discs.

SET-UP

| | | 2-WAY VALVE | | 3-WAY VALVE | |
|--|--|--|--|--|--|
| | | SPECIFY UPON ORDERING | | SPECIFY UPON ORDERING | |
| NON-SPRING RETURN Stays in Last Position | TR24-3-T US TR24-3 US On/Off or Floating Point Actuators | Power to pin 2 will drive valve CCW. Power to pin 3 will drive valve CW. | | Power to pin 2 will drive valve CCW. Power to pin 3 will drive valve CW. | |
| | TR24-SR-T US TR24-SR US Proportional Type Actuators | NC: Closed A to AB, will open as voltage increases. | NO: Open A to AB, will close as voltage increases. (Can be chosen with switch inside terminal block of actuator.) | NC: Closed A to AB, will open as voltage increases. | NO: Open A to AB, will close as voltage increases. (Can be chosen with switch inside terminal block of actuator.) |
| | LRB24 (-3), MFT, SR LRX24 (-3), MFT, SR ARB24 (-3), MFT, SR ARX24 (-3), MFT, SR Floating Point or Proportional Type Actuators | Power to pin 2 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "1" position, to reverse select the "0" position. | NO: Open A to AB, will close as voltage increases or power applied. (Can be chosen with CW/CCW switch.) | Power to pin 2 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "1" position, to reverse select the "0" position. | NO: Open A to AB, will close as voltage increases or power applied. (Can be chosen with CW/CCW switch.) |
| SPRING RETURN Note Fail Position | TFRB24 LF24 US AFRB24 | NO/FO Valve: Open A to AB will drive closed. Spring Action: Will spring open A to AB upon power loss. | NC/FC Valve: Closed A to AB will drive open. Spring Action: Will spring closed A to AB upon power loss. | NO/FO Valve: Open A to AB will drive closed. Spring Action: Will spring open A to AB upon power loss. | NC/FC Valve: Closed A to AB will drive open. Spring Action: Will spring closed A to AB upon power loss. |
| | TF (-3), MFT, SR LF (-3), MFT, SR AF SR AFR, MFT Floating Point or Proportional Type Actuators | NC/FO Valve: Closed A to AB will drive open. Spring Action: Will spring open A to AB upon power loss. | NC/FC or NO/FC Valve: Closed A to AB or Open A to AB. (Can be chosen with CW/CCW switch.) Spring Action: Will spring closed A to AB upon power loss. NO/FO Valve: Open A to AB Spring Action: Will spring open A to AB upon power loss. (NO action can be chosen with CW/CCW switch.) | NC/FO Valve: Closed A to AB will drive open Spring Action: Will spring open A to AB upon power loss. | NC/FC or NO/FC Valve: Closed A to AB or Open A to AB. (Can be chosen with CW/CCW switch.) Spring Action: Will spring closed A to AB upon power loss. NO/FO Valve: Open A to AB Spring Action: Will spring open A to AB upon power loss. (NO action can be chosen with CW/CCW switch.) |

GENERAL WIRING INSTRUCTIONS

WARNING The wiring technician must be trained and experienced with electronic circuits. Disconnect power supply before attempting any wiring connections or changes. Make all connections in accordance with wiring diagrams and follow all applicable local and national codes. Provide disconnect and overload protection as required. Use copper, twisted pair, conductors only. If using electrical conduit, the attachment to the actuator must be made with flexible conduit.

Always read the controller manufacturer's installation literature carefully before making any connections. Follow all instructions in this literature. If you have any questions, contact the controller manufacturer and/or Belimo.

Transformer(s)

Belimo actuators require a 24 VAC class 2 transformer and draws a maximum of 10 VA per actuator. The actuator enclosure cannot be opened

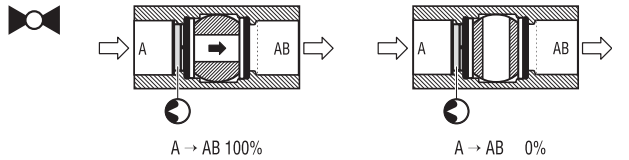
in the field, there are no parts or components to be replaced or repaired.

- EMC directive: 89/336/EEC
- Software class A: Mode of operation type 1
- Low voltage directive: 73/23/EEC

CAUTION It is good practice to power electronic or digital controllers from a separate power transformer than that used for actuators or other end devices. The power supply design in our actuators and other end devices use half wave rectification. Some controllers use full wave rectification. When these two different types of power supplies are connected to the same power transformer and the DC commons are connected together, a short circuit is created across one of the diodes in the full wave power supply, damaging the controller. Only use a single power transformer to power the controller and actuator if you know the controller power supply uses half wave rectification.

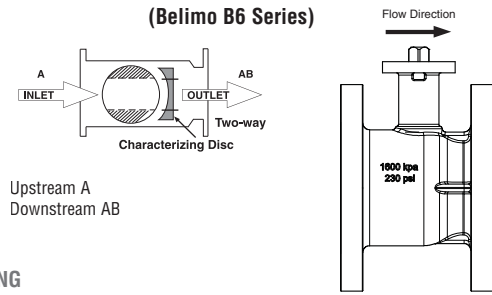
FLOW PATTERNS

2-way Characterized Control Valves™



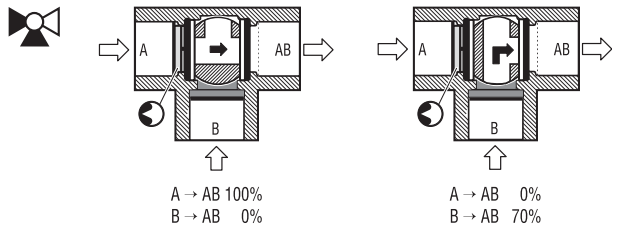
Two-way valves should be installed with the disc upstream.

(Belimo B6 Series)



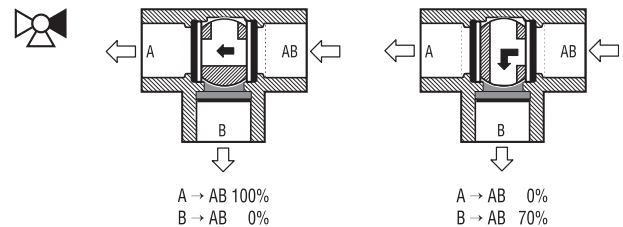
3-way Characterized Control Valves™

MIXING (Not for use in change over applications)



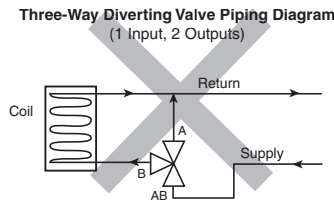
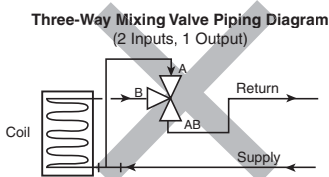
The A-port must be piped to the coil to maintain proper control.

DIVERTING



INCORRECT PIPING

The A-port must be piped to the coil to maintain proper control.



WARNING! Do Not Pipe in this manner!

Note Valve Porting!

The A-port must be piped to the coil! Not the B-port!

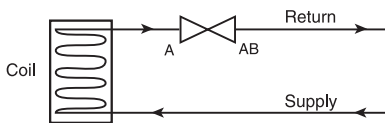
Flow is not possible from A to B. If AB-port is not piped as the common port, the valve must be re-piped. It is good practice to install a balancing valve in the bypass line. These valves are intended for closed loop systems. Do not install in an open loop system or in an application that is open to atmospheric pressure.

OPERATION/INSTALLATION – CORRECT PIPING

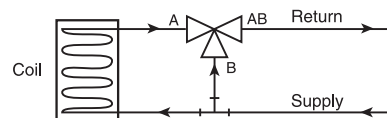
2-way valves should be installed with the disc upstream. If installed with disc downstream, flow curve will be deeper. If installed “backwards” it is NOT necessary to remove and change. No damage or control problems will occur.

3-WAY VALVES MUST BE PIPED CORRECTLY. They can be mixing or diverting. Mixing is the preferred piping arrangement.

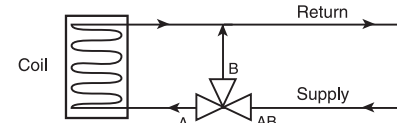
2-way Valve Piping Diagram
(1 Input, 1 Output)



3-way Mixing Valve Piping Diagram
(2 Inputs, 1 Output)



3-way Diverting Valve Piping Diagram
(1 Input, 2 Outputs)



Diverting* (Not for use in change over applications)

The BELIMO Characterized Control Valve is a CONTROL valve, not a manual valve adapted for actuation. The control port is the A-port. It is similar to the globe valve in that the middle port is the B or bypass port. The common port AB is on the main opposite the A-port. These diagrams are for typical applications only. Consult engineering specification and drawings for particular circumstances.

REDUCED B-PORT FLOW

Note: The B-port flow of the 3-way CCV is lower than that of the A-port. In most applications this is beneficial since the reduced flow compensates for the in-existent pressure drop across the coil in the bypass mode. Therefore, proper sizing is important to avoid flow noise in particular when the system is designed with constant speed pumps. Please refer to our valve sizing and selection guidelines.

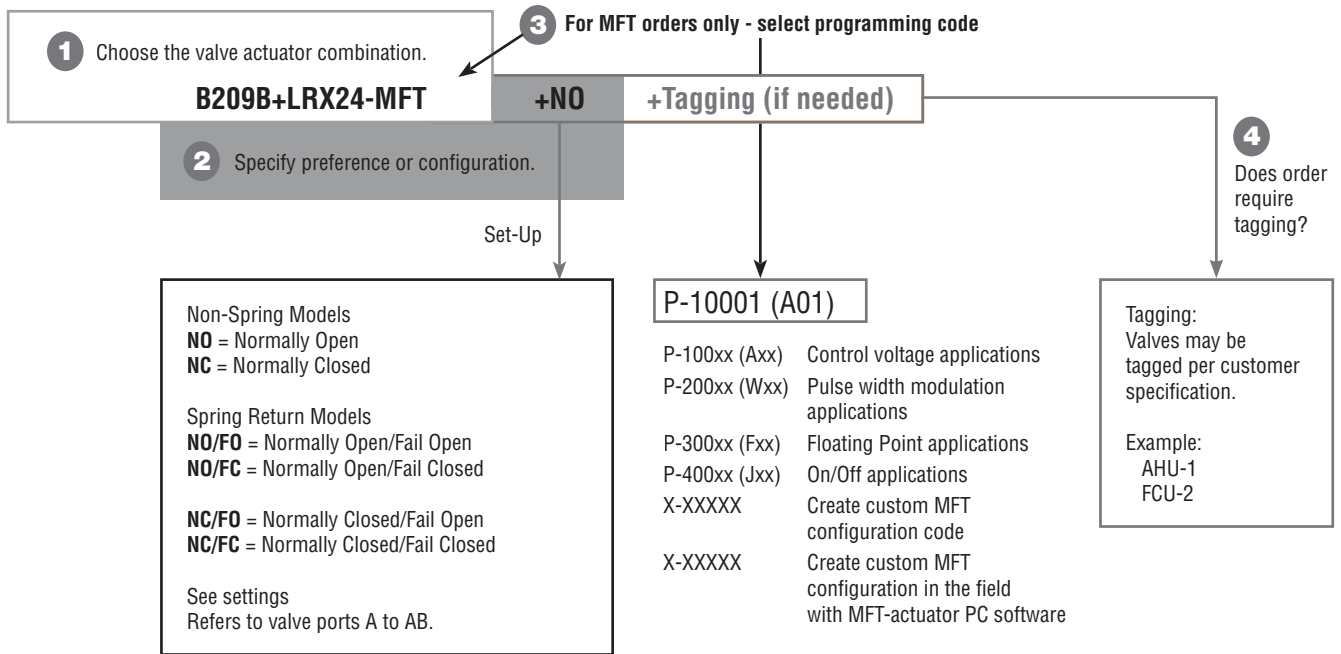
The flow velocity in the pipe upstream and downstream of the valve should be considered as well. The typical HVAC design maximum flow is 4 to 8 ft/s to avoid noise issues.

Also, the pipe reduction factor must be considered and can be found on pages 3 and 4. Pipe reducers decrease the C_v value of a valve and consequently increase the pressure drop across the valve, a situation that could lead to noise or a lower than designed flow.

Diverting* (Not for use in change over applications)

| B2 | 09 | B | LRX | 24 | -MFT | |
|---|---|---|---|---|--|--|
| <p>Valve</p> <p>B2 = 2-way B3 = 3-way B6 = 2-way Flanged</p> | <p>Valve Size</p> <p>07-80 = ½"-3"</p> | <p>Trim Material</p> <p>B = Brass Blank = Stainless Steel Trim</p> | <p>Actuator Type</p> <p>Non-Spring Return TR... LRB... LRX... ARB... ARX... LRQ... NRQ... Spring Return TFR... LF... AFR... Electronic Fail-Safe GK...</p> | <p>Power Supply</p> <p>24 = 24 VAC/DC 120 = 120 VAC* 230 = 230 VAC</p> | <p>Control</p> <p>Blank = On/Off, Floating -3 = Floating Point -SR = 2-10 VDC -MFT = Multi-Function Technology -MFT95 = 0-135 Ω</p> | <p>-T = Terminal Strip -S = Built-in Auxiliary Switch N4 = NEMA 4X, UL Type 4X, IP 66/67 Enclosure</p> |

ORDERING EXAMPLE



5 Complete Ordering Example: **B209B+LRX24-MFT+NO+A01**

*TF, LR and AR Series has 100 to 240 VAC nominal power supply.



Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable flow.

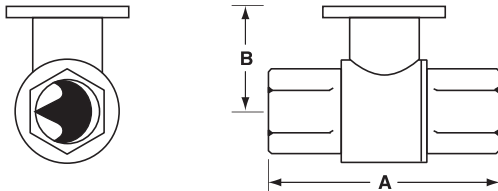
| Technical Data | |
|------------------------------------|--------------------------------------|
| Service | chilled or hot water, 60% glycol |
| Flow characteristic | A-port equal percentage |
| Controllable Flow Range | 75° |
| Sizes | ½", ¾" |
| Type of end fitting | NPT female ends |
| Materials: | |
| Body | forged brass, nickel plated |
| Ball | chrome plated brass |
| Stem | nickel plated brass |
| Seats | PTFE |
| Characterizing disc | Tefzel® |
| Packing | 2 EPDM O-rings, lubricated |
| Body pressure rating | 600 psi |
| Media temp. range | 0°F to 250°F [-18°C to 120°C] |
| Close off pressure | 200 psi |
| Maximum differential pressure (ΔP) | 50 psi for typical applications |
| Leakage | 0% for A to AB |
| External leakage | according to EN 12266-1:2003 |
| C _v rating | A-port: see product chart for values |

Tefzel® is a registered trademark of DuPont

| C _v | Valve Nominal Size | | Type | Suitable Actuators | |
|----------------|--------------------|---------|-----------|--------------------|-----------|
| | Inches | DN [mm] | 2-way NPT | Non-Spring | Spring |
| 0.3 | ½" | 15 | B207B | TR Series | LR Series |
| 0.46 | ½" | 15 | B208B | | |
| 0.8 | ½" | 15 | B209B | | |
| 1.2 | ½" | 15 | B210B | | |
| 1.9 | ½" | 15 | B211B | | |
| 3 | ½" | 15 | B212B | | |
| 4.7 | ½" | 15 | B213B | | |
| 7.4 | ½" | 15 | B214B | | |
| 10 | ½" | 15 | B215B | | |
| 14 | ½" | 15 | B216B | | |
| 4.7 | ¾" | 20 | B217B | TF Series | LF Series |
| 7.4 | ¾" | 20 | B218B | | |
| 10 | ¾" | 20 | B219B | | |
| 14 | ¾" | 20 | B220B | | |
| 24 | ¾" | 20 | B221B* | | |

*Models without characterizing disc

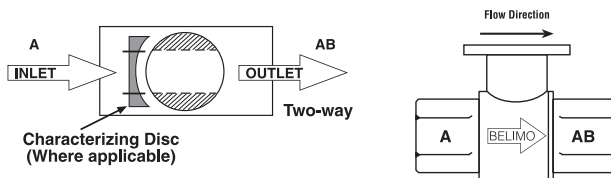
Dimensions



2WayValve-B207-B220

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207B-B211B | ½" | 15 | 2.38" [60.8] | 1.39" [35.2] |
| B212B-B216B | ½" | 15 | 2.38" [60.8] | 1.78" [45.2] |
| B217B-B221B | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |

Flow Patterns



B3 Series, 3-Way, Characterized Control Valve Chrome Plated Brass Ball and Brass Stem

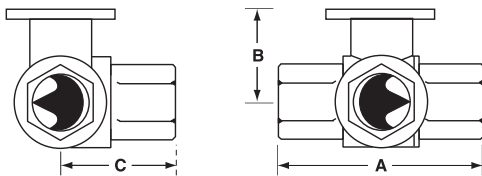


Technical Data

| | |
|------------------------------------|---|
| Service | chilled or hot water, 60% glycol |
| Flow characteristic | A-port equal percentage B-port modified for constant common port flow |
| Controllable Flow Range | 75° |
| Sizes | 1/2", 3/4" |
| Type of end fitting | NPT female ends |
| Materials: | |
| Body | forged brass, nickel plated |
| Ball | chrome plated brass |
| Stem | nickel plated brass |
| Seats | PTFE |
| Characterizing disc | Tefzel® |
| Packing | 2 EPDM O-rings, lubricated |
| Body pressure rating | 600 psi |
| Media temp. range | 0°F to 250°F [-18°C to 120°C] |
| Close off pressure | 200 psi |
| Maximum differential pressure (ΔP) | 50 psi for typical applications |
| Leakage | 0% for A to AB <2.0% for B to AB |
| External leakage | according to EN 12266-1:2003 |
| C _v rating | A-port: see product chart for values B-port: 70% of A to AB C _v |

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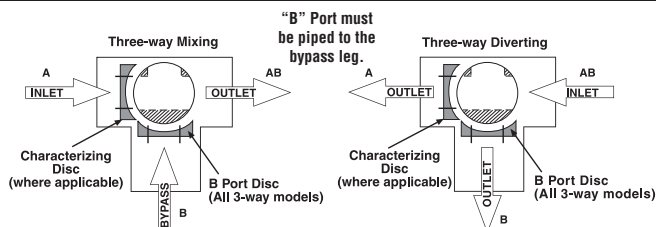
Dimensions



3WayValve-B307-B320

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307B-B311B | 1/2" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312B-B316B | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317B-B321B | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |

Flow Patterns



Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

* (Not for use in change over applications)

| C _v | Inches | DN [mm] | Type | Suitable Actuators | | | |
|----------------|--------|---------|-------|--------------------|-----------|-----------|-----------|
| | | | | Non-Spring | | Spring | |
| 0.3 | 1/2 | 15 | B307B | TR Series | LR Series | TF Series | LF Series |
| 0.46 | 1/2 | 15 | B308B | | | | |
| 0.8 | 1/2 | 15 | B309B | | | | |
| 1.2 | 1/2 | 15 | B310B | | | | |
| 1.9 | 1/2 | 15 | B311B | | | | |
| 3 | 1/2 | 15 | B312B | | | | |
| 4.7 | 1/2 | 15 | B313B | | | | |
| 10 | 1/2 | 15 | B315B | | | | |
| 14 | 1/2 | 15 | B316B | | | | |
| 4.7 | 3/4 | 20 | B317B | | | | |
| 7.4 | 3/4 | 20 | B318B | | | | |
| 14 | 3/4 | 20 | B320B | | | | |
| 24 | 3/4 | 20 | B321B | | | | |

*Models without characterizing disc

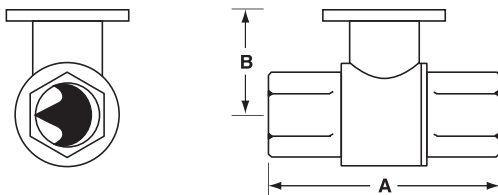
P10419 - 09/13 - Subject to change. © Belimo Aircontrols (USA), Inc.



| Technical Data | |
|------------------------------------|--------------------------------------|
| Service | chilled or hot water, 60% glycol |
| Flow characteristic | A-port equal percentage |
| Controllable Flow Range | 75° |
| Sizes | ½", ¾", 1", 1¼", 1½", 2", 2½", 3" |
| Type of end fitting | NPT female ends |
| Materials: | |
| Body | forged brass, nickel plated |
| Ball | stainless steel |
| Stem | stainless steel |
| Seats | PTFE |
| Characterizing disc | Tefzel® |
| Packing | 2 EPDM O-rings, lubricated |
| Body pressure rating | |
| 600 psi | ½" - 1¼" (B230) |
| 400 psi | 1¼" (B231) - 3" |
| Media temp. range | 0°F to 250°F [-18°C to 120°C] |
| Close off pressure | |
| 200 psi | ½" - 2" (B250) |
| 100 psi | 2" (B251) - 3" |
| Maximum differential pressure (ΔP) | 50 psi for typical applications |
| Leakage | 0% for A to AB |
| External leakage | according to EN 12266-1:2003 |
| C _v rating | A-port: see product chart for values |

Tefzel® is a registered trademark of DuPont

Dimensions



2WayValve-B207-B220

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B216 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

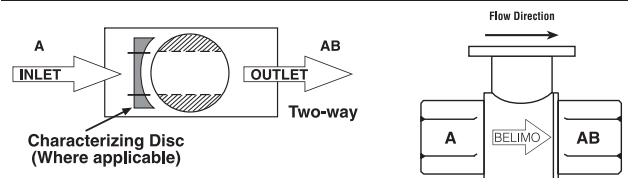
Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable flow.

| C _v | Valve Nominal Size | | Type | Suitable Actuators | | |
|----------------|--------------------|---------|-----------|--------------------|----------------|-----------|
| | Inches | DN [mm] | 2-Way NPT | Non-Spring | Spring | |
| 0.3 | ½" | 15 | B207 | TR Series | LR Series | TF Series |
| 0.46 | ½" | 15 | B208 | | | |
| 0.8 | ½" | 15 | B209 | | | |
| 1.2 | ½" | 15 | B210 | | | |
| 1.9 | ½" | 15 | B211 | | | |
| 3 | ½" | 15 | B212 | | | |
| 4.7 | ½" | 15 | B213 | | | |
| 7.4 | ½" | 15 | B214 | | | |
| 10 | ½" | 15 | B215 | | | |
| 16 | ½" | 15 | B216 | | | |
| 4.7 | ¾" | 20 | B217 | NR...N4 Series | LF Series | |
| 7.4 | ¾" | 20 | B218 | | | |
| 10 | ¾" | 20 | B219 | | | |
| 14 | ¾" | 20 | B220 | | | |
| 24 | ¾" | 20 | B221* | | | |
| 7.4 | 1" | 25 | B222 | | | |
| 10 | 1" | 25 | B223 | | | |
| 19 | 1" | 25 | B224 | | | |
| 30 | 1" | 25 | B225* | | | |
| 10 | 1¼" | 32 | B229 | | | |
| 19 | 1¼" | 32 | B230* | AR Series | AR...N4 Series | |
| 25 | 1¼" | 32 | B231 | | | |
| 37 | 1¼" | 32 | B232* | | | |
| 19 | 1½" | 40 | B238 | | | |
| 29 | 1½" | 40 | B239 | | | |
| 37 | 1½" | 40 | B240* | | | |
| 29 | 2" | 50 | B248 | | | |
| 46 | 2" | 50 | B249 | | | |
| 57 | 2" | 50 | B250* | | | |
| 65 | 2" | 50 | B251 | | | |
| 85 | 2" | 50 | B252 | AF Series | | |
| 120 | 2" | 50 | B253 | | | |
| 240 | 2" | 50 | B254* | | | |
| 60 | 2½" | 65 | B261 | | | |
| 75 | 2½" | 65 | B262 | | | |
| 110 | 2½" | 65 | B263 | | | |
| 150 | 2½" | 65 | B264 | | | |
| 210 | 2½" | 65 | B265* | | | |
| 70 | 3" | 80 | B277 | | | |
| 130 | 3" | 80 | B278 | | | |
| 170 | 3" | 80 | B280* | | | |

*Models without characterizing disc

Flow Patterns



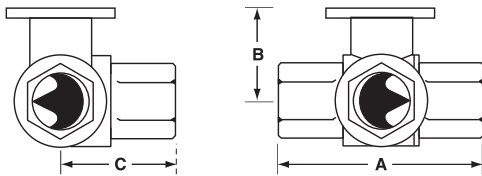
B3 Series, Three Way, Characterized Control Valve Stainless Steel Ball and Stem



| Technical Data | |
|------------------------------------|---|
| Service | chilled or hot water, 60% glycol |
| Flow characteristic | A-port equal percentage B-port modified for constant common port flow |
| Controllable Flow Range | 75° |
| Sizes | ½", ¾", 1", 1¼", 1½", 2" |
| Type of end fitting | NPT female ends |
| Materials: | |
| Body | forged brass, nickel plated |
| Ball | stainless steel |
| Stem | stainless steel |
| Seats | PTFE |
| Characterizing disc | Tefzel® |
| Packing | 2 EPDM O-rings, lubricated |
| Body pressure rating | |
| 600 psi | ½" - 1" |
| 400 psi | 1¼" - 2" |
| Media temp. range | 0°F to 250°F [-18°C to 120°C] |
| Close off pressure | |
| 200 psi | ½" - 2" |
| Maximum differential pressure (ΔP) | 50 psi for typical applications |
| Leakage | 0% for A to AB <2.0% for B to AB |
| External leakage | according to EN 12266-1:2003 |
| C _v rating | A-port: see product chart for values B-port: 70% of A to AB C _v |

Tefzel® is a registered trademark of DuPont

Dimensions



3Way Valve-B307-B320

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B316 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

Application

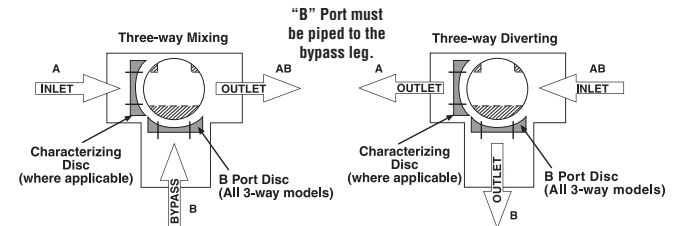
This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

* (Not for use in change over applications)

| C _v | Valve Nominal Size | | Type | Suitable Actuators | |
|----------------|--------------------|---------|-------|--------------------|-----------|
| | Inches | DN [mm] | | Non-Spring | Spring |
| 0.3 | ½" | 15 | B307 | TR Series | TF Series |
| 0.46 | ½" | 15 | B308 | | |
| 0.8 | ½" | 15 | B309 | | |
| 1.2 | ½" | 15 | B310 | | |
| 1.9 | ½" | 15 | B311 | | |
| 3 | ½" | 15 | B312 | | |
| 4.7 | ½" | 15 | B313 | | |
| 10 | ½" | 15 | B315 | | |
| 14 | ½" | 15 | B316 | | |
| 4.7 | ¾" | 20 | B317 | | |
| 7.4 | ¾" | 20 | B318 | | |
| 14 | ¾" | 20 | B320 | | |
| 24 | ¾" | 20 | B321 | | |
| 7.4 | 1" | 25 | B322 | | |
| 10 | 1" | 25 | B323 | | |
| 30 | 1" | 25 | B325* | | |
| 10 | 1¼" | 32 | B329 | AR Series | AF Series |
| 19 | 1¼" | 32 | B330 | | |
| 25 | 1¼" | 32 | B331 | | |
| 19 | 1½" | 40 | B338 | | |
| 29 | 1½" | 40 | B339 | | |
| 37 | 1½" | 40 | B340 | | |
| 46 | 1½" | 40 | B341 | | |
| 29 | 2" | 50 | B347 | | |
| 37 | 2" | 50 | B348 | | |
| 46 | 2" | 50 | B349 | | |
| 57 | 2" | 50 | B350 | | |
| 68 | 2" | 50 | B351 | | |
| 83 | 2" | 50 | B352 | | |

*Models without characterizing disc

Flow Patterns



P10419 - 09/13 - Subject to change. © Belimo Aircontrols (USA), Inc.

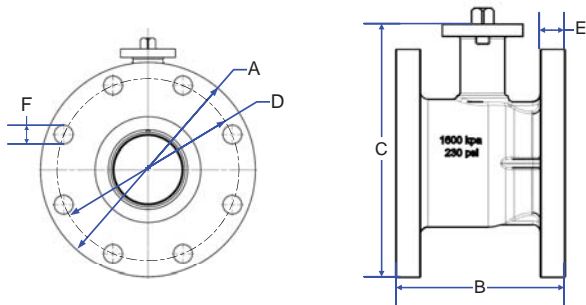


Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

| Technical Data | |
|------------------------------------|---|
| Service | chilled or hot water, 60% glycol |
| Flow characteristic | A-port equal percentage |
| Controllable Flow Range | 75° |
| Sizes | 2½", 3", 4", 5", 6" |
| Type of end fitting | pattern to mate with ANSI 125 flange |
| Materials: | |
| Body | cast iron - GG25 |
| Ball | stainless steel |
| Stem | stainless steel |
| Seats | PTFE |
| Characterizing disc | stainless steel |
| Packing | 2 EPDM O rings, lubricated |
| Body pressure rating | according to ANSI 125, standard class B |
| Media temp. range | 0°F to 248°F [-18°C to +120°C] |
| Close off pressure | 100 psi |
| Maximum differential pressure (ΔP) | 50 psi |
| Leakage | 0% for A to AB |
| Cv rating | A-port: see product chart for values |

Dimensions



| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|----------------|
| | | | A | B | C |
| B6250S | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] |
| B6300S | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] |
| B6400S | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |
| B6500S | 5" [125] | | 10.00" [254.0] | 10.30" [261.6] | 10.50" [266.4] |
| B6600S | 6" [150] | | 11.00" [279.4] | 12.50" [317.5] | 11.70" [296.9] |

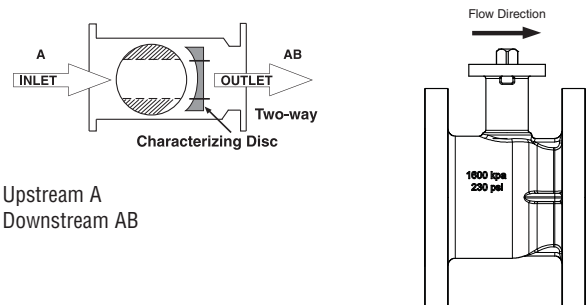
NOTES:

- 1) Flange bolt pattern matches ANSI class 125 flanges (not ANSI/ASME rated)
- 2) Maximum allowable working pressure: 100 PSIG
- 3) It is not recommended to connect raised-face flanges to flat-faced flanges

| Valve Nominal Size | | | Type | Suitable Actuators | | |
|--------------------|--------|---------|--------------|--------------------|------------|----------------------|
| Cv | Inches | DN [mm] | 2-way Flange | Non-Spring | Spring | Electronic Fail-Safe |
| 70 | 2½" | 65 | B6250S-070 | AR Series | AFR Series | |
| 110 | 2½" | 65 | B6250S-110 | | | |
| 110 | 3" | 80 | B6300S-110 | | | |
| 186 | 4" | 100 | B6400S-186 | GR Series | | GKR Series |
| 290 | 5" | 125 | B6500S-290 | | | |
| 400 | 6" | 150 | B6600S-400 | | | |

Flow Pattern

2-way B6250 to B6600 Characterized Control Valves™



Upstream A
Downstream AB

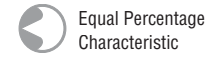
| Bolt Circle Diameter | Flange Thickness Minimum | Bolt Hole Diameter | Number of Bolt Holes |
|----------------------|--------------------------|--------------------|----------------------|
| D | E | F | |
| 5.50" [139.7] | 0.75" [19.05] | 0.75" [19.05] | 4 |
| 6.00" [152.4] | 0.75" [19.05] | 0.75" [19.05] | 4 |
| 7.50" [190.5] | 0.94" [23.88] | 0.75" [19.05] | 8 |
| 8.50" [215.9] | 0.94" [23.88] | 0.88" [22.35] | 8 |
| 9.50" [241.3] | 1.00" [25.40] | 0.88" [22.35] | 8 |

Characterized Control Valve Product Range Overview

B2., B3., 2-way, 3-way, Stainless Steel Ball and Stem



| C _v | Valve Nominal Size | | Type | | Suitable Actuators | | |
|----------------|--------------------|---------|-----------|-----------|--------------------|---------------|-----------|
| | Inches | DN [mm] | 2-way NPT | 3-way NPT | Non-Spring Return | Spring Return | NEMA 4X |
| 0.3 | ½ | 15 | B207(B) | B307(B) | TR Series | TFR Series | NR Series |
| 0.46 | ½ | 15 | B208(B) | B308(B) | | | |
| 0.8 | ½ | 15 | B209(B) | B309(B) | | | |
| 1.2 | ½ | 15 | B210(B) | B310(B) | | | |
| 1.9 | ½ | 15 | B211(B) | B311(B) | | | |
| 3 | ½ | 15 | B212(B) | B312(B) | | | |
| 4.7 | ½ | 15 | B213(B) | B313(B) | | | |
| 7.4 | ½ | 15 | B214(B) | | | | |
| 10 | ½ | 15 | B215(B) | B315(B) | | | |
| 14 | ½ | 15 | B216(B)* | B316(B)* | | | |
| 4.7 | ¾ | 20 | B217(B) | B317(B) | | | |
| 7.4 | ¾ | 20 | B218(B) | B318(B) | | | |
| 10 | ¾ | 20 | B219(B) | | | | |
| 14 | ¾ | 20 | B220(B)* | | | | |
| 14 | ¾ | 20 | | B320(B) | | | |
| 24 | ¾ | 20 | B221(B)* | B321(B)* | | | |
| 7.4 | 1 | 25 | B222 | B322 | | | |
| 10 | 1 | 25 | B223 | B323 | | | |
| 19 | 1 | 25 | B224 | | | | |
| 30 | 1 | 25 | B225* | B325* | | | |
| 10 | 1¼ | 32 | B229 | | | | |
| 19 | 1¼ | 32 | B230* | | | | |
| 10 | 1¼ | 32 | | B329 | | | |
| 19 | 1¼ | 32 | | B330 | | | |
| 25 | 1¼ | 32 | B231 | B331 | | | |
| 37 | 1¼ | 40 | B232* | | | | |
| 19 | 1½ | 40 | B238 | B338 | | | |
| 29 | 1½ | 40 | B239 | B339 | | | |
| 37 | 1½ | 40 | B240* | B340 | | | |
| 46 | 1½ | 40 | | B341 | | | |
| 29 | 2 | 50 | B248 | B347 | | | |
| 37 | 2 | 50 | | B348 | | | |
| 46 | 2 | 50 | B249 | B349 | | | |
| 57 | 2 | 50 | B250* | B350 | | | |
| 65 | 2 | 50 | B251 | | | | |
| 68 | 2 | 50 | | B351 | | | |
| 83 | 2 | 50 | | B352 | | | |
| 85 | 2 | 50 | B252 | | | | |
| 120 | 2 | 50 | B253 | | | | |
| 240 | 2 | 50 | B254* | | | | |



Mode of Operation

The Characterized Control Valve is operated by a rotary actuator. The actuators are controlled by a standard voltage for on/off control or a proportional signal or 3-point control system which move the ball of the valve to the position dictated by the control system.

Product Features

The equal-percentage characteristic of the flow is ensured by the integral characterizing disc. This characteristic provides linear heating or cooling output from the coil improving energy efficiency and comfort.

Actuator Specifications

| | |
|-----------------------|---|
| Control type | on/off, floating point, 2-10 VDC, multi-function technology (MFT) |
| Manual override | TR, LR, AR, NR, AFR series |
| Electrical connection | 3 ft [1m] cable with ½" conduit fitting or covered screw terminal strip |

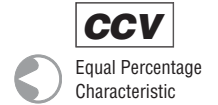
Valve Specifications

| | |
|------------------------------------|---|
| Service | chilled or hot water, 60% glycol |
| Flow characteristic | A-port equal percentage B-port modified for constant common port flow |
| Controllable flow range | 75° |
| Sizes | ½" - 2" |
| Type of end fitting | NPT female ends |
| Materials | |
| Body | forged brass, nickel plated |
| Ball | stainless steel or chrome |
| Stem | stainless steel or chrome |
| Seats | Teflon® PTFE |
| Characterizing disc | |
| ½" - 1 ½" (2-way) | Tefzel® |
| ½" - 1" (3-way) | Tefzel® |
| 2" (2-way) | stainless steel |
| 1¼" - 2" (3-way) | stainless steel |
| Packing | 2 EPDM O-rings, lubricated |
| Media temp range | 0°F to 250°F [-18°C to 120°C] |
| Body pressure rating | |
| ½" - 1¼" (B230) | 600 psi |
| 1¼" (B231) - 2" (B251) | 400 psi |
| Close-off pressure | 200 psi |
| Maximum differential pressure (ΔP) | 50 psi |
| Leakage | 0% for A to AB < 2.0% for B to AB |
| C _v rating/GPM | A port: see product chart above for values B port: 70% of A to AB C _v |

Tefzel® and Teflon® are registered trademarks of DuPont

* Models without characterizing discs. (B) Models with chrome plated brass ball and brass stem
* 3-Way Valves not for use in change over applications

| C _v | Valve Nominal Size | | Type | Suitable Actuators | | |
|----------------|--------------------|---------|------------|--------------------|-------------------|---------------|
| | Inches | DN [mm] | | 2-way NPT | Non-Spring Return | Spring Return |
| 70 | 2½ | 65 | B6250S-070 | | | |
| 110 | 2½ | 65 | B6250S-110 | AR | AFR | |
| 110 | 3 | 80 | B6300S-110 | | | |
| 186 | 4 | 100 | B6400S-186 | | | |
| 290 | 5 | 125 | B6500S-290 | | GR | |
| 400 | 6 | 150 | B6600S-400 | | | GKR |



Applications

Water-side control of heating and cooling systems for AHU supply, cooling towers and chillers.

Mode of Operation

The Characterized Control Valve is operated by a rotary actuator. The actuators are controlled by a standard voltage for on/off control or a proportional signal or 3-point control system which move the ball of the valve to the position dictated by the control system.

Product Features

The equal-percentage characteristic of the flow is ensured by the integral characterizing disc. This characteristic provides linear heating or cooling output from the coil improving energy efficiency and comfort.

Actuator Specifications

| | |
|-----------------------|---|
| Control type | On/Off, Floating Point, 2-10 VDC, Multi-Function Technology (MFT) |
| Manual override | AR, GR, AFR and GKR series |
| Electrical connection | 3 ft [1m] cable with ½" conduit fitting or covered screw terminal strip |

Valve Specifications

| | |
|------------------------------------|---|
| Service | chilled or hot water, 60% glycol |
| Flow characteristic | A-port equal percentage |
| Action | max 90° rotation |
| Sizes | 2½", 3", 4", 5-, 6" |
| Type of end fitting | ANSI 125 flange pattern |
| Materials | |
| Body | cast iron (painted) |
| Ball | stainless steel |
| Stem | stainless steel |
| Seats | PTFE |
| Characterizing disc | stainless steel |
| Packing | 2 EPDM O-rings, lubricated |
| Body pressure rating | According to ANSI 125, standard class B |
| Media temp range | 0°F to 250°F [-18°C to +120°C] |
| Close-off pressure | 100 psi |
| Maximum differential pressure (ΔP) | 50 psi |
| Leakage | 0% for A to AB |

TR24-3 Actuators, On-Off, Floating Point



Models

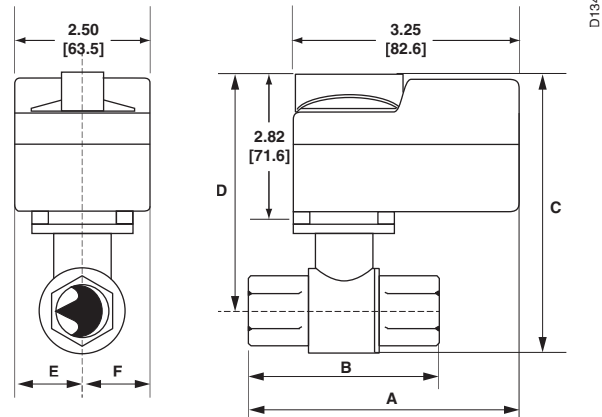
| | |
|--------------------|---|
| TR24-3-T US | |
| TR24-3 US | TR24-3-T US with 3 ft plenum rated cable |
| TR24-3/300 US | TR24-3-T US with 10 ft plenum rated cable |
| TR24-3/500 US | TR24-3-T US with 16 ft plenum rated cable |

Technical Data

| | |
|-----------------------|---|
| Control | on/off, floating point |
| Nominal voltage | 24 VAC 50/60 Hz |
| Nominal voltage range | 19.2...28.8 VAC |
| Power consumption | 1 W |
| Transformer sizing | 1VA (class 2 power source) |
| Electrical connection | screw terminals accessible after removal of small cover (3 ft, 10 ft, 16 ft cables optional) |
| Input impedance | 0.36 kΩ |
| Angle of rotation | 90° |
| Position indication | integrated into handle |
| Manual override | push down handle |
| Running time | 90 seconds @ 60 hz, 108 seconds @ 50 hz |
| Humidity | 5 to 95% non-condensing |
| Ambient temperature | -22°F to 122°F (-30°C to 50°C) |
| Storage temperature | -40°F to 176°F (-40°C to 80°C) |
| Housing | NEMA 1/IP40 |
| Housing rating | UL94-5V(B) |
| Agency listing† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | max. 35 db (A) |
| Quality standard | ISO 9001 |

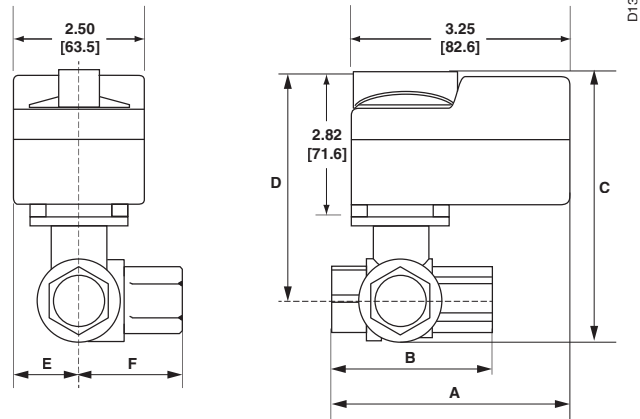
† Rated impulse voltage 330V, Control pollution degree 2, Type of action 1

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |

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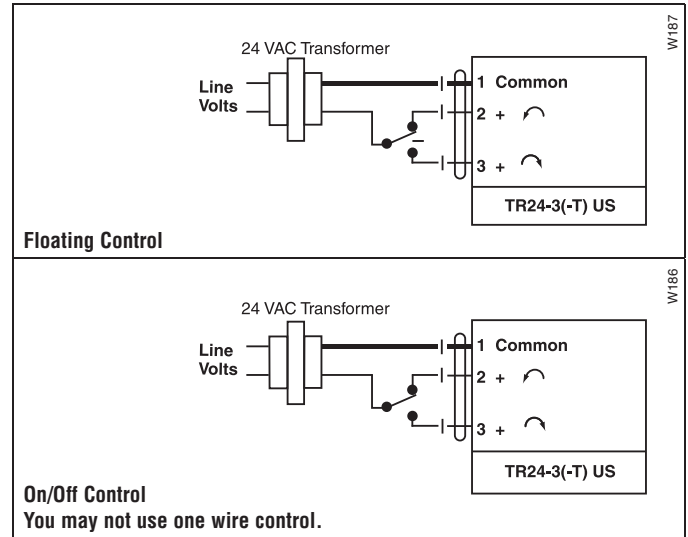
Wiring Diagrams

✂️ INSTALLATION NOTES

- 2 The common connection from the actuator must be connected to the Hot connection of the controller.
- 3 Actuators with plenum rated cable do not have numbers on wires; use color codes instead.
- 4 The actuator Hot must be connected to the control board Hot.

⚠️ WARNING Live Electrical Components!
 During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

NOTE: TR24-3(-T) US cannot be wired in parallel with themselves or any other actuator.



TR24-SR Actuators, Proportional



Models

TR24-SR-T US

| | |
|----------------|--|
| TR24-SR US | TR24-SR-T US with 3 ft plenum rated cable |
| TR24-SR/300 US | TR24-SR-T US with 10 ft plenum rated cable |
| TR24-SR/500 US | TR24-SR-T US with 16 ft plenum rated cable |

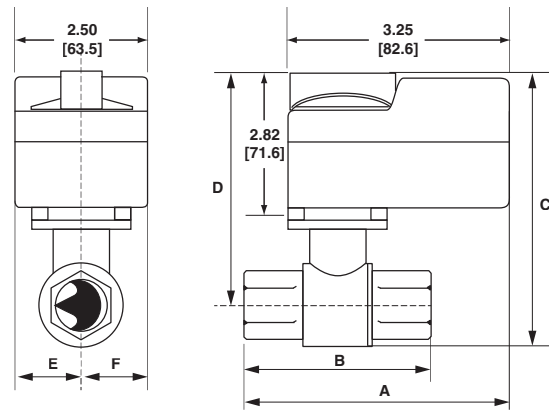
Technical Data

| | |
|-----------------------|---|
| Control | proportional |
| Nominal voltage | 24 VAC 50/60 Hz, 24 VDC |
| Nominal voltage range | 19.2...28.8 VAC, 21.6...28.8 VDC |
| Power consumption | 0.5 W |
| Transformer sizing | 1VA (class 2 power source) |
| Electrical connection | screw terminals accessible after removal of small cover (3 ft, 10 ft, 16 ft cables optional) |
| Input impedance | 100 kΩ |
| Angle of rotation | 90° |
| Direction of rotation | reversible with switch under cover |
| Position indication | integrated into handle |
| Manual override | push down handle |
| Running time | 90 seconds |
| Humidity | 5 to 95% non-condensing |
| Ambient temperature | -22°F to 122°F (-30°C to 50°C) |
| Storage temperature | -40°F to 176°F (-40°C to 80°C) |
| Housing | NEMA 1/IP40 |
| Housing rating | UL94-5V(B) |
| Agency listing† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | max. 35 db (A) |
| Quality standard | ISO 9001 |

† Rated impulse voltage 500V, Control pollution degree 2, Type of action 1

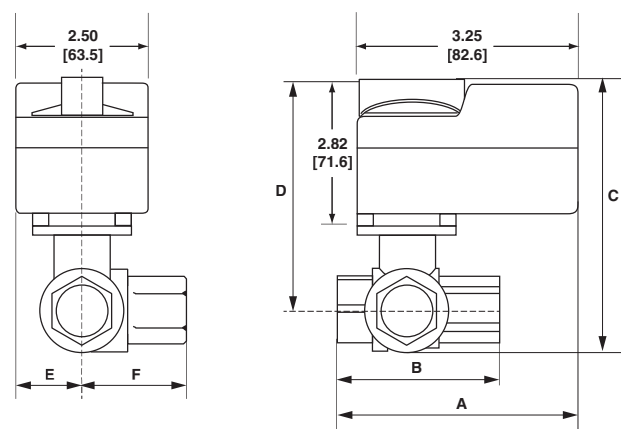
NOTE: Response sensitivity is 75mV

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |

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Wiring Diagrams

✂️ INSTALLATION NOTES

△² Actuators with color coded wires are optional. Wire numbers are provided for reference.

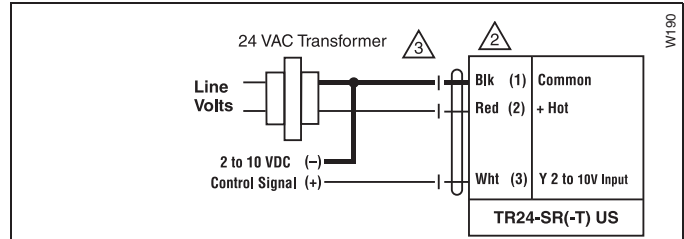
CAUTION Equipment damage!

Actuators may be connected in parallel. Power consumption and input impedance must be observed.

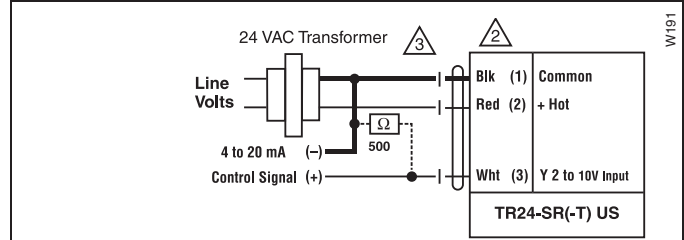
△³ Actuators may also be powered by 24 VDC.

⚠️ WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



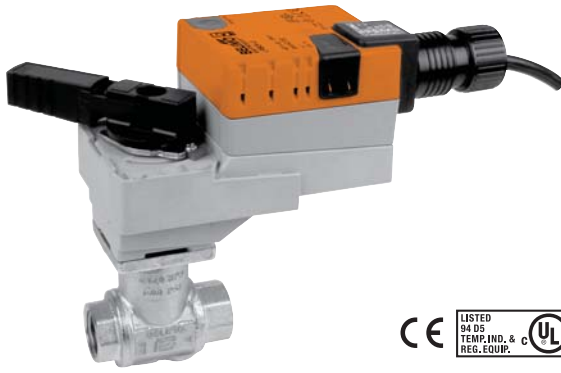
2 to 10 VDC Control of TR24-SR(-T) US



4 to 20 mA Control of TR24-SR(-T) US

Direct/Reverse acting switch is under wiring cover.
 R = CW with decrease in signal
 L = CCW with decrease in signal
 No feedback

LR...24-3 Actuators, On/Off, Floating Point



Models

| | | |
|-----------|-----------|------------------------|
| LRB24-3-T | LRX24-3-T | w/Terminal Block |
| LRB24-3 | LRX24-3 | w/3 ft. cable |
| LRB24-3-S | LRX24-3-S | w/built-in Aux. Switch |

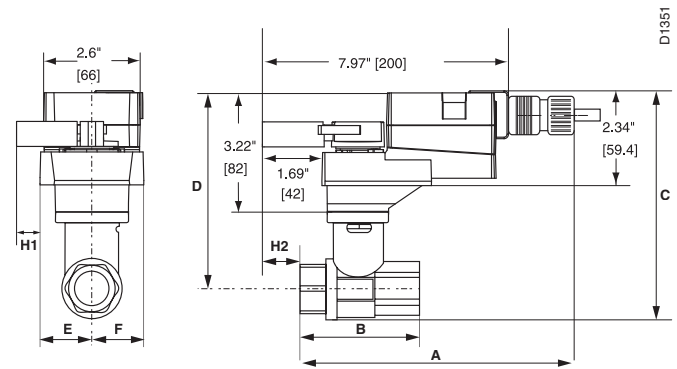
| Technical Data | |
|-----------------------|---|
| Control | on/off, floating point |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 1.5 W holding 0.2 W |
| Transformer sizing | 2 VA (class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA, plenum rated cable |
| LRB24-3 LRX24-3 | 3 ft [1m] 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | 90 seconds, constant independent of load |
| LRB24-3 LRX24-3 | 150, 95, 60, 45, 35 seconds, constant independent of load |
| Humidity | 5 to 95% RH, non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing type | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | less than 35 dB (A) |
| Quality standard | ISO 9001 |

| LR...24-3-T | |
|-----------------------|---|
| Electrical connection | screw terminal (for 26 to 14 GA wire) protected (NEMA 2, IP20) |

| LR...24-3-S | |
|------------------|--|
| Auxiliary switch | 1 SPDT, 3A (0.5A) @ 250 VAC, UL Listed, adjustable 0° to 100° |

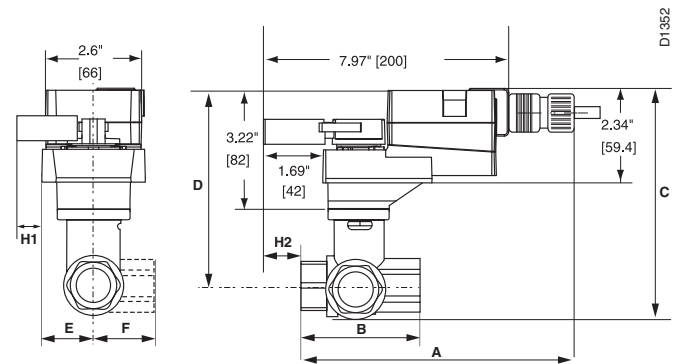
† Rated impulse voltage 800V, Control pollution degree 3, Type of action 1 (1.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 1.39" [35.2] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 1.78" [45.2] | 1.78" [45.2] |
| B217(B)-B221(B) | ¾" | 20 | 1.87" [47.4] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 1.87" [47.4] | 1.87" [47.4] |
| B229-B231 | 1¼" | 32 | 1.87" [47.4] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.06" [52.2] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

✂️ INSTALLATION NOTES



CAUTION Equipment damage!

Actuators may be connected in parallel.
Power consumption and input impedance must be observed.



Actuators are provided with color coded wires.

Wire numbers are provided for reference.



Actuators may also be powered by 24 VDC.



APPLICATION NOTES

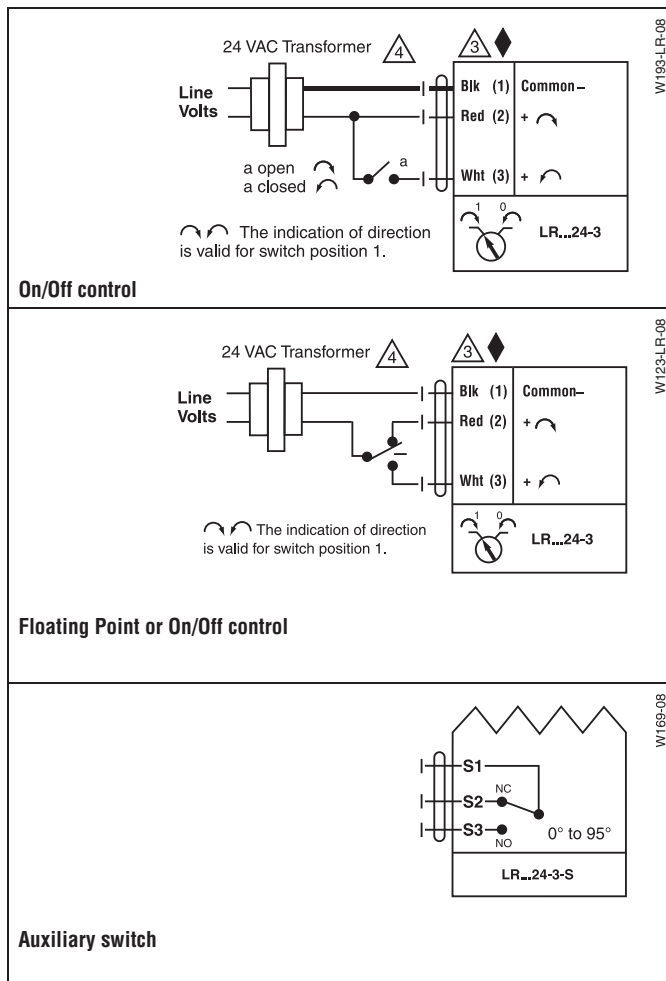


Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

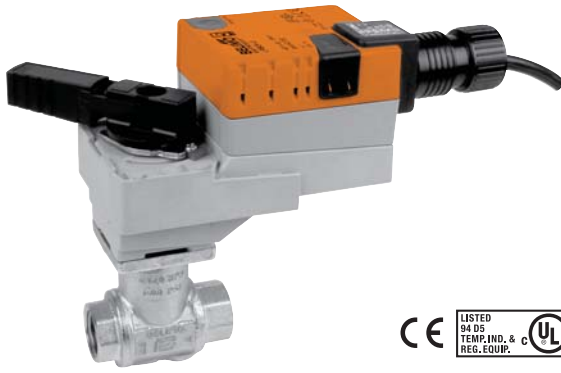


WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LR...24-SR Actuators, Proportional



Models

| | | |
|------------|------------|------------------|
| LRB24-SR-T | LRX24-SR-T | w/Terminal Block |
| LRB24-SR | LRX24-SR | w/3ft. cable |

Technical Data

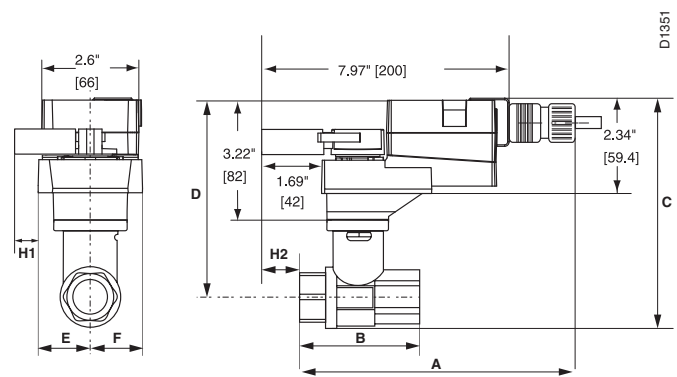
| | |
|-----------------------|---|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 1.5 W holding 0.4 W |
| Transformer sizing | 3 VA (class 2 power source) |
| Electrical connection | 1/2" conduit connector 18 GA, plenum rated cable LRB24-SR 3 ft [1m] LRX24-SR 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA |
| Feedback output U | 1 to 10 VDC, max 0.5 mA |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | constant independent of load LRB24-SR 90 seconds LRX24-SR 150, 95, 60, 45, 35 seconds |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <35 dB(A) |
| Quality standard | ISO 9001 |

LR...24-SR-T

| | |
|-----------------------|--|
| Electrical connection | screw terminal (for 26 to 14 GA wire) protected (NEMA 2/IP20) |
|-----------------------|--|

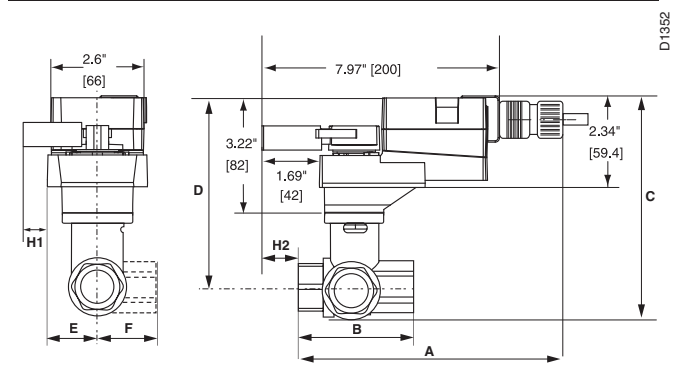
† Rated impulse voltage 800V, Control pollution degree 3, Type of action 1 (1.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | 1/2" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B231 | 1 1/4" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | 1/2" | 15 | 2.06" [52.2] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

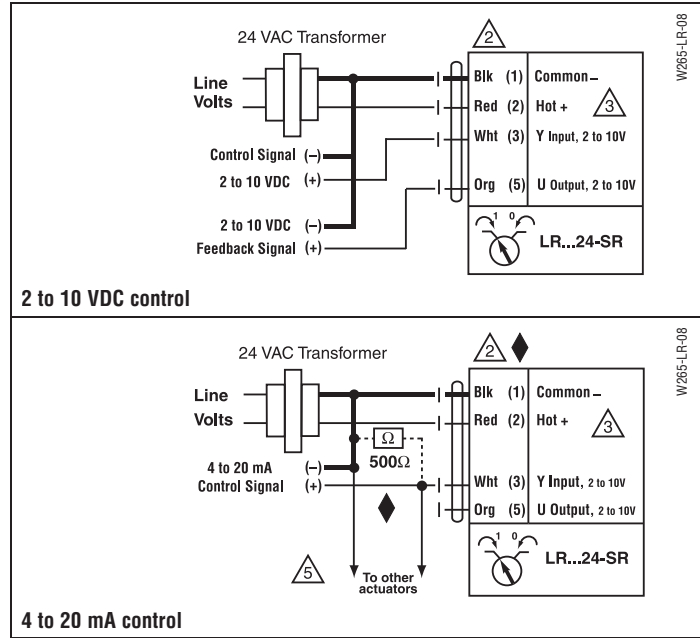
✂️ INSTALLATION NOTES

- ⚠️ **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- ⚠️ Actuators may also be powered by 24 VDC.
- ⚠️ Only connect common to neg. (-) leg of control circuits.

📄 APPLICATION NOTES

- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.
- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

⚠️ **WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LR...120-3 Actuators, On/Off, Floating Point



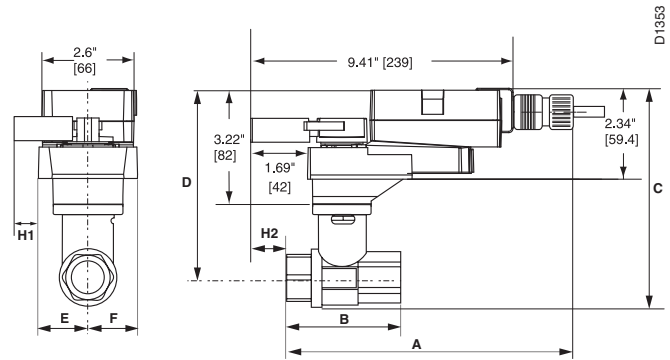
Models

LRB120-3
LRX120-3

| Technical Data | |
|-----------------------|---|
| Control | On/Off, Floating Point |
| Power supply | 100 to 240 VAC, 50/60 Hz (nominal) 85 to 265 VAC, 50/60 Hz (tolerance) |
| Power consumption | running 2 W |
| | holding 0.5 W |
| Transformer sizing | 4 VA (class 2 power source) |
| Electrical connection | 1/2" conduit connector 18 GA, plenum rated cable 3 ft [1m] |
| | LRB120-3 LRX120-3 |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | LRB120-3 90 seconds, constant independent of load |
| | LRX120-3 150, 95, 60, 45, 35 seconds, constant independent of load |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <35 dB(A) |
| Quality standard | ISO 9001 |

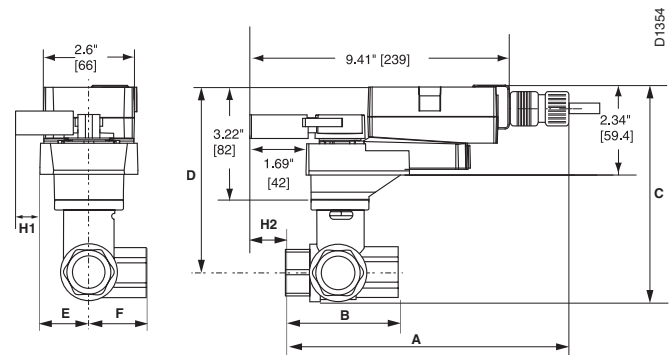
† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | 1/2" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1 1/4" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | 1/2" | 15 | 2.06" [52.2] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

✂ **INSTALLATION NOTES**



CAUTION Equipment damage!

Actuators may be connected in parallel.
Power consumption and input impedance must be observed.



APPLICATION NOTES

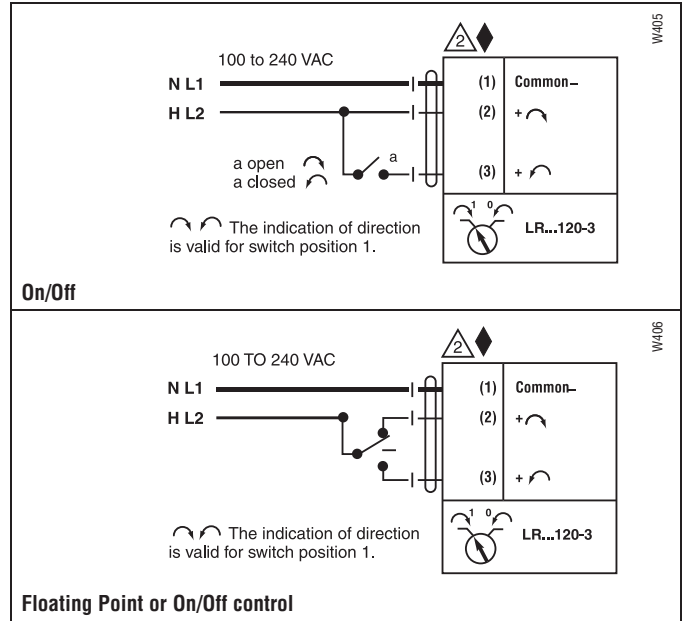


Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

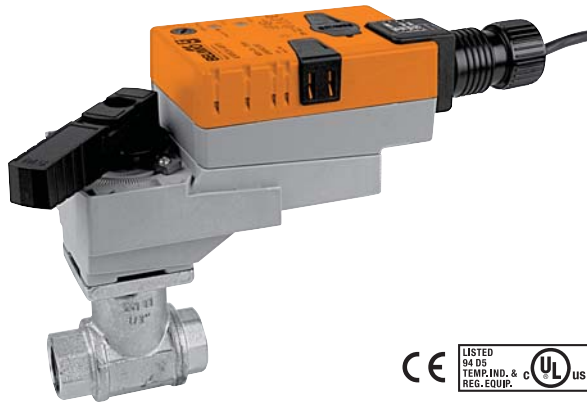


WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LR...120-SR Actuators, Proportional



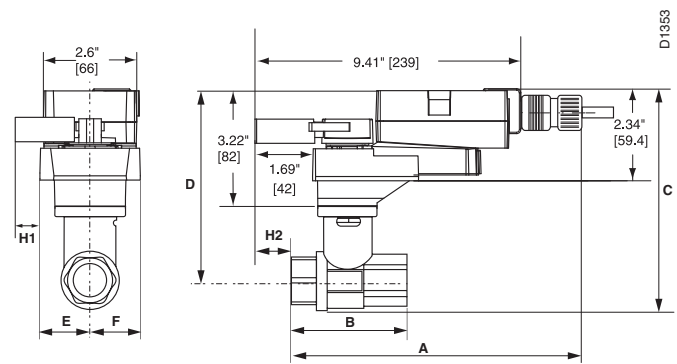
Models

LRB120-SR
LRX120-SR

| Technical Data | |
|-----------------------|--|
| Power supply | 100 to 240 VAC, 50/60 Hz (nominal) 85 to 265 VAC, 50/60 Hz (tolerance) |
| Power consumption | running 2.5 W holding 1 W |
| Transformer sizing | 4.5 VA (class 2 power source) |
| Electrical connection | 1/2" conduit connector 18 GA, plenum rated cable 3 ft [1m] LRB120-SR LRX120-SR 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA |
| Feedback output U | 1 to 10 VDC, max 0.5 mA |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | constant independent of load |
| LRB120-SR | 90 seconds |
| LRX120-SR | 150, 95, 60, 45, 35 seconds |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <35 dB(A) |
| Quality standard | ISO 9001 |

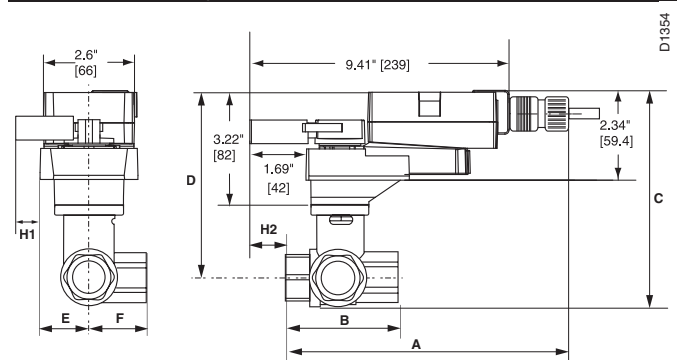
† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | 1/2" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1 1/4" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | 1/2" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

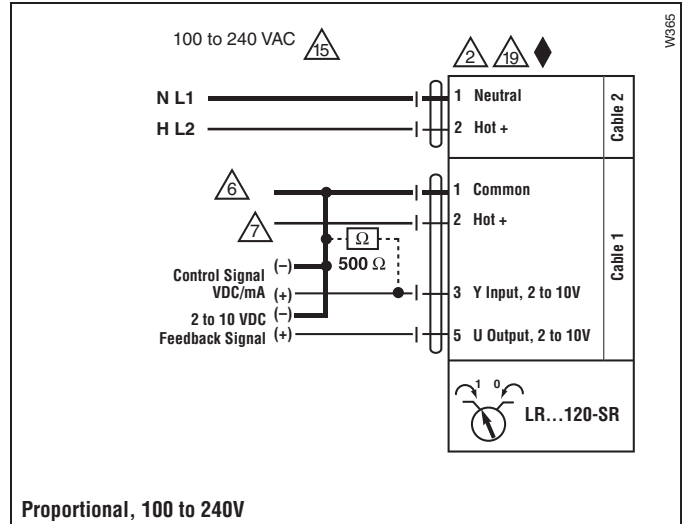
✂️ INSTALLATION NOTES

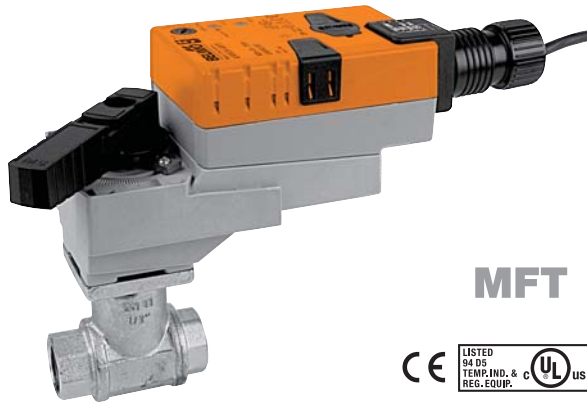
- ⚠️ **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- ⚠️ Only connect common to neg. (-) leg of control circuits.
- ⚠️ A 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.
- ⚠️ LRB(X) can be supplied with both 120 VAC and 230 VAC.
- ⚠️ All 120 VAC and 230 VAC actuators use appliance rated cables.

📄 APPLICATION NOTES

- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

⚠️ **WARNING Live Electrical Components!**
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MFT



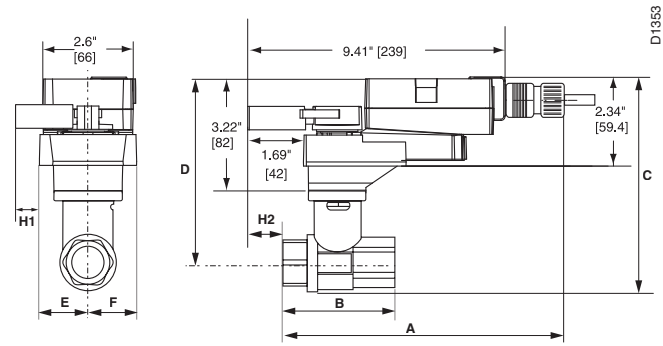
Models

LRX24-MFT Flexible Version

| Technical Data | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2 W holding 1.2 W |
| Transformer sizing | 6 VA (class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA, plenum rated cable LRX24-MFT 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y | 2 to 10 VDC (default) 4 to 20 mA variable (VDC, PWM, floating point, on/off) |
| Feedback output U | 2 to 10 VDC, 0.5mA max VDC variable |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω 1500 Ω (PWM, floating point, on/off) |
| Angle of rotation | 90° electronically variable adjustable with mechanical stop |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | 150 seconds (default) Variable (35 to 150 secs) |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <35 dB(A) |
| Quality standard | ISO 9001 |

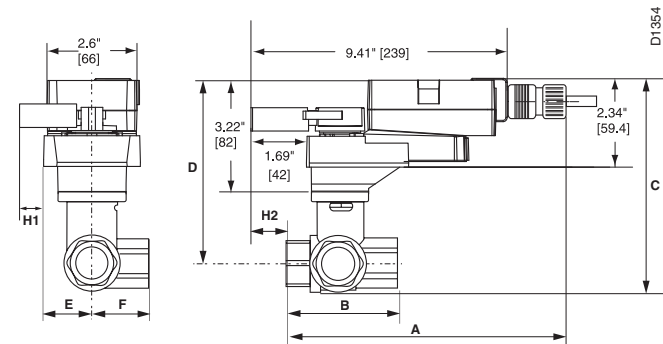
† Rated impulse voltage 800V, Control pollution degree 3,
Type of action 1 (1.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

Wiring Diagrams

INSTALLATION NOTES

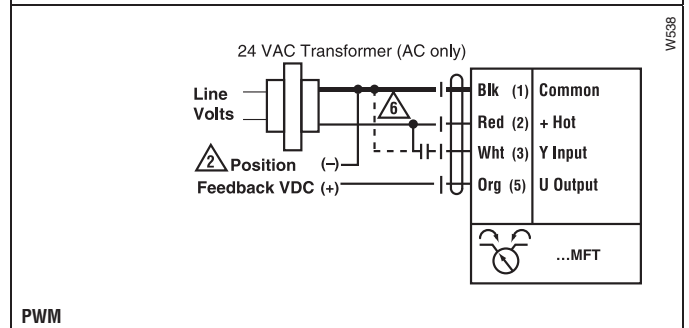
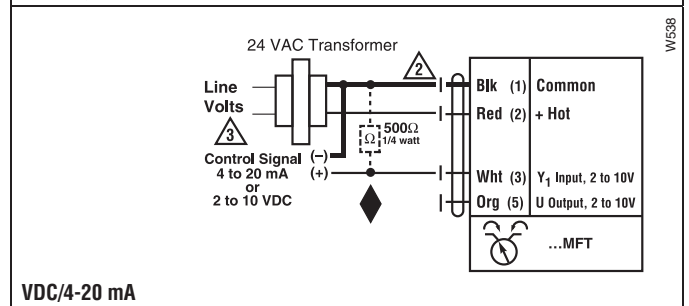
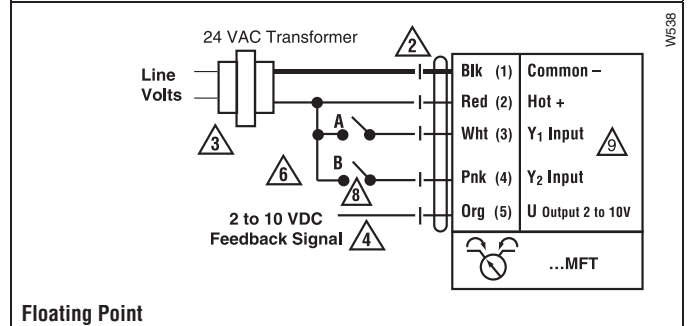
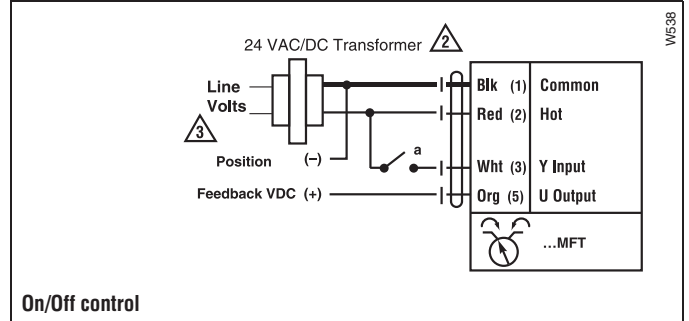
- 2** **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3** Actuators may also be powered by 24 VDC.
- 4** Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.
- 6** Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8** Contact closures A & B also can be triacs.
- 8** A & B should both be closed for triac source and open for triac sink.
- 9** For triac sink the common connection from the actuator must be connected to the hot connection.

APPLICATION NOTES

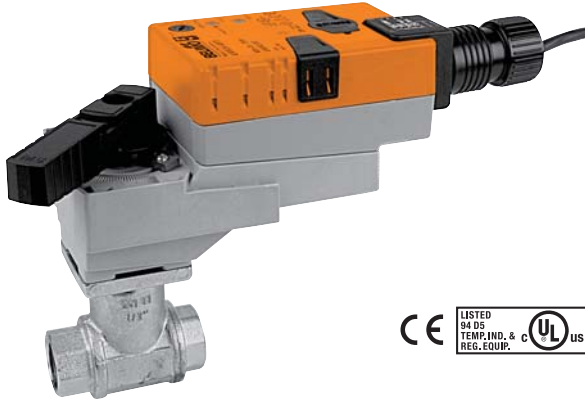
- ◆** The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

! WARNING Live Electrical Components!
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LRX24-PC Actuators, 0 to 20V Phasecut, Proportional

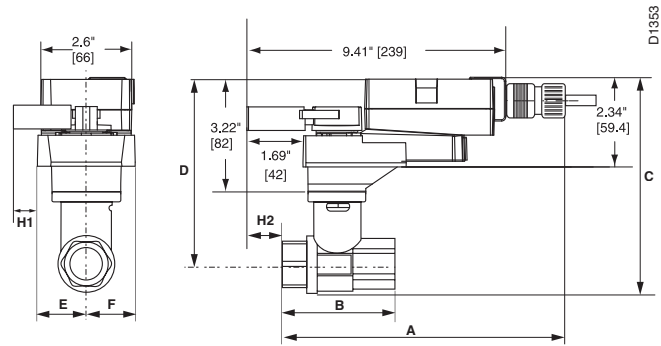


Models

LRX24-PC

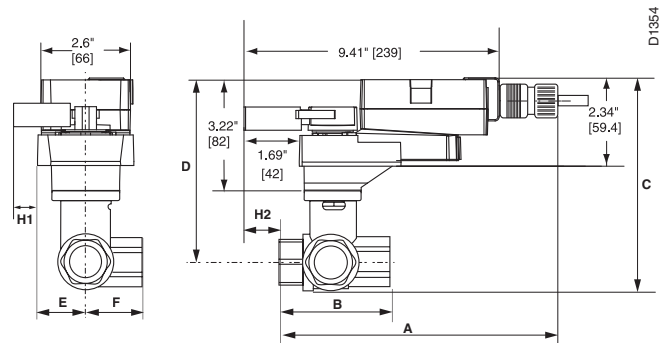
| Technical Data | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2 W holding 1.2 W |
| Transformer sizing | 5 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range Y | 0 to 20V phasecut |
| Feedback output U | 2 to 10 VDC, 0.5mA max |
| Input impedance | 8 kΩ (50 mW) |
| Angle of rotation | 90°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | 150 seconds (default) |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <35 dB(A) |
| Quality standard | ISO 9001 |

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

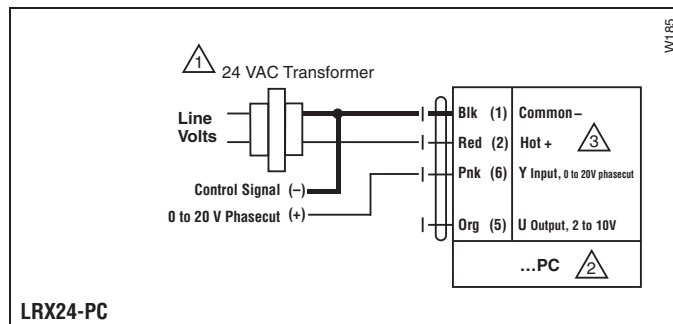
INSTALLATION NOTES

Provide overload protection and disconnect as required.

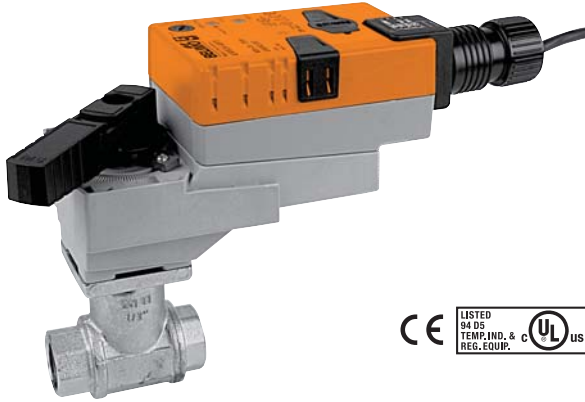
CAUTION Equipment damage!
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC.

WARNING Live Electrical Components!
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LRX24-MFT95 Actuators, 0 to 135 Ω, Proportional



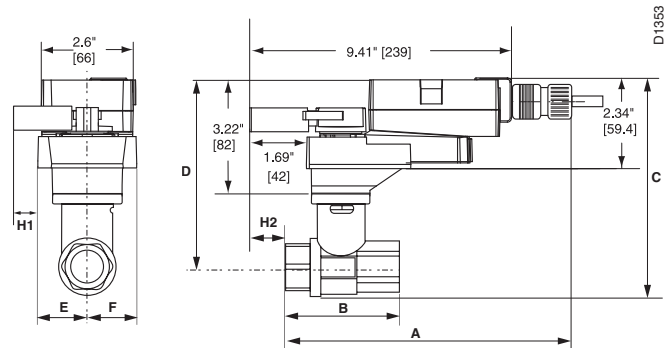
Models

LRX24-MFT95

| Technical Data | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2 W holding 1.2 W |
| Transformer sizing | 5 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range WRB | 0 to 135 Ω Honeywell Electronic Series 90, 0 to 135 Ω input |
| Feedback output U | 2 to 10 VDC, 0.5mA max |
| Input impedance | 100 kΩ (0.1 mW) |
| Angle of rotation | 90°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with ↻/↻ switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | 150 seconds (default) variable (35 to 150 seconds) |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <35 dB(A) |
| Quality standard | ISO 9001 |

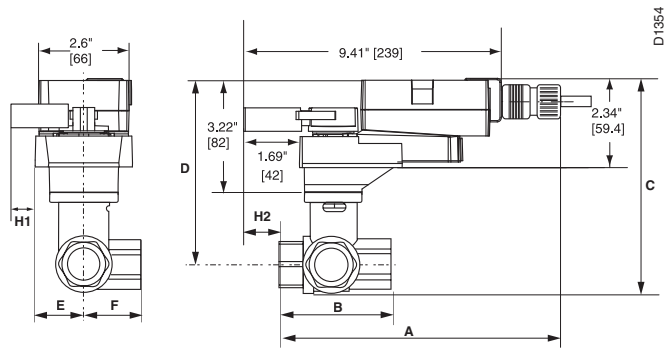
†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

INSTALLATION NOTES

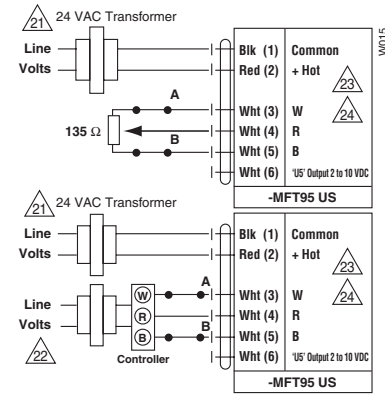
- 21 Provide overload protection and disconnect as required.
- 22 Actuators and controller must have separate transformers.
- 23 Consult controller instruction data for more detailed information.
- 24 Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell® resistor kits may also be used.
- 25 To reverse control rotation, use the reversing switch. 2524232221

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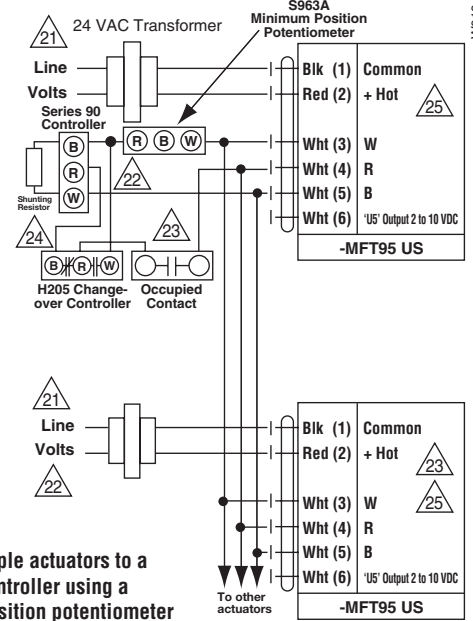
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| Switch A | Switch B | Damper Position |
|----------|----------|-----------------|
| | | Damper Open |
| | | Damper Closed |

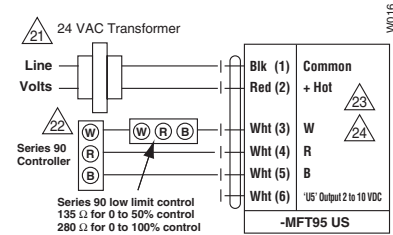
The direction of rotation switch is set so that the fail safe position and the position of the damper is closed with no signal at wire R.



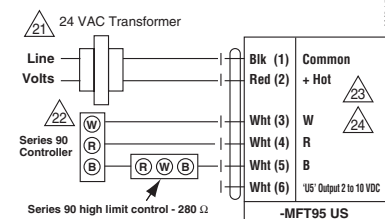
Override



Wiring multiple actuators to a Series 90 controller using a minimum position potentiometer



Low Limit Control



High Limit Control

LRQ...24-1 Quick Running Actuators, On/Off

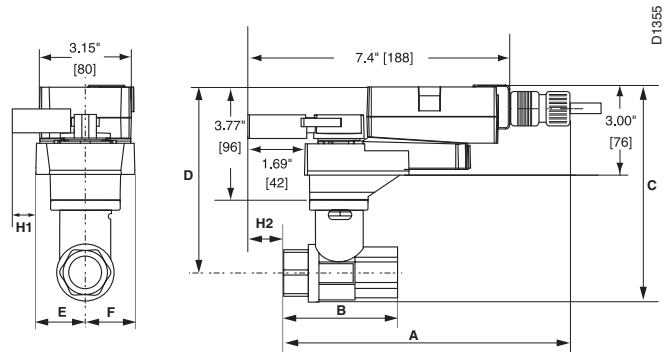


Models

| | |
|----------|------------------|
| LRQB24-1 | Basic Version |
| LRQX24-1 | Flexible Version |

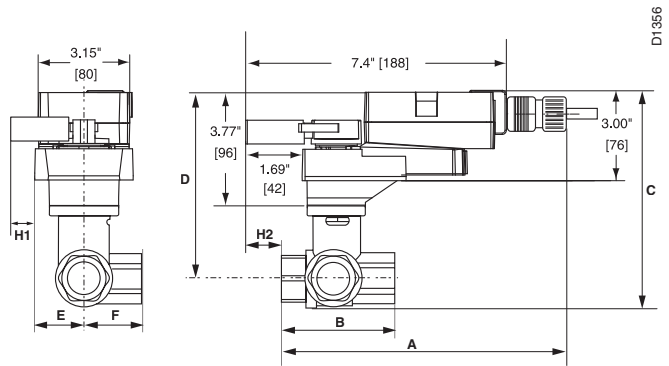
| Technical Data | |
|-----------------------|--|
| Control | on/off |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 12 W holding 1.5 W |
| Transformer sizing | 18 VA (Class 2 power source) 20A @ 5ms max |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable LRQB24-1 3 ft [1m] LRQX24-1 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | max 95°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | LRQB24-1 5 seconds constant of independent load LRQX24-1 5 or 10 seconds constant of independent load |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <52 dB(A) |
| Quality standard | ISO 9001 |

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

✂️ **INSTALLATION NOTES**

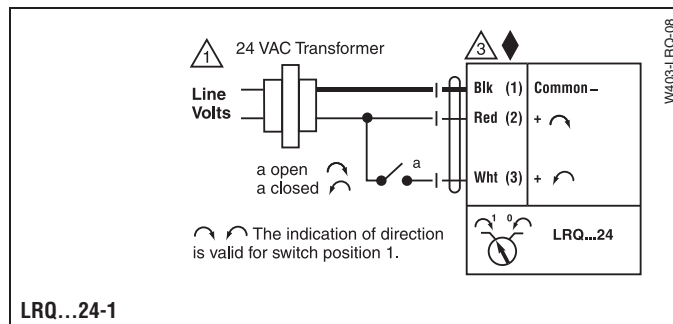
- 1 Provide overload protection and disconnect as required.
- 3 Actuators may also be powered by 24 VDC.

📄 **APPLICATION NOTES**

- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

⚠️ **WARNING Live Electrical Components!**

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





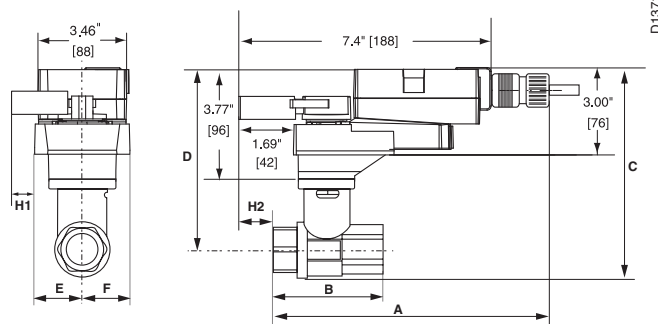
Models

LRQB24-MFT Basic Version
LRQX24-MFT Flexible Version

Technical Data

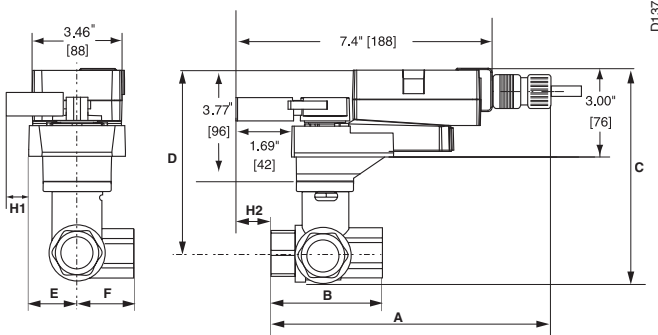
| | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 12 W holding 1.5 W |
| Transformer sizing | 18 VA (Class 2 power source) 20A @ 5ms max |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable LRQB24-MFT 3 ft [1m] LRQX24-MFT 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, on/off) |
| Feedback output U | 2 to 10 VDC, 0.5mA max VDC variable |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω 1500 Ω (on/off) |
| Angle of rotation | max 95°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | reflective visual indicator (snap-on) |
| Manual override | external push button |
| Running time | LRQB24-MFT 5 seconds constant of independent load LRQX24-MFT 5 or 10 seconds constant of independent load |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <52 dB(A) |
| Quality standard | ISO 9001 |

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

Wiring Diagrams

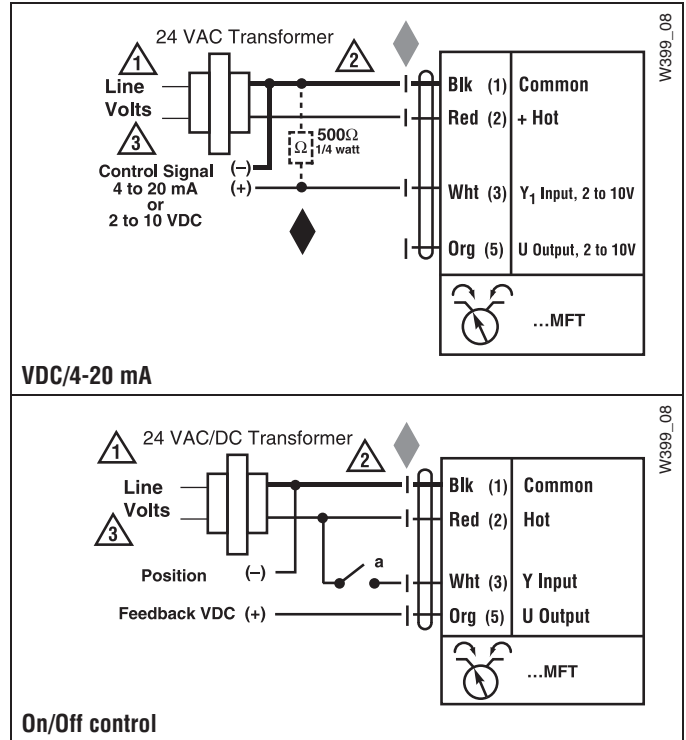
✂️ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor may be used.

⚠️ WARNING Live Electrical Components!
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NRQ...24-1 Quick Running Actuators, On/Off



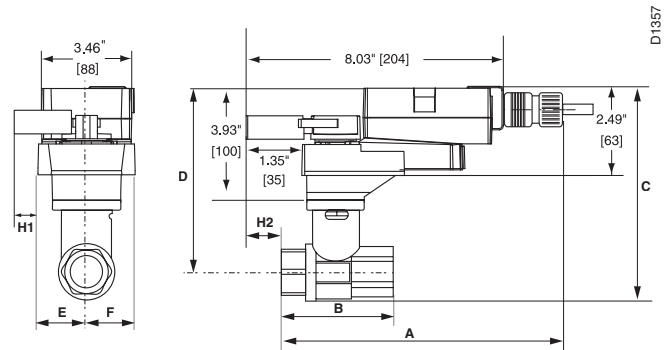
Models

| | |
|----------|------------------|
| NRQB24-1 | Basic Version |
| NRQX24-1 | Flexible Version |

| Technical Data | |
|-----------------------|--|
| Control | on/off |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 12 W holding 1.5 W |
| Transformer sizing | 18 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector, 18 GA plenum rated cable NRQB24-1 3 ft [1m] NRQX24-1 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | max 95°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | reflective visual indicator (snap-on) |
| Manual override | external push button |
| Running time | constant of independent load |
| NRQB24-1 | 5 seconds |
| NRQX24-1 | 5, 10 or 15 seconds |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <52 dB(A) |
| Quality standard | ISO 9001 |

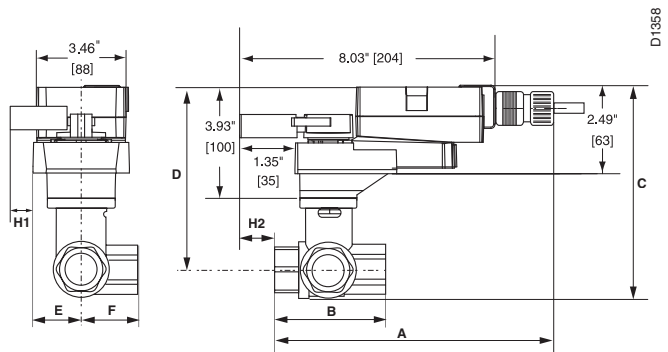
Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107] | 2.27" [57.7] |

Dimensions with 3-Way Valve





| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |

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Wiring Diagrams

INSTALLATION NOTES

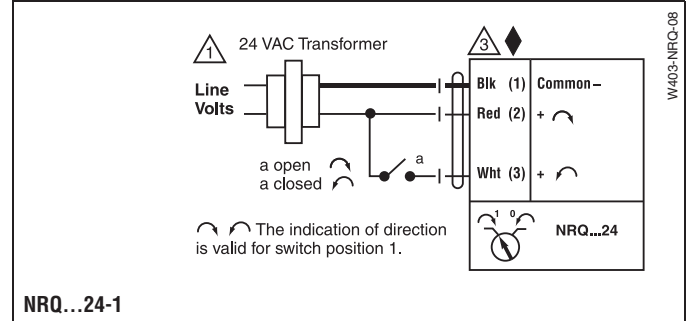
-  Provide overload protection and disconnect as required.
-  Actuators may also be powered by 24 VDC.

APPLICATION NOTES

-  Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

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Models

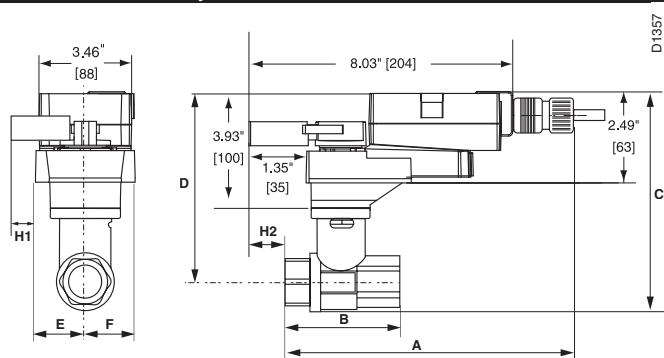
NRQB24-MFT Basic Version
NRQX24-MFT Flexible Version

Technical Data

| | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 12 W holding 1.5 W |
| Transformer sizing | 18 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector, 18 GA plenum rated cable NRQB24-MFT 3 ft [1m] NRQX24-MFT 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, on/off) |
| Feedback output U | 2 to 10 VDC, 0.5mA max VDC variable |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω, 1500 Ω (on/off) |
| Angle of rotation | max 95°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with switch |
| Position indication | reflective visual indicator (snap-on) |
| Manual override | external push button |
| Running time | constant of independent load NRQB24-MFT 5 seconds NRQX24-MFT 5, 10 or 15 seconds |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <52 dB(A) |
| Quality standard | ISO 9001 |

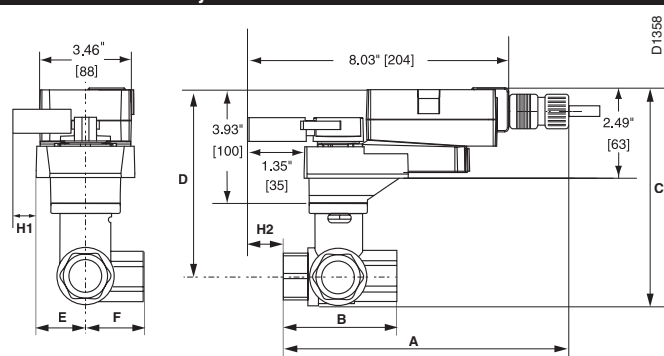
Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107] | 2.27" [57.7] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |

Wiring Diagrams

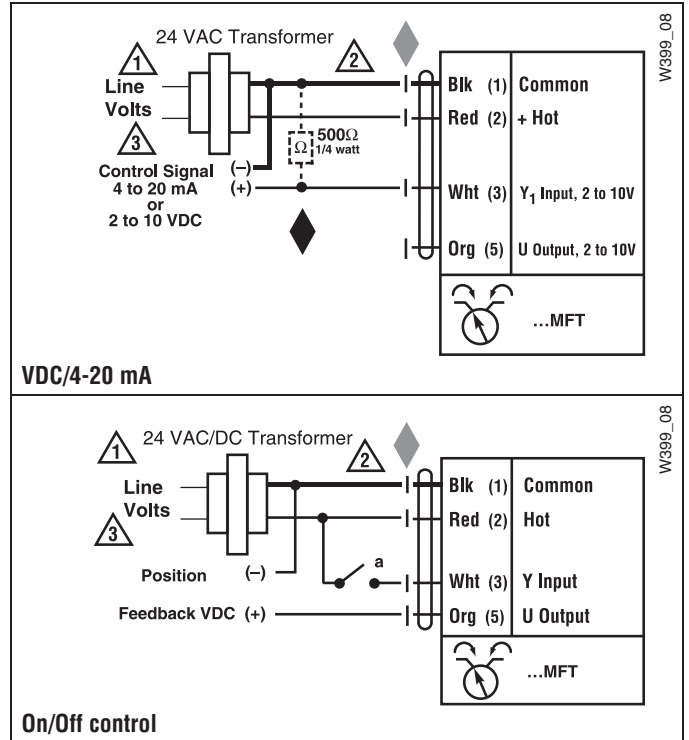
✂ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor may be used.

⚠ WARNING Live Electrical Components!
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NRB24-3-T N4 NEMA 4X Actuators, On/Off, Floating Point



Models

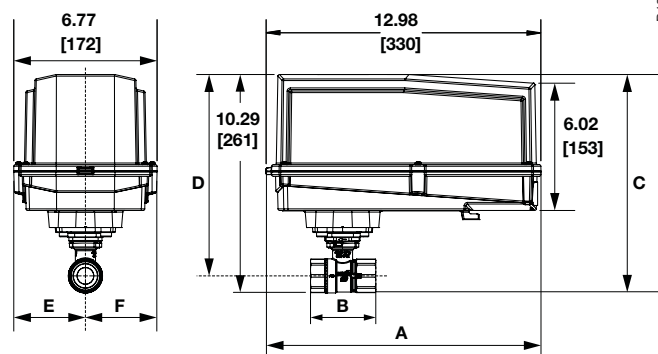
NRB24-3-T N4
NRB24-3-T N4H w/built in heater

| Technical Data | |
|-----------------------|--|
| Control | on/off, floating point |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.0 W / heater 24 W holding 0.2 W |
| Transformer sizing | 4 VA (class 2 power source) / heater 19 VA |
| Electrical connection | screw terminal (for 26 to 14 GA wire) |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | visual pointer |
| Manual override | external push button |
| Running time | 90 seconds constant independent of load |
| Humidity | 100% RH |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing type | UL Type 4X/NEMA 4X/IP66 & IP67 |
| Housing material | Polypropylene |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC. |
| Quality standard | ISO 9001 |

*Cannot be used with the CCV-EXT-KIT

† Rated impulse voltage 800V, Control pollution degree 3,
Type of action 1.

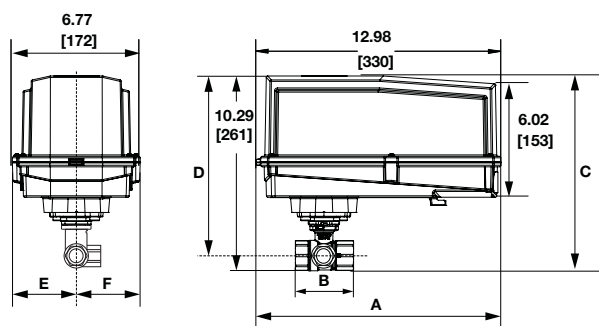
Dimensions with 2-Way Valve



D1363

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



D1364

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

INSTALLATION NOTES

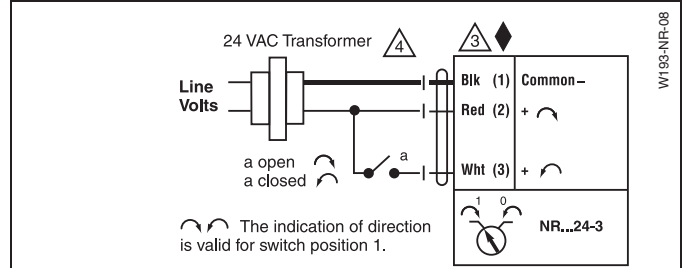
- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators are provided with color coded wires.
- 4 Wire numbers are provided for reference.
- 4 Actuators may also be powered by 24 VDC.

APPLICATION NOTES

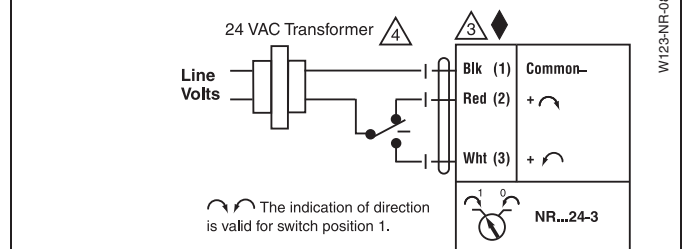
Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!
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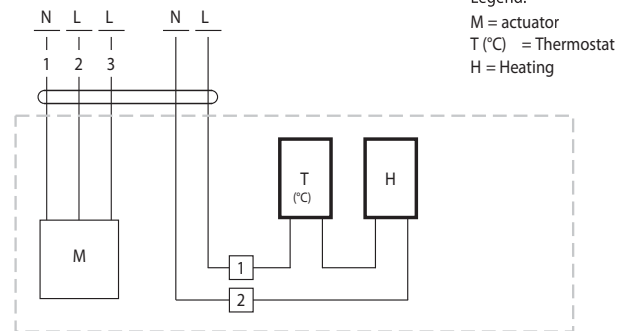


On/Off control



Floating Point control

with actuator types ..-3



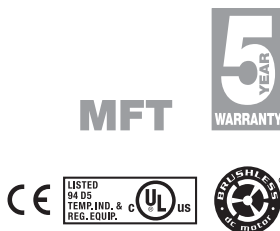
Legend:
M = actuator
T (°C) = Thermostat
H = Heating

Note
The following points must be taken into account with independent, external wiring:

- All contact between the cables or wires that are introduced and the heating element is to be avoided.
- Where necessary, use cables with sufficient numbers of wires, e.g. so that the heating and the actuator can be supplied separately with voltage.

Heater wiring

NRB24-SR-T N4 NEMA 4X Actuators, Proportional



Models

NRB24-SR-T N4
NRB24-SR-T N4H w/built in heater

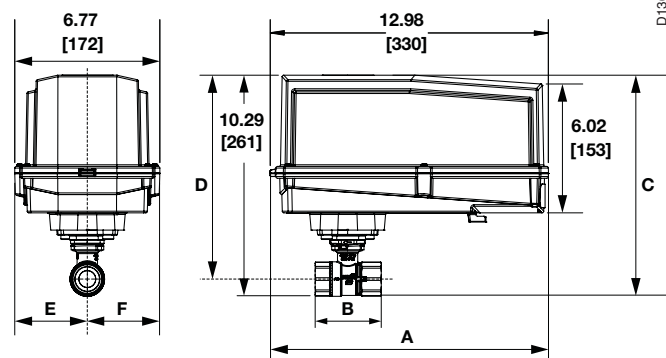
Technical Data

| | |
|-----------------------|--|
| Control | 2 to 10 VDC, 4 to 20 mA |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W / heater 24 W holding 0.4 W |
| Transformer sizing | 5 VA (class 2 power source) / heater 20 VA |
| Electrical connection | screw terminal (for 26 to 14 GA wire) |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 100 kΩ (0.1mA), 500Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | visual pointer |
| Manual override | external push button |
| Running time | 90 seconds constant independent of load |
| Humidity | 100% RH |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing type | UL Type 4X/NEMA 4X/IP66 & IP67 |
| Housing material | Polypropylene |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC. |
| Quality standard | ISO 9001 |

†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3

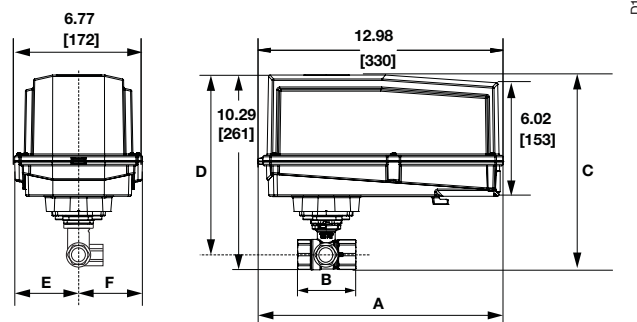
*Cannot be used with the CCV-EXT-KIT

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

✂️ INSTALLATION NOTES

- ⚠️ **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- ⚠️ **3** Actuators may also be powered by 24 VDC.
- ⚠️ **5** Only connect common to neg. (-) leg of control circuits.

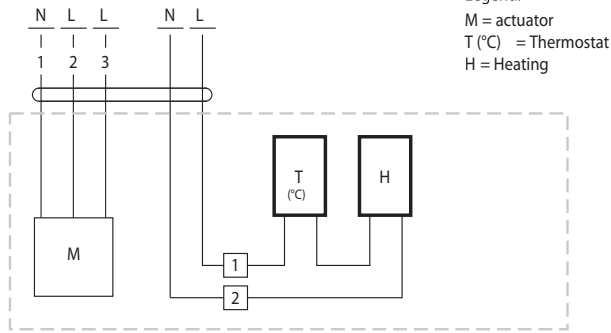
📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

⚠️ **WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Wiring Diagrams

with actuator types ...3

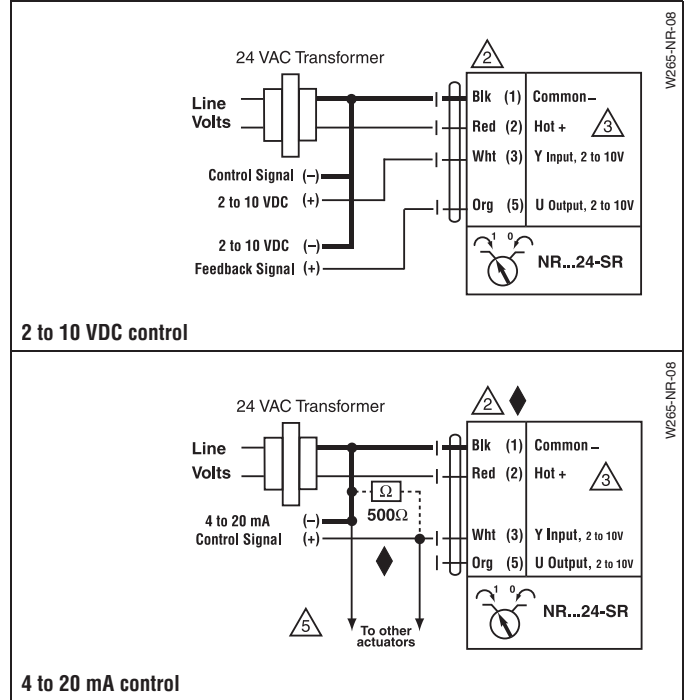


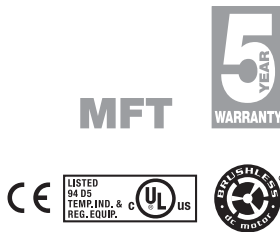
Note
The following points must be taken into account with independent, external wiring:

- All contact between the cables or wires that are introduced and the heating element is to be avoided.
- Where necessary, use cables with sufficient numbers of wires, e.g. so that the heating and the actuator can be supplied separately with voltage.

Heater wiring

P10419 - 09/13 - Subject to change. © Belimo Aircontrols (USA), Inc.





Models

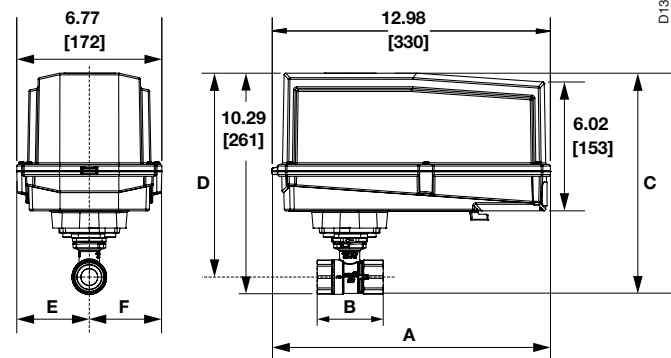
NRX24-MFT-T N4
NRX24-MFT-T N4H w/built in heater

| Technical Data | |
|-----------------------|--|
| Control | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off) |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 3.5 W (1.25 W) / heater 24 W holding 1.25 W |
| Transformer sizing | 6 VA (class 2 power source) / heater 21 VA |
| Electrical connection | screw terminal (for 26 to 14 GA wire) |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω 1500 Ω (PWM, floating point, on/off) |
| Angle of rotation | 95°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with switch |
| Position indication | visual pointer |
| Manual override | external push button |
| Running time | 150 seconds (default) constant independent of load variable (75 to 350 seconds) |
| Humidity | 100% RH |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing type | UL Type 4X/NEMA 4X/IP66 & IP67 |
| Housing material | Polypropelene |
| Agency Listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC. |
| Quality standard | ISO 9001 |

†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3

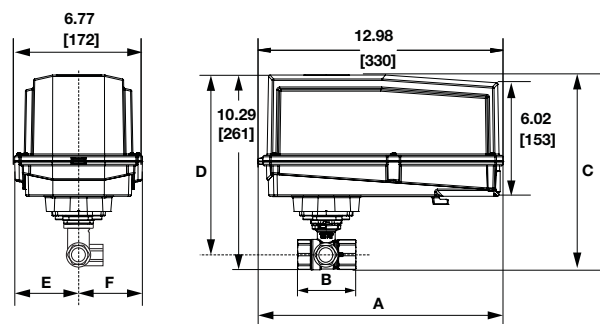
*Cannot be used with the CCV-EXT-KIT

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

Wiring Diagrams

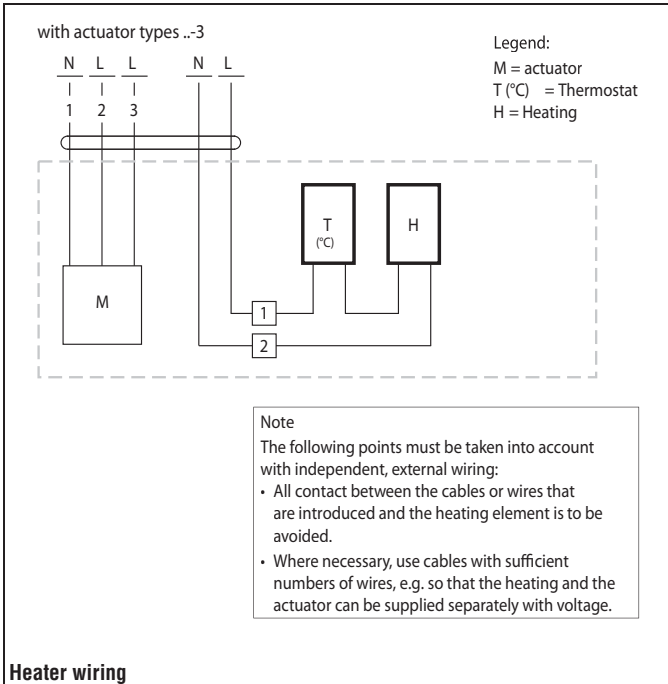
✂ INSTALLATION NOTES

- ⚠ **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- ⚠ Actuators may also be powered by 24 VDC.
- ⚠ Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.
- ⚠ Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- ⚠ Contact closures A & B also can be triacs.
- ⚠ A & B should both be closed for triac source and open for triac sink.
- ⚠ For triac sink the common connection from the actuator must be connected to the hot connection.

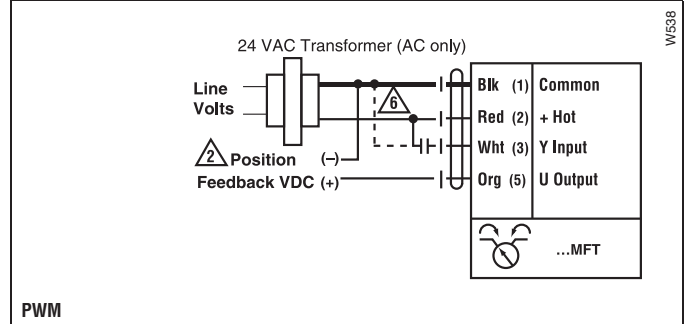
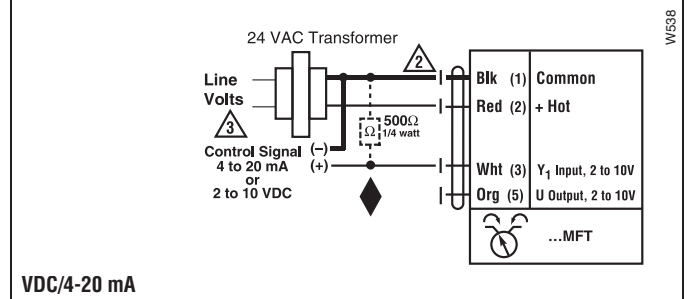
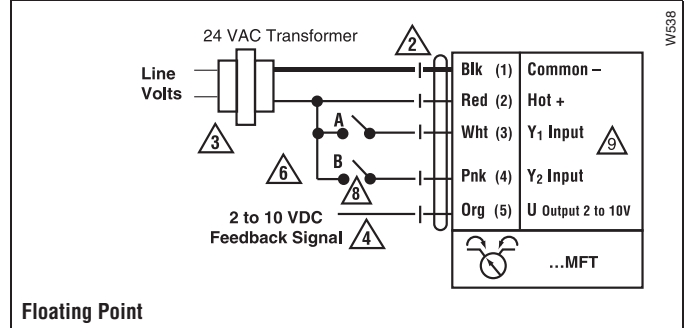
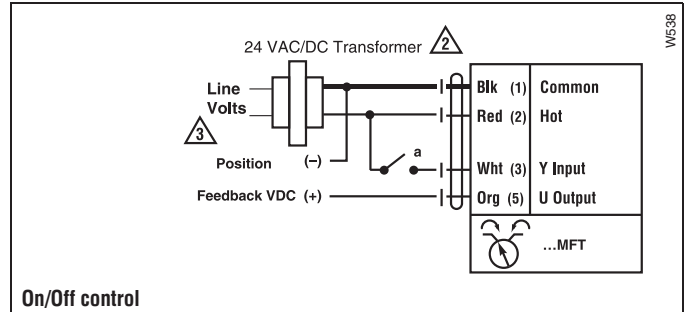
📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

⚠ WARNING Live Electrical Components!
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AR...24-3 Actuators, On/Off, Floating Point



Models

| | |
|--------------|---------------------------------|
| ARB24-3 | |
| ARB24-3-S | w/built-in Aux. Switch |
| ARX24-3 | Flexible |
| ARX24-3-S | Flexible w/built-in Aux. Switch |
| ARB24-3-5-14 | |
| ARX24-3-5-14 | |

Technical Data

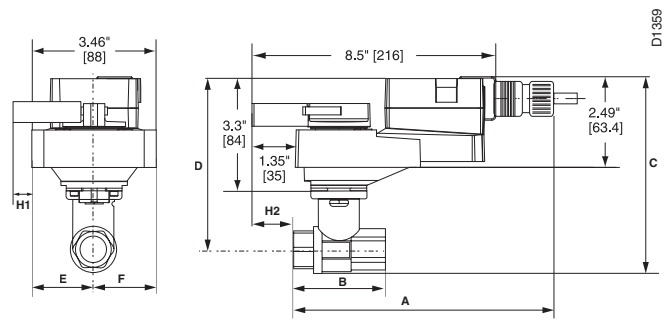
| | |
|-----------------------|--|
| Control | on/off, floating point |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W holding 0.2 W |
| Transformer sizing | 5.5 VA (class 2 power source) |
| Electrical connection | 1/2" conduit connector 18 GA plenum rated cable |
| ARB24-3... | 3 ft. [1m] |
| ARX24-3... | 3 ft. [1m] 10 ft. [3m] 16 ft. [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with protected \curvearrowright / \curvearrowleft switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | ARB24-3... 90 seconds ARX24-3... 300, 150, 90 seconds, constant independent of load |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

AR...24-3-S

| | |
|------------------------------|--|
| Auxiliary switch (-S models) | 1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed, adjustable 0 to 90° |
|------------------------------|--|

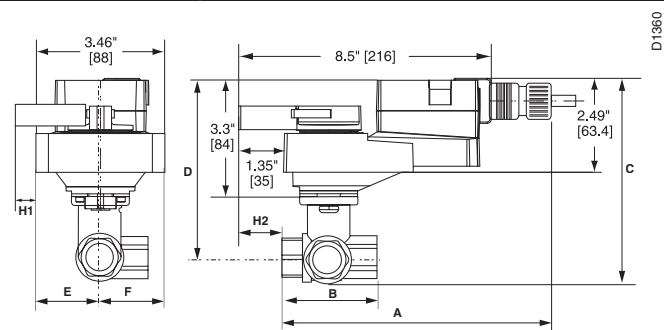
† Rated impulse voltage 800V, Control pollution degree 3, Type of action 1
(1.B for -S models)

Dimensions with 2-Way Valve



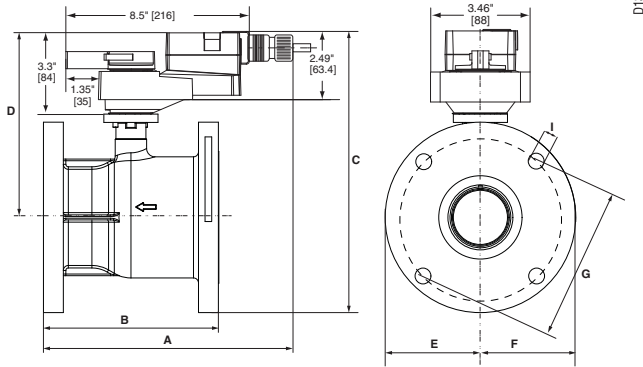
| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.98" [50.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 1.98" [50.4] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.21" [56.2] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.45" [62.2] | 2.33" [59.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.68" [68.0] | 2.60" [66.0] |

Dimensions



D1373

| Valve Body | Nominal Pipe Size | Top Flange Design | Face-to-Face Length | | | Height |
|------------|-------------------|-------------------|---------------------|---------------|---------------|--------|
| | | | A | B | C | |
| B6250 | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] | |
| B6300 | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] | |
| B6400 | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] | |

Wiring Diagrams

INSTALLATION NOTES

- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel. Power consumption and input impedance must be observed. For end position indication, interlock control, etc.,
- 3 ARB24-3-S incorporates one built-in auxiliary switches: 1 x SPDT, 3A (0.5A) @250 VAC, UL listed, adjustable 0° to 95°.
- 4 Actuators may also be powered by 24 VDC.

APPLICATION NOTES

- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

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On/Off control

W409

Floating Point or On/Off control

W411

Auxiliary switch

W410

AR...24-SR Actuators, Proportional



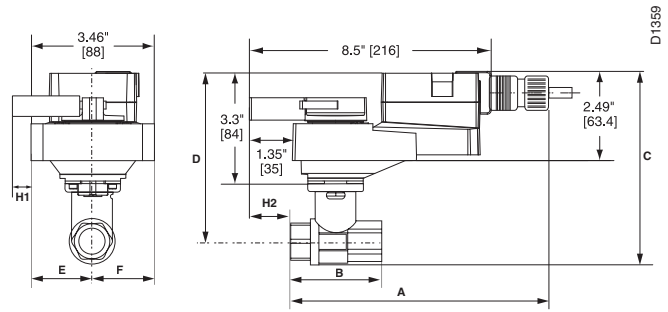
Models

ARB24-SR
ARX24-SR Flexible Version

| Technical Data | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W holding 0.4 W |
| Transformer sizing | 5 VA (class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA |
| Feedback output U | 1 to 10 VDC, max 0.5 mA |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Torque | 180 in-lb [20 Nm] |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | ARB24-SR... 90 seconds ARX24-SR... 300, 150, 90 seconds, constant independent of load |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to +122°F [-30°C to +50°C] |
| Storage temperature | -40°F to +176°F [-40°C to +80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

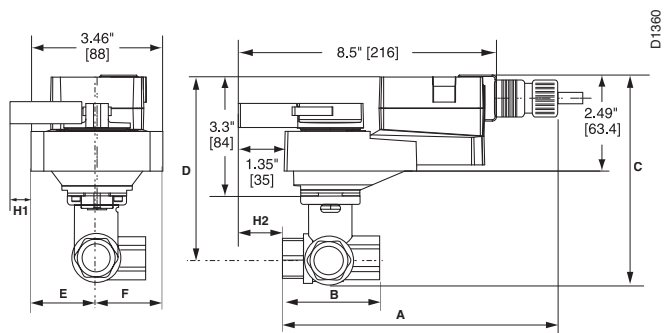
† Rated impulse voltage 800V, Control pollution degree 3, Type of action 1
(1.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

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Wiring Diagrams

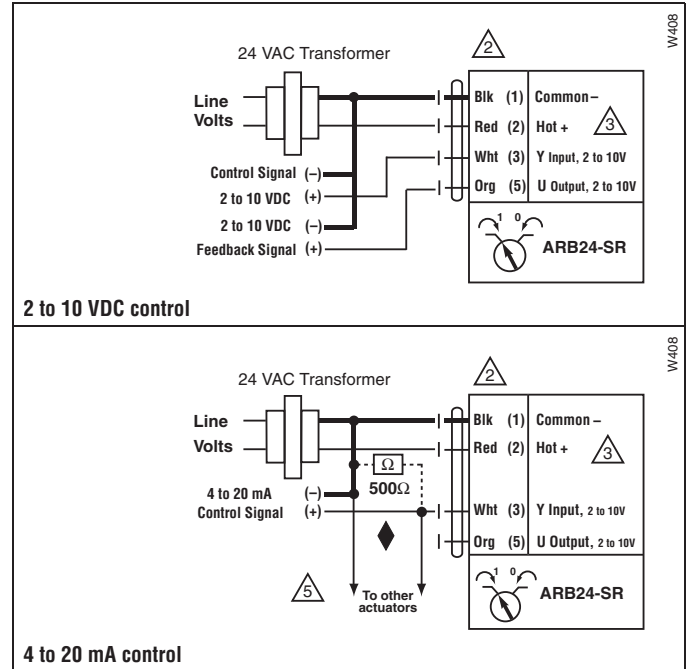
✂️ INSTALLATION NOTES

- ⚠️ **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- ⚠️ Actuators may also be powered by 24 VDC.
- ⚠️ Only connect common to neg. (-) leg of control circuits.

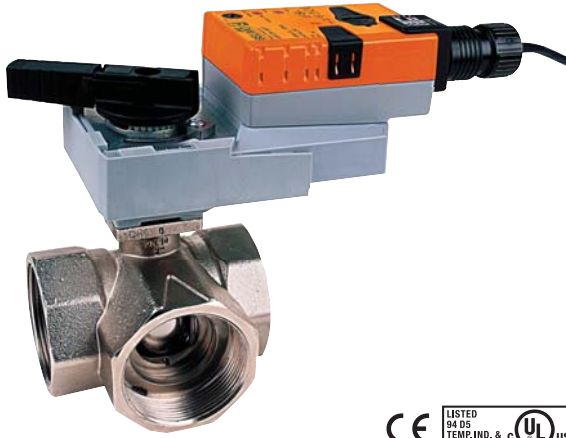
📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

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AR...120-3 Actuators, On/Off, Floating Point



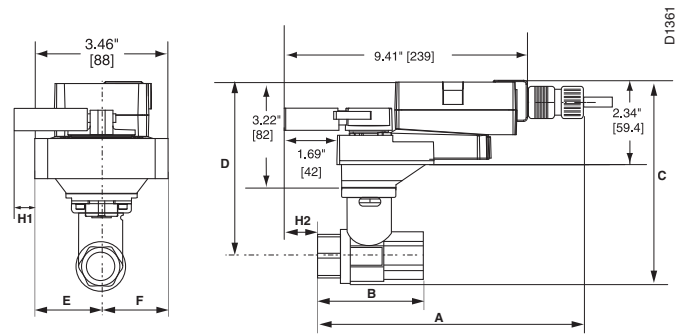
Models

ARB120-3
ARX120-3 Flexible Version

| Technical Data | |
|-----------------------|--|
| Control | on/off, floating point |
| Power supply | 100 to 240 VAC, 50/60 Hz (nominal) 85 to 265 VAC, 50/60 Hz (tolerance) |
| Power consumption | running 3 W |
| | holding 0.6 W |
| Transformer sizing | 7 VA (class 2 power source) |
| Electrical connection | ½" conduit connector |
| | 18 GA appliance rated cable |
| | ARB120-3 3 ft [1m] ARX120-3 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | 90 seconds |
| | ARB120-3 300, 150, 90 seconds, ARX120-3 constant independent of load |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <45 dB(A) |
| Servicing | maintenance free |
| Quality standard | ISO 9001 |

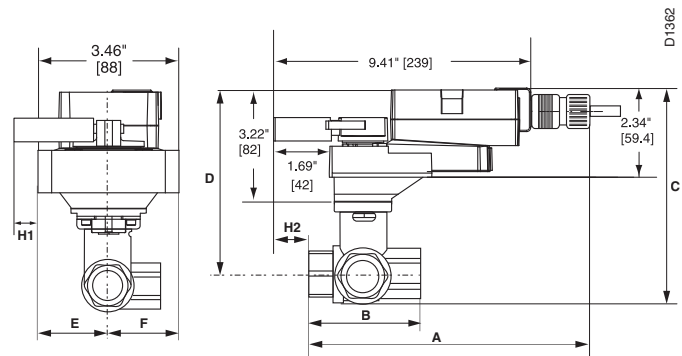
† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Dimensions with 2-Way Valve



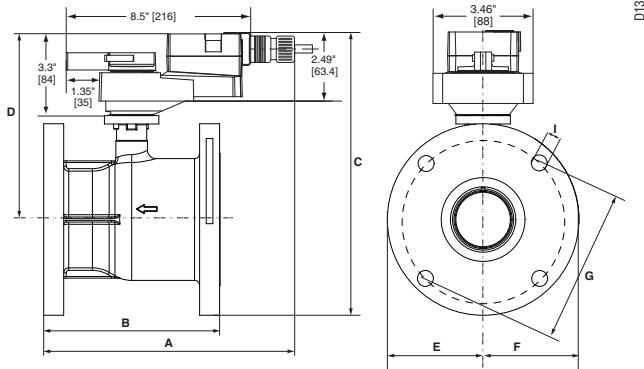
| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

Dimensions



D1373

| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|---------------|
| | | | A | B | C |
| B6250 | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] |
| B6300 | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] |
| B6400 | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |

Wiring Diagrams

INSTALLATION NOTES

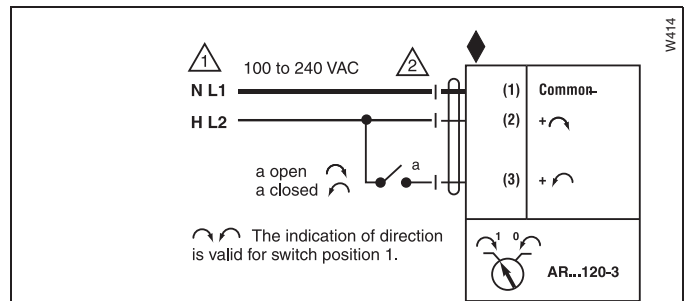
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel. Power consumption and input impedance must be observed.

APPLICATION NOTES

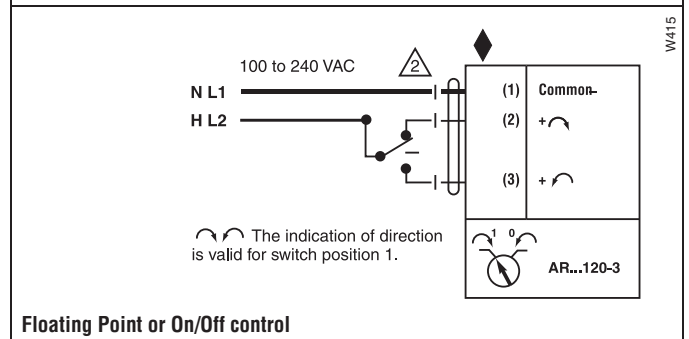
- Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

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On/Off control



Floating Point or On/Off control



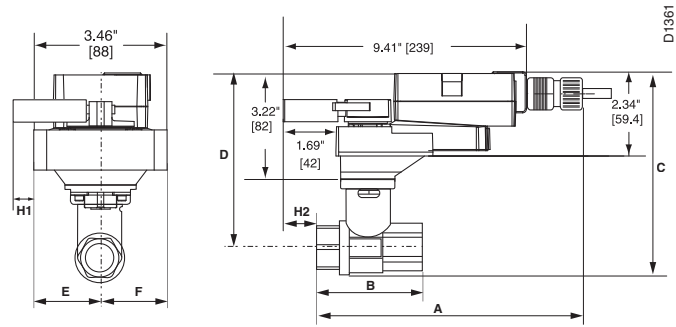
Models

ARB120-SR
ARX120-SR Flexible Version

| Technical Data | |
|-----------------------|---|
| Control | on/off, floating point |
| Power supply | 100 to 240 VAC, 50/60 Hz (nominal) 85 to 265 VAC, 50/60 Hz (tolerance) |
| Power consumption | running 3 W |
| | holding 0.6 W |
| Transformer sizing | 7.5 VA (class 2 power source) |
| Electrical connection | 1/2" conduit connector |
| | 18 GA plenum rated cable |
| | ARB120-SR 3 ft [1m] ARX120-SR 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Feedback output U | 1 to 10 VDC, max 0.5 mA |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | ARB120-SR 90 seconds |
| | ARX120-SR 300, 150, 90 seconds, constant independent of load |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <45 dB(A) |
| Servicing | maintenance free |
| Quality standard | ISO 9001 |

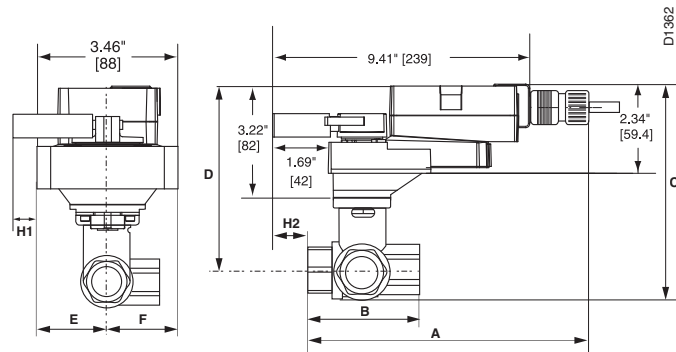
† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

Wiring Diagrams

✂️ INSTALLATION NOTES



CAUTION Equipment damage!

Actuators may be connected in parallel.
Power consumption and input impedance must be observed.



Only connect common to neg. (-) leg of control circuits.



A 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.



ARB(X) can be supplied with both 120 VAC and 230 VAC.



All 120 VAC and 230 VAC actuators use appliance rated cables.



APPLICATION NOTES

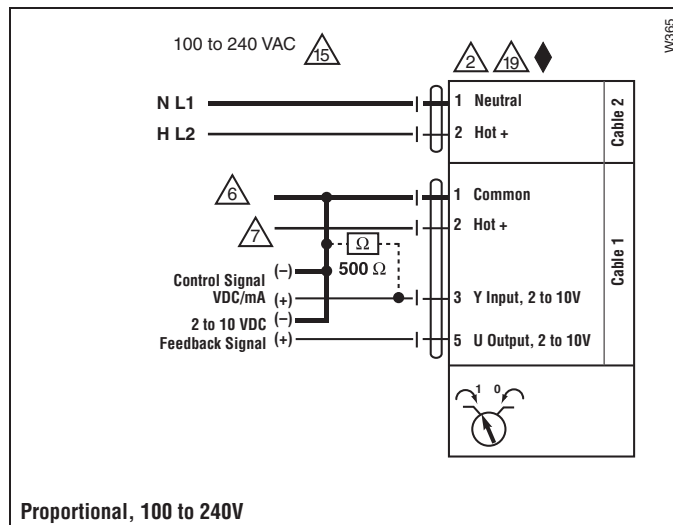


Meets cULus or UL and CSA requirements without the need of an electrical ground connection.



WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





MFT



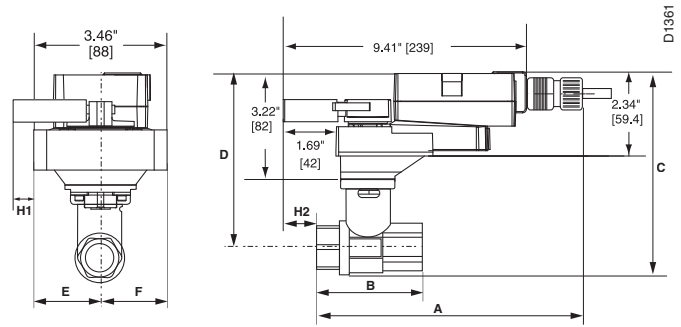
Models

ARX24-MFT
ARX24-MFT-5-14

| Technical Data | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 4 W holding 1.25 W |
| Transformer sizing | 6 VA (class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable ARX24-MFT 3 ft. [1m], 10 ft. [3m], 16 ft. [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off) |
| Feedback output U | 2 to 10 VDC, 0.5 mA max VDC variable |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω 1500 Ω (PWM, floating point, on/off) |
| Angle of rotation | 95° electronically variable |
| Direction of rotation | reversible with protected switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | ARB24-MFT 150 seconds ARX24-MFT variable (90 to 350 seconds) |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

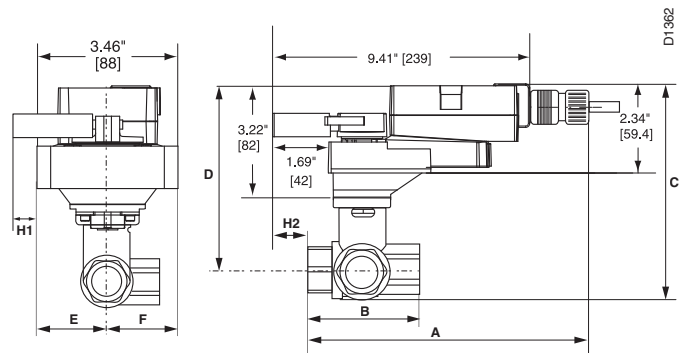
† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Dimensions with 2-Way Valve



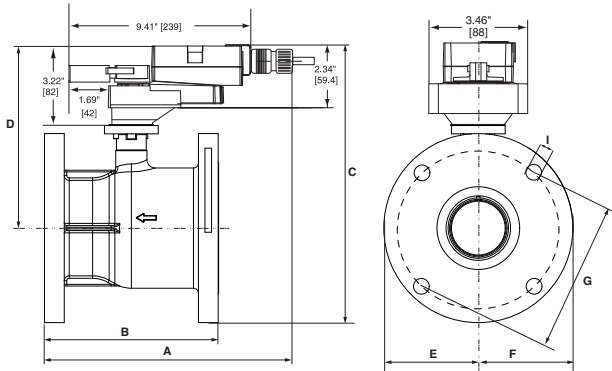
| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 1.98" [50.4] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 1.98" [50.4] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.21" [56.2] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.45" [62.2] | 2.33" [59.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.68" [68.0] | 2.60" [66.0] |

Dimensions



| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|---------------|
| | | | A | B | C |
| B6250 | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] |
| B6300 | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] |
| B6400 | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |

Wiring Diagrams

INSTALLATION NOTES

- 2** **CAUTION** *Equipment damage!*
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3** Actuators may also be powered by 24 VDC.
- 4** Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 6** Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8** Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
- 9** For triac sink the common connection from the actuator must be connected to the hot connection.

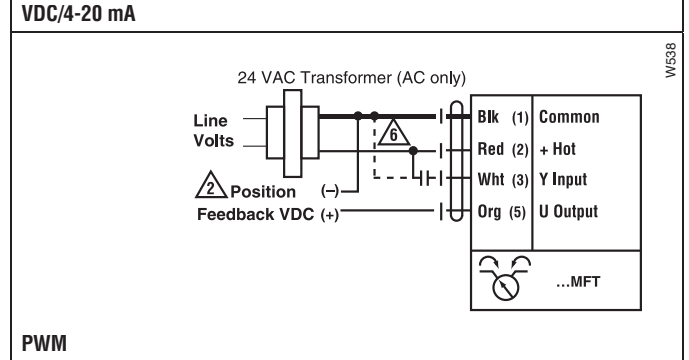
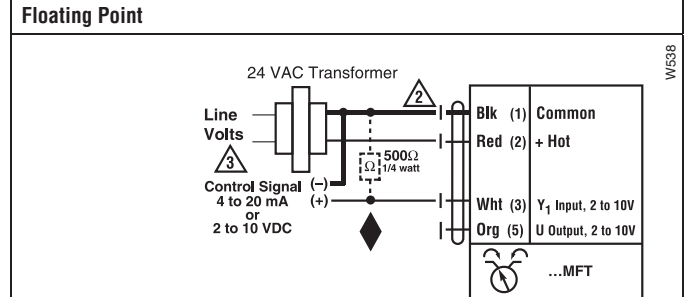
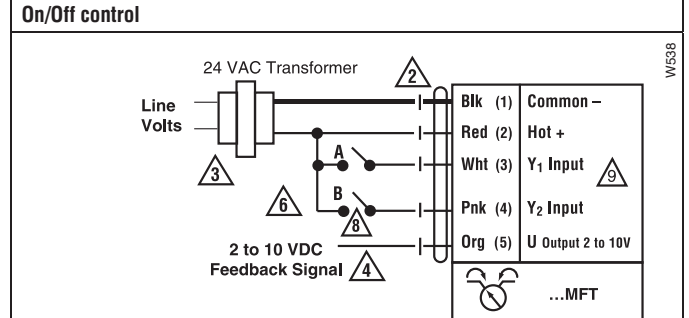
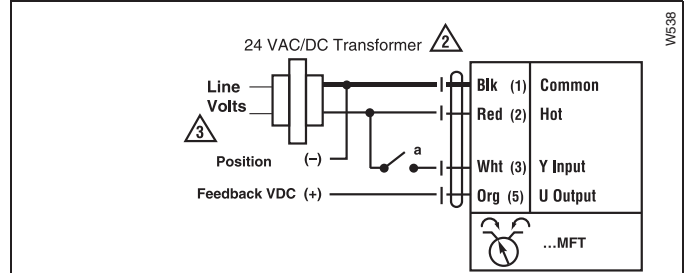
APPLICATION NOTES

- ◆** The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING *Live Electrical Components!*

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

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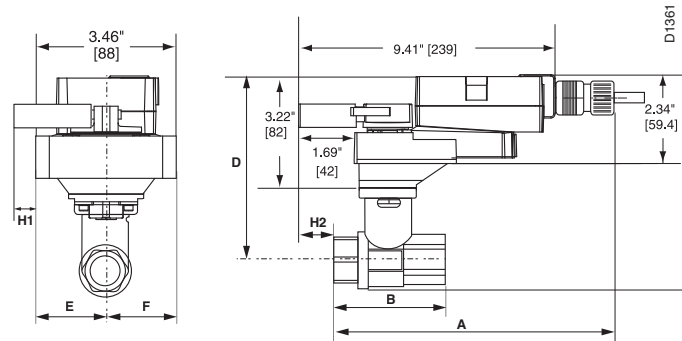
Models

ARX24-PC

| Technical Data | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 4 W holding 1.25 W |
| Transformer sizing | 5.5 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable 3 ft. [1m], 10 ft. [3m], 16 ft. [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range Y | 0 to 20V phasecut |
| Feedback output U | 2 to 10 VDC, 0.5mA max VDC variable |
| Input impedance | 8 kΩ (50 mW) |
| Angle of rotation | 90°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | 150 seconds (default) |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

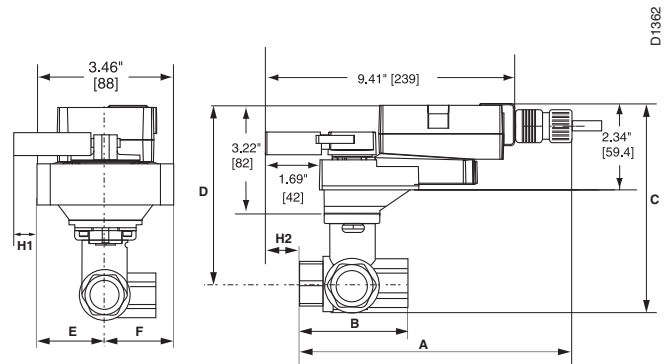
†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |


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Wiring Diagrams

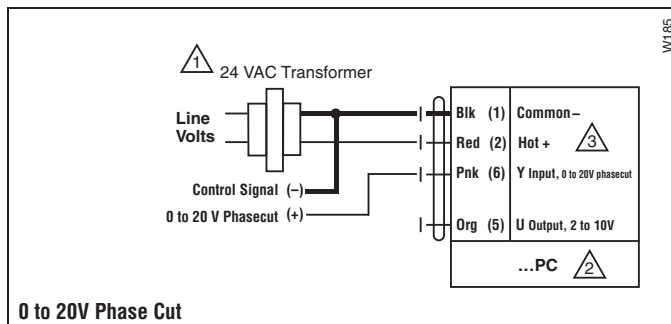
INSTALLATION NOTES

 Provide overload protection and disconnect as required.

 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

 Actuators may also be powered by 24 VDC.

 **WARNING Live Electrical Components!**
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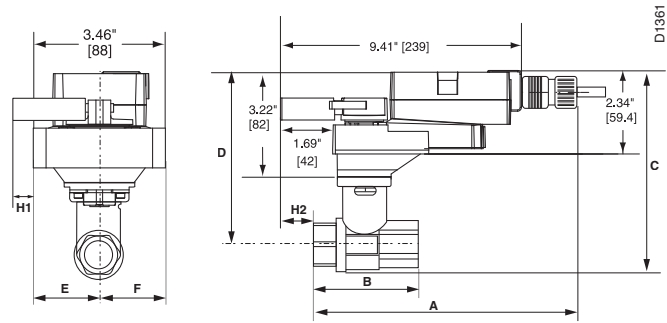
Models

ARX24-MFT95

| Technical Data | |
|-----------------------|---|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 4 W holding 1.25 W |
| Transformer sizing | 6 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector 18 GA plenum rated cable 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range WRB | 0 to 135 Ω Honeywell Electronic Series 90, 0 to 135 Ω input |
| Feedback output U | 2 to 10 VDC, 0.5mA max |
| Input impedance | 100 kΩ (0.1 mW) |
| Angle of rotation | 90°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with ↻/↻ switch |
| Position indication | handle |
| Manual override | external push button |
| Running time | 150 seconds (default) variable (90 to 350 seconds) |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

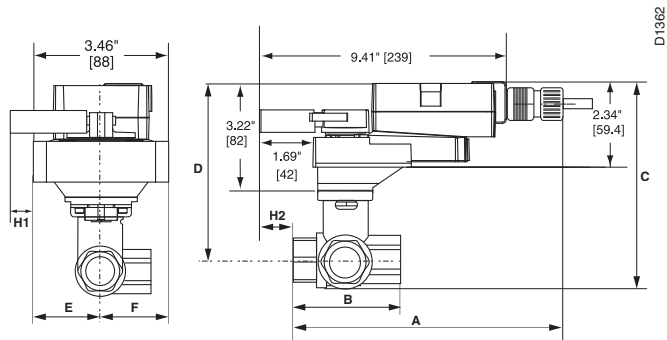
†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

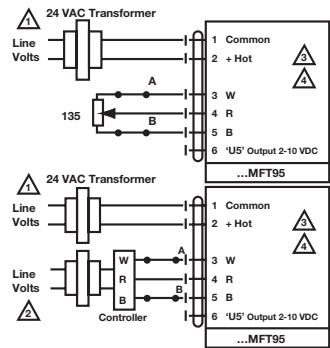
Wiring Diagrams

✂️ INSTALLATION NOTES

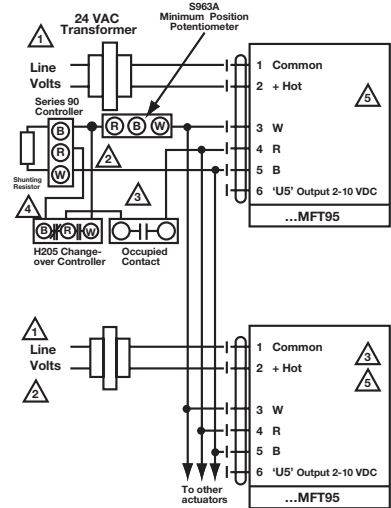
- 1 Provide overload protection and disconnect as required.
 - 2 **CAUTION Equipment damage!**
Actuators and controller must have separate transformers.
 - 3 Consult controller instruction data for more detailed installation information.
 - 4 Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell resistor kits may also be used.
 - 5 To reverse control rotation, use the reversing switch.
- ⚠️ WARNING Live Electrical Components!**
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| Switch A | Switch B | Damper Position |
|----------|----------|-----------------|
| | | Damper Open |
| | | Damper Closed |

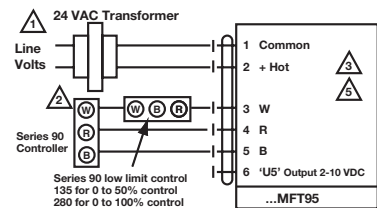
The direction of rotation switch is set so that the fail safe position and the position of the damper is closed with no signal at wire R.



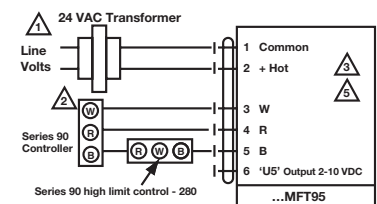
Override



Wiring multiple actuators to a Series 90 controller using a minimum position potentiometer.



Low Limit Control



High Limit Control



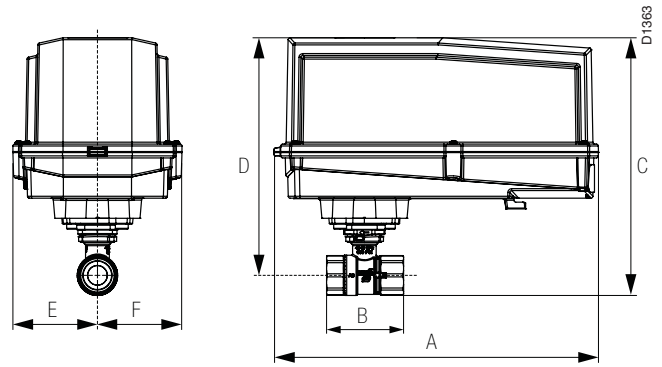
Models

- ARB24-3-T N4
- ARB24-3-T N4H w/built in heater
- ARX24-3-T N4
- ARX24-3-T N4H w/built in heater

| Technical Data | |
|-----------------------|--|
| Control | on/off, floating point |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W / heater 23 W holding 0.5 W |
| Transformer sizing | 5.5 VA (class 2 power source) / heater 20.5 VA |
| Electrical connection | screw terminal (for 26 to 14 GA wire) |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | visual pointer |
| Manual override | external push button |
| Running time | 90 seconds constant independent of load |
| Humidity | 100% RH |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing type | UL Type 4X/NEMA 4X/IP66 & IP67 |
| Housing material | Polypropelene |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC. |
| Quality standard | ISO 9001 |

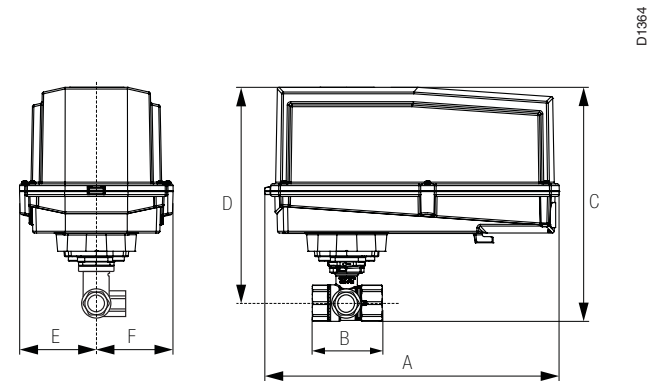
†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3
*Cannot be used with the CCV-EXT-KIT

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

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Wiring Diagrams

✂️ INSTALLATION NOTES



CAUTION Equipment damage!

Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
For end position indication, interlock control, etc.,



ARB24-3-S incorporates one built-in auxiliary switches:
1 x SPDT, 3A (0.5A) @250 VAC, UL listed, adjustable 0° to 95°.



Actuators may also be powered by 24 VDC.



APPLICATION NOTES

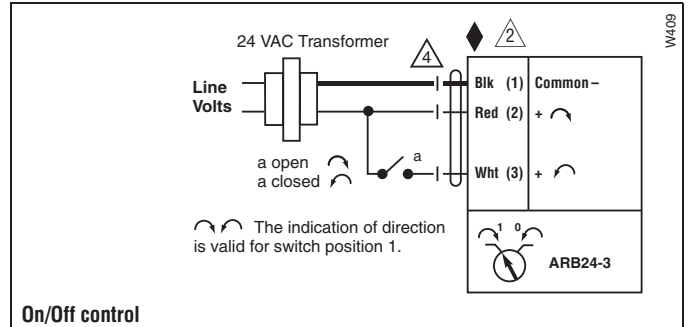


Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

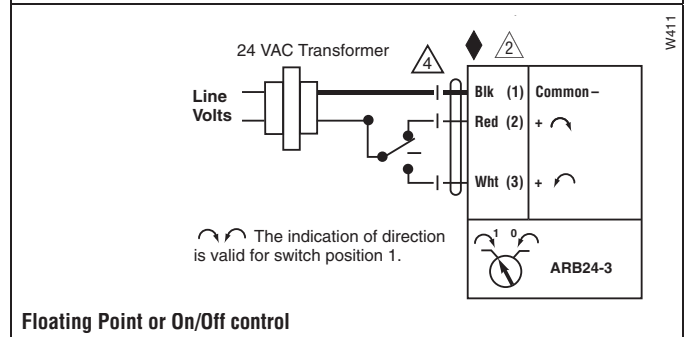


WARNING Live Electrical Components!

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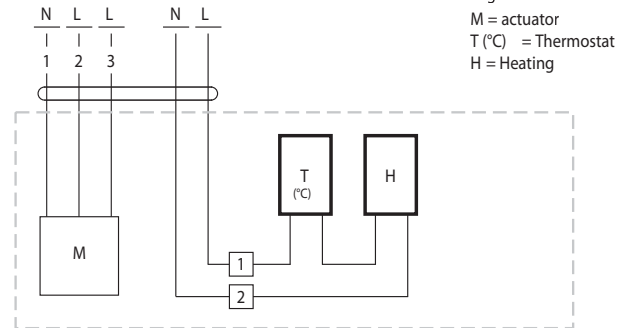


On/Off control



Floating Point or On/Off control

with actuator types ...3



Note

- The following points must be taken into account with independent, external wiring:
- All contact between the cables or wires that are introduced and the heating element is to be avoided.
 - Where necessary, use cables with sufficient numbers of wires, e.g. so that the heating and the actuator can be supplied separately with voltage.

Heater wiring



Models

| | |
|----------------|-------------------|
| ARB24-SR-T N4 | |
| ARB24-SR-T N4H | w/built in heater |
| ARX24-SR-T N4 | |
| ARX24-SR-T N4H | w/built in heater |

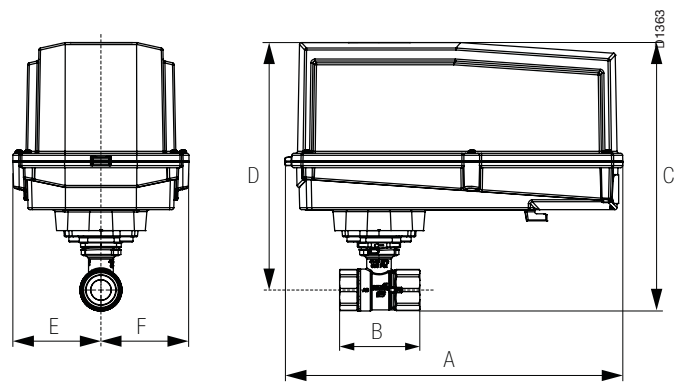
Technical Data

| | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W / heater 23 W holding 0.4 W |
| Transformer sizing | 5 VA (class 2 power source) / heater 20 VA |
| Electrical connection | screw terminal (for 26 tp 14 GA wire) |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA |
| Input impedance | 600 Ω |
| Angle of rotation | 90°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | visual pointer |
| Manual override | external push button |
| Running time | 90 seconds constant independent of load |
| Humidity | 100% RH |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing type | UL Type 4X/NEMA 4X/IP66 & IP67 |
| Housing material | Polypropelene |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC. |
| Quality standard | ISO 9001 |

†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3

*Cannot be used with the CCV-EXT-KIT

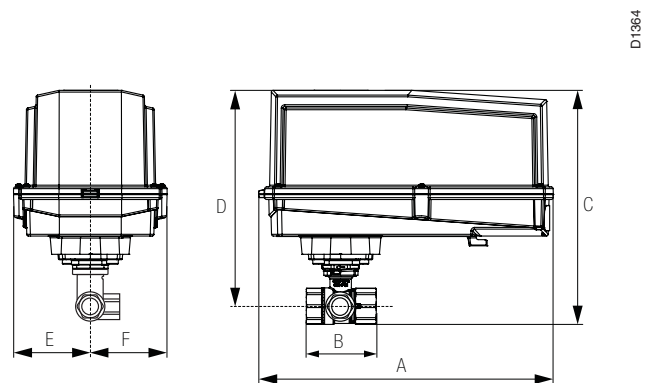
Dimensions with 2-Way Valve



ARB N4, ARX N4, NRB N4, NRX N4

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



D1364

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

Wiring Diagrams

✂ INSTALLATION NOTES

- ⚠ **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- ⚠ **3** Actuators may also be powered by 24 VDC.
- ⚠ **5** Only connect common to neg. (-) leg of control circuits.

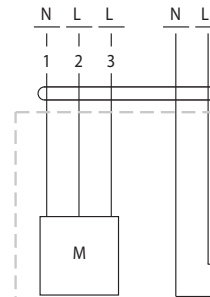
📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

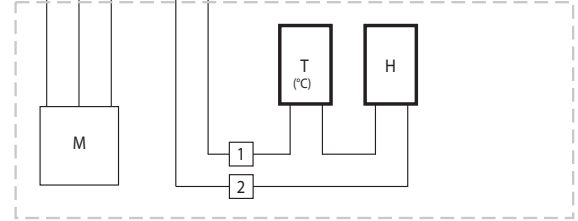
- ⚠ **WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Wiring Diagrams

with actuator types ...3



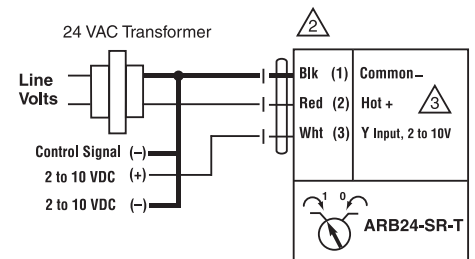
Legend:
M = actuator
T (°C) = Thermostat
H = Heating



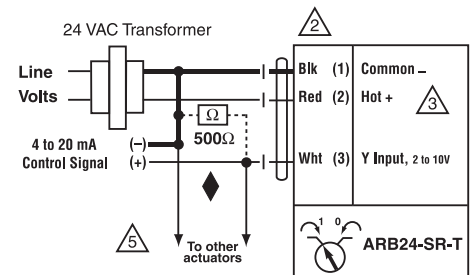
Note

- The following points must be taken into account with independent, external wiring:
- All contact between the cables or wires that are introduced and the heating element is to be avoided.
 - Where necessary, use cables with sufficient numbers of wires, e.g. so that the heating and the actuator can be supplied separately with voltage.

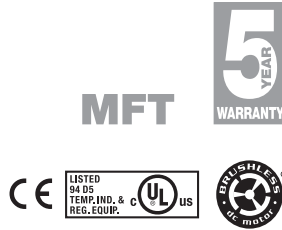
Heater wiring



2 to 10 VDC control



4 to 20 mA control



Models

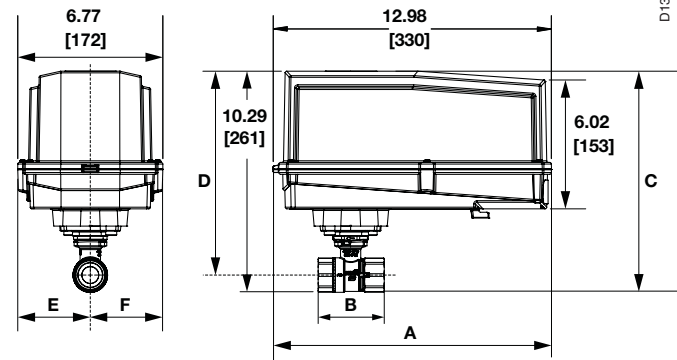
ARX24-MFT-T N4
ARX24-MFT-T N4H w/built in heater

| Technical Data | |
|-----------------------|--|
| Control | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off) |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 3.5 W / heater 24 W holding 1.25 W |
| Transformer sizing | 6 VA (class 2 power source) / heater 21 VA |
| Electrical connection | screw terminal (for 26 tp 14 GA wire) |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1500 Ω for PWM, floating point and on/off control |
| Angle of rotation | 95°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with switch |
| Position indication | visual pointer |
| Manual override | external push button |
| Running time | 150 seconds (default) constant independent of load variable (75 to 350 seconds) |
| Humidity | 100% RH |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing type | UL Type 4X/NEMA 4X/IP66 & IP67 |
| Housing material | Polypropelene |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC. |
| Quality standard | ISO 9001 |

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

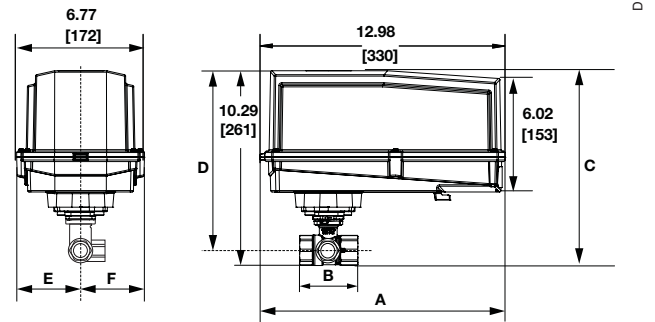
*Cannot be used with the CCV-EXT-KIT

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.27" [57.7] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

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Wiring Diagrams

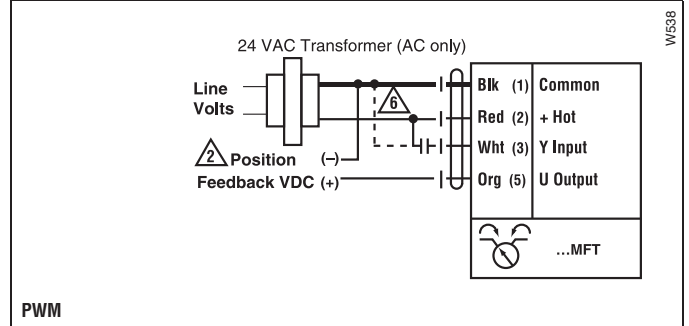
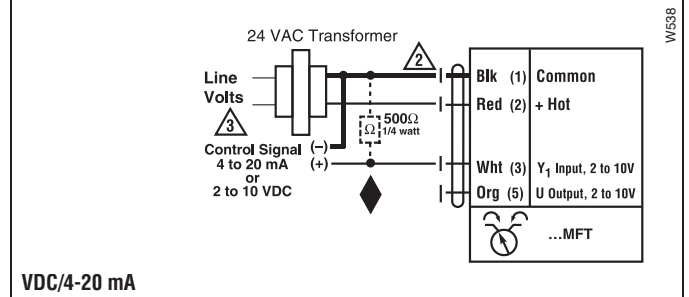
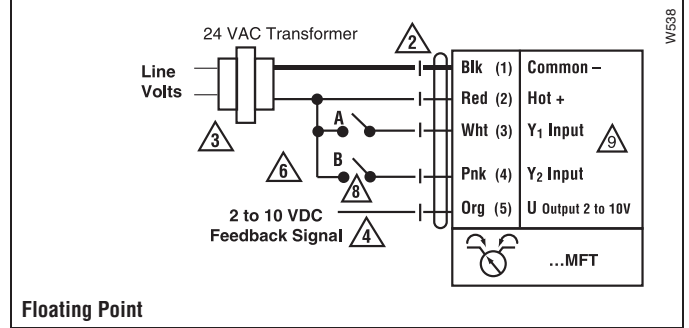
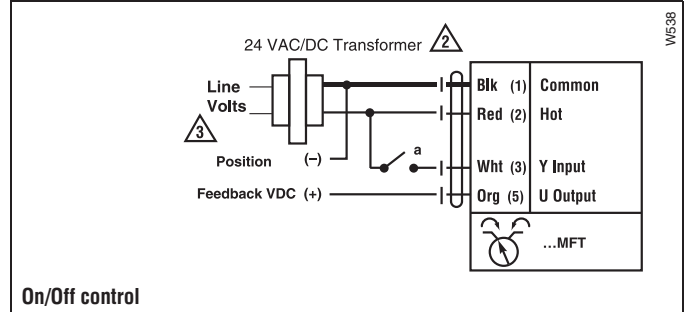
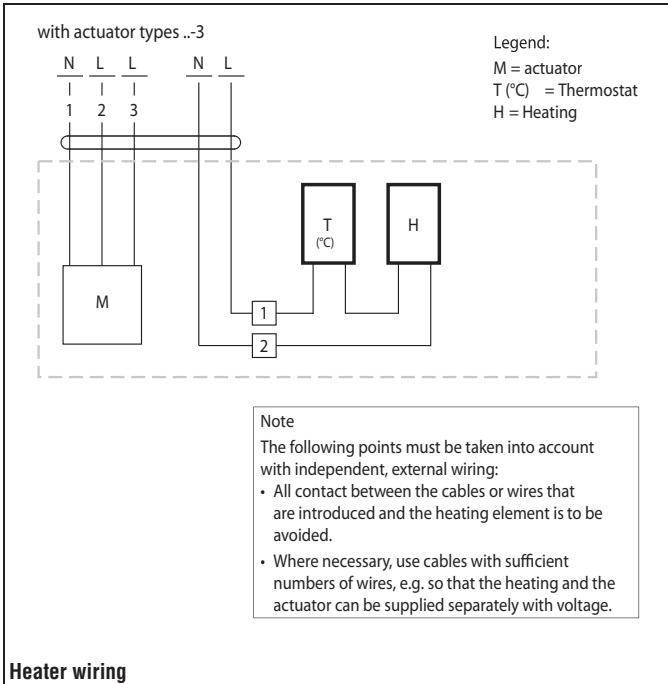
INSTALLATION NOTES

- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.
- 6 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs.
- 8 A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection.

APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



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ARQX24-1 Quick Running Actuators, On/Off



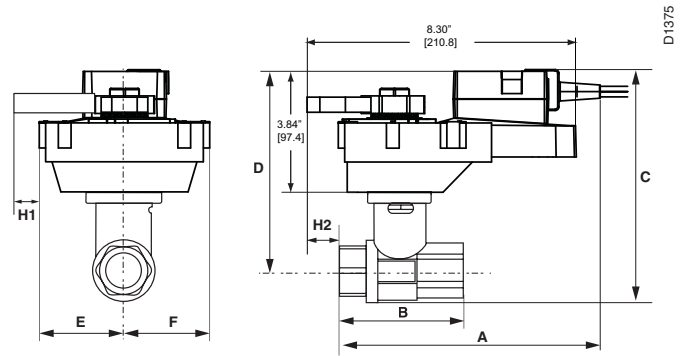
Models

ARQX24-1 Flexible Version

| Technical Data | |
|-----------------------|--|
| Control | on/off |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 15 W holding 1.5 W |
| Transformer sizing | 26 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector, 18 GA plenum rated cable 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Input impedance | 100 Ω |
| Angle of rotation | max 95°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | reflective visual indicator (snap-on) |
| Manual override | external push button |
| Running time | constant of independent load 10 or 15 seconds |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <52 dB(A) |
| Quality standard | ISO 9001 |

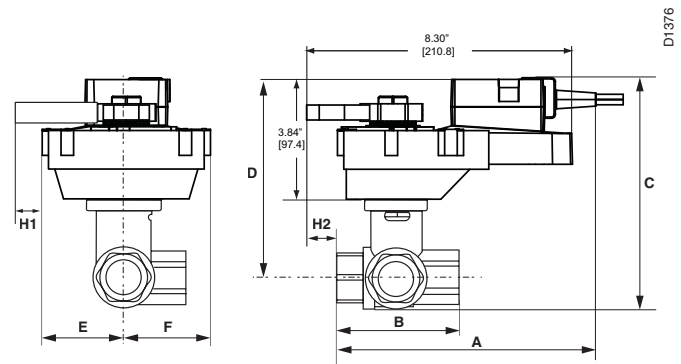
Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B248-B280 | 2" | 50 | 4.21" [107] | 2.27" [57.7] |

Dimensions with 3-Way Valve





| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B330-B332 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B340 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.90" [61.1] |
| B348-B352 | 2" | 50 | 4.95" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

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Wiring Diagrams

INSTALLATION NOTES

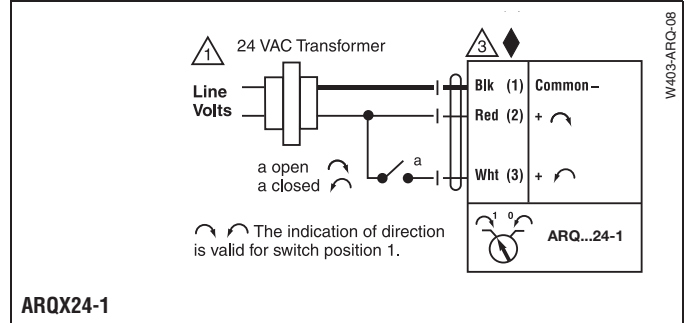
-  Provide overload protection and disconnect as required.
-  Actuators may also be powered by 24 VDC.

APPLICATION NOTES

-  Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





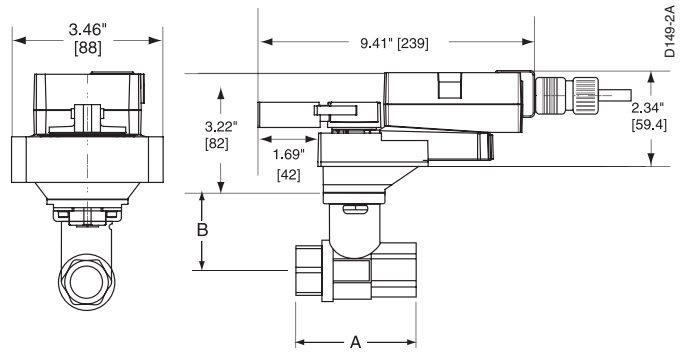
Models

ARQX24-MFT Flexible Version

| Technical Data | |
|-----------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 15 W holding 1.5 W |
| Transformer sizing | 26 VA (Class 2 power source) |
| Electrical connection | ½" conduit connector, 18 GA plenum rated cable 3 ft [1m], 10 ft [3m], 16 ft [5m] |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, on/off) |
| Feedback output U | 2 to 10 VDC, 0.5mA max VDC variable |
| Input impedance | 100 kΩ (0.1 mA), 500 Ω, 1500 Ω (on/off) |
| Angle of rotation | max 95°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with ↻/↻ switch |
| Position indication | reflective visual indicator (snap-on) |
| Manual override | external push button |
| Running time | constant of independent load 10 or 15 seconds |
| Humidity | 5 to 95% RH non-condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54 |
| Housing material | UL94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level | <52 dB(A) |
| Quality standard | ISO 9001 |

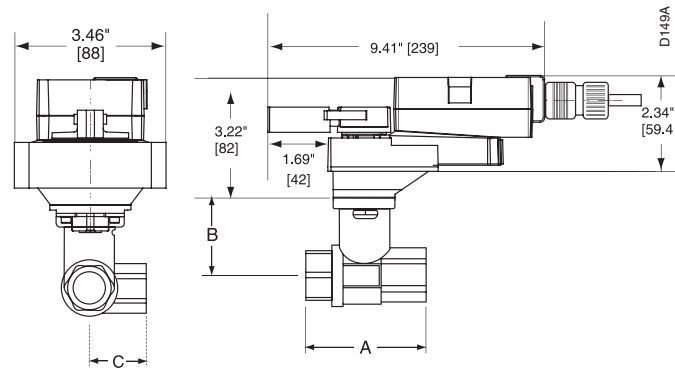
Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1¼" | 32 | 3.72" [94.6] | 2.04" [51.9] |
| B238-B240 | 1½" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2½" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B330-B332 | 1¼" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B340 | 1½" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.90" [61.1] |
| B348-B352 | 2" | 50 | 4.95" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

Wiring Diagrams

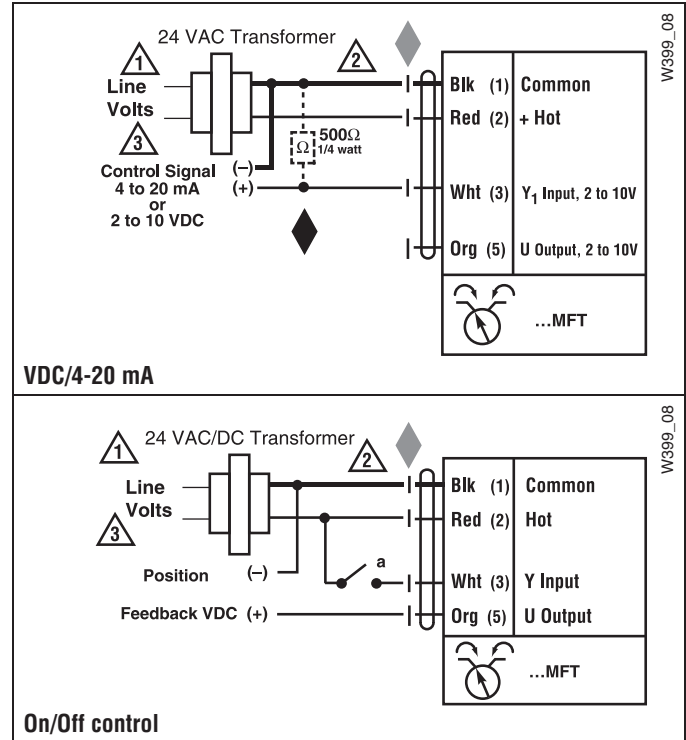
✂️ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor may be used.

⚠️ WARNING Live Electrical Components!
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



GRB24-3, GRX24-3 Actuators, On/Off, Floating Point



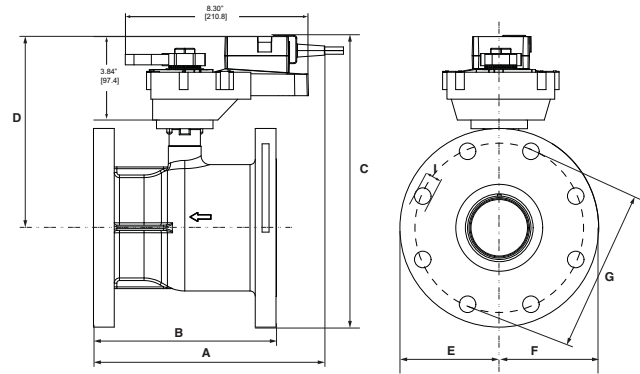
Models

GRB24-3-5-14
GRX24-3-5-14

| Technical Data | |
|-----------------------|---|
| Control | on/off, floating point |
| Power supply | 24 VAC ± 20% 50/60 Hz |
| Power consumption | running 4 W holding 2 W |
| Transformer sizing | 6 VA (Class 2 power source) |
| Electrical connection | 3 ft, 18 GA plenum rated cable ½" conduit connector GRX 3 ft. [1m], 10 ft. [3m], 16 ft. [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 600 Ω |
| Angle of rotation | max. 95°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | visual indicator |
| Running time | 150 seconds, constant independent of load |
| Manual override | external push button |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Housing | NEMA 2/IP54, Enclosure Type 2 |
| Agency listings † | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EEC and 2006/95/EC. |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

Dimensions





D1377

| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|----------------|
| | | | A | B | C |
| B6400 | 4" [100] | F05 | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |
| B6500 | 5" [125] | | 10.00" [254] | 10.30" [261.6] | 10.50" [266.4] |
| B6600 | 6" [150] | | 11.00" [279.4] | 12.50" [317.5] | 11.70" [296.9] |


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Wiring Diagrams

INSTALLATION NOTES

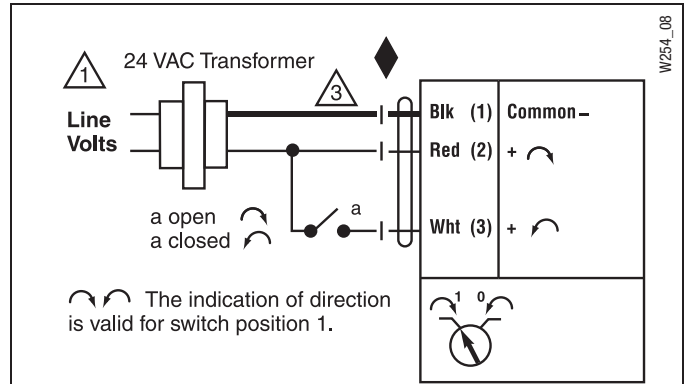
-  Provide overload protection and disconnect as required.
-  Actuators may also be powered by 24 VDC.

APPLICATION NOTES

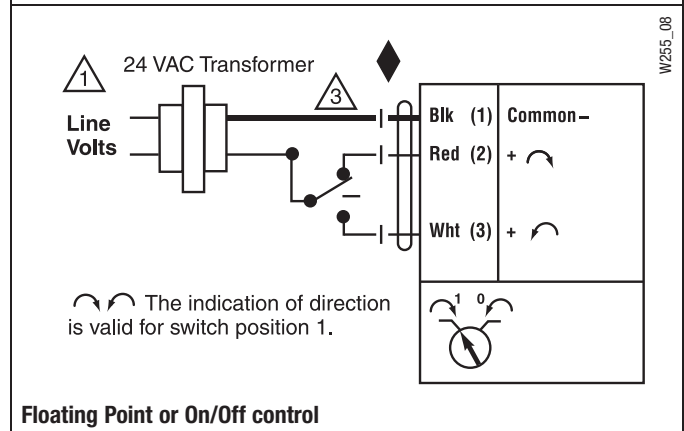
-  Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



On/Off control



Floating Point or On/Off control



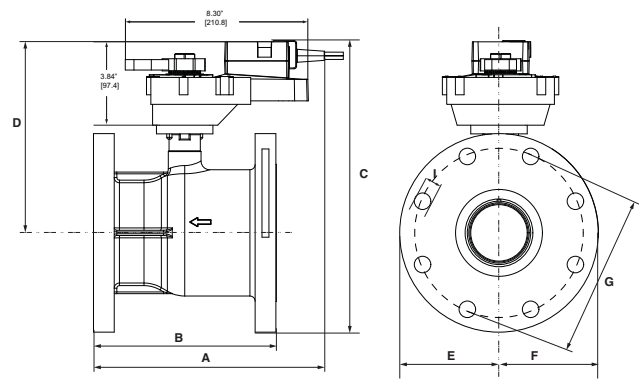
Models
GRB120-3
GRX120-3

Technical Data

| | |
|-----------------------|---|
| Power Supply | 100 to 240 VAC, 50/60 Hz (nominal) 85 to 265 VAC, 50/60 Hz (tolerance) |
| Power consumption | running 4 W holding 2 W |
| Transformer sizing | 7 VA (Class 2 power source) |
| Electrical connection | 18 GA appliance rated cable ½" conduit connector 3 ft. [1m], 10 ft. [3m], 16 ft. [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Control | on/off, floating point |
| Input impedance | 600 Ω |
| Angle of rotation | max. 95°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | external push button |
| Running time | 150 seconds, constant independent of load |
| Humidity | 5 to 95% RH non condensing (EN 60730-1) |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Housing | NEMA 2/IP54, Enclosure Type 2 |
| Housing material | UL94-5VA |
| Agency listings † | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EEC and 2006/95/EC. |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

Dimensions



D1377

| Valve Body | Nominal Pipe Size | Top Flange Design | Face-to-Face Length | | Height |
|------------|-------------------|-------------------|---------------------|----------------|----------------|
| | | | A | B | C |
| B6400 | 4" [100] | F05 | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |
| B6500 | 5" [125] | | 10.00" [254] | 10.30" [261.6] | 10.50" [266.4] |
| B6600 | 6" [150] | | 11.00" [279.4] | 12.50" [317.5] | 11.70" [296.9] |

Wiring Diagrams

✂️ INSTALLATION NOTES

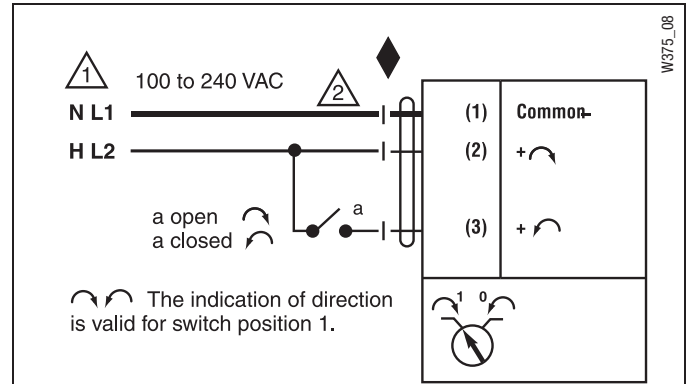
- 1 Provide overload protection and disconnect as required.
- 2 Actuators may be connected in parallel. Power consumption and input impedance must be observed.

📄 APPLICATION NOTES

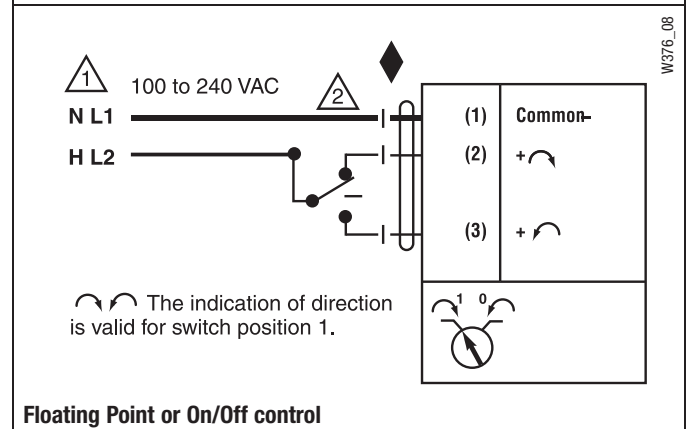
- ◆ Meets cULus requirements without the need of an electrical ground connection.

⚠️ WARNING Live Electrical Components!

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On/Off control



Floating Point or On/Off control



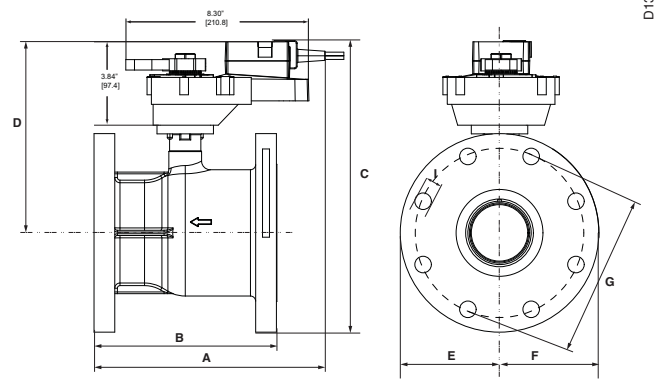
Models

GRX24-MFT-5-14

| Technical Data | |
|-----------------------|---|
| Control | 2 to 10 VDC, 4 to 40 mA (default) variable (VDC, PWM, floating point, on/off) |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 4.5 W holding 1.5 W |
| Transformer sizing | 7 VA (Class 2 power source) |
| Electrical connection | 3 ft, 18 GA plenum rated cable ½" conduit connector 3 ft. [1m], 10 ft. [3m], 16 ft. [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Feedback output | 2 to 10 VDC, 0.5 mA max, VDC variable |
| Input impedance | 100 kΩ (0.1 mA, 500 Ω) 1500 Ω (PWM, floating point, on/off) |
| Angle of rotation | max. 95°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with switch |
| Position indication | visual indicator |
| Running time | 150 seconds (default) variable (75 to 300 seconds) |
| Manual override | external push button |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Housing | NEMA 2/IP54, Enclosure Type 2 |
| Housing material | UL94-5V (flammability rating) |
| Agency listings † | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EEC and 2006/95/EC. |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

Dimensions



| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | | Face-to-Face Length | | Height |
|------------|-------------------|-------------------|-----------------|----------------|---------------------|----------------|--------|
| | | | A | B | B | C | |
| B6400 | 4" [100] | F05 | 9.00" [228.6] | 8.30" [210.8] | 8.30" [210.8] | 9.30" [235.9] | |
| B6500 | 5" [125] | | 10.00" [254] | 10.30" [261.6] | 10.30" [261.6] | 10.50" [266.4] | |
| B6600 | 6" [150] | | 11.00" [279.4] | 12.50" [317.5] | 12.50" [317.5] | 11.70" [296.9] | |

Wiring Diagrams

✂️ INSTALLATION NOTES

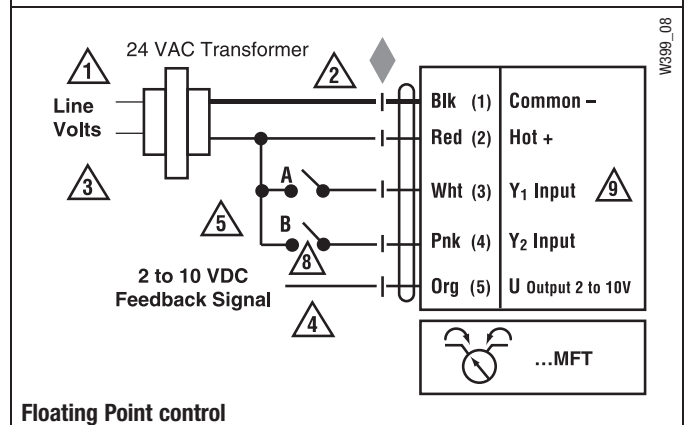
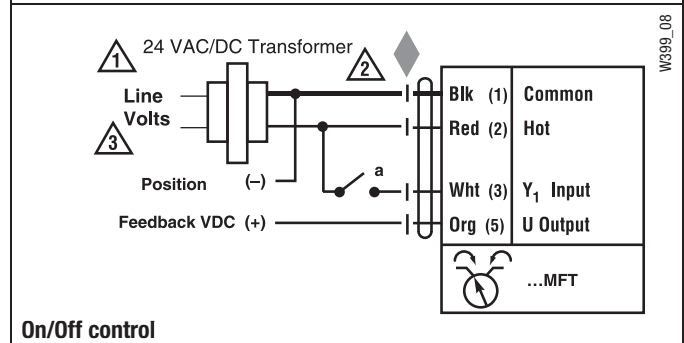
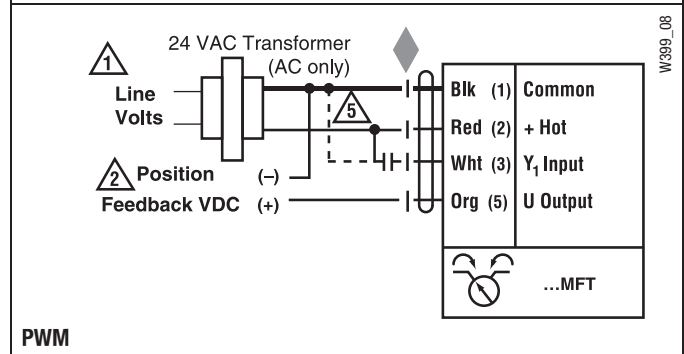
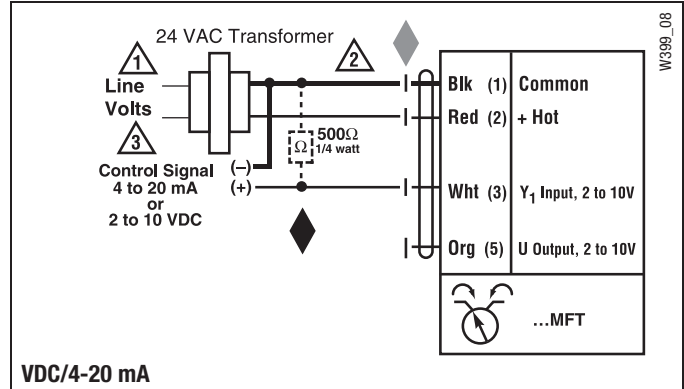
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

📄 APPLICATION NOTES

- ◆ Meets UL requirements without the need of an electrical ground connection.
- ◆ The ZG-R01 500 Ω resistor may be used.

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TFRB(X) Actuators, On/Off



Models

TFRB(X)24 TFRB(X)120
 TFRB(X)24-S TFRB(X)120-S w/built-in Aux. Switch

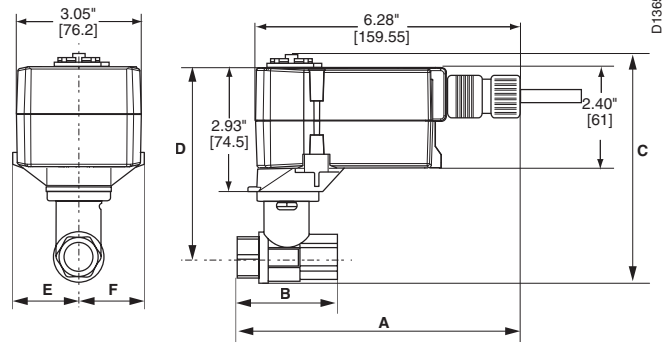
| Technical Data | | |
|---------------------------|---------------|---|
| Control | | on/off |
| Power supply | | 24VAC ± 20%, 50/60Hz |
| TFRB(X)24(-S) | | 24VDC ± 10% |
| TFRB(X)120(-S) | | (nominal) 100 to 240 VAC, 50/60 Hz |
| | | (tolerance) 85 to 265 VAC, 50/60 Hz |
| Power consumption | running | 2.5 W |
| | holding | 1.3 W |
| Transformer sizing | | 5 VA (class 2 power source) |
| TFRB(X)24(-S) | | 5 VA (class 2 power source) |
| TFRB(X)120(-S) | | 5 VA (class 2 power source) |
| Electrical connection | | 1/2" conduit connector |
| (-S models have 2 cables) | | 18 GA appliance cable |
| TFRB(X)24... | | 3 ft [1m] |
| TFRB(X)120 | | 10 ft [3m] |
| | | 16 ft [5m] |
| Overload protection | | electronic throughout 0° to 95° rotation |
| Angle of rotation | | 95° |
| Direction of rotation | | reversible with protected mounting |
| Position indication | | visual indicator, 0° to 95° |
| Running time | motor | <75 seconds (0 to 18 in-lb) |
| | spring | <75 sec @ -22°F to 122°F [-20°C to 50°C] |
| Humidity | | 5 to 95% RH non-condensing |
| Ambient temperature | | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | | -40°F to 176°F [-40°C to 80°C] |
| Housing | | NEMA type 2/IP42 |
| Housing material | | UL94 - 5VA |
| Agency listings† | | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level (max) | running | <40 db (A) |
| | spring return | <40 dB (A) |
| Quality standard | | ISO 9001 |

TFRB(X)...-S

Auxiliary switch 1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed adjustable 0° to 95°

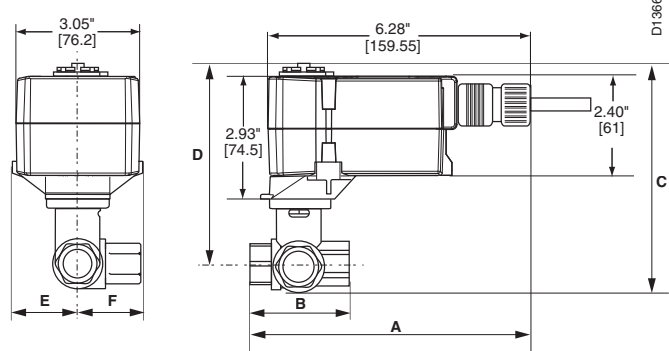
† Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3, Type of action 1.AA (1.AA.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | 1/2" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | 1/2" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | 1/2" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | 3/4" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |

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Wiring Diagrams

✂ **INSTALLATION NOTES**



CAUTION Equipment damage!

Actuators may be connected in parallel.
Power consumption and input impedance must be observed.



Actuators may also be powered by 24 VDC.



APPLICATION NOTES

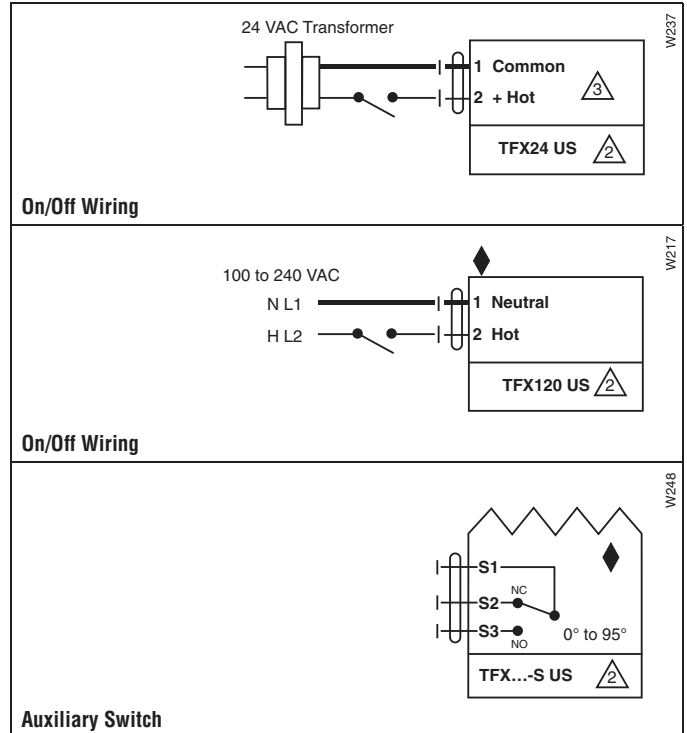


Meets cULus or UL and CSA requirements without the need of an electrical ground connection.



WARNING Live Electrical Components!

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TFRB(X)24-3 Actuators, Floating Point



Models

TFRB(X)24-3
TFRB(X)24-3-S w/built-in Aux. Switch

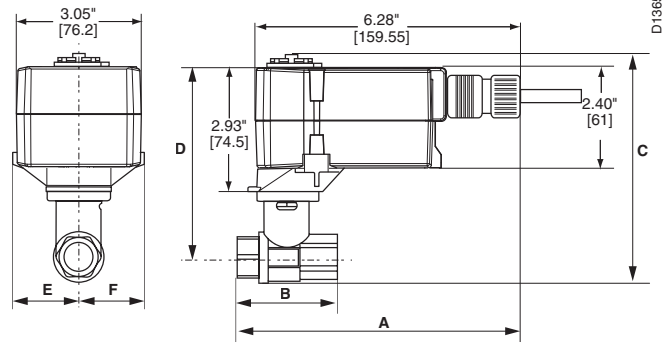
| Technical Data | |
|--|---|
| Control | floating point |
| Power supply | 24VAC ± 20%, 50/60Hz |
| Power consumption | running 2.5 W |
| | holding 1.0 W |
| Transformer sizing | 4 VA (class 2 power source) |
| Electrical connection (-S models have 2 cables) TFRB(X)24-3... | ½" conduit connector |
| | 18 GA plenum rated cable |
| | 3 ft [1m] |
| | 10 ft [3m] 16 ft [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 1000 Ω (0.6w) control inputs |
| Angle of rotation | 95° |
| Direction of rotation | spring reversible with CW/CCW mounting |
| | motor reversible with built-in switch |
| Position indication | visual indicator, 0° to 95° |
| Running time | motor 95 sec constant, independent of load |
| | spring <25 sec @ -4°F to 122°F [-20°C to 50°C] <60 sec @ -22°F [-30°C] |
| Humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA type 2/IP42 |
| Housing material | UL94 - 5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level (max) | running <35 db (A) |
| | spring return 62 db (A) |
| Quality standard | ISO 9001 |

TFRB(X)24-3-S US

Auxiliary switch 1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed, adjustable 0° to 95°

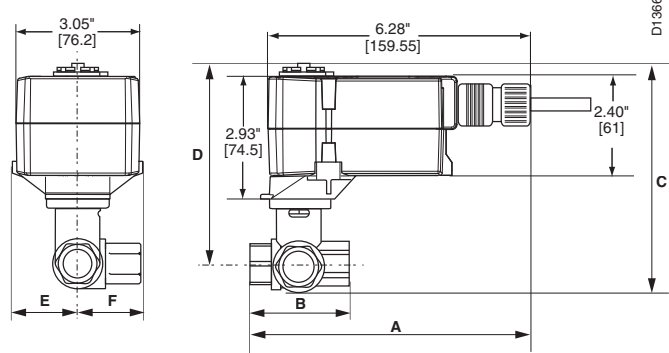
† Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3, Type of action 1.AA (1.AA.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |

Wiring Diagrams

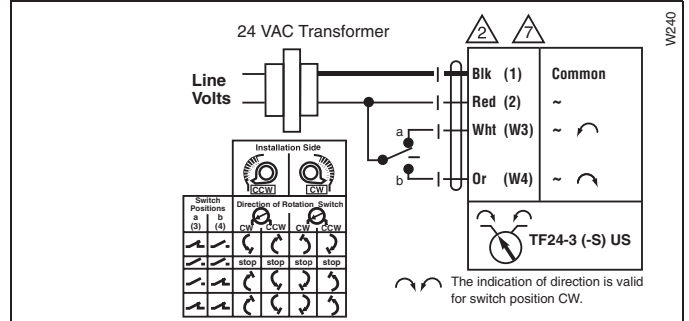
INSTALLATION NOTES

- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 The common connection from the actuator must be connected to the Hot connection of the controller.
- 4 The actuator Hot must be connected to the control board common.
- 5 For end position indication, interlock control, fan startup, etc., TF24-3-S US incorporates one built-in auxiliary switch: 1 x SPDT, 3A (0.5A) @250 VAC, UL listed, adjustable 0° to 95°.
- 7 Actuators with plenum rated cable do not have numbers on wires; use color coded instead. Actuators with appliance rated cable use numbers.

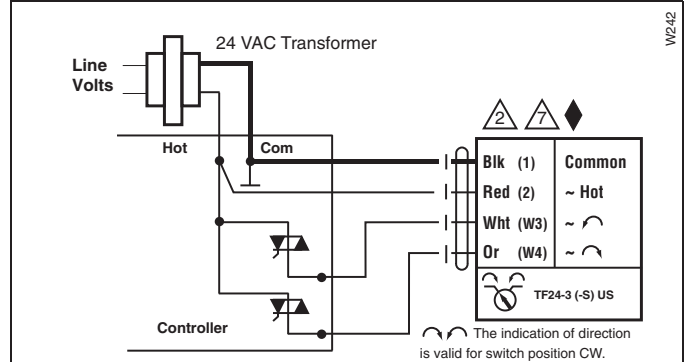
APPLICATION NOTES

- Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

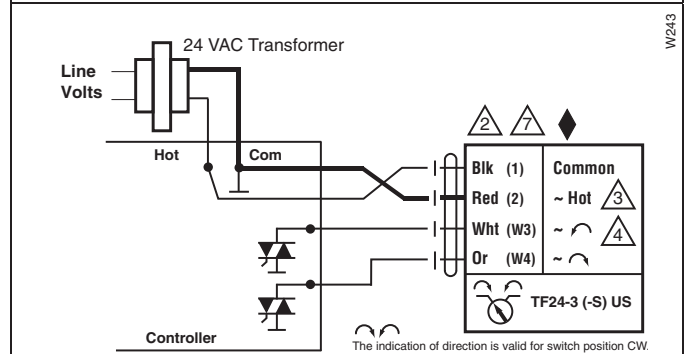
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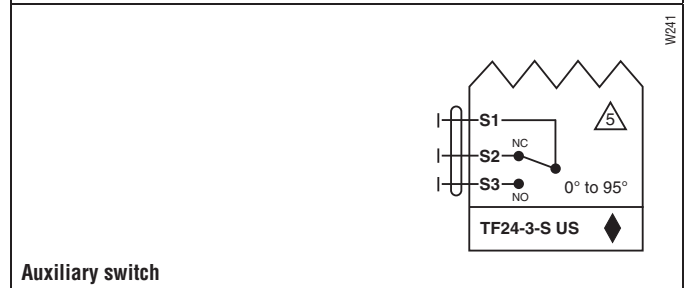
Floating point control



Triac source



Triac sink with separate transformers



Auxiliary switch

TFRB(X)24-SR Actuators, Proportional



Models

TFRB(X)24-SR
TFRB(X)24-SR-S w/built-in Aux. Switch

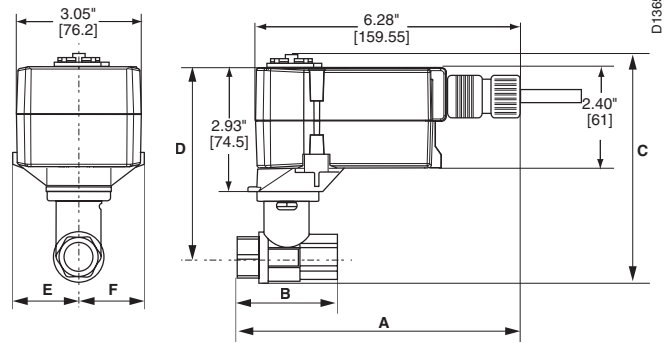
| Technical Data | |
|---|---|
| Control | proportional |
| Power supply | 24 VAC ± 20%, 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W holding 1.0 W |
| Transformer sizing | 4 VA (class 2 power source) |
| Electrical connection (-S models have 2 cables) TFRB(X)24-SR... | ½" conduit connector 18 GA plenum rated cable 3 ft [1m] 10 ft [3m] 16 ft [5m] |
| Electrical protection | actuators are double insulated |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20 mA |
| Input impedance | 100k Ω (0.1mA), 500 Ω |
| Angle of rotation | 95° |
| Direction of rotation | spring reversible with CW/CCW mounting motor reversible with built-in switch |
| Position indication | visual indicator, 0° to 95° |
| Running time | motor 95 sec constant, independent of load spring <25 sec @ -4°F to 122°F [-20°C to 50°C] <60 sec @ -22°F [-30°C] |
| Humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA type 2/IP42 |
| Housing material | UL94 - 5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level (max) | running <35 db (A) spring return <62 db (A) |
| Quality standard | ISO 9001 |

TFRB(X)24-SR-S

| | |
|------------------|--|
| Auxiliary switch | 1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed, adjustable 0° to 95° |
|------------------|--|

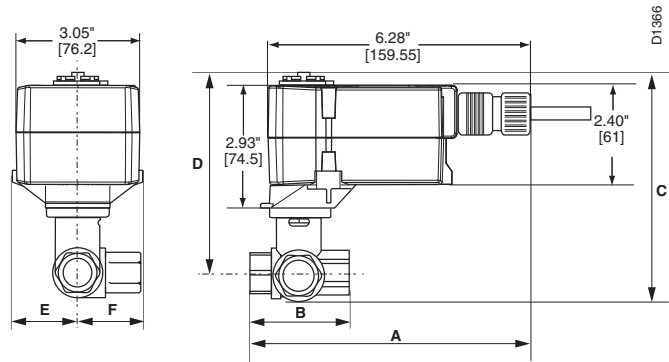
† Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3, Type of action 1.AA (1.AA.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B221(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B321(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |

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Wiring Diagrams

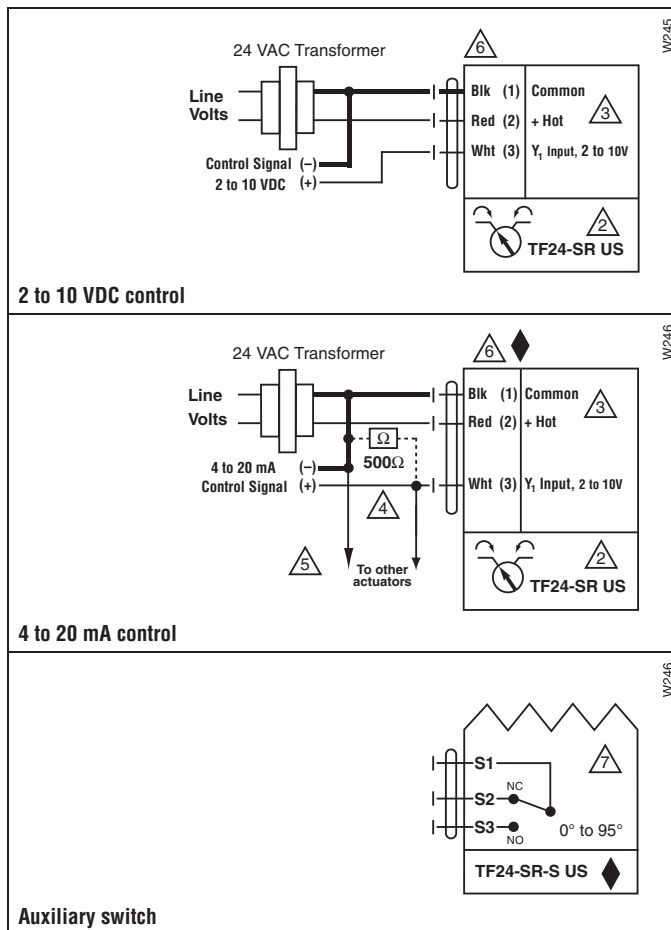
✂️ INSTALLATION NOTES

- ⚠️ **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- ⚠️ Up to 4 actuators may be connected in parallel. With 4 actuators wired to one 500 Ω resistor, a +2% shift of control signal may be required.
Power consumption must be observed.
- ⚠️ Actuators may also be powered by 24 VDC.
- ⚠️ Only connect common to neg. (—) leg of control circuits.
- ⚠️ Actuators with plenum rated cable do not have numbers on wires; use color codes instead.
- ⚠️ For end position indication, interlock control, fan startup, etc., TF24-SR-S US incorporates one built-in auxiliary switch: 1 x SPDT, 3A (0.5A) @250 VAC, UL listed, adjustable 0° to 95°.

📄 APPLICATION NOTES

- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

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MFT



Models

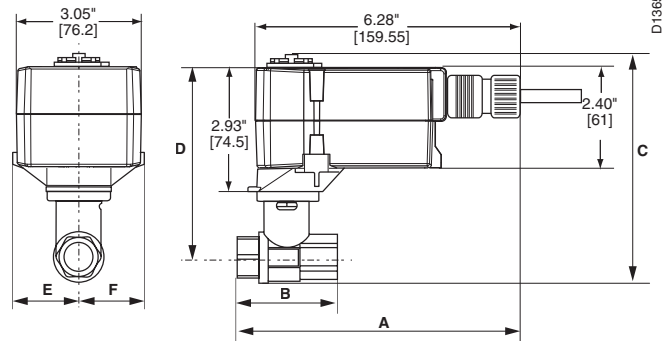
TFRX24-MFT

| Technical Data | |
|-------------------------------|---|
| Control | MFT |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W holding 1.0 W |
| Transformer sizing | 4 VA (class 2 power source) |
| Electrical connection | ½" conduit connector 3 ft [1m], 18 GA plenum rated cable |
| Overload protection | electronic throughout 0° to 95° rotation |
| Operating range Y* | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off) |
| Feedback output U* | 2 to 10 VDC, 0.5 mA max |
| Input impedance | 100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1500 Ω for PWM, floating point and on/off control |
| Mechanical angle of rotation* | 95° |
| Angle of rotation adaptation* | Off (Default) |
| Direction of rotation | spring motor reversible with CW/CCW mounting reversible with built-in switch |
| Position indication | visual indicator, 0° to 95° |
| Override control* | Min. (Min Position) = 0% - ZS (Mid. Position) = 50% - Max. (Max. Position) = 100% |
| Running time | motor* 95 seconds constant independent of load spring <25 seconds @ -4°F to 122°F [-20°C to 50°C] <60 seconds @ -22°F [-30°C] |
| Humidity | 5 to 95% RH, non-condensing |
| Ambient temperature | -22 to 122° F (-30 to 50° C) |
| Storage temperature | -40 to 176° F (-40 to 80° C) |
| Housing | NEMA 2/IP42 |
| Housing material | UL 94-5VA |
| Agency listings† | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC and 2006/95/EC for line voltage and/or -S versions |
| Noise level (max) | running <35 dB (A) spring return <65 dB (A) |
| Quality standard | ISO 9001 |

* Variable when configured with MFT options

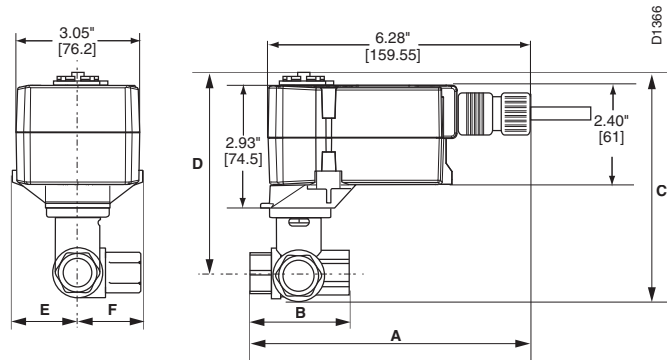
† Rated impulse voltage 0.8 kV, Control pollution degree 3, Type of action 1.AA.

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B221 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |

Dimensions with 3-Way Valve



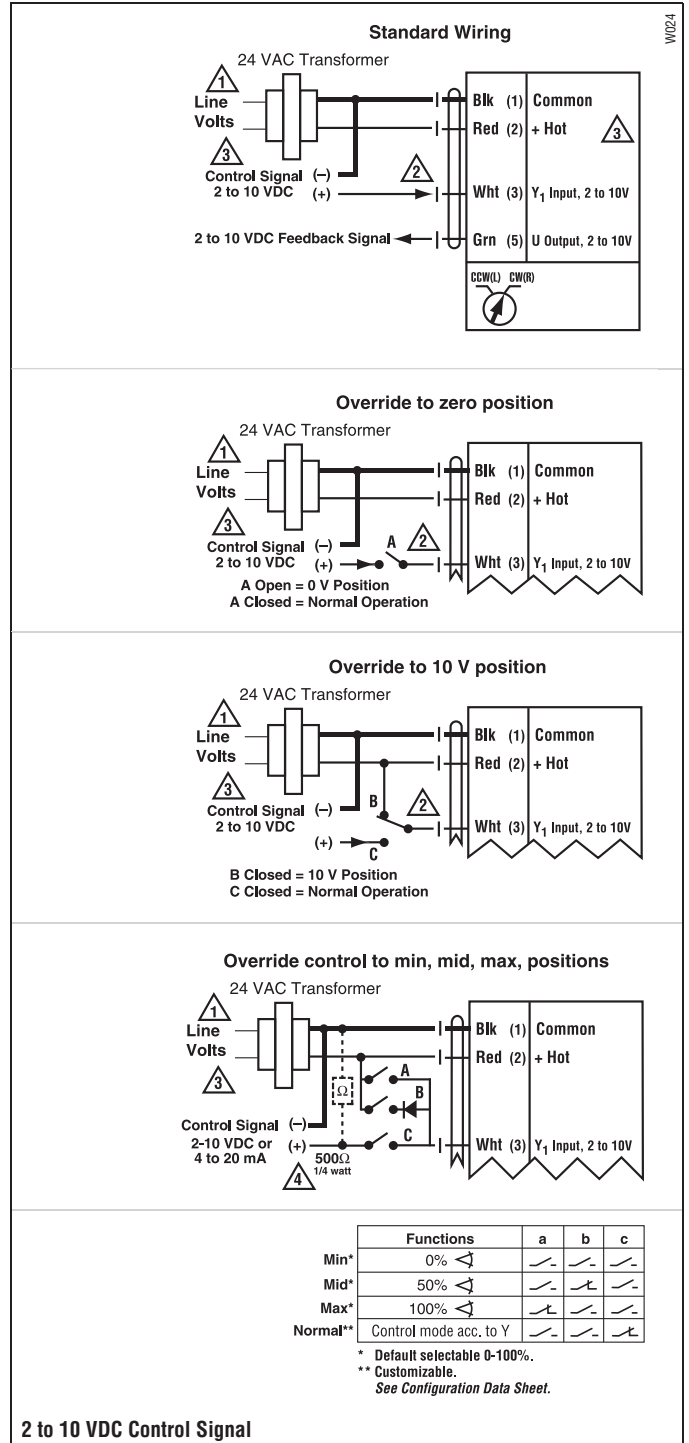
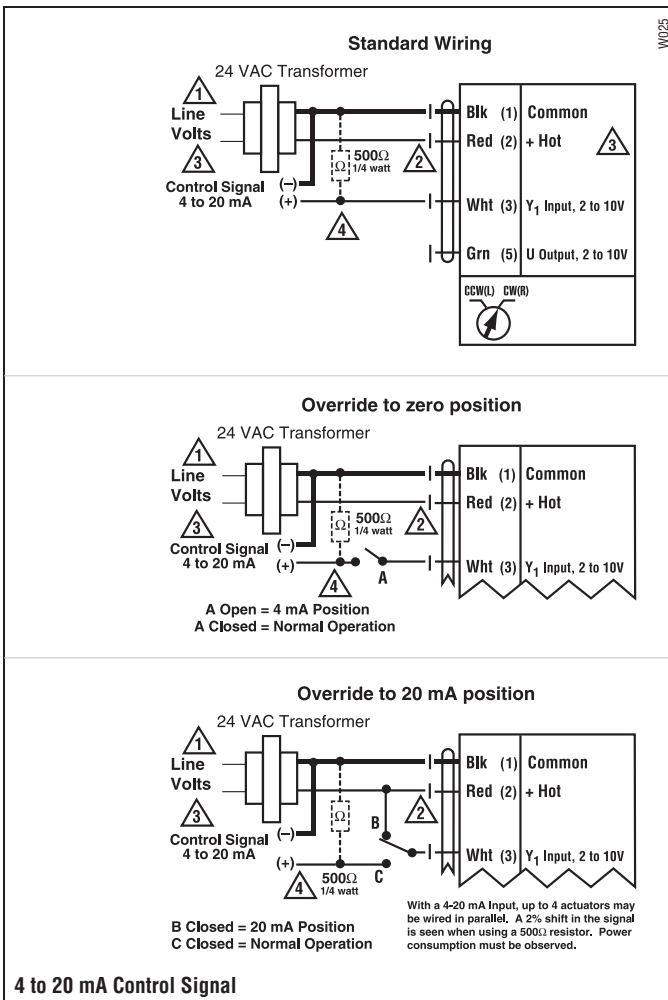
| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B321 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |

Wiring Diagrams

INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 ZG-R01 may be used.

WARNING Live Electrical Components!
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



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Models

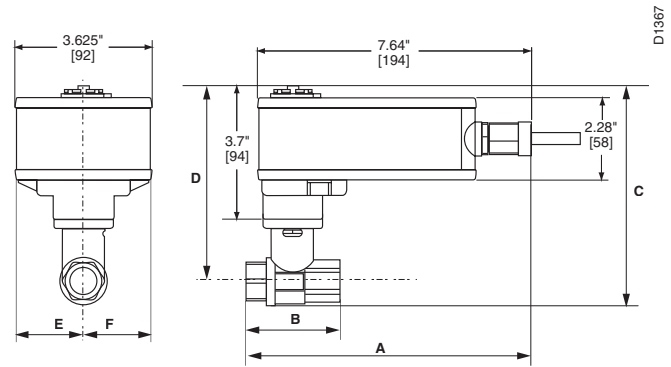
| | |
|------------|------------------------|
| LF24 US | |
| LF24-S US | w/built-in Aux. Switch |
| LF120 US | |
| LF120-S US | w/built-in Aux. Switch |

| Technical Data | |
|-------------------------|---|
| Control | on/off, floating point |
| Power supply | |
| LF24(-S) US | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| LF120(-S) US | 120 VAC ± 10% 50/60 Hz |
| Power consumption | |
| LF24(-S) US | running 5 W holding 2.5 W |
| LF120(-S) US | running 5.5 W holding 3.5 W |
| Transformer sizing | |
| LF24(-S) US | 7 VA, class 2 power source |
| LF120(-S) US | 7.5 VA, class 2 power source |
| Electrical connection | ½" conduit connector 3 ft [1m], 18 GA appliance cable |
| Electrical protection | 120V actuators double insulated |
| Overload protection | electronic throughout rotation |
| Angle of rotation | 95° |
| Spring return direction | reversible with CW/CCW mounting |
| Position indication | visual indicator 0° to 90° |
| Running time | motor <40 to 75 seconds (on/off) spring <25 sec. @-4°F to 122°F [-20°C to 50°C] <60 sec. @-22°F [-30°C] |
| Ambient temperature | -22° F to 122° F [-30° C to 50° C] |
| Housing | NEMA 2 |
| Agency listings† | cULus according to UL 873 and CAN/CSA C22.2 No. 24-93 |
| Noise level (max) | running <30 db(A) spring return 62 db(A) |
| Quality standard | ISO 9001 |

| LF...-S US | |
|------------------|---|
| Auxiliary switch | 1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed, adjustable 0° to 95° (double insulated) |

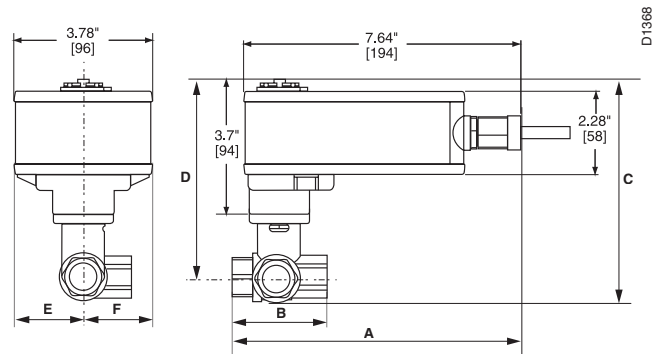
† Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3, Type of action 1.AA (1.AA.B for -S models)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B220(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B320(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

Wiring Diagrams

✂️ INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 **CAUTION Equipment damage!**
Actuators may be connected in parallel.
Power consumption must be observed.

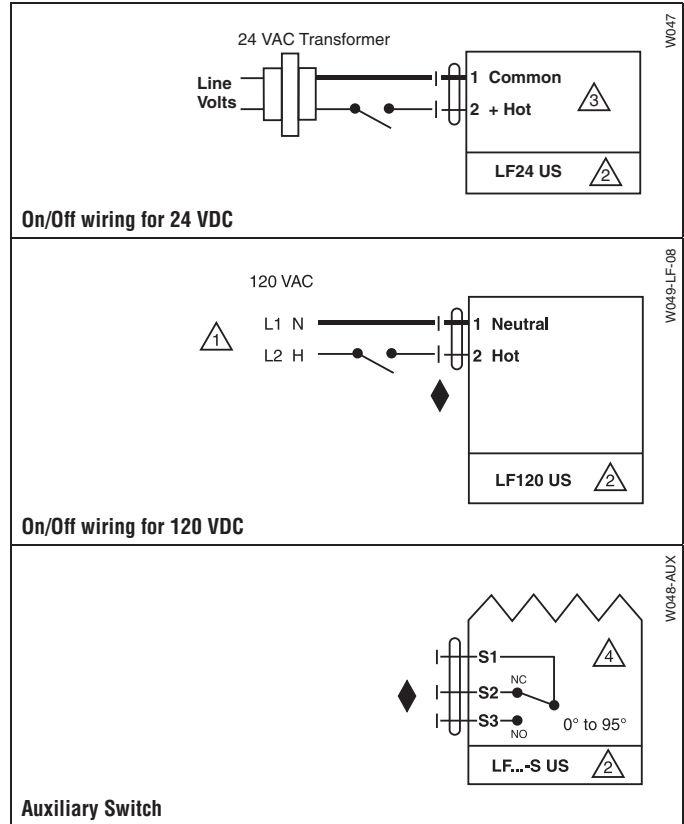
3 Actuator may also be powered by 24 VDC.

4 For end position indication, interlock control, fan startup, etc., LF24-S US and LF120-S US incorporates a built-in auxiliary switch: 1 x SPDT, 6A (1.5A) @ 250 VAC, UL listed, adjustable 0° to 95°.

📄 APPLICATION NOTES

◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

⚠️ **WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LF24-3 Actuators, Floating Point



Models

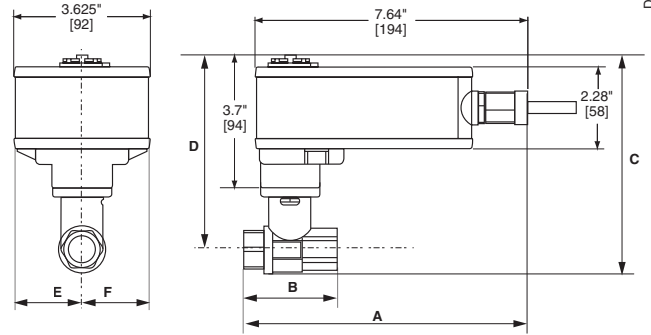
LF24-3 US
LF24-3-S US w/built-in Aux. Switch

| Technical Data | |
|-----------------------|---|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 2.5 W holding 1W |
| Transformer sizing | 5 VA (class 2 power source) |
| Electrical connection | ½" conduit connector (-S models have 2 cables) 3 ft [1m], 18 GA appliance cable |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 1000 Ω (0.6w) control inputs |
| Angle of rotation | 95° |
| Direction of rotation | spring reversible with CW/CCW mounting motor reversible with built-in switch |
| Position indication | visual indicator 0° to 90° |
| Running time | motor 150 seconds constant independent of load spring <25 seconds @ -4°F to 122°F [-20°C to 50°C] <60 seconds @ -22°F [-30°C] |
| Humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22° F to 122° F [-30° C to 50° C] |
| Storage temperature | -40° F to 176° F [-40° C to 80° C] |
| Housing | NEMA type 2/IP54 |
| Housing material | zinc coated metal |
| Agency listings | cULus according to UL 873 and CAN/CSA C22.2 No. 24-93 |
| Noise level (max) | running <30 db(A) spring return 62 db(A) |
| Servicing | maintenance free |
| Quality standard | ISO 9001 |

LF24-3-S US

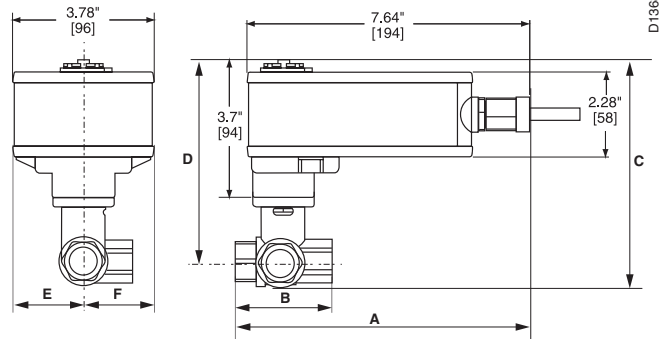
Auxiliary switch 1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed, adjustable 0° to 95° (double insulated)

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B220(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B320(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

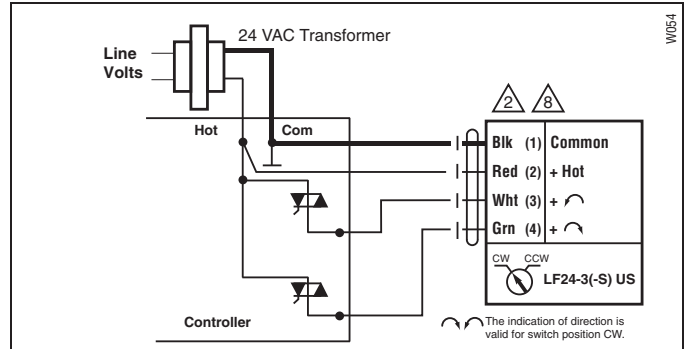
✂️ INSTALLATION NOTES

- CAUTION Equipment damage!**
- 2 Actuators may be connected in parallel. Power consumption must be observed.
 - 3 Actuators may also be powered by 24 VDC.
 - 4 The common connection from the actuator must be connected to the Hot connection of the controller.
 - 5 The actuator Hot must be connected to the control board common.
 - 6 For end position indication, interlock control, fan startup, etc., LF24-3-S US incorporates one built-in auxiliary switch: 1 x SPDT, 6A (1.5A) @ 250 VAC, UL listed, adjustable 0° to 95°.
 - 8 Actuators with plenum rated cable do not have numbers on wires; use color coded instead. Actuators with appliance rated cable use numbers.

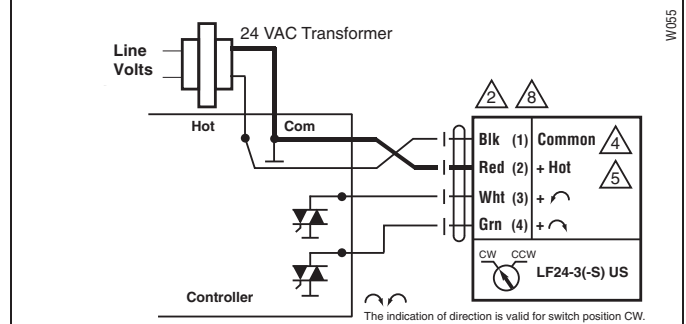
📄 APPLICATION NOTES

- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

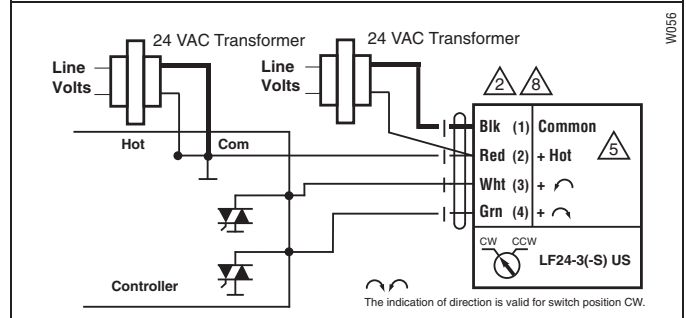
⚠️ WARNING Live Electrical Components!
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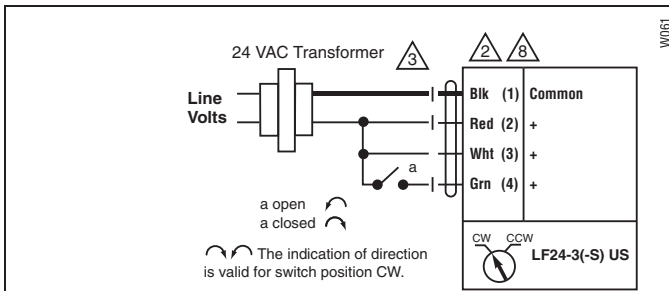
Triac source



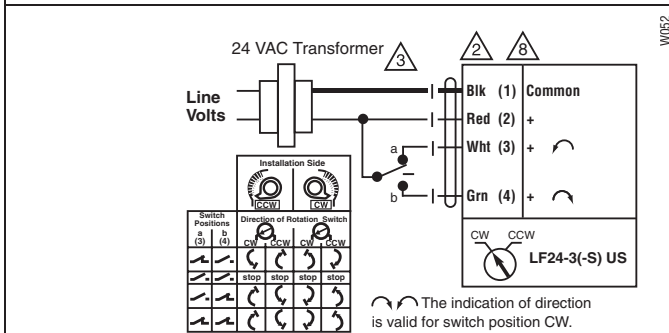
Triac sink



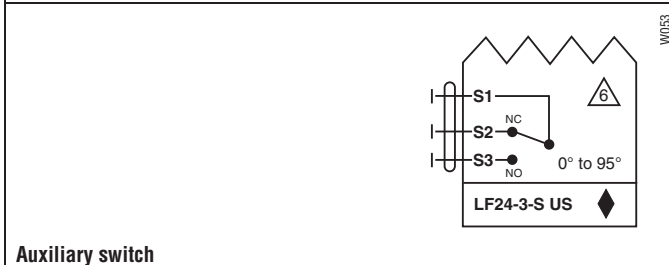
Triac sink with separate transformers



On/Off control



Floating Point control



Auxiliary switch

LF24-SR Actuators, Proportional



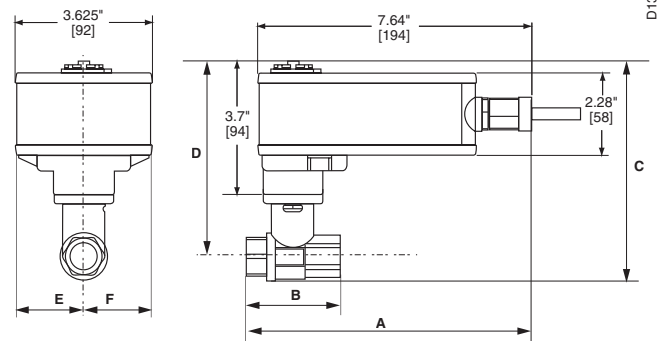
Models

LF24-SR US
LF24-SR-S US w/built-in Aux. Switch

| Technical Data | |
|--|--|
| Control | proportional |
| Control signal | 2 to 10 VDC 4 to 20 mA (with 500 Ω resistor) |
| Power consumption | running 2.5 W holding 1 W |
| Transformer sizing | 5 VA, class 2 power |
| Electrical connection (-S models have 2 cables) | ½" conduit connector 3 ft [1m], 18 GA appliance cable |
| Overload protection | electronic throughout 0° to 95° rotation |
| Feedback output | 2 to 10 VDC |
| Input impedance | 100 kΩ |
| Angle of rotation | 95° |
| Direction of rotation | spring reversible with CW/CCW mounting motor reversible with built-in switch |
| Position indication | visual indicator |
| Running time | motor 150 sec. independent of load (proportional) spring <25 seconds @ -4°F to 122°F [-20°C to 50°C] <60 seconds @ -22°F [-30°C] |
| Ambient temperature | -22° F to 122° F [-30° C to 50° C] |
| Housing | NEMA 2 |
| Agency listings | cULus according to UL 873 and CAN/CSA C22.2 No. 24-93 |
| Noise level (max) | running <30 db(A) spring return 62 dB(A) |
| Quality standard | ISO 9001 |

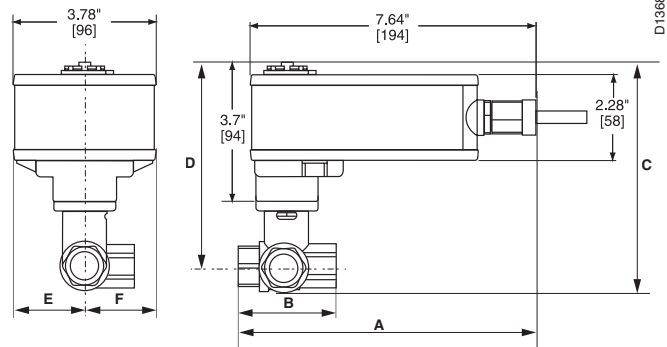
| LF24-SR-S US | |
|------------------|---|
| Auxiliary switch | 1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed, adjustable 0° to 95° (double insulated) |

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|-----------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207(B)-B211(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212(B)-B215(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217(B)-B220(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|-----------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307(B)-B311(B) | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312(B)-B315(B) | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317(B)-B320(B) | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

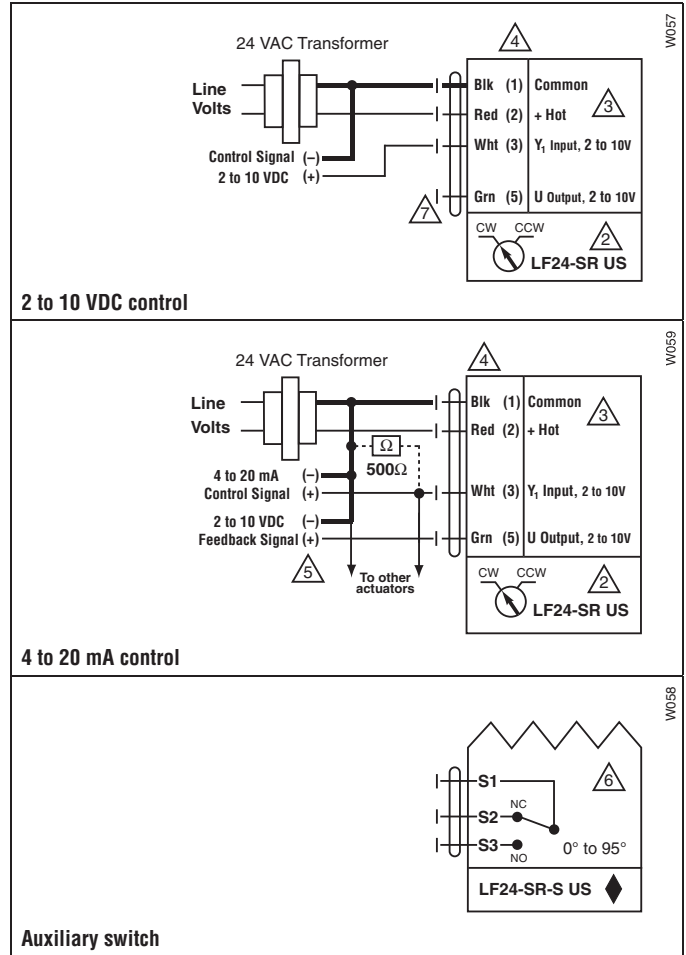
✂️ INSTALLATION NOTES

- ⚠️ **CAUTION Equipment damage!**
Actuators may be connected in parallel. Up to 4 actuators may be connected in parallel. With 4 actuators wired to one 500 Ω resistor, a +2% shift of control signal may be required. Power consumption must be observed.
- ⚠️ Actuators may also be powered by 24 VDC.
- ⚠️ Actuators with plenum rated cable do not have numbers on wires; use color codes instead.
- ⚠️ Only connect common to neg. (-) leg of control circuits.
- ⚠️ For end position indication, interlock control, fan startup, etc., LF24-SR-S US incorporates one built-in auxiliary switch: 1 x SPDT, 6A (1.5A) @ 250 VAC, UL listed, adjustable 0° to 95°.
- ⚠️ The LF24-SR-S US wire 5 is white.

📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.
- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

⚠️ **WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LF24-MFT Actuators, Multi-Function Technology



MFT



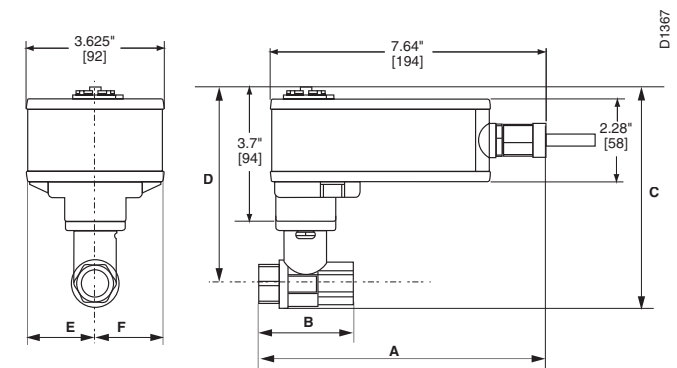
Models

LF24-MFT US
LF24-MFT-S US w/built-in Aux. Switch

| Technical Data | | |
|-----------------------|---------------------------|--|
| Control | | MFT |
| Control signal | | 2 to 10 VDC |
| Power consumption | running | 2.5 W |
| | holding | 1 W |
| Transformer sizing | | 5 VA (class 2 power source) |
| Electrical connection | | ½" conduit connector |
| | (-S models have 2 cables) | 3 ft [1m], 18 GA appliance cable |
| Overload protection | | electronic throughout 0° to 95° rotation |
| Feedback output | | 2 to 10 VDC, 0.5 mA max |
| Input impedance | | 100 kΩ for 2 to 10 VDC (0.1 mA) |
| | | 500 Ω for 4 to 20mA |
| | | 750 Ω for PWM |
| | | 500 Ω for on/off and floating point |
| Angle of rotation | | 95° |
| Direction of rotation | spring | reversible with CW/CCW mounting |
| | motor | reversible with built-in switch |
| Position indication | | visual indicator |
| Running time | motor | 150 seconds independent of load (proportional, default) |
| | spring | <25 seconds @ -4°F to 122°F [-20°C to 50°C] <60 seconds @ -22°F [-30°C] |
| Ambient temperature | | -22° F to 122° F [-30° C to 50° C] |
| Housing | | NEMA 2 |
| Agency listings | | cULus according to UL 873 and CAN/CSA C22.2 No. 24-93 |
| Noise level (max) | running | <30 db(A) |
| | spring return | 62 db(A) |
| Quality standard | | ISO 9001 |

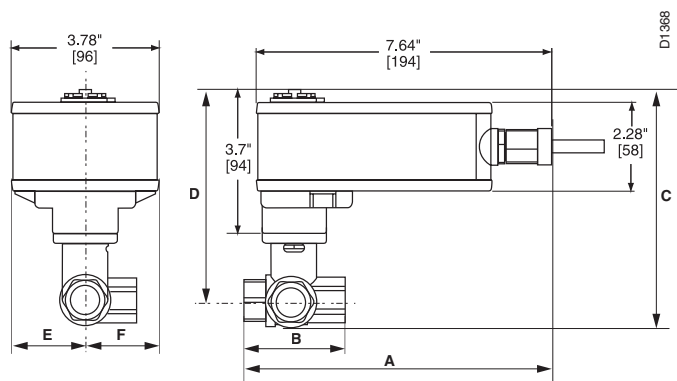
| LF24-MFT-S US | | |
|------------------|--|---|
| Auxiliary switch | | 1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed, adjustable 0° to 95° (double insulated) |

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B207-B211 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] |
| B212-B215 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] |
| B217-B220 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] |
| B229-B230 | 1¼" | 32 | 3.72" [94.6] | 1.87" [47.4] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B307-B311 | ½" | 15 | 2.41" [61.1] | 1.39" [35.2] | 1.20" [30.6] |
| B312-B315 | ½" | 15 | 2.38" [60.4] | 1.78" [45.2] | 1.29" [32.8] |
| B317-B320 | ¾" | 20 | 2.73" [69.3] | 1.87" [47.4] | 1.47" [37.3] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.87" [47.4] | 1.59" [40.3] |

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Wiring Diagrams

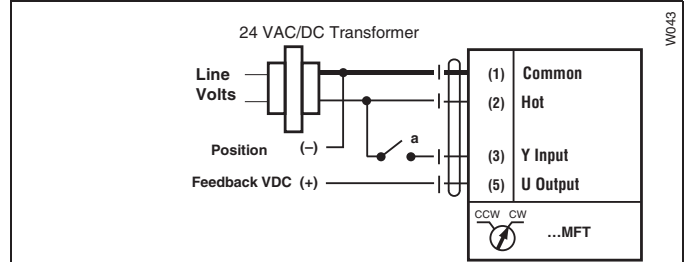
✂️ INSTALLATION NOTES

- 2 **CAUTION Equipment damage!**
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 IN4004 or IN4007 diode (IN4007 supplied, Belimo part number 40155).
- 5 Triac A and B can also be contact closures.
- 6 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.
- 7 Position feedback cannot be used with Triac sink controller. The actuators internal common reference is not compatible.

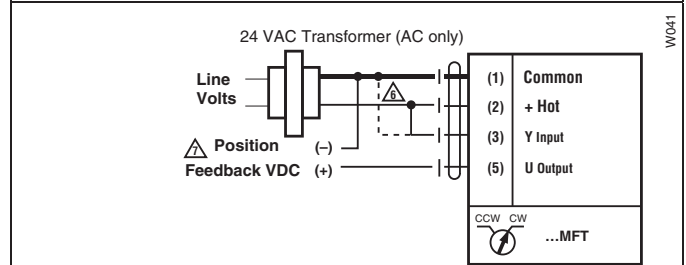
📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

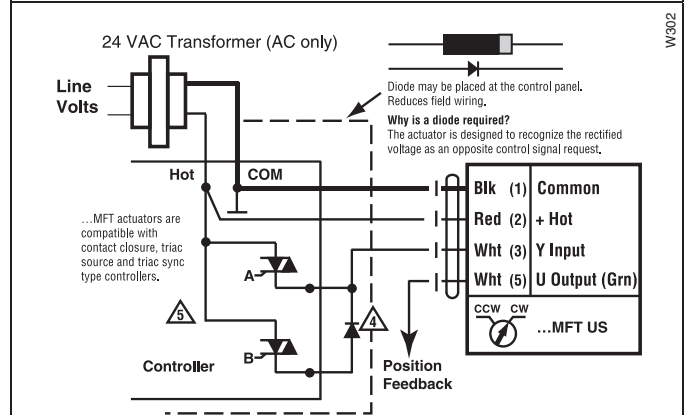
⚠️ WARNING Live Electrical Components!
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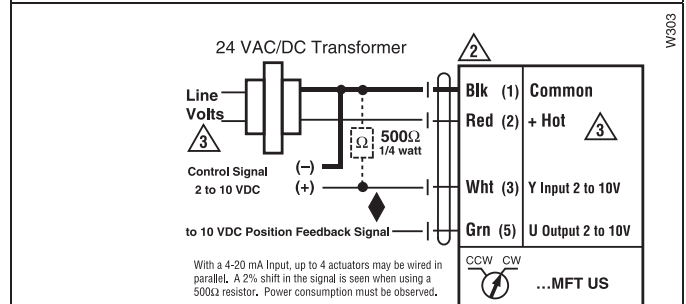
On/Off control



PWM, triac source and sink



Floating Point control



Proportional 2 to 10 or 4 to 20 mA control signal

AFRB24(-S), AFRX24(-S) Actuators, On/Off



Models

AFRB24
AFRB24-S
AFRX24
AFRX24-S

Technical Data

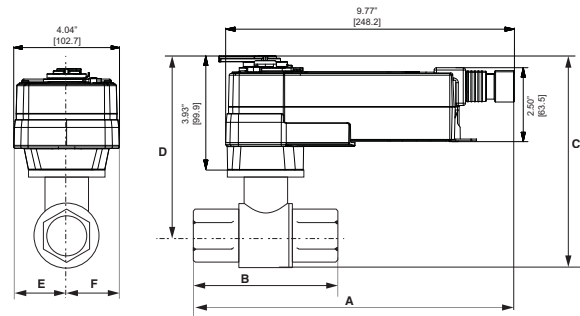
| | |
|-----------------------|--|
| Power supply | 24 VAC \pm 20% 50/60 Hz 24 VDC +20% / -10% |
| Power consumption | running 5 W holding 2.5 W |
| Transformer sizing | 7.5 VA (class 2 power source) |
| Electrical connection | AFRB24... 3 ft., 18 GA appliance cable, 1/2" conduit connector -S models: two 3 ft., 18 gauge appliance cables with 1/2" conduit connectors AFRX24... 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector -S models: two 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] appliance cables, with or without 1/2" conduit connectors |
| Overload protection | electronic throughout 0 to 95° rotation |
| Control | on/off |
| Direction of rotation | spring reversible with CW/CCW mounting |
| Angle of rotation | 95° |
| Running time | motor < 75 seconds spring 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C] |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2, IP54, Enclosure Type2 |
| Agency listings † | cULus according to UL60730-1A/-2-14, CAN/GSA E60730-1:02, CE according to 2004/108/EC & 2006/95/EC |
| Noise level | <50dB(A) motor @ 75 seconds <62dB(A) spring return |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFRB24-S, AFRX24-S

| | |
|--------------------|--|
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90° |
|--------------------|--|

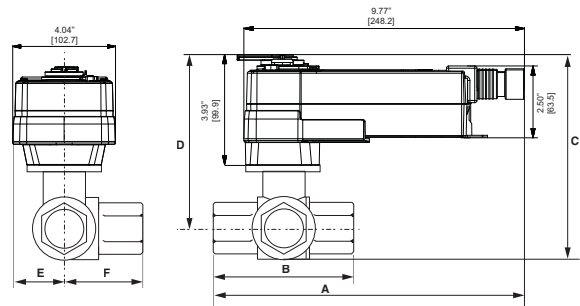
Dimensions



D1369

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B212-B216 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] |
| B217-B221 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] |
| B229-B230 | 1 1/4" | 32 | 3.72" [94.6] | 1.81" [45.9] |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.98" [50.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 1.98" [50.4] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions



D1370

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B312-B316 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] | 1.26" [32.1] |
| B317-B321 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] | 1.45" [36.8] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] | 1.56" [39.8] |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.21" [56.2] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.45" [62.2] | 2.33" [59.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.68" [68.0] | 2.60" [66.0] |

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Wiring Diagrams

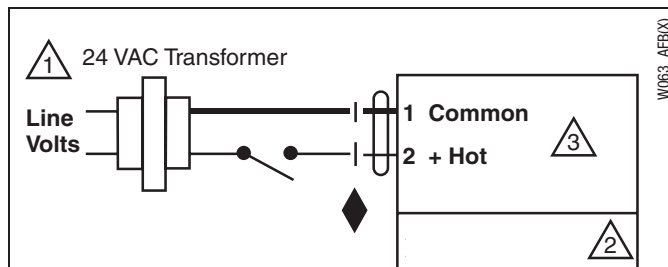
✂️ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 For end position indication, interlock control, fan startup, etc., AFRB24-S and AFRX24-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

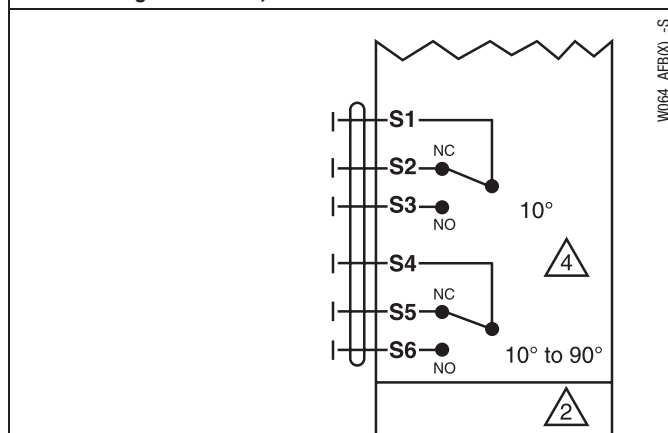
📄 APPLICATION NOTES

- ◆ Meets cULus requirements without the need of an electrical ground connection.

- ⚠️ **WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



On/Off wiring for AFRB24, AFRX24



Auxiliary Switches for AFRB24-S, AFRX24-S



Models

AFRBUP
AFRBUP-S
AFRXUP
AFRXUP-S

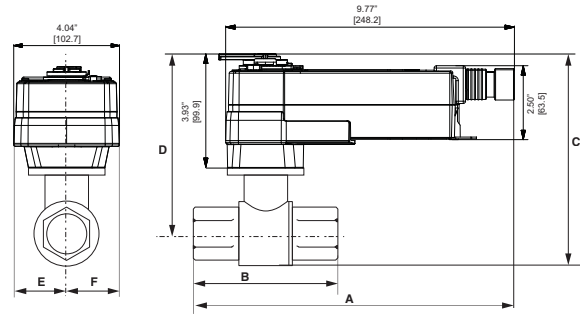
| Technical Data | |
|-----------------------|---|
| Power supply | 24 to 240 VAC -20% / +10%, 50/60 Hz 24 to 125 VDC \pm 10% |
| Power consumption | running 7 W |
| | holding 3.5 W |
| Transformer sizing | 7 VA @ 24 VAC (class 2 power source) 8.5 VA @ 120 VAC 18 VA @ 240 VAC |
| Electrical connection | |
| AFRBUP... | 3 ft., 18 GA appliance cable, 1/2" conduit connector -S models: two 3 ft., 18 gauge appliance cables with 1/2" conduit connectors |
| AFRXUP... | 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector -S models: two 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] appliance cables, with or without 1/2" conduit connectors |
| Overload protection | electronic throughout 0 to 95° rotation |
| Control | on/off |
| Direction of rotation | spring reversible with CW/CCW mounting |
| Angle of rotation | 95° (adjustable with mechanical end stop, 35° to 95°) |
| Running time | motor < 75 seconds |
| | spring 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C] |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54, Enclosure Type2 |
| Agency listings † | cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC & 2006/95/EC |
| Noise level | <50dB(A) motor @ 75 seconds <62dB(A) spring return |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFRBUP-S, AFRXUP-S

| | |
|--------------------|--|
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90° |
|--------------------|--|

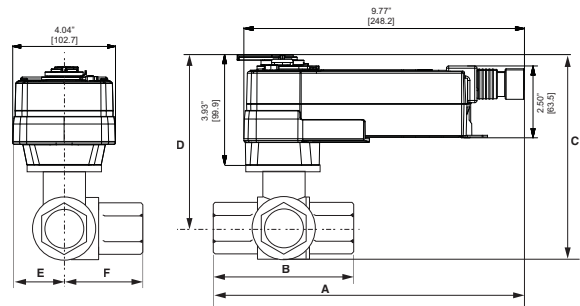
Dimensions



D1369

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B212-B216 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] |
| B217-B221 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] |
| B229-B230 | 1 1/4" | 32 | 3.72" [94.6] | 1.81" [45.9] |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.98" [50.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 1.98" [50.4] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions



D1370

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B312-B316 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] | 1.26" [32.1] |
| B317-B321 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] | 1.45" [36.8] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] | 1.56" [39.8] |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.21" [56.2] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.45" [62.2] | 2.33" [59.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.68" [68.0] | 2.60" [66.0] |

Wiring Diagrams

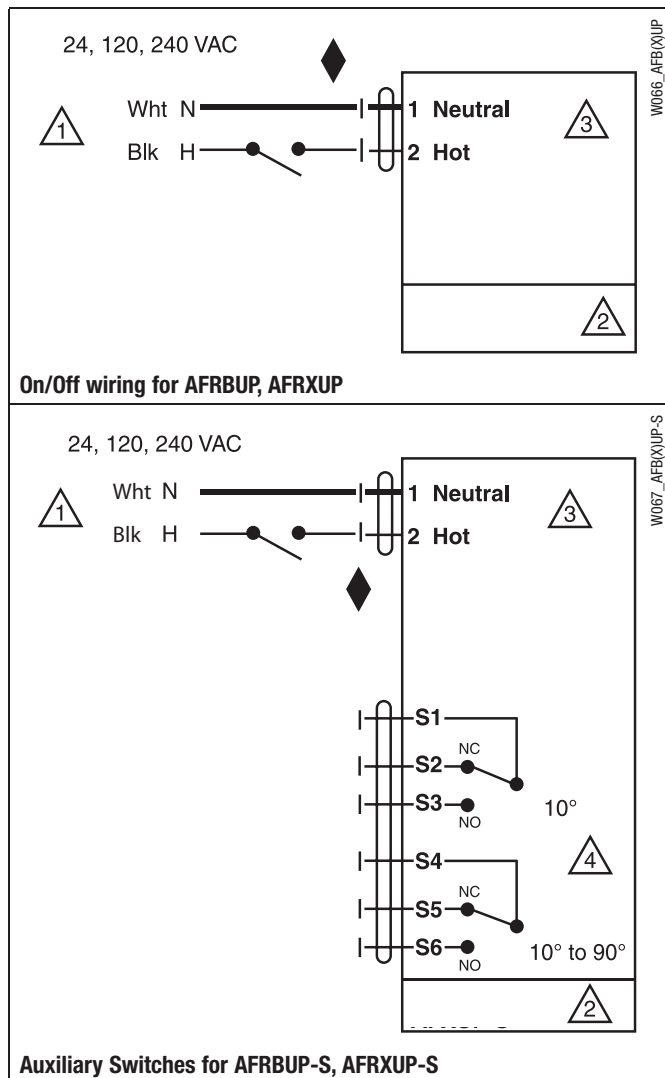
✂️ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 No ground connection is required.
- 4 For end position indication, interlock control, fan startup, etc.,
AFRBUP-S and AFRXUP-S incorporates two built-in auxiliary switches:
2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at
+10°, one is adjustable 10° to 90°.

📄 APPLICATION NOTES

- ◆ Meets cULus requirements without the need of an electrical ground connection.

⚠️ WARNING Live Electrical Components!
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



AFRB24-SR, AFRX24-SR

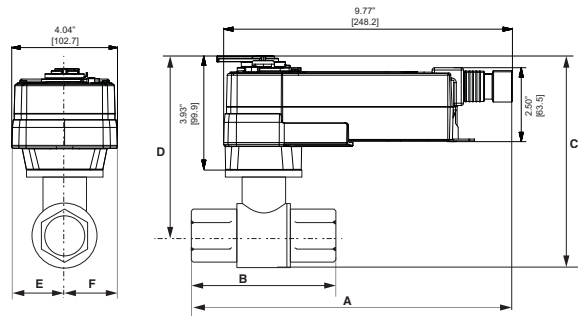
Proportional, Spring Return, 24 V, for 2 to 10 VDC or 4 to 20 mA Control Signal



| Technical Data | |
|------------------------------|---|
| Power supply | 24 VAC \pm 20%, 50/60 Hz 24 VDC +20% / -10% |
| Power consumption | running 5.5 W holding 3 W |
| Transformer sizing | 8.5 VA (class 2 power source) |
| Electrical connection | |
| AFRB... | 3 ft, 18 GA appliance cable, 1/2" conduit connector -S models: two 3 ft, 18 gauge appliance cables with 1/2" conduit connectors |
| AFX... | 3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector -S models: Two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables, with or without 1/2" conduit connectors |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range Y | 2 to 10 VDC, 4 to 20mA |
| Input impedance | 100 k Ω for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA |
| Feedback output U | 2 to 10 VDC (max. 0.5 mA) |
| Direction of rotation | spring reversible with CW/CCW mounting motor reversible with built-in switch |
| Mechanical angle of rotation | 95° (adjustable with mechanical end stop, 35° to 95°) |
| Running time | spring < 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C] motor 95 seconds |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Humidity | max. 95% RH non-condensing |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | Nema 2, IP54, Enclosure Type2 |
| Housing material | zinc coated metal and plastic casing |
| Agency listings† | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC |
| Noise level | \leq 40dB(A) motor @ 95 seconds \leq 62dB(A) spring return |
| Servicing | maintenance free |
| Quality standard | ISO 9001 |
| Weight | 4.6 lbs (2.1 kg); 4.9 lbs (2.25 kg) with switches |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

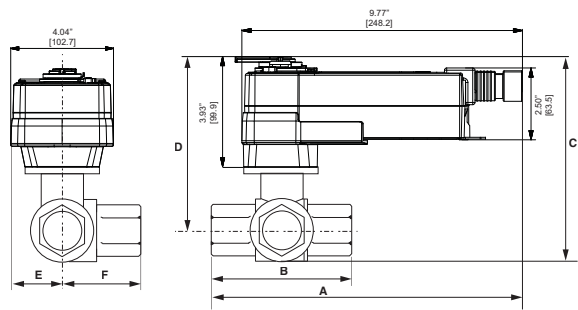
Dimensions



D1369

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B212-B216 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] |
| B217-B221 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] |
| B229-B230 | 1 1/4" | 32 | 3.72" [94.6] | 1.81" [45.9] |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.98" [50.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 1.98" [50.4] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions



D1370

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B312-B316 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] | 1.26" [32.1] |
| B317-B321 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] | 1.45" [36.8] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] | 1.56" [39.8] |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.21" [56.2] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.45" [62.2] | 2.33" [59.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.68" [68.0] | 2.60" [66.0] |

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Accessories

| | |
|-----------|---|
| AV 8-25 | Shaft extension |
| IND-AFB | Damper position indicator |
| KH-AFB | Crank arm |
| K7-2 | Universal clamp for up to 1.05" dia jackshafts |
| TF-CC US | Conduit fitting |
| Tool-06 | 8mm and 10 mm wrench |
| ZG-100 | Universal mounting bracket |
| ZG-101 | Universal mounting bracket |
| ZG-118 | Mounting bracket for Barber Colman® MA 3./4..., Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crank arm type installations |
| ZG-AFB | Crank arm adaptor kit |
| ZG-AFB118 | Crank arm adaptor kit |
| ZS-100 | Weather shield (metal) |
| ZS-150 | Weather shield (polycarbonate) |
| ZS-260 | Explosion-proof housing |
| ZS-300 | NEMA 4X housing |

NOTE: When using AFRB24-SR, AFRB24-SR-S, AFRX24-SR and AFRX24-SR-S actuators, only use accessories listed on this page.

For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators shall be cULus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
Up to 4 actuators may be connected in parallel if not mechanically mounted to the same shaft. With 4 actuators wired to one 500 Ω resistor. Power consumption must be observed.
- 3 Actuator may also be powered by 24 VDC.
- 4 For end position indication, interlock control, fan startup, etc., AFB24-SR-S and AFX24-SR-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.
- 5 Only connect common to neg. (-) leg of control circuits

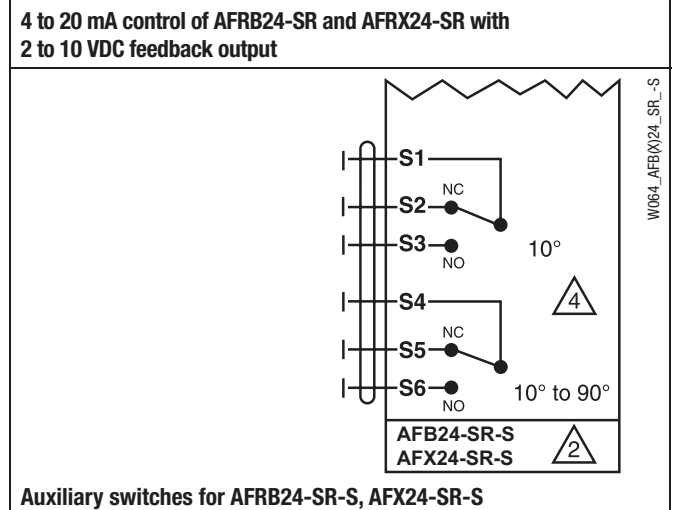
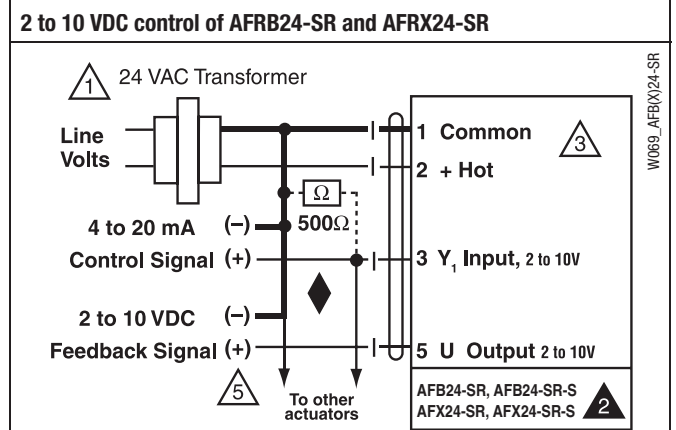
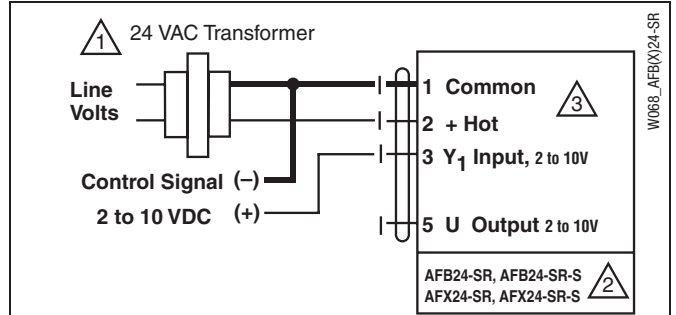
APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.

ATTENTION: AFRB24-SR(-S) and AFRX24-SR(-S) **cannot** be tandem mounted on the same damper or valve shaft. Only On/Off and MFT AF models can be used for tandem mount applications.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





MFT



Models

AFRX24-MFT
AFRX24-MFT-S

| Technical Data | |
|------------------------|---|
| Control | MFT |
| Control signal | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off) |
| Power supply | 24 VAC, +/- 20%, 50/60 Hz 24 VDC, +20% / -10% |
| Power consumption† | running 7.5 W holding 3 W |
| Transformer sizing† | 10 VA (Class 2 power source) |
| Electrical connection | 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector -S models: two 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] appliance cables with or without 1/2" conduit connectors |
| Overload protection | electronic throughout 0 to 90° rotation |
| Feedback output* | 2 to 10 VDC, 0.5 mA max (variable) |
| Input impedance | 100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1500 Ω for on/off and floating point |
| Angle of rotation | 95° |
| Direction of rotation* | spring reversible with CW/CCW mounting motor reversible with built-in ↻ switch |
| Position indication | visual indicator 0° to 95° (0° is spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time | motor* 150 seconds (default), variable (70 to 220 seconds) spring <20 sec @ -4°F to 122°F [-20°C to 50°C] <-22° F to 122° F [-30° C to 50° C] |
| Ambient temperature | -22° F to 122° F [-30° C to 50° C] |
| Housing | NEMA 2, IP54, Enclosure Type 2 |
| Agency listings | cULus according. To UL60730-1A/-2-14, CAN/CSA E60730- 1:02, CE according. To 2004/108/EC & 2006/95/EC |
| Noise level | ≤40dB(A) motor @ 150 seconds, run time dependent ≤62dB(A) spring return |
| Quality standard | ISO 9001 |

† Programmed for 70 sec motor runtime. At 150 sec motor run time, transformer sizing is 8.5 VA and power consumption is 6 W running/3 W holding.

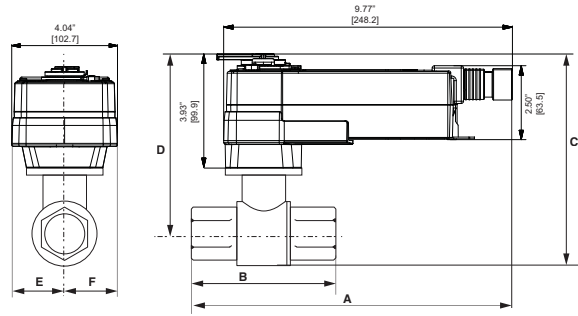
* Variable when configured with MFT options

‡ Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFRX24-MFT-S

| | |
|--------------------|--|
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10° to 90° |
|--------------------|--|

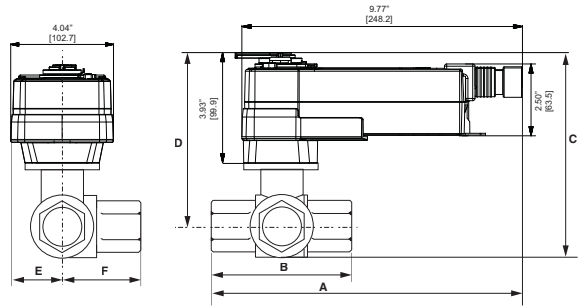
Dimensions



D1369

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B212-B216 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] |
| B217-B221 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] |
| B229-B230 | 1 1/4" | 32 | 3.72" [94.6] | 1.81" [45.9] |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.98" [50.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 1.98" [50.4] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions

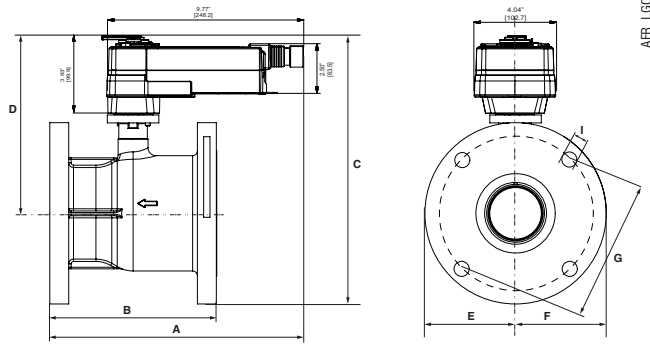


D1370

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B312-B316 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] | 1.26" [32.1] |
| B317-B321 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] | 1.45" [36.8] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] | 1.56" [39.8] |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.21" [56.2] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.45" [62.2] | 2.33" [59.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.68" [68.0] | 2.60" [66.0] |

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Dimensions



| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|---------------|
| | | | A | B | C |
| B6250 | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] |
| B6300 | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] |
| B6400 | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |

Wiring Diagrams

INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!** Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs.
- 8 A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

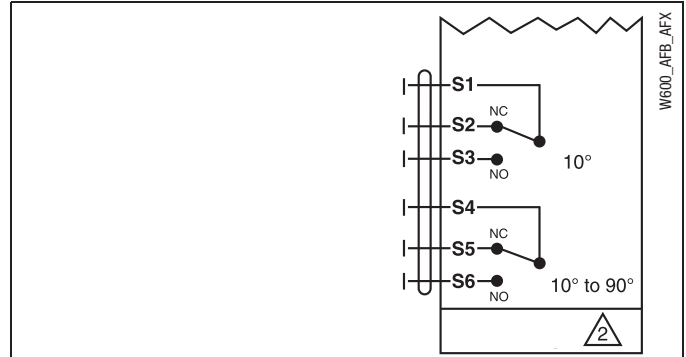
APPLICATION NOTES

- ◆ Meets UL requirements without the need of an electrical ground connection.
- ◆ The ZG-R01 500 Ω resistor may be used.

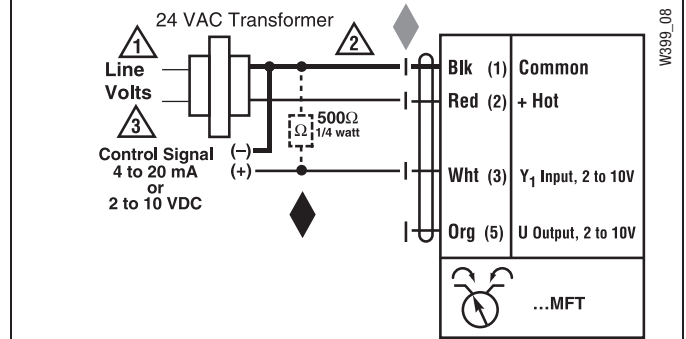
WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

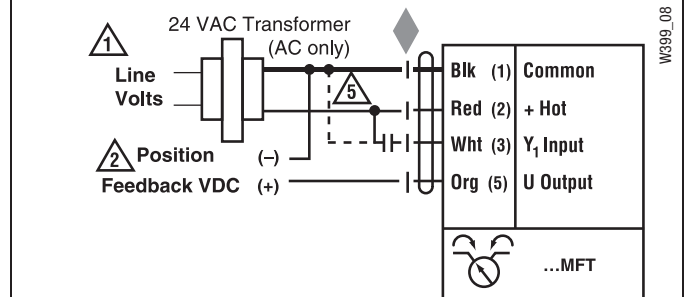
P10419 - 09/13 - Subject to change. © Belimo Aircontrols (USA), Inc.



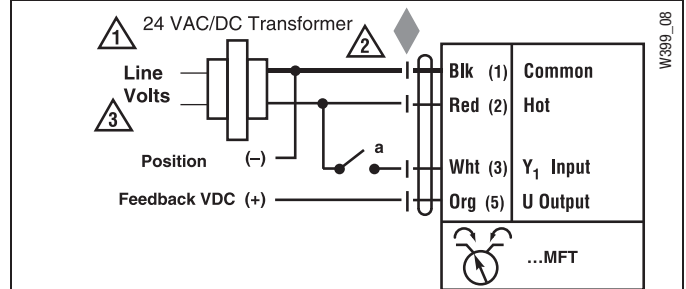
Auxiliary Switches for AFRX24-MFT



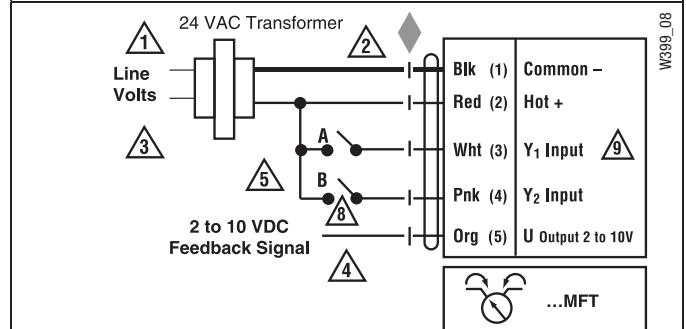
VDC/4-20 mA



PWM



On/Off control



Floating Point control

AFRX24-MFT95 Actuator, Proportional Potentiometric Control



MFT



Models

AFRX24-MFT95

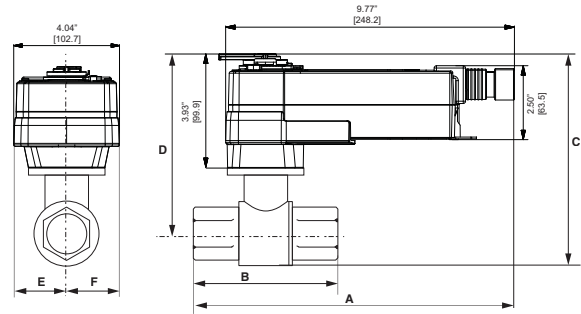
| Technical Data | |
|------------------------|--|
| Control | MFT |
| Control signal | 0 to 135 Ω Honeywell Electronic Series 90, 0 to 135 Ω input |
| Power supply | 24 VAC, +/- 20%, 50/60 Hz 24 VDC, +20% / -10% |
| Power consumption† | running 7.5 W holding 3 W |
| Transformer sizing† | 10 VA (Class 2 power source) |
| Electrical connection | 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA plenum cables, with or without 1/2" conduit connector |
| Overload protection | electronic throughout 0 to 90° rotation |
| Feedback output* | 2 to 10 VDC, 0.5 mA max (variable) |
| Angle of rotation | 95° |
| Direction of rotation* | spring reversible with CW/CCW mounting motor reversible with built-in switch |
| Position indication | visual indicator 0° to 95° (0° is spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time | motor* 150 seconds (default), variable (70 to 220 seconds) spring <20 sec @ -4°F to 122°F [-20°C to 50°C] |
| Ambient temperature | -22° F to 122° F [-30° C to 50° C] |
| Housing | NEMA 2, IP54, Enclosure Type 2 |
| Agency listings | cULus according. To UL60730-1A/-2-14, CAN/CSA E60730- 1:02, CE according. To 2004/108/EC & 2006/95/EC |
| Noise level | ≤40dB(A) motor @ 150 seconds, run time dependent ≤62dB(A) spring return |
| Quality standard | ISO 9001 |

† Programmed for 70 sec motor runtime. At 150 sec motor run time, transformer sizing is 8.5 VA and power consumption is 6 W running/3 W holding.

* Variable when configured with MFT options

‡ Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

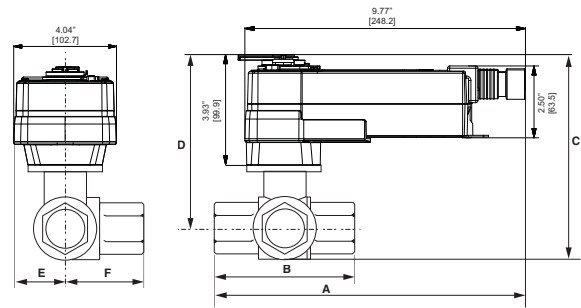
Dimensions



D1369

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B212-B215 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] |
| B217-B221 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] |
| B222-B225 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] |
| B229-B230 | 1 1/4" | 32 | 3.72" [94.6] | 1.81" [45.9] |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.98" [50.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 1.98" [50.4] |
| B248-B250 | 2" | 50 | 4.21" [107.0] | 2.21" [56.2] |
| B251-B254 | 2" | 50 | 4.93" [125.2] | 2.68" [68.0] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.68" [68.0] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.68" [68.0] |

Dimensions

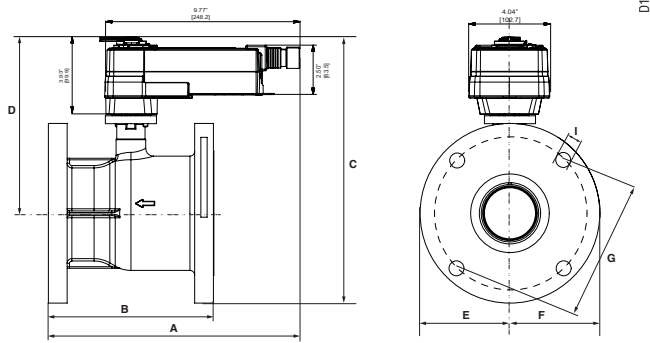


D1370

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B312-B315 | 1/2" | 15 | 2.38" [60.4] | 1.72" [43.7] | 1.26" [32.1] |
| B317-B321 | 3/4" | 20 | 2.73" [69.3] | 1.81" [45.9] | 1.45" [36.8] |
| B322-B325 | 1" | 25 | 3.09" [78.4] | 1.81" [45.9] | 1.56" [39.8] |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.21" [56.2] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.45" [62.2] | 2.33" [59.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.68" [68.0] | 2.60" [66.0] |

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Dimensions



D1378

| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|---------------|
| | | | A | B | C |
| B6250 | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] |
| B6300 | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] |
| B6400 | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |

Wiring Diagrams

INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 Actuators and controller must have separate transformers.
- 3 Consult controller instruction data for more detailed installation information.
- 4 To reverse control rotation, use the reversing switch.
- 5 Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell resistor kits may also be used.

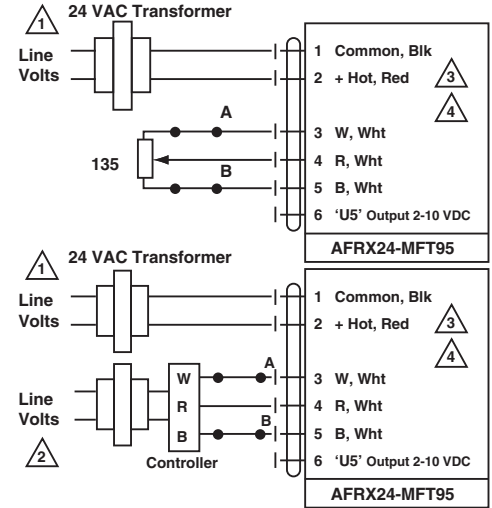
WARNING Live Electrical Components!

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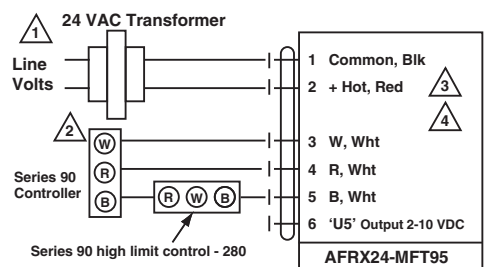
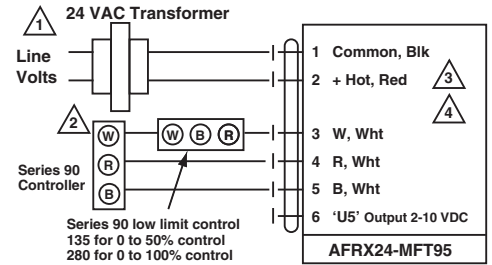
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| Switch A | Switch B | Damper Position |
|----------|----------|-----------------|
| | | Damper Open |
| | | Damper Closed |

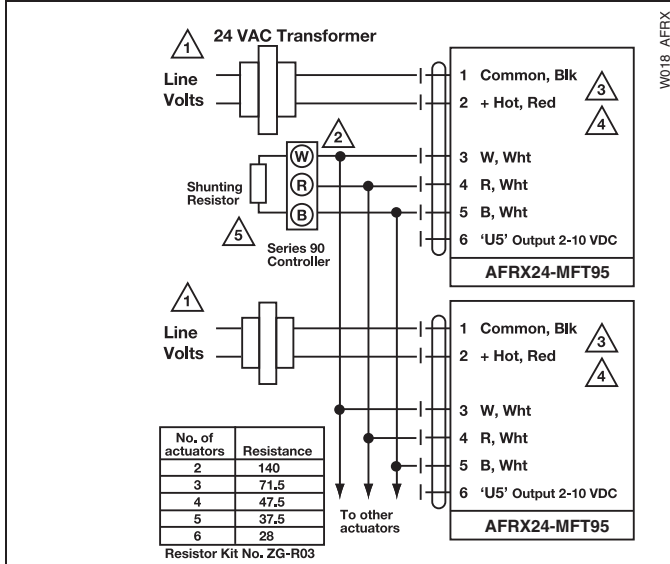
The direction of rotation switch is set so that the fail safe position and the position of the damper is closed with no signal at wire R.



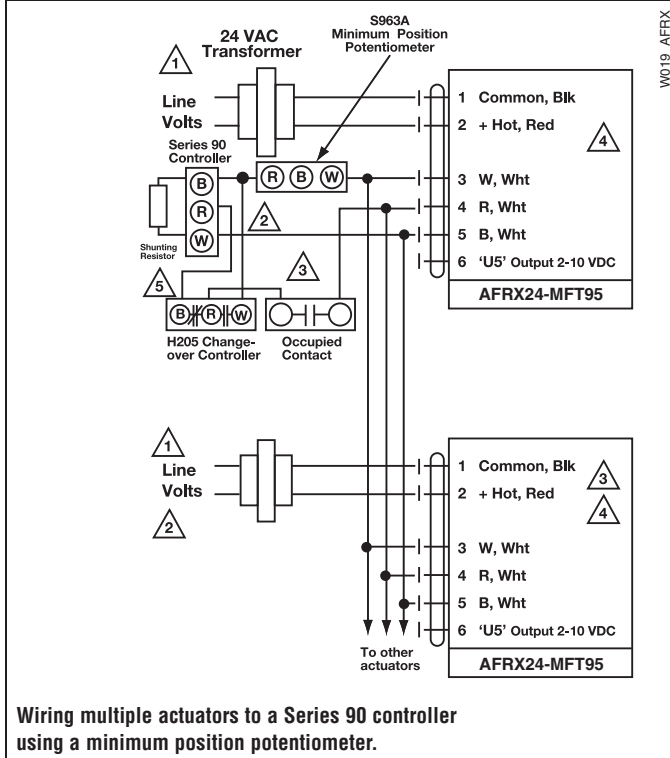
Override of AFRX24-MFT95



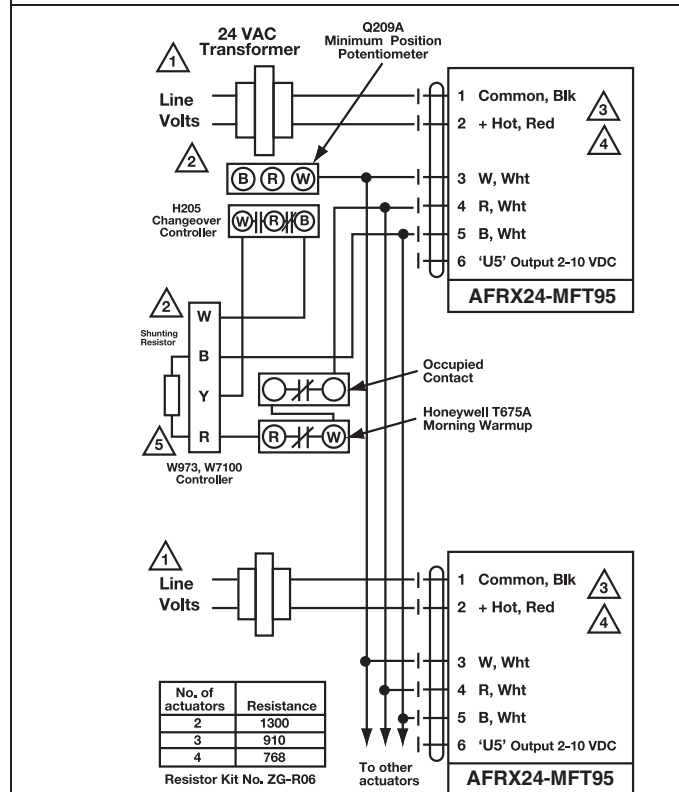
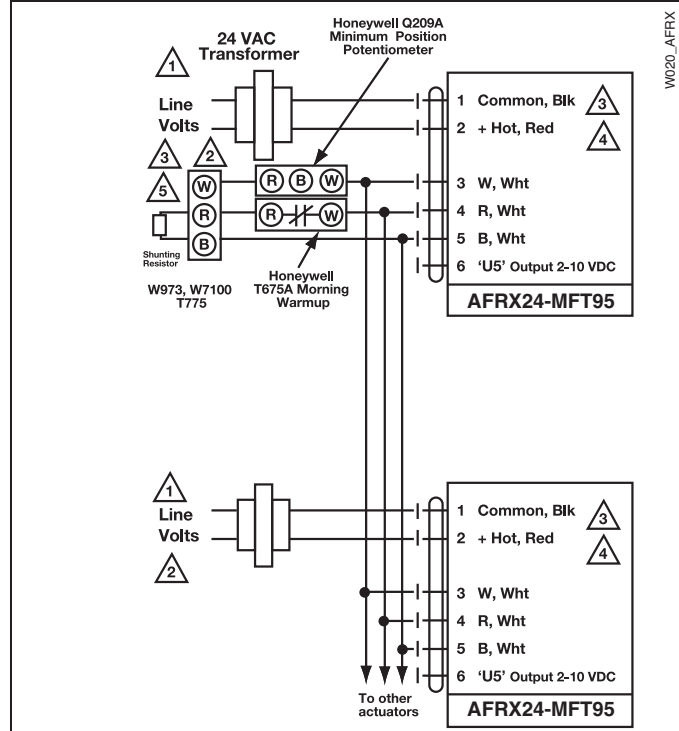
AFRX24-MFT95 used with a Series 90 controller and a Series 90 low limit control



Wiring multiple actuators to a Series 90 controller.



Wiring multiple actuators to a Series 90 controller using a minimum position potentiometer.



Typical wiring diagrams for multiple actuators used with the W973, W7100 and T775 controllers.

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Models

| | |
|--------------|---|
| AFRB24 N4 | Basic Version |
| AFRB24 N4H | Basic Version w/built in heater |
| AFRB24-S N4 | Basic Version w/built-in aux. switch |
| AFRB24-S N4H | Basic Version w/built-in aux. switch & heater |
| AFRX24 N4 | Flexible Version |
| AFRX24-S N4 | Flexible Version w/built-in aux. switch |
| AFRX24 N4H | Flexible Version w/built in heater |
| AFRX24-S N4H | Flexible Version aux. switch & heater |

Technical Data

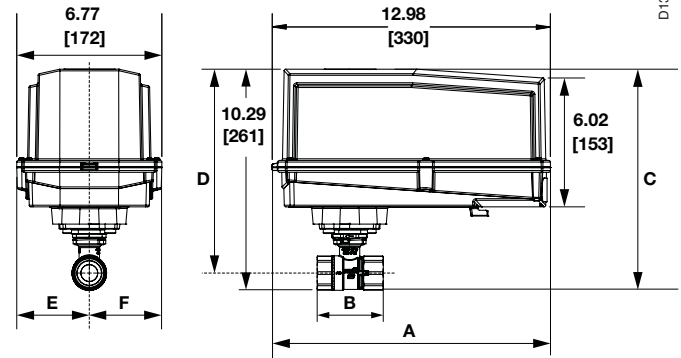
| | |
|------------------------------|--|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC +20% / -10% |
| Power consumption | running 5 W / heater 25 W holding 2.5 W |
| Transformer sizing | 7.5 VA (class 2 power source) / heater 25 VA |
| Electrical connection | 3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance cable, with or without 1/2" conduit connector -S models: Two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables with or without 1/2" conduit connectors |
| | heater (N4H) terminal block, 26-16 GA |
| Overload protection | electronic throughout 0 to 95° rotation |
| Control | on/off |
| Torque | 180 in-lb [20 Nm] minimum |
| Direction of rotation | spring reversible with CW/CCW mounting in housing |
| Mechanical angle of rotation | 95° (adjustable with mechanical end stop, 35° to 95°) |
| Running time | motor < 75 seconds spring 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C] |
| | spring (with heater) 20 seconds @ -4°F to 122°F [-20°C to 50°C], < 60 seconds @ -49°F [-45°C] |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Humidity | max. 95% RH non-condensing |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| | with heater -49°F to 122°F [-45°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | UL Type 4, NEMA 4, IP66 |
| Housing material | polycarbonate |
| Agency listings † | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC |
| Noise level | <50dB(A) motor @ 75 seconds <62dB(A) spring return |
| Servicing | maintenance free |
| Quality standard | ISO 9001 |
| Weight | 9.7 lbs (4.4 kg); 10 lbs (4.5 kg) with switches; 10.5 lbs (4.8 kg) with heater |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 4.

AFRB24-S N4, AFRB24-S N4H, AFRX24-S N4, AFRX24-S N4H

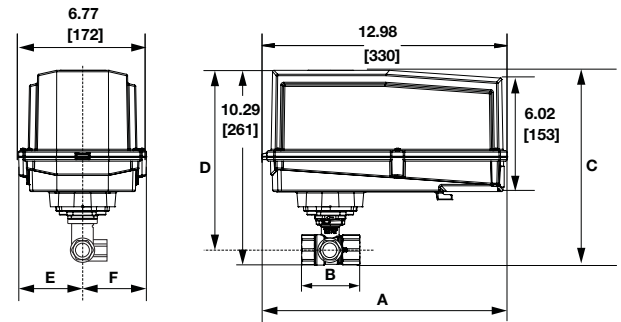
| | |
|--------------------|---|
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90° |
|--------------------|---|

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.84" [47.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B332 | 1 1/4" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

AFRB24 N4, AFRB24 N4H, AFRB24-S N4, AFRB24-S N4H, AFRX24 N4, AFRX24 N4H, AFRX24-S N4, AFRX24-S N4H



NEMA 4, On/Off, Spring Return, 24 V

Accessories

| | |
|-------------|--|
| Tool-06 | 8mm and 10 mm wrench |
| 43442-00001 | Gland (needed for additional wires) |
| 11097-00001 | Gasket for Gland (needed for additional wires) |

NOTE: When using AFRB24 N4, AFRB24 N4H, AFRB24-S N4, AFRB24-S N4H, AFRX24 N4, AFRX24 N4H, AFRX24-S N4, AFRX24-S N4H actuators, only use accessories listed on this page. For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

✂ INSTALLATION NOTES

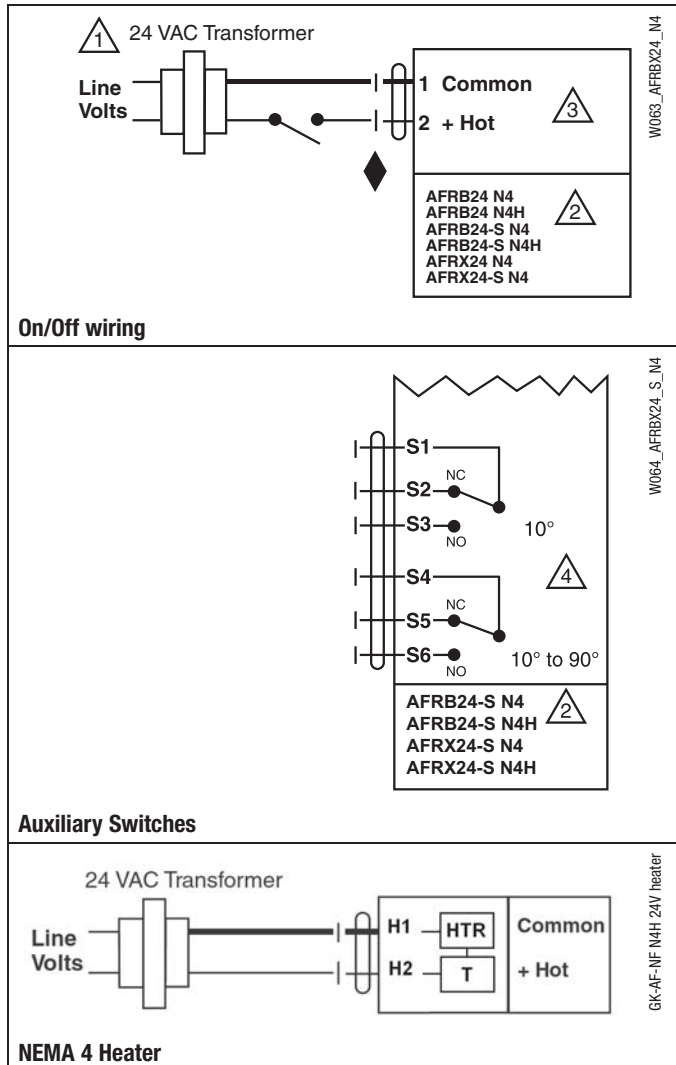
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 For end position indication, interlock control, fan startup, etc., AFRB24-S N4, AFRB24-S N4H, AFRX24-S N4, AFRX24-S N4H incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

📄 APPLICATION NOTES

- ◆ Meets cULus requirements without the need of an electrical ground connection.

⚠ WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



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Models

| | |
|--------------|--|
| AFRBUP N4 | Basic Version |
| AFRBUP-S N4 | Basic Version w/built-in aux. switch |
| AFRBUP N4H | Basic Version w/built in heater |
| AFRBUP-S N4H | Basic Version w/built-in aux. switch & heater |
| AFRXUP N4 | Flexible Version |
| AFRXUP-S N4 | Flexible Version w/built-in aux. switch |
| AFRXUP N4H | Flexible Version w/built in heater |
| AFRXUP-S N4H | Flexible Version w/built-in aux. switch & heater |

Technical Data

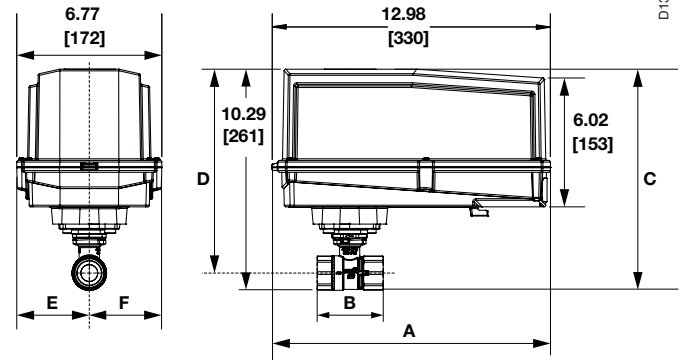
| | |
|------------------------------|--|
| Power supply | 24...240 VAC -20% / +10%, 50/60 Hz 24...125 VDC ±10% |
| Power consumption | running 7 W / heater 25 W holding 3.5 W |
| Transformer sizing | 7 VA @ 24 VAC (class 2 power source) 8.5 VA @ 120 VAC / heater 25 VA @120 VAC 18 VA @ 240 VAC |
| Electrical connection | AFRBUP... N4 3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance cable, with or without 1/2" conduit connector AFRXUP... N4 -S models: Two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables with or without 1/2" conduit connectors heater (N4H) terminal block, 18-16 GA |
| Overload protection | electronic throughout 0 to 95° rotation |
| Control | on/off |
| Torque | 180 in-lb [20 Nm] minimum |
| Direction of rotation | spring reversible with CW/CCW mounting inside housing |
| Mechanical angle of rotation | 95° (adjustable with mechanical end stop, 35° to 95°) |
| Running time | motor < 75 sec spring 20 sec @ -4°F to 122°F [-20°C to 50°C]; < 60 sec @ -22°F [-30°C] spring (with heater) 20 sec @ -4°F to 122°F [-20°C to 50°C]; < 60 sec @ -49°F [-45°C] |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Humidity | max. 95% RH non-condensing |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] with heater -49°F to 122°F [-45°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | UL Type 4, NEMA 4, IP66 |
| Housing material | polycarbonate |
| Agency listings † | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC |
| Noise level | <50dB(A) motor @ 75 seconds <62dB(A) spring return |
| Servicing | maintenance free |
| Quality standard | ISO 9001 |
| Weight | 9.7 lbs (4.4 kg), 10 lbs (4.5 kg) with switches 10.5 lbs (4.8 kg) with heater |

† Rated Impulse Voltage 4kV, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 4.

AFRBUP-S N4, AFRBUP-S N4H, AFRXUP-S N4, AFRXUP-S N4H

| | |
|--------------------|---|
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL Approved one set at +10°, one adjustable 10° to 90° |
|--------------------|---|

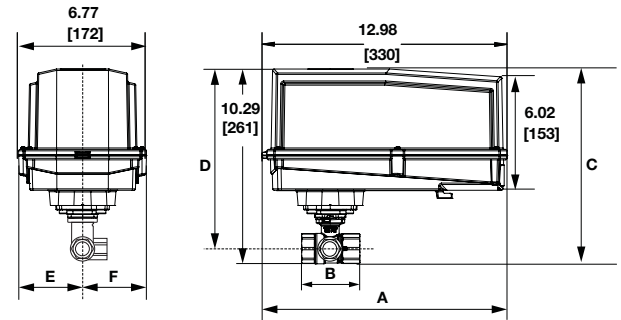
Dimensions with 2-Way Valve



D1363

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.84" [47.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



D1364

| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

AFRBUP N4, AFRBUP-S N4, AFRBUP N4H, AFRBUP-S N4H, AFRXUP N4, AFRXUP-S N4, AFRXUP N4H, AFRXUP-S N4H



NEMA 4, On/Off, Spring Return, 24 to 240 VAC

Accessories

| | |
|-------------|--|
| Tool-06 | 8mm and 10 mm wrench |
| 43442-00001 | Gland (needed for additional wires) |
| 11097-00001 | Gasket for Gland (needed for additional wires) |

NOTE: When using AFRBUP N4, AFRBUP-S N4, AFRBUP N4H, AFRBUP-S N4H, AFRXUP N4, AFRXUP-S N4, AFRXUP N4H, AFRXUP-S N4H actuators, only use accessories listed on this page. For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

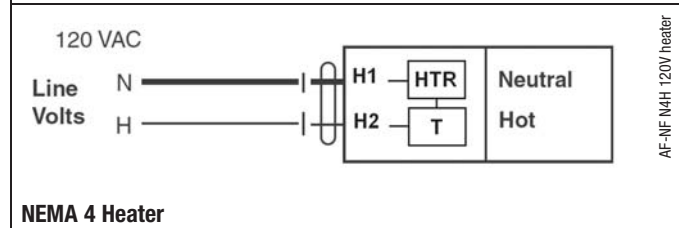
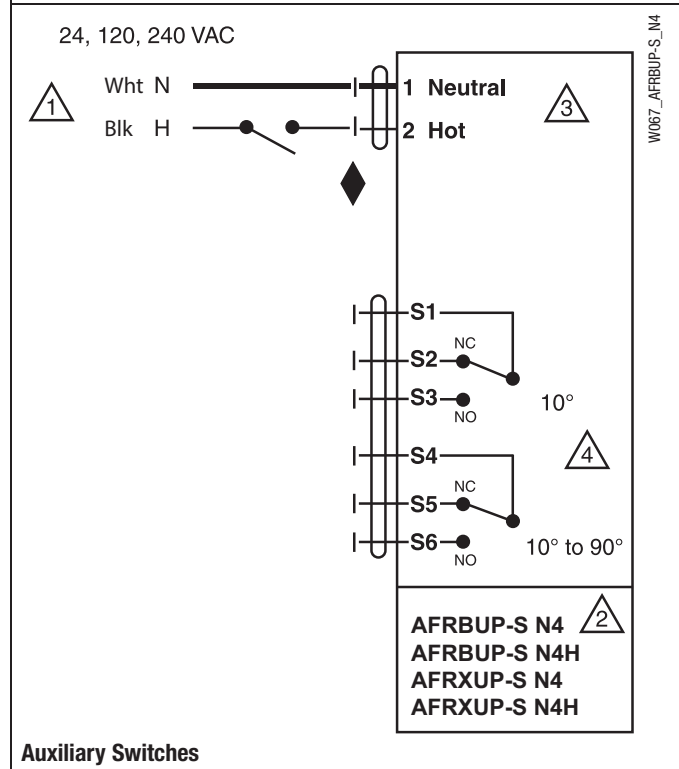
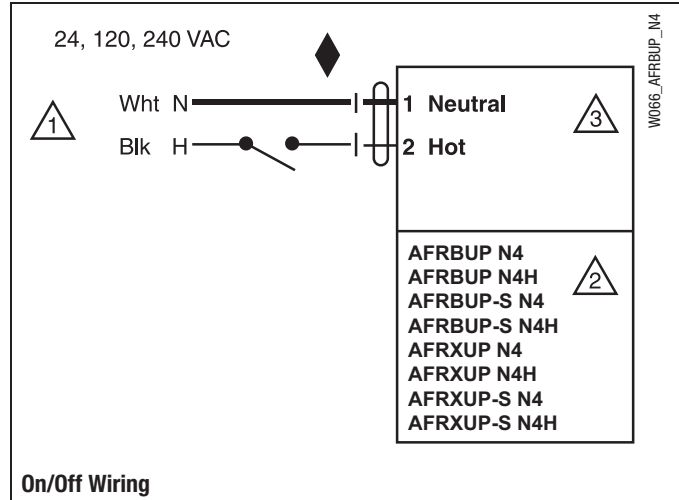
INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 For end position indication, interlock control, fan startup, etc., AFRB24-S N4, AFRB24-S N4H, AFRX24-S N4, AFRX24-S N4H incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

APPLICATION NOTES

- Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



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Models

| | |
|------------------|--|
| AFRB24-MFT N4 | Basic Version |
| AFRB24-MFT-S N4 | Basic Version w/built-in aux. switch |
| AFRB24-MFT N4H | Basic Version w/built in heater |
| AFRB24-MFT-S N4H | Basic Version w/built-in aux. switch & heater |
| AFRX24-MFT N4 | Flexible Version |
| AFRX24-MFT-S N4 | Flexible Version w/built-in aux. switch |
| AFRX24-MFT N4H | Flexible Version w/built in heater |
| AFRX24-MFT-S N4H | Flexible Version w/built in aux. switch & heater |



MFT



Technical Data

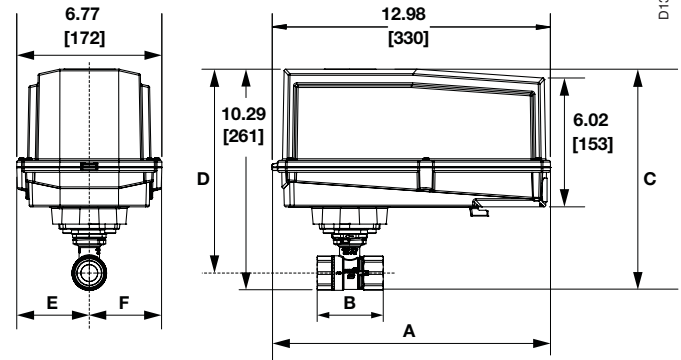
| | |
|-------------------------------|--|
| Power supply | 24 VAC, +/- 20%, 50/60 Hz 24 VDC, +20% / -10% |
| Power consumption | running: 7.5 W / heater 25 W holding: 3 W |
| Transformer sizing | 10 VA (Class 2 power source) / heater 25 VA |
| Electrical connection | 3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance cables, with 1/2" conduit connector -S models: two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables with 1/2" conduit connectors heater (N4H) terminal block, 26-16 GA |
| Overload protection | electronic throughout 0 to 95° rotation |
| Operating range Y* | 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off) |
| Input impedance | 100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1500 Ω for PWM, floating point and on/off control |
| Feedback output U* | 2 to 10 VDC, 0.5 mA max |
| Torque | minimum 180 in-lb (20 Nm) |
| Direction of rotation | spring: reversible with cw/ccw mounting inside housing motor: reversible with built-in switch |
| Mechanical angle of rotation* | 95° (adjustable with mechanical end stop, 35° to 95°) |
| Running time | motor*: 150 seconds (default), variable (70 to 220 seconds) spring: <20 sec @ -4°F to 122°F [-20°C to 50°C]; <60 sec @ -22°F [-30°C] spring (with heater): <20 sec @ -4°F to 122°F [-20°C to 50°C]; <60 sec @ -49°F [-45°C] |
| Angle of Rotation adaptation | off (default) |
| Override control* | min position = 0% mid. position = 50% max. position = 100% |
| Position indication | visual indicator, 0° to 95° (0° is spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Humidity | max. 95% RH non-condensing |
| Ambient temperature | -22°F to 122°F (-30°C to 50°C) with heater: -49°F to 122°F (-45°C to 50°C) |
| Storage temperature | -40°F to 176°F (-40°C to 80°C) |
| Housing | UL Type 4, NEMA 4, IP66 |
| Housing material | polycarbonate |
| Noise level | ≤40dB(A) motor @ 150 seconds, run time dependent ≤62dB(A) spring return |
| Agency listings † | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC |
| Quality standard | ISO 9001 |
| Servicing | maintenance free |
| Weight | 9.7 lbs. (4.4 kg), 10 lbs. (4.5 kg) with switches 10.5 lbs (4.8 kg) with heater |

* Variable when configured with MFT options
† Rated Impulse Voltage 800V, Type of action 1_AA (1_AA.B for -S version), Control Pollution Degree 4.
♦ Programmed for 70 sec motor run time. At 150 sec motor run time, transformer sizing is 8.5 VA and power consumption is 6 W running / 3 W holding.

AFRB24-MFT-S N4, AFRB24-MFT-S N4H, AFRX24-MFT-S N4, AFRX24-MFT-S N4H

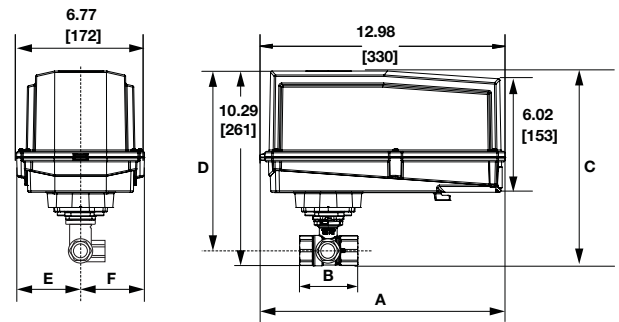
| | |
|--------------------|---|
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90° |
|--------------------|---|

Dimensions with 2-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | |
|------------|--------------------|---------|--------------------------|--------------|
| | Inches | DN [mm] | A | B |
| B231-B232 | 1 1/4" | 32 | 3.72" [94.6] | 1.84" [47.4] |
| B238-B240 | 1 1/2" | 40 | 3.88" [98.5] | 2.04" [51.9] |
| B248-B254 | 2" | 50 | 4.93" [125.2] | 2.73" [69.5] |
| B261-B265 | 2 1/2" | 65 | 5.55" [140.9] | 2.73" [69.5] |
| B277-B280 | 3" | 80 | 5.82" [147.9] | 2.73" [69.5] |

Dimensions with 3-Way Valve



| Valve Body | Valve Nominal Size | | Dimensions (Inches [mm]) | | |
|------------|--------------------|---------|--------------------------|--------------|--------------|
| | Inches | DN [mm] | A | B | C |
| B329-B331 | 1 1/4" | 32 | 3.96" [100.6] | 2.27" [57.7] | 2.14" [54.3] |
| B338-B341 | 1 1/2" | 40 | 4.39" [111.6] | 2.51" [63.7] | 2.40" [61.1] |
| B347-B352 | 2" | 50 | 4.90" [124.5] | 2.73" [69.5] | 2.74" [69.7] |

AFRB24-MFT N4, AFRB24-MFT-S N4, AFRB24-MFT N4H, AFRB24-MFT-S N4H AFRX24-MFT N4, AFRX24-MFT-S N4, AFRX24-MFT N4H, AFRX24-MFT-S N4H



NEMA 4, Proportional, Spring Return, Direct Coupled, 24V, Multi-Function Technology®

Accessories

| | |
|-------------|--|
| Tool-06 | 8mm and 10 mm wrench |
| 43442-00001 | Gland (needed for additional wires) |
| 11097-00001 | Gasket for Gland (needed for additional wires) |

NOTE: When using AFRB24-MFT N4, AFRB24-MFT-S N4, AFRB24-MFT N4H, AFRB24-MFT-S N4H AFRX24-MFT N4, AFRX24-MFT-S N4, AFRX24-MFT N4H, AFRX24-MFT-S N4H actuators, only use accessories listed on this page. For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

The actuator must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators shall be cULus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

INSTALLATION NOTES

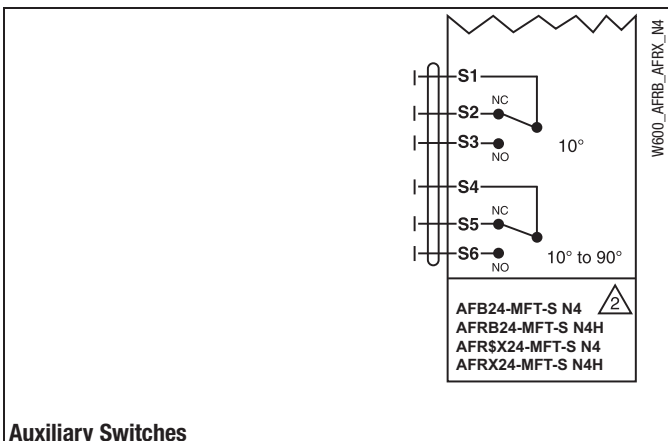
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs.
A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

APPLICATION NOTES

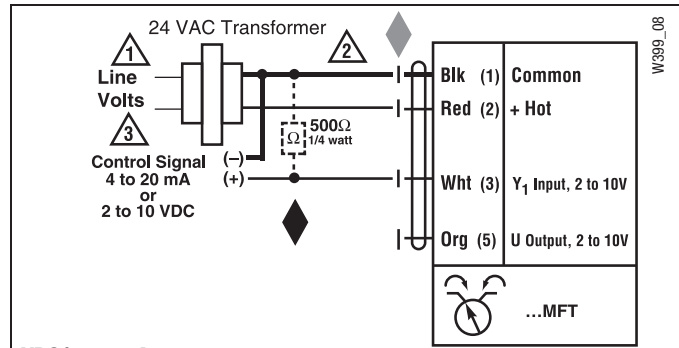
- ◆ Meets UL requirements without the need of an electrical ground connection.
- ◆ The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

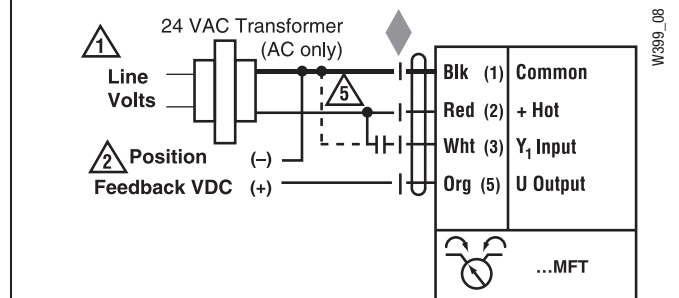
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



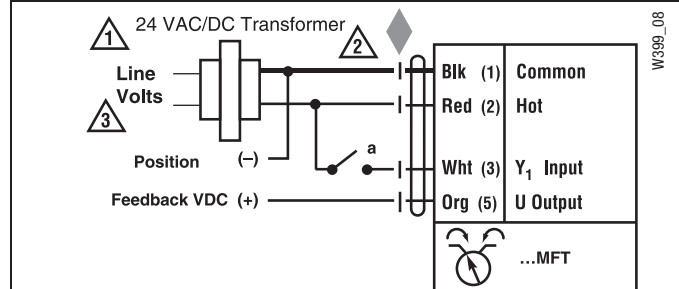
Auxiliary Switches



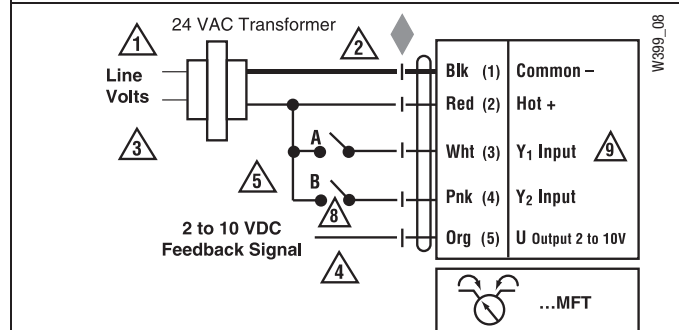
VDC/4-20 mA



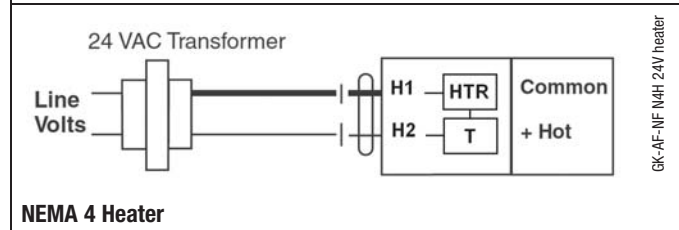
PWM



On/Off Control



Floating Point Control

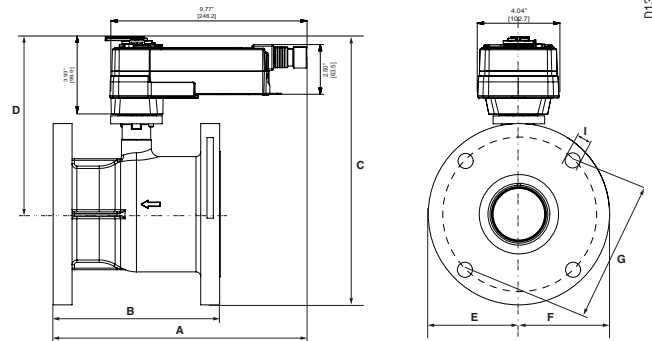


NEMA 4 Heater

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Dimensions



D1378

Models

AFRB24-5-14
AFRB24-S-5-14

| Technical Data | |
|--|---|
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC +20% / -10% |
| Power consumption | running 5 W holding 2.5 W |
| Transformer sizing | 7.5 VA (class 2 power source) |
| Electrical connection | |
| AFRB24... | 3 ft., 18 GA appliance cable, 1/2" conduit connector -S models: two 3 ft., 18 gauge appliance cables with 1/2" conduit connectors |
| AFRX24... | 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector -S models: two 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] appliance cables, with or without 1/2" conduit connectors |
| Overload protection | electronic throughout 0 to 95° rotation |
| Control | on/off |
| Direction of rotation | spring reversible with CW/CCW mounting |
| Angle of rotation | 95° |
| Running time | motor < 75 seconds spring 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C] |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2, IP54, Enclosure Type2 |
| Agency listings † | cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC & 2006/95/EC |
| Noise level | <50dB(A) motor @ 75 seconds <62dB(A) spring return |
| Quality standard | ISO 9001 |
| † Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3. | |
| AFRB24-S, AFRX24-S | |
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90° |

| Valve Body | Nominal Pipe Size | Top Flange Design | Face-to-Face Length | | | Height |
|------------|-------------------|-------------------|---------------------|---------------|---------------|--------|
| | | | A | B | C | |
| B6250 | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] | |
| B6300 | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] | |
| B6400 | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] | |

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Wiring Diagrams

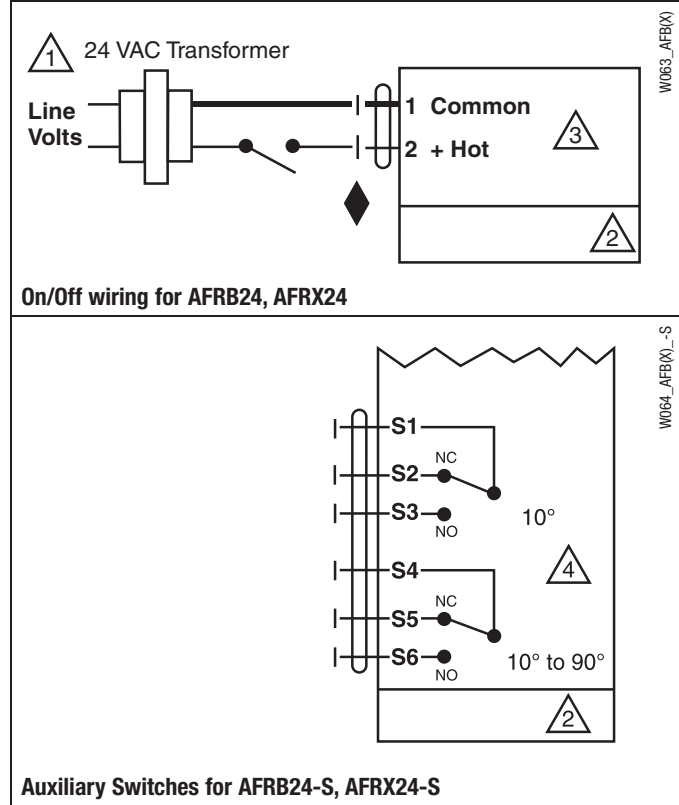
✂️ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 For end position indication, interlock control, fan startup, etc., AFRB24-S and AFRX24-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

📄 APPLICATION NOTES

- ◆ Meets cULus requirements without the need of an electrical ground connection.

- ⚠️ **WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





Models

AFRBUP-5-14
AFRBUP-S-5-14

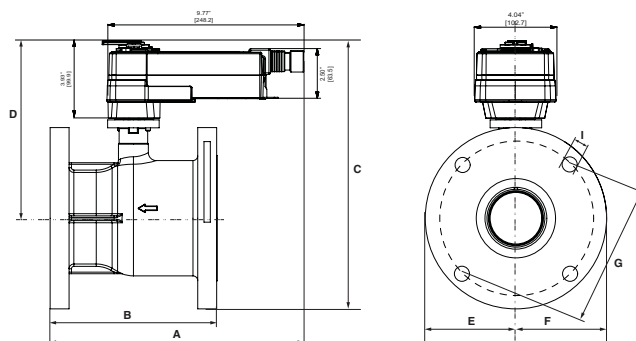
| Technical Data | |
|-----------------------|--|
| Power supply | 24 to 240 VAC -20% / +10%, 50/60 Hz 24 to 125 VDC ±10% |
| Power consumption | running 7 W holding 3.5 W |
| Transformer sizing | 7 VA @ 24 VAC (class 2 power source) 8.5 VA @ 120 VAC 18 VA @ 240 VAC |
| Electrical connection | AFRBUP... 3 ft., 18 GA appliance cable, 1/2" conduit connector -S models: two 3 ft., 18 gauge appliance cables with 1/2" conduit connectors AFRXUP... 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector -S models: two 3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] appliance cables, with or without 1/2" conduit connectors |
| Overload protection | electronic throughout 0 to 95° rotation |
| Control | on/off |
| Direction of rotation | spring reversible with CW/CCW mounting |
| Angle of rotation | 95° (adjustable with mechanical end stop, 35° to 95°) |
| Running time | motor < 75 seconds spring 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C] |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2/IP54, Enclosure Type2 |
| Agency listings † | cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EC & 2006/95/EC |
| Noise level | <50dB(A) motor @ 75 seconds ≤62dB(A) spring return |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFRBUP-S, AFRXUP-S

| | |
|--------------------|--|
| Auxiliary switches | 2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90° |
|--------------------|--|

Dimensions



D1378

| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|---------------|
| | | | A | B | C |
| B6250 | 2½" [65] | F05 | 7.50" [190.5] | 5.50" [139.7] | 8.10" [205.4] |
| B6300 | 3" [80] | | 8.00" [203.2] | 6.60" [167.6] | 8.40" [213.1] |
| B6400 | 4" [100] | | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |

Wiring Diagrams

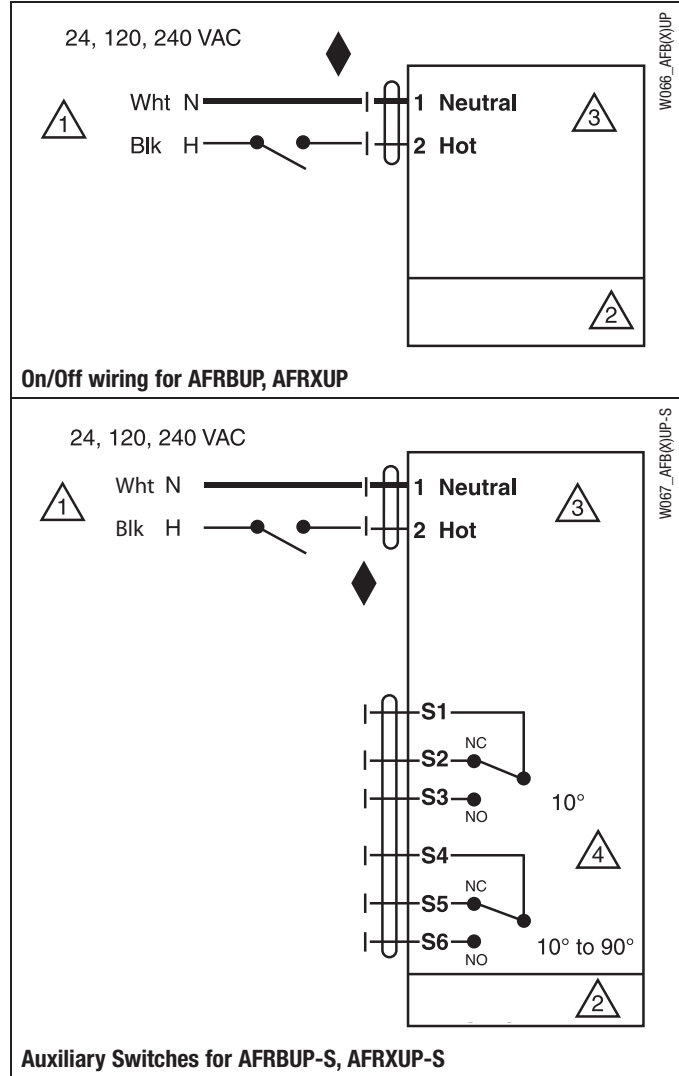
INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
- 3 No ground connection is required.
- 4 For end position indication, interlock control, fan startup, etc., AFRBUP-S and AFRXUP-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

APPLICATION NOTES

- Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!
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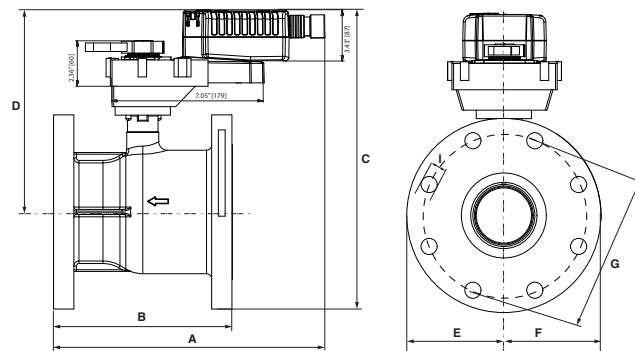
Models

GKRB24-3-5-14

| Technical Data | |
|-----------------------|--|
| Control | on/off, floating point |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 12 W holding 3 W |
| Transformer sizing | 18 VA (Class 2 power source) |
| Electrical connection | 3 ft, 18 GA plenum rated cable ½" conduit connector |
| Overload protection | electronic throughout 0° to 95° rotation |
| Input impedance | 100 kΩ (0.1mA), 500 Ω, 1500 Ω (floating point, on/off) |
| Angle of rotation | max. 95°, adjustable with mechanical stop |
| Direction of rotation | reversible with switch |
| Position indication | visual indicator |
| Running time | running 150 seconds fail-safe 35 seconds |
| Manual override | external push button |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Housing | NEMA 2/IP54, Enclosure Type 2 |
| Agency listings † | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EEC and 2006/95/EC |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

Dimensions

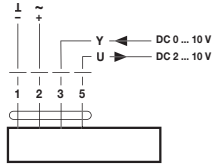


| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|----------------|
| | | | A | B | C |
| B6400 | 4" [100] | F05 | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |
| B6500 | 5" [125] | | 10.00" [254] | 10.30" [261.6] | 10.50" [266.4] |
| B6600 | 6" [150] | | 11.00" [279.4] | 12.50" [317.5] | 11.70" [296.9] |

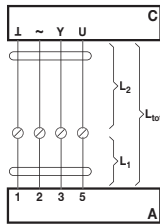
Electrical Installation

Wiring diagram

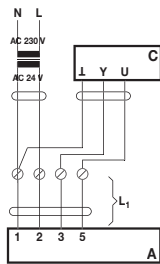
Note
 • Connect via safety isolation transformer.
 • Parallel connection of other actuators possible.
 Note performance data for supply.



Cable lengths



Note
 When several actuators are connected in parallel, the maximum cable length must be divided by the number of actuators.



Note
 There are no special restrictions on installation if the supply and data cable are routed separately.

Cable colors:
 1 = black
 2 = red
 3 = white
 5 = orange

| Cross section L ₂ | Max. cable length L _{tot} = L ₁ + L ₂ | | Example for DC |
|---------------------------------|---|-------|--|
| | 1 / ~ AC | DC | |
| 0.75 mm ² | ≤30 m | ≤5 m | 1 m (L ₁) + 4 m (L ₂) |
| 1.00 mm ² | ≤40 m | ≤8 m | 1 m (L ₁) + 7 m (L ₂) |
| 1.50 mm ² | ≤70 m | ≤12 m | 1 m (L ₁) + 11 m (L ₂) |
| 2.50 mm ² | ≤100 m | ≤20 m | 1 m (L ₁) + 19 m (L ₂) |

A = Actuator
 C = Control unit
 L₁ = Belimo connecting cable, 1 m (4 x 0.75 mm²)
 L₂ = Customer cable
 L_{tot} = Maximum cable length

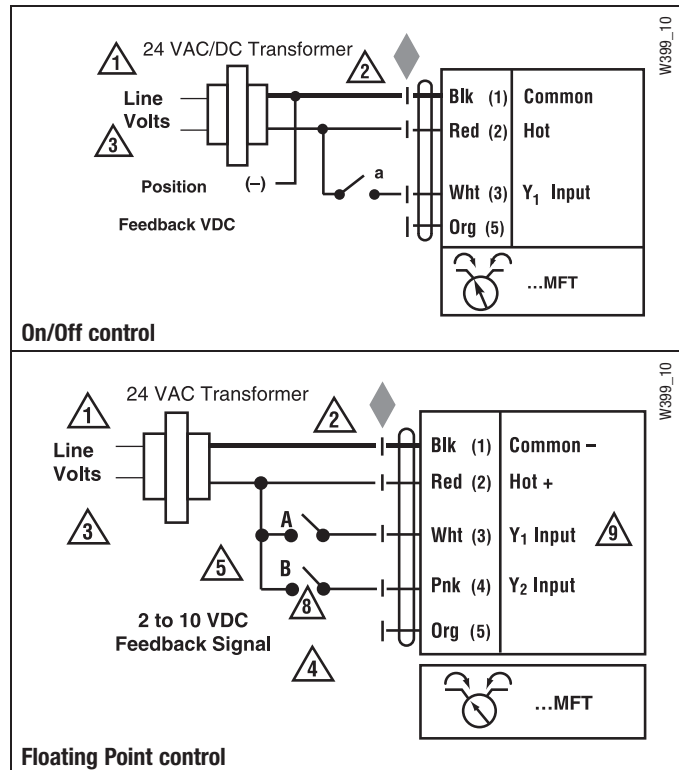
Wiring Diagrams

INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

APPLICATION NOTES

- Meets UL requirements without the need of an electrical ground connection.
- WARNING Live Electrical Components!**
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





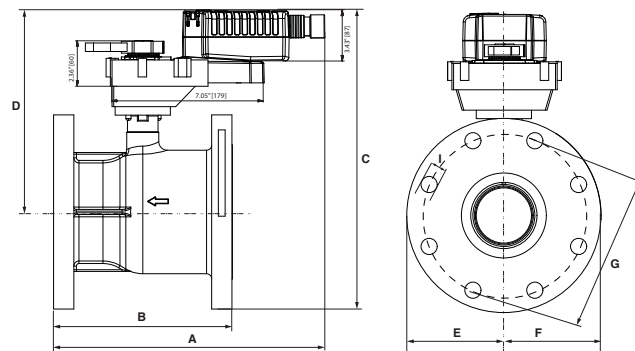
Models

GKRX24-MFT-5-14

| Technical Data | |
|-----------------------|---|
| Control | 2 to 10 VDC, 4 to 40 mA (default) variable (VDC, PWM, floating point, on/off) |
| Power supply | 24 VAC ± 20% 50/60 Hz 24 VDC ± 10% |
| Power consumption | running 12 W holding 3 W |
| Transformer sizing | 21 VA (Class 2 power source) |
| Electrical connection | 3 ft, 18 GA plenum rated cable ½" conduit connector 10 ft. [3m], 16 ft. [5m] |
| Overload protection | electronic throughout 0° to 95° rotation |
| Feedback output | 2 to 10 VDC, 0.5 mA max, VDC variable |
| Input impedance | 100 kΩ (0.1 mA, 500 Ω) 1500 Ω (PWM, floating point, on/off) |
| Angle of rotation | max. 95°, adjustable with mechanical stop electronically variable |
| Direction of rotation | reversible with switch |
| Position indication | visual indicator |
| Running time | 150 seconds (default) variable (90 to 150 seconds) fail-safe 35 seconds |
| Manual override | external push button |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Housing | NEMA 2/IP54, Enclosure Type 2 |
| Housing material | UL94-5V (flammability rating) |
| Agency listings † | cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE according to 2004/108/EEC and 2006/95/EC. |
| Noise level | <45 dB(A) |
| Quality standard | ISO 9001 |

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

Dimensions



D1379

| Valve Body | Nominal Pipe Size | Top Flange Design | Flange Diameter | Face-to-Face Length | Height |
|------------|-------------------|-------------------|-----------------|---------------------|----------------|
| | | | A | B | C |
| B6400 | 4" [100] | F05 | 9.00" [228.6] | 8.30" [210.8] | 9.30" [235.9] |
| B6500 | 5" [125] | | 10.00" [254] | 10.30" [261.6] | 10.50" [266.4] |
| B6600 | 6" [150] | | 11.00" [279.4] | 12.50" [317.5] | 11.70" [296.9] |

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Wiring Diagrams

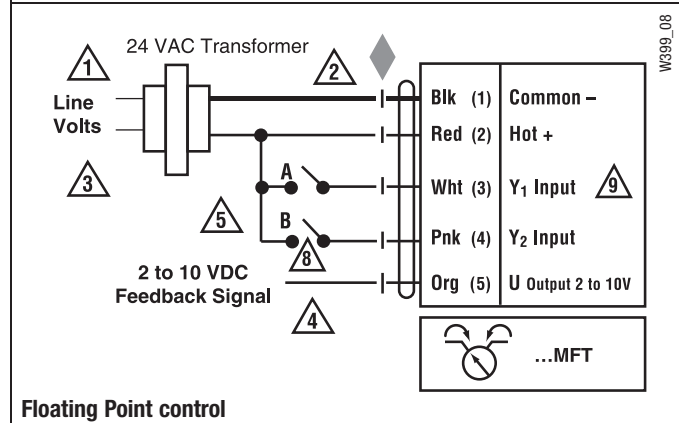
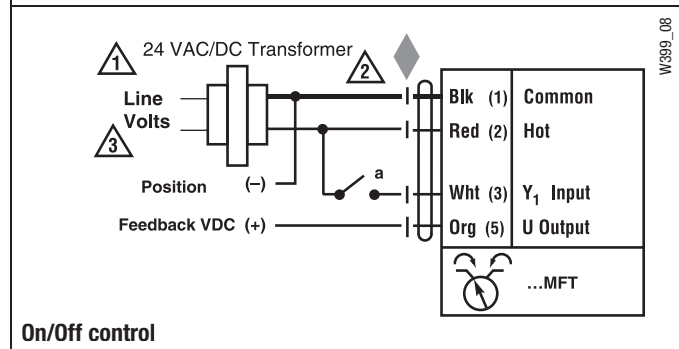
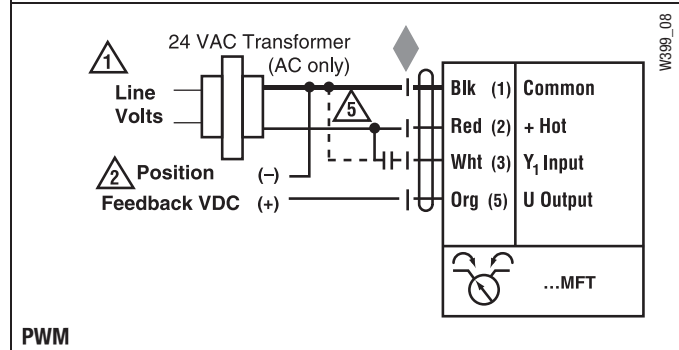
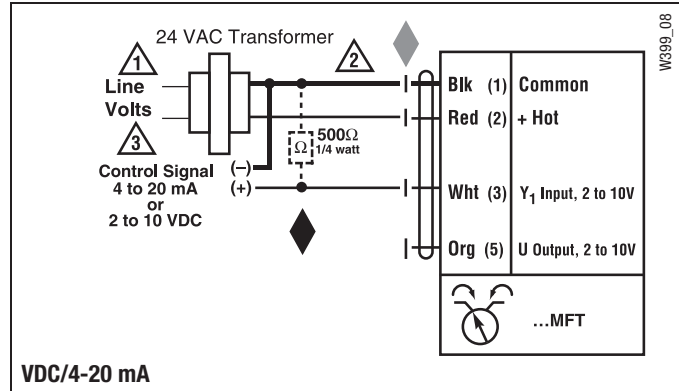
INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

APPLICATION NOTES

- ◆ Meets UL requirements without the need of an electrical ground connection.
- ◆ The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

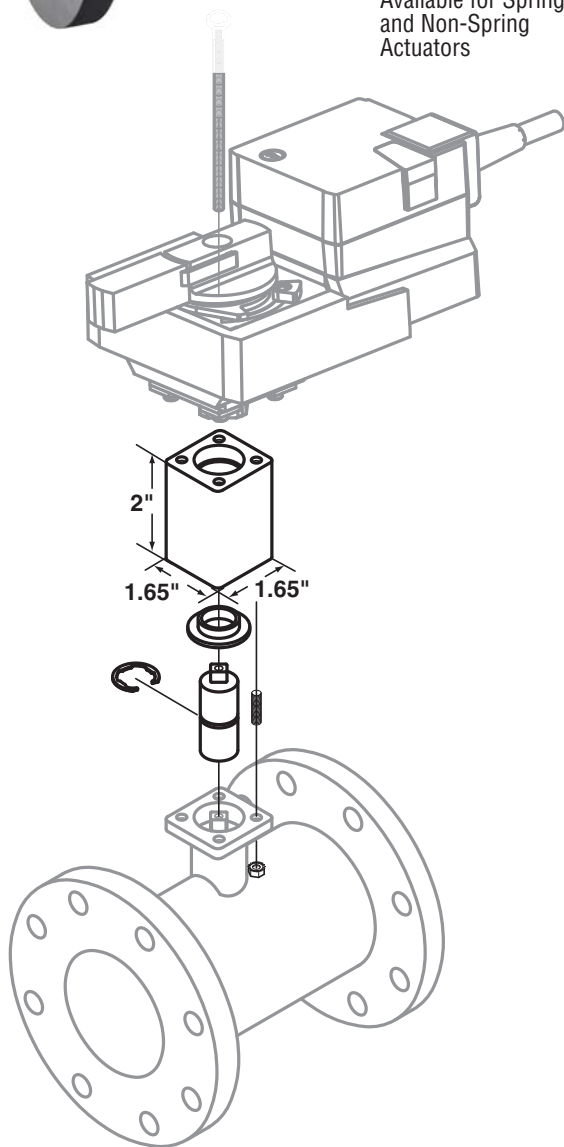


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CCV-EXT-KIT, CCV and PICCV Valve Neck Extension Kit



Available for Spring
and Non-Spring
Actuators



Application

The CCV-EXT-KIT can be used with most CCV's* and PICCV in order to achieve a large clearance over the pipe. The Extension Kit will provide an additional 2" of space between the top of the valve and the base of the actuator. bracket is made from aluminum and is not intended as a thermal block.

- Extension kit will be automatically assembled with any Flanged CCV assembly.

Technical Data

| | |
|------------------|--------|
| Extension Height | 2" |
| Total Weight | 0.7 lb |

Material

| | |
|-------------------|---------------------|
| Extension Housing | Aluminum - Anodized |
| Shaft | Stainless Steel |
| Threaded Hardware | Stainless Steel |
| Bearing | Oilite® Bearing |
| Retaining Clip | Stainless Steel |

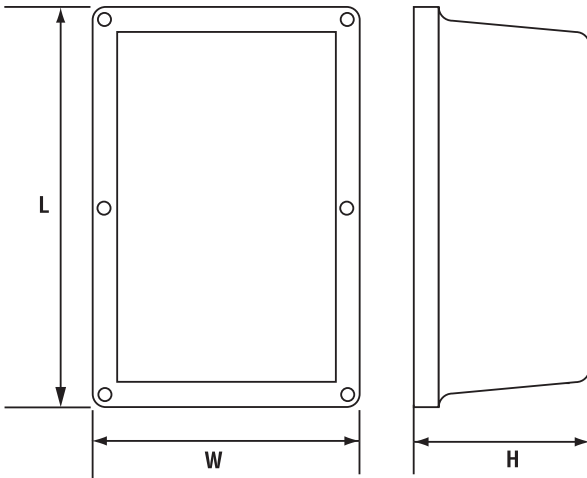
| | TR | LRB (X) | ARB (X) | TF | LF | AF |
|-------------------|----|---------|---------|----|----|----|
| Extension Bracket | ● | ● | ● | ● | ● | ● |
| CCV-EXT-Kit | ● | ● | ● | ● | ● | ● |

- * Cannot be used with N4 actuators.
- * Available for previous NF assemblies.
- * CCV-EXT-KIT cannot be used with any valve smaller than the B212(B) and B312(B).
- * For use with B2 and B3 series only. Cannot be used with B6 series.



Application

The ZS-CCV... weather shield provides moderate protection for valves which are mounted outdoors. This product is designed as a water tight enclosure. The housing allows easy mounting over the actuator, while allowing easy viewing of the actuator in operation. Weather shield for PICCV/CCV to provide protection for actuators in outdoor applications.



| Specifications | |
|--------------------------|-----------------------------------|
| Cover | PETG with UV resistant smoke tint |
| Perimeter Gasket | Silicon Rubber |
| Rubber Gasket | Silicon Rubber |
| Spring Clips | Stainless Steel |
| Temperature limitations: | -22°F to 122°F (-30°C to 50°C) |
| Plate (ZS-CCV-100) | Aluminum |
| Plate | Galvaneal w/black powder coat |

| Part Number | Actuator |
|----------------|-------------|
| ZS - CCV - 90 | LF, AF |
| ZS - CCV - 100 | LRB(X), ARX |
| ZS - CCV - 110 | AFRB(X) |

| L | W | H |
|--------------|-------------|------------|
| 16.25" [413] | 8.75" [222] | 4.5" [114] |

Parts List

- Cover including Rubber Perimeter Gasket, Rubber Gasket
- Back Plate
- Anti-Rotation Post with screw and lock washer
- Valve Gasket
- Assorted Cap plugs for unused holes

- Screws AF - 2 bolts with nylon insert locking nuts
- LRB(X), ARX - 1 screw, 1 washer

No weather shield available at this time for the TF and TR actuators. Designed for NEMA 4 specifications.

* Cannot be used with B6 series.

Auxiliary Switches S1A, S2A

For non-spring return direct-coupled actuators

Application

The S1A and S2A auxiliary switches are used to indicate when a desired position of a valve is reached or to interface additional controls for a specific control sequence.

Operation

The S1A and S2A auxiliary switches are mounted onto the direct coupled actuator. The switches are modular units that mount directly onto LR and AR type actuators and are locked into place by guiding grooves on the sides of the actuator.

A driver disk is attached to the actuator handle and offers direct transmission of the actuator position to the micro switch cams. The switching points can be set over the full scale of 0 to 1 simply by adjusting the slotted discs.

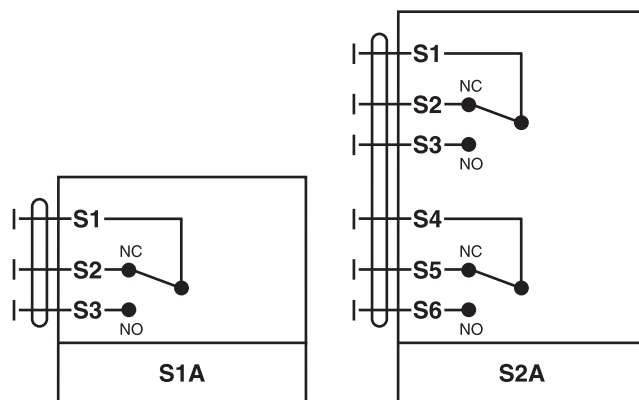


| Types | | | |
|---------|--------|------------------------------|--|
| S1A | 1 SPDT | 3 ft, 18 GA Appliance Cable | |
| S1A/300 | 1 SPDT | 6 ft, 18 GA Appliance Cable | |
| S1A/500 | 1 SPDT | 10 ft, 18 GA Appliance Cable | |

| | | | |
|---------|--------|------------------------------|--|
| S2A | 2 SPDT | 3 ft, 18 GA Appliance Cable | |
| S2A/300 | 2 SPDT | 6 ft, 18 GA Appliance Cable | |
| S2A/500 | 2 SPDT | 10 ft, 18 GA Appliance Cable | |

| Technical Data | S1A | S2A |
|---------------------|--|----------------|
| Number of switches | 1 SPDT | 2 SPDT |
| Weight | 4.6 oz [130 g] | 6.0 oz [170 g] |
| Switching capacity | 3A (0.5A), 250 VAC | |
| Switching point | adjustable over full rotation (0° to 95°) | |
| Pre-setting | with scale possible | |
| Humidity | 5 to 95% RH non-condensing | |
| Ambient temperature | -22°F to 122°F [-30°C to +50°C] | |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] | |
| Housing | NEMA 2 / IP54 | |
| Housing rating | UL94-5VA | |
| Servicing | maintenance free | |
| Agency listings | cULus acc. to UL60730-1 CE according to 73/23/EEC | |
| Quality standard | ISO 9001 | |

Wiring Diagram

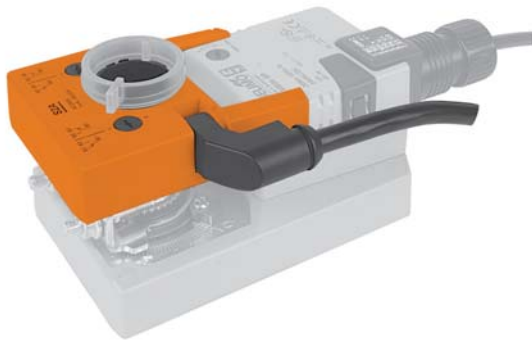


Mounting Instructions

1. Press down the manual override button and rotate the actuator fully counter clockwise.
2. Place the switch/potentiometer adaptor onto the hex shaft of the handle which is in the center of the valve/actuator coupling.
3. Slide switch onto the actuator using the actuator guiding grooves on the sides of the actuator.
4. Check for correct mating of the adaptor to the switch.
5. Adjust switch dials as necessary.

Feedback Potentiometer P...A

For the non-spring return direct-coupled actuators



Application

The P...A feedback potentiometers are used with LR and AR actuators to provide a resistive signal which varies with valve position.

The P...A units are applied with commercial proportional temperature controllers to provide feedback of the valve position, or with electric or electronic meters to provide position indication. The signal can also be used as a positioner for parallel operation of multiple actuators.

Operation

The P...A feedback potentiometers are mounted onto the direct coupled actuator. The switches are modular units that mount directly onto LR and AR type actuators and are locked into place by guiding grooves on the sides of the actuator.

A driver disk is attached to the actuator handle and offers direct transmission of the actuator position to the micro switch cams.

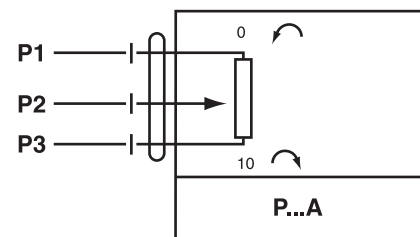
| Types | | |
|---------|------------------------|---------|
| P140A | Feedback Potentiometer | 140 Ω |
| P200A | Feedback Potentiometer | 200 Ω |
| P500A | Feedback Potentiometer | 500 Ω |
| P1000A | Feedback Potentiometer | 1000 Ω |
| P2800A | Feedback Potentiometer | 2800 Ω |
| P5000A | Feedback Potentiometer | 5000 Ω |
| P10000A | Feedback Potentiometer | 10000 Ω |

| Technical Data | P...A |
|-----------------------|--|
| Resistance values | as above |
| Output | 1 W |
| Tolerance | ± 5% |
| Linearity | ± 2% |
| Resolution | min. 1% |
| Residual resistance | max. 5% on both sides |
| Electrical connection | 3 ft, 18 GA appliance cable ½" conduit connector |
| Humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22°F to 122°F [-30°C to 50°C] |
| Storage temperature | -40°F to 176°F [-40°C to 80°C] |
| Housing | NEMA 2 / IP54 |
| Housing rating | UL94-5VA |
| Servicing | maintenance free |
| Agency listings | cULus acc. to UL60730-1 CE according to 73/23/EEC |
| Quality standard | ISO 9001 |
| Weight | 4.6 oz [130 g] |

Mounting Instructions

1. Press down the manual override button and rotate the actuator fully counter clockwise.
2. Place the switch/potentiometer adaptor onto the hex shaft of the handle which is in the center of the valve/actuator coupling.
3. Slide switch onto the actuator using the actuator guiding grooves on the sides of the actuator.
4. Check for correct mating of the adaptor to the switch.
5. Adjust switch dials as necessary.

Wiring Diagram



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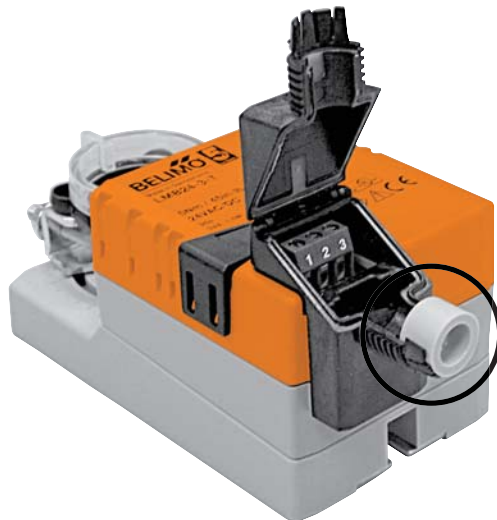
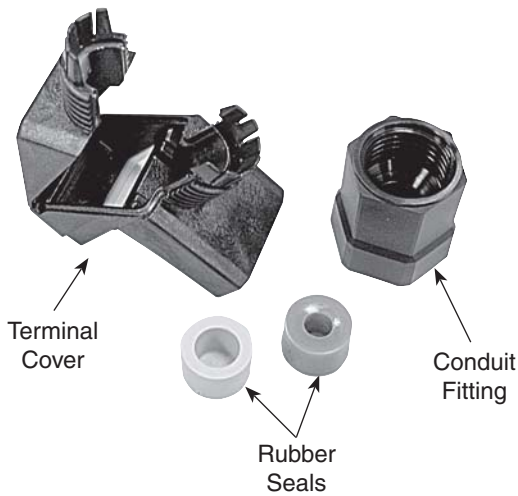
For the non-spring return direct-coupled actuators

Application

Belimo non-spring return actuators with terminal strips are can be converted from NEMA 1/IP20 to NEMA 2/IP54 using the protective terminal cover ZS-T.

The ZS-T terminal cover accessory consists of:

- Terminal Cover
- Conduit Fitting
- Rubber Seal for Wire Diameter 4-6
- Rubber Seal for Wire Diameter 6-8



Mounting the Terminal Cover

1. Attach terminal cover to actuator, if not done already.
2. Slide the conduit fitting and correct size rubber seal onto wire.
3. Wire up actuator using the terminal strips.
4. Fit rubber seal into slot of terminal cover.



5. Shut terminal top and screw on conduit connector.

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MFT Standard Configuration



| | Configuration (Substitute 'V' for 'P' for NV(F) actuators) | Code | Control | | Motion | | |
|----------------|--|-----------------|--------------------|-------------------|---------------|----------|------------|
| | | | Input Range | Position Feedback | Running Time† | Torque % | Adaptation |
| Voltage | P-10001 | A01 | 2.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10002 | A02 | 0.0 to 10.0 VDC | 0.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10003 | A03 | 2.0 to 10.0 VDC | 0.0 to 5.0 VDC | 150 | 100 | Manual |
| | P-10004 | A04 | 4.0 to 7.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10005 | A05 | 6.0 to 9.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10006 | A06 | 10.5 to 13.5 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10007 | A07 | 0.0 to 5.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10009 | A09 | 5.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10010 | A10 | 5.0 to 10.0 VDC | 0.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10013 | A13 | 0.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10015 | A15 | 2.0 to 5.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10016 | A16 | 2.0 to 6.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10017 | A17 | 6.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10018 | A18 | 14.0 to 17.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10020 | A20 | 9.0 to 12.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10028 | A28 | 0.0 to 10.0 VDC | 0.0 to 10.0 VDC | 100 | 100 | Manual |
| | P-10031 | A31 | 0.0 to 4.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10063 | A63 | 0.5 to 4.5 VDC | 0.5 to 4.5 VDC | 150 | 100 | Manual |
| P-10064 | A64 | 5.5 to 10.0 VDC | 5.5 to 10.0 VDC | 150 | 100 | Manual | |
| PWM | P-20001 | W01 | 0.59 to 2.93 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20002 | W02 | 0.02 to 5.00 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20003 | W03 | 0.10 to 25.50 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20004 | W04 | 0.10 to 25.60 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20005 | W05 | 0.10 to 5.20 sec. | 0.0 to 5.0 VDC | 150 | 100 | Manual |
| Floating Point | P-30001 | F01 | Floating point | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-30002 | F02 | Floating point | 0.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-30003 | F03 | Floating point | 2.0 to 10.0 VDC | 100 | 100 | Manual |
| | P-30004 | F04 | Floating point | 0.0 to 5.0 VDC | 100 | 100 | Manual |
| | P-30005 | F05 | Floating point | 0.0 to 10.0 VDC | 100 | 100 | Manual |
| | P-30006 | F06 | Floating point | 0.0 to 5.0 VDC | 150 | 100 | Manual |
| On/Off | P-40001 | J01 | On/Off | 2.0 to 10.0 VDC | 75 | 100 | Manual |
| | P-40002 | J02 | On/Off | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-40003 | J03 | On/Off | 2.0 to 10.0 VDC | 75 | 100 | Manual |
| | P-40004 | J04 | On/Off | 0.0 to 5.0 VDC | 100 | 100 | Manual |
| | P-40005 | J05 | On/Off | 0.0 to 10.0 VDC | 100 | 100 | Manual |

*P-10001 is the default configuration.

Example: AF24-MFT US is the basic model. Add the P... pre-set MFT configuration number and list price to the actuator when ordering, as needed.

Note: V-codes used for NV...Series actuator. All other MFT actuators use P-codes.

Note: Most popular configurations available at no additional cost.

Note: If the configuration needed is not listed, please fill in pg. 112 or call Belimo Customer Service at 800-543-9038.

Note: For Non-Spring Return Actuators the 3-digit code can be used in place of the P... pre-set MFT configuration number.

PRODUCTS

| | MODEL | Base Actuator Codes | Control Input | Feedback | Running Time | Angle of Rotation/Stroke | Power Supply | VA Rating | Weight (lb) |
|------------------|-------------|---------------------|------------------------|--------------|---------------|--------------------------|--------------|-----------|-------------|
| 45 in.-lb [5 Nm] | LRX24-3 | LR000 | On/Off, Floating Point | — | 95 (Default) | 95 deg | 24 VAC/DC | 3 | 1.08 |
| | LRX24-SR | LR030 | 2-10 VDC (4-20mA*) | — | 95 (Default) | 95 deg | 24 VAC/DC | 3 | 1.08 |
| | LRX24-PC | LRXX0† | 0-20 V Phasecut | 2-10 VDC | 95 (Default) | 95 deg | 24 VAC/DC | 3 | 1.08 |
| | LRX24-MFT | LR100 | 2-10 VDC (Default) | 2-10 VDC | 150 (Default) | 95 deg | 24 VAC/DC | 3 | 1.08 |
| | LRX24-MFT95 | LRXX0† | 0 to 135 Ohm | 2-10 VDC | 150 (Default) | 95 deg | 24 VAC/DC | 3 | 1.08 |
| | LRX120-3 | LR060 | On/Off, Floating Point | — | 95 (Default) | 95 deg | 120-240 VAC | 3 | 1.08 |
| LRX120-SR | LR450 | 2-10 VDC (4-20mA*) | — | 95 (Default) | 95 deg | 120-240 VAC | 3 | 1.08 | |

| | | | | | | | | | |
|--------------------|-------------|--------------------|------------------------|--------------|---------------|-------------|-------------|------|------|
| 180 in.-lb [20 Nm] | ARX24-3 | AR000 | On/Off, Floating Point | — | 95 (Default) | 95 deg | 24 VAC/DC | 5 | 1.08 |
| | ARX24-SR | AR030 | 2-10 VDC (4-20mA*) | — | 95 (Default) | 95 deg | 24 VAC/DC | 5 | 1.08 |
| | ARX24-PC | ARXX0† | 0-20 V Phasecut | 2-10 VDC | 95 (Default) | 95 deg | 24 VAC/DC | 5 | 1.08 |
| | ARX24-MFT | AR100 | 2-10 VDC (Default) | 2-10 VDC | 150 (Default) | 95 deg | 24 VAC/DC | 5 | 1.08 |
| | ARX24-MFT95 | ARXX0† | 0 to 135 Ohm | 2-10 VDC | 150 (Default) | 95 deg | 24 VAC/DC | 5 | 1.08 |
| | ARX120-3 | AR060 | On/Off, Floating Point | — | 95 (Default) | 95 deg | 120-240 VAC | 5 | 1.08 |
| ARX120-SR | AR450 | 2-10 VDC (4-20mA*) | — | 95 (Default) | 95 deg | 120-240 VAC | 5 | 1.08 | |

† For correct code please call Belimo Customer service 800-543-9038

| | Configuration (Substitute 'V' for 'P' for NV[F] actuators) | Code | Control | | Motion | | |
|----------------|---|-----------------|--------------------|-------------------|---------------|----------|------------|
| | | | Input Range | Position Feedback | Running Time† | Torque % | Adaptation |
| Voltage | P-10001 | A01 | 2.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10002 | A02 | 0.0 to 10.0 VDC | 0.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10003 | A03 | 2.0 to 10.0 VDC | 0.0 to 5.0 VDC | 150 | 100 | Manual |
| | P-10004 | A04 | 4.0 to 7.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10005 | A05 | 6.0 to 9.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10006 | A06 | 10.5 to 13.5 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10007 | A07 | 0.0 to 5.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10009 | A09 | 5.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10010 | A10 | 5.0 to 10.0 VDC | 0.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10013 | A13 | 0.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10015 | A15 | 2.0 to 5.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10016 | A16 | 2.0 to 6.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10017 | A17 | 6.0 to 10.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10018 | A18 | 14.0 to 17.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10020 | A20 | 9.0 to 12.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10028 | A28 | 0.0 to 10.0 VDC | 0.0 to 10.0 VDC | 100 | 100 | Manual |
| | P-10031 | A31 | 0.0 to 4.0 VDC | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-10063 | A63 | 0.5 to 4.5 VDC | 0.5 to 4.5 VDC | 150 | 100 | Manual |
| P-10064 | A64 | 5.5 to 10.0 VDC | 5.5 to 10.0 VDC | 150 | 100 | Manual | |
| PWM | P-20001 | W01 | 0.59 to 2.93 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20002 | W02 | 0.02 to 5.00 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20003 | W03 | 0.10 to 25.50 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20004 | W04 | 0.10 to 25.60 sec. | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-20005 | W05 | 0.10 to 5.20 sec. | 0.0 to 5.0 VDC | 150 | 100 | Manual |
| Floating Point | P-30001 | F01 | Floating point | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-30002 | F02 | Floating point | 0.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-30003 | F03 | Floating point | 2.0 to 10.0 VDC | 100 | 100 | Manual |
| | P-30004 | F04 | Floating point | 0.0 to 5.0 VDC | 100 | 100 | Manual |
| | P-30005 | F05 | Floating point | 0.0 to 10.0 VDC | 100 | 100 | Manual |
| | P-30006 | F06 | Floating point | 0.0 to 5.0 VDC | 150 | 100 | Manual |
| On/Off | P-40001 | J01 | On/Off | None | 75 | 100 | Manual |
| | P-40002 | J02 | On/Off | 2.0 to 10.0 VDC | 150 | 100 | Manual |
| | P-40003 | J03 | On/Off | None | 75 | 100 | Manual |
| | P-40004 | J04 | On/Off | 0.0 to 5.0 VDC | 100 | 100 | Manual |
| | P-40005 | J05 | On/Off | 0.0 to 10.0 VDC | 100 | 100 | Manual |

*P-10001 is the default configuration.

Custom MFT Configuration Order Form

FAX: USA Toll Free 1-800-228-8283



#1 Select an Actuator

(use one sheet for each unique actuator/configuration)

| | Quantity | | Quantity |
|--|----------|--------------------------------------|----------|
| <input type="checkbox"/> AF24-MFT US | _____ | <input type="checkbox"/> AMX24-MFT | _____ |
| <input type="checkbox"/> AF24-MFT-S US | _____ | <input type="checkbox"/> AMX24-MFTX1 | _____ |
| <input type="checkbox"/> NF24-MFT US | _____ | <input type="checkbox"/> NMX24-MFT | _____ |
| <input type="checkbox"/> LF24-MFT US | _____ | <input type="checkbox"/> NMX24-MFTX1 | _____ |
| <input type="checkbox"/> LF24-MFT-S US | _____ | <input type="checkbox"/> LMX24-MFT | _____ |
| <input type="checkbox"/> AF24-MFT95 US | _____ | <input type="checkbox"/> LMX24-MFTX1 | _____ |
| <input type="checkbox"/> NV24-MFT US | _____ | <input type="checkbox"/> LRX24-MFT | _____ |
| <input type="checkbox"/> NVF24-MFT US | _____ | <input type="checkbox"/> GMX24-MFT95 | _____ |
| <input type="checkbox"/> NVF24-MFT-E US | _____ | <input type="checkbox"/> AMX24-MFT95 | _____ |
| <input type="checkbox"/> NVFD24-MFT US | _____ | <input type="checkbox"/> NMX24-MFT95 | _____ |
| <input type="checkbox"/> NVFD24-MFT-E US | _____ | <input type="checkbox"/> LMX24-MFT95 | _____ |
| <input type="checkbox"/> GMX24-MFT | _____ | <input type="checkbox"/> LHX24-MFT | _____ |
| <input type="checkbox"/> GMX24-MFTX1 | _____ | <input type="checkbox"/> LUX24-MFT | _____ |

(-S=Auxiliary Switch)

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

Email _____

FIELD LABELING: LBL-MFT

- Custom configuration labels required
 1-3/8" X 1-1/4" orange labels preprinted to your specifications 12 label sets per sheet.
 Includes configuration code and wiring labels.

#2 Create a Custom Configuration

1 Angle of rotation setting

Deactivated (Default) The following settings 2 - 5 refer to the full angle of rotation of 95°.

Activated The following settings 2 - 5 are automatically adapted to the effective mechanical angle of rotation.

Manual triggering by pressing the push button twice.

Automatic triggering each time the unit is powered up or by pressing the push button twice.

2 Control Types

| VDC | PWM | Floating Point | On/Off |
|--|--|--------------------------|--------------------------|
| <input type="checkbox"/> 2 - 10 | <input type="checkbox"/> 0.2 to 5.0 seconds | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> 0 - 10 | <input type="checkbox"/> 0.1 to 25.5 seconds | | |
| <input type="checkbox"/> Variable | <input type="checkbox"/> 0.59 to 2.93 seconds | | |
| Start <input type="checkbox"/> <input type="checkbox"/> · <input type="checkbox"/> | <input type="checkbox"/> Variable | | |
| Stop <input type="checkbox"/> <input type="checkbox"/> · <input type="checkbox"/> | Start <input type="checkbox"/> <input type="checkbox"/> · <input type="checkbox"/> | | |
| | Stop <input type="checkbox"/> <input type="checkbox"/> · <input type="checkbox"/> | | |

3 Feedback Signals U₅

| | | |
|--|---|--|
| <input type="checkbox"/> Position Feedback U | DC 2...10 V (Default) | |
| <input type="checkbox"/> Position Feedback U | DC 0...10 V | |
| <input type="checkbox"/> Position Feedback U | Start DC <input type="checkbox"/> · <input type="checkbox"/> V (0...8 V) | The finish must be at least 2 V above the start! |
| | Finish DC <input type="checkbox"/> <input type="checkbox"/> · <input type="checkbox"/> V (2...10 V) | |

4 Running Time

150 seconds (Default)

Running time seconds (75...300 seconds) (in 5 second increments)

Note: The sound power level [dB(A)] increases when the running time is below 150 seconds.

| | |
|--------|------------------|
| LM | 35...150 seconds |
| NM | 45...170 seconds |
| AM | 90...300 seconds |
| GM | 90...300 seconds |
| Others | 75...300 seconds |

5 Override control and electronic angle of rotation limiting

Min. (min. position) = % (0...100%) <↵ (beginning of working range) default 0

ZS (intermediate position) = % (0...100%) (0% = Min.; 100% = Max.) default 50

Max. (max. position) = % (0...100%) <↵ (end of working range) default 100