INSTALLATION MANUAL

REC 72-CELL MODULES

Installation instructions for all REC 72-cell size solar panels certified according to UL 1703 and UL 61730:

- REC Peak Energy 72 Series
- REC TwinPeak 72 Series
- REC TwinPeak 2S 72 Series
- REC TwinPeak 2S Mono 72 Series
- REC TwinPeak 2S 72 XV Bifacial Series
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INTRODUCTION

Thank you for choosing REC photovoltaic panels for your installation. REC solar panels are ideal for delivering long-lasting and reliable power output. They have been created through intelligent design and are manufactured to the highest quality and environmental standards. With correct installation and maintenance, REC panels will provide clean, renewable energy for many years.

Please read this entire manual carefully. It contains critical information on safety, as well as detailed instructions for the installation, operation and maintenance of the panels. Failure to follow these procedures will invalidate the warranty (available to download via www.recgroup.com/warranty). Review all instructions and safety notes before working on the system. Failure to do so may lead to injury or damage to property.

HOW TO USE THIS MANUAL

This installation manual describes the procedures for the terrestrial mounting of all REC solar panels of a '72-cell size' of the REC Peak Energy and REC TwinPeak product families (as indicated by the use of the suffix 72 in the panel name) certified according to the UL 1703 and UL 61730 standards in a photovoltaic array. This includes panels with a white or black backsheet, a silver or black frame, for a maximum system voltage of 1000 V or 1500 V, and/or square or rectangular monocrystalline or multicrystalline cells. The installed panel is considered to be in compliance with UL 1703 and UL 61730 only when mounted in the manner specified by this installation manual. Note that any panel without a frame (laminate) is not considered to comply with the requirements of UL 1703 and UL 61730 unless mechanically installed with hardware that has been tested and evaluated with the panel under this standard or by a field inspection certifying that the installed panel complies with the requirements of UL 1703 and UL 61730.

Except where specifically stated, the information and drawings within this manual refer to all frame, backsheet, and cell types; the illustrations are meant to be a generic representation of the instructions detailed in the text regardless of the color depicted. Review this entire manual before commencing installation of the panels and ensure you are working from the latest version. Throughout the manual, you will see icons which highlight important information or notes:

- Indicates potential for damage to the array, property or personal safety.

- Indicates important notes on best practice to help with the installation.

For further information on installation procedures, please call your panel distributor or contact your local REC Solar office. Details can be found at: www.recgroup.com/contact.

YOUR RESPONSIBILITY AS AN INSTALLER

Installers are responsible for the safe and effective installation and operation of the photovoltaic system and for adhering to all applicable local and national standards and regulations. Prior to installation, check all current regulations and permits concerning solar installations and ensure all local directives are observed. Furthermore, installers are responsible for the following points:

- Ensuring the REC solar panels are in a suitable condition for use and appropriate for the particular installation and environment,
- Using only parts that comply with the specifications set out in this manual,
- Ensuring a safe installation of all aspects of the electrical array.

All equipment should be properly maintained and inspected prior to use.

SUPPORT

Do not attempt to install REC solar panels when you are unsure of the procedure or suitability. For questions or guidance with your installation, please call your distributor or contact your REC sales office, which can be found at: www.recgroup.com/contacts.

LIABILITY DISCLAIMER

REC SOLAR PTE. LTD. accepts no liability for the usability and functionality of its photovoltaic panels if the instructions in this guide are not observed. Since compliance with this guide and the conditions and methods of installation, operation, use and maintenance of the panels are not checked or monitored by REC SOLAR PTE. LTD., REC SOLAR PTE. LTD. accepts no liability for damage arising from improper application or incorrect installation, operation or maintenance. This does not apply to damages due to a panel fault, in cases of loss of life, bodily injury or damage to health or in the event of a grossly negligent breach of obligations on the part of REC SOLAR PTE. LTD. and/or in the event of an intentional or grossly negligent breach of obligations by a legal representative or vicarious agent. REC reserves the right to make changes or amendments to this manual at any time, without prior notice.

This document may be produced in different languages. If there is any conflict, the English language version shall be definitive.

LIMITED WARRANTY

The REC Limited Warranty is available to download from www.recgroup.com/warranty. Ignoring any of the instructions in this manual may be classed as improper installation or use and invalidate the Warranty Terms and Conditions. If you have any questions about installation and the Warranty validity, please contact REC’s technical support.

Caution: Only qualified personnel should perform work on photovoltaic systems such as installation, commissioning, maintenance and repairs. Be sure to follow the safety instructions for all system components. Ensure relevant local codes and regulations for health and safety and accident prevention are observed.
SAFETY MEASURES

Installers are responsible for the safe and effective installation and operation of the system and for adhering to all applicable local and national standards and regulations. All relevant local codes and regulations should be referred to and observed as well as regulations on working at heights and fall protection.

SAFETY IN THE WORKING AREA

i) Safety in the working area
Installation of REC solar panels may involve working on rooftops or raised platforms. Ensure all local regulations regarding working at heights are followed. Before beginning work on a photovoltaic system, ensure all working surfaces are structurally sound and capable of bearing the weight of employees and required equipment.

⚠️ Remember to isolate the system from the grid before carrying out any maintenance or repair work.

ii) Preventing current generation
To prevent the panels automatically generating current (electricity) when exposed to light, shield the system with a non-transparent cover during installation, maintenance or repair work.

iii) Specific hazards of DC electricity
Solar panels generate direct current (DC). Once current is flowing, breaking or opening a connection (e.g., disconnecting two panels) can cause an electrical arc. Unlike low voltage AC wiring, DC arcs are not self-extinguishing. They are potentially lethal burn and fire hazards:

- Follow panel and inverter manufacturers’ installation, handling and operating instructions,
- Remove/open the inverter AC fuse/circuit breaker before disconnecting from the public grid,
- Switch off or disconnect the inverter and wait for the time specified by the manufacturer before commencing work. High-voltage components need sufficient time to discharge.

iv) Safety requirements
The voltage produced by a single panel and panels connected in series (voltages added together) or in parallel (currents added together) can be dangerous. Although the fully insulated plug contacts on the panel’s output cables provide touch-safe protection, the following points must be observed during handling to avoid the risk of sparking, fire hazards, burns and lethal electric shocks:

- Exercise extreme caution when wiring panels and look out for damaged or dirty cables etc,
- Never insert metallic or other conductive objects into plugs or sockets,
- Ensure that all electrical connections are completely dry before assembly,
- Keep all materials, tools, and working conditions dry and tidy,
- Use appropriate safety equipment e.g., non-slip footwear, insulated gloves and insulated tools,
- Solar panels produce current when exposed to sunlight. Do not connect the system to the inverter during solar exposure.

PANEL HANDLING

To avoid damage to the solar cells and other components, all REC solar panels should be handled with care and protected from damage at all times. All warnings and instructions on the packaging should be observed. Follow these guidelines when unpacking, transporting or storing panels:

- Record the serial numbers prior to installation and note the information in the system documentation,
- Carry the panels using both hands and do not use the junction box or cables as a grip,
- Do not allow the panels to sag or bow under their own weight when being carried,
- Do not subject panels to loads or stresses, e.g., leaning on them or through the placing of weight on them,
- Do not stand on the panels,
- Avoid dropping the panels as any damage caused may be unseen,
- Keep all electrical contacts clean and dry,
- Store panels in a dry and properly ventilated room,
- Do not apply force to the backsheet,
- Avoid using sharp or pointed objects if panels require marking,
- Never apply paints, adhesives or detergents to the back of the laminate,
- Do not use any solar panel that is damaged or been tampered with,
- Never attempt to disassemble, modify, or adapt the panels or labels in any way as this will void the warranty.

⚠️ Do not use a panel which is broken or damaged. If the panel front glass is broken or laminate back sheet is damaged, it can expose personnel to hazardous voltages.
ELECTRICAL INSTALLATION

ELECTRICAL REQUIREMENTS

i) System Requirements
REC solar panels are only for use where they meet the specific technical requirements of the complete system. Ensure other components will not cause mechanical or electrical damage to the panels. Only panels of the same type and power class should be connected.

ii) String configuration
When using string configuration, plan and execute it according to the inverter manufacturer’s instructions. The number of panels connected to an inverter must be within the inverter voltage limits and operating range. Do not exceed the total system voltage permitted by the manufacturer, nor under any circumstance exceed the maximum system voltage as stated in the applicable product technical specifications at the rear of this manual. The maximum system fuse rating and the maximum reverse current for each panel can be found in the technical specifications for the product at the rear of this manual.

iii) String connection
If panels are connected in series, they must have the same ampere rating; if panels are connected in parallel, they should have the same voltage rating. The maximum number of panels that can be connected in series or parallel depends upon system design, type of inverter and environmental conditions. Panel and string configuration must correspond to the specifications of other system components e.g., inverter. Refer to the reverse current rating of the panel as indicated in the Technical Characteristics section to the rear of this manual or on the panel datasheet.

iv) Wiring layout
To minimize voltage surges (e.g., indirect lightning strikes), cables of the same string must be bundled together so loops are as small as possible. String configurations must be checked before commissioning. If open circuit voltage (V_{oc}) and short circuit current (I_{sc}) deviate from specification, this may indicate a configuration fault. Correct DC polarity must be observed at all times.

v) Electrical Ratings
Electrical ratings are within a specific tolerance of measured values at Standard Test Conditions (STC) as given in the technical specifications for each panel at the rear of this manual. Allow for increased panel output as a result of conditions different to STC by multiplying the I_{sc} and V_{oc} values of the panel by 1.25 (or according to local regulations) for electrical system installation.
MECHANICAL INSTALLATION

Common hardware items such as nuts, bolts, star washers, lock washers and the like have not been evaluated for electrical conductivity or for use as grounding devices and should be used only for maintaining mechanical connections and holding electrical grounding devices in the proper position for electrical conductivity. Such devices, where supplied with the module and evaluated through the requirements in UL 1703 and UL 61730, may be used for grounding connections in accordance with the instructions provided with the module.

FIRE GUIDELINES
REC solar panels have a Type 1 or Type 2 fire classification according to UL 1703 and UL 61730 (see product label). The fire performance rating of the panels is only valid when mounted in the manner specified in this installation manual. The complete system fire class rating is to be achieved by the combination of module fire performance type and UL 2703 certified mounting structure for a non-BIPV module or panel. Please refer to mounting structure UL 2703 listing for System Fire Classification. Any specific limitations on the inclination or accessories required to maintain a specific System Fire Class Rating must be clearly specified in the mounting system manufacturer’s installation instructions and UL 2703 certification. Utilize the following fire safety guidelines when installing REC solar panels:

• Check with all relevant local authorities for fire safety requirements for any building or structure on to which the panels will be installed,
• The system design must ensure that it can be easily accessed in the event of a building fire,
• Check with relevant authorities for applicable regulations concerning setbacks or other placement restrictions that may apply for roof-mounted arrays,
• The use of DC ground fault interrupters is recommended. This may also be required by local and national codes,
• All electrical appliances are a fire risk. The panel must be mounted over a fire retardant roof covering rated for the application and a distance of 1.6 in (40 mm) between the panel and the mounting surface, allowing free circulation of air beneath the panels must be respected at all times.

ORIENTATION
The optimal mounting position of panels results in the sun's rays falling perpendicular (i.e., at 90°) to the surface. To maximize system output, panels should be installed at the optimum orientation and tilt angle. The specifics of this depend on location and can be calculated by a qualified system designer. All panels in a string should, wherever possible, have the same orientation and tilt to ensure the system does not underperform due to mismatched outputs.

- **Dependent on local conditions, a lower angle of installation will potentially increase the requirement for regular cleaning.**
- **The solar panels must not be exposed to artificially concentrated light.**

ENVIRONMENTAL FACTORS
REC solar panels are designed to provide decades of durable and stable output in installations up to 1.2 miles (2000 m) above sea level. Ambient operating temperatures must be between -40° and +185°F (-40° and +85°C).

- **For further information regarding installations on water platforms, e.g., floating pontoons, see Annex 1 at the rear of this manual.**

The panels are not suitable for installation in potentially hazardous locations nor should they be installed in the following locations:

• Near sources of flammable gas or vapor e.g., gas stations, gas containers or spray paint facilities,
• Near open flames,
• Under water or in water features,
• Where exposed to sulfur e.g., near sulfur springs or volcanoes,
• Where the panels may be exposed to harmful chemicals.

- **Ensure panels are not exposed to direct contact with salt water/spray and avoid installation in areas subject to high salt mist content.**
PANEL INSTALLATION

REC solar panels are designed for capturing solar radiation and are not suitable for use as overhead or vertical glazing. The panels are considered to be in compliance with UL standards, only when the panel is mounted specified by the mounting instructions below. The IP rating of the junction box provides a level of protection that allows panels to be mounted in any orientation (see product technical specifications for exact rating).

⚠️ Panels must be installed so that the cells are not shaded as this will drastically reduce electrical output. If partial shading is inevitable at certain times of the day or year, it must be kept to an absolute minimum.

There are different options for securing REC solar panels depending on the array design. Ensure the mounting structure can withstand anticipated wind and snow loads. Mounting hardware is not supplied by REC. Follow the mounting hardware manufacturer’s instructions and recommendations at all times.

⚠️ Remove any labels or stickers that may be on the front of the panels and ensure no residue is left on the glass.

⚠️ There must be a minimum clearance gap of 1.6 in (40 mm) between the uppermost part of the installation surface (e.g., rooftop) and the lowest part of the panel (i.e., underside of module frame) to avoid any damage to the panel and to ensure sufficient airflow for cooling, helping to improve performance. The surface below the modules must be kept clear of any objects that may cause damage to the panel.

RAIL SPECIFICATIONS

REC solar panels are typically installed on a rail-based mounting system (fig. 1). Installers must ensure that the rails are suitable for the system design and expected design loads. If using mounting rails, ensure they run parallel to the frame (fig. 2) or across the module, underneath the frame (fig. 3) and that rails are positioned directly under the module clamping zones shown on the subsequent pages.

Fig. 1: Example of rail cross-section

Fig. 2: Panel mounting; Rails parallel to long side

Fig. 3: Panel mounting; Rails parallel to short side
**CLAMP SPECIFICATIONS**

REC TwinPeak 25 72 panels have been evaluated by UL for mounting using rails in combination with end and mid clamps, ASTM F593C stainless steel screw and rail nuts with the below ratings and dimensions. Alternatively clamps suitable for the planned installation and expected system design loads and that meet the specifications shown in the table below can be used to secure the panel to the mounting structure:

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<tr>
<th>Criteria</th>
<th>Specification</th>
<th>Material Specification</th>
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<tbody>
<tr>
<td>Minimum yield strength</td>
<td>2089 ton/ft² (200 MPa)</td>
<td>e.g., 6005 T5 alloy</td>
</tr>
<tr>
<td>Minimum tensile strength</td>
<td>2610 ton/ft² (250 MPa)</td>
<td></td>
</tr>
<tr>
<td>Minimum grip length</td>
<td>1.6 in (40 mm)</td>
<td></td>
</tr>
<tr>
<td>Minimum grip depth</td>
<td>0.2 in (5 mm)</td>
<td></td>
</tr>
<tr>
<td>Minimum thickness of load carrying walls</td>
<td>0.16 in (4 mm)</td>
<td></td>
</tr>
<tr>
<td>Screw connection</td>
<td>0.32 in (8 mm) bolt, nut &amp; washer</td>
<td>ASTM F593C (stainless steel)</td>
</tr>
</tbody>
</table>

- Clamps must have a minimum grip length of 1.6 in (40 mm), a minimum grip depth of 0.2 in (5 mm) as indicated in fig. 4. The grip area must not extend onto the panel frame and cause cell shading.
- Panels must be clamped in a minimum of two points per long-side of the frame (a minimum of four clamping points per panel),
- Use appropriate bolted connections as per clamp manufacturer’s instructions (fig. 5),
- Follow the clamp manufacturer’s recommended applied torque to fasten the clamps.

![Fig. 4: Clamp specifications: End and mid-clamps](image)

![Fig. 5: Clamping the frame to rail](image)

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⚠️ In areas of snow build-up panels can be subjected to forces in excess of the stated limit even when snow depth does not appear extreme, causing damage to the framework. If the installation is likely to be affected by this, further suitable panel support is recommended on the lower row of panels.

🌟 In the case of any questions regarding mounting systems, or if the mounting system to be used does not match any of the instructions shown in this installation manual, please contact REC for further support.
Mounting using clamps: Long side
REC Peak Energy 72 panels can be secured using clamps where both clamps and rails are located within the constraints shown in fig. 16. Mounting utilizing clamps has been found to be in compliance with UL 1703 requirements for design loads up to 72.2 lbs/ft² (3600 Pa) downwards pressure and 33.4 lbs/ft² (1600 Pa) upwards pressure according to the clamping position. Panels must be clamped in a minimum of four individual clamping zones as shown below. Site-specific loads such as wind or snow which may exert force in a different way need to be taken into consideration to ensure this limit is not exceeded.

- Clamps and rails must be located and secured at a distance of 9.8 in - 13.8 in (250 - 350 mm) from the panel corner (fig. 6).
- Follow the clamp manufacturer’s recommended applied torque to fasten the clamps.
- The distance between the end clamp and the end of the rail must be minimum 1 in (25 mm).

Mounting using clamps: Short side
REC Peak Energy 72 solar panels have not been certified for installation using clamps on the short side of the panel. Clamping the module on the short side may compromise the mechanical integrity of the panel and is not permitted (fig. 6).

Fig. 6: Clamping Zones: REC Peak Energy 72 Series (measurements in diagram shown in mm [in])
- Clamping in the green zone 9.8 in - 13.8 in (250 - 350 mm) is certified for downward loads to 72.2 lbs/ft² (5400 Pa) and upward loads to 33.4 lbs/ft² (1600 Pa).
- Clamping in the red zone is not permitted (0 - 9.8 in (0 - 250 mm), > 13.8 in (> 350 mm) on long side, and entire length of short side).

Mounting holes
REC Peak Energy 72 panels have been certified for installation using the four elongated holes 0.6 x 0.35 in (14 x 9 mm) on the underside of the panel frame at a distance of 270 mm from the short side edge (fig. 7), utilizing rails and bolts matching the specifications in fig. 8. Installation of REC Peak Energy 72 Series panels using mounting holes complies with UL 61730 requirements for a maximum downward design load of 72.2 lbs/ft² (3600 Pa) downward force and 33.4 lbs/ft² (1600 Pa) upwards force. When installing in this way, the frame must be supported by two transverse rails (figs. 1 & 2) of aluminium or galvanized steel (to avoid galvanic corrosion) suitable for the application and appropriate for the local environment. These must be held in position by bolts and flange nuts as per the specifications below. Observe the following procedures when using mounting holes:

- The mounting construction should be of aluminium or galvanized steel to avoid galvanic corrosion and be appropriate for the local environment.
- Additional electrical bonding to Ground is required for the support structure.
- All four mounting holes in the frame must be used.
- Tighten fastenings using a torque wrench according to the mounting structure manufacturer’s instructions.

Fig. 7: Mounting holes: REC Peak Energy 72 Series (mm [in])

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Specifications: REC Peak Energy 72 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>6105 - T5 aluminum extrusion</td>
</tr>
<tr>
<td>Bolt</td>
<td>M6 x 25 drop in T-stud kit</td>
</tr>
<tr>
<td>Nut</td>
<td>M6 flanged hex locking nut</td>
</tr>
</tbody>
</table>

The product warranty will be voided if additional holes are made in the frame. All fixing and fastening materials must be corrosion resistant.
Mounting using clamps: Long side
REC TwinPeak 72 panels can be secured using clamps where both clamps and rails are located within the constraints shown in fig. 10. Mounting utilizing clamps has been found to be in compliance with UL 1703 requirements for design loads up to 72.2 lbs/ft² (3600 Pa) downwards force and 33.4 lbs/ft² (1600 Pa) upwards force according to the clamping position. Panels must be clamped in a minimum of four individual clamping zones as shown below. Site-specific loads such as wind or snow which may exert force in a different way need to be taken into consideration to ensure this limit is not exceeded.

- Clamps and rails must be located and secured at a distance of 9.8 - 13.8 in (235 - 335 mm) from the panel corner (fig. 10).
- Follow the clamp manufacturer’s recommended applied torque to fasten the clamps.
- The distance between the end clamp and the end of the rail must be minimum 1 in (25 mm).

Mounting using clamps: Short side
REC TwinPeak 72 solar panels have not been certified for installation using clamps on the short side of the panel. Clamping the module on the short side may compromise the mechanical integrity of the panel and is not permitted (fig. 10).

Fig. 10: Clamping Zones: REC TwinPeak 72 Series (measurements in diagram shown in mm [in])
- Clamping in the green zone 9.2 in - 13.2 in (235 - 335 mm) is certified for downward loads to 72.2 lbs/ft² (5400 Pa) and upward loads to 33.4 lbs/ft² (1600 Pa).
- Clamping in the red zone is not permitted (0 - 9.8 in (0 - 235 mm), > 13.8 in (> 335 mm) on long side, and entire length of short side).

Mounting holes
REC TwinPeak 72 panels have been certified for installation using the four elongated holes 0.6 x 0.35 in (14 x 9 mm) on the underside of the panel frame at a distance of 10.8 in (275 mm) from the short side edge (fig. 11), utilizing rails and bolts matching the specifications in fig. 12. Installation of REC TwinPeak 72 panels using mounting holes complies with UL 61730 requirements for a maximum downward design load of 72.2 lbs/ft² (3600 Pa) downward force and 33.4 lbs/ft² (1600 Pa) upwards force. When installing in this way, the frame must be supported by two transverse rails (figs. 1 & 2) of aluminium or galvanized steel (to avoid galvanic corrosion) suitable for the application and appropriate for the local environment. These must be held in position by bolts and flange nuts as per the specifications below. Observe the following procedures when using mounting holes:

- The mounting construction should be of aluminium or galvanized steel to avoid galvanic corrosion and be appropriate for the local environment.
- Additional electrical bonding to Ground is required for the support structure.
- All four mounting holes in the frame must be used.
- Tighten fastenings using a torque wrench according to the mounting structure manufacturer’s instructions.

There are four mounting holes on the underside of the long frame side spaced 7.9 in (200 mm) from the center (31.6 in (802.5 mm) from the corner). These are intended for use with specific tracker systems only, and not for rail-based systems. Unauthorized use of these may void the warranty. Consult first with REC if you need to use these for installation, otherwise only the mounting holes shown in fig. 11 are to be used.

The product warranty will be voided if additional holes are made in the frame. All fixing and fastening materials must be corrosion resistant.

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Material</th>
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<tbody>
<tr>
<td>Rail</td>
<td>6105 - T5 aluminum extrusion</td>
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</tbody>
</table>

Each panel must be clamped at a minimum of four points. The minimum grip length of each clamp (fig. 4) and the rail must be fully located in the same color zone to be rated to that load value (fig. 10). If the panel is secured in two different zones, it is rated to the lower load value only.
Mounting using clamps: Long side
REC TwinPeak 2S 72 panels can be secured using clamps where both clamps and rails are located within the constraints shown in fig. 14. Mounting utilizing clamps has been found to be in compliance with UL 61730 requirements for design loads up to 72.2 lbs/ft² (3600 Pa) downwards force and 33.4 lbs/ft² (1600 Pa) upwards force according to the clamping position. Panels must be clamped in a minimum of four individual clamping zones as shown below. Site-specific loads such as wind or snow which may exert force in a different way need to be taken into consideration to ensure this limit is not exceeded.

- Clamps and rails must be located and secured at a distance between 7.9 - 20.5 in (200 - 520 mm) from the panel corner (fig. 14).
- Follow the clamp manufacturer’s recommended applied torque to fasten the clamps.
- The distance between the end clamp and the end of the rail must be minimum 1 in (25 mm).

Mounting using clamps: Short side
REC TwinPeak 2S 72 solar panels have not been certified for installation using clamps on the short side of the panel. Clamping the module on the short side may compromise the mechanical integrity of the panel and is not permitted (fig. 14).

![Clamping Zones: REC TwinPeak 2S 72 Series (measurements in diagram shown in mm [in])](image)

![Mounting hole installation: REC TwinPeak 2S 72](image)

Each panel must be clamped at a minimum of four points. The minimum grip length of each clamp (fig. 4) and the rail must be fully located in the same color zone to be rated to that load value (fig. 14). If the panel is secured in two different zones, it is rated to the lower load value only.

Mounting holes
REC TwinPeak 2S 72 panels have been certified for installation using the four elongated holes 0.6 x 0.35 in (11 x 6.6 mm) on the underside of the panel frame at a distance of 10.8 in (275 mm) from the short side edge (fig. 15), utilizing rails and bolts matching the specifications in fig. 16. Installation of REC TwinPeak 2S 72 panels using mounting holes complies with UL 61730 requirements for a maximum downward design load of 72.2 lbs/ft² (3600 Pa) downward force and 33.4 lbs/ft² (1600 Pa) upwards force. When installing in this way, the frame must be supported by two transverse rails (figs. 1 & 2) of aluminium or galvanized steel (to avoid galvanic corrosion) suitable for the application and appropriate for the local environment. These must be held in position by bolts and flange nuts as per the specifications below. Observe the following procedures when using mounting holes:

- The mounting construction should be of aluminium or galvanized steel to avoid galvanic corrosion and be appropriate for the local environment.
- Additional electrical bonding to Ground is required for the support structure.
- All four mounting holes in the frame must be used.
- Tighten fastenings using a torque wrench according to the mounting structure manufacturer’s instructions.

![Mounting holes: REC TwinPeak 2S 72 (mm [in])](image)

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>6105-T5 aluminum extrusion</td>
</tr>
<tr>
<td>Bolt</td>
<td>M6 x 25 drop in T-stud kit</td>
</tr>
<tr>
<td>Nut</td>
<td>M6 flanged hex locking nut</td>
</tr>
</tbody>
</table>

There are four mounting holes on the underside of the long frame side spaced 7.9 in (200 mm) from the center (31.6 in (802.5 mm) from the corner). These are intended for use with specific tracker systems only, and not for rail-based systems. Unauthorized use of these may void the warranty. Consult first with REC if you need to use these for installation, otherwise only the mounting holes shown in fig. 15 are to be used.

The product warranty will be voided if additional holes are made in the frame. All fixing and fastening materials must be corrosion resistant.
DRAINAGE HOLES
Each corner of the panel frame has small drainage holes that allow water caused by rain, condensation, snow melt, cleaning or any other process to exit the frame easily and to minimize damage caused by freezing and thawing (fig. 18). These holes must not be used for mounting the panel.

To enable effective drainage and ensure there is no damage to the module, the drainage holes must remain fully open and enable water egress during and after installation.

Note: The shape and dimensions of the drainage holes may vary slightly from the above image depending on product and/or frame design.

GROUNDING
A panel with exposed conductive parts is considered to be in compliance with UL 1703 and UL 61730 only when it is electrically grounded in accordance with the instructions presented below and the requirements of the National Electrical Code. When grounding a panel, it must be done using an electrical connection from the panel frame. REC solar panels have a clearly marked, small round Ø 6 mm grounding hole positioned near each corner of the panel to aid in grounding as shown in fig. 13 (exact positioning can be seen in the Technical Characteristics section at the rear of this manual); these can be further identified by the grounding symbol stamped in the frame next to it. Grounding is achieved through securement to the panel frame of UL listed grounding clips/lugs as specified in fig. 19 in combination with the REC solar panel(s). Check all applicable requirements before beginning installation.

• Suitable grounding clips/lugs must be used: Listed: (KDER) ILSCO, GBL-4DBT (tin plated) (E34440).
• Grounding cable size must be between 4 - 14 AWG (2.1 - 21.2 mm²)
• Attach clips/lugs to the grounding holes in the panel frames.
• Affix to the frame using a #10 star washer and #10 lock nut, ensuring a conductive connection (fig. 20).
• Place the star washer between the frame and the nut, using a 0.2 in (5 mm) diameter stainless steel bolt and locking nut to mount the lug to the panel frame and tighten according to the manufacturer’s 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.

To avoid galvanic corrosion, stainless steel fastening materials are preferred, however galvanized or hot dipped zinc plated fasteners are equally suitable.

Negative grounding of the modules is not required.

<table>
<thead>
<tr>
<th>Cross section [mm²]</th>
<th>Type</th>
<th>Torque [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. - 21.2</td>
<td>Stranded</td>
<td>3.9</td>
</tr>
<tr>
<td>8.4</td>
<td>Stranded</td>
<td>3.4</td>
</tr>
<tr>
<td>2.1 - 5.3</td>
<td>Stranded / Solid</td>
<td>2.8</td>
</tr>
</tbody>
</table>
CABLES, CONNECTIONS AND CONNECTORS

All connectors and cables must be checked to ensure they are secure and tight as well as electrically and mechanically sound. UV-resistant cables and connectors approved for outdoor use must be used. Conductor gauge must be chosen to ensure DC power losses (voltage drop) are kept to a minimum (<1%).

Observe all local regulations when selecting cables. For string connections, use minimum 10 AWG (4 mm²) or copper wires insulated for a maximum operating temperature of 194°F (90°C). Secure cables using UV-resistant cable ties or other device. Loose and unsecured cables must be protected from damage (e.g., mechanical, abrasion, sharp objects, animals). Avoid exposing cables to direct sunlight and permanent tension.

In order to ensure durable and safe connections between panels and BOS equipment, the following instructions must be followed in order to protect the electrical connections from the elements. Further information is given in the Guide to Best Practice - Connections and Connectors which can be found via the REC online Download Center (www.recgroup.com/downloads).

Safety is paramount when working with electrical connectors. Ensure that any installation work is not carried out on live or load-carrying parts. Connections must not be disconnected under load and the system must be isolated from the grid before carrying out any maintenance or repair work.

CONNECTORS

The exact connector type used on REC solar panels is indicated in the product specifications at the rear of this manual. The stated IP rating is only valid when correctly mated. To ensure connector compatibility and reduce the potential for damage to the modules and the installation, mated connectors must be from the same manufacturer and of the same (i.e., mateable) connector type and system rating. Connections may also be made using connectors that are certified as mateable.

Instellers are responsible for the compliancy of the system with any local regulations regarding the mating of connectors, e.g., NEC 110.3 (B).

The cutting of panel cables is only permitted in order to replace a factory-installed connector with another brand of connector to ensure ‘like-for-like’ mating when connecting to a non-REC external device. All other changes are prohibited and will invalidate the REC warranty. The connector replacement procedure must be carried out by the installer correctly according to the replacement connector manufacturer’s instructions. The selected replacement connector must also fulfill all relevant technical specifications and be certified according to applicable standards (e.g., IEC 62852 or UL 6703) so as to ensure they are fit for purpose and safety. The REC warranty does not extend to cover any fault traceable to the replaced connectors.

- The secure connection of connectors is identified by a firm click once inserted.
- The use of any chemicals or lubricants on the connectors or contacts must be carried out in line with the connector manufacturer’s instructions.

Any other modification to the panel is prohibited, including the opening of the junction box, unless explicitly authorized by REC. Doing so will invalidate the warranty.

PROTECTING THE CABLES

- To prevent stress on the junction box casing, ensure the cable exits the junction box in a straight line before any bend in the cable.
- The cables on REC solar panels have a minimum bending radius of 1.2 in (30 mm) to avoid damage to the insulation (fig. 21).

Fig. 21: Minimum cable bend radius

- Ensure cables do not hang loose where they may be damaged through friction or stress, e.g., caused by wind or grazing animals.
- Shield connectors from falling or dropping water by locating them directly beneath a panel.
- Cables must be firmly secured to the structure, without over-tightening, as this can deform the cable insulation.

SECURING CABLES AND CONNECTORS

- When securing the connector, place it so that it has with sufficient air circulation all around. This allows the connector to dry effectively and avoids the risk of damage or degradation of the connection.
- Good practice is to secure the cable either side of the connectors, ensuring no stress is exerted on the connector casing or cable entry.

To enable correct cooling and drying of the connectors, do not add extra protection to the connector, e.g., heat shrink, grease or tape.
MAINTENANCE

CLEANING INSTRUCTIONS

REC solar panels have been designed for easy maintenance. The need for cleaning the solar panels will vary dependent on location, rainfall, air pollution levels and the angle of installation – the lower the angle of installation, the more cleaning will be required. ‘Normal’ rainfall will naturally clean the panels if installed at a sufficient angle. To optimize electrical output it is recommended to clean the panels when dirt can be seen on the glass surface.

🌟 Panel cleaning should always be carried out when the panels are cool to avoid breakage through thermal shock, e.g., in the morning.

The build up of dirt on the panel surface over time may cause cell shading which will reduce power output or can even cause further damage. To clean either the front or rear of the panels, use only deionized water free from grit and physical contaminants, at ambient temperature and use a sponge, microfiber cloth or a soft brush to wipe away the dirt (rainwater, tap water or diluted alcohol may also be used as a secondary solution). For further cleaning a mild, biological and biodegradable washing-up liquid may be used.

When cleaning the panel, take care not to scratch the surface or introduce foreign elements that may cause damage. Ensure the water used is free from grit and physical contaminants that may damage the panel. Always rinse the panel with plenty of water. If soiling remains on the panel, repeat the cleaning process. If stains require more effort to be removed, Isopropyl alcohol of a concentration less than 10% may be used. Acid or Alkali detergent may not be used.

⚠️ Use of high pressure hoses or cleaners is not permitted as these may damage the panels, laminate or cells.

Using a soft rubber squeegee, wipe the panel surface from the top downwards to remove any residual water from the panel glass. Panels can be left to dry in the air or wiped dry with a clean and soft cloth or chamois. Avoid putting pressure on the on the panel surface when drying, e.g., leaning or standing on it.

For more information on cleaning REC solar panels, consult the REC Cleaning Information Sheet which is available to download from the online REC Download Center www.recgroup.com/downloads. If in doubt at any time when cleaning the panels, stop and obtain professional advice.

SYSTEM INSPECTION

The system should be inspected regularly to ensure that:

- Fasteners are secure, tight and free from corrosion,
- Electrical connections are secure, tight, clean, and free of corrosion,
- The mechanical integrity of the cables is intact,
- Bonding points to ground are tight, secure and free from corrosion (which could break the continuity between the panels and ground).

RECYCLING

REC makes every effort to ensure panel packaging is kept to a minimum. The paper and cardboard packaging can be recycled and the protective wrapping and panel separating blocks are also recyclable in many areas. Recycle packaging and modules according to local guidelines and regulations.

DISPOSAL OF OLD ELECTRICAL AND ELECTRONIC EQUIPMENT

Modules should be recycled at the end of their useful life according to local guidelines and regulations. By ensuring REC solar panels are disposed of correctly, you will help prevent potential negative consequences for the environment and human health which could otherwise be caused by inappropriate waste treatment. The majority of the module components can be recycled.
TECHNICAL CHARACTERISTICS: REC PEAK ENERGY 72 SERIES

Fig. 22: Panel dimensions: REC Peak Energy 72 Series

**Measurements in inches**

### ELECTRICAL DATA @ STC

<table>
<thead>
<tr>
<th>Product code*: RECxxxxPE72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power - $P_{\text{MPP}}$ (Wp)</td>
</tr>
<tr>
<td>Watt Class Sorting - (W)</td>
</tr>
<tr>
<td>Nominal Power Voltage - $V_{\text{MPP}}$ (V)</td>
</tr>
<tr>
<td>Nominal Power Current - $I_{\text{MPP}}$ (A)</td>
</tr>
<tr>
<td>Open Circuit Voltage - $V_{\text{OC}}$ (V)</td>
</tr>
<tr>
<td>Short Circuit Current - $I_{\text{SC}}$ (A)</td>
</tr>
<tr>
<td>Panel Efficiency (%)</td>
</tr>
</tbody>
</table>

Values at Standard Test Conditions (STC): air mass AM1.5, irradiance 1000 W/m², temperature 25°C, based on a production spread with a tolerance of $V_{\text{OC}}$, $I_{\text{SC}}$, ±10% within one watt class. At low irradiance of 200 W/m² at least 95.5% of the STC module efficiency will be achieved.

*Where xxx indicates the nominal power class ($P_{\text{MPP}}$) at STC indicated above.

### ELECTRICAL DATA @ NOCT

<table>
<thead>
<tr>
<th>Product code*: RECxxxxPE72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power - $P_{\text{MPP}}$ (Wp)</td>
</tr>
<tr>
<td>Nominal Power Voltage - $V_{\text{MPP}}$ (V)</td>
</tr>
<tr>
<td>Nominal Power Current - $I_{\text{MPP}}$ (A)</td>
</tr>
<tr>
<td>Open Circuit Voltage - $V_{\text{OC}}$ (V)</td>
</tr>
<tr>
<td>Short Circuit Current - $I_{\text{SC}}$ (A)</td>
</tr>
</tbody>
</table>

Nominal Operating Cell Temperature (NOCT), air mass AM1.5, irradiance 800 W/m², temperature 20°C, windspeed 1 m/s

*Where xxx indicates the nominal power class ($P_{\text{MPP}}$) at NOCT indicated above.

### CERTIFICATIONS

UL 1703, Fire classification Type 2, IEC 61215, IEC 61730, IEC 62804 (PID), IEC 62708 (Salt Mist - severity 6), IEC 62984 (PID-Free), IEC 62716 (Ammonia Resistance), ISO 11925-2 (ignitability Class E), UNI 845791774 (Class A), ISO 9001:2015, ISO 14001, OHSAS 18001

### WARRANTY

10 year product warranty
25 year linear power output warranty
(max. degression in performance of 0.7% p.a.)

See warranty conditions for further details.

### TEMPERATURE RATINGS*

Nominal Operating Cell Temperature: 116°F (46.6°C) h2°C
Temperature coefficient of $P_{\text{MPP}}$: -0.40%/°C
Temperature coefficient of $V_{\text{OC}}$: -0.27%/°C
Temperature coefficient of $I_{\text{SC}}$: 0.013%/°C

*The temperature coefficients stated are linear values

### MAXIMUM RATINGS

Operational temperature: -40° ... +185°F (-40 ... +85°C)
Maximum system voltage: 1000 V
Design load (+): snow 75.2 lbs/ft² (3600 Pa)*
Design load (-): wind 33.4 kg/m² (1600 Pa)*
Max series fuse rating: 20 A
Max reverse current: 20 A

*Safety factor 1.5, refer to installation instructions

### MECHANICAL DATA

Dimensions: 77.5 x 39 x 1.8 in (1968 x 991 x 45 mm)
Area: 21 ft² (1.95 m²)
Weight: 59.5 lbs (27 kg)

### GENERAL DATA

Cell type: 72 multicrystalline cells
3 strings of 24 cells in series
Glass: 0.16 in (4 mm) solar glass with anti-reflection surface treatment
Backsheet: Highly resistant polymeric construction
Frame: Anodized aluminum
Junction box: 3 bypass diodes, IP67 rated
Cable: 12 AWG (4 mm²) PV wire, 47 + 47 in (1.2 m + 1.2 m)
Connectors: Tonglin TL-Cable01S-F, 12 AWG (4 mm²)
Origin: Made in Singapore

**16.7% EFFICIENCY**

**10 YEAR PRODUCT WARRANTY**

**25 YEAR LINEAR POWER OUTPUT WARRANTY**
**TECHNICAL CHARACTERISTICS: REC TWINPEAK 72 & REC TWINPEAK 72 XV SERIES**

**ELECTRICAL DATA @ STC**

<table>
<thead>
<tr>
<th>Product code*: RECxxxTP72</th>
<th>Nominal Power - P_{MPPP} (Wp)</th>
<th>330</th>
<th>335</th>
<th>340</th>
<th>345</th>
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</thead>
<tbody>
<tr>
<td>Watt Class Sorting: - (W)</td>
<td>-0/+5</td>
<td>-0/+5</td>
<td>-0/+5</td>
<td>-0/+5</td>
<td>-0/+5</td>
</tr>
<tr>
<td>Nominal Power Voltage - V_{MPPP} (V)</td>
<td>38.1</td>
<td>38.3</td>
<td>38.5</td>
<td>38.7</td>
<td></td>
</tr>
<tr>
<td>Nominal Power Current - I_{MPPP} (A)</td>
<td>8.67</td>
<td>8.75</td>
<td>8.84</td>
<td>8.92</td>
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</tr>
<tr>
<td>Open Circuit Voltage - V_{OC} (V)</td>
<td>46.0</td>
<td>46.2</td>
<td>46.3</td>
<td>46.5</td>
<td></td>
</tr>
<tr>
<td>Short Circuit Current - I_{SC} (A)</td>
<td>9.22</td>
<td>9.27</td>
<td>9.32</td>
<td>9.36</td>
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</tr>
<tr>
<td>Panel Efficiency (%)</td>
<td>16.4</td>
<td>16.7</td>
<td>16.9</td>
<td>17.2</td>
<td></td>
</tr>
</tbody>
</table>

Values at Standard Test Conditions (STC): air mass AM1.5, irradiance 1000 W/m², temperature 25°C, based on a production spread with a tolerance of V_{OC} & I_{SC} ±10% within one watt class. Where xxx indicates the nominal power class (P_{MPPP}) at STC indicated above, and can be followed by the suffix XV for 1500 V rated modules.

**ELECTRICAL DATA @ NOCT**

<table>
<thead>
<tr>
<th>Product code*: RECxxxTP72</th>
<th>Nominal Power - P_{MPPP} (Wp)</th>
<th>244</th>
<th>248</th>
<th>251</th>
<th>255</th>
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</thead>
<tbody>
<tr>
<td>Nominal Power Voltage - V_{MPPP} (V)</td>
<td>34.9</td>
<td>35.1</td>
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<td></td>
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<tr>
<td>Nominal Power Current - I_{MPPP} (A)</td>
<td>6.99</td>
<td>7.06</td>
<td>7.13</td>
<td>7.21</td>
<td></td>
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<tr>
<td>Open Circuit Voltage - V_{OC} (V)</td>
<td>42.3</td>
<td>42.5</td>
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<tr>
<td>Short Circuit Current - I_{SC} (A)</td>
<td>7.44</td>
<td>7.48</td>
<td>7.52</td>
<td>7.57</td>
<td></td>
</tr>
</tbody>
</table>

Nominal Operating Cell Temperature (NOCT): air mass AM1.5, irradiance 800 W/m², temperature 20°C, wind speed 1 m/s. Where xxx indicates the nominal power class (P_{MPPP}) at STC indicated above, and can be followed by the suffix XV for 1500 V rated modules.

**CERTIFICATIONS**

UL 1703, Fire classification Type 1(5000 V XX), Type 2(1000 V), IEC 61215, IEC 61701, IEC 62804, IEC 62716, IEC 6801, IEC 6801 (Sand Mst – severity 6), IEC 62804 (PID Free), IEC 62716 (Ammonia), ISO10195-2 (Class E), UNI-845/9174 (Class A), ISO 9001:2015, ISO 14001, OHSAS 18001

**WARRANTY**

10 year product warranty
25 year linear power output warranty (max. deg. in performance of 0.7% p.a.)

See warranty conditions for further details.

**17.2% EFFICIENCY**

**10 YEAR PRODUCT WARRANTY**

**25 YEAR LINEAR POWER OUTPUT WARRANTY**

**GENERAL DATA**

Cell type: 144 half-cut multicrystalline cells

Glass: 0.16 in (4 mm) solar glass with anti-reflection surface treatment

Backsheet: Highly resistant polymeric construction

Frame: Anodized aluminum

Junction box: 3-part, 3 bypass diodes, IP67 rated

Cable: 12 AWG (4 mm²) PV wire, 47 + 47 in (1.2 m + 1.2 m)

Connectors: Tonglin TL-Cable01, 12 AWG (4 mm²) (1000 V)

Tonglin TL-Cable01-SF, 12 AWG (4 mm²) (1500 V)

Origin: Silicon: Made in USA & Norway

Wafer/Cell/Module: Made in Singapore

**MAXIMUM RATING**

Operational temperature: -40° ... +185°F (-40 ... +85°C)

Maximum system voltage: 1000 V / 1500 V

Design load (+): wind 75.2 lbs/ft² (3600 Pa)*

Design load (-): snow 33.4 kg/m² (1600 Pa)*

Max series fuse rating: 20 A

Max reverse current: 20 A

*Safety factor 1.5, refer to installation instructions

**TEMPERATURE RATINGS**

Nominal Operating Cell Temperature: 112°F (44.6°C) (±2°C)

Temperature coefficient of P_{MPPP} -0.36 %/°C

Temperature coefficient of V_{OC} -0.30 %/°C

Temperature coefficient of I_{SC} 0.066 %/°C

*The temperature coefficients stated are linear values

**MECHANICAL DATA**

Dimensions: 78.9 x 39.4 x 18 in (2005 x 1001 x 45 mm)

Area: 216 ft² (2.01 m²)

Weight: 61.7 lbs (28 kg)

Ref: NE-05-05-06 Rev- M 10.17 Specifications subject to change without notice.
TECHNICAL CHARACTERISTICS: REC TWINPEAK 2S 72 & REC TWINPEAK 2S 72 XV SERIES

Fig. 24: Panel dimensions: REC TwinPeak 2S Series

Measurements in mm [in]

<table>
<thead>
<tr>
<th>ELECTRICAL DATA @ STC</th>
<th>Product code: RECxxxTP2S 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power - PMPP (Wp)</td>
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</tr>
<tr>
<td>Watt Class Sorting: (W)</td>
<td>-0/+5 -0/+5 -0/+5 -0/+5 -0/+5 -0/+5</td>
</tr>
<tr>
<td>Nominal Power Voltage - Vmpp (V)</td>
<td>38.1 38.3 38.5 38.7 38.9 39.1</td>
</tr>
<tr>
<td>Nominal Power Current - Impp (A)</td>
<td>8.67 8.75 8.84 8.92 9.00 9.09</td>
</tr>
<tr>
<td>Open Circuit Voltage - Voc (V)</td>
<td>46.0 46.2 46.3 46.5 46.7 46.9</td>
</tr>
<tr>
<td>Short Circuit Current - Iscc (A)</td>
<td>9.44 9.52 9.58 9.64 9.72 9.78</td>
</tr>
<tr>
<td>Panel Efficiency (%)</td>
<td>16.5 16.7 16.9 17.2 17.4 17.7</td>
</tr>
</tbody>
</table>

Values at Standard Test Conditions (STC): air mass AM1.5, irradiance 1000 W/m², temperature 25°C, based on a production spread with a tolerance of Voc, Iscc ±10% within one watt class. At low irradiance of 200 W/m² at least 95% of the STC module efficiency will be achieved.

Where xxx indicates the nominal power class (PMPP) at STC indicated above, and can be followed by the suffix XV for 1500 V rated modules.

<table>
<thead>
<tr>
<th>ELECTRICAL DATA @ NOCT</th>
<th>Product code: RECxxxTP2S 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power - PMPP (Wp)</td>
<td>244 252 257 260 264 268</td>
</tr>
<tr>
<td>Nominal Power Voltage - Vmpp (V)</td>
<td>34.9 35.5 35.7 35.8 36.0 36.2</td>
</tr>
<tr>
<td>Nominal Power Current - Impp (A)</td>
<td>6.99 7.10 7.19 7.25 7.32 7.39</td>
</tr>
<tr>
<td>Open Circuit Voltage - Voc (V)</td>
<td>42.3 42.8 42.9 43.1 43.2 43.3</td>
</tr>
<tr>
<td>Short Circuit Current - Iscc (A)</td>
<td>7.44 7.74 7.79 7.84 7.90 7.95</td>
</tr>
</tbody>
</table>

Nominal Operating Cell Temperature (NOCT): air mass AM1.5, irradiance 800 W/m², temperature 20°C, wind speed 1 m/s

Where xxx indicates the nominal power class (PMPP) at STC indicated above, and can be followed by the suffix XV for 1500 V rated modules.

**CERTIFICATIONS**

- UL 67730: Fire classification Type II (1500 V XV) Type 2 (1000 V)
- IEC 62708, IEC 62706, IEC 62701, IEC 62704 (PID), IEC 60601-1, IEC 62100-3
- ISO 9601:2011, ISO 14001, DIN 40801 18001

**WARRANTY**

- 20 year product warranty
- 25 year linear power output warranty
  (max. degression in performance of 0.5% p.a.)
  See warranty conditions for further details.

**MECHANICAL DATA**

- Dimensions: 78.9 x 39.4 x 1.2 in (2005 x 1001 x 30 mm)
- Area: 216 ft² (201 mm²)
- Weight: 48.5 lbs (22 kg)

**GENERAL DATA**

- Cell type: 144 half-cut multicrystalline cells
- Glass: 0.16 in (3.2 mm) solar glass with anti-reflection surface treatment
- Backsheet: Highly resistant polymeric construction
- Frame: Anodized aluminum
- Support bars: Anodized aluminum
- Junction box: 3-part, 3 bypass diodes, IP67 rated
- Cable: 12 AWG (4 mm²) PV wire, 47 + 47 in (1.2 m + 1.2 m)
- Connectors: Tongil TL-Cable01, 12 AWG (4 mm²) (1000 V)
  Tongil TL-Cable01-SF, 12 AWG (4 mm²) (1500 V)
- Origin: Silicon, Made in USA & Norway
- Wafer/Cell/Module: Made in Singapore

**MAXIMUM RATINGS**

- Operational temperature: -40° ... +185°F (-40 ... +85°C)
- Maximum system voltage: 1000 V / 1500 V
- Design load (+): snow 75.2 lbs/ft² (3600 Pa)*
- Design load (-): wind 33.4 kg/m² (1600 Pa)*
- Max series fuse rating: 20 A
- Max reverse current: 20 A
  *Safety factor 1.5, refer to installation instructions

**TEMPERATURE RATING**

- Nominal Operating Cell Temperature: 112°F (44.6°C) (±2°C)
- Temperature coefficient of PMPP: -0.36%/°C
- Temperature coefficient of Vmpp: -0.30%/°C
- Temperature coefficient of Iscc: 0.066%/°C
  *The temperature coefficients stated are linear values

**REMARKS**

Ref: NE-05-05-05 Rev D 01.19
Specifications subject to change without notice.

- 17.7% EFFICIENCY
- 20 YEAR PRODUCT WARRANTY
- 25 YEAR LINEAR POWER OUTPUT WARRANTY
Fig. 25: Panel dimensions: REC TwinPeak 2S Mono 72 Series

**TECHNICAL CHARACTERISTICS: REC TWINPEAK 2S MONO 72 & REC TWINPEAK 2S MONO 72 XV SERIES**

**ELECTRICAL DATA @ STC**

<table>
<thead>
<tr>
<th>Product Code: RECxxxxTP2SM 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power - P_{mpp} (Wp)</td>
</tr>
<tr>
<td>Watt Class Sorting - (W)</td>
</tr>
<tr>
<td>Nominal Power Voltage - V_{mpp} (V)</td>
</tr>
<tr>
<td>Nominal Power Current - I_{mpp} (A)</td>
</tr>
<tr>
<td>Open Circuit Voltage - V_{oc} (V)</td>
</tr>
<tr>
<td>Short Circuit Current - I_{sc} (A)</td>
</tr>
<tr>
<td>Panel Efficiency [%]</td>
</tr>
</tbody>
</table>

Values at standard test conditions STC (solar I. S, irradiance 1000 W/m², cell temperature 77°F (25°C)) at least 95% of the STC module efficiency will be achieved.

**ELECTRICAL DATA @ NOCT**

<table>
<thead>
<tr>
<th>Product Code: RECxxxxTP2SM 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power - P_{mpp} (Wp)</td>
</tr>
<tr>
<td>Nominal Power Voltage - V_{mpp} (V)</td>
</tr>
<tr>
<td>Nominal Power Current - I_{mpp} (A)</td>
</tr>
<tr>
<td>Open Circuit Voltage - V_{oc} (V)</td>
</tr>
<tr>
<td>Short Circuit Current - I_{sc} (A)</td>
</tr>
</tbody>
</table>

Nominal cell operating temperature NOCT (800 W/m², AM 1.5, wind speed 1 m/s, ambient temperature 68°F(20°C)).

**CERTIFICATION**

* xxx indicates the nominal power class (P_{mpp}) at STC, and can be followed by the suffix XV for modules with a 1500 V maximum system rating.

**GENERAL DATA**

- **Cell type:** 144 half-cut monocrystalline cells
- **Glass:** 0.13 in (3.2 mm) solar glass with anti-reflection surface treatment
- **Backsheet:** Highly resistant polymeric construction
- **Frame:** Anodized aluminum
- **Support bars:** Anodized aluminum
- **Junction box:** 3-part, 3 bypass diodes, IP67 rated
- **Cable:** 12 AWG (4 mm²) PV wire, 47 + 47 in (1.2 m + 1.2 m)
- **Connectors:** Tongin TL-Cable01-5F, 12 AWG (4 mm²)
- **Origin:** Silicon: Made in US & Norway, Wafer/Cell/Module: Made in Singapore

**MAXIMUM RATINGS**

- **Operational temperature:** -40°...+185°F (-40...+85°C)
- **Maximum system voltage:** 1000 V / 1500 V
- **Design load (+): snow** 75.2 lbs/ft² (3600 Pa)*
- **Design load (-): wind** 33.4 kg/m² (1600 Pa)*
- **Max series fuse rating:** 20 A
- **Max reverse current:** 20 A

* Safety factor 1.5, refer to installation instructions

**TEMPERATURE RATING**

- **Nominal Operating Cell Temperature:** 112°F (44.9°C) (±2°C)
- **Temperature coefficient of P_{mpp}** 0.37 %/°C
- **Temperature coefficient of V_{oc}** 0.28 %/°C
- **Temperature coefficient of I_{sc}** 0.04 %/°C

* The temperature coefficients stated are linear values

**MECHANICAL DATA**

- **Dimensions:** 78.9 x 39.4 x 1.2 in (2005 x 1001 x 30 mm)
- **Area:** 216 ft² (2.01 m²)
- **Weight:** 48.5 lbs (22 kg)

**WARRANTY**

- **20 year product warranty**
- **25 year linear power output warranty**

*See warranty conditions for further details.

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UL 61730 Fire classification: Type I (1500 V XV). Type 2 (1000 V).

IEC 61215, IEC 61730, IEC 62804 (PID), IEC 62716 (Ammonia),
IEC 6770 (Salt Mist level 6).


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**Rev B.3 - 01.19**

REC Installation Manual - 72-Cell products according to UL 1703

Ref NE-05-07-13 Rev-A 11.18 Specifications subject to change without notice.

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**EFFICIENCY**

18.9%

**20 YEAR PRODUCT WARRANTY**

**25 YEAR LINEAR POWER OUTPUT WARRANTY**

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**SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.**
ANNEX 1: INSTALLATIONS ON WATER PLATFORMS

This section is applicable to the following products only (other module types have not yet been qualified for installations on water platforms):

- REC Peak Energy 72 Series
- REC TwinPeak 72 Series & REC TwinPeak 72 XV Series
- REC TwinPeak 2S 72 Series & REC TwinPeak 2S 72 XV Series

The above named REC solar panels may be installed on water platform-type mounting systems (note that the UL 1703 and UL 61730 certification testing of solar panels does not include testing on these types of systems). When installing any of the above named REC solar panels on fixed position (e.g., anchored) water platforms, for example, floating pontoons, follow the instructions below specific to such applications. Failure to do so will invalidate the warranty.

⚠️ For all installations on water platforms, first advise REC before the start of installation in case of any site specific instructions or constraints.

INSTALLATION ENVIRONMENT

i) Installation site
- REC solar panels may only be installed on closed bodies of fresh water where water salinity does not exceed 25 ppt (25 mS/cm) at 77°F (25°C) (15 PSU). This specifically excludes mounting on sea and ocean applications.
- The maximum permitted wave height must not exceed 3.3 ft (1 m) from the crest to the trough of the wave.

ii) Floating platforms
- When using a floating platform, follow the manufacturer’s instructions regarding installation, maintenance, inspection and cleaning at all times.

iii) Minimum installation height
- The minimum installation height of REC solar panels on floating platform systems is 5.9 in (15 cm) and is defined as the height between the water surface and the lowest edge/part of the panel during normal operation. This will help to shield the panel from direct water spray.

INSTALLATION INSTRUCTIONS

i) System installation
- All cables used for the installation must have sufficient length and slack to prevent damage due to water level changes and wave motions.

⚠️ Negative system grounding is required for REC solar panels installed on a floating platform.

ii) Mounting panels
- Installation of REC solar panels must be in accordance with the aforementioned standard mounting instructions.
- The junction box should be oriented as far as possible from the water surface according to system design and the junction box, cables and connectors must be protected from direct water splash.
- The installation must allow for sufficient spacing between individual panels, in order to avoid all contact as caused by the natural movement and flexing of the floating structure.

iii) Panel protection
- In areas with high avian activity, additional bird repelling devices may be installed as long as they do not adversely affect system performance, e.g., shading or to the local environment etc.
- If using lightning protection equipment on the floating installation, all relevant local regulations must be respected.

MAINTENANCE
- Regularly inspect the installation to ensure all panels are securely mounted.

⭐️ For installations with high avian activity, system cleaning may be required at more frequent intervals to reduce shading of panels caused by bird defecation.

SAFETY
- Immediately disconnect the system if the installation or the floating platform exhibits deviation from standard operating conditions.
- In the event of the floating platform being submerged, disconnect the DC connection at the inverter immediately. Do not attempt to salvage panels when sunlight is present.
ANNEX 2: INSTALLATION OF BIFACIAL PANELS

This section is applicable to the following product(s) only:

• REC TwinPeak 72 XV Bifacial Series

The above named REC solar panel type has a transparent backsheet and double-sided cells which allows the capture of light on the rear side of the panel in addition to light captured on the front side. This produces an increase in overall power that can be anywhere up to as much as 50% dependent on the surrounding environmental conditions as the cells receive light reflected from the surface and further diffused light. The current generated on the rear of the cell is added to that produced by the front to increase total power gain.

Bifacial modules give the highest energy yield when the rear side of the cells can capture the most light available to them. This means that the output power increases proportionally to the albedo (reflected) light received by the rear side of modules. The amount of albedo light available to the rear side of the cells is greatly influenced by the height and tilt angle of the installation. When installing an REC TwinPeak 72 XV Bifacial panel, follow the regular installation instructions in this manual for the correct module type in addition to the recommendations below which are specific to bifacial applications and can help ensure the best performance:

**Bifacial modules produce voltage when exposed to light on the rear side as well as the front. Take care during installation, maintenance or repair work to shield both sides from light to minimize the production of electricity.**

**SYSTEM DESIGN**

• Care must be taken when sizing a system that the correct inverter size is chosen. REC recommends that system calculations take into account the electrical data of both the front and rear sides of the panel.

• As voltage range and the thermal coefficients are the same for bifacial cells as for monofacial, these can be used in system calculations as for standard panel sizing.

**INSTALLATION SITE**

• Bifacial panels should be installed above a surface that gives the highest albedo (amount of reflection) possible. For example, a white painted roof or light colored gravel.

• Modules should be elevated above the surface as high as is reasonably possible to enable the highest amount of light transfer to the rear side.

**SYSTEM INSTALLATION**

• The mounting system used to secure the modules, and other system components, e.g., cable routing, should not cause any shading of the rear side of the solar panel.

• Suitable ventilation should be ensured to enable sufficient cooling of the panel on both sides.

**Wherever possible, a small gap of around 200 mm (or more) should be left between installed modules. This will allow light to pass between the modules and reduce the shading of the installation surface, simultaneously increasing the amount of reflection possible at the rear of the panel array.**

**MAINTENANCE**

• Regularly inspect the installation to ensure all panels are securely mounted.

• The surface on which the system is mounted should be periodically checked for signs of weathering, ageing or other environmental influence in order to ensure the highest albedo level for maximum energy production. Corrective actions may include re-painting, clearance of debris, weeding or simple cleaning.
ANNEX 3: INSTALLATIONS USING RAPID SHUTDOWN DEVICES

This section is applicable to all REC products referred to in this installation manual.

Rapid Shutdown (RSD) is the name given to the range of panel-level components that can be installed in PV system circuits installed on or in buildings to reduce shock hazard for emergency responders. RSD devices can be supplied pre-installed by panel manufacturers or as a ‘retro-fit’ system made by third-party manufacturers. From January 1, 2019, Section 690.12 of the 2017 National Electrical Code (NEC) (in the U.S.A.) requires the panel-level rapid shutdown of solar systems (replacing the previous array-level shutdown requirement of NEC 2014). This means that all conductors within an array’s 1-ft (300 mm) boundary have to be reduced to 80 V or less within 30 seconds of rapid shutdown initiation.

RSD devices may be used on REC solar panels where desirable or mandatory (note that the certification testing of solar panels does not include testing with RSD devices). When installing an RSD device on an REC solar panel, follow the instructions provided by the device manufacturer and the instructions specific for REC solar panels given below. Failure to follow the manufacturer and the REC instructions may invalidate the warranty.

**INSTALLATION**

**i) Installation**

- RSD devices are suitable for use wherever solar panels are suitable for installation. Observe any limitations set by the RSD manufacturer. (e.g., minimum mounting gap between RSD and rooftop).
- When attaching an RSD device to a solar panel, it must be secured to the panel frame. Follow RSD manufacturer instructions to ensure optimum mounting of RSD device and prevent any slippage during operation.
- RSD devices may also be attached to the mounting construction. In such cases, refer to the instructions provided by the manufacturer.
- Wherever possible, the installation of the RSD device should not cover the product label on the rear of the panel.
- RSD devices may only be installed on REC solar panels in the areas shown in the diagram below (fig. 26):

**CONNECTION**

- First ensure the installation of the RSD device is secure and safe.
- Following the device manufacturer’s instructions to connect the cables from the RSD device to the solar panel correctly (usually positive to positive [+ to +] and negative to negative [- to -]).
- Connection to the next panel in the array should be done from the ‘free’ cables.

**SAFETY**

- Immediately disconnect the device if there is a problem during installation.

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Fig. 26: RSD device installation zones
- Installation of RSD device in the green zone is permitted.
- Installation of RSD device in the red zone is not permitted.

! **To avoid damage to the panel and to allow for thermal expansion, there must be a minimum gap of 0.1 in (2.5 mm) between the RSD device and the panel backsheet.**

! **The mounting holes in the panel frame must not be used for the installation of RSD devices.**

! **The drilling of extra holes in the frame is not permitted and will invalidate the panel warranty.**
## DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision Number</th>
<th>Reason</th>
</tr>
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<tr>
<td>03.2017</td>
<td>A</td>
<td>First release of combined installation manual for all REC 72-cell solar panels</td>
</tr>
<tr>
<td>11.2018</td>
<td>B</td>
<td>Update to UL 61730 certification standards, revision to Connectors</td>
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<tr>
<td>12.2018</td>
<td>B.2</td>
<td>Addition of Annex 3: RSD, addition of REC TwinPeak 2 Mono and REC TwinPeak 2S Mono 72 products,</td>
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<tr>
<td>01.2019</td>
<td>B.3</td>
<td>Update to warranty conditions</td>
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