BELIMO®

Configurable rotary actuator for butterfly valves
- **Torque motor 1500 Nm**
- **Nominal voltage AC 230 V**
- **Control modulating 2...10 V variable**
- **Position feedback 2...10 V variable**
- **with 2 integrated auxiliary switches**
- **with torque limit protection and alarm**

Technical data

Electrical data		
	Nominal voltage	AC 230 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 207...253 V
	Power consumption in operation	288 W
	Power consumption in operation note	incl. heating
	Power consumption for wire sizing	460 VA
	Current consumption	2.0 A
	Auxiliary switch	2 x SPDT, 1 x 3° / 1 x 87°
	Switching capacity auxiliary switch	1 mA...5 A (3 A inductive), DC 5 V...AC 250 V
	Connection supply / control	Terminals 2.5 mm² (Wire 2 x 1.5 mm² or 1 x 2.5 mm²)
	Parallel operation	Yes (note the performance data)

Functional data		
	Torque motor	1500 Nm
	Operating range Y	2...10 V
	Input Impedance	100 kΩ
	Operating range Y variable	Start point 0.5...30 V End point 2.5...32 V
	Position feedback U	2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	Start point 0.5...8 V End point 2.5...10 V
	Position accuracy	±5%
	Manual override	temporary with handwheel (non-rotating)
	Angle of rotation	90°
	Angle of rotation note	Internal limit switch, not adjustable
	Running time motor	55 s / 90°
	Duty cycle value	75% (= active time 55 s / operating time 73 s)
	Sound power level, motor	70 dB(A)
	Position indication	Mechanically (integrated)

Safety		
	Protection class IEC/EN	I protective earth (PE)
	Protection class auxiliary switch IEC/EN	I protective earth (PE)
	Degree of protection IEC/EN	IP67
	EMC	CE according to 2014/30/EU
	Low voltage directive	CE according to 2014/35/EU
	Mode of operation	Type 1
	Control pollution degree	4
	Ambient temperature	-30...65°C
	Storage temperature	-30...80°C
	Ambient humidity	Max. 95% r.H., non-condensing
	Servicing	maintenance-free

Mechanical data		
	Connection flange	F14

Weight		
	Weight	36 kg

Materials		
	Housing material	Die cast aluminium

Safety notes

⚠️

- This device has been designed for use in stationary heating, ventilation and air-conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Outdoor application: only possible in case that no (sea) water, snow, ice, insolation or aggressive gases interfere directly with the actuator and that is ensured that the ambient conditions remain at any time within the thresholds according to the data sheet.
- Caution: Power supply voltage!
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The device does not contain any parts that can be replaced or repaired by the user.
- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- Warning: Leakage current possible (<3.5 mA)! When connecting the actuator, connect the earth first and then the supply connections! Do not disconnect the earth until after both supply connections have been disconnected!
- A change of the preset angle of rotation limitation may not take place neither by means of limit switches nor by means of PC-Tool/ZTH-.. .

Product features

Mode of operation	The actuator is connected with a standard modulating signal and drives to the position defined by the positioning signal. The measuring voltage U serves for the electrical display of the actuator position 0...100% and as slave control signal for other actuators.
Parametrisable actuators	The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the Belimo Service Tool MFT-P.
Manual override	The butterfly valve can be closed (turn clockwise) and opened (turn anticlockwise) 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 end stops limit the actuator to –2° and 92°. The internal limit switches interrupt the voltage supply to the motor. In addition, a motor thermostat provides overload protection and interrupts the voltage supply if the actuator is used outside of the specified temperatures.
Torque protection	A torque limit switch is equipped to protect the system from structural overloads, in the event when the valve is outside of the recommended operating condition or when the valve is stuck. An alarm switch will be triggered when the torque limit switch
Combination valve/actuator	Refer to the valve documentation for suitable valves, their permitted fluid temperatures and closing pressures.
Signalling	The integrated auxiliary switches are equipped with a gold/silver coating that permits integration both in circuits with low currents (mA range) and in ones with larger-sized currents (A range) in accordance with the specifications in the data sheet. It should be noted with this application however that the contacts can no longer be used in the milliampere range after larger currents have been applied to them, even if this has taken place only once.

Accessories

	Description	Type
Electrical accessories	Connection cable 5 m, A+B: RJ12 6/6	ZK6-GEN
	Description	**Type**
Service Tools	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P

Electrical installation
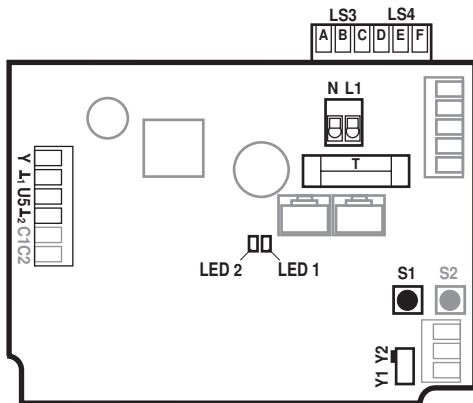
⚠	**Notes**	• Caution: Power supply voltage!

4-lead connection

4-lead system connection

Electrical installation for 4-lead connection

Y1 ↻	A – AB = 100%
↺ Y2	A – AB = 0%

LS3	100%
LS4	0%
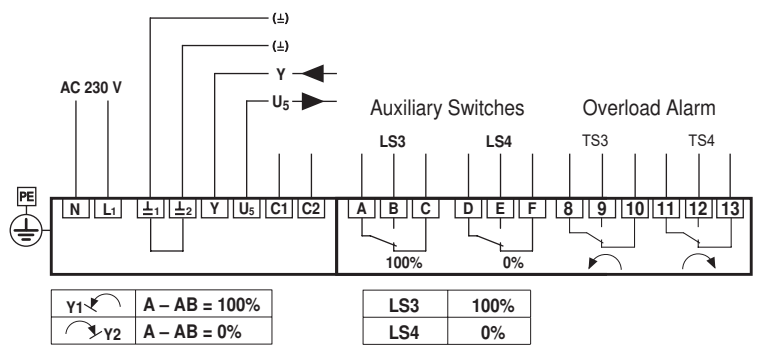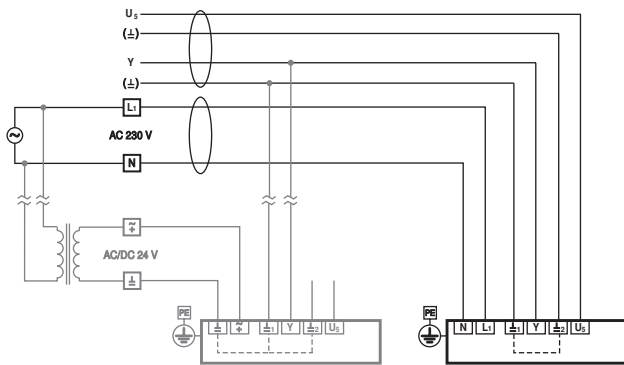
Connection and function elements

| N / L1	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	
$\perp_1$ / $\perp_2$	Ground 24 V-side	
S1	Adaptation button	Adaptation procedure is started (press S1 for 3 s) Adaptation must take place after the TC1/TC2 have been adjusted
S2	Not used	
LED 1 (yellow)	On	Adaptation procedure activated
	Off	Standard operation
LED 2 (green)	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	
TS3	Overload alarm ↰	Terminal #8 will loop to terminal #9 if torque value overloads
TS4	Overload alarm ↘	Terminal #11 will loop to terminal #12 if torque value overloads

Settings

	Notes	• Limit switches TC1/TC2 and angle of rotation limitation are provided with sealing varnish and may not be adjusted.

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 stem. The butterfly valve closes when the stem is turning clockwise (cw) and opens when the stem is turning counterclockwise (ccw).
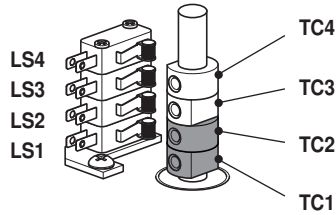
TC1/TC2 with sealing varnish: limit switches are secured against adjustment

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 (0°).
• TC1 for limit switch open (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 corresponding setting cams
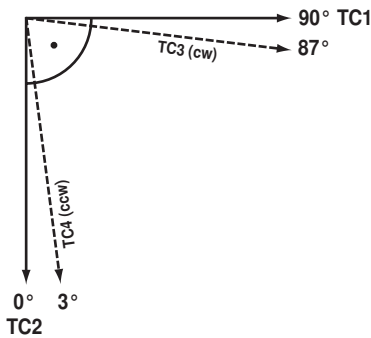
TC1: OPEN
TC2: CLOSED
TC3: Present position
TC4: Desired position

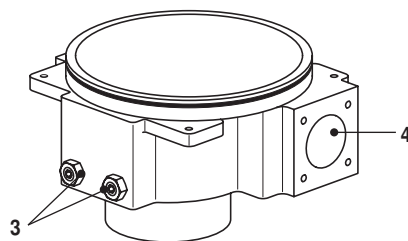**Mechanical angle of rotation limitation**

The mechanical angle of rotation (3) is set at the factory to -2° and 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 (3).

Relationship between mechanical angle of rotation limitation, limit and auxiliary switches
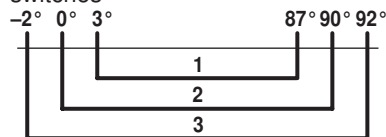
1: Auxiliary switch adjustable TC3 / TC4
2: Limit switch fix adjusted TC1 / TC2
3: Mechanical angle of rotation fix adjusted

3: Angle of rotation limitation with sealing varnish: Must not be adjusted
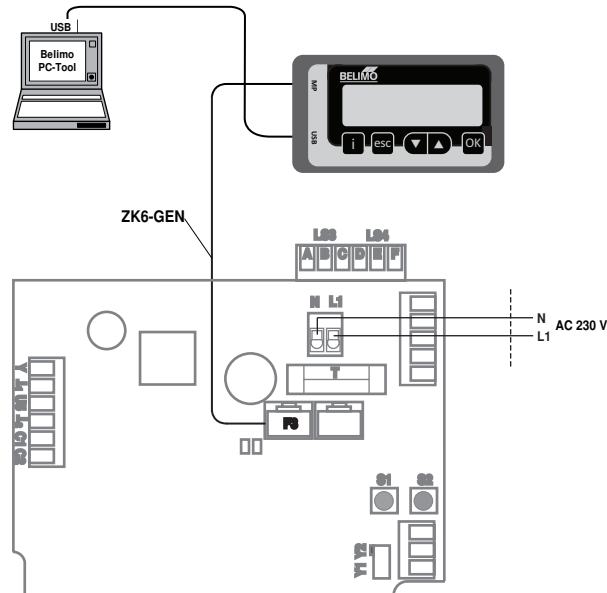4: Connection handwheel

Service

| ⚠ | **Notes** | • Actuators may be configured with Belimo PC-Tool MFT-P or ZTH EU service tool using the service socket of the actuator. |

Service Tools connection

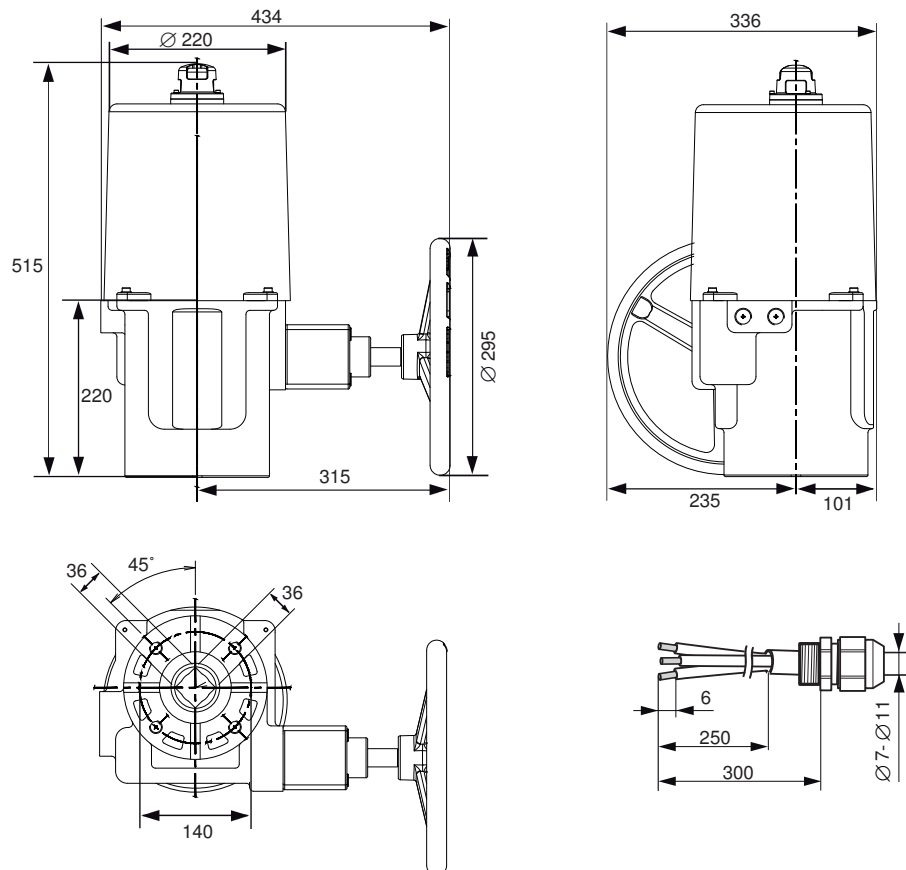Local connection with ZTH EU via service socket of the SY actuator.

Note
The housing cover must be opened so that the connections are accessible.

Dimensions [mm]

Dimensional drawings

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Further documentation

- Data sheets for butterfly valves
- Installation instructions for actuators and/or butterfly valves
- Notes for project planning for butterfly valves