3-way Mixing/Diverting, Characterized Control Valve, Stainless Steel Ball and Stem

Picture may differ from product

5-year warranty

## Type overview

| Type | DN |
|---|---|
| B331 | 1 1/4" [32] |

## Technical data

| | | |
|---|---|---|
| **Functional data** | Valve size [mm] | 1.25" [32] |
| | Fluid | chilled or hot water, up to 60% glycol |
| | Fluid Temp Range (water) | 0...250°F [-18...120°C] |
| | Body Pressure Rating | 400 psi |
| | Close-off pressure Δps | 200 psi |
| | Flow | A-port: as stated in chart B-port: 70% of A – AB Cv |
| | Flow characteristic | A-port equal percentage, B-port modified for constant common port flow |
| | Leakage rate | 0% for A – AB, <2.0% for B – AB |
| | Pipe connection | Internal thread<br>NPT (female) |
| | Servicing | maintenance-free |
| | Flow Pattern | 3-way Mixing/Diverting |
| | Controllable flow range | 75° |
| | Cv | 25 |
| **Materials** | Valve body | Nickel-plated brass body |
| | Stem | stainless steel |
| | Stem seal | EPDM (lubricated) |
| | Seat | PTFE |
| | Characterized disc | Ryton PPS |
| | O-ring | EPDM (lubricated) |
| | Ball | stainless steel |
| **Suitable actuators** | Non Fail-Safe | ARB(X)<br>ARQB(X)<br>ARB(X) N4 |
| | Spring | AFRB(X) |

## Safety notes

- WARNING: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

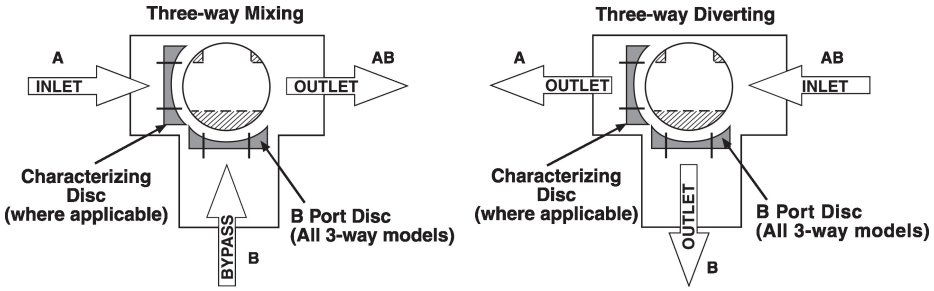
## Product features

**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.

**Flow/Mounting details**

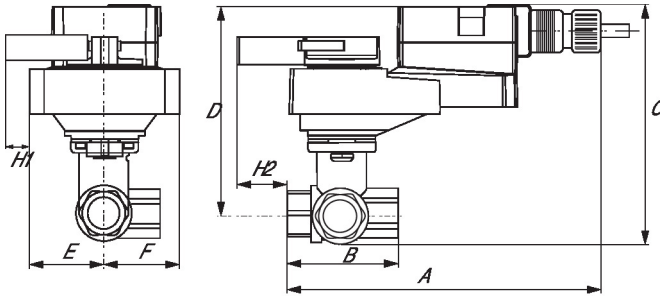
This valve is not suitable for use as a change over valve.




## Dimensions

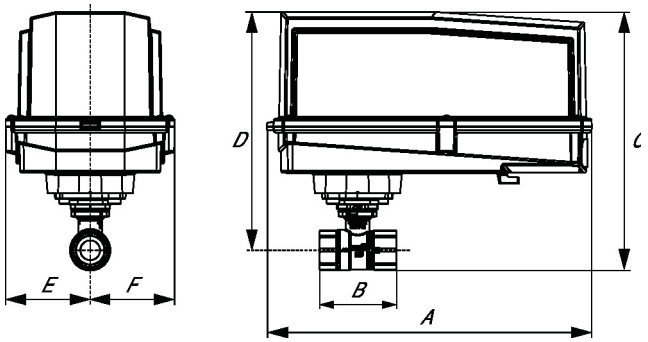
| Type | DN | Weight |
|---|---|---|
| B331 | 1 1/4" [32] | 2.5 lb [1.1 kg] |

ARB, ARX



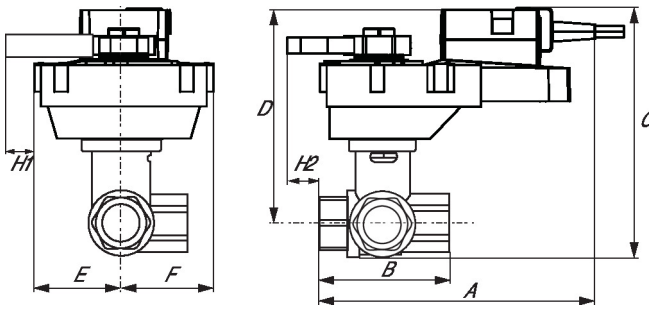

| A | B | C | D | E | F | H1 | H2 |
|---|---|---|---|---|---|---|---|
| 10.0" [254] | 4.0" [101] | 6.8" [172] | 5.5" [140] | 1.77" [44] | 2.1" [54] | 0.8" [20] | 1.2" [30] |

ARB N4, ARX N4, NRB N4, NRX N4




| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 11.4" [289] | 4.0" [101] | 8.9" [226] | 7.6" [194] | 3.1" [80] | 3.1" [80] |

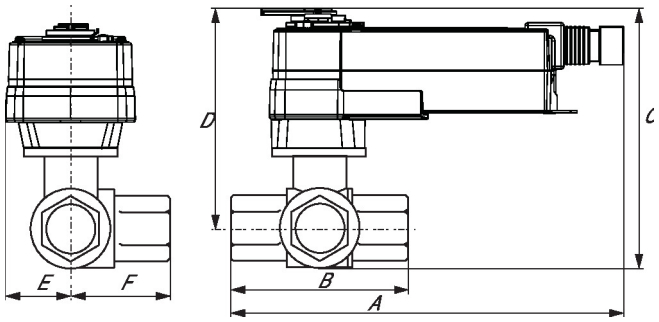
ARQB, ARQX




| A | B | C | D | E | F | H1 | H2 |
|---|---|---|---|---|---|---|---|
| 9.7" [246] | 4.0" [101] | 7.5" [191] | 6.2" [158] | 1.77" [44] | 2.1" [54] | 1.4" [34] | 0.8" [20] |

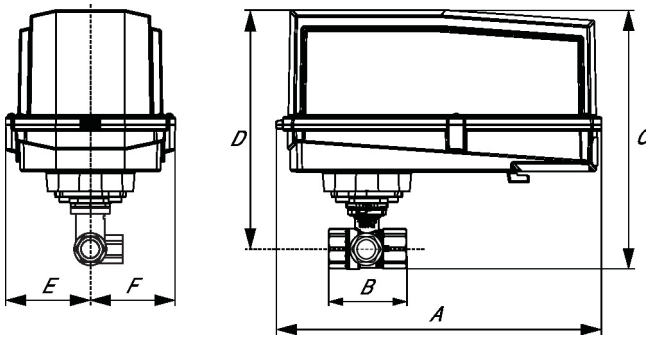
## Dimensions

AFRB, AFRX




| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 10.6" [269] | 4.0" [101] | 6.9" [175] | 5.7" [146] | 2.1" [54] | 1.3" [33] |

AFRB N4, AFRX N4




| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 13.0" [330] | 4.0" [101] | 10.5" [267] | 9.5" [241] | 3.7" [95] | 3.7" [95] |

MFT/programmable, Spring return, 24 V

5-year warranty

MFT

## Technical data

| | | |
|---|---|---|
| **Electrical data** | Nominal voltage | AC/DC 24 V |
| | Nominal voltage frequency | 50/60 Hz |
| | Nominal voltage range | AC 19.2...28.8 V / DC 21.6...28.8 V |
| | Power consumption in operation | 7.5 W |
| | Power consumption in rest position | 3 W |
| | Transformer sizing | 10 VA |
| | Electrical Connection | 18 AWG appliance cable, 1 m, with 1/2" NPT conduit connector |
| | Overload Protection | electronic throughout 0...95° rotation |
| **Functional data** | Operating range Y | 2...10 V |
| | Operating range Y note | 4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor) |
| | Input impedance | 100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA, 1500 Ω for PWM, On/Off and Floating point |
| | Operating range Y variable | Start point 0.5...30 V<br>End point 2.5...32 V |
| | Operating modes optional | variable (VDC, PWM, on/off, floating point) |
| | Position feedback U | 2...10 V |
| | Position feedback U note | Max. 0.5 mA |
| | Position feedback U variable | VDC variable |
| | Direction of motion motor | selectable with switch |
| | Direction of motion fail-safe | reversible with cw/ccw mounting |
| | Manual override | 5 mm hex crank (3/16" Allen), supplied |
| | Angle of rotation | 90° |
| | Running Time (Motor) | 150 s / 90° |
| | Running time motor variable | 70...220 s |
| | Running time fail-safe | <20 s |
| | Adaptation Setting Range | off (default) |
| | Override control | MIN (minimum position) = 0%<br>MID (intermediate position) = 50%<br>MAX (maximum position) = 100% |

## Technical data

| | | |
|---|---|---|
| **Functional data** | Noise level, motor | 45 dB(A) |
| | Noise level, fail-safe | 62 dB(A) |
| | Position indication | Mechanical |
| **Safety data** | Power source UL | Class 2 Supply |
| | Degree of protection IEC/EN | IP66 |
| | Degree of protection NEMA/UL | NEMA 4X |
| | Housing | UL Enclosure Type 4X |
| | Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU and 2014/35/EU |
| | Quality Standard | ISO 9001 |
| | Ambient humidity | Max. 100% RH |
| | Ambient temperature | -22...122°F [-30...50°C] |
| | Ambient temperature note | -40...50°C [104...122°F] for actuator with integrated heating |
| | Storage temperature | -40...176°F [-40...80°C] |
| | Servicing | maintenance-free |
| **Weight** | Weight | 6.7 lb [3.0 kg] |
| **Materials** | Housing material | Die cast aluminium and plastic casing |

**Footnotes** †Rated Impulse Voltage 800V, Type of Action 1, Control Pollution Degree 2.

## Product features

**Default/Configuration** Default parameters for 2 to 10 VDC applications of the AF..-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

**Factory settings** Default parameters for 2 to 10 VDC applications of the AF..-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

## Accessories

**Gateways**

| Description | Type |
|---|---|
| Gateway MP to BACnet MS/TP | UK24BAC |
| Gateway MP to Modbus RTU | UK24MOD |
| Gateway MP to LonWorks | UK24LON |

**Tools**

| Description | Type |
|---|---|
| Connecting cable 10 ft [3 m], A: RJ11 6/4 ZTH EU, B: 3-pin Weidmüller and supply connection | ZK4-GEN |
| Service tool, with ZIP-USB function, for configurable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US |

**Factory add-on option only**

| Description | Type |
|---|---|
| Heater, with adjustable thermostat | ACT_PACK_H |

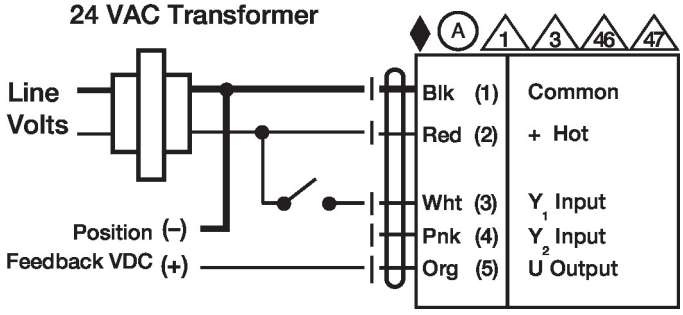
## Electrical installation

INSTALLATION NOTES

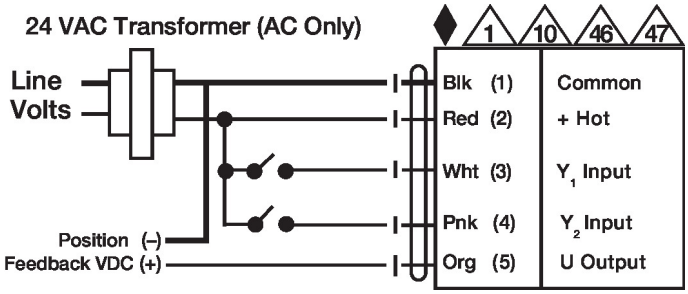
Ⓐ Actuators with appliance cables are numbered.
1 Provide overload protection and disconnect as required.
3 Actuators may also be powered by DC 24 V.
5 Only connect common to negative (-) leg of control circuits.
7 A 500 Ω resistor (ZG-R01) converts the 4...20 mA control signal to 2...10 V.
8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 V line.
10 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.
12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).
46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.
47 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.

## Wiring diagrams

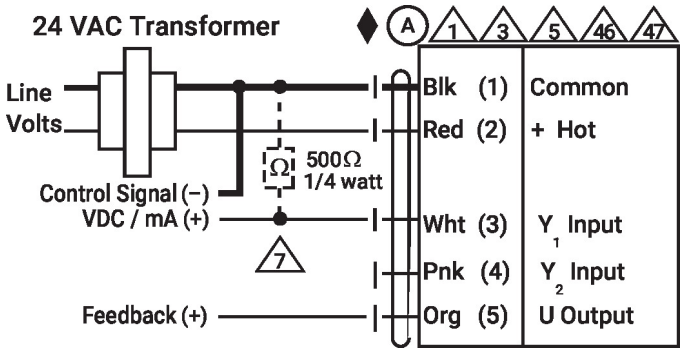
On/Off



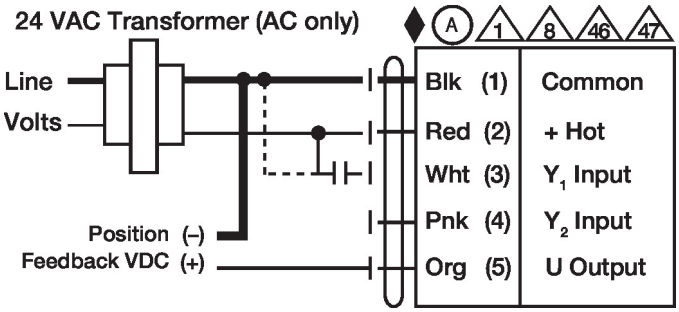

Floating Point




VDC/mA Control



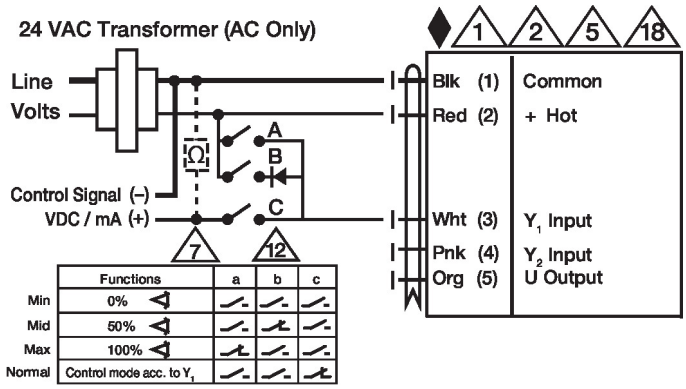

PWM Control



## Electrical installation

### Wiring diagrams

Override Control




Primary - Secondary