



## **BUTTERFLY VALVES VIC SERIES**

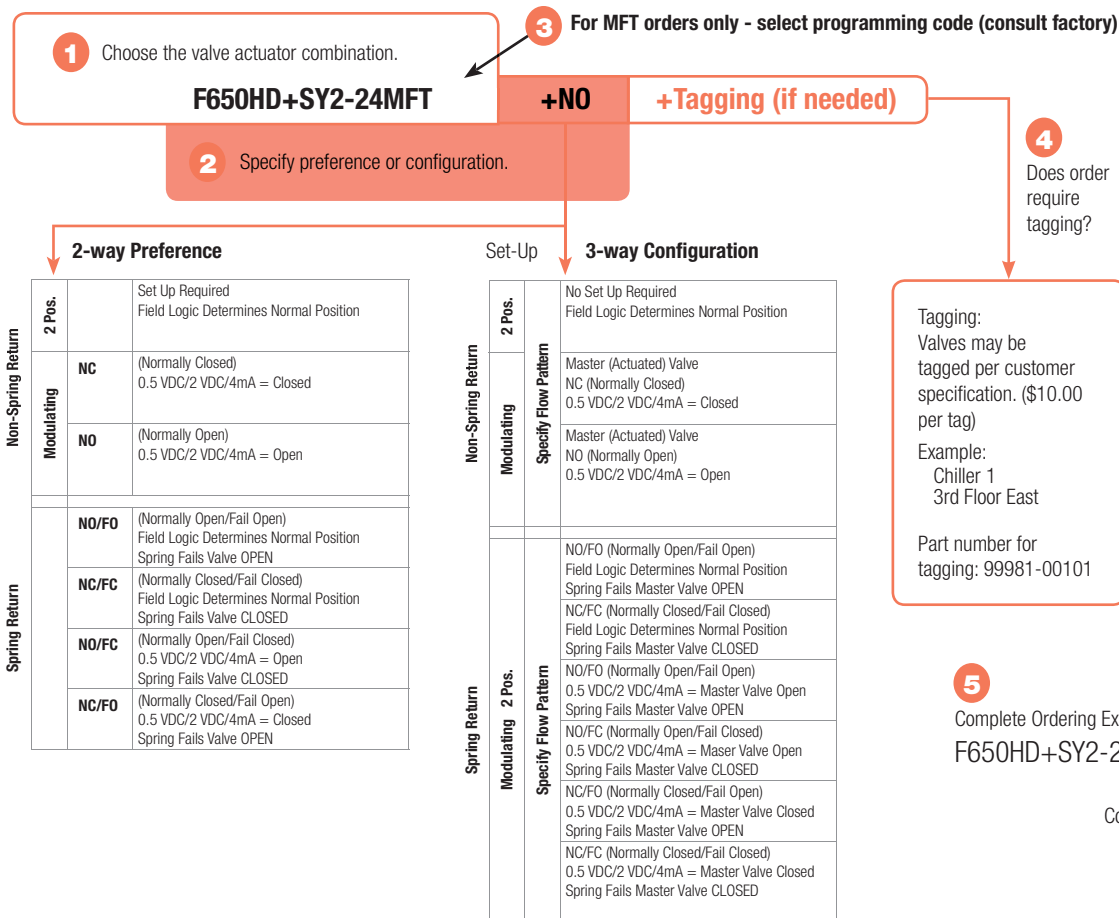
### **High Performance for a Wide Range of Applications**

- Grooved butterfly valves meet a wide range of applications.
- Advanced seat and disc design provides zero percent leakage capability at each valve's rated temperature/pressure while maintaining a low seating torque.

# Butterfly Valve Nomenclature

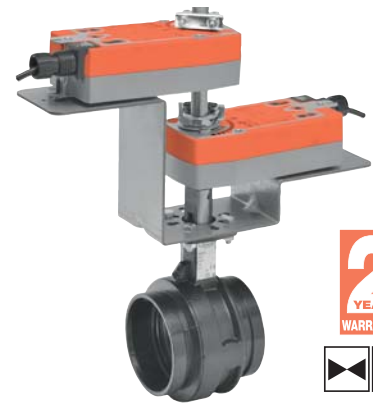
F6	50	VIC	SY2	-24	MFT	
<b>Valve</b> F6 = 2-way F7 = 3-way	<b>Valve Size</b> 50 = 2" 65 = 2½" 80 = 3" 100 = 4" 125 = 5" 150 = 6" 200 = 8" 250 = 10" 300 = 12"	<b>Trim Material</b> -VIC = Ductile Iron Grooved End Body, Nickel Coated Ductile Iron Disc, 0% Leakage up to 200 psi	<b>Actuator Type</b> <b>Non-Spring Return</b> AMB(X) GM... N4(H) GMB(X) DRB(X) DR... N4(H) SY <b>Electronic Fail-Safe</b> GK <b>Spring Return</b> AF	<b>Power Supply</b> -24 = 24 VAC/DC -110 = 110/120 VAC -120 = 120 VAC -230 = 230 VAC UP = 24-240 VAC or 24-125 VDC	<b>Control</b> -3-X1 = On/Off, Floating Point MFT or MFT-X1 = Multi-Function Technology	-S = Built-in Auxiliary Switch N4 = NEMA 4/4X N4H = NEMA 4 with Heater

## Ordering Example



# Control Valve Product Range

## Grooved Butterfly Valve Product Range



		2-way			Suitable Actuators			
		Valve Nominal Size		Type	Non-Spring Return		Spring Return	Electronic Fail-Safe
C <sub>V</sub> 90°	C <sub>V</sub> 60°	IN	DN [mm]	2-way				
115	36	2	50	F650VIC	AM Series	GM Series	AF Series	GK
260	80	2½	65	F665VIC				
440	140	3	80	F680VIC	DR Series	SY Series		
820	250	4	100	F6100VIC				
1200	370	5	125	F6125VIC				
1800	560	6	150	F6150VIC				
3400	1050	8	200	F6200VIC				
5800	1800	10	250	F6250VIC				
9000	2790	12	300	F6300VIC				

### Mode of Operation

Grooved butterfly valves are designed for body pressures ranging from full vacuum to 300 psi and for bi-directional, dead end services to full body pressure. The valve patented seat design ensures full 360° sealing. The pressure-enhanced seat compresses to form a larger seating area as the pressure increases. Valve construction and performance meet and exceed MSS-SP-67 requirements.

### Product Features

The unique single offset disc and seat design ensures positive valve seating while maintaining low seating torque.

### Actuator Specifications

Control type	on/off, floating point, modulating, 2-10 VDC, multi-function technology (MFT)
Manual override	all models
Electrical connection	3 ft. [1 m] cable terminal block

### Valve Specifications

Service	chilled, hot water, 60% glycol
Flow characteristic	F6 modified equal percentage F7 modified linear
Sizes	2" to 12"
End fitting	grooved ANSI/AWWA (C606)
Materials*	
Body	ductile iron ASTM A536, grade 65-45-12
Body finish	black alkyd enamel
Disc	electrolysis nickel coated ductile iron
Shaft	416 stainless steel
Seat	EPDM
Bearings	fiberglass with TFE lining
Media temp. range	-20°F to +250°F [-30°C to +120°C]
Body pressure rating	300 psi
Close-off pressure	200 psi (for most combinations)
Rangeability	100:1
Maximum velocity	20 FPS
Leakage	0%

\*VIC® 300 Masterseal™ is manufactured by Victaulic Company

		3-way			Suitable Actuators			
		Valve Nominal Size		Type	Non-Spring Return		Spring Return	
C <sub>V</sub> 90°	C <sub>V</sub> 60°	IN	DN [mm]	3-way				
115	36	2	50	F750VIC	AM Series	GM Series	AF	
260	80	2½	65	F765VIC				
440	140	3	80	F780VIC	DR Series	SY Series		
820	250	4	100	F7100VIC				
1200	370	5	125	F7125VIC				
1800	560	6	150	F7150VIC				
3400	1050	8	200	F7200VIC				
5800	1800	10	250	F7250VIC				
9000	2790	12	300	F7300VIC				

# Features and Benefits

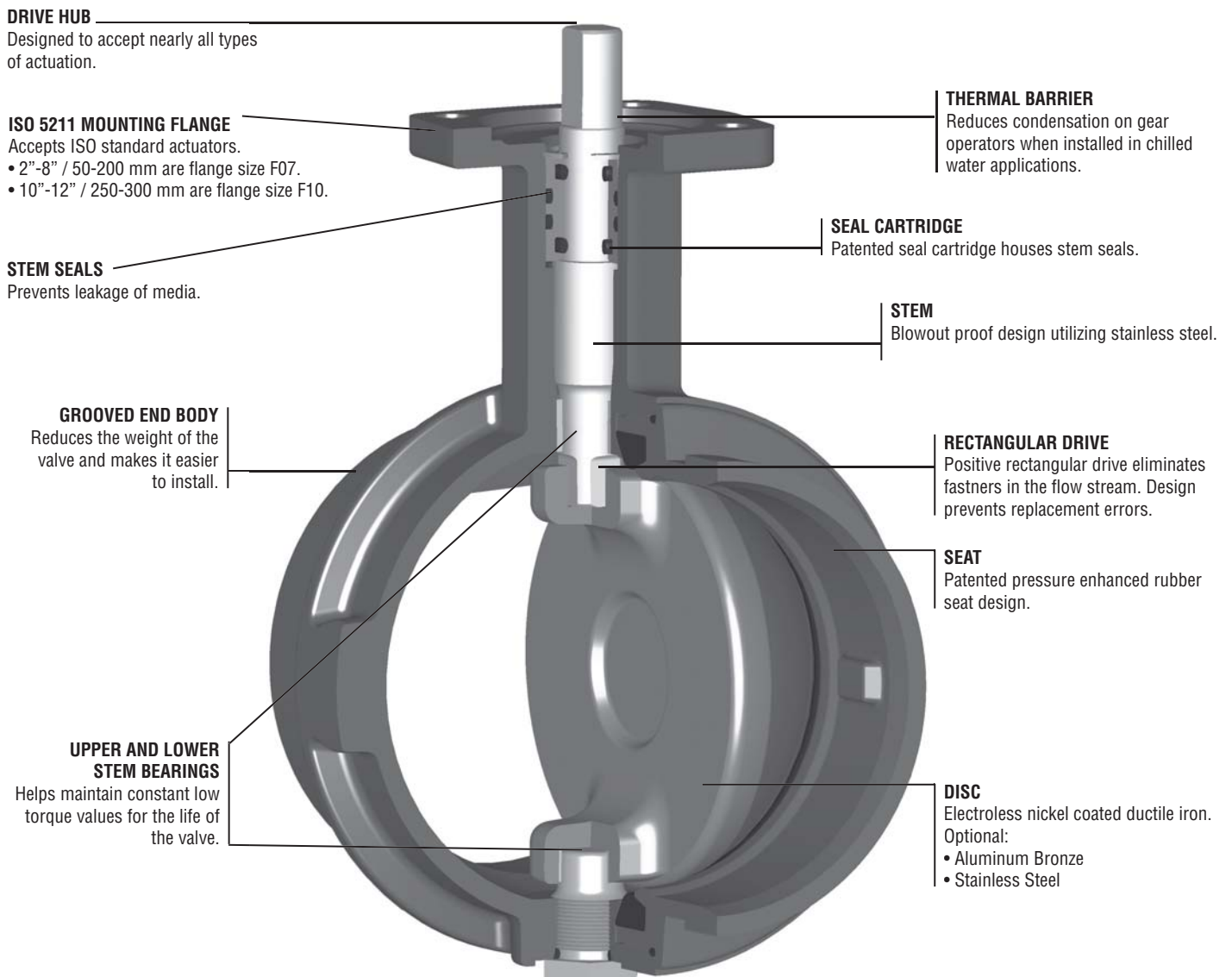
## VIC... Victaulic Butterfly Valves



Belimo VIC.. Series Victaulic Butterfly Valves are designed for pressure ranging from vacuum to 300psi and for dead end services to full working pressure. All Victaulic valves are supplied in grooved style body design.

### Valve Design Features

- The valve features a patented seat design that assures full 360° sealing.
- The pressure enhanced seat compresses to form a larger seating area as the pressure increases.
- The seat design also contributes to low breakaway torque of the valve.
- Valves have EPDM seats that are DL classified to ANSI/NSF 61.
- The disc is ductile iron, conforming to ASTM A-536, grade 65-45-12 with electrolysis nickel coating conforming to ASTM B-733.
- Stem is 416 stainless steel conforming to ASTM A-582.



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## Standard Actuation (Average Assembly Weights)

	Size	Valve	Max GPM	COP	NON-SPRING RETURN			SPRING RETURN		ELECTRONIC FAIL-SAFE
					AMB(X)	GMB(X)	2*GMB(X)	AF...	2*AF...	2*GK...
2-WAY	2"	F650VIC	118	200	14 lbs.			14 lbs.		
	2.5"	F665VIC	184	50/200	14 lbs.	14 lbs.			24 lbs.	
	3"	F680VIC	264	200		16 lbs.			25 lbs.	
	4"	F6100VIC	470	200			32 lbs.			51 lbs.
3-WAY	2"	F750VIC	118	50/200	46 lbs.	53 lbs.		46 lbs.		
	2.5"	F765VIC	184	50/200		55 lbs.			65 lbs.	
	3"	F780VIC	264	50		70 lbs.	72 lbs.			

## Industrial Actuation (Average Assembly Weights)

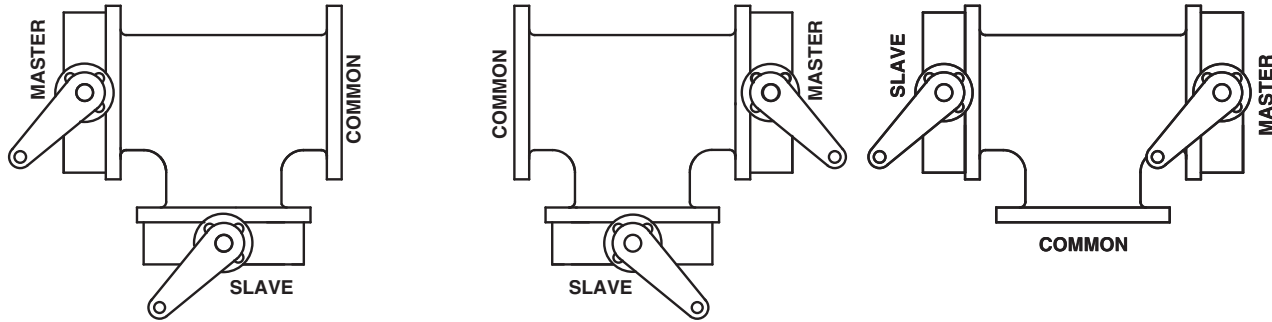
	Size	Valve	Max GPM	COP	ACTUATOR							
					NON-SPRING RETURN							
					SY1...	SY2...	SY3...	SY4...	SY5...	SY6...	SY7...	
2-WAY	2"	F650VIC	118	200	15 lbs.							
	2.5"	F665VIC	184	200	15 lbs.							
	3"	F680VIC	264	50/200	16 lbs.	44 lbs.						
	4"	F6100VIC	470	200		47 lbs.						
	5"	F6125VIC	734	50		52 lbs.						
	6"	F6150VIC	1058	50/200		56 lbs.	56 lbs.					
	8"	F6200VIC	1880	200			64 lbs.	64 lbs.				
	10"	F6250VIC	2938	200					81 lbs.			
3-WAY	12"	F6300VIC	4230	200					101 lbs.			
	2"	F750VIC	118	200	47 lbs.							
	2.5"	F765VIC	184	50/200	57 lbs.	80 lbs.						
	3"	F780VIC	264	200		87 lbs.						
	4"	F7100VIC	470	200		137 lbs.						
	5"	F7125VIC	734	200		168 lbs.						
	6"	F7150VIC	1058	50/200		201 lbs.	201 lbs.					
	8"	F7200VIC	1880	200				276 lbs.				
10"	F7250VIC	2938	50				452 lbs.			456 lbs.		
	12"	F7300VIC	4230	50			603 lbs.				645 lbs.	

**Max GPM** = Maximum US gallons of water (gpm) per minute, at room temperature, that will flow through the fully open valve without exceeding design velocity limits.

**COP** = Close-Off Pressure stated in psi. This is the maximum differential pressure the valve will close-off against while maintaining a bubble tight seal.

All SY series actuators are NEMA 4X rated and include 2 auxiliary switches and a heater.

### VIC Series Valves



D163

CONFIG CODE	ON/OFF OR MOD@2VDC MASTER VALVE IS	MASTER VALVE @ FAIL
X10	OPEN	NON-FAIL
X11	OPEN	OPEN
X12	OPEN	CLOSED
X13	CLOSED	NON-FAIL
X14	CLOSED	OPEN
X15	CLOSED	CLOSED

CONFIG CODE	ON/OFF OR MOD@2VDC MASTER VALVE IS	MASTER VALVE @ FAIL
X20	OPEN	NON-FAIL
X21	OPEN	OPEN
X22	OPEN	CLOSED
X23	CLOSED	NON-FAIL
X24	CLOSED	OPEN
X25	CLOSED	CLOSED

CONFIG CODE	ON/OFF OR MOD@2VDC MASTER VALVE IS	MASTER VALVE @ FAIL
X30	OPEN	NON-FAIL
X31	OPEN	OPEN
X32	OPEN	CLOSED
X33	CLOSED	NON-FAIL
X34	CLOSED	OPEN
X35	CLOSED	CLOSED

**X Specifies Bi-Directional Flow Capability**

**Notes:**

1. Slave Valve operates inversely of the Master Valve.
2. The Master Valve is always located on the run.
3. The Slave Valve may also have an actuator if required (Direct Coupled).
4. On/Off actuator normal position is a function of field logic.
5. Proportional actuator normal position is a function of the CCW/CW
6. All 3-way assemblies are designed for 90 degree actuator rotation.

**VIC Flow in Schedule 40 Pipe (Fluid Velocity in GPM). Use with Grooved Series Butterfly Valves.**

SIZE	1 FPS	3 FPS	5 FPS	8 FPS	10 FPS	12 FPS	15 FPS	16 FPS	20 FPS
2"	10	31	52	84	105	126	157	167	209
2½"	15	45	75	119	149	179	224	239	298
3"	23	69	115	184	230	277	346	369	461
4"	40	119	198	317	397	476	595	635	794
5"	62	187	312	499	624	748	935	998	1247
6"	90	270	450	720	900	1081	1351	1441	1801
8"	156	468	780	1247	1559	1871	2339	2495	3119
10"	246	737	1229	1966	2458	2949	3687	3932	4916
12"	353	1058	1763	2820	3525	4230	5288	5640	7050

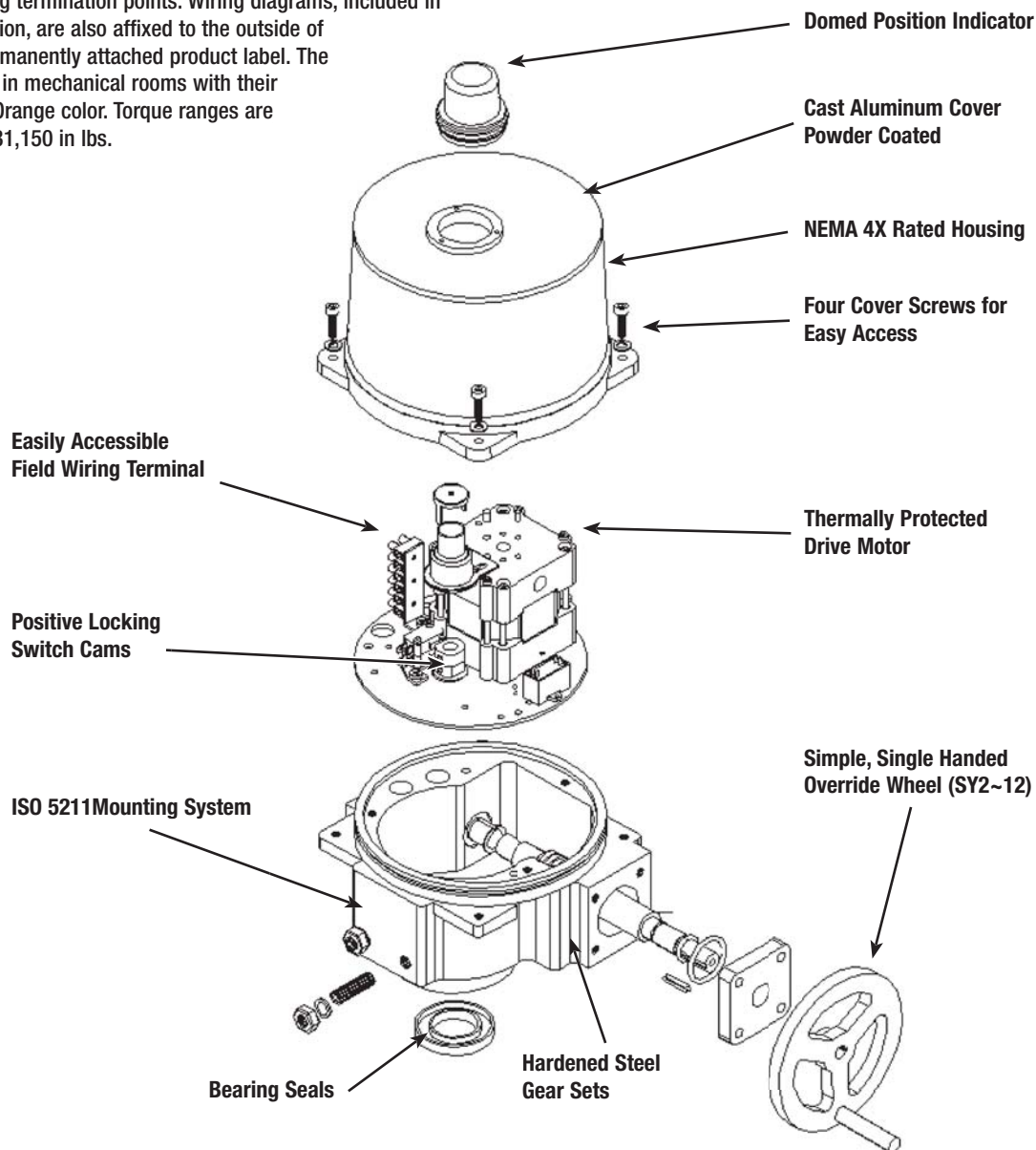
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# SY Series Actuators

Belimo's SY series electric actuators have been designed to mate with our HD(U), Grooved and SHP... series butterfly valves and other quarter turn valve applications.

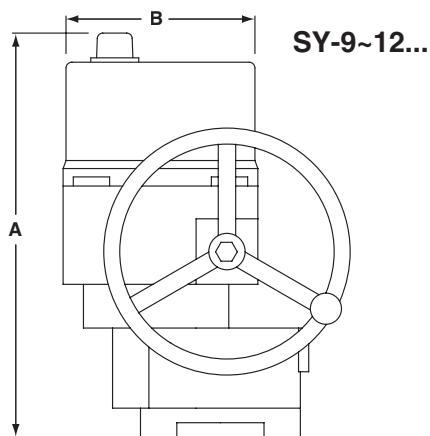
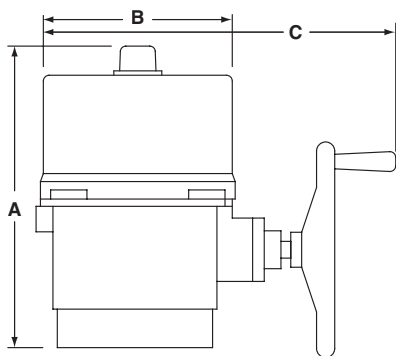
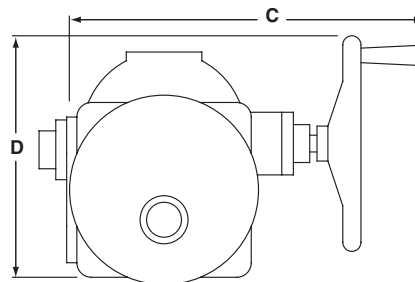
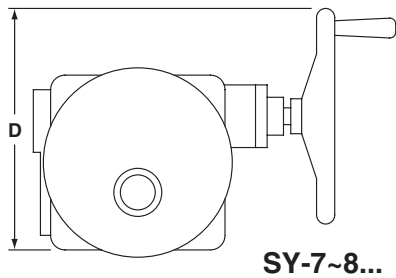
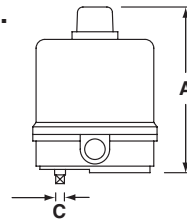
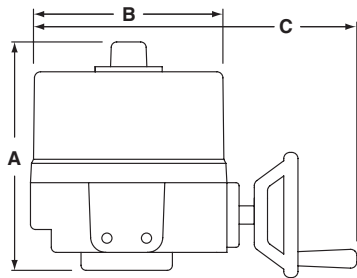
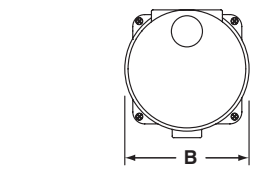
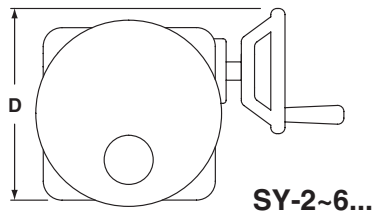
The patented gear drive mechanism provides for efficient, smooth operation while allowing easy manual override at any time. Drawing upon years of experience in the actuation industry, we have incorporated the most desirable features into the SY product range.

All units have NEMA 4X ratings, easily visible position indicators, international standard ISO5211 mounting systems, internal thermal motor overload protection, heater, dual auxiliary Form C switches, and easily accessible wiring termination points. Wiring diagrams, included in all printed documentation, are also affixed to the outside of the housing on the permanently attached product label. The units are easily visible in mechanical rooms with their characteristic Belimo Orange color. Torque ranges are available from 310 to 31,150 in lbs.



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



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

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



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		SY1	SY2	SY3	SY4	SY5
		Amps	Amps	Amps	Amps	Amps
wire gauge		1.8	3	3	6	6.5
<b>MAX Distance between Actuator and Supply (feet)</b>						
18		92	55	55		
16		144	87	87	43	40
14		233	140	140	70	65
12		357	214	214	107	99
10		606	364	364	182	168
8		905	543	543	271	250

**24 VAC**

		SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY11	SY12
		Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
wire gauge		0.5	1	1	1.3	1.5	1.8	3.2	4	3.2	4	3	4
<b>MAX Distance between Actuator and Supply (feet)</b>													
18		1515	758	758	583	505	421	237	189	237	189	253	189
16		2381	1190	1190	916	794	661	372	298	372	298	397	298
14		3846	1923	1923	1479	1282	1068	601	481	601	481	641	481
12		5882	2941	2941	2262	1961	1634	919	735	919	735	980	735
10		10000	5000	5000	3846	3333	2778	1563	1250	1563	1250	1667	1250
8		14925	7463	7463	5741	4975	4146	2332	1866	2332	1866	2488	1866

**110 VAC**

		SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY11	SY12
		Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
wire gauge		0.3	0.5	0.5	0.6	0.7	0.8	1.6	2	1.6	2	1.6	2.2
<b>MAX Distance between Actuator and Supply (feet)</b>													
18		5051	3030	3030	2525	2165	1894	947	758	947	758	947	689
16		7937	4762	4762	3968	3401	2976	1488	1190	1488	1190	1488	1082
14		12821	7692	7692	6410	5495	4808	2404	1923	2404	1923	2404	1748
12		19608	11765	11765	9804	8403	7353	3676	2941	3676	2941	3676	2674
10		33333	20000	20000	16667	14286	12500	6250	5000	6250	5000	6250	4545
8		49751	29851	29851	24876	21322	18657	9328	7463	9328	7463	9328	6784

**220 VAC**

The NEC mandates that 24 VAC over 100 VA power requires CLASS 1 wiring conduit. Local codes may vary. Do NOT mix CLASS 1 & CLASS 2 circuits in the same conduit. Generally, 24 VAC actuators over 100 VA should be changed to 120 VAC models.



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
SY1-24	310 in-lbs/ 35 Nm	20 seconds	1.6 A	1.7 A	30	29	48	51	8 mm Wrench Required	2.0 kg/4.9 lbs.
SY2-24	800 in-lbs/ 90 Nm	16 seconds	2.9 A	3.0 A	60	65	87	90	Hand Wheel	11 kg/24.5 lbs.
SY3-24	1330 in-lbs/ 150 Nm	25 seconds	2.8 A	2.8 A	65	76	84	84	Hand Wheel	11 kg/24.5 lbs.
SY4-24	3540 in-lbs/ 400 Nm	30 seconds	9.5 A	9.5 A	208	212	285	285	Hand Wheel	22 kg/48.5 lbs.
SY5-24	4430 in-lbs/ 500 Nm	35 seconds	9.3 A	9.4 A	178	168	279	282	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
SY1-110	310 in-lbs/ 35 Nm	17 seconds	12 seconds	0.8 A	0.7 A	81	75	120	105	8 mm Wrench Required	2.0 kg/4.9 lbs.
SY2-110	800 in-lbs/ 90 Nm	19 seconds	16 seconds	1.7 A	1.1 A	185	130	255	165	Hand Wheel	11 kg/24.5 lbs.
SY3-110	1330 in-lbs/ 150 Nm	30 seconds	25 seconds	1.5 A	1.1 A	178	130	225	165	Hand Wheel	11 kg/24.5 lbs.
SY4-110	3540 in-lbs/ 400 Nm	21 seconds	18 seconds	2.2 A	1.8 A	240	196	330	270	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	330	270	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	330	270	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	960	525	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	1230	720	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	405	420	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	420	435	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	495	540	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	555	570	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
SY1-220	310 in-lbs/ 35 Nm	14 seconds	11 seconds	0.4 A	0.4 A	68	69	115	115	8mm Wrench Required	2.0 kg/4.9 lbs.
SY2-220	800 in-lbs/ 90 Nm	19 seconds	15 seconds	0.7 A	0.5A	142	100	202	144	Hand Wheel	11 kg/24.5 lbs.
SY3-220	1330 in-lbs/ 150 Nm	30 seconds	25 seconds	0.7 A	0.5 A	143	102	202	144	Hand Wheel	11 kg/24.5 lbs.
SY4-220	3540 in-lbs/ 400 Nm	21 seconds	18 seconds	1.1 A	0.9 A	221	180	317	259	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	317	259	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	288	259	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	518	403	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	547	403	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	460	690	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	489	719	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	518	719	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	518	690	Hand Wheel	72 kg/176.4 lbs.

\*25% safety factor included in the VA rating.

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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
SY1-24P	310 in-lbs/ 35 Nm	15 seconds	2.0 A	2.0 A	32.7	33.1	60	60	8 mm Wrench Required	2.0 kg/4.9 lbs.
SY2-24MFT	800 in-lbs/ 90 Nm	16 seconds	2.9 A	3.6 A	65	66	87	108	Hand Wheel	11 kg/24.5 lbs.
SY3-24MFT	1330 in-lbs/ 150 Nm	24 seconds	2.8 A	3.6 A	69	69	84	108	Hand Wheel	11 kg/24.5 lbs.
SY4-24MFT	3540 in-lbs/ 400 Nm	23 seconds	11.0 A	11.0 A	254	251	330	330	Hand Wheel	22 kg/48.5 lbs.
SY5-24MFT	4430 in-lbs/ 500 Nm	30 seconds	10.2 A	10.2 A	232	230	306	306	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
SY1-120P	310 in-lbs/ 35 Nm	18 seconds	18 seconds	0.6 A	0.6 A	56	58	90	90	8mm Wrench Required	2.0 kg/4.9 lbs.
SY2-120MFT	800 in-lbs/ 90 Nm	14 seconds	15 seconds	0.8 A	0.7 A	81	76	120	105	Hand Wheel	11 kg/24.5 lbs.
SY3-120MFT	1330 in-lbs/ 150 Nm	21 seconds	23 seconds	0.7 A	0.7 A	75	71	105	105	Hand Wheel	11 kg/24.5 lbs.
SY4-120MFT	3540 in-lbs/ 400 Nm	16 seconds	17 seconds	2.3 A	2.4 A	258	256	345	360	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	345	345	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	330	330	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	270	255	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	390	390	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	540	510	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	600	600	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	465	450	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	540	510	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
SY1-230P	310 in-lbs/ 35 Nm	16 seconds	16 seconds	0.4 A	0.4 A	64	62	115	115	8mm Wrench Required	2.0 kg/4.9 lbs.
SY2-230MFT	800 in-lbs/ 90 Nm	14 seconds	14 seconds	0.4 A	0.4 A	76	78	115	115	Hand Wheel	11 kg/24.5 lbs.
SY3-230MFT	1330 in-lbs/ 150 Nm	23 seconds	23 seconds	0.4 A	0.4 A	74	76	115	115	Hand Wheel	11 kg/24.5 lbs.
SY4-230MFT	3540 in-lbs/ 400 Nm	16 seconds	17 seconds	1.1 A	1.1 A	222	217	317	317	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	317	288	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	317	317	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	259	230	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	374	374	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	317	317	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	374	374	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	575	547	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	633	575	Hand Wheel	72 kg/176.4 lbs.


\*25% safety factor included in the VA rating.

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BUTTERFLY VALVES

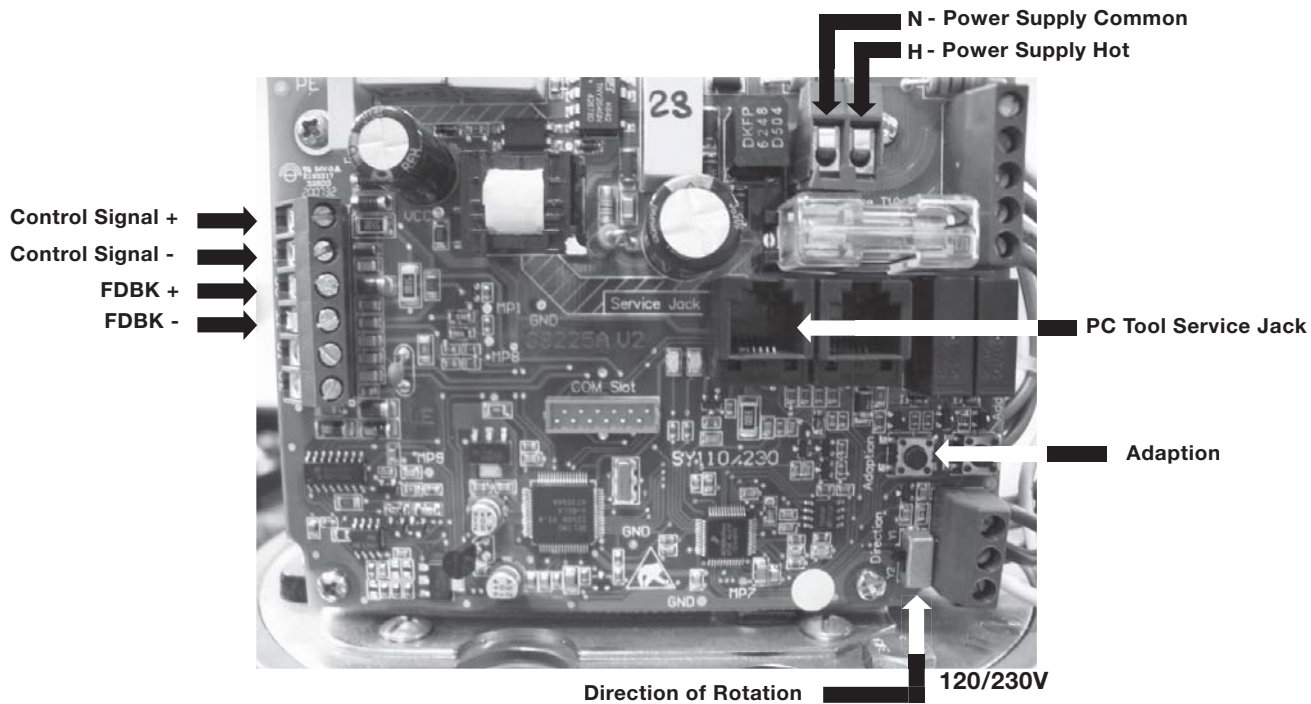
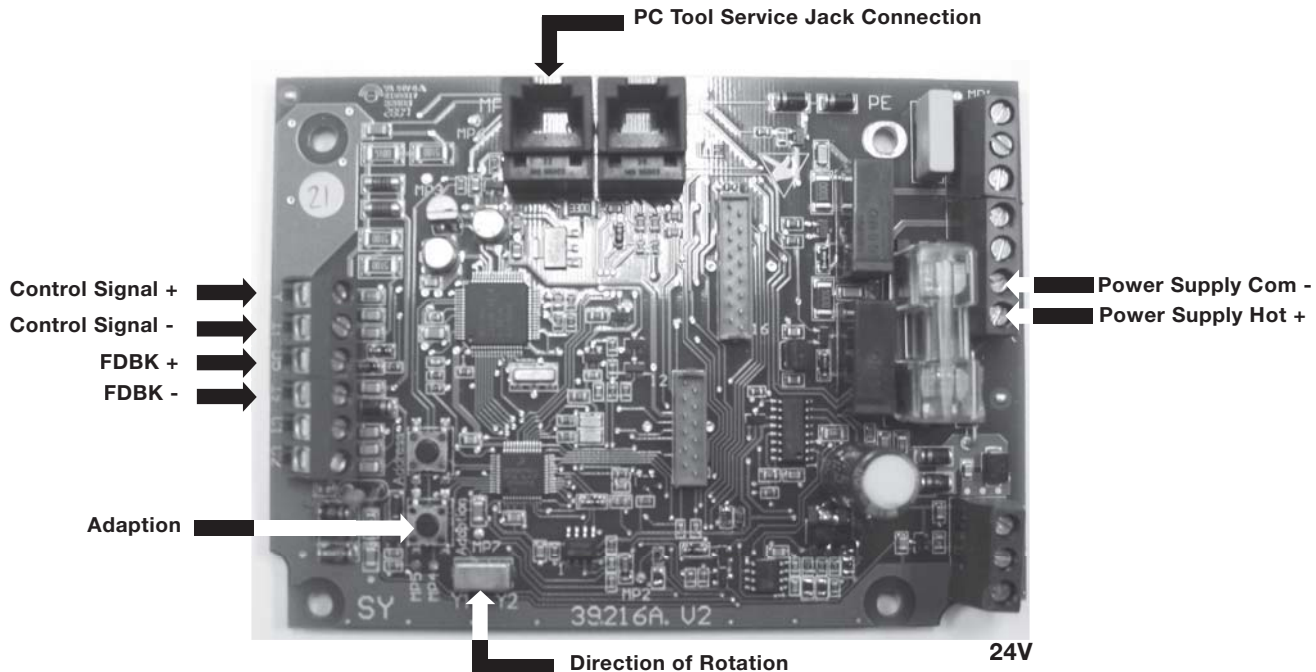
**Actuators: SYx-MFT**

 **INSTALLATION NOTES**

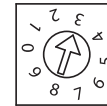
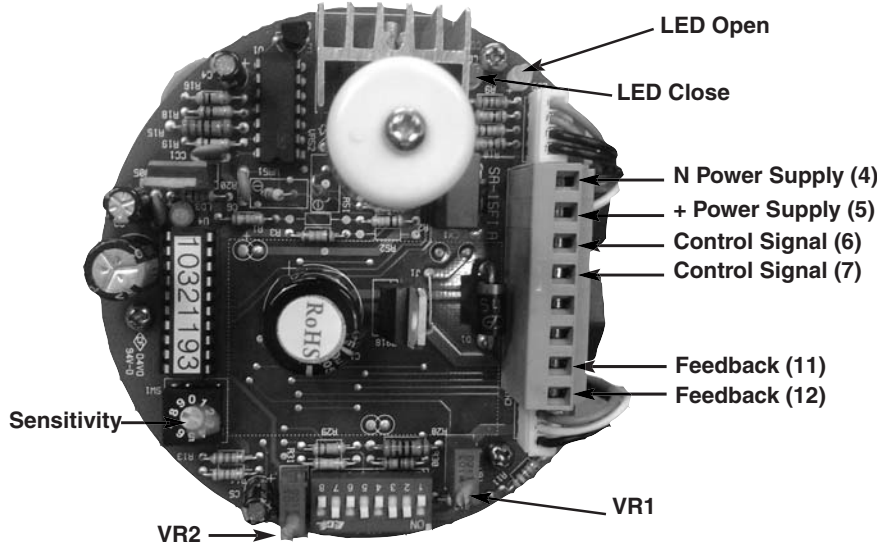
 **CAUTION**

**Notes:**

1. Motor CAMS have been factory calibrated and should not be moved.
2. An adaption must be performed if any limit switch is adjusted. This will calibrate the beginning and end stopping points. Press the adaption button for 3 seconds and release.
3. New SY actuators must have an adaption performed before operation.



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Sensitivity switch setting is position #3 for factory default. To widen dead-band, select a higher number (up to 9).

**INSTALLATION NOTES**  
**CAUTION**

- Notes:**
1. Do not change sensitivity or dip switch settings with power applied!
  2. VR1 and VR2 are factory calibrated and should not be moved.
  3. Motor CAMS have been factory calibrated and should not be moved.

**Dip Switch Settings**

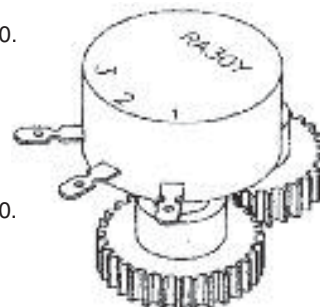
	INPUT = 2-10 VDC		RESPONSE = DIRECT
	INPUT = 4-20mA		RESPONSE = REVERSE
	INPUT = 1-5 VDC		LOSS OF SIGNAL = CLOSED (Direct Acting)
	OUTPUT = 4-20mA		LOSS OF SIGNAL = OPEN (Reverse Acting)
	OUTPUT = 2-10 VDC		LOSS OF SIGNAL = OPEN (Direct Acting)
			LOSS OF SIGNAL = CLOSED (Reverse Acting)
			LOSS OF SIGNAL = STOP

**WARNING**

**Potentiometer (Factory Pre-set)**

**For 2-position actuators with 1k feedback option**  
Potentiometer points 1, 2, 3 are wired to terminal blocks 8, 9, 10.  
When a valve is closed: 8, 9 → 1k Ω  
9, 10 → 0k Ω  
When a valve is opened: 8, 9 → 0k Ω  
9, 10 → 1k Ω

**For modulating actuators with 1k feedback option\***  
Potentiometer points 1, 2, 3 are wired to terminal blocks 8, 9, 10.  
When a valve is closed: 8, 9 → 1k Ω  
9, 10 → 0k Ω  
When a valve is opened: 8, 9 → 0k Ω  
9, 10 → 1k Ω



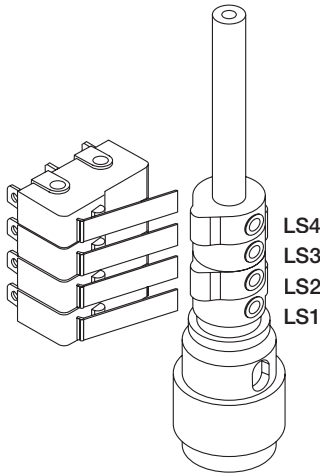
\*On modulating actuators **DO NOT** master/slave using optional potentiometer.

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**CAUTION**

### Electrical Travel Adjustment (Factory Pre-set)







SY-1



Factory pre-set see chart below. Field adjustable if required

-  **LS4**  
Auxiliary Switch for Closed Indication
-  **LS3**  
Auxiliary Switch for Opened Indication

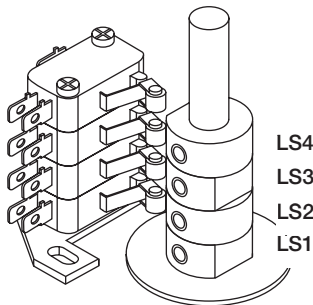
Factory pre-set and calibrated. Do not adjust - warranty voided

-  **LS2**  
"CLOSE"  
  -  Clockwise Decrease Closed Angle
  -  Counter-clockwise Increase Closed Angle
-  **LS1**  
"OPEN"  
  -  Clockwise Increase Opening Angle
  -  Counter-clockwise Decrease Opening Angle



**CAUTION**

### Electrical Travel Adjustment







SY-2-12



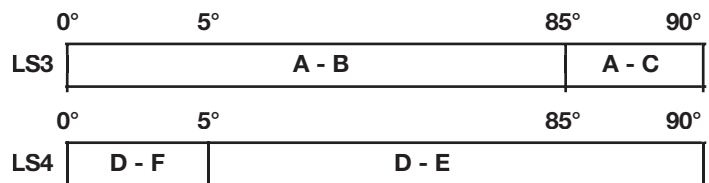
Factory pre-set see chart below. Field adjustable if required

-  **LS4**  
Auxiliary Switch for Closed Indication
-  **LS3**  
Auxiliary Switch for Opened Indication

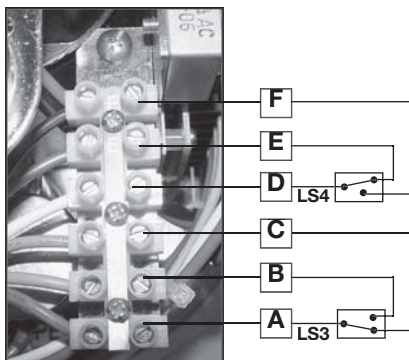
Factory pre-set and calibrated. Do not adjust - warranty voided

-  **LS2**  
"CLOSE"  
  -  Clockwise Decrease Closed Angle
  -  Counter-clockwise Increase Closed Angle
-  **LS1**  
"OPEN"  
  -  Clockwise Increase Opening Angle
  -  Counter-clockwise Decrease Opening Angle

Switches at left are shown with actuator fully open.



**WARNING**



**INSTALLATION NOTES**

**CAUTION**

**Notes:**

- An adaption must be performed when the limit switches are adjusted. For the SYx-MFT actuators. This will calibrate the beginning and end stopping points. Press the adaption button for 3 seconds and release.

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.

### NOTES SY1...5-24

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.

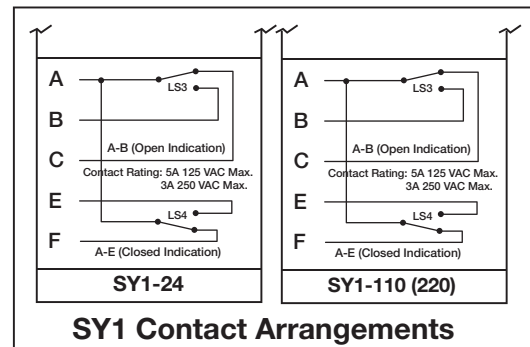
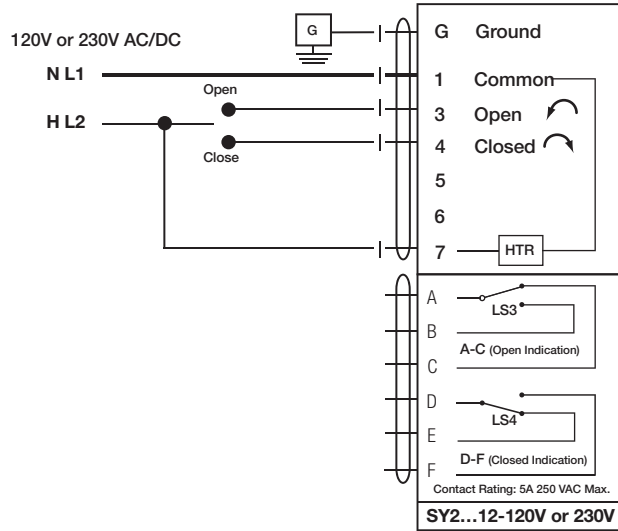
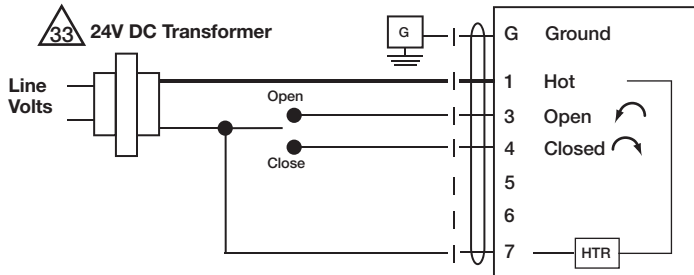
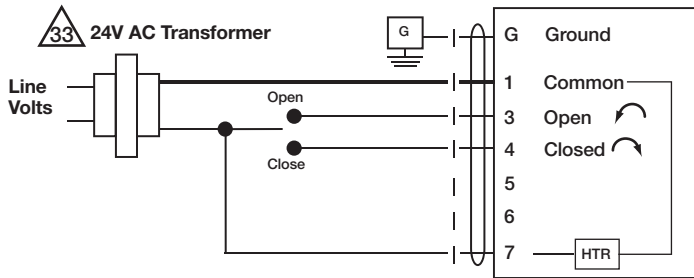
### INSTALLATION NOTES

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...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.



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W547\_11

## SY Actuator Wiring Diagram, SY1-24P and SY1-110P (220P)

### 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



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



Use of feedback is optional.



### NOTES SY1...24P

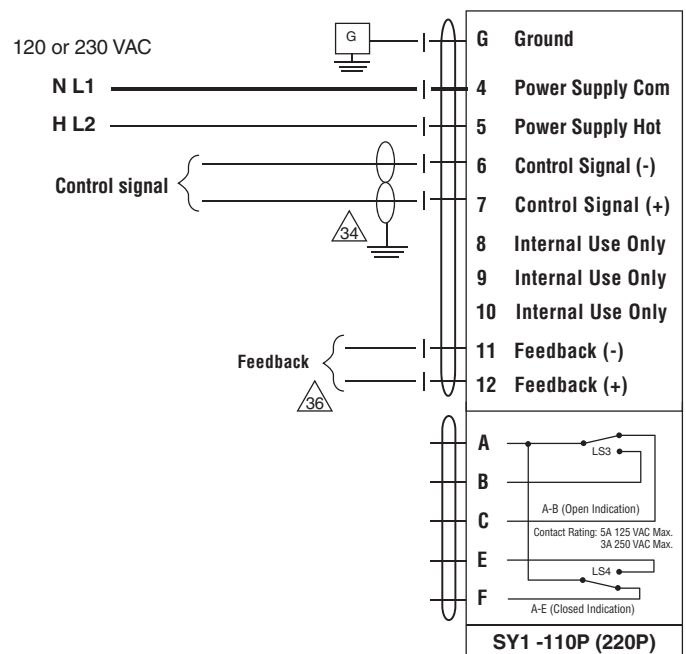
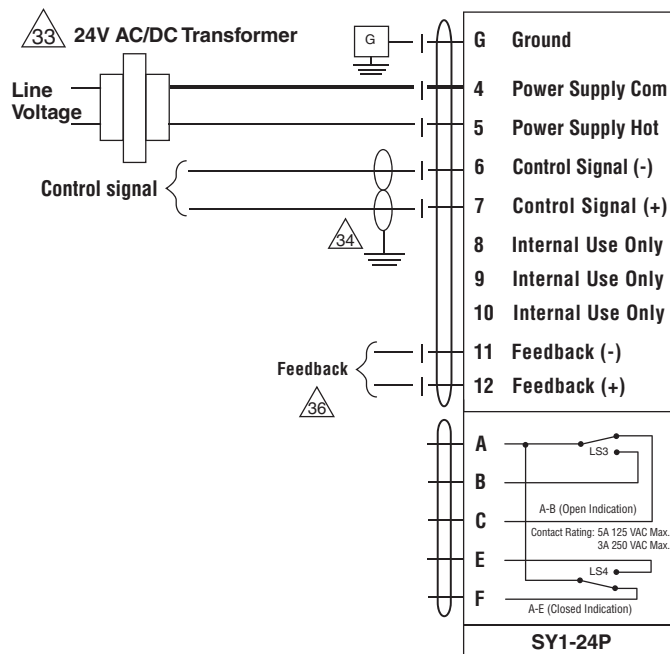
**33** Each actuator should be powered by a single, isolated control transformer.

- Power supply Com/Neutral and Control Signal "-" wiring to a common is prohibited. Terminals 4 and 6 need to be wired separately.
- Do not change sensitivity or dip switch settings with power applied.



### NOTES SY1...110P (220P)

- **Caution:** Power supply voltage.
- Power supply Com/Neutral and Control Signal "-" wiring to a common is prohibited. Terminals 4 and 6 need to be wired separately.
- Do not change sensitivity or dip switch settings with power applied.





# 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.

### NOTES SY2...5-24MFT

- Each actuator should be powered by a single, isolated control transformer.
- Power supply Com/Neutral and Control Signal "-" wiring to a common is prohibited.

### INSTALLATION NOTES

Observe Class 1 and Class 2 wiring restrictions.

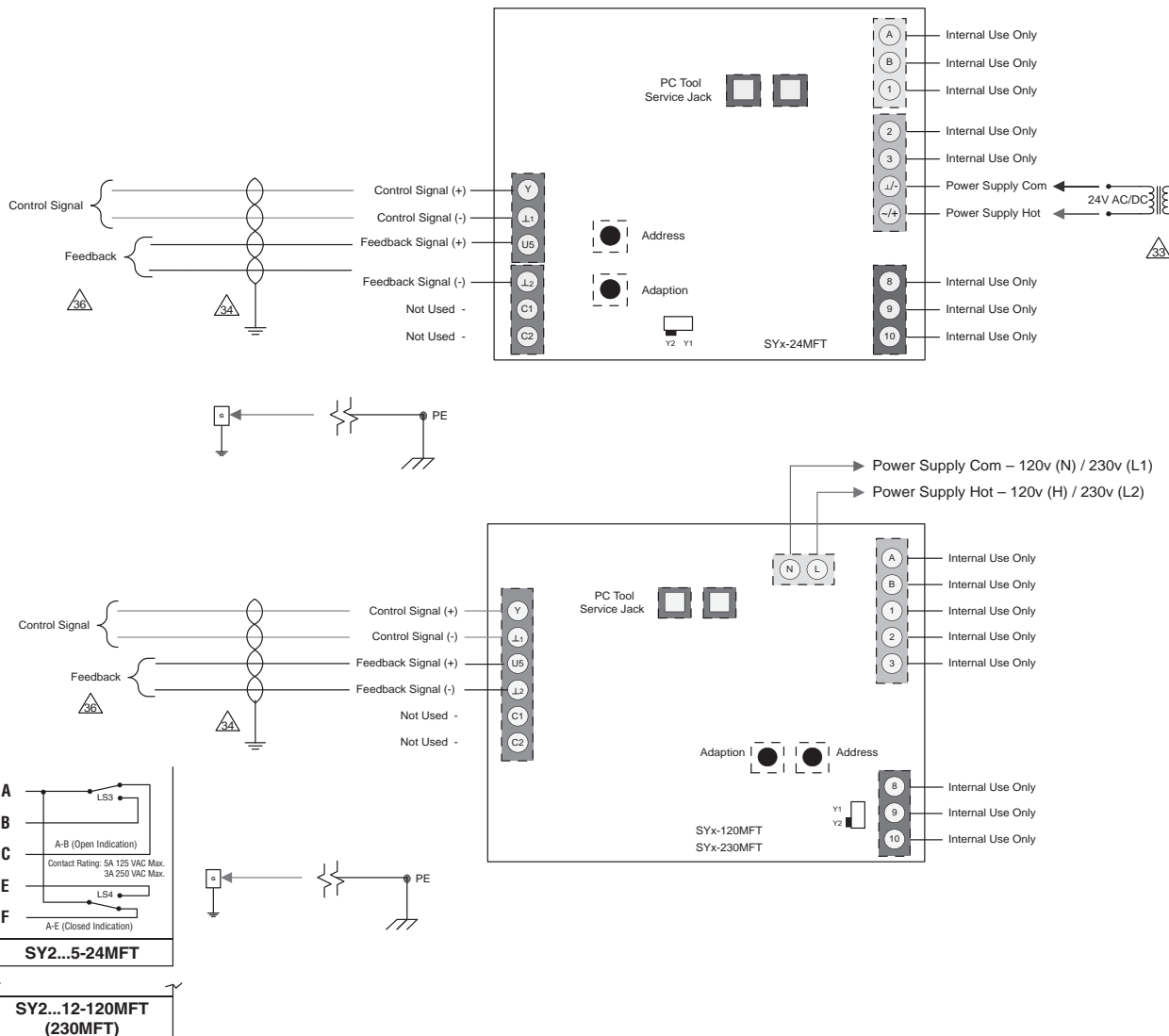
Transformer sizing = SY actuator draw X 1.25 (safety margin)  
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A, 3.75A X 24 VAC = 90VA Transformer)

### APPLICATION NOTES

- Ground shielded wire at control panel chassis. Tape back ground at actuator.
- Use of feedback is optional.

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

- Caution: Power supply voltage.



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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.**

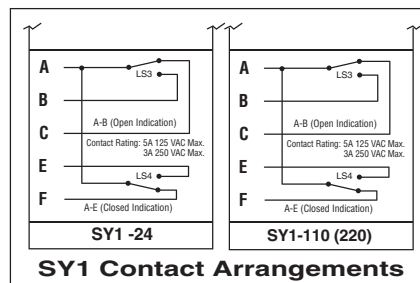
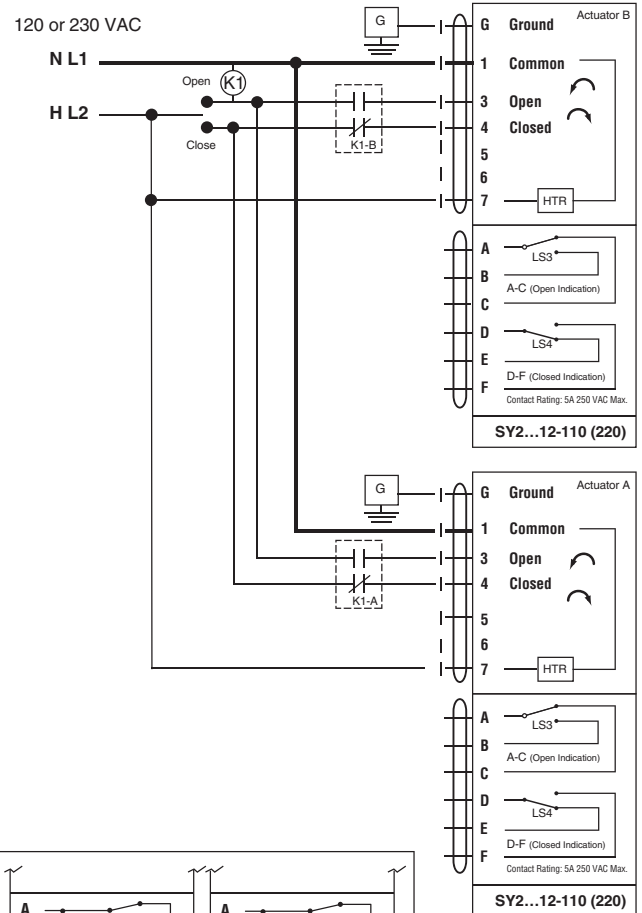
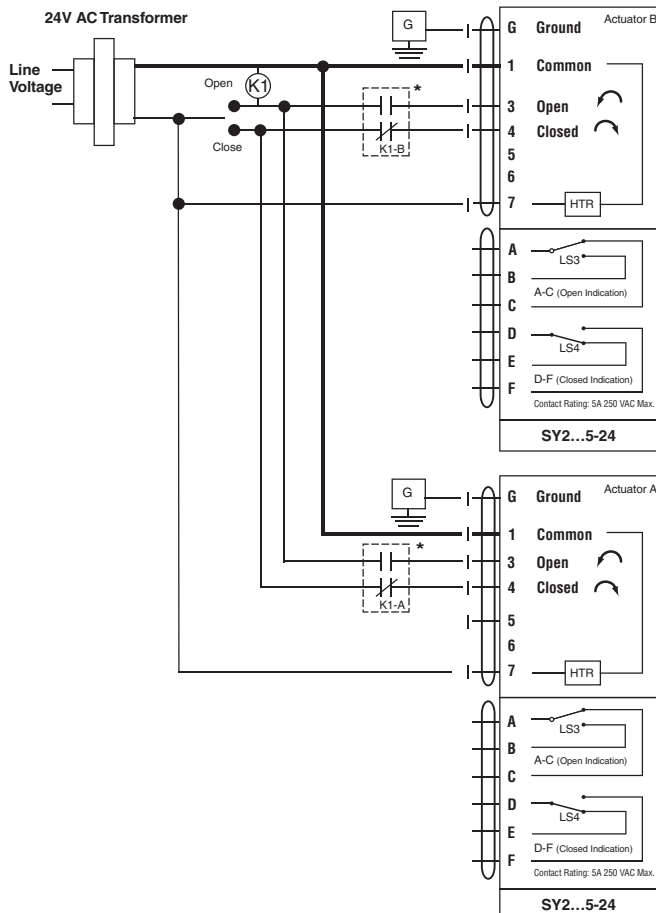
The reason parallel applications need isolation relays is that the motor uses two sets of windings, one for each direction. When one is energized to turn the actuator in a specific direction a voltage is generated in the other due to the magnetic field created from the first. It's called back EMF. This 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.



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### SY Actuator Wiring Diagram, SY1-24P – 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).

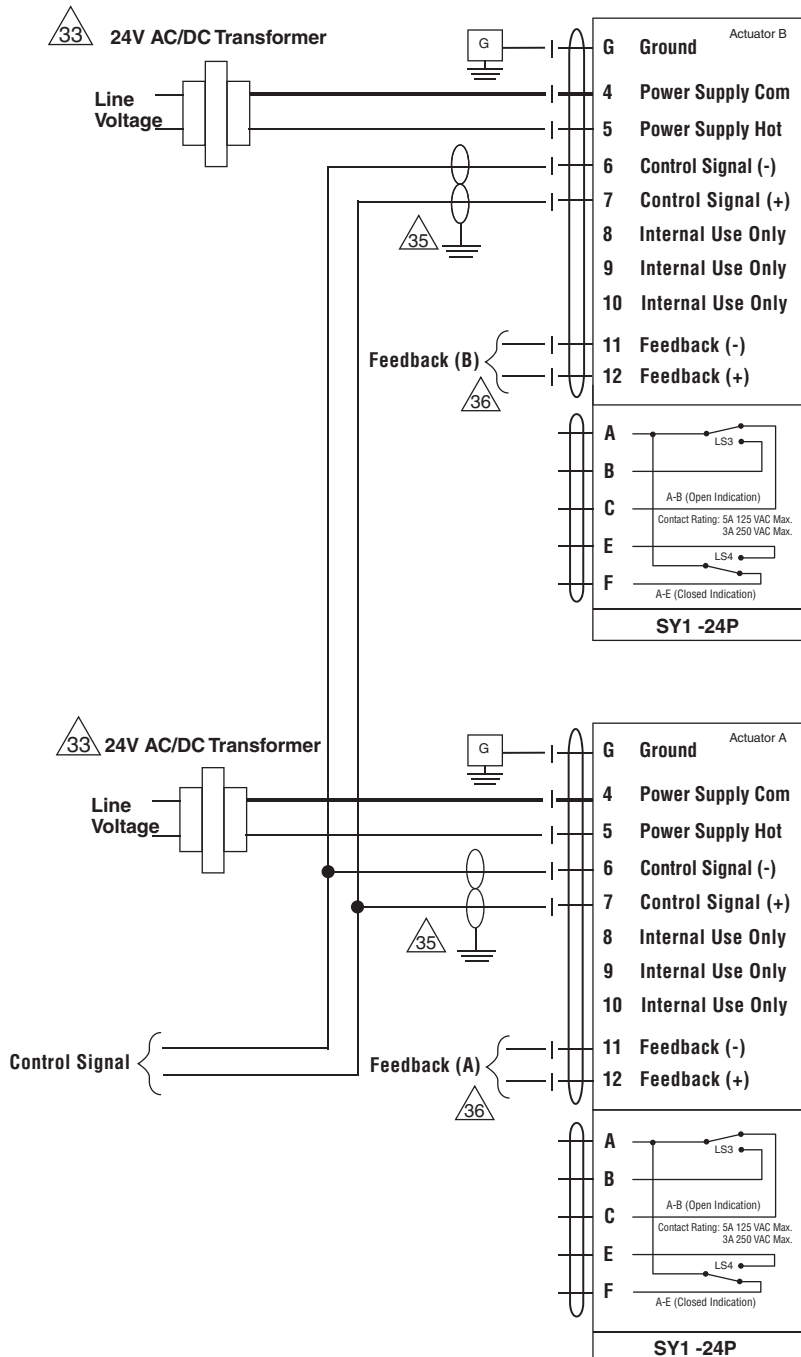
#### NOTES SY1-24P

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

- **SY1-24P notes:** Power supply Com/Neutral and Control Signal "-" wiring to a common is prohibited. Terminals 4 and 6 need to be wired separately otherwise irreversible damage will occur.
- Do not change sensitivity or dip switch settings with power applied.

#### 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.



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).

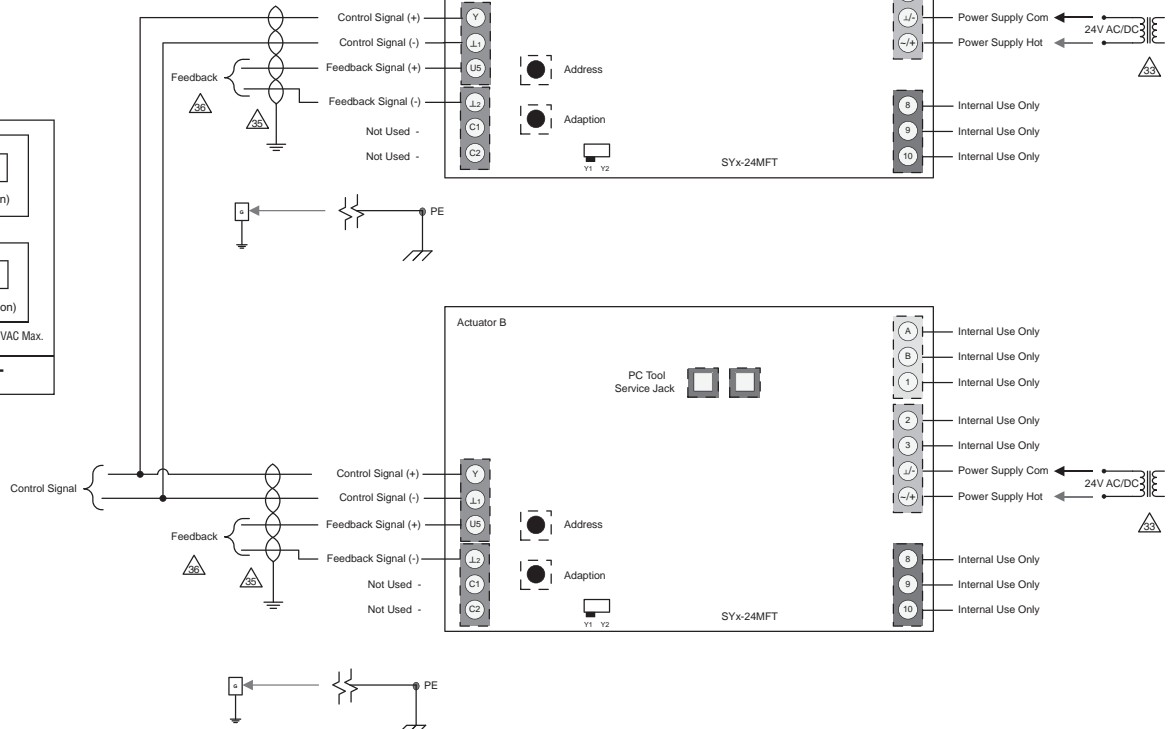
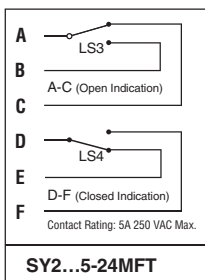
**NOTES SY2...5-24MFT**

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

**APPLICATION NOTES**

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

Use of feedback is optional.



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# Wiring for Control Valves

## Proportional, 110/220V, 120/230V



W552\_1\_11

Actuators: SY1-110P SY1-220P

### Hazard Identification

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

### CAUTION

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

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

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



### INSTALLATION NOTES

Observe class 1 and class 2 wiring restrictions.



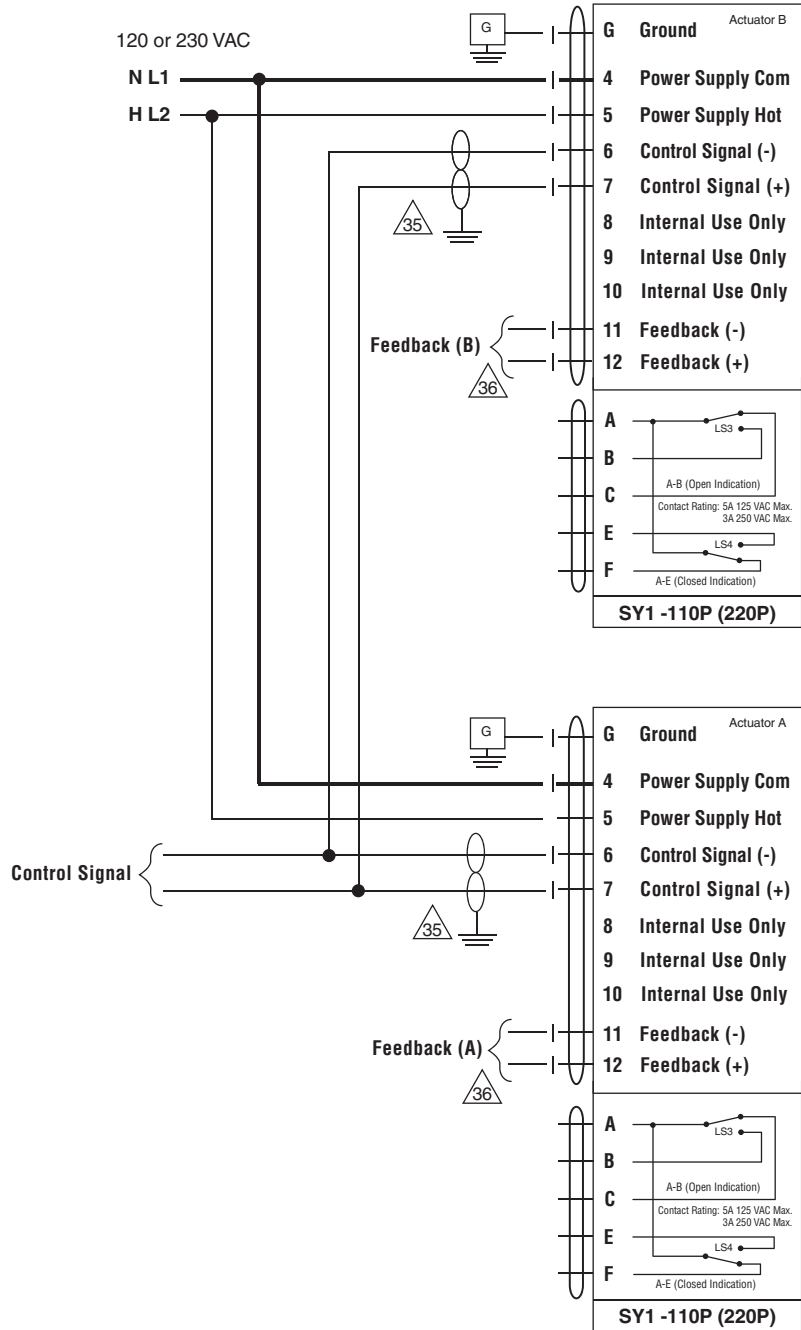
### APPLICATION NOTES

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



### NOTES SY1-110P (220P)

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



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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**

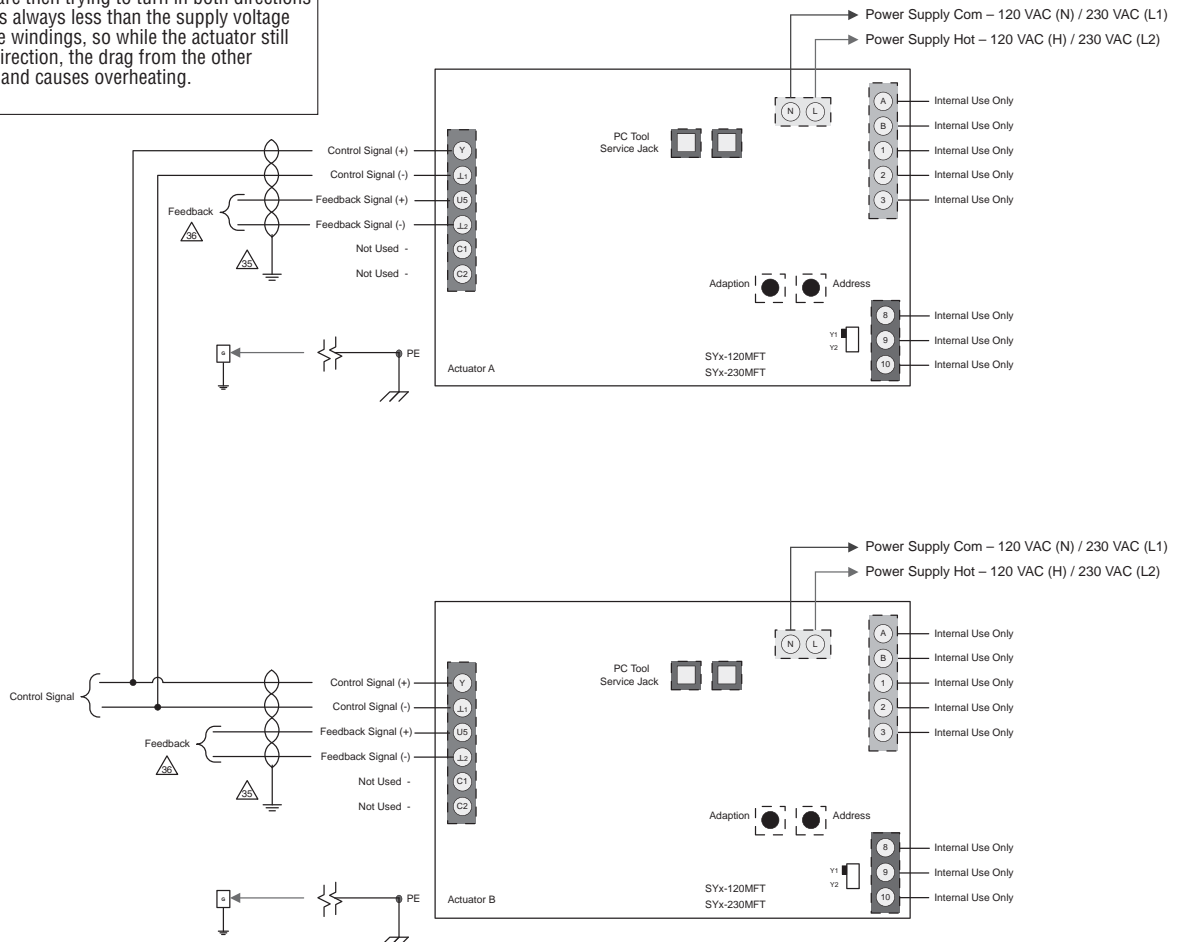
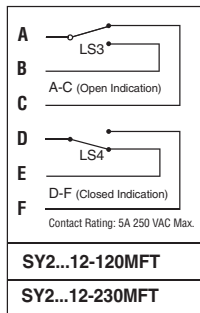
Observe class 1 and class 2 wiring restrictions.

**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.



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## VIC Series Butterfly Valves

### Maintenance Instructions

#### Safety Precautions

Before removing the valve from the line or loosening any bolts, it is important to verify the following conditions:

1. Be sure the line is depressurized and drained.
2. Be sure of the pipeline media. Proper care should be taken for protection against toxic and/or flammable fluids.
3. Never remove the valve without an Operator (Manual or Automatic) already attached to the valve shaft.
4. Never remove the Operator from the valve while the valve is in the pipeline under pressure.
5. Always be sure that the disc is cracked approximately 5° off of the closed position before removing the valve.

#### General Maintenance

The following periodic preventative maintenance practices are recommended for all Butterfly Valves.

1. Operate the valve from full open to full closed to assure operability.
2. Check flange bolting, actuator mounts and hangers for evidence of loosening and correct as needed.
3. Inspect the valve and surrounding area for previous or existing leakage at flange faces or shaft connections.
4. Check piping and/or wiring to actuators and related equipment for looseness and correct as needed.
5. If not in use, exercise the butterfly valve (full open and close) at least once a month.

### Installation

Consult the Victaulic I-100 field instructional handbook for product installation of the VIC series butterfly valves.