Communicative rotary actuator for butterfly valves
- **Nominal torque 90Nm**
- **Nominal voltage AC/DC 24V**
- **Control Modulating: DC (0)2...10V variable**
- **Position feedback: DC 2...10V variable**
- **Communication via Belimo MP-Bus**
- **Conversion of sensor signals**

Technical data

Electrical data	Nominal voltage	AC/DC 24V
	Nominal voltage frequency	50/60Hz
	Nominal voltage range	AC 19.2...28.8V / DC 21.6...28.8V
	Power consumption in operation	9W
	Power consumption at rest	2W
	Power consumption for wire sizing	12VA
	Connection supply / control	Cable 1m, 4 x 0.75mm²
	Parallel operation	No
Functional data	Torque motor	max. 90Nm (not constant)
	Positioning signal Y	DC 0...10V
	Positioning signal Y note	Input impedance 100kΩ
	Control signal Y variable	Open-close 3-point (AC only) Modulating (DC 0...32V)
	Operating range Y	DC 2...10V
	Operating range Y variable	Start point DC 0.5...30V End point DC 2.5...32V
	Position feedback U	DC 2...10V
	Position feedback U note	Max. 0.5mA
	Position feedback U variable	Start point DC 0.5...8V End point DC 2.5...10V
	Position accuracy	±5%
	Manual override	Gear disengagement with push-button, can be locked
	Running time motor	150 s / 90°
	Motor running time variable	75...290 s
	Automatic adjustment of operating range to match the mechanical angle of rotation	Automatic adaptation of operating range and feedback to match the mechanical angle of rotation:Manual triggering of the adaption by pressing the «Adaption» button or with the PC-Tool
	Override control	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, AC only) = 50%
	Override control variable	MAX = (MIN + 30°)...100% MIN = 0%...(MAX – 30°) ZS = MIN...MAX
	Sound power level motor max.	45dB(A)
	Position indication	Yes
Safety	Protection class IEC/EN	III Safety extra-low voltage
	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2, UL Enclosure Type 2
	EMC	CE according to 2004/108/EC
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1
	Rated impulse voltage supply / control	0.8kV
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Non-operating temperature	-40...80°C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
Mechanical data	Connection flange	F07
Weight	Weight	Approx. 3.6kg

UL marked actuators is optional, please contact your local Sales Representative for details.

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.
- The switch for changing the direction of rotation may not be adjusted.
- 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 cables must not be removed from the device.
- 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

Conventional operation:
The actuator is connected with a standard modulating signal of DC 0...10V and travels 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.
Operation on the MP-Bus:
The actuator receives its digital positioning signal from the higher level controller via the MP-Bus and travels to the position defined. Connection U serves as communication interface and does not supply an analogue measuring voltage.

Converter for sensors

Connection option for a sensor (passive or active sensor or switching contact). The MP actuator serves as an analogue/digital converter for the transmission of the sensor signal via MP-Bus to the higher level system.

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 AP.

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 is disengaged for as long as the button is pressed or remains locked).

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.

Combination valve/actuator

For valves with the following mechanical specifications in accordance with ISO 5211 F07:
- Square stem head SW = 17mm for form fit coupling of the rotary actuator.
- Hole circle d = 70mm

Home position

The actuator moves to the home position when the supply voltage is switched on for the first time, i.e. at the time of commissioning or after pressing the «gear disengagement» key.
Factory setting: Y2 (counter-clockwise rotation).
The actuator then moves into the position defined by the positioning signal.

Y	
Y2	A – AB = 0%
Y1	A – AB = 100%

Accessories

	Description	Type
Electrical accessories	Gateway MP for BACnet MS/TP, AC/DC 24 V	S1A
	Gateway MP to Modbus RTU, AC/DC 24 V	
	Gateway MP for LonWorks®, AC/DC 24 V, LonMark-certified	
	Gateway MP to KNX/EIB, AC/DC 24 V, EIBA certified	
	Connecting board MP bus suitable for wiring boxes EXT-WR-FP..-MP	
	MP-Bus power supply for MP actuators, AC 230/24V for local power supply	
	Auxiliary switch, add-on, 1 x SPDT	
	Auxiliary switch, add-on, 2 x SPDT	
	Feedback potentiometer 140 Ohm, add-on	
	Feedback potentiometer 200 Ohm, add-on	
	Feedback potentiometer 500 Ohm, add-on	
	Feedback potentiometer 1 kOhm, add-on	
	Feedback potentiometer 2.8 kOhm, add-on	
	Feedback potentiometer 5 kOhm, add-on	
	Feedback potentiometer 10 kOhm, add-on	

UL marked actuators is optional, please contact your local Sales Representative for details.

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Accessories (continued)

	Description	Type
Service Tools	Service Tool, for MF/MP/Modbus/LonWorks actuators and VAV-Controller	ZTH AP
	Belimo PC-Tool, software for adjustments and diagnostics	MFT-P
	Adapter to Service-Tool ZTH	MFT-C
	ZIP-USB-MP interface	ZIP-USB-MP

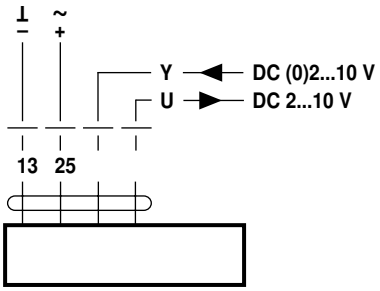
Wiring diagram

Notes

- Connection via safety isolating transformer.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

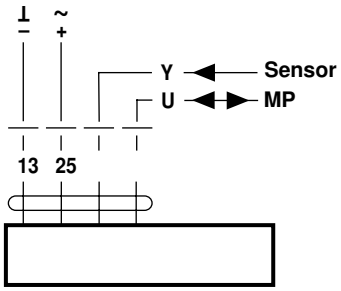
Wiring diagrams

AC/DC 24V, modulating



Cable colours:
1 = black
2 = red
3 = white
5 = orange

Operation on the MP-Bus



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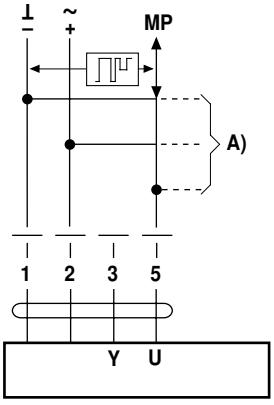
Functions

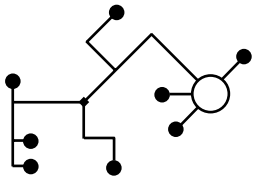
Functions when operated on MP-Bus

Connection on the MP-Bus



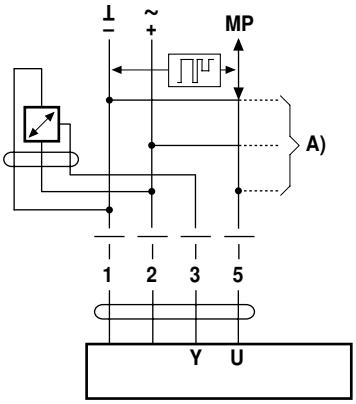
A) more actuators and sensors (max.8)

Power topology



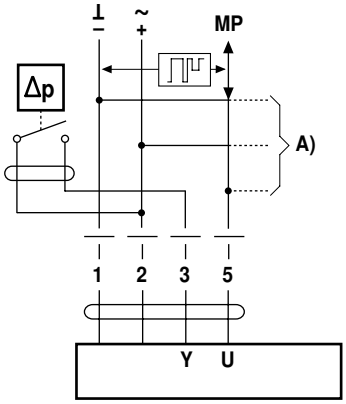
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).
Supply and communication in one and the same 3-wire cable
- no shielding or twisting necessary
- no terminating resistors required

Connection of active sensors



A) more actuators and sensors (max.8)
- Supply AC/DC 24V
- Output signal DC 0...10V (max. DC 0...32V)
- Resolution 30mV

Connection of external switching contact



A) more actuators and sensors (max.8)
- Switching current 16mA @ 24V
- Start point of the operating range must be parameterised on the MP actuator as ≥ 0.6V

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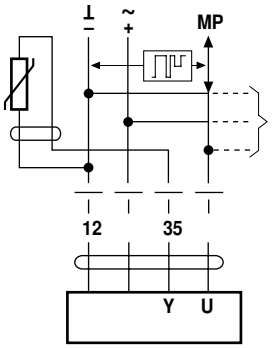
Functions

Connection of passive sensors

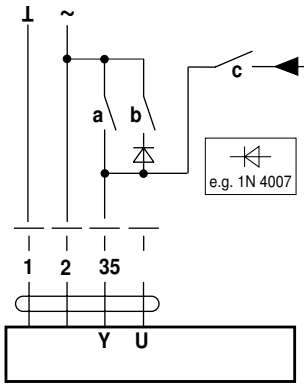


Ni1000	–28...+98°C	850...1600 Ω 2)
PT1000	–35...+155°C	850...1600 Ω 2)
NTC	–10...+160°C 1)	200 Ω...60 kΩ 2)

1) Depending on the type
2) Resolution 1Ohm

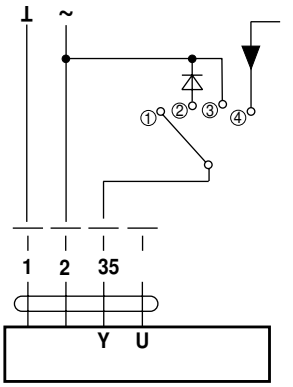
Functions with basic values (only in conventional mode)

Override control with AC 24V with relay contacts



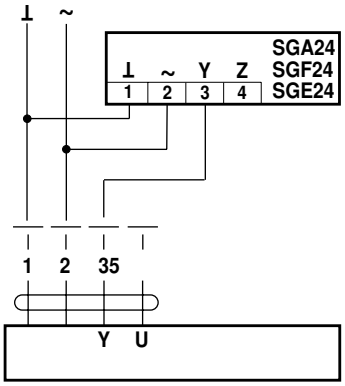
	ab		c
0%			
ZS 50%			
100%			
Y			

Override control with AC 24V with rotary switch

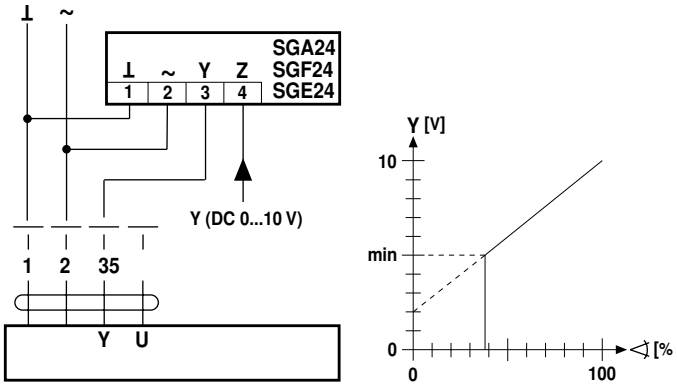


Pos	
10	%
2	ZS 50%
3	100%
4	Y

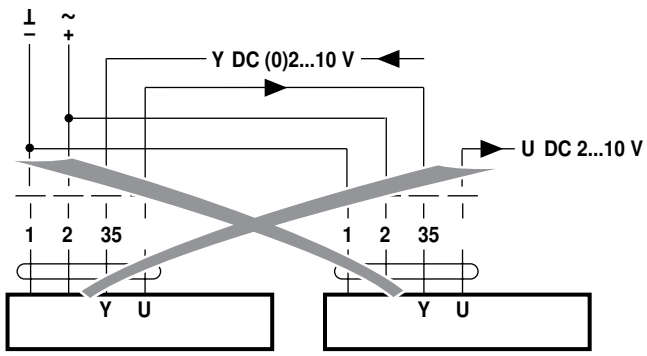
Remote control 0...100% positioner SG..



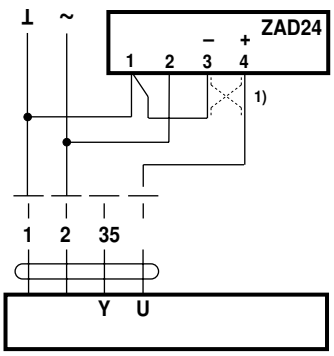
Minimum limit with positioner SG..



Follow-up control (position-dependent)



Position indication



(1) Adapting the direction of rotation

UL marked actuators is optional, please contact your local Sales Representative for details.

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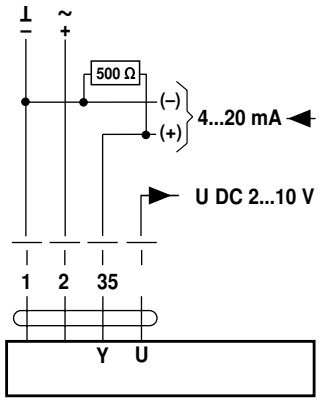
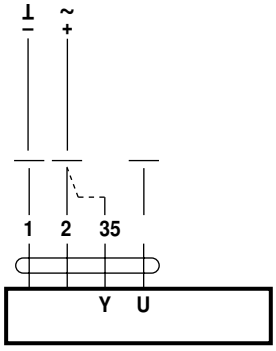
Functions

Follow-up control (position-dependent)



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

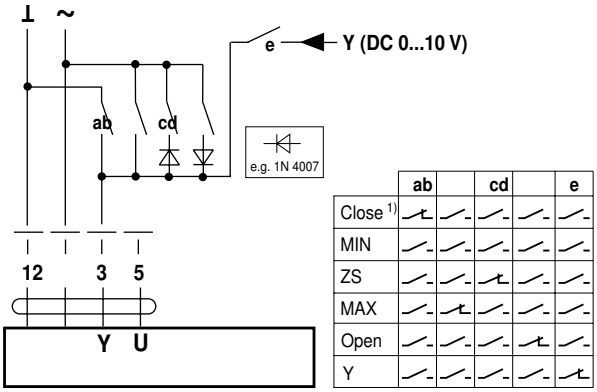
Position indication



Procedure
1. Connect 24V to connections 1 and 2
2. Disconnect connection 3:
– with direction of rotation 0: Actuator rotates to the left
– with direction of rotation 1: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
– Actuator runs in opposite direction

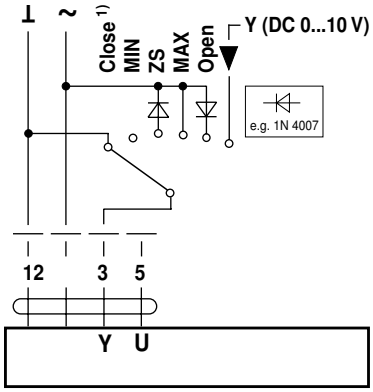
Functions for actuators with specific parameters (Parametrisation with PC-Tool necessary)

Override control and limiting with AC 24V with relay contacts



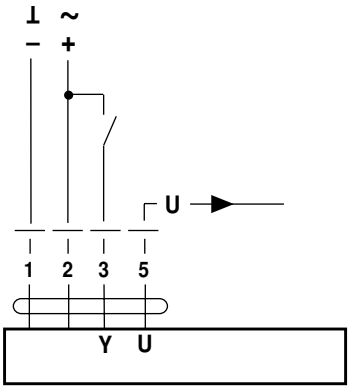
	ab		cd		e
Close [1]	⌐	_	⌐	_	_
MIN	_	_	⌐	_	_
ZS	_	_	_	_	_
MAX	_	⌐	_	_	_
Open	_	_	_	⌐	_
Y	_	_	_	_	⌐

Override control and limiting with AC 24V with rotary switch

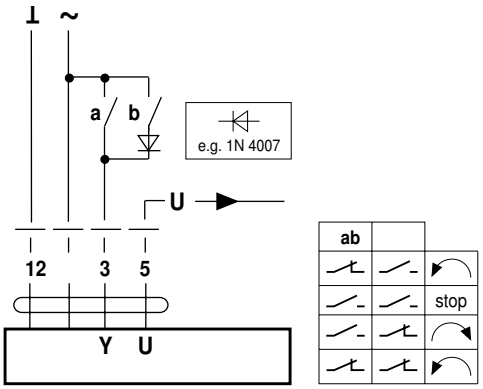


1) Caution: This function is only guaranteed if the start point of the operating range is defined as min. 0.6V.

Control open-close



AC/DC 24V, 3-point



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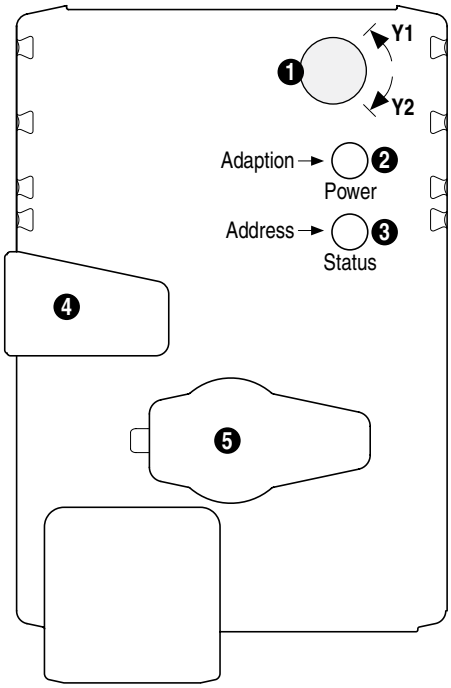
Operating controls and indicators



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 adaption followed by standard operation

3 Push-button and LED display yellow
Off: Standard mode without MP bus
Flickering: MP communication active
On: Adaption or synchronising process active
Flashing: Addressing request sent to MP master
Press button: Acknowledgment of addressing

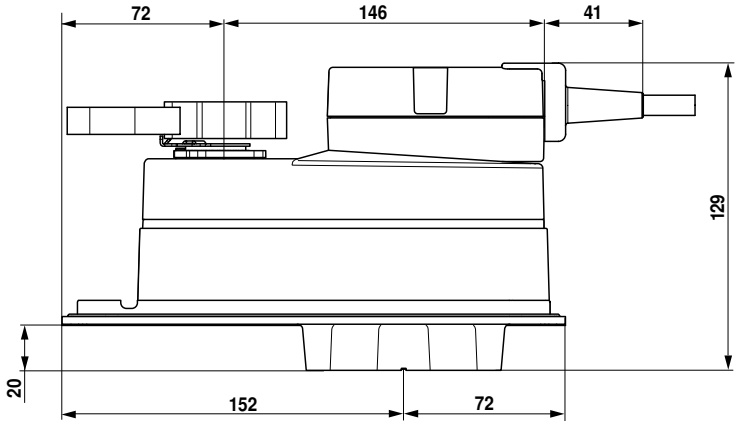
4 Gear disengagement button
Press button: Gear disengaged, motor stops, manual operation possible
Release button:Gear engaged, synchronisation starts, followed by standard operation

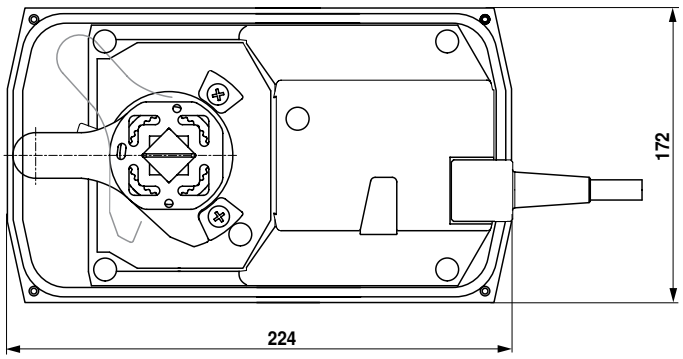
5 Service plug
For connecting parameterising and service tools

Check power supply connection
2 Off and 3 On: Possible wiring error in power supply

Dimensions [mm]

Dimensional drawings





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