



High Performance
for a Wide Range of
Applications

SHP Series Actuators for Butterfly Valves



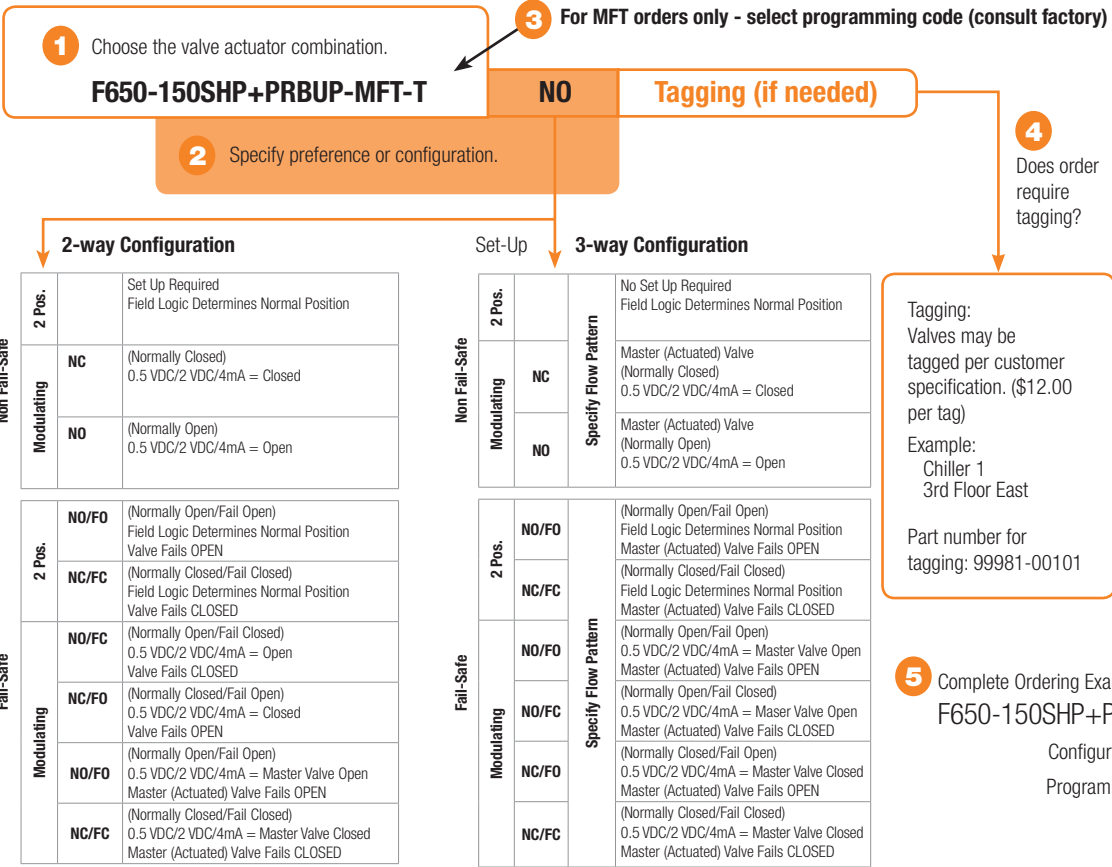
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BELIMO[®]

Butterfly Valve Nomenclature

F6	50	-150SHP	+PRB	UP	-MFT	-T	
Valve F6 = 2-way F7 = 3-way	Valve Size 50 = 2" 65 = 2½" 80 = 3" 100 = 4" 125 = 5" 150 = 6" 200 = 8" 250 = 10" 300 = 12" 350 = 14" 400 = 16" 450 = 18" 500 = 20" 600 = 24"	Trim Material -150SHP = ANSI Class 150, Stainless Disc, Steel Body, RPTFE Seat, 0% Leakage up to 285 psi -300SHP = ANSI Class 300, Stainless Disc, Steel Body, RPTFE Seat, 0% Leakage up to 600 psi	Actuator Type Non Fail-Safe GMB, GMX GR/ GM... N4 PRB, PRX SY Fail-Safe Electronic GKB, GKX PKRX Spring Return AFB, AFX AFRB, AFRX	Power Supply -24 = 24 VAC/DC -110 = 110/120 VAC -120 = 120 VAC -230 = 230 VAC UP = 24-240 VAC or 24-125 VDC	Control -3-X1 = On/Off, Floating Point -MFT or -MFT-X1 = Multi-Function Technology	-S = Built-in Auxiliary Switch N4 = NEMA 4/4X -T = Terminal Block	-200 = 8" -250 = 10"

Ordering Example



High Performance Butterfly Valve Product Range

		2-way Valves			Suitable Actuators					
		Valve Nominal Size	Type		Non Fail-Safe				Fail-Safe	
C _v 90°	C _v 60°	Inches	ANSI 150 2-way	ANSI 300 2-way	150		300		Spring Return	Electronic
102	56	2	F650-150SHP	F650-300SHP	GM Series	PR Series	GM Series	PR Series	AF Series	AF Series
146	80	2½	F665-150SHP	F665-300SHP						
228	125	3	F680-150SHP	F680-300SHP	GM Series	PR Series	GM Series	PR Series	AF Series	AF Series
451	248	4	F6100-150SHP	F6100-300SHP						
714	392	5	F6125-150SHP	F6125-300SHP	GM Series	PR Series	GM Series	PR Series	AF Series	AF Series
1103	607	6	F6150-150SHP	F6150-300SHP						
2064	1135	8	F6200-150SHP	F6200-300SHP	GM Series	PR Series	GM Series	PR Series	AF Series	AF Series
3517	1934	10	F6250-150SHP	F6250-300SHP						
4837	2660	12	F6300-150SHP	F6300-300SHP	GM Series	PR Series	GM Series	PR Series	AF Series	AF Series
6857	3592	14*	F6350-150SHP	F6350-300SHP						
9287	4865	16*	F6400-150SHP	F6400-300SHP	GM Series	PR Series	GM Series	PR Series	AF Series	AF Series
11400	6270	18*	F6450-150SHP							
14420	7590	20*	F6500-150SHP		GM Series	PR Series	GM Series	PR Series	AF Series	AF Series
22050	11550	24*	F6600-150SHP							

Note: C_v values listed for ANSI Class 150 Butterfly Valves. Please consult the technical documentation for ANSI Class 300 C_v values and configurations.

*Call Customer Service at 1-800-543-9038 for product availability. Longer lead times may apply.



Mode of Operation

High performance butterfly valves are designed for modulating and isolation service and feature a machined seat design and blow out proof solid shaft, providing better torque consistency, which offers longer actuator life and reduced risk of leakage. Available for a variety of high temperature and pressure ratings i.e., ASME/ANSI Class 300 or 150. Valve sizes range from 2 to 24 inches, with rangeabilities of 100:1, 0% leakage ratings, and a maximum valve velocity of 32 FPS.

Product Features

Unique body seat and double offset disc design ensures positive valve sealing to help assure leak free performance in water applications 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 (-T models)
Communication (PR)	BACnet MS/TP, NFC, listed by BTL, Modbus

Valve Specifications

Service	chilled or hot water, 60% glycol, steam to 50 psi
Flow characteristic	F6 modified equal percentage, unidirectional F7 modified linear, unidirectional
Sizes	2" to 24"
End fitting	ASME/ANSI Class 150 or 300
Materials	Body: carbon steel full lug Disc: 316 stainless steel Shaft: 17-4 PH stainless Seat: RTFE Gland seal: TFE Bearings: glass backed PTFE
Media temp. range	-22°F to +400°F [-30°C to +204°C]
Body pressure rating	150 SHP: ASME/ANSI Class 150 300 SHP: ASME/ANSI Class 300
Close-off pressure	150: 285 psi, 300: 600 psi
Rangeability	100:1
Maximum velocity	32 FPS
Leakage	0%

Double 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.

		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	ANSI 300 3-way	150		300		150	300
102	56	2	F750-150SHP	F750-300SHP	GM Series	PR Series	GM Series	PR Series	GK Series	GK Series
146	80	2½	F765-150SHP	F765-300SHP						
228	125	3	F780-150SHP	F780-300SHP	GM Series	PR Series	GM Series	PR Series	GK Series	GK Series
451	248	4	F7100-150SHP	F7100-300SHP						
714	392	5	F7125-150SHP	F7125-300SHP	GM Series	PR Series	GM Series	PR Series	GK Series	GK Series
1103	607	6	F7150-150SHP	F7150-300SHP						
2064	1135	8	F7200-150SHP	F7200-300SHP	GM Series	PR Series	GM Series	PR Series	GK Series	GK Series
3517	1934	10	F7250-150SHP	F7250-300SHP						
4837	2660	12	F7300-150SHP	F7300-300SHP	GM Series	PR Series	GM Series	PR Series	GK Series	GK Series
6857	3592	14*	F7350-150SHP							
9287	4865	16*	F7400-150SHP		GM Series	PR Series	GM Series	PR Series	GK Series	GK Series

Note: C_v values listed for ANSI Class 150 Butterfly Valves. Please consult the technical documentation for ANSI Class 300 C_v values and configurations.

*Call Customer Service at 1-800-543-9038 for product availability. Longer lead times may apply.

Features and Benefits

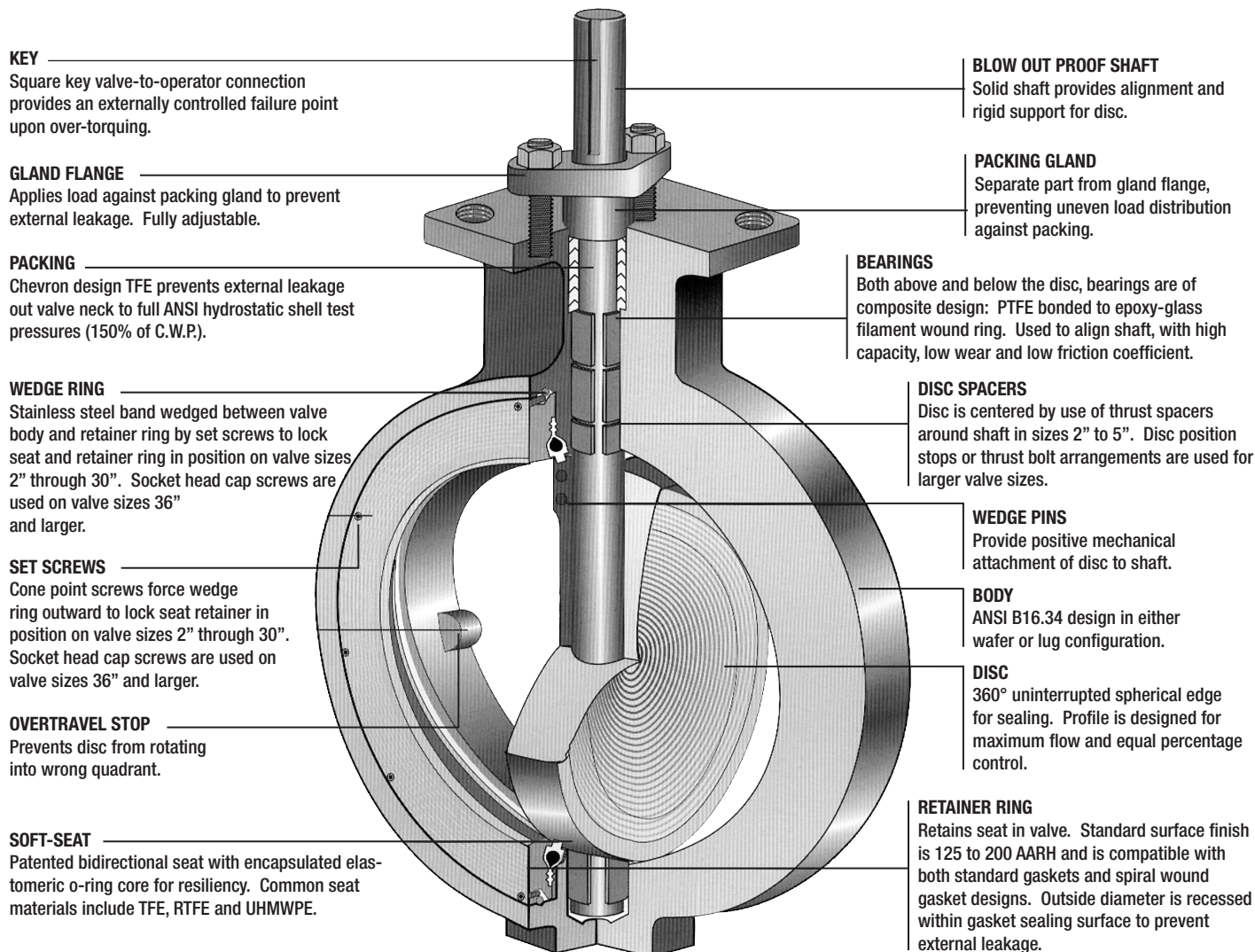
SHP... Series High Performance Butterfly Valves



Belimo SHP... Series Butterfly Valves are designed for use in ANSI Class 150 and ANSI Class 300 piping systems and are supplied in standard lug style body designs.

Valve Design Features

- Unique seat and disc design provides Bi-Directional bubble tight shutoff at rated pressure/temperatures
- The Soft Seat design creates a self-energized seal in vacuum-to-low pressure applications
- Under high pressure conditions, the seat is also designed to permit, confine and direct movement of the seat against the disc edge, up to the full ANSI Class 150 or 300 Cold Working Pressures
- The Soft Seat is designed for high services with minimal wear and low torque
- Seat replacement is a simple operation, requiring no special tools
- Valve Body is Full Lug type cast in Carbon Steel
- Disc is cast in CF8M Stainless Steel
- Shaft is 17-4pH Stainless for superior strength
- Soft Seat is RPTFE for increased wear resistance and low torque
- Top Mounted Gland Flange easily accessible without removing actuator or mounting brackets
- Double 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.
- Metal ID tag on valve neck



Tech.Doc - 04/19 - Subject to change. © Belimo Aircontrols (USA), Inc.

Average Assembly Weights

					ACTUATOR				
					NON-SPRING RETURN		SPRING RETURN	ELECTRONIC FAIL-SAFE	
					GMB(X)	2*GMB(X)	2*AF	GK	2*GK
ANSI 150	2-way	Size	Valve	Max GPM	COP				
		2"	F650-150SHP	313	150			24 lbs.	
		2"	F650-150SHP	313	285	18 lbs.			19 lbs.
		2½"	F665-150SHP	490	150			24 lbs.	
		2½"	F665-150SHP	490	285	18 lbs.			19 lbs.
		3"	F680-150SHP	705	150			26 lbs.	
		3"	F680-150SHP	705	285	20 lbs.			21 lbs.
		4"	F6100-150SHP	1253	150	32 lbs.			33 lbs.
		4"	F6100-150SHP	1253	150		40 lbs.		42 lbs.
	3-way	2"	F750-150SHP	313	285		67 lbs.		69 lbs.
		2½"	F765-150SHP	490	285		78 lbs.		80 lbs.
		3"	F780-150SHP	705	285		88 lbs.		90 lbs.
		4"	F7100-150SHP	1253	150		135 lbs.		139 lbs.

					ACTUATOR				
					NON-SPRING RETURN		SPRING RETURN	ELECTRONIC FAIL-SAFE	
					GMB(X)	2*GMB(X)	2*AF	GK	2*GK
ANSI 300	2-way	Size	Valve	Max GPM	COP				
		2"	F650-300SHP	313	150			24 lbs.	
		2"	F650-300SHP	313	285	18 lbs.			19 lbs.
		2½"	F665-300SHP	490	150			24 lbs.	
		2½"	F665-300SHP	490	285	18 lbs.			19 lbs.
		3"	F680-300SHP	705	150			30 lbs.	
		3"	F680-300SHP	705	285	24 lbs.			25 lbs.
		4"	F6100-300SHP	1253	150	31 lbs.			32 lbs.
		4"	F6100-300SHP	1253	285		39 lbs.		
	3-way	2"	F750-300SHP	313	285		89 lbs.		94 lbs.
		2½"	F765-300SHP	490	285		109 lbs.		114 lbs.
		3"	F780-300SHP	705	285		132 lbs.		136 lbs.
		4"	F7100-300SHP	1253	150		185 lbs.		193 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 and PR series actuators are NEMA 4X rated and include 2 auxiliary switches and a heater.

SHP Series Butterfly Valves with Industrial Actuation



Average Assembly Weights

					ACTUATOR								
					NON-SPRING RETURN								
	Size	Valve Model	Max GPM	COP	PR	SY4-110	SY5-110	SY7-110	SY8-110	SY9-110	SY10-110	SY11-110	SY-12-110
ANSI 150	2-way	2"	F650-150SHP	313	285	30 lbs.							
		2½"	F665-150SHP	490	285	30 lbs.							
		3"	F680-150SHP	705	285	33 lbs.							
		4"	F6100-150SHP	1253	285	45 lbs.							
		5"	F6125-150SHP	1958	285	50 lbs.							
		6"	F6150-150SHP	2820	285	55 lbs.							
		8"	F6200-150SHP	5013	150		80 lbs.						
		8"	F6200-150SHP	5013	285		100 lbs.						
		10"	F6250-150SHP	7834	285		146 lbs.						
		12"	F6300-150SHP	11280	150		182 lbs.						
		12"	F6300-150SHP	11280	285		182 lbs.						
		14"	F6350-150SHP	15354	150		238 lbs.						
		14"	F6350-150SHP	15354	285			269 lbs.					
		16"	F6400-150SHP	20054	285			336 lbs.					
	3-way	18"	F6450-150SHP	25381	150			391 lbs.					
		18"	F6450-150SHP	25381	285				391 lbs.				
		20"	F6500-150SHP	31334	150				500 lbs.				
		20"	F6500-150SHP	31334	285					544 lbs.			
		24"	F6600-150SHP	45121	150						832 lbs.		
		30"	F6750-150SHP	70502	100								1255 lbs.
		2"	F750-150SHP	313	285	74 lbs.							
		2½"	F765-150SHP	490	285	85 lbs.							
		3"	F780-150SHP	705	285	95 lbs.							
		4"	F7100-150SHP	1253	285	154 lbs.							
		5"	F7125-150SHP	1958	285		200 lbs.						
		6"	F7150-150SHP	2820	285		240 lbs.						
		8"	F7200-150SHP	5013	285		355 lbs.						
		10"	F7250-150SHP	7834	150		585 lbs.						
		10"	F7250-150SHP	7834	285			585 lbs.					
		12"	F7300-150SHP	11280	150								
		12"	F7300-150SHP	11280	285			819 lbs.					
		14"	F7350-150SHP	15354	285			1118 lbs.					
		16"	F7400-150SHP	20054	150			1469 lbs.		1523 lbs.			
		18"	F7450-150SHP	25381	150				1783 lbs.				
		18"	F7450-150SHP	25381	285						1831 lbs.		
		20"	F7500-150SHP	31334	150					2351 lbs.			
		20"	F7500-150SHP	31334	285							2351 lbs.	
		24"	F7600-150SHP	45121	150								3722 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 and PR series actuators are NEMA 4X rated and include 2 auxiliary switches and a heater.

Average Assembly Weights

					ACTUATOR							
					NON-SPRING RETURN							
	Size	Valve Model	Max GPM	COP	PR	SY4-110	SY5-110	SY7-110	SY8-110	SY9-110	SY10-110	SY11-110
ANSI 300	2-way	2"	F650-300SHP	313	600	30 lbs.						
		2½"	F665-300SHP	490	600	30 lbs.						
		3"	F680-300SHP	705	600	33 lbs.						
		4"	F6100-300SHP	1253	600	45 lbs.						
		5"	F6125-300SHP	1958	285	50 lbs.	60 lbs.					
		5"	F6125-300SHP	1958	600		62 lbs.					
		6"	F6150-300SHP	2820	285	77 lbs.						
		6"	F6150-300SHP	2820	600		80 lbs.					
		8"	F6200-300SHP	5013	150		110 lbs.					
		8"	F6200-300SHP	5013	600		132 lbs.					
		8"	F6200-300SHP	5013	285		170 lbs.					
		10"	F6250-300SHP	7834	400			170 lbs.				
		10"	F6250-300SHP	7834	600				201 lbs.			
		10"	F6250-300SHP	7834	150		254 lbs.					
		12"	F6300-300SHP	11280	285			254 lbs.				
		12"	F6300-300SHP	11280	600				285 lbs.			
		12"	F6300-300SHP	11280	150			379 lbs.				
		14"	F6350-300SHP	15354	400				410 lbs.			
		14"	F6350-300SHP	15354	600					410 lbs.		
		14"	F6350-300SHP	15354	150				487 lbs.			
		16"	F6400-300SHP	20054	285					487 lbs.		
		16"	F6400-300SHP	20054	400						531 lbs.	
		16"	F6400-300SHP	20054	600							531 lbs.
		16"	F6400-300SHP	20054	150				603 lbs.			
		18"	F6450-300SHP	25381	400						647 lbs.	
		18"	F6450-300SHP	25381	600							647 lbs.
		18"	F6450-300SHP	25381	150					821 lbs.		
		20"	F6500-300SHP	31334	285							865 lbs.
20"	F6500-300SHP	31334	400								865 lbs.	
24"	F6600-300SHP	45121	150								1150 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 and PR series actuators are NEMA 4X rated and include 2 auxiliary switches and a heater.

SHP Series Butterfly Valves with Industrial Actuation



Average Assembly Weights

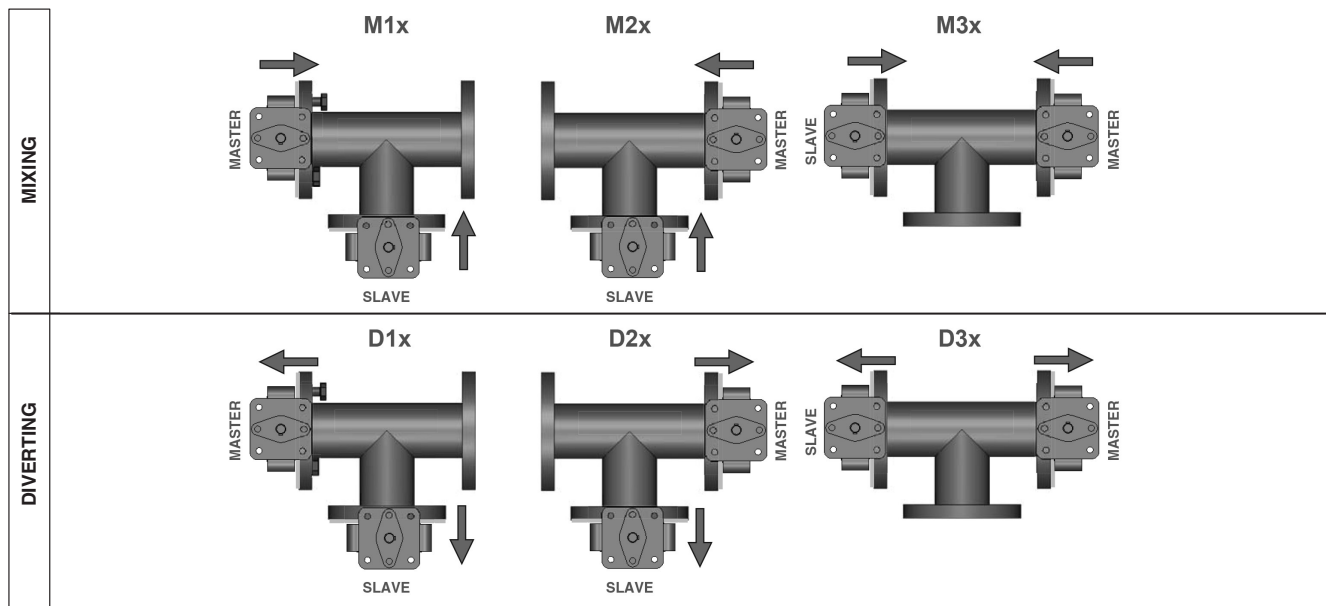
					ACTUATOR								
					NON-SPRING RETURN								
	Size	Valve Model	Max GPM	COP	PR	SY4-110	SY5-110	SY7-110	SY8-110	SY9-110	SY10-110	SY11-110	SY-12-110
ANSI 300 3-way	2"	F750-300SHP	313	400	104 lbs.								
	2"	F750-300SHP	313	600	104 lbs.								
	2½"	F765-300SHP	490	400	124 lbs.								
	2½"	F765-300SHP	490	600	124 lbs.								
	3"	F780-300SHP	705	400	147 lbs.								
	3"	F780-300SHP	705	600	147 lbs.								
	4"	F7100-300SHP	1253	285	222 lbs.								
	4"	F7100-300SHP	1253	600	222 lbs.								
	5"	F7125-300SHP	1958	285		275 lbs.							
	5"	F7125-300SHP	1958	600		301 lbs.							
	6"	F7150-300SHP	2820	285		366 lbs.							
	6"	F7150-300SHP	2820	600		392 lbs.							
	8"	F7200-300SHP	5013	400		579 lbs.							
	8"	F7200-300SHP	5013	600			579 lbs.						
	8"	F7200-300SHP	5013	150		897 lbs.							
	10"	F7250-300SHP	7834	285			897 lbs.						
	10"	F7250-300SHP	7834	600				931 lbs.					
	10"	F7250-300SHP	7834	150			1301 lbs.						
	12"	F7300-300SHP	11280	400				1335 lbs.					
	12"	F7300-300SHP	11280	600					1335 lbs.				
	12"	F7300-300SHP	11280	150				1927 lbs.					
	14"	F7350-300SHP	15354	400					1927 lbs.				
	14"	F7350-300SHP	15354	600							1975 lbs.		
	14"	F7350-300SHP	15354	150				2461 lbs.					
	16"	F7400-300SHP	20054	285						2510 lbs.			
	16"	F7400-300SHP	20054	400							2510 lbs.		
	16"	F7400-300SHP	20054	600									2510 lbs.
	16"	F7400-300SHP	20054	150					3063 lbs.				
	18"	F7450-300SHP	25381	285							3111 lbs.		
	18"	F7450-300SHP	25381	400								3111 lbs.	
	18"	F7450-300SHP	25381	150						4096 lbs.			
	20"	F7500-300SHP	31334	285									4096 lbs.
	24"	F7600-300SHP	45121	150									6049 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 and PR series actuators are NEMA 4X rated and include 2 auxiliary switches and a heater.

150 SHP/300 SHP Series Valves – SHP Series Valves are Flow Direction Specific



CONFIG CODE	ON/OFF OR MOD@2VDC MASTER VALVE IS	MASTER VALVE @ FAIL
M(D)10	OPEN	FAIL IN PLACE
M(D)11	OPEN	OPEN
M(D)12	OPEN	CLOSED
M(D)13	CLOSED	FAIL IN PLACE
M(D)14	CLOSED	OPEN
M(D)15	CLOSED	CLOSED

CONFIG CODE	ON/OFF OR MOD@2VDC MASTER VALVE IS	MASTER VALVE @ FAIL
M(D)20	OPEN	FAIL IN PLACE
M(D)21	OPEN	OPEN
M(D)22	OPEN	CLOSED
M(D)23	CLOSED	FAIL IN PLACE
M(D)24	CLOSED	OPEN
M(D)25	CLOSED	CLOSED

CONFIG CODE	ON/OFF OR MOD@2VDC MASTER VALVE IS	MASTER VALVE @ FAIL
M(D)30	OPEN	FAIL IN PLACE
M(D)31	OPEN	OPEN
M(D)32	OPEN	CLOSED
M(D)33	CLOSED	FAIL IN PLACE
M(D)34	CLOSED	OPEN
M(D)35	CLOSED	CLOSED

M Specifies MIXING, D Specifies DIVERTING

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. Modulating actuator normal position (i.e., fully CW or fully CCW) is set by the direction control switch or field programming via NFC app.
6. All 3-way assemblies are designed for 90 degree actuator rotation.
7. **Actuators installed default over Master Valve.**

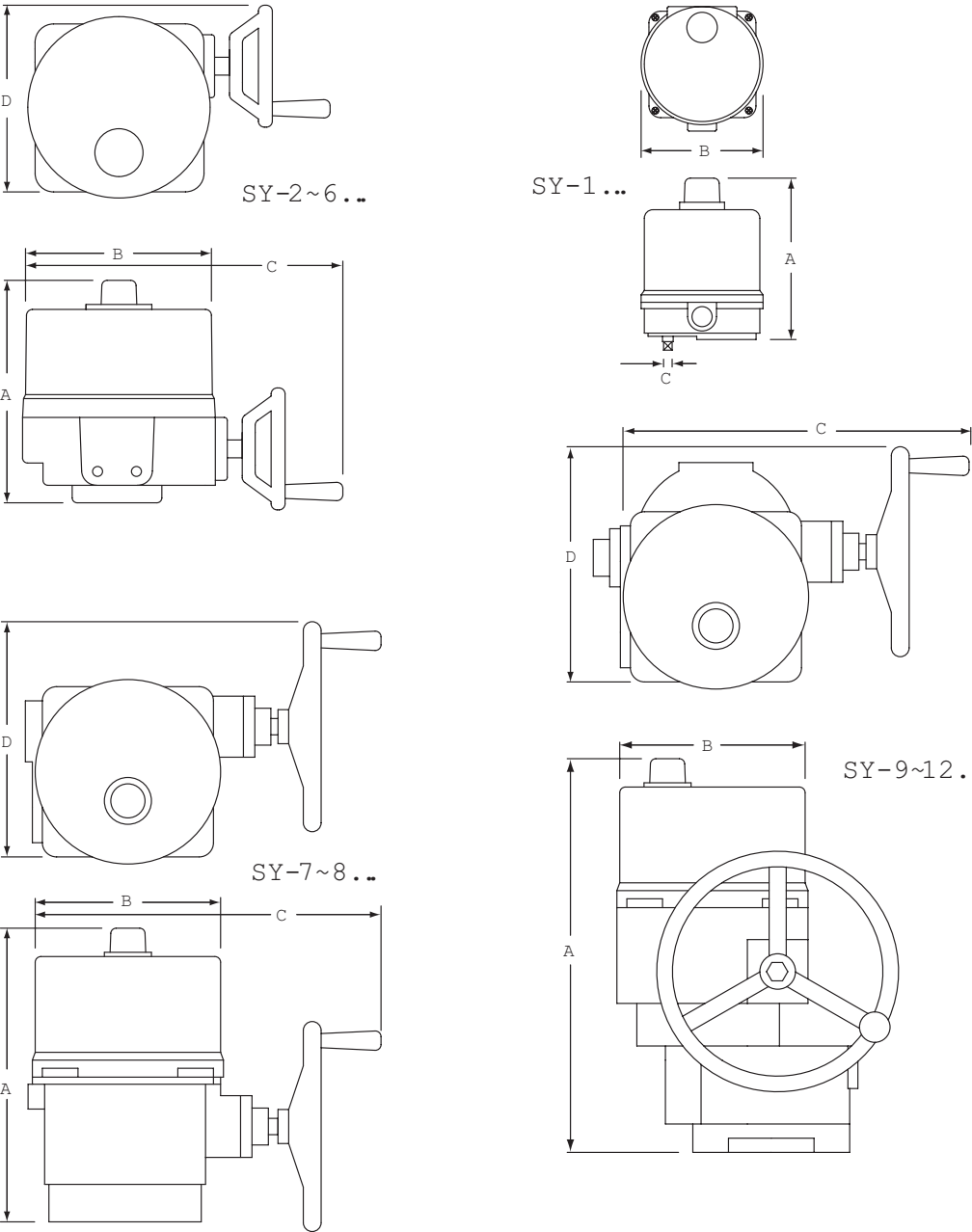
Flow in Std Weight Pipe (Fluid Velocity in GPM). Use with SHP Series BF Valves.

SIZE	4 FPS	8 FPS	12 FPS	16 FPS	20 FPS	24 FPS	28 FPS	32 FPS	36 FPS
2"	39	78	118	157	196	235	274	313	353
2½"	61	122	184	245	306	367	428	490	551
3"	88	176	264	353	441	529	617	705	793
4"	157	313	470	627	783	940	1097	1253	1410
5"	245	490	734	979	1224	1469	1714	1958	2203
6"	352	705	1058	1410	1763	2115	2468	2820	3173
8"	627	1253	1880	2507	3133	3760	4387	5013	5640
10"	979	1958	2938	3917	4896	5875	6854	7834	8813
12"	1410	2820	4230	5640	7050	8460	9870	11280	12690
14"	1919	3838	5738	7677	9596	11515	13435	15354	17273
16"	2507	5013	7520	10027	12534	15040	17547	20054	22561
18"	3173	6345	9518	12690	15863	19036	22208	25381	28553
20"	3917	7834	11750	15667	19584	23501	27418	31334	35251
24"	5640	11280	16921	22561	28201	33841	39481	45121	50762
30"	8813	17625	26438	35251	44064	52877	61689	70502	79315

It is not recommended to exceed 32 feet per second through high performance butterfly valves. Velocities greater than 32 fps may damage the valve.

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]
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., SY4~6 = SY-4 and SY-6

24 VAC						
	SY1	SY2	SY3	SY4	SY5	
	[A]	[A]	[A]	[A]	[A]	
current	1.6	3.4	3.1	9.4	8.9	
wire gauge	MAX distance between actuator and supply [feet]					
18	97	45	50			
16	153	72	79	26	28	
14	244	115	126	42	44	
12	387	182	200	66	70	
10	616	290	318	105	111	
8	980	461	506	167	176	

120 VAC												
	SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY11	SY12
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]
current	0.7	1.2	1.2	2.1	2	2.4	4.2	4.2	3	3.2	3.6	3.8
wire gauge	MAX distance between actuator and supply [feet]											
18	1,103	644	644	368	386	322	184	184	257	241	215	203
16	1,750	1,021	1,021	583	613	510	292	292	408	383	340	322
14	2,788	1,626	1,626	929	976	813	465	465	651	610	542	514
12	4,428	2,583	2,583	1,476	1,550	1,292	738	738	1,033	969	861	816
10	7,044	4,109	4,109	2,348	2,465	2,054	1,174	1,174	1,644	1,541	1,370	1,298
8	11,204	6,536	6,536	3,735	3,922	3,268	1,867	1,867	2,614	2,451	2,179	2,064

230 VAC												
	SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY11	SY12
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]
current	0.4	0.6	0.6	1.1	1	1.1	2	2	2.5	2.6	2.7	2.5
wire gauge	MAX distance between actuator and supply [feet]											
18	3,701	2,467	2,467	1,346	1,480	1,346	740	740	592	569	548	592
16	5,871	3,914	3,914	2,135	2,348	2,135	1,174	1,174	939	903	870	939
14	9,352	6,234	6,234	3,401	3,741	3,401	1,870	1,870	1,496	1,439	1,385	1,496
12	14,854	9,903	9,903	5,401	5,942	5,401	2,971	2,971	2,377	2,285	2,201	2,377
10	23,626	15,751	15,751	8,591	9,450	8,591	4,725	4,725	3,780	3,635	3,500	3,780
8	37,581	25,054	25,054	13,666	15,033	13,666	7,516	7,516	6,013	5,782	5,568	6,013

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.

Wire Size vs. Length of Run for SY Series Actuators
Modulating



24 VAC					
	SY1	SY2	SY3	SY4	SY5
	[A]	[A]	[A]	[A]	[A]
current	2.8	3.4	3.1	9.4	8.9
wire gauge	MAX distance between actuator and supply [feet]				
18	55	45	50		
16	88	72	79	26	28
14	139	115	126	42	44
12	221	182	200	66	70
10	352	290	318	105	111
8	560	461	506	167	176

120 VAC											
	SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY12
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]
current	0.6	0.8	0.7	2.1	1.9	2	2	2.8	2.7	3	4.5
wire gauge	MAX distance between actuator and supply [feet]										
18	1,287	966	1,103	368	407	386	386	276	286	257	180
16	2,042	1,531	1,750	583	645	613	613	438	454	408	285
14	3,253	2,440	2,788	929	1,027	976	976	697	723	651	454
12	5,167	3,875	4,428	1,476	1,632	1,550	1,550	1,107	1,148	1,033	721
10	8,218	6,163	7,044	2,348	2,595	2,465	2,465	1,761	1,826	1,644	1,147
8	13,072	9,804	11,204	3,735	4,128	3,922	3,922	2,801	2,905	2,614	1,824

230 VAC											
	SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY12
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]
current	0.4	0.4	0.4	1.1	1	1	1.2	1.6	1.1	1.4	2.5
wire gauge	MAX distance between actuator and supply [feet]										
18	3,701	3,701	3,701	1,346	1,480	1,480	1,234	925	1,346	1,057	673
16	5,871	5,871	5,871	2,135	2,348	2,348	1,957	1,468	2,135	1,677	1,067
14	9,352	9,352	9,352	3,401	3,741	3,741	3,117	2,338	3,401	2,672	1,700
12	14,854	14,854	14,854	5,401	5,942	5,942	4,951	3,713	5,401	4,244	2,701
10	23,626	23,626	23,626	8,591	9,450	9,450	7,875	5,906	8,591	6,750	4,296
8	37,581	37,581	37,581	13,666	15,033	15,033	12,527	9,395	13,666	10,738	6,833

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 (60 Hz)	VA (60 Hz)	Override	Weight
PRBUP-3-T*	1400 in-lbs/ 160 Nm	35 seconds	0.8 A	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	20	Manual override crank	5.8 kg/12.8 lbs.
SY4-24	3540 in-lbs/ 400 Nm	16 seconds	9.5 A	228	Hand wheel	22 kg/48.5 lbs.
SY5-24	4430 in-lbs/ 500 Nm	35 seconds	9.4 A	227	Hand wheel	22 kg/48.5 lbs.

Power Supply 120 VAC Single Phase

Model #	Torque	Speed 60 Hz	Current Draw (60 Hz)	VA (60 Hz)	Override	Weight
PRBUP-3-T*	1400 in-lbs/ 160 Nm	35 seconds	0.2 A	23	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-3-T*	1400 in-lbs/ 160 Nm	35, 30-120 seconds	0.2 A	23	Manual override crank	5.8 kg/12.8 lbs.
SY4-110	3540 in-lbs/ 400 Nm	18 seconds	1.8 A	216	Hand wheel	22 kg/48.5 lbs.
SY5-110	4430 in-lbs/ 500 Nm	25 seconds	1.8 A	216	Hand wheel	22 kg/48.5 lbs.
SY6-110	5750 in-lbs/ 650 Nm	32 seconds	1.8 A	216	Hand wheel	22 kg/48.5 lbs.
SY7-110	8850 in-lbs/ 1000 Nm	49 seconds	3.5 A	420	Hand wheel	36 kg/79.5 lbs.
SY8-110	13280 in-lbs/ 1500 Nm	50 seconds	4.8 A	576	Hand wheel	36 kg/79.5 lbs.
SY9-110	17700 in-lbs/ 2000 Nm	57 seconds	2.8 A	336	Hand wheel	72 kg/176.4 lbs.
SY10-110	22130 in-lbs/ 2500 Nm	62 seconds	2.9 A	348	Hand wheel	72 kg/176.4 lbs.
SY11-110	26550 in-lbs/ 3000 Nm	69 seconds	3.6 A	432	Hand wheel	72 kg/176.4 lbs.
SY12-110	30980 in-lbs/ 3500 Nm	60 seconds	3.8 A	456	Hand wheel	72 kg/176.4 lbs.

Power Supply 230 VAC Single Phase

Model #	Torque	Speed 60 Hz	Current Draw (60 Hz)	VA (60 Hz)	Override	Weight
PRBUP-3-T*	1400 in-lbs/ 160 Nm	35 sec.	0.2 A	52	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-3-T*	1400 in-lbs/ 160 Nm	35, 30-120 sec.	0.2 A	52	Manual override crank	5.8 kg/12.8 lbs.
SY4-220	3540 in-lbs/ 400 Nm	18 seconds	0.9 A	207	Hand wheel	22 kg/48.5 lbs.
SY5-220	4430 in-lbs/ 500 Nm	25 seconds	0.9 A	207	Hand wheel	22 kg/48.5 lbs.
SY6-220	5750 in-lbs/ 650 Nm	31 seconds	0.9 A	207	Hand wheel	22 kg/48.5 lbs.

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

Power Supply 24 VAC/VDC Single Phase

Model #	Torque	Speed 50 Hz/60 Hz	Current Draw (60 Hz)	VA (60 Hz)	Override	Weight
PRBUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.9 A	20	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.9 A	20	Manual override crank	5.8 kg/12.8 lbs.
PKRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	2.2 A	55	Manual override crank	6.4 kg/14.1 lbs.
SY4-24MFT	3540 in-lbs/ 400 Nm	16 seconds	11.0 A	264	Hand wheel	22 kg/48.5 lbs.
SY5-24MFT	4430 in-lbs/ 500 Nm	30 seconds	10.2 A	245	Hand wheel	22 kg/48.5 lbs.

Power Supply 120 VAC Single Phase

Model #	Torque	Speed 60 Hz	Current Draw (60 Hz)	VA (60 Hz)	Override	Weight
PRBUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.2 A	23	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.2 A	23	Manual override crank	5.8 kg/12.8 lbs.
PKRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.3 A	43	Manual override crank	6.4 kg/14.1 lbs.
SY4-120MFT	3540 in-lbs/ 400 Nm	17 seconds	2.4 A	288	Hand wheel	22 kg/48.5 lbs.
SY5-120MFT	4430 in-lbs/ 500 Nm	21 seconds	2.3 A	276	Hand wheel	22 kg/48.5 lbs.
SY6-120MFT	5750 in-lbs/ 650 Nm	29 seconds	2.2 A	264	Hand wheel	22 kg/48.5 lbs.
SY7-120MFT	8850 in-lbs/ 1000 Nm	44 seconds	1.7 A	204	Hand wheel	36 kg/79.5 lbs.
SY8-120MFT	13280 in-lbs/ 1500 Nm	48 seconds	2.6 A	312	Hand wheel	36 kg/79.5 lbs.
SY9-120MFT	17700 in-lbs/ 2000 Nm	47 seconds	3.4 A	408	Hand wheel	72 kg/176.4 lbs.
SY10-120MFT	22130 in-lbs/ 2500 Nm	51 seconds	4.0 A	480	Hand wheel	72 kg/176.4 lbs.
SY11-120MFT	26550 in-lbs/ 3000 Nm	56 seconds	3.0 A	360	Hand wheel	72 kg/176.4 lbs.
SY12-120MFT	30980 in-lbs/ 3500 Nm	62 seconds	3.4 A	408	Hand wheel	72 kg/176.4 lbs.

Power Supply 230 VAC Single Phase

Model #	Torque	Speed 60 Hz	Current Draw (60 Hz)	VA (60 Hz)	Override	Weight
PRBUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.1 A	52	Manual override crank	5.8 kg/12.8 lbs.
PRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.1 A	52	Manual override crank	5.8 kg/12.8 lbs.
PKRXUP-MFT-T*	1400 in-lbs/160 Nm	30-120 sec.	0.2 A	68	Manual override crank	6.4 kg/14.1 lbs.
SY4-230MFT	3540 in-lbs/ 400 Nm	17 seconds	1.1 A	253	Hand wheel	22 kg/48.5 lbs.
SY5-230MFT	4430 in-lbs/ 500 Nm	22 seconds	1.0 A	230	Hand wheel	22 kg/48.5 lbs.
SY6-230MFT	5750 in-lbs/ 650 Nm	32 seconds	1.1 A	253	Hand wheel	22 kg/48.5 lbs.
SY7-230MFT	8850 in-lbs/ 1000 Nm	44 seconds	0.8 A	184	Hand wheel	36 kg/79.5 lbs.
SY8-230MFT	13280 in-lbs/ 1500 Nm	57 seconds	1.4 A	322	Hand wheel	36 kg/79.5 lbs.
SY9-230MFT	17700 in-lbs/ 2000 Nm	61 seconds	1.1 A	253	Hand wheel	72 kg/176.4 lbs.
SY10-230MFT	22130 in-lbs/ 2500 Nm	70 seconds	1.4 A	322	Hand wheel	72 kg/176.4 lbs.
SY11-230MFT	26550 in-lbs/ 3000 Nm	48 seconds	1.9 A	437	Hand wheel	72 kg/176.4 lbs.
SY12-230MFT	30980 in-lbs/ 3500 Nm	51 seconds	2.0 A	460	Hand wheel	72 kg/176.4 lbs.

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

Actuators: SYx-MFT



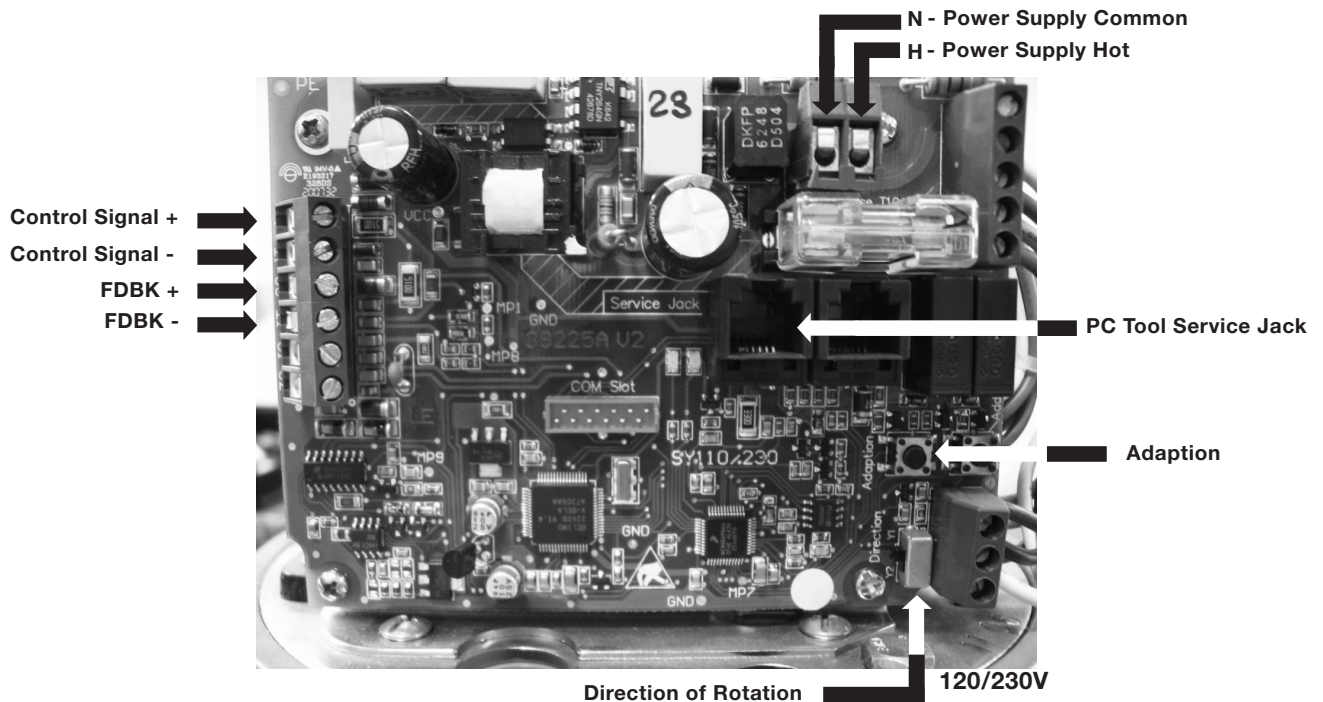
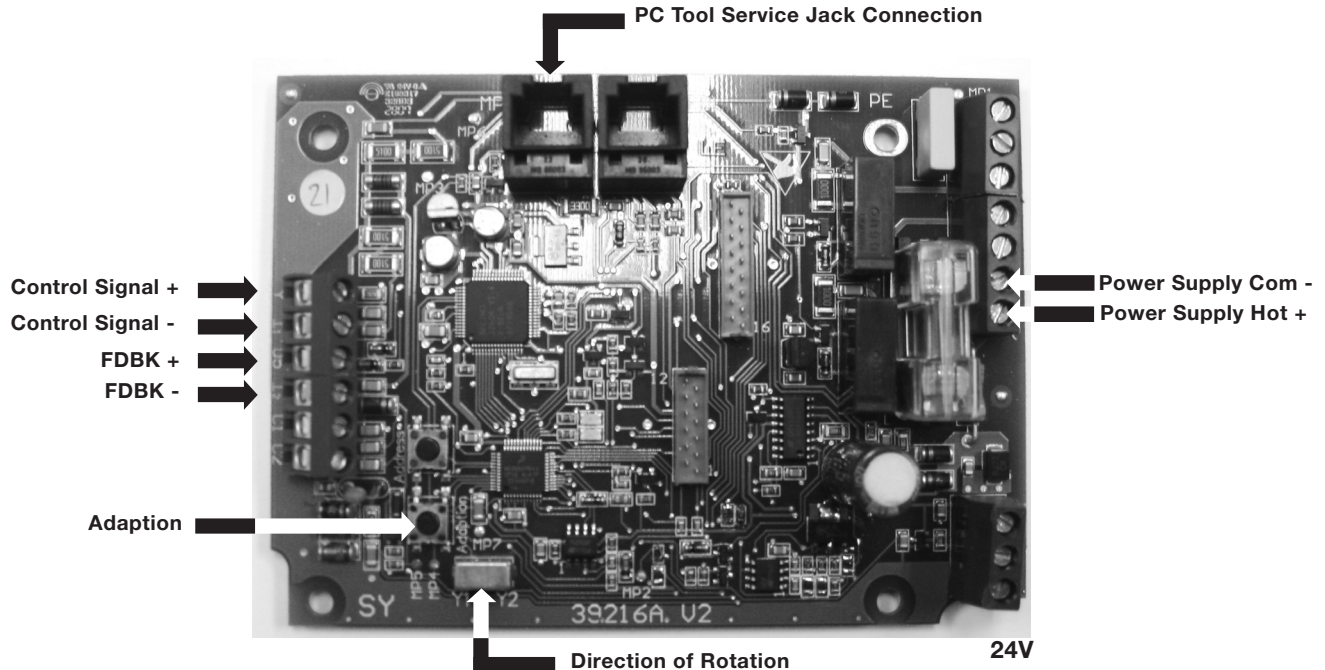
INSTALLATION NOTES



CAUTION

Notes:

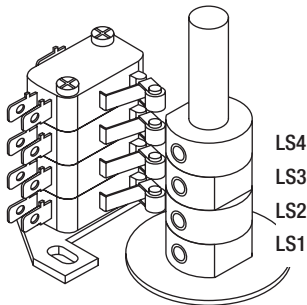
1. Motor CAMS have been factory calibrated and should not be moved.
2. An adaption must be performed if any limit switch is adjusted. This will calibrate the beginning and end stopping points. Press the adaption button for 3 seconds and release.
3. New SY actuators must have an adaption performed before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





Electrical Travel Adjustment

SY4-12



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 without consulting factory. This will void the warranty

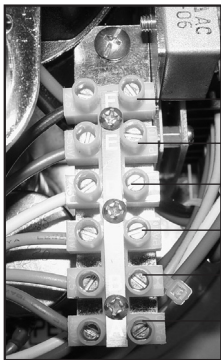
- LS2 "CLOSE"
↻ Clockwise Decrease Closed Angle
↻ Counter-clockwise Increase Closed Angle
- LS1 "OPEN"
↻ Clockwise Increase Opening Angle
↻ Counter-clockwise Decrease Opening Angle

Switches at left are shown with actuator fully open.

	0°	5°	85°	90°
LS3	A - B		A - C	
	0°	5°	85°	90°
LS4	D - F		D - E	

Notes:

1. 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.
2. Contact Technical Support if travel adjustment is required.



Actuators: SY4...12-110 SY4...12-220

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 SY4...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.
- Required:** Terminal #7 needs to be field wired to enable heater circuit.



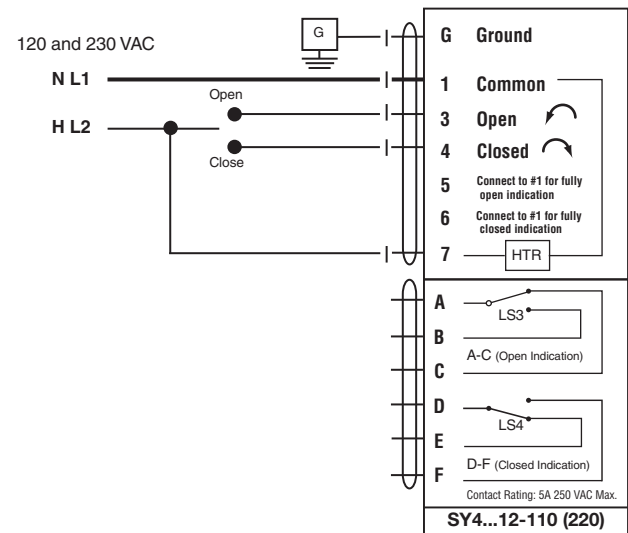
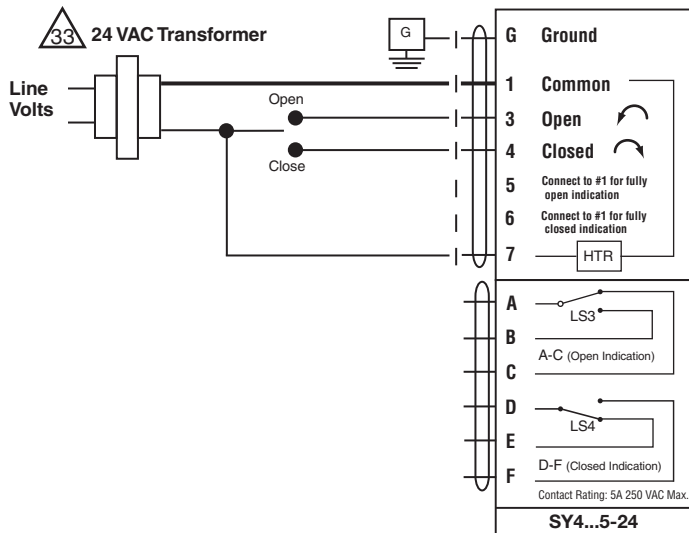
INSTALLATION NOTES

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 SY4...12-110 (220)

- 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.
- Required:** Terminal #7 needs to be field wired to enable heater circuit.



Actuators: SY4...5-24 SY4...12-110 SY4...12-220

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.

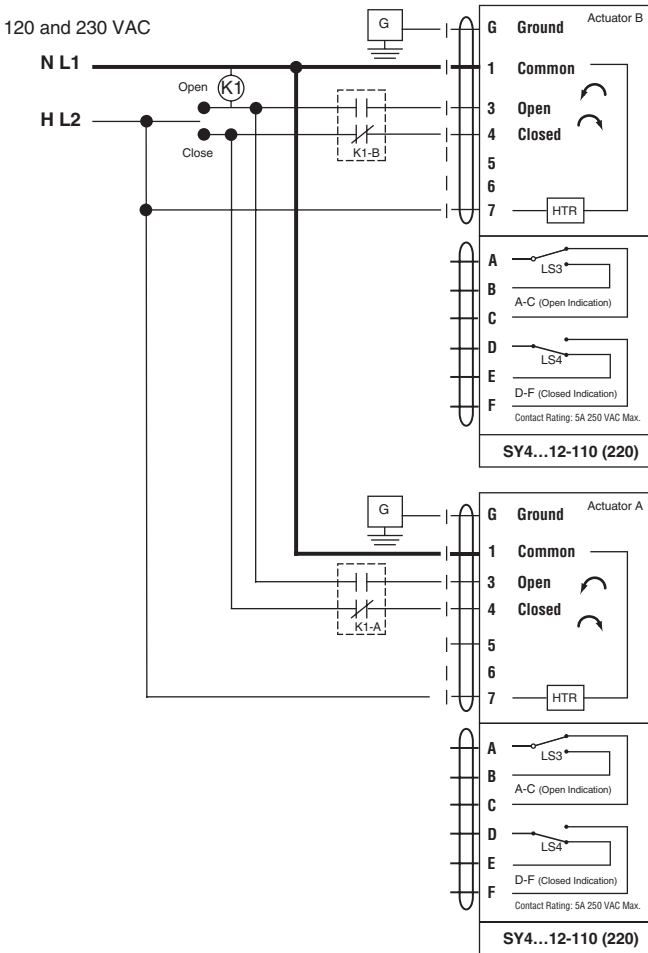
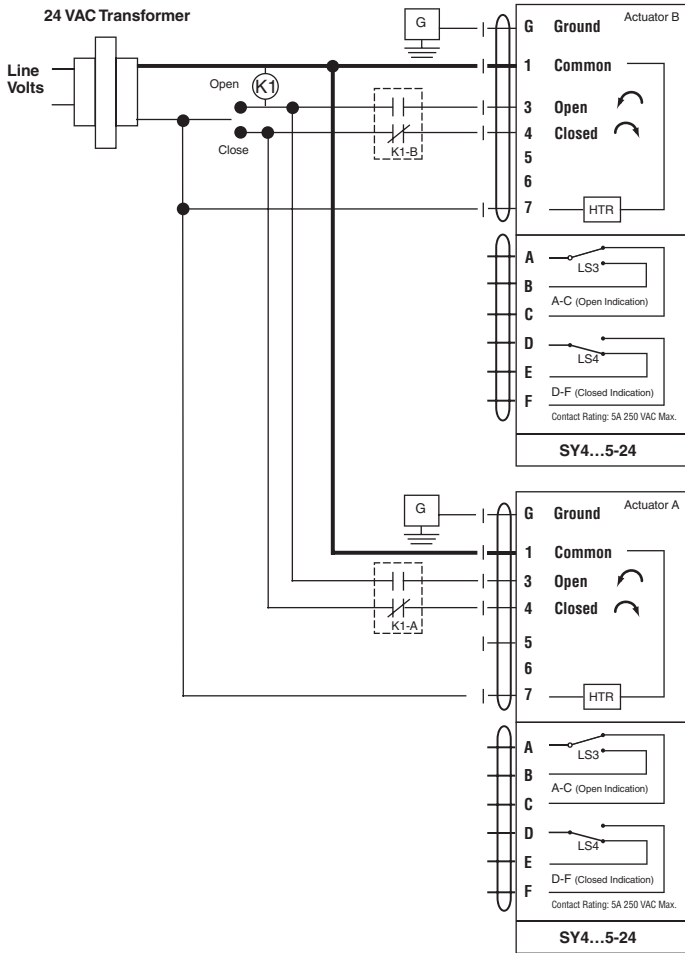


INSTALLATION NOTES

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

- **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.
- **Required:** Terminal #7 needs to be field wired to enable heater circuit.



Actuators: SY4...5-24MFT SY4...12-120MFT SY4...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 SY4...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.

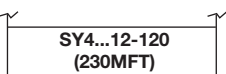
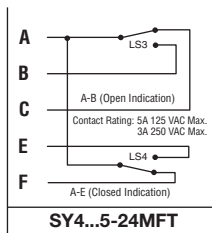
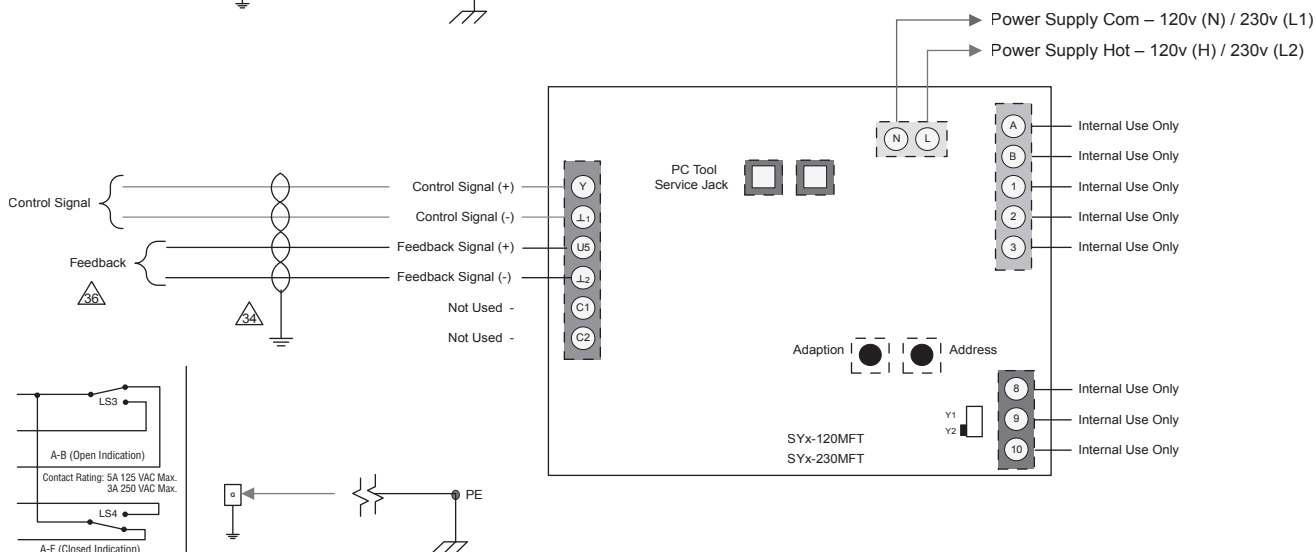
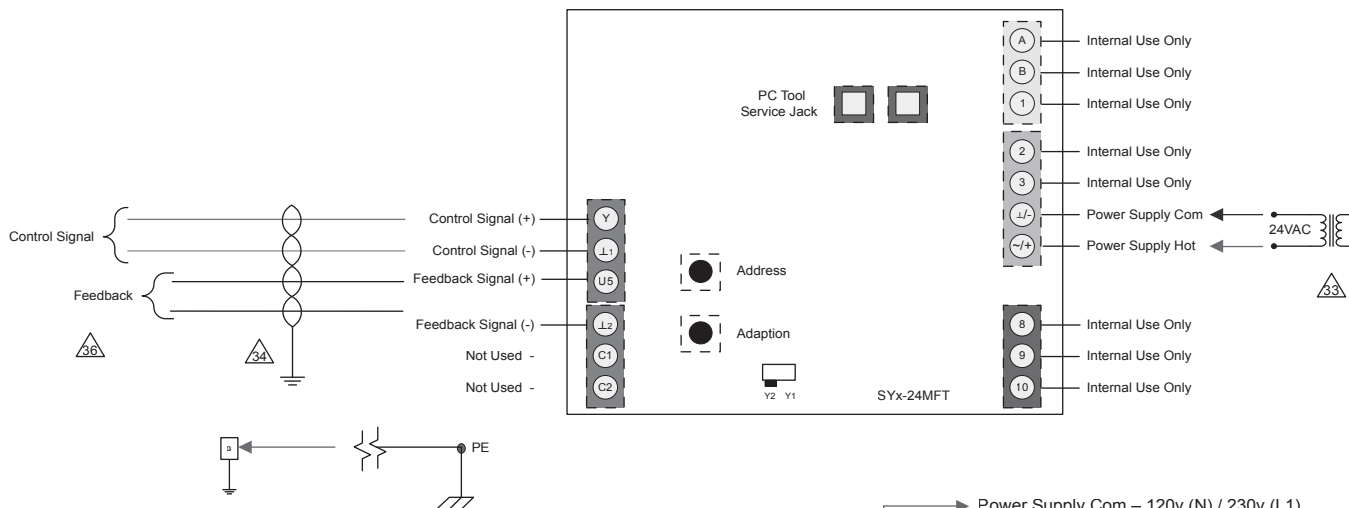
Transformer sizing = SY actuator draw X 1.25 (safety margin)
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A X 24 VAC = 90VA Transformer)

APPLICATION NOTES

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

NOTES SY4...12-120 (230MFT)

- Caution: Power supply voltage.



Actuators: SY4...5-24MFT

W550-2

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).

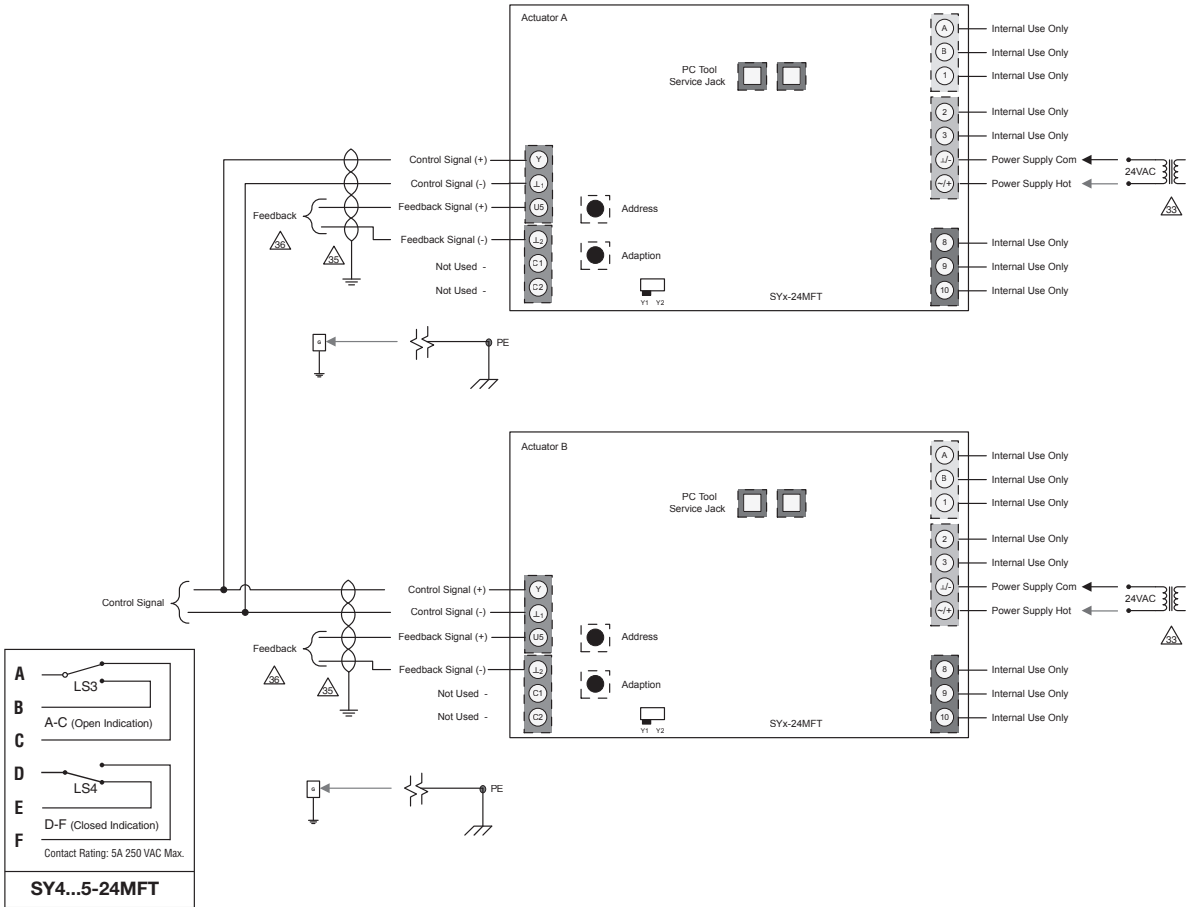
NOTES SY4...5-24MFT

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.



Actuators: SY4...12-120MFT SY4...12-230MFT

W552-2

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.

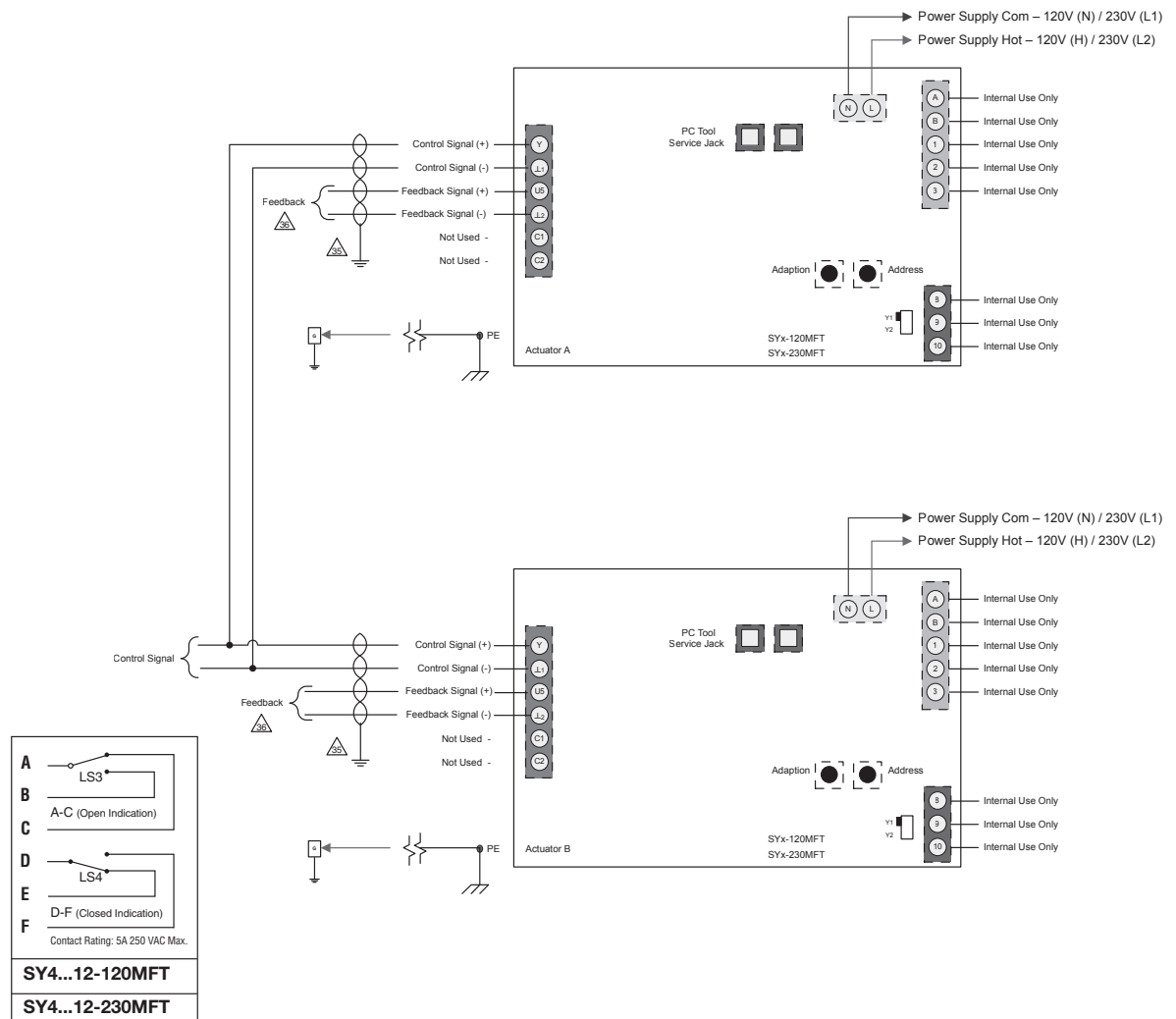


Use of feedback is optional.



NOTES SY4...12-120 (230MFT)

- **Caution:** Power supply voltage.



Installation Recommendations

SHP Series Butterfly Valves

Valve Design

1. The SHP Series High Performance Butterfly Valve features a double offset (or, double eccentric) shaft design to minimize seat abrasion and lower torque. This double offset design allows the disc to lift off and “cam” away from the seat as it rotates open.
2. The SHP valve always rotates clockwise to close (when viewed from above) and counterclockwise to open.
3. The valve body has an Overtravel Stop which prevents the disc from over rotating into the wrong quadrant. This stop is not to be used as a disc position stop; if the disc contacts the Overtravel Stop, this means it has rotated beyond the seat.
4. The SHP valve is bidirectional, but the preferred installation position is with the seat in the upstream position (SUS). Note the arrow on the metal tag attached to the valve body.

Safety Precautions

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 install 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 in the full-closed position before installing the valve.
6. Take care in handling the valve. Treat this valve as a piece of machinery.

Flange Compatibility

The SHP valve is designed to fit between flanges as follows:

ANSI Class 150	2" to 24"
MSS SP-44 Class 150	30" to 48"
ANSI B16.47 Class 150 A Flanges	
ANSI Class 300	2" to 24"
MSS SP-44 Class 300	30"
ANSI B16.47 Class 200 A Flanges	

Gasket Compatibility

The SHP valve is designed to accommodate the use of standard fiber gaskets (such as non-asbestos, flexible graphite, asbestos or equivalent gasket materials) of 1/16" or less, meeting the dimensional requirements of ANSI B16.21-1978. Thick elastomeric gaskets are not recommended. Metallic wound (Flexitallic) gaskets may also be used.

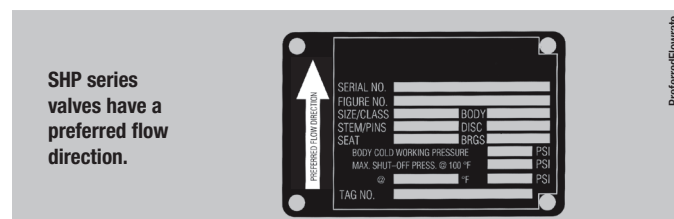
Pipe Schedule Compatibility

The SHP valve is designed to allow the disc edge to rotate into the open position without interference with the pipeline I.D. in the following pipe schedules:

SIZE	ANSI 150	ANSI 300
2" - 12"	SCH 80	SCH 80
14" - 24"	SCH 40	SCH 80
30"	SCH 30	SCH 80
36" - 42"	STD WT	
48"	XS	

Product Identification

1. Every SHP valve has a metal identification tag attached to the valve body. Information includes the Figure Number, the Size and Pressure Class, the Materials of Construction, and the Operating Pressures and Temperatures.
2. Every SHP valve is hydrostatically tested before it is shipped. The metal tag also includes a Serial Number; this number, unique for each valve, is recorded by the Belimo Quality Control Department along with the test results and material certification data, for individual traceability and verification of every valve produced.



UNPACKING AND STORAGE INSTRUCTIONS

1. Check the packing list against the valve received to verify that the quantities, sizes and materials are correct.
2. Check to make sure that the valve and operator were not damaged during shipment.
3. If the valve is to be stored before being installed, it should be protected from harsh environmental conditions.
4. Store the valve with the disc in the closed position to protect the sealing edge and the seat.
5. Keep the valve in a clean location, away from dirt, debris and corrosive materials.
6. Keep the valve in a dry area with the flange protectors attached.
7. Keep the valve in a cool location if possible, out of direct sunlight.
8. If not in use, exercise the butterfly valve (full open and close) at least once a month.

SHP Series Butterfly Valves

Storage of Butterfly Valve Assemblies

- Assemblies must be stored indoors, protected from the elements.
- Materials received on job sites that have long installation lead times should receive extra protection from construction damage.
- Valve faces must be protected from abrasion, cutting and nicking, as this will damage the face and may cause flange area leaks.
- Electric actuators cannot be stored in wet, damp or caustic areas.
- Do not store construction material on top of valve assemblies.

Installation Practices

- SHP series butterfly valves are designed to be installed between ANSI 125/150 flat-faced or raised face, slip-on weld neck flanges.
- Valve should be installed a minimum of 6 pipe diameters from upstream or downstream elbows, strainers, pumps, etc.
- For chilled water, condenser water or hot water applications, the valve should be installed with the stem in a vertical orientation, with the actuator mounted above the valve.
- For applications in which there is a possibility of sediment in the flow, the valve should be installed with the stem in a horizontal position and the bottom of the disc should close FROM the downstream side, rather than from the upstream side.
- **Flange gaskets must be used on SHP series BF valves.**
- Make sure the flange faces are clean and free of rust, scale and debris to prevent damage to the flange gasket.
- Follow the recommended flange bolting sequence found in the "Installation Recommendations" section of this guide.

Installation using Welded Flanges

- Mount flanges on both sides of valve body and install bolts to properly align valve body and both flanges.
- Make sure the valve I.D. and flange internal diameters are in alignment.
- Take valve body / flange pair assembly and align with piping ends.
- TACK weld the flanges to the piping in several places. Do NOT seam weld at this time!
- Remove the lug bolts and carefully remove the valve body from the flanges.
- Seam weld the entire flange / piping connection for both flanges.
- Let the piping components cool completely before re-inserting the valve body.
- **WARNING!** Seam welding with the valve body installed between the flanges can damage the valve seats due to heat migration through the flange to the valve body.

Butterfly Sizing and Selection

CONSULT CHART ON PAGE 9

(Flow in Standard Weight Pipe-Fluid Velocity in GPM).

For SHP Series Butterfly Valves, the 32 ft/second column is applied.

For example: Application requires a 2-way, 600 GPM Butterfly valve, a valve of 3" minimum would be selected. The 3" valve at 32 ft/second would be able to withstand a capacity of 705 GPM, without damage to the seat.

Notes

1. Most Butterflies are line size and piping geometry is not considered. If valve size must be reduced, a recommendation is to select a valve only one size less than the pipe. (Do not exceed velocity limit)
2. For a modulating Butterfly valve, the Cv rating is determined at 60° open. For a 2-position Butterfly valve, the Cv is determined at 90° open.

Consult Belimo Technical Support for applications involving steam, high velocity requirements, etc.

Installation Recommendations

SHP Series Butterfly Valves



Pre-Installation Procedure

1. Remove the protective face covers from the valve.
2. Inspect the valve to be certain the waterway is free from dirt and foreign matter. Be certain the adjoining pipeline is free from any foreign material such as rust and pipe scale or welding slag that could damage the seat and disc sealing surfaces.
3. Actuators should be mounted on the valve prior to installation to facilitate proper alignment of the disc in the valve seat.
4. The valve should be in the **closed position**. Make sure the open and closed positions of the actuator correspond to the counter-clockwise to open direction of rotation of the valve.
5. Cycle the valve to the fully open position, then back to the fully closed position, checking the actuator travel stop settings for proper disc alignment.
6. Check the valve identification tag for valve class, materials, and operating pressure to be sure they are correct for the application.

WARNING! Personal injury or property damage may result if the valve is installed where service conditions could exceed the valve ratings.

7. Check the flange bolts or studs for proper size, threading, and length.

REMEMBER: Install the valve with the disc in the full-closed position using the appropriate flange gaskets on BOTH valve flange faces.

Valve Installation Procedure

The SHP High Performance Butterfly Valve can be installed in the pipeline with the shaft in the vertical, horizontal, or other intermediate position. Based on applications experience, however, in media with concentrations of solid or abrasive particles or media subject to solidification buildup, valve performance and service life will be enhanced by mounting the valve with the shaft in the horizontal position.

All SHP valves are bidirectional and can be mounted in the pipeline in either flow direction; however, the preferred flow direction for all seat styles and materials is with the seat retainer ring located upstream (sus) to provide maximum seat protection.

For SHP Series valves

- a. Noting the flow direction arrow on the tag, place the valve between the flanges, making sure the arrow on the tag points in the direction of the flow.
 - b. Install the lower flange bolts loosely, leaving space for the flange gaskets.
 - c. After inserting the flange gaskets, install the remaining bolts.
3. Using the sequence shown to the right, tighten the flange bolts evenly to assure uniform gasket compression.

CAUTION: The SHP valve should be centered between the flanges and gaskets to prevent damage to the disc edge and shaft as a result of the disc striking the flange, gasket, or pipe.

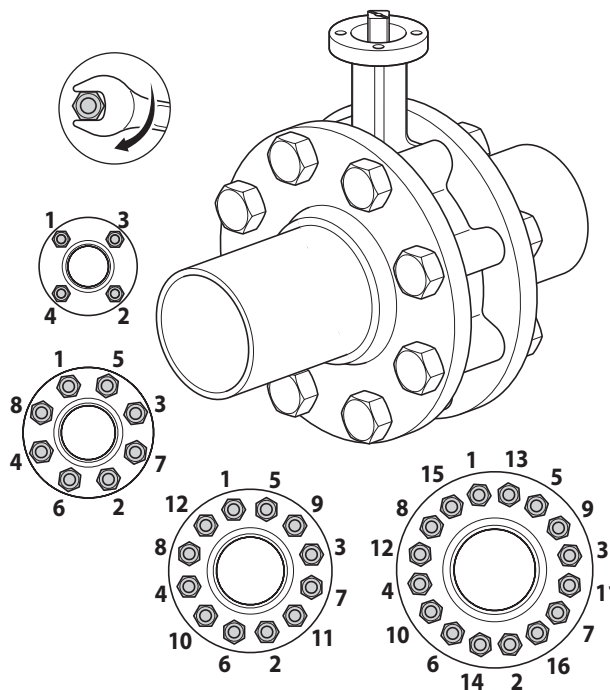
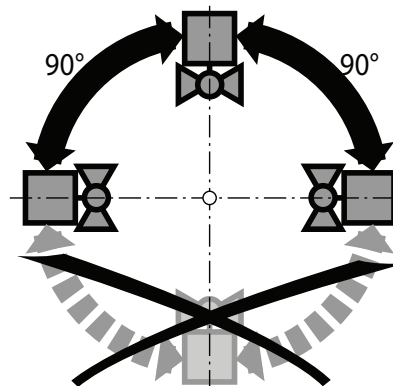
4. Electricity should be connected to the unit as specified by the actuator manufacturer.
5. The valve is now ready for operation.

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

NOTE

Actuator must be mounted at or above pipe center line for all actuator types.

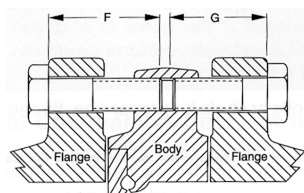


FLANGE BOLTING RECOMMENDATIONS

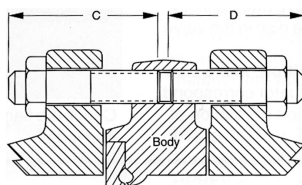
Lug Valves, 2" – 30", ANSI 125/150 Bolt Pattern

Valve Size	Thread Size	STUDS & NUTS						MACHINE BOLTS					
		C	QTY	LENGTH	D	QTY	LENGTH	F	QTY	LENGTH	G	QTY	LENGTH
2"	5/8-11		4	2.50		4	2.50		4	1.63		4	1.63
2-1/2"	5/8-11		4	2.75		4	2.75		4	1.85		4	1.85
3"	5/8-11		4	3.25		4	2.50		4	2.25		4	1.63
4"	5/8-11		8	3.00		8	2.75		8	2.12		8	1.88
5"	3/4-10		8	3.00		8	3.00		8	2.00		8	2.00
6"	3/4-10		8	3.50		8	3.00		8	2.50		8	1.88
8"	3/4-10		8	3.75		8	3.25		8	2.70		8	2.13
10"	7/8-9		12	4.25		12	3.50		12	3.00		12	2.25
12"	7/8-9		12	4.75		12	3.50		12	3.45		12	2.35
14"	1-8		12	5.00		12	4.00		12	3.75		12	2.70
16"	1-8		16	5.50		16	4.25		16	4.12		16	2.75
18"	1-1/8-8		16	5.75		16	4.75		16	4.38		16	3.25
20"	1-1/8-8		16	6.75		16	4.75		16	5.12		16	3.25
24"	1-1/4-8		20	7.25		20	5.75		20	5.63		20	4.25
30"	1-1/4-8		24	7.75		24	7.75		24	6.25		24	6.25
			4**	6.50		4**	6.25		4*	5.00		4**	4.63

LUG BODY
HEX HEAD MACHINE BOLTS



LUG BODY
STUDS and NUTS



Bolting and torque recommendations are made without warranty, and apply only to steel weld-neck or slip-on flanges.

The use of lock washers and/or lubrication with the bolting will affect stated torque values.

Length of machine bolts based on:

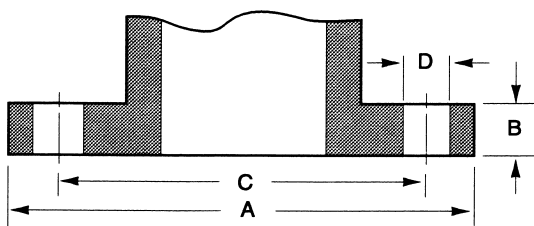
1. Gasket thickness of 0.06 inches.
2. Minimum flange thickness of weld-neck flanges per ANSI B16.5 and B16.47 Series A.

* Variation to specified bolting length may result in improper installation.

FLANGE BOLTING RECOMMENDATIONS

Flange Detail for ANSI 150 B16.5 Pipe Flanges 150 SHP Series Butterfly Valves

Nominal Pipe Size	FLANGES		DRILLING		BOLTING	
	A Flange Diameter	B Flange Thickness	C Diameter of Bolt Circle	D Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts
2"	6"	3/4"	4-3/4"	3/4"	4	5/8"
2-1/2"	7"	7/8"	5-1/2"	3/4"	4	5/8"
3"	7-1/2"	15/16"	6"	3/4"	4	5/8"
4"	9"	15/16"	7-1/2"	3/4"	8	5/8"
5"	10"	15/16"	8-1/2"	7/8"	8	3/4"
6"	11"	1"	9-1/2"	7/8"	8	3/4"
8"	13-1/2"	1-1/8"	11-3/4"	7/8"	8	3/4"
10"	16"	1-3/16"	14-1/4"	1"	12	7/8"
12"	19"	1-1/4"	17"	1"	12	7/8"
14"	21"	1-3/8"	18-3/4"	1-1/8"	12	1"
16"	23-1/2"	1-7/16"	21-1/4"	1-1/8"	16	1"
18"	25"	1-5/8"	22-3/4"	1-1/4"	16	1-1/8"
20"	27-1/2"	1-11/16"	25"	1-1/4"	20	1-1/8"
24"	32"	1-7/8"	29-1/2"	1-3/8"	20	1-1/4"



Every effort is made to provide accurate information, but no liability for claims arising from erroneous data will be accepted by Belimo.

Installation Recommendations

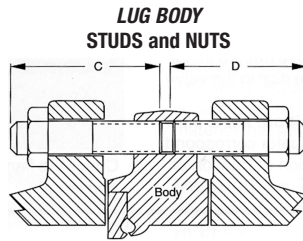
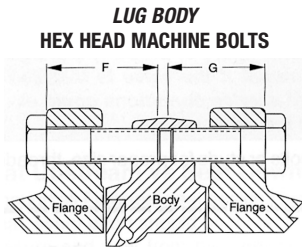
SHP Series Butterfly Valves



FLANGE BOLTING RECOMMENDATIONS

Lug Valves, 2"-24", ANSI 250/300 Bolt Pattern

		BOLT ENGAGEMENT IN VALVE*				STUDS & NUTS				MACHINE BOLTS									
Valve Size	Thread Size	A	QTY	LENGTH	B	QTY	LENGTH	C	QTY	LENGTH	D	QTY	LENGTH	F	QTY	LENGTH	G	QTY	LENGTH
2"	5/8-11		8	.94		8	.57		8	2.25		8	2.62		8	1.50		8	2.00
2-1/2"	5/8-11		8	.97		8	.67		8	2.75		8	3.00		8	1.75		8	2.00
3"	3/4-10		8	1.03		8	.82		8	3.00		8	3.00		8	2.12		8	2.00
4"	3/4-10		8	1.19		8	.87		8	3.50		8	3.25		8	2.50		8	2.00
5"	3/4-10		8	1.22		8	.79		8	5.25		8	3.62		8	2.25		8	2.75
6"	3/4-10		12	1.30		12	.92		12	3.75		12	3.50		12	2.75		12	2.25
8"	7/8-9		12	1.70		12	1.12		12	4.50		12	4.00		12	3.25		12	2.75
10"	1-8		16	1.86		16	1.30		16	5.00		16	4.50		16	3.25		16	3.12
12"	1-1/8-8		16	2.05		16	1.47		16	5.50		16	5.00		16	4.00		16	3.38
14"	1-1/8-8		16	2.44		16	2.11		16	6.00		16	5.75		16	4.62		16	4.25
	1-1/8-8		4**	1.60		4**	1.26		4**	5.25		4**	4.75		4**	3.75		4**	3.44
16"	1-1/4-8		16	2.56		16	2.62		16	6.50		16	6.50		16	4.88		16	4.88
	1-1/4-8		4**	1.53		4**	1.58		4**	5.25		4**	5.25		4**	3.88		4**	4.25
18"	1-1/4-8		20	2.87		20	2.89		20	7.00		20	7.00		20	5.25		20	5.25
	1-1/4-8		4**	1.65		4**	1.43		4**	5.50		4**	5.50		4**	4.00		4**	3.88
20"	1-1/4-8		20	3.18		20	3.00		20	7.50		20	7.25		20	5.69		20	5.69
	1-1/4-8		4**	1.68		4**	1.75		4**	5.75		4**	5.50		4**	4.19		4**	4.00
24"	1-1/2-8		20	3.56		20	3.51		20	8.25		20	8.25		20	6.31		20	6.25
	1-1/2-8		4**	1.80		4**	1.75		4**	6.25		4**	6.25		4**	4.56		4**	4.50



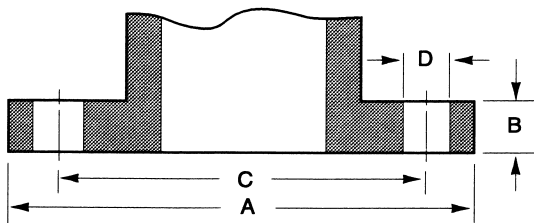
* Bolt lengths "A" & "B" are from face of valve body to minimum depth in lug. Flange & gasket thickness must be added to calculate minimum bolt length.

**Special length required for tapped blind holes on either side of the valve shaft at the top and bottom ends of the valve body.

FLANGE BOLTING RECOMMENDATIONS

Flange Detail for ANSI 300 B16.5 Pipe Flanges 300 SHP Series Butterfly Valves

Nominal Pipe Size	FLANGES		DRILLING		BOLTING	
	A Flange Diameter	B Flange Thickness	C Diameter of Bolt Circle	D Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts
2"	6.50	.88	5.00	.75	8	5/8"
2-1/2"	7.50	1.00	5.88	.88	8	3/4"
3"	8.25	1.12	6.63	.88	8	3/4"
4"	10.00	1.25	7.88	.88	8	3/4"
5"	11.00	1.38	9.25	.88	8	3/4"
6"	12.50	1.44	10.63	.88	12	3/4"
8"	15.00	1.62	13.00	1.00	12	7/8"
10"	17.50	1.88	15.25	1.12	16	1"
12"	20.50	2.00	17.75	1.25	16	1-1/8"
14"	23.00	2.12	20.25	1.25	20	1-1/8"
16"	25.50	2.25	22.50	1.37	20	1-1/4"
18"	28.00	2.38	24.75	1.37	24	1-1/4"
20"	30.50	2.50	27.00	1.37	24	1-1/4"
24"	36.00	2.75	32.00	1.62	24	1-1/2"



Verify that Control Signal and Power are present at the actuator.

- Measure between Control Signal + and – and power + and – on control board. (See photo of control boards below for locations).
- Check fuses on both boards. If fuses are blown, replace before proceeding.

Verify that the green LED is lit on the control board – this indicates power is present.

If yes:

- Push the button labelled “Adaption”, hold for 3-5 seconds then release. (see left photo for 24V, right photo for 120V)
- The LED next to green LED should light up (amber in color)
- Actuator should click. Drive fully in one direction. It will stop there for 5-10 seconds. Click and drive fully in the opposite direction.
- The amber light should go out.

If the sequence does not happen as above, please have the tech make a note of what does happen.

Possibilities include

- Amber light goes on, actuator clicks but does not move at all.
- Amber light goes on, actuator clicks and drives in one direction, and clicks but does not drive in the other direction.
- Amber light does not light, and the actuator does nothing at all.

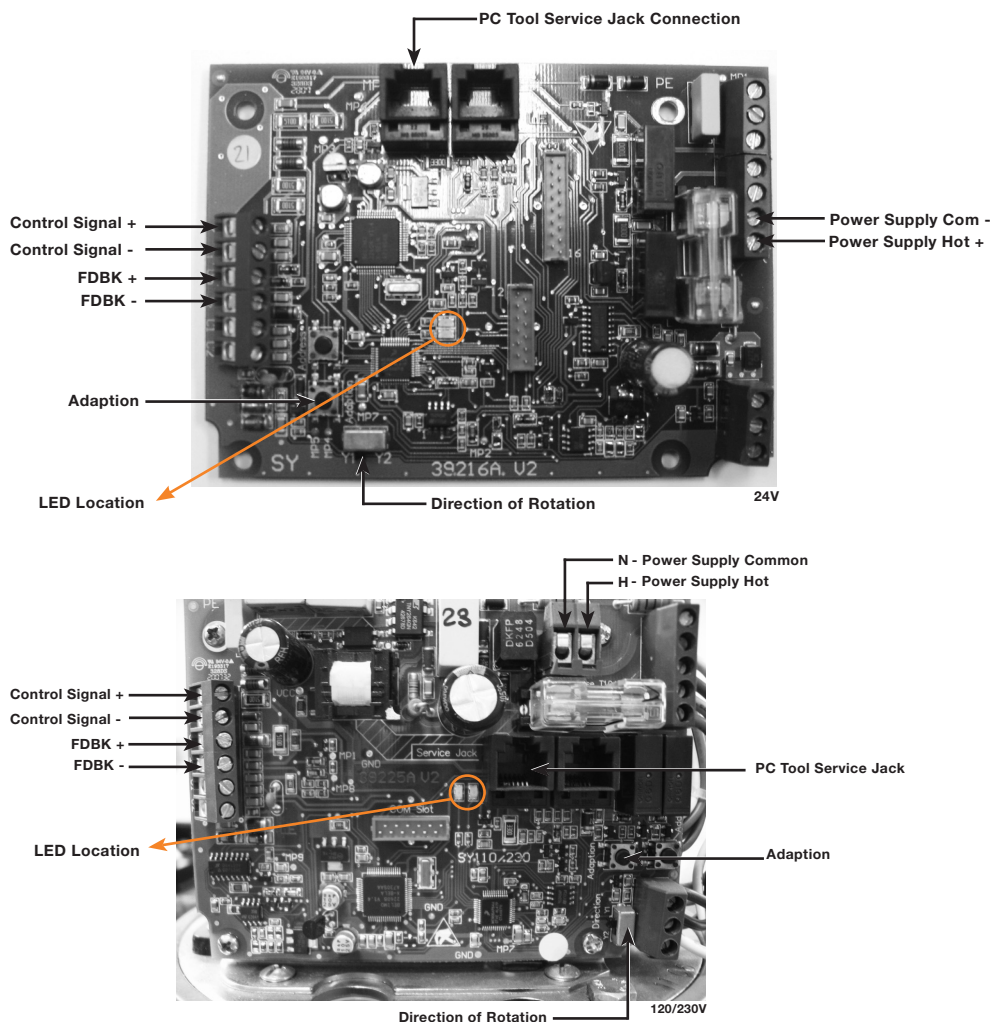
If something else occurs, please make a note and communicate to a Belimo Technical Support Representative as the actuator most likely will need to be replaced.

If the actuator adapts correctly:

1. Verify correct wiring of control signal (confirm correct polarity of field wiring and meter). Must have “Control +” and “Control –” and not share the “Control –” with the 24V common, or 120V Neutral (4 wires are required, 2 for power and 2 for Control Signal).
2. Provide a DC control signal other than minimum or maximum (suggest 6 VDC or 50% command).
3. Measure with DC voltmeter on “Control +” and “Control –” at actuator and verify that a voltage other than 0(2) or 10V is present on those terminals. If actuator does not drive to approximately the mid position and voltage is present, the actuator most likely will need to be replaced.

The following information is helpful to determine warranty coverage and additional steps that might need to be taken:

1. PO# or Belimo SO# or ID# (ID is located on actuator cover under the model #).
2. Is this a retrofit or was it factory assembled to a valve?
3. Has this actuator ever worked on this site (brand new install that did not work, or has been working correctly for a certain period of time).
4. Proper transformer sizing (see PGPL for current VA requirements).
5. Confirm correct wire size vs. length or run for SY actuators.



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