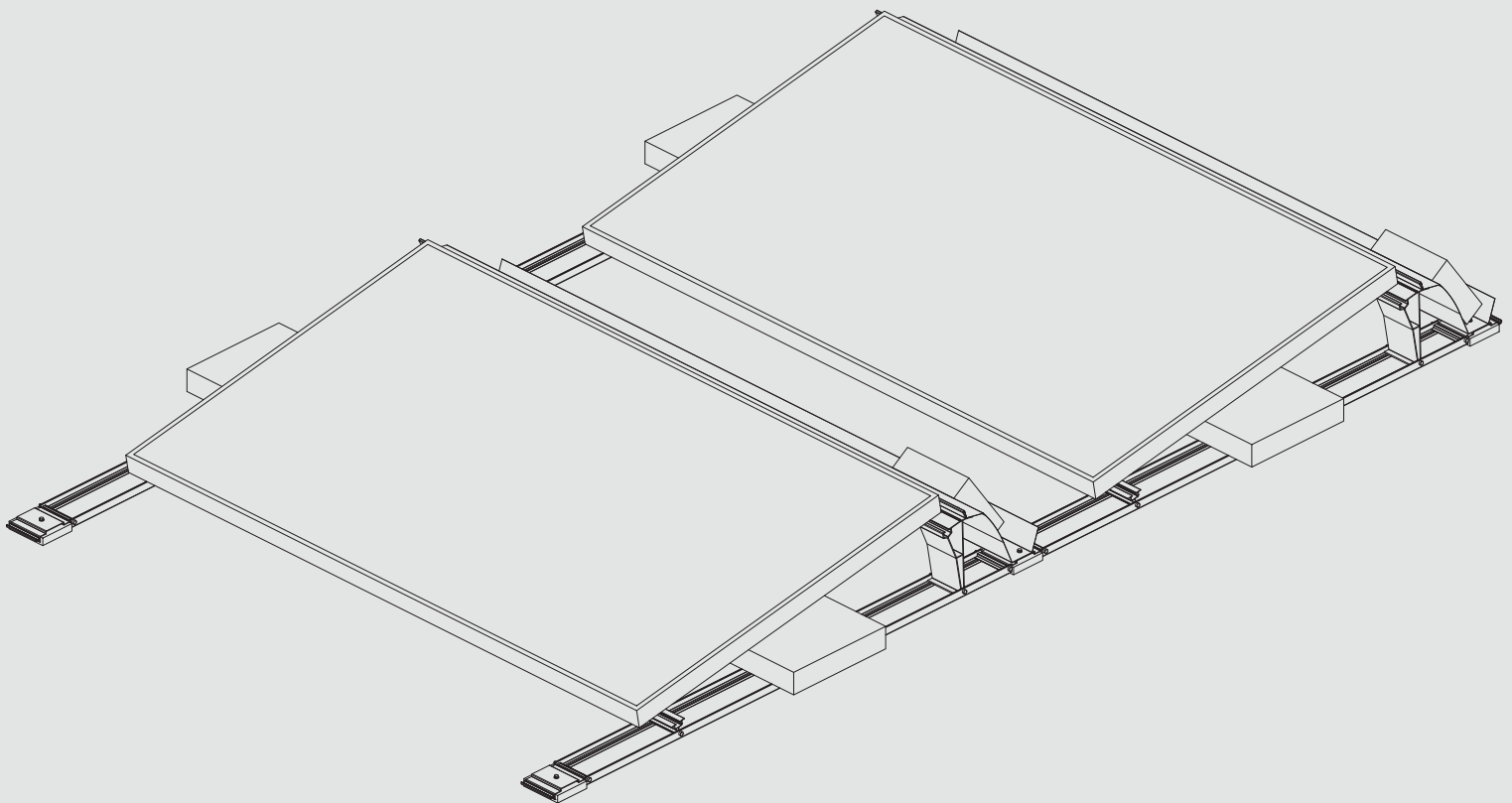


FS10-S/FS18-S

DE | Installationsanleitung
GB | Installation Instructions
FR | Notice d'installation
IT | Manuale di installazione
ES | Manual de instalación
NL | Installatiehandleiding



DE | Lesen Sie diese Installationsanleitung vor Montagebeginn!
Montage nur durch sachkundige, qualifizierte Personen!

GB | Read these instructions before installation!
Installation should only be carried out by skilled, qualified personnel!

FR | Prenez soin de lire le présent manuel d'installation avant le début du montage!
Montage seulement par des personnes compétentes et qualifiées!

IT | Leggere le presenti istruzioni di installazione prima di intraprendere i lavori di montaggio!
Il montaggio è consentito esclusivamente a personale esperto e qualificato!

ES | Lea estas instrucciones de instalación antes de comenzar el montaje!
El montaje solo debe realizarlo personal experto y cualificado.

NL | Lees deze installatiehandleiding alvorens met de montage te beginnen!
De montage mag uitsluitend plaatsvinden door deskundige, gekwalificeerde personen!



DE | Verwendung

Montagesystem für die Installation von gerahmten PV-Modulen auf Flachdächern mit einer Dachneigung von bis zu 5° ohne Dachdurchdringung.

Vor Installation zu beachten

Das FS10-S/FS18-S wird mit zusätzlichem Ballast (Gehwegplatten etc.) beschwert, um den Windlasten zu widerstehen. Das erforderliche Gewicht des Ballastes ist von der Höhe des Gebäudes, seiner Lage und der Beschaffenheit des Untergrundes sowie von den Windlasten abhängig.



Der **Reibbeiwert** von mindestens $\mu = 0,5$ ist einzuhalten. Dieser ist zwingend vor der Installation durch einen Fachmann vor Ort beim Kunden mit einer Federwaage zu ermitteln und zu protokollieren. Der Reibbeiwert ist ein Bestandteil zur Ballastermittlung und abhängig von den örtlichen Gegebenheiten.

Richtwerte für den erforderlichen Ballast lassen sich nach Eurocode 1 (EN 1991) berechnen.

Module sind immer quer zu montieren.

Beim Montagesystem FS10-S/FS18-S werden die Module im Eckbereich der kurzen Modulseite befestigt. Es ist bauseits zu prüfen, ob der vom Modulhersteller vorgegebene Klemmbereich eingehalten wird sowie die zulässigen Modullasten nicht überschritten werden.

Ablaufbohrungen in PV-Modulrahmen müssen freigehalten werden und dürfen durch das Montagesystem nicht verdeckt werden.

Für die Montage muss die Dachfläche frei von Schnee, Eis und Schmutz sein.

Berücksichtigen Sie bei der Montage die gültigen Regelwerke, den Stand der Technik und die aktuellen Arbeitsschutzrichtlinien.

Voraussetzung für den bestimmungsgemäßen Einsatz ist immer ein geeigneter Untergrund, der die auftretenden Kräfte (Gewichtslast, Wind und Schneelast)



Vor Montage muss die Standsicherheit des PV-Systems nachgewiesen werden. Die Gebäudekonstruktion, Dachabdichtung sowie Dämmschicht müssen die zusätzlichen Lasten sicher aufnehmen können.

aufnehmen kann. Der Wasserablauf des Flachdaches und dessen Richtung muss ebenfalls beachtet werden.

Die Dachhaut muss für das Auflegen von Bautenschutzmatte geeignet sein. Die Verträglichkeit zwischen Bautenschutzmatte und Dachfolie ist vorab zu prüfen. Speziell bei Weich-PVC-Dachfolien sind zusätzliche Maßnahmen notwendig, welche die sog. Weichmacherwanderung verhindern. Der Folienhersteller kann hier Auskunft geben.

Windgutachten

Die Sog- und Druckbeiwerte sind in Windkanalversuchen ermittelt worden. Diese können auf Anfrage von der Renusol GmbH zur Verfügung gestellt werden.

Mitgeltende Dokumente

"Allgemeine Hinweise FS10-S/FS18-S"
"Allgemeine Installations-, Wartungs- und Montagehinweise"
"Sicherheitshinweise zur Installationsanleitung"
"Garantiebedingungen und Haftungsausschluss."

Diese Dokumente sind verfügbar unter www.renusol.com

Garantie und Gewährleistung

Die Garantie von Renusol gilt nur bei Verwendung des original FS10-S/FS18-S Komplettsystems und Einhaltung der Garantiebedingungen. Für die gesetzliche Mängelhaftung/Gewährleistung beachten Sie bitte die Allgemeine Geschäftsbedingungen von Renusol.

www.renusol.com



GB | General Guidelines

Mounting system for installing framed solar PV modules on flat roofs with a roofpitch of up to 5° without penetrating the roof.

To be noted before installation

The FS10-S/FS18-S is weighed down with ballast (paving slabs etc.) in order to resist wind loads. The required weight of the ballast depends on the height of the building, its location and the condition of the installation surface in addition to the magnitude of the wind loads.



The coefficient of friction of at least $\mu = 0.5$ is observed. This is mandatory prior to installation to determine on site by the customer using a spring balance and recorded. The coefficient of friction is a component for determining ballast and depending on the local conditions.

Guideline values for the necessary ballast can be calculated using Eurocode 1 (EN 1991).

Modules are always to be mounted in landscape.

When mounted by the FS10-S/FS18-S, modules are mounted in the corner of the long sides. It must be checked, whether the value specified by the module manufacturer clamping range is maintained.

Drain holes in PV module frame must be kept clear and may not be obscured by the mounting system.

The roof area must be free of snow, ice and dirt during installation.

Be sure to observe the relevant regulations, latest technology standards and current health and safety guidelines during installation.

A suitable subsurface that can absorb any forces that may occur (weight, wind and snow loads) is always a prerequisite for use in accordance with regulations. Water drainage on the flat roof and its direction must also be taken into consideration.

The roof covering must be suitable for



The structural stability of the PV system must be verified before installation. The building construction, roofing and insulation must withstand the additional loads safely.

laying down building protection mats. The compatibility between the building protection mat and the roof membrane must be verified in advance.

Windreport

The pressure and suction coefficients are calculated on the basis of wind tunnel tests and are available from Renusol GmbH on request.

Applicable Documents

"General Notes FS10-S/FS18-S"

"General installation, maintenance and assembly instructions"

"Safety Instructions for Installation Instructions"

"Warranty and Disclaimer."

These documents are available at www.renusol.com

Warranty

The Renusol warranty only applies if an original FS10-S/FS18-S complete system is used and the warranty terms and conditions are met. For implied defects liability/warranty please refer to the Renusol General Terms and Conditions.

www.renusol.com



FR | **Recommandations générales**

Système de montage pour l'installation de modules photovoltaïques sur des toitures plates d'une inclinaison maximale de 5° sans les percer.

A noter avant l'installation

Le système FS10-S/FS18-S doit être alourdi au moyen de lest (dalles de ciment, etc.) afin de pouvoir faire face aux charges dues au vent. Le poids de lest nécessaire dépend de la hauteur du bâtiment, de sa situation et de la constitution du support ainsi que des charges dues au vent.



Le coefficient de frottement d'au moins $0,5 \mu$ = est observée. Ceci est obligatoire avant l'installation afin de déterminer sur place par le client en utilisant une balance à ressort et enregistrée. Le coefficient de frottement est un élément de détermination de ballast et en fonction des conditions locales.

Des valeurs indicatives pour le lest nécessaire peuvent également être calculées sur la base de l'Eurocode 1 (EN 1991).

Les modules sont toujours à être monté transversalement.

Les trous de drainage dans le cadre du module PV doivent être dégagés et ne peuvent pas être masqués par le système de montage.

Lors du montage, la surface de toit doit être exempte de neige, de glace et de saletés.

Prendre en compte lors de l'assemblage des réglementations en vigueur, l'état de l'art et de la réglementation en matière de santé et de sécurité.

Pour que l'utilisation soit conforme à la destination, il convient de choisir un sol approprié capable d'absorber les forces en présence (poids, vent et neige). L'écoulement des eaux de la toiture plate et sa direction doivent également être pris en compte.

L'enveloppe de la toiture doit être compa-

tible avec la pose des tapis de protection. Il convient de contrôler au préalable la compatibilité entre le tapis de protection et le lé d'étanchéité.

Rapport de vent

Les coefficients de succion et de pression ont été déterminés dans le cadre d'essais en soufflerie aérodynamique. Sur demande, ils peuvent être mis à votre disposition par la Renusol GmbH.

Garantie

La garantie Renusol n'est valable qu'en cas d'utilisation du système FS10-S/FS18-S complet original et de respect des conditions de garantie. Pour la garantie en raison des défauts/garantie de qualité, veuillez-vous référer aux conditions générales de vente de Renusol.

www.renusol.com



Avant le montage, la stabilité statique du système photovoltaïque doit être prouvée. La construction du bâtiment doit pouvoir absorber sûrement les charges supplémentaires.



IT | Avvertenze generali

Sistema di supporto per l'installazione di moduli fotovoltaici su tetti piani con un'inclinazione massima di 5° senza perforazione della copertura.

Da considerare prima dell'installazione

La resistenza di FS10-S/FS18-S ai carichi provocati dal vento è garantita mediante opportuno zavorramento con piastre di pavimentazione. Il peso della zavorra dipende dall'altezza dell'edificio, dalla localizzazione geografica del medesimo, dalle caratteristiche del fondo e dagli indici di vento insistenti sulla zona di installazione.



Il coefficiente di attrito di almeno $\mu = 0.5$ si osserva. Questo è obbligatorio prima dell'installazione di determinare sul posto dal cliente utilizzando una bilancia a molla e registrato. Il coefficiente di attrito è un componente per la determinazione zavorra e seconda delle condizioni locali.

I valori di riferimento per la quantificazione della zavorra necessaria possono essere desunti da Eurocode 1 (EN 1991).

I moduli sono sempre essere montato trasversalmente.

Fori di drenaggio nel telaio del modulo FV devono essere tenute sgombre e non possono essere oscurati dal sistema di montaggio.

Il montaggio del sistema di supporto presuppone l'assenza di neve, ghiaccio e sporcizia dalla superficie del tetto.

In fase di montaggio, osservare le regolamentazioni vigenti in materia, lo stato della tecnica e le norme di sicurezza sul lavoro, in particolare quelle inerenti a lavori svolti sui tetti di edifici.

Prerequisito per un utilizzo conforme è sempre un fondo d'installazione adeguato, in grado di supportare le forze che su di esso agiscono (carichi per peso, vento e neve). Inoltre occorre tenere presente il drenaggio del tetto piano e la sua direzione.

Il manto del tetto deve essere adatto



Il montaggio può aver luogo solo previa certificazione della sicurezza statica dell'impianto fotovoltaico. La struttura dell'edificio deve essere in condizione di sopportare in sicurezza i carichi supplementari su esso applicati.

all'applicazione di stuoie protettive. Verificare preventivamente la compatibilità della stuoia protettiva con la membrana del tetto.

Ventor rapporto

I valori di pressione e di depressione sono stati rilevati da prove condotte in galleria del vento. Tali risultati possono essere messi a disposizione da Renusol GmbH dietro specifica richiesta.

Garanzia

La garanzia concessa da Renusol è applicabile solo utilizzando il sistema originale FS10-S/FS18-S completo e attenendosi alle condizioni di garanzia. In merito alla garanzia legale e commerciale si rimanda alle condizioni generali di Renusol.

La versione aggiornata delle istruzioni di montaggio sono reperibili al sito web:

www.renusol.com



ES | Indicaciones generales

Sistema de montaje para la instalación de módulos fotovoltaicos en tejados planos con una inclinación de hasta 5° sin penetración en el tejado.

Ha de observarse antes de la instalación

La FS10-S/FS18-S se carga con balasto (placas de cobertura, etc.) para resistir las cargas de viento. El peso necesario del balasto depende de la altura del edificio, su posición y de la naturaleza del subsuelo, así como de las cargas de viento.



Se observa el coeficiente de fricción de al menos $\mu = 0,5$. Esto es obligatorio antes de la instalación para determinar in situ por el cliente utilizando una balanza de resorte y grabado. El coeficiente de fricción es un componente para la determinación de lastre y dependiendo de las condiciones locales.

Los valores orientativos para el balasto necesario se pueden calcular según el Eurocode 1 (EN 1991).

Los módulos son siempre para ser montado transversalmente.

Los agujeros de drenaje en PV marco del módulo deben estar libres y no pueden ser oscurecidas por el sistema de montaje.

Para el montaje, la superficie del tejado debe estar libre de nieve, hielo y suciedad.

Tenga en cuenta durante el montaje los códigos vigentes, el estado de la técnica y las directivas de protección en el trabajo, sobre todo en los trabajos en el tejado.

Un requisito indispensable para una utilización conforme es contar siempre con un sustrato adecuado y capaz de soportar las fuerzas que se producirán (peso, viento y nieve). También hay que tener en cuenta la evacuación del agua en cubiertas planas y su dirección.

El revestimiento de la cubierta debe ser adecuado para la colocación de la protección para la cubierta. Antes de colocarla



Antes del montaje se debe verificar la estabilidad del sistema fotovoltaico. El edificio debe poder recibir con seguridad las cargas adicionales.

se comprobará la compatibilidad entre la protección para la cubierta y la lámina de revestimiento de la cubierta.

Evaluaciones de viento

Los valores de presión y succión han sido determinados en pruebas dentro del túnel del viento. Renusol GmbH puede facilitarle estos datos en caso de solicitud.

Garantía

La garantía de Renusol solo tiene validez si se utiliza el sistema completo original FS10-S/FS18-S y se cumplen las condiciones de la garantía. Para la responsabilidad por deficiencias/prestación de la garantía tenga en cuenta las condiciones comerciales generales de Renusol.

www.renusol.com



NL | Algemene aanwijzingen

Montagesysteem voor de installatie van zonnepanelen op platte daken met een helling van maximaal 5° zonder dakdoo-
rvoer.

Te worden opgemerkt voor de installatie

De FS10-S/FS18-S wordt verzaagd met ballast (grind, trottoirtegels etc.) om weerstand te bieden aan de windbelasting. Het vereiste gewicht van de ballast is afhankelijk van de hoogte van het gebouw, de ligging en de aard van de ondergrond en van de windbelasting.



De wrijvingscoëfficiënt van ten minste $\mu = 0,5$ waargenomen. Dit is verplicht voorafgaand aan de installatie te bepalen ter plaatse door de klant met behulp van een veer balans en geregistreerd. De wrijvingscoëfficiënt is een component voor het bepalen ballast en afhankelijk van de plaatselijke omstandigheden.

Richtwaarden voor de vereiste ballast kunnen worden berekend conform Eurocode 1 (EN 1991).

Modules zijn altijd dwars gemonteerd worden.

Drain gaten in PV-module-frame moeten vrijgehouden worden en mogen niet worden gestoord door het montagesysteem. Voor de montage moet het dakoppervlak sneeuw-, ijs- en vuilvrij zijn.

Neem bij de montage de geldende voorschriften, de stand van de techniek en de actuele ARBO-richtlijnen in acht, met name tijdens de werkzaamheden op het dak.

Voorwaarde voor gebruik volgens de voorschriften is altijd een geschikte ondergrond die de optredende krachten (gewichtbelasting, wind en sneeuwbelasting) kan opnemen. De waterafvoer van het platte dak en de richting daarvan moeten eveneens in acht genomen worden.

De dakbedekking moet geschikt zijn om te bedekken met bouwbeschermingsmatten.



Vóór de montage moet de stabiliteit van de zonnestroominstallatie worden aangetoond. Om veiligheidsredenen moet de constructie van het gebouw ruim berekend zijn op de extra belasting.

De compatibiliteit tussen bouwbeschermingsmat en dakfolie moet van tevoren worden gecontroleerd.

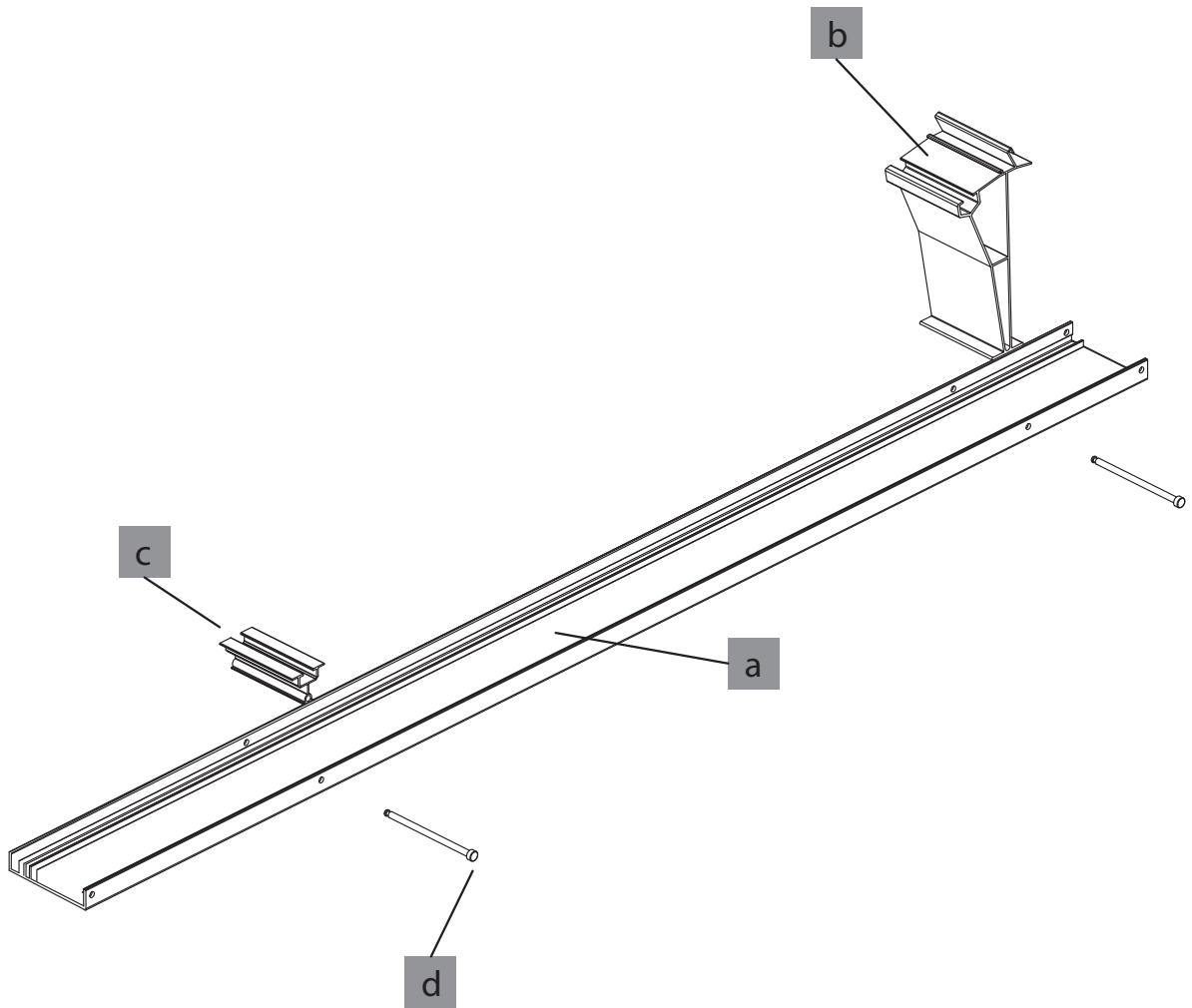
Wind verslag

De zuig- en drukcoëfficiënt zijn berekend op basis van windtunneltests. De resultaten hiervan worden op aanvraag beschikbaar gesteld door de firma Renusol GmbH.

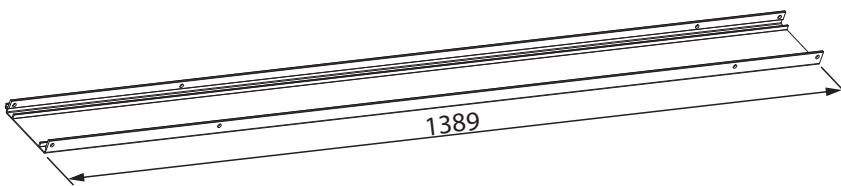
Garantie:

De garantie van Renusol geldt uitsluitend bij gebruik van het originele FS10-S/FS18-S totaalsysteem en inachtneming van de garantievoorwaarden. Zie voor informatie m.b.t. de wettelijke garantie a.u.b. de algemene voorwaarden van Renusol.

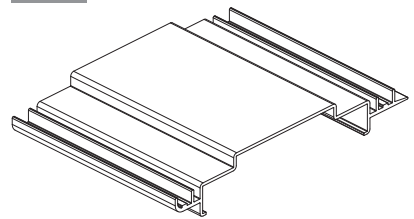
www.renusol.com



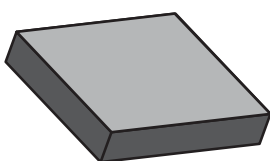
a R500400



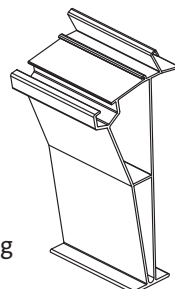
b R500404



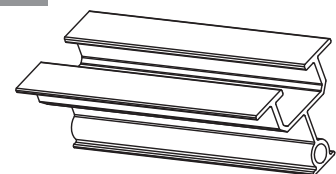
c R500411/ R500410



d R500421

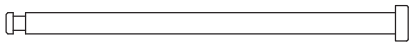


e R500420

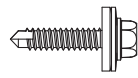


R500410: Bituminöse Abdichtung /Bituminous sealing
 R500411: Folienabdichtung / Foil sealing

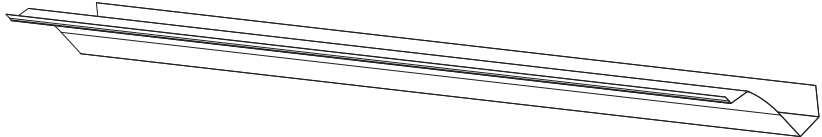
f R900314



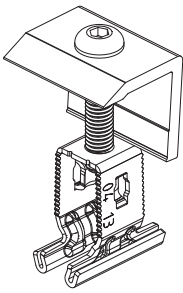
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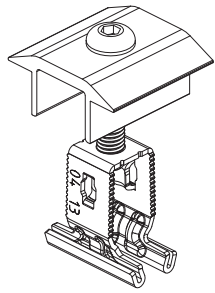
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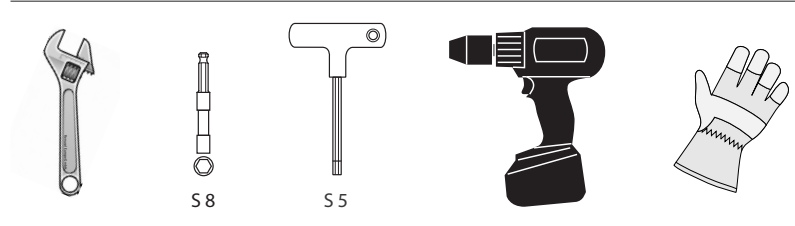
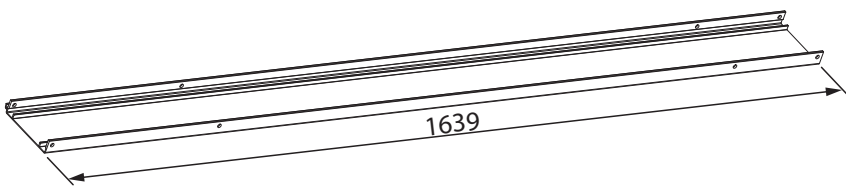
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R420082

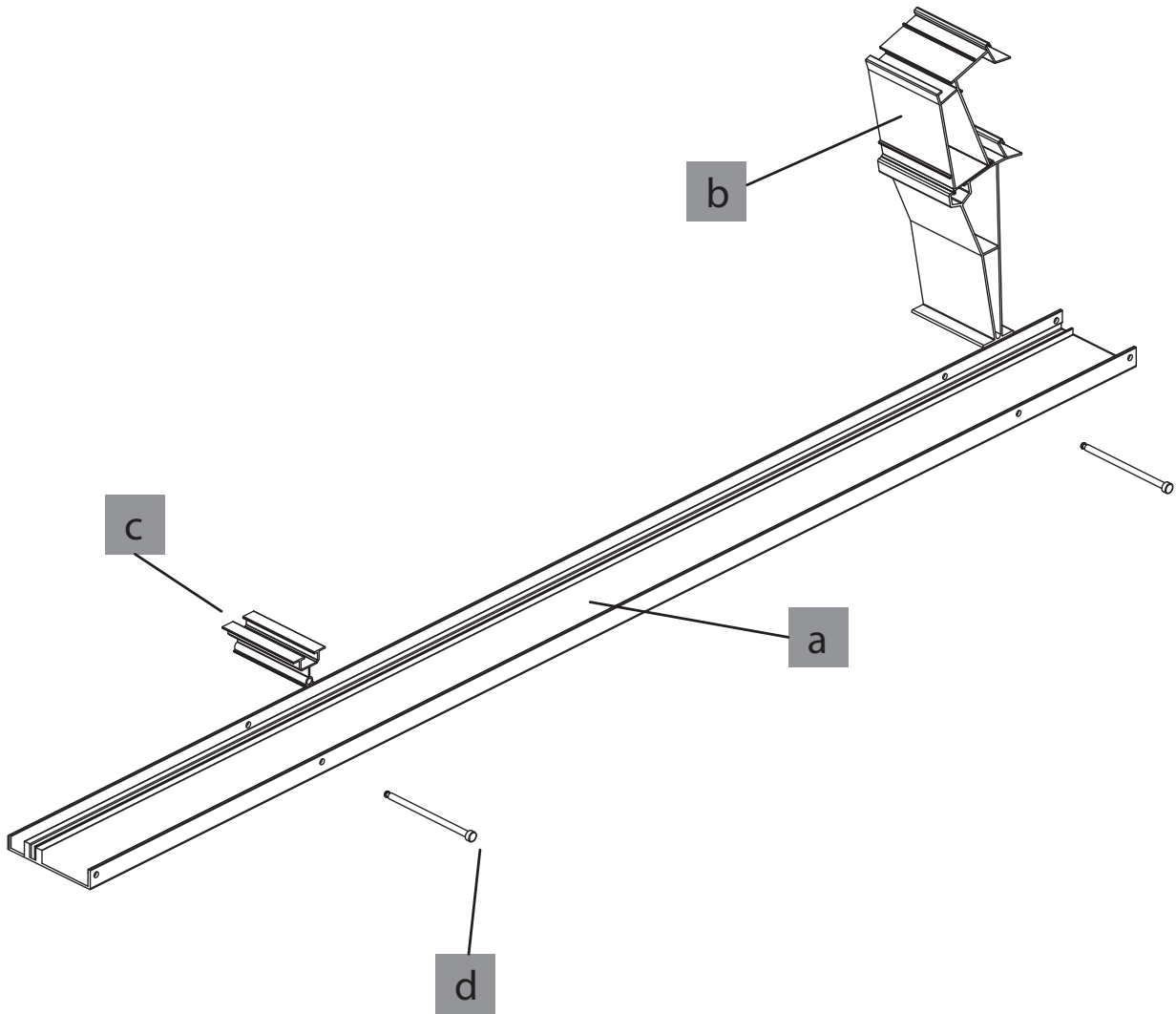


R500402 (Optional)

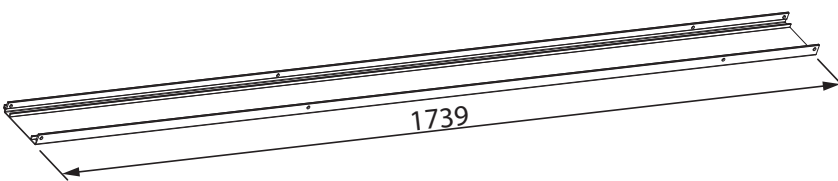


S8

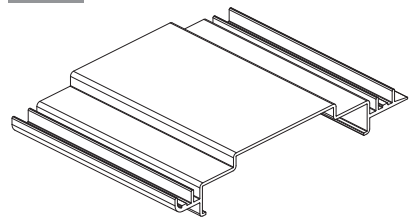
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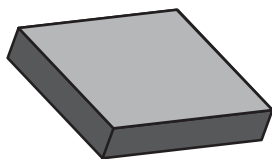
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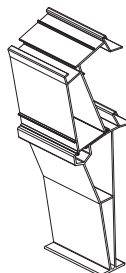
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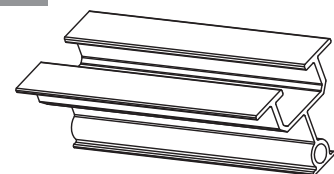
c R500411/ R500410



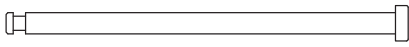
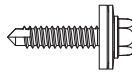
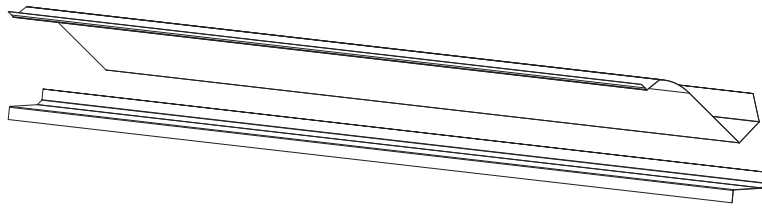
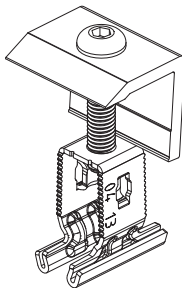
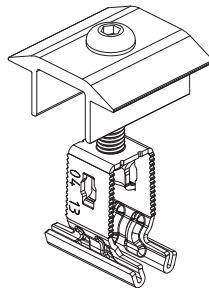
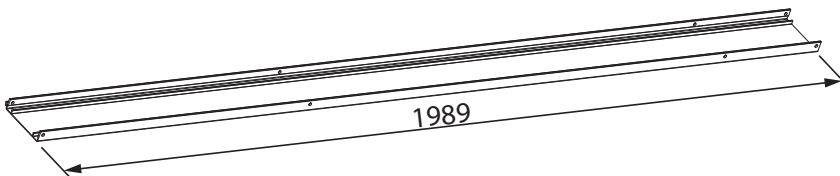
d R510422



e R500420



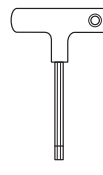
R500410: Bituminöse Abdichtung / Bituminous sealing
 R500411: Folienabdichtung / Foil sealing

f**R900314****g****R900229****h****R520431****R420081****R420082****R500403 (Optional)**

R500402: Für einen größeren Reihenabstand
R500402: To increase the distance between rows



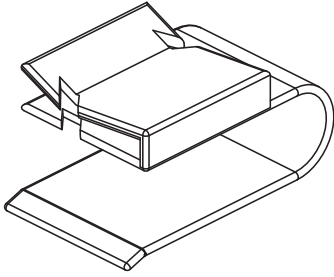
S8



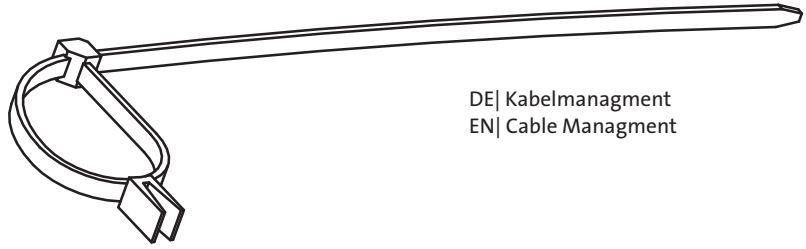
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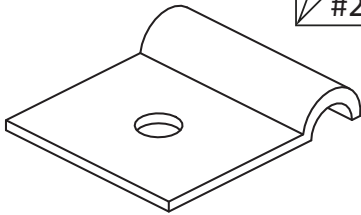


DE| Kabelmanagment
EN| Cable Managment

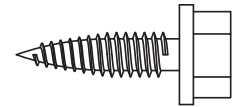
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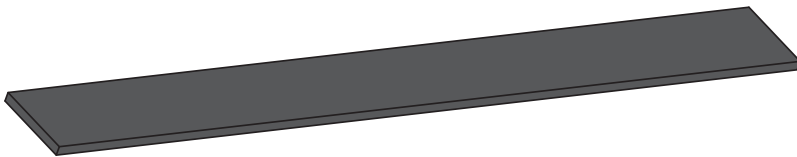
DE| Potentialausgleich
EN| Potential Equalization



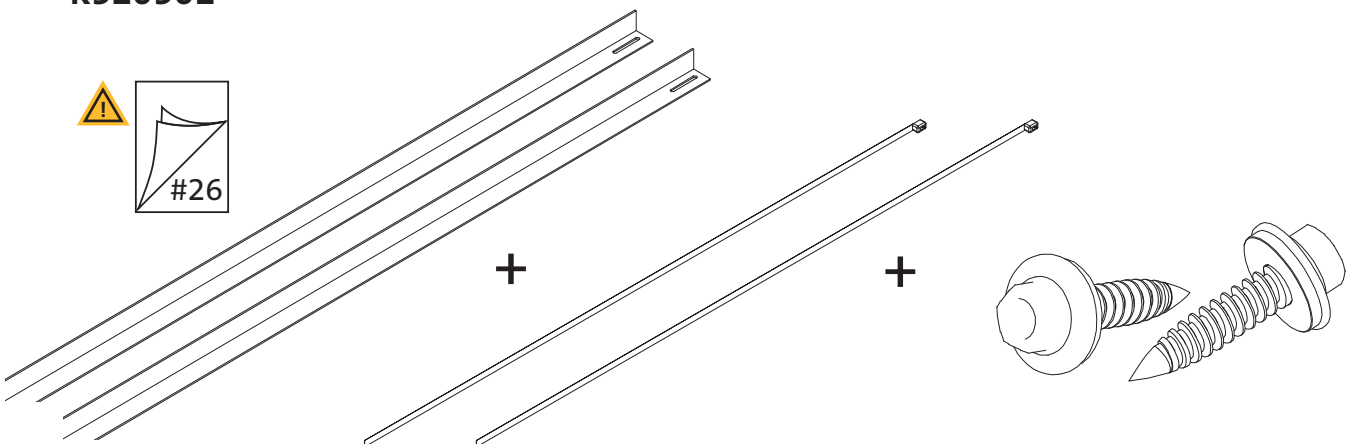
R900234



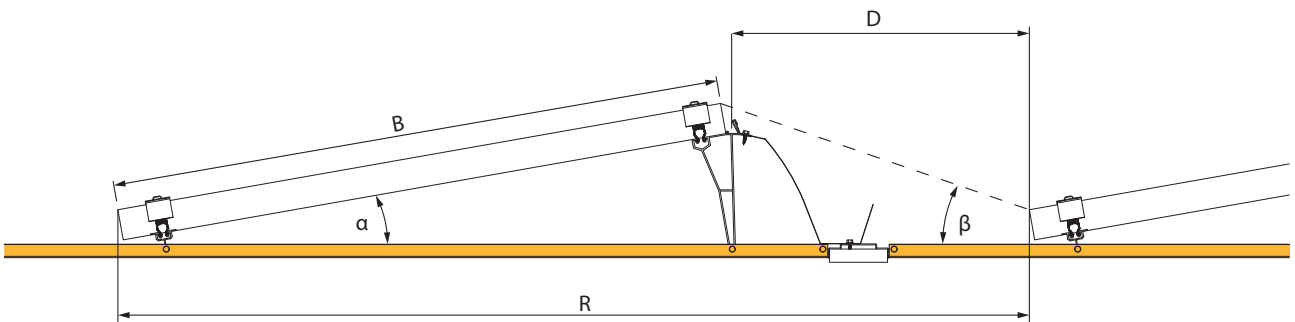
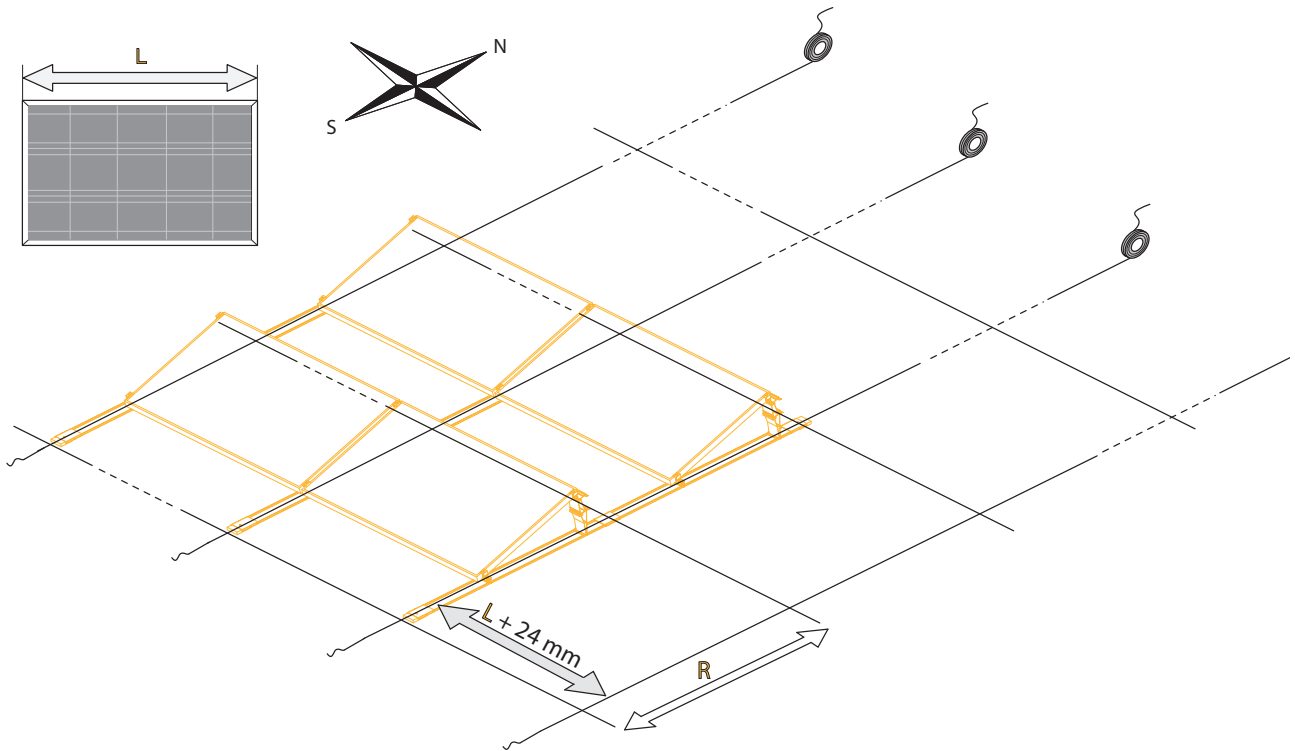
R500412



R520501

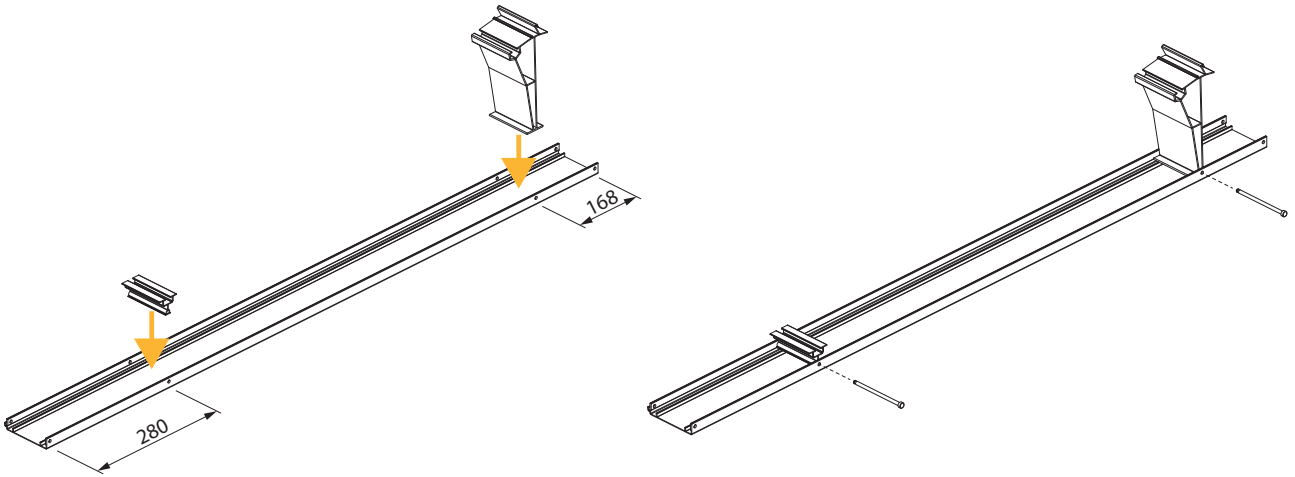


R520501: Wenn eine höhere Ballastierung benötigt wird
R520501: When high ballasting is required

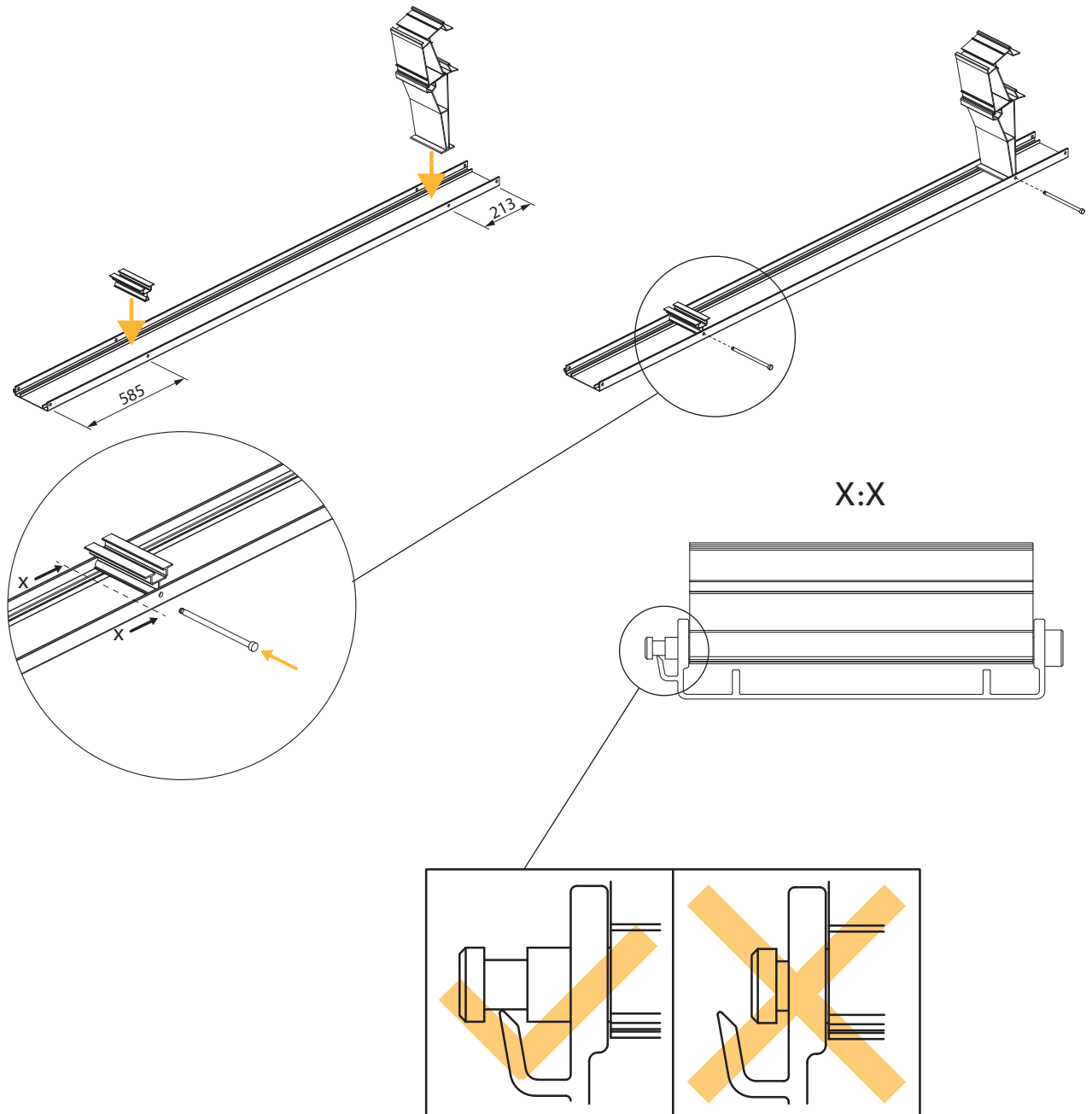


Maße / Dimensions / Afmetingen					
	B (mm)	α	β	R (mm)	D (mm)
Süd / South / Sud / Zuid 10° (Art. Nr.: R500400)	950 - 1.050	10°	17,5°	1490	555 - 450
Süd / South / Sud / Zuid 10°+ (Art. Nr.: R500401)	950 - 1.050	10°	12°	1740	804 - 705
Süd / South / Sud / Zuid 18° (Art. Nr.: R500402)	975 - 1.010	18°	17,5°	1840	912 - 880
Süd / South / Sud / Zuid 18°+ (Art. Nr.: R500403)	975 - 1.010	18°	14,5°	2090	1162 - 1130

FS10-S

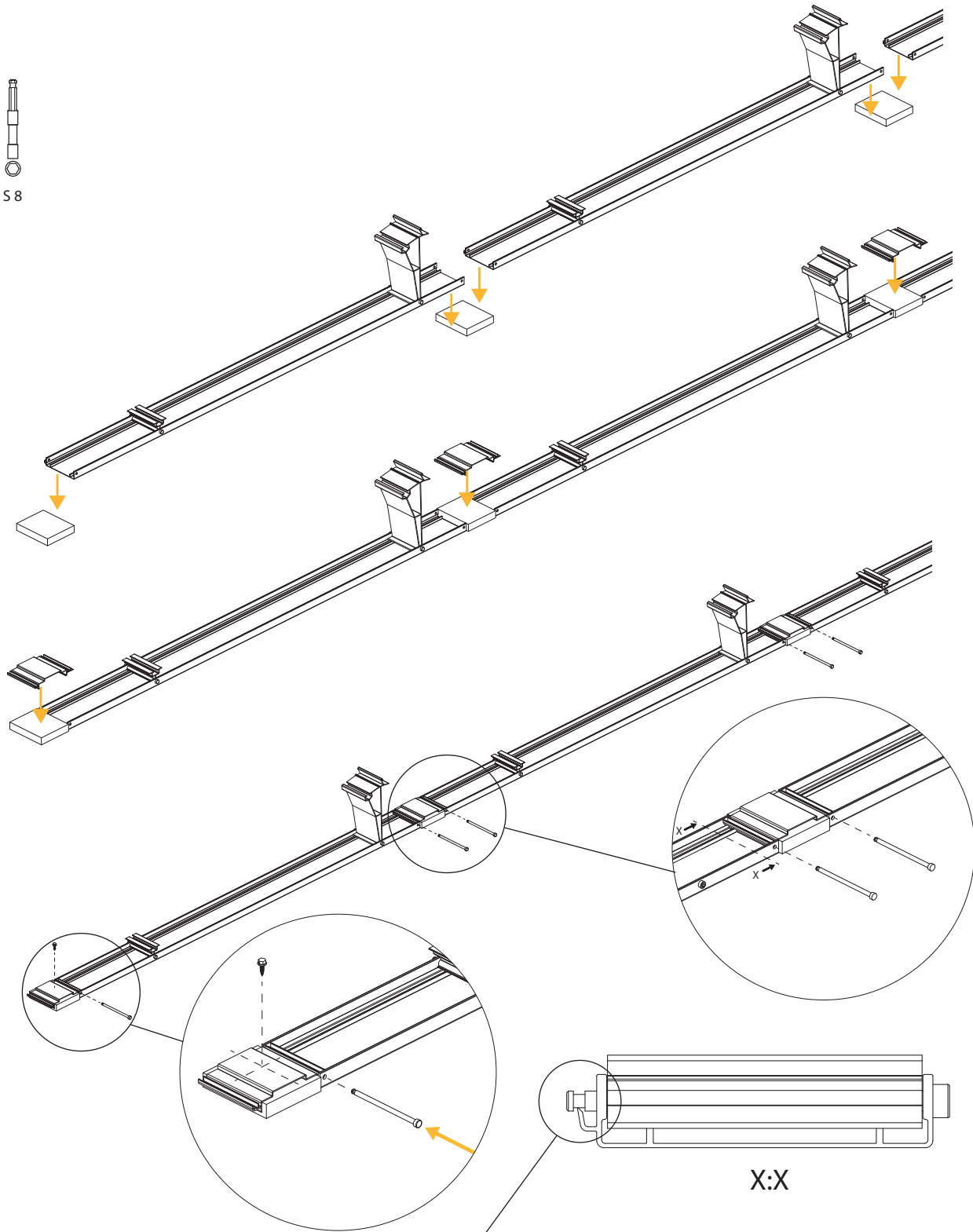


FS18-S

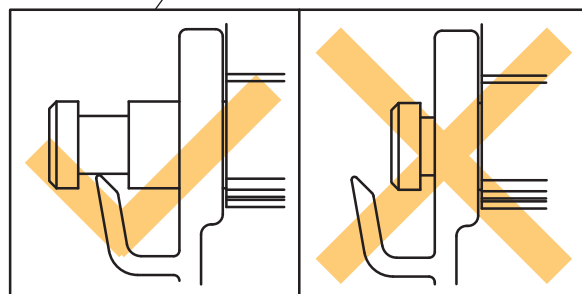
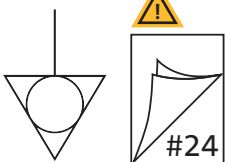


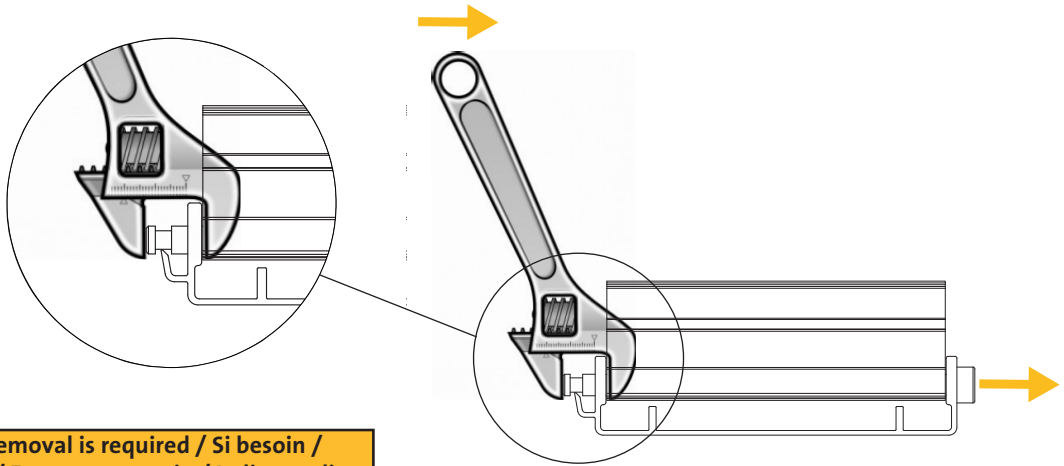


S 8



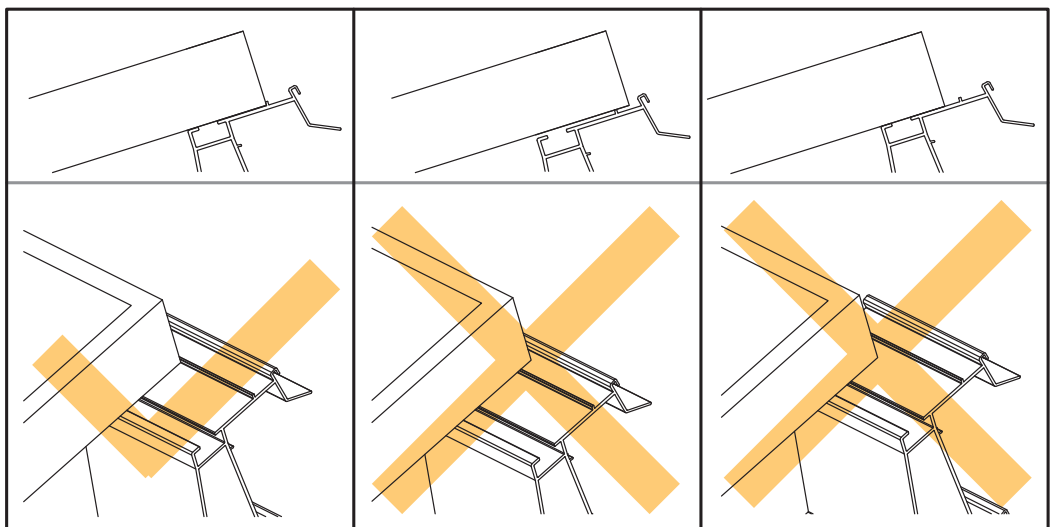
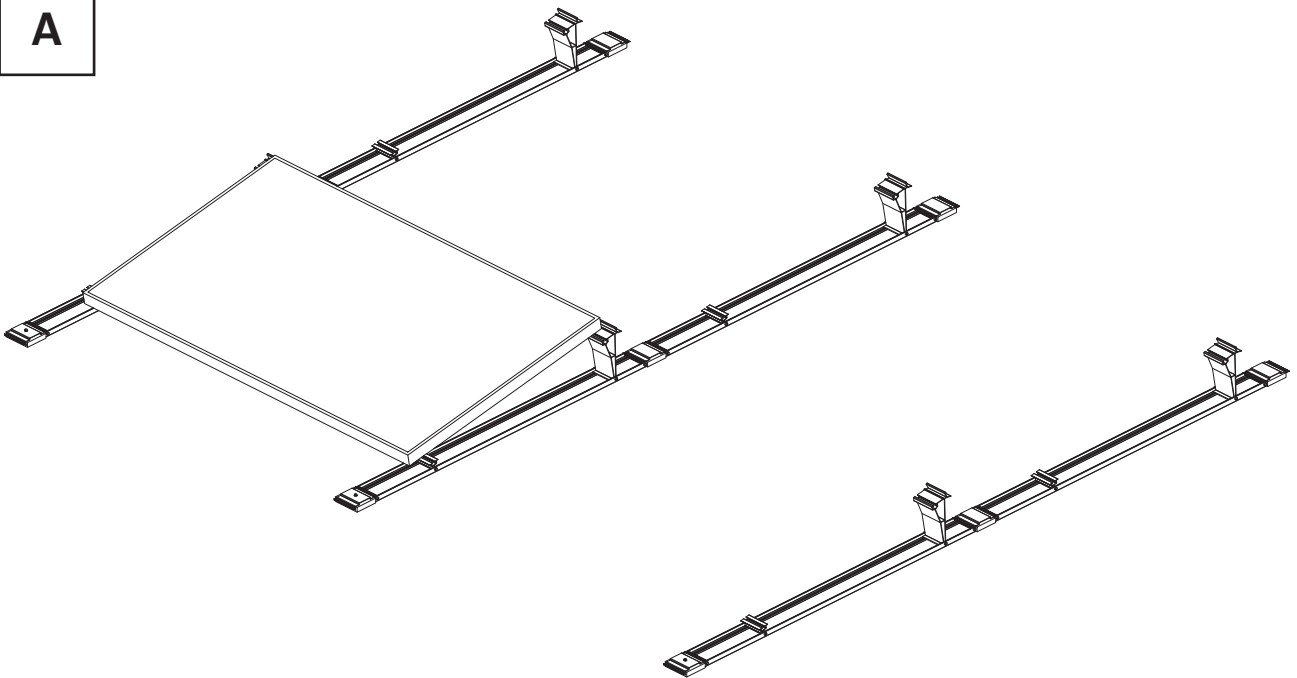
DE| Potentialausgleich
EN| Potential Equalization



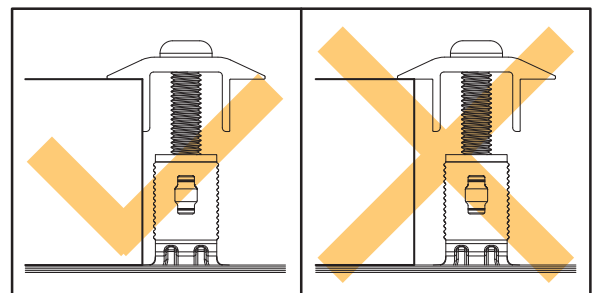
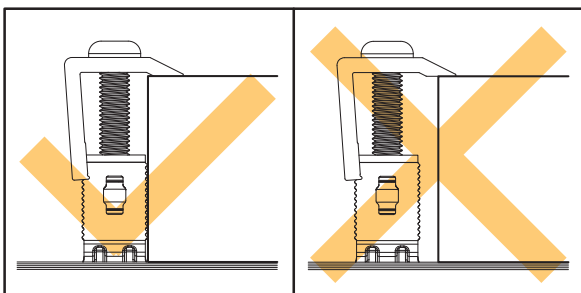
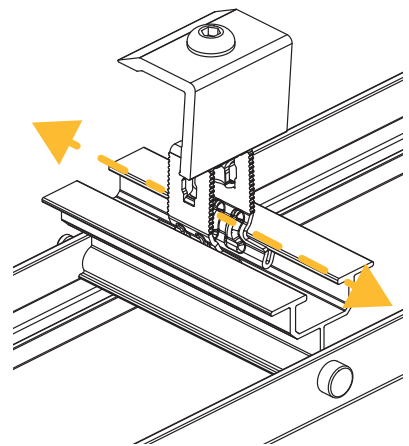
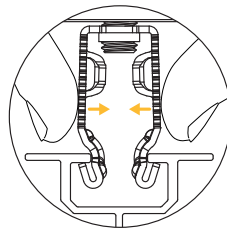
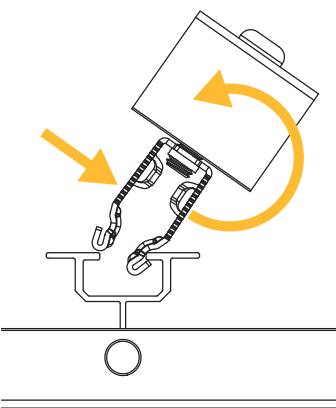
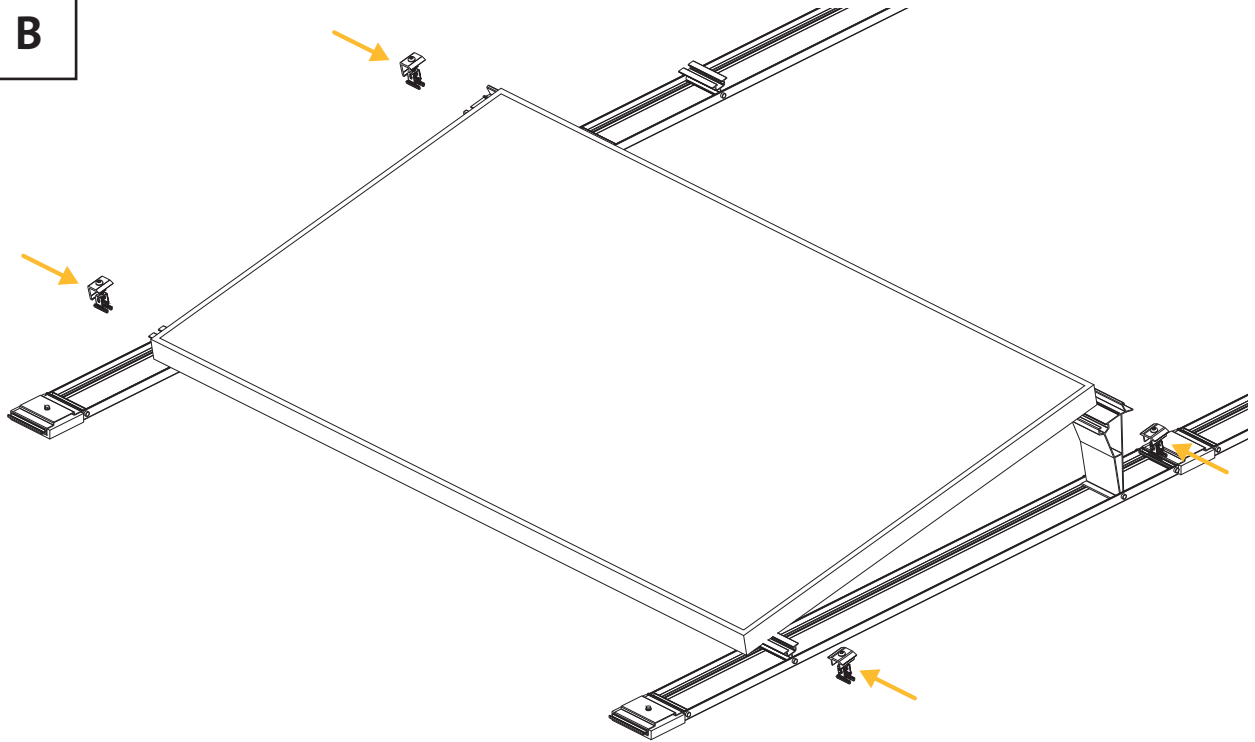


Bei Bedarf / If removal is required / Si besoin /
All'occorrenza / En caso necesario / Indien nodig

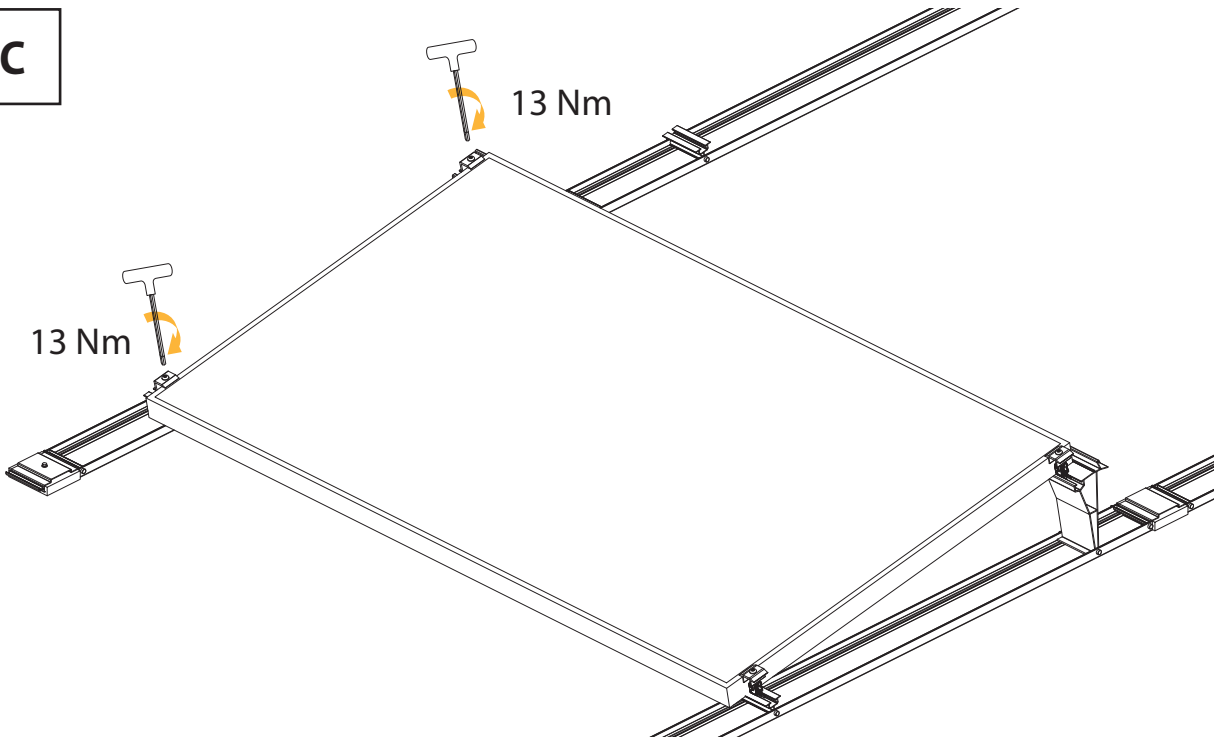
A



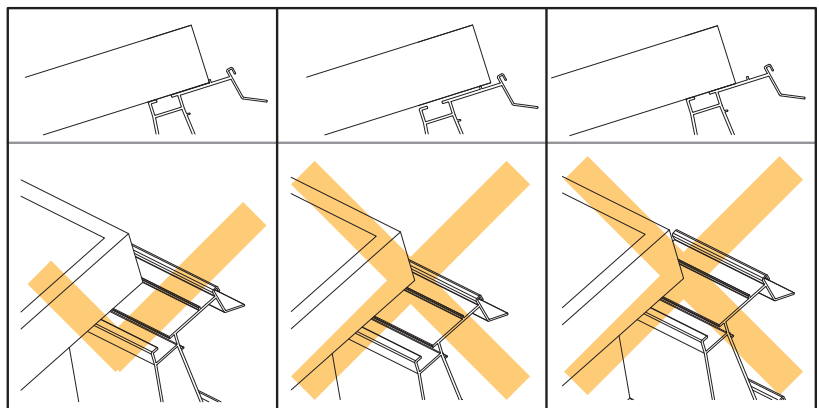
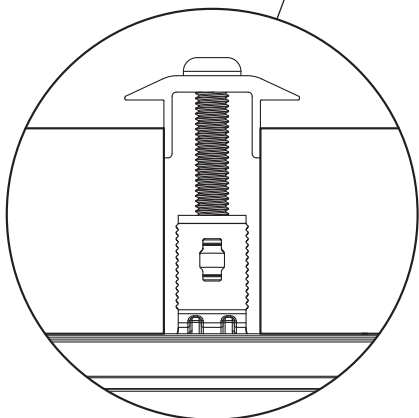
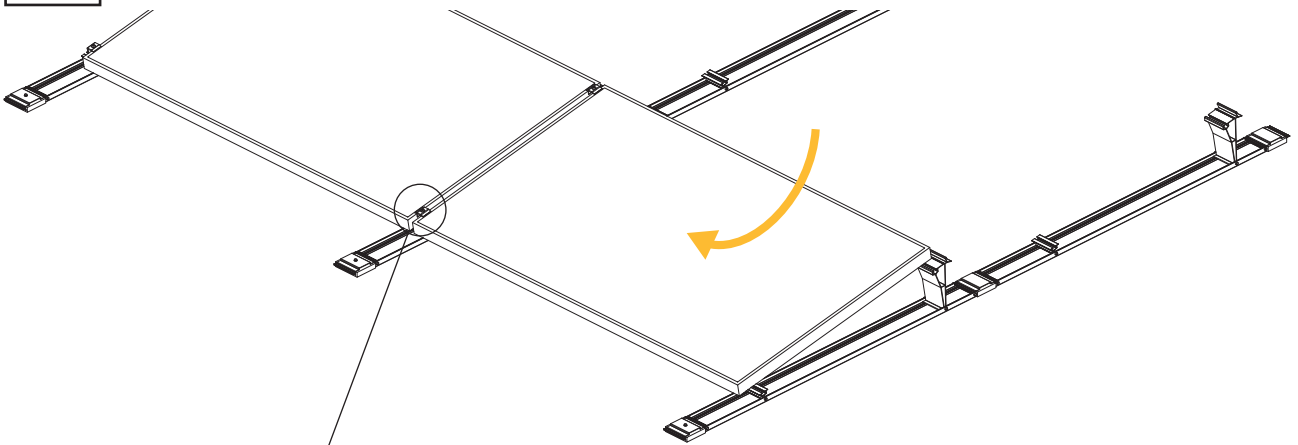
B



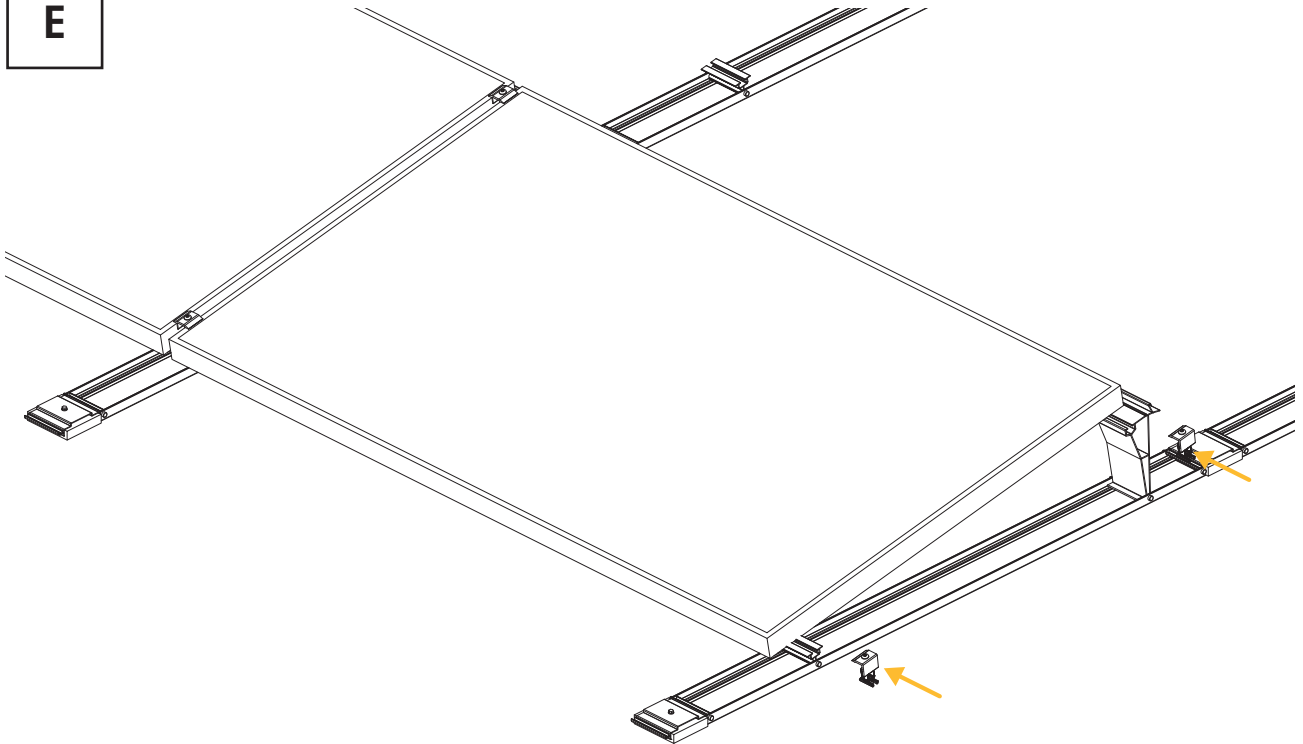
C



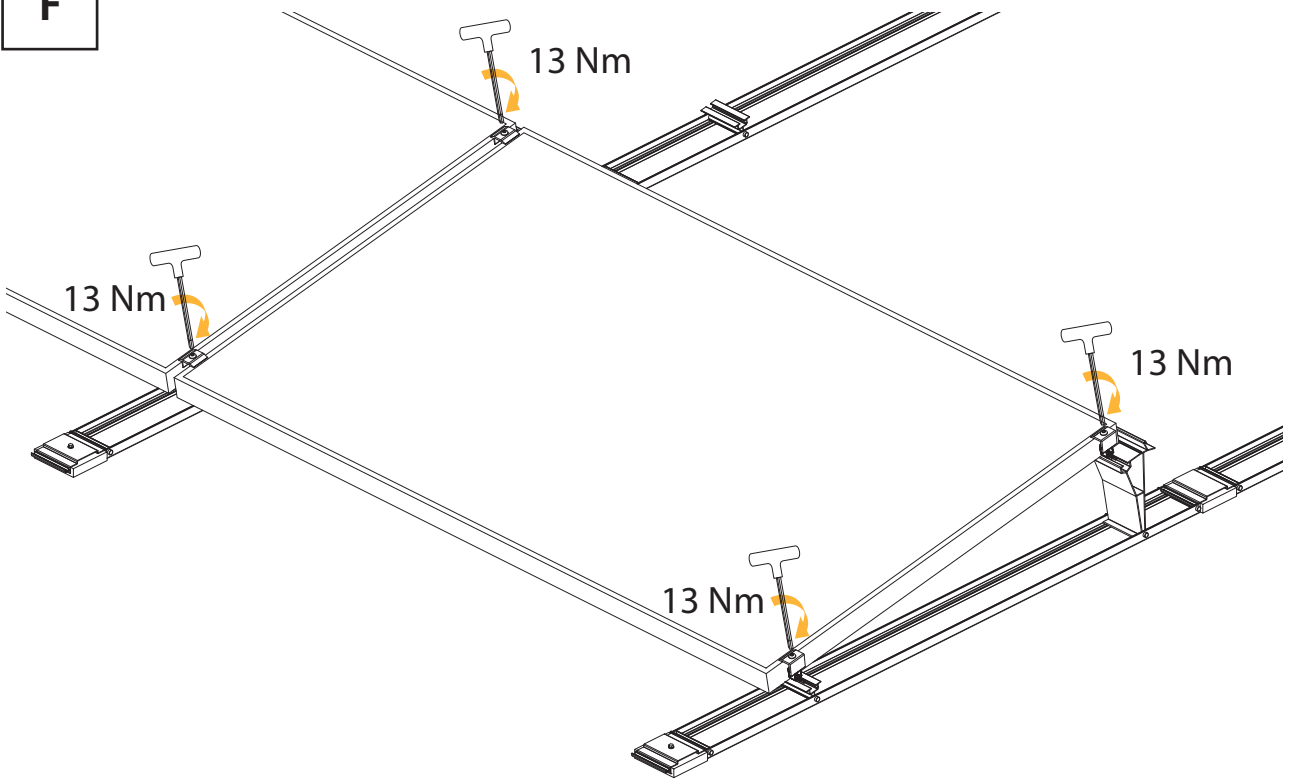
D



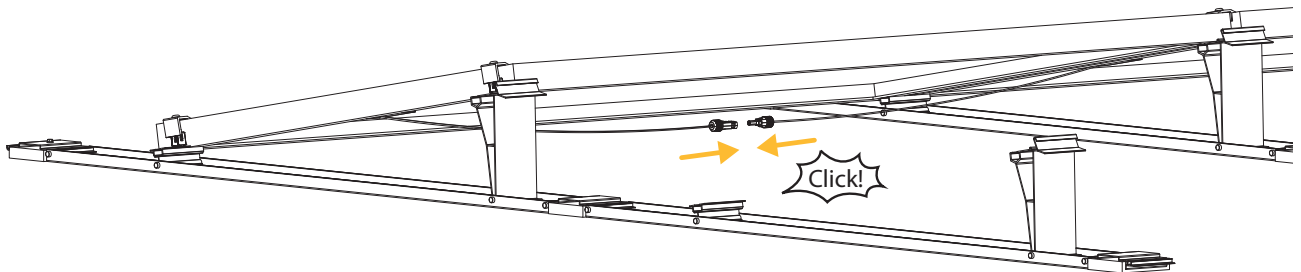
E



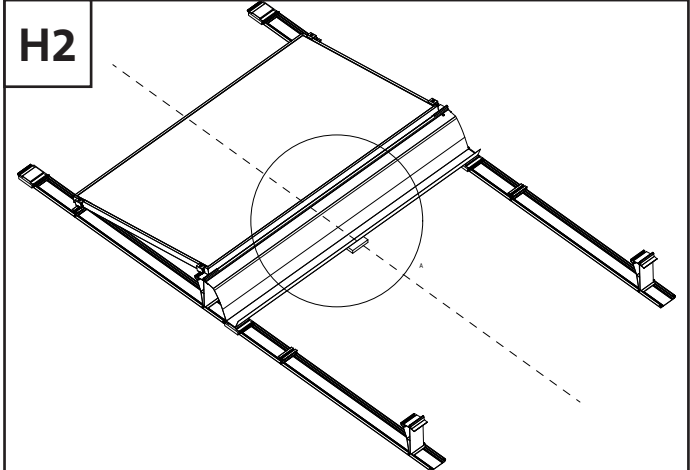
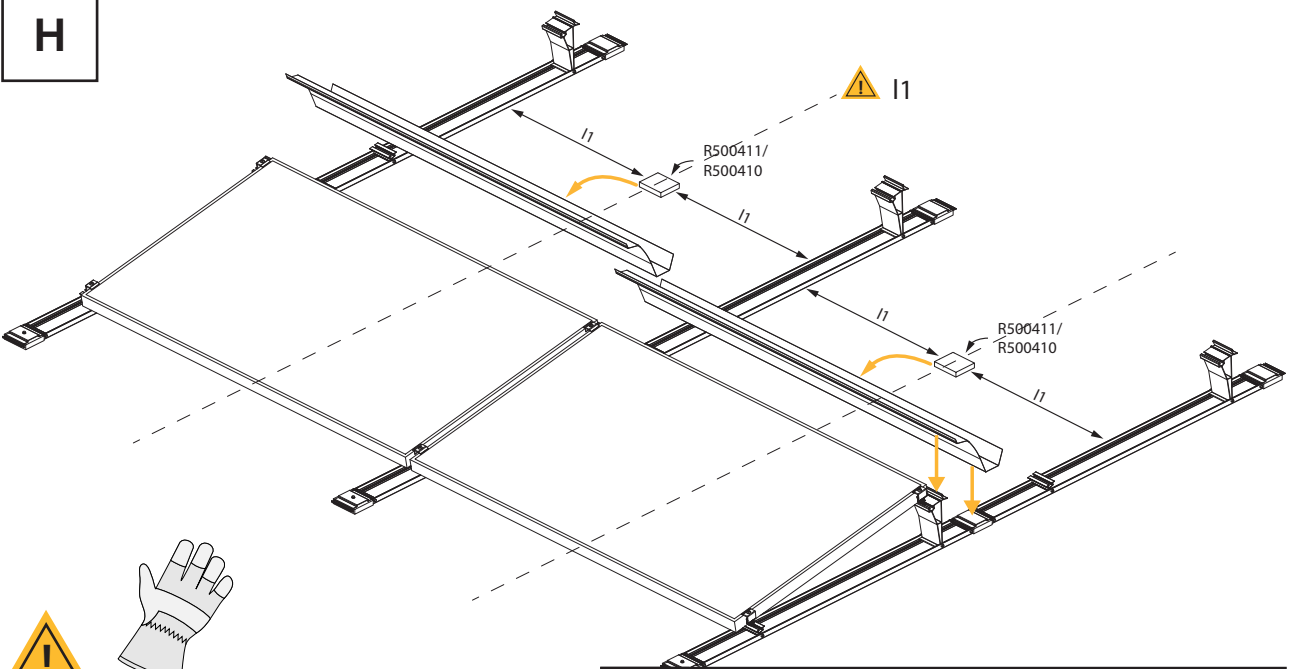
F



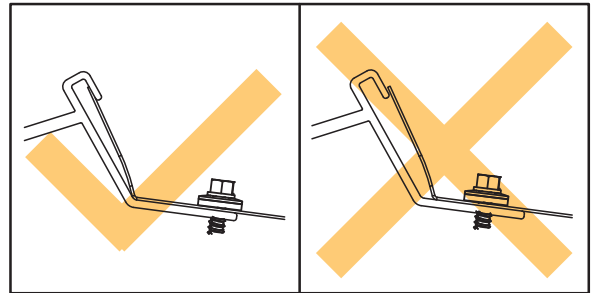
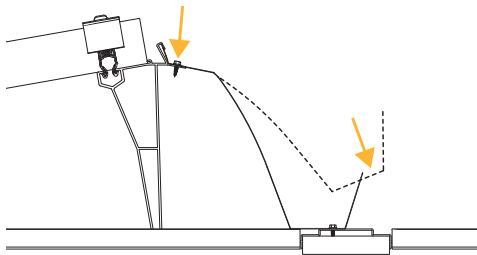
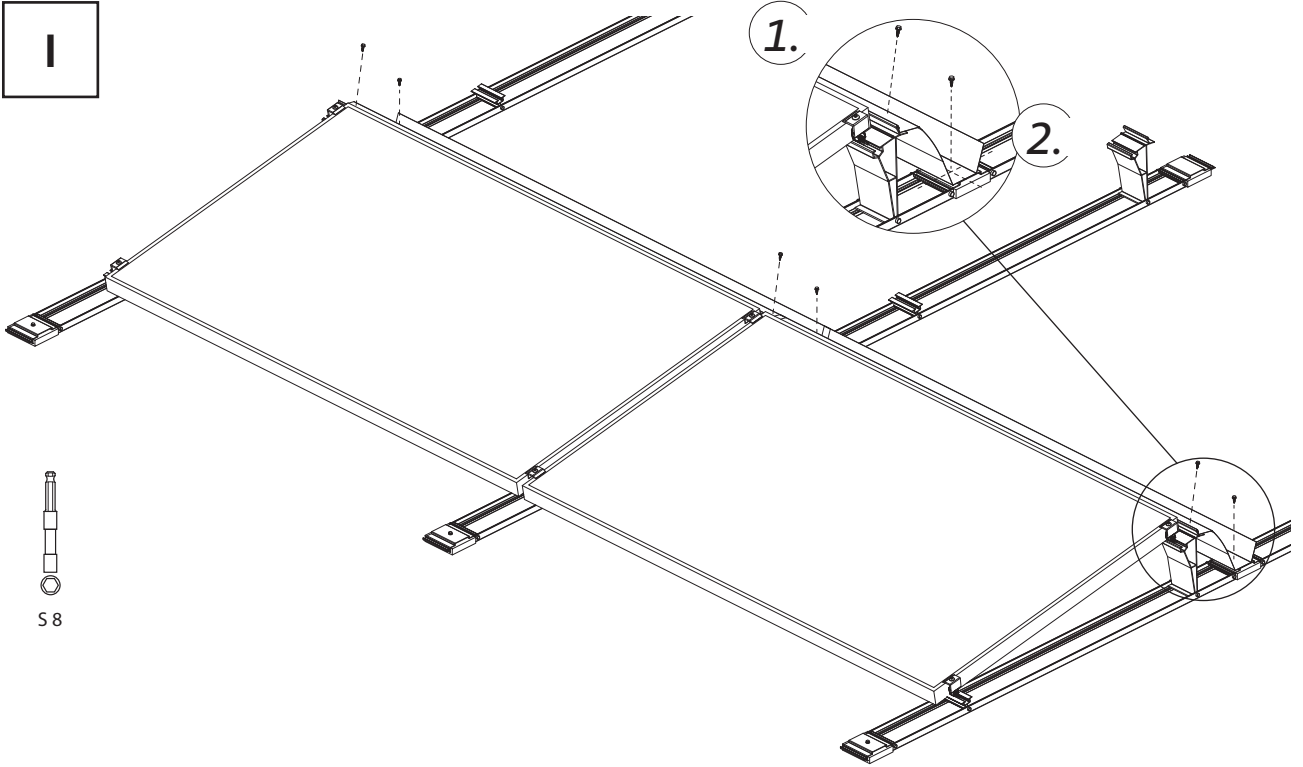
G



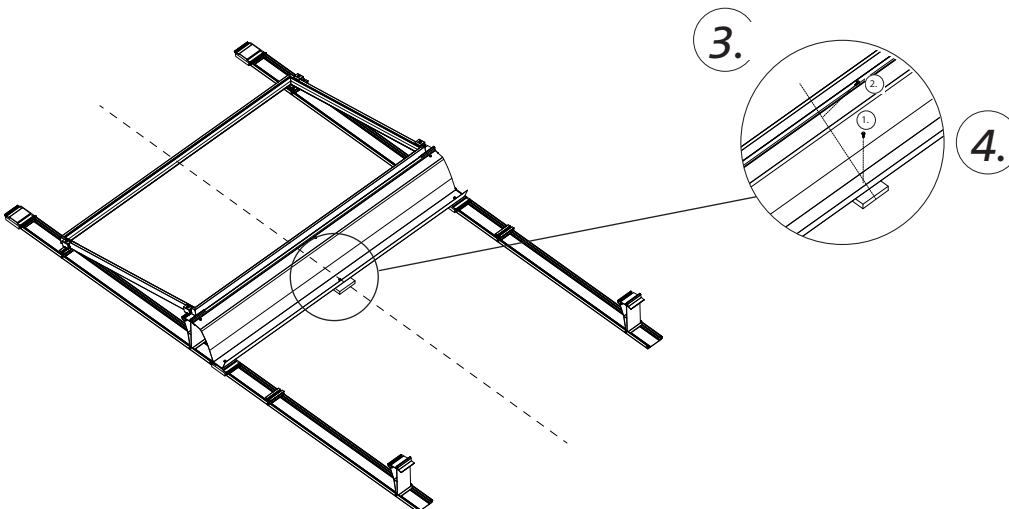
H



I

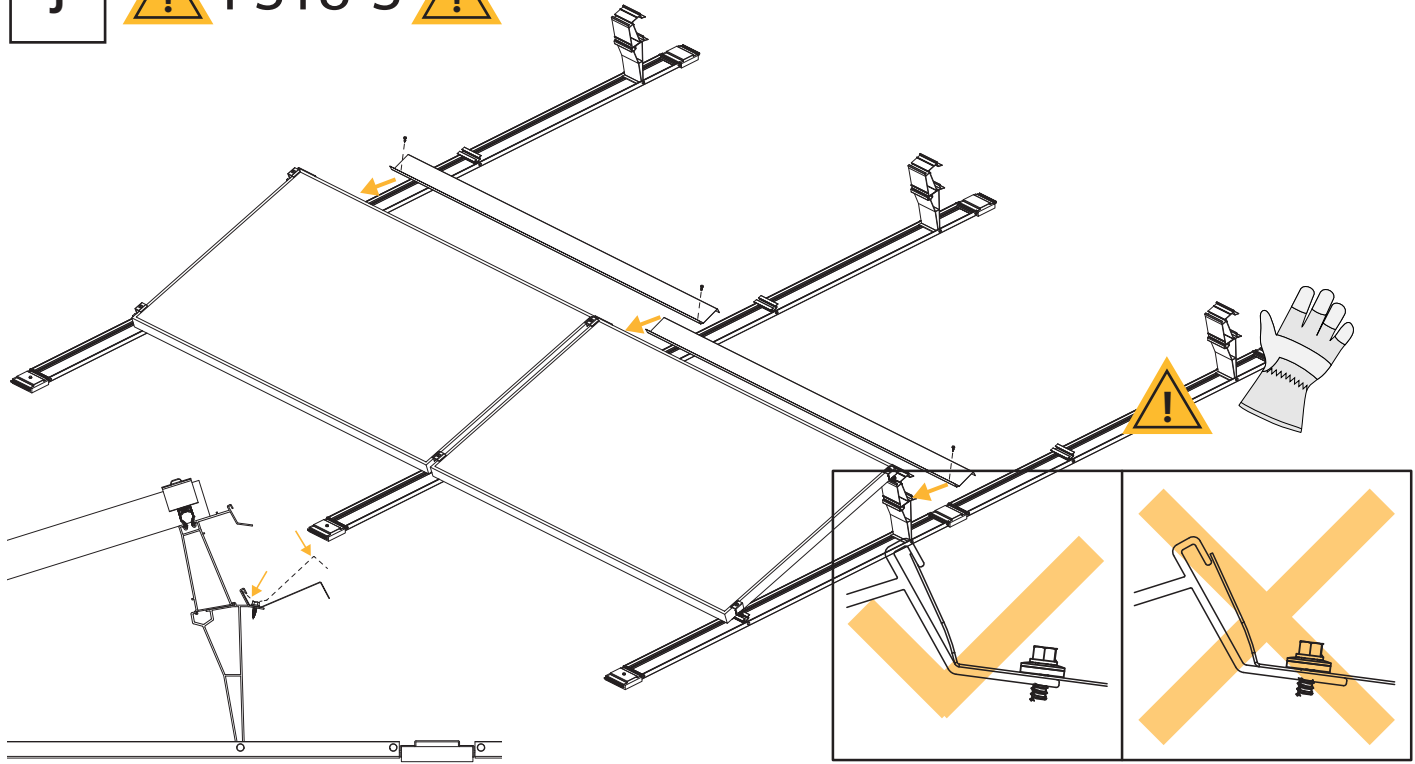


12



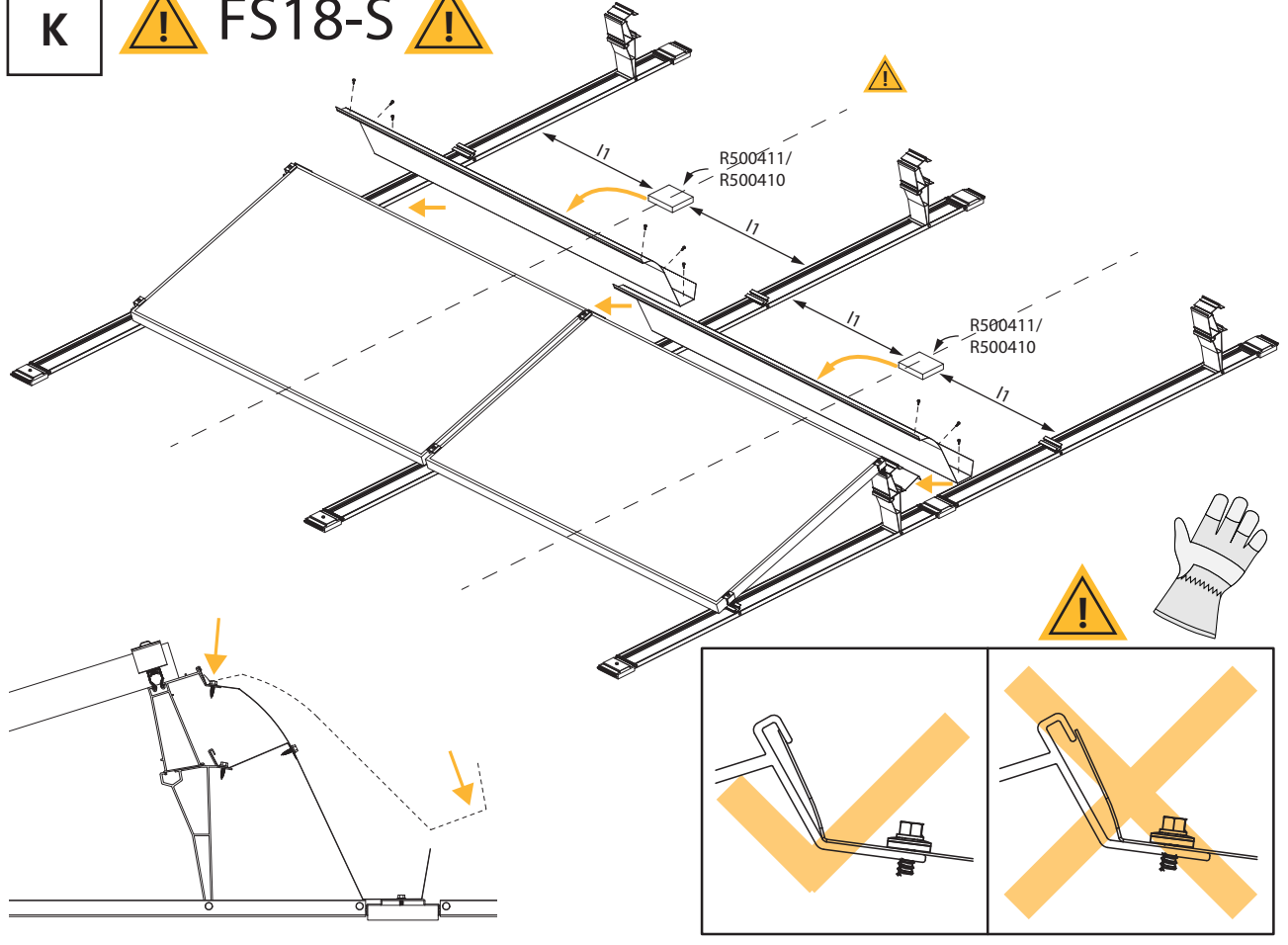
J

⚠ FS18-S ⚠

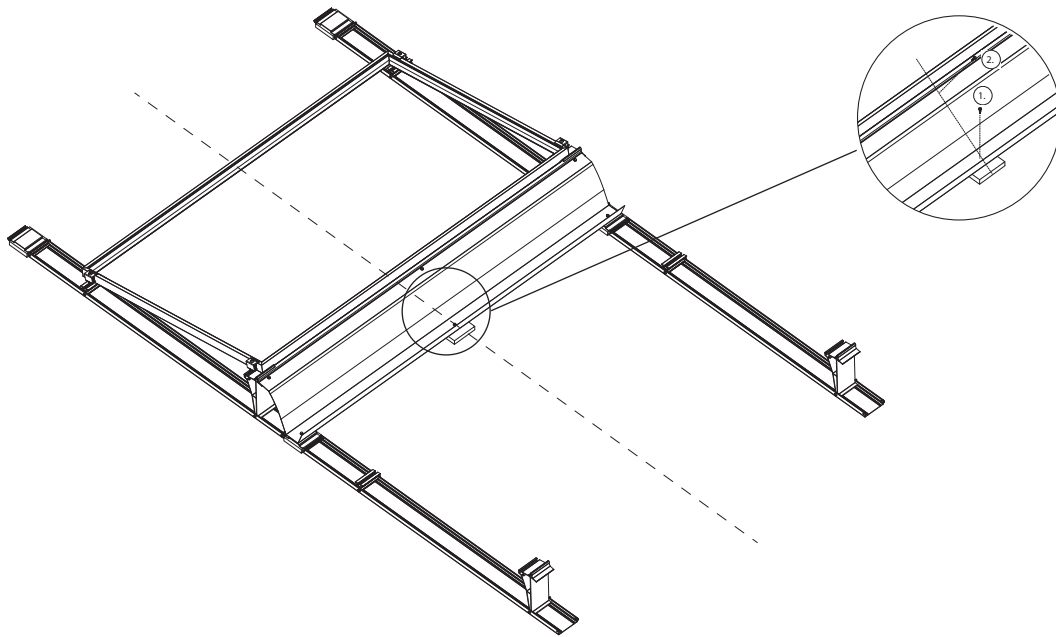


K

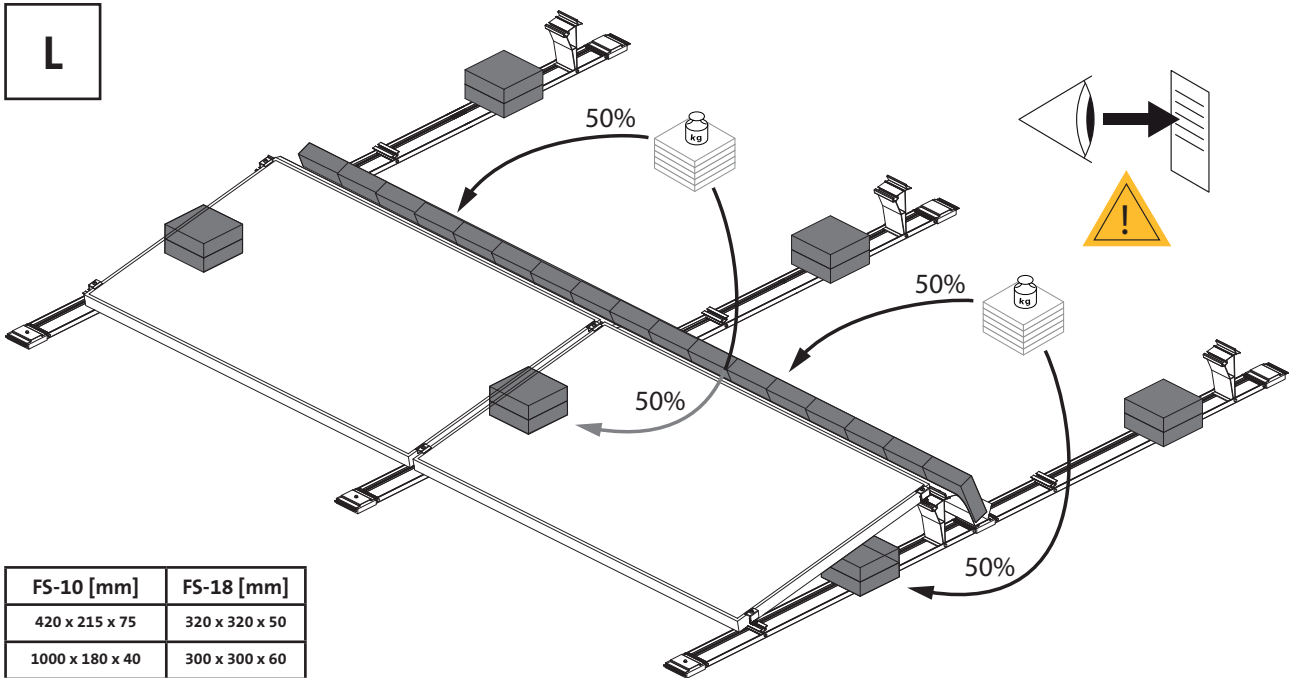
⚠ FS18-S ⚠



K2



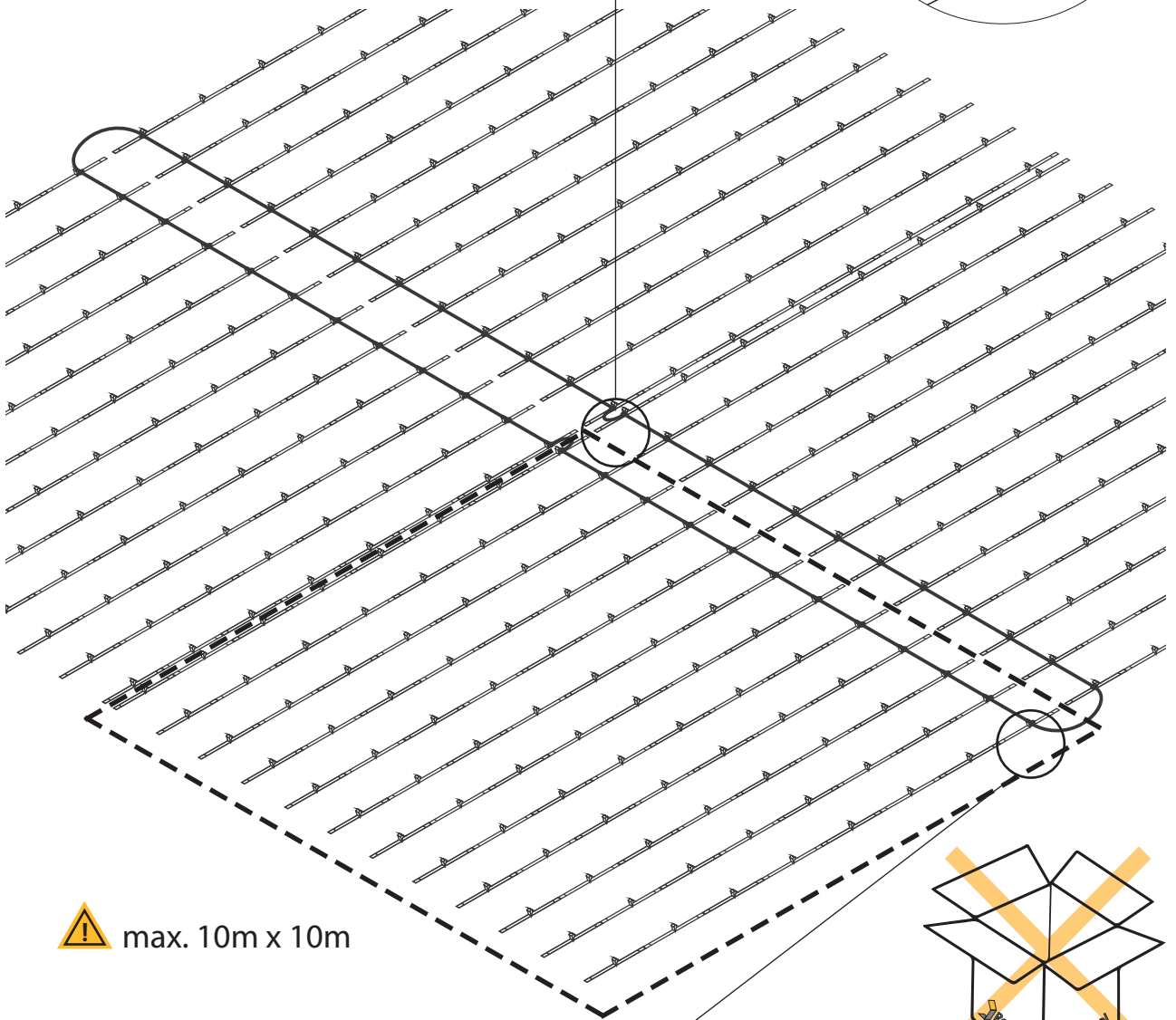
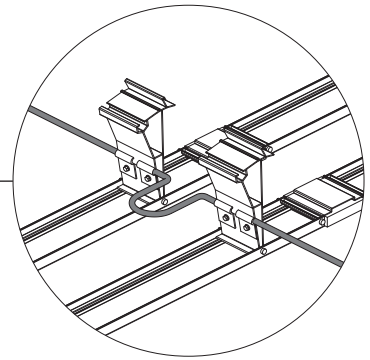
L




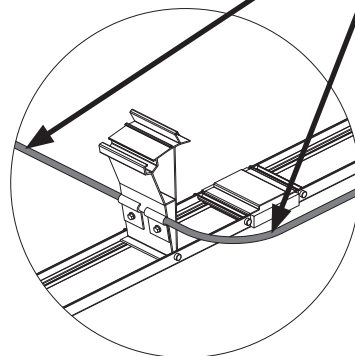
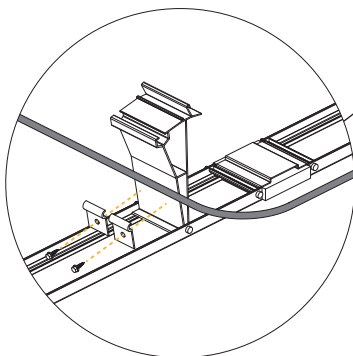
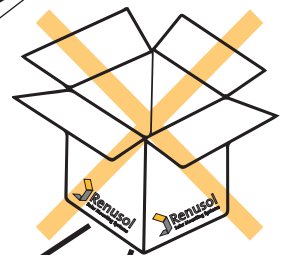
FS-10 [mm]	FS-18 [mm]
420 x 215 x 75	320 x 320 x 50
1000 x 180 x 40	300 x 300 x 60
1000 x 160 x 50	
1000 x 150 x 60	



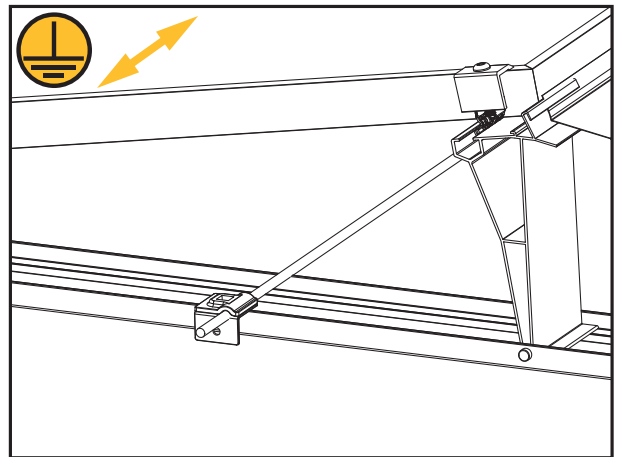
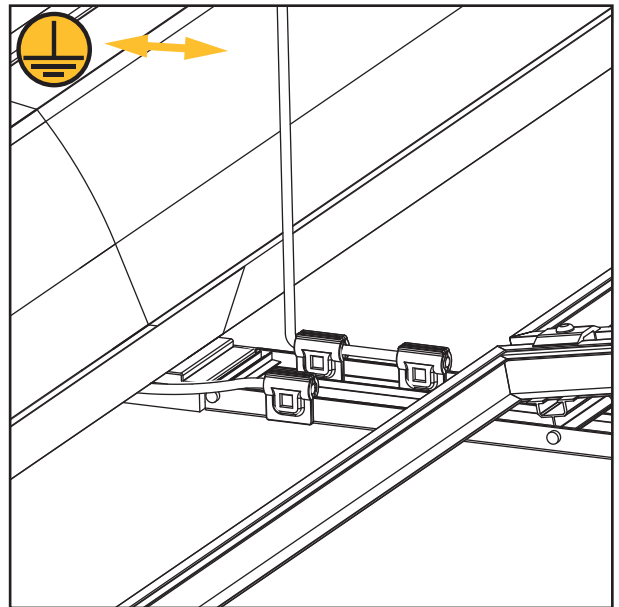
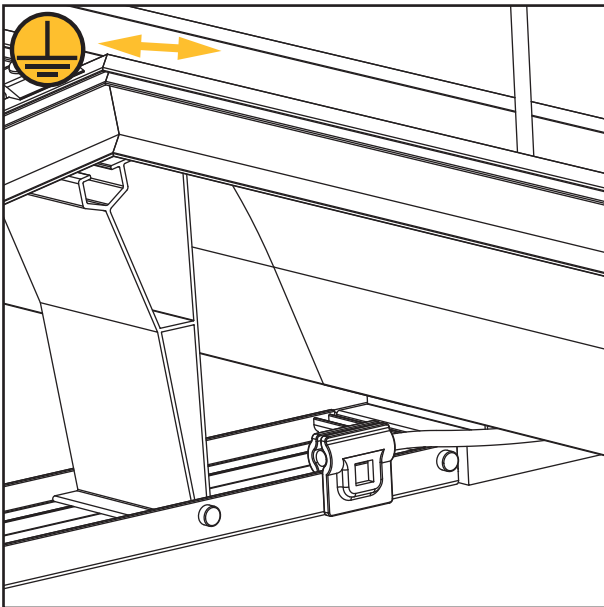
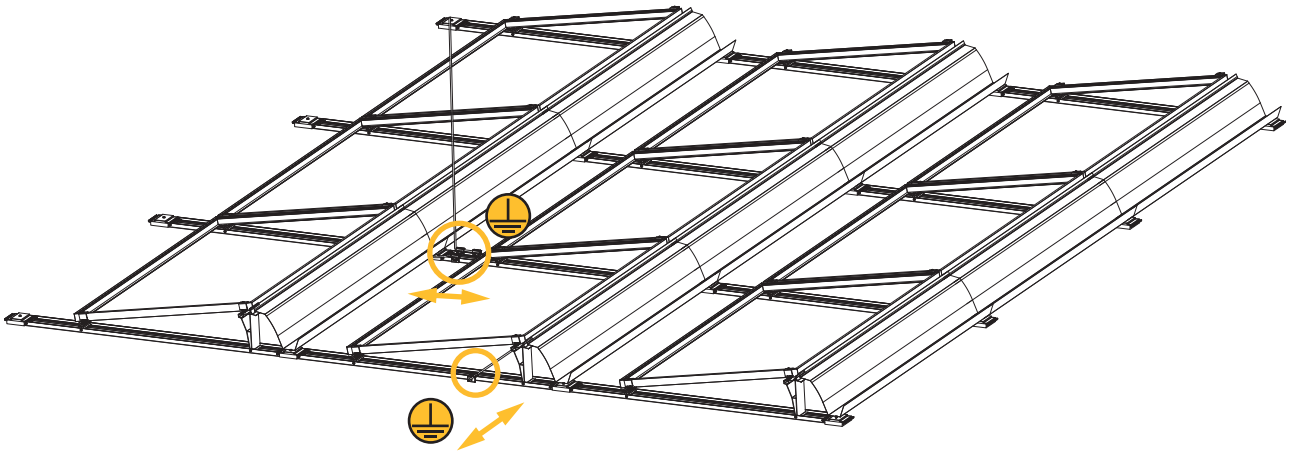
58



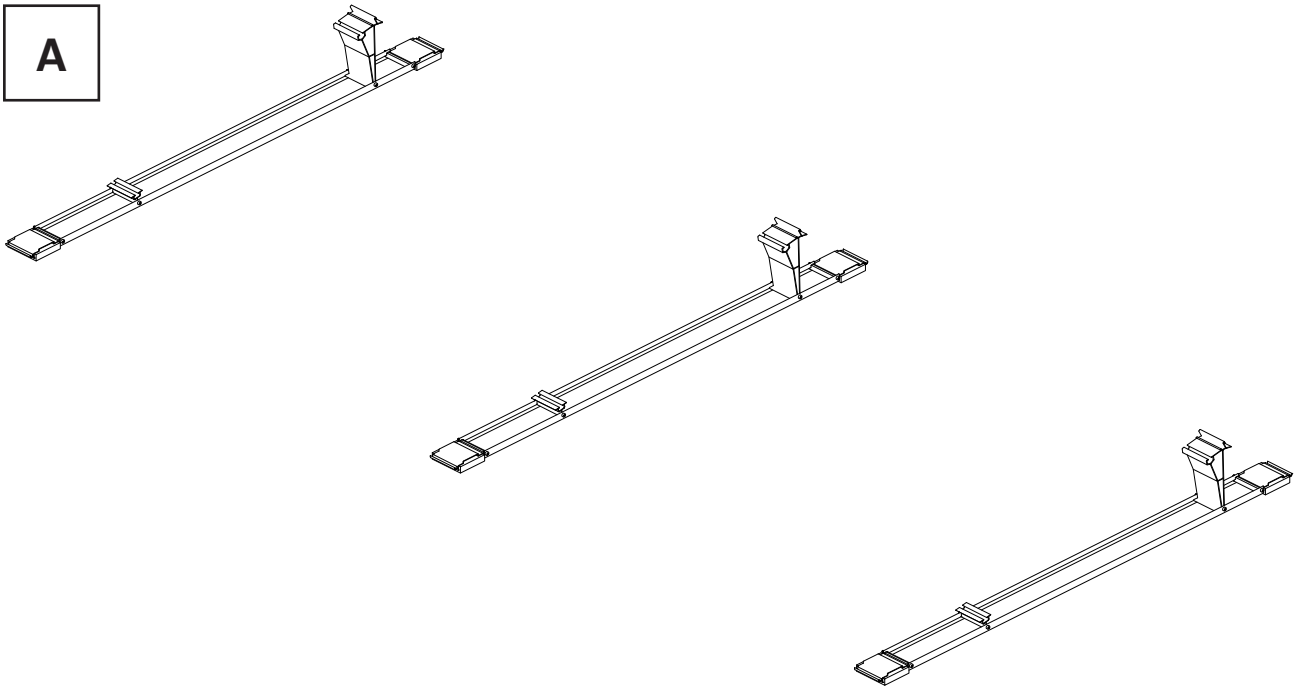
 max. 10m x 10m



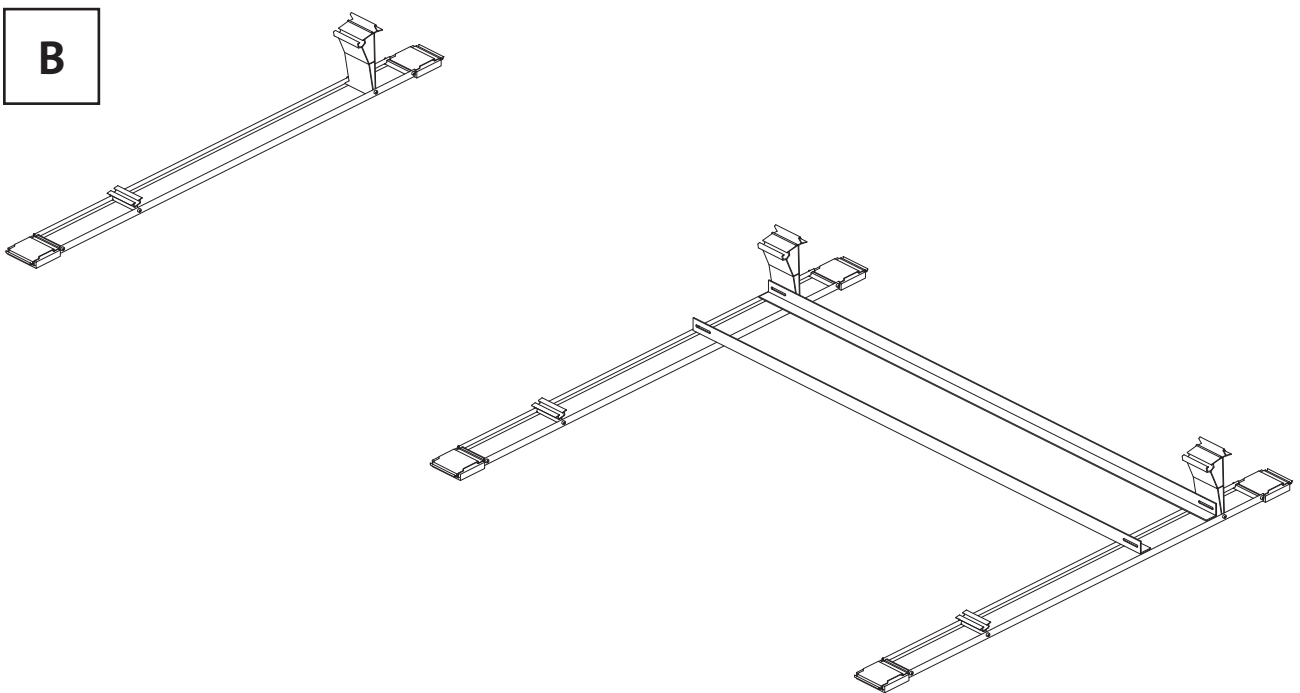
Optional FS10-S/FS18-S



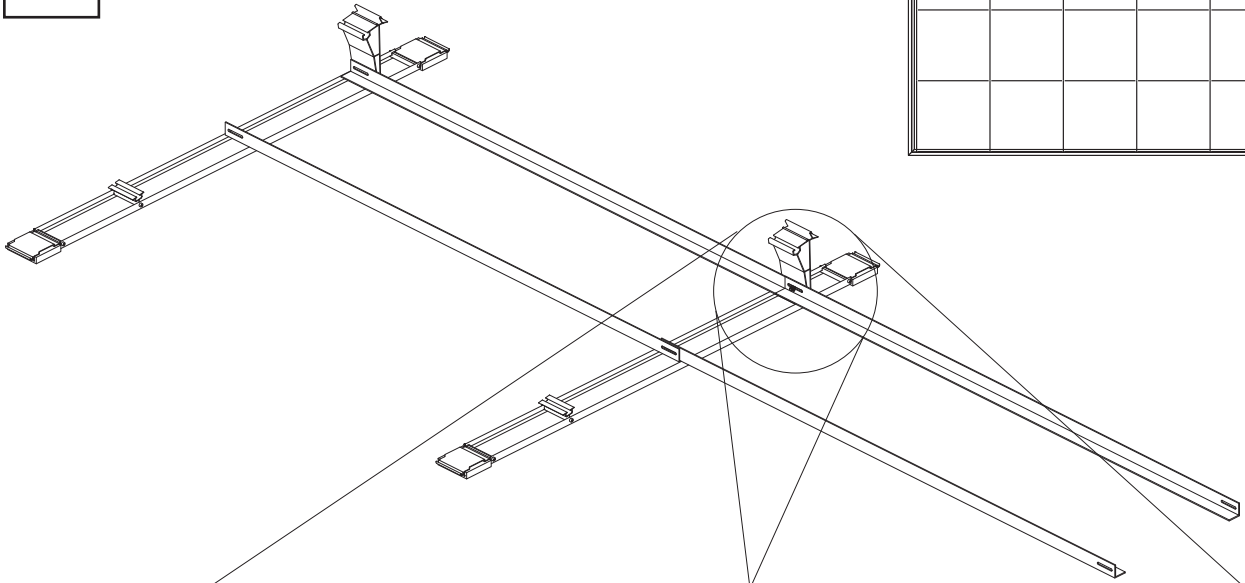
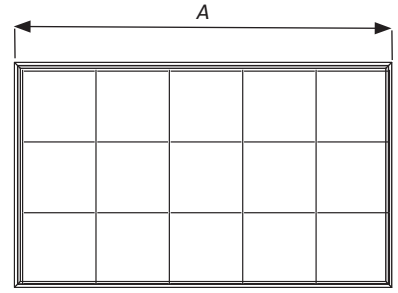
A



B



C

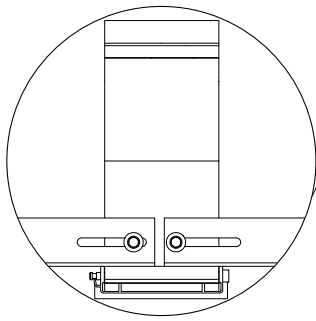
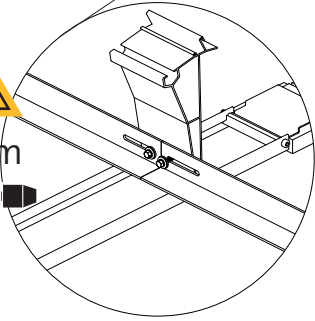


A) 1606 - 1724 mm

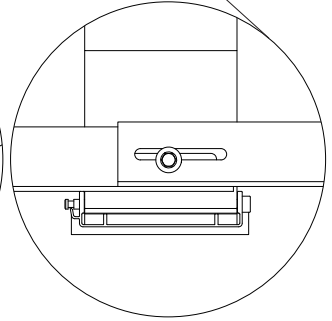
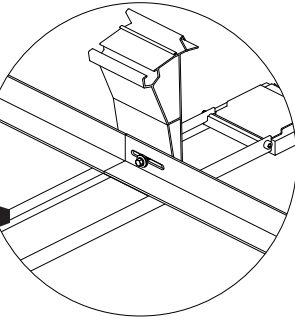
A) 1726 - 1776 mm



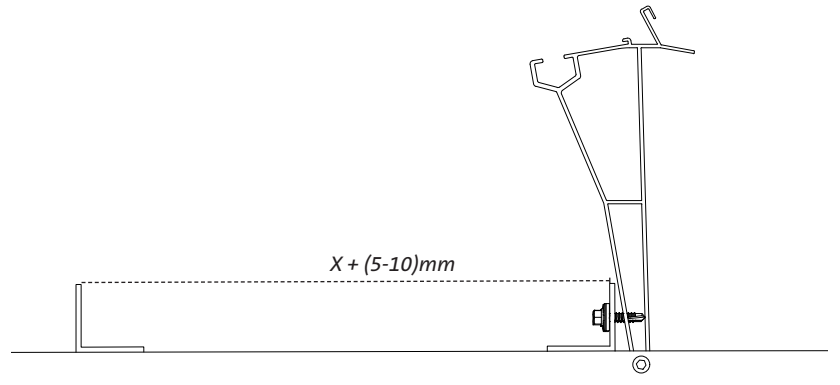
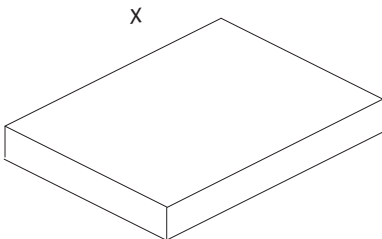
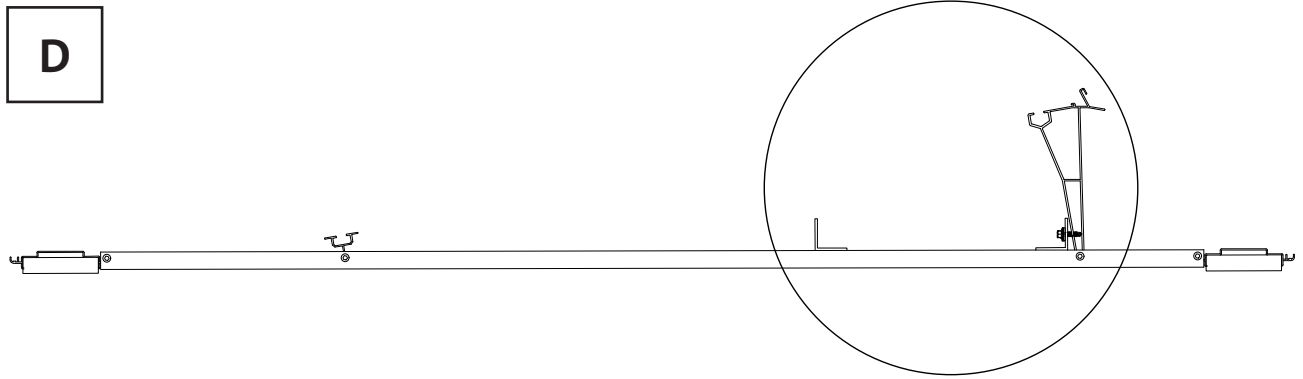
13 Nm



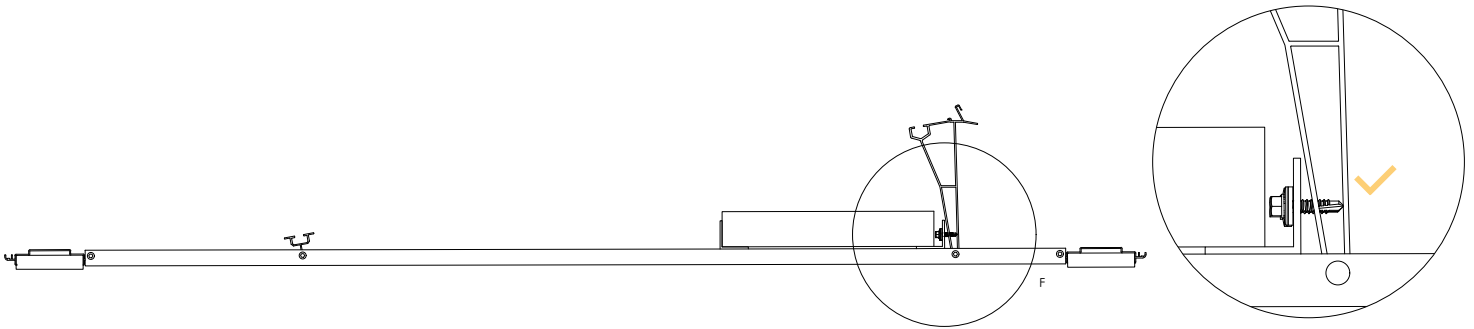
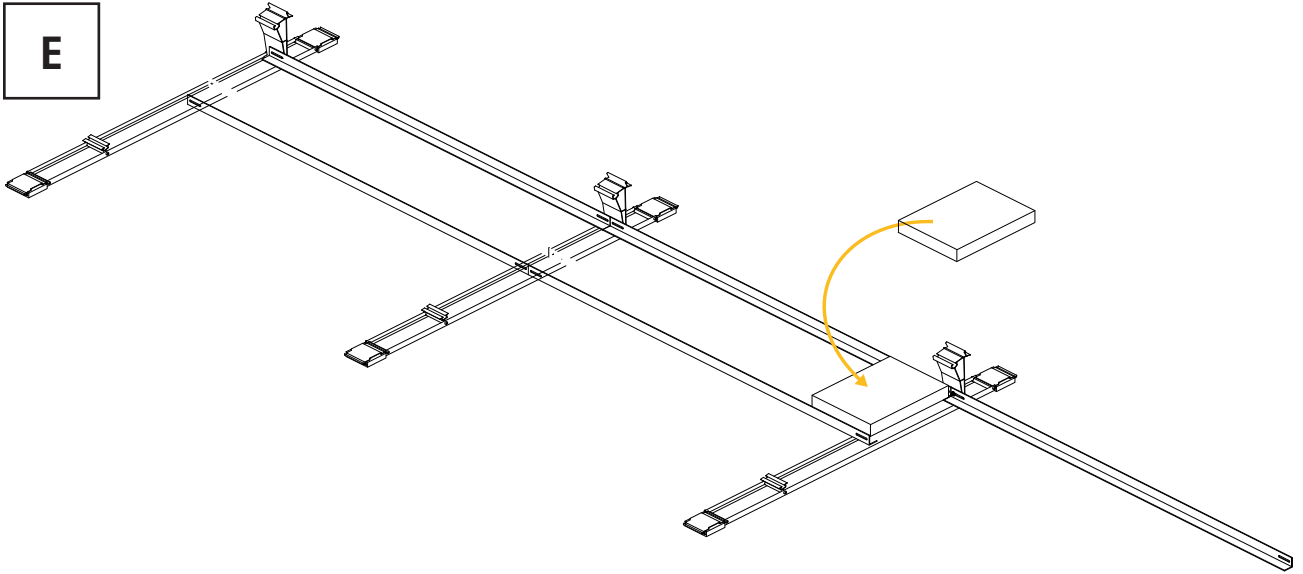
13 Nm



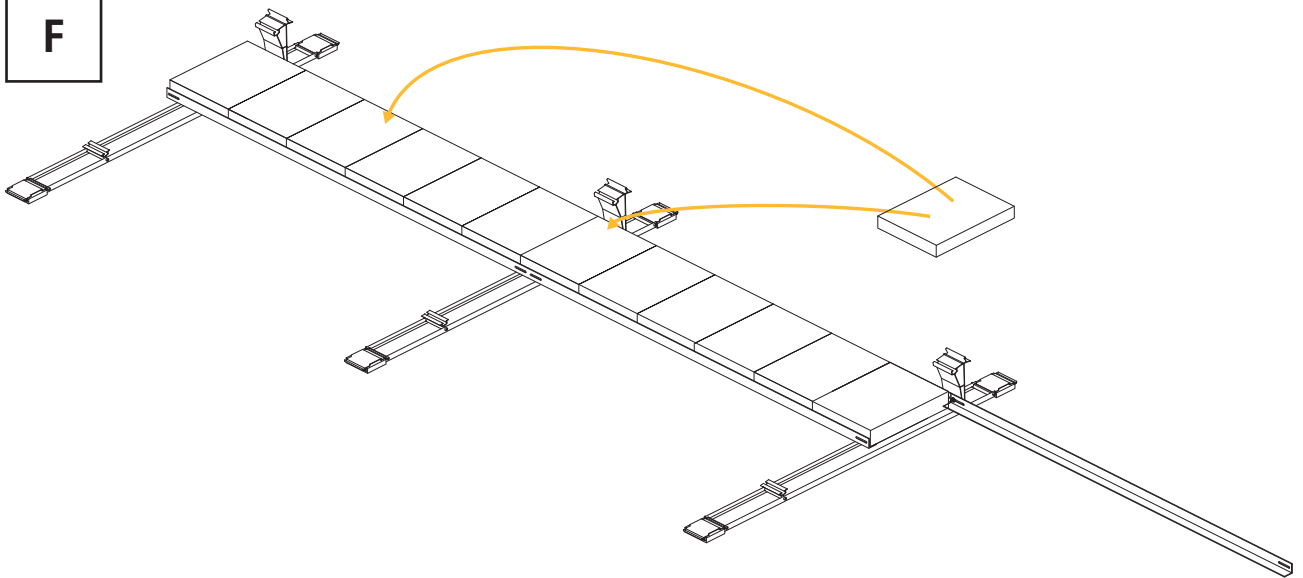
D



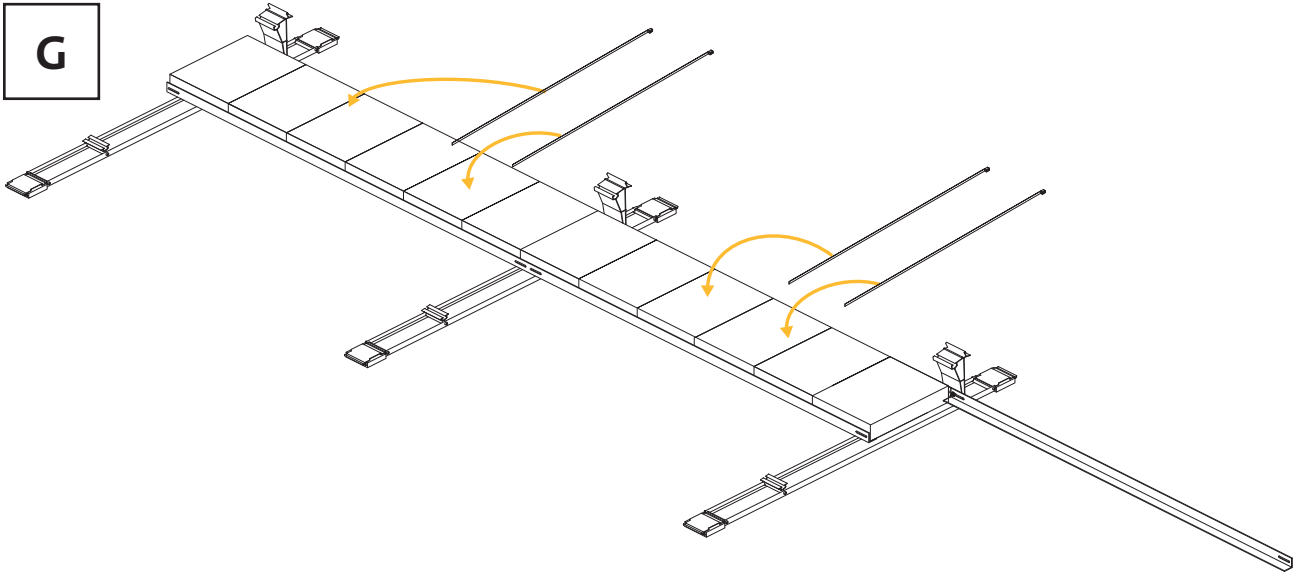
E



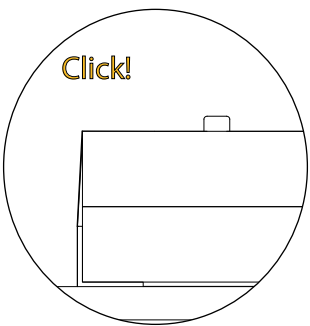
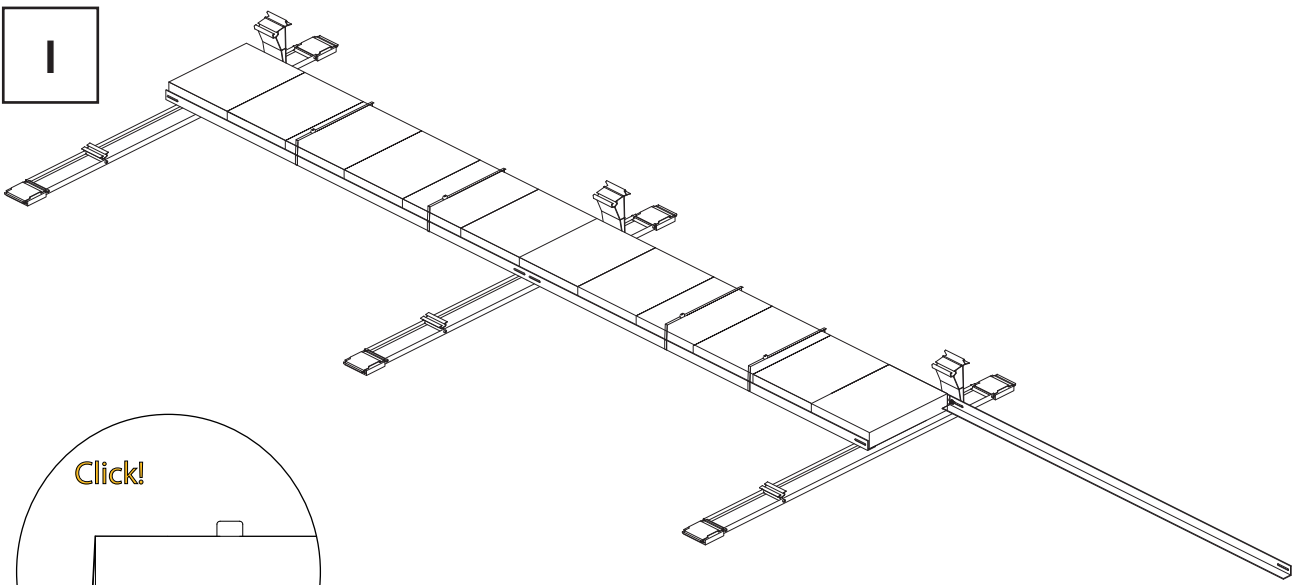
F



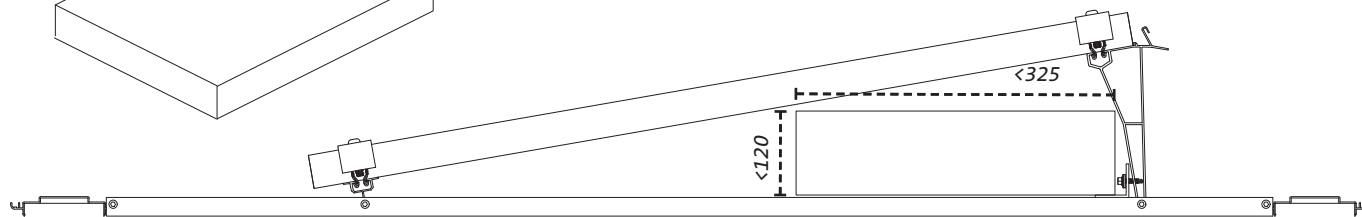
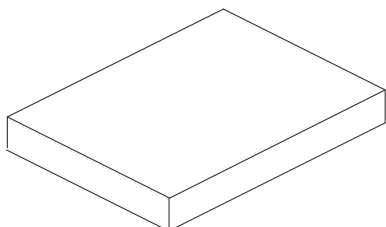
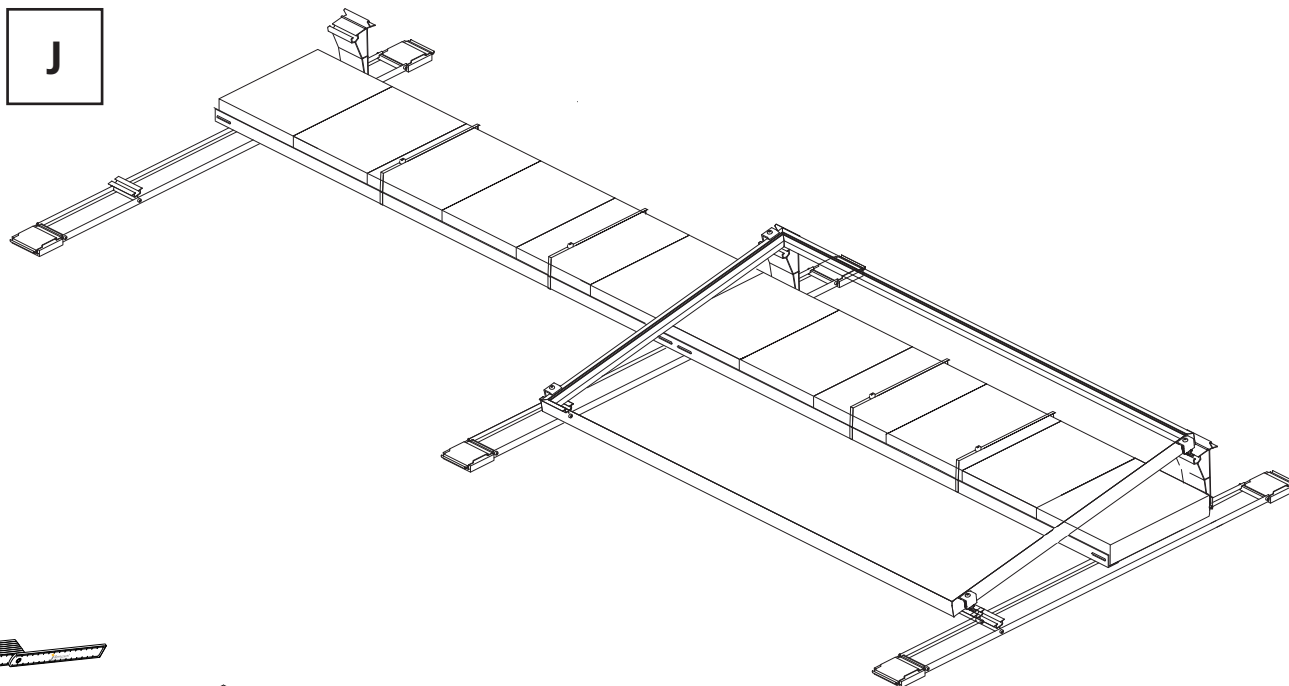
G



I



J



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FR | Les illustrations et textes sont conformes à l'état de la technique au moment de mise sous presse. Sous toutes réserves de modifications.

IT | Figure e testi corrispondono allo stato più attuale della tecnica al momento dell'ordine di stampa. Con riserva di modifiche.

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