

Type overview





Туре			DN
F7250-300SHP			250
Fechnical data			
	Functional data	Valve size [mm]	10" [250]
		Fluid	chilled or hot water, up to 60% glycol
		Fluid Temp Range (water)	-22400°F [-30204°C]
		Body Pressure Rating	ANSI Class 300
		Flow characteristic	modified linear, unidirectional
		Servicing	maintenance-free
		Flow Pattern	3-way Mixing/Diverting
		Leakage rate	0%
		Controllable flow range	quarter turn, mechanically limited
		Cv	3517
		Maximum Velocity	32 FPS
		Lug threads	1-8 UNC
	Materials	Valve body	Carbon steel full lug (ASME B16.34)
		Stem	17-4 PH stainless steel

# Safety notes



Suitable actuators

Seat

Disc

Bearing

Non-Spring

Pipe connection

• WARNING: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

**RPTFE** 

SY5 SY4 SY7

ASME/ANSI class 300 flange

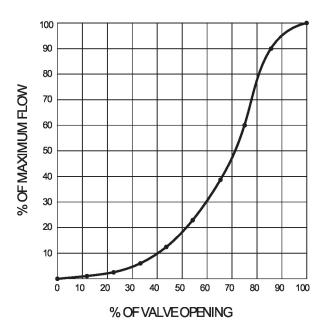
glass backed PTFE

316 stainless steel

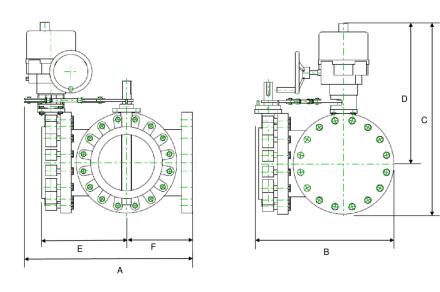


# **Product features**

# Flow/Mounting details



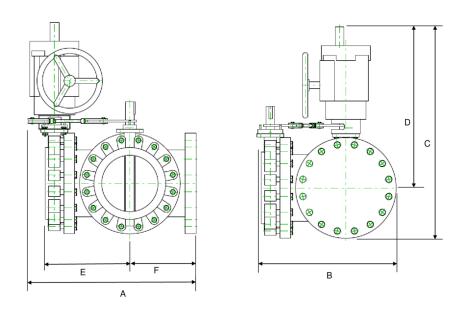
Dimensions			
Туре	DN	Weight	
F7250-300SHP	250	507.1 lb [230 kg]	



SY4..6

Α	В	C	D	E	F	Number of Bolt Holes
29.0" [737]	23.5" [597]	33.1" [842]	24.4" [620]	14.8" [375]	11.5" [292]	16





SY7..8

Α	В	C	D	E	F	Number of Bolt Holes
29.0" [737]	23.5" [597]	36.7" [933]	28.0" [712]	14.8" [375]	11.5" [292]	16



# MFT/programmable, Non fail-safe, 120 V





Functional data   Particular			
Nominal voltage frequency Nominal voltage range AC 96132 V Transformer sizing Current consumption 2 A Auxiliary switch Switching capacity auxiliary switch Electrical Connection Terminal blocks Overload Protection Internal Humidty Control Torque motor Operating range Y Input impedance Position feedback U note Direction of motion motor Position feedback U note Direction of motion motor Manual override Angle of rotation Angle of rotation Safety data  Safety data  Safety data  Position indication  Safety data Quality Standard Ambient temperature Ambient temperature Love Storage Time Act Storage Love Storage Lov	Technical data		
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Nominal voltage range   AC 96132 V     Transformer sizing   240 VA     Current consumption   2 A     Auxiliary switch   2x SPDT, 1 mA5 A (3 A inductive), DC 5 VAC     250 V, 1 x 3° / 1 x 87°     Switching capacity auxiliary switch   1 mA5 A (3 A inductive), DC 5 VAC     Electrical Connection   Terminal blocks     Overload Protection   thermally protected 135°C cut-out     Internal Humidty Control   resistive heating element     Functional data   Torque motor   1000 Nm     Operating range Y   210 V     Input impedance   100 kΩ     Position feedback U   210 V     Position feedback U variable   VDC variable     Direction of motion motor   selectable with switch 0/1     Manual override   hand wheel     Angle of rotation   90°     Running Time (Motor)   59 s     Duty cycle value   75%     Noise level, motor   45 dB(A)     Position indication   top mounted domed indicator     Safety data   Degree of protection NEMA/UL   NEMA AX     Enclosure   UL Enclosure Type 4X     Agency Listing   ISO, CE, CCSAus     Quality Standard   ISO 9001     Ambient humidity   Max. 100% RH     Ambient temperature   -22149°F [-3065°C]			50/60 Hz
Transformer sizing 240 VA Current consumption 2 A  Auxiliary switch 2x SPDT, 1 mA5 A (3 A inductive), DC 5 VAC 250 V, 1 x 3° / 1 x 87°  Switching capacity auxiliary switch 1 mA5 A (3 A inductive), DC 5 VAC 250 V 1 electrical Connection Terminal blocks Overload Protection thermally protected 135°C cut-out Internal Humidty Control resistive heating element  Functional data  Torque motor 1000 Nm Operating range Y 210 V Input impedance 100 kΩ Position feedback U 210 V Position feedback U variable VDC variable Direction of motion motor selectable with switch 0/1 Manual override hand wheel Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN 1P66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Agency Listing 150, CE, cCSAus Quality Standard 150 9001 Ambient temperature -22149°F [-3065°C] Storage temperature -22149°F [-3065°C]			AC 96132 V
Current consumption 2 A Auxiliary switch 2x SPDT, 1 mA5 A (3 A inductive), DC 5 VAC 250 V, 1 x 3° / 1 x 87°  Switching capacity auxiliary switch 1 mA5 A (3 A inductive), DC 5 VAC 250 V Electrical Connection Terminal blocks Overload Protection thermally protected 135°C cut-out Internal Humidty Control resistive heating element  Functional data Torque motor 1000 Nm Operating range Y 210 V Input impedance 100 kΩ Position feedback U 210 V Position feedback U 1000 Mm. VDC variable VDC variable VDC variable Direction of motion motor selectable with switch 0/1 Manual override hand wheel Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN IP66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Agency Listing 150, CE, CCSAus Quality Standard 150 9001 Ambient temperature -22149°F [-3065°C]			240 VA
Switching capacity auxiliary switch 1 mA5 A (3 A inductive), DC 5 VAC 250 V Electrical Connection Terminal blocks Overload Protection thermally protected 135°C cut-out Internal Humidty Control resistive heating element  Functional data  Torque motor 1000 Nm Operating range Y 210 V Input impedance 100 kΩ Position feedback U 210 V Position feedback U 100 variable VDC variable Direction of motion motor selectable with switch 0/1 Manual override hand wheel Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data  Degree of protection IEC/EN 1P66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Agency Listing ISO, CE, cCSAus Quality Standard ISO 9001 Ambient humidity Max. 100% RH Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Current consumption	2 A
Electrical Connection Terminal blocks Overload Protection thermally protected 135°C cut-out Internal Humidty Control resistive heating element  Functional data  Torque motor 1000 Nm Operating range Y 210 V Input impedance 100 kΩ Position feedback U 210 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 hand wheel Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN IP66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Ambient humidity Max. 100% RH Ambient humidity Max. 100% RH Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Auxiliary switch	
Overload Protection     thermally protected 135°C cut-out       Internal Humidty Control     resistive heating element       Functional data     Torque motor     1000 Nm       Operating range Y     210 V       Input impedance     100 kΩ       Position feedback U     210 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     hand wheel       Angle of rotation     90°       Running Time (Motor)     59 s       Duty cycle value     75%       Noise level, motor     45 dB(A)       Position indication     top mounted domed indicator       Safety data       Degree of protection IEC/EN     IP66/67       Degree of protection NEMA/UL     NEMA 4X       Enclosure     UL Enclosure Type 4X       Agency Listing     ISO, CE, cCSAus       Quality Standard     ISO 9001       Ambient humidity     Max. 100% RH       Ambient temperature     -22149°F [-3065°C]       Storage temperature     -40176°F [-4080°C]		Switching capacity auxiliary switch	1 mA5 A (3 A inductive), DC 5 VAC 250 V
Internal Humidty Control resistive heating element  Functional data  Torque motor 1000 Nm Operating range Y 210 V Input impedance 100 kΩ Position feedback U 210 V Position feedback U 1000 Nm Operating range Y 210 V Position feedback U 1000 Nm Position feedback U 1000 Nm Operating range Y 1000 Nm Operating range Y 210 V Position feedback U 1000 Nm Operating range Y 1000 Nm Operating range Y 210 V Operating range Y 1000 Nm Operating range		Electrical Connection	Terminal blocks
Torque motor 1000 Nm Operating range Y 210 V Input impedance 100 kΩ Position feedback U 210 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 hand wheel Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN IP66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Agency Listing ISO, CE, CCSAus Quality Standard ISO 9001 Ambient humidity Max. 100% RH Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Overload Protection	thermally protected 135°C cut-out
Operating range Y Input impedance Position feedback U Position feedback U orde Position feedback U orde Position feedback U orde Position feedback U variable Oirection of motion motor Manual override Angle of rotation Running Time (Motor) Duty cycle value Noise level, motor Position indication  Safety data  Degree of protection NEMA/UL Enclosure Quality Standard Ambient humidity Ambient temperature Storage temperature  100 kΩ 210 V 2		Internal Humidty Control	resistive heating element
Input impedance 100 kΩ Position feedback U 210 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 hand wheel Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN IP66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Agency Listing ISO, CE, cCSAus Quality Standard ISO 9001 Ambient humidity Max. 100% RH Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]	Functional data	Torque motor	1000 Nm
Position feedback U Position feedback U note Position feedback U variable VDC variable Direction of motion motor Selectable with switch 0/1 Manual override Angle of rotation Running Time (Motor) Duty cycle value Noise level, motor Position indication  Safety data  Degree of protection IEC/EN Degree of protection NEMA/UL Enclosure Agency Listing Quality Standard Ambient humidity Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Operating range Y	210 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 hand wheel Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN IP66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Agency Listing ISO, CE, cCSAus Quality Standard ISO 9001 Ambient humidity Max. 100% RH Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Input impedance	100 kΩ
Position feedback U variable Direction of motion motor Selectable with switch 0/1 Manual override Angle of rotation Running Time (Motor) Duty cycle value Noise level, motor Position indication  Safety data  Degree of protection IEC/EN Degree of protection NEMA/UL Enclosure Agency Listing Quality Standard Ambient humidity Ambient temperature  VDC variable VDC variable Selectable with switch 0/1 And wheel And wheel And wheel And wheel And wheel And wheel Afel (A) Pos Selectable with switch 0/1 And wheel		Position feedback U	210 V
Direction of motion motor  Manual override  Angle of rotation  Running Time (Motor)  Duty cycle value  Noise level, motor  Position indication  Safety data  Degree of protection IEC/EN  Degree of protection NEMA/UL  Enclosure  Agency Listing  Quality Standard  Ambient humidity  Ambient temperature  -22149°F [-3065°C]  Storage temperature  Selectable with switch 0/1  hand wheel  han		Position feedback U note	Max. 0.5 mA
Manual override Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN Degree of protection NEMA/UL Enclosure UL Enclosure Type 4X Agency Listing Quality Standard Ambient humidity Ambient temperature Storage temperature Manual wheel And wheel Appea		Position feedback U variable	VDC variable
Angle of rotation 90° Running Time (Motor) 59 s Duty cycle value 75% Noise level, motor 45 dB(A) Position indication top mounted domed indicator  Safety data Degree of protection IEC/EN IP66/67 Degree of protection NEMA/UL NEMA 4X Enclosure UL Enclosure Type 4X Agency Listing ISO, CE, cCSAus Quality Standard ISO 9001 Ambient humidity Max. 100% RH Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Direction of motion motor	selectable with switch 0/1
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Duty cycle value  Noise level, motor  Position indication  Degree of protection IEC/EN  Degree of protection NEMA/UL  Enclosure  Agency Listing  Quality Standard  Ambient humidity  Ambient temperature  Duty cycle value  75%  176%  186/67		Angle of rotation	90°
Noise level, motor Position indication  Safety data  Degree of protection IEC/EN Degree of protection NEMA/UL Enclosure Agency Listing Quality Standard Ambient humidity Ambient temperature Storage temperature  NEMA 4X IP66/67 UL Enclosure Type 4X ISO, CE, cCSAus ISO, CE, cCSAus ISO 9001 Ambient Max. 100% RH Ambient 100% RH Ambient 100% RH -22149°F [-3065°C]		Running Time (Motor)	59 s
Position indication top mounted domed indicator  Safety data  Degree of protection IEC/EN Degree of protection NEMA/UL Enclosure UL Enclosure Type 4X Agency Listing ISO, CE, cCSAus Quality Standard ISO 9001 Ambient humidity Max. 100% RH Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Duty cycle value	75%
Safety data  Degree of protection IEC/EN Degree of protection NEMA/UL Enclosure Agency Listing Quality Standard Ambient humidity Ambient temperature Storage temperature  PEG/67  NEMA 4X  UL Enclosure Type 4X  ISO, CE, cCSAus  ISO 9001  Max. 100% RH  -22149°F [-3065°C]		Noise level, motor	45 dB(A)
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Agency Listing ISO, CE, cCSAus  Quality Standard ISO 9001  Ambient humidity Max. 100% RH  Ambient temperature -22149°F [-3065°C]  Storage temperature -40176°F [-4080°C]		Degree of protection NEMA/UL	NEMA 4X
Quality Standard ISO 9001  Ambient humidity Max. 100% RH  Ambient temperature -22149°F [-3065°C]  Storage temperature -40176°F [-4080°C]		Enclosure	UL Enclosure Type 4X
Ambient humidity  Ambient temperature  -22149°F [-3065°C]  Storage temperature  -40176°F [-4080°C]		Agency Listing	ISO, CE, cCSAus
Ambient temperature -22149°F [-3065°C] Storage temperature -40176°F [-4080°C]		Quality Standard	ISO 9001
Storage temperature -40176°F [-4080°C]		·	Max. 100% RH
		Ambient temperature	-22149°F [-3065°C]
Servicing maintenance-free		Storage temperature	-40176°F [-4080°C]
		Servicing	maintenance-free

75 lb [34 kg]

Weight Weight



#### **Technical data**

Materials	Housing material	die cast aluminium	
	Gear train	high alloy steel gear sets, self locking	

#### **Product features**

#### Application

SY Series actuators are fractional horsepower devices, and utilize full-wave power supplies. Observe wire sizing and transformer sizing requirements. Proportional models CANNOT be connected to Belimo direct coupled (AF, AM, GM...etc) actuator power supplies or any type of half-wave device. You MUST use a separate, dedicated transformer or power supply to power the SY actuator. Please do not connect other automation equipment to the dedicated SY supply source. You MUST use four wires (plus a ground) to control a proportional control SY actuator (See SY Wiring Section).

#### **Accessories**

Gateways	Description	Туре
	Gateway MP to BACnet MS/TP	UK24BAC
	Gateway MP to Modbus RTU	UK24MOD
	Gateway MP to LonWorks	UK24LON
Electrical accessories	Description	Туре
	Local electric disconnect for SY412 series actuator, AC 120 V, MFT Service tool, with ZIP-USB function, for programmable and	HOA-120VMFT ZTH US
	communicative Belimo actuators, VAV controller and HVAC performance devices	
	Battery backup system for SY712 series actuator, AC 120 V, on/off	EXT-NSV-B05-120
Tools	Description	Туре
	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**

Do not change sensitivity or dip switch setting with power applied.

6 Power supply Common/Neutral and Control Signal "-"wiring to a common is prohibited. Terminals 4 and 6 need to be wired separately.



**<u>kallow</u>** Isolation relays must be used in parallel connection of multiple actuators using a common control signal inputs. The relays should be DPDT.

fix Isolation relays are required in parallel applications. The reason parallel applications need isolation relays is that the motor uses two sets of windings, one for each direction. When one is energized to turn the actuator in a specific direction a voltage is generated in the other due to the magnetic field created from the first. It's called back EMF. This is not an issue with one actuator because the voltage generated in the second winding isn't connected to anything so there is no flow. On parallel applications without isolation, this EMF voltage energizes the winding it is connected to on the other actuators in the system, the actuators are tying to turn in both directions at once. The EMF voltage is always less than the supply voltage due to the resistance of the windings, so while the actuator still turns in the commanded direction, the drag from the other reduces the torque output and causes overheating.



### 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.



## **Electrical installation**

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

## Wiring diagrams

