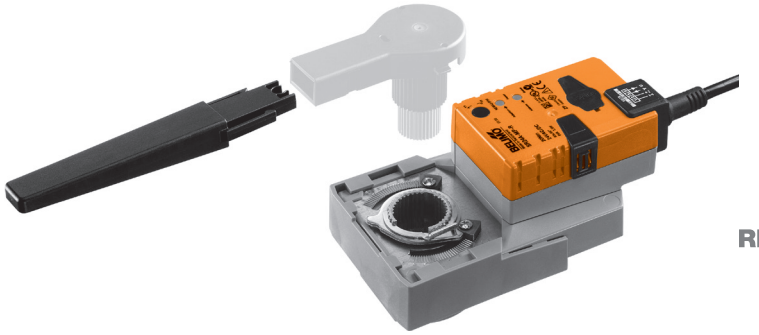
BELIMO

Technical data sheet SR24A-MF-R

Parameterisable Retrofit rotary actuator for rotary valves and butterfly valves

- **Nominal torque 20 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control modulating DC 0...10 V or variable**
- **Position feedback DC 2...10 V or variable**



RETROFIT

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	3.5 W
	Power consumption at rest	1.25 W
	Power consumption for wire sizing	6 VA
	Connection supply / control	Cable 1 m, 4 x 0.75 mm²
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	Min. 20 Nm
	Control signal Y	DC 0...10 V
	Control signal Y note	Input impedance 100 kΩ
	Control signal Y variable	Open-close 3-point (AC only)
	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% absolute
	Manual override	Gear disengagement with push-button, can be locked
	Running time motor	90 s / 90°
	Running time motor variable	90...150 s
	Angle of rotation adaption	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
	Angle of rotation adaption variable	Automatic adaption whenever the supply voltage is switched on, or manual triggering
	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.	35 dB(A)
	Sound power level variable	45 dB(A) @ 90 s running time 35 dB(A) @ 150 s running time
	Position indication	Mechanical, integrated, two-section
Safety	Protection class IEC/EN	III safety extra-low voltage
	Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2, UL Enclosure Type 2
	EMV	CE according to 2004/108/EC

Technical data

Safety	Certification IEC/EN	Certified to 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 current voltage supply / control	0.8 kV
	Control pollution degree	3
	Ambient temperature	0...50°C
	Non-operating temperature	-40...80°C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
Mechanical data	Connection flange	F03/F04/F05
Weight	Weight approx.	0.9 kg

Safety notes

- This 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.
- 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 only be operated by authorized personnel. The direction of rotation must not in particular be reversed in a frost protection circuit.
- The surface temperature between actuator and fitting may not exceed 50°C.
- 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 cable 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

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.

Parameterisable actuators

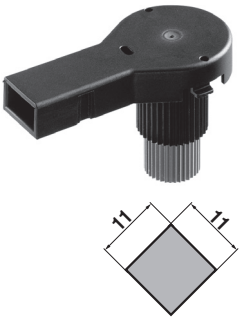
The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the PC-Tool MFT-P or with the Service tool ZTH-GEN.

Application

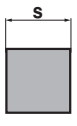
For rotary valves and butterfly valves with the following mechanical specifications:
– ISO 5211: F03, F04, F05 (hole circle diameter on the flange for mounting the fitting)
– ISO 5211: quadratic, flat head or wedge-shaped stem head geometry

Tappet shaft

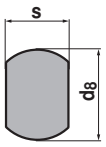
The tappet shaft is not included in the scope of delivery (see «Accessories»).



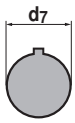
Type
ZSV-11-4K



Type	s [mm]
ZSV-08	8
ZSV-09	9
ZSV-10	10
ZSV-11	11
ZSV-12	12
ZSV-14	14



Type	s [mm]	d_8 [mm]
ZSF-08	8	10
ZSF-09	9	12
ZSF-10	10	14
ZSF-11	11	14
ZSF-14	14	18



Type	d_7 [mm]
ZSK-12	12
ZSK-14	14

Product features

Direct mounting Simple direct mounting on the rotary actuator or butterfly valve with mounting flange. The mounting orientation in relation to the fitting can be selected in 90° steps.

Manual override Manual operation ist possible with the push-button (the gearing latch remains disengaged as long as the push-button is pressed or detented).

Adjustable angle of rotation Adjustable angle of rotation with mechanical end stops.

High functional reliability The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.

Position indication The two-section position indication (lever) can be reduced to 70 mm, the front part of the lever can be attached to the cable (clip).

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

Electrical accessories

Description	Type
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
Feedback potentiometer 10 kOhm, add-on	P10000A

Mechanical accessories

Description	Type
Form fit adapter SR, 8x8x57 mm	ZSV-08
Form fit adapter SR, 9x9x57 mm	ZSV-09
Form fit adapter SR, 10x10x57 mm	ZSV-10
Form fit adapter SR, 11x11x57 mm	ZSV-11
Form fit adapter SR, 11x11x57 mm (square)	ZSV-11-4K
Form fit adapter SR, 12x12x57 mm	ZSV-12
Form fit adapter SR, 14x14x57 mm	ZSV-14
Form fit adapter SR, 8xØ17x57 mm	ZSF-08
Form fit adapter SR, 9xØ12x57 mm	ZSF-09
Form fit adapter SR, 10xØ17x57 mm	ZSF-10
Form fit adapter SR, 11xØ14x57 mm	ZSF-11
Form fit adapter SR, 14xØ18x57 mm	ZSF-14
Form fit adapter SR, Ø12x4x57 mm	ZSK-12
Form fit adapter SR, Ø14x5x57 mm	ZSK-14

Service Tools

Description	Type
Servicetool, for MF/MP/Modbus/LonWorks actuators and VAV-Control	ZTH-GEN
Belimo PC-TOOL Software for adjustments and diagnostics	MFT-P

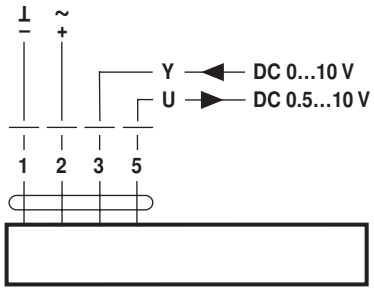
Electrical installation

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

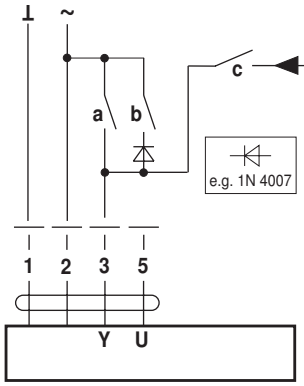


Cable colours:
1 = black
2 = red
3 = white
5 = orange

Functions

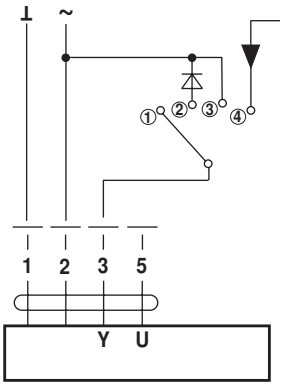
Functions with basic values

Override control with AC 24 V with relay contacts



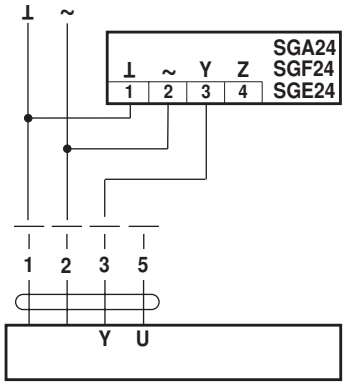
	a	b	c
0%	_/_	_/_	_/_
ZS 50%	_/_	__	_/_
100%	__	_/_	_/_
Y	_/_	_/_	__

Override control with AC 24 V with rotary switch

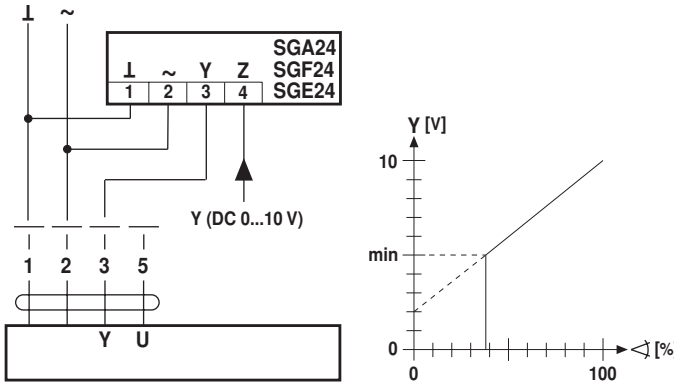


Pos	
1	0%
2	ZS 50%
3	100%
4	Y

Remote control 0...100%

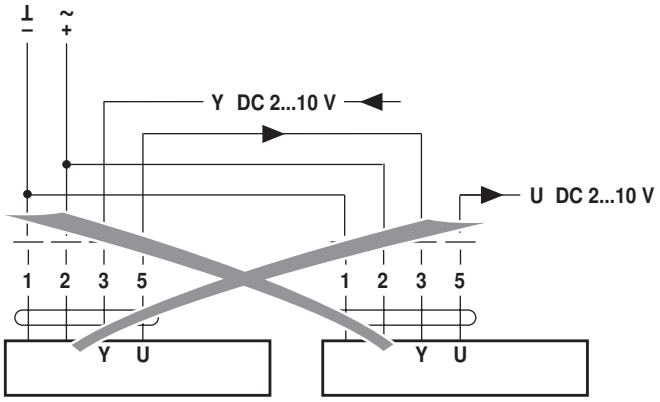


Minimum limit (with position sensor)

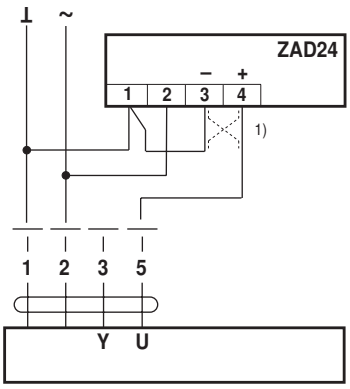


Electrical installation

Follow-up control (position-dependent)

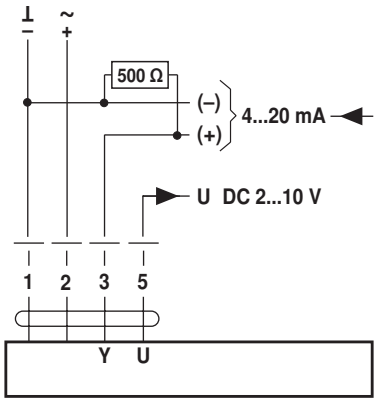


Position indication



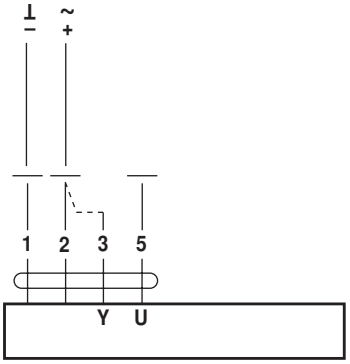
1) Adapting the direction of rotation

Control with 4...20 mA via external resistor



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

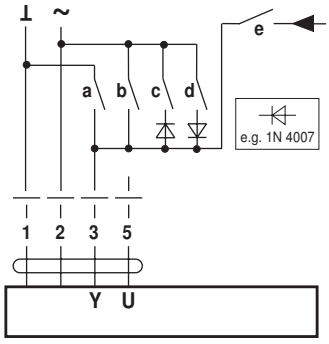
Functional check



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

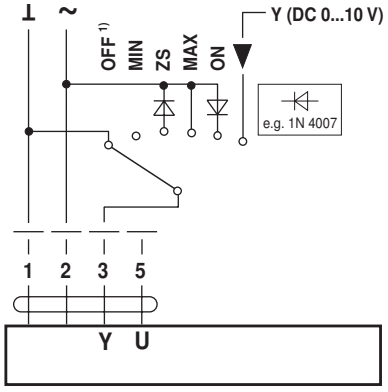
Functions for actuators with specific parameters

Override control and limiting with AC 24V with relay contacts



	a	b	c	d	e
OFF 1)	⊥	–	–	–	–
MIN	–	–	–	–	–
ZS	–	–	⊥	–	–
MAX	–	⊥	–	–	–
ON	–	–	–	⊥	–
Y	–	–	–	–	⊥

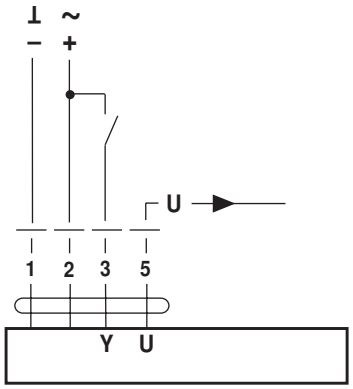
Override control and limiting with AC 24V with rotary switch



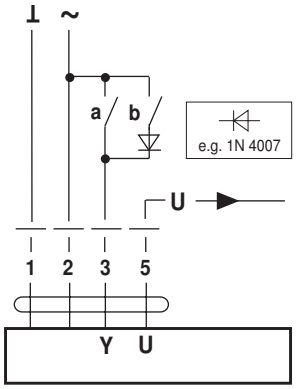
1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.6V.

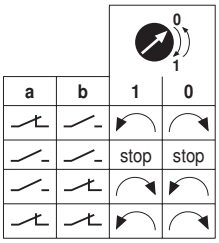
Functions

AC/DC 24, Open-close

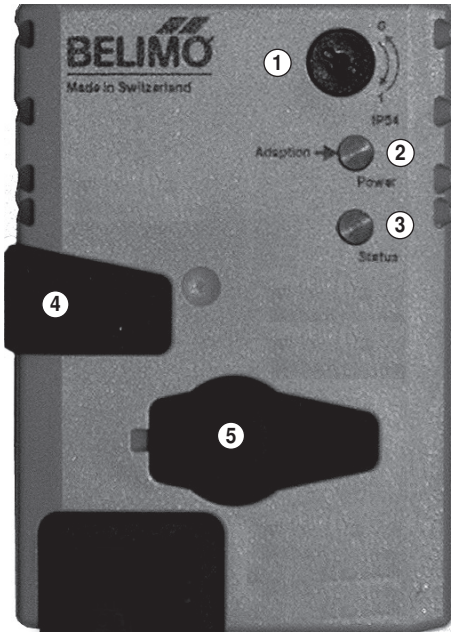


AC/DC 24 V, 3-point





Operating controls and indicators



① Direction of rotation switch
Switching over: Direction of rotation changes

② Pushbutton and green LED display
Off: No voltage supply or malfunction
On: Operation
Press button: Switches on angle of rotation adaption followed by standard operation

③ Pushbutton and yellow LED display
Off: Standard operation
On: Adaption or synchronising process active
Press button: No function

④ Gear disengagement pushbutton
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

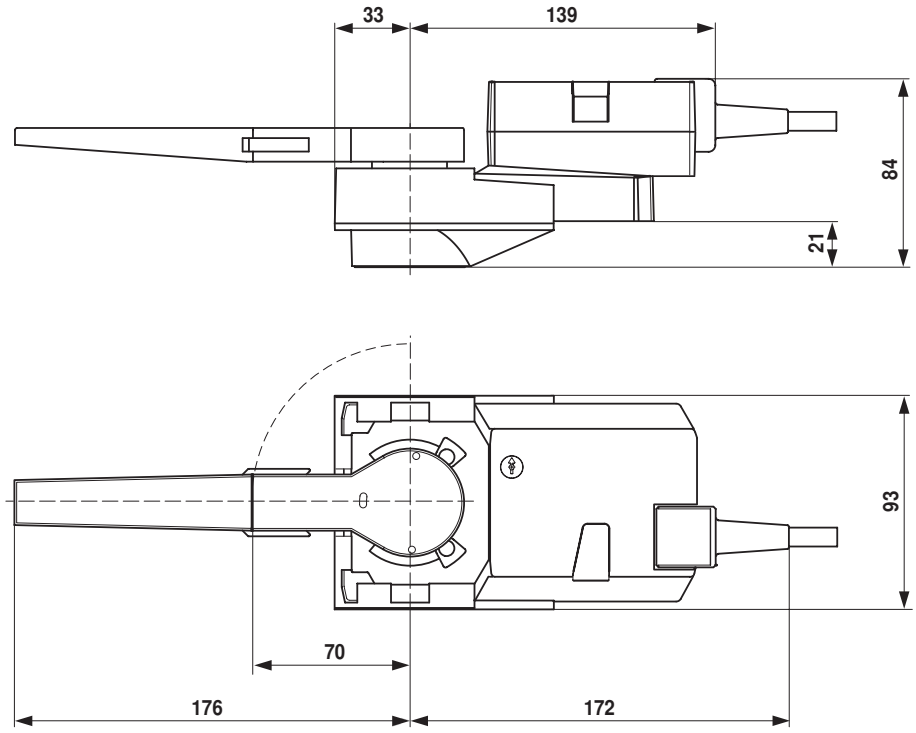
Check voltage supply connection

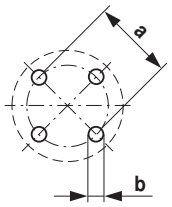
a) ② Off and ③ On
b) ② Blinking and ③ Blinking

} Check the supply connections.
Possibly ⏚ and ⏚ are swapped over.

Dimensions [mm]

Dimensional drawings





Flansch	a	b
F03	∅ 36	4 x M5
F04	∅ 42	4 x M5
F05	∅ 50	4 x M6

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
- Notes for project planning for butterfly valves