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**Butterfly Valve:**  
**UFLK Series**      **Linkage Solution**  
                                  **2-way Valves**  
                                  **3-way Valves**

### Retrofit Solutions for Virtually any Valve

#### Manufacturers:

**Butterfly:** Bray, Centerline, Keystone, Flowseal and more

**Control:** On/Off, Floating, 2-10VDC  
 Multi-Function Technology®  
 Spring Return or  
 Non-Spring Return

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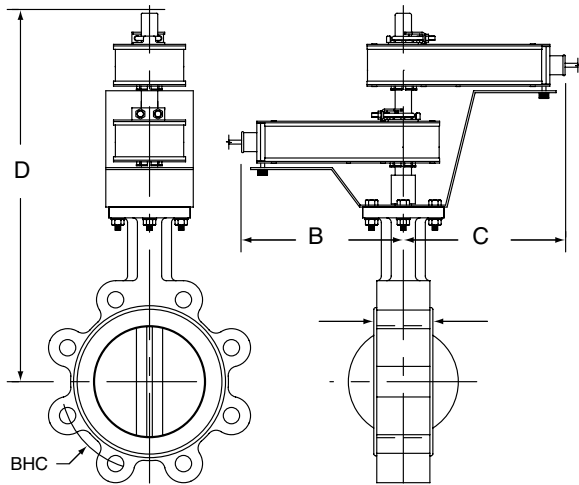


# Butterfly Valve Retrofit

Tips for choosing a butterfly valve retrofit solution

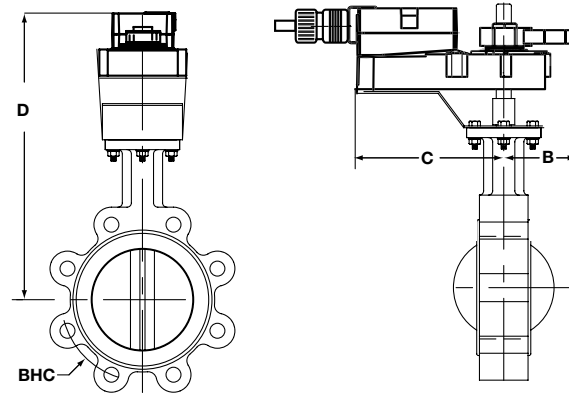


## Dimensions with 2-Way Valve



BF2WUDIM

## Dimensions with 2-Way Valve



AM\_GM\_LineRevised

### Maximum Dimensions (Inches)

Size	B	C	D(Max)	Actuator
2"	9	9	19.5	AF
2"	7	7	15	AMB(X)
2"	4.25	4.25	15.5	SY1...
2"	8	13	20.25	SY2...
2½"	9	9	20	AF
2½"	9	9	20	2*AF
2½"	7	7	15.5	AMB(X)
2½"	4.25	4.25	16	SY1...
2½"	8	13	20.75	SY2...
3"	7	7	16	AMB(X)
3"	8	8	16	GMB(X)
3"	9	9	20.5	2*AF
3"	4.25	4.25	16.25	SY1...
3"	8	13	21	SY2...
4"	8	8	17	GMB(X)
4"	9	9	21	2*AF
4"	8	8	21	2*GMB(X)
4"	8	13	21.75	SY2...
5"	8	8	17.5	GMB(X)
5"	9	9	22	2*AF
5"	8	13	22.25	SY2...
6"	8	8	22.5	GMB(X)
6"	8	13	23	SY2...
6"	8	13	22.75	SY3...
8"	8	13	24.25	SY3...
8"	12	15	29	SY4...
10"	8	13	25.5	SY3...
10"	12	15	30	SY4...
12"	8	13	27.25	SY3...
12"	12	15	32	SY4...
14"	12	15	33	SY5...
16"	12	15	34.5	SY6...
18"	14	21	39.25	SY8...
20"	14	21	41.5	SY8...
24"	14	22	53.25	SY11...
30"	14	22	57.5	SY12...

### Application Notes

1. Dimensions are approximate
2. Custom kits may be taller and varies by application needs
3. Dimension "D" allows for actuator removal without the need to remove the valve from the pipe.
4. Dual actuated valves have single actuators mounted on each valve shaft.

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## How to select a Butterfly Valve Retrofit Solution

Follow the four steps listed below when ordering a butterfly valve retrofit kit.

**Example:** Centerline C200 Series, 2½" valve, using a **Non-Spring Return** Belimo actuator.

- 1 Identify the **Valve Manufacturer, Valve Series** and **Valve Size**.
- 2 Determine the type of actuator you require: Belimo Spring Return, Non-Spring or SY Series Industrial. Belimo Spring and Non-Spring actuators are typically only available on smaller sizes.  
Look at the solution using the Non-Spring Return Belimo Actuator. Looking at the **UFLK3500**, the **GM** Series actuator will provide a **200 psi close-off** for the **2½" valve** with **Non-Spring Return** actuation.
- 3 Use the actuator listings to make your final actuator selection. Decide between **GMX24-3-X1** and **GMX24-MFT-X1**.  
**ACTUATOR NOT INCLUDED IN THE LIST PRICE OF THE LINKAGE.**

- 4 HOW TO ORDER: **Item 1 1pc UFLK3500**  
**Item 2 1pc GMX24-MFT-X1**



1 Select linkage solution based on the **Valve Number, Configuration, and Size**; select the proper **Linkage Solution** for your valve.

### EXAMPLE PAGE

#### Centerline

C200 Round Top Series Butterfly Valves  
Linkage/Actuator Selection Guide

Valve Body Model	Valve Configuration	Size	Failsafe	Close-Off psi	Belimo Actuator Series (Sold Separately)	Belimo Linkage	
C200 Round Top Series Butterfly Valves	2-way	2"	No	200	AM	UFLK3500	
			Yes	200	AF	UFLK3500	
		2½"	No	200	GM	UFLK3500	
			Yes	200	2*AF	UFLK3502	
		3"	No	200	GM	UFLK3500	
			Yes	200	2*AF	UFLK3502	
	2-way	2"	2"	No	200	SY1	UFLK3538
				Yes	200	SY2	UFLK3540
			2½"	No	200	GM	UFLK3500
				Yes	200	2*AF	UFLK3502
			3"	No	200	GM	UFLK3500
				Yes	200	2*AF	UFLK3502

### UFLK1300

Example: **Centerline C200 Series, 2½" valve** using a **non-spring return** Belimo actuation.

Choose correct linkage **UFLK3500**.

- 2 Verify close-off is suitable for application.  
Looking at the **UFLK3500**, the **GM** Series actuator will provide **200 psi close-off** for the **2½" valve**.

MODEL	Non-Spring Return Actuators					
	Control Input	Feedback	Power Supply	Running Time(s) [Default]	VA Rating	Aux. Switch
<b>BASIC PRODUCTS</b>						
GMB24-3-X1	On/Off, Floating Point	Add-on	24 VAC/DC	150 seconds	6	Add-on
GMB24-SR	2-10 VDC (4-20mA*)	2-10 VDC	24 VAC/DC	150 seconds	6.5	Add-on
<b>CUSTOMIZE IT</b>						
GMX24-3	On/Off, Floating Point	Add on	24 VAC/DC	150 seconds	7	Add-on
GMX24-SR	2-10 VDC (4-20mA*)	2-10 VDC	24 VAC/DC	150 seconds	6.5	Add-on
GMX24-PC	0-20 V Phasecut	2-10 VDC	24 VAC/DC	150 seconds	7	Add-on
GMX24-MFT-X1	Various	Various	24 VAC/DC	Various	7	Add-on
GMX24-MFT95-X1	0 to 135 Ω	2-10 VDC	24 VAC/DC	150 seconds	7	Add-on
GMX120-3	On/Off, Floating Point	Add on	100-240 VAC	150 seconds	9	Add-on

‡ For applications that require more torque the GMB Series can be dual mounted. A maximum of 2 GMB/X... Series actuators can be mechanically connected to one damper or valve shaft. The torque is 640 in-lb.  
\*With the 500 Ω resistor added.

- 3 Select actuator based on needed control type.  
Decide between **GMB24-3-X1** and **GMX24-MFT-X1**.

- 4 Complete Ordering Example:  
Item 1: **UFLK3500**  
Item 2: **GMX24-MFT-X1**

### SY Series Actuators

SERIES	MODEL	TORQUE	RUN TIME(S) 90°@60Hz	POWER SUPPLY	DUTY CYCLE	CONTROL			FEEDBACK
						PROPORTIONAL	3 POINT	ON/OFF	
SY1	SY1-110	35 Nm / 310 in-lb	12 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY1-24	35 Nm / 310 in-lb	12 seconds	24 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY1-220	35 Nm / 310 in-lb	12 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY1-110P	35 Nm / 310 in-lb	12 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY1-24P	35 Nm / 310 in-lb	12 seconds	24 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY1-220P	35 Nm / 310 in-lb	12 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA	
SY2	SY2-110	90 Nm / 801 in-lb	15 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY2-24	90 Nm / 801 in-lb	15 seconds	24 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY2-220	90 Nm / 801 in-lb	15 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY2-120MFT	90 Nm / 801 in-lb	15 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY2-24MFT	90 Nm / 801 in-lb	15 seconds	24 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY2-230MFT	90 Nm / 801 in-lb	15 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA	
SY3	SY3-110	150 Nm / 1335 in-lb	22 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY3-24	150 Nm / 1335 in-lb	22 seconds	24 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY3-220	150 Nm / 1335 in-lb	22 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY3-24MFT	150 Nm / 1335 in-lb	22 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY3-120MFT	150 Nm / 1335 in-lb	22 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY3-230MFT	150 Nm / 1335 in-lb	22 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA	
SY4	SY4-110	400 Nm / 3560 in-lb	16 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY4-24	400 Nm / 3560 in-lb	16 seconds	24 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY4-220	400 Nm / 3560 in-lb	16 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY4-24MFT	400 Nm / 3560 in-lb	16 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY4-120MFT	400 Nm / 3560 in-lb	16 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY4-230MFT	400 Nm / 3560 in-lb	16 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA	
SY5	SY5-110	500 Nm / 4450 in-lb	22 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY5-24	500 Nm / 4450 in-lb	22 seconds	24 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY5-220	500 Nm / 4450 in-lb	22 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY5-24MFT	500 Nm / 4450 in-lb	22 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY5-120MFT	500 Nm / 4450 in-lb	22 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY5-230MFT	500 Nm / 4450 in-lb	22 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA	
SY6	SY6-110	650 Nm / 5785 in-lb	28 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY6-220	650 Nm / 5785 in-lb	28 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY6-120MFT	650 Nm / 5785 in-lb	28 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY6-230MFT	650 Nm / 5785 in-lb	28 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY7	SY7-110	1000 Nm / 8900 in-lb	46 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY7-220	1000 Nm / 8900 in-lb	46 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY7-120MFT	1000 Nm / 8900 in-lb	46 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY7-230MFT	1000 Nm / 8900 in-lb	46 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY8	SY8-110	1500 Nm / 13350 in-lb	46 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY8-220	1500 Nm / 13350 in-lb	46 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY8-120MFT	1500 Nm / 13350 in-lb	46 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY8-230MFT	1500 Nm / 13350 in-lb	46 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA

Proportional actuators will accept 0-10 VDC, 2-10 VDC, or 4-20 mA control signals as standard.

All SY actuators are non-spring return, but can be used with NSV-SY back up systems for fail-safe applications.

These products carry a two year warranty when sold as part of an assembly or with a UFLK retrofit kit.

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# Butterfly Valve Retrofit Actuators

## Actuator Selection Guide



### SY Series Actuators

SERIES	MODEL	TORQUE	RUN TIME(S) 90°@60Hz	POWER SUPPLY	DUTY CYCLE	CONTROL			FEEDBACK
						PROPORTIONAL	3 POINT	ON/OFF	
SY9	SY9-110	2000 Nm / 17800 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY9-220	2000 Nm / 17800 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY9-120MFT	2000 Nm / 17800 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY9-230MFT	2000 Nm / 17800 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY10	SY10-110	2500 Nm / 22250 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY10-220	2500 Nm / 22250 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY10-120MFT	2500 Nm / 22250 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY10-230MFT	2500 Nm / 22250 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY11	SY11-110	3000 Nm / 26700 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY11-220	3000 Nm / 26700 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY11-120MFT	3000 Nm / 26700 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY11-230MFT	3000 Nm / 26700 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
SY12	SY12-110	3500 Nm / 31150 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY12-220	3500 Nm / 31150 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	30%		•	•	none, opt 1k
	SY12-120MFT	3500 Nm / 31150 in-lb	58 seconds	120 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA
	SY12-230MFT	3500 Nm / 31150 in-lb	58 seconds	230 VAC ±10%, 50/60 Hz	75%	•			2-10 VDC/4-20 mA

Proportional actuators will accept 0-10 VDC, 2-10 VDC, or 4-20 mA control signals as standard.

All SY actuators are non-spring return, but can be used with NSV-SY back up systems for fail-safe applications.

These products carry a two year warranty when sold as part of an assembly or with a UFLK retrofit kit.

### ROTARY ACTUATORS

SERIES	MODEL	Spring Return	Electronic Fail Safe	Control Input	Feedback Position	Power Supply
AF Series*	AF24 US, AFB24	•		24 VAC/DC		24 VAC/DC
	AFX24-MFT-X1	•		Variable with MFT (VDC, PWM, Floating Pt., On/Off)	variable VDC	24 VAC/DC
AM Series*	AMB24-3-X1			24 VAC/DC		24 VAC/DC
	AMX24-MFT-X1			Variable with MFT (VDC, PWM, Floating Pt., On/Off)	variable VDC	24 VAC/DC
GM Series*	GMB24-3-X1			24 VAC/DC		24 VAC/DC
	GMX24-MFT-X1			Variable with MFT (VDC, PWM, Floating Pt., On/Off)	variable VDC	24 VAC/DC
GK Series*	GKB24-3-X1		•	24 VAC/DC		24 VAC/DC
	GKX24-MFT-X1		•	Variable with MFT (VDC, PWM, Floating Pt., On/Off)	variable VDC	24 VAC/DC

\*Please consult the Damper sections for a full list of product offerings. Standard run times should be considered in the selection. All air side products are applicable for retrofit kits.

Select "X1" actuators come with a handle.

### MULTI-FUNCTION TECHNOLOGY

ROTARY ACTUATOR CODES	P-CODE		Control Input	Running Time	Built-in Feedback
	P-10001	A01	2-10 VDC	150 seconds	2-10 VDC
	P-10002	A02	0-10 VDC	150 seconds	0-10 VDC
	P-10028	A28	0-10 VDC	150 seconds	0-10 VDC
	P-10063	A63	0.5-4.5 VDC	150 seconds	0.5-4.5 VDC
	P-10064	A64	5.5-10 VDC	150 seconds	5.5-10 VDC
	P-20002	W02	0.02-5.00 seconds PWM	150 seconds	2-10 VDC
	P-20003	W03	0.10-25.5 seconds PWM	150 seconds	2-10 VDC
	P-30001	F01	Floating Pt.	150 seconds	2-10 VDC
	P-40002	J02	On/Off	150 seconds	2-10 VDC

### SY MULTI-FUNCTION TECHNOLOGY

Description	MFT-CODE	Control Input	Built-in Feedback	Loss of Signal	Running Time
MFT	ACE	2...10V	2...10V	stop	actuator(s) constant
MFT	ACF	0.5...10V	0.5...10V	stop	actuator(s) constant
MFT	ACG	4...20mA	4...20mA	stop	actuator(s) constant
MFT	ACH	4...20mA	2...10V	stop	actuator(s) constant
MFT	ACJ	2...10V	2...10V	open	actuator(s) constant
MFT	ACK	0.5...10V	0.5...10V	open	actuator(s) constant
MFT	ACL	4...20mA	4...20mA	open	actuator(s) constant
MFT	ACM	4...20mA	2...10V	open	actuator(s) constant
MFT	ACN	2...10V	2...10V	close	actuator(s) constant
MFT	ACP	0.5...10V	0.5...10V	close	actuator(s) constant
MFT	ACR	4...20mA	4...20mA	close	actuator(s) constant
MFT	ACS	4...20mA	2...10V	close	actuator(s) constant

All other configurations carry a \$34.00 list price.

Standard delivery may vary, please consult your customer service representative for the latest lead time(s).

800-543-9038 USA

866-805-7089 CANADA

203-791-8396 LATIN AMERICA

Valve Body Model	Valve Configuration	Size	Failsafe	Close-Off psi	Belimo Actuator Series (Sold Separately)	Belimo Linkage
30/31 Series Butterfly Valves	2-way	2"	No	175	AM	UFLK1100
					SY1	UFLK1130
					SY2	UFLK1132
			Yes	175	2*AF	UFLK1102
		2½"	No		GM	UFLK1100
					SY1	UFLK1130
				SY2	UFLK1132	
			Yes	175	2*AF	UFLK1102
		3"	No		GK	UFLK1100
					2*GM	UFLK1102
				SY2	UFLK1132	
			Yes	175	2*GK	UFLK1102
		4"	No		2*GM	UFLK1108
					SY2	UFLK1134
			Yes	175	2*GK	UFLK1108
		5"	No		SY3	UFLK1136
			6"	No	175	SY3
		8"		No	175	SY4
			10"	No	175	SY4
		12"		No	175	SY6
	14"		No	175	SY7	UFLK1144
		16"	No	175	SY8	UFLK1144
	18"		No	175	SY9	UFLK1146
		20"	No	175	SY10	UFLK1146
	3-way		2"	No	200	SY1
				SY2		UFLK4132
		Yes		2*AF		UFLK4102
		2½"		No		200
				SY2	UFLK4132	
			Yes	200	2*GK	UFLK4102
3"		No	200		2*GM	UFLK4102
				SY2	UFLK4132	
		Yes	200	2*GK	UFLK4102	
4"		No		200	SY3	UFLK4134
		5"	No		200	SY4
6"			No	200		SY4
		8"	No		200	SY5
10"			No	200		SY6
		12"	No		200	SY7
14"			No	150		SY8
		16"	No		150	SY9
18"			No	150		SY11
		20"	No		150	SY12

All close-off pressures listed are approximate and based on valve condition and application.

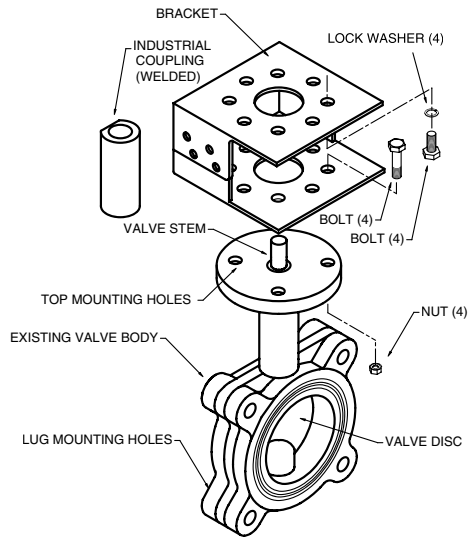


Valve Body Model	Valve Configuration	Size	Failsafe	Close-Off psi	Belimo Actuator Series (Sold Separately)	Belimo Linkage	
40/41 Series Butterfly Valves	2-way	2½"	No	285	2*GM	UFLK1200	
			Yes	285	2*GK	UFLK1224	
		3"	No	285	2*GM	UFLK1200	
			Yes	285	2*GK	UFLK1224	
		4"	No	285	2*GM	UFLK1200	
			Yes	285	2*GK	UFLK1200	
		5"	No	285	SY3	UFLK1226	
		6"	No	285	SY4	UFLK1228	
		8"	No	285	SY4	UFLK1230	
		10"	No	285	SY6	UFLK1232	
		12"	No	285	SY7	UFLK1234	
		14"	No	285	SY8	UFLK1236	
		16"	No	285	SY9	UFLK1238	
		18"	No	285	SY11	UFLK1240	
		20"	No	285	SY12	UFLK1242	
		3-way	2½"	No	285	2*GM	UFLK4200
				Yes	285	2*GK	UFLK4222
			3"	No	285	2*GM	UFLK4200
	Yes			285	2*GK	UFLK4200	
	4"		No	285	SY3	UFLK4222	
	5"		No	285	SY4	UFLK4224	
	6"		No	285	SY4	UFLK4224	
	8"		No	285	SY5	UFLK4226	
	10"		No	285	SY7	UFLK4228	
	12"		No	285	SY8	UFLK4230	
	14"		No	285	SY10	UFLK4232	
	16"		No	285	SY12	UFLK4234	

All close-off pressures listed are approximate and based on valve condition and application.

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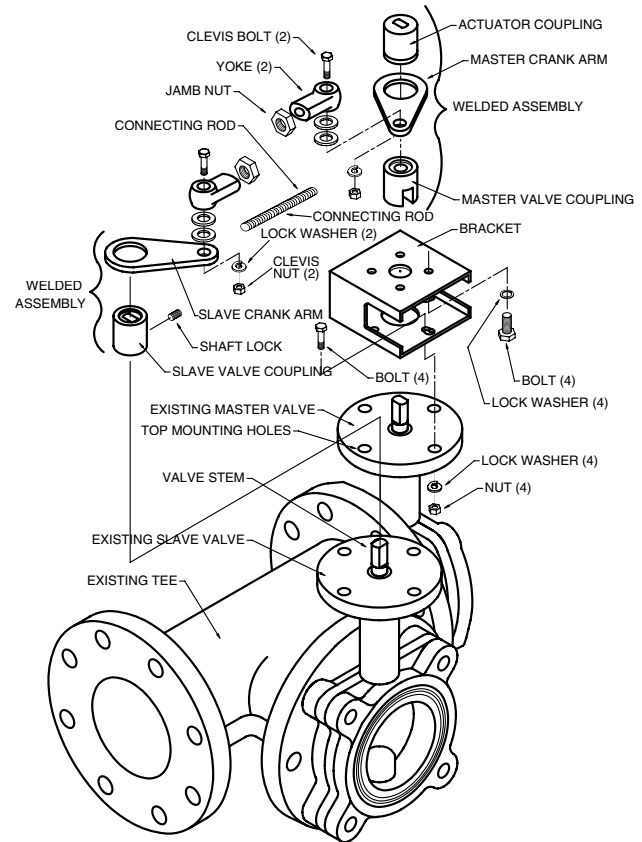
**Industrial Electric 2-way  
Generic – Must complete BFV Retrofit Form**



**UFSP0020  
UFSP0022**

**SY1 - SY8  
SY9 - SY12**

**Industrial Electric 3-way  
Generic – Must complete BFV Retrofit Form**



**UFSP0024  
UFSP0026**

**SY1 - SY8  
SY9 - SY12**

**NOTE: 3-way bracket configuration shown is only one of many possible arrangements.**

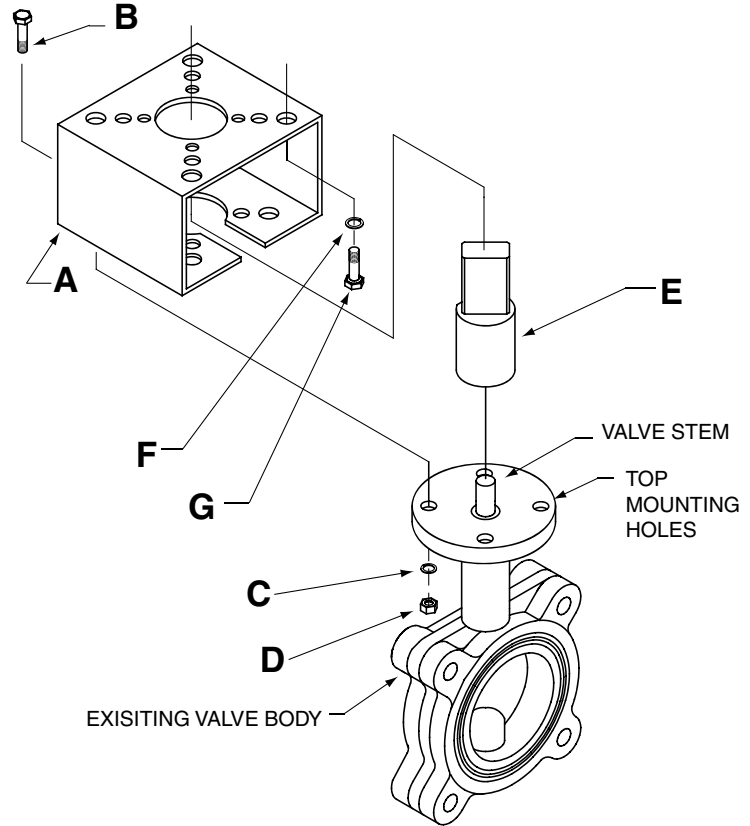
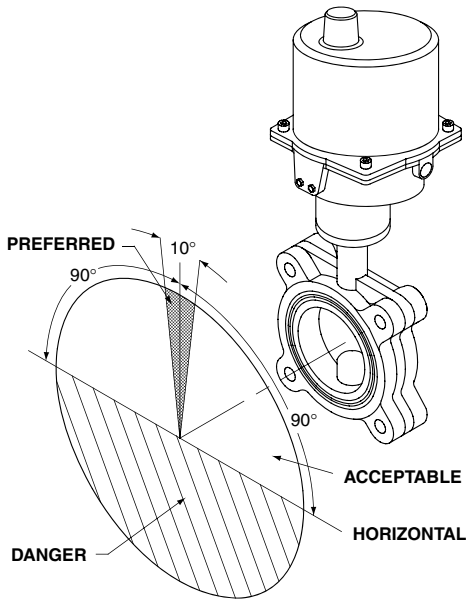
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**Assembly Procedure for SY...Retrofit Solution**

**Retrofit Requirement:**

The initial step is to determine if your application can accept a retrofit solution. As shown below (Fig. 1), the valve stem must not be located below the horizontal plane. If this condition exists, the SY actuator could not be used in this situation. A Belimo technical support person is available to help determine what solution best fits your application. A typical solution is shown in Fig. 2.



**Assembly Procedure (Mechanical)**

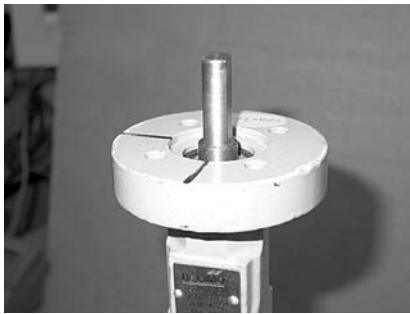


**Step 1)** The valve must be stripped down to its basic form. Remove all other linkage components before starting the assembly sequence below. The linkage components have been designed to attach to the existing valve flange rather than to any existing hardware.



**Step 2)** The valve has either flats, a key slot, holes or a mark indicating the position of the disc with respect to the shaft. Usually, the flats, keys, holes and marks are PARALLEL to the valve disc. The photo at left shows the flattened shaft in the CLOSED position.

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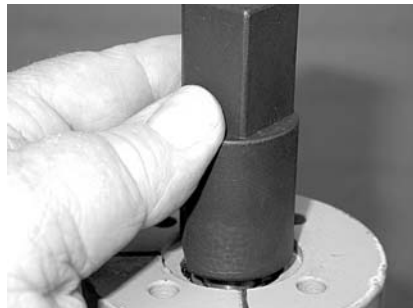


**Step 3)** The valve MUST be in the OPEN position before starting the retrofit process. The photo at the left shows the shaft flats are PARALLEL to the piping, but the disc is PARALLEL to the flats, thereby indicating the valve

disc is in the fully OPEN position. You MUST verify the disc is fully OPEN before proceeding.

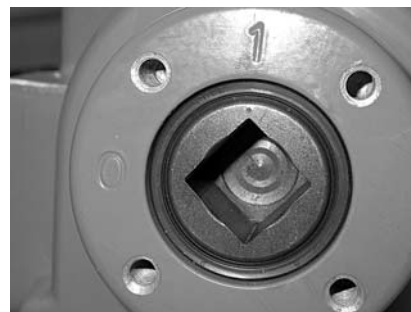


**Step 7)** The SY actuator is shipped in the OPEN position. Make sure the actuator is in the OPEN position before attaching to the valve/coupling assembly. The SY actuator turns counter clockwise (CCW) to the OPEN position, when viewed from ABOVE the actuator.

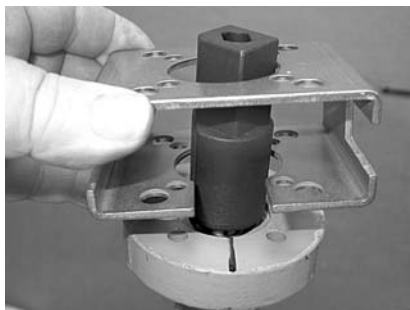


**Step 4)** Place the coupling (E) over the valve stem. It can be assembled in two different positions 180 degrees apart, but either position is OK. It would be helpful at this time to make a mark on the coupling and on the valve body so you

can easily reference the position of the valve after the actuator is attached.



**Step 8)** Verify that the SY actuator is in the OPEN position also by looking at the bottom of the actuator. There is a dimple mark punched in the output shaft which will align with the "1" mark when the actuator is in the OPEN position.



**Step 5)** Install the actuator mounting bracket (A) onto the valve top works flange as shown.



actuator with the square drive or keys in the coupling (C). The SY actuator will slide completely over the drive square and will rest ON the mounting bracket (A).



**Step 6)** Insert the four mounting bolts (B), lockwashers (C), and the hex nuts (D). Do NOT tighten at this time.



**Step 10)** Attach the hand knob to the hand wheel as shown below (if not already completed).



**Step 11)** Tighten the jam nut to prevent the hand knob from becoming loose.



**Step 12)** Insert the four hex bolts (G) and lock washers (F) through the bracket and into the bottom of the SY actuator as shown. Do NOT tighten until all four sets have been installed. Slight twisting of the entire SY actuator will facilitate alignment of the bolts.



**Step 13)** After all four have been inserted, tighten accordingly.



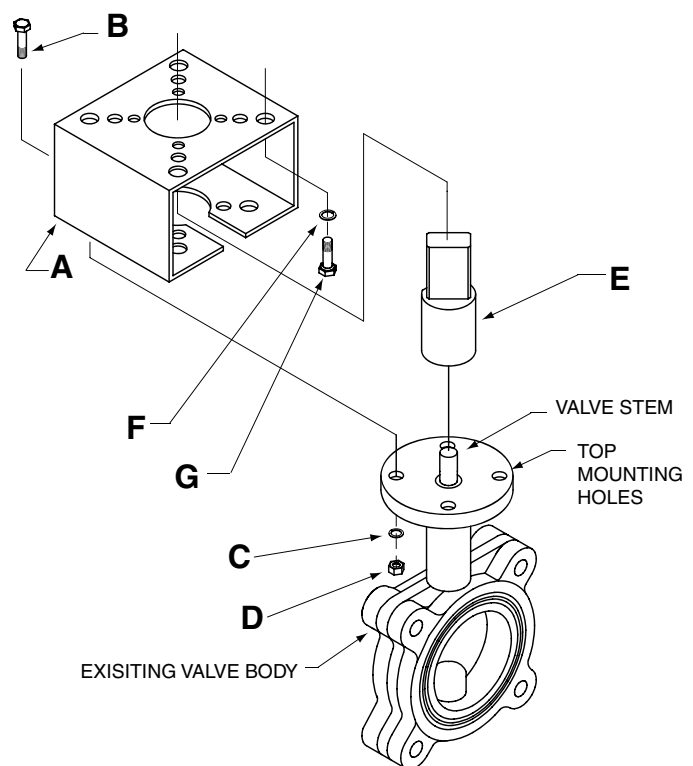
**Step 14)** Now tighten the four bracket bolts (B, C, D) assembled previously in step 6 .



**Step 15)** When mechanical assembly is complete, the SY actuator and valve body should be oriented as shown below. The actuator is in the OPEN position, and the valve disc is fully OPEN. All bolts are tight, and electrical checkout is now possible.

**Application Note:**

The hand wheel on the SY actuator is engaged at all times but does not rotate when the actuator is running. It is possible at anytime to turn the hand wheel by simply rotating it CW or CCW. The hand wheel does NOT need to be pulled or pushed into the actuator to make it operational. However, it should be noted that if a control signal and power is present at the actuator when the hand wheel is turned, the actuator will return to its controlled position. If it is desired to have the actuator maintain its position after turning the hand wheel, it will be necessary to remove power from the actuator, either at the source or by use of an optional SY-HOA local switch.



**Assembly Procedure (Electrical), On/Off Models**



**WARNING**

Hazard identification warnings appear at appropriate sections throughout this manual. Read these carefully.



**Step 1)** Remove the four hex bolts securing the cover to the base casting.

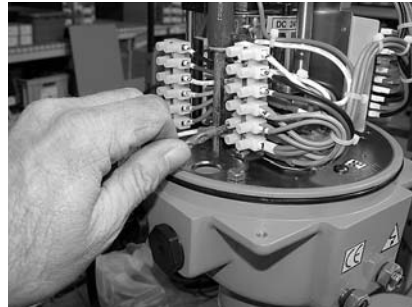


**Step 6)** Apply proper voltage to terminals 1 (Neutral) & 7 (Hot). Apply proper actuator voltage to terminals 1 (Neutral) & 4 (Hot) to drive the actuator CLOSED until the end-of-travel cam STOPS the actuator movement.

**7.** Visually check the position of the valve to make sure it reaches its full CLOSED position.



**Step 2)** Remove cover from the SY actuator. A flat blade screwdriver inserted carefully into the provided slot (as shown) will facilitate removal of the cover.



**Step 8)** Apply proper voltage to terminals 1 (Neutral) & 7 (Hot). Apply proper actuator voltage to terminals 1 (Neutral) & 3 (Hot) to drive the actuator OPEN until the end-of-travel cam STOPS the actuator movement.

**Step 9)** Visually check the position of the valve disc to make sure it reaches its full OPEN position.

**Step 10)** If the valve functions properly, mechanical assembly and electrical checkout are complete.

**Step 3)** Conduit entries into the SY actuator must be selected for their operating location (indoors protected, indoors wash down, outdoors, etc). Be sure to follow standard NEC guidelines when selecting conduit and connector types.

**Step 4)** Follow the wire sizing chart in the Installation Operation Manual (IOM) (Belimo p/n 71150-00001.C page 10) to make sure you use the correctly size wire when connecting the SY to your power source. Failure to follow the recommendations in the table could cause actuator failure or nuisance tripping.

**Step 5)** Follow the wiring diagrams in the IOM pages 18 (single) & 23 (multiple) for proper power and control wiring to the SY actuator. Make note of the following:

- a. Do NOT connect multiple actuators in parallel without isolation relays.
- b. Be sure "Hot" is connected to terminal #7 to enable the heater circuit, and "Neutral" is connected to terminal #1.



**WARNING**

**FACTORY NOTE:**

The SY actuators have been calibrated at the factory before shipping to you for use in this retrofit kit. The SY actuator calibration will suffice 99% of the time for your application. Improper calibration to the actuator may void your warranty. If you have any questions, please contact a Belimo technical support representative at 800-543-9038 for assistance.

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# SY... Series Butterfly Valve Retrofit Solution

Retrofitting 2-way Valves with Belimo SY Proportional Non-Spring Return Actuator



## Assembly Procedure (Electrical), Proportional Models

### Hazard Identification

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



**Step 1)** Remove the four hex bolts securing the cover to the base casting.

**Step 6)** Connect the proper electrical power and control wiring per the wiring diagrams located on pages 14-37.

**Step 7)** Check the operation of the actuator by commanding the control system to generate control signals matching the needs of the job to run the valve from fully CLOSED to fully OPEN, as well as a MID-POINT position. The indicator on the top of the SY actuator will be an indicator as to the position of the actuator, and therefore, the valve position.

**Step 8)** If the valve functions properly, mechanical assembly and electrical checkout are complete.



**Step 2)** Remove cover from the SY actuator. A flat blade screwdriver inserted carefully into the provided slot (as shown) will facilitate removal of the cover.

### WARNING

#### **FACTORY NOTE:**

The SY actuators have been calibrated at the factory before shipping to you for use in this retrofit kit. The SY actuator calibration will suffice 99% of the time for your application. Improper calibration to the actuator may void your warranty. If you have any questions, please contact a Belimo technical support representative at 800-543-9038 for assistance.

**Step 3)** Conduit entries into the SY actuator must be selected for their operating location (indoors protected, indoors wash down, outdoors, etc). Be sure to follow standard NEC guidelines when selecting conduit and connector types.

**Step 4)** Follow the wire sizing chart in the Installation Operation manual (IOM) (Belimo p/n 70103-00001D page 17) to make sure you use the correct size wire when connecting the SY to your power source. Failure to follow the recommendations in the table could cause actuator failure or nuisance tripping.

**Step 5)** Follow the wiring diagrams in the IOM pages 14 through 37 for proper power and control wiring to the SY actuator.

Note: All SY1-P and SY2..12-MFT actuators are factory pre-set with the proper customer requested control programming.

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