Operating Manual

Folding Arm²

SIMON RWA®
Begeisterung trifft Technik

BA_EA-KL2-xxx_EN_13

exemplary picture!

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Table of contents

General

2. General

2.1 Foreword to this Manual

This manual has been created for the purposes of proper operation, installation and maintenance by trained, experienced specialist personnel (e. g. mechatronics engineer or electrician) and / or specialist personnel with knowledge involving the installation of electrical devices.

Read the operating manual carefully and follow the prescribed sequence. Retain the operating manual for later use / maintenance. Please precisely observe the pin assignment, the minimum and maximum performance data (see “Technical data”) and the installation instructions. Incorrect usage or improper operation / assembly can cause the loss of system functions and result in damage to property and / or persons.

You will find the following symbols in this manual:

INFO

This information provides you with additional tips!

ATTENTION

This warning draws your attention to potential dangers for the product!

DANGER

This warning draws your attention to possible risks to your life or health!

ENVIRONMENTAL NOTE

This warning draws your attention to potential dangers for the environment!

➢ This is how operating procedures are identified.

➘ Consequences are represented this way.

- *Buttons* or *switches* to be activated are indicated in italics.
- “Displays” are placed in quotation marks.

2.2 Use for the intended Purpose

Openers (actuators) serve for the opening of building coverings, which can be installed in walls or in roofs and used for the ventilation of rooms or for the exhaust of fire smoke.

The opening actuator may have to be extended by protective measures in accordance with the risk assessment which is to be carried out.

2.3 Product Description

The opening actuator is suitable for mounting on building coverings (e. g. windows). They are usable with SHEV and / or ventilation controllers from SIMON RWA-Systeme GmbH. The opening actuator is suitable for installation and use in smoke exhaust systems.

2.4 Functional Description

The folding arm® is an extremely compact opening actuator that functions, without spindles, chains or similar actuating elements. The two lever arms rotate around the actuator body, thus moving the window element which is attached by a flange.

The technical highlights are:

- Compatible with SHEV systems
- Very large opening angles can be implemented
- 710 mm stroke with a force of 500 N, 800 N or 1000 N depending on the version
- Opening time less than 60 seconds
- High-performance gearbox
- Intelligent overload cut-off
  - ❋ Electronic stroke
  - ❋ Soft start
- Intelligent bracket system (enables flexible installation on main and secondary closing edge)
- Programming interface
- Low current consumption and high efficiency
- Any desired coating possible (RAL, DB)

General

2.5 Technical Data

Table 1: Electrical Characteristics

Actuator type/version	EA-KL²-50 Tandem	EA-KL²-80 Tandem	EA-KL²-100 Tandem
Rated voltage:	24 V DC		
Permissible rated voltage range:	24 V DC -15%; +25%		
Ripple of rated voltage:	500 mV		
Undervoltage detection:	Yes		
Rated current[1] :	2.0 A	2.6 A	3.0 A
Maximum starting current:	OPENING: 2.2 A CLOSING: 2.0 A	OPENING: 2.9 A CLOSING: 2.0 A	OPENING: 3.3 A CLOSING: 2,0 A
Maximum cut-off current in 'OPENING' direction:	2.0 A	2.6 A	3.0 A
Maximum cut-off current in 'CLOSING' direction:	2.0 A	1.7 A	1.7 A
Current consumption after cut-off (closed current):	65 mA		
Cut-off via:	built-in electronic overload cut-off		
Maximum permissible number of actuator units connected in parallel[2] :	4		
Cable length between two actuators in tandem mode:	max. 10 m		
Run-on time[3] :	3 s		
Pulse time[4] :	320 ms		
Protection class:	III		

1. Maximum current consumption with nominal load.
2. With common cut-off function (tandem function).
3. The run-on time indicates how long the actuators connected in parallel remain powered after the trigger actuator is shut down.
4. The pulse time indicates how long the internal or external overload cut-off provides the cut-off signal at the output.

Table 2: Volt-free Contact (C1, C2)

Actuator type/version	EA-KL²-50 Tandem	EA-KL²-80 Tandem	EA-KL²-100 Tandem
Rated voltage:	max. 30 V DC		
Relay contact load:	2 A		

The normally open contact (NO) is only switched when the actuator is cut off in the 'CLOSED' end position. This means that the signal is stroke-dependent and can be evaluated as a 'CLOSED signal'.

ATTENTION

The maximum contact load (see Table 2: "Volt-free Contact (C1, C2)") must not be exceeded.

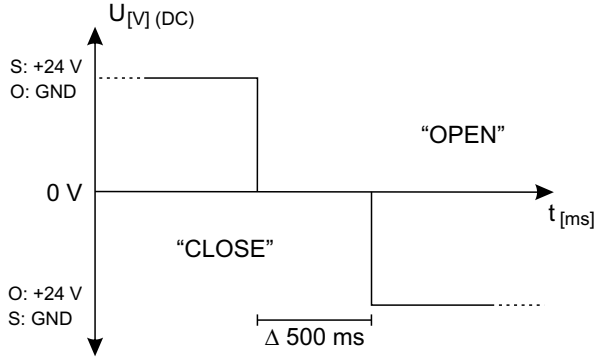
General

Table 3: Connection and Operation

Actuator type/version	EA-KL²-50 Tandem	EA-KL²-80 Tandem	EA-KL²-100 Tandem
Silicone connection cable:	6 x 0.75 mm²		
Connection cable length[1] :	2 m		
Pause when changing direction[2] :	min. 500 ms		
Switch-on duration:	ED 30		
Stability of opening and closing cycles:	> 11,000		
Sound level[3] :	< 70 dB (A)		
Multiple triggering as per prEN 12101-9:	allowed		
Multiple triggering after stop:	allowed		
Maintenance:	(see 7. “Care and Maintenance” on page 22)		

1. Optional lengths possible.
2. It is important that we have a zero-voltage part of 500 ms (see Figure 1: “Zero-Voltage Part by Direction Change”).
3. Measured at a distance of one metre under normal conditions.

Figure 1: Zero-Voltage Part by Direction Change



ATTENTION

Voltage stability / quality: Allowed are only clear power downs (voltage drop from 24 V (DC) to 0 V in less than 10 ms).
Especially for transition from primary power supply (main operation) to secondary power supply (backup power supply).

Table 4: Installation and Environmental Conditions

Actuator type/version	EA-KL²-50 Tandem	EA-KL²-80 Tandem	EA-KL²-100 Tandem
Rated operating temperature:	20 °C		
Permissible ambient temperature range:	0 to 75 °C		
Temperature stability (SHEV):	300 °C		
Ingress protection:	IP 54		
Usage range:	Central European environmental conditions ≤ 2,000 metres above sea level.		

General

Table 5: Approvals and Certificates

Actuator type/version	EA-KL²-50 Tandem	EA-KL²-80 Tandem	EA-KL²-100 Tandem
CE-compliant:	in accordance with EMC directive 2004/108/EC and the low-voltage directive 2006/95/EC		
Further approvals:	on request		

Table 6: Mechanical Characteristics

Actuator type/version	EA-KL²-50 Tandem	EA-KL²-80 Tandem	EA-KL²-100 Tandem
Maximum compressive force:	500 N	800 N	1000 N
Maximum tractive force[1] :	500 N	500 N	500 N
Condition of loading:	Opening against nominal load Closing with nominal load support		
Nominal locking force:	700 N in OPENING and CLOSING	1200 N in OPENING and CLOSING	1200 N in OPENING and CLOSING
Nominal stroke[2] :	710 mm		
Stroke speed with nominal load[3] :	14.5 mm/s	13 mm/s	11.8 mm/s
Stroke speed with a part load[4] :	part load: 350 N 15.4 mm/s	part load: 500 N 14.8 mm/s	part load: 700 N 13.9 mm/s
Material surface: lever:	Alu E6/EV1 Stainless steel		
Dimensions (L x W x H):	500 x 58 x 122 mm		
Weight:	4.6 kg	5.5 kg	5.5 kg

1. Other values are possible as options
2. The nominal stroke can deviate by ± 5% due to mechanical damping.
3. In relation to a stroke of 710 mm; tolerance ±5%
4. In relation to a stroke of 710 mm with part load; tolerance ±5%

Table 7: Accessories

Actuator type/version	EA-KL²-50 Tandem	EA-KL²-80 Tandem	EA-KL²-100 Tandem
Mechanical connection to the actuator:	A wide selection of bracket sets is available. The technical data apply only in conjunction with original accessories!		
Mechanical connection to the actuator housing:	A wide selection of bracket sets is available. The technical data apply only in conjunction with original accessories!		

Safety Regulations

3. Safety Regulations

FOR THE SAFETY OF PERSONS IT IS IMPORTANT TO FOLLOW THESE INSTRUCTIONS. THESE INSTRUCTIONS ARE TO BE KEPT AND HANDED TO THE CUSTOMER FOLLOWING INSTALLATION AND COMMISSIONING.

DANGER

Do not allow unauthorised persons (e. g. children) to operate permanently installed control panels. Keep remote controls out of reach of unauthorised persons.

DANGER

Please consider VDE 0833 for hazard alert systems, VDE 0100 for electrical systems, DIN 18232 for SHEV systems, the local fire department regulations, the energy supply company regulations for the mains connection as well as BGV A3 and the BG regulation BGR 232. All relevant national safety regulations and rules apply to the bringing onto the market, installation and commissioning of the equipment outside the country of manufacture (Germany).

DANGER

Free access must be ensured to the energy supplies and electrical control panels of SHEV systems.

DANGER

The sign for the manual release must be attached permanently in the vicinity of its actuating element.

DANGER

Force operated windows which are lower than 2.5 m above the top edge of the finished floor (even if this only applies to parts of the window) require a risk assessment with regard to the danger of persons being crushed or trapped. Several national and international regulations regulate the protective measures necessary depending upon the type of use of the window. A risk analysis must be carried out.
The building planner / architect or the entity issuing the invitation to bid must clearly specify the requirements for force operated windows. This includes agreement with the responsible authorities (e. g. building authority) and, if necessary in the case of commercial and public use, with the involvement of the responsible insurance company. The client who installs the force operated window is responsible for adherence to the tendering specifications, taking into account technical rules and the state of the art. The client / customer / user must ensure that force operated windows are operated and maintained in accordance with the user information/ operating instructions.
The regulations (BGR 232) of the association of commercial and industrial workers' compensation insurance carriers have to be considered! Other persons must be kept away if a switch with an 'off' presetting is operated or if a window closes that had been opened by a fire alarm system.

DANGER

The actuating element of switches with an 'off' presetting must be installed in a place with a direct line of sight to the driven part, but away from moving parts. If it is not a key switch, it must be installed at a height of at least 1.5 m and must be inaccessible to the public.

Figures

4. Figures

Figure 2: Folding Arm²

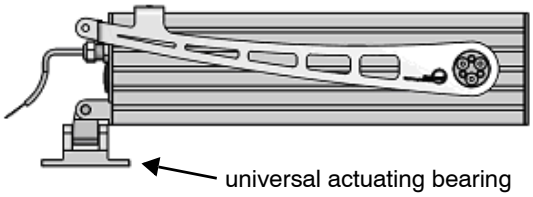


Figure 3: Attachment to the main closing Edge

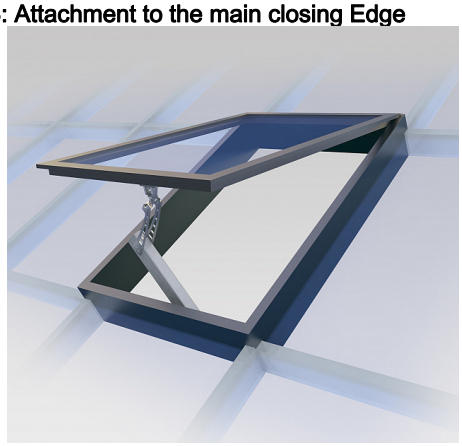


Figure 4: Attachment to the secondary closing Edge

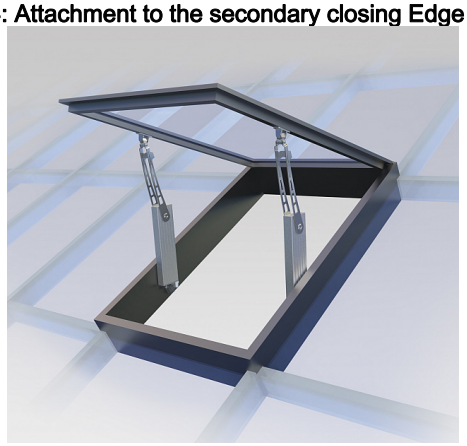


Figure 5: Inward Opening

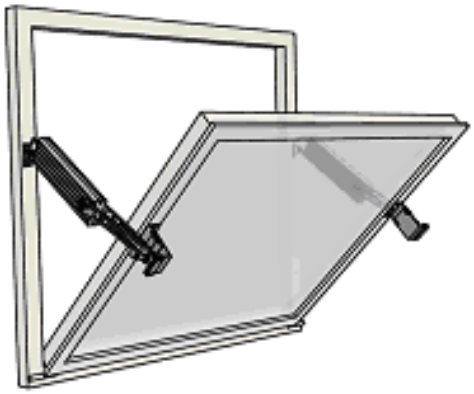


Figure 6: K-KL²-M Bracket (outward central)

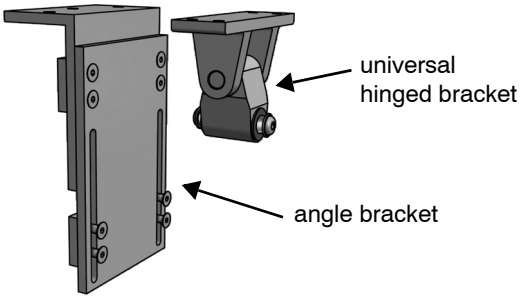


Figure 7: K-KL²-S Bracket (lateral outward)

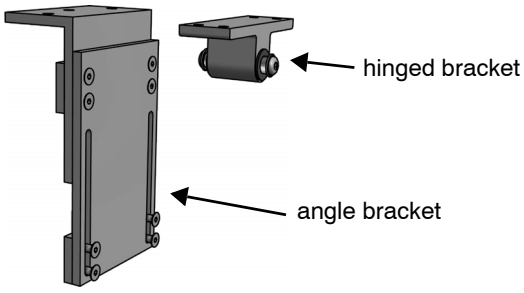
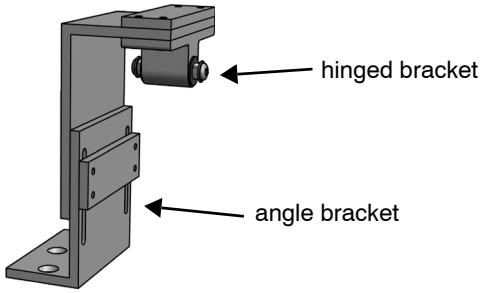


Figure 8: K-KL²-I Bracket (lateral inward)



5. Mounting

INFO

Information can be found in the ZVEI data sheet 'Force operated windows' (www.simon-rwa.de).

DANGER

Mounting may be carried out only by professional personnel (qualified electrician)! All relevant national safety regulations and rules apply to mounting, installation and commissioning.
If the installation is not carried out correctly there is a danger of electrocution. It is essential that you adhere to the applicable safety regulations! Pay attention to the valid installation regulations. Incorrect installation can lead to serious injuries.

DANGER

A restrictor stay with sufficient stroke must be installed at bottom hung wings.
It must be ensured that the actuator fastening to the window or wing frame is permanent and suitable for the actuator force mentioned on the type plate.

DANGER

In the case of windows lower than 2.5 m above the top edge of the finished floor, which have an opening of more than 200 mm when open, the closing movement must be controlled by a switch with an 'off' presetting if the opening movement is triggered by a fire alarm system.

DANGER

The opening actuators must be installed such that the doors can open in the direction of escape.

DANGER

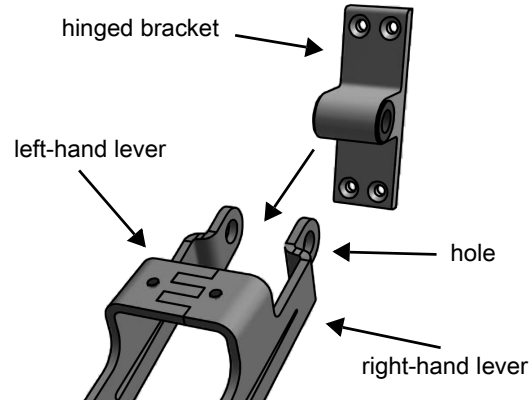
If the opening actuators are used with SHEV systems, ensure that controllers that can be locked can only be active when no other person is in the room.

5.1 Mechanical Connection

5.1.1 Mounting the hinged Bracket

➢ Position the hinged bracket between the levers so that the lever holes are congruent to the hole in the hinged bracked.

Figure 9

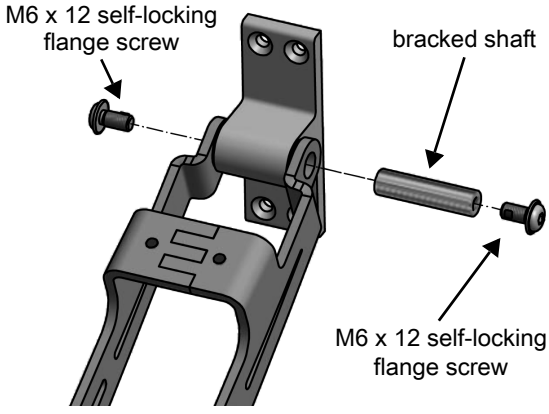


ATTENTION

Use only the screws provided with thread locking compound!

➢ Fix the hinged bracket with the brackerd shaft and the M6 x 12 self-locking flange screws.

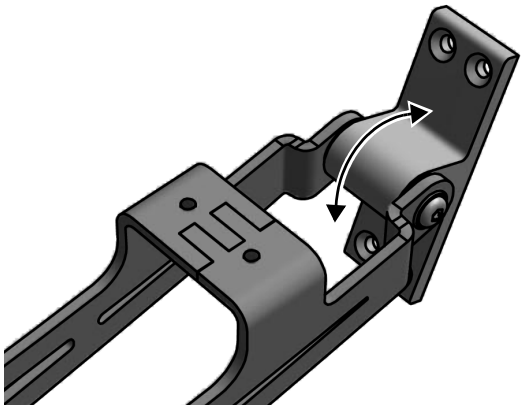
Figure 10



Mounting

➢ Tighten the counter flange screws to a torque of 7.3 Nm.

Figure 11



5.1.2 Checking the Bracket

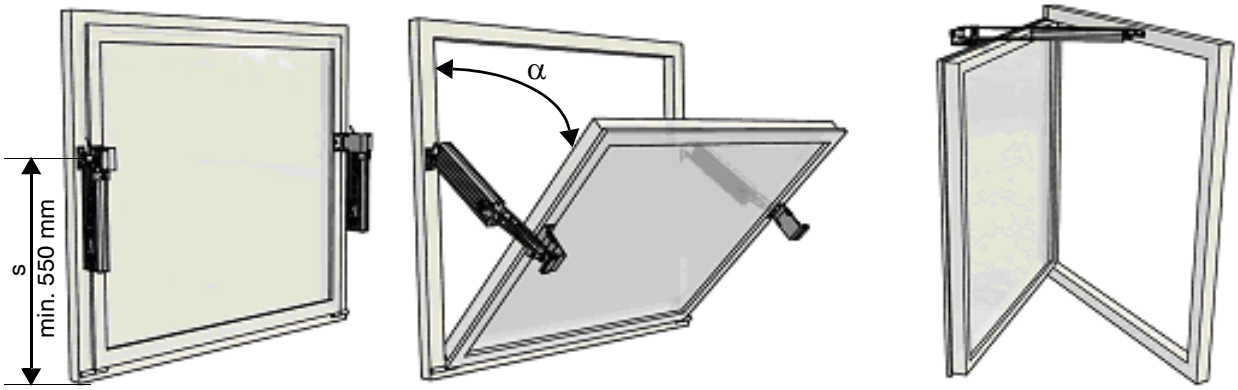
➢ Check that the screws are tight and that the bracket moves freely.

5.1.3 Mounting the angle Bracket and Folding Arm²

The method of mounting the folding arm² and the selection of the correct bracket depend on the desired application.

- For the K-KL²-I bracket set, read on at “Inward Opening – Mounting on the secondary closing Edge”.
- For the K-KL²-S bracket set, read on at “Outward Opening – Mounting on the secondary closing Edge” on page 13.
- For the K-KL²-M bracket set, read on at “Outward Opening – Mounting on the main closing Edge” on page 18.

5.1.3.a Inward Opening – Mounting on the secondary closing Edge

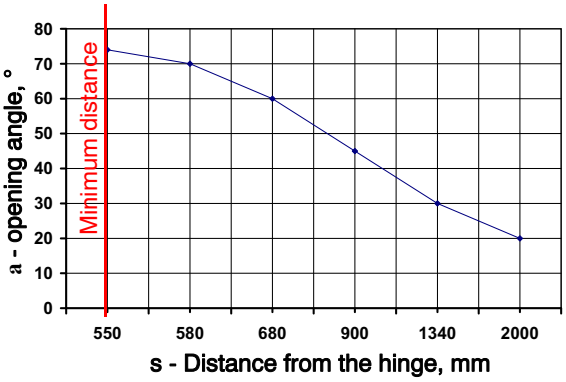


tandem application *solo application*

ATTENTION

Note that the angle bracket is fastened parallel to the secondary closing edge and must be mounted at a distance of 2 mm (± 1 mm) from the wing edge.

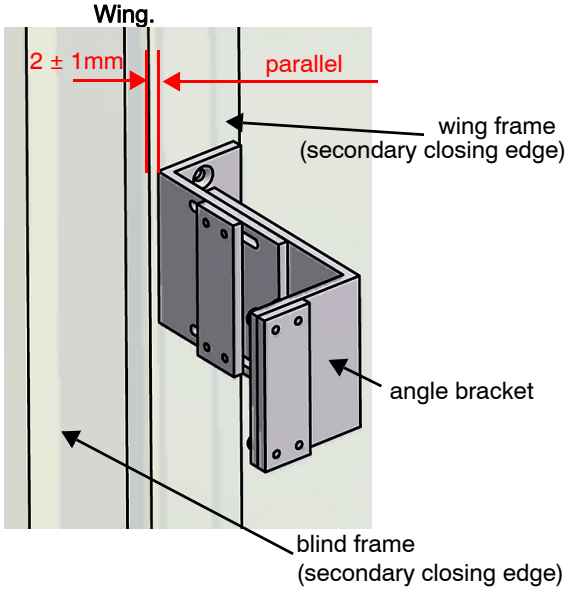
Figure 12: Diagram of opening Angle



Mounting

- Fasten the angle bracket to the wing frame using three suitable screws ø6 mm! The position depends on the desired opening angle and the weight of the window (see Figure 12: “Diagram of opening Angle” on page 10).

Figure 13: Positioning of the angle Bracket with closed Wing.

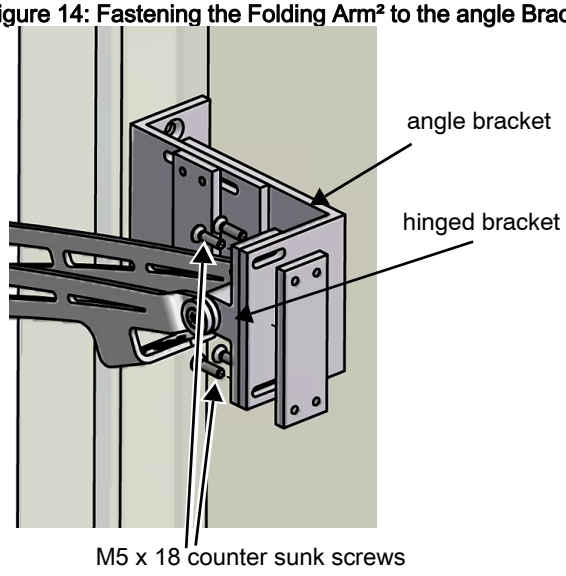


INFO

The folding arm² can optionally be driven from the ‘CLOSED’ position to an opened position in order to do this. Use a suitable power supply for this!

- Fasten the hinged bracket to the angle bracket.
- Tighten the M5 x 18 counter sunk screws to a torque of 5.5 Nm.

Figure 14: Fastening the Folding Arm² to the angle Bracket



ATTENTION

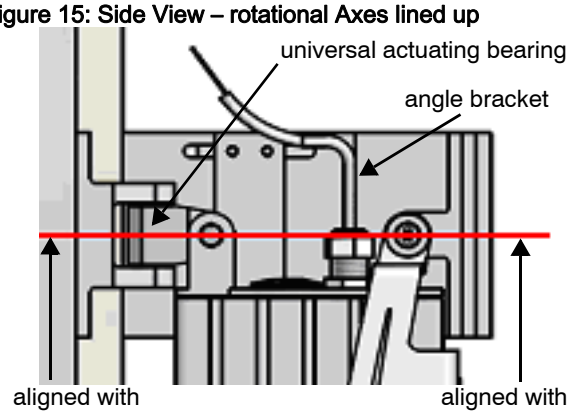
Before fastening the folding arm² to the blind frame, it is essential to drive the folding arm² back to the ‘CLOSED’ position.

ATTENTION

Ensure that the angle bracket and the ‘universal actuating bearing’ line up when the window is closed!

Mounting

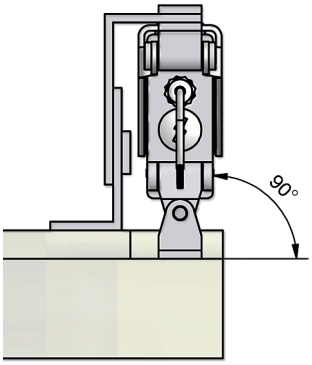
Figure 15: Side View – rotational Axes lined up



ATTENTION

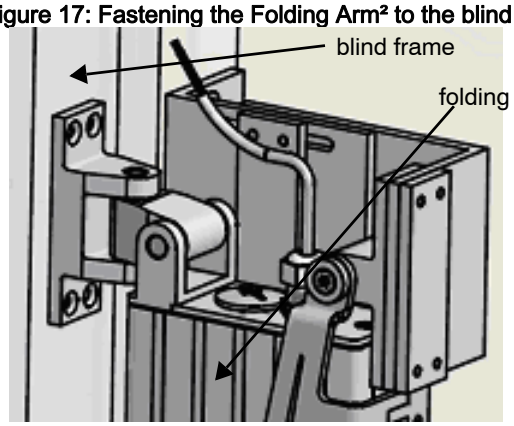
Note that the folding arm² is screwed at a right-angle to the blind frame.

Figure 16: Plan View – at a right-angle to the Frame



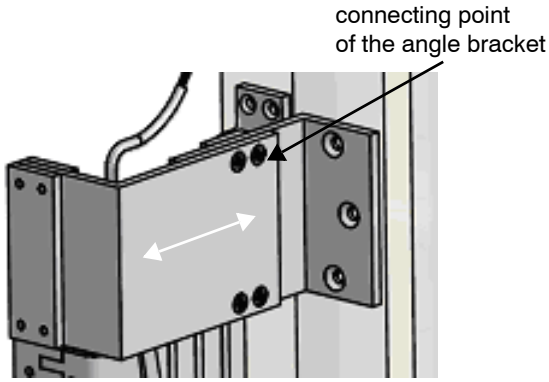
➢ Screw the folding arm² to the blind frame.

Figure 17: Fastening the Folding Arm² to the blind Frame



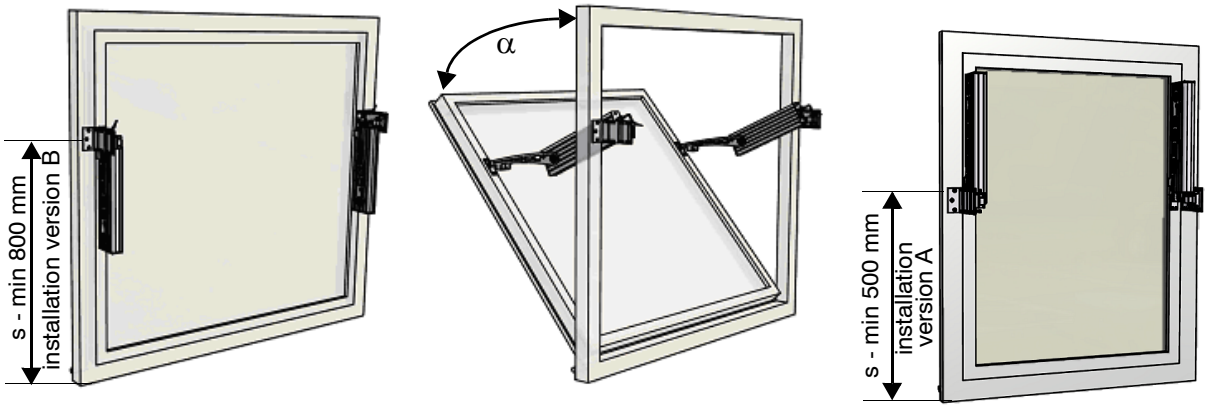
➢ Ensure the tight sealing of the window by adjusting the angle bracket, then tighten the sunk screws at the connecting point of the angle bracket to a torque of 5.5 Nm.

Figure 18: Adjustable angle Bracket

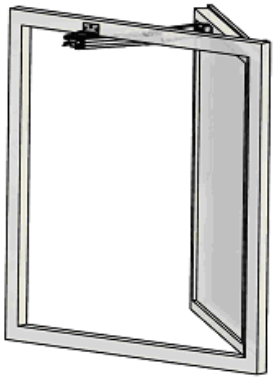


Mounting

5.1.3.b Outward Opening – Mounting on the secondary closing Edge



tandem application



solo application

Basically there are two version of installation:

- Version A (see Figure 19: “Installation Version A”)
- Version B (see Figure 22: “Installation Version B” on page 15)

The installation depends on the heigh of the window and the requested opening angle (see Figure 20: “Diagram of opening Angle installation Version A” on page 14 and Figure 23: “Diagram of opening Angle installation Version B” on page 15).

Figure 19: Installation Version A

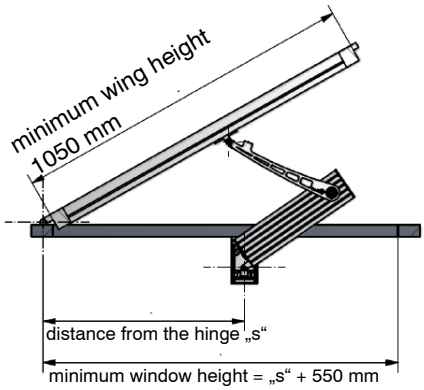
Mounting

ATTENTION

For prevention of sash damage you have to check the profile, glass thickness and installation location / direction of the folding arm². In case of doubt we always recommend a consultation with the technical sales of Simon RWA Systeme GmbH for considering a special application. We are happy to assist you in planning this issue.

Figure 20: Diagram of opening Angle installation Version A

Figure 21: Installation Version A – minimum Dimension



ATTENTION

Outwards opening windows with smaller sashes (≤ 900 mm) flush to the adjacent area of the frame can have a collision of folding arm² with the window frame (see Figure 22: “Installation Version B” on page 15). This is valid for the usage in the facade and also for the roof area.

Mounting

Figure 22: Installation Version B

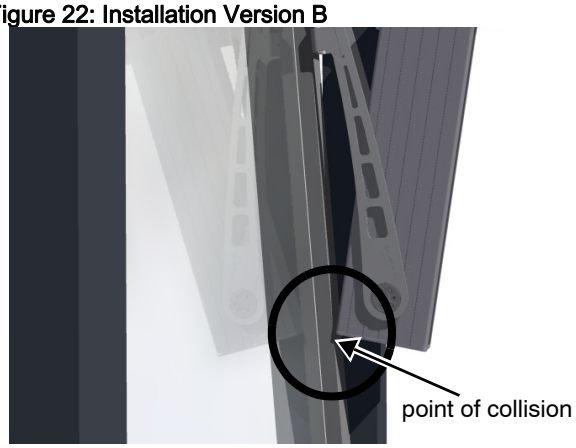
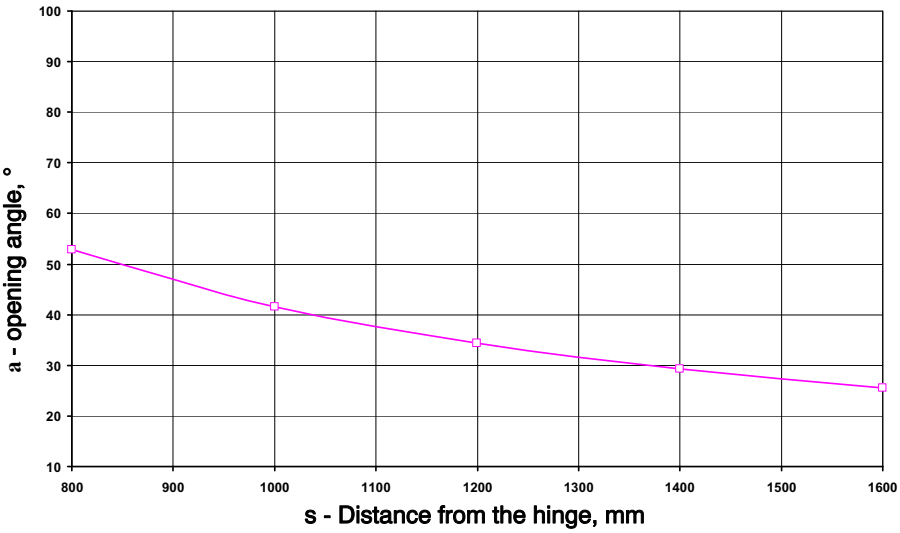


Figure 23: Diagram of opening Angle installation Version B

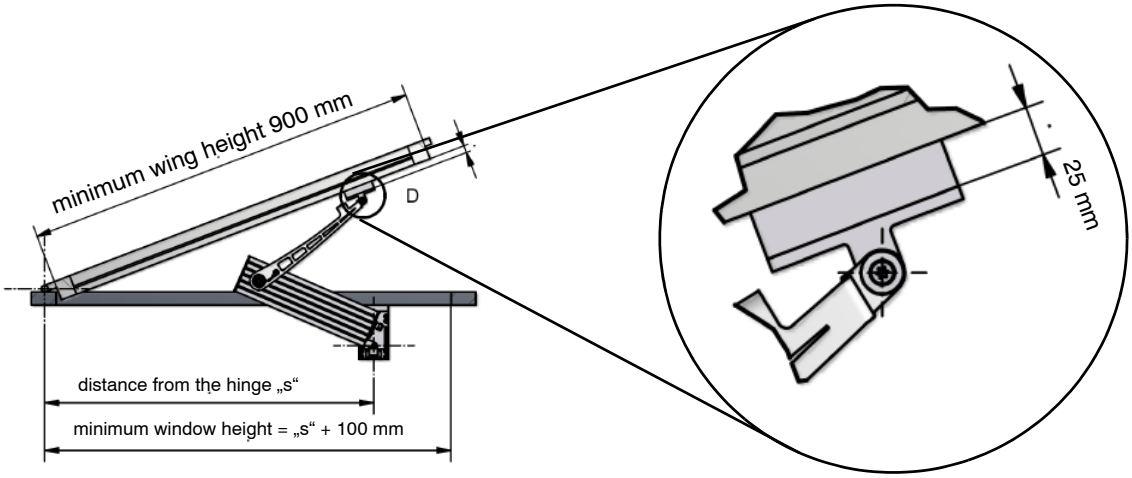


ATTENTION

Distance block necessary
Additional to the bracket K2 1612 consider distance block (Item number: K2 1617)!

Mounting

Figure 24: Installation Version B – minimum Dimension

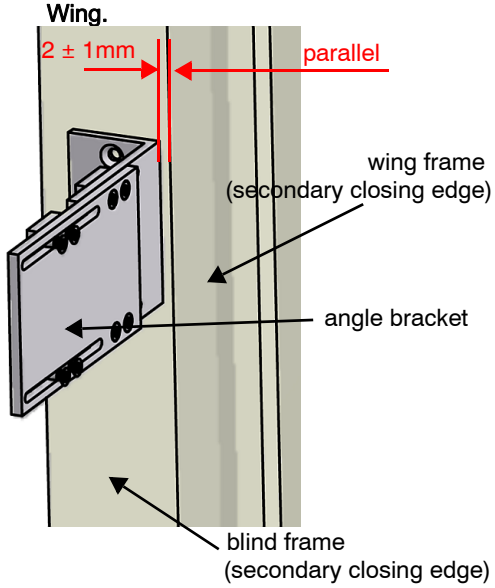


ATTENTION

Note that the angle bracket is fastened parallel to the secondary closing edge and must be mounted at a distance of 2 mm (± 1 mm) from the edge of the blind frame.

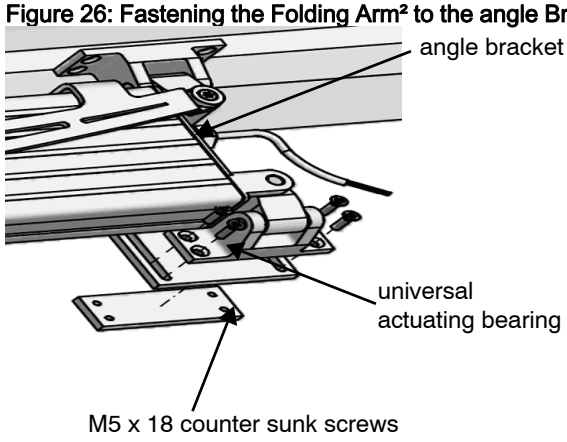
- Fasten the angle bracket to the blind frame using three suitable screws ø6 mm! The position depends on the desired opening angle and the weight of the window.

Figure 25: Positioning of the angle Bracket with closed Wing.



- Fasten the folding arm² to the angle bracket.
- Tighten the M5 x 18 counter sunk screws to a torque of 5.5 Nm.

Figure 26: Fastening the Folding Arm² to the angle Bracket

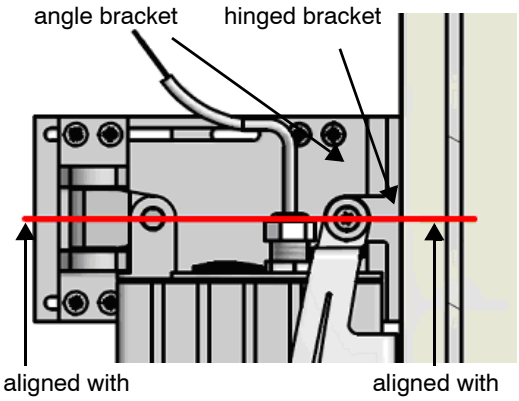


Mounting

ATTENTION

Ensure that the angle bracket and the hinged bracket line up when the window is closed!

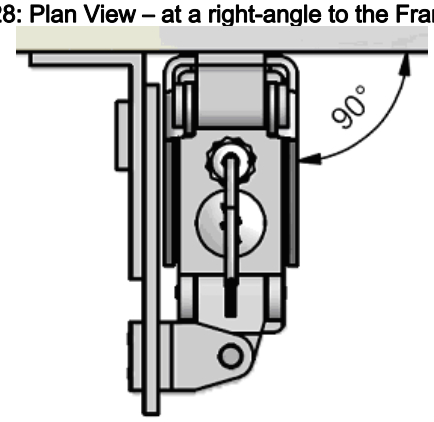
Figure 27: Side View – rotational Axes lined up



ATTENTION

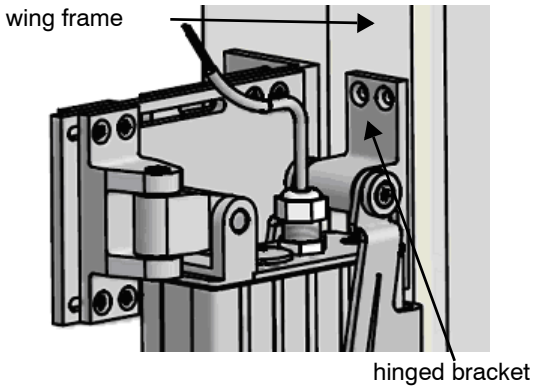
Note that the folding arm² is screwed at a right-angle to the wing frame.

Figure 28: Plan View – at a right-angle to the Frame



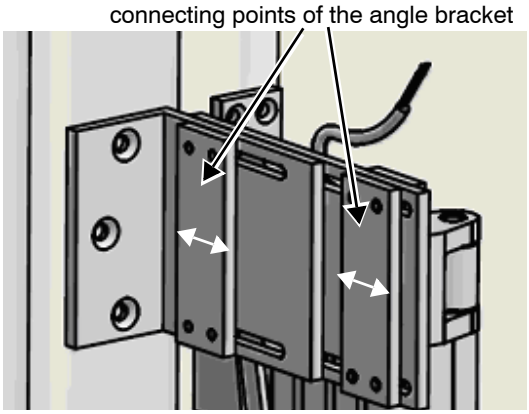
➢ Screw the hinged bracket to the wing frame.

Figure 29: Fastening the hinged Bracket to the Wing Frame



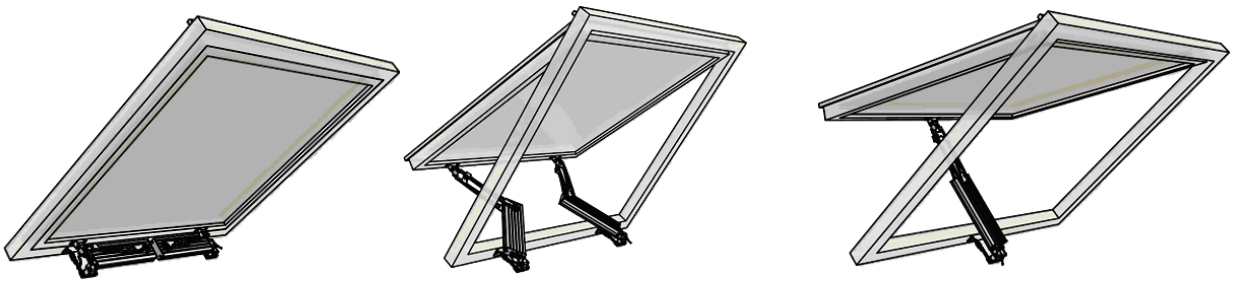
➢ Ensure the tight sealing of the window by adjusting the angle bracket, then tighten the sunk screws at the connecting point of the angle bracket to a torque of 5.5 Nm.

Figure 30: Adjustable angle Bracket



Mounting

5.1.3.c Outward Opening – Mounting on the main closing Edge



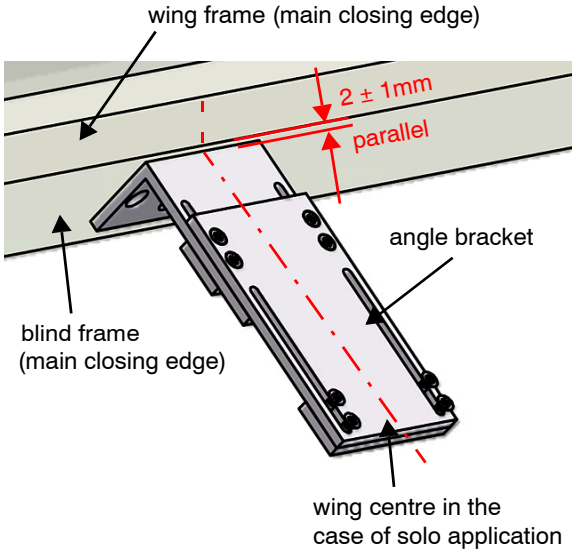
tandem application *solo application*

ATTENTION

Note that the angle bracket is fastened parallel to the main closing edge and must be mounted at a distance of 2 mm (± 1 mm) from the edge of the blind frame.

➢ Fasten the angle bracket to the blind frame using three suitable screws ø6 mm.

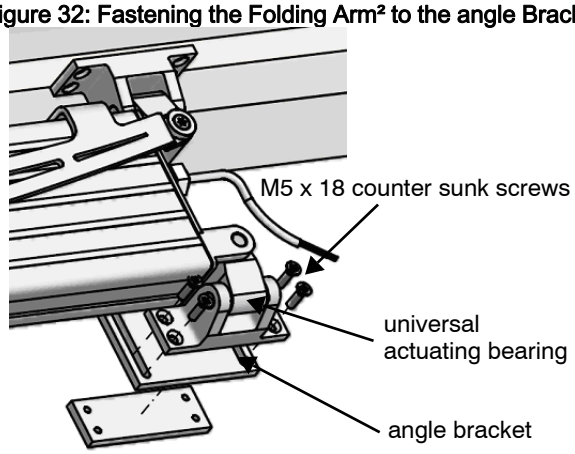
Figure 31: Positioning of the angle Bracket with closed Wing.



➢ Fasten the folding arm² to the angle bracket.

➢ Tighten the M5 x 18 counter sunk screws to a torque of 5.5 Nm.

Figure 32: Fastening the Folding Arm² to the angle Bracket

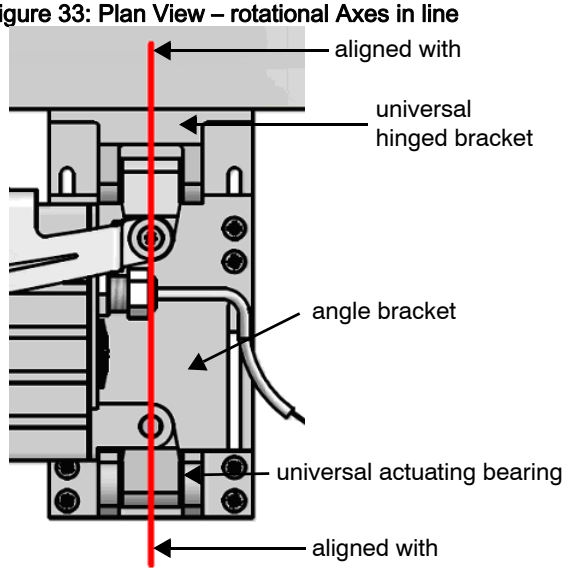


Mounting

ATTENTION

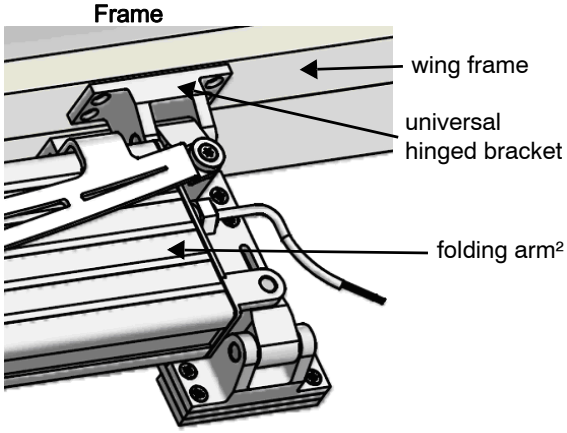
Ensure that the angle bracket and the universal hinged bracket line up when the window is closed!

Figure 33: Plan View – rotational Axes in line



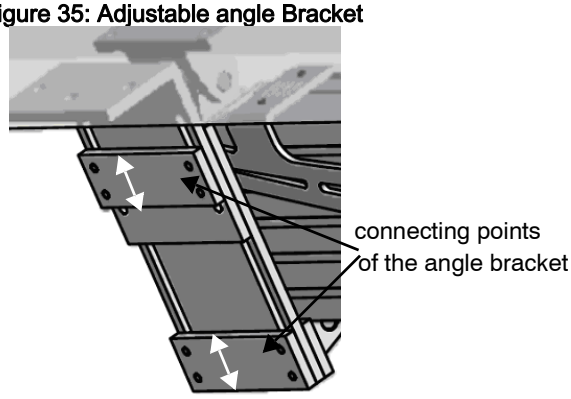
➢ Screw the 'universal hinged bracket' to the wing frame.

Figure 34: Fastening the hinged Bracket to the Wing Frame



➢ Ensure the tight sealing of the window by adjusting the angle bracket, then tighten the sunk screws at the connecting point of the angle bracket to a torque of 5.5 Nm.

Figure 35: Adjustable angle Bracket



➢ Finally, carry out a visual check.

Mounting

5.2 Electrical Connection

DANGER

Please check the complete system before connecting to the 24 V DC supply.

INFO

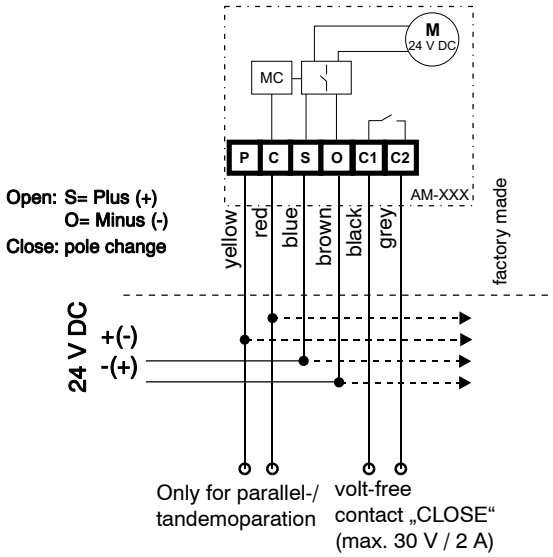
We recommend that a test run be carried out using a mobile power supply. This allows simple and fast reaction to malfunctions.

ATTENTION

Do not earth the electrical connection.
The actuator may only be run with 24 V DC protective low voltage!

➢ Connect cables in accordance with the connection diagram.

Figure 36: Connection Diagram



5.2.1 Feedback

Necessary, for example, for control purposes, running displays etc.

ATTENTION

Exclusively a stop command and a cut-off signal (e. g. overload cut-off) are relayed to the actuators connected in parallel. The cables or functions of the actuators connected in parallel are not monitored and therefore do not lead to the shutting down of the actuators connected in parallel.

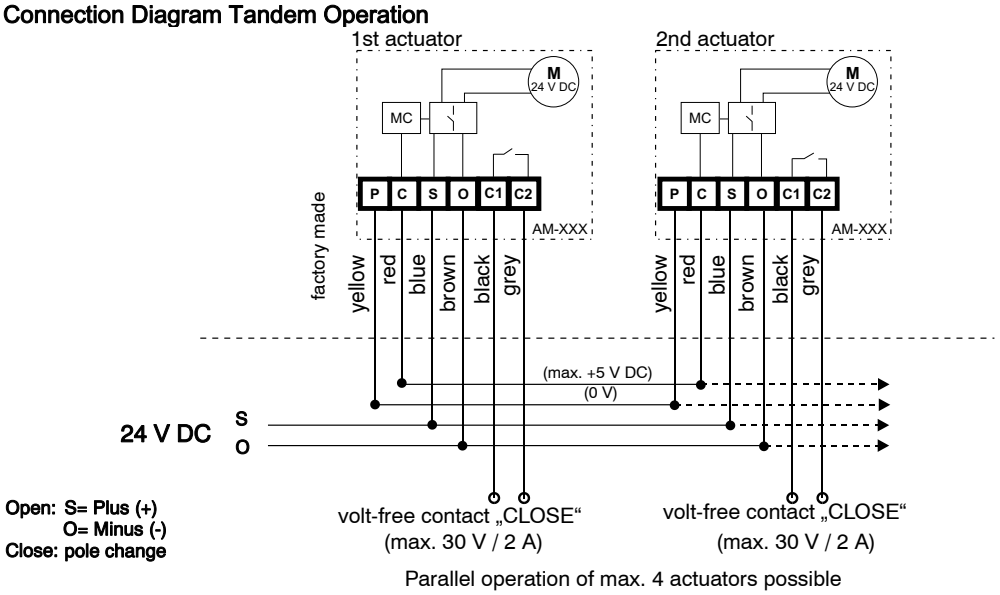
Commissioning

5.2.2 Parallel Connection (Tandem Operation)

ATTENTION

Actuators run at the same time. Power supply and cable dimension must be calculated according to total current consumption.

Figure 37: Connection Diagram Tandem Operation



Parallel operation of max. 4 actuators possible

6. Commissioning

DANGER

Following the installation it must be checked that the mechanism is correctly adjusted and that the safety system and the manual release, if installed, work correctly.

INFO

The power source must be appropriate for the actuator Both voltage and current must agree with the specifications on the type label. The specified voltage and current must also actually be made available on the connection cable. Voltage drops must be prevented by appropriate dimensioning of the supply cable.
Moreover, the regulations contained in the DIN VDE 0100 and DIN VDE 0298 standards apply.

ATTENTION

Before initial commissioning, the supply cabling must be checked. In particular, the cable cross section must be checked.

- Carry out the commissioning. Carry out a visual and functional check before switching the opening actuator on.
- If everything is in full working order, the actuator can be connected to the final power supply.

Care and Maintenance

DANGER

The testing of plants is to be carried out in accordance with the applicable national regulations (in Germany these include DIN VDE 0100 part 600). To this end, make all necessary preparations: e. g. establish a PE connection to the housing cover.

Note for fitters:

In accordance with Appendix III of the machine directive, the CE marking must be permanently affixed to the product and must be visible and legible.

(See 9.2 “EC manufacturer’s Declaration (Distributor)” on page 23.)

7. Care and Maintenance

ATTENTION

The customer is obliged to check the function of the actuator periodically. In case of any defects please inform the installer at once. Please change defect parts immediately with original spare parts. The opening actuator may be opened exclusively by the manufacturer.

DANGER

Smoke and heat exhaust vent systems serve the protection of human lives and must therefore be maintained regularly – at least once a year – by a specialised company authorised by the manufacturer. The maintenance work carried out is to be documented.

The maintenance must be performed according to a checklist to be procured from the manufacturer.

7.1 Environmental Notes

ENVIRONMENTAL NOTE

The opening actuators are recyclable and must not be disposed of in the residual waste. According to the disposal law “ElektroG”, this device must be disposed properly at the end of its life time. Please contact your waste disposal company if you have any questions.

7.2 Repair and Replacement

DANGER

The opening actuator must not be used if repair or adjustment work needs to be carried out. The system must be disconnected on all poles from the mains and emergency current supplies before performing cleaning or other maintenance work.

The opening actuator may be repaired only by the manufacturer. The opening actuator must be replaced in the case of a fault of defect.

7.3 Guarantee Conditions

The product must be used as normally intended. The product is subject to natural wear and tear. In case of material defect claims, these shall be asserted in writing, stating the source of supply of the device. The following applies with respect to the guarantee: “General conditions for the supply of products and services of the electrical and electronics industry (“Green delivery terms” – GL)”. These can be found at our homepage **www.simon-rwa.de**. We would be happy to send you a copy upon request.

Troubleshooting

8. Troubleshooting

Table 8: Overview of Faults

Malfunction	Possible causes	Failure correction
The actuator does not work.	- No mains voltage; - Connection cable defective; - Wind/rain detector has tripped.	- Check the fuse and the supply cable; - Check the connection cable; - Not a malfunction
The actuator runs in the wrong direction;	- Connecting terminals '+/- ' wrong way round; S = blue; O = brown	- Swap connecting terminals 'S' and 'O'.

9. Appendix

9.1 Manufacturer's Declaration

CE

We hereby declare the conformity of the product with the applicable guidelines. The declaration of conformity can be viewed in the company and will be delivered upon request. This declaration certifies conformity with the directives mentioned, but gives no guarantee of characteristics. This declaration becomes invalid following a change that has been made without our consent.

9.2 EC manufacturer's Declaration (Distributor)

The installer is responsible for the proper mounting or commissioning and the preparation of the declaration of conformity in accordance with the EU directives.

INFO

The installer is responsible for affixing the CE marking. The CE-marking is to be affixed in a visible place!

9.3 Company Addresses

9.3.1 Germany:

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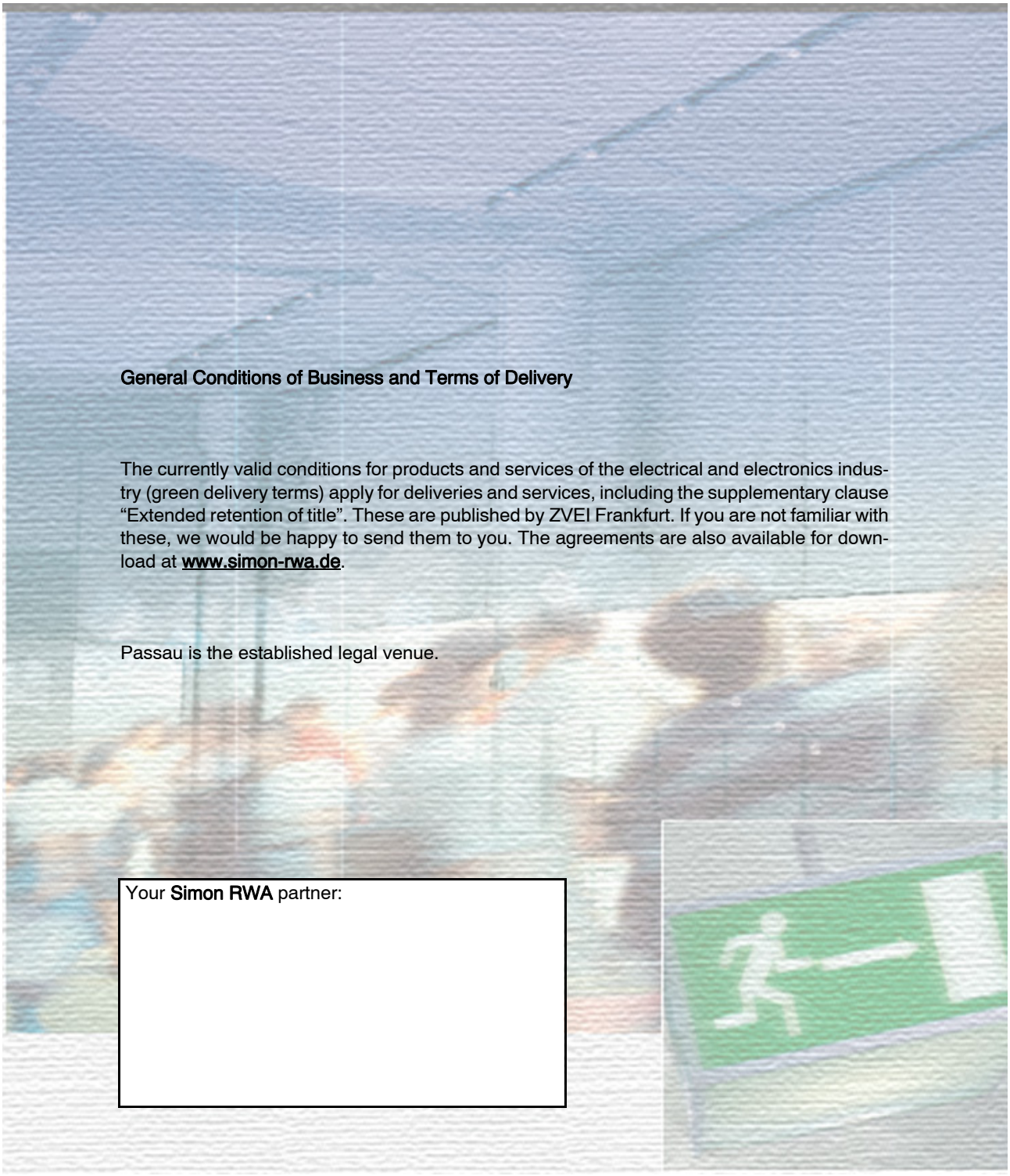
E-mail: info@simon-rwa.com

Operating Manual

Folding Arm²

SIMON RWA®
Begeisterung trifft Technik

BA_EA-KL2-xxx_EN_13



General Conditions of Business and Terms of Delivery

The currently valid conditions for products and services of the electrical and electronics industry (green delivery terms) apply for deliveries and services, including the supplementary clause “Extended retention of title”. These are published by ZVEI Frankfurt. If you are not familiar with these, we would be happy to send them to you. The agreements are also available for download at **www.simon-rwa.de**.

Passau is the established legal venue.

Your **Simon RWA** partner: