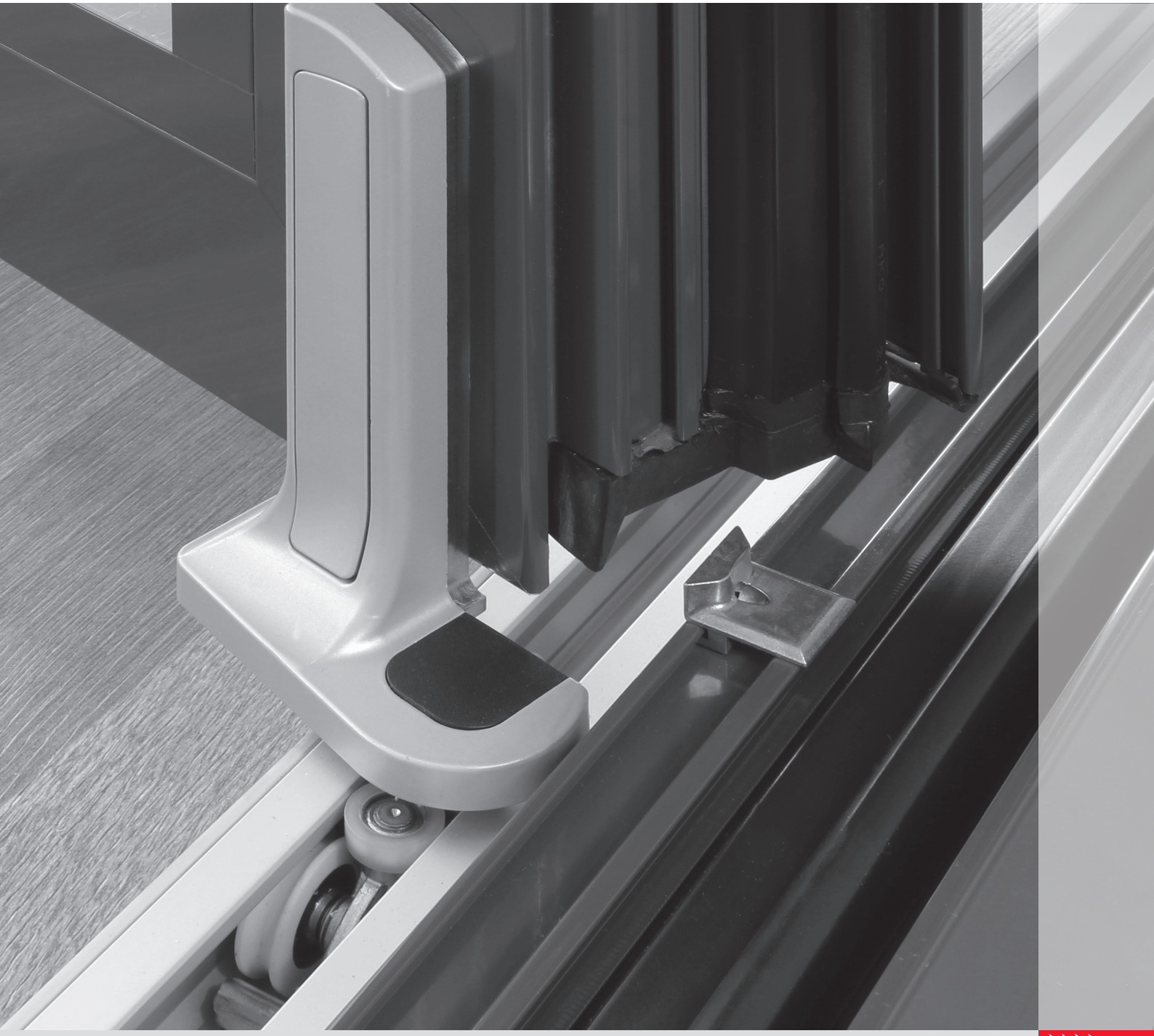
Window and Door Technology

Roto Patio Fold

Premium hardware
for Fold&Slide systems with a large surface

Installation, maintenance and operation instructions
for aluminium profiles



General information

Security

Information on the product

Hardware overview

Installation

This manual contains important information, instructions and application diagrams (maximum sash sizes and sash weights) as well as installation instructions regarding the further work of the hardware.

Also, this manual contains binding guidelines to ensure the duty to instruct through to the end-user.

The information and instructions in this manual refer to the products of the Roto Patio hardware system.

Apart from these installation, maintenance and operation instructions, the following documents apply:

- Directives TBDK of the Quality Assurance Association: Locks and Hardware (Richtlinie TBDK der Gütegemeinschaft Schlösser und Beschläge e. V.)
- Directives VHBH of the Quality Assurance Association: Locks and Hardware (Richtlinie VHBH der Gütegemeinschaft Schlösser und Beschläge e. V.)
- Directives VHBE of the Quality Assurance Association: Locks and Hardware (Richtlinie VHBE der Gütegemeinschaft Schlösser und Beschläge e. V.)
- RAL Installation guideline

This manual should be stored in such a manner that it can be quickly used, if needed.

Additional markings

To highlight handling directives, results, lists, references and other elements, the following signs are used in this manual:

Marking	Explanation
	Sash
	Frame
	Drill holes
①	Hardware components
1.	Action steps
▪	First level of the hierarchy in a list
–	Unordered list (second level of the hierarchy)
→ p. 12	(Cross) reference in tables
Refer to page 12	(Cross) reference in the text

Abbreviation	Explanation
Ill.	Illustration
AD	Coverage
FRCL	Frame clearance
SW	Sash width
SH	Sash height
L	DIN left (view from inside)
Material no.	Material number
TEFF	Top edge of finished floor
R	DIN right (view from inside)
FEW	Frame external width
FEH	Frame external height
FRW	Frame rebate width
FRH	Frame rebate height
SG	Shadow gap
OH	Overlap height
unc.	uncoated

All dimensions stated in mm.

Protection of copyright

The information in this document is intended for the following target groups:

Hardware dealers
The “hardware dealers” target group includes all companies/persons who purchase hardware from the hardware manufacturer to resell it without the hardware being modified or subjected to further work.

Manufacturers of windows and balcony doors
The “manufacturers of windows and balcony doors” target group includes all companies/persons who purchase hardware from the hardware manufacturer or the hardware dealer and build it into windows and balcony doors.

Building element dealers/Installation company
The “building element dealers” target group includes all companies/persons who purchase windows and balcony doors from the manufacturer of windows and balcony doors in order to sell these on and to install them into a building development, without the windows or balcony doors being modified.

The “installation company” target group includes all companies/persons who purchase windows and balcony doors from the manufacturer of windows and balcony doors, or from a building element dealer, in order to sell these and to install them into a building development, without the windows or balcony doors being modified.

Builder
The “builder” target group includes all companies/persons who order windows and/or balcony doors for installation into their building project.

End-users
The “end-users” target group includes all persons who operate the installed windows and/or balcony doors.

NOTE!
Every target group must fully comply with its instruction obligation. Unless defined otherwise in the following, the documents and information may be transmitted e.g. as printed documents, CD-ROM, or via Internet access.

Responsibility of the hardware dealer
The hardware dealer must transmit the following documents to the manufacturer of windows and balcony doors:
- Installation, maintenance and operation instructions
- Directive for fixing load-bearing Turn-Only and Tilt&Turn hardware components (TBDK)
- Guidelines/advice on the product and on liability (VHBH)
- Specifications/information for end-users (VHBE)

Responsibility of the manufacturer of windows and balcony doors
The manufacturer of windows and balcony doors must transmit the following documents to the building element dealer or to the builder, even when a subcontractor (installation company) is acting as an intermediary:
- Installation, maintenance and operation instructions
- Directive for fixing load-bearing Turn-Only and Tilt&Turn hardware components (TBDK)
- Guidelines/advice on the product and on liability (VHBH)
- Specifications/information for end-users (VHBE)

He must ensure that the end-user is provided with the documents and information intended for him, in printed format.

Responsibility of the building element dealer/installation company
The building element dealer must transmit the following documents to the builder, even when a subcontractor (installation company) is acting as an intermediary:
- Maintenance and operating instructions (with the focus on hardware)
- Guidelines/advice on the product and on liability (VHBH)
- Specifications/information for end-users (VHBE)

Responsibility of the builder
The builder must transmit the following documents to the end-user:
- Maintenance and operating instructions (with the focus on hardware)
- Specifications/information for end-users (VHBE)

In this instructions, safety information is indicated by a symbol. The safety information is introduced by a key word that indicates the severity of the danger.

DANGER!
This symbol in conjunction with the signal word indicates an imminently hazardous situation, which could result in death or serious damage to health if it is not avoided.

WARNING!
This symbol in conjunction with the signal word indicates a potentially dangerous situation, which could result in death or serious damage to health if it is not avoided.

CAUTION!
This symbol in conjunction with the signal word indicates a potentially dangerous situation, which may lead to minor or light injuries if it is not avoided.

NOTE!
This symbol in conjunction with the signal word indicates a potentially dangerous situation, which may lead to property or environmental damage if it is not avoided.

All details and instructions in this document were compiled taking into account the relevant standards and regulations, the state of the art, and also many years of knowledge and experience.

The hardware manufacturer accepts no liability for damages resulting from:

- Failure to comply with this document and all product-specific documents and related applicable directives (refer to the chapters Security and Stipulated use).
- Non-stipulated use/misuse (refer to the chapters Security and Stipulated use).
- Insufficient invitation to tender, failure to adhere to the installation instructions or application drawings.
- Increased soiling.

Claims by third parties against the hardware manufacturer on the ground of damages resulting from misuse or failure to follow the instruction obligation on the part of the hardware dealer, the manufacturer of windows and balcony doors, and of the building element dealer or the builder are transferred accordingly.

The undertakings agreed in the delivery contract, the general conditions of business and the delivery conditions of the hardware manufacturer, and the legal regulations applicable at the time of concluding a contract are effective.

The warranty covers only original Roto components.

The right to technical modifications for the improvement of performance characteristics and for further development is reserved.

Turn-Only and Tilt&Turn hardware as covered by this definition is one-hand-operation hardware, Turn-Only and Tilt&Turn hardware for windows and balcony doors in building construction. This is used to enable windows and balcony-door sashes into a turning position by operating a 'hand-lever' (handle) or into a limited tilting position in the case of the scissors (sash-stay) version. Turn-Only and Tilt&Turn hardware is used on vertically installed windows and balcony doors made of aluminium. Turn-Only and Tilt&Turn hardware as covered by this definition, locks window and balcony door sashes or enables various ventilating positions. When closing, the gasket counter force must be overcome as a rule.

Correct use also includes adhering to all the specifications in the product-specific documents, such as:

- These installation, maintenance and operation instructions
- Product catalogues
- Information and specifications of the profile manufacturer (e.g. light metal profiles etc.)
- The relevant directives TBDK, VHBH and VHBE of the Quality Assurance Association: Locks and Hardware (Gütegemeinschaft Schlösser und Beschläge e. V.)
- The valid national laws and directives

Any type of use that goes beyond or differs from the defined correct use shall be regarded as misuse.

WARNING!
Danger from misuse!
Misuse and incorrect installation of hardware can result in hazardous situations.

- Never use hardware combinations that have not been approved by the hardware manufacturer.
- Never use accessories that are not original products or that have not been approved by the hardware manufacturer.

Sliding hardware as well as Fold&Slide hardware is hardware for sliding sashes for windows and balcony doors that are mainly used as glazed exterior structures.
In combination with the sliding sashes, fixed-glazing-units and/or further sashes can be situated in a window element.
Sliding hardware is equipped with a locking mechanism that fastens the sliding sash. Sliding hardware is equipped with rollers that are mainly located on the bottom horizontal plane of the sliding sash.
In addition, scissor stay-arms for tilting and mechanisms to lift and/or parallel-retract the sashes can be specified. By means of the hardware, the sashes are locked, brought into the ventilation position and pushed to the side.
Sliding hardware is solely used for further processing of vertically installed windows and balcony door sashes made of timber or PVC, and their corresponding material combinations.

NOTE!
Depending on the outside temperature, relative air humidity of the ambient air, as well as the application location of the sliding element, a temporary formation of condensation water on the aluminium tracks on the inside may occur. This is particularly promoted when the air circulation is hindered; for example due to deep reveals, curtains as well as unfavourable radiator positioning and the like.

Correct use also includes adhering to all the specifications in the product-specific documents, such as:

- These installation, maintenance and operation instructions
- Product catalogues
- Information and specifications of the profile manufacturer (e.g. PVC or light metal profiles etc.)
- The relevant directives VHBH and VHBE of the Quality Assurance Association: Locks and Hardware (Gütegemeinschaft Schlösser und Beschläge e. V.)
- The valid national laws and directives

Any type of use that goes beyond or differs from the defined correct use shall be regarded as misuse.

WARNING!
Danger from misuse!
Misuse and incorrect installation of hardware can result in hazardous situations.
- Never use hardware combinations that have not been approved by the hardware manufacturer.
- Never use accessories that are not original products or that have not been approved by the hardware manufacturer.

For windows and balcony doors with Turn-Only and Tilt&Turn hardware, window and balcony door sashes can be brought into a turn position or into a limited tilting position by means of the scissor stay.
When a sash is closed and the hardware is locked, the resistance of a gasket usually needs to be overcome.

WARNING!
Danger of injury and material damage from incorrect closing and opening the sash!
Incorrect closing and opening of sashes can result in serious injuries and significant material damage.
Therefore:

- Ensure that when closing the sash, it does not collide with the frame or with another sash.
- Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully closed position, and that it is brought very slowly towards the frame.
- Ensure that the sash never slams closed or swings open in an uncontrolled manner.

Any use beyond or other than the stipulated application and installation of the products is deemed to be misuse and can result in dangerous circumstances.

WARNING!
Danger from misuse!
Misuse of windows and balcony doors can result in dangerous circumstances.
In particular, avoid the following applications:

- insertion of obstacles in the opening area between the frame and the window and balcony door sashes,
- the deliberate or negligent application of excessive loads on windows or balcony doors,
- deliberate or uncontrolled slamming or pushing of windows and balcony doors against the window reveal. This can destroy the hardware, frame materials, or other individual components of the windows or balcony doors.

Claims for damages of any type whatsoever resulting of operation other than that stipulated are excluded.

On windows or balcony doors with sliding hardware the sashes can be moved horizontally or vertically by operating a 'hand-lever' (handle).
On special constructions the sashes additionally can be folded by sliding (like an accordeon – Fold&Slide windows).
On special constructions some of the sashes additionally can be brought into a turning position and/or into a limited tilting position in the case of the scissors (sash-stay) version.
When a sash is closed and the hardware is locked, the resistance of a gasket usually needs to be overcome.

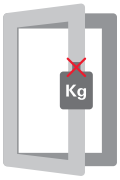
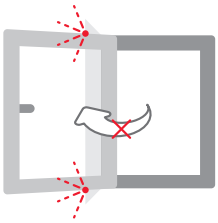
WARNING!
Danger of injury and material damage from incorrect closing and opening the sash!
Incorrect closing and opening of sashes can result in serious injuries and significant material damage.
Therefore:
- Ensure that when opening or closing the sash, it does not collide with the frame or with another sash.
- Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully opened or closed position, and that it is brought very slowly towards the frame, the opening restrictor or another sash (technical value – maximum reference speed of the closing edge $v \leq 0.2$ m/s).

Any use beyond or other than the stipulated application and installation of the products is deemed to be misuse and can result in dangerous circumstances.

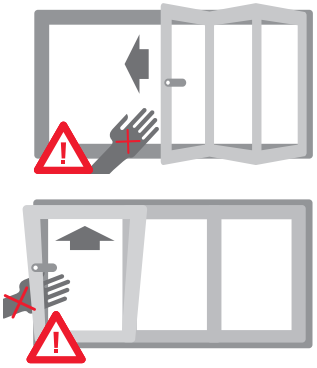
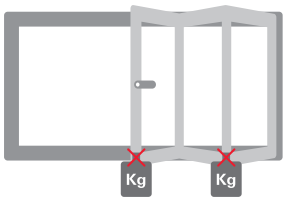
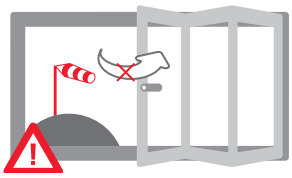
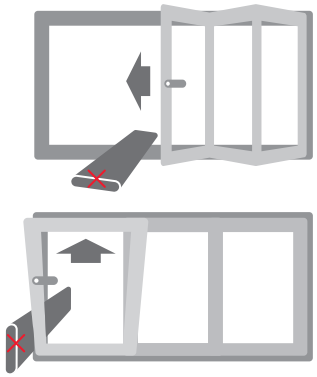
WARNING!
Danger from misuse!
Misuse of windows and balcony doors can result in dangerous circumstances.
In particular, avoid the following applications:
- insertion of obstacles in the opening area between the frame and the window and balcony door sashes,
- the deliberate or negligent application of excessive loads on windows or balcony doors,
- deliberate or uncontrolled slamming or pushing of windows and balcony doors against the window reveal. This can destroy the hardware, frame materials, or other individual components of the windows or balcony doors.

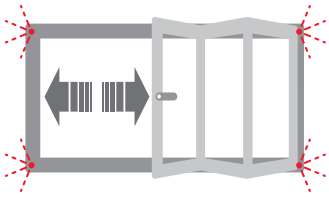
Claims for damages of any type whatsoever resulting of operation other than that stipulated are excluded.

Comply with the following symbols and their meanings in order to avoid accidents, injuries and material damage.

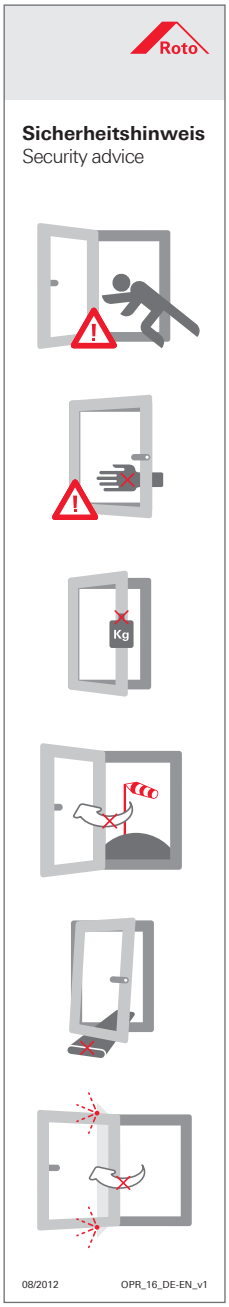
Symbol	Meaning
	**DANGER!** **Danger of injury from falling through open windows and balcony doors.** ▪ Proceed cautiously in the vicinity of open windows and balcony doors. ▪ Please keep children and persons that cannot appreciate the danger away from the hazard area.
	**WARNING!** **Danger of injury through trapping of body parts in the opening gap between sash and frame.** ▪ When closing windows and balcony doors, never reach between sash and frame, and always act with care. ▪ Please keep children and persons that cannot appreciate the danger away from the hazard area.
	**WARNING!** **Danger of injury and material damage from overloading the sash** ▪ Refrain from additionally loading the sash.
	**CAUTION!** **Danger of injury from the effect of wind** ▪ Prevent wind from acting on the open sash. ▪ During wind and draughts, close and lock windows and balcony door sashes.
	**CAUTION!** **Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame** ▪ Refrain from inserting obstacles in the opening gap between the sash and the frame.
	**CAUTION!** **Danger of injury and material damage from pressing the sash against the opening edge (reveal)** ▪ Do not press the sash against the opening edge (reveal).

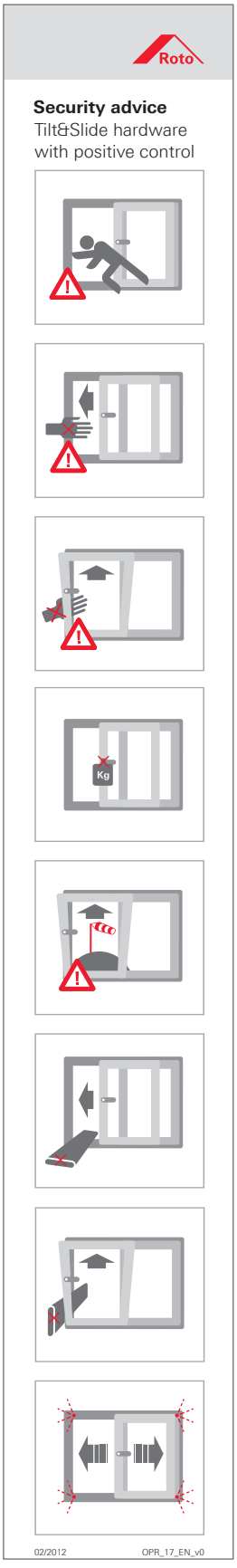
Comply with the following symbols and their meanings in order to avoid accidents, injuries and material damage.

Symbol	Meaning
	**DANGER!** **Danger of injury from falling through open windows and balcony doors.** ▪ Proceed cautiously in the vicinity of open windows and balcony doors. ▪ Please keep children and persons that cannot appreciate the danger away from the hazard area.
	**WARNING!** **Danger of injury through trapping of body parts in the opening gap between sash and frame.** ▪ When closing windows and balcony doors, never reach between sash and frame, and always act with care. ▪ Please keep children and persons that cannot appreciate the danger away from the hazard area.
	**WARNING!** **Danger of injury and material damage from overloading the sash** ▪ Refrain from additionally loading the sash.
	**CAUTION!** **Danger of injury from the effect of wind** ▪ Prevent wind from acting on the open sash. ▪ During wind and drafts, close and lock windows and balcony door sashes.
	**CAUTION!** **Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame** ▪ Refrain from inserting obstacles in the opening gap between the sash and the frame.

Symbol	Meaning
	**CAUTION!** **Danger of injury and material damage from pressing the sash against the opening edge (reveal) and from uncontrolled opening and closing of the sash** ▪ Do not press the sash against the opening edge (reveal). ▪ Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully opened or closed position.

The following symbols can be used on windows and balcony doors to protect the end-user. Always keep these symbols in a clearly legible state. Please order stickers separately (OPR_16_DE-EN, OPR_17_DE-EN).





Maximum sash sizes and weights

The technical data, application diagrams, and component classifications in the product-specific documentation of the hardware manufacturer give instructions on the maximum permitted sash sizes and weights. Here, the component with the smallest permitted load bearing capacity decides the maximum permitted sash weight.

- Check compliance of the technical data, application diagrams, and component classifications before the use of electronic data sets, and especially their use in fenestration programmes.
- The maximum permitted sash sizes and weights must never be exceeded. In the case of uncertainty contact the hardware manufacturer.

Specifications for profile manufacturers

The manufacturer of windows and/or balcony doors must comply with all specified system-related dimensions (e.g. gasket gap dimensions or locking -point distances). Furthermore, he must check these regularly and make certain of them, especially on the first use of new hardware components, during manufacture, in an ongoing manner up to and including the window installation.

Specifications for fabricators

In the area of the support brackets, cut the reinforcements to mitre and push forward into the sash edges. Do not place sashes with already fitted hardware components against or on top of each other, thereby placing stress on the projecting support brackets. Seal all the outer components on the profile-side assembly surfaces to prevent moisture from entering.

NOTE!
The hardware components are designed in such a manner, that the system-related dimensions can be adjusted, provided the hardware can have an effect on these. If a deviation from these dimensions is noticed only after the installation of the windows, the hardware manufacturer is not responsible for any possible additional work arising.

Composition of hardware

Burglary inhibiting windows and balcony doors require hardware which fulfils particular requirements.
Windows and balcony doors for damp rooms, and those for use in environments with aggressive and corrosive air components require hardware which fulfils particular requirements.
The resistance of windows and balcony doors to wind loads when closed and locked depends on the actual designs of the windows and balcony doors. Wind loads prescribed by law and standards (e.g. as per EN 12210 – especially test pressure P3) can be dissipated by the hardware system.
The hardware combinations and installations appropriate for windows and balcony doors in the previously mentioned areas should be specifically selected and agreed with the hardware manufacturer and the profile manufacturer.

NOTE!
The guidelines of the hardware manufacturer relating to the combination of the hardware (e.g. the use of additional stay arms, the design of hardware for burglary-inhibiting sashes for windows and balcony doors, etc.) are binding.

DANGER!
Danger to life from incorrectly installed and threaded hardware components!
Incorrect installation and threading of hardware components can result in dangerous circumstances and cause severe accidents, even including death.
Therefore:

- For installation and especially for threaded components, observe the product-specific documentation of the hardware manufacturer, the information from the profile manufacturer, and all contents of the TBDK directive of the Gütegemeinschaft Schlösser und Beschläge e. V.
- The window fabricator must ensure adequate fixing of the hardware components and correct load transfer.

This danger note shall apply to all screwable hardware components and particularly to those safety components which are part of the RC equipment. Generally, the kind and quality of the screw fixing depends on the aluminium profile of the profile manufacturer and has to be tested before use (system check).

Do not use any acid cross-linked sealing compounds that could lead to corrosion of the hardware components. The glazing spacer-block regulations for the glazing method are to be adhered to.

Roto Patio Fold

- Concealed central locking system for one-hand-operation
- Optional top or bottom running door elements
- Inward or outward opening
- Silver anodised roller tracks and guide tracks
- Coloured cover strips
- Powder-coated hinges and support brackets
- Standard colours:
  – White R07.2
  – Medium bronze R05.3
  – Silver R01.1
  – Black brown R04.4
  – Unpainted (for on-site coating)

- Tilt&Turn or Turn-Only sash as the access sash
- In conjunction with the enhanced threshold and Patio Fold hinges, only the Turn-Only sash can be used as the access sash
- Retro-adjustable components

- Additional possibilities:
  – Roto security components
  – MVS

- Area of use:
  – Sash width SW at least 480 mm – max. 1230 mm (access sash on the frame side)
  – Sash width SW at least 480 mm – max. 930 mm (folding sash)
  – Sash height SH at least 630 mm – max. 2830 mm
  – Sash weight S.kg max. 100 kg (for bottom-running version)
  – Sash weight S.kg max. 80 kg (for top-running version)

- Roller track length max. 6 m

Explanation of the digit string in the diagrams

A mirror image of each diagram can also be implemented.

Number of sashes that open to the left

532

Total number of sashes | Number of sashes that open to the right

For explanation of the letters (A-F) please refer to the dimensioned drawing on page 73.

DIAGRAM 321

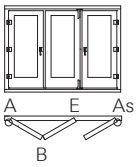


DIAGRAM 330

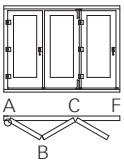


DIAGRAM 431

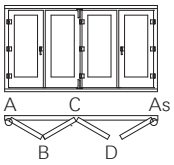


DIAGRAM 532

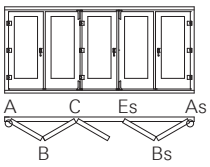


DIAGRAM 541

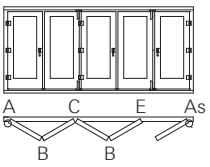


DIAGRAM 550

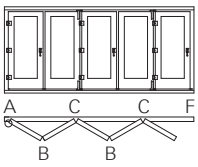


DIAGRAM 633

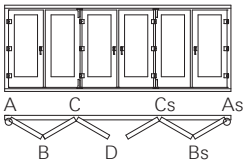


DIAGRAM 651

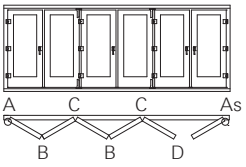


DIAGRAM 743

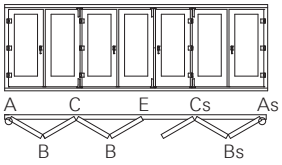


DIAGRAM 752

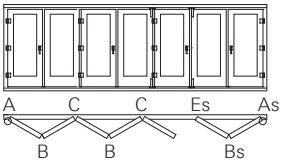


DIAGRAM 761

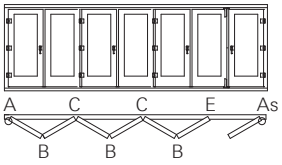


DIAGRAM 770

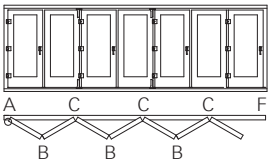
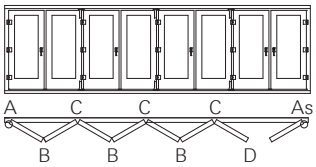
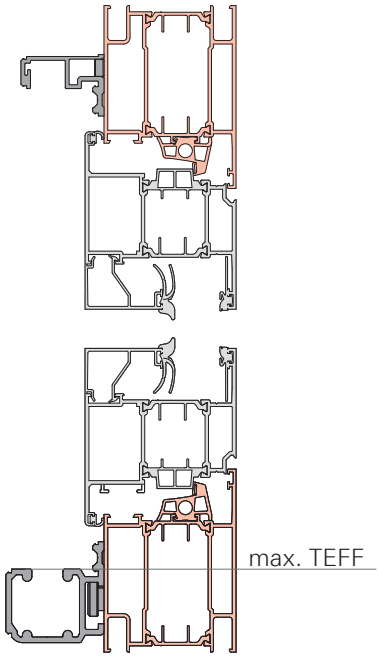


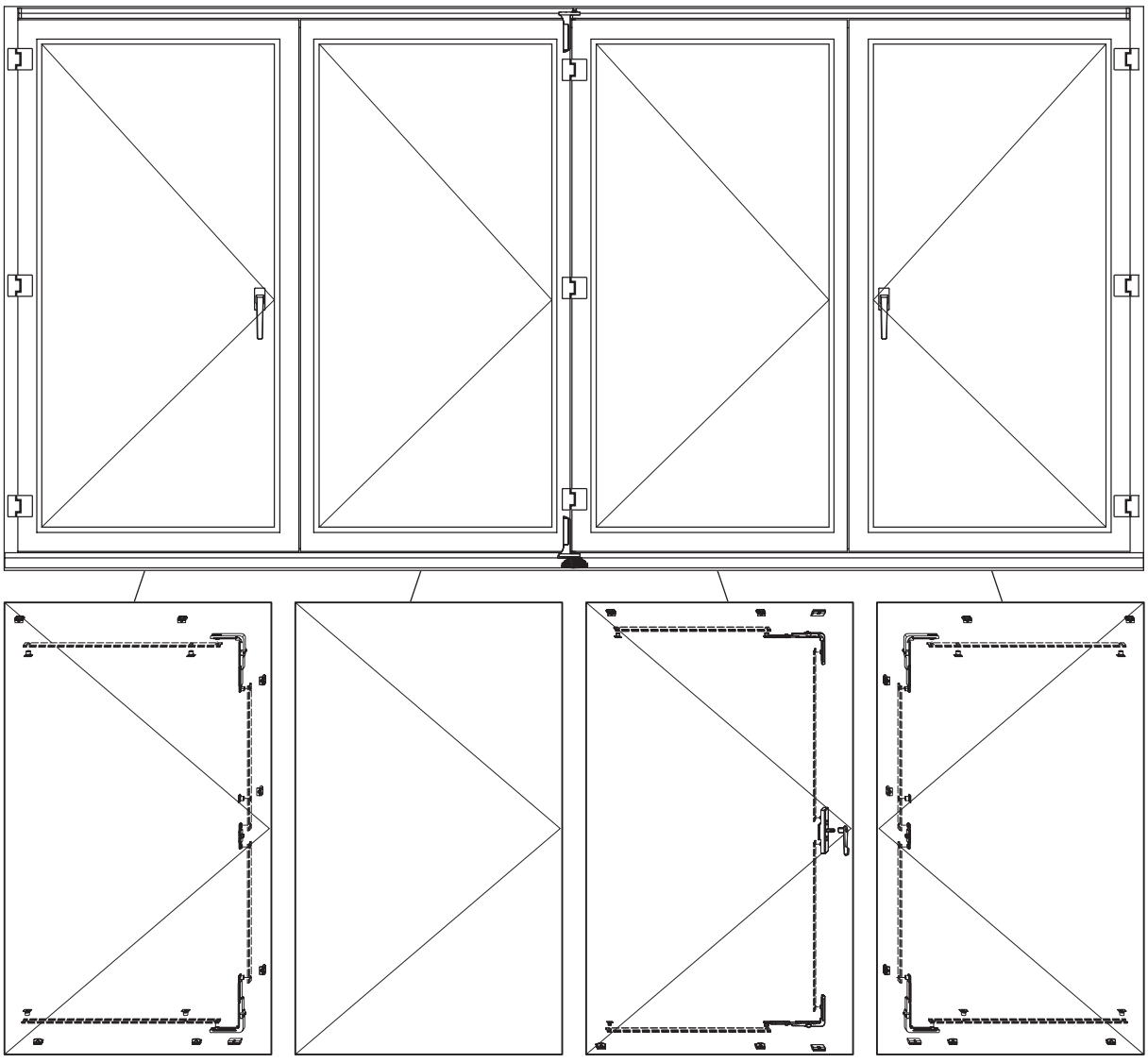
DIAGRAM 871



Combination possibility 1

- Bottom running
- Guide track, top
- Roller track, bottom





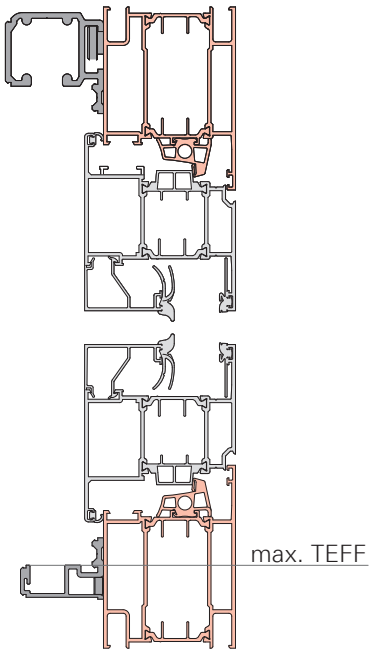
NOTE!

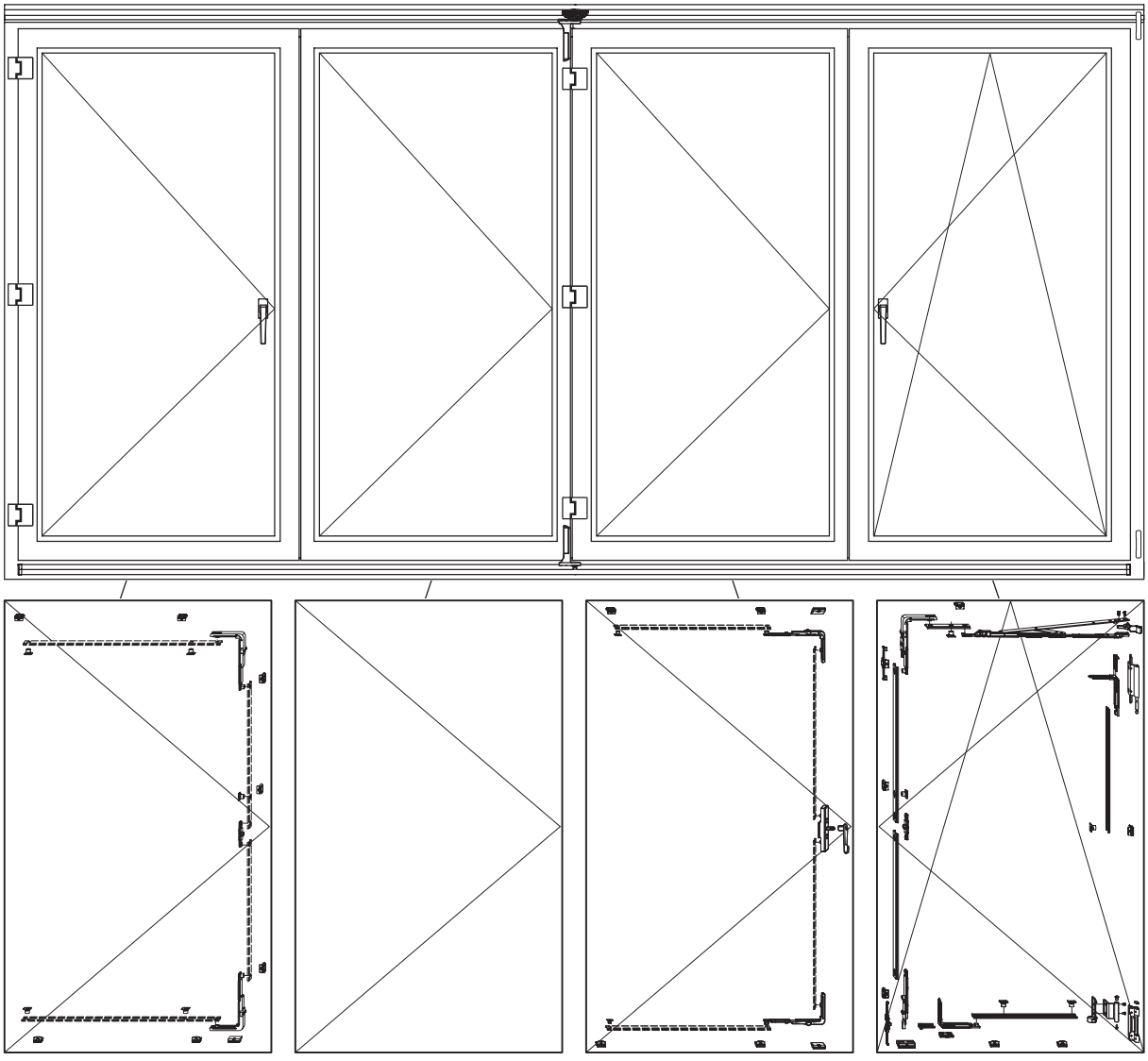
In conjunction with this document, the following documents for the installation of Turn-Only and Tilt&Turn hardware apply:

- IMO_72 (Roto AL 540 Tilt&Turn sash)
- IMO_20 (Roto AL 540 Turn-Only sash)
- CTL_14 (Roto AL catalogue)
  Roto Patio S flush-encased gearboxes can be used depending on the profile.

Combination possibility 2

- Top running
- Roller track, top
- Guide track, bottom





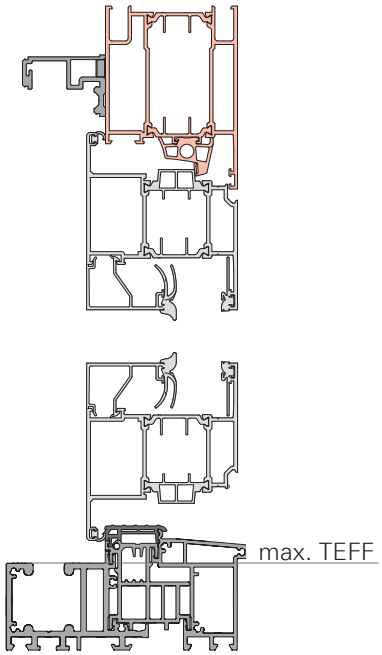
NOTE!

In conjunction with this document, the following documents for the installation of Turn-Only and Tilt&Turn hardware apply:

- IMO_72 (Roto AL 540 Tilt&Turn sash)
- IMO_20 (Roto AL 540 Turn-Only sash)
- CTL_14 (Roto AL catalogue)
  Roto Patio S flush-encased gearboxes can be used depending on the profile.

Combination possibility 3

- Bottom running
- Guide track, top
- Enhanced threshold, bottom

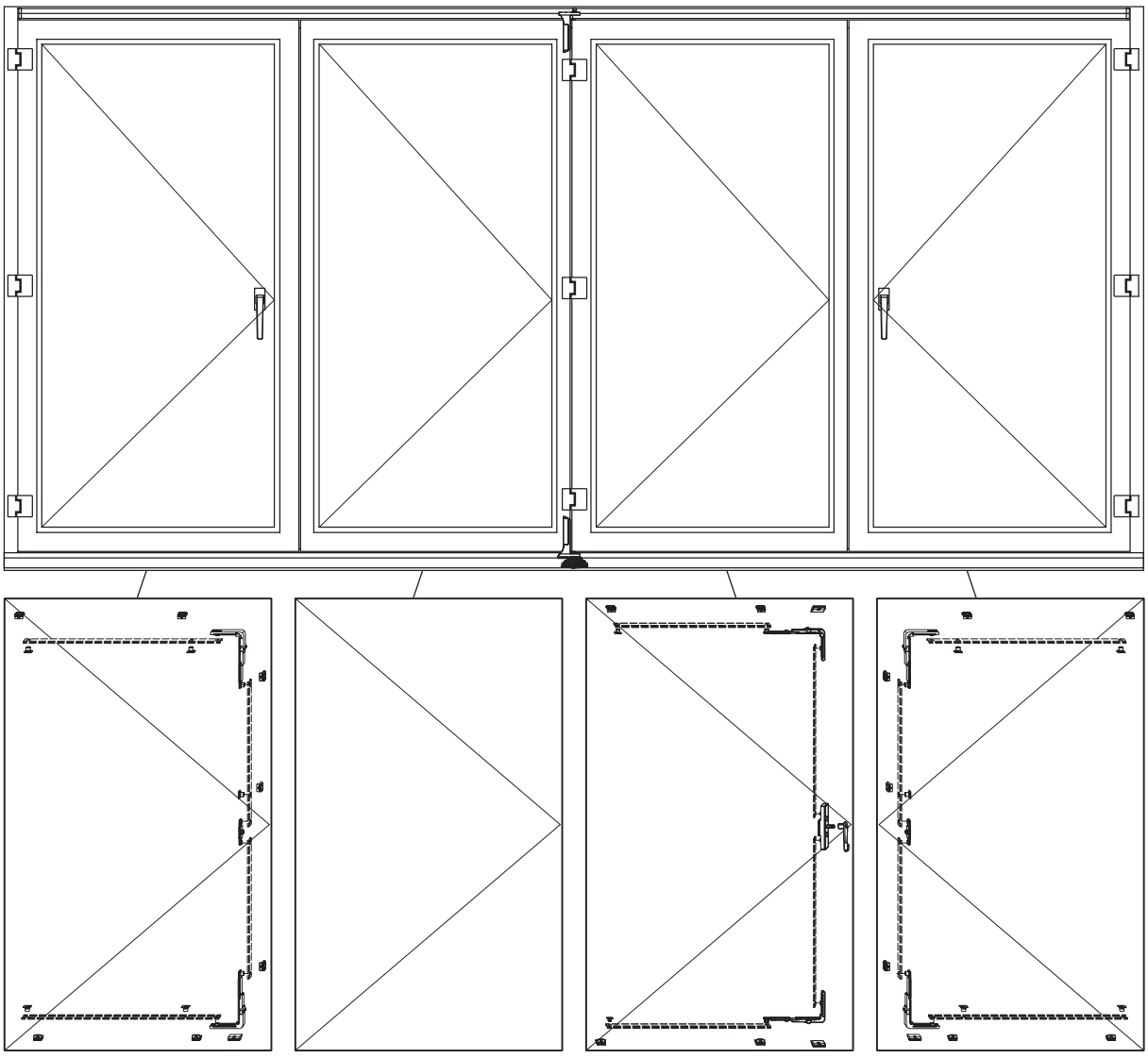


NOTE!
In conjunction with this document, the following documents for the installation of Turn-Only and Tilt&Turn hardware apply:

- IMO_20 (Roto AL 540 Turn-Only sash)
- CTL_14 (Roto AL catalogue)
  Roto Patio S flush-encased gearboxes can be used depending on the profile.

NOTE!
The barrier-free enhanced threshold acc. to DIN 18040-1 fulfils the requirements of the Energy Saving Regulations (isothermal efficiency acc. to DIN 4108). It is only of limited suitability in driving rain conditions. The impermeability depends on the profile and must be tested individually.

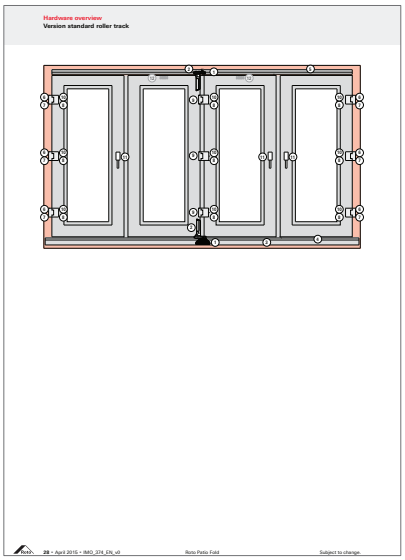
NOTE!
In conjunction with the enhanced threshold and Patio Fold hinges, only the Turn-Only sash can be used as the access sash

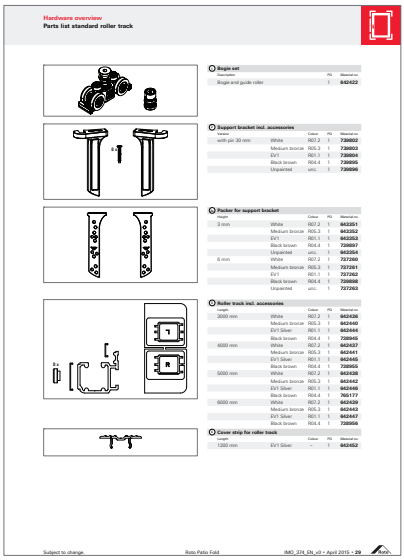


Explanation on the hardware overview chapter

The hardware overviews on the following pages are recommendations of Roto Frank AG.

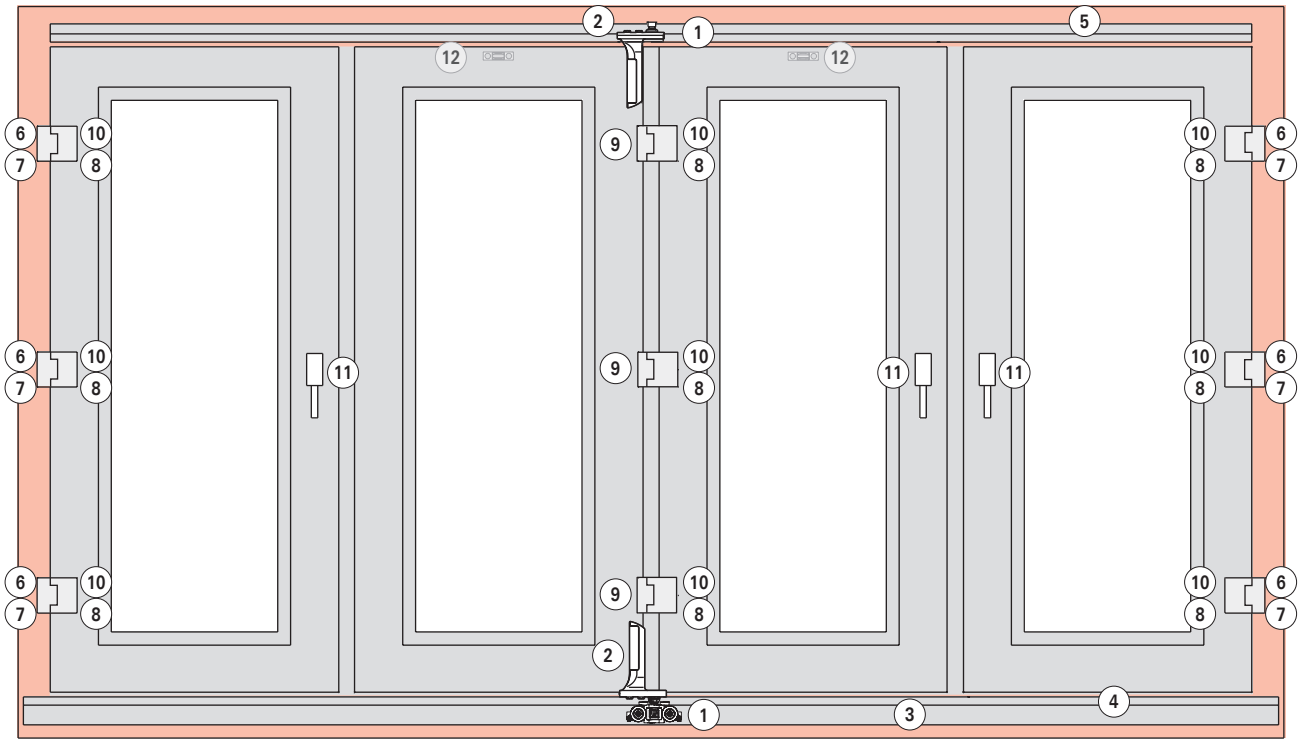
The hardware overview chapter shows on the left page the single hardware components of the opening type in the overview and on the right page the respective parts list. Position numbers allow the allocation between overview and parts list.





The parts list includes all profile related versions of the Roto Patio Fold hardware system as well as of the enhanced threshold Roto Fold. Technical details, special groove and clearance version information available upon request.

The actual scope of delivery depends on the ordered hardware configuration (height and width of the window). Handles have to be ordered separately.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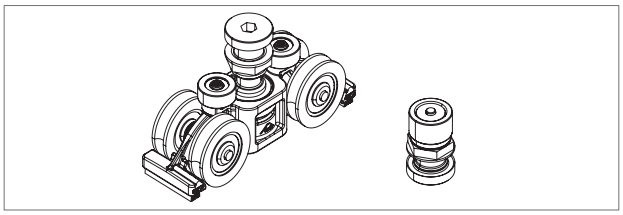
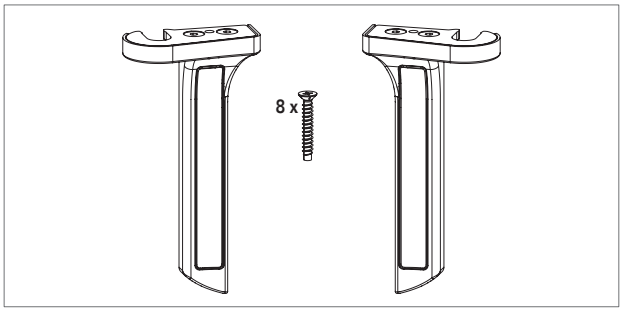


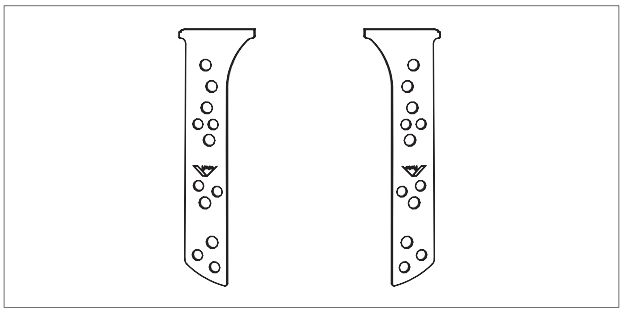
(1) Bogie set

Description	PQ	Material no.
Bogie and guide roller	1	**642422**



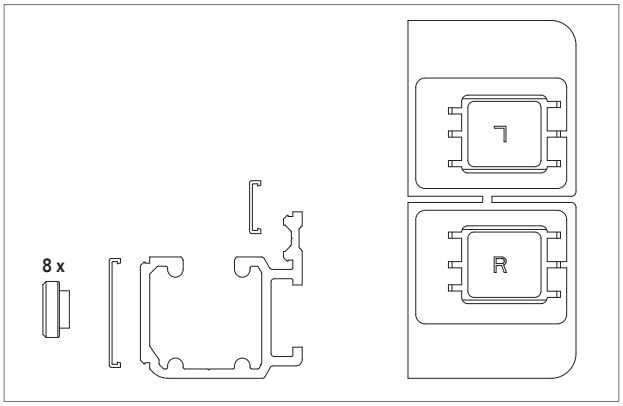
(2) Support bracket incl. accessories

Version		Colour	PQ	Material no.
with pin 30 mm	White	R07.2	1	**739802**
	Medium bronze	R05.3	1	**739803**
	EV1	R01.1	1	**739804**
	Black brown	R04.4	1	**739895**
	Unpainted	unc.	1	**739896**



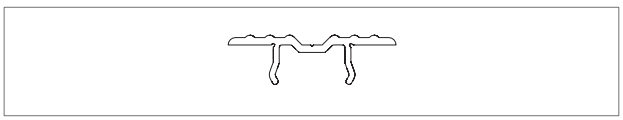
(2a) Packer for support bracket

Height		Colour	PQ	Material no.
3 mm	White	R07.2	1	**643351**
	Medium bronze	R05.3	1	**643352**
	EV1	R01.1	1	**643353**
	Black brown	R04.4	1	**739897**
	Unpainted	unc.	1	**643354**
6 mm	White	R07.2	1	**737260**
	Medium bronze	R05.3	1	**737261**
	EV1	R01.1	1	**737262**
	Black brown	R04.4	1	**739898**
	Unpainted	unc.	1	**737263**



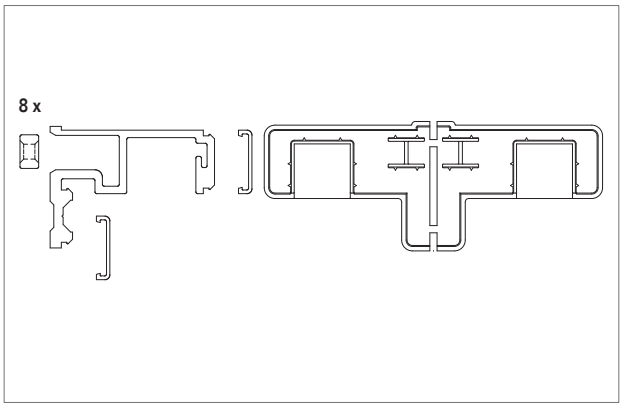
(3) Roller track incl. accessories

Length		Colour	PQ	Material no.
3000 mm	White	R07.2	1	**642436**
	Medium bronze	R05.3	1	**642440**
	EV1 Silver	R01.1	1	**642444**
	Black brown	R04.4	1	**738945**
4000 mm	White	R07.2	1	**642437**
	Medium bronze	R05.3	1	**642441**
	EV1 Silver	R01.1	1	**642445**
	Black brown	R04.4	1	**738955**
5000 mm	White	R07.2	1	**642438**
	Medium bronze	R05.3	1	**642442**
	EV1 Silver	R01.1	1	**642446**
	Black brown	R04.4	1	**765177**
6000 mm	White	R07.2	1	**642439**
	Medium bronze	R05.3	1	**642443**
	EV1 Silver	R01.1	1	**642447**
	Black brown	R04.4	1	**738956**



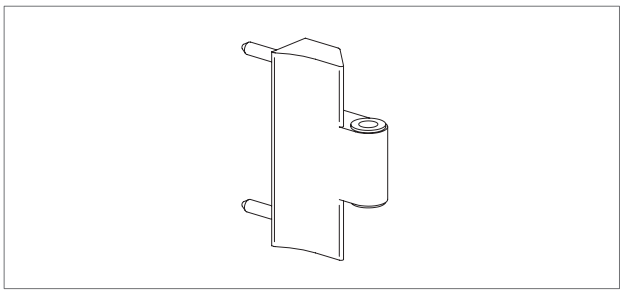
(4) Cover strip for roller track

Length		Colour	PQ	Material no.
1300 mm	EV1 Silver	–	1	**642452**



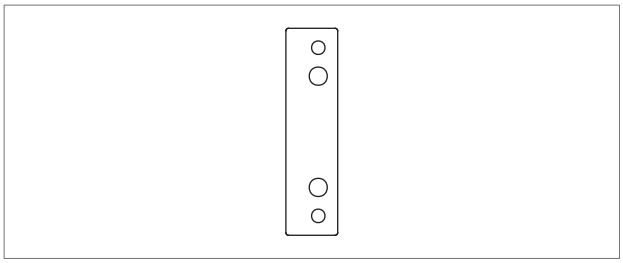
(5) Guide track incl. accessories

Length		Colour	PQ	Material no.
3000 mm	White	R07.2	1	**312797**
	Medium bronze	R05.3	1	**312802**
	EV1 Silver	R01.1	1	**312807**
	Black brown	R04.4	1	**490442**
4000 mm	White	R07.2	1	**312798**
	Medium bronze	R05.3	1	**312803**
	EV1 Silver	R01.1	1	**312808**
	Black brown	R04.4	1	**490441**
5000 mm	White	R07.2	1	**312799**
	Medium bronze	R05.3	1	**312804**
	EV1 Silver	R01.1	1	**312809**
	Black brown	R04.4	1	**765178**
6000 mm	White	R07.2	1	**312800**
	Medium bronze	R05.3	1	**312805**
	EV1 Silver	R01.1	1	**312810**
	Black brown	R04.4	1	**490440**



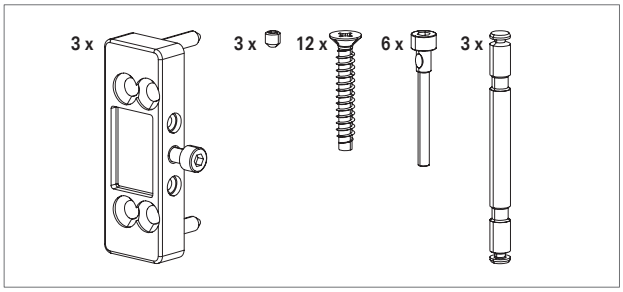
(6) Frame hinge-bearing

Version		Colour	PQ	Material no.
7 mm | pin 25 mm	White	R07.2	3	**734522**
	Medium bronze	R05.3	3	**734523**
	Silver	R01.1	3	**734524**
	Black brown	R04.4	3	**739899**
	Unpainted	unc.	3	**739906**
10 mm | pin 25 mm	White	R07.2	3	**734525**
	Medium bronze	R05.3	3	**734526**
	Silver	R01.1	3	**734527**
	Black brown	R04.4	3	**739900**
	Unpainted	unc.	3	**734528**



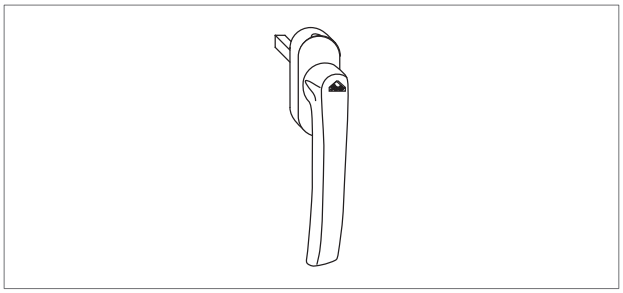
(7) Packers frame hinge-bearing

thickness		Colour	PQ	Material no.
1 mm	White	R07.2	3	**312831**
	Medium bronze	R05.3	3	**312832**
	Silver	R01.1	3	**312833**
	Black brown	R04.4	3	**490461**
	Unpainted	unc.	3	**337802**
2 mm	White	R07.2	3	**312834**
	Medium bronze	R05.3	3	**312835**
	Silver	R01.1	3	**312836**
	Black brown	R04.4	3	**490460**
	Unpainted	unc.	3	**337803**



(8) Hinge-fixing insert

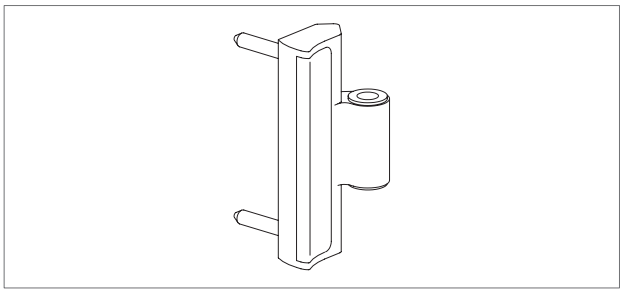
	Description	PQ	Material no.
A	Screwing axis 40 / 50 mm, 50 mm screws: pin 25 mm	3	**734492**
	Screwing axis 40 / 50 mm, 50 mm screws: pin 40 mm	3	**765866**
B	Screwing axis 44 / 54 mm, 50 mm screws: pin 40 mm	3	**733493**



(11) Roto Line flat handle, 10 mm lugs, 35 mm pin length

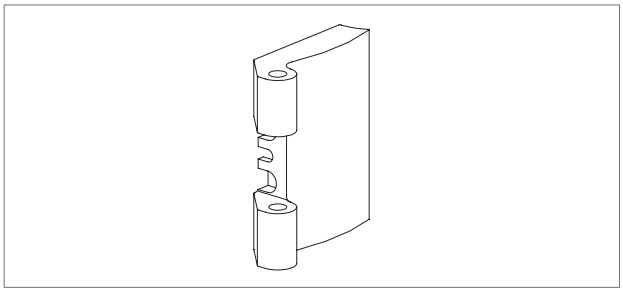
Version		Colour	PQ	Material no.
	White	R07.2	1	**336110**
	Medium bronze	R05.3	1	**336111**
	Silver	R01.1	1	**336112**
	Black brown	R04.4	1	**490462**

NOTE!
Depending on the design, further handles from the Roto range are possible.



(9) Sash hinge-bearing

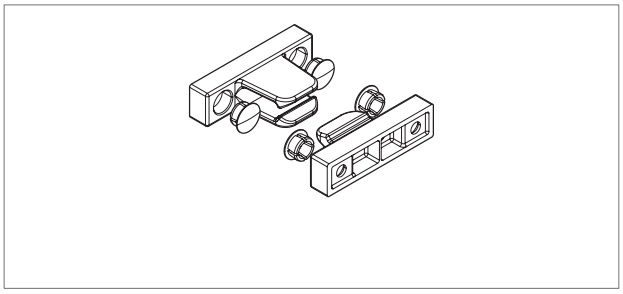
Version		Colour	PQ	Material no.
20 mm | pin 25 mm	White	R07.2	3	**734361**
	Medium bronze	R05.3	3	**734362**
	Silver	R01.1	3	**734363**
	Black brown	R04.4	3	**738915**
	Unpainted	unc.	3	**734364**
30 mm | pin 25 mm	White	R07.2	3	**734365**
	Medium bronze	R05.3	3	**734366**
	Silver	R01.1	3	**734367**
	Black brown	R04.4	3	**738914**
	Unpainted	unc.	3	**734368**
20 mm | pin 40 mm	White	R07.2	3	**734369**
	Medium bronze	R05.3	3	**734310**
	Silver	R01.1	3	**734370**
	Unpainted	unc.	3	**734371**
30 mm | pin 40 mm	White	R07.2	3	**734372**
	Medium bronze	R05.3	3	**734373**
	Silver	R01.1	3	**734374**
	Unpainted	unc.	3	**734375**



(10) Hinge

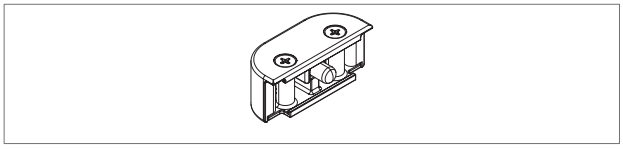
Version		Colour	PQ	Material no.
40 mm	White	R07.2	3	**733366**
	Medium bronze	R05.3	3	**733367**
	Silver	R01.1	3	**733368**
	Black brown	R04.4	3	**738894**
	Unpainted	unc.	3	**733372**
50 mm	White	R07.2	3	**733369**
	Medium bronze	R05.3	3	**733370**
	Silver	R01.1	3	**733371**
	Black brown	R04.4	3	**738905**
	Unpainted	unc.	3	**733373**

Accessories



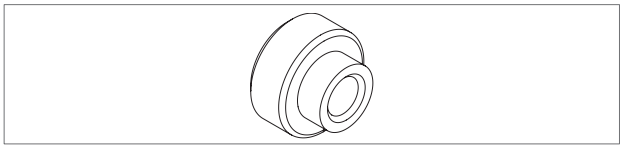
(12) Set sash retaining device

Version	Colour	PQ	Material no.
White	R07.2	1	**340208**
Black	R06.2	1	**340211**
Silver	R01.1	1	**375241**



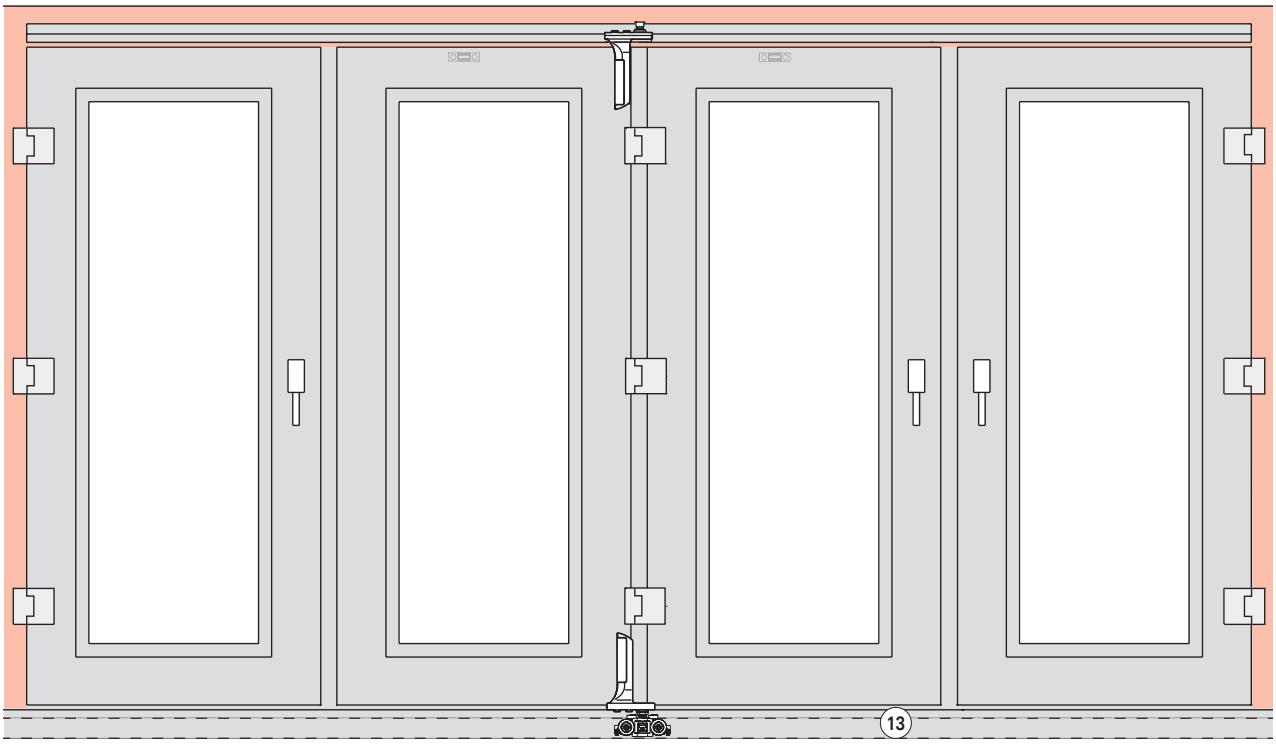
Sash stop

Version	Colour	PQ	Material no.
White	R07.2	1	**444807**
Medium bronze	R05.3	1	**444808**
Silver	R01.1	1	**444809**



Roll-support

Version	PQ	Material no.
Diameter 12 mm	100	**632002**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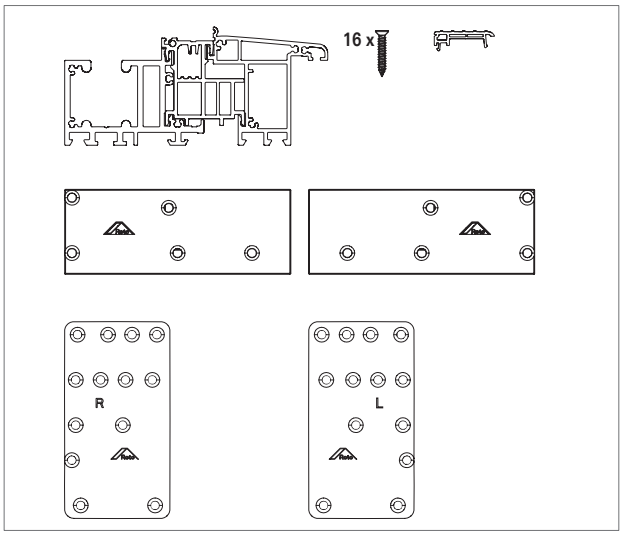
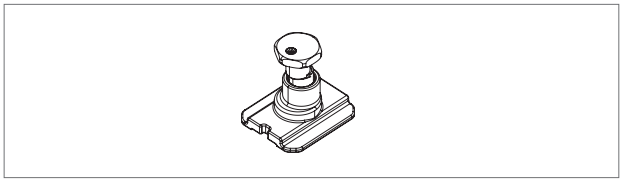


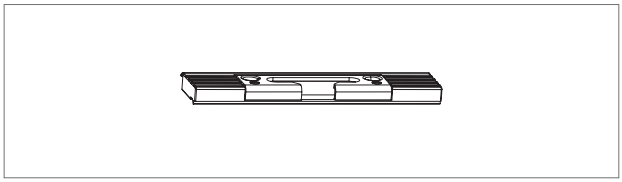
(13) Enhanced threshold incl. accessories

Version		Colour	PQ	Material no.
3000 mm	EV1 Silver	–	1	**642448**
4000 mm	EV1 Silver	–	1	**642449**
5000 mm	EV1 Silver	–	1	**642450**
6000 mm	EV1 Silver	–	1	**642451**



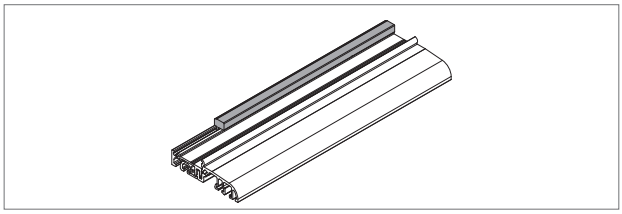
Locking cam

Description	PQ	Material no.
Locking cam, insertable	1	**764419**



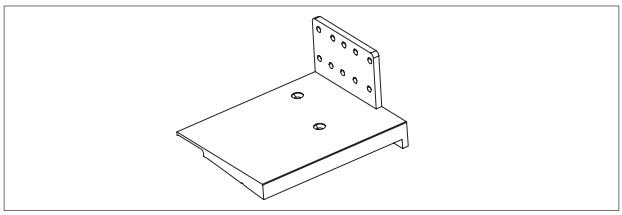
Tilt striker enhanced threshold

Description	PQ	Material no.
Tilt striker BKV Eifel Aluminium	1	**764420**



Adapter profile for Eifel TB

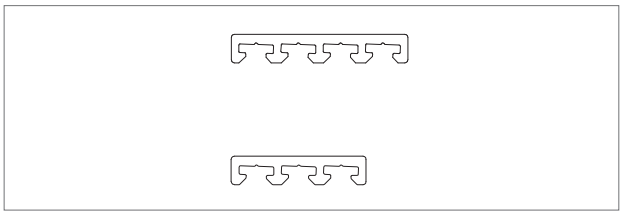
Description	Length	Surface-finish	PQ	Material no.
TB adapter profile	160 mm	Grey	10 pcs	**548528**



Universal threshold bracket

	Surround frame depth	Surface-finish	PQ	Material no.
without radius	70 – 80 mm	White	5 pair	**547017**
	70 – 80 mm	Black	5 pair	**547018**
	70 – 80 mm	Grey	5 pair	**571778**
	80 – 100 mm	White	5 pair	**547019**
	80 – 100 mm	Black	5 pair	**547020**
	80 – 100 mm	Grey	5 pair	**562611**

NOTE!
When ordering profile-specific threshold brackets, pay attention to the screw positions at the corner connector of the enhanced threshold (→ page 59).



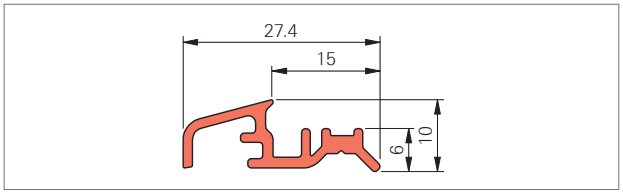
Brush-holder profile

Description	Length	Surface-finish	PQ	Material no.
quadruple	6 m	E6 / C-0	10 pcs	**632575**
	1.20 m	E6 / C-0	5 pcs	**632576**
	Cut by the metre	E6 / C-0	variable	**763219**
triple	60 m	E6 / C-0	10 pcs	**640407**
	6 m	E6 / C-0	1 pcs	**640408**
	1.20 m	E6 / C-0	5 pcs	**640409**
	Cut by the metre	E6 / C-0	variable	**763220**

PB 48 Fin-Seal brush seal

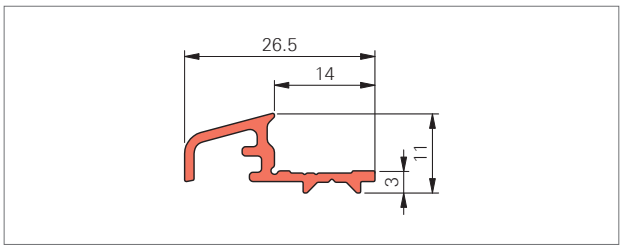
Description	Surface-finish	PQ	Material no.
Brush seal, 10 mm	Grey	60 m	**601080**
Cut by the metre	Grey	variable	**602186**
Brush seal, 17 mm	Grey	40 m	**604872**
Cut by the metre	Grey	variable	**604873**

Optional



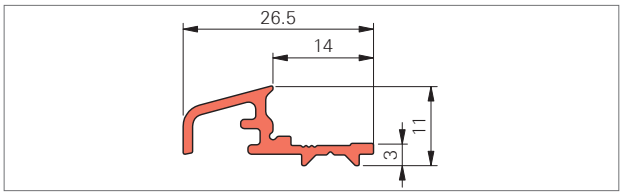
Weather profile strip I

Description	Length	Surface-finish	PQ	Material no.
Weather profile strip I	6 m	E6 / C-0	60 m	**543515**
	1.18 m	E6 / C-0	25 pcs	**543518**
Cut by the metre		E6 / C-0	variable	**625768**



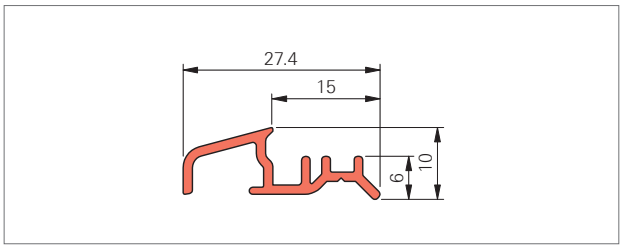
Weather profile strip II

Description	Length	Surface-finish	PQ	Material no.
Weather profile strip II	6 m	E6 / C-0	60 m	**543497**
	1.18 m	E6 / C-0	25 pcs	**543500**
Cut by the metre		E6 / C-0	variable	**625769**



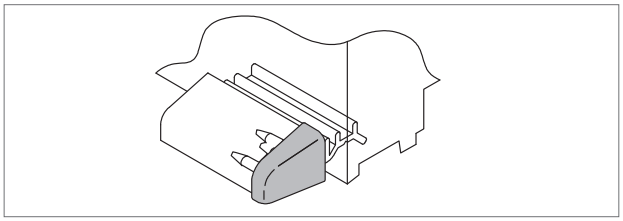
Weather profile strip III

Description	Length	Surface-finish	PQ	Material no.
Weather profile strip III	6 m	E6 / C-0	60 m	**543506**
	1.18 m	E6 / C-0	25 pcs	**543509**
Cut by the metre		E6 / C-0	variable	**625772**



Weather profile strip IV

Description	Length	Surface-finish	PQ	Material no.
Weather profile strip IV	6 m	E6 / C-0	60 m	**543486**
	1.18 m	E6 / C-0	25 pcs	**543489**
Cut by the metre		E6 / C-0	variable	**625770**



End cap for weather profile strip (pair)

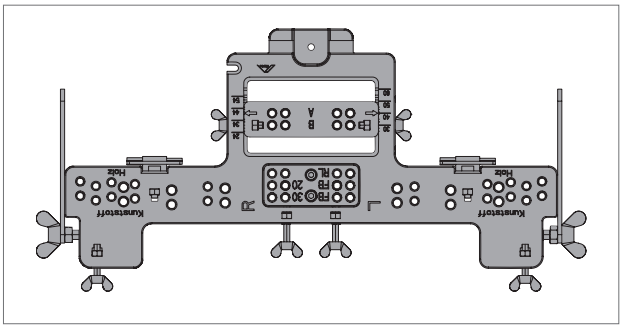
Description	Surface-finish	PQ	Material no.
End cap for weather profile strip	Grey	50 P.	**540403**

NOTE!
Further hardware parts for the enhanced threshold can be found in the Door catalogue CTL_8_EN.

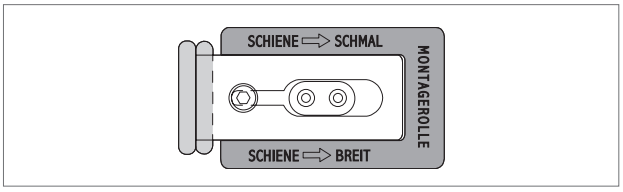
Profile	Frame hinge-bearing/Hinge		Sash hinge-bearing / Hinge			
	Frame hinge-bearing / Hinge	Packer	Sash hinge outside	Sash hinge inside	Pin length Support bracket	Packer Support bracket
Cortizo COR 60	07 / 50, pin 25	1	20 / 40, pin 25	30 / 40, pin 25	30 mm	6 + 3 mm
Extragusa V-8000	07 / 50	–	20 / 40, pin 25	30 / 40, pin 25	40 mm	6 + 3 mm
Feal Termo 65	7 / 50, pin 25	1	20 / 40, pin 40	30 / 40, pin 25	30 mm	6 + 3 mm
Feal Z50 Alu	7 / 50, pin 25	1	20 / 40, pin 40	30 / 40, pin 25	30 mm	6 + 3 mm
Sykon Serie 75	10 / 50, pin 25	–	20 / 40, pin 25	30 / 40, pin 25	30 mm	6 + 3 mm
Yawal	7 / 50, pin 25	2	20 / 40, pin 25	30 / 40, pin 25	30 mm	6 + 3 mm

NOTE!
Further profile assessment upon request.

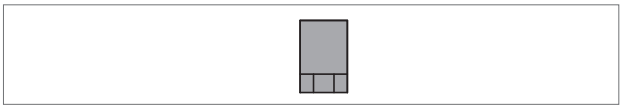
Drawing no.	Adapter profile Eifel TB (see page 33)	Universal threshold bracket (see page 34)	Brush profile holder	Brush seal	
				10 mm	17 mm
S14A560-000	548528	70 - 80 mm	640408	601080	604872
S14A475-000	548528	68 mm	640408	601080	604872
S15A133-000	548528	68 mm	–	–	–
S15A114-000	548528	68 mm	–	–	–
S14A611-000	548528	70 - 80 mm	640408	601080	604872
S15A091-000	548528	70 mm	640408	601080	604872



Drilling jigs	
Drilling jig (hinges and support bracket)	643365

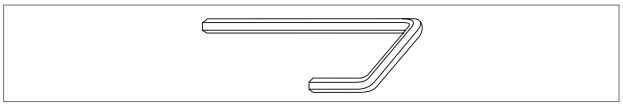


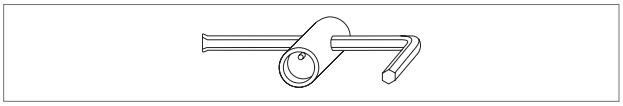
Drilling jig (roller tracks and guide tracks)	314417



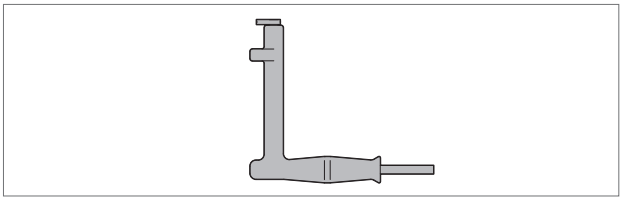
Drilling jig (sash stop)	469831

Tools	
Allen key	208609





Adjusting key	258191



Pin extractor handle	740068
used to insert and/or remove stay-bearing pins	
Replacement blade for pin extractor handle	230765

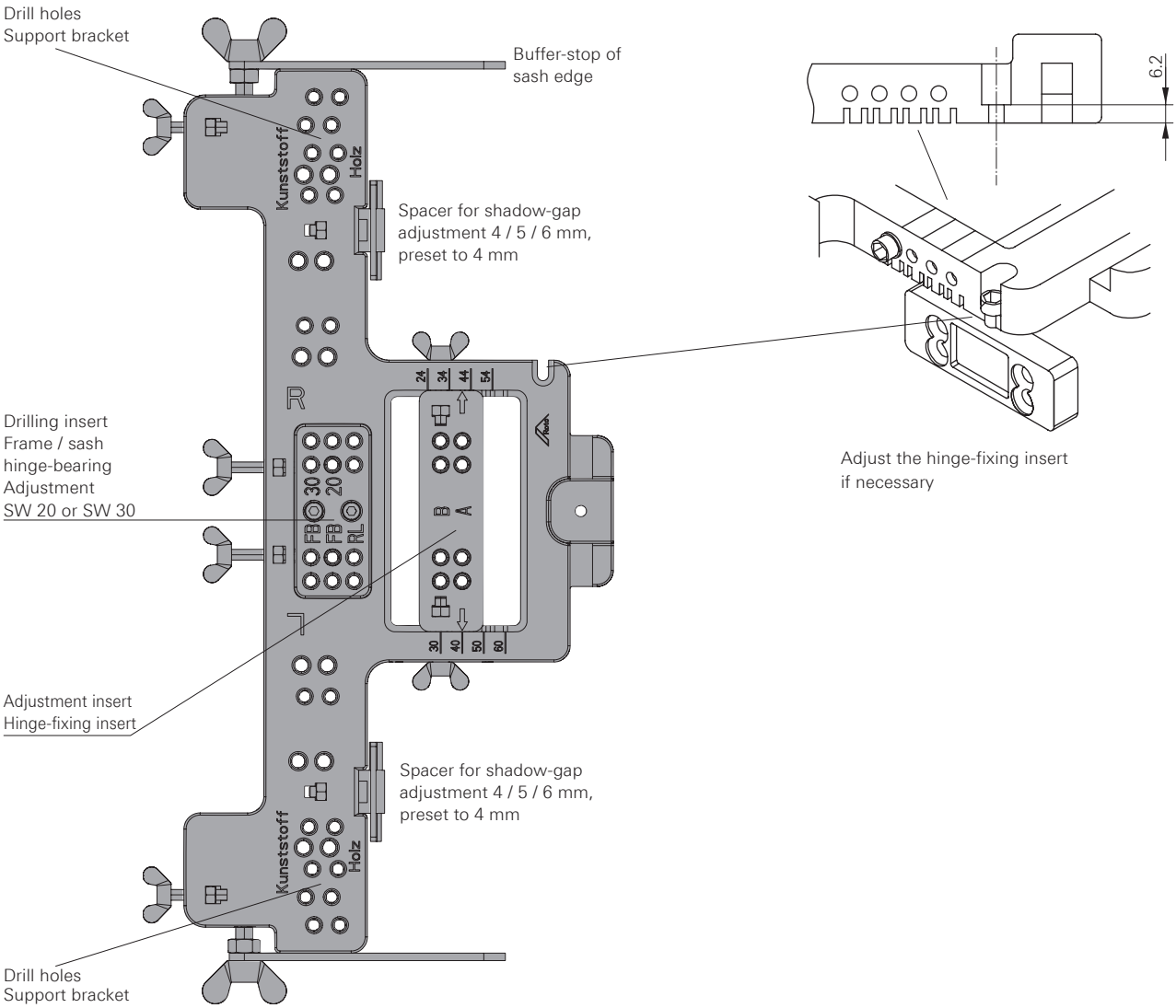
NOTE!
The window fabricator must ensure adequate fixing of the hardware components and correct load transfer. Recommendation: Prove by DIN EN 13126-15, tests 7.2 and 7.3.

Screw-fixing through 2 profile walls

- The wall-thickness of the first screwing level through aluminium must be at least 2 mm.
- If the wall-thickness of the first screwing level is < 2 mm, use supports or riveting nuts in order to achieve a wall-thickness of at least 2 mm.
- The wall-thickness of the second screwing level through aluminium must be at least 1.6 mm.

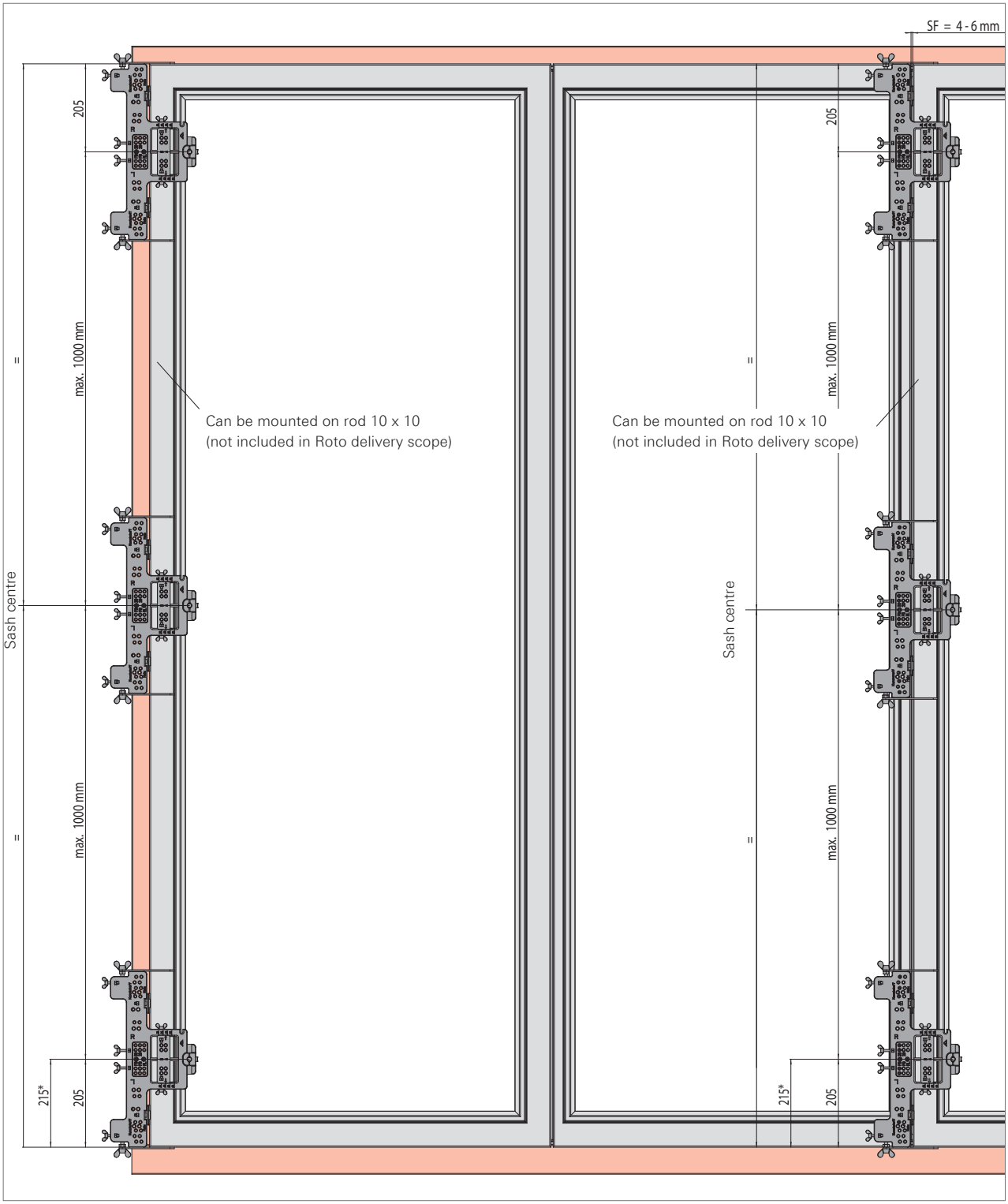
Screw-fixing through 1 profile wall

- The wall-thickness of the first screwing level through aluminium must be at least 6 mm.
- To achieve this, supports or riveting nuts must be used.



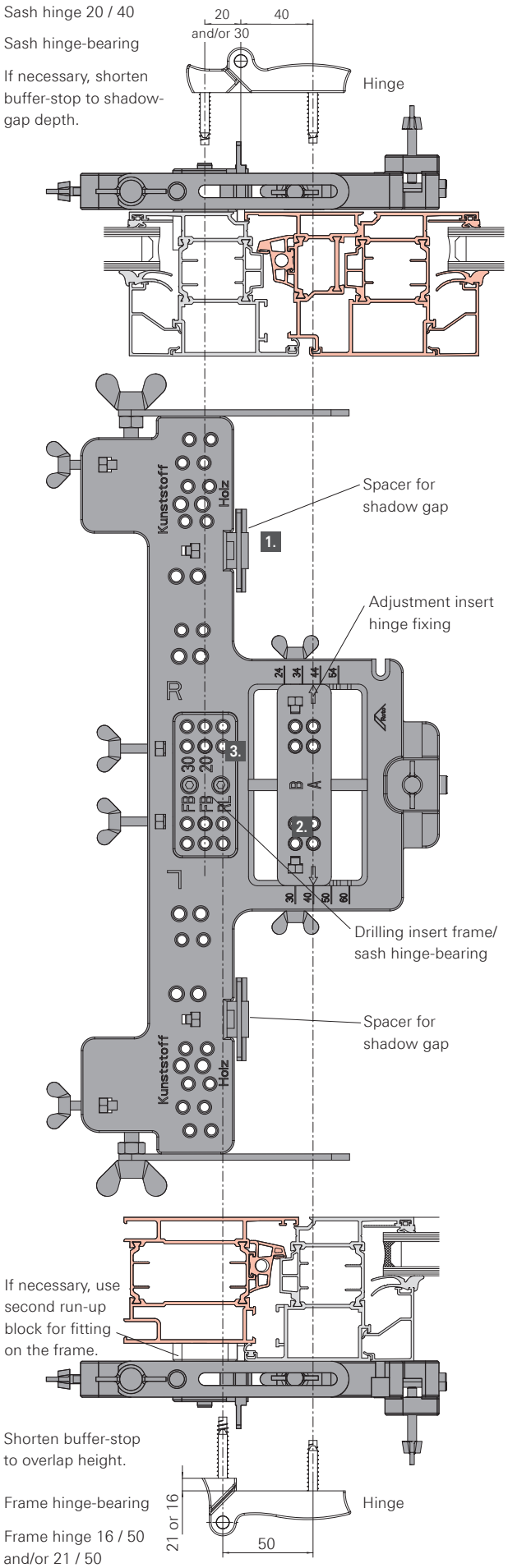
Position: Frame hinge-bearing

Position: Sash hinge-bearing



NOTE!
SH ≤ 2400 mm: Install 3 hinges for each sash evenly distributed over the whole sash height.
SH ≥ 2401 mm: Install 4 hinges for each sash evenly distributed over the whole sash height.

* with enhanced threshold



Installation of sash hinge 20 / 40 and/or 30 / 40

Drilling-jig adjustments

1.	Spacers for shadow gap	**profile related**
2.	Adjustment insert hinge fixing	**Arrow points to 40**
3.	Drilling insert frame/sash hinge-bearing If necessary, use second run-up block for fitting on the frame.	**SW 20 and/or SW 30**

Drill

4. Fold together the folding sash according to the diagram.

5. Drill with Ø 5 mm drill

▪ in adjustment insert hinge fixing	**A**
▪ Drilling insert frame/sash hinge-bearing	**SW 20 and/or SW 30**

Installation of frame hinge 16 / 50 and/or 21 / 50

Drilling-jig adjustments

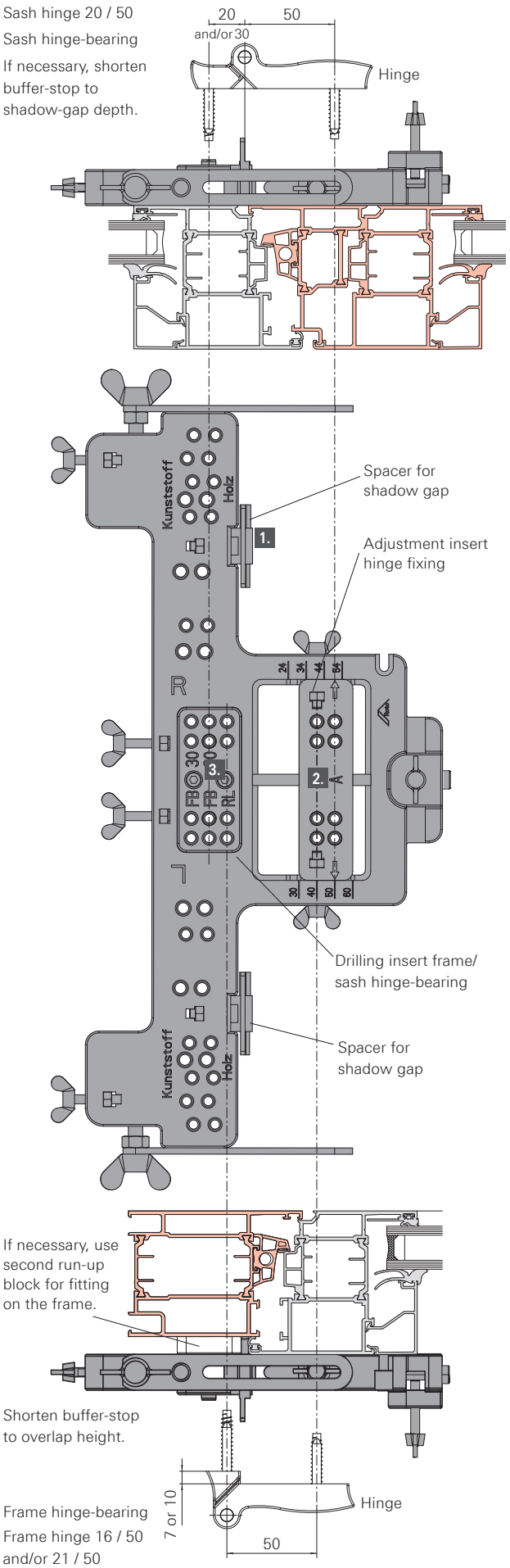
1.	Spacers for shadow gap	**4 mm**
2.	Adjustment insert hinge fixing	**Arrow points to 40**
3.	Drilling insert frame/sash hinge-bearing If necessary, use second run-up block for fitting on the frame.	**F.h-b**

Drill

4. Place the frame side of the folding sash on the frame and align (observe the chamber dimension).

5. Drill with Ø 5 mm drill

▪ in adjustment insert hinge fixing	**A**
▪ in drilling insert frame/sash hinge-bearing	**F.h-b**



Installation of sash hinge 20 / 50 or 30 / 50

Drilling-jig adjustments

1.	Spacers for shadow gap	**profile related**
2.	Adjustment insert hinge fixing	**Arrow points to 50**
3.	Drilling insert frame/sash hinge-bearing If necessary, use second run-up block for fitting on the frame.	**SW 20 or SW 30**

Drill

4. Fold together the folding sash according to the diagram.
5. Drill with Ø 5 mm drill
   - in adjustment insert hinge fixing **A**
   - in drilling insert frame/sash hinge-bearing **SW 20 and/or SW 30**

Installation of frame hinge 16 / 50 and/or 21 / 50

Drilling-jig adjustments

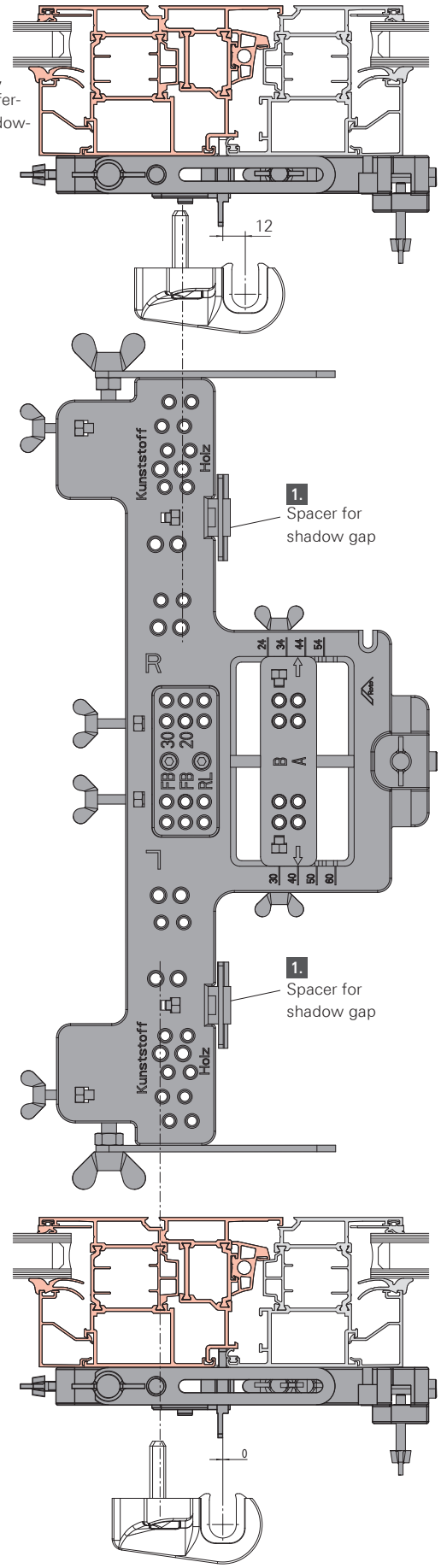
1.	Spacers for shadow gap	**4 mm**
2.	Adjustment insert hinge fixing	**Arrow points to 50**
3.	Drilling insert frame/sash hinge-bearing If necessary, use second run-up block for fitting on the frame.	**F.h-b**

Drill

4. Place the frame side of the folding sash on the frame and align (observe the chamber dimension).
5. Drill with Ø 5 mm drill
   - in adjustment insert hinge fixing **B**
   - in drilling insert frame/sash hinge-bearing **F.h-b**

12 mm offset to shadow gap

If necessary, shorten buffer-stop to shadow-gap depth.



Predrilling of the support bracket

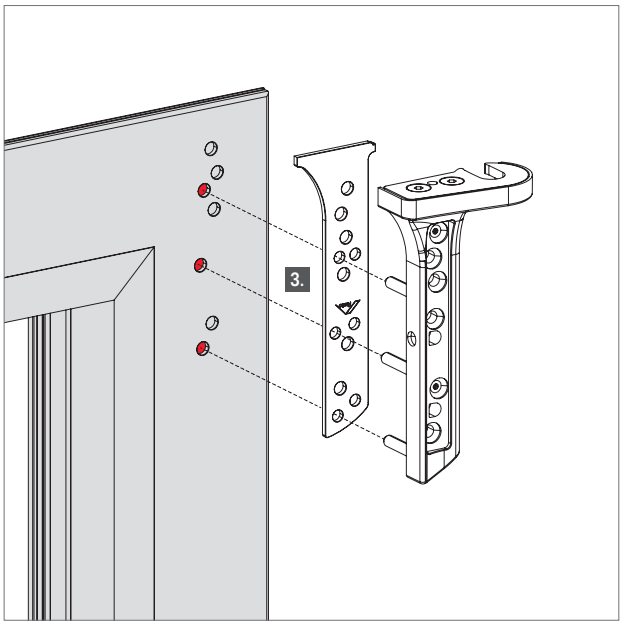
Drilling-jig adjustments

1. Adjust the spacers for shadow gap, shorten to shadow gap depth if necessary.

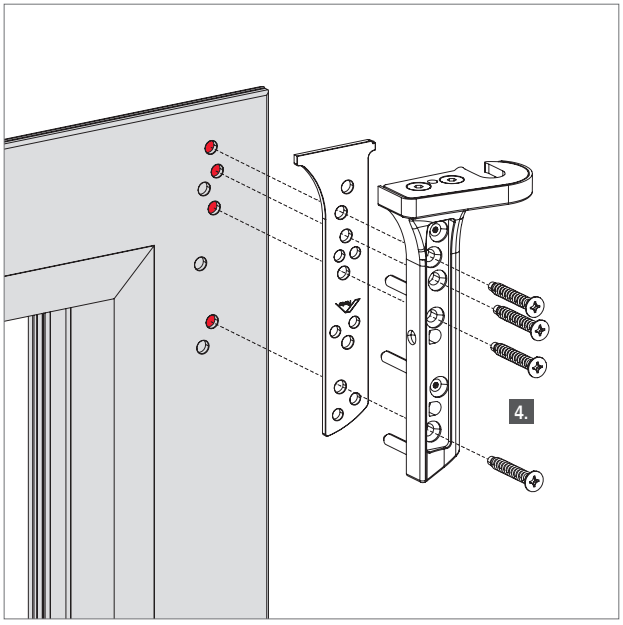
Drill:

2. Predrilling of screws Ø 5 mm, predrilling of pins Ø 6 mm, according to the drilling-jig inscription (timber = 12 mm offset).

NOTE!
Observe the profile-specific installation instructions.

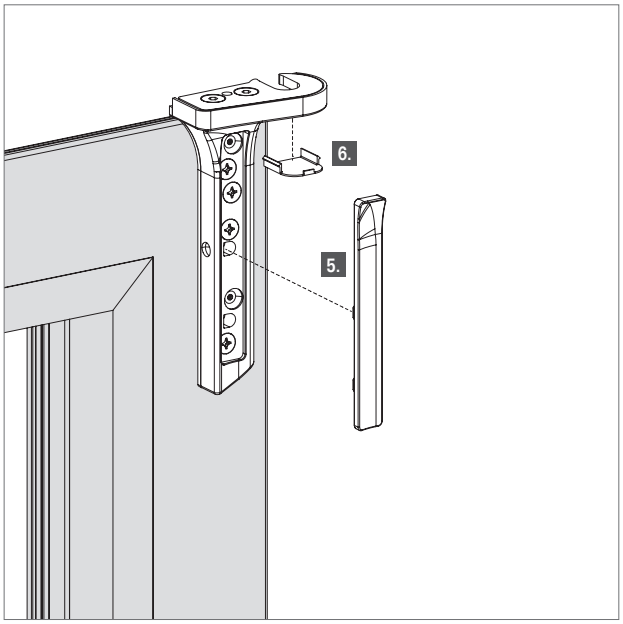


1. Move drilling jig with stop to initial position (see p. 41–43).
2. Carry out drillings with drilling jig (643365) (see p. 41–43).
3. Bring together support bracket and packer accurately and slide 3 cams of the support bracket into suitable drilling channels.

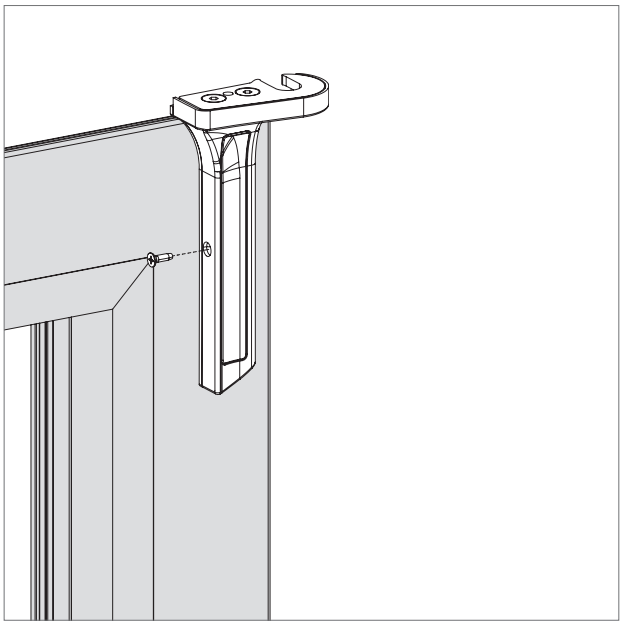


4. Fasten support bracket and packer with 4 Euro screws.

NOTE!
Seal the holes for the outer support brackets with suitable sealing compound to prevent the ingress of water.

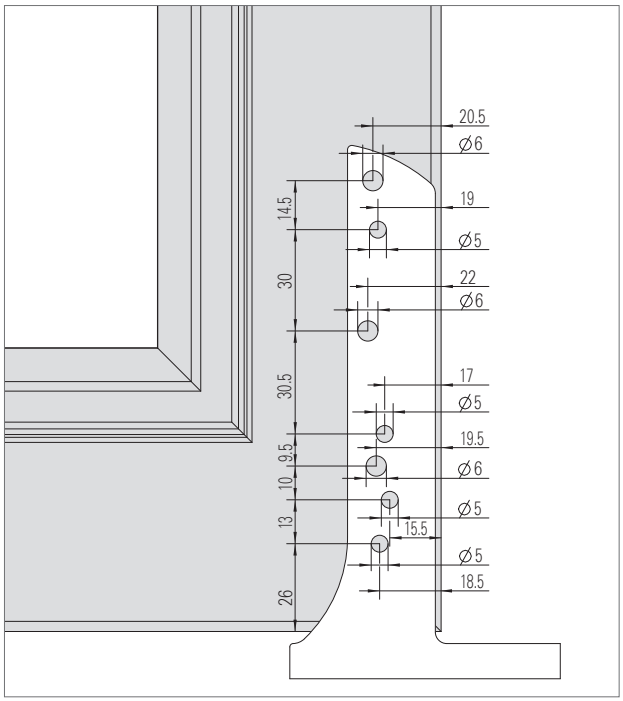


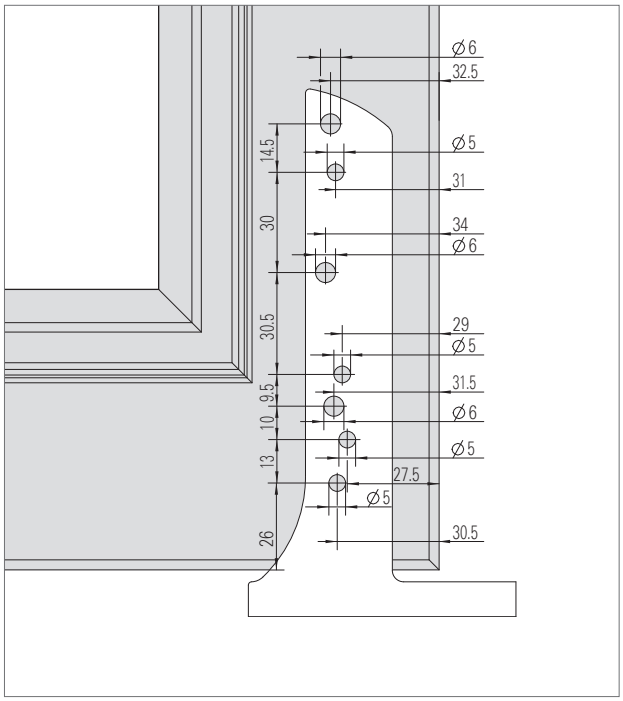
5. Position the cover plate.
6. After installation of the bogies, clip on/insert the small cover cap.



7. Secure the cover plate with countersunk screw.

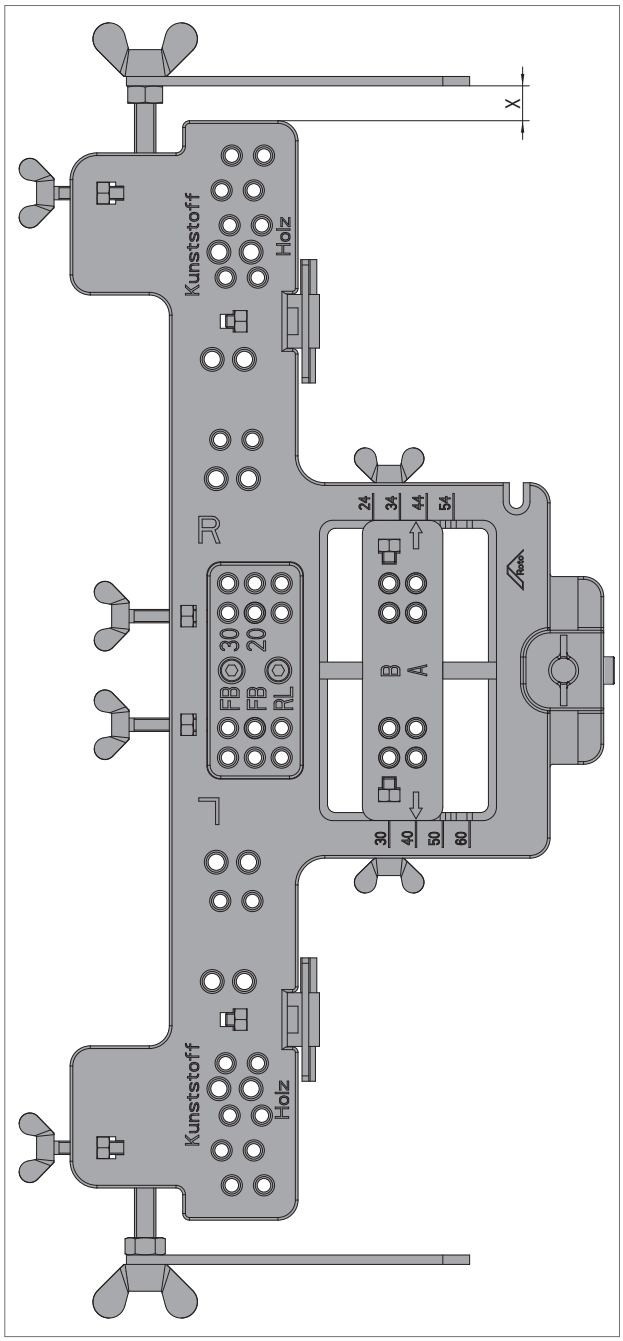
Mounting support bracket for bottom roller track





NOTE!

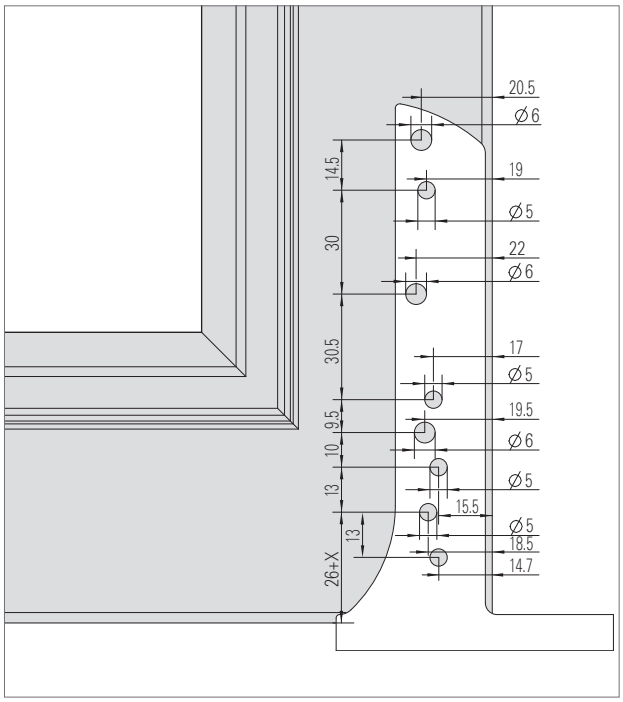
- Observe the profile-specific installation instructions, because some aluminium profile systems must be drilled in timber position.
- Seal the holes for the outer support brackets with suitable sealing compound to prevent the ingress of water.

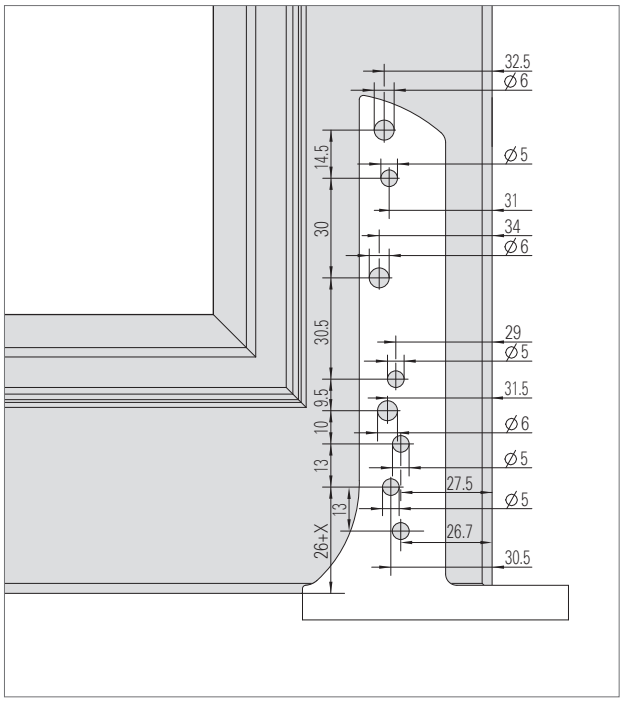


1. Determine the profile's overlap width.
2. Determine the reference dimension X (= overlap width -11.5 mm)
3. Set the reference dimension X (e.g. with metre rule or slide gauge)
4. Place the drilling jig on the profile and push the stop to the sash edge. Fix the drilling jig.
5. Drills the holes.

Examples for dimension X with ...

Overlap width		Dimension X
15	=	8
20	=	13
25	=	18



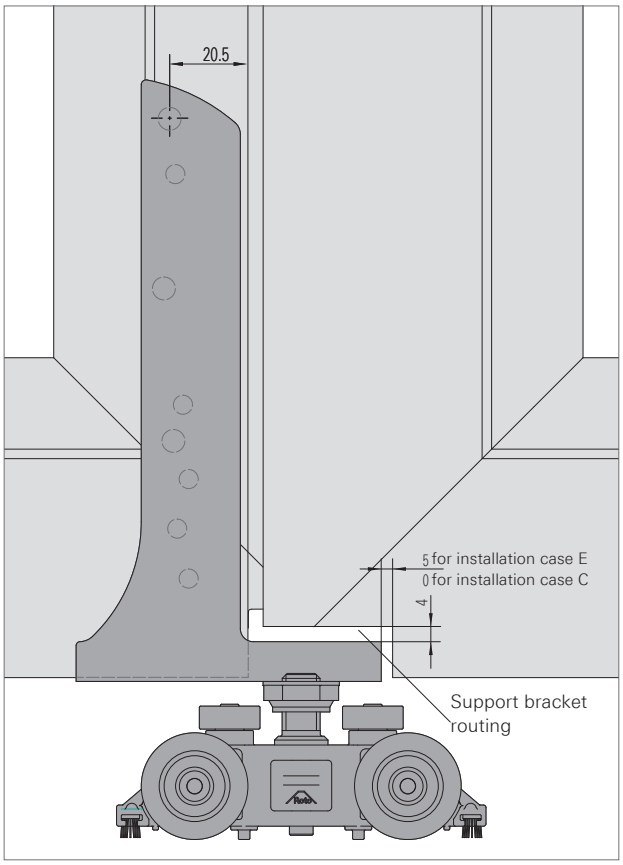


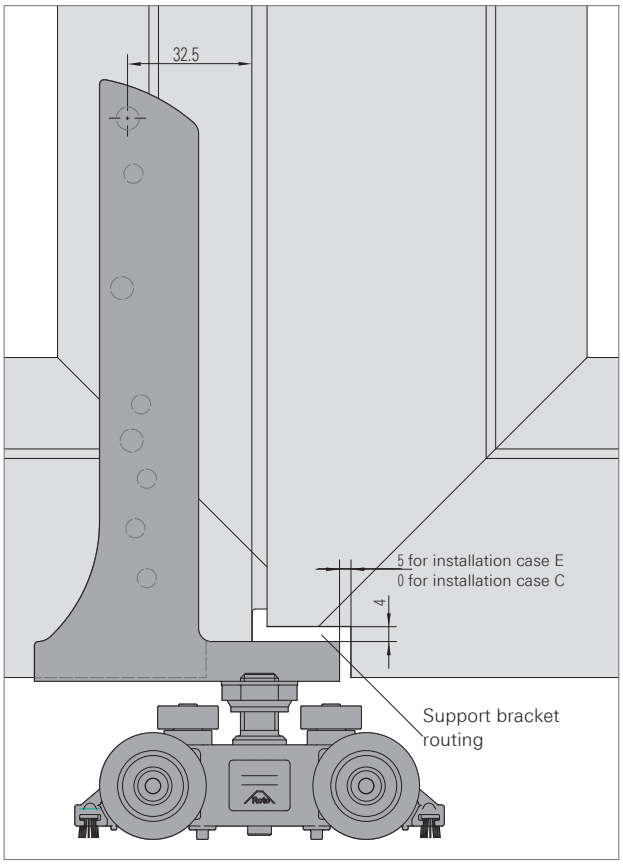
NOTE!

- Observe the profile-specific installation instructions, because aluminium profile systems must be drilled in timber or PVC position (pay attention to the profile assessment).
- Seal the holes for the outer support brackets with suitable sealing compound to prevent the ingress of water.
- Explanation of dimension "X", → page 47.
- Shorten the additional screw for aluminium profile with Euro-groove if necessary, if hardware is used in this area.

NOTE!

Shorten the additional screw for the Euro-groove if necessary, if hardware is used in this area.



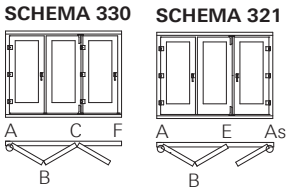


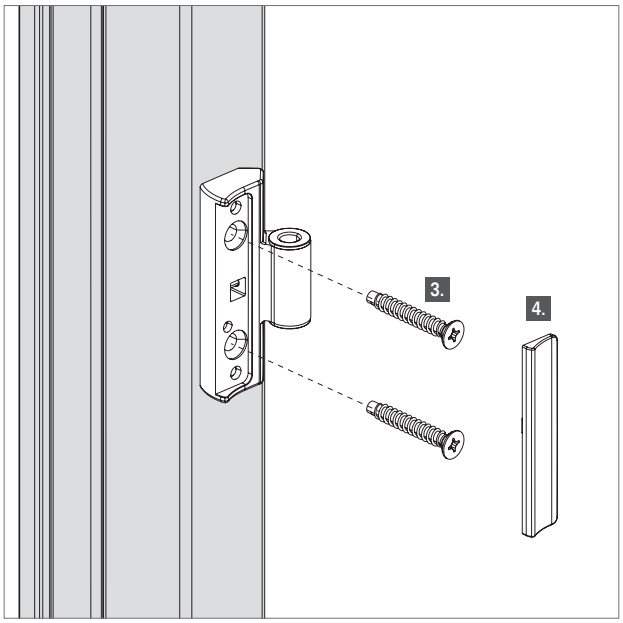
Punching on aluminium profiles

Punching is normally necessary on one sash.

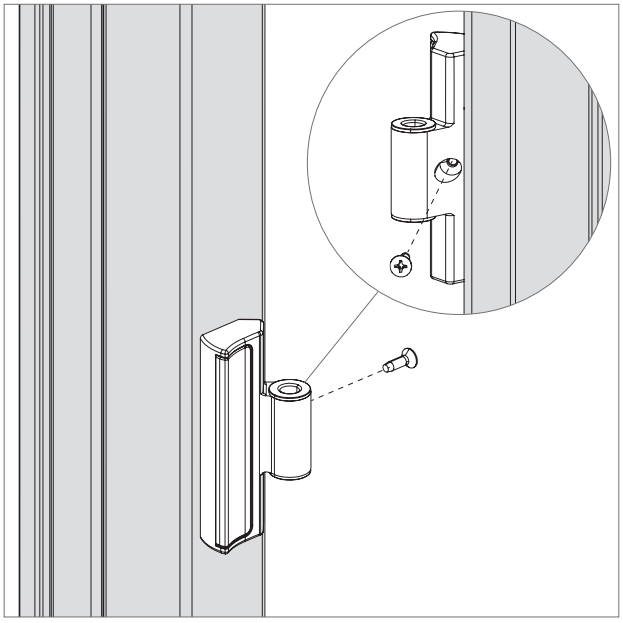
NOTE!

Accurate measurements of punching in the corresponding drawing for a profile check (→ page 37).

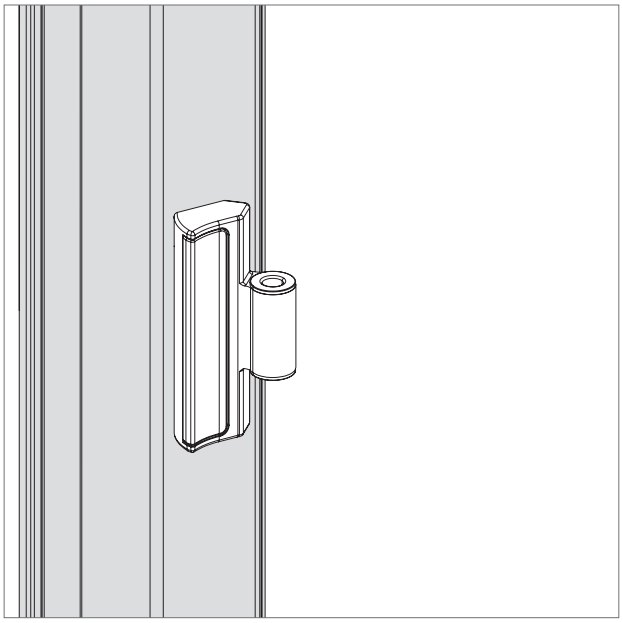




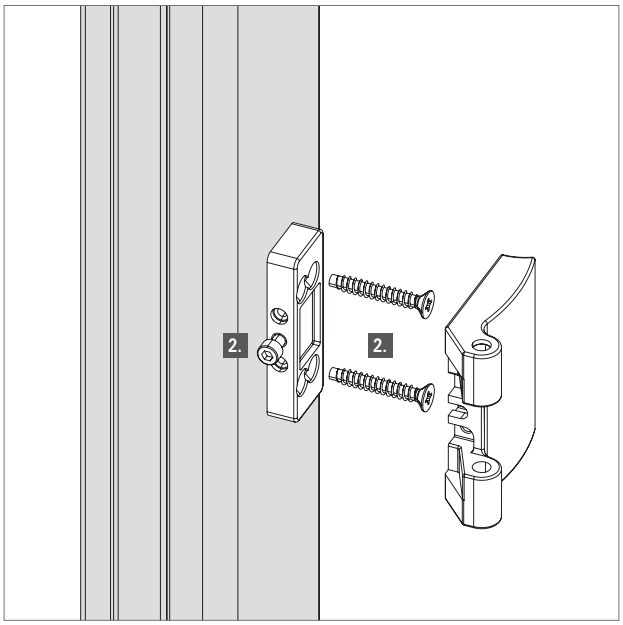
1. Fold together the folding sash according to the diagram, carry out the drillings for the sash hinge-bearing, then for the hinge-fixing insert and the support brackets with drilling jig (643365), not dep.
2. Push in the sash hinge-bearing (not dep.).
3. Screw-fix the sash hinge-bearing with Euro screws.
4. Position the cover plate.



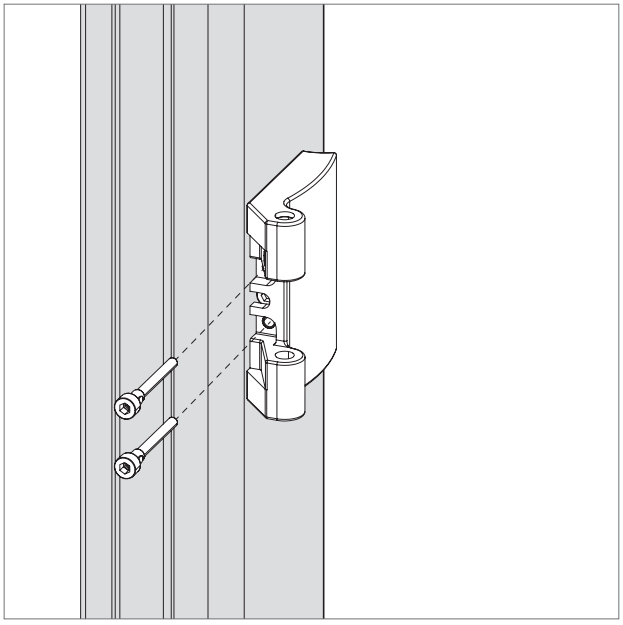
5. Secure the cover plate with countersunk screw.



NOTE!
Seal the profile holes for the outer frame hinge-bearing and hinge-fixing inserts with suitable sealing compound to prevent the ingress of water.

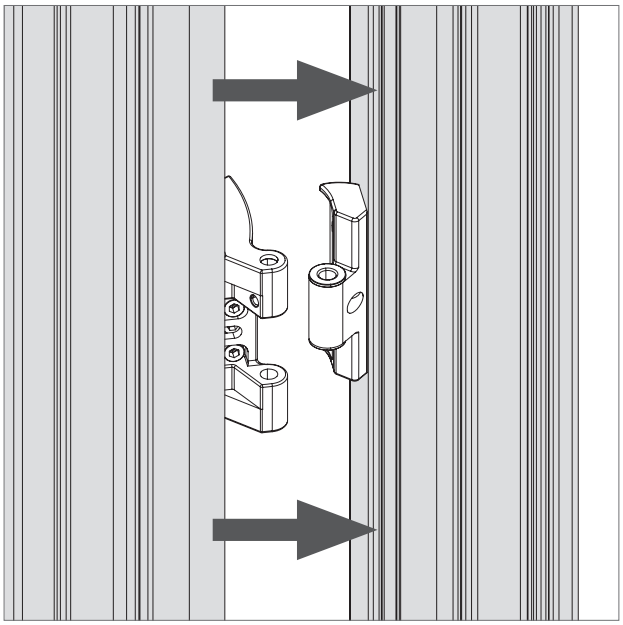


1. Push in the hinge-fixing insert.
2. Fix with Euro screws and 4 mm cylinder screw.



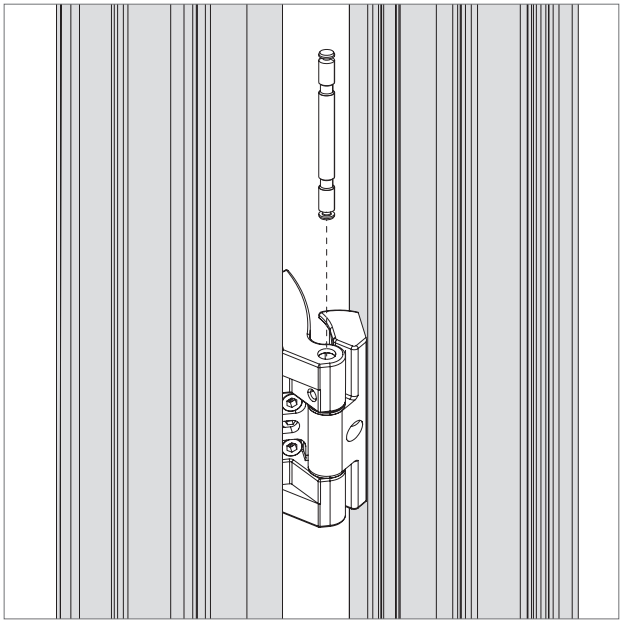
3. Put hinge 40 or hinge 50 on the hinge-fixing insert and fix with 4 mm cylinder screws.
   At the factory the hinge-fixing insert is designed with hinge 40 for 40 mm bolt axis or with hinge 50 for 50 mm bolt axis.

NOTE!
Seal the profile holes for the outer frame hinge-bearing and hinge-fixing inserts with suitable sealing compound to prevent the ingress of water.

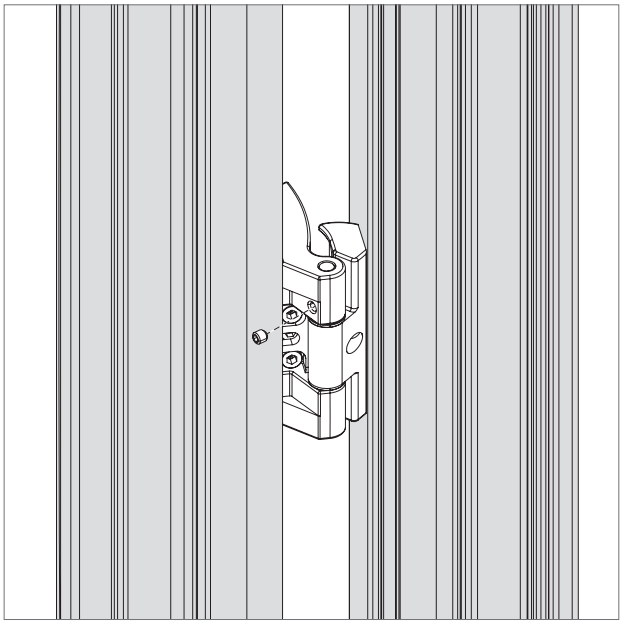


Installation and securing

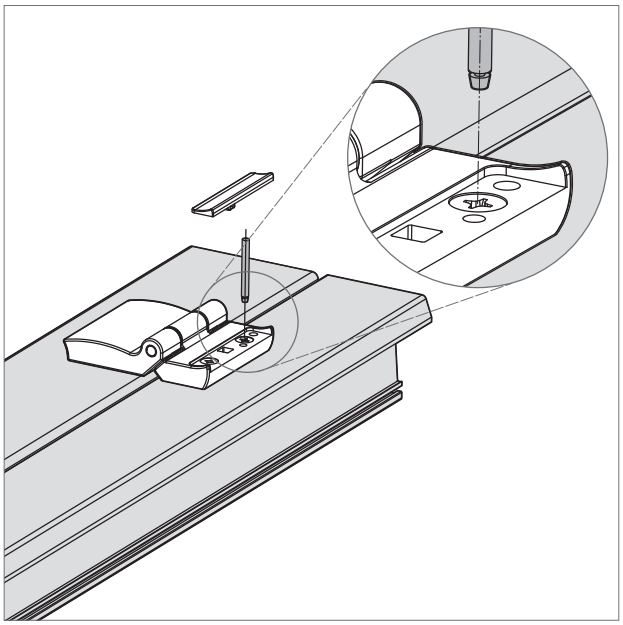
1. With the sash open, bring the hinge and bearing together.



2. Insert the cylindrical pin flush.



3. Secure the cylindrical pin with the size 2.5 bolt. Tightening torque: 5 Nm



Safeguarding outside

Secure the hinges in the outside area with a security pin (224749) to prevent unauthorised removal.

1. Open the sash.
2. Remove the countersunk screw and cover plate (→ page 51).
3. Close the sash.
4. Drive in the security pin into the screw head.
5. Break off the base of the pin.
6. Open the sash.
7. Position again the cover plate and screw-fix.

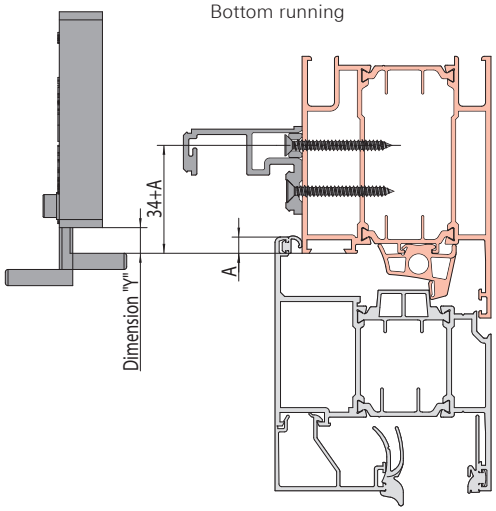
Bottom running		
A coverage	Dimension Y	Dimension Y
Overlap clearance	Bottom	Top
5	4	8.5
6	3	9.5
7	4	10.5
8	5	11.5

Top running		
A coverage	Dimension Y	Dimension Y
Overlap clearance	Bottom	Top
5	4	8.5
6	9.5	12
7	10.5	13
8	11.5	14

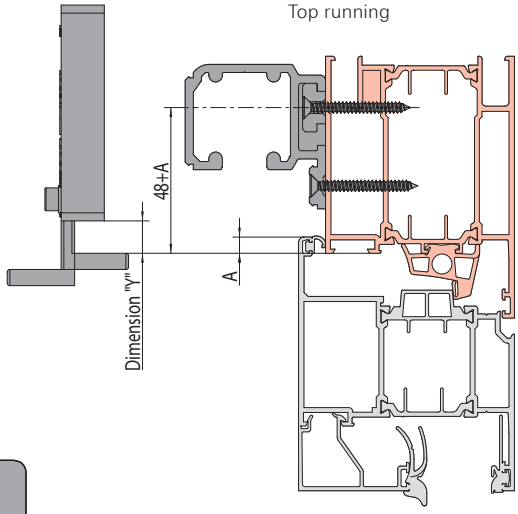
1. Carry out the frame drillings for the roll-supports (2 drillings per metre for roller track and 1 per metre for guide track), with drilling jig (314417) and screw-fix the rollers.
2. Drillings for guide track:
   Drilling jig for narrow track

   Drillings for roller track:
   Drilling jig for broad track
3. Cut the bottom roller track to size:
   Size = Frame external width –6 mm
4. Cut the guide track to size:
   Size = Total width
5. Place the roller tracks on the rollers from the top and slide them in place according to the illustration.
6. Predrill the mounting holes Ø 3 mm.
7. Screw-fix the tracks.

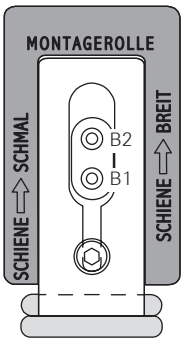
Bottom running



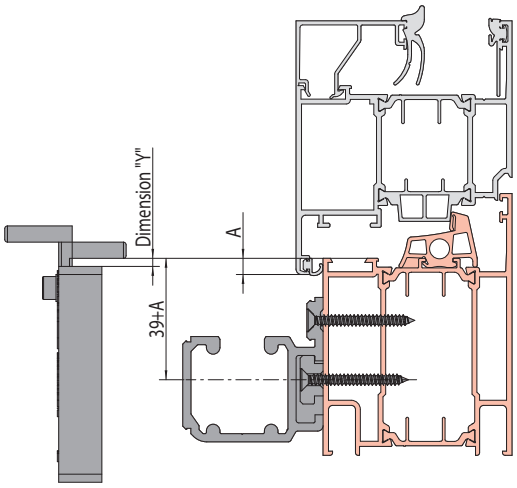
Top running

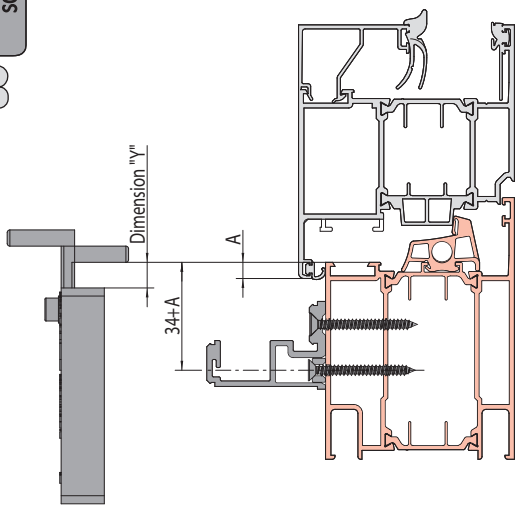


2.

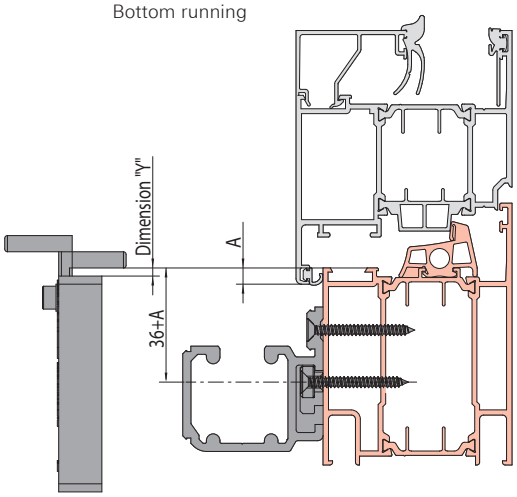


NOTE!
Depending on the required distance, choose B1 or B2.



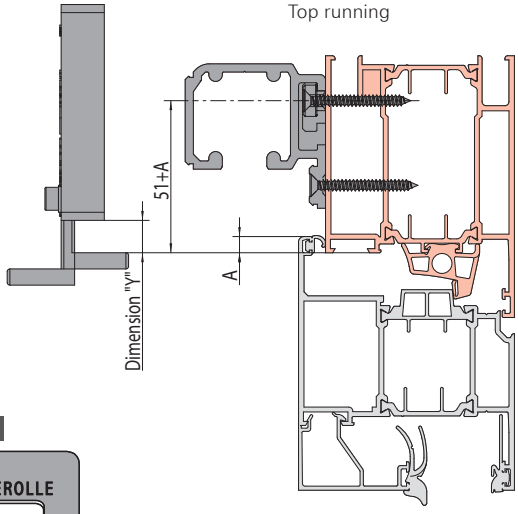


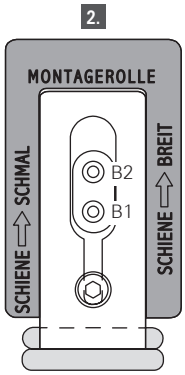
Bottom running



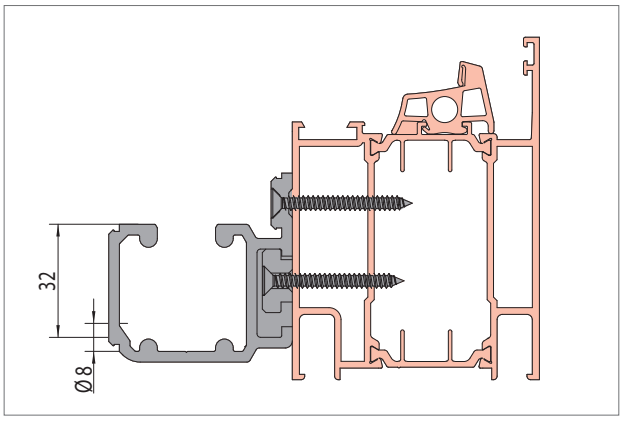
NOTE!
For inserting the roll-support 632002 (optional accessory), adjust the drilling jig accordingly and set the drill-hole pattern with 3 mm offset in line with the drawing.

Top running



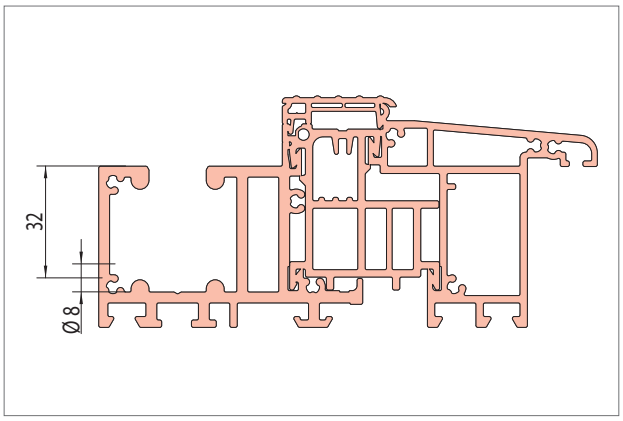


NOTE!
Depending on the required distance, choose B1 or B2.



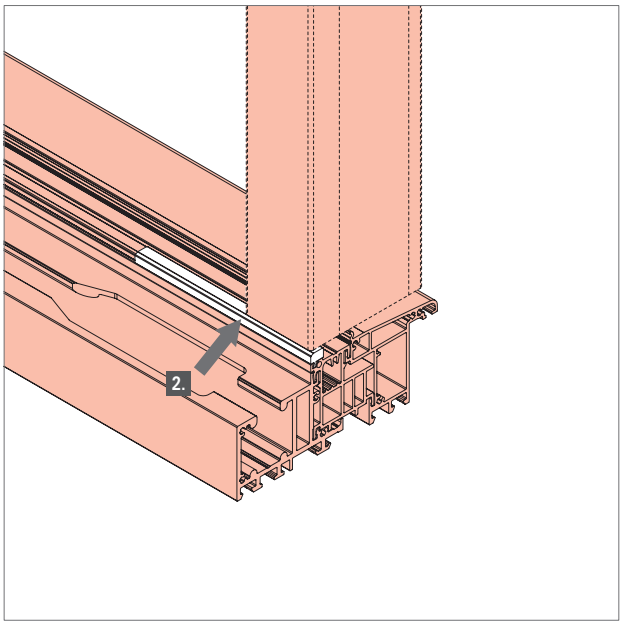
If the roller track is used outdoors, 8 mm holes must be made at 300 mm intervals in order to remove water.

NOTE!
Do not damage the roller track while drilling. Deburr the holes and clean the running surfaces of the bogie after drilling.



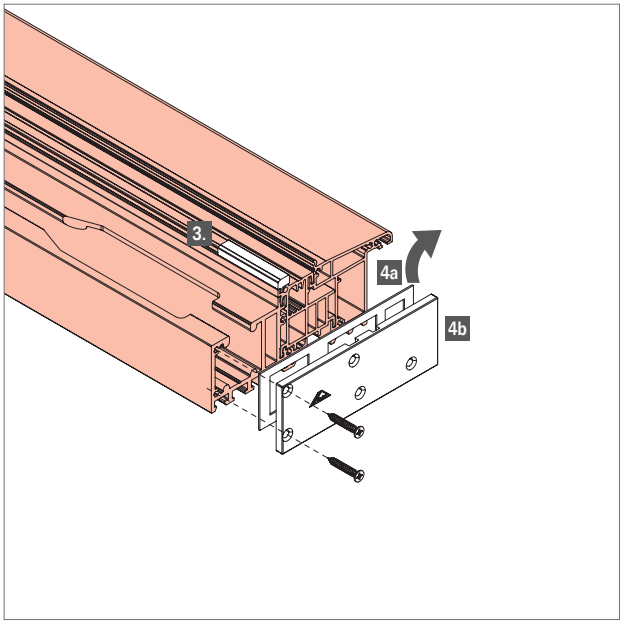
If the enhanced threshold is using for "outward opening", 8 mm holes must be made at 300 mm intervals in order to remove water.

NOTE!
Do not damage the roller track while drilling. Deburr the holes and clean the running surfaces of the bogie after drilling.



1. Cut the enhanced threshold to the required length, making sure that the cut edge is clean.

2. Cut the TB adapter profile (548528) to the width of the profile.

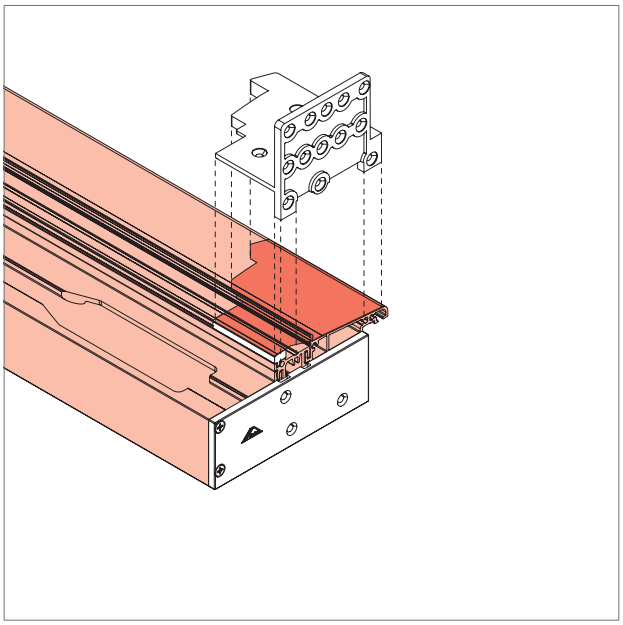


3. Insert the cut TB adapter profile (548528).

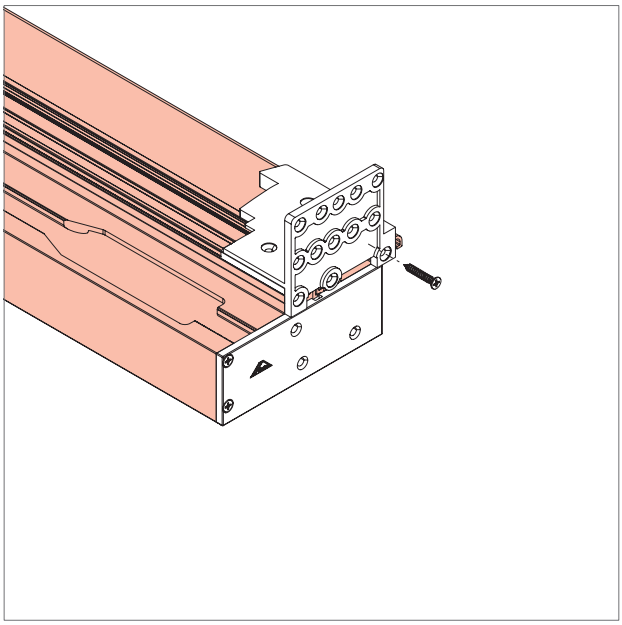
4a Pull off the adhesive film on the cover cap before placing it onto the threshold.

4b Secure the cover cap.

NOTE!
The screws shown are in the misc. small components pack of the enhanced threshold.

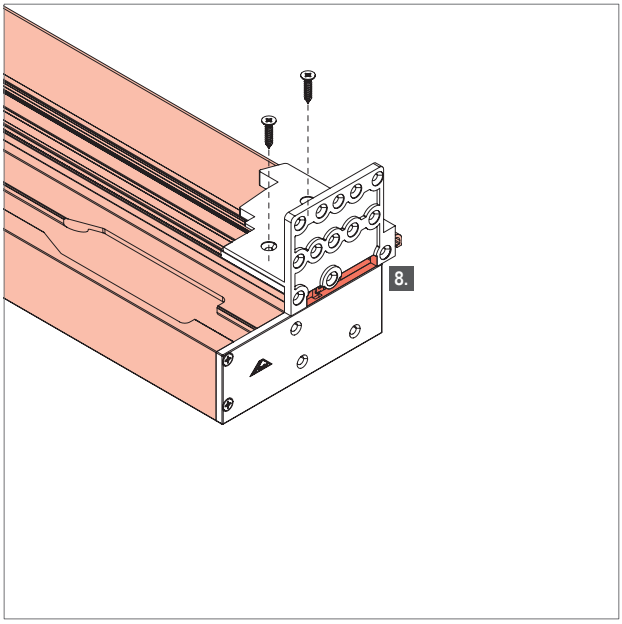


5. Seal the surface on the threshold before installing the threshold bracket with a suitable sealing compound to prevent the ingress of water.



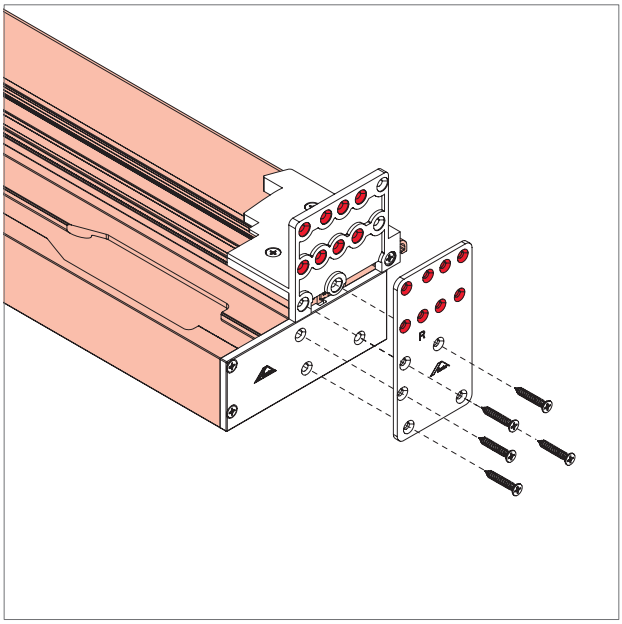
6. Secure the threshold bracket.

> **NOTE!**
> The screws shown are in the misc. small components pack of the enhanced threshold.



7. Recommendation: Self-tapping screws (choice on site) ISO 7050 – ST 4.2 x ... – C – Z, stainless steel A2

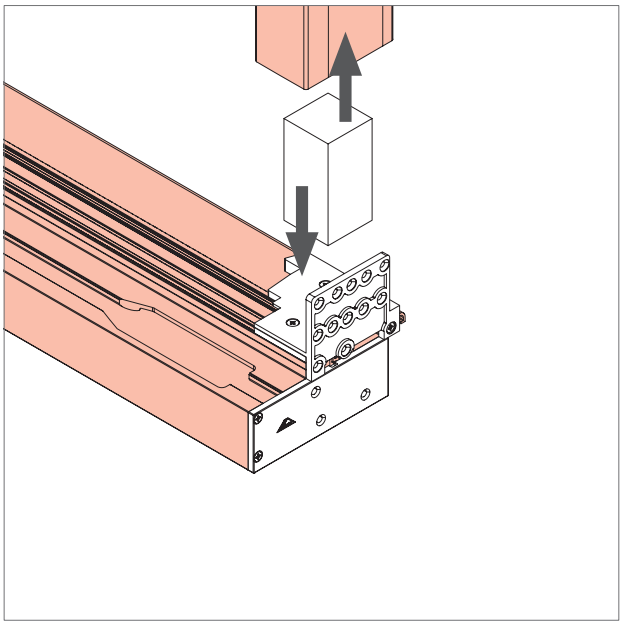
8. Seal the gap between the threshold bracket and cover cap with a suitable sealing compound to prevent the ingress of water.



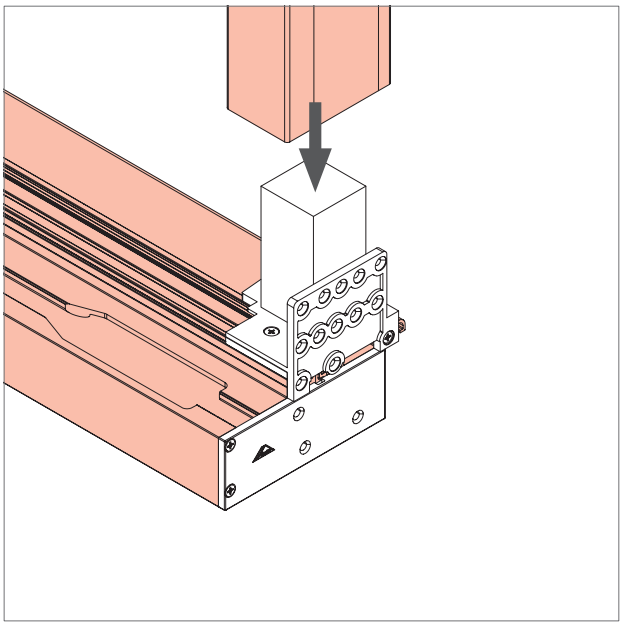
9. Fix the threshold bracket with self-tapping screws 4.2 x 25.

> **NOTE!**
> The screws shown are in the misc. small components pack of the enhanced threshold.

> **NOTE!**
> When ordering profile-specific threshold brackets, pay attention to the screw positions (see red identifier) to the corner connector of the enhanced threshold.

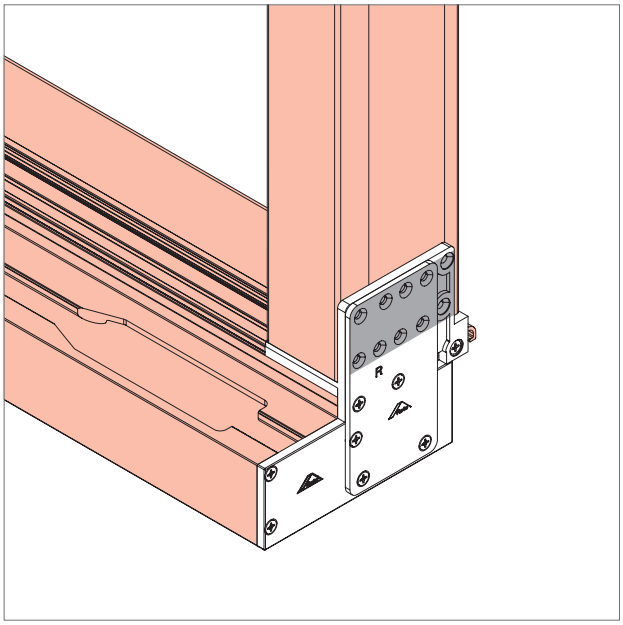


10. Cut the profile stabiliser (e.g. made of solid PVC) to match the frame profile.



11. Insert profile stabiliser and screw it securely to the enhanced threshold.

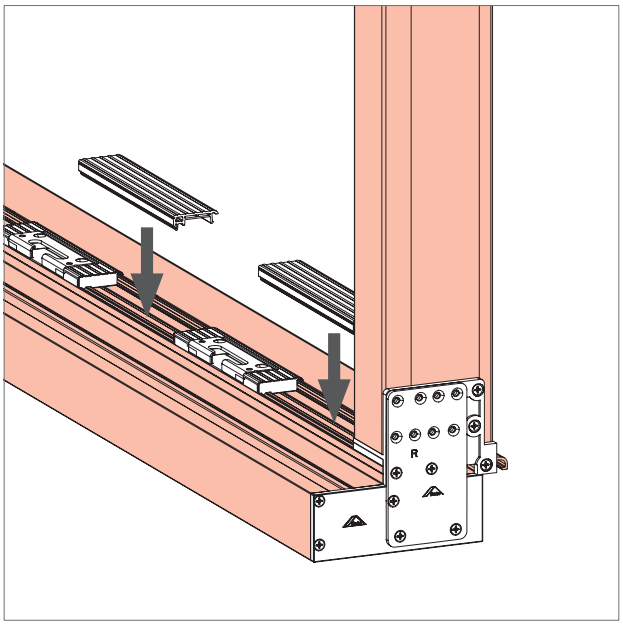
NOTE!
Coordinate the length of the screws to the on-site conditions.



12. Secure the frame.
Recommendation: Self-tapping screws (choice on site) ISO 7050 – ST 4.2 x ... – C – Z, stainless steel A2

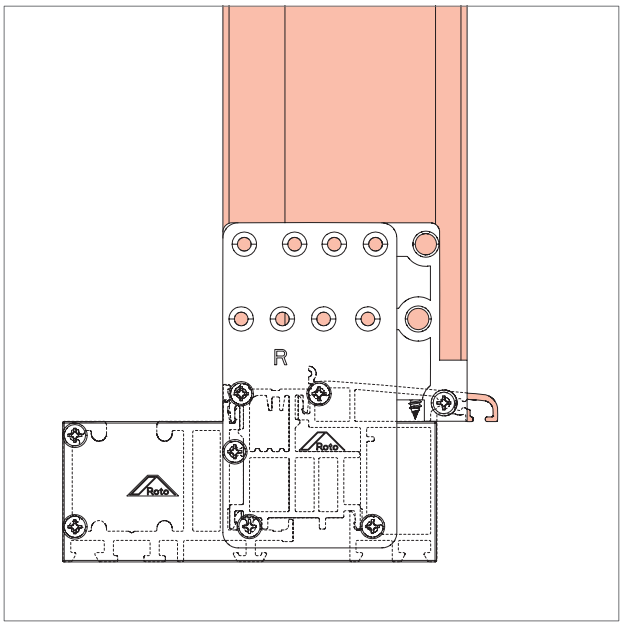
NOTE!
Coordinate the length of the screws to the on-site conditions.
Generally, screw into the reinforcement.

NOTE!
Seal the holes for the outer fastenings with suitable sealing compound to prevent the ingress of water.

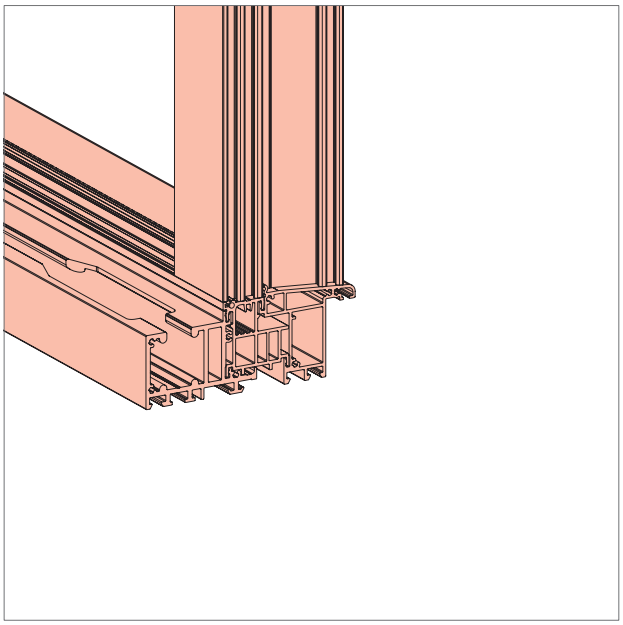


13. Position and secure the strikers according to the locking cams of central locking system.

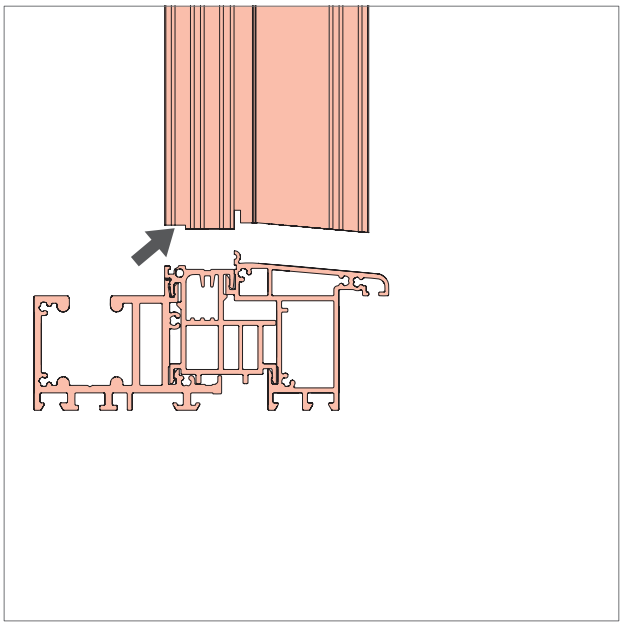
14. Cut the profile cover to size and clip it into place.



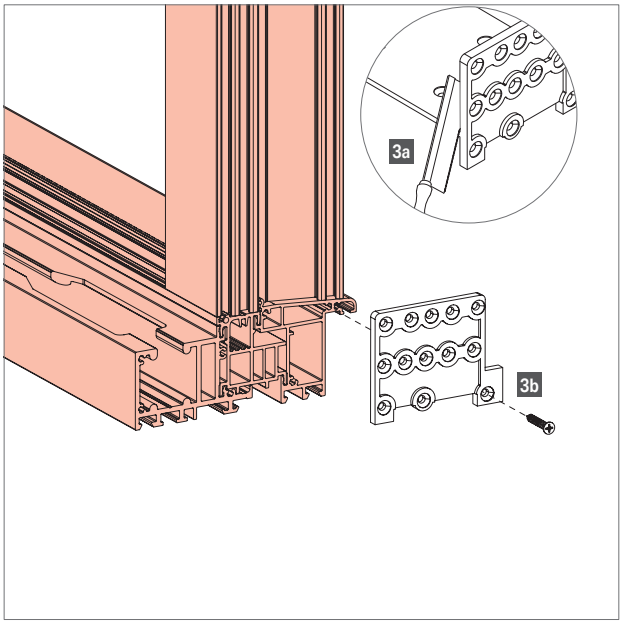
Ensure installation flush with the edge.



1. Cut the enhanced threshold to the required length, making sure that the cut edge is clean.

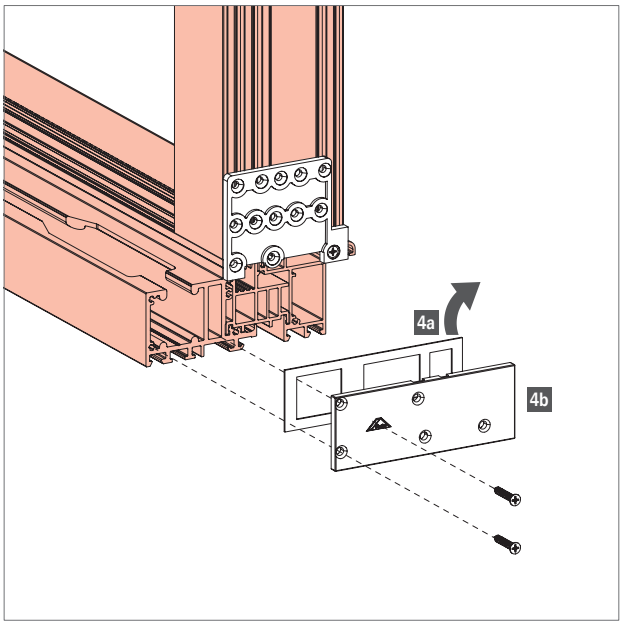


2. Frame counter-routed, adapted to the enhanced threshold BKV Eifel TB



3a Cut the base plate of the threshold bracket to length.
3b Secure the shortened threshold bracket as a spacer.

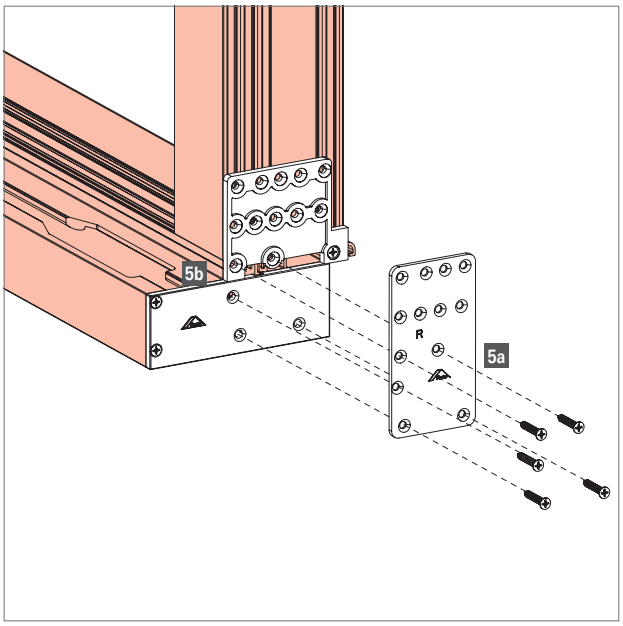
NOTE!
The screws shown are in the misc. small components pack of the enhanced threshold.



4a Pull off the adhesive film on the cover cap before placing it onto the threshold.

4b Secure the cover cap.

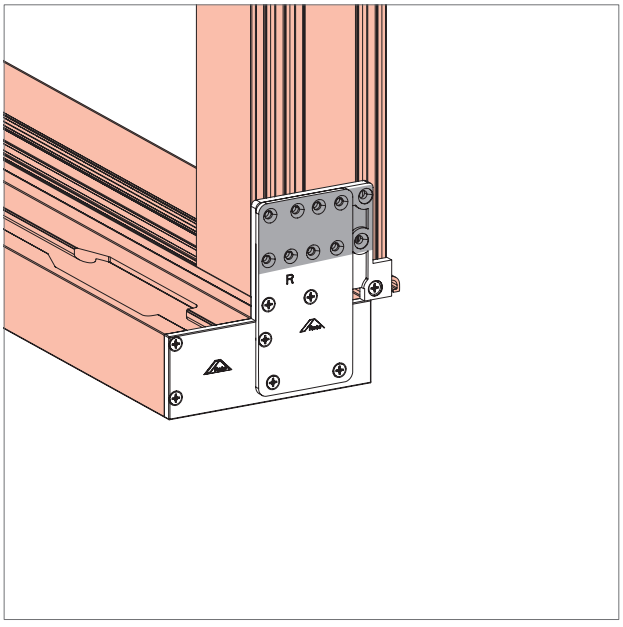
NOTE!
The screws shown are in the misc. small components pack of the enhanced threshold.



5a Secure the threshold bracket with self-tapping screws.

NOTE!
The screws shown are in the misc. small components pack of the enhanced threshold.

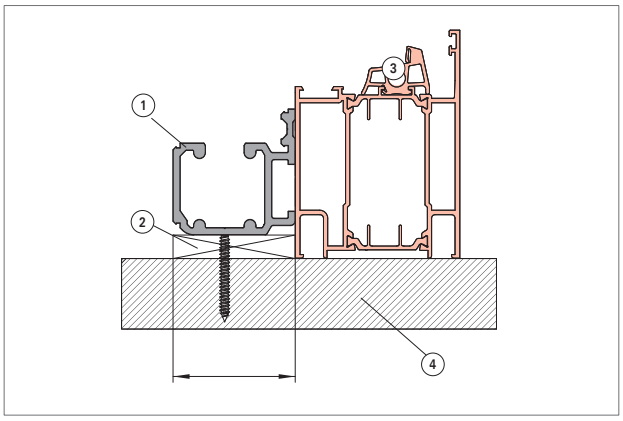
5b Seal the relevant surfaces.



6. Secure the frame.
Recommendation: Self-tapping screws (choice on site)
ISO 7050 – ST 4.2 x ... – C – Z, stainless steel A2

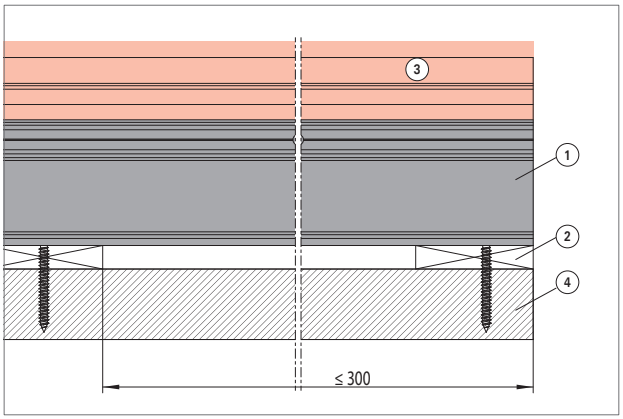
NOTE!
Harmonise the length of the screws to the conditions at the installation site.

NOTE!
Seal the holes for the outer fastenings with suitable sealing compound to prevent the ingress of water.



Put down a pressure-resistant packer over the complete width of the roller track.

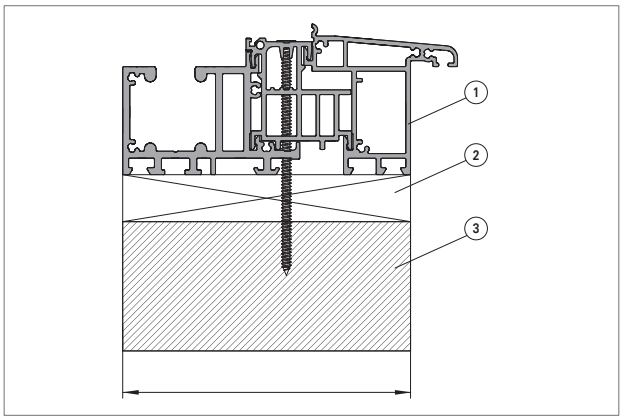
① Roller track
② Packer
③ Frame
④ Floor



Packer along the complete length of the roller track, but at least every 300 mm out from the corner.

Screw the roller track onto the floor through the packer at least every 300 mm.

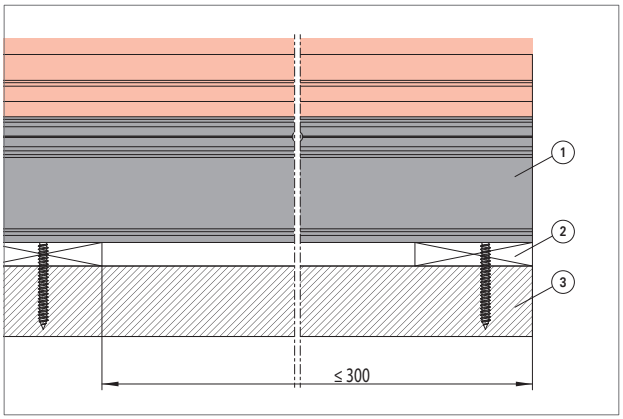
① Roller track
② Packer
③ Frame
④ Floor



Put down a pressure-resistant packer over the complete width of the enhanced threshold.

Pre-drill the screw position / rawlplug position with max. Ø 10 mm. Coordinate the screw length and screw diameter at the installation site.

① Enhanced threshold
② Packer
③ Floor

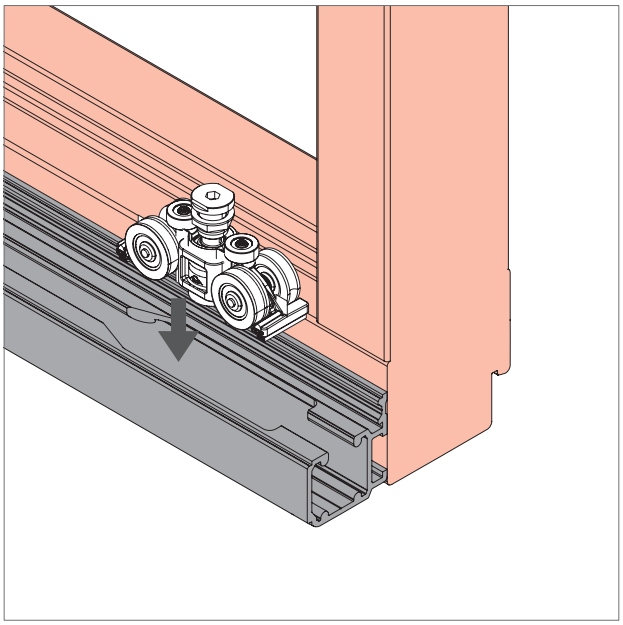


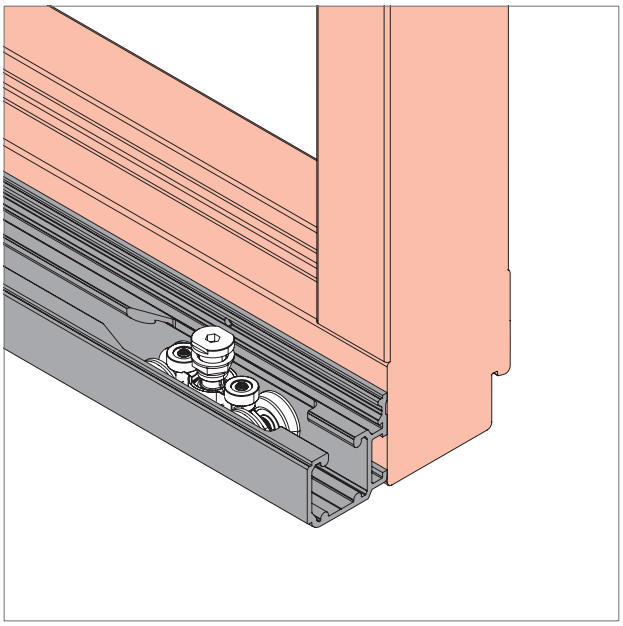
Packer along the complete length of the enhanced threshold, but at least every 300 mm out from the corner.

Screw the enhanced threshold onto the floor through the packer at least every 300 mm.

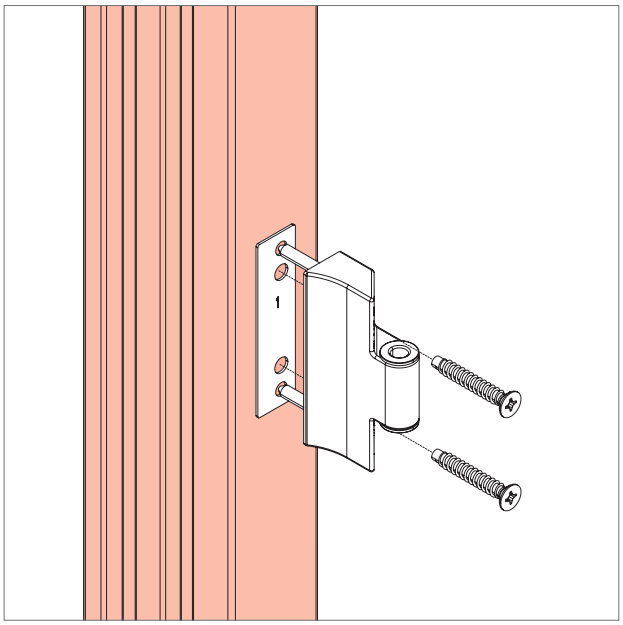
① Enhanced threshold
② Packer
③ Floor

NOTE!
Maximum permitted unevenness of the entire enhanced threshold ±1 mm.





1. Insert bogie into the opening provided in the roller track.

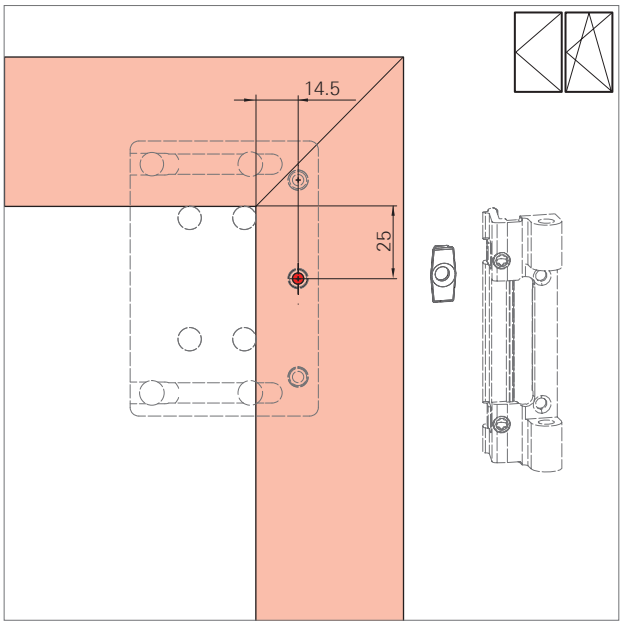


Installing the frame hinge-bearing

1. Place the frame side of the folding sash on the frame and align (observe the chamber dimension) and carry out the drillings for the frame hinge with drilling jig (643365) (not dep.)
2. Define the number of required spacers for the frame hinge-bearing according to the table.

Quantity of spacers required

Frame hinge	Overlap height OH	Number of spacers	
		1 mm	2 mm
7	7	–	–
	8	6	–
	9	–	6
10	10	–	–
	11	6	–
	12	–	6
	13	6	6
	14	–	12



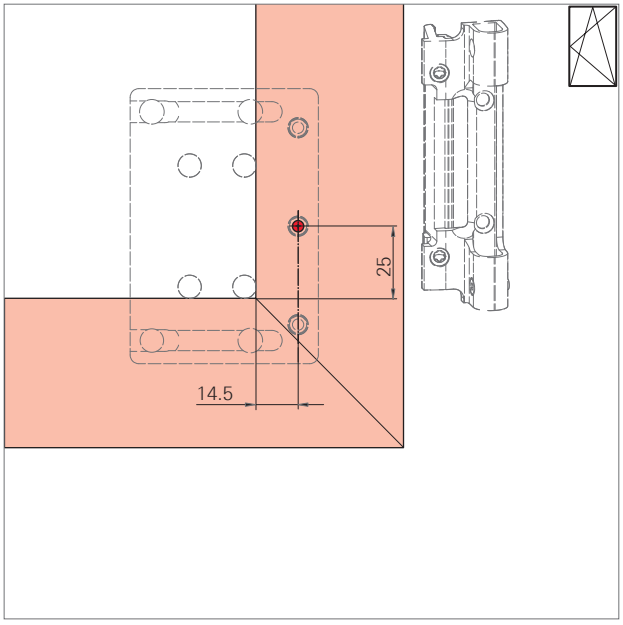
Drilling for fixing connecting-link for stay bearing / swivel bearing (S.kg > 90 kg)

Jig for stay bearing and pivot rest **638665**

1. Position the drilling jig at the cams in the frame.
2. Drill the hole:
   1 x Ø 3.9 mm, depth min. 14 mm.

NOTES!

- The description refers to the surrounding frame.
- Wall-thickness ≥ 6 mm (with corner connector). On solid material drill out to Ø 4.1 mm.



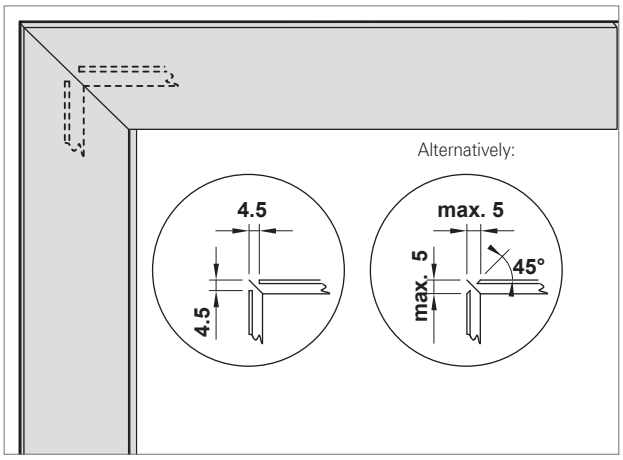
Drilling for pivot rest (SH > 2400 mm)

Jig for stay bearing and pivot rest **638665**

1. Position the drilling jig at the cams in the frame.
2. Drill the hole:
   1 x Ø 3.9 mm, depth min. 14 mm.

NOTES!

- The description refers to the surrounding frame.
- Wall-thickness ≥ 6 mm (with corner connector). On solid material drill out to Ø 4.1 mm.

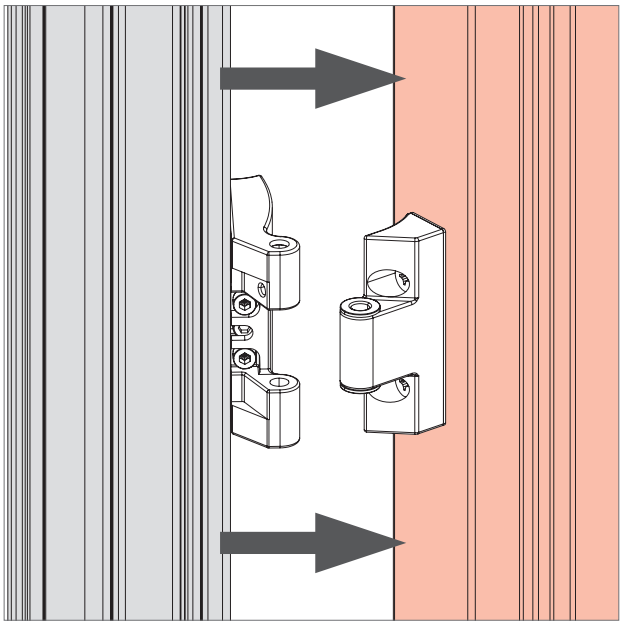


Routing for the sash corners

1. Open all sash corners of the connecting-rod groove according to the drawing.

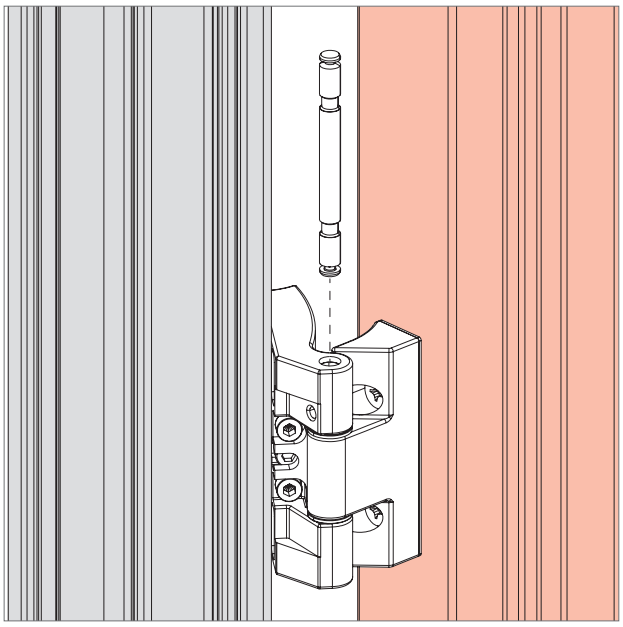
NOTE!

Ensure burr-free edges.

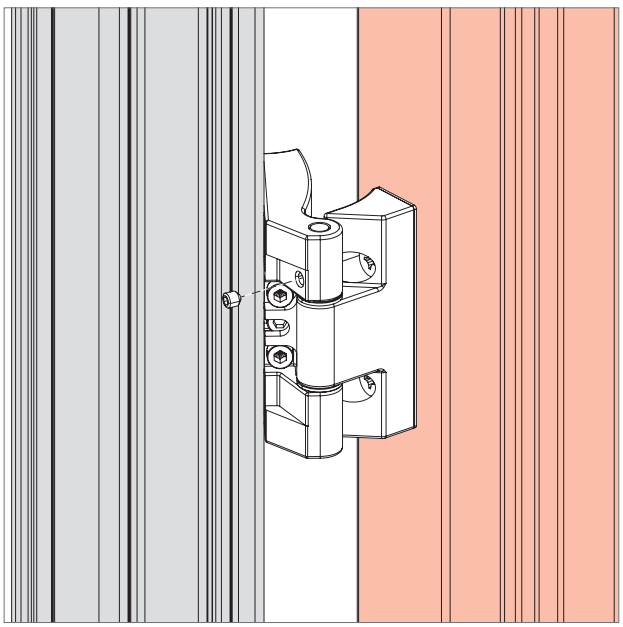


Installation and securing

1. With the sash open, bring the hinge and bearing together.



2. Insert the cylindrical pin flush.



3. Secure the cylindrical pin with the size 2.5 bolt. Tightening torque: 5 Nm

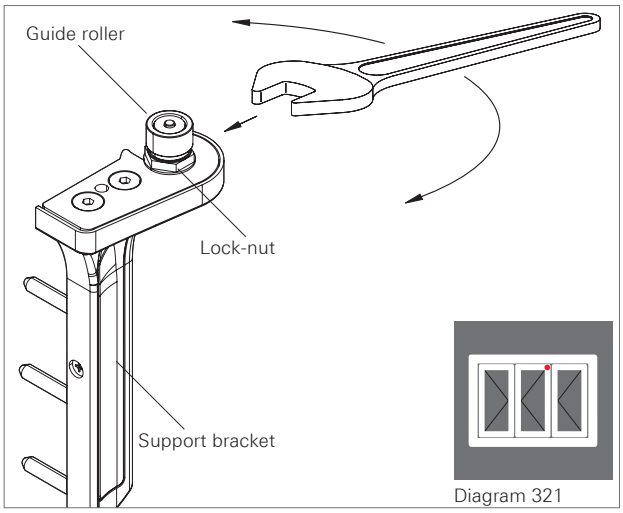


Diagram 321

1. Insert the sash with the guide roller into the rail at the top and swing in the sash.

2. Screw-fix the lock-nut with open-end spanner size 17.
Tightening torque: 22 Nm ±2 Nm

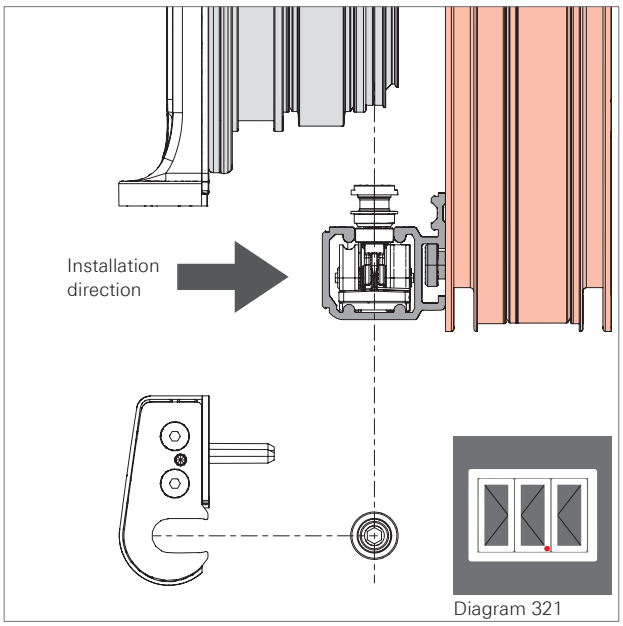
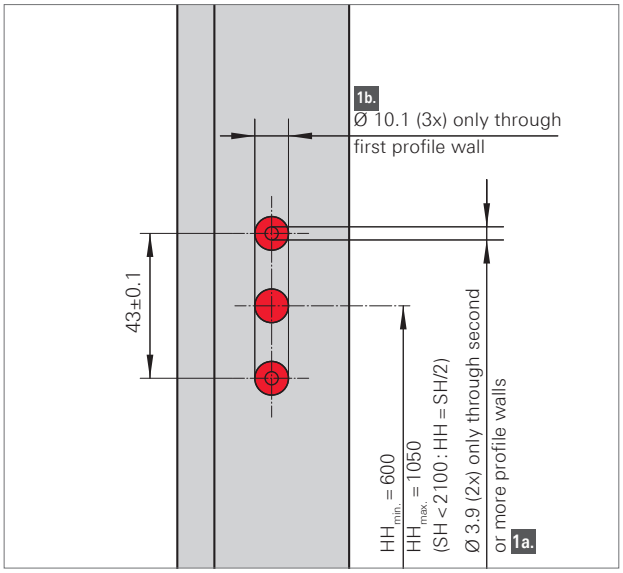


Diagram 321

3. Connect the bogie and the support bracket:
Tightening torque: 22 Nm ±2 Nm

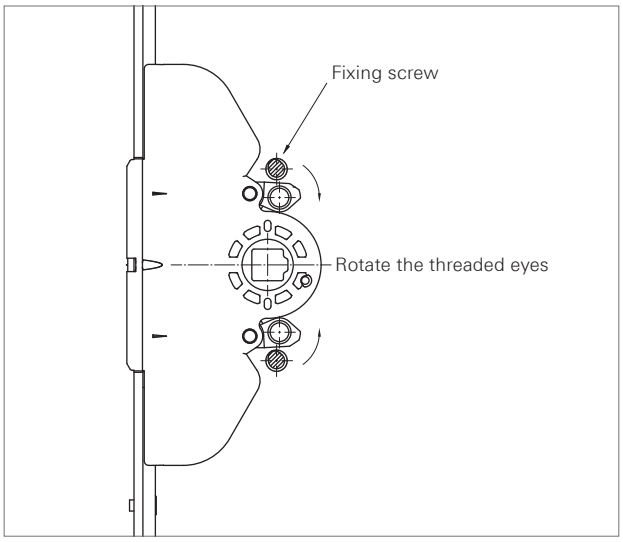
NOTE!
Pay attention to the installation direction.



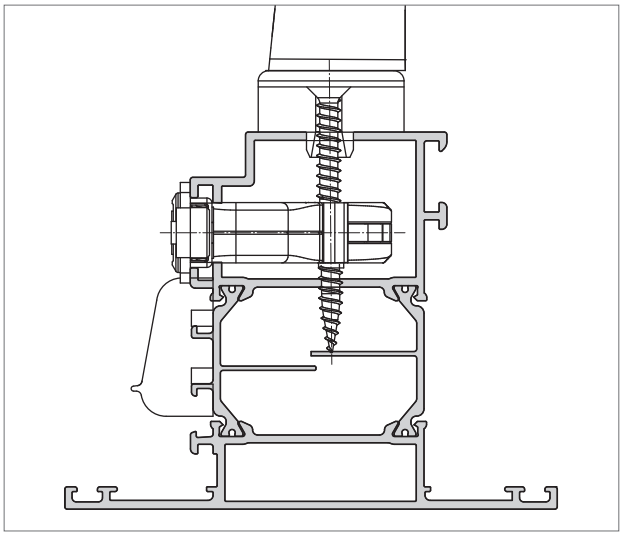
Installation and securing

1a. Ø 3.9 (2x) only through second or more profile walls.

1b. Ø 10.1 (3x) only through first profile wall.

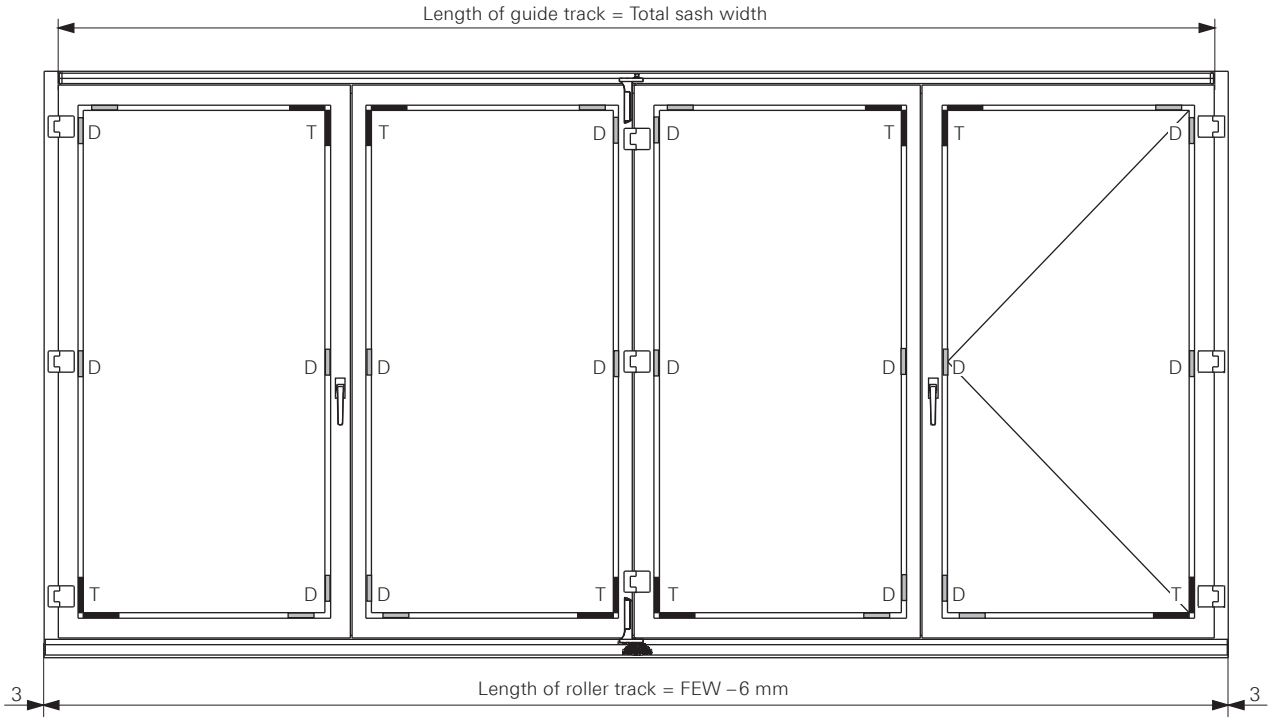


2. Rotate the threaded eyes inward, before you mount the gearbox.
Use a self-tapping screw 3.9 x … for mounting the gearbox to the faceplate.

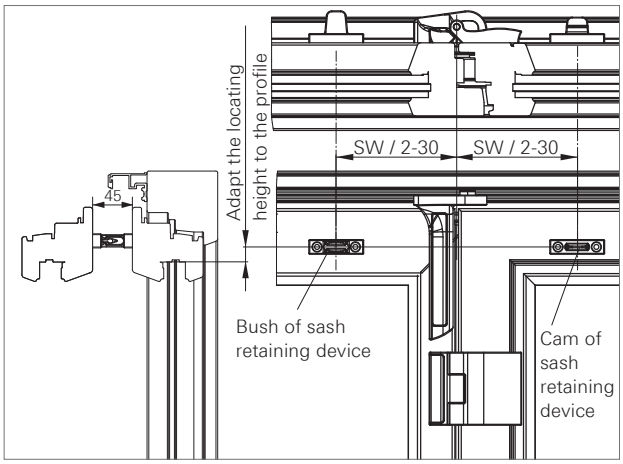


3. If necessary, shorten the pin of the window handle or drill out the second profile wall to Ø 10.1 mm. Passing the gearbox, screw-fix the window handle with countersunk tapping-screws 4.8 x 50 to the second profile wall.

Frontal view support bracket



T = Support block
D = Spacer block



1. Determine the position according to the drawing.
2. Predrill Ø 3.5 mm.
3. Screw-fix the sash retaining device with countersunk screws Ø 5 mm.

DIAGRAM 321

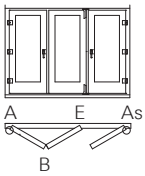


DIAGRAM 330

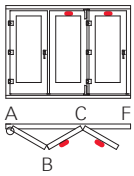


DIAGRAM 431

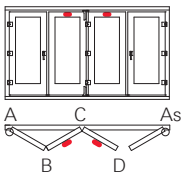


DIAGRAM 532

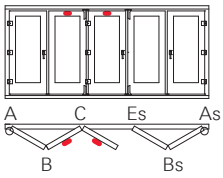


DIAGRAM 541

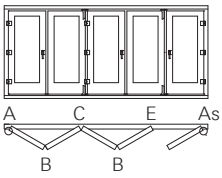


DIAGRAM 550

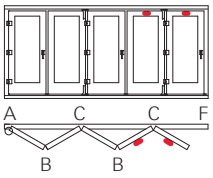


DIAGRAM 633

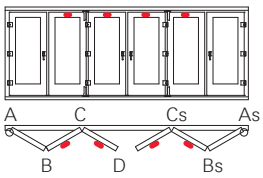


DIAGRAM 651

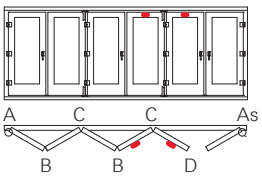


DIAGRAM 743

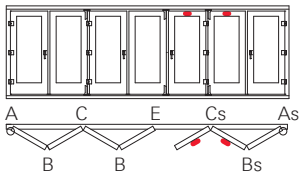


DIAGRAM 752

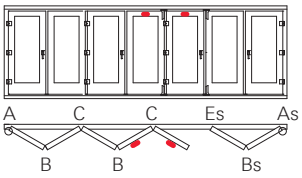


DIAGRAM 761

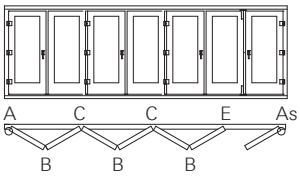


DIAGRAM 770

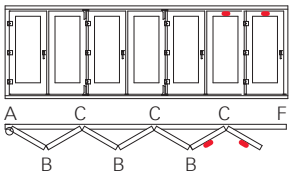
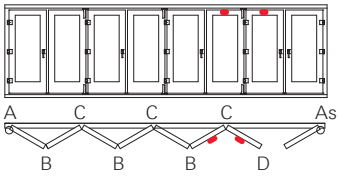
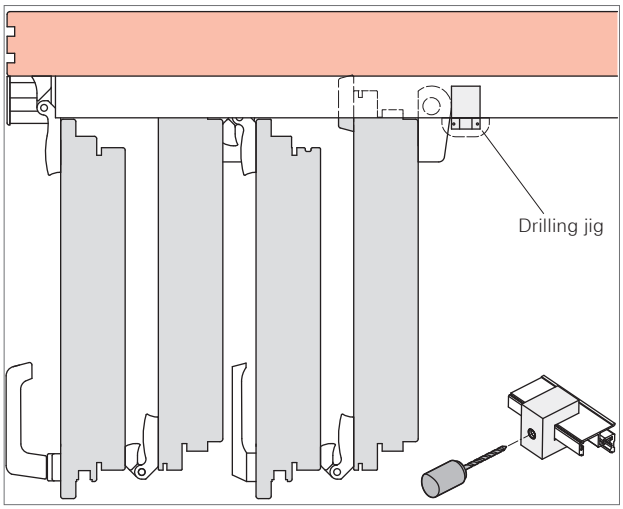
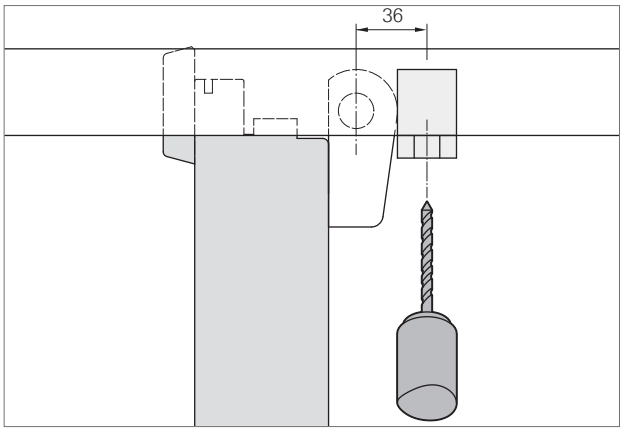


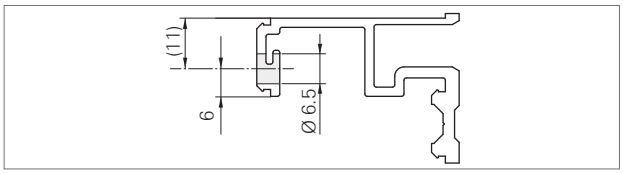
DIAGRAM 871

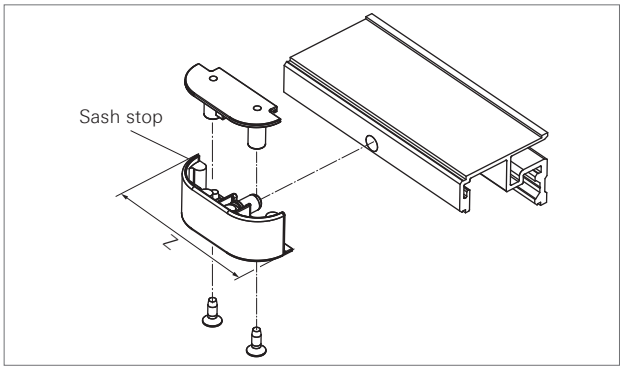




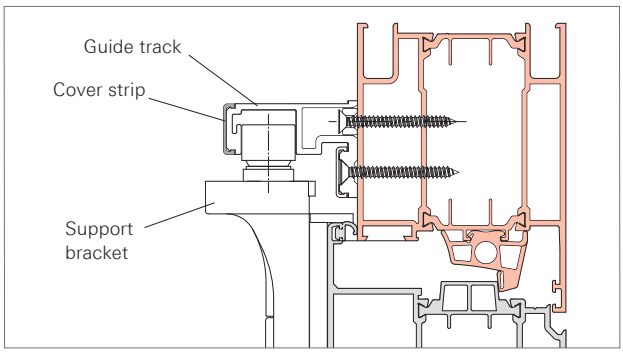
1. Open the door and fold together the sashes.
2. Determine the sash stop's position when the sashes are pushed together.
3. Carry out the drilling in the guide track with drilling jig (mat. no. 469831).



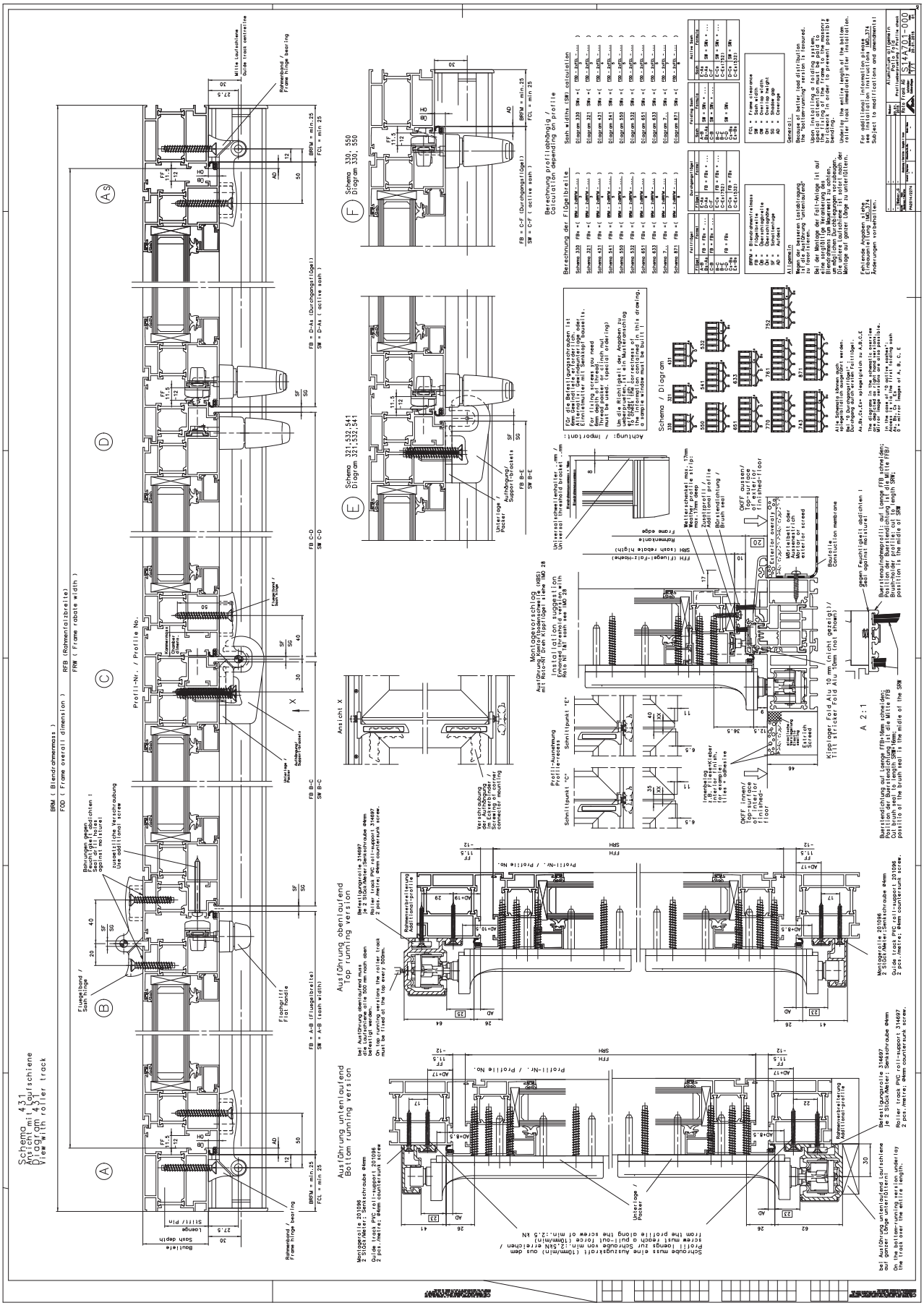




4. Mount the sash stop and screw-fix with enclosed countersunk screws.
5. Check for ease of movement.



6. Cut the cover strip to size acc. to dimension Z and mount it.


Schema 431
Diagram 431
Laufschiene
Roll track
Profil-Nr. / Profile No.
Flügelband / Sash hinge
Flachgriff / Flat handle
Rahmenband / Frame hinge bearing
Ansicht X
Ausführung obenlaufend
Top running version
Ausführung unterlaufend
Bottom running version
Montagevorschlag
Installation suggestion
Kippleger Fold Alu 10 mm (nicht gezeigt) / Tilt stricker Fold Alu 10mm (not shown)
Schema / Diagram
Berechnung der Flügelbreite
Berechnung Profilabhängig / Profile dependent
Schema 330, 550
Diagram 330, 550
Schema 321,532,541
Diagram 321,532,541
A 2:1

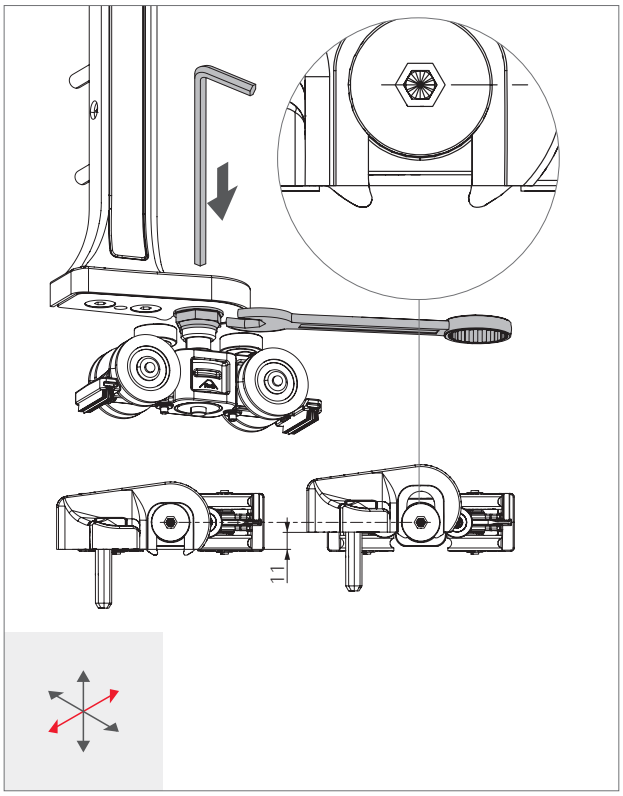
Symbols for the sash adjustment when installed
These symbols facilitate the orientation while adjusting the window sashes after installation with the following steps.

Height adjustment

Lateral adjustment

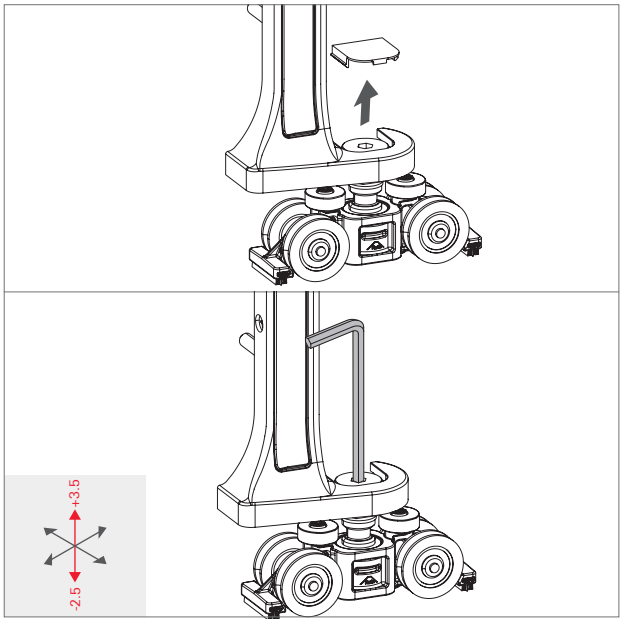
Gasket-compression adjustment

NOTE!
Adjusting Roto hardware components may only be carried out by authorised and qualified personnel.



Gasket-compression adjustment of the sashes via bogie

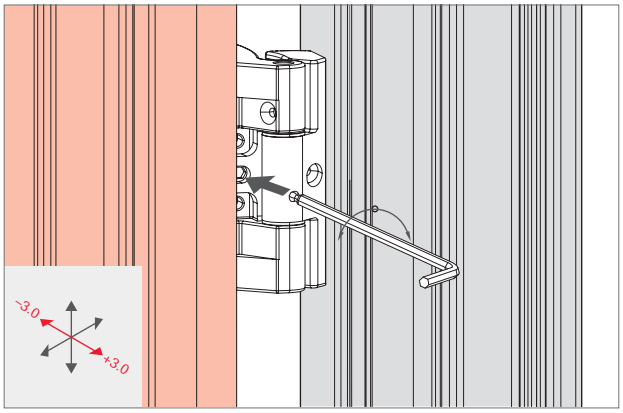
1. Remove the cover cap.
2. Release the support bracket on the threaded bolt.
   Allen key size 6 and
   open-end spanner size 17.
3. Set the gasket compression.
4. Tighten the screws.



Height adjustment of the sashes via bogie

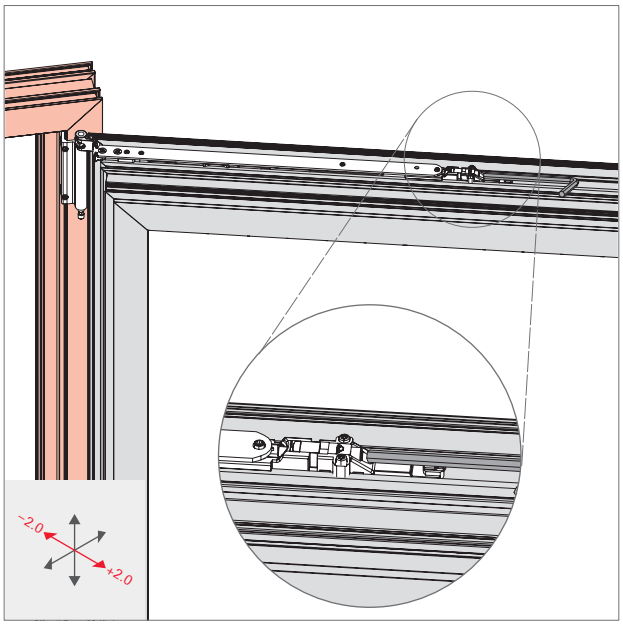
1. Remove the cover cap.

2. Adjust the bogie height by turning the threaded bolt with the 4 mm Allen key.



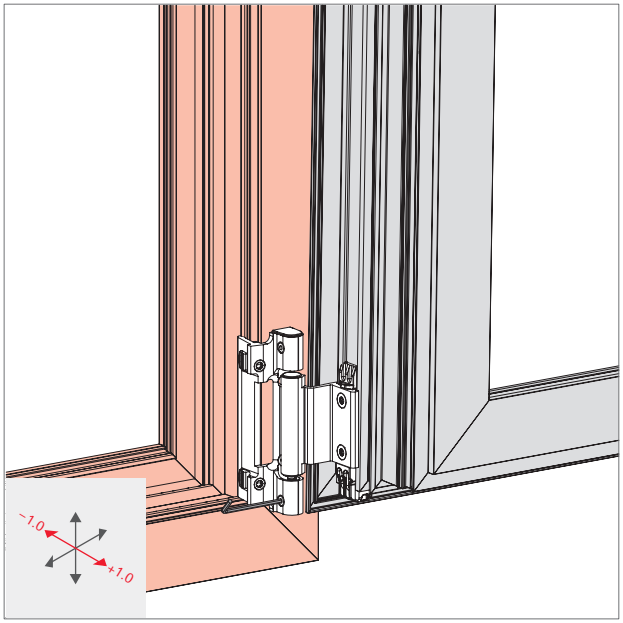
Lateral adjustment of the shadow gap via the hinge

1. Open the sash resp. element.
2. Turn the cylinder screw in the middle with a 4 mm Allen key for adjusting the hinge.
   4 mm Allen key
   Turning 180° = 0.5 mm
   Turning 360° = 1.0 mm



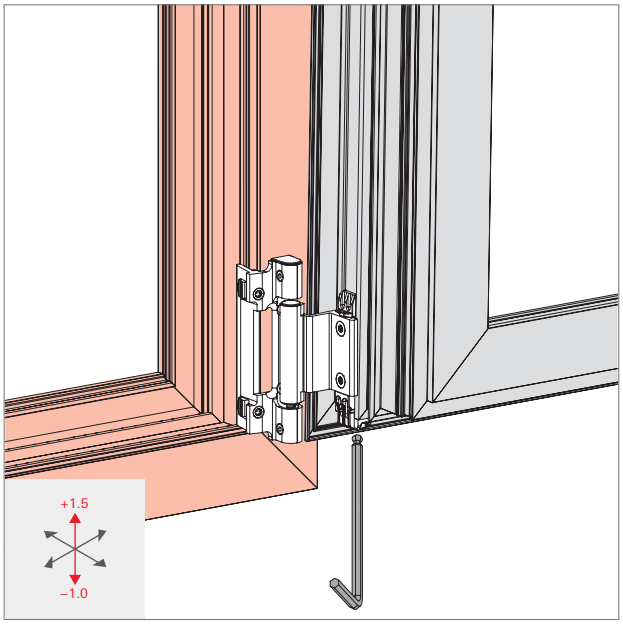
Lateral adjustment of the sash on the scissor-stay guide

1. Open the window sash 90°.
2. Lateral adjustment ±2 mm with 4 mm Allen key



Lateral adjustment of the sash at the pivot rest

1. Open the window sash 90°.
2. Lateral adjustment ±1 mm via the screw in the pivot rest with 2.5 mm Allen key.

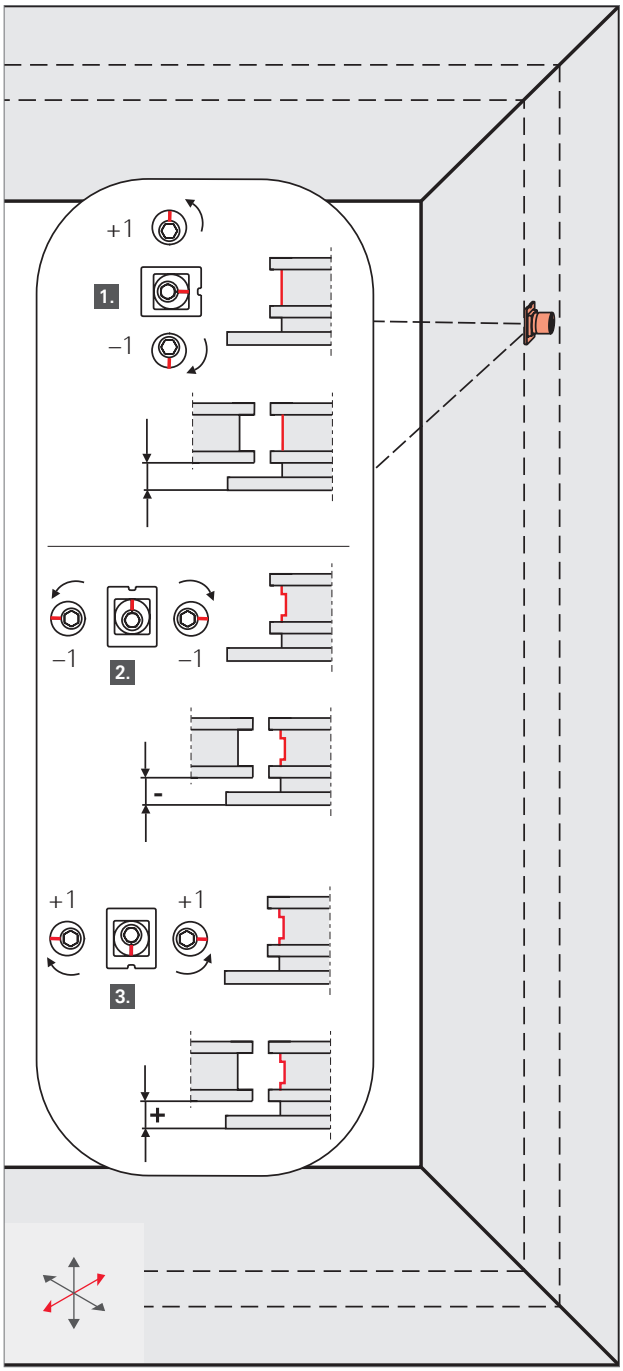


Height adjustment of the sash at the corner hinge

1. Open the window sash 90°.

NOTE!
Before adjustments, the corner hinge must be released (loosen the screws by 1 rotation). When doing so, the sash must be released and prevented against falling down.

2. Height adjustment +1.5 mm / -1 mm with 4 mm Allen key.



Adjust the gasket compression with a 4 mm Torx key.

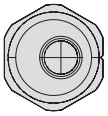
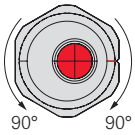
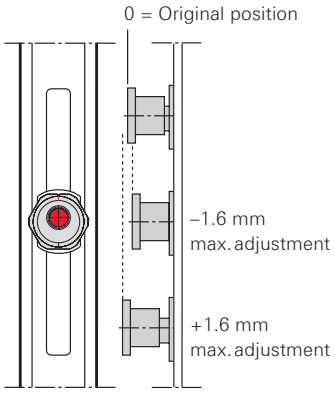
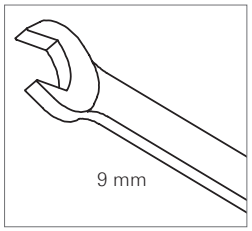
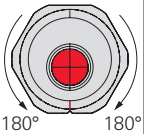
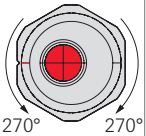
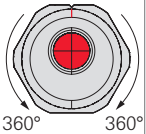
1. Increasing and reduction of the gasket compression possible.

2. Only reduction of the gasket compression possible.

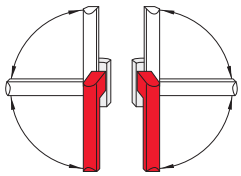
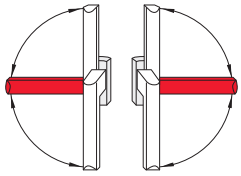
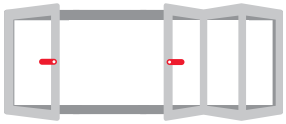
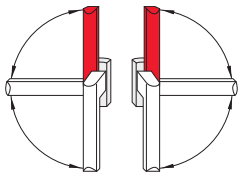
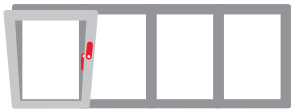
3. Only increasing of the gasket compression possible.

Locking cam adjustment instructions

V cam, extended (10 mm clearance)

Cam type	Adjustment range	Gasket-compression adjustment/mm 	Height adjustment/mm 	Side view/top view	Tools
					
	 90° 90°	**±1.0 mm**	**±0.2 mm**	 0 = Original position –1.6 mm max. adjustment +1.6 mm max. adjustment	 9 mm
	 180° 180°	**–**	**±0.4 mm**		
	 270° 270°	**±1.0 mm**	**±0.6 mm**		
	 360° 360°	**–**	**±0.8 mm**		

The following symbols show the different handle positions and the resulting sash positions of windows and balcony doors.

Handle position	Sash position	Symbol	Meaning
			Closed position of the sash
			Turn and fold position of the sash
			Opened tilt position of the sash
			Malpositioning of the sash

Maintenance

WARNING!
Danger of injury through incorrectly conducted maintenance work!
Incorrect maintenance can result in serious personal injury or material damage.

- Before starting work, ensure that there is sufficient installation room.
- Maintain order and cleanliness at the installation location.
- Ensure that the window or balcony door is prevented from suddenly slamming during maintenance work.
- Get a specialist company to carry out adjustment work on hardware – especially of pivot rests and scissor stays – as well as replacement of parts and hinging and unhinging of sashes.
- Do not unhinge the sash for maintenance work.

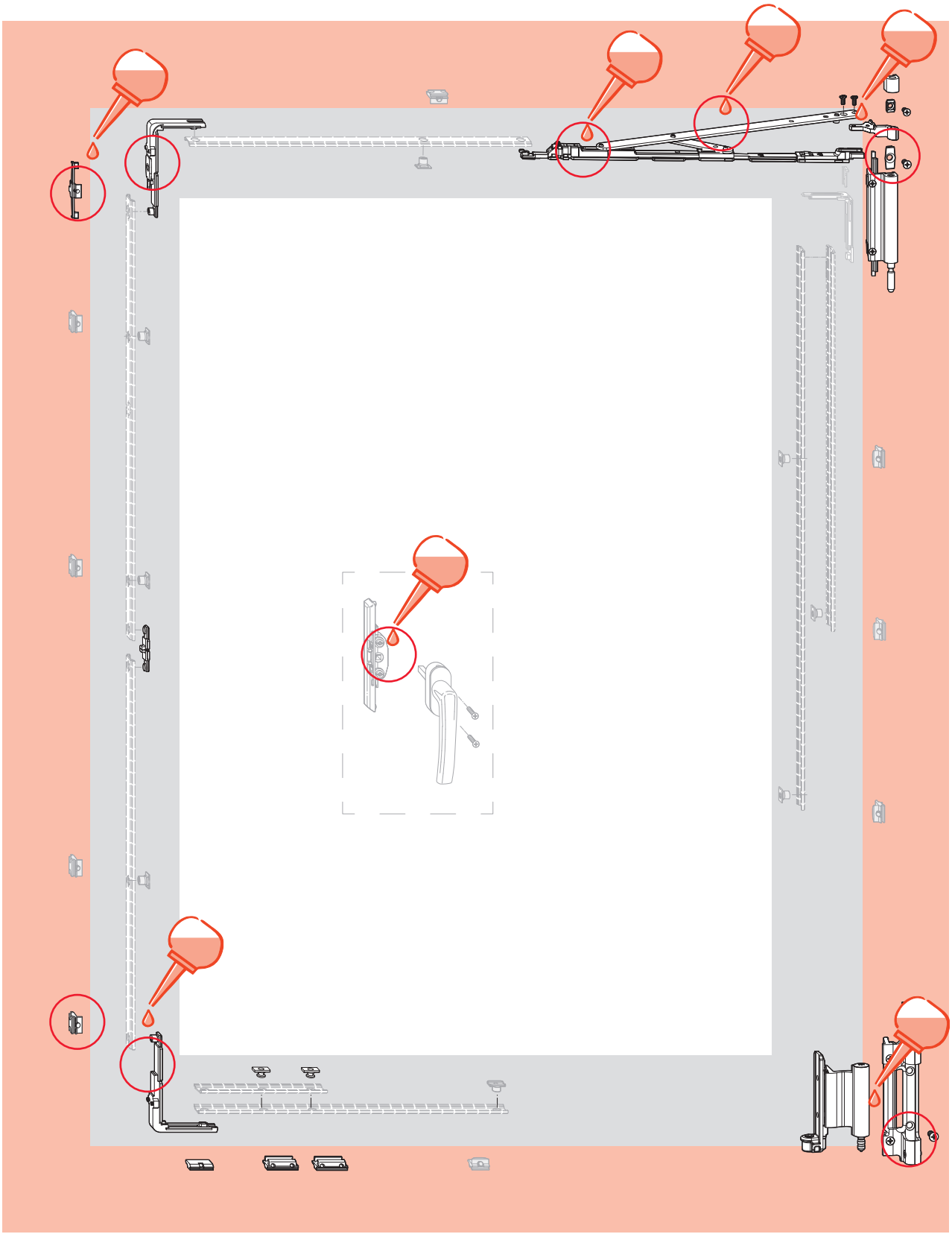
At least annually, every six months for school and hotel buildings:	**Specialist company**	**End-users**
If necessary, tighten fixing screws.	■	–
Replace damaged screws.	■	–
If necessary, replace components.	■	–
Lubricate all moving components with acid free and non resinous oil from a specialised dealer.	□	□
Lubricate steel strikers with acid free and non resinous grease from a specialised dealer.	□	□

■ = To be carried out **only** by a specialist company.
– = **Not** to be carried out by the end-user; the end-user may not carry out installation work!
□ = To be carried out either by a specialist company or by the end-user.

NOTE!
Observe the following environmental protection notes during maintenance work:

– Remove emerging or residual grease at the lubricating points and dispose of in accordance with the valid local regulations.
– Collect exchanged oil in suitable containers and dispose of in accordance with the environmental regulations.

The hardware overview shows the arrangement of the lubrication points, but does not necessarily correspond to the installed hardware. The number of lubrication points depends on the size and design of the window.



Inspection

At least annually, every six months for school and hotel buildings:

	Specialist company	End-users
Check that safety-relevant hardware components are mounted securely.	☐	☐
Examine safety-relevant hardware components for wear and tear.	☐	☐
All movable parts are to be operation-tested.	☐	☐
All locking points are to be operation-tested.	☐	☐
The hardware's smooth operation can be checked by means of moving the window handle.		
▪ In accordance with DIN 18055, the locking and unlocking moment is max. 10 Nm.	■	–
▪ It can be checked using a torque wrench.	■	–
▪ The smooth operation can be improved by greasing/oiling or adjusting the hardware.	■	–

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☐ = To be carried out either by a specialist company or by the end-user.

Care

	Specialist company	End-users
Keep the hardware free from deposits and soiling.	☐	☐
Never use aggressive, acidiferous cleaners or abrasive cleaning agents.	☐	☐
Only use mild, pH-neutral cleaning agents in diluted form.	☐	☐
Only use a soft cloth for cleaning.	☐	☐

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No legal claims can be derived from these recommendations, the application is to be conveyed for each concrete individual case. The window and balcony door manufacturer must draw builders and end-user's particular attention to these maintenance instructions. Roto Frank AG recommends window fabricators to make maintenance agreements with their end-users.

Protection against corrosion

	Specialist company	End-users
Aggressive vapours (e.g. by means of formic acid or acetic acid, ammonia, amine or ammonia compounds, aldehydes, phenols, chlorine, tannic acid etc.) in the vicinity of the windows must be absolutely avoided.	■	–
Never use acetic-acid or cross-linked acidic sealing compounds or those with the above mentioned contents, since both the direct contact with the sealing compound and its vaporisation can attack the hardware's surface.	■	–
Due to the risk of salt deposits on the hardware, shorter maintenance and lubrication intervals are necessary in coastal areas (every three months).	■	–

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Protection against dirt

	Specialist company	End-users
Remove deposits and dirt from building materials (building dust, plaster, cement, etc.) or similar materials with water before it cures.	□	□
Keep the hardware and the threshold free from deposits and soiling.	□	□
Never use aggressive, acidiferous cleaners or abrasive cleaning agents.	□	□
Only use mild, pH-neutral cleaning agents in diluted form.	□	□
Only use a soft cloth for cleaning.	□	□

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– = **Not** to be carried out by the end-user; the end-user may not carry out installation work!
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Protection against (permanent) moist interior air

	Specialist company	End-users
Ventilate the hardware and the rebate areas – especially in the construction phase – so that they are neither exposed to direct contact with water nor to formation of condensation water.	☐	☐
Ensure that (permanently) damp spatial air cannot condense in the hinge and rebate areas: ▪ Force ventilate several times each day (open all windows for approx. 15 minutes). ▪ Also ventilate during holidays and absences. ▪ For more complex construction projects, develop a ventilation plan if necessary. If described systematic ventilation is not possible, e.g. because fresh screed must not be traversed, or it cannot take draughts, put the windows into the tilted position and make them airtight by taping on the indoor side. Divert the moisture present in the room air to the outside by means of condensation dryers.	☐	☐

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☐ = To be carried out either by a specialist company or by the end-user.

Protection against damages due to renovation work

	Specialist company	End-users
When applying surface treatments of the windows, exclude all hardware components from this treatment, and thus protect against contamination.	☐	☐
Use only adhesive tapes which do not damage the varnish layers. In the case of doubt, ask the window fabricator.	☐	☐

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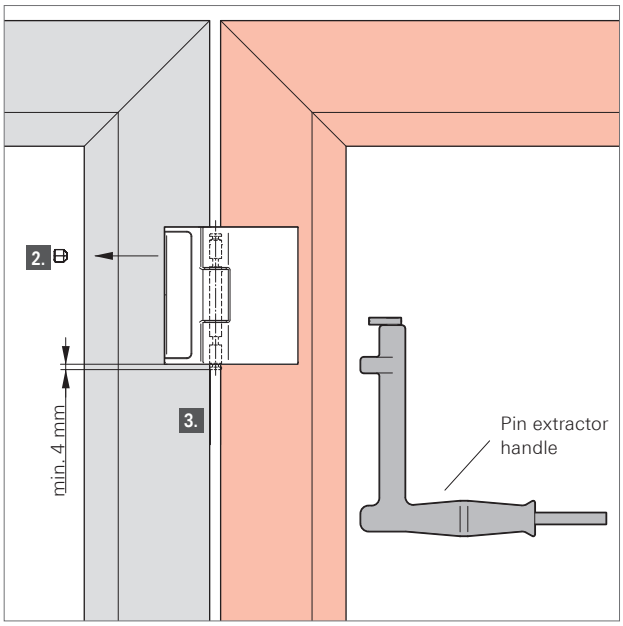
☐ = To be carried out either by a specialist company or by the end-user.



1. Open the sash/element and secure it from falling out.
2. Remove the threaded bolt (2.5 mm Allen key).
3. Tap out the cylindrical pin min. 4 mm and pull out downwards with the pin extractor handle.
4. Carefully lift out the sash.

Transport / handling of the window elements

DANGER!
Danger to life from incorrect handling and transport!
Incorrect handling and unsuitable transport of window elements can result in dangerous circumstances and cause severe accidents, even including death.

Therefore:

- During loading and unloading, select force application points which exclusively create reaction forces appropriate to the designed layout of the hardware components for the intended installation location.
- During handling and transport, ensure that hardware is in the locked position, so as to prevent an uncontrolled opening of the window. During transport, additionally use suitable means of securing, e.g. tensioning belts.
- Use only transport protections designed for the respective clearance.
- Wherever possible, undertake transport in the intended installation position – transport windows upright and glazed.
- Prevent diagonal moving and slipping of the sash with respect to the frame (e.g. by using spacers).
- If transport in the intended installation position is not possible, unhinge the sash, and transport it separately from the frame to which it belongs.

NOTE!
The type and the force application points when transporting, loading, and unloading have a significant effect on the reaction forces which arise. Especially when using auxiliaries such as suckers, transport nets, forklifts, or cranes, reaction forces may arise which result in damage or overloading to the installed hardware.
Therefore observe the following during all transport, loading, and unloading:

- Always choose the force application points so that the resulting reaction forces are dissipated appropriate to the designed layout of the hardware components for the intended installation location. This applies particularly for the hinge positions.

Check the delivery on receipt immediately for completeness and transport damage.

NOTE!
Claim any damage as soon as it is detected. Claims for damage can only be invoked within the statutory reclamation period.

Separate the hardware components from the window and dispose of as metal scrap.

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