AMSO SOLAR

INSTALLATION GUIDE

SOLAR PANEL

Installer must read and understand the instructions before installation.

If there are questions, please contact **Nanjing** Amso Solar after sales department for further information.

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1 OVERVIEW

Thank you for choosing Nanjing Amso Solar Technology Co Ltd. This Manual is to give information on how to apply Nanjing Amso Solar PV modules properly.

Installer must read and understand the instructions before installation. If there are any questions, please contact Nanjing Amso Solar after sales department for further info - rmation.

Installer should conform to all safety precautions in the guide and local codes when installing solar modules. In addition, before installing the system, contact local authorities to determine the necessary permitting, installation and inspection requirements. Keep this manual in a safe place for further reference (care and maintenance) and in case of sale or disposal of the modules.

1.1 APPLICABLE PRODUCTS

This document applies to the following Nanjing Amso Solar PV Modules.

Co-license Model

ASxxxM-72(xxx=340-400 in step of 5W)

ASxxxM-60(xxx=285-330 in step of 5W)

ASxxxM-54(xxx=255-300 in step of 5W)

ASxxxM-48(xxx=230-265 in step of 5W)

ASxxxM-36(xxx=170-200 in step of 5W)

ASSF-xxxM(xxx=380-405 in step of 5W)

ASSE-xxxM(xxx=320-335 in step of 5W)

ASSU-xxxM(xxx=425-445 in step of 5W)

ASSK-xxxM(xxx=355-370 in step of 5W)

2 SAFETY

2.1 GENERAL SAFETY

- Installing solar photovoltaic systems requires specialized skills and knowledge. Installation should only be performed by qualified persons.
- Installers should assume all risks of injury that might occur during installation, including, but not limited to, the risk of electric shock.
- One single module may generate more than 30V DC when exposed to direct sunlight. Contact with a DC voltage of 30V or more is potentially hazardous.
- Our module application class is class A, modules rated for use in this application class may be used in systems operating at greater than 50V DC or 240W, where general contact access is anticipated.
- Do not disconnect under load.
- Photovoltaic solar modules convert light energy to direct current electrical energy. They are designed for outdoor use. Modules can be ground mounted, mounted on rooftops, vehicles or boats. The proper design of support structures lies within responsibility of the system designers and installers.

2.2 HANDLING SAFETY

- Do not lift the module by grasping the module's junction box or electrical leads.
- Do not stand or step on the module.
- Do not drop the module or allow objects to fall on the module.
- To avoid glass breakage, do not place any heavy objects on the module.
- Be cautious when setting the module down on to a surface.
- Inappropriate transport and installation may break the module.
- Do not attempt to disassemble the modules, and do not remove any attached nameplates or components from the modules.
- Do not apply paint or adhesive to the module top surface.
- To avoid damage to the backsheet, do not scratch or hit the backsheet.
- Do not drill holes in the frame. This may compromise the frame strength and cause corrosion of the frame.
- Do not scratch the anodized coating of the frame (except for grounding connection). It may cause corrosion of the frame or compromise the frame strength.
- Be careful when setting the panel down onto a surface, particularly when placing it on a corner.
- A panel with broken glass or torn backsheet cannot be repaired and must not be used

since contact with any panel surface or the frame can cause an electric shock.

- Work only under dry conditions, and use only dry tools. Do not handle panels when they are wet unless wearing appropriate protective equipment.
- When storing uninstalled panels outdoors for any period of time, always cover the panels and ensure that the glass faces upwards to stop water from collecting inside the panel and causing damage to exposed connectors.

2.3 INSTALLATION SAFETY

- Never open electrical connections or unplug connectors while the circuit is under load.
- Contact with electrically charged parts of the panels, such as terminals, can result in burns, sparks and lethal shock whether or not the panel is connected.
- Do not touch the PV module unnecessarily during installation. The glass surface and the frame may be hot; there is a risk of burns and electric shock.
- Do not work in the rain, snow or in windy conditions.
- Avoid exposing cables to direct sunlight in order to prevent their degradation.
- Keep children well away from the system while transporting and installing mechanical and electrical components.
- Completely cover the module with an opaque material during installation to prevent electricity from being generated.
- Do not wear metallic rings, watchbands, ear, nose, lip rings or other metallic objects while installing or troubleshooting photovoltaic systems.
- Use only insulated tools that are approved for working on electrical installations.
- Follow the safety regulations for all other system components, including wires and cables, connectors, charging regulators, inverters, storage batteries, rechargeable batteries, etc.
- Only use connectors to connect modules to form a string, or connect to another device. Removing the module connectors will render the warranty void.

2.4 FIRE SAFETY

- Consult your local authority for guidelines and for building or structural fire safety.
- Roof constructions and installations may affect the fire safety of a building; improper installation may create hazards in the event of a fire.
- Use components such as ground fault circuit breakers and fuses as required by local authority.
- Do not use panels near equipment or in places where flammable gases may be generated.
- The modules have been rated Fire Class C, and are suitable for mounting onto a fire retardant roof covering rated for the application at a minimum distance of 10cm from the panel to the roof plane.

3 PRODUCT IDENTIFICATION

Each module has label providing the following information:
Nameplate label: describes the product type, rated power, rated current, rated voltage, open circuit voltage, short circuit current, (all as measured under standard test conditions), weight, dimensions and the maximum system voltage of 1,000 volts DC. The nameplate is attached on the backsheet of the module.

4 MECHANICAL INSTALLATION

4.1 GENERAL INSTALLATION GUIDELINES

- The module mounting structure must be made of durable, corrosion-resistant and UV-resistant material.
- In regions with heavy snowfall in winter, select the height of the mounting system so that the lowest edge of the module is not covered by snow for any length of time.
- In addition, ensure that the lowest portion of the module is placed high enough so that it is not shaded by plants or trees or damaged by flying sand.
- The modules must be securely attached to the mounting structure.
- Provide adequate ventilation under the modules in conformity to your local regulations. A minimum distance of 10 cm between the roof plane and the frame of the module is generally recommended.
- Always observe the instructions and safety precautions included with the module support frames.
- Do not attempt to drill holes in the glass surface of the modules as this will void the warranty.
- Do not drill additional mounting holes in the frames of the modules as this will void the warranty.
- Before installing modules on a roof, ensure that the roof construction is suitable. In addition, any roof penetration required to mount the module must be properly sealed to prevent leaks.
- When installing a module on a pole, choose a pole and module mounting structure that will withstand the anticipated winds for the area.
- Dust building up on the surface of the module can impair module performance.
- Observe the linear thermal expansion of the module frames (the recommended minimum distance between two modules 2 cm).
- Always keep the backsheet of the module free from foreign objects or structural elements, which could come into contact with the panel, especially when the module is under mechanical load.

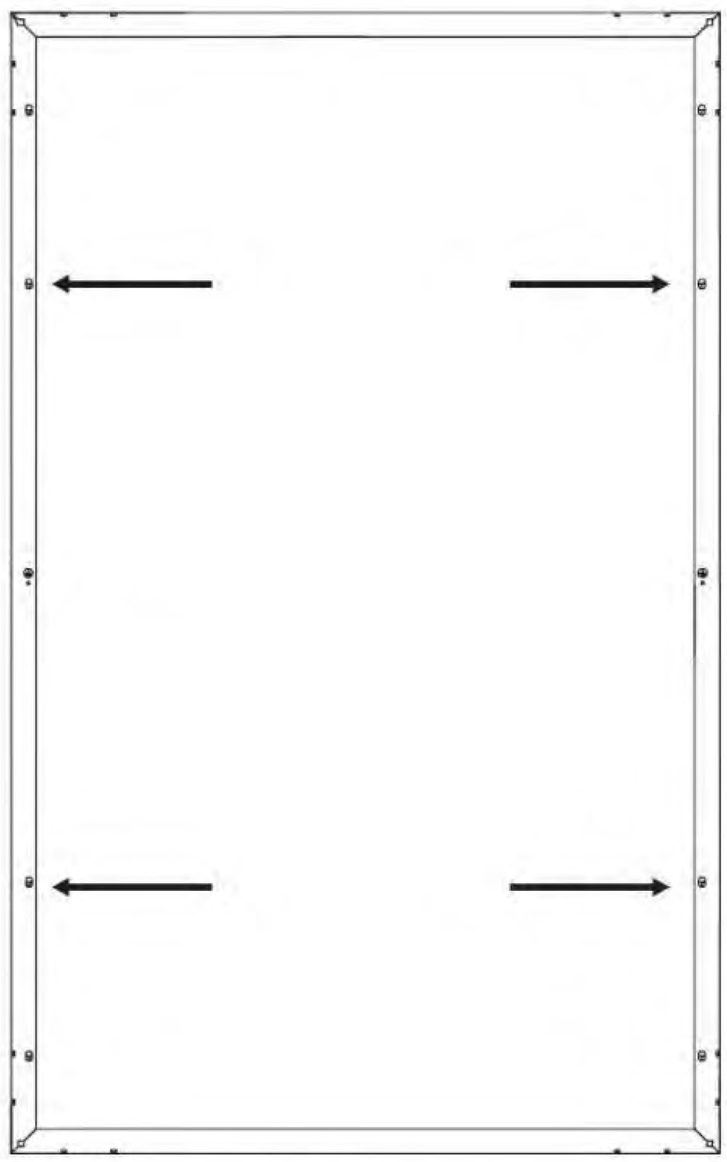
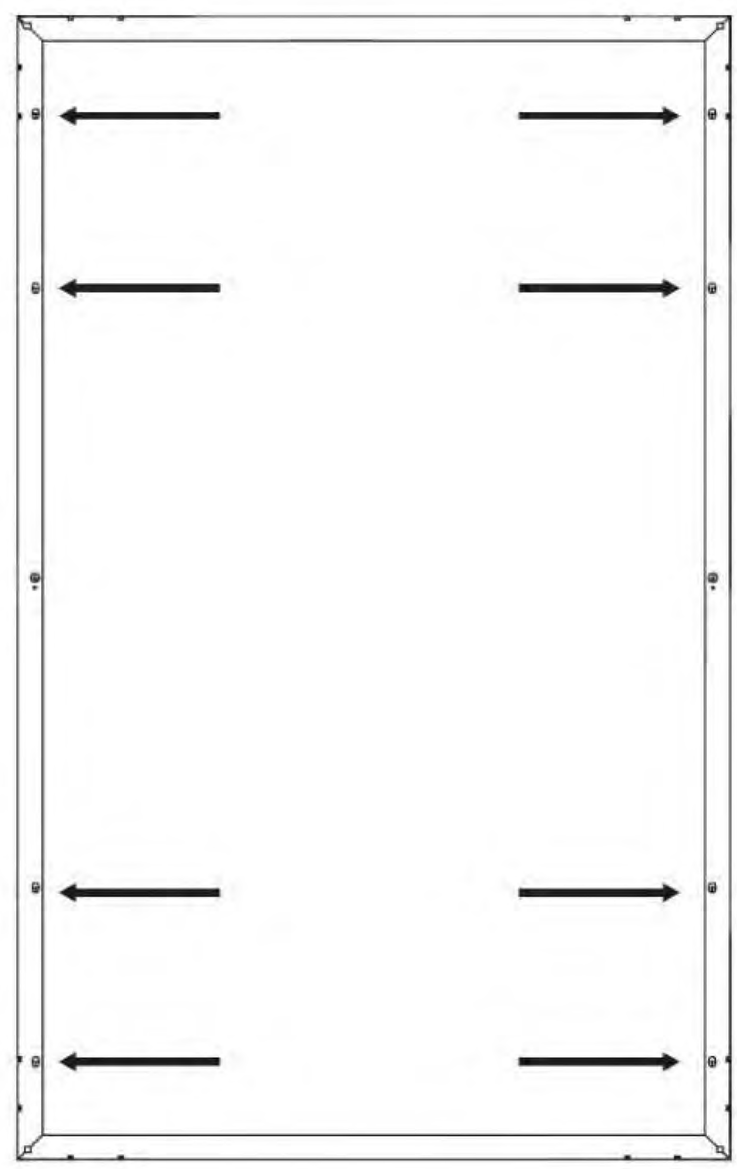
- Ensure modules are not subjected to wind or snow loads exceeding the maximum permissible loads, and are not subject to excessive forces due to the thermal expansion of the support structures. See the following sections for more detailed information.

4.2 LOCATION AND ANGLE SELECTION

- It is recommended to install PV modules where has excellent sunlight resources. In the Northern Hemisphere, the module should typically face south, and in the Southern Hemisphere, the modules should typically face north. The most optimistic installation angle varies according to different latitudes and longitudes; please consult experts with appropriate knowledge background when determining the installation locations and angles.
- Amso Solar recommends installing the modules with a tilt angle of at least 10 degrees, making it easier for dust to be washed off by rain.
- When choosing a site, avoid trees, buildings or obstructions, which could cast shadows on the solar photovoltaic modules. Shading causes hotspot and loss of output, even though the factory fitted bypass diodes of the PV module will minimize such effect.
- Do not install the PV module near naked flame or flammable materials.
- Do not install the PV module in a location where it would be immersed in water or constantly exposed to water from a sprinkler or fountain etc.

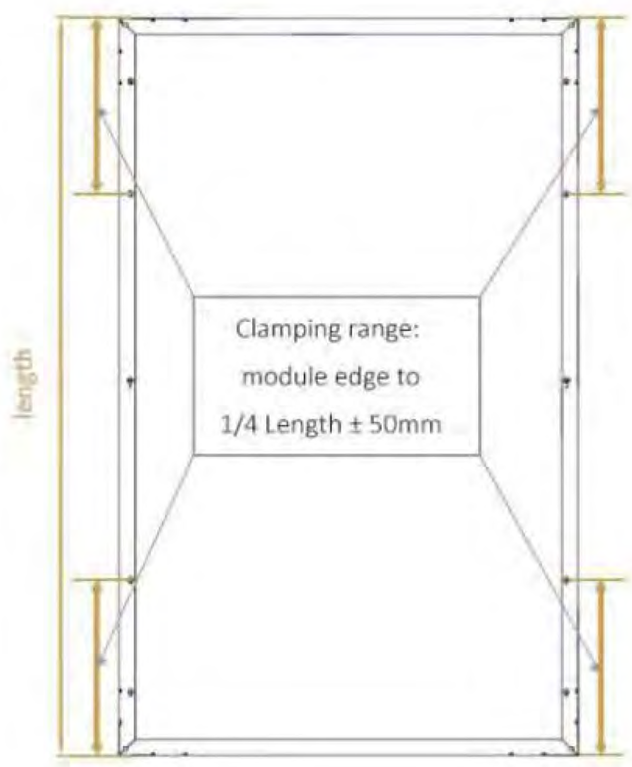
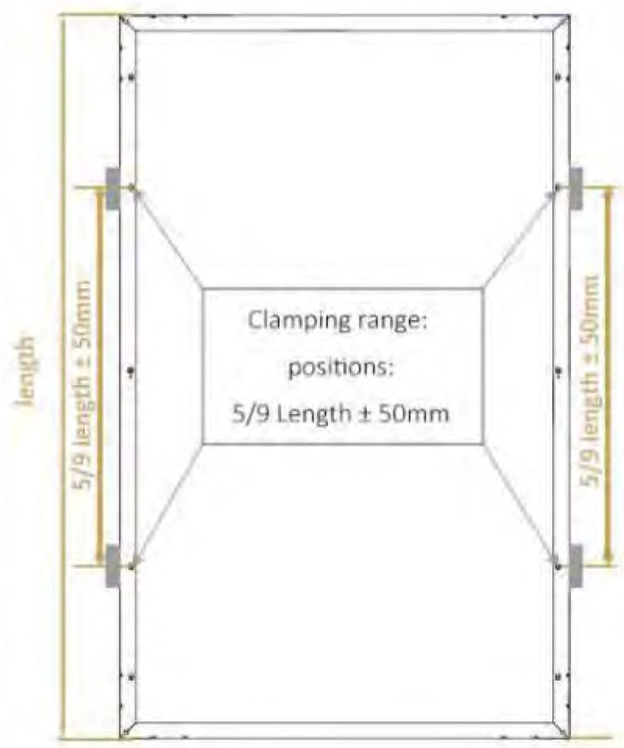
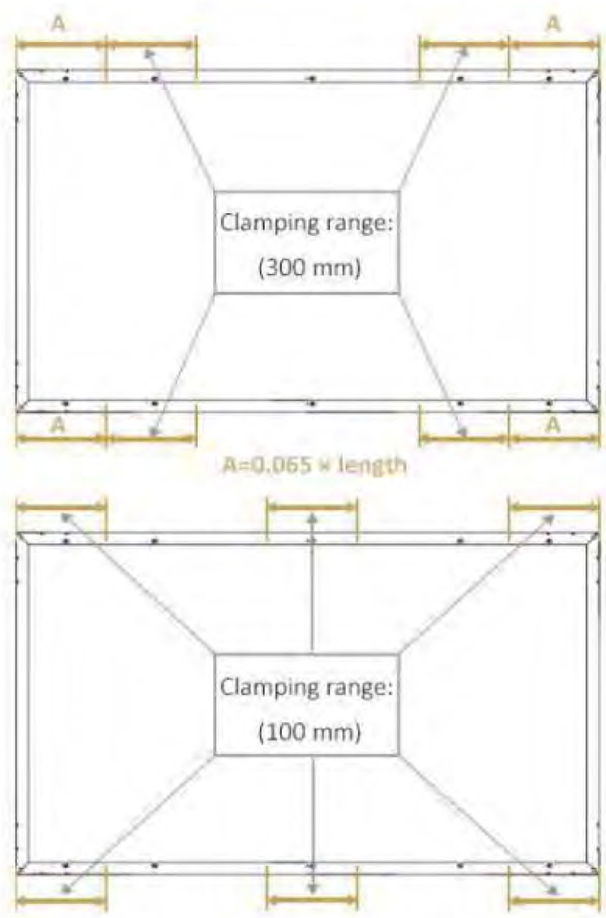
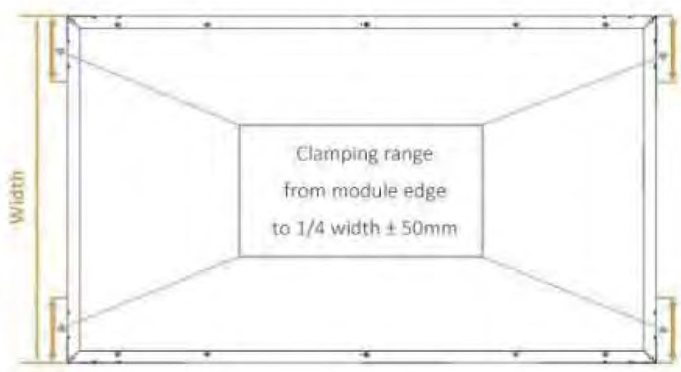
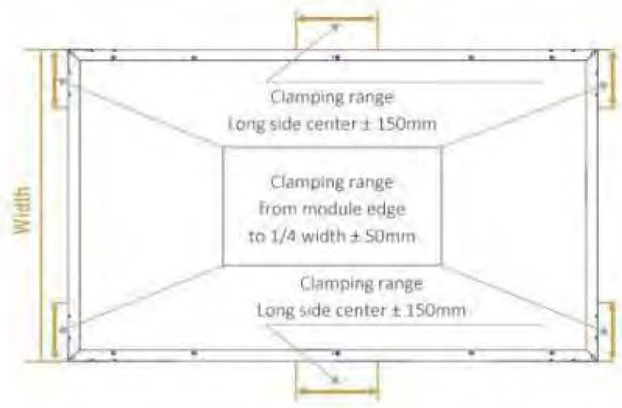
4.3 SCREW INSTALLATION

Each PV module has 8 mounting holes（155W-370W). And each PV module has 4 moun-ting holes(10W-150W) . The downward mechanical load resistance of Amso PV module would be different according to the installation holes used (shown as table 1). Please use 8 of them to secure the modules to support structure. The module frame must be attached to a mounting rail using M8 corrosion-proof screws together with spring washers and flat washers in eight symmetrical locations on the AS module. The applied torque should be big enough to fix it steadily.The reference torque value for M8 screw is 16~20N*m.

	3,800 Pa Load	5,400 Pa Load
Mounting holes system	 Use 4 mounting holes	 Use 8 mounting holes

4.4 CLAMP INSTALLATION

The module may be fastened to the support frame by using clamps on the long or short side of the module frame. Refer to Table 2 for instructions.

	2,400 Pa Load	3,800 Pa Load	5,400 Pa Load
Clamping System (to the long side of the frame)	 Use 4 clamps	 Use 4 clamps	
Clamping System (to the short side of the frame)	 Use 4 clamps on short side		 Use 4 clamps on short side and 2 clamps at the center of each long side of the frame

4.5 ELECTRICAL INSTALLATION

- ONLY qualified personnel can install or perform maintenance work on these PV modules.
- BE AWARE of dangerous high DC voltage when connecting module.
- DO NOT damage or scratch the rear surface of the module.
- DO NOT handle or install module when they are wet.
- The wiring components shall be compatible with the PV modules.
- The PV modules connected in serial shall have similar current. The Voc of one PV string shall no higher than the maximum system voltage (make reference to the maximum system voltage marked on label), the Voc temperature coefficient feature and the extreme low temperature of installation location must be taken into consideration when calculate the Voc of the PV string .
- The PV modules connected in parallel shall have similar Voltage. The Isc temperature coefficient feature and the extreme high temperature of installation location must be taken into consideration when calculate the Isc of the PV array.
- Please refer to local regulations to determine the system wires size, type and temperature.
- The cross-sectional area and cable connector capacity must satisfy the maximum short-circuit of PV system (For a single component, we recommended the cross-sectional area of cables is 4mm2 and the the rated current of connectors is more than 15A), otherwise cables and connectors will become overheating for large current. Please pay attention: the temperature limit of cables is 85°C and the temperature limit of connector is 105°C.
- A qualified system designer or integrator should always be consulted.
- Building permits, inspections and approvals by the local utility are generally required.

4.6 GROUNDING

Local regulations may require grounding of the panels. Where grounding is necessary or desired, it must be done using an electrical connection from the panel frame.
solar panels have a clearly marked, small round grounding hole positioned near each corner of the panel to aid in grounding. These can be further identified by the grounding symbol stamped in the frame next to it. The support bars across the rear of Amso Solar solar panels are connected to the frame via specially designed grounding clip and do not need to be individually grounded. Check all applicable requirements before beginning installation.

- Suitable grounding clips, lugs or other constructions must be used,
- Attach grounds to the grounding holes in the panel frames,
- Follow the grounding device manufacturer's installation instructions to ensure a safe and conductive connection, including any supplementary hardware, e.g., star washer, and tighten according to recommended torque.

Where common grounding hardware (nuts, bolts, star washers, split-ring lock washers, flat washers and the like) are used to attach a grounding device, the attachment must be made in conformance with the grounding device manufacturer's instructions.

5 MAINTENANCE

To ensure optimum module performance, Amso Solar recommends the following maintenance measures:

- Clean the glass surface of the module when required. If dirt is allowed to accumulate, it will reduce power output or even cause further damage. Always use clean, soft water and a soft sponge or cloth for cleaning. A mild, non-abrasive cleaning agent may be used to remove stubborn dirt. Do not use high pressure hoses, they may damage the module. Clean the modules in the early morning to avoid thermal shock and damage. Never attempt to clean broken modules.
- Check the electrical, grounding and mechanical connections every six months to verify that they are clean, secure, undamaged and free of corrosion.
- If any problem arises, consult a professional for suggestions.
- Caution: observe the maintenance instructions for all components used in the system, such as support frames, charging regulators, inverters, batteries etc.

6 DISCLAIMER OF LIABILITY

- As the adherence to this manual and the conditions or methods of installation, operation, use and maintenance of photovoltaic (PV) products are beyond Amso Solar's control, Amso Solar does not accept responsibility and expressly disclaims liability for any loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance.
- No responsibility is assumed by Amso Solar for any infringement of patents or other rights of third parties, which may result from the use of the PV product. No license is granted by implication or otherwise under any patent or patent rights.
- The information in this manual is based on Amso Solar's best knowledge and experience and is believed to be reliable; but such information including product specification (without limitations) and suggestions do not constitute a warranty, express or implied. Amso Solar reserves the right to change the manual, the PV product, the specifications, or product information sheets without prior notice.

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