

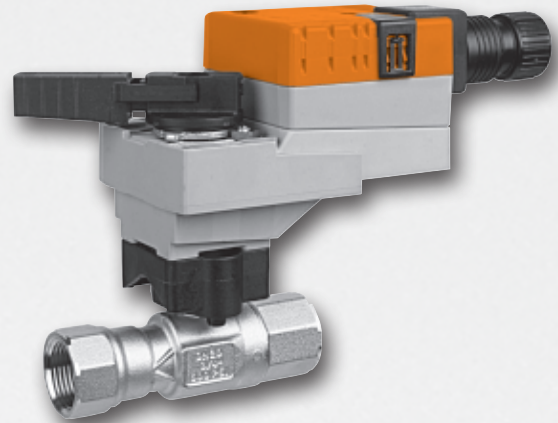
# 9

## HIGH TEMPERATURE CHARACTERIZED CONTROL VALVES (HTCCV)

- Extremely low lead content enabling valve to be used as a potable water valve.
- Fluid dynamically designed characterizing elongated disc reduces turbulent flow and improves efficiency of the system.
- Maintenance free – no repacking required after being in service for an extended period of time.
- Dezincified brass body to ensure the mechanical strength and integrity of the valve in a critical steam application.

### Applications

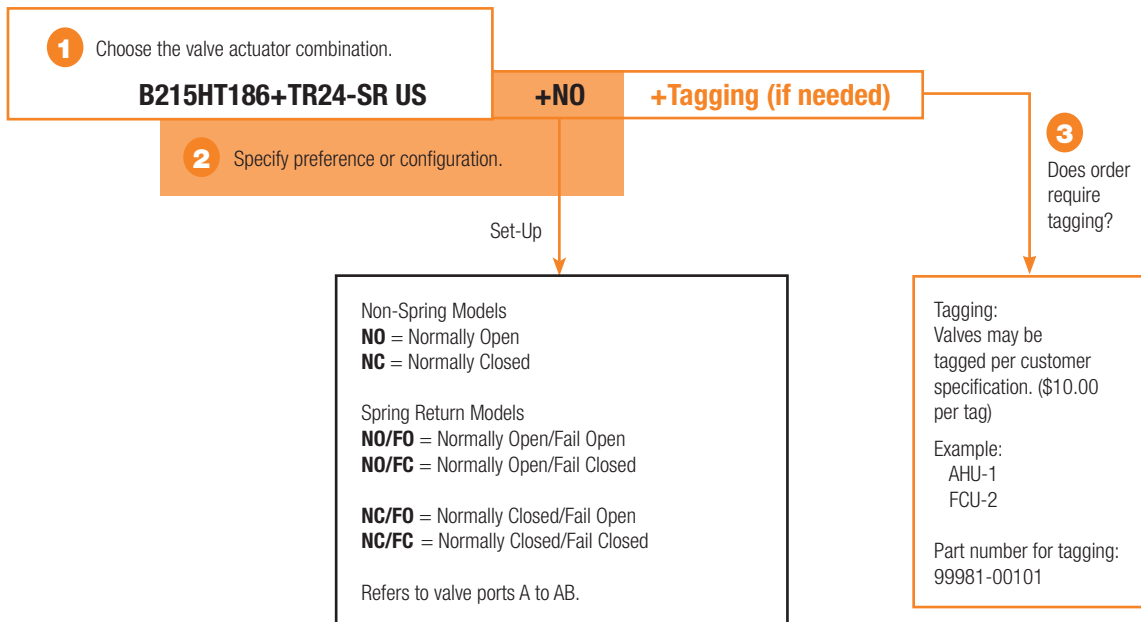
Available with spring and non-spring return actuators, the HTCCV meets the challenges of space restricted applications, such as unit ventilations and fan coil units. In addition, with its sturdy construction and specially designed disc, it is the perfect solution for a steam control valve with supply pressures of 15 psig or less. The HTCCV is environmentally friendly and is suitable for use as a potable water control valve, a first ever for the Belimo product line.



# High Temperature Characterized Control Valve (HTCCV) Nomenclature

|                            |                                       |                  |  |  |   |   |                                |
|----------------------------|---------------------------------------|------------------|--|--|---|---|--------------------------------|
| <b>B2</b>                  | <b>15</b>                             | <b>HT</b>        | <b>186</b>                                 | <b>TR</b>  | <b>24</b>   | <b>-SR</b>  |                                |
| <b>Valve</b><br>B2 = 2-way | <b>Valve Size</b><br>15-25 = ½" to 1" | High Temperature | <b>Cv Rating</b><br>1.86<br>Refer to Table | <b>Actuator Type</b><br>Non-Spring Return<br>TR...<br>LR...<br>Spring Return<br>TF...<br>LF... | <b>Power Supply</b><br>24 = 24 VAC/DC<br>120 = 120 VAC* | <b>Control</b><br>Blank = On/Off<br>-3 = Floating Point<br>-SR = 2-10 VDC<br>-MFT = Multi-Function Technology | -S = Built-in Auxiliary Switch |

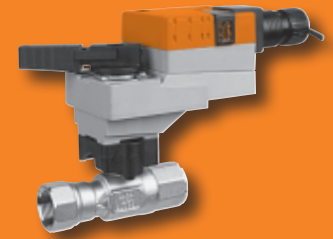
## Ordering Example



\*TF Series has 100 to 240 VAC nominal power supply.

# Control Valve Product Range

## High Temperature Characterized Control Valves Product Range B2..HT., 2-way



Equal-percentage characteristic

| C <sub>v</sub> | Valve Nominal Size |         | Type       | Suitable Actuators |                   |           |
|----------------|--------------------|---------|------------|--------------------|-------------------|-----------|
|                | Inches             | DN [mm] | 2-way NPT  | Spring Return      | Non-Spring Return |           |
| 0.29           | ½                  | 15      | B215HT029  | TF Series          |                   | TR Series |
| 0.46           | ½                  | 15      | B215HT046  |                    |                   |           |
| 0.73           | ½                  | 15      | B215HT073  |                    |                   |           |
| 1.16           | ½                  | 15      | B215HT116  |                    |                   |           |
| 1.86           | ½                  | 15      | B215HT186  |                    |                   |           |
| 2.90           | ½                  | 15      | B215HT290  |                    |                   |           |
| 4.55           | ½                  | 15      | B215HT455* | LF Series          |                   | LR Series |
| 1.86           | ¾                  | 20      | B220HT186  |                    |                   |           |
| 2.90           | ¾                  | 20      | B220HT290  |                    |                   |           |
| 4.64           | ¾                  | 20      | B220HT464  |                    |                   |           |
| 7.31           | ¾                  | 20      | B220HT731  |                    |                   |           |
| 9.28           | ¾                  | 20      | B220HT928  |                    |                   |           |
| 13.20          | ¾                  | 20      | B220HT1320 |                    |                   |           |
| 4.64           | 1                  | 25      | B225HT464  |                    |                   |           |
| 7.31           | 1                  | 25      | B225HT731  |                    |                   |           |
| 11.60          | 1                  | 25      | B225HT1160 |                    |                   |           |
| 18.56          | 1                  | 25      | B225HT1856 |                    |                   |           |
| 28.00          | 1                  | 25      | B225HT2800 |                    |                   |           |

\* modified equal percentage.

### Applications

- Water/low pressure steam control of air handling apparatus in ventilation and air-conditioning systems
- District heating
- Humidifier

### Mode of Operation

The control valve is operated by an electronic actuator that responds to a standard voltage for on/off control, by a proportional VDC/4...20 mA, or 3-point control system. The actuator will then move the ball of the valve to the position dictated by the control signal and change the flow.

### Product Features

Equal-percentage characteristic of the flow; models with \* have modified equal percentage characteristic.

### Actuator Specifications

|                       |  |
|-----------------------|--|
| Control type          | On/Off, Floating Point, 2-10 VDC Multi-Function Technology (MFT) |
| Manual override       | (only LR, TR Series)   |
| Electrical connection | 3 ft [1m] cable with ½" conduit fitting (except TR)              |

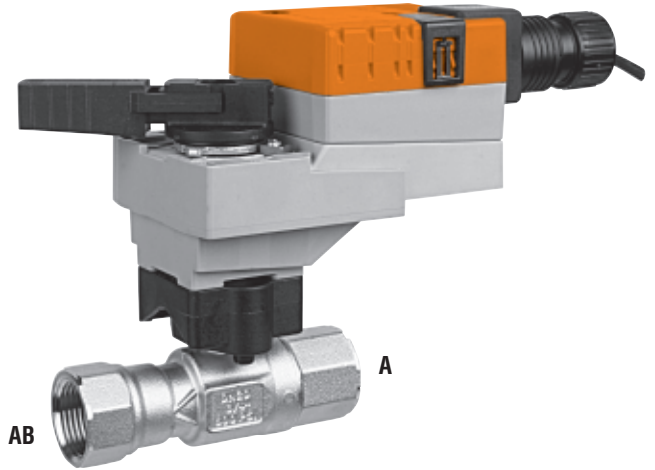
### Valve Specifications

|                                    |   |
|------------------------------------|---|
| Service                            | potable or hot water, 60% glycol, steam                                 |
| Flow characteristic                | A-port equal percentage   |
| Controllable flow range            | 75°   |
| Sizes                              | ½" - 1"   |
| Type of end fitting                | NPT female ends   |
| Materials                          |   |
| Body                               | brass (DZR) P-CuZn35Pb2   |
| Ball                               | stainless steel   |
| Stem                               | stainless steel   |
| Seats                              | Tefzel®   |
| Characterizing disc                | Tefzel®   |
| Packing                            | EPDM O-rings  |
| Pressure rating                    | 600 psi   |
| Media temp range                   |   |
| Steam                              | 250°F   |
| Water                              | 60°F to 266°F   |
| Close off pressure                 | 200 psi   |
| Maximum differential pressure (ΔP) | 60 psi partially open ball<br>116 psi full open only (Model #B215HT455) |
| Steam                              | 15 psi  |
| Maximum inlet pressure             |   |
| Steam                              | 15 psi  |
| Leakage                            | bubble tight 0%   |
| C <sub>v</sub> rating              | see product chart for values  |

## SET-UP

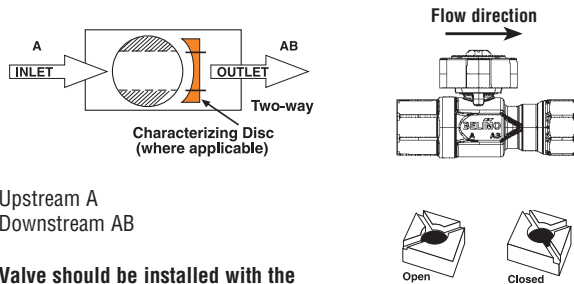
|   |   | TWO-WAY VALVE<br>(Specify upon ordering)   |  |
|---|---|--|--|
| NON-SPRING RETURN<br>Stays in Last Position | TR24-3 US   | Power to pin 2 will drive valve CCW.<br>Power to pin 3 will drive valve CW.  |  |
|   | TR24-SR US  | <b>NC:</b> Closed A to AB, will open as voltage increases.   | <b>NO:</b> Open A to AB, will close as voltage increases<br>(Can be chosen with switch inside terminal block of actuator).   |
|   | LRB24-3,<br>LRB24-SR,<br>LRX24-MFT  | 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. | <b>NO:</b> Open A to AB, will close as voltage increases or power applied.<br>(Can be chosen with CW/CCW switch).  |
| SPRING RETURN<br>Note Fail Position         | TFX24 US<br>LF24 US   | <b>NO/FO</b> Valve: Open A to AB will drive closed.<br>Spring Action: Will spring open A to AB upon power loss.  | <b>NC/FC</b> Valve: Closed A to AB will drive open.<br>Spring Action: Will spring closed A to AB upon power loss.  |
|   | TF (-3), MFT, SR<br>LF (-3), MFT, SR<br>Floating or Proportional type actuators | <b>NC/FO</b> Valve: Closed A to AB will drive open.<br>Spring Action: Will spring open A to AB upon power loss.  | <b>NC/FC</b> or <b>NO/FC</b> Valve: Closed A to AB or Open A to AB<br>(Can be chosen with CW/CCW switch).<br>Spring Action: Will spring closed A to AB upon power loss.<br><br><b>NO/FO</b> Valve: Open A to AB<br>Spring Action: Will spring open A to AB upon power loss.<br>( <b>NO</b> action can be chosen with CW/CCW switch). |

|                                    |   |
|------------------------------------|---|
| Service                            | potable or hot water, 60% glycol, steam   |
| Flow characteristic                | A-port equal percentage   |
| Media temp range                   | 60°F to 266°F [12.5°C to 130°C] Water<br>max 250°F [120°C] Steam                          |
| Maximum differential pressure (ΔP) | 60 psi typical application<br>116 psi full open only (Model # B215HT455)<br>steam: 15 psi |
| Maximum inlet                      | steam: 15 psi   |
| Leakage                            | 0% for A to AB  |



### FLOW PATTERN

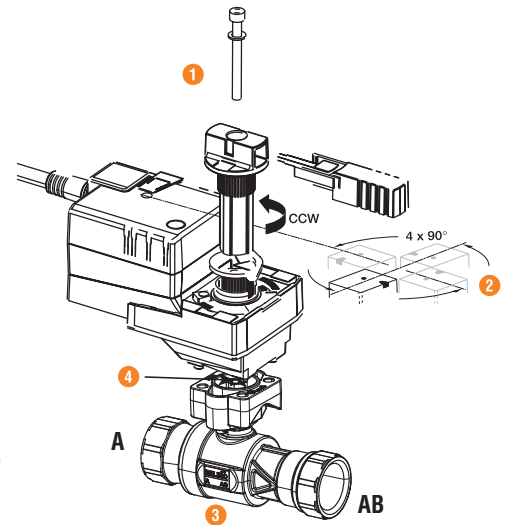
#### 2-way High Temperature Characterized Control Valves



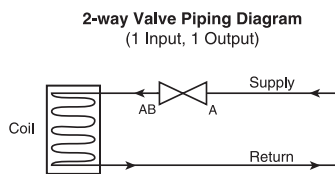
Valve should be installed with the disc downstream, unlike the CCV.

### ASSEMBLY

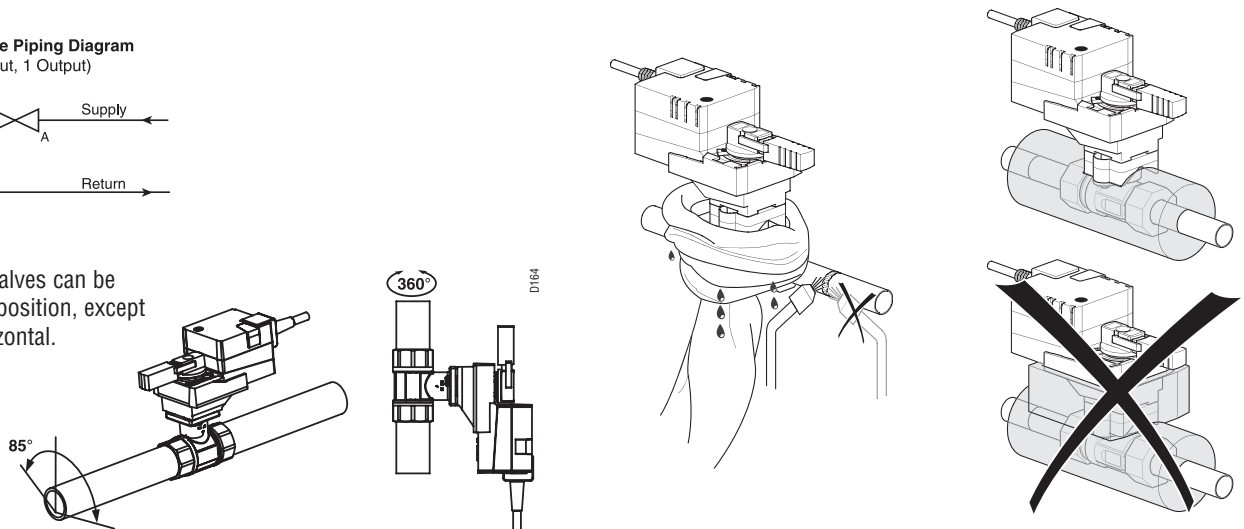
- 1 One screw attaches to valve
- 2 Four actuator mounting positions
- 3 2-way flow pattern
- 4 Top of valve stem indicates direction of flow (Flow A to AB shown)



### OPERATION/INSTALLATION



**Mounting:** The valves can be mounted in any position, except stem below horizontal.



# High Temperature CCV, Non-Spring Return Actuator

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



## Valve Specifications

|                                    |   |
|------------------------------------|---|
| Service                            | potable or hot water,<br>60% glycol, steam                                  |
| Flow characteristic                | A-port equal percentage   |
| Controlable flow range             | 75°   |
| Sizes                              | ½" - 1"   |
| Type of end fitting                | NPT female ends   |
| Materials:                         |   |
| Body                               | Dezincified (DZR) brass<br>(P-CuZn35Pb2)                                    |
| Ball                               | stainless steel   |
| Stem                               | stainless steel   |
| Seats                              | Tefzel®   |
| Characterizing disc                | Tefzel®   |
| Packing                            | EPDM O-rings, lubricated  |
| Pressure rating                    | 600 psi   |
| Media temp. range                  |   |
| Steam                              | 250°F   |
| Water                              | 60°F to 266°F   |
| Close off pressure                 | 200 psi   |
| Maximum differential pressure (ΔP) | 60 psi typical application<br>116 psi full open only<br>(Model # B215HT455) |
| Maximum inlet                      | steam: 15 psi   |
| Leakage                            | bubble tight 0%   |
| C <sub>v</sub> rating              | see chart below for values  |



## Non-Spring Return Actuators



| ACTUATOR PART #                 | TR24-3 US      | TR24-SR US   | LRB24-3                | LRB24-SR     | LRX24-MFT   |
|---------------------------------|----------------|--------------|------------------------|--------------|---|
| Control type                    | Floating Point | Proportional | On/Off, Floating Point | Proportional | Proportional/MFT                                      |
| Manual override                 | •              | •            | •                      | •            | •   |
| Running time                    | 95 seconds     | 95 seconds   | 90 seconds             | 90 seconds   | 150 seconds (default)<br>variable (35 to 150 seconds) |
| Noise level                     | <35 dB(A)      | <35 dB(A)    | <35 dB(A)              | <35 dB(A)    | <35 dB(A)   |
| <b>ELECTRICAL CONNECTION:</b>   |                |              |                        |              |   |
| 3 ft. cable, ½" conduit fitting |                |              | •                      | •            | •   |
| Covered terminal strip          | •              | •            |                        |              |   |

| HTCCV Model #  | C <sub>v</sub> Rating | Valve Nominal Size |       |               | Close-Off psi | TR24-3 US | TR24-SR US | LRB24-3  | LRB24-SR | LRX24-MFT |
|--|-----------------------|--------------------|-------|---------------|---------------|-----------|------------|----------|----------|-----------|
|  |                       | Inches             | DN mm | Close-Off psi |               |           |            |          |          |           |
| <b>2-WAY HIGH TEMPERATURE CCV WITH NON-SPRING RETURN ACTUATORS</b> |                       |                    |       |               |               |           |            |          |          |           |
| B215HT029  | 0.29                  | ½                  | 15    | 200           | \$232.00      | \$332.00  | \$266.00   | \$346.00 | \$468.00 |           |
| B215HT046  | 0.46                  | ½                  | 15    | 200           | \$232.00      | \$332.00  | \$266.00   | \$346.00 | \$468.00 |           |
| B215HT073  | 0.73                  | ½                  | 15    | 200           | \$232.00      | \$332.00  | \$266.00   | \$346.00 | \$468.00 |           |
| B215HT116  | 1.16                  | ½                  | 15    | 200           | \$236.00      | \$336.00  | \$268.00   | \$348.00 | \$470.00 |           |
| B215HT186  | 1.86                  | ½                  | 15    | 200           | \$236.00      | \$336.00  | \$270.00   | \$350.00 | \$472.00 |           |
| B215HT290  | 2.90                  | ½                  | 15    | 200           | \$238.00      | \$338.00  | \$272.00   | \$352.00 | \$474.00 |           |
| B215HT455*   | 4.55                  | ½                  | 15    | 200           | \$242.00      | \$342.00  | \$302.00   | \$382.00 | \$504.00 |           |
| B220HT186  | 1.86                  | ¾                  | 20    | 200           |               |           | \$302.00   | \$382.00 | \$504.00 |           |
| B220HT290  | 2.90                  | ¾                  | 20    | 200           |               |           | \$302.00   | \$382.00 | \$504.00 |           |
| B220HT464  | 4.64                  | ¾                  | 20    | 200           |               |           | \$304.00   | \$382.00 | \$504.00 |           |
| B220HT731  | 7.31                  | ¾                  | 20    | 200           |               |           | \$304.00   | \$384.00 | \$506.00 |           |
| B220HT928  | 9.28                  | ¾                  | 20    | 200           |               |           | \$306.00   | \$386.00 | \$508.00 |           |
| B220HT1320   | 13.20                 | ¾                  | 20    | 200           |               |           | \$310.00   | \$388.00 | \$530.00 |           |
| B225HT464  | 4.64                  | 1                  | 25    | 200           |               |           | \$342.00   | \$422.00 | \$544.00 |           |
| B225HT731  | 7.31                  | 1                  | 25    | 200           |               |           | \$342.00   | \$422.00 | \$544.00 |           |
| B225HT1160   | 11.60                 | 1                  | 25    | 200           |               |           | \$346.00   | \$426.00 | \$548.00 |           |
| B225HT1856   | 18.56                 | 1                  | 25    | 200           |               |           | \$346.00   | \$426.00 | \$548.00 |           |
| B225HT2800   | 28.00                 | 1                  | 25    | 200           |               |           | \$348.00   | \$428.00 | \$550.00 |           |

\*Models have modified equal percentage characteristic.

## OPTIONS (ADD TO LIST PRICE)

| Description               | LRB24-3-S |
|---------------------------|-----------|
| built-in auxiliary switch | \$66.00   |

### Valve Specifications

|                                    |   |
|------------------------------------|---|
| Service                            | potable or hot water, 60% glycol, steam   |
| Flow characteristic                | A-port equal percentage   |
| Controlable flow range             | 75°   |
| Sizes                              | ½" - 1"   |
| Type of end fitting                | NPT female ends   |
| Materials:                         |   |
| Body                               | Dezincified (DZR) brass (P-CuZn35Pb2)   |
| Ball                               | stainless steel   |
| Stem                               | stainless steel   |
| Seats                              | Tefzel®   |
| Characterizing disc                | Tefzel®   |
| Packing                            | EPDM O-rings, lubricated  |
| Pressure rating                    | 600 psi   |
| Media temp. range                  |   |
| Steam                              | 250°F   |
| Water                              | 60°F to 266°F   |
| Close off pressure                 | 200 psi   |
| Maximum differential pressure (ΔP) | 60 psi typical application<br>116 psi full open only (Model # B215HT455)<br>steam: 15 psi |
| Maximum inlet                      | steam: 15 psi   |
| Leakage                            | bubble tight 0%   |
| Cv rating                          | see chart below for values  |



### Spring Return Actuators



| ACTUATOR PART # |        | TFX24 US  | TF24-3 US   | TF24-SR US  | TF24-MFT US                                       | LF24 US   | LF24-3 US   | LF24-SR US  | LF24-MFT US                                       |
|-----------------|--------|---|---|---|---|---|---|---|---|
| Control type    |        | On/Off  | Floating  | Proportional                                      | Proportional/MFT                                  | On/Off  | Floating  | Proportional                                      | Proportional/MFT                                  |
| Running time    | Motor  | <75 seconds                                       | <95 seconds                                       | <95 seconds                                       | 150 seconds                                       | <40 to 75 seconds                                 | 150 seconds                                       | 150 seconds                                       | 150 seconds                                       |
|                 | Spring | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F | <25 seconds @ -4°F to 122°F<br><60 seconds @-22°F |
| Noise level     | Motor  | <50 dB(A)   | <35 dB(A)   | <35 dB(A)   | <35 dB(A)   | <50 dB(A)   | <30 dB(A)   | <30 dB(A)   | <30 dB(A)   |
|                 | Spring | <62 dB(A)   | < 62 dB(A)  | <62 dB(A)   | <62 dB(A)   | <62 dB(A)   | <62 dB(A)   | <62 dB(A)   | <62 dB(A)   |

### ELECTRICAL CONNECTION:

3 ft. cable, ½" conduit fitting

| Valve Nominal Size |           |        |       |               |  |  |  |  |  |
|--------------------|-----------|--------|-------|---------------|--|--|--|--|--|
| HTCCV Model #      | Cv Rating | Inches | DN mm | Close-Off psi |  |  |  |  |  |

### 2-WAY HIGH TEMPERATURE CCV WITH SPRING RETURN ACTUATORS

|            |       |   |    |     |          |          |          |          |          |          |          |          |
|------------|-------|---|----|-----|----------|----------|----------|----------|----------|----------|----------|----------|
| B215HT029  | 0.29  | ½ | 15 | 200 | \$336.00 | \$396.00 | \$430.00 | \$486.00 |          |          |          |          |
| B215HT046  | 0.46  | ½ | 15 | 200 | \$336.00 | \$396.00 | \$430.00 | \$486.00 |          |          |          |          |
| B215HT073  | 0.73  | ½ | 15 | 200 | \$336.00 | \$396.00 | \$430.00 | \$486.00 |          |          |          |          |
| B215HT116  | 1.16  | ½ | 15 | 200 | \$338.00 | \$398.00 | \$432.00 | \$488.00 |          |          |          |          |
| B215HT186  | 1.86  | ½ | 15 | 200 | \$338.00 | \$398.00 | \$432.00 | \$488.00 |          |          |          |          |
| B215HT290  | 2.90  | ½ | 15 | 200 | \$346.00 | \$406.00 | \$440.00 | \$496.00 |          |          |          |          |
| B215HT455* | 4.55  | ½ | 15 | 200 | \$348.00 | \$408.00 | \$442.00 | \$498.00 |          |          |          |          |
| B220HT186  | 1.86  | ¾ | 20 | 200 |          |          |          |          | \$406.00 | \$490.00 | \$522.00 | \$638.00 |
| B220HT290  | 2.90  | ¾ | 20 | 200 |          |          |          |          | \$406.00 | \$490.00 | \$522.00 | \$638.00 |
| B220HT464  | 4.64  | ¾ | 20 | 200 |          |          |          |          | \$406.00 | \$490.00 | \$522.00 | \$638.00 |
| B220HT731  | 7.31  | ¾ | 20 | 200 |          |          |          |          | \$408.00 | \$492.00 | \$526.00 | \$640.00 |
| B220HT928  | 9.28  | ¾ | 20 | 200 |          |          |          |          | \$412.00 | \$494.00 | \$528.00 | \$642.00 |
| B220HT1320 | 13.20 | ¾ | 20 | 200 |          |          |          |          | \$414.00 | \$496.00 | \$530.00 | \$644.00 |
| B225HT464  | 4.64  | 1 | 25 | 200 |          |          |          |          | \$470.00 | \$554.00 | \$584.00 | \$698.00 |
| B225HT731  | 7.31  | 1 | 25 | 200 |          |          |          |          | \$470.00 | \$554.00 | \$584.00 | \$698.00 |
| B225HT1160 | 11.60 | 1 | 25 | 200 |          |          |          |          | \$474.00 | \$558.00 | \$588.00 | \$702.00 |
| B225HT1856 | 18.56 | 1 | 25 | 200 |          |          |          |          | \$484.00 | \$558.00 | \$588.00 | \$702.00 |
| B225HT2800 | 28.00 | 1 | 25 | 200 |          |          |          |          | \$476.00 | \$560.00 | \$590.00 | \$704.00 |

\*Models have modified equal percentage characteristic.

### OPTIONS (ADD TO LIST PRICE ABOVE)

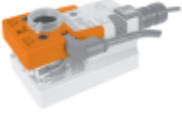
|                                   | TFX24-S US  | TF24-3-S US  | TF24-SR-S US | TF24-MFT-S US | LF24-S US    | LF24-3-S US   | LF24-SR-S US | LF24-MFT-S US |
|-----------------------------------|-------------|--------------|--------------|---------------|--------------|---------------|--------------|---------------|
| built-in auxiliary switch         | \$52.00     | \$52.00      |              |               | \$54.00      |               |              |               |
| 120 VAC power supply              |             |              |              |               |              |               |              |               |
| OPTIONS (ADD TO LIST PRICE ABOVE) | TFX120-S US | TF24-SR-S US | TF120-S US   | TF24-3-S US   | TF24-SR-S US | TF24-MFT-S US | TF120 US     | TF24-SR-S US  |
| built-in auxiliary switch         | \$94.00     | \$52.00      | \$86.00      | \$54.00       | \$54.00      | \$54.00       | \$32.00      | \$54.00       |
| OPTIONS (ADD TO LIST PRICE ABOVE) | TFX120 US   | TF120 US     | TF120 US     | TF120 US      | TF120 US     | TF120 US      | TF120 US     | TF120 US      |
| 120 VAC power supply              | \$42.00     |              |              |               |              |               |              |               |

Note: For TF actuators, weather shield are not available at this time.

# Valve Accessories

HTCCV



| AUXILIARY SWITCHES & POTENTIOMETERS   | Non-Spring Return |            |
|---|-------------------|------------|
|   | LR                | List Price |
|  <p><b>S1A</b><br/>Auxiliary switch - 1x SPDT, 3A<br/>(0.5A Inductive) @ 250 VAC</p> <p><b>S2A</b><br/>Auxiliary switch - 1x SPDT, 3A<br/>(0.5A Inductive) @ 250 VAC</p> <p><b>P140A</b><br/>Feedback potentiometer 140 Ω</p> <p><b>P500A</b><br/>Feedback potentiometer 500 Ω</p> <p><b>P1000A</b><br/>Feedback potentiometer 1000 Ω</p> <p><b>P2800A</b><br/>Feedback potentiometer 2800 Ω</p> <p><b>P5000A</b><br/>Feedback potentiometer 5000 Ω</p> <p><b>P10000A</b><br/>Feedback potentiometer 10000 Ω</p> | •                 | \$74.00    |
|   | •                 | \$110.00   |
|   | •                 | \$116.00   |
|   | •                 | \$116.00   |
|   | •                 | \$116.00   |
|   | •                 | \$116.00   |
|   | •                 | \$116.00   |
|   | •                 | \$116.00   |

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