

# MODULES HANDLING

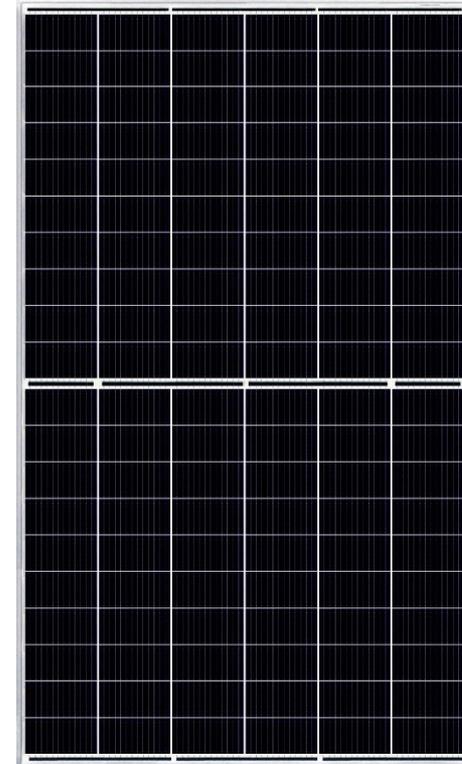
# Purpose of the Document

Give instructions on unloading, moving, storing and maintaining modules.

For more details refer to the CSI Solar installation manual or contact CSI Solar technical support.

## Aplicability

All modules produced by CSI Solar at various manufacturing locations around the world and model details are available on our website.



# Minimum Requirements



Must have a licensed (qualified) licensed driver who uses a standard forklift or crane for offloading operations;

Retaining ropes, cushioning materials, suitable forklift, tool and equipment;

The entire operation must be conducted with sufficient light;

According to the actual project situation / environment, choose a suitable equipment / vehicle to transfer the pallet(s);

It is mandatory to protect the pallets from any type of collision, avoid external pressure and any other type of force or external impact;

Additional workers to support the pallet handling process;

Proper storage facility;

Suitable safety gears.

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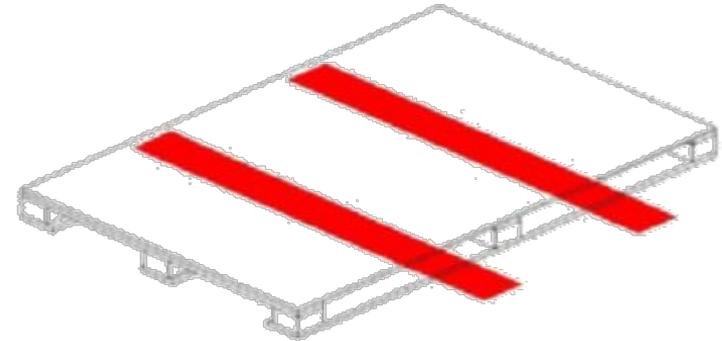
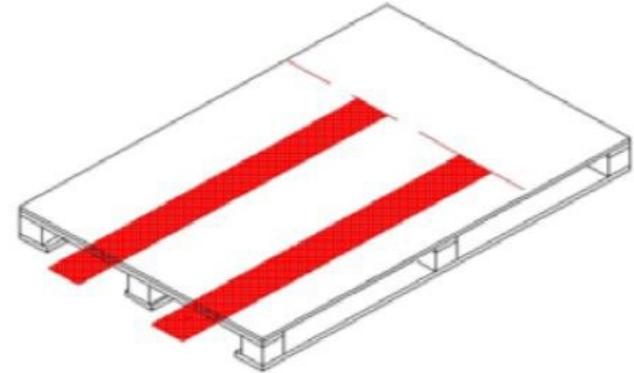
# Types of Pallets

## Pallet of 03 Supports:

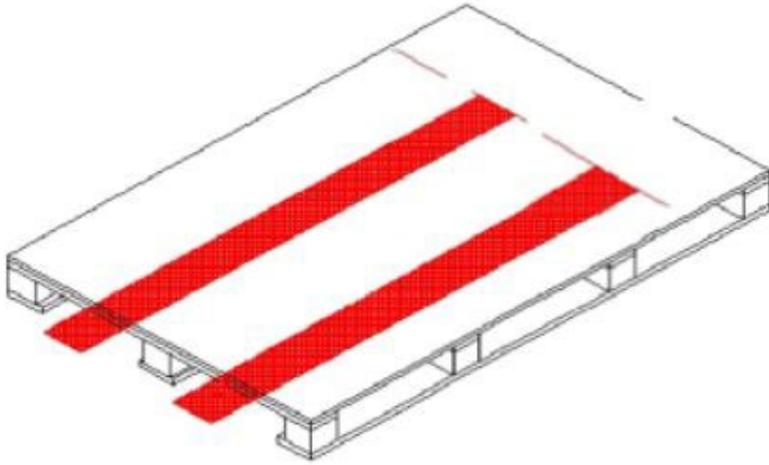
Use the short side to access the length of the pallet.

The forklift fork must remain between the second and third support.

**Handling on the short side is recommended only during loading and unloading operations.**



# Types of Pallets



## Pallet of 04 Supports:

Use the short side to access the length of the pallet.

The forklift fork should reach the third support.

**Handling on the short side is recommended only during loading and unloading operations.**

# Types of Pallets

## Pallet of 05 Supports:

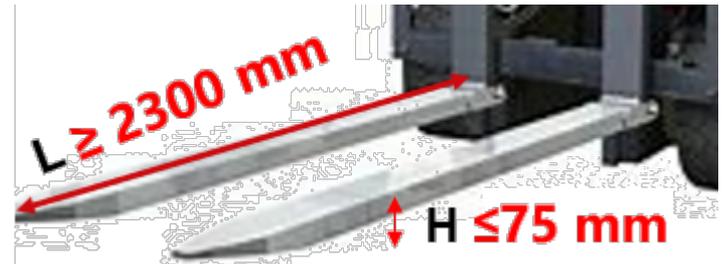
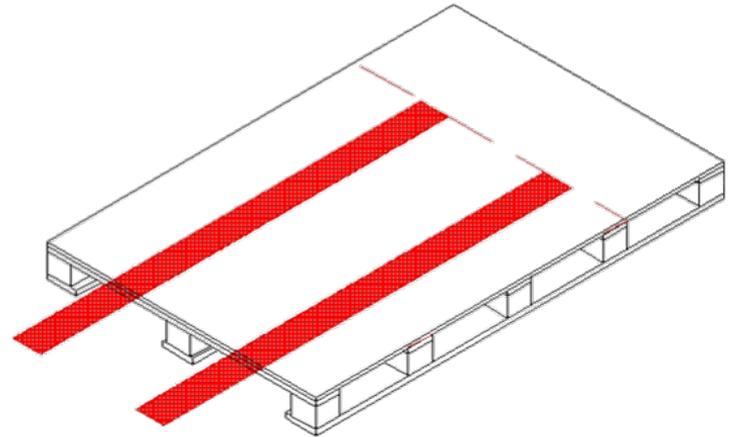
Use the short side to access the length of the pallet.

The forklift fork should reach the fourth support.

The forklift must have a load capacity  $> 2.5T$  to handle 2 stacked pallets.

**Handling on the short side is recommended only during loading and unloading operations.**

For all regular modules except (Bi)HiKu7, forks with a length greater than 2.30 m and a thickness less than or equal to 7.5 cm should be required.

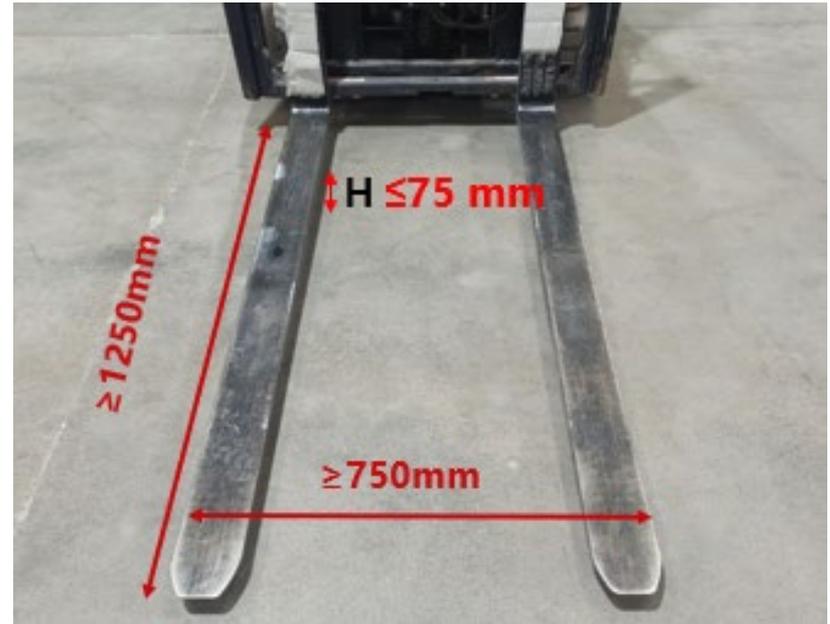


# Types of Pallets

## Requirements for HiKu7 & (TOP)BiHiKu7:

The forklift must have a load capacity  $> 1.5T$ .

It is suggested that the forklift arm length is 1.25~1.3m.



# Unloading the Modules with Horizontal package



## When using a crane:

It is suggested to use tools for fixing the top and bottom of the bracket.

It is recommended to lift carefully to avoid breaking the glass of the modules.

Once the pallets are in the air (before they are placed on the ground), there must be ground personnel to stabilize the pallets to avoid collisions between the pallets which can cause micro-cracks.

# Unloading the Modules with Horizontal package

## Using a forklift:

Cushioning materials such as foam cotton or other materials should be added to the forklift support arms to prevent pallets from tipping or unbalanced on the forklift fork.

When lifting and lowering pallets, it is not allowed to shake or tilt the pallet suddenly.

Forklifts must be lifted carefully to prevent pallets from rocking or hitting the ground, which can cause micro-cracks.

The forklift speed must not exceed 10 km/h.



# Unloading the Modules with Vertical package



## When using a crane:

The length of the lifting wire rope should be adjusted according to the number of pallets (not more than two) and add horizontal support rod in between two ropes (recommended).

Try to keep minimum distance between crank hook to ropes as much as you can to avoid twisting of the ropes.

Total length of a rope should be more than or equal to 9m when lifting with a single Pallet; When lifting with double pallets, the total length of a single rope should be at least of 12m.

# Unloading the Modules with Vertical package HiKu7 & (TOP)BiHiKu7

When using forklift to upload Vertical package like HiKu7 & (TOP)BiHiKu7, besides to follow above requirements for Horizontal package, attention should be paid to the items below.



Container bottom level and the loading/ unloading platform level must be at the same level, and the inclination angle must be  $\leq 3^\circ$ .

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# Storage

Protect against moisture, case collapse and module connector to be immersed in water.

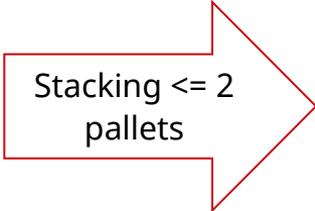
The floor must be flat.

After unloading is complete, check if there are any (non-conformities) on the pallets.



# Storage of Horizontal and Vertical Pallets

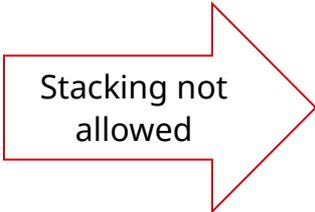
In any circumstances, pallets with landscape-oriented (horizontal) module packaging shall not be stacked vertically more than two high.



Stacking  $\leq 2$   
pallets



And for pallets with portrait-oriented (vertical) module packaging, stacking is not allowed.



Stacking not  
allowed



# Pallet Stacking for horizontal package

In some horizontal packaging pallet models, according to product model, wood N-protection is added.

Rest assured that the pallet with the reinforcement of the wooden "exoskeleton" is always the pallet below the pallet stack.

In other words, the pallet with the N-wood reinforcement should never be on top of another pallet.

And when N-reinforcement is required, pallets **without** this protection cannot fall below any other pallet in the transport.



Pallet with reinforcement  
always underneath.

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# Delivery of Modules

## Unloading operation:

The customer/partner needs to confirm that the physical appearance of the delivered modules or pallets is in good condition.



组件到货时请及时核对签收单上的组件型号 功率及数量

# Handling by pallets

## Project Location

- Based on the project environment, choose the right equipment to move the entire pallet.
- It needs to protect the pallets from collisions, presses and other external forces.



# Storage



# Storage



# Storage



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# Unpacking for Horizontal package

1. Remove the 03 marked tapes.
2. Remove the lid from the box.



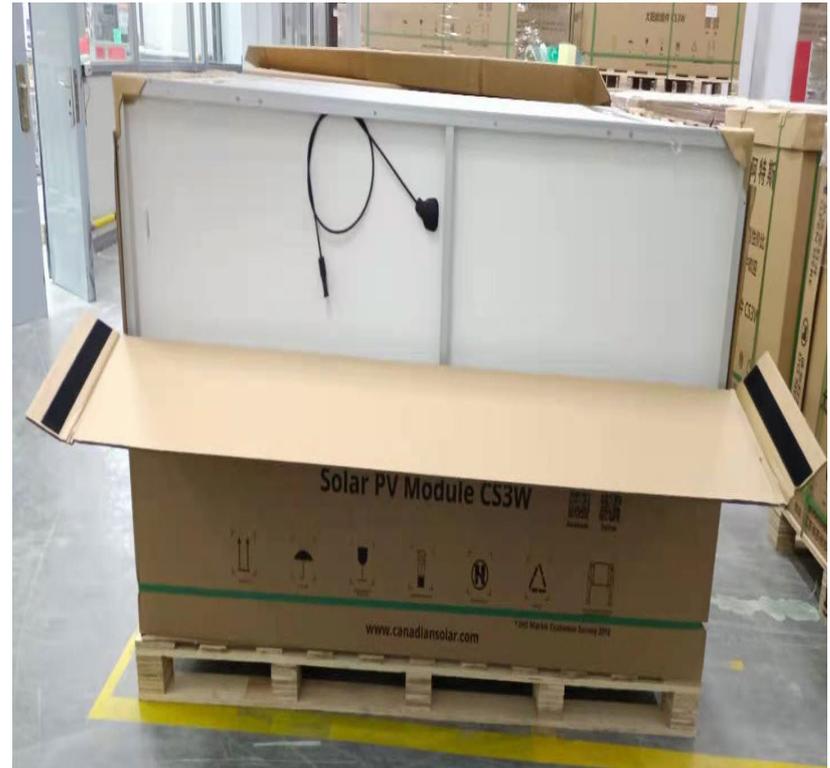
## Unpacking for Horizontal package

3. Remove the remaining tapes, leaving only the bottom tape.



# Unpacking for Horizontal package

4. Remove the velcro



## Unpacking for Horizontal package

5. 02 people detach the security tape one module at a time.



# Unpacking for Vertical package TOPBiHiKu7 & (Bi)HiKu7

Position pallets on flat surfaces. The slope of the ground should not exceed 4°.

Carefully remove all the plastic wrap that surrounds the box.



Flat ground



Inclination > 4°



# Unpacking for Vertical package TOPBiHiKu7 & (Bi)HiKu7



**We strongly recommend** using a rear support to prevent pallets from tipping.\*

Place it on the side with the image highlighted.

Remove the plastic wrap.

**Attention:**

Keep the plastic film on the top cover and then remove with the top cover joined together

# Unpacking for Vertical package TOPBiHiKu7 & (Bi)HiKu7

Remove all external (green) security tapes.



# Unpacking for Vertical package TOPBiHiKu7 & (Bi)HiKu7



Remove the paper beams at the corners of the pallet, and then use the paper beam to remove the top cover and plastic wrap.

# Unpacking for Vertical package TOPBiHiKu7 & (Bi)HiKu7



Open the package under "Unpack Here". Bend the other three sides back.

## Attention:

Please start with "Unzip here".

The other three sides are suggested to be torn off (when the wind is strong).



# Unpacking for Vertical package TOPBiHiKu7 & (Bi)HiKu7



First cut the horizontal inner ribbons and keep the internal tapes vertical.

Please keep two people on both sides of the pallet.

Keep 2 vertical handles (one left on each side) and cut the remaining ribbons.

It is recommended to push the modules into the rack and cut all tapes.

Remove the tape.

# Unpacking for Vertical package TOPBiHiKu7 & (Bi)HiKu7

Once the package is opened, remove the modules piece by piece until finished.

## Attention:

The rear support tool is used: A person needs to hold the modules while moving the other modules.

Remove the modules from both sides at the same time.

Separate the rest, separate different materials for proper recycling.

Do not remove the tape that holds the connectors when unpacking.



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## Storage of unpacked modules



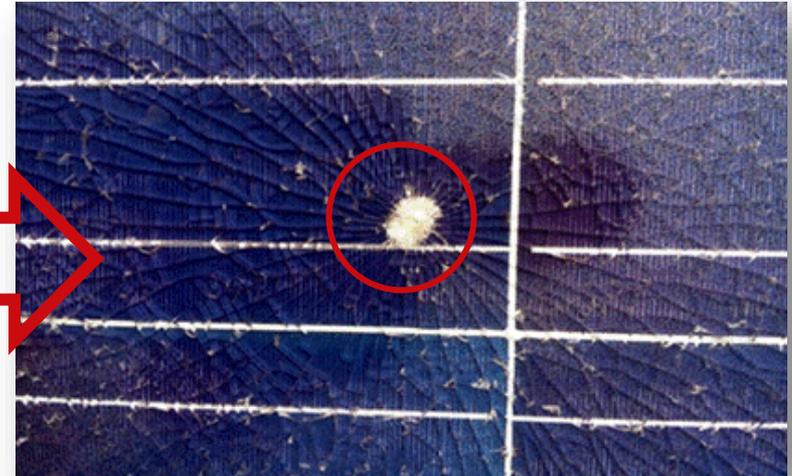
For single-glass or double-glass modules, the stacking of modules should be limited to **no more than 12 modules** and frames should be aligned.

Please, are not allowed to transport stacked modules (any quantity).

## Storage of unpacked modules

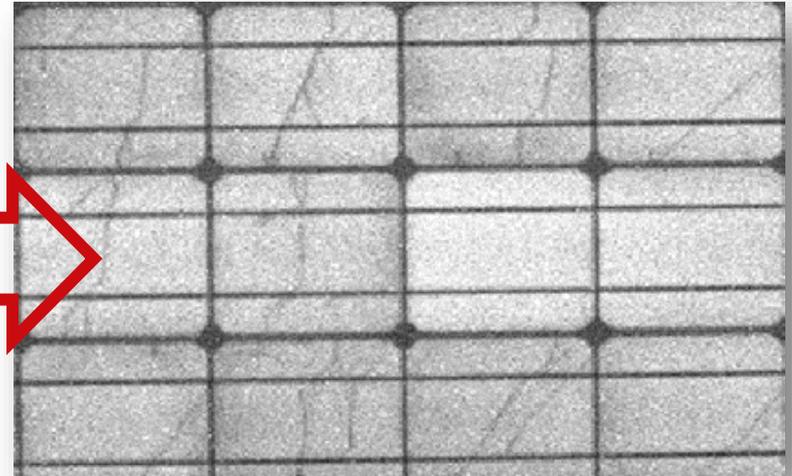
The modules must be stacked horizontally and on their respective supports.

Otherwise, it may cause the glass to break.



## Storage of unpacked modules

As well, it can cause microcracks.



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# Module Handling

The module must be carried by two people using both hands.



# Module Handling

A single person should not load the module. Do not carry the module on your head or pull it by the cables or the junction box.



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# Installation

It is recommended that modules are installed from top to bottom.

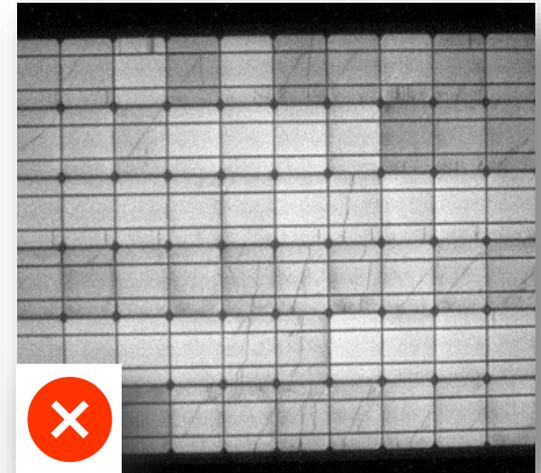
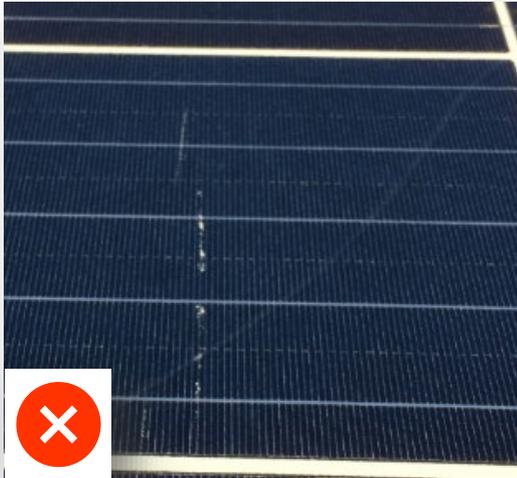
Thus, avoiding exerting effort on the module surface.



# Installation

Installation must be careful.

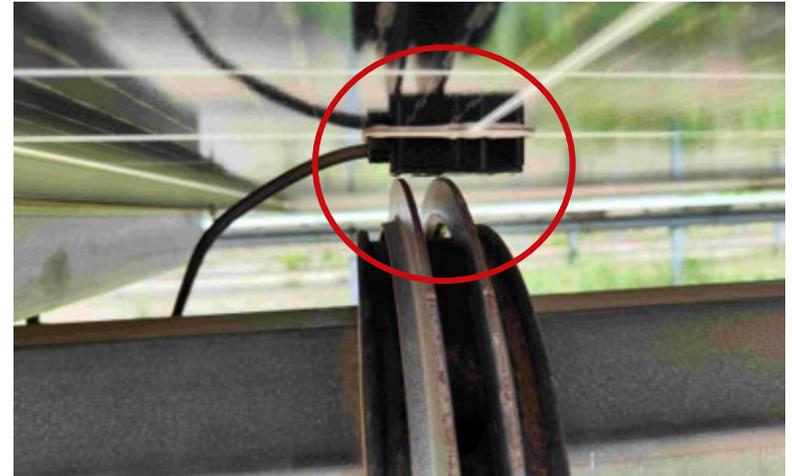
Do not walk over the modules or use any tool to knock or the modules. Avoid scratches or microcracks.



# Installation

The junction box or the cable or other parts of the module must not be pressed by the rails or the fixing structure.

For tracking structures, the shaft or rim (or any part) must not touch the module during rotation.



# Installation

Modules must be in open circuit condition until connection to the network.

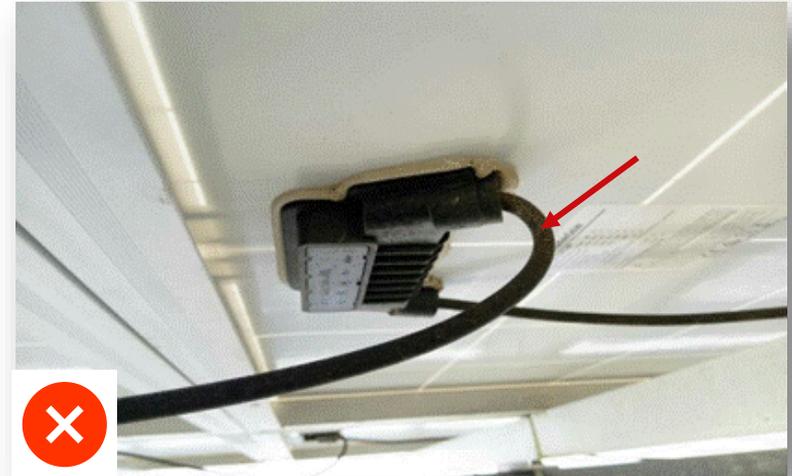
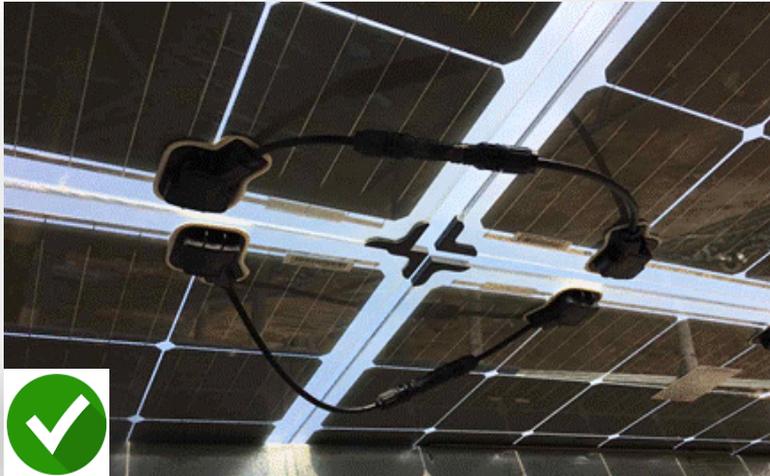
Until connection, the module connector must be protected against water, dust and so on.

After coupling, the connector cover must be kept for possible later use.



# Installation - Electrical Connection

Prevent cables from tensing.



# Maintenance

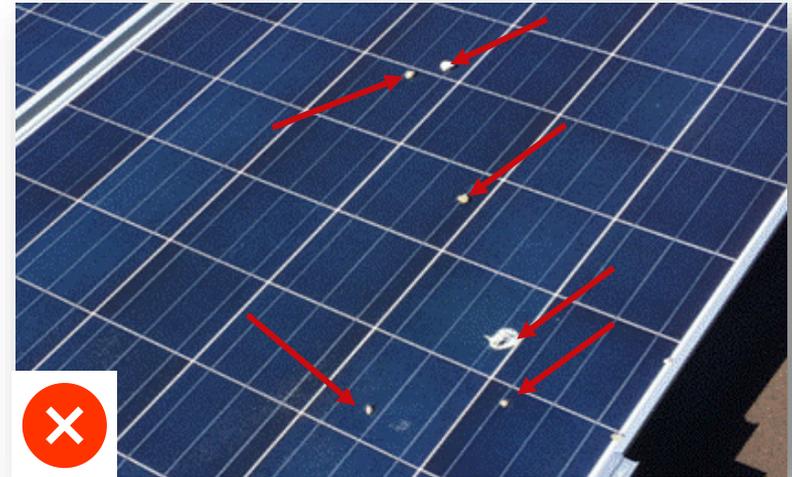
Keep the modules clean of animal waste, seeds, pollen, branches, tree leaves, dust and so on.



# Maintenance

The system should be serviced every 60 days\* to verify the integrity of the cabling system and fastening structure.

\*it depends on dust and rainy days of the place.



**THANK YOU!**