



- Live-load packing set
- Stainless steel ball & stem
- Blow-out proof stem design

Application

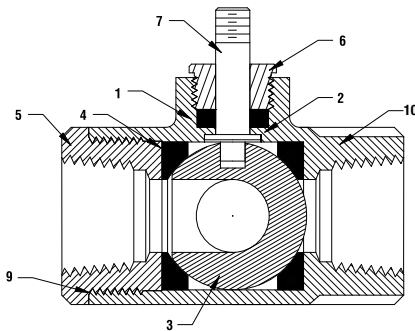
These threaded valves are designed to provide modulating or two position control of hot or chilled water and saturated steam systems under 50 psi.

Typical applications include reheat coils, VAV terminal control, unit ventilators, and air handlers, especially in areas which have minimum profile requirements.

- Up to 50 psi steam
- ½" - 2000 PSIG WOG, Cold Non-Shock.
- Federal Specification: WW-V-35C, Type II,
Composition: SS
Style: 3

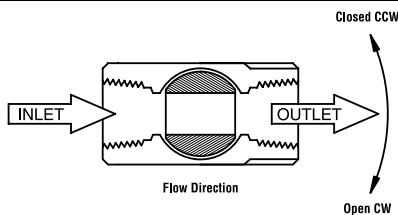
Technical Data	
Media	chilled or hot water, glycol, 50# steam
Flow characteristic	modified equal percentage
Action	90° rotation valve open CW, valve closed CCW
Sizes	½", ¾", 1", 1¼", 1½", 2"
Type of end fitting	SAE NPT (female connections)
Materials:	
1 Stem packing	reinforced PTFE
2 Stem bearing	reinforced PTFE
3 Ball	316 stainless steel
4 Seat (x2)	reinforced PTFE w/ Durafill
5 Retainer	B16 (¾" - 1") stainless steel B584 (1¼" - 2") stainless steel
6 Gland	A276-316
7 Stem	316 stainless steel
8 Jam nut	stainless steel
9 Body seal	PTFE (1¼" to 2")
10 Body	A351-CF8M 316 stainless steel

C _v	Valve Nominal Size		Type	Suitable Actuators		
	Inches	DN [mm]	2-way NPT	Spring Return	Non-Spring Return	
15	½	15	B2050VSS-15	LF Series	NM Series	SY Series
30	¾	20	B219VSS			
43	1	25	B224VSS	AF Series	GM AM Series	
108	2	50	B249VSS			



Pressure rating	2000 psig WOG (½" - 1")
Media temp. range	-22°F to +298°F (-30°C to +148°C)
Close-off pressure	600 psig @ 100°F
Maximum differential pressure (ΔP)	<600 psig

Flow Patterns





Models

SY1-24(P)
SY2-24MFT

Attention

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**).

Technical Data - continued

Power Consumption	
SY1-24(P)	1.8A
SY2-24MFT	3.0A
Torque	
SY1-24(P)	35 Nm / 310 in-lbs
SY2-24MFT	90 Nm / 801 in-lbs
Manual Override	
SY1-24(P)	8mm wrench
SY2-24	hand wheel
Running Time	
SY1-24(P)	15 seconds
SY2-24MFT	15 seconds

Technical Data	
Power supply	24 VAC 50/60 Hz, single phase
Electrical connection	½" conduit connector, screw terminals
Overload protection	thermally protected 135°C cut-out
Motor protection	SY1 H class insulation SY2... F class insulation
Geartrain	high alloy steel gear sets, self locking
Operating range	SY...-24 on/off SY...-24MFT 2-10 VDC, 4-20mA, 1-5 VDC
Sensitivity	SY...-24MFT 0.2 mA / 100mV
Feedback	SY...-24MFT 2-10 VDC, 4-20 mA
Angle of rotation	mechanically limited to 95°
Direction of rotation	reversible
Position indication	top mounted domed indicator
Internal humidity control	resistive heating element
Auxiliary switches	(2) SPDT, 10A 250VAC factory set for 3° and 87° 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

Wiring Diagrams

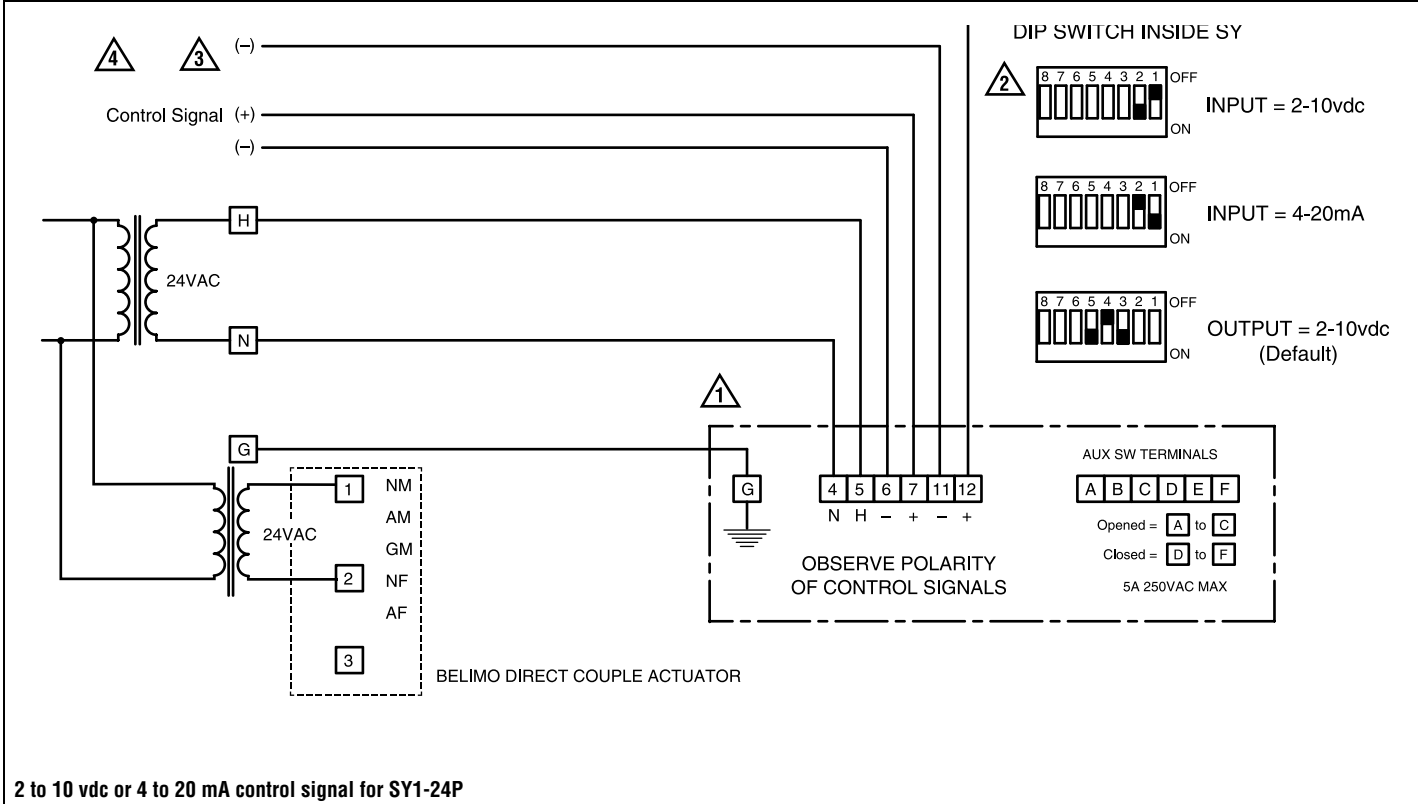
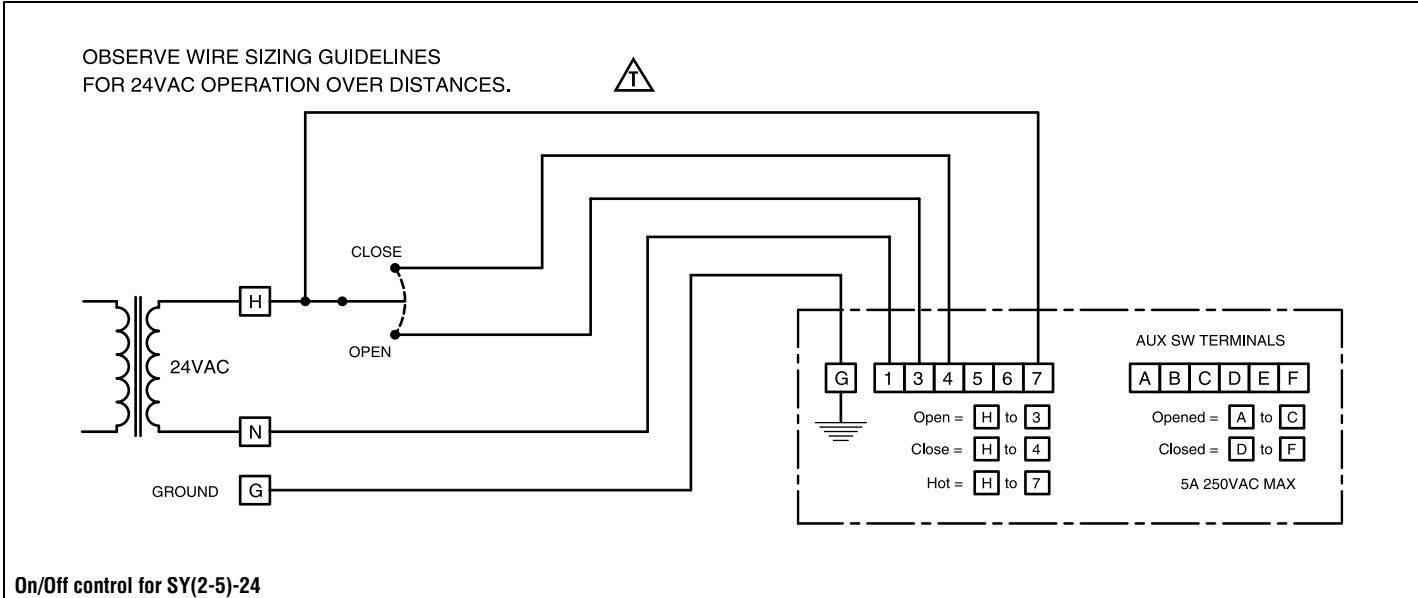
✂️ INSTALLATION NOTES

- Transformer sizing = SY actuator draw X 1.25 (safety margin)
EXAMPLE: SY2-24 requires 3.0A x 1.25 = 3.75A, 3.75A X 24 VAC = 90VA Transformer.
- There can be no connection (internal to automation controller, external wiring, or otherwise) between actuator supply neutral & control signal reference. These actuators are full wave devices. Any connection to half wave equipment will result in equipment damage.
- Do not change sensitivity or dip switch settings with power applied.

Terminals 6 & 11 can be common when control and feedback signals are both set for 2-10VDC operation.

Use of feedback is optional.

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.



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Application:

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

Technical Data - <i>continued</i>		
Power Consumption		
SY1-110(P)	0.5A	
SY2-120MFT	1.0A	
Torque		
SY1-110(P)	35 Nm / 310 in-lbs	
SY2-120MFT	90 Nm / 801 in-lbs	
Manual Override		
SY1-110(P)	8mm wrench	
SY2-120MFT	hand wheel	
Running Time		
	50 Hz	60 Hz
SY1-110(P)	13 seconds	12 seconds
SY2-120MFT	17 seconds	15 seconds

Models

SY1-110(P)
SY2-120MFT

Technical Data	
Power supply	120 VAC 50/60 Hz, single phase
Electrical connection	½" conduit connector, screw terminals
Overload protection	thermally protected 135°C cut-out
Motor protection	SY1 H class insulation SY2... F class insulation
Geartrain	high alloy steel gear sets, self locking
Operating range	SY...-110 on/off, floating point SY...-120MFT 2-10 VDC 4-20 mA, 1-5 VDC
Sensitivity	SY...-120MFT 0.2 mA / 100mV
Feedback	SY...120MFT 2-10 VDC, 4-20 mA
Angle of rotation	mechanically limited to 95°
Direction of rotation	reversible
Position indication	top mounted domed indicator
Internal humidity control	resistive heating element
Auxiliary switches	(2) SPDT, 5A 250 VAC 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

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Wiring Diagrams

Hazard Identification

Warnings and Cautions appear at appropriate sections throughout this manual. Read these carefully.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Indicates an action or condition that may cause irreversible damage to the actuator(s) or associated equipment.

Equipment damage!
Power consumption and input impedance must be observed.

INSTALLATION NOTES

Observe class 1 and class 2 wiring restrictions.

APPLICATION NOTES

35 Recommended twisted shielded pair for control wiring. Ground shielded wire at control panel chassis. Tape back ground at actuator.

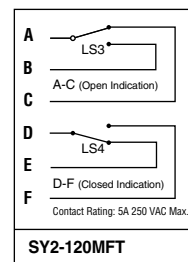
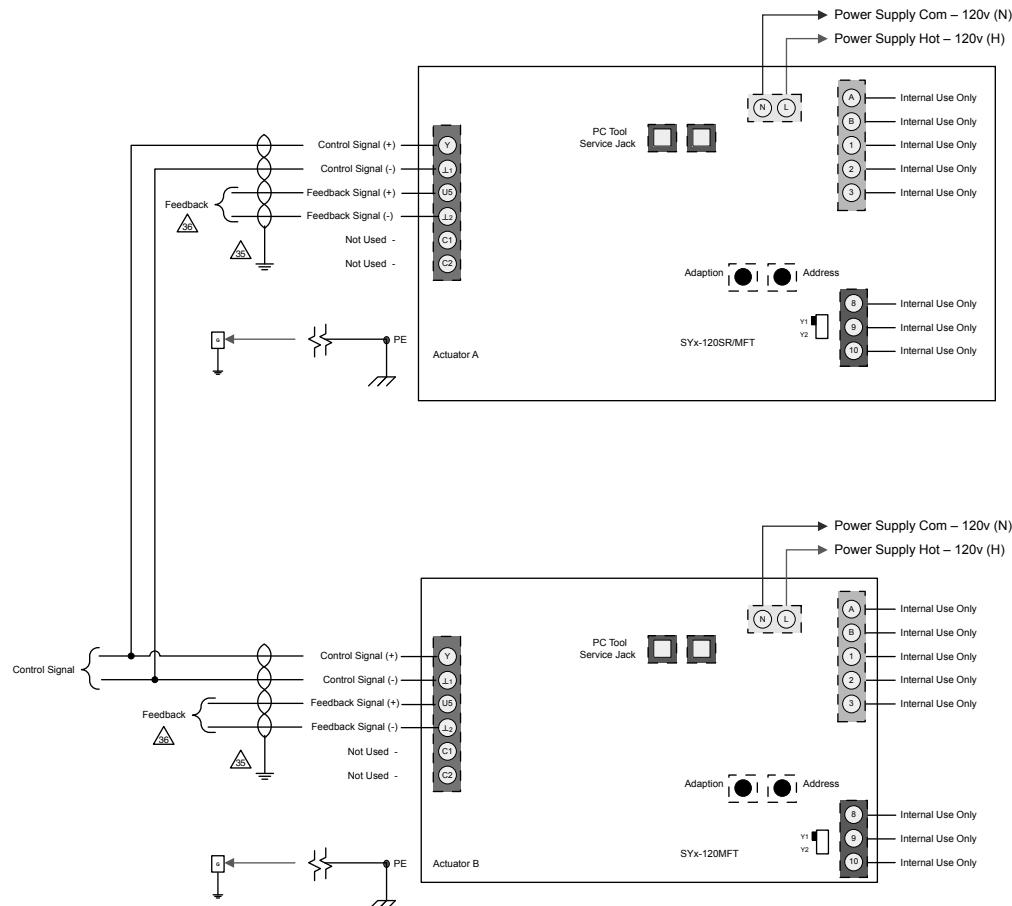
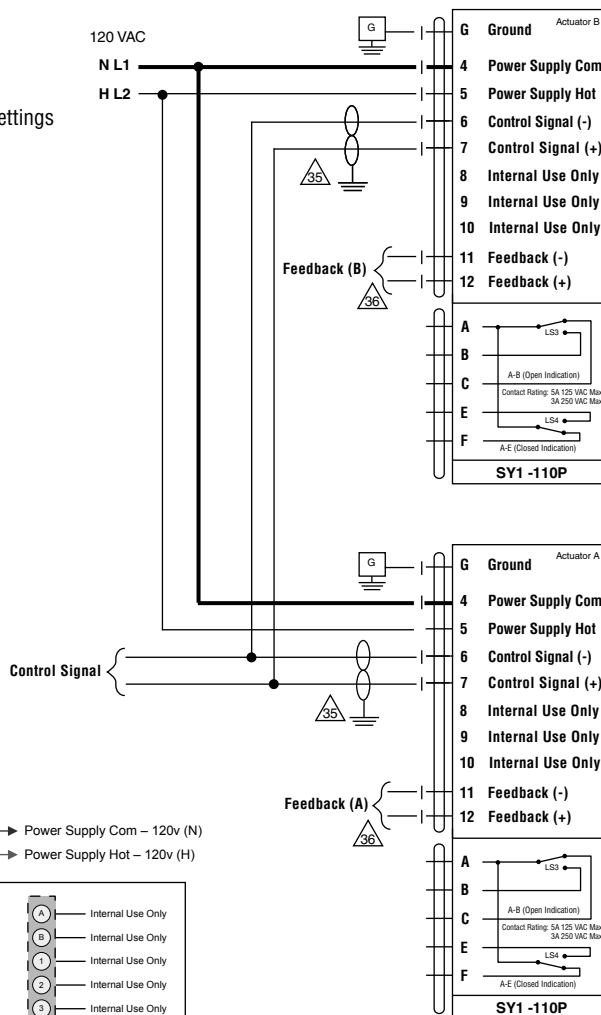
36 Use of feedback is optional.

NOTES SY1-110P

- **Caution:** Power supply voltage.
- Do not change sensitivity or dip switch settings with power applied.

NOTES SY2-120MFT

- **Caution:** Power supply voltage.





Models

SY1-220(P)
SY2-230MFT

Technical Data	
Power supply	230 VAC 50/60 Hz, single phase
Electrical connection	½" conduit connector, screw terminals
Overload protection	thermally protected 135°C cut-out
Motor protection	SY1 H class insulation SY2... F class insulation
Geartrain	high alloy steel gear sets, self locking
Operating range	SY...-220 on/off, floating point SY...-230MFT 2-10 VDC, 4-20 mA, 1-5 VDC
Sensitivity	SY...-230MFT 0.2 mA / 200mV
Feedback	SY...-230MFT 2-10 VDC, 4-20 mA
Angle of rotation	mechanically limited to 95°
Direction of rotation	reversible
Position indication	top mounted domed indicator
Internal humidity control	resistive heating element
Auxiliary switches	(2) SPDT, 5A 250VAC 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

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Technical Data - Continued		
Power consumption		
SY1-220(P)	0.3A	
SY2-230MFT	0.5A	
Torque		
SY1-220(P)	35 Nm / 310 in-lbs	
SY2-230MFT	90 Nm / 801 in-lbs	
Manual Override		
SY1-220(P)	8mm wrench	
SY2-230MFT	hand wheel	
Running Time	50 Hz	60 Hz
SY1-220(P)	13 seconds	12 seconds
SY2-230MFT	17 seconds	15 seconds

Wiring Diagrams

Hazard Identification

Warnings and Cautions appear at appropriate sections throughout this manual. Read these carefully.

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Equipment damage!
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INSTALLATION NOTES

Observe class 1 and class 2 wiring restrictions.



APPLICATION NOTES

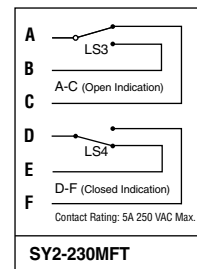
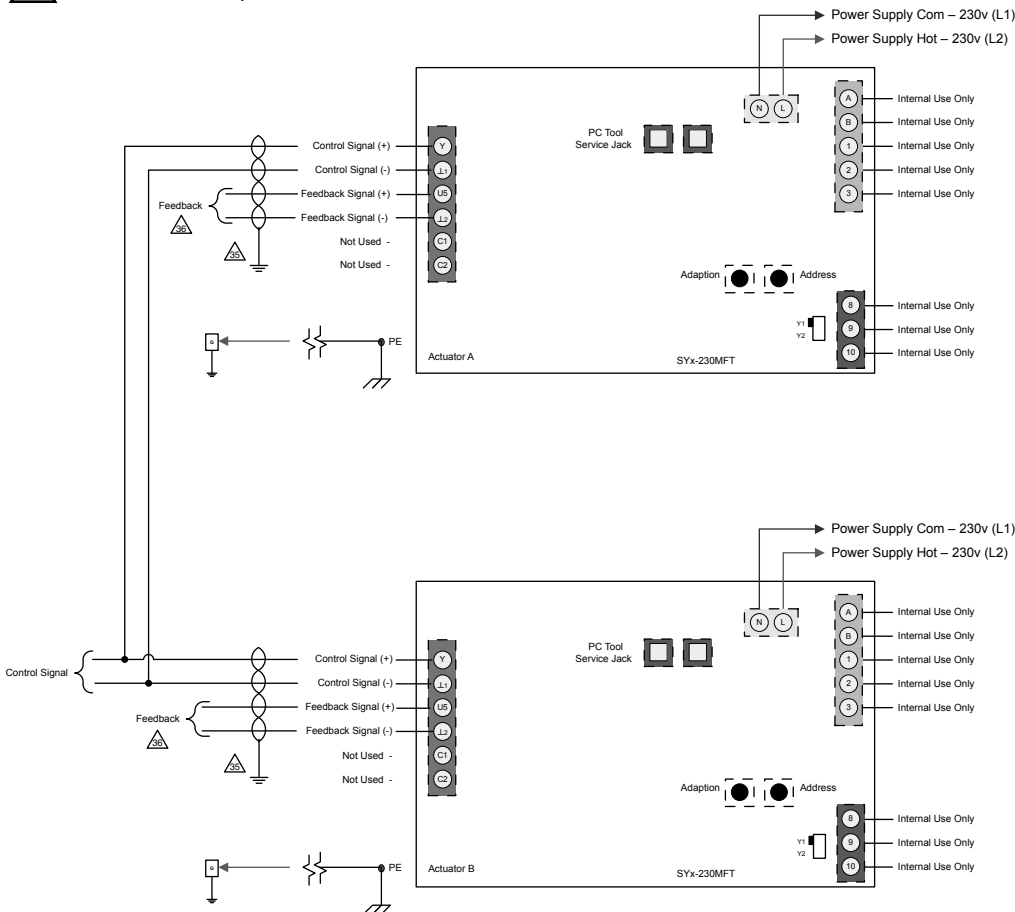
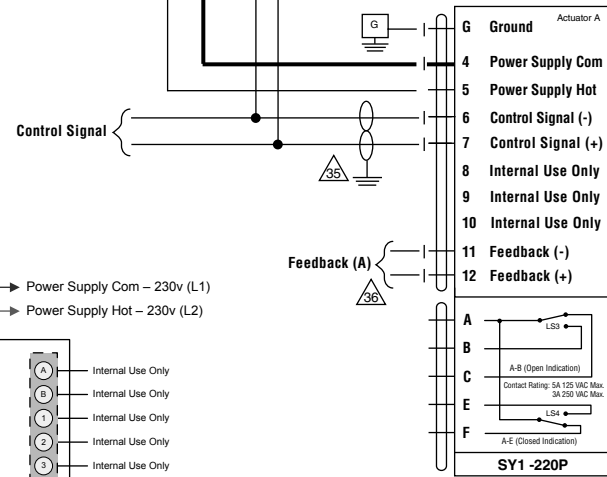
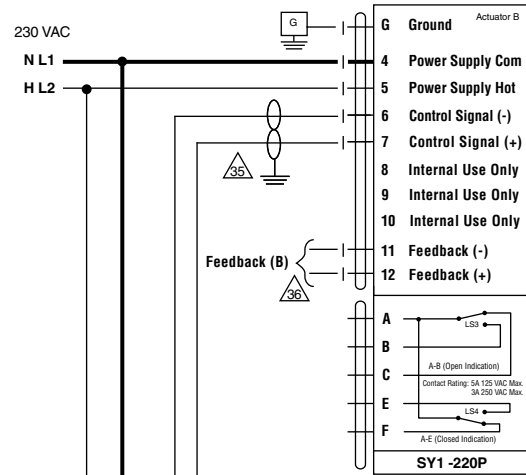
- Recommended twisted shielded pair for control wiring. Ground shielded wire at control panel chassis. Tape back ground at actuator.
- Use of feedback is optional.

NOTES SY1-220P

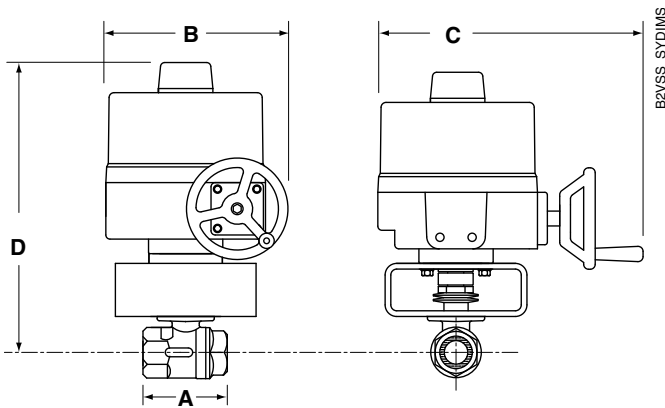
- **Caution:** Power supply voltage.
- Do not change sensitivity or dip switch settings with power applied.

NOTES SY2-230MFT

- **Caution:** Power supply voltage.



Dimensions with 2-Way Valves



Valve Nominal Size Dimensions (Inches)

	Valve Body	COP	Inches	DN [mm]	A	B	C	D
SY1	B2050VS-01	600	½"	15	2.25	4.00	6.25	8.00
	B2050VS-02	600	½"	15	2.25	4.00	6.25	8.00
	B2050VS-04	600	½"	15	2.25	4.00	6.25	8.00
	B2050VS-15	600	½"	15	2.25	4.00	6.25	8.00
SY1 & SY2	B219VS	600	¾"	20	3.00	4.00	6.25	8.00
	B220VS	600	¾"	20	3.12	4.00	6.25	3.12
	B224VS	600	1"	25	3.37	4.00	6.25	16.00
	B225VS	600	1"	25	3.62	4.00	6.25	9.00
	B232VS	600	1¼"	32	3.97	4.00	6.25	9.50
SY2	B239VS	600	1½"	40	4.37	4.00	6.25	17.50
	B240VS	600	1½"	40	4.75	8.00	13.00	19.00
	B249VS	600	2"	50	4.68	8.00	13.00	19.50
	B250VS	600	2"	50	5.37	8.00	13.00	20.00
	B265VS	600	2½"	65	6.25	8.00	13.00	20.00

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