

Modulating rotary actuator for butterfly valves

- Torque 500 Nm
- Nominal voltage 24 V
- Control: Modulating DC 0 ... 10 V
- Position feedback: DC 0 ... 10 V
- 2 Auxiliary switches
- State at loss of signal: closed


Technical data

Electrical data	Nominal voltage	AC 24 V, 50/60 Hz	For 3-lead connection
		AC/DC 24 V, 50/60 Hz	For 4-lead connection
	Power supply range	AC/DC 21.6 ... 26.4 V	
	Power consumption	180 W @ nominal torque	
	Current consumption	6.5 A	
	Auxiliary switch	2 x EPU, 5 A, AC 230 V II $\bar{\text{I}}$ Switching points: 90° \curvearrowright	
	Connection	Terminals, 2 x 1.5 mm ² or 1 x 2.5 mm ²	
Parallel connection	Supply voltage	Not possible	
	Controller signals	Only possible for 4-lead connection	
Functional data	Torque (nominal torque)	Min. 500 Nm @ nominal voltage	
	Control Control signal Y	DC 0 ... 10 V, input impedance 100 k Ω	
	Operating range	DC 0.5 ... 10 V	
	Position feedback measuring voltage U5	DC 0 ... 10 V, max. 0.5 mA	
	Position accuracy	\pm 5% absolute	
	Manual override	Temporary with handwheel (not revolving)	
	Angle of rotation	90° \curvearrowright (internal limit switch)	
	Running time	22 s	
	Duty cycle	75% (e.g. 22s / 7s)	
	Sound power level	Max. 70 dB (A)	
	Position indication	Mechanical (integrated)	
Safety	Protection class	III Safety extra-low voltage	
	Degree of protection	IP67	
	EMC	CE according to 2004/108/EC	
	Low-voltage directive	CE according to 2006/95/EC	
	Certification	Tested in EN 61000-6-2 : 2005 accordance with EN 61000-6-4 : 2007	
	Mode of operation	Type 1 (EN 60730-1)	
	Rated impulse voltage	500 V (EN 60730-1)	
	Control pollution degree	4 (EN 60730-1)	
	Ambient temperature	-20 ... +60 °C	
	Medium temperature	-20 ... +120 °C (in the butterfly valve) max. 130 °C / 1 h	
	Non-operating temperature	-30 ... +80 °C	
	Ambient humidity	95% r.H., non-condensating (EN 60730-1)	
	Maintenance	Maintenance-free	
Mechanical data	Connection flange	ISO 5211 / F10	
	Housing material	Cast aluminium	
Dimensions / Weight	Dimensions	See «Dimensions» on page 6	
	Weight	Approx. 22 kg	

Safety notes



- The actuator has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- It may only be installed by suitably trained personnel.
Any legal regulations or regulations issued by government agency authorities must be observed during assembly.
- The device does not contain any parts that can be replaced or repaired by the user.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

Mode of operation	The actuator is controlled with a standard modulating signal and travels to the position defined by the control signal. The measuring voltage U serves for the electrical display of the actuator position 0 ... 100% and as slave control signal for other actuators.
Simple direct mounting	Simple direct mounting on the butterfly valve. The mounting position in relation to the butterfly valve can be selected in 90° steps.
Manual override	The butterfly valve can be closed (turn clockwise) and opened (turn counterclockwise) with the handwheel. The handwheel does not move while the motor is running.
Internal heating	An internal heater prevents condensation buildup.
High functional reliability	Mechanical stops limit the actuator to -2° and $92^\circ \pm 1$. The internal limit switches interrupt the voltage supply to the motor. In addition, a motor thermostat provides overload protection because at 135°C it interrupts the voltage supply.
Combination butterfly valve actuators	For suitable butterfly valves, their permitted media temperatures and closing pressures are referred to the butterfly documentation.

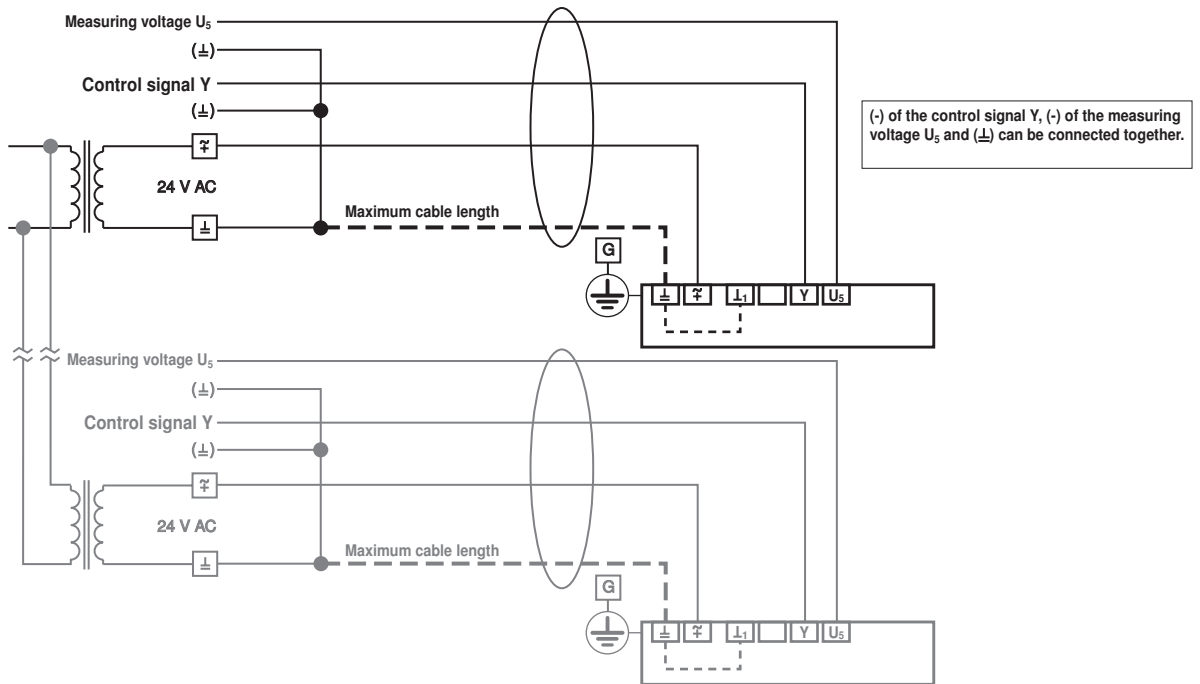
Restrictions for 3-lead (and 4-lead) connector techniques

The following overview shows the differences between the 24 V actuator wiring options. The same PCB (Print) can be used for both wirings.

	3-lead connection	4-lead connection
Description	Signal and connection to power supply have the same ground connection	Signal and connection to power supply have different ground connections
Supply voltage	AC only	AC / DC
Maximum cable length*	The maximum cable length is defined in the following connection diagram:	
Wire cross-section	0.75 mm ² 1.00 mm ² 1.50 mm ² 2.50 mm ²	No limitation
SY 2	12 m 17 m 24 m 43 m	No limitation
SY 3	12 m 17 m 24 m 43 m	No limitation
SY 4	5 m 7 m 10 m 17 m	No limitation
SY 5	5 m 7 m 10 m 17 m	No limitation
Measuring voltage U₅	U ₅ is stable as soon as the actuator stops	No limitation
Control signal mA	Not possible	The ground connection \perp must be wired to the actuator with mA control signal

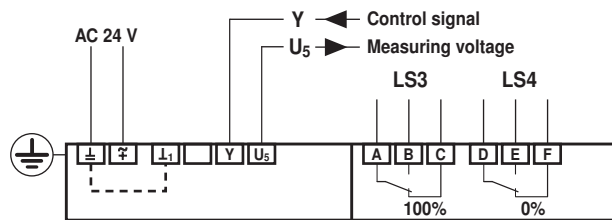
* The limitation regarding cable length is because of the large amounts of current required by the SY actuator. A high level of current will in turn have an influence on the signals.

3-lead system connection



Electrical installation for 3-lead connection

Wiring diagrams

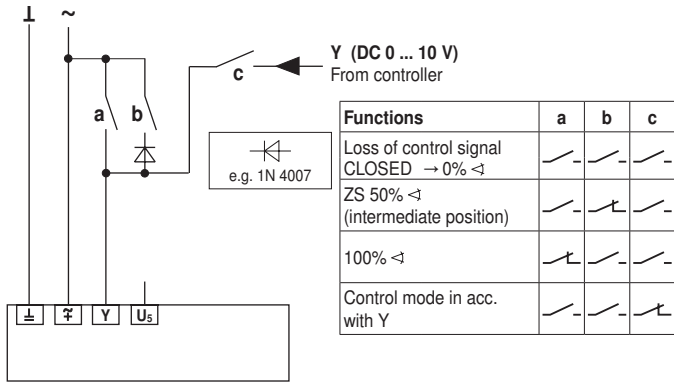


Actuator	Butterfly valve
Y1 ↻	A - AB = 100%
Y2 ↻	A - AB = 0%

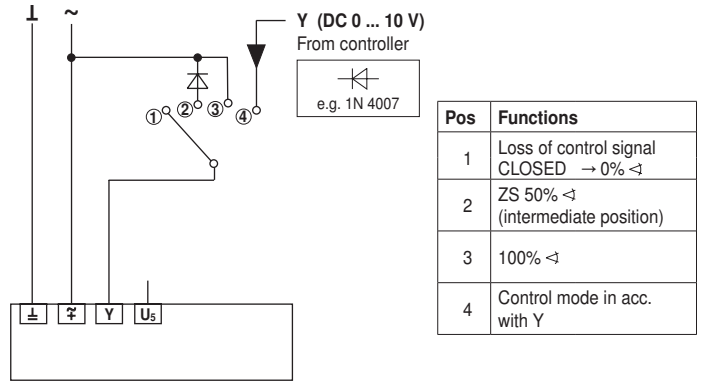
Auxiliary switch	Position	Butterfly valve
LS3	100%	open
LS4	0%	closed

Functions with basic values - 3-lead connection technology

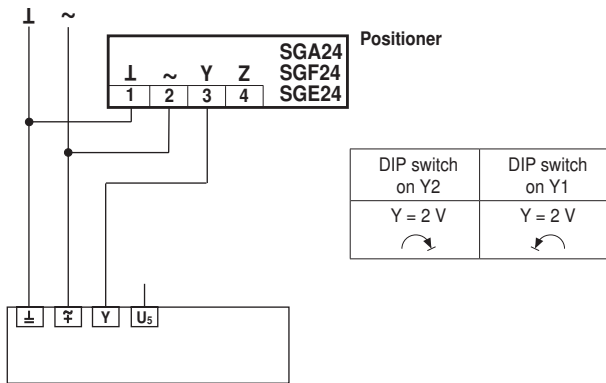
Override control with AC 24 V with relay contacts



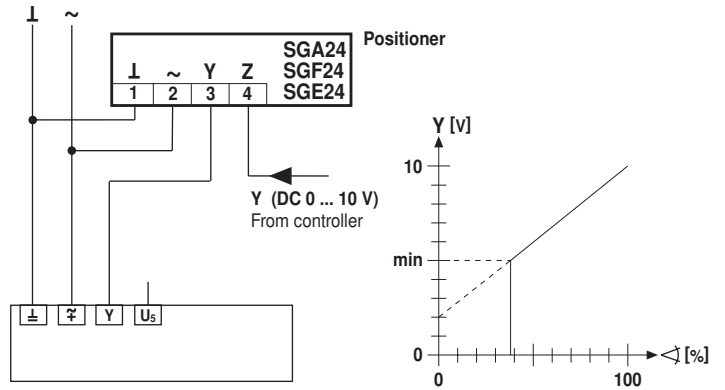
Override control with AC 24 V with rotary control switch



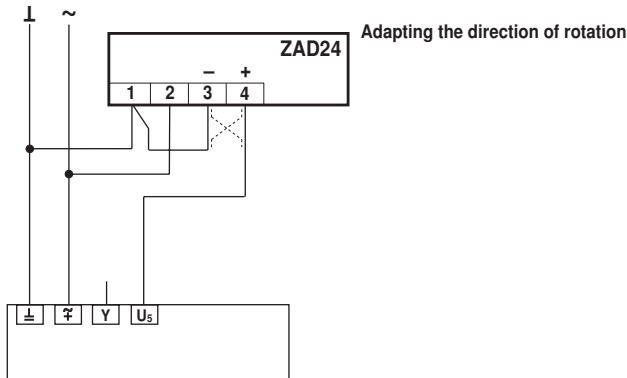
Remote control 0 ... 100 %



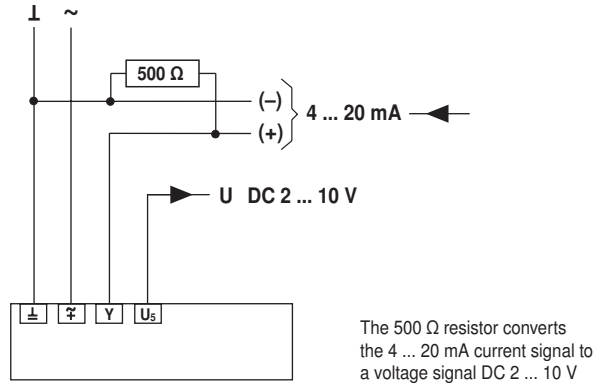
Minimum limit



Master/Slave control (position-dependent)



Control with 4 ... 20 mA via external resistance



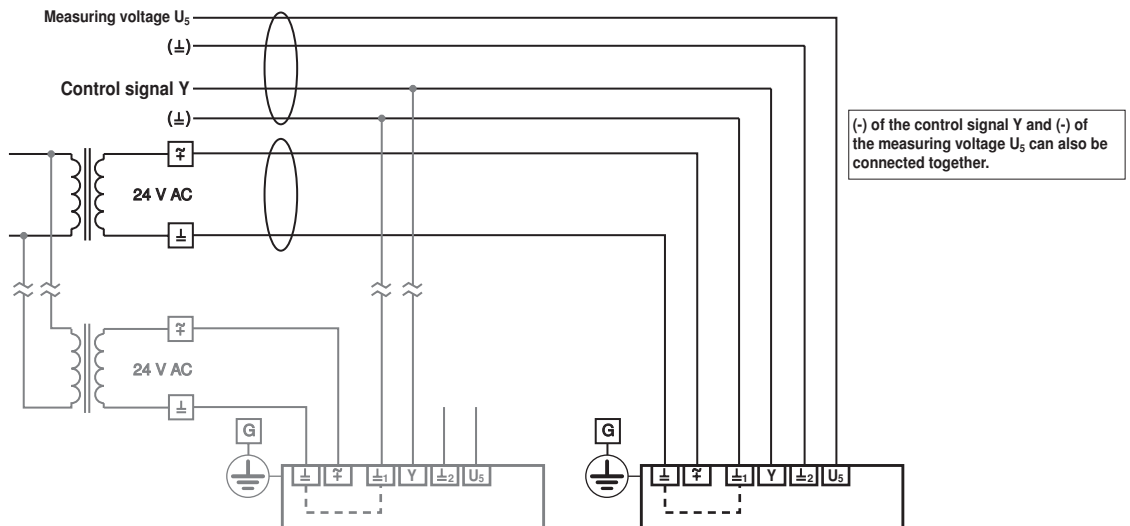
Restrictions for 4-lead (and 3-lead) connector technologies

The following overview shows the differences between the 24 V actuator wiring options. The same PCB (Print) can be used for both wirings.

	3-lead connection				4-lead connection
Description	Signal and connection to power supply have the same ground connection				Signal and connection to power supply have different ground connections
Supply voltage	AC only				AC / DC
Maximum cable length*	The maximum cable length is defined in the following connection diagram:				
Wire cross-section	0.75 mm ²	1.00 mm ²	1.50 mm ²	2.50 mm ²	No limitation
SY 2	12 m	17 m	24 m	43 m	No limitation
SY 3	12 m	17 m	24 m	43 m	No limitation
SY 4	5 m	7 m	10 m	17 m	No limitation
SY 5	5 m	7 m	10 m	17 m	No limitation
Measuring voltage U5	U5 is stable as soon as the actuator stops				No limitation
Control signal mA	Not possible				The ground connection \perp must be wired to the actuator with mA control signal

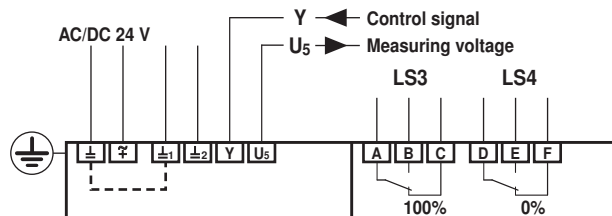
* The limitation regarding cable length is because of the large amounts of current required by the SY actuator. A high level of current will in turn have an influence on the signals.

4-lead system connection



Electrical installation for 4-lead connection

Wiring diagrams

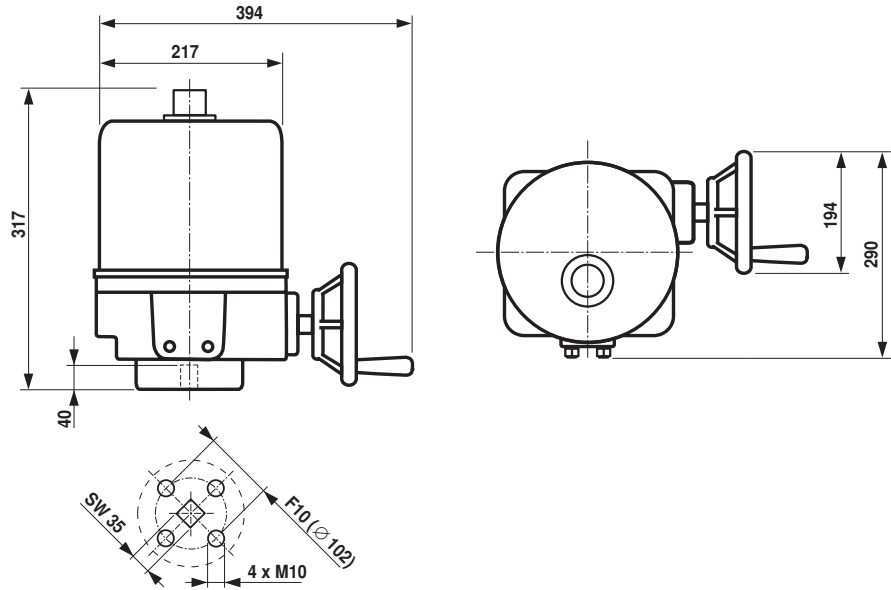


Actuator	Butterfly valve
\curvearrowright Y1	A - AB = 100%
\curvearrowleft Y2	A - AB = 0%

Auxiliary switch	Position	Butterfly valve
LS3	100%	open
LS4	0%	closed

Dimensions [mm]

Dimensional drawings



Settings

Setting cam

The setting cams for limit and auxiliary switches can be accessed by removing the housing cover.

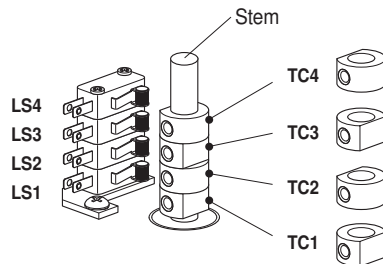
Optionally, auxiliary switches LS4/LS3 can be connected for signalling.

Limit switches LS2/LS1 interrupt the voltage to the motor and are controlled by setting cams TC...

The setting cams turn with the spindle. The butterfly valve closes when the stem is turning clockwise (cw) and opens when the stem is turning counterclockwise (ccw).

Important!

Settings are only allowed to be made by authorised specialist personnel.

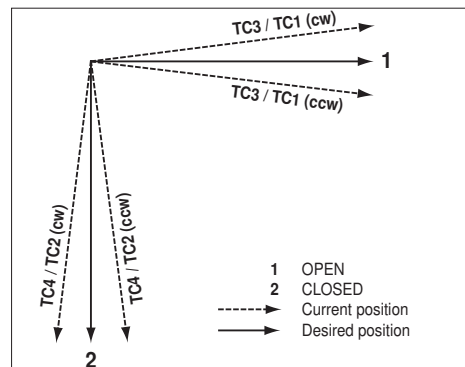


Settings of setting cams TC..

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

Adjusting setting cams

- 1 Use a 2.5 mm Allen key to unscrew the corresponding setting cams TC..
- 2 Turn the setting cam using the Allen key
- 3 Set as shown in the illustration below
- 4 Use the Allen key to tighten the setting cams



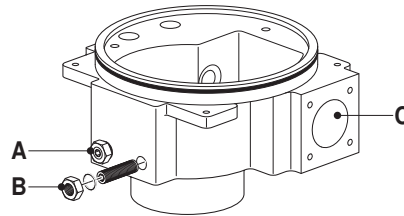
Adaption An adaptation must take place after the TC1 and TC2 have been adjusted.

Settings

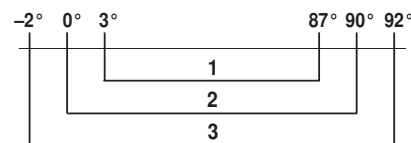
(continued)

Mechanical angle of rotation limitation

The mechanical angle of rotation is set at the factory to 92° and cannot be changed. The handwheel is rotated by means of a worm gear in a planetary gear unit. The gearing is stopped mechanically by means of two setscrews **1** and **2** (1½ rotations of the setscrews correspond to 2°↔). Both limit switches LS 2 /LS 1 are set to 90°↔ and must always switch off the motor before the mechanical angle of rotation limitation.

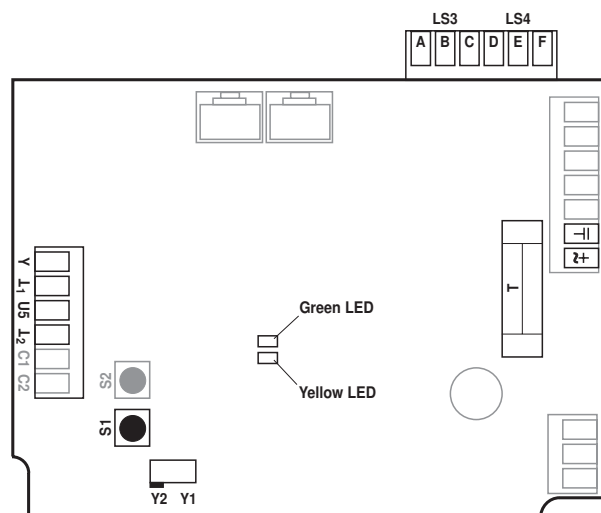


A Angle of rotation limiting OPEN (90°↔)
B Angle of rotation limiting CLOSED (0°↔)
C Connection of handwheel for angle of rotation limiting

Relationship between mechanical angle of rotation limiting, limit and auxiliary switches

1 Auxiliary switch TC3 / TC4
2 Limit switch TC1 / TC2
3 Mechanical angle of rotation limitation (A + B)

Connection and function elements

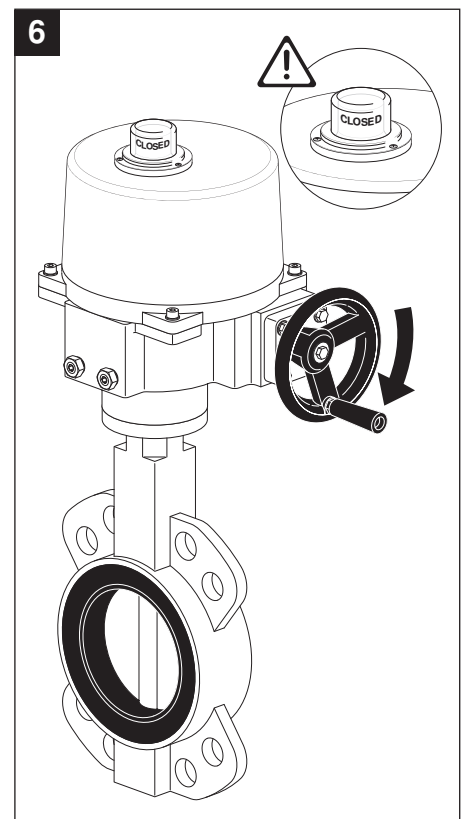
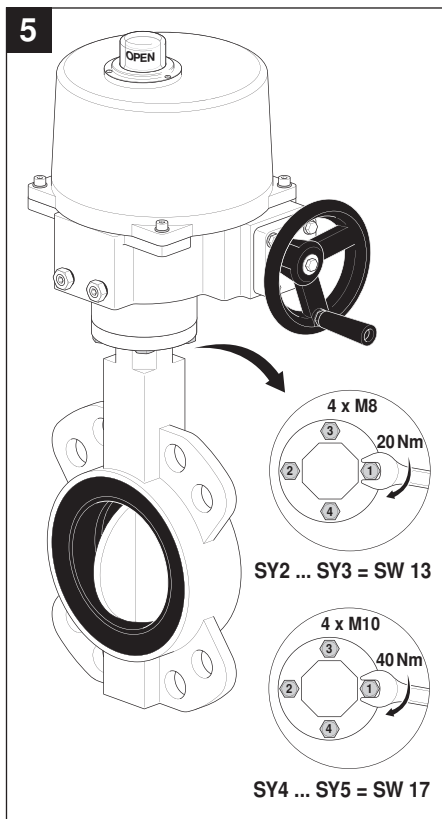
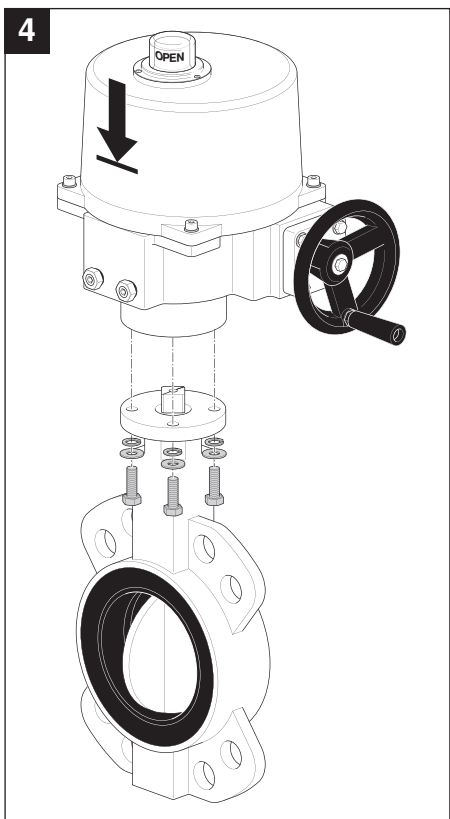
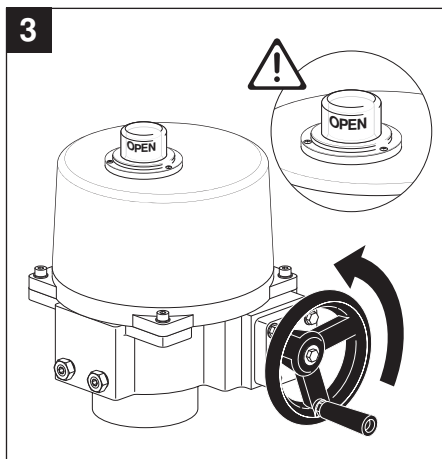
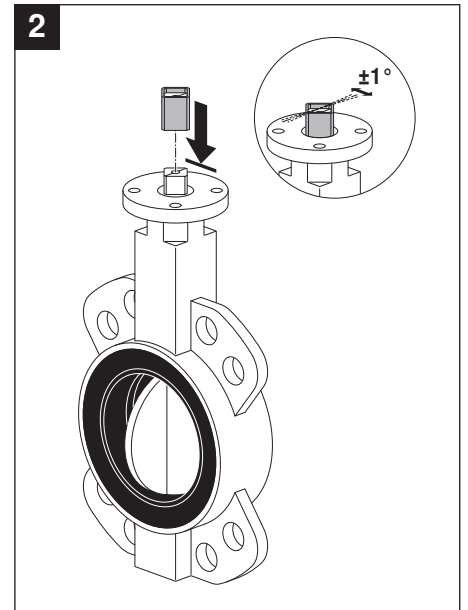
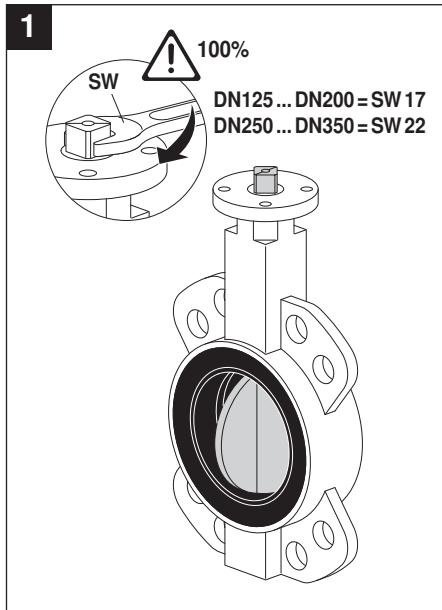
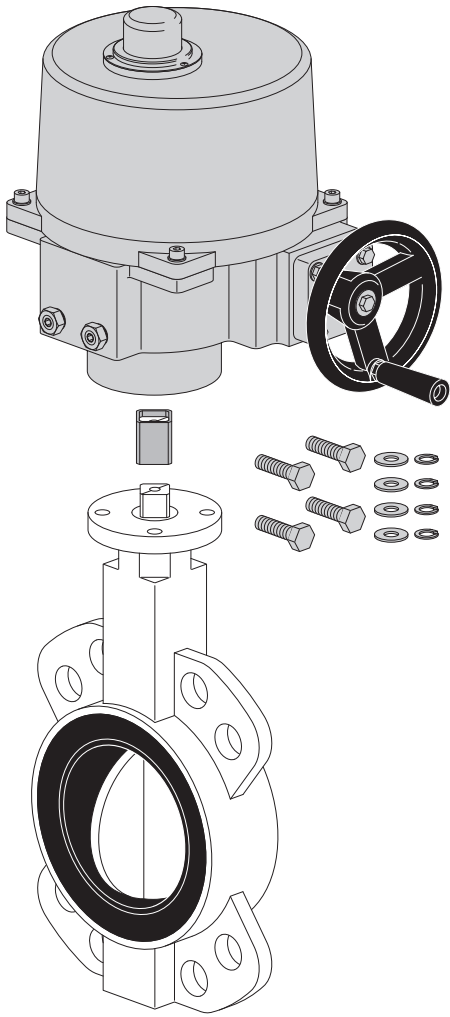


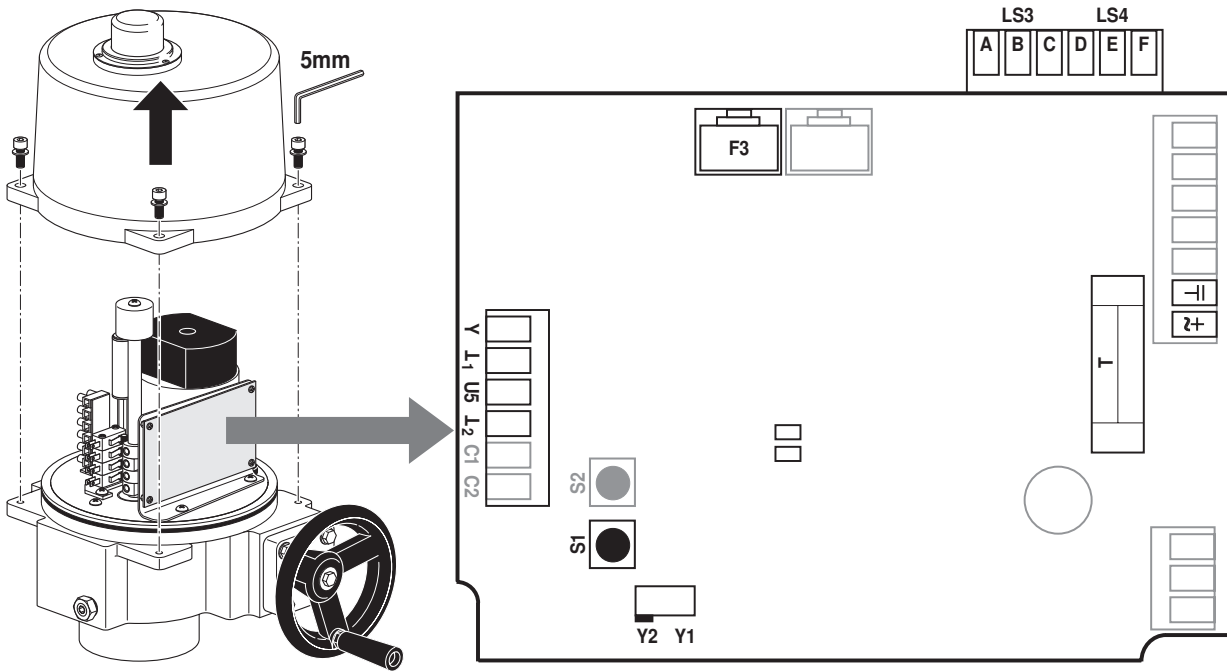
\pm / \mp	Power supply voltage	
Y1	Direction of rotation switch	Actuator rotates anticlockwise (ccw), valve opens
Y2	Direction of rotation switch	Actuator rotates clockwise (cw) valve closes
Y	Control signal	
U5	Position feedback	
L1 / L2	0-lead (ground)	
S1	Adaptation button	Adaptation procedure is started (press S1 for 3 s) Adaptation must take place after the TC1 and TC2 have been adjusted.
Yellow LED	On	Adaptation procedure activated
	Off	Standard operation
Green LED	On	In operation
	Off	No voltage supply or fault
T	Plug-in fuse	Type T10A250V
LS3	Auxiliary switch	Factory setting 87°↔
LS4	Auxiliary switch	Factory setting 3°↔
C1 / C2	Not used	
S2	Not used	

Further documentation

- Complete overview «The complete range of water solutions»
- Data sheets, butterfly valves
- Installation instructions for actuators and/or butterfly valves, respectively
- Notes for project planning (hydraulic characteristic curves and circuits, installation regulations, commissioning, maintenance. etc.)

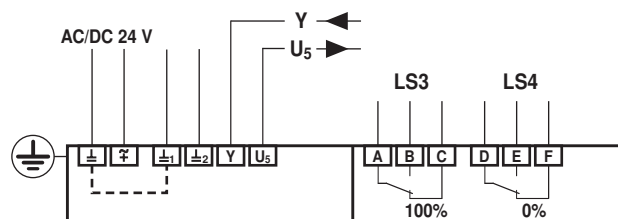
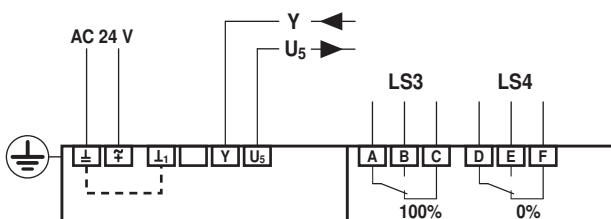
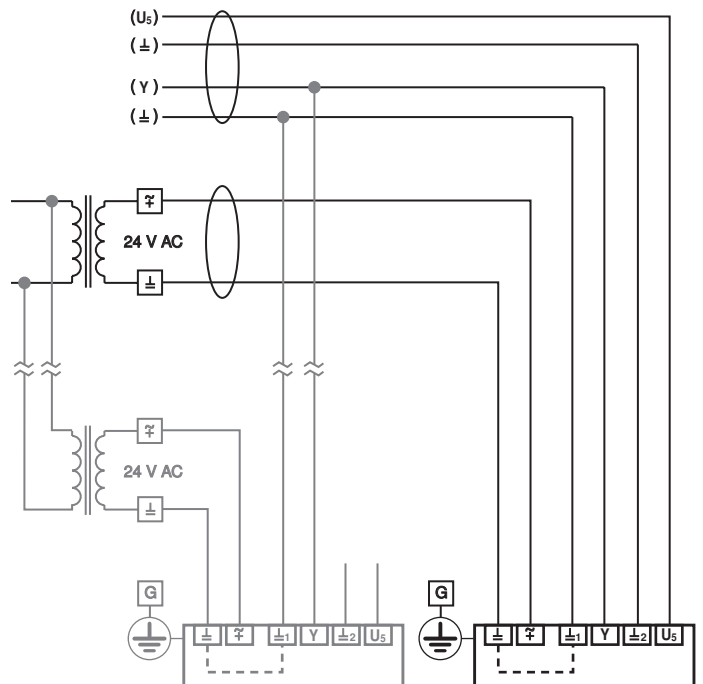
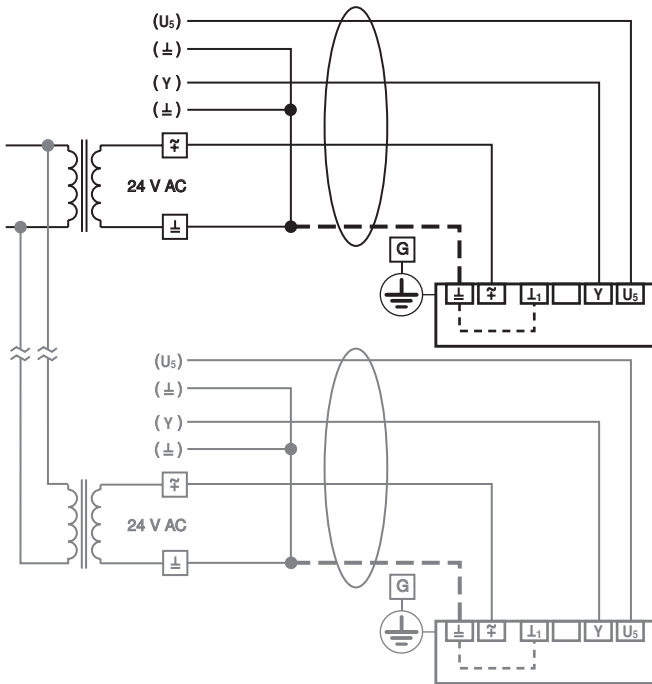
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SY..-24-SR-T / SY..-24-MF-T / SY..-24-MP-T

SY..-24-SR-T / SY..-24-MF-T



Y1 ←	A - AB = 100%
→ Y2	A - AB = 0%

Y1 ←	A - AB = 100%
→ Y2	A - AB = 0%

