



**Sistema brevettato - Patented system**

# **INSTALLATION AND MAINTENANCE INSTRUCTIONS**

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**MOUNTING SYSTEMS FOR PV  
INSTALLATIONS ON FLAT ROOFS**

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# A. SAFETY INDICATIONS

## A 01- Classification of the safety indications

Below are some basic definitions:

	<b>DANGER!</b> Warns of an immediate danger of death
	<b>CAREFUL!</b> It warns of a possible danger to life and/or serious injury
	<b>CAUTION!</b> Warns of possible injuries
	<b>WARNING!</b> Warns of material damage without potential injury

- Observe local standards, building regulations and safety regulations during installation. Observe the safety instructions of the other system components.
- Failure to observe the following instructions may result in property damage and/or serious injury.
- Keep the installation instructions.

# A. SAFETY INDICATIONS

## A 02- Safety guidelines for the Installer



### **WARNING**

#### **RISK OF FALL**

- When working on roofs and during ascent and descent there is a risk of falls. It is essential that you observe the safety regulations and use adequate fall protections.



### **CAREFUL**

#### **HAND INJURY**

- During the assembly of the structure and forms there is a risk of injury and entrapment of the limbs.
- Work shall only be carried out by appropriately trained personnel.
- Use protective gloves and safety shoes.

#### **MUSCLE TEARING AND LUMBAR BACK INJURIES**

- Strictly follow the company's rules on manual handling of loads

#### **FALL OF OBJECTS**

- During assembly on the roof there is a risk that tools or assembly material may fall off the roof, causing injury to people and property underneath.
- Before starting assembly work, delimit the danger zone below and warn people nearby not to approach.

# A. SAFETY INDICATIONS

## A 03- Indications for planning and sizing

- Value the need for accessories to enhance the stability of the system according to the wind load, as shown in DM14 01 2008 Circ. 02 February 2009-N 617.
- The crucial factors for the wind load calculation are the speed of reference, that changes according to the area of the plant location (from 1 to 9), the building height, the distance from the roof edges.
- Pay particular attention to installations within 30 km from the coast and/or typically windy.
- The designer and the installer are in charge for the sizing of the plant structure.
- Make sure that the substructure is appropriate in terms of capacity.
- Ask the client the residual bearing capacity available, check that the slab performs the load division and divide the weight of modules + ballast per  $\text{m}^2$ , included the area between the rows and the distance from the roof edges.
- For any doubt consult a qualified technician.

# A. SAFETY INDICATIONS

## A 04- System description

Sun Ballast is a modular system, both in terms of tilt angles and weight. The 34 Sun Ballast models: 0°.K, 3°K, 5°, 5°.2, 5°.3, 5°.4, 5°.5, 5°.6, 8°.K, 10°, 11°K, 11°.2, 11°.3, 15°, 20°, 30°.1, 35°, allow the modules to be installed in various orientations: landscape, portrait, east-west.

The modulation of load is made through the possibility of inserting additional ballasts and/or installing reinforcing bars; the great advantage of inserting the weights only where most appropriate permits not to load the roof unnecessarily and to meet the wind load verification.



### GENERAL INFORMATION

Please read carefully the Sun Ballast product sheets for the system in question.

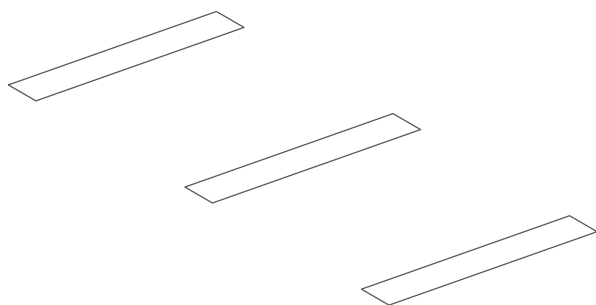
For an indicative calculation of wind load and potential use of additional weights, please provide us with: planimetry, height and complete address of the building.

Otherwise consult a qualified technician.

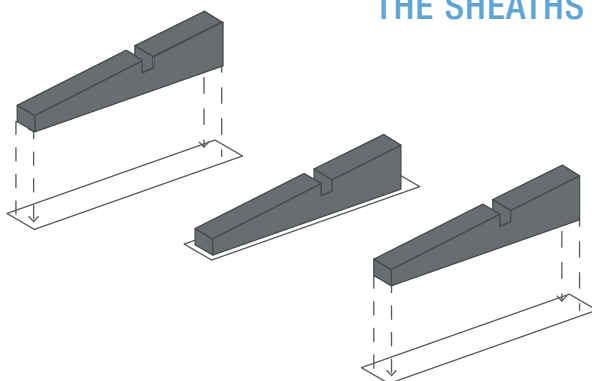
# B. ASSEMBLY SEQUENCE OF SUN BALLAST SYSTEM AND ACCESSORIES

## B 01- Standard assembly sequence

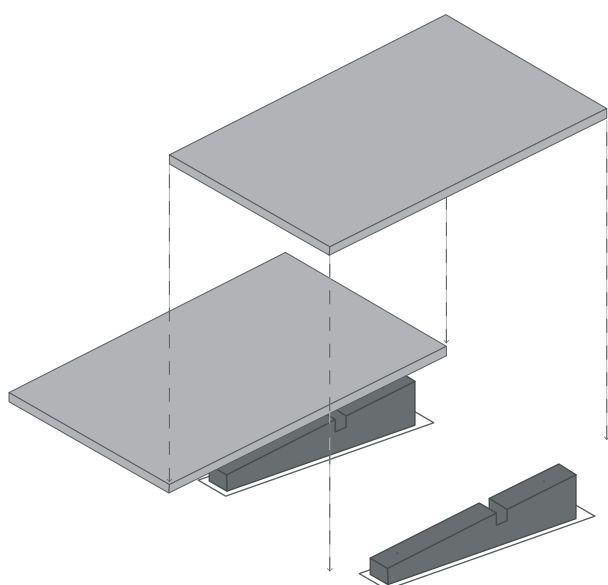
### PHASE 1: LAYING OF THE SHEATHS



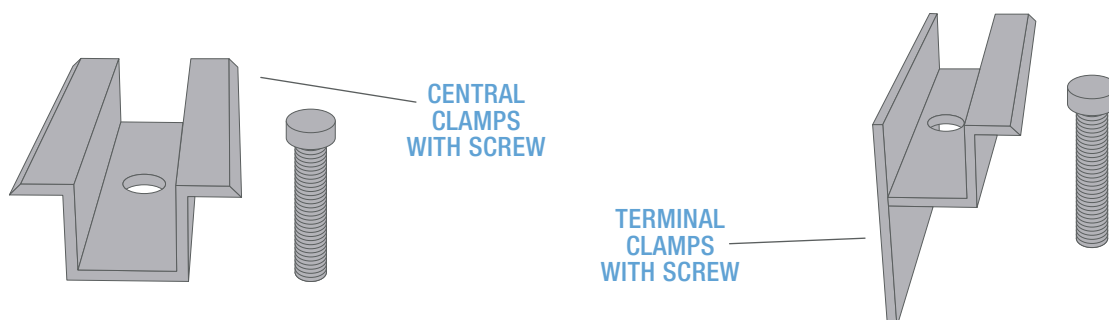
### PHASE 2: LAYING OF BALLASTS ON THE SHEATHS



### PHASE 3: LAYING OF THE PV PANELS



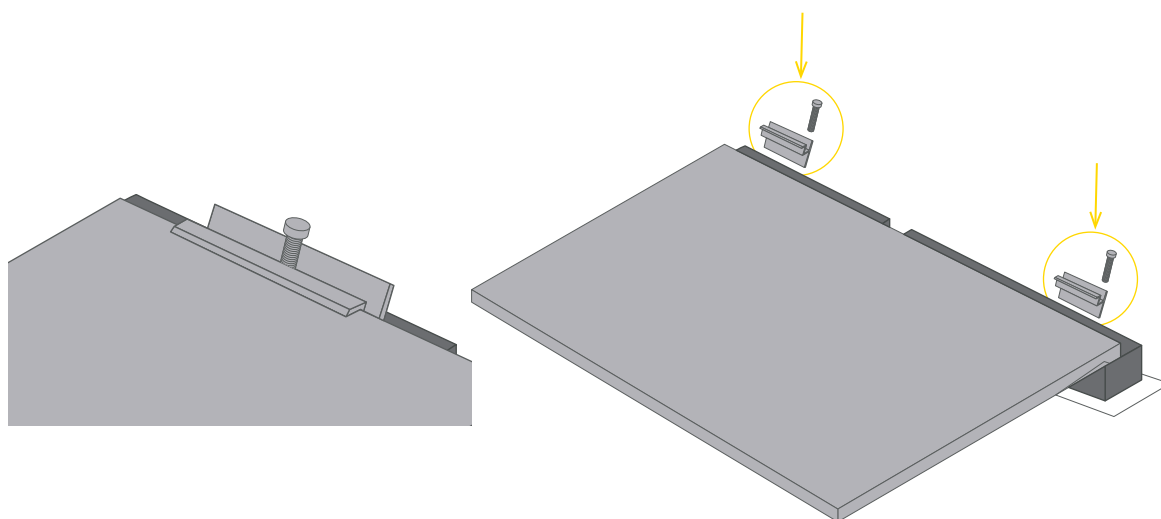
### PHASE 4: PREPARATION OF THE FIXING CLAMPS



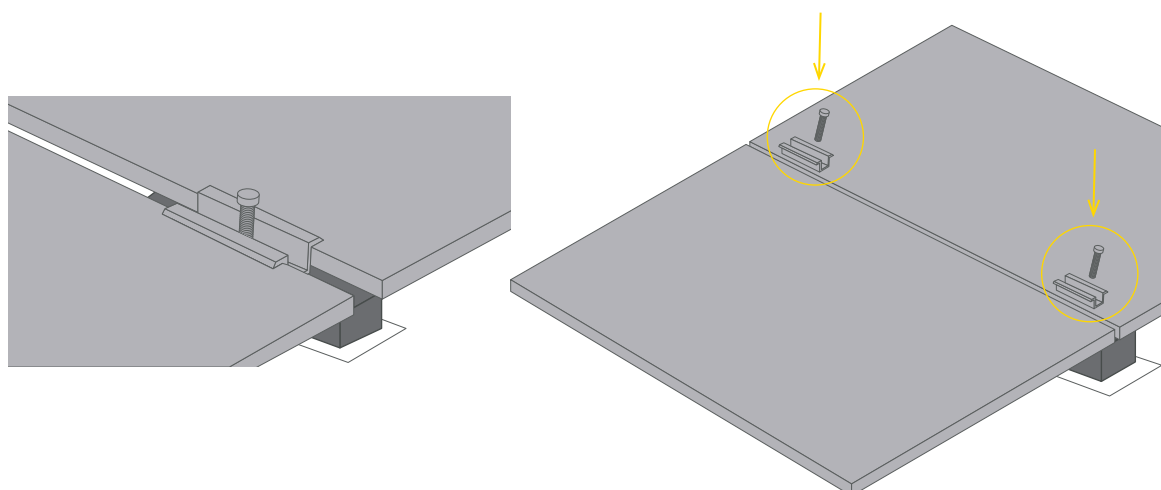
# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES

## B 01- Standard assembly sequence

### PHASE 5A: PANEL FIXING - TERMINAL CLAMPS

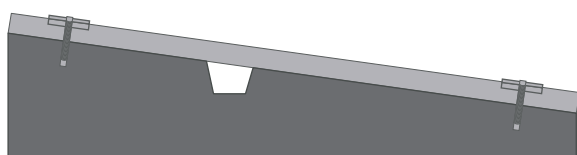


### PHASE 5B: P PANEL FIXING - CENTRAL CLAMPS

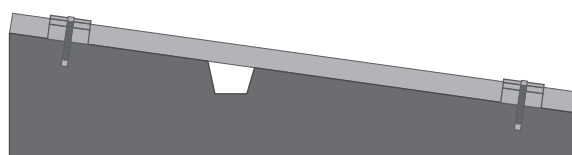


### SECTIONS

CENTRAL CLAMPS



TERMINAL CLAMPS

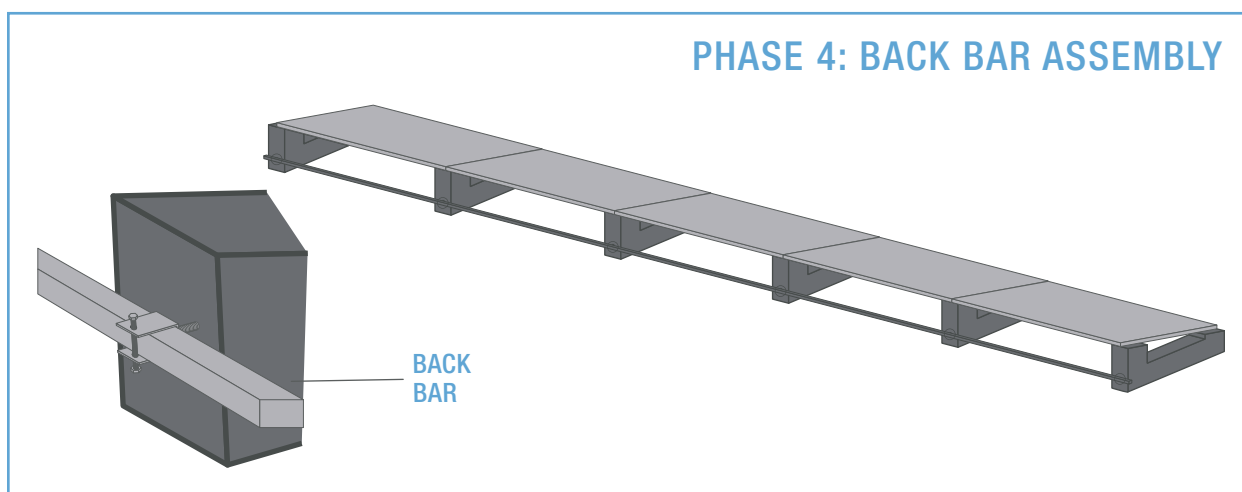
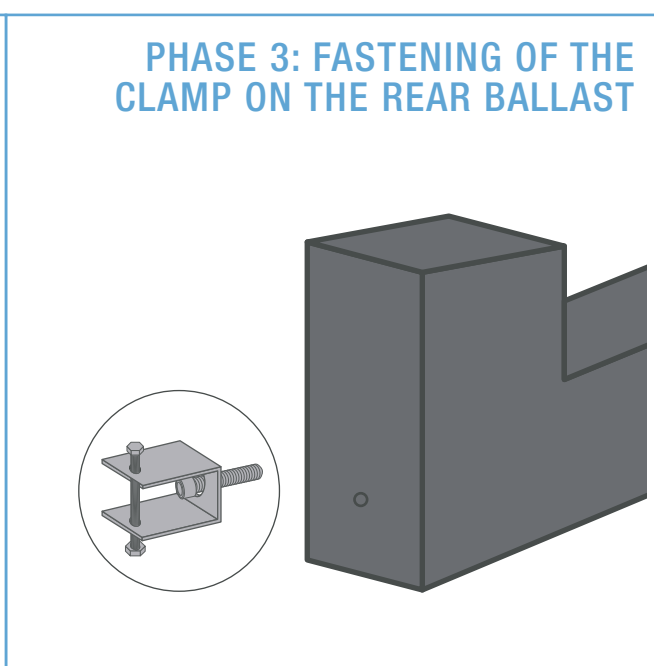
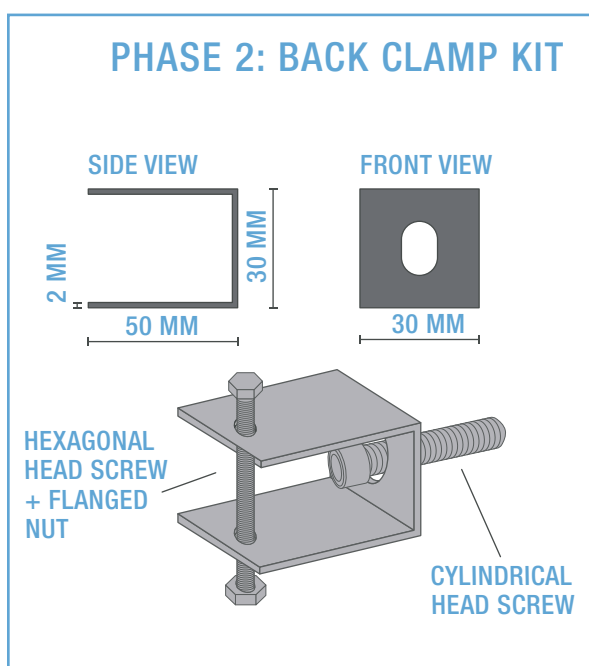
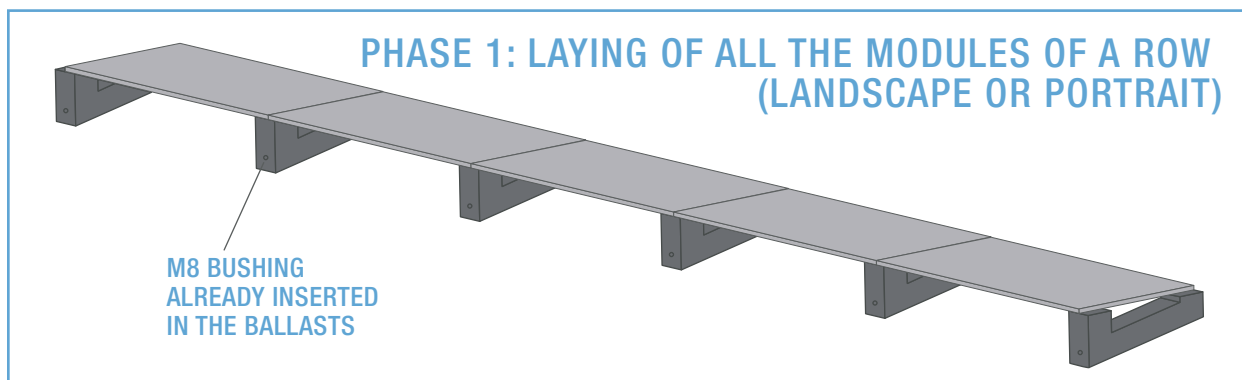




# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES

(IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

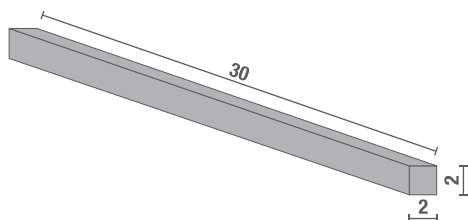
## B 02- Assembly of back bar



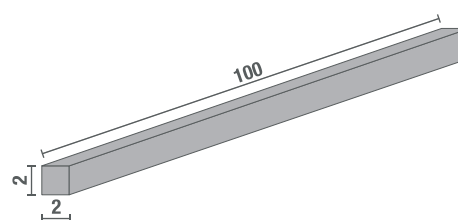
# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

## B 03- Assembly of joints

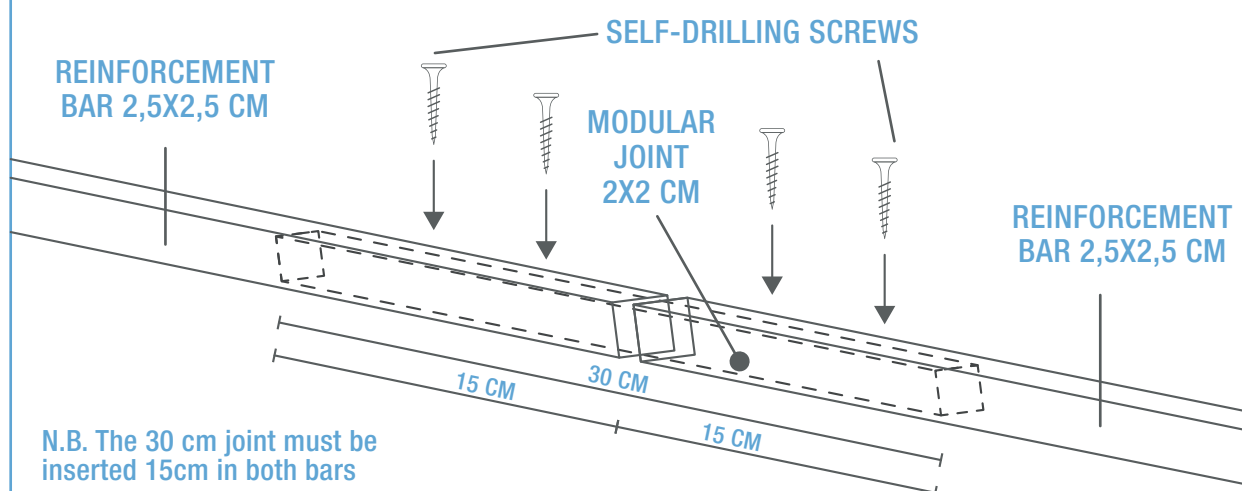
JOINT FOR SQUARE SECTION  
REINFORCEMENT BAR  
20X20X1.5 MM L = 30 CM



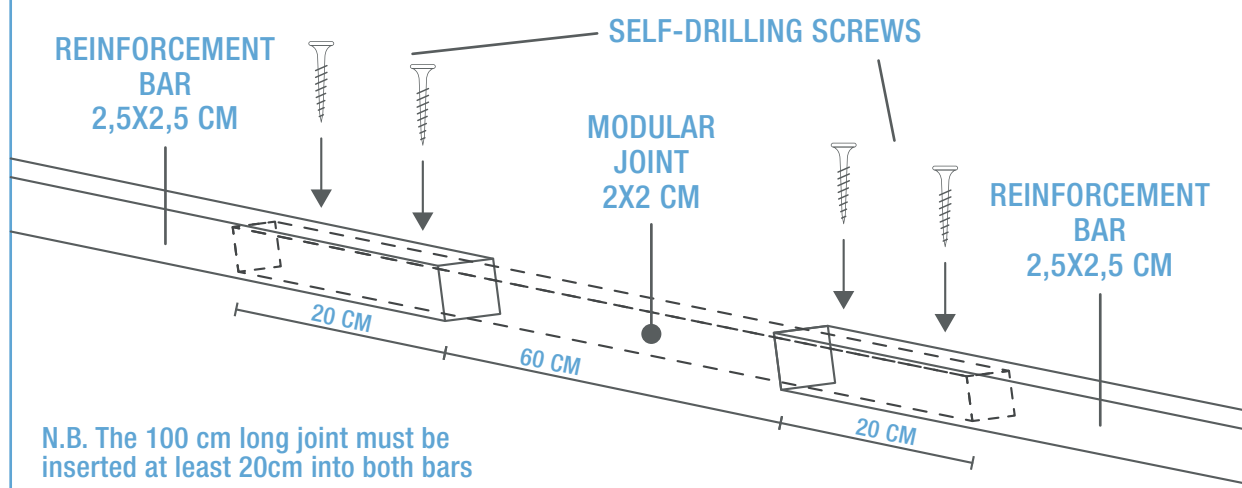
MODULAR JOINT FOR SQUARE  
SECTION REINFORCEMENT BAR  
20X20X1.5 MM L = 100 CM



### ASSEMBLY OF JOINT L = 30 CM



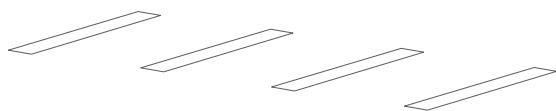
### ASSEMBLY OF MODULAR JOINT L = 100 CM



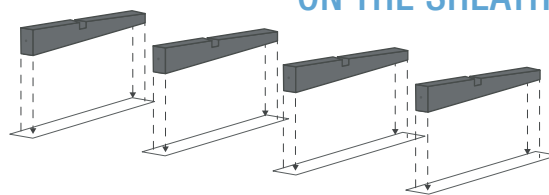
## **B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES** (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

### **B 04- Assembly sequence of additional weights (35Kg and 50Kg)**

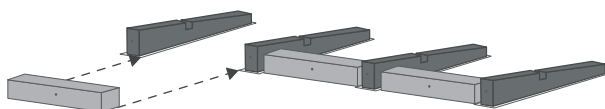
**PHASE 1: LAYING OF THE SHEATHS**



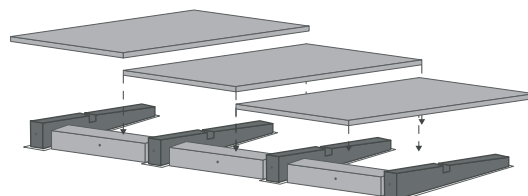
**PHASE 2: LAYING OF THE BALLAST ON THE SHEATHS**



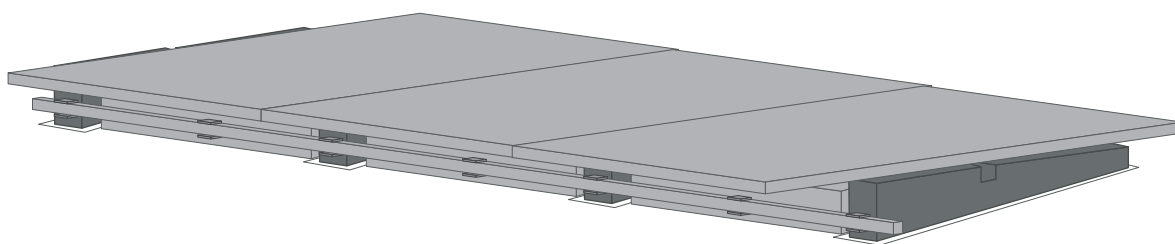
**PHASE 3: INSERTION OF WEIGHTS**



**PHASE 4: LAYING OF THE PV PANELS**



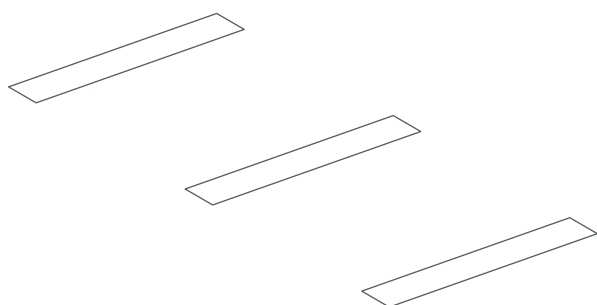
**PHASE 5: ASSEMBLY OF BACK BAR**



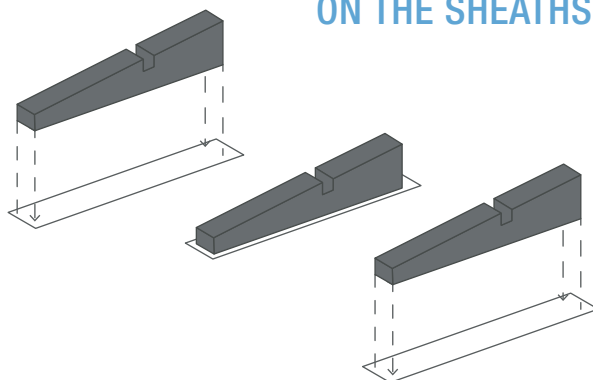
# **B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES** (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

## **B 05- Assembly sequence of additional ballasts**

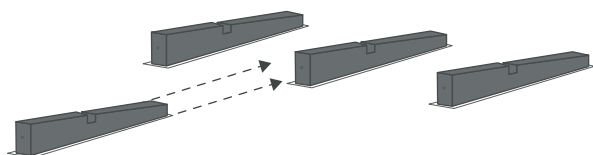
**PHASE 1: LAYING OF THE SHEATHS**



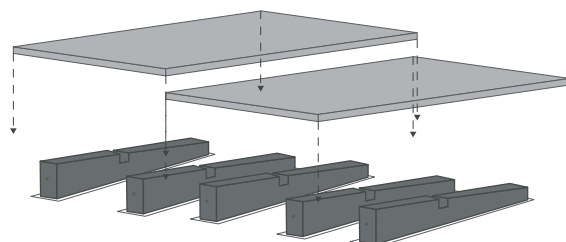
**PHASE 2: LAYING OF THE BALLASTS ON THE SHEATHS**



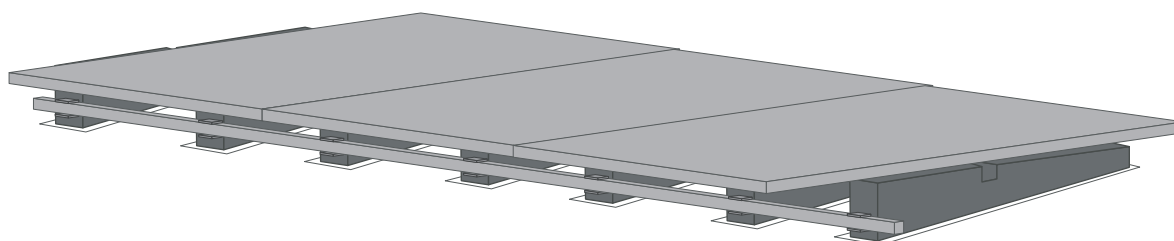
**PHASE 3: INSERTION OF ADDITIONAL BALLAST**



**PHASE 4: LAYING OF PV THE PANELS**



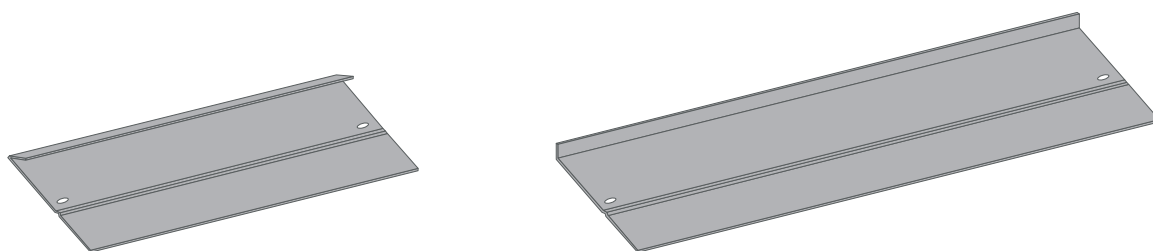
**PHASE 5: ASSEMBLY OF BACK BAR**



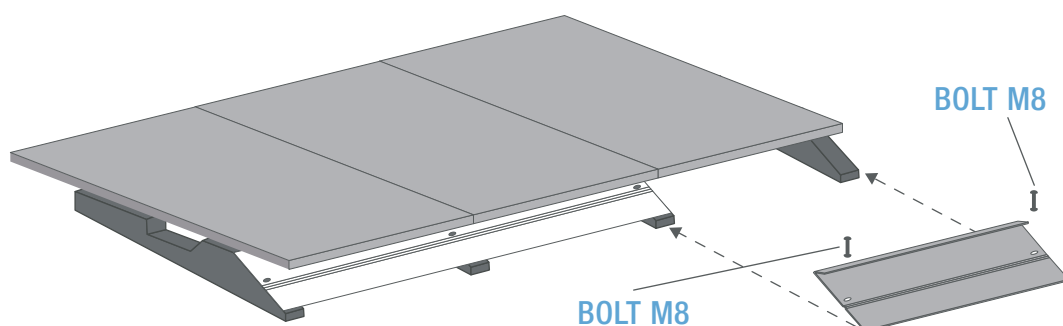
# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

## B 06- Assembly of carter 10°

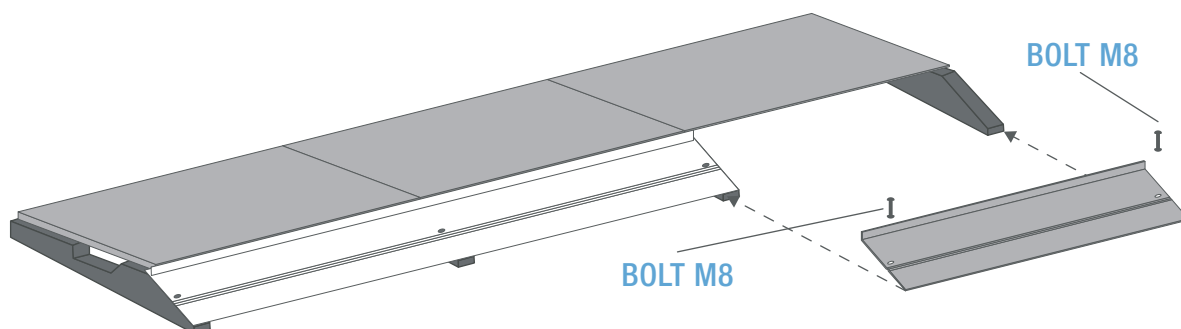
CARTER ASSEMBLY



CARTER ASSEMBLY

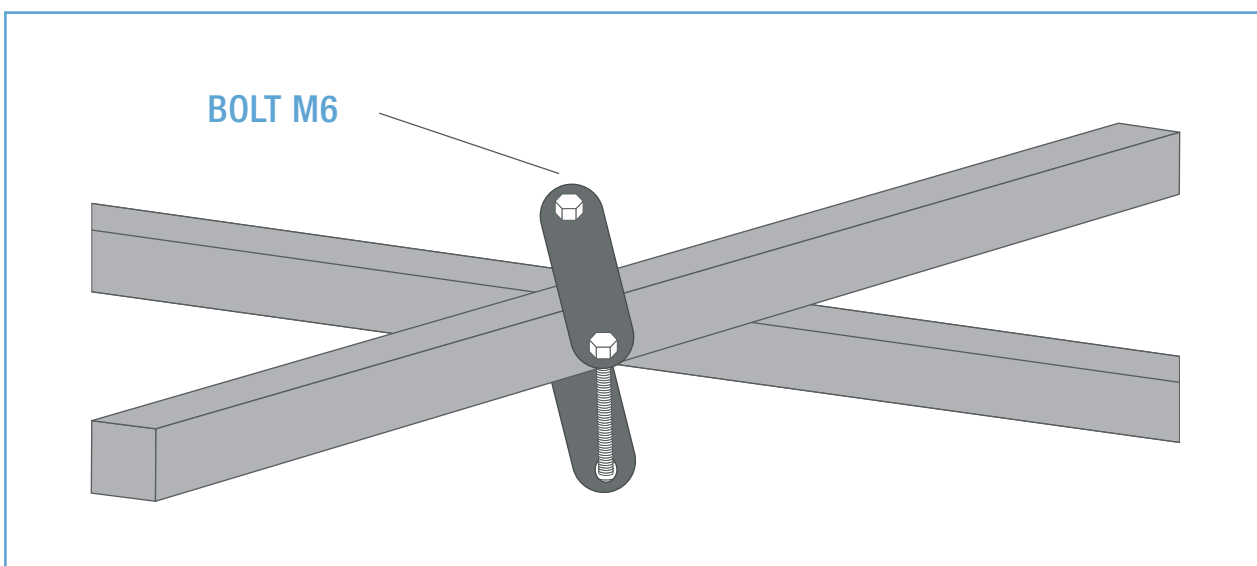
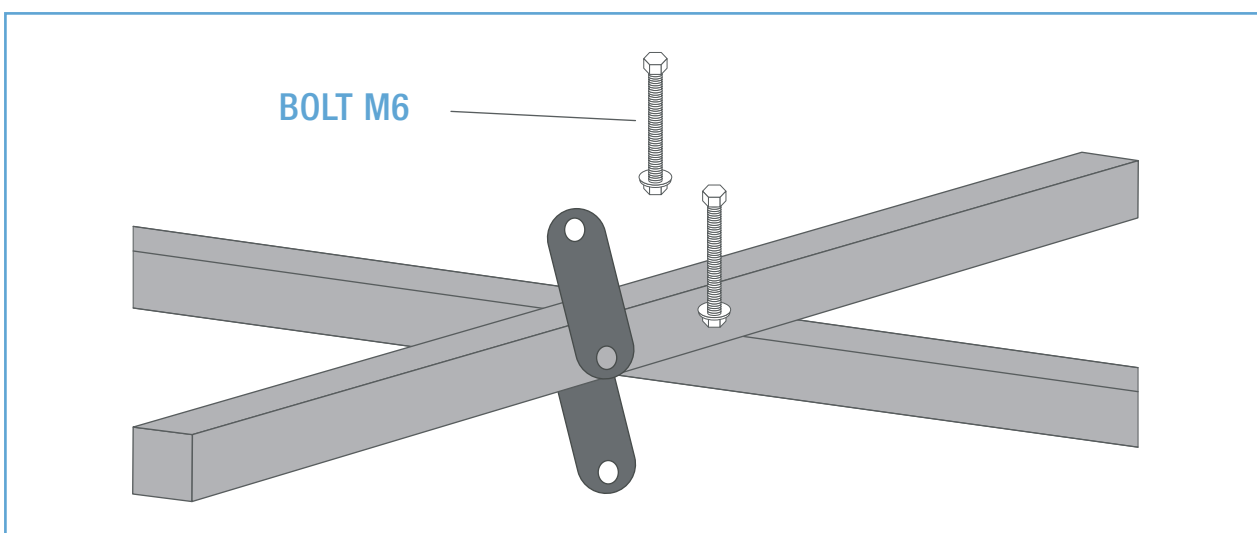
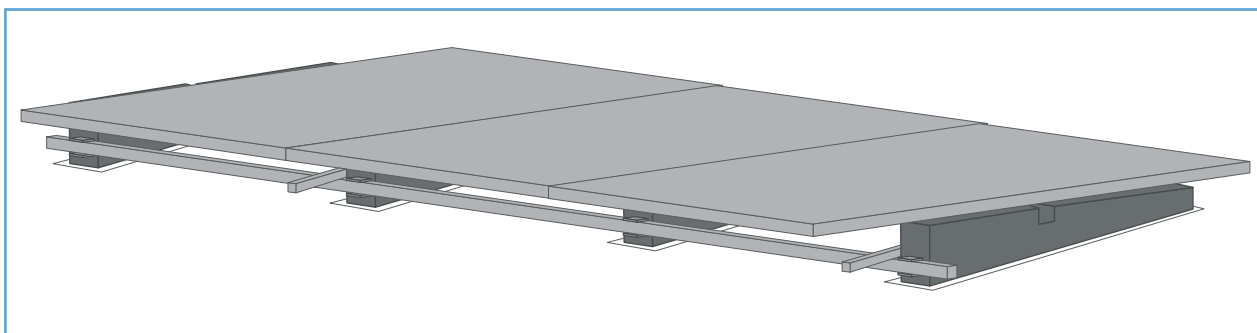


CARTER ASSEMBLY



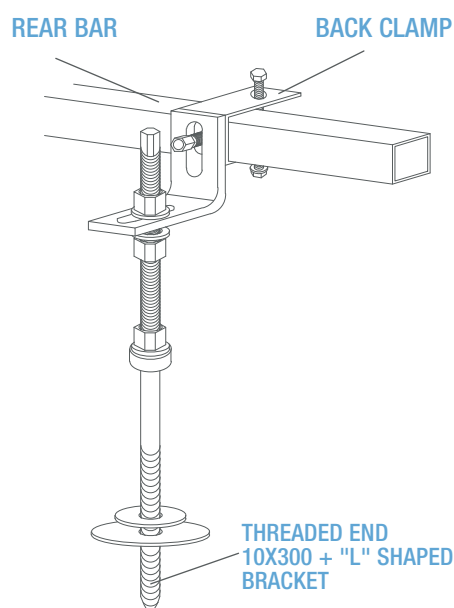
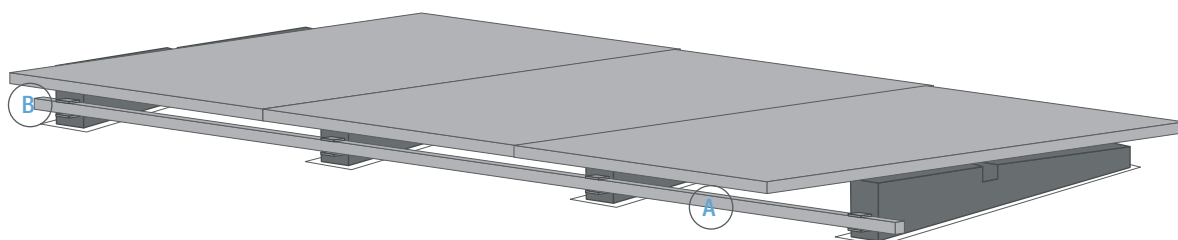
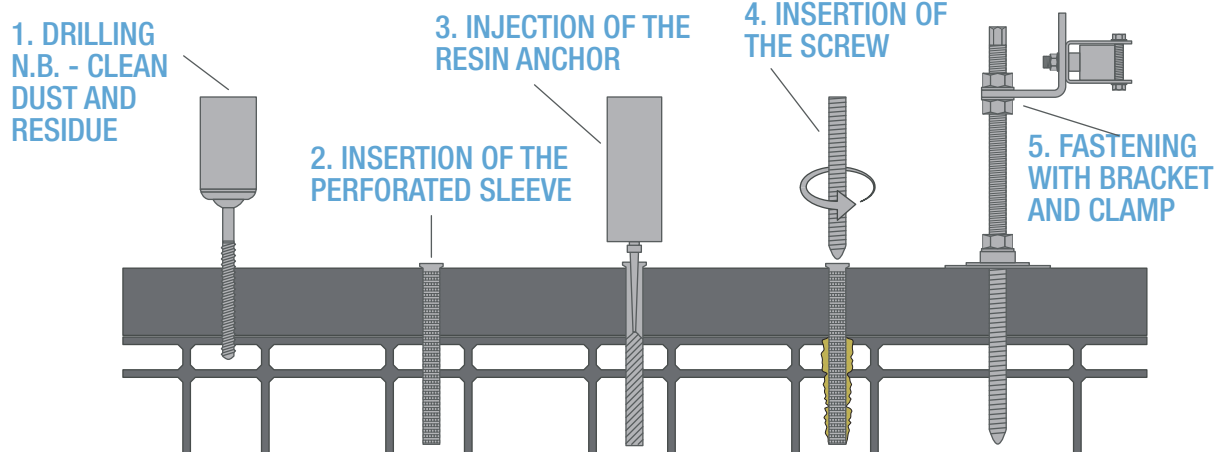
## **B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES** (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

### **B 07- Assembly of the plate for bar crossing**

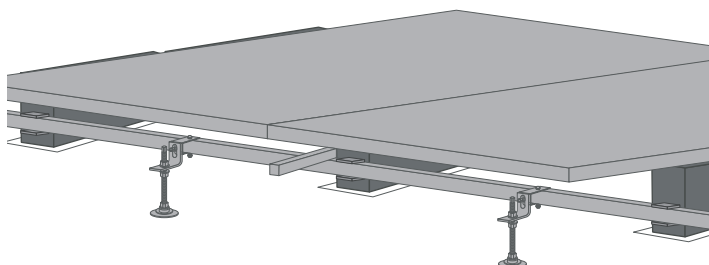


# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

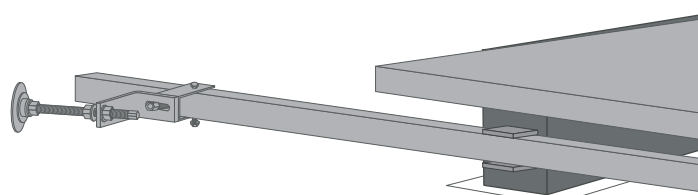
## B 08- Assembly of hanger bolt



### A - FASTENING TO FLAT SURFACE

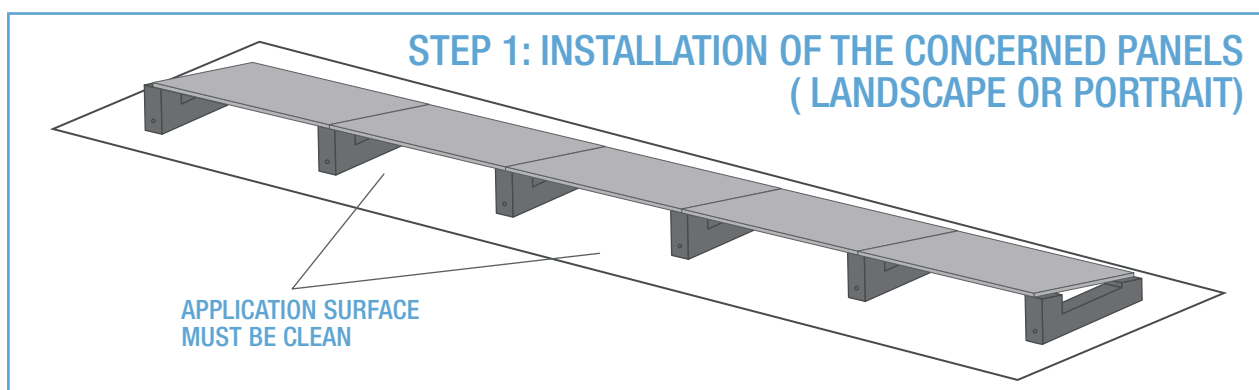


### B - FASTENING TO PARAPET

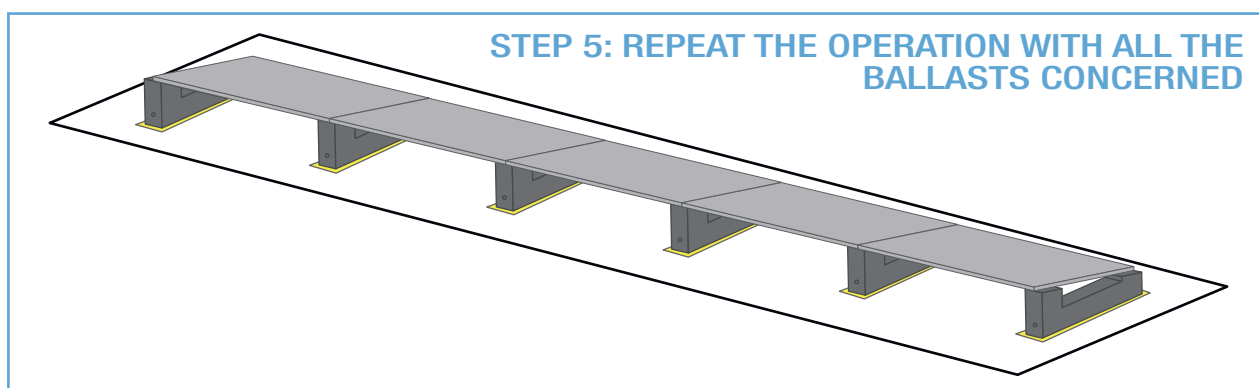
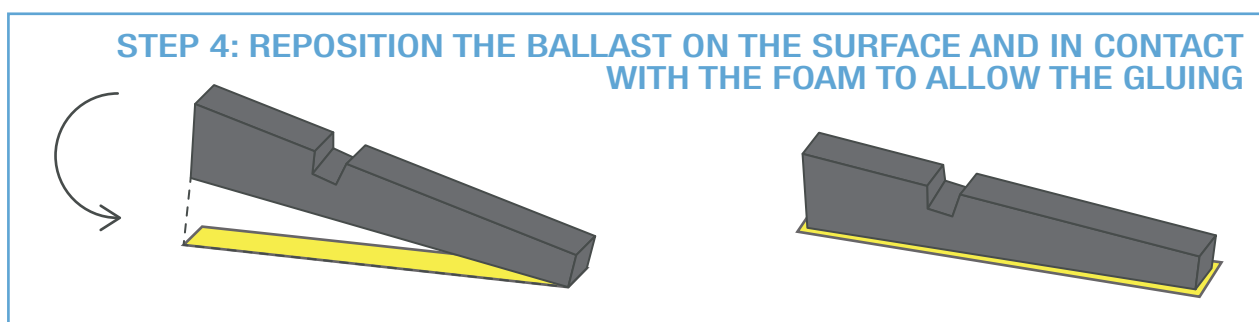
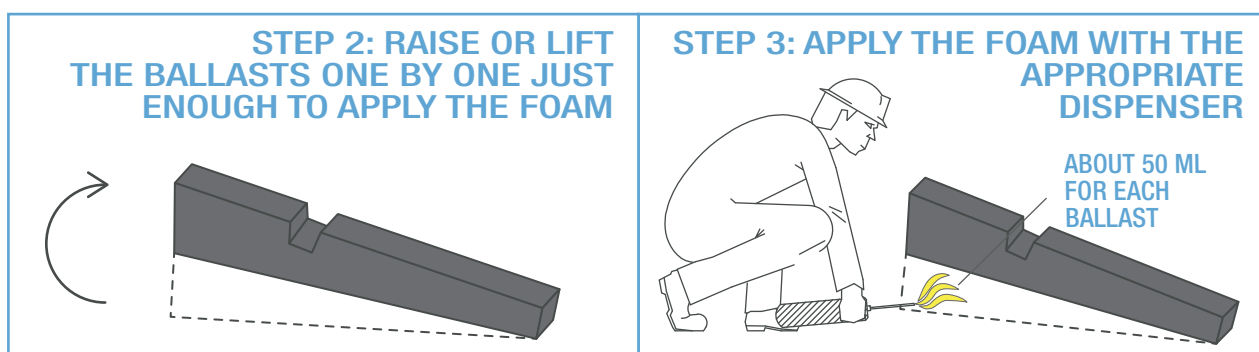


# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

## B 09- Application guide of polyurethane foam



...ONCE THE ROW CONSISTING OF PANELS, BALLASTS, CLAMPS AND ANY ACCESSORIES HAS BEEN SET UP, IT IS NECESSARY TO PROCEED GRADUALLY...

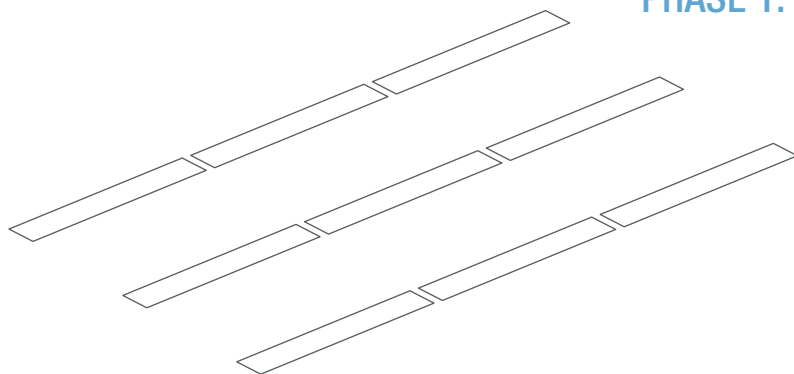




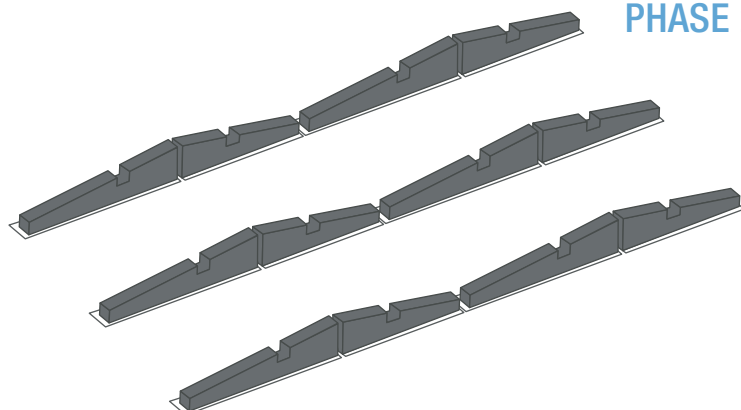
## B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES

### B 10- Assembly sequence of east-west panels

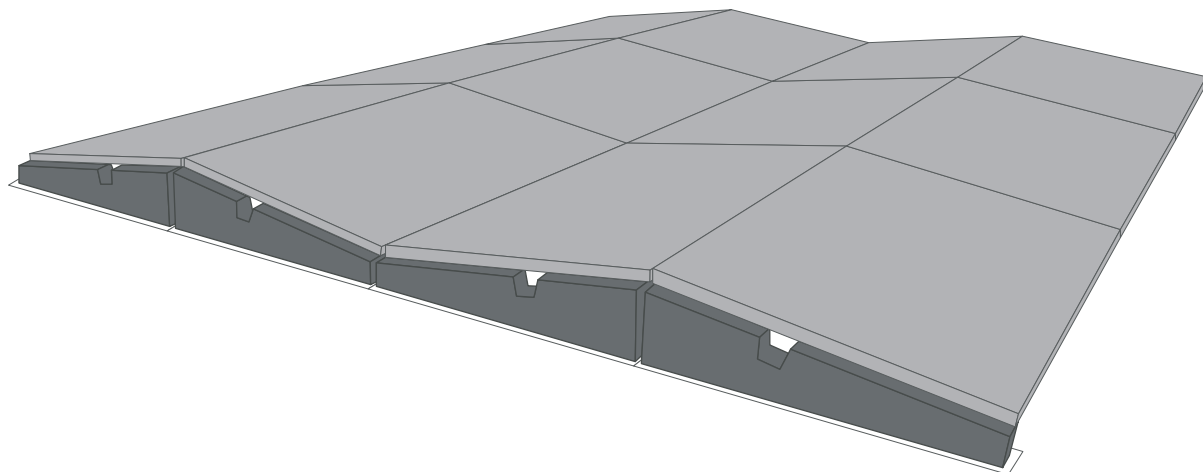
PHASE 1: LAYING OF THE SHEATHS



PHASE 2: LAYING OF THE BALLASTS ON THE SHEATHS



PHASE 3: INSTALLATION OF THE MODULES

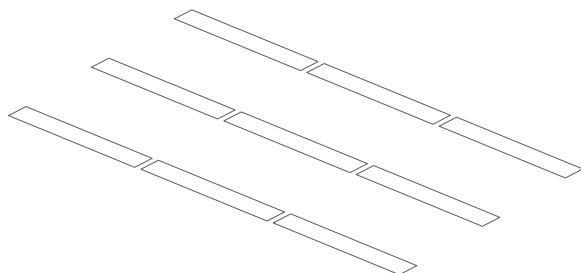


# **B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES**

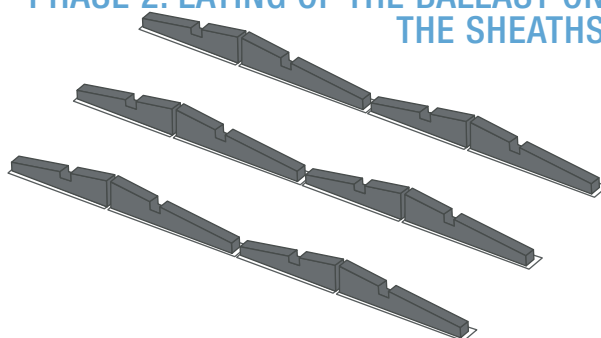
(IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

## **B 11- Assembly of east-west junction plate**

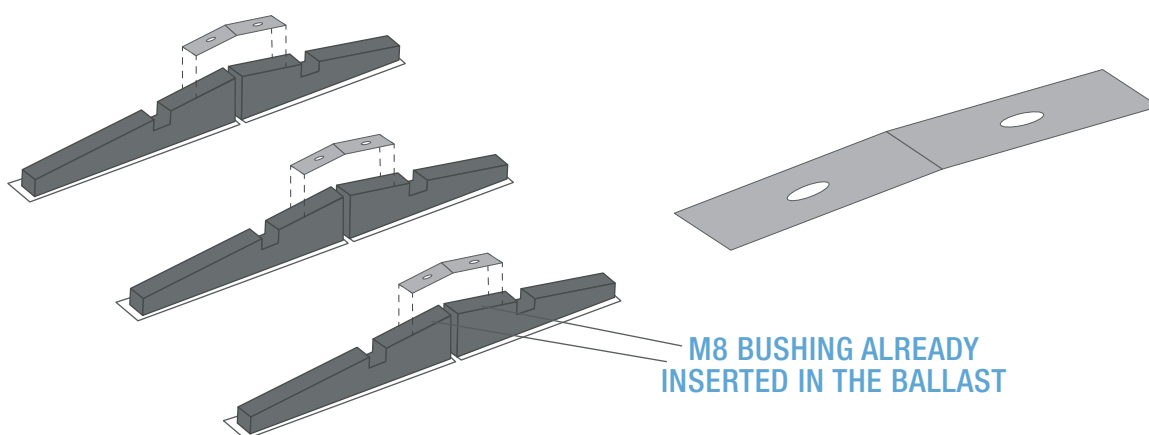
**PHASE 1: LAYING OF THE SHEATHS**



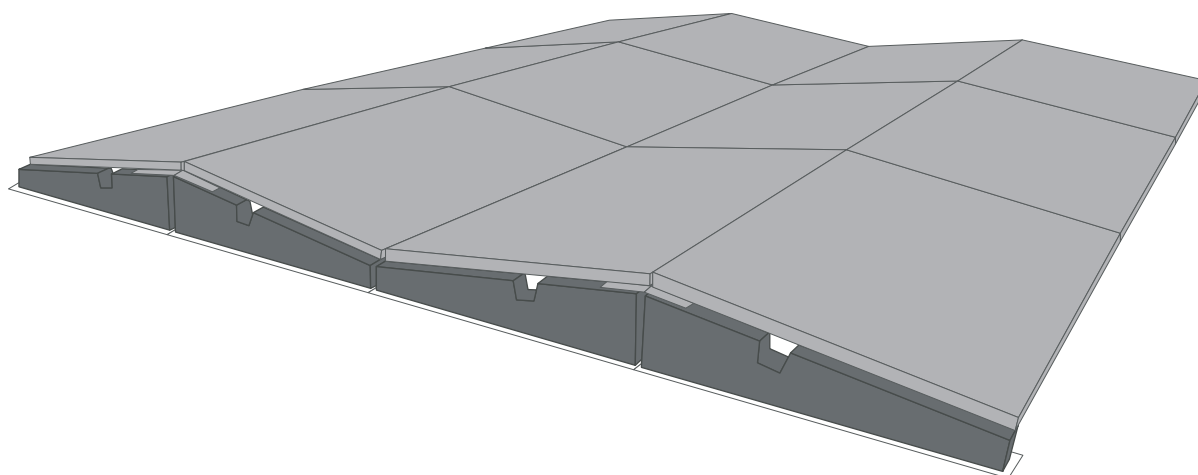
**PHASE 2: LAYING OF THE BALLAST ON THE SHEATHS**



**PHASE 3- ASSEMBLY OF EAST-WEST JUNCTION PLATE**

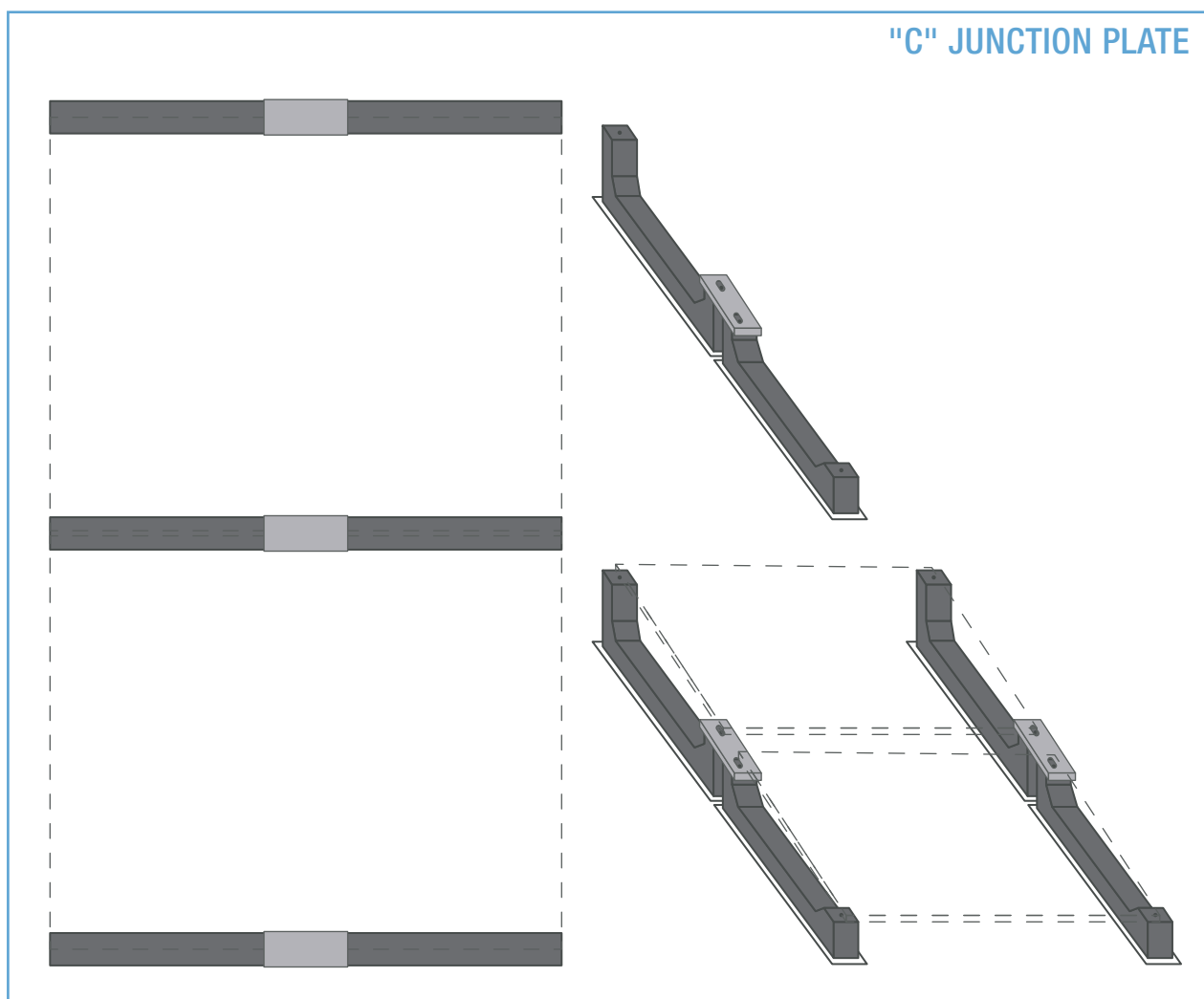
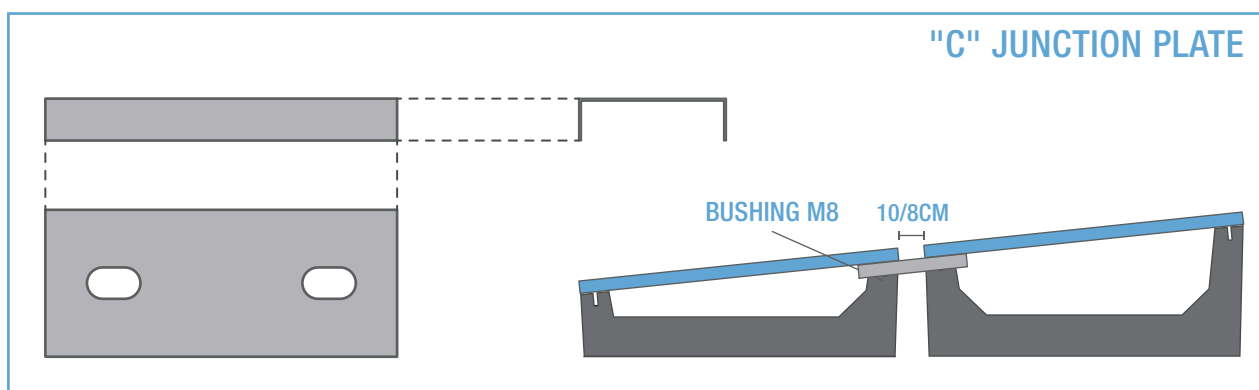


**PHASE 4: INSTALLATION OF THE MODULES**



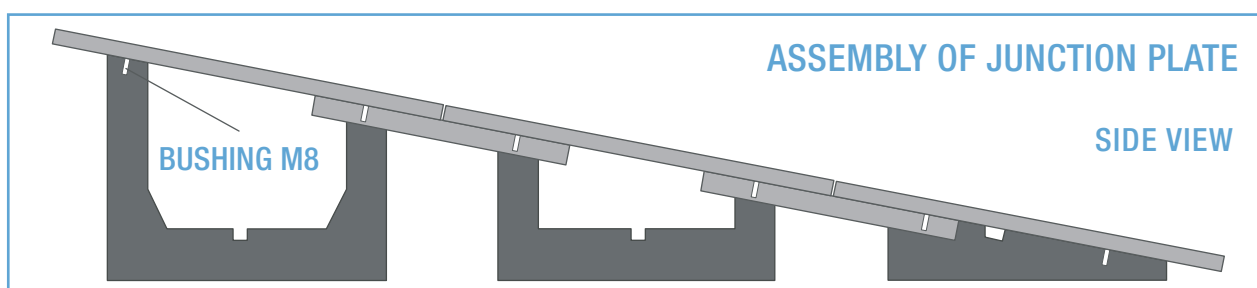
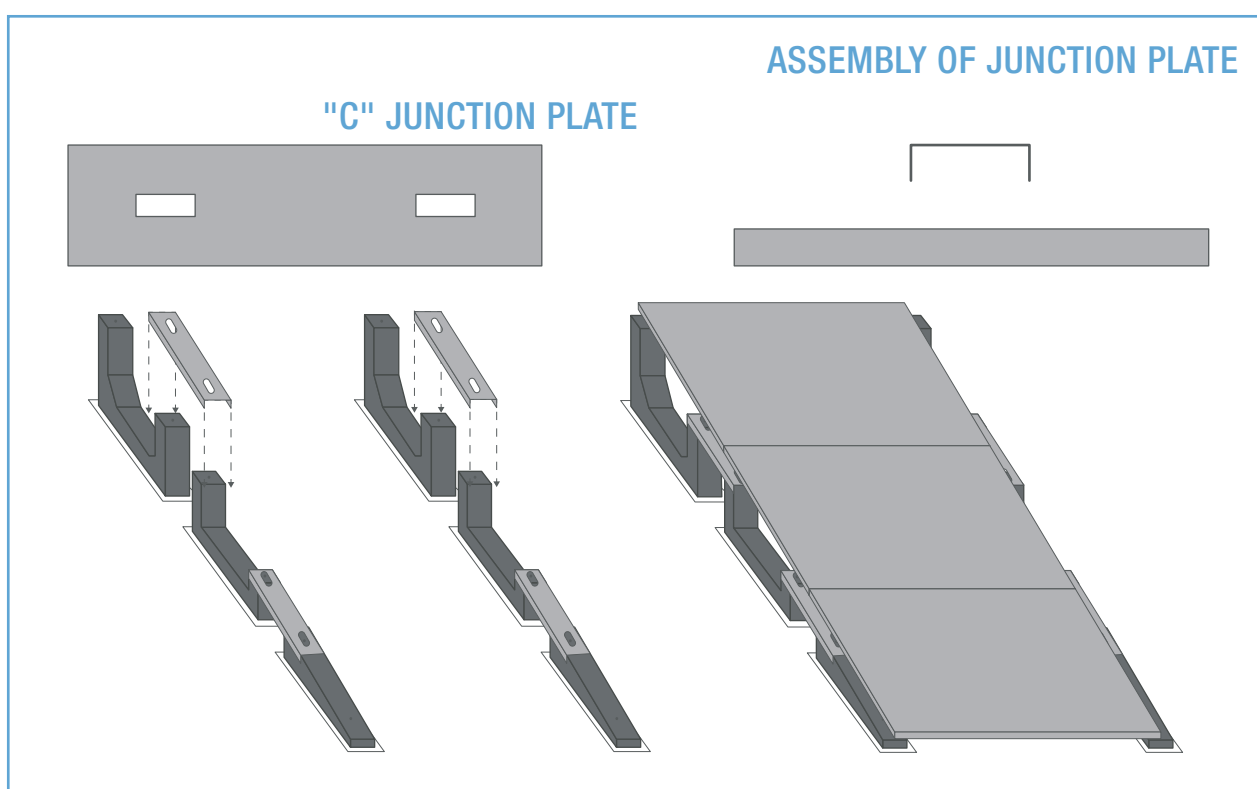
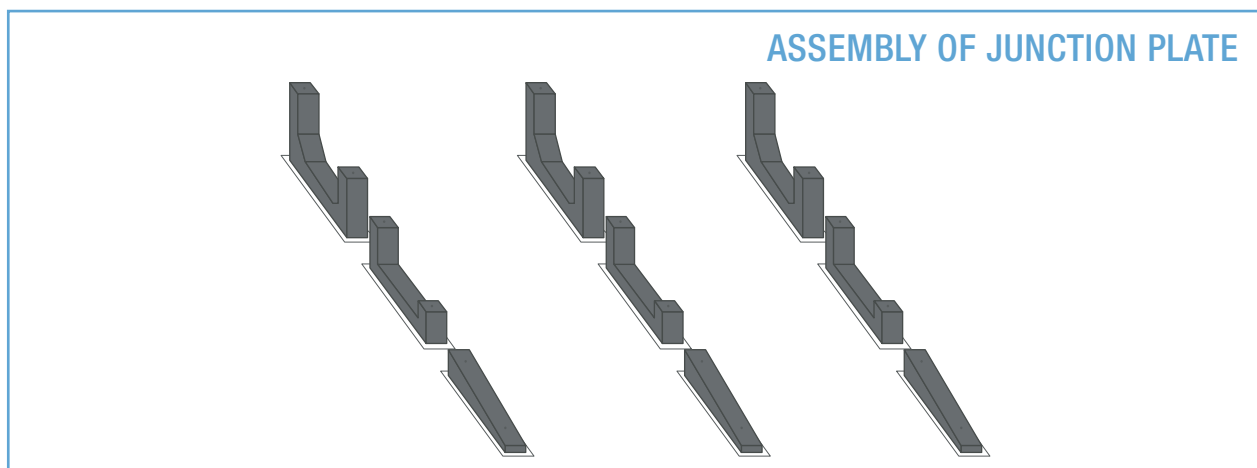
## B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

### B 12- Assembly of junction plate for 5° sail-shaped system



## B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

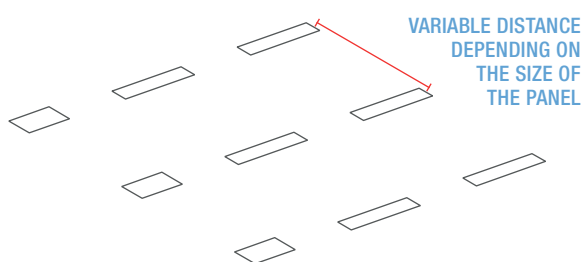
### B 13- Assembly of junction plate for 11° sail-shaped system



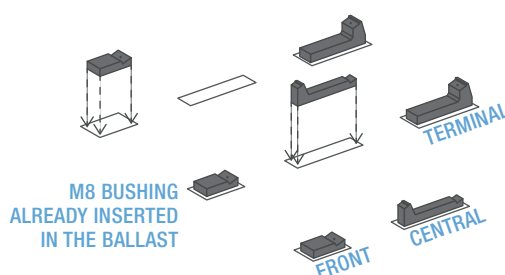
# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES

## B 14- Assembly sequence of Connect System

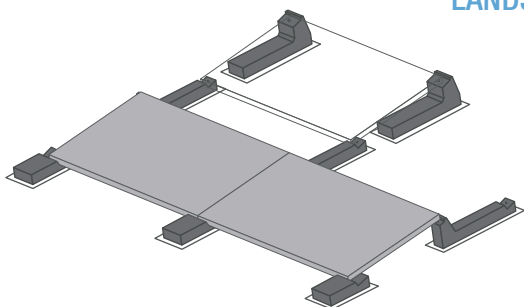
PHASE 1: LAYING OF THE SHEATHS



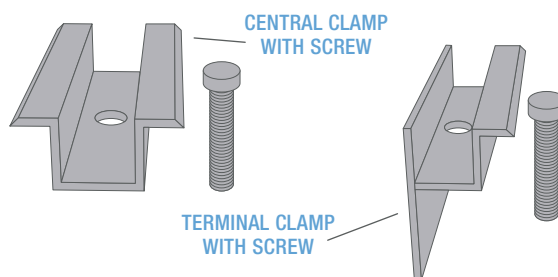
PHASE 2: LAYING THE BALLAST ON THE SHEATHS



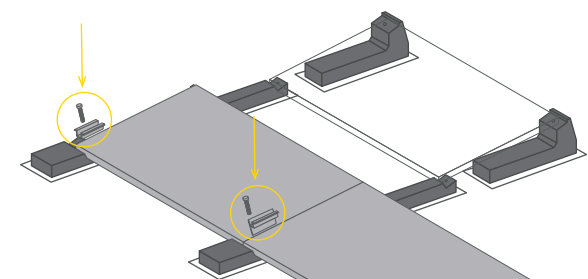
PHASE 3: INSTALLATION OF THE PV PANELS IN LANDSCAPE



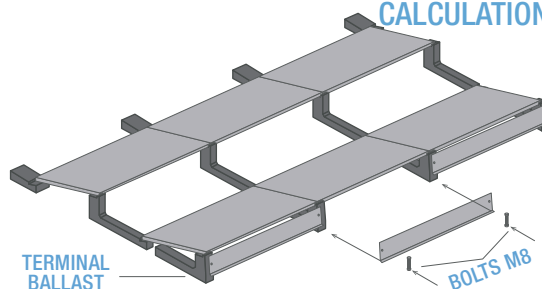
PHASE 4: PREPARATION OF THE FIXING CLAMPS



PHASE 5: PV PANEL FIXING



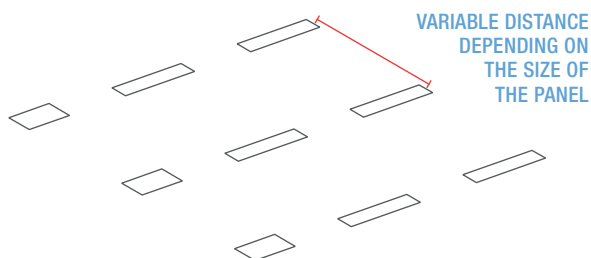
PHASE 6: ASSEMBLY OF THE WINDBREAKS (IF IT IS NECESSARY FROM THE WIND LOAD CALCULATIONS)



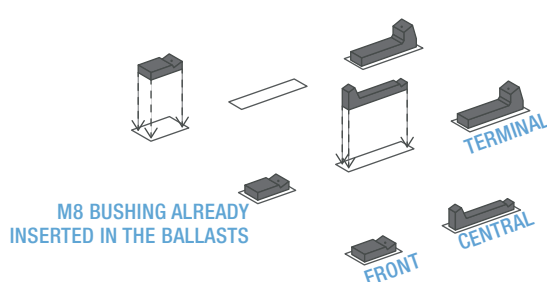
# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES

## B 15- Assembly sequence of Connect System in portrait

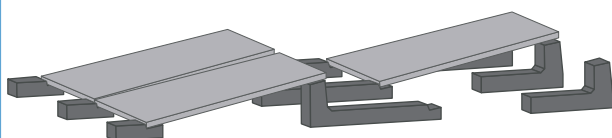
### PHASE 1: LAYING OF THE SHEATHS



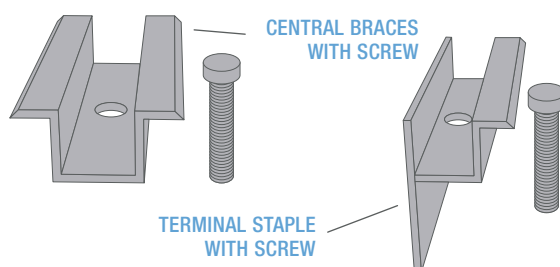
### PHASE 2: LAYING THE BALLAST ON THE SHEATHS



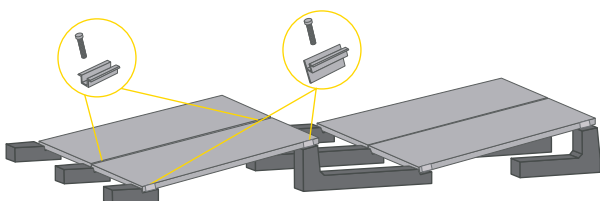
### PHASE 3: INSTALLATION OF THE PV PANELS IN PORTRAIT



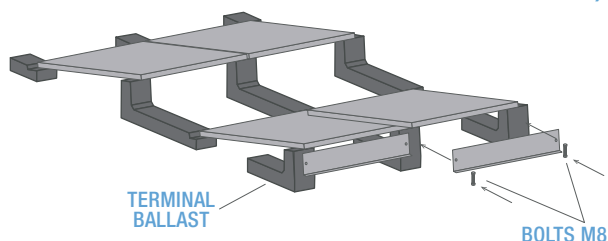
### PHASE 4: ARRANGEMENT OF THE BRACES FOR FASTENING



### PHASE 5: PV PANEL FIXING



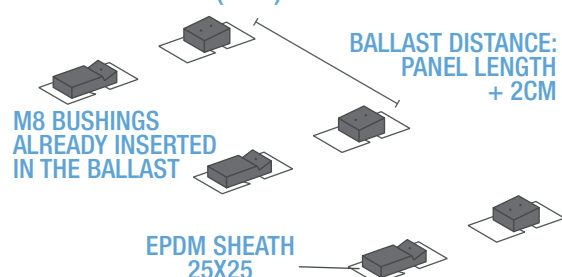
### PHASE 6: ASSEMBLY OF THE WINDBREAKS (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)



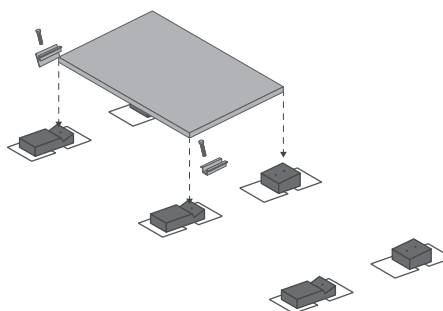
# B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES

## B 16- Assembly sequence of 5° double row connect system

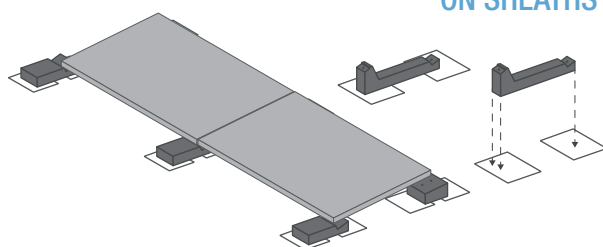
### PHASE 1: LAYING OF FRONT AND CENTRAL (CRC) BALLAST ON THE SHEAT



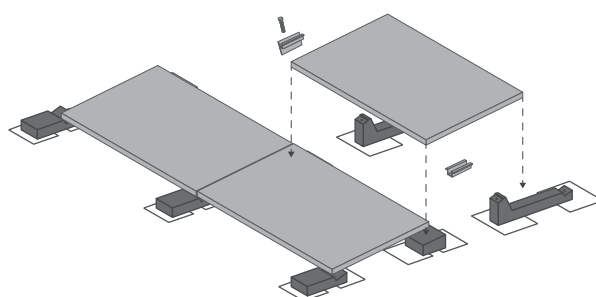
### PHASE 2: LAYING OF THE PANELS ON THE FIRST ROW WITH FIXING CLAMPS



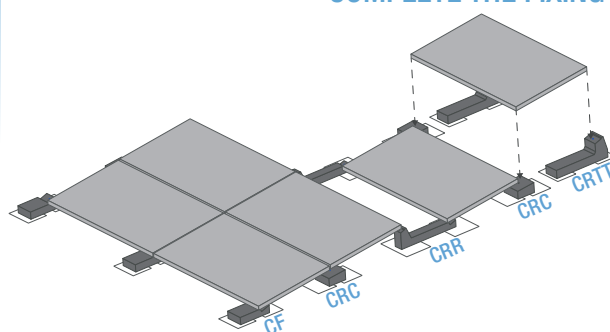
### PHASE 3: LAYING OF CENTRAL BALLAST (CRC) ON SHEATHS



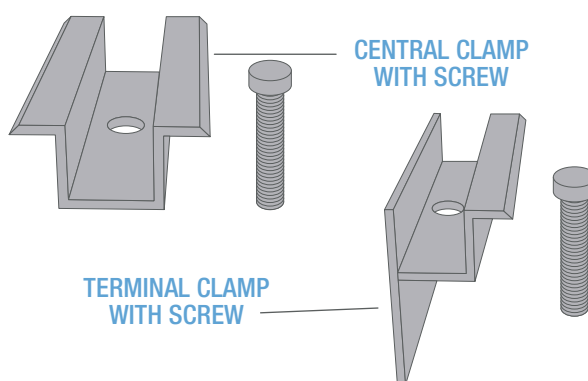
### PHASE 4: LAYING OF THE PANELS ON THE SECOND ROW WITH FIXING CLAMPS



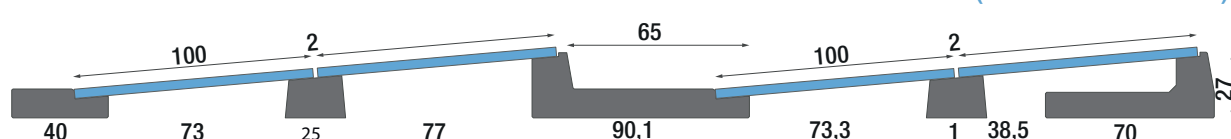
### FASE 5: LAYING OF THE CENTRAL (CRC) AND TERMINAL BALLAST ON THE SECOND BLOCK AND PLACE THE RESPECTIVE PANELS. COMPLETE THE FIXING



### PREPARATION OF THE CLAMPS FOR FIXING



### SIDE VIEW OF THE SYSTEM (DIMENSIONS IN CM)

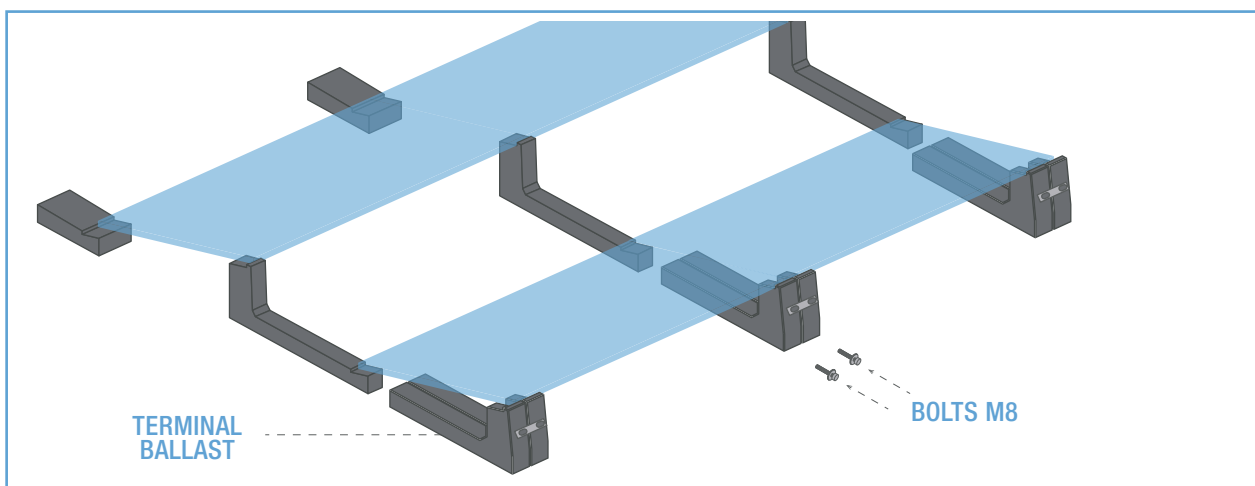
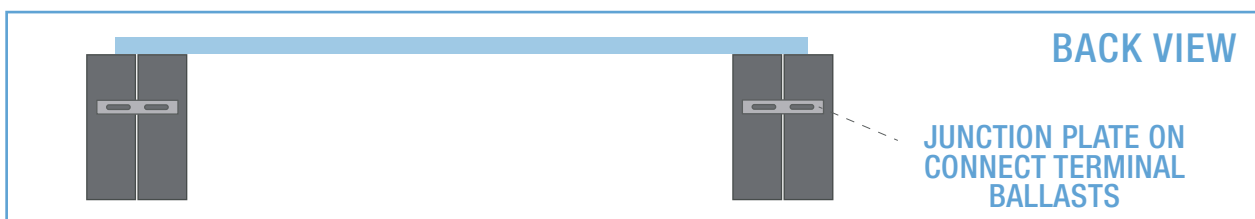
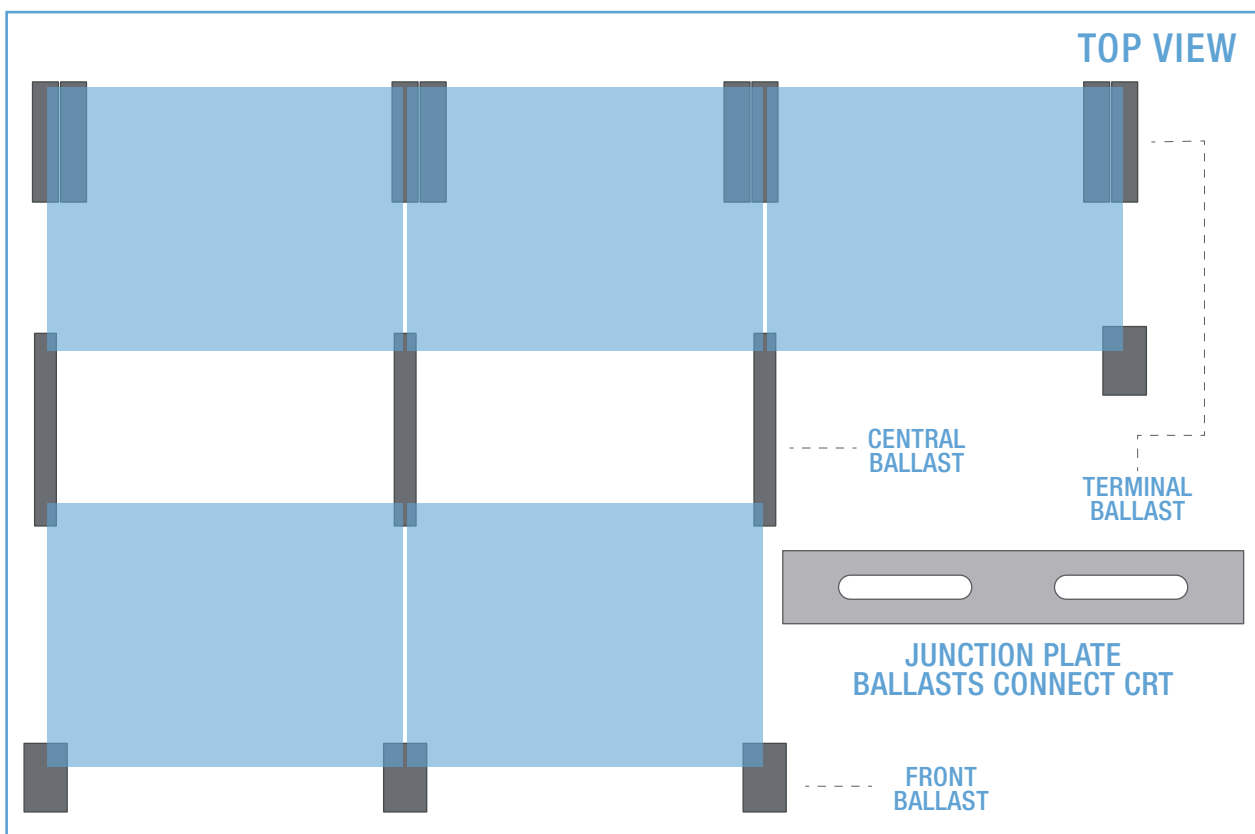






## B. ASSEMBLY SEQUENCE FOR SUN BALLAST SYSTEM AND ACCESSORIES (IF IT IS NECESSARY REFERRED TO THE TECHNICAL REPORT)

### B 18- Assembly of junction plate for double terminal ballast



## C. MAINTENANCE

- The Photovoltaic systems are subject to annual controls where, besides the verification of the electric systems, the general state of every component of the plant must be verified, particularly the structure of support and ballasting.
- Pay particular attention to the tightening of the brace that binds the modules to the ballasts and the bars to the ballasts.
- In phase of maintenance it is necessary to verify whether the rows have moved because of exceptional wind loads and/or wind loads which had not been foreseen and calculated in the first instance (during the installation).
- Should anomalies occur, the non-conforming parts must be fixed and/or replaced, preserving the safety measures on the plant.

# **D. RESPONSIBILITY**

Basic Srl does not undertake any control activities on the installation of ballasts and panels, which shall follow the assembly instructions indicated in this manual, therefore it declines any responsibility for damage due to improper use of the Sun Ballast system.

## **CIVIL LIABILITY RELATED TO BUILDING**

We act in compliance with the current regulations into force.

## **INTRODUCTION**

The topic of the civil liabilities in the field of housebuilding is rather delicate and blurred, because of the countless technical norms which currently create considerable confusion. Innumerable are the duties to fulfil, it is unclear who shall take charge of the onerous duty of verifying and sanctioning though.

## **NON-CONTRACTUAL LIABILITY AS PER ART. 1669 ITALIAN CIVIL CODE**

Joint responsibility of contractor, of works manager and of client himself.

Fundamental is the art. 1669 Italian C.C. "Deterioration and defects of immovable things" which establishes: "In the case of buildings or other immovable property intended by their nature to last for extended periods of time, if, in the course of ten years after completion, the work, due to soil or construction defects, deteriorates in whole or in part, or presents a clear danger of ruin or serious defects, the contractor shall be liable to the client and its assignees, provided that the report is made within one year from its identification. The client's right shall lapse within one year of the report."

Although at a first reading the aforementioned article entrusts the contractor with the exclusive responsibility, this is not the case: the orientation now consolidated by the Court of Cassation identifies in art. 1669 of the Civil Code a form of non-contractual liability which, therefore, goes beyond the limits of the contractual relationship between the parties and involves, in addition to the contractor, the designer, the works manager and the client himself who has directly managed the construction of the property.

Everyone can be called upon to jointly and severally compensate the damage that has occurred, when their respective conduct (actions or omissions), although independent of each other, have efficiently contributed to the creation of the harmful event. (Cass. N.20294/2004-Cass.n.12367/2002-Cass.n.972/2000).

For further clarity, please remark: the supplier of materials used in the construction of the building cannot be included in the case of non-contractual liability indicated above, since its performance is limited to the delivery of the products without participating, therefore, in the construction of the building. (Cass. n. 13158/2002)

## **THE PRODUCER**

### **Responsibility and guarantees**

The article 1° of the DPR n. 224 of 1988 enacts the general principle according to which "the producer is responsible of the damage caused by a defect of their product" towards all consumers: whether professionals, companies and authorized personnel, or private citizens.

The producer is also required to:

- specify the indications and limits of use of the products, providing any necessary warnings and legal obligations;
- to enter the data measured in quality control and within the limits of responsibility;
- Have third party companies carry out tests on the products, which recognize their functionality, and request ITC/ETA certification on systems and CE marking, where mandatory.

# **E. WARRANTY**

Basic Srl guarantees the functionality over time of Sun Ballast supports for photovoltaic panels on flat roofs, produced and marketed by the Company itself, for a period of 25 years from the date of purchase.

## **SUBJECT OF THE WARRANTY**

Basic Srl guarantees the resistance to corrosion derived by weather conditions (rain, ice, temperature fluctuations, salinity) of the supports, from the same produced and marketed, for photovoltaic panels on flat roof for a period of 25 years from the date of purchase.

## **WARRANTY TERMS AND CONDITIONS**

The Warranty will be operational only if all the following conditions are applied:

1. Il sistema dovrà essere integralmente realizzato con la gamma degli accessori forniti da Basic:

- Central brace in aluminum
- Terminal brace in aluminum
- Screw for central and terminal brace INOX A2m
- Sheath
- Potential accessories.

2. The ballast system shall be installed in a workmanlike manner and in compliance with the specific installation instructions of Basic Srl which are into force at the moment of purchasing and written in the technical specifications and in these assembly instructions.

3. If the ballasted system has been built using materials and components other than those specified in point "1", they must in any case have been marketed by Basic Srl. Any damage due to products not marketed by Basic Srl is excluded from this warranty.

This warranty is provided to the client with every order placed by the client. In the event of damage attributable to the terms stated in this warranty, and excluding any other obligation or reimbursement, Basic Srl:

- shall provide a replacement product without additional charges. If the product is no longer in production, Basic Srl shall supply an equivalent product of equal value;

- shall provide directly, through personnel chosen by the same and at its own expense, to restore the original functionality, possibly after an inspection by one of its representatives who will assess and determine the type of intervention required.

## **ESCLUSIONS**

This Warranty does not include:

- damages caused by soil movements, settlement of the structure of the immovable property or movements of the structure
- damages caused by an incorrect use or maintenance of the structure, by activities, tampering or changes made by third parties
- accidental or voluntary damages, actions of war included
- damages caused by lightnings
- damages caused by natural disasters
- damages derived from a wrong installation
- damages derived from a wrong dimensioning

Any other obligation or indemnity to be paid by Basic Srl is expressly included, and Basic Srl shall not be held liable for any direct or indirect damage to goods, movable and immovable property, rights or activities of the person guaranteed to third parties.

## **PROCEDURE**

The request for activation of this warranty shall be made in writing and shall be received within 30 days from the date on which the damage becomes evident. The notice shall be accompanied by an evidence of purchase (copy of the invoice), shall state the details of the declared damages and shall be sent to [info@sunballast.com](mailto:info@sunballast.com), to your marketing representative or on our website <http://www.sunballast.it/en/contacts>

In any case, the client's rights against its direct seller are not affected, in accordance with the applicable legislation on warranty in the sale of consumer goods art. 1490 of the Italian Civil Code.

This warranty is transferable to subsequent owners without prior notice from Basic Srl.

# **F. DECLARATION OF TECHNICAL CONFORMITY BASIC SRL**

**Seat:** Via della Costituzione 26-42028 Poviglio (RE) – Italia

**Management System:** UNI EN ISO 9001:2015 – CERTIFICATE N° 50 100 3413

**Denomination:** Ballasts in precast unreinforced concrete

(Inside there is an iron rod to increase mechanical elasticity)

**Article:** Sun Ballast Sun Ballast (Patented System)

## **Technical characteristics**

- Exposure class: XC4 unless otherwise specified
- Strength class: C32/40
- Minimum cement content: 340 kg/m<sup>2</sup>
- Class of fire resistance **C A1** (as established by the Decree of the Italian Ministry of the Interior on the 14th January 1985)
- Maximum depth of water (H<sub>2</sub>O) penetration under the pressure 500 kPa: 15 mm
- Medium depth of water (H<sub>2</sub>O) penetration under the pressure 500 kPa: 10 mm
- Determination of the tensile/pull-out strength of the buckle M8 embedded in the concrete element through direct tensile test on the bolt M8 which is screwed in the buckle
- Minimum tensile strength of the test at 15 KN (1530 kg) without any slipping of the buckle inserted in the Sun Ballast ballast
- Weight tolerance +/-5%

## **YEAR OF CONSTRUCTION 2020**

### **BASIC SRL DECLARES THAT**

The production complies with all instructions and procedure of the quality management system certified according to the UNI EN ISO 9001:2015. Any modification to the product covered by this declaration made without the authorisation of the manufacturer shall render this declaration of technical conformity null and void.

**Poviglio (RE), 07/01/2020**

**The legal representative**

**Basic Srl**  
Via della Costituzione, 26 - 42028 Poviglio  
Tel/Fax 0522/960926  
P.iva 02557770257 REA: 292573  
info@sunballast.it  
www.sunballast.it

# G. REPORT OF INSTALLATION (FACSIMILE)

Installer's personal data:

Check	Positive / Negative	Notes
Check the condition of the roof, before positioning the system, to ensure its suitability for installation and the absence of existing defects (tears, joints, detached sheath and any obstacles not described in the design phase).		
Check that the products installed correspond as indicated on the design, report or order confirmation.		
Check that the height of the building, the railing, the distance from the roof edge, the distance between the rows, correspond to those indicated in the system layout.		
In the case of changes with respect to the project, check the need for additional accessories and related installation and, if necessary, update the project.		
Check that potential accessories are properly placed in order to improve the resistance to wind loads.		
Check that all components are properly locked.		
Check that the worksite is clean and no component or packaging is left onsite that could damage the work surface.		
Pictures of the installed plant.		

Date of inspection and completion of works

Installer's signature/stamp



# H. SYSTEM REGISTER

DATA OF THE INSTALLATION COMPANY	
COMPANY NAME	
ADDRESS	
ZIP	CITY
VAT	

INSTALLATION DETAILS			
CLIENT		PLACE OF INSTALLATION	
PLANT CAPACITY		BALLAST TYPE	
Accessories used: Additional weights, reinforcement bars, windshield carter			
MODULE DIMENSIONS		PRESENCE AND HEIGHT OF PERIMETER PARAPET	
NORTH:	SOUTH:	EAST:	WEST:
DISTANCE FROM THE PARAPET			
RESIDUAL BEARING CAPACITY OF THE SLAB		ROOF INCLINATION	
BUILDING HEIGHT			

Locality of the plant: 1,2,3,4,5,6,7,8,9: Vb0 m/s reference wind speed: 25; 26; 27; 28; 29; 30; 31			
GROUNG ROUGHNESS CLASS			
• CLASSE A  Urban areas where at least 15% of the surface is covered with buildings whose average height exceeds 15 m	• CLASSE B  Wooded, industrial, suburban, and urban areas (not in class A)	• CLASSE C  Areas with distributed barriers (trees, houses, walls, fences...): areas whose roughness is not attributable to A, B, D classes	• CLASSE D  Areas without barriers (open land, airports, agricultural areas, pastures, sandy areas, wetlands, surfaces covered in snow or ice, lakes...)

# I. REGISTER FOR PLANNED MAINTENANCE

Date of maintenance	Anomalies identified	Company data	Operator's signature

[illegible]



# **INSTALLATION**

