



ACVATIX™

## Electromotive actuators for valves **SAX..**

with a 20 mm stroke

- **SAX31..** Operating voltage AC 230 V, 3-position control signal
- **SAX61..** Operating voltage AC/DC 24 V, control signal DC 0...10 V, 4...20 mA
- **SAX81..** Operating voltage AC/DC 24 V, 3-position control signal
- **SAX61..** Position feedback, override control, changeover of flow characteristic
- **SAX61../MO** Operating voltage AC/DC 24 V, RS485 for Modbus RTU communication
- For direct mounting on valves, no adjustment required
- Manual adjuster, position indicator and status indication (LED)
- Optional functional extension using auxiliary switches, potentiometer, function module, stem heating element

### Use

To operate Siemens 2-port and 3-port valves, types V..F21..., V..F22..., V..F31..., V..F32..., V..F40..., V..F41..., V..G41..., V..F42..., VVF52.. and V..F53.. with 20 mm stroke as control and safety shutoff valves in heating, ventilation and air conditioning plants.

## Type summary

Type	Stock no.	Stroke	Pos. force	Operating voltage	Pos. signal	Spr.. ret. time	Pos. time	LED	Manual adjuster	Extra functions		
<b>SAX31.00</b>	S55150-A105	20 mm	800 N	AC 230 V	3-Punkt	-	120 s	-	Press and fix	-		
<b>SAX31.03</b>	S55150-A106						30 s	✓		Position feedback, forced control, changeover of characteristic curve		
<b>SAX61.03</b> <b>SAX61.03U</b>	S55150-A100 S55150-A100-A100			AC/DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω		Modbus RTU	120 s		-	Position feedback, forced control	
<b>SAX61.03/MO</b>	S55150-A140				3-Punkt		30 s	-		-		
<b>SAX81.00</b>	S55150-A102											
<b>SAX81.03</b> <b>SAX81.03U</b>	S55150-A103 S55150-A103-A100											

## Electrical accessories

Product no.	Auxiliary switch <b>ASC10.51</b>	Potentiometer <b>ASZ7.5</b>	Function module <b>AZX61.1</b>	Stem heating element <b>ASZ6.6</b>
Stock number	S55845-Z103	S55845-Z106	S55845-Z107	S55845-Z108
	Max. 2			Max. 1
<b>SAX31..</b>	Max. 2	Max. 1	-	Max. 1
<b>SAX61..</b>	Max. 2	-	Max. 1 AZX61.1	
<b>SAX61../MO</b>		-		
<b>SAX81..</b>		Max. 1	-	

Note: ASZ7.5

For the combination SIMATIC S5/S7 and position feedback message, we recommend actuators with DC 0...9.8 V feedback signals.

The signal peaks that occur in the potentiometer ASZ7.5 may result in error messages on Siemens SIMATIC.

This is not the case when combined with Siemens HVAC controllers.

The reason is that SIMATIC has a higher resolution and faster response time.

## Mechanical accessories

Weather shield ASK39.1<sup>1)</sup>

<sup>1)</sup> SAX61../MO is not suitable for exterior application

## Ordering

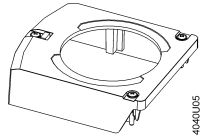

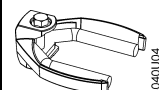
### Example

Product no.	Stock no.	Description	Quantity
SAX81.03	S55150-A103	Actuator	1
ASZ7.5	S55845-Z106	Potentiometer	1

### Delivery

Actuators, valves and accessories are supplied in individual packs.

### Spare parts

Product number / Stock number	Description	Image
8000060843	Housing cover	
	Screw (valve stem coupling)	
	U-bracket	

## Product documentation

Title	Contents	Document ID
Position actuators SAX.., SAY.., SAV.., SAL.. for valves	Basic documentation: Comprehensive information on new generation actuators SAX..	CE1P4040_01en
Electromotive actuators for valves SAX..	Data sheet: Product description SAX..	CE1N4501
Electromotive actuators for valves SA.., Modbus RTU	Data sheet: Communication profile Modbus	A6V101037195
Mounting instructions S..6../MO and G..161../MO	Mounting instructions: Mounting and installation instructions	A5W00027551

The documents, to include related documents such as environmental declarations, CE declaration, etc. are available for download from the following Internet address: <http://siemens.com/bt/download>

## Equipment combinations

Type reference	DN	PN class	$k_{vs}$ [m <sup>3</sup> /h]	Data sheet	
<b>2-port valves VV.. (control or safety shutoff valves)</b>					
VVF21..	Flange	25...80	6	1.9...100	N4310
VVF22..	Flange	25...80	6	2.5...100	N4401
VVF31..	Flange	15...80	10	2.5...100	N4320
VVF32..	Flange	15...80	10	1.6...100	N4402
VVF40..	Flange	15...80	16	1.9...100	N4330
VVF41..	Flange	50		19 / 31	N4340
VVF42..	Flange	15...80		1.6...100	N4403
VVF42..K	Flange	50...80		40...100	
VVG41..	Thread	15...50		0.63...40	N4363
VVF52..	Flange	15...40	25	0.16...25	N4373
VVF53..	Flange	15...50		0.16...40	N4405
<b>3-port valves VX.. (control valves for "mixing" and "diverting" functions)</b>					
VXF21..	Flange	25...80	6	1.9...100	N4410
VXF22..	Flange	25...80	6	2.5...100	N4401
VXF31..	Flange	15...80	10	2.5...100	N4420
VXF32..	Flange	15...80	10	1.6...100	N4402
VXF40..	Flange	15...80	16	1.9...100	N4430
VXF41..	Flange	15...50		1.9...31	N4440
VXF42..	Flange	15...80		1.6...100	N4403
VXG41..	Thread	15...50		1.6...40	N4463
VXF53..	Flange	15...50	25	1.6...40	N4405

**Notes**

**Engineering**

SAX31.. and SAX81..

3-position actuators must have their own specific controller, refer to "Connection diagrams" (page 9).

SAX61..

Up to 10 actuators can drive in parallel on a controller output with a rating of 1 mA. Modulating actuators have an input impedance of 100 kΩ.

SAX61../MO

The Modbus converter is designed for analog control on 0..10 V on the actuator side.

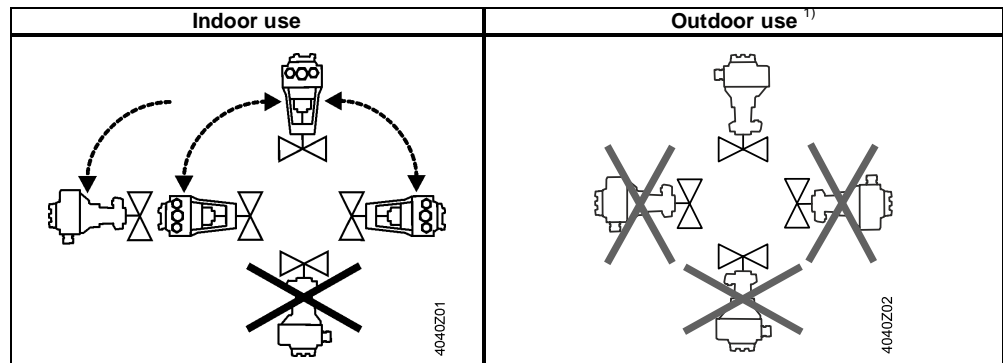
**Note:** Keep the setting of the analog signal on the actuator as is (switch 1 to "OFF"), adjustment is not allowed.

The actuators are factory-set to equal-percentage characteristic curve.

**Note:** The DIL switch (actuator-internal changeover of characteristic curve) must be set to "log" (switch 2 to "OFF").

**Mounting**

Mounting positions

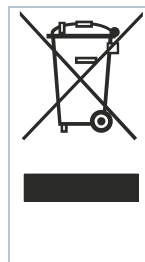


1) Only together with weather shield ASK39.1  
SAX61../MO is not suitable for outdoor use.

**Maintenance**

The actuators are maintenance-free.

**Disposal**



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

**Warranty**

The engineering data specified in "Equipment combinations" (page 3) are only guaranteed in combination with the Siemens valves listed.

**Note**

**When using the actuators together with valves by other manufacturers, users are required to ensure correct functioning, and Siemens will assume no responsibility.**

## Technical data

		SAX..
<b>Power supply</b>	Operating voltage SAX31.. SAX61.. SAX81..	AC 230 V ±15% AC 24 V ± 20% / DC 24 V + 20% / -15% (SELV) AC 24 V ±20% / DC 24 V + 20 % / -15% (SELV)
	External supply line protection (EU)	<ul style="list-style-type: none"> <li>Fuse slow 6...10 A</li> <li>Circuit breaker max. 13 A, Characteristic B, C, D according to EN 60898</li> <li>Power source with current limitation of max. 10 A</li> </ul>
	Power consumption at 50 Hz SAX31.00           Stem retracts / extends SAX31.03           Stem retracts / extends SAX61.03..         Stem retracts / extends SAX61.03/MO       Stem retracts / extends SAX81.00..         Stem retracts / extends SAX81.03..         Stem retracts / extends	3.5 VA / 2 W 6 VA / 3.5 W 8 VA / 3.75 W 8.7 VA / 4.25 W 3.5 VA / 2.25 W 5 VA / 3.75 W
<b>Function data</b>	Positioning times (with the specified nominal stroke) The positioning time can vary, depending on the type of valve -> refer chapter "Type summary" (page 2) SAX31.00, SAX81.00.. SAX31.03, SAX61.03.., SAX81.03.. Positioning force Nominal stroke Working stroke area the actuator is able to calibrate Permissible medium temperature (valve fitted)	120 s 30 s 800 N 20 mm 6 .. 24 mm -25°...130 °C
<b>Signal inputs</b>	Y1 / Y2  SAX31.., SAX81.. SAX31..           Voltage SAX81..           Voltage Y-positioning signal SAX61.. (DC 0...10 V)           Current draw SAX61.. (DC 4...20 mA)         Input impedance Current draw Input impedance	3-position AC 230 V ± 15 % AC 24 V ± 20 % / DC 24 V + 20 % / - 15% ≤ 0,1 mA ≥ 100 kΩ DC 4...20 mA ± 1 % ≤ 500 Ω
<b>Communication</b> Communication protocol	Modbus RTU Number of nodes Address range  Transmission formats  Baud rates (kbaud)	RS-485, not galvanically isolated Max. 32 1...247 / 255 Factory setting: 255 1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2 Factory setting: 1-8-E-1 Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2 Factory setting: Auto
<b>Parallel operation</b>	SAX61..	≤ 10 (depending on controller output)
<b>Forced control</b>	Positioning signal "Z"  SAX61.. R = 0...1000 Ω Z connected to G Z connected to G0 Voltage  Current draw	R = 0...1000 Ω, G, G0 Stroke proportional to R Max. stroke 100% <sup>1)</sup> Min. stroke 0% <sup>1)</sup> Max. AC 24 V ± 20% Max. DC 24 V + 20% / -15% ≤ 0.1 mA
<b>Position feedback</b>	Position feedback U  SAX61.. Load impedance Load	DC 0...10 V >10 kΩ res. Max. 1 mA
<b>Connecting cable</b>	Wire cross-sectional areas	0.13...1.5 mm <sup>2</sup> , AWG 24...16 <sup>2)</sup>
	Cable entries  SAX.. SAX..U  SAX61../MO	EU: 2 entries Ø 20.5 mm (for M20) 1 entry Ø 25.5 mm (for M25) US: 3 entries Ø 21.5 mm for ½" tube connection Fixed connecting cable 0.9 m Number of cores 5 x 0.75 mm <sup>2</sup>
<b>Degree of protection</b>	Housing from vertical to horizontal (see "Mounting")	IP54 as per EN 60529 <sup>3)</sup>
	Insulation class Actuators SAX31..           AC 230 V Actuators SAX61..           AC / DC 24 V Actuators SAX81..           AC / DC 24 V	As per EN 60730 II III III
<b>Environmental conditions</b>	Operation Climatic conditions Mounting location Temperature Genera Humidity (noncondensing)	IEC 60721-3-3 Class 3K5 Indoors (weather-protected) <sup>3)</sup> -5...<55 °C 5...95% r.h.


		SAX..
	Transport Climatic conditions Temperature Humidity	IEC 60721-3-2 Class 2K3 -25...70 °C <95% r.h.
	Storage Climatic conditions Temperature Humidity	IEC 60721-3-1 Class 1K3 -15...55 °C 5...95% r.h.
	Max. media temperatur when mounted on valve	130 °C
<b>Standards and directives</b>	Product standard	EN 60730-x
	Electromagnetic compatibility (application)	For residential, commercial and industrial environments
	EU conformity (CE)	CE1T4501X1 <sup>4)</sup>
	RCM conformity	CE1T4515X4 <sup>4)</sup>
	EAC conformity	Eurasian conformity for all SAX..
	UL, cUL AC 230 V AC/DC 24 V	- UL 873 <a href="http://ul.com/database">http://ul.com/database</a>
<b>Environmental compatibility</b>	The product environmental declarations 7173310559Ben <sup>4)</sup> and A6V101083254 <sup>4)</sup> contain data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
<b>Dimensions</b>		See "Dimensions" (page 10)
<b>Accessories</b> <sup>5)</sup>	Potentiometer ASZ7.5 Voltage Current rating	0...1000 Ω ± 5% DC 10 V <4 mA
	Auxiliary switch ASC10.51 External supply line protection US Installation, UL & cUL	Switching capacity AC 24...230 V, 6 (2) A, potential-free See "Power supply" AC 24 V class 2, 5 A general purpose
	Stem heating element ASZ6.6 Power supply Power consumption Inrush current (cold)	AC/DC 24 V, ± 20% 40 VA / 30 W Max. 8,5 A (max. temperature 85 °C / 185 F)

<sup>1)</sup> Note the direction of control action of the DIL switch

<sup>2)</sup> AWG = American wire gauge

<sup>3)</sup> Always together with weather shield ASK39.1 for outdoor use, housing IP protection IP 54 as is SAX61../MO is not suitable for outdoor use.

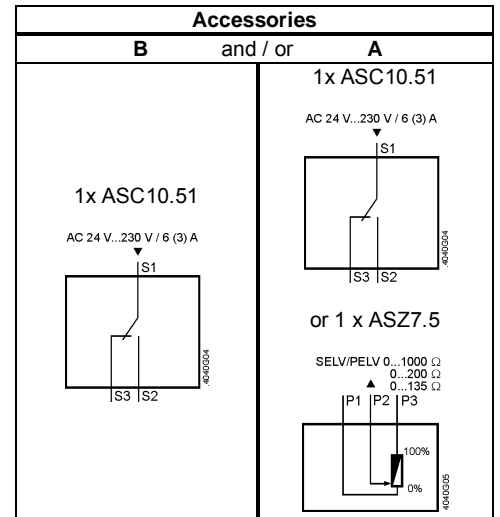
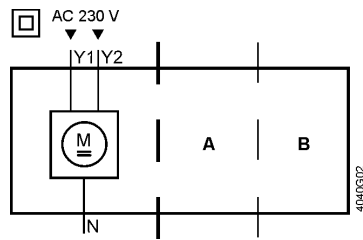
<sup>4)</sup> Documents available at <http://www.siemens.com/bt/download>

<sup>5)</sup> UL recognized component 

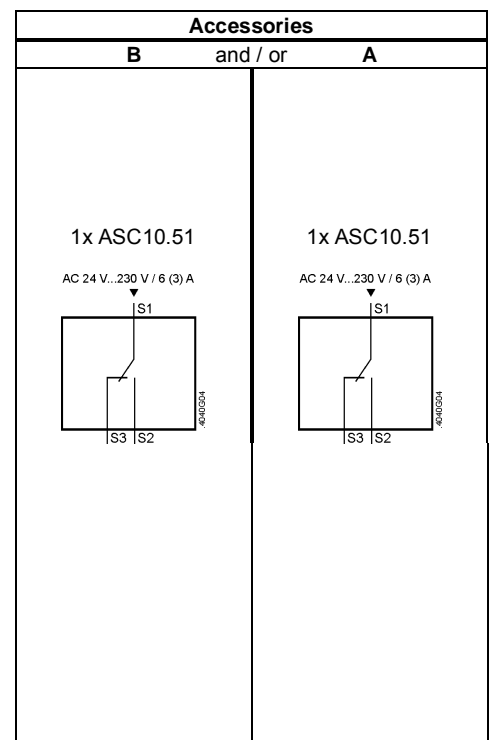
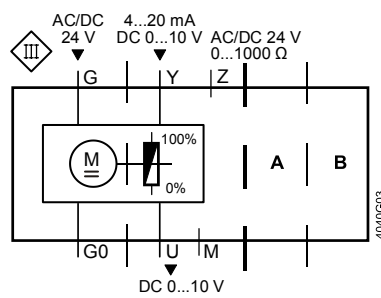
## Connection diagrams

### Internal diagrams

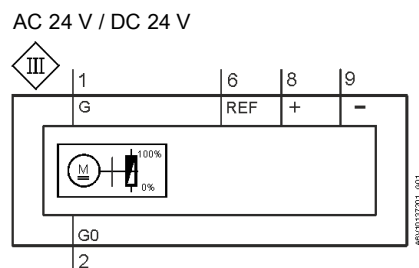
SAX31..



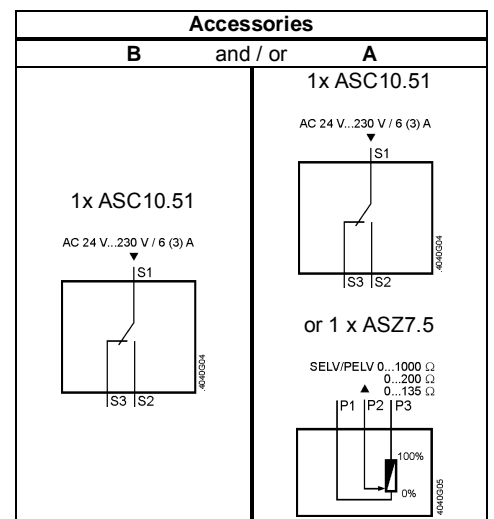
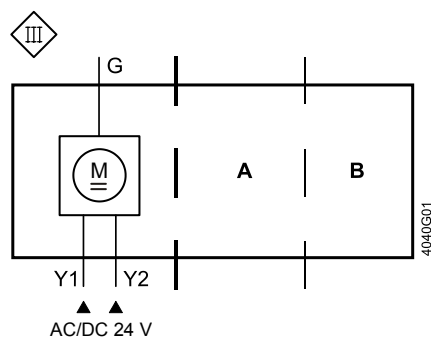
SAX61..



SAX61../MO



SAX81..



## Connection terminals

SAX31..

AC 230 V, 3-position

<b>N</b>	System neutral (SN)
<b>Y1</b>	Positioning signal (actuator's stem extends)
<b>Y2</b>	Positioning signal (actuator's stem retracts)

SAX61..

AC/DC 24 V, DC 0...10 V / 4...20 mA / 0...1000 Ω

<b>G0</b>	System neutral (SN)
<b>G</b>	System potential (SP)
<b>Y</b>	Positioning signal for DC 0...10 V / 4...20 mA
<b>M</b>	Measuring neutral
<b>U</b>	Position feedback DC 0...10 V - (reference potential is M measuring neutral)
<b>Z</b>	Positioning signal forced control

SAX61../MO,  
Fixed connecting cable  
5 x 0.75 mm<sup>2</sup>

AC/DC 24 V, Modbus RTU

<b>G0</b>	System neutral (SN)	black
<b>G</b>	System potential (SP) AC 24 V ~ / DC 24 V =	red
<b>REF</b>	Reference (Modbus RTU)	purple
<b>+</b>	Bus + (Modbus RTU)	gray
<b>-</b>	Bus - (Modbus RTU)	rose

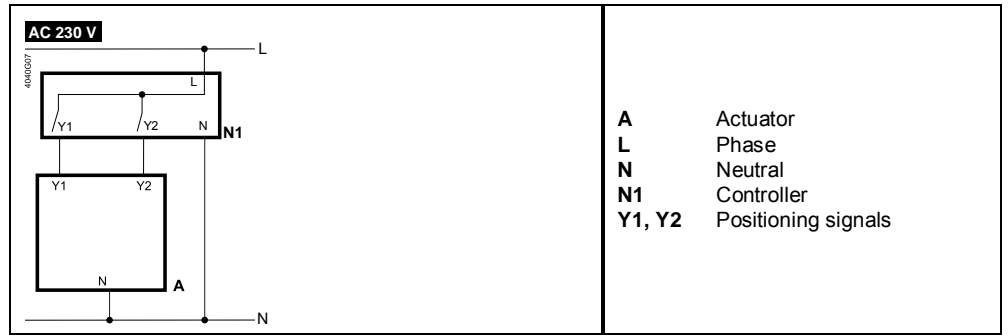
SAX81..

AC/DC 24 V, 3-position

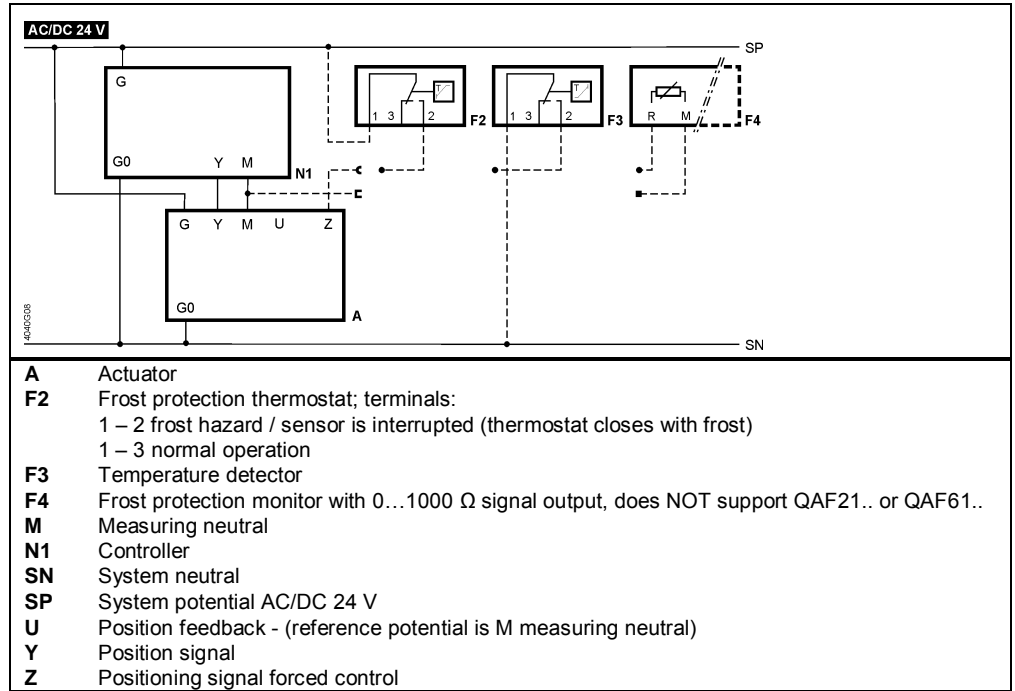
<b>G</b>	System potential (SP)
<b>Y1</b>	Positioning signal (actuator's stem extends)
<b>Y2</b>	Positioning signal (actuator's stem retracts)



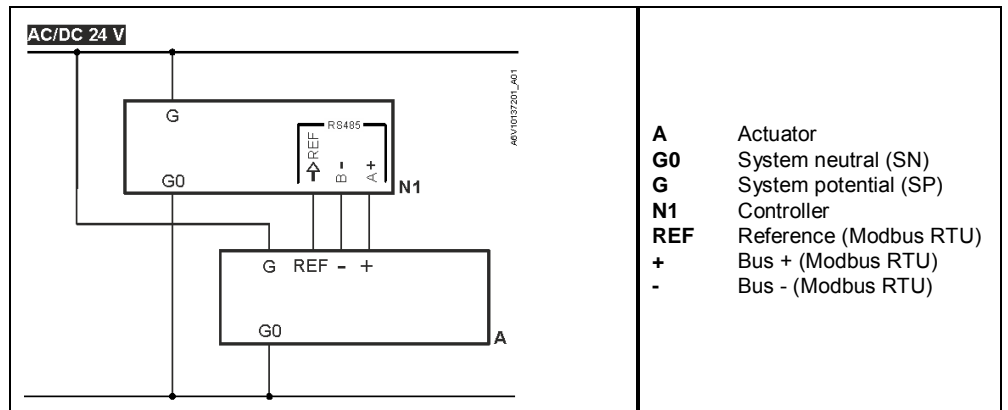
**Connection diagrams**  
SAX31..



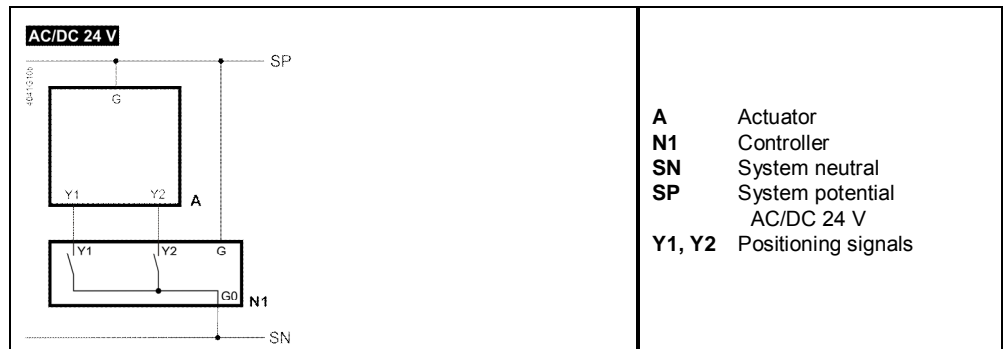
SAX61..



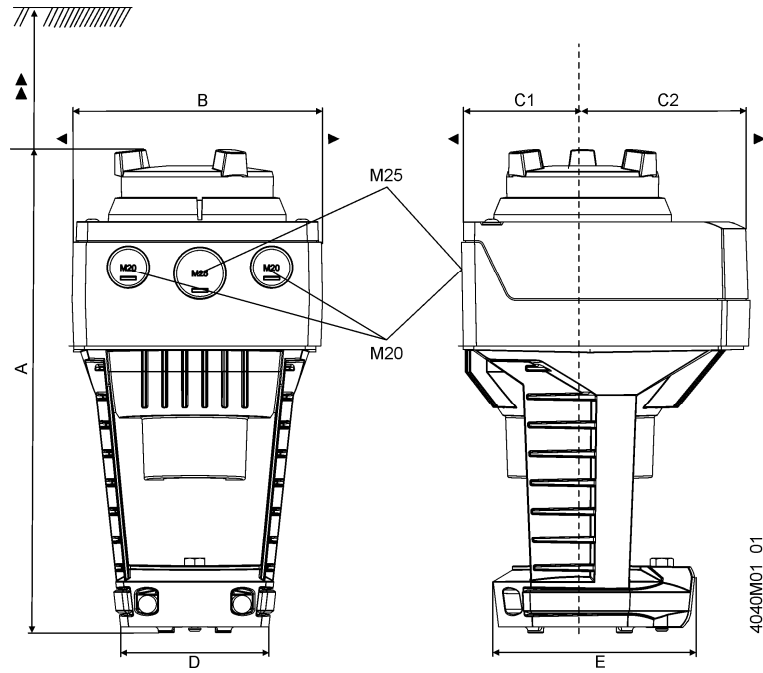
SAX61../MO



SAX81..



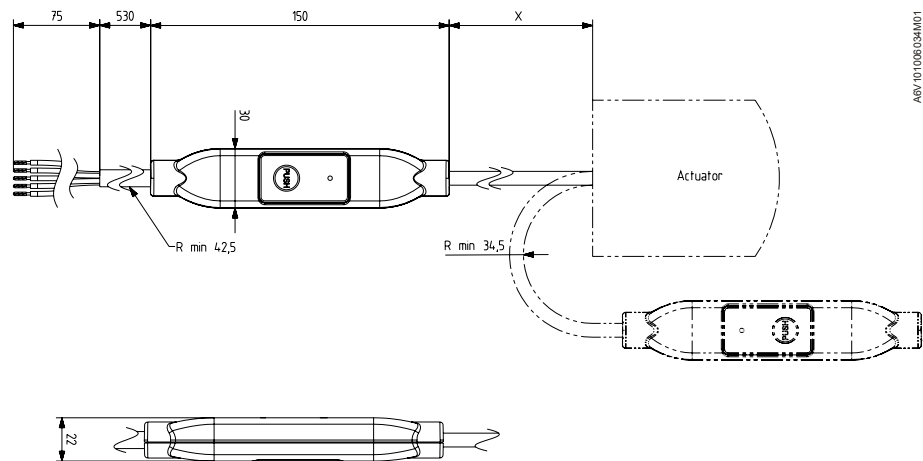
# Dimensions



Type	A	B	C	C1	C2	D	E	▶	▶▶	kg
SAX..(U <sup>1)</sup> )	242	124	150	68	82	80	100	100	200	1,780
SAX../MO <sup>2)</sup>										1,930
With ASK39.1: SAX..(U <sup>1)</sup> )	267	154	300	200	100	-	-	-	-	2,010

<sup>1)</sup> SAX..U: For 1/2" tube connections (21.5 mm dia.); 1,850 kg; 2,080 kg with ASK39.1  
<sup>2)</sup> Device contains fixed connecting cable – left cable duct used

## External Modbus converter



Type	X	kg
SAX../MO	250	0.15 <sup>1)</sup>

<sup>1)</sup> Already included in the total weight

Dimensions in mm

## Revision numbers

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Type	Valid from rev. no.
SAX31.00	..H
SAX31.03	..H
SAX61.03..	..H
SAX61.03/MO	..H
SAX81.00..	..H
SAX81.03..	..H

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