

Roto Patio Inowa

Intelligent hardware for tightly sealed sliding systems

Installation, maintenance and operation instructions
for aluminium profiles



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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 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.)

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
	Drillings and special highlighting in installation steps
	Standard hardware components, optional hardware components
	Action steps
	Component designation in a graphic
	Connecting-rod designation
	First level of hierarchy in a list
–	Unordered list (second level of hierarchy)
→ p. 12	(Cross) reference in tables
Refer to page 12	(Cross) reference in the text

Symbol	Explanation
Material	
	Aluminium
Tilt&Turn opening types	
	Slide to the side
Table name	
	Sash width
	Sash height
	Colour code

Symbol	Explanation
	Manufacturer
	Screws
	Spindle length
	Surface-finish
	Packaging quantity
N ^o	Material number
	Anodised
	Powder coated (for RAL colours)

Abbreviation	Explanation
lock.	lockable
BS	Backset
SW	Sash width
SH	Sash height
S.kg	Sash weight
IS	Inline Sliding
kg	Kilogramme
L	Left
mm	Millimetres
CL	Centre lock
R	Right
Pc.	Pieces
PQ	Packaging quantity

All dimensions stated in millimetres, unless otherwise stated.

Protection of copyright

The contents of this manual are protected by copyright. In the framework of the hardware manufacturing, the use of the contents is allowed. Any other or further use is not permitted without written permission of the manufacturer.

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 project, 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:

- Catalogue
- Installation, maintenance and operation instructions
- Guidelines / advice on the product and on liability (VHBH)
- Guidelines / advice 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
- Guidelines / advice on the product and on liability (VHBH)
- Guidelines / advice for end-users (VHBE)

The manufacturer 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)
- Guidelines / advice 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)
- Guidelines / advice for end-users (VHBE)

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).
- Operation other than that 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.

In this manual, 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.



Sliding 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 can be opened, brought into the ventilation position resp. pushed to the side and locked.

Sliding hardware is solely used for further processing of vertically installed windows and balcony door sashes made of timber, PVC or aluminium, 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.
-

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.

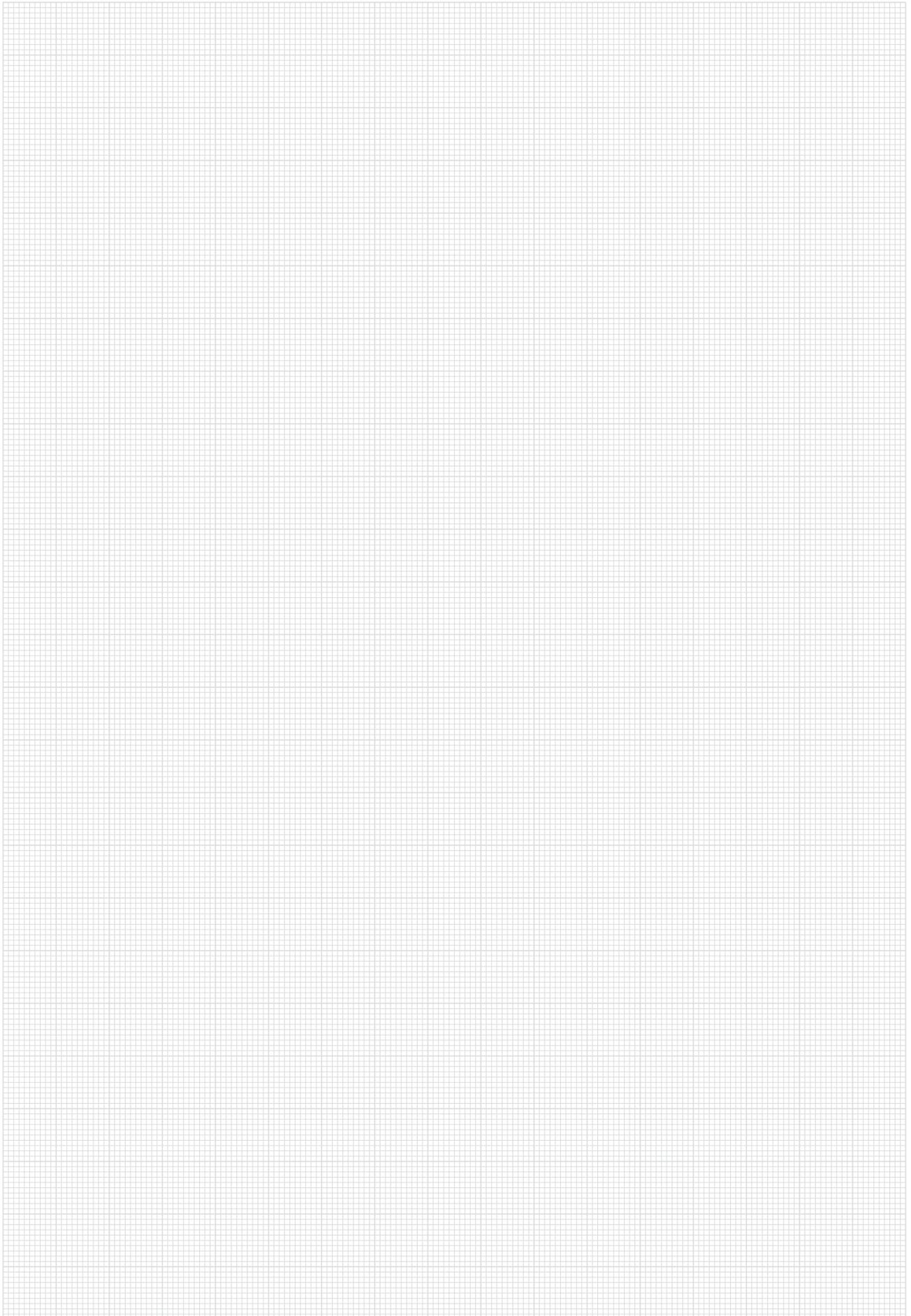
**WARNING!****Danger from misuse!**

Misuse of windows and balcony doors can result in dangerous circumstances.

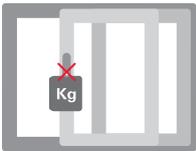
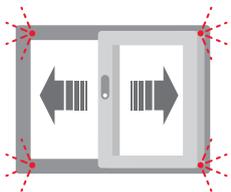
In particular, avoid the following applications:

- 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 and 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.

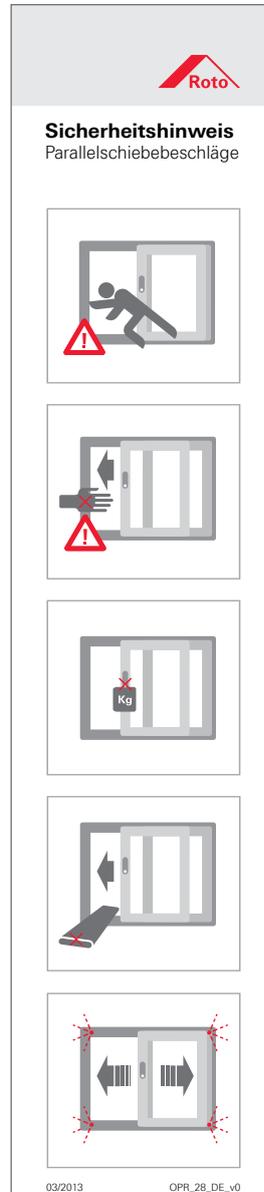


Comply with the following symbols and their meanings in order to avoid accidents, injuries and material damage.

Symbol	Meaning
	<p>DANGER! Danger of injury from falling through open windows and balcony doors.</p> <ul style="list-style-type: none"> – Behave with care near to open windows and balcony doors. – Please keep children and persons that cannot appreciate the danger away from the hazard area.
	<p>WARNING! Danger of injury through trapping of body parts in the opening gap between sash and frame.</p> <ul style="list-style-type: none"> – 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.
	<p>WARNING! Danger of injury and material damage from overloading the sash</p> <ul style="list-style-type: none"> – Do not overload the sash.
	<p>CAUTION! Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</p> <ul style="list-style-type: none"> – Do not insert obstructions into the opening gap between sash and frame.
	<p>CAUTION! Injury and property damage from uncontrolled opening and closing of the sash</p> <ul style="list-style-type: none"> – 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_28_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.

Guidelines from the profile manufacturer

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.



NOTE

The hardware components should in principle be designed in such a manner, that the system-related dimensions can be adjusted to the extent that they are affected by the hardware. 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.



- The hardware components described in these installation, maintenance and operation instructions are made of steel, colourless passivated and sealed according to DIN EN 12329.
- The hardware components may only be used with aluminium profiles.
- The hardware components may not be used in environments with salty, aggressive or corrosion-promoting air.

- The guide track and the roller track must not be painted.

- If in some cases it is expected (due to operation in hotels, schools, kindergartens etc.) that the element will be excessively used, this must be prevented by adequate measures. Also in movable objects like trains or ships there may occur disorders caused by the object movement.



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 and the information of the hardware manufacturer.

- For Roto Patio Inowa for aluminium hardware the application ranges on page 16–17 apply.
- Information with respect to screwing speed and torque are binding. (Do not overtighten the screws!)
- Fasten the hardware components with the included screws.
- Install all hardware components properly in accordance with these instructions.
- For the glazing packers the Technical Guidelines of the Glazing Trade, no. 3 “Packing of Glazing Units” must be observed.

Fixing screws for hardware components (not included in delivery scope)

For components	Quantity	Size	Diameter to be drilled	Drive unit
Bogie	5	4.2 x 22	3.5	w/o specification
Control unit	5	4.2 x 22	3.5	w/o specification
Centre-closer	6	4.2 x 22	3.5	w/o specification
Centre-closer striker	2	4.2 x 22	3.5	w/o specification
Striker diagram A / A'	2	4.2 x 22	3.5	w/o specification
Striker diagram C / C'	2	4.2 x 22	3.5	w/o specification
Roto Line window handle	2	M5 x ...	10.1 / 12	Phillips screw

General hardware characteristics

- Sliding hardware with circumferential gasket
- Concealed hardware
- Hardware-controlled, active locking points are possible all round to ensure maximum tightness and security
- The sash runs within the frame profile with a retracting distance of 8 mm
- Comfortable automatic pulling-in of the sash into the frame for extremely high tightness
- Simple, intuitive operation
- Low operational forces, because only a slight transverse movement of the sash is required
- Slimline profile views possible
- Sash width: 600 mm – 1500 mm
- Sash height: 1000 mm – 2500 mm
- Sash weight: max. 200 kg
- Opening diagrams:
 - A (running inside or outside)
 - C (running inside or outside)
- Burglary resistance class: Basic security
- Profile depth: ≥ 52 mm



Application diagram up to 200 kg

Limitation of sash formats depending on the glass thickness

Application range

Sash width **SW** 600 – 1500 mm

Sash height **SH** 1000 – 2500 mm

Sash weight **S.kg** max. 200 kg

Glass weight max. 60 kg / m²

Sash height **SH** : Sash width **SW** = max. 2 : 1

The information in the application diagram refers to the glass weight in kg/m².

1 mm/m² glass thickness = 2.5 kg

 = Impermissible application range

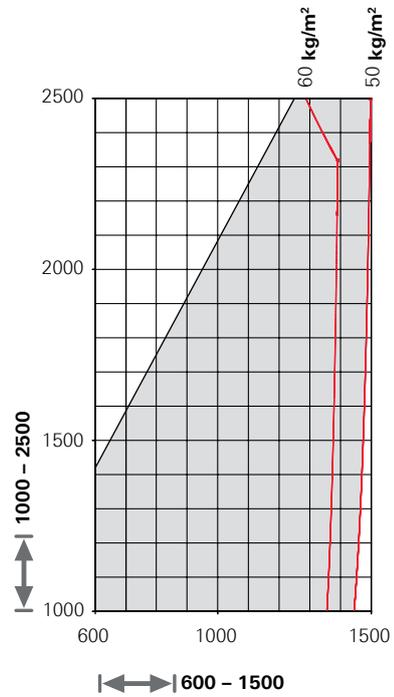


Diagram A

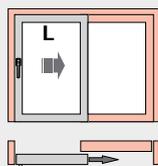


Diagram A (running inside)

1 sliding sash (L or R)

1 fixed glazing

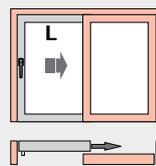


Diagram A' (running outside)

1 sliding sash (L or R)

1 fixed glazing

Diagram C

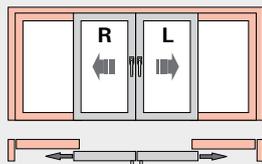


Diagram C (running inside)

2 sliding sashes (L and R)

2 fixed glazings

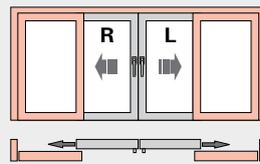
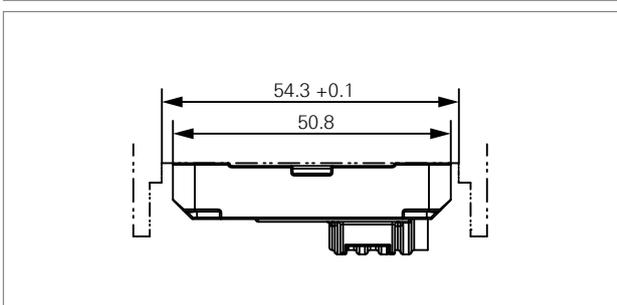
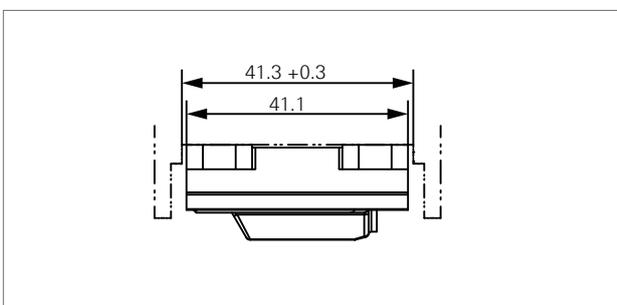
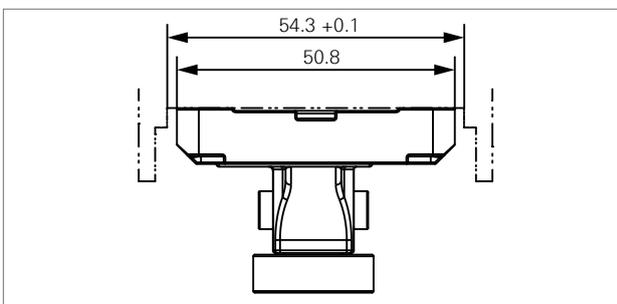
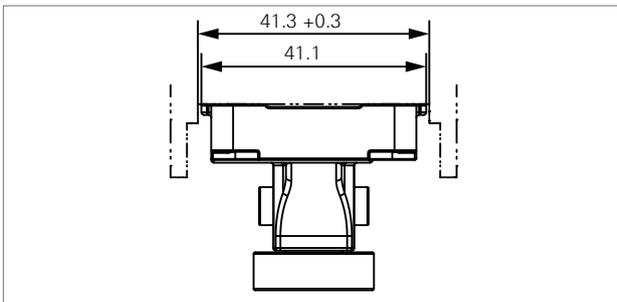
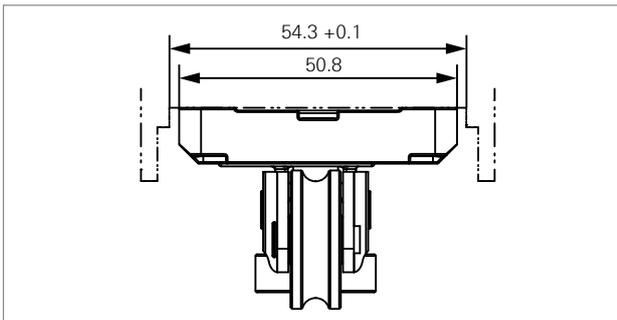
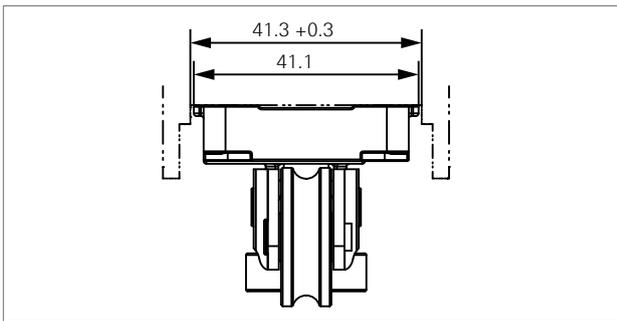


Diagram C' (running outside)

2 sliding sashes (L and R)

2 fixed glazings



Bogie dimensions

Designation

Size 41

Size 51

Control-unit dimensions

Designation

Size 41

Size 51

Centre-closer dimensions

Designation

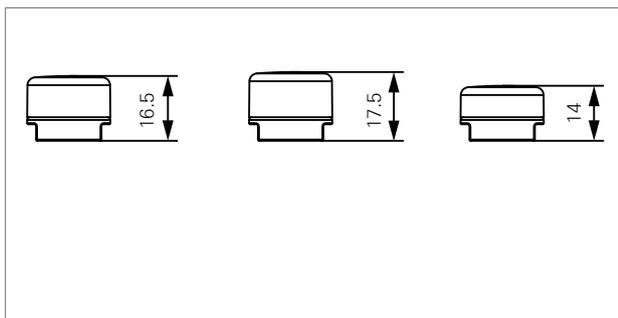
Size 41

Size 51

Information on the product

Patio Inowa – component dimensions

Roto Patio Inowa



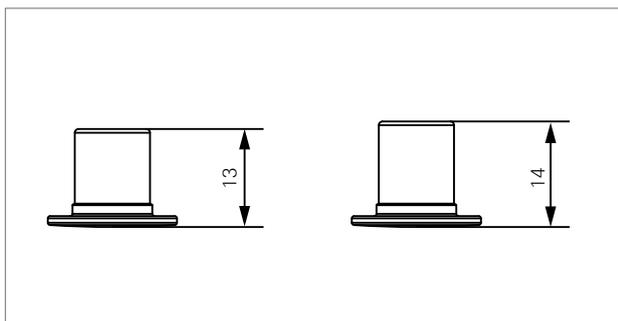
Rubber buffer

Designation

Size 16.5

Size 17.5

Size 14

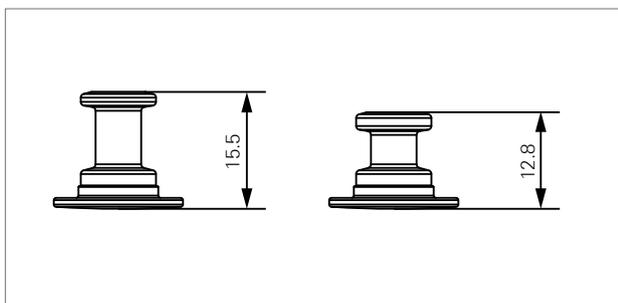


Guide-block dimensions

Designation

Size 13

Size 14

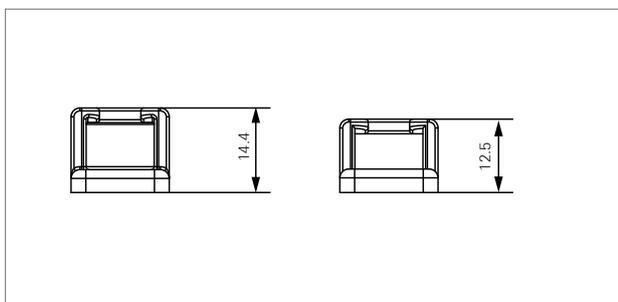


SEC-cam dimensions

Designation

Size 15.5

Size 12.8

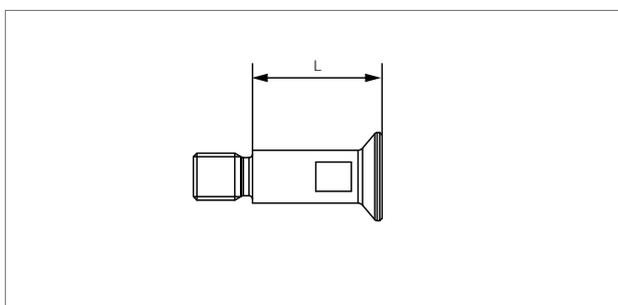


SEC-striker dimensions

Designation

Size 14.4

Size 12.5



Locking cam centre-closer dimensions

Designation

Size L: 13.5, 21.9, 34.4

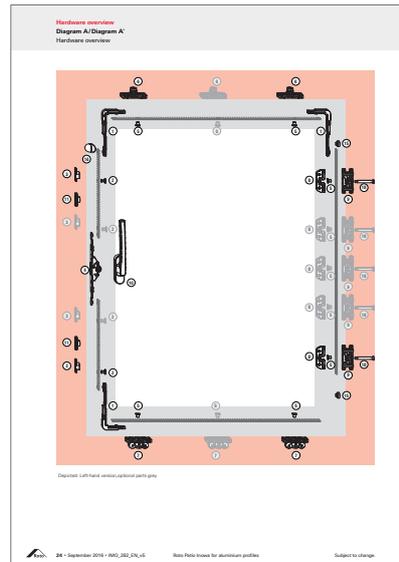


Explanation on the hardware overview chapter

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 in the hardware overview and on the right page the respective parts list.

Position numbers in surrounding circles allow the allocation between hardware overview and parts list.



Hardware overview
Diagram A / Diagram A'
Parts list

Application range
Sash width BW 600 - 1500 mm
Sash height SH 1000 - 2500 mm
Sash weight S kg max. 200 kg

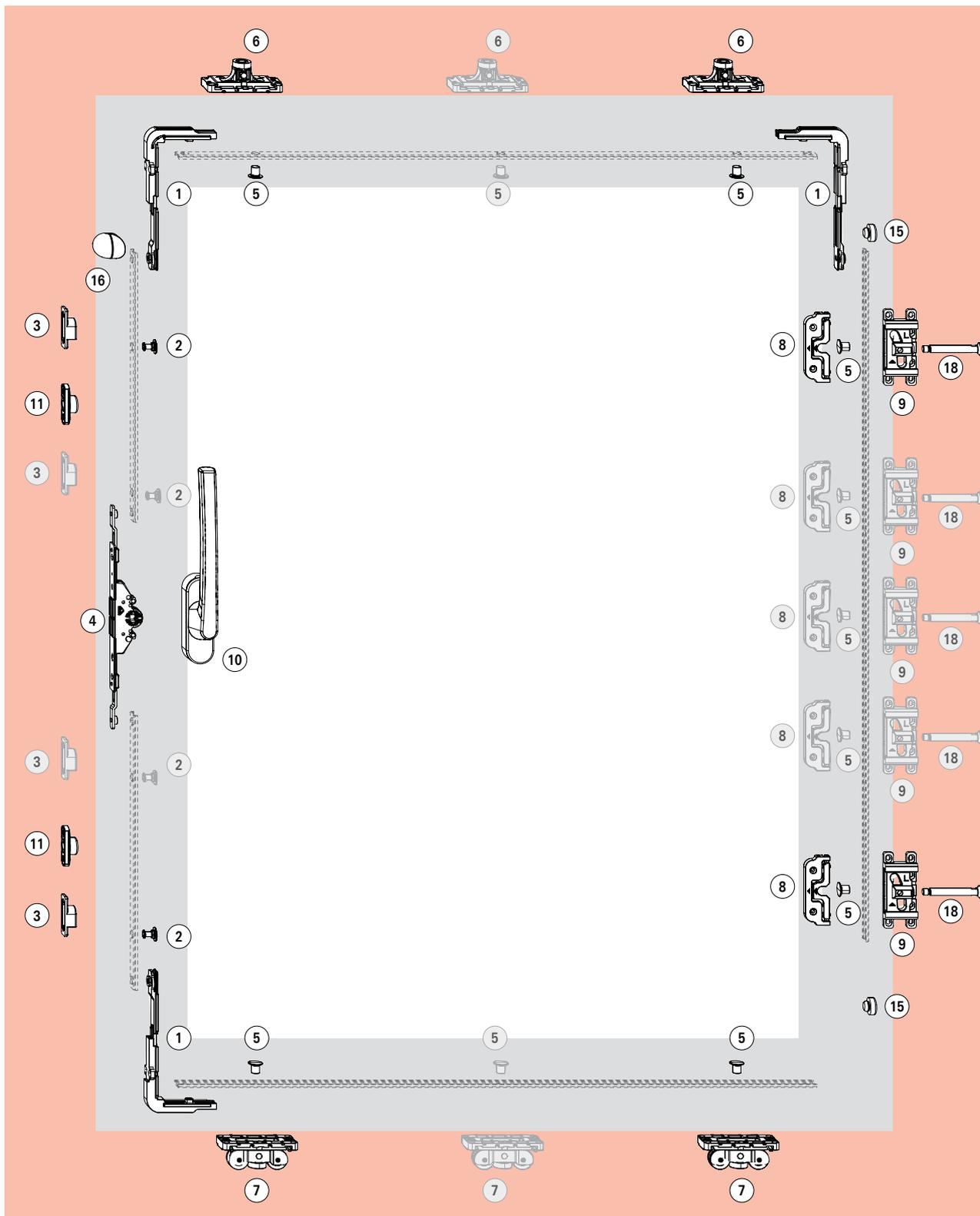
Component description	Part No.	Material	Part No. description	Part No.
1. Support	01 10 10 00	6060-T6	10. Support	10 10 10 00
2. Control cam	01 10 10 00	6060-T6	Control cam	10 10 10 00
3. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
4. Cover glass	01 10 10 00	6060-T6	Cover glass	10 10 10 00
5. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
6. Cover glass	01 10 10 00	6060-T6	Cover glass	10 10 10 00
7. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
8. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
9. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
10. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
11. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
12. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
13. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
14. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00
15. Control roller	01 10 10 00	6060-T6	Control roller	10 10 10 00

Subject to change. Roto Patio Inowa for aluminium profiles. IMO_282_EN_v5 - September 2016 - 26

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



Hardware overview
Diagram A/Diagram A'
Hardware overview



Depicted: Left-hand version, optional parts grey



Application range

Sash width **SW** 600 – 1500 mmSash height **SH** 1000 – 2500 mmSash weight **S.kg** max. 200 kg

Locking components diagram A / A'						
	Pc.	Designation	Size	Cam	DIN	PQ Material no.
⑦	2	Bogie¹⁾	41	10	L	50 635296
			41	10	R	50 635301
			51	10	L	50 763674
			51	10	R	50 763685
⑥	2	Control unit²⁾	41	10	L	50 635302
			41	10	R	50 635303
			51	10	L	50 763686
			51	10	R	50 763685
⑨	2	Centre-closer	41	10	L	50 635305
			41	10	R	50 635306
			51	10	L	50 763688
			51	10	R	50 763689
①	3	Corner drive			L/R	50 776328
⑧	2	Centre-closer striker			L/R	100 732103
⑤		Control cam	13		L/R	50 639932
			14		L/R	50 776402
⑪	2	Stop A/C	14		L/R	100 635307
			16.5		L/R	100 757701
			17.5		L/R	100 757587
②		SEC locking cam	12.8		L/R	50 639931
			15.5		L/R	50 757585
③		SEC striker	12.5		L/R	100 482260
			14.4		L/R	100 744684
⑱		Locking cam centre-closer	21.9		L/R	100 757586
			24.6		L/R	100 775929
			34.4		L/R	100 771375

Espagnolettes						
	Pc.	Designation	Backset	Cam	DIN	PQ Material no.
④	1	Flush-encased gearbox	25	10	L/R	50 625430
			30	10	L/R	50 625431
			35	10	L/R	50 625432
			40	10	L/R	50 625433
1		Flush-encased gearbox, lockable	25	10	L/R	50 625438
			30	10	L/R	50 625439
			35	10	L/R	50 625440
			40	10	L/R	50 625441

Handles				
	Pc.	Designation	DIN	Material no.
⑩	1	Handles	L/R	→ p. 30 → CTL_1

Buffer					
	Pc.	Designation	Size	DIN	PQ Material no.
⑮	2	Rubber buffer A/C	14	L/R	10 780647
			16.5	L/R	10 635183
			17.5	L/R	10 757587

Connecting-rod				
	Pc.	Designation	DIN	PQ Material no.
w/o. no.		Connecting-rod ECC / 6 m	L/R	334665
Buffer stop A' / C' (incl. rubber part, without screws)				
	Pc.	Code	Colour	Material no.
⑮	1	R 01.5	White, aluminium, RAL 9006	449963
		R 04.1	Grey brown, RAL 8019	317251
		R 06.2	Jet black, RAL 9005	335555
		R 07.2	Traffic white, RAL 9016	317250
			Uncoated	317249

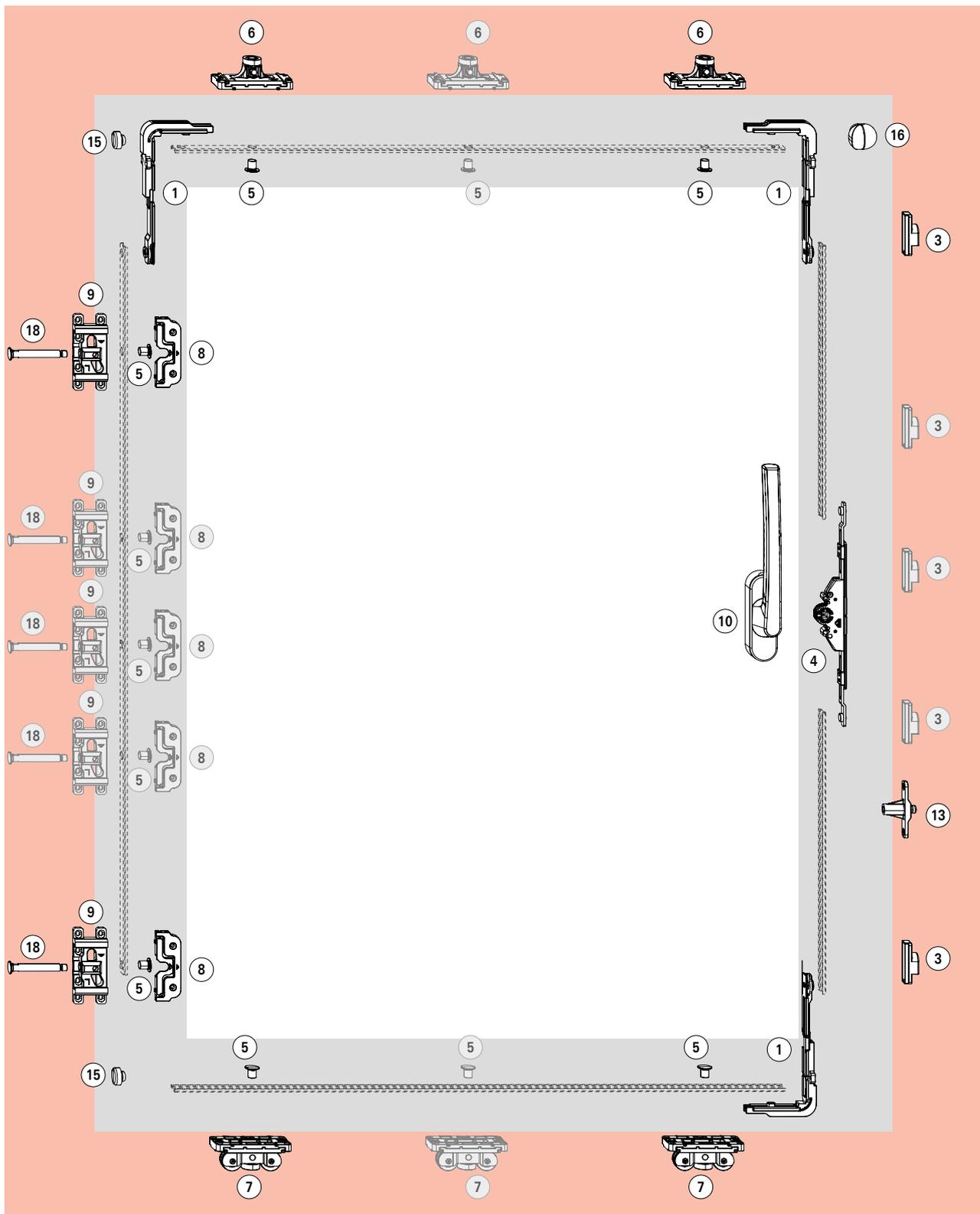
1) From SW > 1101 mm, a third bogie is required. In the middle of this area no spacer blocking for load transfer of the bogie.

2) From SW > 1101 mm, a third control unit is required.

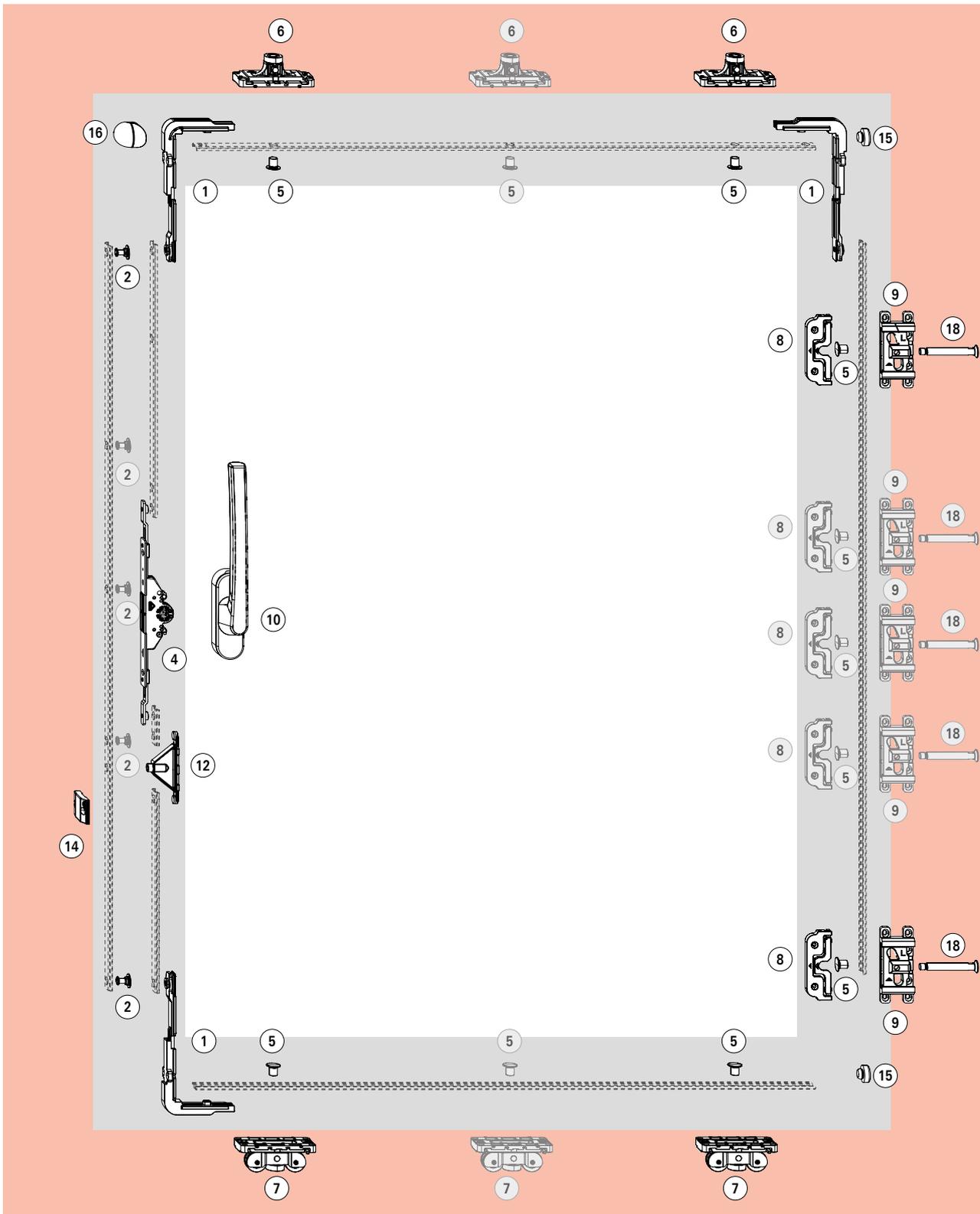
Hardware overview

Diagram C/Diagram C'

Hardware overview – passive sash



Depicted: Right-hand version, optional parts grey



Depicted: Left-hand version, optional parts grey

Application range

Sash width **SW** 600 – 1500 mm

Sash height **SH** 1000 – 2500 mm

Sash weight **S.kg** max. 200 kg

Locking components diagram C / C'						
	Pc.	Designation	Size	Cam	DIN	PQ Material no.
⑦	4	Bogie¹⁾	41	10	L	50 635296
			41	10	R	50 635301
			51	10	L	50 763674
			51	10	R	50 763685
⑥	4	Control unit²⁾	41	10	L	50 635302
			41	10	R	50 635303
			51	10	L	50 763686
			51	10	R	50 763685
⑨	4	Centre-closer	41	10	L	50 635305
			41	10	R	50 635306
			51	10	L	50 763688
			51	10	R	50 763689
①	6	Corner drive			L/R	50 776328
⑧	4	Centre-closer striker			L/R	100 732103
⑤		Control cam	13		L/R	50 639932
			14		L/R	50 776402
②	2	SEC locking cam			L/R	50 639931
③	2	SEC striker 17 mm diagram C / C'			L/R	100 639115
⑫	1	Coupling 31 compl. consists of: Coupling 31 Cylinder screw M6 x 10			L/R	100 729177
⑬	1	Mishandling device			L/R	100 729484
⑭	1	Run-up block mishandling device			L/R	100 729535
⑪	2	Stop A/C	14		L/R	100 635307
			16.5		L/R	100 757701
			17.5		L/R	100 757587
②		SEC locking cam	12.8		L/R	50 639931
			15.5		L/R	50 757585
③		SEC striker	12.5		L/R	100 482260
			14.4		L/R	100 744684
⑱		Locking cam centre-closer	21.9		L/R	100 757586
			24.6		L/R	100 775929
			34.4		L/R	100 771375

Espagnolettes						
	Pc.	Designation	Backset	Cam	DIN	PQ Material no.
④	2	Flush-encased gearbox	25	10	L/R	50 625430
			30	10	L/R	50 625431
			35	10	L/R	50 625432
			40	10	L/R	50 625433
			2	Flush-encased gearbox, lockable	25	10
			30	10	L/R	50 625439
			35	10	L/R	50 625440
			40	10	L/R	50 625441

Handles			
	Pc.	Designation	DIN Material no.
⑩	2	Handles	L/R → p. 30 → CTL_1

Buffer					
	Pc.	Designation	Size	DIN PQ Material no.	
⑮	4	Rubber buffer A/C	14	L/R	10 780647
			16.5	L/R	10 635183
			17.5	L/R	10 757587

Connecting-rod			
	Pc.	Designation	DIN PQ Material no.
w/o. no.		Connecting-rod ECC / 6 m	L/R 334665
Buffer stop A' / C' (incl. rubber part, without screws)			
	Pc.	Code	Colour Material no.
⑯	2	R 01.5	White, aluminium, RAL 9006 449963
		R 04.1	Grey brown, RAL 8019 317251
		R 06.2	Jet black, RAL 9005 335555
		R 07.2	Traffic-white, RAL 9016 317250
			Uncoated 317249

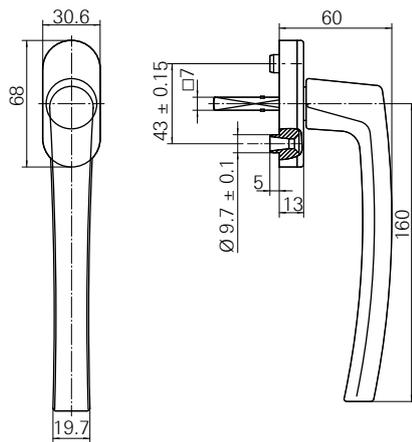
1) From SW > 1101 mm, a third bogie is required. In the middle of this area no spacer blocking for load transfer of the bogie.
2) From SW > 1101 mm, a third control unit is required.



Profile system	Bogie Control unit Centre-closer L/R	Locking cam centre-closer	Control cam	SEC locking cam	SEC striker	Buffer	Stop	Espagnolette
	Size	Size	Size	Size	Size	Size	Size	Backset
Feal	51	34.4	14	15.5	14.4	17.5	16.5	35
Extal	41	21.9	13	15.5	14.4	16.5	16.5	30
Extrugasa	51	24.6	14	15.5	12.5	17.5	17.5	25

Handles

Roto Line / Patio Alversa



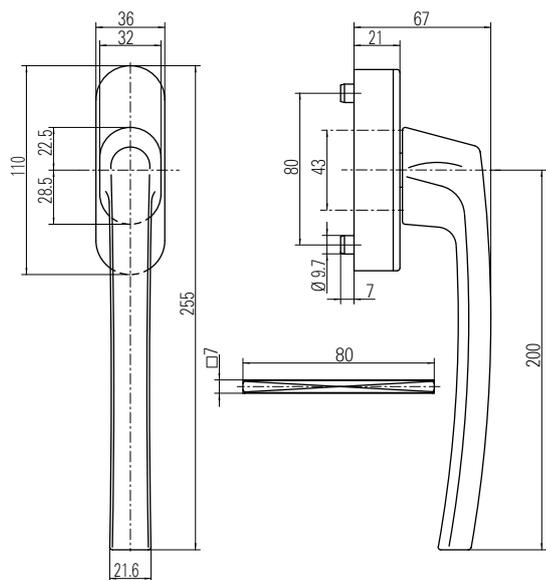
Parts list

Colour



Spindle length 35

Silver	R01.1		-	35		20	211598
Nickel silver	R01.2		-	35		20	211599
Titanium matt	R01.3		-	35		20	288728
Silver	R01.5		-	35		20	623491
Medium bronze	R05.3		-	35		20	211597
Dark bronze	R05.4		-	35		20	288727
Jet black	R06.2M		-	35		20	626524
Traffic white	R07.2		-	35		20	211596



Parts list

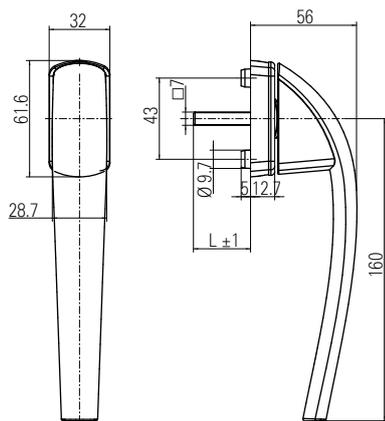
Colour



Grey brown	R04.1		M5 x 50			1	642875
Jet black	R06.2M		M5 x 50			1	642876
Traffic white	R07.2		M5 x 50			1	642877
Silver	FC9022		M5 x 50			1	642878
Spindle 7 x 7 x 80				30		1	737985

Handles

Roto Swing / Patio Alversa



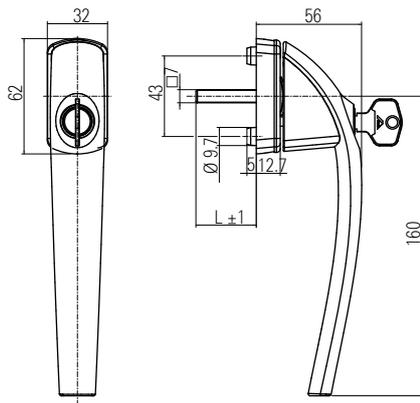
Parts list

Colour



Spindle length 35

Silver	R01.1		-	35		15	619714
Medium bronze	R05.3		-	35		15	619725
Traffic white	R07.2		-	35		15	619726



Parts list

Colour



Spindle length 35

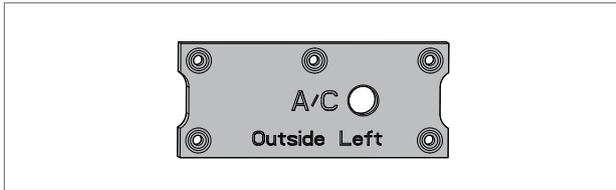
Silver	R01.1		-	35		15	619733
Medium bronze	R05.3		-	35		15	619734
Traffic white	R07.2		-	35		15	619735

Spindle length 40

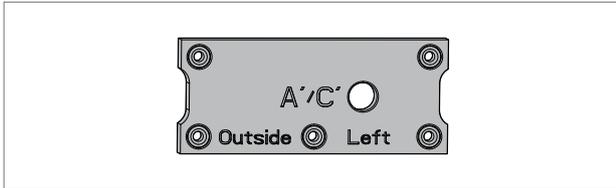
Silver	R01.1		-	40		15	619736
Medium bronze	R05.3		-	40		15	619737
Traffic white	R07.2		-	40		15	619738

Spindle length 43

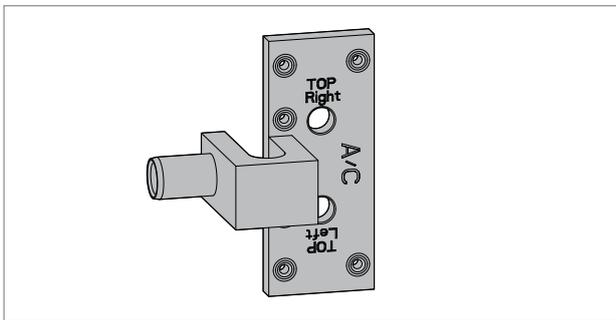
Silver	R01.1		-	43		15	619739
Medium bronze	R05.3		-	43		15	619740
Traffic white	R07.2		-	43		15	619741



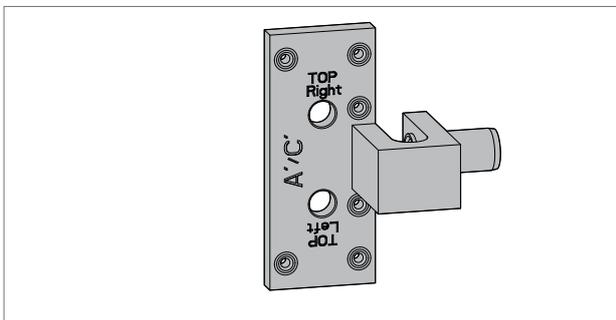
Drilling jig bogie/control unit diagram A/C				
Designation	Size	Cam	DIN	Material no.
Drilling jig	41	10	L/R	635308
	51	10	L/R	763691



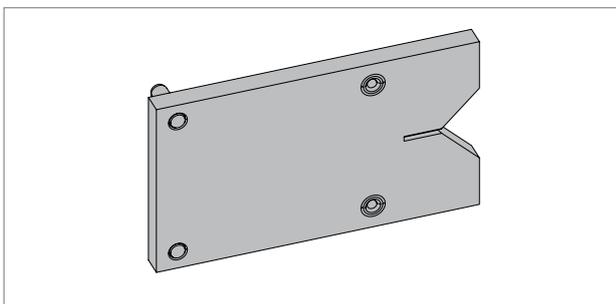
Drilling jig bogie/control unit diagram A' / C'				
Designation	Size	Cam	DIN	Material no.
Drilling jig	41	10	L/R	635309



Drilling jig centre-closer diagram A/C				
Designation	Size	Cam	DIN	Material no.
Drilling jig	41	10	L/R	635310
	51	10	L/R	763690



Drilling jig centre-closer diagram A' / C'				
Designation	Size	Cam	DIN	Material no.
Drilling jig	41	10	L/R	635311

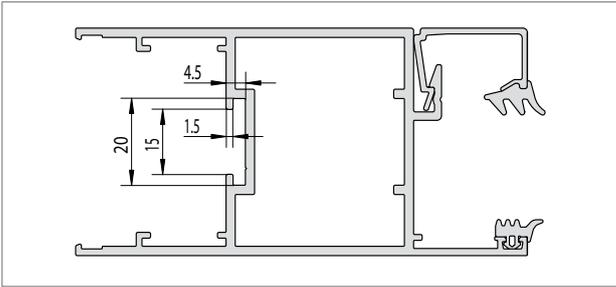


Drilling jig centre-closer striker		
Designation	DIN	Material no.
Drilling jig	L/R	732113

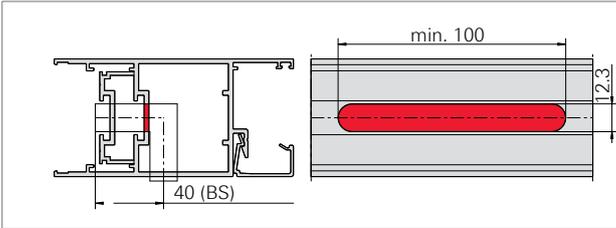
Installation

Drilling and routing dimensions

Espagnolette / lockable espagnolette / recessed grip

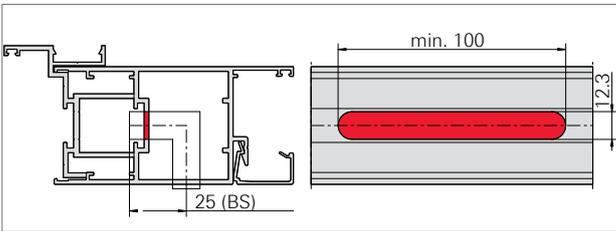


Sash profile cross section: Dimensional data for hardware

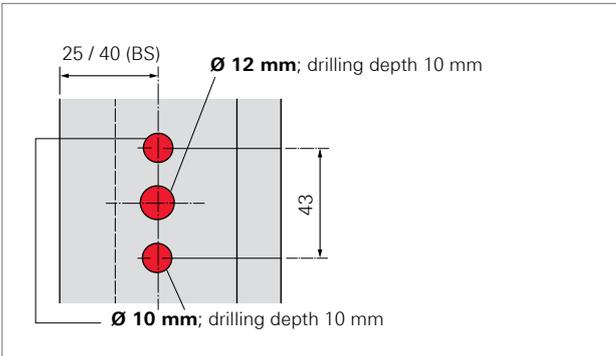


Routing dimensions

Espagnolette gear-casing diagram A / A'

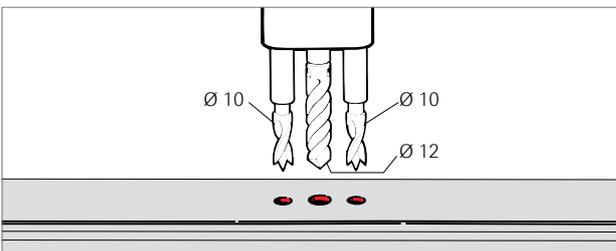


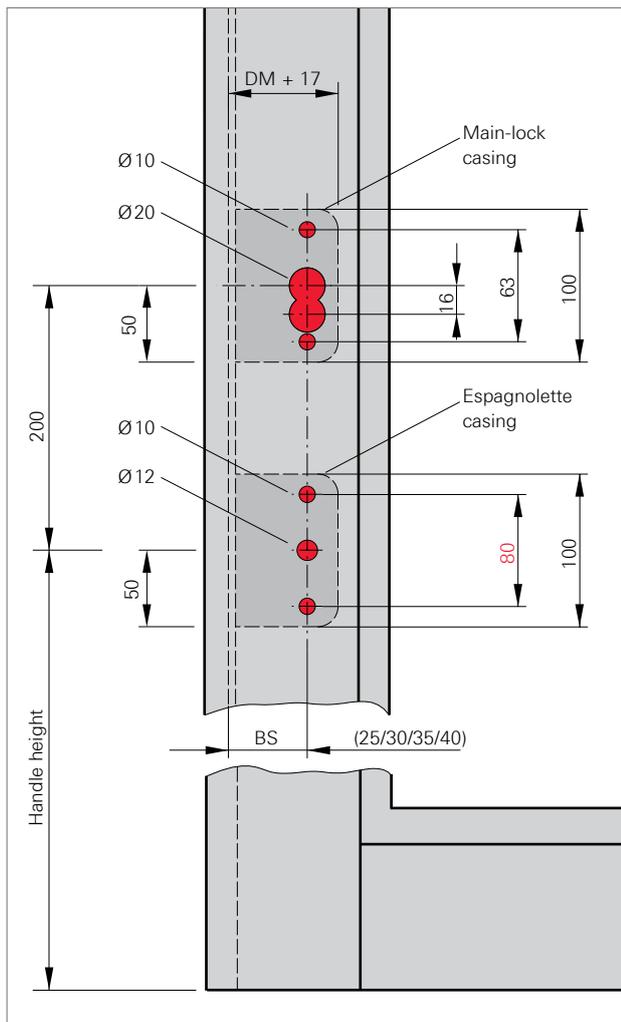
Espagnolette gear-casing diagram C / C'



Espagnolette

Drill the holes for spindle and lugs of the handle.



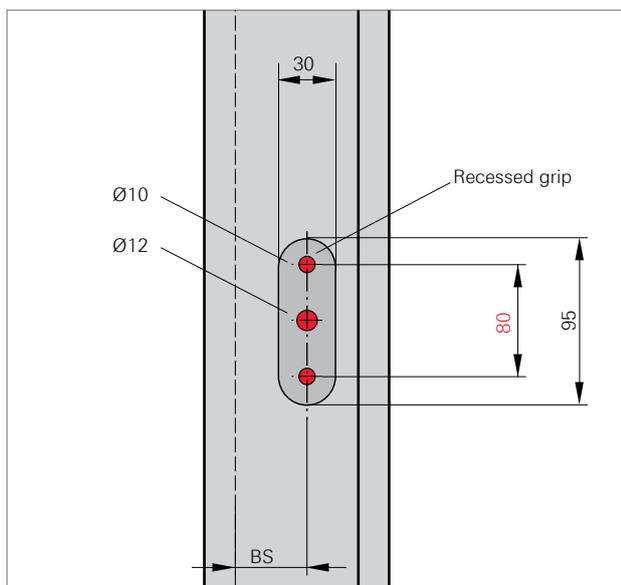


Espagnolette, lockable

1. Carry out the drill-holes with the drilling jig for the espagnolette.
For espagnolettes without main-lock casing:
Drill-hole pattern for espagnolette casing.
For lockable espagnolette:
Drill-hole pattern for lock and espagnolette casing.

NOTE
Illustration: lockable espagnolette for Patio Lift handle with lug distance 80.

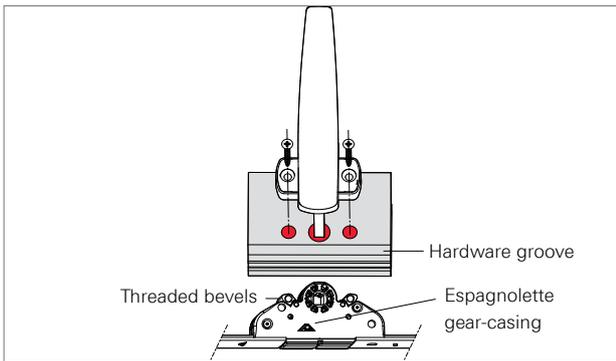
2. Carry out the espagnolette routing for lock and casing (lockable espagnolette).



Recessed grip Patio Lift (oval)

1. Route out the recessed grip on the sash exterior with the recessed grip routing jig.

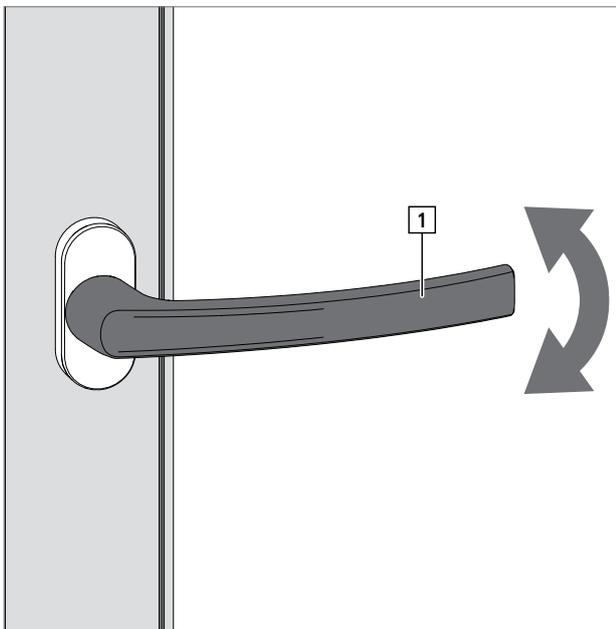
NOTE
Example: Recessed grip 80, depth 8 mm.

**Installing the handle**

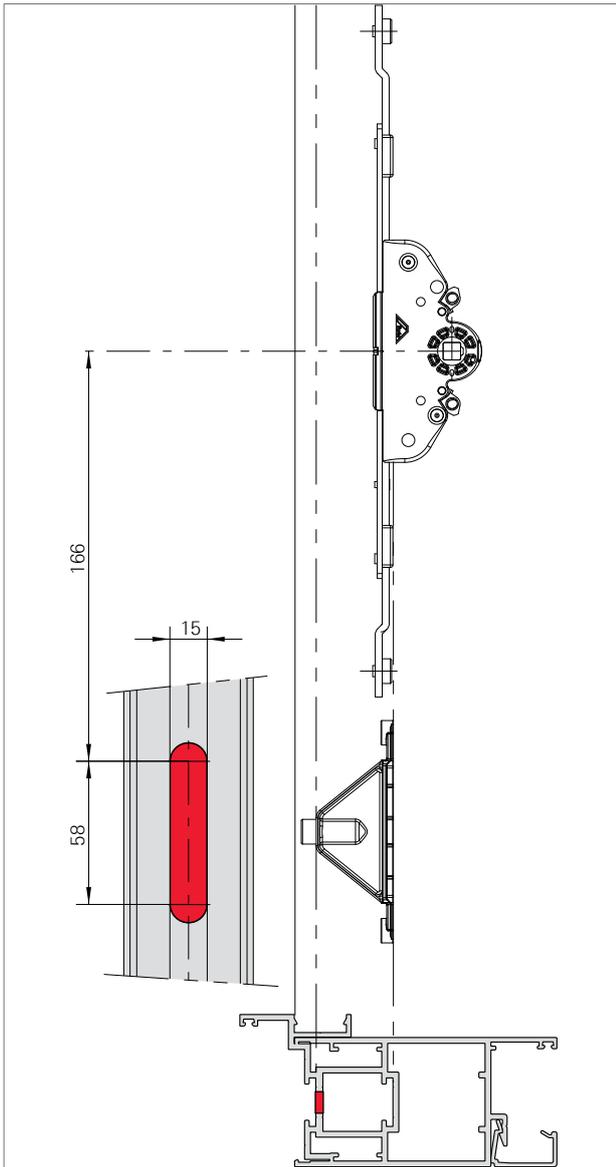
Screw-fix the window handle in the main-lock casing with DIN 965 M5 x ... countersunk screws

Undo the centre-fixing.

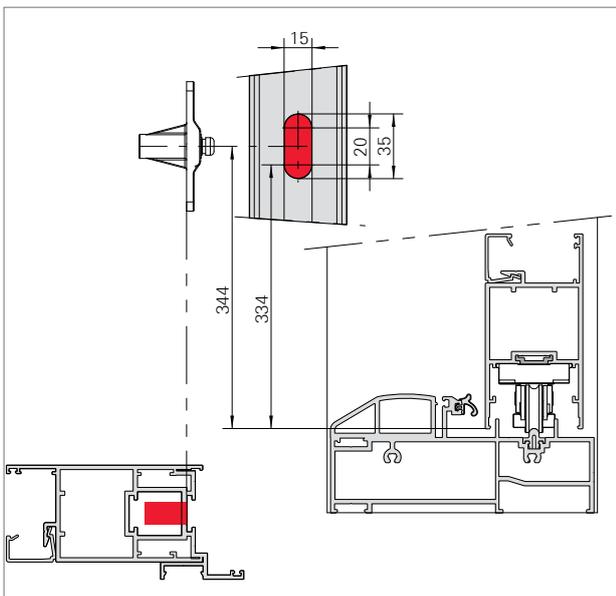
Turning the handle loosens the centre-fixing of the hardware components. Audible cracking noise.



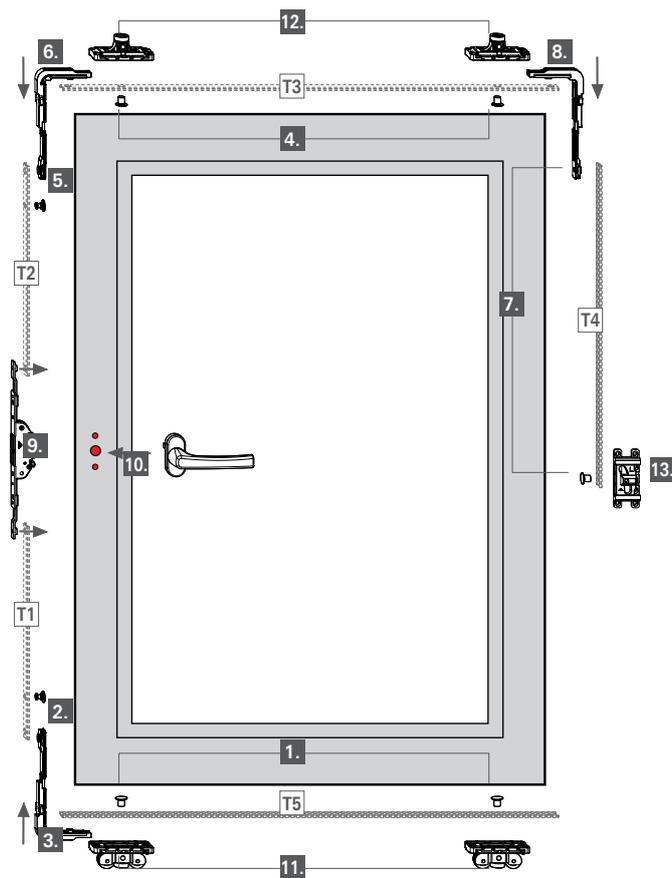
1. Handle [1] is in sliding position.
2. Turn the handle in one direction up to the stop.
Audible cracking noise.
3. Turn the handle in opposite direction up to the stop.
Audible cracking noise.
4. Turn the handle again in both directions and check for ease of movement.



Mill elongated hole for coupling.



Mill elongated hole for mishandling device.

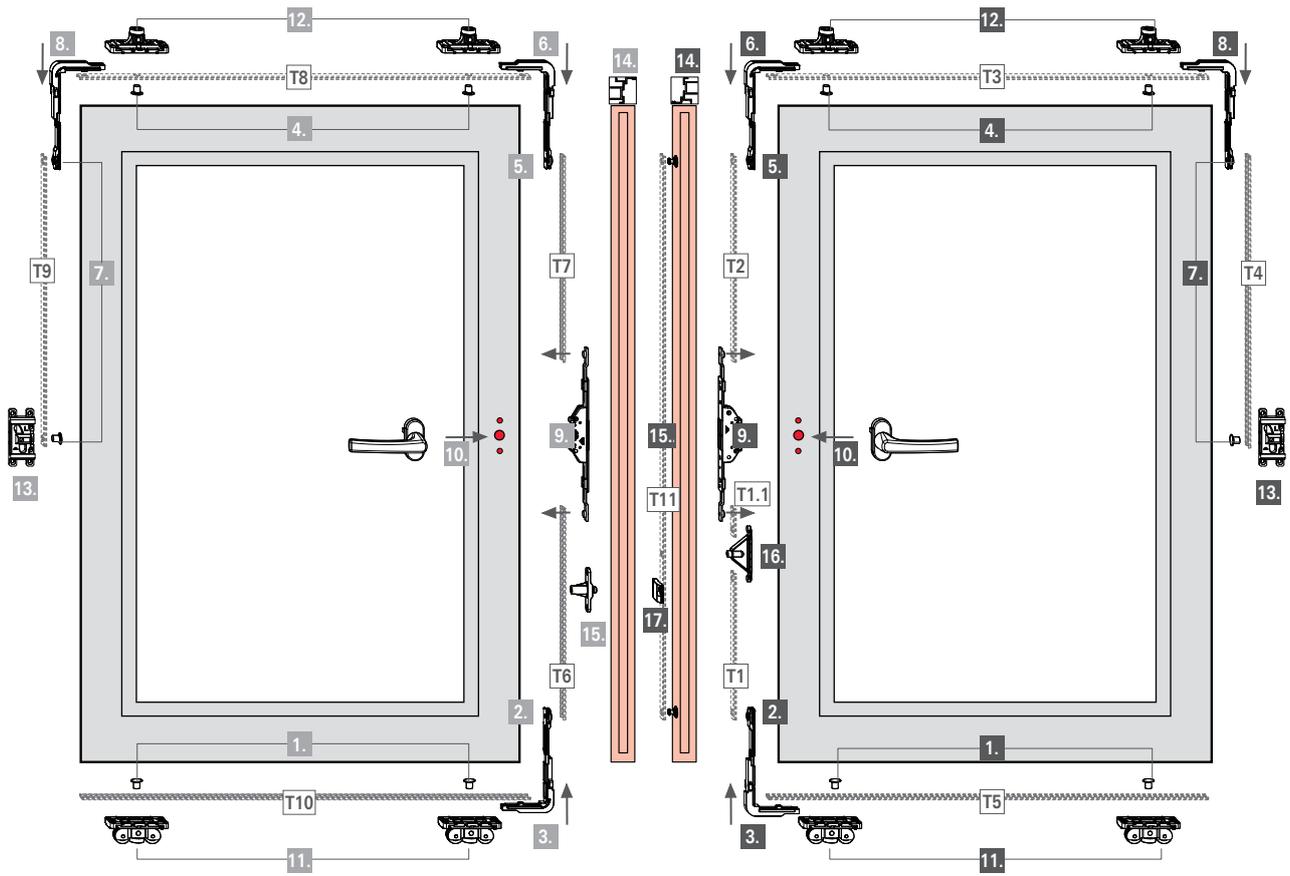


1. Put the control cam into the connecting-rod **T5** and insert connecting-rod into the lower hardware groove.
2. Put the SEC locking cam and the corner drive into the connecting-rod **T1**.
3. Insert connecting-rod **T1**, SEC locking cam, and corner drive from the bottom into the hardware groove. Mount the horizontal connector cam of the corner drive into the connecting-rod **T5** at the bottom, fully insert and screw-fix.
4. Put the control cam into the connecting-rod **T3** and insert connecting-rod into the upper hardware groove.
5. Put the SEC locking cam and the corner drive into the connecting-rod **T2**.
6. Insert connecting-rod **T2**, SEC locking cam, and corner drive from the top into the hardware groove. Mount the horizontal connector cam of the corner drive on top into the connecting-rod **T3**, fully insert and screw-fix.
7. Put the control cam and the corner drive into the connecting-rod **T4**.
8. Insert connecting-rod **T4**, control cam, and corner drive from top into the hardware groove. Mount the horizontal connector cam of the corner drive on top into the connecting-rod **T3**, fully insert and screw-fix.
9. Mount the espagnolette into the connecting-rods **T1** and **T2** and screw-fix.
10. Install the window handle. Then undo the centre-fixing (by moving the window handle) and bring the handle into the opening position.
11. Put the bogie on the control cam and screw-fix. Undo the centre-fixing.
12. Put the control unit on the control cam and screw-fix. Undo the centre-fixing.
13. Put the centre-closer on the control cam and screw-fix. Undo the centre-fixing.

Installation

Sash

Installing hardware components – diagram C/C'



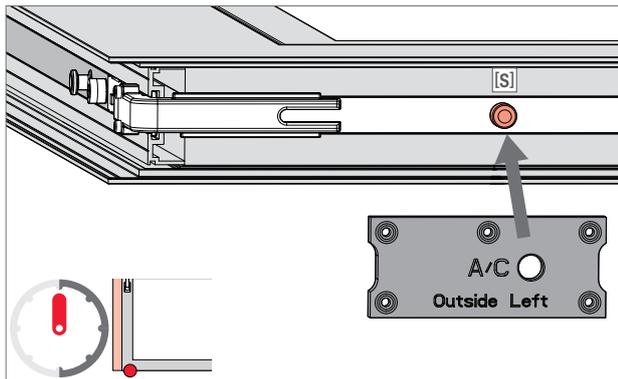


1. Put the control cam into the connecting-rod **T10** and insert connecting-rod into the lower hardware groove.
 2. Put the corner drive into the connecting-rod **T6**.
 3. Insert connecting-rod **T6** and corner drive from beneath into the hardware groove. Mount the horizontal connector cam of the corner drive into the connecting-rod **T10** at the bottom, fully insert and screw-fix.
 4. Put the control cam into the connecting-rod **T8** and insert connecting-rod into the upper hardware groove.
 5. Put the corner drive into the connecting-rod **T7**.
 6. Insert connecting-rod **T7** and corner drive from the top into the hardware groove. Mount the horizontal connector cam of the corner drive into the connecting-rod **T8** from the top, fully insert and screw-fix.
 7. Put the control cam and the corner drive into the connecting-rod **T9**.
 8. Insert connecting-rod **T9**, control cam, and corner drive from top into the hardware groove. Mount the horizontal connector cam of the corner drive on top into the connecting-rod **T8**, fully insert and screw-fix.
 9. Mount the espagnolette into the connecting-rods **T6** and **T7** and screw-fix.
 10. Install the window handle. Then undo the centre-fixing (by moving the window handle) and bring the handle into the opening position.
 11. Put the bogie on the control cam and screw-fix. Undo the centre-fixing.
 12. Put the control unit on the control cam and screw-fix. Undo the centre-fixing.
 13. Put the centre-closer on the locking cam and screw-fix. Undo the centre-fixing.
 14. Install the assembly profile.
 15. Install the mishandling device.
1. Put the control cam into the connecting-rod **T5** and insert connecting-rod into the lower hardware groove.
 2. Put the corner drive and the coupling into the connecting-rod **T1**.
 3. Insert **T1** and **T1.1**, coupling and corner drive from the bottom into the hardware groove. Mount the horizontal connector cam of the corner drive into the connecting-rod **T5** at the bottom, fully insert and screw-fix.
 4. Put the control cam into the connecting-rod **T3** and insert connecting-rod into the upper hardware groove.
 5. Put the corner drive into the connecting-rod **T2**.
 6. Insert connecting-rod **T2** and corner drive from the top into the hardware groove. Mount the horizontal connector cam of the corner drive into the connecting-rod **T3** from the top, fully insert and screw-fix.
 7. Put the control cam and the corner drive into the connecting-rod **T4**.
 8. Insert connecting-rod **T4**, control cam, and corner drive from top into the hardware groove. Mount the horizontal connector cam of the corner drive on top into the connecting-rod **T3**, fully insert and screw-fix.
 9. Mount the espagnolette into the connecting-rods **T1.1** and **T2** and screw-fix.
 10. Install the window handle. Then undo the centre-fixing (by moving the window handle) and bring the handle into the opening position.
 11. Put the bogie on the control cam and screw-fix. Undo the centre-fixing.
 12. Put the control unit on the control cam and screw-fix. Undo the centre-fixing.
 13. Put the centre-closer on the control cam and screw-fix. Undo the centre-fixing.
 14. Install the assembly profile.
 15. Put the SEC locking cam into the connecting-rod **T11** and insert into assembly profile.
 16. Fix the connecting-rod in the coupling.
 17. Install the run-up block.

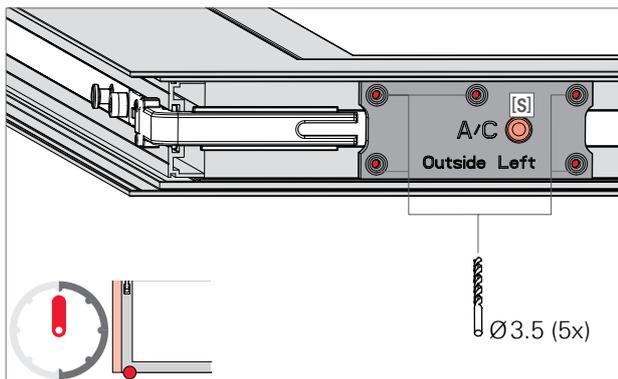
Installation

Sash

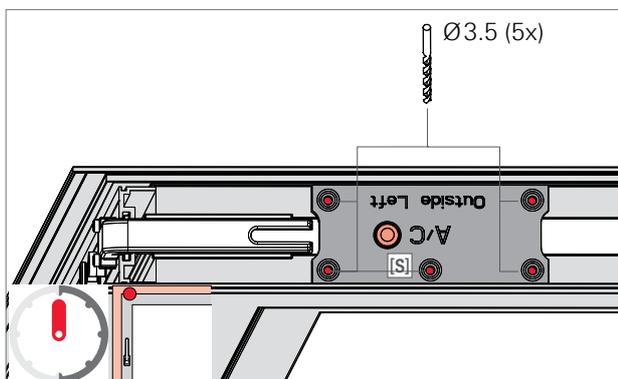
Installing bogie / control unit – diagram A/C



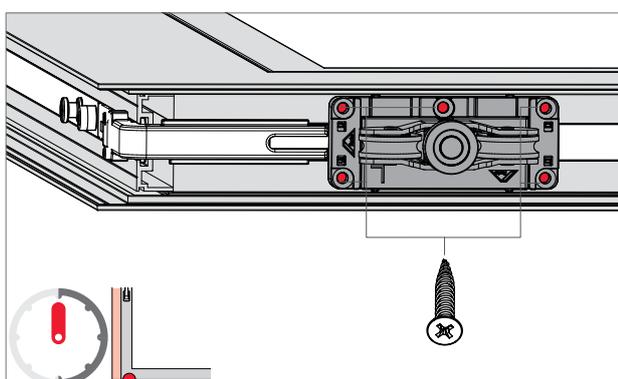
1. Insert the drilling jig of diagram A/C into that cam [S], which controls the bogie/control unit.



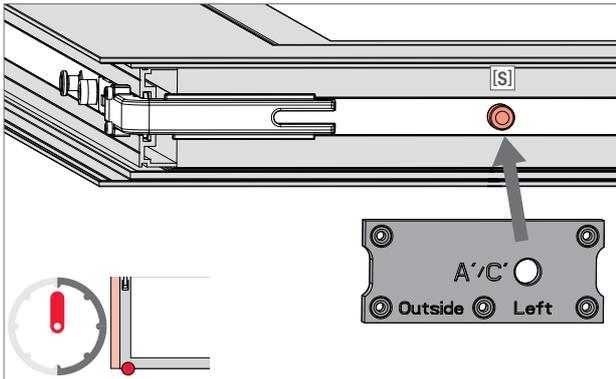
2. Drill the holes.
Each bogie / control unit: Ø3.5 (5x)



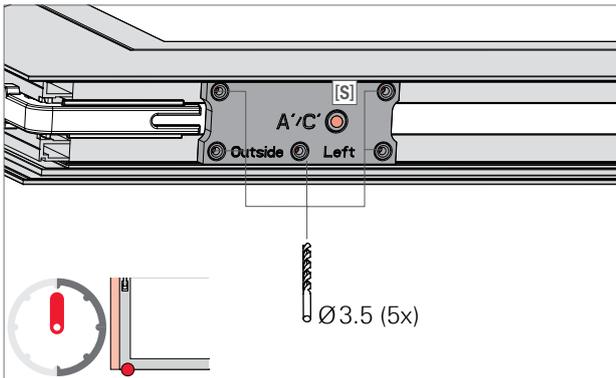
3. Insert and screw-fix bogie and control unit as shown.
Stainless-steel screws 4.2 x ... (5x)



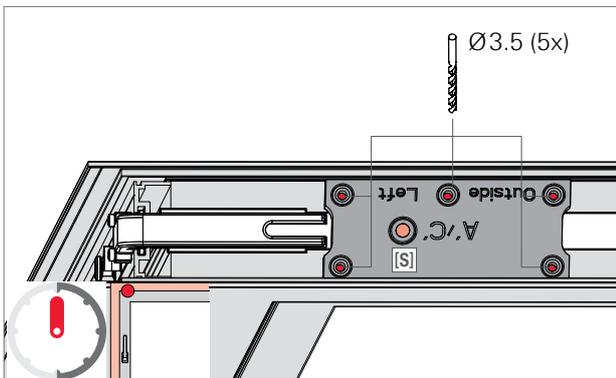
4. Undo the centre-fixing.



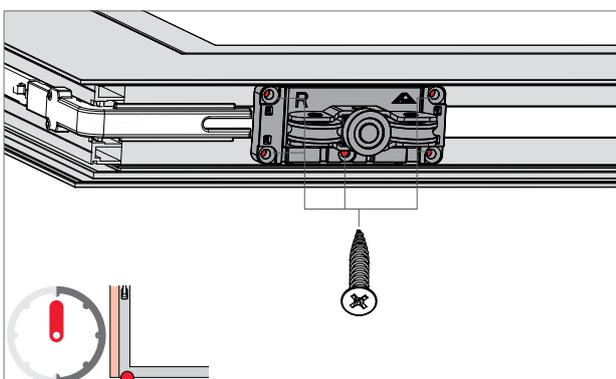
1. Insert the drilling jig of diagram A' / C' into that cam [S], which controls the bogie/control unit.



2. Drill the holes.
Each bogie / control unit: Ø3.5 (5x)



3. Insert and screw-fix bogie and control unit as shown.
Stainless-steel screws 4.2 x ... (5x)



4. Undo the centre-fixing.

Installation

Sash

Installing the centre-closer – all diagrams

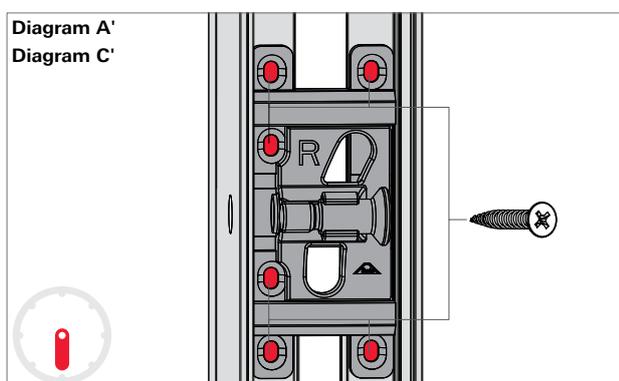
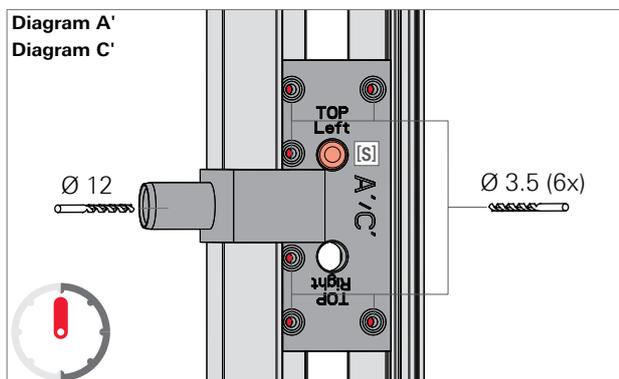
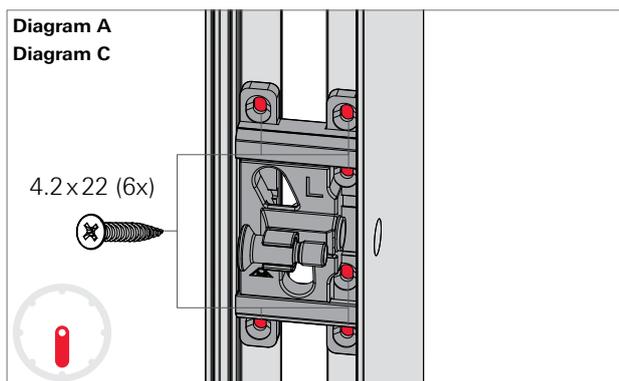
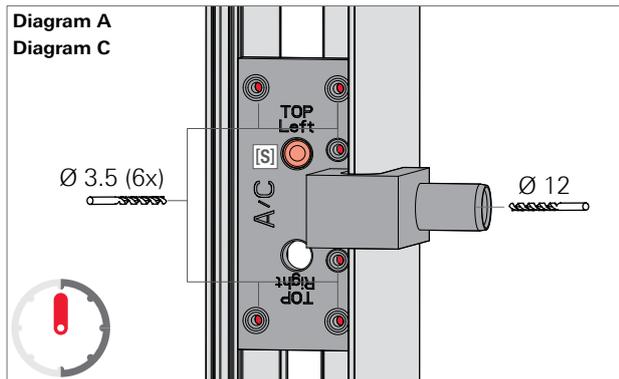


Diagram A/C

1. Insert the drilling jig of diagram A/C into that cam [S], which controls the sash component of the centre-closer.
2. Drill the holes. Each centre-closer (sash component):
Ø 3.5 (6x)
Ø 12 (1x)

3. Insert the sash component of the centre-closer and screw-fix.
Stainless-steel screws 4.2 x ... (6x)

Diagram A' / C'

1. Insert the drilling jig of diagram A' / C' into that cam [S], which controls the sash component of the centre-closer.
2. Drill the holes. Each centre-closer (sash component):
Ø 3.5 (6x)
Ø 12 (1x)

3. Insert the sash component of the centre-closer and screw-fix.
Stainless-steel screws 4.2 x ... (6x)

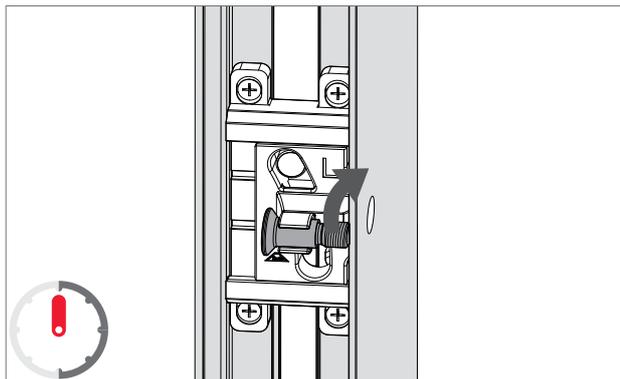
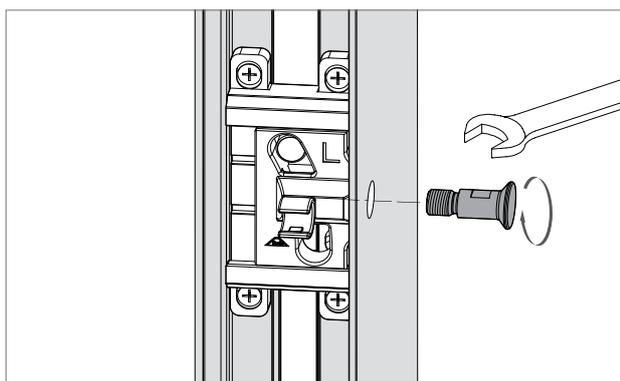


Diagram A/C

1. Release the locking cam of the centre-closer from the locking device.

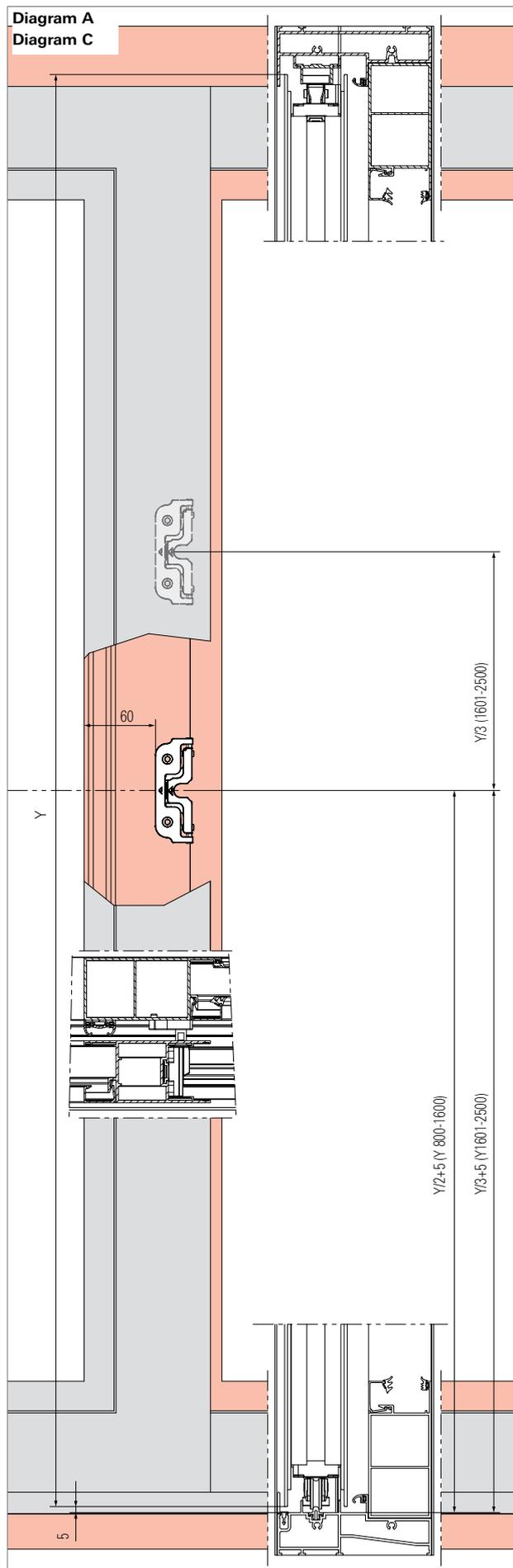


2. Insert the locking cam of the centre-closer and screw-fix.
Tool:
Open-end spanner 8 mm



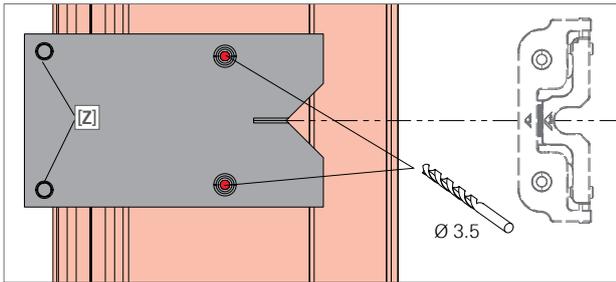
NOTE

Tighten the locking cam of the centre-closer finger tight.



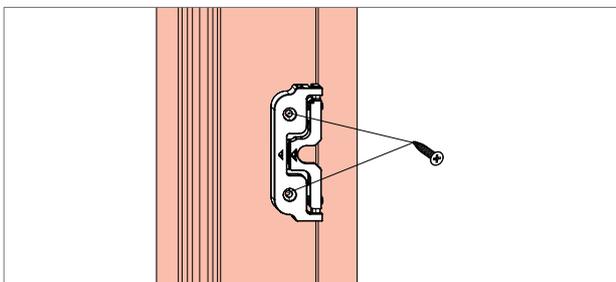
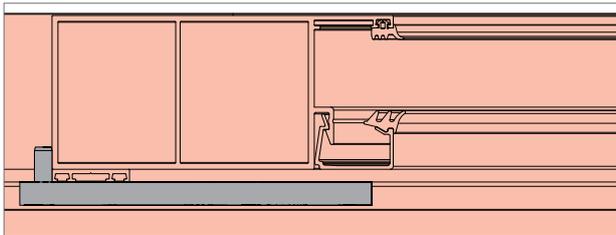
Version: Taking measurements

1. Take the measurements for the installation of the centre-closer striker.
2. Drill the holes. Each centre-closer striker:
 - Ø 3.5 (2x)
 - Ø 5 (1x)

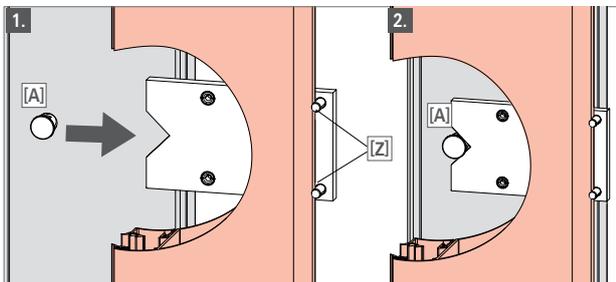


Version: Positioning the drilling jig at the frame profile

1. Position the drilling jig for the centre-closer striker with the cams [Z] flush to the frame profile as depicted and drill the holes. Each centre-closer striker: Ø 3.5 (2x)

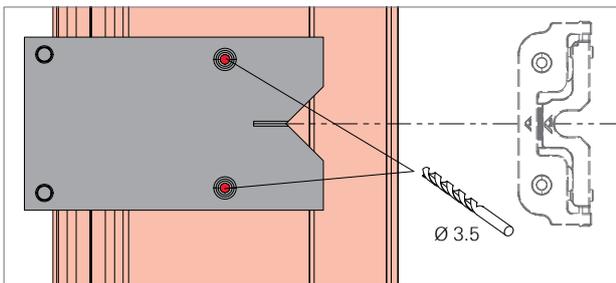


2. Insert the centre-closer striker and screw-fix. Stainless-steel screws 4.2 x 22 (6x)

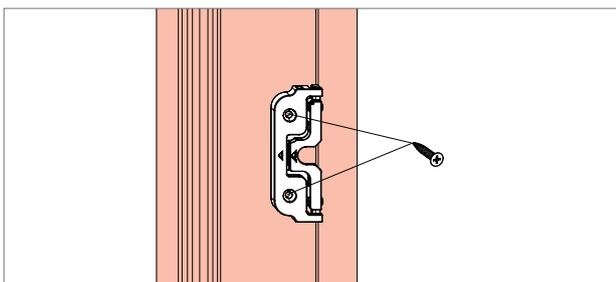


Version: Positioning the drilling jig V recess to cam

1. Position the drilling jig for the centre-closer striker at the mullion profile flush with the cams [Z] as depicted.
2. Insert the sash with cam [A] into the V recess of the drilling jig.



3. Drill the holes. Each centre-closer striker (frame component): Ø 3.5 (2x)

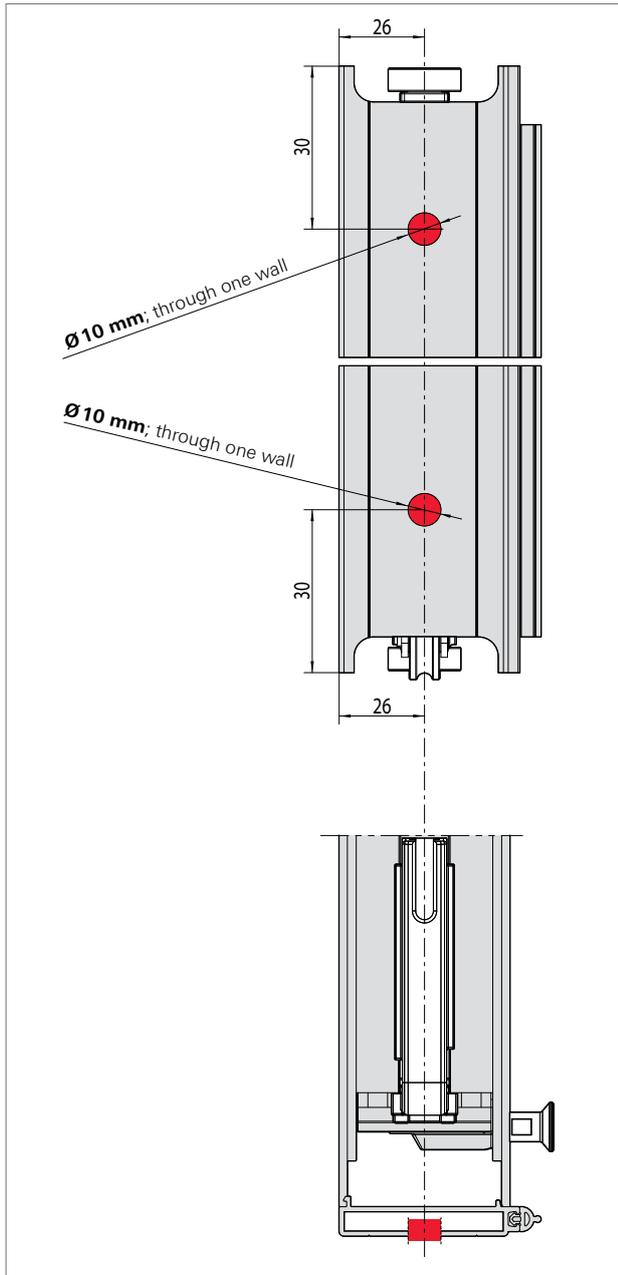


4. Insert the centre-closer striker and screw-fix. Stainless-steel screws 4.2 x 22 (6x)

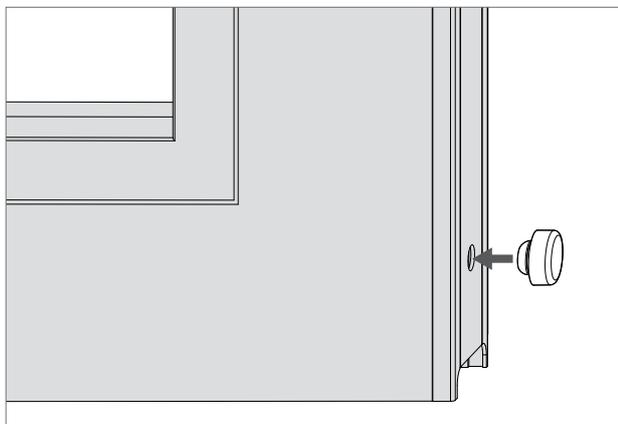
Installation

Frame

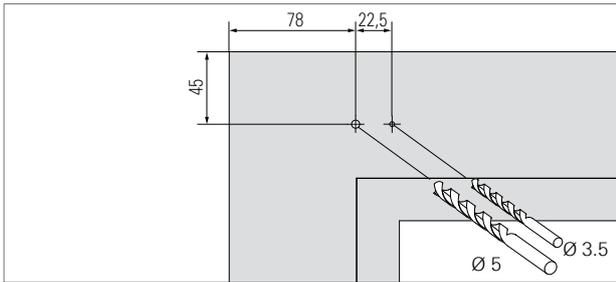
Installing rubber buffers – diagram A/C



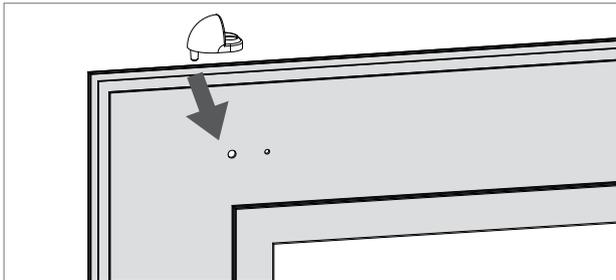
1. Drill the holes for the rubber buffers.
Ø 10 (2x)



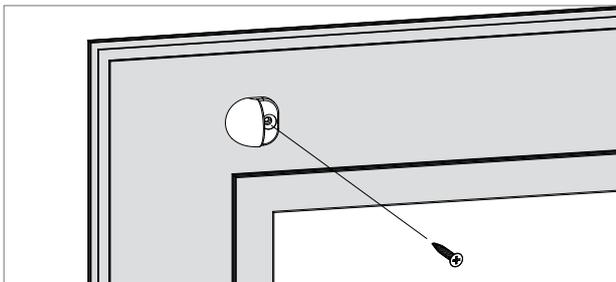
2. Insert the rubber buffers.



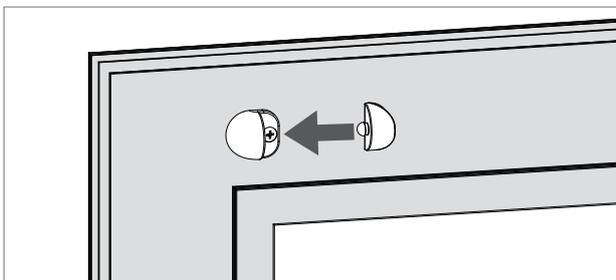
1. Drill the holes. For each stop (frame component):
Ø 3.5 (1x)
Ø 5 (1x)



2. Insert the stop component with cams into the drilling Ø5.



3. Screw-fix stop component.
Stainless-steel screw 4.2x22 (1x)

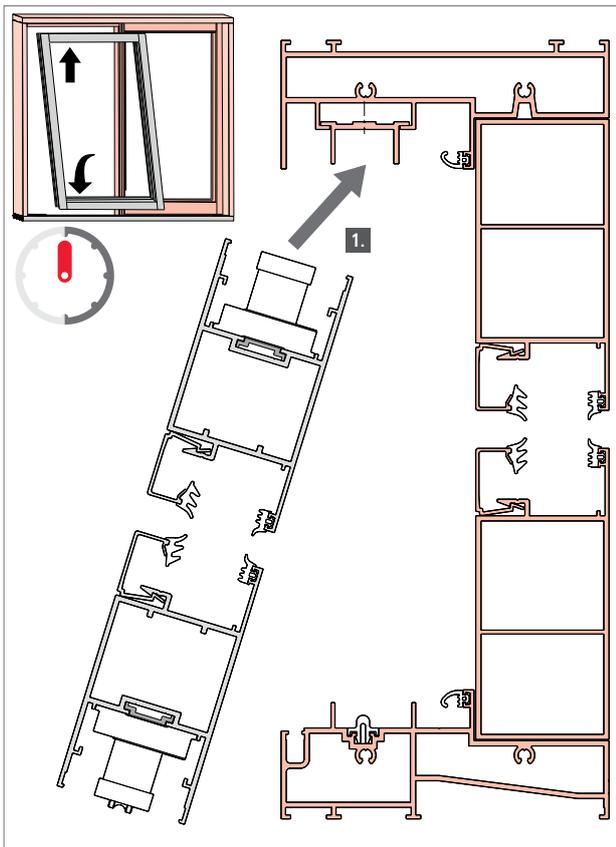


4. Slide the rubber cap onto the buffer stop.

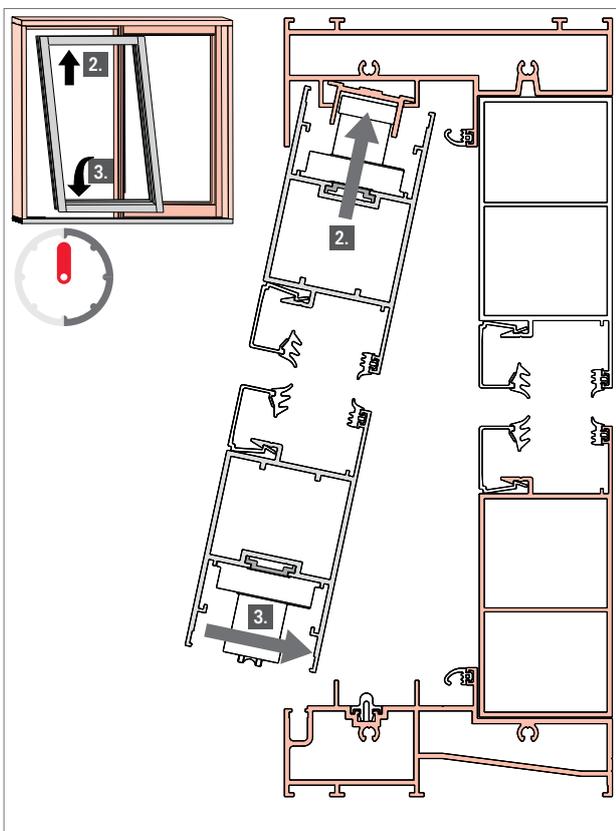
Installation

Connecting sash and frame

Hinging the sash



1. Secure the sash with handle in sliding position from falling out. Position it parallel to the frame and slightly tilt on top.

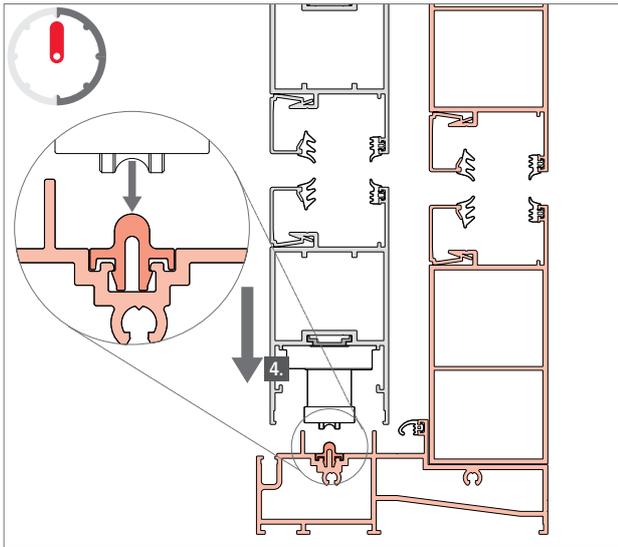


2. Swivel in the sash until it is vertical to the guide track.

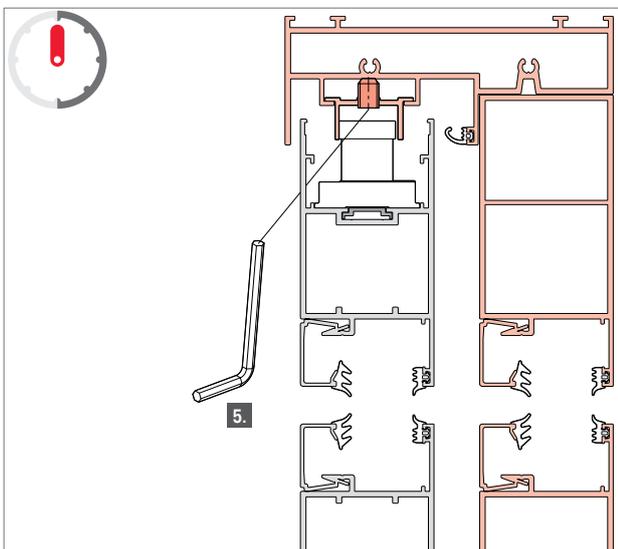


NOTE

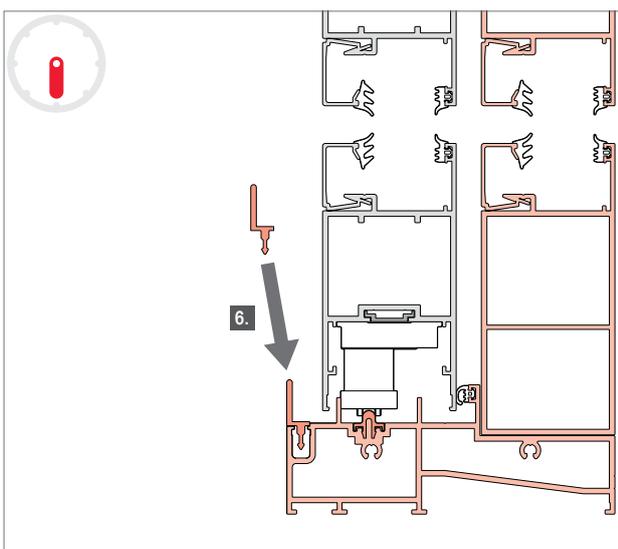
Guide tracks and roller tracks must not be painted!



- 3. Lower the sash with handle in sliding position in a controlled manner, until the bogie rollers are placed securely in the bottom guide track.

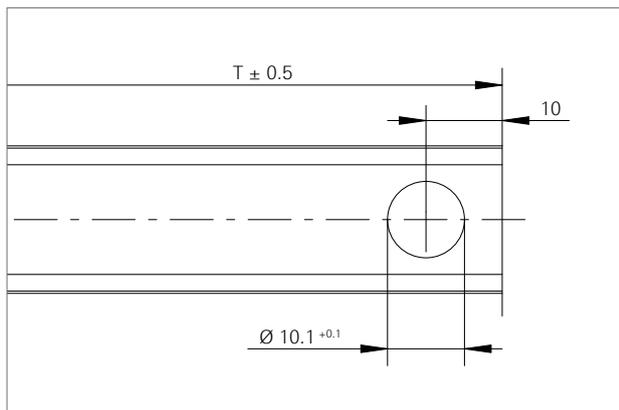


- 4. Firmly tighten the pre-assembled screws in the upper guide track.
Tool: 4 mm hex key



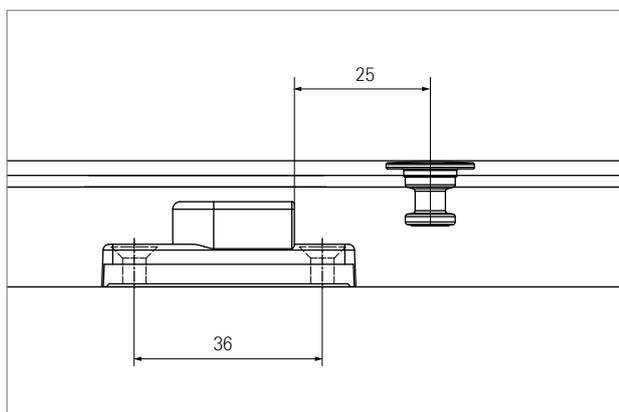
- 5. Bring the handle into the locked position and clip in the guard rail as shown.

i NOTE
Guide tracks and roller tracks must not be painted!



General dimensions of all coupling points (for connecting-rods), unless otherwise stated.

Dimension T = all connecting-rod dimensions ± 0.5 mm.

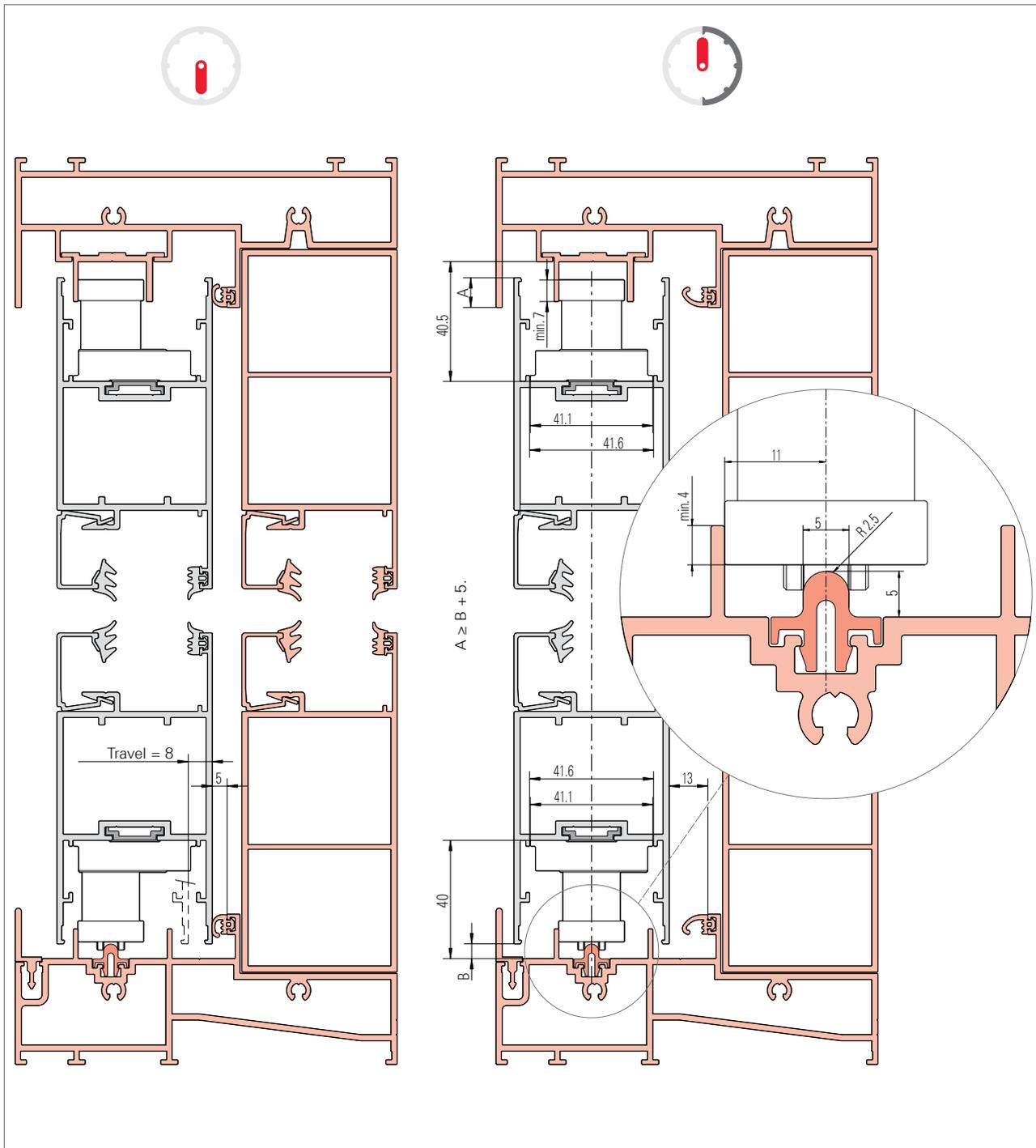


Determine the correct striker position (with respect to the locking-cam position): Striker and locking cam should have a distance of 25 mm (hardware in opening position).



NOTE

Before starting series production, check all dimensions in a sample installation.



NOTE

Provide a controlled water drainage for the profile.

To highlight references and other elements, the following signs are used in the installation drawings:

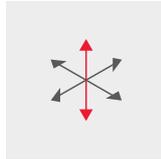
Marking	Explanation
A	A
B	B
Beschlag	Hardware
C	C
FB	Sash width
FH	Sash height
GH	Handle height
Griffsitz	Handle position
links	Left
mittig / mittiger	centred
rechts	Right
Schema A	Diagram A

**Note**

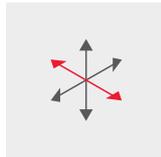
Roto assists the customer in checking the profiles. Please contact your local Roto sales representative. In the meantime, a profile-specific installation drawing will be created.

Symbols for the sash adjustment when installed

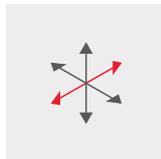
These symbols facilitate the orientation while adjusting the window sashes after installation with the following steps. Use a 4 mm hex key as tool.



Height adjustment



Lateral adjustment

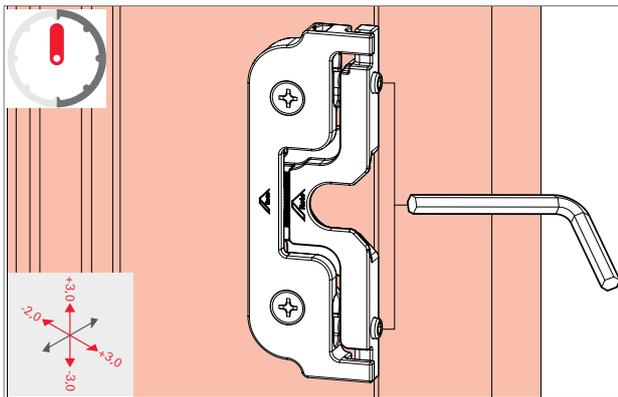


Gasket-compression adjustment



NOTE

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



Lateral adjustment of the sash at the centre-closer striker

1. Close the window sash (handle position open).
2. Lateral adjustment of the sash at the CL striker via 2 bolts in the fastening plate.

Tool: 2.5 mm hex key

i **NOTE**

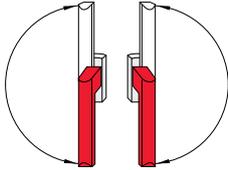
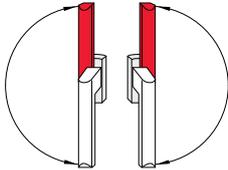
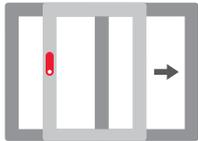
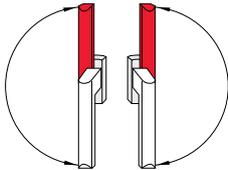
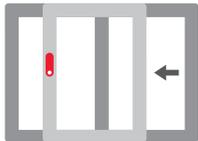
The centre-closer striker is equipped with a variable height adjustment which permits an installation tolerance of ± 3 mm of the locking cam.

Operation

Operating information

Handle position for sliding hardware

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
			Opened slide position of the sash
			Closed slide position of the sash

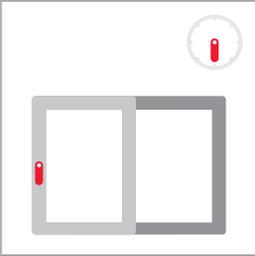


The following symbols can be used on windows and balcony doors to protect the end-user. Always keep these symbols in a clearly legible state. Please order stickers separately (OPR_27_DE-EN).

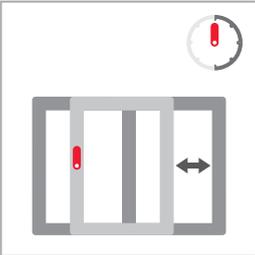


Schiebebeschlag
Slide hardware

geschlossen
closed



schieben
slide



03/2013 OPR_27_DE_v0

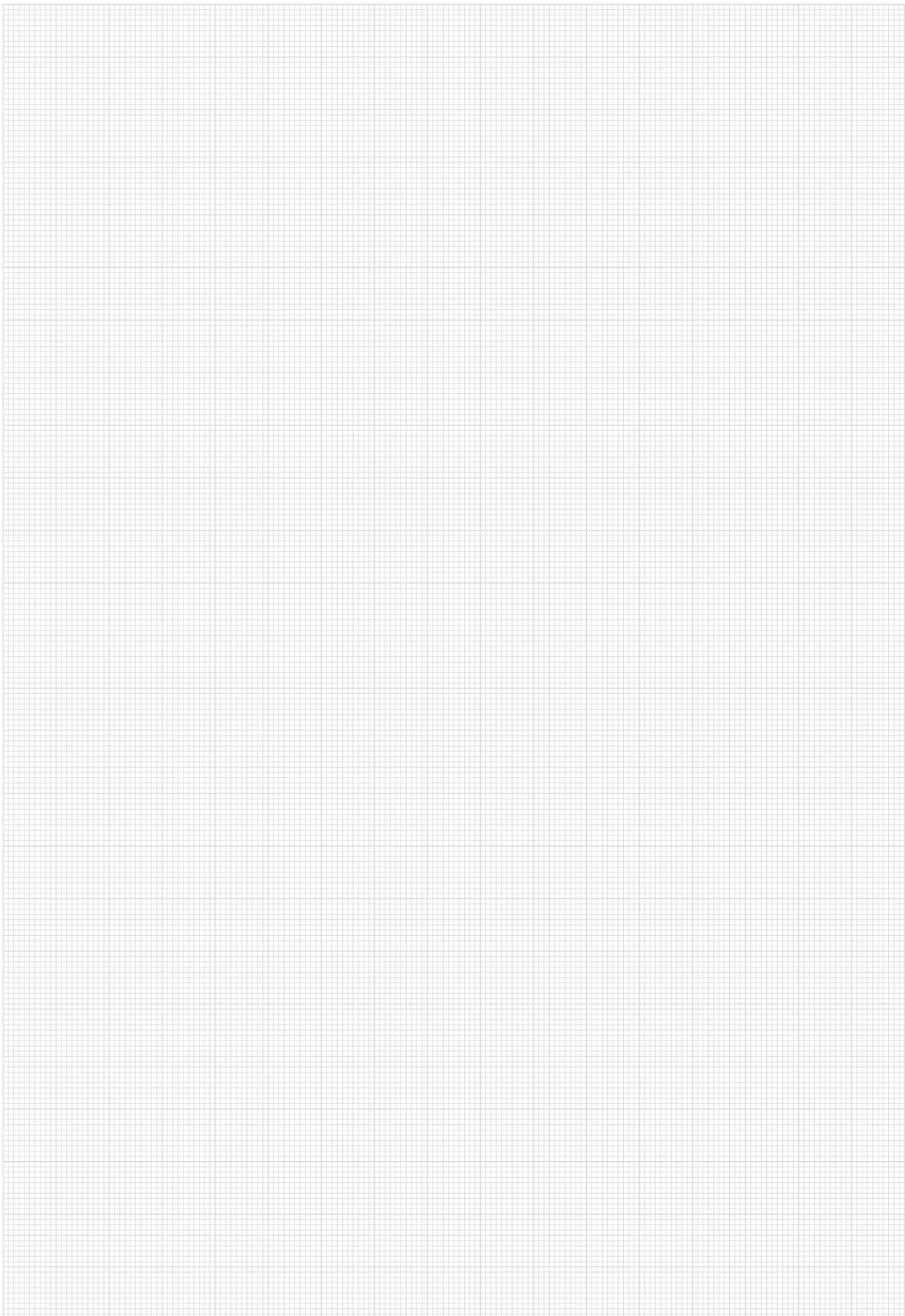
Troubleshooting

Problem	Cause	Corrective action	Specialist company	End-users
Handle is difficult to rotate.	– Frame parts are not properly greased.	– Grease frame parts.	<input type="checkbox"/>	<input type="checkbox"/>
	– Faulty handle.	– Replace the handle.	■	–
	– Handle screws are screwed in too strong.	– Slightly loosen the screws.	■	–
	– Oblique screws in the sash parts.	– Straight screw-fixing of the sash parts.	■	–
	– Faulty sash parts.	– Replace the sash parts.	■	–
	– Faulty striker locations.	– Adjust the striker locations.	■	–
Handle can not rotate 180°.	– Faulty installation of sash parts.	– Check connecting-rod length and replace if necessary.	■	–
Locking cams rubber at striker.	– Faulty striker locations.	– Adjust the striker locations.	■	–

■ = 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



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 in the area of pivot rests or bogies and of hinges – as well as replacement of parts and hinging, and unhinging of sashes.
- Do not un hinge 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 strikers with acid free and non resinous grease from a specialised dealer.	□	□

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

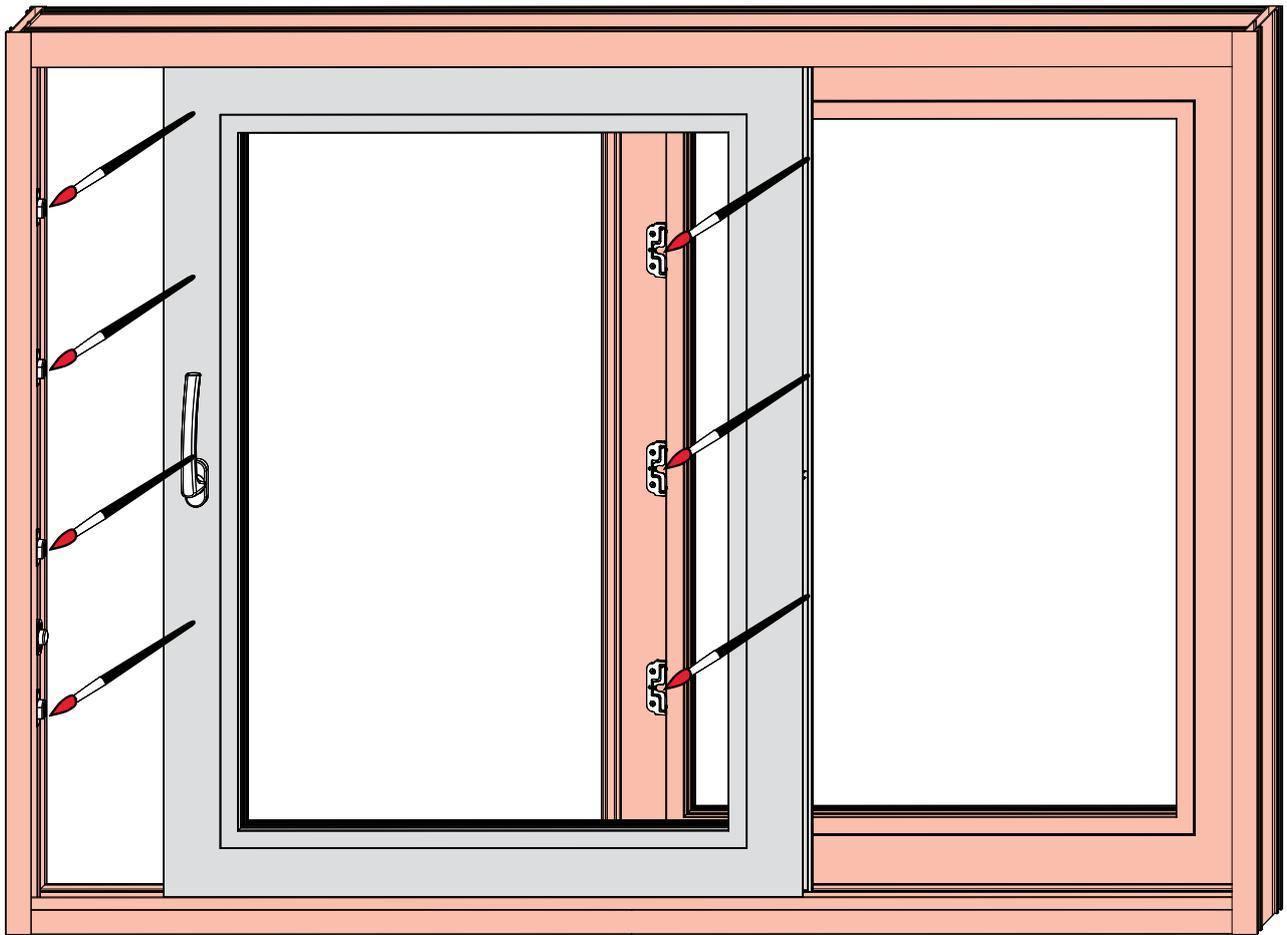


NOTE

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. The illustrated overview 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.	<input type="checkbox"/>	<input type="checkbox"/>
Examine safety-relevant hardware components for wear and tear.	<input type="checkbox"/>	<input type="checkbox"/>
All movable parts are to be operation-tested.	<input type="checkbox"/>	<input type="checkbox"/>
All locking points are to be operation-tested.	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	– – –

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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.	<input type="checkbox"/>	<input type="checkbox"/>
Never use aggressive, acidiferous cleaners or abrasive cleaning agents.	<input type="checkbox"/>	<input type="checkbox"/>
Only use mild, pH-neutral cleaning agents in diluted form.	<input type="checkbox"/>	<input type="checkbox"/>
Only use a soft cloth for cleaning.	<input type="checkbox"/>	<input type="checkbox"/>

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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.	■	–
Always use stainless-steel screws.	■	–

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Protection against dirt

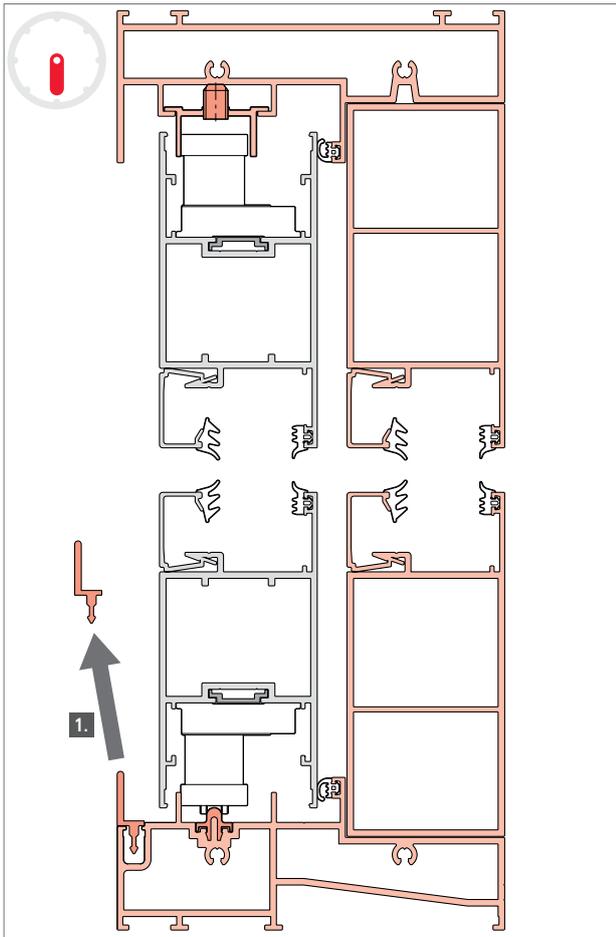
	Specialist company	End-users
Remove deposits and dirt from building materials (building dust, plaster, cement, etc.) or similar materials with water before it cures.	□	□
Keep the hardware free from deposits and soiling.	□	□
Never use aggressive, acidiferous cleaners or abrasive cleaning agents.	□	□
Only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

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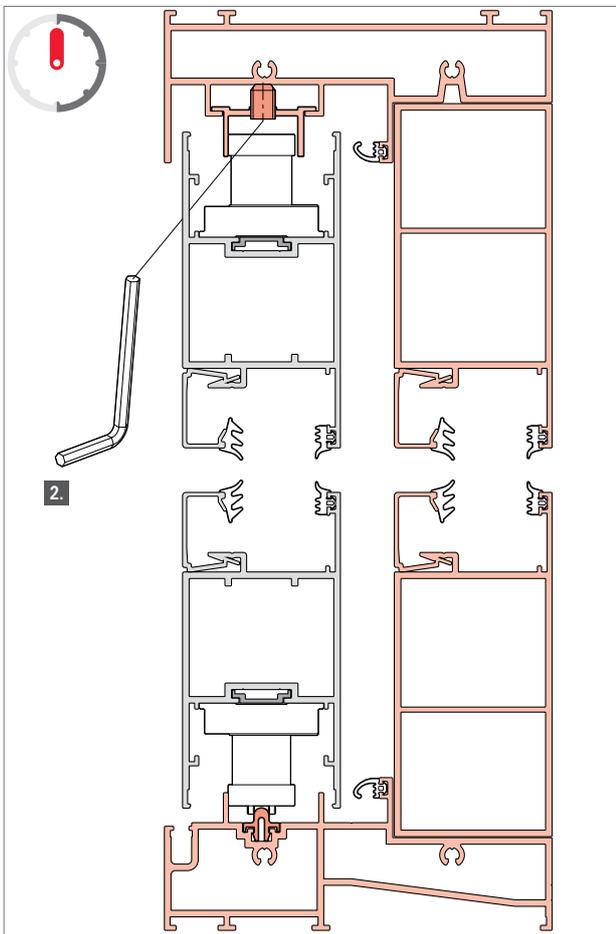
Protection against (permanent) moist interior air

	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.	<input type="checkbox"/>	<input type="checkbox"/>
<p>Ensure that (permanently) damp spatial air cannot condense in the hinge and rebate areas:</p> <ul style="list-style-type: none"> – 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. <p>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.</p>	<input type="checkbox"/>	<input type="checkbox"/>

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1. Bring the handle into the locked position and release the guard rail as shown.

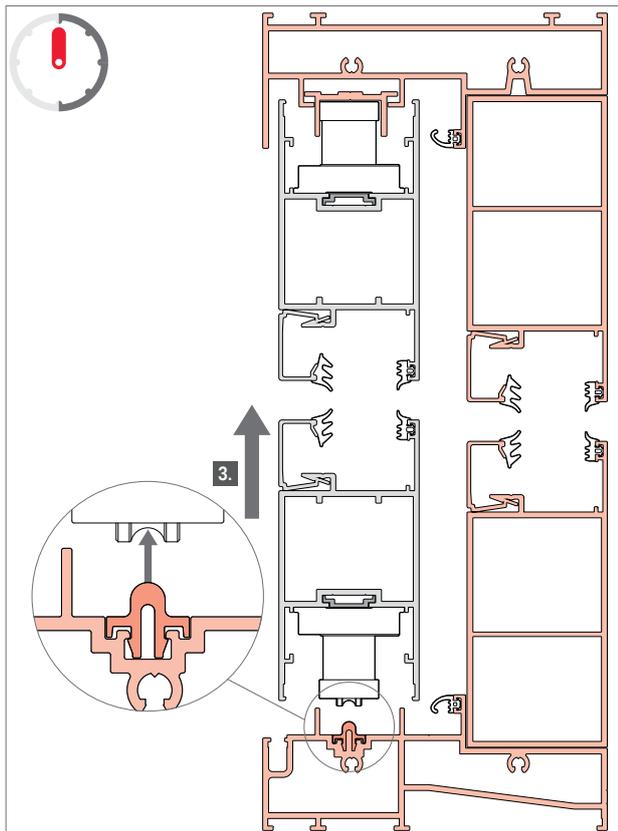


2. Bring the handle into the sliding position and loosen the screws in the upper guide track (4 mm hex key).

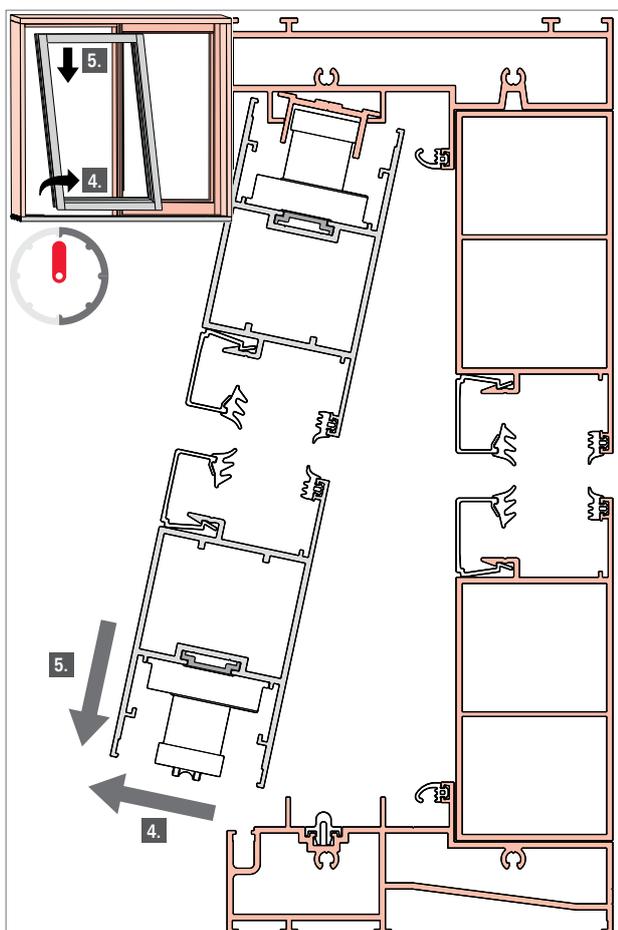
Dismantling

Leaf

Unhinging the sash



3. Secure the sash from falling out (handle in sliding position) and lift it up.

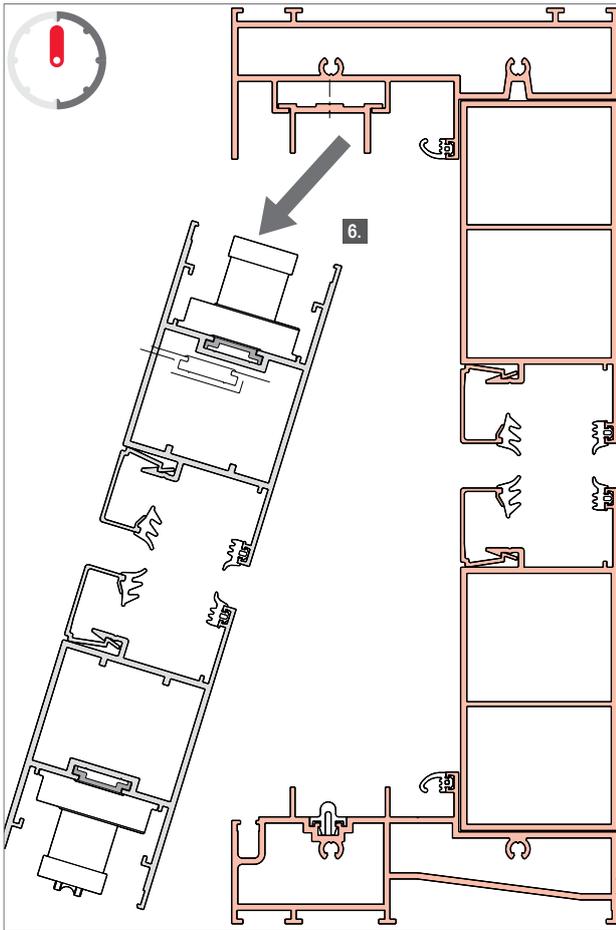


4. With the handle in sliding position, swivel outwards the sash – please note that the upper guide track is not fixed!
5. Lower the sash in a controlled manner.

Dismantling

Leaf

Unhinging the sash



6. Remove the sash from the frame.



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 sash. Use suitable means of securing for this.
 - Use only transport fastenings designed for the respective clearance.
 - Wherever possible, transport the windows in the intended installation position. If transport in the intended installation position is not possible, unhinge the sash, and transport it separately from the frame to which it belongs.
-

During transport, loading, and unloading, especially when auxiliaries such as suckers, transport nets, forklifts, or cranes are used for support, reaction forces may arise which result in damage or overloading to the installed hardware. Therefore observe the following during all transport, loading, and unloading:

- The type and the force application points when transporting, loading, and unloading have a significant effect on the reaction forces which arise.
 - 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.



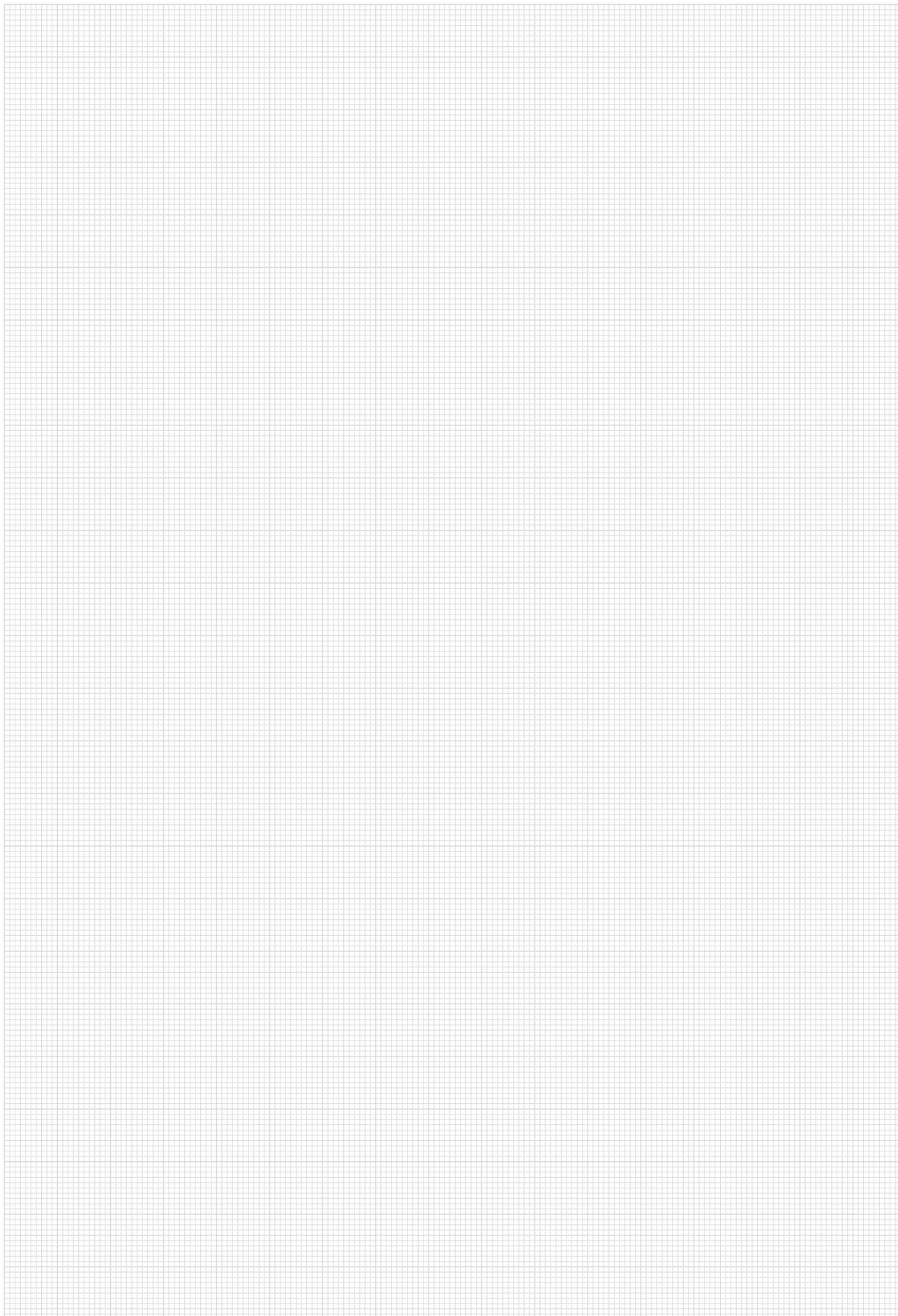
Note

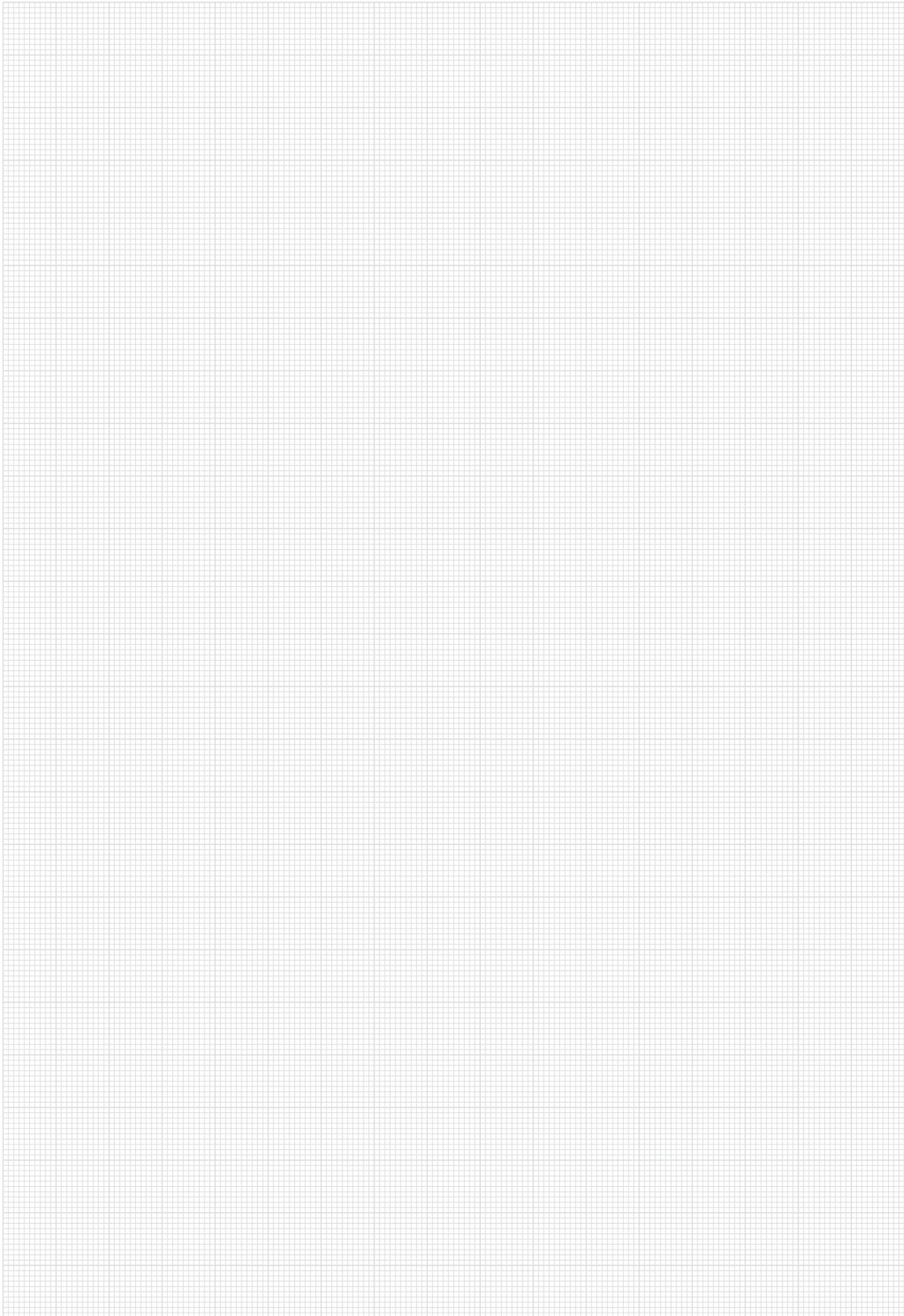
Claim any damage as soon as it is detected. Claims for damage can only be invoked within the statutory reclamation period.

Disposal

Disposal of window hardware

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





Imprint

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