

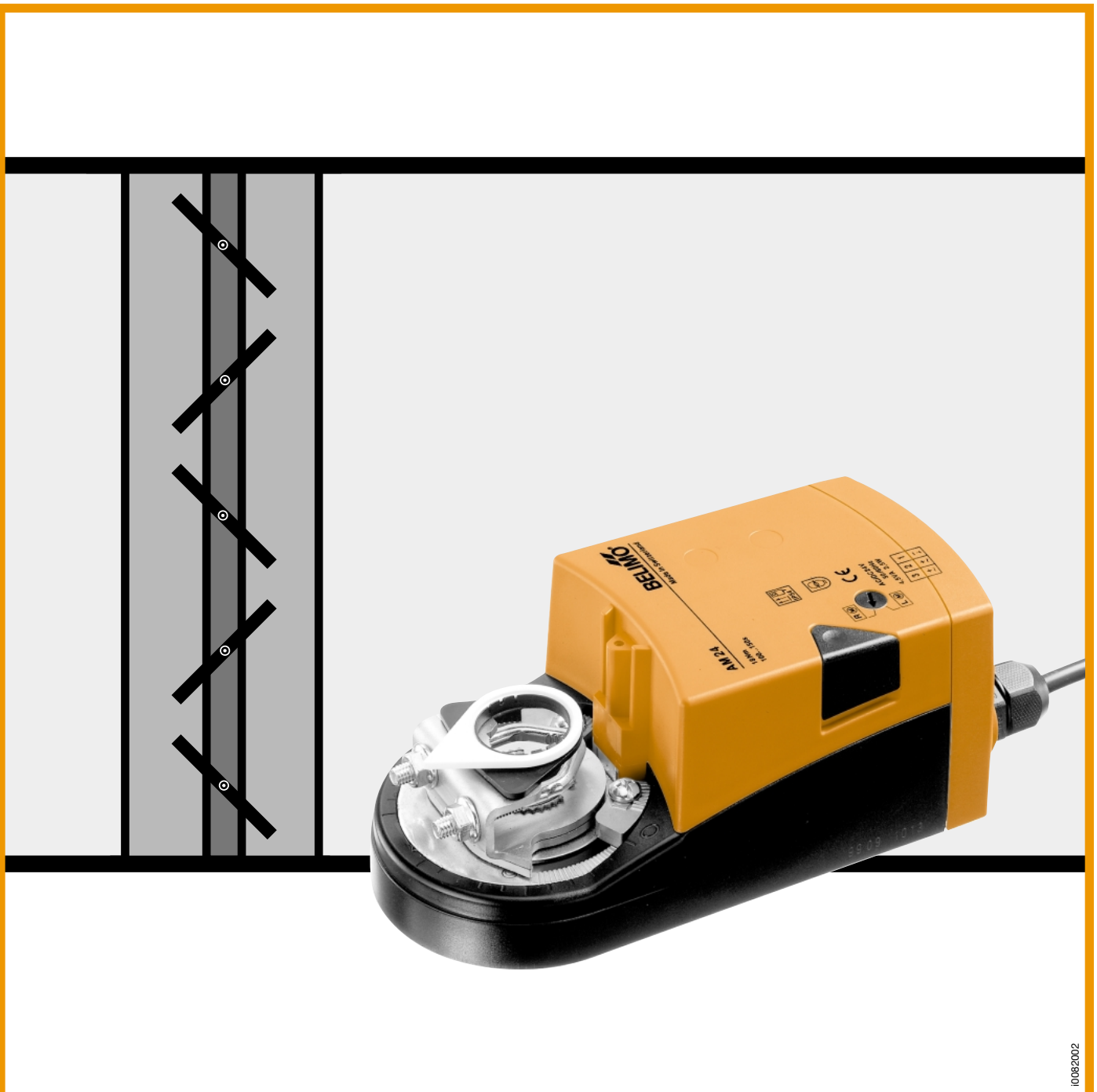
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2. AM-2 Product Information Damper actuators

AM



The complete range of damper actuators for general use in HVAC systems

Type	LM	NM	SM	AM	GM	LF	AF
Torque	4 Nm	8 Nm	15 Nm	18 Nm	30 Nm	4 Nm	15 Nm
Spring return function	-	-	-	-	-		
For dampers up to approx.	0.8 m ²	1.5 m ²	3 m ²	3.6 m ²	6 m ²	0.8 m ²	3 m ²

For more information, please contact your Belimo Representative or order any brochures you need by fax.

Fax to: **BELIMO** (address overleaf)

Please send us product brochures on the following damper actuators:

LM... NM... SM... GM... LF... AF... Electrical accessories

Please send also information on:

Motorised fire and smoke dampers
 Variable air-volume control (VAV-Control)

Please call us back

Sender

Company: _____

Name: _____

Address: _____

Post Code: _____ Country: _____

Phone: _____ Fax: _____

E-Mail: _____ Date: _____

Selection table

		AM24	AM24-S	AM230	AM230-S	AM230-2	AM230-2-S	AM230-SR	AM24-SR
Torque	18 Nm								
Torque	selectable								MFT
Nominal voltage	AC / DC 24 V AC 230 V	•	•	•	•	•	•	•	•
Running time	100...150 s 150 s selectable	•	•	•	•	•	•	•	• MFT
Control	Open/Close	•	•	•	•	•	•	•	•
	Single-wire 2-wire Modulating DC 0...10 V selectable control	•	•	•	•	•	•	•	• MFT
Direction of rotation reversible (right/left)		•	•	•	•	•	•	•	•
Manual operation by pushbutton		•	•	•	•	•	•	•	•
Auxiliary switches potential-free			•	•	•	•	•	•	•
Mechanical angle of rotation limiting		•	•	•	•	•	•	•	•
Continuous position feedback								•	•
Selectable feedback									MFT
Damper rotation with universal spindle clamp		•	•	•	•	•	•	•	•

MFT  = selectable values and functions

US standard conformance and AC 110 V types available to order

Damper actuators, Open/Close

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Note

Using BELIMO damper actuators

The actuators listed in this catalogue are intended for the operation of air dampers in HVAC systems.

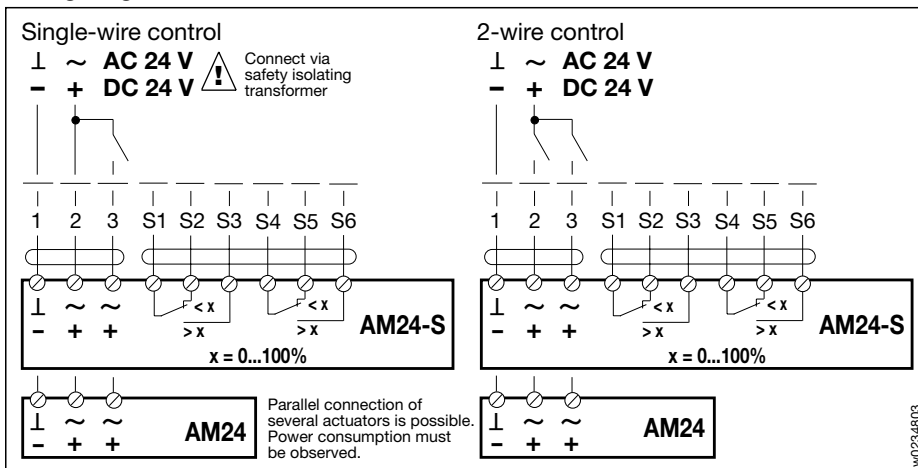
Torque requirements

When calculating the torque required to operate dampers, it is essential to take into account all the data supplied by the damper manufacturer concerning cross sectional area, design, mounting and air flow conditions.



p0056002

Wiring diagram



w0234803

Technical data	AM24, AM24-S
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	4.5 VA (I _{max} 2.7 A @ 5 ms)
Power consumption	2.5 W
Connecting cable	– motor 1 m long, 3 x 0.75 mm ² – auxiliary switch (AM24-S) 1 m long, 6 x 0.75 mm ² (direct connection by screw terminals for 2 x 1.5 mm ² wire possible)
Cable glands	– AM24 1 x for motor lead 6...7 mm dia.
PG11 included	– AM24-S 1 x for motor lead 6...7 mm dia. 1 x for switch lead 8...9 mm dia.
Auxiliary switch (AM24-S)	2 x SPDT 6 (1.5) A, AC 250 V □
– Switching point	adjustable 0...100% ◁
Direction of rotation	selected with L / R switch
Manual operation	pushbutton, auto-return
Torque	min. 18 Nm (at rated voltage)
Angle of rotation	max. 95° (adjustable 35...100% by mechanical stops)
Running time	100...150 s (0...18 Nm)
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, 92/31/EEC, 93/68/EEC
Low Voltage Directive	CE according to 73/23/EEC
Maintenance	maintenance-free
Weight	1300 g

Dampers up to approx. 3.6 m²

Open/Close actuator (AC/DC 24 V)

Single-wire or 2-wire control

Multi-function connection

Application

The AM24(-S) is intended for operation of air control dampers in HVAC systems.

Mode of operation

Open / Close control by single-wire or 2-wire system.

Product features

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.

Flexible signalling 0...100%, with 2 adjustable auxiliary switches (AM24-S only).

Connection is either by means of the pre-fitted leads 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

SA1, SA2 Auxiliary switches, page 17
PA... Feedback potentiometer, page 18

Mechanical accessories, page 22

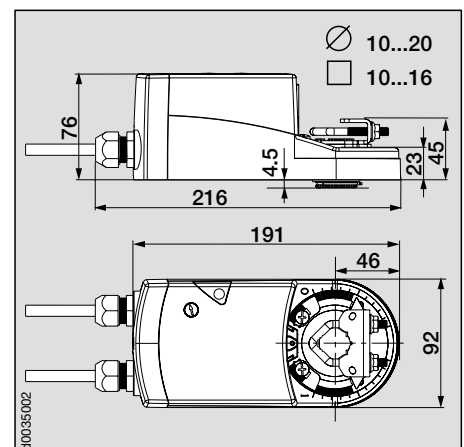
ZG-AM Damper linkage kit

Mounting instructions, page 21/22

Adjusting auxiliary switch AM24-S, page 7

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

Dimensions



d0035002



Dampers up to approx. 3.6 m²
Open/Close actuator (AC 230 V)

Control by single-pole contact (single-wire control)

Multi-function connection

Application

The AM230(-S) is intended for operation of air control dampers in HVAC systems.

Mode of operation

Open/Close control by single-wire system.

Product features

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.

Flexible signalling 0...100%, with 2 adjustable auxiliary switches (AM230-S only).

Connection is either by means of the pre-fitted leads 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

- SA1, SA2 Auxiliary switches, page 17
- PA... Feedback potentiometer, page 18

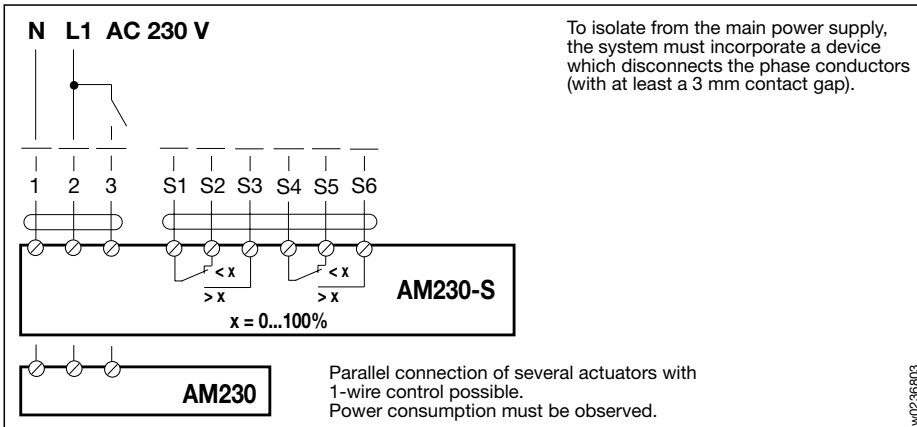
Mechanical accessories, page 22
 ZG-AM Damper linkage kit

Mounting instructions, page 21/22

Adjusting auxiliary switch AM230-S, page 7

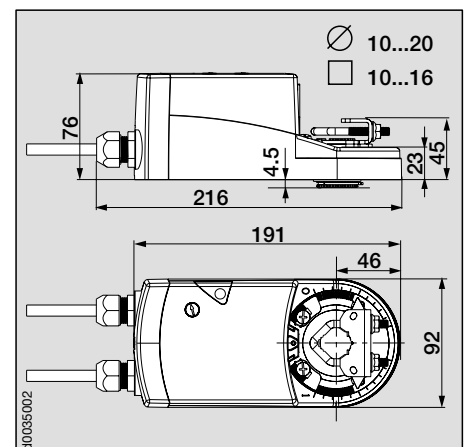
Important: Read the notes about the use and torque requirements of the damper actuators on page 3.

Wiring diagram



Technical data	AM230, AM230-S
Nominal voltage	AC 230 V 50/60 Hz
Nominal voltage range	AC 198...264 V
For wire sizing	25 VA @ 50 Hz, 30 VA @ 60 Hz (I _{max} 4.2 A @ 1 ms)
Power consumption	3 W @ 50 Hz, 3.8 W @ 60 Hz
Connecting cable	- motor 1 m long, 3 x 0.75 mm ² - auxiliary switch (AM230-S) 1 m long, 6 x 0.75 mm ² (direct connection by screw terminals for 2 x 1.5 mm ² wire possible)
Cable glands	- AM230 1 x for motor lead 6...7 mm dia.
PG11 included	- AM230-S 1 x for motor lead 6...7 mm dia. 1 x for switch lead 8...9 mm dia.
Auxiliary switch (AM230-S)	2 x SPDT 6 (1.5) A, AC 250 V <input type="checkbox"/>
- Switching point	adjustable 0...100% \triangleleft
Direction of rotation	selected with L / R switch
Manual operation	pushbutton, auto-return
Torque	min. 18 Nm (at rated voltage)
Angle of rotation	max. 95° (adjustable 35...100% by mechanical stops)
Running time	100...150 s (0...18 Nm)
Sound power level	max. 45 dB (A)
Position indication	mechanical
Protection class	II (all insulated)
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, 92/31/EEC, 93/68/EEC
Low Voltage Directive	CE according to 73/23/EEC
Maintenance	maintenance-free
Weight	1300 g

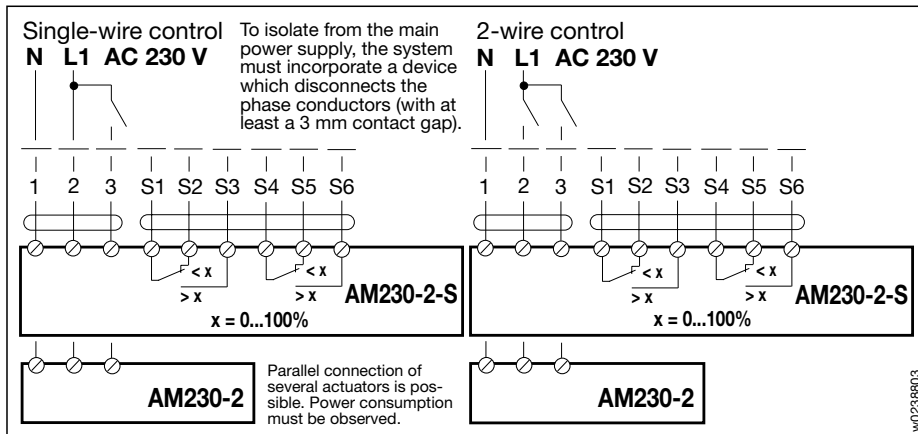
Dimensions





p0060002

Wiring diagram



w0298803

Technical data	AM230-2, AM230-2-S
Nominal voltage	AC 230 V 50/60 Hz
Nominal voltage range	AC 198...264 V
For wire sizing	25 VA @ 50 Hz, 30 VA @ 60 Hz (Imax 4.2 A @ 2 ms)
Power consumption	4 W @ 50 Hz, 4.8 W @ 60 Hz
Connecting cable	– motor 1 m long, 3 x 0.75 mm ² – auxiliary switch (AM230-2-S) 1 m long, 6 x 0.75 mm ² (direct connection by screw terminals for 2 x 1.5 mm ² wire possible)
Cable glands	– AM230-2 1 x for motor lead 6...7 mm dia.
PG11 included	– AM230-2-S 1 x for motor lead 6...7 mm dia. 1 x for switch lead 8...9 mm dia.
Auxiliary switch (AM230-2-S)	2 x SPDT 6 (1.5) A, AC 250 V <input type="checkbox"/>
– Switching point	adjustable 0...100% \triangleleft
Direction of rotation	selected with L / R switch
Manual operation	pushbutton, auto-return
Torque	min. 18 Nm (at rated voltage)
Angle of rotation	max. 95° (adjustable 35...100% by mechanical stops)
Running time	100...150 s (0...18 Nm)
Sound power level	max. 45 dB (A)
Position indication	mechanical
Protection class	II (all insulated)
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, 92/31/EEC, 93/68/EEC
Low Voltage Directive	CE according to 73/23/EEC
Maintenance	maintenance-free
Weight	1300 g

Dampers up to approx. 3.6 m²

Open/Close actuator
(AC 230 V)

Single-wire or 2-wire control

Multi-function connection

Application

The AM230-2(-S) is intended for operation of air control dampers in HVAC systems.

Mode of operation

Open / Close control by single-wire or 2-wire system.

Product features

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.

Flexible signalling 0...100%, with 2 adjustable auxiliary switches (AM230-2-S only).

Connection is either by means of the pre-fitted leads 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

SA1, SA2 Auxiliary switches, page 17
PA... Feedback potentiometer, page 18

Mechanical accessories, page 22

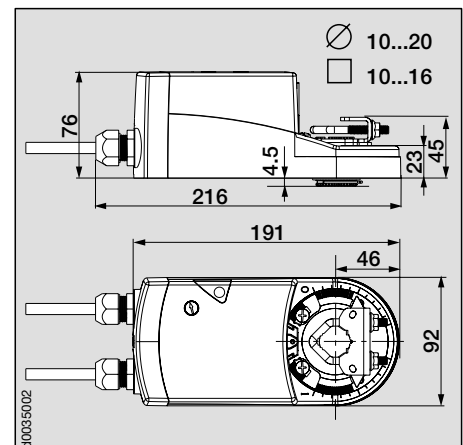
ZG-AM Damper linkage kit

Mounting instructions, page 21/22

Adjusting auxiliary switch AM230-2-S, page 7

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

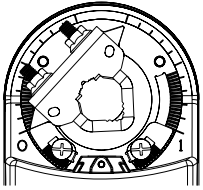
Dimensions



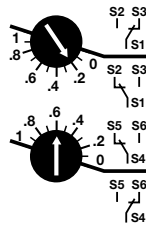
d00635002

a) Referring to end stop 0

Option 1: Actuator at left-hand end stop



Procedure:



For S1/S2/S3: Turn the dial from position 0 clockwise (cw) until the tip of the arrow is pointing to the required switching position.

The switch in the example is set to .2 (2 scale divisions cw from 0 correspond to 20% rotation).

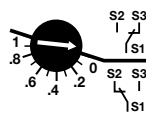
For S4/S5/S6: Turn the dial from position 0 anticlockwise (ccw) until the tip of the arrow is pointing to the required switching position.

The switch in the example is set to .6 (6 scale divisions ccw from 0 correspond to 60% rotation).

Now, when the actuator rotates clockwise, the switch S1/S2/S3 will operate at 20% – and the switch S4/S5/S6 at 60% rotation. (Connections S1–S3 and S4–S6 made).

Option 2: Actuator at switching position

Procedure for switches S1/S2/S3:



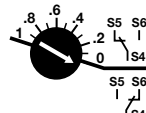
Depress the manual-operation pushbutton and move the actuator manually to the position where the auxiliary switch is needed to operate.

(see example: 20% rotation)

Turn the dial anticlockwise (ccw) until the tip of the arrow is just past the zero position (see Fig.).

(Connection S1–S3 made and switching position set for 20% rotation.)

Procedure for switches S4/S5/S6:

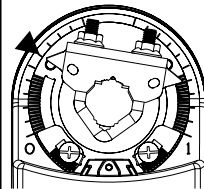
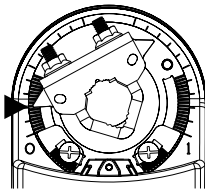


Depress the manual-operation pushbutton and move the actuator manually to the position where the auxiliary switch is needed to operate.

(see example: 60% rotation)

Turn the dial clockwise (cw) until the tip of the arrow is just past the zero position (see Fig.).

(Connection S4–S6 made and switching position set for 60% rotation.)



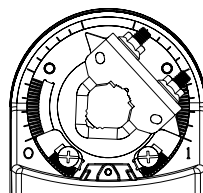
Position for switch S1/S2/S3

Position for switch S4/S5/S6

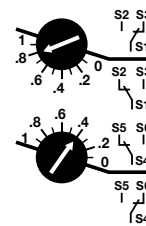
m0051002

b) Referring to end stop 1

Option 1: Actuator at right-hand end stop



Procedure:



For S1/S2/S3: Turn the dial from position 1 anticlockwise (ccw) until the tip of the arrow is pointing to the required switching position.

The switch in the example is set to .8 (2 scale divisions ccw from 1 correspond to 20% rotation).

For S4/S5/S6: Turn the dial from position 1 clockwise (cw) until the tip of the arrow is pointing to the required switching position.

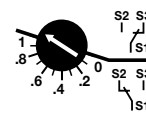
The switch in the example is set to .4 (6 scale divisions cw from 1 correspond to 60% rotation).

Now, when the actuator rotates anticlockwise, the switch S1/S2/S3 will operate at 20% – and the switch S4/S5/S6 at 60% rotation.

(Connections S1–S3 and S4–S6 made).

Option 2: Actuator at switching position

Procedure for switches S1/S2/S3:



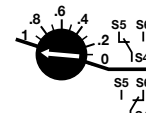
Depress the manual-operation pushbutton and move the actuator manually to the position where the auxiliary switch is needed to operate.

(see example: 20% rotation)

Turn the dial clockwise (cw) until the tip of the arrow is just past the 1 position (see Fig.).

(Connection S1–S3 made and switching position set for 20% rotation.)

Procedure for switches S4/S5/S6:

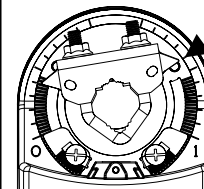
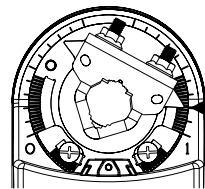


Depress the manual-operation pushbutton and move the actuator manually to the position where the auxiliary switch is needed to operate.

(see example: 60% rotation)

Turn the dial anticlockwise (ccw) until the tip of the arrow is just past the 1 position (see Fig.).

(Connection S4–S6 made and switching position set for 60% rotation.)



Position for switch S1/S2/S3

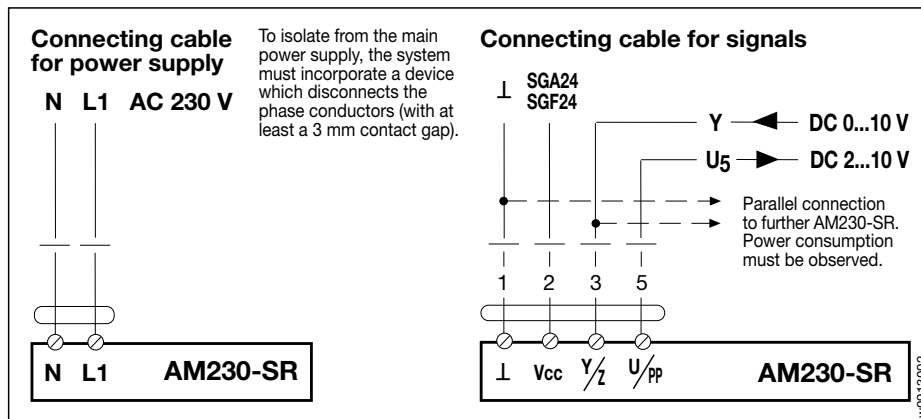
Position for switch S4/S5/S6

m0052002



p0087002

Wiring diagram



w0913002

Technical data	AM230-SR
Nominal voltage	AC 230 V 50/60 Hz
Nominal voltage range	AC 198...264 V
For wire sizing	5 VA (I _{max} 300 mA @ 2 ms)
Power consumption	running: 4 W, at rest: 3.1 W
Connecting cable	power supply: 1 m, 2 x 0.75 mm ² signals: 1 m, 4 x 0.75 mm ² (direct connection by screw terminals for 2 x 1.5 mm ² wire possible)
Cable glands (PG11 included)	1 x for motor lead 6...8 mm dia. 1 x for signals lead 8...10 mm dia.
Control signal Y	DC 0...10 V @ R _i 47 kΩ
Operating range	DC 2...10 V
Function pos. feedback U ₅	DC 2...10 V @ max. 0.7 mA
Positioning accuracy	± 5%
Direction of rotation (at Y = 0 V)	selected with L / R at switch position L ↻ resp. R ↻
Manual operation	push button, auto-return
Torque	min. 18 Nm (at rated voltage)
Angle of rotation	max. 95° (adjustable 35...100% by mechanical stops)
Running time	150 s
Sound power level	max. 45 dB (A)
Position indication	mechanical
Protection class	power supply: II (all insulated) signal part: ⚡ (safety low voltage)
Degree of protection	IP 54 (bottom cable entry)
Ambient temperature range	-30...+50 °C
Non-operating temperature	-40...+80 °C
Humidity test	to EN 60335-1
EMC	CE according to 89/336/EEC, 92/31/EEC, 93/68/EEC
Low Voltage Directive	CE according to 73/23/EEC
Maintenance	maintenance-free
Weight	1500 g

Dampers up to approx. 3.6 m²
Modulating actuator (AC 230 V)
Control DC 0...10 V
Position feedback DC 2...10 V
Multi-function connection

Application

The type AM230-SR is intended for the operation of air control dampers in ventilation and air-conditioning systems.

Mode of operation

Modulating control is effected by means of a standard DC 0...10 V control signal.

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 pushbutton, the actuator will run to the basic position.

Pos. reversing switch	Basic positions
Y = 0 ↻	ccw ↻ Stop left
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 leads included with the actuator or directly by means of screw terminals. In the case of direct connection the terminal box will be opened (page 15/16).

Electrical accessories

SA1, SA2 Auxiliary switches, page 17
 PA... Feedback potentiometer, p.18

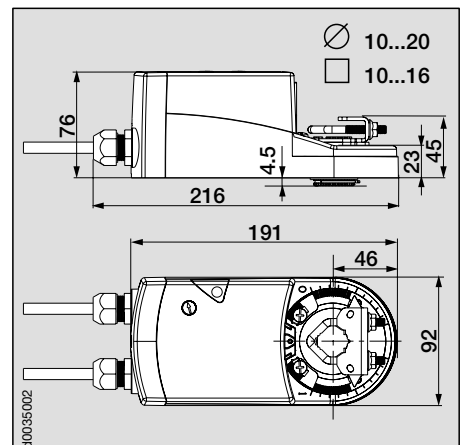
Mechanical accessories, page 22

ZG-AM Damper linkage kit

Mounting instructions, page 21/22

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

Dimensions



d0035002

Override control

With relay contacts

Functions	a	b
0% ↶	—	—
100% ↷	—	—
Control mode acc. to Y	—	—

With rotary switch

Pos	Functions
1	0% ↶
2	100% ↷
3	Control mode acc. to Y

Remote control 0...100%

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

Minimum position

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

Master-slave control (depending on position)

Note ±5% positioning accuracy between actuators

U₅ DC 2...10 V to next actuator

Control by 4...20 mA via external resistor

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

Function monitoring

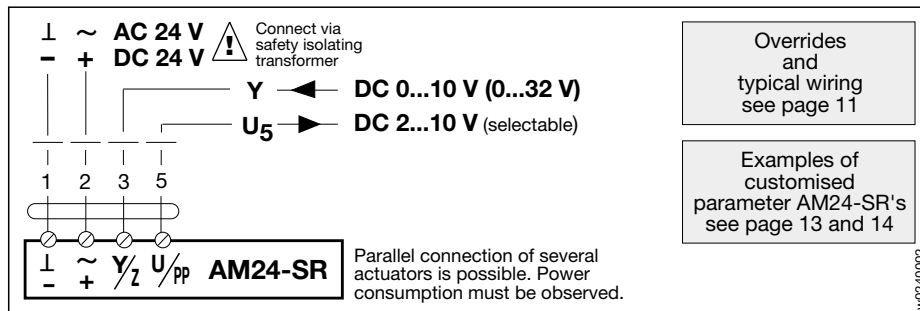
Procedure

- Disconnect terminal 3:
 - For direction of rotation "L": actuators runs ↶
 - For direction of rotation "R": actuators runs ↷
- Link terminals 2 and 3:
 - actuator runs in the opposite direction



p0061002

Wiring diagram



w0240002

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

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

With rotary switch

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

Remote control 0...100%

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

Minimum position

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

Master-slave control (depending on position)

Note $\pm 5\%$ positioning accuracy between actuators

Control by 4...20 mA via external resistor

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

Position indication

Function monitoring

Procedure

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

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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** [][] % ↯ (5...95%) and **S2** [][] % ↯ (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% ↯
 ZS (intermediate position) = 50% ↯ **(basic values)**
 Max. (max. position) = 100% ↯
- Min. (min. position) = [][][] % (0...100%) ↯ (beginning of operating range)
 ZS (intermediate position) = [][][] % (0...100%) (0% = Min.; 100% = Max.)
 Max. (max. position) = [][][] % (0...100%) ↯ (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

Y (DC V) from controller

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

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

1 2 3 5

AM24-SR/Spec.

With rotary switch

AC 24 V

Y (DC V) from controller

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

Y DC 0...10 V from controller

U₅ → DC 4... 7 V

1 2 3 5

AM24-SR/Spec.

OPEN (100%)

Max. 70%

Min. 30%

CLOSE (0%)

U₅ [V]

Y [%]

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 8 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

DC 24 V

Y ← DC 0...10 V

U₅ → DC 1... 9 V

1 2 3 5

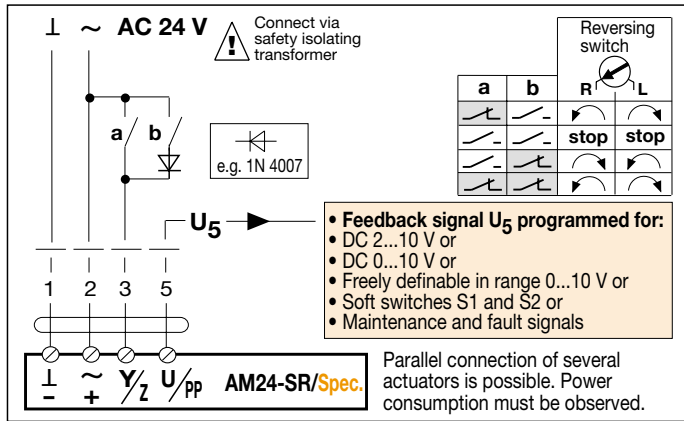
AM24-SR/Spec.

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

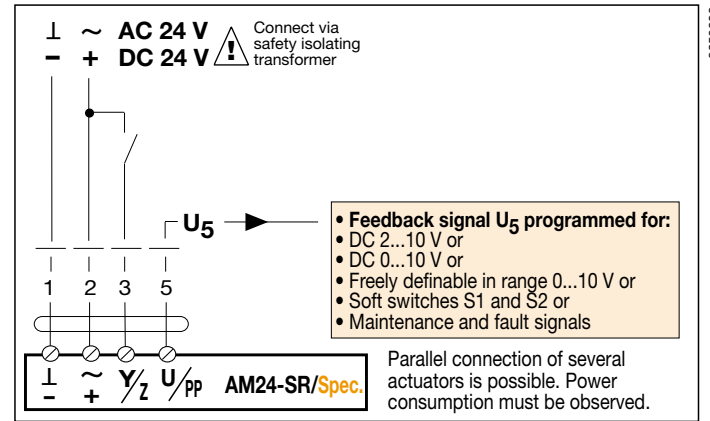
b) Graph **with** angle of rotation setting

MFT

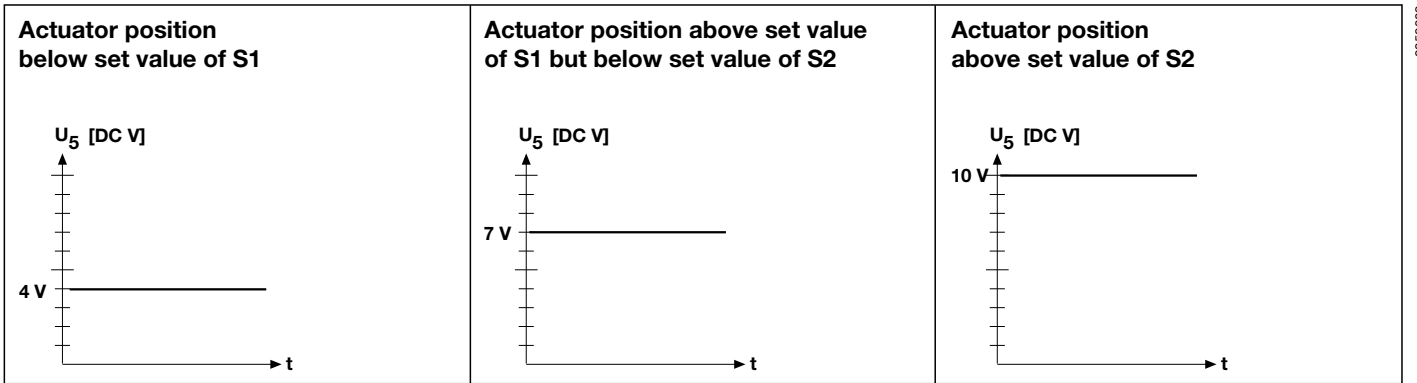
Wiring diagram for 3-point control (parameters customised with MFT Handy)



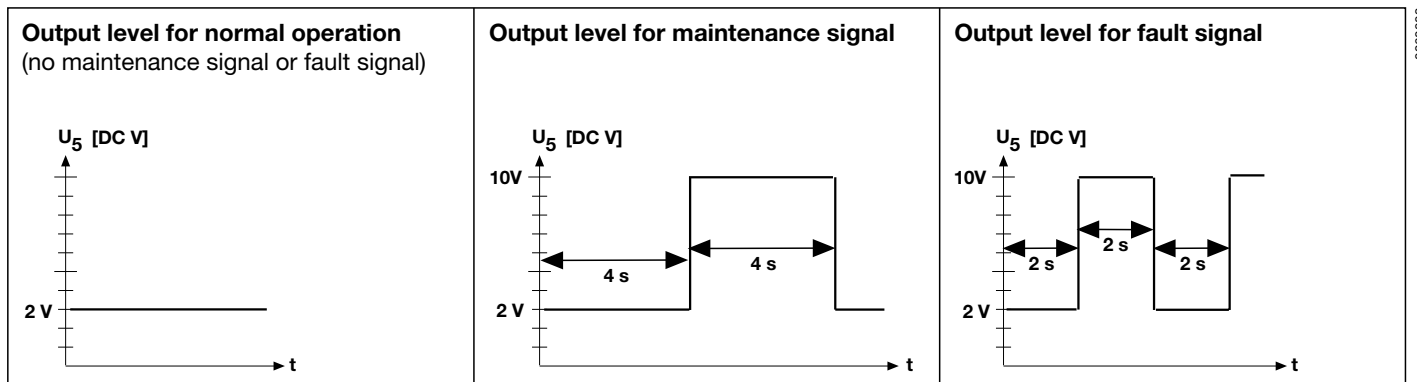
Wiring diagram for OPEN/CLOSE control (parameters customised with MFT Handy)



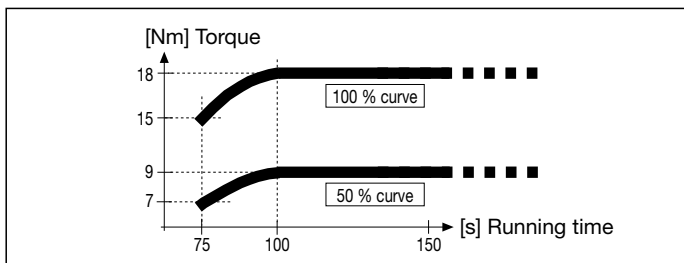
Function of feedback signal U_5 with customised parameters for soft switches S1 and S2



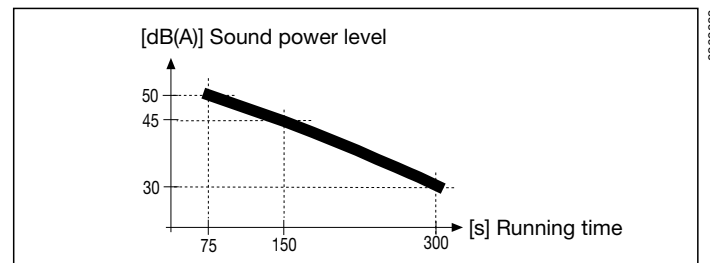
Function of feedback signal U_5 with customised parameters for maintenance and fault signals

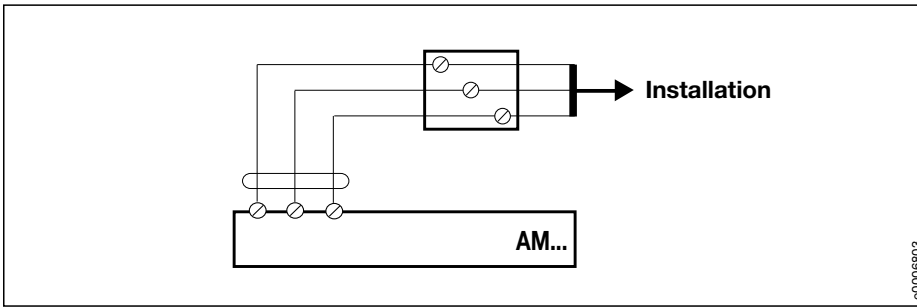


Torque function when running time is changed



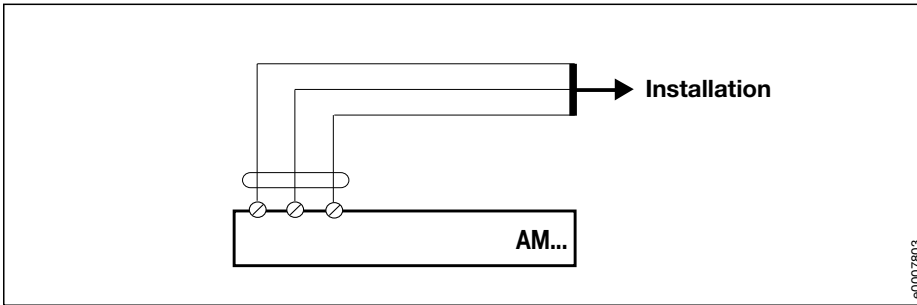
Sound power level function when running time is changed





Connection via terminal box

The normal practice is for AM... actuators to be connected by means of the prefitted flexible lead supplied with each unit. In this case the electrical connections between the actuator and the main system are made via the terminal box provided by the installer.

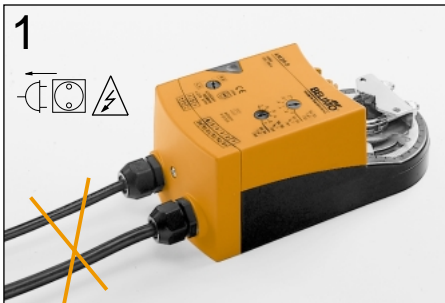


Direct connection

The actuator can also be connected to the main system directly, in which case no installer's terminal box is required.

Procedure for direct connection

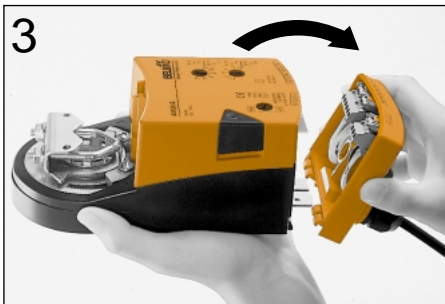
a) Disconnect the prefitted lead



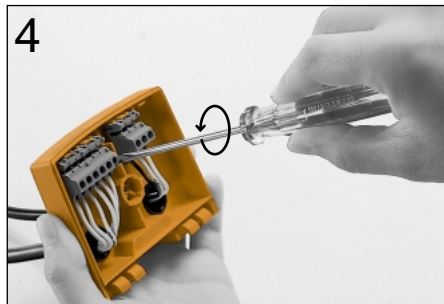
1
Disconnect the actuator from the main power supply. **Important:** the unit must be de-energized.



2
Remove the box fixing screw.

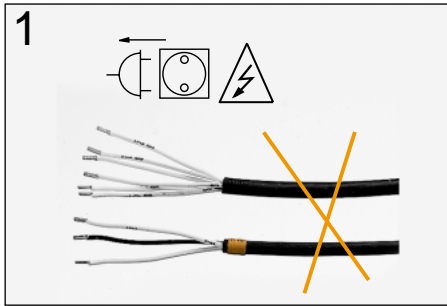


3
Detach the terminal box from the actuator.

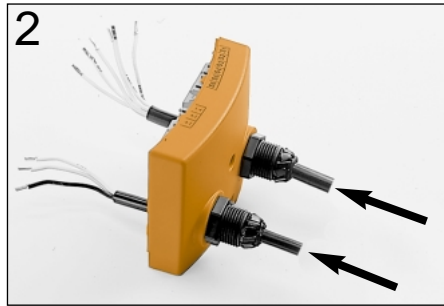


4
Loosen the terminals and remove the flexible lead.

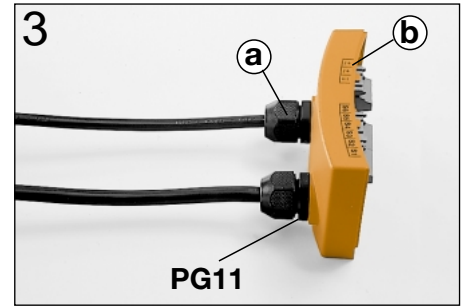
b) Connect the system cables directly to the actuator



De-energize the connecting cables.

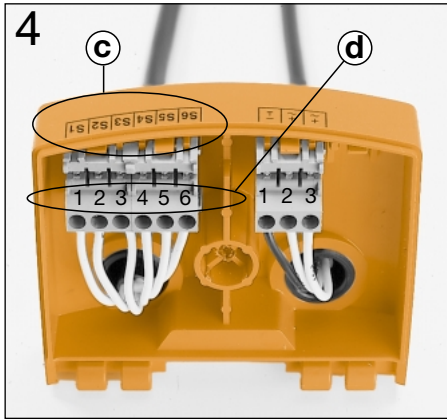


Pass the cables through the existing PG glands into the terminal box.



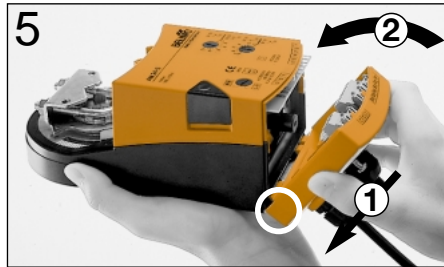
Tighten the cable glands (a). The glands are screwed directly into the terminal box (b) by means of a Type PG11 universal thread.

They provide strain relief for the connecting cables and also prevent any moisture from entering the box. Different types of standard cable gland can be used if necessary but they must have a PG11 thread.



Connect the cable cores.

The markings on the terminal box (c) and on the terminals themselves (d) are for user guidance.

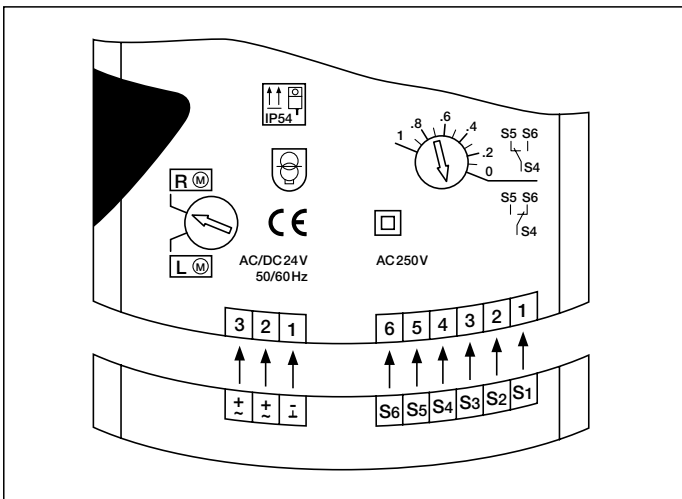


Re-attach the terminal box to the actuator.

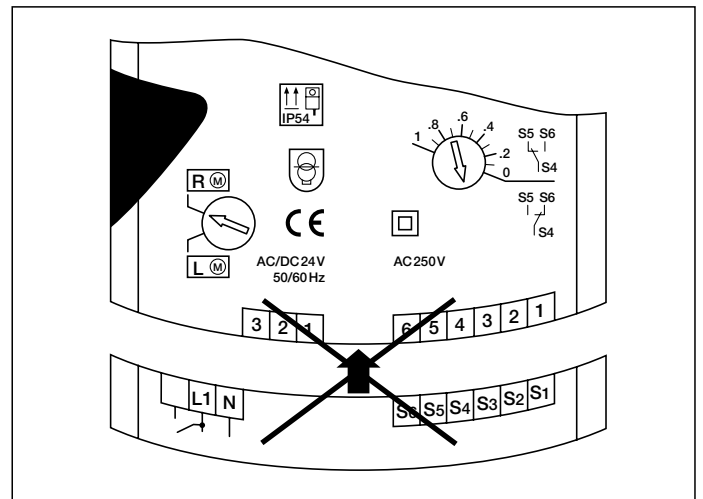


Tighten the box fixing screw.

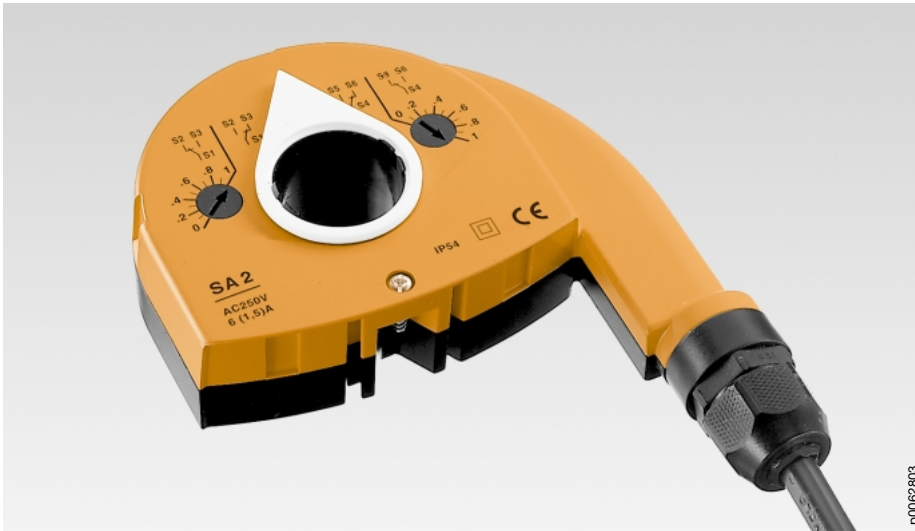
Safe connection



Matching terminal markings on actuator and terminal box show the user that the right terminal box has been connected to the right actuator.



In addition, mechanical coding ensures that the terminal box of a AC 230 V AM... actuator cannot be fitted to a 24 V actuator.



Compatible with all AM... damper actuators

Application

The auxiliary switch units SA1 and SA2 are intended for the signalling of end positions or for performing switching functions at any angular position.

Mode of operation

A driver disk is positively attached to the spindle clamp so that there is a direct link between its position and the microswitch operating cams.

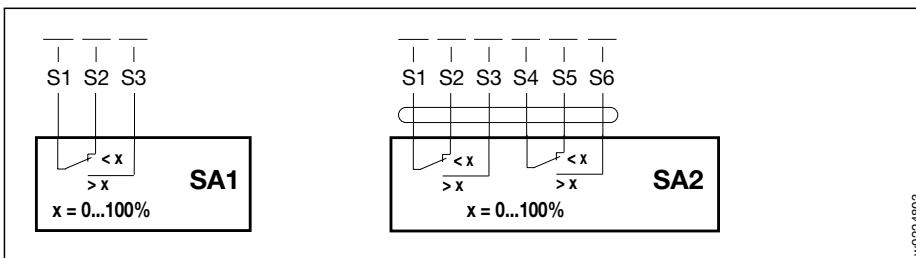
The switching points can be set anywhere in the range from 0 to 1 by means of a dial. The switch position can be read off at any time.

Installation

The auxiliary switch units plug directly on to the spindle clamp of the AM... damper actuators. The guide slots between the housing and the switch unit ensure proper location. The unit is secured to the motor housing with a prefitted screw.

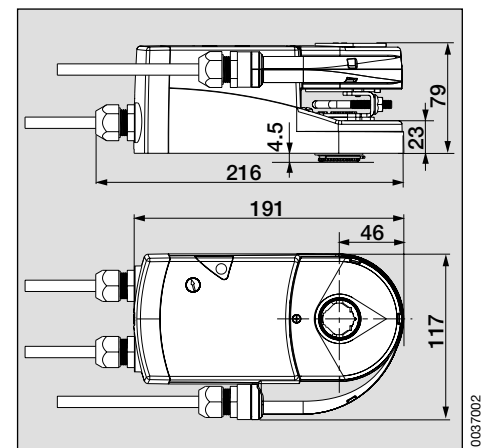
Mounting instruction, page 19

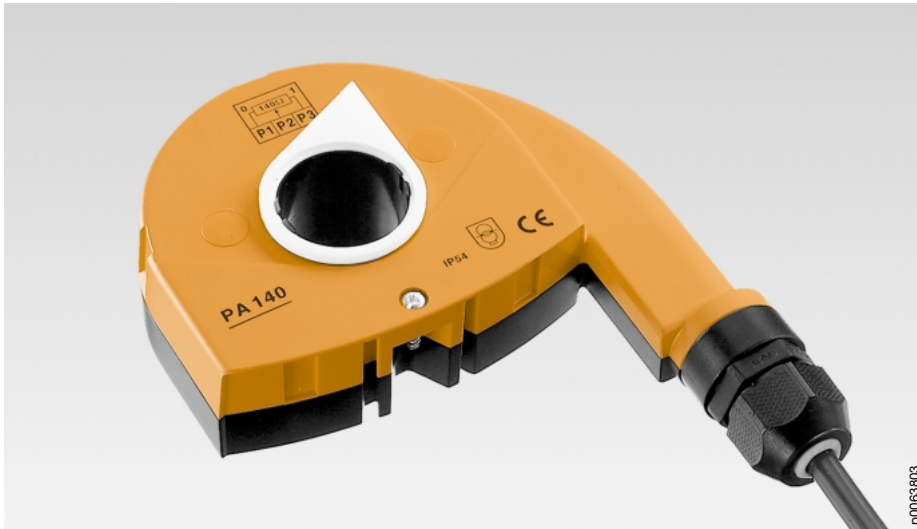
Wiring diagram



Technical Data	SA1	SA2
Number of switches	1 x SPDT	2 x SPDT
Switching capacity	6 A (1.5 A) AC 250 V	
Connecting cable	1 m long, 3 x 0.75 mm ²	1 m long, 6 x 0.75 mm ²
Switching point	Adjustable over full actuator rotation 0...1. Pre-setting by scale possible.	
Protection class	II (all insulated)	
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	
Weight	225 g	265 g

Dimensions





p0063803

Compatible with all AM... damper actuators

Application

The feedback potentiometer PA... is used for the modulating control of dampers in conjunction with controllers with rigid feedback. It can also be used in conjunction with normal commercially available systems for damper position indication or as positioner for actuators operating in parallel.

Mode of operation

The driver disk is positively attached to the spindle clamp and transmits the rotary motion of the actuator directly to the potentiometer.

Installation

The feedback potentiometer plugs directly on to the spindle clamp of the AM... damper actuators. The guide slots between the housing and the switch unit ensure proper location. The unit is secured to the motor housing with a prefitted screw.

Mounting instruction, page 19

Wiring diagram

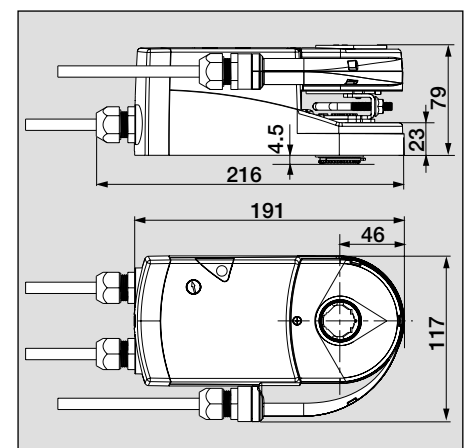


w0225803

Types		Resistance data
PA140	Feedback potentiometer	140 Ohm
PA500	Feedback potentiometer	500 Ohm
PA1000	Feedback potentiometer	1000 Ohm
PA2800	Feedback potentiometer	2800 Ohm

Technical data	PA...
Resistance data	as above
Tolerance	± 5%
Rating	1 W
Linearity	± 2%
Resolution	min. 1%
Residual resistance	max. 5% on both sides
Connecting cable	1 m long, 3 x 0.75 mm ²
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
Weight	250 g

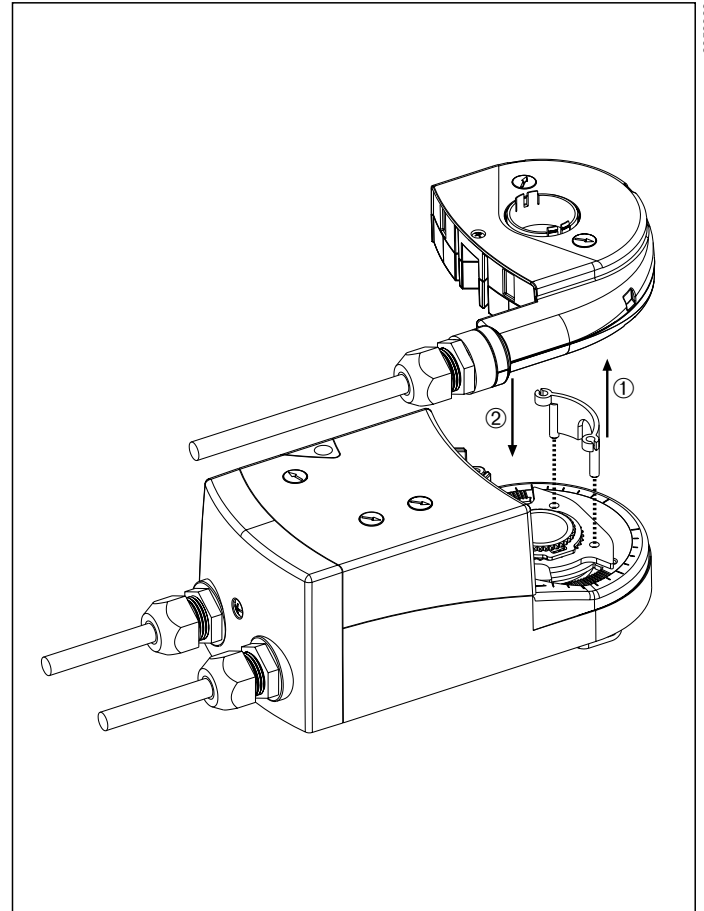
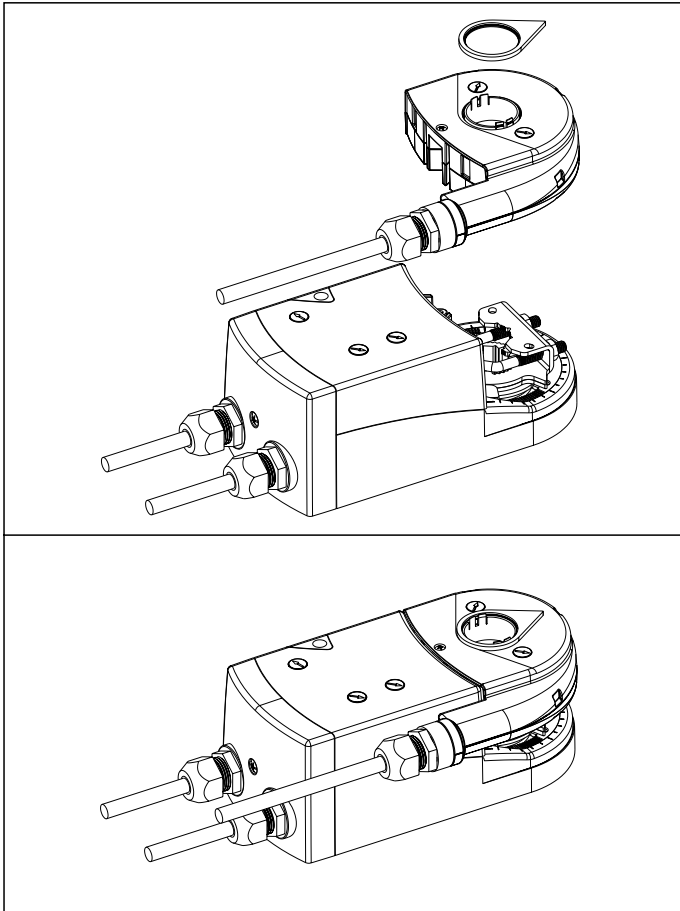
Dimensions



d0037002

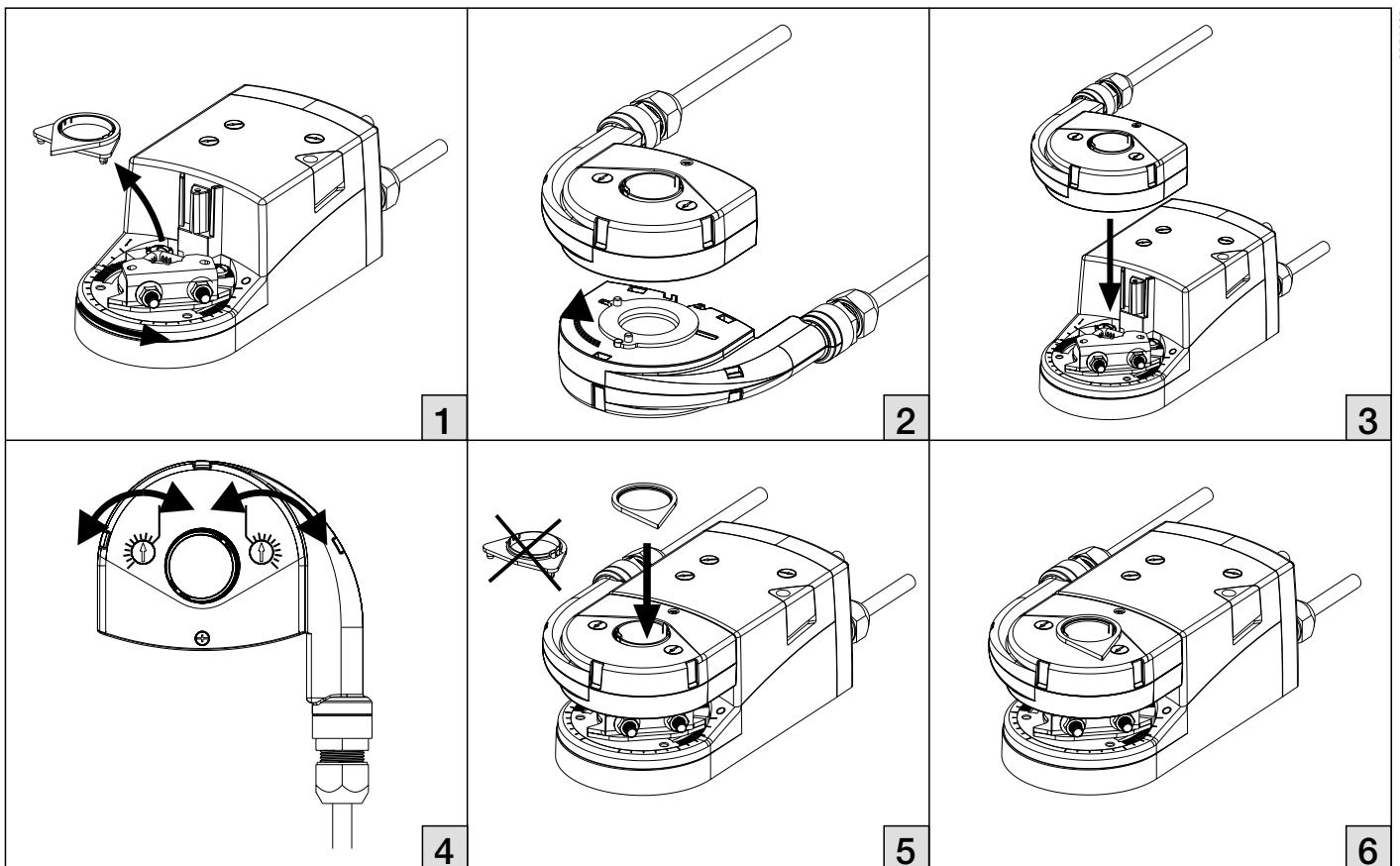
Mounting with damper spindles ≥ 50 mm

Mounting with short damper spindles ≥ 20 mm

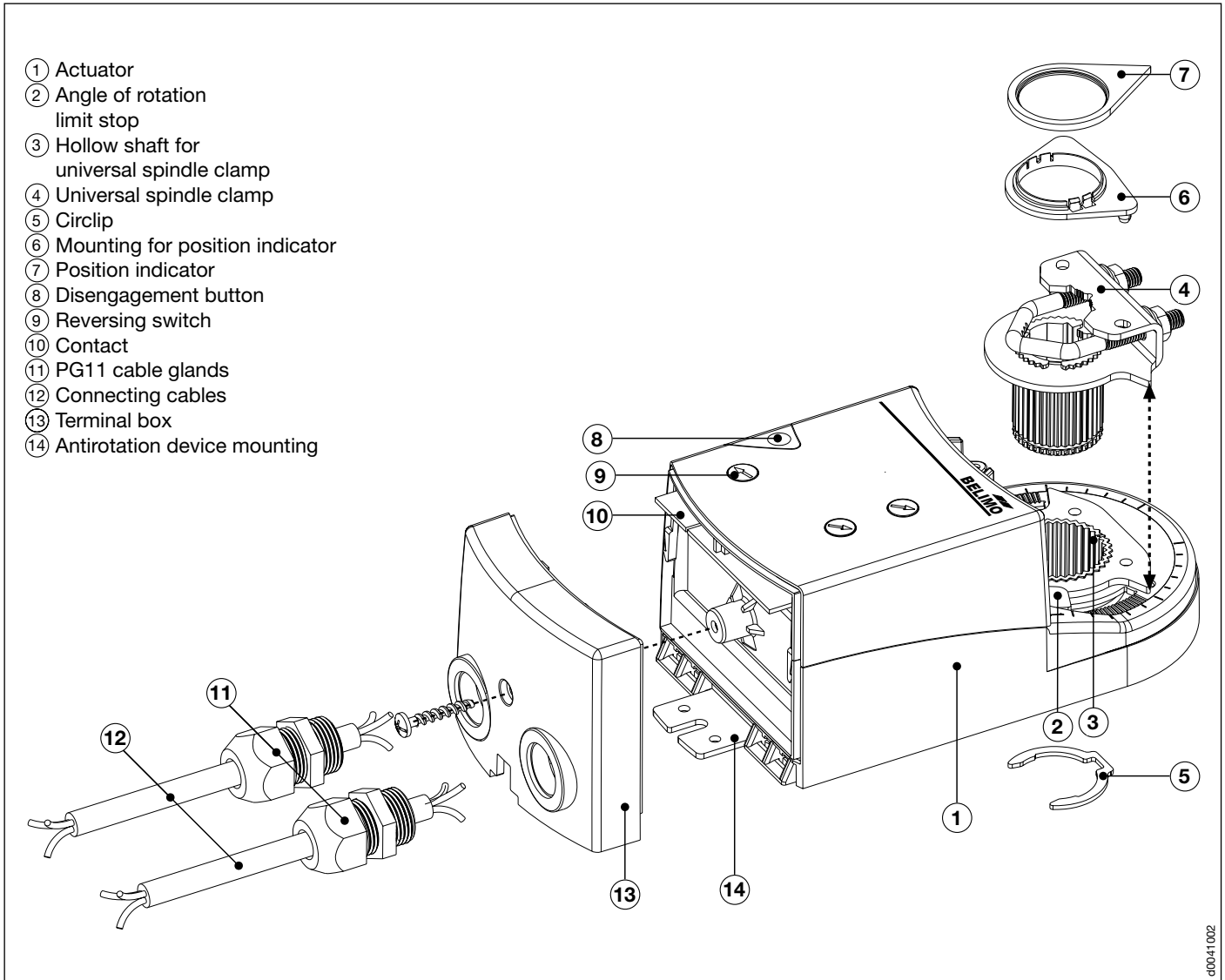


m005002

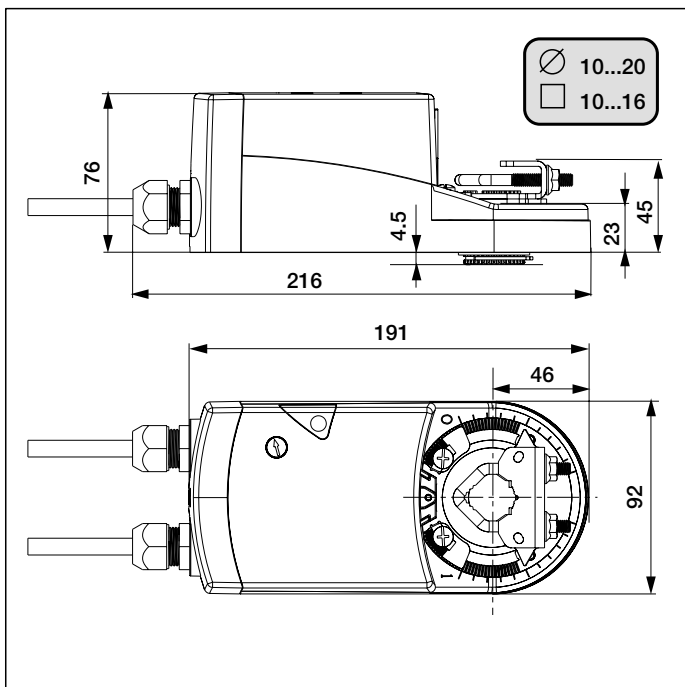
Adjusting the auxiliary switches SA1, SA2



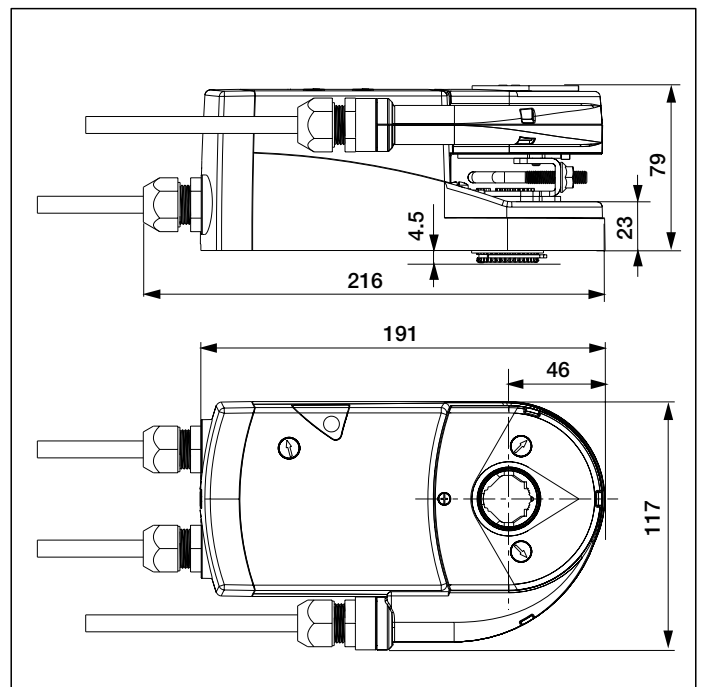
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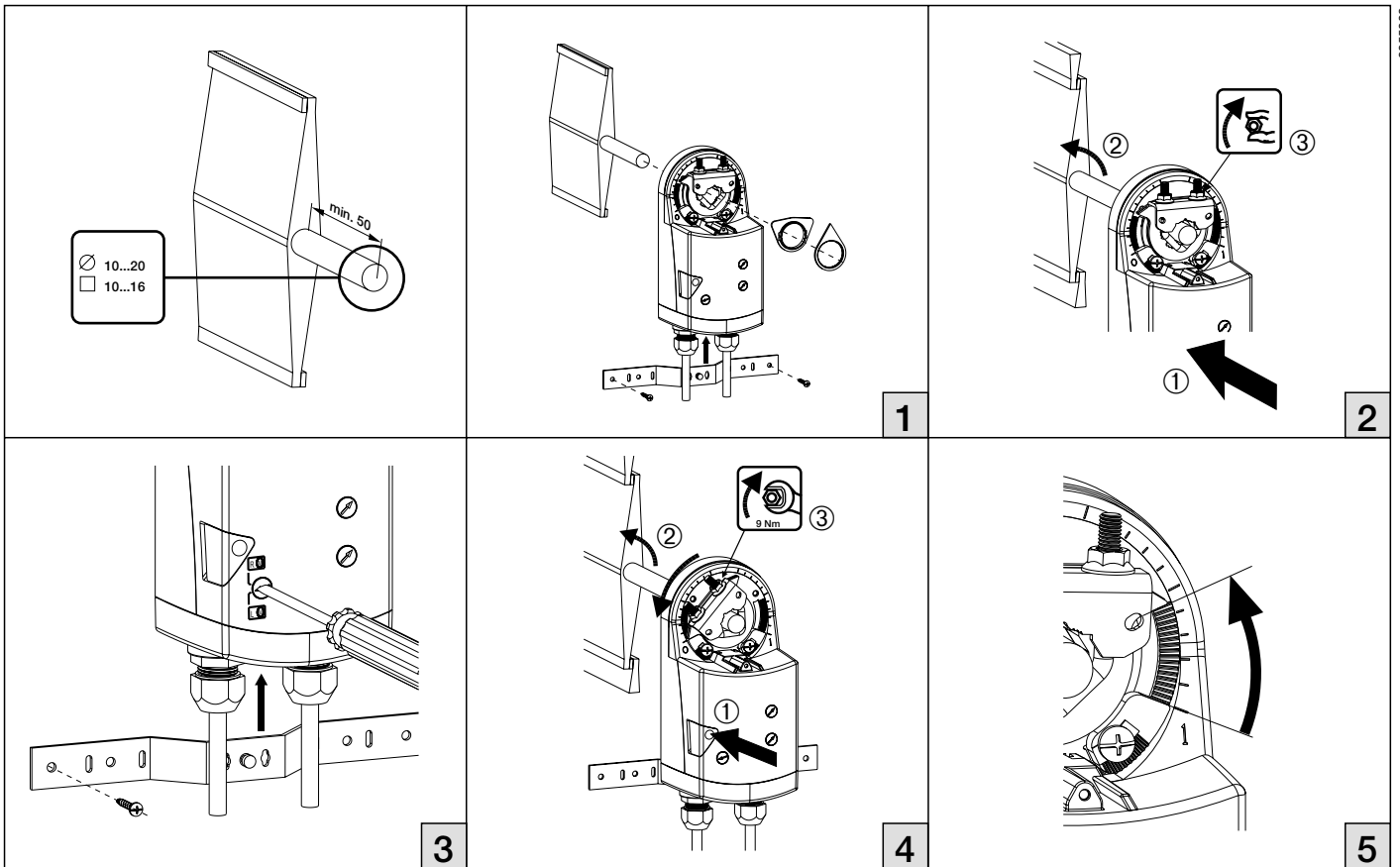
Dimensions Actuator



Dimensions Actuator with fitted auxiliary switches SA... or PA...

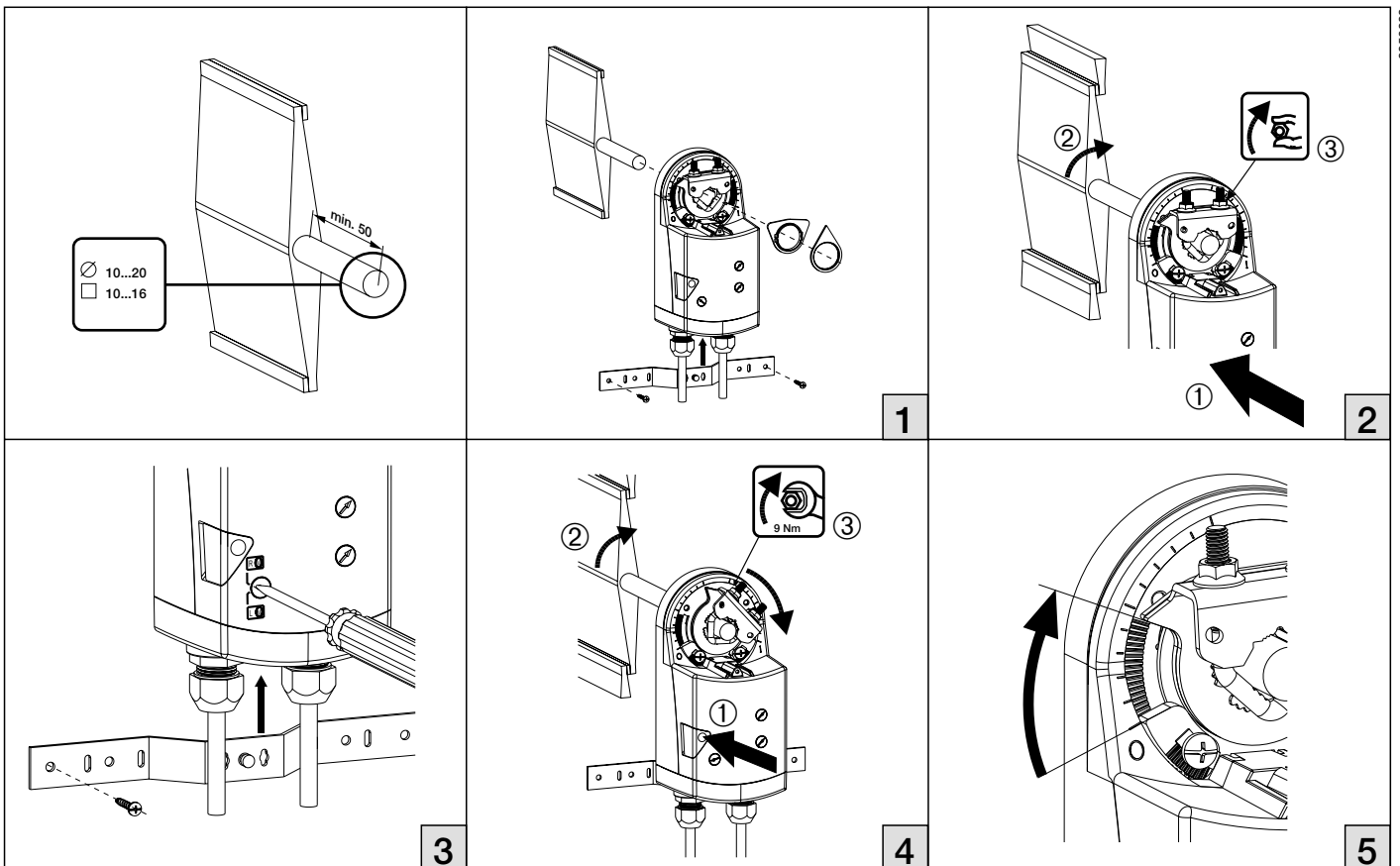


Mounting on anticlockwise-closing damper



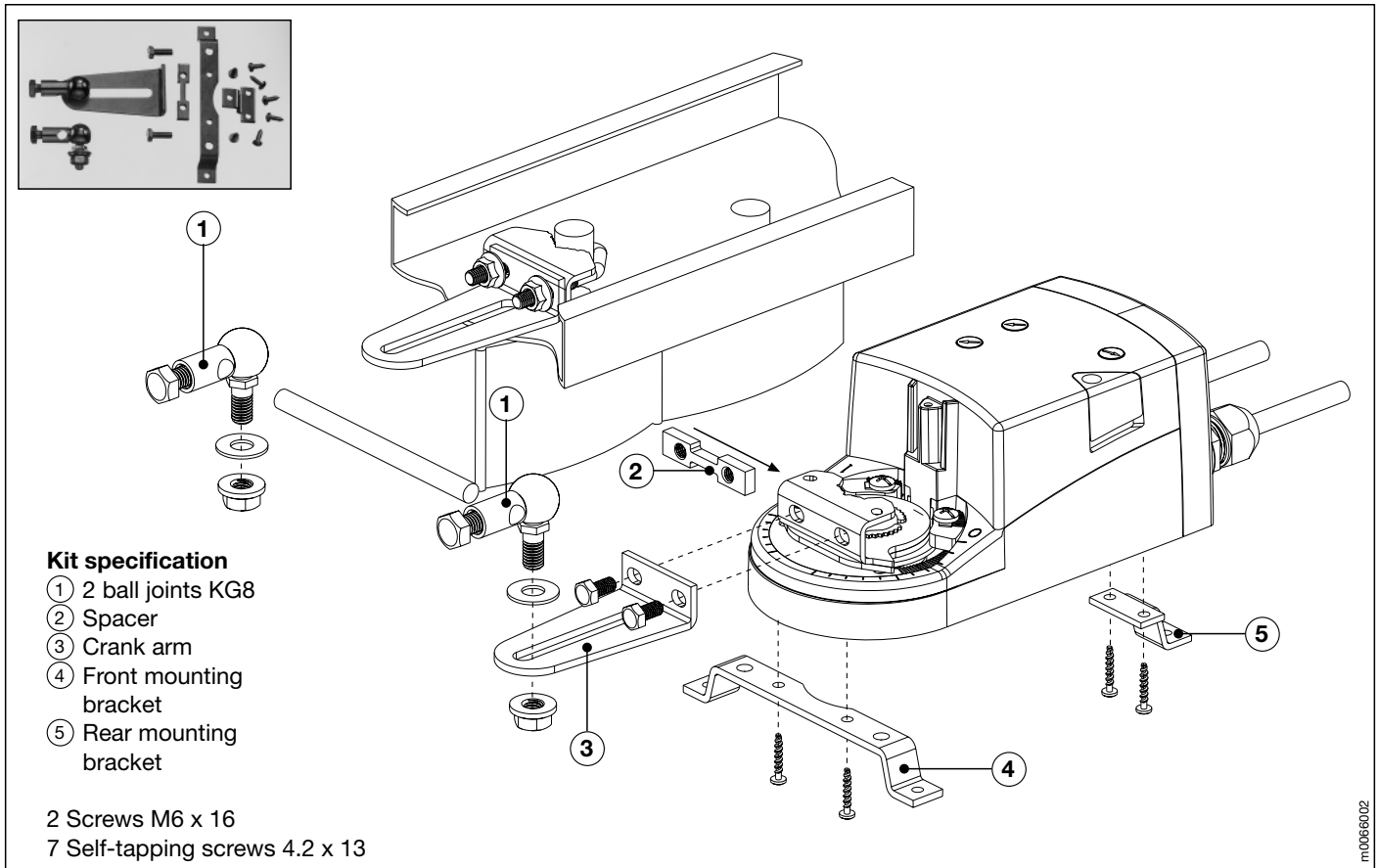
m0055002

Mounting on clockwise-closing damper

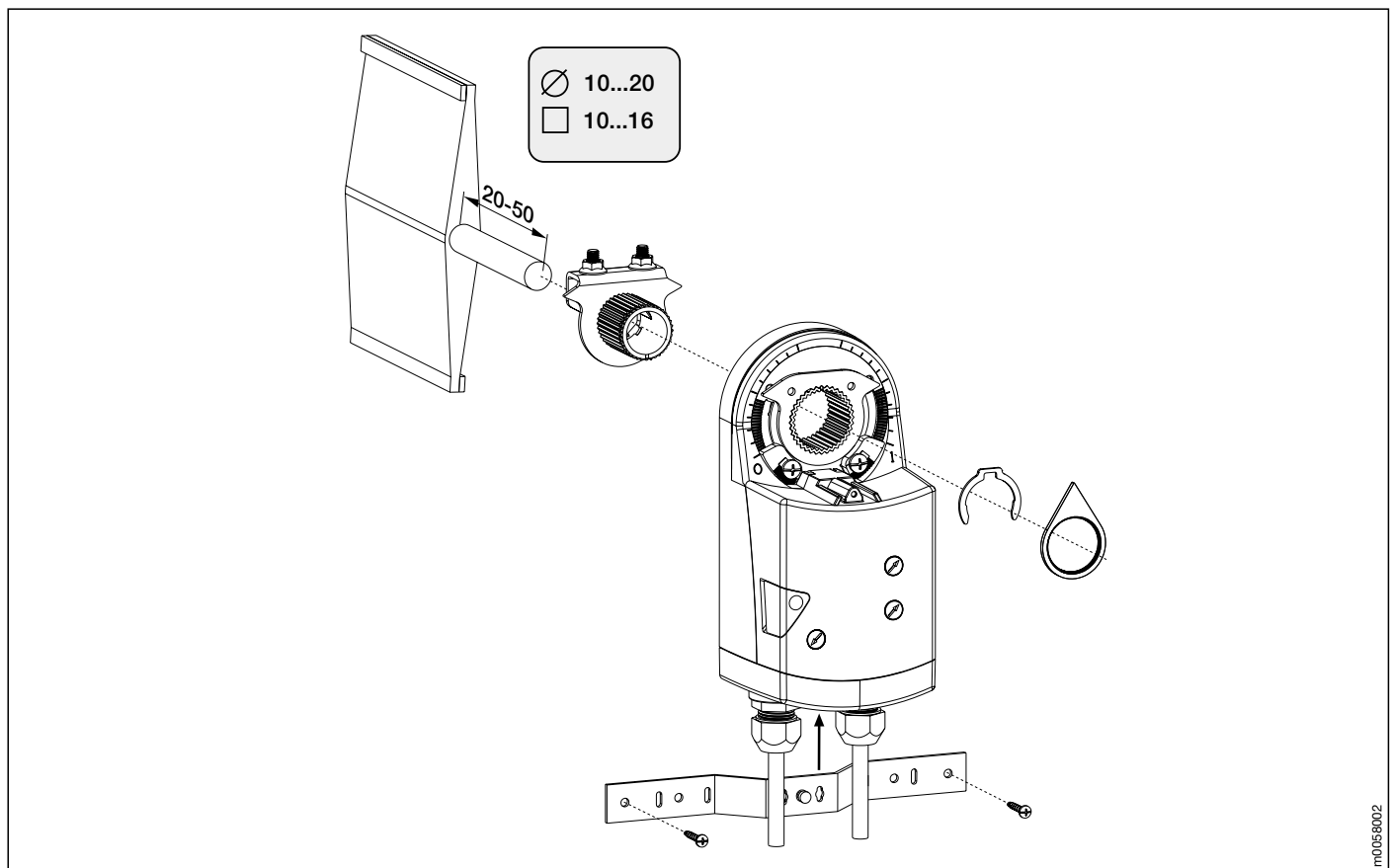


m0055002

Mounting with linkage (Accessory ZG-AM)

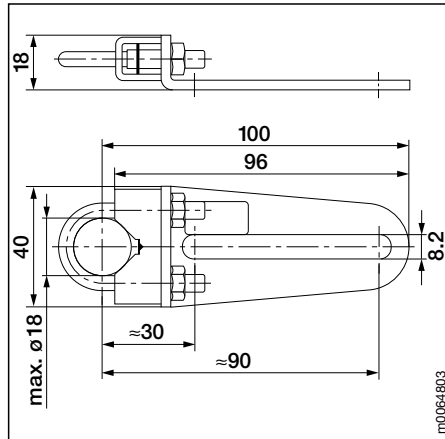


Mounting on short spindles, ≥ 20 mm





m0063803



m0064803

KH8

Universal crank arm

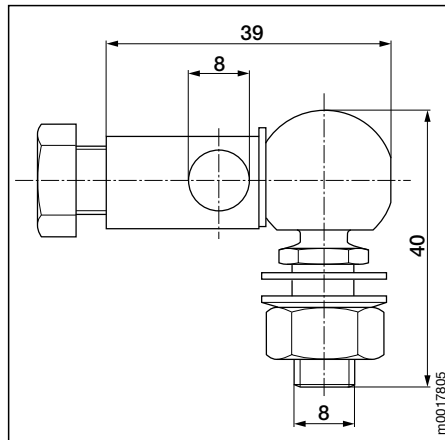
Zinc-plated steel; suitable for damper spindles:

- ⌀ 10...18 mm
- 10...14 mm

KG8



m0016712



m0017805

KG8

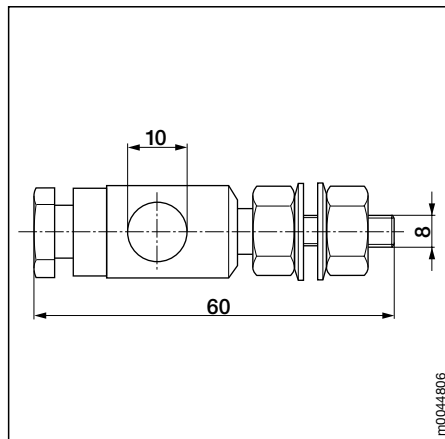
Ball joint

Zinc-plated steel; suitable for use with KH8 universal crank arms and round steel rod Ø 8 mm.

KG10



m0018707



m0044806

KG10

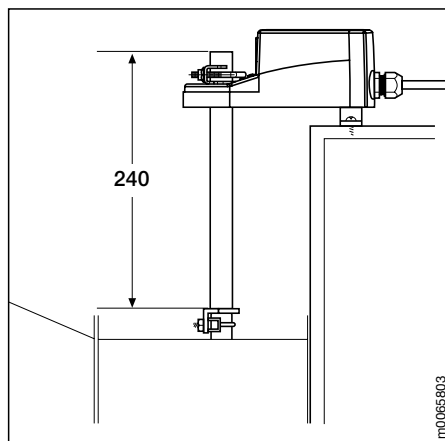
Ball joint

Zinc-plated steel; suitable for use with KH8 universal crank arm and round steel rod Ø 10 mm.

AV10-18



m0020707



m0065803

AV10-18

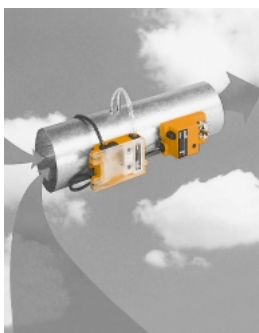
Universal spindle extension

Suitable for damper spindles:

- ⌀ 10...18 mm
- 10...14 mm

The worldwide leading actuator technology for all controlled devices in heating, ventilation and air-conditioning plants

Air applications

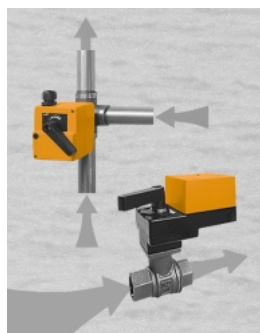


Damper actuators and spring-return actuators for air control dampers are invaluable elements of good HVAC systems.

Extra-strong safety actuators for motorizing fire and smoke extraction dampers help raise safety standards in buildings.

Air volume boxes – equipped with VAV-Control – ensure higher standards of comfort for the occupants of air-conditioned single rooms as well as saving energy.

Water applications



Rotary actuators for heating system mixing valves and motorized ball valves ensure reliable control of HVAC water systems.

Globe valves with MFT[®] actuators allow easy adaptation to the needs of HVAC systems.

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