BUTTERFLY VALVES
SHP SERIES

High Performance for 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.
- Stainless steel disc and shaft on SHP series are standard for superior durability and long lasting operation.

Butterfly Valve Nomenclature

F6	50	-150SHP	SY2	-24	MFT	
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 Lug Body, RPTFE Seat, 0% Leakage up to 285 psi **-300SHP** = ANSI Class 300, Stainless Disc, Steel Lug Body, RPTFE Seat, 0% Leakage up to 600 psi	**Actuator Type** **Non-Spring Return** GM... N4(H) GMB(X) SY **Electronic Fail-Safe** GK **Spring Return** AF	**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 N4H = NEMA 4 with Heater

Ordering Example

1. Choose the valve actuator combination.

F650-150SHP+SY2-24MFT **+NO** **+Tagging (if needed)**

2. Specify preference or configuration.

3. **For MFT orders only - select programming code (consult factory)**

4. Does order require tagging?

Tagging:
Valves may be tagged per customer specification. ($10.00 per tag)

Example:
Chiller 1
3rd Floor East

Part number for tagging: 99981-00101

5. Complete Ordering Example:

F650-150SHP+SY2-24MFT+NO +ACE

Consult factory

2-way Preference

Non-Spring Return	2 Pos.		Set Up Required Field Logic Determines Normal Position
	Modulating	NC	(Normally Closed) 0.5 VDC/2 VDC/4mA = Closed
		NO	(Normally Open) 0.5 VDC/2 VDC/4mA = Open
Spring Return		NO/FO	(Normally Open/Fail Open) Field Logic Determines Normal Position Spring Fails Valve OPEN
		NC/FC	(Normally Closed/Fail Closed) Field Logic Determines Normal Position Spring Fails Valve CLOSED
		NO/FC	(Normally Open/Fail Closed) 0.5 VDC/2 VDC/4mA = Open Spring Fails Valve CLOSED
		NC/FO	(Normally Closed/Fail Open) 0.5 VDC/2 VDC/4mA = Closed Spring Fails Valve OPEN

Set-Up **3-way Configuration**

Non-Spring Return	2 Pos.		No Set Up Required Field Logic Determines Normal Position
	Modulating	Specify Flow Pattern	Master (Actuated) Valve NC (Normally Closed) 0.5 VDC/2 VDC/4mA = Closed
			Master (Actuated) Valve NO (Normally Open) 0.5 VDC/2 VDC/4mA = Open
Spring Return	Modulating 2 Pos.	Specify Flow Pattern	NO/FO (Normally Open/Fail Open) Field Logic Determines Normal Position Spring Fails Master Valve OPEN
			NC/FC (Normally Closed/Fail Closed) Field Logic Determines Normal Position Spring Fails Master Valve CLOSED
			NO/FO (Normally Open/Fail Open) 0.5 VDC/2 VDC/4mA = Master Valve Open Spring Fails Master Valve OPEN
			NO/FC (Normally Open/Fail Closed) 0.5 VDC/2 VDC/4mA = Maser Valve Open Spring Fails Master Valve CLOSED
			NC/FO (Normally Closed/Fail Open) 0.5 VDC/2 VDC/4mA = Master Valve Closed Spring Fails Master Valve OPEN
			NC/FC (Normally Closed/Fail Closed) 0.5 VDC/2 VDC/4mA = Master Valve Closed Spring Fails Master Valve CLOSED

Control Valve Product Range

High Performance Butterfly Valve Product Range

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

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.

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 rangebilities 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

	3-way Valves			Suitable Actuators					
	Valve Nominal Size	Type		Non-Spring Return				Electronic Fail-Safe	
C_V 90°	C_V 60°	Inches	ANSI 150 3-way	ANSI 300 3-way	150	300	150	300	150	300
100	52	2	F750-150SHP	F750-300SHP	GM Series	GM	SY Series	SY Series	GK Series	GK Series
143	75	2½	F765-150SHP	F765-300SHP						
223	117	3	F780-150SHP	F780-300SHP						
435	228	4	F7100-150SHP	F7100-300SHP						
688	361	5	F7125-150SHP	F7125-300SHP						
1041	546	6	F7150-150SHP	F7150-300SHP						
1911	1001	8	F7200-150SHP	F7200-300SHP						
3194	1673	10	F7250-150SHP	F7250-300SHP						
4428	2319	12	F7300-150SHP	F7300-300SHP						
5702	2986	14	F7350-150SHP	F7350-300SHP						
8243	3988	16	F7400-150SHP	F7400-300SHP						
9712	5088	18	F7450-150SHP	F7450-300SHP						
10658	7590	20	F7500-150SHP	F7500-300SHP						
16205	11550	24	F7600-150SHP	F7600-300SHP						

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.

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	-20°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%

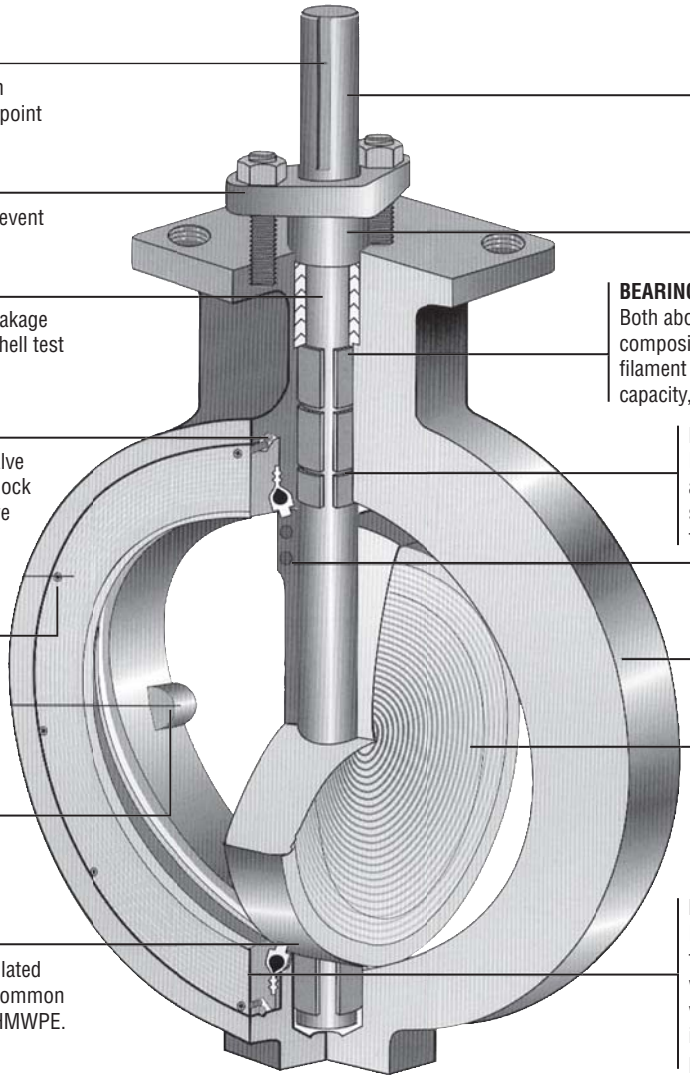
Double Dead End Service: Utilizes larger retainer ring set screws to allow the valve to be placed at the end of the line without a down stream flange in either flow direction while still holding full pressure.

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



KEY
Square key valve-to-operator connection provides an externally controlled failure point upon over-torquing.

GLAND FLANGE
Applies load against packing gland to prevent external leakage. Fully adjustable.

PACKING
Chevron design TFE prevents external leakage out valve neck to full ANSI hydrostatic shell test pressures (150% of C.W.P.).

WEDGE RING
Stainless steel band wedged between valve body and retainer ring by set screws to lock seat and retainer ring in position on valve sizes 2" through 30". Socket head cap screws are used on valve sizes 36" and larger.

SET SCREWS
Cone point screws force wedge ring outward to lock seat retainer in position on valve sizes 2" through 30". Socket head cap screws are used on valve sizes 36" and larger.

OVERTRAVEL STOP
Prevents disc from rotating into wrong quadrant.

SOFT-SEAT
Patented bidirectional seat with encapsulated elastomeric o-ring core for resiliency. Common seat materials include TFE, RTFE and UHMWPE.

BLOW OUT PROOF SHAFT
Solid shaft provides alignment and rigid support for disc.

PACKING GLAND
Separate part from gland flange, preventing uneven load distribution against packing.

BEARINGS
Both above and below the disc, bearings are of composite design: PTFE bonded to epoxy-glass filament wound ring. Used to align shaft, with high capacity, low wear and low friction coefficient.

DISC SPACERS
Disc is centered by use of thrust spacers around shaft in sizes 2" to 5". Disc position stops or thrust bolt arrangements are used for larger valve sizes.

WEDGE PINS
Provide positive mechanical attachment of disc to shaft.

BODY
ANSI B16.34 design in either wafer or lug configuration.

DISC
360° uninterrupted spherical edge for sealing. Profile is designed for maximum flow and equal percentage control.

RETAINER RING
Retains seat in valve. Standard surface finish is 125 to 200 AARH and is compatible with both standard gaskets and spiral wound gasket designs. Outside diameter is recessed within gasket sealing surface to prevent external leakage.

Average Assembly Weights

					ACTUATOR				
					NON-SPRING RETURN		SPRING RETURN	ELECTRONIC FAIL-SAFE	
		Size	Valve	Max GPM	COP	GMB(X)	2*GMB(X)	2*AF	GK	2*GK
ANSI 150	2-way	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	
		Size	Valve	Max GPM	COP	GMB(X)	2*GMB(X)	2*AF	GK	2*GK
ANSI 300	2-way	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 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	SY2-110	SY3-110	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	39 lbs.									
	2½”	F665-150SHP	490	285	39 lbs.									
	3”	F680-150SHP	705	285	41 lbs.									
	4”	F6100-150SHP	1253	285	53 lbs.									
	5”	F6125-150SHP	1958	285	58 lbs.									
	6”	F6150-150SHP	2820	285	63 lbs.									
	8”	F6200-150SHP	5013	150		76 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.					
	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.
ANSI 150 3-way	2”	F750-150SHP	313	285	82 lbs.									
	2½”	F765-150SHP	490	285	93 lbs.									
	3”	F780-150SHP	705	285	103 lbs.									
	4”	F7100-150SHP	1253	285	162 lbs.									
	5”	F7125-150SHP	1958	285		195 lbs.								
	6”	F7150-150SHP	2820	285		234 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				785 lbs.						
	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 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	SY2-110	SY3-110	SY4-110	SY5-110	SY7-110	SY8-110	SY9-110	SY10-110	SY11-110
ANSI 300 2-way	2”	F650-300SHP	313	600	39 lbs.								
	2½”	F665-300SHP	490	600	39 lbs.								
	3”	F680-300SHP	705	600	45 lbs.								
	4”	F6100-300SHP	1253	600	52 lbs.								
	5”	F6125-300SHP	1958	285	58 lbs.								
	5”	F6125-300SHP	1958	600		58 lbs.							
	6”	F6150-300SHP	2820	285	77 lbs.								
	6”	F6150-300SHP	2820	600		77 lbs.							
	8”	F6200-300SHP	5013	150		108 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 series actuators are NEMA 4X rated and include 2 auxiliary switches and a heater.

Average Assembly Weights

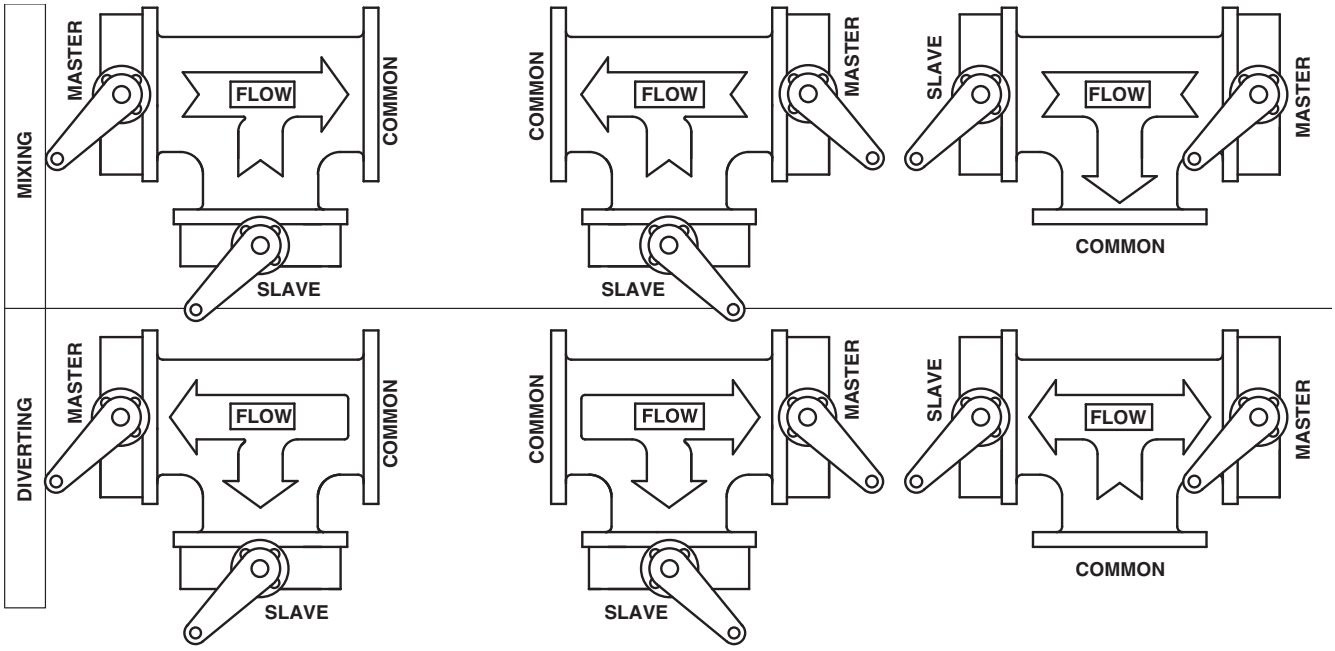
					ACTUATOR									
					NON-SPRING RETURN									
	Size	Valve Model	Max GPM	COP	SY2-110	SY3-110	SY4-110	SY5-110	SY7-110	SY8-110	SY9-110	SY10-110	SY11-110	SY-12-110
ANSI 300 3-way	2”	F750-300SHP	313	400	104 lbs.									
	2”	F750-300SHP	313	600		104 lbs								
	2½”	F765-300SHP	490	400	124 lbs.									
	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		274 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 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	NON-FAIL
M(D)11	OPEN	OPEN
M(D)12	OPEN	CLOSED
M(D)13	CLOSED	NON-FAIL
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	NON-FAIL
M(D)21	OPEN	OPEN
M(D)22	OPEN	CLOSED
M(D)23	CLOSED	NON-FAIL
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	NON-FAIL
M(D)31	OPEN	OPEN
M(D)32	OPEN	CLOSED
M(D)33	CLOSED	NON-FAIL
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. Proportional actuator normal position is a function of the CCW/CW swit
6. All 3-way assemblies are designed for 90 degree actuator rotation.

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

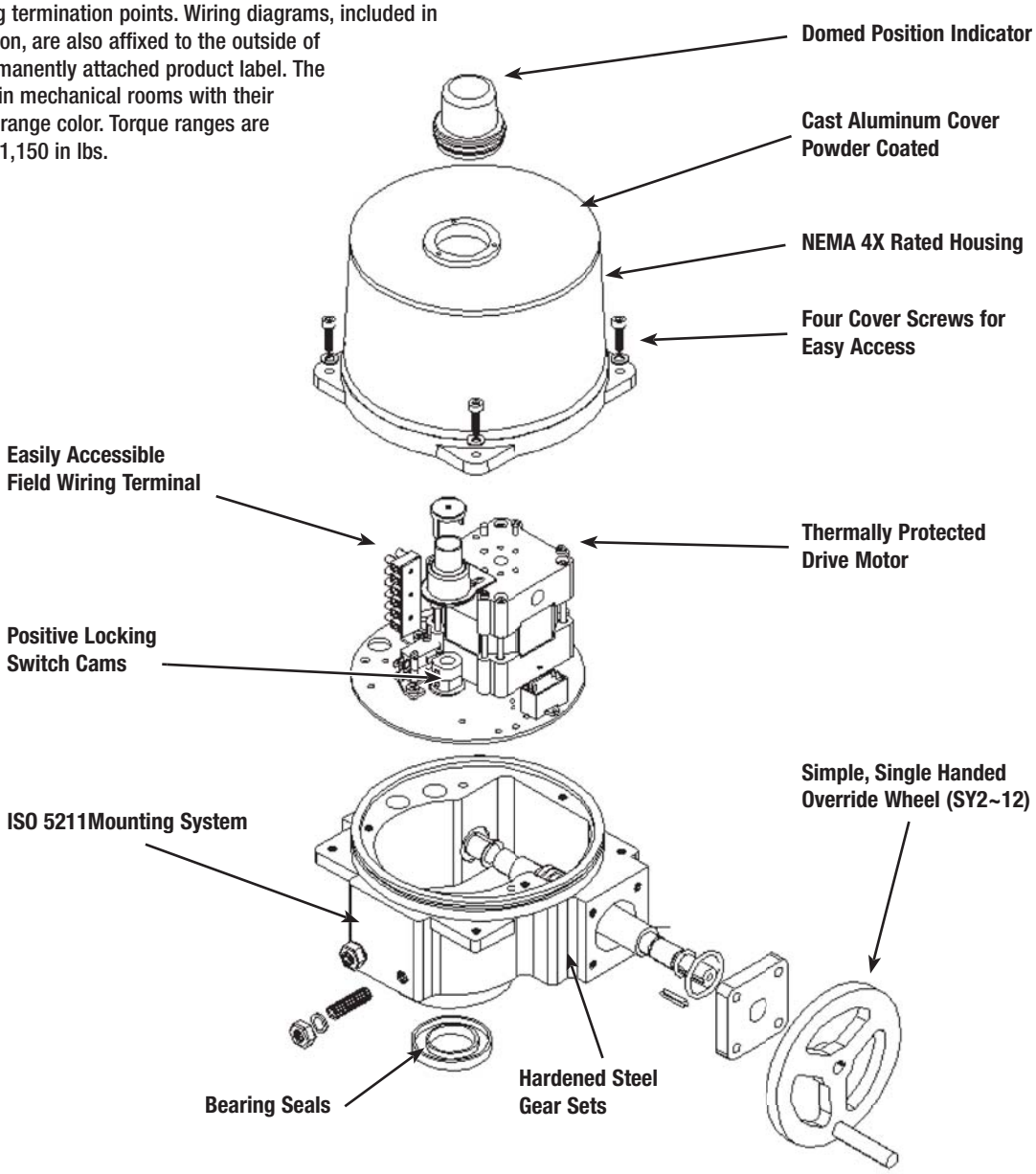
It is not recommended to exceed 32 feet per second through high performance butterfly valves.
Velocities greater than 32 fps may damage the valve.

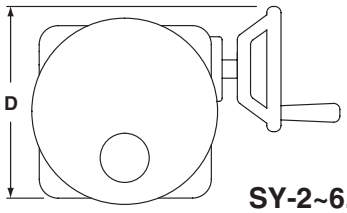
SY Series Actuators

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.

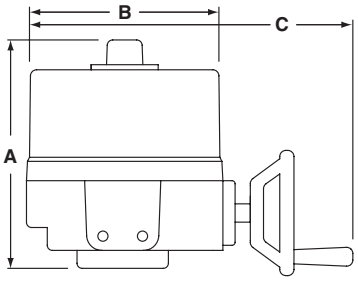
The patented gear drive mechanism provides for efficient, smooth operation while allowing easy manual override at any time. Drawing upon years of experience in the actuation industry, we have incorporated the most desirable features into the SY product range.

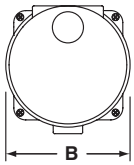
All units have NEMA 4X ratings, easily visible position indicators, international standard ISO5211 mounting systems, internal thermal motor overload protection, heater, dual auxiliary Form C switches, and easily accessible wiring termination points. Wiring diagrams, included in all printed documentation, 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.



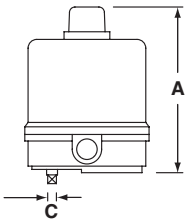


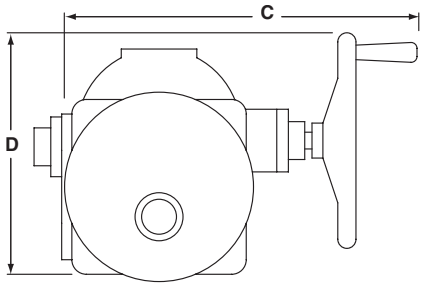
SY-2~6...

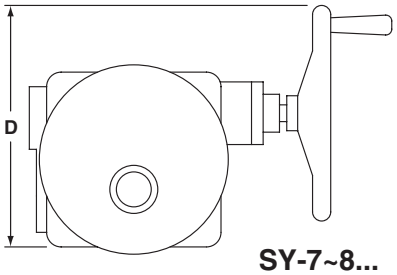




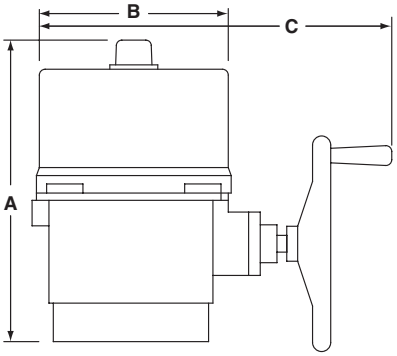
SY-1...

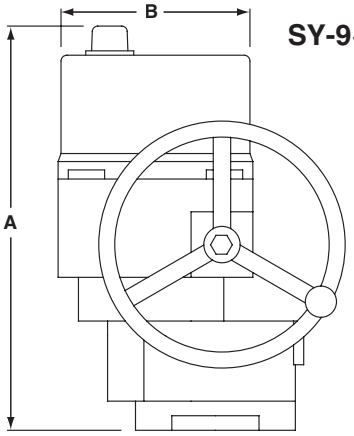






SY-7~8...





SY-9~12...

MODEL	DIM A (MAX)	Add to Dim A for cover removal	DIM B	DIM C (MAX)	DIM D
	Inches [mm]	Inches [mm]	Inches [mm]	Inches [mm]	Inches [mm]
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

800-543-9038 USA
866-805-7089 CANADA
203-791-8396 LATIN AMERICA / CARIBBEAN

Wire Size vs. Length of Run for SY Series Actuators

		SY1	SY2	SY3	SY4	SY5
24 VAC		Amps	Amps	Amps	Amps	Amps
	wire gauge	1.8	3	3	6	6.5
		MAX Distance between Actuator and Supply (feet)				
	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

		SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY11	SY12
110 VAC		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
		MAX Distance between Actuator and Supply (feet)											
	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

		SY1	SY2	SY3	SY4	SY5	SY6	SY7	SY8	SY9	SY10	SY11	SY12
220 VAC		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
		MAX Distance between Actuator and Supply (feet)											
	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

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.

Butterfly Valve SY Actuators

BELIMO

2 YEAR WARRANTY

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.

2 YEAR WARRANTY

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.

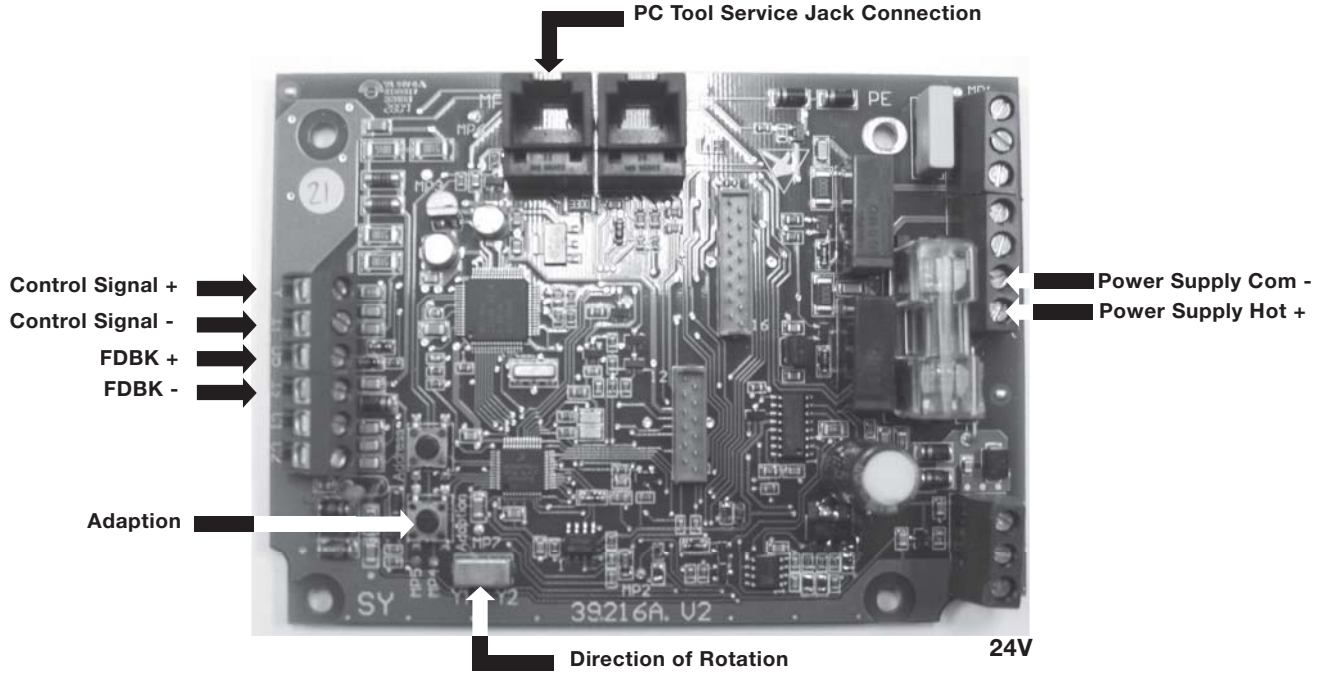
*25% safety factor included in the VA rating.

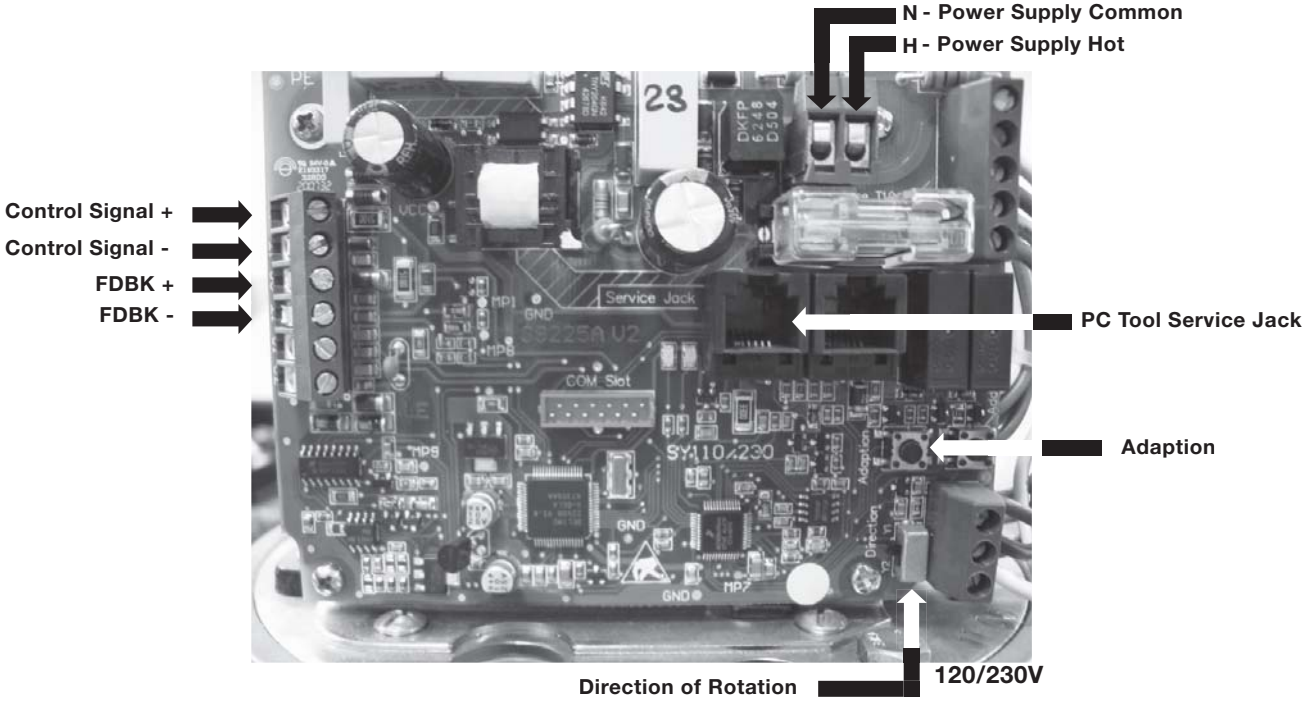
Actuators: SYx-MFT

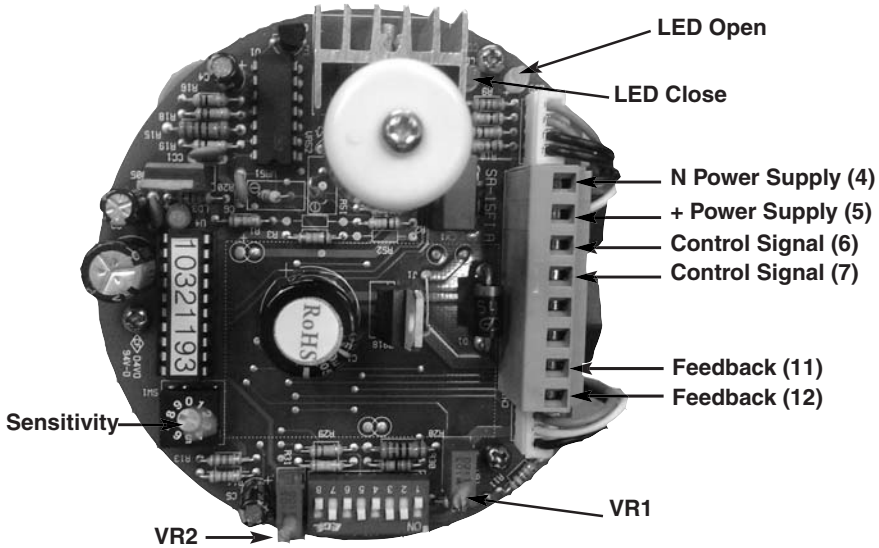
INSTALLATION NOTES

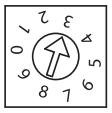
CAUTION

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.









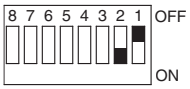
Sensitivity switch setting is position #3 for factory default. To widen dead-band, select a higher number (up to 9).

INSTALLATION NOTES

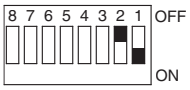
CAUTION

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.

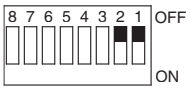
Dip Switch Settings



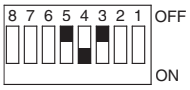
INPUT = 2-10 VDC



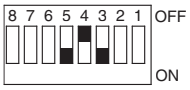
INPUT = 4-20mA



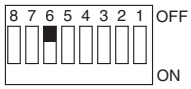
INPUT = 1-5 VDC



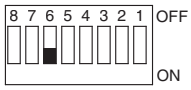
OUTPUT = 4-20mA



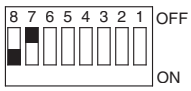
OUTPUT = 2-10 VDC



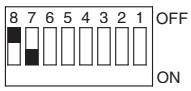
RESPONSE = DIRECT



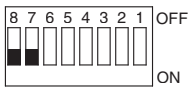
RESPONSE = REVERSE



LOSS OF SIGNAL = CLOSED (Direct Acting)
LOSS OF SIGNAL = OPEN (Reverse Acting)



LOSS OF SIGNAL = OPEN (Direct Acting)
LOSS OF SIGNAL = CLOSED (Reverse Acting)



LOSS OF SIGNAL = STOP

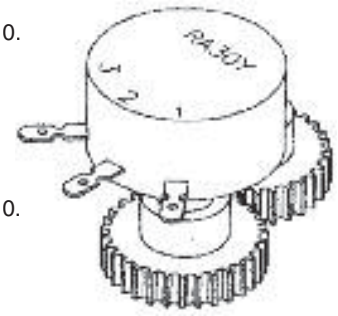
WARNING

Potentiometer (Factory Pre-set)

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

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

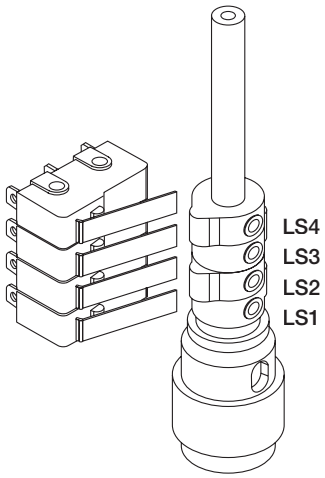


BELIMO

⚠ 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

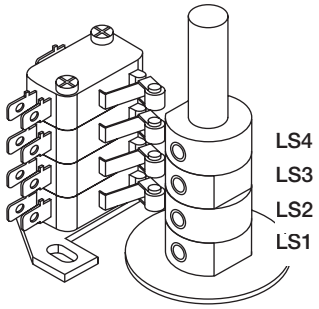
LS2 "CLOSE"
- Clockwise Decrease Closed Angle
- Counter-clockwise Increase Closed Angle

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

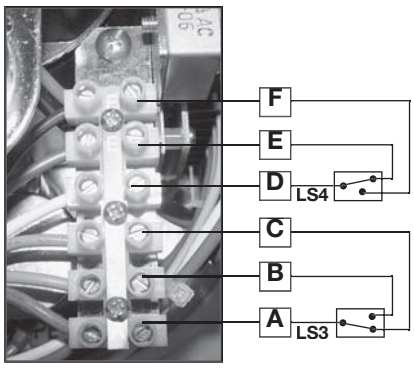
LS3
Auxiliary Switch for Opened Indication

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

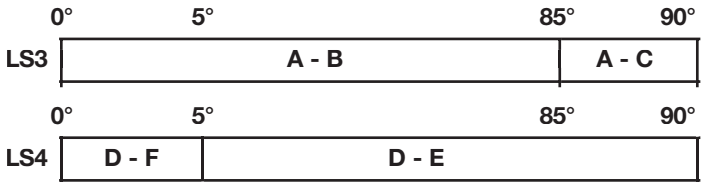
LS2 "CLOSE"
- Clockwise Decrease Closed Angle
- Counter-clockwise Increase Closed Angle

LS1 "OPEN"
- Clockwise Increase Opening Angle
- Counter-clockwise Decrease Opening Angle

⚠ WARNING



Switches at left are shown with actuator fully open.



INSTALLATION NOTES

⚠ CAUTION

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.

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

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.

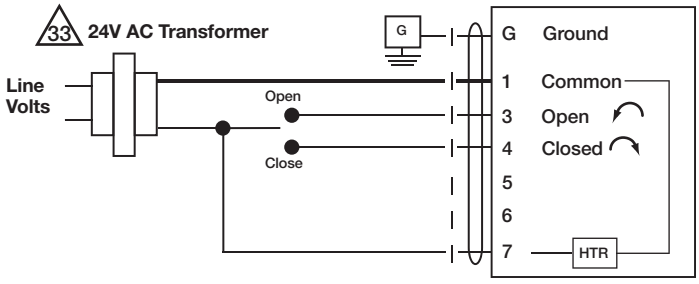
INSTALLATION NOTES

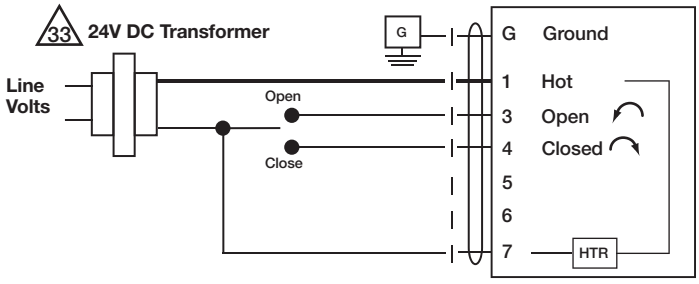
Observe class 1 and class 2 wiring restrictions.

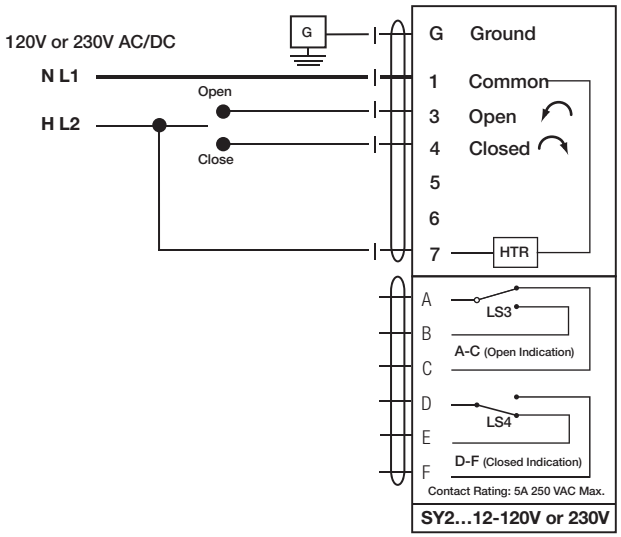
Transformer sizing = SY actuator draw X 1.25 (safety margin)
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A,
3.75A X 24 VAC = 90VA Transformer).

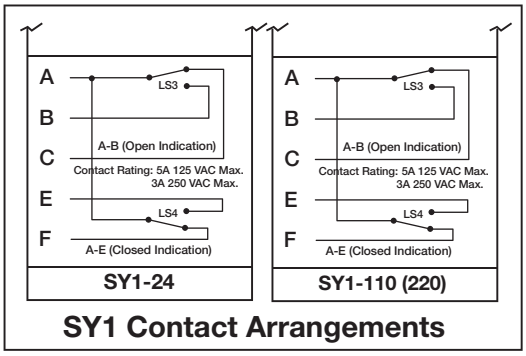
NOTES SY1…12-120V or 230V

- **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.









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

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

36 Use of feedback is optional.

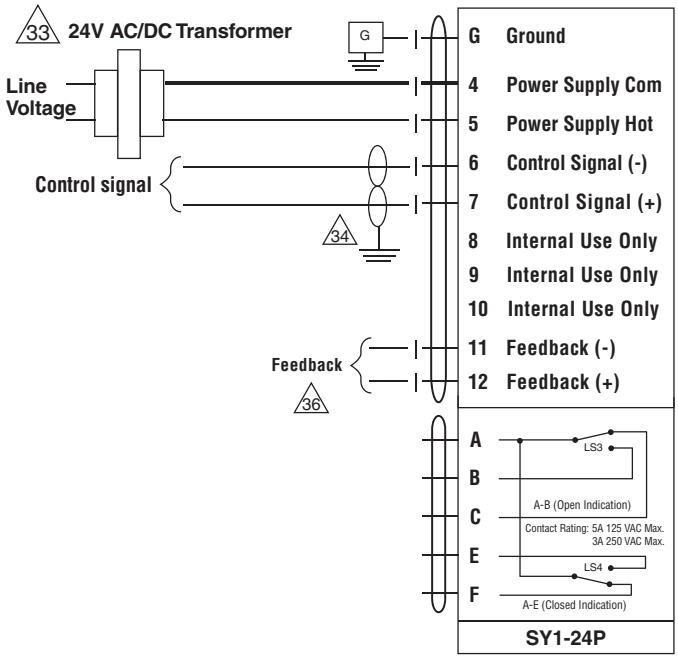
NOTES SY1...24P

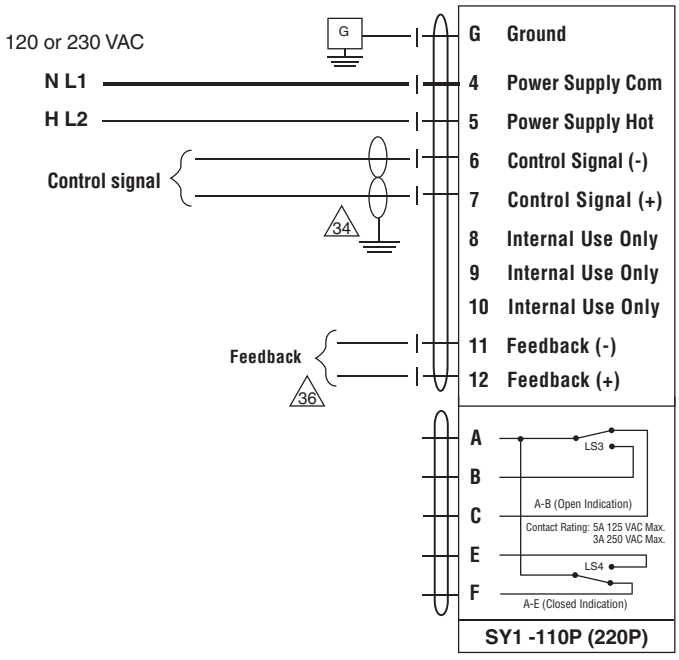
33 Each actuator should be powered by a single, isolated control transformer.

- 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.





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

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.

INSTALLATION NOTES

Observe Class 1 and Class 2 wiring restrictions.

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

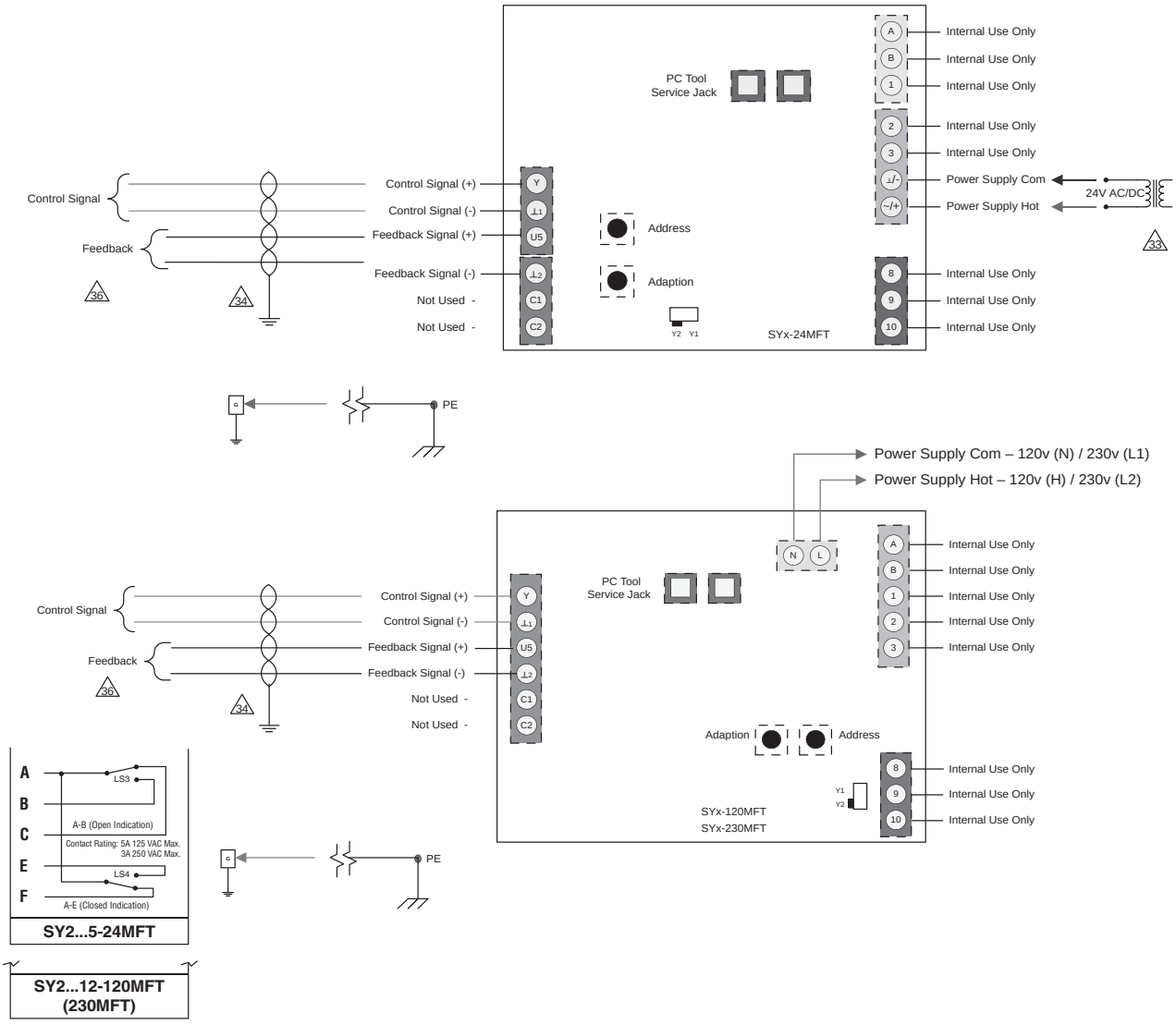
APPLICATION NOTES

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

36 Use of feedback is optional.

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

- **Caution:** Power supply voltage.



W549_11

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

Hazard Identification

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

CAUTION

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

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

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

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

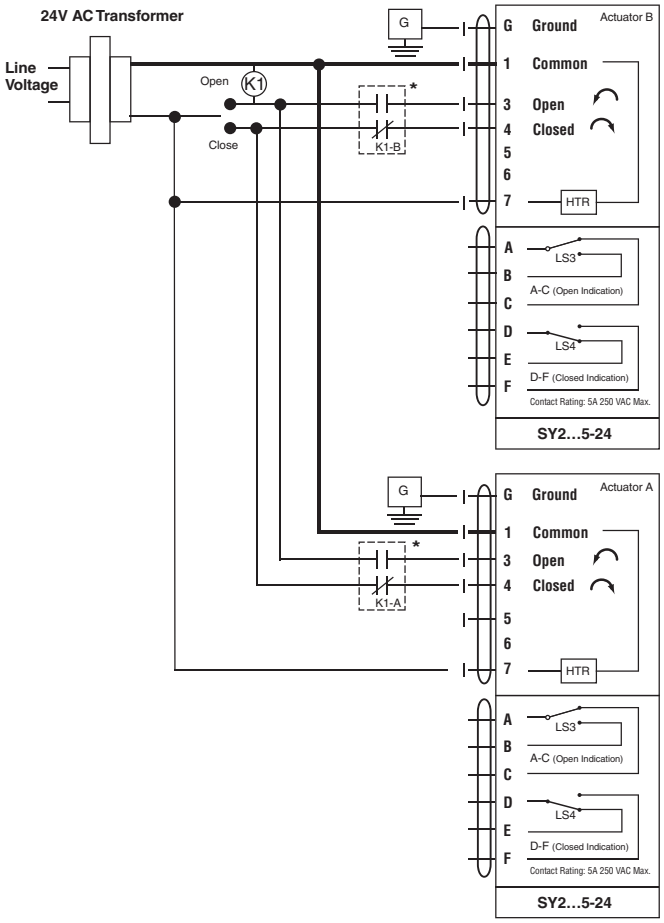
INSTALLATION NOTES

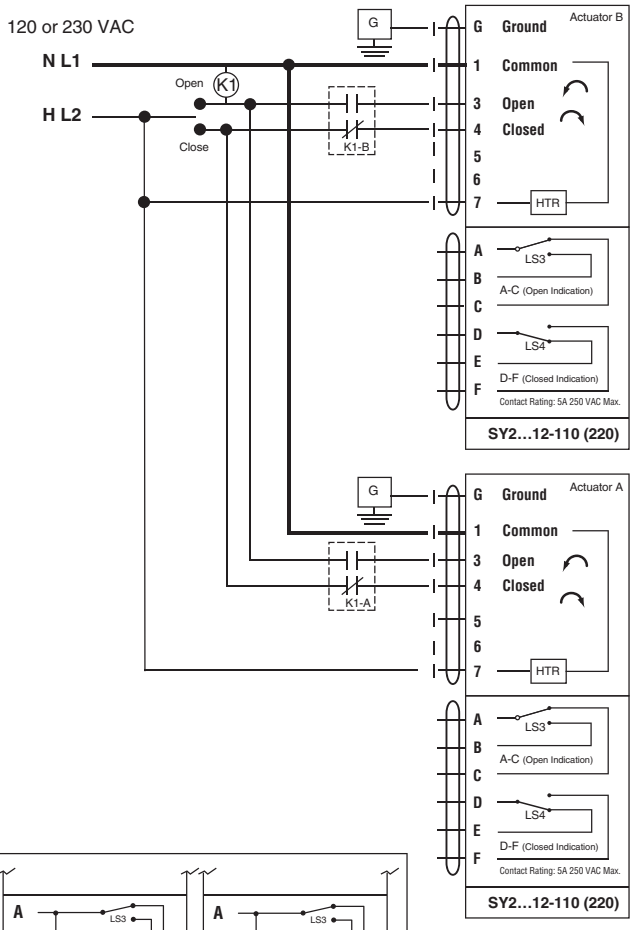
Observe class 1 and class 2 wiring restrictions.

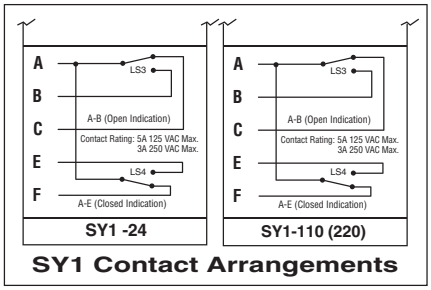
Transformer sizing = SY actuator draw X 1.25 (safety margin)
(Ex. SY2-24 requires 3.0A x 1.25 = 3.75A,
3.75A X 24 VAC = 90VA Transformer).

NOTES

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







W550_11

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

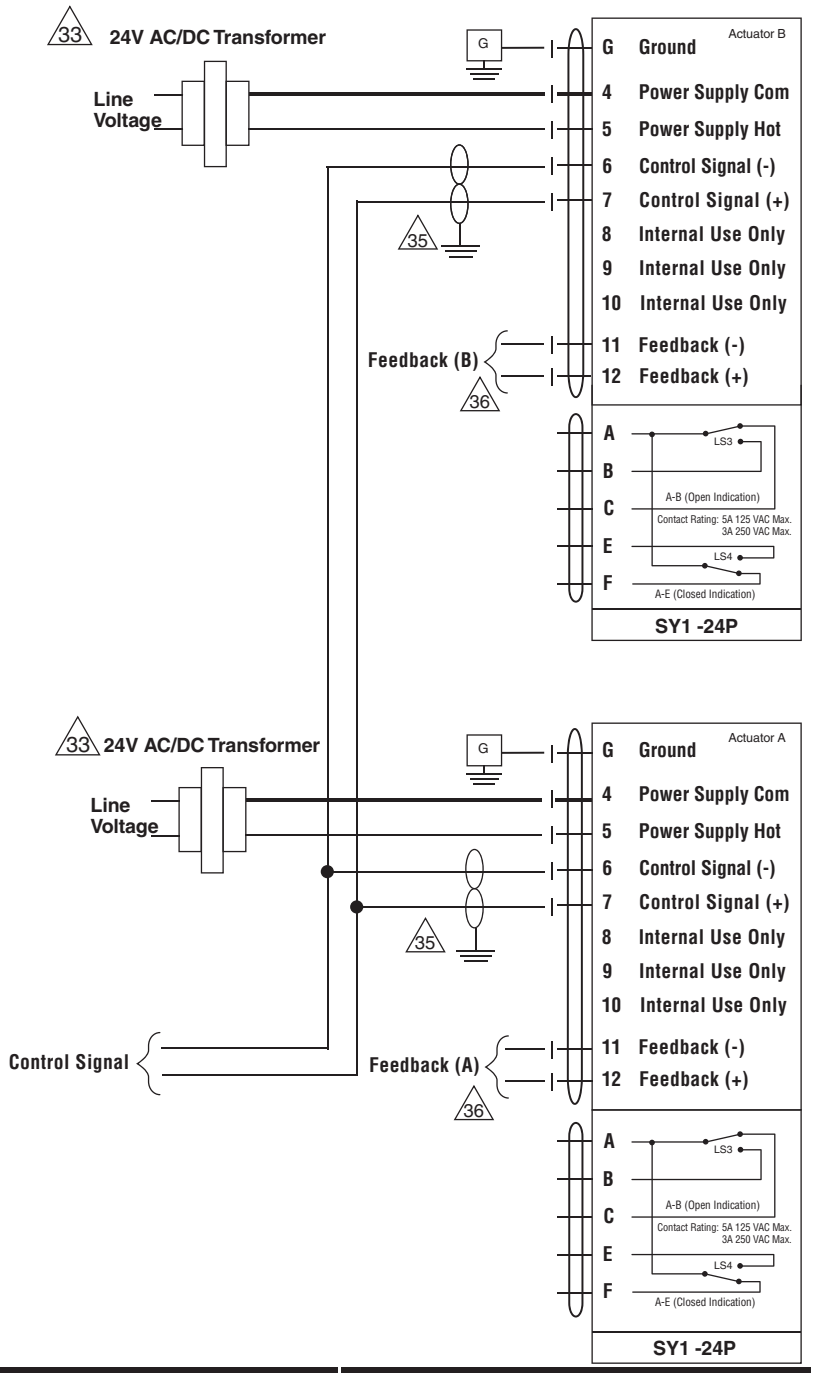
33 Each actuator should be powered by a single, isolated control transformer.

- **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).

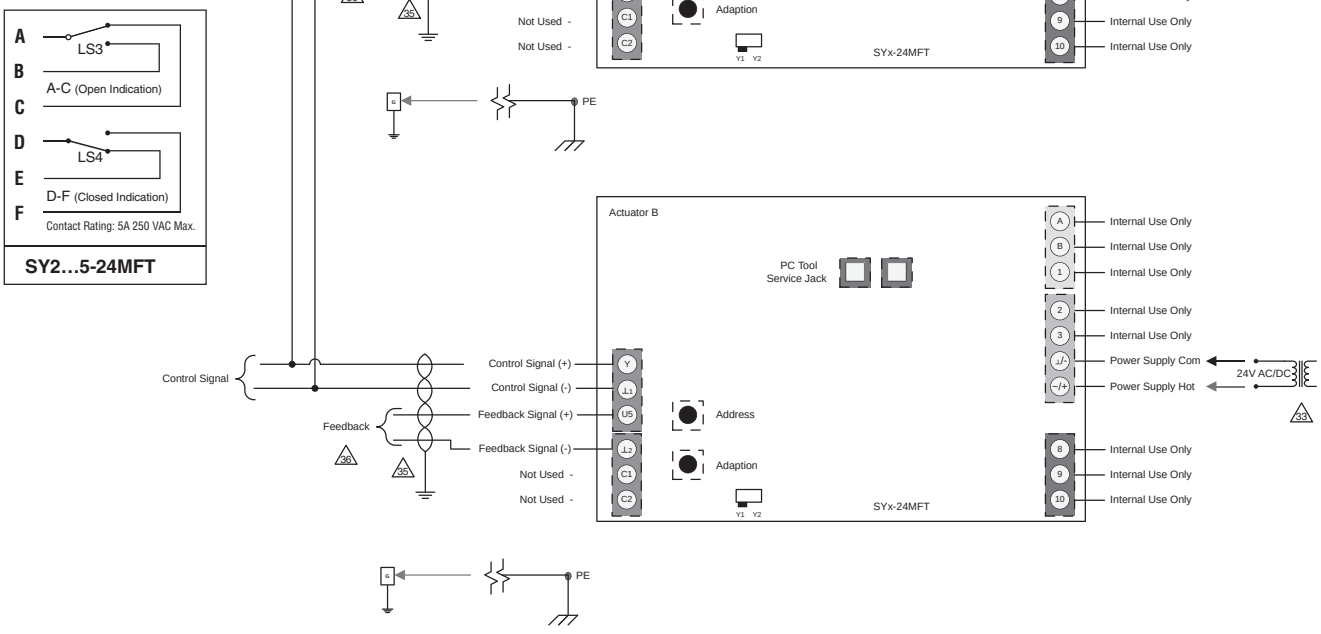
NOTES SY2...5-24MFT

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

APPLICATION NOTES

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

36 Use of feedback is optional.



W552_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.

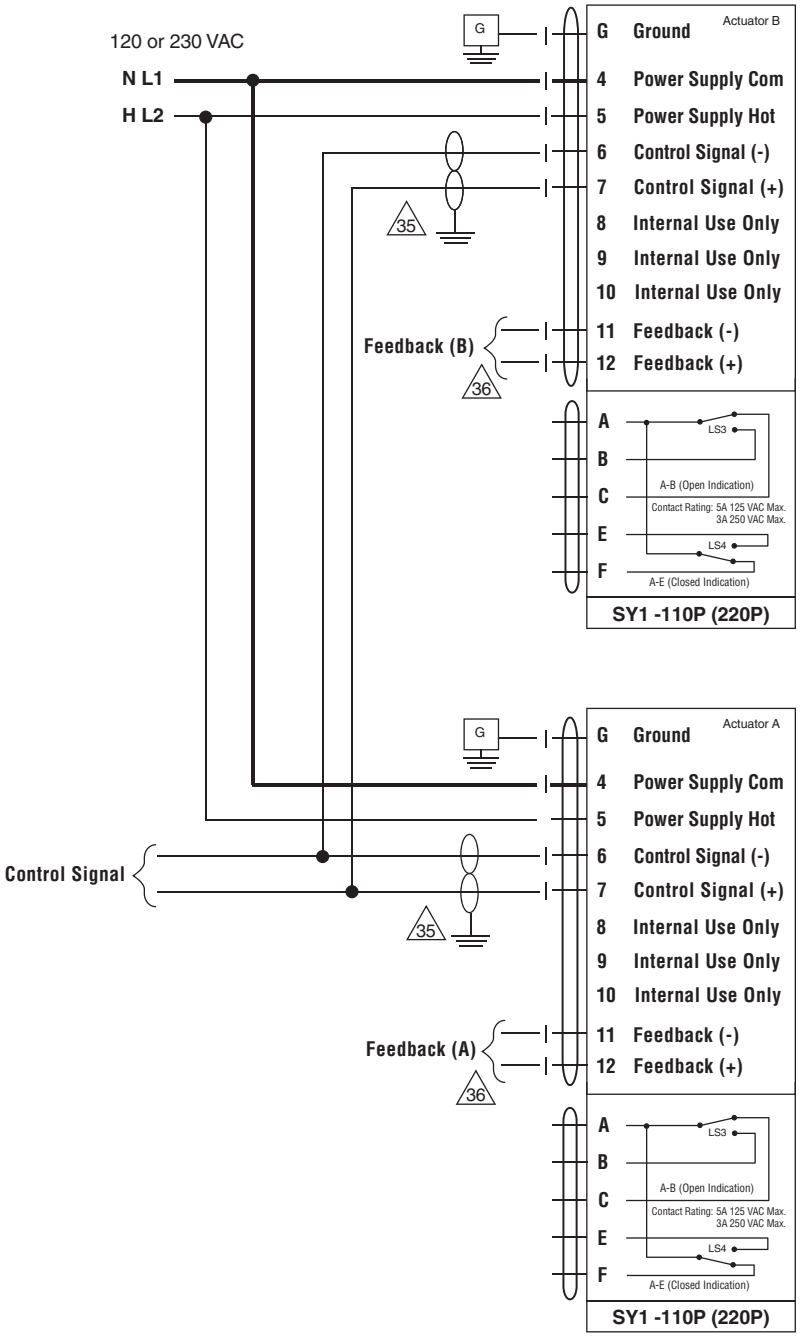
APPLICATION NOTES

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

36 Use of feedback is optional.

NOTES SY1-110P (220P)

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



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

W552..2

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

Hazard Identification

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

CAUTION

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

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

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

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

INSTALLATION NOTES

Observe class 1 and class 2 wiring restrictions.

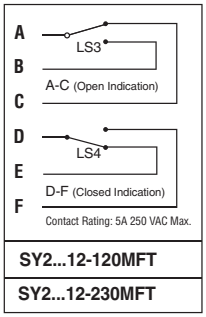
APPLICATION NOTES

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

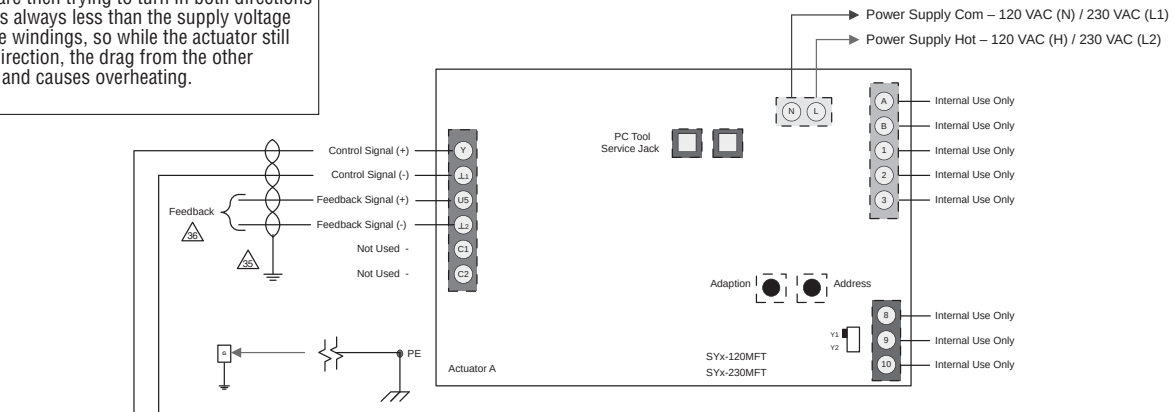
36 Use of feedback is optional.

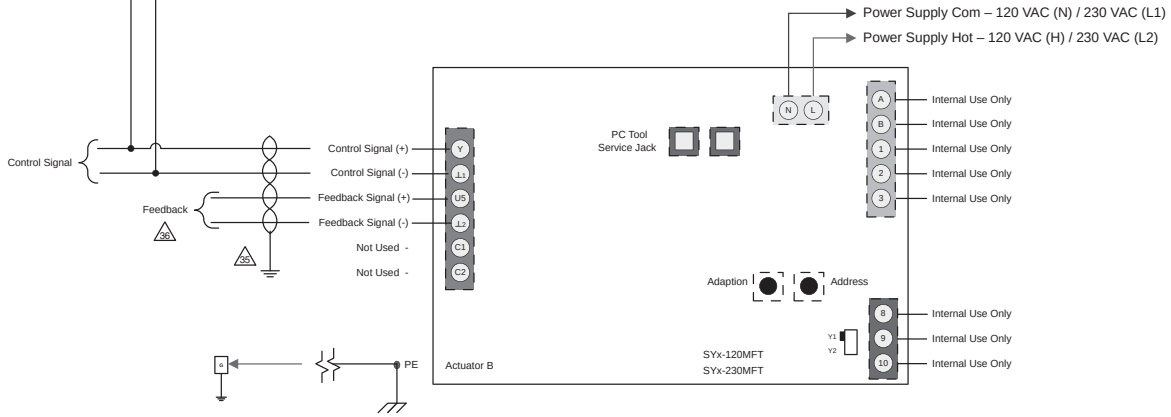
NOTES SY2...12-120MFT (230MFT)

- **Caution:** Power supply voltage.



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





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; if you treat it like a machine, it will operate like a machine…if you treat it like a piece of pipe, it may work like a piece of pipe.

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

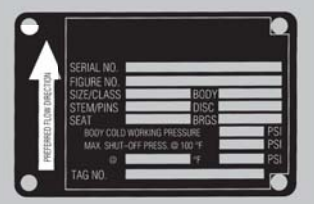
The SHP valve is designed to allow the disc edge to rotate into the open position without interference with the pipeline I.D. in the following pipe schedules:

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.

SHP series valves have a preferred flow direction.



PreferredFlowrate

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 21**
(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.

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.

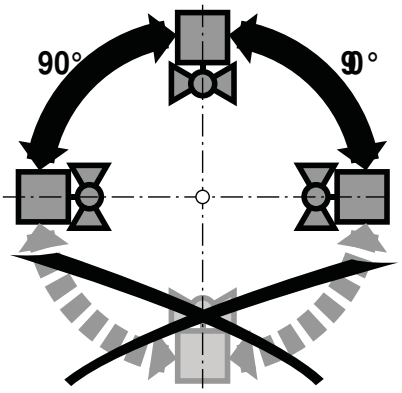
c. After inserting the flange gaskets, install the remaining bolts.

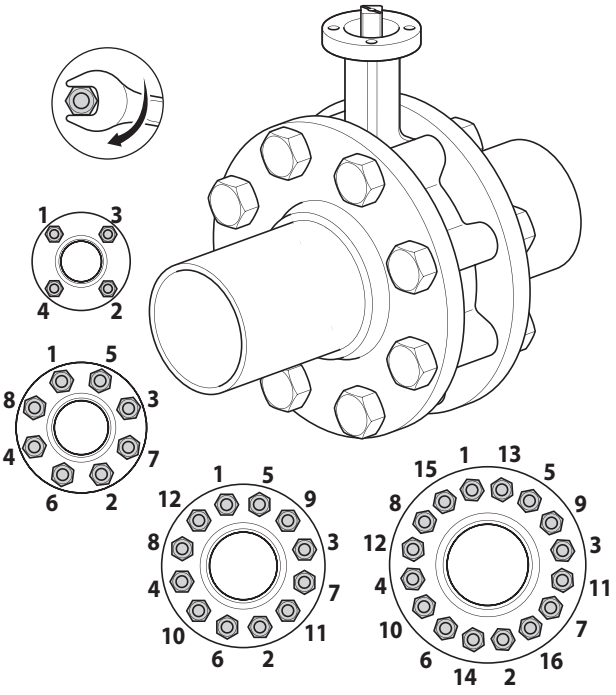
3. Using the sequence shown to the right, tighten the flange bolts evenly to assure uniform gasket compression.

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.

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



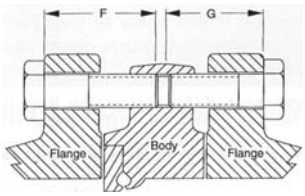


FLANGE BOLTING RECOMMENDATIONS

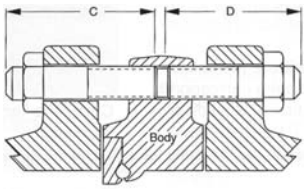
Lug Valves, 2"– 30", ANSI 125/150 Bolt Pattern

		STUDS & NUTS						MACHINE BOLTS					
Valve Size	Thread Size	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
	1-1/8-8		4**	5.50		4**	4.75		4*	4.12		4**	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
	1-1/4-8		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.

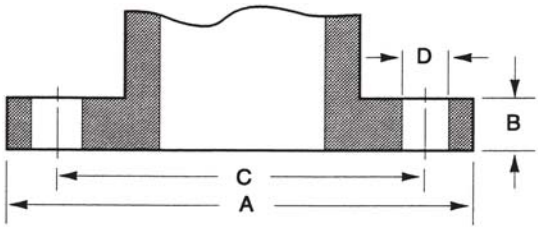
Length of machine bolts based on:
1. Gasket thickness of 0.06 inches.
2. Minimum flange thickness of weld-neck flanges per ANSI B16.5 and B16.47 Series A.

* 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

	FLANGES		DRILLING		BOLTING	
Nominal Pipe Size	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"



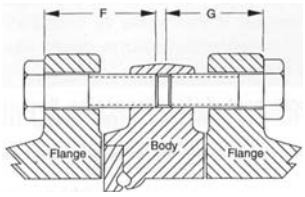
Every effort is made to provide accurate information, but no liability for claims arising from erroneous data will be accepted by Belimo.

FLANGE BOLTING RECOMMENDATIONS

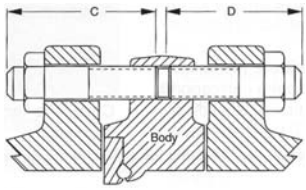
Lug Valves, 2”-24”, ANSI 250/300 Bolt Pattern

		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

LUG BODY
HEX HEAD MACHINE BOLTS



LUG BODY
STUDS and NUTS



* 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

	FLANGES		DRILLING		BOLTING	
Nominal Pipe Size	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”