

Configurable rotary actuator for rotary valves
and butterfly valves

- Torque motor Max. 90 Nm (not constant)
- Nominal voltage AC/DC 24 V
- Control modulating 2...10 V variable
- Position feedback 2...10 V variable
- Running time motor 150 s
- Optimum weather protection for use outdoors



Technical data

Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption in operation	6.5 W
	Power consumption in rest position	2.5 W
	Power consumption for wire sizing	9.5 VA
	Connection supply / control	Terminals 4 mm ² (cable Ø4...10 mm, 4-wire)
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	Max. 90 Nm (not constant)
	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
	Operating modes optional	Open/close 3-point (AC only) Modulating (DC 0...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	with push-button, can be locked
	Running time motor	150 s / 90°
	Running time motor variable	75...270 s
	Adaptation setting range	manual (automatic on first power-up)
	Adaptation setting range variable	No action Adaptation when switched on Adaptation after pushing the manual override button
	Override control	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, AC only) = 50%
	Override control variable	MAX = (MIN + 33%)...100% MIN = 0%...(MAX - 33%) ZS = MIN...MAX
	Sound power level, motor	45 dB(A)
	Position indication	Yes
Safety data	Protection class IEC/EN	III, Safety Extra-Low Voltage (SELV)
	Power source UL	Class 2 Supply
	Degree of protection IEC/EN	IP66/67
	Degree of protection NEMA/UL	NEMA 4X

Safety data	Enclosure	UL Enclosure Type 4X
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1
	Rated impulse voltage supply / control	0.8 kV
	Pollution degree	4
	Ambient humidity	Max. 100% RH
	Ambient temperature	-30...50°C [-22...122°F]
	Ambient temperature note	-40...50°C for actuator with integrated heating
	Storage temperature	-40...80°C [-40...176°F]
	Servicing	maintenance-free
Mechanical data	Connection flange	F05
Weight	Weight	5.5 kg

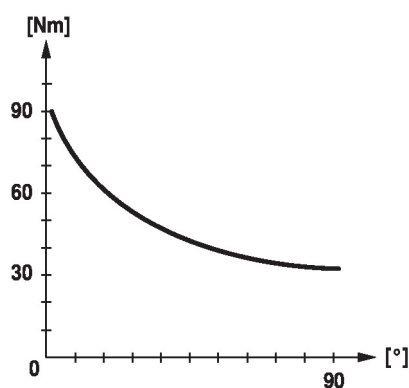
Safety notes


- 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.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- Junction boxes must at least correspond with enclosure IP degree of protection!
- The cover of the protective housing may be opened for adjustment and servicing. When it is closed afterwards, the housing must seal tight (see installation instructions).
- The switch for changing the direction of rotation may only be operated by authorised specialists. The direction of rotation must not in particular be reversed in a frost protection circuit.
- The angle of rotation is not permitted to be subjected to mechanical limitation. It is forbidden to alter the mechanical end stops.
- The device may only be opened at the manufacturer's site. It 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.
- The device is not designed for applications where chemical influences (gases, fluids) are present or for utilisation in corrosive environments in general.
- The actuator may not be used in plenary applications (e.g. suspended ceilings or raised floors).
- The materials used may be subject to external influences (temperature, pressure, construction fastening, effect of chemical substances, etc.), which cannot be simulated in laboratory tests or field trials. In case of doubt, we definitely recommend that you carry out a test. This information does not imply any legal entitlement. Belimo will not be held liable and will provide no warranty.
- If cables which are not authorised for UL (NEMA) Type 4X applications are used, then flexible metallic cable conduits or suitable threaded cable conduits of equal value are to be used.
- When used under high UV loads, e.g. extreme sunlight, the use of flexible metallic or equivalent cable conduits is recommended.

Product features

Fields of application	The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions: - UV radiation - Rain / Snow - Dirt / Dust - Air humidity - Alternating climate / frequent and severe temperature fluctuations (Recommendation: use the actuator with integrated factory-installed heating which can be ordered separately to prevent internal condensation)
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Mode of operation	The actuator is connected with a standard control signal of 0...10 V and drives to the position defined by the control signal. Measuring voltage U serves for the electrical display of the valve position 0.5...100% and as control signal for other actuators.
Parametrisable actuators	The factory settings cover the most common applications. Single parameters can be modified with the Belimo Service Tools MFT-P or ZTH EU.
Simple direct mounting	Simple direct mounting on the butterfly valve. The mounting orientation in relation to the butterfly valve can be selected in 90° (angle) increments.
Manual override	Manual override with push-button possible (the gear train is disengaged for as long as the button is pressed or remains locked). The housing cover must be removed for manual override.
Adjustable angle of rotation	Adjustable angle of rotation with mechanical end stops. Standard setting 0...90°. The housing cover must be removed to set the angle of rotation.
High functional reliability	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
Home position	The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out an adaptation, which is when the operating range and position feedback adjust themselves to the mechanical setting range. The actuator then moves into the position defined by the control signal. Factory setting: Y2 (counter-clockwise rotation).
Adaptation and synchronisation	An adaptation can be triggered manually by pressing the "Adaptation" button or with the PC-Tool. Both mechanical end stops are detected during the adaptation (entire setting range). Automatic synchronisation after pressing the manual override button is configured. The synchronisation is in the home position (0%). The actuator then moves into the position defined by the control signal. A range of settings can be adapted using the PC-Tool (see MFT-P documentation)
Torque not constant	Due to the non-linear torque characteristic the actuator can only be used for butterfly valves and not for other armatures.



Accessories

Electrical accessories	Description	Type
	Auxiliary switch 2 x SPDT add-on	S2A
	Feedback potentiometer 140 Ω add-on	P140A
	Feedback potentiometer 200 Ω add-on	P200A
	Feedback potentiometer 500 Ω add-on	P500A
	Feedback potentiometer 1 kΩ add-on	P1000A
	Feedback potentiometer 2.8 kΩ add-on	P2800A
	Feedback potentiometer 5 kΩ add-on	P5000A
	Feedback potentiometer 10 kΩ add-on	P10000A

Tools

Description	Type
Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
Adapter for Service-Tool ZTH	MFT-C
Service Tool, with ZIP-USB function, for parametrisable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH AP

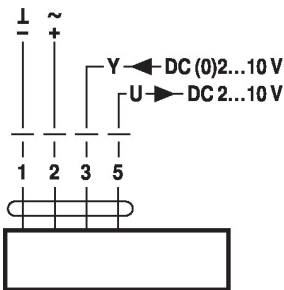
Options ex works only

Description	Type
Heater, with adjustable thermostat	HT24-MG
Heater, with mechanical humidistat	HH24-MG

Electrical installation

Supply from isolating transformer.
Parallel connection of other actuators possible. Observe the performance data.
Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.
Wiring diagrams

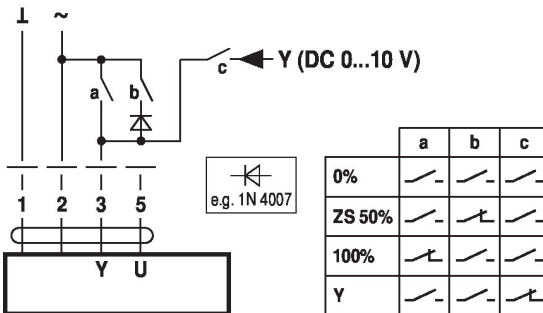
AC/DC 24 V, modulating


Cable colours:

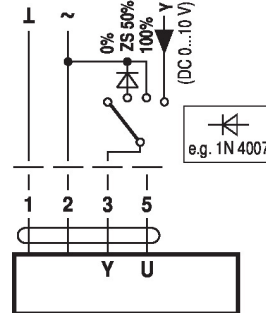
- 1 = black
- 2 = red
- 3 = white
- 5 = orange

Functions
Functions with basic values (conventional mode)

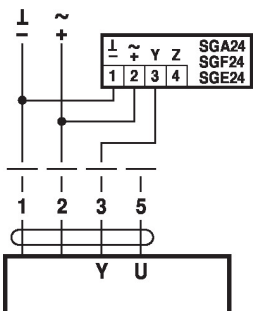
Override control with AC 24 V with relay contacts



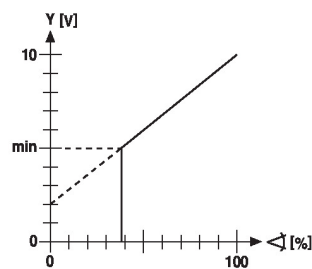
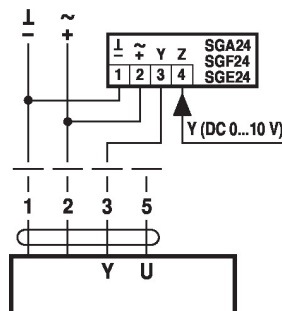
Override control with AC 24 V with rotary switch



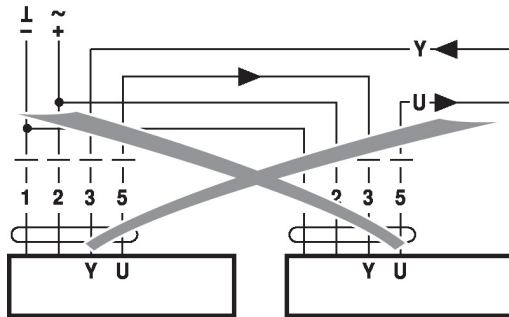
Control remotely 0...100% with positioner SG..



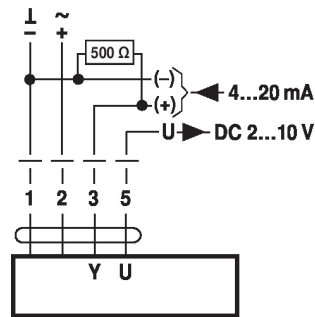
Minimum limit with positioner SG..



Follow-up control (position-dependent)

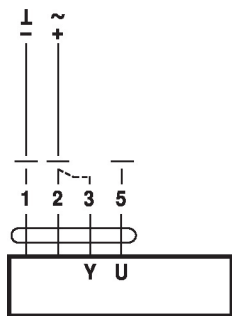


Control with 4...20 mA via external resistor



Caution:
The operating range must be set to DC 2...10 V.
The 500 Ω resistor converts the 4...20 mA current signal to a voltage signal DC 2...10 V

Functional check

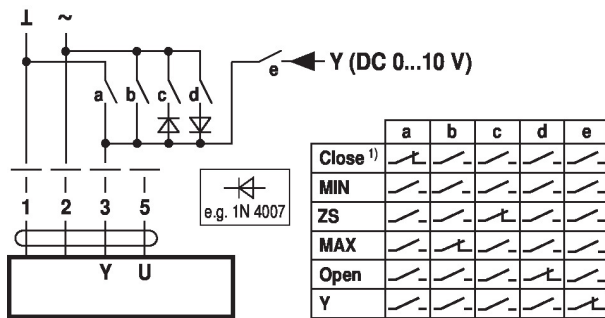


Procedure

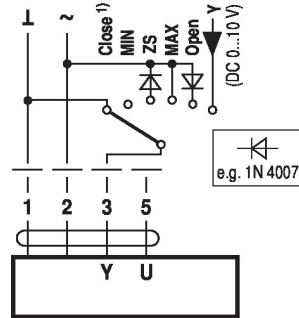
1. Connect 24 V to connections 1 and 2
2. Disconnect connection 3:
 - with direction of rotation Y1: Actuator rotates to the left
 - with direction of rotation Y2: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
 - Actuator runs in opposite direction

Functions with specific parameters (parametrisation necessary)

Override control and limiting with AC 24 V with relay contacts

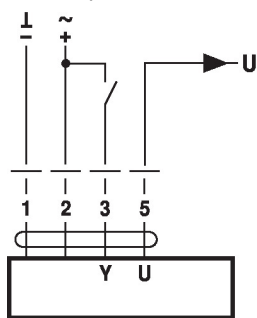


Override control and limiting with AC 24 V with rotary switch

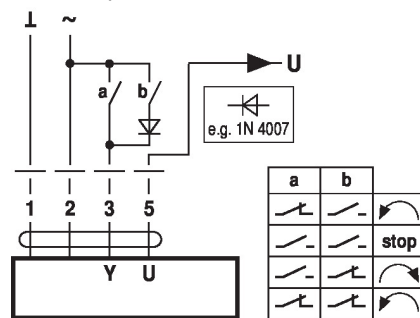


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

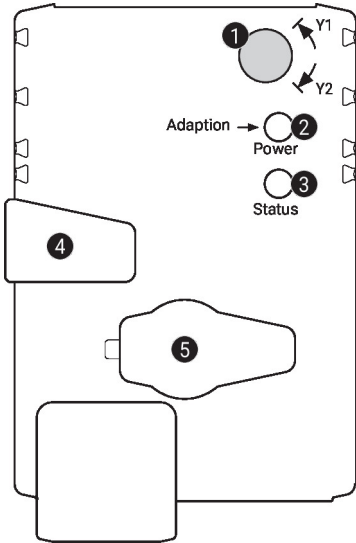
Control open/close



Control 3-point with AC 24 V



Operating controls and indicators



1 Direction of rotation switch

Switch over: Direction of rotation changes

2 Push-button and LED display green

Off: No power supply or malfunction

On: In operation

Press button: Triggers angle of rotation adaptation, followed by standard mode

3 Push-button and LED display yellow

Off: Standard mode

On: Adaptation or synchronisation process active

Press button: No function

4 Manual override button

Press button: Gear train disengages, motor stops, manual override possible

Release button: Gear train engages, standard mode

5 Service plug

For connecting parametrisation and service tools

Check power supply connection

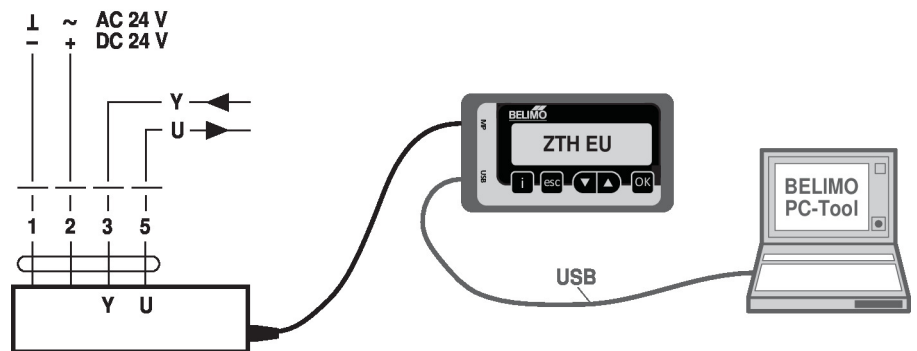
2 Off and 3 On Possible wiring error in power supply

Service

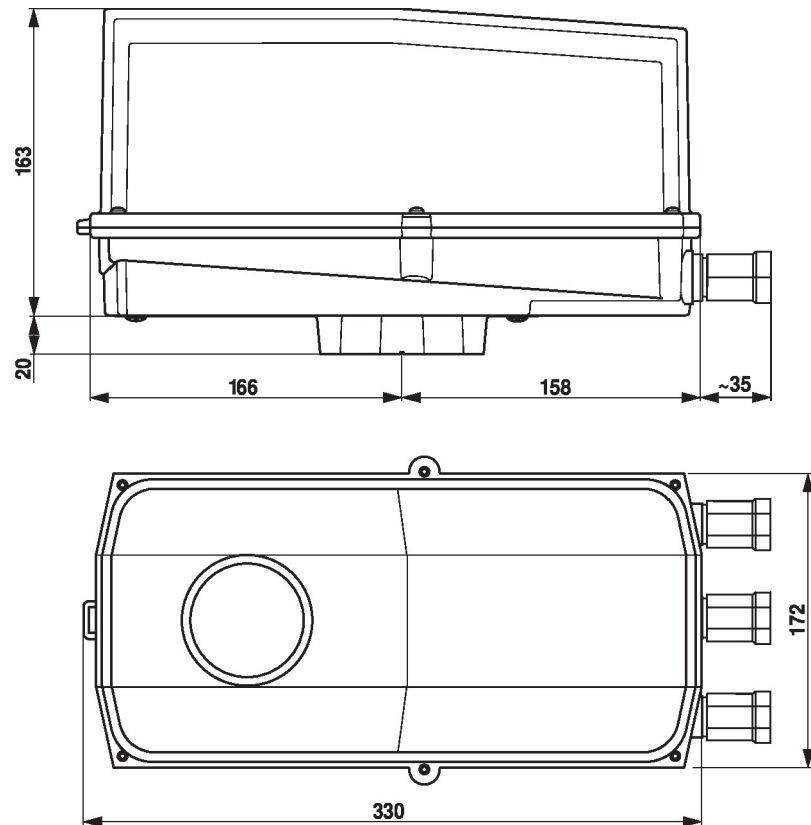
Tools connection The actuator can be parametrised by ZTH EU via the service socket.

For an extended parametrisation the PC tool can be connected.

Connection ZTH EU / PC-Tool



Dimensions



Further documentation

- The complete product range for water applications
- Data sheets for rotary valves and butterfly valves
- Installation instructions for actuators and/or rotary valves and butterfly valves
- General notes for project planning