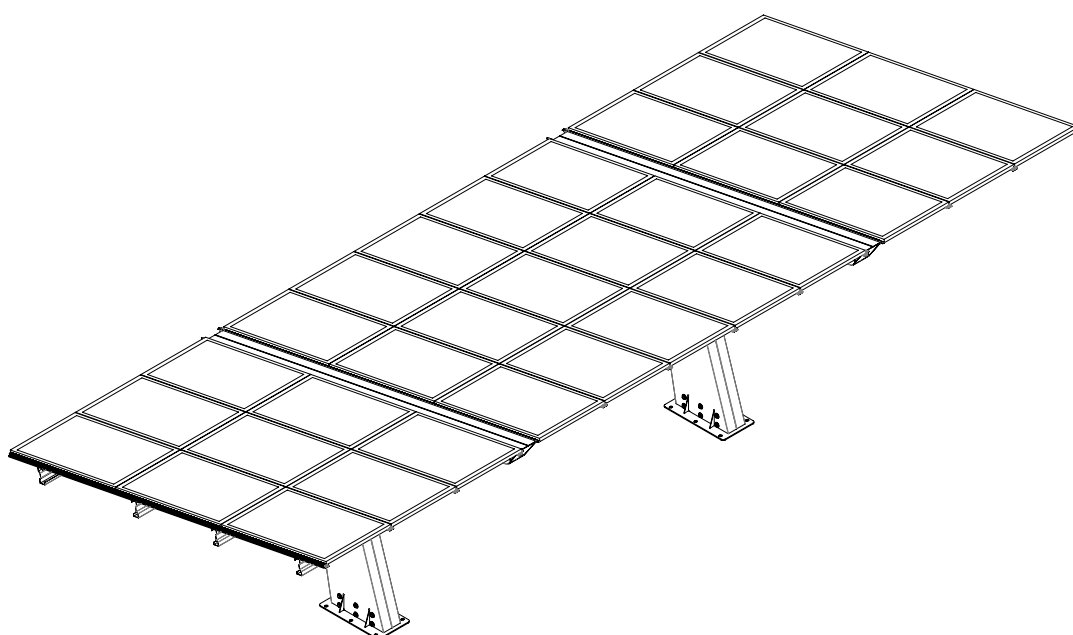


# Circutor

## Canopies

### PVS2



## INSTALLATION GUIDE


(M273A01-03-19A)







## SAFETY PRECAUTIONS


Follow the warnings described in this manual with the symbols shown below.

	<p><b>DANGER</b> Warns of a risk, which could result in personal injury or material damage.</p>
---	---

	<p><b>ATTENTION</b> Indicates that special attention should be paid to a specific point.</p>
---	--

**If you must handle the unit for its installation, start-up or maintenance, the following should be taken into consideration:**

	<p>Incorrect handling or installation of the unit may result in injury to personnel as well as damage to the unit. In particular, handling with voltages applied may result in electric shock, which may cause death or serious injury to personnel. Defective installation or maintenance may also lead to the risk of fire. Read the manual carefully prior to connecting the unit. Follow all installation and maintenance instructions throughout the unit's working life. Pay special attention to the installation standards of the National Electrical Code.</p>
---	---

	<p><b>Refer to the instruction manual before using the unit</b> In this manual, if the instructions marked with this symbol are not respected or carried out correctly, it can result in injury or damage to the unit and /or installations.</p>
---	--

CIRCUTOR, SA reserves the right to modify features or the product manual without prior notification.


## DISCLAIMER

**CIRCUTOR, SA** reserves the right to make modifications to the device or the unit specifications set out in this instruction manual without prior notice.

**CIRCUTOR, SA** on its web site, supplies its customers with the latest versions of the device specifications and the most updated manuals.

[www.circutor.com](http://www.circutor.com)



	<p><b>CIRCUTOR</b>, recommends using the original cables and accessories that are supplied with the device.</p>
---	---

## CONTENTS

SAFETY PRECAUTIONS .....	3
DISCLAIMER .....	3
CONTENTS .....	4
REVISION LOG .....	6
1.- WARRANTY CERTIFICATE FOR THE CANOPIES .....	7
2.- FORESEEABLE MISUSE .....	8
3.- PVS2 MODELS .....	9
4.- COMPONENTS .....	11
4.1.- FEET AND WINGS .....	12
4.2.- BEAMS, PROFILES AND FASTENING OF MODULES .....	13
5.- PREPARATION OF THE INSTALLATION .....	14
5.1.- STUDY INTO THE ELECTRICAL PROJECT .....	14
5.1.1.- STANDARD INSTALLATION WITH RECHARGE POINT IN START FOOT .....	14
5.1.2.- STANDARD INSTALLATION WITH RECHARGE POINT IN START AND END FOOT .....	14
5.1.3.- MAJOR INSTALLATION .....	15
5.1.4.- INTERNAL CONNECTION OF FEET .....	15
5.2.- PREPARATION OF FOOTINGS .....	16
5.3.- EARTH CONNECTION .....	17
5.4.- ASSEMBLE TEMPLATES .....	17
5.5.- FILLING THE FOOTINGS .....	18
5.6.- REMOVE UPPER TEMPLATE .....	18
6.- ASSEMBLY OF FEET AND WINGS .....	19
6.1.- FOOT INSTALLATION (A) .....	19
6.2.- FOOT INSTALLATION (B) .....	20
6.3.- INSTALLATION OF FEET REINFORCEMENT .....	21
6.4.- INSTALLATION OF WINGS (A) .....	22
6.5.- ALIGNMENT OF THE FEET .....	23
7.- ASSEMBLY OF BEAMS .....	24
7.1.- FITTING OF ANGLES .....	24
7.2.- BEAM ANGLES .....	25
7.3.- FITTING OF BEAMS .....	26
7.4.- INSTALLATION OF EARTHING POINT .....	27
8.- PROFILES AND MODULES .....	28
8.1.- INTERMEDIATE PROFILES .....	28
8.2.- FINAL PROFILES .....	28
8.3.- PREPARATION OF PROFILES .....	29
8.4.- FITTING OF INTERMEDIATE PROFILES (1) .....	30
8.5.- FITTING OF INTERMEDIATE PROFILES (2) .....	31
8.6.- FITTING OF FINAL PROFILES (3) .....	32
8.7.- FITTING OF FINAL PROFILES (4) .....	33
8.8.- SETTING MODULES A .....	34
8.9.- SETTING MODULES B .....	35
8.10.- CONNECTION OF STRINGS .....	36
9.- FINAL FOUNDATIONS .....	37
10.- INSTALLATION OF THE CHARGER .....	38
11.- USAGE AND MAINTENANCE .....	40
11.1.- INSTALLATION .....	40
11.1.1.- ASSEMBLY ACCORDING TO MANUFACTURER SPECIFICATIONS .....	40
11.1.2.- DIFFICULTIES AND VARIATIONS DURING ASSEMBLY .....	40
11.1.3.- BONDING OF PARTS AND TIGHTENING TORQUE .....	40
11.1.4.- FOUNDATIONS, ALIGNMENT AND LEVELLING OF THE CANOPIES .....	40
11.1.5.- LOCATION AND CHARACTERISTICS OF THE INSTALLATION ZONE .....	40
11.2.- USE AND UPKEEP .....	41
11.2.1.- STRUCTURAL ELEMENTS MUST NOT BE MODIFIED .....	41
11.2.2.- USAGE OVERLOAD INDICATED IN THE PROJECT MUST NOT BE EXCEEDED .....	41
11.2.3.- THE ORIGINAL STATUS OF THE ELEMENTS OF THE CANOPY CANNOT BE MODIFIED .....	41
11.2.4.- AVOID THE CONTACT OF THE STEEL WITH OXIDISING OR AGGRESSIVE ELEMENTS .....	41
11.3.- REVISION AND MAINTENANCE .....	42
11.3.1.- GENERAL CONDITIONS .....	42

11.3.2.- REVISION AND MAINTENANCE TASKS..... 42

11.3.3.- CASES THAT INVOLVE SPECIAL REVIEWS..... 43

12.- MAINTENANCE AND TECHNICAL SERVICE..... 44

## REVISION LOG

Table 1: Revision log.

Date	Revision	Description
08/19	M273A01-01-19A	Initial version

**Note :** The images of the devices are for illustrative purposes only and may differ from the original device.

## 1.- WARRANTY CERTIFICATE FOR THE CANOPIES

### 10 year Warranty for defects in materials or manufacturing flaws

**CIRCUTOR** hereby guarantees, for a period of 10 years, from the date of delivery to the buyer, that its canopies are free of any defect in their materials or manufacture that hinder their normal operation under proper conditions of usage, installation and maintenance.

If, at any time, during the period of validity of this guarantee, the appearance of defects in their materials or their manufacture occurs, **CIRCUTOR** undertakes to replace the defective structure.

The guarantees contained in this Certificate will be provided by **CIRCUTOR** subject to the general terms and conditions expressed below:

### Exclusions and Limitations of Guarantees

Those damages and faults established herein will be exempt from the warranty rights whenever these arise from:

- 1.- Accidents or negligent, improper or unsuitable use.
- 2.- Failing to respect the installation, usage and maintenance instructions set forth.

**CIRCUTOR** reserves the right to supply a different model of structure to handle the accepted warranty claims, for replacement or expansion, in the event that the original model was no longer manufactured.

### Admitted usage

This type of canopy is a metallic structure with two basic functions:

- ✓ To support a cover of photovoltaic solar modules or thermal solar panels, for the production of running or hot water respectively.
- ✓ To protect motor vehicles, motorcycles, bicycles, people, etc. from the sun and the rain under the cover.

## 2.- FORESEEABLE MISUSE

This type of canopy is not intended to:

- ✓ To withstand overloads higher than those indicated in the corresponding certificate of technical characteristics, due to meteorological conditions (snow and wind) of the site and the own weight of the solar panels.
- ✓ People will not be allowed to climb onto the canopy, with the exception of those who access it to carry out maintenance and assembly tasks. No more than one person with their personal work material (100 kg) may climb onto the canopy.
- ✓ It is not allowed to cover the sides, front or rear with any type of enclosure that wholly or partially prevents the passage of the wind.
- ✓ The installation of posters or jutting elements is not allowed, nor in general, any added element that increases the surface exposed to the wind.
- ✓ Only the assembly of original parts and components supplied by CIRCUTOR is allowed.
- ✓ **CIRCUTOR** will not be held liable for any unauthorised modification to the canopy, once the same has been put into service.
- ✓ If a wall is installed along the entire length of the canopy, a special study will be required to vary the coefficient of obstruction contemplated in the calculation.

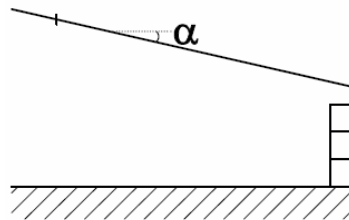


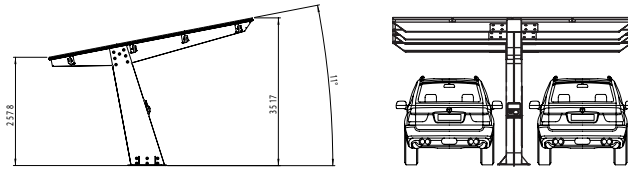
Figure 1: Variation of the obstruction coefficient.

- ✓ If the canopy is installed in the vicinity of a height change or on a steep wall or mound that increases the height of the canopy above the ground level to more than 3 m in height at the centre point of the roofing, a special study will be required owing to the modification of the pressure and suction coefficients considered in the calculation.

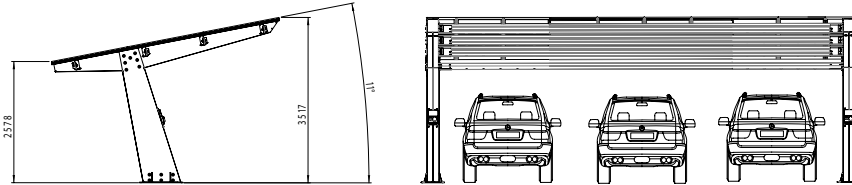


### 3.- PVS2 MODELS

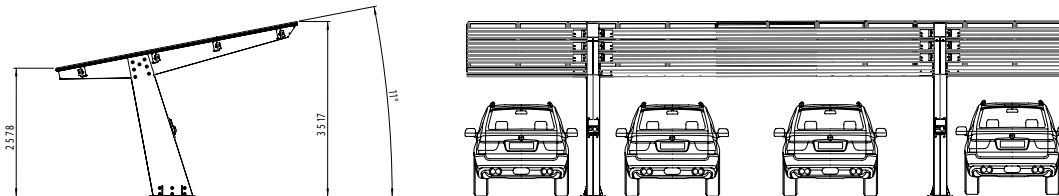
#### PVS2-2



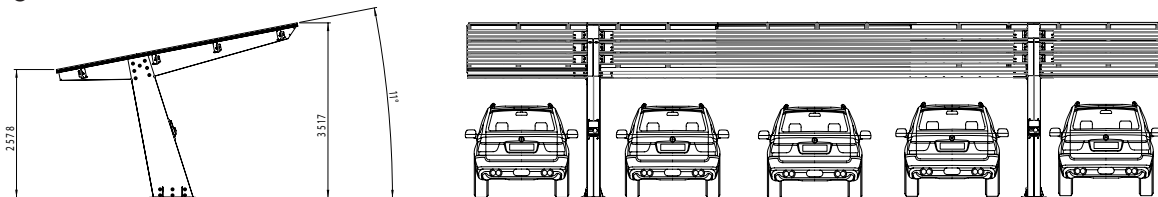
#### PVS2-3



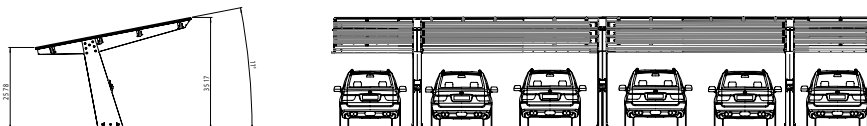
#### PVS2-4



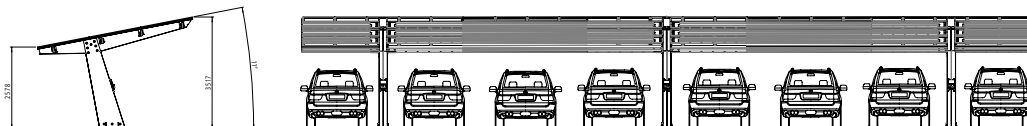
#### PVS2-5



#### PVS2-6



#### PVS2-8



#### PVS2-10

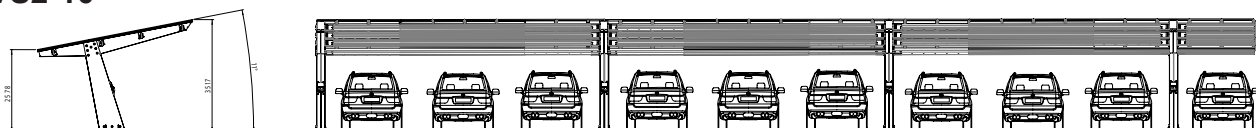


Figure 2: PVS2 models.

Table 2: PVS2 models.

Model	Length	kWp	Modules	Feet
PVS2-2	5,0 m	4,20 kWp	15	1
PVS2-3	8,0 m	6,72 kWp	24	2
PVS2-4	10,0 m	8,40 kWp	30	2
PVS2-5	13,0 m	10,92 kWp	39	2
PVS2-6	15,0 m	12,60 kWp	45	3
PVS2-8	20,0 m	16,80 kWp	60	3
PVS2-10	25,0 m	21,00 kWp	75	4

## 4.- COMPONENTS

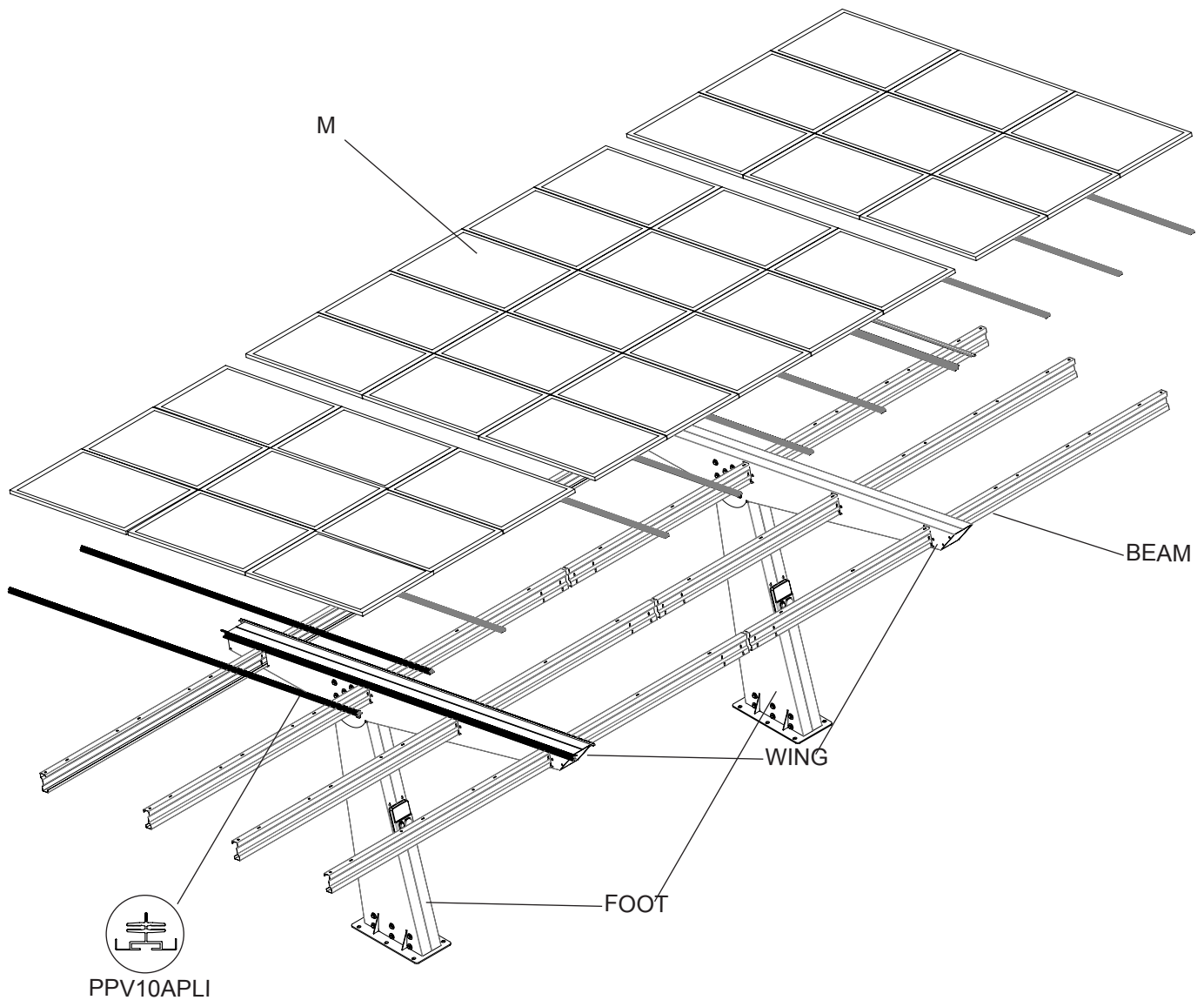
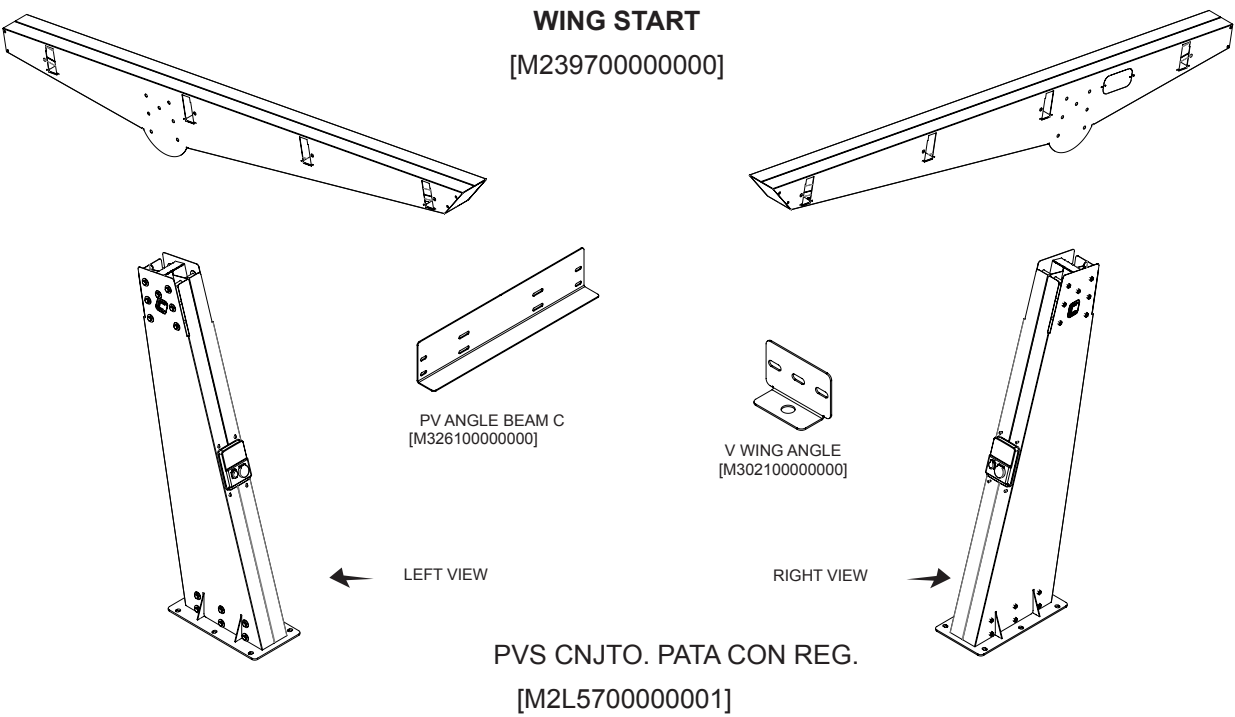







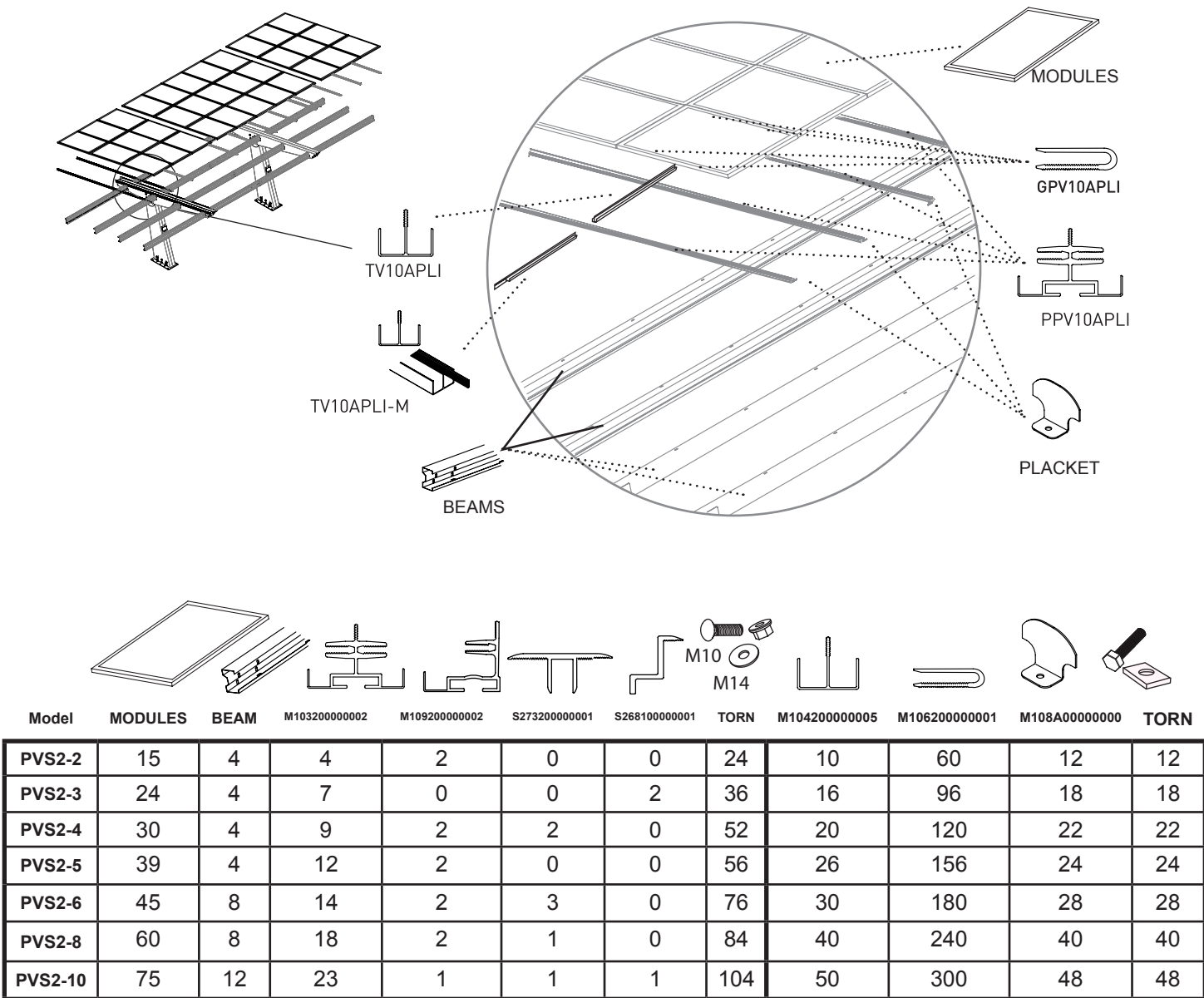
Figure 3: PVS2 components.

4.1.- FEET AND WINGS



DIN 931		M20X280	(17u. )
DIN 603		M10X25	(8u. )
		M10X50	(8u. )
DIN 6923		M10	(16u. )
DIN 934		M24 Zn	(24u. )
		M24	(4u. )
		M20	(17u. )
DIN 9021		M24	(8u. )
		M20	(26u. )

4.2.- BEAMS, PROFILES AND FASTENING OF MODULES



## 5.- PREPARATION OF THE INSTALLATION

### 5.1.- STUDY INTO THE ELECTRICAL PROJECT

#### 5.1.1.- STANDARD INSTALLATION WITH RECHARGE POINT IN START FOOT

Lowering of strings (DC wiring) per start foot.

Power supply to recharging point in start foot (AC wiring).

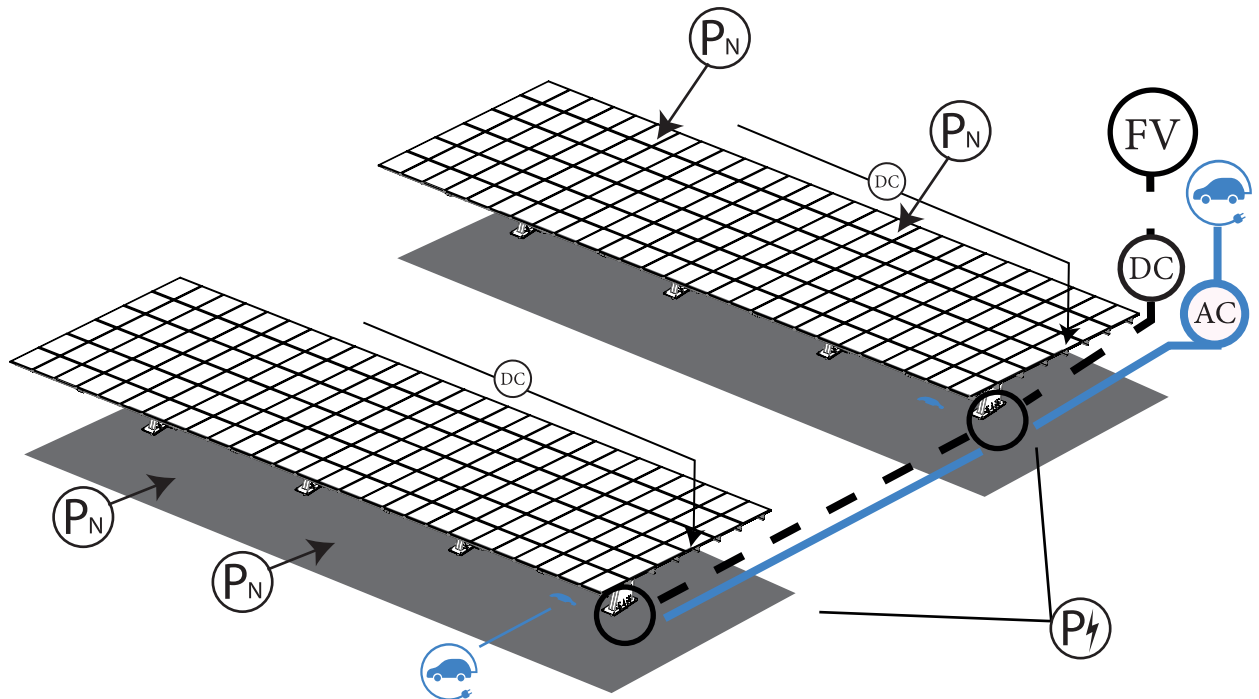


Figure 4: Standard installation with recharging point in start foot.

#### 5.1.2.-STANDARD INSTALLATION WITH RECHARGE POINT IN START AND END FOOT

Lowering of strings (DC wiring) per start foot.

Power supply to recharging point in start and end foot (AC wiring).

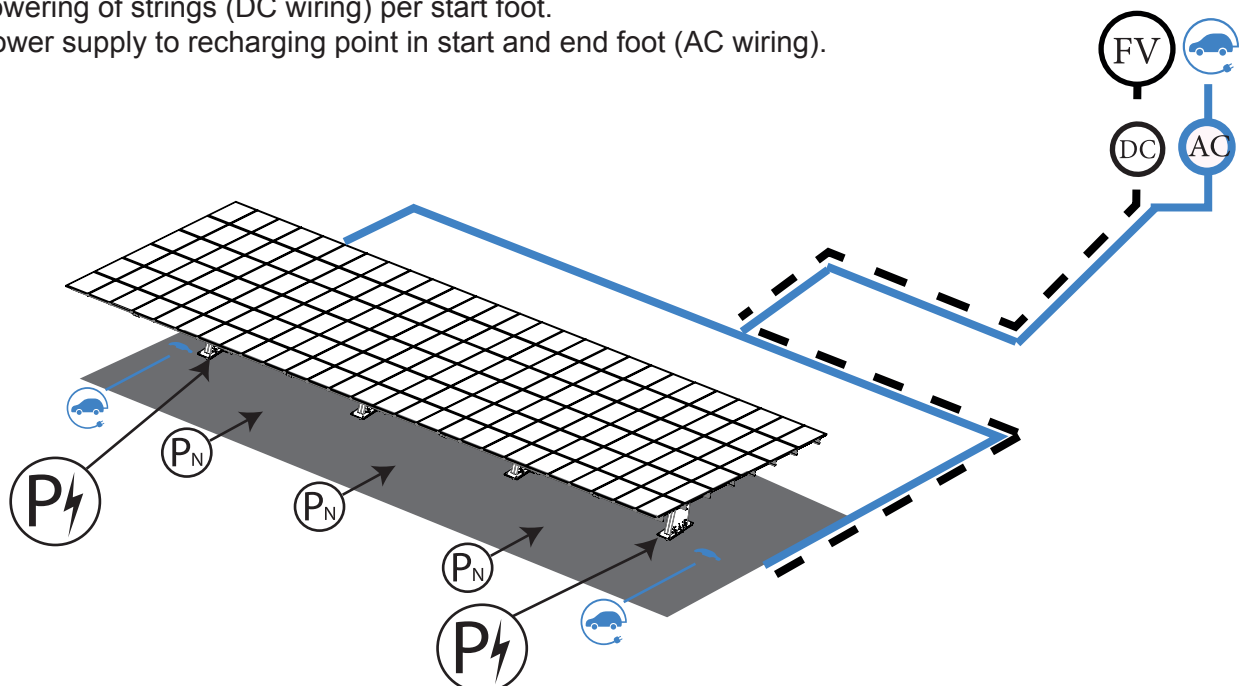


Figure 5: Standard installation with recharging point in start and end foot.

### 5.1.3.- MAJOR INSTALLATION

Power supply of recharging points in each foot. (AC wiring)

Lowering of strings (DC wiring) per start and central foot.

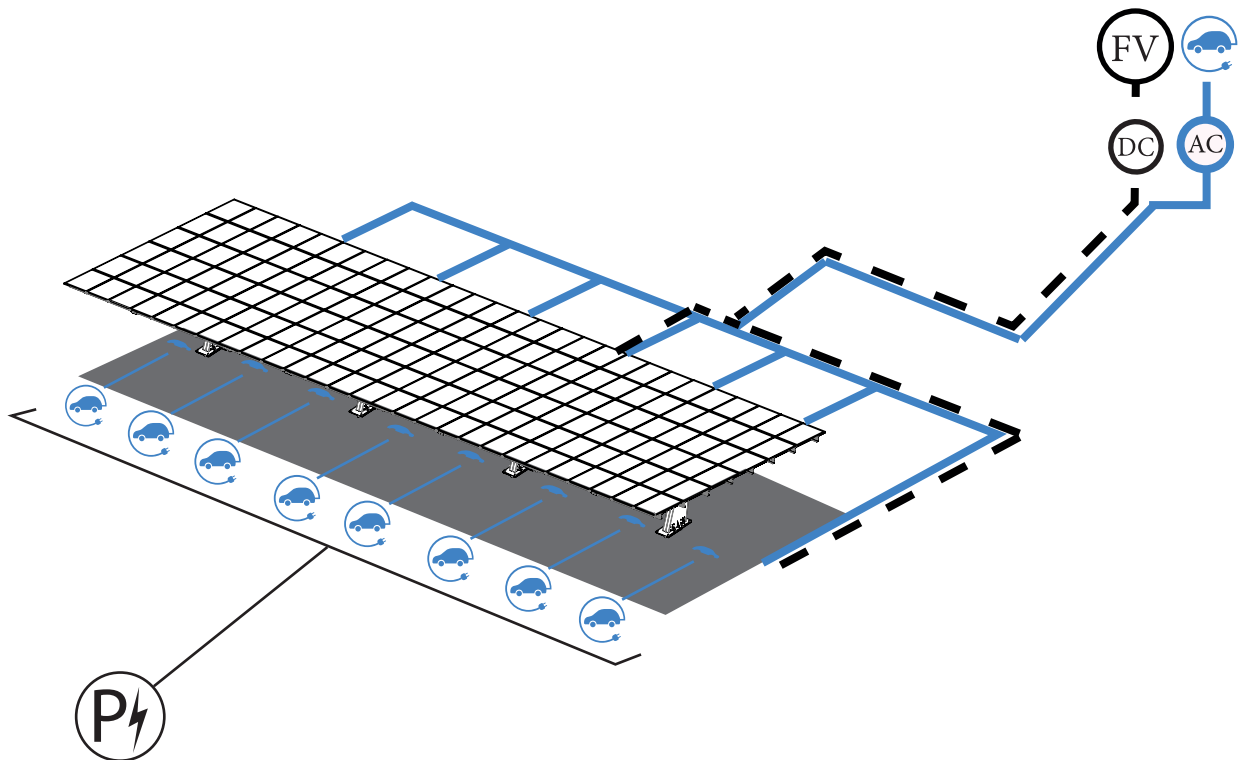


Figure 6: Major installation.

### 5.1.4.- INTERNAL CONNECTION OF FEET

CONDUCTION OF DC  
WIRING THROUGH THE  
BEAMS

EARTH  
CONNECTION  
(SEE POINT 7.4)

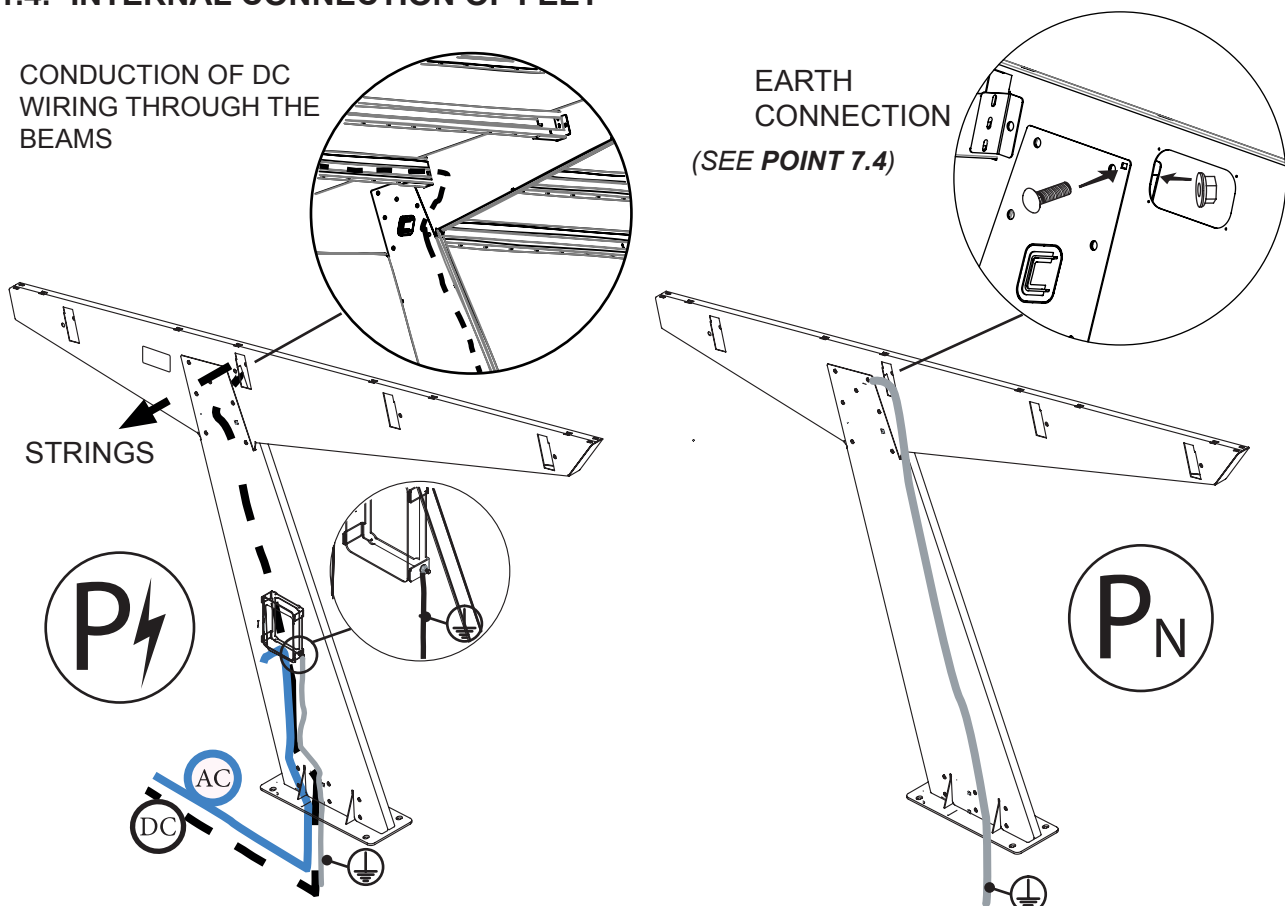
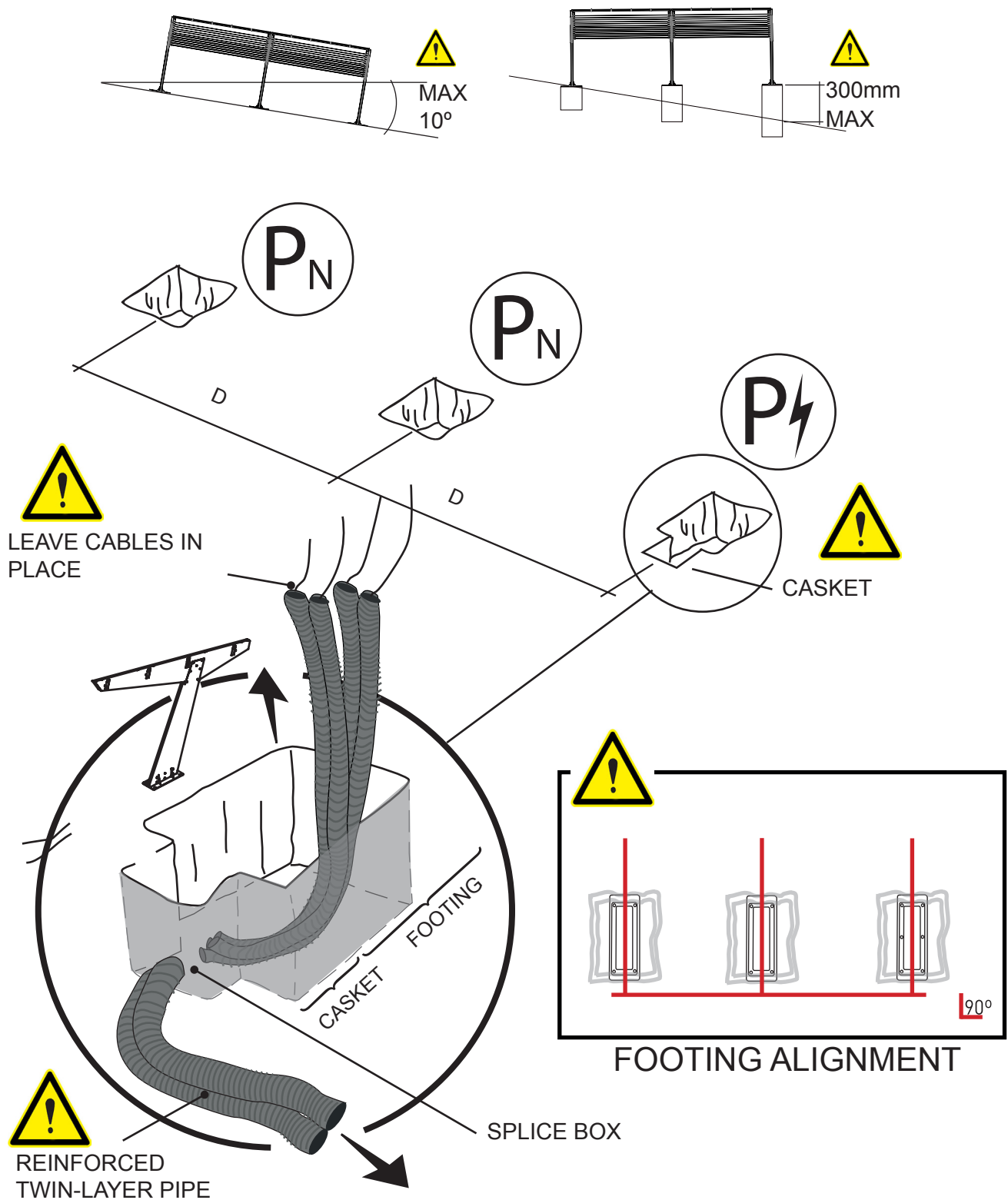


Figure 7: Internal connection of feet.

## 5.2.- PREPARATION OF FOOTINGS



-PROJECTION OF A LENGTH OF 6 M APPROXIMATELY FROM CASKET SPLICE FOR THE LOWERING OF STRINGS, DC WIRING.

-IF IT IS ONLY FOR AC WIRING OF THE CHARGER, PROJECTION OF 4 M APPROXIMATELY OF CASKET SPLICE.

Figure 8: Preparation of footings.



## 5.3.- EARTH CONNECTION

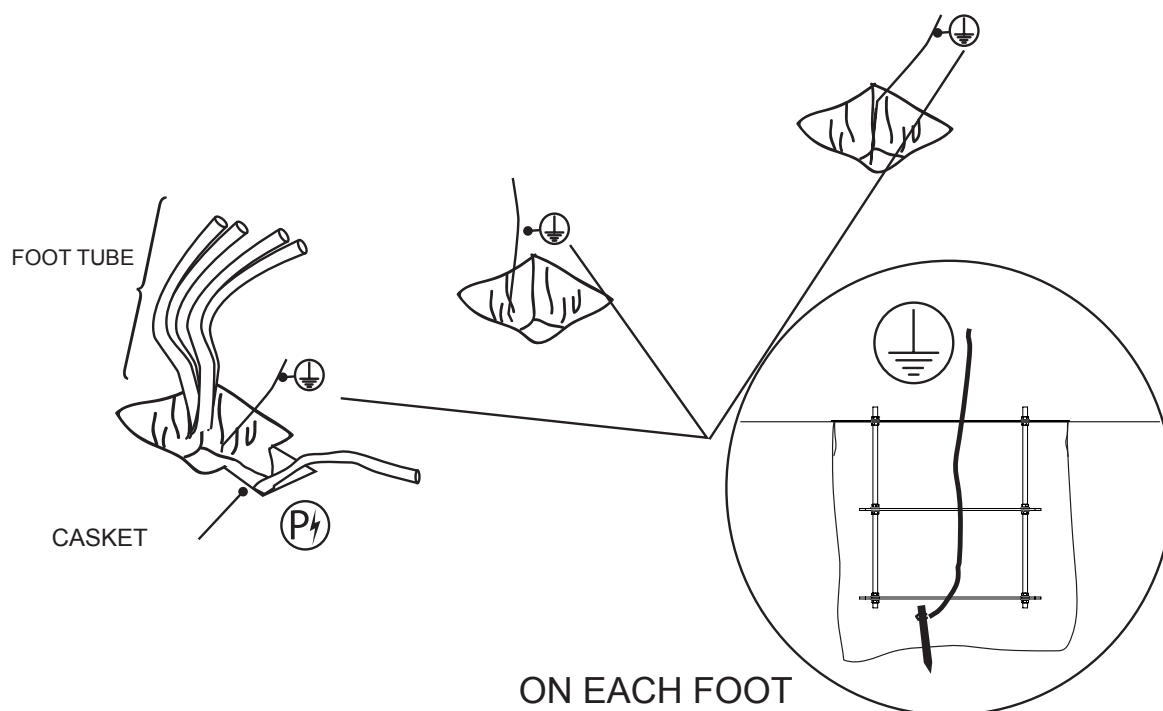


Figure 9: Earth connection.

## 5.4.- ASSEMBLE TEMPLATES

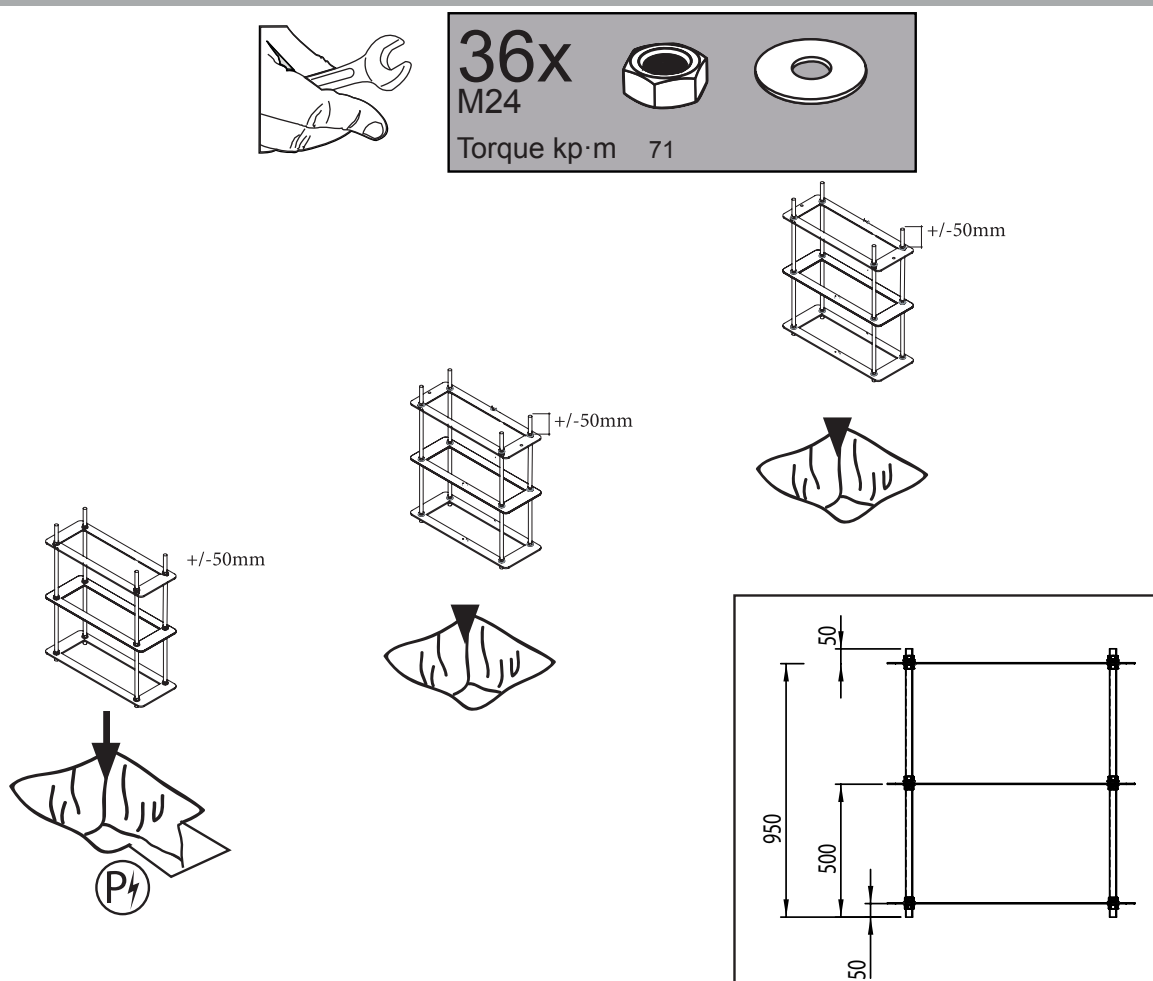


Figure 10: Assembly of templates.

## 5.5.- FILLING THE FOOTINGS

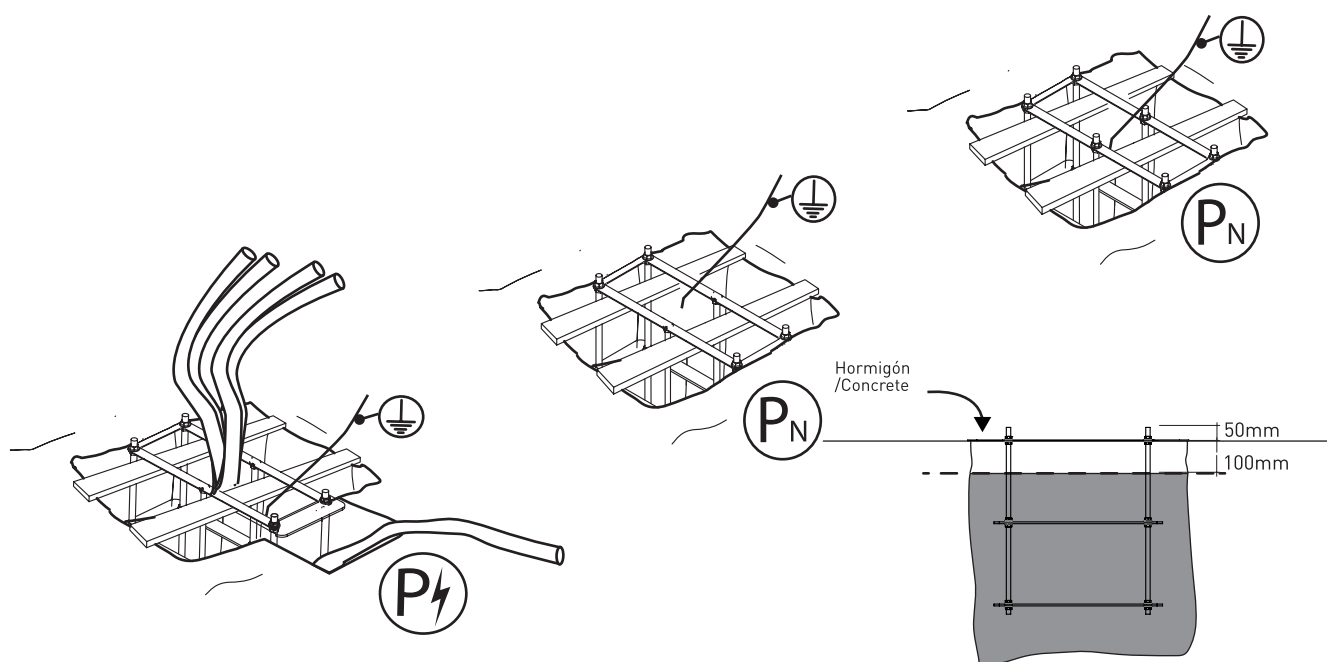


Figure 11: Filling the footings.

## 5.6.- REMOVE UPPER TEMPLATE

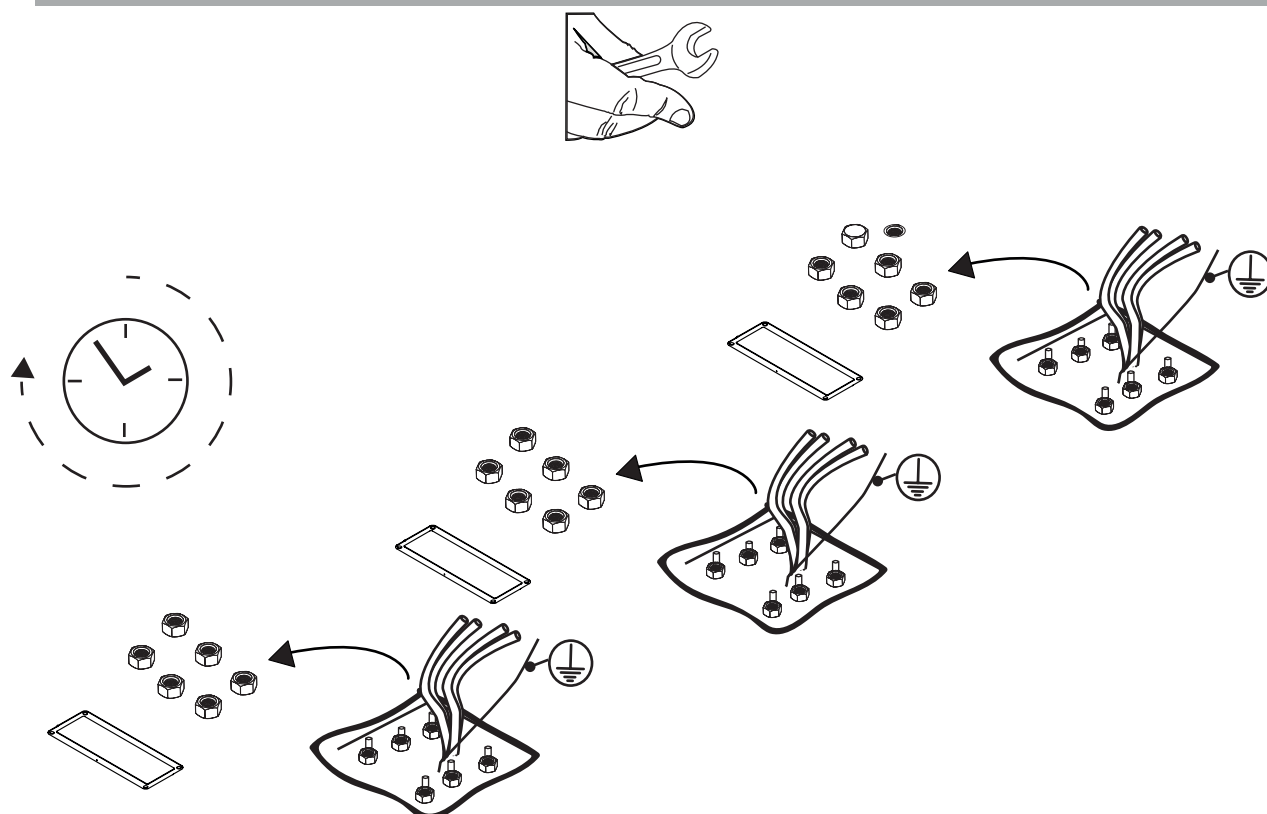


Figure 12: Remove upper template.

## 6.- ASSEMBLY OF FEET AND WINGS

### 6.1.- FOOT INSTALLATION (A)

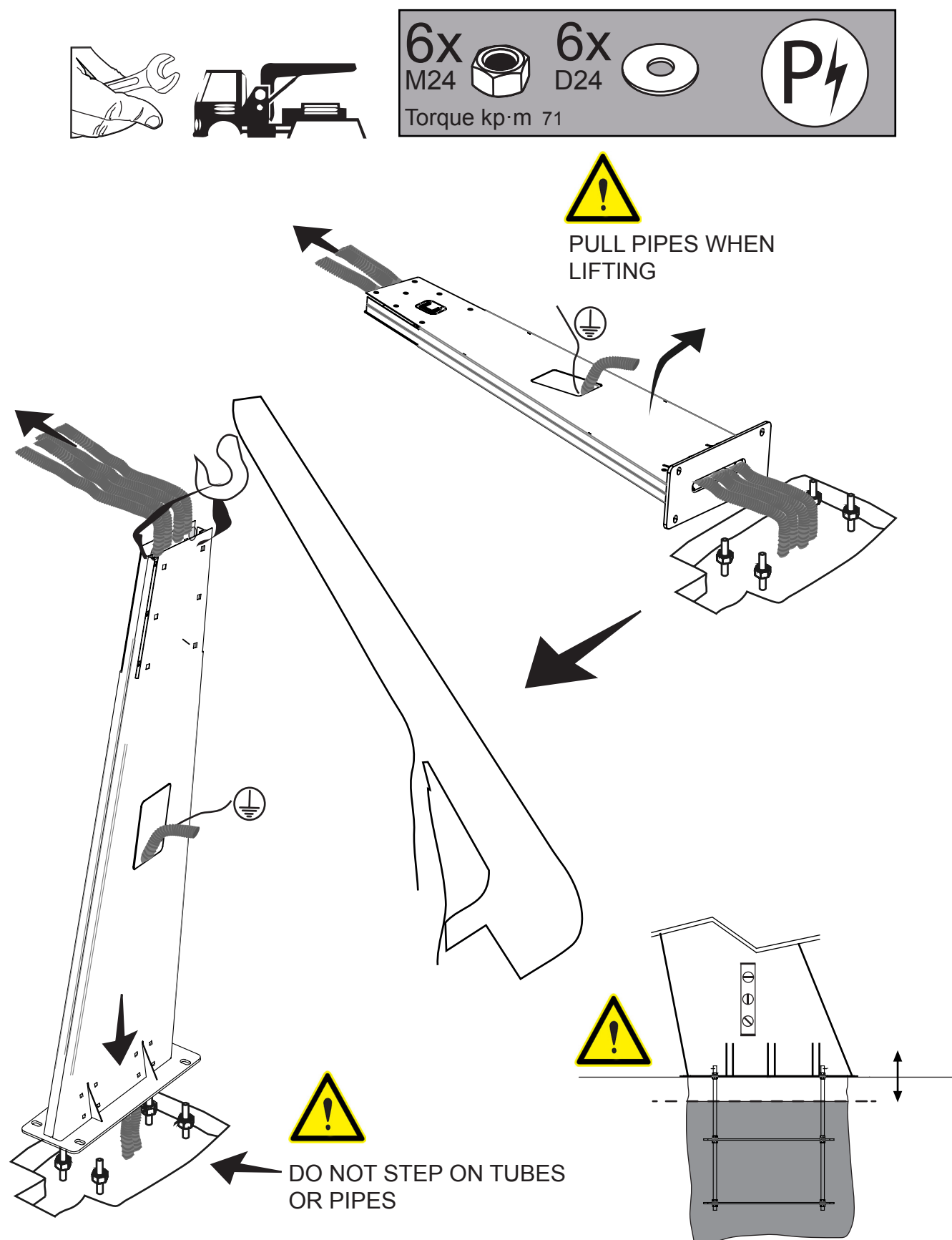


Figure 13: Foot installation (A)

## 6.2.- FOOT INSTALLATION (B)

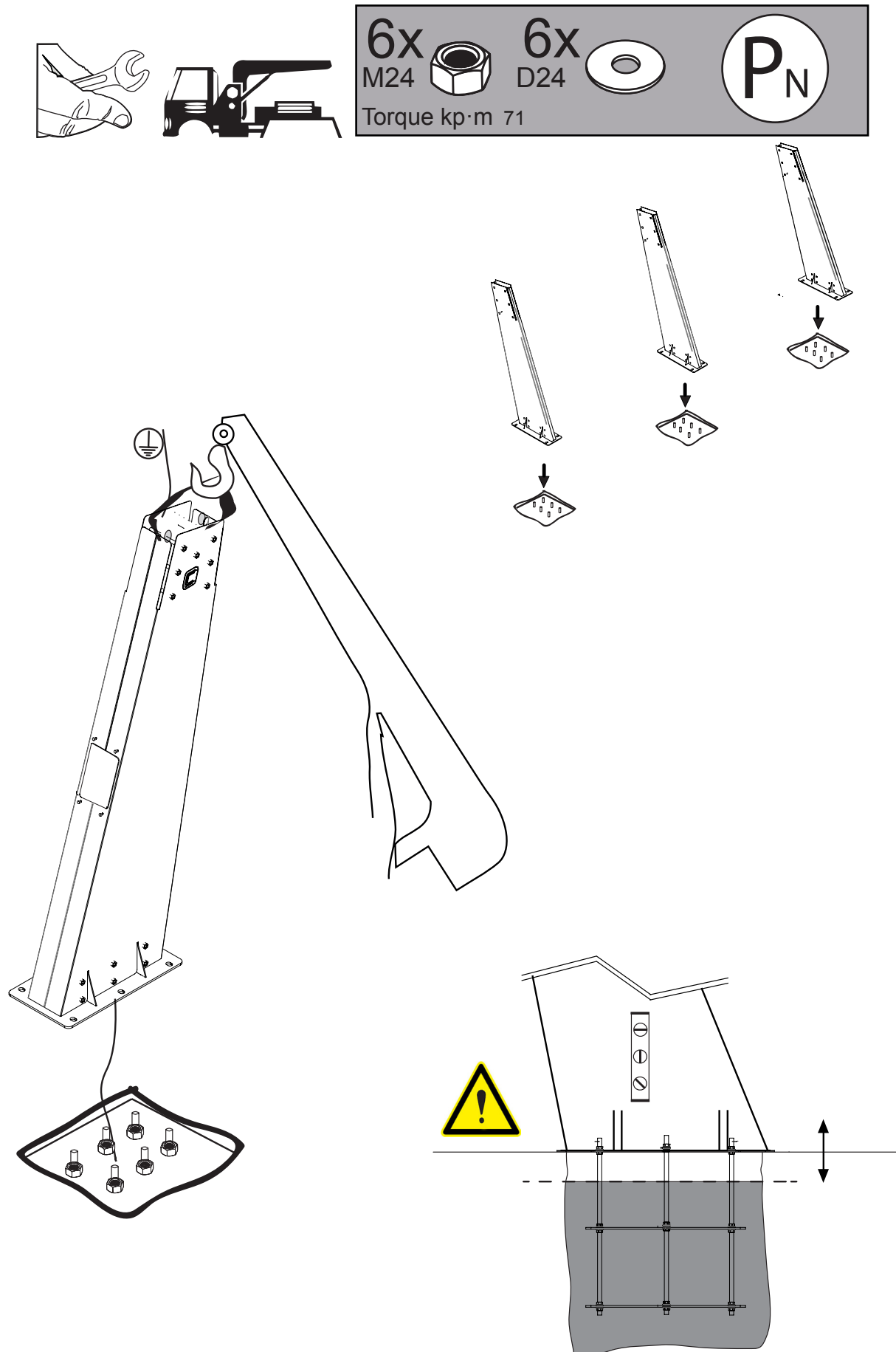


Figure 14: Foot installation (B)

## 6.3.- INSTALLATION OF FEET REINFORCEMENT

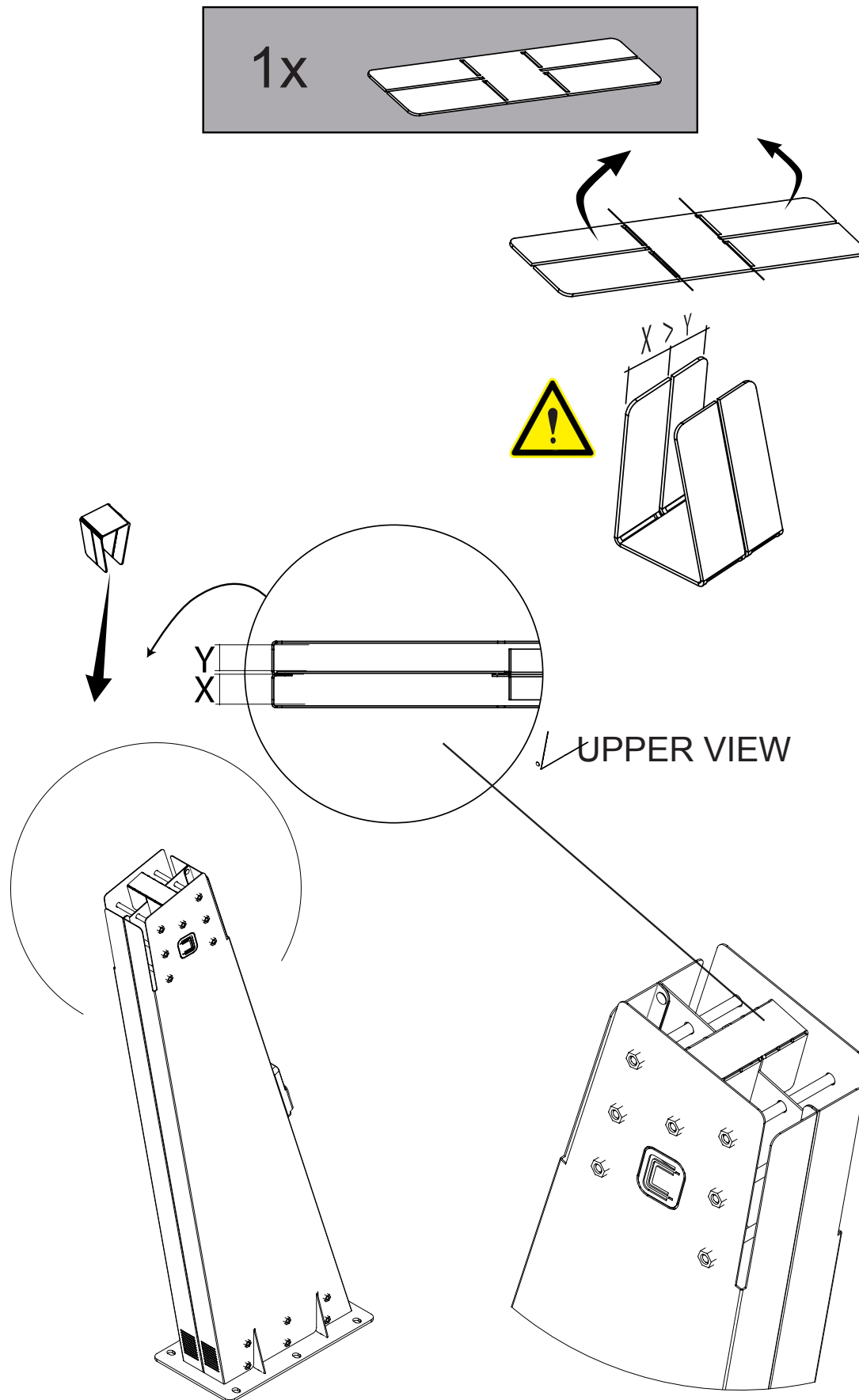
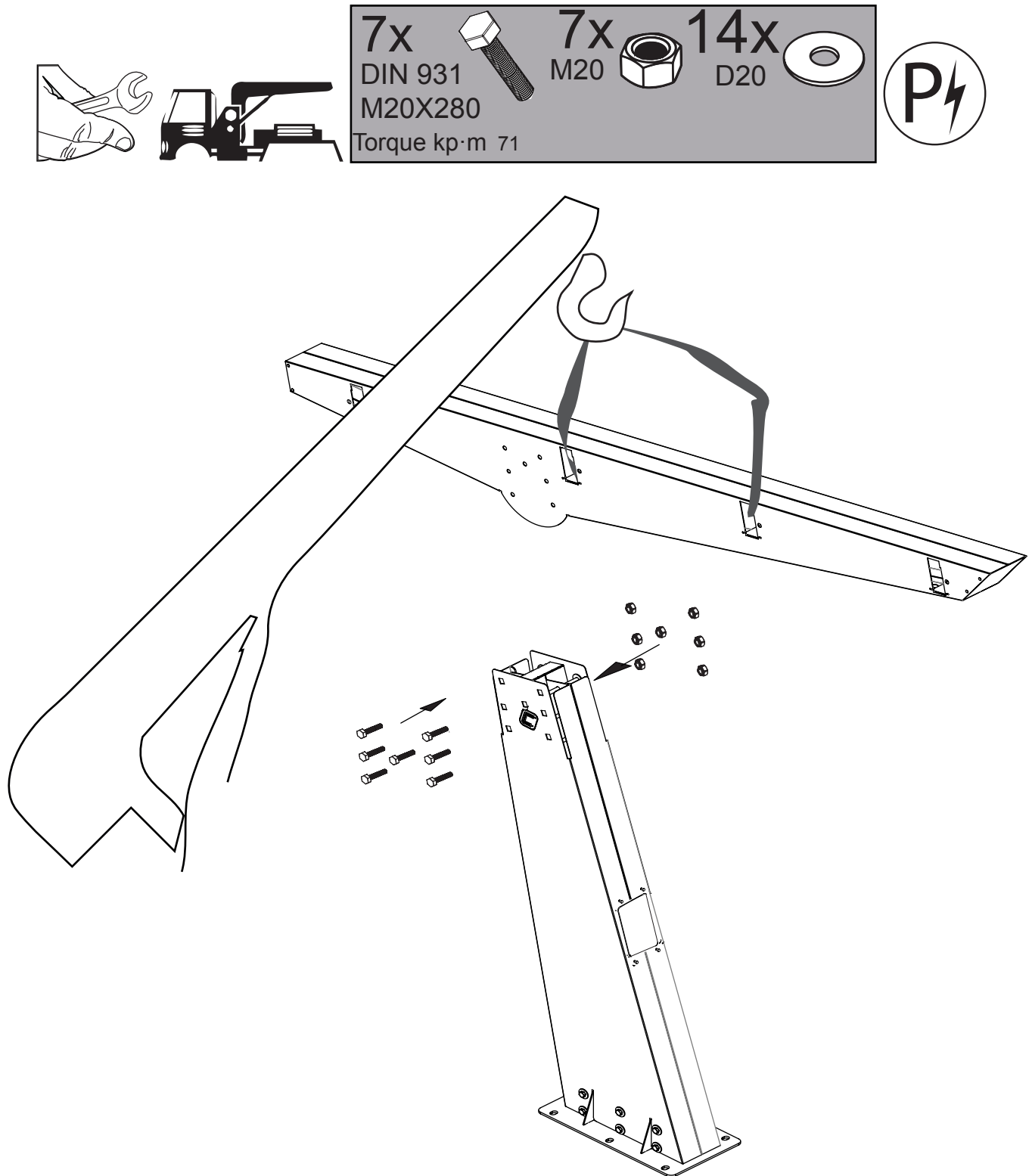


Figure 15: Installation of foot reinforcement.

## 6.4- INSTALLATION OF WINGS (A)



## 6.5- ALIGNMENT OF THE FEET

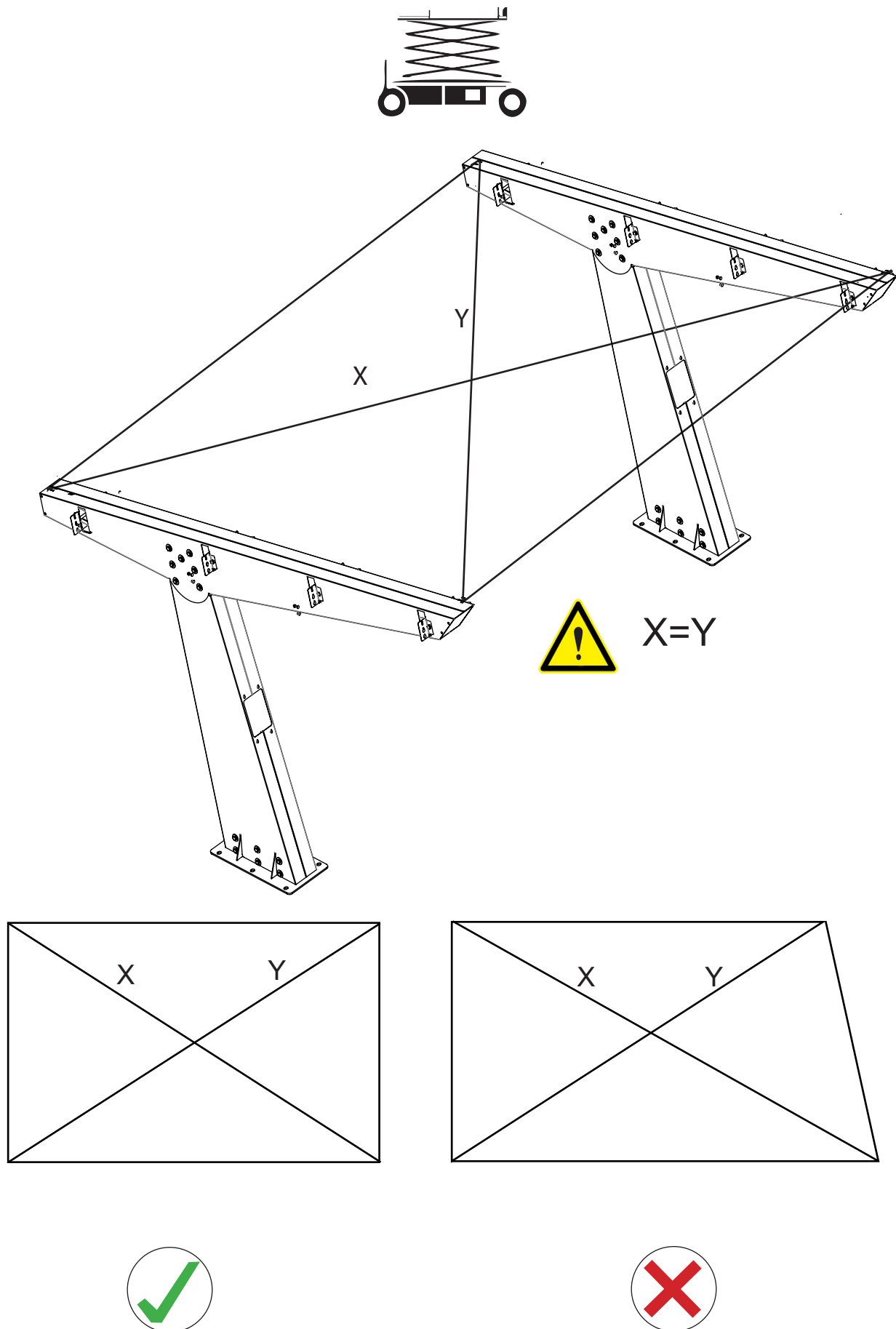


Figure 17: Alignment of the feet

## 7.- ASSEMBLY OF BEAMS

### 7.1- FITTING OF ANGLES

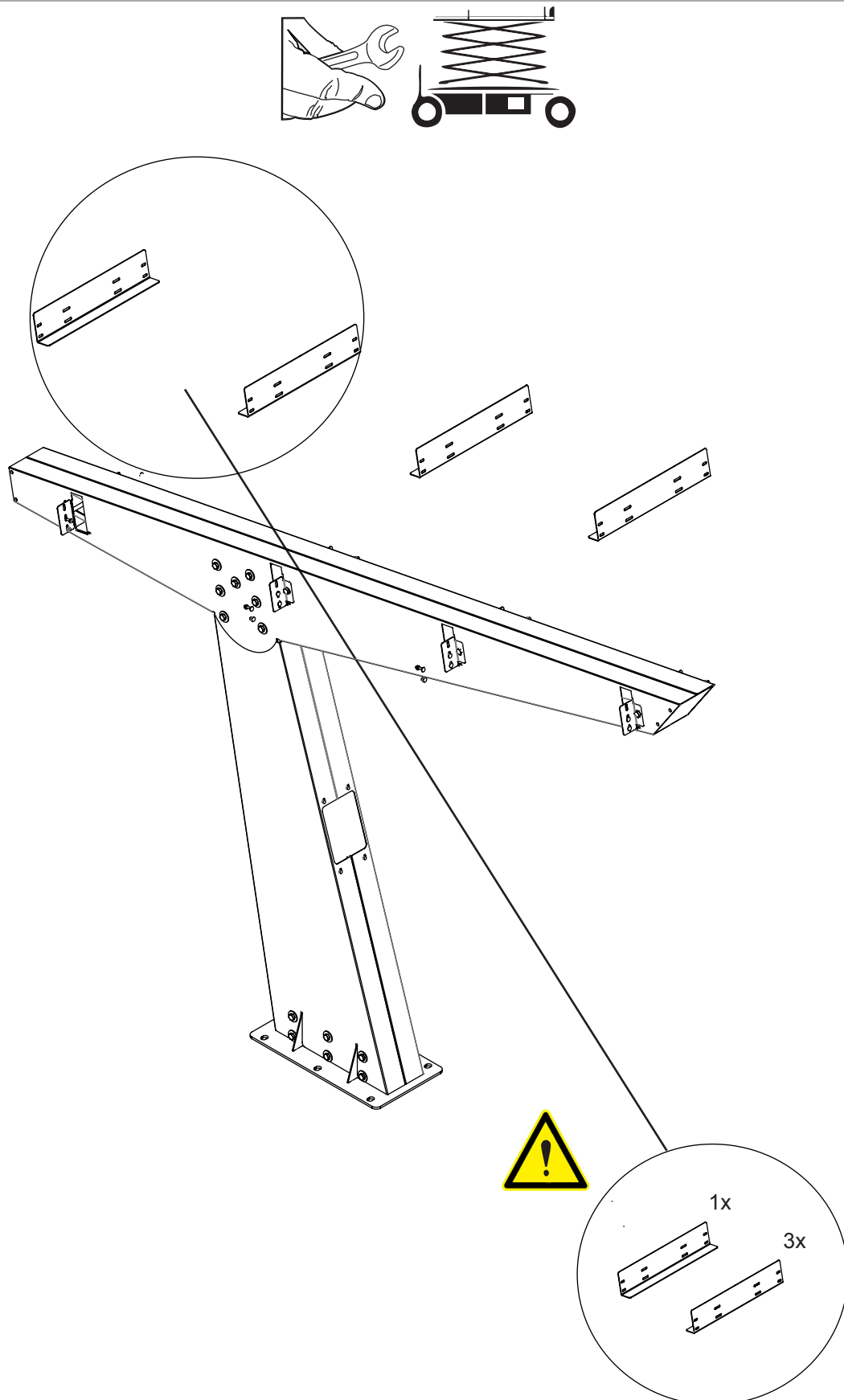
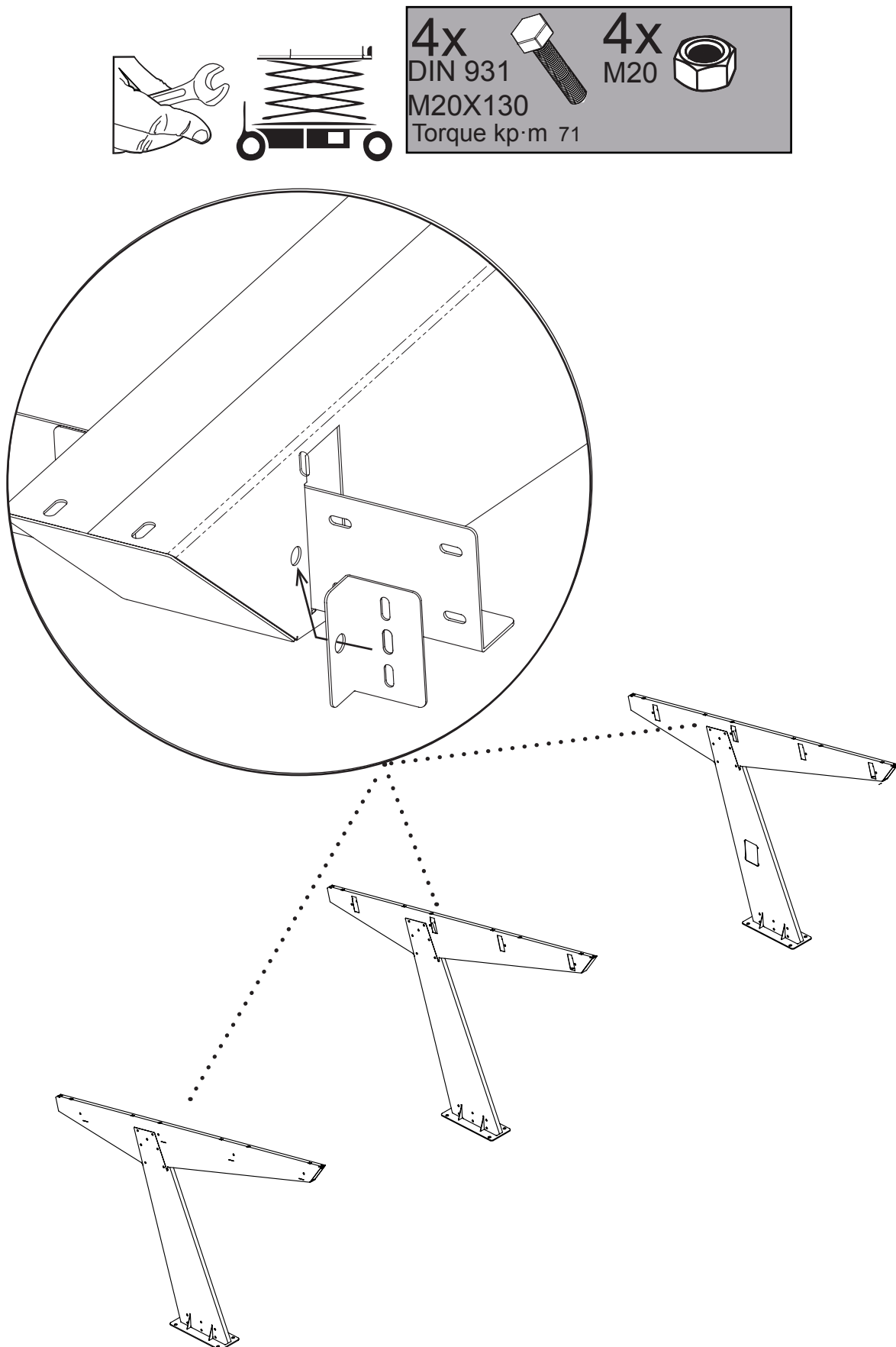


Figure 18: Fitting of angles.



## 7.2- BEAM ANGLES



## 7.3 - FITTING OF BEAMS

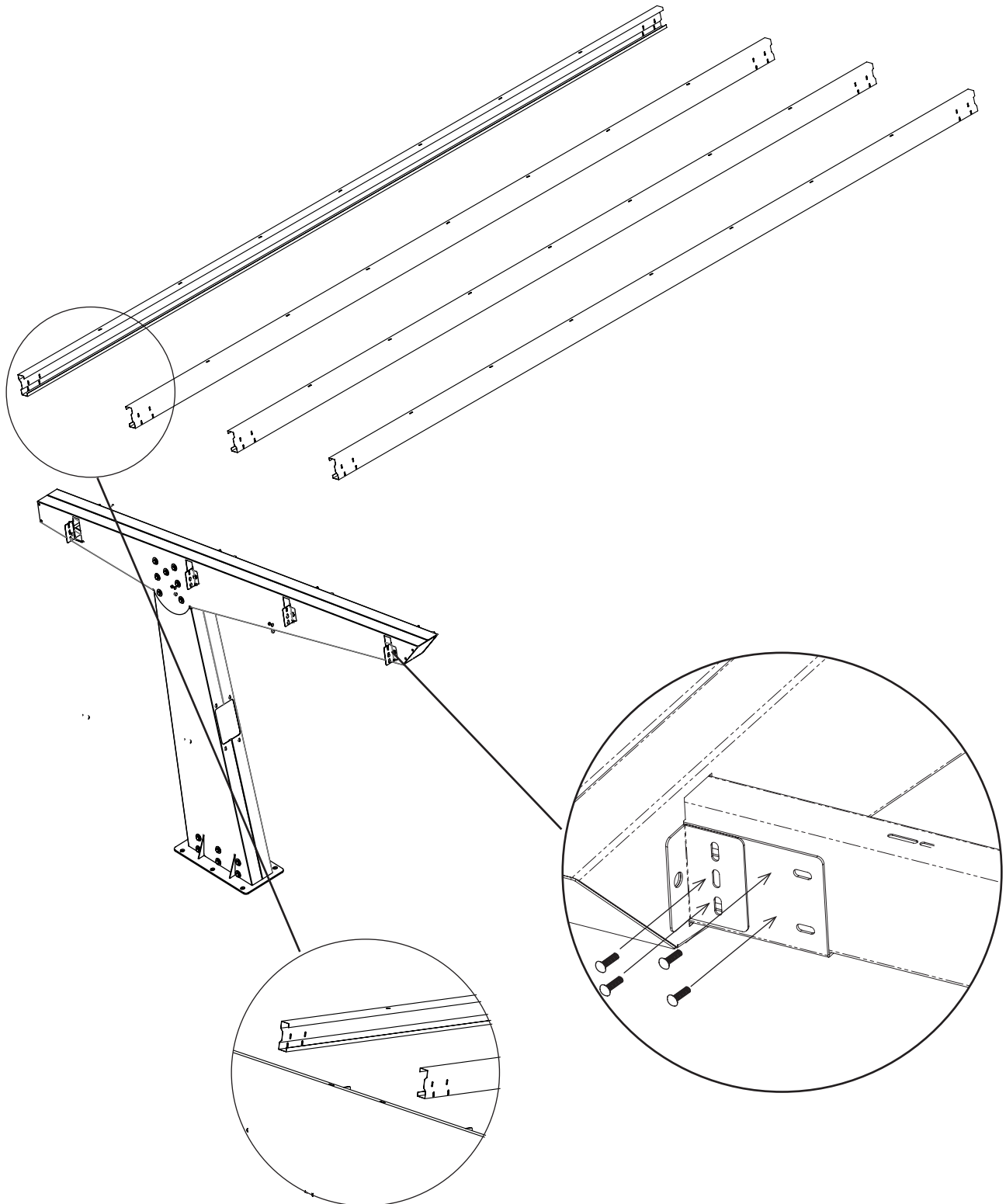
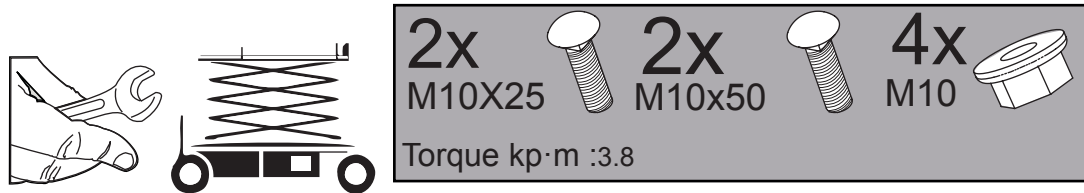


Figure 20: Fitting of beams.

## 7.4 - INSTALLATION OF EARTHING POINT

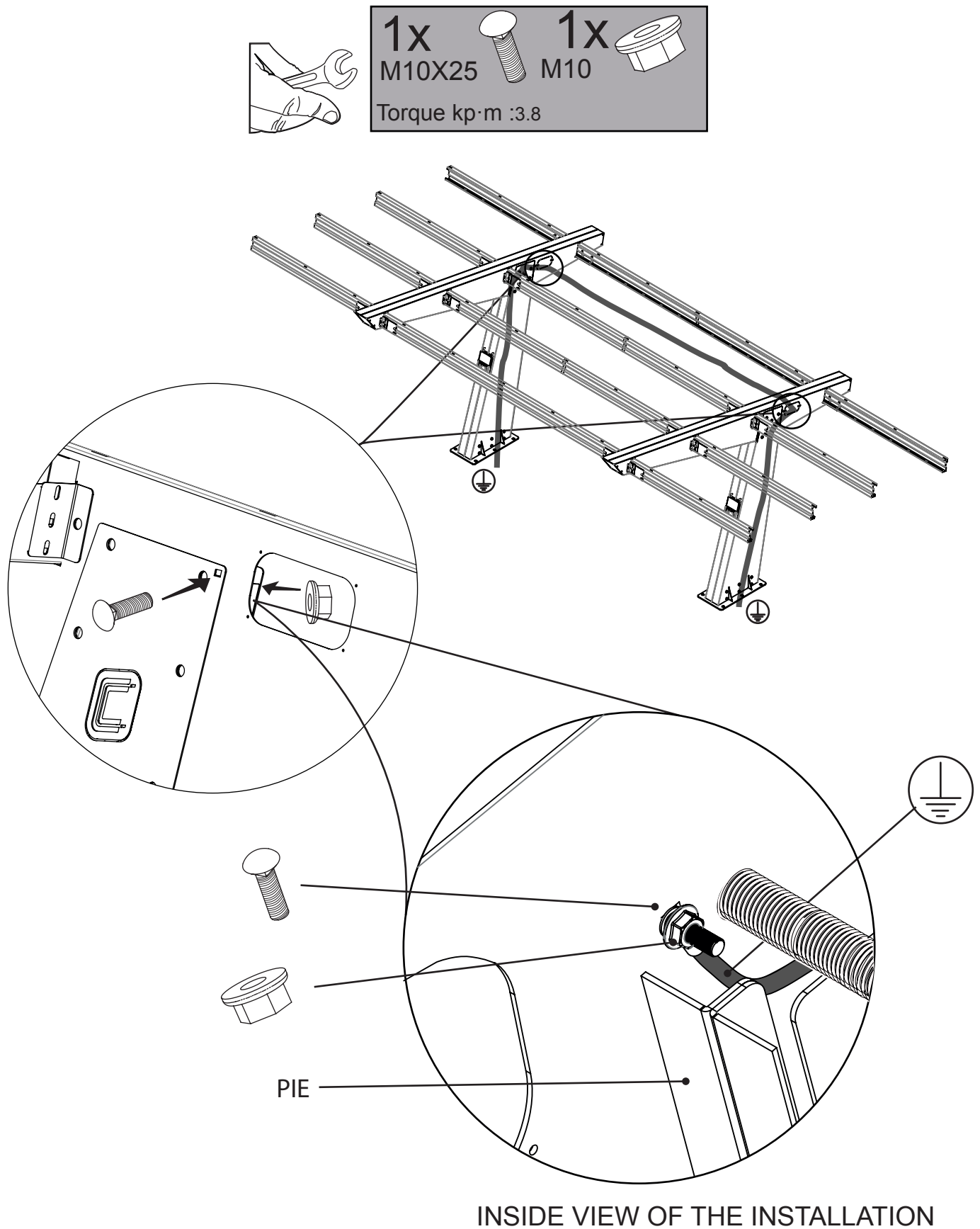


Figure 21: Installation of earthing point.

## 8.- PROFILES AND MODULES

### 8.1 - INTERMEDIATE PROFILES

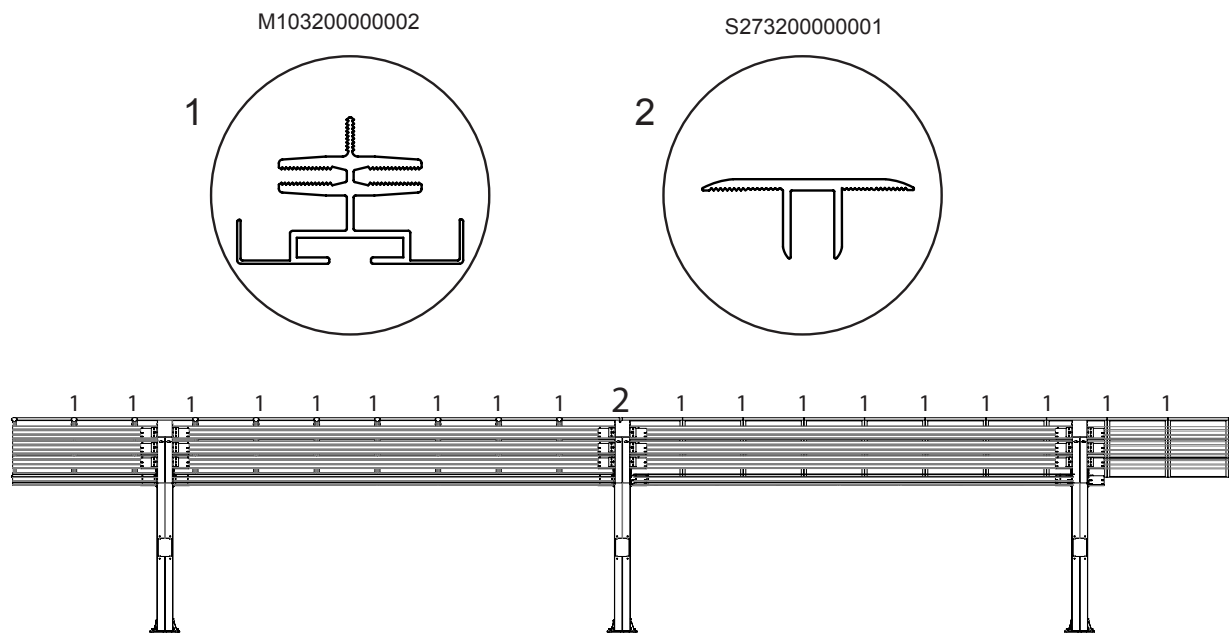


Figure 22:Intermediate profiles

### 8.2 - FINAL PROFILES

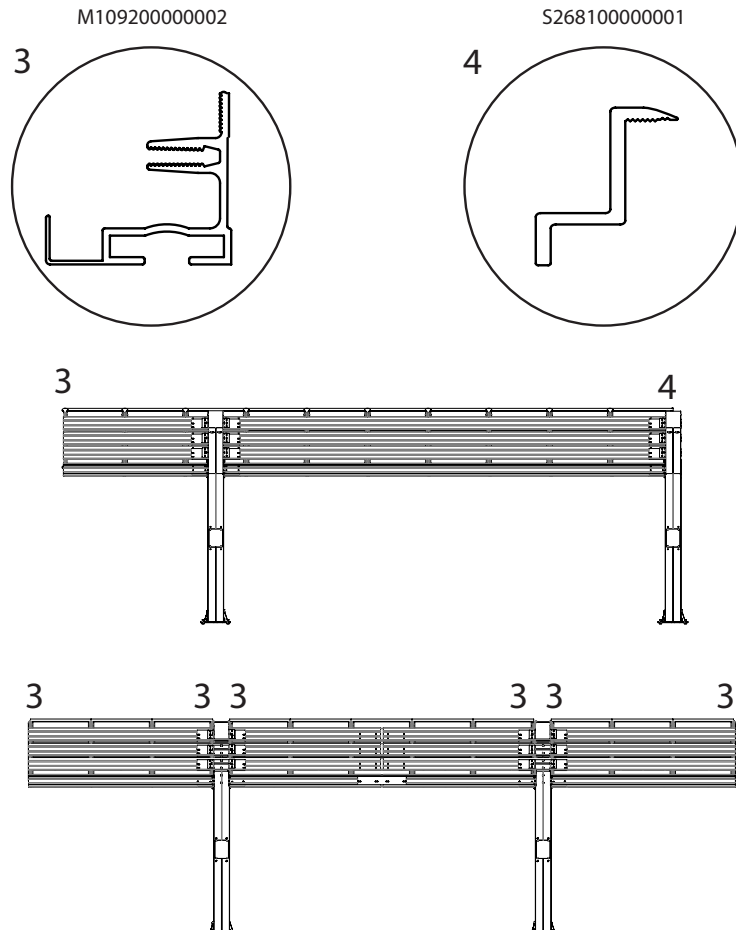


Figure 23:Final profiles.

## 8.3 - PREPARATION OF PROFILES



A

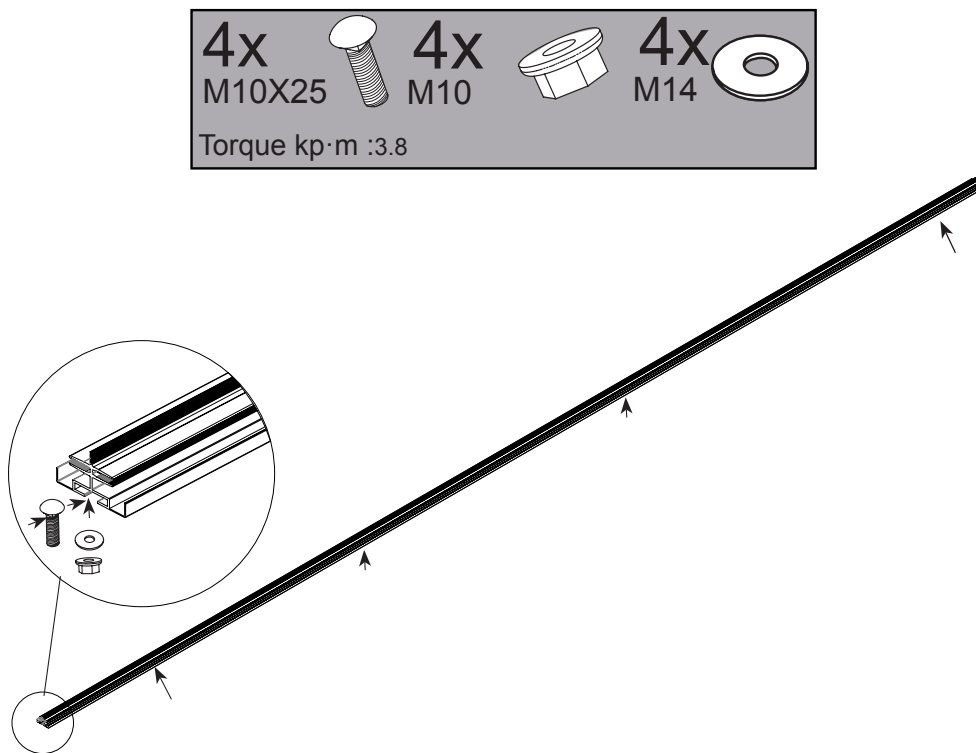


Figure 24: Preparation of profiles A

B

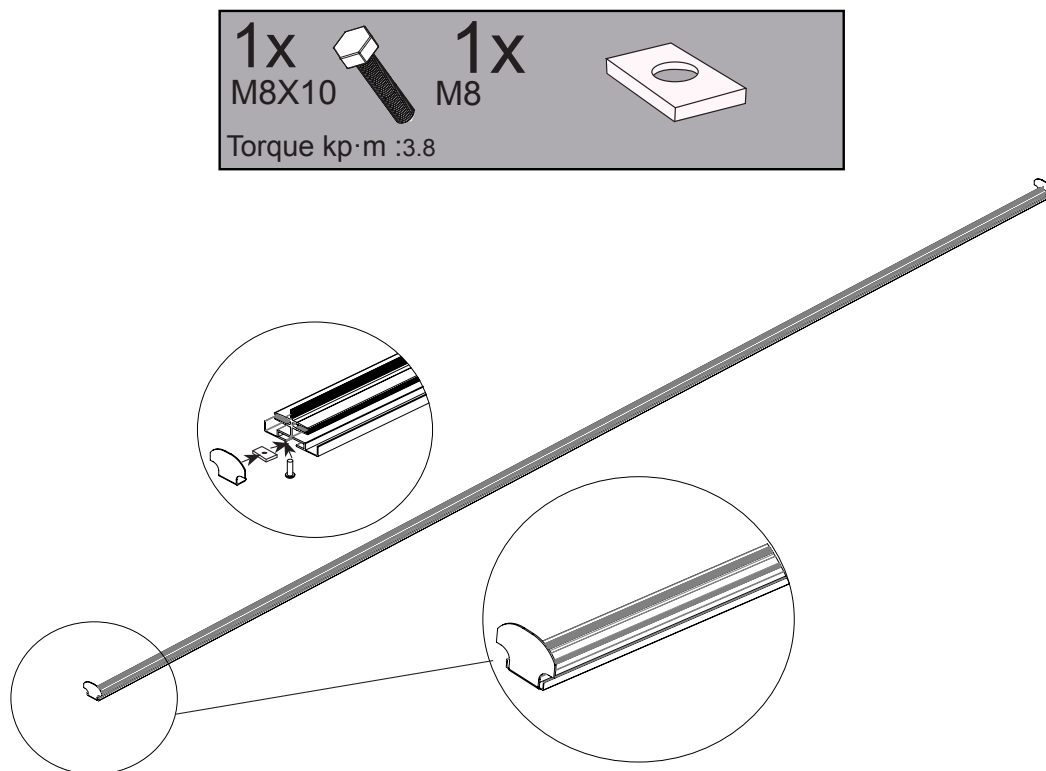


Figure 25: Preparation of profiles B

## 8.4 - FITTING OF INTERMEDIATE PROFILES (1)

1 M103200000002

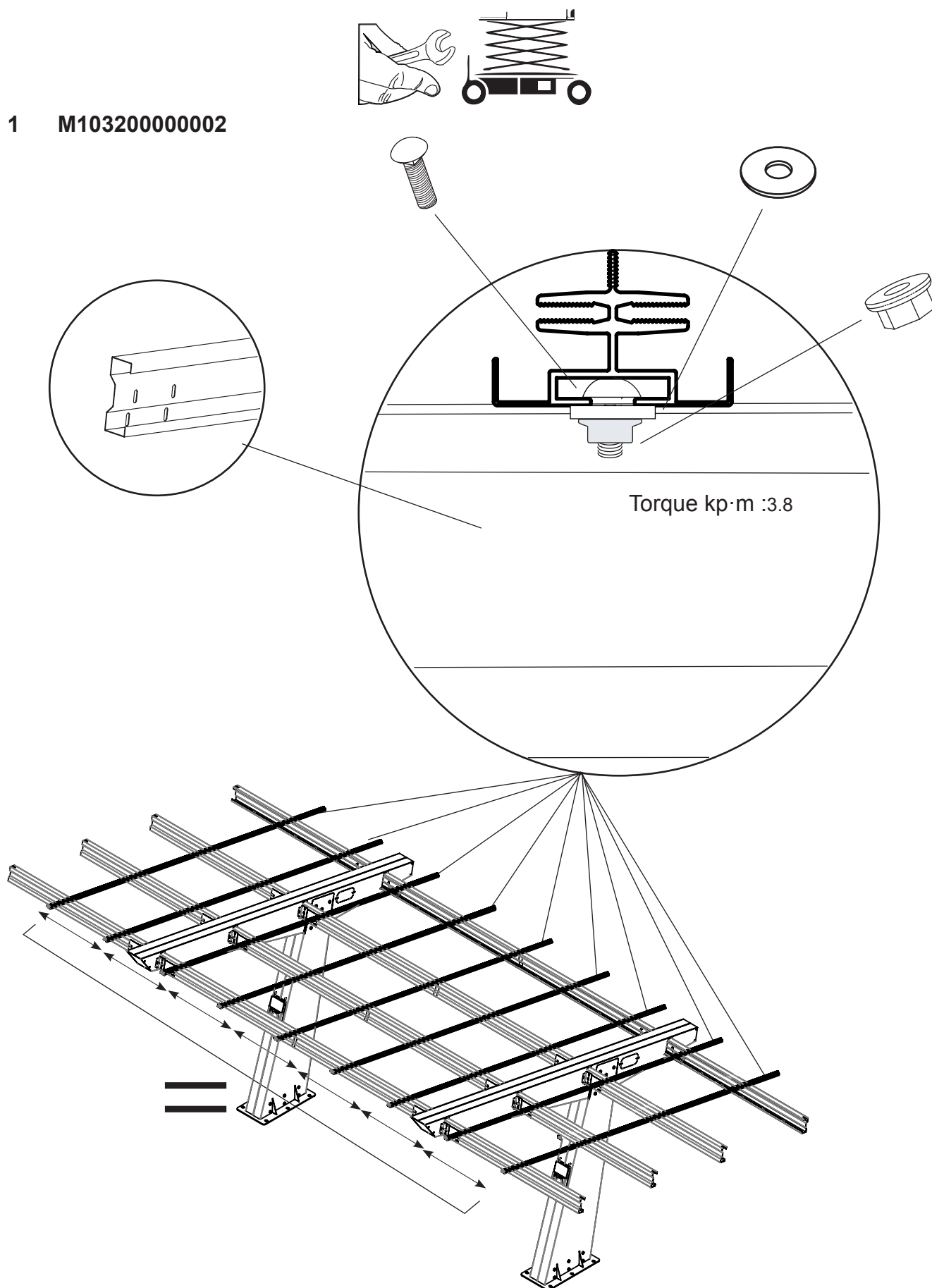


Figure 26:Fitting of intermediate profiles 1

## 8.5 - FITTING OF INTERMEDIATE PROFILES (2)

2 S273200000001

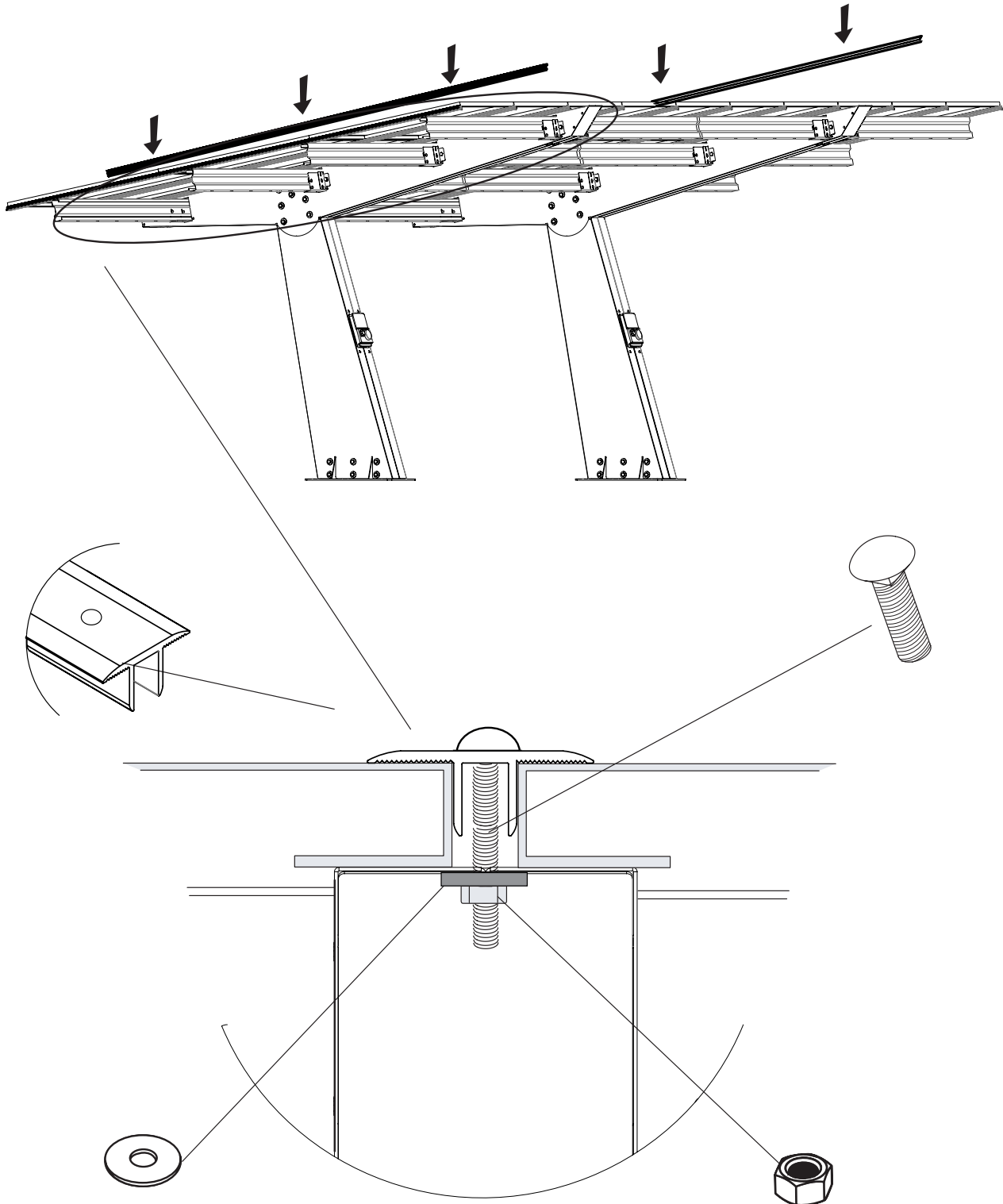
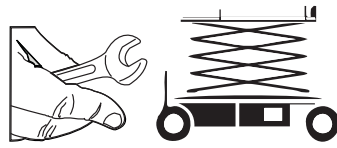


Figure 27:Fitting of intermediate profiles 2

## 8.6 - FITTING OF FINAL PROFILES (3)

3 M109200000002

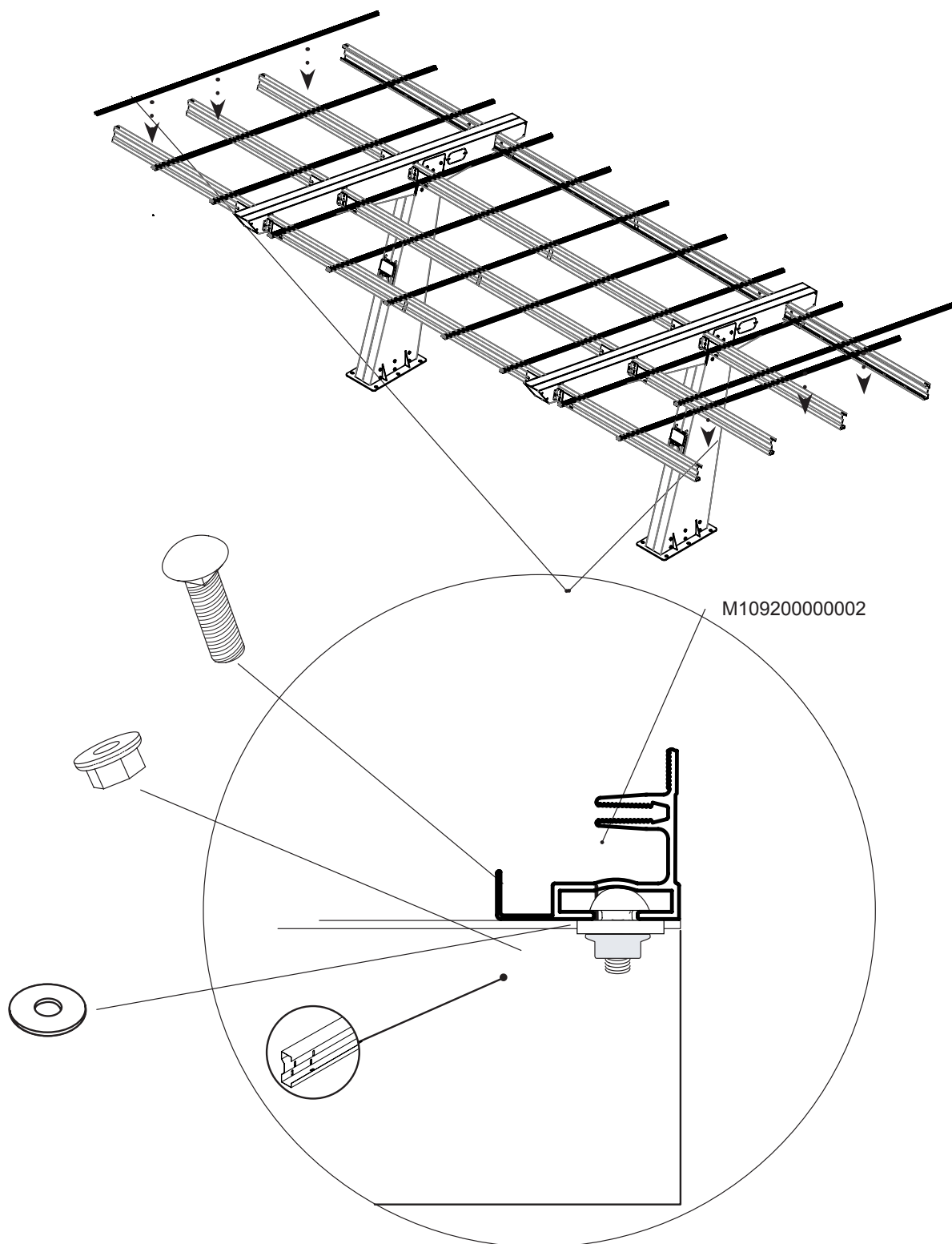
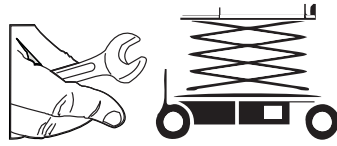


Figure 28: Fitting of final profiles 3.



## 8.7 - FITTING OF FINAL PROFILES (4)



## 4 S268100000001

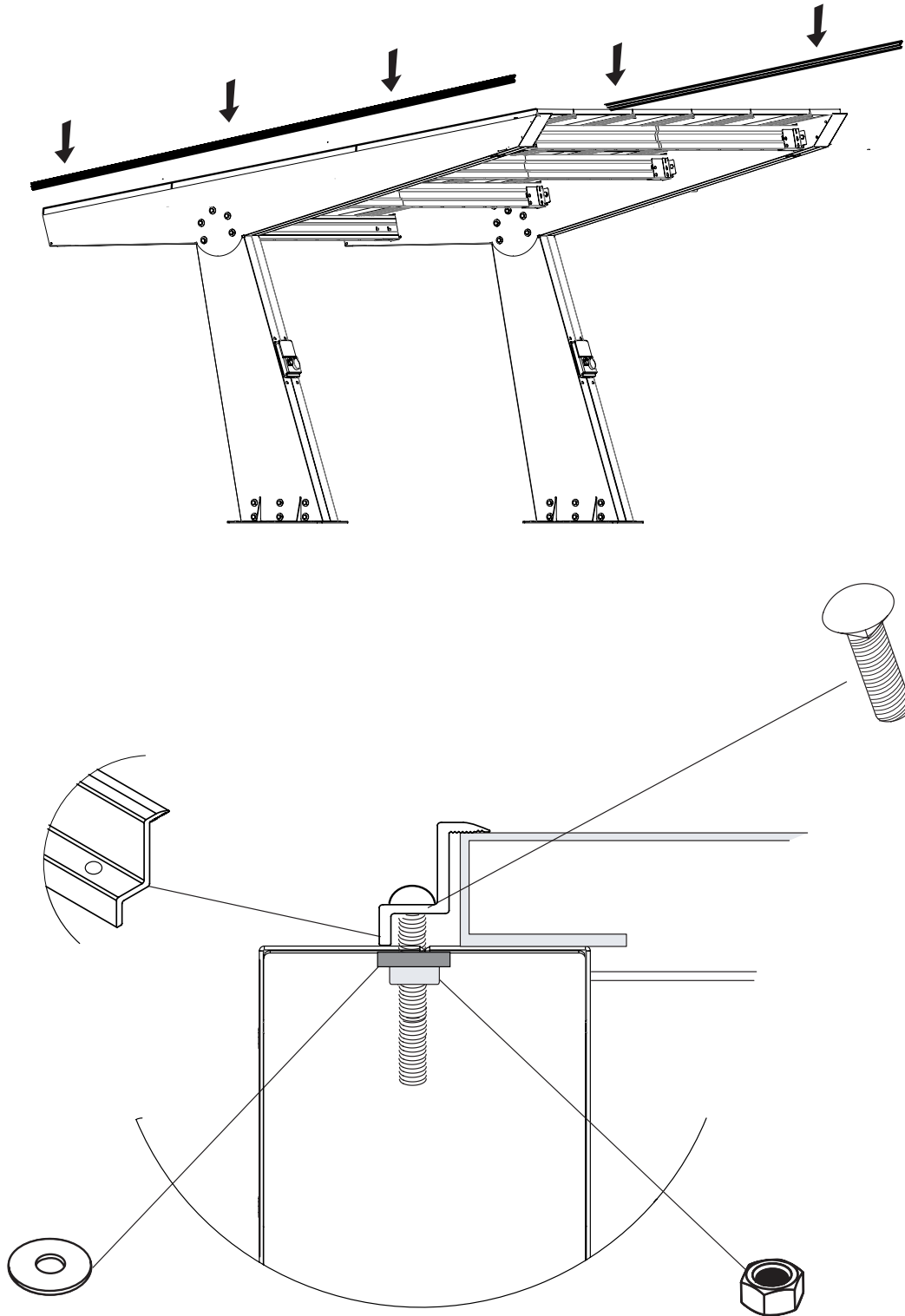


Figure 29: Fitting of final profiles 4.

## 8.8 - SETTING MODULES A

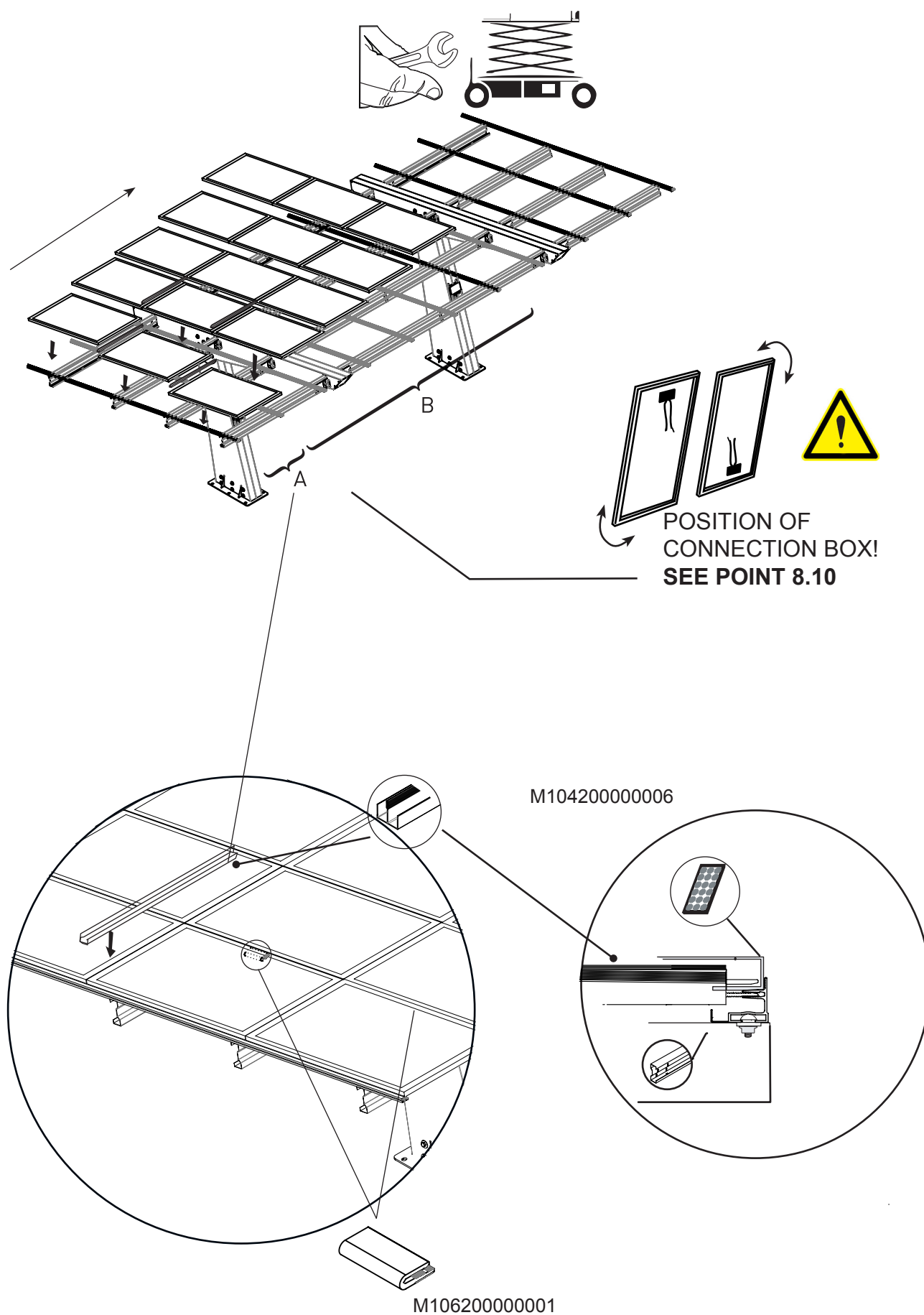


Figure 30: Setting modules A.

## 8.9 - SETTING MODULES B

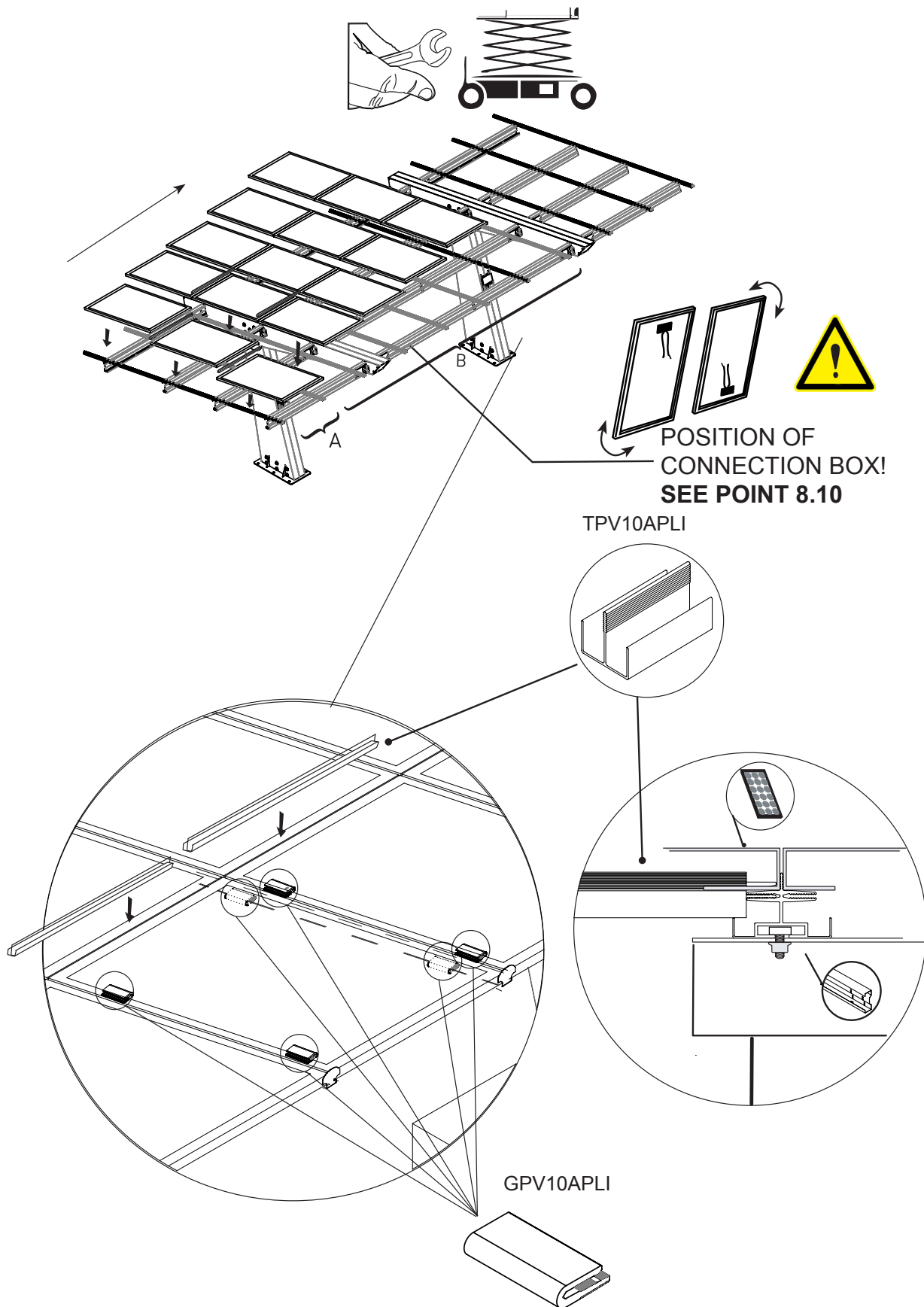
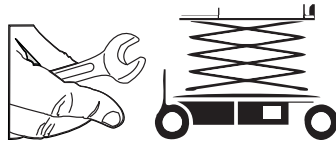


Figure 31: Setting modules B.

## 8.10 - CONNECTION OF STRINGS



Distribute the modules according to their connection as per the following scheme:

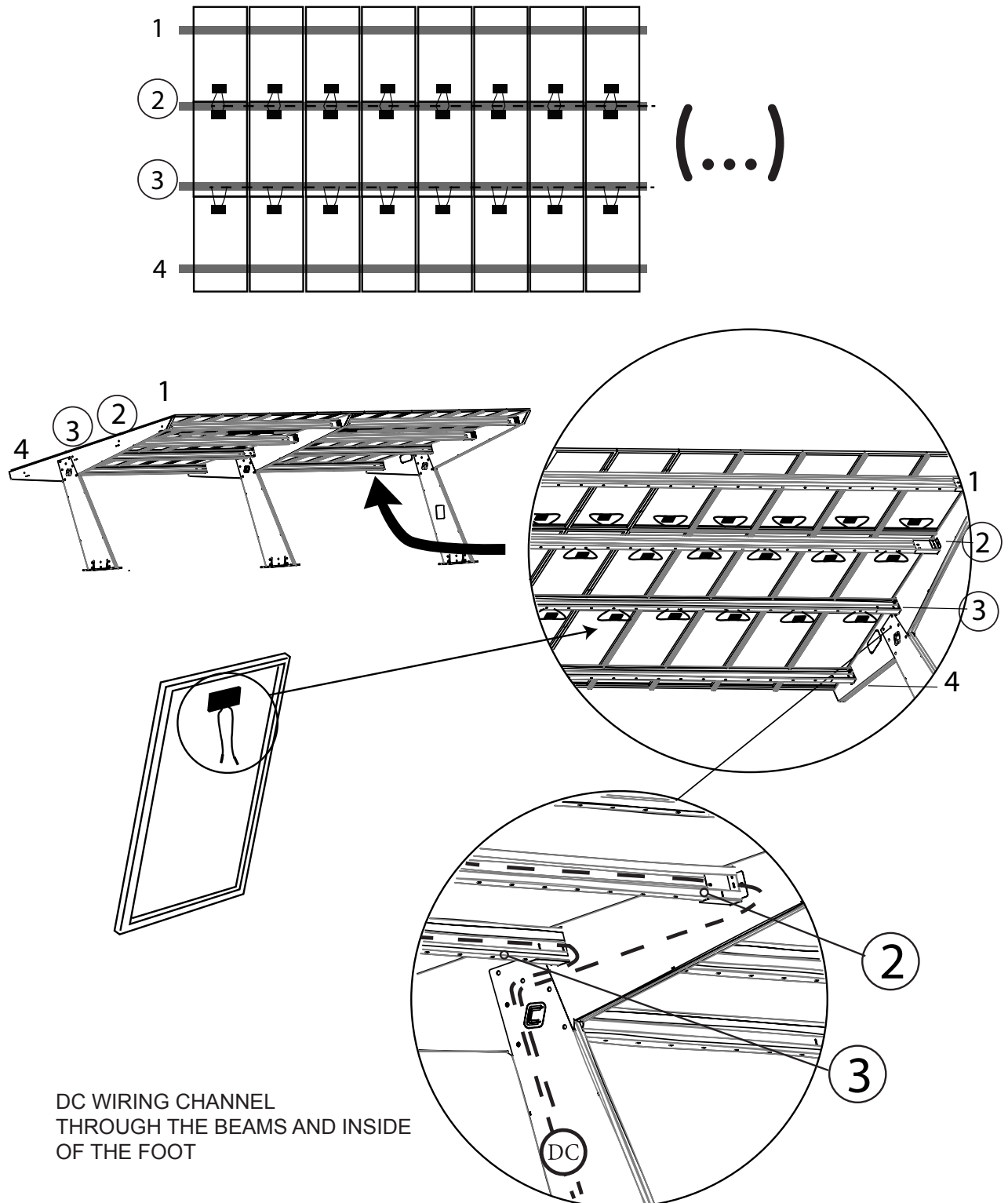


Figure 32: Connection of strings.

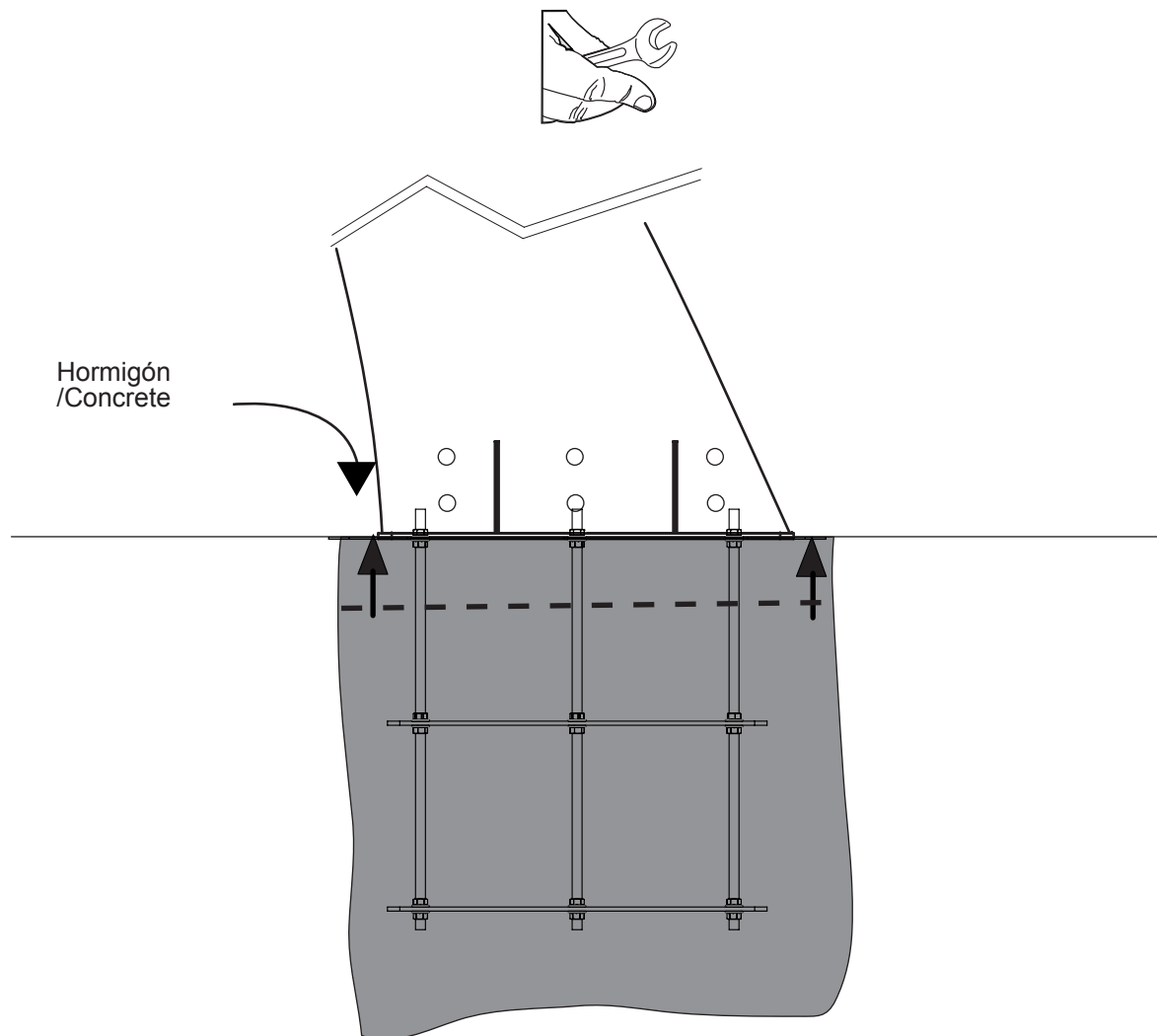
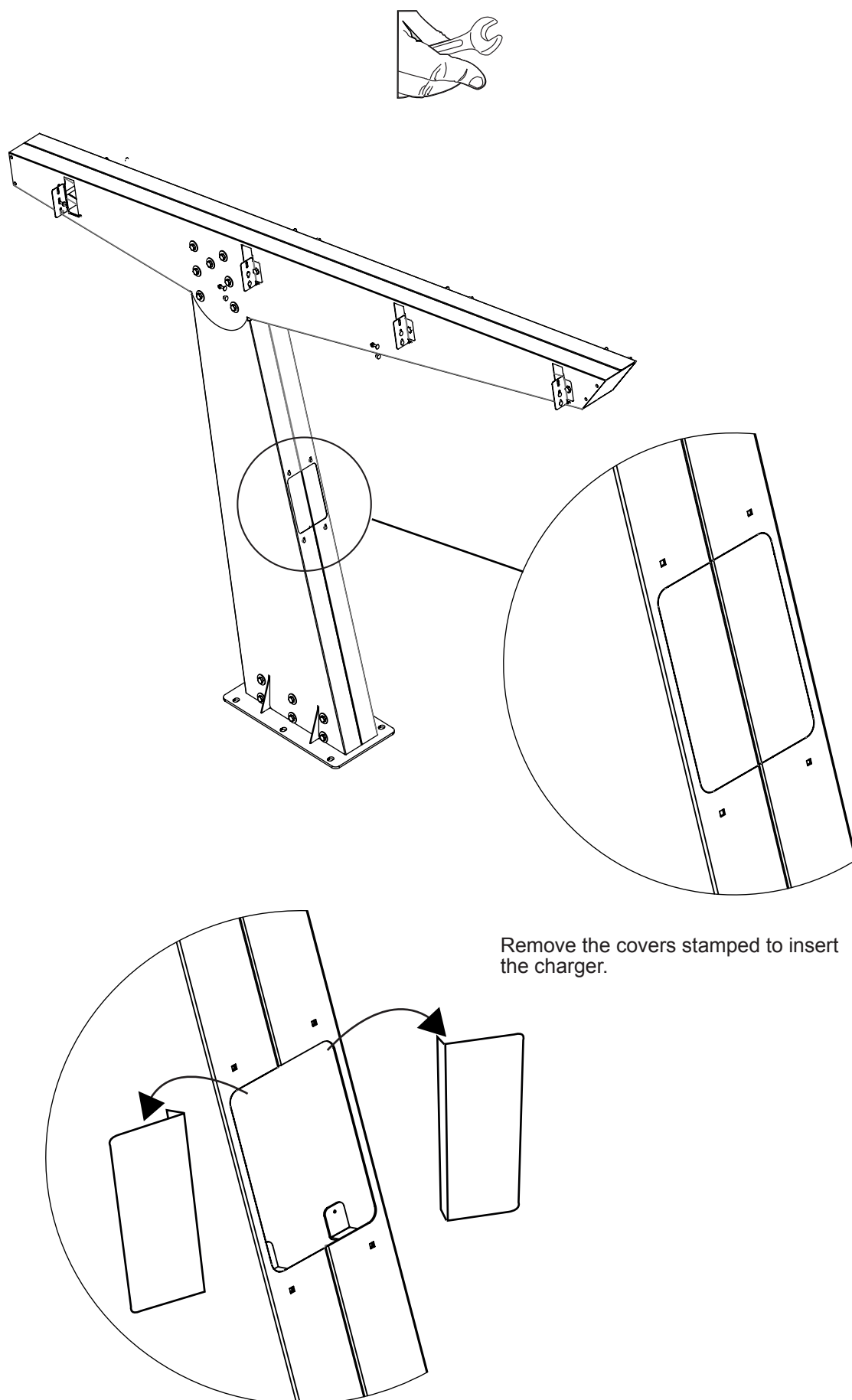
**9.- FINAL FOUNDATIONS**

Figure 33:Final foundations.

**10.- INSTALLATION OF THE CHARGER****Figure 34: Installation of the charger, Step 1.**

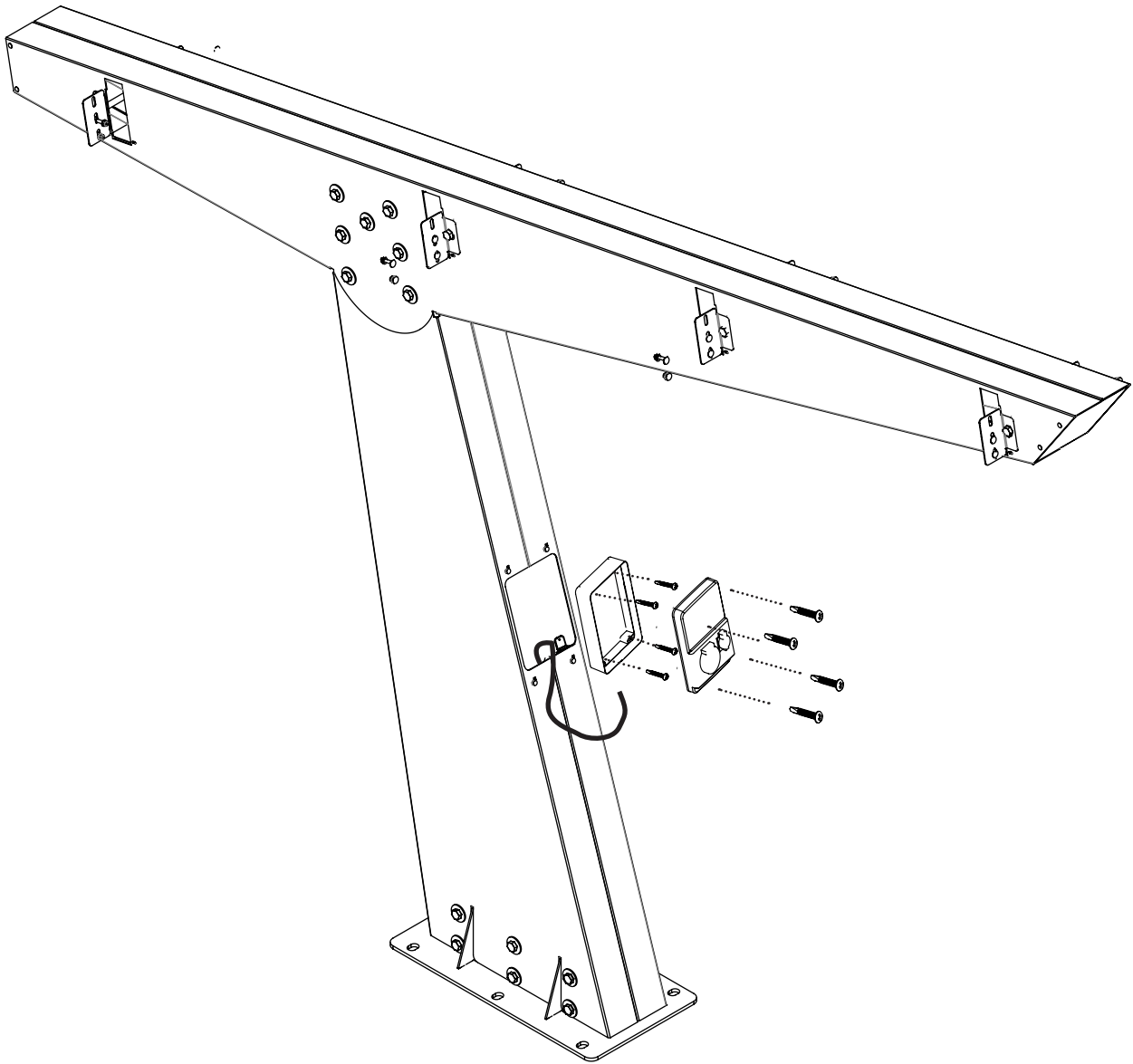


Figure 35: Installation of the charger, Step 2.

## 11.- USAGE AND MAINTENANCE

### 11.1 - INSTALLATION

Before the assembly of the canopies, the technical management of the works or the engineering company that carries out the installation project must draft a technical project in which the housings (foundations, footings, support structure, etc.) are sized accordingly with the resulting stressed exerted on the canopy due to wind and snow indicated by the regulations applicable to the specific location of the canopy.

#### 11.1.1.- ASSEMBLY ACCORDING TO MANUFACTURER SPECIFICATIONS

The canopies must be assembled following the instructions in this assembly manual. Under no circumstances may parts or pieces be modified, or steps omitted.

#### 11.1.2.- DIFFICULTIES AND VARIATIONS DURING ASSEMBLY

Any damage detected during the assembly, either as a result of the actual process or if any part does not match those described in the manual, must be notified of to the company supplying the structure.

#### 11.1.3.- BONDING OF PARTS AND TIGHTENING TORQUE

All joints of the canopy's parts must be made with the supplied screws and nuts. Any change of screws and nuts must be communicated and authorised by the manufacturer.

The tightening torques of the joints must be checked according to the following specifications:

**M8** = between 16 and 19 Nm

**M10** = between 33 and 39

**M20** = between 182 and 274 Nm

**M24** = between 264 and 324 Nm

#### 11.1.4.- FOUNDATIONS, ALIGNMENT AND LEVELLING OF THE CANOPIES

The foundations must be made with the material supplied by the manufacturer and according to the specifications described in this manual.

The legs must be aligned and level.

In the event that these requirements cannot be met due to the type of installation, please notify the manufacturer to study the situation and behaviour of the canopy.

Any installation made on sloping terrain should be specifically studied to ensure the proper functioning of the canopy.

#### 11.1.5.- LOCATION AND CHARACTERISTICS OF THE INSTALLATION ZONE

The canopies have been studied to be installed free of any building or nearby walls. If an adjacent wall is installed, a special study will be required to vary the coefficient of obstruction contemplated in the calculation.



If the canopy is installed in the vicinity of a height change, or on a steep wall or mound that increases the height of the canopy above the grade to more than 3 m in height at the centre point of the roofing, a special study will be required owing to the modification of the pressure and suction coefficients considered in the calculation.

## 11.2 - USE AND UPKEEP

Maintenance is essential for proper service of this canopy. This section details the work to be performed by the owner or a subcontracted company to ensure continuity in the service of the canopy.

### 11.2.1.- STRUCTURAL ELEMENTS MUST NOT BE MODIFIED

The structural elements that make up the structure: bases, feet, wings and beams must not be modified from their original state without the intervention of a qualified technician.

### 11.2.2.- USAGE OVERLOAD INDICATED IN THE PROJECT MUST NOT BE EXCEEDED

The overload of use cannot be exceeded without prior consultation with the specialist technician, especially in the case of changes in use. Should these be exceeded, there would be depletion in the structure leading to deformations and breaks.

People will not be allowed to climb onto the canopy, with the exception of those who access it to carry out maintenance and assembly tasks. No more than one person with their personal work material (100 kg) may climb onto the canopy.

### 11.2.3.- THE ORIGINAL STATUS OF THE ELEMENTS OF THE CANOPY CANNOT BE MODIFIED

Do not drill or weld in metal profiles without consulting a specialist technician.

The installation of posters or jutting elements is not allowed, nor in general, any added element that increases the surface exposed to the wind.

### 11.2.4.- AVOID THE CONTACT OF THE STEEL WITH OXIDISING OR AGGRESSIVE ELEMENTS

Steel elements should not be exposed to aggressive elements such as urine and accumulations of water in the areas of the feet are to be avoided.

**Any abnormal situation that appears in the different structural elements must be notified of to a trained technician or to the manufacturer.**

## 11.3 - REVISION AND MAINTENANCE

### 11.3.1.- GENERAL CONDITIONS

The construction management or the engineering company that carry out the project will define the periods and maintenance actions required for the housing or foundation. It is highly recommended to carry out testing procedures on concrete footings or housings.

In each maintenance revision a form sheet must be completed with the following information outlined below:

- Maintenance Company.
- Person who performs the tasks.
- Date of completion of the works.
- Visually reviewed points.
- Damages in the visually reviewed points.
- Points reviewed using gauge key.
- Points that have been retightened due to tension slipping.
- If protective paintwork has been added.
- Remarks.

Maintenance work must be carried out with sufficient trained personnel who are qualified to complete these tasks.

The maintenance guidelines must be adjusted and, if necessary, these must be changed periodically according to the conditions of service and the product's alteration over time.

### 11.3.2.- REVISION AND MAINTENANCE TASKS

#### 11.3.2.1.- Periodicity: every six months

Visual inspection of the entire canopy, looking for possible damage to the entire structure such as bumps, fissures, deformations, breaks, or possible rust issues. The fastening hardware at the angles between the flag and the belts are points in which special attention must be paid. Any damage will be repaired immediately to avoid possible accidents or lack of service.

Table of minimum visual revisions:

Table 3: Visual revision chart.

Visual revision	Appearance	Deformation
Base anchor screws		
Top layer		
Welding base Joint		
Screws in the joint of the base and the foot		
Point P1		
Screws in the joint of the foot and the wing		
Screws in the joint of the flag and the angle		
Angle		
Screw in the joint of the angle and the belts		
End contact point between belts and angle		
Belts central point		

### 11.3.2.2.- Periodicity: annual

Check all the fastening screws of the sail with a torque wrench (base / foot / wing).  
Review with normal key of all the screws of the cover (in this case the torque wrench is not necessary).

Should it be observed that in each revision there are several screws that are not with the correct tightening torque, it will be necessary to carry out these revisions more frequently and to try to determine the reason why these screws come loose (excessive vibrations, excessive clearances or other causes).

### 11.3.2.3.- Periodicity: every 3 years

Carrying out a repaint every 3 years with Valentine's Oxigel Pavonado paint or similar. Should rust be detected resulting from highly corrosive environments, by blows or any other cause, a remediation of the point with rust will be carried out immediately and a product will be applied to provide sufficiently accredited protection in the affected area.

This periodicity has been determined by the experience of the manufacturer of the paintwork. It is not an exact period and can be reduced or lengthened depending on the climatic conditions of the area where it is located.

### 11.3.3.- CASES THAT INVOLVE SPECIAL REVIEWS

The maintenance manager or the owner must carry out a damage evaluation in the following scenarios:

- In case of a scale VII earthquake (EMS scale).
- In case of storms whose maximum wind speed exceeds 120 km/h  
When 50 kg/m<sup>2</sup> of accumulated snow is exceeded.
- In case of impact of a vehicle, an evaluation of the possible damages received.
- In all cases where it is noted or suspected that the structure may have some damage, regardless of the cause.

## 12.- MAINTENANCE AND TECHNICAL SERVICE

In the case of any query in relation to device operation or malfunction, please contact the **CIRCUTOR, SA** Technical Support Service.

### **Technical Assistance Service**

Vial Sant Jordi, s/n, 08232 - Viladecavalls (Barcelona)

Tel: 902 449 459 ( España ) / +34 937 452 919 (outside of Spain)

email: [sat@circutor.com](mailto:sat@circutor.com)



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