aumüller
Innovativ in die Zukunft

Assembly Instructions

according to Machinery Directive 2006/42/EC (annex VI)

SP

24 V DC / 230 V AC

Spindle Drive

9000002601-V0 AAM 12W42

CE

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This is a translation of the original assembly instructions into English

Contact us during our business hours: Monday - Thursday 8 am to 4 pm and Friday 8 am - 12 am.

Important note:

We are aware of our responsibility, which is why we present life-supporting and value-preserving products with greatest possible conscientiousness. Although we make every effort to ensure that the data and information are as correct and up-to-date as possible, we still cannot guarantee that they are free from mistakes and errors.

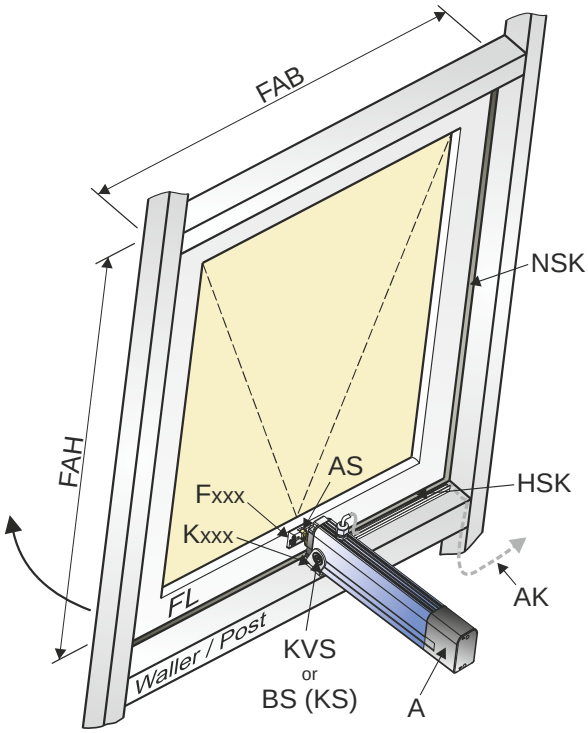
All information and data contained in this document are subject to alterations without prior notice.

The publication of these assembly and operating instructions supersedes all previous editions.

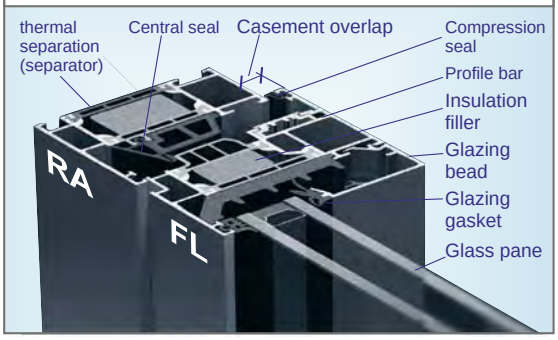
The paper used for printing is bleached without chlorine.

Abbreviations:

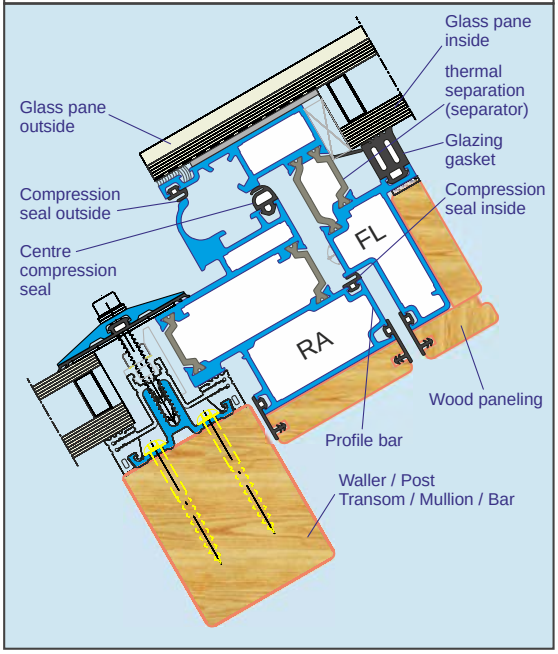
F xxx = casement bracket
K xxx = bracket
FÜ = casement overlap
A = drive / actuator
FL = casement
RA = frame
FAB = overall width of casement
FAH = overall height of casement
AK = connecting cable / drive cable
AS = Eye bolt
BS = Collar screw G1/8
KS = Clamping blocks (thick, thin)
KVS = Fix clamping bolt connection
⟶ = Opening direction
L = overall length of drive
BD = hinge (band)
MB = middle hinge (band)
HSK = leading edge
NSK = side edge
SL = snow load
FG = casement weight



Facade windows - profile section



Roof windows - profile section



The above abbreviations are used consistently throughout these assembly & operating instructions.

Unless stated differently, all dimensions indicated in this document are in **mm**.

General tolerances in accordance with **DIN ISO 2768-m**.

Warning notes in these instructions:

DANGER Failure to comply with the safety instructions (warning notes) results in irreversible injury or death.

WARNING Failure to comply with the safety instructions (warning notes) can result in irreversible injury or death.

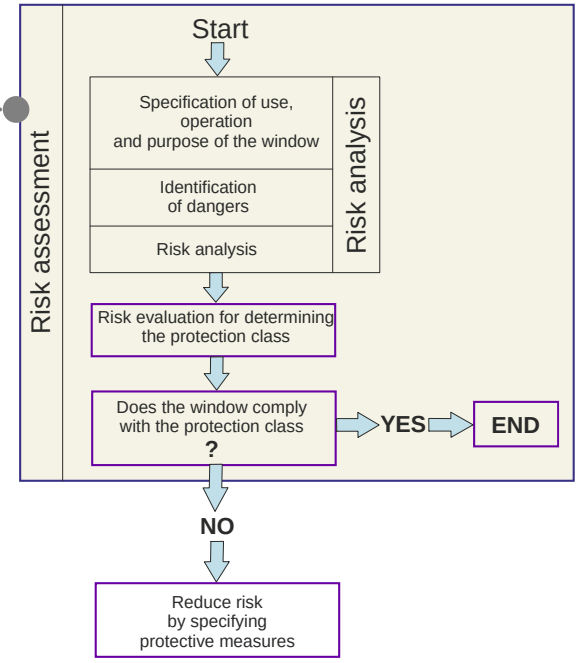
CAUTION Failure to comply with the safety instructions (warning notes) can result in minor or moderate (reversible) injuries.

NOTICE Failure to comply with the safety instructions (warning notes) can lead to damage to property.

Risk Assessment

for power-operated windows (machines)
according to ISO 12100

General Approach



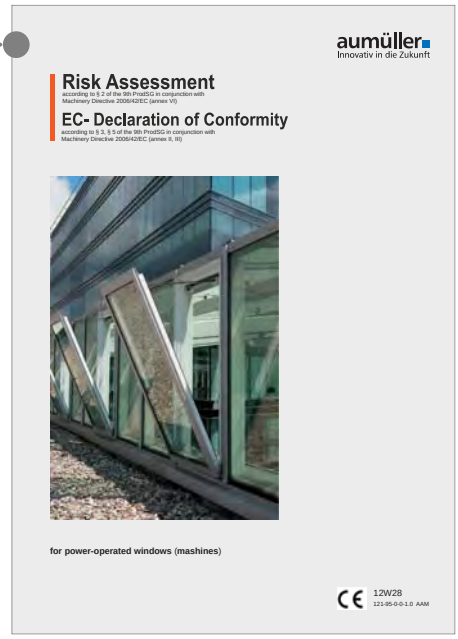
For information

Once the system planner has carried out the necessary risk assessment for power-operated windows and incorporated any specific requirements into the structural specifications, the installer of the power-operated windows is obliged to carry out a further risk assessment to ensure that the planning requirements are complied with.
If the specified protection class has not been achieved, further precautions must be taken to reduce the risk.

Extract from Machinery Directive 2006/42/EC

„The manufacturer of machinery or his authorised representative must ensure that a risk assessment is carried out in order to determine the health and safety requirements which apply to the machinery.
The machinery must then be designed and constructed taking into account the results of the risk assessment."

Separate documentation relating to risk assessment can be downloaded from the homepage of Aumüller Aumatic GmbH:
www.aumueller-gmbh.de



It is essential to ensure compliance with the latest version of the guidelines, standards and national legislation applicable to the assembly and the electrical connection of drives / control and regulation electronics.

This includes in particular:

BGR 232
„Guidelines on power-operated windows, doors and gates“

VDE 0100-Part 100
"Erection of power installations with rated voltages below 1000"

EN 60335-1 / EN 60335-2-103
„Household and similar electrical appliances.
Drives for gates, doors and windows and analogues.“

MRL 2006/42/EC
"Machinery directive"

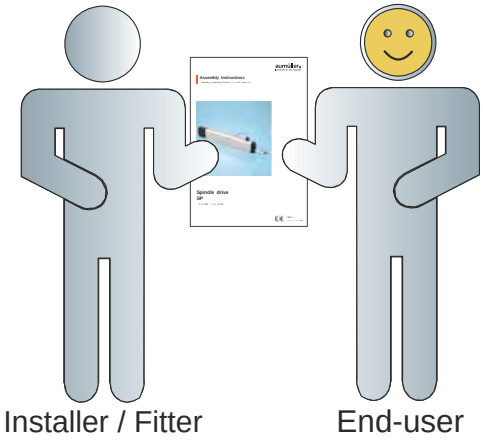
DIN 4102-12
„Functional integrity of a cable system “

Accident prevention regulations:
in particular **VBG 1** „General Regulations“ and **VBG 4** „Electrical installations and equipment“

Handover of Assembly and Operating instructions

- on completion of the installation and commissioning of any “power-operated window” system - the installer must hand these assembly and operating instructions over to the end-user.
- the end-user must retain these instructions for further reference and use, if required.

These instructions can also be downloaded from our website:
www.aumueller-gmbh.de



Read prior to installation and keep over the lifetime of the drive!

Risk of crushing and entrapment !
Window closes automatically !

During closing and opening the drive is stopped either by the disconnection integrated in the drive or by an external disconnection module (depending on the drive version).
Please refer to the techn. data for information on pressure force.
Do not put your hand into the window rabbet or into the moving chain or spindle during assembly work and operation!

There is always enough pressure force to crush fingers in case of carelessness!

Crush and shear points between casements and frames, light domes and metal curb must be secured up to a height of 2.5 m (bottom edge of window element to finished floor level) by devices that will stop the movement by touch or interruption initiated by a person and prevent any injury.

Symbols for safety instructions

Caution / Warning
Danger from electric current.

Caution / Warning
Risk of crushing and entrapment when window is operating
(sticker supplied with drive)

Attention / Warning
Risk of damage / destruction of the drive and / or window

Assembly & Operating Instructions
for the professional assembly, installation and maintenance to be carried out by qualified and safety-minded electricians and/or skilled personnel with in-depth knowledge of electrical and mechanical drive assembly.
Read and adhere to the assembly instructions as well as to the specified sequence and keep the manual for later use (maintenance).
It is only possible to ensure safe operation and avoid damage and risks if the system is carefully assembled and adjusted according to these assembly instructions.
All dimensions have to be verified at the place of installation and must be adjusted, if required.

Please note the connection assignment, the permissible drive voltage (see type plate), the minimum and maximum performance data (see technical data) and the assembly and installation notes and strictly adhere to them!
Never connect 24 V DC drives to 230 V supply !
Danger to life !

Spare parts, fasteners, fittings and controllers
Only operate the drive with controllers built by the same manufacturer. There is no liability, warranty or customer service if third-party parts are used. If spare parts/fittings or extension parts are required, only original replacement parts from the manufacturer may be used.

Range of Application
Exclusively suited for the automatic opening and closing of the window types specified in these assembly instructions. For any application not included in these instructions please consult the manufacturer or his authorized reseller for further information. Always check that your system complies with the applicable regulations.
Special attention shall be given to opening width and opening cross-section of the window, permissible fitting dimensions, opening time and opening speed, exerted forces, temperature resistance of drive/devices and cables as well as to the cross-section of the connection cable depending on the cable length and the power consumption.
Required fastening material shall be selected and, if necessary, completed to suit the drive and the exerted loads.

Make sure that all products installed are permanently protected from dust and moisture unless the drive is expressly suited for use in damp or humid environments (see technical data).

Declaration of Incorporation
The drives are manufactured and tested in accordance with the European Directives. The appropriate declaration of incorporation has been issued. You may only operate the drive if there is a declaration of conformity within the meaning of the MD for the entire system.

Cable routing and electrical connections
must be carried out by authorized electricians only.
All relevant DIN and VDE regulations must be observed for the installation. VDE 0815 Installation cables and lines.
VDE 0833 Hazard alarm systems for fire, intrusion and hold-up.
Specify suitable types of cable on consultation with the competent local authorities, energy supply companies and Employers' Liability Insurance Associations. Please pay especially regard to:
All extra low-voltage lines (24 V) must be laid separately from power cables.Flexible lines must not be flush mounted.
Freely suspended lines must be provided with strain relief.

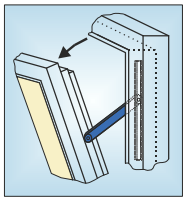
All lines must be laid such way that they can be neither sheared off, nor twisted or kinked during operation.

All junction boxes and external drive controllers must be positioned to allow access for maintenance work. The cable type, lengths and sizes must comply with the technical specifications.

All 230 V components must be disconnectable from the mains voltage supply for maintenance and repairs.

Maintenance or Modification
Prior to any maintenance work or modification of the system (e.g. exchange of the drive) the mains voltage and – where available – the batteries shall be disconnected in all poles.
Lasting functionality and high reliability of the drive require maintenance by suitably trained personnel at regular intervals (in the case of SHEV systems the legal requirement is once a year).
Check the system for operational availability on a regular basis.
This is also recommended for a system with purely natural ventilation.
Remove any contamination from the drive when servicing the system.
Check mountings and clamping screws for tight fit.
Test the devices by opening and closing them in test runs.
The drive itself is maintenance-free.
Faulty devices may only be repaired in our plant.
Only original parts from the manufacturer may be used.
We recommend a scheduled **Maintenance Agreement**.

After installation
and after each modification in the set-up, check all functions in test runs. Once the system is completely installed, the end-user must be instructed on all important functions and the operation of the system. The end-user must also be notified of the remaining risks/hazards.

For the use of bottom-hung windows

Bottom-hung windows must be provided with a casement stay (also called safety scissors) or similar devices. Casement stays prevent damage and injuries to persons which might result from improper installation and handling. Please note:
The casement stay must match the opening stroke of the drive (see techn. data).
This means: the opening width of the safety scissors must be greater than the drive stroke in order to avoid any blocking.

BUREAU VERITAS
Certification

Certificate

awarded to

aumüller
Innovativ in die Zukunft

Aumüller Aumatic GmbH
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Tel.: +49 (0)821 270 930 • Fax: +49 (0)821 709 842
www.ferralux.de • info@ferralux.de

with the production site:
Am Gemeindewald 11-13
D-86672 Thierhaupten

Bureau Veritas Certification certifies that the Management System of the above organisation has been assessed and found to be in accordance with the requirements of the standards detailed below.

Standard

DIN EN ISO 9001:2008

Scope of supply

Design, development, manufacturing and marketing of products and systems for smoke and heat exhaust ventilation, natural ventilation, automatic doors and gates, as well as related maintenance, services and after-sales support

Original approval date:	24.07.2002		
Date of the audit:	19.08.2011	Date of next recertification:	18.08.2014

Subject to the continual satisfactory operation of the organisation's Management System, this certificate is valid from:

Date of certification:	24.11.2011	Valid until:	23.11.2014

To check this certificate validity you may contact Bureau Veritas Certification. Further clarifications regarding the scope of this certificate and the applicability of the Management Systems requirements may be obtained by consulting the organisation.

Local Technical Manager

Date 12.12.2011
Certificate number: **DE002432-1**

Deutscher Akkreditierungs Rat
DAR

Bureau Veritas Certification Germany GmbH
Veritaskai 1 · 21079 Hamburg

EINBAUERKLÄRUNG

für eine unvollständige Maschine

(nach Anhang II-1B der EG-Richtlinie 2006/42/EG)

Declaration of incorporation

for a partly completed machinery

(in accordance with Annex II-part B of EC- Directive 2006/42/EC)

(Dokument - Nr. / *Document no.*: 121-165-0-13-8.2)

Hersteller
Manufacturer

aumüller
Innovativ in die Zukunft

Aumüller Aumatic GmbH
Gemeindewald 11
86672 Thierhaupten, Germany

Produktbezeichnung
Product designation

Spindelantrieb / *Spindle Drive :*
SP 8 - 24 V DC / SP 8-Z - 230 V AC

Folgende grundlegende Sicherheits- und Gesundheitsschutzanforderungen nach Anhang I der o.a. EG- Richtlinie sind angewandt und eingehalten:
Follow basic compromise of safety and healthprotection requirements are applied and follow in accordance with Annex II-1B of s.a. EC- Directive

Nr. */ no: 1.1.2; 1.1.3; 1.1.5 / 1.2.1 / 1.3.2-7 / 1.5.1; 1.5.4; 1.5.11 / 1.6.1 / 1.7.1; 1.7.3; 1.7.4, -4.1, -4.2, -4.3*

Die speziellen technischen Unterlagen nach Anhang VII B wurden erstellt
The relevant technical documentation described in Annex VII, part B is prepared

Ich werde der zuständigen Behörde ggf. die vorgenannten speziellen technischen Unterlagen in Form von Papier oder elektronisch übermitteln
I will transmit the aforsaid relevant technical documentation in hardcopy- / or electronic form to appropriate authority

Die vorgenannten speziellen technischen Unterlagen können angefordert werden bei:
The aforesaid relevant technical documentation can be required by follow person:
***Herrn Reiner Aumüller** , Steinerne Furt 58a in 86167 Augsburg*

Die Montageanleitung nach Anhang VI wurde erstellt
Assembly instructions described in Annex VI are prepared

Wir bestätigen die Konformität des oben bezeichneten Produktes mit folgend gelisteten EG- Richtlinien sowie Normen:
Maschinenrichtlinie **2006/42/EG**, Richtlinie über elektromagnetische Verträglichkeit **2004/108/EG**, Niederspannungsrichtlinie **2006/95/EG**

We confirm herewith the conformity of the above mentioned product with EC Directive and the standards listed below:
*Machinery Directive **2006/42/EC**, Directive concerning Electromagnetic Compatibilty **2004/108/EC**, low voltage Directive **2006/95/EC***

sowie:
as well as

EN 55011, EN 55014-1, EN 55014-02
EN 55022, EN 60335-2-103,
EN 12101-2 (24 V Antriebe / *drives* mit /*with* NRWG / *NSHEV*)

Hiermit erklären wir, dass das Teil in der von uns gelieferten Ausführung und gemäß den beigefügten Betriebs- und Installationshinweisen zum Einbau in eine Maschine bestimmt ist, und ihr Betrieb solange untersagt ist, bis festgestellt ist, dass die Maschine, in die genanntes Teil eingebaut werden soll, den Bestimmungen der EG Maschinenrichtlinie 2006/42/EG entspricht.

We herewith declare that the part in the version delivered by us is intended to be installed in a machine in accordance with the enclosed operating and installation instructions, and that its operation is prohibited until the machine, into which the part is to be installed, is found to comply with the regulations of the EC Machine Directive 2006/42/EC.

Rechtsverbindliche Unterschrift:
Legally binding signature:

Thierhaupten, den
dated 11.06.2010

Dipl.-Ing. (FH) Reiner Aumüller
Geschäftsführer - Managing Director

Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
The safety information in the product documentation supplied with the product has to be observed

Area of application

For electromotive opening and closing of building openings in facades and roof areas. Examples are:bottom-hung, top-hung, side-hung, vertically pivoting and horizontally pivoting casements as well as light domes, flaps and blinds made of base materials such as aluminium, plastic or wood.

For power-operated windows in natural smoke and heat exhaust applications (NSHEV) as well as in natural ventilation systems.

The main purpose of this product is to save human lives in case of fire.

The safety features of this product are crucial for compliance with the Machinery Directive 2006/42/EC and EN12101-02.

The most important feature is the **opening of the window** after activation from a control unit (SHEV control unit) or after triggering of a fire alarm button or smoke detector or triggering of the fire alarm unit.

Range of application

Casement dimensions:
Casement overall height (FAH)
Casement overall width (FAB)

(see individual examples of application)

Casement weights:
general fill weight = max. 30kg/m²

Casement type:
Roof windows / light domes / bottom-hung, top-hung, side-hung, vertically pivoting and horizontally pivoting casements

Opening direction of casements:
outward opening

otherwise dependent on the following components:

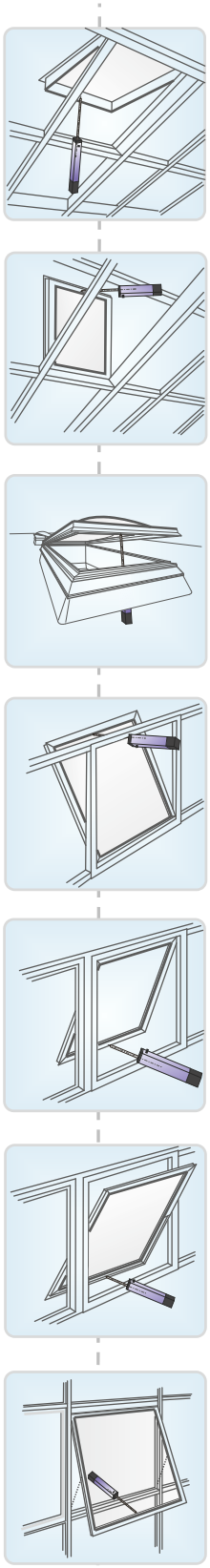
Assembly location / drive stroke / opening width

Different specifications apply depending on the **contact point** of the drive.

The given casement dimensions are only for orientation. The actual application range depends on the relationship: Outer width of casement (FAB)/(FAH) outer height of casement, total weight of casement and opening width. Adherence to drive *force path diagrams* is essential.

Please ask for our separate installation documents, if required.

General Use



Shown with the following example

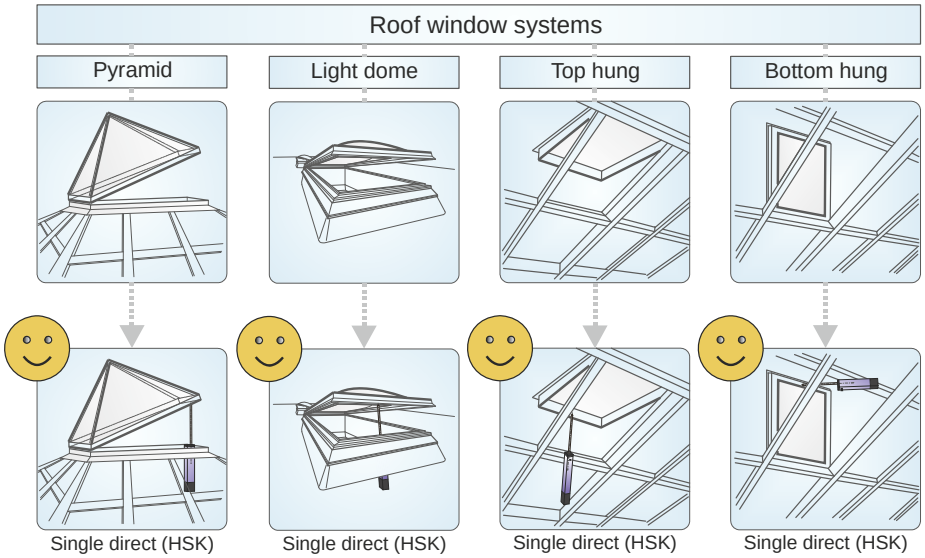
Example: roof area window
Activation directly on HSK
(Mounting on frame)

Example: fasade area window
Activation directly on HSK
(Mounting on bar / waler)

Example: light dome
Activation directly on HSK
(Mounting on frame or curb)

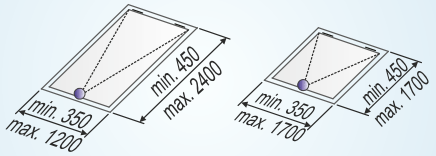
Any use of the drive other than the one specified in this document causes loss of warranty.
The assumption of possible follow-up costs and further claims is excluded.

Explanation of symbols	
☺	highly recommended
😐	less recommended
☹	critical application



General range of casement dimensions

Single contact directly on HSK



Outside dimensions of FAB / FAH in mm

Other dimensions upon request

For the different drive contact points on the casement the following must be considered:

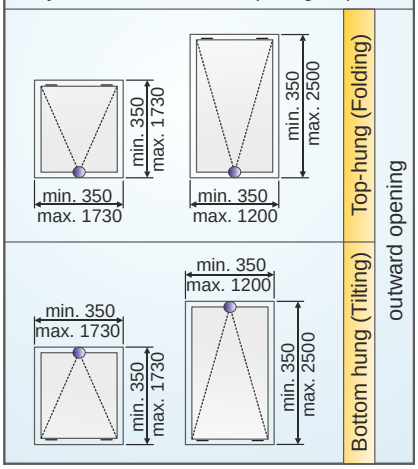
- Total weight of casement (glass + frame)
- Size of casement outer width of casement (FAB) x outer height of casement (FAH)
- Snow load (depending on snow load zone / application area)
- Slope of roof (important for calculating snow load)
- Wind load (influence of side winds)
- Required opening cross section (geometric or aerodynamic)
- Required force and stroke of drive(s)

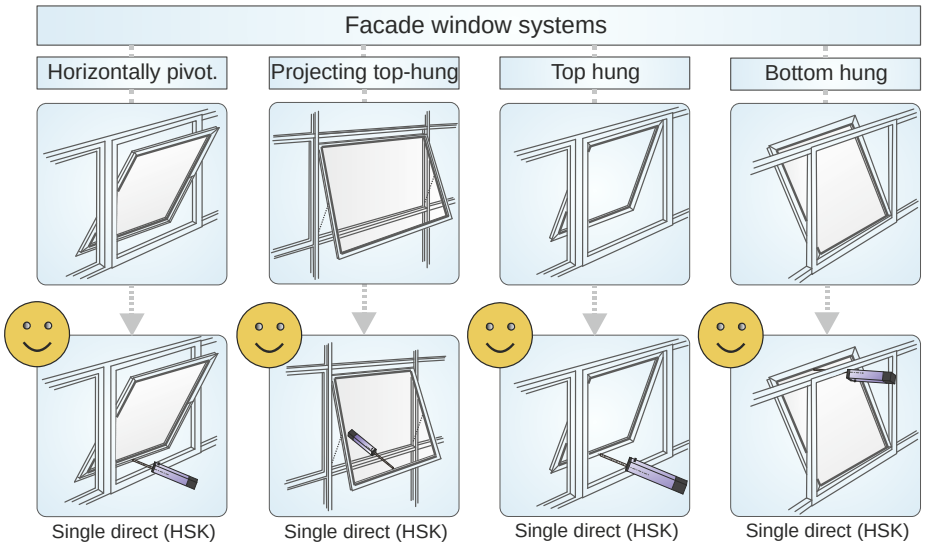
General range of casement dimen.

Single contact directly on HSK

- Consider vertically and horizontally pivoting casements like side and bottom hung casements, keeping in mind that the pivot is in the middle of the respective casement.

- Consider top hung projecting casements outward opening top hung windows. Pay close attention to the opening sequence!





There are very many different kinds of window profile systems on the market.
Different mounting brackets and fastening devices to be used depend on the particular profile.
On the pages below you may find special planning details for prevalent systems.
The request for separate planning diagrams is optional.

⚠ WARNING

Important instructions for safe assembly! Fully observe all instructions! Incorrect assembly may lead to serious injuries!

Storage of the drives on site prior to the assembly

Protective measures against damage, dust, humidity or contamination (for example caused by covers, film or cardboard packaging) must be taken.
Only store the drives in dry and well ventilated places before installation.

Testing the drives prior to installation

We recommend checking the drives prior to installation for their good mechanical condition and completeness.
Drives must run easily in both directions. We recommend the use of our test kit for drives in 24 V DC / 230 V AC (part no.: 533981).

Never install and operate damaged products. Any damage must be reported immediately to the supplier / manufacturer.
Drives must always be tested on a non-slip and stable surface or in a test fixture.
During trial operation there should be no physical contact with the extending spindle.

Instructions on Intended Use

Ensure that the use of the drives is in accordance with the specified range of application / area of application. Any other use of the products causes loss of warranty.
The end-user must be informed about the intended use of the drives.
In particular, it must be pointed out to the end-user that - apart from pressure and tensile forces in opening / closing direction - no additional forces may impact on the drive spindle.
Additional warning signs might be required.

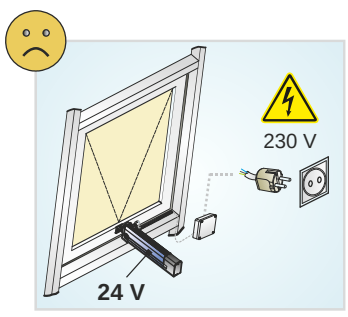
Determining required safety measures in accordance with MD 2006/42/EC

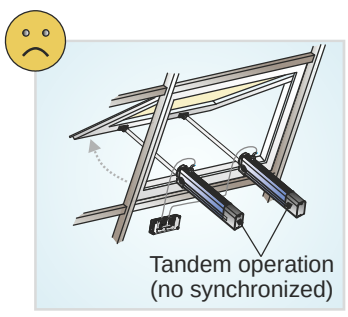
A risk assessment must be carried out in order to determine any required safety measures. Furthermore the operator must be notified of the remaining risks.
(Separate documents are available from Aumüller Aumatic GmbH).

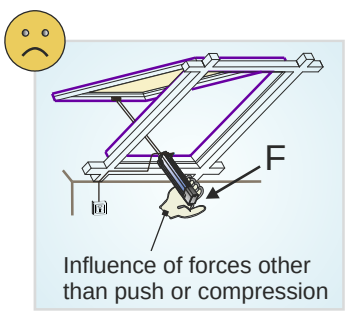
Predictable Misuse

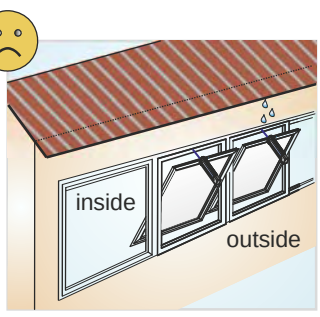
It is absolutely essential to avoid any foreseeable misuse of the drives!

Some examples:









Checking Installation Requirements

Depending on the place of installation / type of window and on the real structural conditions there are different installation requirements for the drives.
They are obtained from the special installation sketches and/or planning drawings and have to be checked accordingly.

Generally the following should be checked first of all:

- Are the supporting surface and the structural conditions adequate for the load transfer?
- Does the installation level require an additional supporting structure?
- Is there enough space for the pivotal motion of the drive?
- Have sufficient measures been taken to avoid thermal bridges (thermal separation) at the application points?

If not, the operator must be notified of these requirements!

Information on the Load Transfer

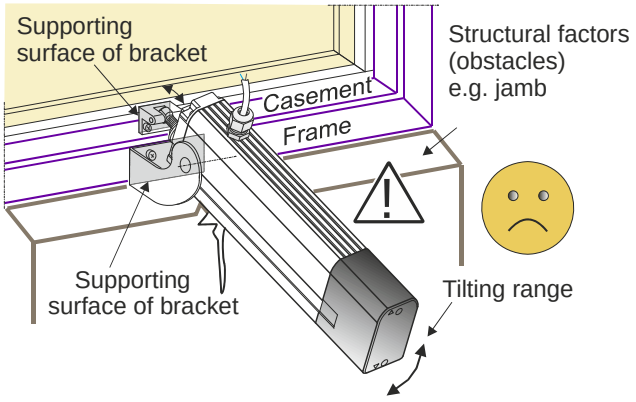
of the drives to the window profiling:

The supporting surface of the brackets and casement brackets must fully rest on the window or frame profile, respectively. Tilting movements of the mounting elements when the spindel moves out are not allowed. Safe and firm mounting on the window profile must be ensured.

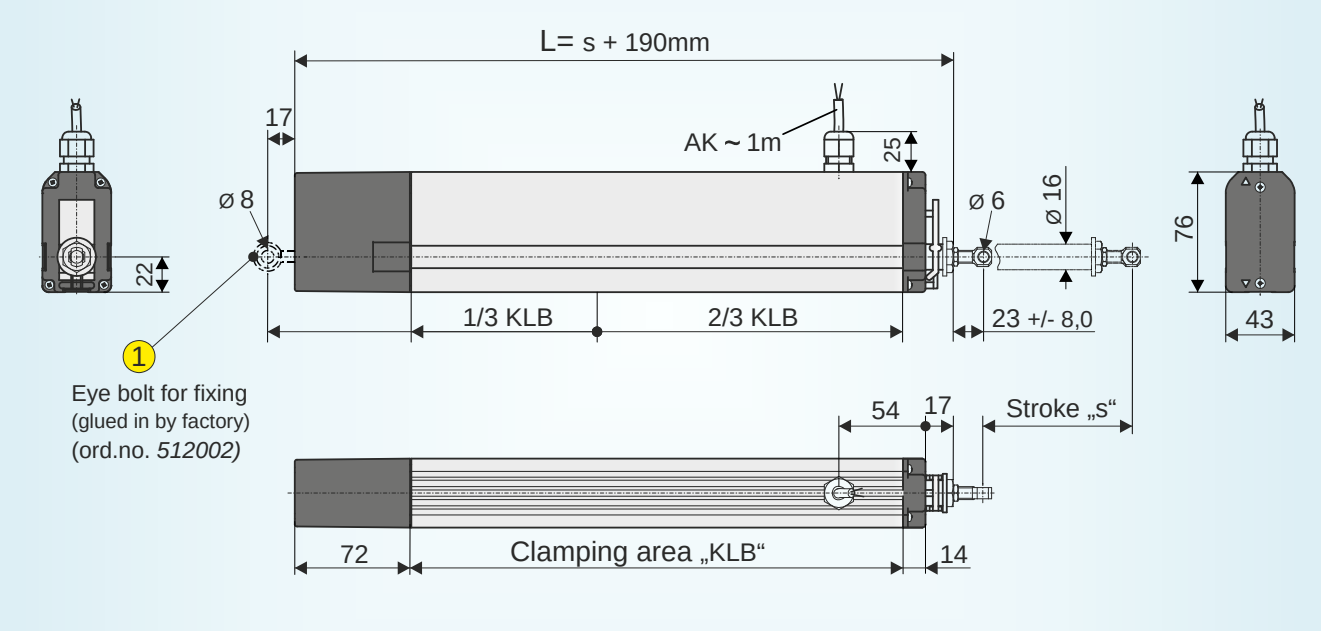
Insert underlay plates / brackets, if necessary.

⚠ CAUTION

It is absolutely essential to take the drive tilting range into consideration. If this cannot be ensured, find mounting alternative or another type of drive.



Dimension Sheet SP 8 xxx / SP 8-Z xxx 24 V DC



Technical description / product features

- Silver anodized aluminium body (E6/C-0)
- Robust aluminum spindle
- Silicone-based connection cable, length approx. 1m
- Cable version: 2 x 0,75 mm² (Standard)
- Cable version: 4 x 0,75 mm² (Z-Version)
- Maintenance-free (drive)
- RAL colour finish possible
- Floating contact „Z“ for closed position-optional
- Temperature stability (300°C)

Operating Parameters

• Rated voltage:	**“U”**	24 V DC, 2 Vss	(+ / - 20%)
• Cut-off current:	**“I”**	approx. 1,0 A	
• Max. pressure force:	**“F”**	800 N	
• Max. pulling force:	**“F”**	800 N	
• Stroke:	**“s“**	100 to 750 mm ± 5 %	
• Stoke speed at 2/3 nominal load and 24 V DC:		7,0 mm/s	
• Protection class:		IP 54	
• Duty ratio (for 10min):	**“ED”**	30%	
• Synchronous mode:		not possible	
• Ambient temperature range:		- 5°C to +75°C	(Environmental Class I)
• General performance:		opening against nominal load / closing with nominal load support	
• Installation length:	**„L“**	see dimension sheet	

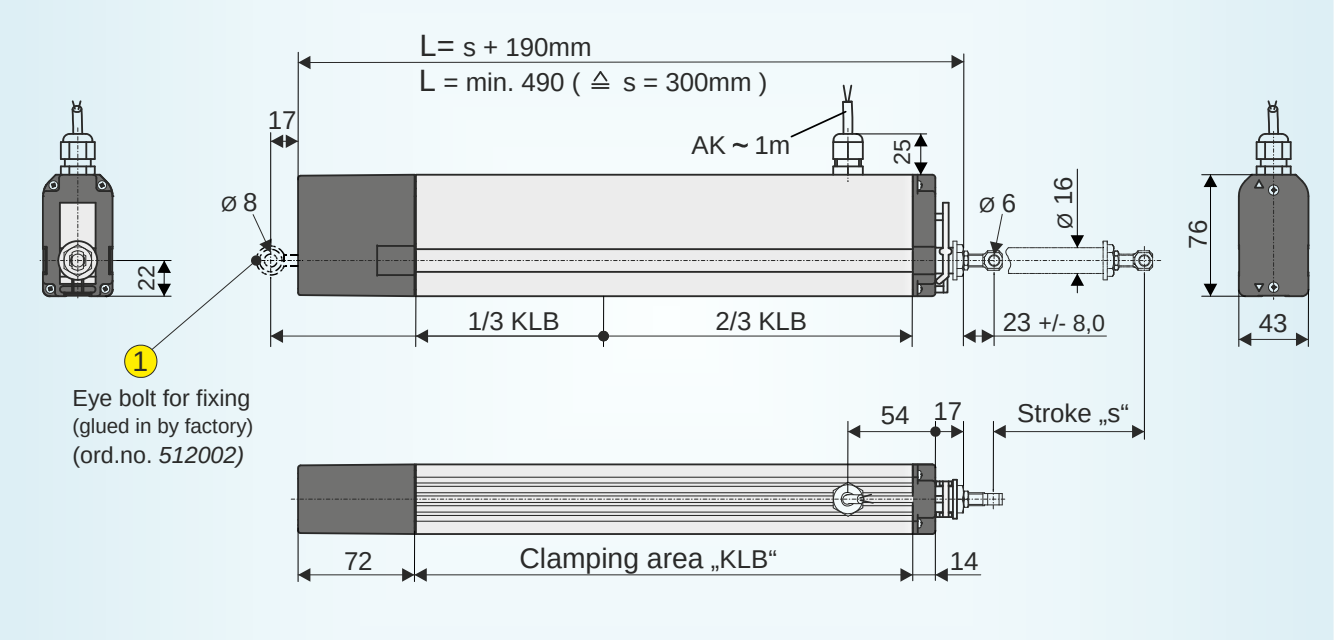
* Please refer to the **Technical Data Sheets** for technical information on the individual drive versions

Versions

Standard = has internal disconnection via end switches and disconnection at overload
Z = like standard, but with additional potential free contact CLOSE

1 not supplied

Dimension Sheet SP 8-Z xxx in 230 V AC



Technical description / product features

- Silver anodized aluminium body (E6/C-0)
- Robust aluminum spindle
- PVC connection cable, length approx. 1m
- Cable version: 6 x 0,75 mm²
- Drive is not suitable for direct switch-over of the running direction
- Maintenance-free (drive)
- RAL colour finish possible
- Floating contact „Z“ for closed position-optional
- Parallel operation up to max. 8 drives possible

Operating Parameters

• Rated voltage:	**“U”**	230 V AC, 50 Hz	(+ / - 20%)
• Cut-off current:	**“I”**	approx. 0,2 A	
• Max. pressure force:	**“F”**	800 N	
• Max. pulling force:	**“F”**	800 N	
• Stroke:	**“s”**	300 to 750 mm ± 5 %	
• Stroke speed with 2/3 nominal load:		8,5 mm/s	
• Enclosure protection:		IP 54	
• Duty ratio (for 10min):	**“ED”**	30%	
• Synchronouse mode:		not possible	
• Ambient temperature range:		- 5°C bis +75°C	(Environmental Class I)
• General performance:		opening against nominal load / closing with nominal load support	
• Installation length	**„L“**	see dimension sheet	

* Please refer to the **Technical Data Sheets** for technical information on the individual drive versions

Versions

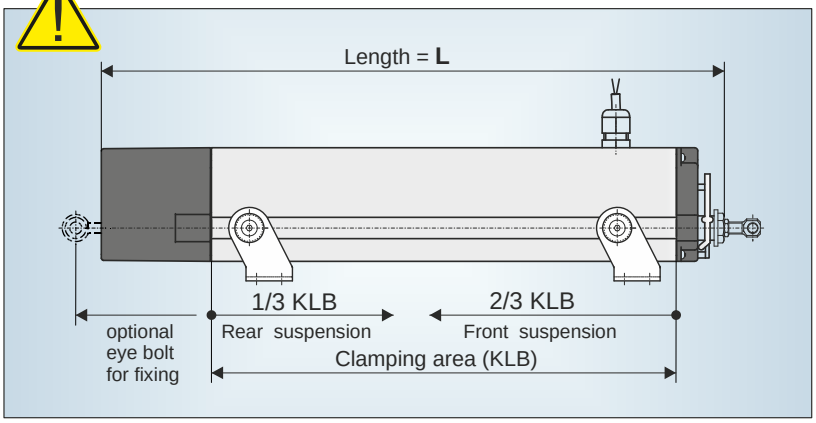
Standard = has internal disconnection via end switches and disconnection at overload and with additional potential free contact CLOSE

1 not supplied

Version 24 V DC	Stroke (mm)	L (mm)
SP 8 - xxx L = (s +190)	100	290
	180	370
	200	390
	300	490
	400	590
	500	690
	600	790
	700	890
	750	940

Version 230 V AC	Stroke (mm)	L (mm)
SP 8-Z xxx L = (s +190)	300	490
	400	590
	500	690
	750	940

Note max. load in N for extended spindle if unit suspended at rear!



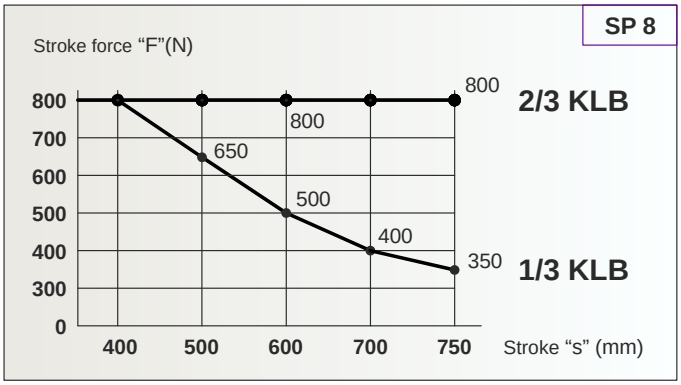
The values stated in the diagram include a safety factor of around 1.3 and are only valid for loads lifted vertically.
If used for diagonal application, the applicable torques must be noted !

Please note:

The stroke specifications listed in the table do not guarantee actual availability of same when ordering.

See specifications in product list.

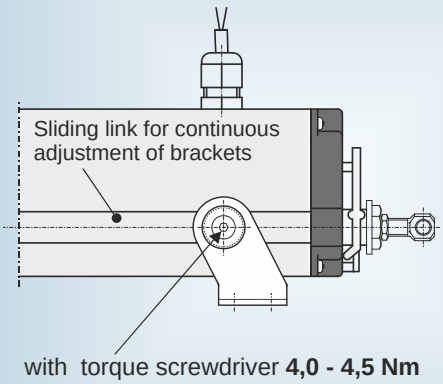
Force-path diagram



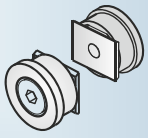
Fixing with clamping bolt connection

Observe specifications of the torque screwdriver for clamping bolt connection

with clamping bolt connection

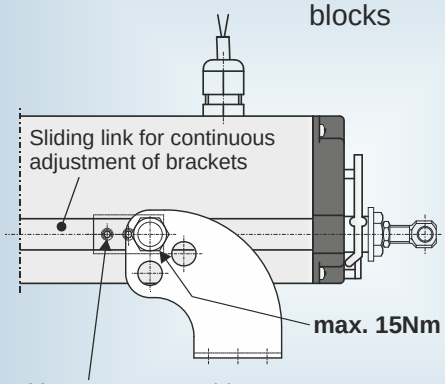


with torque screwdriver **4,0 - 4,5 Nm** (hexagonal insert: size **4**) tighten



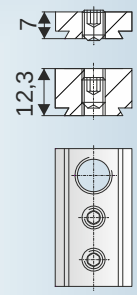
clamping bolts

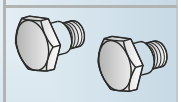
with collar screws and clamping blocks



with torque screwdriver **2,0 - 2,5 Nm** (hexagonal insert: size **3**) tighten

clamping blocks





collar screws

When installing the „partly incomplete machine„

Spindle drive type:
SP 8 xxx in 24 V DC
SP 8-Z xxx in 230 V DC

the following requirements must be met in order to allow correct assembly with other components to produce a complete machine without compromising health and safety of people:

1. The assembly steps / instructions provided must be followed exactly and complied with.
2. The type of drive to be used must be selected to suit the specified range of application (appropriate stroke, stroke force and installation length).
3. Proper fastening accessories (brackets, casement brackets) must be selected for the particular activation type selected. Profile-dependent drilling hole patterns must be adhered to.
4. The fasteners (screws) to be selected for fastening the drive to the window must be compatible with the window material (aluminium, wood, plastic, steel).
5. The installer must use tools in safety-related flawless condition for the assembly and should be aware of all hazards associated with the mechanical and electrical components.
6. The electrical connection must be carried out by authorized electrical contractors in accordance with the generally applicable DIN and VDE provisions.
7. There must be adequate space on the frame and on the casement to accommodate a drive.
8. The risk assessment for the power-operated window must be carried out in advance and, where applicable, safety measures must be taken to reduce the risk. The end user must be notified of the remaining risks.
9. Before installing check that the window is in a faultless mechanical condition. It should open and close easily.

Tools required

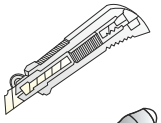
Depending on the application different tools will be needed to fasten the drives and brackets on the window:

- marker

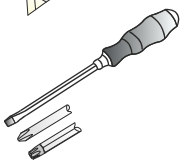
- centre punch

- hammer

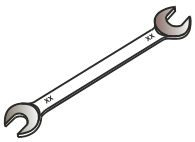
- Knife



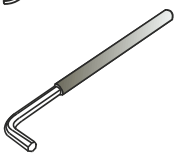
- screwdrivers: for slotted-head, Philips-tip or torx-head screws (depending on the screws used)



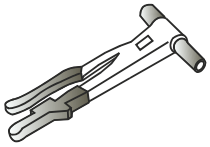
- Spanner sets with SW 13 and SW 14



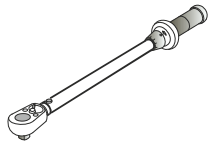
- hexagonal wrench for SW 2,5 / 3 / 4 / 5



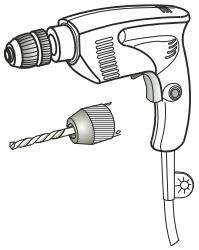
- possibly a tool for blind rivet nuts of size M6



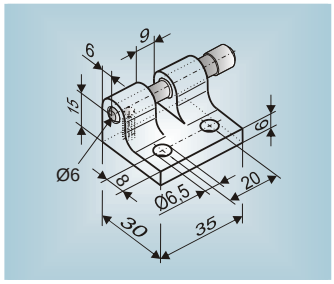
- Torque wrench



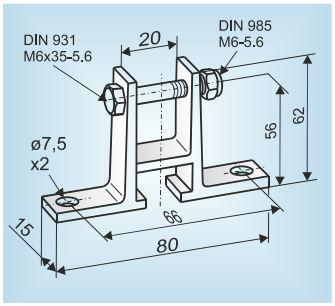
- power drill with appropriate sizes and types of drill bits for aluminium / steel / wood / plastic



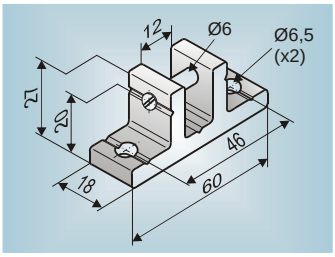
- Threadlocker adhesive



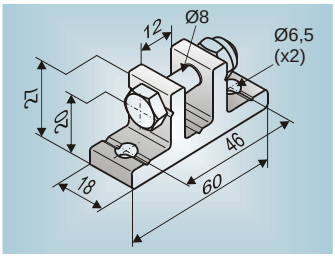
F 1 casement bracket
with locking bolt Ø **6 mm**
Max load. **1000 N**
ord.no. *150102*



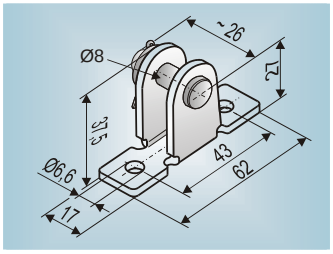
F 2 casement bracket
extruded aluminium,
for Eternit roof lights
Max load. **800 N**
ord.no. *150303*



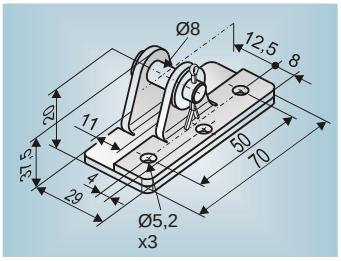
F 10.6 casement bracket
aluminium, with threaded stud M6
Max load. **1600 N**
ord.no. *151000*



F 10.8S casement bracket
aluminium, with M8 x 35 hex
head bolt, M8-DIN 985 nut
Heavy duty version
ord.no. *151105*

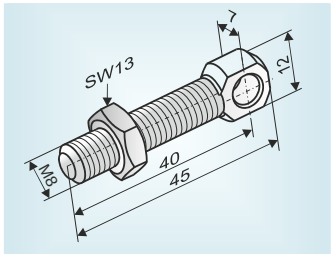


F 11 casement bracket
with Ø 8 mm bolt, washer,
cotter pin
Max load**. 1600 N**
Steel, bright zinc-plated - ord.no*. 151400*
Stainless steel - ord.no. *151401*



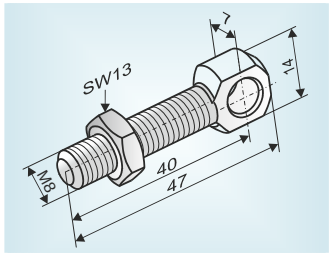
F 13 casement bracket
with Ø 8 mm bolt, washer,
cotter pin
Max load. **1600 N**

Steel, bright zinc-plated
ord.no.*151405*



„AS“ eyebolt
M 8 x 40 mm
(with nut M8 DIN 439)
eye Ø **6 mm**, bright zinc-plated

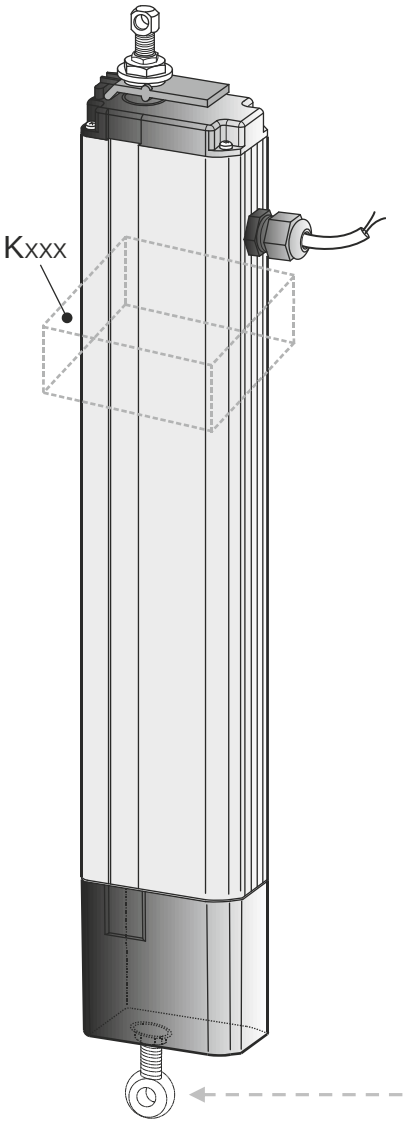
ord.no. *105400*
(included in the delivery)

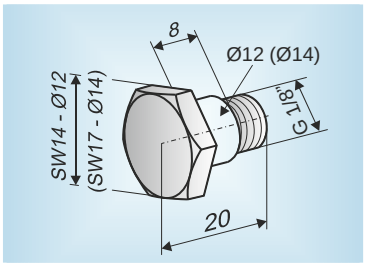


„AS“ eyebolt
M 8 x 40 mm
(with nut M8 DIN 439)
eye Ø **8 mm**, bright zinc-plated

ord.no. *105420*
(optional)

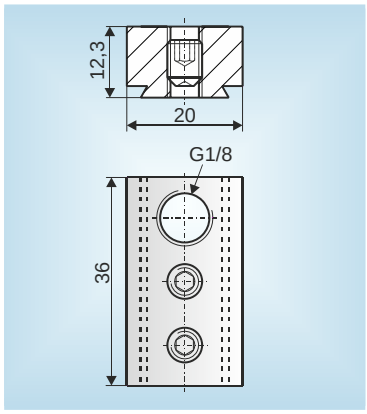
Mounting brackets with thick clamping blocks





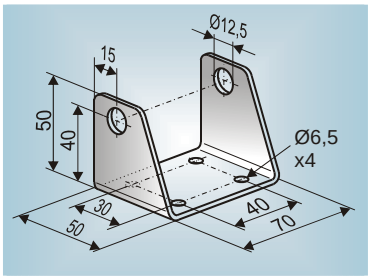
„BS“ collar screw G 1/8
spare part for varios brackets
with Ø 12,5 mm borehole

Collar Ø **12 mm** - ord.no. *172800*



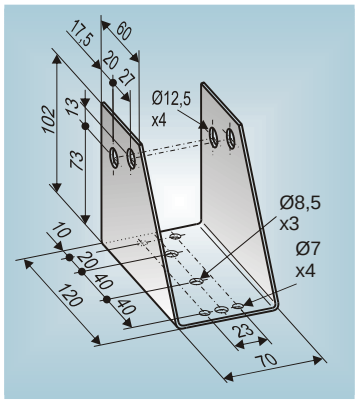
„KS“ clamping block SP-thick
aluminum,
for mounting brackets K5, K7
incl. 2 collar screws Ø 12 mm

threaded **G1/8** - ord.no. *513901*



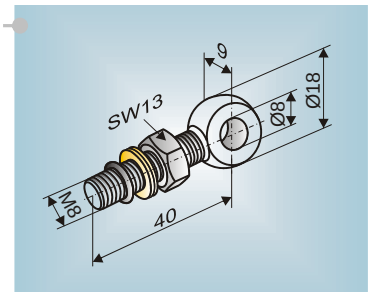
K 5 mounting bracket
stainless steel (V2A),
with Ø 12.5 mm hole
- for clamping fitting with
2x Ø 12 mm collar screws

ord.*no. 155800*



K 7 mounting bracket
steel, bright zinc-plated
with Ø 12.5 mm hole
- for clamping fitting with
2x Ø 12 mm collar screws

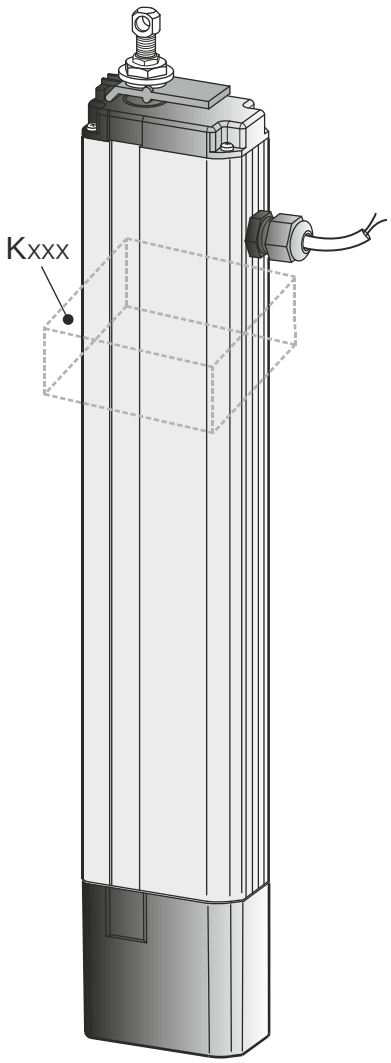
ord.no. *157500*

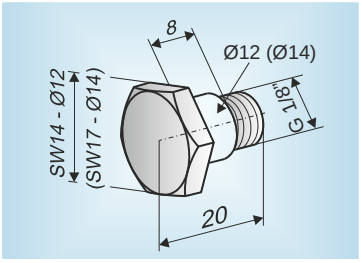


„AS“ eyebolt - optional
M8 x 40 mm
(with Nordlock washer and o-ring,
glued in by factory)

Eye Ø **8 mm**, bright zinc-plated

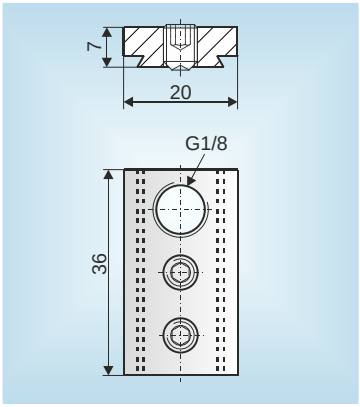
ord.no. *512002*





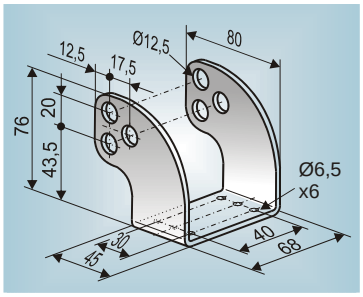
„BS“ collar screw G 1/8
spare part for varios brackets
with Ø 12,5 mm borehole

Collar Ø 12 mm - ord.no. *172800*



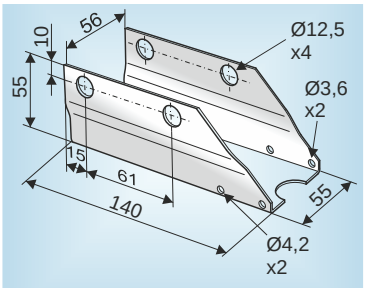
„KS“ clamping block SP-thin
aluminum,
for mounting brackets K82, K4-long
incl. 2 collar screws Ø 12 mm

threaded **G1/8** - ord.no. *513902*



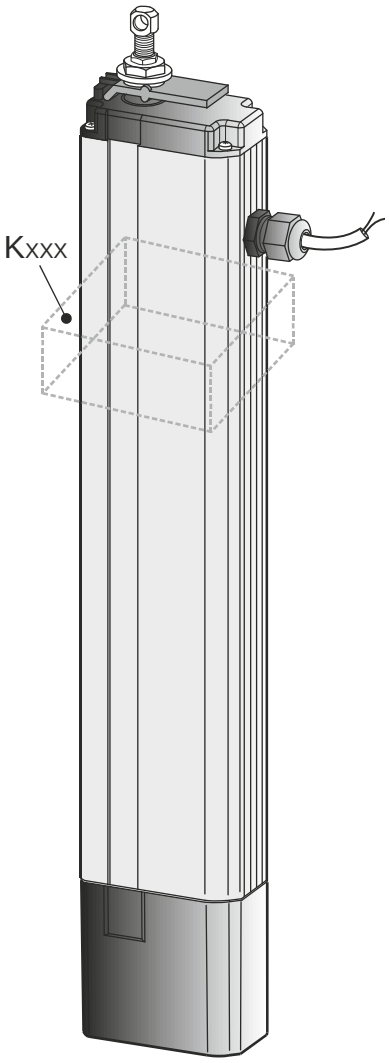
K 82 mounting bracket
stainless steel (V2A)
with Ø 12.5 mm hole
- for clamping fitting with
  2x Ø 12 mm collar screws

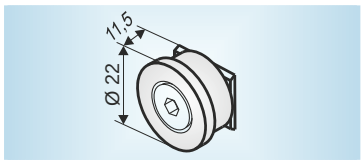
ord.no. *151320*



K 4-long mounting bracket
steel, bright zinc-plated
with Ø 12.5 mm hole
- for clamping fitting with
  2x Ø 12 mm collar screws

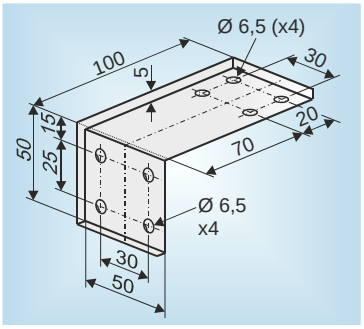
ord.no. *155610*



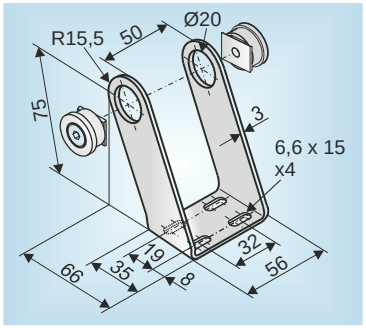


„KVS“ Clamping bolts
2 pcs.
for various brackets with
Ø 20 mm hole

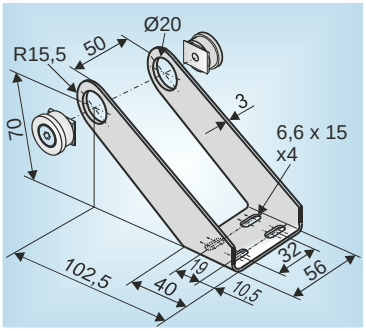
ord.no. *155010*



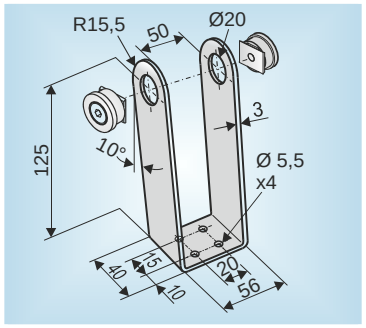
K 9 mounting bracket
aluminium E6/C-0
- for mounting with various brackets
ord.no. *158501*



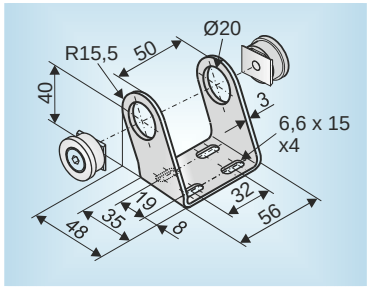
K 57 mounting bracket
- with Ø 20 mm hole
steel, br. zinc-plated - ord.no. *160930*
steel, RAL 9010 - ord.no. *160933*



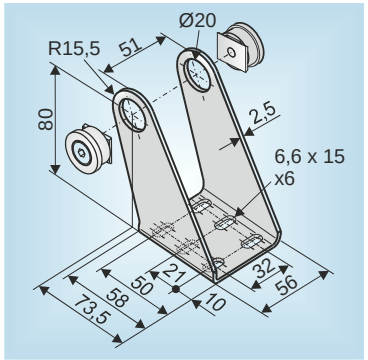
K 57.2 mounting bracket
- with Ø 20 mm hole
steel, br. zinc-plated - ord.no. *160931*
steel, RAL 9010 - ord.no. *160936*



K 57.3 mounting bracket
- with Ø 20 mm hole
steel, br. zinc-plated - ord.no. *160935*



K 59 mounting bracket
- with Ø 20 mm hole
steel, RAL 9006 - ord.no. *160934*
steel, RAL 9010 - ord.no. *160932*



K 92 mounting bracket
- with Ø 20 mm hole
steel, RAL 9010 - ord.no. *160937*

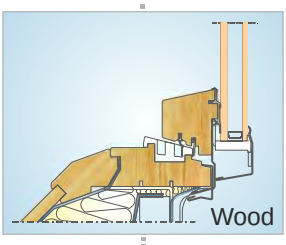
⚠ CAUTION The selection of appropriate fasteners is an **important prerequisite** for the safe and proper operation of drives on power-operated windows. Only use specified fasteners!

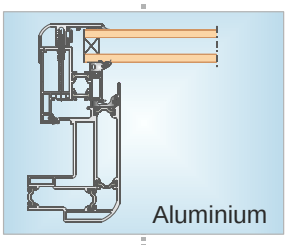
Check before start of assembly which fasteners of size 6 can be used!
All clamping and mounting screws shall be checked for tight fit and must be re-tightened, if necessary.

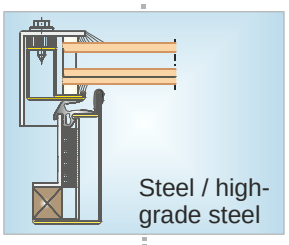
We recommend using thread-locking compound (e.g. Loctite) to secure the fasteners against loosening due to vibrations caused by moving of the casement via drive.

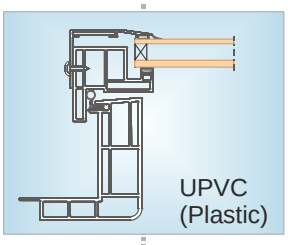
In case of doubt please consult the window manufacturer and/or the drive supplier.

Window profile - examples









Specified fasteners

Wood screws
size 6

such as:
DIN 96
DIN 7996
DIN 571

with head type
round head with slot
round head w. cross
or hex head
or special type

Recommendation
Secure screws against loosening by adding wood adhesive

Thread /,
self-tapping /
or sheet-metal screws
of size M5 or ST4.8

such as:
ISO 4762, ISO 4017
ISO 7049, ISO 7085
DIN 7500

with head type
Cylinder head with hex socket, internal serration (Torx), Phillips or external hex head

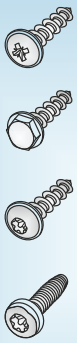
Blind rivet nut
size M6 e.g. with knurled countersunk head

Thread /,
self-tapping /
or sheet-metal screws
of size M5 or ST4.8

such as:
ISO 4762, ISO 4017
ISO 7049, ISO 7085
DIN 7500

with head type
Cylinder head with hex socket, internal serration (Torx), Phillips or external hex head

Blind rivet nut
size M6 e.g. with knurled countersunk head



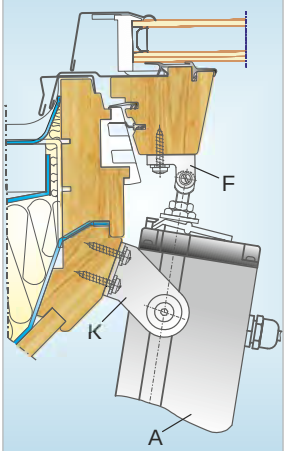
Screws for plastic
size 6 or
sheet-metal screws
ST4.8

such as:
DIN 95606
DIN 95607
ISO 7049
ISO 7085
DIN 7500

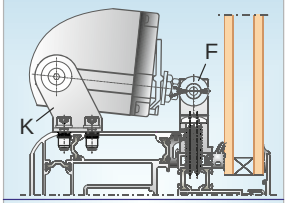
with head type
round head with cross or external hex head or special form with internal serration

Mounting examples

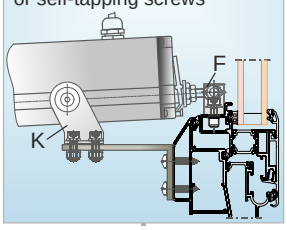
Wood screws



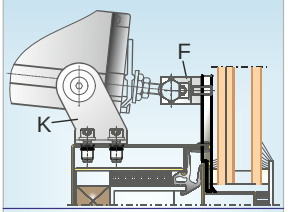
Metric screws with blind rivet nuts



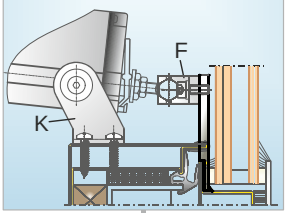
Sheet-metal screws or self-tapping screws



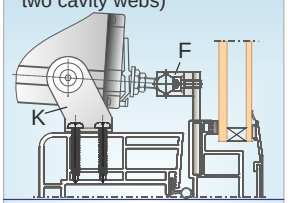
Metric screws with blind rivet nuts



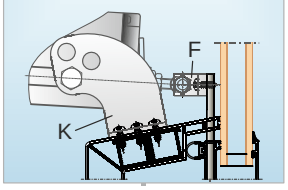
Sheet-metal screws or self-tapping screws



Screws for plastic
(if possible, screw through two cavity webs)

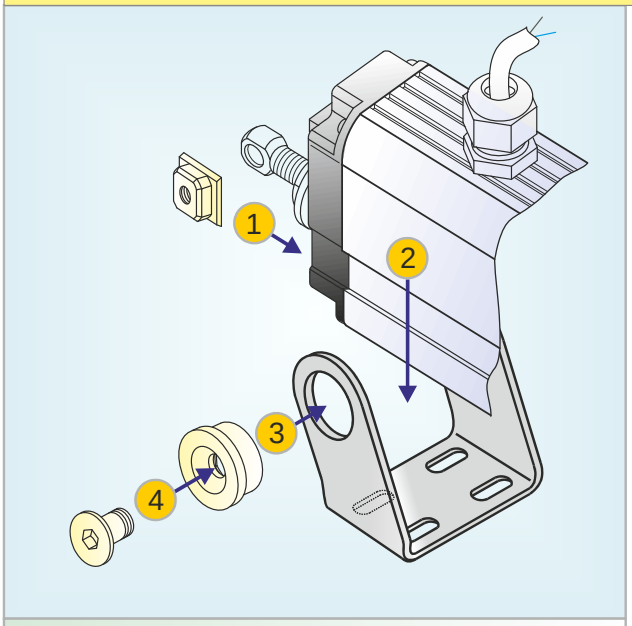


Sheet-metal screws or self-tapping screws (screwed into steel cavity reinforcement)



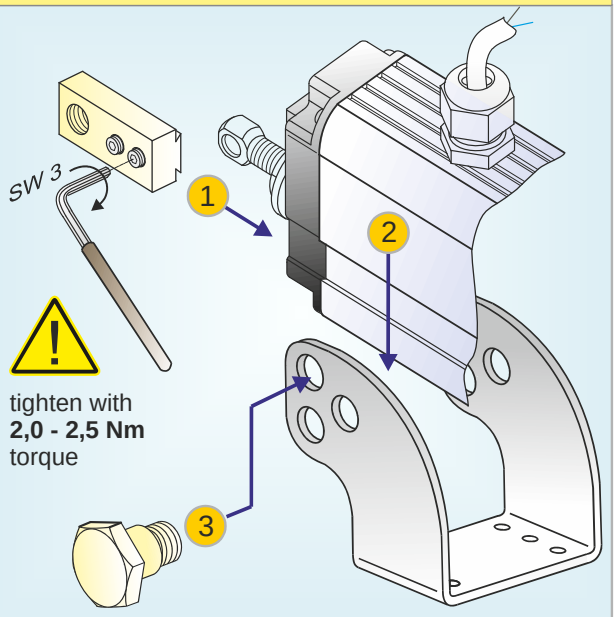
The use of appropriate screws depends on the window material and on the formation and thickness of the profile. It also depends on the forces that are applied to the window by the drives. Depending on the profile system different fasteners may be suitable. This must be checked prior to assembly.

Positioning and fixation of brackets



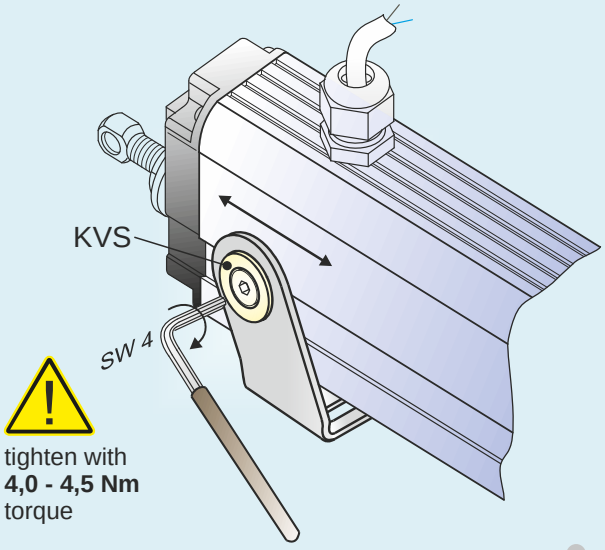
Fixation of brackets in guide of sliding link with clamping screws

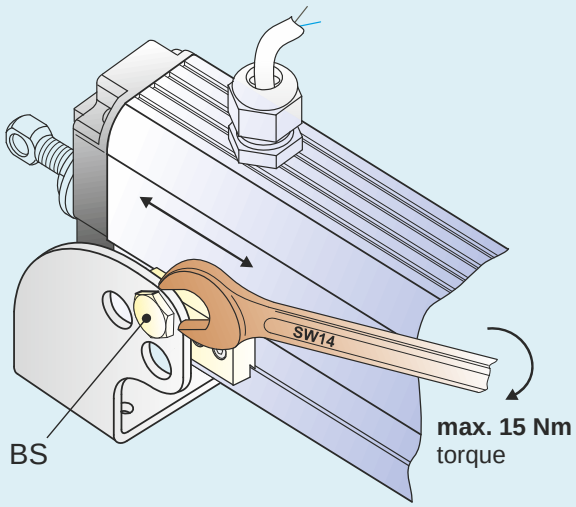
- insert clamping stones on both sides of drive
- position drive in bracket
- insert sliding screws
- tighten with socket head screws (ensure correct torque!)



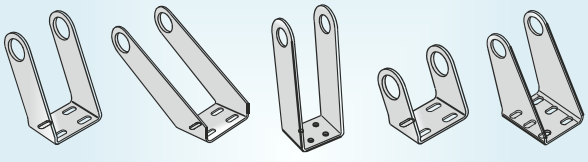
Fixation of brackets in guide of sliding link with collar screws and clamping blocks

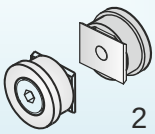
- insert clamping blocks on both sides of drive and tight. them
- position drive in bracket
- insert collar screws and tighten with SW14 wrench (max. torque = 15Nm)



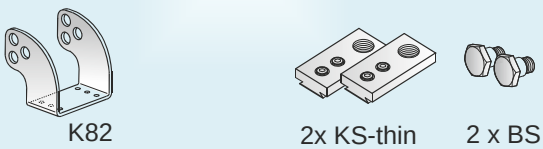


Application with:

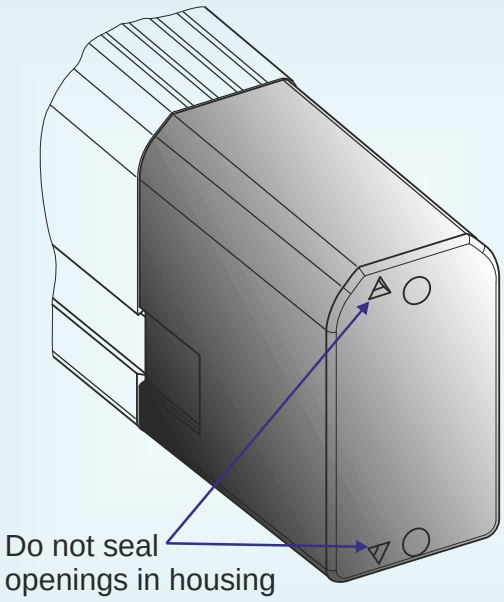




Application with:

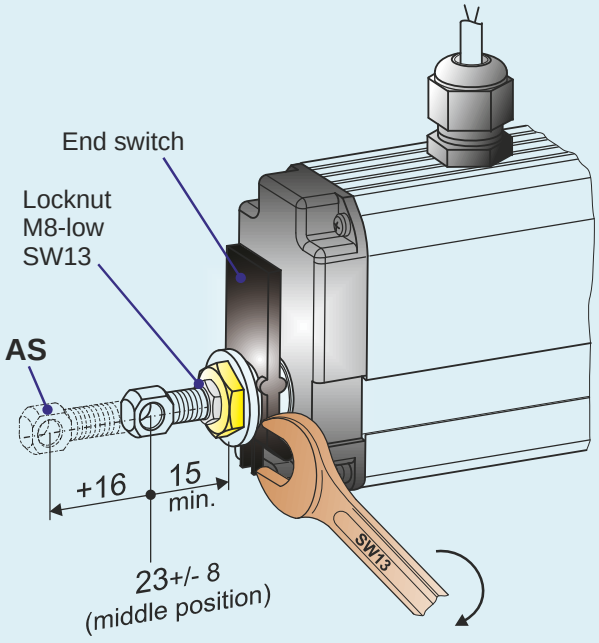


Adjustment possibilities



- openings may not be sealed with any materials whatsoever

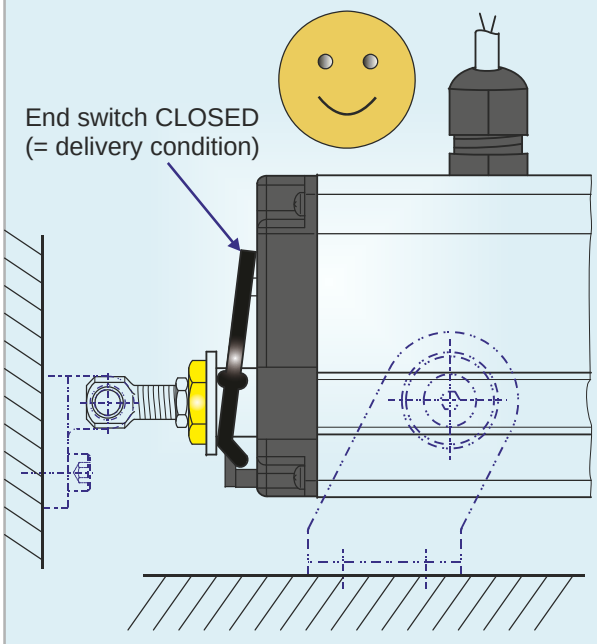
- do not insert objects such as wire, screw drivers, etc. in openings



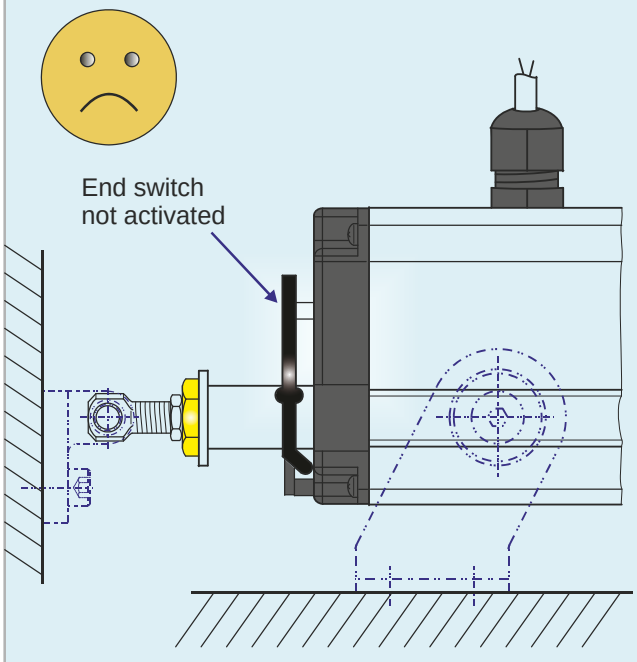
Adjustment possibility for disconnection

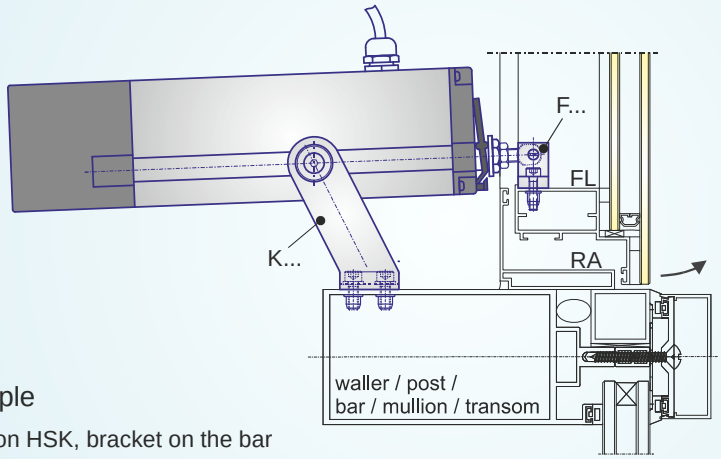
- loosen lock nut
- manually turn AS inward and / or outward (dependent on assembly)
- tighten lock nut again
- ensure that drive shuts off via end switch and not via overload

The end switch has to be pushed/activated when the window is closed.



Drive switches off on overload

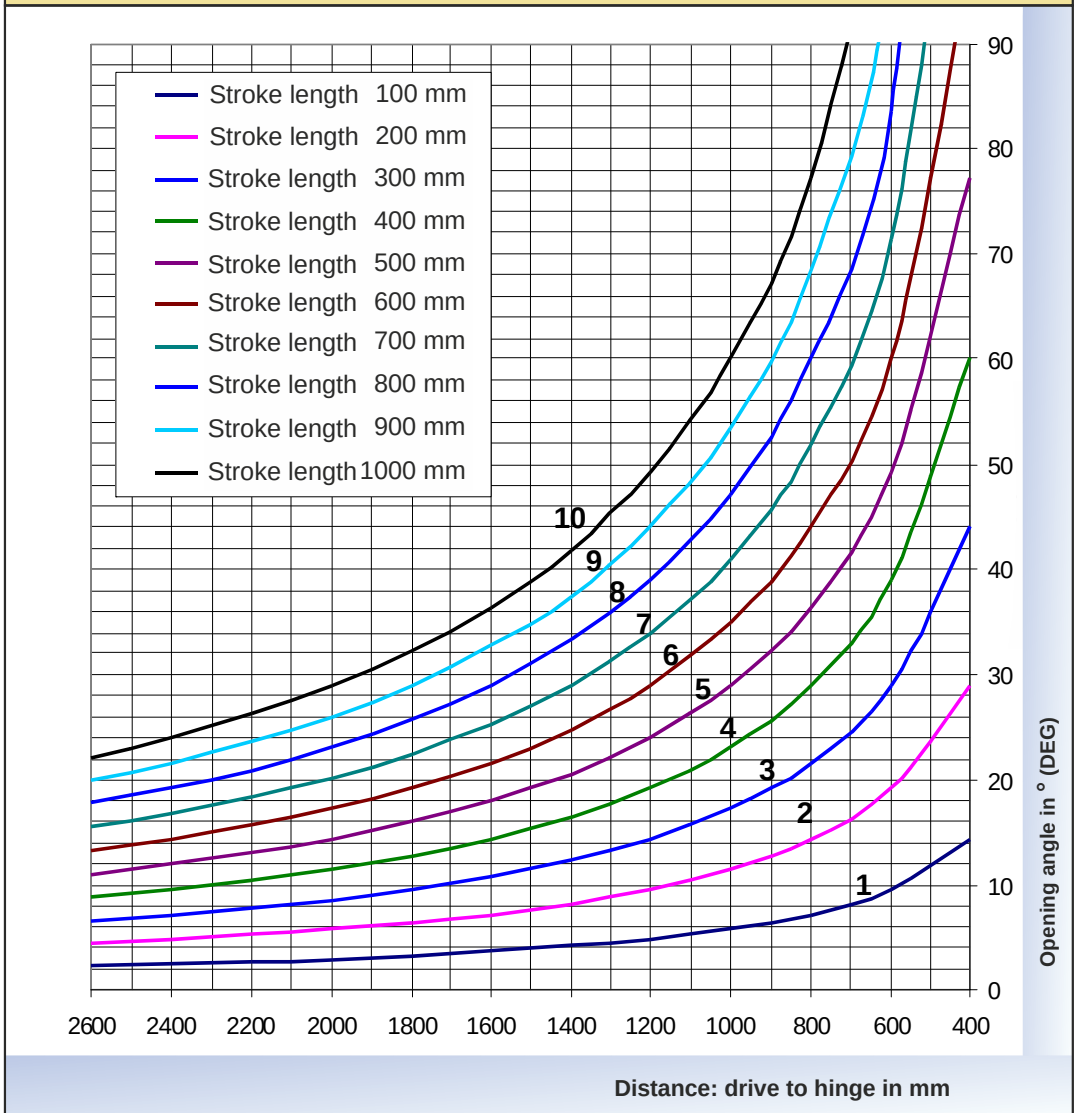




Mounting example

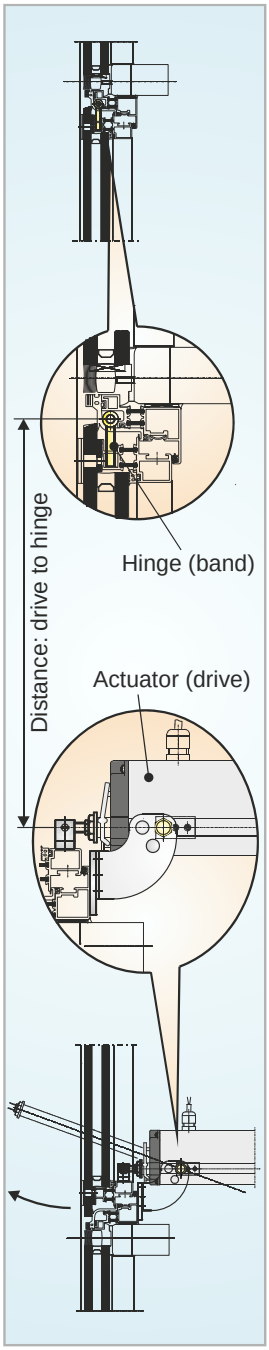
Activation directly on HSK, bracket on the bar

For drives acting directly on the leading edge (HSK), the opening angle depends on the distance between the hinge (pivot axis) and the actuation point of the drive and its stroke length, plus the opening width at the actuation point. This diagram helps work this out.

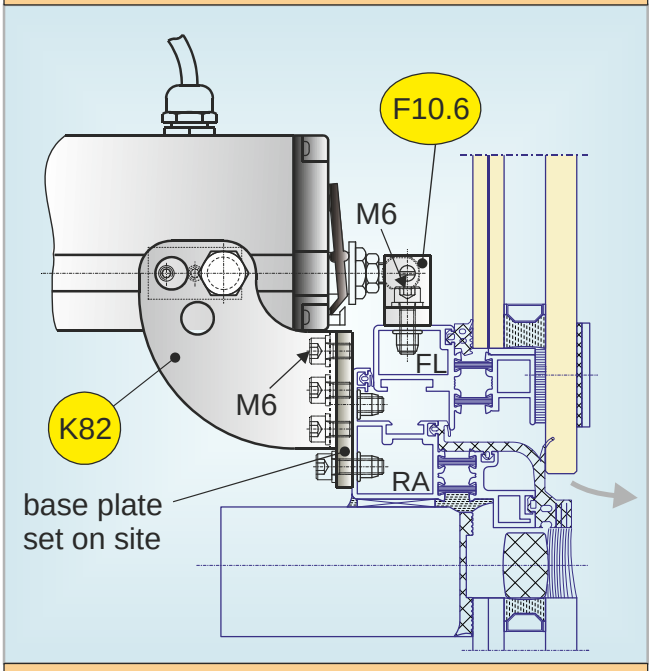


Note: When fitting the drive to the HSK, the window height defines the opening angle!

This window sizing chart is a general guide to help establish the most appropriate stroke actuator for the window opening required.
To enable the exact opening area to be established the specific window size and profile details are needed.

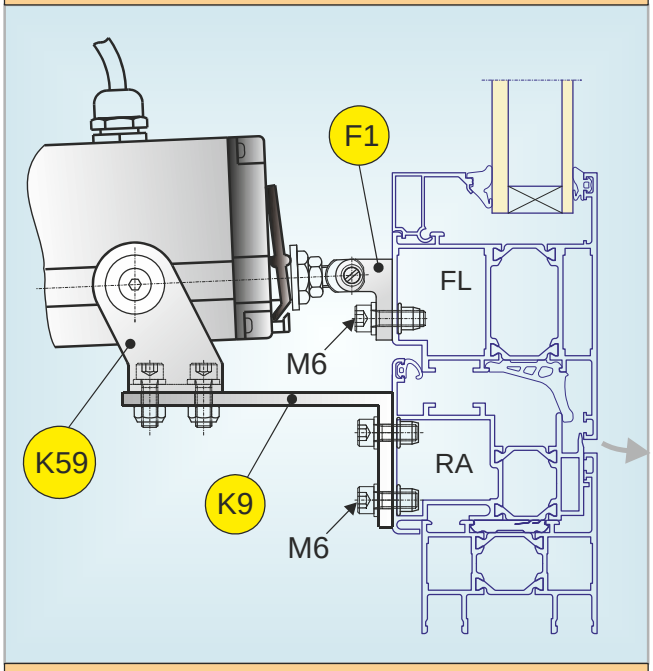


Facade window
e.g. top hung projecting casement



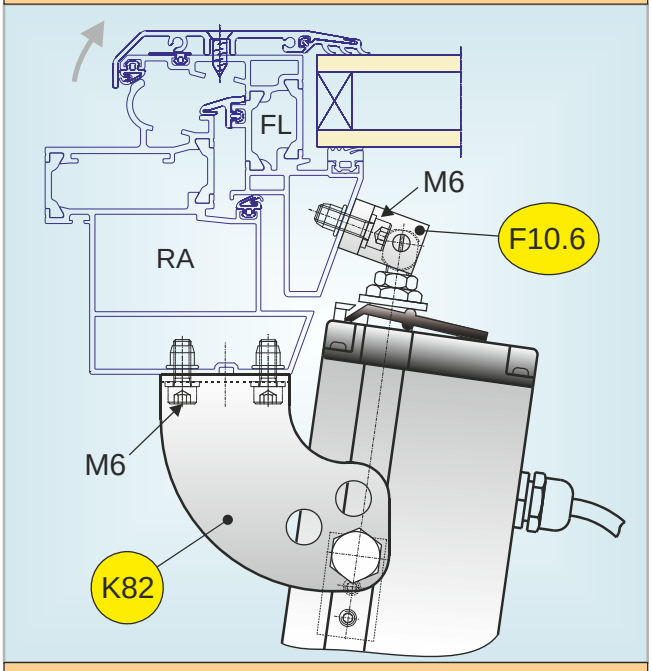
outward opening on HSK

Facade window
e.g. top hung or horizontally pivot. casem.



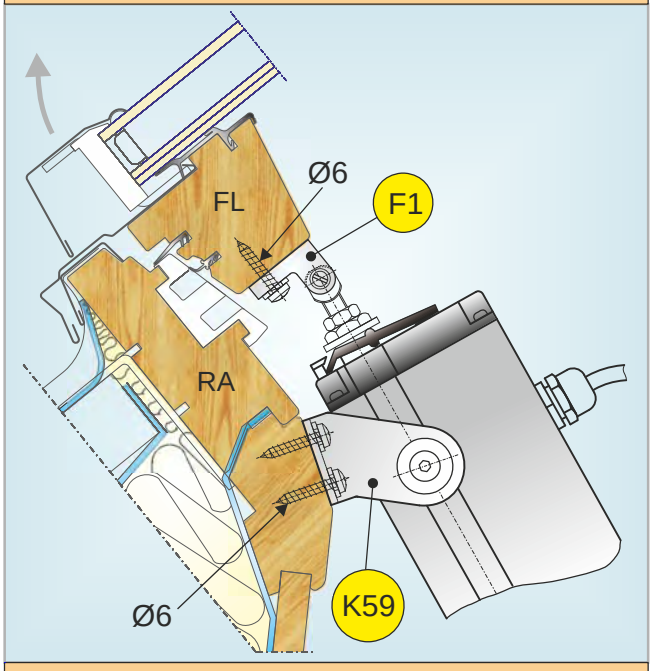
outward opening on HSK

Roof casement system:
SCHÜCO AWS 57RO

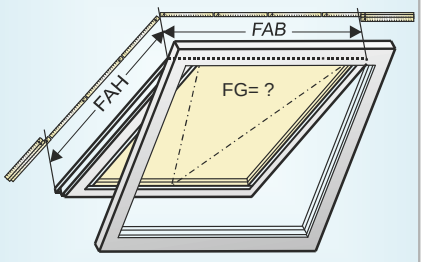


outward opening on HSK

Roof casement system: FAKRO



outward opening on HSK



1

Check window size on site
- Measure FAB and FAH, possibly recalculate casement weight
- Compare with project drawings or consult our specialized personnel

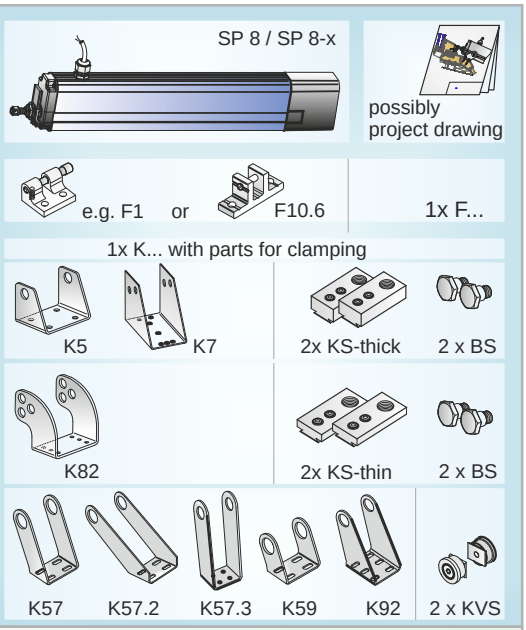
for roof windows
for SHEV's

Example calculation

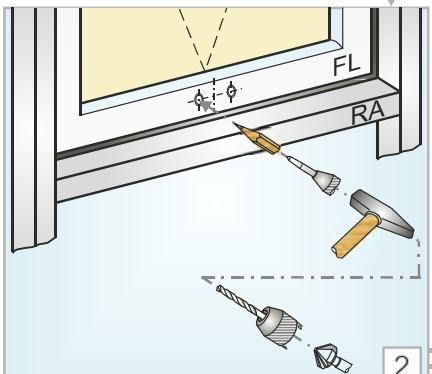
Calculate snow load based on national norms/directiv. (DIN 1055-5 for Germany)

Total weight =
FG + snow load

Total weight =
(50 + 100)kg = 150kg



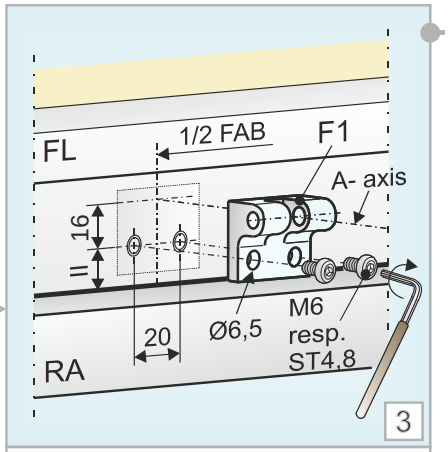
Check if delivered products are complete



2

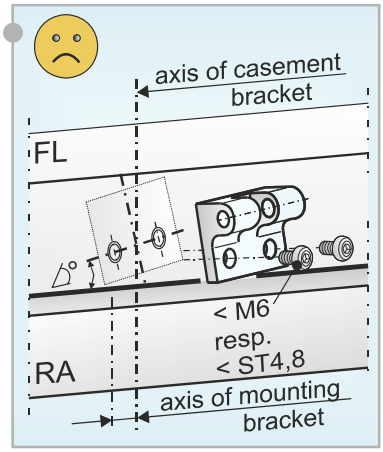
Determine fasteners
- see guide on page 20

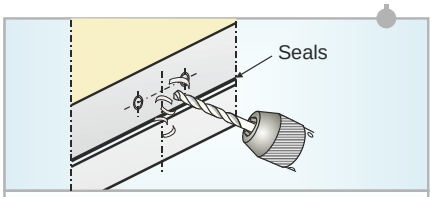
Produce holes of the correct Ø
- Refer to the general or project-specific documents for the correct dimensions or determine them on site



3

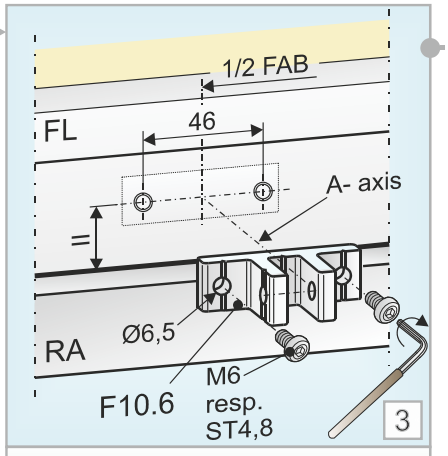
Fit the casement bracket F1
- make sure it is parallel to the edge of the window





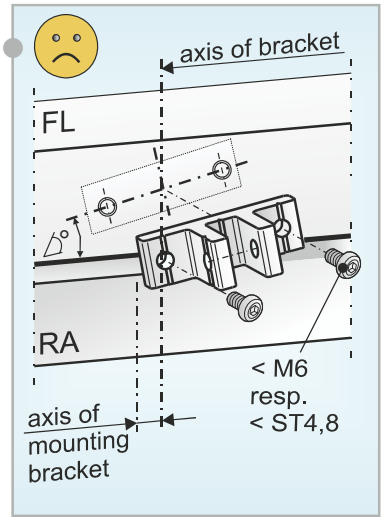
Avoid damage to material and property

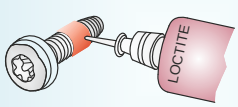
- Carefully clear away drilling swarfs to prevent seals from being damaged
- Avoid surface scratches, for example by using masking tape



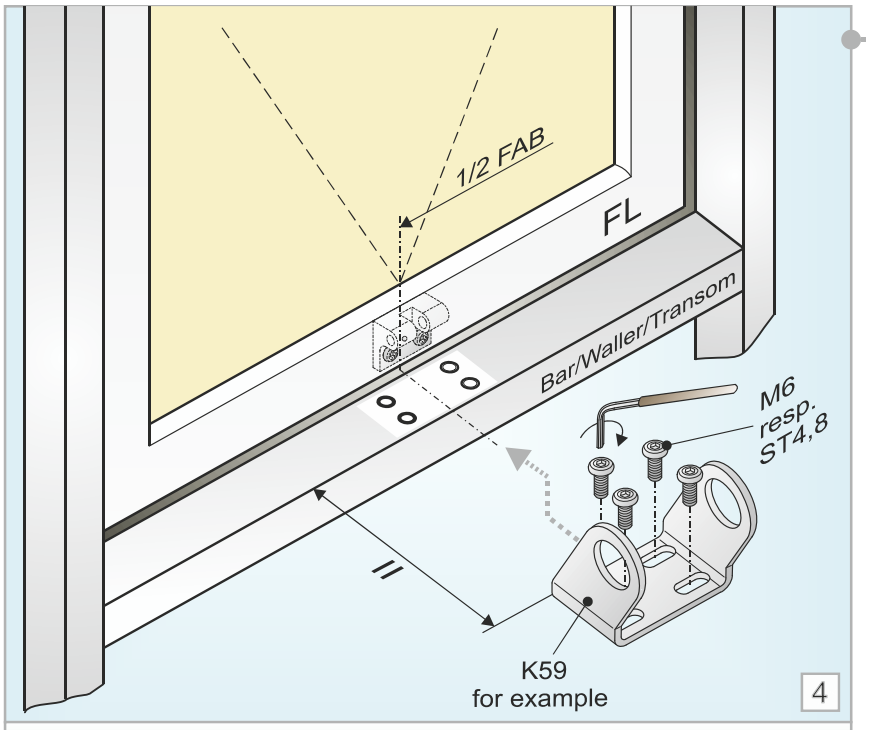
3

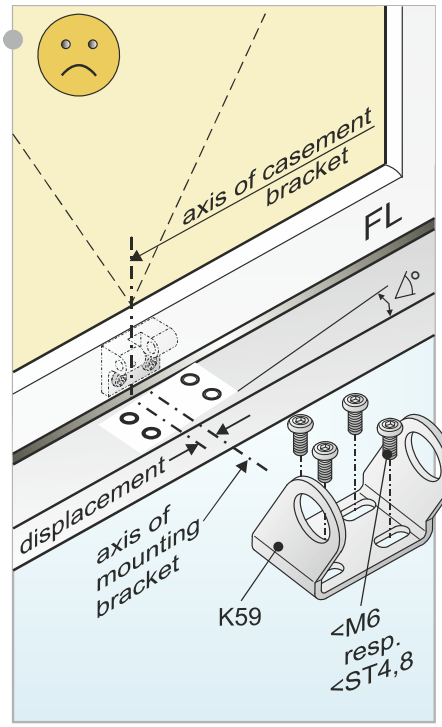
Fit the casement bracket F10.6
- make sure it is parallel to the edge of the window



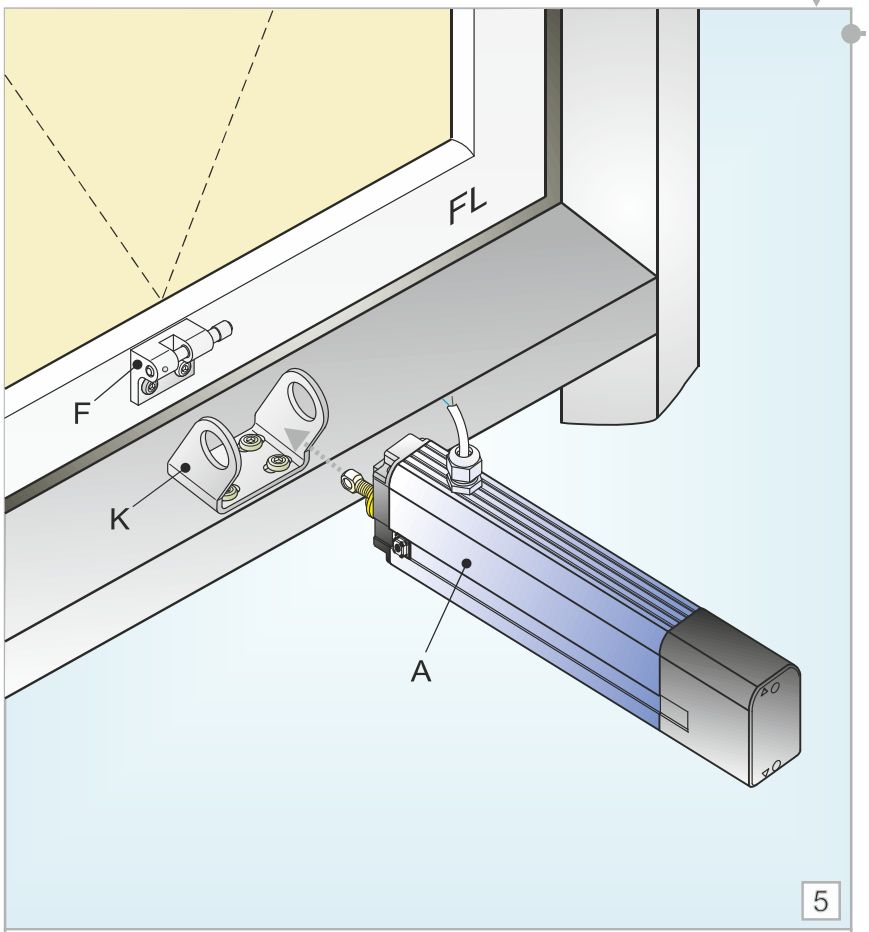


Secure fasteners against loosening
- e.g. by applying removable thread-locking compound

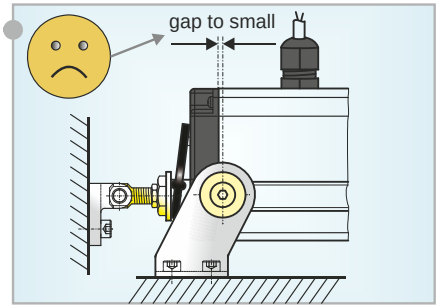


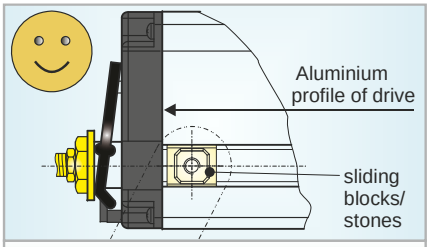


Screw on mounting bracket e.g. K59
- borehole intervals determined on site (Dimensions for brackets see page 17 - 19)
- make sure it is parallel to the edge of the window

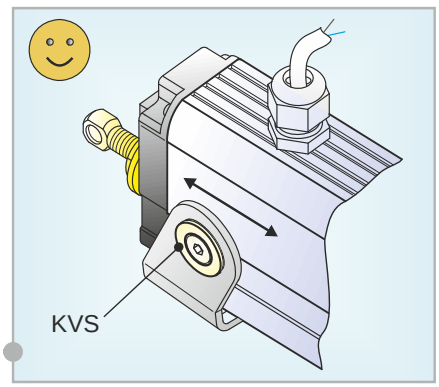


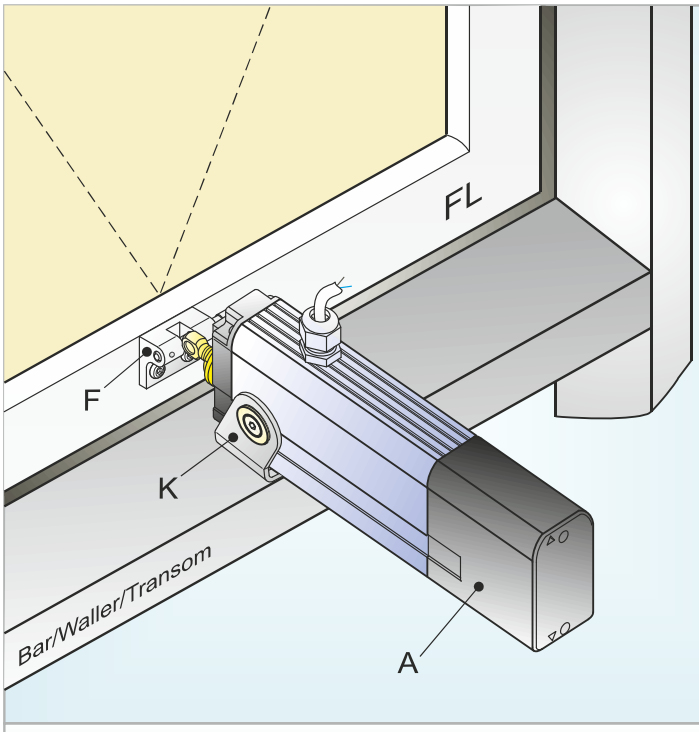
Hang drive in mounting brackets e.g. K59
- for installation of bracket positioning / fixing - see page 21 & 22
- Do not tighten yet- drive still has to remain moveable





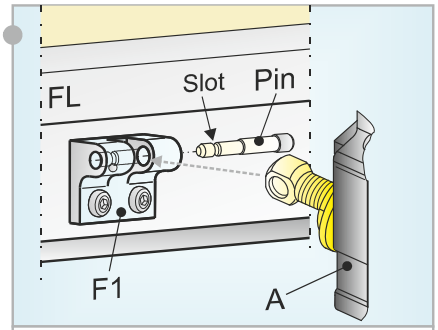
Positioning of clamping blocks / stones
- these must be inserted completely into the drive profile



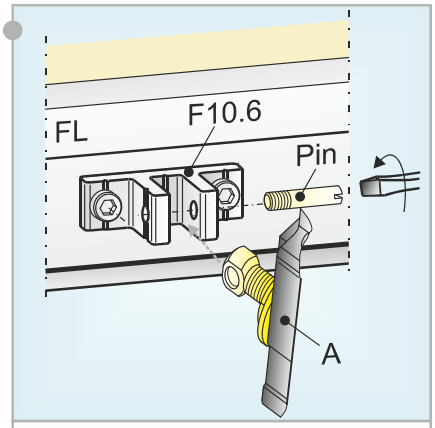


6

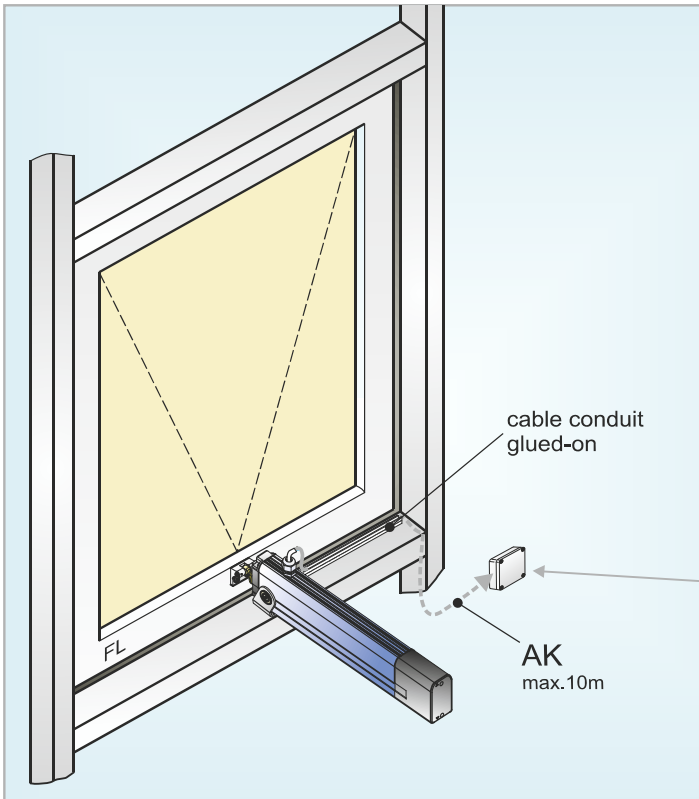
Connect drive with casement bracket
- adjust eyebolt if necessary (see page 22)
- adjust contact pressure of casement by regulating the eyebolt and by sliding the drive in the bracket
- make sure that the drive shut off via end switch (see page 22)



Suspend the drive in casem. bracket **F1**
- insert pin
- the pin needs to slot in securely (Clicking sound coming)



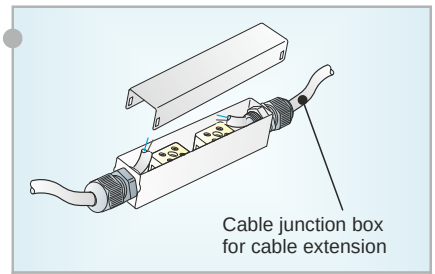
Suspend the drive in cas. bracket **F10.6**
- screw in pin
- secure pin from loosening itself with glue



7

Route cable according to on-site situation on frame or bar (waler)

- the cable must adapt to pivoting angle of the drive (lay with strap)
- Cable must be protected against damage such as shearing off, kinking, cracking

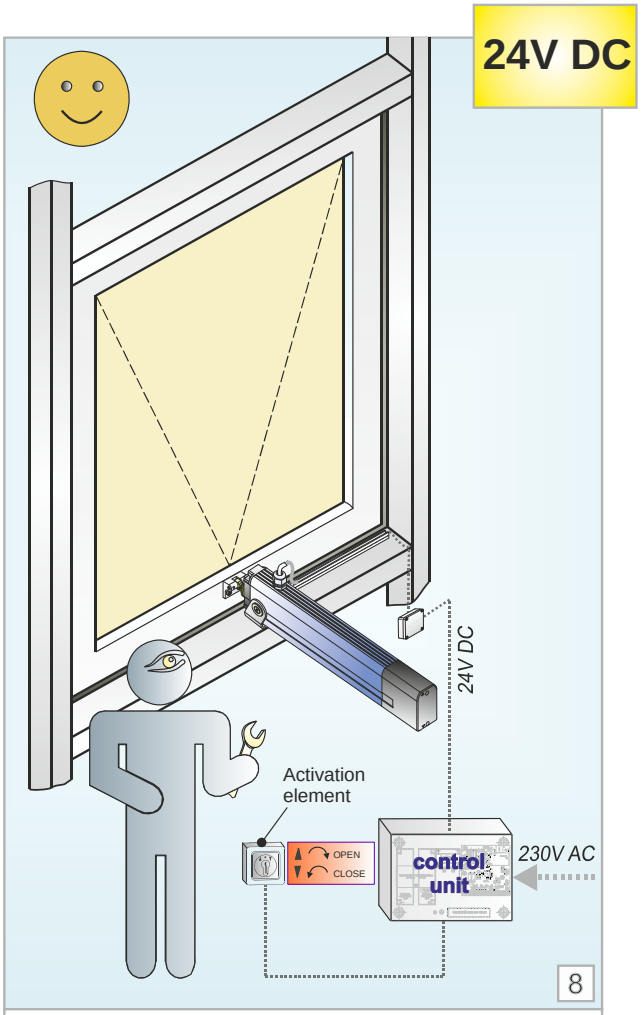


Ways to extend connecting cable

- make sure the voltage loss is no more than 2 V
- max. extension up to 10 m

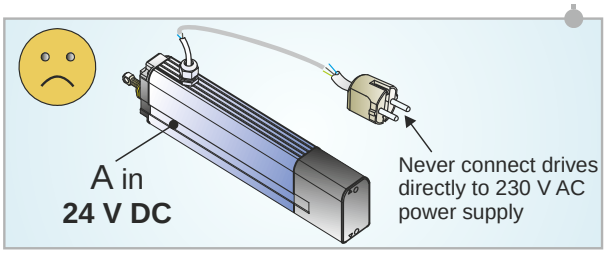
Install site-supplied junction box and carry out electrical connection (see pages 29 & 30)

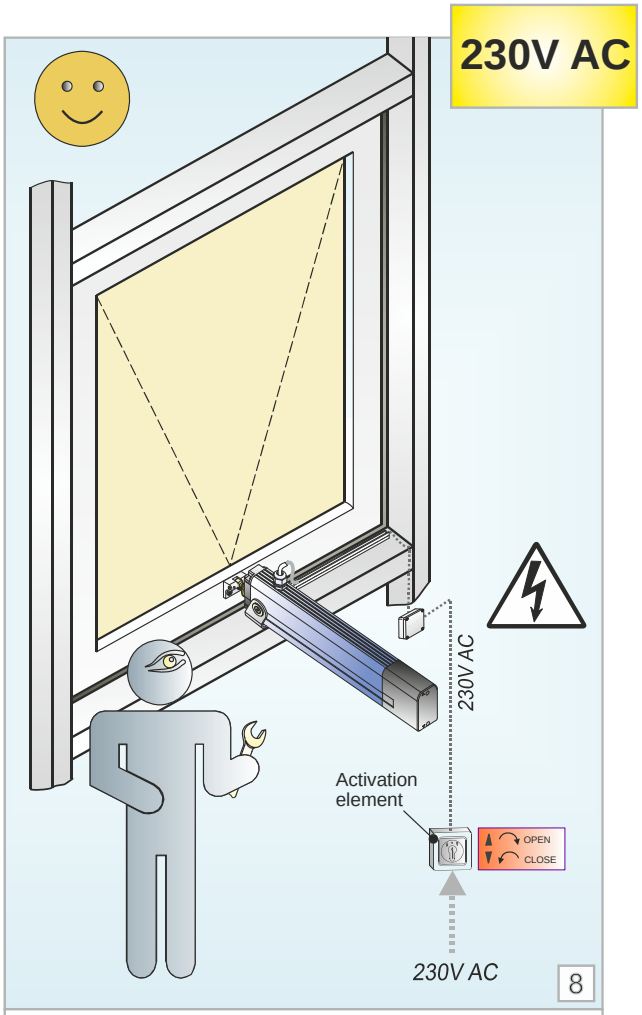
- close to the window – must be easily accessible later on
- Avoid any installation area with large temperature differences, risk of water condensation
- Observe maximum cable length of drives, standard length approx. 1 m
- Ensure that a later removal of the connection cable is possible



Check safety of assembled system
- Connect control voltage
- Check fasteners (brackets, mounting brackets) and tighten as necessary

Perform operational test
- Visual inspection of casement movements
- Immediately stop the system in case of malfunction
- Make sure there are no collisions with the facade construction and, if necessary, take corrective measures or re-configure the drives





Check safety of assembled system
- Connect control voltage
- Check fasteners (brackets, mounting brackets) and tighten as necessary

Perform operational test
- Visual inspection of casement movements
- Immediately stop the system in case of malfunction
- Make sure there are no collisions with the facade construction and, if necessary, take corrective measures or re-configure the drives

NOTICE Once the mounting has been completed, the health and safety requirements set out in the **Machinery Directive MD 2006/42/EC** must be adhered to.

⚠ WARNING Where windows are within easy reach (below a distance of 2.5 m from the bottom edge of the window to the finished floor) the **warning sign** must be clearly attached on the casement or on the frame!
Furthermore, the installer of the power-operated window must carry out a risk assessment.

The protection class for the window specified by the project planner must be complied with!

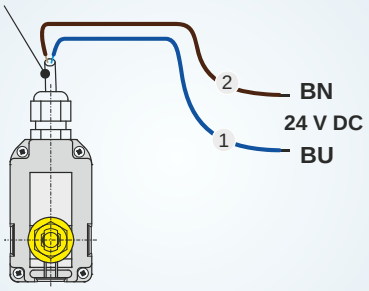
Carry out the electrical connection according to the drive variant.

Note: The direction of travel of the drive may be changed by interchanging (polarity reversal) the wires „**BN – (brown)** “ - „**BU – (blue)**“ .

24 V DC

Version: without Z (close) contact

Silicone cable
2 x 0,75mm²



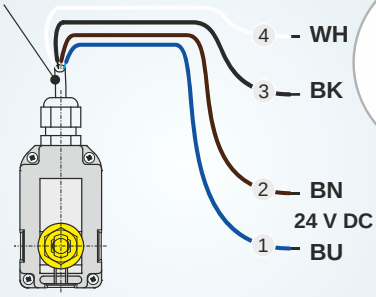
	+	-
BN	+	-
BU	-	+

Drive type: **SP 8**

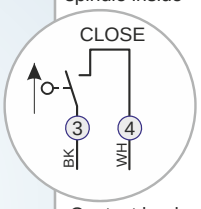
(with electronic end switches and overload disconnection)

Version: with Z (close) contact

Silicone cable
4 x 0,75mm²



Switch position with spindle inside



Contact load:
max. 48V
min. 12V DC, 10mA

	+	-
BN	+	-
BU	-	+

Drive type: **SP 8- Z**

(with electronic end switches and overload disconnection and additional floating contact for closed position)

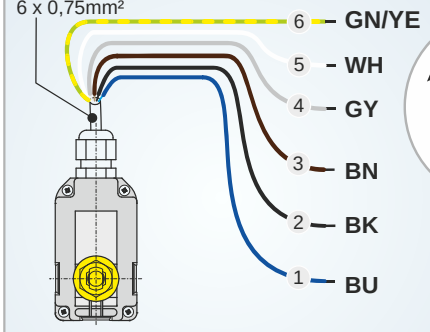
230 V AC

Attention! Danger of electric shock!

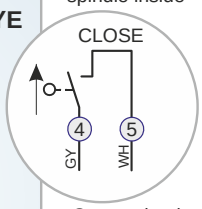
Make sure that no 230 V line voltage is live on terminals during the drive connection !
- Note: Switch off the operation voltage after ca. 3 min. in order to save energy (accord. to regulations of Euro ACE)
- Drive is not suitable for **direct** switch-over of the running direction !

Version: with Z (close) contact

PVC cable
6 x 0,75mm²



Switch position with spindle inside



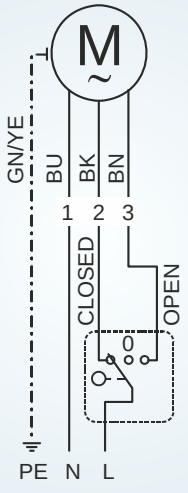
Contact load:
max. 230V AC, 2A
min. 12V DC, 10mA

	open	close
L	BN	BK

Drive type: **SP 8-Z**

(with electronic end switches and overload disconnection and additional floating contact for closed position)

Connection diagram

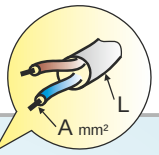


230 V, 50 Hz

Note:
Unused wires must be safely terminated – risk of short-circuit!
- Please pay regard to the general safety instructions on page 6 and page 33 (cable routing).

Direction of travel		Reverse polarity
OPEN	↑	+ - ↑
CLOSE	↓	- + ↓

Wire colour coding	
Colour	according to IEC 757
BLACK	BK
WHITE	WH
BROWN	BN
BLUE	BU
GREEN / YELLOW	GN/YE
GREY	GY



Calculation formula

for cable size required for a motor line

$$A_{mm^2} = \frac{I_{(Total)} \times L_{(Length\ of\ motor\ line)} \times 2}{2{,}0\ V_{(Maximum\ voltage\ drop)} \times 56\ m/(\Omega * mm^2)}$$

Example calculation

Available figures:
- Drive current for each drive (2 x 0.8 A) from data sheet
- Length of cable run from last window to control unit (e.g. 10m)

$$A = \frac{(2x4{,}0A) \times 10m \times 2}{2{,}0V \times 56m/(\Omega * mm^2)}$$

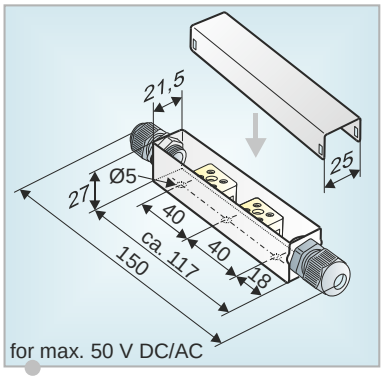
$A = 1{,}42mm^2 \rightarrow$ **1,5mm²** selected

The number of wires required can be found in the wiring diagram

Please note the valid guidelines and directives, e.g. DIN 4102-12 relating to preserving the functionality of a wiring system (E30, E60, E90) and the guidelines relating to the building!

Recommendation:

When you select a cable, use one with the next highest wire cross-section in order to accommodate subsequent changes to the system (e.g. replacement of drive for stronger ones with greater power consumption or extending the SHE or ventilation line).



Cable junction box
for extending a drive cable

stainless steel (V2A), IP40
Dimension (W x H x L): 25 x 27 x 150 mm

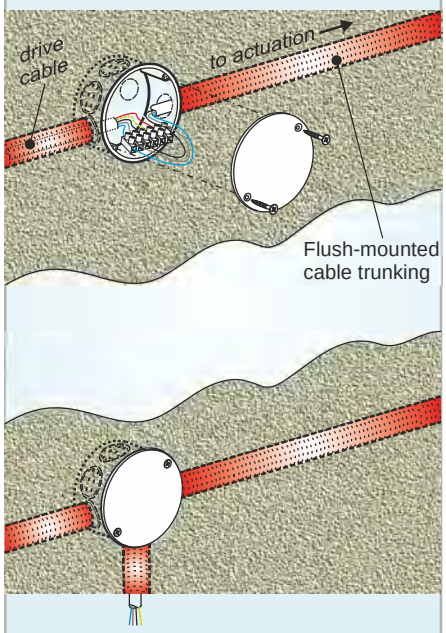
with PG9 (grey) cable glands and strain relief,
with loose ceramic terminals,

for low voltage up to 50 V DC/AC only

ord.no. *513344*

Possibilities for connection of drive cable

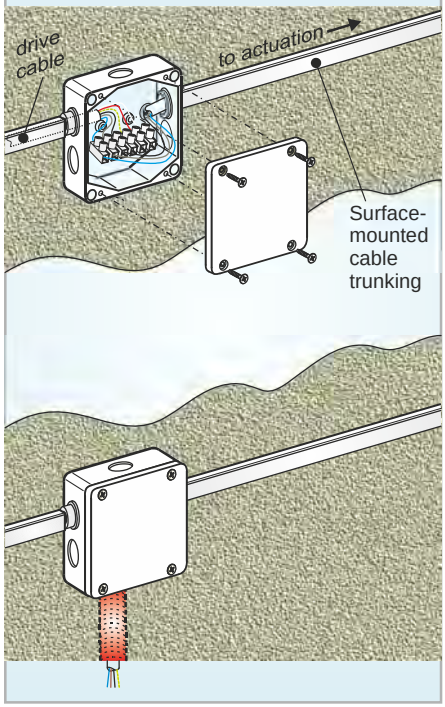
in flush-mounted junction box



Connecting the drive cable

- avoid installing in areas with large temperature fluctuations - risk of condensation forming
- near the window, needs to be accessible later for any repairs
- make sure that dismounting is possible
- note cable length of drives, standard length approx. 1 m

in surface-mounted junction box



Target group

This operating instructions is intended for operators instructed in Natural Smoke Exhaust system (NSE / SHEV) and natural ventilation of the window with knowledge of operating modes, as well as the Rest-Risks of the system.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
Children should be supervised to ensure that they do not play with the appliance.

Operation of power-operated windows

The manual switch with OFF default setting (e.g. key switch) must be positioned within eyeshot of the operated window but in a safe distance from moving parts.
If it is not a key switch, the operating element must be mounted at a height of at least 1.5 m and out of reach for unauthorized operation.

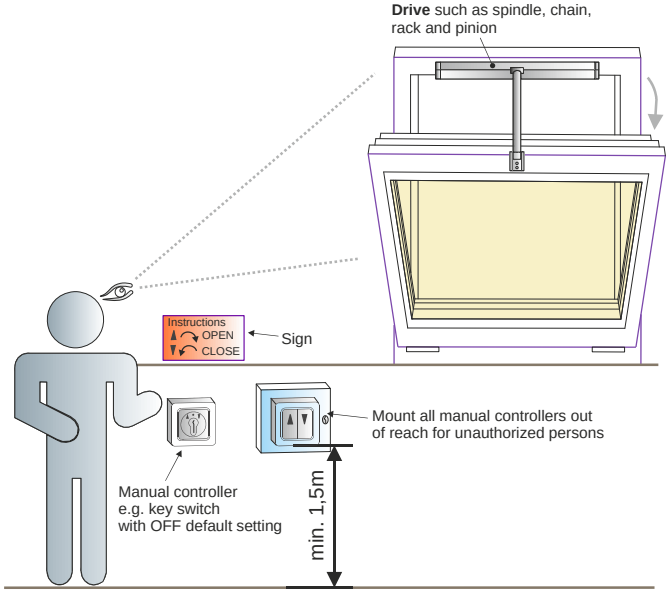
Drives that are operated by a handheld controller must be provided with a sign indicating how to use it. The sign shall be fixed permanently and clearly visible.

⚠ CAUTION During the opening operation of power-operated windows all persons should be kept clear off the window (directly below or right next to it, within the opening radius of the casement) since operating the hand-held controller may lead to uncontrolled movements of the driven part, for example due to mechanical failure or imbalance.

Do not allow children playing with fixed regulating and control devices and keep remote controllers out of children's reach.

Keep all other persons away when operating a **switch with OFF default setting**.

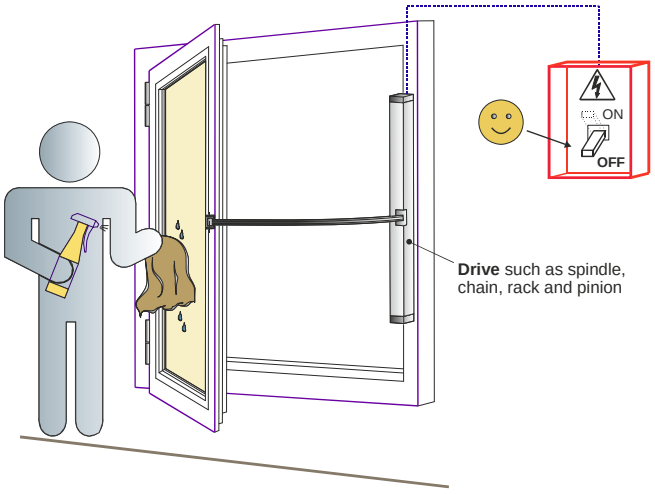
⚠ WARNING Do not operate the window during repairs or maintenance work.



Maintenance and Service / Cleaning

In order to ensure troublefree operation the following operations shall be carried out every 1000 opening cycles, however **at least once** a year according to DIN18232 / VdS- guidelines Model Building Regulations and individual manufacturer's guidelines.

1. Disconnect the system from the mains power supply when cleaning or carrying out other maintenance work.
2. Check all mountings and clamping screws for tight fit and re-tighten, if necessary.
3. Check the system for imbalance and signs of wear or damage to cables /springs and fittings.
4. Check for optimal positioning of the casements in the window frame. Adjust alignment of window fittings and, if necessary, seal pressure depth.
5. Do not repair the drive yourself if defective. Do not attempt to remove the drive housing or accessories.
   Please consult the manufacturer if the device is damaged.
   Only use original spare parts from the manufacturer.
6. When cleaning the window make sure that the drives do not come directly into contact with water or detergents such as alkaline or acid solutions.
7. Protect the drives from dirt and dust during the construction phase or during internal and external renovation work (e.g. wallpapering, painting, etc.).



Recommendation
To ensure that the system works perfectly throughout its long service life we recommend having the system serviced as specified at least once a year by our trained specialist personnel.

Carry out regular functional tests on a monthly basis.

Check the direction of travel of the drives by operating a manual OPEN-CLOSE control switch.

Troubleshooting, Service and Repair

Proper repair of a defective drive cannot be performed by the contractor or end-user and is therefore not permissible. Repairs can only be carried out by the manufacturer or by a specialist company authorized by the manufacturer. Opening or manipulation of the drive causes loss of warranty.

1. Replace faulty drives or have them repaired by the manufacturer.
2. If problems occur during installation or normal operation, use the following table for troubleshooting.

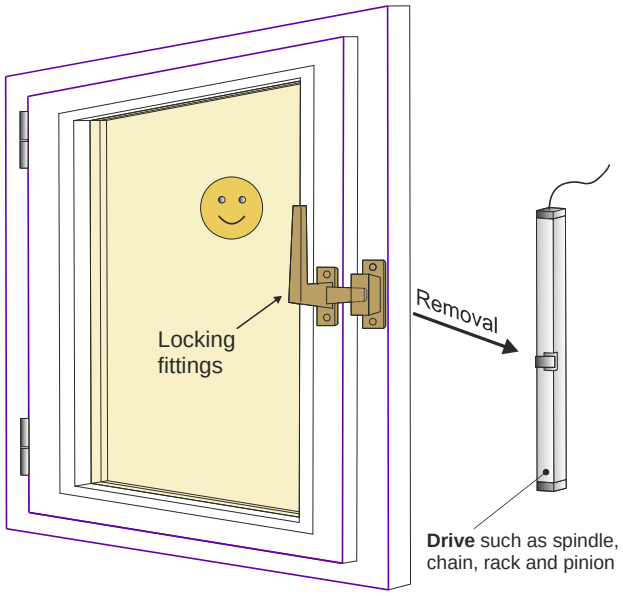
Problem	Possible Causes	Possible Solutions
Drive doesn't start	* Duration of mains power supply too short	Adjust supply voltage as specified in the technical documentat.
	* Drive run direction not correct	Check drive cables
	* Connecting cable not connected	Check all connection cables
	* Power supply / Control Unit voltage incorrect, too high or too low (see data sheet)	Check power supply unit and replace if necessary
	* No mains supply to power supply unit / Control Unit (no voltage)	Connect power supply
Drive doesn't start after having been in operation several times	* Operating time has been exceeded - drive has been overheated	Wait until drive has cooled down and start again
	* See possible causes above associated with "Drive doesn't start"	See possible solutions above associated with "Drive doesn't start
Drive doesn't close	* Closing edge safety mechanism has been triggered	Release safety area for operation and reset closing edge safety mechanism
	* See possible causes above associated with "Drive doesn't start"	See possible solutions above associated with "Drive doesn't start
Drive runs uncontrolled in open and close direction	* Alternating voltage portion of drive voltage from power supply or control unit too high	Set drive voltage to required value (see data sheet of drive)
	* Output voltage of power supply / control unit incorrect	Check output voltage of power supply / control unit and resolve fault accordingly

Removal and disposal

To remove the drives reverse the sequence used for the assembly. Adjustment work is not required.

⚠ WARNING

1. Before removing a drive, disconnect it from the power supply.
2. When removing a drive, the window must be secured against unintended opening, for example by fitting a locking fitting.



Dispose of the parts in accordance with the applicable local or national legal regulations.

* Dispose of packaging properly.
* Electric devices shall be taken to local recycling centres or removed by a waste recycling company.

The Act governing the sale, return and environmentally sound disposal of electrical and electronic equipment (ElektroG) does not apply to the above products.

Drive materials

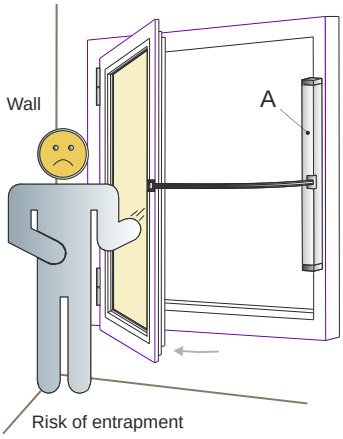
- Iron (screws, brackets, ...)
- Aluminium (profiles, ...)
- Plastic (covers, ...)
- Electronic parts (motor, controller, relay, ...)
- Cables
- Copper
- Zinc

Electrical devices and batteries cannot be disposed of as domestic waste.

Avoiding risk situations

⚠ CAUTION

Make sure that the power-operated window can move freely and does not clash with any fixed parts (e.g. wall…..).



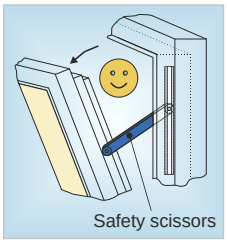
Window casement stability / safety

⚠ WARNING

Casements must be hung or secured such way that, in case one of the mounting elements fails, it will not break away from the frame and fall to the ground or have unintended movements by providing double suspensions, safety scissors, casement stays.

Inward and outward opening bottom-hung casements must be provided with safety scissors / casement stays.
They prevent damage if the drive breaks down.
The safety stays should be selected to suit the opening width and the mechanical features of the window as intended.
They must not restrict the drive stroke.

Also refer to the „Guidelines for power-operated windows, doors and gates" (BGR 232) and to the ZVEI Brochure „SHEV News, No. 3, Power-operated windows"



Cable routing and electrical connection

⚠ DANGER

Before working on the system the mains voltage supply and the batteries shall be disconnected in all poles. Never operate the drives, controllers, manual switches and sensors on operating voltages and connections contrary to the specifications in the operating instructions.
There is danger to life and it may result in the destruction of the components!
Cable routing and electrical connections may only be carried out by qualified electricians. Secure power supply lines 230 / 400V AC separately on site. The installation requires compliance with the relevant laws, regulations, guidelines and standards such as the Model Wiring Guideline (MLAR/ LAR/ RbALei), the VDE0100 "Erection of power installations with rated voltages below 1000V", VDE 0815 "Installation cables and wires", VDE 0833 "Hazard alarm systems for Fire, Intruder and Hold-up". Specify suitable types of cable on consultation with the competent local certification authorities, energy supply companies or fire protection authorities, if necessary.
Extra low-voltage lines (e.g. 24 V DC) must be laid separately from low-voltage lines (e.g. 230 V AC). Flexible lines must not be flush-mounted. Freely suspended lines must be provided with strain relief. All lines must be laid such way that they can be neither sheared off, nor twisted or kinked during operation.
All power supply connections, control units and junction boxes must be accessible for maintenance work.
Select the types, lengths and cross-sections of the lines according to the technical specifications.
Check connection points for tight fit of the screwed connections and cable ends.

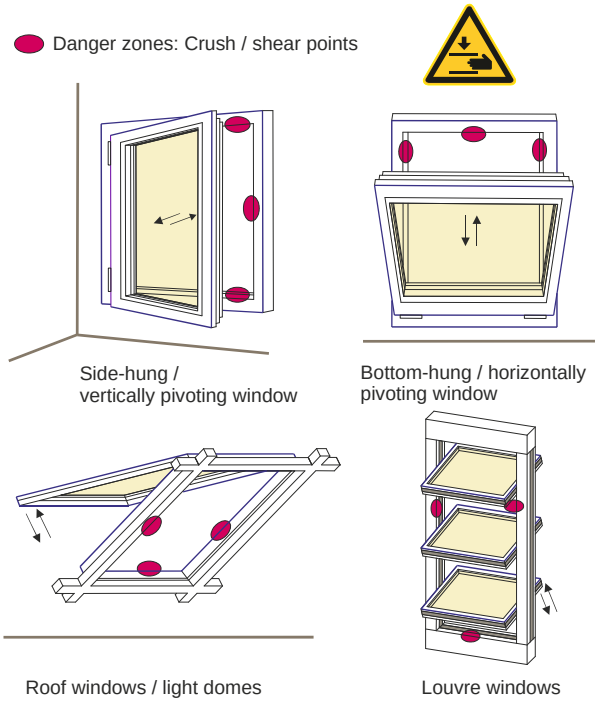
Mounting and fastening material

Required or supplied fastening material shall be selected and, if necessary, supplemented to suit the building's structure and the corresponding strain.

⚠ WARNING **Crush and shear points**

Power-operated windows, doors and gates: the danger zones of crush and shear points, for example between casement and frame or light dome and metal curb must be secured by appropriate devices that will prevent any injury.

Also refer to the „Guidelines for power-operated windows, doors and gates" (BGR 232) and to the ZVEI Brochure „SHEV News, No. 3, Power-operated windows"



Accident prevention regulations and guidelines issued by the employers' liability insurance association

NOTICE

When working at, in or on a building or part of a building the specifications and notes of the respective accident prevention regulations (UVV) and the regulations and rules of the employers' liability insurance association (BGR) must be observed and adhered to.

Ambient conditions

The product must not be hit, dropped or exposed to vibrations, humidity, aggressive gases or other damaging environments unless it is approved for one or several of these ambient conditions by the manufacturer.

Warranty and After-Sales Service

Basically our **„General Terms and Conditions of Goods and Services by the Electrical Industry"** issued by the Central Association of the Electrical Engineering and Electronics Industry (ZVEI) are applicable.

This warranty complies with legal requirements and applies to the country in which the drive was purchased.

The warranty covers material and manufacturing faults that occur during normal use of the products.

The warranty period for materials supplied is 12 months from the date of delivery.

Warranty and liability claims with damages to property and persons will be excluded if they are due to one or several of the following causes:

- Improper use of the drive.
- Improper assembly, commissioning, operation, maintenance and repair of the drive.
- Operating the drive with defective, improperly installed or malfunctioning safety and protection devices.
- Failure to comply with the notes and assembly pre-requisites as specified in these assembly and operating instructions.
- Unauthorized constructional modifications to the drive or to accessories such as casement bracket, frame mounting brackets.
- Cases of catastrophe caused by foreign objects and Acts of God.
- Wear

For possible warranty claims or required spare parts or accessories please contact your nearest branch office or the competent contact person at Aumüller Aumatic GmbH. Details can be found on our website.

Liability

We reserve the right to change or adjust products at any time without prior notice. Illustrations are subject to change.

Although we take every care to ensure accuracy, we cannot accept liability for the content of this document.

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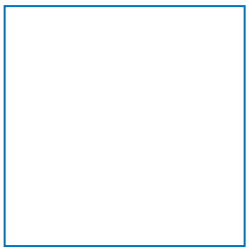
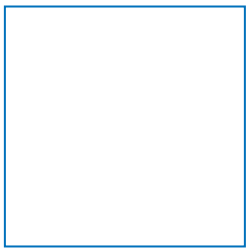


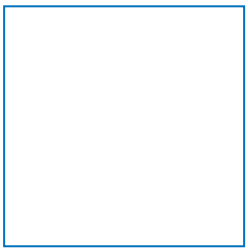
Rauch- und Wärmeabzug

aumüller vent



Kontrollierte, natürliche Lüftung

aumüller carPark



Parkraum-Management

Engineering

Systemtechnik

Service