

## **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
Nº	Material number
	Anodised
	Powder coated (for RAL colours)

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

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**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.

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**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.

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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 accordion – 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.



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**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  $v \leq 0.2 \text{ m/s}$ ).

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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.



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

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

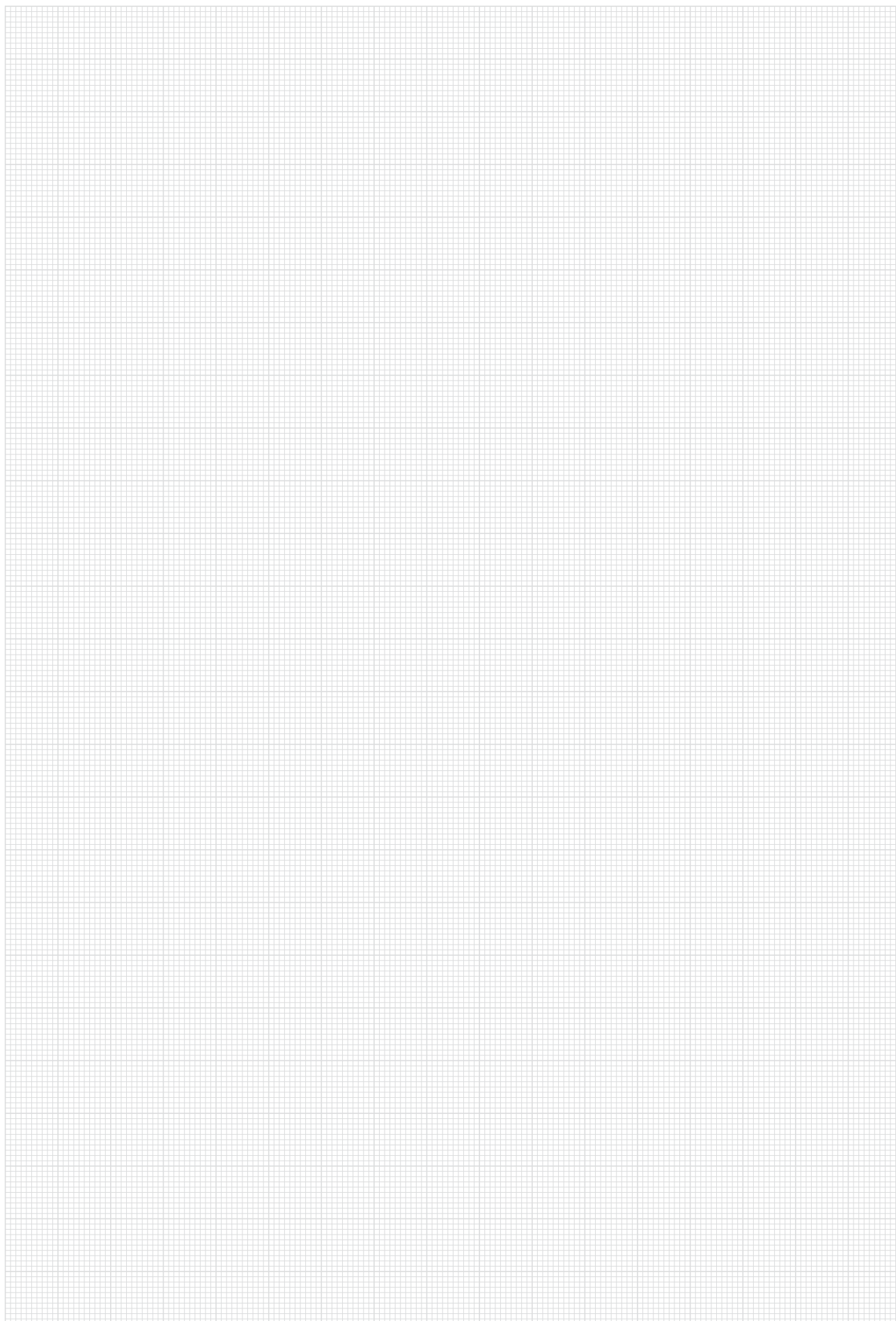
In particular, avoid the following applications:

- 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.



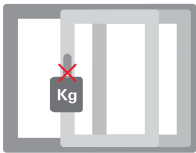
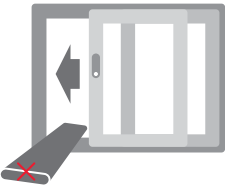
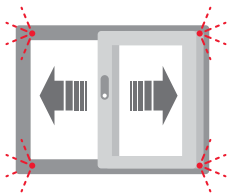
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Claims for damages of any type whatsoever resulting of operation other than that stipulated are excluded.



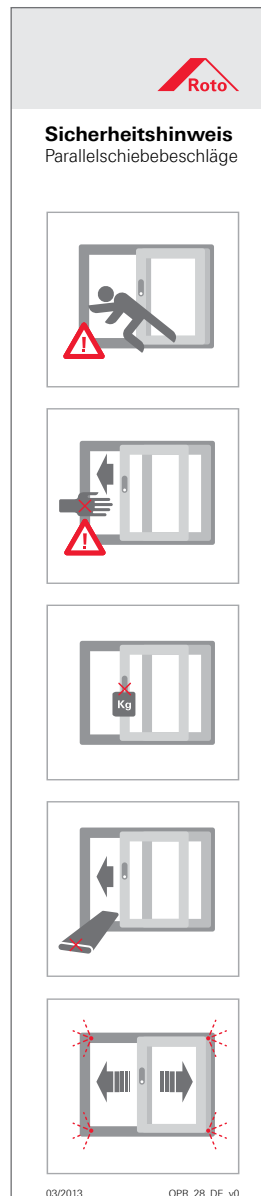


Comply with the following symbols and their meanings in order to avoid accidents, injuries and material damage.

Symbol	Meaning
	<p><b>DANGER!</b>  <b>Danger of injury from falling through open windows and balcony doors.</b></p> <ul style="list-style-type: none"> <li>– Behave with care near to open windows and balcony doors.</li> <li>– Please keep children and persons that cannot appreciate the danger away from the hazard area.</li> </ul>
	<p><b>WARNING!</b>  <b>Danger of injury through trapping of body parts in the opening gap between sash and frame.</b></p> <ul style="list-style-type: none"> <li>– When closing windows and balcony doors, never reach between sash and frame, and always act with care.</li> <li>– Please keep children and persons that cannot appreciate the danger away from the hazard area.</li> </ul>
	<p><b>WARNING!</b>  <b>Danger of injury and material damage from overloading the sash</b></p> <ul style="list-style-type: none"> <li>– Do not overload the sash.</li> </ul>
	<p><b>CAUTION!</b>  <b>Danger of injury and material damage from insertion of obstructions into the opening gap between sash and frame</b></p> <ul style="list-style-type: none"> <li>– Do not insert obstructions into the opening gap between sash and frame.</li> </ul>
	<p><b>CAUTION!</b>  <b>Injury and property damage from uncontrolled opening and closing of the sash</b></p> <ul style="list-style-type: none"> <li>– Ensure that the sash is guided slowly by hand throughout the entire range of movement as far as the fully opened or closed position.</li> </ul>



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:  $\geq 52$  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

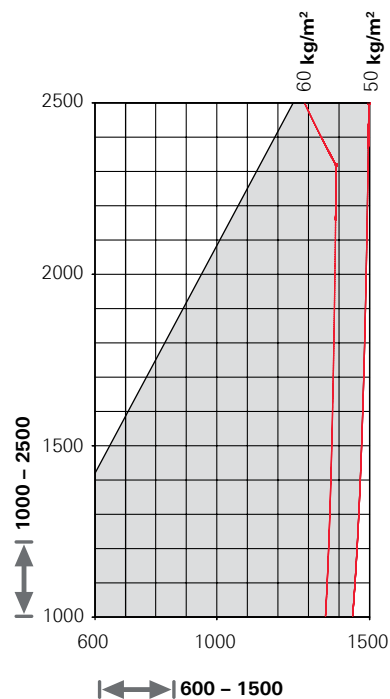
Glass weight ..... max. 60 kg / m<sup>2</sup>

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

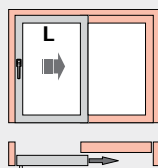
The information in the application diagram refers to the glass weight in kg/m<sup>2</sup>.

1 mm/m<sup>2</sup> glass thickness = 2.5 kg

 = Impermissible application range



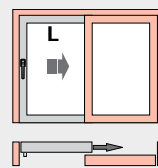
**Diagram A**



**Diagram A (running inside)**

1 sliding sash (L or R)

1 fixed glazing

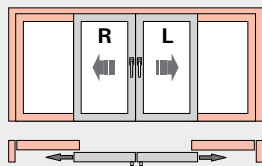


**Diagram A' (running outside)**

1 sliding sash (L or R)

1 fixed glazing

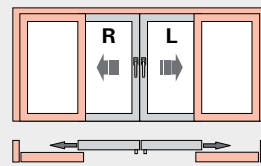
**Diagram C**



**Diagram C (running inside)**

2 sliding sashes (L and R)

2 fixed glazings

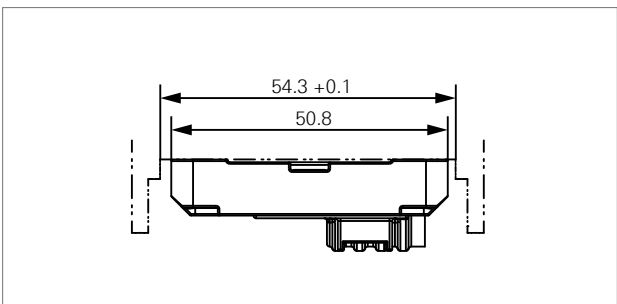
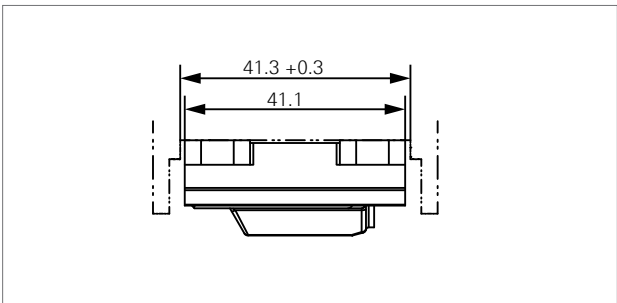
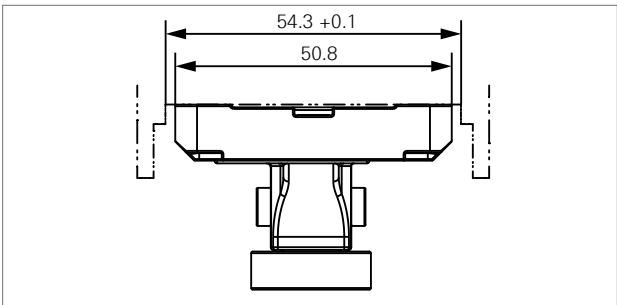
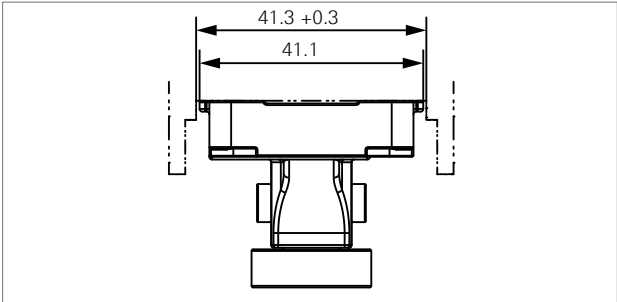
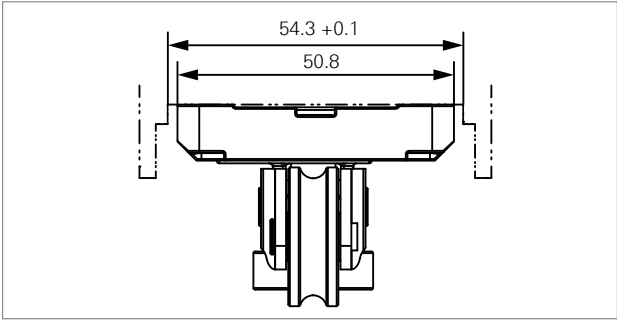
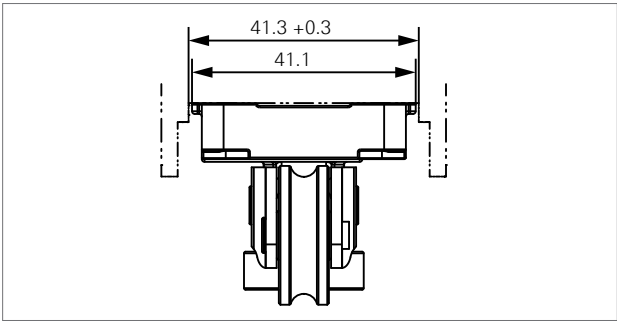


**Diagram C' (running outside)**

2 sliding sashes (L and R)

2 fixed glazings





**Bogie dimensions**

Designation

Size 41

Size 51

**Control-unit dimensions**

Designation

Size 41

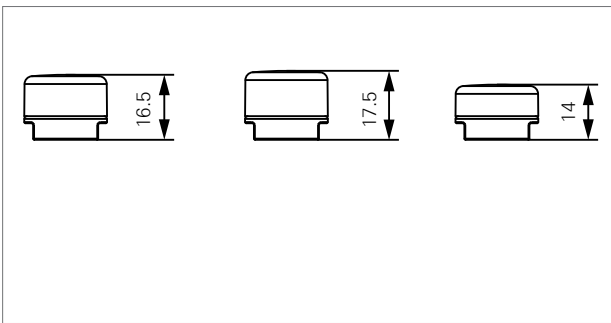
Size 51

**Centre-closer dimensions**

Designation

Size 41

Size 51



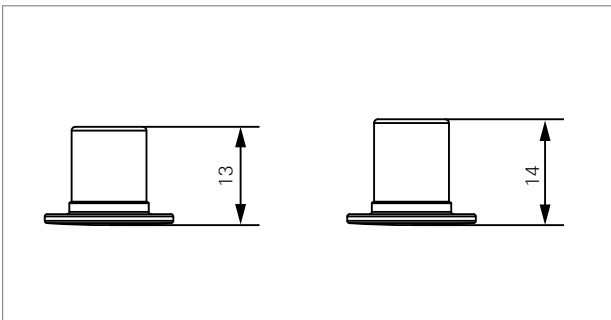
#### Rubber buffer

Designation

Size 16.5

Size 17.5

Size 14

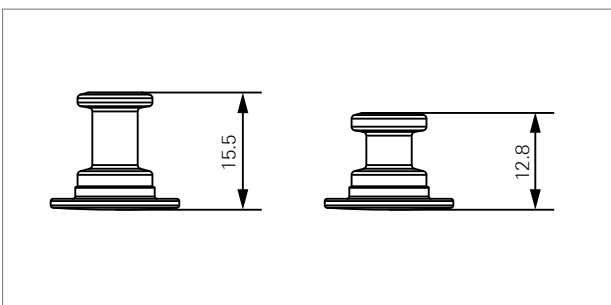


#### Guide-block dimensions

Designation

Size 13

Size 14

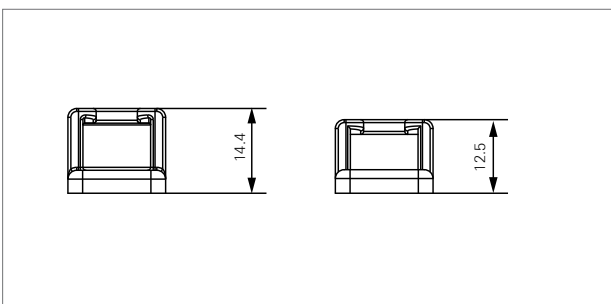


#### SEC-cam dimensions

Designation

Size 15.5

Size 12.8

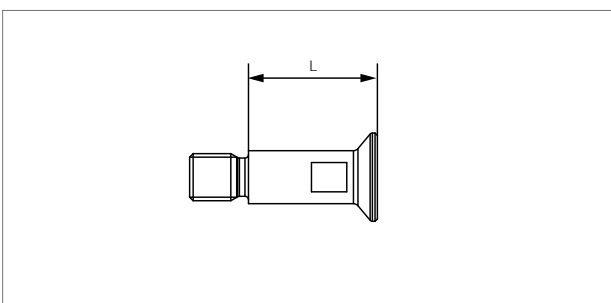


#### SEC-striker dimensions

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'  
Hardware overview

Dispersed with hand version optional parts grey

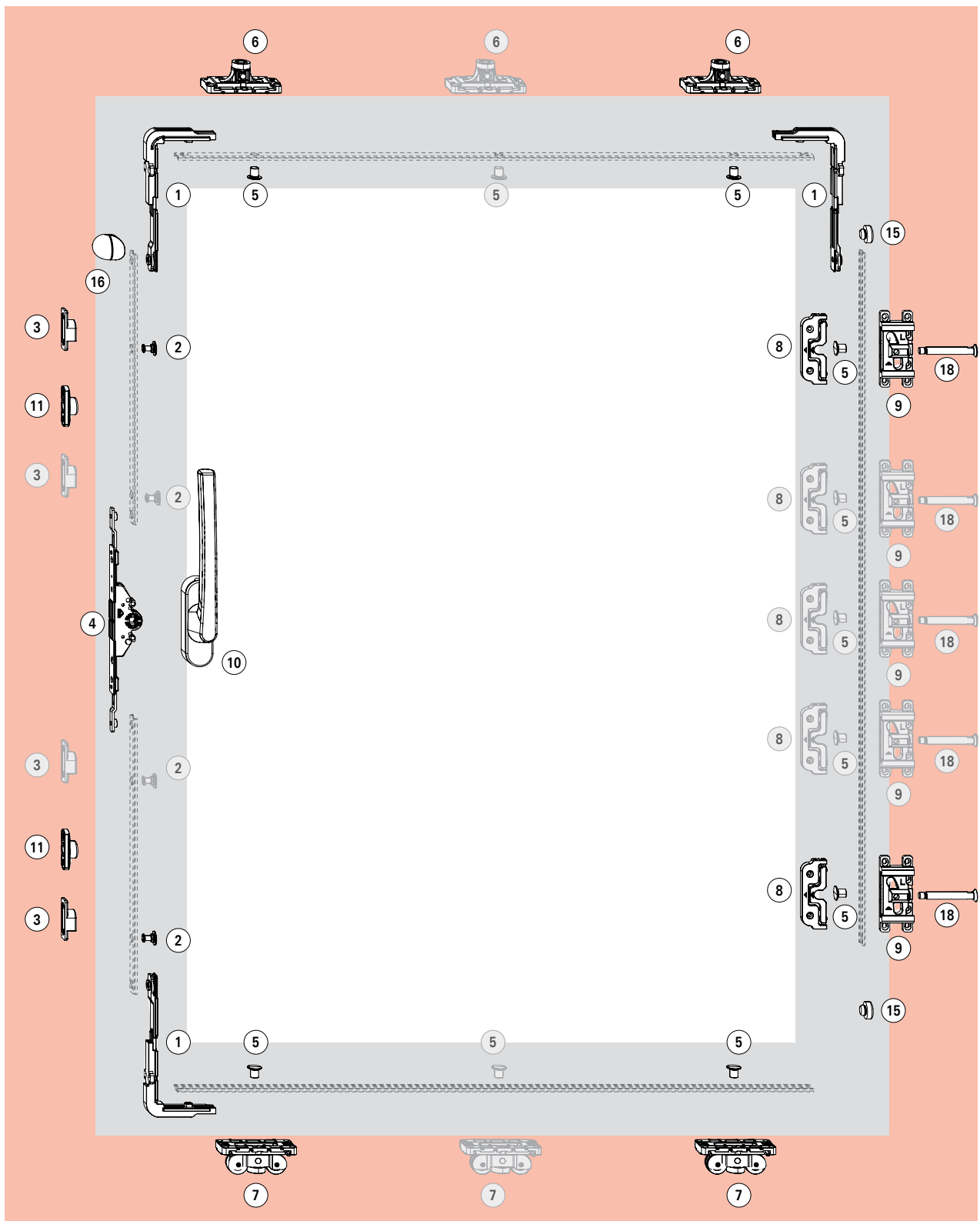
24 - September 2016 - IMO\_282\_EN\_v5 Roto Patio Inowa for aluminium profiles Subject to change.

**Hardware overview**  
Diagram A/ Diagram A'  
Parts list

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

Position	Component	Part number	Material	Part number	Material
1	Control unit	82001	Al	82001	Al
2	Control unit	82002	Al	82002	Al
3	Control unit	82003	Al	82003	Al
4	Control unit	82004	Al	82004	Al
5	Control unit	82005	Al	82005	Al
6	Control unit	82006	Al	82006	Al
7	Control unit	82007	Al	82007	Al
8	Control unit	82008	Al	82008	Al
9	Control unit	82009	Al	82009	Al
10	Control unit	82010	Al	82010	Al
11	Control unit	82011	Al	82011	Al
12	Control unit	82012	Al	82012	Al
13	Control unit	82013	Al	82013	Al
14	Control unit	82014	Al	82014	Al
15	Control unit	82015	Al	82015	Al
16	Control unit	82016	Al	82016	Al
17	Control unit	82017	Al	82017	Al
18	Control unit	82018	Al	82018	Al
19	Control unit	82019	Al	82019	Al
20	Control unit	82020	Al	82020	Al
21	Control unit	82021	Al	82021	Al
22	Control unit	82022	Al	82022	Al
23	Control unit	82023	Al	82023	Al
24	Control unit	82024	Al	82024	Al
25	Control unit	82025	Al	82025	Al
26	Control unit	82026	Al	82026	Al
27	Control unit	82027	Al	82027	Al
28	Control unit	82028	Al	82028	Al
29	Control unit	82029	Al	82029	Al
30	Control unit	82030	Al	82030	Al
31	Control unit	82031	Al	82031	Al
32	Control unit	82032	Al	82032	Al
33	Control unit	82033	Al	82033	Al
34	Control unit	82034	Al	82034	Al
35	Control unit	82035	Al	82035	Al
36	Control unit	82036	Al	82036	Al
37	Control unit	82037	Al	82037	Al
38	Control unit	82038	Al	82038	Al
39	Control unit	82039	Al	82039	Al
40	Control unit	82040	Al	82040	Al
41	Control unit	82041	Al	82041	Al
42	Control unit	82042	Al	82042	Al
43	Control unit	82043	Al	82043	Al
44	Control unit	82044	Al	82044	Al
45	Control unit	82045	Al	82045	Al
46	Control unit	82046	Al	82046	Al
47	Control unit	82047	Al	82047	Al
48	Control unit	82048	Al	82048	Al
49	Control unit	82049	Al	82049	Al
50	Control unit	82050	Al	82050	Al
51	Control unit	82051	Al	82051	Al
52	Control unit	82052	Al	82052	Al
53	Control unit	82053	Al	82053	Al
54	Control unit	82054	Al	82054	Al
55	Control unit	82055	Al	82055	Al
56	Control unit	82056	Al	82056	Al
57	Control unit	82057	Al	82057	Al
58	Control unit	82058	Al	82058	Al
59	Control unit	82059	Al	82059	Al
60	Control unit	82060	Al	82060	Al
61	Control unit	82061	Al	82061	Al
62	Control unit	82062	Al	82062	Al
63	Control unit	82063	Al	82063	Al
64	Control unit	82064	Al	82064	Al
65	Control unit	82065	Al	82065	Al
66	Control unit	82066	Al	82066	Al
67	Control unit	82067	Al	82067	Al
68	Control unit	82068	Al	82068	Al
69	Control unit	82069	Al	82069	Al
70	Control unit	82070	Al	82070	Al
71	Control unit	82071	Al	82071	Al
72	Control unit	82072	Al	82072	Al
73	Control unit	82073	Al	82073	Al
74	Control unit	82074	Al	82074	Al
75	Control unit	82075	Al	82075	Al
76	Control unit	82076	Al	82076	Al
77	Control unit	82077	Al	82077	Al
78	Control unit	82078	Al	82078	Al
79	Control unit	82079	Al	82079	Al
80	Control unit	82080	Al	82080	Al
81	Control unit	82081	Al	82081	Al
82	Control unit	82082	Al	82082	Al
83	Control unit	82083	Al	82083	Al
84	Control unit	82084	Al	82084	Al
85	Control unit	82085	Al	82085	Al
86	Control unit	82086	Al	82086	Al
87	Control unit	82087	Al	82087	Al
88	Control unit	82088	Al	82088	Al
89	Control unit	82089	Al	82089	Al
90	Control unit	82090	Al	82090	Al
91	Control unit	82091	Al	82091	Al
92	Control unit	82092	Al	82092	Al
93	Control unit	82093	Al	82093	Al
94	Control unit	82094	Al	82094	Al
95	Control unit	82095	Al	82095	Al
96	Control unit	82096	Al	82096	Al
97	Control unit	82097	Al	82097	Al
98	Control unit	82098	Al	82098	Al
99	Control unit	82099	Al	82099	Al
100	Control unit	82100	Al	82100	Al
101	Control unit	82101	Al	82101	Al
102	Control unit	82102	Al	82102	Al
103	Control unit	82103	Al	82103	Al
104	Control unit	82104	Al	82104	Al
105	Control unit	82105	Al	82105	Al
106	Control unit	82106	Al	82106	Al
107	Control unit	82107	Al	82107	Al
108	Control unit	82108	Al	82108	Al
109	Control unit	82109	Al	82109	Al
110	Control unit	82110	Al	82110	Al
111	Control unit	82111	Al	82111	Al
112	Control unit	82112	Al	82112	Al
113	Control unit	82113	Al	82113	Al
114	Control unit	82114	Al	82114	Al
115	Control unit	82115	Al	82115	Al
116	Control unit	82116	Al	82116	Al
117	Control unit	82117	Al	82117	Al
118	Control unit	82118	Al	82118	Al
119	Control unit	82119	Al	82119	Al
120	Control unit	82120	Al	82120	Al
121	Control unit	82121	Al	82121	Al
122	Control unit	82122	Al	82122	Al
123	Control unit	82123	Al	82123	Al
124	Control unit	82124	Al	82124	Al
125	Control unit	82125	Al	82125	Al
126	Control unit	82126	Al	82126	Al
127	Control unit	82127	Al	82127	Al
128	Control unit	82128	Al	82128	Al
129	Control unit	82129	Al	82129	Al
130	Control unit	82130	Al	82130	Al
131	Control unit	82131	Al	82131	Al
132	Control unit	82132	Al	82132	Al
133	Control unit	82133	Al	82133	Al
134	Control unit	82134	Al	82134	Al
135	Control unit	82135	Al	82135	Al
136	Control unit	82136	Al	82136	Al
137	Control unit	82137	Al	82137	Al
138	Control unit	82138	Al	82138	Al
139	Control unit	82139	Al	82139	Al
140	Control unit	82140	Al	82140	Al
141	Control unit	82141	Al	82141	Al
142	Control unit	82142	Al	82142	Al
143	Control unit	82143	Al	82143	Al
144	Control unit	82144	Al	82144	Al
145	Control unit	82145	Al	82145	Al
146	Control unit	82146	Al	82146	Al
147	Control unit	82147	Al	82147	Al
148	Control unit	82148	Al	82148	Al
149	Control unit	82149	Al	82149	Al
150	Control unit	82150	Al	82150	Al
151	Control unit	82151	Al	82151	Al
152	Control unit	82152	Al	82152	Al
153	Control unit	82153	Al	82153	Al
154	Control unit	82154	Al	82154	Al
155	Control unit	82155	Al	82155	Al
156	Control unit	82156	Al	82156	Al
157	Control unit	82157	Al	82157	Al
158	Control unit	82158	Al	82158	Al
159	Control unit	82159	Al	82159	Al
160	Control unit	82160	Al	82160	Al
161	Control unit	82161	Al	82161	Al
162	Control unit	82162	Al	82162	Al
163	Control unit	82163	Al	82163	Al
164	Control unit	82164	Al	82164	Al
165	Control unit	82165	Al	82165	Al
166	Control unit	82166	Al	82166	Al
167	Control unit	82167	Al	82167	Al
168	Control unit	82168	Al	82168	Al
169	Control unit	82169	Al	82169	Al
170	Control unit	82170	Al	82170	Al
171	Control unit	82171	Al	82171	Al
172	Control unit	82172	Al	82172	Al
173	Control unit	82173	Al	82173	Al
174	Control unit	82174	Al	82174	Al
175	Control unit	82175	Al	82175	Al
176	Control unit	82176	Al	82176	Al
177	Control unit	82177	Al	82177	Al
178	Control unit	82178	Al	82178	Al
179	Control unit	82179	Al	82179	Al
180	Control unit	82180	Al	82180	Al
181	Control unit	82181	Al	82181	Al
182	Control unit	82182	Al	82182	Al
183	Control unit	82183	Al	82183	Al
184	Control unit	82184	Al	82184	Al
185	Control unit	82185	Al	82185	Al
186	Control unit	82186	Al	82186	Al
187	Control unit	82187	Al	82187	Al
188	Control unit	82188	Al	82188	Al
189	Control unit	82189	Al	82189	Al
190	Control unit	82190	Al	82190	Al
191	Control unit	82191	Al	82191	Al
192	Control unit	82192	Al	82192	Al
193	Control unit	82193	Al	82193	Al
194	Control unit	82194	Al	82194	Al
195	Control unit	82195	Al	82195	Al
196	Control unit	82196	Al	82196	Al
197	Control unit	82197	Al	82197	Al
198	Control unit	82198	Al	82198	Al

**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	<b>Bogie<sup>1)</sup></b>	41	10	L	50 <b>635296</b>
			41	10	R	50 <b>635301</b>
			51	10	L	50 <b>763674</b>
			51	10	R	50 <b>763685</b>
⑥	2	<b>Control unit<sup>2)</sup></b>	41	10	L	50 <b>635302</b>
			41	10	R	50 <b>635303</b>
			51	10	L	50 <b>763686</b>
			51	10	R	50 <b>763685</b>
⑨	2	<b>Centre-closer</b>	41	10	L	50 <b>635305</b>
			41	10	R	50 <b>635306</b>
			51	10	L	50 <b>763688</b>
			51	10	R	50 <b>763689</b>
①	3	<b>Corner drive</b>			L/R	50 <b>776328</b>
⑧	2	<b>Centre-closer striker</b>			L/R	100 <b>732103</b>
⑤		<b>Control cam</b>	13		L/R	50 <b>639932</b>
			14		L/R	50 <b>776402</b>
⑪	2	<b>Stop A/C</b>	14		L/R	100 <b>635307</b>
			16.5		L/R	100 <b>757701</b>
			17.5		L/R	100 <b>757587</b>
②		<b>SEC locking cam</b>	12.8		L/R	50 <b>639931</b>
			15.5		L/R	50 <b>757585</b>
③		<b>SEC striker</b>	12.5		L/R	100 <b>482260</b>
			14.4		L/R	100 <b>744684</b>
⑱		<b>Locking cam centre-closer</b>	21.9		L/R	100 <b>757586</b>
			24.6		L/R	100 <b>775929</b>
			34.4		L/R	100 <b>771375</b>

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

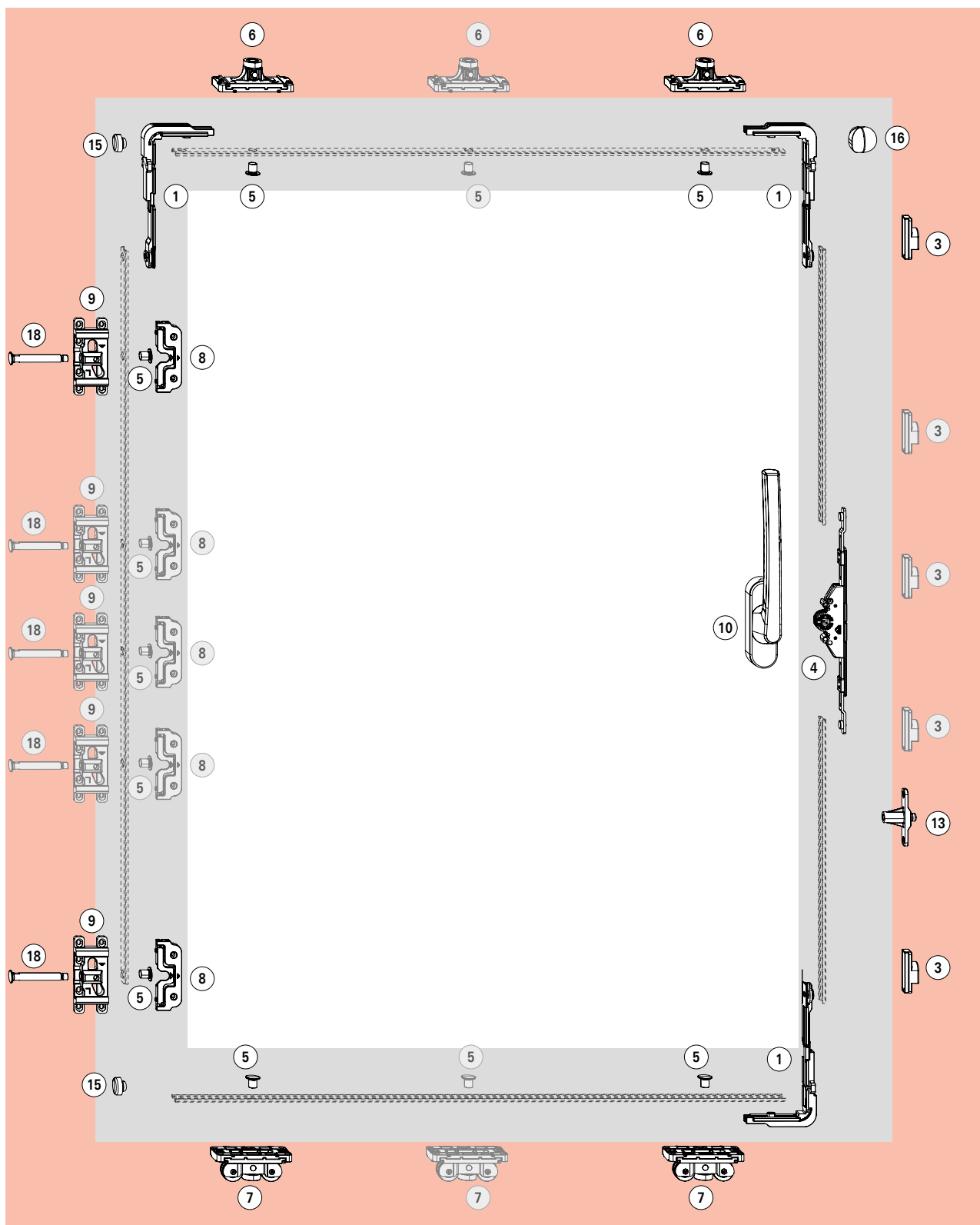
Handles			
	Pc.	Designation	DIN Material no.
⑩	1	<b>Handles</b>	L/R → p. 30 → CTL_1

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

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

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.



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

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

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

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

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

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.

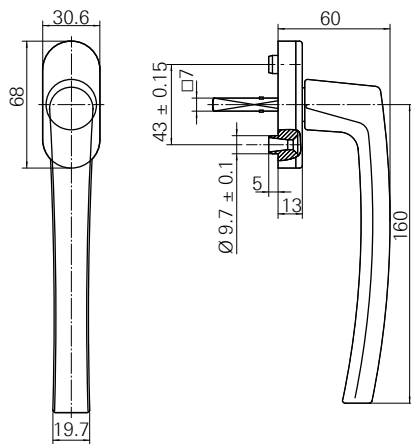




Profile system	Bogie Control unit Centre-closer L/R	Locking cam centre-closer	Control cam	SEC locking cam	SEC striker	Buffer	Stop	Espagnolette
	Size	Size	Size	Size	Size	Size	Size	Backset
<b>Feal</b>								
	51	34.4	14	15.5	14.4	17.5	16.5	35
<b>Extal</b>								
	41	21.9	13	15.5	14.4	16.5	16.5	30
<b>Extrugasa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

## Handles

Roto Line / Patio Alversa



### Parts list

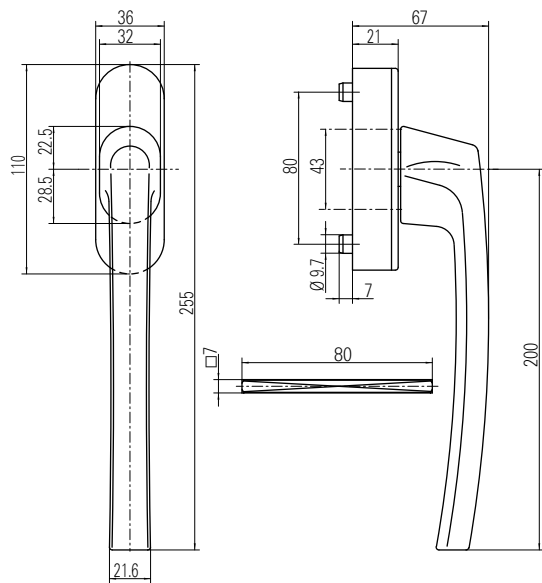
Colour



Nº

### 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

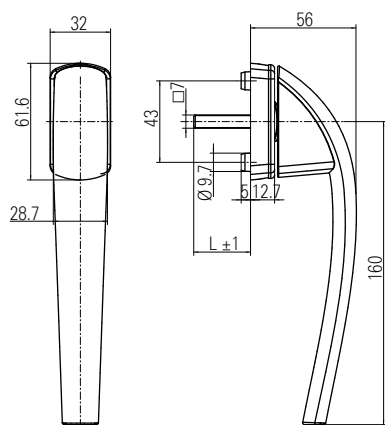
## Colour



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



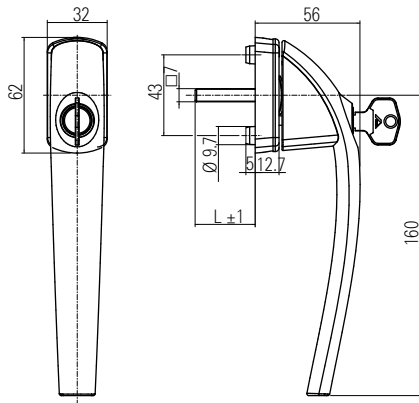
### Parts list

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



Nº

#### 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

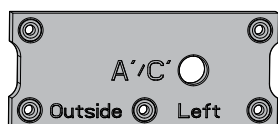
Silver	R01.1		-	40		15	619736
Medium bronze	R05.3		-	40		15	619737
Traffic white	R07.2		-	40		15	619738

#### Spindle length 43

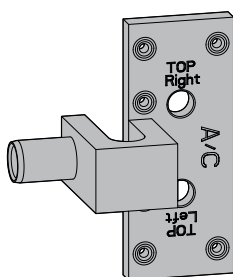
Silver	R01.1		-	43		15	619739
Medium bronze	R05.3		-	43		15	619740
Traffic white	R07.2		-	43		15	619741

**Drilling jig bogie/control unit diagram A/C**

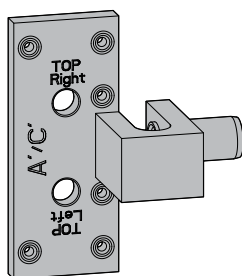
Designation	Size	Cam	DIN	Material no.
<b>Drilling jig</b>	41	10	L/R	<b>635308</b>
	51	10	L/R	<b>763691</b>

**Drilling jig bogie/control unit diagram A' / C'**

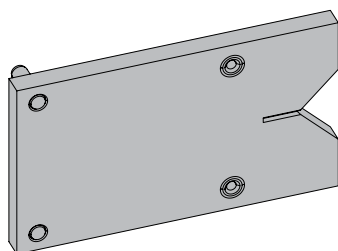
Designation	Size	Cam	DIN	Material no.
<b>Drilling jig</b>	41	10	L/R	<b>635309</b>

**Drilling jig centre-closer diagram A/C**

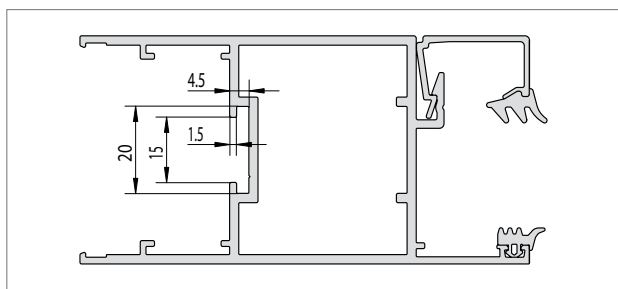
Designation	Size	Cam	DIN	Material no.
<b>Drilling jig</b>	41	10	L/R	<b>635310</b>
	51	10	L/R	<b>763690</b>

**Drilling jig centre-closer diagram A' / C'**

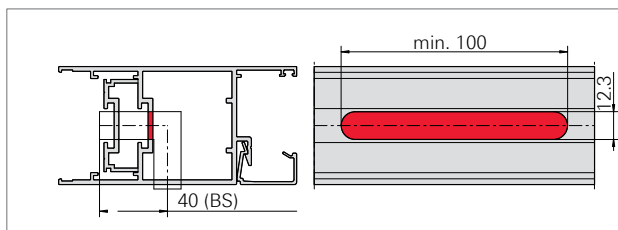
Designation	Size	Cam	DIN	Material no.
<b>Drilling jig</b>	41	10	L/R	<b>635311</b>

**Drilling jig centre-closer striker**

Designation	DIN	Material no.
<b>Drilling jig</b>	L/R	<b>732113</b>

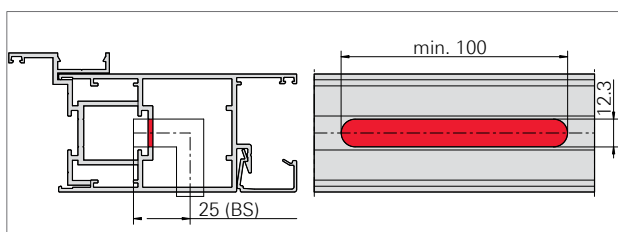


**Sash profile cross section: Dimensional data for hardware**

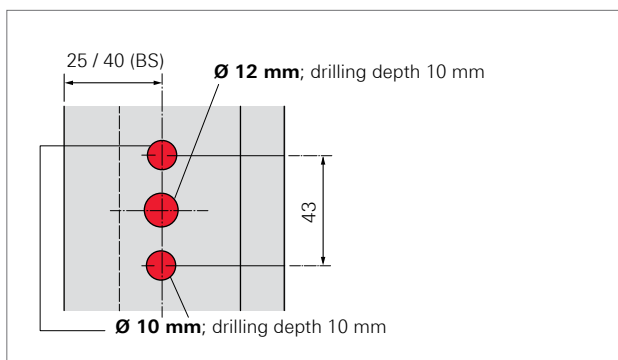


### Routing dimensions

Espagnolette gear-casing diagram A / A'

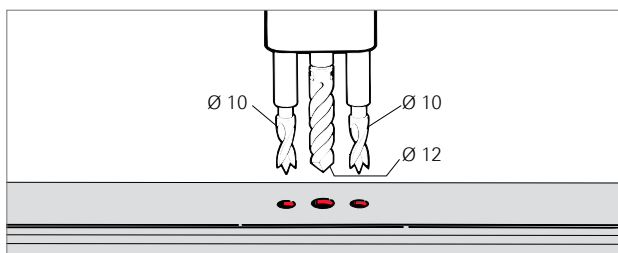


Espagnolette gear-casing diagram C / C'



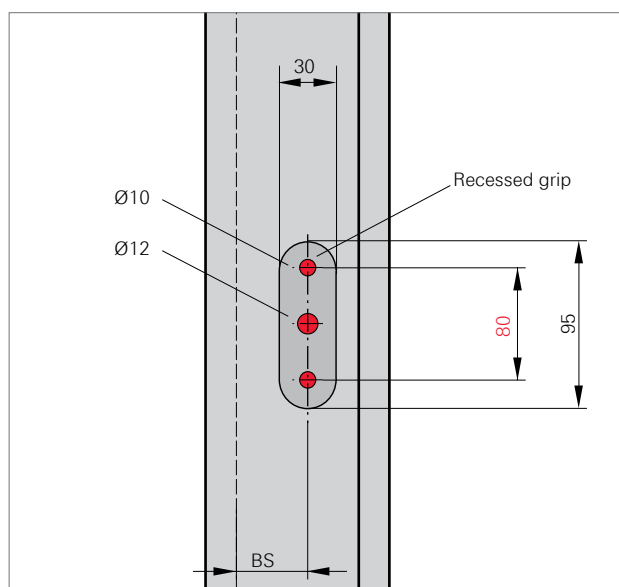
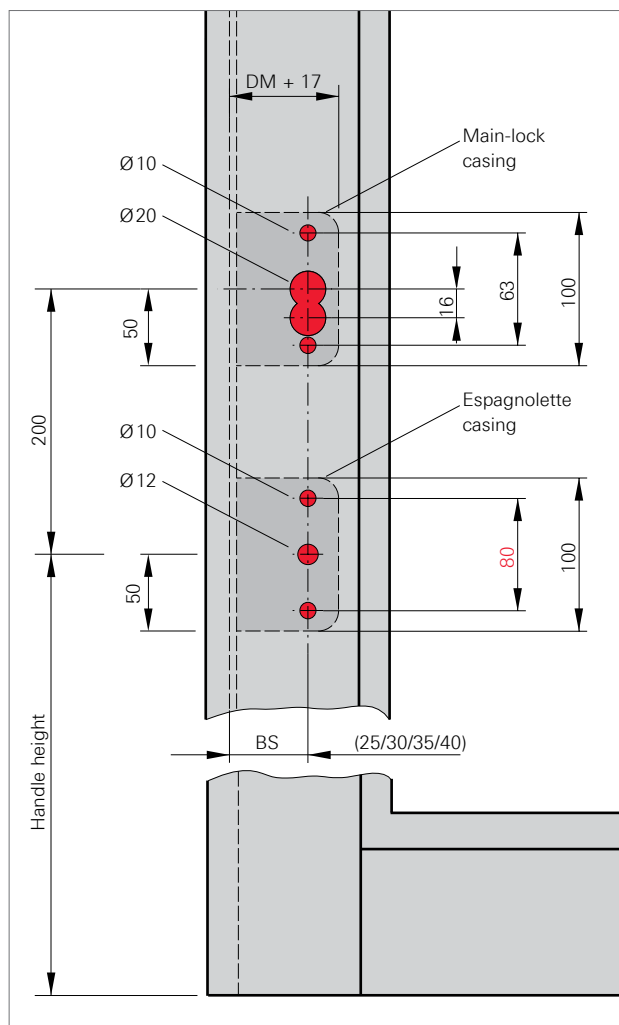
### Espagnolette

Drill the holes for spindle and lugs of the handle.



## Drilling and routing dimensions

Espagnolette / lockable espagnolette / recessed grip



### 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).

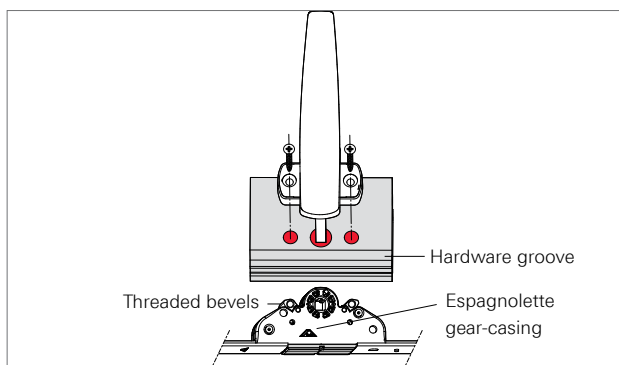
### Recessed grip Patio Lift (oval)

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

## NOTE

Example: Recessed grip **80**, depth 8 mm.



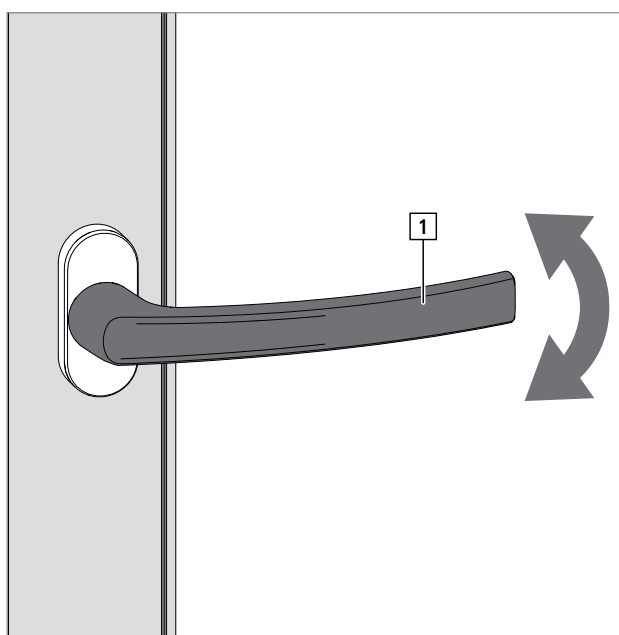


#### Installing the handle

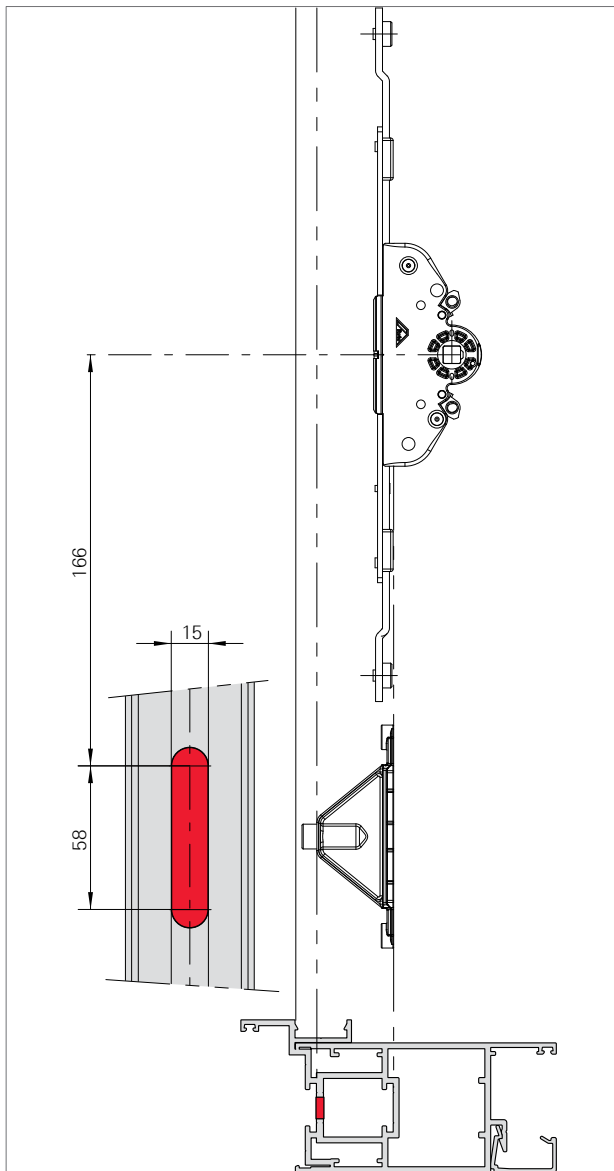
Screw-fix the window handle in the main-lock casing with DIN 965 M5 x ... countersunk screws

#### Undo the centre-fixing.

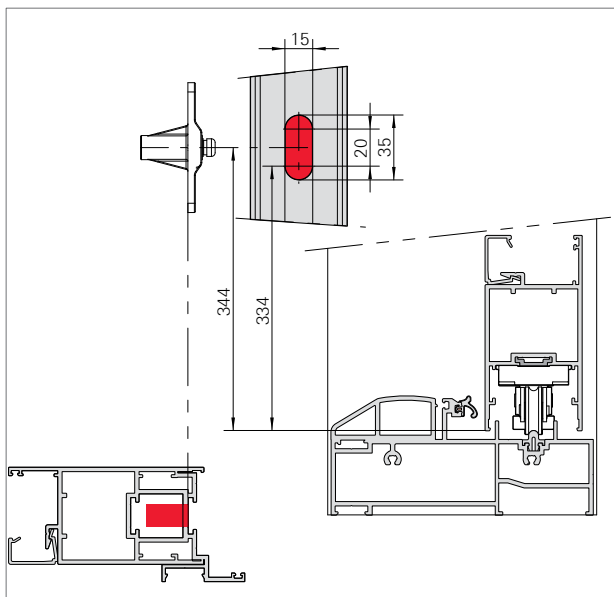
Turning the handle loosens the centre-fixing of the hardware components. Audible cracking noise.



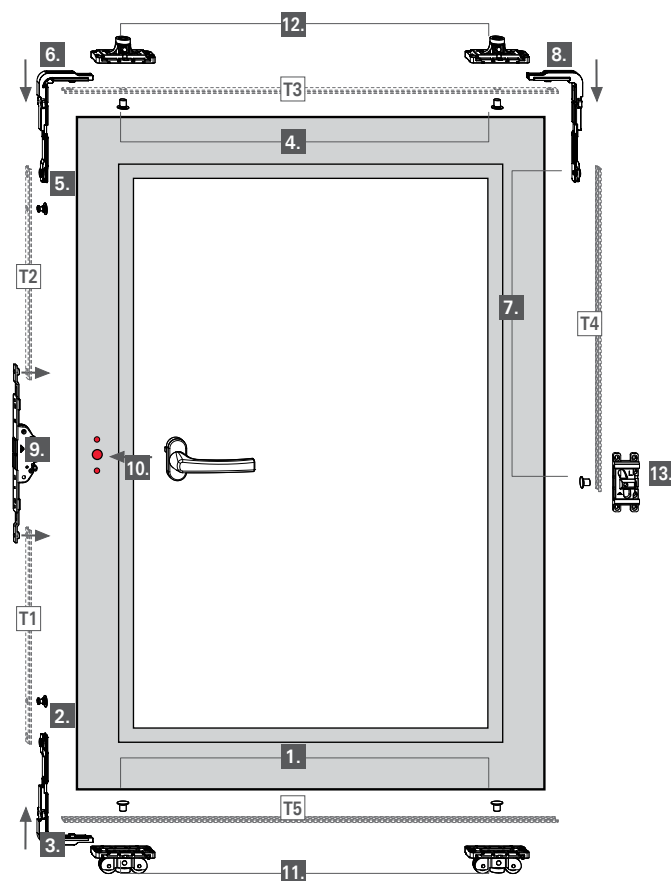
1. Handle [1] is in sliding position.
2. Turn the handle in one direction up to the stop.  
Audible cracking noise.
3. Turn the handle in opposite direction up to the stop.  
Audible cracking noise.
4. Turn the handle again in both directions and check for ease of movement.



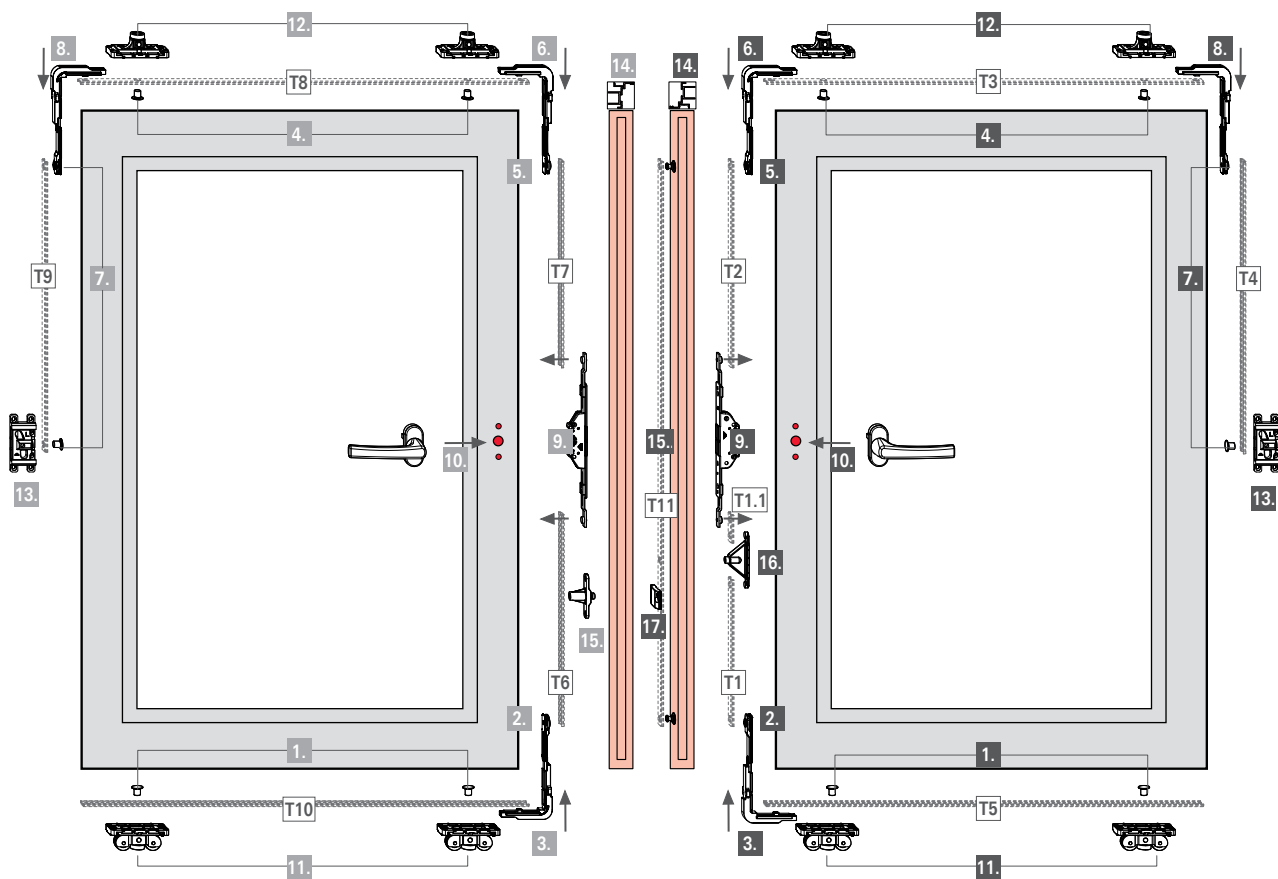
Mill elongated hole for coupling.



Mill elongated hole for mishandling device.

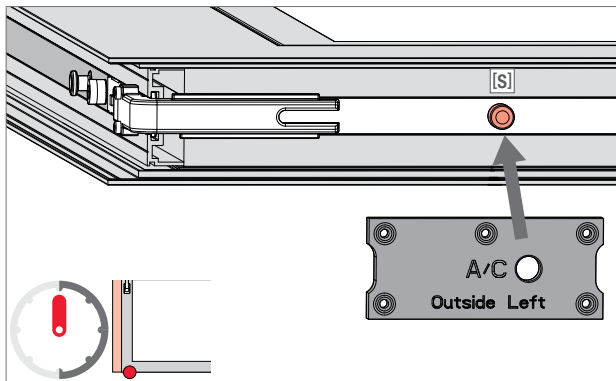


1. Put the control cam into the connecting-rod **T5** and insert connecting-rod into the lower hardware groove.
2. Put the SEC locking cam and the corner drive into the connecting-rod **T1**.
3. Insert connecting-rod **T1**, SEC locking cam, and corner drive from the bottom into the hardware groove. 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.

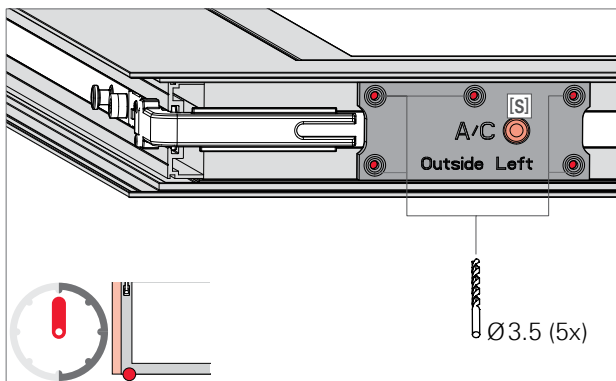




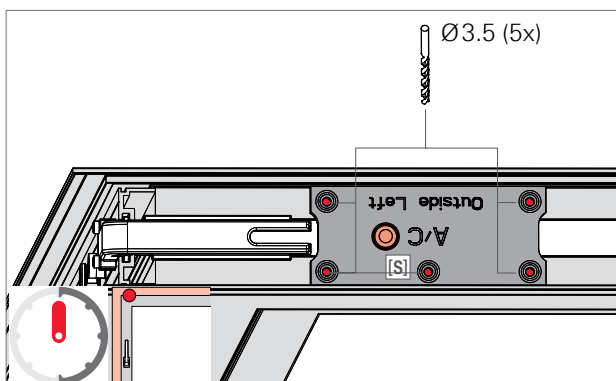
1. Put the control cam into the connecting-rod **T10** and insert connecting-rod into the lower hardware groove.
  2. Put the corner drive into the connecting-rod **T6**.
  3. Insert connecting-rod **T6** and corner drive from beneath into the hardware groove. Mount the horizontal connector cam of the 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.



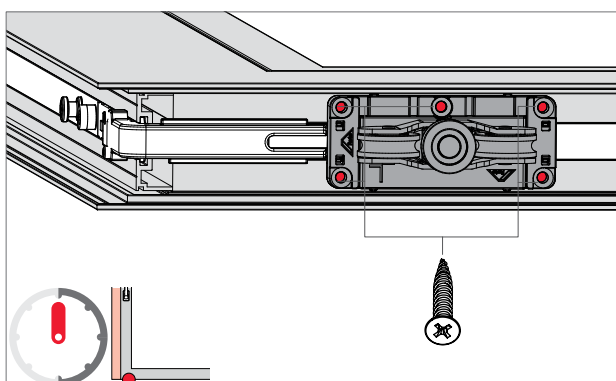
1. Insert the drilling jig of diagram A/C into that cam [S], which controls the bogie/control unit.



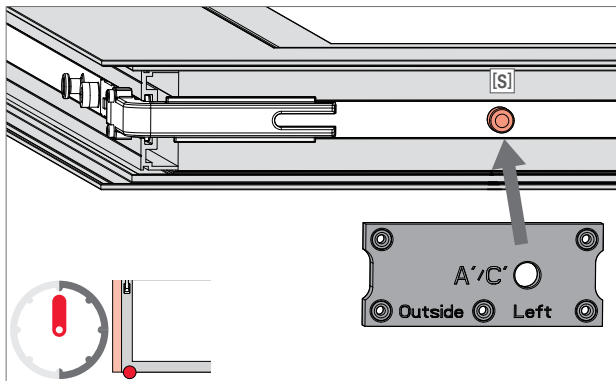
2. Drill the holes.  
Each bogie / control unit: Ø3.5 (5x)



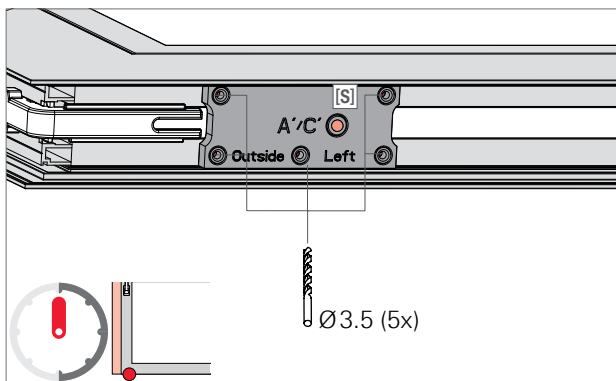
3. Insert and screw-fix bogie and control unit as shown.  
Stainless-steel screws 4.2 x ... (5x)



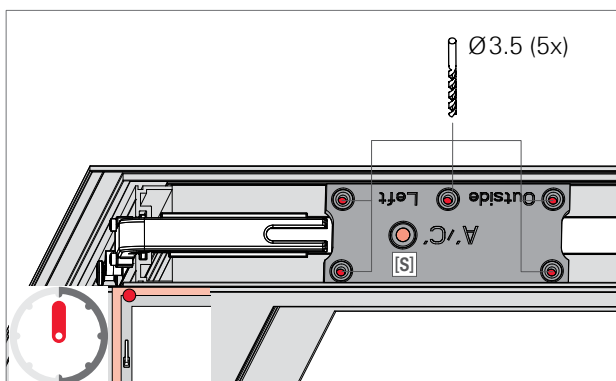
4. Undo the centre-fixing.



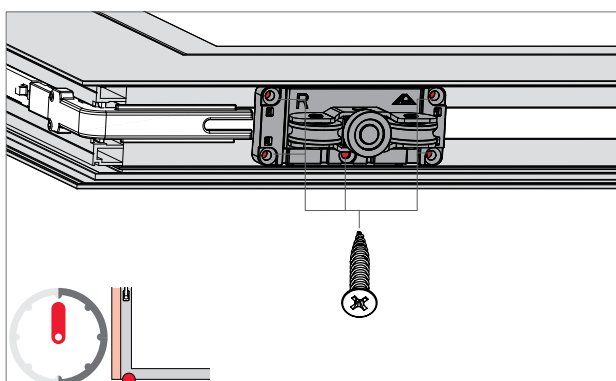
1. Insert the drilling jig of diagram A' / C' into that cam [S], which controls the bogie/control unit.



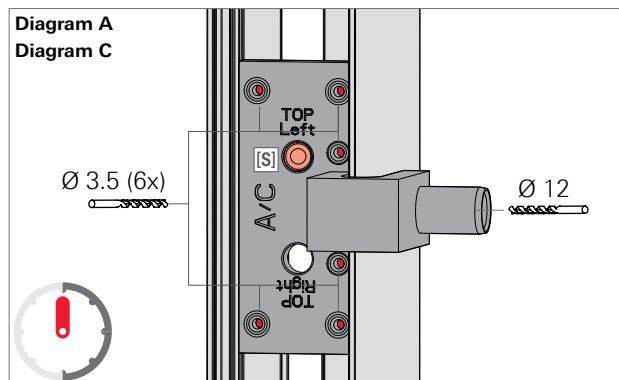
2. Drill the holes.  
Each bogie / control unit: Ø3.5 (5x)



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

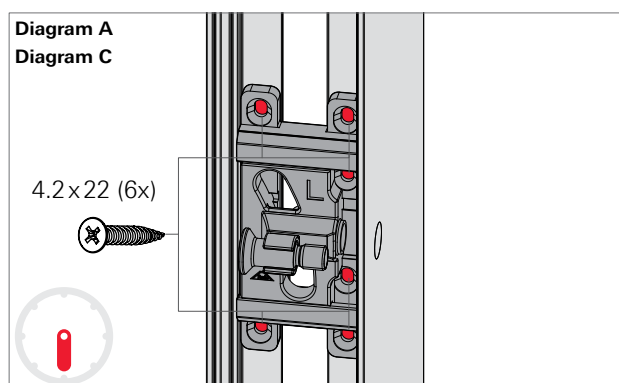


4. Undo the centre-fixing.

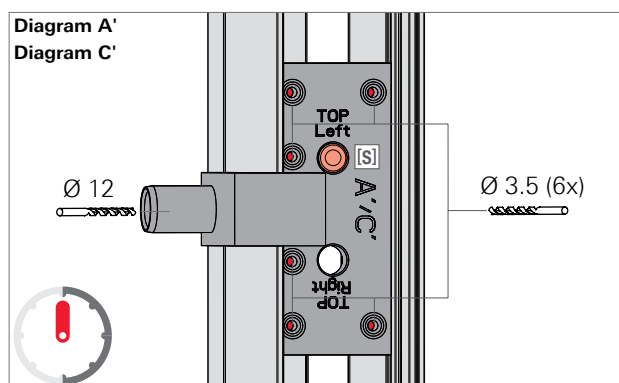


#### Diagram A/C

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)

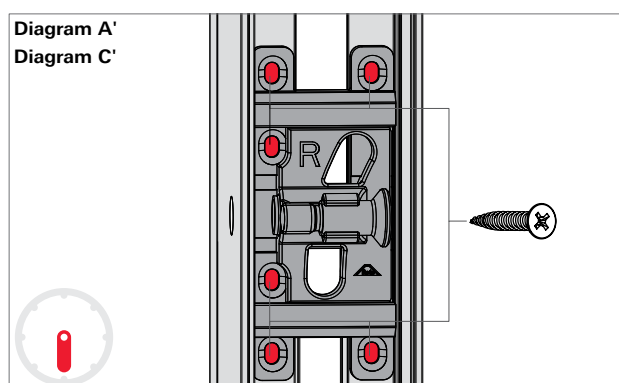


3. Insert the sash component of the centre-closer and screw-fix.  
Stainless-steel screws 4.2 x ... (6x)



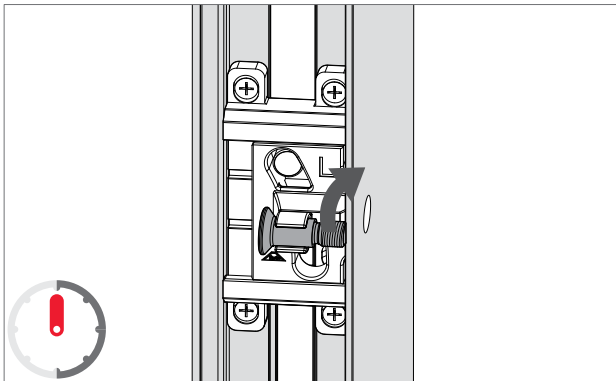
#### Diagram A' / C'

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)

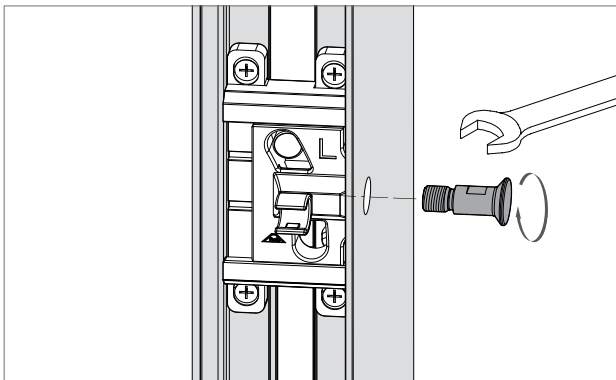


3. Insert the sash component of the centre-closer and screw-fix.  
Stainless-steel screws 4.2 x ... (6x)



**Diagram A/C**

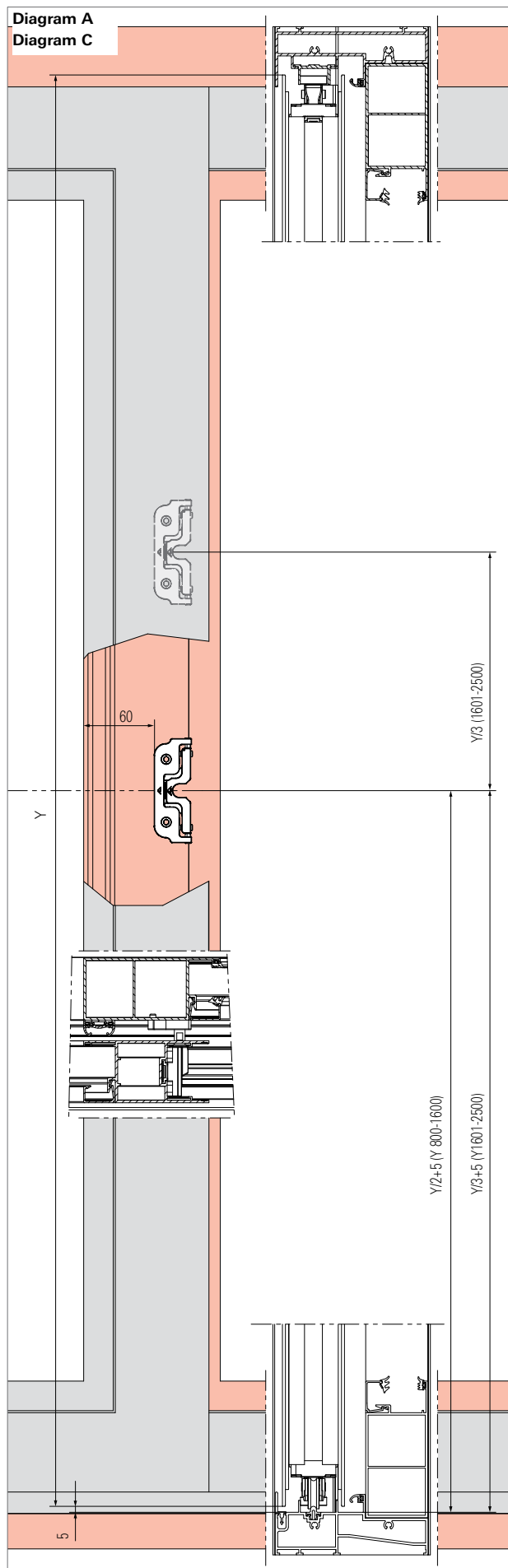
1. Release the locking cam of the centre-closer from the locking device.



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

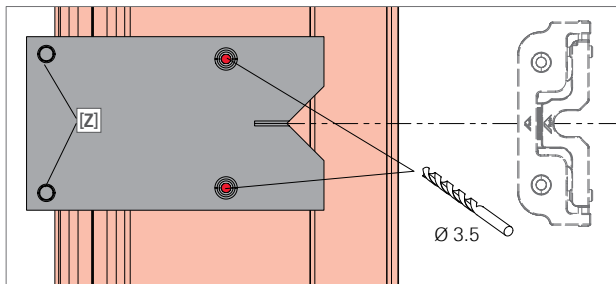
**NOTE**

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



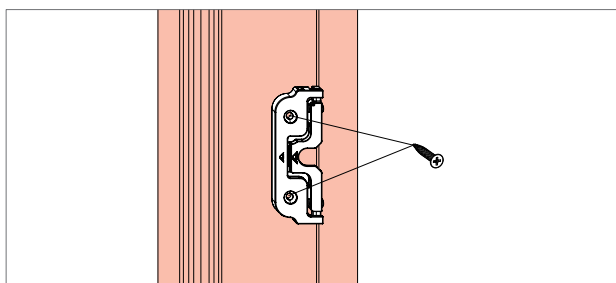
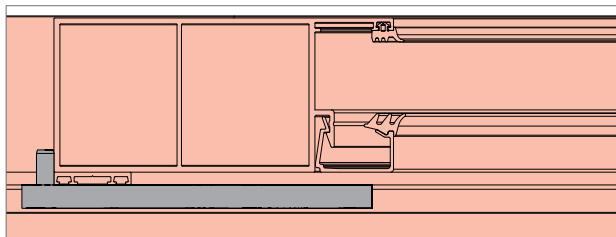
#### Version: Taking measurements

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

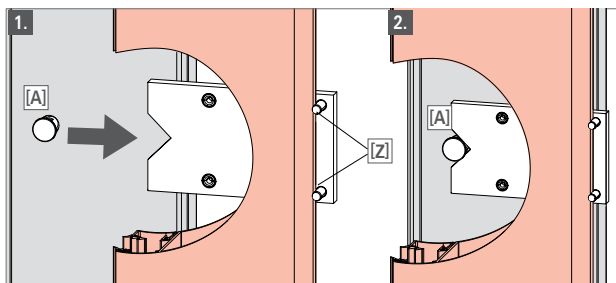


#### Version: Positioning the drilling jig at the frame profile

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)

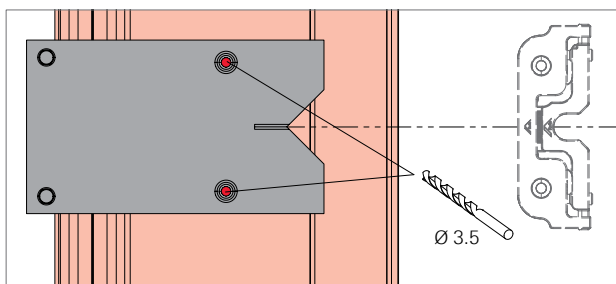


2. Insert the centre-closer striker and screw-fix. Stainless-steel screws 4.2 x 22 (6x)

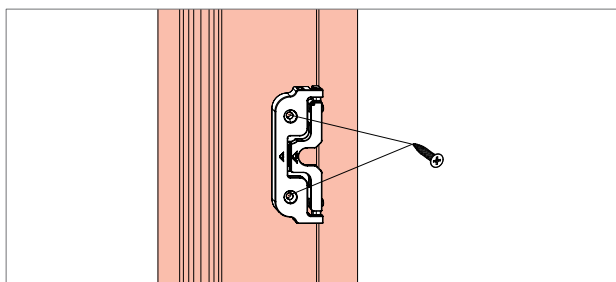


#### Version: Positioning the drilling jig V recess to cam

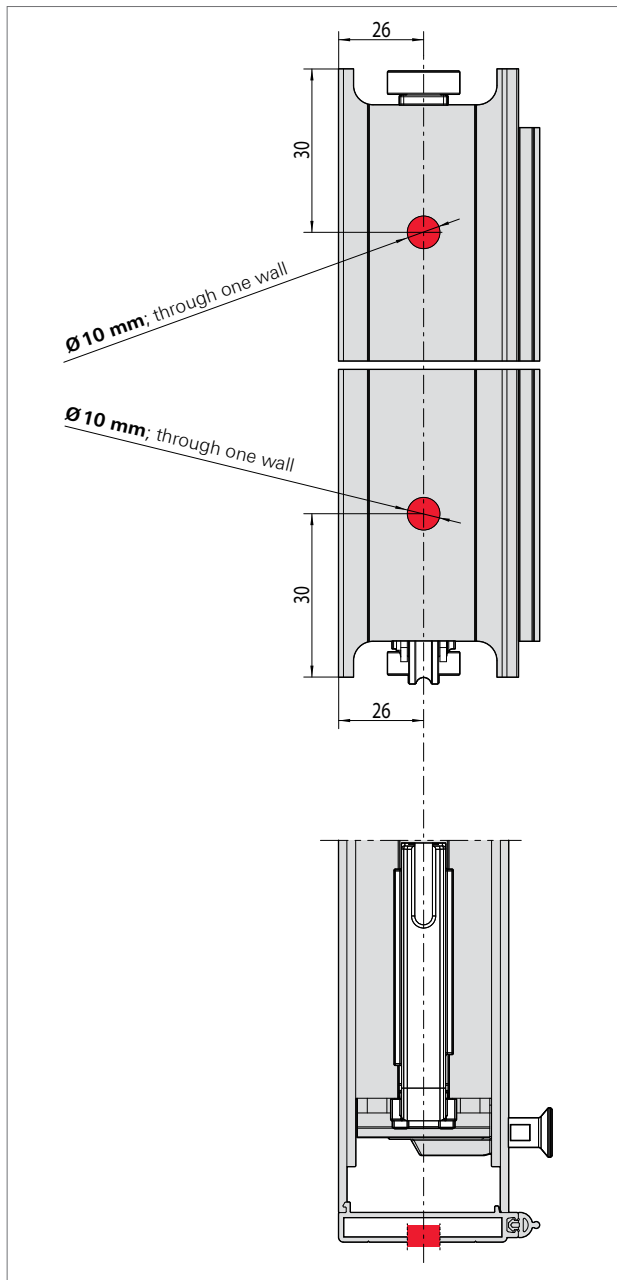
1. Position the drilling jig for the centre-closer striker at the mullion profile flush with the cams [Z] as depicted.
2. Insert the sash with cam [A] into the V recess of the drilling jig.



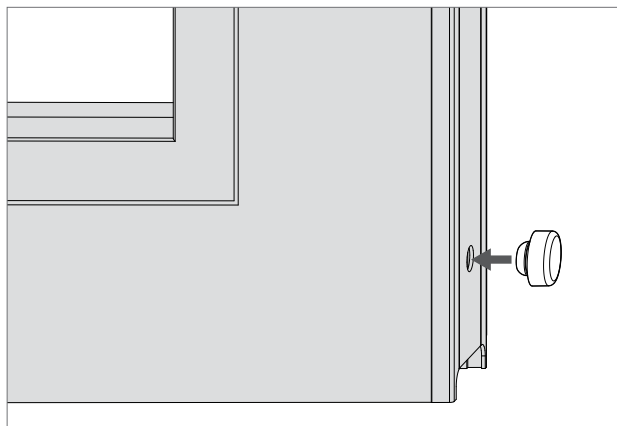
3. Drill the holes. Each centre-closer striker (frame component): Ø 3.5 (2x)



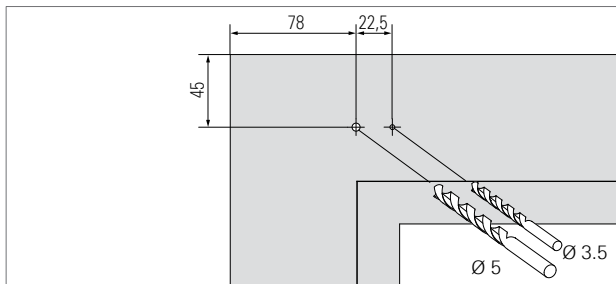
4. Insert the centre-closer striker and screw-fix. Stainless-steel screws 4.2 x 22 (6x)



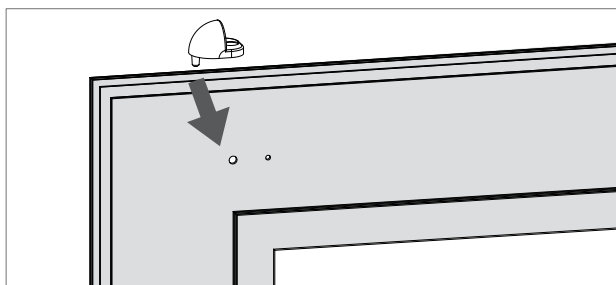
1. Drill the holes for the rubber buffers.  
Ø 10 (2x)



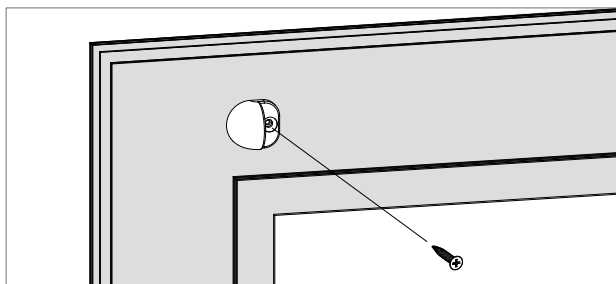
2. Insert the rubber buffers.



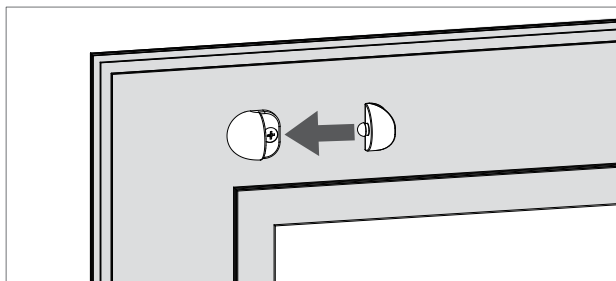
1. Drill the holes. For each stop (frame component):  
 $\varnothing 3.5$  (1x)  
 $\varnothing 5$  (1x)



2. Insert the stop component with cams into the drilling  $\varnothing 5$ .



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

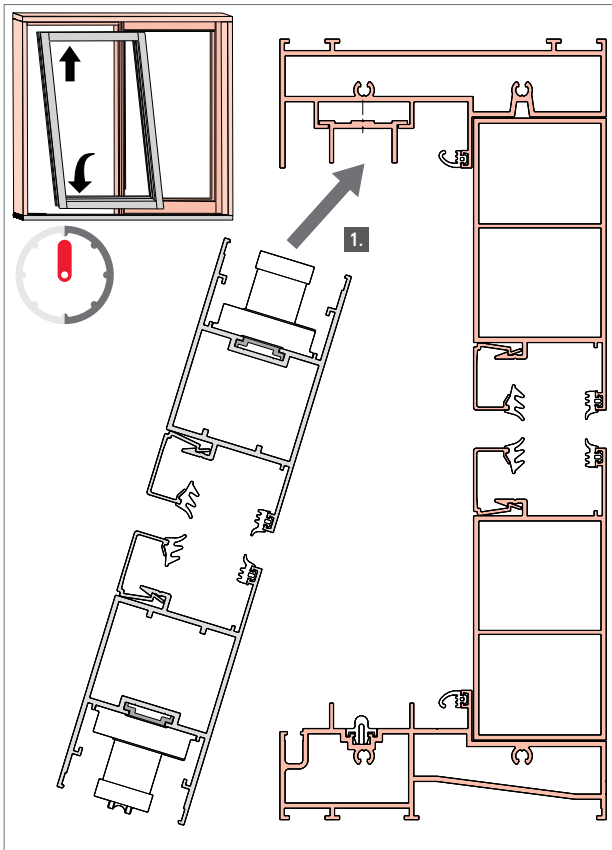


4. Slide the rubber cap onto the buffer stop.

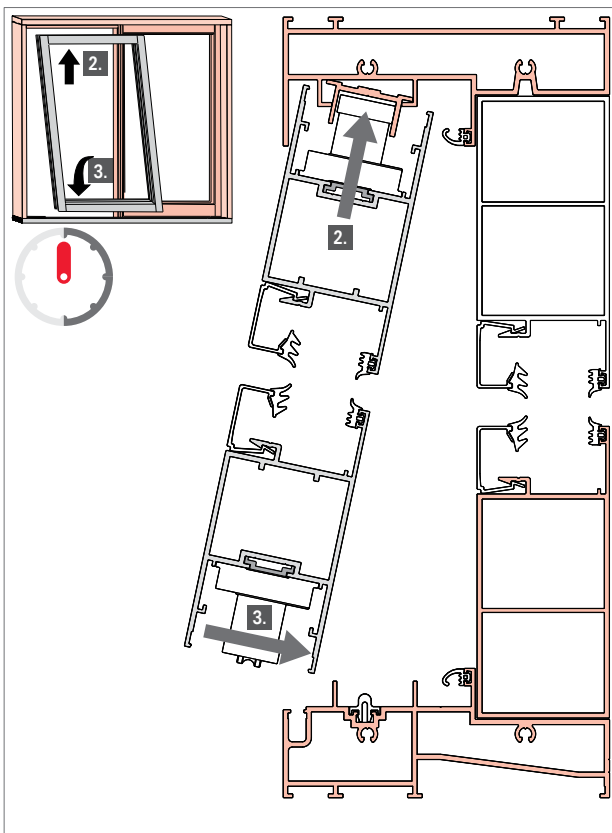
## Installation

### 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.

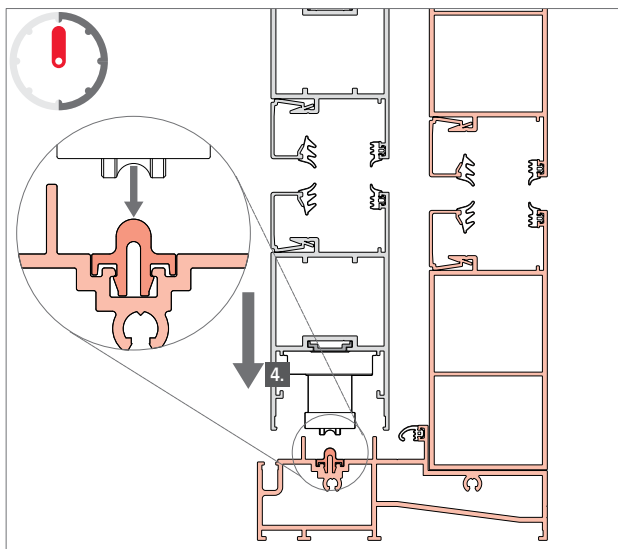


2. Swivel in the sash until it is vertical to the guide track.

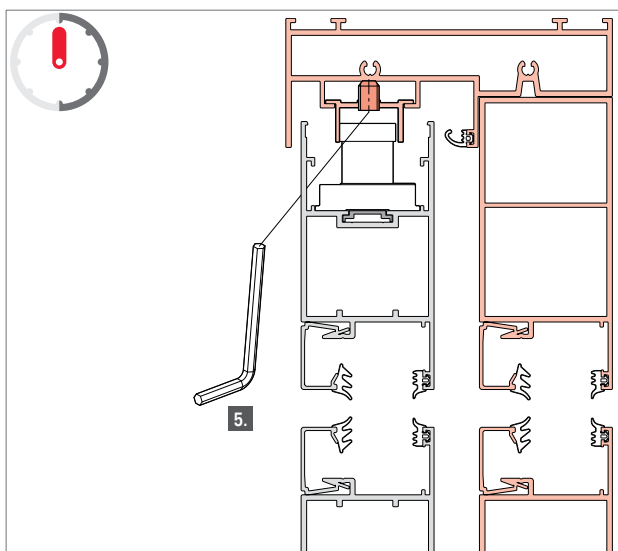


#### NOTE

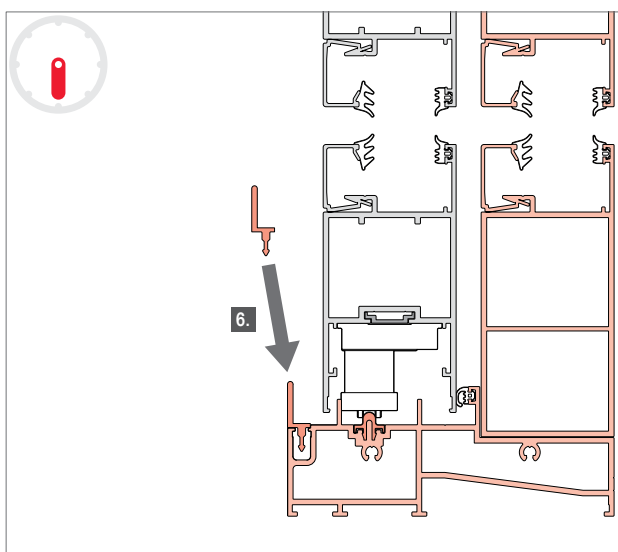
Guide tracks and roller tracks must not be painted!



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

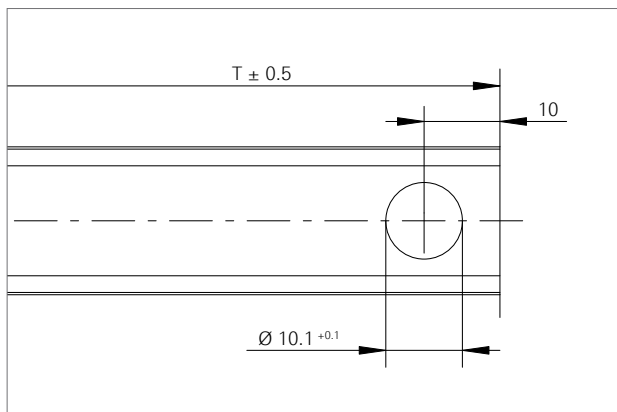


5. Bring the handle into the locked position and clip in the guard rail as shown.



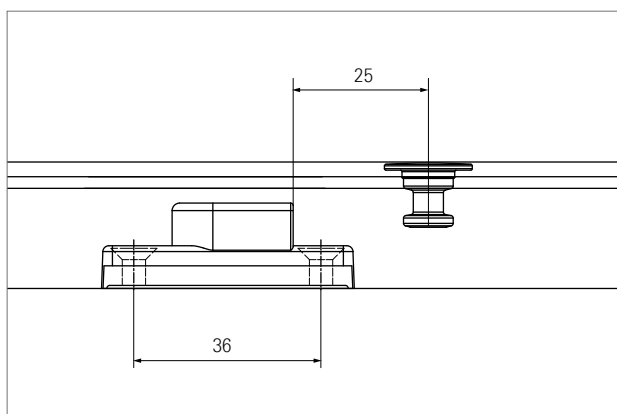
#### NOTE

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  $\pm 0.5$  mm.



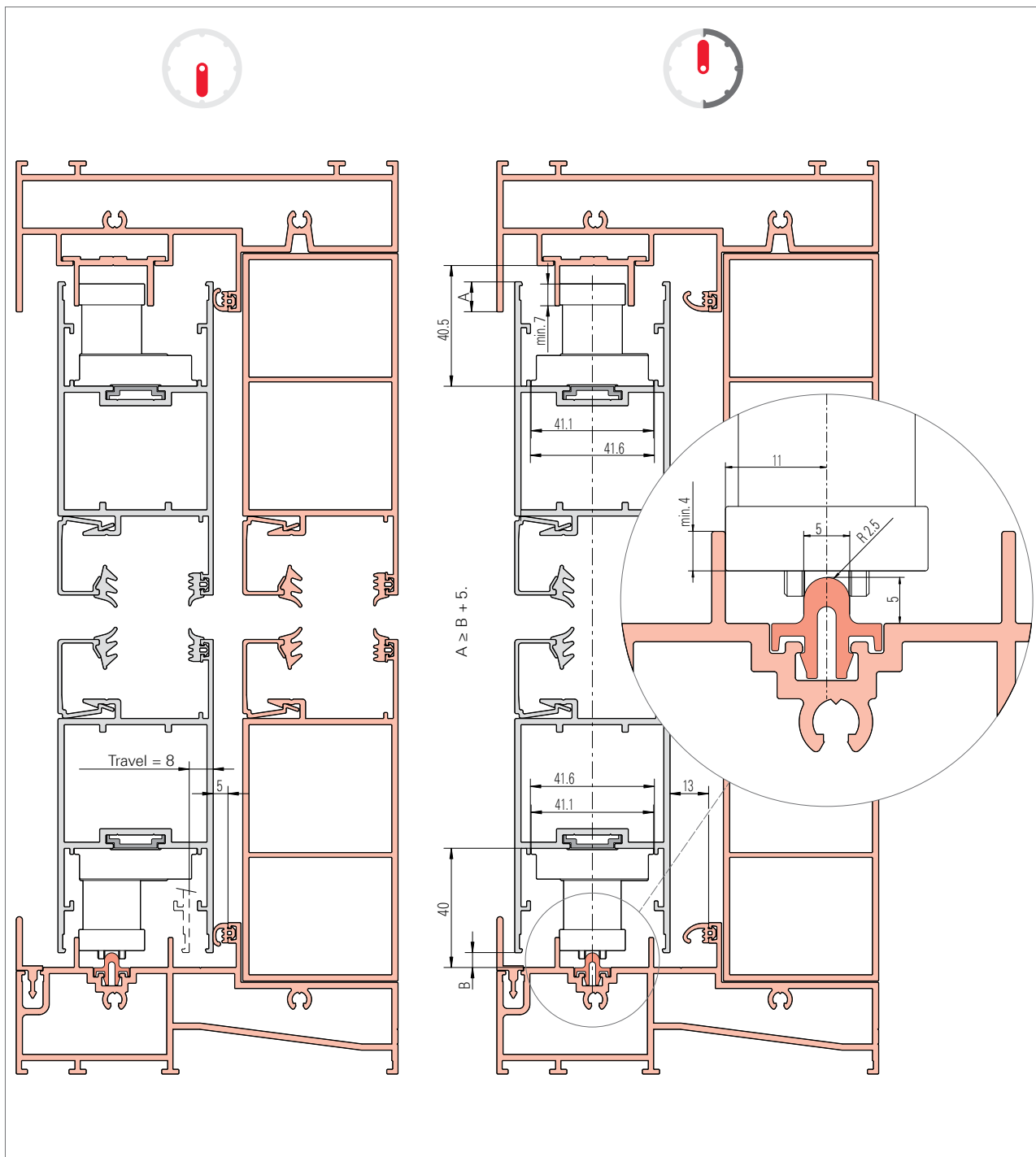
Determine the correct striker position (with respect to the locking-cam position): Striker and locking cam should have a distance of 25 mm (hardware in opening position).



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



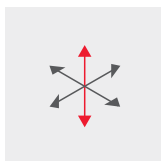
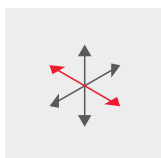
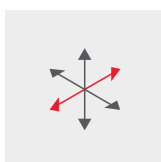
#### Note

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.

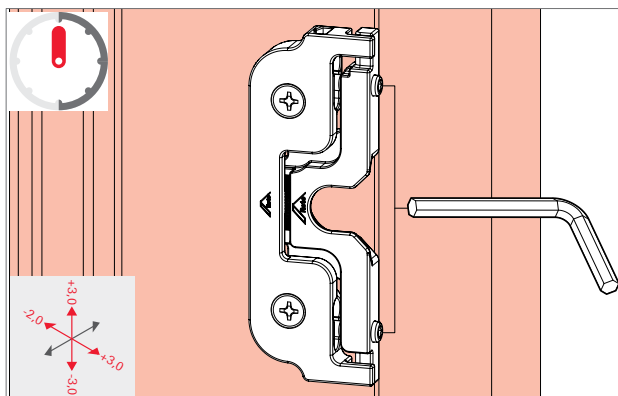


**Symbols for the sash adjustment when installed**

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.

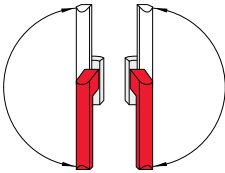


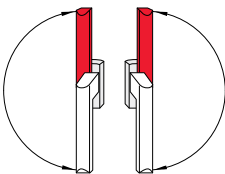
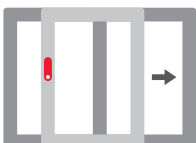

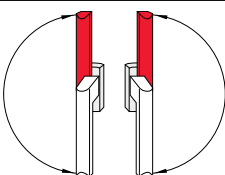
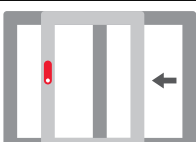

Tool: 2.5 mm hex key



#### NOTE


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

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

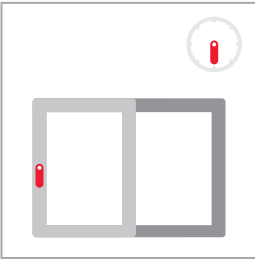


The following symbols can be used on windows and balcony doors to protect the end-user. Always keep these symbols in a clearly legible state. Please order stickers separately (OPR\_27\_DE-EN).

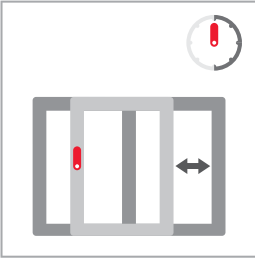


**Schiebebeschlag**  
Slide hardware

**geschlossen**  
closed



**schieben**  
slide



03/2013      OPR\_27\_DE\_v0

## Troubleshooting

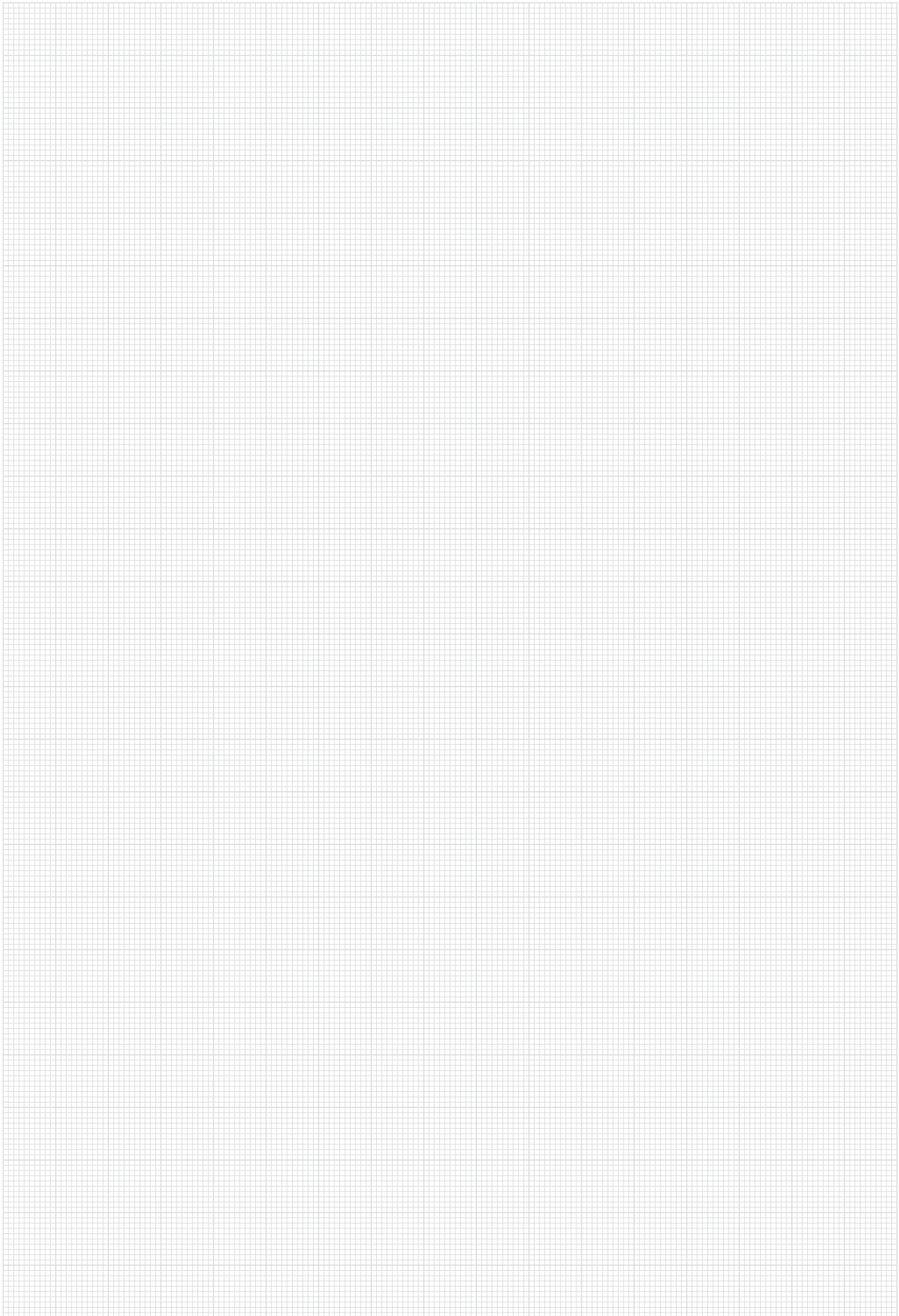
Problem	Cause	Corrective action	Specialist company	End-users
Handle is difficult to rotate.	<ul style="list-style-type: none"> <li>– Frame parts are not properly greased.</li> <li>– Faulty handle.</li> <li>– Handle screws are screwed in too strong.</li> <li>– Oblique screws in the sash parts.</li> <li>– Faulty sash parts.</li> <li>– Faulty striker locations.</li> </ul>	<ul style="list-style-type: none"> <li>– Grease frame parts.</li> <li>– Replace the handle.</li> <li>– Slightly loosen the screws.</li> <li>– Straight screw-fixing of the sash parts.</li> <li>– Replace the sash parts.</li> <li>– Adjust the striker locations.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/></li> <li>■</li> <li>■</li> <li>■</li> <li>■</li> <li>■</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/></li> <li>–</li> <li>–</li> <li>–</li> <li>–</li> <li>–</li> </ul>
Handle can not rotate 180°.	<ul style="list-style-type: none"> <li>– Faulty installation of sash parts.</li> </ul>	<ul style="list-style-type: none"> <li>– Check connecting-rod length and replace if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>■</li> </ul>	<ul style="list-style-type: none"> <li>–</li> </ul>
Locking cams rubber at striker.	<ul style="list-style-type: none"> <li>– Faulty striker locations.</li> </ul>	<ul style="list-style-type: none"> <li>– Adjust the striker locations.</li> </ul>	<ul style="list-style-type: none"> <li>■</li> </ul>	<ul style="list-style-type: none"> <li>–</li> </ul>

■ = 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 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 strikers with acid free and non resinous grease from a specialised dealer.	□	□

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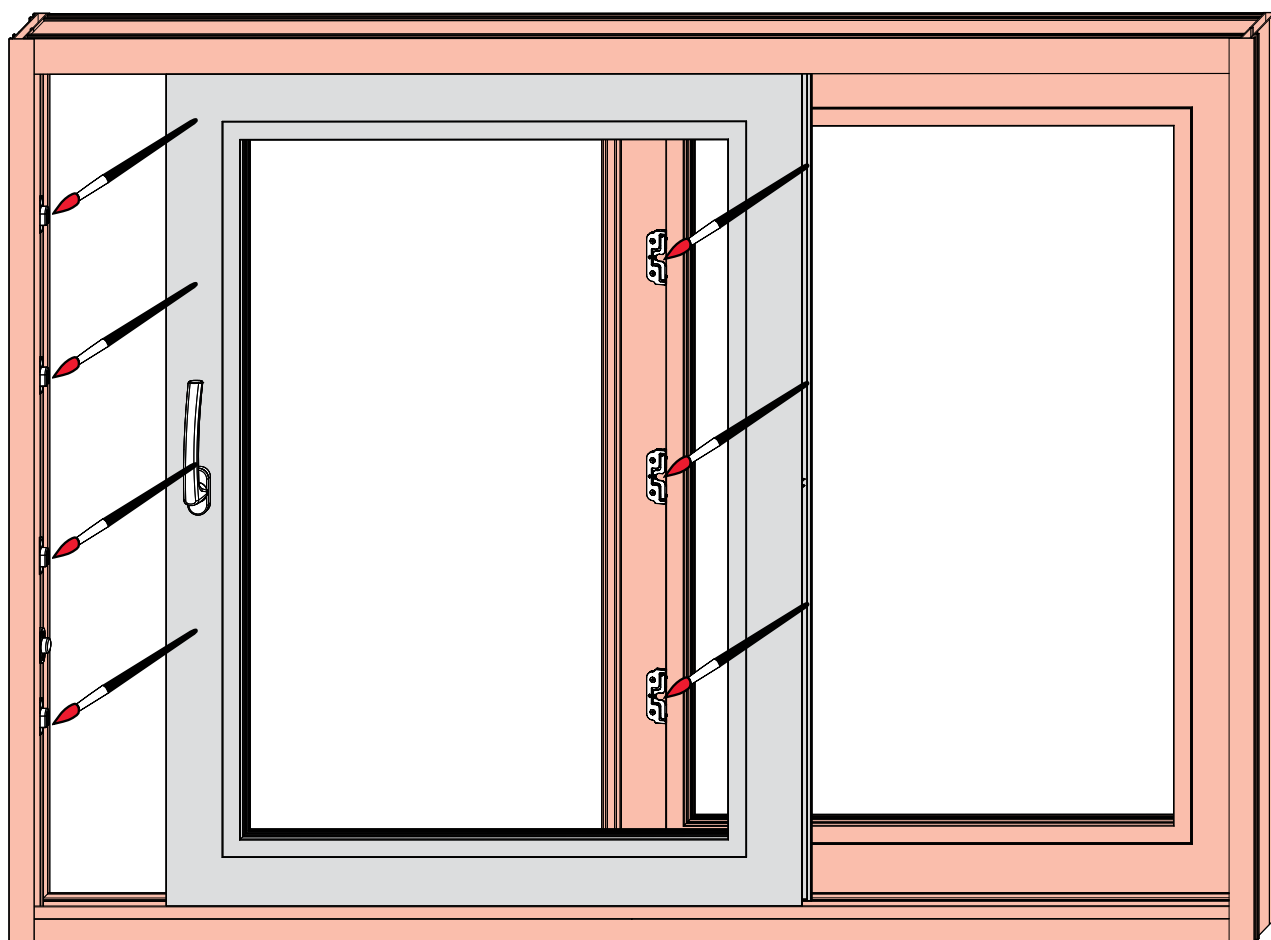


### NOTE

**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.	■	–

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## 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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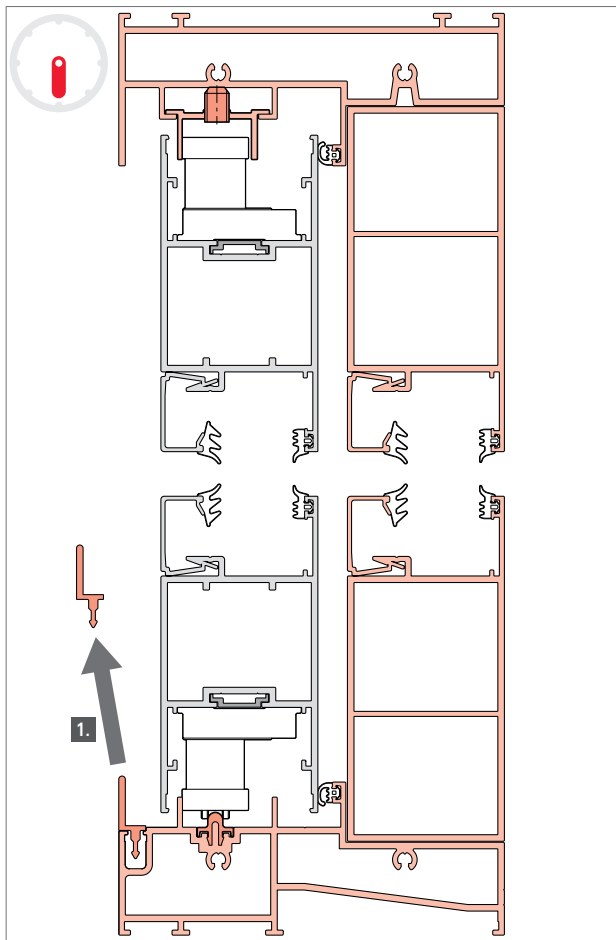
**Protection against (permanent) moist interior air**

	<b>Specialist company</b>	<b>End-users</b>
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"> <li>– Force ventilate several times each day (open all windows for approx. 15 minutes).</li> <li>– Also ventilate during holidays and absences.</li> <li>– For more complex construction projects, develop a ventilation plan if necessary.</li> </ul> <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.</p> <p>Divert the moisture present in the room air to the outside by means of condensation dryers.</p>	<input type="checkbox"/>	<input type="checkbox"/>

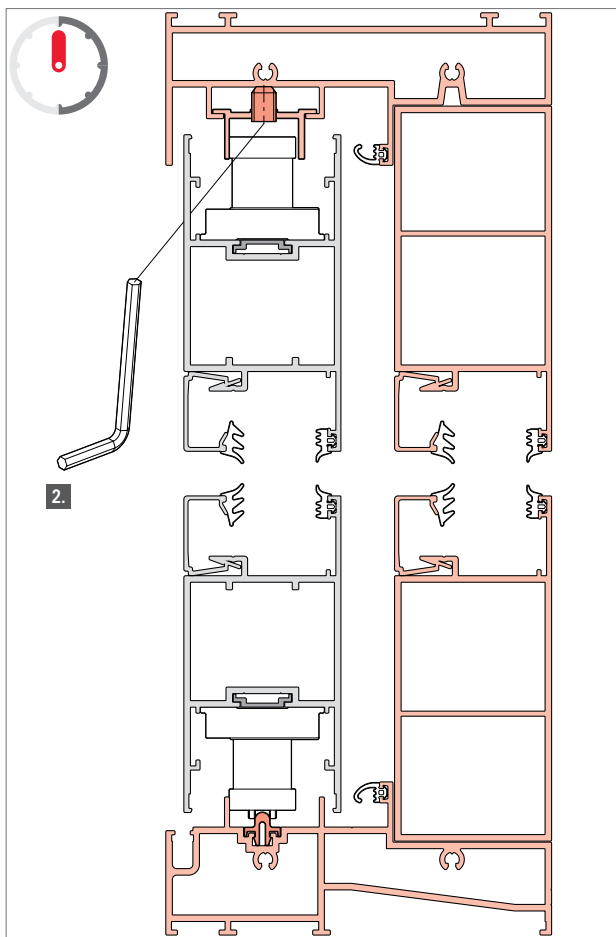
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1. Bring the handle into the locked position and release the guard rail as shown.

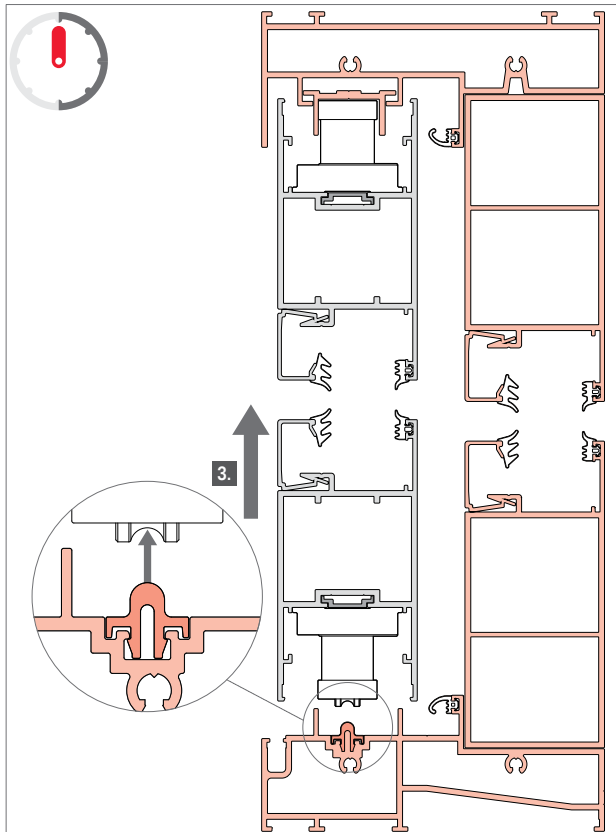


2. Bring the handle into the sliding position and loosen the screws in the upper guide track (4 mm hex key).

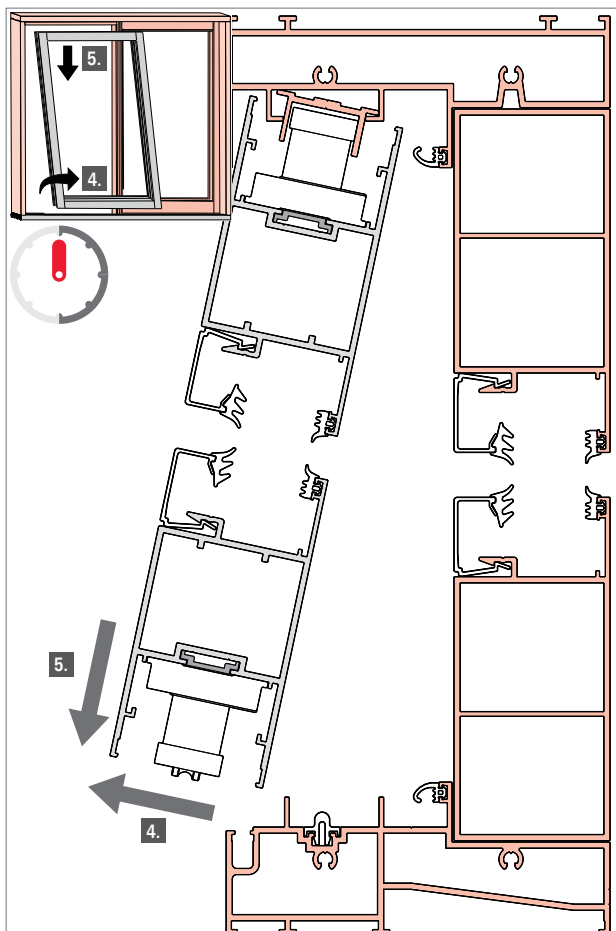
## Dismantling

### Leaf

#### Unhinging the sash

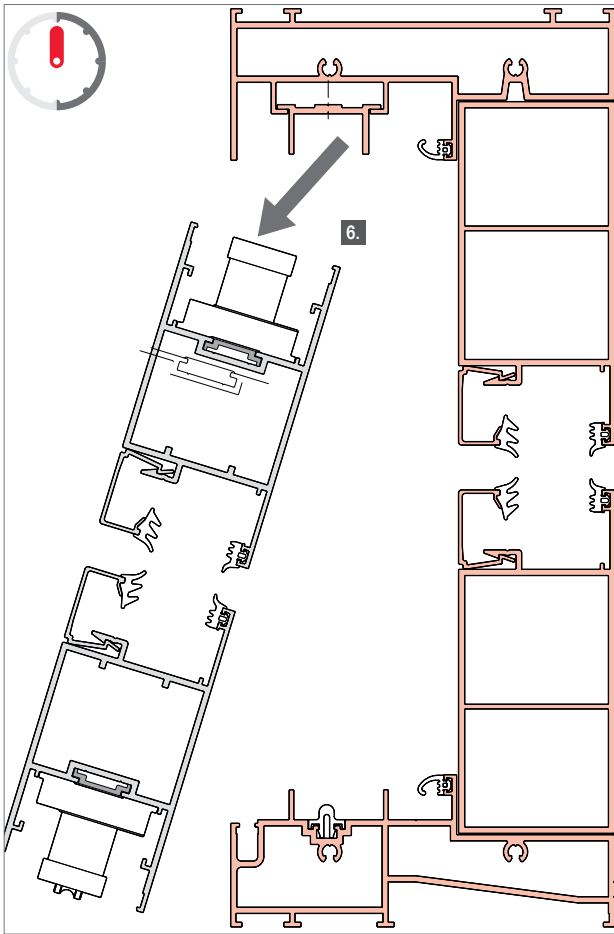


3. Secure the sash from falling out (handle in sliding position) and lift it up.



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.





**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.



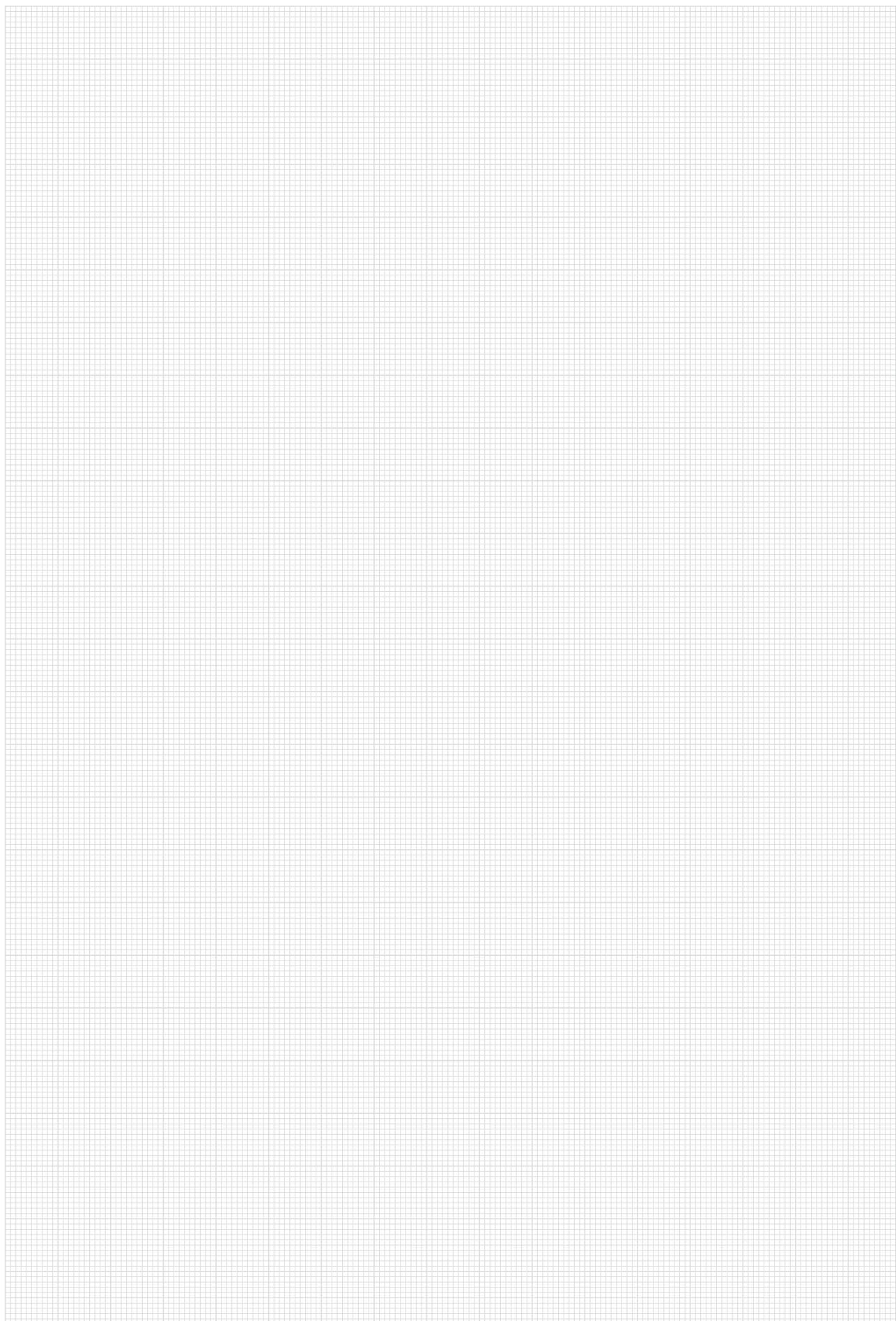
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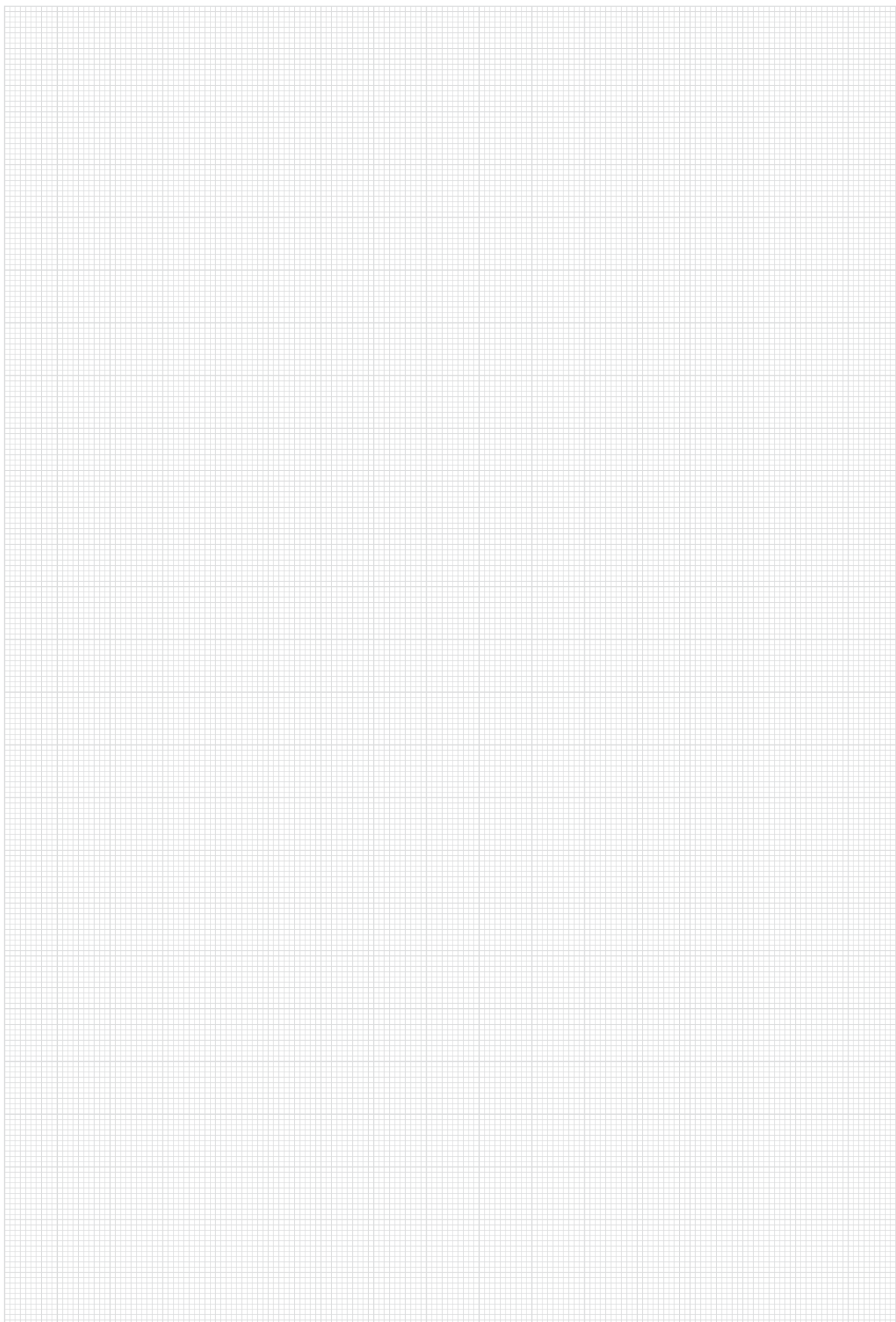
**Note**

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.





**Imprint**

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