

# HareonSolar

## PV module Installation Manual

Version 2015.05

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## **PURPOSE**

This manual is for Hareon solar PV module (hereinafter referred to as Module); introduce safety and maintenance information of module installation. Please read this manual carefully before you start the installation, follow the rules strictly during the installation.

## **DISCLAIMER OF LIABILITY**

Because the use of this manual and the conditions or methods of installation, operation, use and maintenance of module are beyond Hareon's control, Hareon does not accept responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance.

No responsibility is assumed by Hareon for any infringement of patents or other rights of third parties, which may result from use of the module. No license is granted by implication or otherwise under any patent or patent rights.

The information in this manual is based on Hareon's knowledge and experience and is believed to be reliable; but such information including product specification (without limitations) and suggestions do not constitute a warranty, expresses or implied. Hareon reserve the right to change the manual, the PV produce, the specifications, or product information sheets without prior notice.

## QUALITY ASSURANCE

Hareonsolar provide 10 years ensure for materials and process of module in 10 years after module sold.

12 years ensure for 90% output, 25 years ensure for 80% output.

## SECURITY AND TRANSPORT



Do not step on the module



Do not dismantle drop the module



Artificially concentrated sunlight shall not be directed on the module or panel



Do not hoist on the connection boxes



Do not use pointed or sharp objects with the module



Do not bend the module. Use both hands



Do not touch the surface of the coated glass with bare hand



Ensure all contacts are kept clean and dry

# MECHANICAL INSTALLATION

## Site choosing

- Select a suitable location for installing the modules.
- The modules should be facing south in northern latitudes and north in southern latitudes.
- The module should not be shaded at any time.
- Do not use modules near equipment or in locations where flammable gases may be generated or collected.
- **Modules are not design for seaside, module installation location away from the seaside at least 1 kilometer.**
- The module to be installed under the following conditions:
  - Operating Temp:  $-40^{\circ}$  ~  $85^{\circ}$
  - Storage Temp:  $-40^{\circ}$  ~  $60^{\circ}$
  - Humidity:  $\leq 85\%$
  - Wind Pressure:  $\leq 2400\text{Pa}$
  - Snow Pressure:  $\leq 5400\text{Pa}$
  - Corrosion resistance: except area with salt or sulfur corrosion

## Mounting angle

- A string of module should be mounted at the same angle, radiation exposure differ from mounting angle, it will cause current difference, which lead to lower operating efficiency of the whole system.
- Mounting angle please refer to table 1

table1

| latitude                    | Mounting angle                   |
|-----------------------------|----------------------------------|
| $0^{\circ}$ ~ $15^{\circ}$  | $=15^{\circ}$                    |
| $15^{\circ}$ ~ $25^{\circ}$ | $=\text{Latitude}$               |
| $25^{\circ}$ ~ $30^{\circ}$ | $= \text{Latitude} + 5^{\circ}$  |
| $30^{\circ}$ ~ $35^{\circ}$ | $= \text{Latitude} + 10^{\circ}$ |
| $35^{\circ}$ ~ $40^{\circ}$ | $= \text{Latitude} + 15^{\circ}$ |
| $> 40^{\circ}$              | $= \text{Latitude} + 20^{\circ}$ |

## Module mounting

- General rules
  - The module mounting structure must be made of durable, corrosion-resistant and UV-resistant material.
  - Modules must be securely attached to the mounting structure.
  - 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.
  - 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.
  - Observe the linear thermal expansion of the module frames (the recommended

minimum distance between two modules is 2 cm).

- Always observe the instructions and safety precautions included with the module support frames.
- Do not attempt to drill holes in the glass surface or 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.

➤ Installation methods

Modules can be installed on the frame by the following 3 methods:

- ✓ Mounting hole system: use corrosion free M8 bolt, module can be installed on the support frame through the installation holes on its own frame, show in figure1
- ✓ Clamping system: choose the right fixture to fix the module on the support frame, show in figure2
- ✓ Insertion system: Insert the whole module into the rail, show in figure3

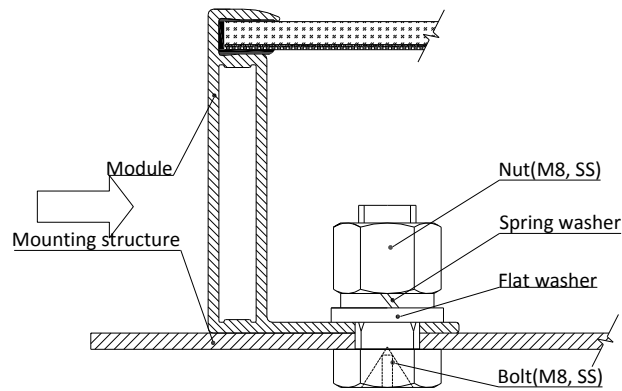
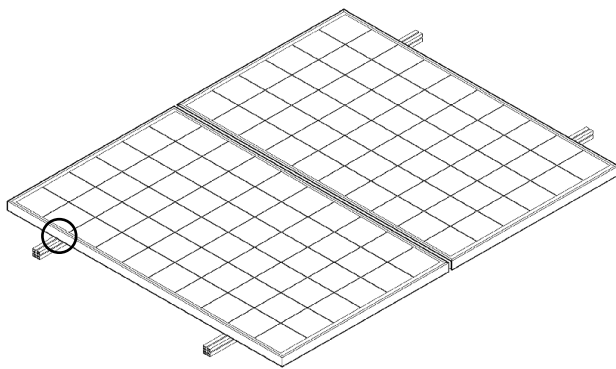


figure1

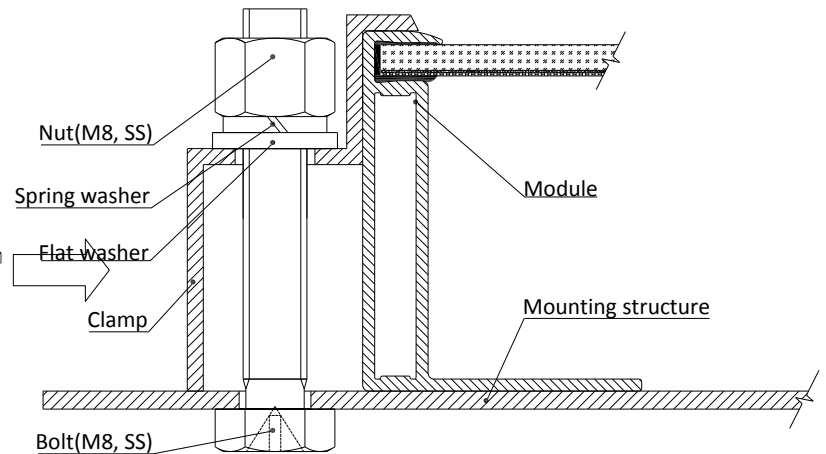
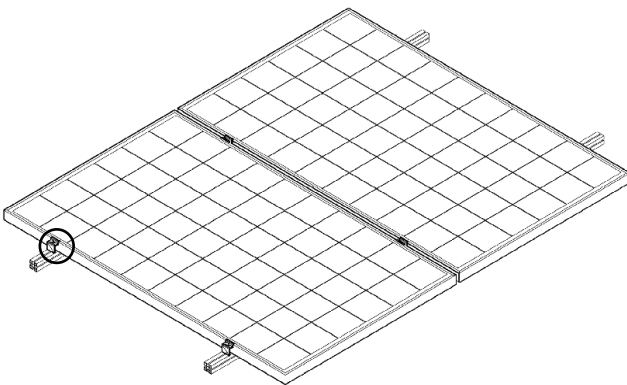


figure2

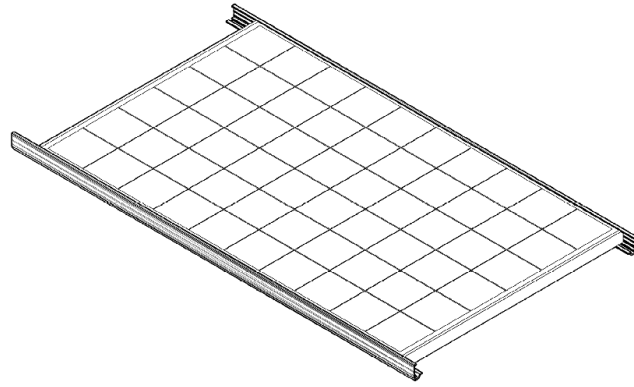


figure3

- Select the proper installation method depending on the load, please refer to figure4 for details:

|   | 2400Pa load                        | 3800Pa load                        | 5400Pa load   |                                   |
|---|------------------------------------|------------------------------------|---|-----------------------------------|
| Screw fitting   | 1/1                                | 1/2<br><br>Use four mounting holes | 1/3<br><br>Use eight mounting holes   |                                   |
| Clamping system<br>Attachment to the long module sides  | 2/1<br><br>Use four mounting clips | 2/2<br><br>Use four mounting clips | 2/3<br><br>Use four mounting clips  | 2/4<br><br>Use six mounting clips |
| Clamping system<br>Attachment to the short module sides | 3/1<br><br>Use four mounting clips | 3/2                                | 3/3<br><br>Short frame use four mounting clips<br>Long frame use two mounting clips |                                   |
| Insertion system  | 4/1<br><br>Insertion system        | 4/2                                | 4/3<br><br>Insertion system   |                                   |

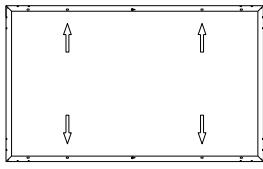
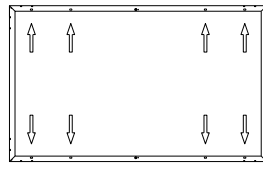

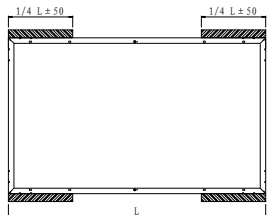

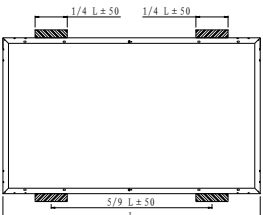

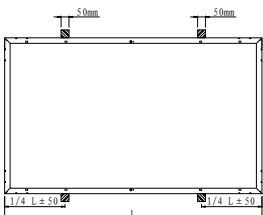

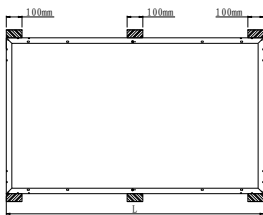

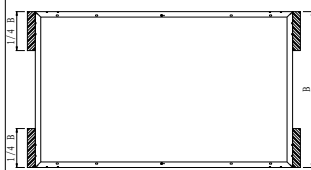

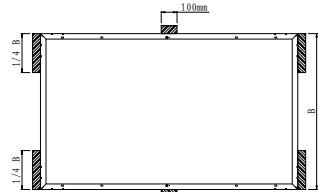
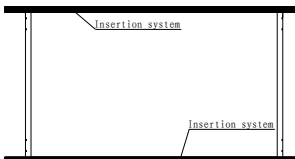
|  | 2400Pa load  | 3800Pa load   | 5400Pa load   |  |
|--|--|---|---|--|
| Screw fitting  | 5/1  | 5/2<br><br>Use four mounting holes   | 5/3<br><br>Use eight mounting holes  |  |
| Clamping system<br>Attachment to the long module sides | 6/1 <br><br>Use four mounting clips    | 6/2 <br><br>Use four mounting clips | 6/3 <br><br>Use four mounting clips  | 6/4 <br><br>Use six mounting clips |
|  | 7/1 <br><br>Use four mounting clips | 7/2   | 7/3 <br><br>Short frame use four mounting clips<br>Long frame use two mounting clips |  |
| Insertion system                                       | 8/1  | 8/2   | 8/3<br>  |  |

figure4

Note: The module has passed the IEC61215 mechanical 2400Pa and 5400Pa on existing 8 installing holes.

➤ Module Specification(show in figure5,table2 and table 3)

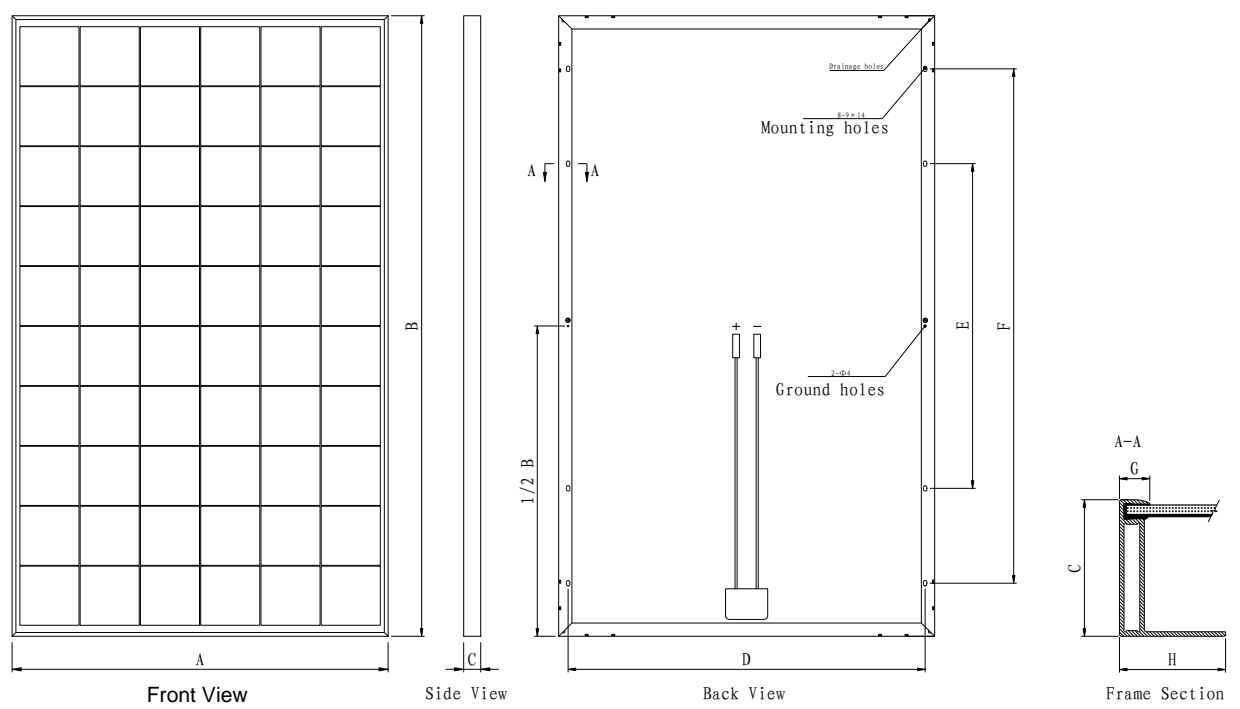


figure5



table2

unit: mm

| No. | Module Type    | A   | B    | C  | D   | E   | F    | G  | H  | weight<br>(kg) |
|-----|----------------|-----|------|----|-----|-----|------|----|----|----------------|
| 1   | HR-XXXP-18/Bb  | 992 | 1636 | 35 | 942 | 856 | 1356 | 10 | 35 | 19.0           |
|     |                | 992 | 1636 | 40 | 942 | 856 | 1356 | 10 | 35 | 19.3           |
| 5   | HR-XXXP-18/Bbb | 992 | 1636 | 35 | 942 | 856 | 1356 | 10 | 35 | 19.0           |
|     |                | 992 | 1636 | 40 | 942 | 856 | 1356 | 10 | 35 | 19.3           |
| 6   | HR-XXX-18/Cb   | 992 | 1636 | 35 | 942 | 856 | 1356 | 10 | 35 | 19.0           |
|     |                | 992 | 1636 | 40 | 942 | 856 | 1356 | 10 | 35 | 19.3           |
| 7   | HR-XXX-18/Cbb  | 992 | 1636 | 35 | 942 | 856 | 1356 | 10 | 35 | 19.0           |
|     |                | 992 | 1636 | 40 | 942 | 856 | 1356 | 10 | 35 | 19.3           |
| 8   | HR-XXXP-24/Ba  | 992 | 1952 | 35 | 942 | 856 | 1356 | 10 | 35 | 21.5           |
|     |                | 992 | 1952 | 40 | 942 | 856 | 1356 | 10 | 35 | 21.8           |
| 9   | HR-XXXP-24/Bab | 992 | 1952 | 35 | 942 | 856 | 1356 | 10 | 35 | 21.5           |
|     |                | 992 | 1952 | 40 | 942 | 856 | 1356 | 10 | 35 | 21.8           |
| 10  | HR-XXX-24/Ca   | 992 | 1952 | 35 | 942 | 856 | 1356 | 10 | 35 | 21.5           |
|     |                | 992 | 1952 | 40 | 942 | 856 | 1356 | 10 | 35 | 21.8           |
| 11  | HR-XXX-24/Cab  | 992 | 1952 | 35 | 942 | 856 | 1356 | 10 | 35 | 21.5           |
|     |                | 992 | 1952 | 40 | 942 | 856 | 1356 | 10 | 35 | 21.8           |

Note: "XXX" refer to power index

Table 3 performance data

Note: In order to distinguish the fire resistance module from the standard module, we add letter“f” at the end of module name, e.g. the fire resistance module of HR-XXX-18/Bb series will be named HR-XXX-18/Bbf.

/Bb series – outer dimensions -1636mm× 992mm ×35mm 1636mm× 992mm ×40mm

| Model         | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|---------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXXP-18/Bb | 1000                       | 37.25    | 29.67   | 8.09   | 8.48   | 240     | 15                      | Class A           | 21                                 | Class C<br>HR-XXXP-18/Bbf             |
|               | 1000                       | 37.34    | 29.88   | 8.20   | 8.63   | 245     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 37.41    | 29.98   | 8.34   | 8.79   | 250     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 37.54    | 30.25   | 8.43   | 8.94   | 255     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 37.65    | 30.51   | 8.52   | 9.09   | 260     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 37.81    | 30.71   | 8.63   | 9.24   | 265     | 15                      | Class A           |                                    |                                       |

/Bbb series – outer dimensions –1636mm× 992mm ×35mm 1636mm× 992mm ×40mm

| Model          | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|----------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXXP-18/Bbb | 1000                       | 37.16    | 29.90   | 7.86   | 8.61   | 235     | 15                      | Class A           | 21                                 | Class C<br>HR-XXXP-18/Bbbf            |
|                | 1000                       | 37.23    | 29.98   | 8.01   | 8.66   | 240     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 37.34    | 30.11   | 8.14   | 8.82   | 245     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 37.42    | 30.31   | 8.25   | 8.98   | 250     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 37.53    | 30.51   | 8.36   | 9.13   | 255     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 37.63    | 30.74   | 8.46   | 9.30   | 260     | 15                      | Class A           |                                    |                                       |

/Cb series – outer dimensions – 1636mm x 992mm x 35mm 1636mm x 992mm x 40mm

| Model        | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|--------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXX-18/Cb | 1000                       | 37.42    | 30.30   | 8.09   | 8.73   | 245     | 15                      | Class A           | 21                                 | Class C<br>HR-XXX-18/Cbf              |
|              | 1000                       | 37.51    | 30.40   | 8.22   | 8.88   | 250     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 37.59    | 30.50   | 8.36   | 9.03   | 255     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 37.73    | 30.60   | 8.50   | 9.18   | 260     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 37.91    | 30.70   | 8.63   | 9.31   | 265     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 38.10    | 30.80   | 8.77   | 9.45   | 270     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 38.30    | 30.90   | 8.90   | 9.57   | 275     | 15                      | Class A           |                                    |                                       |

/Cbb series – outer dimensions – 1636mm x 992mm x 35mm 1636mm x 992mm x 40mm

| Model         | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|---------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXX-18/Cbb | 1000                       | 37.51    | 30.49   | 8.04   | 8.64   | 245     | 15                      | Class A           | 21                                 | Class C<br>HR-XXX-18/Cbb              |
|               | 1000                       | 37.59    | 30.59   | 8.17   | 8.79   | 250     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 37.73    | 30.69   | 8.31   | 8.93   | 255     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 37.91    | 30.79   | 8.44   | 9.06   | 260     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 38.10    | 30.90   | 8.58   | 9.19   | 265     | 15                      | Class A           |                                    |                                       |

/Ba– outer dimensions – 1952mm× 992mm ×35mm1982mm×1000mm×40mm

| Model         | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|---------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXXP-24/Ba | 1000                       | 44.51    | 35.60   | 8.00   | 8.52   | 285     | 15                      | Class A           | 17                                 | Class C<br>HR-XXXP-24/Baf             |
|               | 1000                       | 44.65    | 35.86   | 8.09   | 8.64   | 290     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 44.74    | 35.98   | 8.20   | 8.76   | 295     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 44.82    | 36.30   | 8.26   | 8.88   | 300     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 44.91    | 36.61   | 8.33   | 8.99   | 305     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 45.05    | 36.82   | 8.42   | 9.10   | 310     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 45.29    | 36.98   | 8.52   | 9.11   | 315     | 15                      | Class A           |                                    |                                       |

/Bab series – outer dimensions –1952mm× 992mm ×35mm1982mm×1000mm×40mm

| Model          | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|----------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXXP-24/Bab | 1000                       | 44.59    | 35.81   | 7.82   | 8.53   | 280     | 15                      | Class A           | 17                                 | Class C<br>HR-XXXP-24/Babf            |
|                | 1000                       | 44.68    | 36.01   | 7.91   | 8.74   | 285     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 44.81    | 36.18   | 8.02   | 8.85   | 290     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 44.90    | 36.42   | 8.10   | 8.86   | 295     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 45.04    | 36.81   | 8.15   | 8.88   | 300     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 45.16    | 37.01   | 8.24   | 9.12   | 305     | 15                      | Class A           |                                    |                                       |
|                | 1000                       | 45.25    | 37.12   | 8.35   | 9.20   | 310     | 15                      | Class A           |                                    |                                       |

/Cab series – outer dimensions –1952mm× 992mm ×35mm1982mm× 1000mm× 40mm

| Model         | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|---------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXX-24/Cab | 1000                       | 45.28    | 36.56   | 7.93   | 8.47   | 290     | 15                      | Class A           | 17                                 | Class C<br>HR-XXX-24/Cabf             |
|               | 1000                       | 45.49    | 36.68   | 8.04   | 8.56   | 295     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 45.72    | 36.80   | 8.15   | 8.63   | 300     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 46.02    | 36.92   | 8.26   | 8.72   | 305     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 46.31    | 36.99   | 8.38   | 8.79   | 310     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 46.61    | 37.10   | 8.49   | 8.87   | 315     | 15                      | Class A           |                                    |                                       |
|               | 1000                       | 46.91    | 37.23   | 8.60   | 8.93   | 320     | 15                      | Class A           |                                    |                                       |

/Ca series – outer dimensions –1952mm× 992mm ×35mm1982mm× 1000mm× 40mm

| Model        | Maximum System Voltage(V ) | Voc (V ) | Vm (V ) | Im (A) | Isc(A) | Pmax(W) | Maximum Series Fuse (A) | Application class | Max. quantity of modules in series | Fire Resistance Class and Module Type |
|--------------|----------------------------|----------|---------|--------|--------|---------|-------------------------|-------------------|------------------------------------|---------------------------------------|
| HR-XXX-24/Ca | 1000                       | 45.01    | 36.48   | 8.09   | 8.71   | 295     | 15                      | Class A           | 17                                 | Class C<br>HR-XXX-24/Caf              |
|              | 1000                       | 45.11    | 36.60   | 8.20   | 8.81   | 300     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 45.28    | 36.72   | 8.31   | 8.92   | 305     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 45.49    | 36.84   | 8.41   | 9.01   | 310     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 45.62    | 36.91   | 8.53   | 9.12   | 315     | 15                      | Class A           |                                    |                                       |
|              | 1000                       | 45.80    | 37.02   | 8.64   | 9.21   | 320     | 15                      | Class A           |                                    |                                       |

# ELECTRICAL INSTALLATION

DC power generated by PV system can be converted to AC power, connected to the Grid. Policies to the Grid connected renewable energy system vary from region to region. Please turn to senior system design engineer for relevant information before you start to design the PV system.

Usually, you should get a formal approval from local public utilities sector before you start it.

## General Rules

- Installation structure should be compatible with Aluminum frame of module, in order to avoid galvanic corrosion.
- System (inverter) Negative grounding is recommended during installation of Module to prevent PID effect
- Positive and negative part of the module should use the same type of connector for electrical connection.
- All electrical components should have ratings equal or greater to the system rating. Do not exceed the maximum allowable system, voltage as listed on the module label.
- Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of ISC and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, fuse sizes, and size of controls connected to the PV output.
- To prevent discharge in the process of dismantling conductor, you must use an opaque material to completely cover the modules
- PV system only installed by certified professionals, module can generate a current under light, non-professionals not familiar with safety regulations may be subject to the risk of electric shock, etc.
- Always use the same type of module in a PV system. While connected in series, voltage of each string should below maximum system voltage (show in figure6). Recommended maximum series module configurations:  $1000\text{ V}/(1.25 \cdot V_{oc})$ , please refer to table 3.
- While connected in parallel, the output current is equal to the sum of current of each string (show in figure7). Use a fuse in each string of module; please refer to the application requirements locally. Recommended maximum parallel module configurations: Fuse rating/ $I_{sc}+1$ , please refer to table 3.

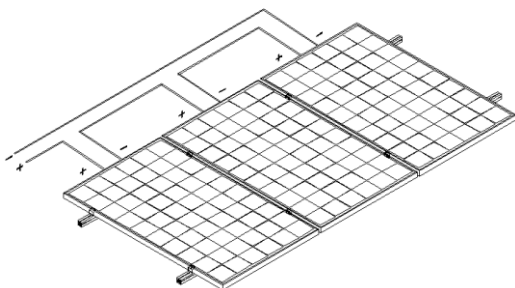


figure6series

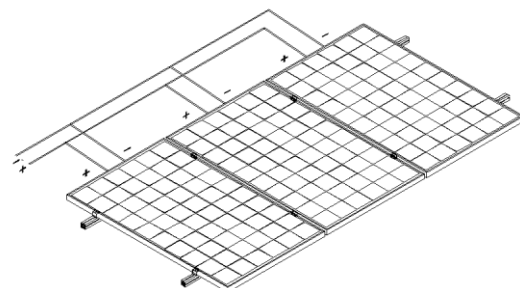


figure7 Parallel

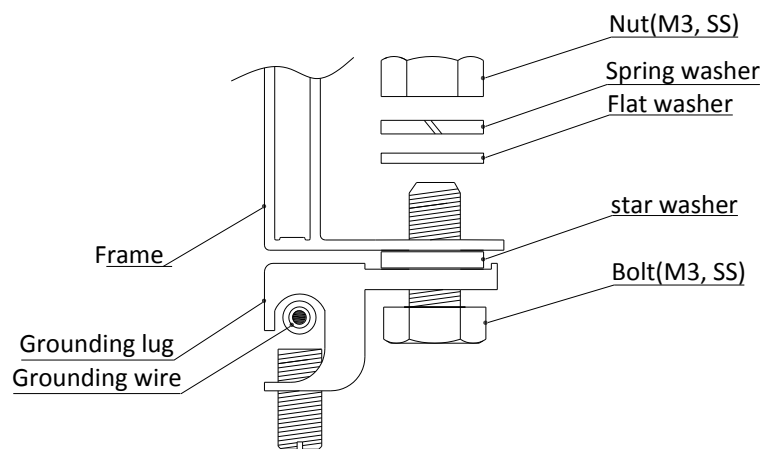
- Please refer to local regulations to determine the system wires size, type and temperature.
- The cross section area of cable and the capacity of connector must be selected to suit the maximum system short circuit current(Recommended cross section area of cable is  $4\text{mm}^2$  for a single module and rated current of a connector is larger than 10A ), otherwise the cable and

connector will be overheated under large current. Please pay attention: the temperature limit of cables is 85°C and the temperature limit of connector 105°C.

- During the installation, make sure the connectors, inverters and other electrical components in a disconnected.
- In order to reduce lightning damage, keep the loop as small as possible while laying cable. Recommended that each string using the fuse protection device.

## GROUNDING

- All frame and mounting structure are required to grounding In accordance with the National Electrical Code.
- While using metal structure, please make sure its surface have been electroplating treated, in order to keep a good conducting circuit.
- Choose a proper grounding conductor, connecting frame with the mounting structure, effectively grounding.
- Grounding conductor must be connected to ground via a suitable ground electrode. Lugs recommended. Mounting frame should also be grounding without bolts and nuts electrically connecting to module frame.
- Striping the grounding wire to proper length, do not hurt the metal core during; insert it into the lug, fastening the screw then. Follow figure8 use bolt to connect lug to the frame. Recommended



M3 screw assembly is 2.3 N·m.

Figure 8

## BYPASS DIODE AND BLOCK DIODE

In system with more than 2 strings of module, while one module shaded and others under light, overload I<sub>sc</sub> will cause overheat of cell to damage the module.

By-pass diodes are required to protect each string of the module from the effect of shading. Do not try to open the j-box by yourself to change diode even if it breaks down, turn to professionals for help, the information of bypass diode please refer to table 4

Blocking diodes are used between battery and module to prevent damage on module while discharge.

Table4

| Object  | Manufacturer / trademark                            | Type / model | Technical data / ratings           | Standard (if applicable) | Certificates (if applicable) |
|---|---|--------------|------------------------------------|--------------------------|------------------------------|
| Combination A (TL-BOX026-15D3):for all type families, except for 96pcs 5" mono type.  |   |              |                                    |                          |                              |
| Bypass diode  | PAN JIT INTERNATIONAL INC.                          | SB1540LS     | Tj max =200°C; If=15A              | -                        | -                            |
| Combination B(PV-ZH009): only for 6"mono, poly and quasi mono c-Si type families.   |   |              |                                    |                          |                              |
| Bypass diode  | PAN JIT INTERNATIONAL, INC.                         | 10SQ050      | Tj max =200°C; If=10A              | -                        | -                            |
| Combination C (TL-BOX005B-1-12):for all type families, except for 96pcs 5" mono type.   |   |              |                                    |                          |                              |
| Bypass diode  | PAN JIT INTERNATIONAL, INC.                         | 12SQ045      | Tj max =200°C; If=12A              | -                        | -                            |
| Combination E (JW BOX2661): for all type families, except for 96pcs 5" mono type.   |   |              |                                    |                          |                              |
| Bypass diode  | Diotec Semiconductor AG.                            | SBJ1845      | Tj max =200°C; If=18A              |                          |                              |
|   | PAN JIT INTERNATIONAL, INC.                         | SB2045F      | Tj max =200°C; If=13A              |                          |                              |
| Combination F (PV-ZH009-3): for all type families, except 96pcs 5" mono type.   |   |              |                                    |                          |                              |
| Bypass diode  | Ningbo ZhonghuanSunter PV Technology Co.,Ltd.       | 20SQ045      | Tj max =200°C; If=20A              | -                        | -                            |
| Combination G (RH3), only restricted combined with Toyo backsheet W250-S-FA20-le  |   |              |                                    |                          |                              |
| Bypass diode  | ST semiconductor                                    | STPS1545CG   | Tj max =175°C; If =20A             | -                        | -                            |
| Combination I(TL-BOX026-15D3P):for all type families, not combined with KEIWA WPF325PO backsheet  |   |              |                                    |                          |                              |
| Bypass diode  | PAN JIT INTERNATIONAL INC.                          | SB1540LS     | Tj max =200°C; If=15A              | -                        | -                            |
| Potting material  | Tonsan Adhesive Co., Ltd                            | 3153         | -                                  | -                        | -                            |
| Combination J(PV-RH0502B): only for 5"mono c-si type family, restricted combined with 3M backsheet Scotchshield Film 17T , Toyo solar back sheet W250-S-FA20-le and August Krempel PTL3-38/250. |   |              |                                    |                          |                              |
| Bypass diode  | Yangzhou Yangjie Electronic Co.,Ltd                 | 10SQ050      | Tj max =200°C; If=10A              | -                        | -                            |
|   | Yangzhou Hongyang Electronics Co.,Ltd               | 10SQ050      | Tj max =200°C; If=10A              | -                        | -                            |
|   | CixiRenhe Photovoltaic Electrical Appliance Co.,Ltd | ZJRHPVS105   | Tj max =200°C; I <sub>f</sub> =15A | -                        | -                            |
| Combination K(PV-RH701-11A/-15A):for all type families , restricted combined with 3M backsheet Scotchshield Film 17T , Toyo solar back sheet W250-S-FA20-le and August Krempel PTL3-38/250.     |   |              |                                    |                          |                              |



| Object   | Manufacturer / trademark                            | Type / model | Technical data / ratings | Standard (if applicable) | Certificates (if applicable) |
|--|---|--------------|--------------------------|--------------------------|------------------------------|
| Bypass diode   | Yangzhou Yangjie Electronic Co.,Ltd                 | 10SQ050      | Tj max =200°C; If=10A    | -                        | -                            |
|  | Yangzhou Hongyang Electronics Co.,Ltd               | 10SQ050      | Tj max =200°C; If=10A    | -                        | -                            |
|  | CixiRenhe Photovoltaic Electrical Appliance Co.,Ltd | ZJRHPVS105   | Tj max =200°C; If=15A    | -                        | -                            |
| Combination L(PV-RH701L):for all type families, restricted combined with 3M backsheet Scotchshield Film 17T , Toyo solar back sheet W250-S-FA20-le and August Krempel PTL3-38/250.   |   |              |                          |                          |                              |
| Bypass diode   | Renhe Photovoltaic Technology Co.,Ltd               | PS4512       | Tj max =200°C; If=12A    | -                        | -                            |
| Combination M(GF20): for all types except for 5" mono 96 pcs ; restricted combined with 3M backsheet Scotchshield Film 17T & 15T Black & 15T , Toyo solar back sheet W250-S-FA20-le and August Krempel PTL3-38/250,DyMat PYE SPV, DyMatBk PYE;   |   |              |                          |                          |                              |
| Bypass diode   | Renhe Photovoltaic Electrical Co.,Ltd               | PST4020      | Tj max =200°C; If=20A    | -                        | -                            |
| Combination N(PV-ZH011-1): for all types except for 5" mono 96 pcs ; restricted combined with 3M backsheet Scotchshield Film 17T & 15T Black & 15T , Toyo solar back sheet W250-S-FA20-le , August Krempel PTL3-38/250 & PVL 2-1000V , KEIWA backsheet WPF325PO,Filmback-PVS 190,DyMat PYE SPV, DyMatBk PYE; |   |              |                          |                          |                              |
| Bypass diode   | Ningbo Zhonghuan Sunter PV Technology Co., Ltd      | 20SQ045      | Tj max =200°C; If=20A    | -                        | -                            |
|  | Jinan Jing Heng Electronics Co.,Ltd                 | SR3045       | Tj max =200°C; If=30A    | -                        | -                            |
| Combination O(BOX0707-2): for all types except for 5" mono 96 pcs ; restricted combined with Toyo solar back sheet W250-S-FA20-le  |   |              |                          |                          |                              |
| Bypass diode   | Yangzhou Hongyang Electronics Co., Ltd              | 15SQ045      | Tj max =200°C; If=15A    | -                        | -                            |
| Combination P(GIPB-33):for all type families , restricted combined with 3M backsheet Scotchshield Film 17T and Toyo solar back sheet W250-S-FA20-le.   |   |              |                          |                          |                              |
| Bypass diode   | Foxconn (Kun Shan) Computer Connector Co.,Ltd       | 15SQ045      | Tj max =200°C; If=15A    | -                        | -                            |
| Combination Q( PV-JB003A-4):Only for 5"mono c-Si family types , restricted combined with 3M backsheet Scotchshield Film 17T and Toyo solar back sheet W250-S-FA20-le.  |   |              |                          |                          |                              |
| Bypass diode   | Yangzhou Yangjie Electronic Co.,Ltd                 | 10SQ050      | Tj max =200°C; If=10A    | -                        | -                            |
| Combination R( PV-JB003A-2):for all family types, except for 5"mono c-Si family types , restricted combined with 3M backsheet Scotchshield Film 17T and Toyo solar back sheet W250-S-FA20-le.  |   |              |                          |                          |                              |
| Bypass diode   | Yangzhou Yangjie Electronic Co.,Ltd                 | 12SQ045      | Tj max =200°C; If=12A    | -                        | -                            |
|  | PAN JIT INTERNATIONAL INC                           | 12SQ045      | Tj max =200°C; If=12A    | -                        | -                            |
| Combination S( TL-BOX029-1A & TL-BOX029-2A & TL-BOX029-3A): for all family types, restricted combined with 3M backsheet Scotchshield Film 15T and Toyo solar back sheet W250-S-FA20-le.  |   |              |                          |                          |                              |
| Bypass diode   | PAN JIT INTERNATIONAL INC                           | SB3040DY     | Tj max =200°C; If=30A    | -                        | -                            |
| Combination T( CM0804-01a, restricted combined with Sunocean-FPE35 & W250-S-FA20-le & HTP-S320-31):  |   |              |                          |                          |                              |
| Bypass diode   | PANJIT ELECTRONICS(WUXI),LTD                        | SB1640LDC    | Tj max =175°C; If=16A    | -                        | -                            |
|  | Yangzhou Yangjie Electronic Co.,Ltd                 | GF1640MC     | Tj max =200°C; If=16A    | -                        | -                            |
| Combination U(102043-x, restricted combined with Madico backsheet Protekt HD, 3M backsheet Scotchshield Film 15T, August Krempel PTL3-38/250 & PVL 2-1000V , KEIWA backsheet WPF325PO and Isovolta backsheet AAA3554.  |   |              |                          |                          |                              |
| Bypass diode   | PANJIT ELECTRONICS(WUXI),LTD                        | SB1640LDC    | Tj max =200°C; If=16A    | -                        | -                            |

| Object                      | Manufacturer / trademark | Type / model | Technical data / ratings | Standard<br>(if applicable) | Certificates<br>(if applicable) |
|-----------------------------|--------------------------|--------------|--------------------------|-----------------------------|---------------------------------|
| Combination V(0-1740699-5), |                          |              |                          |                             |                                 |
| Bypass diode                | TYCO                     | SL1515B      | Tj max =200°C; If=20A    |                             |                                 |

## MAINTENANCE

Module under normal circumstances no maintenance. Here we recommend the following maintenance methods to ensure the best performance of module:

- In most conditions, the rain can be enough to keep the glass clean.
- Clean the glass surface of the module when required. Always use clean water and a soft sponge or cloth for cleaning. A mild, non-abrasive cleaning agent may be used to remove stubborn dirt.
- Do not try to clean a module with broken glass or perforated backsheet; it will cause serious electrical shock.
- Regulation inspection every 6 month for grounding, mechanical and electrical connections. Make sure all connectors clean, reliable, no damage or corrosion happened.
- You must use an opaque material to completely cover the module during maintenance. If you need electrical or mechanical inspection or maintenance, it is recommended to have a licensed, authorized professional carry out the job to avoid hazards of electric shock or injury.



Warning: Before any electrical maintenance, you should firstly shut down the system; any improper maintenance can lead to electric shock or injury.

## RECYCLING

As a member of PV CYCLE, Hareonsolar promise after module has been out of use, it will be recycled by specialized organizations to ensure all over the PV process is environment friendly. All service items are compliance with CE, providing free terminal service also (except accidents occurring during the installation)

To get more information please visit: <http://www.pvcycle.org/>



✘ All contents of this installation manual, the final interpretation from Hareon Solar.



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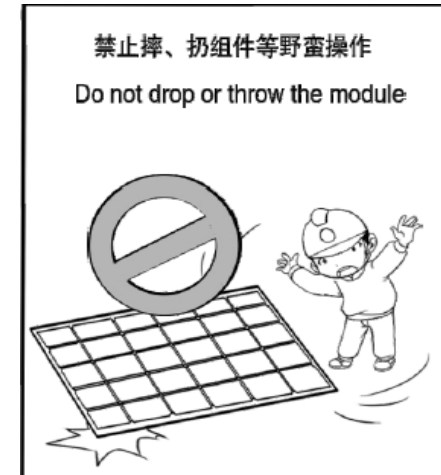
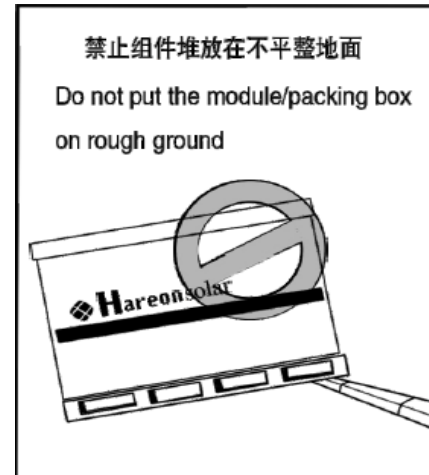
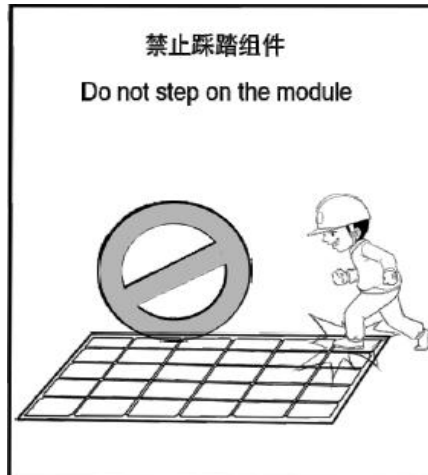
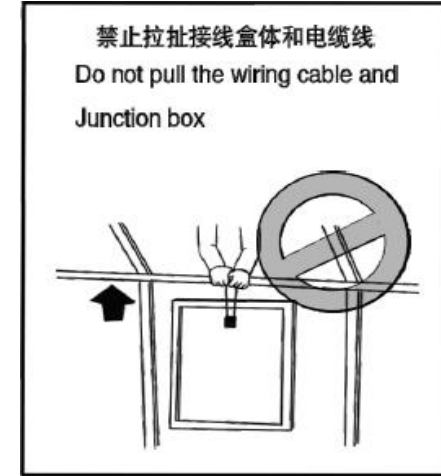
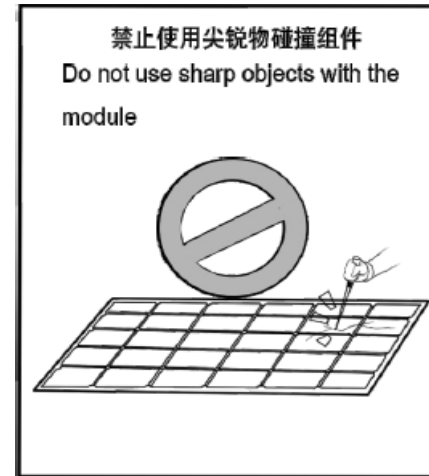
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## ADDENDUM 1

## Module Installation Warning



**Disclaimer: Due to the damage caused by illegal operations, Hareonsolar does not offer any assurance of quality.**