

### Butterfly Valve with Lug types

- Disc 304 stainless steel
- Bubble tight shut-off
- Resilient seat
- Valve face-to-face dimensions comply with API 609 & MSS-SP-67
- Completely assembled and tested, ready for installation



5-year warranty

### Type overview

| Type   | DN |
|--------|----|
| F650HD | 50 |

### Technical data

|                    |                          |                                                |
|--------------------|--------------------------|------------------------------------------------|
| Functional data    | Valve size [mm]          | 2" [50]                                        |
|                    | Fluid                    | chilled or hot water, up to 60% glycol         |
|                    | Fluid Temp Range (water) | -22...250°F [-30...120°C]                      |
|                    | Body Pressure Rating     | ANSI Class Consistent with 125, 232 psi CWP    |
|                    | Close-off pressure Δps   | 200 psi                                        |
|                    | Flow characteristic      | modified equal percentage                      |
|                    | Leakage rate             | 0% leakage, leakage rateA                      |
|                    | Pipe connection          | Flange<br>for use with ASME/ANSI class 125/150 |
|                    | Servicing                | maintenance-free                               |
|                    | Flow Pattern             | 2-way                                          |
|                    | Controllable flow range  | 90° rotation                                   |
|                    | Cv                       | 115                                            |
|                    | Maximum Velocity         | 12 FPS                                         |
|                    | Lug threads              | 5/8-11 UNC                                     |
| Materials          | Valve body               | Ductile cast iron ASTM A536                    |
|                    | Body finish              | epoxy powder coating (blue RAL 5002)           |
|                    | Stem                     | 416 stainless steel                            |
|                    | Stem seal                | EPDM (lubricated)                              |
|                    | Seat                     | EPDM                                           |
|                    | Bearing                  | RPTFE                                          |
| Suitable actuators | Disc                     | 304 stainless steel                            |
|                    | Non Fail-Safe            | ARB(X)<br>GRB(X)                               |
|                    | Spring                   | AFRB(X)                                        |

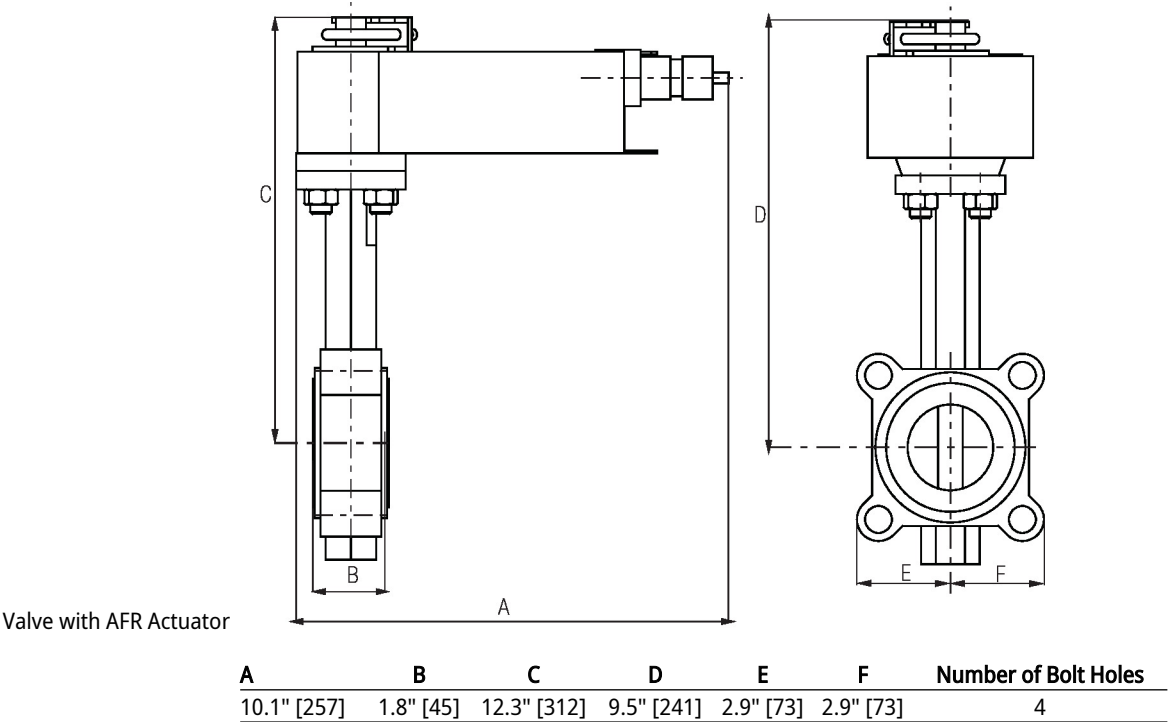
Product features

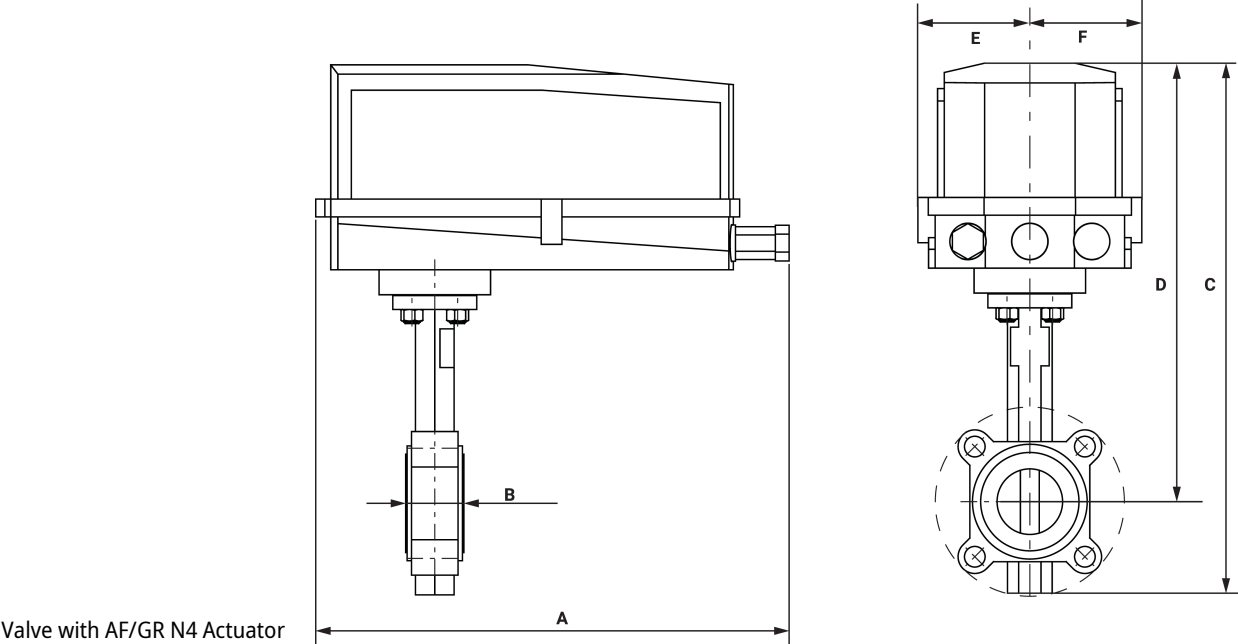
Flow/Mounting details



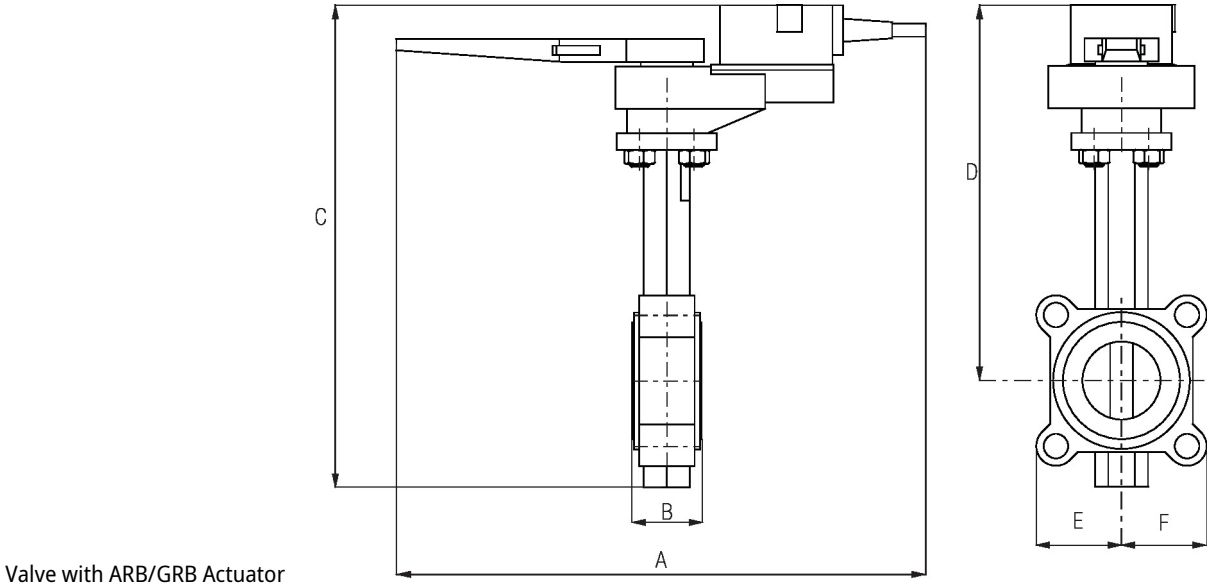
Dimensions

| Type   | DN | Weight         |
|--------|----|----------------|
| F650HD | 50 | 12 lb [5.3 kg] |

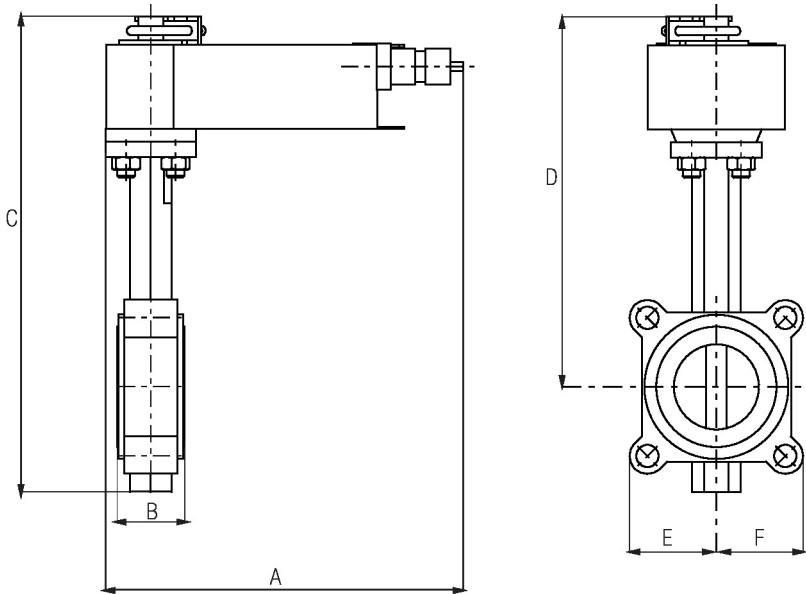




| A           | B         | C           | D           | E         | F         | Number of Bolt Holes |
|-------------|-----------|-------------|-------------|-----------|-----------|----------------------|
| 14.5" [368] | 1.8" [45] | 16.1" [409] | 13.3" [338] | 3.4" [86] | 3.4" [86] | 4                    |

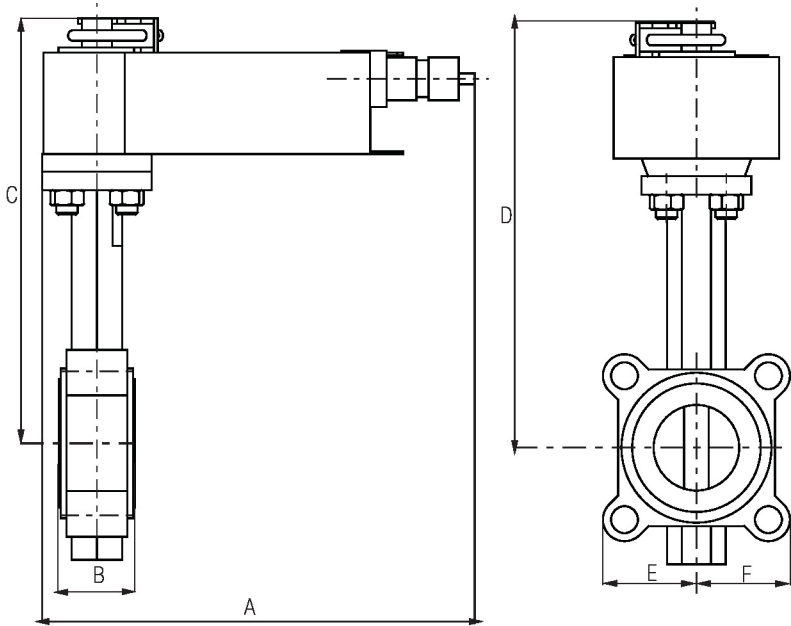


| A           | B         | C           | D          | E         | F         | Number of Bolt Holes |
|-------------|-----------|-------------|------------|-----------|-----------|----------------------|
| 14.6" [370] | 1.8" [45] | 12.4" [314] | 9.7" [246] | 2.9" [73] | 2.9" [73] | 4                    |



Valve with AFB/AFX Actuator

| A           | B         | C           | D           | E         | F         | Number of Bolt Holes |
|-------------|-----------|-------------|-------------|-----------|-----------|----------------------|
| 10.1" [257] | 1.8" [45] | 15.1" [384] | 12.4" [315] | 2.9" [73] | 2.9" [73] | 4                    |

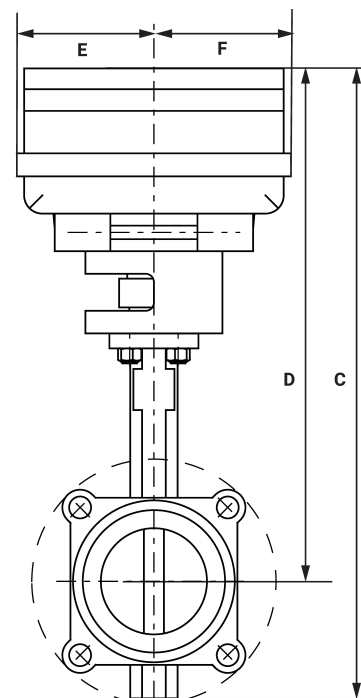
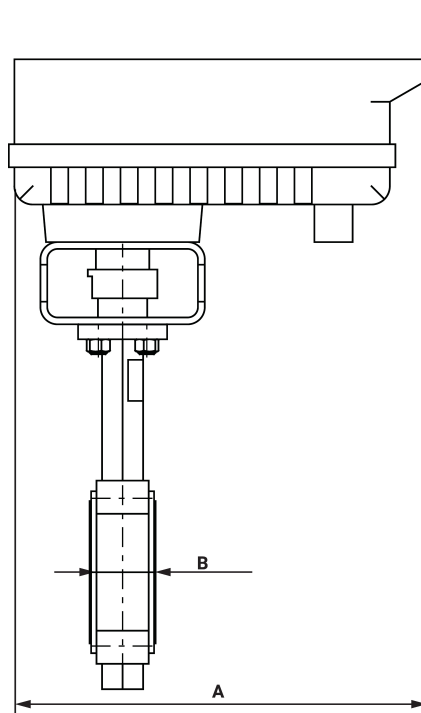


Valve with AMB/AMX Actuator

| A          | B         | C           | D           | E         | F         | Number of Bolt Holes |
|------------|-----------|-------------|-------------|-----------|-----------|----------------------|
| 8.3" [211] | 1.8" [45] | 15.1" [384] | 12.4" [315] | 2.9" [73] | 2.9" [73] | 4                    |

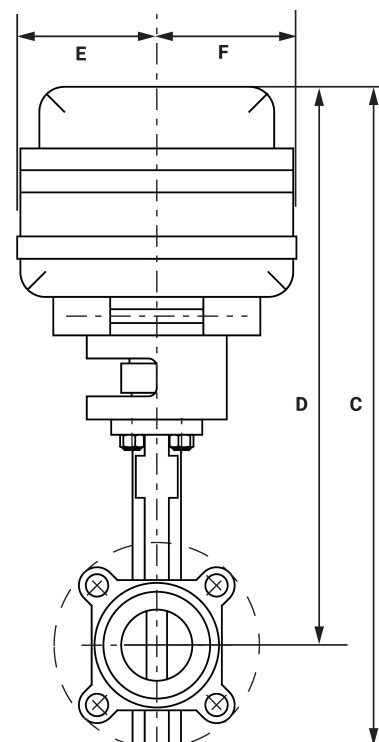
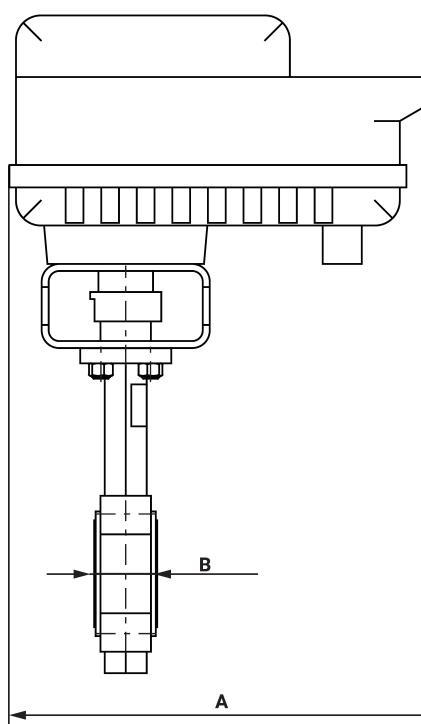
## Dimensions

Valve with PR Actuator



| A           | B         | C           | D           | E          | F          | Number of Bolt Holes |
|-------------|-----------|-------------|-------------|------------|------------|----------------------|
| 12.0" [304] | 1.8" [45] | 16.7" [425] | 13.9" [354] | 3.9" [100] | 3.9" [100] | 4                    |

Valve with PK Actuator



| A           | B         | C           | D           | E          | F          | Number of Bolt Holes |
|-------------|-----------|-------------|-------------|------------|------------|----------------------|
| 12.0" [304] | 1.8" [45] | 18.5" [470] | 15.7" [399] | 3.9" [100] | 3.9" [100] | 4                    |
| A           | B         | C           | D           | E          | F          | Number of Bolt Holes |
| 10.8" [275] | 1.8" [45] | 13.0" [330] | 10.2" [260] | 2.9" [73]  | 2.9" [73]  | 4                    |

MFT/programmable, Non fail-safe, 24 V



5-year warranty



## Technical data

|                 |                                    |                                                                                                          |
|-----------------|------------------------------------|----------------------------------------------------------------------------------------------------------|
| Electrical data | Nominal voltage                    | AC/DC 24 V                                                                                               |
|                 | Nominal voltage frequency          | 50/60 Hz                                                                                                 |
|                 | Nominal voltage range              | AC 19.2...28.8 V / DC 21.6...28.8 V                                                                      |
|                 | Power consumption in operation     | 3.5 W                                                                                                    |
|                 | Power consumption in rest position | 1.3 W                                                                                                    |
|                 | Transformer sizing                 | 6 VA                                                                                                     |
|                 | Electrical Connection              | 18 GA plenum cable, 1 m, 3 m, or 5 m with 1/2" NPT conduit connector, degree of protection NEMA 2 / IP54 |
|                 | Overload Protection                | electronic throughout 0...90° rotation                                                                   |
| Functional data | Operating range Y                  | 2...10 V                                                                                                 |
|                 | Operating range Y note             | 4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)                                                              |
|                 | Input impedance                    | 100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA, 1500 Ω for PWM, On/Off and Floating point             |
|                 | Operating range Y variable         | Start point 0.5...30 V<br>End point 2.5...32 V                                                           |
|                 | Operating modes optional           | variable (VDC, on/off, floating point)                                                                   |
|                 | Position feedback U                | 2...10 V                                                                                                 |
|                 | Position feedback U note           | Max. 0.5 mA                                                                                              |
|                 | Position feedback U variable       | VDC variable                                                                                             |
|                 | Direction of motion motor          | selectable with switch 0/1                                                                               |
|                 | Manual override                    | external push button                                                                                     |
|                 | Angle of rotation                  | 90°                                                                                                      |
|                 | Angle of rotation note             | adjustable with mechanical stop                                                                          |
|                 | Running Time (Motor)               | 150 s / 90°                                                                                              |
|                 | Running time motor variable        | 90...150 s                                                                                               |
|                 | Noise level, motor                 | 45 dB(A)                                                                                                 |
|                 | Position indication                | Mechanical, pluggable                                                                                    |
| Safety data     | Power source UL                    | Class 2 Supply                                                                                           |
|                 | Degree of protection IEC/EN        | IP54                                                                                                     |
|                 | Degree of protection NEMA/UL       | NEMA 2                                                                                                   |
|                 | Enclosure                          | UL Enclosure Type 2                                                                                      |
|                 | Agency Listing                     | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU                               |
|                 | Quality Standard                   | ISO 9001                                                                                                 |

## Technical data

|                    |                     |                                                                                             |
|--------------------|---------------------|---------------------------------------------------------------------------------------------|
| <b>Safety data</b> | UL 2043 Compliant   | Suitable for use in air plenums per Section 300.22(C) of the NEC and Section 602 of the IMC |
|                    | Ambient humidity    | Max. 95% RH, non-condensing                                                                 |
|                    | Ambient temperature | -22...122°F [-30...50°C]                                                                    |
|                    | Storage temperature | -40...176°F [-40...80°C]                                                                    |
|                    | Servicing           | maintenance-free                                                                            |
| <b>Weight</b>      | Weight              | 2.0 lb [0.92 kg]                                                                            |
| <b>Materials</b>   | Housing material    | Galvanized steel and plastic housing                                                        |

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

## Accessories

|                               |                                                                                                                                       |             |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Gateways</b>               | <b>Description</b>                                                                                                                    | <b>Type</b> |
|                               | Gateway MP to BACnet MS/TP                                                                                                            | UK24BAC     |
|                               | Gateway MP to Modbus RTU                                                                                                              | UK24MOD     |
| <b>Electrical accessories</b> | Gateway MP to LonWorks                                                                                                                | UK24LON     |
|                               | <b>Description</b>                                                                                                                    | <b>Type</b> |
|                               | Battery backup system, for non-spring return models                                                                                   | NSV24 US    |
|                               | Battery, 12 V, 1.2 Ah (two required)                                                                                                  | NSV-BAT     |
|                               | Service tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US      |
| <b>Tools</b>                  | <b>Description</b>                                                                                                                    | <b>Type</b> |
|                               | Connecting cable 10 ft [3 m], A: RJ11 6/4 ZTH EU, B: 3-pin Weidmüller and supply connection                                           | ZK4-GEN     |
|                               | Service tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US      |

## Electrical installation

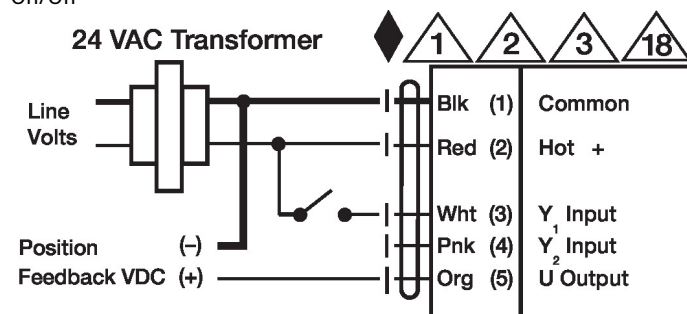
 **INSTALLATION NOTES**

-  1 Provide overload protection and disconnect as required.
-  2 Actuators may be connected in parallel. Power consumption and input impedance must be observed.
-  3 Actuators may also be powered by DC 24 V.
-  5 Only connect common to negative (-) leg of control circuits.
-  7 A 500 Ω resistor (ZG-R01) converts the 4...20 mA control signal to 2...10 V.
-  8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 V line.
-  10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.
-  12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).
-  18 Actuators with plenum cable do not have numbers; use color codes instead.
-  Meets cULus requirements without the need of an electrical ground connection.
-  **Warning! Live electrical components!**  
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

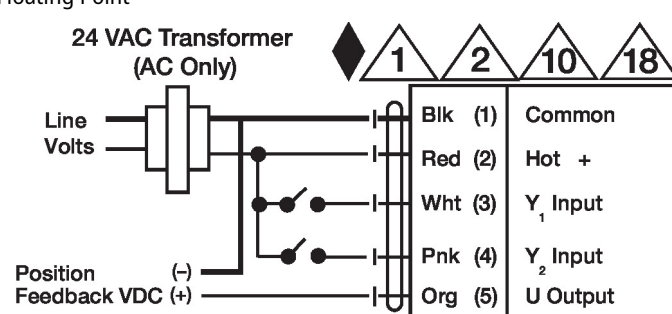
### Electrical installation

#### Wiring diagrams

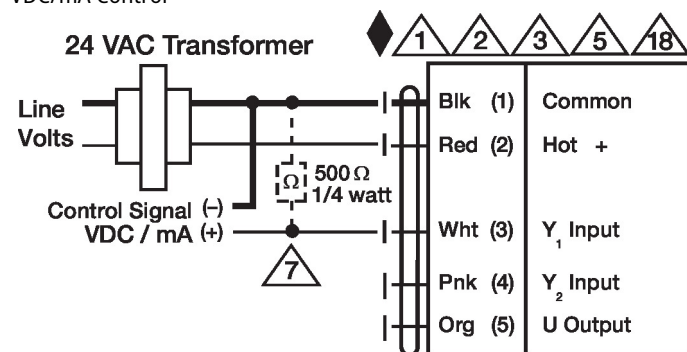
On/Off



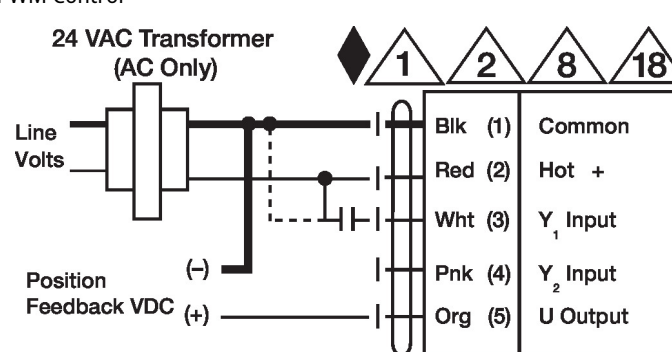
Floating Point



VDC/mA Control



PWM Control



Override Control

