ReNew

SOLAR PV MODULE
Installation Manual

BIFACIAL MODULE

RPS1MH66BDXXX | RPS1MH60BDXXX | RPS2MH72BDXXX

RPS3MH66BDXXX

MONOFACIAL MODULE

RPS1MH66MBXXX | RPS1MH60MBXXX | RPS2MH72MBXXX

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1. Overview

Thank you for choosing ReNew PV modules. This manual briefly elaborates on the installation and safety use information for our modules. Since solar PV modules generate electricity when exposed to light, there are certain safety precautions that need to be regulated.

Please follow the instructions carefully before installing and making use of the modules.

2. Laws and Regulations

Installation of photovoltaic modules i.e. electrical and mechanical shall be in accordance with applicable regulations, including electrical law, construction law and electrical connection requirements. These regulations vary from site to site, building roof installation, vehicle applications, etc. Requirements may also vary depending on the installed system voltage, DC or AC. Please contact local authorities for specific terms.

External or otherwise artificially concentrated sunlight shall not be directed onto the front or back face of the PV module.

3. General Information

3.1. Module Identification

There are 3 labels on the modules which contain the following information.

- **Back label or rating label**
  - Product model / type
  - Module electrical data (Power, V_{oc}, I_{sc}, I_{mpp}, V_{mpp})
  - Certification logo and certification number
  - Maximum overload protection current
  - Maximum system voltage
  - Manufacturing address
  - Safety sign

- **Current binning label/ Rated working label**
  - High
  - Low

- **Module Serial Number**
  - There is unique serial number, one will be inside the laminates and other two will be pasted on the substrate and frame.

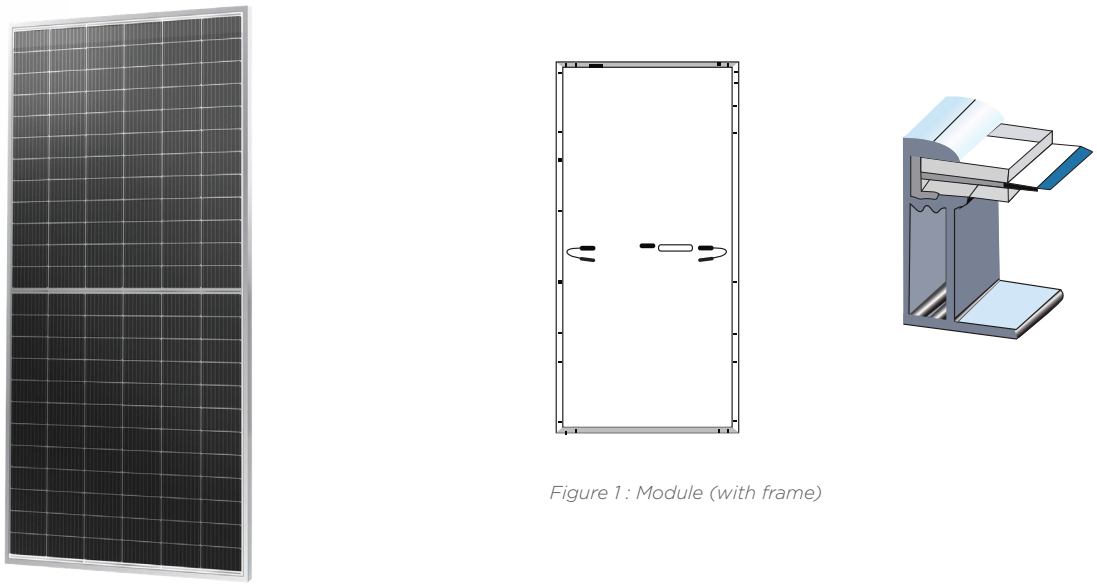
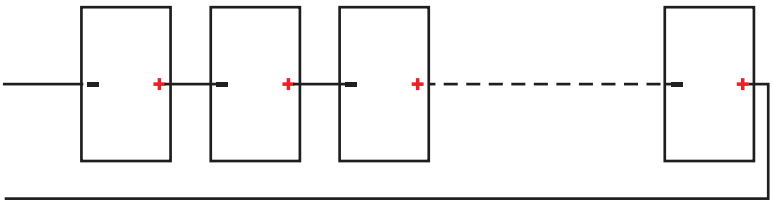
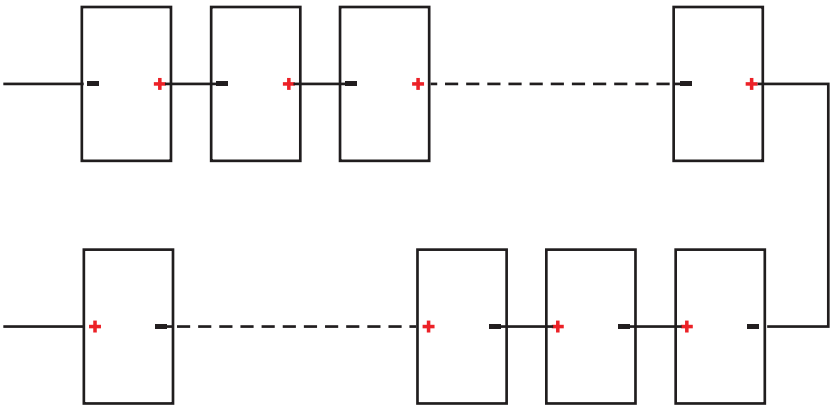
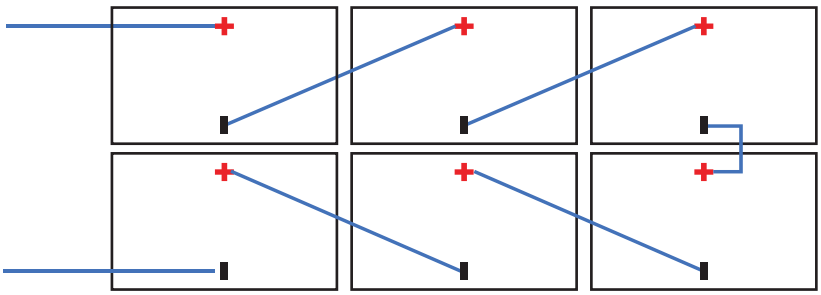


Figure 1 : Module (with frame)

3.2. Wiring Methodology

In case where a cable connection method is not included in the below table confirm the suitable cable length with any ReNew sales representative.

Orientation	Recommended wiring connection
Portrait (1P)	 An extension cord is required at the last module
Portrait (2P)	

Landscape	 Required cable length will be mentioned in the product datasheet

3.3. Electrical Performance Safety

- The module's solar cell will generate direct current (DC) when it is exposed to direct sunlight or other light sources, and direct contact with electricity live parts of the module, such as terminals, can result in injury or death, irrespective of whether or not the module and the other electrical equipment are connected.

  La cellule solaire du module générera un courant continu (CC) lorsqu'elle est exposée à la lumière directe du soleil ou à d'autres sources lumineuses, et un contact direct avec des parties électriques sous tension du module, telles que des bornes, peut entraîner des blessures ou la mort, indépendamment du fait que pas le module et les autres équipements électriques sont connectés.

- In case of no connected load or external circuits, modules can still produce voltage. Please use insulation tools and wear rubber gloves when operating modules in the sunlight.

  En l'absence de charge connectée ou de circuits externes, les modules peuvent encore produire de la tension. Veuillez utiliser des outils d'isolation et porter des gants en caoutchouc lorsque vous utilisez des modules à la lumière du soleil.

- Operation of PV modules can only be stopped when they are kept away from sunlight or covered by hard board or UV-proof materials or when the sun-facing side of the module is placed on a smooth and flat surface facing downwards.

  Le fonctionnement des modules PV ne peut être arrêté que lorsqu'ils sont tenus à l'écart de la lumière du soleil ou recouverts de panneaux durs ou de matériaux résistants aux UV ou lorsque l'angle des modules face au soleil est placé sur des surfaces lisses et planes.

- To avoid electric arc or electric shock hazards, please do not break down electric connections in loaded conditions. Incorrect connections will also lead to an electric arc or shock. Keep connectors dry and clean and make sure that they are in good operating conditions.

  Pour éviter les risques d'arc électrique ou de choc électrique, veuillez ne pas rompre la connexion électrique dans des conditions de charge. Des connexions incorrectes

entraîneront également un arc électrique ou un choc électrique. Gardez les connecteurs secs et propres et assurez-vous qu'ils sont en bon état de fonctionnement.

- Broken glass either in front or rear can become an electrical safety hazard (may cause electric shock or fire). These modules cannot be repaired and should be removed and replaced immediately.

  Le verre brisé à l'avant et à l'arrière peut entraîner un danger électrique (peut provoquer un choc électrique ou un incendie). Ces modules ne peuvent pas être réparés et doivent être retirés et remplacés immédiatement.

- If the edge-sealing material of a module is damaged, this module needs to be isolated first then either repaired or replaced immediately with new one.

  Si le matériau d'étanchéité des bords est endommagé, ce module doit d'abord être isolé, puis réparé et remplacé ou remplacé immédiatement par un nouveau.

- Do not operate when modules are wet unless you wear PPE (personal protective equipment). Please follow the cleaning requirements in this manual when cleaning modules.

  Ne pas utiliser lorsque les modules sont mouillés, sauf si vous portez un EPI (équipement de protection individuelle). Veuillez suivre les exigences de nettoyage de ce manuel lors du nettoyage des modules.

3.4. Operation Safety

- Do not damage the package and do not drop packaged modules to the ground.

  N'endommagez pas l'emballage et ne laissez pas tomber les modules emballés sur le sol.

- Do not exceed the indicated maximum layer limit on the packaging carton when piling modules up.

  Ne dépassez pas la limite maximale de couche indiquée sur le carton d'emballage lors de l'empilement des modules.

- Put packaging carton in the ventilated, water-proof and dry places before unpacking modules.

  Placez le carton d'emballage dans des endroits ventilés, étanches et secs avant de déballer les modules.

- If modules are stored in an uncontrolled environment, the storage time should be less than 3 months and extra precautions should be taken to prevent connectors from being exposed to moisture or sunlight, like using connector endcaps.

  Si les modules sont stockés dans un environnement non contrôlé, la durée de stockage doit être inférieure à 3 mois et des précautions supplémentaires doivent être prises pour éviter que les connecteurs ne soient exposés à l'humidité ou à la lumière du soleil, comme l'utilisation d'embouts de connecteur.

- Stacks of modules should contain no more than 12 modules, and the frames should be aligned. Do not place excessive loads on the module or twist the module frame.

Les piles de modules ne doivent pas contenir plus de 12 modules et les cadres doivent être alignés. Ne placez pas de charges excessives sur le module et ne tordez pas le cadre du module.

- Follow unpacking instructions when opening packaging carton.

  Suivez les instructions de déballage lors de l'ouverture du carton d'emballage.

- Do not lift or carry the modules using junction box wires attached to the modules.

  Le transport des modules avec la boîte de jonction ou les fils est strictement interdit.

- Do not stand or walk on modules.

  Ne vous tenez pas debout ou ne marchez pas sur les modules.

- To avoid damage to glass, heavy objects are not allowed on modules.

  Pour éviter que le verre ne soit endommagé, les objets lourds ne sont pas autorisés sur les modules.

- Be careful when placing modules at corners in particular.

  Soyez prudent lorsque vous placez des modules dans les coins en particulier.

- Do not try to dismantle the module or remove nameplate or parts of modules.

  N'essayez pas de démonter le module ou de retirer la plaque signalétique ou des parties de modules.

- Do not paint or apply any other adhesive on modules.

  Ne peignez pas ou n'appliquez aucun autre adhésif sur les modules.

- Do not damage or scratch backsheet of modules.

  Ne pas endommager ni rayer la feuille arrière des modules.

- Do not drill holes on the frame of module, this may reduce frame loading capacity and lead to frame corrosion and invalidation of the limited warranty provided for customers.

  Ne percez pas de trous sur le cadre du module, cela peut réduire la capacité de charge du cadre et entraîner la corrosion du cadre et l'invalidation de la garantie limitée fournie aux clients.

- Do not insert any conductive material into the connectors attached to the module.

  N'insérez aucun matériau conducteur dans les connecteurs fixés au module.

- Do not connect or disconnect the module when there is a current flow, or connected with any powered system.

  Ne pas connecter ou déconnecter le module lorsqu'il y a un flux de courant, ou connecté à un système alimenté.

- Do not use water to extinguish fires when the module is connected to any powered system.

  N'utilisez pas d'eau pour éteindre les incendies lorsque le module est connecté à un système alimenté.

- Do not carry modules on your head.

  Ne portez pas de modules sur la tête.

- Do not carry modules with ropes.

  Ne transportez pas les modules avec des cordes.

- Do not carry modules on your back.

  Ne transportez pas les modules sur votre dos.

- Do not artificially concentrate sunlight on the module.

  Ne concentrez pas artificiellement la lumière du soleil sur le module.

- During the normal operation of modules, they should not be blocked by buildings, trees, chimneys, etc. at any time of the day.

  Pendant le fonctionnement normal des modules, ils ne doivent pas être bloqués par des bâtiments, des arbres, des cheminées, etc. à tout moment de la journée.

- Do not scratch anodic coating of the aluminium alloy frame except for grounding connection. Scratch may lead to frame corrosion and reduce frame loading capacity and long-term reliability.

  Ne rayez pas le revêtement anodique du cadre en alliage d'aluminium, sauf pour la connexion de mise à la terre. Les rayures peuvent entraîner la corrosion du cadre et réduire la capacité de charge du cadre et sa fiabilité à long terme.

- Do not repair problematic modules on your own.

  Ne réparez pas vous-même les modules problématiques.

- The junction box must meet IP68 requirements, however they must be protected from direct sunlight and water immersion. The interconnection of female-male connectors shall meet the IP68 requirements.

  La boîte de jonction doit répondre aux exigences IP68, mais elle doit être protégée de la lumière directe du soleil et de l'immersion dans l'eau. L'interconnexion des connecteurs femelle-mâle doit répondre aux exigences IP68.

- The junction box connector should not be in contact with oily substances, organic solvents and other corrosive materials, like alcohol, gasoline, lubricants, rust inhibitors, herbicides, to avoid damage to the connector.

  Le connecteur de la boîte de jonction ne doit pas être en contact avec des substances huileuses, des solvants organiques et d'autres matériaux corrosifs, c'est-à-dire de l'alcool, de l'essence, des lubrifiants, des inhibiteurs de rouille, des herbicides, pour éviter d'endommager le connecteur.

3.5. Fire Safety

- Please refer to regional laws and regulations before installing modules and abide by the building's fire safety standards and requirements. According to the corresponding certification standards, the fire rating of ReNew modules is IEC Class C.

Veuillez vous référer aux lois et réglementations régionales avant d'installer les modules et respecter les exigences relatives à la protection contre les incendies des bâtiments. Selon les normes de certification correspondantes, la résistance au feu du module photovoltaïque ReNew modules est la classe CEI C.

- Adopt proper module accessories such as fuse, circuit breaker and grounding connector according to local regulations. Please do not apply modules where exposed inflammable gases are nearby.

  Adoptez les accessoires de module appropriés tels que le fusible, le disjoncteur et le connecteur de mise à la terre conformément aux réglementations locales. Veuillez ne pas appliquer de modules à proximité de gaz inflammables exposés.

4. Installation Conditions

4.1. Installation Safety

- Always wear safety helmets, insulated gloves and insulated rubber shoes and other protective measures during installation.
- When installing or maintaining the PV system, please do not wear metal rings, watches and other metal products, so as not to cause electric shock and damage the modules.
- Keep the module unpacked until installation. Once the modules are removed from the pallet, they shall be installed and connected to the inverter. If they are not installed immediately, protective measures (such as adding rubber joint cover, etc.) should be taken on the connection head.
- Do not touch the PV module with bare hands during installation. The glass surface and the frame may be hot. There is a risk of burns and electric shock. Use standard safety tools and equipment when installing the modules.
- Do not work in rain, snow or windy conditions.
- Due to the risk of electrical shock, do not perform any work if the terminals of the module are wet.
- Use insulated tools and do not use wet tools.
- Only the modules of the same size and the specifications within same range can be connected in series.
- Connect the male and female connectors correctly, check the wiring condition, and that no wire is detached from the module, secure the wires with cable ties so that the wires do not scratch or squeeze the backsheet of the modules.

- Do not touch the junction box or the connectors with bare hands during installation or under sunlight, regardless if the module is connected to or disconnected from the system.
- Do not drill holes in the frame without authorization from ReNew, which may cause corrosion or other negative effects to the module.
- When installing modules on roof mounted structures, please try to follow the “from top to bottom” and “from left to right” principles.
- Thermal expansion and cold contraction effect occurs on the modules. During installation, the interval between two adjacent modules is recommended ≥10mm. The minimum clearance between two adjacent dual-glass modules is recommended ≥20mm. If there are special requirements, please confirm with ReNew before installation.
- Sufficient clearance (at least 10 cm (3.94 in)) between the module frame and the mounting surface is required to allow cooling air to circulate around the back of the module. This also enables condensation or moisture to dissipate.
- During the installation, as also for module removal, maintenance and any other related processes, it is recommended that the force applied between the cable and the connector to be no more than 60N.

4.2. Climatic Condition

The recommended weather conditions for installing modules are:

a) Humidity: < 85% RH
b) Ambient air temperature range: -40°C to + 50°C
c) Module operating temperature: -40°C to + 70°C

Please consult the ReNew technical support department for more information on the use of modules in special climates, such as an altitude greater than 2000m.

It is possible that modules installed with restricted airflow are not allowed for use in some hot locations, depending on system design parameters. Installers should assess if the system design at a specific geographic location will result in a 98th percentile module operating temperature greater than 70°C, and must consider and avoid these factors in design of systems.

Make sure that the installed modules do not bear wind or snow load that exceeds the permissible maximum load.

4.3. Site and tilt angle selection

4.3.1. Site Selection

- In most applications, ReNew PV modules should be installed in a location where they can receive maximum sunlight throughout the year.
- When choosing a site, avoid trees, buildings or obstructions that could create shadows on the modules. Shading causes loss of power output, even though bypass diodes have been installed for the module, shading will affect the optimum performance and safety issue of the PV modules. Operation in permanent shading conditions is not recommended.

- Do not install modules at places that are possible to be flooded.
- Make sure that installed modules are not subjected to wind or snow pressure that exceeds the permissible maximum load limit.
- Do not install the PV module in a location where it would be immersed in water or continually exposed to water from a sprinkler or fountain etc.
- Carry out lightning protection for modules installed in places with frequent lightning and thunder.
- Modules cannot be used in environments with too much hails, snows, flue gas, air pollution and soot or in places with strong corrosive substances such as salt, salt mist, saline, active chemical steam, acid rain, or other substances corroding modules, affecting modules' safety or performance.
- In places 50~500m away from the sea, stainless steel or aluminum materials should be used when connecting the PV modules, and the installation position must be processed with anti-corrosion treatment.

4.3.2. Tilt Angle Selection

Tilt angle of modules: Included angle between module surface and horizontal surface; the module will obtain the maximum power output in direct facing of sunlight.

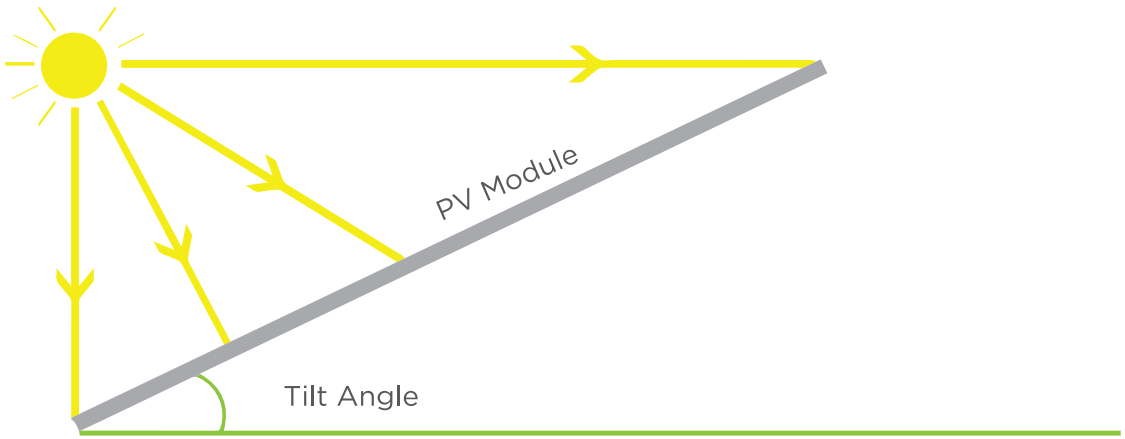


Figure 2 : Tilt Angle of PV Module

Modules are preferred to be south-facing in the northern hemisphere and north-facing in the southern hemisphere. Please refer to standard module installation guideline or suggestions from an experienced PV module installer, for the specific installation angle.

ReNew suggests that the tilt angle of module installation be no less than 10°, so that dust accumulated on the module surface can be easily washed away by rainfall and the frequency of cleaning modules is also reduced. This also makes it easy for accumulated water to flow away, avoiding water marks on the glass due to prolonged ponding which might affect the module appearance and performance.

ReNew modules connected in string should be installed with the same orientation and tilt angle. Different orientations and tilt angles may result in different received solar irradiation and output power loss. In order to achieve the maximum annual generating capacity, the optimal orientation and inclination of PV modules in the installed area should be selected to ensure that sunlight can still reach to modules even on the shortest day of the year.

5. Mechanical Installation

5.1. Regular Requirements

- Make sure that module installation mode and bracket system can meet the expected load, which is the requisite assurance that the bracket installer must provide. Installation bracket system shall be tested and inspected by a third-party testing institution with static mechanical analysis capacity in accordance with local, national or international standards.
- Module bracket shall be made from durable, corrosion-resistant, UV-proof materials.
- Modules shall be fixed on the bracket solidly.
- Use higher brackets in places with heavy snow accumulation so the lowest point of modules is not shadowed by snow for a long time. In addition, make the lowest point of modules high enough so as to avoid shading from vegetation or reduce damage from sand/stones.
- Make sure that backsheets of modules are not in contact with bracket or building structures that can pierce into the inside of the modules, especially when the module surface is imposed by pressure.
- Maximum static load of the PV module is downforce 5400Pa (designed load of 3600Pa) and uplift force 2400Pa (designed load of 1600Pa, as per IEC 61215-2), which can vary from different mounting methods of the modules (please refer to the following installation guidance). *The described load in this manual is for the test load.*

Maximum test load = 1.5 (Safety factor) x Design Load

- Modules can be installed horizontally or vertically. When installing the components, be cautious not to block the drain hole of the frame.

5.2. Bolt Mountings

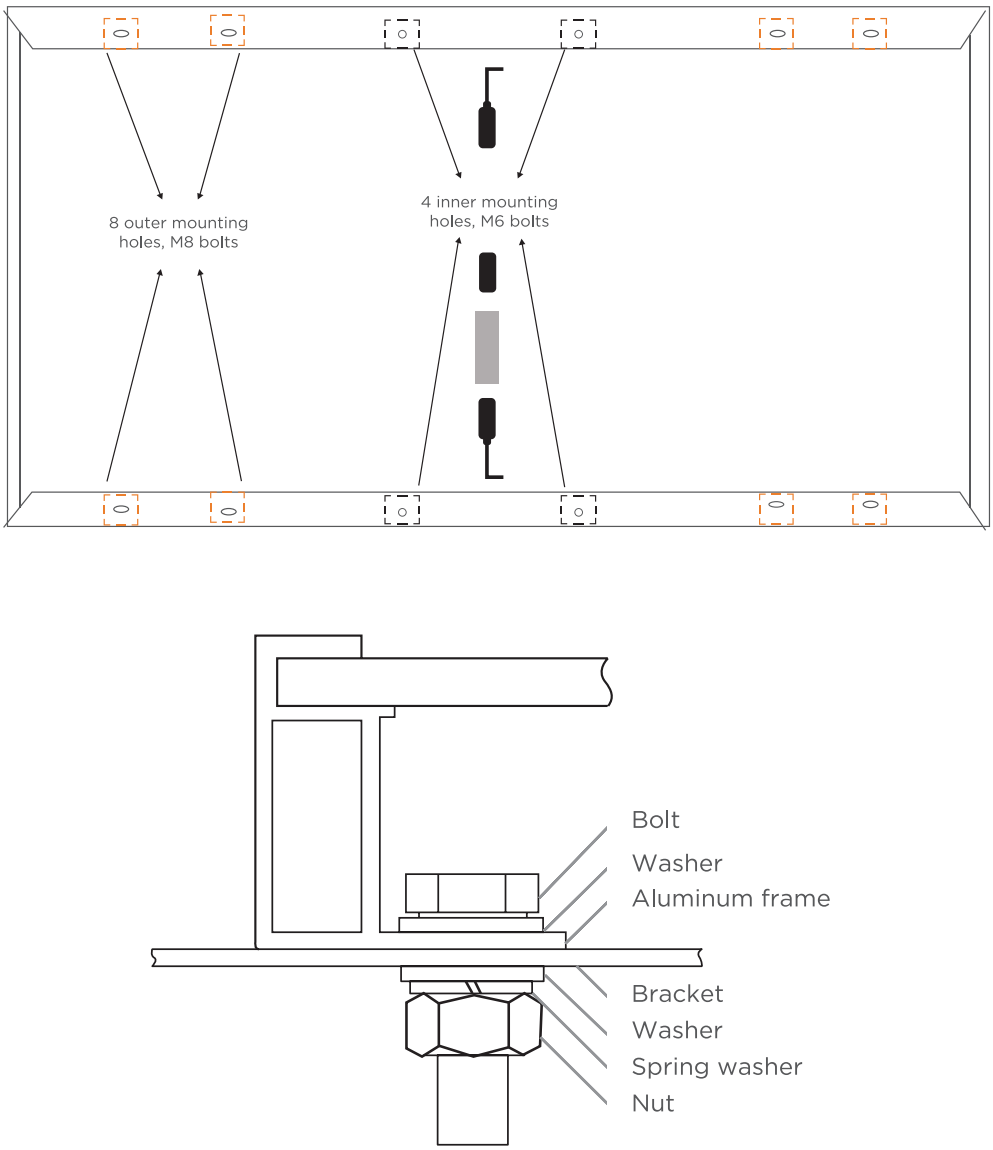


Figure 3: Mounting with bolt

Mounting Hole	Bolt SizeBolt Size	Tightening Torque
14mm x 9mm	M8	22-30 N*M
10mm x 7mm	M6	9-12 N*M

Table 1: Bolts for different mounting holes

The reference value of tightening torque for M8 bolt is 22-30 N*M, and for M6 bolt is 9-12 N*M. If special mounting system or special installation method is required, please reconfirm with the supplier of the racking system regarding the torque value.

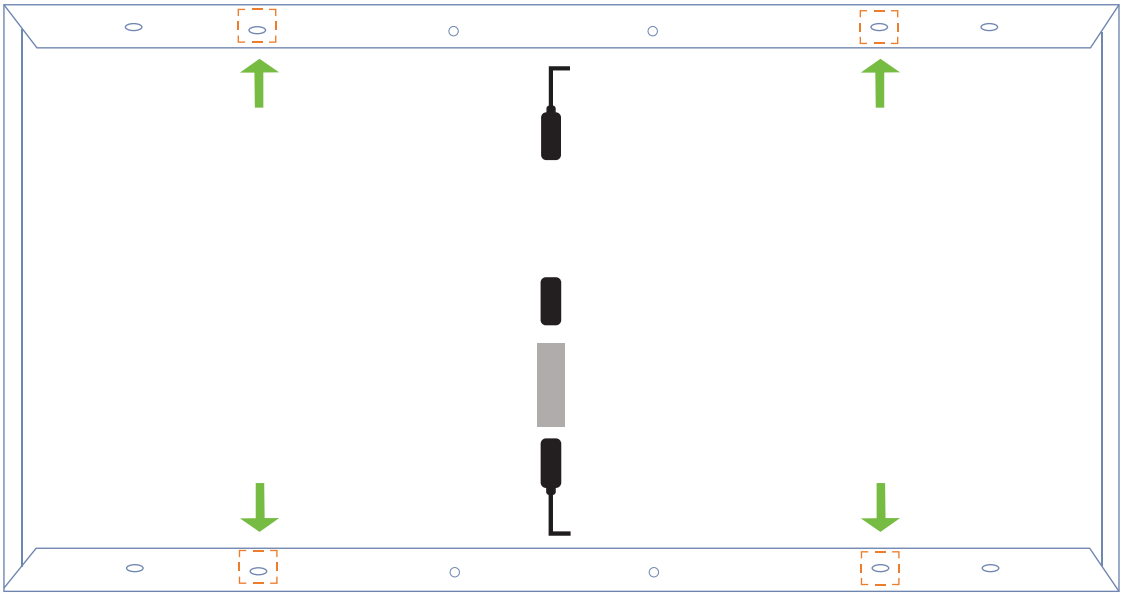


Figure 4: Mounting hole position of bolt mounting for 2400Pa

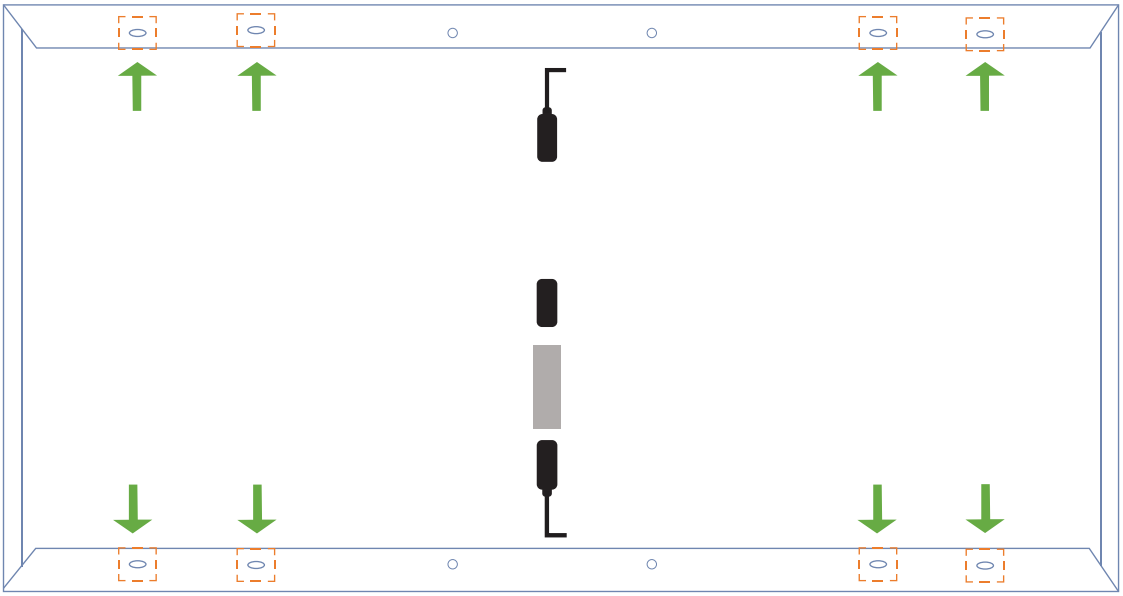


Figure 5: Mounting hole position of bolt mounting for 5400Pa

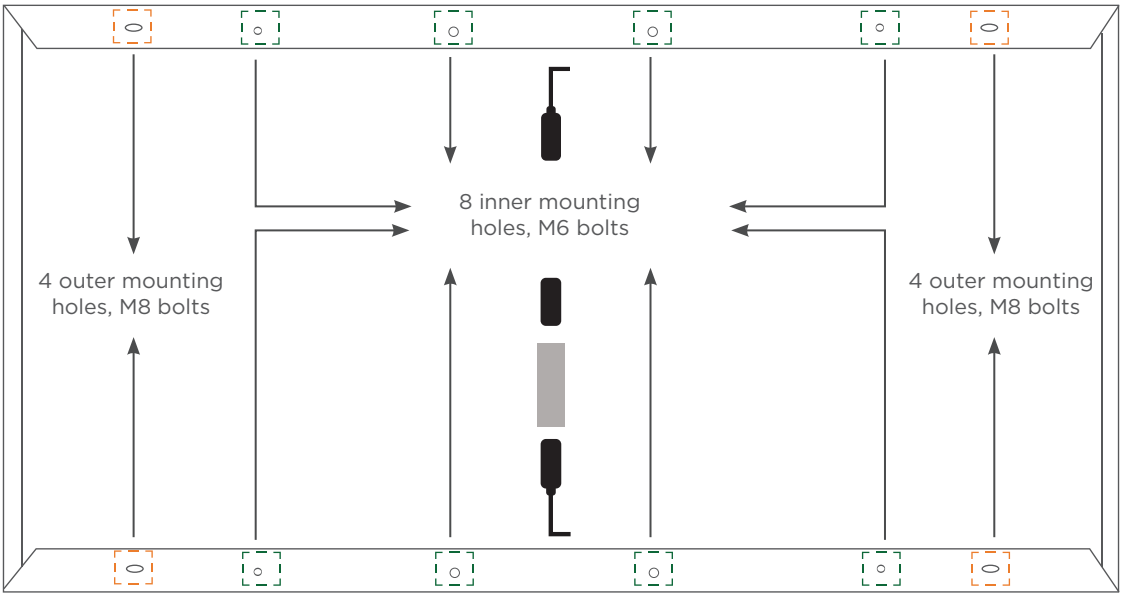


Figure 6: Mounting hole position of bolt mounting for module model RPS3MH66BDXXX only

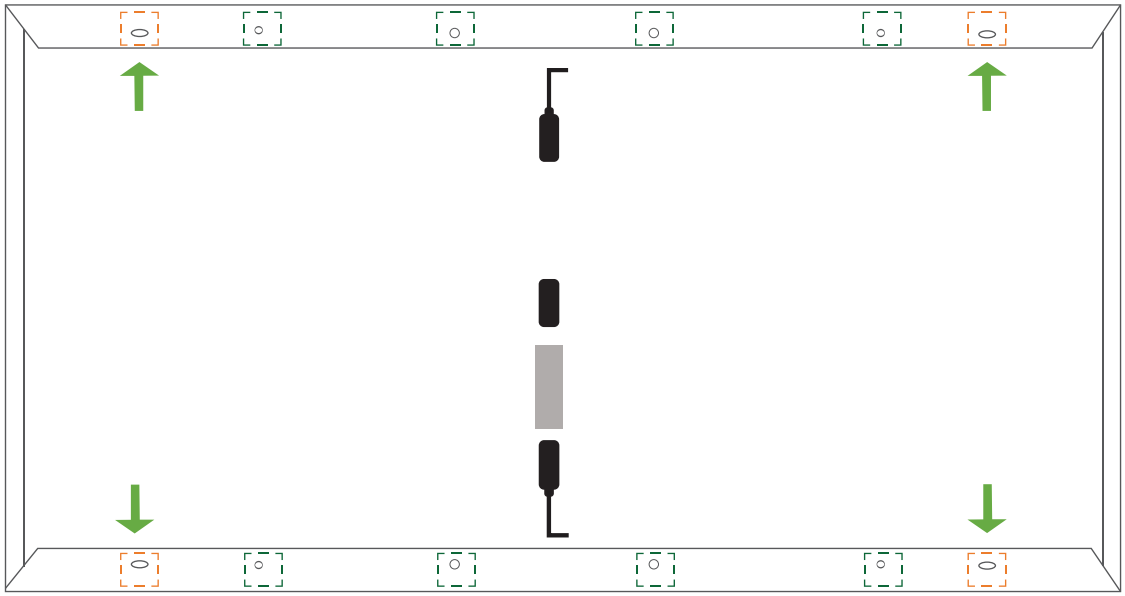


Figure 7: Mounting hole position of bolt mounting for 2400Pa and module model RPS3MH66BDXXX only

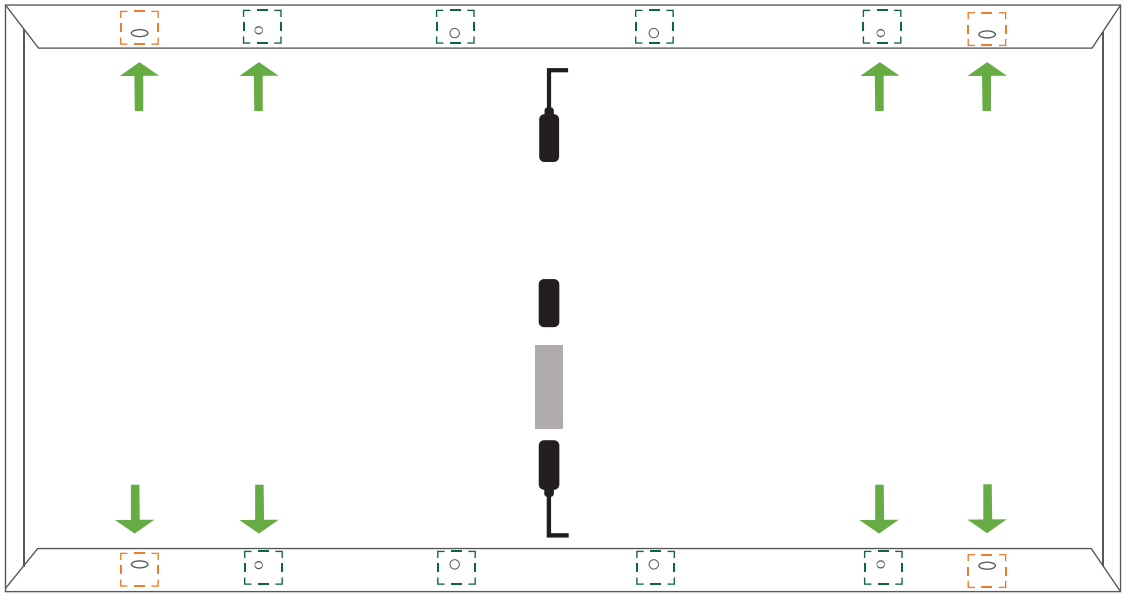


Figure 8: Mounting hole position of bolt mounting for 5400Pa and module model RPS3MH66BDXXX only

Applicable Model	Module Dimension		Mounting Pitch		
	Length(mm)	Width(mm)	X-Pitch (mm)	Y-Pitch (mm)	
RPS1MH66BDXXX	2390	1303	1253	1000	1400
RPS1MH60BDXXX	2178	1303	1253	1000	1400
RPS2MH72BDXXX	2278	1134	1084/1094	1000	1400
RPS1MH66MBXXX	2390	1303	1253	1000	1400
RPS1MH60MBXXX	2178	1303	1253	1000	1400
RPS2MH72MBXXX	2278	1134	1084	1000	1400
RPS3MH66BDXXX	2382	1134	1094	-	1400

Table 2: Mounting hole position for applicable module

5.3 Mounting with Tracker

Renew modules are compatible with various mainstream tracker systems in the industry. The maximum test load that agrees with various models are given in the table 3. For tracker M6 Stainless steel Bolt Spring Washer nut hardware should be used. Please contact renew customer service team in case of any specific tracker system, drawing.

Model	Installation	Test load (Pa)
RPS2MH72BDXXX	400 mm hole distance	+1800/-1800
RPS2MH72BDXXX	400 mm hole distance along with supporting rail	+2400/-2400
RPS3MH66BDXXX	400 mm hole distance	+1200/-1200
RPS3MH66BDXXX	790 mm hole distance	+2400/-2400

Table 3: The maximum test load for applicable module

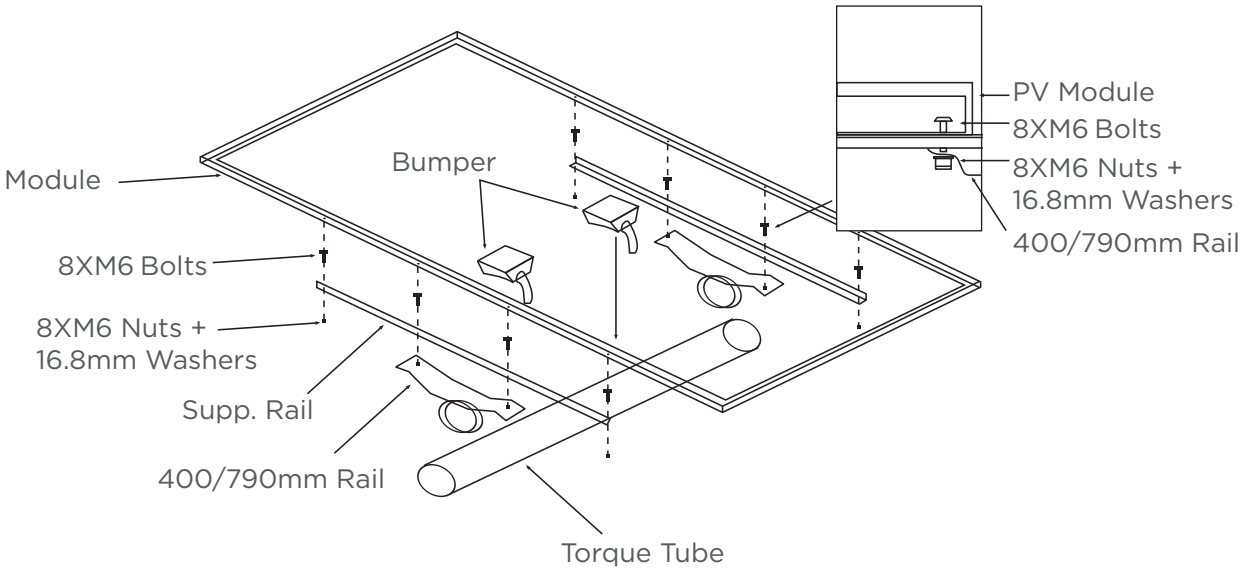


Figure 9: Tracker mounting with Supporting rail

6. Electrical Installation

6.1. Electrical Performance

The reported performance measurements are subject to ±5% uncertainty at STC (1000 W/m^2, (25 ± 2)°C, AM 1.5 according to IEC 60904-3) for voltage, current and ±3% power, and ±10% uncertainty at BSTC (AM 1.5, T = 25°C, Irradiance = 1000W/m^2 + φ*135W/m^2) for voltage, current and ±5% power, φ is the bifaciality factor of module which is mentioned on the rating label for power, voltage and current.

Maximum allowable system voltage for ReNew PV modules is 1500V, Class for protection against electrical shock, in accordance with Clause 4 of IEC 61730-1:2023 is CLASS II.

When modules are in series connection, the string voltage is sum of individual modules in one string.

When modules are in parallel connection, the current is sum of the individual string current. Modules with different electric performance models cannot be connected in one string.

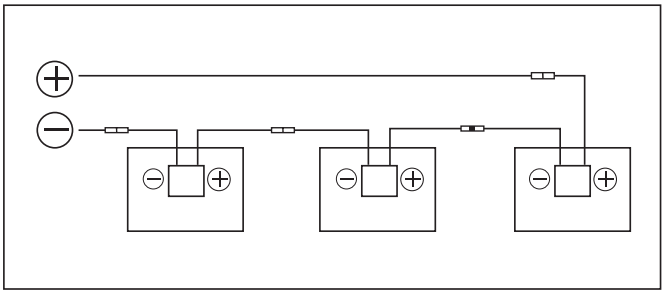


Figure 10: Series String Connection

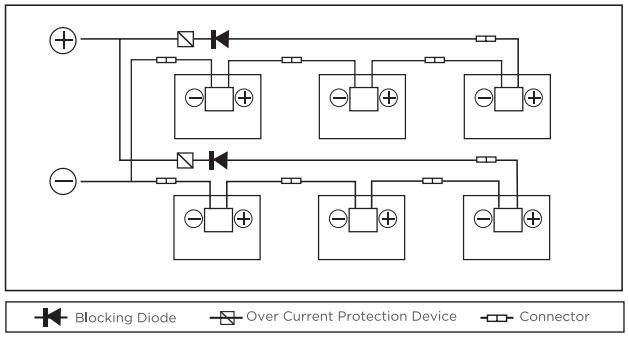


Figure 11: Parallel Connection

The maximum allowed quantity of modules in string connection shall be calculated according to relative regulations. The open circuit voltage value under the expected lowest temperature shall not exceed the maximum system voltage value allowed by modules and other values required by DC electric parts.

a) If modules are connected in series, the total voltage is equal to the sum of individual voltages. The recommended system voltage is as below,

$$\text{System voltage} \geq N*V_{oc}[1+T_cV_{oc}* (T_{min}-25)]$$

Where:
N - module numbers in series
V_{oc} - Open circuit voltage (refer to product datasheet)
T_cV_{oc} - Temperature coefficient of open circuit voltage (refer to product datasheet)
T_{min} - Minimum ambient temperature

b) If the modules are connected in parallel, the recommended number of modules in parallel is maximum series fuse rating/I_{sc}+1

A photovoltaic module is likely to experience conditions that produce higher current and/or voltage than reported at standard test conditions. Factors to consider include module temperature and front side irradiance (and, for bifacial modules, ground or roof albedo, row spacing, and installation height). Accordingly, the values of V_{OC} and I_{SC} (or for bifacial modules, $I_{SC\text{-}aBSI}$) marked on this PV module should be multiplied by a factor of 1.25 when determining voltage and current ratings for components connected to the PV output."

"The safety factor of 1.25 given for the minimum voltage rating of the components in the example statement above may be modified during the design of a system according to the minimum temperature of the location of the installation and the temperature coefficient for V_{OC}. The safety factor of 1.25 given for conductor current ratings values for I_{SC} (or for bifacial modules, $I_{SC\text{-}aBSI}$) may be adjusted based on the maximum values of irradiance incident on the front side of the module (and the rear side for bifacial modules). To this purpose, a full simulation for the specific location and module orientation (and for bifacial modules, ground albedo, row spacing and installation height) is required. Further guidance for the choice of a safety factor other than 1.25 is given in IEC 62548."

If there is reverse current exceeding the maximum fuse current flowing through the module, use overcurrent protection device with the same specifications to protect the module; if parallel connection is more than 2, there must be an overcurrent protection device on each string of module. Below table indicates advisable maximum overcurrent rating:

Applicable Model	Module Type	Maximum Overcurrent Protection Rating
RPS1MH66BDXXX	Bifacial	35A
RPS1MH60BDXXX	Bifacial	35A
RPS2MH72BDXXX	Bifacial	30A
RPS1MH66MBXXX	Monofacial	30A
RPS1MH60MBXXX	Monofacial	30A
RPS3MH66BDXXX	Bifacial	35A

Table 4 : Maximum overcurrent protection rating for applicable model

The module is considered to be in compliance with this standard only when the module is mounted in the manner specified by the mounting instructions. A module with exposed conductive parts is considered to be in compliance with this standard only when it is electrically grounded in accordance with the instructions and the requirements of the National Electrical Code, ANSI/NFPA 70 (2014-2017)

6.2. Cables and Wiring

In module design, adopt junction boxes with the protective level of IP68 for on-site connection to provide environmental protection for wires and connections and contacting protection for non-insulating electric parts. The junction box performs the protective level of IP68 with well-connected cables and connectors. These designs facilitate parallel connection of modules. Each module has two individual wires connecting the junction box, one is a negative pole and the other is a positive pole. Two modules can be in series connection by inserting the positive pole at one end of the wire of one module into the negative pole of the adjoining module.

According to local fire protection, building and electrical regulations, apply proper cable and connector; ensure the electrical and mechanical property of the cables (the cables should be put in a catheter with anti-UV aging properties, and if exposed to air, the cable itself should have anti-UV aging capability).

The installer can only use single-wire cable, 2.5-16mm^2 (5-14 AWG),with proper insulation capability to withstand the maximum open circuit voltage (such as EN50618 approval). Need to select appropriate wire specifications to reduce voltage drop.

ReNew requires that all wiring and electrical connections comply with the appropriate 'Electrical Code'. When cables are fixed on the bracket, avoid mechanical damage to cables or modules. Do not press cables by force. Adopt UV-resistant cable ties and clamps to fix cables on the bracket. Though cables are UV resistant and waterproof, it is still necessary to prevent cables from direct sunlight and water immersion. The minimum bending radius of cables should be 43mm (1.69in).

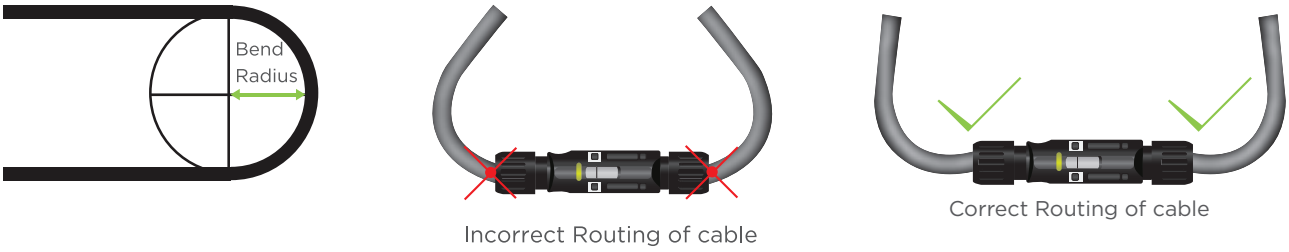


Figure 12: Routing of cable

6.3. Connectors

Please keep connectors clean and dry. Make sure connector caps are fastened before connection. Do not connect under improper conditions of damp, dirty or other exceptional situations. Avoid exposing connectors to direct sunlight and water immersion or falling onto ground or roof. Incorrect connection may lead to electric arc and electric shock. Please make sure that all electric connections are reliable. Make sure all connectors are fully locked. Only compatible connectors that can be mated, i.e. from the same vendor and model, shall be used. Approved connector make of each PV model as per IEC CDF is given below

Connector manufacturer	Connector model name (female)	Allowable mating connector model name(male)
Jiangsu Haitian Microelectronics	PV- HT03x	PV- HT03x
Dhash PV Technologies Pvt ltd	DS01	DS01
Suzhou UKT New Energy Technology Co., Ltd	PV-CO02-xy	PV-CO02-xy
Staubli Electrical connectors	MC4 – Evo 2	MC4 – Evo 2
Zhejiang Zhonghuan Sunter PV Technology Co Ltd.	PV-ZH202B	PV-ZH202B

Table 5 : Allowable mating connector manufacturer and model name

6.4. Bypass Diode

PV module junction box contains bypass diode which is in parallel connection with the cell string. If hot spot occurs, the diode will come into operation to stop the main current from flowing through the hot spot cells in order to prevent module over-heated and performance loss. Notice, bypass diode is not the overcurrent protection device. If the diode is suspected to be defective, the installer or system maintenance supplier shall contact ReNew. Please do not try to open the module junction box on your own.

7. Grounding

In design of modules, the anodized corrosion resistant aluminum alloy frame is applied for rigidity support. For safety utilization and to protect modules from lightning and static electricity damage, the module frame must be grounded. The grounding device must be in full contact with inner side of the aluminum alloy and penetrate surface oxide film of the frame.

Do not drill additional grounding holes on module frame.

The grounding conductor or wire may be copper, copper alloy, or any other material acceptable for application as an electrical conductor as per respective National Electrical Codes. The grounding conductor must then make a connection to the ground with a suitable ground electrode. Holes marked with a grounding mark on the frame can only be used for grounding but not for mounting.

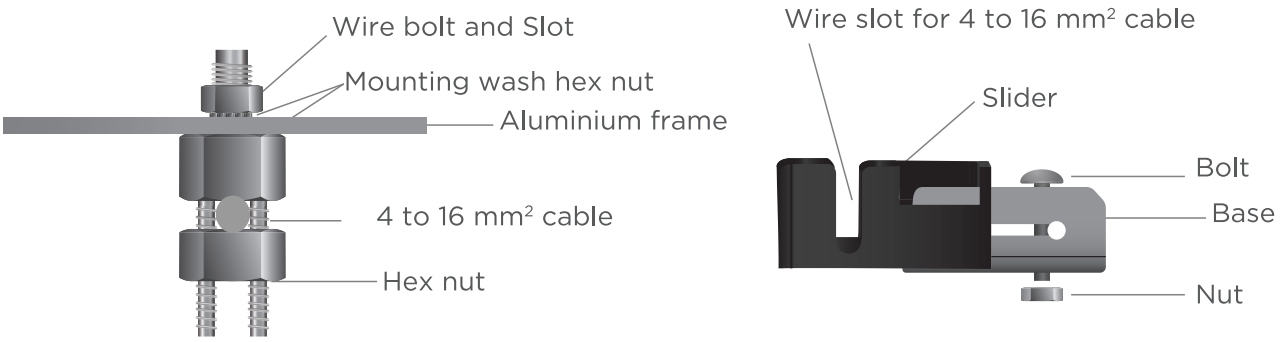


Figure 13: PV module grounding methods

Holes provided for this purpose are identified with a grounding symbol (IEC61730-1). Grounding connections should be installed by a qualified electrician. Connect module frames together using adequate grounding cables: Grounding wire size (4-16 mm^2/12-6 AWG solid bare copper) should be selected and installed underneath the wire binding bolt.

The electrical contact is made by penetrating the anodized coating of the aluminum frame and tightening the mounting screw (together with the star washer) to the proper torque of 3-7 N*M.

8. Operation and Maintenance

It is the user's responsibility to carry out regular inspection and maintenance of modules, especially during the period of limited warranty; and inform the supplier within two weeks when modules are found broken.

8.1. Cleaning

Accumulation of dust or dirt on the module front face will result in a decreased energy output. Clean the module preferably once every year, (more frequently in dusty conditions), using a soft cloth (dry /damp). Water with high mineral content may leave deposits on the glass surface and is not recommended. It is recommended to use neutral water of the PH value ranging from 6.5 to 8.5 to clean the glass, so as to not cause damage to the glass coating layer.

- The site environment conditions and frequency of cleaning the module can be fixed/altered if output from module is reduced.
- Module cleaning to be done before sunrise and after sunset to prevent thermal stress.
- Cleaning process must be carried out after PV modules power is off and modules are cooled.
- Determine the module glass temperature; if glass is too hot it will be damaged by the application of cold-water spray. Difference in water and glass temperature should be less than (8°C).
- Deposit such as dry floating dust and leaves on the module surface should be whisked off with a dry whisk or cloth.
- For inorganic wet dust which is not easy to clean, carry out general cleaning mentioned above. Then, use clean water (<400TDS) with pressure not exceeding 35bar for wash clean.
- To clean organic dust like bird dropping, plant sap etc., first use clean water with pressure not exceeding 35bar. Then, clean with mild soap water with water gun at not less than 0.5 meters distance having water pressure not exceeding 35bar.
- After washing with mild soap water, rinse with clean water.
- Use soft sponge or cotton to wipe the components gently without application of force or scratching.

8.2. Cleaning Precautions

- Do not use high pressure water.
- Do not use harmful chemicals.
- Do not use cold water when the module glass temperature is high.
- Do not use hot water to clean cold panel. Thermal shock from the difference in temperature between the glass surface and water can result in fracturing or breaking of the glass.
- Never spray water on broken modules.
- Do not clean with bare hands. Clean after wearing gloves.
- Do not use tools like knife, blade, wire etc., for cleaning.
- Do not stand on the panels for cleaning.

8.3. Module Appearance Inspection

Check module cosmetic defects with naked eyes, especially:

- Module glass cracks.
- Corrosion at welding parts of the cell main grid (caused by moisture into the module to damage of sealing materials during installation or transportation).
- Check whether there are traces of burn marks on the module back sheet.
- Check PV modules if there are any signs of aging including rodent damage, climate aging, connectors tightness, corrosion and grounding condition.
- Check if any sharp objects are in contact with the surface of the PV module.
- Check if there are any obstacles causing shading of the PV module.
- Check if there are any loose or damaged screws in between the modules and mounting system. If so, adjust or fix them on time.
- Check the tightness of the connectors and cables twice a year.
- Check if there is any crack or gap of silicone near the junction box, annually.

9. Product Electrical Parameters

Type name or model no.	RPS1MH66MBxxx (xxx= 650-670Wp in step of 1)	RPS1MH60MBxxx (xxx= 580-600Wp in step of 1)	RPS2MH72MBxxx (xxx= 535- 550Wp in step of 1)
Nominal maximum output power at STC [W]	650-670 in steps 1	580 - 600 in steps of 1	535 - 550 in steps of 1
Nominal short-circuit current at STC [A]	18.00 - 18.70	18.00 - 18.70	13.00 - 14.80
Nominal open-circuit voltage at STC [V]	44.10 - 46.50	40.10 - 12.20	48.30 - 49.90
Tolerance of rating at STC (P_{mpp} / I_{sc} / V_{oc}) [%]	±3/±5/±5	±3/±5/±5	±3/±5/±5
Nominal maximum output power at BNPI/ BSTC [W]	N/A	N/A	N/A
Nominal short-circuit current at BNPI/ BSTC [A]	N/A	N/A	N/A
Nominal open-circuit voltage at BNPI/ BSTC [V]	N/A	N/A	N/A
Tolerance of rating at BNPI/ BSTC (P_{mpp}/ I_{sc} / V_{oc}) [%]	N/A	N/A	N/A
Bifaciality coefficient	N/A	N/A	N/A
Dimensions (L x W x H) [mm]	2390x1303x35	2178x1303x35	2278x1134x35
Module area [m^2]	3.11	2.84	2.58
Class (IEC 61730-1:2016)	Class II	Class II	Class II
Maximum system voltage [VDC]	1500	1500	1500
Pollution degree	PD2	PD2	PD2
Qualified as cemented joint design	No	No	No
Over-current protection rating [A]	30	30	25
Defined min. clearance distance [mm]	15	15	15
Max. operational altitude [masl]	≤2000	≤2000	≤2000
Design load – downwards [Pa]	3600	3600	3600
Design load - –upwards [Pa]	1600	1600	1600
Safety factor for mechanical load	1.5	1.5	1.5
Number of solar cells	132	120	144
Connection of cells(S,SP,PS)	SP	SP	SP
Number if diodes	3	3	3
Cells per diode	44	40	48

Type name or model no.	RPS1MH66BDxxx (xxx= 650-670Wp in step of 1)	RPS1MH60B-Dxxx (xxx= 580-600Wp in step of 1)	RPS2MH72B-Dxxx (xxx= 535-610Wp in step of 1)	RPS3MH66BDxxx (xxx= 600-645Wp in step of 1)
Nominal maximum output power at STC [W]	650 - 670 in steps of 1	580 - 600 in steps of 1	535 - 610 in steps of 1	600 - 645 in steps of 1
Nominal short-circuit current at STC [A]	18.00-18.70	18.00-18.70	13.14-14.80	15.85-16.32
Nominal open-circuit voltage at STC [V]	44.10-46.50	40.10-42.20	48.30-49.90	48.08-49.80
Tolerance of rating at STC (P_{mpp} / I_{sc} / V_{oc}) [%]	±3/±5/±5	±3/±5/±5	±3/±5/±5	±3/±5/±5
Nominal maximum output power at BNPI/ BSTC [W]	715-737	638-660	589-655	665-715
Nominal short-circuit current at BNPI/ BSTC [A]	20.10-20.40	20.10-20.40	15.10-16.50	17.56-18.08
Nominal open-circuit voltage at BNPI/ BSTC [V]	45.20-46.30	40.60-41.75	49.05-49.90	48.08-49.82
Tolerance of rating at BNPI/ BSTC (P_{mpp}/ I_{sc} / V_{oc}) [%]	±5/±10/±10	±5/±10/±10	±5/±10/±10	±5/±10/±10
Bifaciality coefficient	70±5%	70±5%	70±5%, 80±5%	80±5%
Dimensions (L x W x H) [mm]	2390x1303x35	2178x1303x35	2278x1134x35/30	2382x1134x30
Module area [m^2]	3.11	2.84	2.58	2.70
Class (IEC 61730-1:2016)	Class II	Class II	Class II	Class II
Maximum system voltage [VDC]	1500	1500	1500	1500
Pollution degree	PD2	PD2	PD1	PD1
Qualified as cemented joint design	No	No	No	No
Over-current protection rating [A]	35	35	30	35
Defined min. clearance distance [mm]	15	15	10.4	10.4
Max. operational altitude [masl]	≤2000	≤2000	≤2000	≤2000
Design load – downwards [Pa]	3600	3600	3600	3600
Design load - –upwards [Pa]	1600	1600	1600	1600
Safety factor for mechanical load	1.5	1.5	1.5	1.5
Number of solar cells	132	120	144	132
Connection of cells(S,SP,PS)	SP	SP	SP	SP
Number if diodes	3	3	3	3
Cells per diode	44	40	48	44

Table 6: Electrical parameters of bifacial product

Kindly refer to respective product datasheets for the final electrical parameters

10. Disclaimer of liability

The information contained in this manual is subject to change by ReNew without prior notice. ReNew gives no warranty of any kind whatsoever, either explicitly or implicitly, with respect to the information contained herein. In the event of any inconsistency among different language versions of this document, the English version shall prevail. ReNew shall not be held responsible for damages of any kind, including – without limitation – bodily harm, injury or damage to property, in connection with handling PV modules, system installation, or compliance or non-compliance with the instructions set forth in this manual.

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