# Technical data sheet B208

2-way, Characterized Control Valve, Stainless Steel Ball and Stem



Picture may differ from product

5-year warranty

## Type overview

| Type | DN |
|---|---|
| B208 | 1/2" [15] |

## Technical data

| | | |
|---|---|---|
| **Functional data** | Valve size [mm] | 0.5" [15] |
| | Fluid | chilled or hot water, up to 60% glycol |
| | Fluid Temp Range (water) | 0...250°F [-18...120°C] |
| | Body Pressure Rating | 600 psi |
| | Close-off pressure Δps | 200 psi |
| | Flow characteristic | equal percentage |
| | Leakage rate | 0% for A–AB |
| | Pipe connection | Internal thread<br>NPT (female) |
| | Servicing | maintenance-free |
| | Flow Pattern | 2-way |
| | Controllable flow range | 75° |
| | Cv | 0.46 |
| **Materials** | Valve body | Nickel-plated brass body |
| | Stem | stainless steel |
| | Stem seal | EPDM (lubricated) |
| | Seat | PTFE |
| | Characterized disc | TEFZEL® |
| | O-ring | EPDM (lubricated) |
| | Ball | stainless steel |
| **Suitable actuators** | Non Fail-Safe | TR<br>LRB(X)<br>LRQB(X)<br>NRB(X) N4 |
| | Spring | TFRB(X)<br>LF |

## 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

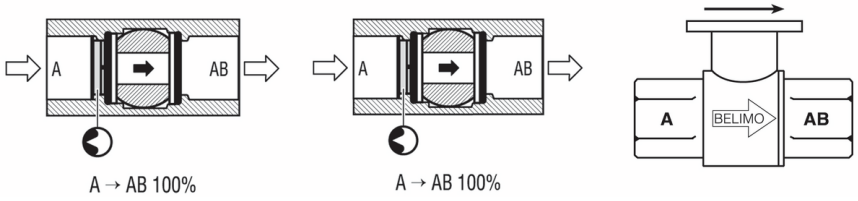
## Product features

**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 flow.

**Flow/Mounting details**

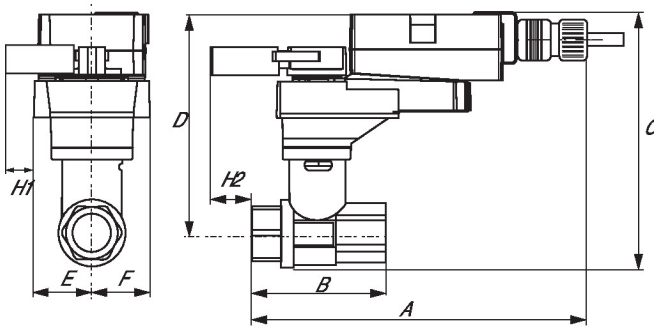
Two-way valves should be installed with the disc upstream.




## Dimensions

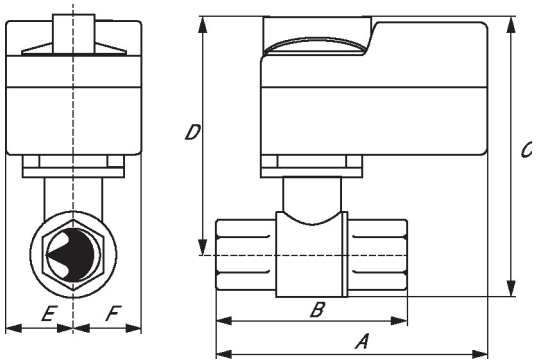
| Type | DN | Weight |
|---|---|---|
| B208 | 1/2" [15] | 0.50 lb [0.23 kg] |

LRB, LRX



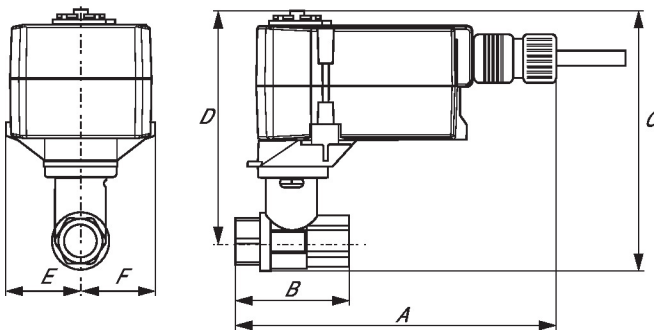

| A | B | C | D | E | F | H1 | H2 |
|---|---|---|---|---|---|---|---|
| 9.4" [239] | 2.4" [60] | 5.2" [132] | 4.6" [117] | 1.3" [33] | 1.3" [33] | 1.2" [30] | 1.1" [28] |

TR




| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 3.7" [95] | 2.4" [60] | 4.8" [122] | 4.2" [107] | 1.3" [33] | 1.3" [33] |

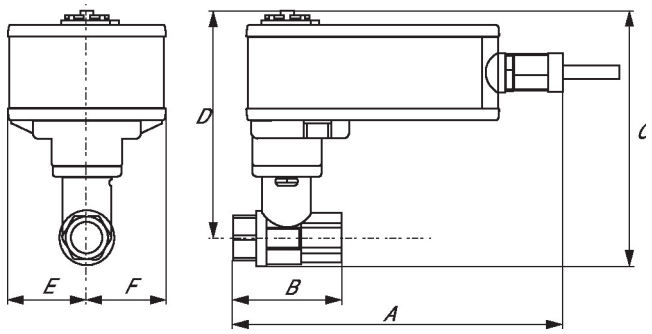
TFRB, TFRX




| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 6.6" [167] | 2.4" [60] | 4.9" [124] | 4.3" [110] | 1.5" [39] | 1.5" [39] |

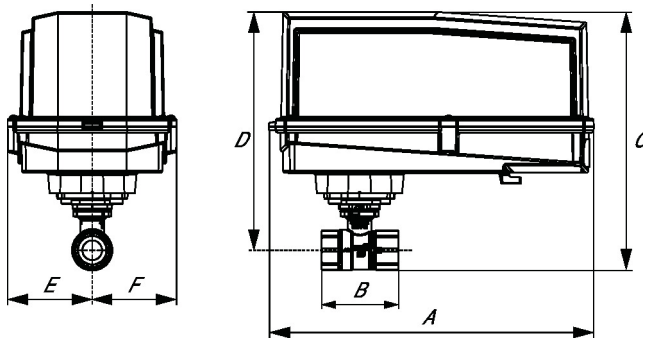
## Dimensions

LF




| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 7.91" [200] | 2.4" [60] | 5.7" [146] | 5.1" [129] | 1.8" [46] | 1.8" [46] |

ARB N4, ARX N4, NRB N4, NRX N4




| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 11.4" [289] | 2.4" [60] | 7.7" [196] | 7.0" [179] | 3.1" [80] | 3.1" [80] |

MFT/programmable, Non fail-safe, 24 V



5-year warranty

Please note: Due to a supplier issue, certain NEMA 4 actuator covers will be supplied in gray instead of orange until further notice. This change ensures uninterrupted shipping and the same protective properties and product specifications.

## 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 | 3.5 W |
| | Power consumption in rest position | 1.3 W |
| | Transformer sizing | 6 VA |
| | Electrical Connection | Screw terminal (for 26...14 AWG wire), 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 DC 2...10 V (0.1 mA), 500 Ω for 4...20 mA, 1500 Ω for PWM and On/Off |
| | 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 0/1 |
| | Manual override | external push button |
| | Angle of rotation | Max. 90° |
| | Angle of rotation note | adjustable with mechanical stop |
| | Running Time (Motor) | 150 s / 90° |
| | Running time motor variable | 45...150 s |
| | Sound power level, motor | 45 dB(A) |
| | Position indication | pointer |
| **Safety data** | Power source UL | Class 2 Supply |
| | Degree of protection IEC/EN | IP66/67 |
| | 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 |

## Technical data

| | | |
|---|---|---|
| **Safety data** | Ambient temperature | -22...122°F [-30...50°C] |
| | Ambient temperature note | -40...122°F [-40...50°C] for actuator with integrated heating |
| | Storage temperature | -22...122°F [-30...50°C] |
| | Servicing | maintenance-free |
| **Weight** | Weight | 3.7 lb [1.7 kg] |
| **Materials** | Housing material | Die cast aluminium and plastic casing |

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

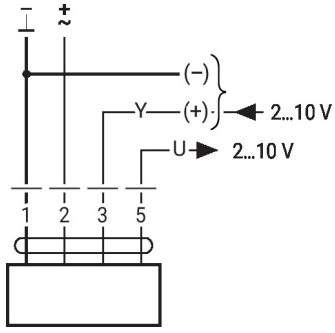
## Accessories

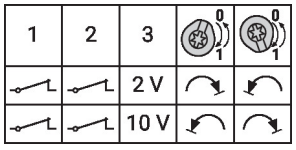
| **Tools** | **Description** | **Type** |
|---|---|---|
| | Connecting cable 10 ft [3 m], A: RJ11 6/4 LINK.10, B: 3-pin Weidmüller and supply connection | ZK4-GEN |
| | Service tool, with ZIP-USB function, for configurable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US |
| **Electrical accessories** | **Description** | **Type** |
| | Auxiliary switch 1x SPDT add-on | S1A |
| | Auxiliary switch 2x SPDT add-on | S2A |
| | Feedback potentiometer 140 Ω add-on, grey | P140A GR |
| | Feedback potentiometer 1 kΩ add-on, grey | P1000A GR |
| | Feedback potentiometer 10 kΩ add-on, grey | P10000A GR |
| | Feedback potentiometer 2.8 kΩ add-on, grey | P2800A GR |
| | Feedback potentiometer 500 Ω add-on, grey | P500A GR |
| | Feedback potentiometer 5 kΩ add-on, grey | P5000A GR |
| **Gateways** | **Description** | **Type** |
| | Gateway MP to BACnet MS/TP | UK24BAC |
| | Gateway MP to Modbus RTU | UK24MOD |
| | Gateway MP to LonWorks | UK24LON |
| **Factory add-on option only** | **Description** | **Type** |
| | Heater, with adjustable thermostat | ACT_PACK_H |

## Electrical installation

**Wire colors:**
1 = black
2 = red
3 = white
5 = orange

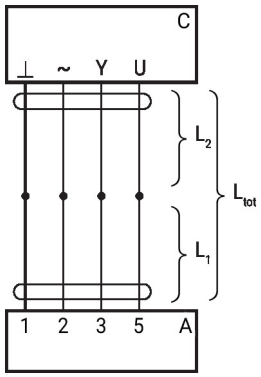
AC/DC 24 V, modulating



## Electrical installation

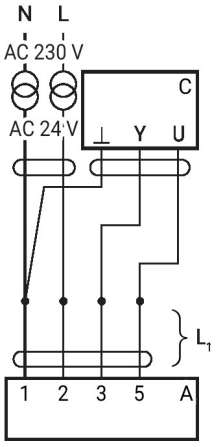
Signal cable lengths




| $L_2$ | $L_{tot} = L_1 + L_2$ | |
|---|---|---|
| ⊥ / ~ | AC | DC |
| 0.75 mm² | ≤30 m | ≤5 m |
| 1.00 mm² | ≤40 m | ≤8 m |
| 1.50 mm² | ≤70 m | ≤12 m |
| 2.50 mm² | ≤100 m | ≤20 m |

A = Actuator
C = Control unit (controlling unit)
L1 = Connecting cable of the actuator
L2 = Customer cable
Ltot = Maximum signal cable length

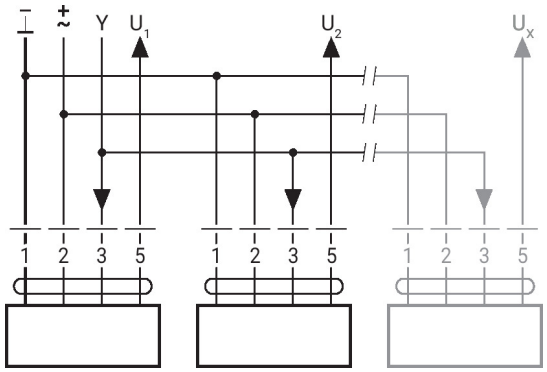
Note:
When several actuators are connected in parallel, the maximum signal cable length must be divided by the number of actuators.




A = Actuator
C = Control unit (controlling unit)
L1 = Connecting cable of the actuator

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

Parallel operation

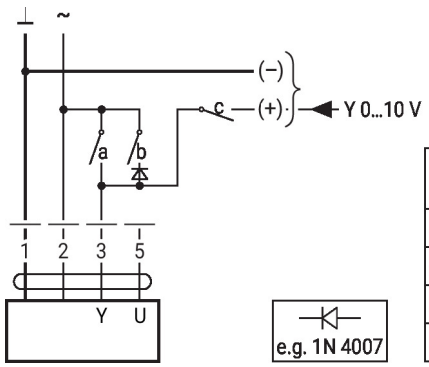



Max. 8 actuators in parallel
Parallel operation is permitted only on non-connected axes
Do not fail to observe performance data with parallel operation

## Further electrical installations

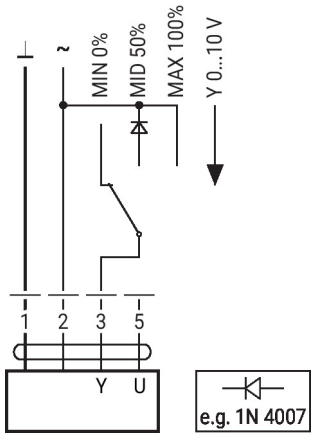
### Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts

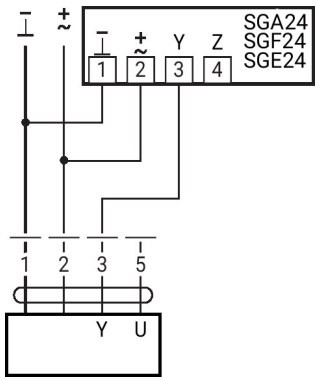



| 1 | 2 | a | b | c | |
|---|---|---|---|---|---|
| | | | | | 0 % |
| | | | | | ZS 50% |
| | | | | | 100% |
| | | | | | Y |

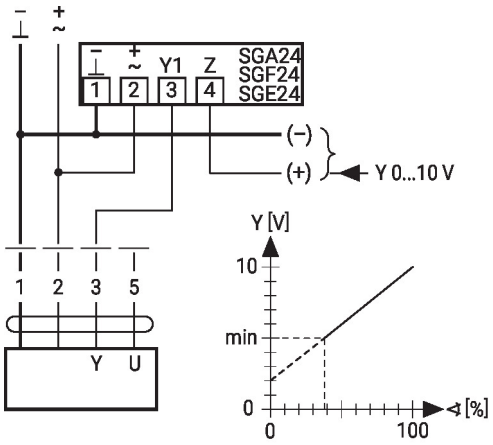
Override control with AC 24 V with rotary switch



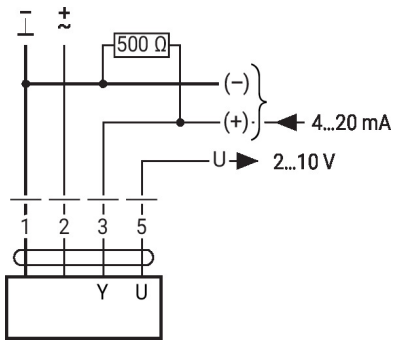

Control remotely 0...100% with positioner SG..




Minimum limit with positioner SG..




Control with 4...20 mA via external resistor

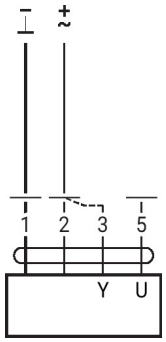



Caution:
The operating range must be set to DC 2...10 V.
The 500 Ohm resistor converts the 4...20 mA current signal to a voltage signal DC 2...10 V.

## Further electrical installations

### Functions with basic values (conventional mode)

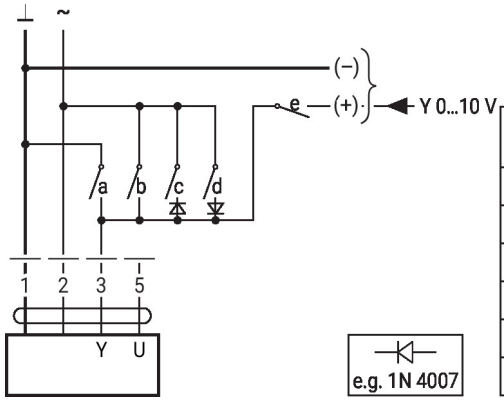
Functional check




**Procedure**
1. Connect 24 V to connections 1 and 2
2. Disconnect connection 3:
– With direction of rotation 0: Actuator rotates to the left
– With direction of rotation 1: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
– Actuator runs in opposite direction

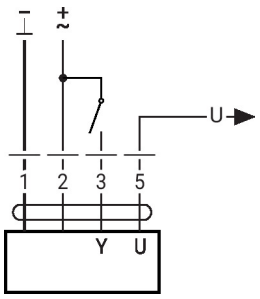
### Functions with specific parameters (configuration necessary)

Override control and limiting with AC 24 V with relay contacts

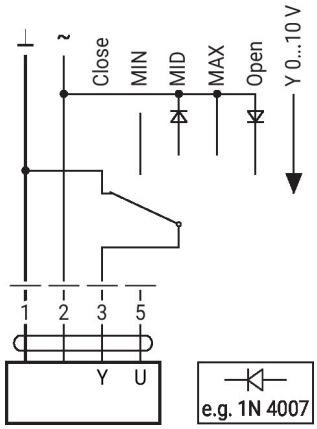



| 1 | 2 | a | b | c | d | e | |
|---|---|---|---|---|---|---|---|
| ⌐ | ⌐ | ⌐ | _ | _ | _ | _ | Close |
| ⌐ | ⌐ | _ | ⌐ | _ | _ | _ | MIN |
| ⌐ | ⌐ | ⌐ | _ | ⌐ | _ | _ | ZS |
| ⌐ | ⌐ | _ | ⌐ | ⌐ | _ | _ | MAX |
| ⌐ | ⌐ | _ | _ | _ | ⌐ | _ | Open |
| ⌐ | ⌐ | _ | _ | _ | _ | ⌐ | Y |

Control on/off




Override control and limiting with AC 24 V with rotary switch




Caution:
The "Close" function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.