Operating manual
500 N / 650 N Chain actuators

SIMON
we create fire safety

BA EA230-K-50 PA-K-50/xxx PA-K-65/xxx EN 1.2

For further information please visit our product-website:

short.simon-protec.com/pak50en

SICO

24 VDC

230 VAC

Table of contents

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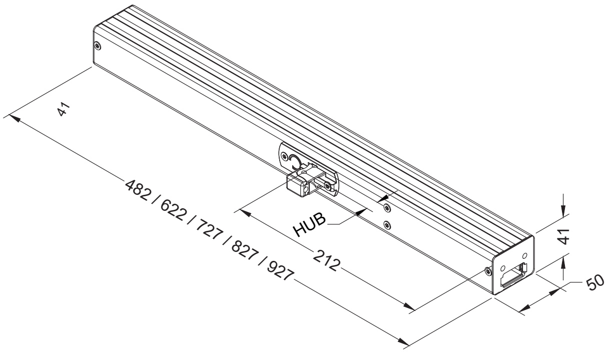
These operating instructions are only valid with the supplied supplementary sheet „Safety instructions and Warranty conditions“!

1. Figures

Figure 1: Dimensions actuators

PA-K-50/65



EA230-K-50-S

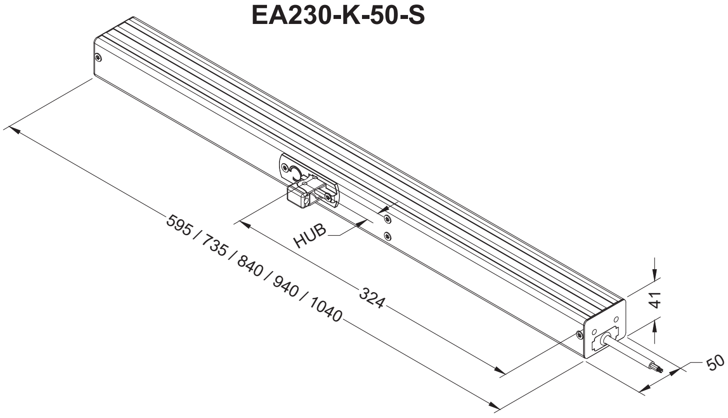


Figure 2: Upper bracket K-K50-OK

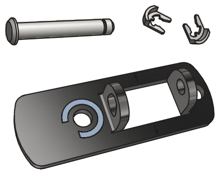


Figure 3: Upper bracket K-K-OK-SK

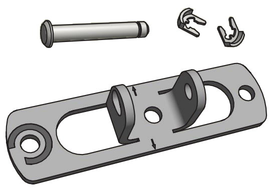


Figure 4: Lower bracket K-K50-A

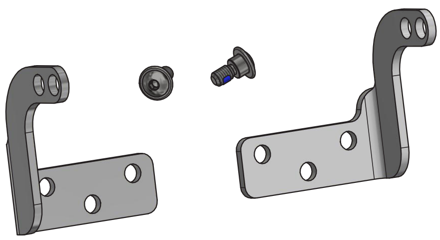


Figure 5: Lower bracket K-K50-K

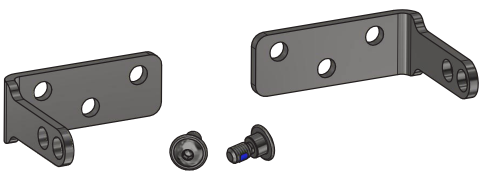


Figure 6: Lower bracket K-K50-FLEX

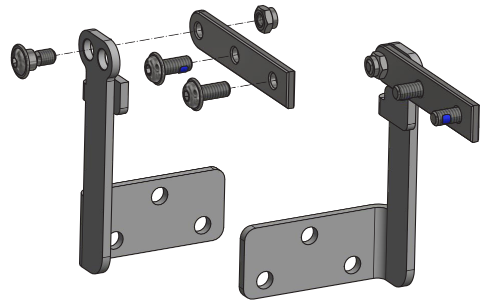


Figure 7: Insertion bracket inside K-K50-AKI

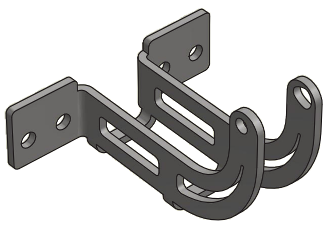
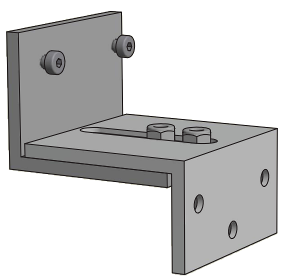


Figure 8: Supporting bracket inside K-K50-SKI



2. General

2.1. Use for the intended purpose

See supplementary sheet „Safety instructions and Warranty conditions“!

3. Mounting

3.1. Safety instructions

See supplementary sheet „Safety instructions and Warranty conditions“!

3.2. Mechanical connection

ATTENTION

All dimensions given in this chapter are minimum specifications and may vary depending on the type and design of the window.

Depending on the mounting position and shape of the window or building cover you need different combinations of brackets in order to mount the actuator. The brackets (see page 3) have to be ordered separately.

ATTENTION

Consider the static properties of the frame when installing the actuator.

Use appropriate fastenings depending on the material of the window.

Fastenings are not included in the delivery scope.

- ➢ Before mounting the actuator, check that the chain is extended a small distance.
- ➢ To achieve a good sealing of the window, check before mounting the actuator that after installation the chain of the actuator is extended a little, but not more than 25 mm after installation, otherwise the proper working of the electronic zero-reset cannot be guaranteed.

3.2.1. Mounting the lower brackets

- ➢ Determine the mounting position of the brackets so that the chain of the actuator does not collide with the window frame or sash in any opening position of the window and that the position of the chain is in the middle of the window.
- ➢ Mount the brackets with screws suitable for the respective window (screws not included in delivery), see page 3.
- ➢ Insert the actuator into the mounting brackets (K-K50-A, K-K50-K or K-K50-FLEX) and fix it with the self-locking flange head screws.

Figure 9: K-K50-A

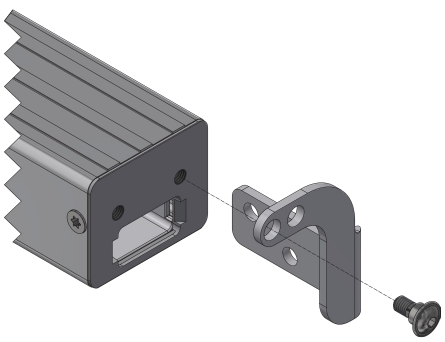


Figure 10: K-K50-K

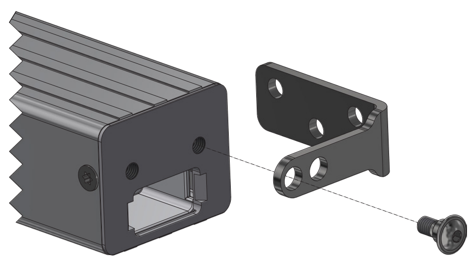
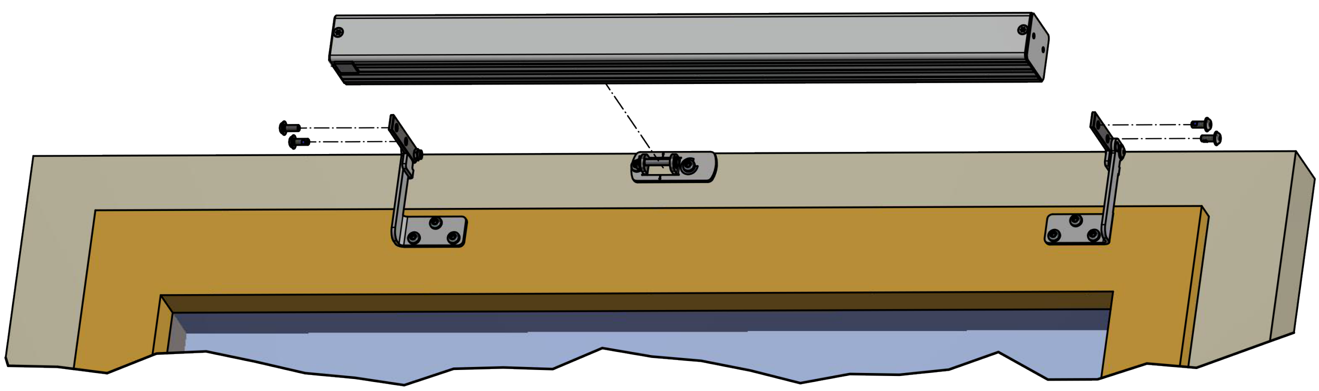


Figure 11: K-K50-FLEX



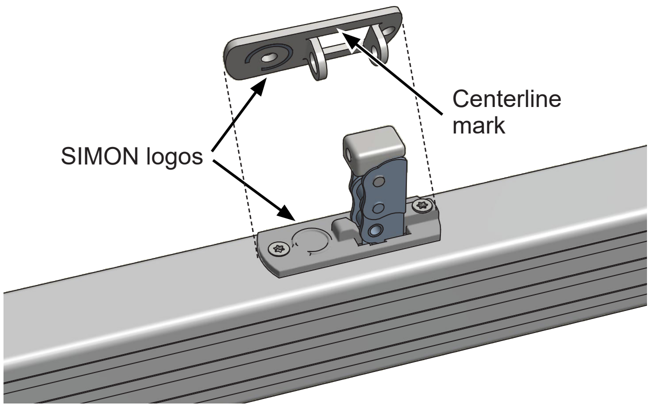
3.2.2. Upper bracket K-K50-OK / K-K-OK-SK

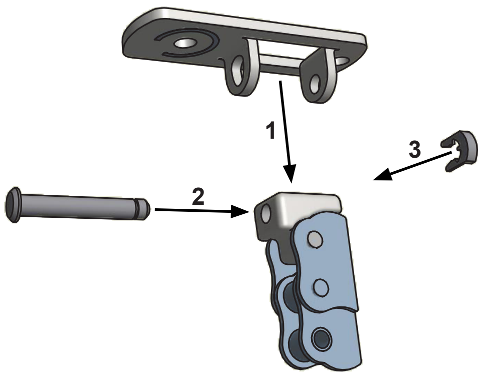
ATTENTION

The upper bracket must always be aligned so that the SIMON logo of the bracket and the chain actuator are on the same side.

INFORMATION

Centerline mark to align the bracket in the middle of the wing (solo variant) or at 1/4 distance from the left and right edge (parallel variant).



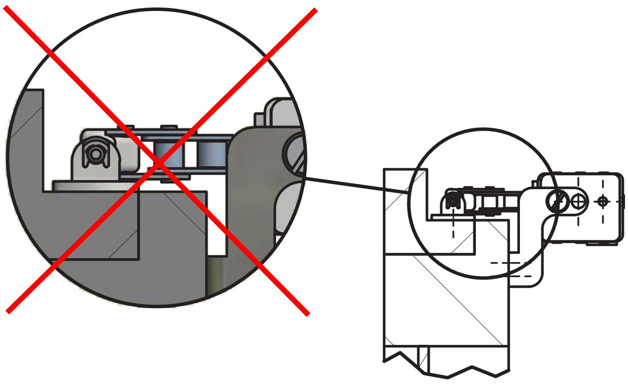


- Extend the chain about 100 mm and connect the chain end with the K-K50-OK (1). Insert in the mounting bolt from the side with the logo (2) and secure it on the other side with the retaining ring (3).

3.2.3. Incorrect positioning of K-K50-OK

ATTENTION

The upper bracket K-K50-OK must not be mounted rotated!



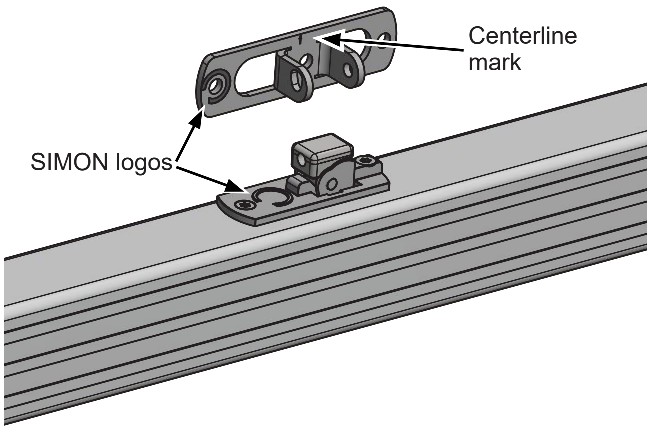
INFORMATION

This mounting variant is possible with the alternative upper bracket K-K-OK-SK.

3.2.4. Alignment of K-K-OK-SK

ATTENTION

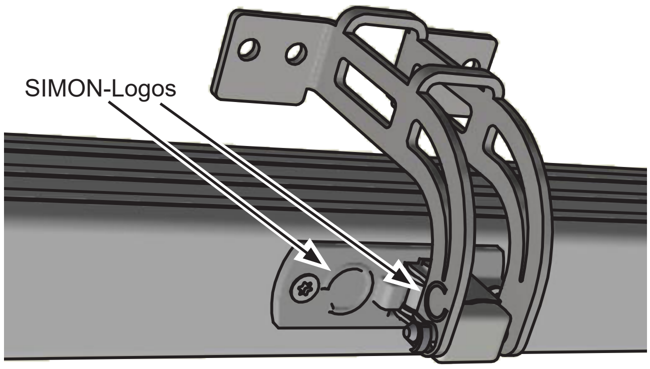
The combination of actuator and bracket may only be used with this alignment to each other.

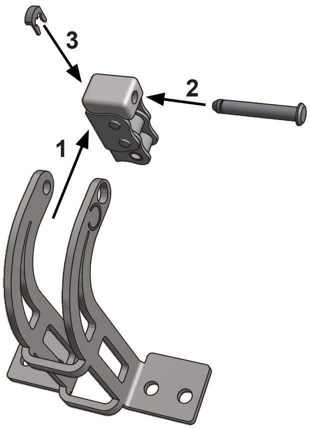


3.2.5. Upper bracket K-K50-AKI

ATTENTION

The upper bracket must always be aligned so that the SIMON logo of the bracket and the chain actuator are on the same side.

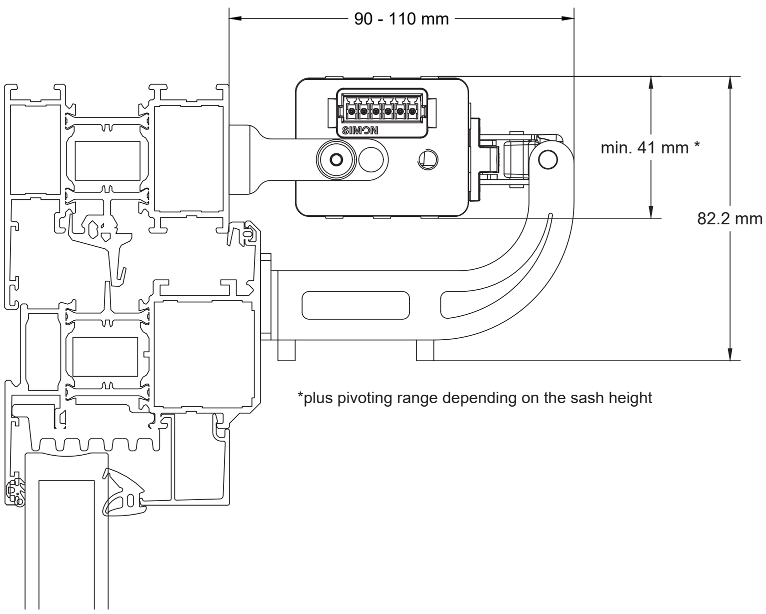


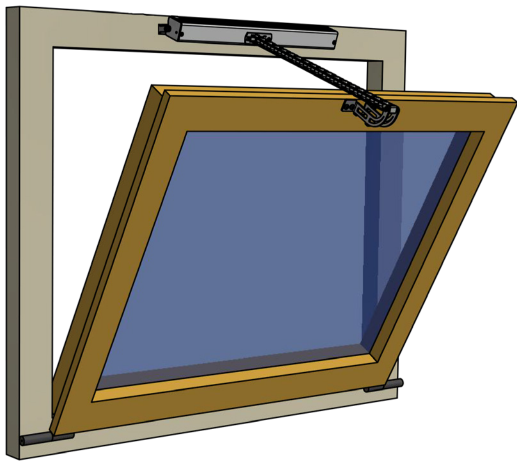


➢ Extend the chain about 100 mm and connect the chain end with the K-K50-OK (1). Insert the mounting bolt from the side with logo (2) and secure it on the other side with the retaining ring (3).

3.2.6. Inward opening top/bottom hung window, mounting on the window frame

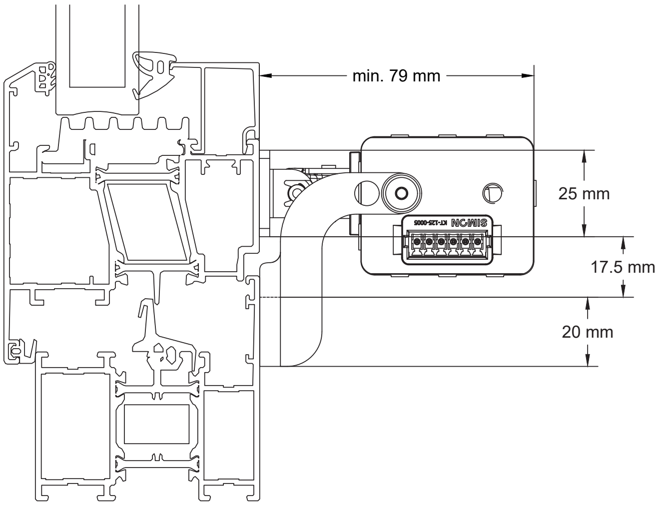
Figure 12: Bottom hung wing

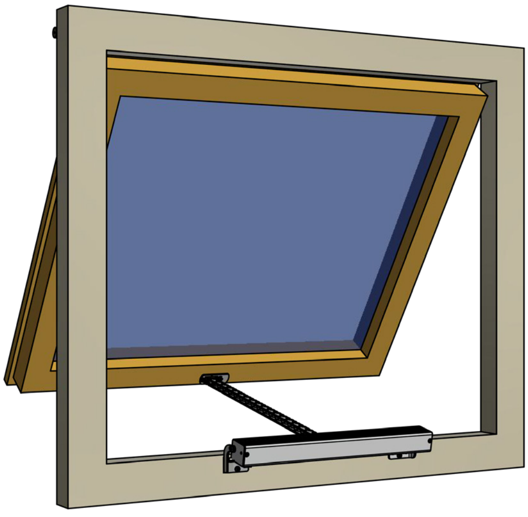




3.2.7. Outward opening top/bottom hung window / roof window, mounting on the window frame

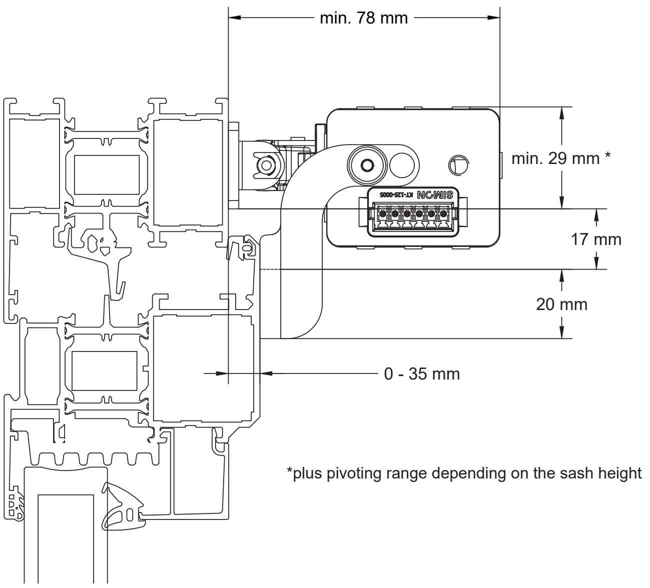
Figure 13: Top hung wing

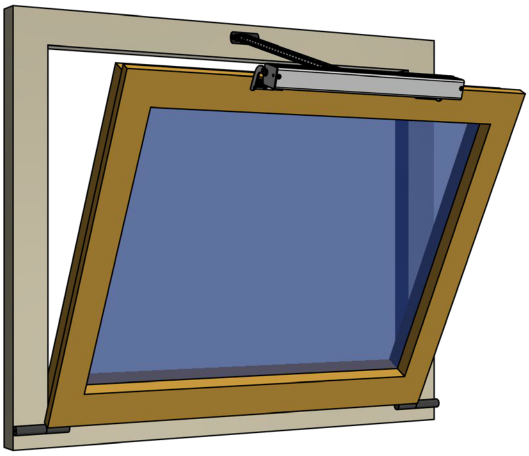




3.2.8. Inward opening top/bottom hung window, mounting on the sash

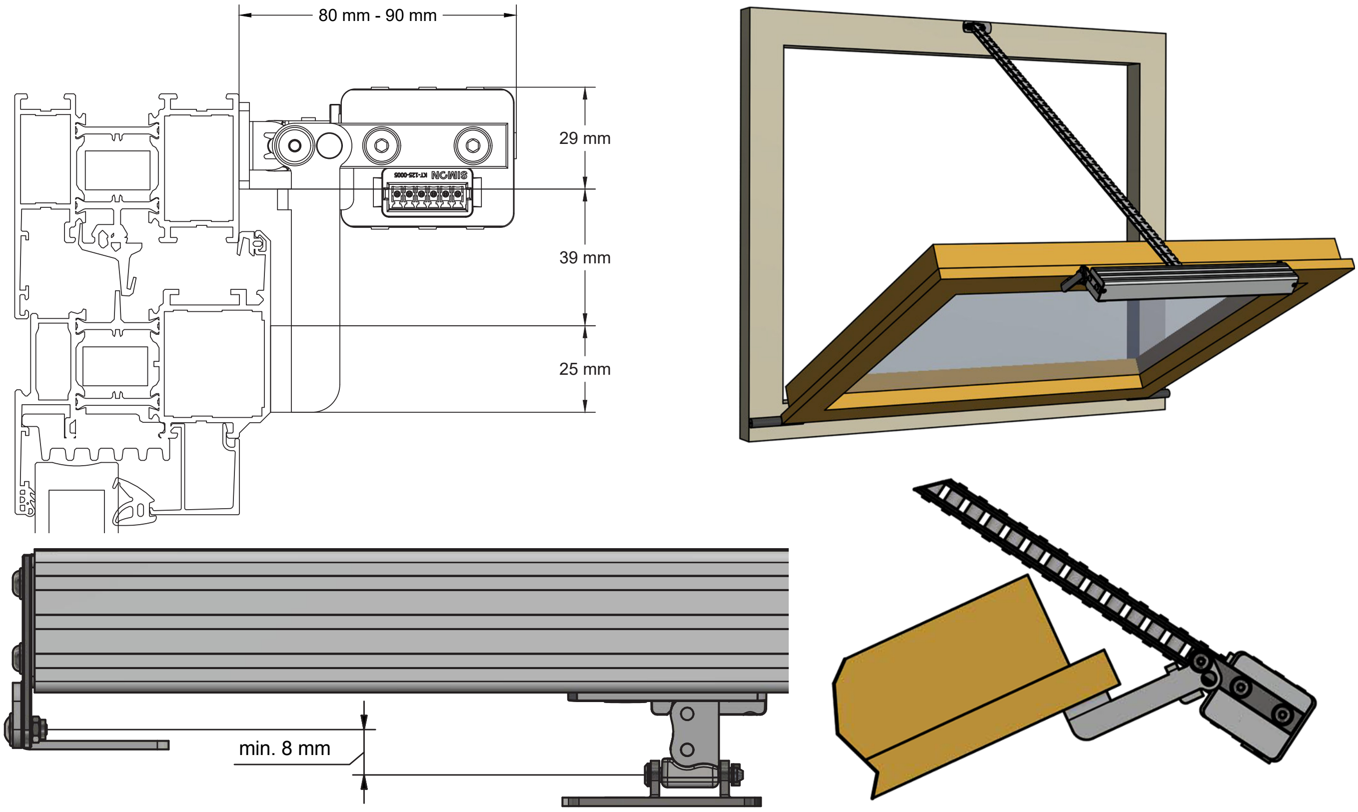
Figure 14: Bottom hung wing





3.2.9. Inward opening bottom hung window, mounting on the sash – K-K50-FLEX

Figure 15: Bottom hung wing



3.2.10. Side hung window

ATTENTION

The chain actuator may only be installed upright (with the motor side up) on DIN Left windows!

Figure 16: Mounted on window frame — K-K50-AKI

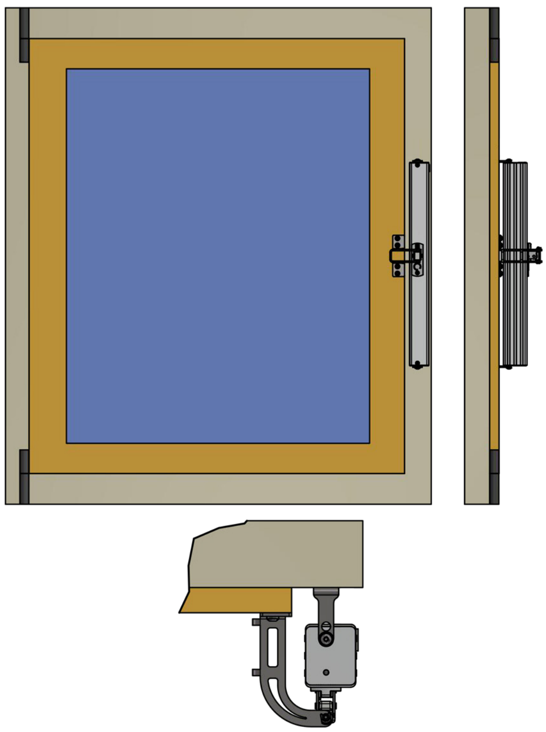


Figure 17: Mounted on sash — K-K50-A

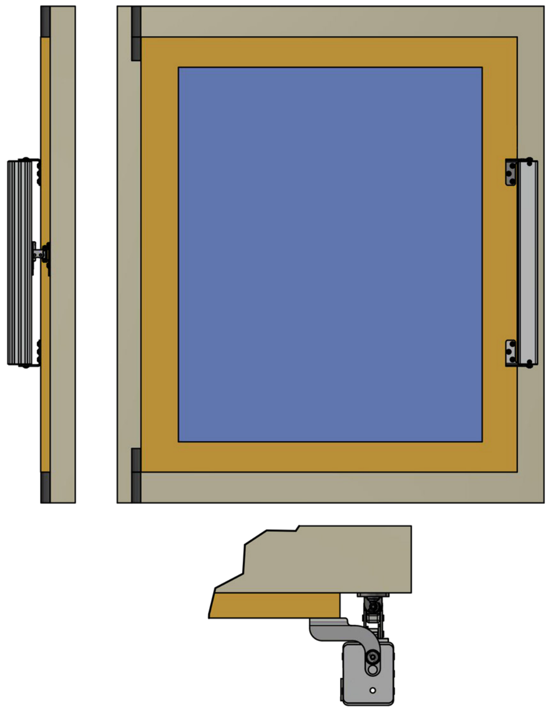
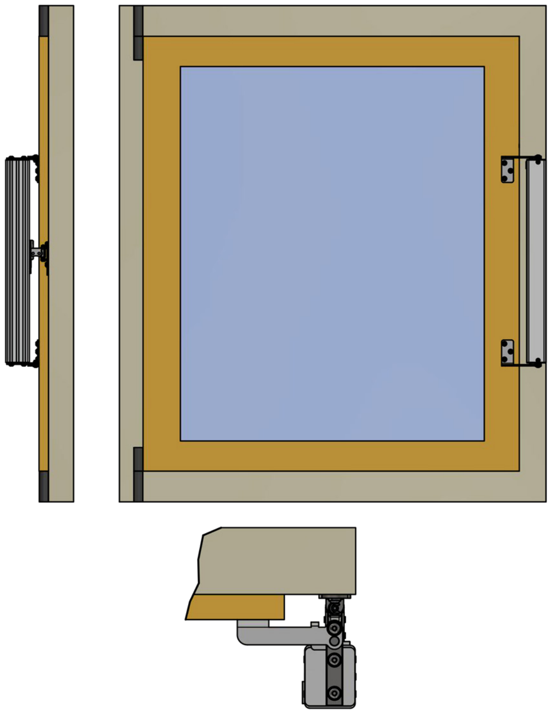


Figure 18: Mounted on sash — K-K50-FLEX



3.2.11. Calculate force / stroke

This calculation is only valid for vertically installed wall windows. For other installation options, a more detailed calculation must be made, which we can assist with.

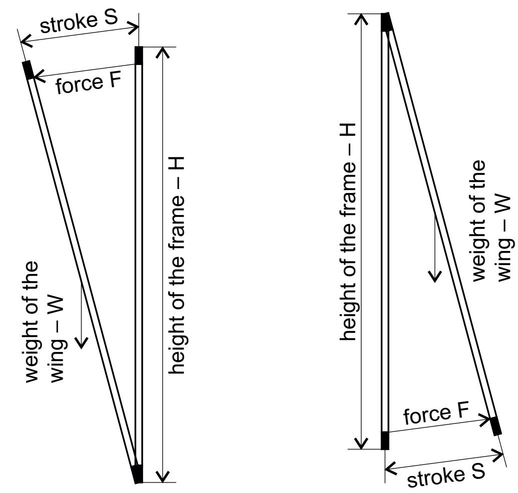
F := force of the actautor [N]
S := stroke of the actuator [mm]
H := height of the window sash [mm]
G := weight of the window sash [kg]

Required force of the actuator at a given stroke:

$$\mathbf{F = (G / 2) \times (S : H) \times 10}$$
$$\mathbf{= (G \times S \times 5) : H}$$

Maximum possible stroke of the actuator at a given force:

$$\mathbf{S = (2 \times F \times H) : (G \times 10)}$$
$$\mathbf{= (F \times H) : (G \times 5)}$$



3.2.12. Permissible tractive and pushing force

ATTENTION – PA-K-50

Permissible application (pushing force):

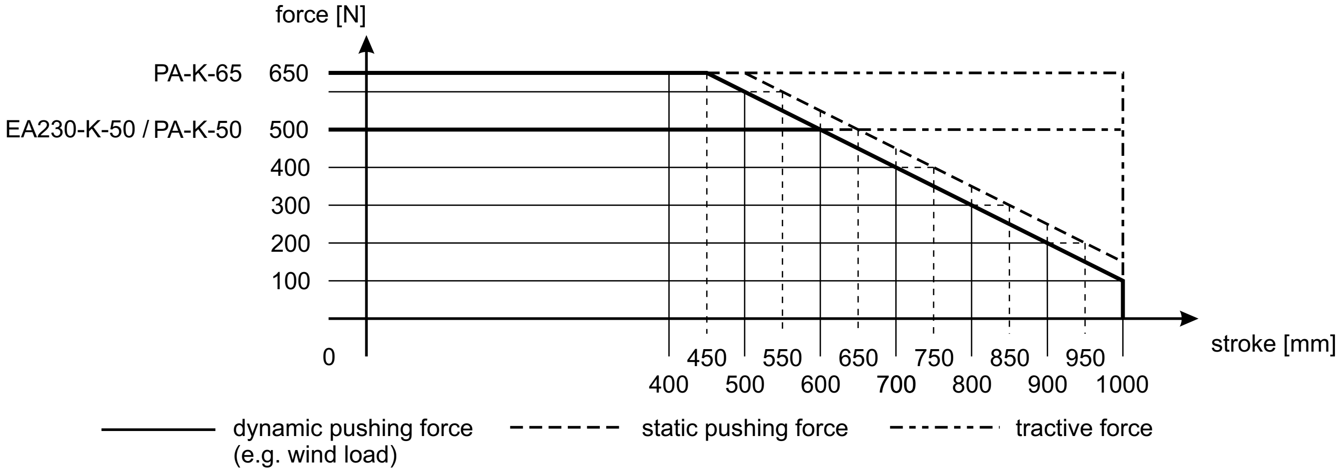
- Roof window: max. stroke 500 mm
- Top hung window: max. stroke 600 mm

ATTENTION – PA-K-65

Permissible application (pushing force):

- Roof window: max. stroke 400 mm
- Top hung window: max. stroke 500 mm

Figure 19: Permissible tractive and pushing force



3.3. Electrical connection 24 V DC

24 VDC

See the attached sheet "**safety instructions and warranty conditions**"!

ATTENTION

Unused wires must be electrically insulated.

The wires **C1** and **C2 must not** be connected to each other during normal operation.

3.3.1. Power supply

The supply voltage must be dimensioned sufficiently for the actuator. Voltage and current must fit the specifications on the type label.

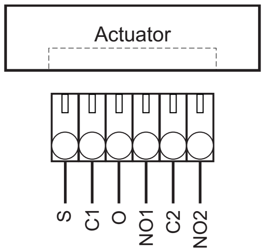
3.3.2. Feedback – volt-free contact

The normally open contact (NO1, NO2) is activated in direction "CLOSE" when the actuator is cut off in end position "CLOSE". The message is stroke-dependent and can be evaluated as a "CLOSED" message.

3.3.3. Preparation for installation

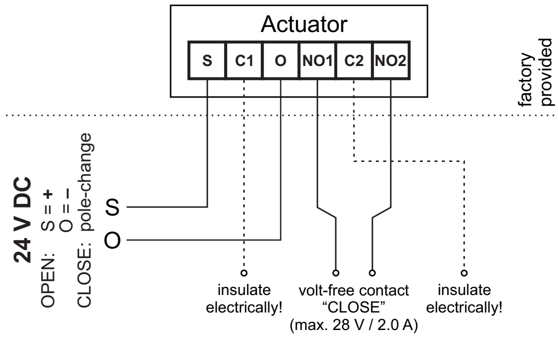
Before starting the installation, the required connection cable must be assembled. For this purpose use the plug included in the scope of delivery (see instructions in the accessory bag with SICO PLUG). For NSHEV according to EN 12101-2, the silicone connecting cable approved by the manufacturer must be used.

3.3.4. SICO PLUG Assignment



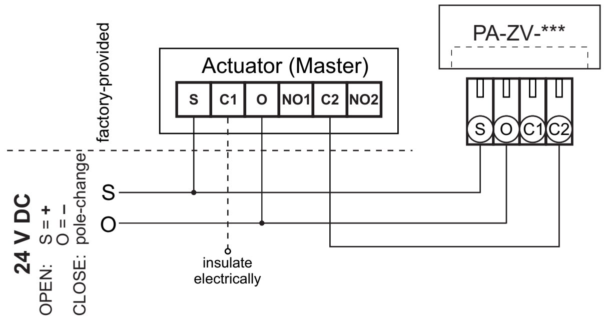
3.3.5. Single operation

➢ Connect wires according to the wiring diagram.



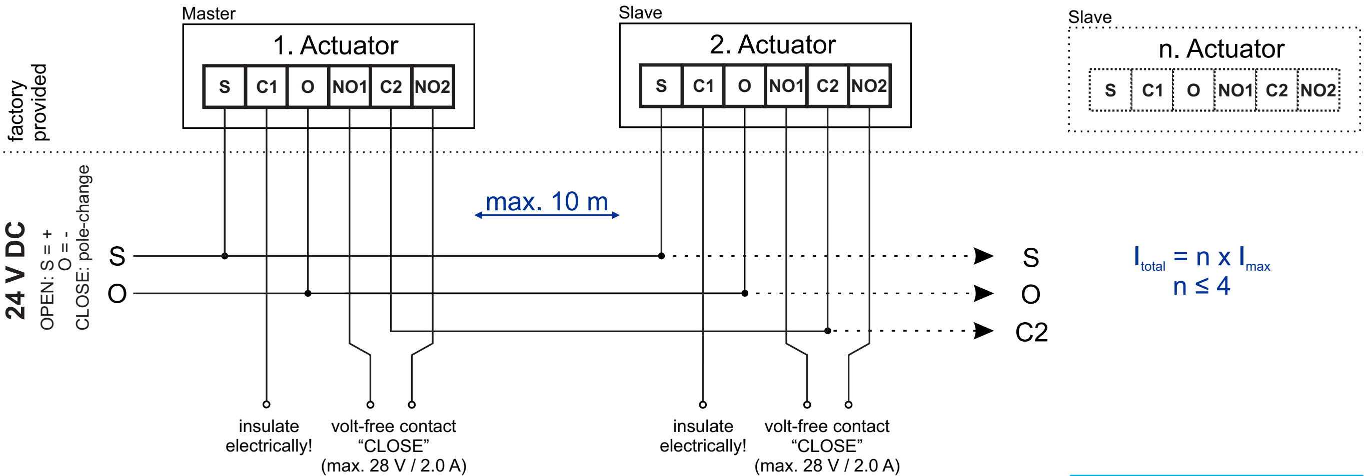
3.3.6. Connection SICO locking

➢ Connect wires according to the wiring diagram.



3.3.7. Synchronous operation

➢ Connect wires according to the wiring diagram.



$I_{total} = n \times I_{max}$
$n \leq 4$

3.3.8. Double connection (DA version)

ATTENTION

For actuators with double connection in synchronous operation, connect only the wires S, O and C2 with each other after parameterisation! Electrically insulate C1 as well as NO1 and NO2 of the SLAVE actuator.

Questions on the wire colours?

short.simon-protec.com/sicocolours

3.4. Electrical connection 230 VAC

230 VAC

See supplementary sheet „**Safety instructions and Warranty conditions**“!

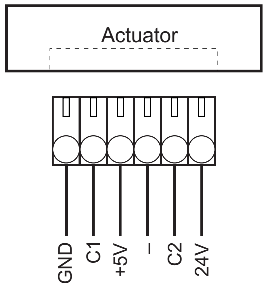
ATTENTION

Never supply L_{OPEN} and L_{CLOSE} with 230 VAC at the same time and observe the inteded pause time of 500 ms when switching. Non-observance will result in destruction of the actuator.

INFORMATION

The EA230-K-50 has a SICO-Plug connection for parametirization, synchronisation and connection with PA fittings (see 3.5 and 3.6). Connection to the power supply is made via the fixed connection cable on the 230 VAC side.

3.4.1. SICO PLUG Assignment

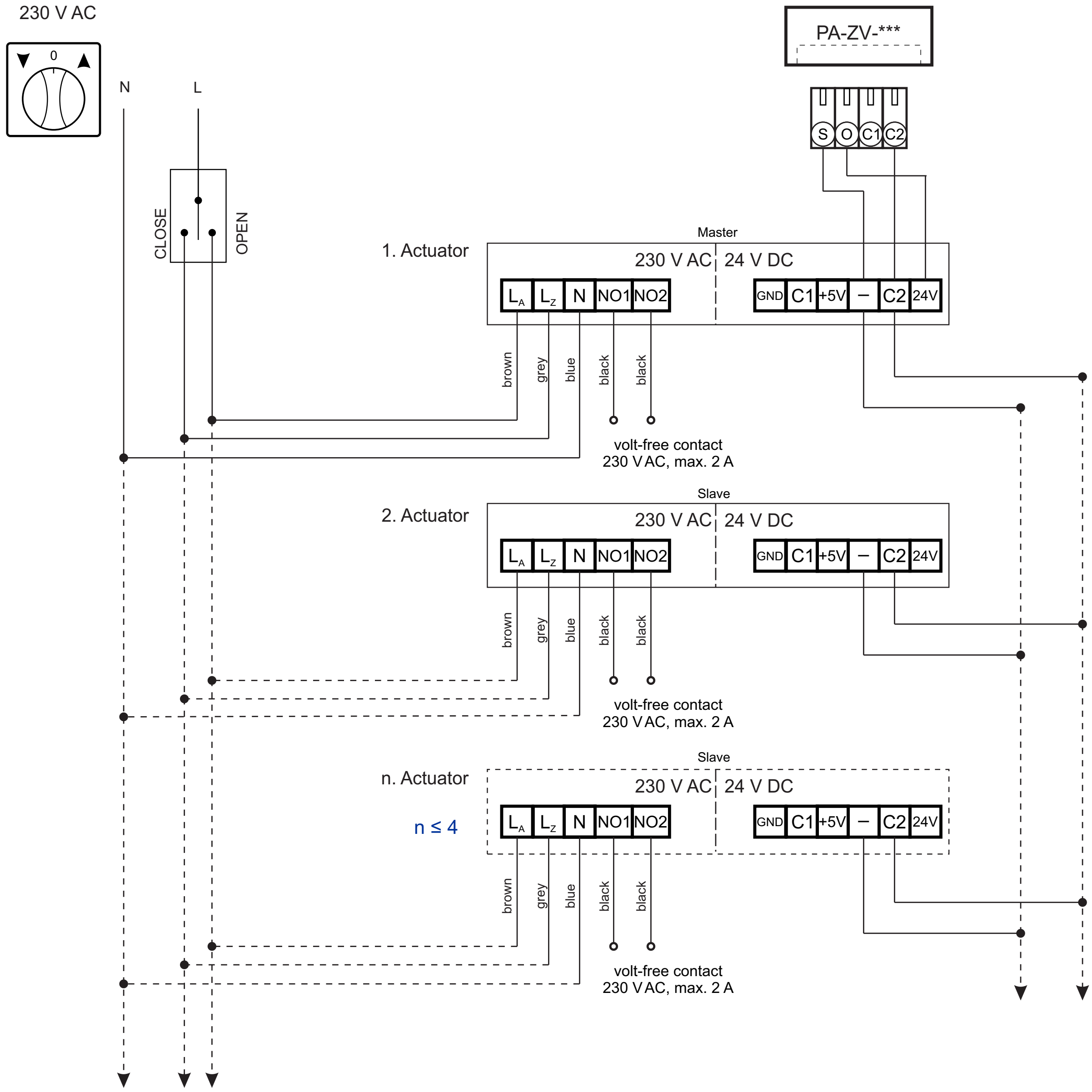


3.4.2. Feedback signal – volt-free contact

When the actuator is cut-off in end position, the normally open contact (NO1, NO2) is activated in direction CLOSE / OPEN. The signal is stroke-dependent and can be evaluated as CLOSED / OPENED signal.The switching position (OPEN / CLOSE) of the contact can be parameterized via SICO LINK.

3.4.3. One or more actuators in synchronous operation with optional SICO locking

➢ Connect wires according to the wiring diagram.

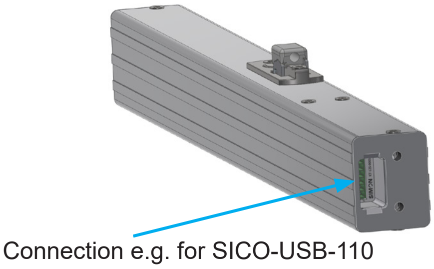


3.5. Parameterization options

Ycan make all parameterizations via the **SICO LINK** interface. You will need a **SICO-LINK-USB connection set** for this. The **MASTER / SLAVE** setting can also be made without a connection set – see 3.6.1 and / or the video at:

short.simon-protec.com/pasynchro

Figure 20: Interface for SICO LINK



3.5.1. Opening and closing behavior

See Figure 21.

Electronical stroke: You can choose the actual stroke of the actuator freely between 0 and maximum stroke.

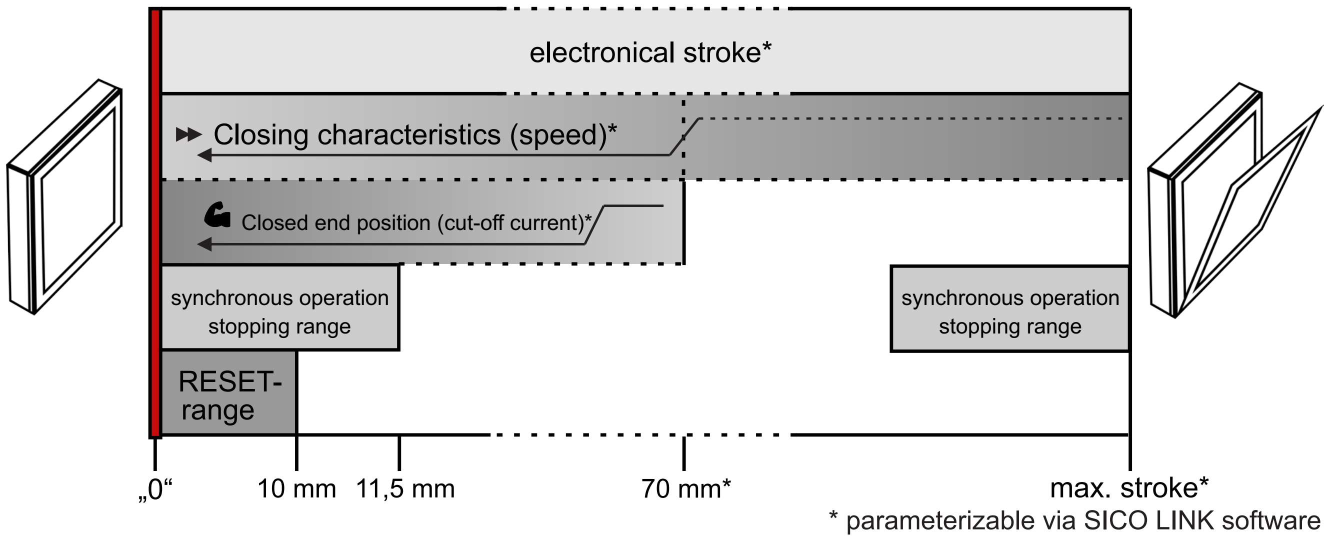
Closing characteristics: The following parameters for the behavior of the actuator during the closing process can be set: speed, force, and the stroke range in which these parameters should apply. If you select a speed ≤ 5 mm/s, the protection class 3 requirements regarding anti-pinch protection[1)] are met.

Closed end position (cut-off current): The following parameters for the behavior of the actuator in the end position CLOSED can be set, for example to optimize the tight closure of the window: force and stroke range in which the force should apply.

RESET-range: When the actuator is cut off on overload within the RESET-range, the electronic zero point is set new.

Synchronous operation stopping range: If an actuator cuts off in synchronous operation in direction "OPEN" or "CLOSE" within the **stopping range**, the remaining actuators continue to run until cutoff in the respective end position.

Figure 21: Opening and closing behavior



3.5.2. Synchronous actuators

The synchronous actuators of the PA-K-50 / PA-K-65 series are identified by the suffix „**S**“ in the part number (e. g. PA-K-50/600-S).

3.5.3. Zero point/RESET-range

If the closed position of the actuator is out of the RESET-range after installation, resetting the zero point, (SICO LINK / RESET-run) and adjusting of the maximum stroke accordingly is required.

3.5.4. Operating modes synchronous actuator

If a synchronous actuator is to be used as a single actuator, the operating mode must be set to "Single operation" (SICO LINK or RESET-run) – factory setting.

If several actuators are to be used in synchronous operation, one actuator must be set to "Synchro Master" and the remaining actuators to "Slave" (SICO LINK or manual MASTER / SLAVE setting).

ATTENTION

In order to recalibrate the synchronous function, the actuator must be fully closed in the reset range after max. 50 cycles.

[1)] According to EuroWindoor guidance sheet KB.01, available at **short.simon-protec.com/eurowindooren**.

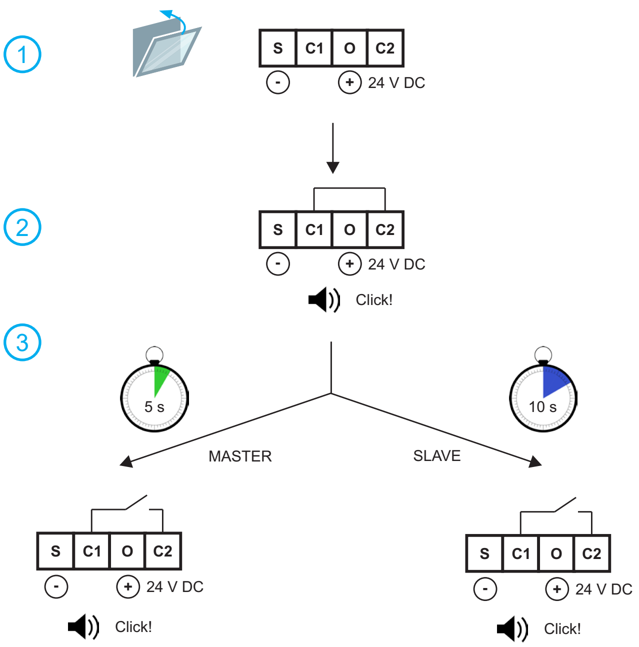
3.6. Manual setting

3.6.1. MASTER / SLAVE setting

ATTENTION

Manual setting: One MASTER and one SLAVE possible.

SICO LINK: One MASTER and up to four SLAVEs possible.



INFORMATION

Alternatively, you can set MASTER / SLAVE through SICO LINK.

1

- Operate the actuator in the CLOSE direction (**S = "–", O = "+"**). Let the actuator switch off in the CLOSE end position.

2

- Connect wire **C1** directly to wire **C2**. You will hear a relay click.

3

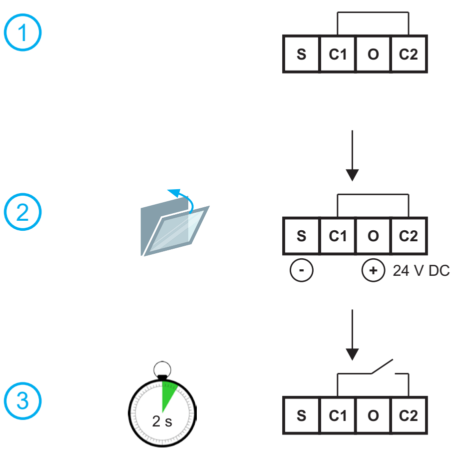
- **MASTER:** Wait 5 seconds until you hear a relay click.
- **SLAVE:** Wait 10 seconds until you hear a relay click.
- After the setting is complete, disconnect wire **C1** and wire **C2** and insulate them correctly.

3.6.2. RESET Run / Commissioning

A RESET run resets the parameters of the actuator or adjusts them to the installation conditions.

You should do a RESET run:

- after installation or replacement
- if the opening width of the closed actuator is outside the RESET range at the window
- if you want to reset the MASTER / SLAVE setting



↘ A synchronous-capable actuator will be reset to SOLO mode by the RESET run. In this mode, the actuator can also operate alone.

INFORMATION

Alternatively, you can do the RESET through SICO LINK.

1

- Disconnect the actuator from power.
- Connect wire **C1** directly to wire **C2**.

2

- Operate the actuator in the CLOSE direction (**S = "–", O = "+"**). Let the actuator switch off in the CLOSE end position.

3

↘ The zero point is set.

- Disconnect the actuator from power.
- Disconnect wire **C1** and wire **C2** and insulate them correctly.

4. Technical data

Table 1: Electrical characteristics

Actuator type	EA230-K-50/xxx	PA-K-50/xxx	PA-K-65/xxx
Rated voltage	230 V AC	24 V DC	
Permissible rated voltage range	230 V AC/ 50 Hz ±10 %	24 V DC ±15 %	
Ripple of rated voltage Vpp	–	max. 500 mV	
Inrush current (power supply) / duration	45 A (AC) / 1.2 ms	–	
Rated power	34.5 W	–	
Undervoltage detection	Yes (24 V DC side)	Yes	
Rated current[1]	0.15 A (AC)	1.4 A	1.9 A
Closed end position (cut-off current) [2]	45 mA	0.5 A	
Closed end position (stroke) [2]	70 mm		
Current consumption after cut-off (closed current)	20 mA	35 mA	
Power consumption in standby mode [3]	0.1 W		
Cut-off via	built-in electronic overload cut-off		
Maximum permissible number of actuators connected in parallel (with seperate wiring)	4		
Maximum permissible number of actuators connected in parallel (with through-wiring via double connection)	–	2	
Cable length between two actuators in synchro mode	max. 10 m		
Protection class	II		

(1) Maximum current consumption with nominal load.
(2) Default value.Parameterizable via SICO LINK. Maximum value for stroke 110 mm.
(3) According to Standby Regulation (EU) 2023/826. DC motors are exempt.

Table 2: Feedback contact

Actuator type	EA230-K-50/xxx	PA-K-50/xxx	PA-K-65/xxx
Rated voltage	230 V AC ±10 %	24 V DC	
Relay contact load	2 A	1 A	

ATTENTION

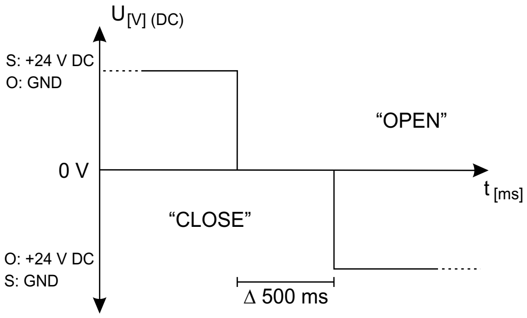
The maximum load capacity of the contact must not be exceeded.

Table 3: Connection and operation

Actuator type	EA230-K-50/xxx	PA-K-50/xxx	PA-K-65/xxx
Recommended connection cable	6 × 0.5 mm²	6 × 0.75 mm²	
Pause time during change of direction[1]	min. 500 ms		
Switch-on duration	ED 30 % (Short-term operation: 3 of 10 Min.)		ED 20 % (Short-term operation: 2 of 10 Min.)
Stability of opening and closing cycles	> 11.000		
Sound level[2]	< 50 dB (A)		
Deadlock according to prEN 12101-9/ISO 21927-9	allowed		
Multiple triggering after stop	allowed		
Maintenance	See supplementary sheet “Safety instructions and Warranty conditions”!		

(4) For the change of direction (pole reversal) it is necessary that the power supply ensures a pause time (zero-volt range) of at least 500 ms (see Figure 22). This pause time must also be ensured during multiple triggering in the same direction.
(5) Measured at a distance of one metre under normal conditions.

Figure 22: Zero voltage range at changing of direction



ATTENTION

Voltage stability / quality: only defined cut-off processes are permitted (cut-off time from rated voltage 24 V to 0 V in t <10 ms).

This applies in particular for switching operations from primary (mains operation) to secondary energy source (emergency power batteries).

A voltage edge with a zero-crossing time of at least 500 ms must be ensured, even during multiple triggering in the same direction.

Table 4: Installation and environmental conditions

Actuator type	EA230-K-50 / xxx	PA-K-50 / xxx	PA-K-65 / xxx
Rated operating temperature	20 °C		
Permissible ambient temperature range	from -5 to 75 °C		
Temperature - stability (SHE)	300 °C		
Ingress protection	IP 32		
Usage range	Central European environmental conditions ≤ 2,000 metres above sea level		

Table 5: Mechanical characteristics

Actuator type	EA230-K-50 / xxx	PA-K-50 / xxx	PA-K-65 / xxx
Maximum pushing force [(1)]	500 N		650 N
Maximum pull force [(2)]	500 N		650 N
Condition of loading	Opening against nominal load Closing with nominal load support		
Nominal locking forcce	≤ 2000 N in "OPEN" and "CLOSE"		
Nominal stroke for pulling application [(3)]	300 mm / 600 mm / 800 mm / 1000 mm / 1200 mm		
Nominal stroke for pushing application	300 mm / 600 mm		300 mm / 450 mm
Stroke speed at nominal load [(4)]	8.0 mm/s	10.5 mm/s	8.5 mm/s
Closing characteristics (speed) [(5)]	40% (< 5 mm/s)		
Closing characteristics (stroke) [(5)]	70 mm		
Material / Surface housing	Alu E6/EV1 Coatings in all RAL and DB colours possible		
Material chain	corrosion-resistant monostable steel chain, silver nickel plated		
Dimensions (L × W × H) [(5)]	300 mm Stroke: 595 × 50 × 41 mm 600 mm Stroke: 735 × 50 × 41 mm 800 mm Stroke: 840 × 50 × 41 mm 1 000 mm Stroke: 940 × 50 × 41 mm 1 200 mm Stroke 1040 × 50 × 41 mm	300 mm Stroke: 482 × 50 × 41 mm 600 mm Stroke: 622 × 50 × 41 mm 800 mm Stroke: 727 × 50 × 41 mm 1 000 mm Stroke: 827 × 50 × 41 mm 1 200 mm Stroke: 927 × 50 × 41 mm	
Weight approx.	1.90 kg / 2.10 kg / 2.50 kg / 2.80 kg / 3.10 kg		

(1) Only under optimum conditions. Pushing force can be parameterized via SICO LINK.
(2) Tractive force parameterizable via SICO LINK.
(3) The nominal stroke can deviate by ± 3 % due to mechanical damping, but no more than 20 mm.
(4) In relation to a stroke of 600 mm; tolerance ± 10%. Depending on the installation conditions, speeds of up to 16 mm/s may be possible under pulling load.
(5) Default. Parameterizable via SICO LINK. Maximum reduction of speed by 40% amounts to < 5 mm/s. If the speed is reduced to this value over the entire stroke, the actuator fulfills the demands of protection class 3 regarding anti-pinch protection according to EuroWindoor guidance sheet KB.01
(6) Plus chain exit (20 mm).

Table 6: Approvals and certificates

Actuator type	EA230-K-50 / xxx	PA-K-50 / xxx	PA-K-65 / xxx
CE-compliant	In accordance with EMC directive 2014 / 30 / EU and the low voltage directive 2014 / 35 / EU		
Further approvals	On request (e.g. NSHEV according to EN 12101-2)		

Notes