



| Technical Data                      |                                                        |
|-------------------------------------|--------------------------------------------------------|
| Service                             | chilled, hot water, 60% glycol                         |
| Flow characteristic                 | modified equal percentage                              |
| Action                              | 90° rotation                                           |
| Sizes                               | 2" to 30"                                              |
| Type of end fitting                 | for use with ANSI 125/150 flanges                      |
| Materials                           |                                                        |
| Body                                | ductile iron ASTM A536                                 |
| Body finish                         | epoxy powder coated                                    |
| Disc                                | 304 stainless steel                                    |
| Seat                                | EPDM standard                                          |
| Shaft                               | 416 stainless steel                                    |
| O-ring                              | EPDM                                                   |
| Upper bushing                       | RPTFE                                                  |
| Middle bushings                     | RPTFE                                                  |
| Lower bushing                       | RPTFE                                                  |
| Media temperature range             | -22°F to 250°F [-30°C to 120°C]                        |
| Operation ambient temperature range | -22°F to 122°F [-30°C to 50°C]                         |
| Body pressure rating                | ASME/ANSI Class 125/150<br>(200 psi at -30°F to 275°F) |
| Close-off pressure                  | 200 psi (2"-12"), 150 psi (14"-30")                    |
| Rangeability                        | 10:1 (for 30° to 70° range)                            |
| Maximum velocity                    | 12 FPS                                                 |

- 200 psi (2" to 12") and 150 psi (14"-30") bubble tight shut-off
- Long stem design allows for 2" insulation
- Valve face-to-face dimensions comply with API 609 & MSS-SP-67
- Completely assembled and tested, ready for installation

## Application

These valves are designed to meet the needs of HVAC and commercial applications requiring bubble tight shut-off for liquids. Typical applications include chiller isolation, cooling tower isolation, change-over systems, large air handler coil control, bypass and process control applications. The large  $C_v$  values provide for an economical control valve solution for larger flow applications. Designed for use in Victaulic piping systems when mated to Victaulic 41 series flange nipples.

## Jobsite Note

Valves should be stored in a weather protected area prior to construction. Complete installation recommendations can be found in Belimo's Installation and Maintenance Instructions for F6/F7...HD/HDU Butterfly Valves.

| Valve                 |                       |     |            | Type    | Suitable Actuators |            |           |
|-----------------------|-----------------------|-----|------------|---------|--------------------|------------|-----------|
| C <sub>v</sub><br>90° | C <sub>v</sub><br>60° | IN  | DN<br>[mm] |         | Spring             | Non-Spring |           |
| 115                   | 44                    | 2"  | 50         | F650HD  | AF Series          | AM         | SY Series |
| 196                   | 75                    | 2½" | 65         | F665HD  |                    |            |           |
| 302                   | 116                   | 3"  | 80         | F680HD  |                    | GM         |           |
| 600                   | 230                   | 4"  | 100        | F6100HD |                    |            |           |
| 1022                  | 392                   | 5"  | 125        | F6125HD |                    |            |           |
| 1579                  | 605                   | 6"  | 150        | F6150HD |                    |            |           |
| 3136                  | 1202                  | 8"  | 200        | F6200HD |                    |            |           |
| 5340                  | 2047                  | 10" | 250        | F6250HD |                    |            |           |
| 8250                  | 3062                  | 12" | 300        | F6300HD |                    |            |           |
| 11917                 | 4568                  | 14" | 350        | F6350HD |                    |            |           |
| 16388                 | 6282                  | 16" | 400        | F6400HD |                    |            |           |
| 21705                 | 8320                  | 18" | 450        | F6450HD |                    |            |           |
| 27908                 | 10698                 | 20" | 500        | F6500HD |                    |            |           |
| 43116                 | 16528                 | 24" | 600        | F6600HD |                    |            |           |
| 73426                 | 28146                 | 30" | 750        | F6750HD |                    |            |           |

| Valve   | Size   | $C_v$ | MOD |      |      |      |       |       |       |       | ON/OFF |
|---------|--------|-------|-----|------|------|------|-------|-------|-------|-------|--------|
|         |        |       | 10° | 20°  | 30°  | 40°  | 50°   | 60°   | 70°   | 80°   | 90°    |
| F650HD  | 2"     | 115   | .06 | 3    | 7    | 15   | 27    | 44    | 70    | 105   | 115    |
| F665HD  | 2-1/2" | 196   | .10 | 6    | 12   | 25   | 45    | 75    | 119   | 178   | 196    |
| F680HD  | 3"     | 302   | .20 | 9    | 18   | 39   | 70    | 116   | 183   | 275   | 302    |
| F6100HD | 4"     | 600   | .30 | 17   | 36   | 78   | 139   | 230   | 364   | 546   | 600    |
| F6125HD | 5"     | 1022  | .50 | 29   | 61   | 133  | 237   | 392   | 620   | 930   | 1022   |
| F6150HD | 6"     | 1579  | .80 | 45   | 95   | 205  | 366   | 605   | 958   | 1437  | 1579   |
| F6200HD | 8"     | 3136  | 2   | 89   | 188  | 408  | 727   | 1202  | 1903  | 2854  | 3136   |
| F6250HD | 10"    | 5340  | 3   | 151  | 320  | 694  | 1237  | 2047  | 3240  | 4859  | 5340   |
| F6300HD | 12"    | 8250  | 4   | 234  | 495  | 1072 | 1911  | 3062  | 5005  | 7507  | 8250   |
| F6350HD | 14"    | 11917 | 6   | 338  | 715  | 1549 | 2761  | 4568  | 7230  | 10844 | 11917  |
| F6400HD | 16"    | 16388 | 8   | 464  | 983  | 2130 | 3797  | 6282  | 9942  | 14913 | 16388  |
| F6450HD | 18"    | 21705 | 11  | 615  | 1302 | 2822 | 5028  | 8320  | 13168 | 19752 | 21705  |
| F6500HD | 20"    | 27908 | 14  | 791  | 1674 | 3628 | 6465  | 10698 | 16931 | 25396 | 27908  |
| F6600HD | 24"    | 43116 | 22  | 1222 | 2587 | 5605 | 9989  | 16528 | 26157 | 39236 | 43116  |
| F6750HD | 30"    | 73426 | 37  | 2081 | 4405 | 9545 | 17011 | 28146 | 44545 | 66818 | 73426  |

# F6...HD Butterfly Valves 2"-30" Ductile Iron Lug Body Resilient Seat, 304 Stainless Disc



## Maximum Dimensions (Inches)

| Valve   | Size | C <sub>v</sub> 90° | C <sub>v</sub> 60° | A      | B       | C       | D(Max) | BHC   | No. of Holes | Lug Bolt   | Actuator | Close-Off (PSI) |               |
|---------|------|--------------------|--------------------|--------|---------|---------|--------|-------|--------------|------------|----------|-----------------|---------------|
| F650HD  | 2"   | 115                | 44                 | 1.65   | 9.00    | 9.00    | 19.50  | 4.75  | 4            | 5/8-11UNC  | AF       | 200             | Fail Safe     |
| F665HD  | 2½"  | 196                | 75                 | 1.76   | 9.00    | 9.00    | 20.00  | 5.50  | 4            | 5/8-11UNC  | 2*AF     | 200             |               |
| F680HD  | 3"   | 302                | 116                | 1.78   | 9.00    | 9.00    | 20.50  | 6.00  | 4            | 5/8-11UNC  |          | 200             |               |
| F650HD  | 2"   | 115                | 44                 | 1.65   | 7.00    | 7.00    | 15.00  | 4.75  | 4            | 5/8-11UNC  | AMB(X)   | 200             | Non-Fail Safe |
| F665HD  | 2½"  | 196                | 75                 | 1.76   | 7.00    | 7.00    | 15.50  | 5.50  | 4            | 5/8-11UNC  | GMB(X)   | 200             |               |
| F680HD  | 3"   | 302                | 116                | 1.78   | 8.00    | 8.00    | 16.00  | 6.00  | 4            | 5/8-11UNC  |          | 200             |               |
| F6100HD | 4"   | 600                | 230                | 2.05   | 8.00    | 8.00    | 21.00  | 7.50  | 8            | 5/8-11UNC  | 2*GMB(X) | 200             |               |
| Valve   | Size | C <sub>v</sub> 90° | C <sub>v</sub> 60° | A(Max) | B (Max) | C (Max) | D(Max) | BHC   | No. of Holes | Lug Bolt   | Actuator | Close-Off (PSI) |               |
| F650HD  | 2"   | 115                | 44                 | 1.65   | 8.00    | 13.00   | 20.25  | 4.75  | 4            | 5/8-11UNC  | SY2...   | 200             | Non-Fail Safe |
| F665HD  | 2½"  | 196                | 75                 | 1.76   | 8.00    | 13.00   | 20.75  | 5.50  | 4            | 5/8-11UNC  |          | 200             |               |
| F680HD  | 3"   | 302                | 116                | 1.78   | 8.00    | 13.00   | 21.00  | 6.00  | 4            | 5/8-11UNC  |          | 200             |               |
| F6100HD | 4"   | 600                | 230                | 2.05   | 8.00    | 13.00   | 21.75  | 7.50  | 8            | 5/8-11UNC  | SY3...   | 200             |               |
| F6125HD | 5"   | 1022               | 392                | 2.14   | 8.00    | 13.00   | 22.25  | 8.50  | 8            | 3/4-10UNC  |          | 200             |               |
| F6150HD | 6"   | 1579               | 605                | 2.19   | 8.00    | 13.00   | 22.75  | 9.50  | 8            | 3/4-10UNC  | SY4...   | 200             |               |
| F6200HD | 8"   | 3136               | 1202               | 2.37   | 12.00   | 15.00   | 29.00  | 11.75 | 8            | 3/4-10UNC  |          | 200             |               |
| F6250HD | 10"  | 5340               | 2047               | 2.58   | 12.00   | 15.00   | 30.00  | 14.25 | 12           | 7/8-9UNC   | SY5...   | 200             |               |
| F6300HD | 12"  | 8250               | 3062               | 3.01   | 12.00   | 15.00   | 32.00  | 17.00 | 12           | 7/8-9UNC   |          | 200             |               |
| F6350HD | 14"  | 11917              | 4568               | 3.02   | 12.00   | 15.00   | 33.00  | 18.75 | 12           | 1-8UNC     | SY6...†  | 150             |               |
| F6400HD | 16"  | 16388              | 6282               | 3.39   | 12.00   | 15.00   | 34.50  | 21.25 | 16           | 1-8UNC     |          | 150             |               |
| F6450HD | 18"  | 21705              | 8320               | 4.13   | 14.00   | 21.00   | 39.25  | 22.75 | 16           | 1 1/8-7UNC | SY8...†  | 150             |               |
| F6500HD | 20"  | 27908              | 10698              | 5.00   | 14.00   | 21.00   | 41.50  | 25.00 | 20           | 1 1/8-7UNC |          | 150             |               |
| F6600HD | 24"  | 43116              | 16528              | 5.94   | 14.00   | 22.00   | 53.25  | 29.50 | 20           | 1 1/4-7UNC | SY11...† | 150             |               |
| F6750HD | 30"  | 73426              | 28146              | 6.57   | 14.00   | 22.00   | 57.50  | 36.00 | 28           | 1 1/4-7UNC | SY12...† | 150             |               |

Dimension "A" is compressed, add .125" for relaxed state.

†SY6 and larger available in 110/220 VAC versions only.

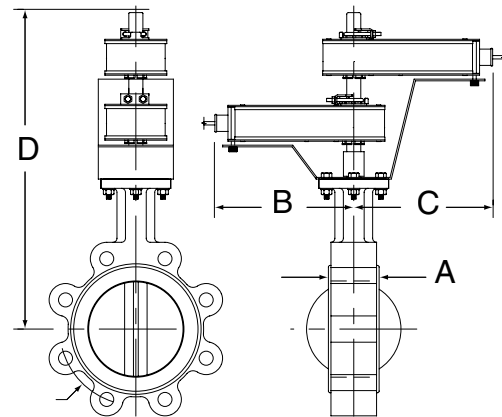
AF, AM and GM maximum actuator ambient temperature is 122°F.

SY... maximum actuator ambient temperature is 150°F.

## Application Notes

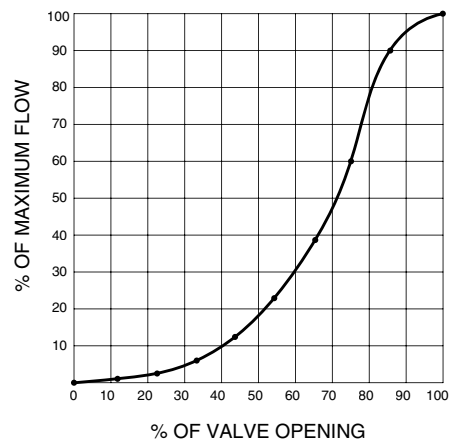
- Valves are rated at 200 psi differential pressure in the closed position (SY... 150 psi 14"+).
- Valves are furnished with lugs tapped for use with ANSI Class 125/150 flanges. Installation flanges and hardware are not included.
- 2-way assemblies are furnished assembled and tested, ready for installation.
- Dimension "D" allows for actuator removal without the need to remove the valve from the pipe.
- Weather shields are available, dimensional data upon request.
- Dual actuated valves have actuators mounted on a common valve shaft.
- Belimo SY Series actuators are NEMA 4X rated.

## Dimensions



BF2WUDIM

## Flow Pattern



IM40048 - 06/10 - Subject to change. © Belimo Aircontrols (USA), Inc.

# SY...230 Series Non-Spring Return Actuator



## Technical Data - 230 VAC



### Application:

The SY actuators are NEMA 4X rated and designed to meet the needs of HVAC and Commercial applications. Offered on Belimo standard and high performance valve series, these actuators are available for on/off and modulating applications. Depending on the application, they are available in 24 VAC/ VDC, 120 VAC and 230 VAC.

### Technical Data

|                           |                                                                                |
|---------------------------|--------------------------------------------------------------------------------|
| Electrical connection     | ½" conduit connector, screw terminals                                          |
| Overload protection       | thermally protected 135°C cut-out                                              |
| Motor protection          | H Class insulation (SY-1), F Class (SY-2...12)                                 |
| Gear train                | high alloy steel gear sets, self locking                                       |
| Operating range           | (SY...-220) on/off, floating point<br>(SY...230MFT) 2-10 VDC, 4-20mA, 0-10 VDC |
| Sensitivity               | (SY...230MFT) 0.4mA/200mV                                                      |
| Reversal hysteresis       | (SY...230MFT) 1.0mA/500mV                                                      |
| Feedback                  | (SY...230MFT) 2-10 VDC                                                         |
| Angle of rotation         | 90°                                                                            |
| Direction of rotation     | reversible                                                                     |
| Position indication       | top mounted domed indicator                                                    |
| Internal humidity control | resistive heating element                                                      |
| Auxiliary switches        | (2) SPDT, 5A 250 VAC<br>factory set for 5° and 85° change of state             |
| Ambient temperature       | -22°F to +150°F [-30°C to +65°C]                                               |
| Humidity range            | up to 95%                                                                      |
| Housing type              | IP67, NEMA 4X                                                                  |
| Housing material          | die cast aluminum alloy                                                        |
| Agency listings           | ISO, CE, cCSAus                                                                |

### Power Supply

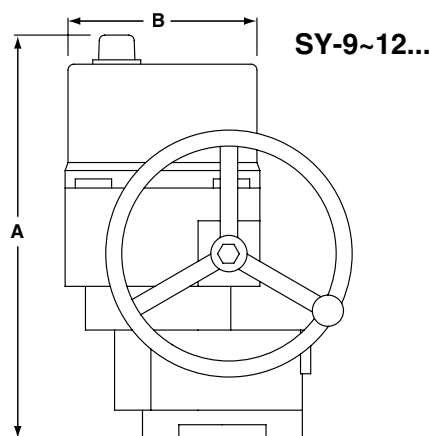
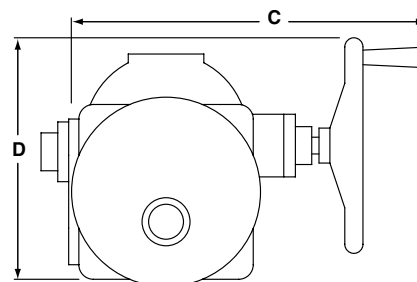
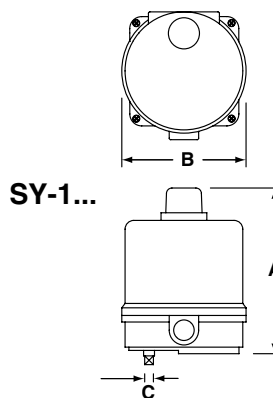
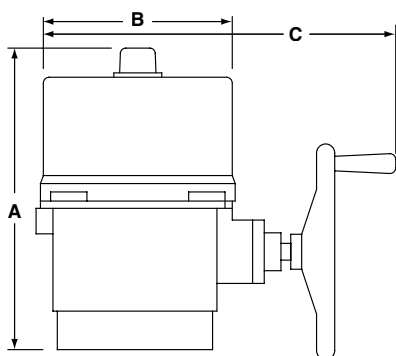
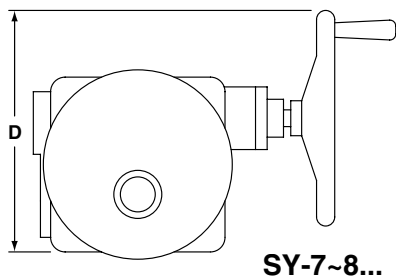
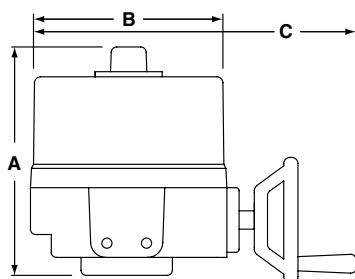
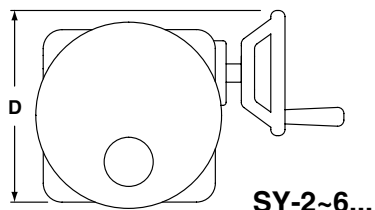
230 VAC 50/60Hz, single phase

| Model         | Torque              | Speed<br>60Hz | Speed<br>50Hz | Power<br>Consumption | Duty Cycle |     | Override   | Weight         |
|---------------|---------------------|---------------|---------------|----------------------|------------|-----|------------|----------------|
|               |                     |               |               |                      | On/Off     | MFT |            |                |
| SY1-220(P)    | 35Nm/310 in-lbs     | 12s           | 13s           | 0.3A                 | 30%        | 75% | 8mm Wrench | 2.0kg/4.9 lb.  |
| SY2-230(MFT)  | 90Nm/801 in-lbs     | 15s           | 17s           | 0.5A                 | 30%        | 75% | Hand Wheel | 11kg/24.5 lb.  |
| SY3-230(MFT)  | 150Nm/1335 in-lbs   | 22s           | 26s           | 0.5A                 | 30%        | 75% | Hand Wheel | 11kg/24.5 lb.  |
| SY4-230(MFT)  | 400Nm/3560 in-lbs   | 16s           | 18s           | 0.6A                 | 30%        | 75% | Hand Wheel | 22kg/48.5 lb.  |
| SY5-230(MFT)  | 500Nm/4450 in-lbs   | 22s           | 25s           | 0.7A                 | 30%        | 75% | Hand Wheel | 22kg/48.5 lb.  |
| SY6-230(MFT)  | 650Nm/5785 in-lbs   | 28s           | 31s           | 0.8A                 | 30%        | 75% | Hand Wheel | 22kg/48.5 lb.  |
| SY7-230(MFT)  | 1000Nm/8900 in-lbs  | 46s           | 55s           | 1.6A                 | 30%        | 75% | Hand Wheel | 36kg/79.5 lb.  |
| SY8-230(MFT)  | 1500Nm/13350 in-lbs | 46s           | 55s           | 2.0A                 | 30%        | 75% | Hand Wheel | 36kg/79.5 lb.  |
| SY9-230(MFT)  | 2000Nm/17800 in-lbs | 58s           | 70s           | 1.6A                 | 30%        | 50% | Hand Wheel | 56kg/123.5 lb. |
| SY10-230(MFT) | 2500Nm/22250 in-lbs | 58s           | 70s           | 2.0A                 | 30%        | 50% | Hand Wheel | 56kg/123.5 lb. |
| SY11-230(MFT) | 3000Nm/26700 in-lbs | 58s           | 70s           | 1.6A                 | 30%        | 50% | Hand Wheel | 56kg/123.5 lb. |
| SY12-230(MFT) | 3500Nm/31150 in-lbs | 58s           | 70s           | 2.2A                 | 30%        | 50% | Hand Wheel | 56kg/123.5 lb. |

800-543-9038 USA

866-805-7089 CANADA

203-791-8396 LATIN AMERICA



| MODEL  | DIM A (MAX) | Add to Dim A for cover removal | DIM B       | DIM C (MAX) | DIM D       |
|--------|-------------|--------------------------------|-------------|-------------|-------------|
|        | Inches [mm] | Inches [mm]                    | Inches [mm] | Inches [mm] | Inches [mm] |
| SY1    | 6.10 [155]  | 3.94 [100]                     | 4.25 [108]  | 8mm         | -           |
| SY2~3  | 10.04 [255] | 7.48 [190]                     | 7.87 [200]  | 12.99 [330] | 7.87 [200]  |
| SY4~6  | 12.40 [315] | 8.86 [225]                     | 9.21 [234]  | 14.96 [380] | 11.81 [300] |
| SY7~8  | 16.54 [420] | 8.86 [225]                     | 9.21 [234]  | 17.72 [450] | 13.39 [340] |
| SY9~12 | 23.23 [590] | 8.86 [225]                     | 10.24 [260] | 18.50 [470] | 13.78 [350] |

Note: ~ indicates range of actuator i.e., SY2~3 = SY-2 and SY-3