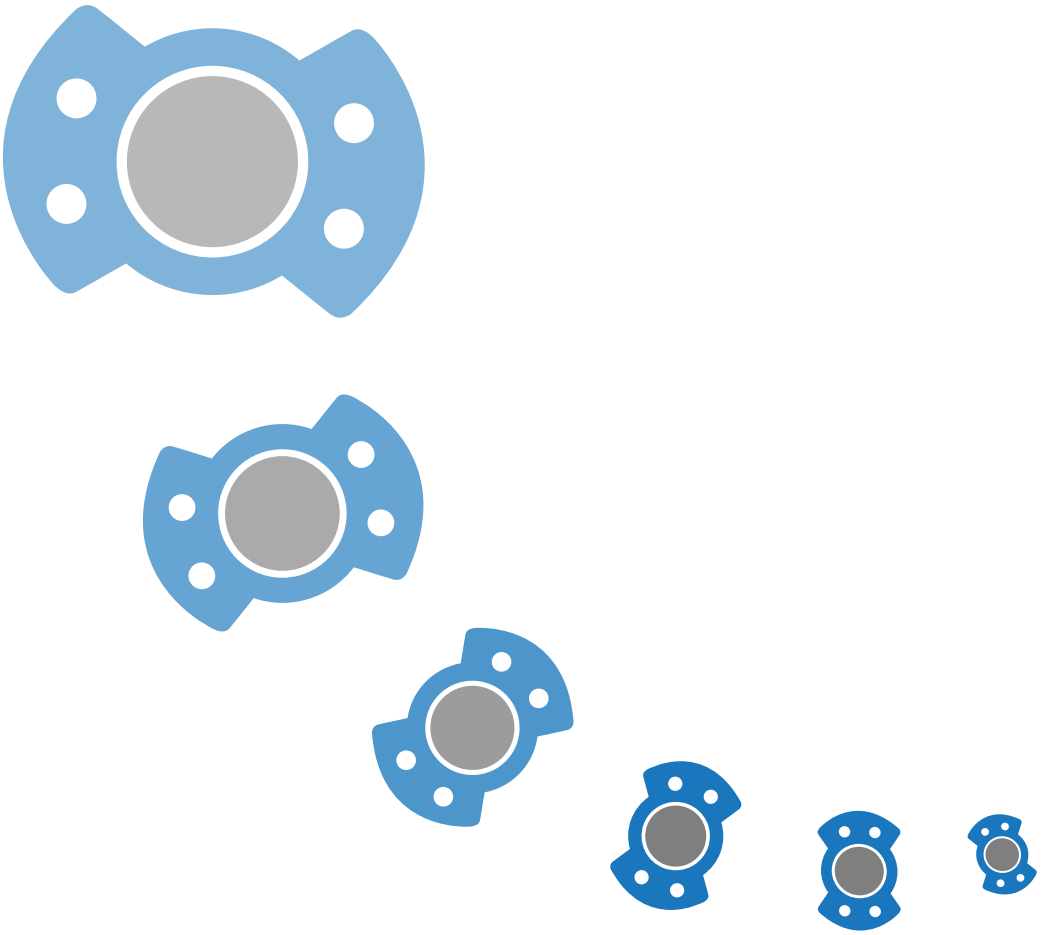
D6 Butterfly Valves

Technical Databook

Ver. 2



Belimo Actuators Ltd.

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Butterfly valves and rotary actuators for Open/Close or modulating control

Nylon coated disc (D(U)6..series)

Key features

Rated pressure: 1600kPa

Other technical data see page 4...6

k_v [m³/h]			80	170	290	560	870	1340	2690	5540	7540	10300	14300	18900	24200
DN [mm]			50	65	80	100	125	150	200	250	300	350	400	450	500
Type	Wafer	D(U)6..	DU650	DU665	DU680	DU6100	DU6125	DU6150	DU6200	DU6250	DU6300	D6350	D6400	D6450	D6500
	Lug	D(U)6..L	DU650L	DU665L	DU680L	DU6100L	DU6125L	DU6150L	DU6200L	DU6250L	DU6300L	D6350L	D6400L	D6450L	D6500L
With Open/Close actuator		IP54	NRVU24(-S) NRVU230(-S) AF24(-S) AF230(-S)		SRVU.. AF..	SRVU.. GRVU.. AF..	GRVU..	GRVU.. 2xGRVU..	2xGRVU..						
		IP67	SY1-24-3-T SY1-230-3-T				SY2..	SY2..	SY2.. SY3..	SY3.. SY4..	SY4..	SY6..	SY7.. SY8..	SY8..	SY9..
With modulating actuator		IP54	NRVU24-SR AF24-SR		SRVU.. AF..	SRVU.. GRVU.. AF..	GRVU..	GRVU.. 2xGRVU..	2xGRVU..						
		IP67	SY1U24-SR-T SY1U230-SR-T				SY2..	SY2..	SY2.. SY3..	SY3.. SY4..	SY4..	SY6..	SY7.. SY8..	SY8..	SY9..

Stainless steel disc (D(U)6..S series) could be available on request.

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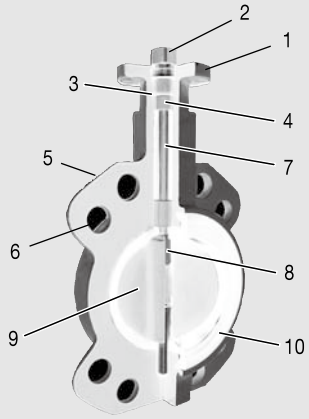
Subject to technical changes.

Belimo D(U)6.. series Butterfly valves are designed to meet the stringent needs of HVAC and commercial applications requiring positive shut-off for liquids.

Valve design features

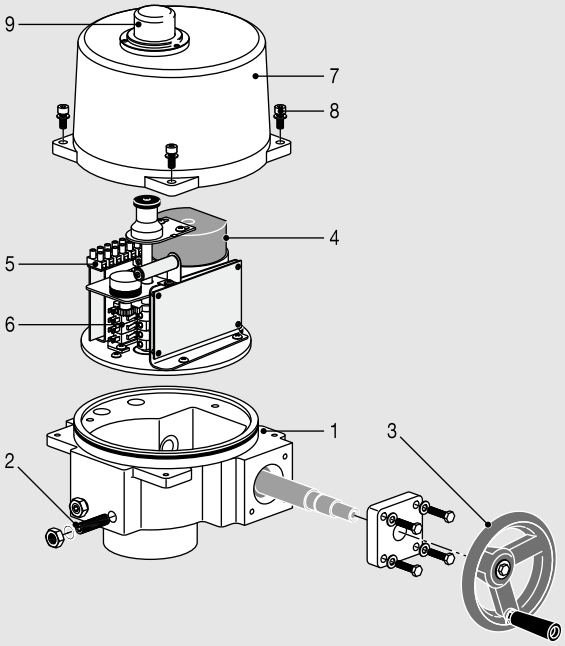


1. Mounting flange according to ISO 5211.
2. Square stem head for form-fit attachment of the rotary actuator.
3. Stem with EPDM O-ring seal.
4. RPTFE stem bearing.
5. Valve body made of cast iron (DN50...300), spheroidal ductile iron (DN350...500).
6. Hole pattern for PN 6/10/16 (wafer type), PN16 (lug type).
7. Stem made of stainless steel 416.
8. Double-D-fit attachment of the stem to the throttling element.
9. Throttling element made of spheroidal ductile iron nylon coated or stainless steel 316 (on request).
10. EPDM seat lining, integrated flange sealing.

- Double-D-fit of valve stem connecting with the valve disc produces close tolerance, easy disassembly. The disc can be self-adjusting to centralize due to this unique design. (DN50...300)
- The integrated flange sealing ensures positive connection of the valve body, seat and disc, and provides complete isolation of the media from the body.It makes field replacement simple and fast, can seal with socket welding or welding neck flanges and without additional gaskets.
- The ball profile style seat eliminates elastomer movement and reduces seat tearing or fatiguing due to bunching.
- Double seals prevent media coming into the valve. The primary seal is achieved by an interference fit of the molded seat flat with the disc hub. The secondary seal is created when the stem diameter is greater than the seat stem hole.
- The disc casting is precision machined, hand polished then coated with nylon layer which gives a smooth and close disc-to-seat relationship.
- The three non-corrosive RPTFE (Reinforced Poly Tetra Fluoro Ethylene) bushings completely isolate the valve shaft from the body, resulting in increased control of the valve disc, lower valve seating torque and longer valve life.
- The nylon coated disc features a very good corrosion resistance - superior resistance to a broad range of chemical environments, as well as very low coefficient of friction and excellent resistance to impact and ultra-violet radiation. The stainless steel 316 disc(on request) is rust proof, and can with stand higher temperature than nylon coated disc.

Additionally to satisfy higher IP requirement and large size butterfly automation, Belimo offers SY.. series rotary actuators being designed to mate with the D(U)6.. series Butterfly valves and other quarter turn valve applications.

SY.. actuator design features



1. Gearbox with hardened planetary gear.
2. Two adjusting stop screws for limiting of manual rotation angle.
3. Handwheel that acts directly on the planetary gear.
4. Motor protected by a thermostat.
5. Terminals.
6. Limit switches and two auxiliary switches.
7. Housing made of cast aluminum (IP67).
8. 4 x M5 hexagonal screws for cover of housing.
9. Sight glass for position indicator (rotary cylinder).

- The patented gear drive mechanism provides efficient, smooth operation while allowing easy manual override at any time.
- With IP67 rating, easily visible position indicator, international standard ISO 5211 mounting system, internal thermal motor overload protection, heater, dual auxiliary Form C switches, and easily accessible wiring termination points.
- The units are easily visible in mechanical rooms with their characteristic Belimo orange color. Wiring diagrams included in all printed documentation, are also affixed to the outside of the housing on the permanently attached product label.
- The torque ranges are available from 35 to 3500 Nm.

Actuators designed for D(U)6 valves

Belimo AF.., NRVU.., SRVU.. and GRVU.. series rotary actuators use the best possible electric motors and gearings and also employ highly sophisticated electronics for the control. The universal product design makes installation, operation and service so much easier.

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Kv Value [m³/h]

Type	Size		90°	80°	70°	60°	50°	40°	30°	20°	10°
DU650/L	DN50	2"	80	75	57	39	27	21	16	6.9	1.09
DU665/L	DN65	2.5"	170	142	99	64	42	30	19	7.5	5.2
DU680/L	DN80	3"	290	278	205	139	87	51	34	21	7.7
DU6100/L	DN100	4"	560	404	270	137	105	67	46	26	6.3
DU6125/L	DN125	5"	870	744	502	306	186	113	60	33	15.6
DU6150/L	DN150	6"	1340	1185	720	472	294	171	94	47	25.9
DU6200/L	DN200	8"	2690	2360	1483	956	617	362	211	88	52.0
DU6250/L	DN250	10"	5540	3948	2364	1502	911	588	334	193	84.5
DU6300/L	DN300	12"	7540	6147	3607	2083	1229	706	401	164	4.13
DU6350/L	DN350	14"	10300	9348	6233	3938	2380	1335	616	291	5.2
DU6400/L	DN400	16"	14300	12856	8571	5416	3237	1836	847	400	6.9
DU6450/L	DN450	18"	18900	17028	11352	7172	4334	2433	1122	530	9.5
DU6500/L	DN500	20"	24200	21893	14596	9222	5573	3128	1443	682	12

The maximum velocity in the butterfly valve is 9m/s (for Open/Close control)

Closing Pressure ΔPs and linkage — D(U)6../L nylon coated disc series

Type	IP54 Actuator								IP67 Actuator							
	NRVU.. [10Nm]	AF.. [15Nm]		SRVU.. [20Nm]	GRVU.. [40Nm]		2XGRVU.. [72Nm]		SY1.. [35Nm]	SY2.. [90Nm]	SY3.. [150Nm]	SY4.. [400Nm]	SY6.. [650Nm]	SY7.. [1000Nm]	SY8.. [1500Nm]	SY9.. [2000Nm]
	ΔPs kPa	ΔPs kPa	Linkage WD6..	ΔPs kPa	ΔPs kPa	Linkage WD6..	ΔPs kPa	Linkage WD6..	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa
DU650/L	1200	1200	-AF	-	-	-	-	-	1200	-	-	-	-	-	-	-
DU665/L	1200	1200	-AF	-	-	-	-	-	1200	-	-	-	-	-	-	-
DU680/L	-	1200	-AF	1200	-	-	-	-	1200	-	-	-	-	-	-	-
DU6100/L	-	400	-AF	600	1200	-GR	-	-	600[1]	-	-	-	-	-	-	-
DU6125/L	-	-	-	-	1200	-GR	-	-	-	1200	-	-	-	-	-	-
DU6150/L	-	-	-	-	400	-GR	1200	-2GR	-	1200	-	-	-	-	-	-
DU6200/L	-	-	-	-	-	-	600	-2GR	-	600	1200	-	-	-	-	-
DU6250/L	-	-	-	-	-	-	-	-	-	-	600	1200	-	-	-	-
DU6300/L	-	-	-	-	-	-	-	-	-	-	-	1200	-	-	-	-
D6350/L	-	-	-	-	-	-	-	-	-	-	-	-	1200	-	-	-
D6400/L	-	-	-	-	-	-	-	-	-	-	-	-	-	600	1200	-
D6450/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200	-
D6500/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200

Closing Pressure ΔPs and linkage —D(U)6../S stainless steel disc series(on request)

Type	IP54 Actuator								IP67 Actuator						
	NRVU.. [10Nm]	AF.. [15Nm]		SRVU.. [20Nm]	GRVU.. [40Nm]		2XGRVU.. [72Nm]		SY1.. [35Nm]	SY2.. [90Nm]	SY3.. [150Nm]	SY4.. [400Nm]	SY6.. [650Nm]	SY8.. [1500Nm]	SY9.. [2000Nm]
	ΔPs kPa	ΔPs kPa	Linkage WD6..	ΔPs kPa	ΔPs kPa	Linkage WD6..	ΔPs kPa	Linkage WD6..	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa
DU650..S	1200	1200	-AF	-	-	-	-	-	1200	-	-	-	-	-	-
DU665..S	1200	1200	-AF	-	-	-	-	-	1200	-	-	-	-	-	-
DU680..S	-	1200	-AF	1200	-	-	-	-	1200	-	-	-	-	-	-
DU6100..S	-	400	-AF	600	1200	-GR	-	-	600[1]	-	-	-	-	-	-
DU6125..S	-	-	-	-	600	-GR	1200	-2GR	-	1200	-	-	-	-	-
DU6150..S	-	-	-		-	-	1200	-2GR	-	1200	-	-	-	-	-
DU6200..S	-	-	-	-	-	-	400	-2GR	-	600	1200	-	-	-	-
DU6250..S	-	-	-	-	-	-	-	-	-	-	400	1200	-	-	-
DU6300..S	-	-	-	-	-	-	-	-	-	-	-	1200	-	-	-
D6350..S	-	-	-	-	-	-	-	-	-	-	-	-	1200	-	-
D6400..S	-	-	-	-	-	-	-	-	-	-	-	-	-	1200	-
D6450..S	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
D6500..S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000

1) For 1200 kPa application, contact Belimo sales representative.

Subject to technical changes.

2-way Butterfly valves flanged
DN50...500

For 2-point or modulating control of cold and hot water.

Applications

Typical applications include chiller isolation,cooling tower isolation, change-over systems, large air handling coil control, bypass and process control.

Technical data

Flow media	Chilled and hot water, sea water
Temperature of medium	- 20°C... + 100°C
Rated pressure	1600 kPa (PN16)
Flow characteristic	Modified equal-percentage
Rangeability	10:1 (for 30° to 70° range)
Leakage rate	Bubble tight (to DIN 3230)
Pipe connections	Flange ISO 7005-2 PN6/10/16 for wafer and PN 16 for lug
Closing pressure	See page 4
Mounting position	Vertical to horizontal
Maintenance	Maintenance-free
Angle of rotation	90° rotation
Materials	
Valve body	Cast iron GG25(DN50...300) / Ductile iron GGG40 (DN350...500)
Disc	Nylon coated ductile iron / Stainless steel 316 disc (on request)
Seat	EPDMboot seat
Shaft	416 Stainless steel
Bushing	RPTFE

Ordering example

DU6 125 L / GRVU230

Actuator:	GRVU230 actuators, open/close, 100...240V AC
Package*:	"/" Valve and actuator supplied separately (actuator pre-assembled on request)
Disc & flange pattern:	L - Lug, Nylon coated disc default - Wafer, Nylon coated disc
Size:	DN125
Butterfly valve	DU6 Low torque series D6 General torque series

* For linkage please refer to page 4.

Mode of operation

The Butterfly valve is operated by a rotary actuator. Both spring return or non-spring return actuators are available. Select the actuator according to required close-off pressure and environmental condition of installation. The actuators are controlled by a standard Open/Close or modulating control system and move the disc of the valve to the position dictated by the control signal.

Product features

The large Kv values provide an economical control valve solution for larger flow applications.

Manual operation

Turn the valve by using a 20mm wrench with the manual button of NRVU.., SRVU.. or GRVU.. actuator pressed. The valve matched with SY actuator can be operated by turnning the wheel of SY2...9.. or via an 8mm wrench (SY1..).

Subject to technical changes.

Dimensions of Butterfly valves

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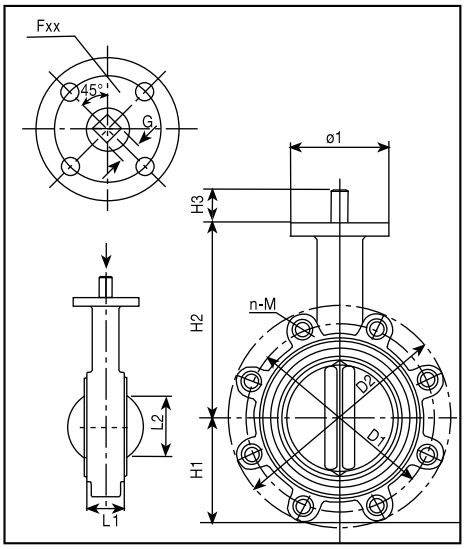
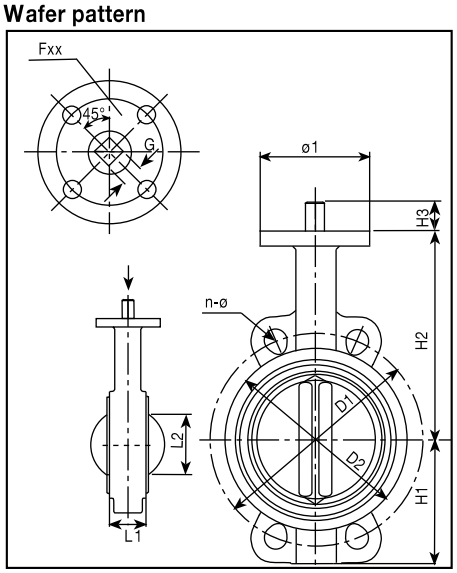
Lug pattern



Wafer pattern



Dimensions for PN16 lug pattern Butterfly valve

Type	Size DN [mm]	Top flange Fxx	D1	D2	L1	L2	H1	H2	H3	G	ø1	n-M	Weight (Kg)
DU650L	50	F05	125	155	43	33	70	134	13	14	65	4-M16	3.2
DU665L	65	F05	145	175	46	48	76	147	13	14	65	4-M16	3.8
DU680L	80	F05	160	190	46	66	89	158	13	14	65	8-M16	5.0
DU6100L	100	F05	180	214	52	91	104	173	13	14	65	8-M16	9.0
DU6125L	125	F07	210	252	56	115	118	195	19	17	90	8-M16	11.3
DU6150L	150	F07	240	282	56	142	132	213	19	17	90	8-M20	15.0
DU6200L	200	F07	295	337	60	194	167	247	19	17	125	12-M20	20.0
DU6250L	250	F10	355	405	68	245	197	287	38	22	125	12-M24	30.0
DU6300L	300	F10	410	460	78	294	239	316	24	22	125	12-M24	46.0
D6350L	350	F10	470	524	79	328	265	345	24	22	125	16-M24	66.5
D6400L	400	F14	525	585	105	374	293	377	38	36	175	16-M27	96.0
D6450L	450	F14	585	645	112	425	327	412	38	36	175	20-M27	122.0
D6500L	500	F16	650	714	129	472	357	440	38	36	210	20-M30	202.0

Dimensions for PN6/10/16 wafer pattern Butterfly valve

Type	Size DN [mm]	Top flange Fxx	D2	L1	L2	H1	H2	H3	G	ø1	PN6		PN10		PN16		Weight (Kg)
											D1	n-ø	D1	n-ø	D1	n-ø	
DU650	50	F05	93	43	33	70	134	13	14	65	110	4-14	125	4-19	125	4-19	2.3
DU665	65	F05	107	46	48	76	147	13	14	65	130	4-14	145	4-19	145	4-19	2.8
DU680	80	F05	123	46	66	89	158	13	14	65	150	4-19	160	8-19	160	8-19	3.5
DU6100	100	F05	151	52	91	104	173	13	14	65	170	4-19	180	8-19	180	8-19	5.5
DU6125	125	F07	177	56	115	118	195	19	17	90	200	8-19	210	8-19	210	8-19	7.4
DU6150	150	F07	204	56	142	132	213	19	17	90	225	8-19	240	8-23	240	8-23	9.0
DU6200	200	F07	260	60	194	167	247	19	17	125	280	8-19	295	8-23	295	12-23	15.0
DU6250	250	F10	314	68	245	197	287	38	22	125	335	12-19	350	12-23	355	12-28	21.5
DU6300	300	F10	370	78	294	239	316	24	22	125	395	12-23	400	12-23	410	12-28	32.3
D6350	350	F10	422	79	328	265	345	24	22	125	445	12-23	460	16-23	470	16-28	43.5
D6400	400	F14	473	105	374	297	377	38	36	175	495	16-23	515	16-28	525	16-31	64.0
D6450	450	F14	526	112	425	331	412	38	36	175	550	16-23	565	20-28	585	20-31	83.25
D6500	500	F16	577	129	472	361	440	38	36	210	600	20-23	620	20-28	650	20-34	165.1

Subject to technical changes.

- **Non-spring return actuators,for operation of DN50...65 Butterfly valves**
- **Torque 10 Nm**
- **Open/Close or 3-point control: NRVU24(-S), NRVU230(-S)**
- **Modulating control: NRVU24-SR**

Technical data

NRVU24(-S)	Nominal voltage		AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range		AC/DC 19.2... 28.8 V
	Power consumption	- running	2.0 W
		- holding	0.2 W
	For transformer/wire sizing		4 VA
	Connecting cable	- Motor	Cable 1m, 3 x 0.75mm²
		- Auxiliary switch(-S)	Cable 1m, 3 x 0.75mm²
	Protection class		III (safety low voltage)
	Weight		NRVU24 approx 750g, NRVU24-S approx 850g
NRVU230(-S)	Nominal voltage		AC 100... 240 V 50/60 Hz
	Nominal voltage range		AC 85... 265 V
	Power consumption	- running	3.0 W
		- holding	0.6 W
	For wire sizing		7 VA
	Connecting cable	- Motor	Cable 1m, 3 x 0.75mm²
		- Auxiliary switch(-S)	Cable 1m, 3 x 0.75mm²
	Protection class		II (Totally insulated) ⧈
	Weight		NRVU230 approx 800g, NRVU230-S approx 850g
NRVU24-SR	Nominal voltage		AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range		AC/DC 19.2 ... 28.8 V
	Power consumption	- running	2.5 W
		- holding	0.4 W
	For transformer/wire sizing		5 VA
	Connecting cable		Cable 1m, 4 x 0.75mm²
	Control signal Y		DC 2(0)...10 V @ input resistance 100KΩ
	Feedback signal U		DC 2...10 V @ max. 1 mA
	Synchronisation		± 5 %
	Protection class		III (safety low voltage)
	Weight		800g
Common technical data	Torque		Min. 10 Nm @ nominal voltage
	Auxiliary switch (NRVU..-S)		1 x SPDT 1 mA... 3 (0.5) A, AC 250 V ⧈ 0..100% adjustable
	Angle of rotation		max. 90°
	Direction of rotation		Pre-setting ↷ to close (switch hidden under a label)
	Sound power level		max. 45 dB(A)
	Position indicator		mechanical, remote visible
	Manual override		Gearing disengaged by pressing the pushbutton, manual operate while the button is held depressed
	Running time		90s
	Mode of operation		EN 60730-1 Type 1
	Ambient temp.		- 30°C... + 50°C
	Non-operation temp.		- 40°C... + 80°C
	Humidity test		95% RH, non condensing (EN 60730-1)
	Degree of protection		IP54 in any direction
	EMC Low Voltage Directive		CE according to 89/336/EEC CE according to 73/23/EEC
	Maintenance		maintenance free

Subject to technical changes.

Product features

Mode of operation
NRVU24-SR is controlled by means of a standard control signal DC 2(0)...10V and travels to the position defined by this signal. The feedback signal U allows the valve position (0...100%)to be electrically indicated and serves as a follow-up control signal for other actuators.

Adjustable angle of rotation
High functional reliability
Adjustable angle of rotation with mechanical end stops.
The actuator is overload-proof, requires no limit switches and automatically stops when the endstop is reached.

Flexible signalization
Flexible signalization of the NRVU..-S with adjustable auxiliary switch (0...100%).

Simple mounting
Includes WD6-NRSR linkage kit, see page 27.

Wiring diagrams

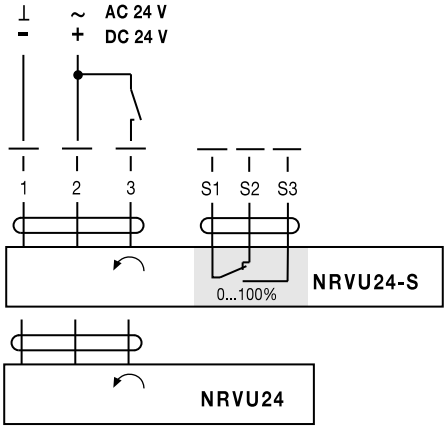
NRVU24(-S)

Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

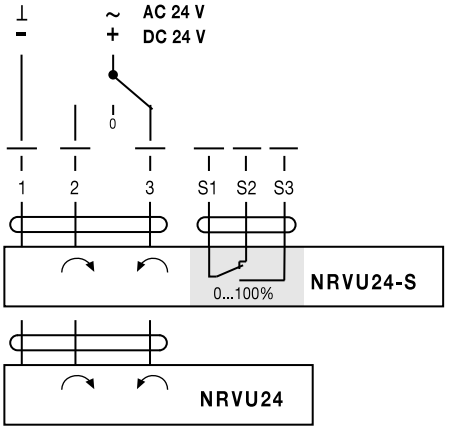
Direction of rotation
(factory setting, switch hidden)

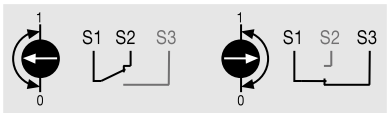
Auxiliary switch(-S)

Open/Close control



3-point control





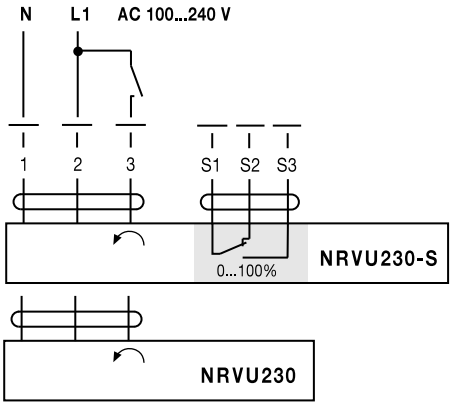
NRVU230(-S)

Notes
- Caution: Power supply voltage !
- Other actuators can be connected in parallel. Please note the performance data.

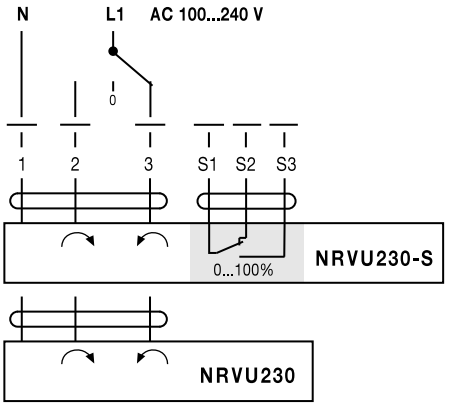
Direction of rotation
(factory setting, switch hidden)

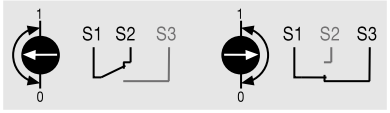
Auxiliary switch(-S)

Open/Close control



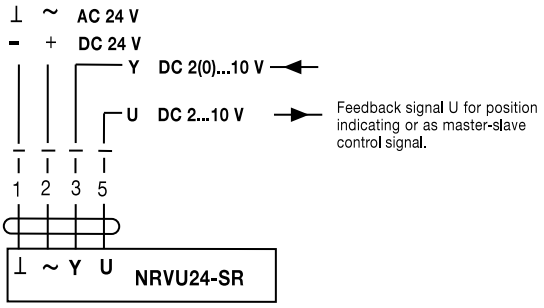
3-point control





Subject to technical changes.

NRVU24-SR **Modulating control**

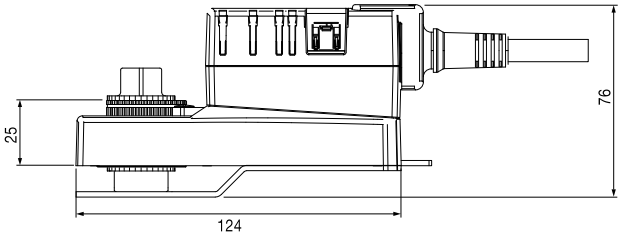


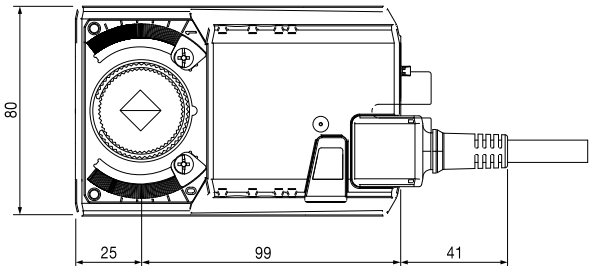
Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

Direction of rotation
(factory setting, switch hidden)

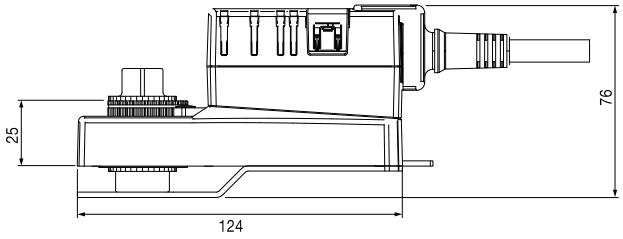
Dimensions Unit [mm]

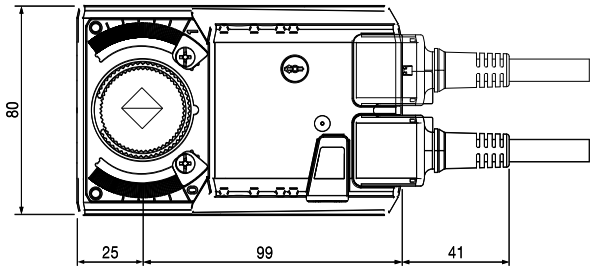
NRVU24
NRVU230
NRVU24-SR





NRVU24-S
NRVU230-S





Subject to technical changes.

SRVU.. Butterfly valve actuators

- **Non-spring return actuators, for operation of DN80...100 Butterfly valves**
- **Torque 20 Nm**
- **Open/Close or 3-point control: SRVU24(-S), SRVU230(-S)**
- **Modulating control: SRVU24-SR**

Technical data

SRVU24(-S)	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption - running	2.5 W
	- holding	0.2 W
	For transformer/wire sizing	5.5 VA
	Connecting cable - Motor	Cable 1m, 3 x 0.75mm²
	- Auxiliary switch(-S)	Cable 1m, 3 x 0.75mm²
	Protection class	III (safety low voltage)
	Weight	SRVU24 approx 1000g SRVU24-S approx 1050g
SRVU230(-S)	Nominal voltage	AC 100... 240 V 50/60 Hz
	Nominal voltage range	AC 85... 265 V
	Power consumption - running	3.0 W
	- holding	0.6 W
	For wire sizing	7 VA
	Connecting cable - Motor	Cable 1m, 3 x 0.75mm²
	- Auxiliary switch(-S)	Cable 1m, 3 x 0.75mm²
	Protection class	II (Totally insulated) ⧈
	Weight	SRVU230 approx 1050g, SRVU230-S approx 1100g
SRVU24-SR	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption - running	2.5 W
	- holding	0.4 W
	For transformer/wire sizing	5 VA
	Connecting cable	Cable 1m, 4 x 0.75mm²
	Control signal Y	DC 2(0)...10 V @ input resistance 100KΩ
	Feedback signal U	DC 2...10 V @ max. 1 mA
	Synchronisation	± 5%
	Protection class	III (safety low voltage)
	Weight	1050g
Common technical data	Torque	Min. 20 Nm @ nominal voltage
	Auxiliary switch (SRVU..-S)	1 x SPDT 1 mA ... 3 (0.5) A, AC 250 V ⧈ 0..100% adjustable
	Angle of rotation	max. 90°
	Direction of rotation	Pre-setting ↷ to close (switch hidden under a label)
	Sound power level	max. 45 dB(A)
	Position indicator	mechanical, remote visible
	Manual override	Gearing disengaged by pressing the push button, manual operate while the button is held depressed
	Running time	90s
	Mode of operation	EN 60730-1 Type 1
	Ambient temp.	-30°C... + 50°
	Non-operation temp.	-40°C... + 80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Low Voltage Directive	CE according to 73/23/EEC
	Maintenance	maintenance free

Subject to technical changes.

Product features

Mode of operation SRVU24-SR is controlled by means of a standard control signal DC 2(0)...10V and travels to the position defined by this signal. The feedback signal U allows the valve position (0...100%) to beelectrically indicated and serves as a follow-up control signal for other actuators.

Adjustable angle of rotation Adjustable angle of rotation with mechanical end stops.

High functional reliability The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached

Flexible signalization Flexible signalization of the SRVU..-S with adjustable auxiliary switch (0...100%)

Simple mounting Includes WD6-NRSR linkage kit, see page 27.

Wiring diagrams

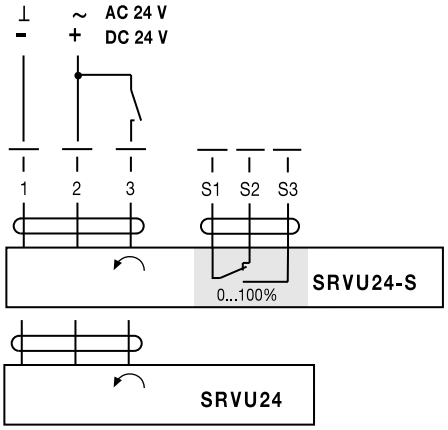
SRVU24(-S)

Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

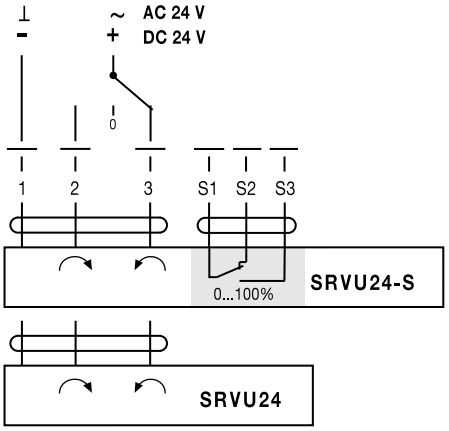
Direction of rotation
(factory setting, switch hidden)

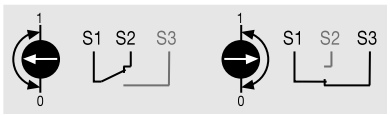
Auxiliary switch(-S)

Open/Close control



3-point control





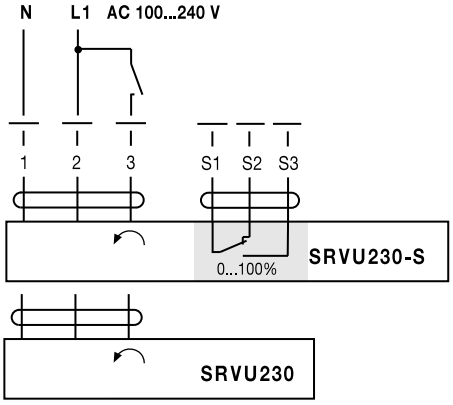
SRVU230(-S)

Notes
- Caution: Power supply voltage !
- Other actuators can be connected in parallel. Please note the performance data.

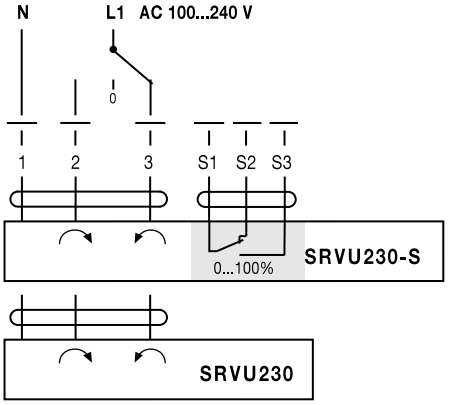
Direction of rotation
(factory setting, switch hidden)

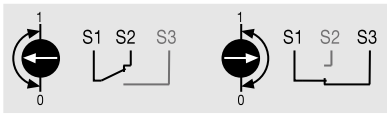
Auxiliary switch(-S)

Open/Close control



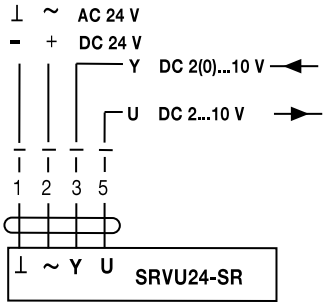
3-point control





Subject to technical changes.

SRVU24-SR **Modulating control**



Feedback signal U for position indicating or as master-slave control signal.

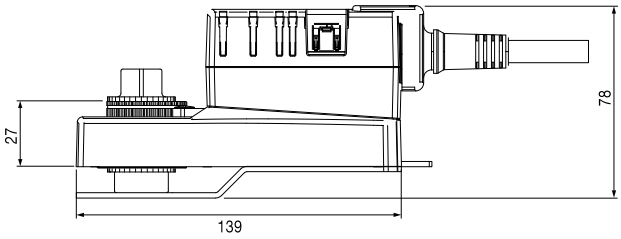
Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

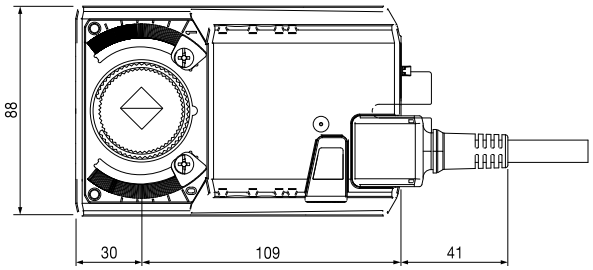
Direction of rotation
(factory setting, switch hidden)

Dimensions

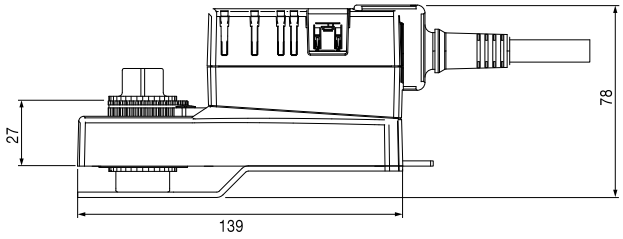
Unit [mm]

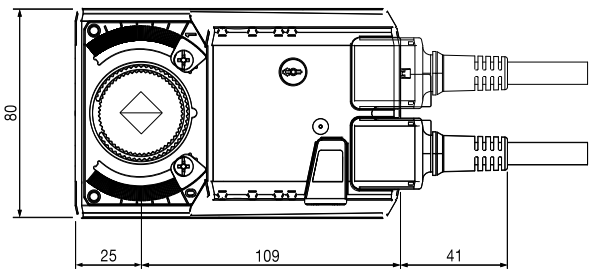
SRVU24
SRVU230
SRVU24-SR





SRVU24-S
SRVU230-S





Subject to technical changes.

- **Non-spring return actuators, for operation of DN100...150 Butterfly valves, dual GRVU.. are for operation of DN125... 200 Butterfly valves**
- **Torque 40 Nm**
- **Open/Close control: GRVU24, GRVU230**
- **Modulating control: GRVU24-SR**

Technical data

GRVU24	Nominal voltage		AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range		AC/DC 19.2 ... 28.8 V
	Power consumption	- running	4 W
		- holding	2 W
	For transformer/wire sizing		6 VA
	Connecting cable		Cable 1m, 3 x 0.75mm²
	Protection class		III (safety low voltage)
	Weight		Approx. 1550g
GRVU230	Nominal voltage		AC 100...240 V 50/60 Hz
	Nominal voltage range		AC 85...265 V
	Power consumption	- running	4 W
		- holding	2 W
	For wire sizing		7 VA
	Connecting cable		Cable 1m, 3 x 0.75mm²
	Protection class		II (Totally insulated) ⧈
	Weight		Approx. 1550 g
GRVU24-SR	Nominal voltage		AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range		AC/DC 19.2 ... 28.8 V
	Power consumption	- running	4.5 W
		- holding	2 W
	For transformer/wire sizing		6.5 VA
	Connecting cable		Cable 1m, 4 x 0.75mm
	Control signal Y		DC 2(0)...10 V @ input resistance 100KΩ
	Feedback signal U		DC 2...10 V @ max. 1 mA
	Synchronisation		± 5%
	Protection class		III (safety low voltage)
	Weight		1550g
Common technical data	Torque		Min. 40 Nm @ nominal voltage
	Angle of rotation		max. 95°
	Direction of rotation		Pre-setting ↷ to close (switch hidden under a label)
	Sound power level		max. 45 dB(A)
	Position indicator		mechanical, remote visible
	Manual override		Gearing disengaged by pressing the pushbutton, manual operate while the button is held depressed
	Running time		150s
	Mode of operation		EN 60730-1 Type 1
	Ambient temp.		- 30°C...+ 50°C
	Non-operation temp.		- 40°C...+ 80°C
	Humidity test		95% RH, non condensing (EN 60730-1)
	Degree of protection		IP54 in any direction
	Low Voltage Directive		CE according to 89/336/EEC CE according to 73/23/EEC
	Maintenance		maintenance free

Subject to technical changes.

Product features

Mode of operation
GRVU24-SR is controlled by means of a standard control signal DC 2(0)...10V and travels to the position defined by this signal. The feedback signal U allows the valve position (0...100%)to be electrically indicated and serves as a follow-up control signal for other actuators.

Adjustable angle of rotation
Adjustable angle of rotation with mechanical end stops.

High functional reliability
The actuator is overload-proof, requires no limit switches and automatically stops when the endstop is reached.

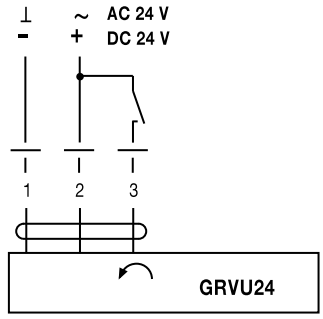
Accessories

	Description
Electrical accessories (available on request)	Auxiliary switch S..A.. (WD6P needed)
	Feedback potentiometer P..A.. (WD6P needed)
	Positioner SG..24
	Digital position indication ZAD24
Linkage kit	WD6-GR, for DN100...150 butterfly valve with single GRVU.. actuator, see page 28
	WD6-2GR, for DN125...200 butterfly valve with dual GRVU.. actuators, see page 29
	WD6P, for DU6... butterfly valve with Auxiliary Switch or potentiometer

Wiring diagrams

GRVU24 — **Open/Close control**

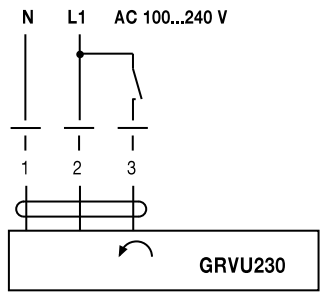
Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.



Direction of rotation
(factory setting, switch hidden)

GRVU230 — **Open/Close control**

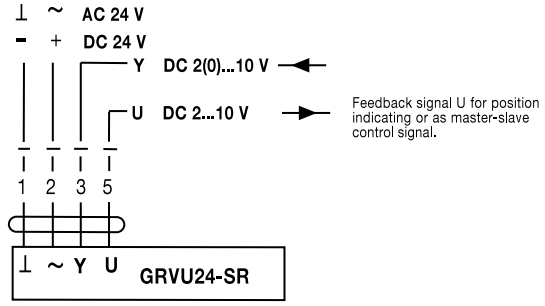
Notes
- Caution: Power supply voltage !
- Other actuators can be connected in parallel. Please note the performance data.



Direction of rotation
(factory setting, switch hidden)

GRVU24-SR — **Modulating control**

Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.



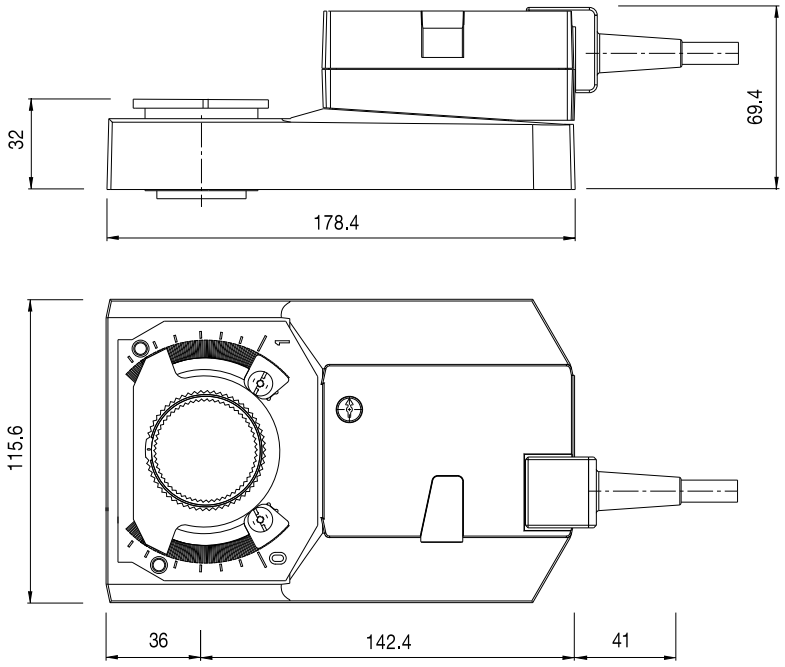
Direction of rotation
(factory setting, switch hidden)

Subject to technical changes.

Dimensions

Unit [mm]

GRVU24
GRVU230
GRVU24-SR



Subject to technical changes.

BELIMO

- **For operation of DN50...100 Butterfly valves**
- **Torque 15 Nm**
- **Open/Close control: AF24(-S), AF230 (-S)**
- **Modulating control: AF24-SR**

Technical data

AF24(-S)	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC 19.2...28.8 V, DC 21.6...26.4 V
	Power consumption -running -holding	5 W 1.5 W
	For transformer/wire sizing	10 VA
	Connecting cable -Motor -Auxiliary switch(-S)	Cable 1m, 2 x 0.75mm² Cable 1m, 6 x 0.75mm²
	Weight	3000g
AF230(-S)	Nominal voltage	AC 230 V 50/60 Hz
	Nominal voltage range	AC 198...264 V
	Power consumption -running -holding	6.5 W 2.5 W
	For wire sizing	11 VA
	Connecting cable -Motor -Auxiliary switch(-S)	Cable 1m, 2 x 0.75mm² Cable 1m, 6 x 0.75mm²
	Weight	3300 g
AF24-SR	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC 19.2... 28.8 V, DC 21.6... 26.4 V
	Power consumption -running -holding	6 W 2.5 W
	For transformer/wire sizing	10 VA
	Connecting cable	Cable 1m, 5 x 0.75mm²
	Control signal Y	DC 2(0)...10 V @ input resistance 100KΩ
	Feedback signal U	DC 2...10 V @ max.0.5 mA
	Synchronisation	± 5%
	Weight	2700g
Common technical data	Torque -Motor -Spring return	min. 15 Nm min. 15 Nm
	Auxiliary switch (AF..-S) Angle of rotation	2 x SPDT 6 (3) A, AC250 V ⧈ fixed 5%◁, adjustable 28..94%◁
	Angle of rotation	max. 95°
	Dirction of rotation - AF24(-S), AF230(-S) - AF24-SR	selected by mounting side of L/R selected by mounting side of L/R or reversing
	Sound power level	-motor max. 45 dB(A), spring ≈ 62 dB(A)
	Position indicator	mechanical
	Manual override	hex crank
	Service life	≈ 60000 operations
	Running time	moto ≈150s, spring return ≈16s
	Ambient temp.	- 30°C...+ 50°C
	Non-operation temp.	- 40°C...+ 80°C
	Humidity test	to EN 60335-1
	Degree of protection	IP54
	EMC Low Voltage Directive	CE according to 89/336/EEC, 92/31/EEC, etc CE according to 73/23/EEC
	Maintenance	maintenance free

Accessories

WD6-AF	Linkage kit for DN50...100 butterfly valve with AF.. actuator, see page 26

Subject to technical changes.

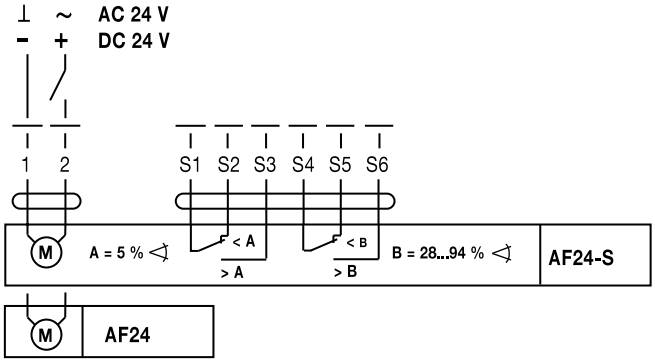
Product features

Improved functional safety The AF.. actuator moves the valve to its normal working position while tensioning the return spring at the same time. If the power supply is interrupted, the energy stored in the spring movesthe valve back to its safe position. The actuator is overload proof, needs no limit switches andhalts automatically at the end stop.

Variable end switch The AF24-S actuator has one fixed auxiliary switch and one adjustable auxiliary switch whichallows angle of rotation of 5% and between 28...94% to be signalled.

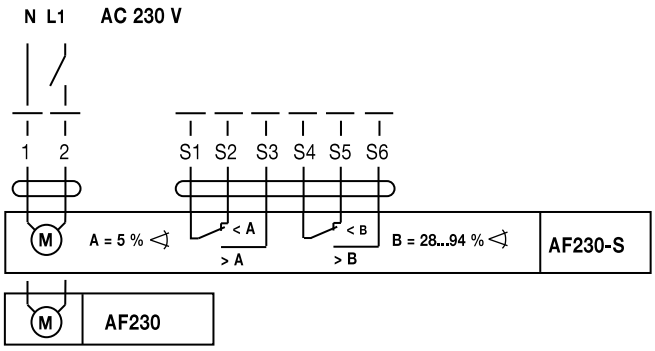
Wiring diagrams

AF24(-S)



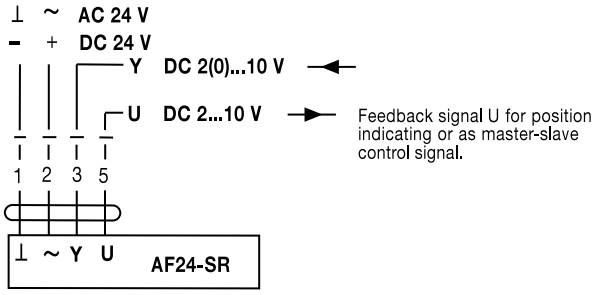
Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

AF230(-S)

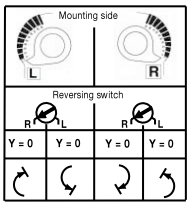


Notes
- Caution: Power supply voltage !
- Other actuators can be connected in parallel. Please note the performance data.

AF24-SR



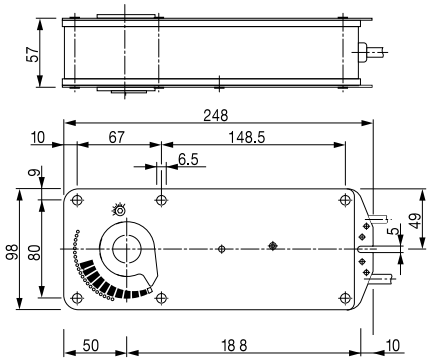
Feedback signal U for position indicating or as master-slave control signal.



Notes
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

Dimensions

Unit [mm]



Subject to technical changes.

SY.. large torque actuators

- **Non-spring return large torque actuators, for operation of DN50...500 Butterfly valves**
- **Torque 35...2000 Nm**
- **Open/Close or 3-point control: SY...24-3-T, SY...230-3-T**
- **Modulating control: SY...U24-SR-T, SY...U230-SR-T**
- **MF/MP-T models also available on request**

Technical data

Electric data

Nominal voltage	AC 24 V
SY... -3-T, SY... -SR-T	AC 230 V
Power supply range	AC 21.6... 26.4 V
SY... -3-T, SY... -SR-T	207... 253 V
Electrical connection	½"cable connector, screw terminals
Thermal protection	Thermally protected 135°C cut-out
Motor protection	H class insulation (SY1-..), F class insulation (SY2... 9)
Gear train	High alloy steel gear sets
Control signal	Open/close, 3-point control
SY... -3-T, SY... -SR-T	2(0)...10 VDC
Sensitivity	200 mV (for SY... -SR-T only)
Feedback	2(0)...10 VDC (for SY.. -SR-T only)
Angle of rotation range	Electrically limited to 90°, Max. 95° for manual operation
Position indication	Top mounted domed indication
Internal humidity control	Up to 95%, resistive heating element
Auxiliary switches	(2)SPDT, 3 A, AC 250 V (SY1); 5 A, AC250 V (SY2...9)
Ambient temperature	- 20°C ... 60°C
Housing type	IP67 / NEMA 4
Housing material	Die cast aluminium alloy
EMC	CE according to 89/336/EEC
Low voltage directive	CE according to 73/23/EEC, 93/68/EEC

Model No.	Torque (Nm)	Motorpower		Running time			Running current		Manual Override	Weight (Kg)	Mounting flange (ISO 5211)
		24V AC	230V AC	24V AC	230 V AC 60Hz	230 V AC 50Hz	24V AC	230V AC			
SY1-..	35	10W	10W	15s	12s	13s	0.6A	0.3A	by 8mm Wrench	2.0	F05
SY2-..	90	70W	40W	15s	15s	17s	3.0A	0.5A	Handwheel	11	F07
SY3-..	150	70W	40W	22s	22s	26s	3.0A	0.5A	Handwheel	11	F07
SY4-..	400	180W	120W	16s	16s	18s	6.0A	0.6A	Handwheel	22	F10
SY5-..	500	180W	120W	22s	22s	25s	6.5A	0.7A	Handwheel	22	F10
SY6-..	650	/	120W	/	28s	31s	/	0.8A	Handwheel	22	F10
SY7-..	1000	/	180W	/	46s	55s	/	1.6A	Handwheel	36	F14
SY8-..	1500	/	220W	/	46s	55s	/	2.0A	Handwheel	36	F14
SY9-..	2000	/	180W	/	58s	70s	/	1.6A	Handwheel	56	F16

Product features

Electrical connections

All actuator control elements are wired to a terminal strip under the main cover. Remove the cover and insert the cables through the cable connector in order to reach the terminal strip. The connectors should be made according to the diagram. Before beginning this procedure, make sure that the power supply voltage is in accordance with the actuator's nameplate. After the terminal connections have been made, move the actuator manually to the half-open position and make a preliminary check of the wiring.

Manual operation

Turn the handwheel clockwise to close the actuator and counterclockwise to open. This provides a temporary manual operation. For a permanent manual operation, remove the power from the actuator. (Note: Need a 8mm wrench for SY1..)

Overload protection

If the running torque exceeds the normal torque requirement, then the overload protection will be functioned to prevent the motor overload.

Subject to technical changes.

Designation

SY4 U24 -SR -T

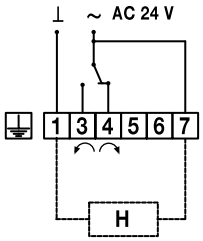
With terminal only
"-SR":Modulating control
"-3":Open/close or 3-point control
"U24": 24V nominal voltage (modulating)
"U230": 230V nominal voltage (modulating)
"-24": 24V nominal voltage (open/close, 3-point)
"-230": 230V nominal voltage (open/close, 3-point)
Model number

eg. Modulating control
SY2U230-SR-T
Open/close, 3-point control
SY2-24-3-T

Wiring diagrams

SY..-24-3-T

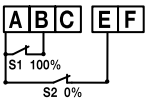
Open/Close or 3-point control



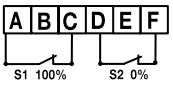
Terminal

#1	Power supply Com/Neutral
#3	Power supply Hot line for Open
#4	Power supply Hot line for Close
#5	Connect to Com/Neutral for fully open indication
#6	Connect to Com/Neutral for fully close indication
#7	Heater

Auxiliary switch



SY1-24-3-T

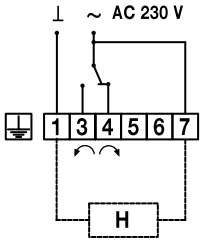


SY(2...5)-24-3-T

Notes
- Connection via safety isolating transformer
- Relays are needed in parallel connection of several actuators
- "L1" cannot be connected to terminal #3 and #4 simultanenously.
- 30% duty cycle.

SY..-230-3-T

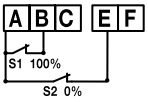
Open/Close or 3-point control



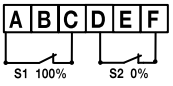
Terminal

#1	Power supply Com/Neutral
#3	Power supply Hot line for Open
#4	Power supply Hot line for Close
#5	Connect to Com/Neutral for fully open indication
#6	Connect to Com/Neutral for fully close indication
#7	Heater

Auxiliary switch



SY1-230-3-T

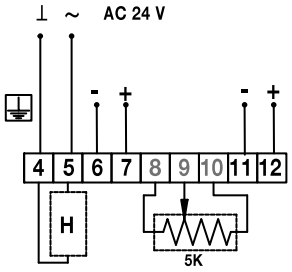


SY(2...9)-230-3-T

Notes
- Caution: Power supply voltage !
- Relays are needed in parallel connection of several actuators
- "L1" cannot be connected to terminal #3 and #4 simultanenously.
- 30% duty cycle.

SY1U24-SR-T

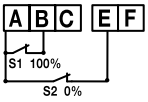
Modulating control



Terminal

#4	Power supply Com / Neutral
#5	Power supply Hot line
#6	Control signal -
#7	Control signal +
#8	For actuator internal use
#9	For actuator internal use
#10	For actuator internal use
#11	Feedback signal -
#12	Feedback signal +

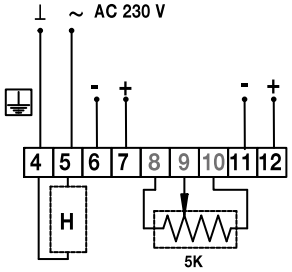
Auxiliary switch



Notes
- Connection via safety isolating transformer
- Power supply Com / Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

SY1U230-SR-T

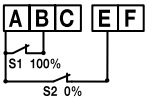
Modulating control



Terminal

#4	Power supply Com / Neutral
#5	Power supply Hot line
#6	Control signal -
#7	Control signal +
#8	For actuator internal use
#9	For actuator internal use
#10	For actuator internal use
#11	Feedback signal -
#12	Feedback signal +

Auxiliary switch



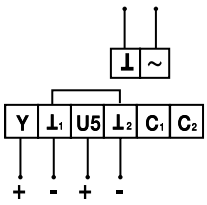
Notes
- Caution: Power supply voltage !
- Power supply Com / Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

Subject to technical changes.

SY..U24-SR-T
SY..U24-MF-T

Modulating control

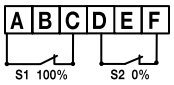
AC 24 V



Terminal

⊥	Power supply Com / Neutral
~	Power supply Hot line
Y	Control signal +
⊥1	Control signal -
U5	Feedback signal +
⊥2	Feedback signal -
C1	leave unconnected
C2	

Auxiliary switch



SY(2...5)U24-SR-T
SY(2...5)U24-MF-T

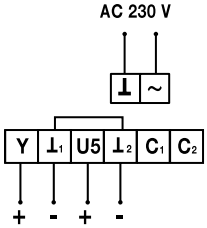
Notes

- Connection via safety isolating transformer
- Power supply Com / Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

SY..U230-SR-T
SY..U230-MF-T

Modulating control

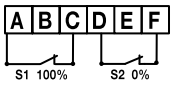
AC 230 V



Terminal

⊥	Power supply Com / Neutral
~	Power supply Hot line
Y	Control signal +
⊥1	Control signal -
U5	Feedback signal +
⊥2	Feedback signal -
C1	leave unconnected
C2	

Auxiliary switch



SY(2...9)U230-SR-T
SY(2...9)U230-MF-T

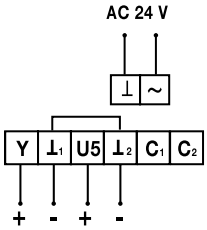
Notes

- Caution: Power supply voltage !
- Power supply Com / Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

SY..U24-MP-T

Modulating control

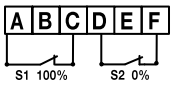
AC 24 V



Terminal

⊥	Power supply Com / Neutral
~	Power supply Hot line
Y	Sensor signal +
⊥1	Sensor signal -
U5	MP-Bus signal +
⊥2	MP-Bus signal -
C1	leave unconnected
C2	

Auxiliary switch



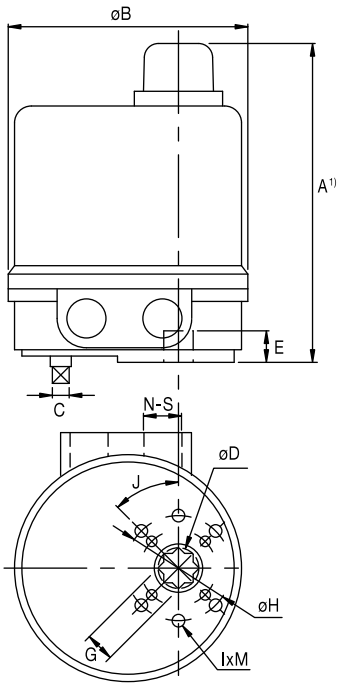
SY(2...5)U24-MP-T

Notes

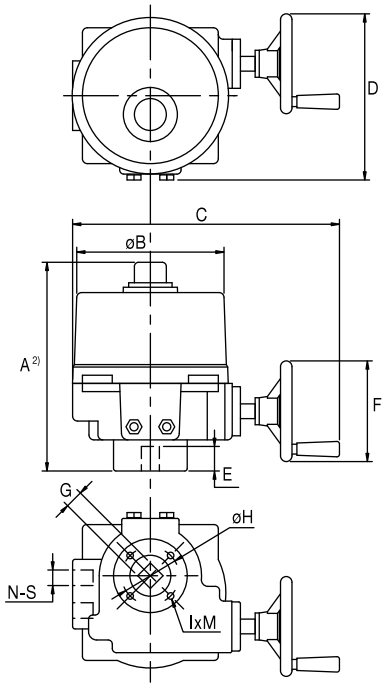
- Connection via safety isolating transformer
- Power supply Com / Neutral and sensor/MP-Bus signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

Subject to technical changes.

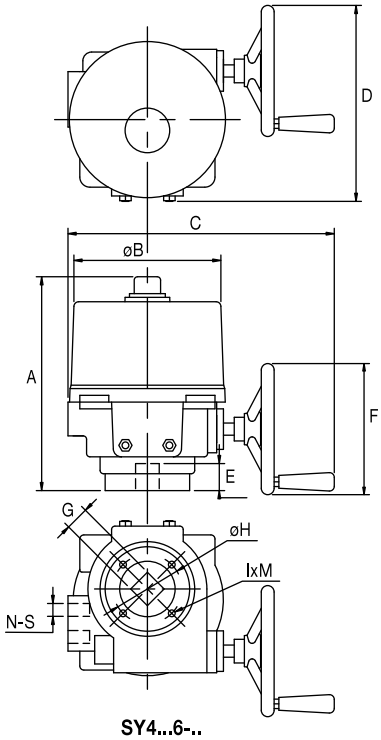
Dimensions Unit [mm]



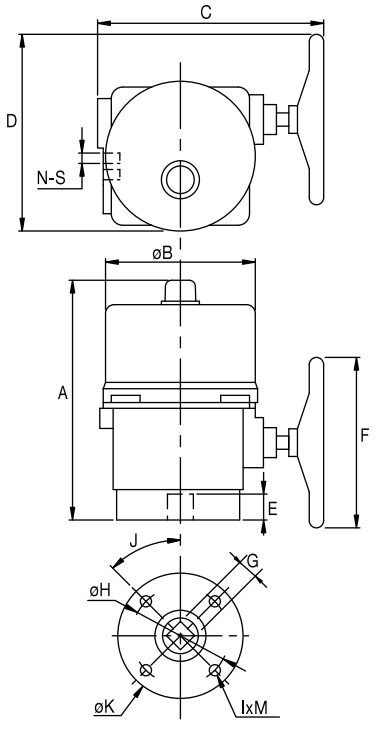
SY1-..



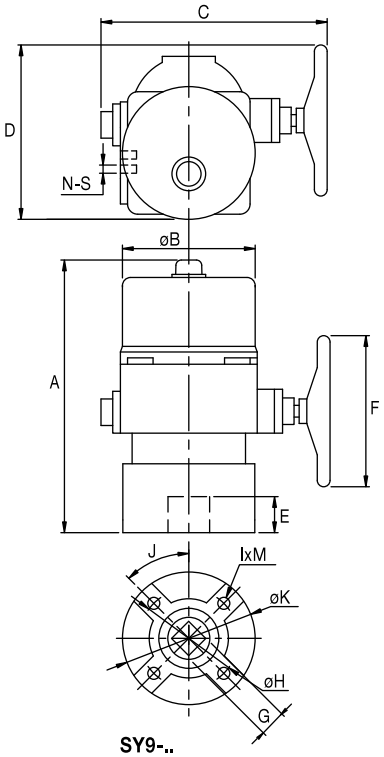
SY2/3-..



SY4...6-..



SY7/8-..



SY9-..

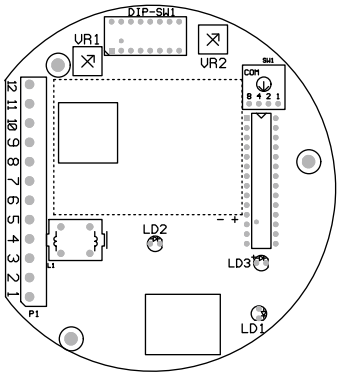
1) For SY1U24(230)-SR-T, A is185

2) For SY2(3)-230-3-T, A is 255

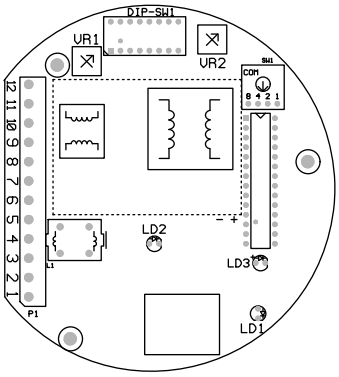
Model No. \ Dim.	A	B	C	D	E	F	G	H	I	J	K	M	N	S	Flange type
SY1-..	155[1)]	114	8	19	15	-	14	50	6	45°	-	m6	2	1/2 PS	F05
SY2/3-..	289[2)]	180	326	203	30	123	17/22	70	4	-	-	m8	2	1/2 PS	F07
SY4...6-..	317	217	394	290	40	194	22/35	102	4	-	-	m10	2	1/2 PS	F10
SY7/8-..	406	217	348	336	60	297	36	140	4	45°	180	m16	2	1/2 PS	F14
SY9..-..	564	256	455	392	100	395	36	165	4	45°	221	m20	2	1/2 PS	F16

Subject to technical changes.

Circuit board set up



SY1U24-SR-T



SY1U230-SR-T

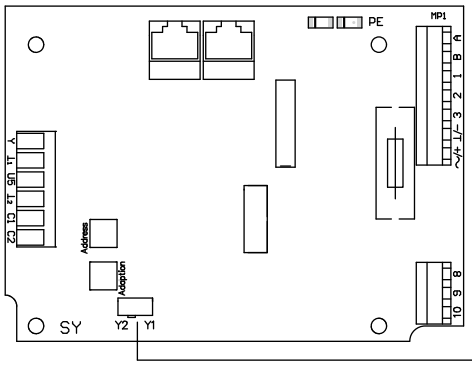
⚠ Disconnect power supply before changing the following settings.
The words in Bold are default settings.

- DIP switches setting
  Factory setting

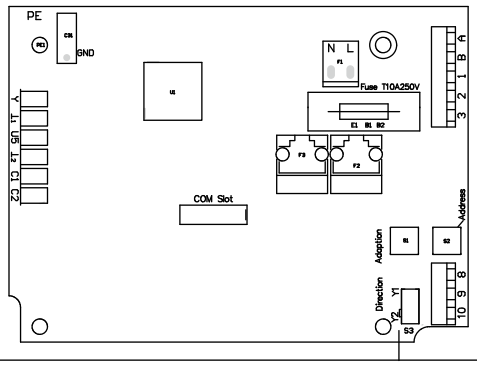
S1, S2 - for Input signal			S3, S4, S5 - for Output signal				S6 - Direction of Travel in response to the control		S7 & S8 - Actuator response to the control signal failure		
Input signal	**S1**	**S2**	**Output signal**	**S3**	**S4**	**S5**	**Symbol**	**S6**	**When signal fails**	**S7**	**S8**
2~10V	**Off**	**On**	**2~10V**	**On**	**Off**	**On**	90° Y	**Off**	Fully closed	Off	On
4~20mA	On	Off	4~20mA	Off	On	Off			Fully open	On	Off
1~5V	Off	Off					90° Y	On	**Stop**	**On**	**On**

- SW1 sensitive switch

Position "0": Lowest sensitive, 0~90° divided into 17 steps.
Position "1": Highest sensitive, 0~90° divided into 80 steps.
Before power on, make sure the input signal and voltage wiring are in accordance with the actuator nameplate and Dip-switch setting.
(only available for SY1U24/230-SR-T)



SY(2...5)U24-SR/MF/MP-T

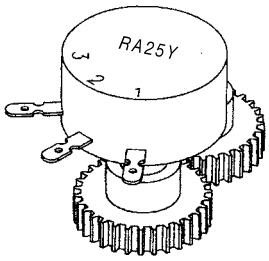


SY(2...9)U230-SR/MF-T

Direction switch
Y2 standard

Position feedback

It is possible to add a potentiometer to provide feedback signal.



Potentiometer

For open/close actuators with 1k feedback option
Potentiometer points 1, 2, 3 are wired to terminal blocks 10, 9, 8.

When a actuator is close:	8, 9	1k Ohm
	9, 10	0k Ohm
When a actuator is open:	8, 9	0k Ohm
	9, 10	1k Ohm

For Modulating actuator, the potentiometer is a standard part and for actuator internal use only.

Accessories

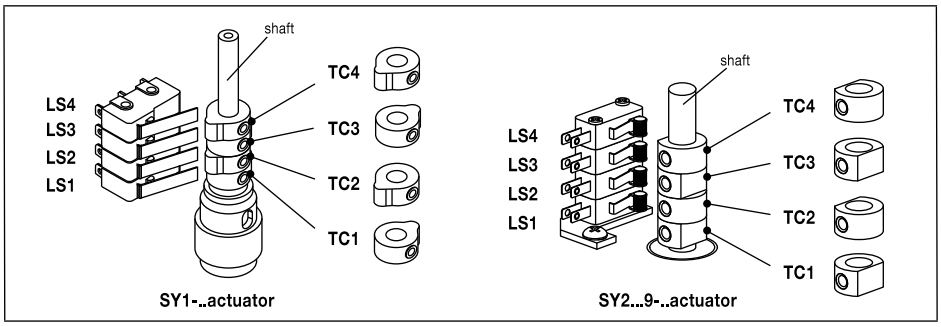
	Description
Electrical accessories	Feedback potentiometer SY-1000-FB (for SY..-3-T actuator)

Subject to technical changes.

Travel cams TC..

Only authorized and trained persons are allowed to change the settings.

- TC1- for **open** position of limit switch (factory setting 90°).
- TC2 - for **closed** position of limit switch (factory setting 0°).
- TC3 - for **open** position of auxiliary switch (factory setting 87°).
- TC4 - for **closed** position of auxiliary switch (factory setting 3°).



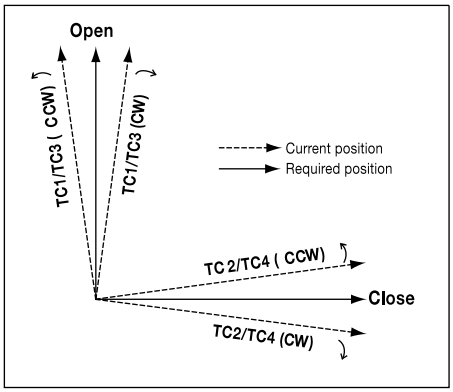
The cams for adjusting the limit and auxiliary switches are accessible if the cover is removed. The LS2/LS1 limit switches interrupt the power supply to the motor and are controlled by means of the TC.. cams which rotate with the shaft. The LS4/LS3 auxiliary switches can optionally be connected for signalization purposes. The actuator closes the valve when the shaft turns clockwise (CW) and opens the valve when the shaft turns counter clockwise (CCW).

Adjusting the travel cam

1. Loosen the travel cam to be adjusted with a 2.5mm hexagonal key;
2. Turn the cam with the hexagonal key;
3. Adjust the cam as shown in the diagram and initial tighten the cam;
4. Check the operation of the switch with power on
5. Tighten the cams after successful adjustment.

(Only availlable for SY(2-9)U24/230-SR-T)
Perform an adaption after changing the position of the travel cam

Adaption button



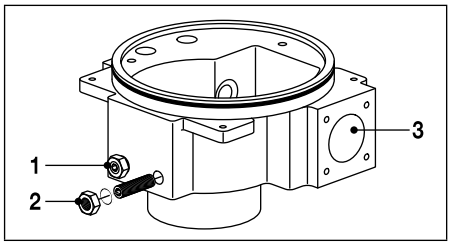
(Only available for SY1U24/230-SR-T)
When you need to adjust the signal of modulating board, please adjust the VR1 & VR2:

- VR2 adjusts 4 mA, 2 V, 1 V (Fully-close)
- VR1 adjusts 20 mA, 10 V, 5 V (Fully-open)

Please turn the VR2 to the end by clockwise direction and input 4 mA to modulating board. Then please slightly turn the VR2 by counter -clockwise direction about 3~6 times until the RED light keeps ON.

Please turn the VR1 to the end by counter-clockwise direction and input 20 mA to modulating board. Then please slightly turn the VR1 by clockwise direction about 3~6 times until the GREEN light keeps ON.

Limiting of manual rotation angle



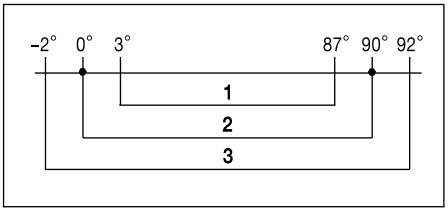
1. Stop screw for OPEN limiting
2. Stop screw for CLOSED limiting
3. Handwheel connection, for manual operation

Note: SY1 without the stop screws

The limiting of manual rotation angle is set at -2...92° in the factory. The handwheel turns the planetary gear by means of a worm wheel. The gear is stopped mechanically by the two stop screws 1 and 2 (1 turn of the stop screw correspond to a 2° angle of rotation). When the moto stops at fully closed or open position, tighten the corresponding screw untill it touches the gearbox, turn the screw 1 cycle back and lock by an allen key and a wrench.

Note:
The two limit switches LS2/LS1 are set at 0...90° angle. The LS2/LS1 switches must always switch off the moto **before** the effect of manual stop screws.
It is emphasized that the sto screws are only a safety feature to prevent overtravel when the actuator is being operated manually.

Relationship between the switches and travels



1. Auxiliary switches setting
2. Limit switches setting
3. Stop screws setting for manual operation

Subject to technical changes.

Open/Close position setting

Closed position (0%) setting

1) For Open/close actuator, wiring on terminal#1, #4. (see Wiring diagram)
2) Power on.The actuator will drive CW to fully closed position.
3) Adjust travel cam TC2 in the closed position. (see page 23) For modulating actuator, firstly loose a fanshaped cam which connected with the potentiometer; retighten it after the successful setting of TC2.
4) Check whether LS2 switch trips prior to manual operation stop. (So when motor stops at fully closed position, it should be possible for further operating the hand wheel CW1/2...3/4turn. Otherwise the stops crew for close need to be adjusted, see page 23)

Open position (100%) setting

1) For Open/close actuator, wiring on terminal#1, #3. (see Wiring diagram)
2) Power on. The actuator will drive CCW to fully open position.
3) Adjust travel cam TC1 in the open position. (see page 23) For modulating actuator, firstly Check loose a fanshaped cam which connected with the potentiometer; retighten it after the successful setting of TC1.
4) Check whether LS1 switch trips prior to manual operation stop. (So when motor stops at fully open position, it should be possible for further operating the hand wheel CCW 1/2...3/4 turn. Otherwise the stop screw for open need to be adjusted, see page23)

General

Cautions of installation

Make sure if the voltage is correct before wiring.
Re-place cover immediately after start-up and make sure that the seals are clean. Never fail to replace the potection cover. If water never enter, dry thoroughly before re-placing cover. Don't reverse the motor head or install it upside down. Be sure to keep it away from gas, do not use in the explosive and chemical district. Power off before maintenance purpose. The Open/Close frequency of the electric actuator is testricted according to the duty cycle, to avoid over heated.

Maintenance

All actuators are lubricated with anti-high temperature lubricant for long life and therefore require no special maintenance. The condition of the valve stem and its nut must be checked periodically to make sure they are cleamn and well lubricated. We recommend that a program of periodic maintenance should be drawn up for actuators that are operated infrequently.

Storage

The actuator includes electrical equipment as well as greese lubricated gear stages. Inspite of the weather proof enclosure, oxidation, jamming and other alterations are possible if acctuator is not correctly stored. The actuators should be stored under a shelter in a clean, dry place, and protected from frequent changes in temperature. Avoid placing the actuators directly on the floor. The actuators are quipped with heat resistance, it si recommended that connect and give power supply to the actuator especially if the place of the storage is humid. Check that the temporary sealing plug of the cable entries are well in place. Make sure that the covers and boxes are well closed to ensure weather proof sealing.

Trouble shooting

Conditions	Possibilities	Solutions
Motor overheat	Voltage abnormal	Check by multimeter.
	High working frequency	Limit the working frequency.
	Motor spindle is stuck or valve is too tight to move	Replace the stuck as semblies or the valve.
	The gearbox stuck by stop screw	Check and correct travel cam for evidence of loosening; inspect the stop screw setting by operating the handwheel manually .
No operation	Power supply or voltage abnormal	Check the power supply voltage with the identification plate.
	Fuse blown	Check and replace the fuse as required. (except for HW-CB PCB)
	Tripping of motor thermal protective device	Check if the motor is hot. The actuator will be available again after the motor is cooled down. Solve the motor overheat problem.
Running motor stops	Power supply is short circuit	Check wiring.
	Alienative object stuck in the pipe	Take off the valve for cleaning.
Unable fully open/closed	The fixing screw for travel cam release	Re-adjust and tighten the travel cam.
The actuator couldn't stop at the right position and hunting	The sensitivity setting is incorrect	Adjust the sensitivity switch SW1 to increase the number.
Occasional fail in motor switched on or off	Power input of "open" and "close" simultaneously	Check if the external control switch is normal; relays are needed in parallel connection of several actuators.

Subject to technical changes.

Installation and maintenance instructions

Pre-installation procedure

1) Be certainthe 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.
2) Any actuator should be mounted on the valve prior to installation to facilitate proper alignment of the disc in the valve seat.
3) Check the valve identification tag for materials, and operating pressure to ensure they arecorrect for the application.
4) Check the flange bolts or studs for proper size, threading and length.

Valve installation procedure

Position the connecting pipe flanges in the line to insure proper alignment prior to valve insta-care in handling the valve so as to prevent possible damage to the disc or seat faces.llation. Spread the pipe flanges apart enough to allow the valve body to be located betweenthe flanges without actually contacting the flange surfaces (See Figure 1). Exercise particular care in handling the valve so as to prevent possible damage to the disc or seat faces.

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

1) For both wafer and lug valves: a. Place the valve between the flanges. b. Install all bolts between the valve and the mating flanges. Hand tighten bolts as necessary.
2) Before completing the tightening of any bolts,the valve should be centered between the flangesand then carefully opened and closed to insure free,unobstructed disc movement (see Fig.2).
3) Tighten the flange bolts evenly to assure uniform compression.
4) If an actuator is to be used, electricity should be connected to the unit as specified by the actuator manufacturer.
5) Cycle the valve to the fully open position, then back to the fully closed position, check the actuator travel stop settings for proper disc alignment. The valve should be operated to assure that no binding is taking place.
6) The valve is now ready for operation.

Safety precautions

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

1) Be sure the line is depressurized and drained.
2) Be sure of the pipeline media. Proper care should be taken for protection against toxic and/or flammable fluids.
3) Exercise caution if removing the actuator from the valve when the pipeline is under pressure. The valve disc may move suddenly due to the pressure.
4) Always be sure that the disc is in the close position before removing the valve.

General maintenance

The following periodic preventative maintenance practices are recommended for all butterfly valves:

1) Operate the valve from full open to full closed to assure operability.
2) Check flange bolting for evidence of loosening and correct.
3) Inspect the valve and surrounding area for previous or existing leakage at flange faces or shaft connections.
4) Check piping and/or wiring to actuators and related equipment for looseness and correct as needed.

Figure 1 Initial installation of valve

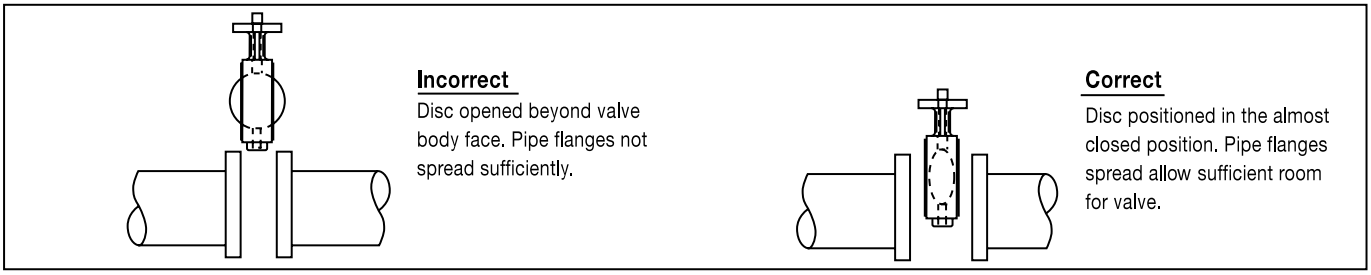


Figure 2 Centering and flanging of valve

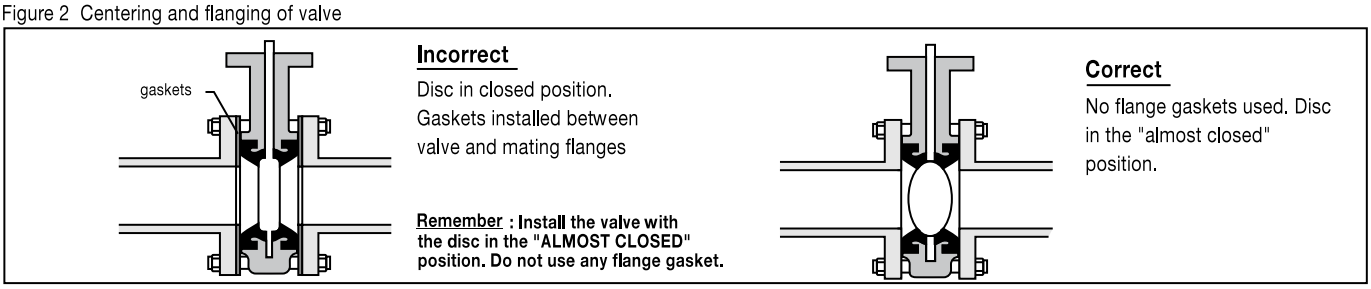
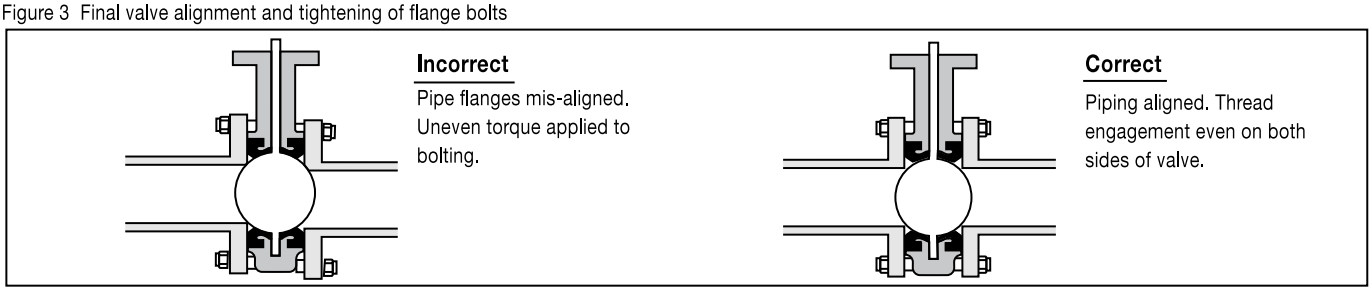


Figure 3 Final valve alignment and tightening of flange bolts



Subject to technical changes.

BELIMO

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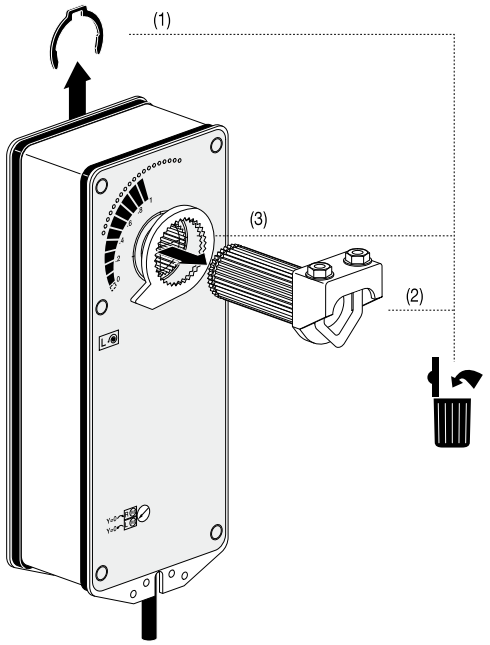

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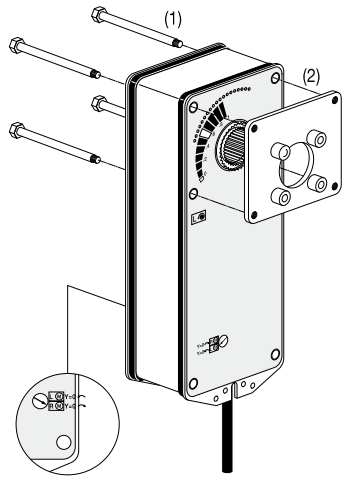

Actuator normally closed

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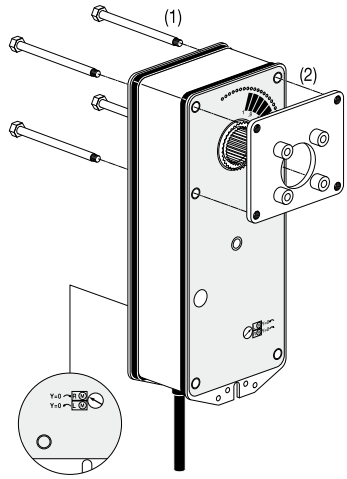

Actuator normally open

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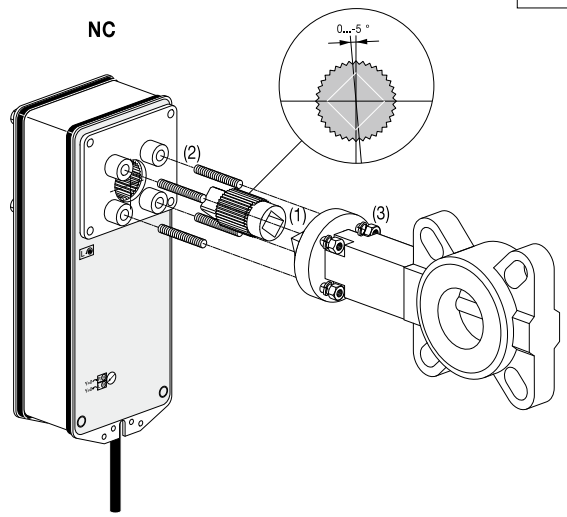

Actuator normally closed

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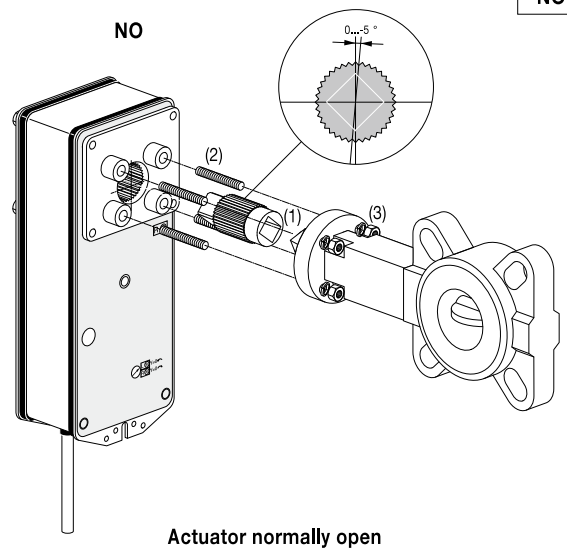
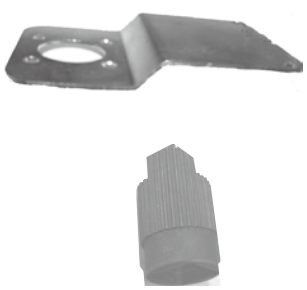


Actuator normally open

Subject to technical changes.



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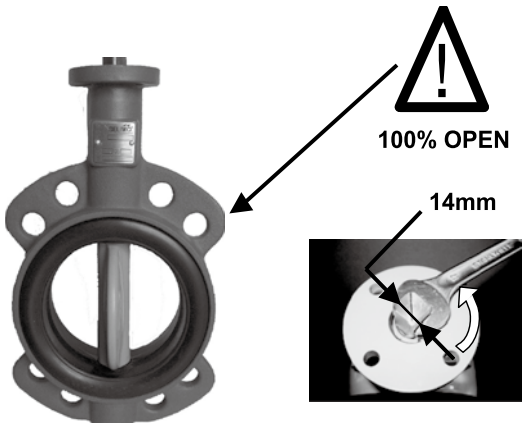

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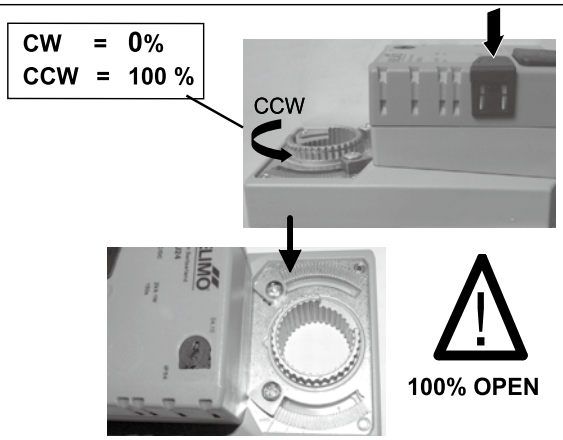

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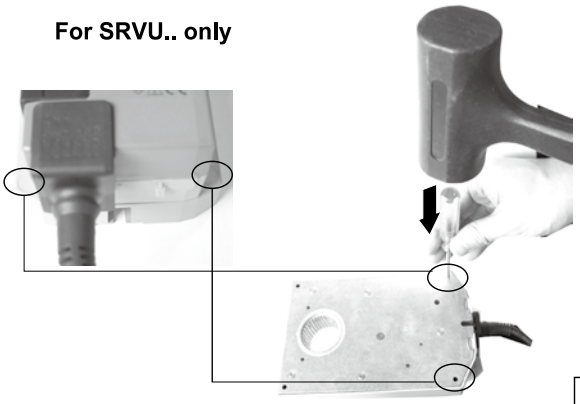

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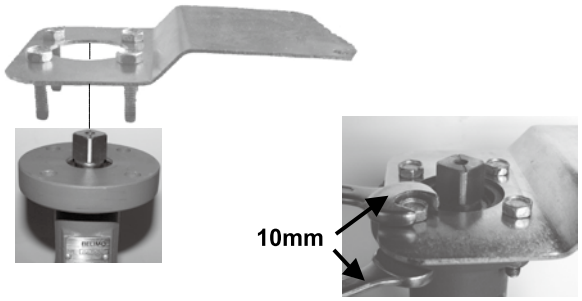

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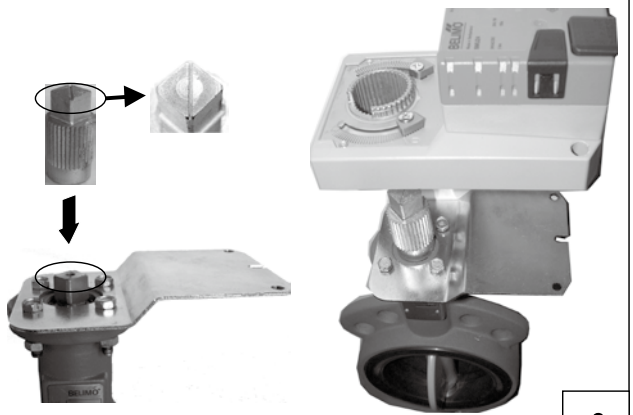

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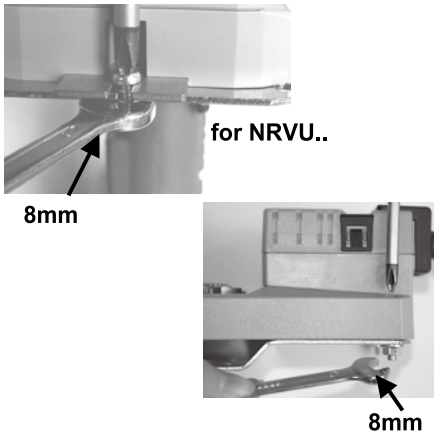

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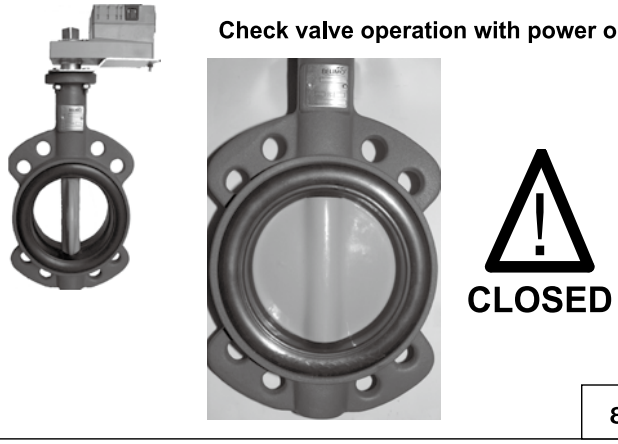


8

Subject to technical changes.

WD6-GR linkage kit installation instructions

BELIMO


x 1


x 1


x 1 (for DN100 BFV)


x 2

x 2


x 4 (for DN100 BFV)


x 4 (For DN100 BFV)

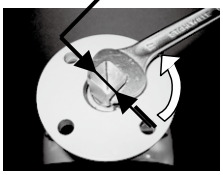

x 4


x 4

1

100% OPEN

17mm
(14mm for DN100 BFV)



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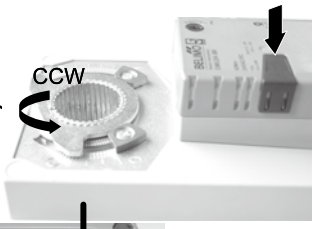
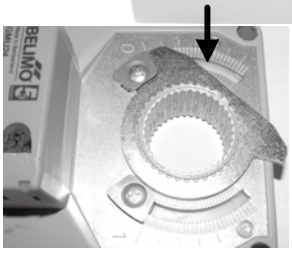
CW = 0%
CCW = 100 %

CCW





100% OPEN

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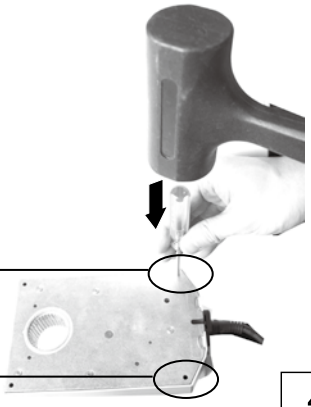

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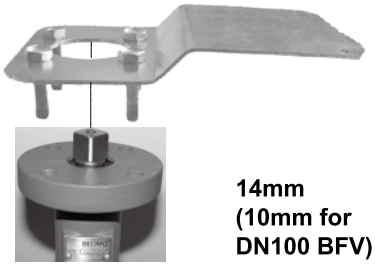
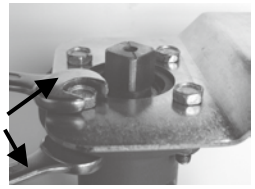


14mm
(10mm for DN100 BFV)



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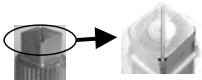

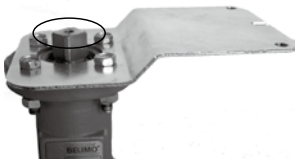

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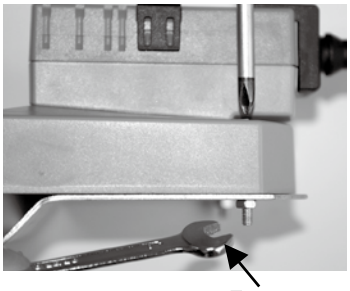


7mm

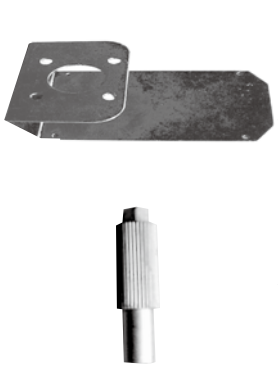
7

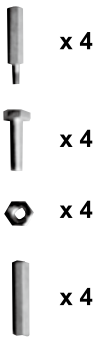
Check valve operation with power on

CLOSED

8

Subject to technical changes.





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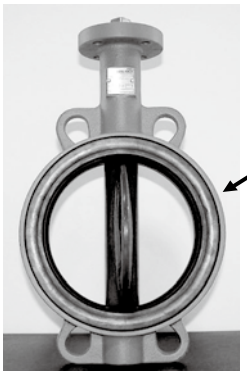

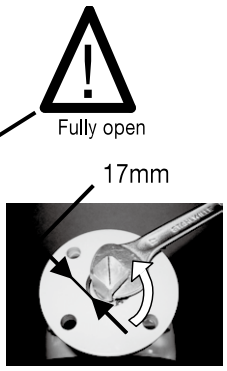

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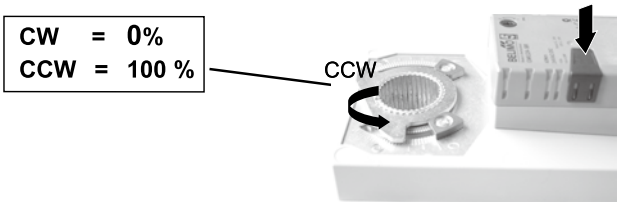

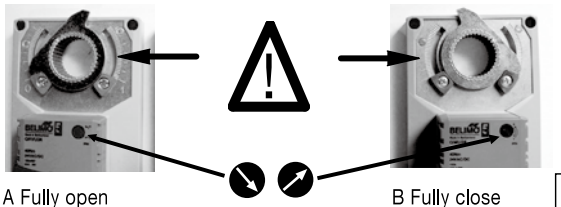

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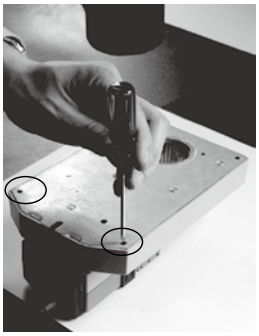

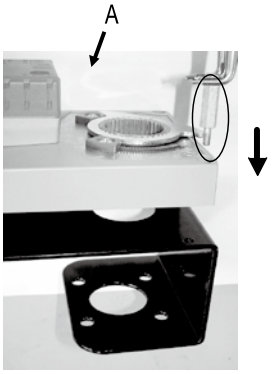

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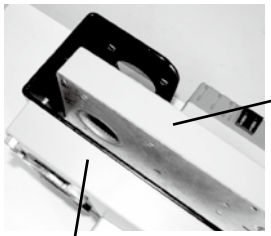

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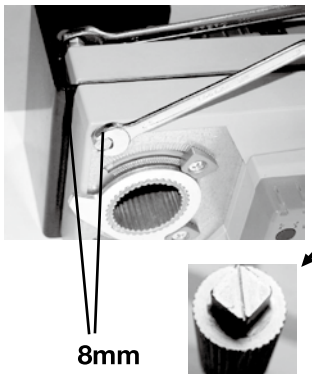

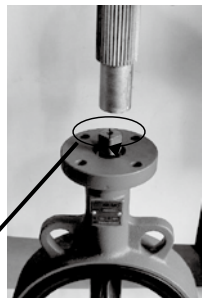

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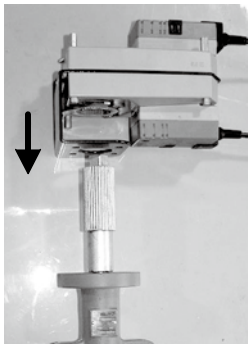

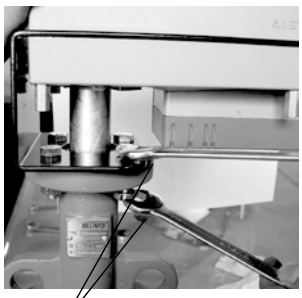

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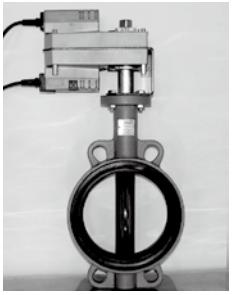
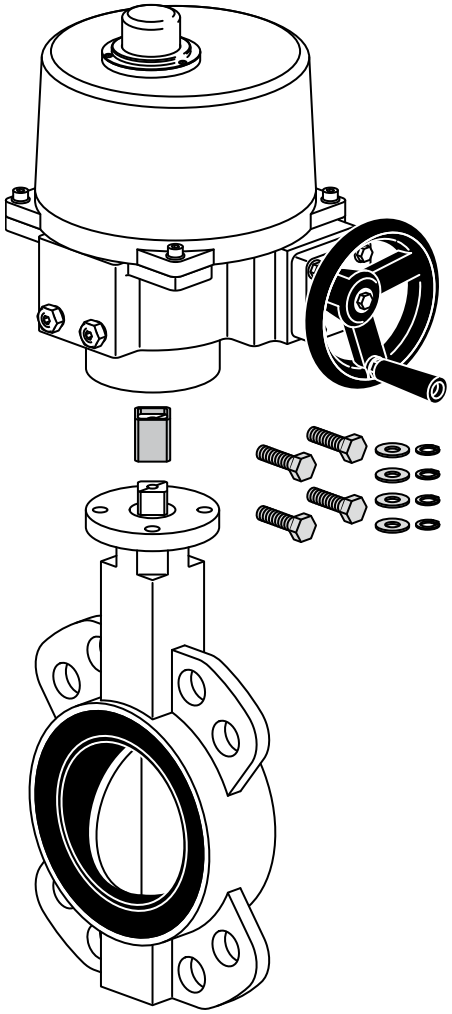


Test whether valve can be drivern by actuators to fully closed position

8

Subject to technical changes.



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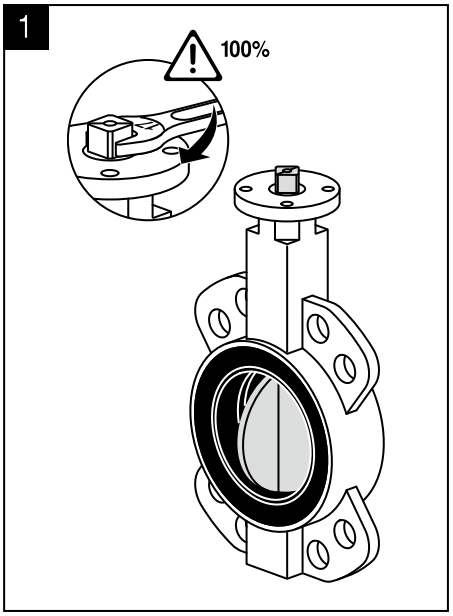

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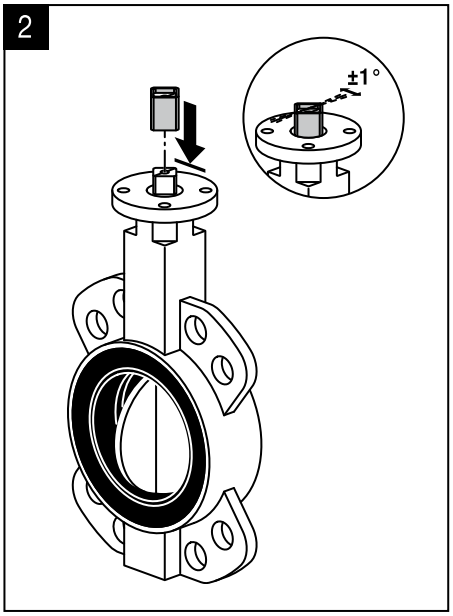

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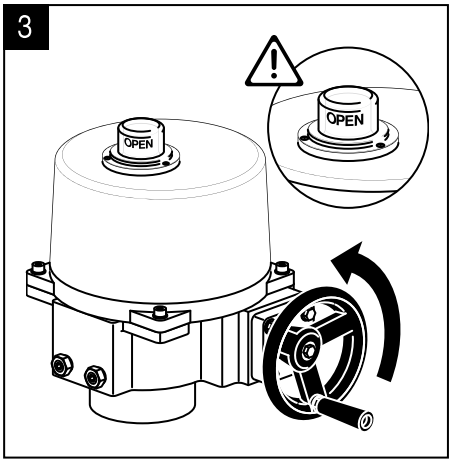

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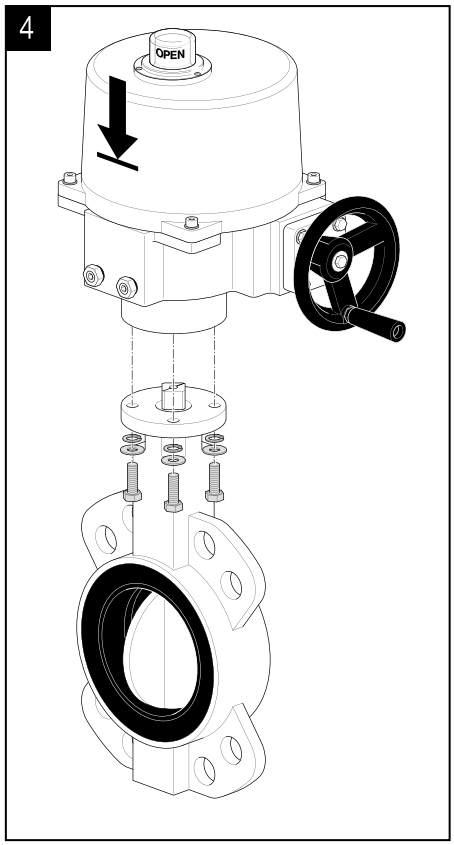

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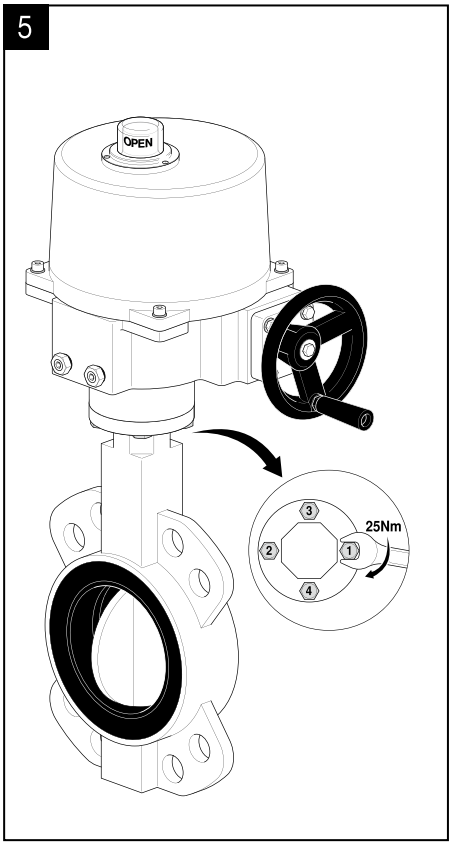

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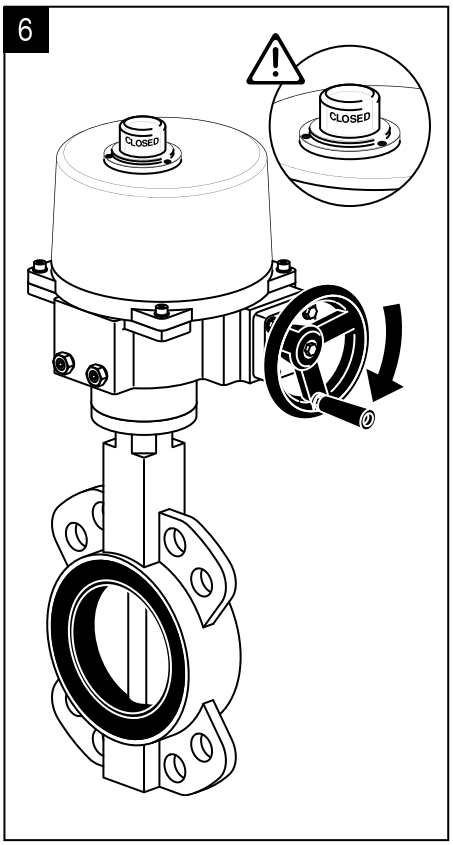

Subject to technical changes.

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A partnership for motorizing HVAC actuators

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