Operating Manual

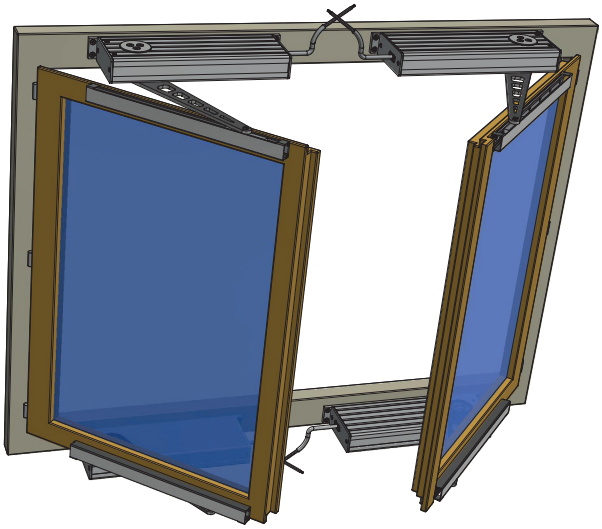
Rotary wing actuator EA-KL²-DF(-K)

SIMON
we create fire safety

EA-KL²-DF / EA-KL²-DF-K

For further information please visit our product website:

short.simon-protec.com/eakl2dfen



SIMON LINK® | 24 VDC | DIN EN 12101-2

Only valid in combination with the attached sheet "Safety instructions and warranty conditions"!

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Table of contents

1. Preface

1.1. Foreword to this manual

This manual is intended for professional operation, installation and maintenance by trained, knowledgeable and qualified personnel (such as mechatronics engineer or electrician) and / or qualified personnel who know how to install electrical equipment.

Read these operating instructions carefully and pay particular attention to the hazard warnings. Keep these operating instructions for later use / maintenance. Please pay close attention to the pin assignment, the minimum and maximum performance data (see “Technical data”) and the installation instructions. Incorrect use or improper operation / assembly can cause the loss of system functions and cause damage to property and/or persons.

The following symbols can be found in this manual:

INFORMATION

An information text gives you additional hints!

ATTENTION

This warning alerts you to potential hazards that may impact the product!

DANGER

This warning alerts you to potential dangers to your life or health!

ENVIRONMENTAL NOTE

This note alerts you to possible environmental hazards!

➢ Instructions for action are marked in this way.

➘ Conclusions are presented in this way.

- **Buttons** or **switches** to be pressed / activated are shown in **bold**.
- “Indicators” are put in quotation marks.

1.2. Use for the intended purpose

Opening actuators are used for power-operated opening and closing of building covers, which are installed in walls or in roofs and used for ventilation of rooms or for the discharge of fire smoke. The opening actuator must be extended by any protective measures in accordance with the risk assessment to be carried out.

1.3. Safety instructions

See the attached sheet “Safety instructions and warranty conditions”!

DANGER

Mounting shall be carried out only by professional personnel (electrically skilled person)! All relevant national safety regulations and rules apply to mounting, installation and commissioning.

Incorrect installation causes the danger of electric shock. Be sure to follow the valid safety rules!
Pay attention to the valid installation regulations. Incorrect installation can lead to serious injuries.

1.3.1. Mechanical connection

ATTENTION

When installing the actuator, observe the static properties of the window frame. Depending on the material of the window on which the actuator is to be mounted, use suitable fastening material (not included).

1.3.2. Electrical connection

DANGER

Only connect to the power supply (24 V DC) after checking the entire system.

INFORMATION

We recommend a trial operation with a suitable mobile power supply (including control unit, no battery alone). This allows a simple and fast reaction to malfunctions.

ATTENTION

Make sure that the loops of the supply line, taking into account the bending radii, are sufficiently dimensioned on moving parts, in order to prevent a clamping or breaking of the connection cable.

ATTENTION

Do not earth the electrical connection.

The actuator may only be run with 24 V DC protective low voltage!

Insulate all unused wires.

1.3.3. Risk analysis

INFORMATION

According to the application, carry out a risk analysis (e. g. of the assembled system).

Notes on risk analysis and assembly can be found in the leaflet in the guidance sheet KB.01 ‘Power operated Windows’:

www.eurowindoor.eu/news-and-proceeding/position-papers-and-publications/.

1.4. Figures / delivery

Figure 1: Folding Arm² rotary wing – EA-KL²-DF

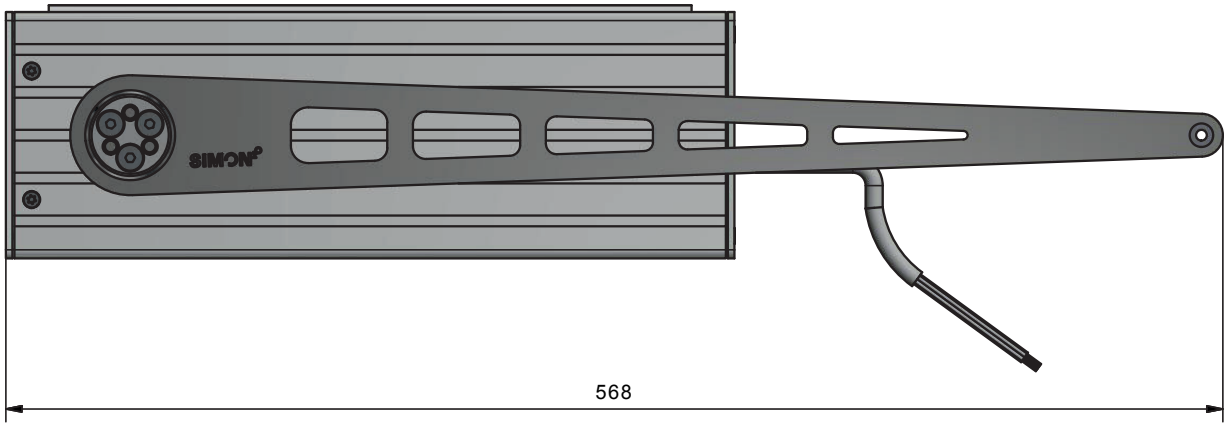


Figure 2: Folding Arm² rotary wing short – EA-KL²-DF-K

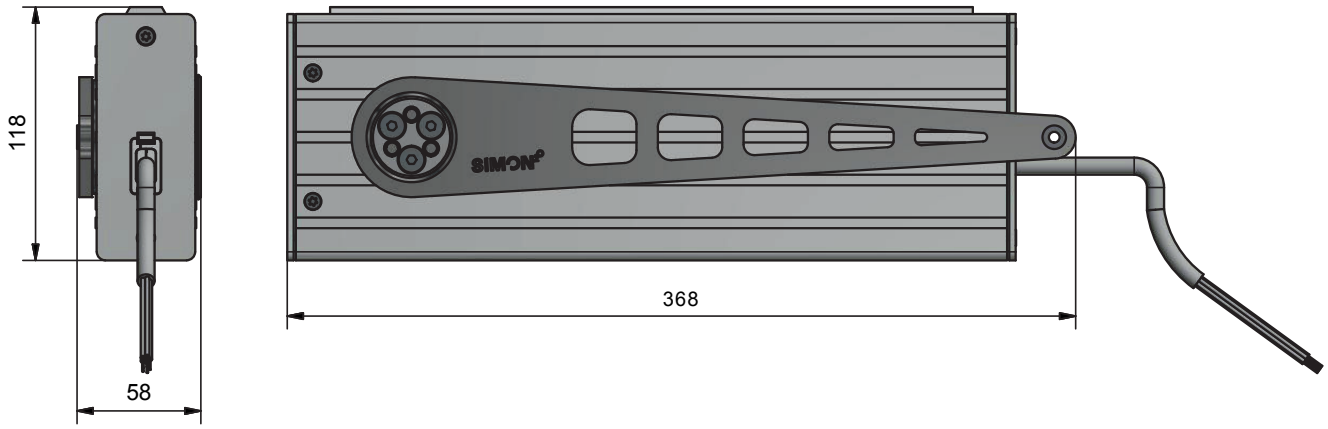
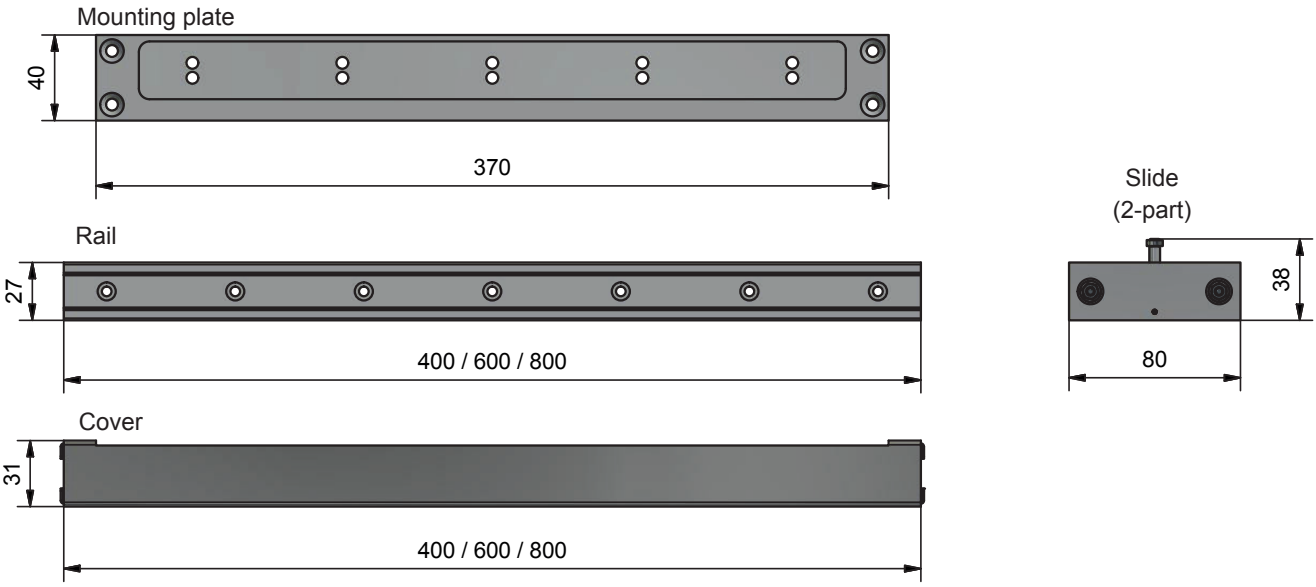


Figure 3: Mounting plate, rail, slide and cover



1.5. SIMON LINK

INFORMATION

To parametrise via SIMON LINK, you need a USB service cable and the associated software (version 2.0 or higher).

More information under:

short.simon-protec.com/slen

The actuator has a parametrisation port on which via SIMON LINK

- the opening width can be electronically limited,
- the direction of movement can be changed,
- the forces in “OPEN” and “CLOSE” directions can be set,
- a start-up delay can be set in “OPEN” and / or “CLOSE”,
- the dry contact can be set,
- a detailed status message of the actuator can be read out.

To connect the actuator with SIMON LINK, it must be supplied with 24 V DC continuously and switched off in end position “OPEN” or in the desired position. If the actuator is to be read out and parametrised unmounted in the preparation phase via SIMON LINK, proceed as follows:

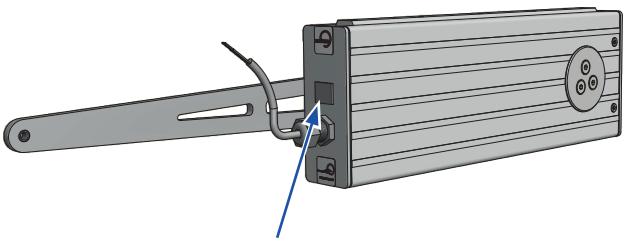
➢ Supply the actuator with voltage according to the electrical connection for SINGLE operation (see chapter 2.2: “SINGLE connection” on page 7) to “blue” (S) and “brown” (O) and connect the wires “red” and “yellow” for a short time.

↘ The actuator stops after two seconds.

➢ Now you can read out and parametrise the actuator with SIMON LINK.

➢ If the desired direction of rotation is already known, it can also be adjusted before installation (see chapter 3.5.1: “Adjust the direction of rotation” on page 11).

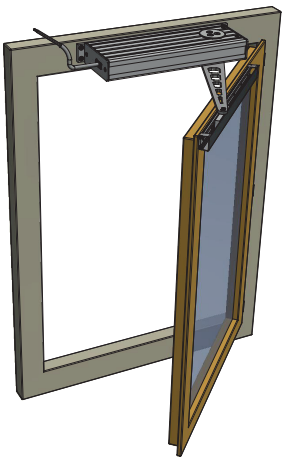
Figure 4: Parametrisation port for SIMON LINK



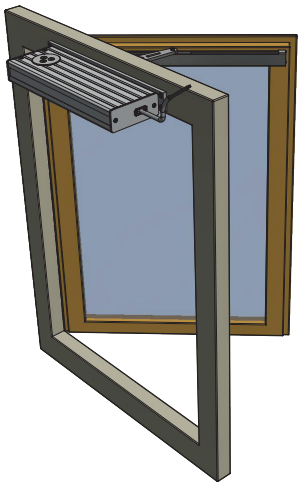
1.6. Assembly situations

Figure 5: Direction of rotation STANDARD

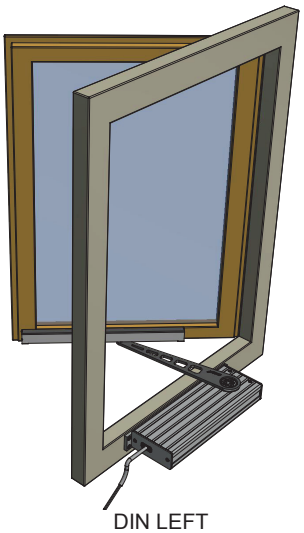
DIN LEFT
INSIDE opening
Actuator BOTTOM
Fastening strip STANDARD



DIN RIGHT
INSIDE opening
Actuator ON TOP
Fastening strip STANDARD



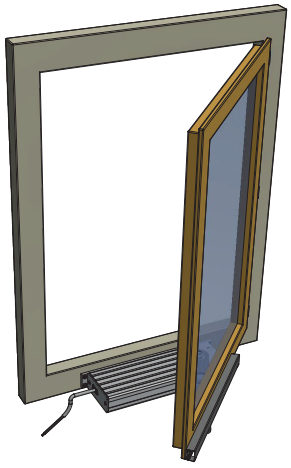
DIN RIGHT
OUTSIDE opening
Actuator ON TOP
Fastening strip ALTERNATIVE



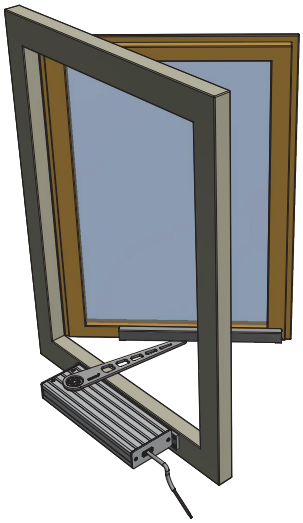
DIN LEFT
OUTSIDE opening
Actuator BOTTOM
Fastening strip ALTERNATIVE

Figure 6: Direction of rotation INVERSE

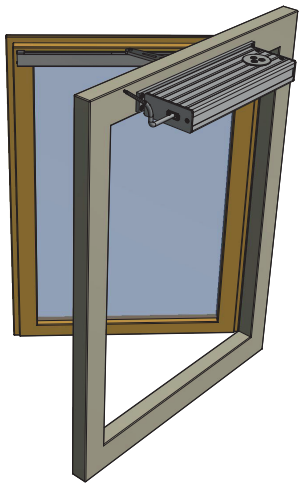
DIN LEFT
INSIDE opening
Actuator ON TOP
Fastening strip ALTERNATIVE



DIN RIGHT
INSIDE opening
Actuator BOTTOM
Fastening strip ALTERNATIVE



DIN RIGHT
OUTSIDE opening
Actuator BOTTOM
Fastening strip STANDARD



DIN LEFT
OUTSIDE opening
Actuator ON TOP
Fastening strip STANDARD

2. Electrical connection

2.1. Supply

The dimension of the power supply has to be suitable for this actuator. Both voltage and current must fit the specifications on the type label. Check the power supply before starting for the first time, particularly noting the right 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):

INFORMATION

Motor cable – notes on dimensioning (rule of thumbs):

wire cross-section [mm²] = single wire length [m]
x number of actuators
x power consumption per actuator [A]
/ 73.

The national regulations are valid.

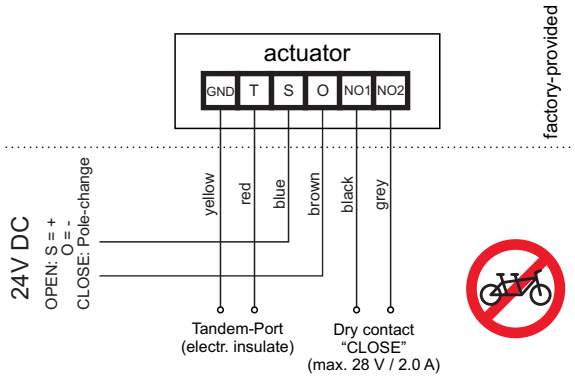
2.2. SINGLE connection

ATTENTION

When not in use, the wires “red” and “yellow” must be electrically insulated.

The wires “red” and “yellow” may only be connected together for a RESET of the actuator.

➢ Connect wires according to connection diagram.

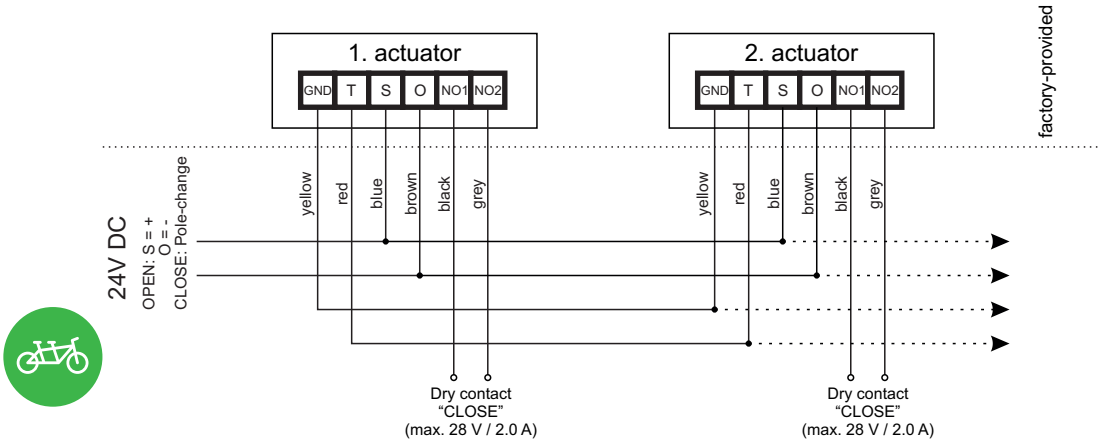


2.3. TANDEM operation

ATTENTION

Only for actuators mounted together on the same wing.

➢ Connect wires according to connection diagram.



2.4. TANDEM-Port

ATTENTION

Only a cut-off signal (e.g. overload cut-off) is forwarded to the actuators connected in parallel. A line or function monitoring of the actuators connected in parallel is not carried out and thus does not lead to switching off the parallel connected actuators.

2.5. Feedback – dry contact

The normally open contact (NO1, NO2) is switched when the actuator is switched off in end position, the message depends on the stroke and can be evaluated as “CLOSE / OPEN message”. By default, the dry contact is set to “CLOSE”. This signal contact is only active when the actuator is powered. It is not a real end switch.

INFORMATION

The switching position (OPEN / CLOSE) of the contact can be parametrised via SIMON LINK.

3. Mounting

ATTENTION

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

3.1. SINGLE installation

Figure 7: Installation sequence SINGLE installation

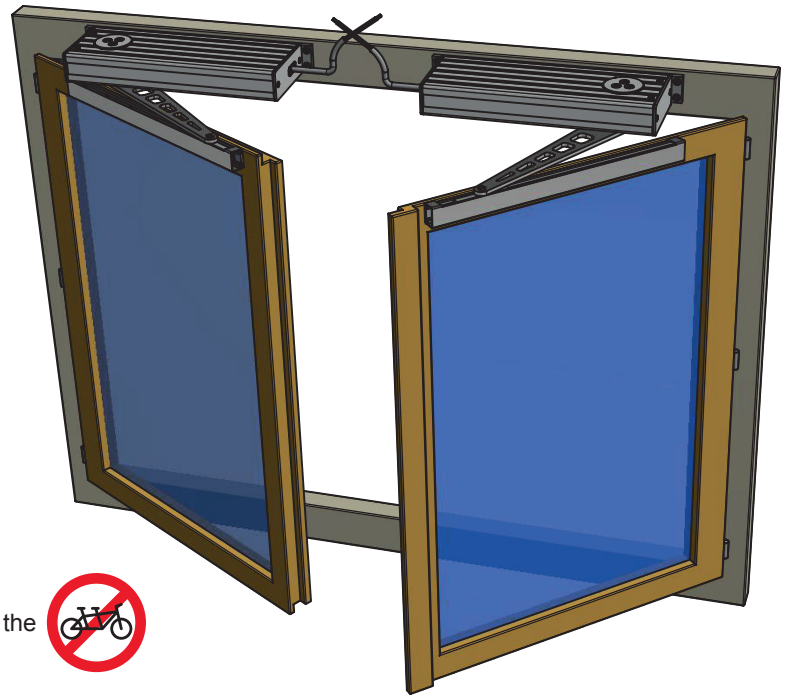
1. Determine **mounting position**
2. **Prepare actuator**
   - direction of rotation
   - fastening strip
3. Mount **rail**
4. Install **mounting plate** and **actuator**
5. Mount **slide**
6. Perform RESET-run & test run
7. Mount **cover**

3.2. TANDEM installation

Figure 8: Installation sequence TANDEM installation

- Install **first actuator** such as **SINGLE** installation (**do not mount the cover yet**)
- **Open slightly the first actuator** and disconnect slide and actuator
- Install **second actuator** such as **SINGLE** installation
- Move the second actuator to approximately the same position as the first.
- Mount the **first slide** again
- Close **both actuators**
- Connect **TANDEM LINE** & carry out a **test run**
- Mount **covers**

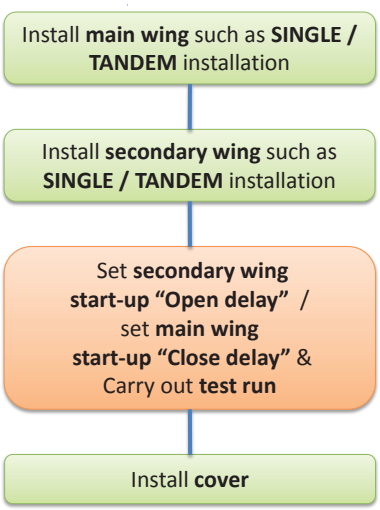
3.3. Second sash installation



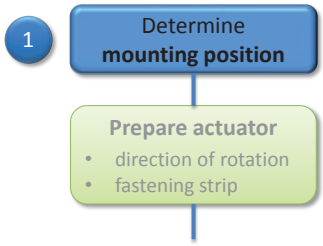
INFORMATION

For mounting on a second sash, start-up delays must be set in all actuators via SIMON LINK.

Figure 9: Installation sequence SECOND SASH installation



3.4. Determine mounting position



INFORMATION

Due to different protrusions of the sash to the frame, small deviations may occur. The following figures are exemplary.

The maximum possible sash dimensions depend on several parameters and must be defined before installation of the actuator in case of doubt. External influencing factors, such as wind loads and sash weight, may play a significant role in this case.

Figure 10: EA-KL²-DF — opening inward

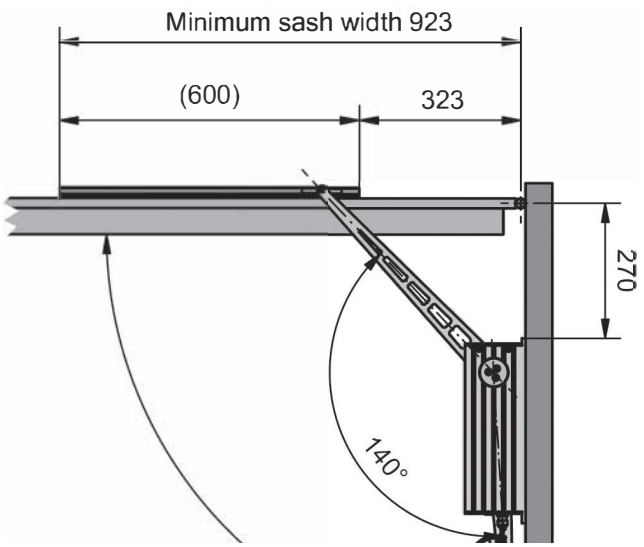


Figure 11: EA-KL²-DF-K — opening inward

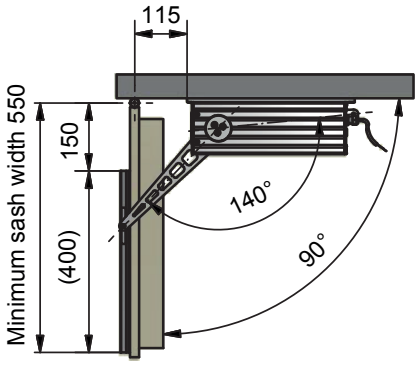


Figure 12: EA-KL²-DF — opening outward

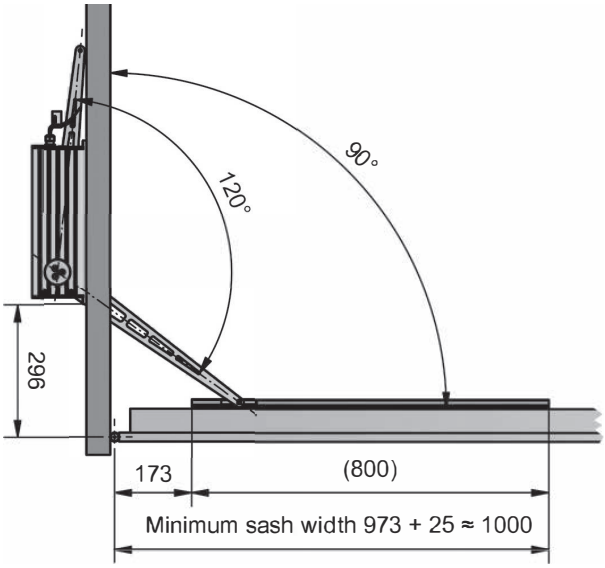
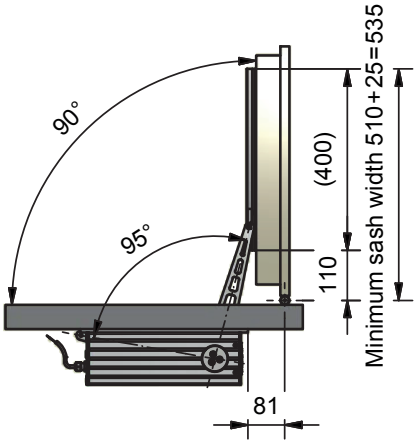
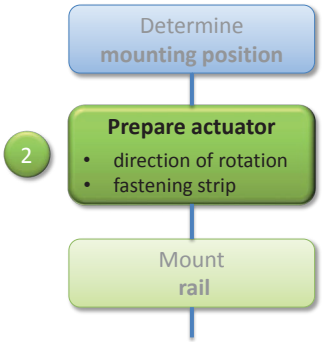


Figure 13: EA-KL²-DF-K — opening outward



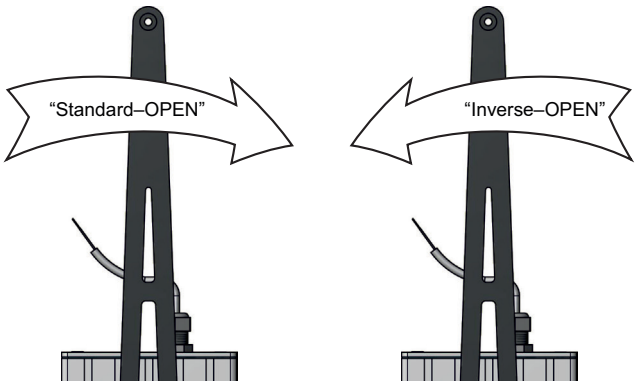
3.5. Prepare the actuator



3.5.1. Adjust the direction of rotation

The actuator EA-KL²-DF(-K) can be used flexibly with regard to the installation situation and direction of rotation.
In “OPEN” direction, the actuator stops automatically, starting from its 0-point, after reaching the set maximum stroke.
In “CLOSE” direction, the actuator always stops due to overload cut-off after reaching the set SOFT-CLOSE current.
To facilitate installation, you can adjust the direction of rotation even when the unit is not mounted.

Figure 14: direction of rotation



delivery status

3.5.1.a. Direction of rotation change via SIMON LINK

To parametrise the actuator via the SIMON LINK software, proceed as described in section 1.5: “SIMON LINK” on page 5.

3.5.1.b. Direction of rotation change via electrical connection

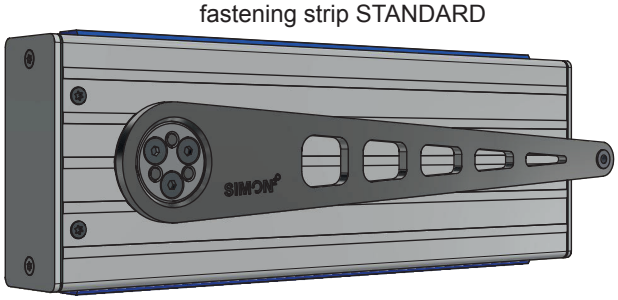
Without using SIMON LINK, change the direction of rotation as follows:

- ➢ Connect the “yellow” and “red” wires.
- ➢ Supply the actuator with power so that it drives in the “CLOSE” direction to be set.
- ➢ Let the actuator drive briefly in the new “CLOSE” direction. Then stop the actuator.
  - ➘ Starting from the driven “CLOSE” direction, the actuator has now saved its direction of rotation.
- ➢ Disconnect the “yellow” and “red” wires and insolate them.

3.5.2. Transfer fastening strip (from STANDARD to ALTERNATIVE)

Figure 15: Fastening strip

fastening strip STANDARD



fastening strip ALTERNATIVE

Figure 16: Release the cover

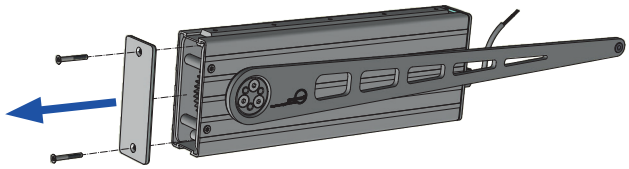


Figure 17: Transfer fastening strip

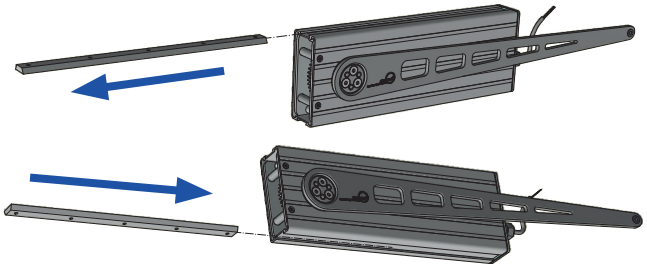
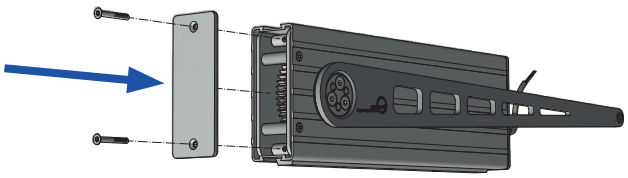
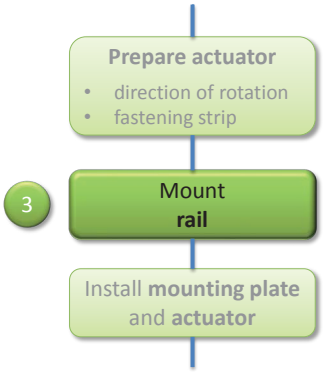


Figure 18: Screw cover



3.6. Mount rail



ATTENTION

Make sure that the screw heads do not protrude and ensure unhindered running of the slide.

Figure 19

Mount the running rail **parallel** to the edge of the sash

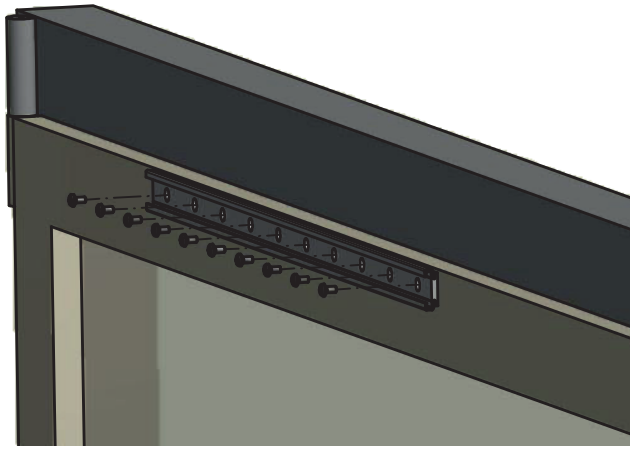
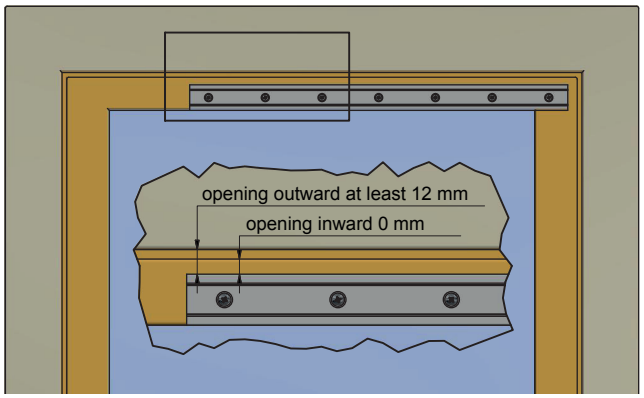


Figure 20



3.7. Mount actuator

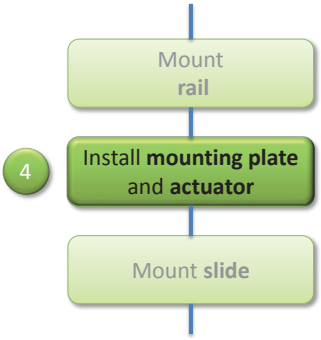
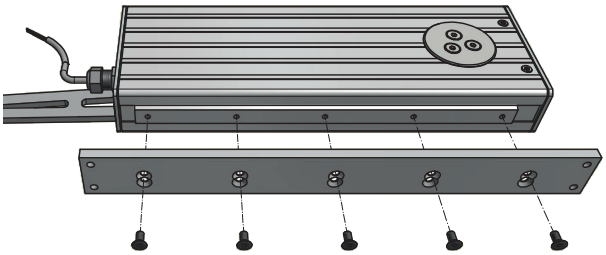


Figure 21: mounting plate — opening inward



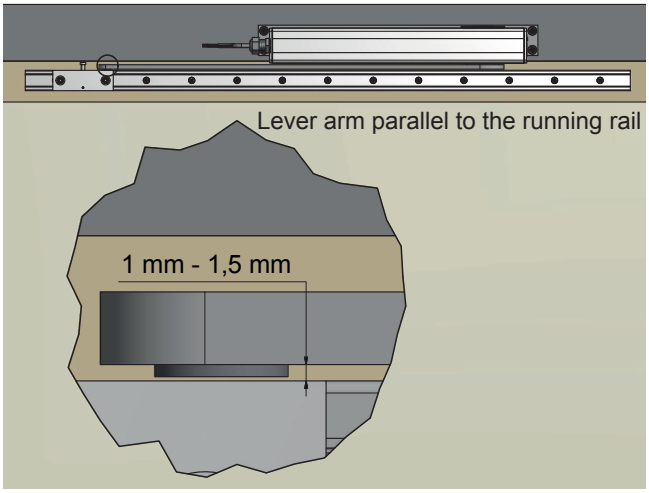
Tighten screws with 4 Nm

Mount the mounting plate centered to the actuator

Figure 22: mounting plate— opening inward

Mount the mounting plate **offset** from the lever arm

Figure 23: install actuator



3.8. Mount slide

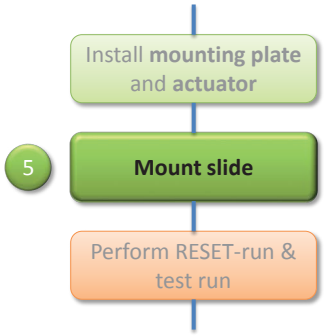


Figure 24: Insert slide

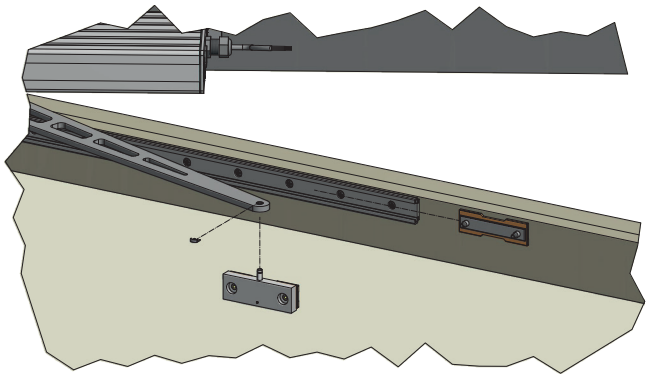
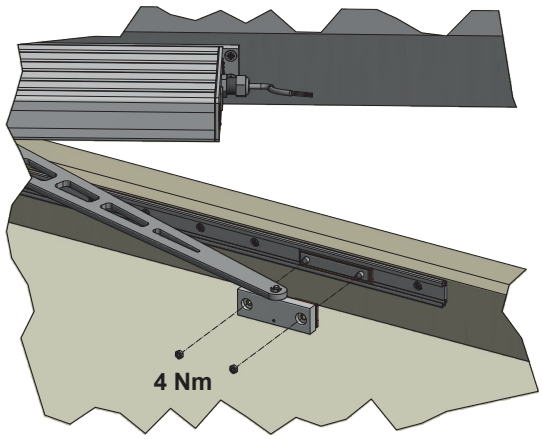
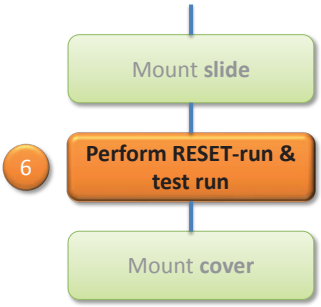


Figure 25: Fastening slide



3.9. Perform a RESET-run



3.9.1. SINGLE operation

- After mounting and connecting the actuator to the slide, make sure that the window is slightly open. Then connect the “yellow” and “red” wires.
- Supply the actuator with 24V DC via the wires “blue” (S) and “brown” (O), so that it drives into “CLOSE” direction (window / flap closes).
- While the actuator is driving in “CLOSE” direction, you can disconnect the “yellow” and “red” wires.
- Let the actuator drive completely into end position “CLOSE” and let it be switched off by overload, when the window is closed.
  - The direction of rotation is now set correctly.
  - The actuator has set a new zero point in the end position.
- You can now finally connect the actuator to the control unit, see chapter 2.2: “SINGLE connection” on page 7.

3.9.2. TANDEM operation

ATTENTION

In order to prevent damage to the window and to the actuators, perform the RESET-run in the TANDEM case individually, as with two SINGLE actuators.

- Connect the first actuator to the window via the slide and perform a RESET-run as described above.
- Now disconnect the first actuator from the window again and connect the second actuator to the window.
- Perform a RESET-run for the second actuator as described above.
- After the RESET-run of the actuators reconnect both with the slides and close the window. Then connect the actuators according to the TANDEM connection diagram and then connect them to the control unit, see chapter 2.3: “TANDEM operation” on page 7.

3.10. Mount the cover

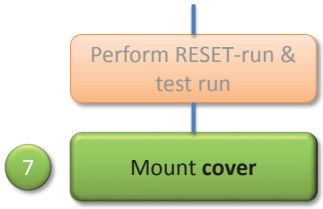
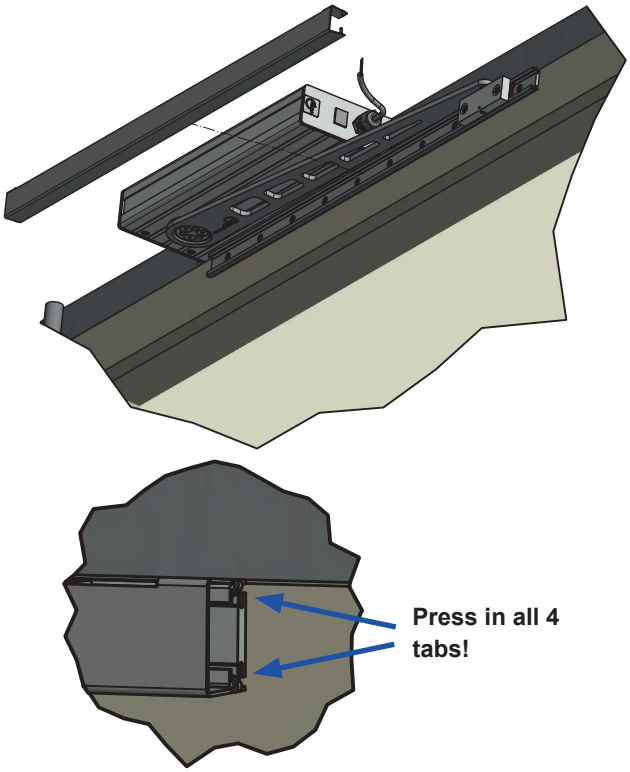


Figure 26



Press in all 4 tabs!

4. Technical data

Table 1: Electrical characteristics

Actuator type	EA-KL²-DF-K	EA-KL²-DF
Rated voltage	24 V DC	
Permissible rated voltage range	24 V DC -15 % / +15 %	
Ripple of rated voltage Vpp	maximum 500 mV	
Undervoltage detection	Yes	
Rated current(1)	1.1 A	1.5 A
Maximum starting current “OPEN” / “CLOSE”	1.3 A	1.7 A
Maximum cut-off current in “OPEN” / “CLOSE” direction	1.2 A	1.6 A(2)
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(3)	4	
Cable length between two actuators in tandem mode	max. 10 m	
Tandem stop time(4)	3 s	
Tandem-pulse time(5)	320 ms	
Protection class	III	

(1) Maximum current consumption at nominal load.

(2) In special cases, the cut-off current in the “OPEN” direction can be increased up to 2.0 A with SIMON LINK.

(3) With common cut-off function (tandem function).

(4) The stopping time (tandem) indicates how long the actuators connected in parallel remain activated after the triggering actuator has been cut off.

(5) The pulse time indicates how long the load cut-off via tandem sends a cut-off signal.

ATTENTION

The rails and slides supplied and their fastening must only be loaded with max. 500 N!

If a cut-off current > 1.6 A is selected, the rail can be over-loaded and depending on the application, this can lead to mechanical damage to the actuator and rail.

SIMON PROtec Systems GmbH does not assume any warranty if the normal load on the rail is more than 500 N due to made software settings!

Table 2: Dry contact (NO1 / NO2)

Actuator type	EA-KL²-DF-K	EA-KL²-DF
Rated voltage	max. 28 V DC	
Relay contact load	max. 2.0 A	

ATTENTION

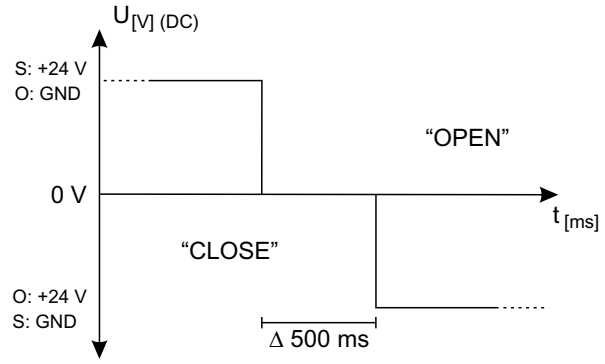
The maximum load capacity of the contact must not be exceeded!

Table 3: Connection and operation

Actuator type	EA-KL²-DF-K	EA-KL²-DF
Connection silicone cable	6 x 0.75 mm	
Connection cable length[6]	3 m	
Pause time during change of direction[7] or re-actuation	at least 500 ms	
Switch-on duration	30 % SD S2 (Short-term operation: 3 of 10 minutes)	
Stability of opening and closing cycles	> 11 000	
Sound level [8]	< 70 dB (A)	
Multiple triggering according to prEN 12101-9	allowed	
Multiple triggering after stop	allowed	
Maintenance	See attached sheet “Safety instructions and warranty conditions”!	

(6) Optional lengths possible.
(7) For the direction change (polarity reversal) it is necessary that the supply ensures a pause time (zero volt range) of at least 500 ms.
(8) Measured at a distance of one meter under normal conditions.

Figure 27: Zero volt range at change of driving direction



ATTENTION

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

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

Table 4: Mechanical properties

Actuator type	EA-KL²-DF-K	EA-KL²-DF
Maximum pushing force [9]	400 N	500 N
Maximum pull force[9]	400 N	500 N
Condition of loading	Open against nominal load / Close against rated load	
Nominal locking force	700 N	
Nominal opening width[10]	140°	
Stroke speed at nominal load[11]	3.1°/s	2.8°/s
Stroke speed partial load[12]	3.5°/s	3.2°/s
Material surface housing	Aluminium E6/EV1 Coatings in all RAL and DB colours possible	
Material lever	stainless steel	
Dimensions (L x W x H)[13]	368 x 58 x 118 mm	568 x 58 x 118 mm
Weight[14]	3.6 kg	4.1 kg

(9) Only under optimal conditions, pushing force parametrisable via SIMON LINK.
(10) The nominal opening width can deviate by ± 5% due to mechanical damping.
(11) Based on 140° opening width of the lever arm; deviation ± 10%.
(12) Based on 140° opening width of the lever arm at respective partial load of 70%; deviation ± 10%
(13) See chapter 1.4: “Figures / delivery” on page 4
(14) Without bracket set.

Table 5: Installation and ambient conditions

Actuator type	EA-KL²-DF-K	EA-KL²-DF
Rated operating temperature	20 °C	
Permissible ambient temperature range	0 °C – 75 °C	
Temperature stability (SHEV)	300 °C	
Ingress protection	IP 54	
Usage range	Central European environmental conditions ≤ 2,000 metres above sea level	

Table 6: Approvals and certificates

Actuator type	EA-KL²-DF-K	EA-KL²-DF
CE-compliant	In accordance with **EMC directive 2014/30/EU** and **low voltage directive 2014/35/EU**	
Further approvals	On request	

5. Appendix

5.1. Care and Maintenance

See supplementary sheet “Safety instructions and warranty conditions!

short.simon-protec.com/sugen

5.2. General business and delivery terms

Deliveries and services are subject to the currently applicable terms for products and services of the electrical industry (green delivery terms), including the supplementary clause “Extended retention of title”. These are published by the German Electrical and Electronic Manufacturers‘ Association (ZV EI), Frankfurt. If you are not aware of these, we will gladly send them to you. You can also download these agreements from

short.simon-protec.com/agben.

The place of jurisdiction is Passau.

5.3. Company addresses

5.3.1. System manufacturer

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5.3.4. Hungary

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Internet: www.simon-protec.hu

6. Manufacturer‘s declaration

CE We hereby declare that the product complies with the applicable directives. The declaration of conformity can be read at the company‘s premises and will be sent to you upon request. This declaration certifies that the product complies with the mentioned directives, but does not represent any guarantee of the product‘s features. This declaration loses its validity, if the product is modified without seeking our prior authorisation.

7. EC manufacturer‘s declaration (distributor)

The installer is responsible for the proper assembly or commissioning, the preparation of the declaration of conformity in accordance with EU directives and for affixing the CE marking. The CE marking must be affixed visibly!