

# B278, 2-Way, Characterized Control Valve

## Stainless Steel Ball and Stem



| Technical Data                    |                                      |
|-----------------------------------|--------------------------------------|
| Service                           | chilled, hot water, up to 60% glycol |
| Flow Characteristic               | equal percentage                     |
| Controllable Flow Range           | 75°                                  |
| Size [mm]                         | 3" [80]                              |
| End Fitting                       | NPT female ends                      |
| Body                              | forged brass, nickel plated          |
| Ball                              | stainless steel                      |
| Stem                              | stainless steel                      |
| Stem Packing                      | EPDM (lubricated)                    |
| Seat                              | Teflon® PTFE                         |
| Seat O-ring                       | EPDM (lubricated)                    |
| Characterized Disc                | TEFZEL®                              |
| Body Pressure Rating [psi]        | 400                                  |
| Media Temperature Range (Water)   | 0°F to 212°F [-18°C to 100°C]        |
| Max Differential Pressure (Water) | 30 psi                               |
| Close-Off Pressure                | 100 psi                              |
| Cv                                | 130                                  |
| Weight                            | 9 lb [4.1 kg]                        |
| Leakage                           | 0% for A to AB                       |
| Servicing                         | maintenance free                     |



### 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.

### Suitable Actuators

|      | Non-Spring | Spring  |
|------|------------|---------|
| B278 | ARB(X)     | AFRB(X) |

### Dimensions (Inches [mm])



| A            | B              | C              | D              | E          | F | H1            | H2            |
|--------------|----------------|----------------|----------------|------------|---|---------------|---------------|
| 11"<br>[280] | 5.82"<br>[148] | 8.48"<br>[217] | 5.95"<br>[152] | 2.78" [71] |   | 2.07"<br>[53] | 0.75"<br>[20] |

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## B278, 2-Way, Characterized Control Valve Stainless Steel Ball and Stem

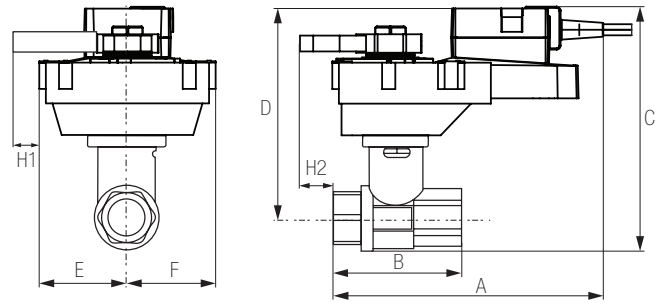
### Dimensions (Inches [mm])



**AFRB, AFRX**

| A               | B           | C           | D           | E          | F |
|-----------------|-------------|-------------|-------------|------------|---|
| 11.77"<br>[299] | 5.82" [148] | 9.11" [231] | 6.61" [168] | 2.02" [51] |   |

### Dimensions (Inches [mm])



**ARQB, ARQX**

| A             | B              | C              | D              | E          | F | H1            | H2        |
|---------------|----------------|----------------|----------------|------------|---|---------------|-----------|
| 9.9"<br>[251] | 4.21"<br>[107] | 8.61"<br>[220] | 6.11"<br>[155] | 2.28" [58] |   | 0.75"<br>[20] | 0.5" [15] |

### Dimensions (Inches [mm])



**AFRB N4, AFRX N4**

| A               | B           | C               | D           | E          | F |
|-----------------|-------------|-----------------|-------------|------------|---|
| 12.98"<br>[330] | 5.82" [148] | 10.29"<br>[261] | 9.24" [235] | 3.39" [86] |   |

### Dimensions (Inches [mm])



**ARB N4, ARX N4, NRB N4, NRX N4**

| A               | B           | C               | D           | E          | F |
|-----------------|-------------|-----------------|-------------|------------|---|
| 11.36"<br>[289] | 5.82" [148] | 10.74"<br>[274] | 8.01" [204] | 3.15" [80] |   |

# AFRX24-MFT

Modulating, Spring Return, 24 V, Multi-Function Technology®



| Technical Data                    |  |
|-----------------------------------|--|
| Power Supply                      | 24 VAC, ±20%, 50/60 Hz, 24 VDC, ±10%   |
| Power Consumption Running         | 7.5 W  |
| Power Consumption Holding         | 3 W  |
| Transformer Sizing                | 10 VA (class 2 power source)   |
| Electrical Connection             | 3ft [1m], 18 GA appliance cable with 1/2" conduit connector  |
| Overload Protection               | electronic throughout 0° to 95° rotation   |
| Operating Range Y                 | 2 to 10 VDC, 4 to 20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor), variable (VDC, PWM, floating point, on/off) |
| Input Impedance                   | 100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA, 1500 Ω for PWM, floating point and On/Off      |
| Feedback Output U                 | 2 to 10 VDC, 0.5 mA max, VDC variable  |
| Angle of Rotation                 | 90°  |
| Direction of Rotation (Motor)     | reversible with switch   |
| Direction of Rotation (Fail-Safe) | reversible with CW/CCW mounting  |
| Position Indication               | visual indicator, 0° to 95° (0° is full spring return position)  |
| Manual Override                   | 5 mm hex crank (3/16" Allen), supplied   |
| Running Time (Motor)              | default 150 sec, variable 70...220 sec   |
| Running Time (Fail-Safe)          | <20 sec  |
| Angle of Rotation Adaptation      | off (default)  |
| Ambient Temperature Range         | -22°F to 122°F [-30°C to 50°C]   |
| Storage Temperature Range         | -40°F to 176°F [-40°C to 80°C]   |
| Housing                           | NEMA 2, IP54, UL Enclosure Type 2  |
| Agency Listings†                  | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC             |
| Noise Level (Motor)               | <45 dB (A)   |
| Noise Level (Fail-Safe)           | <62 dB (A)   |
| Servicing                         | maintenance free   |
| Quality Standard                  | ISO 9001   |

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

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**Wiring Diagrams**
**INSTALLATION NOTES**

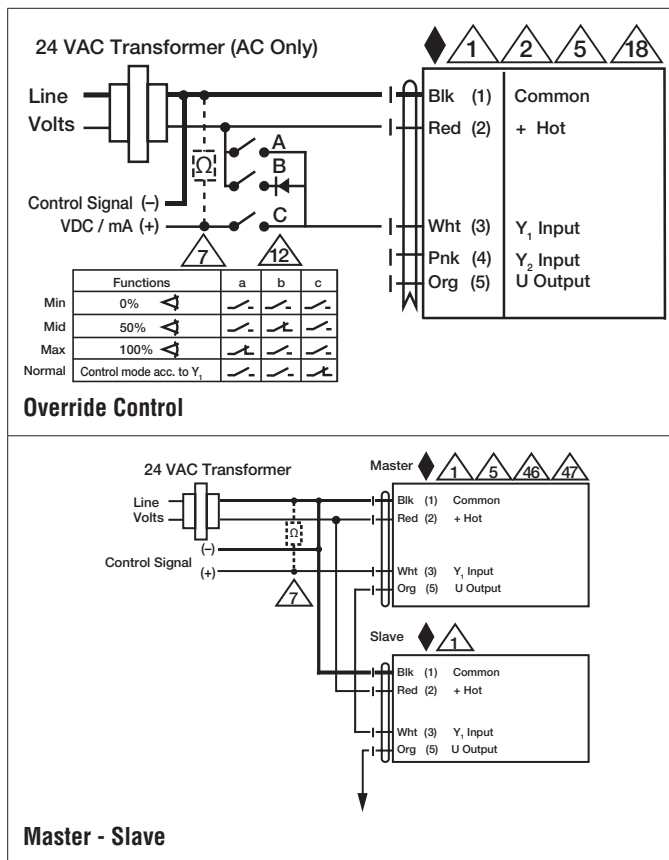
- Actuators with appliance cables are numbered.
- Provide overload protection and disconnect as required.
- Actuators may also be powered by 24 VDC.
- Only connect common to negative (-) leg of control circuits.
- A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.
- Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.
- For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.
- IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).
- Actuators may be controlled in parallel. Current draw and input impedance must be observed.
- Master-Slave wiring required for piggy-back applications. Feedback from Master to control input(s) of Slave(s).
- 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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