

# F6 Series 2-Way, ANSI Class 150 Butterfly Valve Reinforced Teflon Seat, 316 Stainless Disc



- Bubble tight shut-off to ANSI Class 150 Standards
- Long stem design allows for 2" insulation minimum
- Valve Face-to-face dimensions comply with API 609 & MSS-SP-68
- Designed to be installed between ASME/ANSI B16.5 Flanges
- Completely assembled and tested, ready for installation

## Application

These valves are designed to meet the needs of HVAC and Commercial applications requiring positive shut-off for liquids at higher pressures and temperatures. Typical applications include chiller isolation, cooling tower isolation, change-over systems, large air handler coil control, bypass and process control applications. The large C<sub>v</sub> values provide for an economical control valve solution for larger flow applications.

## Dead End Service

Utilizes larger retainer ring set screws to allow the valve to be placed at the end of the line without a down stream flange in either flow direction while still holding full pressure.

| Technical Data          |                                                 |
|-------------------------|-------------------------------------------------|
| Service                 | chilled, hot water, 60% glycol, steam to 50 psi |
| Flow characteristic     | modified equal percentage, unidirectional       |
| Controllable flow range | 82°                                             |
| Sizes                   | 2" to 24"                                       |
| Type of end fitting     | for use with ASME/class 125/150 flange          |
| Materials               |                                                 |
| Body                    | carbon steel full lug                           |
| Disc                    | 316 stainless steel                             |
| Seat                    | RPTFE                                           |
| Shaft                   | 17-4 PH stainless                               |
| Gland seal              | PTFE                                            |
| Bushings                | glass backed PTFE                               |
| Media temperature range | -20°F to 400°F [-30°C to 204°C]                 |
| Body pressure rating    | ANSI Class 150                                  |
| Close-off pressure      | 285 psi                                         |
| Rangeability            | 100:1 (for 30 deg to 70 deg range)              |
| Maximum velocity        | 32 FPS                                          |
| Leakage                 | bubble tight                                    |

|                    |                    | 2-way Valves       |                | Suitable Actuators          |           |               |            |           |  |
|--------------------|--------------------|--------------------|----------------|-----------------------------|-----------|---------------|------------|-----------|--|
|                    |                    | Valve Nominal Size | Type           | Non Fail-Safe               |           | Fail-Safe     |            |           |  |
|                    |                    |                    |                |                             |           | Spring Return | Electronic |           |  |
| C <sub>v</sub> 90° | C <sub>v</sub> 60° | Inches             | ANSI 150 2-way | 150                         |           | 150           |            | 150       |  |
| 102                | 56                 | 2                  | F650-150SHP    | GM Series                   | PR Series | AF Series     |            | GK Series |  |
| 146                | 80                 | 2½                 | F665-150SHP    |                             |           |               |            |           |  |
| 228                | 125                | 3                  | F680-150SHP    |                             |           |               |            |           |  |
| 451                | 248                | 4                  | F6100-150SHP   |                             |           |               |            |           |  |
| 714                | 392                | 5                  | F6125-150SHP   | SY Series (2 Year Warranty) |           |               |            | PKR       |  |
| 1103               | 607                | 6                  | F6150-150SHP   |                             |           |               |            |           |  |
| 2064               | 1135               | 8                  | F6200-150SHP   |                             |           |               |            |           |  |
| 3517               | 1934               | 10                 | F6250-150SHP   |                             |           |               |            |           |  |
| 4837               | 2660               | 12                 | F6300-150SHP   |                             |           |               |            |           |  |
| 6857               | 3592               | 14*                | F6350-150SHP   |                             |           |               |            |           |  |
| 9287               | 4865               | 16*                | F6400-150SHP   |                             |           |               |            |           |  |
| 11400              | 6270               | 18*                | F6450-150SHP   |                             |           |               |            |           |  |
| 14420              | 7590               | 20*                | F6500-150SHP   |                             |           |               |            |           |  |
| 22050              | 11550              | 24*                | F6600-150SHP   |                             |           |               |            |           |  |

| Valve        | Size | C <sub>v</sub> | MOD  |      |      |      |      |       |       |       | ON/OFF |  |
|--------------|------|----------------|------|------|------|------|------|-------|-------|-------|--------|--|
|              |      |                | 10°  | 20°  | 30°  | 40°  | 50°  | 60°   | 70°   | 80°   | 90°    |  |
| F650-150SHP  | 2"   | 102            | 1.50 | 6.10 | 14   | 26   | 39   | 56    | 77    | 99    | 102    |  |
| F665-150SHP  | 2½"  | 146            | 2.20 | 8.80 | 20   | 37   | 55   | 80    | 110   | 142   | 146    |  |
| F680-150SHP  | 3"   | 228            | 3.40 | 14   | 32   | 57   | 87   | 125   | 171   | 221   | 228    |  |
| F6100-150SHP | 4"   | 451            | 6.80 | 27   | 63   | 114  | 171  | 248   | 338   | 437   | 451    |  |
| F6125-150SHP | 5"   | 714            | 11   | 43   | 100  | 180  | 271  | 393   | 536   | 693   | 714    |  |
| F6150-150SHP | 6"   | 1103           | 17   | 66   | 154  | 278  | 419  | 607   | 827   | 1070  | 1103   |  |
| F6200-150SHP | 8"   | 2064           | 31   | 124  | 289  | 520  | 784  | 1135  | 1548  | 2002  | 2064   |  |
| F6250-150SHP | 10"  | 3517           | 53   | 211  | 492  | 886  | 1336 | 1934  | 2638  | 3411  | 3517   |  |
| F6300-150SHP | 12"  | 4837           | 73   | 290  | 677  | 1219 | 1838 | 2660  | 3628  | 4692  | 4837   |  |
| F6350-150SHP | 14"  | 6857           | 90   | 392  | 914  | 1646 | 2481 | 3592  | 4898  | 6530  | 6857   |  |
| F6400-150SHP | 16"  | 9287           | 132  | 531  | 1230 | 2229 | 3361 | 4865  | 6634  | 8845  | 9287   |  |
| F6450-150SHP | 18"  | 11400          | 171  | 684  | 1596 | 3873 | 4332 | 6270  | 8550  | 11270 | 11400  |  |
| F6500-150SHP | 20"  | 14420          | 207  | 828  | 1932 | 3478 | 5244 | 7590  | 10350 | 13800 | 14420  |  |
| F6600-150SHP | 24"  | 22050          | 315  | 1260 | 2940 | 5292 | 7890 | 11550 | 15750 | 21000 | 22050  |  |

## Maximum Dimensions (Inches)

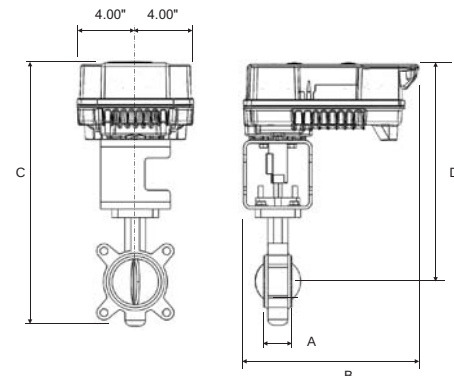
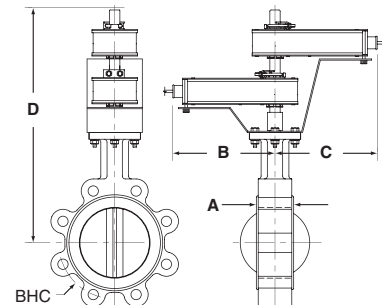
| Valve        | Size | C <sub>v</sub> 90° | A    | B     | C     | D(Max) | BHC   | No. of Holes | Lug Bolt    | Actuator | Close-Off (PSI) |                                            |
|--------------|------|--------------------|------|-------|-------|--------|-------|--------------|-------------|----------|-----------------|--------------------------------------------|
| F650-150SHP  | 2"   | 102                | 1.75 | 9.00  | 9.00  | 19.50  | 4.75  | 4            | 5/8-11 UNC  | 2*AF     | 150             | Spring Return                              |
| F665-150SHP  | 2½"  | 146                | 1.88 | 9.00  | 9.00  | 20.00  | 5.50  | 4            | 5/8-11 UNC  |          | 150             |                                            |
| F680-150SHP  | 3"   | 228                | 1.92 | 9.00  | 9.00  | 20.50  | 6.00  | 4            | 5/8-11 UNC  |          | 150             |                                            |
| F6100-150SHP | 4"   | 451                | 2.13 | 9.00  | 9.00  | 21.00  | 7.50  | 8            | 5/8-11 UNC  |          | 150             |                                            |
| F650-150SHP  | 2"   | 102                | 1.75 | 9.00  | 9.00  | 19.50  | 4.75  | 4            | 5/8-11 UNC  | GK       | 285             | Electronic Fail-Safe                       |
| F665-150SHP  | 2½"  | 146                | 1.88 | 9.00  | 9.00  | 20.00  | 5.50  | 4            | 5/8-11 UNC  |          | 285             |                                            |
| F680-150SHP  | 3"   | 228                | 1.92 | 9.00  | 9.00  | 20.50  | 6.00  | 4            | 5/8-11 UNC  |          | 285             |                                            |
| F6100-150SHP | 4"   | 451                | 2.13 | 9.00  | 9.00  | 21.00  | 7.50  | 8            | 5/8-11 UNC  |          | 150             |                                            |
| F6100-150SHP | 4"   | 451                | 2.13 | 9.00  | 9.00  | 21.00  | 7.50  | 8            | 5/8-11 UNC  | 2*GK     | 285             | Non-Spring Return Electronic Fail-Safe (K) |
| F650-150SHP  | 2"   | 102                | 1.75 | 9.00  | 9.00  | 19.50  | 4.75  | 4            | 5/8-11 UNC  | GM       | 285             |                                            |
| F665-150SHP  | 2½"  | 146                | 1.88 | 9.00  | 9.00  | 20.00  | 5.50  | 4            | 5/8-11 UNC  |          | 285             |                                            |
| F680-150SHP  | 3"   | 228                | 1.92 | 9.00  | 9.00  | 20.50  | 6.00  | 4            | 5/8-11 UNC  |          | 285             |                                            |
| F6100-150SHP | 4"   | 451                | 2.13 | 9.00  | 9.00  | 21.00  | 7.50  | 8            | 5/8-11 UNC  |          | 150             |                                            |
| F6100-150SHP | 4"   | 451                | 2.13 | 9.00  | 9.00  | 21.00  | 7.50  | 8            | 5/8-11 UNC  | 2*GM     | 285             |                                            |
| F650-150SHP  | 2"   | 102                | 1.75 | 10.00 | 15.00 | 14.00  | 4.75  | 4            | 5/8-11 UNC  | PR/PK    | 285             |                                            |
| F665-150SHP  | 2½"  | 146                | 1.88 | 10.00 | 16.00 | 14.00  | 5.50  | 4            | 5/8-11 UNC  |          | 285             |                                            |
| F680-150SHP  | 3"   | 228                | 1.92 | 10.00 | 17.00 | 15.00  | 6.00  | 4            | 5/8-11 UNC  |          | 285             |                                            |
| F6100-150SHP | 4"   | 451                | 2.13 | 10.00 | 18.00 | 16.00  | 7.50  | 8            | 5/8-11 UNC  |          | 285             |                                            |
| F6125-150SHP | 5"   | 714                | 2.25 | 10.00 | 19.00 | 16.00  | 8.50  | 8            | 3/4-10 UNC  | SY4...   | 285             |                                            |
| F6150-150SHP | 6"   | 1103               | 2.29 | 10.00 | 20.00 | 17.00  | 9.50  | 8            | 3/4-10 UNC  |          | 285             |                                            |
| F6200-150SHP | 8"   | 2064               | 2.50 | 12.00 | 12.00 | 32.00  | 11.75 | 8            | 3/4-10 UNC  |          | 285             |                                            |
| F6250-150SHP | 10"  | 3517               | 2.81 | 12.00 | 12.00 | 33.00  | 14.25 | 12           | 7/8-9 UNC   |          | 285             |                                            |
| F6300-150SHP | 12"  | 4837               | 3.23 | 12.00 | 12.00 | 35.00  | 17.00 | 12           | 7/8-9 UNC   | SY4...   | 150             |                                            |
|              |      |                    |      |       |       |        |       |              |             | SY5...   | 285             |                                            |
|              |      |                    |      |       |       |        |       |              |             | SY5...   | 150             |                                            |
|              |      |                    |      |       |       |        |       |              |             | SY7...   | 150             |                                            |
| F6350-150SHP | 14"  | 6857               | 3.62 | 14.00 | 14.00 | 36.00  | 18.75 | 12           | 1-8 UNC     | SY8...   | 285             |                                            |
| F6400-150SHP | 16"  | 9287               | 4.00 | 14.00 | 14.00 | 37.50  | 21.25 | 16           | 1-8 UNC     | SY7...   | 150             |                                            |
| F6450-150SHP | 18"  | 11400              | 4.50 | 14.00 | 14.00 | 42.25  | 22.75 | 16           | 1 1/8-8 UNC | SY8...   | 285             |                                            |
| F6500-150SHP | 20"  | 14420              | 5.00 | 14.00 | 14.00 | 49.50  | 25.00 | 20           | 1 1/8-8 UNC | SY8...   | 150             |                                            |
|              |      |                    |      |       |       |        |       |              |             | SY10...  | 285             |                                            |
| F6600-150SHP | 24"  | 22050              | 6.06 | 14.00 | 14.00 | 56.25  | 29.50 | 20           | 1 1/4-8 UNC | SY10...  | 150             |                                            |

Dimension "A" does not include flange gaskets. (2 required per valve)

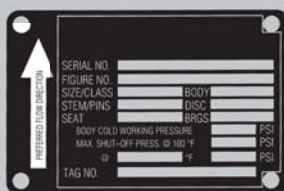
## Application Notes

- Valves are rated at 285 psi differential pressure in the closed position @ 100°F media temperature.
- Valves are furnished with lugs tapped for use between ANSI Class 125/150 flanges conforming to ANSI B16.5 Standards.
- 2-way assemblies are furnished assembled, calibrated and tested, ready for installation.
- Dimension "D" allows for actuator(s) removal without the need to remove the valve from the pipe.
- Weather shields are available, dimensional data furnished upon request.
- Flange gaskets (2 required, not provided with valve) MUST be used between valve and ANSI flange.
- Flange bolts are not included with the valve. These are furnished by others.

## Dimensions



**SHP series valves have a preferred flow direction.**



Preferred Flowrate



5-year warranty



## Technical data

|                        |                                     |                                                                                                   |
|------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Electrical data</b> | Nominal voltage                     | AC 24...240 V / DC 24...125 V                                                                     |
|                        | Nominal voltage frequency           | 50/60 Hz                                                                                          |
|                        | Power consumption in operation      | 20 W                                                                                              |
|                        | Power consumption in rest position  | 6 W                                                                                               |
|                        | Transformer sizing                  | 20 VA @ AC/DC 24 V (class 2 power source), 23 VA @ AC/DC 120 V, 52 VA @ AC 230 V                  |
|                        | Auxiliary switch                    | 2 x SPDT, 3 A resistive (0.5 A inductive) @ AC 250 V, 1 x 10° / 1 x 0...90° (default setting 85°) |
|                        | Switching capacity auxiliary switch | 3 A resistive (0.5 A inductive) @ AC 250 V                                                        |
|                        | Electrical Connection               | Terminal blocks, (PE) Ground-Screw                                                                |
|                        | Overload Protection                 | electronic throughout 0...90° rotation                                                            |
| <b>Functional data</b> | Communicative control               | BACnet MS/TP<br>Modbus RTU<br>MP-Bus                                                              |
|                        | Operating range Y                   | 2...10 V                                                                                          |
|                        | Operating range Y note              | 4...20 mA                                                                                         |
|                        | Input Impedance                     | 100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA, 1500 Ω for On/Off                              |
|                        | Operating range Y variable          | Start point 0.5...30 V<br>End point 2.5...32 V                                                    |
|                        | Options positioning signal          | 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           | reversible with app                                                                               |
|                        | Manual override                     | 7 mm hex crank, supplied                                                                          |
|                        | Angle of rotation                   | 90°                                                                                               |
|                        | Running Time (Motor)                | default 35 s, variable 30...120 s                                                                 |
|                        | Running time motor variable         | 30...120 s                                                                                        |
|                        | Noise level, motor                  | 68 dB(A)                                                                                          |
|                        | Position indication                 | integral pointer                                                                                  |
|                        | Passive sensor inputs               | 2x (Pt1000, Ni1000, NTC10k2)                                                                      |
| <b>Safety data</b>     | Degree of protection IEC/EN         | IP66/67                                                                                           |
|                        | Degree of protection NEMA/UL        | NEMA 4X                                                                                           |
|                        | Enclosure                           | UL Enclosure Type 4X                                                                              |
|                        | Agency Listing                      | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU and 2014/35/EU         |
|                        | Quality Standard                    | ISO 9001                                                                                          |
|                        | Ambient temperature                 | -22...122°F [-30...50°C]                                                                          |

|                    |                     |                                       |
|--------------------|---------------------|---------------------------------------|
| <b>Safety data</b> | Storage temperature | -40...176°F [-40...80°C]              |
|                    | Ambient humidity    | Max. 100% RH                          |
|                    | Servicing           | maintenance-free                      |
| <b>Weight</b>      | Weight              | 13 lb [5.9 kg]                        |
| <b>Materials</b>   | Housing material    | Die cast aluminium and plastic casing |

## Product features

- Application** PR Series valve actuators are designed with an integrated linkage and visual position indicators. For outdoor applications, the installed valve must be mounted with the actuator at or above horizontal. For indoor applications the actuator can be in any location including directly under the valve.
- Operation** The PR series actuator provides 90° of rotation and a visual indicator shows the position of the valve. The PR Series actuator uses a low power consumption brushless DC motor and is electronically protected against overload. A universal power supply is furnished to connect supply voltage in the range of AC 24...240 V and DC 24...125 V. Included is a smart heater with thermostat to eliminate condensation. Two auxiliary switches are provided; one set at 10° open and the other is field adjustable. Running time is field adjustable from 30...120 seconds by using the Near Field Communication (NFC) app and a smart phone.
- †Use 60°C/75°C copper wire size range 12...28 AWG, stranded or solid. Use flexible metal conduit. Push the listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuators input wiring with listed flexible conduit. Properly terminate the conduit in a suitable junction box. Rated impulse Voltage 4000 V. Type of 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 LonWorks                                                                                                                | UK24LON     |
| <b>Electrical accessories</b> | Gateway MP to Modbus RTU                                                                                                              | UK24MOD     |
|                               | <b>Description</b>                                                                                                                    | <b>Type</b> |
|                               | Service Tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US      |
| <b>Mechanical accessories</b> | <b>Description</b>                                                                                                                    | <b>Type</b> |
|                               | Hand crank for PR, PKR, PM                                                                                                            | ZG-HND PR   |
| <b>Service tools</b>          | <b>Description</b>                                                                                                                    | <b>Type</b> |
|                               | Connection 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      |

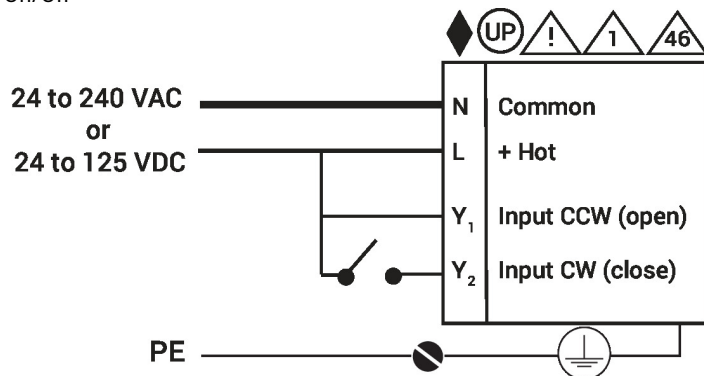
## Electrical installation

-  Meets cULus requirements without the need of an electrical ground connection.
-  Universal Power Supply (UP) models can be supplied with 24 V up to 240 V.
-  Disconnect power.
-  Provide overload protection and disconnect as required.
-  Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.
-  Only connect common to negative (-) leg of control circuits.
-  Actuators may be controlled in parallel. Current draw and input impedance must be observed.
-  **Warning! Live electrical components!**

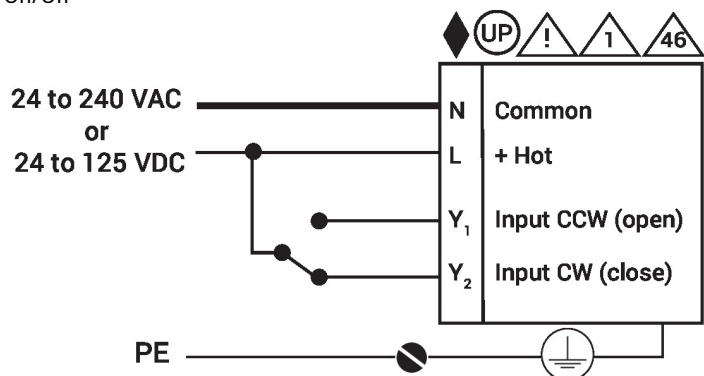
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

## Wiring diagrams

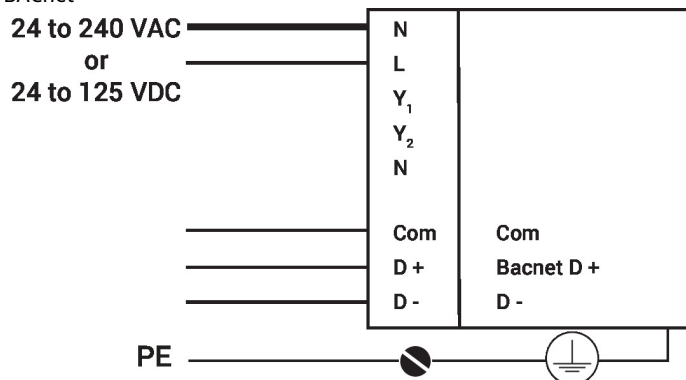
### On/Off



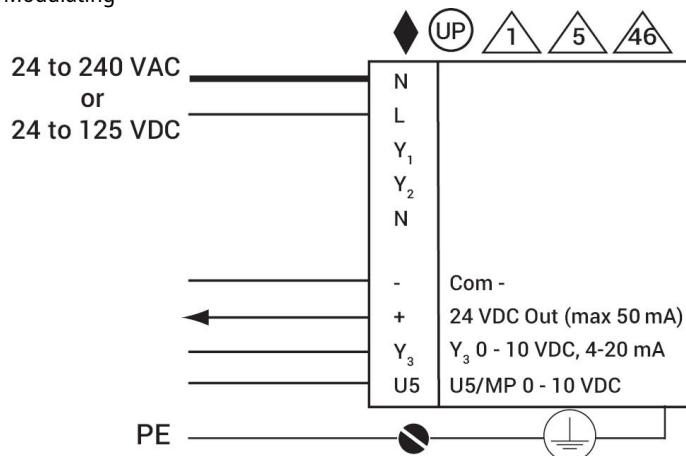
### On/Off



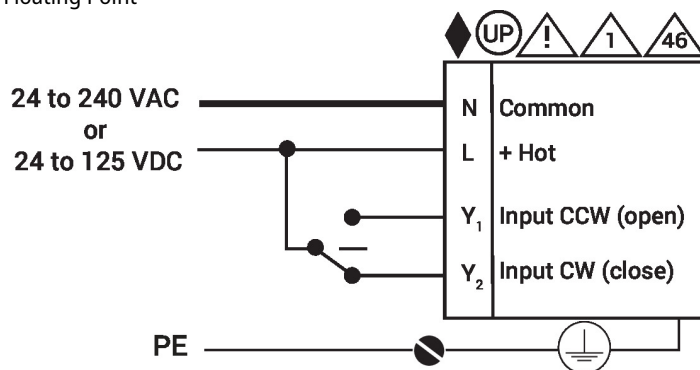
### BACnet



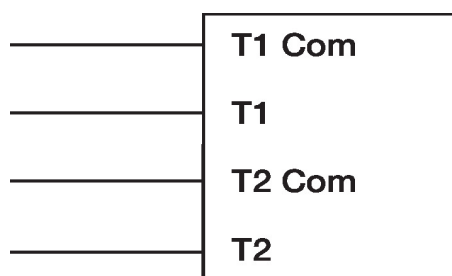
### Modulating



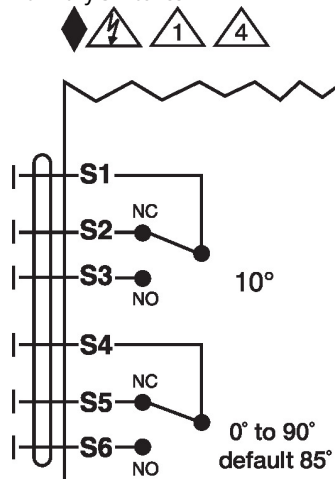
Floating Point



Temperature Sensors



Auxiliary Switches



## Dimensions

Dimensional drawings

