

# B209, 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]                         | 0.5" [15]                            |
| 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]        | 600                                  |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to 120°C]        |
| Max Differential Pressure (Water) | 50 psi (345 kPa)                     |
| Close-Off Pressure                | 200 psi                              |
| Cv                                | 0.8                                  |
| Weight                            | 0.4 lb [0.2 kg]                      |
| Leakage                           | 0% for A to AB                       |
| Servicing                         | maintenance free                     |



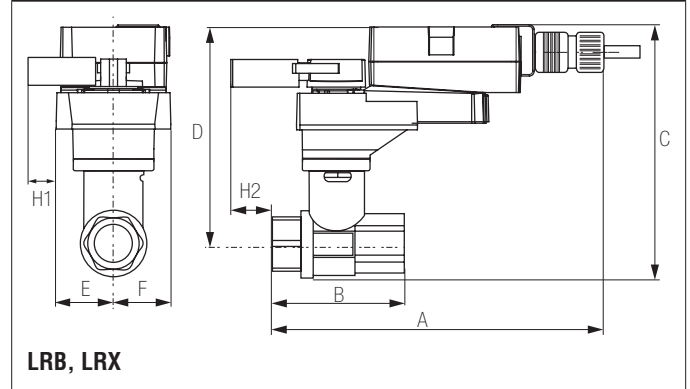
### Application

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  |
|------|------------|---------|
| B209 | TR, LR, NR | TFR, LF |

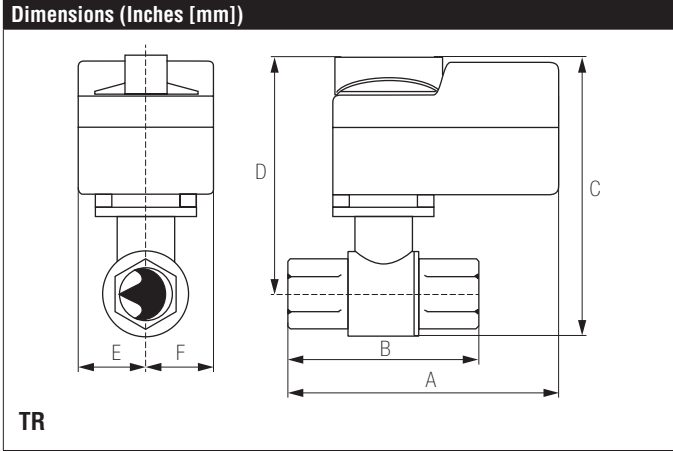
### Dimensions (Inches [mm])



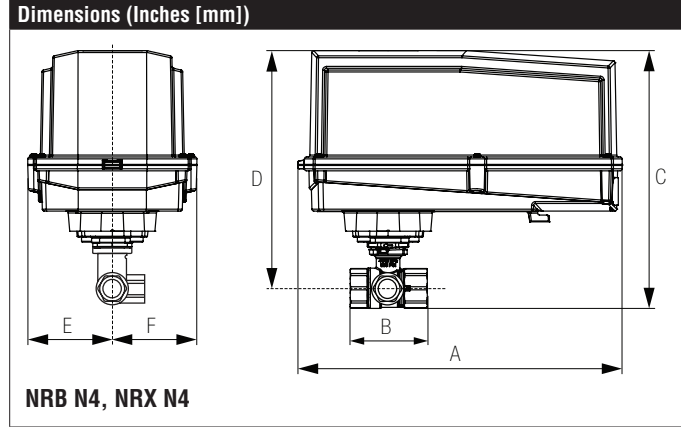
| A          | B          | C           | D           | E         | F | H1         | H2        |
|------------|------------|-------------|-------------|-----------|---|------------|-----------|
| 9.4" [239] | 2.38" [60] | 5.19" [132] | 4.61" [117] | 1.3" [33] |   | 1.18" [30] | 1.1" [28] |

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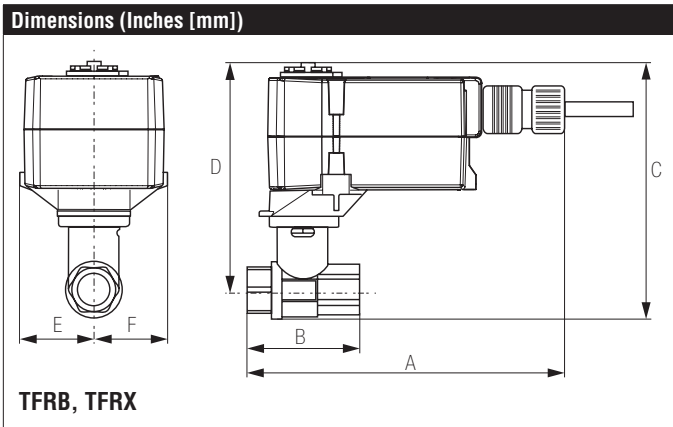
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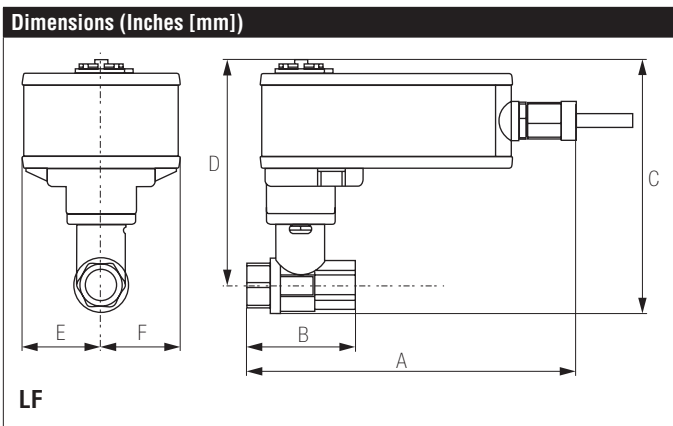
| A          | B          | C           | D           | E          | F |
|------------|------------|-------------|-------------|------------|---|
| 3.72" [95] | 2.38" [60] | 4.79" [122] | 4.21" [107] | 1.25" [32] |   |



| A            | B          | C           | D           | E          | F |
|--------------|------------|-------------|-------------|------------|---|
| 11.36" [289] | 2.38" [60] | 7.68" [195] | 7.06" [179] | 3.15" [80] |   |



| A           | B          | C          | D           | E          | F |
|-------------|------------|------------|-------------|------------|---|
| 6.59" [167] | 2.38" [60] | 4.9" [124] | 4.32" [110] | 1.53" [38] |   |



| A          | B          | C           | D           | E          | F |
|------------|------------|-------------|-------------|------------|---|
| 7.9" [201] | 2.38" [60] | 5.67" [144] | 5.09" [129] | 1.82" [46] |   |

# TFRB24-SR-S

Modulating, Spring Return, 24 VAC for 2 to 10 VDC or 4 to 20 mA Control Signal



| Technical Data                    |  |
|-----------------------------------|--|
| Power Supply                      | 24 VAC, ±20%, 50/60 Hz, 24 VDC, ±10%   |
| Power Consumption Running         | 2 W  |
| Power Consumption Holding         | 1 W  |
| Transformer Sizing                | 4 VA (class 2 power source)  |
| Electrical Connection             | (2) 3ft [1m], 18 GA appliance cables with 1/2" conduit connectors                          |
| 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)                                  |
| 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, 0.5 mA max  |
| Angle of Rotation                 | Max. 95°, 90°  |
| Direction of Rotation (Motor)     | reversible with built-in switch  |
| Direction of Rotation (Fail-Safe) | reversible with CW/CCW mounting  |
| Position Indication               | visual indicator, 0° to 95° (0° is full spring return position)                            |
| Running Time (Motor)              | 95 sec   |
| Running Time (Fail-Safe)          | <25 sec  |
| Ambient Humidity                  | max. 95% RH non-condensing   |
| 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, IP42, UL Enclosure Type 2  |
| Housing Material                  | UL94-5VA   |
| 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)               | <35 dB (A)   |
| Noise Level (Fail-Safe)           | <62 dB (A)   |
| Servicing                         | maintenance free   |
| Quality Standard                  | ISO 9001   |
| Weight                            | 1.8 lb [0.8 kg]  |
| Auxiliary switch                  | 1 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, adjustable 0° to 95°                    |

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

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

- Provide overload protection and disconnect as required.
- 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 negative (-) leg of control circuits.
- A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.
- One built-in auxiliary switch (1x SPDT), for end position indication, interlock control, fan startup, etc.
- Meets cULus requirements without the need of an electrical ground connection.
- Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.

**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.

