

Operating Manual

Linear Actuator

EA-L-500-1000/xxx EN 1.0

500 N:

- M2-1701 (S/T) (300 mm stroke)
- M2-1702 (S/T) (500 mm stroke)
- M2-1703 (S/T) (750 mm stroke)
- M2-1704 (S/T) (1.000 mm stroke)

750 N:

- M2-1743 (S/T) (300 mm stroke)
- M2-1744 (S/T) (500 mm stroke)
- M2-1745 (S/T) (750 mm stroke)
- M2-1746 (S/T) (1.000 mm stroke)

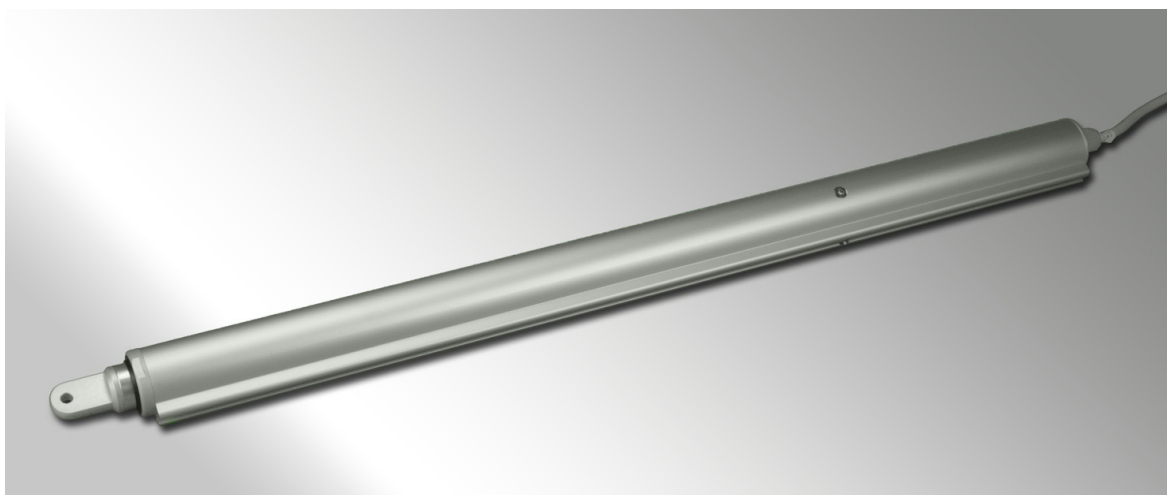
1.000 N:

- M2-1712 (S/T) (300 mm stroke)
- M2-1710 (S/T) (500 mm stroke)
- M2-1713 (S/T) (750 mm stroke)
- M2-1711 (S/T) (1.000 mm stroke)

This operating manual is only valid for actuators with the following endings of type numbers (see type label): -02, -T (tandem¹) and -S (synchro²).

Made by Simon RWA-Systeme GmbH GERMANY www.simon-rwa.de		CE
Linearantrieb/Linear actu	EA-L-1000/500-02	
F=1.000 N	s=500 mm	
U=24 Vdc	I=1,0 A (ED 30%)	
FA: 144840 IP 54	SN: 0919703412	

sample picture!



sample picture!

1. Actuator with cut-off communication.
2. Actuator with synchronous-speed control and cut-off communication (if one actuator stops in case of an overload cut-off the cut-off signal is transferred to the parallel connected actuators).

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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

This actuator offers a multitude of application options. In the range of standard actuators it is characterized by a couple of unique selling points which make application as easy as possible for you. Its special aluminium profile tube with integrated multifunctional nut enables a flexible bracket system and a hidden cable running. High temperature resistance and resistance under permanent load and further quality characteristics according to DIN EN 12101/2 are a matter of course.

General

2.5 Technical data

Table 1: Electrical characteristics

actuator type / version	EA-L-500/ EA-L-750/ EA-L-1000	EA-L-500/ EA-L-750/ EA-L-1000 Tandem	EA-L-500/ EA-L-750/ EA-L-1000 Synchro
Rated voltage:	24 V DC		
Permissible rated voltage range:	24 V DC -15%; +25%		
Ripple of rated voltage:	max. 500 mV		
Undervoltage detection:	No		
Rated current ¹ :	500 N: 0.95 A 750 N: 1.2 A 1,000 N: 0.95 A		500 N: 1.2 A 750 N: 1.4 A 1,000 N: 1.2 A
Maximum starting current in 'OPENING' and 'CLOSING' direction:	500 N: 1.14 A 750 N: 1.44 A 1,000 N: 1.14 A		500 N: 1.44 A 750 N: 1.68 A 1000 N: 1.44 A
Maximum cut-off current in 'OPENING' and 'CLOSING' direction:	500 N: 0.95 A 750 N: 1.2 A 1,000 N: 0.95 A		500 N: 1.2 A 750 N: 1.4 A 1,000 N: 1.2 A
Current consumption after cut-off (closed current):	65 mA		
Cut-off via:	built-in electronic overload cut-off		
Maximum number of actuator units connected in parallel ² :	---	4	
Cable length between two actuators in tandem or synchro mode:	---	max. 10 m	
Run-on time ³ :	---	500 ms	
Pulse time ⁴ :	---	300 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.

General

Table 2: Feedback contact

actuator type / version	EA-L-500/ EA-L-750/ EA-L-1000	EA-L-500/ EA-L-750/ EA-L-1000 Tandem	EA-L-500/ EA-L-750/ EA-L-1000 Synchro
Rated voltage:	max. 30 V DC		
Relay contact load:	1 A		



ATTENTION

The maximum contact load must not be exceeded.

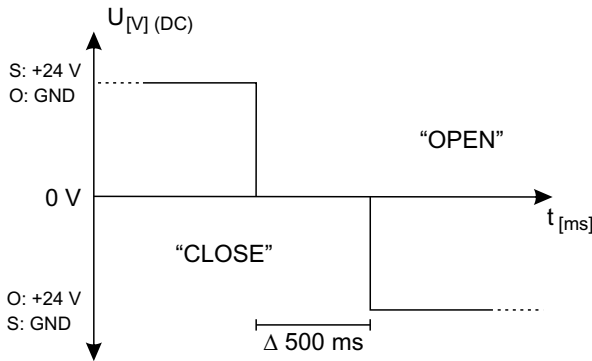
Table 3: Connection and operation

actuator type / version	EA-L-500/ EA-L-750/ EA-L-1000	EA-L-500/ EA-L-750/ EA-L-1000 Tandem	EA-L-500/ EA-L-750/ EA-L-1000 Synchro
Silicone connection cable:	3 x 0.75 mm ²	5 x 0.75 mm ²	
Connection cable length ¹ :	up to 600 mm stroke 2 m length, from 750 mm stroke 3.5 m length		
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 chapter 7. "Care and maintenance" on page 18.		

1. Optional lengths possible.
2. It is important that we have a zero-voltage part of minimum 500 ms (see Figure 1: "Zero-Voltage part by direction change" on page 6).
3. Measured at a distance of one metre under normal conditions.

General

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-L-500/ EA-L-750/ EA-L-1000	EA-L-500/ EA-L-750/ EA-L-1000 Tandem	EA-L-500/ EA-L-750/ EA-L-1000 Synchro
Rated operating temperature:	20 °C		
Permissible ambient temperature range:	from -5 to 75 °C		
Temperature stability (SHEV):	300 °C		
Ingress protection:	IP 54		
Rated operating temperature:	Central European environmental conditions ≤ 2,000 metres above sea level.		

Table 5: Approvals and certificates

actuator type / version	EA-L-500/ EA-L-750/ EA-L-1000	EA-L-500/ EA-L-750/ EA-L-1000 Tandem	EA-L-500/ EA-L-750/ EA-L-1000 Synchro
CE-compliant:	in accordance with EMC directive 2004/108/EC and the low-voltage directive 2006/95/EC		
Further approvals:	on request		

General

Table 6: Mechanical characteristics

actuator type / version	EA-L-500/ EA-L-750/ EA-L-1000	EA-L-500/ EA-L-750/ EA-L-1000 Tandem	EA-L-500/ EA-L-750/ EA-L-1000 Synchro
Maximum push force:	500 N/ 750 N/ 1,000 N		
Maximum pull force ¹ :	500 N/ 750 N/ 1,000 N		
Condition of loading:	Opening against nominal load Closing with nominal load support		
Nominal locking force:	600 N/ 900 N/ 1,200 N in 'OPENING' and 'CLOSING' direction		
Nominal stroke ² :	200 mm/ 300 mm/ 500 mm/ 600 mm/ 750 mm/ 1,000 mm		
Stroke speed with nominal load ³ :	500 N: 8.0 mm/s to 8.4 mm/s 750 N: 7.2 mm/s to 7.6 mm/s 1,000 N: 4.6 mm/s to 5.0 mm/s		500 N: 7.4 mm/s 750 N: 6.4 mm/s 1,000 N: 4.2 mm/s
Stroke speed with a part load ⁴ :	500 N: 8.9 mm/s to 9.3 mm/s 750 N: 7.6 mm/s to 7.9 mm/s 1,000 N: 4.8 mm/s to 5.2 mm/s		500 N: 7.4 mm/s 750 N: 6.4 mm/s 1,000 N: 4.2 mm/s
Material surface:	Alu E6/EV1 Finishing ⁵ in any standard RAL and DB colour available on request.		
Dimensions (L x W x H) ⁶ :	200 mm stroke: 563 x 36 x 42 mm/ 300 mm stroke: 663 x 36 x 42 mm/ 500 mm stroke: 863 x 36 x 42 mm/ 600 mm stroke: 963 x 36 x 42 mm/ 750 mm stroke: 1,113 x 36 x 42 mm/ 1,000 mm stroke: 1,363 x 36 x 42 mm		
Weight:	1.45 kg/ 1.7 kg/ 2.2 kg/ 2.4 kg/ 2.85 kg/ 3.55 kg		

1. Other values are possible as options.
2. The nominal stroke can deviate by $\pm 3\%$, but not more than 20 mm, due to mechanical damping and tolerances.
3. In relation to a stroke of 500 mm; tolerance $\pm 10\%$.
4. In relation to a stroke of 500 mm with part load; tolerance $\pm 10\%$.
5. Attention: nuts, bolts, washers, sliders and similar individual parts are not coated.
6. Given until the end of cable fitting: 342 mm (motor, ...) + stroke + 21 mm (cable fitting).

Table 7: Accessories

actuator type / version	EA-L-500/ EA-L-750/ EA-L-1000	EA-L-500/ EA-L-750/ EA-L-1000 Tandem	EA-L-500/ EA-L-750/ EA-L-1000 Synchro
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: Linear actuator



Figure 3: Upper bracket OK (K2 1501)



winding left
(standard)

winding right

Figure 4: Upper bracket OK-1500 (K2 1501 B)

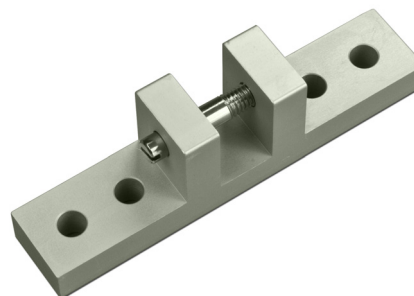
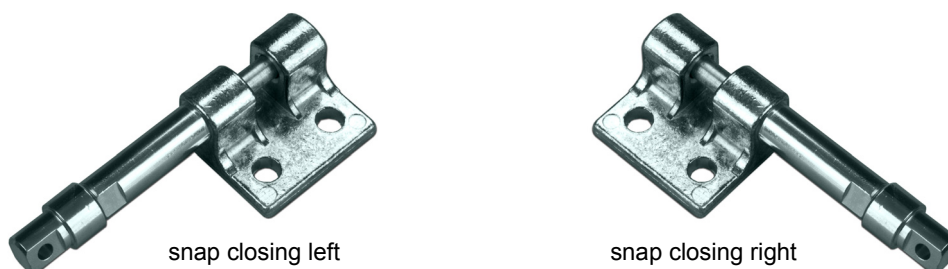


Figure 5: Upper bracket DAS with snap closing (K2 1502)



snap closing left

snap closing right

Figures

Figure 6: Mounting bracket HK-L (K2 1539)



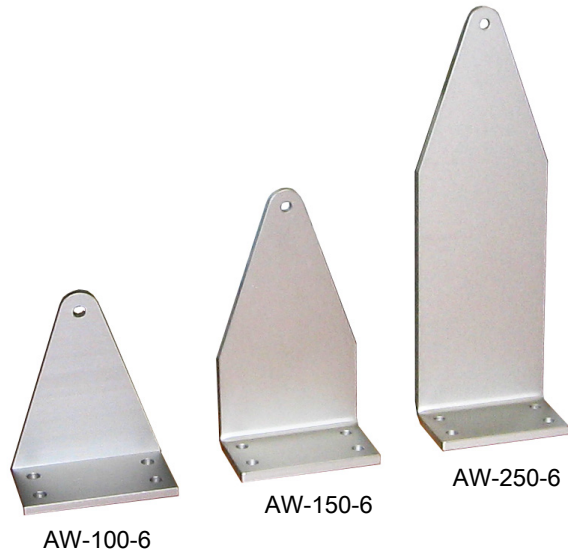
Figure 7: Mounting bracket UK-L (K2 1562)



Figure 8: Mounting bracket UK-L1B (K2 1560 A)



Figure 9: Angle brackets AW-100-6 (K2 1506), AW-150-6 (K2 1507 A) and AW-250-6 (K2 1519 A)



Mounting

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

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

The exact position of the actuator at the rear / bottom bracket can always be re-adjusted by unscrewing of the studs.



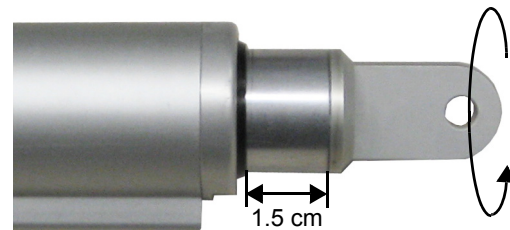
ATTENTION

Consider the static properties of the frame for the installation of the drive.

Use appropriate fastenings depending on the material of the window onto which the actuator is mounted. Fastenings are not included.

- To achieve a good sealing of buildings cover turn the eye bolt anti-clockwise until the pushing tube is extended about 1.5 cm before installing the actuator.

Figure 10



Depending on the mounting position and shape of the window or buildings cover you need different combinations of mounting brackets, the brackets (see page 9 and page 10) must be ordered separately.

Mounting

5.1.1 Top hung outward opening window, mounting on the main closing edge

Figure 11

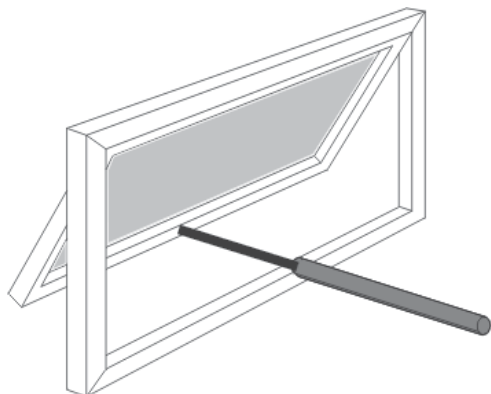


Figure 12: Top hung window with thick reveal

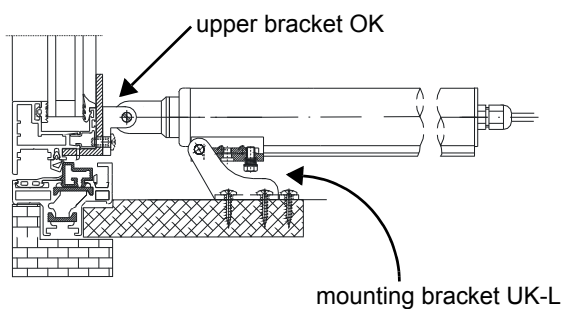


Figure 13: Flush top hung window

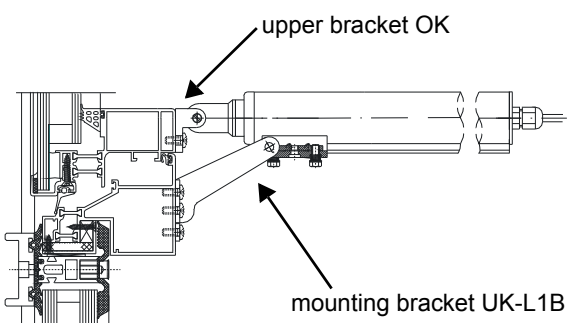
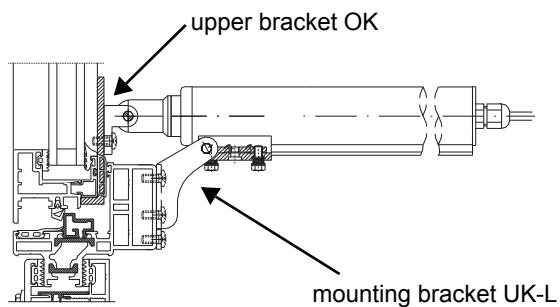


Figure 14: Top hung window in post-and-beam construction



5.1.2 Bottom hung inward opening window, mounting on the secondary closing edge

Figure 15

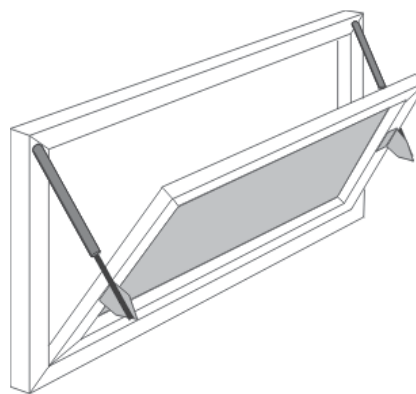
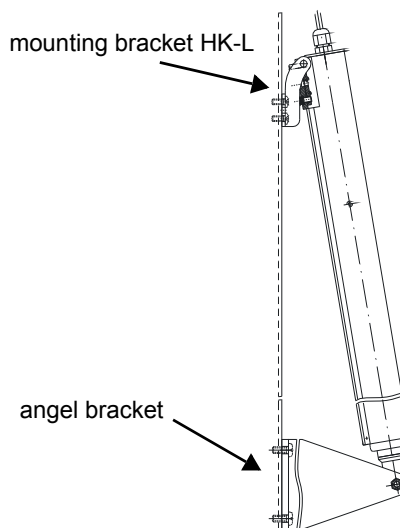


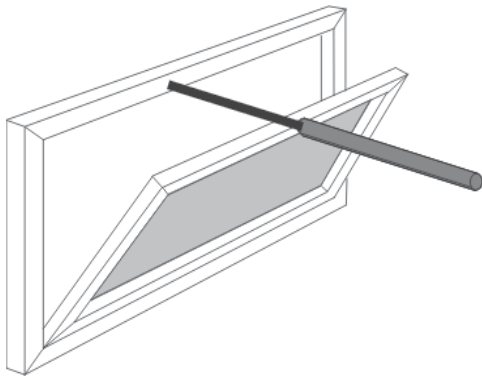
Figure 16



Mounting

5.1.3 Bottom hung inward opening window, mounting on the main closing edge on the wing

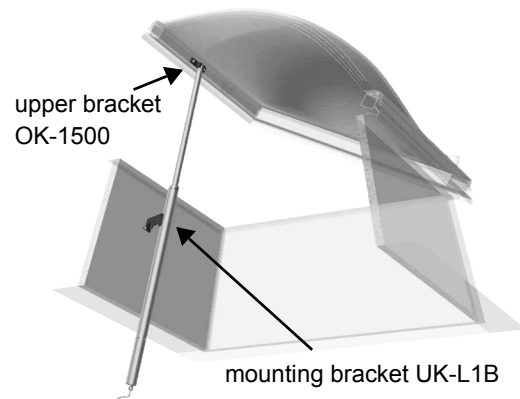
Figure 17



5.1.4 Roof dome

Depending on the type and form of the roof dome you may need a mounting angle for fixing of the mounting bracket, the mounting angel is not included in the delivery.

Figure 18: Roof dome (view from the inside)



- Finally, carry out a visual check.

Mounting

5.2 Electrical connection



ATTENTION

Make sure that the loops in the supply cable near moving parts are sufficiently large to prevent the connecting cable from becoming trapped or being torn away.



INFO

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



DANGER

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



ATTENTION

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

Do not earth "F" nor loop it.

Insulate any unused wires.

Do not connect red and yellow wires of actuators.



ATTENTION

In SHEV systems (controllers) never connect the "F" contact to the "G" terminal on the controller.

The dimension of power supply has to be suitable for this actuator. Both voltage and current must agree with the specifications on the type label. Check the power cables before starting for the first time, particularly noting the wire cross-section. Comply with the relevant directives with respect to minimum values for lead dimensioning. Typical calculation (these are only approximate values and this is not an accurate calculation):

$$\text{wire cross-section [mm}^2\text{]} := 0.019 \times \text{number of motors} \times \text{current consumption per motor [A]} \times \text{length of wire [m]}$$

5.2.1 Feedback signal

Required e. g. for control purposes, running displays etc. After switching off the actuator the integrated control electronics switch the respectively positive or negative operating voltage from "S" to the feedback contact "F" (black wire). Sequence signal (e. g. feedback) via "F" contact. Depending on the application insulate the feedback contact "F"!

5.2.2 Tandem port

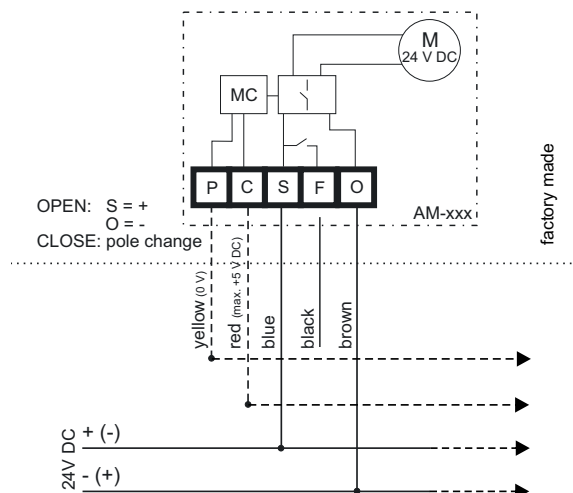


ATTENTION

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.

5.2.3 Single connection

- Connect leads according to wiring diagram (the wire colours are only valid for SIMON actuators with factory-fitted connection cables). Insulate any unused wires!



Mounting

5.2.4 Parallel connection



ATTENTION

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

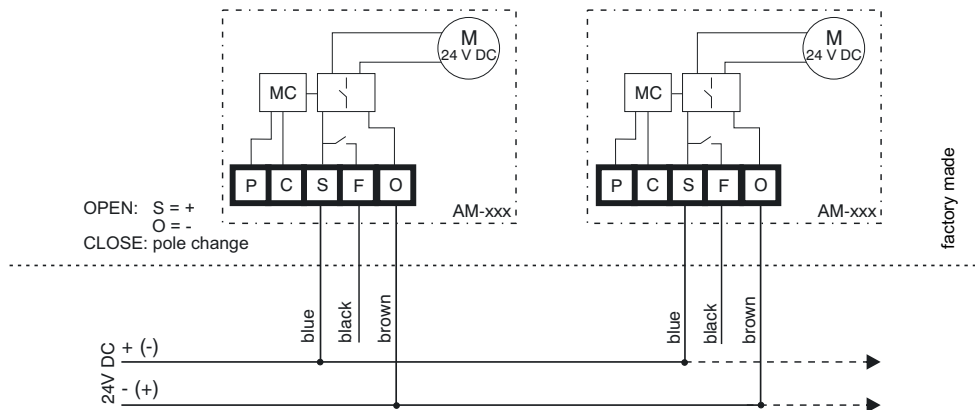
Depending on the application insulate the feedback contact "F"!



ATTENTION

In the case that two or more actuators are mounted on the same window or building covering to avoid damage of the window or building covering please use actuators with tandem- or synchro-function (see 5.2.5 "Parallel connection (tandem- or synchro-operation)" on page 16)!

- Connect leads according to wiring diagram (the wire colours are only valid for SIMON actuators with factory-fitted connection cables).



Mounting

5.2.5 Parallel connection (tandem- or synchro-operation)

You can connect maximum four actuators in parallel-/synchro-operation (e. g. on huge window frames). If one actuator stops in case of an overload cut-off the cut-off signal is transferred to the parallel connected actuators, which will stop after a scheduled time (see Table 1: "Electrical characteristics" on page 4). Therefore the damage of the window should be avoid.



ATTENTION

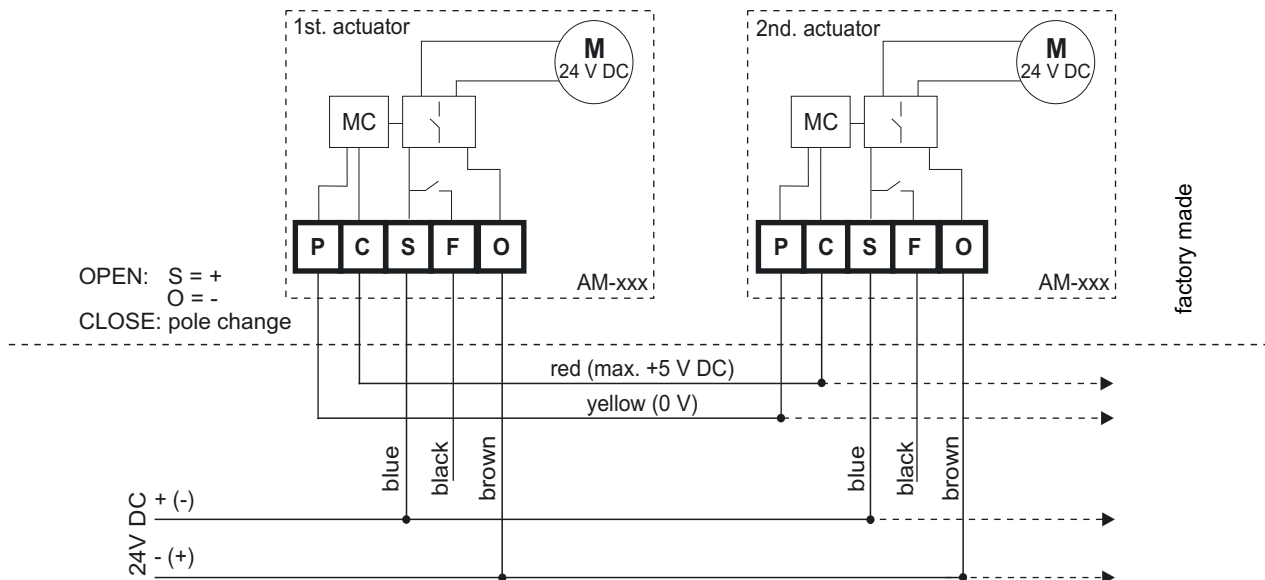
Actuators run at the same time. Power supply and cable dimension must be calculated according to total current consumption.



ATTENTION

Connect maximum four actuators in parallel- or synchro-operation.

- Connect leads according to wiring diagram (the wire colours are only valid for SIMON actuators with factory-fitted connection cables).



ATTENTION

After switching off the actuator the integrated control electronics switch the respectively positive or negative operating voltage from "S" to the feedback contact "F" (black wire). Sequence signal (e. g. feedback) via "F" contact.

Insulate any unused wires!

The red and yellow wires are connected correspondingly red to red and yellow to yellow in the case of parallel connected actuators (maximum four). Do not connect red and yellow wires of actuators.

Commissioning

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.



DANGERR

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 19.)

Care and maintenance

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 note



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

Tabelle 8: Overview of faults

Malfuction	Possible causes	Failure correction
The actuator is not working.	<ul style="list-style-type: none">- Missing power supply actuation, or SHEV main board- Connection cable defective- Wind/rain detector has tripped.	<ul style="list-style-type: none">- Check the fuse and the supply cable- Check the connection cable- No fault, if necessary detach WTS to locate error.
Incorrect travel direction of actuator.	<ul style="list-style-type: none">- Connecting terminals "+ / -" changed S = blue; O = brown	<ul style="list-style-type: none">- Reverse polarity of connection terminals "S" and "O"

9. Appendix

9.1 Manufacturer's declaration



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

Simon RWA[®] Systeme GmbH
Medienstr. 8
D – 94036 Passau
Tel: +49 (0)851 98870 - 0
Fax: +49 (0)851 98870-70
E-mail: info@simon-rwa.de
Internet: www.simon-rwa.de

9.3.2 Switzerland

Simon RWA[®] Systeme AG
Allmendstrasse 8
CH – 8320 Fehraltorf
Tel: +41 (0)44 956 50 30
Fax: +41 (0)44 956 50 40
E-mail: info@simon-rwa.ch
Internet: www.simon-rwa.ch

9.3.3 Hungary

Simon RWA[®] Systeme Kft.
Vezér utca 147 / D, 3rd Floor, No. 17
H – 1149 Budapest
Tel: +36 (0)44 822 12 52
Fax: +36 (0)44 822 12 03
E-mail: info@simon-rwa.com

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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: