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

BELIMO

- **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_v 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_V 90°	C_V 60°	Inches	ANSI 150 2-way	150	300	150	300	150	300
102	56	2	F650-150SHP	GM Series	GM Series	AF Series	AF Series	GK Series	GK Series
146	80	2½	F665-150SHP						
228	125	3	F680-150SHP						
451	248	4	F6100-150SHP	PR Series	PR Series			PKR	PKR
714	392	5	F6125-150SHP						
1103	607	6	F6150-150SHP						
2064	1135	8	F6200-150SHP	SY Series (2 Year Warranty)	SY (2 Year Warranty)				
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						

							MOD			ON/OFF
Valve	Size	C_v	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)

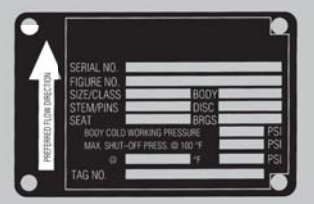
Valve	Size	C_v 90°	A	B	C	D(Max)	BHC	No. of Holes	Lug Bolt	Actuator	Close-Off (PSI)	
F650-150SHP	2"	102	1.75	9.00	9.00	19.50	4.75	4	5/8-11 UNC	2*AF	150	Spring Return
F665-150SHP	2½"	146	1.88	9.00	9.00	20.00	5.50	4	5/8-11 UNC		150	
F680-150SHP	3"	228	1.92	9.00	9.00	20.50	6.00	4	5/8-11 UNC		150	
F6100-150SHP	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	
F650-150SHP	2"	102	1.75	9.00	9.00	19.50	4.75	4	5/8-11 UNC	GM	285	Non-Spring Return Electronic Fail-Safe (K)
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		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	SY4…	285	
F6250-150SHP	10"	3517	2.81	12.00	12.00	33.00	14.25	12	7/8-9 UNC	SY4…	285	
F6300-150SHP	12"	4837	3.23	12.00	12.00	35.00	17.00	12	7/8-9 UNC	SY4…	150	
										SY5…	285	
F6350-150SHP	14"	6857	3.62	14.00	14.00	36.00	18.75	12	1-8 UNC	SY5…	150	
										SY7…	285	
											150	
F6400-150SHP	16"	9287	4.00	14.00	14.00	37.50	21.25	16	1-8 UNC	SY8…	285	
F6450-150SHP	18"	11400	4.50	14.00	14.00	42.25	22.75	16	1 1/8-8 UNC	SY7…	150	
										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

1. Valves are rated at 285 psi differential pressure in the closed position @ 100°F media temperature.
2. Valves are furnished with lugs tapped for use between ANSI Class 125/150 flanges conforming to ANSI B16.5 Standards.
3. 2-way assemblies are furnished assembled, calibrated and tested, ready for installation.
4. Dimension "D" allows for actuator(s) removal without the need to remove the valve from the pipe.
5. Weather shields are available, dimensional data furnished upon request.
6. Flange gaskets (2 required, not provided with valve) MUST be used between valve and ANSI flange.
7. Flange bolts are not included with the valve. These are furnished by others.

SHP series valves have a preferred flow direction.



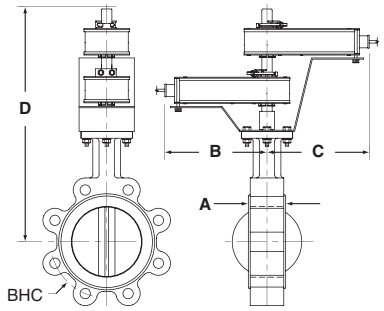
PreferredFlowrate

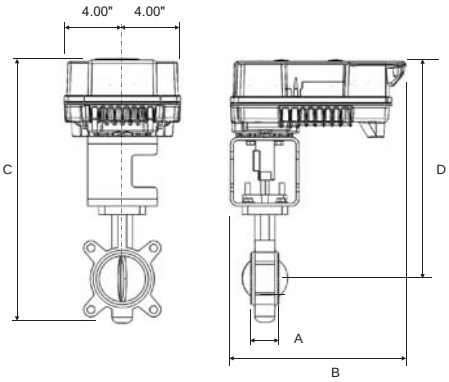
Safety Notes

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

Dimensions

D102





F7 Series 3-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**
- **Tees comply with ASME/ANSI B16.1 Class 125 Flanges**

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_V 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 18"
Type of end fitting	for use with ASME/class 125/150 flanges
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

		3-way Valves		Suitable Actuators					
		Valve Nominal Size	Type	Non Fail-Safe				Electronic Fail-Safe	
C_V 90°	C_V 60°	Inches	ANSI 150 3-way	150		300		150	300
102	56	2	F750-150SHP	GM Series	PR Series	GM Series	PR Series	GK Series	GK Series
146	80	2½	F765-150SHP						PKR
228	125	3	F780-150SHP						
451	248	4	F7100-150SHP						
714	393	5	F7125-150SHP		SY Series (2 Year Warranty)		SY Series (2 Year Warranty)		
1103	607	6	F7150-150SHP						
2064	1135	8	F7200-150SHP						
3517	1934	10	F7250-150SHP						
4837	2660	12	F7300-150SHP						
6857	3592	14*	F7350-150SHP						
9287	4865	16*	F7400-150SHP						
11400	6270	18*	F7450-150SHP						

							MOD				ON/OFF
Valve	Size	C_V	10°	20°	30°	40°	50°	60°	70°	80°	90°
F750-150SHP	2"	102	1.50	6.10	14	26	39	56	77	99	102
F765-150SHP	2½"	146	2.20	8.80	20	37	55	80	110	142	146
F780-150SHP	3"	228	3.40	14	32	57	87	125	171	221	228
F7100-150SHP	4"	451	6.80	27	63	114	171	248	338	437	451
F7125-150SHP	5"	714	11	43	100	180	271	393	536	693	714
F7150-150SHP	6"	1103	17	66	154	278	419	607	827	1070	1103
F7200-150SHP	8"	2064	31	124	289	520	784	1135	1548	2002	2064
F7250-150SHP	10"	3517	53	211	492	886	1336	1934	2638	3411	3517
F7300-150SHP	12"	4837	73	290	677	1219	1838	2660	3628	4692	4837
F7350-150SHP	14"	6857	103	411	960	1728	2606	3592	5143	6651	6857
F7400-150SHP	16"	9287	139	557	1300	2340	3529	4865	6965	9008	9287
F7450-150SHP	18"	11400	171	684	1596	2873	4332	6270	8550	11058	11400

Maximum Dimensions (Inches)

Valve	Size	C_v 90°	A	B	C	D(Max)	BHC	No. of Holes	Lug Bolt	Actuator	Close-Off (PSI)	
F750-150SHP	2"	102	4.50	6.38	6.38	16.50	4.75	4	5/8-11 UNC	GK	150	Electronic Fail-Safe
F765-150SHP	2½"	146	5.00	6.88	6.88	17.00	5.50	4	5/8-11 UNC		150	
F780-150SHP	3"	228	5.50	7.56	7.56	17.50	6.00	4	5/8-11 UNC		150	
F750-150SHP	2"	102	4.50	6.38	6.38	16.50	4.75	4	5/8-11 UNC	2*GK	285	
F765-150SHP	2½"	146	5.00	6.88	6.88	17.00	5.50	4	5/8-11 UNC		285	
F780-150SHP	3"	228	5.50	7.56	7.56	17.50	6.00	4	5/8-11 UNC		285	
F750-150SHP	2"	102	4.50	6.38	6.38	16.50	4.75	4	5/8-11 UNC	GM	150	Non-Spring Return Electronic Fail-Safe (K)
F765-150SHP	2½"	146	5.00	6.88	6.88	17.00	5.50	4	5/8-11 UNC		150	
F780-150SHP	3"	228	5.50	7.56	7.56	17.50	6.00	4	5/8-11 UNC		150	
F7100-150SHP	4"	451	6.50	8.63	8.63	18.00	7.50	8	5/8-11 UNC		150	
F750-150SHP	2"	102	4.50	6.38	6.38	16.50	4.75	4	5/8-11 UNC	2*GM	285	
F765-150SHP	2½"	146	5.00	6.88	6.88	17.00	5.50	4	5/8-11 UNC		285	
F780-150SHP	3"	228	5.50	7.56	7.56	17.50	6.00	4	5/8-11 UNC		285	
F750-150SHP	2"	102	4.50	6.38	6.38	14.00	4.75	4	5/8-11 UNC	PR/PK	285	
F765-150SHP	2½"	146	5.00	6.88	6.88	14.50	5.50	4	5/8-11 UNC		285	
F780-150SHP	3"	228	5.50	7.56	7.56	15.00	6.00	4	5/8-11 UNC		285	
F7100-150SHP	4"	451	6.50	8.63	8.63	16.00	7.50	8	5/8-11 UNC		285	
F7125-150SHP	5"	714	7.50	9.75	9.75	24.25	8.50	8	3/4-10 UNC	SY4…	285	
F7150-150SHP	6"	1103	8.00	10.25	10.25	24.75	9.50	8	3/4-10 UNC		285	
F7200-150SHP	8"	2064	9.00	11.50	11.50	32.00	11.75	8	3/4-10 UNC	SY4…	150	
F7250-150SHP	10"	3517	11.00	13.81	13.81	33.00	14.25	12	7/8-9 UNC	SY4…	150	
										SY5…	285	
F7300-150SHP	12"	4837	12.00	15.81	15.81	35.00	17.00	12	7/8-9 UNC	SY5…	150	
										SY7…	285	
F7350-150SHP	14"	6857	14.00	17.62	17.62	36.00	18.75	12	1-8 UNC	SY7…	285	
F7400-150SHP	16"	9287	15.00	19.00	19.00	37.50	21.25	16	1-8 UNC	SY7…	150	
										SY9…	285	
F7450-150SHP	18"	11400	16.50	21.00	21.00	42.25	22.75	16	1 1/8-8 UNC	SY8…	150	
										SY10…	285	

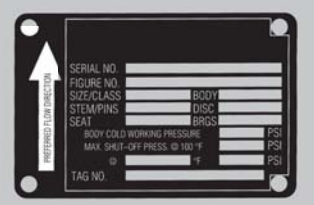
Dimensions "A, B and C" do not include flange gaskets. (3 required per valve)

Application Notes

1. Valves are rated at 285 psi differential pressure in the closed position @ 100°F media temperature.
2. Valves are furnished with lugs tapped for use between ANSI Class 125/150 flanges conforming to ANSI B16.5 Standards.
3. 3-way assemblies are furnished assembled with Tee, calibrated and tested, ready for installation. All 3-way assemblies require the customer to specify the 3-way configuration code prior to order entry to guarantee correct placement of valves and actuator(s) on the assembly.
4. Dimension "D" allows for actuator(s) removal without the need to remove the valve from the pipe.
5. Weather shields are available, dimensional data furnished upon request.
6. Dual actuated valves have single actuators mounted on each valve shaft.
7. Flange gaskets (3 required, not provided with valve) MUST be used between valve and ANSI flange.
8. Flange bolts are not included with the valve. These are furnished by others.

⚠ **Note:** For tee configuration, please refer to page 5.

SHP series valves have a preferred flow direction.



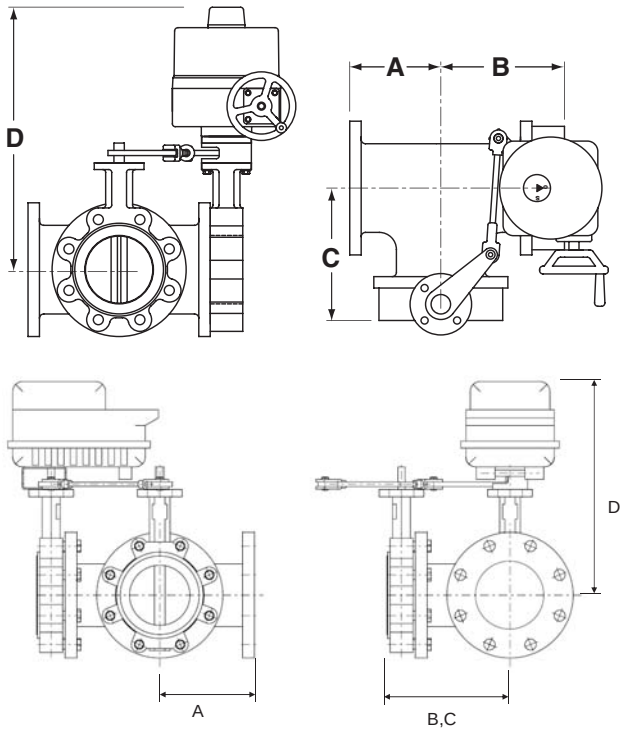
PreferredFlowrate

Safety Notes

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

Dimensions

D104



2 YEAR WARRANTY

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
Motor protection	H Class insulation (SY-1), F Class (SY-2…5)
Gear train	high alloy steel gear sets, self locking
Operating range	(SY…-24) on/off, floating point (SY...24MFT) 2-10 VDC, 4-20 mA, 0-10 VDC
Sensitivity	(SY…24MFT) 0.4 mA/200mV
Reversal hysteresis	(SY…24MFT)1.0 mA/500mV
Feedback	(SY…24MFT) 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	factory set for 5° and 85° change of state SY1: (2) SPDT, min 1 mA, 24 VAC; max 3A, 250 VAC. SY4-12: (2) SPDT, min 1 mA, 24 VAC; max 5A, 250 VAC.
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 24 VAC/VDC 50/60Hz, single phase

Model	Torque	Speed	Power Consumption	Duty Cycle		Override	Weight
				On/Off	MFT		
SY4-24(MFT)	400Nm/3560 in-lbs	16s	6.0A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY5-24(MFT)	500Nm/4450 in-lbs	22s	6.5A	30%	75%	Hand Wheel	22kg/48.5 lb.

SY...120V Series Non-Spring Return Actuator
Technical Data - 120 VAC

2 YEAR WARRANTY

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
Motor protection	H Class insulation (SY-1), F Class (SY-2…12)
Gear train	high alloy steel gear sets, self locking
Operating range	(SY…-110) on/off, floating point (SY...120MFT) 2-10 VDC, 4-20 mA, 0-10 VDC
Sensitivity	(SY…120MFT) 0.4 mA/200mV
Reversal hysteresis	(SY…120MFT) 1.0 mA/500mV
Feedback	(SY…120MFT) 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	factory set for 5° and 85° change of state SY1: (2) SPDT, min 1 mA, 24 VAC; max 3A, 250 VAC. SY4-12: (2) SPDT, min 1 mA, 24 VAC; max 5A, 250 VAC.
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

Note: Leakage current is possible (<3.5 mA).
Connect ground before applying voltage.

Power Supply 120 VAC 50/60Hz, single phase

Model	Torque	Speed 60Hz	Speed 50Hz	Power Consumption	Duty Cycle		Override	Weight
					On/Off	Proportional		
SY4-120(MFT)	400Nm/3560 in-lbs	16s	18s	1.3A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY5-120(MFT)	500Nm/4450 in-lbs	22s	25s	1.5A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY6-120(MFT)	650Nm/5785 in-lbs	28s	31s	1.8A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY7-120(MFT)	1000Nm/8900 in-lbs	46s	55s	3.2A	30%	75%	Hand Wheel	36kg/79.5 lb.
SY8-120(MFT)	1500Nm/13350 in-lbs	46s	55s	4.0A	30%	75%	Hand Wheel	36kg/79.5 lb.
SY9-120(MFT)	2000Nm/17800 in-lbs	58s	70s	3.2A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY10-120(MFT)	2500Nm/22250 in-lbs	58s	70s	4.0A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY11-120(MFT)	3000Nm/26700 in-lbs	58s	70s	3.0A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY12-120(MFT)	3500Nm/31150 in-lbs	58s	70s	4.0A	30%	50%	Hand Wheel	56kg/123.5 lb.

2 YEAR WARRANTY

Application:

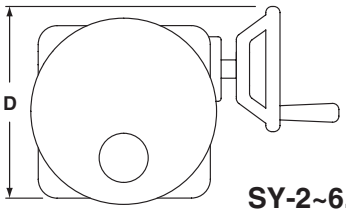
The SY actuators are NEMA 4X rated and designed to meet the needs of HVAC and Commercial applications. Offered on Belimo standard and high performance valve series, these actuators are available for on/off and modulating applications. Depending on the application, they are available in 24 VAC/ VDC, 120 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 (SY...230MFT) 2-10 VDC, 4-20 mA, 0-10 VDC
Sensitivity	(SY…230MFT) 0.4 mA/200mV
Reversal hysteresis	(SY…230MFT) 1.0 mA/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	factory set for 5° and 85° change of state SY1: (2) SPDT, min 1 mA, 24 VAC; max 3A, 250 VAC. SY4-12: (2) SPDT, min 1 mA, 24 VAC; max 5A, 250 VAC.
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

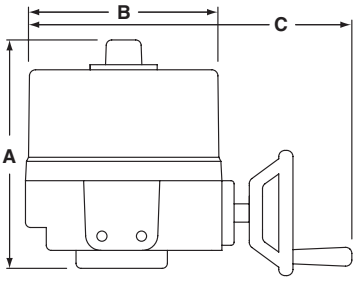
Power Supply 230 VAC 50/60Hz, single phase

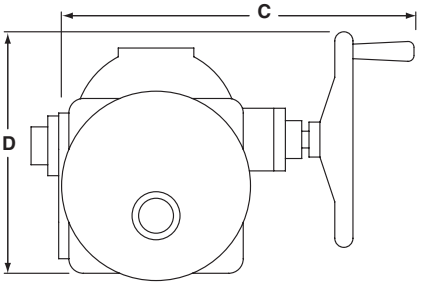
Model	Torque	Speed 60Hz	Speed 50Hz	Power Consumption	Duty Cycle		Override	Weight
					On/Off	MFT		
SY4-230(MFT)	400Nm/3560 in-lbs	16s	18s	0.6A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY5-230(MFT)	500Nm/4450 in-lbs	22s	25s	0.7A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY6-230(MFT)	650Nm/5785 in-lbs	28s	31s	0.8A	30%	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.

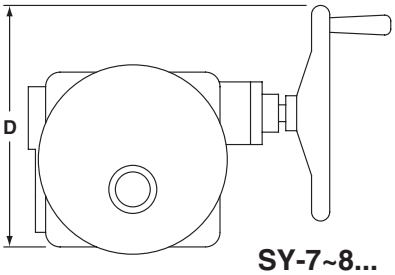
SY... Series Non-Spring Return Actuator Dimensions



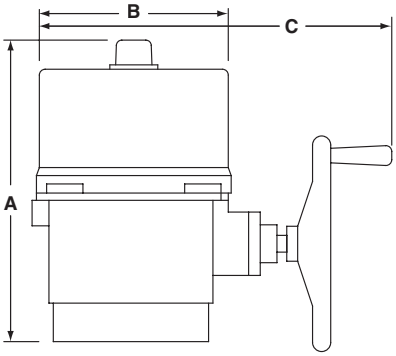
SY-2~6...

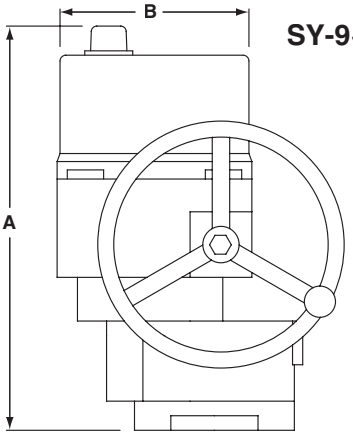






SY-7~8...





SY-9~12...

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]
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]

Power Supply 24 VAC/VDC Single Phase

Model #	Torque	Speed 50 Hz/60 Hz	Current Draw (50 Hz)	Current Draw (60 Hz)	W (50 Hz)	W (60 Hz)	VA (50 Hz)	VA (60 Hz)	Override	Weight
PRBUP-3-T*	1400 in-lbs/ 160 Nm	35 seconds	0.8 A	0.8 A	20	20	20	20	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-3-T*	1400 in-lbs/ 160 Nm	35, 30-120 seconds	0.8 A	0.8 A	20	20	20	20	Manual override crank	5.8 kg/12.8 lbs.
SY4-24	3540 in-lbs/ 400 Nm	30 seconds	9.5 A	9.5 A	208	212	228	228	Hand wheel	22 kg/48.5 lbs.
SY5-24	4430 in-lbs/ 500 Nm	35 seconds	9.3 A	9.4 A	178	168	223	227	Hand wheel	22 kg/48.5 lbs.

Power Supply 120 VAC Single Phase

Model #	Torque	Speed 50 Hz	Speed 60 Hz	Current Draw (50 Hz)	Current Draw (60 Hz)	W (50 Hz)	W (60 Hz)	VA (50 Hz)	VA (60 Hz)	Override	Weight
PRBUP-3-T*	1400 in-lbs/ 160 Nm	35 seconds	35 seconds	0.2 A	0.2 A	18	18	23	23	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-3-T*	1400 in-lbs/ 160 Nm	35, 30-120 seconds	35, 30-120 seconds	0.2 A	0.2 A	18	18	23	23	Manual override crank	5.8 kg/12.8 lbs.
SY4-110	3540 in-lbs/ 400 Nm	21 seconds	18 seconds	2.2 A	1.8 A	240	196	264	216	Hand wheel	22 kg/48.5 lbs.
SY5-110	4430 in-lbs/ 500 Nm	29 seconds	25 seconds	2.2 A	1.8 A	242	193	264	216	Hand wheel	22 kg/48.5 lbs.
SY6-110	5750 in-lbs/ 650 Nm	37 seconds	32 seconds	2.2 A	1.8 A	247	198	264	216	Hand wheel	22 kg/48.5 lbs.
SY7-110	8850 in-lbs/ 1000 Nm	59 seconds	49 seconds	6.4 A	3.5 A	670	385	768	420	Hand wheel	36 kg/79.5 lbs.
SY8-110	13280 in-lbs/ 1500 Nm	60 seconds	50 seconds	8.2 A	4.8 A	847	514	984	576	Hand wheel	36 kg/79.5 lbs.
SY9-110	17700 in-lbs/ 2000 Nm	68 seconds	57 seconds	2.7 A	2.8 A	304	311	324	336	Hand wheel	72 kg/176.4 lbs.
SY10-110	22130 in-lbs/ 2500 Nm	75 seconds	62 seconds	2.8 A	2.9 A	318	335	336	348	Hand wheel	72 kg/176.4 lbs.
SY11-110	26550 in-lbs/ 3000 Nm	78 seconds	69 seconds	3.3 A	3.6 A	365	387	396	432	Hand wheel	72 kg/176.4 lbs.
SY12-110	30980 in-lbs/ 3500 Nm	72 seconds	60 seconds	3.7 A	3.8 A	415	422	444	456	Hand wheel	72 kg/176.4 lbs.

Power Supply 230 VAC Single Phase

Model #	Torque	Speed 50 Hz	Speed 60 Hz	Current Draw (50 Hz)	Current Draw (60 Hz)	W (50 Hz)	W (60 Hz)	VA (50 Hz)	VA (60 Hz)	Override	Weight
PRBUP-3-T*	1400 in-lbs/ 160 Nm	35 sec.	35 sec.	0.2 A	0.2 A	20	20	52	52	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-3-T*	1400 in-lbs/ 160 Nm	35, 30-120 sec.	35, 30-120 sec.	0.2 A	0.2 A	20	20	52	52	Manual override crank	5.8 kg/12.8 lbs.
SY4-220	3540 in-lbs/ 400 Nm	21 seconds	18 seconds	1.1 A	0.9 A	221	180	253	207	Hand wheel	22 kg/48.5 lbs.
SY5-220	4430 in-lbs/ 500 Nm	29 seconds	25 seconds	1.1 A	0.9 A	216	179	253	207	Hand wheel	22 kg/48.5 lbs.
SY6-220	5750 in-lbs/ 650 Nm	38 seconds	31 seconds	1.0 A	0.9 A	193	177	230	207	Hand wheel	22 kg/48.5 lbs.
SY7-220	8850 in-lbs/ 1000 Nm	58 seconds	48 seconds	1.8 A	1.4 A	381	290	414	322	Hand wheel	36 kg/79.5 lbs.
SY8-220	13280 in-lbs/ 1500 Nm	59 seconds	49 seconds	1.9 A	1.4 A	428	294	437	322	Hand wheel	36 kg/79.5 lbs.
SY9-220	17700 in-lbs/ 2000 Nm	68 seconds	57 seconds	1.6 A	2.4 A	356	509	368	552	Hand wheel	72 kg/176.4 lbs.
SY10-220	22130 in-lbs/ 2500 Nm	73 seconds	62 seconds	1.7 A	2.5 A	377	531	391	579	Hand wheel	72 kg/176.4 lbs.
SY11-220	26550 in-lbs/ 3000 Nm	46 seconds	64 seconds	1.8 A	2.5 A	397	547	414	579	Hand wheel	72 kg/176.4 lbs.
SY12-220	30980 in-lbs/ 3500 Nm	74 seconds	61 seconds	1.8 A	2.4 A	409	505	414	552	Hand wheel	72 kg/176.4 lbs.

*-200 and -250 versions have the same ratings.

BELIMO

Power Supply 24 VAC/VDC Single Phase

Model #	Torque	Speed 50 Hz/60 Hz	Current Draw (50 Hz)	Current Draw (60 Hz)	W (50 Hz)	W (60 Hz)	VA (50 Hz)	VA (60 Hz)	Override	Weight
PRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.9 A	0.9 A	20	20	20	20	Manual override crank	5.8 kg/12.8 lbs.
PKRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	2.2 A	2.2 A	52	52	55	55	Manual override crank	6.4 kg/14.1 lbs.
SY4-24MFT	3540 in-lbs/ 400 Nm	23 seconds	11.0 A	11.0 A	254	251	264	264	Hand wheel	22 kg/48.5 lbs.
SY5-24MFT	4430 in-lbs/ 500 Nm	30 seconds	10.2 A	10.2 A	232	230	245	245	Hand wheel	22 kg/48.5 lbs.

Power Supply 120 VAC Single Phase

Model #	Torque	Speed 50 Hz	Speed 60 Hz	Current Draw (50 Hz)	Current Draw (60 Hz)	W (50 Hz)	W (60 Hz)	VA (50 Hz)	VA (60 Hz)	Override	Weight
PRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	30-120 sec.	0.2 A	0.2 A	18	18	23	23	Manual override crank	5.8 kg/12.8 lbs.
PKRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	30-120 sec.	0.3 A	0.3 A	40	40	43	43	Manual override crank	6.4 kg/14.1 lbs.
SY4-120MFT	3540 in-lbs/ 400 Nm	16 seconds	17 seconds	2.3 A	2.4 A	258	256	276	288	Hand wheel	22 kg/48.5 lbs.
SY5-120MFT	4430 in-lbs/ 500 Nm	21 seconds	21 seconds	2.3 A	2.3 A	216	208	276	276	Hand wheel	22 kg/48.5 lbs.
SY6-120MFT	5750 in-lbs/ 650 Nm	28 seconds	29 seconds	2.2 A	2.2 A	240	236	264	264	Hand wheel	22 kg/48.5 lbs.
SY7-120MFT	8850 in-lbs/ 1000 Nm	41 seconds	44 seconds	1.8 A	1.7 A	198	192	216	204	Hand wheel	36 kg/79.5 lbs.
SY8-120MFT	13280 in-lbs/ 1500 Nm	48 seconds	48 seconds	2.6 A	2.6 A	275	266	312	312	Hand wheel	36 kg/79.5 lbs.
SY9-120MFT	17700 in-lbs/ 2000 Nm	47 seconds	47 seconds	3.6 A	3.4 A	397	382	432	408	Hand wheel	72 kg/176.4 lbs.
SY10-120MFT	22130 in-lbs/ 2500 Nm	52 seconds	51 seconds	4.0 A	4.0 A	450	445	480	480	Hand wheel	72 kg/176.4 lbs.
SY11-120MFT	26550 in-lbs/ 3000 Nm	55 seconds	56 seconds	3.1 A	3.0 A	332	318	372	360	Hand wheel	72 kg/176.4 lbs.
SY12-120MFT	30980 in-lbs/ 3500 Nm	61 seconds	62 seconds	3.6 A	3.4 A	386	368	432	408	Hand wheel	72 kg/176.4 lbs.

Power Supply 230 VAC Single Phase

Model #	Torque	Speed 50 Hz	Speed 60 Hz	Current Draw (50 Hz)	Current Draw (60 Hz)	W (50 Hz)	W (60 Hz)	VA (50 Hz)	VA (60 Hz)	Override	Weight
PRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	30-120 sec.	0.1 A	0.1 A	20	20	52	52	Manual override crank	5.8 kg/12.8 lbs.
PKRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	30-120 sec.	0.2 A	0.2 A	40	40	68	68	Manual override crank	6.4 kg/14.1 lbs.
SY4-230MFT	3540 in-lbs/ 400 Nm	16 seconds	17 seconds	1.1 A	1.1 A	222	217	253	253	Hand wheel	22 kg/48.5 lbs.
SY5-230MFT	4430 in-lbs/ 500 Nm	22 seconds	22 seconds	1.1 A	1.0 A	211	200	253	230	Hand wheel	22 kg/48.5 lbs.
SY6-230MFT	5750 in-lbs/ 650 Nm	32 seconds	32 seconds	1.1 A	1.1 A	236	232	253	253	Hand wheel	22 kg/48.5 lbs.
SY7-230MFT	8850 in-lbs/ 1000 Nm	44 seconds	44 seconds	0.9 A	0.8 A	167	157	207	184	Hand wheel	36 kg/79.5 lbs.
SY8-230MFT	13280 in-lbs/ 1500 Nm	55 seconds	57 seconds	1.3 A	1.4 A	288	286	299	322	Hand wheel	36 kg/79.5 lbs.
SY9-230MFT	17700 in-lbs/ 2000 Nm	61 seconds	61 seconds	1.1 A	1.1 A	240	233	253	253	Hand wheel	72 kg/176.4 lbs.
SY10-230MFT	22130 in-lbs/ 2500 Nm	72 seconds	70 seconds	1.4 A	1.4 A	277	284	322	322	Hand wheel	72 kg/176.4 lbs.
SY11-230MFT	26550 in-lbs/ 3000 Nm	44 seconds	48 seconds	2.0 A	1.9 A	376	363	460	437	Hand wheel	72 kg/176.4 lbs.
SY12-230MFT	30980 in-lbs/ 3500 Nm	47 seconds	51 seconds	2.2 A	2.0 A	490	456	506	460	Hand wheel	72 kg/176.4 lbs.

*-200 and -250 versions have the same ratings.

W546_12

SY Actuator Wiring Diagram, SY1…5-24V – On/Off
SY1…12-120V or 230V On/Off

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.

Transformer sizing = SY actuator draw X 1.25 (safety margin)
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A,
3.75A X 24 VAC = 90VA Transformer).

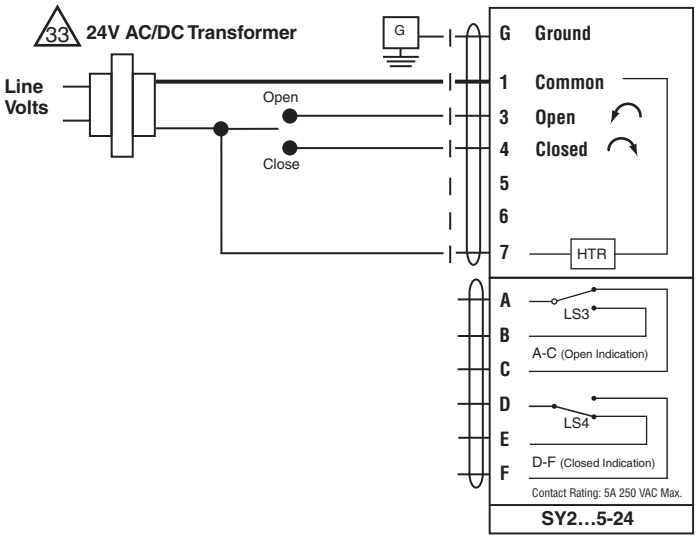
NOTES SY1…5-24

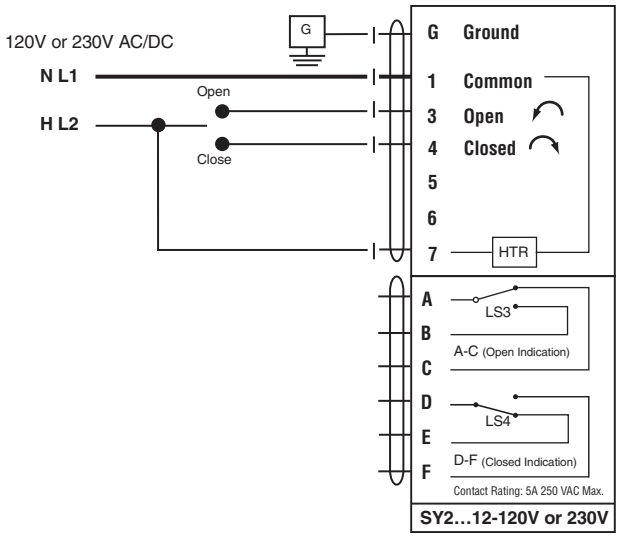
33 Each actuator should be powered by a single, isolated control transformer.

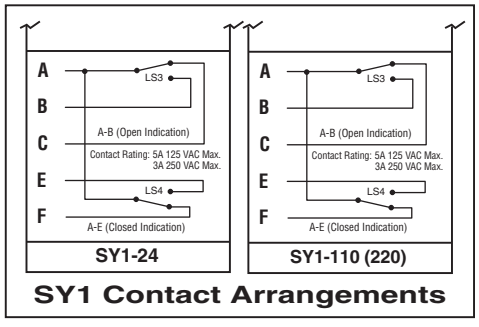
- Isolation relays must be used in parallel connection of multiple actuators using a common control signal input.
- "H" cannot be connected to terminal #3 and #4 simultaneously.

NOTES SY1…12-120V or 230V

- **Caution:** Power Supply Voltage
- Isolation relays must be used in parallel connection of multiple actuators using a common control signal input.
- "H" (L2) cannot be connected to terminal #3 and #4 simultaneously.







Wiring for Control Valves
Proportional, 24V, 120/230V

W547_2_11

Actuator: **SY2…5-24MFT** **SY2...12-120MFT** **SY2...12-230MFT**

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.

Transformer sizing = SY actuator draw X 1.25 (safety margin)
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A, 3.75A X 24 VAC = 90VA Transformer)

APPLICATION NOTES

34 Ground shielded wire at control panel chassis.
Tape back ground at actuator.

36 Use of feedback is optional.

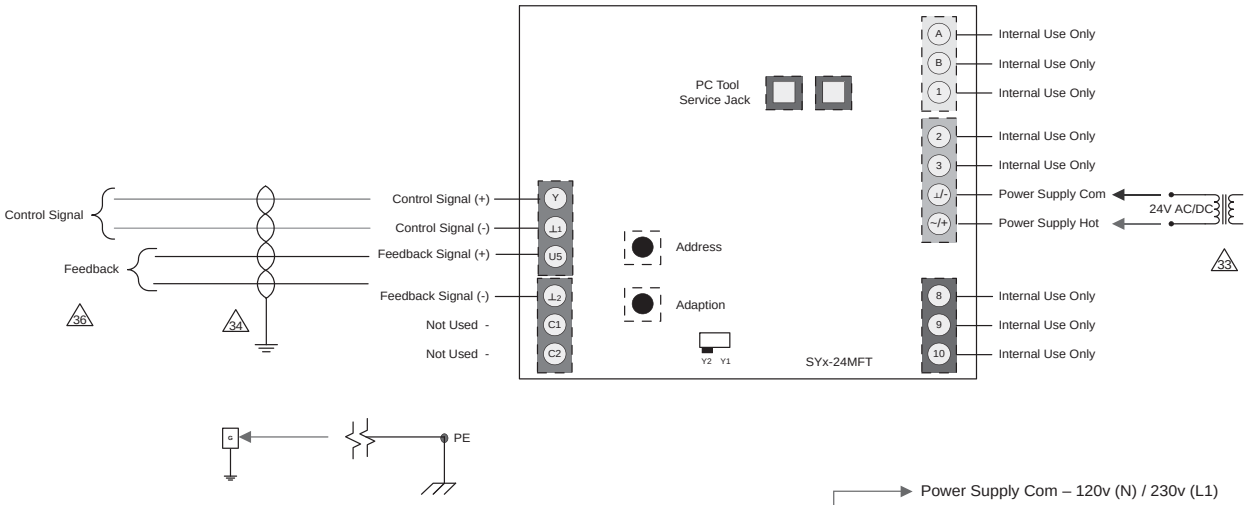
NOTES SY2...5-24MFT

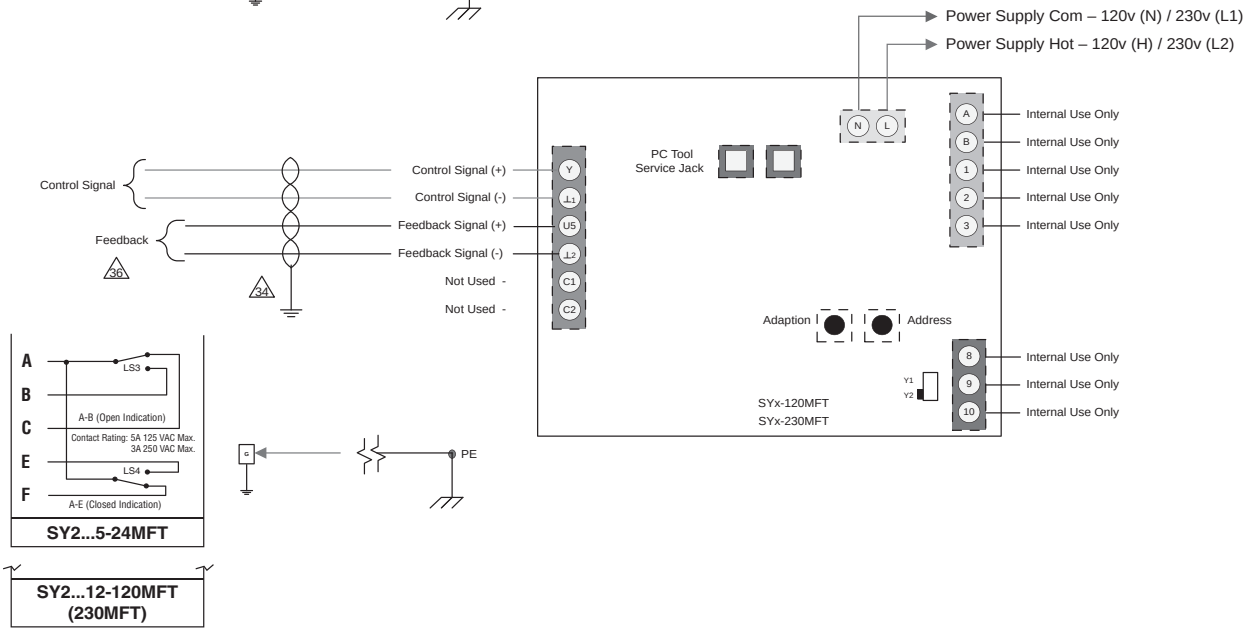
33 Each actuator should be powered by a single, isolated control transformer.

- Power supply Com/Neutral and Control Signal "–" wiring to a common is prohibited.

NOTES SY2...12-120MFT (230MFT)

- **Caution:** Power supply voltage.





W549_11

SY Actuator Wiring Diagram, SY1…5-24 – Multiple Wiring
SY1…12-110 (220) – Multiple Wiring

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.

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 OK with one actuator because the voltage generated in the second winding isn't connected to anything so there is no flow; it has no magnetic effect on the motor.
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 then trying 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.

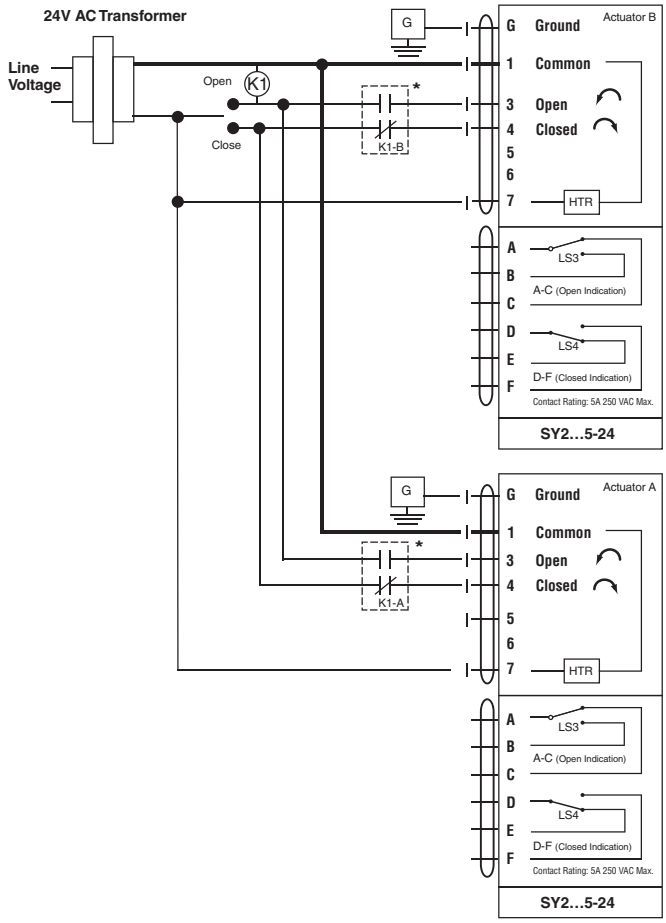
INSTALLATION NOTES

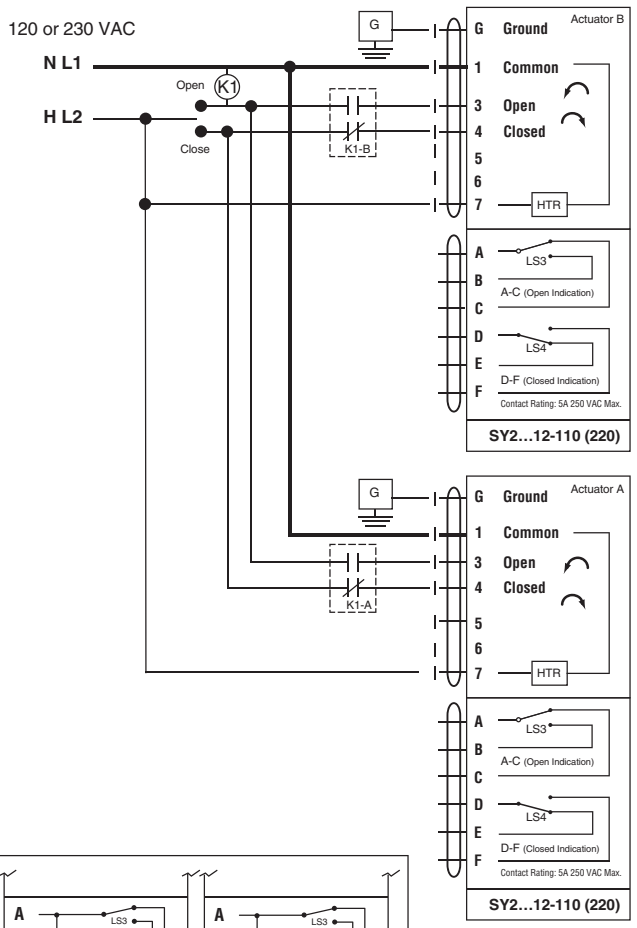
Observe class 1 and class 2 wiring restrictions.

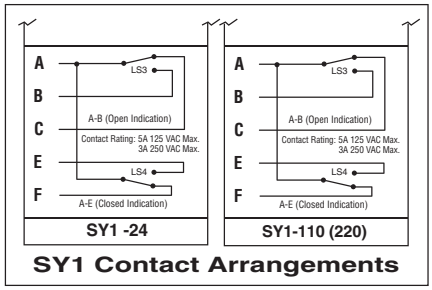
Transformer sizing = SY actuator draw X 1.25 (safety margin)
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A,
3.75A X 24 VAC = 90VA Transformer).

NOTES

- **Caution:** Power Supply Voltage.
- Isolation relays must be used in parallel connection of multiple actuators using a common control signal input. Should be DPDT.
- "H" (L2) cannot be connected to terminal #3 and #4 simultaneously.
- **Required:** Terminal #7 needs to be field wired to enable heater circuit.







W550_2_11

Actuators: SY2...5-24MFT

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.

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 OK with one actuator because the voltage generated in the second winding isn't connected to anything so there is no flow; it has no magnetic effect on the motor.
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 then trying 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.

INSTALLATION NOTES

Observe class 1 and class 2 wiring restrictions.

Transformer sizing = SY actuator draw X 1.25 (safety margin)
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A,
3.75A X 24 VAC = 90VA Transformer).

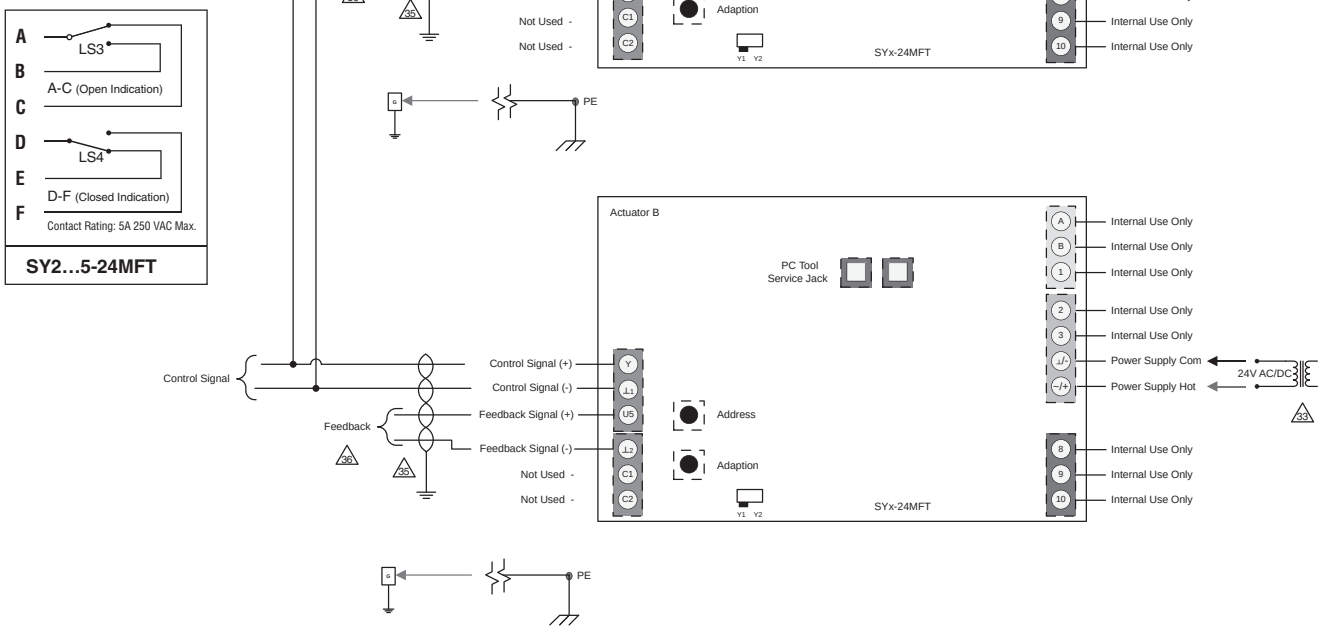
NOTES SY2...5-24MFT

33 Each actuator should be powered by a single, isolated control transformer.

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.



W552_2

Actuators: SY2...12-120MFT SY2...12-230MFT

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.

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 OK with one actuator because the voltage generated in the second winding isn't connected to anything so there is no flow; it has no magnetic effect on the motor.
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 then trying 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.

INSTALLATION NOTES

Observe class 1 and class 2 wiring restrictions.

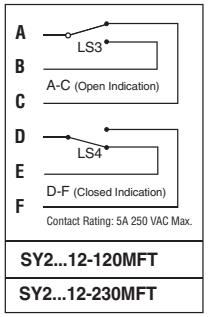
APPLICATION NOTES

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

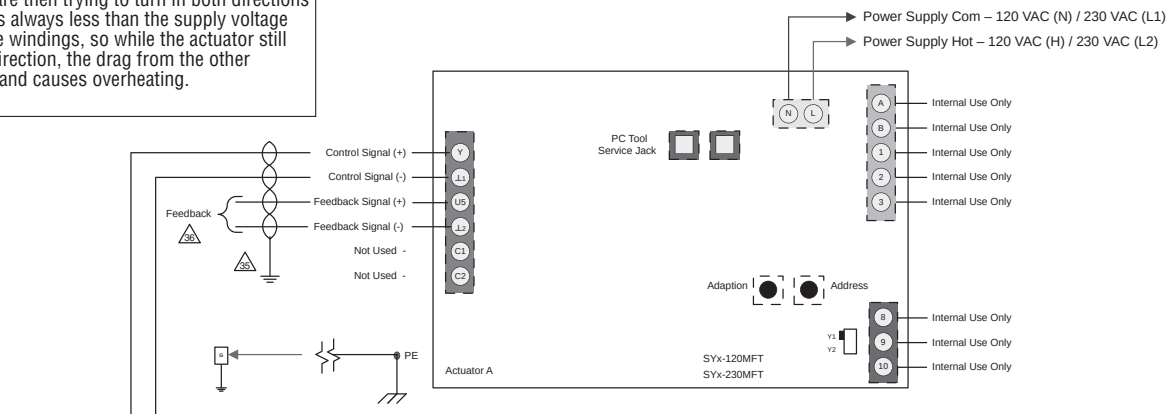
36 Use of feedback is optional.

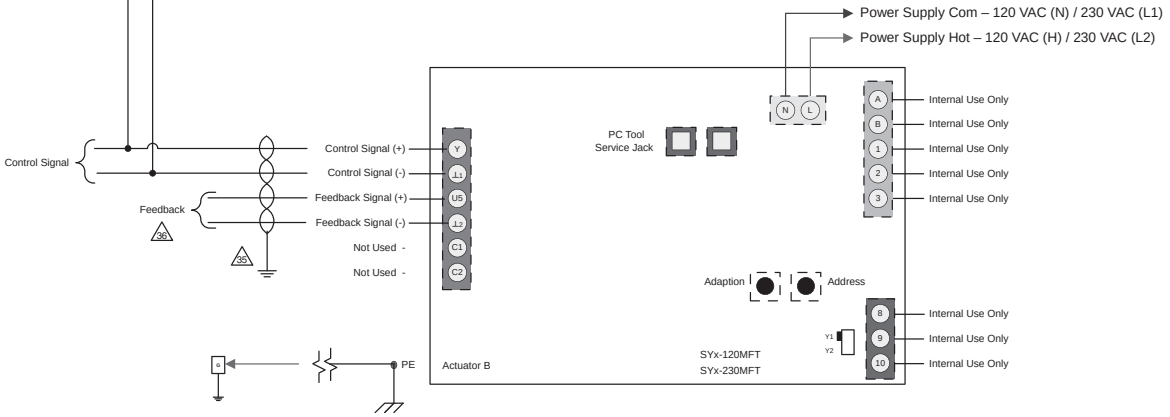
NOTES SY2...12-120MFT (230MFT)

- **Caution:** Power supply voltage.



SY2...12-120MFT
SY2...12-230MFT





AFBUP(-S)-X1, AFXUP(-S)-X1 Actuators, On/Off

Models

AFBUP-X1
AFBUP-S-X1
AFXUP-X1
AFXUP-S-X1

Technical Data		
Power supply		24...240 VAC -20% / +10%, 50/60 Hz 24...125 VDC ±10%
Power consumption	running	7 W
	holding	3.5 W
Transformer sizing		7 VA @ 24 VAC (class 2 power source) 8.5 VA @ 120 VAC 18 VA @ 240 VAC
Electrical connection		
AFBUP...		3 ft, 18 GA appliance cable, 1/2" conduit connector **-S models:** Two 3 ft, 18 gauge appliance cables with 1/2" conduit connectors
AFXUP...		3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance cable, with or without 1/2" conduit connector **-S models:** Two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables with or without 1/2" conduit connectors
Overload protection		Electronic throughout 0 to 95° rotation
Control		On/Off
Torque		180 in-lb [20 Nm] minimum
Direction of rotation	spring	reversible with CW/CCW mounting
Mechanical angle of rotation		95° (adjustable with mechanical end stop, 35° to 95°)
Running time	motor	< 75 sec
	spring	20 sec @ -4°F to 122°F [-20°C to 50°C]; < 60 sec @ -22°F [-30°C]
Position indication		visual indicator, 0° to 95° (0° is full spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Humidity		max. 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		Nema 2, IP54, Enclosure Type2
Housing material		Zinc coated metal and plastic casing
Agency listings †		cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC
Noise level		<50dB(A) motor @ 75 seconds ≤62dB(A) spring return
Servicing		maintenance free
Quality standard		ISO 9001
Weight		4.6 lbs (2.1 kg), 4.9 lbs (2.25 kg) with switches

† Rated Impulse Voltage 4kV, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFBUP-S-X1, AFXUP-S-X1	
Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL Approved one set at +10°, one adjustable 10° to 90°

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 ***CAUTION** Equipment Damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

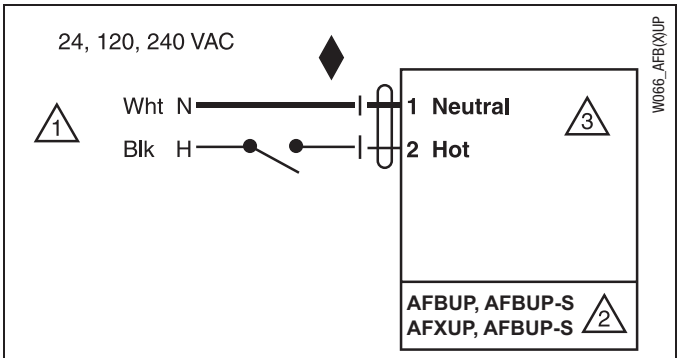
3 No ground connection is required.

4 For end position indication, interlock control, fan startup, etc., AFBUP-S-X1 and AFXUP-S-X1 incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

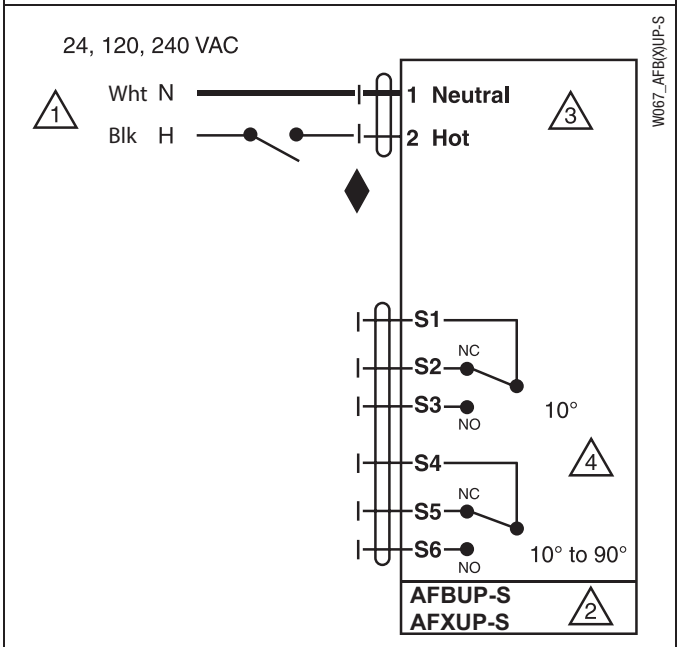
APPLICATION NOTES

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.



On/Off wiring for AFBUP-X1, AFXUP-X1



Auxiliary Switches for AFBUP-S-X1, AFXUP-S-X1

AF Actuators, Multi-Function Technology

Models

AFX24-MFT-X1
AFX24-MFT-S-X1 w/built-in Aux. Switches
2*AFX24-MFT-X1
2*AFX24-MFT-S-X1

Technical Data	
Power supply	24 VAC, +/- 20%, 50/60 Hz 24 VDC, +20% / -10%
Power consumption♦ running	7.5 W
Power consumption♦ holding	3 W
Transformer sizing	10 VA (Class 2 power source)
Electrical connection AFX...	 3 ft [1m] default, 10 ft [3m] or 16 ft [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector **-S models:** two 3 ft [1m] default, 10 ft [3m] or 16 ft [5m] appliance cables with or without 1/2" conduit connectors
Overload protection	electronic throughout 0 to 95° rotation
Operating range Y*	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off)
Input impedance	100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1500 Ω for PWM, floating point and on/off control
Feedback output U*	2 to 10 VDC, 0.5 mA max
Torque	minimum 180 in-lb (20 Nm)
Direction of rotation* spring	reversible with cw/ccw mounting
Direction of rotation* motor	reversible with built-in switch
Mechanical angle of rotation*	95° (adjustable with mechanical end stop, 35° to 95°)
Running time spring	<20 sec @ -4°F to 122°F [-20° C to 50° C]; <60 sec @ -22°F [-30° C]
Running time motor*	150 seconds (default), variable (70 to 220 seconds)
Angle of rotation adaptation	off (default)
Override control*	min position = 0% mid. position = 50% max. position = 100%
Position indication	visual indicator, 0° to 95° (0° is spring return position)
Manual override	5 mm hex crank (3/16" Allen), supplied
Humidity	max. 95% RH, non-condensing
Ambient temperature	-22 to 122° F (-30 to 50° C)
Storage temperature	-40 to 176° F (-40 to 80° C)
Housing	NEMA 2, IP54, Enclosure Type 2
Housing material	zinc coated metal and plastic casing
Noise level	≤40dB(A) motor @ 150 seconds, run time dependent ≤62dB(A) spring return
Agency listings †	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC
Quality standard	ISO 9001
Servicing	maintenance free
Weight	4.6 lbs. (1.9 kg), 4.9 lbs. (2 kg) with switch

* Variable when configured with MFT options

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

♦ Programmed for 70 sec motor run time. At 150 sec motor run time, transformer sizing is 8.5 VA and power consumption is 6 W running / 3 W holding.

AFX24-MFT-S-X1	
Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90°

Wiring Diagrams

INSTALLATION NOTES

3 Actuators may also be powered by 24 VDC.

4 IN4004 or IN4007 diode (IN4007 supplied, Belimo part number 40155).

5 Triac A and B can also be contact closures.

6 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

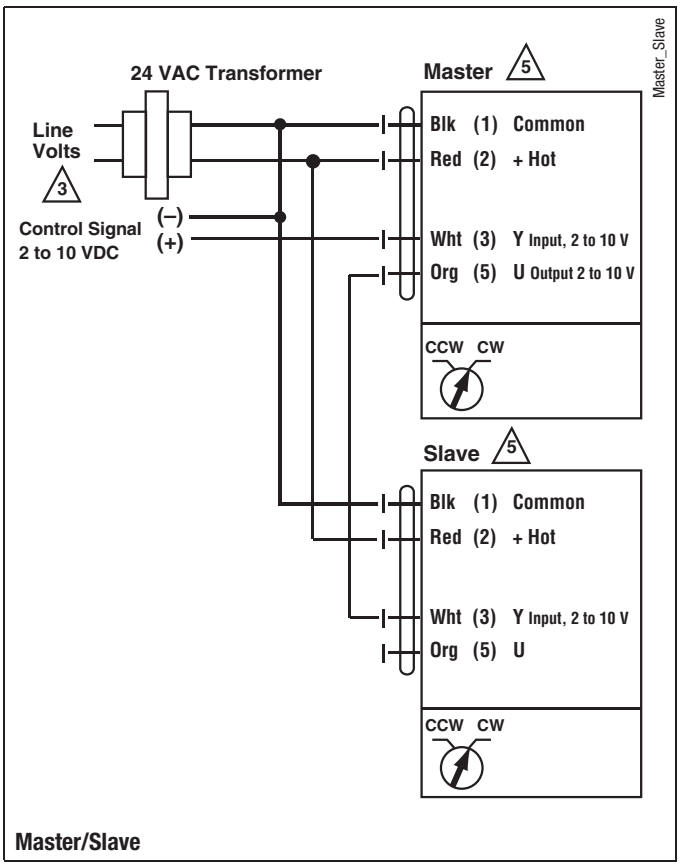
7 Position feedback cannot be used with Triac sink controller. The actuators internal common reference is not compatible.

APPLICATION NOTES

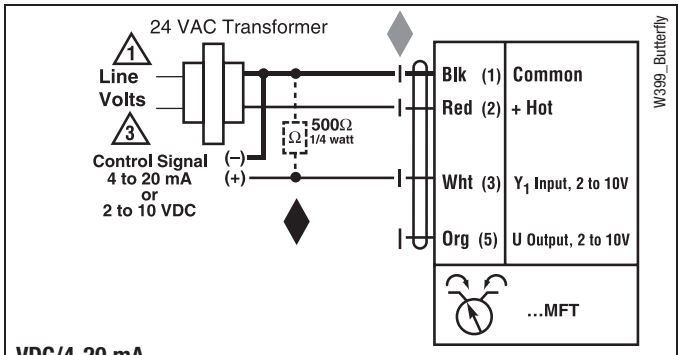
- The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.
- Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING *Live Electrical Components!*

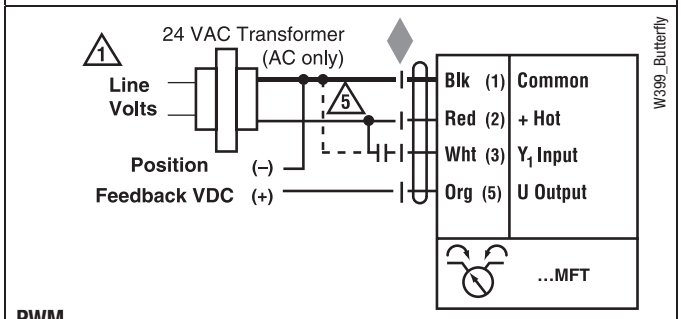
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



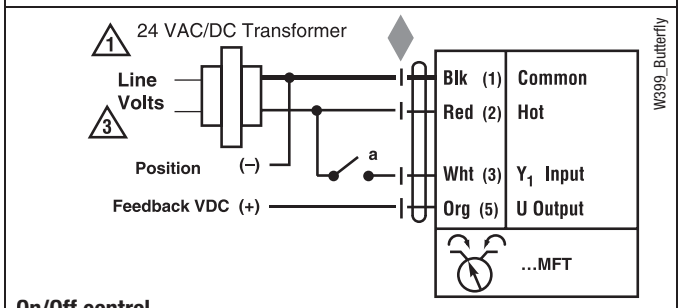
Master/Slave



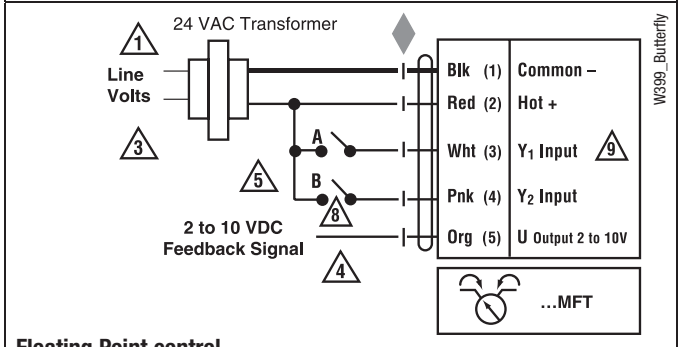
VDC/4-20 mA



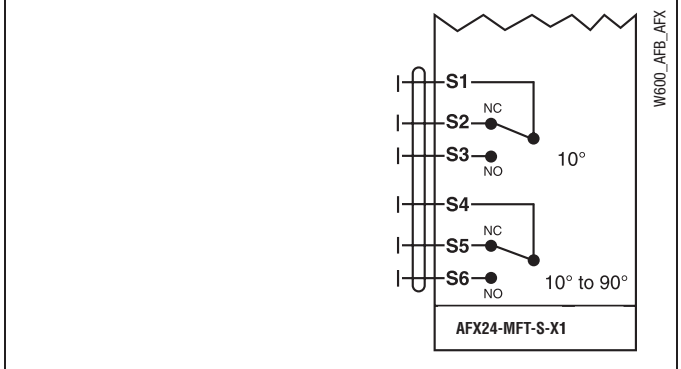
PWM



On/Off control



Floating Point control



Auxiliary Switches for AFX24-MFT-S-X1

DKRX24-3-T, DKRX(B)24-3-T N4(H)
NEMA 2/NEMA 4 Actuators, On/Off, Floating Point

Models

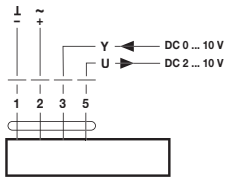
DKRX24-3-T	w/terminal block
DKRX24-3-T N4	w/terminal block
DKRB24-3-T N4H	w/heater

Technical Data		
Control		on/off, floating point
Power supply		24 VAC ± 20/-10% 50/60 Hz
Power consumption	running	12W / heater 33W
	holding	3W
Transformer sizing		21 VA (class 2 power source) / heater 36 VA
Electrical connection		screw terminal (for 22 to 12 AWG wire)
Overload protection		electronic throughout 0° to 90° rotation
Input impedance		100 Ω at control input 1500 Ω floating point
Angle of rotation		90°
Position indication		visual pointer (N4)
Manual override		internal push button (UL Type 4) external push buttom (UL Type 2)
Running time		150 seconds (default)
Fail-Safe		35 seconds
Humidity		5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material		Polycarbonate
Agency listings		cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC		CE according to 2004/108/EC
Quality standard		ISO 9001
Servicing		maintenance free

Electrical Installation

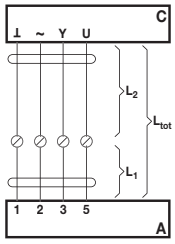
Wiring diagram

Note
- Connect via safety isolation transformer.
- Parallel connection of other actuators possible. Note performance data for supply.

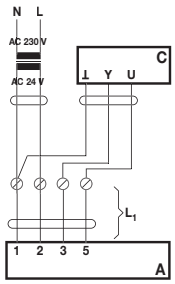


Cable lengths

Note
When several actuators are connected in parallel, the maximum cable length must be divided by the number of actuators.



Note
There are no special restrictions on installation if the supply and data cable are routed separately.



Cable colors:
1 = black
2 = red
3 = white
5 = orange

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)
L_2 = Customer cable
L_{tot} = Maximum cable length

Cross section L_2 ⊥ / ~	Max. cable length $L_{tot} = L_1 + L_2$ AC	DC	Example for DC
0.75 mm²	≤30 m	≤5 m	1 m (L_1) + 4 m (L_2)
1.00 mm²	≤40 m	≤8 m	1 m (L_1) + 7 m (L_2)
1.50 mm²	≤70 m	≤12 m	1 m (L_1) + 11 m (L_2)
2.50 mm²	≤100 m	≤20 m	1 m (L_1) + 19 m (L_2)

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 ***CAUTION*** *Equipment Damage!*
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.

5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

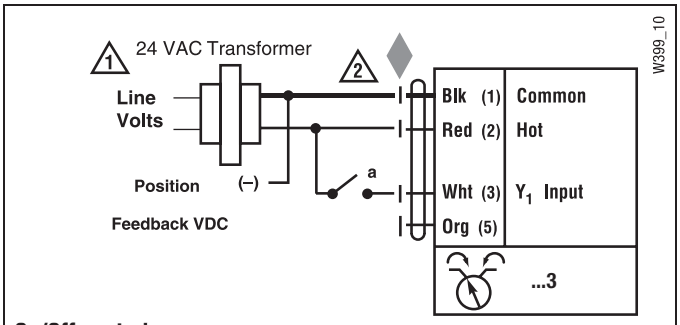
8 Contact closures A & B also can be triacs.
A & B should both be closed for triac source and open for triac sink.

9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

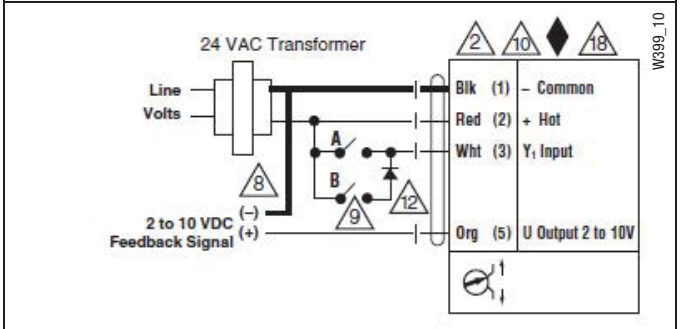
APPLICATION NOTES

Meets UL 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.



On/Off control



Floating Point control

DKRX24-MFT-T, DKRX(B)24-MFT-T N4(H)
NEMA 2/NEMA 4 Actuators, Multi-Function Technology

MFT

Models

DKRX24-MFT-T	w/terminal block
DKRX24-MFT-T N4	w/terminal block
DKRB24-MFT-T N4H	w/heater

Technical Data	
Control	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	12 W / heater 33W
holding	3 W
Transformer sizing	21 VA (class 2 power source) / heater 36 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 90° rotation
Input impedance	100 kΩ (0.1 mA) 500 Ω 1500 Ω (floating point, on/off)
Angle of rotation	90° electronically variable
Position indication	visual pointer (N4)
Manual override	internal push button (UL Type 4) external push buttom (UL Type 2)
Running time	150 seconds (default) variable (75 to 290 seconds)
Fail-Safe	35 seconds
Humidity	5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001
Servicing	maintenance free

Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△3 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

△8 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

△9 Contact closures A & B also can be triacs.
A& B should both be closed for triac source and open for triac sink.

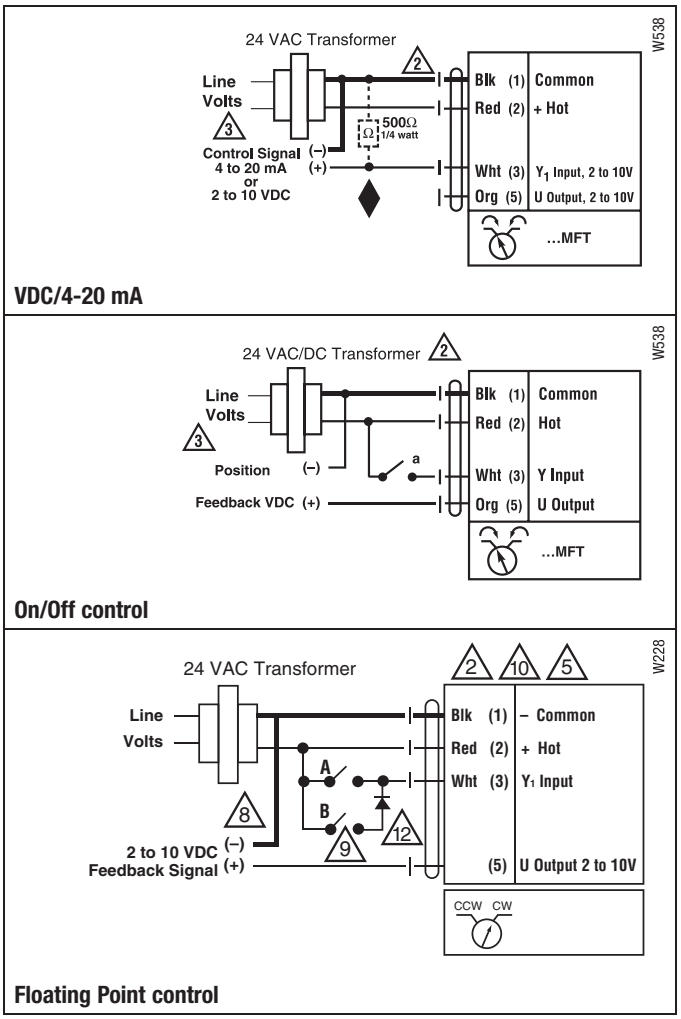
△10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

△12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).

APPLICATION NOTES

◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

***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.



DRCX24-3-T, DRCX(B)24-3-T N4(H)
NEMA 2/NEMA 4 Actuators, On/Off, Floating Point

Models

DRCX24-3-T	w/terminal block
DRCX24-3-T N4	w/terminal block
DRCB24-3-T N4H	w/heater

Technical Data	
Control	on/off, floating point
Power supply	24 VAC ± 20/-10% 50/60 Hz 24 VDC ± 10%
Power consumption running	9W / heater 29W
holding	2W
Transformer sizing	12 VA (class 2 power source) / heater 27 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 90° rotation
Input impedance	1000 Ω at control input
Angle of rotation	90°
Position indication	visual pointer
Manual override	internal push button (UL Type 4) external push buttom (UL Type 2)
Running time	35 seconds (default)
Humidity	5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△4 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

△8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

△9 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.

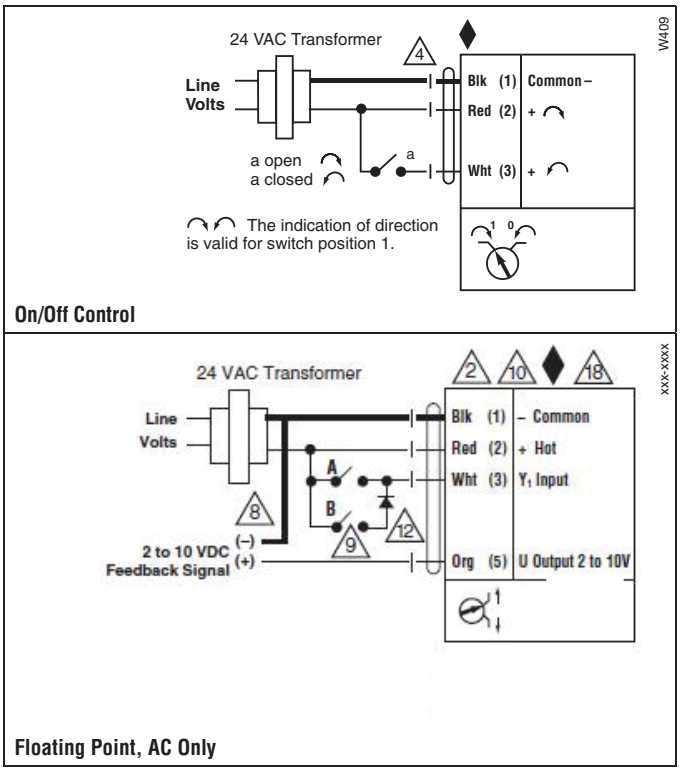
△10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

APPLICATION NOTES

♦ Meets cULus or UL and CSA 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.

⚠ ***WARNING** Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



DRX24-MFT-T, DRX24-MFT-T N4, DRCX24-MFT-T, DRCX(B)24-MFT-T N4(H)
NEMA 2/NEMA 4 Actuators, Multi-Function Technology

MFT

Models

DRX24-MFT-T	w/terminal block
DRX24-MFT-T N4	w/terminal block
DRCX24-MFT-T	w/terminal block
DRCX24-MFT-T N4	w/terminal block
DRCB24-MFT-T N4H	w/heater

Technical Data		
Control		2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	6.5 W / heater 27W
	holding	2.5 W
Transformer sizing		9.5 VA (class 2 power source) / heater 25 VA
Electrical connection		screw terminal (for 22 to 12 AWG wire)
Overload protection		electronic throughout 0° to 90° rotation
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1000 Ω for floating point and on-off control
Angle of rotation		90° electronically variable
Position indication		visual pointer
Manual override		internal push button (UL Type 4) external push buttom (UL Type 2)
Running time		
DRX...		150 seconds
DRCX...		35 seconds
Humidity		5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material		Polycarbonate
Agency listings		cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14"
EMC		CE according to 2004/108/EC
Quality standard		ISO 9001

Wiring Diagrams

INSTALLATION NOTES

CAUTION *Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

3 Actuators may also be powered by 24 VDC.

5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

8 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

9 Contact closures A & B also can be triacs.
A& B should both be closed for triac source and open for triac sink.

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.

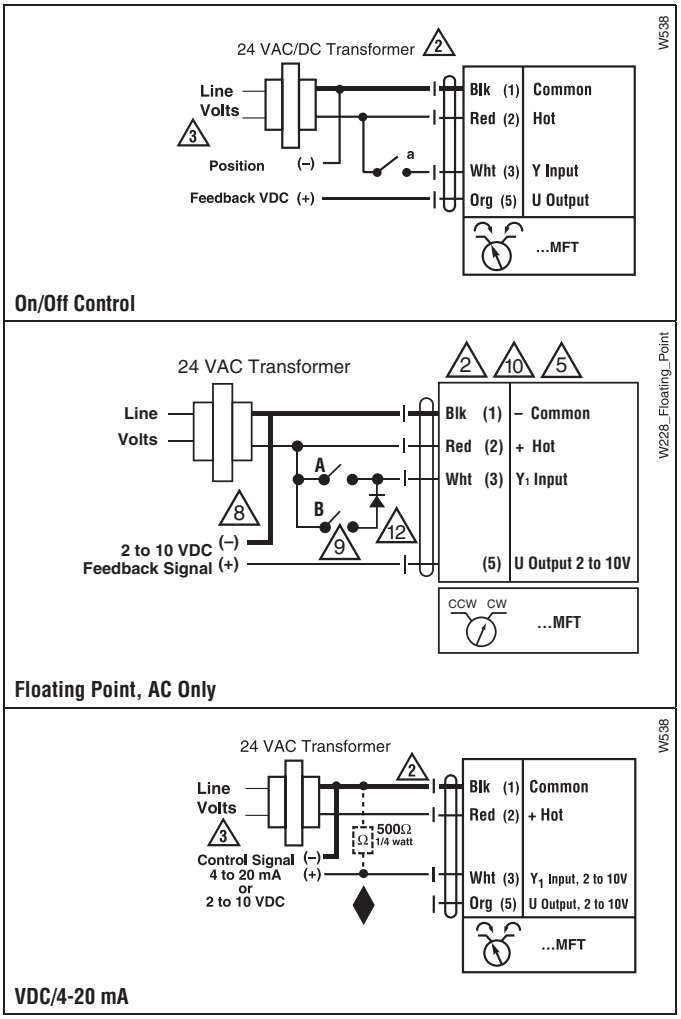
12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).

APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

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.

WARNING *Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



GK Actuators, On/Off, Floating Point

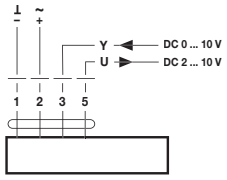
Models

GKRB24-3-X1
GKRB24-3-5
GKB24-3-X1

Technical Data	
Power supply	24VAC ±20% 50/60Hz
Power consumption	12W (3W)
Transformer sizing	21VA (class 2 power source)
Electrical connection	18 GA plenum rated cable ½" conduit connector protected NEMA 2 (IP54) 3 ft [1m] 10 ft [3m] 16 ft [5m]
Overload protection	electronic throughout 0 to 95 rotation
Operation range Y	on/off, floating point
Input impedance	100kΩ (0.1 mA), 500Ω 1500Ω (floating point, on/off)
Feedback output U	2 to 10VDC, 0.5mA max, VDC variable
Angle of rotation	max. 95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with ↷/↶ switch
Fail-safe position	adjustable with dial or tool 0 to 100% in 10% increments
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time normal operation fail-safe	 150 seconds (default), variable 90 to 150 seconds 35 seconds
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA2, IP54, UL enclosure type 2
Housing material	UL94-5VA
Agency list	cULus acc. to UL 60730-1A/-2-14 CAN/CSA E60730-1:02 CE acc. to 2004/108/EEC and 2006/95/EC
Noise level	< 45dB(A)
Servicing	maintenance free
Quality standard	ISO 9001

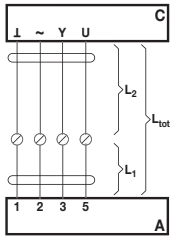
Electrical Installation

Wiring diagram

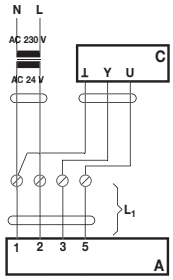


Note
- Connect via safety isolation transformer.
- Parallel connection of other actuators possible. Note performance data for supply.

Cable lengths



Note
When several actuators are connected in parallel, the maximum cable length must be divided by the number of actuators.



Note
There are no special restrictions on installation if the supply and data cable are routed separately.

Cable colors:
1 = black
2 = red
3 = white
5 = orange

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)
L_2 = Customer cable
L_{tot} = Maximum cable length

Cross section L_2 ⊥ / ~	Max. cable length $L_{tot} = L_1 + L_2$ AC	DC	Example for DC
0.75 mm²	≤30 m	≤5 m	1 m (L_1) + 4 m (L_2)
1.00 mm²	≤40 m	≤8 m	1 m (L_1) + 7 m (L_2)
1.50 mm²	≤70 m	≤12 m	1 m (L_1) + 11 m (L_2)
2.50 mm²	≤100 m	≤20 m	1 m (L_1) + 19 m (L_2)

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)

Wiring Diagrams

INSTALLATION NOTES

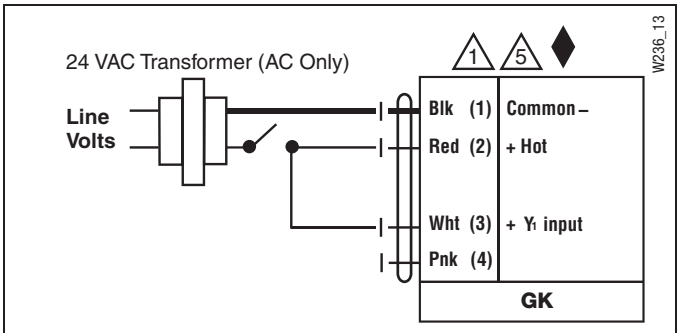
1. Provide overload protection and disconnect as required.
3. Actuators may also be powered by 24 VDC.
4. Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
5. Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
8. Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
9. For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

APPLICATION NOTES

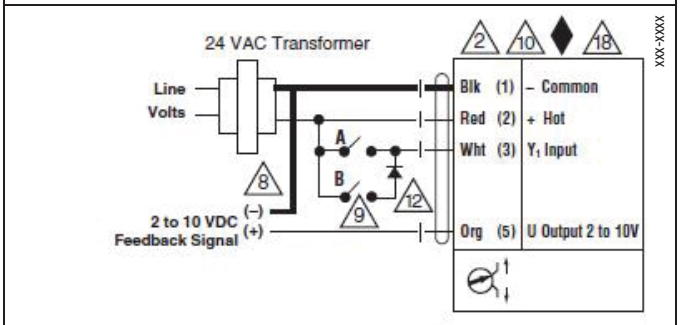
Meets UL requirements without the need of an electrical ground connection.

***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.

NOTE: Wiring diagrams shown are for single actuator mounted solutions



On/Off control



Floating Point control

GK Actuators, Multi-Function Technology

MFT

Models

GKRX24-MFT-X1
GKX24-MFT-X1

Technical Data	GKX24-MFT-X1
Power supply	24VAC ±20% 50/60Hz 24VDC ±10%
Power consumption	12W (3W)
Transformer sizing	21VA (class 2 power source)
Electrical connection	18 GA plenum rated cable ½" conduit connector protected NEMA 2 (IP54) 3 ft [1m] 10 ft [3m] 16 ft [5m]
Overload protection	electronic throughout 0 to 95 rotation
Operation range Y	2 to 10 VDC, 4 to 20mA (default) variable (VDC,PWM, floating point, on/off)
Input impedance	100 kΩ (0.1 mA), 500 Ω 1500 Ω (PWM, floating point, on/off)
Feedback output U	2 to 10VDC, 0.5mA max, VDC variable
Angle of rotation	max. 95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with ↷/↶ switch
Fail-safe position	adjustable with dial or tool 0 to 100% in 10% increments
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time normal operation fail-safe	 95 seconds (default), variable 90 to 150 seconds 35 seconds
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA2, IP54, UL enclosure type 2
Housing material	UL94-5VA
Agency list	cULus acc. to UL 60730-1A/-2-14 CAN/CSA E60730-1:02 CE acc. to 2004/108/EEC and 2006/95/EC
Noise level	< 45dB(A)
Servicing	maintenance free
Quality standard	ISO 9001

Note: GKR Actuators are on 2-way valves
GKX Actuators are on 3-way valves

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

3 Actuators may also be powered by 24 VDC.

4 Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.

5 Control signal may be pulsed from either the Hot (source)
or the Common (sink) 24 VAC line.

8 Contact closures A & B also can be triacs.
A & B should both be closed for triac source and open for triac sink.

9 For triac sink the common connection from the actuator
must be connected to the hot connection of the controller.

APPLICATION NOTES

◆ Meets UL requirements without the need of an electrical ground connection.

◆ The ZG-R01 500 Ω resistor may be used.

***WARNING** Live Electrical Components!*
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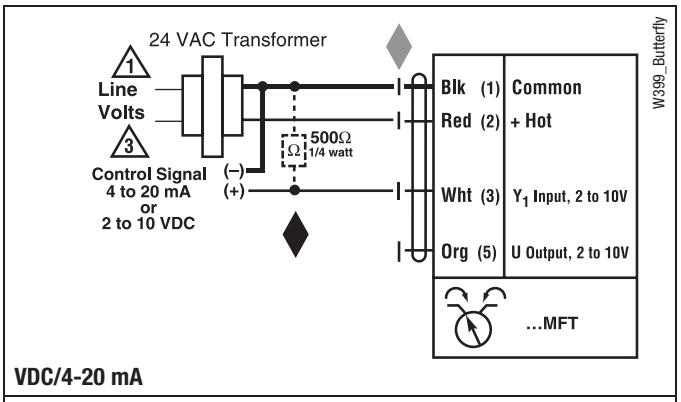
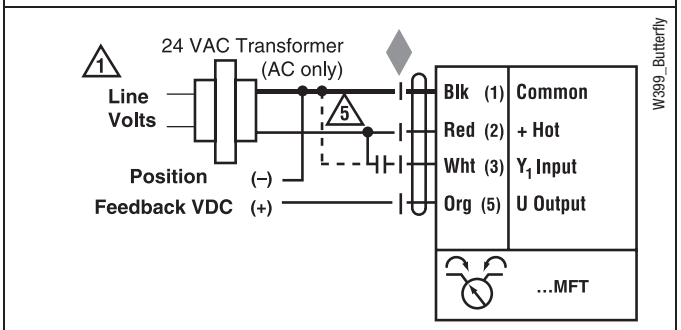
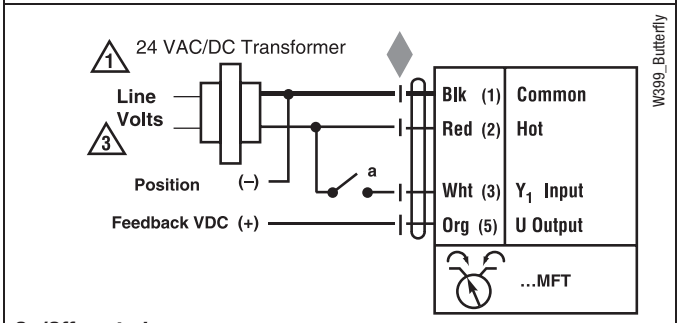
NOTE: Wiring diagrams shown are for single actuator mounted solutions



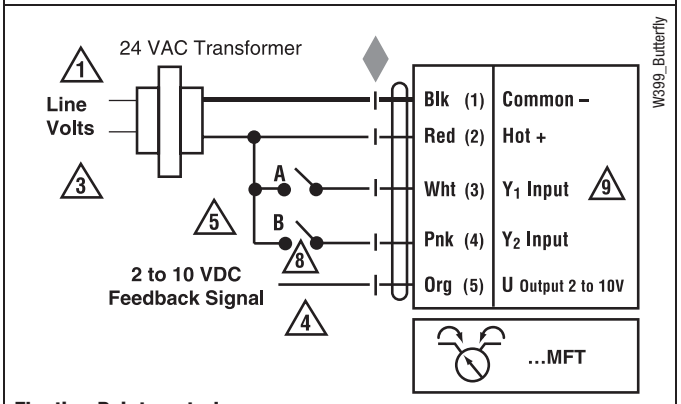
VDC/4-20 mA



PWM



On/Off control



Floating Point control

AM/AR Series Actuators, On/Off, Floating Point

Models

AMB24-3-X1
ARB24-3-X1
ARB24-3-5

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	2.0 W
	holding	0.2 W
Transformer sizing		5.5 VA (class 2 power source)
Electrical connection		3 ft, 18 GA plenum rated cable ½" conduit connector
Overload protection		electronic throughout 0° to 95° rotation
Control		on/off, floating point
Input impedance		600 Ω
Angle of rotation		95°, adjustable with mechanical stop
Direction of rotation		reversible with protected ↷/↶ switch
Position indication		handle
Manual override		external push button
Running time		95 seconds
Humidity		5 to 95% RH non condensing (EN 60730-1)
Ambient temperature		-22°F to +122°F [-30°C to +50°C]
Storage temperature		-40°F to +176°F [-40°C to +80°C]
Housing		NEMA 2/IP54
Housing material		UL94-5VA
Agency listings†		cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC (and 2006/95/EC for line voltage and/or -S versions)
Noise level		<45dB(A)
Quality standard		ISO 9001

Note: AR Actuators are on 2-way valves
AM Actuators are on 3-way valves

Wiring Diagrams

INSTALLATION NOTES

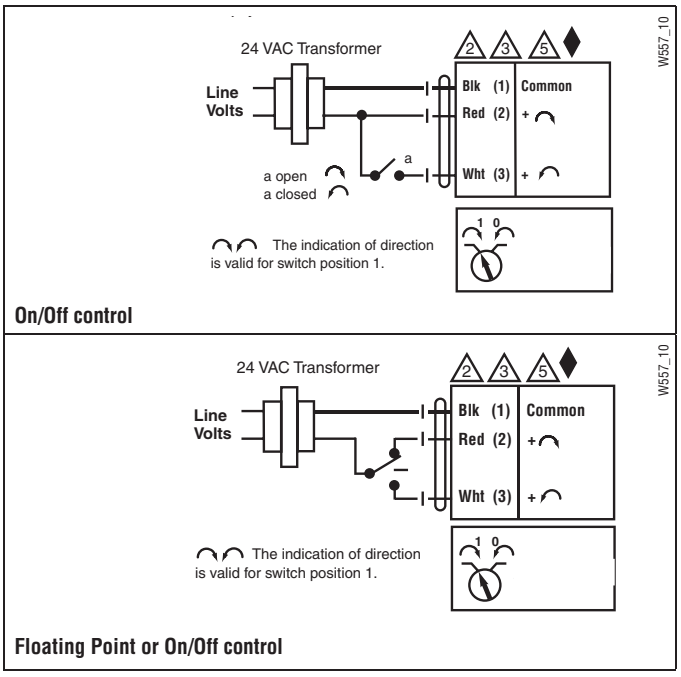
△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△4 Actuators may also be powered by 24 VDC.

APPLICATION NOTES

♦ Meets cULus or UL and CSA 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.



On/Off control

Floating Point or On/Off control

AM/AR Series Actuators, Multi-Function Technology

Models

AMX24-MFT-X1
ARX24-MFT-X1
ARB24-MFT-5

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	4 W
Power consumption holding	1.25 W
Transformer sizing	6 VA (class 2 power source)
Electrical connection	3 ft [1m], 10 ft [3m], 16 ft [5m] 18 GA plenum rated cable ½" conduit connector
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off)
Input impedance	100k Ω (0.1 mA), 500 Ω 1500 Ω (PWM, floating point, on/off)
Feedback output U	2 to 10 VDC, 0.5 mA max VDC variable
Angle of rotation	95° electronically variable
Direction of rotation	reversible with protected ↷/↶ switch
Position indication	handle
Manual override	external push button
Running time	150 seconds (default) variable (90 to 350 secs)
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC
Noise level	<45dB(A)
Quality standard	ISO 9001

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Wiring Diagrams

INSTALLATION NOTES

△3 Actuators may also be powered by 24 VDC.

△4 Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.

△6 Control signal may be pulsed from either the Hot (source)
or the Common (sink) 24 VAC line.

△8 Contact closures A & B also can be triacs.
A& B should both be closed for triac source and open for triac sink.

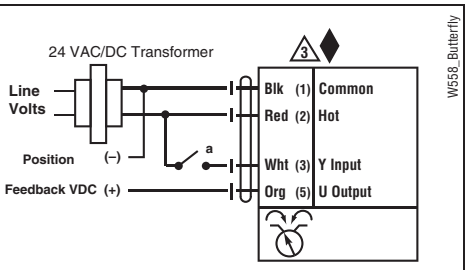
△9 For triac sink the common connection from the actuator
must be connected to the hot connection.

APPLICATION NOTES

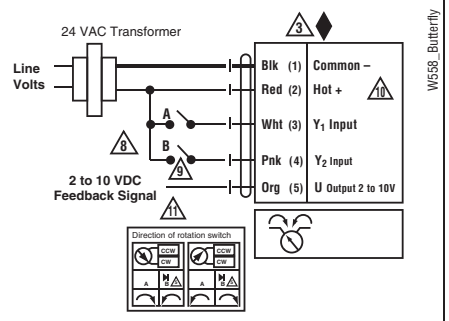
◆ The ZG-R01 500 Ω resistor converts the 4 to 10 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING *Live Electrical Components!*

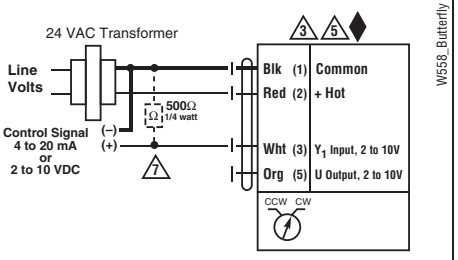
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



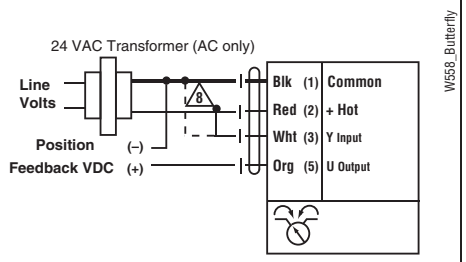
Two Position



Floating Point



VDC/4-20 mA



PWM

GM/GR Actuators, On/Off, Floating Point

Models

GMB24-3-X1
GRB24-3-X1
GRB24-3-5
GRB24-3-7

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	4.0 W
	holding	2 W
Transformer sizing		6 VA (class 2 power source)
Electrical connection		3 ft, 18 GA appliance cable, 1/2" conduit connector
Overload protection		electronic throughout 0 to 95° rotation
Control signal		On/Off, Floating Point
Input impedance		600 Ω
Angle of rotation		mechanically limited to 95°
Direction of rotation		reversible with switch A/B
Position indication		0 to 1 and reversible indicator
Running time		150 sec.
Humidity		5 to 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2/IP54
Housing material		UL94-5VA (flammability rating)
Agency listings		cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No.24-93, CE according to 89/336/EEC
Noise level		max. 45 dB (A)
Servicing		maintenance free
Quality standard		ISO 9001

Note: GR Actuators are on 2-way valves
GM Actuators are on 3-way valves

Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

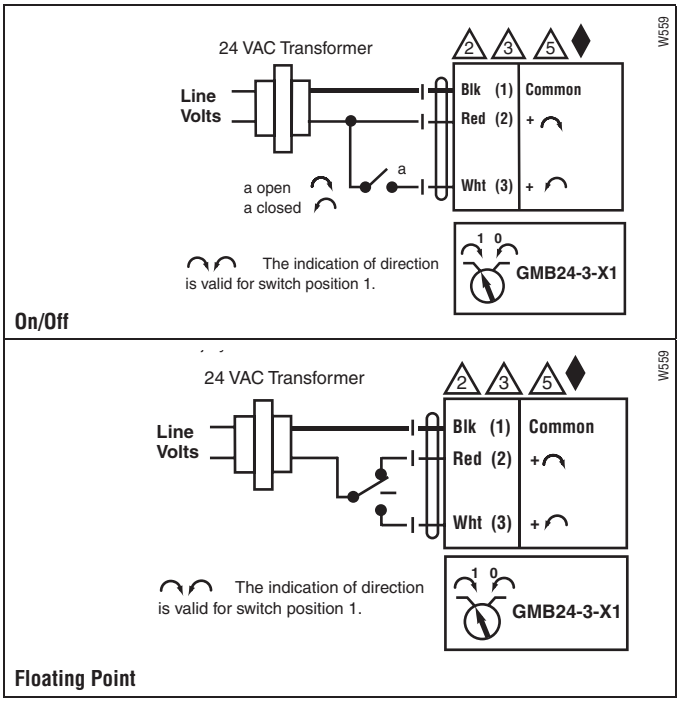
△3 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

APPLICATION NOTES

◆ Meets cULus or UL and CSA 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.



BELIMO

5 YEAR WARRANTY

MFT CE LISTED 94 05 TEMP. IND. & REG. EQUIP. c UL us BRUSHLESS dc. motor

Models

GMX24-MFT-X1
GRX24-MFT-X1
GRB24-MFT-5
GRX24-MFT-7

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	4.5 W
	holding	2 W
Transformer sizing		7 VA (class 2 power source)
Electrical connection		3 ft, 18 GA appliance cable, 1/2" conduit connector
Overload protection		electronic throughout 0 to 95° rotation
Control signal		2 to 10 VDC, 4 to 20 mA (with 500 Ω, 1/4 W resistor) ZG-R01
Input impedance		100 k Ω for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 750 Ω for PWM 1500 Ω for on/off and floating point
Angle of rotation		mechanically limited to 95°
Direction of rotation		reversible with switch A/B
Position indication		0 to 1 and reversible indicator
Running time		150 seconds
Humidity		5 to 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2/IP54
Housing material		UL94-5VA (flammability rating)
Agency listings		cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No.24-93, CE according to 89/336/EEC
Noise level		max. 45 dB(A)
Servicing		maintenance free
Quality standard		ISO 9001

Wiring Diagrams

INSTALLATION NOTES

△3 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color coded instead. Actuators with appliance rated cable use numbers.

△8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

△10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller.

APPLICATION NOTES

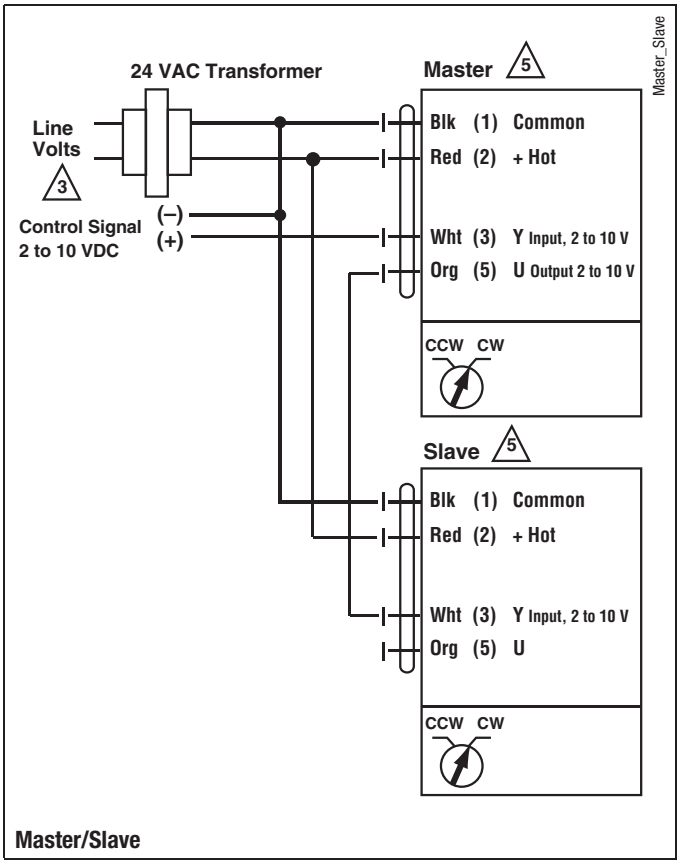
◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

△9 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.

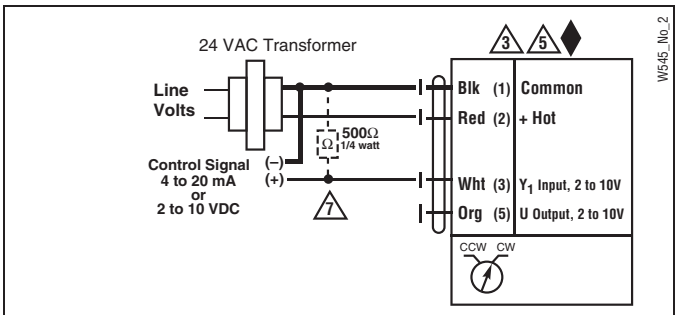
△11 Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

⚠ *WARNING* *Live Electrical Components!*

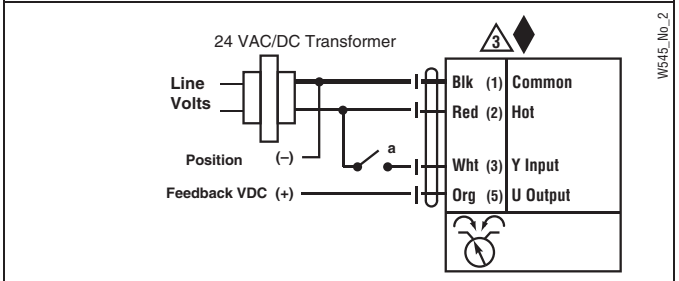
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



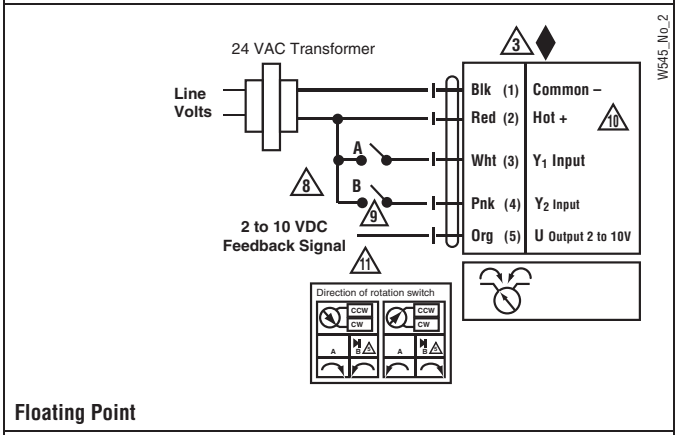
Master/Slave



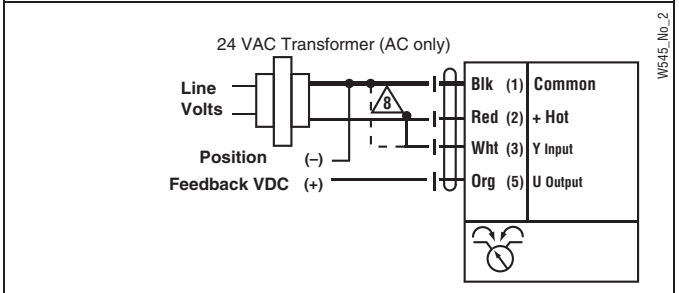
VDC/4-20 mA



Two Position



Floating Point



PWM

GRCX(B)24-3-T N4(H) NEMA 4 Actuators, On/Off, Floating Point

Models

GRCX24-3-T N4 w/terminal block
GRCB24-3-T N4H w/heater

Technical Data		
Control		on/off, floating point
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	8W / heater 29W
	holding	2.5W
Transformer sizing		11 VA (class 2 power source) / heater 26 VA
Electrical connection		screw terminal (for 22 to 12 AWG wire)
Overload protection		electronic throughout 0° to 90° rotation
Input impedance		1000 Ω at control input
Angle of rotation		90°, adjustable with mechanical stop
Position indication		visual pointer
Manual override		internal push button (UL Type 4)
Running time		35 seconds (default)
Humidity		5 to 100% RH (UL Type 4)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4/NEMA 4/IP66
Housing material		Polycarbonate
Agency listings		cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC		CE according to 2004/108/EC
Quality standard		ISO 9001

Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△4 Actuators may also be powered by 24 VDC.

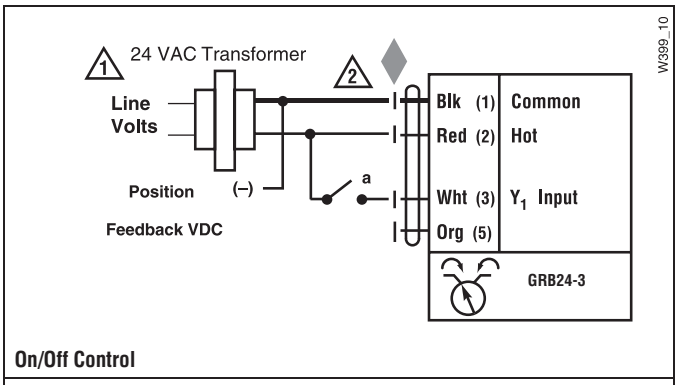
△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

APPLICATION NOTES

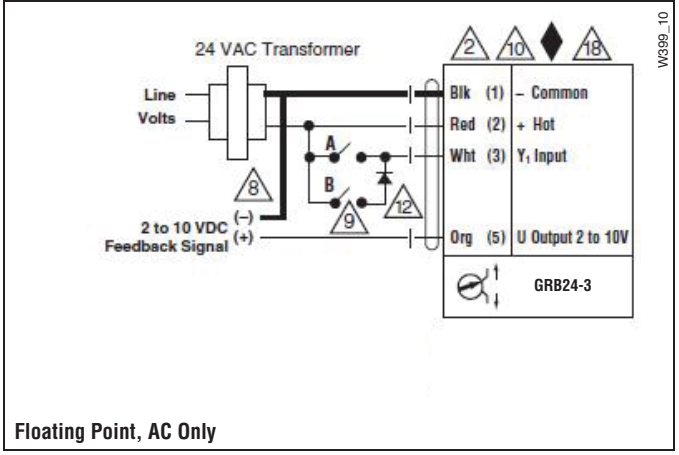
♦ Meets cULus or UL and CSA requirements without the need of an electrical ground connection. Use suitable flexible metallic conduit or its equivalent with the conduit fitting.

⚠ ***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.

⚠ ***WARNING** Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



On/Off Control



Floating Point, AC Only

GRX(B)24-MFT-T N4(H) NEMA 4 Actuators, Multi-Function Technology

MFT

Models

GRX24-MFT-T N4 w/terminal block
GRB24-MFT-T N4H w/heater

Technical Data		
Control		2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	8 W / heater 29W
	holding	2.5 W
Transformer sizing		11 VA (class 2 power source) / heater 24 VA
Electrical connection		screw terminal (for 22 to 12 AWG wire)
Overload protection		electronic throughout 0° to 90° rotation
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1000 Ω for floating point and on-off control
Angle of rotation		90°, adjustable with mechanical stop electronically variable
Position indication		visual pointer
Manual override		internal push button (UL Type 4)
Running time		150 seconds (default) variable (75 to 290 seconds)
Humidity		5 to 100% RH (UL Type 4)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4/NEMA 4/IP66
Housing material		Polycarbonate
Agency listings		cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC		CE according to 2004/108/EC
Quality standard		ISO 9001

Wiring Diagrams

INSTALLATION NOTES

CAUTION *Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

3 Actuators may also be powered by 24 VDC.

5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

8 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

9 Contact closures A & B also can be triacs.
A& B should both be closed for triac source and open for triac sink.

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.

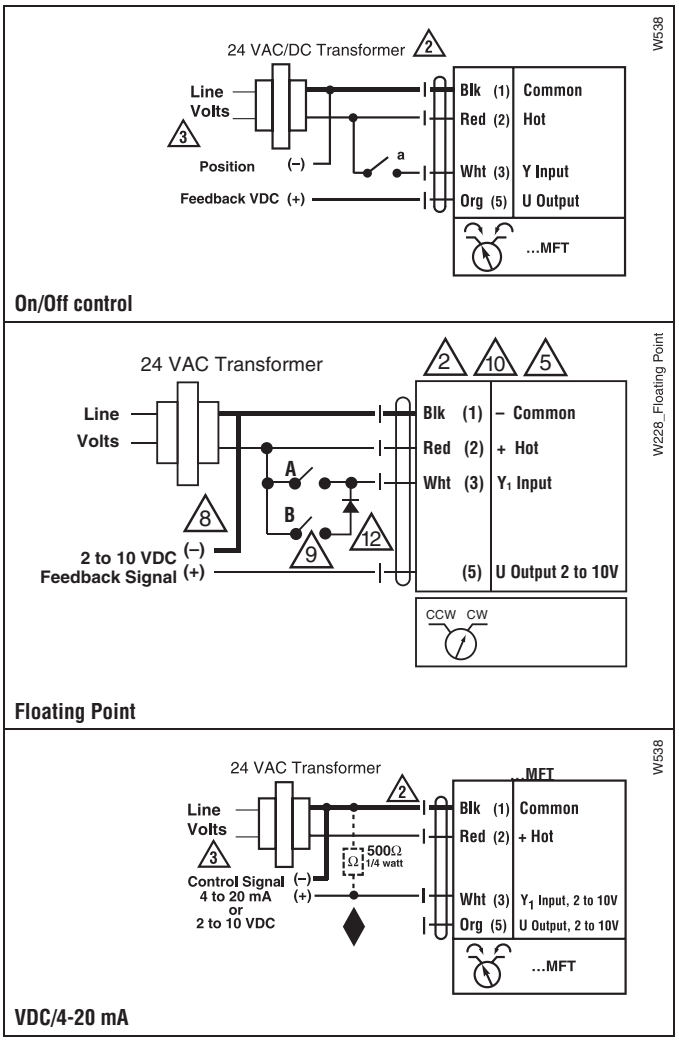
12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).

APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

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.

WARNING *Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



GMCX(B)24-3-T-X1 N4(H) NEMA 4 Actuators, On/Off, Floating Point

Models

GMCX24-3-T-X1 N4 w/terminal block
GMCB24-3-T-X1 N4H w/heater

Technical Data	
Control	on/off, floating point
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	8W / heater 28W
holding	2.5W
Transformer sizing	11 VA (class 2 power source) / heater 26 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	1000 Ω at control input
Angle of rotation	95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with ↷/↶ switch
Position indication	visual pointer
Manual override	internal push button (UL Type 4)
Running time	35 seconds (default)
Humidity	5 to 100% RH (UL Type 4)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

Wiring Diagrams

INSTALLATION NOTES

2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

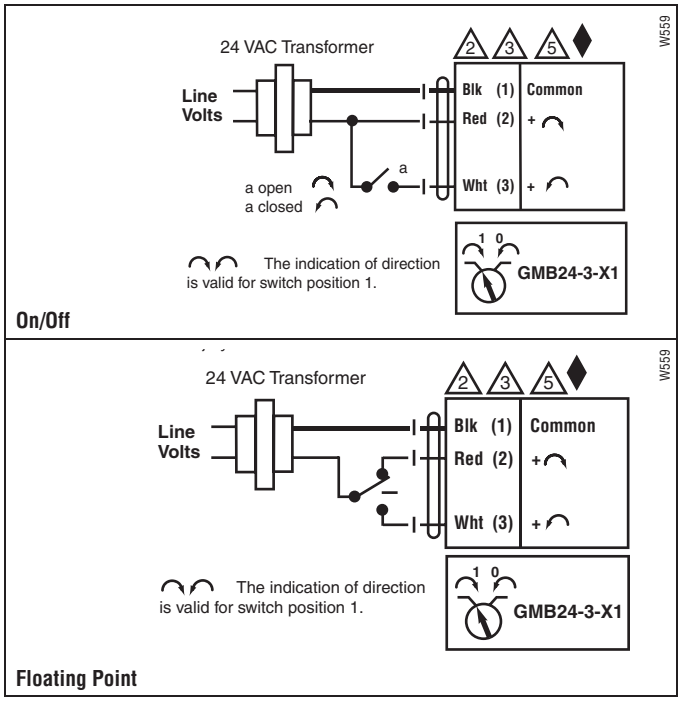
3 Actuators may also be powered by 24 VDC.

5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

APPLICATION NOTES

Meets cULus or UL and CSA 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.



GMX(B)24-MFT-T N4(H) NEMA 4 Actuators, Multi-Function Technology

MFT

5 YEAR WARRANTY

LISTED 94 D5 TEMP. IND. & REG. EQUIP. c UL us

BRUSHLESS dc. motor

Models

GMX24-MFT-T-X1 N4 w/terminal block
GMB24-MFT-T-X1 N4H w/heater

Technical Data	
Control	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	8 W / heater 29W
holding	2.5 W
Transformer sizing	11 VA (class 2 power source) / heater 26 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1000 Ω for floating point and on-off control
Angle of rotation	95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with ↷/↶ switch
Position indication	visual pointer
Manual override	internal push button (UL Type 4)
Running time	150 seconds (default) variable (75 to 290 seconds)
Humidity	5 to 100% RH (UL Type 4)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

Wiring Diagrams

INSTALLATION NOTES

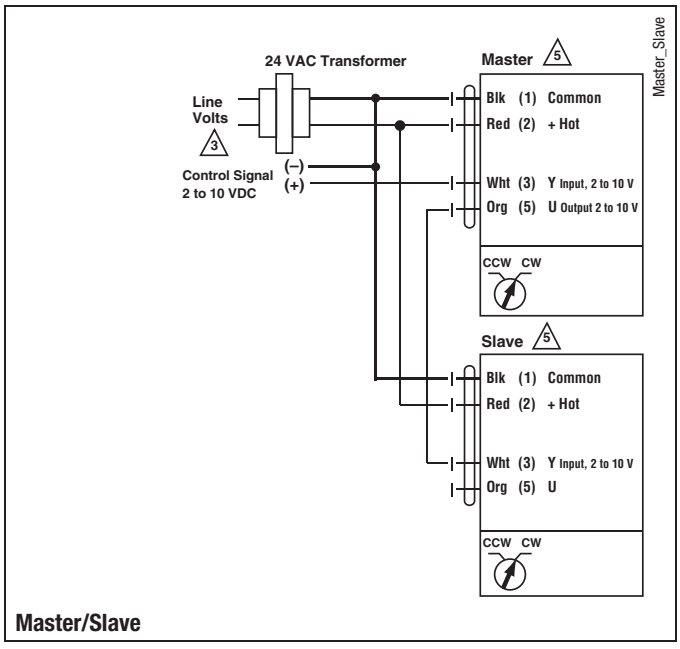
1. Provide overload protection and disconnect as required.
2. ***CAUTION*** *Equipment Damage!*
   Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
3. Actuators may also be powered by 24 VDC.
4. Position feedback cannot be used with Triac sink controller.
   The actuator internal common reference is not compatible.
5. Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
8. Contact closures A & B also can be triacs.
   A & B should both be closed for triac source and open for triac sink.
9. For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

APPLICATION NOTES

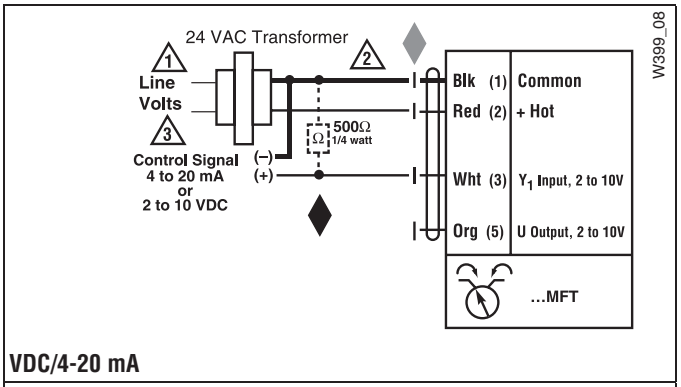
- The ZG-R01 500 Ω resistor may be used.

WARNING *Live Electrical Components!*

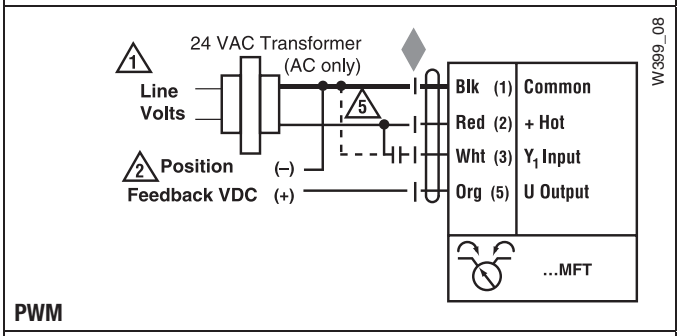
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



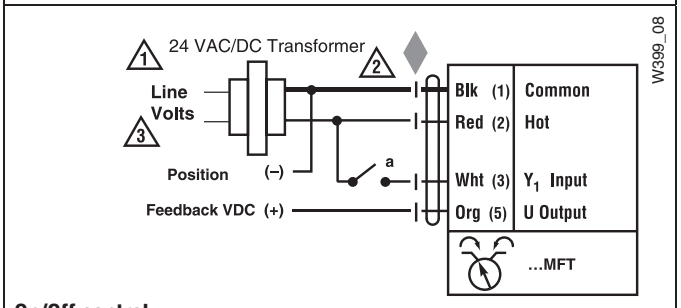
Master/Slave



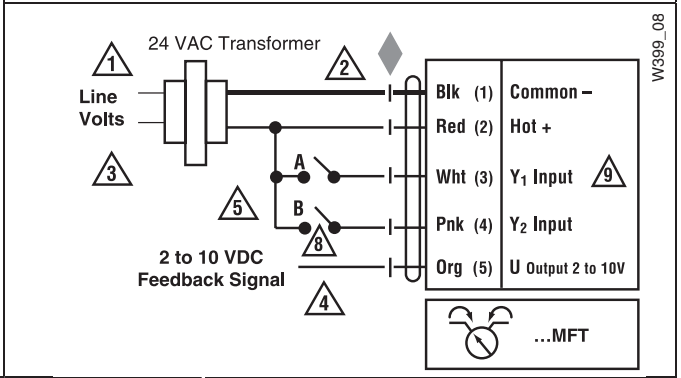
VDC/4-20 mA



PWM

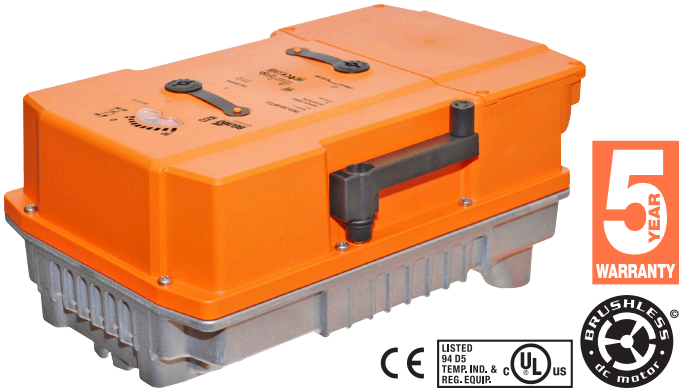


On/Off control



PRBUP-MFT-T

Modulating, Non-Spring Return, 24-240 V, NEMA 4X with BACnet



Technical Data	
Power Supply	24...240 VAC, -20% / +10%, 50/60 Hz, 24...125 VDC, -20% / +10%
Power Consumption Running	20 W @ 24 V, 18 W @ 120 V, 20 W @ 230 V
Power Consumption Holding	3.5 W @ 24 V, 4 W @ 120 V, 6 W @ 230 V
Transformer Sizing	20 VA @ 24 VAC/DC (class 2 power source), 23 VA @ 120 VAC/DC, 52 VA @ 230 VAC
Electrical Connection	terminal block
Overload Protection	electronic thoughout 0° to 90° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA variable (VDC, floating point, on/off)
Input Impedance	100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA, 1500 Ω for On/Off
Feedback Output U	2 to 10 VDC, 0.5 mA max, VDC variable
Angle of Rotation	90°
Torque motor	Min. 1400 in-lbs [160 Nm]
Direction of Rotation (Motor)	reversible with app
Position Indication	integral pointer and bottom mounted reflective indicators
Manual Override	7 mm hex crank, supplied
Running Time (Motor)	35 sec
Ambient Humidity	5 to 100% RH (UL Type 4)
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Storage Temperature Range	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 4X, IP66/67, UL Enclosure Type 4
Housing Material	Aluminum die cast and plastic casing
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC
Noise Level (Motor)	68 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	12.8 lbs [5.8kg]
Auxiliary switch	2 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, one set at 10°, one adjustable 0° to 90°
Communication	BACnet MS/TP
Passive Sensor Inputs	2 (PT1000) (NI1000) (NTC)

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 24-240 VAC and 24-125 VDC. 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 4000V. Type of action 1. Control pollution degree 3.

PRBUP-MFT-T

Modulating, Non-Spring Return, 24-240 V, NEMA 4X with BACnet

Wiring Diagrams

Meets cULus requirements without the need of an electrical ground connection.

Universal Power Supply (UP) models can be supplied with 24 VAC up to 240 VAC, or 24 VDC up to 240 VDC.

Disconnect power.

1 Provide overload protection and disconnect as required.

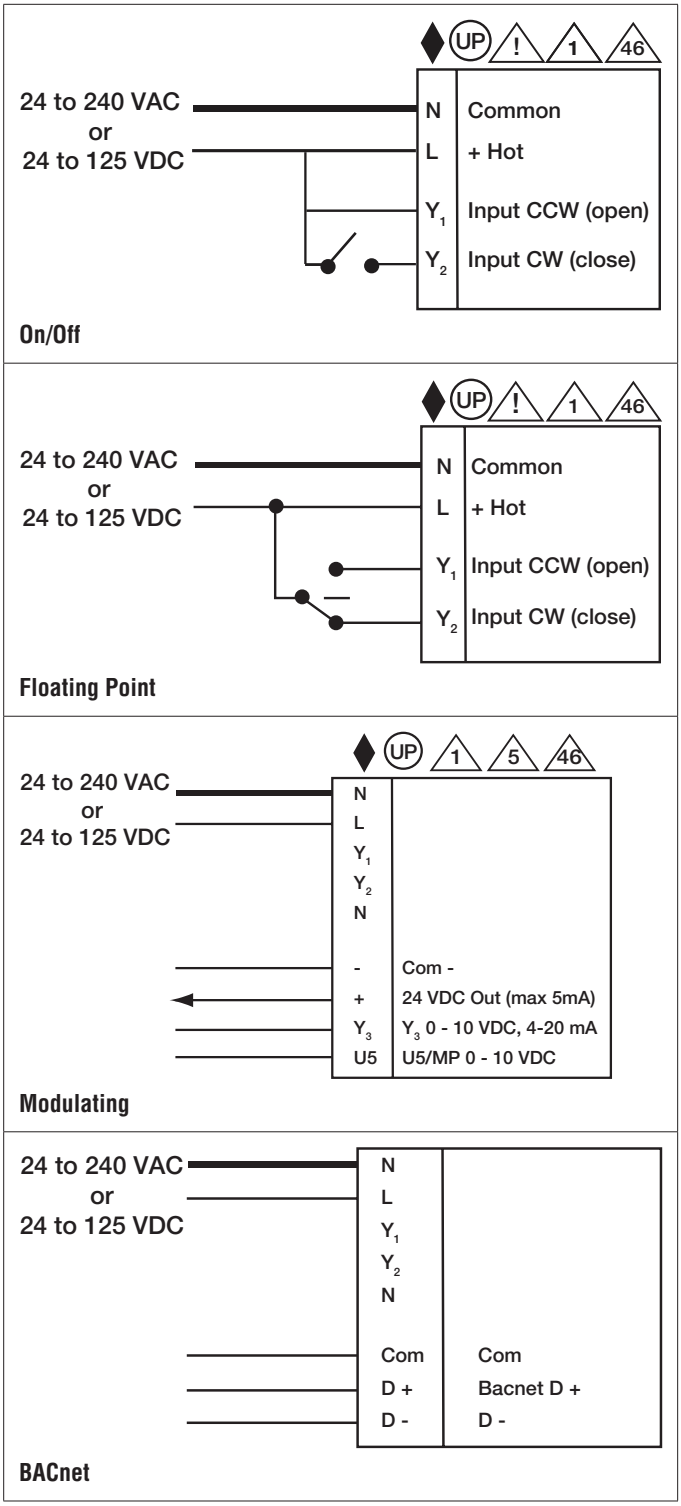
4 Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

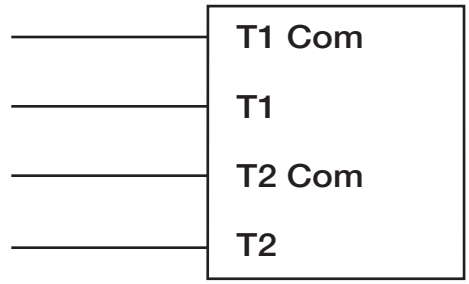
5 Only connect common to negative (-) leg of control circuits.

46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.

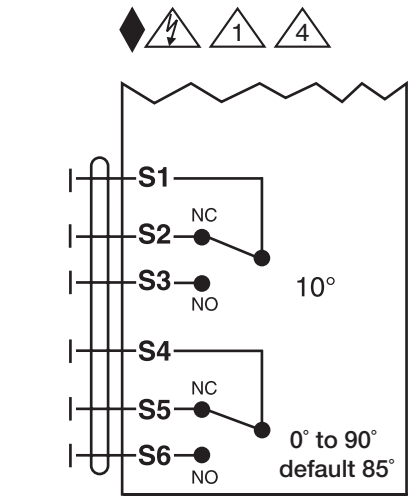
WARNING! LIVE ELECTRICAL COMPONENTS!

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.





Temperature Sensors



Auxiliary Switches

PRXUP-3-T

On/Off, Floating Point, Non-Spring Return, 24-240 V, NEMA 4X

Technical Data	
Power Supply	24...240 VAC, -20% / +10%, 50/60 Hz, 24...125 VDC, -20% / +10%
Power Consumption Running	20 W @ 24 V, 18 W @ 120 V, 20 W @ 230 V
Power Consumption Holding	3.5 W @ 24 V, 4 W @ 120 V, 6 W @ 230 V
Transformer Sizing	20 VA @ 24 VAC/DC (class 2 power source), 23 VA @ 120 VAC/DC, 52 VA @ 230 VAC
Electrical Connection	terminal block
Overload Protection	electronic thoughout 0° to 90° rotation
Input Impedance	1000 Ω
Angle of Rotation	90°
Position Indication	integral pointer and bottom mounted reflective indicators
Manual Override	7 mm hex crank, supplied
Running Time (Motor)	35 sec
Ambient Humidity	5 to 100% RH (UL Type 4)
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Housing	NEMA 4X, IP66/67, UL Enclosure Type 4X
Housing Material	aluminum die cast polycarbonate cover
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC
Noise Level (Motor)	68 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	12.8 lbs [5.8kg]
Auxiliary switch	2 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, one set at 10°, one adjustable 0° to 90°

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 24-240 VAC and 24-125 VDC. 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 4000V. Type of action 1. Control pollution degree 3.

PRXUP-3-T

On/Off, Floating Point, Non-Spring Return, 24-240 V, NEMA 4X

Wiring Diagrams

◆ Meets cULus requirements without the need of an electrical ground connection.

UP Universal Power Supply (UP) models can be supplied with 24 VAC up to 240 VAC, or 24 VDC up to 125 VDC.

Disconnect power.

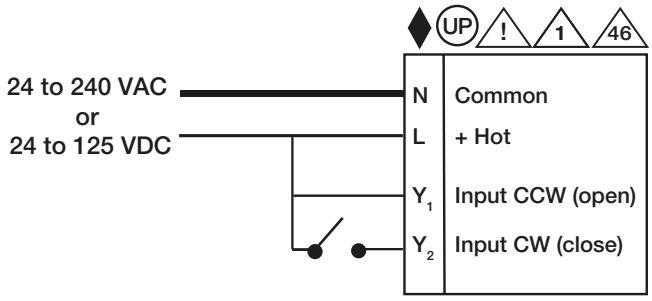
1 Provide overload protection and disconnect as required.

4 Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

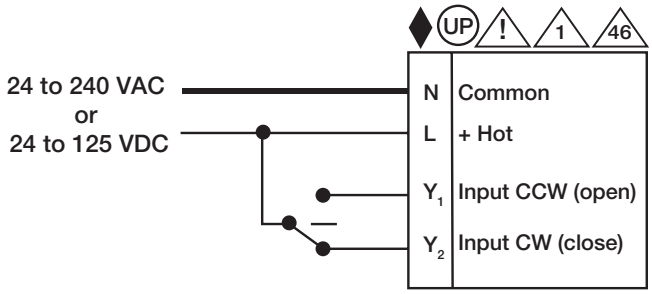
46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.

! ***WARNING! LIVE ELECTRICAL COMPONENTS!***

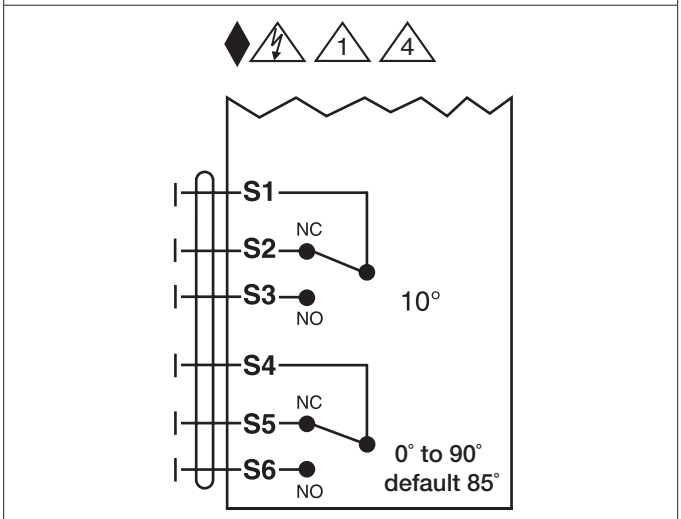
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



On/Off



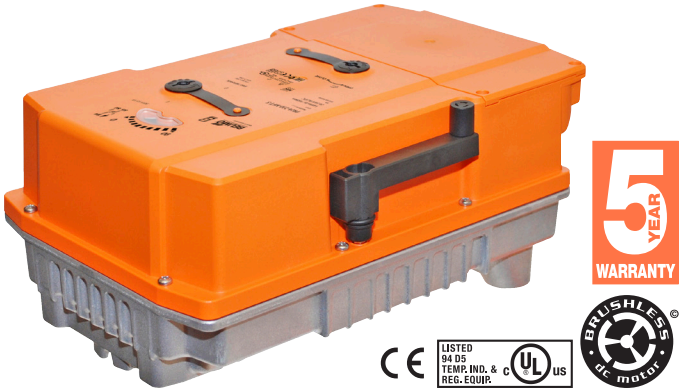
Floating Point



Auxiliary Switches

PRXUP-MFT-T

Modulating, Non-Spring Return, 24-240 V, NEMA 4X with BACnet



Technical Data	
Power Supply	24...240 VAC, -20% / +10%, 50/60 Hz, 24...125 VDC, -20% / +10%
Power Consumption Running	20 W @ 24 V, 18 W @ 120 V, 20 W @ 230 V
Power Consumption Holding	3.5 W @ 24 V, 4 W @ 120 V, 6 W @ 230 V
Transformer Sizing	20 VA @ 24 VAC/DC (class 2 power source), 23 VA @ 120 VAC/DC, 52 VA @ 230 VAC
Electrical Connection	terminal block
Overload Protection	electronic thoughout 0° to 90° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA variable (VDC, floating point, on/off)
Input Impedance	100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA, 1500 Ω for On/Off
Feedback Output U	2 to 10 VDC, 0.5 mA max, VDC variable
Angle of Rotation	90°
Torque motor	Min. 1400 in-lbs [160 Nm]
Direction of Rotation (Motor)	reversible with app
Position Indication	integral pointer and bottom mounted reflective indicators
Manual Override	7 mm hex crank, supplied
Running Time (Motor)	35 sec
Ambient Humidity	5 to 100% RH (UL Type 4)
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Storage Temperature Range	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 4X, IP66/67, UL Enclosure Type 4
Housing Material	Aluminum die cast and plastic casing
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC
Noise Level (Motor)	68 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	12.8 lbs [5.8kg]
Auxiliary switch	2 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, one set at 10°, one adjustable 0° to 90°
Communication	BACnet MS/TP
Passive Sensor Inputs	2 (PT1000) (NI1000) (NTC)

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 24-240 VAC and 24-125 VDC. 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 4000V. Type of action 1. Control pollution degree 3.

PRXUP-MFT-T

Modulating, Non-Spring Return, 24-240 V, NEMA 4X with BACnet

Wiring Diagrams

Meets cULus requirements without the need of an electrical ground connection.

Universal Power Supply (UP) models can be supplied with 24 VAC up to 240 VAC, or 24 VDC up to 240 VDC.

Disconnect power.

1 Provide overload protection and disconnect as required.

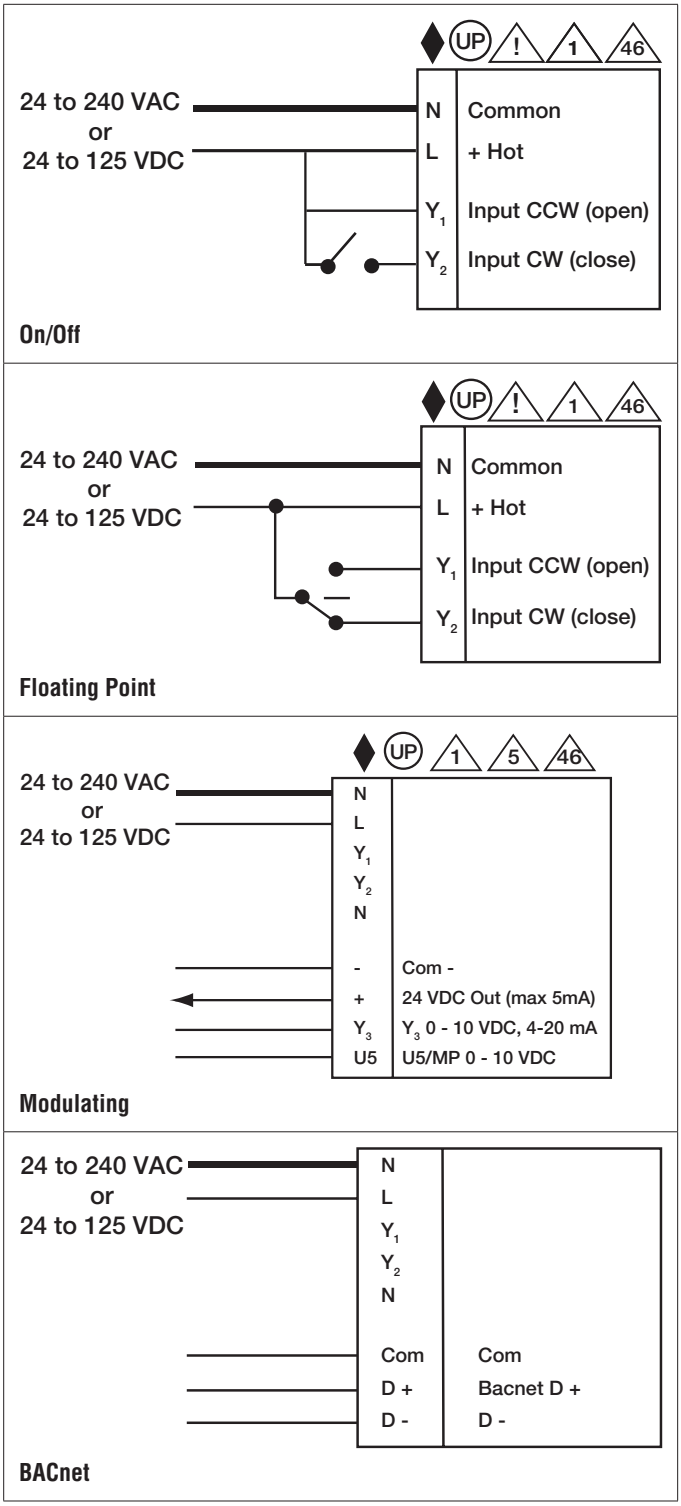
4 Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

5 Only connect common to negative (-) leg of control circuits.

46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.

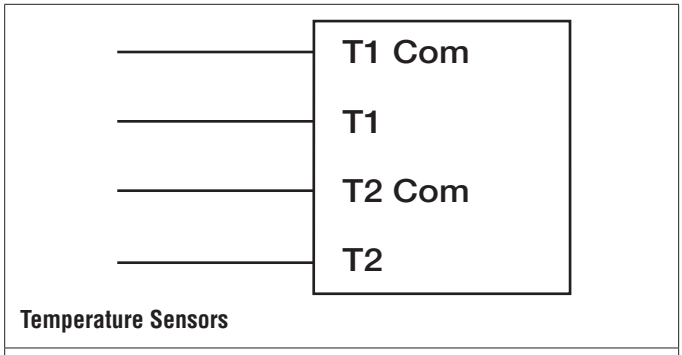
WARNING! LIVE ELECTRICAL COMPONENTS!

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.

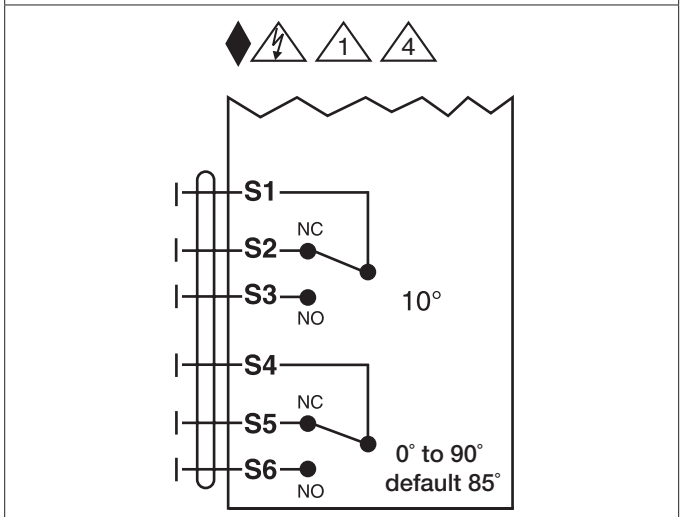


PRXUP-MFT-T

Modulating, Non-Spring Return, 24-240 V, NEMA 4X with BACnet



Temperature Sensors



Auxiliary Switches

PRBUP-3-T

On/Off, Floating Point, Non-Spring Return, 24-240 V, NEMA 4X

Technical Data	
Power Supply	24...240 VAC, -20% / +10%, 50/60 Hz, 24...125 VDC, -20% / +10%
Power Consumption Running	20 W @ 24 V, 18 W @ 120 V, 20 W @ 230 V
Power Consumption Holding	3.5 W @ 24 V, 4 W @ 120 V, 6 W @ 230 V
Transformer Sizing	20 VA @ 24 VAC/DC (class 2 power source), 23 VA @ 120 VAC/DC, 52 VA @ 230 VAC
Electrical Connection	terminal block
Overload Protection	electronic thoughout 0° to 90° rotation
Input Impedance	1000 Ω
Angle of Rotation	90°
Position Indication	integral pointer and bottom mounted reflective indicators
Manual Override	7 mm hex crank, supplied
Running Time (Motor)	35 sec
Ambient Humidity	5 to 100% RH (UL Type 4)
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Housing	NEMA 4X, IP66/67, UL Enclosure Type 4X
Housing Material	aluminum die cast polycarbonate cover
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC
Noise Level (Motor)	68 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	12.8 lbs [5.8kg]
Auxiliary switch	2 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, one set at 10°, one adjustable 0° to 90°

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 24-240 VAC and 24-125 VDC. 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 4000V. Type of action 1. Control pollution degree 3.

PRBUP-3-T

On/Off, Floating Point, Non-Spring Return, 24-240 V, NEMA 4X

Wiring Diagrams

◆ Meets cULus requirements without the need of an electrical ground connection.

(UP) Universal Power Supply (UP) models can be supplied with 24 VAC up to 240 VAC, or 24 VDC up to 125 VDC.

Disconnect power.

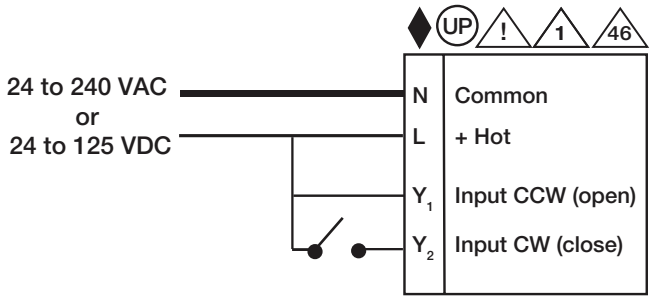
1 Provide overload protection and disconnect as required.

4 Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

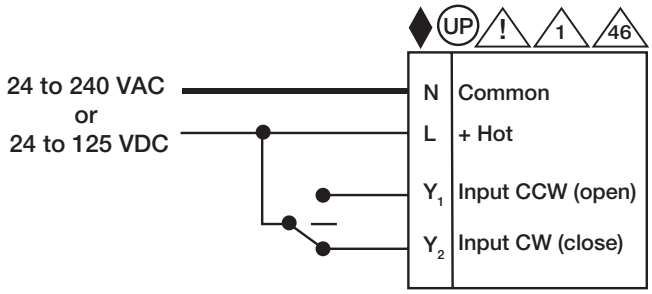
46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.

! ***WARNING! LIVE ELECTRICAL COMPONENTS!***

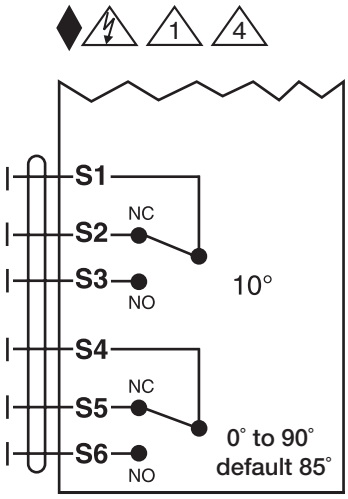
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



On/Off



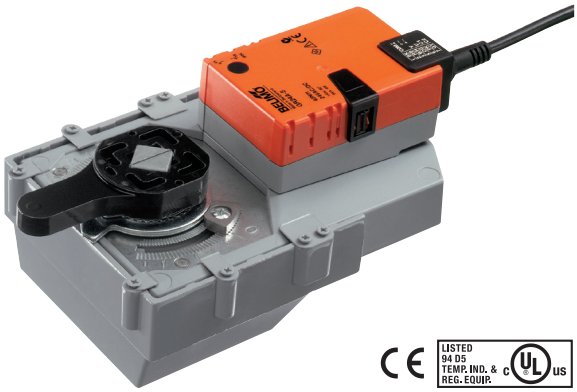
Floating Point



Auxiliary Switches

GRB120-3-5-14

On/Off Floating Point, Non-Spring Return, 110 V



Technical Data	
Power Supply	100-240 VAC ± 20%, 50/60 Hz
Power Consumption Running	4 W
Power Consumption Holding	2 W
Transformer Sizing	7 VA @ 24 VAC (class 2 power source)
Electrical Connection	18 GA applicance rated cable with 1/2" conduit connector protected NEMA 2 (IP54) 3 ft [1m] 10 ft [3m] and 16 ft [5m]
Overload Protection	electronic throughout 0° to 95° rotation
Input Impedance	600 Ω
Angle of Rotation	90°, adjustable with mechanical stop
Direction of Rotation (Motor)	reversible with built-in switch
Manual Override	external push button
Running Time (Motor)	150 sec
Humidity	5 to 95% RH non-condensing
Ambient Temperature Range	-22°F to +122°F [-30°C to +50°C]
Storage Temperature Range	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA 2, IP42, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC
Noise Level (Motor)	<45 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	3.5 lb [1.6 kg]

†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

GRB120-3-5-14

On/Off Floating Point, Non-Spring Return, 110 V

Wiring Diagrams

INSTALLATION NOTES

(A) Actuators with appliance cables are numbered.

1 Provide overload protection and disconnect as required.

11 Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.

Meets cULus requirements without the need of an electrical ground connection.

WARNING! LIVE ELECTRICAL COMPONENTS!

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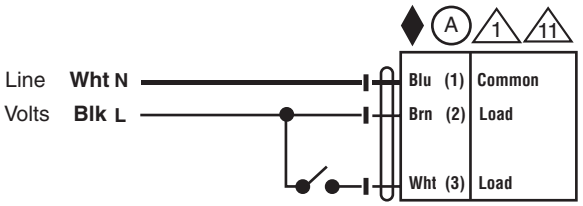
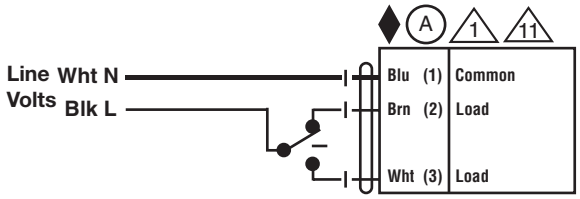


On/Off 100 to 240 VAC



Floating Point 100 to 240 VAC