Window and Door Technology

Roto Patio Alversa

Universal hardware for minimum effort in
Parallel Sliding and Tilt&Slide systems

Installation, maintenance and operating instructions
for aluminium profiles

3 Information on the product

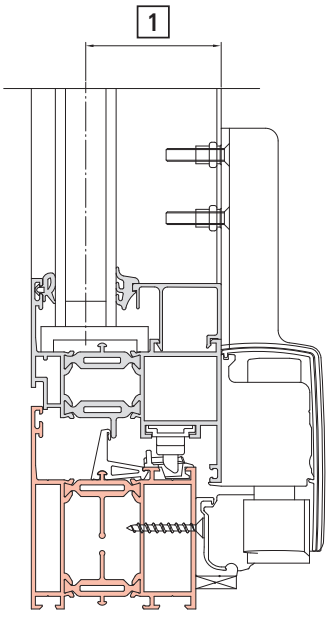
3.1 General hardware characteristics

- Modular sliding system for all profile materials.
- Universal central locking system for use across all variants.
- Universal handle for use across all variants.
- Use of standard components from the Roto AL modular system which have been tried and tested millions of times.
- Optimised run-in and run-out characteristics on all PS variants thanks to damping elements.
- Intuitive operation on all PS variants thanks to the familiar Tilt&Turn operation sequence.

3.2 Application ranges

- Sash width: max. 2000 mm
- Sash height: max. 2700 mm
- Sash weight: max. 200 kg
- Clearance: 11.5 – 12 mm
- Minimum overlap height: 7 mm
- Hardware axis: 10 mm
- Maximum retracting distance: 122 mm
- Frame groove: V.01 and V.02
- Sash groove: 15 / 20
- Compatible with RC2 / RC2N
- Sash arrangement according to diagrams A and C

3.3 Application diagrams

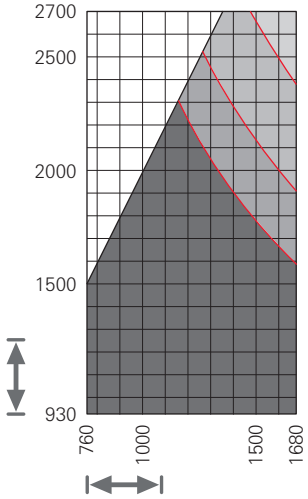


Assignment	Meaning
[1]	M dimension

INFO
See the following pages for the permitted product-specific M dimension. Different dimensions must be technically checked by Roto.

3.3.3 Roto Patio Alversa | PS Air Com

3.3.3.1 Up to 160 kg sash weight



= Impermissible application range
≤ 30 kg/m²
≤ 40 kg/m²
≤ 50 kg/m²
≤ 60 kg/m²

The specifications in the application diagram refer to the glass weight in kg/m².

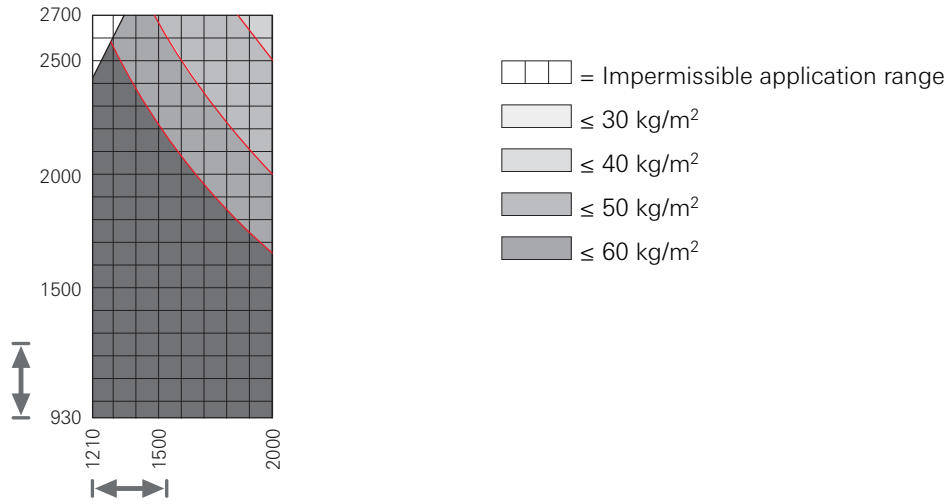
1 mm/m² glass thickness = 2.5 kg

SH:SW = max. 2:1

M dimension = max. 68 mm

		Application range
	Sash width (SW)	760 – 1680
	Sash height (SH)	930 – 2700
	Sash weight (S.kg)	max. 160 kg
	Glass weight	max. 60 kg/m²

3.3.3.2 Up to 200 kg sash weight



The specifications in the application diagram refer to the glass weight in kg/m².

1 mm/m² glass thickness = 2.5 kg

SH:SW = max. 2:1

M dimension = max. 68 mm

		Application range
	Sash width (SW)	1210 – 2000
	Sash height (SH)	930 – 2700
	Sash weight (S.kg)	max. 200 kg
	Glass weight	max. 60 kg/m²

3.4 Design variants

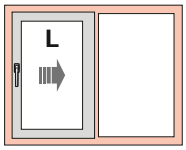
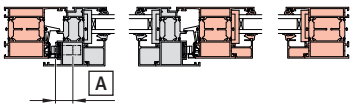
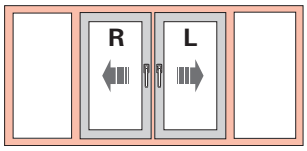
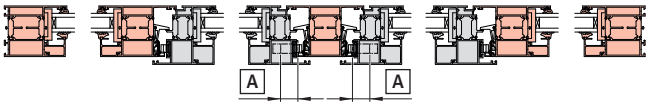
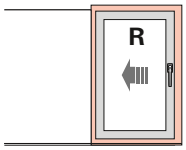
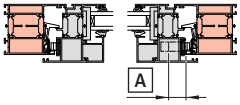
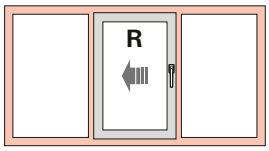
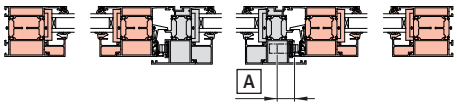
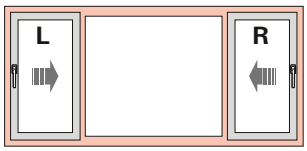
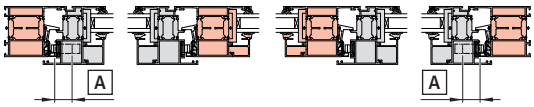
3.4.1 Note regarding the design variants

Combinations for constructing the Patio Alversa are assigned to the following diagrams.

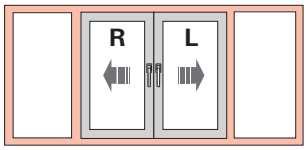
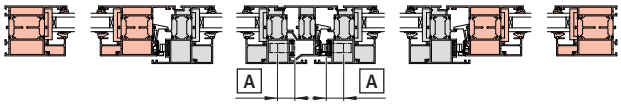
These combinations can be built in DIN L and R.

The cross sections show where the espagnolette is installed.

3.4.2 Diagram A

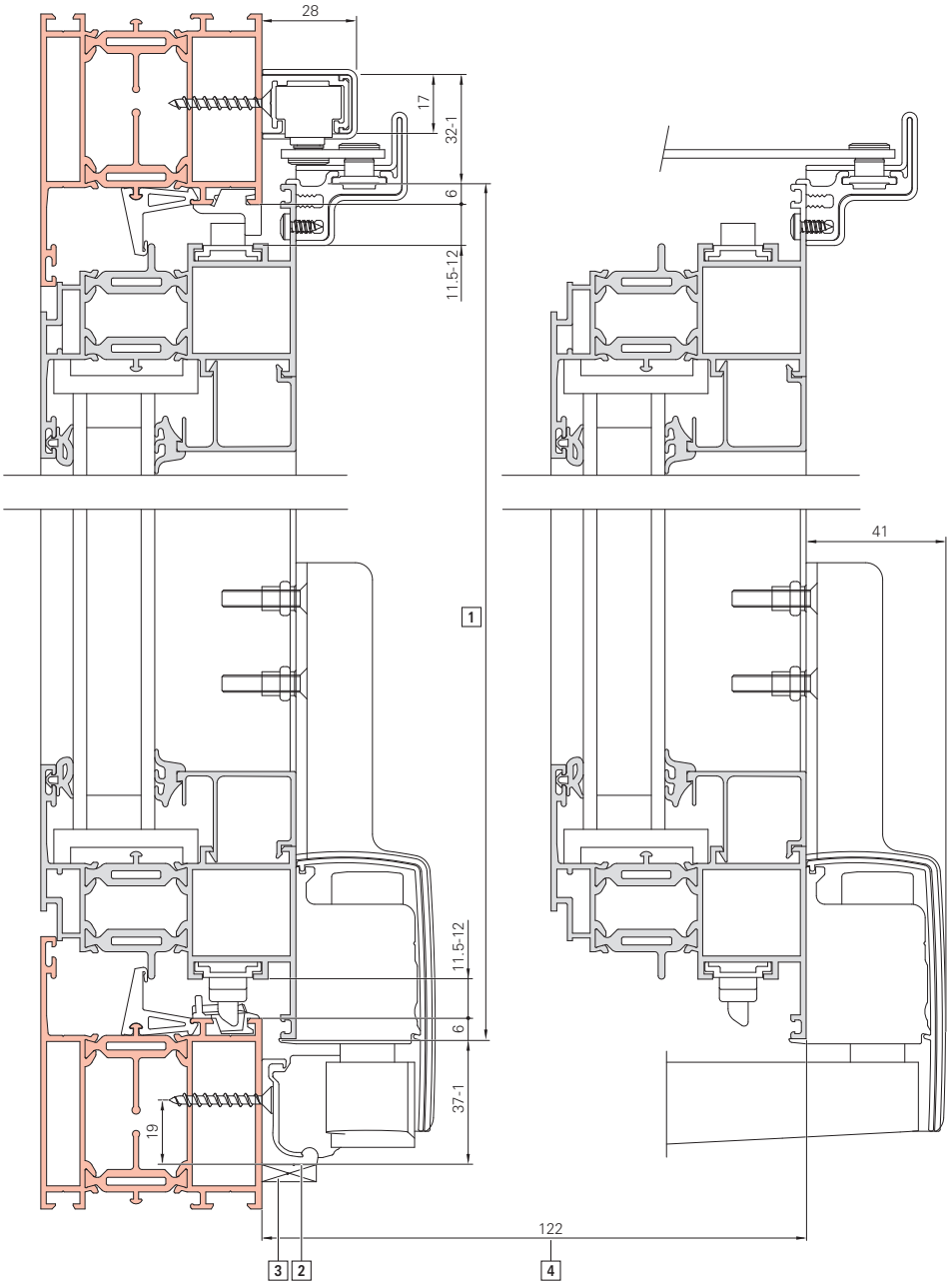
Combinations	Further designation	
 1 sliding sash (L or R) 1 fixed glazing	Diagram A	 [A] = Backset
 2 sliding sashes (L and R) with centre post 2 fixed glazings	Diagram C	 [A] = Backset
 1 sliding sash (L or R) 1 inside window frame flush with the wall	Diagram B	 [A] = Backset
 1 sliding sash (L or R) 2 fixed glazings	Diagram G	 [A] = Backset
 2 sliding sashes (L and R) 1 fixed glazing	Diagram K	 [A] = Backset

3.4.3 Diagram C

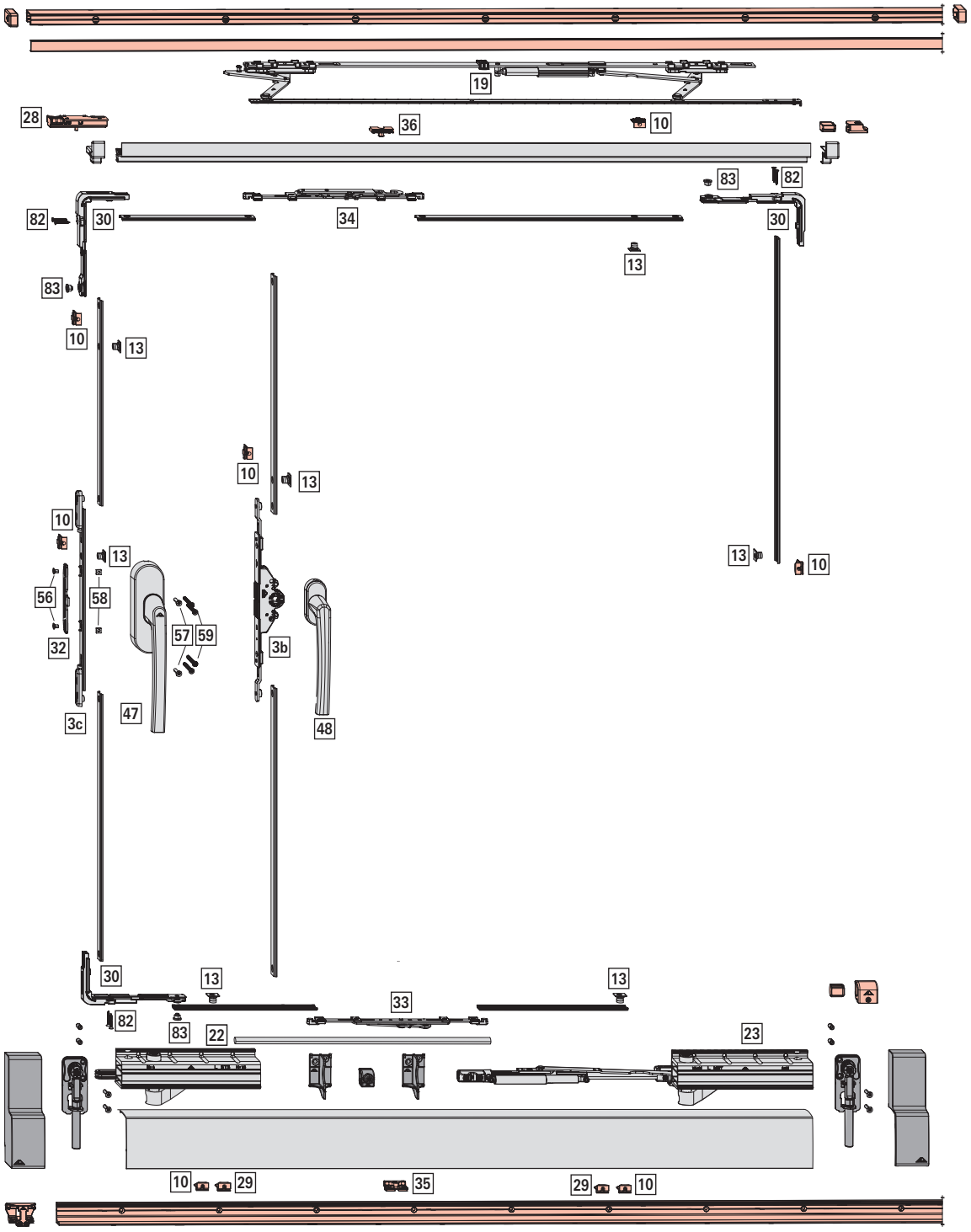
Combinations	Further designation	
 2 sliding sashes (L and R) without centre post 2 fixed glazings	Diagram C	 [A] = Backset

3.5 Profile sections

3.5.1 Vertical cross section



Assignment	Meaning
[1]	SH
[2]	Max. top edge of finished floor
[3]	Underlay the roller track over the entire length on site in order to transfer the load.
[4]	Retracting distance



INFO
Size-dependent components can be found in the parts list.

Reference set shown: up to 160 kg; standard; SW 1000; SH 1300

Application range

Sash width **SW**.....760 – 2000 mm

Sash height **SH**.....930 – 2700 mm

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

Comfort set

Pos.	SW		DIN	PQ	Material no.
	760	– 1400	Left	1	**772315**
			Right	1	**772316**
	1401	– 2000	Left	1	**786062**
			Right	1	**786063**

The comfort set comprises:		Qty
[34]	Comfort scissor stays	1–2
[13]	Insertable cams	4
[33]	Mishandling device	1
[30]	Reinforced corner drives	3
[82]	Countersunk tapping-screw ST3.9 x 25	12
[83]	Special screws M6 x 10	3

Comfort scissor stay frame component*

Pos.			PQ	Material no.
[36]	for comfort scissor stay from comfort set	V.01	2	**772684**
		V.02	2	**786361**

Mishandling device frame component

Pos.			PQ	Material no.
[35]	for mishandling device from comfort set	V.01	1	**786328**
		V.02	1	**786329**

Tilt striker set

Pos.		PQ	Material no.
Tilt striker set V.01		1	**779421**
Tilt striker set V.02		1	**779422**

The tilt striker set comprises:		Qty
[29]	Tilt strikers V.01 / V.02	2
[10]	Strikers V.01 / V.02	8
[13]	Insertable cams	4

Flush-encased gearbox (for Roto Line handles)

Pos.		BS	PQ	Material no.
[3b]	Flush-encased gearbox	25	1	**625430**
		30	1	**625431**
		35	1	**625432**
		40	1	**625433**
	Lock. flush-encased gearbox	25	1	**625438**
		30	1	**625439**
		35	1	**625440**
		40	1	**625441**

[48] Handle → *CTL_1*

INFO
Only use handles with a length of 200 mm for Patio Alversa | PS Air Com.

Adjustable centre section

Pos.		PQ	Material no.
[3c]	for Roto Line Alversa geared-handle	1	**779637**

Roto Line Alversa geared-handle set

Pos.		Colour	PQ	Material no.
200 geared-handle	Silver	R01.5	1	**775916**
	Dark bronze	R05.4	1	**775919**
	Jet black	R06.2	1	**775918**
	Traffic white	R07.2	1	**775917**
	Uncoated	Raw	1	**775920**

The Roto Line Alversa geared-handle set comprises:		Qty
[47]	Alversa 200 geared-handle	1
[32]	T connector	1
[56]	Countersunk screws M5x8	2
[57]	Countersunk screws M5x25	2
[58]	Square nuts M5	2
[59]	Countersunk tapping-screws ST4.8x50	4

Parallel Sliding scissors-slider set, tilt ventilation

Pos.	SW		Damping	DIN	PQ	Material no.
	760	– 930	Yes	Left	1	**772172**
				Right	1	**772216**
	931	– 1280	Yes	Left	1	**772173**
				Right	1	**772217**
	1281	– 1680	Yes	Left	1	**772174**
				Right	1	**772218**
	1681	– 2000	Yes	Left		**772215**
				Right		**772219**

The Parallel Sliding scissors-slider set, tilt ventilation comprises:		Qty
[19]	Parallel Sliding scissors-slider	1
[28]	Tiltable top guide block	1

Parallel Sliding bogie set

Pos.	Weight	Damping	DIN	PQ	Material no.
Bogies					
Bogies	up to 160 kg	Yes	Left	1	**794094**
			Right	1	**794126**

The Parallel Sliding bogie set comprises:		Qty
[22]	Leading bogie	1
[23]	Trailing bogie	1
not dep.	Countersunk tapping-screws ST4.8x50	8

Tandem bogies					
Tandem bogies	up to 200 kg	Yes	Left	1	**794127**
			Right	1	**794128**

The Parallel Sliding tandem bogie set comprises:		Qty
not dep.	Leading tandem bogie	1
not dep.	Trailing tandem bogie	1
not dep.	Countersunk tapping-screws ST4.8x50	16

Track set → *Track set*

Reinforcement bracket set → *Reinforcement bracket set*

ECC connecting-rod C-groove

Pos.		Length	
	Connecting-rod	3 m	**735102**
	Connecting-rod	6 m	**334665**

1) * 2 comfort scissor stay frame components are required for a SW of 1401–2000

Optional parts:

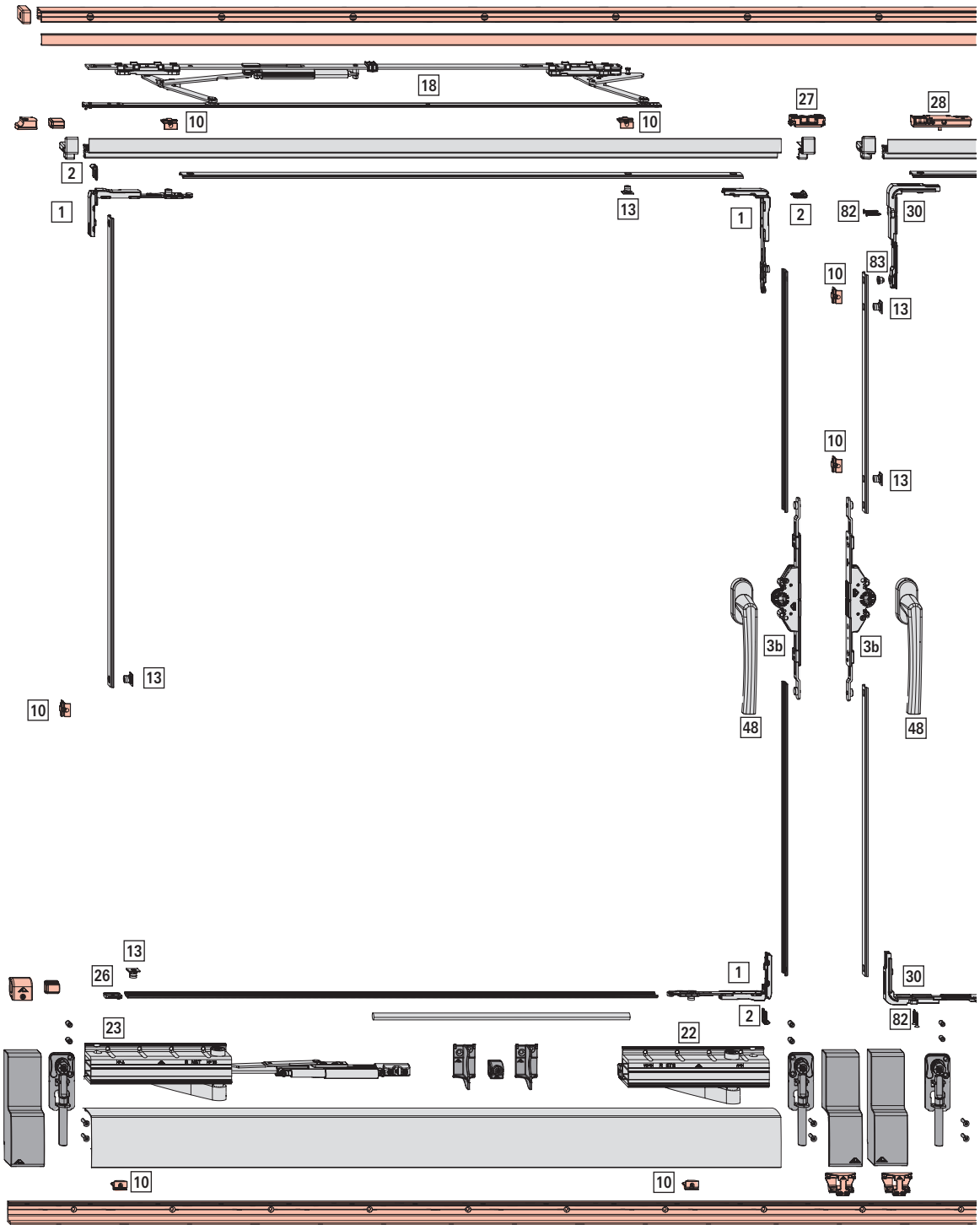
Striker set (additionally for SW > 1280 mm and SH > 1800 mm)			
Pos.		PQ	Material no.
Striker set V.01		1	**786321**
Striker set V.02		1	**786322**
The striker set comprises:		Qty	
[10]	Strikers V.01 / V.02	10	
[13]	Insertable cams	10	

Roto Patio Alversa | PS Air Com – std.

Diagram A

Roto Patio Alversa | PS Air Com, second opening sash – std.

Diagram C



INFO

- Size-dependent components can be found in the parts list.
- Diagram C:
  second opening sash such as Roto Patio Alversa | PS without night ventilation;
  first opening sash such as diagram A Roto Patio Alversa | PS Air Com.

Reference set shown: up to 160 kg; standard; SW 1000; SH 1300; without centre post

Application range

Sash width **SW**.....760 – 2000 mm

Sash height **SH**.....930 – 2700 mm

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

Corner drive set 626523

Pos.		Qty
The corner drive set comprises:		
[1]	Corner drives	3
[2]	Retaining forks	3
[13]	Insertable cams	1

Tilt striker set

Pos.		PQ	Material no.
	Tilt striker set V.01	1	**779421**
	Tilt striker set V.02	1	**779422**
The tilt striker set comprises:		Qty	
[29]	Tilt strikers V.01 / V.02	2	
[10]	Strikers V.01 / V.02	8	
[13]	Insertable cams	4	

Locking set

Pos.		Qty	Material no.
	Locking set V.01	1	**791720**
	Locking set V.01	1	**791721**
The locking set comprises:		PQ	
[10]	Strikers V.01 / V.02	8	
[13]	Insertable cams	4	

Travel restrictor

Pos.		Qty	Material no.
[26]	Travel restrictor	1	**786295**

Comfort set

Pos.	SW		DIN	PQ	Material no.
	760	– 1400	Left	1	**772315**
			Right	1	**772316**
	1401	– 2000	Left	1	**786062**
			Right	1	**786063**

The comfort set comprises:		Qty
[34]	Comfort scissor stays	1–2
[13]	Insertable cams	4
[33]	Mishandling device	1
[30]	Reinforced corner drives	3
[82]	Countersunk tapping-screw ST3.9 x 25	12
[83]	Special screws M6 x 10	3

Comfort scissor stay frame component*

Pos.			PQ	Material no.
[36]	for comfort scissor stay from comfort set	V.01	2	**772684**
		V.02	2	**786361**

Mishandling device frame component

Pos.			PQ	Material no.
[35]	for mishandling device from comfort set	V.01	1	**786328**
		V.02	1	**786329**

Flush-encased gearbox (for Roto Line handles)

Pos.		BS	PQ	Material no.
[3b]	Flush-encased gearbox	25	1	**625430**
		30	1	**625431**
		35	1	**625432**
		40	1	**625433**
	Lock. flush-encased gearbox	25	1	**625438**
		30	1	**625439**
		35	1	**625440**
		40	1	**625441**

[48] Handle → *CTL_1*

INFO
Only use handles with a length of 200 mm for Patio Alversa | PS Air Com.

Adjustable centre section

Pos.		PQ	Material no.
[3c]	for Roto Line Alversa geared-handle	1	**779637**

Roto Line Alversa geared-handle set

Pos.			Colour	PQ	Material no.
200 geared-handle		Silver	R01.5	1	**775916**
		Dark bronze	R05.4	1	**775919**
		Jet black	R06.2	1	**775918**
		Traffic white	R07.2	1	**775917**
		Uncoated	Raw	1	**775920**

The Roto Line Alversa geared-handle set comprises:		Qty
[47]	Alversa 200 geared-handle	1
[32]	T connector	1
[56]	Countersunk screws M5x8	2
[57]	Countersunk screws M5x25	2
[58]	Square nuts M5	2
[59]	Countersunk tapping-screws ST4.8x50	4

Parallel Sliding scissors-slider set, tilt ventilation

Pos.	SW		Damping	DIN	PQ	Material no.
	760	– 930	Yes	Left	1	**772172**
				Right	1	**772216**
	931	– 1280	Yes	Left	1	**772173**
				Right	1	**772217**
	1281	– 1680	Yes	Left	1	**772174**
				Right	1	**772218**
	1681	– 2000	Yes	Left		**772215**
				Right		**772219**

The Parallel Sliding scissors-slider set, tilt ventilation comprises:		Qty
[19]	Parallel Sliding scissors-slider	1
[28]	Tiltable top guide block	1

1) * 2 comfort scissor stay frame components are required for a SW of 1401–2000

Parallel Sliding scissors-slider set, night ventilation

Pos.	SW		Damping	DIN	PQ	Material no.
	760	– 930	Yes	Left	1	**772220**
				Right	1	**772225**
	931	– 1280	Yes	Left	1	**772221**
				Right	1	**772226**
	1281	– 1680	Yes	Left	1	**772222**
				Right	1	**772227**
	1681	– 2000	Yes	Left	1	**772223**
				Right	1	**772228**

The Parallel Sliding scissors-slider set, night ventilation comprises:		Qty
[18]	Parallel Sliding scissors-slider	1
[27]	Fixed top guide block	1

Parallel Sliding bogie set

Pos.	Weight	Damping	DIN	PQ	Material no.
Bogies					
Bogies	up to 160 kg	Yes	Left	1	**794094**
			Right	1	**794126**

The Parallel Sliding bogie set comprises:		Qty
[22]	Leading bogie	1
[23]	Trailing bogie	1
not dep.	Countersunk tapping-screws ST4.8 x 50	8

Tandem bogies					
Tandem bogies	up to 200 kg	Yes	Left	1	**794127**
			Right	1	**794128**

The Parallel Sliding tandem bogie set comprises:		Qty
not dep.	Leading tandem bogie	1
not dep.	Trailing tandem bogie	1
not dep.	Countersunk tapping-screws ST4.8 x 50	16

Track set → *Track set*

Reinforcement bracket set → *Reinforcement bracket set*

ECC connecting-rod C-groove

Pos.		Length	
	Connecting-rod	3 m	**735102**
	Connecting-rod	6 m	**334665**

Optional parts:

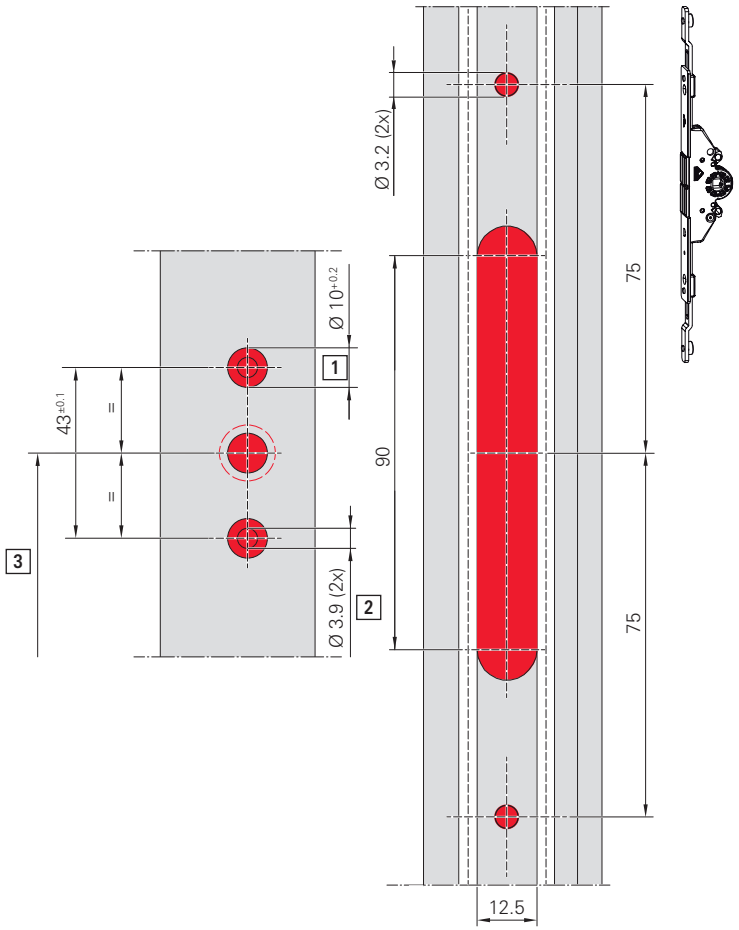
Striker set (additionally for SW > 1280 mm and SH > 1800 mm)

Pos.	PQ	Material no.
Striker set V.01	1	**786321**
Striker set V.02	1	**786322**

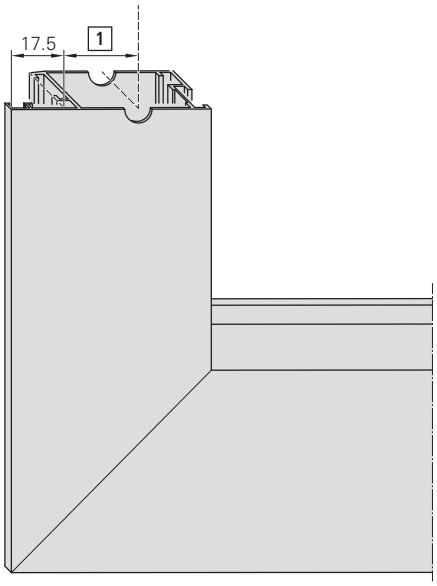
The striker set comprises:		Qty
[10]	Strikers V.01 / V.02	10
[13]	Insertable cams	10

7.2 Drilling and routing dimensions

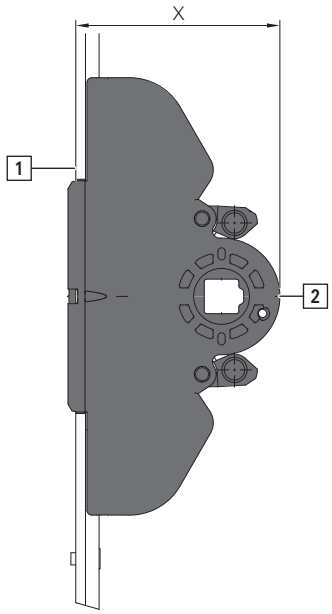
7.2.1 Flush-encased gearbox without profile cylinder



Drillings for the handle's sprocket and lugs
with SH ≥ 930
[1] Ø 10 $^{+0.2}$
only through the first profile wall
[2] Ø 3.9
only through the second profile wall or
additional profile walls
[3] Handle height
HH ≥ 260

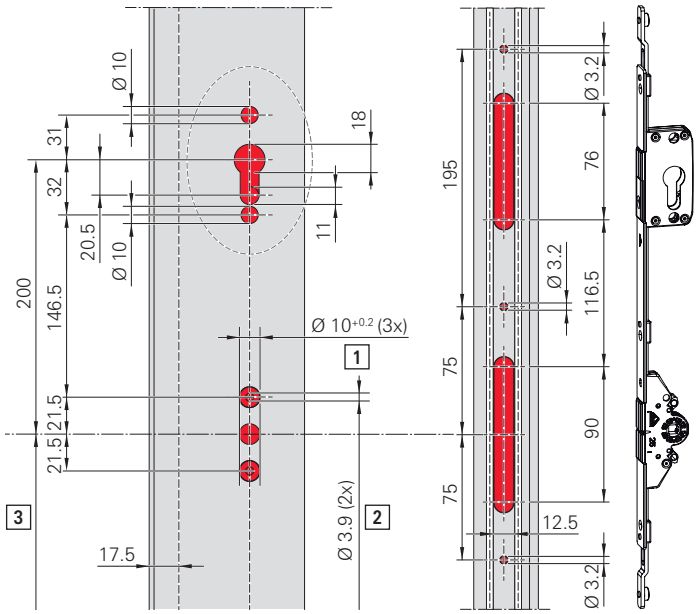


[1] Backset with 6 mm overlap coverage
Top edge of espagnolette faceplate

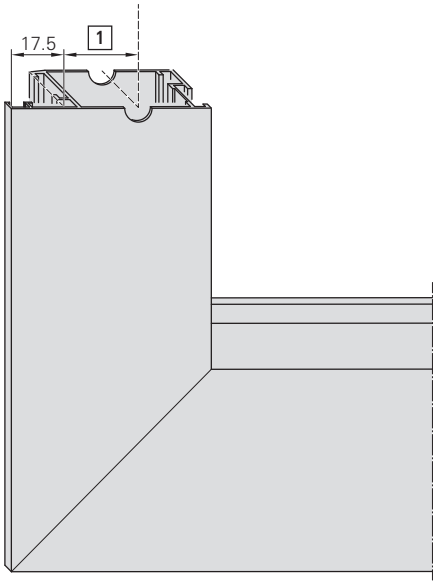


Routing depth espagnolette casing
[1] Top edge of faceplate
[2] Bottom edge of espagnolette
X = min. routing depth

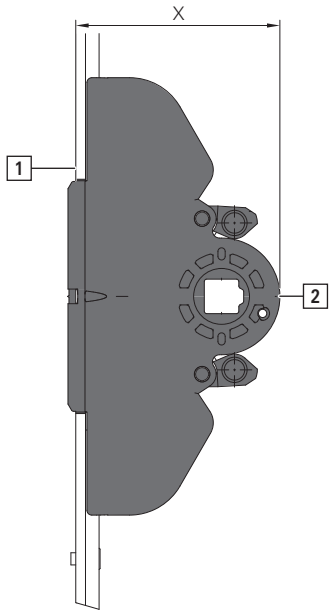
7.2.2 Flush-encased gearbox with profile cylinder



Drillings for the handle's sprocket and lugs
[1] Ø 10 $^{+0.2}$
only through the first profile wall
[2] Ø 3.9
only through the second profile wall or additional profile walls
[3] Handle height
$HH_{min.}$ = 600
HH = SH / 2

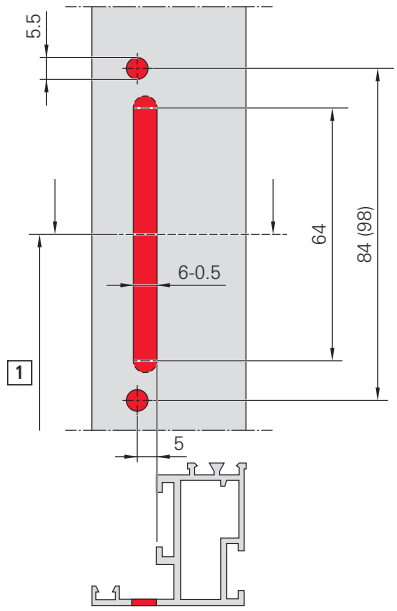


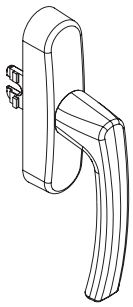
[1] Backset with 6 mm overlap coverage
Top edge of espagnolette faceplate



Routing depth espagnolette casing
[1] Top edge of faceplate
[2] Bottom edge of espagnolette
X = min. routing depth

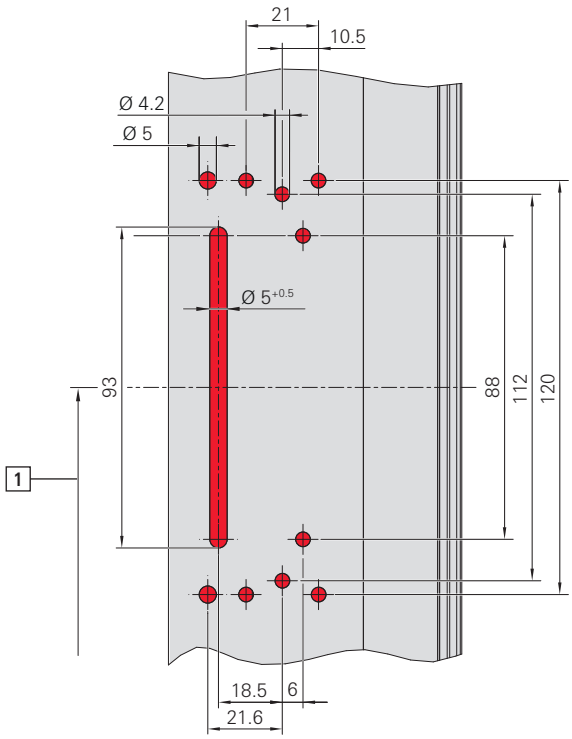
7.2.3 Roto Line AL geared-handle

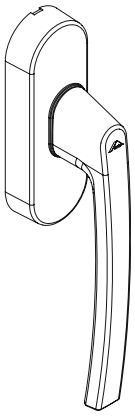




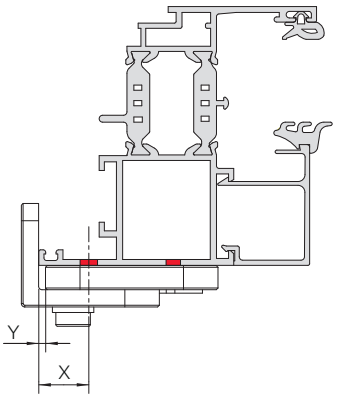
Drillings for the handle's sprocket and lugs with SH ≥ 930
[1] Handle height ≥ 260

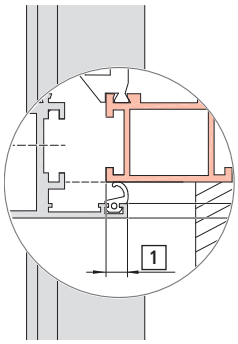
7.2.4 Roto Line Alversa geared-handle





Geared-handle drilling and routing dimensions
[1] Handle height

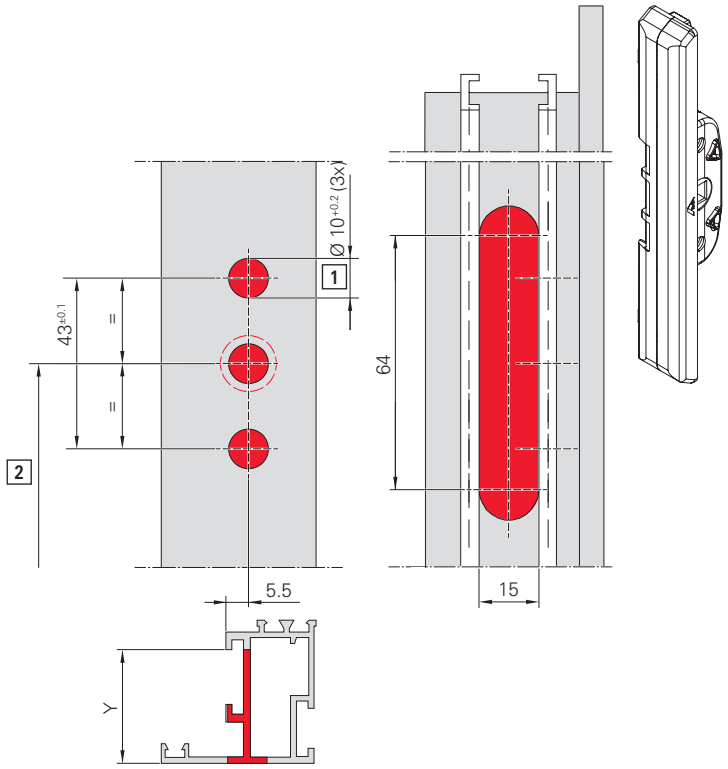




X= slot position
Y= reference dimension for drilling jig
[1] Coverage

Coverage	X	Y
6	14.5	2
5	13.5	1
4	12.5	0

7.2.5 Flush-encased gearbox without mishandling device



Drillings for the handle's sprocket and lugs
with SH ≥ 930
[1] Ø 10 + 0.2
only through the first profile wall
[2] Handle height
HH ≥ 260
Y = drilling depth

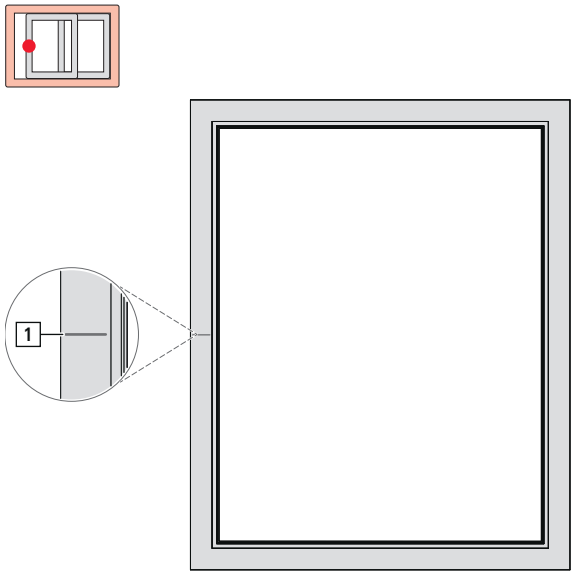
7.3 Sash

7.3.1 Preparing the sash for the flush-encased gearbox

7.3.1.1 Handle drillings

Creating the drillings for the handle

1. Mark the handle-height position on the inside of the sash [1].



2. Create the drillings.
   Note any different drilling dimensions. → *7.2 "Drilling and routing dimensions" from page 80*

3. Deburr the drillings.

7.3.1.2 Espagnolette casing cutout

Routing the cutout for the espagnolette casing

1. Route the cutout for the espagnolette.
   Observe the routing dimensions. → *7.2 "Drilling and routing dimensions" from page 80*

2. Deburr the cutout for the espagnolette.

7.3.1.3 Espagnolette casing cutout with lock case

Milling the cutout for the espagnolette casing with lock case

1. Mill the cutout for the espagnolette.
   Observe the routing dimensions. → *7.2 "Drilling and routing dimensions" from page 80*

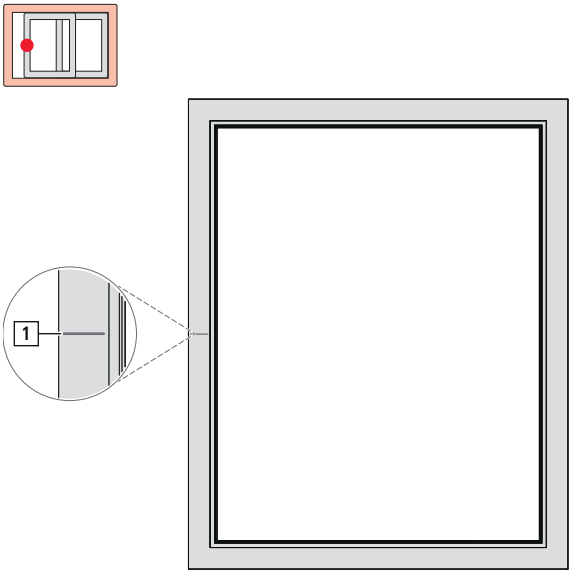
2. Deburr the cutout for the espagnolette.

7.3.2 Preparing the sash for the geared-handle

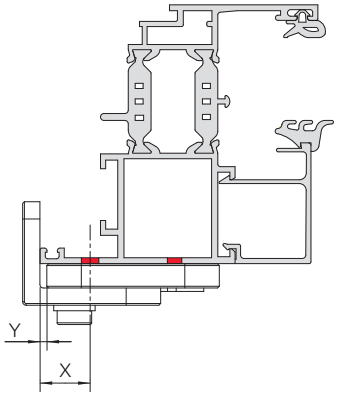
7.3.2.1 Handle drill holes

Drilling the holes for the handle

1. Mark the handle-height position on the inside of the sash [1].



2. Adjust the drilling jig depending on the overlap width.



X= slot position
Y= reference dimension for drilling jig

Coverage	X	Y
6	14.5	2
5	13.5	1
4	12.5	0

7.3.3 Preparing the connecting-rods

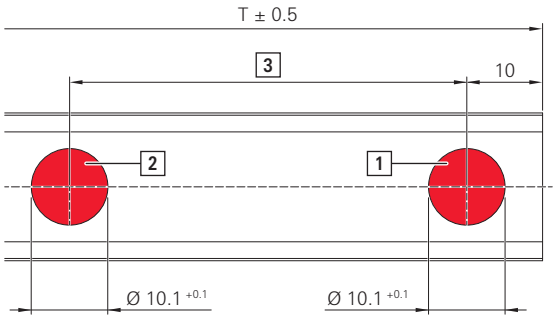
INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

Cropping

INFO
All connecting-rod dimensions refer to an overlap width of 22 mm. If the overlap width differs from this, adapt all connecting-rod dimensions accordingly.
All connecting-rod dimensions T ±0.5 mm.

1. Length of the connecting-rods according to the installation drawing. → *from page 161*
2. Mark the length on the connecting-rods.
3. Crop the connecting-rods.

Drilling



Position	Designation
[1]	Drill hole for coupling point
[2]	Drill hole for insertable cam
[3]	Position dimension for insertable cam

1. Position of the coupling points and insertable cams in the connecting-rods in accordance with the installation drawing. → *from page 161*
2. Drill the holes.

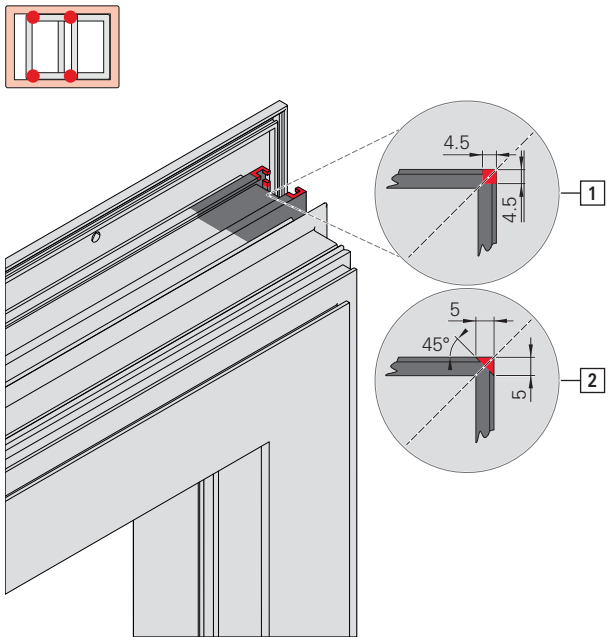
7.3.4 Opening the sash corners

Routing the sash corners

INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

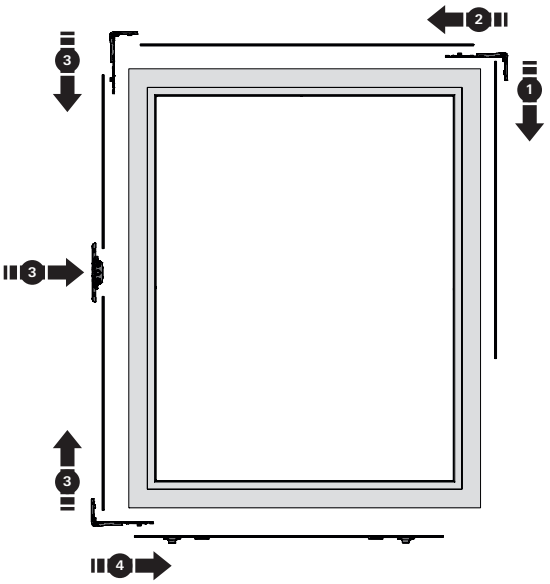
1. Open the connecting-rod groove at all sash corners.
   Comply with the dimensions from the drawing.

Position	Designation
[1]	Connecting-rod groove opening
[2]	Alternative connecting-rod groove opening



2. Deburr the edges.

7.3.5 Installation sequence



[1] Connecting-rod on the hinge side
[2] Horizontal top connecting-rods and components
[3] Connecting-rods and espagnolette on the locking side
[4] Horizontal bottom connecting-rod and components

Observing the installation sequence

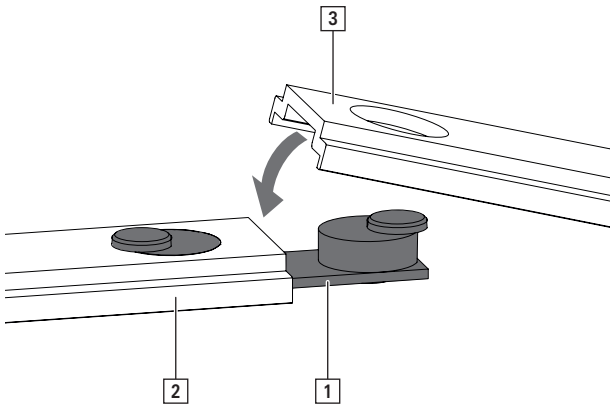
1. Open the sash corners. → *from page 91*
2. Crop and drill into the connecting-rods. → *from page 90*
3. Install the insertable cam. → *from page 95*
4. Install the connecting-rod on the hinge side. → *from page 103*
5. Install the horizontal top connecting-rods and components. → *from page 105*
6. Install the connecting-rods and espagnolette on the locking side. → *from page 108*
7. Install the horizontal bottom connecting-rod and components. → *from page 115*
8. Install the handle. → *from page 118*

7.3.6 Connecting the coupling points

INFO
Prepared connecting-rods always have coupling points.

Joining the connecting-rods

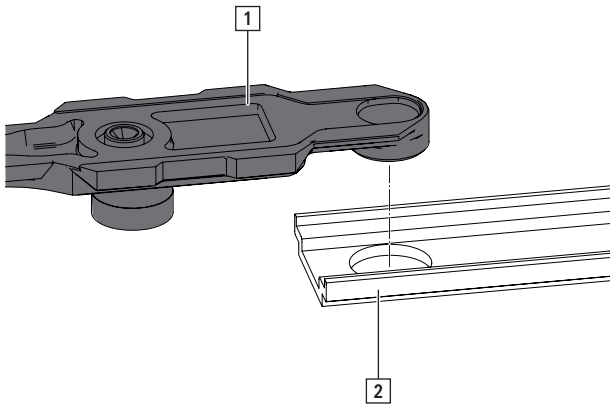
1. Use the SEC coupler component [1] at the coupling point on a connecting-rod [2].



2. Connect the unit to another connecting-rod [3] at the coupling point.

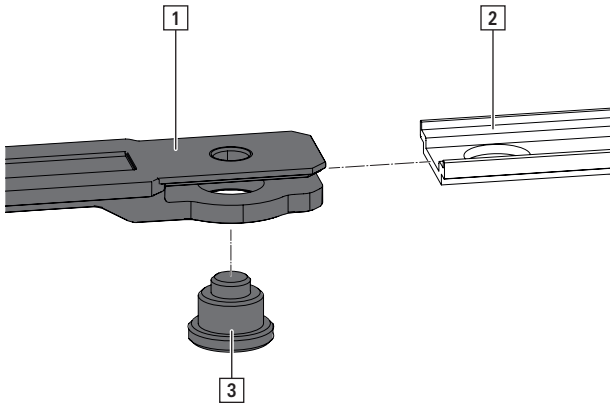
Connecting the corner drive to the connecting-rod

1. Connect the corner drive [1] at the coupling point on the connecting-rod [2].



Connecting the reinforced corner drive to the connecting-rod

1. Slide the reinforced corner drive [1] onto the connecting-rod [2].

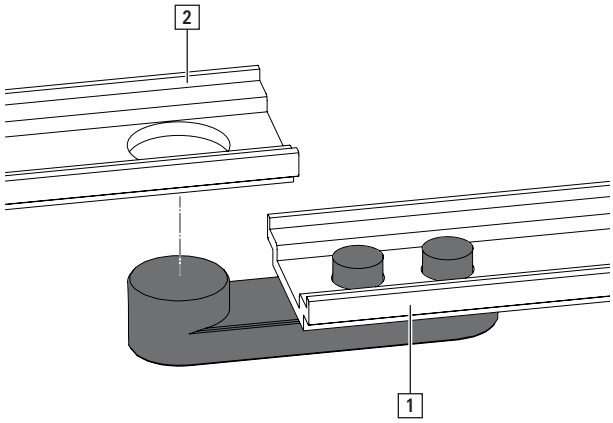


2. Screw down the unit with a screw [3].

Connecting the bullet catch track / night ventilation track to the connecting-rod

INFO
This is illustrated using a bullet catch track as an example.

1. Connect the bullet catch track [1] at the coupling point on the connecting-rod [2].



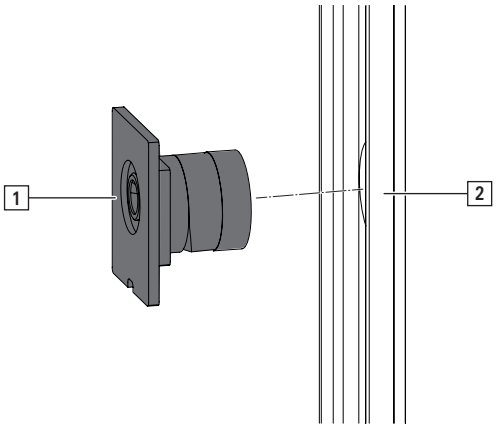
7.3.7 Insertable cams

Installing the insertable cam

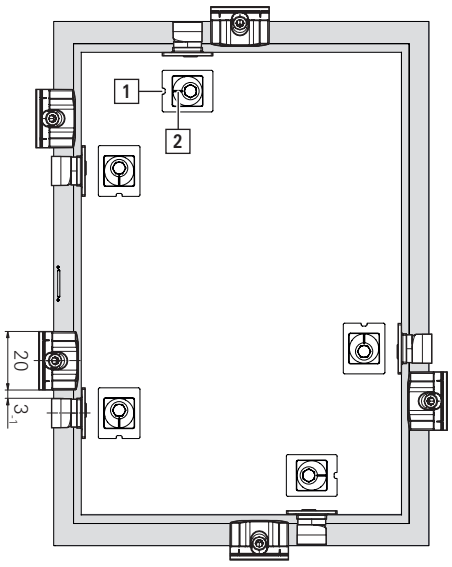
INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

1. Number and position of insertable cams in accordance with the installation drawings. → *from page 161*

2. Insert the insertable cams [1] into the connecting-rod [2].



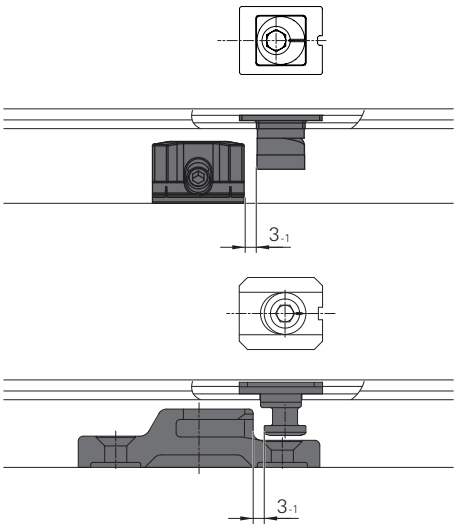
a. Prevent a recess [1] from forming between the insertable cam and the striker position.



b. Adjust the marking [2] for adjusting the insertable cam horizontally or vertically in relation to direction of travel.

Note the type of connecting-rod (standard / with extended connecting-rod groove). → *9.4 "Adjusting the insertable cams" from page 176*

3. Determine the striker position.
   The distance between the striker and the insertable cam is 3 mm.
   The distance between the SEC striker and the SEC locking cam is 3 mm.



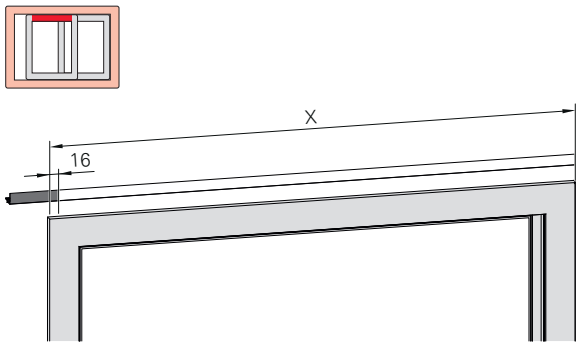
7.3.8 Stay-connecting profile

7.3.8.1 Cropping the stay-connecting profile

6 mm holes for securing the scissors-slider are provided at both ends of the stay-connecting profile at the factory.

Alternatively, drill the hole. → *7.3.8.4 "Stay-connecting profile (storage length)" from page 99*

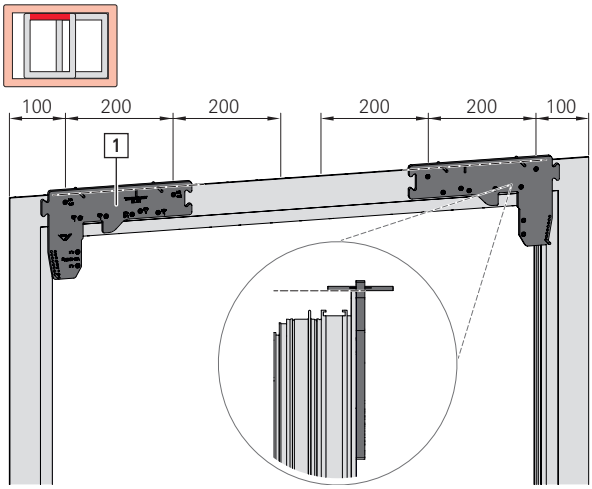
1. Crop the stay-connecting profile to the width of the sash, minus 16 mm [1].
   Crop the stay-connecting profile for sash DIN L on the left.
   Crop the stay-connecting profile for sash DIN R on the right.



7.3.8.2 Drilling holes in the stay-connecting profile

Positioning the drilling jig on the sash

1. Place the drilling jig stop [1] on the top edge of the window sash profile.



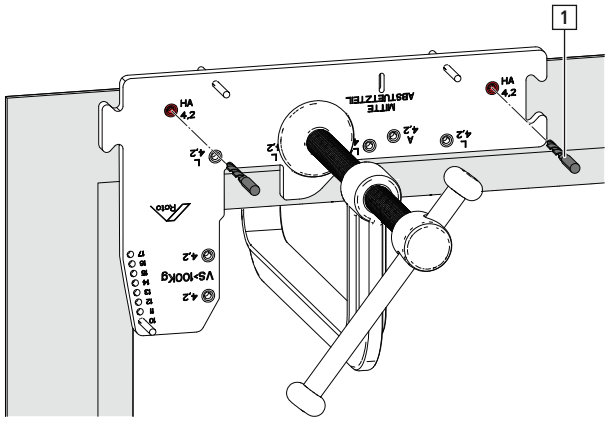
2. Fix the drilling jig(s) in place using a screw clamp.

INFO
Drill holes, spaced 200 mm apart, on the inside of the sash.

Drilling the holes

Drill: Ø 4.2 mm

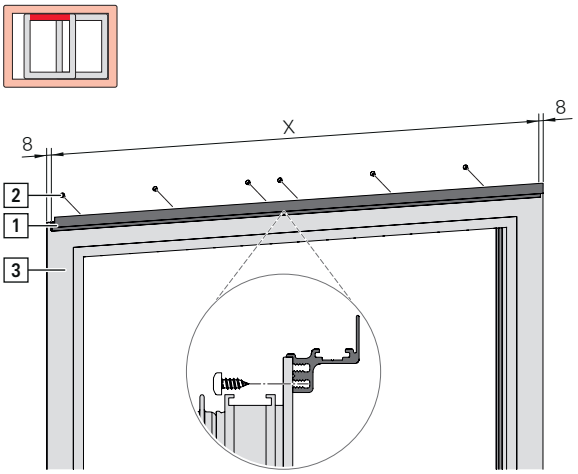
1. Drill into the window sash using the drill [1].



7.3.8.3 Installing the stay-connecting profile

1. Place the stay-connecting profile [1] on the top of the outer edge of the sash.

2. Screw down the stay-connecting profile in the centre of the sash [3] using screws [2].

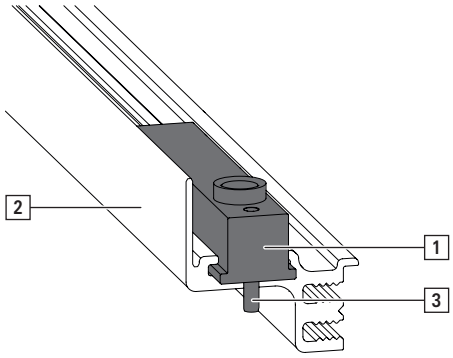


7.3.8.4 Stay-connecting profile (storage length)

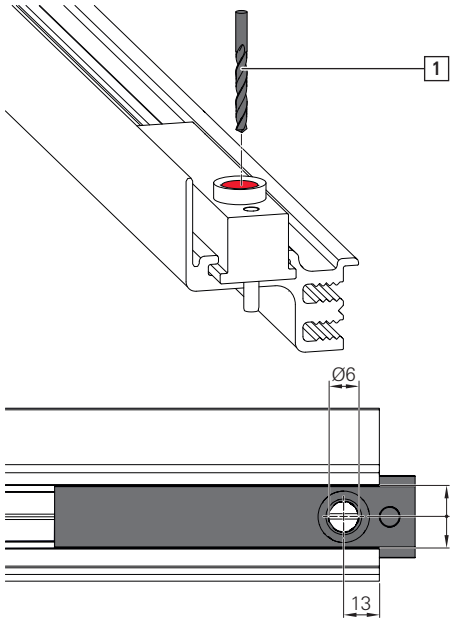
Drilling the hole in the stay-connecting profile (storage length)

1. Insert the drilling jig [1] into the stay-connecting profile [2] on the hinge side.

2. Position the drilling jig stop [3] on the stay-connecting profile.



3. Drill into the stay-connecting profile using a Ø 6 mm drill [1].



7.3.9 Corner drives

7.3.9.1

Installing the corner drives

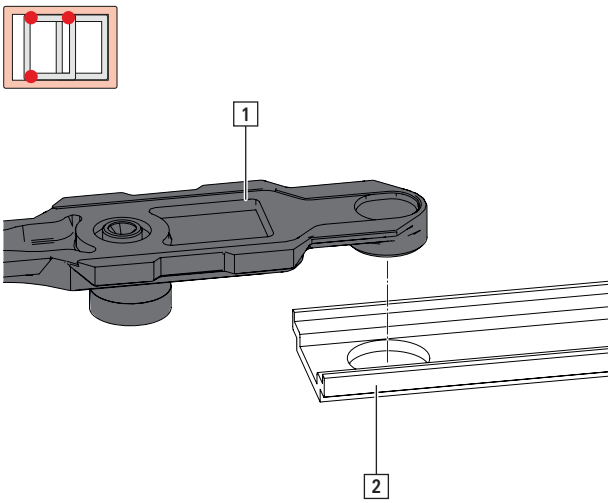
PRECONDITION

- Drill holes created in the handle → *from page 80*
- Cutout for the espagnolette routed → *from page 80*
- Sash corners opened → *from page 91*
- Connecting-rods prepared → *from page 90*
- Insertable cams installed → *from page 95*

INFO

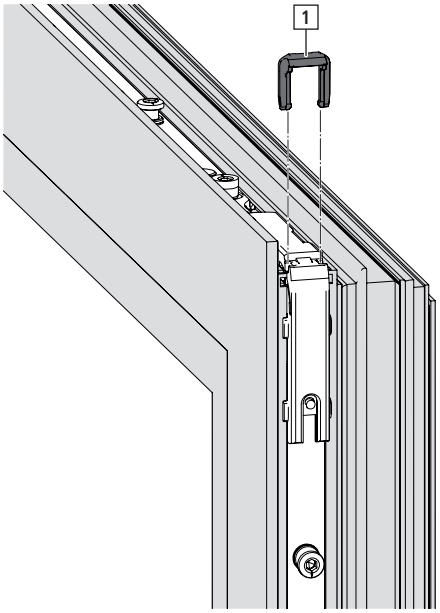
Comply with the installation sequence for the aluminium sash. → *from page 92*

1. Connect the corner drive [1] to the connecting-rod [2] and additional components at the coupling point.



2. Insert everything jointly into the connecting-rod groove.

3. Fix the corner drive to the sash using the retaining fork [1].



7.3.9.2

Installing reinforced corner drives

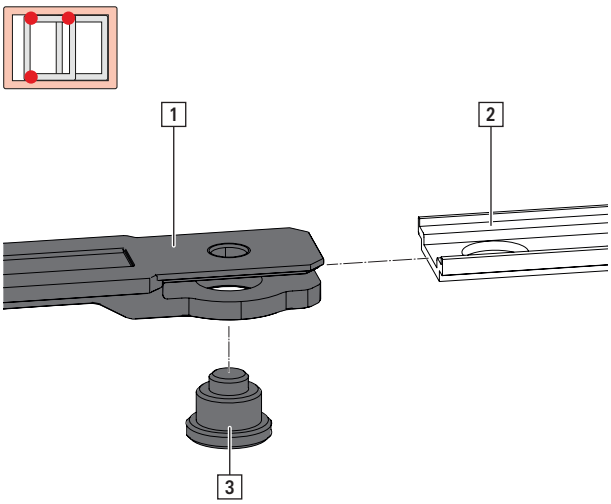
PRECONDITION

- Drill holes created in the handle → *from page 80*
- Cutout for the espagnolette routed → *from page 80*
- Sash corners opened → *from page 91*
- Connecting-rods prepared → *from page 90*
- Insertable cams installed → *from page 95*

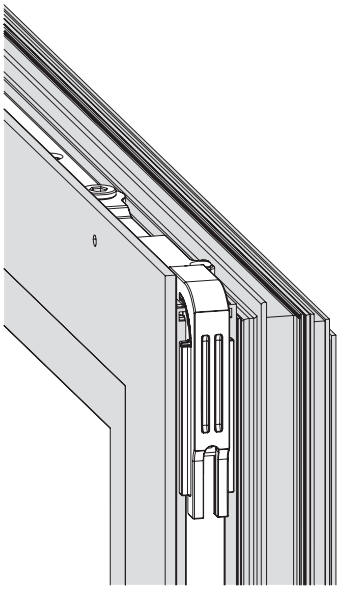
INFO

Comply with the installation sequence for the aluminium sash. → *from page 92*

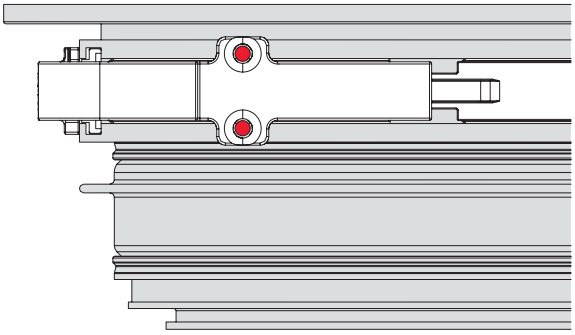
1. Connect the corner drive [1] to the connecting-rod [2] and additional components at the coupling point using the special screw [3].



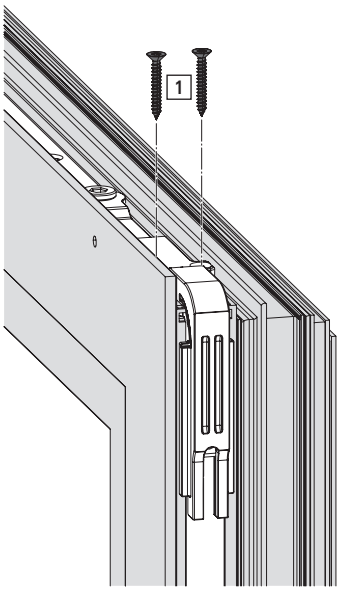
2. Insert everything jointly into the connecting-rod groove.



3. Drill holes through the corner drive in the sash using a Ø 3.0 drill.



4. Fix the corner drive to the sash using screws [1].



7.3.10 Connecting-rods on the hinge side

Installing connecting-rods on the hinge side

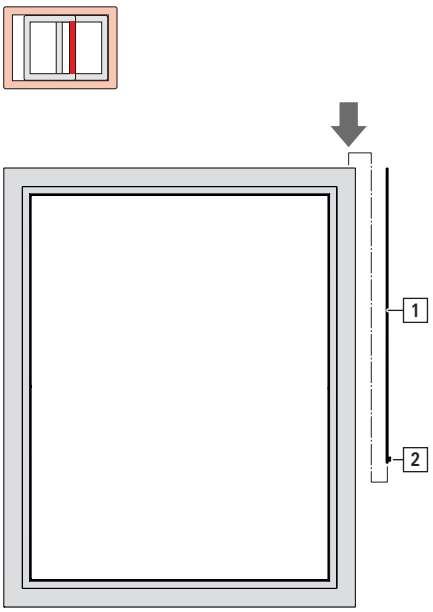
INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

1. Number and position of insertable cams in accordance with the installation drawings. → *from page 161*

2. Insert the insertable cams into the connecting-rod. → *7.3.7 "Insertable cams" from page 95*

Note the alignment of the insertable cam.

3. Insert the connecting-rod [1] with the insertable cam [2] into the connecting-rod groove from above on the hinge side.



7.3.11 Horizontal top connecting-rods and components

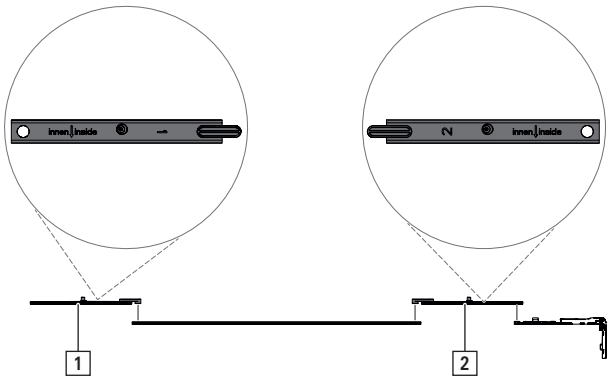
Variant	Number of connecting-rods	Corner drive	Additional components
Roto Patio Alversa | KS	1	from corner drive set	–
Roto Patio Alversa | PS without night ventilation			
Roto Patio Alversa | PS with night ventilation	1 3 (for RC2)		Night ventilation track 1 Night ventilation track 2 2 coupler components for RC2
Roto Patio Alversa | PS Air Com	2 (with SW < 1401 mm) 3 (with SW ≥ 1401 mm)	reinforced; from comfort set	Comfort scissor stay

Installing horizontal top connecting-rods and components

INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

PRECONDITION
Roto Patio Alversa | PS with night ventilation
Ensure that you install the night ventilation tracks in the following order (for DIN L):

1. Night ventilation track 1 [1]
2. Connecting-rod
3. Night ventilation track 2 [2]
4. Corner drive

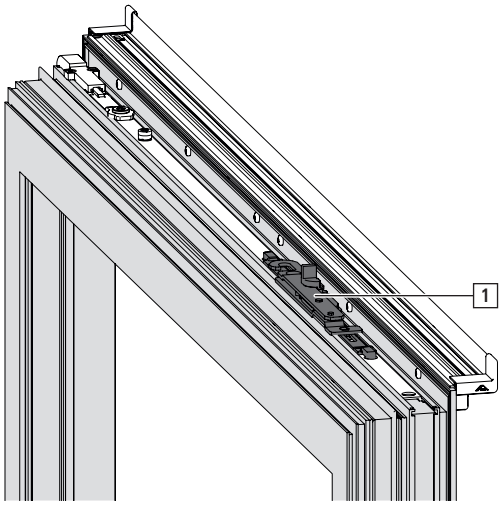


Installation is performed inversely for the DIN R sash.

PRECONDITION

Roto Patio Alversa | PS Air Com

Note the installation direction of the comfort scissor stay [1].



With SW ≥ 1401 mm, install 2 comfort scissor stays.

CAUTION

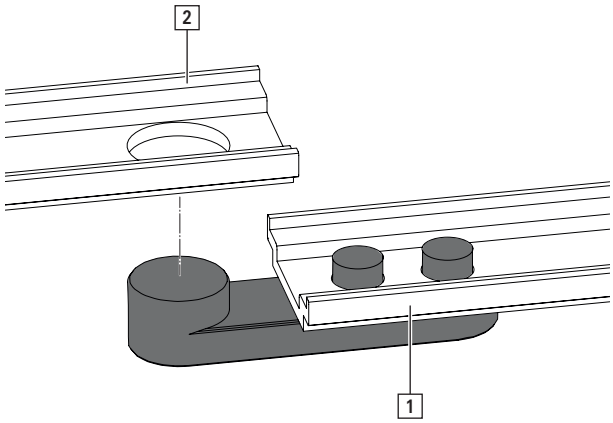
Selecting incorrect components may lead to property damage.

The comfort scissor stay must only be installed together with the mishandling device. Failure to do so may result in damage to the frame and hardware components.

- ▸ Only install the comfort scissor stay together with the mishandling device.

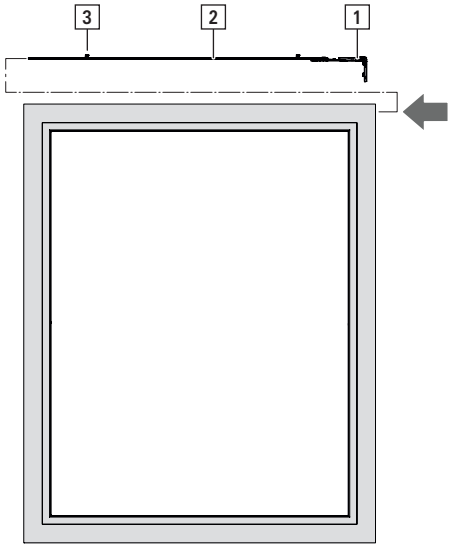
1. Select additional components on the basis of the table.

2. Connect additional components [1] to connecting-rods [2] at coupling points.



3. Connect the corner drive [1] to the connecting-rod [2] and additional part at the coupling point. → *7.3.6 "Connecting the coupling points" from page 93*

   Install the insertable cam [3]. → *7.3.7 "Insertable cams" from page 95*



4. Insert everything jointly into the connecting-rod groove at the top on the hinge side.

5. Fix the corner drive to the sash. → *7.3.9 "Corner drives" from page 100*

Roto Patio Alversa | PS Air Com:

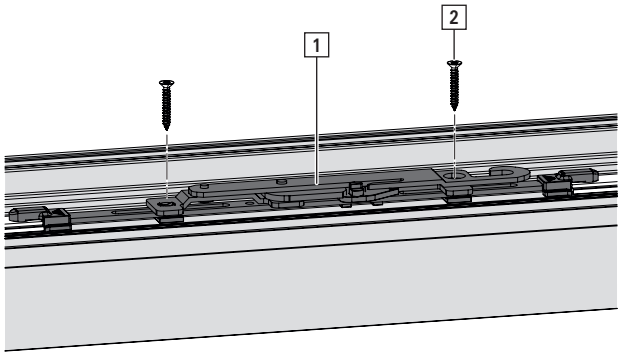
CAUTION

A loose comfort scissor stay may cause property damage

1. If the comfort scissor stay is loose, this causes the hardware to lose its hold and it may bend out of shape.

   Predrill the comfort scissor stay with Ø 3.0 drill at the 2 mounting holes.

   Screw down the comfort scissor stay [1] using screws [2].



7.3.12 Connecting-rods and espagnolette on the locking side

7.3.12.1 Espagnolette overview

Variant	Number of connecting-rods	Corner drive	Espagnolette	Espagnolette component	Handle
Roto Patio Alversa | KS Roto Patio Alversa | PS without / with night ventilation	2	from corner drive set	Flush-encased gearbox without mishandling device	–	e.g. Roto Line AL window handle
	2		SEC flush-encased gearbox without mishandling device	SEC drilling protection SEC rebate clearance reduction espagnolette SEC connector	
	1		Roto Line AL geared-handle	Insertable connector-bolt Geared-handle support	–
	2		Roto Line AL lockable geared-handle	SEC geared-handle protection Geared-handle support SEC connector	
	2		Flush-encased gearbox without / with profile cylinder	–	e.g. Roto Line Patio Alversa interior handle
	2		Roto Line Alversa geared-handle Roto Line Alversa lockable geared-handle	Adjustable centre section T-connector	–
Roto Patio Alversa | PS Air Com	2	reinforced; from comfort set	Roto Line Alversa geared-handle	Adjustable centre section T-connector	–
			Flush-encased gearbox without / with profile cylinder	–	e.g. Roto Line Patio Alversa interior handle

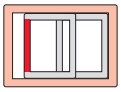
7.3.12.2 Flush-encased gearbox

Installing the flush-encased gearbox

INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

INFO
This is illustrated using a flush-encased gearbox without / with profile cylinder as an example.
The step "Fold in threaded eyes" is omitted for flush-encased gearboxs without mishandling device.
Turning the clampable lugs after installing a flush-encased gearbox without mishandling device ensures that it is seated so that it can be transported safely.

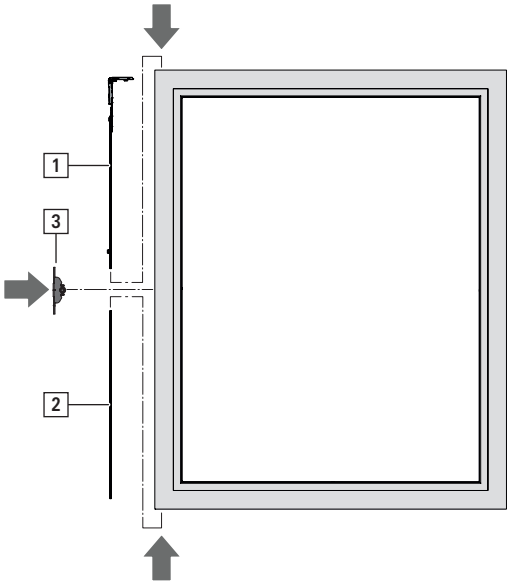
1. Position of the flush-encased gearbox in accordance with the installation drawings. → *from page 161*



2. Connect the corner drive to the connecting-rod [1] at the coupling point. → *7.3.6 "Connecting the coupling points" from page 93*

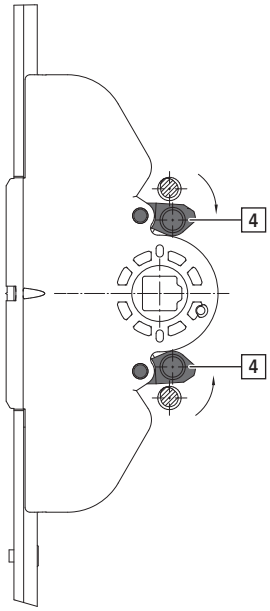
Install the insertable cam. → *7.3.7 "Insertable cams" from page 95*

3. Insert everything jointly into the connecting-rod groove from above on the locking side.



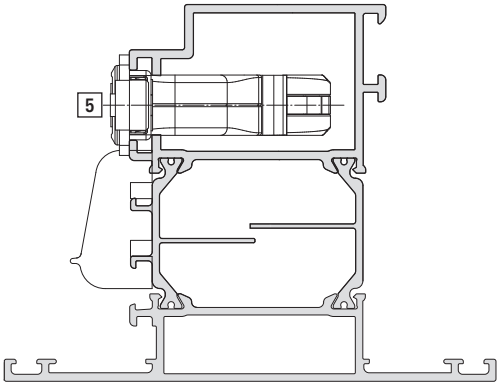
4. Insert the connecting-rod [2] and the insertable cam into the connecting-rod groove from below on the locking side.

5. Fold in the threaded eyes [4] on the flush-encased gearbox [3].



6. Place the flush-encased gearbox on the connecting-rods on the locking side and connect it to the coupling points.

7. Screw the espagnolette to the faceplate using screws [5].



8. Fix the corner drive to the sash. → *7.3.9 "Corner drives" from page 100*

7.3.12.3 Insertable connector-bolt

for Roto Line AL geared-handle

Installing the insertable connector-bolt

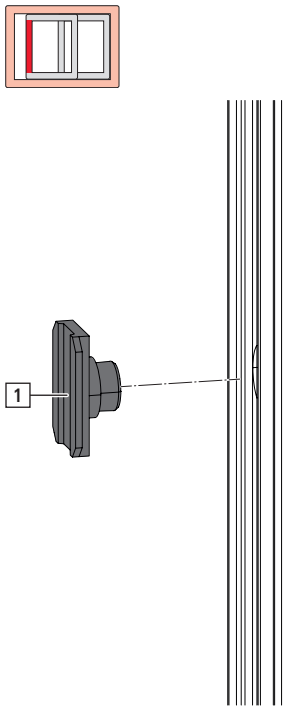
INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

1. Position of the insertable connector-bolt in accordance with the installation drawings. → *from page 161*

2. Connect the corner drive to the connecting-rod at the coupling point. → *7.3.6 "Connecting the coupling points" from page 93*

Install the insertable cam. → *7.3.7 "Insertable cams" from page 95*

3. Insert the insertable connector-bolt [1] into the continuous connecting-rod.



4. Insert everything jointly into the connecting-rod groove from above on the locking side.

5. Fix the corner drive to the sash using the retaining fork. → *7.3.9 "Corner drives" from page 100*

7.3.12.4 SEC geared-handle protection

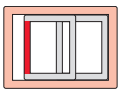
for Roto Line AL lockable geared-handle

Installing the SEC geared-handle protection

PRECONDITION
- Roto Line AL lockable geared-handle AL installed → *from page 120*

INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

1. Position of the SEC geared-handle protection in accordance with the installation drawings. → *from page 161*



2. Install the Roto Line AL lockable geared-handle with geared-handle support. → *from page 120*

INFO

It is not possible to install the geared-handle support at a later point.

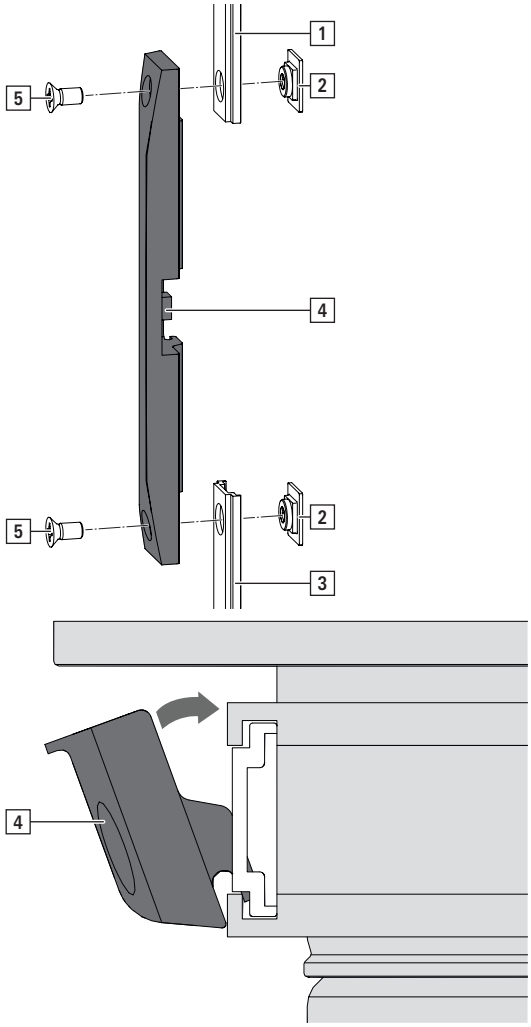
3. Screw down the SEC geared-handle protection onto the connecting-rods as follows.

a. Insert the corner drive with connecting-rod [1], SEC connector [2] and insertable cam into the connecting-rod groove from above on the locking side.

b. Insert the connecting-rod [3], SEC connector [2] and insertable cam into the connecting-rod groove from below on the locking side.

c. Swing the SEC geared-handle protection [4] into the connecting-rod groove on the locking side.

d. Screw down the SEC geared-handle protection onto the connecting-rods using screws on the SEC connectors.



4. Fix the corner drive to the sash. → *7.3.9 "Corner drives" from page 100*

7.3.12.5 Adjustable centre section

for Roto Line Alversa geared-handle

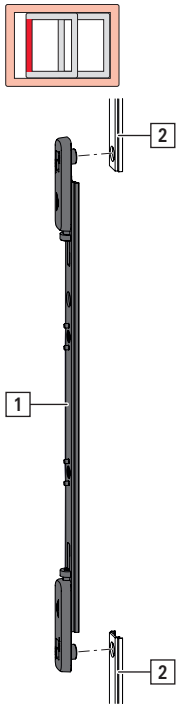
Installing the adjustable centre section

INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

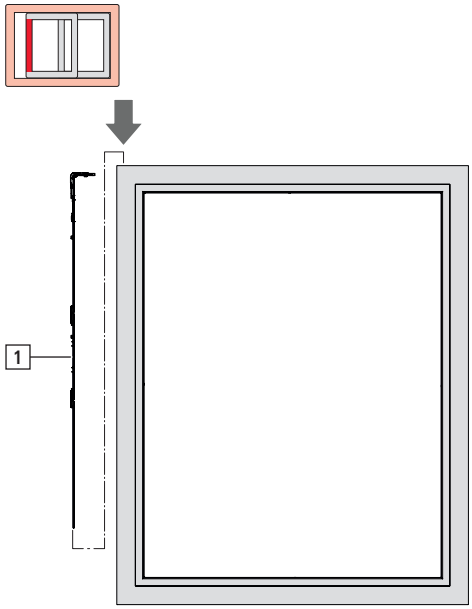
1. Position of the adjustable centre section in accordance with the installation drawings. → *from page 161*

2. Connect the corner drive to the connecting-rod at the coupling point. → *7.3.6 "Connecting the coupling points" from page 93*
   Install the insertable cam. → *7.3.7 "Insertable cams" from page 95*

3. Connect the adjustable centre section [1] to connecting-rods [2] at the coupling point.



4. Insert everything jointly into the connecting-rod groove from above on the locking side.



5. Fix the corner drive to the sash. → *7.3.9 "Corner drives" from page 100*

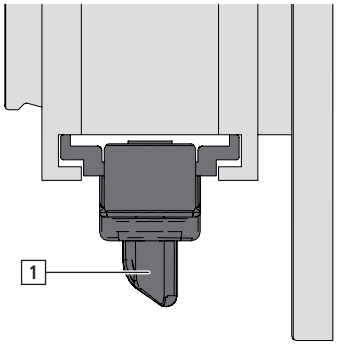
7.3.13 Horizontal bottom connecting-rods and components

Variant	Number of connecting-rods	Corner drive	Additional part
Roto Patio Alversa | KS	1 3 (for RC2)	from corner drive set	Left bullet catch track Right bullet catch track 2 coupler components for RC2
Roto Patio Alversa | PS without night ventilation	1		Travel restrictor → *7.3.14 "Travel restrictor" from page 117*
Roto Patio Alversa | PS with night ventilation	1 3 (for RC2)		Night ventilation track 1 Night ventilation track 2 2 coupler components for RC2
Roto Patio Alversa | PS Air Com	2	reinforced; from comfort set	Mishandling device

Installing the horizontal bottom connecting-rods and components

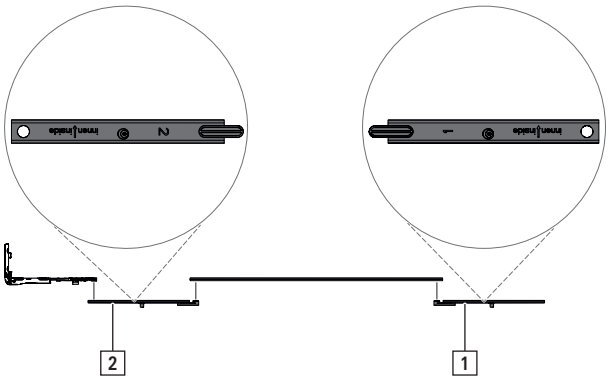
INFO
Comply with the installation sequence for the aluminium sash. → *from page 92*

PRECONDITION
Roto Patio Alversa | KS
Note the alignment of the bullet catch track [1].



PRECONDITION
Roto Patio Alversa | PS with night ventilation
Ensure that you install the night ventilation tracks in the following order (for DIN L):

1. Night ventilation track 1 [1]
2. Connecting-rod
3. Night ventilation track 2 [2]
4. Corner drive

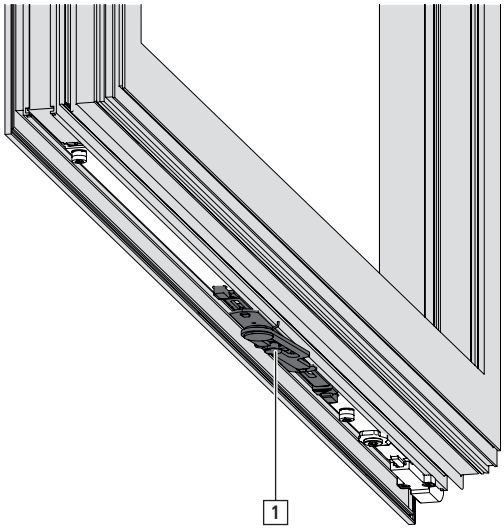


Installation is performed inversely for the DIN R sash.

PRECONDITION

Roto Patio Alversa | PS Air Com

Note the installation direction of the mishandling device [1].



CAUTION

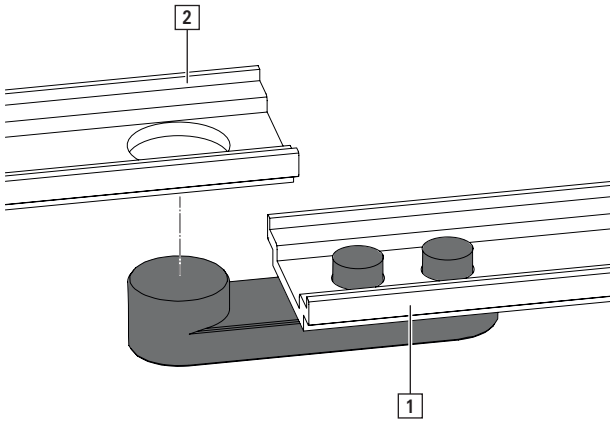
Selecting incorrect components may lead to property damage.

The mishandling device must only be installed together with the comfort scissor stay. Failure to do so may result in damage to the frame and hardware components.

- Only install the mishandling device together with the comfort scissor stay.

1. Select additional components on the basis of the table.

2. Connect additional components [1] to connecting-rods [2] at coupling points.



3. Connect the corner drive to the connecting-rod, insertable cam and additional part at coupling points. → *7.3.9 "Corner drives" from page 100*

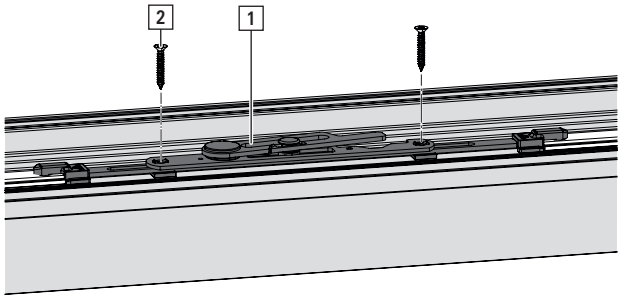
4. Insert everything jointly into the connecting-rod groove at the bottom on the locking side.

5. Fix the corner drive to the sash. → *7.3.9 "Corner drives" from page 100*
Roto Patio Alversa | PS Air Com:

CAUTION

A loose mishandling device may cause property damage

1. If the mishandling device is loose, this causes the hardware to lose its hold and it may bend out of shape.
Move the mishandling device [1] into the centre position.
Predrill the mishandling device with Ø 3.0 drill at the 2 mounting holes.
Screw down the mishandling device using screws [2].



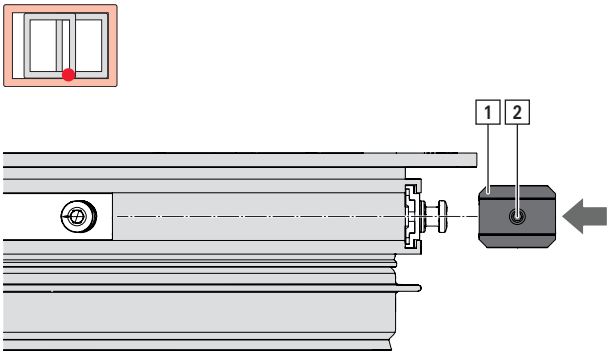
7.3.14 Travel restrictor

Installing the travel restrictor

PRECONDITION
Handle installed. → *7.3.15 "Handle" from page 118*

1. Move the handle to the sliding position (horizontally aligned with the escutcheon cover).

2. Slide the bottom travel restrictor [1] from the hinge side to the horizontal bottom connecting-rod and screw down with a screw [2].

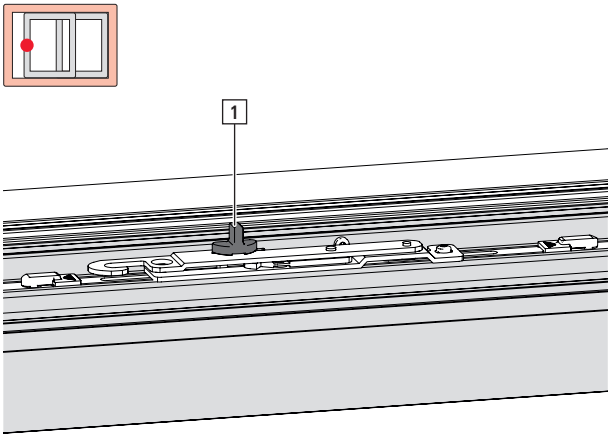


7.3.15 Handle

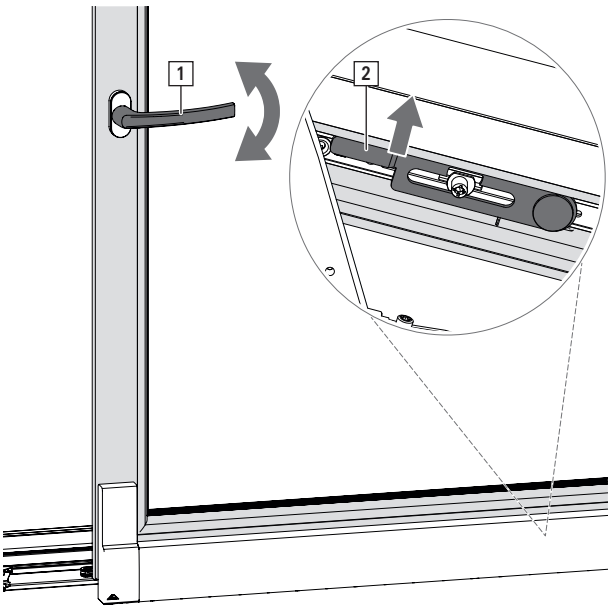
7.3.15.1 Centre-fixing

Removing the centre-fixing

1. Remove the centre-fixing [1] from the top comfort scissor stay.



2. Actuate the bottom mishandling device [2] to turn the handle.

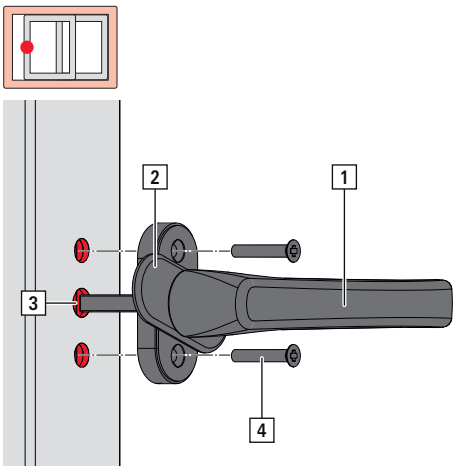


7.3.15.2 Roto Line Alversa standard

Installing the handle – Flush-encased gearbox

1. Move the handle [1] to the sliding position (horizontally aligned with the escutcheon cover).

2. Rotate the cover [2] on the handle 90°.



3. Insert the handle into the sash [3].

4. Screw down the handle using screws [4].
   Flush-encased gearbox without mishandling device: overcome the resistance of the transport protection.

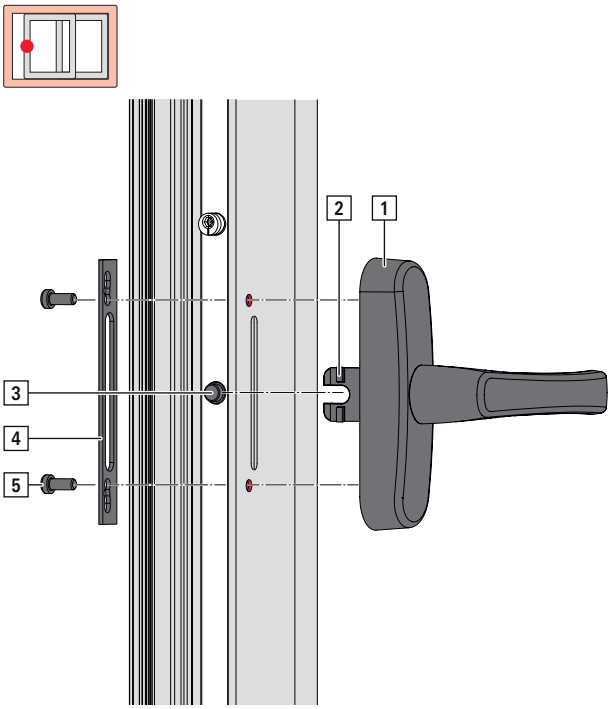
5. Rotate the cover on the handle 90°.

7.3.15.3 Roto Line AL geared-handle

Installing the handle – Insertable connector-bolt / SEC geared-handle protection

PRECONDITION
On RC2 with SEC geared-handle protection, the handle must be installed before the SEC geared-handle protection. → *from page 111*

1. Move the handle to the sliding position.



2. Place the espagnolette [1] on the sash from the inside of the sash.
   The fork [2] engages in the connector-bolt [3].

3. Install the geared-handle support [4] from the outside of the sash on the sash to the espagnolette.

a. Align the geared-handle support on the drill holes.
b. Screw down the espagnolette using screws [5].

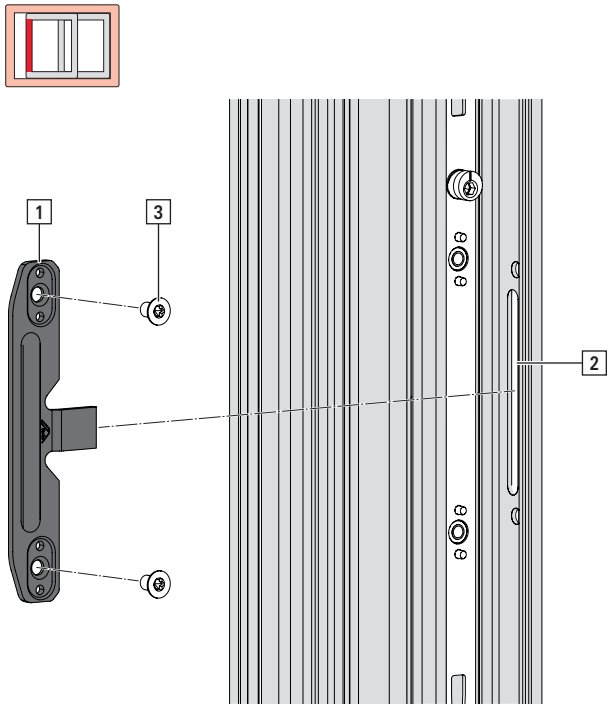
4. Turn the handle to check that it runs smoothly.

5. Move the handle to the closed position.

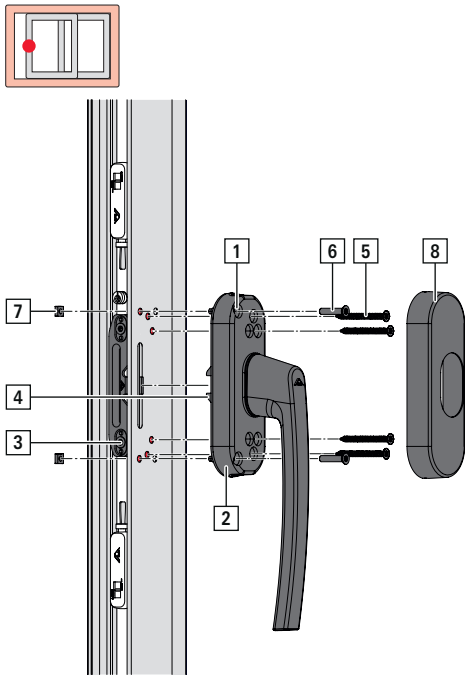
7.3.15.4 Roto Line Alversa geared-handle

Installing the handle – Adjustable centre section with T-connector

1. Insert the T-connector [1] through the slot on the handle [2].
   Screw down the T-connector on the adjustable centre section using screws [3].



2. Open the drill holes [1] on the espagnolette [2].



3. Move the handle to the sliding position (horizontally aligned with the escutcheon cover).

4. Place the espagnolette on the sash.
   The connector [3] engages in the coupling point [4].

5. Screw down the espagnolette using screws [5] and [6] and square nuts [7].

INFO

Roto Patio Alversa | PS Air Com:

Remove the centre-fixing from the comfort scissor stay. → *118*

6. Move the handle to the closed position and attach the cover [8].

7. Move the handle to the sliding position.

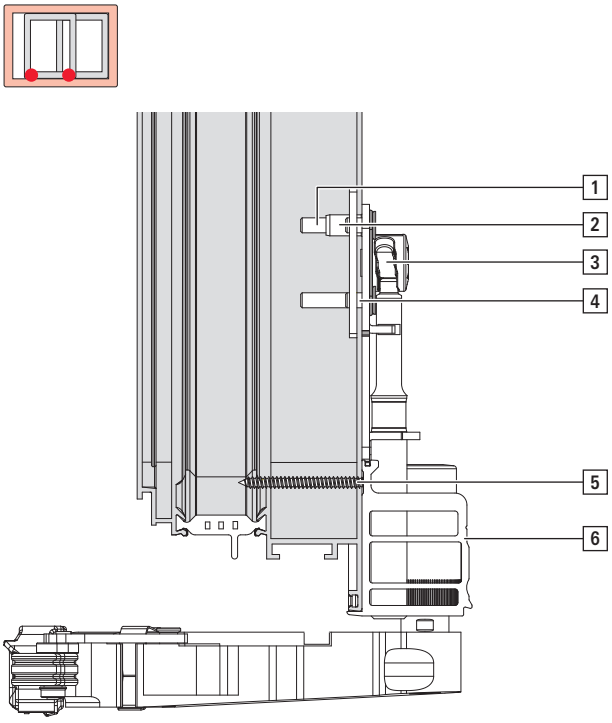
7.3.16 Bogies / reinforcement brackets

WARNING

Incorrect screw connections may lead to serious injuries.

The hardware components can be pulled out of the sash if they are not screwed through a profile wall that is at least 6 mm thick in total or screwed down using rivet nuts.

- Select the length of the screws so that they will hold in the aluminium profile. Alternatively, insert additional aluminium profiles.



Assignment	Designation
[1]	Screw for reinforcement bracket
[2]	Rivet nut
[3]	Reinforcement bracket
[4]	Screw for reinforcement bracket
[5]	Screw
[6]	Bogie

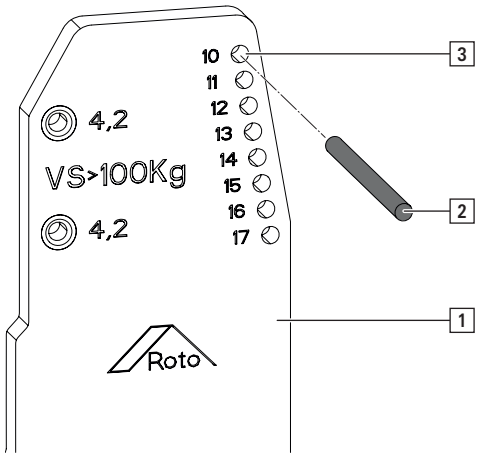
The following installation sequence applies to the following components:

- Bogies up to 160 kg (with / without damping)
- Tandem bogies up to 200 kg (with damping)

INFO
Leading bogies are installed on the locking side.
Trailing bogies are installed on the hinge side.

7.3.16.1 Preparing the drilling jig

1. Insert the dowel pin [2] into the dowel pin position 10 [3] on the drilling jig [1].



INFO
2 drilling jigs are required for each sash side on tandem bogies. Only insert the dowel pin into the outer drilling jig.

INFO
Drill holes on the inside of the sash.

INFO
Always install 2 reinforcement brackets for the Roto Patio Alversa | PS.

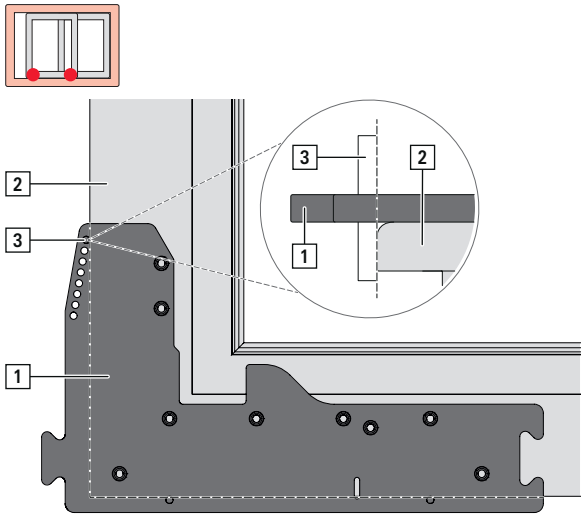
The following drill holes are required:

Determining the drill holes

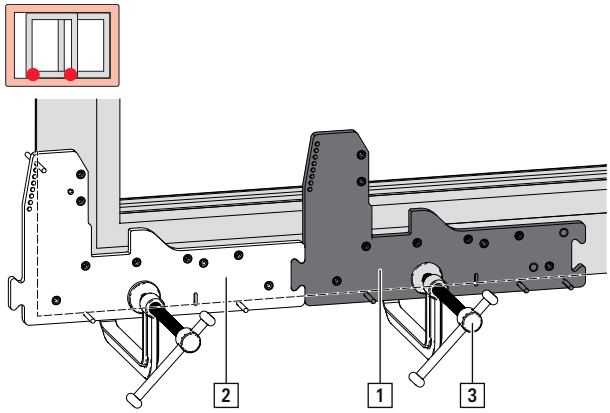
Sash weight	Bogies	Reinforcement brackets
Up to 100 kg For: Roto Patio Alversa | KS	2 bogies 4 drill holes each	without
Up to 160 kg	2 bogies 4 drill holes each	2 reinforcement brackets 2 drill holes each
over 160 kg	2 tandem bogies 8 drill holes each	2 reinforcement brackets 2 drill holes each

Positioning the drilling jig

1. Position the drilling jig [1] on the lower edge of the sash [2].
   The dowel pin [3] is located on the outside of the sash.



2. For tandem bogies, insert the second drilling jig [1] into the first drilling jig [2].



3. Check that the drilling jig is seated correctly.

4. Fasten the drilling jig(s) using a screw clamp [3].

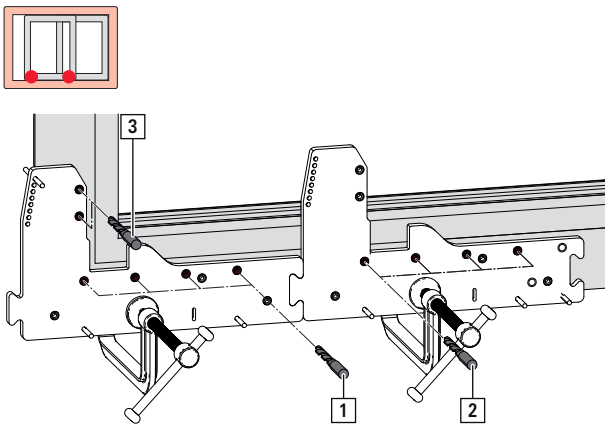
7.3.16.2 Drilling the holes

WARNING
Incorrect screw connections may lead to serious injuries.
The hardware components can be pulled out of the sash if they are not screwed through a profile wall that is at least 6 mm thick in total or screwed down using rivet nuts.
- ▸ Select the length of the screws so that they will hold in the aluminium profile. Alternatively, insert additional aluminium profiles.

INFO
2 drilling jigs are required for each sash side on tandem bogies. Only insert the dowel pin into the outer drilling jig.

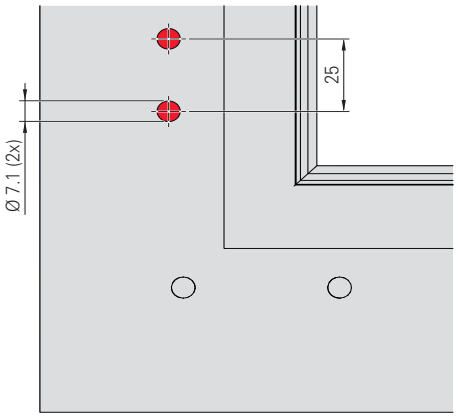
INFO
Drill holes on the inside of the sash.

INFO
Drill holes for reinforcement brackets in Tilt&Slide systems with a sash weight of over 100 kg.



1. Drill the holes [1] for the bogies, or
   Drill the holes [1] and [2] for the tandem bogie.
   S.kg > 100 kg: drill the holes [3] for the reinforcement brackets.
   Drill: Ø 4.2 mm

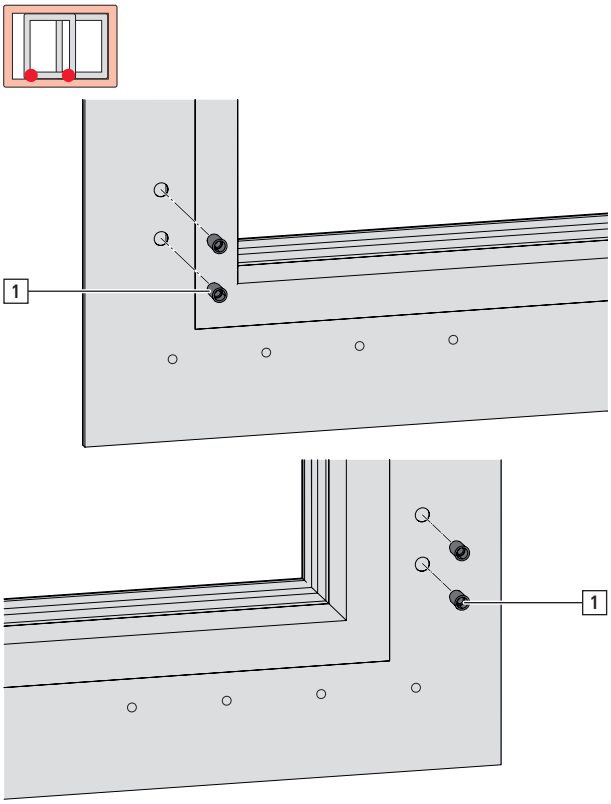
2. Drill Ø 4.2 mm inner holes with a Ø 7.1 mm drill.



7.3.16.3 Rivet nuts

Fitting rivet nuts

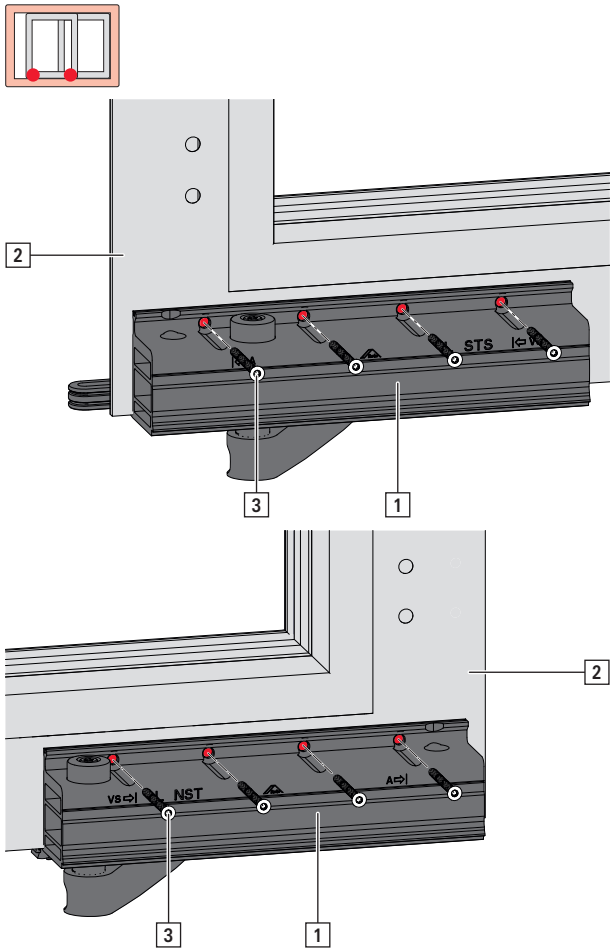
1. Fit rivet nuts [1] in the drill holes for the reinforcement brackets.



7.3.16.4 Bogies

Installing the bogies

1. Place the bogies [1] on the sash [2].

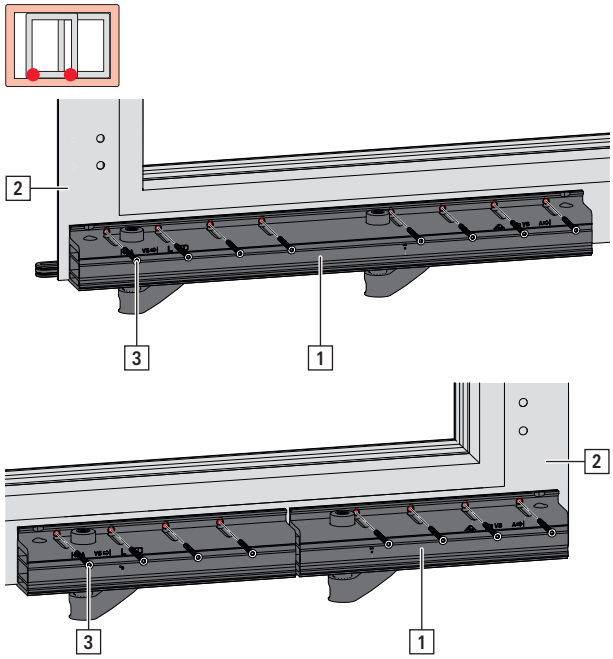


2. Check that the bogies are seated correctly:
   - Distance from the outer edges of the sash. → *7.3.16.1 "Preparing the drilling jig" from page 123*
   - Flush with the lower edge of the sash frame.

3. Screw down each bogie with 4 screws [3].

Installing the tandem bogies

1. Place the tandem bogies [1] on the sash [2].

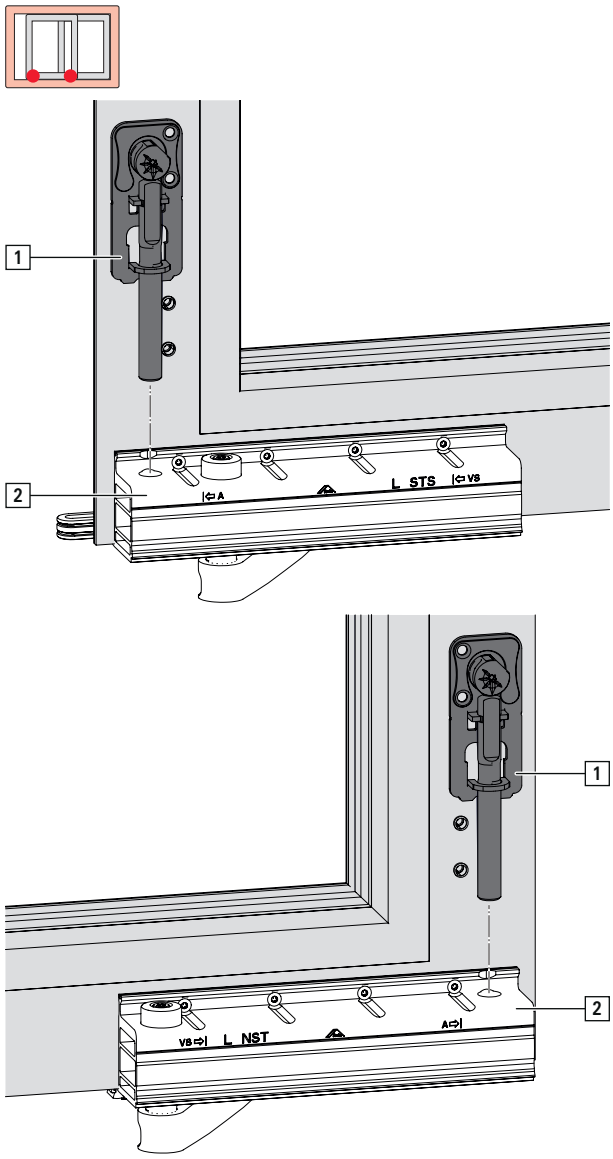


2. Check that the tandem bogies are seated correctly:
   - Distance from the outer edges of the sash. → *7.3.16.1 "Preparing the drilling jig" from page 123*
   - Flush with the lower edge of the sash frame.

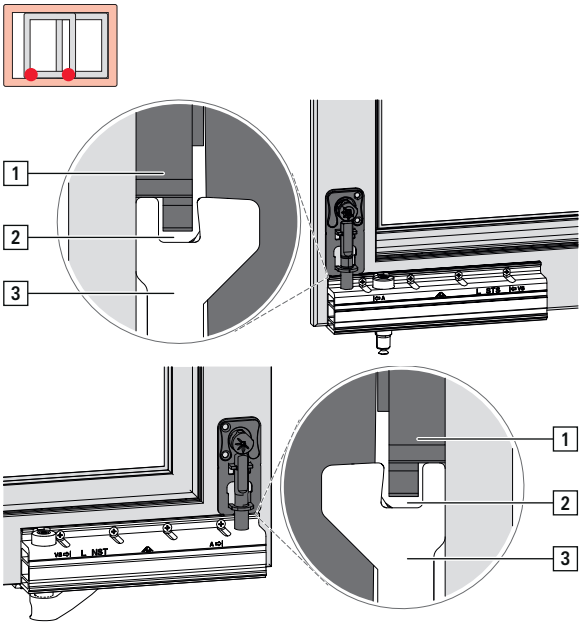
3. Screw down each tandem bogie with 8 screws [3].

7.3.16.5 Installing the reinforcement brackets

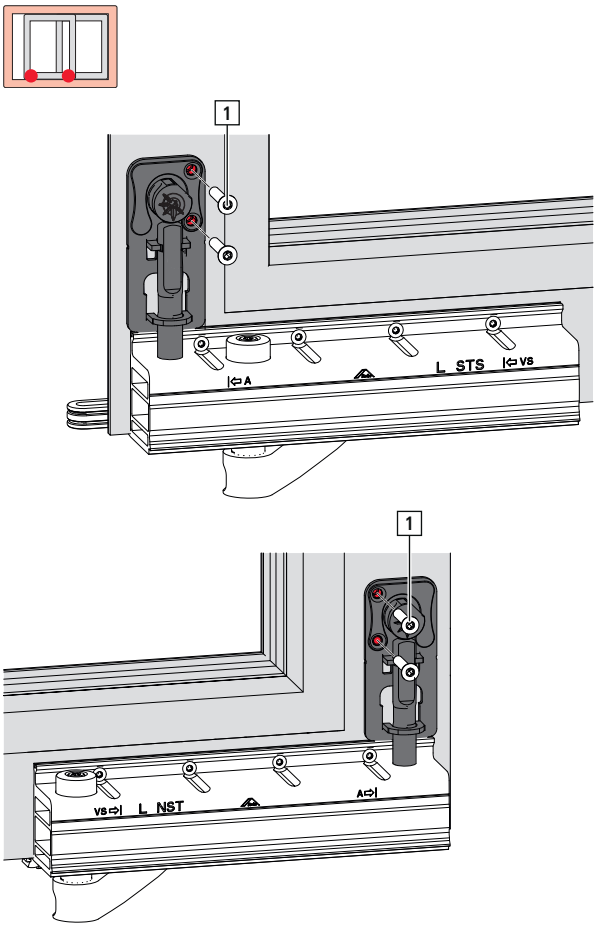
1. Insert the reinforcement brackets [1] into the bogies [2].



2. Check that the reinforcement brackets are seated correctly.
   Has the reinforcement bracket [1] been inserted into the guide groove [2] in the bogie [3]?



3. Screw down the reinforcement brackets with 2 screws [1].



7.3.17 Support bracket

7.3.17.1 Support bracket drill holes

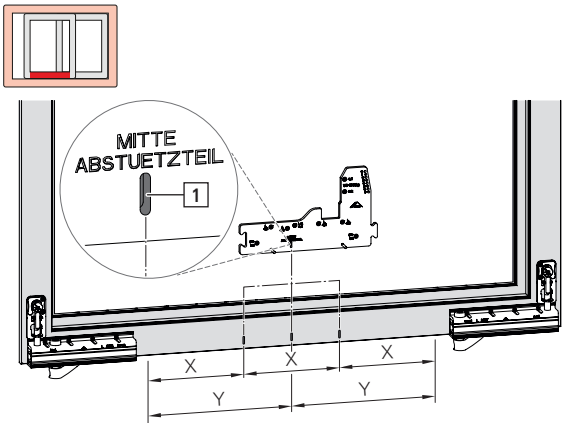
Drilling the holes for the support bracket

1. Determine the position of the support brackets with the same distance on the right and left.

> **INFO**
>
> Always install two cover support brackets from SRW > 1400 mm.

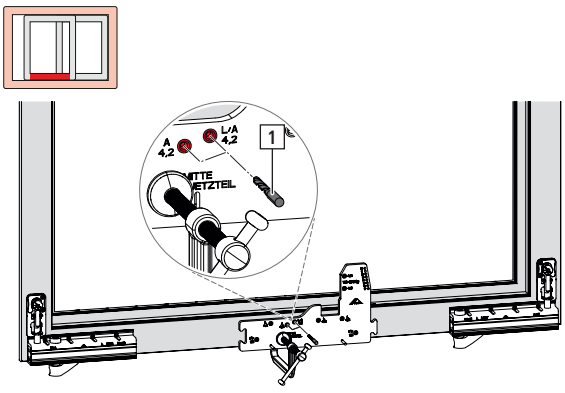
2. Mark the position of the support brackets.

3. Place the drilling jig on the marking [1].



4. Fix the drilling jig in place using the screw clamp.

5. Drill the holes [1] for the support brackets.

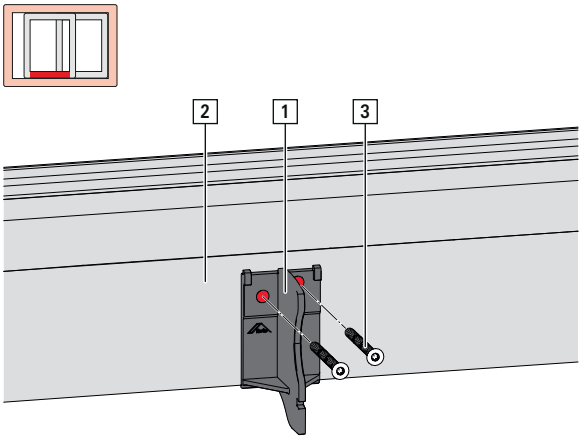


7.3.17.2 Cover support bracket

Installing the cover support bracket

PRECONDITION
With SW > 1480, install 2 cover support brackets.

1. Place the cover support bracket [1] on the sash [2].



2. Screw down the cover support bracket with 2 screws [3].

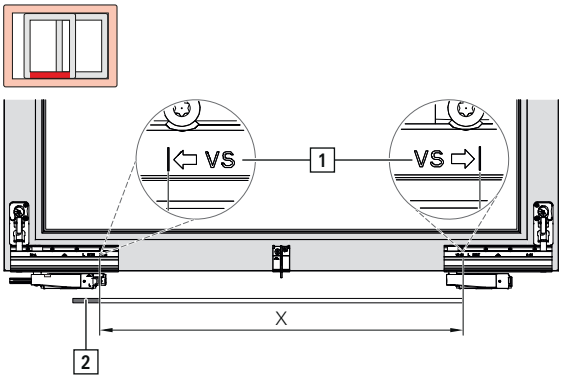
7.3.18 Connecting rod / connecting-rod support-block

7.3.18.1 Connecting rod

Cropping the connecting rod

Connecting rod for	Length
Bogies without damping (Roto Patio Alversa | KS only)	according to the marking
Bogies with damping (Roto Patio Alversa | PS only)	according to the marking, minus 315 mm

1. Mark the connecting rod according to the bogie markings [1].

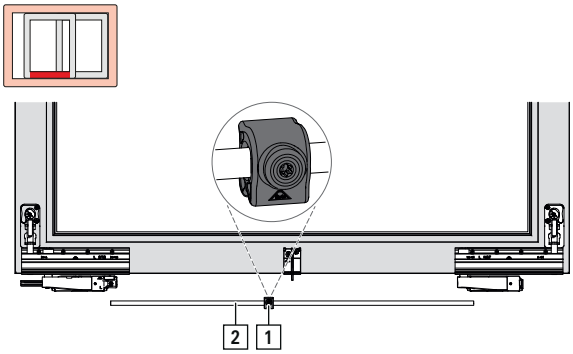


2. Crop the connecting rod [2].

7.3.18.2 Connecting-rod support-block

Installing the connecting-rod support-block

1. From an SW of > 1480 mm: push an additional connecting rod support-block [1] to the centre of the connecting rod [2].



2. Align the connecting-rod support-block with the bogie.

> **INFO**
>
> Position the threaded bolt so that it is perpendicular to the inside of the sash.

3. Screw down the connecting rod support-block on the connecting rod (torque: 2 – 3 Nm).

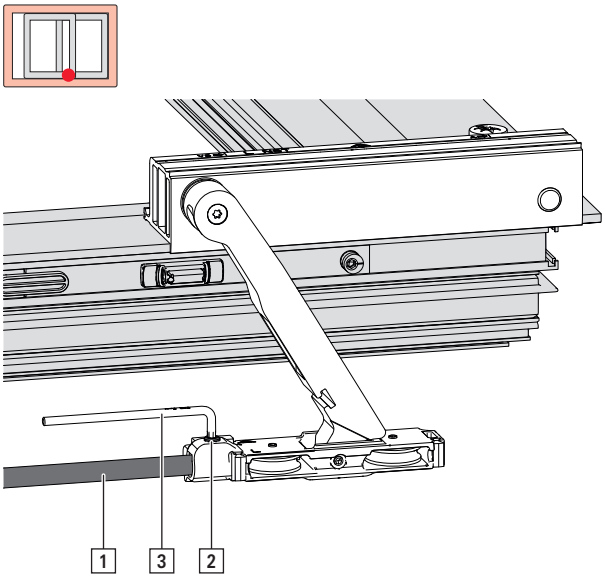
7.3.18.3 Connecting rod

Installing the connecting rod

INFO
The drilling jig for the bogie or the jig for the top guide block can be used for the purpose of fixing the support arm to the bogie. While doing so, ensure that the jig rests on the sash component of the bogie.

1. Insert the connecting rod [1] on the hinge side.

2. Tighten the screw [2] on the hinge side using a T25 hexalobular socket screwdriver [3] (torque: 5 – 7 Nm).



3. Place the drilling jig [1] for fixing the support arm [2] on the bogie [3] on the hinge side.

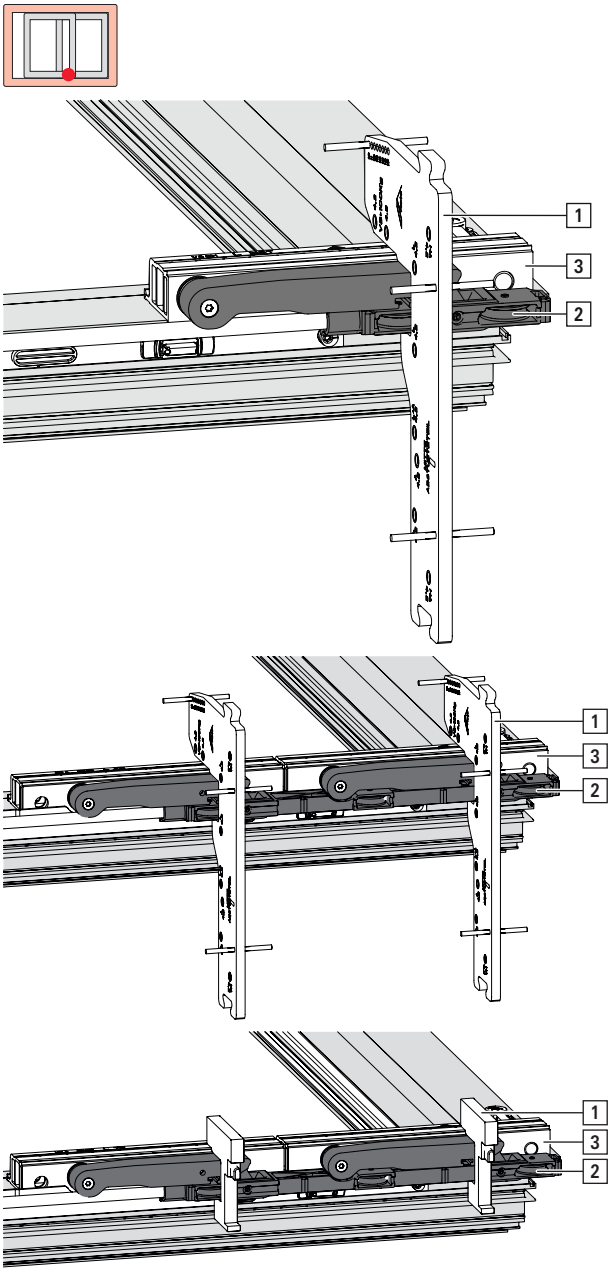
   Check that the jig is resting on the sash component of the bogie.

   For a tandem bogie:

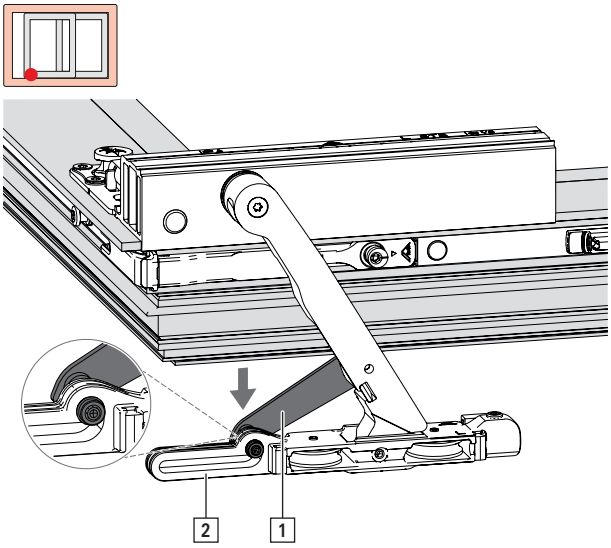
   Place the drilling jigs [1] for fixing the support arm [2] on the bogie [3] on the hinge side.

   Alternatively:

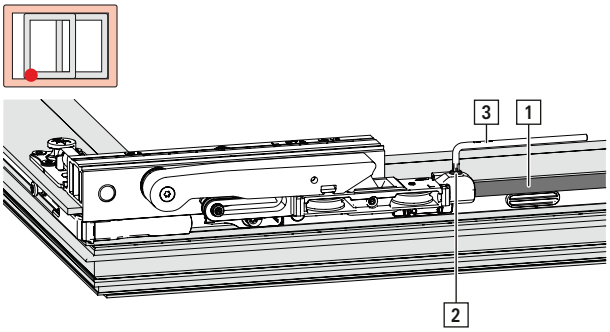
   Place the top guide block jigs [1] for fixing the support arm [2] on the bogie [3] on the hinge side.



4. Unlock the control arm [1] on the locking side of the bogie housing [2] by moving it downwards and fold up the support arm.



5. Insert the connecting rod [1] on the locking side.



6. Align the support arms so that they are parallel with the frame.

   Check that the jig is resting on the sash component of the bogie.

   If necessary, place a second drilling jig on the locking side of the bogie in order to fix the support arm.

7. Tighten the screw [2] on the locking side using a T25 hexalobular socket screwdriver [3] (torque: 5 – 7 Nm).

7.4 Frame

INFO
Install the frame hardware components on the horizontal frame (workshop).
The reveal in the wall prevents frame hardware components from being installed correctly.

7.4.1 Frame hardware components

Installing the frame hardware components

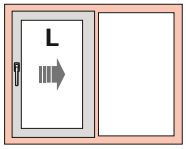
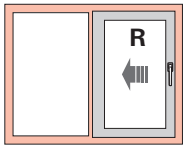
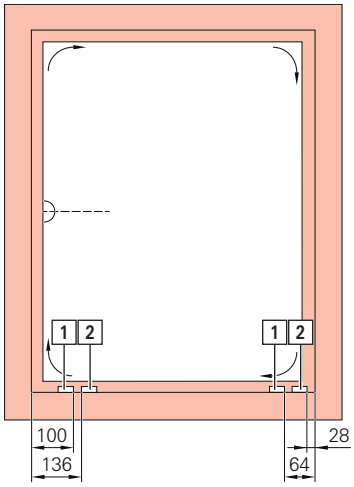
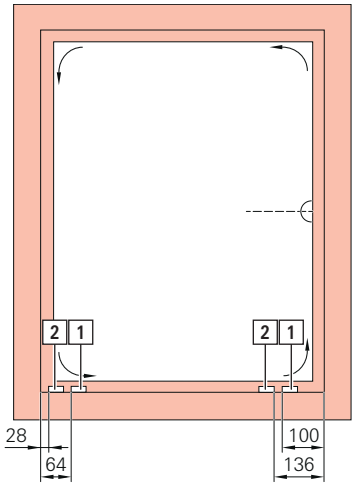
1. Position strikers, guide strikers, tilt strikers, the frame component for the mishandling device and the frame component for the comfort scissor stay in accordance with the installation drawings. → *from page 161*

Variant	Frame component
Roto Patio Alversa | KS	Strikers Guide strikers
Roto Patio Alversa | PS without night ventilation	Strikers
Roto Patio Alversa | PS with night ventilation	Strikers Night ventilation strikers
Roto Patio Alversa | PS Air Com	Strikers Tilt strikers Comfort scissor stay frame component (with SW > 1401, install 2 frame components) Mishandling device frame component

7.4.2 Tilt strikers

7.4.2.1 Overview with dimensional drawing

INFO
Do not mix up strikers and tilt strikers. Tilt strikers are marked with a red glue dot that can be removed after installation.

Tilt striker positions on the left	Tilt striker positions on the right
	
	

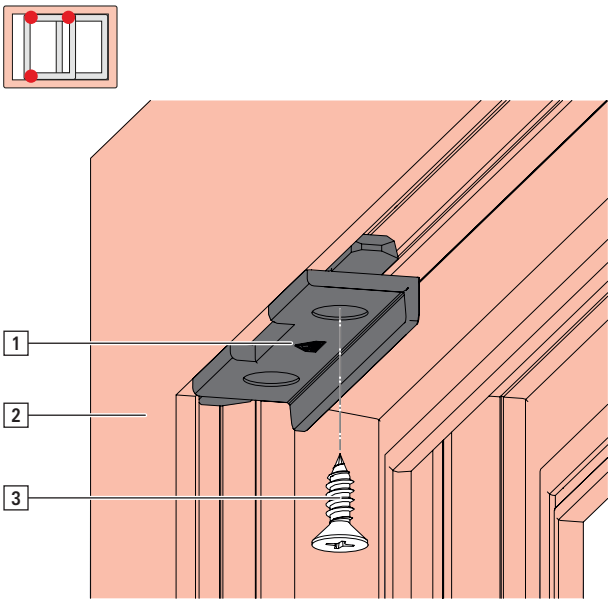
[1] Striker

[2] Tilt striker

7.4.3 Corner drive SEC rebate clearance reduction

Installing corner drive SEC rebate clearance reduction

1. Insert corner drive SEC rebate clearance reductions [1] into the frame [2].



2. Push the corner drive SEC rebate clearance reductions all the way into the corner and screw down with the screw [3].

7.4.4 Guide track

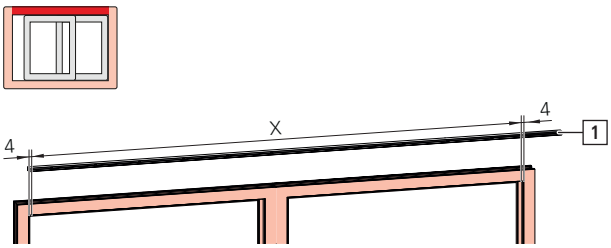
WARNING
Incorrect screw connections may lead to serious injuries.
The hardware components can be pulled out of the sash if they are not screwed through a profile wall that is at least 6 mm thick in total or screwed down using rivet nuts.

- Select the length of the screws so that they will hold in the aluminium profile. Alternatively, insert additional aluminium profiles.

7.4.4.1 Preparing the guide track

Cropping the guide track

1. Crop the guide track [1].
   X = frame internal width + (2 x coverage) - 8

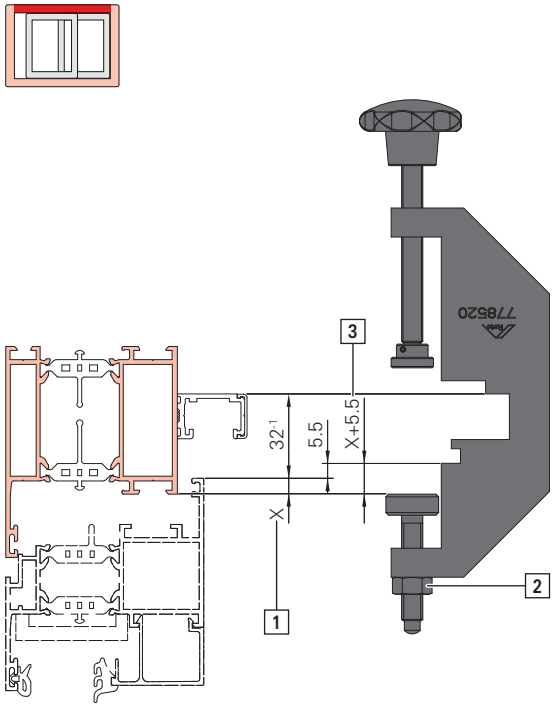


7.4.4.2 Guide track drill holes

Drilling the holes for the guide track

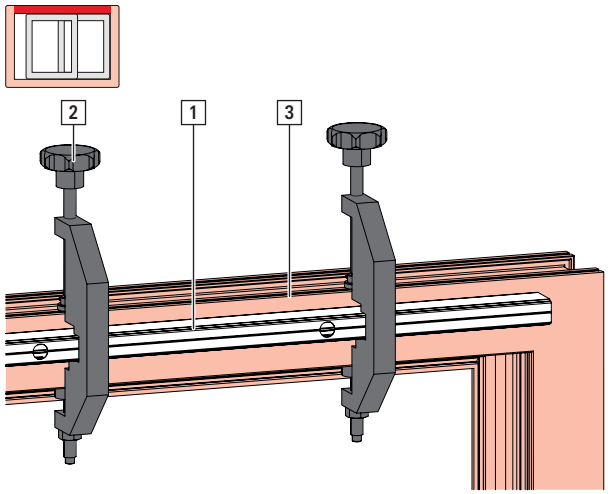
1. Adjust the jig for the guide track.

a. Determine coverage X [1] with a clearance of 11.5 mm.
b. Undo the nut [2].
c. Adjust dimension X + 5.5 [3] for the guide track.
d. Tighten the nut.

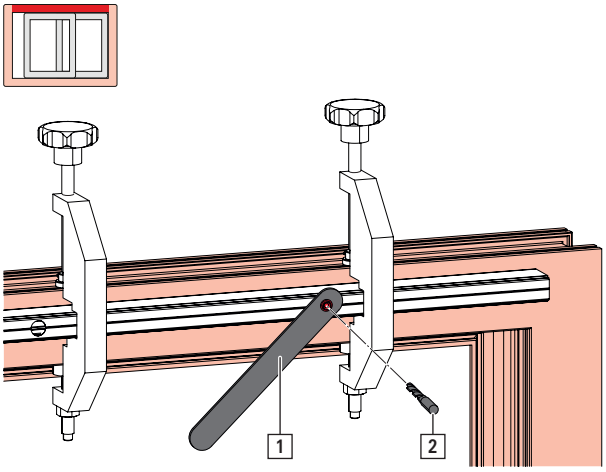


2. Align the guide track [1] with jigs [2] in the centre of the frame [3].

a. Position the guide track in 2 jigs.
b. Place the jigs with the guide track on the frame from below.
c. Fasten the jigs to the frame.

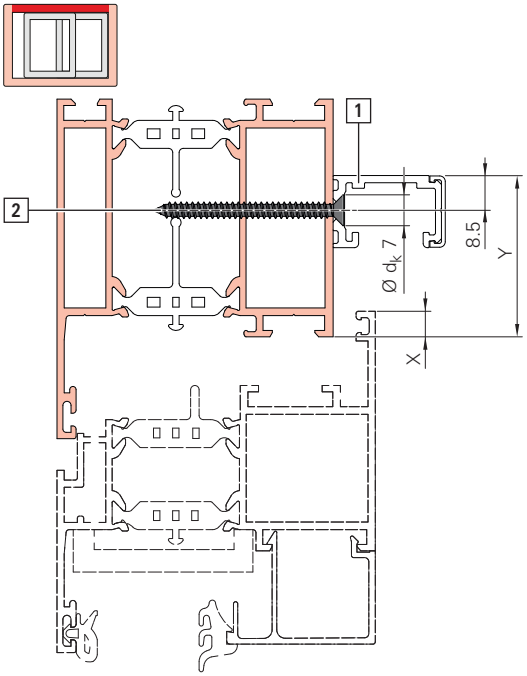


3. Use a drilling aid [1] to drill holes in the guide track.
   Drill [2]: Ø 3.0 mm



7.4.4.3 Installing the guide track

1. Fasten the guide track to the frame with the distance dimension Y. Note coverage X.
   With coverage 4: Y = 36 mm.
   With coverage 5: Y = 37 mm.
   With coverage 6: Y = 38 mm.



2. Screw down the guide track [1] in all predrilled holes using screws [2].

7.4.5 Scissors-slider

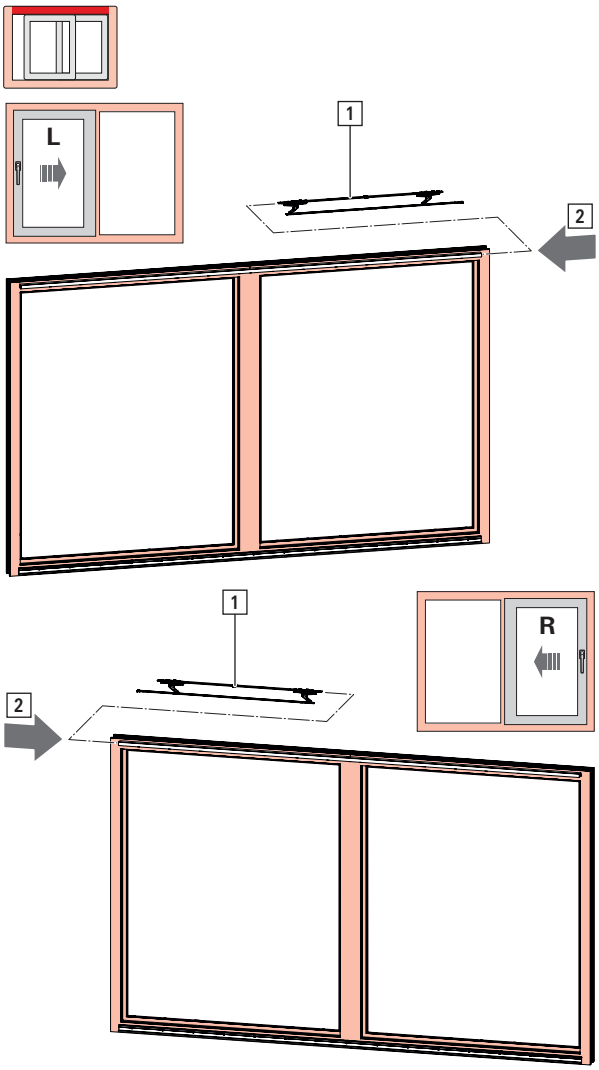
WARNING
Trapped limbs may result in injuries.
When being transported, the scissors-slider can open and close uncontrollably. This can result in limbs being trapped and seriously injured.
- ▸ Note the danger zone in the scissors-slider.
- ▸ Close the scissors-slider after installation and secure it in place for transport.
- ▸ Wear safety gloves.

The scissor-stay retention must always be located on the hinge side.

- The Roto Patio Alversa | KS scissors-slider can be pushed past the middle (dead centre) and be used for left and right-hand sashes. Always note the correct side during insertion.
- The Roto Patio Alversa | PS scissors-slider is available in left or right-hand variants.

Inserting the scissors-slider

1. Open the scissors-slider [1].



2. Insert the scissors-slider into the guide track from the hinge side [2].

3. Close the scissors-slider and secure it in place for transport and to prevent it from opening and falling out.

7.4.6 Roller track

WARNING
Incorrect screw connections may lead to serious injuries.
The hardware components can be pulled out of the sash if they are not screwed through a profile wall that is at least 6 mm thick in total or screwed down using rivet nuts.
- ▶ Select the length of the screws so that they will hold in the aluminium profile. Alternatively, insert additional aluminium profiles.

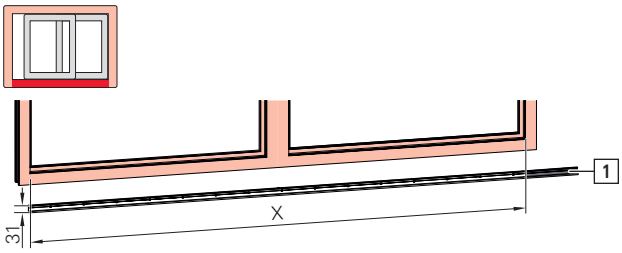
CAUTION
Inadequate load transfer may lead to crushing and property damage.
If no underlay is present between the roller track and base, this can cause the sash to fall.
- ▶ Underlay the roller track over the entire length on site in order to transfer the load.

7.4.6.1 Preparing the roller track

Cropping the roller track

INFO
Install the roller track on the horizontal frame (workshop).

1. Crop the roller track [1].
   X = frame internal width + (2 x coverage)

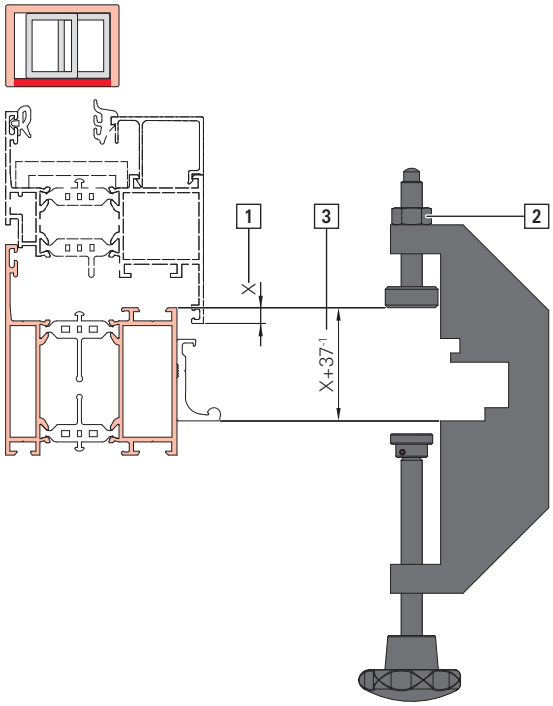


7.4.6.2 Roller track drill holes

Drilling the holes for the roller track

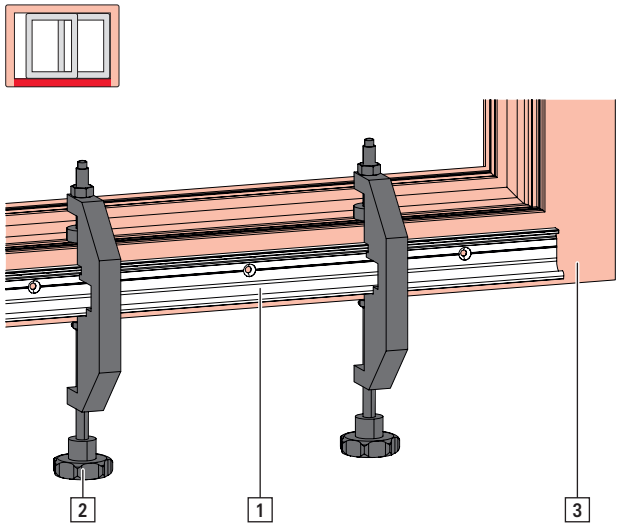
1. Adjust the jig for the roller track.

a. Determine coverage X [1] with a clearance of 11.5 mm.
b. Undo the nut [2].
c. Adjust dimension X + 37 $^{-1}$ [3] for the roller track.
d. Tighten the nut.

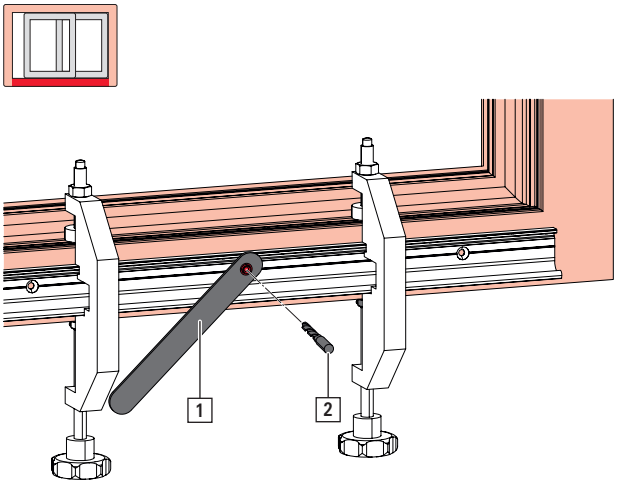


2. Align the roller track [1] with jigs [2] in the centre of the frame [3].

a. Position the roller track in 2 jigs.
b. Place the jigs with the roller track on the frame from above.
c. Fasten the jigs to the frame.



3. Use a drilling aid [1] to drill holes in the roller track.
   Drill [2]: Ø 3.0 mm

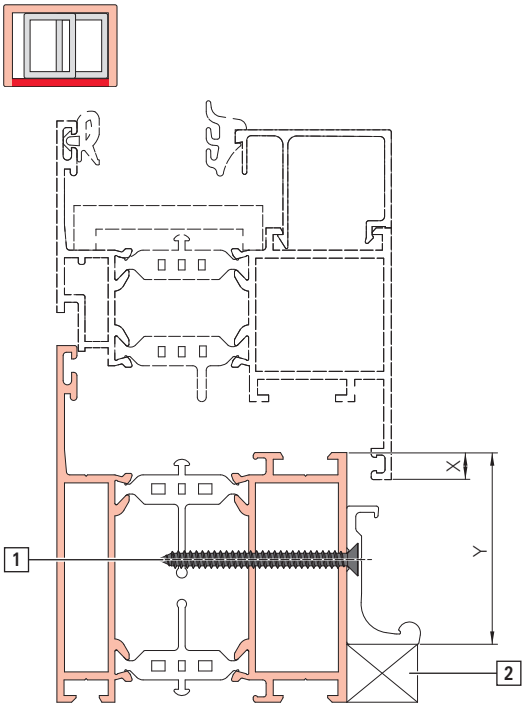


7.4.6.3 Roller track

Installing the roller track

CAUTION
Inadequate load transfer may lead to crushing and property damage.
If no underlay is present between the roller track and base, this can cause the sash to fall.
▶ Underlay the roller track over the entire length on site in order to transfer the load.

1. Fasten the roller track to the frame with the distance dimension Y. Note coverage X.
   With coverage 4: Y = 41 mm.
   With coverage 5: Y = 42 mm.
   With coverage 6: Y = 43 mm.
   Screw down the roller track in all predrilled holes using screws [1].



2. Underlay the roller track over the entire length on site in order to transfer the load [2].

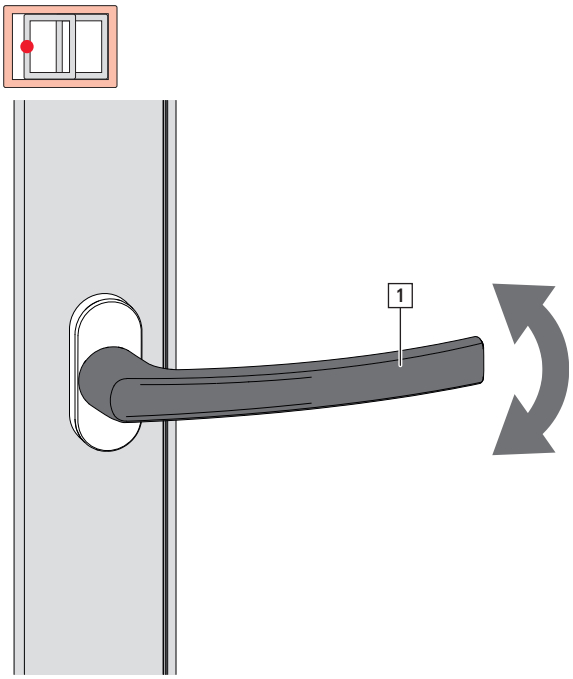
7.5 Joining the sash and frame

WARNING
Heavy loads pose the risk of injury and property damage.
Lifting and carrying heavy loads in an uncontrolled manner may lead to physical injury and property damage.
- Transport and installation must be carried out by at least two people.
- Do not rest sashes on the bogies.
- Use transportation means. → *13 "Transport" from page 190*

7.5.1 Sash

Placing the sash on the roller track

1. Move the handle [1] into the sliding position.



2. Lock the bogies in the stopped position.

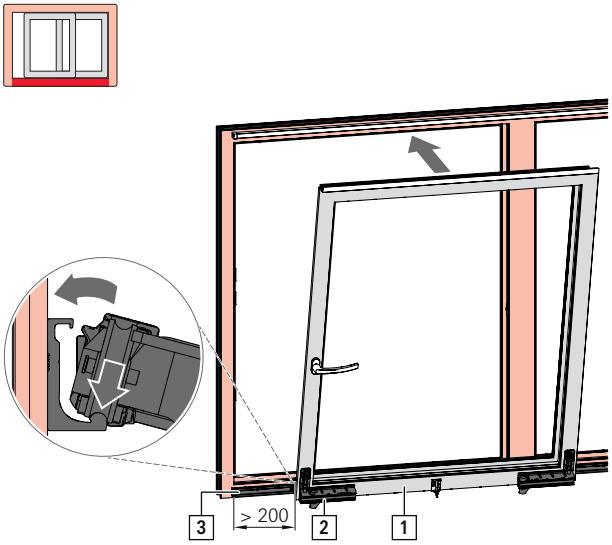
3. Place the sash in front of the frame.

a. Use a clean underlay.

b. Only use a support-brace in the centre of the frame so that the bogies can hang free.

4. Lift the sash at a slight incline.

5. Place the sash [1] with the bogie rollers [2] on the front edge of the roller track [3].



6. Check that the bogie rollers are correctly positioned on the roller track by pushing the sash.

   The bogies must run smoothly.

7.5.2 Scissors-slider

DANGER

Connecting the scissors-slider to the sash incorrectly presents an immediate danger to life and may cause serious injuries.

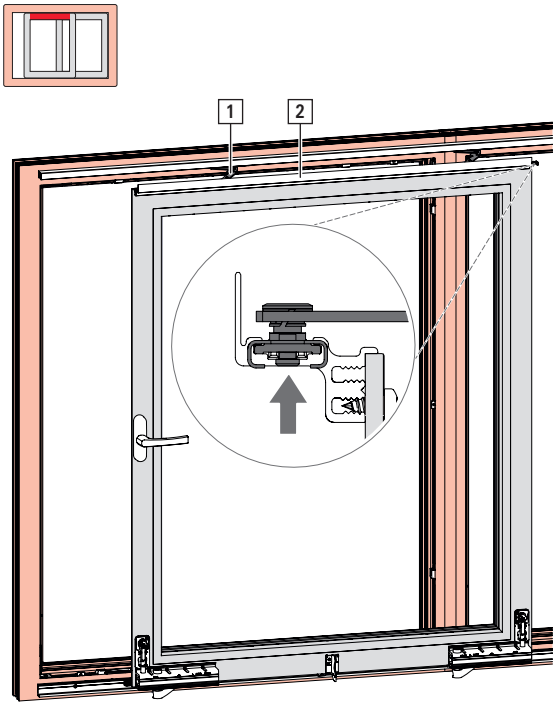
The window sash can fall out if the scissors-slider is not engaged correctly or not engaged at all in the drill hole in the stay-connecting profile, and if the end caps for the stay-connecting profile have not been installed. This results in an immediate danger to life.

- ▶ Engage the scissors-slider safety pin in the drill hole in the stay-connecting profile correctly (see the following figure).
- ▶ Install the end caps for the stay-connecting profile with the preassembled locking plate.

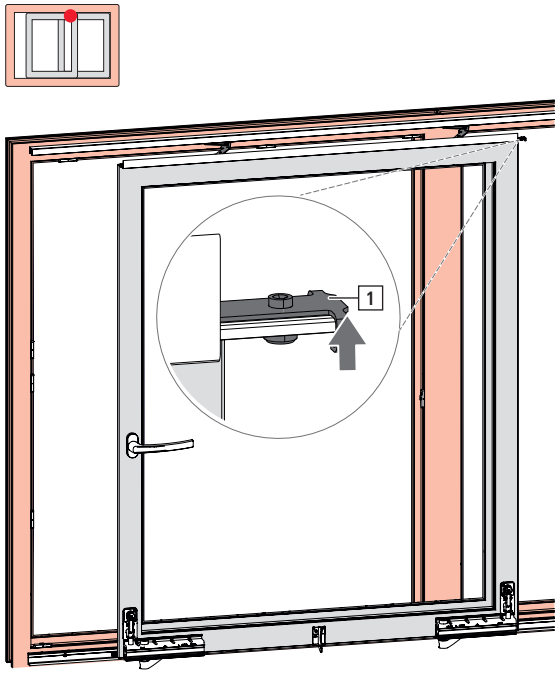
Inserting the scissors-slider into the sash

Drill hole in the stay-connecting profile.

1. Insert the scissors-slider [1] into the groove of the stay-connecting profile [2] from the hinge side.



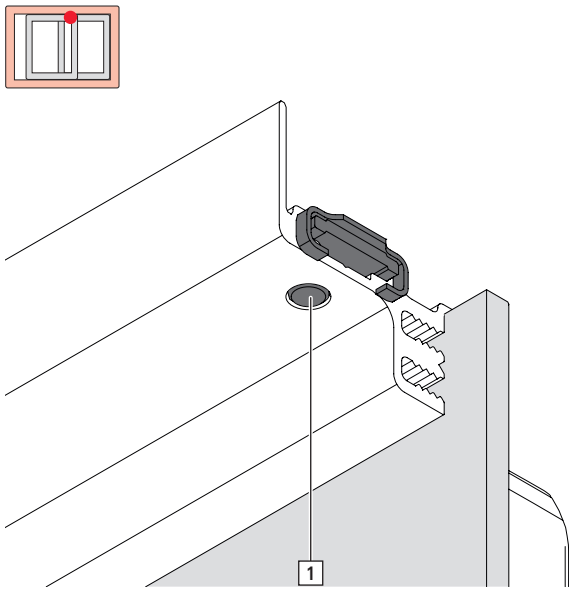
2. Push the scissors-slider spring [1] upwards.



3. Continue to push the scissors-slider until the scissors-slider safety pin engages in the drill hole in the stay-connecting profile.

4. Check that the scissors-slider has been installed correctly.

   The safety pin must be visibly engaged in the drill hole [1] in the stay-connecting profile from below.

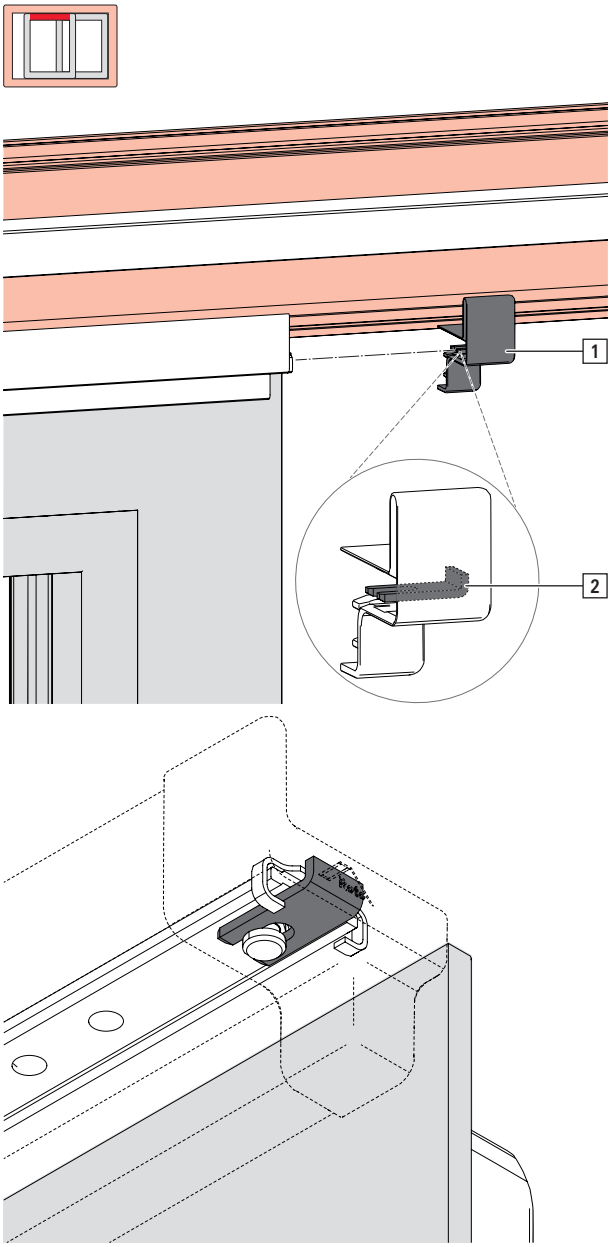


7.5.3 End caps for stay-connecting profile

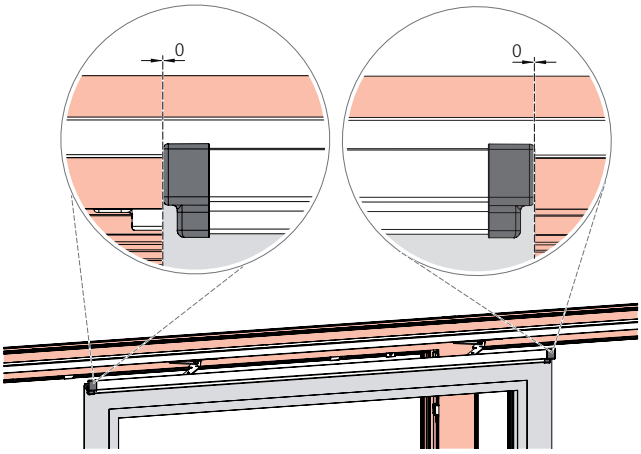
Installing end caps for the stay-connecting profile

1. Place the end caps [1] on the left and right ends of the stay-connecting profile.

   The locking plate [2] in the end caps prevents the safety pin from inadvertently coming out of the stay-connecting profile.



2. Check the end caps to ensure that they lie flush with the sash.



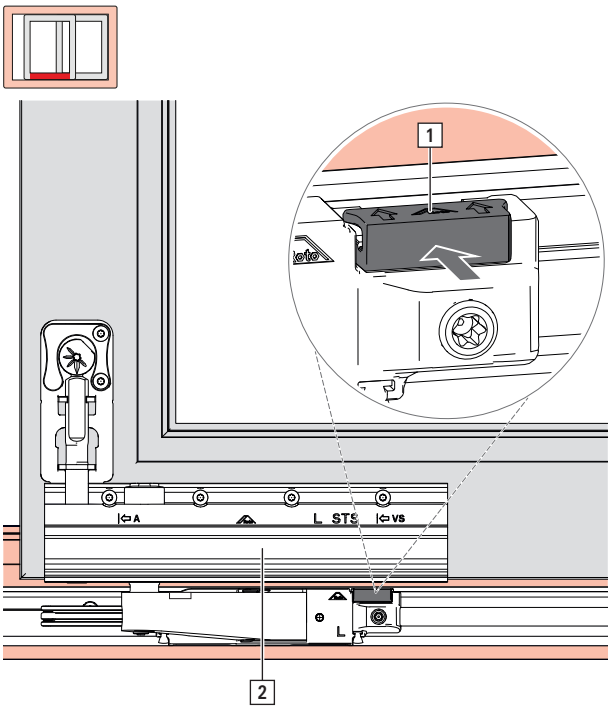
7.5.4 Bogie safety mechanism

PRECONDITION
Adjustment completed. → *9 "Adjustment" from page 174*
- Horizontal bogies
- Horizontal clearance

Activating the bogie safety mechanism

WARNING
A missing bogie safety mechanism poses the risk of injury and property damage.
If the bogie safety mechanism is not engaged correctly or not engaged at all, the window sash is not adequately secured.
- ▸ Check that the bogie safety mechanisms are seated correctly.
- ▸ Note the following figure.

1. Push the bogie safety mechanisms [1] backwards on both bogies [2] until they engage.



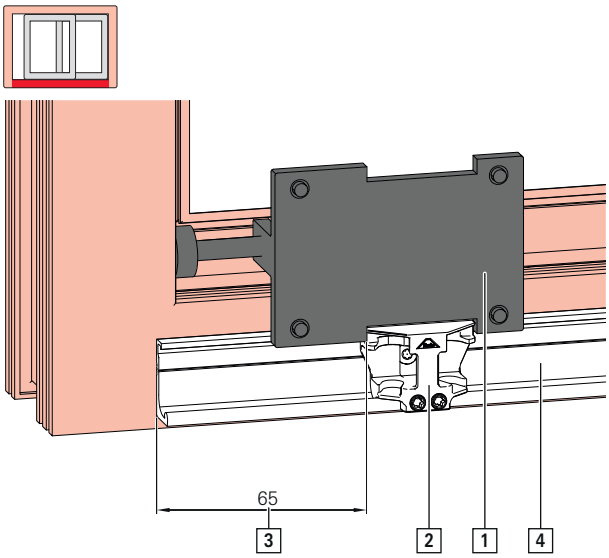
7.5.5 Bottom guide block

7.5.5.1 Installing the bottom guide block

PRECONDITION
Adjustment completed. → *9 "Adjustment" from page 174*
- Horizontal clearance

1. Diagram A: installation using a positioning jig

a. Adjust the jig [1] for the guide block [2] to approximately 65 mm [3] according to the figure.



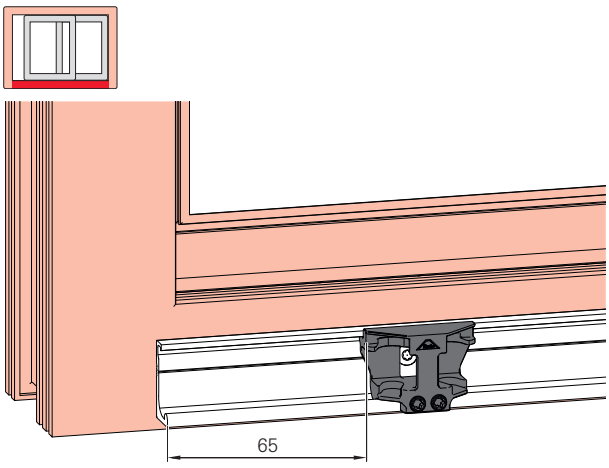
b. Insert the guide block in the roller track [4].

c. Place the jig for the guide block on the roller track.

2. Diagram A (alternative): installation using a dimensional drawing

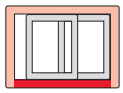
a. Insert the guide block [2] on the locking side without a jig.

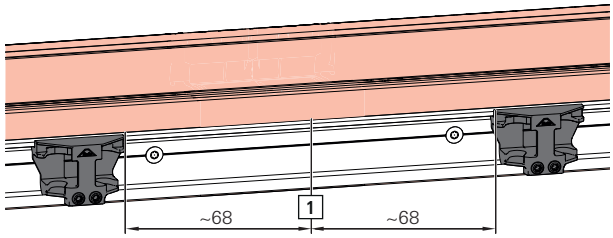
b. Position the guide block approximately 65 mm from the outer edge of the roller track on the locking side.



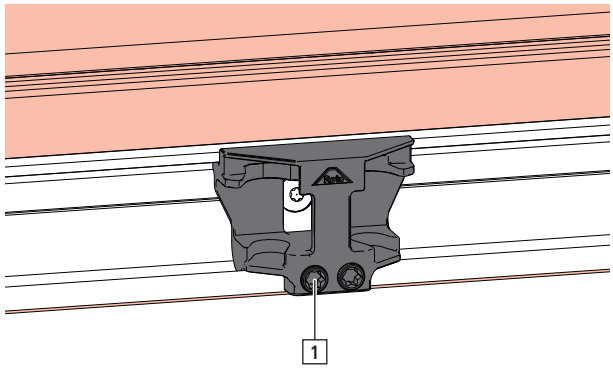
3. Diagram C: installation using a dimensional drawing

a. Position the guide block approximately 68 mm from the centre of the frame [1] if there is a continuous roller track.





4. Gently tighten one of the two screws [1] on the guide block using a T25 hexalobular socket screwdriver (torque: max. 1 Nm).



5. Move the sash into the closed position.

6. Check for 11.5 mm clearance on both sides.
   If necessary, reposition the guide block.

7. Tighten both screws on the guide block using a T25 hexalobular socket screwdriver (torque: max. 3 – 4 Nm).

7.5.6 Fixed top guide block

7.5.6.1 Preparing the top guide block

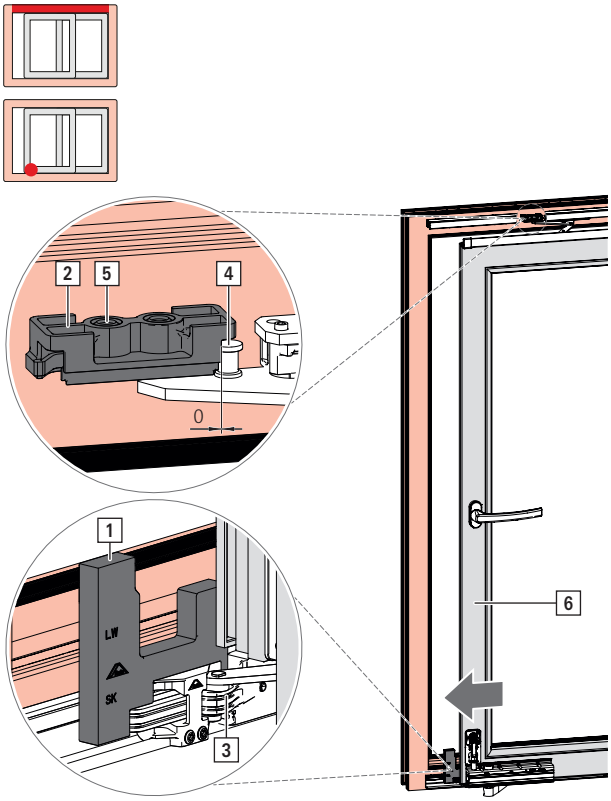
PRECONDITION
Adjustment completed. → *9 "Adjustment" from page 174*

1. Push the sash until it reaches the bottom guide block.
   The sash must fully remain in the stopped position.

7.5.6.2 Fixed top guide block

Installing the fixed top guide block

1. Place the jig [1] for the fixed top guide block [2] on the bottom guide block with bogies [3].



2. Insert the fixed top guide block into the guide track until it reaches the scissors-slider pilot drift [4].

3. Gently tighten the screws [5] on the fixed top guide block using a T25 hexalobular socket screwdriver (torque: max. 1 Nm).

4. Remove the jig.

5. Move the sash [6] into the closed position.

6. Check for 11.5 mm clearance on both sides.
   If necessary, reposition the fixed top guide block.

7. Tighten both screws on the fixed top guide block using a T25 hexalobular socket screwdriver (torque: max. 3 – 4 Nm).

7.5.7 Tiltable top guide block

7.5.7.1 Preparing the top guide block

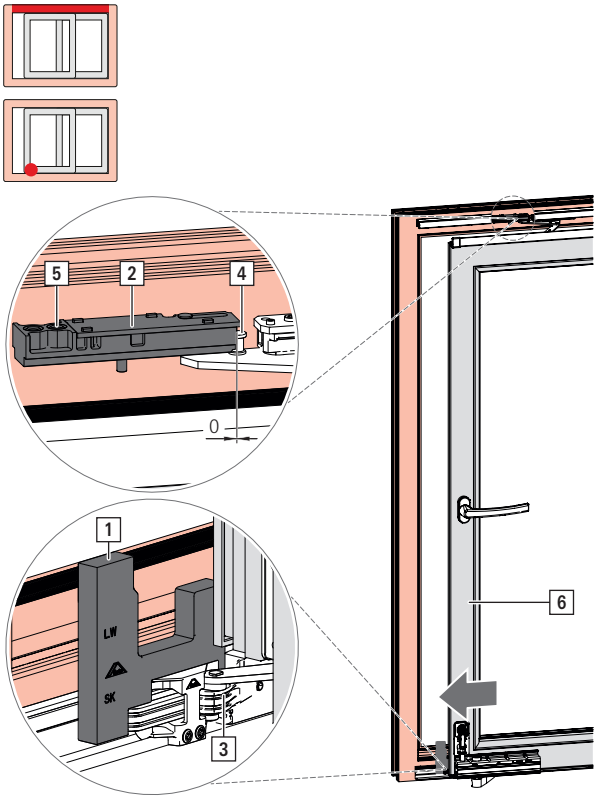
PRECONDITION
Adjustment completed. → *9 "Adjustment" from page 174*

1. Push the sash until it reaches the bottom guide block.
   The sash must fully remain in the stopped position.

7.5.7.2 Tiltable top guide block

Installing the tiltable top guide block

1. Place the jig [1] for the tiltable top guide block [2] on the bottom guide block with bogies [3].



2. Insert the tiltable top guide block into the guide track until it reaches the scissors-slider pilot drift [4].

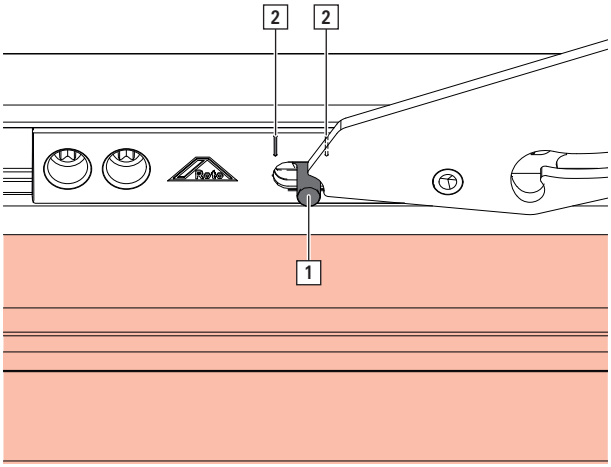
3. Gently tighten the screws [5] on the tiltable top guide block using a T25 hexalobular socket screwdriver (torque: max. 1 Nm).

4. Remove the jig.

5. Move the sash [6] into the closed position.

6. Check for 11.5 mm clearance on both sides.
   If necessary, reposition the tiltable top guide block.

7. Check the sash tilt function.
   Ensure that the control bolt [1] on the tiltable top guide block is between the 2 markings [2] when the sash is tilted.
   If necessary, reposition the tiltable top guide block.

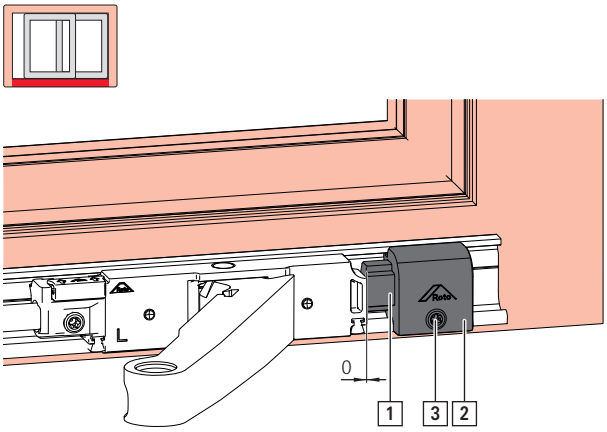


8. Tighten both screws on the tiltable top guide block using a T25 hexalobular socket screwdriver (torque: max. 3 – 4 Nm).

7.5.8 Buffer stops

Installing the bottom buffer stop

1. Insert the rubber buffer [1] into the buffer stop [2].



2. Insert the bottom buffer stop into the required position in the roller track.

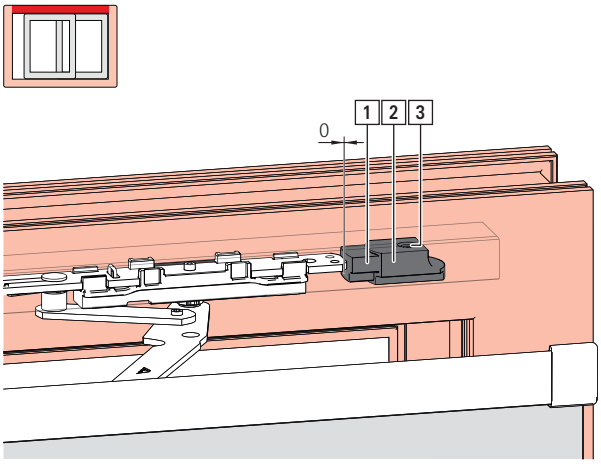
3. Tighten the screw [3] using a T25 hexalobular socket screwdriver (torque: 2 - 3 Nm).

Installing the top buffer stop

1. Insert the rubber buffer [1] into the buffer stop [2].

2. Open the sash until it reaches the buffer stop.

3. Insert the top buffer stop into the guide track until it reaches the scissors-slider.



4. Tighten the screw [3] using a T25 hexalobular socket screwdriver (torque: 2 - 3 Nm).

5. Check whether the sash touches the top and bottom buffer stop at the same time.
   If necessary, realign the top buffer stop.

7.5.9 Covers

7.5.9.1 Cover profile bogies

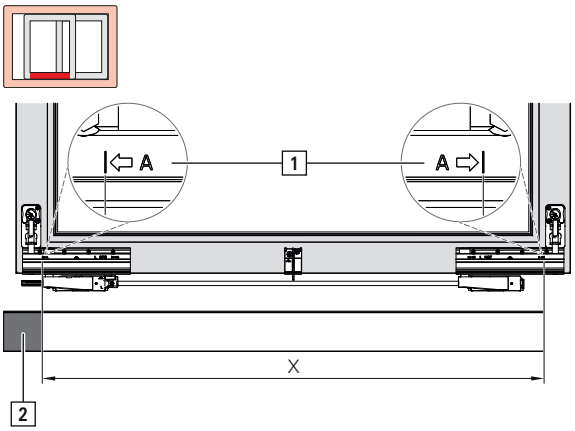
Installing the cover profile bogies

1. Carry out the necessary adjustments before installing the bogie cover. → *9 "Adjustment" from page 174*

2. Crop the cover profile.

a. Without reinforcement bracket: mark and crop the cover profile at the outer edges of the bogie profiles.

b. With reinforcement bracket: crop the cover profile according to the markings [1] on the bogies [2].

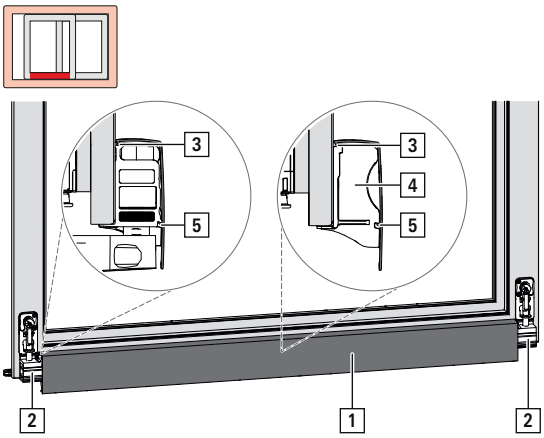


3. Move the cover profile into place.

a. Align the cover profile [1] with the markings on the bogies [2].

b. Insert the top of the cover profile [3] into the bogie and the support bracket [4].

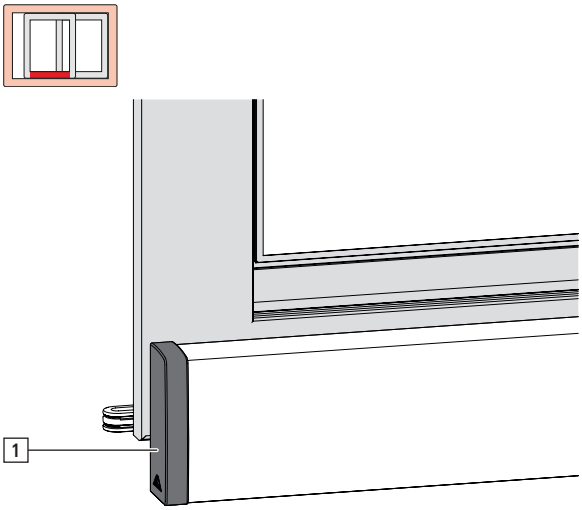
c. Clip the bottom of the cover profile into the bogie and the support bracket [5].



7.5.9.2 Cover caps for bogies without a reinforcement bracket

Installing cover caps for bogies without a reinforcement bracket

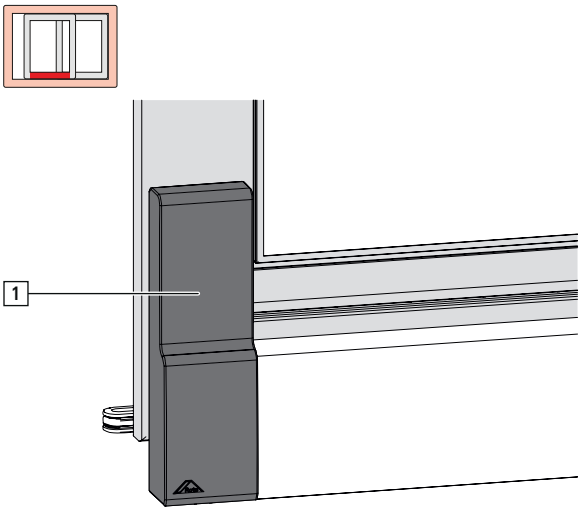
1. Place the corresponding cover caps [1] on the left and right of the cover profile bogies.



7.5.9.3 Cover caps for bogies with a reinforcement bracket

Installing cover caps for bogies with a reinforcement bracket

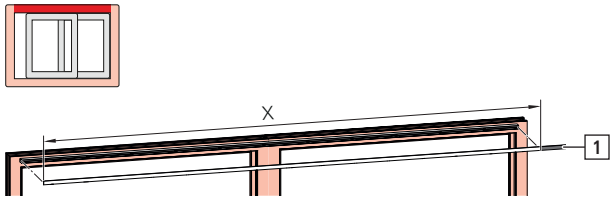
1. Clip the corresponding cover caps [1] to the left and right of the reinforcement brackets.



7.5.9.4 Guide track cover profile

Installing the guide track cover profile

1. Crop the cover to the dimension of the guide track [1].

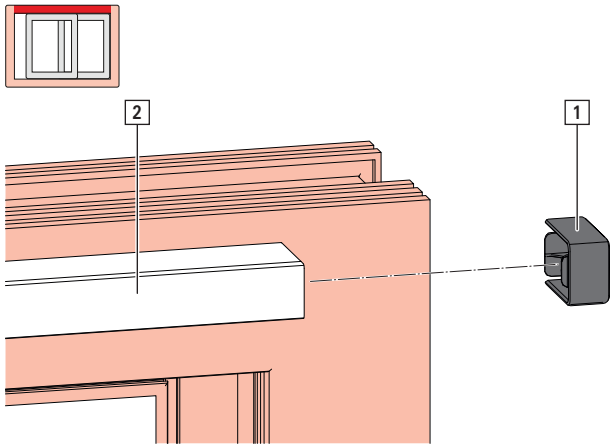


2. Place the cover on the guide track.

7.5.9.5 Guide track end caps

Installing guide track end caps

1. Place the end caps [1] on the right and left of the guide track [2].



8 Installation drawings

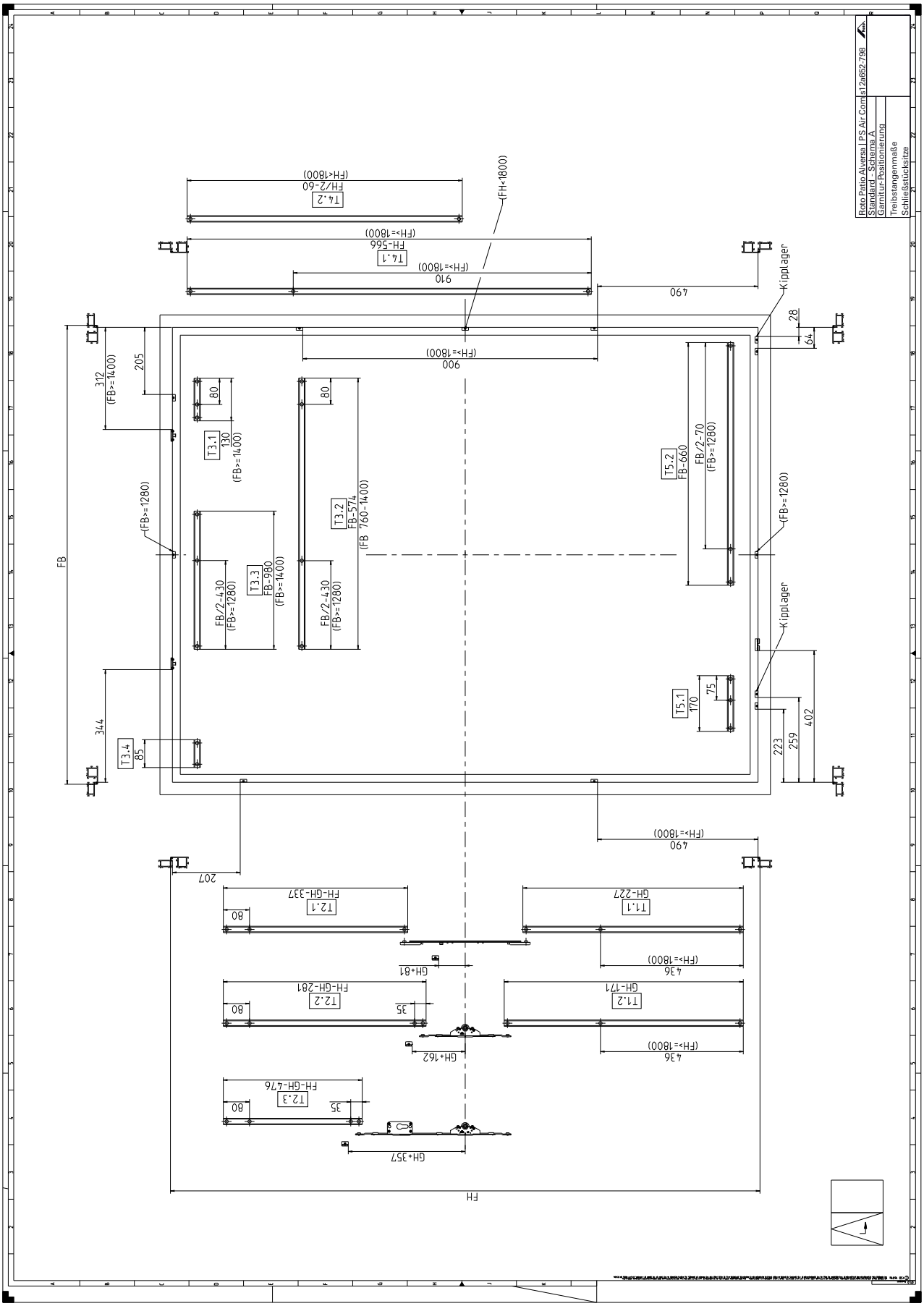
8.1 Explanation

The following marks are used in the installation drawings to emphasise references and other elements:

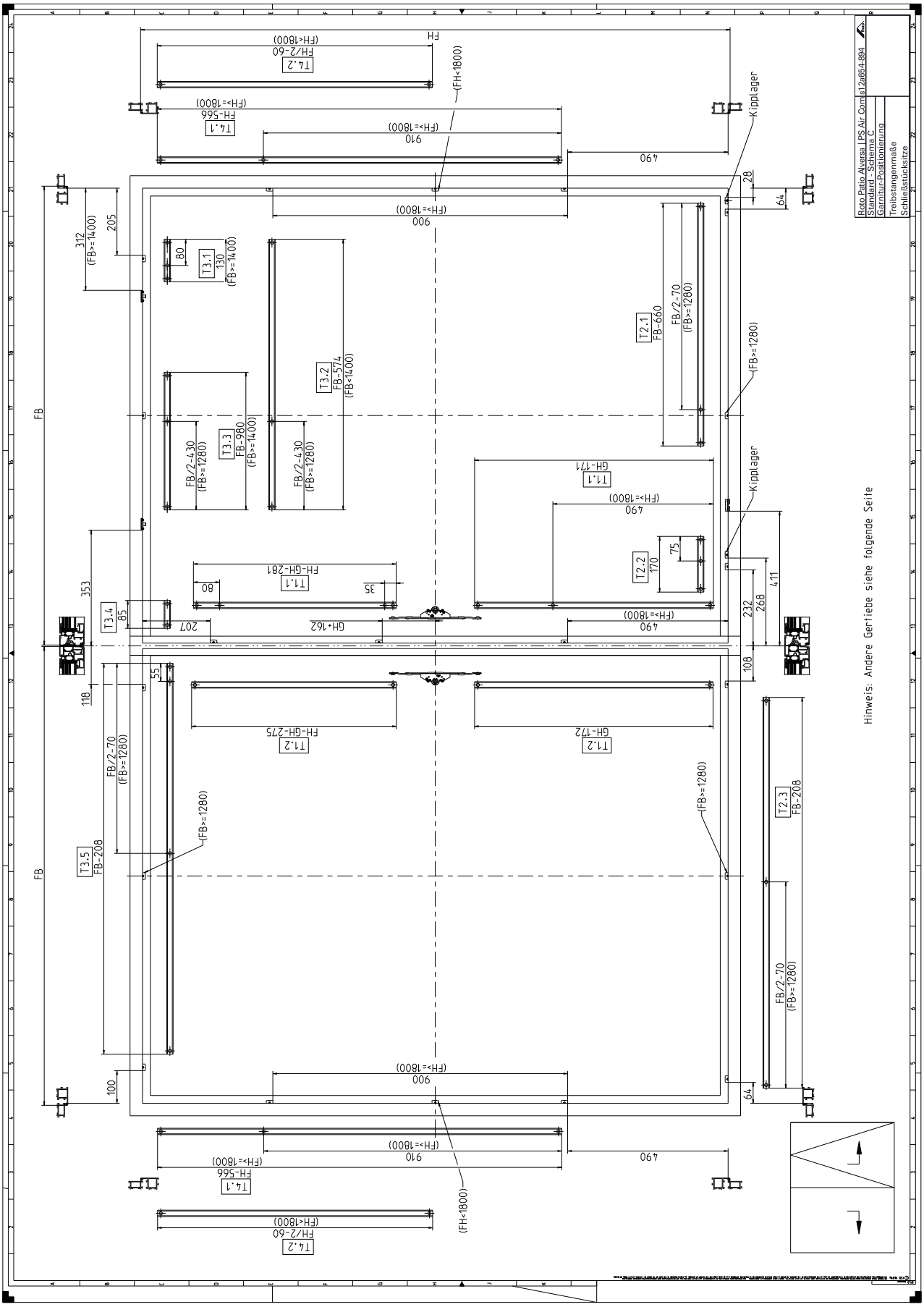
Marking	Meaning
FB	Sash width
FH	Sash height
Garnitur-Positionierung	Set positioning
Getriebevarianten	Espagnolette variants
GH	Handle height
Hinweis: Andere Getriebe siehe folgende Seite	Note: see the following page for other espagnolettes
Hinweis: Andere Getriebe siehe Seite Schema A	Note: see diagram A for other espagnolettes
Kipplager	Tilt strikers
Schema A	Diagram A
Schema C	Diagram C
Schließstücksitze	Striker positions
STD	Standard
T	Connecting-rod
Treibstangenmaße	Connecting-rod dimensions

INFO
The dimensions refer to an overlap width of 22 mm. If the overlap width differs from this, the connecting-rod dimensions must be adapted accordingly.

8.11 Installation drawings for Roto Patio Alversa | PS Air Com; diagram A; std.



8.12 Installation drawings for Roto Patio Alversa | PS Air Com; diagram C; std.



9 Adjustment

9.1 Aligning the sash horizontally

ATTENTION

Uneven adjustment may result in property damage.

The bogies are preset evenly at the factory. To correctly align the sash, adjust the bogies evenly – in order to avoid jamming – using their adjusting screws.

▶ Align both bogies evenly using their adjusting screws.

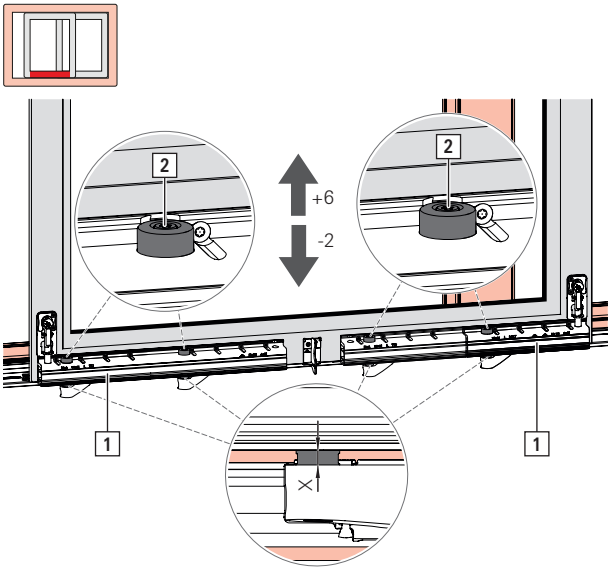
Setting the height of the sash in the frame

1. Check the bottom horizontal clearance.

2. Use a T25 hexalobular socket screwdriver on the adjusting screws [2] to align the bogies [1].
   1 adjusting screw per bogie
   2 adjusting screws per tandem bogie

a. Too little clearance:
   Evenly adjust the adjusting screws in clockwise direction.

b. Too much clearance:
   Evenly adjust the adjusting screws in counter-clockwise direction.



INFO

Adjusting screw original position X = 5 mm

$X_{max.}$ = 11 mm

$X_{min.}$ = 3 mm

9.2 Aligning the bogies parallel

Setting the sash to run into the frame evenly

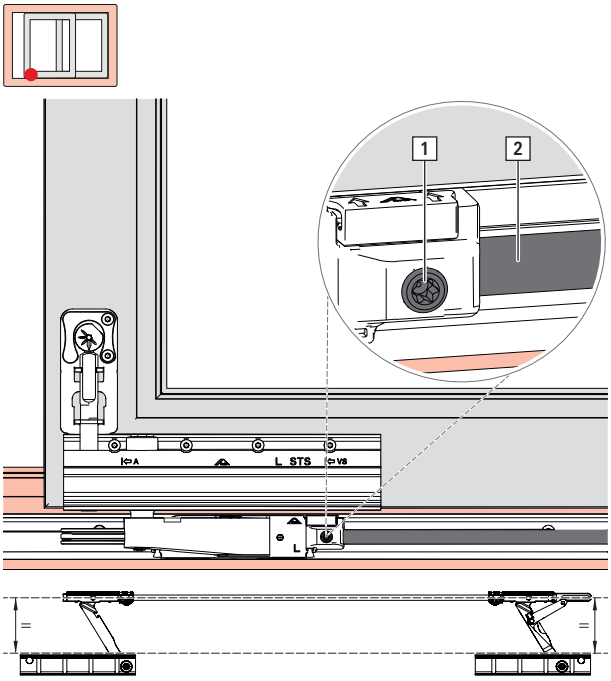
1. Move the sash into the sliding position.

2. Adjust the connecting rod.

a. Loosen the screw [1] on the connecting rod [2] using a T25 hexalobular socket screwdriver on the locking side bogie.

b. Align the bogie on the hinge side to be parallel by moving the connecting rod to the left or right.

c. Tighten the screw on the connecting rod using a T25 hexalobular socket screwdriver (torque: max. 5 – 7 Nm) on the locking side bogie.

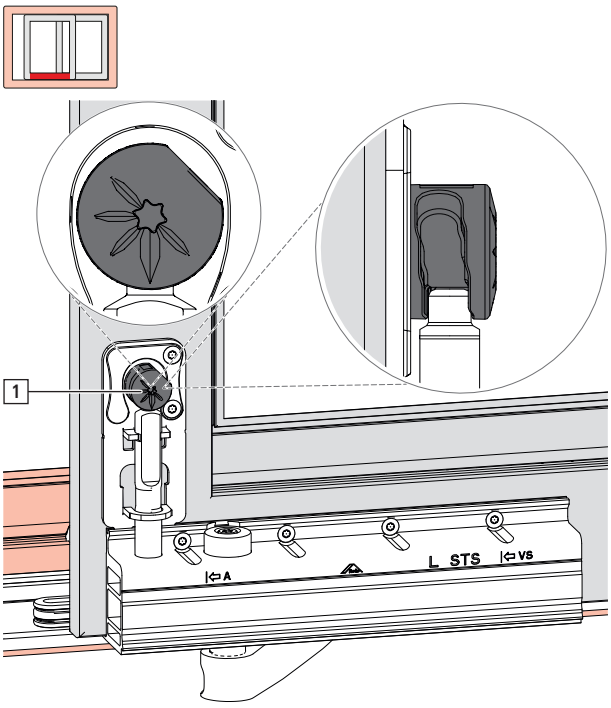


9.3 Adjusting reinforcement brackets

Adjust the reinforcement brackets to optimise the smooth running of the sash into the frame.

Adjusting reinforcement brackets from their original position

1. Adjust both reinforcement brackets evenly [1].
   The markings must be in the same position on both sides of the sash.

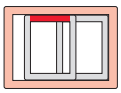


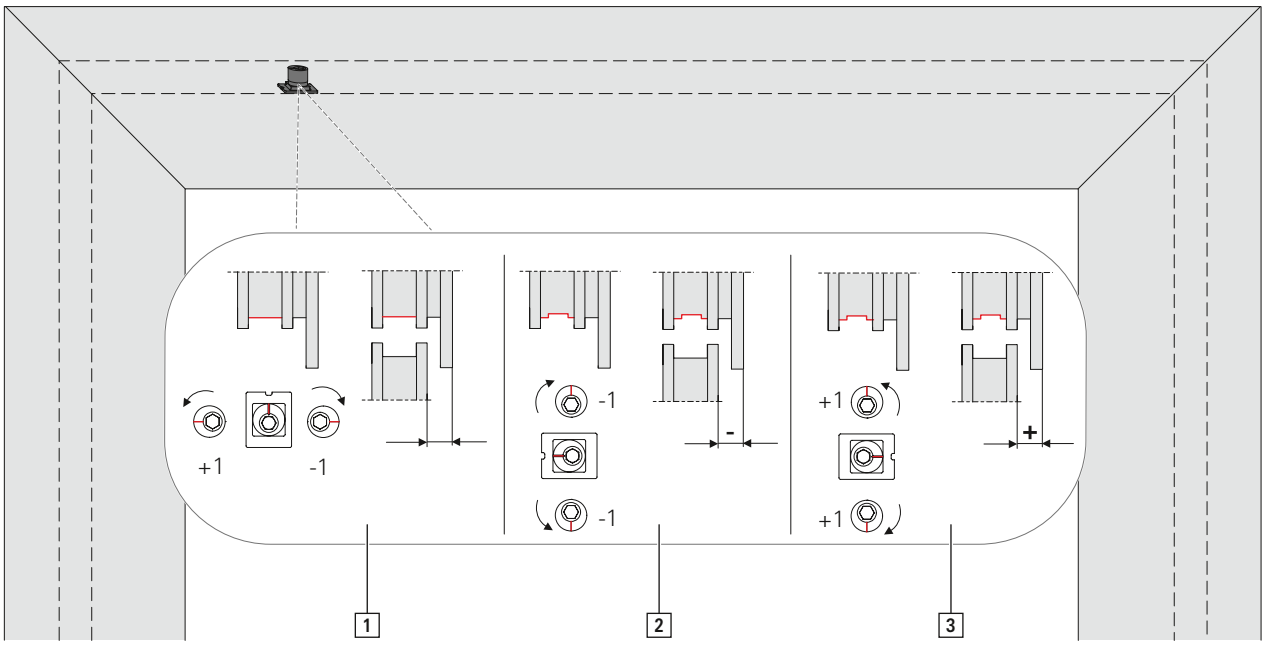
2. Adjust by turning counterclockwise with a T25 hexalobular socket screwdriver and the sash will close more easily.

Adjust by turning clockwise with a T25 hexalobular socket screwdriver and the sash will open more easily.

3. Check whether the bogies run smoothly.
   If too extreme an adjustment is made, the bogies may drag.

9.4 Adjusting the insertable cams





Adjusting the gasket-compression

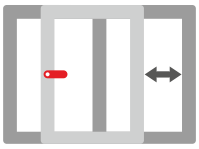
4 mm hex key

1. Adjust the locking cam as shown.

- [1] Increase / reduce the gasket-compression
- [2] Reduce the gasket-compression
- [3] Increase the gasket-compression

9.5 Adjusting the travel

10.1.4 Roto Patio Alversa | PS Air Com

Handle position	Sash position	Meaning
		Sash in closed position.
		Sash in sliding position.
		Sash in comfortable tilted position.

10.2 Troubleshooting

Fault	Cause	Corrective action	Specialist company	End user
Handle is difficult to turn.	Frame components have not been greased	Grease the frame components	☐	☐
	Handle faulty	Replace the handle	■	
	Handle screwed into place too tightly	Undo the screw fixing slightly	■	
	Sash components with oblique screws	Screw the sash components in straight	■	
	Sash components faulty	Replace the sash components	■	
	Incorrect striker positions	Adjust the striker positions	■	
Handle cannot be turned 180°.	Sash components hinged or installed incorrectly	Check the setting in turn mode (potentially rehang – start from the T&T espagnolette).	■	
Locking cam rubber at the striker.	Sash mounted incorrectly	Rehang the sash	■	
	Incorrect striker positions	Adjust the striker positions	■	

☐ = May be carried out by a specialist company or the end user

■ = **Must** be carried out by a specialist company

11 Maintenance

CAUTION

Improperly performed maintenance work may result in injuries.

Improper maintenance can lead to serious injuries or property damage.

- Ensure that there is sufficient space for installation before starting work.
- Ensure that the installation site is clean and tidy.
- Always have hardware adjustment and replacement work performed by a specialist company.
- Secure windows or balcony doors against unintentionally opening or closing.
- Do not unhinge windows or balcony doors for maintenance purposes.

ATTENTION

Incomplete or incorrect checks may result in property damage.

Adjusting the hardware incorrectly or improperly may cause the window or balcony door to malfunction.

- Check the hardware when installed.
- If defects need to be remedied, have the window or balcony door unhinged and remounted by a specialist company.

INFO

The manufacturer must draw the attention of builders and end-users to these maintenance instructions. Roto Frank AG recommends the manufacturer conclude a maintenance agreement with their end-users.

No legal claims can be derived from the following recommendations; their application is to be based on the specific individual case.

11.1 Maintenance intervals

ATTENTION

Inadequate maintenance may cause property damage.

The maintenance intervals must be adapted to the respective ambient conditions. The maintenance intervals correspond to the current directives and represent a maximum time frame.

- Determine the appropriate maintenance interval in accordance with the ambient conditions.

The maintenance interval for all tasks relating to the hardware components is **annually** at the least. In hospitals, schools and hotels, the maintenance interval is **six-monthly**.

Regular maintenance is necessary in order to maintain the proper and smooth-running operation of the hardware and to prevent premature wear or even defects.

	Responsibility	
Cleaning		→ *from page 182*
Clean hardware	□	
Maintenance		→ *from page 182*
Lubricate moving parts	□	
Lubricate locking points	□	
Performance test		→ *from page 186*
Check that hardware components are fitted securely	□	
Inspect hardware components for wear	□	
Check that moving parts work properly	□	
Check that locking points work properly	□	
Check ease of movement	■	
Repair		
Retighten fixing screws	■	
Replace damaged parts	■	

☐ = May be carried out by a specialist company or the end-user

■ = **Must** be carried out by a specialist company

11.2 Cleaning

ATTENTION
Incompatible cleaning agents may cause property damage.
Incompatible cleaning agents may damage surfaces and destroy gaskets.
- Never use aggressive or flammable liquids, acidic cleaners or abrasive cleaners.
- Only use cleaning and care agents that do not adversely affect the corrosion protection of the hardware components and gaskets.
- Only use mild, pH-neutral cleaning agents that have been diluted.

Cleaning the hardware

- Clean deposits and contaminants off the hardware using a soft cloth.
- Lubricate moving parts and locking points after cleaning. → *11.3 "Maintenance" from page 182*
- Apply a thin protective film to the hardware, for example using a cloth soaked in oil.

11.3 Maintenance

ATTENTION
Using incorrect lubricants may cause property damage.
Substandard lubricants can prevent the hardware from working properly.
- Use high-quality lubricants.
- Only use resin-free and acid-free lubricants.

ATTENTION
Cleaning agents and lubricants may pollute the environment.
Leaking or excess cleaning agents and lubricants may pollute the environment.
- Remove any leaking or excess cleaning agents and lubricants.
- Dispose of cleaning agents and lubricants separately and properly.
- Observe the applicable directives and national laws.

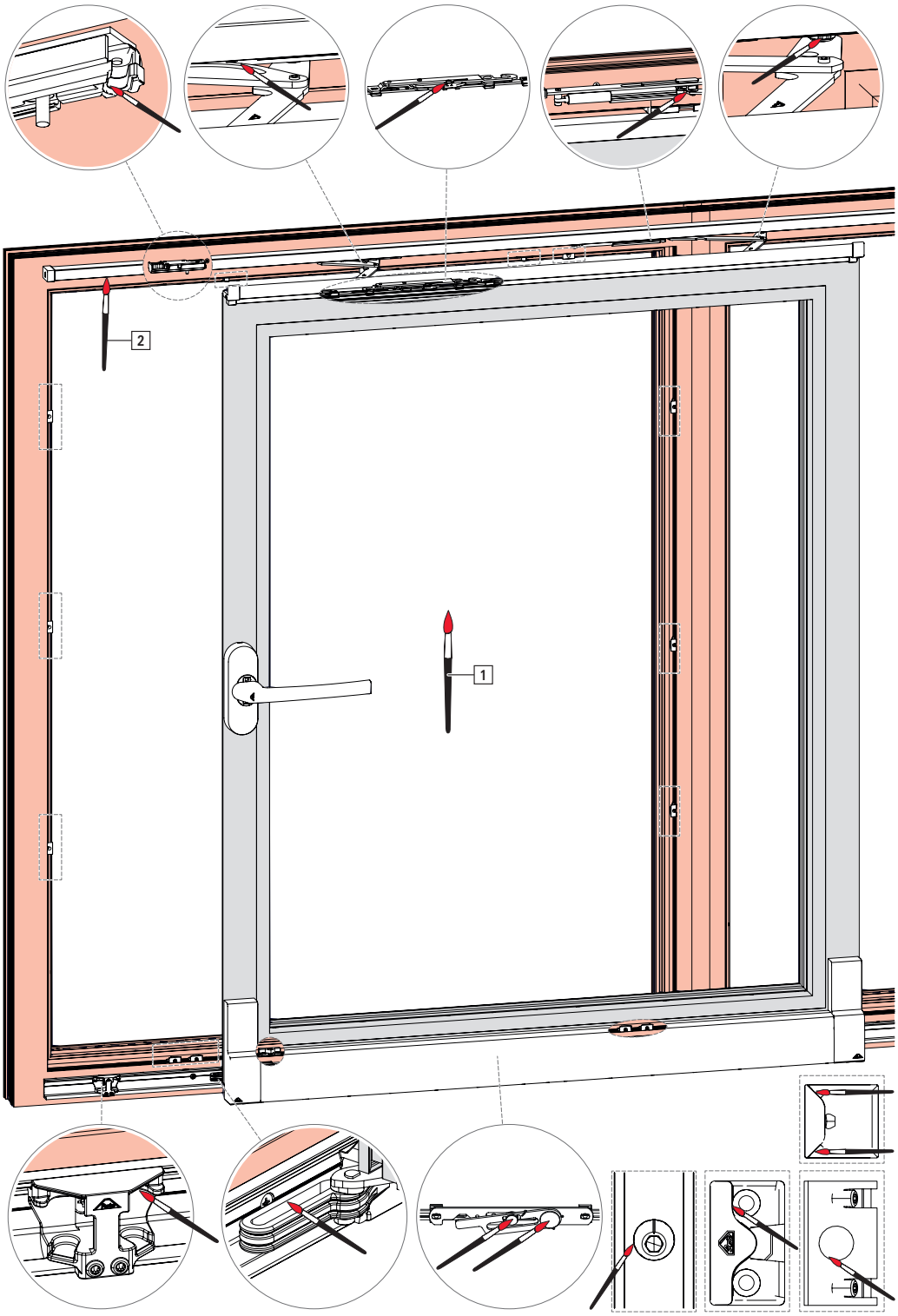
Ease of movement can be improved by lubricating or adjusting the hardware. All functional hardware components must be lubricated on a regular basis.

Recommended lubricants

■ Roto NT grease

INFO
The hardware overview shown displays the positioning of potential lubrication points. The hardware overview shown does not necessarily match the installed hardware. The number of lubrication points varies depending on the size and design of the element.

11.3.3 Roto Patio Alversa | PS Air Com



[1] Grease

[2] Grease along the entire length.

11.4 Performance test

Check for proper operation:

- Inspect hardware components for damage, deformation and a firm fit.
- Check that windows or balcony doors run smoothly by opening and closing them.
- Check the window or balcony door gaskets for elasticity and fit.
- Check closed windows or balcony doors to ensure that they are leakproof.
- Locking and unlocking torque max. 10 Nm. The test can be performed using a torque wrench.

Have malfunctions remedied by a specialist company.

11.5 Repair

ATTENTION
Securing components incorrectly may lead to property damage.
Loose or faulty screws may impair function.
- Check that the individual screws are secure and seated correctly.
- Tighten or replace loose or faulty screws immediately.
- Only used the screws suggested for repairs.

Repair work includes replacing and repairing components and is only necessary if components have become damaged after wear or as a result of external circumstances. The hardware must be secured reliably in order to ensure that the element works properly and is safe to use.

The following tasks must only be performed by a specialist company:

- All adjustment work on the hardware
- Replacing hardware or hardware components
- Installing and removing windows or balcony doors

The specialist company must observe the following:

- The necessary repair work must be performed properly, according to generally recognised engineering practice and in accordance with the applicable regulations.
- Makeshift repairs must not be performed on worn or damaged components.
- Only original or approved spare parts may be used in the course of repairs.

11.6 Preventative measures

These measures are intended to preserve the surface finish and durability. They aim to prevent premature wear or contamination and thereby simplify maintenance.

Corrosion protection

Cleaning agents can corrode the surface of the hardware.

Protect the hardware:

1. Do not use aggressive or flammable liquids, acidic cleaners or abrasive cleaners.
2. Only use mild, pH-neutral cleaning agents that have been diluted.
3. Apply a thin protective film to the hardware, for example using a cloth soaked in oil.
4. Only use high-quality components for repairs, such as stainless steel screws.

Protection from contaminants

Contaminants impair the proper operation of the hardware.

Protect the hardware:

1. Remove deposits and contaminants caused by construction materials before they bond with water, e.g. builder's dust, plaster, stucco, mortar and cement.

2. Always clean using a soft cloth.

Protection against (permanently) damp room air

Damp room air can lead to mould growth and corrosion caused by condensation.

Protect the hardware:

1. Provide adequate ventilation for hardware, particularly during the construction phase.

2. Intensively air out the room several times per day by opening all windows or balcony doors for approximately 15 minutes.

   If intensive airing is not an option, place the windows or balcony doors in tilt mode and provide airtight masking inside the room, e.g. if there is fresh screed that cannot be walked on or must not be exposed to drafts. Discharge outside any humidity present in the room air using dehumidifiers.

3. Establish a ventilation plan for more complex construction projects if necessary.

4. Provide adequate ventilation during holiday periods as well.

12 Dismantling

ATTENTION

Incorrect dismantling poses the potential risk of injury and property damage.

- Always have dismantling carried out by an authorised specialist company.

12.1 Sash

WARNING

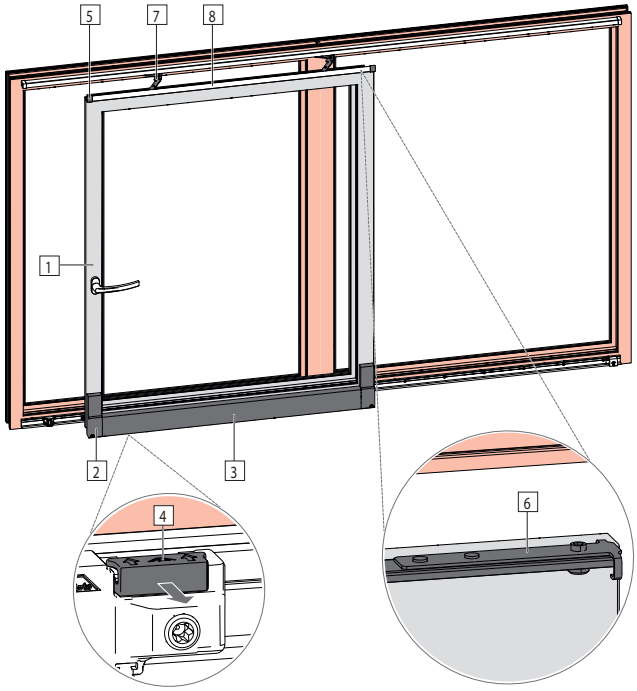
Heavy loads pose the risk of injury and property damage.

Lifting and carrying heavy loads in an uncontrolled manner may lead to physical injury and property damage.

- Transport and removal must be carried out by at least two people.
- Do not rest sashes on the bogies.
- Use transportation means. → *13 "Transport" from page 190*

Unhinging sashes

1. Move the sash [1] into the sliding position.



2. Remove the covers.
   - Left and right bogie cover caps [2]
   - Bogie cover [3]

   a. Remove the bogie cover caps by pulling them forwards.

   b. Grasp the back of the bogie cover from below and pull it diagonally upwards.

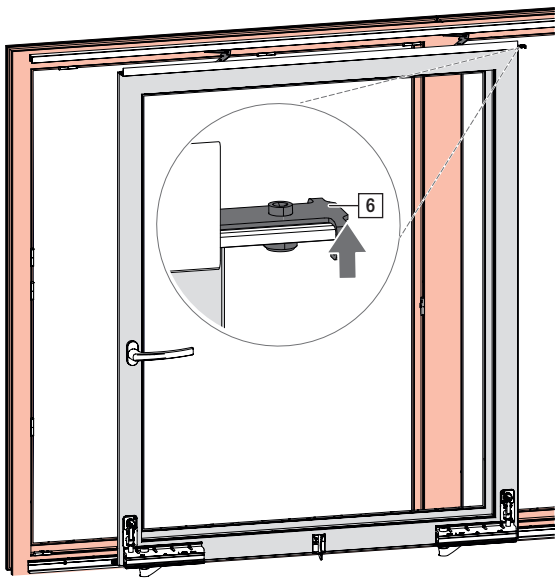
   Pull forcefully, using both hands.

3. Push the bogie safety mechanism [4] forwards.

4. Remove the stay-connecting profile cover caps [5].

5. Secure the sash to prevent it falling out before pushing the scissors-slider [7] out.

6. Push the scissors-slider spring [6] upwards and undo the form-fitting connection between the scissors-slider and stay-connecting profile [8].



7. Push the scissors-slider out of the stay-connecting profile.

8. Lift the sash at a slight incline.

9. Place the sash in front of the frame.

a. Use a clean underlay.
b. Only use a support-brace in the centre of the sash so that the bogies can hang free.

12.2 Hardware components

Dismantling hardware components

1. Undo all screw connections.

2. Remove the hardware components.

3. Dispose of the hardware components properly.

13 Transport

13.1 Transporting the hardware

WARNING
Trapped limbs may result in injuries.
The transported goods can skid or fall during transportation tasks. This can result in limbs being trapped and seriously injured.
- Wear safety gloves and protective footwear.

WARNING
Heavy loads present an injury risk.
Lifting and carrying heavy loads in an uncontrolled manner may lead to injuries in the event of a fall or physical overexertion.
- Observe the applicable accident prevention regulations.
- Transport heavy loads with two people and / or use suitable transportation means, such as an industrial truck.

WARNING
Physical strain may cause damage to health.
Moving heavy loads for extended periods leads to physical injury in the long term.
- When carrying and lifting by hand, comply with a maximum weight of 40 kg for men and 25 kg for women.
- Always carry and lift smaller shipments with an ergonomically correct posture.

Hardware is supplied to the specialist company as complete sets. The components are packaged accordingly for each shipment. The instructions for safely transporting the hardware are described below.

Observe the following basic instructions when transporting hardware:

- Transport larger shipments using appropriate transportation means, such as industrial trucks.
- Note the transport weight in order to select appropriate transportation means.
- Immediately check the delivery for completeness and transport damages on receipt.

INFO
Submit a complaint about any defects as soon as they are identified. Claims for damages may only be made within the reclamation period.

Use the following transportation means for support when transporting, loading and unloading larger shipments:

- Industrial trucks (e.g. forklifts, telescopic handlers, pallet trucks)
- Lifting equipment (e.g. transport nets, lifting straps, round slings)
- Protective devices (e.g. edge protection, spacer blocks)

INFO
Industrial trucks and lifting devices may only be operated by qualified persons.

INFO
Lifting equipment and protective devices may only be used if they are in full working order.

13.2 Storing the hardware

Store all hardware components as follows until they are installed:

- Dry and protected
- On a level surface
- Protected against sunshine

14 Disposal

ATTENTION
Incorrect disposal can harm the environment.
Pieces of hardware are raw materials.
- Dispose of hardware for environmentally friendly material reutilisation as mixed scrap.

14.1 Disposing of packaging

The hardware is supplied as complete sets together with the packaging. Once unpacked, the installation company or builder is responsible for disposing of the packaging properly. The packaging materials are produced in accordance with current environmental protection standards. The materials can be recycled separately.

Observe the following basic instructions for the proper disposal of packaging:

- Do not dispose of packaging in household waste.
- Hand over packaging at local waste collection points or recycling centres.
- Observe the national regulations on the disposal of recyclable materials.
- Contact the local authorities if necessary.

14.2 Disposing of hardware

Once the hardware is finished with, the end user or builder is responsible for properly disposing of the windows or balcony doors and the hardware, including any accessories. Hardware is produced in accordance with current environmental protection standards. The materials can be recycled separately.

Follow the following basic instructions for the proper disposal of hardware:

- Observe the information and specifications for disposing of window profiles contained in the other applicable documents.
- Separate hardware components from windows or balcony doors.
- Do not dispose of hardware in household waste.
- Hand over hardware at local waste collection points or recycling centres.
- Observe the national regulations on the disposal of recyclable materials.
- Contact the local authorities if necessary.

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