

Parameterisable rotary actuator for rotary valves and butterfly valves

- Nominal torque 40 Nm
- Nominal voltage AC/DC 24 V
- Control Modulating DC (0)2...10 V Variable
- Stellungsrückmeldung DC 2...10 V Variable
- Running time motor 35 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	8 W
	Power consumption in rest position	2.5 W
	Power consumption for wire sizing	11 VA
	Connection supply / control	Terminals 4 mm ² (cable Ø 4...10 mm, 4-wire)
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	Min. 40 Nm
	Positioning signal Y	DC 0...10 V
	Positioning signal Y note	Input impedance 100 kΩ
	Control signal Y variable	Open-close 3-point (AC only) Modulating (DC 0...32 V)
	Operating range Y	DC 2...10 V
	Operating range Y variable	Start point DC 0.5...30 V End point DC 2.5...32 V
	Position feedback U	DC 2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	Start point DC 0.5...8 V End point DC 2.5...10 V
	Position accuracy	±5%
	Manual override	Gear disengagement with push-button, can be locked
	Running time motor	35 s / 90°
	Motor running time variable	35...150 s
	Adaption setting range	manual (automatic on first power-up)
	Adaption setting range variable	No action Adaption when switched on Adaption after pushing the gear disengagement 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	35 dB(A)
Position indication	Yes	
Safety	Protection class IEC/EN	III Safety extra-low voltage
	Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP66
	Degree of protection NEMA/UL	NEMA 4, UL Enclosure Type 4
	EMC	CE according to 2004/108/EC
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Certification UL	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1:02
	Mode of operation	Type 1
	Rated impulse voltage supply / control	0.8 kV

Technical data

Safety	Control pollution degree	4
	Ambient temperature	-30...50 °C
	Ambient temperature note	-40...50 °C for actuator with integrated heating
	Non-operating temperature	-40...80 °C
	Ambient humidity	100% r.h.
	Maintenance	Maintenance-free
Mechanical data	Connection flange	F05
Weight	Weight approx.	4.1 kg

Safety notes



- This device 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.
- 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 on the inside may only be opened in the manufacturer's factory. It 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.
- The actuator 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 subjected 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 4 applications are guided out of the unit, then flexible metallic cable conduits or suitable threaded cable conduits of equal value are to be used.

Product features

Fields of application	The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions: <ul style="list-style-type: none"> - UV radiation - rain / snow - dirt / dust - Humidity - Changing atmosphere / frequent and severe temperature fluctuations (recommendation: use the actuator with integrated factory-installed heating which can be ordered separately to prevent internal condensation)
Principle of operation	The actuator is connected with a standard modulating signal of DC 0...10V and travels to the position defined by the positioning signal. Measuring voltage U serves for the electrical display of the valve position 0...100% and as slave control signal for other actuators.
Parameterisable actuators	The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the PC-Tool MFT-P or with the Service tool ZTH EU.

Product features

Simple direct mounting	Simple direct mounting on the rotary valve or butterfly valve with mounting flange. The mounting orientation in relation to the fitting can be selected in 90° steps.
Manual override	Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked). The housing cover must be removed for manual override.
High functional reliability	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
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.
Combination valve/actuator	For valves with the following mechanical specifications in accordance with ISO 5211 F05: - Square stem head SW = 14 mm for form fit coupling of the rotary actuator. - Hole circle d = 50 mm
Home position	The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out an adaption, 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 positioning signal. Factory setting: Y2 (counter-clockwise rotation).
Adaption and synchronisation	An adaption can be triggered manually by pressing the „Adaption“ button or with the PC-Tool. Both mechanical end stops are detected during the adaption (entire setting range). Automatic synchronisation after pressing the gearbox disengagement button is configured. The synchronisation is in the home position (0%). The actuator then moves into the position defined by the positioning signal. A range of settings can be adapted using the PC-Tool (see MFT-P documentation)

Accessories

	Description	Type
Electrical accessories	Auxiliary switch, add-on, 1 x SPDT	S1A
	Auxiliary switch, add-on, 2 x SPDT	S2A
	Feedback potentiometer 140 Ohm, add-on	P140A
	Feedback potentiometer 200 Ohm, add-on	P200A
	Feedback potentiometer 500 Ohm, add-on	P500A
	Feedback potentiometer 1 kOhm, add-on	P1000A
	Feedback potentiometer 2.8 kOhm, add-on	P2800A
	Feedback potentiometer 5 kOhm, add-on	P5000A
	Heating with mechanical humidistat HH24-MG	HH24-MG
Heating with adjustable thermostat HT24-MG	HT24-MG	
	Description	Type
Service Tools	Service Tool, for MF/MP/Modbus/LonWorks actuators and VAV-Controller	ZTH EU
	Belimo PC-Tool, software for adjustments and diagnostics	MFT-P
	Adapter to Service-Tool ZTH	MFT-C

Electrical installation

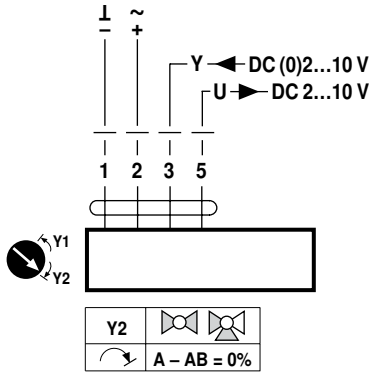


Notes

- Connection via safety 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



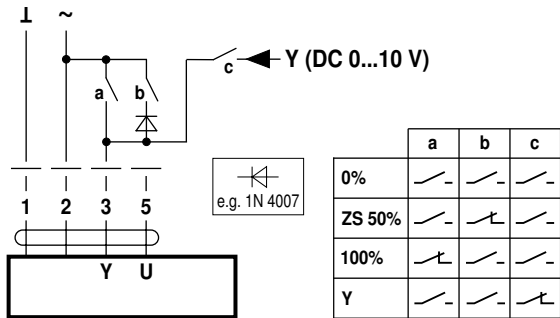
Cable colours:

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

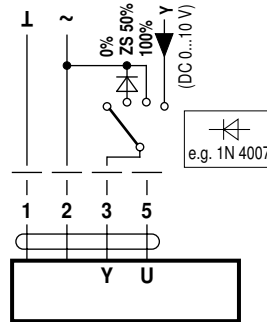
Functions

Functions with basic values (conventional mode)

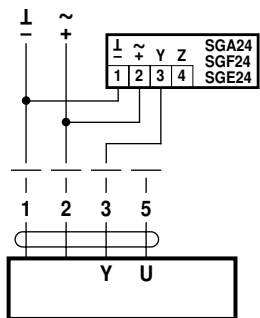
Override control with AC 24 V with relay contacts



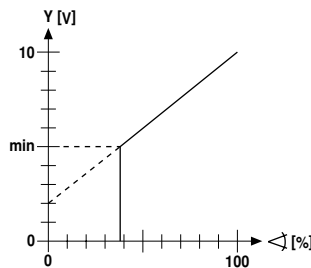
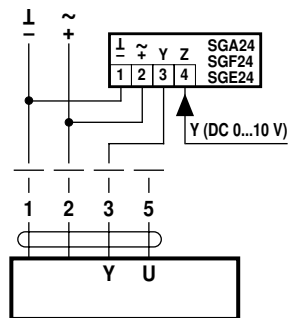
Override control with AC 24 V with rotary switch



Remote control 0...100% with positioner SG..

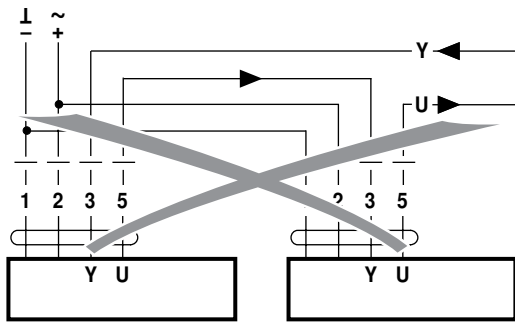


Minimum limit with positioner SG..

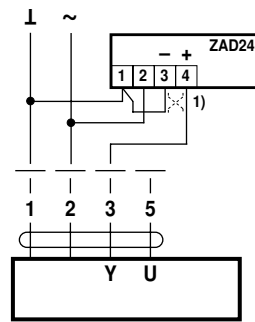


Functions

Follow-up control (position-dependent)

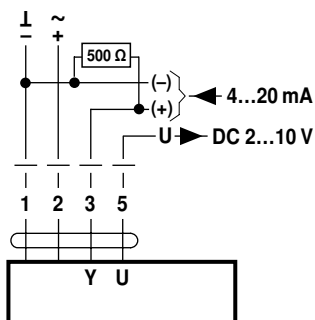


Position indication



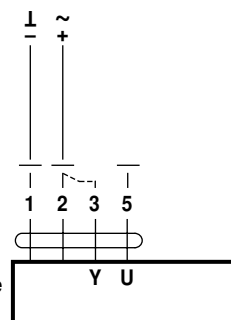
(1) Adapting the direction of rotation

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

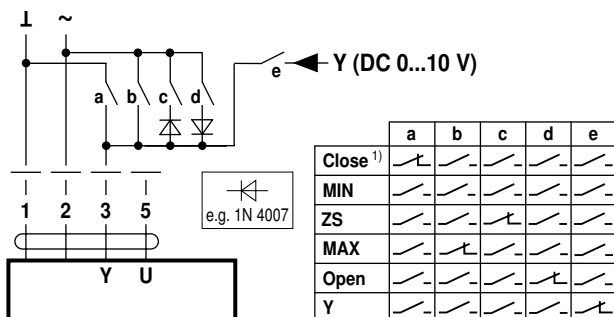
Functional check



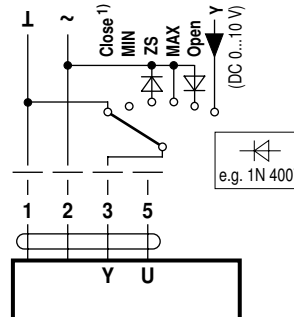
- Procedure**
1. Connect 24V to connections 1 and 2
 2. Disconnect connection 3:
 - with direction of rotation Y1: Actuator rotates to the left
 - with direction of rotation Y2: Actuator rotates to the right
 3. Short-circuit connections 2 and 3:
 - Actuator runs in opposite direction

Functions for actuators with specific parameters (Parametrisation with PC-Tool necessary)

Override control and limiting with AC 24 V with relay contacts

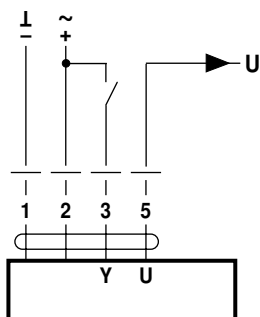


Override control and limiting with AC 24 V with rotary switch

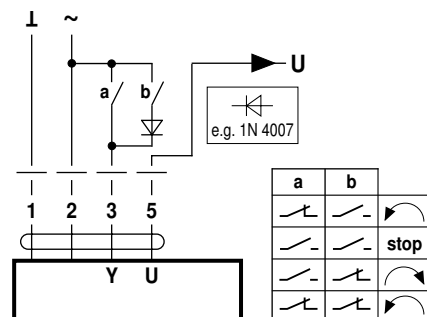


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

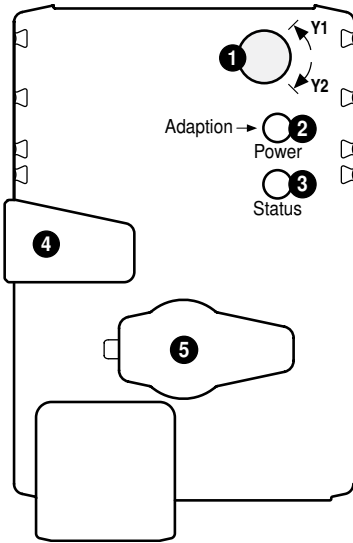
Control open-close



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 synchronising process active
Press button: No function
 - 4 Gear disengagement button**
Press button: Gear disengages, motor stops, manual override possible
Release button: Gear engages, synchronisation starts, followed by standard mode
 - 5 Service plug**
For connecting parameterisation and service tools
- Check power supply connection**
- 2** Off and **3** On Possible wiring error in power supply

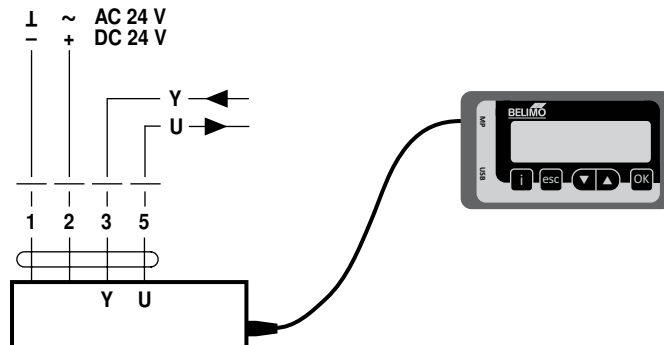
Service



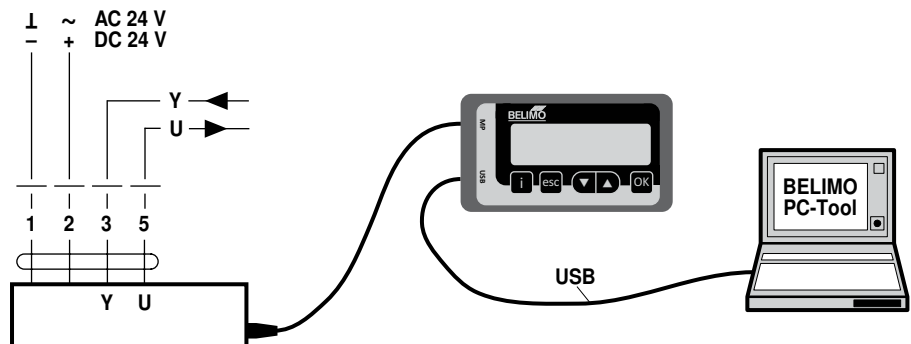
Notes

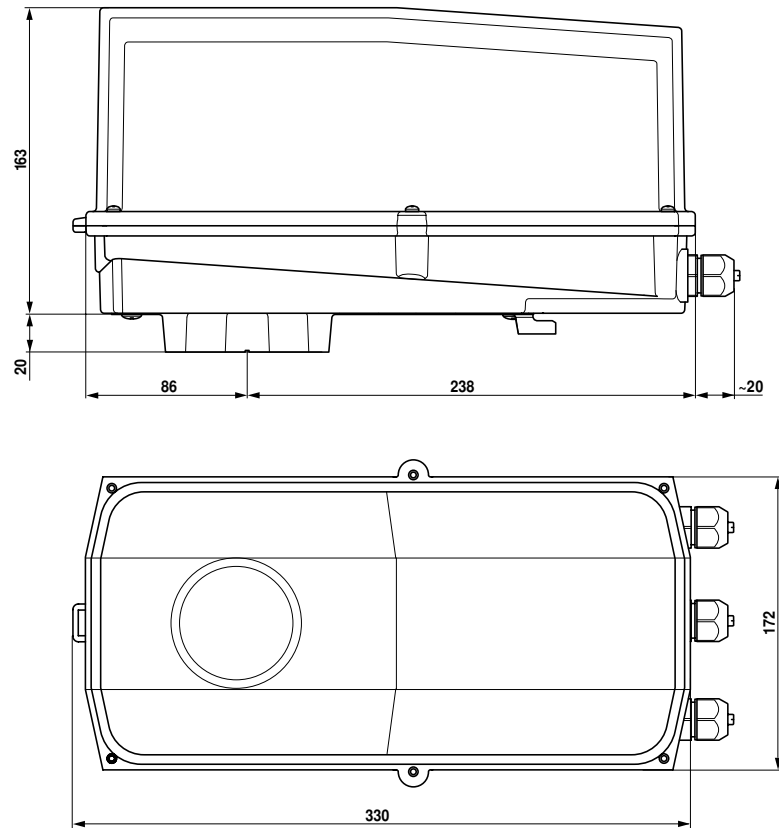
- The actuator can be parameterised by PC-Tool and ZTH EU via the service socket.

ZTH EU connection



PC-Tool connection



Dimensions [mm]**Dimensional drawings****Further documentation**

- Overview Valve-actuator combinations
- Data sheets for rotary valves and butterfly valves
- Installation instructions for actuators and/or rotary valves and butterfly valves
- General notes for project planning