



Unpacking and Storage Manual of PV Modules

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<http://www.ulicasolar.com>

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1 Introduction

➤ Firstly, thank you for choosing our photovoltaic Modules (hereinafter referred to as "Module" or "PV Module"), which produced by Ningbo Ulica Solar Co., Ltd. (hereinafter referred to as "Ulica Solar"). In order to ensure the safety of loading, unloading, unpacking and storage of Modules, Please read this manual carefully. When you need to unpack and install Modules, you can search and download relevant content from the Ulica website. If you have any questions during the use of this manual, please connect Ulica Solar's customer service team at sales@ulsolar.com.cn.



Warning

Otherwise, the product may be damaged or the user's personal safety may be



Prohibition

Otherwise, the product may be damaged or the user's personal safety may be

2 Unloading

- In any circumstances, for vertical landscape packages, it shall not be stacked more than two layers; for vertical portrait packages, stacking is not allowed.
- The working ground needs to ensure that the packaging box can be placed horizontally and steadily to avoid tipping.
- Example for vertical landscape package and vertical portrait package is shown as follows:

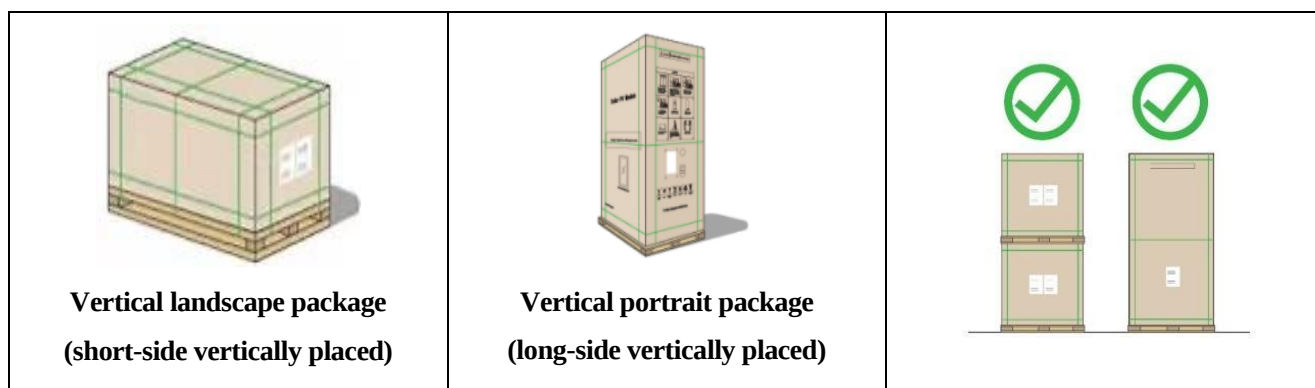


Figure 1 Vertical landscape package and vertical portrait package styles

2.1 Preparation

Upon arrival of the Modules, please check the packaging box is in good condition, and check whether the Module type and quantity on the outer packaging are consistent with the delivery order, if anything is wrong, please contact the logistics staff and the Ulica Solar sales staff.

2.1.1 Unloading with crane

When crane is used to unload the Modules, please choose and use specialized tooling according to the weight and size of the Module. Do not use the rope or sling for direct lifting. It is recommended to use steel pipe with sufficient strength for hoisting. Please adjust the position of the sling to keep the Modules steady. To ensure the safety of the Module, wooden sticks, boards or other fixtures of the same width as the outer packing cases should be used on the upper part of the box to prevent the sling from squeezing the pallet and damaging the Modules. When placing the Modules, do not lower the packing box too quickly and put it on a flat ground.



Figure 2 Schematic diagram of crane unloading



For vertical landscape packages, do not lift up more than four pallets of Modules at once; for vertical portrait packages, do not lift up more than two pallets of Modules at once. Do not unload Modules under the weather conditions of wind more than 6 class (in Beaufort scale), heavy rain or heavy snow.

2.1.2 Unloading with forklift

- The loading dock should be as the same height as the underside of the carrier.
- Please keep sufficient safety space between forklift and personnel when the forklift is operating, prohibit people stand or walk around the forklift.
- The forklift should be driven at a controlled driving speed of $\leq 5\text{km/h}$ in straight and $\leq 3\text{km/h}$ for turning, so as to avoid sudden stops and rapid starts to prevent Modules from tipping to cause personnel injury.
- Since the packing box will block the sight of the forklift driver, it is recommended to drive backwards during the forklifting, and arrange for special supervision and command to prevent bumping into people or items causing personal injury or damage to the Modules.
- Please choose a flat and solid ground to place the Module package after transportation to the installation site.

(I) Forklift operation in warehouse

- When using a forklift to unload the Modules, please choose a forklift with suitable tonnage according to Module weight. The forks should go into the pallet at least $3/4$ of the pallet depth during unloading (the forks length $L \geq 3/4$ of pallet length). It is recommended to extend the height or width of the forklift rack to prevent the forklift from directly touching the Module glass.

- In order to ensure better stability during forklift transport, the forks distance (W) should be adjusted to the maximum position without any interference.
- Please operate slowly and do not allow the forks to hit the carton or pallet.



Figure 3 Schematic diagram of forklift transport Module

Taking vertical portrait package as an example, the following precautions need to be taken:

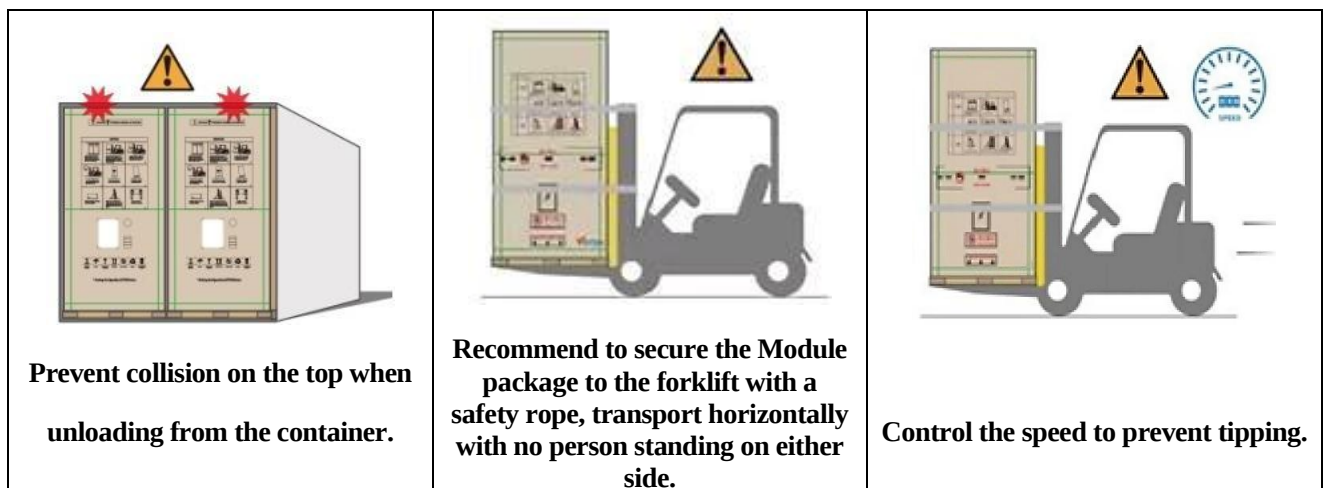


Figure 4 Precautions for forklift transportation

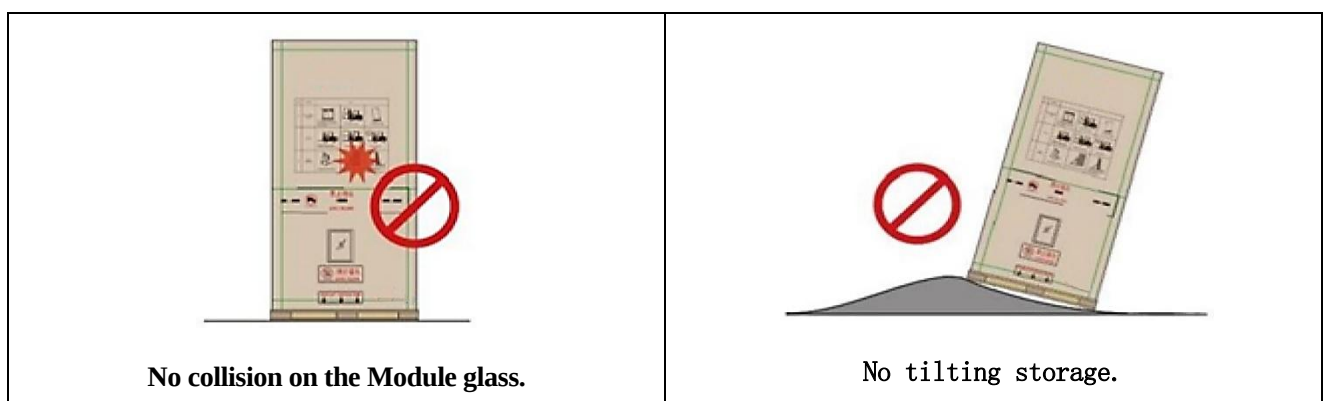


Figure 5 It is forbidden to collide with Modules and to store at an inclination

(II) Forklift specification requirements:

Please use forklifts with a rated lifting capacity of ≥ 3.5 tons to load and transport the Modules.

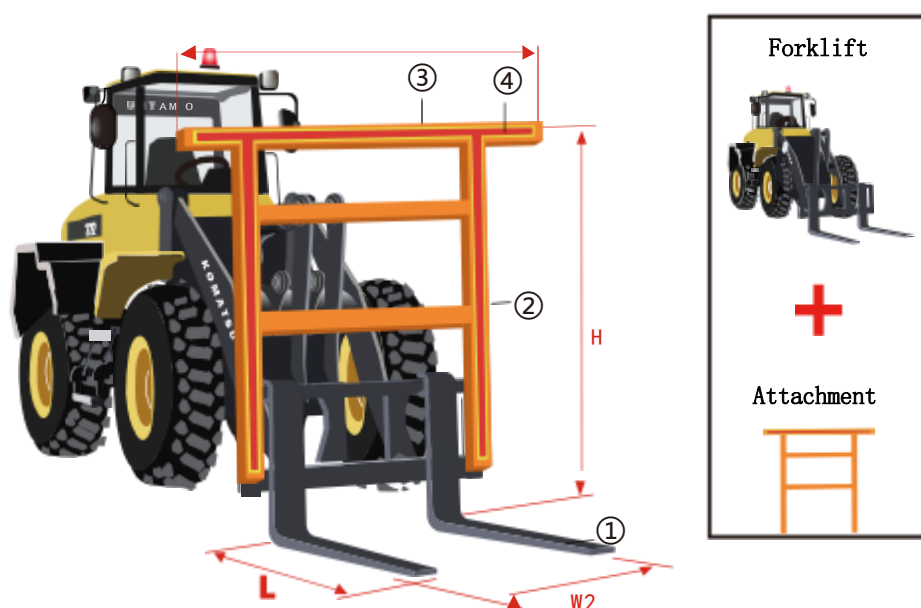


Figure 6 Schematic diagram of a forklift



Do not allow the convex part of the fork to directly contact with the carton or Modules to prevent damage to the Modules.



Figure 7 It is forbidden for the raised part of the fork to be in direct contact with the carton

I Vertical portrait package

- ① Forks: The fork length (L) should ≥ 1.0 m. The forks distance (W2) should be adjusted to the maximum position without any interference to the pallet.
- ② Backrest: The backrest length (H) should ≥ 1.7 m; the backrest width (W1) should ≥ 1.5 m. The backrest shall perpendicular to the fork, and the structure must be firm (withstand pressure ≥ 15 tonf). When the entire Module package leans on the backrest, the backrest shall not be deformed due to pressure.
- ③ The beam is shown above
- ④ The contact position between the top beam and the Module package should be fixed with a buffer material (preferably silicone, rubber, EPE) to prevent the forklift from damaging the Modules.

II Vertical landscape package

- ① Forks: The fork length (L) should ≥ 1.0 m. The forks distance (W2) should be adjusted to the maximum position without any interference to the pallet.
- ② Backrest The backrest length (H) should ≥ 1.5 m or the backrest width (W1) should ≥ 2.5 m. The backrest shall perpendicular to the fork, and the structure must be firm (withstand pressure ≥ 15 tonf). When the entire Module package leans on the backrest, the backrest shall not be deformed due to pressure.
- ③ The beam is shown above
- ④ The contact position between the top beam and the Module package should be fixed with a buffer material (preferably silicone, rubber, EPE) to prevent the forklift from damaging the Modules.

*Forklift specifications and operating practices include, but are not limited to, the above-mentioned matters. Please also pay attention to the following precautions:

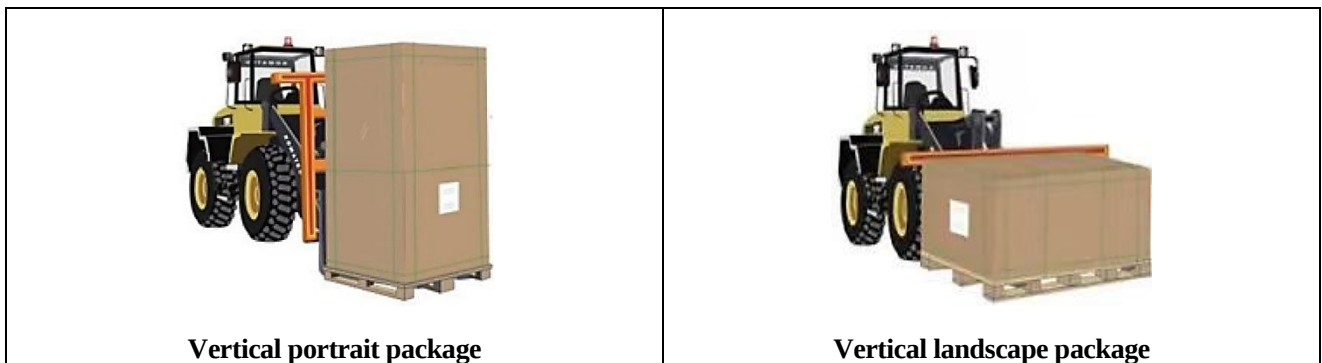
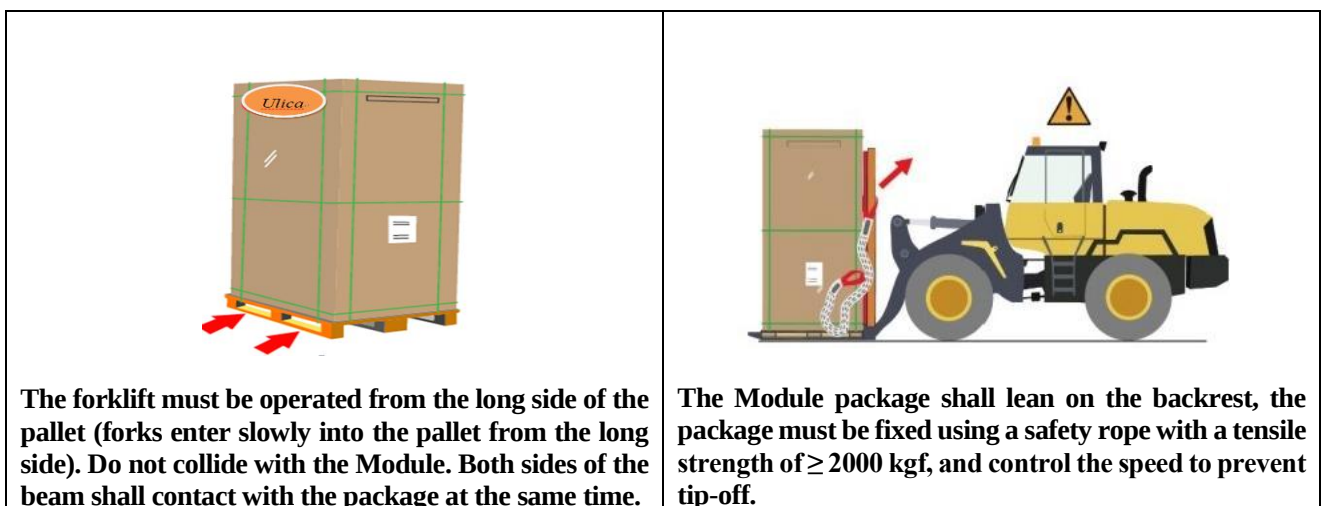


Figure 8 Schematic diagram of vertical packaging and horizontal packaging forklifts

The key points to note are as follows:



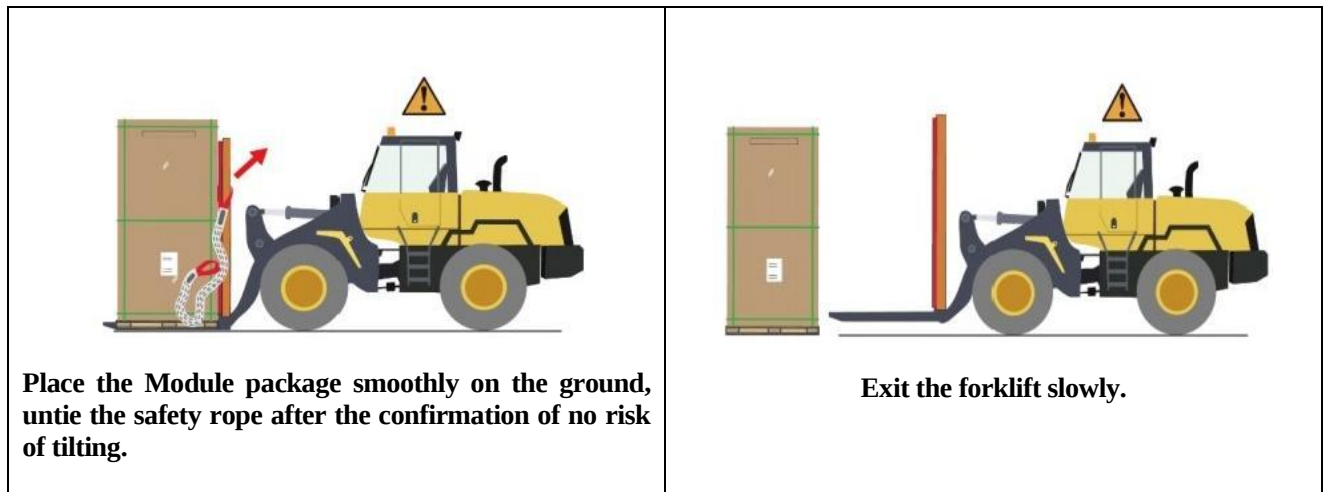


Figure 9 Precautions for the use of forklifts

2.2 Secondary Transportation

- The packaged Modules can be transported by land, sea or air. During transportation, make sure that the package is fixed with packing belts securely on the shipping platform without any movement.
- If the unpacked Modules need to be transported to other places, it is recommended to pack the single Module together in a package to the maximum number allowed, and fixed with inner packing belts (2100N force recommended). Finally, cover it with the packaging carton box and fix it with the same number of packing belts as before.
- If the number of Modules need to be packed is less than the maximum number allowed in a package, the Modules need to be fixed and secured to the center of the pallet for utility packaging (the following figure to the left) or on the side for distribution packaging (the following figure to the right), and fixed with inner packing belts (2100N force recommended). Finally, cover it with the packaging carton box and fix it with the same number of packing belts as before. Do not put the unfulfilled package on the lower layer when transported.

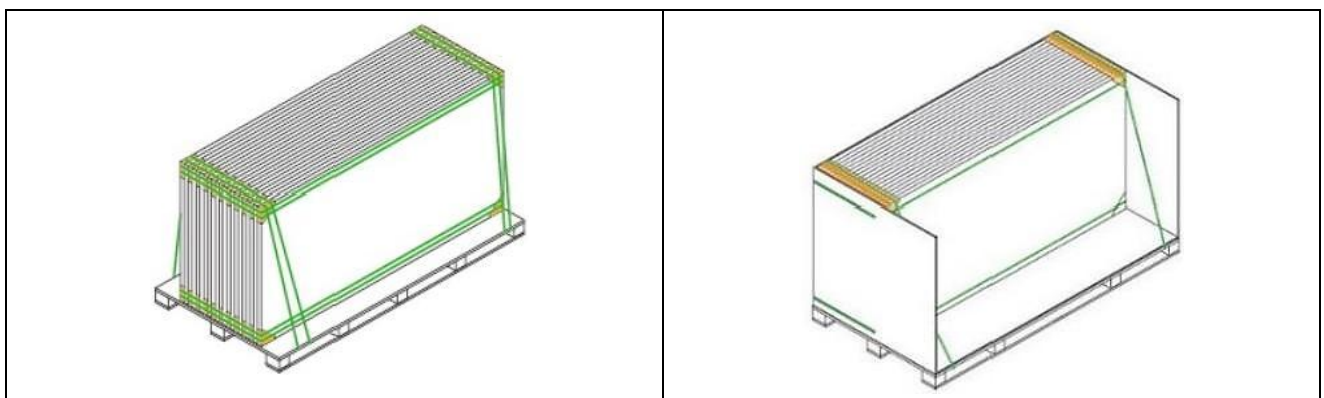


Figure 10 Schematic diagram of how components are packed for less than one pallet



- Please use appropriate means to transport the Modules. Do not use pedicab to transport or handle the Modules.
- There is no stacking of pallets allowed (for both vertical landscape and vertical portrait packages), when transporting with small trucks. Please fix the package to the vehicle using safety ropes and control the driving speed according to the road conditions. Please put paper corner support or other buffer material between safety rope and carbon box to protect Modules from damage.
- When using box trucker and flatbed trucker transport the Modules, the Module packages should be placed close to each other without any gap. The empty space needs to be filled to prevent the package moving backwards to the rear of the truck. Additionally, every package needs to be fixed using ropes to the vehicle when transporting with the flatbed trucker.
- Do not allow pallets to exceed the loading area of the transport vehicle.

3 Storage

Modules should be stored in a dry and ventilated environment on a flat ground (for vertically portrait package, the inclination of ground need to be less than 8°), to avoid damage or dumping of the Modules due to ground deformation or collapse. Storage requirements: relative humidity < 85% and temperature range of -40°C to 50°C.



- Do not remove the original package and keep the wrapping film and carton box in a good condition, if the Modules require long-distance transport or long-term storage.
- For long-term storage, it is recommended to store the Modules in a standard warehouse with regular inspection, and under confirming of your personal safety, reinforce the package in a timely manner if any anomalies are found.
- The warehouse shelves should have sufficient carrying capacity and storage space, regular inspection is required to ensure the storage safety.
- If you need to store the Modules in the project site, do not choose soft ground and the ground that is easy to collapse, should choose a hard ground or a higher ground with flat surface to ensure the Module packages not collapsing and tilting for long-term storage.
- In rainy weather, please fully cover the Modules and pallets with a rain protection and take moisture-proof measures on pallets and cartons to prevent collapse and moisture ingress. Under sun or wind, remove the rain cloth to allow the package to dry as soon as possible, prevent package collapse caused by the rain.

- Do not allow the pallets to soak in water. The ground drainage measures should be done previously for the storage site to prevent a large amount of water accumulation on the ground after rain, causing the ground to soften, sink, etc.
- Do not allow unauthorized persons to access the Module storage area.
- The Modules should be centrally stored.

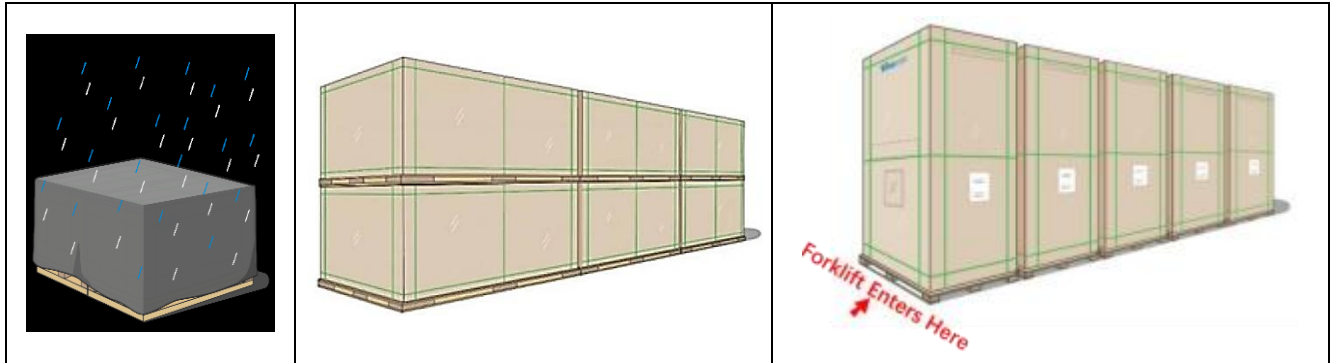


Figure 11 Diagram of Module storage

4 Unpacking Introduction

4.1 Unpacking Safety

- Before unpacking, please check the product type, power bins, serial number and relevant suggestions on the A4 paper of the packaging box, and read the unpacking instructions carefully. Custom unpacking methods are prohibited.
- Before unpacking, please make sure that the packaging box is in good condition, it is recommended to use art knife to remove the packing belt and wrapping film. Violent removal is prohibited to avoid scratching the Modules in the box.
- Please check that the number of Modules in the box and the barcode information on the Module frame are consistent with the information on the A4 paper on the packaging box.
- Please follow the recommended unpacking steps to unpack the Modules. When unpacking, it must be operated by two or more people at the same time. Always wear insulating gloves when handling the Modules.
- If all the Modules are not taken out after unpacking, the remaining Modules shall be placed horizontally and repackaged to prevent them from tipping. When packaging, Monofacial of Back Sheet Products: please note that the glass side of the bottom Module should face up, the glass side of the middle Modules should face down, and the glass side of the top Module should face up. Bifacial Dual Glass Products: Unified face down. Stacks of Modules should contain no more than 16 Modules, and the frames should be aligned.



- For matters regarding the unpacking stand supporter, please contact Ulica Solar sales.
- In windy weather, it is recommended not to carry the Modules, and the unpacked Modules should be properly secured.
- Do not unpack the Modules outside under rain and snow conditions.
- Do not carry the Module by one person to prevent the Module from slipping and hitting other Modules, causing scratches, cracks, or deformation on the Modules.
- Do not lift Modules by their cables or junction box.
- Before removing the inner packing belts, please take measures to protect the Modules from dumping.
- If unpacking the vertical landscape packages on non-horizontal ground, anti-tilting measures should be taken.
- The vertical portrait packages have a high center of gravity and are prohibited to unpack on nonhorizontal or soft grounds to avoid personal injury or even death.
- When unpacking vertical portrait package, do not stand on the back of the stand supporter, please operate in strict accordance with the requirements of the unpacking instructions.
- When removing the packing belts in vertical portrait package, take care not to hurt yourself (face, eyes, etc.).
- Do not stand on the pallet during unpacking, please carry the Modules from sides of the pallet.
- Do not move the stand supporter during unpacking to prevent the Modules being tilted.
- Do not lean the Module on any instable objects, such as poles or mounting columns.
- Do not support the back of the Modules directly with materials such as wooden strips.

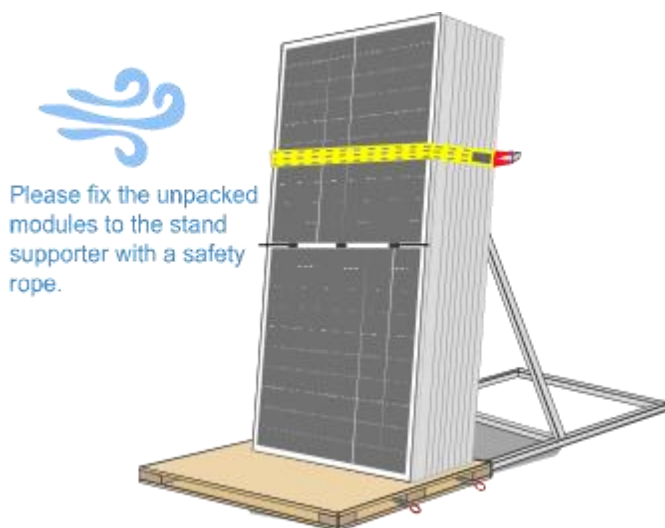


Figure 12 The safety rope secures the upright assembly to the supporter

4.2 Unpacking Steps

【Method A】 Unpacking for UL-***M-120HV(***=595-605W)、UL-***M-132DG(***=650-670W)、
UL-***M-132HV(***=650-670W)、UL-***M-132DGN(***=690-715W) series Modules with vertical portrait package.

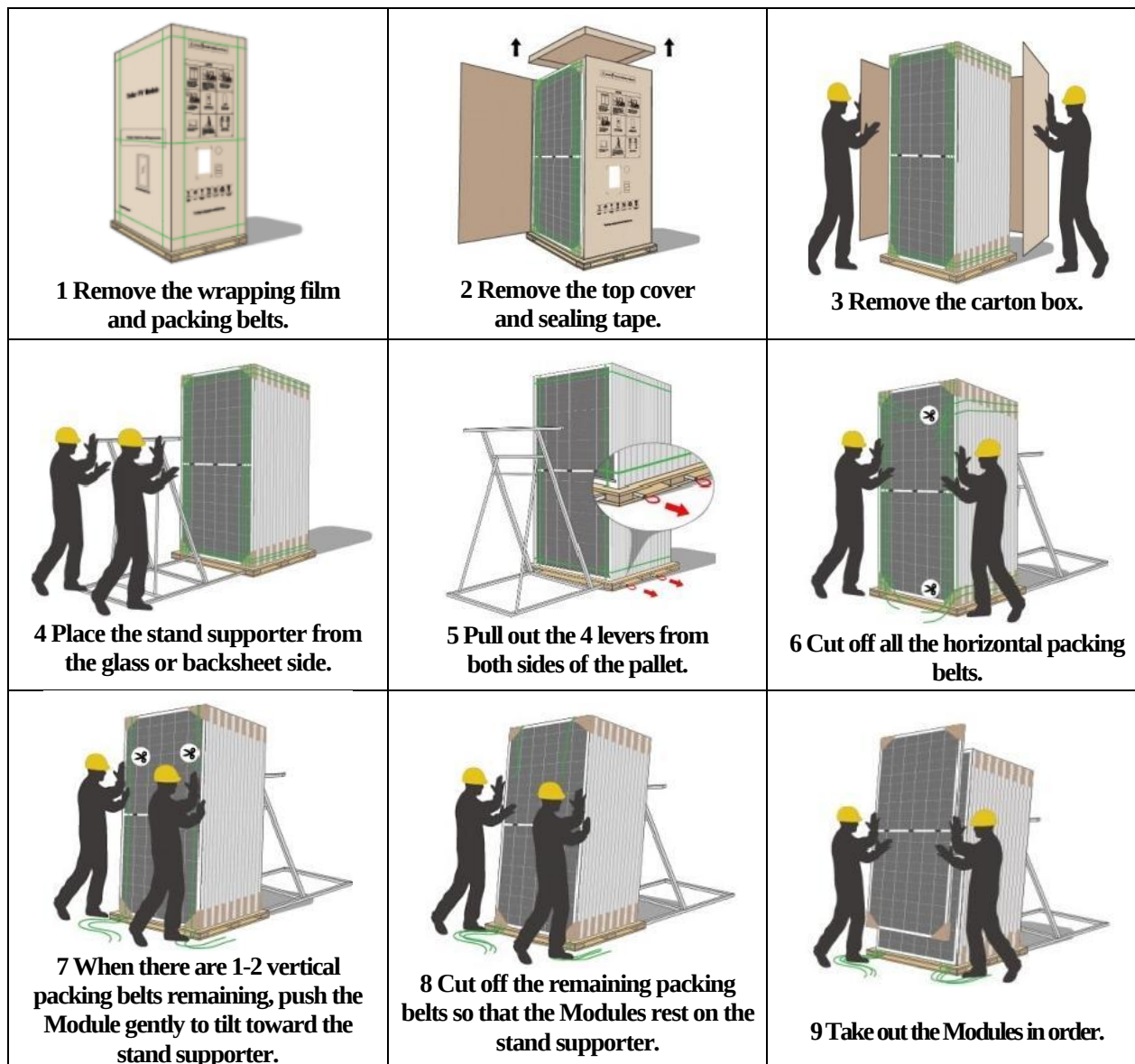


Figure 13 Unpacking process for vertical portrait packaging

【Method B】 Unpacking for except the above described series of products with vertical landscape package.

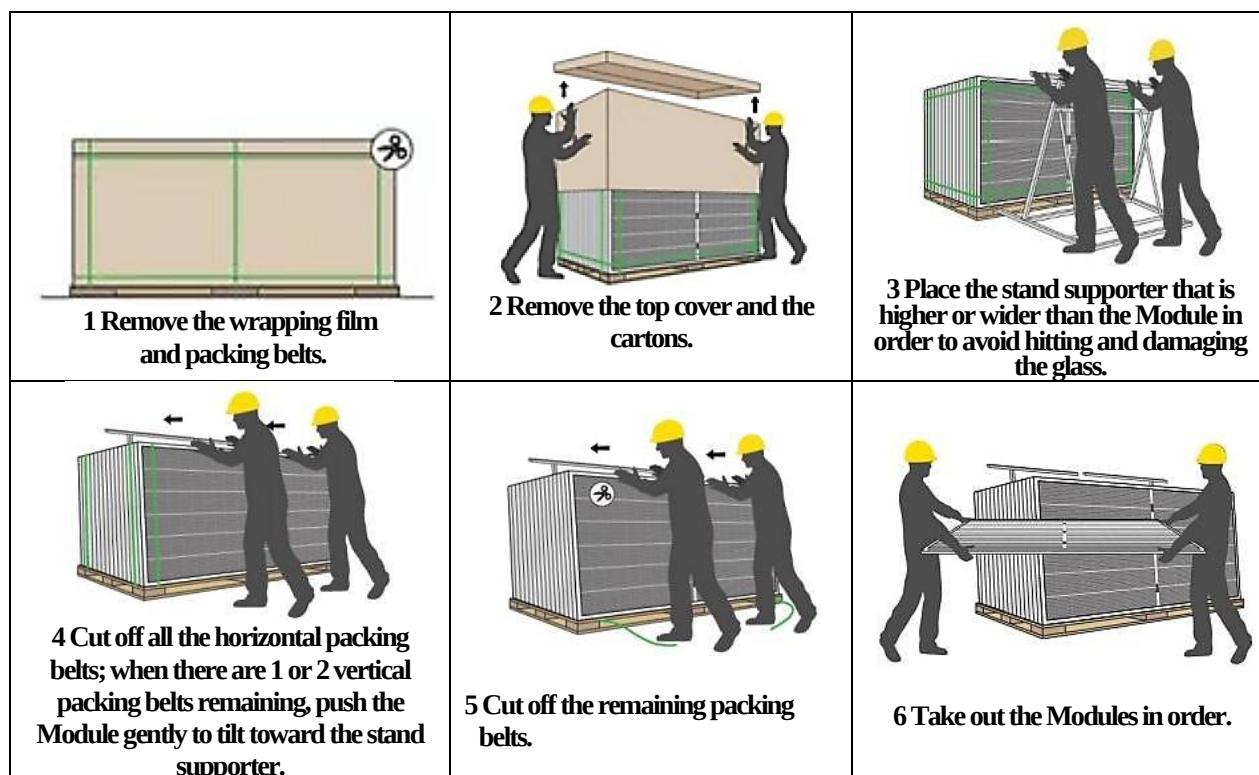


Figure 14 Unpacking process for vertical landscape packaging

5 Reporting Technical Issues and Claims

- Contact your installer.
- Please connect Ulica Solar's customer service team at sales@ulsolar.com.cn.
- For Module specifications or datasheets, please download from: <http://www.ulicasolar.com>.