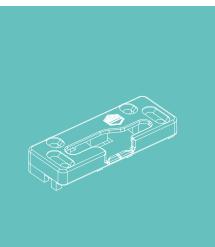


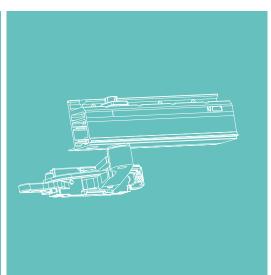


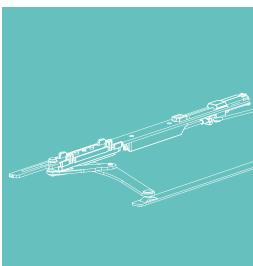


# MACO RAIL-SYSTEMS

SLIDING HARDWARE







### **ASSEMBLY INSTRUCTIONS**

Paralle Sliding Door System (PAS) - Timber / PVC (12 mm Air Gap)

Exclusively for certified specialists!

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#### **General Information**

The current version of our General Terms & Conditions can be found on the MACO website (<a href="www.maco.eu/en-INT/Terms-and-conditions">www.maco.eu/en-INT/Terms-and-conditions</a>). Retain these assembly instructions for later use and maintenance.

Failure to comply with these assembly instructions releases MACO from any liability. Please note your obligation to inform your customer regarding the operation and maintenance of the system as well as all safety related information.

MACO as a customer-oriented and service-oriented company offers you the "Operating and Maintenance Instructions for SKB Standard, Self-locking, Positive Control and PAS END USER" (Order number 757957) and "Maintenance and setting instructions for SKB Standard, Self-locking, Positive Control and PAS SPECIALIST" (Order number 757962) for passing on to end customers. You can find the documents in the download area on www.maco.eu.

Please hand over the user manual to the end user and ensure they are briefed.

#### **Target Group**

This documentation is intended exclusively for specialist companies and certified specialists. The work-steps described herein may only be carried out by certified specialists.

#### Certification

The MACO hardware mentioned in the assembly instructions are tested and regularly monitored in standardised tests in accordance with EN 13126. The achieved Class H3 standard does not refer to your individual element system. Due to a wide range of influencing factors, individual element systems may experience minor deviations from standardised testing, such as:

- > the influence of processing tolerances
- > the effect of assembly tolerances after installation of the element in the building envelope
- > the use of accessories (e.g. weather seals, seal rails, handles, etc.)
- > the use of attachments (e.g. Aluminium shells, sun protection on the sash, insect protection)
- > environmental influences (e.g. humidity, sunlight, high or low temperatures, temperature fluctuations, etc.)
- > room-side influences (moisture, aggressive cleaning agents, etc.)



#### **General Safety Information**

It is important to follow these instructions to ensure people's safety!

When reading this document and the safety instructions, please note the following signs and colours:



This indication indicates a situation that may arise if the instructions are not followed and which can lead to fatal injuries.



This indication indicates a situation that may arise if the instructions are not followed and which can lead to fatal and/or serious injuries.



This indicates a situation that may arise if the instructions are not followed and which can lead to minor injuries.



This note indicates important additional information that is relevant to the error-free assembly / function of the product.

Please pay attention to the VHBE guideline (hardware for windows and balcony doors) of the Gütegemeinschaft Schlösser und Beschläge e.V. (quality assurance association for locks and hardware). This guideline describes all safety-relevant topics for end users for window and balcony door hardware.

#### **General Safety Information**

# **WARNING**

In order to ensure the long-term functionality and thus the operating safety of windows and balcony doors over their expected service life, the fastening of safety-relevant hardware parts is of particular importance.

MACO indicates explicitly that large sash weights are moved and accelerated during opening and closing. This applies particularly to sliding elements. It is at the discretion and the responsibility of the respective manufacturer (window builder), installers and dealers of windows and balcony doors, in particular of lift&slide doors, to offer corresponding movement restrictors or similar.

Incorrect assembly can lead to serious injuries. The installation must be carried out by personnel who have been instructed according to the state of the art and recognised rules of technology.

Due to overuse or improper operation of the Parallel Sliding Door System, the sash may jump out of its guide rails, fall out and thereby cause serious injuries.

Due to the high weight of the element, always pay attention to the correct securing of the element during manufacture, transport and assembly on the construction site.

# **⚠** ATTENTION

If under special circumstances (use in schools, kindergartens, etc.), it is to be expected that the sliding element could be overstressed, this must be prevented by appropriate measures such as moving the stop buffers to reduce the opening width.

Improper handling may lead to crushing. Ensure users are aware of the risk in case of improper handling. This applies particularly to customers with small children.

Injuries may occur in the event of improper handling, in particular if persons or parts of the body are between the frame and the sash when closing or between the sash and the reveal or adjacent components.



#### Note

These instructions describe all assembly steps required to set up standard version hardware. The hardware must be greased/oiled before commissioning (see operating and maintenance instructions).

The Parallel Sliding Door System (PAS) are only intended for use in stationary buildings. They are used for horizontally opening and closing windows and balcony doors. The Parallel Sliding Door System must be installed perpendicular and never in an inclined position.

Handle position middle (1/2 SRH). With a handle position below 1/2 SRH, operational comfort may be affected.

#### Intended use

The areas of application mentioned on page 13 apply to the MACO PAS hardware. Screw-in torque settings are binding and must be followed.

Mount all hardware parts professionally as described in this manual and observe all safety instructions.

To fasten the hardware, use the specified screw sizes! These must reach into the steel reinforcement when using PVC profiles.

Be sure to follow the profile manufacturer's processing policy.

The hardware may not be used for timber with aggressive content / surface treatments.

The hardware parts described in these assembly instructions are made of colourless passivated steel and sealed in accordance with DIN EN 12329. They must not be used in environments with aggressive, corrosive air content. If you are not sure, please ask your MACO contact person for advice.

The hardware manufacturer shall not be liable for any malfunctions or damage to the hardware or to the windows or balcony doors equipped with them, if they are subject to use of third-party hardware, inadequate tendering, failure to comply with the installation rules or application diagrams.

The fabricator is responsible for compliance with the functional dimensions specified in these assembly instructions as well as for flawless hardware assembly and secure fastening of all components.

In order not to affect the lightness of the hardware, turn the screws straight (unless otherwise indicated) and do not over-tighten!

Fix the screws of the supporting components (e.g. rollers, roller rail and guide rail) in the reinforcement profile.

With the spacer-block setting, observe the technical guideline No. 3 of the glazier trade "Blocking of glazing units".

Keep the roller track and all latches free from deposits and dirt to avoid damage to the hardware and ensure optimal functionality. In particular, protect the hardware from cement or plaster residues.

Do not make any constructive changes to the hardware parts.

Always close and lock the window and balcony door sash when windy or drafty. For the purposes of this definition, wind and draught are present if the window or window door sashes located in one of the opening positions are caused to move by air pressure or air suction of their own accord and uncontrollably open or close.



The resistance to wind loads in the closed and locked state depends on the respective construction of the windows and balcony doors. If wind loads in accordance with DIN EN 12210 (in particular test pressure p3) are to be expected, suitable hardware are to be selected and agreed on separately in conjunction with the respective window construction and the frame material.

The defined maximum sash weights for the individual hardware designs must not be exceeded.

The component with the lowest permissible load capacity determines the maximum sash weight. Application diagrams and component mappings must be observed.

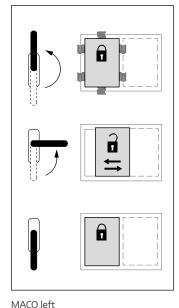
The hardware and the rebate spaces must be sufficiently ventilated, especially during the construction phase, so that they are not exposed to direct moisture or condensation.

The hardware are to be kept free of deposits and contamination by building materials (construction dust, gypsum plaster, cement etc.), therefore windows must be covered accordingly.

The hardware must only be cleaned or polished with mild, pH-neutral detergents in diluted form.

Attach the operating label in a clearly visible manner to the built-in lift and slide sash. The operating label is located in the basic box or in the "corner deflection" package.

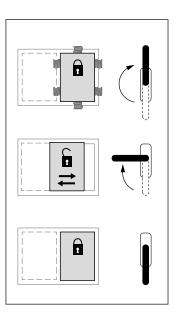
#### Handle positions



Night ventilation

slide

closed



MACO right

#### Improper use

The respective hardware system may only be assembled with hardware components from the MACO slide hardware range. In the event of improper installation of the hardware and/or the use of non-original or non-factory approved system accessories, no liability will be accepted.

Do not use vinegar-based or acid-curing sealants, as these can lead to corrosion of the hardware parts. Further information on MACO surfaces can be found on our website <a href="https://www.maco.eu">www.maco.eu</a> or in brochure Order No. 49510 (in the download area).

The lift and slide elements may only be surface treated before the hardware is installed. Any subsequent surface treatment may restrict the functionality of the hardware. In this case, no warranty claims against the hardware manufacturer shall be accepted.

Protect the hardware from damage by angular or sharp tools.

If you are not sure, please ask your MACO contact person for advice.



#### Storage and Handling

Check the following immediately after delivery:

- > Completeness of delivery (as per the delivery note)
- > Any damage to the packaging
- > Any damage to the materials
- > Improper storage or transport of hardware parts can affect the surface quality. To prevent this, the following points must be observed:
  - > It must be ensured that the room air is permanently dry
  - > Major temperature fluctuations leading to condensation must be prevented. Condensation on hardware causes the galvanised surfaces to be attacked
  - > Avoid aggressive vapours from cleaning agents or assembly aids such as silicone and the like, even for a short time. Vapours from such substances can very quickly lead to corrosion of hardware
  - > Salty air polluted by trade and industry also leads to corrosion on galvanised surfaces and is also not suitable for storage areas.

#### **Transport**

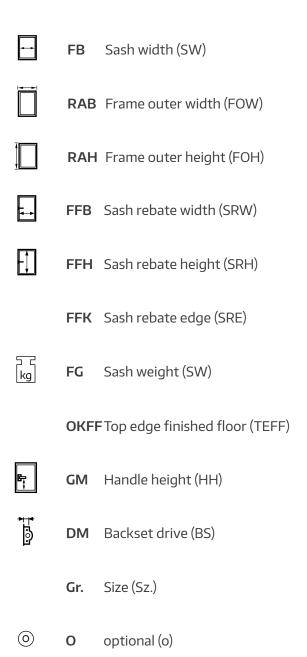
Finished elements must be stored and transported as follows:

- > Upright
- > Slip and tilt secured on suitable surfaces (e.g. G. transport frames)
- > Protected from dirt and damage
- > Avoid loads on mechanical connections!
- > Use special transport devices!

For intermediate storage outdoors:

> Ensure elements and hardware are covered or packaged

# Signs, Symbols and Abbreviations

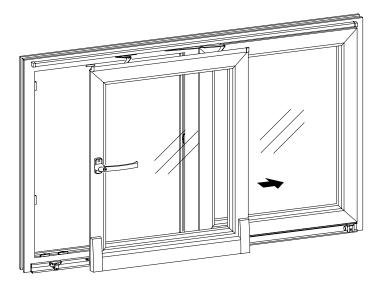


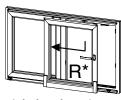
All dimensions without a unit definition are given in mm.



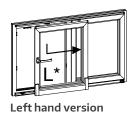
# Version and Application Areas

#### Version





Right hand version



### Area of application - Parallel Sliding Door System (PAS)

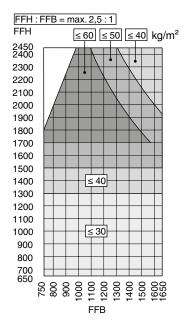
The limits of the areas of application listed here are binding and must not be deviated from. Continue to observe the permissible application sizes, manufacturing specifications, and processing policies as set by the profile manufacturer.

Item	unit	area
Sash rebate width (SRW)	(mm)	750 - 1650
Sash rebate height (SRH)	(mm)	840 - 2450
Sash weight	(kg)	160
Burglary prevention		possible

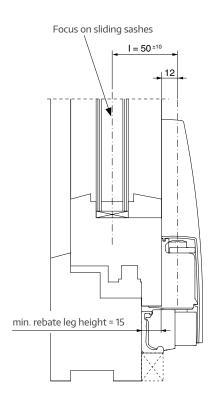
# Version and Application Areas

### **Application Diagram**

#### Application 160 kg



valid for an I-value of 50±10



### Fixing screws for the hardware

These are not included. The length must be chosen according to the profile used.

Countersunk screws 4.0 x ... mm

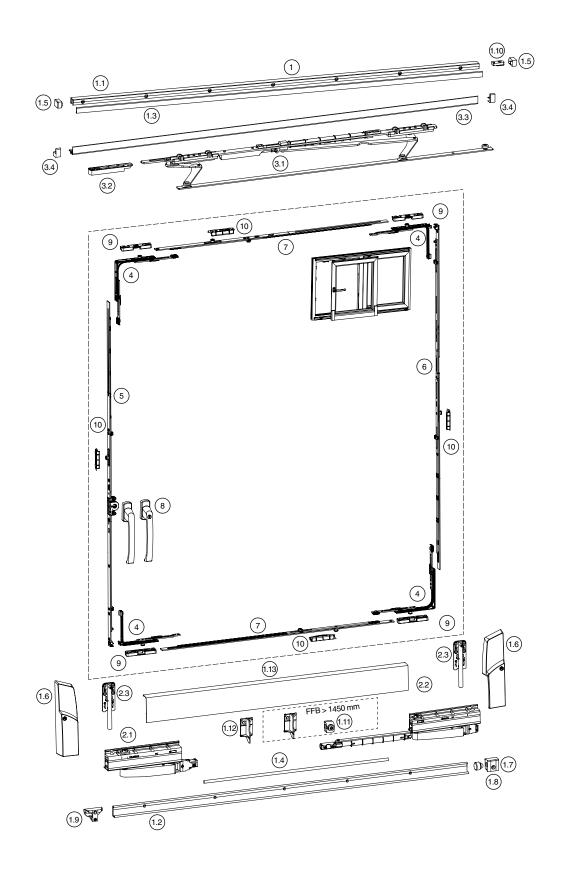
Countersunk screws  $4.0 \times ... \text{ mm}$ , Important: head diameter  $d_k 7 \text{ mm}$ 

Countersunk screws 4.8 x ... mm



# Notes

# Parts overview



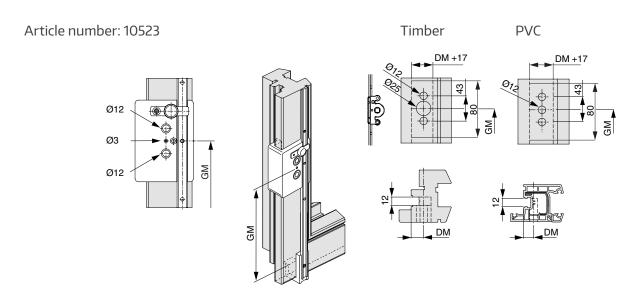


### Parts overview

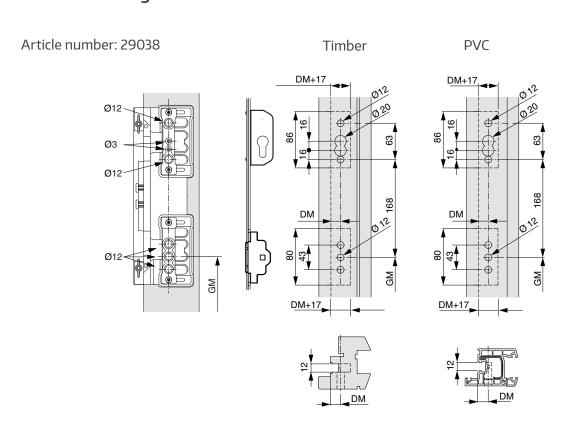
- 1 Profile Packs
  - ① Guide track
  - (1.2) Roller track
  - (1.3) Cover profile PVC
  - ①4 Connecting rod
  - 1.5 Cover cap for guide rail
  - 1.6 Bottom cover cap
  - 1.7 Buffer stop lower
  - (1.8) Rubber mushroom buffers
  - 19 Guide block (lower)
  - 110 Buffer stop upper
  - 111 Support block
  - 112 Support bracket
  - (1.13) Cover profile
- Pack of rollers PAS
  - 21) Leading Rollers 160 kg
  - 22 Roller 160 kg with energy storage unit
  - 23 Reinforcement part adjustable
- 3 Pack of adjustable scissor sliders PAS
  - (3.1) Scissor sliders PAS
  - 32 Control module for scissor slider PAS
  - 33 Stay-connecting profile
  - 34 Cover cap for stay-connecting profile
- 4 Packs of corner elements
- 5 Drive gear
- 6 Height connectors
- Width connectors
- (8) Handles
- 9 Night ventilation striker plate PAS
- 10 Striker plate

# Preparation of sash frame

### Drive gear fixed



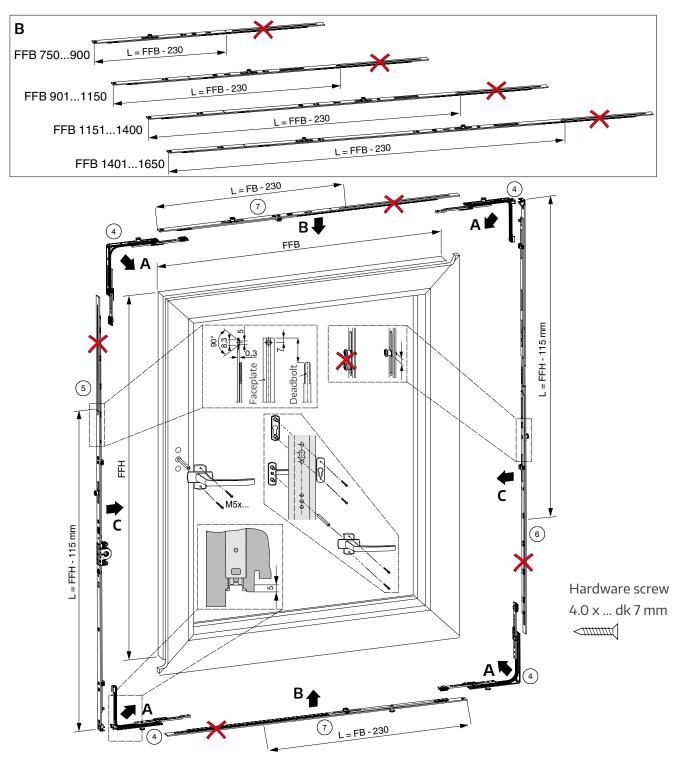
### Lockable drive gear





# Cutting to length and Central Locking assembly

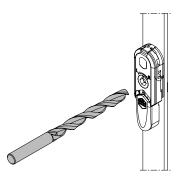
- A Screw in the upper and lower corner elements 4.
- **B** Cut to length the upper and lower width connector and screw in place ?.
- **C** Shorten the height connector ⓐ and drive gear 5 and screw in place.

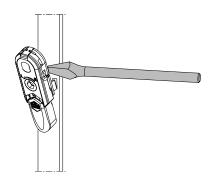


### Remove the sash lifter from the lockable drive gear



To ensure a smooth operation of the fittings and lockable drive gears, the sash lifter has to be removed.





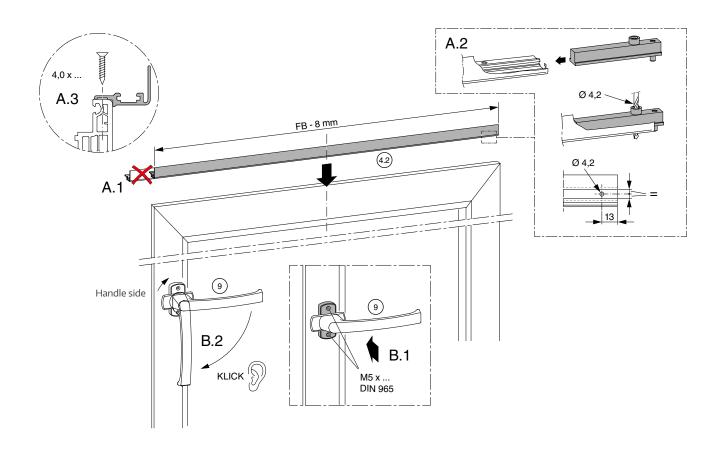


### Assembly of stay-connecting profile

- **A.1** Cut to length the stay-connecting profile (3.3) on the **handle side**, sash width minus 8 mm.
- **A.2** Stay-connecting profiles without holes (storage lengths) must be drilled to the scissor slider on the **non-handle side**. The drill holes must be present on the non-handle side.
- **A.3** Screw in the stay-connecting profile in the centre of the sash.

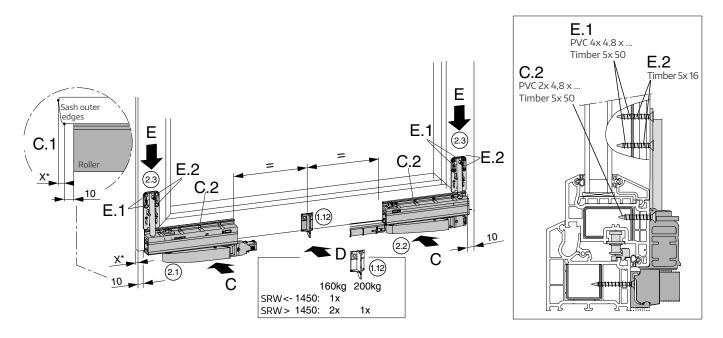
### Handle assembly

- **B.1** Set the handle  $^{\textcircled{9}}$  to 90° position on the sash, twist the cover and screw in the handle with 2 screws M5 x ... Check the function of the central locking for lightness.
- **B.2** Turn back the handle cover.



### Assembly of rollers

- C Screw the rollers (21) / (22) onto the sash frame with 4 screws each for PVC 4.8 x ..., for timber 5 x 50 at a lateral distance of 10 mm to the sash outer edges and flush to the bottom edge (reference edge for profiles with edge radius (C1)).
  - The length of the screws in PVC systems is to be chosen in such a way that they can grip in the steel reinforcement (C2).
- **D** Fix the cover support bracket  $^{(1)2}$  with 2 screws 4.8 x ... in the middle of the rollers. At SRW > 1450, screw both supports evenly between the rollers.
- E Push the reinforcement parts (23) into the profiles of the rollers, let them snap in and screw on as follows: E.1: With PVC, use 2 screws 4.8 x ... so that the screws find grip in the steel reinforcement.
  - For timber, use 2 screws  $5 \times 50$ .
  - **E.2**: For timber, use 2 screws  $5 \times 16$ .

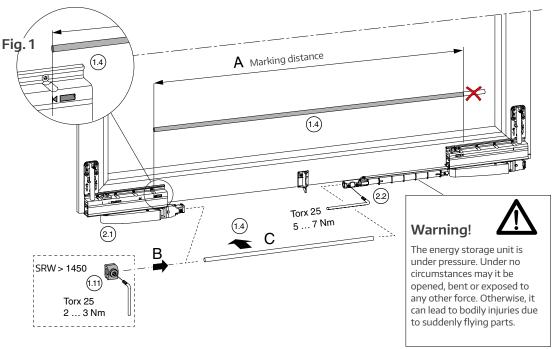


<sup>\*)</sup> Definition of X is required for the later assembly of the guide block



#### Assembly of connecting rod

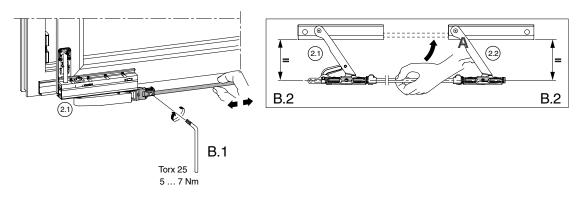
- A Cut the connecting rod  $^{(1.4)}$  to length according to the markings on the rollers (Fig. 1) -364 mm.
- **B** At SRW > 1450: Push the support block (11) to the middle and attach to the connecting rod (Torx 25, 2 ... 3 Nm).
- C Insert connecting rod into the roller clutches (21) and (22). Fix the roller (22) to the non-handle side with Torx 25 (5 ... 7 Nm).



#### Align rollers in parallel

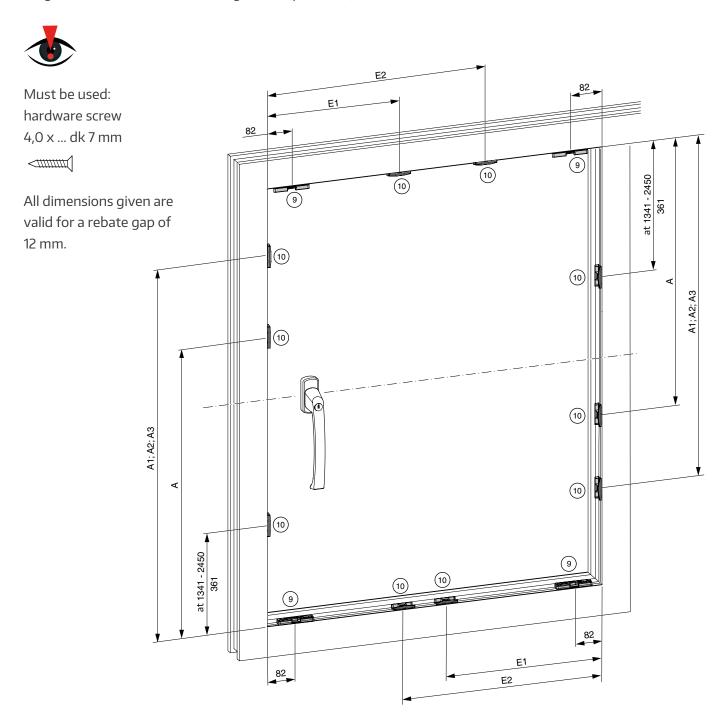
(to ensure an even run-in of the sash into the frame)

- A Grip the connecting rod in the middle and put it into the closed position.
- B In this position, tighten the connecting rod on the handle-side roller (Torx 25. 5 ... 7 Nm) (B.1). Both rollers (21) and (22) must now also be parallel in the open position (B.2).



### Assembly of striker plates

Position and fix night ventilation striker plates PAS  $^{\textcircled{9}}$  and striker plates  $^{\textcircled{10}}$  according to the Figure / Table. Diagram C: see cross-section «Diagram C» (p. 39 - 40).





### Assembly of striker plates Diagram A

Positioning of striker plates, sash lifters for fixed drive gear 12 mm rebate gap

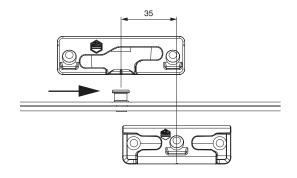
Drive gear siz	ze SRH	А	A1	A2	A3	Handle set without rebate
1090	841 - 1090	586	-	-	-	400
1340	1091 - 1340	686	-	-	-	500
1590	1341 - 1590	_	921	-	-	600
1700	1591 - 1700	_	1021	-	-	700
1950	1701 - 1950	_	796	1466	-	1050
2200	1951 - 2200	_	796	1466	-	1050
2450	2201 -2450	_	796	1466	1966	1050

#### Positioning of striker plates 12 mm rebate gap

Width connector size	SRW	E1	E2
Gr. 1	750 -900	330	-
Gr. 2	901 - 1150	565	-
Gr. 3	1151 -1400	800	-
Gr. 4	1401 - 1650	565	1035

### Burglar resistant version in night ventilation position:

The dimensions given in the tables -35mm



#### Assembly of guide track and roller track and scissor slider

#### Assembly of guide track on frame installation

- A Cut to length the guide track (1). Distance between sash outer edges and the slide and fixed sashes minus 8 mm.
- **B** Assemble the guide track using screws 4.0 x...( $d_k$  7), as shown (**B.1**).



#### **Important Information:**

#### The screw-heads must not protrude above the guide track!

If the screw-heads are protruded, this results in material damage (**B.2**)!

Oil the sliding surface of the guide track over the entire length of the track (**B.3**).

**C** Cut the cover profile  $^{(3)}$  to the dimensions of the guide track and click onto the guide track.

#### Assembly of the roller track on the frame installation

- D Cut the roller track (1.2) flush to the sash outer edges of the slide and fixed sashes.
- **E** Fix the roller track with  $35^{+1}$  mm distance from the bottom edge of the roller track to the bottom edge of the sash frame with screws  $4.0 \times ... (d_{\nu} 7)$  on the frame installation (**E.1**).



#### **Important Information:**

#### The screw-heads must not protrude above the roller track!

The screw-heads are protruded, this results in material damage (E.2)!

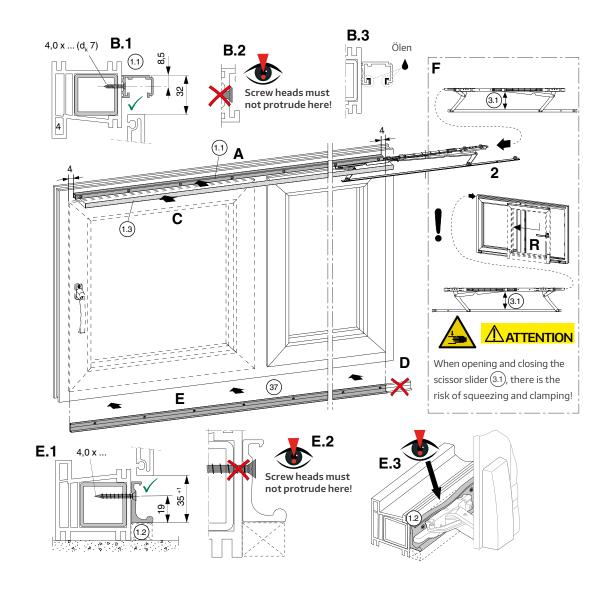
In the case of visible deformations or unusual (clearly audible) noises in the area of the roller track, this must be continuously packed to ensure load transmission (E.3).

#### Scissor slider assembly in the guide track

F Open 1 the scissor slider 31 and slide into the guide track as shown 2.



### Assembly of guide track and roller track and scissor slider



### Hinging sashes

#### Set the sash frame on the roller track

A Turn handle to slide position. Lift the sash slightly tilted inwards and use the rollers to lower onto the front edge of the roller track (12) (**Fig. 1**). Check the position of the rollers by pushing the sash and, if necessary, correct them.

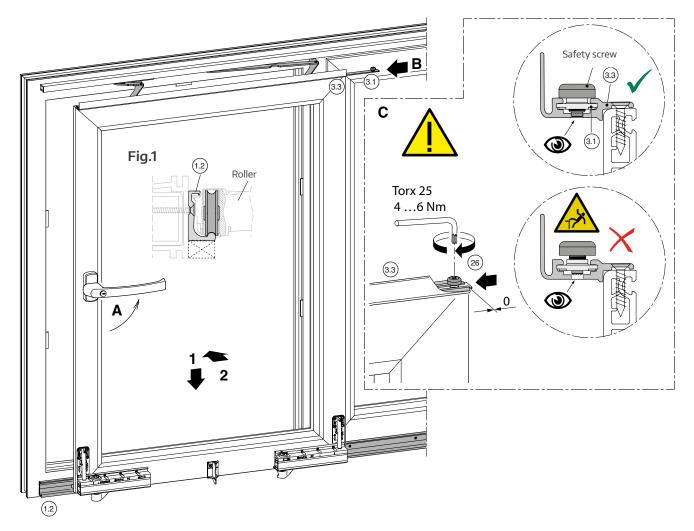
#### Connect sash frames with guide track

- **B** Scissor slider (3.1) into the stay-connecting profile (3.3).
- C Scissor slider (3.1) flush to the sash edge, tighten the safety screw (Torx 25,4...6 Nm).



The safety screw must sit form-fitting in the hole of the stay-connecting profile (3.3). If the safety screw is not visible, the window sash is not adequately secured.

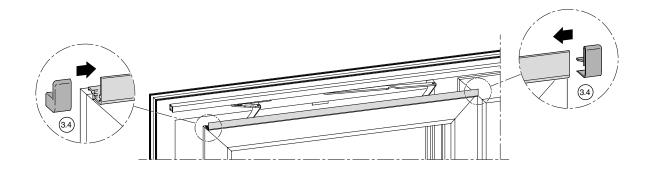
Serious bodily injuries can occur!





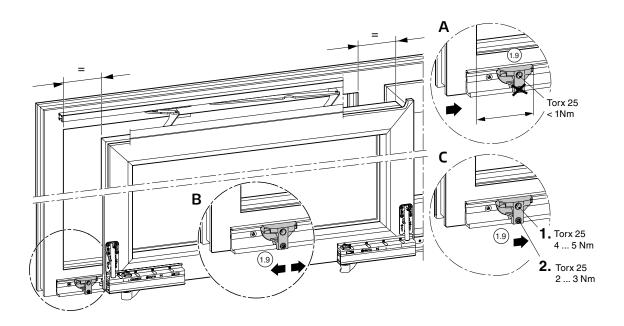
### Assembly of the cover caps, stay-connecting profile

D Insert the cover caps (3.4) left and right on the ends of the stay-connecting profile.



### Assembly of the guide block below

- A Position the guide block (1.9) on the handle side approx. 116 mm + X\* from the outside edge of the roller track
  - Then, tighten only slightly with the top screw (Torx 25, < 1 Nm).
- **B** Put the sash in the slide position (angelehnt an den Steuerklotz) and check the rebate gap on both sides (12 mm). If necessary, reposition the guide block.
- **C** 1. Tighten the top screw on the guide block tightly (Torx 25, 4 ... 5 Nm).
  - 2. Then, tighten the bottom screw (Torx 25, 2 ... 3 Nm).

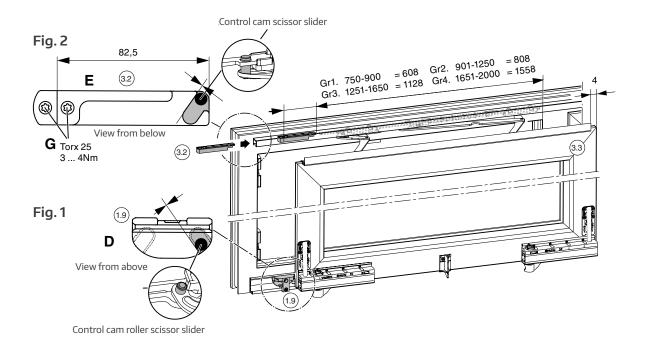


<sup>\*</sup> Definition of X: see Page 22 "Assembly of rollers"



### Assembly of the guide block above

- D Slide the sash as shown in Fig. 1 onto the lower guide block (19) until the guide cam of the roller with control (2.1) (handle side) touches the inlet curve, but does NOT enter it.
- E Slide the control module into the guide track at the top 32 up to the guide cam of the scissor slider (Fig. 2). Lightly tighten the screws (Torx 25) of the control module.
- **F** Put the sash in the closed position and check the rebate gap on both sides (12mm). Where applicable, reposition the guide block (without illustration).
- G Securely tighten both screws of the control module (Torx 25, 3 ... 4 Nm). Alternatively, you can also measure the position of the control module at the top 32 (see dimensions in the illustration). The dimensions refer to 12 mm rebate gap, 20 mm rebate width and correctly positioned stay-connecting profile 33 (4 mm rebate width).



#### Horizontal orientation of the sash

- A Check the rebate gap at the top and bottom on both sides (without Fig.).
- **B** Remove twist protection devices.
- **C** Lift the rollers using adjustment screws (Torx 40) to align the sash.



The adjustment screws must only be screwed out max. 11 mm. If the adjustment screws are screwed out more than 11 mm, this destroys the rollers!

The rollers are preset evenly at the factory. For correct alignment of the sash, the rollers must each be adjusted evenly using their two adjustment screws so that they do not tilt.

**D** Replace the twist protection devices on the adjustment screws, and slightly correct the alignment of the adjustment screws beforehand if necessary. The twist protection devices must sit parallel to the outside edge of the rollers.

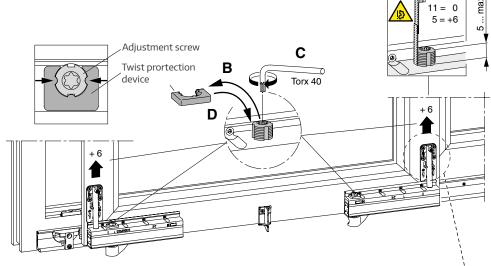


If the rollers are adjusted unevenly, the scissor slider guide block must be repositioned (see page 30/31).

#### Adjust reinforcement parts

(to optimise easy insertion of the sash into the frame)

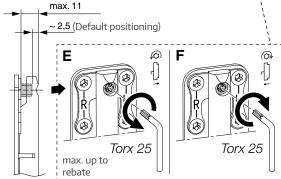
- **E** Simplify insertion.
- **F** Simplify removal.





#### **Important Information:**

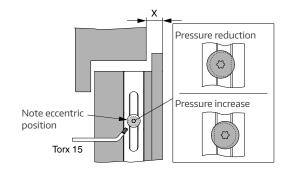
From the default setting, both reinforcement parts should be adjusted evenly only in the direction of E. If the adjustment towards E is too much, the rollers may be ground down depending on the profile and sash weight. In this case, turn the adjustment screw until it runs freely, back towards F.





### Adjusting the sash pressure (rebate height)

Check closing behaviour of the sash. Adjust the sash pressure by adjusting the rebate height (X) using Torx 15.

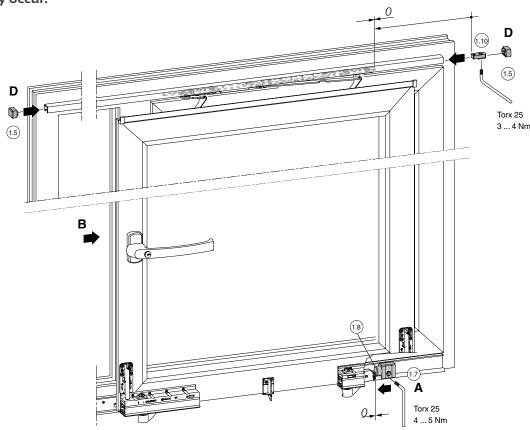


#### Assembly of buffer stops

- A Screw in the lower buffer stop (1.7) with rubber mushroom buffer (1.8) the desired position on the roller track (Torx 25, 4 ... 5 Nm).
- **B** Push the sash frame right up to the buffer stop.
- C Insert the upper buffer stop  $\bigcirc$  ight up to scissor slider in the guide track and screw in tightly (Torx 25, 3 ... 4 Nm).
- **D** Insert the cover caps (1.5) on the ends of the guide track.



If the sash does not evenly move against the upper and lower buffer stops, material damage may occur.



### Assembly of covers

#### Activate the roller safety devices

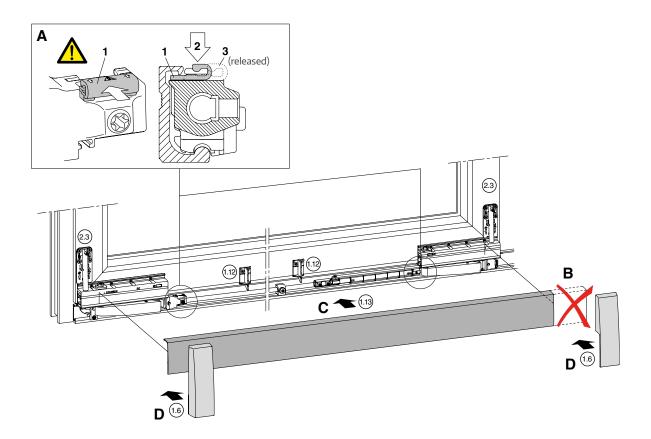
A Push the roller safety device (1) backwards on both rollers until it snaps in at the position shown (2).



If the roller safety device is not correctly positioned or missing from the position shown (2), the window sash is not adequately secured (3). Serious bodily injuries can occur!

#### Assemble roller covers

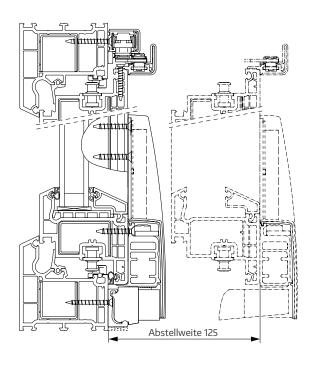
- **B** Cut the cover profile (1.13) to length according to the markings on the rollers.
- **C** Align the cover profile to the roller markings and clip onto the roller profiles as well as the cover support bracket(s) (1.12).
- D Clip on the cover caps at the bottom left (1.6) and at the bottom right on the reinforcement parts (2.3).



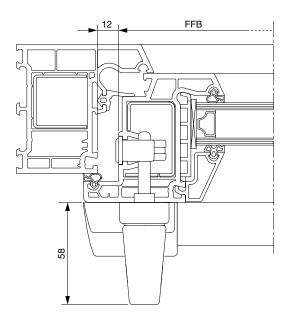


# Cross-sections

# Opening width 125



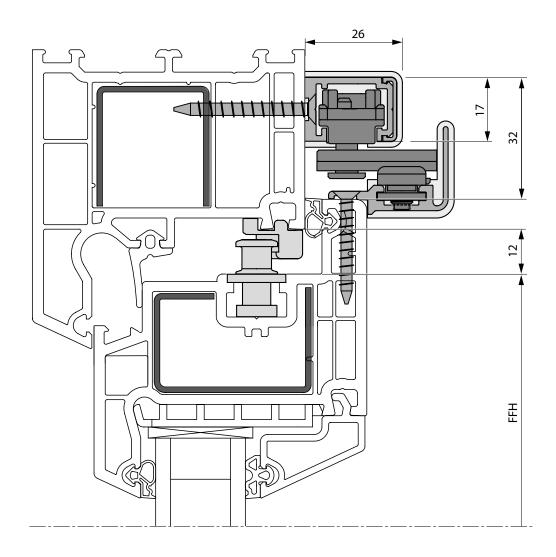
#### Horizontal cross-section handle EG



# Cross-sections

### Vertical cross-section top

Scale 1:1

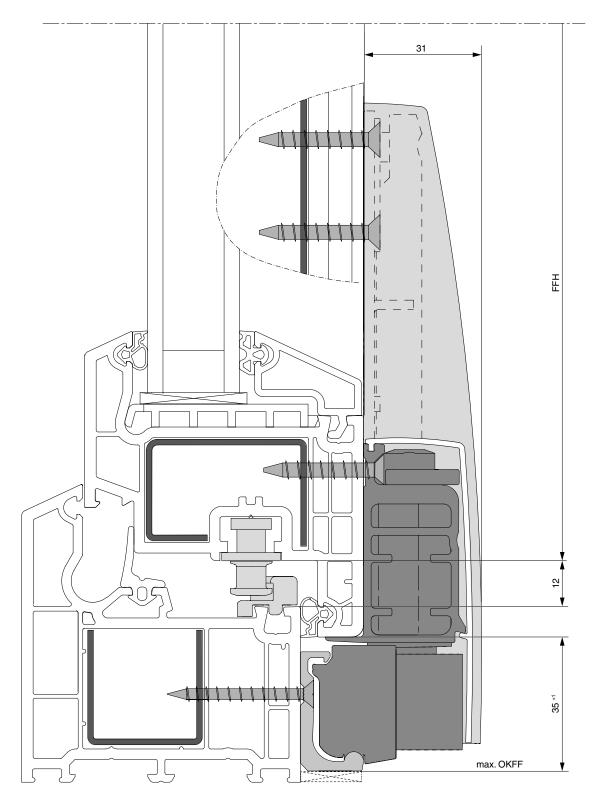




# Cross-sections

### **Vertical cross-section bottom**

Scale 1:1



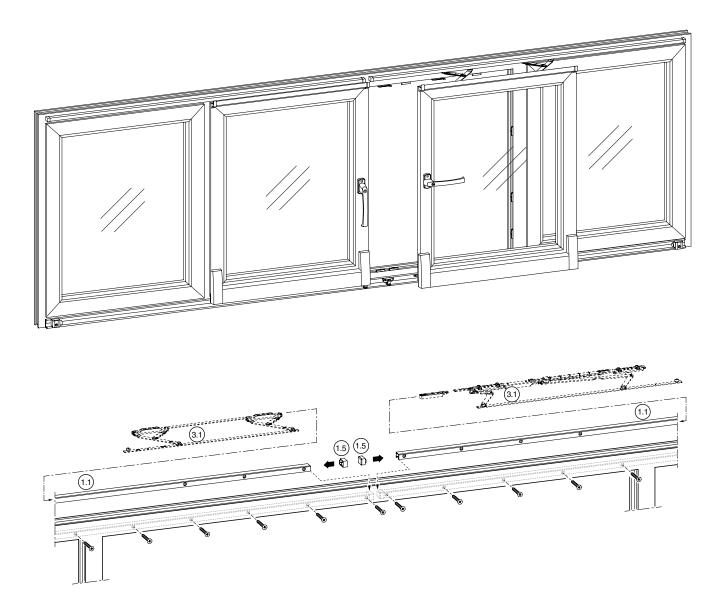
# Scheme C

### Assembly of guide track

### If insufficient space:

- A Push both tilt stays (3.1) sideways into the guide tracks (1.1).
- **B** Insert the cover caps (1.5) on the ends of the guide tracks.
- **C** Assemble the guide tracks using screws 4.0 x ...  $(d_k 7)$  onto the frame installation.

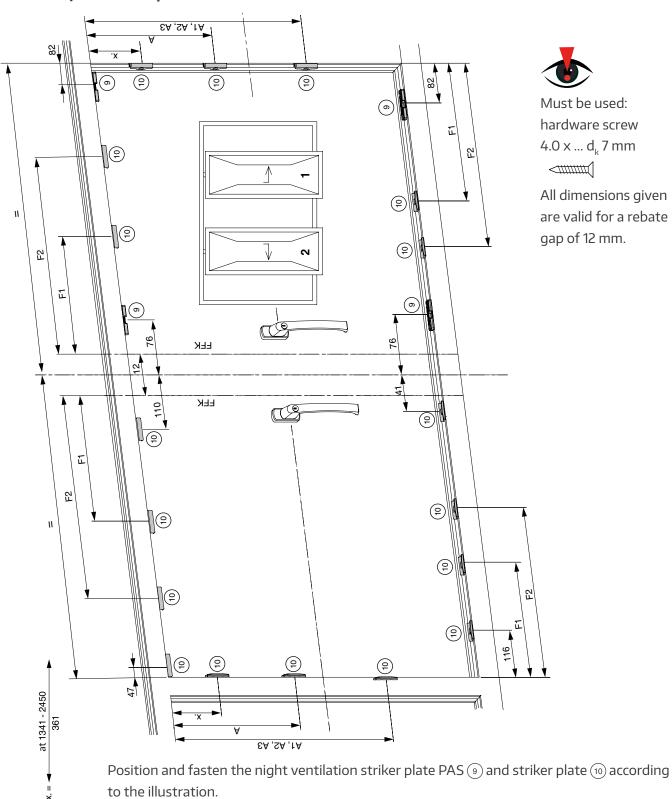
See also "Assembly of guide track" section.





# Notes

### Assembly of striker plates Scheme C





### Assembly of striker plates Scheme C

Positioning of striker plates for fixed drive gear 12 mm rebate gap

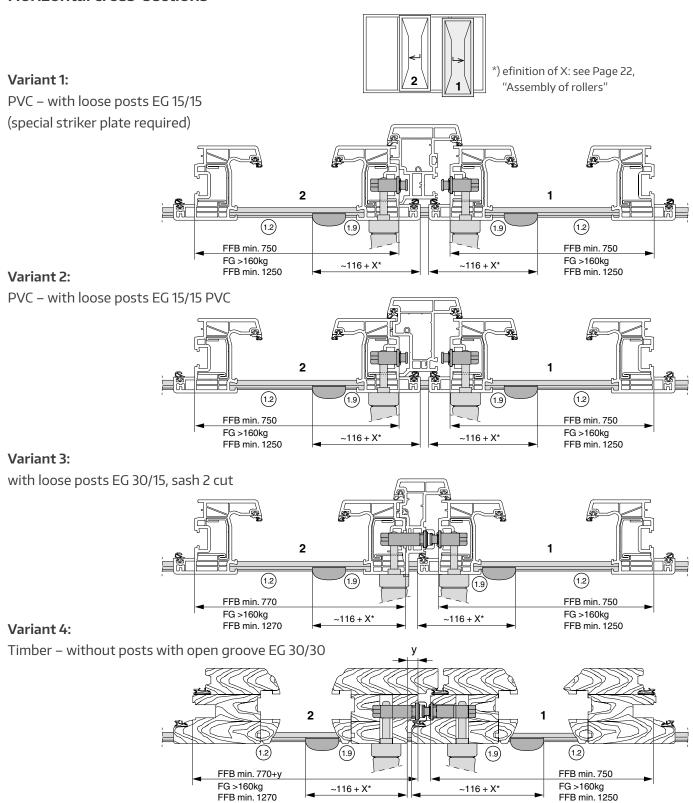
Drive gear size	SRH	А	A1	A2	А3	Handle position without rebate
1090	841 - 1090	544	-	_	_	400
1340	1091 - 1340	644	-	_	_	500
1590	1341 - 1590	_	879	_	_	600
1700	1591 - 1700	_	979	_	_	700
1950	1701 - 1950	_	754	1424	_	1050
2200	1951 - 2200	_	754	1424	_	1050
2450	2201 -2450	_	754	1424	1924	1050

Positioning of striker plate for width connector 12 mm rebate gap

Width connector	SRW	F1	F2
Size 1	620 -900	324	-
Size 2	901 - 1150	559	-
Size 3	1151 -1400	794	-
Size 4	1401 - 1650	559	1029

### Scheme C

#### **Horizontal cross-sections**





# Notes

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