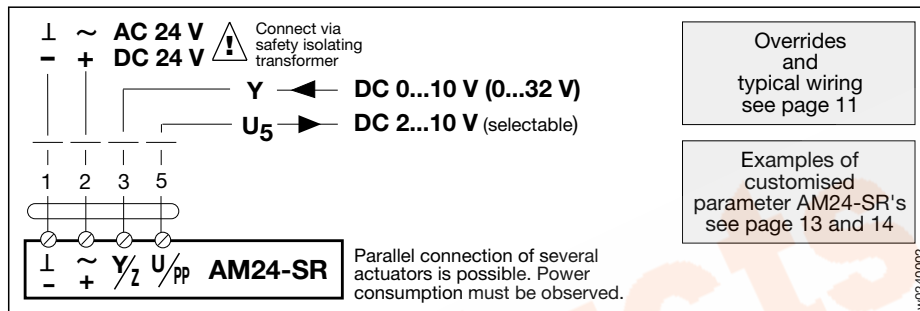




p0061002

Wiring diagram



Technical data	Basic values for the AM24-SR	
Nominal voltage	AC 24 V 50/60 Hz, DC 24 V	
Nominal voltage range	AC 19.2...28.8 V, DC 21.6...28.8 V	
For wire sizing	5 VA (I _{max} 8.3 A @ 5 ms)	
Power consumption	running: 2.5 W, at rest: 1.2 W	
Connecting cable	1 m long, 4 x 0.75 mm ² (direct connection by screw terminals for 2 x 1.5 mm ² wire possible)	
Cable glands	1 x for motor lead 6...7 mm dia.	
PG11 included		
Control signal Y	DC 0...10 V @ Ri 47 kΩ	
Operating range	DC 2...10 V	
Function		
position feedback U ₅	DC 2...10 V @ max. 0.7 mA	
Positioning accuracy	± 5%	
Direction of rotation	selected with L / R	
Direction of rotation (at Y = 0 V) at switch position L resp. R		
Torque	min. 18 Nm (at rated voltage)	
Angle of rotation	max. 95° (adjustable 35...100% by mechan. stops)	
Running time	150 s	
Angle of rotation adaption	none	
Override control (referred to the complete mechanical angle of rotation 95°)	Min. (min. position)	= 0%
	ZS (mid. position)	= 50%
	Max. (max. position)	= 100%
Sound power level	max. 45 dB (A)	
Position indication	mechanical	
Protection class	⚡ (safety low voltage)	
Degree of protection	IP 54 (bottom cable entry)	
Ambient temp. range	-30...+ 50 °C	
Non-operating temp.	-40...+ 80 °C	
Humidity test	according to EN 60335-1	
EMC	CE according to: 89/336/EEC, 91/31/EEC, 93/68/EEC	
Maintenance	maintenance-free	
Weight	1300 g	

selectable
These values can be changed using the MFT Handy. Special versions with preset values can be ordered as per the configuration data sheet (page 12).
Open/Close, 3-point
Start DC 0...30 V
Finish DC 2...32 V
Measuring signal U
Start DC 0...8 V
Finish DC 2...10 V
Soft-switch S1 5...95%
Soft-switch S2 5...95%
Maintenance and fault alarms
electronically reversible
50% reduced
* 75...300 s
Automatic adjustment of running time, working range and measuring signal U to the mechanical angle of rotation
Min. 0...100%
ZS 0...100%
Max. 0...100%
*
* Note! Remember that the torque and the sound power level change too when the running time is changed (see diagrams on page 14).
Examples and functions of customised parameter AM24-SR's see page 13 and 14.

Dampers up to approx. 3.6 m²
Modulating damper actuator (AC/DC 24 V)
Control DC 0...10 V or selectable
Position feedback DC 2...10 V or selectable
Communication capacity (PP)

Application

The AM24-SR is intended for operation of air control dampers in HVAC systems.

Adjustment

The basic parameters for normal applications of the AM24-SR actuator are assigned during manufacturing. If necessary, special versions of the actuators can be ordered with the functions highlighted in orange in the table. The configuration data sheet on page 12 is intended as an aid to ordering special purpose products. For making service adjustments to the system, these parameters can be changed when necessary using the MFT Handy (see Operating Instructions MFT-H).

Product features

Basic positions

When the power supply is switched on for the first time, i.e. during the initial commissioning or after pressing the button, the actuator will run to the basic position.

Pos. reversing switch	Basic positions
L (M) Y = 0	ccw Stop left
R (M) Y = 0	cw Stop right

The actuator then runs to the position demanded by the control signal.

Simple direct mounting on the damper spindle by universal spindle clamp. An anti-rotation device is supplied.

Manual operation by self-resetting push-button when necessary (gearing disengaged while the button is held depressed).

Adjustable angle of rotation with mechanical stops.

High functional reliability (overload-proof) needs no limit switches, halts automatically at the end stops.

Connection is either by means of the pre-fitted lead included with the actuator or directly by means of screw terminals. In the case of direct connection terminal box will be opened (page 15/16).

Electrical accessories (* see Doc. 2. Z-...)

*SG...24	Positioners
*ZAD24	Digital position indicator
MFT-H	Handy
SA1, SA2	Auxiliary switches, page 17
PA...	Feedback potentiometer, p. 18

Mechanical accessories, page 22

ZG-AM Damper linkage kit

Mounting instructions, page 21/22

Typical functions, page 11

Important: Read the notes about the use and torque requirements of the damper actuators on page 3.

Dimensions, page 20

Override control with AC 24 V

With relay contacts

AC 24 V ⚠️ Connect via safety isolating transformer

Y (DC 0...10 V) from controller

Functions	a	b	c
0% ↶	—	—	—
Intermed. position 50% ↶	—	↗	—
100% ↶	↗	—	—
Control mode acc. to Y	—	—	↗

⊥ ~ Y/Z U_{PP} AM24-SR

With rotary switch

AC 24 V ⚠️ Connect via safety isolating transformer

Y (DC 0...10 V) from controller

Pos	Functions
1	0% ↶
2	Intermed. position 50% ↶
3	100% ↶
4	Control mode acc. to Y

⊥ ~ Y/Z U_{PP} AM24-SR

Remote control 0...100%

AC 24 V ⚠️ Connect via safety isolating transformer

⊥ ~ Y Z SGA24, SGF24 SGE24 Positioner

Y DC 0...10 V (from controller)

⊥ ~ Y/Z U_{PP} AM24-SR

Parallel connection of further actuators is possible (up to 4).

Minimum position

AC 24 V ⚠️ Connect via safety isolating transformer

⊥ ~ Y Z SGA24, SGF24 SGE24 Positioner

Y DC 0...10 V (from controller)

Y [V]

10 V

min.

0 V

0% 100%

Angle of rotation

⊥ ~ Y/Z U_{PP} AM24-SR

Parallel connection of further actuators is possible (up to 4).

Master-slave control (depending on position)

⊥ ~ **AC 24 V** ⚠️ Connect via safety isolating transformer

- + **DC 24 V** ⚠️ Connect via safety isolating transformer

Y DC 0...10 V

Note ± 5% positioning accuracy between actuators

U₅ DC 2...10 V to next actuator

⊥ ~ Y/Z U_{PP} **Master actuator** AM24-SR

⊥ ~ Y/Z U_{PP} **Slave actuator** AM24-SR

Control by 4...20 mA via external resistor

⊥ ~ **AC 24 V** ⚠️ Connect via safety isolating transformer

- + **DC 24 V** ⚠️ Connect via safety isolating transformer

500 Ω

4...20 mA

U₅ DC 2...10 V

* The 500 Ω resistor converts the 4...20 mA current signal to a voltage signal of DC 2...10 V.

⊥ ~ Y/Z U_{PP} AM24-SR

Position indication

AC 24 V ⚠️ Connect via safety isolating transformer

⊥ ~ Y/Z U_{PP} AM24-SR

⊥ ~ Y/Z U_{PP} ZAD24

Direction of rotation

Function monitoring

AC 24 V ⚠️ Connect via safety isolating transformer

⊥ ~ Y/Z U_{PP} AM24-SR

Procedure

- AC 24 V at terminals 1 and 2
- Disconnect terminal 3:
 - For direction of rotation "L": actuator runs ↶
 - For direction of rotation "R": actuator runs ↷
- link terminals 2 and 3:
 - actuator runs in the opposite direction



Customer: _____

 Quantity: _____
 Required delivery date: _____

The purpose of this configuration data sheet is to facilitate the ordering and documentation of customised parameter AM24-SR actuators.

Part No.

AM24	-																			
-------------	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Leave blank. The number will be entered by Belimo.

Angle of rotation setting

①

- Deactivated** (basic value) The following settings ② - ⑥ refer to the full angle of rotation of 95°.
- Activated** The following settings ② - ⑥ are automatically adapted to the effective mechanical angle of rotation.
- Manual** triggering by pressing the pushbutton twice
- Automatic** triggering each time the unit is powered up or by pressing the pushbutton twice.

Operating range

②

- DC 2...10 V (basic value) Start = DC 2 V
Finish = DC 10 V
- DC 0...10 V Start = DC 0 V
Finish = DC 10 V
- Start DC , V (0...30 V) The finish must be at least 2 V above the start!
 Finish DC , V (2...32 V)

Feedback signals U₅

③

- Measuring signal U** DC 2...10 V (basic value) Start = DC 2 V
Finish = DC 10 V
- Measuring signal U** DC 0...10 V Start = DC 0 V
Finish = DC 10 V
- Measuring signal U** Start DC , V (0...8 V) The finish must be at least 2 V above the start!
 Finish DC , V (2...10 V)
- Soft-switches S1** % \triangleleft (5...95%) and **S2** % \triangleleft (5...95%)
The S1 value must be less than the S2 value!

Maintenance and fault signals U₅

④

Please seek advice from your local Belimo agent if you wish to make use of the facility for maintenance and fault signals. The master control system must be able to interpret the pulsating output level of U₅ correctly in order to generate corresponding signals on the master control system level.

- OFF** (basic value)
- ON** Feedback signals ③ **overridden**
- ON** Feedback signals ③ **deactivated**
- | Maintenance signal | Fault signal | Tick all maintenance and fault signals required |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Actuator hunting |
| <input type="checkbox"/> | <input type="checkbox"/> | Mechanical overload, actuator stopped |
| <input type="checkbox"/> | <input type="checkbox"/> | Mechanical load limit reached |
| <input type="checkbox"/> | <input type="checkbox"/> | Mechanical travel changed 10% |
- For these functions with a mechanically-limited angle of rotation (<95°) the angle of rotation setting ① must be **activated!**

Running time

⑤

- 150 s (basic value)
- Running time s (75...300 s)
- Note:** The torque [Nm] and sound power level [dB(A)] change when the running time exceeds 150 s. Refer to the function graphs on page 14.

Override control and electronic angle of rotation limiting

⑥

- Min. (min. position) = 0% \triangleleft
 ZS (intermediate position) = 50% \triangleleft **(basic values)**
 Max. (max. position) = 100% \triangleleft
- Min. (min. position) = % (0...100%) \triangleleft (beginning of operating range)
 ZS (intermediate position) = % (0...100%) (0% = Min.; 100% = Max.)
 Max. (max. position) = % (0...100%) \triangleleft (end of operating range)

Torque

⑦

- normal (basic value)
- 50% reduced

AM24-SR wiring diagram for customised parameter override control with AC 24 V

With relay contacts

AC 24 V Connect via safety isolating transformer

Y (DC V) from controller

Selectable
Min = 0...100%
ZS = 0...100%
Max. = 0...100%

Function	a	b	c	d	e
CLOSE 1)					
Min. position					
ZS (intermed. position)					
Max. position					
OPEN					
Control mode acc. to Y					

1 2 3 5

AM24-SR/Spec.

With rotary switch

AC 24 V Connect via safety isolating transformer

Y (DC V) from controller

e.g. 1N 4007

1 2 3 5

AM24-SR/Spec.

1) Note! The function needs the beginning of the operating range to be set to a minimum of 0.6 V in order to be effective.

Example of override control and electronic angle of rotation limiting with feedback signal U₅

AC 24 V Connect via safety isolating transformer

Y DC 0...10 V from controller

e.g. 1N 4007

U₅ → DC 4... 7 V

1 2 3 5

AM24-SR/Spec.

OPEN (100%)

Max. 70%

Min. 30%

CLOSE (0%)

U₅ [V]

Y [%]

0 3 4 7 8 10 [V]

Min. = Beginning of operating range (3 V)
Max. = End of operating range (8 V)

Description

- In the control mode (rotary switch Pos. ⑥) the actuator runs with limiting through Min. and Max. (example: 30%...70%) in the control range.
Note: When the Y-signal is < 0,2 V, the actuator runs in the override position CLOSE.
- When the rotary switch is set to positions ①-⑤, the actuator runs to the required position according to the appropriate override command.

Parameter settings:

Operating range		Feedback signal U ₅
Start = DC 3 V	Finish = DC 8 V	Start = DC 4 V
		Finish = DC 7 V
Min. (min. position)	Max. (max. position)	ZS (intermed. position)
30% ↯	70% ↯	60%

Note: The intermediate position ZS is referred to the control range set with Min. and Max. (0% ZS = Min. / 100% ZS = Max.)

Example of feedback signal U₅ with mechanically-limited angle of rotation (with and without angle of rotation setting)

Parameter settings:

Control signal	Feedback signal U ₅	Angle of rotation mechanically limited by limit stops
DC 0...10 V	Start = DC 1 V Finish = DC 9 V	at 70% ↯

AC 24 V Connect via safety isolating transformer

Y → DC 0...10 V

U₅ → DC 1... 9 V

1 2 3 5

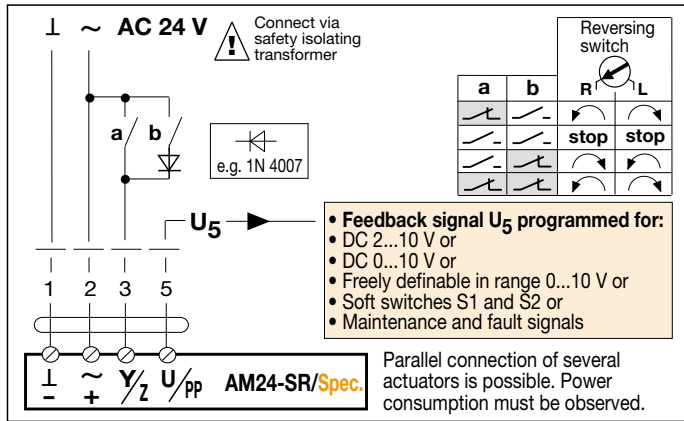
AM24-SR/Spec.

a) Graph **without** angle of rotation setting

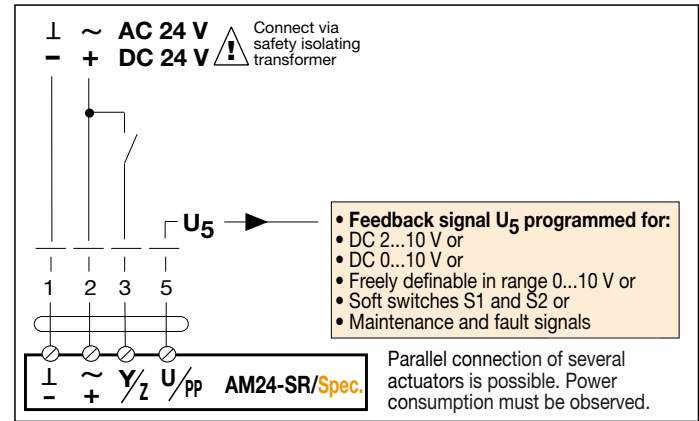
b) Graph **with** angle of rotation setting



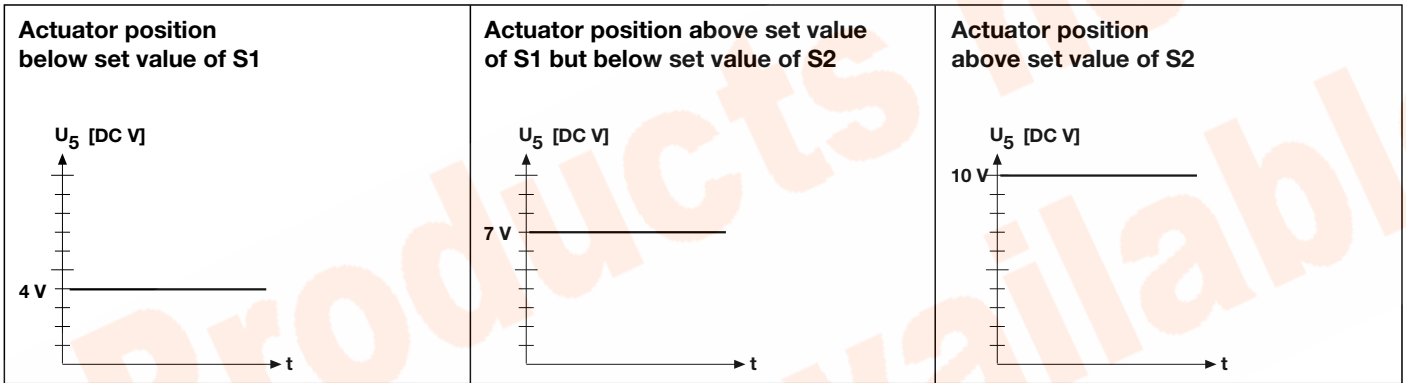
Wiring diagram for 3-point control (parameters customised with MFT Handy)



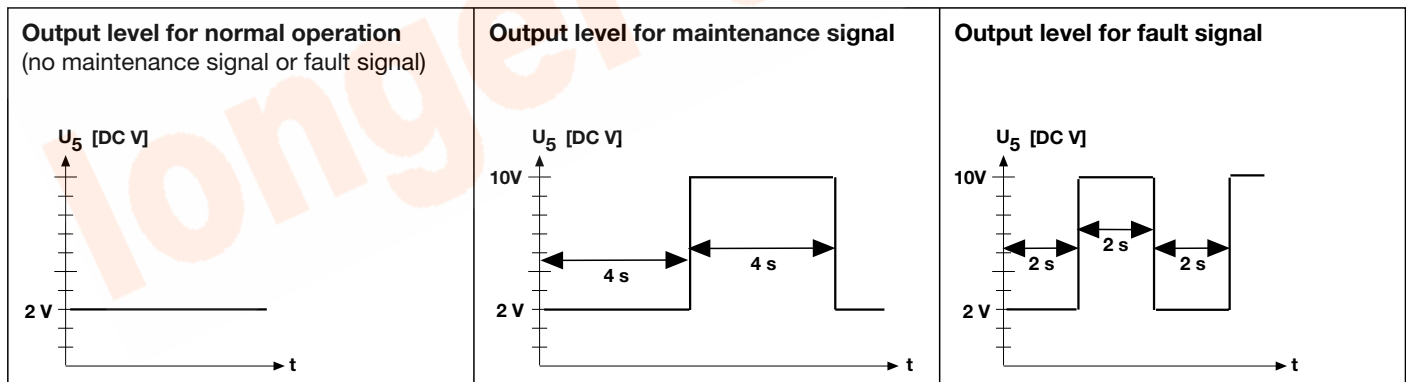
Wiring diagram for OPEN/CLOSE control (parameters customised with MFT Handy)



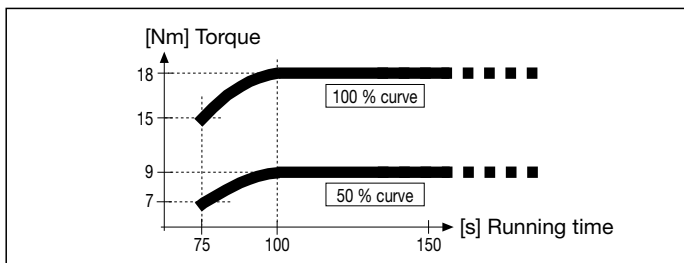
Function of feedback signal U_5 with customised parameters for soft switches S1 and S2



Function of feedback signal U_5 with customised parameters for maintenance and fault signals



Torque function when running time is changed



Sound power level function when running time is changed

