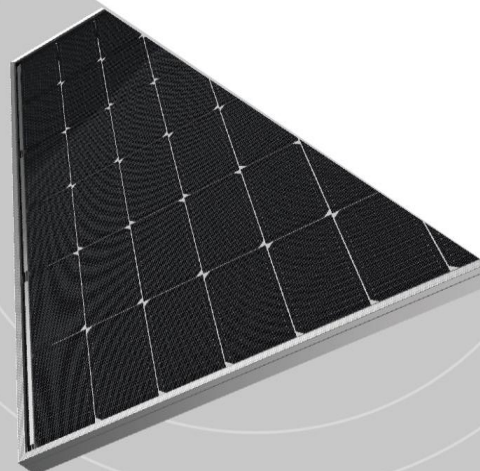


# **Jinko Solar**

**Storage and Unpacking Instruction of  
210 Series Photovoltaic Modules  
(Vertical Portrait Package)**



# Contents

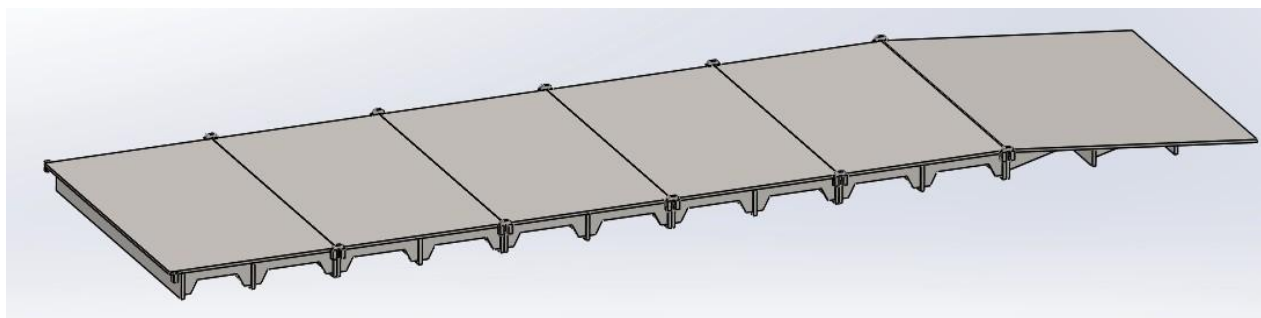
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# 1. General Information

Thanks for choosing Jinko solar PV modules (hereafter referred to as 'modules'). To ensure the safety of loading, unloading, unpacking and storage of PV modules, please read this manual carefully. This manual is only applicable to the vertical portrait package of Jinko solar 210 series products. When you need to unpack and install the modules, you can search and download relevant content from Jinko's official website. Please do not hesitate to contact us if you have any questions. ([www.jinkosolar.com](http://www.jinkosolar.com))

## 2. Loading and Unloading Information

Upon arrival of the modules, please check the packaging box is in intact, and check whether the module type and quantity on the outer packaging are consistent with the delivery order, if any abnormality is found, please retain this information before opening the box and contact the relevant personnel immediately.



### 2.1 Notes for Container Handling

- Unloading tools: Forklift/Unloading platform/Unloading pad tooling.  
When unloading on the platform or ground, steel plate pads or tooling shall be used to assist in moving the goods out of the container smoothly.

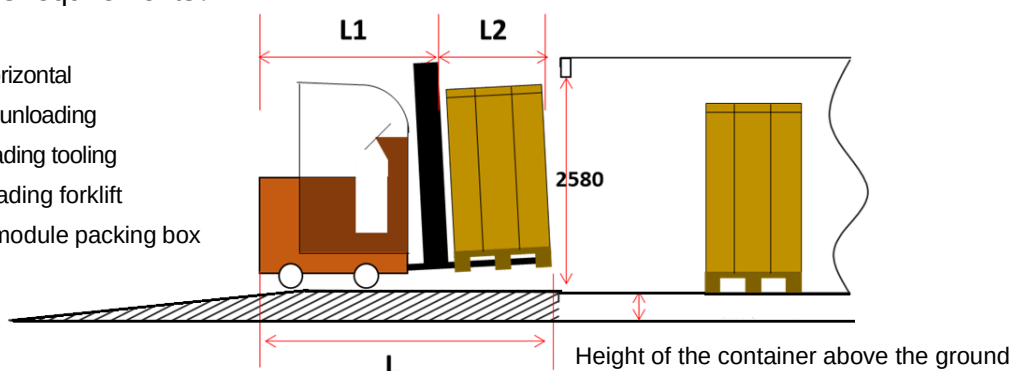
- Unloading tools requirements:

$$L \geq L1 + L2$$

L: Length of the horizontal extension of the unloading platform or unloading tooling

L1: Length of unloading forklift

L2: Length of the module packing box



The height of the unloading platform and the height of the unloading tooling should be kept at the basic level with the bottom of the container (loading bottom plate), and the height tolerance should be controlled within  $\pm 10\text{mm}$ .

It is recommended that the inclination angle between the fixture pad and the plane should be less than  $5^\circ$ , to avoid the forklift hit the top of the container due to too much inclination when it comes out of the container.

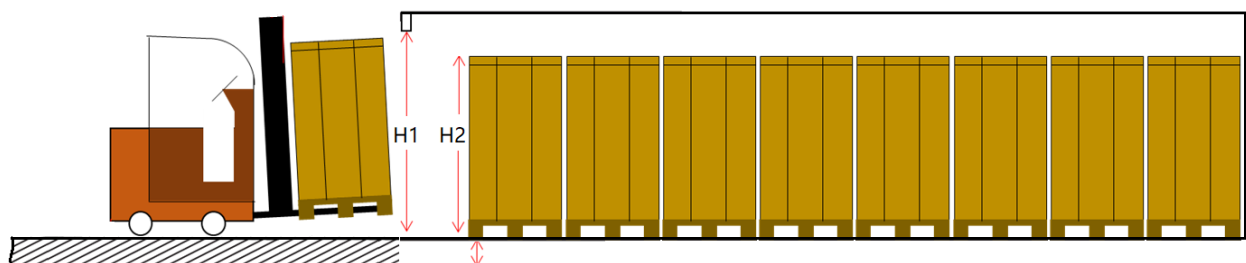
The length of the horizontal extension of the unloading platform or unloading tooling  $L \geq$  the total length of the unloading forklift and the length of the module packing box.

- When the container is unloaded:

When using the fuel forklift, adjust the height of the forks from the ground, the forks into the short side of the pallet, after the forks into the bottom, lift the modules at an appropriate height (the tilt angle required to lift the modules  $< 2^\circ$ ), the smaller the distance from the ground when the forklift out of the container door, ensure that the height of the forks from the ground and the distance from the goods to the top of the container is not more than 50mm;

When the horizontal electric forklift is used to unload the goods, the arm length of the forklift mechanical arm is required to be  $\geq 1200\text{mm}$ . The arm length of the forklift mechanical arm is required to lift the modules from the short side of the pallet with a fork (the height of the forklift is required to be  $\leq 40\text{mm}$  from the ground), and the modules are moved out slowly.

If the modules are unloaded from long side forks, fuel oil forklifts are needed to unload.



Height of the container above the ground

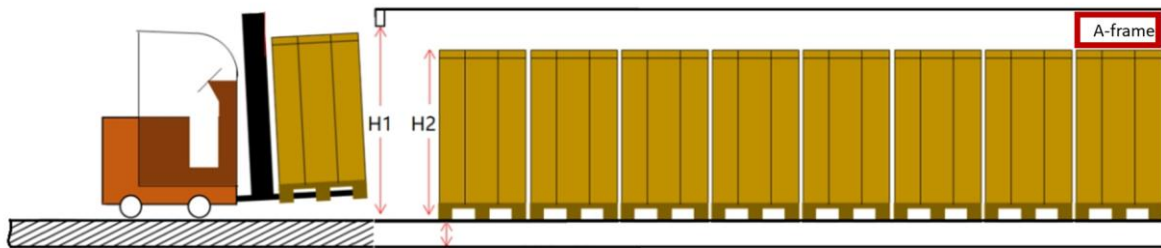
H1: Height of the container door

H2: Height of the module packing box

When unloading, the whole modules should be balanced as far as possible, the forklift arm should be kept relatively horizontal and 2~3cm spacing between modules and walls or adjacent modules is allowed. Besides, the forklift truck should fork the modules out of the container slowly and smoothly to prevent the carton from being damaged by friction between modules and wall or adjacent modules. When the goods go out of the container port, please slow down, and lower the height of the forklift arm from the ground (it is recommended to close to the bottom plate to reserve enough space for the top), pay attention to the distance between the bottom of the goods and the top of the container, prevent the goods from colliding with the top of the container, and ensure that the whole pallet module is safely removed from the container.

- When the A-frame is selected as an option, it is usually placed on top of the two innermost stacks of the container. Retrieving the A-frame requires access equipment and the combined effort of 2-3

personnel.



- In order to prevent the safety of placing and unpacking modules affected by tilt and uneven ground, please choose flat ground when unloading.
- If the modules need to be temporarily stored after unloading, it is recommended to keep sufficient space between each pallet to avoid scratching the carton or pallet during the second transfer.
- When unloading vertical portrait packaging modules, special command is required to ensure that the forklift does not exceed the modules, and prevent damage to adjacent modules when fork is raised or placed due to excessive length of forklift arms.
- See requirements below for other forklift unloading considerations.

## 2.2 Hoisting Precautions

- The hoisting rope of crane unloading needs to choose a longer nylon sling, wire rope is not allowed to use.
- Before lifting, the length of the sling should be evenly distributed on both sides to avoid the case body tilting to one side during lifting, which causes the sling to be too tight and the module to be damaged.
- When lifting, the box should be kept balanced to avoid module tilting.
- When unloading, someone should direct the lifting and dropping of the box, it should be kept as gentle as possible to avoid touching and dropping the module box, and the ground should be levelled;
- Do not lift up more than one pallet of modules at once.
- It is strictly prohibited to carry out hoisting operations in adverse weather conditions such as winds greater than force 6, heavy rain or snow;
- In order to minimize the impact of the sling on the safety of the goods during the lifting process, the necessary support should be done during the loading and unloading process, such as the use of wooden sticks, iron rods or other tooling to support the sling on the top of the box and the same width of the outer box, as well as the bottom of the pallet to increase the metal steel pipe to fix the



slings, in order to reduce the pressure of the contact position of the box and the pallet.

## 2.3 Forklift Handling Precautions

- In the process of loading and unloading, the forklift should be selected reasonably according to the size and weight of the goods. If the fork length is less than 3/4 of the size of the goods, extension sleeves should be fitted on the forks before the module is forked, in order to avoid the packing container dumping when moving the forklift(Figure1). It is recommended to secure the module package to the forklift with a safety rope.
- When the forklift is loaded with modules, the spacing between the two forks should be adjusted as required. The load of the two forks should be balanced without deflection. One side of the module package should be close to the retainer(Figure2).
- The shelf wall of the forklift truck could have cushions, such as foam or silicone pads, to prevent hidden cracks caused by the collision or extrusion between the modules and the shelf wall.
- When the forklift truck is loading and unloading from the long side of the module, the height of the forklift truck shelf wall should be  $\geq 1200\text{mm}$  and the contact surface between the shelf wall and the module should be flat without any protruding point to avoid collision or extrusion which may cause hidden cracks and glass bursting(Figure3).
- Avoid sharp objects (such as forklift pallet fork) contact or collision with module box, so as not to damage the modules inside(Figure4).
- For the vertical portrait packaging modules, the forklift truck is prohibited to lift more than one pallet of modules at a time;
- Loading and unloading process, except forklift operator, others should be kept at a safe distance from range, ensure the safety of personnel.
- A designated person must direct the loading and unloading process to prevent modules from being damaged or knocked over by the forklift; When using a forklift to move palletized packing boxes to the operation area, the forklift shall be slowly and steadily lifted and put down gently during loading and unloading, and the modules shall avoid turbulence and violent vibration during transportation.



Figure1



Figure2



Figure3

Figure4

## 2.4 Instruction for Transshipment at Project Site

- This refers to the transportation of modules from the storage site to the installation site after they arrived at the project storage site.
- The transshipment movement of the packing box shall be completed before the outer packing case is removed, and after unpacking, it shall no longer be transshipped with no fixed protection of the packaging material, and it shall be repackaged before being transported, or a single piece of manual short distance lifting shall be carried out.
- When the modules are transported at the project site, the transportation route shall be selected on a smooth road to avoid damage or cracks of the modules caused by turbulence, collision, extrusion, tilt and other factors. The modules shall be transported on a flat ground.
- Please use forklifts with a rated lifting capacity of  $\geq 3$  tons (more than twice the weight of the pallet) to load and transport the modules.
- Tilt the pallet at an angle (around  $5^\circ$ ) towards the forklift during transportation to avoid shaking.
- The forklift should be driven at a controlled driving speed of  $\leq 5$  km/h in straight and  $\leq 3$  km/h for turning, so as to avoid sudden stops and rapid starts.
- 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.
- During transshipment the module package shall lean on the backrest, the package must be fixed using a safety rope with a tensile strength of  $\geq 2000$  keF, and control the speed to prevent tip-off.

## 3. Storage Information

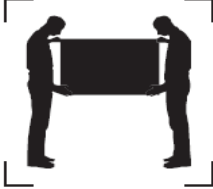
### 3.1 Notes for Storage

- Due to the complex environment and climate of the project site, do not stack the vertical portrait

packaging modules pallet on site.

- The modules shall be stored in a complete outer package. The storage area should provide protection for pallets and boxes from damp, direct sunlight and waterproof (rain) measures.
- The modules storage areas should be kept dry, level, the ground and the horizontal angle should be less than 10 °.
- Make sure that all modules with the same current class are installed in the same area centrally (Square matrix, combiner box).
- The modules should be placed neatly with a safe distance between the boxes. The spacing between boxes should be greater than 30cm.
- Please do not stack other items on the modules or boxes.
- Please note the following storage information labelling instructions.

### 3.2 Storage Information Labelling Instruction

|                                                                                                                                        |                                                                                                           |                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|  <p><b>MODULE SHOULD BE HANDLED BY 2 PERSONS</b></p> |  <p><b>KEEP DRY</b></p> |  <p><b>STACK LIMIT IN 1 UNITS</b></p> |
|  <p><b>THIS SIDE UP</b></p>                         |  <p><b>FRAGILE</b></p> |  <p><b>DO NOT STEP ON</b></p>        |

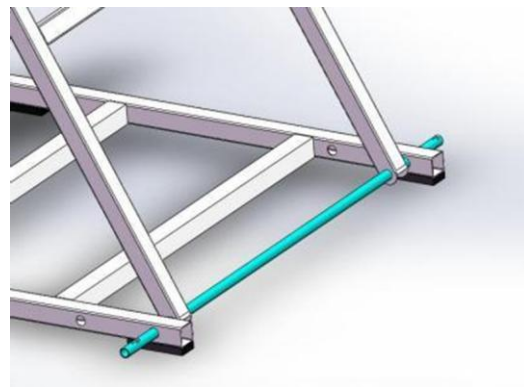
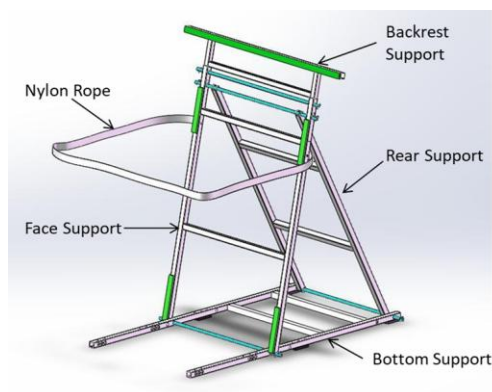
## 4. Unpacking Instruction

- This instruction is only applicable to the vertical portrait package of Jinko solar 210 series products. The number of persons required for unpacking should not be less than 2.
- Equipment and Tools: Cutter, Gloves, Forklift, A-frame.

### 4.1 Unpacking Steps

#### Step one: A-frame mounting

- In order to make sure unpacking is performed on level ground, select a flat level surface where to place the A-frame stand.
- Install the four anti-slip pads in the corresponding holes of the bottom support by pushing the bottom lightly by hand.
- Connect the face support to the bottom support passing the 940 mm connecting rod through the corresponding holes, and keep the assembly in an upright position.
- Insert the backrest support in the face support, and pass the 930 mm connecting rod through to fasten them together.
- Connect the rear support to the face support by passing through the other 930 mm rod.
- Take the other 940 mm connecting rod and pass it through the corresponding holes of bottom and rear supports so they assembly together. Take into account that bottom support has two pairs of mounting holes, allowing the tilt angle to be adjusted to either 5° or 10°. A tilt angle of 5° is recommended when unpacking.
- Attach the nylon rope by securely fastening both buckles to the metal rings on each side of the face support until they click into place. The bottom support of the A-frame has two pairs of mounting holes, allowing the tilt angle to be adjusted to either 5° or 10°. A tilt angle of 5° is recommended when unpacking.



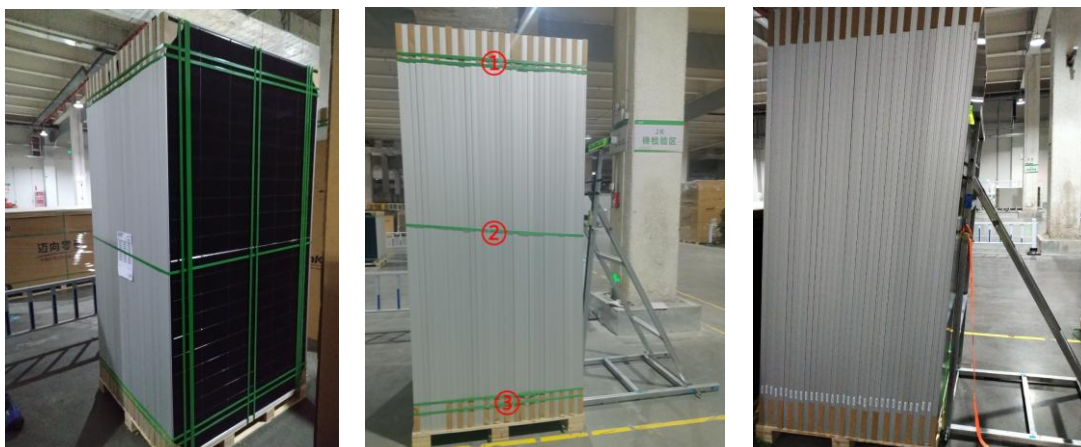
## Step two: remove the carton cover and attach the A-frame to it



- Remove all transparent stretch film wrapping the pallet and packaging assembly.
- Cut the carton strapping in the following order: first the vertical straps, then the horizontal straps from top to bottom. If the module starts to tilt at any time, immediately insert the A-frame into the tray and secure it with the retaining rod. Two people should stand on opposite sides of the module to guide it safely toward the A-frame side.
- Remove the top cover, cut the sealing tape, and lift away the outer carton.
- Align the A-frame with the module tray and insert the guide foot at the bottom of the A-frame into the tray, following the direction of the module panel.
- With a minimum of two people, push the A-frame into the pallet until it reaches its final position. One person should guide the alignment while the other pushes the A-frame forward.
- Once the A-frame is fully inserted, place the two 1450 mm anti-retreat rods through the corresponding fixing holes in the guide foot to lock the A-frame securely in position and prevent any sliding movement (red circles).

## Step three: remove the inner straps

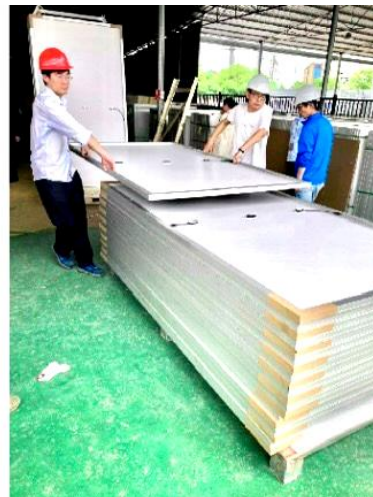
- Attach the safety rope to prevent modules from tipping over.



- Cut the straps in sequence: first cut the vertical straps, then cut the horizontal straps (①). At this time, more than two people push the modules in the direction of the A-frame, so that the modules has a tendency to fall towards the A-frame; then cut the horizontal straps (②), and continue to push the modules to fall towards the A-frame; and finally cut the horizontal straps (③), so that the modules is slowly tilted on the A-frame.
- Note: This is a high risk operation and personnel should wear safety helmets, smash-proof shoes and smash-proof gloves.

#### Step four: take the modules out of the pallet

- Remove the safety rope and carry the modules in turn manually, placing them horizontally until the last module is removed.
- The non-slip tape on both sides should not be torn in its entirety, take one module and tear the width of one module to ensure the tape is still secured to the unloaded modules.



## 4.2 Unpacking Precautions

- When opening cartons outdoors, avoid operating on rainy days because the cartons will soften and spread out to damage modules after rain.
- Fixed measures shall be taken for disassembled modules when outdoor wind-operated. It is advisable not to move the modules to avoid damage.
- Stack modules in a ventilated, rainproof, and dry place before the modules are unpacked.
- Use scissors or art knife to cut the outer box packing tape. Do not scratch glass. Confirm the number of modules in the box immediately after opening the case.
- The working ground needs to ensure that the packing box can be stably placed horizontally to avoid dumping of the modules.
- Please wear protective gloves during unpacking and handling to avoid scratching hands or leaving fingerprints on glass.

- Each module needs to be carried by 2 people, pulling the junction box is prohibited in any case, when lifting the module, grab the short edge and take out the module .
- Before installation, please use scissors to cut the binding band of the fixed wire to avoid the connector hitting the back and damaging the modules.
- Do not remove the corner guard from the modules before installation.
- The remaining modules should be placed in one location and protected by their original packaging.

## 5. Instruction for Sampling

### 5.1 Instruction for Sampling at Project Site

- If the modules need to be spot tested, please refer to the preceding unpacking instructions of this manual to unbox the modules.
- After modules are taken out of box, they should be placed on a vacant pallet. Module should be carried by two people and handled with care during the sampling process (Figure 5). In the process of sampling, the following precautions should be paid attention to avoid causing micro cracks of modules:
  - a) If you need to remove the ties which are used to fix cables, hold the connector upward with your right hand, twist the connector, and pull it slightly upward, then use a tool such as scissors to cut off the ties. And do not hit the rear side of module with the connector(Figure 6).
  - b) Connect the connector: When connecting the connector, do not shake the cable to avoid damaging the module.
  - c) If the module needs to be turned over, fixing measures (adhesive tape, etc.) shall be adopted to fix the connectors to prevent the cracks caused by the drop of the connectors (Figure 7).
  - d) After the completion of the test, remove the tape on the cable, and then fix the cable with a tie, and then pack the modules again for secondary transport.



Figure5



Figure6



Figure7

## 5.2 Instruction for Sample Modules

- Sample modules must be selected for sampling with no damage to the outer package.
- If the client will have a second transfer of modules, Jinko is only responsible for the EL test results of the modules at the first unloading point.



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