



# 12

## **CHARACTERIZED CONTROL VALVES (CCV)**

### **True Advancement in Control Valves**

- Ball valve design offers self-cleaning and zero leakage.
- Rated for water temperatures up to 250°F.
- Maintenance free – no repacking required after being in service for an extended period of time.

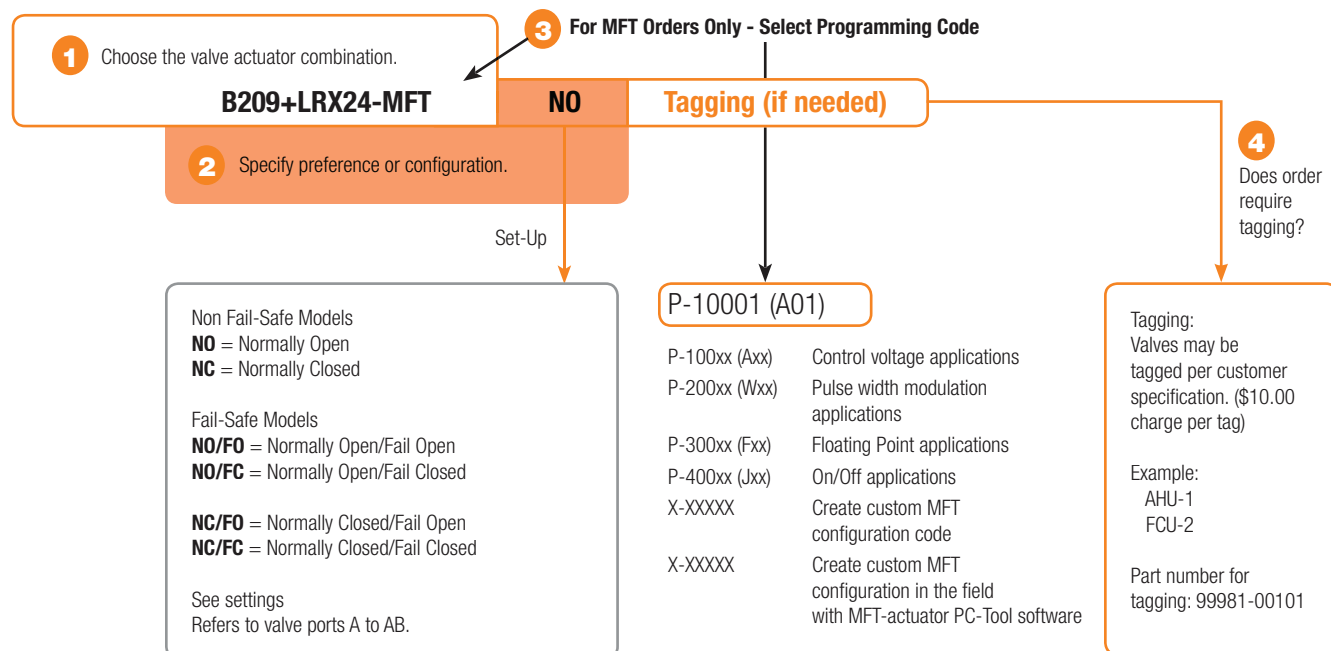
## Characterized Control Valve (CCV) Nomenclature

| B2                                       | 09                                    |                                                                                                                                  | +LRX                                                                                                                                                                                                             | 24                                                                                             | -MFT                                                                                                                                         |                                                                                                                             |
|------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Valve</b><br>B2 = 2-way<br>B3 = 3-way | <b>Valve Size</b><br>07-80 = ½" to 3" | <b>Trim Material</b><br>B = Chrome Plated<br>Brass Ball,<br>Nickel Plated<br>Stem<br>Blank = Stainless<br>Steel Ball<br>and Stem | <b>Actuator Type</b><br><b>Non Fail-Safe</b><br>TR<br>LRB, LRX<br>LRQX<br>NRB, NRX<br>NRQX<br>ARB, ARX<br>ARQX<br><b>Fail-Safe<br/>Spring Return</b><br>TFR, TFRX<br>LF<br>AFR, AFRX<br><b>Electronic</b><br>GKR | <b>Power Supply</b><br>24 = 24 VAC/DC<br>120 = 120 VAC*<br>230 = 230 VAC<br>UP = 24 to 240 VAC | <b>Control</b><br>Blank = On/Off<br>-3 = On/Off, Floating Point<br>-SR = 2-10 VDC<br>-MFT = Multi-Function<br>Technology<br>-MFT95 = 0-135 Ω | -S = Built-in<br>Auxiliary<br>Switch<br>-T = Terminal<br>Strip<br>N4 = NEMA<br>4/4X<br>N4H = NEMA<br>4/4X<br>with<br>Heater |

"X" models are customizable.  
Refer to page 12-8 for programming  
and cable options.

\*LR and AR include 120-240 VAC

## Ordering Example



- 5** Complete Ordering Example: B209+LRX24-MFT  
Configuration: +NO  
Programming: +A01

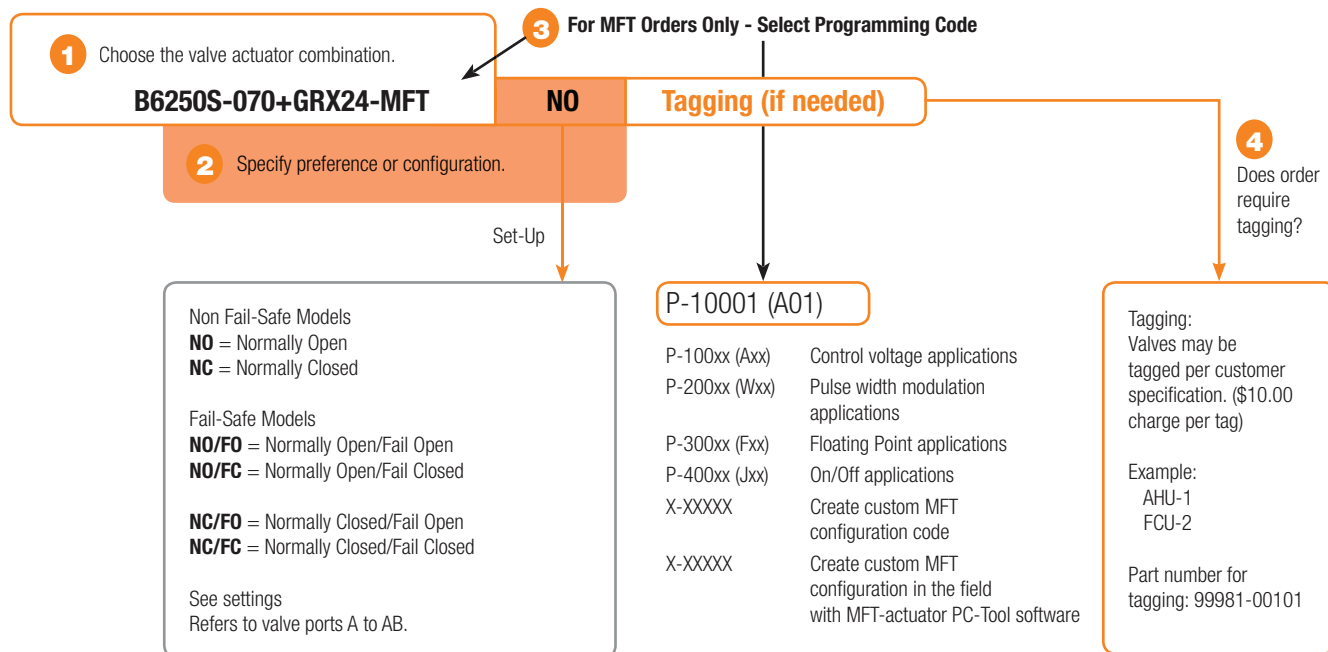
## Characterized Control Valve (CCV) Nomenclature

| B6                                 | 250                                      | S                                                         | -070                                                                                     | +GRX                                                                                                                                                    | 24                                                                                             | -MFT                                                                                                                                      |                                               |
|------------------------------------|------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Valve</b><br>B6 = 2-way Flanged | <b>Valve Size</b><br>250-600 = 2½" to 6" | <b>Trim Material</b><br>S = Stainless Steel Ball and Stem | <b>Cv</b><br>070 = 70 Cv<br>110 = 110 Cv<br>186 = 186 Cv<br>290 = 290 Cv<br>400 = 400 Cv | <b>Actuator Type</b><br><b>Non Fail-Safe</b><br>ARB, ARX<br>GRB, GRX<br><b>Fail-Safe Spring Return</b><br>AFRB, AFRX<br><b>Electronic</b><br>GKRB, GKRX | <b>Power Supply</b><br>24 = 24 VAC/DC<br>120 = 120 VAC*<br>230 = 230 VAC<br>UP = 24 to 240 VAC | <b>Control</b><br>Blank = On/Off<br>-3 = On/Off, Floating Point<br>-SR = 2-10 VDC<br>-MFT = Multi-Function Technology<br>-MFT95 = 0-135 Ω | N4 = NEMA 4/4X<br>N4H = NEMA 4/4X with Heater |

"X" models are customizable.  
Refer to page 12-8 for programming and cable options.

\*AR includes 120-240 VAC

### Ordering Example



- 5** Complete Ordering Example: B6250S-070+GRX24-MFT  
Configuration: +NO  
Programming: +A01

# Control Valve Product Range

## Characterized Control Valve Product Range

| C <sub>v</sub> | Valve Nominal Size |         | Type      |           | Suitable Actuators |           |            |            |
|----------------|--------------------|---------|-----------|-----------|--------------------|-----------|------------|------------|
|                | Inches             | DN [mm] | 2-way NPT | 3-way NPT | Non Fail-Safe      | NEMA 4X   | Fail-Safe  | NEMA 4     |
| 0.3            | ½                  | 15      | B207(B)   | B307(B)   | TR Series          | LR Series | NR Series  | TFR 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)   |                    |           |            |            |
| 16             | ½                  | 15      | B216(B)*  | B316(B)*  |                    |           |            |            |
| 4.7            | ¾                  | 20      | B217(B)   | B317(B)   | LR Series          | NR Series | TFR Series | LF Series  |
| 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      |           | AR Series          | NR Series | TFR Series | LF Series  |
| 19             | 1¼                 | 32      | B230*     |           |                    |           |            |            |
| 10             | 1¼                 | 32      |           | B329      |                    |           |            |            |
| 19             | 1¼                 | 32      |           | B330      |                    |           |            |            |
| 25             | 1¼                 | 32      | B231      | B331      |                    |           |            |            |
| 37             | 1¼                 | 32      | 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      | AR Series          | NR Series | TFR Series | LF Series  |
| 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*     |           |                    |           |            |            |
|                |                    |         |           |           | AR Series          | NR Series | TFR Series | LF Series  |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |
|                |                    |         |           |           |                    |           |            |            |

\* Models without characterizing discs. (B) Models with chrome plated brass ball and nickel plated brass stem



### 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, a modulating signal, or floating 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. [1 m] cable with ½" conduit fitting or covered screw terminal strip |

### Valve Specifications

|                                    |                                                                          |
|------------------------------------|--------------------------------------------------------------------------|
| Service                            | chilled or hot water, up to 60% glycol                                   |
| Flow characteristic                | A-port equal percentage<br>B-port modified for constant common port flow |
| Controllable flow range            | 75°                                                                      |
| Sizes                              | ½", ¾", 1", 1¼", 1½", 2"                                                 |
| End fitting                        | NPT female                                                               |
| Materials                          |                                                                          |
| Body                               | forged brass, nickel plated                                              |
| Ball                               | stainless steel or chrome plated brass                                   |
| Stem                               | stainless steel or nickel plated brass                                   |
| Seats                              | Teflon® PTFE                                                             |
| Seat O-rings                       | EPDM                                                                     |
| Characterizing disc                |                                                                          |
| ½"- 1 ½" (2-way)                   | Tefzel®                                                                  |
| ½"-1" (3-way)                      | Tefzel®                                                                  |
| 2" (2-way) B248-B249               | Tefzel®                                                                  |
| 2" (2-way) B251-B253               | stainless steel                                                          |
| 1¼"- 2" (3-way)                    | stainless steel                                                          |
| Stem O-rings                       | EPDM                                                                     |
| Media temp. range                  | 0°F to 250°F [-18°C to +120°C]                                           |
| Body pressure rating               |                                                                          |
| 2-way                              |                                                                          |
| All ½", ¾", and 1"                 | 600 psi                                                                  |
| 1¼" up to B230                     | 600 psi                                                                  |
| 1¼" from B231                      | 400 psi                                                                  |
| 1½" - 2"                           | 400 psi                                                                  |
| 3-way                              |                                                                          |
| All ½", ¾", and 1"                 | 600 psi                                                                  |
| 1¼"- 2"                            | 400 psi                                                                  |
| Close-off pressure                 | 200 psi                                                                  |
| Maximum differential pressure (ΔP) | 50 psi                                                                   |
| Leakage                            | 0% for A to AB<br>< 2.0% for B to AB                                     |
| Cv rating                          | B port: 70% of A to AB C <sub>v</sub>                                    |

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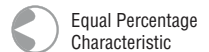
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# Control Valve Product Range

## Characterized Control Valve Product Range

| C <sub>v</sub> | Valve Nominal Size |         | Type      | Suitable Actuators |            |               |
|----------------|--------------------|---------|-----------|--------------------|------------|---------------|
|                | Inches             | DN [mm] | 2-way NPT | Non Fail-Safe      | Fail-Safe  | NEMA 4        |
| 60             | 2½                 | 65      | B261      | AR Series          | AFR Series | AR/AFR Series |
| 75             | 2½                 | 65      | B262      |                    |            |               |
| 110            | 2½                 | 65      | B263      |                    |            |               |
| 150            | 2½                 | 65      | B264      |                    |            |               |
| 210            | 2½                 | 65      | B265*     |                    |            |               |
| 70             | 3                  | 80      | B277      | AR Series          | AFR Series | AR/AFR Series |
| 130            | 3                  | 80      | B278      |                    |            |               |
| 170            | 3                  | 80      | B280*     |                    |            |               |

\* Models without characterizing disc



Equal Percentage Characteristic

### 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, a modulating signal, or floating 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 and AFR series                                                         |
| Electrical connection | 3 ft. [1 m] cable with ½" conduit fitting or covered screw terminal strip |

### Valve Specifications

|                                    |                                        |
|------------------------------------|----------------------------------------|
| Service                            | chilled or hot water, up to 60% glycol |
| Flow characteristic                | A-port equal percentage                |
| Controllable flow range            | 75°                                    |
| Sizes                              | 2½", 3"                                |
| End fitting                        | NPT female                             |
| Materials                          |                                        |
| Body                               | forged brass, nickel plated            |
| Ball                               | stainless steel                        |
| Stem                               | stainless steel                        |
| Seats                              | Teflon® PTFE                           |
| Seat o-rings                       | EPDM                                   |
| Characterizing disc                | Tefzel®                                |
| Stem o-rings                       | EPDM                                   |
| Media temp. range                  | 0°F to 212°F [-18°C to +100°C]         |
| Body pressure rating               | 400 psi                                |
| Close-off pressure                 | 100 psi                                |
| Maximum differential pressure (ΔP) | 30 psi                                 |
| Leakage                            | 0% for A to AB                         |

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# Control Valve Product Range

## Characterized Control Valve Product Range

| C <sub>v</sub> | Valve Nominal Size |         | Type       | Suitable Actuators |         |           |        |
|----------------|--------------------|---------|------------|--------------------|---------|-----------|--------|
|                | Inches             | DN (mm) |            | Non Fail-Safe      | NEMA 4X | Fail-Safe | NEMA 4 |
| 70             | 2½                 | 65      | B6250S-070 |                    |         |           |        |
| 110            | 2½                 | 65      | B6250S-110 | AR                 | AR      | AFR       | AFR    |
| 110            | 3                  | 80      | B6300S-110 |                    |         |           |        |
| 186            | 4                  | 100     | B6400S-186 |                    |         |           |        |
| 290            | 5                  | 125     | B6500S-290 |                    |         |           |        |
| 400            | 6                  | 150     | B6600S-400 |                    |         |           |        |



**5**  
YEAR  
WARRANTY



**CCV**

Equal Percentage  
Characteristic

### 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, a modulating signal, or floating 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. [1 m] cable with ½" conduit fitting or covered screw terminal strip |

### Valve Specifications

|                                    |                                             |
|------------------------------------|---------------------------------------------|
| Service                            | chilled or hot water, up to 60% glycol max. |
| Flow characteristic                | A-port equal percentage                     |
| Controllable flow range            | 75°                                         |
| Sizes                              | 2½", 3", 4", 5", 6"                         |
| End fitting                        | ANSI Class 125 flange, flat face*           |
| Materials                          |                                             |
| Body                               | cast iron GG25                              |
| Ball                               | stainless steel                             |
| Stem                               | stainless steel                             |
| Seats                              | Teflon® PTFE                                |
| Seat o-rings                       | EPDM rubber                                 |
| Characterizing disc                | stainless steel                             |
| Stem o-rings                       | EPDM                                        |
| Media temp. range                  | 0°F to 250°F [-18°C to +120°C]              |
| Body pressure rating               | ANSI 125, Class B                           |
|                                    | °F      Psi                                 |
|                                    | -20° to +150°      200                      |
|                                    | 200°      180                               |
|                                    | 225°      180                               |
|                                    | 250°      175                               |
| Close-off pressure                 | 100 psi                                     |
| Maximum differential pressure (ΔP) | 50 psi                                      |
| Leakage                            | 0% for A to AB                              |

\*125 psi flanges have a plain flat face and should not be bolted to a raised face flange.

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All prices are in US Dollars (USD)

## PIPING REDUCTION CHART

### Piping Reduction Factor (Fp) - Correction Factor for Valves

Values in chart are corrected C<sub>v</sub> ratings for indicated pipe size.

| VALVE SIZE      |            |         |                       |     | LINE SIZE |           |           |           |           |            |            |            |            |            |            |       |       |
|-----------------|------------|---------|-----------------------|-----|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|-------|-------|
| Model #         | Inches     | DN [mm] | C <sub>v</sub> Rating |     | ½"        | ¾"        | 1"        | 1¼"       | 1½"       | 2"         | 2½"        | 3"         | 4"         | 5"         | 6"         | 8"    | 10"   |
| CCV (Threaded)  | B216*      | ½       | 15                    | 16  | <b>16</b> | 9         | 7.2       | 6.6       | -         | -          | -          | -          | -          | -          | -          | -     | -     |
|                 | B221*      | ¾       | 20                    | 24  | -         | <b>24</b> | 19        | 16        | 14.5      | -          | -          | -          | -          | -          | -          | -     | -     |
|                 | B225*      | 1       | 25                    | 30  | -         | -         | <b>30</b> | 27.4      | 24.8      | 22         | -          | -          | -          | -          | -          | -     | -     |
|                 | B230*      | 1¼      | 32                    | 19  | -         | -         | -         | <b>19</b> | 18.8      | 18.2       | 17.8       | -          | -          | -          | -          | -     | -     |
|                 | B232*      | 1¼      | 32                    | 37  | -         | -         | -         | <b>37</b> | 35.5      | 31.8       | 29.9       | -          | -          | -          | -          | -     | -     |
|                 | B240*      | 1½      | 40                    | 37  | -         | -         | -         | -         | <b>37</b> | 35.5       | 34         | 33         | -          | -          | -          | -     | -     |
|                 | B250*      | 2       | 50                    | 57  | -         | -         | -         | -         | -         | <b>57</b>  | 55.8       | 54.2       | 52.2       | -          | -          | -     | -     |
|                 | B251       | 2       | 50                    | 65  | -         | -         | -         | -         | -         | <b>65</b>  | 63.2       | 60.9       | 58.1       | -          | -          | -     | -     |
|                 | B252       | 2       | 50                    | 85  | -         | -         | -         | -         | -         | <b>85</b>  | 81.1       | 76.5       | 71.1       | -          | -          | -     | -     |
|                 | B253       | 2       | 50                    | 120 | -         | -         | -         | -         | -         | <b>120</b> | 109.7      | 99         | 88.1       | -          | -          | -     | -     |
|                 | B254*      | 2       | 50                    | 240 | -         | -         | -         | -         | -         | <b>240</b> | 179.6      | 141.6      | 114.2      | -          | -          | -     | -     |
|                 | B261       | 2½      | 65                    | 60  | -         | -         | -         | -         | -         | -          | <b>60</b>  | 59.6       | 58.3       | 57.5       | -          | -     | -     |
|                 | B262       | 2½      | 65                    | 75  | -         | -         | -         | -         | -         | -          | <b>75</b>  | 74.2       | 71.8       | 70.4       | -          | -     | -     |
|                 | B263       | 2½      | 65                    | 110 | -         | -         | -         | -         | -         | -          | <b>110</b> | 107.4      | 100.7      | 96.7       | -          | -     | -     |
|                 | B264       | 2½      | 65                    | 150 | -         | -         | -         | -         | -         | -          | <b>150</b> | 143.6      | 128.6      | 120.6      | -          | -     | -     |
|                 | B265*      | 2½      | 65                    | 210 | -         | -         | -         | -         | -         | -          | <b>210</b> | 193.5      | 160.8      | 145.9      | -          | -     | -     |
|                 | B277       | 3       | 80                    | 70  | -         | -         | -         | -         | -         | -          | -          | <b>70</b>  | 69.3       | 68.6       | 68.1       | -     | -     |
|                 | B278       | 3       | 80                    | 130 | -         | -         | -         | -         | -         | -          | -          | <b>130</b> | 125.8      | 121.5      | 118.8      | -     | -     |
|                 | B280*      | 3       | 80                    | 170 | -         | -         | -         | -         | -         | -          | -          | <b>170</b> | 161        | 152.3      | 147        | -     | -     |
| LCCCV (Flanged) | B6250S-070 | 2½      | 65                    | 70  | -         | -         | -         | -         | -         | -          | <b>70</b>  | 69.3       | 67.4       | 66.2       | -          | -     | -     |
|                 | B6250S-110 | 2½      | 65                    | 110 | -         | -         | -         | -         | -         | -          | <b>110</b> | 107.4      | 100.7      | 96.7       | -          | -     | -     |
|                 | B6300S-110 | 3       | 80                    | 110 | -         | -         | -         | -         | -         | -          | -          | <b>110</b> | 107.4      | 104.7      | 103        | -     | -     |
|                 | B6400S-186 | 4       | 100                   | 186 | -         | -         | -         | -         | -         | -          | -          | -          | <b>186</b> | 183.3      | 179.8      | 175.1 | -     |
|                 | B6500S-290 | 5       | 125                   | 290 | -         | -         | -         | -         | -         | -          | -          | -          | -          | <b>290</b> | 287        | 278.5 | 273.1 |
|                 | B6600S-400 | 6       | 150                   | 400 | -         | -         | -         | -         | -         | -          | -          | -          | -          | -          | <b>400</b> | 392.3 | 384   |

\* Models without characterizing discs.

NOTE: Please use the corrected C<sub>v</sub> values for the valves listed in the chart when installing them in pipes larger than the line size of the valve.

All CCVs not listed do not require piping reduction factors.

NOTE: Values also apply to A-AB flow of 3-way versions.

NOTE: The values shown in bold are based on test data. All other values are calculated.

# Characterized Control Valves

Set-Up



## SET-UP - Specify Upon Ordering

| 2-WAY VALVE                             |                                                                               |                                                                                                                                                                                            |                                                                                                                                                      | 3-WAY VALVE                                                                                                                                                                                |                                                                                                                                                    |
|-----------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| NON FAIL-SAFE<br>Stays in Last Position | TR24-3(-T)                                                                    | 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.                                                                                                                   |                                                                                                                                                    |
|                                         | LRB24-3(-T), ARB24-3(-T)                                                      | 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.   |                                                                                                                                                      | 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.   |                                                                                                                                                    |
|                                         | TR24-SR(-T), LRB24-SR, LRB(X)24-MFT, ARB24-SR, ARB(X)24-MFT                   | <b>NC:</b> Normally closed A to AB, valve will open as voltage increases                                                                                                                   | <b>NO:</b> Normally open A to AB, valve will close as voltage increases                                                                              | <b>NC:</b> Normally closed A to AB, valve will open as voltage increases                                                                                                                   | <b>NO:</b> Normally open A to AB, valve will close as voltage increases                                                                            |
| SPRING RETURN<br>Note Fail Position     | TFRB24, LF24 US, AFRB24                                                       | <b>NO/FO:</b> Normally open A to AB, valve will drive closed. Spring Action: Actuator will fail open A to AB upon power loss.                                                              | <b>NC/FC:</b> Normally closed A to AB, valve will drive open. Spring Action: Actuator will fail closed A to AB upon power loss.                      | <b>NO/FO:</b> Normally open A to AB, valve will drive closed. Spring Action: Actuator will fail open A to AB upon power loss.                                                              | <b>NC/FC:</b> Normally closed A to AB, valve will drive open. Spring Action: Actuator will fail closed A to AB upon power loss.                    |
|                                         | TFRB24-3, TFRB24-SR, TFRX24-MFT, LF24-3 US, LF24-SR US, AFRB24-SR, AFRX24-MFT | <b>NC/FO:</b> Normally closed A to AB, valve will open as voltage increases. Actuator switch on CW. Spring Action: Will fail open upon power loss.                                         | <b>NC/FC:</b> Normally closed A to AB, valve will open as voltage increases. Actuator switch on CW. Spring Action: Will fail closed upon power loss. | <b>NO/FC:</b> Normally open A to AB, valve will close as voltage increases. Actuator switch on CCW. Spring Action: Will fail closed upon power loss.                                       | <b>NO/FO:</b> Normally open A to AB, valve will close as voltage increases. Actuator switch on CCW. Spring Action: Will fail open upon power loss. |
| ELECTRONIC FAIL-SAFE                    | GKRB24-3†                                                                     | Power to pin 4 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "Y2" position to reverse, select the "Y1" position. |                                                                                                                                                      | Power to pin 4 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "Y2" position to reverse, select the "Y1" position. |                                                                                                                                                    |
|                                         | GKRX24-MFT†                                                                   | <b>NC:</b> Normally closed A to AB, will open as voltage increases when directional switch is in the "Y2" position.                                                                        | <b>NO:</b> Normally open A to AB, will close as voltage increases when directional switch is in the "Y1" position.                                   | <b>NC:</b> Normally closed A to AB, will open as voltage increases when directional switch is in the "Y2" position.                                                                        | <b>NO:</b> Normally open A to AB, will close as voltage increases when directional switch is in the "Y2" position.                                 |

† The GK series Electronic Fail-Safe actuator will drive to a predetermined position using the FO/FC dial on the actuator upon loss of power.

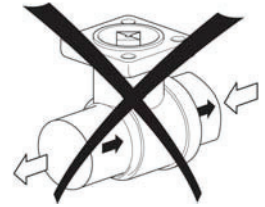
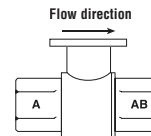
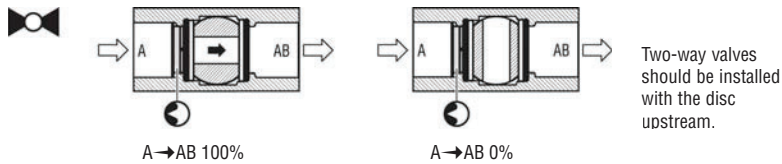
T15000 - 04/18 - Subject to change. © Belimo Aircontrols (USA), Inc.  
All prices are in US Dollars (USD)



**FLOW PATTERNS**

**2-way Characterized Control Valves™**

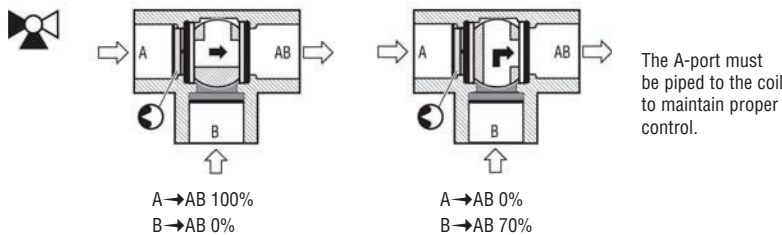
(Belimo B2 Series)



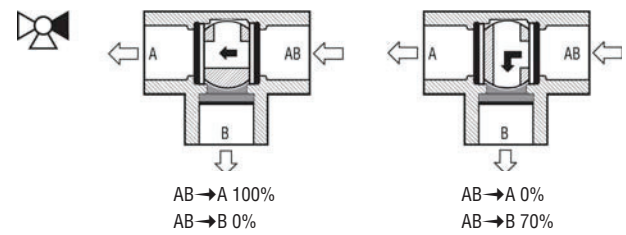
**3-way Characterized Control Valves™**

**MIXING**

(Belimo B3 Series)

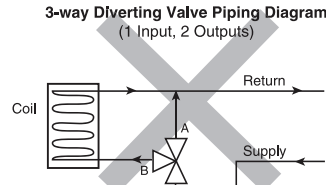
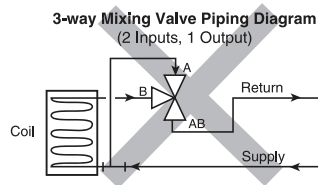


**DIVERTING**



**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!**

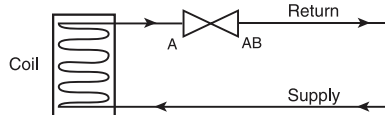
Flow is not possible from A to B. If AB-port is not piped as the common port, the valve must be re-piped. It is good practice to install a balancing valve in the bypass line. These valves are intended for closed loop systems. Do not install in an open loop system or in an application that is open to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

**OPERATION/INSTALLATION – CORRECT PIPING**

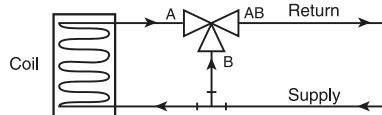
2-way valves should be installed with the disc upstream. If installed with disc downstream, flow curve will be deeper. If installed "backwards" it is NOT necessary to remove and change. No damage or control problems will occur.

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

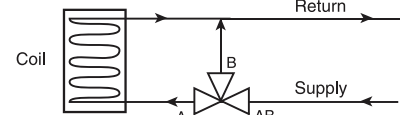
**2-way Valve Piping Diagram**  
(1 Input, 1 Output)



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



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



**Not for use in change over applications.  
Please consider industrial valves in section 14.**

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. Pipe reducers decrease the  $C_v$  value of a valve and consequently increase the pressure drop across the valve creating a situation that could lead to noise or a lower than designed flow.

### ARB...

#### B = Basic stocked product

- Standard 150 second run time.
- Standard 3' plenum cable with conduit connector.

**Typical Lead Time: 1 day**

### ARX...

#### X = Customizable product

- Choice of 10' or 16' cable with conduit connector.
- Option of 3' right angle cables for tight spaces (-3 version only).
- Factory programming for run time, control signal and feedback.

**Typical Lead Time: 3 days or less**

Reorder number consists of options which differ from standard product. This number is printed on the actuator for easy reordering. For example:

#### Reorder # for a ARX24-MFT

is: **AR1000C3A01**

**3** No Charge

**2** \$28

**1** \$577

\$605 Final Price

### 1 ACTUATOR TYPE

### 2 CABLES

| CABLE<br>(with conduit fitting) | SIZE   | CABLE CODE | List Price |
|---------------------------------|--------|------------|------------|
| 24V Plenum Rated                | 3 ft.  | C1         | No Charge  |
|                                 | 10 ft. | C3         | \$29       |
|                                 | 16 ft. | C5         | \$49       |
| 120V Appliance Rated            | 3 ft.  | A1         | No Charge  |
|                                 | 10 ft. | A3         | \$29       |
|                                 | 16 ft. | A5         | \$49       |

### 3 PROGRAM

| ACTUATOR TYPE | CONFIGURATION DESCRIPTION | P-CODE            | CONTROL               |                    | RUNNING TIME | List Price‡ |
|---------------|---------------------------|-------------------|-----------------------|--------------------|--------------|-------------|
|               |                           |                   | CONTROL INPUT         | FEEDBACK POSITION  |              |             |
| -3 and SR     | N/A                       | 0                 | 2-10 VDC (for -3)     | 2-10 VDC (for -3)  | 150 seconds  | No Charge   |
|               | N/A                       | 2                 | 2-10 VDC (for -SR)    | 2-10 VDC (for -SR) | 90 seconds   | No Charge   |
| MFT and PC    | P-10001                   | A01               | 2-10 VDC              | 2-10 VDC           | 150 seconds  | No Charge*  |
|               | P-10002                   | A02               | 0.5-10 VDC            | 0.5-10 VDC         | 150 seconds  | No Charge   |
|               | P-10003                   | A03               | 2-10 VDC              | 0.5-5 VDC          | 150 seconds  | No Charge   |
|               | P-10004                   | A04               | 4-7 VDC               | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10005                   | A05               | 6-9 VDC               | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10006                   | A06               | 10.5 -13.5 VDC        | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10007                   | A07               | 0.5-5 VDC             | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10009                   | A09               | 5-10 VDC              | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10010                   | A10               | 5-10 VDC              | 0-10 VDC           | 150 seconds  | \$35        |
|               | P-10013                   | A13               | 0.5-10 VDC            | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10015                   | A15               | 2-5 VDC               | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10016                   | A16               | 2-6 VDC               | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10017                   | A17               | 6-10 VDC              | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10018                   | A18               | 14-17 VDC             | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10020                   | A20               | 9-12 VDC              | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10028                   | A28               | 0.5-10 VDC            | 0.5-10 VDC         | 100 seconds  | No Charge   |
|               | P-10031                   | A31               | 0.5-4 VDC             | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10063                   | A63               | 0.5-4.5 VDC           | 0.5- 4.5 VDC       | 150 seconds  | No Charge   |
|               | P-10032                   | A32               | 6-14 VDC              | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-10064                   | A64               | 5.5-10 VDC            | 5.5-10 VDC         | 150 seconds  | No Charge   |
|               | N/A                       | AAT               | 2-10 VDC              | 2-10 VDC           | 20 seconds   | No Charge   |
|               | P-20001                   | W01               | 0.59-2.93 seconds     | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-20002                   | W02               | 0.02 to 5.00 seconds  | 2-10 VDC           | 150 seconds  | No Charge   |
|               | P-20003                   | W03               | 0.10 to 25.50 seconds | 2-10 VDC           | 150 seconds  | No Charge   |
|               | P-20004                   | W04               | 0.10 to 25.60 seconds | 2-10 VDC           | 150 seconds  | \$35        |
|               | P-20005                   | W05               | 0.10 to 5.20 seconds  | 0.5-5.0 VDC        | 150 seconds  | \$35        |
|               | P-30001                   | F01               | Floating Point        | 2-10 VDC           | 150 seconds  | No Charge   |
|               | P-30002                   | F02               | Floating Point        | 0.5-10 VDC         | 150 seconds  | \$35        |
|               | P-40002                   | J02               | On/Off                | 2-10 VDC           | 150 seconds  | No Charge   |
|               | N/A                       | S01 (-PC only)    | Phasecut              | 2-10 VDC           | 150 seconds  | No Charge   |
|               | P-16001                   | R01 (-MFT95 only) | 0 to 135 Ω            | 2-10 VDC           | 150 seconds  | No Charge   |

NOTE: Additional P-codes are available, consult factory.

‡ Add to list price of assembly.

\*P-10001 is the default configuration for MFT.

## Valve Specifications

|                                   |                                                                    |
|-----------------------------------|--------------------------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol                              |
| Flow Characteristic (B2)          | A-port equal percentage                                            |
| Flow Characteristic (B3)          | A- port equal percentage; B-port modified linear for constant flow |
| Controllable Flow Range           | 75°                                                                |
| End Fitting                       | NPT female                                                         |
| Body                              | forged brass, nickel plated                                        |
| Ball                              | chrome plated brass                                                |
| Stem                              | nickel plated brass                                                |
| Seat                              | Teflon® PTFE                                                       |
| Characterized Disc                | TEFZEL®                                                            |
| Seat O-ring                       | EPDM                                                               |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                                     |
| Max Differential Pressure (Water) | 50 psi                                                             |
| Leakage                           | 0% for A to AB, <2.0% for B to AB                                  |
| Cv Flow Rating                    | A-port: as stated in chart<br>B-port: 70% of A to AB Cv            |

Visit [www.belimo.us](http://www.belimo.us) to see additional non fail-safe actuator options including 120V and -S models.



| ACTUATOR PART #       | TR24-3-T US                           | TR24-3 US                | TR24-SR-T US                          | TR24-SR US               | LRB24-3                                            | LRB24-SR                                           |
|-----------------------|---------------------------------------|--------------------------|---------------------------------------|--------------------------|----------------------------------------------------|----------------------------------------------------|
| Control               | On/Off, Floating Point                | On/Off, Floating Point   | Modulating                            | Modulating               | On/Off, Floating Point                             | Modulating                                         |
| Manual Override       | •                                     | •                        | •                                     | •                        | •                                                  | •                                                  |
| Running Time (Motor)  | 90 seconds                            | 90 seconds               | 90 seconds                            | 90 seconds               | 90 seconds                                         | 90 seconds                                         |
| Electrical Connection | screw terminal (for 26 to 14 GA wire) | 3 ft, 18 GA plenum cable | screw terminal (for 26 to 14 GA wire) | 3 ft, 18 GA plenum cable | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

## 2-Way

| Model # | Cv   | Size [mm]  | Body Pressure Rating [psi] | Close-Off Pressure [psi] |       |       |       |       |       |       |
|---------|------|------------|----------------------------|--------------------------|-------|-------|-------|-------|-------|-------|
| B207B   | 0.3  | 0.5" [15]  | 600                        | 200                      | \$204 | \$217 | \$301 | \$317 | \$280 | \$417 |
| B208B   | 0.46 |            |                            | 200                      | \$204 | \$217 | \$301 | \$317 | \$280 | \$417 |
| B209B   | 0.8  |            |                            | 200                      | \$204 | \$217 | \$301 | \$317 | \$280 | \$417 |
| B210B   | 1.2  |            |                            | 200                      | \$207 | \$220 | \$304 | \$320 | \$283 | \$419 |
| B211B   | 1.9  |            |                            | 200                      | \$207 | \$220 | \$304 | \$320 | \$283 | \$419 |
| B212B   | 3    |            |                            | 200                      | \$211 | \$224 | \$308 | \$325 | \$289 | \$426 |
| B213B   | 4.7  |            |                            | 200                      | \$213 | \$226 | \$310 | \$327 | \$291 | \$428 |
| B214B   | 7.4  |            |                            | 200                      | \$217 | \$230 | \$315 | \$331 | \$296 | \$433 |
| B215B   | 10   |            |                            | 200                      | \$217 | \$230 | \$315 | \$331 | \$298 | \$435 |
| B216B*  | 16   |            |                            | 200                      | \$219 | \$233 | \$318 | \$333 | \$301 | \$438 |
| B217B   | 4.7  | 0.75" [20] | 600                        | 200                      | \$261 | \$276 | \$360 | \$375 | \$336 | \$473 |
| B218B   | 7.4  |            |                            | 200                      | \$264 | \$279 | \$363 | \$378 | \$339 | \$476 |
| B219B   | 10   |            |                            | 200                      | \$264 | \$279 | \$363 | \$378 | \$341 | \$478 |
| B220B*  | 14   |            |                            | 200                      | \$269 | \$285 | \$369 | \$383 | \$343 | \$480 |
| B221B*  | 24   |            |                            | 200                      |       |       |       |       | \$347 | \$485 |

## 3-Way Mixing/Diverting

|        |      |              |       |               |       |       |       |       |       |       |
|--------|------|--------------|-------|---------------|-------|-------|-------|-------|-------|-------|
| B307B  | 0.3  | 0.5"<br>[15] | 600   | 200           | \$249 | \$264 | \$372 | \$387 | \$326 | \$464 |
| B308B  | 0.46 |              |       | 200           | \$249 | \$264 | \$372 | \$387 | \$326 | \$464 |
| B309B  | 0.8  |              |       | 200           | \$249 | \$264 | \$372 | \$387 | \$326 | \$464 |
| B310B  | 1.2  |              |       | 200           | \$251 | \$266 | \$374 | \$389 | \$328 | \$466 |
| B311B  | 1.9  |              |       | 200           | \$251 | \$266 | \$374 | \$389 | \$328 | \$466 |
| B312B  | 3    |              |       | 200           | \$259 | \$276 | \$382 | \$397 | \$332 | \$470 |
| B313B  | 4.7  |              |       | 200           | \$261 | \$278 | \$384 | \$399 | \$336 | \$474 |
| B315B  | 10   |              |       | 200           | \$262 | \$279 | \$386 | \$401 | \$343 | \$481 |
| B316B* | 16   |              |       | 200           | \$271 | \$289 | \$395 | \$411 | \$345 | \$483 |
| B317B  | 4.7  |              |       | 0.75"<br>[20] | 200   | \$323 | \$339 | \$446 | \$462 | \$368 |
| B318B  | 7.4  | 200          | \$322 |               | \$338 | \$445 | \$461 | \$372 | \$510 |       |
| B320B  | 14   | 200          |       |               |       |       |       | \$379 | \$517 |       |
| B321B* | 24   | 200          |       |               |       |       |       | \$382 | \$520 |       |

\*Models without characterizing discs.

For corrected Cvs with piping reduction factor refer to page 12-5.

# B2/B3 Series Characterized Control Valves with Spring Return Actuators

2-way and 3-way Valves with Chrome Plated Brass Ball and Brass Stem, NPT Female Ends



## Valve Specifications

|                                   |                                                                    |
|-----------------------------------|--------------------------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol                              |
| Flow Characteristic (B2)          | A-port equal percentage                                            |
| Flow Characteristic (B3)          | A- port equal percentage; B-port modified linear for constant flow |
| Controllable Flow Range           | 75°                                                                |
| End Fitting                       | NPT female                                                         |
| Body                              | forged brass, nickel plated                                        |
| Ball                              | chrome plated brass                                                |
| Stem                              | nickel plated brass                                                |
| Seat                              | Teflon® PTFE                                                       |
| Characterized Disc                | TEFZEL®                                                            |
| Seat O-ring                       | EPDM                                                               |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                                     |
| Max Differential Pressure (Water) | 50 psi                                                             |
| Leakage                           | 0% for A to AB, <2.0% for B to AB                                  |
| Cv Flow Rating                    | A-port: as stated in chart<br>B-port: 70% of A to AB Cv            |

Visit [www.belimo.us](http://www.belimo.us) to see additional spring return actuator options including 120V and -S models.



| ACTUATOR PART #          | TFRB24                                                | TFRB24-3                                           | TFRB24-SR                                          | LF24 US                                               | LF24-3 US                                          | LF24-SR US                                         |
|--------------------------|-------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Control                  | On/Off                                                | Floating Point                                     | Modulating                                         | On/Off                                                | Floating Point                                     | Modulating                                         |
| Running Time (Motor)     | <75 seconds                                           | 95 seconds                                         | 95 seconds                                         | 75 seconds                                            | 150 seconds                                        | 150 seconds                                        |
| Running Time (Fail-Safe) | < 25 seconds                                          | <25 seconds                                        | <25 seconds                                        | <25 seconds                                           | <25 seconds                                        | <25 seconds                                        |
| Electrical Connection    | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

## 2-Way

| Model # | Cv   | Size [mm]  | Body Pressure Rating [psi] | Close-Off Pressure [psi] |       |       |       |       |       |       |
|---------|------|------------|----------------------------|--------------------------|-------|-------|-------|-------|-------|-------|
| B207B   | 0.3  | 0.5" [15]  | 600                        | 200                      | \$395 | \$451 | \$485 | \$450 | \$573 | \$589 |
| B208B   | 0.46 |            |                            | 200                      | \$395 | \$451 | \$485 | \$450 | \$573 | \$589 |
| B209B   | 0.8  |            |                            | 200                      | \$395 | \$451 | \$485 | \$450 | \$573 | \$589 |
| B210B   | 1.2  |            |                            | 200                      | \$398 | \$455 | \$488 | \$452 | \$575 | \$591 |
| B211B   | 1.9  |            |                            | 200                      | \$398 | \$455 | \$488 | \$452 | \$575 | \$591 |
| B212B   | 3    |            |                            | 200                      | \$403 | \$460 | \$492 | \$460 | \$581 | \$597 |
| B213B   | 4.7  |            |                            | 200                      | \$405 | \$462 | \$494 | \$462 | \$584 | \$599 |
| B214B   | 7.4  |            |                            | 200                      | \$407 | \$464 | \$498 | \$464 | \$586 | \$601 |
| B215B   | 10   |            |                            | 200                      | \$407 | \$464 | \$498 | \$470 | \$592 | \$608 |
| B216B*  | 16   |            |                            | 200                      | \$407 | \$464 | \$498 | \$472 | \$594 | \$610 |
| B217B   | 4.7  | 0.75" [20] | 600                        | 200                      | \$455 | \$511 | \$545 | \$514 | \$636 | \$652 |
| B218B   | 7.4  |            |                            | 200                      | \$457 | \$513 | \$547 | \$516 | \$638 | \$655 |
| B219B   | 10   |            |                            | 200                      | \$457 | \$513 | \$547 | \$519 | \$641 | \$658 |
| B220B*  | 14   |            |                            | 200                      | \$462 | \$517 | \$551 | \$521 | \$644 | \$660 |
| B221B*  | 24   |            |                            | 200                      |       |       |       | \$524 | \$647 | \$663 |

## 3-Way Mixing/Diverging

|        |      |               |     |     |       |       |       |       |       |       |
|--------|------|---------------|-----|-----|-------|-------|-------|-------|-------|-------|
| B307B  | 0.3  | 0.5"<br>[15]  | 600 | 200 | \$467 | \$545 | \$570 | \$535 | \$657 | \$680 |
| B308B  | 0.46 |               |     | 200 | \$467 | \$545 | \$570 | \$535 | \$657 | \$680 |
| B309B  | 0.8  |               |     | 200 | \$467 | \$545 | \$570 | \$535 | \$657 | \$680 |
| B310B  | 1.2  |               |     | 200 | \$469 | \$547 | \$572 | \$537 | \$659 | \$682 |
| B311B  | 1.9  |               |     | 200 | \$472 | \$550 | \$575 | \$537 | \$659 | \$682 |
| B312B  | 3    |               |     | 200 | \$476 | \$554 | \$579 | \$548 | \$670 | \$692 |
| B313B  | 4.7  |               |     | 200 | \$481 | \$559 | \$585 | \$550 | \$672 | \$694 |
| B315B  | 10   |               |     | 200 | \$481 | \$559 | \$585 | \$552 | \$674 | \$697 |
| B316B* | 16   |               |     | 200 | \$481 | \$559 | \$585 | \$554 | \$676 | \$699 |
| B317B  | 4.7  | 0.75"<br>[20] |     | 200 | \$521 | \$599 | \$624 | \$592 | \$714 | \$736 |
| B318B  | 7.4  |               |     | 200 | \$519 | \$597 | \$622 | \$594 | \$717 | \$739 |
| B320B  | 14   |               |     | 200 |       |       |       | \$598 | \$721 | \$743 |
| B321B* | 24   |               |     | 200 |       |       |       | \$601 | \$724 | \$746 |
|        |      |               |     |     |       |       |       |       |       |       |

\*Models without characterizing discs.  
For corrected Cvs with piping reduction factor refer to page 12-5.

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800-543-9038 USA

866-805-7089 CANADA

203-791-8396 LATIN AMERICA/CARIBBEAN

## Valve Specifications

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol |
| Flow Characteristic               | equal percentage                      |
| Controllable Flow Range           | 75°                                   |
| End Fitting                       | NPT female                            |
| Body                              | forged brass, nickel plated           |
| Ball                              | stainless steel                       |
| Stem                              | stainless steel                       |
| Seat                              | Teflon® PTFE                          |
| Characterized Disc                | TEFZEL®                               |
| Seat O-ring                       | EPDM                                  |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]        |
| Max Differential Pressure (Water) | 50 psi                                |
| Leakage                           | 0%                                    |

Visit [www.belimo.us](http://www.belimo.us) for additional non fail-safe actuator options including 120V and -S models.



| ACTUATOR PART #       | TR24-3-T US                           | TR24-3 US                | TR24-SR-T US                          | TR24-SR US               | LRB24-3                                            | LRB24-SR                                           | LRX24-MFT                                          |
|-----------------------|---------------------------------------|--------------------------|---------------------------------------|--------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Control               | On/Off, Floating Point                | On/Off, Floating Point   | Modulating                            | Modulating               | On/Off, Floating Point                             | Modulating                                         | Modulating/MFT                                     |
| Manual Override       | •                                     | •                        | •                                     | •                        | •                                                  | •                                                  | •                                                  |
| Running Time (Motor)  | 90 seconds                            | 90 seconds               | 90 seconds                            | 90 seconds               | 90 seconds                                         | 90 seconds                                         | 150 seconds (variable)                             |
| Electrical Connection | screw terminal (for 26 to 14 GA wire) | 3 ft, 18 GA plenum cable | screw terminal (for 26 to 14 GA wire) | 3 ft, 18 GA plenum cable | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

## 2-Way

| Model # | Cv   | Size<br>[mm]  | Body Pressure<br>Rating [psi] | Close-Off<br>Pressure<br>[psi] |       |       |       |       |       |       |       |
|---------|------|---------------|-------------------------------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|
| B207    | 0.3  | 0.5"<br>[15]  | 600                           | 200                            | \$236 | \$255 | \$359 | \$374 | \$301 | \$420 | \$554 |
| B208    | 0.46 |               |                               | 200                            | \$236 | \$255 | \$359 | \$374 | \$301 | \$420 | \$554 |
| B209    | 0.8  |               |                               | 200                            | \$236 | \$255 | \$359 | \$374 | \$301 | \$420 | \$554 |
| B210    | 1.2  |               |                               | 200                            | \$245 | \$262 | \$366 | \$381 | \$304 | \$424 | \$557 |
| B211    | 1.9  |               |                               | 200                            | \$245 | \$262 | \$366 | \$381 | \$304 | \$424 | \$557 |
| B212    | 3    |               |                               | 200                            | \$249 | \$266 | \$371 | \$386 | \$306 | \$426 | \$559 |
| B213    | 4.7  |               |                               | 200                            | \$253 | \$270 | \$375 | \$390 | \$321 | \$439 | \$574 |
| B214    | 7.4  |               |                               | 200                            | \$259 | \$278 | \$381 | \$396 | \$328 | \$446 | \$580 |
| B215    | 10   |               |                               | 200                            | \$259 | \$278 | \$381 | \$396 | \$339 | \$447 | \$592 |
| B216*   | 16   |               |                               | 200                            | \$310 | \$321 | \$425 | \$439 | \$341 | \$447 | \$594 |
| B217    | 4.7  | 0.75"<br>[20] |                               | 200                            | \$302 | \$321 | \$404 | \$419 | \$354 | \$453 | \$607 |
| B218    | 7.4  |               |                               | 200                            | \$304 | \$323 | \$405 | \$420 | \$356 | \$458 | \$609 |
| B219    | 10   |               |                               | 200                            | \$304 | \$323 | \$407 | \$421 | \$360 | \$464 | \$613 |
| B220*   | 14   |               |                               | 200                            | \$308 | \$328 | \$408 | \$423 | \$362 | \$465 | \$615 |
| B221*   | 24   |               |                               | 200                            |       |       |       |       | \$365 | \$466 | \$618 |
| B222    | 7.4  | 1"<br>[25]    |                               | 200                            |       |       |       |       | \$374 | \$483 | \$627 |
| B223    | 10   |               |                               | 200                            |       |       |       |       | \$381 | \$487 | \$634 |
| B224    | 19   |               |                               | 200                            |       |       |       |       | \$381 | \$490 | \$634 |
| B225*   | 30   |               |                               | 200                            |       |       |       |       | \$384 | \$495 | \$637 |
| B229    | 10   |               |                               | 1.25"<br>[32]                  | 200   |       |       |       |       | \$425 | \$523 |
| B230*   | 19   | 200           |                               |                                |       |       |       |       | \$427 | \$530 | \$680 |

\* Models without characterizing discs.

For corrected Cvs with piping reduction factor refer to page 12-5.

B2 Series Characterized Control Valves with Non Fail-Safe Actuators
2-way Valve with Stainless Steel Ball and Stem, NPT Female Ends



Valve Specifications

Table with 2 columns: Specification, Value. Rows include Service (chilled, hot water, up to 60% glycol), Flow Characteristic (equal percentage), Controllable Flow Range (75°), End Fitting (NPT female), Body (forged brass, nickel plated), Ball (stainless steel), Stem (stainless steel), Seat (Teflon® PTFE), Characterized Disc (TEFZEL® or stainless steel), Seat O-ring (EPDM), Media Temp. Range 1.25" - 2" (0°F to 250°F [-18°C to +120°C]), Media Temp. Range 2.5" - 3" (0°F to 212°F [-18°C to 100°C]), Max Differential Pressure 1.25" - 2" (50 psi), Max Differential Pressure 2.5" - 3" (30 psi), Leakage (0%).

Visit [www.belimo.us](http://www.belimo.us) for additional non fail-safe actuator options including 120V and -S models.



Table with 4 columns: ACTUATOR PART #, ARB24-3, ARB24-SR, ARX24-MFT. Rows include Control (On/Off, Floating Point; Modulating; Modulating/MFT), Manual Override (bullet points), Running Time (Motor) (90 seconds; 90 seconds; 150 seconds (variable)), Electrical Connection (3 ft, 18 GA plenum cable with 1/2" conduit connector).

2-Way

Table with 5 columns: Model #, Cv, Size [mm], Body Pressure Rating [psi], Close-Off Pressure [psi]. Rows list various models (B231 to B280\*) with their corresponding Cv, sizes (1.25", 1.5", 2", 2.5", 3"), pressure ratings (200, 100), and close-off pressures.

\*Models without characterizing discs.
For corrected Cvs with piping reduction factor refer to page 12-5.

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## Valve Specifications

|                                   |                                                                   |
|-----------------------------------|-------------------------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol                             |
| Flow Characteristic               | A-port equal percentage, B-port modified linear for constant flow |
| Controllable Flow Range           | 75°                                                               |
| End Fitting                       | NPT female                                                        |
| Body                              | forged brass, nickel plated                                       |
| Ball                              | stainless steel                                                   |
| Stem                              | stainless steel                                                   |
| Seat                              | Teflon® PTFE                                                      |
| Characterized Disc                | TEFZEL®                                                           |
| Seat O-ring                       | EPDM                                                              |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                                    |
| Max Differential Pressure (Water) | 50 psi                                                            |
| Leakage                           | 0% for A to AB, <2.0% for B to AB                                 |
| Cv Flow Rating                    | A-port: as stated in chart<br>B-port: 70% of A to AB Cv           |

Visit [www.belimo.us](http://www.belimo.us) for additional non fail-safe actuator options including 120V and -S models.



| ACTUATOR PART #       | TR24-3-T US                           | TR24-3 US                | TR24-SR-T US                          | TR24-SR US               | LRB24-3                                            | LRB24-SR                                           | LRX24-MFT                                          |
|-----------------------|---------------------------------------|--------------------------|---------------------------------------|--------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Control               | On/Off, Floating Point                | On/Off, Floating Point   | Modulating                            | Modulating               | On/Off, Floating Point                             | Modulating                                         | Modulating/MFT                                     |
| Manual Override       | •                                     | •                        | •                                     | •                        | •                                                  | •                                                  | •                                                  |
| Running Time (Motor)  | 90 seconds                            | 90 seconds               | 90 seconds                            | 90 seconds               | 90 seconds                                         | 90 seconds                                         | 150 seconds (variable)                             |
| Electrical Connection | screw terminal (for 26 to 14 GA wire) | 3 ft, 18 GA plenum cable | screw terminal (for 26 to 14 GA wire) | 3 ft, 18 GA plenum cable | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

## 3-Way Mixing/Diverting

| Model # | Cv   | Size<br>[mm]  | Body Pressure<br>Rating [psi] | Close-Off<br>Pressure<br>[psi] |       |       |       |       |       |       |       |
|---------|------|---------------|-------------------------------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|
| B307    | 0.3  | 0.5"<br>[15]  | 600                           | 200                            | \$298 | \$310 | \$429 | \$443 | \$368 | \$494 | \$627 |
| B308    | 0.46 |               |                               | 200                            | \$298 | \$310 | \$429 | \$443 | \$368 | \$494 | \$627 |
| B309    | 0.8  |               |                               | 200                            | \$298 | \$310 | \$429 | \$443 | \$368 | \$494 | \$627 |
| B310    | 1.2  |               |                               | 200                            | \$300 | \$313 | \$431 | \$445 | \$370 | \$498 | \$629 |
| B311    | 1.9  |               |                               | 200                            | \$300 | \$313 | \$431 | \$445 | \$370 | \$498 | \$629 |
| B312    | 3    |               |                               | 200                            | \$306 | \$320 | \$437 | \$451 | \$379 | \$507 | \$638 |
| B313    | 4.7  |               |                               | 200                            | \$308 | \$322 | \$439 | \$454 | \$384 | \$512 | \$644 |
| B315    | 10   |               |                               | 200                            | \$308 | \$322 | \$439 | \$454 | \$391 | \$518 | \$650 |
| B316*   | 16   |               |                               | 200                            | \$319 | \$332 | \$449 | \$464 | \$394 | \$521 | \$654 |
| B317    | 4.7  | 0.75"<br>[20] |                               | 200                            | \$373 | \$386 | \$504 | \$517 | \$457 | \$585 | \$717 |
| B318    | 7.4  |               |                               | 200                            | \$374 | \$387 | \$505 | \$518 | \$460 | \$587 | \$719 |
| B320    | 14   |               |                               | 200                            |       |       |       | \$467 | \$594 | \$726 |       |
| B321*   | 24   |               |                               | 200                            |       |       |       | \$471 | \$598 | \$730 |       |
| B322    | 7.4  | 1"<br>[25]    |                               | 200                            |       |       |       | \$493 | \$621 | \$752 |       |
| B323    | 10   |               |                               | 200                            |       |       |       | \$495 | \$623 | \$755 |       |
| B325*   | 30   |               |                               | 200                            |       |       |       | \$500 | \$627 | \$759 |       |

\*Models without characterizing discs.  
For corrected Cvs with piping reduction factor refer to page 12-5.

B3 Series Characterized Control Valves with Non Fail-Safe Actuators
3-way Valve with Stainless Steel Ball and Stem, NPT Female Ends



Valve Specifications

Table with 2 columns: Specification, Value. Rows include Service, Flow Characteristic, Controllable Flow Range, End Fitting, Body, Ball, Stem, Seat, Characterized Disc, Seat O-ring, Media Temperature Range (Water), Max Differential Pressure (Water), Leakage, and Cv Flow Rating.

Visit www.belimo.us for additional non fail-safe actuator options including 120V and -S models.



Table with 4 columns: ACTUATOR PART #, ARB24-3, ARB24-SR, ARX24-MFT. Rows include Control, Manual Override, Running Time (Motor), and Electrical Connection.

3-Way Mixing/Diverging

Table with 5 columns: Model #, Cv, Size [mm], Body Pressure Rating [psi], Close-Off Pressure [psi]. Rows list various valve models (B329 to B352) and their specifications.

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### Valve Specifications

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol |
| Flow Characteristic               | equal percentage                      |
| Controllable Flow Range           | 75°                                   |
| End Fitting                       | NPT female                            |
| Body                              | forged brass, nickel plated           |
| Ball                              | stainless steel                       |
| Stem                              | stainless steel                       |
| Seat                              | Teflon® PTFE                          |
| Characterized Disc                | TEFZEL®                               |
| Seat O-ring                       | EPDM                                  |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]        |
| Max Differential Pressure (Water) | 50 psi                                |
| Leakage                           | 0%                                    |

Visit [www.belimo.us](http://www.belimo.us) for additional spring return actuator options including 120V and -S models.



| ACTUATOR PART #          | TFRB24                                                | TFRB24-3                                           | TFRB24-SR                                          | TFRX24-MFT                                         | LF24 US                                               | LF24-3 US                                          | LF24-SR US                                         | LF24-MFT US                                           |
|--------------------------|-------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|
| Control                  | On/Off                                                | Floating Point                                     | Modulating                                         | Modulating/ MFT                                    | On/Off                                                | Floating Point                                     | Modulating                                         | Modulating/ MFT                                       |
| Running Time (Motor)     | <75 seconds                                           | 95 seconds                                         | 95 seconds                                         | 150 seconds (variable)                             | 75 seconds                                            | 150 seconds                                        | 150 seconds                                        | 150 seconds (variable)                                |
| Running Time (Fail-Safe) | < 25 seconds                                          | <25 seconds                                        | <25 seconds                                        | <25 seconds                                        | <25 seconds                                           | <25 seconds                                        | <25 seconds                                        | <25 seconds                                           |
| Electrical Connection    | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA appliance cable with ½" conduit connector |

### 2-Way

| Model # | Cv   | Size [mm]  | Body Pressure Rating [psi] | Close-Off Pressure [psi] |       |       |       |       |       |       |       |       |
|---------|------|------------|----------------------------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| B207    | 0.3  | 0.5" [15]  | 600                        | 200                      | \$409 | \$467 | \$502 | \$585 | \$472 | \$593 | \$610 | \$709 |
| B208    | 0.46 |            |                            | 200                      | \$409 | \$467 | \$502 | \$585 | \$472 | \$593 | \$610 | \$709 |
| B209    | 0.8  |            |                            | 200                      | \$409 | \$467 | \$502 | \$585 | \$472 | \$593 | \$610 | \$709 |
| B210    | 1.2  |            |                            | 200                      | \$413 | \$470 | \$505 | \$588 | \$475 | \$596 | \$614 | \$713 |
| B211    | 1.9  |            |                            | 200                      | \$413 | \$470 | \$505 | \$588 | \$475 | \$596 | \$614 | \$713 |
| B212    | 3    |            |                            | 200                      | \$421 | \$478 | \$513 | \$596 | \$481 | \$602 | \$620 | \$720 |
| B213    | 4.7  |            |                            | 200                      | \$424 | \$480 | \$515 | \$598 | \$483 | \$604 | \$622 | \$722 |
| B214    | 7.4  |            |                            | 200                      | \$426 | \$482 | \$517 | \$600 | \$487 | \$608 | \$625 | \$725 |
| B215    | 10   |            |                            | 200                      | \$426 | \$482 | \$517 | \$600 | \$483 | \$604 | \$622 | \$722 |
| B216*   | 16   |            |                            | 200                      | \$427 | \$483 | \$518 | \$601 | \$487 | \$608 | \$625 | \$725 |
| B217    | 4.7  | 0.75" [20] |                            | 200                      | \$472 | \$529 | \$563 | \$647 | \$531 | \$652 | \$670 | \$769 |
| B218    | 7.4  |            |                            | 200                      | \$474 | \$531 | \$565 | \$649 | \$535 | \$656 | \$673 | \$772 |
| B219    | 10   |            |                            | 200                      | \$472 | \$529 | \$563 | \$647 | \$537 | \$658 | \$675 | \$774 |
| B220*   | 14   |            |                            | 200                      | \$479 | \$537 | \$572 | \$655 | \$539 | \$660 | \$677 | \$776 |
| B221*   | 24   |            |                            | 200                      |       |       |       |       | \$543 | \$663 | \$681 | \$780 |
| B222    | 7.4  | 1" [25]    |                            | 200                      |       |       |       |       | \$548 | \$668 | \$686 | \$785 |
| B223    | 10   |            |                            | 200                      |       |       |       |       | \$554 | \$675 | \$692 | \$792 |
| B224    | 19   |            |                            | 200                      |       |       |       |       | \$564 | \$686 | \$703 | \$803 |
| B225*   | 30   |            |                            | 200                      |       |       |       |       | \$572 | \$692 | \$709 | \$809 |
| B229    | 10   |            |                            | 1.25" [32]               | 200   |       |       |       |       | \$582 | \$703 | \$721 |
| B230*   | 19   | 200        |                            |                          |       |       |       |       | \$585 | \$705 | \$723 | \$822 |

\* Models without characterizing discs.

For corrected Cvs with piping reduction factor refer to page 12-5.

# B2 Series Characterized Control Valves with Spring Return Actuators

2-way Valve with Stainless Steel Ball and Stem, NPT Female Ends



## Valve Specifications

|                                      |                                       |
|--------------------------------------|---------------------------------------|
| Service                              | chilled , hot water, up to 60% glycol |
| Flow Characteristic                  | equal percentage                      |
| Controllable Flow Range              | 75°                                   |
| End Fitting                          | NPT female                            |
| Body                                 | forged brass, nickel plated           |
| Ball                                 | stainless steel                       |
| Stem                                 | stainless steel                       |
| Seat                                 | Teflon® PTFE                          |
| Characterized Disc                   | TEFZEL® or stainless steel            |
| Seat O-ring                          | EPDM                                  |
| Media Temp. Range 1.25" - 2"         | 0°F to 250°F [-18°C to +120°C]        |
| Media Temp. Range 2.5" - 3"          | 0°F to 212°F [-18°C to 100°C]         |
| Max Differential Pressure 1.25" - 2" | 50 psi                                |
| Max Differential Pressure 2.5" - 3"  | 30 psi                                |
| Leakage                              | 0%                                    |

Visit [www.belimo.us](http://www.belimo.us) for additional spring return actuator options including 120V and -S models.



| ACTUATOR PART #          | AFRB24                                                | AFRB24-SR                                             | AFRX24-MFT                                         |
|--------------------------|-------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------|
| Control                  | On/Off                                                | Modulating                                            | Modulating/MFT                                     |
| Manual Override          | •                                                     | •                                                     | •                                                  |
| Running Time (Motor)     | 75 seconds                                            | 95 seconds                                            | 150 seconds (variable)                             |
| Running Time (Fail-Safe) | < 20 seconds                                          | < 20 seconds                                          | < 20 seconds                                       |
| Electrical Connection    | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

## 2-Way

| Model # | Cv  | Size [mm] | Body Pressure Rating [psi] | Close-Off Pressure [psi] |         |         |         |  |
|---------|-----|-----------|----------------------------|--------------------------|---------|---------|---------|--|
| B231    | 25  | 1.25"     | 400                        | 200                      | \$674   | \$849   | \$967   |  |
| B232*   | 37  | [32]      |                            | 200                      | \$676   | \$851   | \$969   |  |
| B238    | 19  | 1.5" [40] |                            | 200                      | \$681   | \$855   | \$975   |  |
| B239    | 29  |           |                            | 200                      | \$683   | \$857   | \$977   |  |
| B240*   | 37  |           |                            | 200                      | \$685   | \$859   | \$979   |  |
| B248    | 29  | 2" [50]   |                            | 200                      | \$950   | \$1,125 | \$1,182 |  |
| B249    | 46  |           |                            | 200                      | \$960   | \$1,135 | \$1,194 |  |
| B250*   | 57  |           |                            | 200                      | \$969   | \$1,145 | \$1,204 |  |
| B251    | 65  |           |                            | 200                      | \$1,182 |         | \$1,339 |  |
| B252    | 85  |           |                            | 200                      | \$1,260 |         | \$1,418 |  |
| B253    | 120 |           |                            | 200                      | \$1,335 |         | \$1,492 |  |
| B254*   | 240 |           |                            | 200                      | \$1,339 |         | \$1,497 |  |
| B261    | 60  | 2.5" [65] |                            | 100                      | \$1,343 |         | \$1,500 |  |
| B262    | 75  |           |                            | 100                      | \$1,405 |         | \$1,562 |  |
| B263    | 110 |           |                            | 100                      | \$1,476 |         | \$1,633 |  |
| B264    | 150 |           |                            | 100                      | \$1,510 |         | \$1,667 |  |
| B265*   | 210 |           |                            | 100                      | \$1,674 |         | \$1,829 |  |
| B277    | 70  | 3" [80]   |                            | 100                      | \$1,528 |         | \$1,685 |  |
| B278    | 130 |           |                            | 100                      | \$1,608 |         | \$1,765 |  |
| B280*   | 170 |           |                            | 100                      | \$1,923 |         | \$2,079 |  |

\*Models without characterizing discs.  
For corrected Cvs with piping reduction factor refer to page 12-5.

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### Valve Specifications

|                                   |                                                                   |
|-----------------------------------|-------------------------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol                             |
| Flow Characteristic               | A-port equal percentage, B-port modified linear for constant flow |
| Controllable Flow Range           | 75°                                                               |
| End Fitting                       | NPT female                                                        |
| Body                              | forged brass, nickel plated                                       |
| Ball                              | stainless steel                                                   |
| Stem                              | stainless steel                                                   |
| Seat                              | Teflon® PTFE                                                      |
| Characterized Disc                | TEFZEL® or stainless steel                                        |
| Seat O-ring                       | EPDM                                                              |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                                    |
| Max Differential Pressure (Water) | 50 psi                                                            |
| Leakage                           | 0% for A to AB, <2.0% for B to AB                                 |
| Cv Flow Rating                    | A-port: as stated in chart<br>B-port: 70% of A to AB Cv           |

Visit [www.belimo.us](http://www.belimo.us) for additional spring return actuator options including 120V and -S models.



| ACTUATOR PART #          | TFRB24                                                            | TFRB24-3                                                       | TFRB24-SR                                                      | TFRX24-MFT                                                     | LF24 US                                                           | LF24-3 US                                                      | LF24-SR US                                                     | LF24-MFT US                                                       |
|--------------------------|-------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------|
| Control                  | On/Off                                                            | Floating Point                                                 | Modulating                                                     | Modulating/<br>MFT                                             | On/Off                                                            | Floating Point                                                 | Modulating                                                     | Modulating/<br>MFT                                                |
| Running Time (Motor)     | <75 seconds                                                       | 95 seconds                                                     | 95 seconds                                                     | 150 seconds<br>(variable)                                      | 75 seconds                                                        | 150 seconds                                                    | 150 seconds                                                    | 150 seconds<br>(variable)                                         |
| Running Time (Fail-Safe) | < 25 seconds                                                      | <25 seconds                                                    | <25 seconds                                                    | <25 seconds                                                    | <25 seconds                                                       | <25 seconds                                                    | <25 seconds                                                    | <25 seconds                                                       |
| Electrical Connection    | 3 ft, 18 GA<br>appliance<br>cable with<br>½" conduit<br>connector | 3 ft, 18 GA<br>plenum<br>cable with<br>½" conduit<br>connector | 3 ft, 18 GA<br>plenum<br>cable with<br>½" conduit<br>connector | 3 ft, 18 GA<br>plenum<br>cable with<br>½" conduit<br>connector | 3 ft, 18 GA<br>appliance<br>cable with<br>½" conduit<br>connector | 3 ft, 18 GA<br>plenum<br>cable with<br>½" conduit<br>connector | 3 ft, 18 GA<br>plenum<br>cable with<br>½" conduit<br>connector | 3 ft, 18 GA<br>appliance<br>cable with<br>½" conduit<br>connector |

### 3-Way Mixing/Diverting

| Model # | Cv   | Size<br>[mm]  | Body Pressure<br>Rating [psi] | Close-Off<br>Pressure<br>[psi] |       |       |       |       |       |       |       |       |
|---------|------|---------------|-------------------------------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| B307    | 0.3  | 0.5"<br>[15]  | 600                           | 200                            | \$493 | \$572 | \$585 | \$671 | \$552 | \$676 | \$705 | \$777 |
| B308    | 0.46 |               |                               | 200                            | \$493 | \$572 | \$585 | \$671 | \$552 | \$676 | \$705 | \$777 |
| B309    | 0.8  |               |                               | 200                            | \$493 | \$572 | \$585 | \$671 | \$552 | \$676 | \$705 | \$777 |
| B310    | 1.2  |               |                               | 200                            | \$495 | \$574 | \$587 | \$673 | \$554 | \$678 | \$707 | \$780 |
| B311    | 1.9  |               |                               | 200                            | \$502 | \$579 | \$592 | \$678 | \$554 | \$678 | \$707 | \$780 |
| B312    | 3    |               |                               | 200                            | \$509 | \$587 | \$599 | \$686 | \$566 | \$691 | \$721 | \$793 |
| B313    | 4.7  |               |                               | 200                            | \$511 | \$589 | \$601 | \$688 | \$570 | \$693 | \$723 | \$795 |
| B315    | 10   |               |                               | 200                            | \$511 | \$589 | \$601 | \$688 | \$572 | \$696 | \$725 | \$797 |
| B316*   | 16   |               |                               | 200                            | \$510 | \$588 | \$600 | \$687 | \$574 | \$698 | \$727 | \$800 |
| B317    | 4.7  |               |                               | 200                            | \$557 | \$635 | \$648 | \$734 | \$604 | \$729 | \$759 | \$831 |
| B318    | 7.4  | 0.75"<br>[20] |                               | 200                            | \$557 | \$635 | \$648 | \$734 | \$616 | \$740 | \$769 | \$841 |
| B320    | 14   |               |                               | 200                            |       |       |       | \$623 | \$747 | \$776 | \$849 |       |
| B321*   | 24   |               |                               | 200                            |       |       |       | \$628 | \$751 | \$781 | \$853 |       |
| B322    | 7.4  | 1"<br>[25]    |                               | 200                            |       |       |       |       | \$643 | \$767 | \$796 | \$869 |
| B323    | 10   |               |                               | 200                            |       |       |       | \$650 | \$774 | \$804 | \$876 |       |
| B325*   | 30   |               |                               | 200                            |       |       |       | \$656 | \$780 | \$809 | \$881 |       |

\*Models without characterizing discs.

For corrected Cvs with piping reduction factor refer to page 12-5.

B3 Series Characterized Control Valves with Spring Return Actuators
3-way Valve with Stainless Steel Ball and Stem, NPT Female Ends



Valve Specifications

Table with 2 columns: Specification, Value. Rows include Service, Flow Characteristic, Controllable Flow Range, End Fitting, Body, Ball, Stem, Seat, Characterized Disc, Seat O-ring, Media Temperature Range (Water), Max Differential Pressure (Water), Leakage, and Cv Flow Rating.

Visit www.belimo.us for additional spring return actuator options including 120V and -S models.



Table with 4 columns: ACTUATOR PART #, AFRB24, AFRB24-SR, AFRX24-MFT. Rows include Control, Manual Override, Running Time (Motor), Running Time (Fail-Safe), and Electrical Connection.

3-Way Mixing/Diverting

Table with 5 columns: Model #, Cv, Size [mm], Body Pressure Rating [psi], Close-Off Pressure [psi]. Rows list various valve models (B329 to B352) and their specifications.

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### Valve Specifications

|                                   |                                                 |
|-----------------------------------|-------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol           |
| Flow Characteristic               | equal percentage                                |
| Controllable Flow Range           | 75°                                             |
| End Fitting                       | pattern to mate with ANSI 125 flange, flat face |
| Body                              | cast iron - GG25                                |
| Ball                              | stainless steel                                 |
| Stem                              | stainless steel                                 |
| Seat                              | Teflon® PTFE                                    |
| Characterized Disc                | stainless steel                                 |
| Seat O-ring                       | EPDM                                            |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                  |
| Max Differential Pressure (Water) | 50 psi                                          |
| Leakage                           | 0%                                              |

Visit [www.belimo.us](http://www.belimo.us) for additional non fail-safe actuator options including 120V and -S models.



| ACTUATOR PART #       | ARB24-3-5-14                                       | ARX24-MFT                                          | GRB24-3-5-14                                       | GRX24-MFT                                          |
|-----------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Control               | On/Off, Floating Point                             | Modulating/MFT                                     | On/Off, Floating Point                             | Modulating/MFT                                     |
| Manual Override       | •                                                  | •                                                  | •                                                  | •                                                  |
| Running Time (Motor)  | 90 seconds                                         | 150 seconds (variable)                             | 150 seconds                                        | 150 seconds (variable)                             |
| Electrical Connection | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

### 2-Way

| Model #    | Cv  | Size [mm] | Body Pressure Rating [psi] | Close-Off Pressure [psi] |         |         |         |         |
|------------|-----|-----------|----------------------------|--------------------------|---------|---------|---------|---------|
| B6250S-070 | 70  | 2.5"      | ANSI 125, Standard Class B | 100                      | \$1,949 | \$2,068 |         |         |
| B6250S-110 | 110 | [65]      |                            | 100                      | \$2,035 | \$2,155 |         |         |
| B6300S-110 | 110 | 3" [80]   |                            | 100                      | \$2,134 | \$2,385 |         |         |
| B6400S-186 | 186 | 4" [100]  |                            | 100                      |         |         | \$2,468 | \$2,647 |
| B6500S-290 | 290 | 5" [125]  |                            | 100                      |         |         | \$3,578 | \$3,675 |
| B6600S-400 | 400 | 6" [150]  |                            | 100                      |         |         | \$4,543 | \$4,639 |

Add the P... pre-set MFT configuration number and list price to the actuator when ordering, as needed. Note: Most popular configurations available at no additional cost. All other configurations carry a \$34.00 list price. See page 12-8.

B6 Series Characterized Control Valves with Spring Return and Electronic Fail-Safe Actuators

2-way Valve with Stainless Steel Ball and Stem, Flanged Ends



Valve Specifications

|                                   |                                                 |
|-----------------------------------|-------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol           |
| Flow Characteristic               | equal percentage                                |
| Controllable Flow Range           | 75°                                             |
| End Fitting                       | pattern to mate with ANSI 125 flange, flat face |
| Body                              | cast iron - GG25                                |
| Ball                              | stainless steel                                 |
| Stem                              | stainless steel                                 |
| Seat                              | Teflon® PTFE                                    |
| Characterized Disc                | stainless steel                                 |
| Seat O-ring                       | EPDM                                            |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                  |
| Max Differential Pressure (Water) | 50 psi                                          |
| Leakage                           | 0%                                              |

Visit [www.belimo.us](http://www.belimo.us) for additional spring return and electronic fail-safe actuator options including 120V and -S models.



| ACTUATOR PART #          | AFRX24                                                | AFRX24-MFT                                         | GKRX24-3                                           | GKRX24-MFT                                         |
|--------------------------|-------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Control                  | On/Off                                                | Modulating/MFT                                     | On/Off, Floating Point                             | Modulating/MFT                                     |
| Manual Override          | •                                                     | •                                                  | •                                                  | •                                                  |
| Running Time (Motor)     | 75 seconds                                            | 150 seconds (variable)                             | 150 seconds (variable)                             | 150 seconds (variable)                             |
| Running Time (Fail-Safe) | < 20 seconds                                          | < 20 seconds                                       | 35 seconds                                         | 35 seconds                                         |
| Electrical Connection    | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

2-Way

| Model #    | Cv  | Size [mm] | Body Pressure Rating [psi] | Close-Off Pressure [psi] |         |         |         |
|------------|-----|-----------|----------------------------|--------------------------|---------|---------|---------|
| B6250S-070 | 70  | 2.5" [65] | ANSI 125, Standard Class B | 100                      | \$1,987 | \$2,244 |         |
| B6250S-110 | 110 | 3" [80]   |                            | 100                      | \$2,078 | \$2,334 |         |
| B6300S-110 | 110 | 3" [80]   |                            | 100                      | \$2,243 | \$2,498 |         |
| B6400S-186 | 186 | 4" [100]  |                            | 100                      |         |         | \$2,780 |
| B6500S-290 | 290 | 5" [125]  |                            | 100                      |         |         | \$3,961 |
| B6600S-400 | 400 | 6" [150]  |                            | 100                      |         |         | \$4,851 |
|            |     |           |                            |                          |         |         | \$3,003 |
|            |     |           |                            |                          |         |         | \$4,117 |
|            |     |           |                            |                          |         |         | \$5,066 |

AFRX24 MFT is customizable. Add the P... pre-set MFT configuration number and list price to the actuator when ordering, as needed. Note: Most popular configurations available at no additional cost. All other configurations carry a \$34.00 list price. Refer to page 12-8

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## Valve Specifications

|                                     |                                       |
|-------------------------------------|---------------------------------------|
| Service                             | chilled , hot water, up to 60% glycol |
| Flow characteristic                 | equal percentage                      |
| Controllable Flow Range             | 75°                                   |
| End Fitting                         | NPT female                            |
| Body                                | forged brass, nickel plated           |
| Ball                                | stainless steel                       |
| Stem                                | stainless steel                       |
| Seat                                | Teflon® PTFE                          |
| Characterized Disc                  | TEFZEL® or stainless steel            |
| Seat O-ring                         | EPDM                                  |
| Media Temp. Range 0.5" - 2"         | 0°F to 250°F [-18°C to +120°C]        |
| Media Temp. Range 2.5" - 3"         | 0°F to 212°F [-18°C to 100°C]         |
| Max Differential Pressure 0.5" - 2" | 50 psi                                |
| Max Differential Pressure 2.5" - 3" | 30 psi                                |
| Leakage                             | 0%                                    |



| ACTUATOR PART #       | NRX24-3-T N4           | NRX24-SR-T N4  | NRX24-MFT-T N4         | ARX24-3-T N4           | ARX24-SR-T N4  | ARX24-MFT-T N4         |
|-----------------------|------------------------|----------------|------------------------|------------------------|----------------|------------------------|
| Control               | On/Off, Floating Point | Modulating     | Modulating/MFT         | On/Off, Floating Point | Modulating     | Modulating/MFT         |
| Manual Override       | •                      | •              | •                      | •                      | •              | •                      |
| Running Time (Motor)  | 90 seconds             | 90 seconds     | 150 seconds (variable) | 90 seconds             | 90 seconds     | 150 seconds (variable) |
| Electrical Connection | terminal block         | terminal block | terminal block         | terminal block         | terminal block | terminal block         |

## 2-Way

| Model # | Cv   | Size<br>[mm]  | Body Pressure<br>Rating [psi] | Close-Off<br>Pressure<br>[psi] |       |         |         |         |         |  |
|---------|------|---------------|-------------------------------|--------------------------------|-------|---------|---------|---------|---------|--|
| B207    | 0.3  | 0.5"<br>[15]  | 600                           | 200                            | \$631 | \$739   | \$880   |         |         |  |
| B208    | 0.46 |               |                               | 200                            | \$631 | \$739   | \$880   |         |         |  |
| B209    | 0.8  |               |                               | 200                            | \$631 | \$739   | \$880   |         |         |  |
| B210    | 1.2  |               |                               | 200                            | \$634 | \$742   | \$883   |         |         |  |
| B211    | 1.9  |               |                               | 200                            | \$634 | \$742   | \$883   |         |         |  |
| B212    | 3    |               |                               | 200                            | \$634 | \$742   | \$883   |         |         |  |
| B213    | 4.7  |               |                               | 200                            | \$638 | \$746   | \$888   |         |         |  |
| B214    | 7.4  |               |                               | 200                            | \$645 | \$752   | \$894   |         |         |  |
| B215    | 10   |               |                               | 200                            | \$650 | \$759   | \$900   |         |         |  |
| B216*   | 16   |               |                               | 200                            | \$650 | \$759   | \$900   |         |         |  |
| B217    | 4.7  | 0.75"<br>[20] |                               | 200                            | \$686 | \$794   | \$935   |         |         |  |
| B218    | 7.4  |               |                               | 200                            | \$689 | \$797   | \$939   |         |         |  |
| B219    | 10   |               |                               | 200                            | \$691 | \$800   | \$941   |         |         |  |
| B220*   | 14   |               |                               | 200                            | \$697 | \$805   | \$946   |         |         |  |
| B221*   | 24   |               |                               | 200                            | \$701 | \$809   | \$951   |         |         |  |
| B222    | 7.4  | 1"<br>[25]    |                               | 200                            | \$706 | \$814   | \$956   |         |         |  |
| B223    | 10   |               |                               | 200                            | \$711 | \$819   | \$961   |         |         |  |
| B224    | 19   |               |                               | 200                            | \$711 | \$819   | \$961   |         |         |  |
| B225*   | 30   |               |                               | 200                            | \$717 | \$824   | \$965   |         |         |  |
| B229    | 10   |               |                               | 200                            | \$755 | \$862   | \$1,004 |         |         |  |
| B230*   | 19   | 1.25"<br>[32] |                               | 200                            | \$758 | \$866   | \$1,006 |         |         |  |
| B231    | 25   |               |                               | 200                            |       |         | \$823   | \$985   | \$1,051 |  |
| B232*   | 37   |               |                               | 200                            |       |         | \$825   | \$987   | \$1,053 |  |
| B238    | 19   | 1.5"<br>[40]  |                               | 200                            |       |         | \$833   | \$995   | \$1,061 |  |
| B239    | 29   |               |                               | 200                            |       |         | \$833   | \$995   | \$1,061 |  |
| B240*   | 37   |               |                               | 200                            |       |         | \$838   | \$1,000 | \$1,066 |  |
| B248    | 29   |               |                               | 200                            |       |         | \$861   | \$1,024 | \$1,090 |  |
| B249    | 46   | 2"<br>[50]    |                               | 200                            |       |         | \$981   | \$1,142 | \$1,209 |  |
| B250*   | 57   |               |                               | 200                            |       |         | \$983   | \$1,145 | \$1,211 |  |
| B251    | 65   |               |                               | 200                            |       |         | \$985   | \$1,147 | \$1,213 |  |
| B252    | 85   |               | 200                           |                                |       | \$1,281 | \$1,442 | \$1,509 |         |  |
| B253    | 120  |               | 200                           |                                |       | \$1,356 | \$1,518 | \$1,585 |         |  |
| B254*   | 240  | 2.5"<br>[65]  | 200                           |                                |       | \$1,437 | \$1,600 | \$1,666 |         |  |
| B261    | 60   |               | 100                           |                                |       | \$1,451 | \$1,612 | \$1,679 |         |  |
| B262    | 75   |               | 100                           |                                |       | \$1,453 | \$1,614 | \$1,681 |         |  |
| B263    | 110  |               | 100                           |                                |       | \$1,456 | \$1,616 | \$1,683 |         |  |
| B264    | 150  |               | 100                           |                                |       | \$1,532 | \$1,694 | \$1,761 |         |  |
| B265*   | 210  | 3"<br>[80]    | 100                           |                                |       | \$1,608 | \$1,770 | \$1,837 |         |  |
| B277    | 70   |               | 100                           |                                |       | \$1,626 | \$1,787 | \$1,853 |         |  |
| B278    | 130  |               | 100                           |                                |       | \$1,703 | \$1,866 | \$1,933 |         |  |
| B280*   | 170  |               | 100                           |                                |       | \$1,769 | \$1,932 | \$1,996 |         |  |

\* Models without characterizing discs. For corrected Cvs with piping reduction factor refer to page 12-5.

| ACTUATOR PART #              | NRX24-3-T N4H | NRX24-SR-T N4H | NRX24-MFT-T N4H | ARX24-3-T N4H | ARX24-SR-T N4H | ARX24-MFT-T N4H |
|------------------------------|---------------|----------------|-----------------|---------------|----------------|-----------------|
| Add to List Price for Heater | +\$414        | +\$414         | +\$414          | +\$414        | +\$414         | +\$414          |

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203-791-8396 LATIN AMERICA/CARIBBEAN

B3 Series Characterized Control Valves with NEMA 4X Non Fail-Safe Actuators
3-way Valve with Stainless Steel Ball and Stem, NPT Female Ends



Valve Specifications

Table with 2 columns: Specification, Value. Rows include Service (chilled, hot water, up to 60% glycol), Flow Characteristic (A-port equal percentage, B-port modified linear for constant flow), Controllable Flow Range (75°), End Fitting (NPT female), Body (forged brass, nickel plated), Ball (stainless steel), Stem (stainless steel), Seat (Teflon® PTFE), Characterized Disc (TEFZEL® or stainless steel), Seat O-ring (EPDM), Media Temperature Range (Water) (0°F to 250°F [-18°C to +120°C]), Max Differential Pressure (Water) (50 psi), Leakage (0% for A to AB, <2.0% for B to AB), Cv Flow Rating (A-port: as stated in chart, B-port: 70% of A to AB Cv).



Table with 7 columns: ACTUATOR PART #, NRX24-3-T N4, NRX24-SR-T N4, NRX24-MFT-T N4, ARX24-3-T N4, ARX24-SR-T N4, ARX24-MFT-T N4. Rows include Control (On/Off, Floating Point; Modulating; Modulating/MFT), Manual Override (•), Running Time (Motor) (90 seconds; 90 seconds; 150 seconds (variable); 90 seconds; 90 seconds; 150 seconds (variable)), Electrical Connection (terminal block).

3-Way Mixing/Diverting

Table with 10 columns: Model #, Cv, Size [mm], Body Pressure Rating [psi], Close-Off Pressure [psi], and 5 price columns. Rows list various models (B307 to B352) with their respective specifications and prices.

Models without characterizing discs.
For corrected Cvs with piping reduction factor refer to page 12-5.

Table with 7 columns: ACTUATOR PART #, NRX24-3-T N4H, NRX24-SR-T N4H, NRX24-MFT-T N4H, ARX24-3-T N4H, ARX24-SR-T N4H, ARX24-MFT-T N4H. Row: Add to List Price for Heater (+\$414).



## Valve Specifications

|                                      |                                                                   |
|--------------------------------------|-------------------------------------------------------------------|
| Service                              | chilled , hot water, up to 60% glycol                             |
| Flow Characteristic                  | A-port equal percentage, B-port modified linear for constant flow |
| Controllable Flow Range              | 75°                                                               |
| End Fitting                          | NPT female                                                        |
| Body                                 | forged brass, nickel plated                                       |
| Ball                                 | stainless steel                                                   |
| Stem                                 | stainless steel                                                   |
| Seat                                 | Teflon® PTFE                                                      |
| Characterized Disc                   | TEFZEL® or stainless steel                                        |
| Seat O-ring                          | EPDM                                                              |
| Media Temp. Range 1.25" - 2"         | 0°F to 250°F [-18°C to +120°C]                                    |
| Media Temp. Range 2.5" - 3"          | 0°F to 212°F [-18°C to 100°C]                                     |
| Max Differential Pressure 1.25" - 2" | 50 psi                                                            |
| Max Differential Pressure 2.5" - 3"  | 30 psi                                                            |
| Leakage                              | 0% for A to AB, <2.0% for B to AB                                 |
| Cv Flow Rating                       | A-port: as stated in chart<br>B-port: 70% of A to AB Cv           |



| ACTUATOR PART #          | AFRX24 N4                                             | AFRX24-MFT N4                                      |
|--------------------------|-------------------------------------------------------|----------------------------------------------------|
| Control                  | On/Off                                                | Modulating/MFT                                     |
| Manual Override          | •                                                     | •                                                  |
| Running Time (Motor)     | 75 seconds                                            | 150 seconds (variable)                             |
| Running Time (Fail-Safe) | <20 seconds                                           | <20 seconds                                        |
| Electrical Connection    | 3 ft, 18 GA appliance cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

## 2-Way

| Model # | Cv  | Size [mm]  | Body Pressure Rating [psi] | Close-Off Pressure [psi] |         |         |
|---------|-----|------------|----------------------------|--------------------------|---------|---------|
| B231    | 25  | 1.25" [32] | 400                        | 200                      | \$1,301 | \$1,700 |
| B232*   | 37  | [32]       |                            | 200                      | \$1,305 | \$1,704 |
| B238    | 19  | 1.5" [40]  |                            | 200                      | \$1,309 | \$1,709 |
| B239    | 29  | [40]       |                            | 200                      | \$1,311 | \$1,711 |
| B240*   | 37  |            |                            | 200                      | \$1,314 | \$1,714 |
| B248    | 29  |            |                            | 200                      | \$1,578 | \$1,768 |
| B249    | 46  |            |                            | 200                      | \$1,589 | \$1,782 |
| B250*   | 57  |            |                            | 200                      | \$1,599 | \$1,792 |
| B251    | 65  | 2" [50]    |                            | 200                      | \$1,809 | \$2,003 |
| B252    | 85  |            |                            | 200                      | \$1,888 | \$2,081 |
| B253    | 120 |            |                            | 200                      | \$1,965 | \$2,158 |
| B254*   | 240 |            |                            | 200                      | \$2,202 | \$2,395 |
| B261    | 60  |            |                            | 100                      | \$1,908 | \$2,102 |
| B262    | 75  | 2.5" [65]  |                            | 100                      | \$1,985 | \$2,178 |
| B263    | 110 |            |                            | 100                      | \$2,064 | \$2,257 |
| B264    | 150 |            |                            | 100                      | \$2,139 | \$2,332 |
| B265*   | 210 |            |                            | 100                      | \$2,303 | \$2,496 |
| B277    | 70  | 3" [80]    | 400                        | 100                      | \$2,156 | \$2,349 |
| B278    | 130 |            |                            | 100                      | \$2,238 | \$2,431 |
| B280*   | 170 |            |                            | 100                      | \$2,548 | \$2,742 |

## 3-Way Mixing/Diverting

|      |    |            |     |     |         |         |
|------|----|------------|-----|-----|---------|---------|
| B329 | 10 | 1.25" [32] | 400 | 200 | \$1,508 | \$1,746 |
| B330 | 19 | [32]       |     | 200 | \$1,515 | \$1,755 |
| B331 | 25 |            |     | 200 | \$1,676 | \$1,913 |
| B338 | 19 | 1.5" [40]  |     | 200 | \$1,691 | \$1,931 |
| B339 | 29 | [40]       |     | 200 | \$1,693 | \$1,933 |
| B340 | 37 |            |     | 200 | \$1,699 | \$1,939 |
| B341 | 46 |            |     | 200 | \$1,884 | \$2,122 |
| B347 | 29 |            |     | 200 | \$2,087 | \$2,325 |
| B348 | 37 |            |     | 200 | \$2,090 | \$2,328 |
| B349 | 46 | 2" [50]    |     | 200 | \$2,092 | \$2,330 |
| B350 | 57 |            |     | 200 | \$2,099 | \$2,337 |
| B351 | 68 |            |     | 200 | \$2,290 | \$2,530 |
| B352 | 83 |            |     | 200 | \$2,358 | \$2,597 |

\* Models without characterizing discs.  
For corrected Cvs with piping reduction factor refer to page 12-5.

| ACTUATOR PART #              | AFRX24 N4H | AFRX24-MFT N4H |
|------------------------------|------------|----------------|
| Add to List Price for Heater | +\$1,078   | +\$1,078       |

B6 Series Characterized Control Valves with NEMA 4 Non Fail-Safe Actuators
2-way Valve with Stainless Steel Ball and Stem, Flanged Ends



Valve Specifications

Table with 2 columns: Specification, Value. Rows include Service (chilled, hot water, up to 60% glycol), Flow Characteristic (equal percentage), Controllable Flow Range (75°), End Fitting (pattern to mate with ANSI 125 flange, flat face), Body (cast iron - GG25), Ball (stainless steel), Stem (stainless steel), Seat (Teflon® PTFE), Characterized Disc (stainless steel), Seat O-ring (EPDM), Media Temperature Range (Water) (0°F to 250°F [-18°C to +120°C]), Max Differential Pressure (Water) (50 psi), Leakage (0%).



Table with 5 columns: ACTUATOR PART #, ARX24-3-T N4, ARX24-MFT-T N4, GRX24-3-T N4, GRX24-MFT-T N4. Rows include Control (On/Off, Floating Point / Modulating/MFT), Manual Override (•), Running Time (Motor) (90 seconds / 150 seconds (variable)), Electrical Connection (terminal block).

2-Way

Table with 8 columns: Model #, Cv, Size [mm], Body Pressure Rating [psi], Close-Off Pressure [psi], and price columns. Rows include B6250S-070, B6250S-110, B6300S-110, B6400S-186, B6500S-290, B6600S-400.

Table with 5 columns: ACTUATOR PART #, ARX24-3-T N4H, ARX24-MFT-T N4H, GRX24-3-T N4H, GRX24-MFT-T N4H. Row includes Add to List Price for Heater (+\$414).

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## Valve Specifications

|                                   |                                                 |
|-----------------------------------|-------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol           |
| Flow Characteristic               | equal percentage                                |
| Controllable Flow Range           | 75°                                             |
| End Fitting                       | pattern to mate with ANSI 125 flange, flat face |
| Body                              | cast iron - GG25                                |
| Ball                              | stainless steel                                 |
| Stem                              | stainless steel                                 |
| Seat                              | Teflon® PTFE                                    |
| Characterized Disc                | stainless steel                                 |
| Seat O-ring                       | EPDM                                            |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                  |
| Max Differential Pressure (Water) | 50 psi                                          |
| Leakage                           | 0%                                              |



| ACTUATOR PART #          | AFRX24 N4                                         | AFRX24-MFT N4                                      | GKRX24-3 N4                                        | GKRX24-MFT N4                                      |
|--------------------------|---------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Control                  | On/Off                                            | Modulating/MFT                                     | On/Off, Floating Point                             | Modulating/MFT                                     |
| Manual Override          | •                                                 | •                                                  | •                                                  | •                                                  |
| Running Time (Motor)     | 75 seconds                                        | 150 seconds (variable)                             | 150 seconds (variable)                             | 150 seconds (variable)                             |
| Running Time (Fail-Safe) | < 20 seconds                                      | < 20 seconds                                       | 35 seconds                                         | 35 seconds                                         |
| Electrical Connection    | 3 ft, 18 GA appliance cable, ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

## 2-Way

| Model #    | Cv  | Size [mm] | Body Pressure Rating [psi] | Close-Off Pressure [psi] |         |         |         |
|------------|-----|-----------|----------------------------|--------------------------|---------|---------|---------|
| B6250S-070 | 70  | 2.5"      | ANSI 125, Standard Class B | 100                      | \$2,673 | \$3,092 |         |
| B6250S-110 | 110 | [65]      |                            | 100                      | \$2,912 | \$3,268 |         |
| B6300S-110 | 110 | 3" [80]   |                            | 100                      | \$2,917 | \$3,486 |         |
| B6400S-186 | 186 | 4" [100]  |                            | 100                      |         | \$3,456 | \$3,885 |
| B6500S-290 | 290 | 5" [125]  |                            | 100                      |         | \$4,545 | \$4,973 |
| B6600S-400 | 400 | 6" [150]  |                            | 100                      |         | \$5,197 | \$5,585 |

| ACTUATOR PART #              | AFRX24 N4H | AFRX24-MFT N4H | GKRX24-3 N4H | GKRX24-MFT N4H |
|------------------------------|------------|----------------|--------------|----------------|
| Add to List Price for Heater | +\$1,078   | +\$1,078       | +\$414       | +\$414         |

# B2 Series Characterized Control Valves with Quick Running Non Fail-Safe Actuators

## 2-way Valve with Stainless Steel Ball and Stem, NPT Female Ends



### Valve Specifications

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol |
| Flow Characteristic               | equal percentage                      |
| Controllable Flow Range           | 75°                                   |
| End Fitting                       | NPT female                            |
| Body                              | forged brass, nickel plated           |
| Ball                              | stainless steel                       |
| Stem                              | stainless steel                       |
| Seat                              | Teflon® PTFE                          |
| Characterized Disc                | TEFZEL® or stainless steel            |
| Seat O-ring                       | EPDM                                  |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]        |
| Max Differential Pressure (Water) | 50 psi                                |
| Leakage                           | 0%                                    |



| ACTUATOR PART #       | LRQX24-MFT                                         | NRQX24-MFT                                         | ARQX24-MFT                                         |
|-----------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Control               | Modulating/MFT                                     | Modulating/MFT                                     | Modulating/MFT                                     |
| Manual Override       | •                                                  | •                                                  | •                                                  |
| Running Time (Motor)  | 4 seconds (variable)                               | 4 seconds (variable)                               | 10 seconds (variable)                              |
| Electrical Connection | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

### 2-Way

| Model # | Cv   | Size<br>[mm]  | Body Pressure<br>Rating [psi] | Close-Off<br>Pressure<br>[psi] |       |         |       |  |
|---------|------|---------------|-------------------------------|--------------------------------|-------|---------|-------|--|
| B207    | 0.3  | 0.5"<br>[15]  | 600                           | 200                            | \$728 |         |       |  |
| B208    | 0.46 |               |                               | 200                            | \$728 |         |       |  |
| B209    | 0.8  |               |                               | 200                            | \$728 |         |       |  |
| B210    | 1.2  |               |                               | 200                            | \$732 |         |       |  |
| B211    | 1.9  |               |                               | 200                            | \$732 |         |       |  |
| B212    | 3    |               |                               | 200                            | \$738 |         |       |  |
| B213    | 4.7  |               |                               | 200                            | \$748 |         |       |  |
| B214    | 7.4  |               |                               | 200                            | \$755 |         |       |  |
| B215    | 10   |               |                               | 200                            | \$760 |         |       |  |
| B216*   | 16   |               |                               | 200                            | \$762 |         |       |  |
| B217    | 4.7  |               |                               | 200                            | \$775 |         |       |  |
| B218    | 7.4  |               |                               | 0.75"<br>[20]                  | 200   | \$777   |       |  |
| B219    | 10   | 200           |                               |                                | \$780 |         |       |  |
| B220*   | 14   | 200           |                               |                                | \$782 |         |       |  |
| B221*   | 24   | 200           |                               |                                | \$785 |         |       |  |
| B222    | 7.4  | 1"<br>[25]    |                               | 200                            | \$812 |         |       |  |
| B223    | 10   |               |                               | 200                            | \$818 |         |       |  |
| B224    | 19   |               |                               | 200                            | \$825 |         |       |  |
| B225*   | 30   |               |                               | 200                            | \$829 |         |       |  |
| B229    | 10   | 1.25"<br>[32] |                               | 200                            | \$851 |         |       |  |
| B230*   | 19   |               |                               | 200                            | \$855 |         |       |  |
| B231    | 25   |               |                               | 400                            | 200   |         | \$890 |  |
| B232*   | 37   |               |                               |                                | 200   |         | \$910 |  |
| B238    | 19   | 200           |                               |                                |       | \$910   |       |  |
| B239    | 29   | 200           |                               |                                | \$914 |         |       |  |
| B240*   | 37   | 200           |                               |                                | \$916 |         |       |  |
| B248    | 29   | 200           |                               |                                |       | \$1,047 |       |  |
| B249    | 46   | 2"<br>[50]    | 200                           |                                |       | \$1,051 |       |  |
| B250*   | 57   |               | 200                           |                                |       | \$1,060 |       |  |
| B251    | 65   |               | 200                           |                                |       | \$1,338 |       |  |
| B252    | 85   |               | 200                           |                                |       | \$1,419 |       |  |
| B253    | 120  |               | 200                           |                                |       | \$1,491 |       |  |
| B254*   | 240  |               | 200                           |                                |       | \$1,704 |       |  |

\*Models without characterizing discs.  
For corrected Cvs with piping reduction factor refer to page 12-5.

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All prices are in US Dollars (USD)

### Valve Specifications

|                                   |                                                                   |
|-----------------------------------|-------------------------------------------------------------------|
| Service                           | chilled , hot water, up to 60% glycol                             |
| Flow Characteristic               | A-port equal percentage, B-port modified linear for constant flow |
| Controllable Flow Range           | 75°                                                               |
| End Fitting                       | NPT female                                                        |
| Body                              | forged brass, nickel plated                                       |
| Ball                              | stainless steel                                                   |
| Stem                              | stainless steel                                                   |
| Seat                              | Teflon® PTFE                                                      |
| Characterized Disc                | TEFZEL® or stainless steel                                        |
| Seat O-ring                       | EPDM                                                              |
| Media Temperature Range (Water)   | 0°F to 250°F [-18°C to +120°C]                                    |
| Max Differential Pressure (Water) | 50 psi                                                            |
| Leakage                           | 0% for A to AB, <2.0% for B to AB                                 |
| Cv Flow Rating                    | A-port: as stated in chart<br>B-port: 70% of A to AB Cv           |



| ACTUATOR PART #       | LQX24-MFT                                          | ARQX24-MFT                                         |
|-----------------------|----------------------------------------------------|----------------------------------------------------|
| Control               | Modulating/MFT                                     | Modulating/MFT                                     |
| Manual Override       | •                                                  | •                                                  |
| Running Time (Motor)  | 4 seconds (variable)                               | 10 seconds (variable)                              |
| Electrical Connection | 3 ft, 18 GA plenum cable with ½" conduit connector | 3 ft, 18 GA plenum cable with ½" conduit connector |

### 3-Way Mixing/Diverting

| Model # | Cv   | Size [mm]  | Body Pressure Rating [psi] | Close-Off Pressure [psi] |       |         |         |
|---------|------|------------|----------------------------|--------------------------|-------|---------|---------|
| B307    | 0.3  | 0.5" [15]  | 600                        | 200                      | \$814 |         |         |
| B308    | 0.46 |            |                            | 200                      | \$814 |         |         |
| B309    | 0.8  |            |                            | 200                      | \$814 |         |         |
| B310    | 1.2  |            |                            | 200                      | \$816 |         |         |
| B311    | 1.9  |            |                            | 200                      | \$816 |         |         |
| B312    | 3    |            |                            | 200                      | \$818 |         |         |
| B313    | 4.7  |            |                            | 200                      | \$829 |         |         |
| B315    | 10   |            |                            | 200                      | \$831 |         |         |
| B316*   | 16   |            |                            | 200                      | \$830 |         |         |
| B317    | 4.7  |            |                            | 200                      | \$855 |         |         |
| B318    | 7.4  | 0.75" [20] | 600                        | 200                      | \$859 |         |         |
| B320    | 14   |            |                            | 200                      | \$861 |         |         |
| B321*   | 24   |            |                            | 200                      | \$861 |         |         |
| B322    | 7.4  |            |                            | 200                      | \$956 |         |         |
| B323    | 10   | 1" [25]    |                            | 200                      | \$958 |         |         |
| B325*   | 30   |            |                            | 200                      | \$962 |         |         |
| B329    | 10   |            |                            | 200                      |       | \$976   |         |
| B330    | 19   | 1.25" [32] |                            | 400                      | 200   |         | \$1,020 |
| B331    | 25   |            |                            |                          | 200   |         | \$1,170 |
| B338    | 19   |            |                            |                          | 200   |         | \$1,180 |
| B339    | 29   | 1.5" [40]  | 200                        |                          |       | \$1,182 |         |
| B340    | 37   |            | 200                        |                          |       | \$1,185 |         |
| B341    | 46   |            | 200                        |                          |       | \$1,190 |         |
| B347    | 29   | 2" [50]    | 400                        |                          | 200   |         | \$1,432 |
| B348    | 37   |            |                            |                          | 200   |         | \$1,434 |
| B349    | 46   |            |                            |                          | 200   |         | \$1,436 |
| B350    | 57   |            |                            |                          | 200   |         | \$1,440 |
| B351    | 68   |            |                            | 200                      |       | \$1,448 |         |
| B352    | 83   |            |                            | 200                      |       | \$1,457 |         |

\* Models without characterizing discs.  
For corrected Cvs with piping reduction factor refer to page 12-5.

# LR Series Non Fail-Safe Actuators

Custom, Direct Coupled Non Fail-Safe Actuator, 45 in-lbs Minimum Torque



## Actuator Specifications

|                         |                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------|
| Torque                  | 45 in-lbs [5 Nm]                                                                                                |
| Ambient Temperature     | -22°F to +122°F<br>[-30°C to +50°C]                                                                             |
| Angle of Rotation ♦     | max. 90°, adjustable with mechanical stop electronically variable                                               |
| Position Indication     | handle                                                                                                          |
| Manual Override         | external push-button                                                                                            |
| Direction of Rotation ♦ | reversible with switch                                                                                          |
| Dimensions              | 6.18" x 2.6" x 2.34"<br>[157 x 66 x 59.4 mm]                                                                    |
| Electrical Connection   | 18 GA plenum rated cable, ½" conduit fitting terminal strip (-T) models                                         |
| Overload Protection     | electronic throughout rotation                                                                                  |
| Auxiliary Switch        | (-S) models: 1 SPDT, 3A (0.5A inductive) @ 250V adjustable 5° to 85°                                            |
| Housing                 | NEMA 2/IP54                                                                                                     |
| Agency Listings         | cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CSA C22.2 No. 24-93, CE acc. to 2006/95/EC and 89/336/EEC |



## MFT

MFT= 2-10 VDC Default, or Set, Modify, Read:

- Control (PWM, VDC range, Floating Point)
- Feedback (0-10 VDC, 0-5 VDC, 2-10 VDC, Variable)
- Motion (run time)



All actuators have BDCM



♦ Variable with MFT

| Model      | Control Input          | Feedback | Power Supply | Running Time(s) [Default] | VA Rating | Cable Length | Re-order Number | List Price‡ |
|------------|------------------------|----------|--------------|---------------------------|-----------|--------------|-----------------|-------------|
| LRB24-3    | On/Off, Floating Point | Add on   | 24 VAC/DC    | 90                        | 2         | 3 ft.        | N/A**           | \$226       |
| LRB24-3-S  | On/Off, Floating Point | Add on   | 24 VAC/DC    | 90                        | 2         | 3 ft.        | N/A**           | \$319       |
| LRB24-3-T  | On/Off, Floating Point | Add on   | 24 VAC/DC    | 90                        | 2         | N/A          | N/A**           | \$214       |
| LRB120-3   | On/Off, Floating Point | Add on   | 100-240 VAC  | 90                        | 4         | 3 ft.        | N/A**           | \$283       |
| LRB24-SR   | 2-10 VDC (4-20mA*)     | 2-10 VDC | 24 VAC/DC    | 90                        | 4.5       | 3 ft.        | N/A**           | \$336       |
| LRB24-SR-T | 2-10 VDC (4-20mA*)     | 2-10 VDC | 24 VAC/DC    | 90                        | 4.5       | N/A          | N/A**           | \$328       |
| LRB120-SR  | 2-10 VDC (4-20mA*)     | 2-10 VDC | 100-240 VAC  | 90                        | 4         | 3 ft.        | N/A**           | \$379       |

## MFT VERSION

|           |         |         |           |    |   |       |       |       |
|-----------|---------|---------|-----------|----|---|-------|-------|-------|
| LRB24-MFT | Various | Various | 24 VAC/DC | 90 | 5 | 3 ft. | N/A** | \$444 |
|-----------|---------|---------|-----------|----|---|-------|-------|-------|

See page 12-8 for actuator customizing and available P-Codes.

‡ Prices do not reflect additional programming code surcharge.

\*With 500 Ω resistor- ZG-R01.

\*\* Re-order numbers only available for customizable "X" version actuators (e.g. LRX24-3).

The P-Code programs the actuator for the desired Control Input, Feedback and Running Time.

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All prices are in US Dollars (USD)

## Actuator Specifications

|                         |                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------|
| Torque                  | 180 in-lbs [20 Nm]                                                                                              |
| Ambient Temperature     | -22°F to +122°F<br>[-30°C to +50°C]                                                                             |
| Angle of Rotation ♦     | max 90°, adjustable with mechanical stop electronically variable                                                |
| Position Indication     | handle                                                                                                          |
| Manual Override         | external push-button                                                                                            |
| Direction of Rotation ♦ | reversible with switch                                                                                          |
| Dimensions              | 7.47" x 3.45" x 2.52"<br>[189.8 x 88 x 64 mm]                                                                   |
| Electrical Connection   | 18 GA plenum rated cable, ½" conduit connector                                                                  |
| Overload Protection     | electronic throughout rotation                                                                                  |
| Auxiliary Switch(es)    | (-S) models: 1 SPDT, 3A (0.5A inductive) @ 250V adjustable 5° to 85°                                            |
| Housing                 | NEMA 2/IP54                                                                                                     |
| Agency Listings         | cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CSA C22.2 No. 24-93, CE acc. to 2006/95/EC and 89/336/EEC |

♦ Variable with MFT



## MFT

MFT= 2-10 VDC Default, or Set, Modify, Read:

- Control (PWM, VDC range, Floating Point)
- Feedback (0-10 VDC, 0-5 VDC, 2-10 VDC, Variable)
- Motion (run time)



All Actuators have BDCM



| Model      | Control Input          | Feedback | Power Supply | Running Time(s) | VA Rating | Cable Length | Re-order Number | List Price |
|------------|------------------------|----------|--------------|-----------------|-----------|--------------|-----------------|------------|
| ARB24-3    | On/Off, Floating Point | Add on   | 24 VAC/DC    | 90              | 5.5       | 3 ft.        | N/A**           | \$407      |
| ARB24-3-S  | On/Off, Floating Point | Add on   | 24 VAC/DC    | 90              | 5.5       | 3 ft.        | N/A**           | \$525      |
| ARB24-3-T  | On/Off, Floating Point | Add on   | 24 VAC/DC    | 90              | 5.5       | N/A          | N/A**           | \$390      |
| ARB120-3   | On/Off, Floating Point | Add on   | 100-240 VAC  | 90              | 7         | 3 ft.        | N/A**           | \$470      |
| ARB24-SR   | 2-10 VDC (4-20mA*)     | 2-10 VDC | 24 VAC/DC    | 90              | 5         | 3 ft.        | N/A**           | \$599      |
| ARB24-SR-T | 2-10 VDC (4-20mA*)     | 2-10 VDC | 24 VAC/DC    | 90              | 5         | N/A          | N/A**           | \$574      |
| ARB120-SR  | 2-10 VDC (4-20mA*)     | 2-10 VDC | 100-240 VAC  | 90              | 7.5       | 3 ft.        | N/A**           | \$667      |

## MFT VERSIONS

|             |           |         |           |     |   |       |               |       |
|-------------|-----------|---------|-----------|-----|---|-------|---------------|-------|
| ARB24-MFT   | Various   | Various | 24 VAC/DC | 90  | 6 | 3 ft. | N/A**         | \$594 |
| ARX24-MFT95 | 0 to 135Ω | Various | 24 VAC/DC | 150 | 6 | 3 ft. | AR0L0 0C3 R01 | \$610 |

See page 12-8 for actuator customizing and available P-Codes.

‡ Prices do not reflect additional programming code surcharge.

\*With 500 Ω resistor- ZG-R01.

\*\* Re-order numbers only available for customizable "X" version actuators (e.g. LRX24-3).

The P-Code programs the actuator for the desired Control Input, Feedback and Running Time.