

# Damper Actuators Non-Spring Return



## *Technical Databook*



Product Naming	L	M	U	24	-SR
<b>Torque</b>					
Non-Spring Return					
40Nm			<b>G</b>		
20Nm			<b>S</b>		
10Nm			<b>N</b>		
5Nm			<b>L</b>		
2Nm			<b>C</b>		
Spring Return					
15Nm			<b>A</b>		
7Nm			<b>N</b>		
4Nm			<b>L</b>		
2Nm			<b>T</b>		
Non-Spring Return					<b>M</b>
Spring Return					<b>F</b>
<b>New Generation Non-Spring Return For Asia Pacific</b>					
<b>Power Supply</b>					
AC/DC 24 V				<b>24</b>	
AC 100-240 V(AC 230 for Spring Return)				<b>230</b>	
Non-Spring Return					
ON/OFF, 3-point					<b>Blank</b>
ON/OFF ( only for CMU230.. )					<b>-RES</b>
Modulating DC 2(0)...10 V Control					<b>-SR</b>
Auxiliary Switch					<b>-S</b>
Form fit					<b>-F</b>
Terminal Connection					<b>-T</b>
Spring Return					
ON/OFF					<b>Blank</b>
Modulating DC 2(0)-10 V Control					<b>-SR</b>
3-point					<b>-3</b>
Auxiliary Switch					<b>-S</b>

For customizing type of Non-Spring Return actuators please contact Belimo sales near you.

New Generation Non-spring return actuator	CMU..	LMU..	NMU..	SMU..	GMU..
Open/Close, 3-point	2 Nm	5 Nm	10 Nm	20 Nm	40 Nm
AC 24 V 50/60 Hz, DC 24 V	CMU24(-F8/-F10)(-T)	LMU24(-F/-T)	NMU24(-F/-T)	SMU24(-F/-T)	GMU24*
Auxiliary switch build-in 1 SPDT		LMU24-S	NMU24-S	SMU24-S	
AC 100..240 V 50/60 Hz	CMU230(-F8/-F10)	LMU230	NMU230	SMU230	GMU230*
AC 230 V 50 Hz (Open/Close)	CMU230(-F8/-F10)-RES*				
Auxiliary switch build-in 1 SPDT		LMU230-S	NMU230-S	SMU230-S	
Modulating					
Control signal DC 2(0)..10 V, feedback DC 2...10 V					
AC 24 V 50/60 Hz, DC 24 V	CMU24-SR-R**	LMU24-SR	NMU24-SR	SMU24-SR	GMU24-SR
AC 100..240 V 50/60 Hz		LMU230SR	NMU230SR	SMU230SR	
Running time	75s			150s	
Shaft diameter	6...12.7mm	6... 20mm	8... 26mm	10... 20mm	14... 26mm
Sound power level	Max. 35 dB(A)	Max. 35 dB(A)	Max. 35 dB(A)	Max. 48 dB(A)	Max. 48 dB(A)
Manual override	Disengaging the gearing latch by means of a pushbutton, self-resetting				
Electrical connection	Cable 1 m (-T: Terminal)				
Direction of rotation	Selected by switch				
Angle of rotation	Max. 95°, can be limited at both ends with mechanical adjustable end stops				
Position indication	Mechanical, plug-on				
Degree of protection	IP54 in any direction (-T: IP20)				
EMC	CE according to 89/336/EEC				
Ambient temperature	- 30°C... + 50°C				
Non-operation temperature	- 40°C... + 80°C				
Humidity test	95% RH, non condensing (to EN 60730-1)				

\* Only Open/Close, no 3-point.

\*\* CMU24-SR-R: control signal 2(0) V at the right side, and the left side is available if request.

### Non-spring return damper actuators, 2 Nm

CMU24(-F8/-F10)(-T)	5
CMU24-SR-R	6
CMU230(-F8/-F10)	7
CMU230(-F8/-F10)-RES	8

### Non-spring return damper actuators, 5 Nm

LMU24(-S/-F/-T)	9
LMU24-SR	10
LMU230(-S/-F)	11
LMU230SR	12

### Non-spring return damper actuators, 10 Nm

NMU24(-S/-F/-T)	13
NMU24-SR	14
NMU230(-S/-F)	15
NMU230SR	16

### Non-spring return damper actuators, 20 Nm

SMU24(-S/-F/-T)	17
SMU24-SR	18
SMU230(-S/-F)	19
SMU230SR	20

### Non-spring return damper actuators, 40 Nm

GMU24	21
GMU24-SR	22
GMU230	23

### Wiring diagrams

### Actuator sizing

### Electrical accessories

Auxiliary switches S..A	27
Feedback potentiometers P..A	28
Positioner SGA(F/E/R)24	29
Position indicator ZAD24	30

### Mechanical accessories

### Installation instruction

### Replacement table

## Note:

### Using Belimo Damper actuators:

- The actuators listed in this catalogue are intended for the operation of air dampers in HVAC systems.
- The damper actuator is not allowed to be used outside the specified field of application, especially in aircraft.
- The enclosure of the actuator equipment may only be opened by the manufacturer. It contains no components which the user can replace or repair.
- 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.

### 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 condition.

To put decades of years' experience in manufacturing and developing actuators to good use in providing the best possible actuators for our customers, Belimo has developed the new generation actuators which adopt the latest technologies permitting optimum application and offer a standardized product range with uniform operation and uniform accessories.

- Nominal voltage AC 100...240 V or AC/DC 24 V
- Brushless DC-motors
- Same wiring concept for all types(standard diagrams, less wiring errors, ...)
- Angle of rotation adjustable by mechanical stops
- Manual override by pushbutton
- Degree of protection: IP54 in all mounting positions
- Ambient temperature range: -30 to +50 °C
- Backward compatibility (mechanical and electrical) to existing actuators (retrofit)
- Mounting on short shafts possible
- Option form fitting for all types

Self extinguishing housing,  
conform to UL94-5VB with  
detailed labelling

Reversible switch for  
change of direction  
of rotation

Position indicator  
Visible in bright or  
dim environment

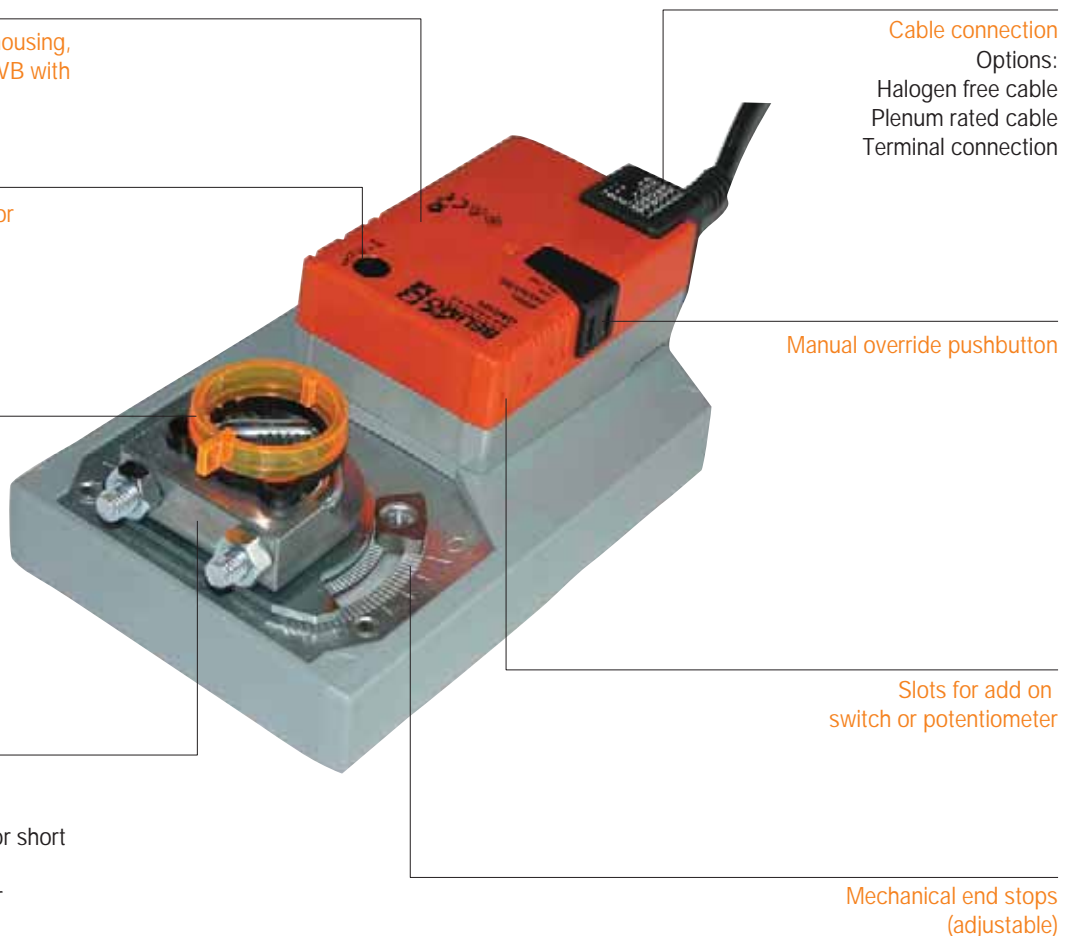
Universal V-clamp  
Options:  
Reversible clamp for short  
shaft mounting  
Form-fit adaptor for  
square shaft

Cable connection  
Options:  
Halogen free cable  
Plenum rated cable  
Terminal connection

Manual override pushbutton

Slots for add on  
switch or potentiometer

Mechanical end stops  
(adjustable)



### Simply versatile

The new generation of actuators brings you a product range with clear basic types, a new motor with a greater output, a longer service life and less energy consumption, as well as universal operating components and identical accessories. This is the concept that will save you even more time and optimize costs in the future.

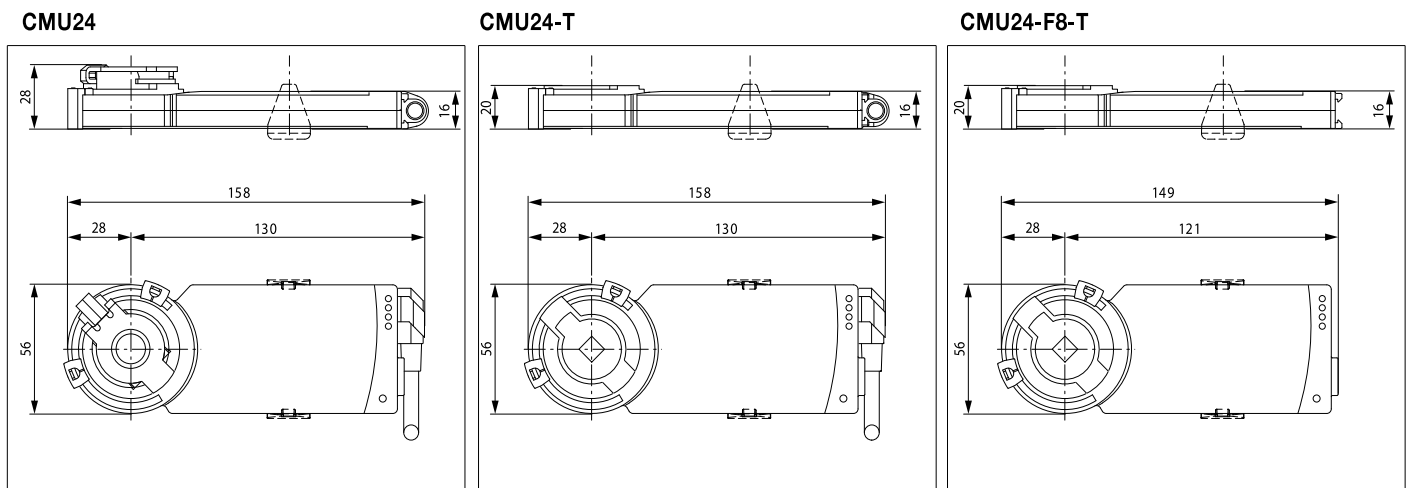
### Simply uncomplicated

The new generation of actuators now makes installation and operation even more efficient. Because the clearly structured, backwards compatible product range makes type selection simpler; the universal operating elements and identical accessories make handling easier, and the actuators have become even more powerful, everything gets easier and goes faster - in other words, typically Belimo.

- For operation of air control dampers in HVAC system.
- Torque 2 Nm
- Nominal voltage AC/DC 24 V
- Control: Open / Close or 3-point


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 24 V, 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2...28.8 V
	Power consumption	0.5 W @ running / 0.2 W @ holding
	Wire/transformer sizing	1 VA
<b>Functional data</b>	Connection: -T	Terminals for 3 x 1.5mm <sup>2</sup> CU wire or 3 x 1.5mm <sup>2</sup> CU litz wires
	Cable	1m, 3 x 0.75mm <sup>2</sup>
	Torque	2 Nm
	Direction of rotation	Dependent on electrical installation
	Manual override	Gear disengagement with magnet
	Angle of rotation Without limiters	Endless
	With limiters	Fixed 315° ↺ or 0... 287.5° ↺ with mechanical end stops, can be adjusted in 2.5° ↺ -increments
	Running time	75s / 90° ↺
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, pluggable with integrated magnet for gear disengagement
<b>Working conditions</b>	Protection class	III (Safety extra-low voltage)
	Degree of protection: Terminal(-T)	IP20
	Cable	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30... + 50°C
	Non-operation temperature	-40... + 80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
<b>Dimensions / weight</b>	Maintenance	Maintenance free
	Dimensions (L x W x H)	See "Dimensions"
	Shaft	⌀ 6...12.7mm
	Form fit (-F8)	8 x 8mm
	(-F10)	10 x 10mm
	Weight	Approx. 130g ~ 220g

**Dimensions [mm]**


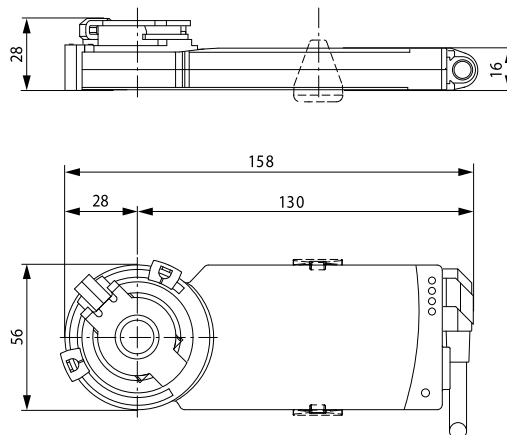
- For operation of air control dampers in HVAC system.
- Torque 2 Nm
- Nominal voltage AC/DC 24 V
- Control signal: DC 2 (0) ... 10 V
- Position feedback: DC 2 ... 10 V



Technical data

<b>Electrical data</b>	Nominal voltage	AC 24 V, 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2... 28.8 V
	Power consumption	1W @ running /0.5W @ holding
	Wire/transformer sizing	2 VA
<b>Functional data</b>	Connection	Cable 1m, 4 x 0.75mm <sup>2</sup>
	Torque	2 Nm
	Control signal	DC 2(0)...10 V (input impedance 100k Ω)
	Feedback signal	DC 2...10 V
	Direction of rotation	Y= 0V right end stop position
	Manual override	Gear disengagement with magnet
	Angle of rotation	Max. 95°, adjustable by mechanical steps
	Running time	75s / 90° ↯
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, pluggable with integrated magnet for gear disengagement
<b>Working conditions</b>	Protection class	III (Safety extra-low voltage)
	Degree of protection: Cable	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30 ... + 50°C
	Non-operation temperature	-40 ... + 80°C
<b>Dimensions / weight</b>	Humidity test	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance free
	Dimensions (L x W x H)	158 x 56 x 28mm
	Shaft diameter	⌀ 6...12.7mm
	Weight	Approx. 220g

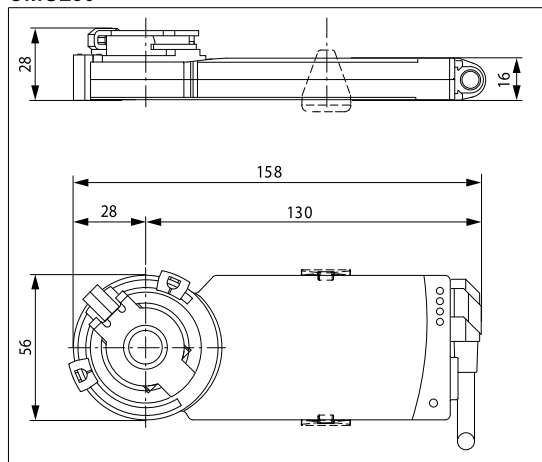
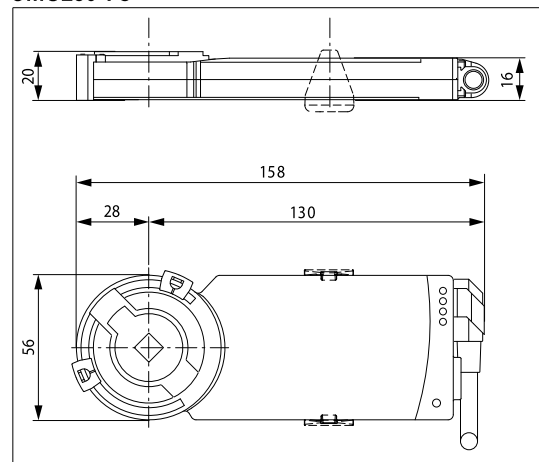
Dimensions [mm]



- For operation of air control dampers in HVAC system.
- Torque 2 Nm
- Nominal voltage AC 100...240 V
- Control: Open / Close or 3-point


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 100...240 V, 50/60 Hz
	Nominal voltage range	AC 85...265 V
	Power consumption	1.5 W running / 1W @ holding
	Wire/transformer sizing	3 VA
<b>Functional data</b>	Connection	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Torque	2 Nm
	Direction of rotation	Dependent on electrical installation
	Manual override	Gear disengagement with magnet
	Angle of rotation Without limiters	Endless
	With limiters	Fixed 315° ↺ or 0... 287.5° ↺ with mechanical end stops, can be adjusted in 2.5° ↺ -increments
<b>Working conditions</b>	Running time	75s / 90° ↺
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, pluggable with integrated magnet for gear disengagement
	Protection class	II (Totally insulated) <input type="checkbox"/>
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Low voltage directive	CE according to 2006/95/EC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30... + 50°C
	Non-operation temperature	-40... + 80°C
<b>Dimensions / weight</b>	Humidity test	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance free
	Dimensions (L x W x H)	See "Dimensions"
	Shaft	6...12.7mm
	Form fit (-F8) (-F10)	8 x 8mm 10 x 10mm
Weight	Approx. 220g	

**Dimensions [mm]**
**CMU230**

**CMU230-F8**


- For operation of air control dampers in HVAC system.
- Torque 2 Nm
- Nominal voltage AC 230 V
- Control: Open / Close

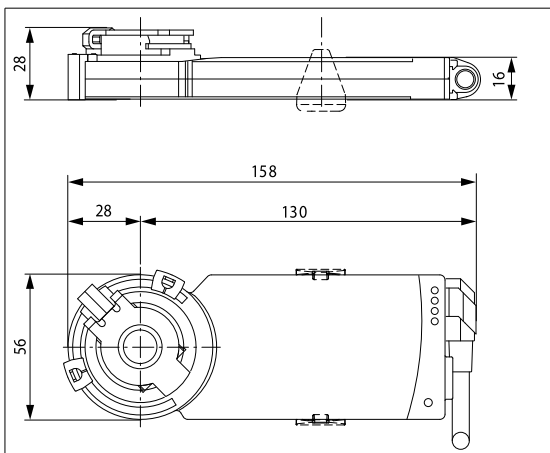


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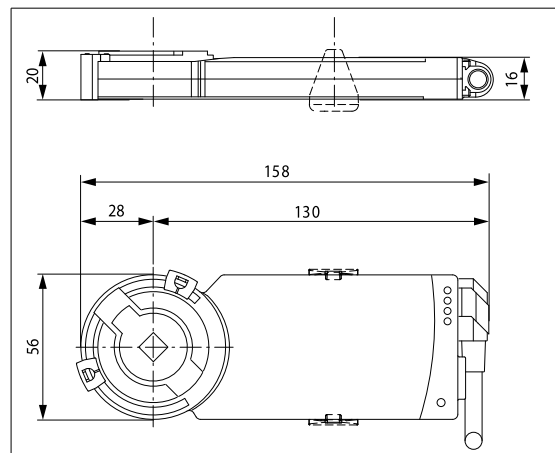
<b>Electrical data</b>	Nominal voltage	AC 230 V, 50Hz
	Nominal voltage range	AC 207...253 V
	Power consumption in operation	1.5 W @ running /1.5 W @ holding
	Wire/transformer sizing	8.5 VA
<b>Functional data</b>	Connection	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Torque	2 Nm
	Direction of rotation	Dependent on electrical installation
	Manual override	Gear disengagement with magnet
	Angle of rotation Without limiters	Endless
	With limiters	Fixed 315° ◁ or 0...287.5° ◁ with mechanical end stops, can be adjusted in 2.5° ◁ increments
	Running time	75s / 90° ◁
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, pluggabel with integrated magnet for gear disengagement
	<b>Working conditions</b>	Protection class
Degree of protection		IP 54 in any direction
EMC		CE according to 89/336/EEC
Low voltage directive		CE according 2006/95/EC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
<b>Dimensions / weight</b>	Humidity test	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance free
	Dimensions (L x W x H)	See "dimensions"
	Shaft	⌀ 6...12.7mm
	Form fit (- F8)	8 x 8mm
	(- F10)	10 x 10mm
Weight	Approx. 220g	

**Dimensions [mm]**

CMU230-RES



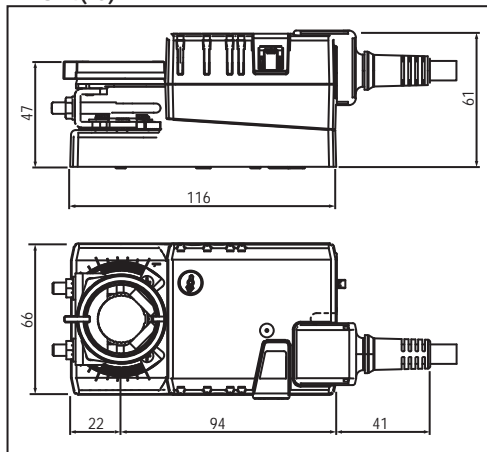
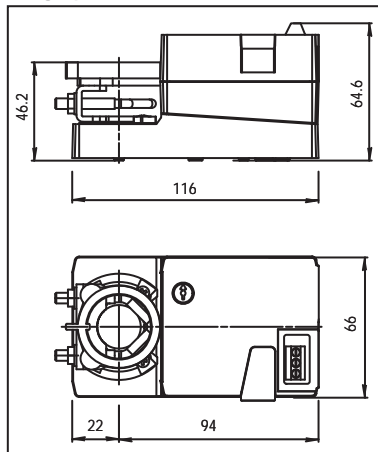
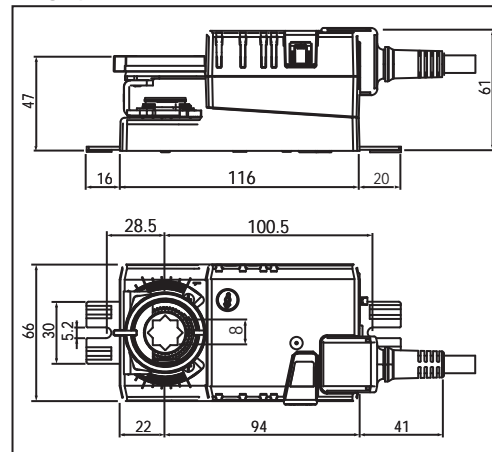
CMU230-F8-RES



- For operation of air control dampers in HVAC system.
- Torque 5 Nm
- Nominal voltage AC/DC 24 V
- Control: Open/Close or 3-point


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption	1 W running / 0.2 W @ holding
	Wire / tranformer sizing	1.5 VA
	Auxiliary switch LMU24-S	1 SPDT, 1 mA... 3 (0.5) A, AC 250 V $\square$ , adjustable
	Connection : Motor LMU24(-S/-F) Auxiliary switch LMU24-S Terminals LMU24-T	Cable 1m, 3 x 0.75mm <sup>2</sup> Cable 1m, 3 x 0.75mm <sup>2</sup> Max. 3 x 1.5mm <sup>2</sup>
<b>Functional data</b>	Torque	5 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 35 dB (A)
<b>Working conditions</b>	Position indication	Mechanical, remote visible
	Protection class	III (safety low voltage)
	Degree of protection: LMU24(-S/-F) LMU24-T	IP54 in any direction IP20
	EMC	CE according to 89/336/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30 ... + 50°C
	Non-operation temperature	-40 ... + 80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance free
	<b>Dimensions / weight</b>	Dimensions (L x W x H)
Shaft length		Min. 37mm
Shaft : LMU24(-T/S) LMU24-F		$\odot$ 6... 20mm 8 x 8mm
Weight		Approx. 500g

**Dimensions [mm]**
**LMU24(-S)**

**LMU24-T**

**LMU24-F**


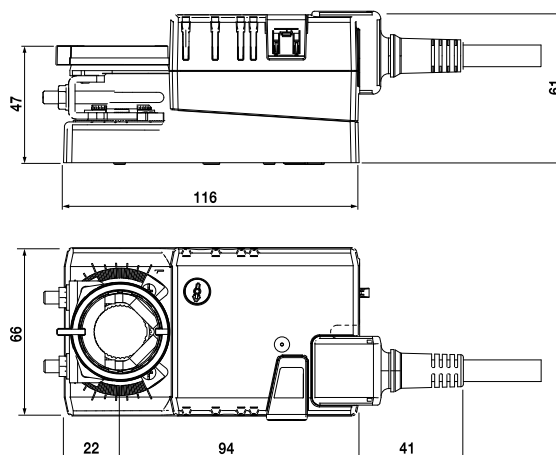


- For operation of air control dampers in HVAC system.
- Torque 5 Nm
- Nominal voltage AC/DC 24 V
- Control signal: DC 2(0) ...10 V
- Position feedback: DC 2 ...10 V

## Technical data

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19,2 ... 28,8 V
	Power consumption	1 W @ running / 0.4 W @ holding
	Wire/transformer sizing	2 VA
	Connection	Cable 1m, 4 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Torque	5 Nm
	Control signal	DC 2(0)...10 V (input impedance 100k $\Omega$ )
	Feedback signal	DC 2...10 V
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30 ... + 50°C
Non-operation temperature		-40 ... + 80°C
Humidity test		95% RH, non condensing (EN 60730-1)
<b>Dimensions / weight</b>	Maintenance	Maintenance free
	Dimensions (L x W x H)	157 x 66 x 60mm
	Shaft length	Min. 37mm
	Shaft	$\text{O} \text{I} \diamond 6 \dots 20\text{mm}$
	Weight	500g

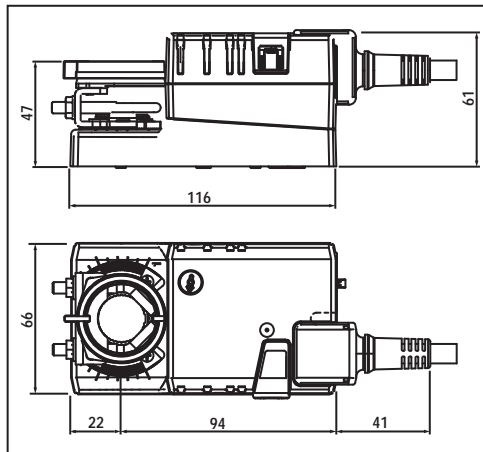
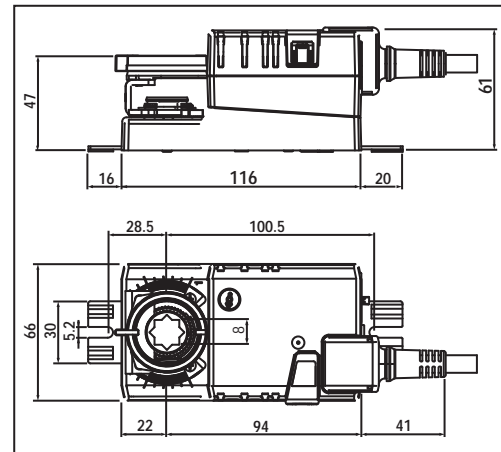
## Dimensions [mm]



- For operation of air control dampers in HVAC system.
- Torque 5 Nm
- Nominal voltage AC 100...240 V
- Control: Open/Close or 3-point


**Technical data**


<b>Electrical data</b>	Nominal voltage	AC 100 ... 240 V, 50/60 Hz
	Nominal voltage range	AC 85 ... 265 V
	Power consumption	1.5 W @ running / 0.5 W @ holding
	Wire/transformer sizing	3.5 VA
	Auxiliary switch LMU230-S	1 SPDT, 1 m A ... 3 (0.5) A, AC 250 V <input type="checkbox"/> , adjustable
	Connection : Motor	Cable 1m, 3 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Auxiliary switch LMU230-S	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Torque	5 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150 s for 95°
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, remote visible
<b>Working conditions</b>	Protection class	II (Totally insulated) <input type="checkbox"/>
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Low voltage directive	CE according to 73/23/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30 ... + 50°C
	Non-operation temperature	-40 ... + 80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
<b>Dimensions / weight</b>	Maintenance	Maintenance free
	Dimensions (L x W x H)	See 'Dimensions'
	Shaft length	Min. 37mm / LMU230-F: min. 20mm
	Shaft : LMU230(-S)	⌀ 6 ... 20mm
	LMU230-F	8 x 8mm
	Weight	Approx. 550g

**Dimensions [mm]**
**LMU230(-S)**

**LMU230-F**


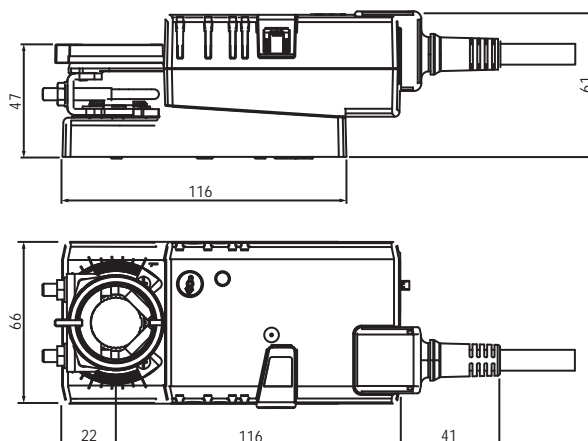


- For operation of air control dampers in HVAC system.
- Torque 5 Nm
- Nominal voltage AC 100 ... 240 V
- Control signal: DC 2(0)...10 V
- Position feedback: DC 2 ...10 V

## Technical data

<b>Electrical data</b>	Nominal voltage	AC 100 ... 240 V, 50/60 Hz
	Nominal voltage range	AC 85 ... 265 V
	Power consumption	2 W @ running / 1 W @ holding
	Wire/transformer sizing	4 VA
	Connection cable: Power supply Signals	Cable 1m, 2 x 0.75mm <sup>2</sup> Cable 1m, 4 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Torque	5 Nm
	Control signal	DC 2(0)...10 V (input impedance 100k $\Omega$ )
	Feedback signal	DC 2...10 V
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150 s for 95°
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Low voltage directive		CE according to 73/23/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
Humidity test		95% RH, non condensing (EN 60730-1)
Maintenance		Maintenance free
<b>Dimensions / weight</b>		Dimensions (L x W x H)
	Shaft length	Min. 37mm
	Shaft	 6... 20mm
	Weight	Approx. 700g

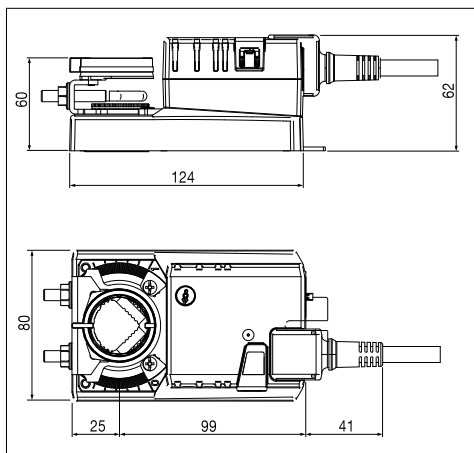
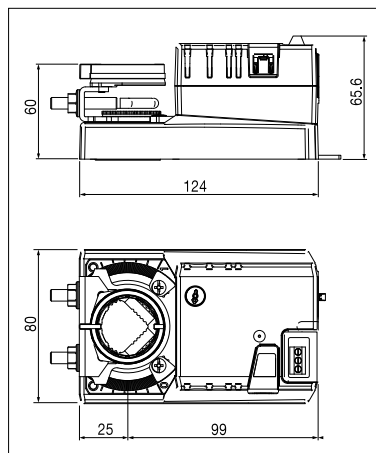
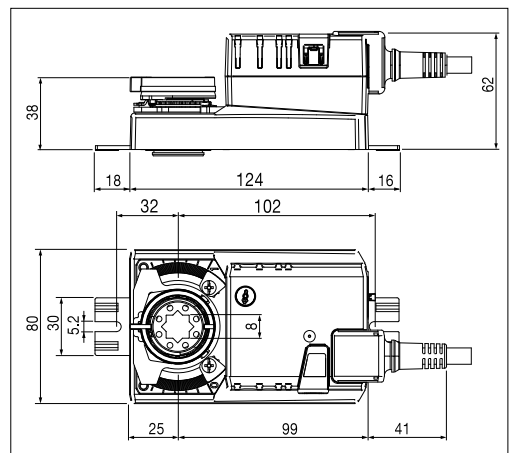
## Dimensions [mm]



- For operation of air control dampers in HVAC system.
- Torque 10 Nm
- Nominal voltage AC/DC 24 V
- Control: Open/Close or 3-point


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption	1.5 W @ running / 0.2 W @ holding
	Wire/transformer sizing	3.5 VA
	Auxiliary switch NMU24-S	1 SPDT, 1 mA ... 3 (0.5) A, AC 250 V <input type="checkbox"/> , adjustable
	Connection : Motor NMU24(-S/-F) Auxiliary switch NMU24-S Terminals NMU24-T	Cable 1m, 3 x 0.75mm <sup>2</sup> Cable 1m, 3 x 0.75mm <sup>2</sup> Max. 3 x 1.5mm <sup>2</sup>
<b>Functional data</b>	Torque	10 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 35 dB (A)
<b>Working conditions</b>	Position indication	Mechanical, remote visible
	Protection class	III (safety low voltage)
	Degree of protection: NMU24(-S/-F) NMU24-T	IP54 in any direction IP20
	EMC	CE according to 89/336/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30... +50°C
<b>Dimensions / weight</b>	Non-operation temperature	-40... +80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance free
	Dimensions (L x W x H)	See 'Dimensions'
	Shaft length	Min. 40mm (20mm with K-NA for reverse mounting - optional)
	Shaft: NMU24(-T/-S) NMU24-F	8... 26.7mm (8... 20mm with K-NA) 8 x 8mm
Weight	Approx. 750g	

**Dimensions [mm]**
**NMU24(-S)**

**NMU24-T**

**NMU24-F**


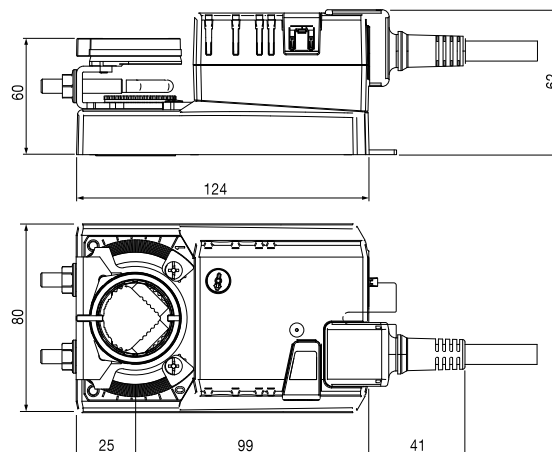


- For operation of air control dampers in HVAC system.
- Torque 10 Nm
- Nominal voltage AC/DC 24 V
- Control signal: DC 2(0) ...10 V
- Position feedback: DC 2 ... 10 V

**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption	2 W @ running / 0.4 W @ holding
	Wire/transformer sizing	4 VA
<b>Functional data</b>	Connection	Cable 1m, 4 x 0.75mm <sup>2</sup>
	Torque	10 Nm
	Control signal	DC 2(0)...10 V (input impedance 100kΩ)
	Feedback signal	DC 2...10 V
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with push button, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150 s for 95°
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, remote visible
<b>Working conditions</b>	Protection class	III (safety low voltage)
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30... +50°C
	Non-operation temperature	-40... +80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
<b>Dimensions / weight</b>	Maintenance	Maintenance free
	Dimensions (L x W x H)	165 x 80 x 62mm
	Shaft length	Min. 40mm (20mm with K-NA for reverse mounting - optional)
	Shaft	⌀ 8... 26.7mm (8... 20mm with K-NA)
	Weight	Approx. 800g

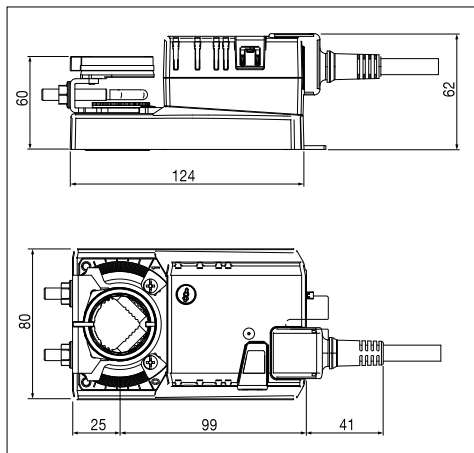
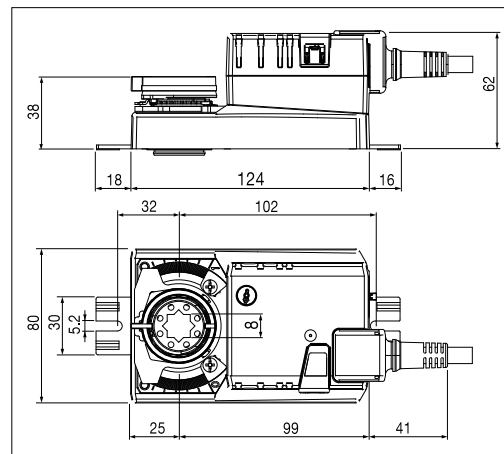
**Dimensions [mm]**



- For operation of air control dampers in HVAC system.
- Torque 10 Nm
- Nominal voltage AC 100...240 V
- Control: Open/Close or 3-point


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 100...240 V, 50/60 Hz
	Nominal voltage range	AC 85 ... 265 V
	Power consumption	2.5 W @ running / 0.6 W @ holding
	Wire/transformer sizing	5.5 VA
	Auxiliary switch NMU230-S	1 SPDT, 1 mA ... 3 (0.5) A, AC 250 V <input type="checkbox"/> , adjustable
<b>Functional data</b>	Connection : Motor	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Auxiliary switch NMU230-S	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Torque	10 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with push button, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Low voltage directive		CE according to 73/23/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
Humidity test		95% RH, non condensing (EN 60730-1)
Maintenance		Maintenance free
<b>Dimensions / weight</b>		Dimensions (L x W x H)
	Shaft length	Min. 40mm (20mm with K-NA for reverse mounting - optional)
	Shaft: NMU230(-S)	⌀ 8... 26.7mm (8 ... 20mm with K-NA)
	NMU230-F	8 x 8mm
	Weight	Approx. 800g

**Dimensions [mm]**
**NMU230(-S)**

**NMU230-F**


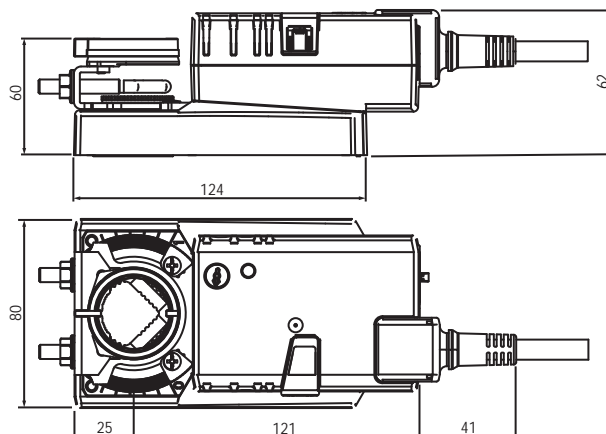


- For operation of air control dampers in HVAC system.
- Torque 10 Nm
- Nominal voltage AC 100 ... 240 V
- Control signal: DC 2(0)...10 V
- Position feedback: DC 2 ... 10 V

Technical data

<b>Electrical data</b>	Nominal voltage	AC 100 ... 240 V , 50/60 Hz
	Nominal voltage range	AC 85 ... 265 V
	Power consumption	3.5 W @ running / 1 W @ holding
	Wire/transformer sizing	6.5 VA
Connection cable: Power supply		Cable 1m, 2 x 0.75mm <sup>2</sup>
Signals		Cable 1m, 4 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Torque	10 Nm
	Control signal	DC2(0)...10 V (input impedance 100k $\Omega$ )
	Feedback signal	DC 2...10 V
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Low voltage directive		CE according to 73/23/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
Humidity test		95% RH, non condensing (EN 60730-1)
Maintenance		Maintenance free
<b>Dimensions / weight</b>		Dimensions (L x W x H)
	Shaft length	Min. 40mm (20mm with K-NA for reverse mounting - optional)
	Shaft	$\varnothing$ 8 ... 26.7mm (8 ... 20mm with K-NA)
	Weight	Approx. 950g

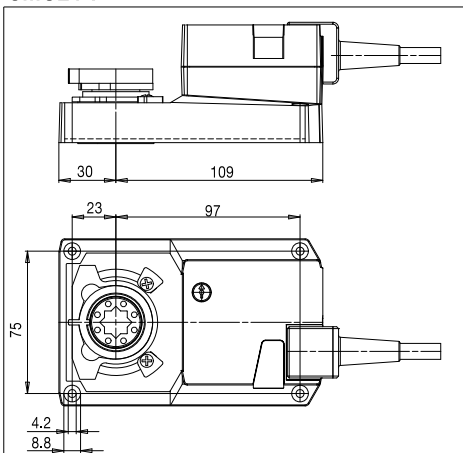
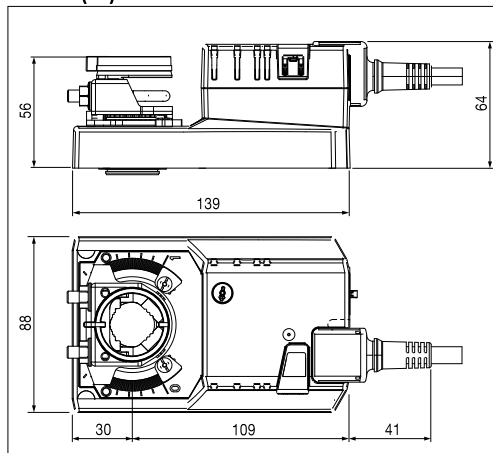
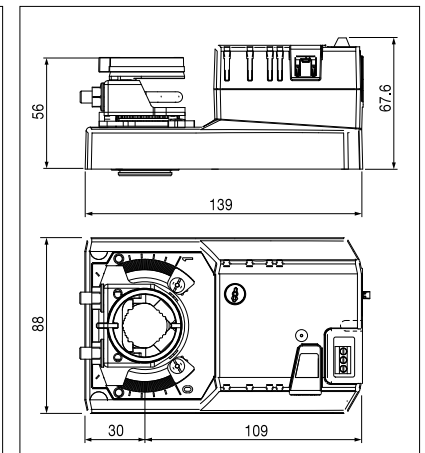
Dimensions [mm]



- For operation of air control dampers in HVAC system.
- Torque 20 Nm
- Nominal voltage AC/DC 24 V
- Control: Open/Close or 3-point


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption	2 W @ running / 0.2 W @ holding
	Wire/transformer sizing	4 VA
	Auxiliary switch SMU24-S	1 SPDT, 1 mA ... 3 (0.5) A, AC 250 V <input type="checkbox"/> , adjustable
	Connection : Motor SMU24(-S/-F)	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Auxiliary switch SMU24-S	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Terminals SMU24-T	Max. 3 x 1.5mm <sup>2</sup>
<b>Functional data</b>	Torque	20 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 46 dB (A)
	Position indication	Mechanical, remote visible
<b>Working conditions</b>	Protection class	III (safety low voltage)
	Degree of protection: SMU24(-S/-F)	IP54 in any direction
	SMU24-T	IP20
	EMC	CE according to 89/336/EEC
	Mode of operation	Type 1 to EN 60730-1
<b>Dimensions / weight</b>	Ambient temperature	-30... +50°C
	Non-operation temperature	-40... +80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance free
	Dimensions (L x W x H)	See 'Dimensions'
	Shaft length	Min. 42 mm (20mm for reverse mounting)
	Shaft: SMU24(-S)	⌀ 10 ... 20mm (10 ... 26.7mm with K-ENSA - optional)
	SMU24-F	12 x 12mm
	Weight	Approx. 1050g

**Dimensions [mm]**
**SMU24-F**

**SMU24(-S)**

**SMU24-T**


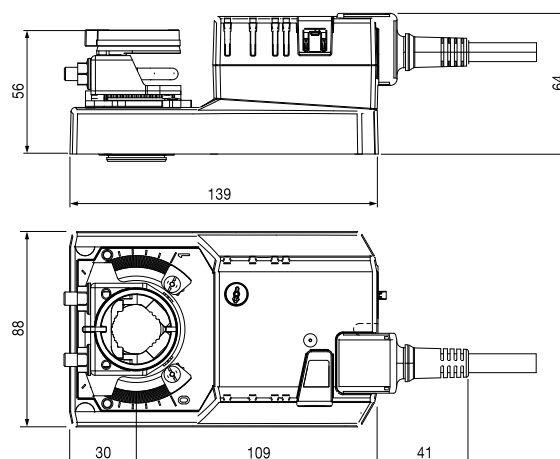


- For operation of air control dampers in HVAC system.
- Torque 20 Nm
- Nominal voltage AC/DC 24 V
- Control signal: DC 2(0) ... 10 V
- Position feedback: DC 2 ... 10 V

## Technical data

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2... 28.8 V
	Power consumption	2 W @ running / 0.4 W @ holding
	Wire/transformer sizing	4 VA
	Connection	Cable 1m, 4 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Torque	20 Nm
	Control Signal	DC 2(0)...10 V (input impedance 100k $\Omega$ )
	Feedback signal	DC 2...10 V
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150 s for 95°
	Sound power level	Max. 46 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
Humidity test		95% RH, non condensing (EN 60730-1)
Maintenance		Maintenance free
<b>Dimensions / weight</b>	Dimensions (L x W x H)	180 x 88 x 64mm
	Shaft length	Min. 42mm (20mm for reverse mounting)
	Shaft	⌀ 10... 20mm (10... 26.7mm with K-ENSA - optional)
	Weight	Approx. 1050g

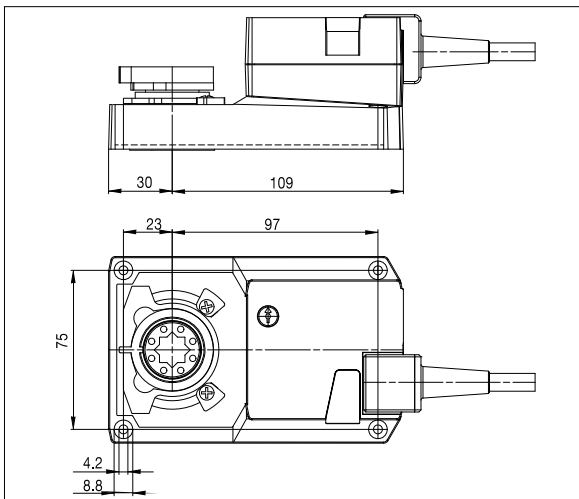
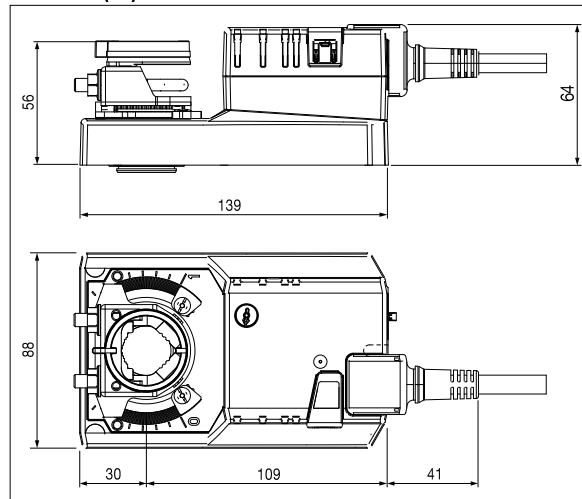
## Dimensions [mm]



- For operation of air control dampers in HVAC system.
- Torque 20 Nm
- Nominal voltage AC 100...240 V
- Control: Open/Close or 3-point


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 100...240 V, 50/60 Hz
	Nominal voltage range	AC 85... 265 V
	Power consumption	2.5 W @ running / 0.6 W @ holding
	Wire/transformer sizing	6 VA
	Auxiliary switch SMU230-S	1 SPDT, 1 mA ... 3 (0.5) A, AC 250 V <input type="checkbox"/> , adjustable
<b>Functional data</b>	Connection : Motor	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Auxiliary switch SMU230-S	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Torque	20 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 46 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Low voltage directive		CE according to 73/23/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
Humidity test		95% RH, non condensing (EN 60730-1)
<b>Dimensions / weight</b>	Maintenance	Maintenance free
	Dimensions (L x W x H)	See 'Dimensions'
	Shaft length	Min. 42mm (20mm with for reverse mounting)
	Shaft: SMU230(-S)	<input type="checkbox"/> 10... 20mm (10... 26.7mm with K-ENSA - optional)
	SMU230-F	12 x 12mm
	Weight	Approx. 1050g

**Dimensions [mm]**
**SMU230-F**

**SMU230(-S)**


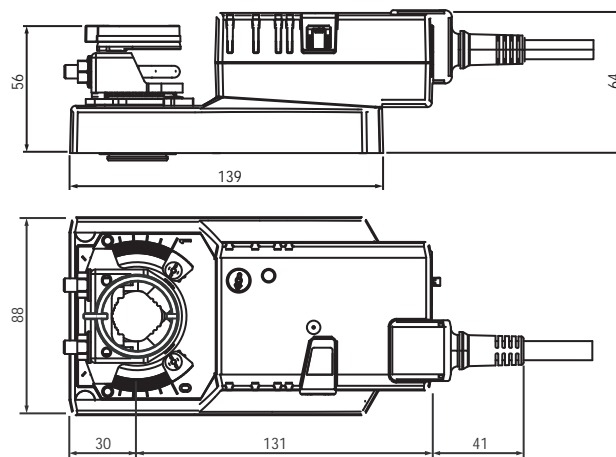


- For operation of air control dampers in HVAC system.
- Torque 20 Nm
- Nominal voltage AC 100 ... 240 V
- Control signal: DC 2(0)...10 V
- Position feedback: DC 2 ... 10 V

## Technical data

<b>Electrical data</b>	Nominal voltage	AC 100 ... 240 V, 50/60 Hz
	Nominal voltage range	AC 85 ... 265 V
	Power consumption	3.5 W @ running / 1 W @ holding
	Wire/transformer sizing	6.5 VA
	Connection cable: Power supply Signals	Cable 1m, 2 x 0.75mm <sup>2</sup> Cable 1m, 4 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Torque	20 Nm
	Control signal	DC 2(0)...10 V (input impedance 100k $\Omega$ )
	Feedback signal	DC 2...10 V
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 46 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Low voltage directive		CE according to 73/23/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
Humidity test		95% RH, non condensing (EN 60730-1)
Maintenance		Maintenance free
<b>Dimensions / weight</b>		Dimensions (L x W x H)
	Shaft length	Min. 42mm (20mm for reverse mounting)
	Shaft	$\text{O}10 \text{H}9$ 10 ... 20mm (10... 26.7mm with K-ENSA - optional)
	Weight	Approx. 1200g

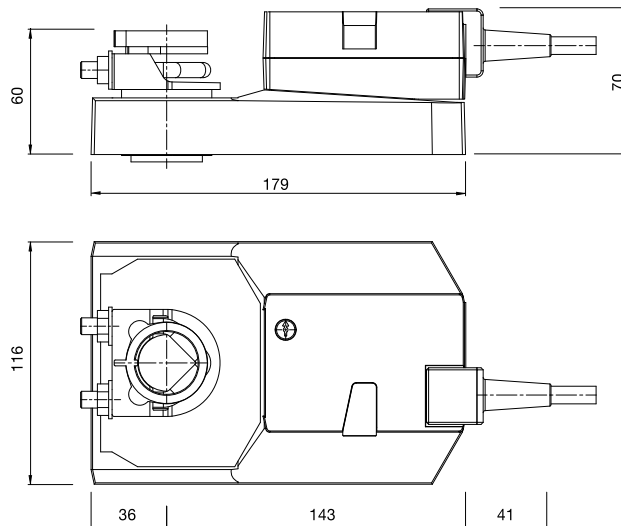
## Dimensions [mm]



- For operation of air control dampers in HVAC system.
- Torque 40 Nm
- Nominal voltage AC/DC 24 V
- Control: Open/Close


**Technical data**

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption	4 W @ running / 2 W @ holding
	Wire/transformer sizing	6 VA
	Connection	Cable 1m, 3 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Torque	40 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 46 dB (A)
	Position indication	Mechanical, remote visible
<b>Working conditions</b>	Protection class	III (safety low voltage)
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30... +50°C
	Non-operation temperature	-40... +80°C
	Humidity test	95% RH, non condensing (EN 60730-1)
<b>Dimensions / weight</b>	Maintenance	Maintenance free
	Dimensions (L x W x H)	220 x 116 x 70mm
	Shaft length	Min. 52mm (20mm for reverse mounting)
	Shaft	⌀ 14 ... 26mm
	Weight	Approx. 1700g

**Dimensions [mm]**


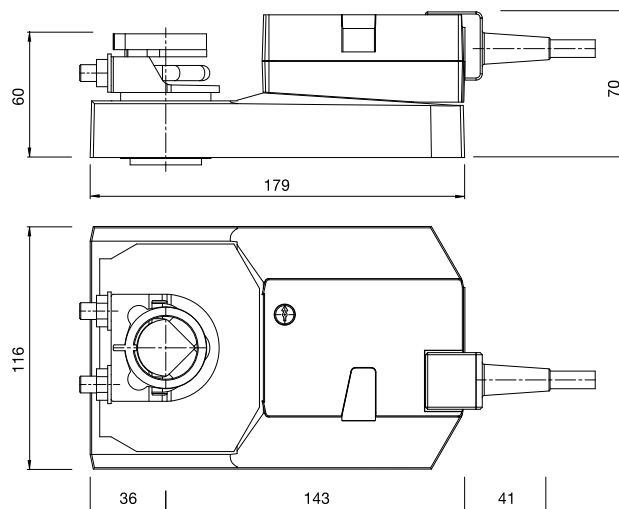


- For operation of air control dampers in HVAC system.
- Torque 40 Nm
- Nominal voltage AC/DC 24 V
- Control signal: DC 2(0) ...10 V
- Position feedback: DC 2 ... 10 V

## Technical data

<b>Electrical data</b>	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption	4.5 W @ running / 2 W @ holding
	Wire/transformer sizing	6.5 VA
	Connection	Cable 1m, 4 x 0.75mm <sup>2</sup>
<b>Functional data</b>	Torque	40 Nm
	Control signal	DC 2(0)...10 V (input impedance 100k Ω)
	Feedback signal	DC 2...10 V
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 46 dB (A)
	Position indication	Mechanical, remote visible
	<b>Working conditions</b>	Protection class
Degree of protection		IP54 in any direction
EMC		CE according to 89/336/EEC
Mode of operation		Type 1 to EN 60730-1
Ambient temperature		-30... +50°C
Non-operation temperature		-40... +80°C
Humidity test		95% RH, non condensing (EN 60730-1)
Maintenance		Maintenance free
<b>Dimensions / weight</b>	Dimensions (L x W x H)	220 x 116 x 70mm
	Shaft length	Min. 52mm (20mm for reverse mounting)
	Shaft	⌀ 14... 26 mm
	Weight	Approx. 1700g

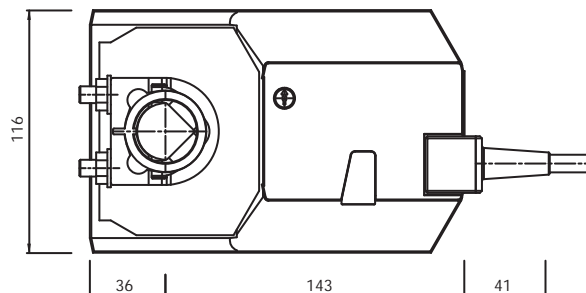
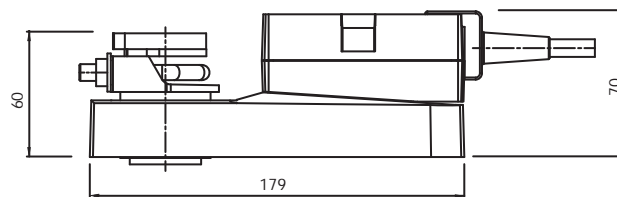
## Dimensions [mm]



- For operation of air control dampers in HVAC system.
- Torque 40 Nm
- Nominal voltage AC 100...240 V
- Control: Open/Close


**Technical data**

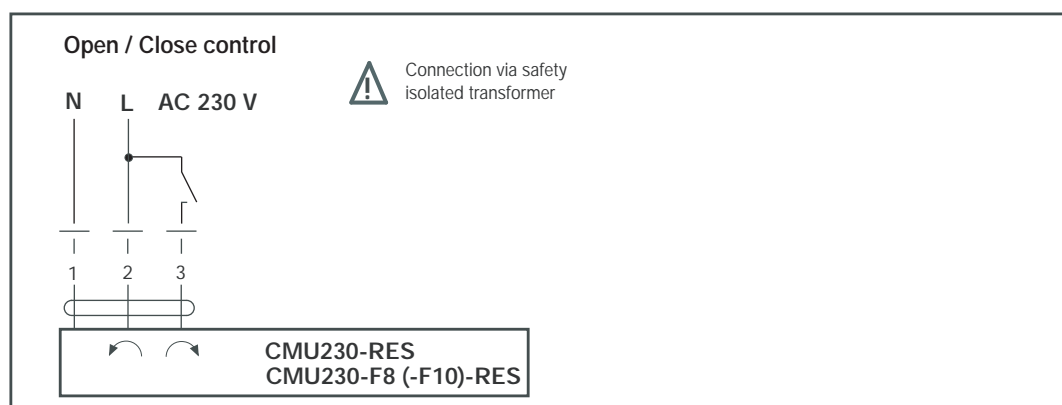
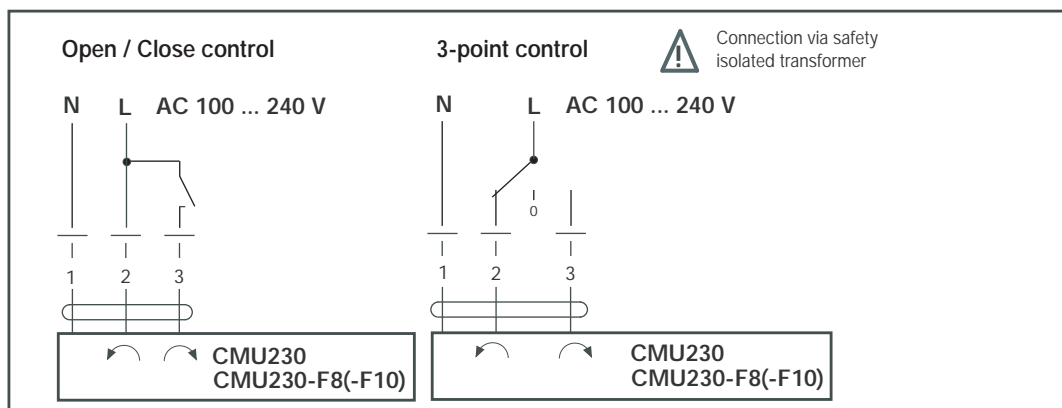
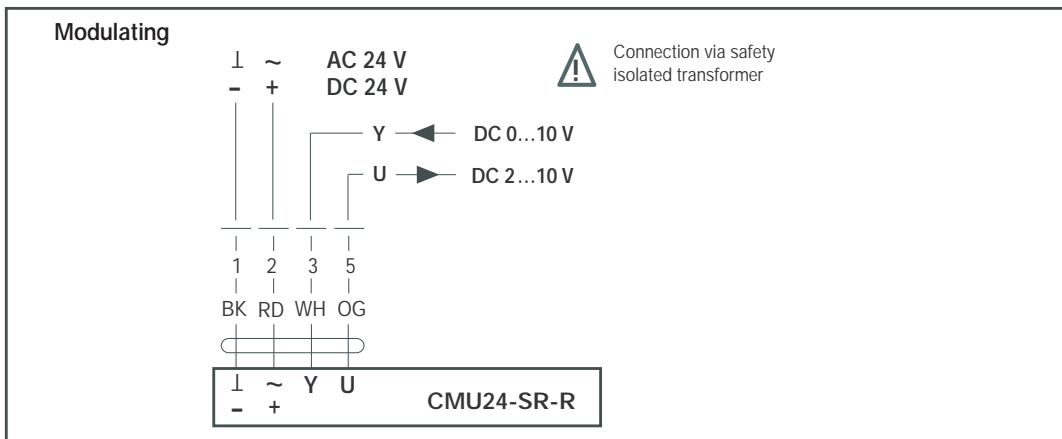
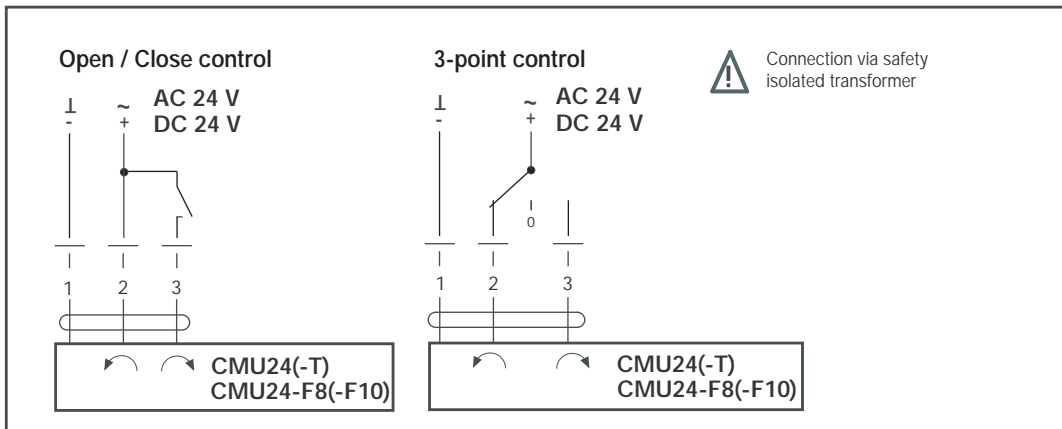
<b>Electrical data</b>	Nominal voltage	AC 100 ... 240 V, 50/60 Hz
	Nominal voltage range	AC 85 ... 265 V
	Power consumption	4 W @ running / 2.5 W @ holding
	Wire/transformer sizing	7 VA
<b>Functional data</b>	Connection cable	Cable 1m, 3 x 0.75mm <sup>2</sup>
	Torque	40 Nm
	Direction of rotation	Selectable by switch
	Manual override	Gearing latch disengaged with pushbutton, self-resetting
	Angle of rotation	Max. 95°, adjustable by mechanical stops
	Running time	150s for 95°
	Sound power level	Max. 46 dB (A)
	Position indication	Mechanical, remote visible
<b>Working conditions</b>	Protection class	II (Totally insulated) <input type="checkbox"/>
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Low voltage directive	CE according to 73/23/EEC
	Mode of operation	Type 1 to EN 60730-1
	Ambient temperature	-30... +50°C
	Non-operation temperature	-40... +80°C
<b>Dimensions / weight</b>	Humidity test	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance free
	Dimensions (L x W x H)	220 x 116 x 70mm
	Shaft length	Min. 52mm (20mm for reverse mounting)
	Shaft	⌀14... 25.2mm
	Weight	Approx. 1700g

**Dimensions [mm]**


## Wiring diagrams : CMU.. series actuators.

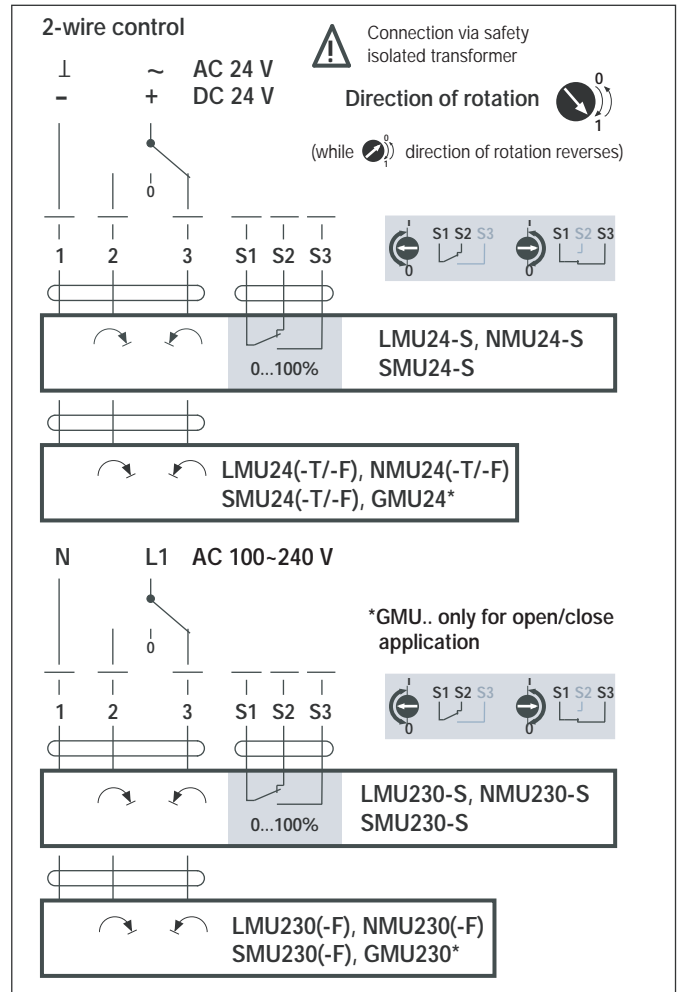
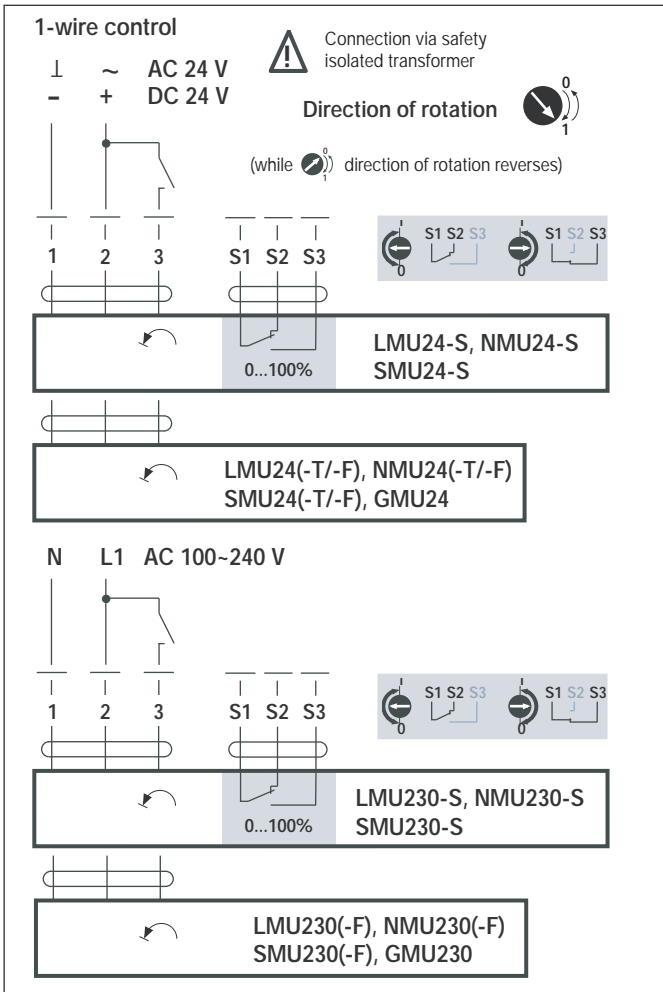
### Notes:

- Parallel connection of several actuator is possible.
- Power consumption must be observed.

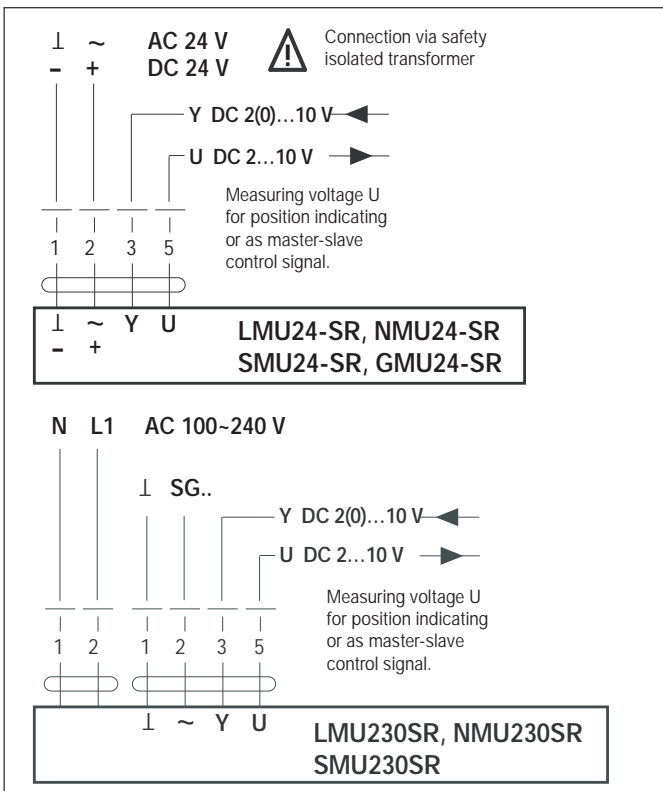


S t t o t e j e t d a n g b s c

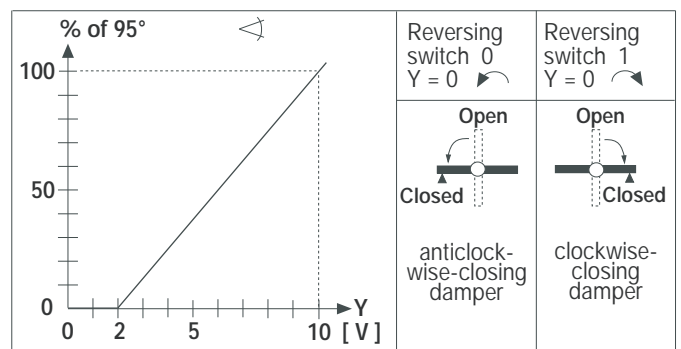
Wiring diagram: On/Off actuators. Parallel connection possible, please note the performance data




Wiring diagram: Modulating actuators. Parallel connection possible, please note the performance data



Position - signal voltage



Direction of rotation 

## Equation for damper actuator sizing

$$\begin{array}{rclclcl} & \text{Cross area of damper} & \times & \text{Rated torque load} & = & \text{Torque requirement} \\ \text{Example:} & 1.6 \text{ m}^2 & \times & 6 & = & 9.6 \end{array}$$

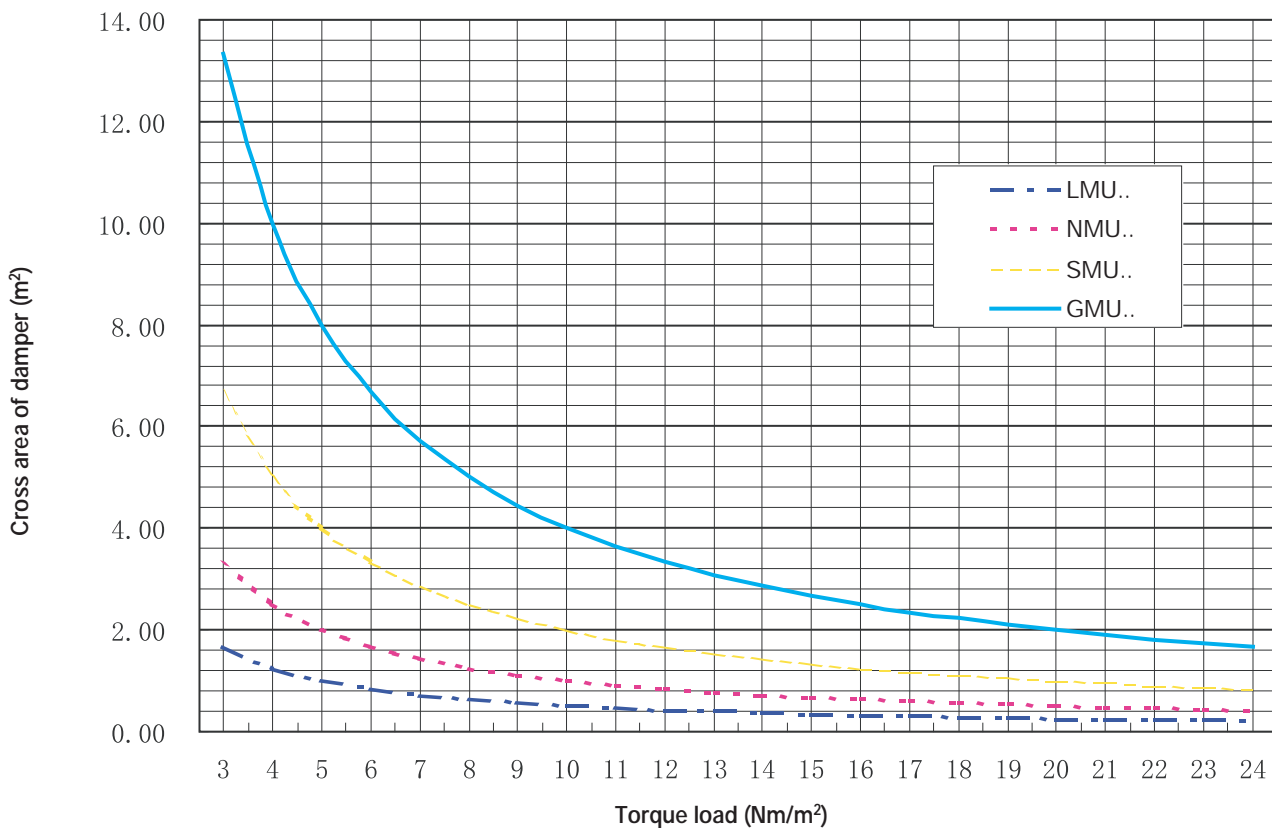
## Torque load of typical dampers in HVAC systems

Actuator sizing can be done according to the typical torque load value listed in following table.\*

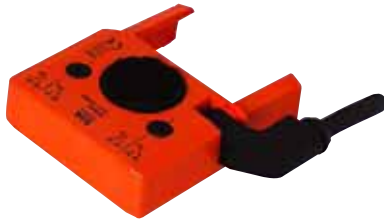
Damper Type	Torque Loading Nm/m <sup>2</sup> (according to air speed or static pressure)		
	<5m/s/ 300Pa	5 - 12m/s or 450Pa	>12m/s or 500Pa
<b>Air tight application</b>			
Round blade/edge seals	12	18	24
Parallel blade/edge seals	8.5	13	17
Opposed blade/edge seals	6	9	12
<b>Normal close - off application</b>			
Round blade/no edge seals	6	9	12
Parallel blade/no edge seals	5	7.5	10
Opposed blade/no edge seals	3.5	5	7

\* Please contact damper manufacturer for torque confirmation.

## Damper area controlled by a Belimo new generation actuator



D-DA043E-1 Subject to technical changes



Auxiliary switches, suitable for all damper actuators LMU.., NMU.., SMU.. and GMU..

- 1 or 2 switches (SPDT, single-pole double-throw)
- Adjustable switching point

## Overview of types

	Type	No. of switches	Cable
Housing color: orange	S1A	1 x SPDT	PVC 1 m, 3 x 0.75 mm <sup>2</sup>
	S2A	2 x SPDT	PVC 1 m, 3 x 0.75 mm <sup>2</sup>
Housing color: grey	S2A GR	2 x SPDT	FRNC 1 m, 6 x 0.75 mm <sup>2</sup>
	S2A/300 GR	2 x SPDT	FRNC 3 m, 6 x 0.75 mm <sup>2</sup>
	S2A/500 GR	2 x SPDT	FRNC 5 m, 6 x 0.75 mm <sup>2</sup>

## Technical data

Functional data	No. of switches	See "Overview of types"
	Switching capacity	1 mA ... 3 (0.5) A, AC 250 V <input type="checkbox"/>
	Switching point	Adjustable over the full range of rotation of the damper actuator (0 ... 1). Presetable by the scale
	Connection	See "Overview of types"
Working conditions	Protection class	II (Totally insulated) <input type="checkbox"/>
	Degree of protection	IP54
	Low voltage directive	CE according to 73/23/EEC
	Mode of operation	Type 1.B (to EN 60730-1)
	Ambient temperature	-30 ... +50°C
	Non-operation temperature	-40 ... +80°C
	Ambient humidity range	95% RH, non-condensing (EN 60730-1)
Maintenance	Maintenance free	
Dimensions / Weight	Dimensions (L x W x H)	See "Dimensions"
	Weight	S1A: Approx. 130 g, S2A: Approx. 170 g

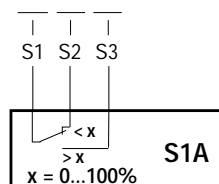
## Product features

<b>Application</b>	S1A.. and S2A.. auxiliary switches are used to signal positions or to execute switching functions in any regular position.
<b>Mode of operation</b>	A form-fit engagement is created between a driver disc and the clamp, causing the position to be directly transferred to the trip cams of the microswitches.
<b>Mounting</b>	The auxiliary switches are attached directly to the clamp of the damper actuator. The guiding grooves between the housing and the switch ensure a tightly sealing fit.

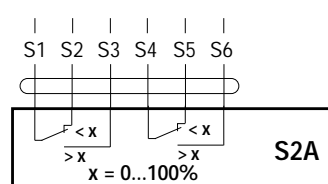
## Electrical installation

### Wiring diagrams

#### S1A



#### S2A

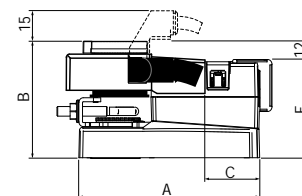
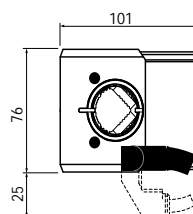


## Dimensions

### Measurement [mm]

with actuator	A	B	C	E
LMU..	116	76.5	36	59
NMU..	124	77.5	41	60
SMU..	139	79.5	51	62
GMU..	179	85.5	62.5	68

All dimensions shall +/- 1mm tolerance



Feedback potentiometers, suitable for all damper actuators LMU.., NMU.., SMU.., and GMU..

- Resistance 140, 500, 1000, 2800, 5000 or 10000 Ohm



## Overview of types

	Type	Resistance Ohm	Type	Resistance Ohm
Housing color: orange	P140A	140	P2800A	2800
	P500A	500	P5000A	5000
	P1000A	1000	P10000A	10000
Housing color: gray	P140A GR	140	P2800A GR	2800
	P500A GR	500	P5000A GR	5000
	P1000A GR	1000	P10000A GR	10000

## Technical data

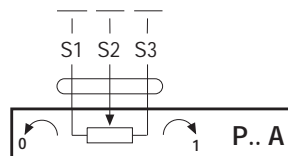
Functional data	Tolerance	±5%
	Loading capacity	1 W
	Linearity	±2%
	Resolution	Min. 1%
	Residual resistance	Max. 5% on both sides
Working conditions	Connection	FRNC cable 1 m, 3 x 0.75 mm <sup>2</sup>
	Protection class	III (safety low voltage)
	Degree of protection	IP54
	Ambient temperature	-30 ... +50°C
	Non-operating temperature range	-40 ... +80°C
Dimensions / Weight	Ambient humidity range	95% RH, non condensing (EN 60730-1)
	Maintenance	Maintenance-free
	Dimensions (L x W x H)	See "Dimensions"
	Weight	Approx. 130 g

## Product features

<b>Application</b>	P..A feedback potentiometers are used for modulating damper controls in conjunction with rigid feedback controllers. In combination with standard systems, these potentiometers are also used as damper position indicators or as positioners for actuators operated in parallel.
<b>Mode of operation</b>	A form-fit engagement is created between a driver disc and the clamp, causing the rotary movement of the damper actuator to be directly transferred to the feedback potentiometer.
<b>Mounting</b>	The feedback potentiometers are attached directly to the clamp of the damper actuator. The guiding grooves between the housing and the switch ensure a tightly sealing fit.

## Electrical installation

### Wiring diagrams

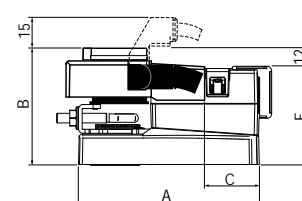
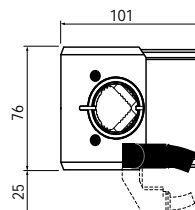


## Dimensions

### Measurement [mm]

with actuator	A	B	C	E
LMU..	116	76.5	36	59
NMU..	124	77.5	41	60
SMU..	139	79.5	51	62
GMU..	179	85.5	62.5	68

All dimensions shall +/- 1mm tolerance





SGA24



SGF24



SGE24



SGR24

Positioner, suitable for modulating damper actuators LMU..-SR, NMU..-SR, SMU..-SR, GMU..-SR

- SGA24: For surface mounting
- SGF24: For flush mounting
- SGE24: For cubicle mounting (DIN, 35 mm)
- SGR24: For room mounting

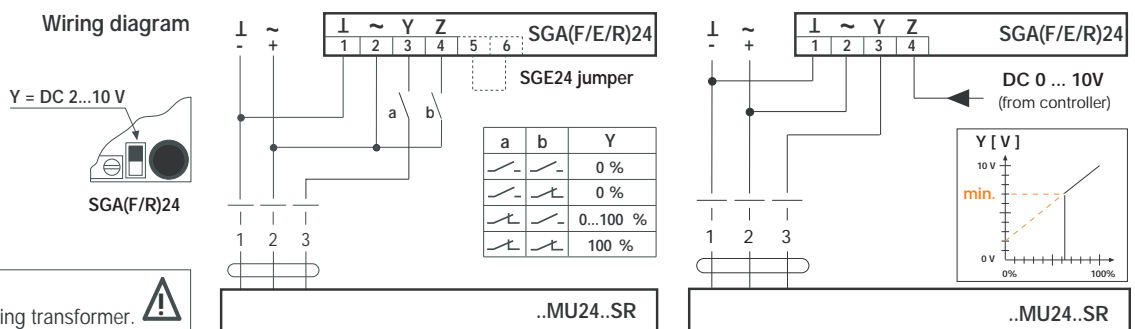
Technical data

Electrical data	Nominal voltage	AC 24 V 50/60 Hz, DC 24 V; Vcc from ..MU230SR
	Nominal voltage range	AC/DC 19.2 ... 28.8 V
	Power consumption	0.3 W
	Wire sizing	1 VA
	Connection	Terminals (max. 1.5 mm <sup>2</sup> , SGE24 max. 4 mm <sup>2</sup> )
Functional data	Control signal Y	DC 2 ... 10 V @ max. 0.5 mA (SGE24 jumper open) DC 0 ... 10 V selectable
	Scale	0 ... 100%
	Working conditions	Protection class
Degree of protection: SGA(F/R)24		IP40 (SGA24: IP54 with conduit connector)
SGE24		IP20
EMC		CE according to 89/336/EEC
Ambient temperature		-20 ... +50°C
Non-operation temperature		-40 ... +80°C
Humidity test		To EN 60730-1
Maintenance		Maintenance free

Product features

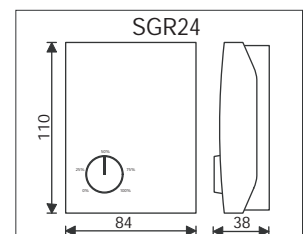
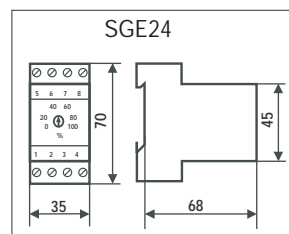
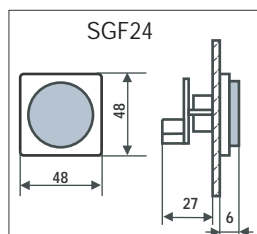
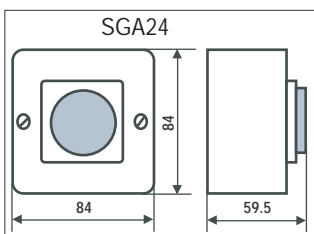
- Application** The positioner is intended for the remote control of modulating actuators or for use as a minimum positioner (providing a buttom limit for the output signals from modulating controllers). The control range is 0 ... 100% of the angle of rotation of the actuator
- Wide setting range** The position to which the rotary knob is turned produces a proportional control signal Y of either DC 2 ... 10 V or DC 0 ... 10 V and thus a proportional change in the position of the actuator between 0 and 100%. The angle of rotation of the knob of SGA(F)24 can be limited mechanically.
- Simple changeover** The changeover from DC 2 ... 10 V to DC 0...10V is selected by a slide switch on the printed circuit board of SGA(F/R)24 or by a wire link between the two terminals 5 and 6 of SGE24.

Electrical installation



**Note**  
Connection via safety isolating transformer.

Dimensions [mm]



Digital position indicator, suitable for modulating damper actuators ..MU24-SR, AF24-SR, LF24-SR and TF24-SR

- For flush mounting



### Technical data

Electrical data	Nominal voltage	AC 24 V, 50/60 Hz	
	Nominal voltage range	AC 19.2 ... 28.8 V	
	Power consumption	4 VA	
	Connection	4-pole plug	
Functional data	indication signal U/I	DC 2 ... 10 V (from actuator)	
	Input resistance	>100 kΩ	
	Starting point U <sub>0</sub>	DC 0 ... 12 V	
	Span ΔU	DC 3 ... 12 V	
	Factory setting	U <sub>0</sub> = DC 0 V, ΔU = DC 10 V	
	Position indication	0 ... 99%	
	Measuring accuracy	0.5% ±1 digit	
Working conditions	Direction of rotation	selected by wiring	
	Protection class	III (safety low voltage)	
	Degree of protection	IP20	
	EMC	CE according to 89/336/EEC	
	Ambient temperature range	0 ... +50°C	
	Humidity test	To EN 60730-1	
	Weight	Weight	Approx. 240 g

### Product features

**Application** The digital position indicator allows the remote indication of damper position.

**Setting the indicator** Remove the snap-fit front plate to give access to the two trimmer potentiometers U<sub>0</sub> and ΔU and also the indicator LEDs.

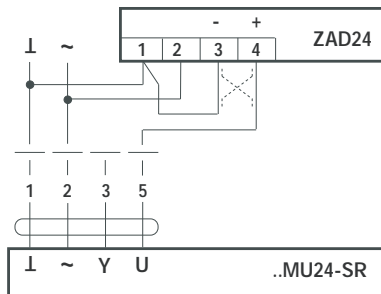
#### Note

The ZAD24 position indicator is supplied fitted with a link between terminals 1 and 3, i.e. the direction of rotation is direct acting.

1. Check the wiring and energize the power supply.
2. Move the damper/actuator to the 'Closed' position.
3. Setting the zero: If the left-hand LED is on, turn the trimmer U<sub>0</sub> clockwise ↻ until 0% is indicated. If the right-hand LED or indicator is on, turn the trimmer U<sub>0</sub> anti-clockwise ↻.
4. Move the damper/actuator to the 'Open' position.
5. Setting the working range: If the right-hand LED is on, turn the trimmer ΔU anticlockwise ↻ until 99% is indicated. If less than 99% is being indicated, turn the trimmer ΔU clockwise ↻.

### Electrical installation

#### Wiring diagram

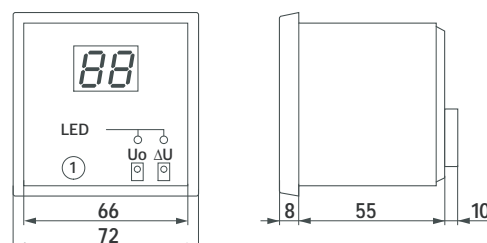


#### Note

Connection via safety isolated transformer. ⚠

### Dimensions

measurement [mm]



Front 72 x 72 mm  
Front cutout 68 x 68 mm  
Mounting depth ca. 80 mm

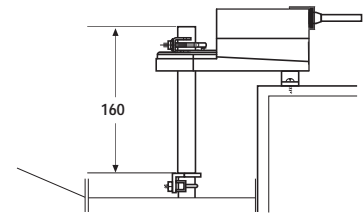
① Trimmer potentiometer

Shaft extension AV6-20

- Length approx. 170 mm
- For damper spindles  $\Phi$  6 ... 20 mm
- Extension  $\Phi$  10 mm



Dimensions [mm]

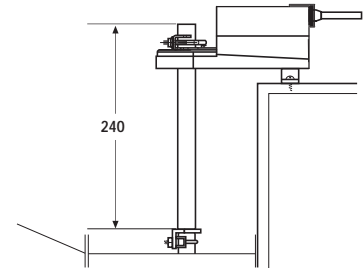


Shaft extension AV8-25

- Length approx. 250 mm
- For damper spindles  $\Phi$  8 ... 25 mm
- Extension  $\Phi$  20 mm



Dimensions [mm]



Reversible spindle clamp K-NA, K-SA

- K-NA: for damper actuator NMU.. (Damper spindles  $\Phi$  8 ... 20 mm)
- K-SA: for damper actuator SMU.. (Damper spindles  $\Phi$  10 ... 20 mm)

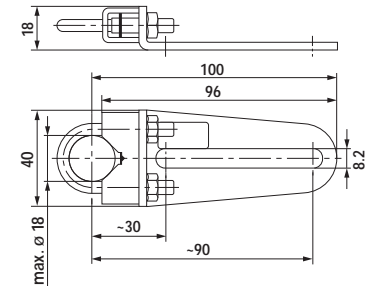


Damper crank arm KH8

- For damper spindles
- Galvanized steel
- Clamping range  $\Phi$  10 ... 18 mm
- Slot width 8.2 mm



Dimensions [mm]

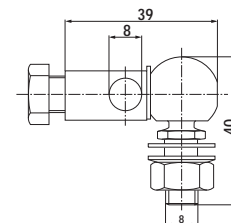


Ball joint KG8

- Suitable for KH8 damper crank arms
- For round steel rod with  $\Phi$  8 mm
- Galvanized steel



Dimensions [mm]

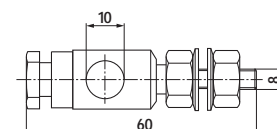


Ball joint KG10A

- Suitable for KH8 damper crank arms
- For round steel rod with  $\Phi$  10 mm
- Galvanized steel

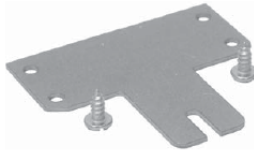


Dimensions [mm]



Extension for ground plate Z-SMA

- Extension for replacement from SM.. or AM.. to SMU..
- Galvanized steel



Actuator arm AH-25

- For damper actuator NMU..
- For standard clamp (on one side)
- Slot width 8.2 mm
- Galvanized steel



Actuator arm AH-20

- For damper actuator SMU..
- For standard clamp (on one side)
- Slot width 8.2 mm
- Galvanized steel



Mounting kit for damper linkage ZG-NMA

- For damper actuator NMU..
- For flat and side mounting



Mounting kit for damper linkage ZG-SMA

- For damper actuator SMU..
- For flat and side mounting



## General information

1. Belimo actuators should be mounted indoors in dry, relatively clean environment free from corrosive fumes. If the actuator is to be mounted outdoors, a protective enclosure must be used to shield the actuator.
2. Order dampers with extended shafts for new construction work. Instruct the installing contractor to allow space for mounting and service of Belimo actuator on the shaft.

## Mounting steps

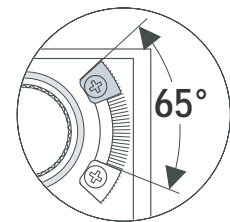
1. Slip the actuator's universal clamp over the damper shaft. Place the actuator in the desired mounting position. Make sure that the bottom of the actuator (metal side) is toward the duct and the operation on the cover are accessible.
2. Turn the damper shaft until the blades are fully closed.
3. Hand tighten the two nuts on the universal clamp.
4. Slide the stud of the anti-rotation bracket into the U slot in the bottom of the actuator, leaving 1~2 mm space between the stud and the slot. Bend the strap as needed to support the rear of the actuator.
5. Fasten the strap to the duct with two screws.
6. Loosen the two nuts on the universal clamp. Disengage the actuator gear train by pressing the "manual override button" (black button). Keep the gears disengaged, and the damper fully closed, rotate the clamp until it is about 5° from the closed position.
7. Tighten the two nuts on the clamp with a wrench.

The damper is now fully closed but the actuator is 5° from fully closed. This is called "pre-loading" the actuator. When the actuator is powered and sent to the closed position: it will put its full torque on the shaft compressing the edge and blade seals. This ensures that the damper will not meet its leakage rating. The actuator is electronically protected from overload and will not be damaged.

## Mechanical angle of rotation limiting

The adjustable stops are needed when there is no damper stop or if you want the damper to stop rotating before it reaches its stops. The new generation non-spring return actuators can be indefinitely stalled in any position without harm.

1. Loosen the two end stops with a screwdriver being careful not to unscrew the captive nut under the slot.
2. Move the stops (in 2.5° steps) to the desired position and retighten the screws.



## Piggyback mounting

Piggyback mounting of GMU.. will be available by Q2 2006.

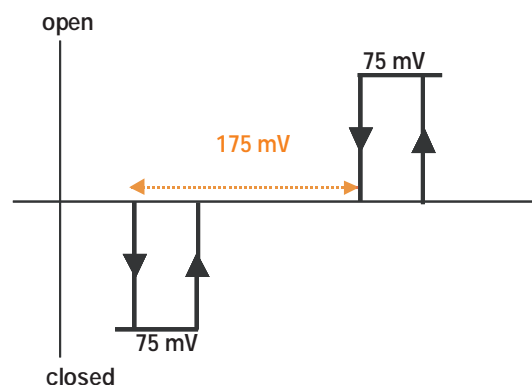
## Reversible switch

During checkout, the switch position can be temporarily reversed and the actuator will reverse its direction. This allows the technician a fast and easy way to check the actuator operation without having to switch wires or change settings on the thermostat. When the check-out is complete, make sure the switch is placed back to its original position.

## Control accuracy and stability

The new generation Non-spring return actuators have built-in brushless DC motors which provide better accuracy and longer service life.

The proportional actuators are designed with a unique non-symmetrical dead band. The actuator follows an increasing or decreasing control signal with a 75 mV resolution. If the signal changes in the opposite direction, the actuator will not respond until the control signal changes by 175 mV. This allows these actuators to track even the slightest deviation very accurately, yet allowing the actuator to "wait" for a much larger change in control signal due to control signal instability.



## Wiring instruction

The wiring technician must be trained and experienced with electronic circuits. Disconnect power supply before attempting any wiring connections or changes. Make all connections in accordance with wiring diagrams and follow all applicable local and national codes. Provide overload protection as required.

- Transformer(s)** The 24V actuators require a 24 VAC class 2 transformer and draw a maximum of "transformer sizing". The actuator enclosure cannot be opened in the field, there are no parts or components that can be replaced or repaired.
- EMC directive: 89/336/EEC
  - Software class A: Mode of operation type 1
  - Low voltage directive: 73/23/EEC

- Safety note** Power electronic or digital controller from a separate power transformer. The power supply designed in our actuators and other end devices uses half wave rectification. Some controllers use full wave rectification. When these two different types of power supplies are connected to the same power transformer and the DC commons are connected together, a short circuit is created across one of the diodes in the full wave power supply, damaging the controller. Only use a single power transformer to power the controller and actuator if you know the controller power supply uses half wave rectification.

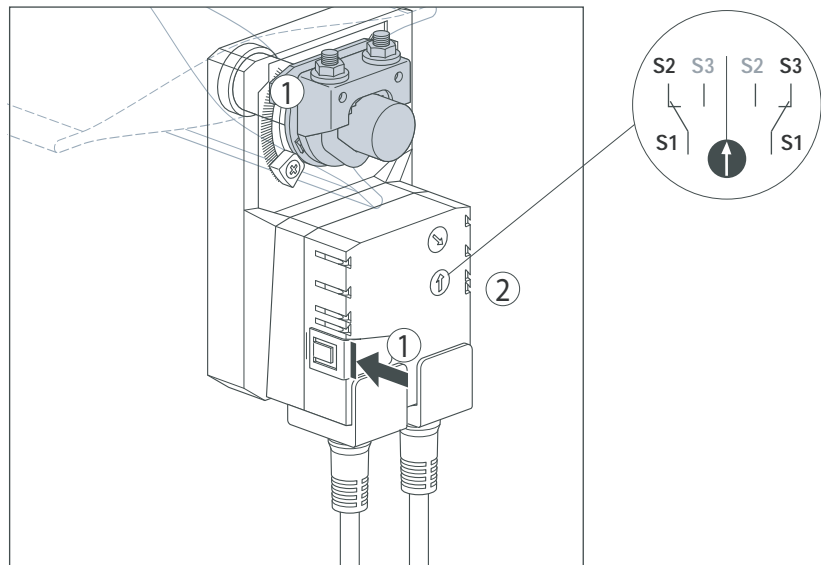
- Multiple actuators, one transformer** Multiple actuators may be powered from one transformer which should be according to following rules:
1. The TOTAL current of the actuators (VA rating) is less than or equal to the rating of the transformer.
  2. Polarity on the secondary of the transformer is strictly followed.
- This means that all No. 1 wires from all actuators are connected to the common leg on the transformer and all No. 2 wires from all actuators are connected to the hot leg. Mixing wire No. 1 & 2 on one leg of the transformer will result in erratic operation or failure of the actuator and controller.

- Multiple actuators, multiple transformers** Multiple actuators positioned by the same control signal may be powered from multiple transformers which should be according to following rules:
1. The transformers are properly sized.
  2. All No. 1 wires from all actuators are tied together and tied to the negative leg of the control signal.

## Auxiliary switch adjustment

1. Press the pushbutton, manually operate the universal clamp to desired switch position.
2. Turn switch pointer to the middle line.
3. When actuator moves clockwise(counter-clockwise) to switch position, switch indicator passes the middle line counterclockwise(clockwise), the contact between S1 and S3 is broken(made) and the contact between S1 and S2 is made(broken).

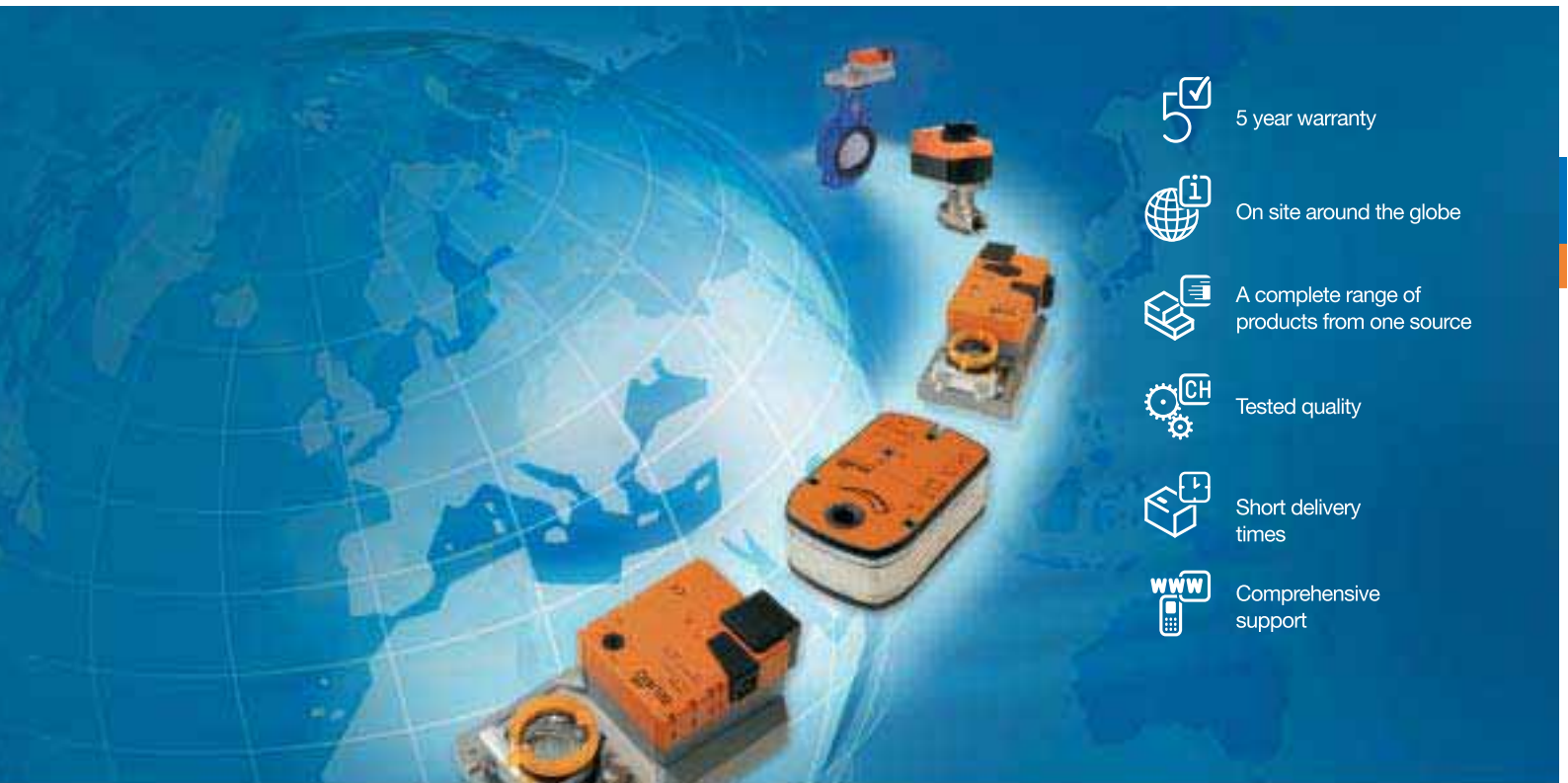
Note: The switching point should be about 5° from the mechanical end stops (1 short step on the scale).



Series	Old models	New Generation	Description
LM..	LM24	LMU24	ON/OFF, floating control, 5 Nm
	LM24-SR	LMU24-SR	Modulating, 5 Nm
	LM24-S	LMU24-S	ON/OFF, floating control, 5 Nm, 1 SPDT auxiliary switch
	LM24-F	LMU24-F	ON/OFF, floating control, 5 Nm, Formfit 8X8 mm
	LM24-T	LMU24-T	ON/OFF, floating control, 5 Nm, Terminal connection
	LM230,LM100	LMU230	ON/OFF, floating control, 5 Nm
	LM230-F,LM100-F	LMU230-F	ON/OFF, floating control, 5 Nm, Formfit 8X8 mm
NM..	NM24	NMU24	ON/OFF, floating control, 10 Nm
	NM24-SR	NMU24-SR	Modulating, 10 Nm
	NM24-S	NMU24-S	ON/OFF, floating control, 10 Nm, 1 SPDT auxiliary switch
	NM24-F	NMU24-F	ON/OFF, floating control, 10 Nm, Formfit 8X8 mm
	NM230	NMU230	ON/OFF, floating control, 10 Nm
	NM230-F	NMU230-F	ON/OFF, floating control, 10 Nm, Formfit 8X8 mm
	NM.. + SN1	NMU.. + S1A	NMU.. actuator with add-on 1 SPDT auxiliary switch
	NM.. + SN2	NMU.. + S2A	NMU.. actuator with add-on 2 SPDT auxiliary switches
SM..	AM24, SM24	SMU24	ON/OFF, floating control, 20 Nm
	AM24-SR,SM24-SR	SMU24-SR	Modulating, 20 Nm
	AM24-S	SMU24-S *	ON/OFF, floating control, 20 Nm, 1 SPDT auxiliary switch
	AM24-SR-S	SMU24-SR + S2A	SMU24-SR with add-on 2 SPDT auxiliary switches
	AM230, AM110, SM230, AM230-2, SM220, AM110-2, SM100, SM110	SMU230	ON/OFF, floating control, 20 Nm
	AM230-SR,SM220-SR	SMU230SR	Modulating, 20 Nm
	AM230-S	SMU230-S *	ON/OFF, floating control, 20 Nm, 1 SPDT auxiliary switch
	AM.. + PA., SM.. + P..	SMU.. + P..A	SMU.. actuator with add-on potentiometer feedback
	AM.. + SA1, SM.. + S1	SMU.. + S1A	SMU.. actuator with add-on 1 SPDT auxiliary switch
	AM.. + SA2, SM.. + S2	SMU.. + S2A	SMU.. actuator with add-on 2 SPDT auxiliary switches
GM..	GM24	GMU24	ON/OFF, floating control, 40 Nm
	GM24-SR	GMU24-SR	Modulating, 40 Nm
	GM230	GMU230	ON/OFF, floating control, 40 Nm
	GM220&GM240	GMU230	ON/OFF, floating control, 40 Nm
	GM.. + P..	GMU.. + P..A	GMU.. actuator with add-on potentiometer feedback
	GM.. + S1	GMU.. + S1A	GMU.. actuator with add-on 1 SPDT auxiliary switch
	GM.. + S2	GMU.. + S2A	GMU.. actuator with add-on 2 SPDT auxiliary switches

\* "...MU..-S" New generation actuators have only 1 built-in auxiliary switch, but old AM..-S actuators have 2 auxiliary switches. When 2 switches are needed, an add-on auxiliary switch S1A or S2A must be used to provide two switches feedback.

# Innovation, Quality and Consultancy: A partnership for motorizing HVAC actuators



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