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Before Installation, Please Review the Following Checklist

- Ensure that SolaRack® is compliant with your module manufacturer.
- Ensure compliance with any clearances required by your local fire department of building & safety code.
- Ensure your work complies with national, state and local requirements - Even those that may supersede this manual.
- All installations must be preformed by licensed contractors & electricians that are bonded and insured.
- Only use system components supplied by SolaRack®
- Make sure your roof is in proper condition prior to installation. Do not install on damaged roofs!
- Use only appropriate, recommended tools and wear safety goggles and gloves during installation

Fire Classification UL 1703

- Any Roof Slope with Module Types 1 and 2
- Testing preformed at 5” from roof surface (worst case). System can be installed at any height.
- Class A rated PV systems can be installed on Class A, B, and C roofs without affecting the roof fire rating.

Grounding & Bonding UL2703

Components tested and listed as a grounding method are:
- Universal Mid Clamp
- Universal End Clamp
- Splice Kit
- Micro Bolt, Listed to ground Solaredge Optimizers
SolaRack Components

**SolaRack MCR 2.0 Rail**
- Material: Aluminum AL 6005-T5
- Finish: Anodized Clear or Black
- Item Number: IGB-SR-2.0MCR136 or IGB-SR-2.0MCR172

**Adjustable S-Tile Hook**
- Material: SUS304
- Item Number: IGB-SR-ADJS

**SolaRack Splice Kit**
- Material: Aluminum AL 6005-T5
- Finish: Clear Anodized / Black Electrophoresis
- Item Number: IGB-SR-SK or IGB-SR-SKB
- Features: Tightening screws and star washers ground the splice bar and rail.

**Universal Mid Clamp**
- Material: Aluminum AL 6005-T5
- Finish: Clear Anodized / Black Electrophoresis
- Item Number: IGB-SR-MUNI2846S or IGB-SR-MUNI2846B
- Frame Size: 28mm-46mm

**Universal End Clamp**
- Material: Aluminum AL 6005-T5
- Finish: Clear Anodized / Black Electrophoresis
- Item Number: IGB-SR-EUNI2846S or IGB-SR-EUNI2846B
- Frame Size: 28mm-46mm

**SolaRack Micro Bolt**
- Material: SUS304
- Finish: Stainless Steel
- Item Number: IGB-SR-MICRO
- Features: UL Listed to ground Solaredge optimizers SE-Pxxx

**Front Tilt Kit**
- Material: Aluminum AL 6005-T5
- Finish: Anodized Clear
- Item Number: IGB-SR-FT
- Features: Dual tilt bracket, L-Foot attachment and rail attachment

**SolaRack Back Tilt Leg**
- Material: Aluminum 6005-T5
- Finish: Clear Anodized
- Item Number: IGB-SR-xxx
- Features: Available in 3 different sizes 10°-15°, 15°-30° & 30°-45°

**ILSCO Grounding**
- Material: 6061-T6 Aluminum
- Finish: Clear
- Item Number: SGB-4
- Features: UL Listed 467, “For single-use only”

**Universal Rail Cap**
- Material: UV-Rated PVC
- Finish: Black
- Item Number: IGB-SR-ENDCAP

**Wire Management**
- Material: UV Rated PVC
- Finish: Black
- Item Number: IGB-SR-EUNI2846S
Markings

All SolaRack MCR 2.0 Rails are marked by the following label

UL 2703
Stamped on SolaRack® Micro attachment bolt channel nut.
Item # IGB-SR-MICRO
* For single-use only

UL 2703
Stamped on SolaRack® Mid & End Clamps Channel nut.
Item # IGB-SR-MUNI2846 / EUNI2846
* For single-use only

Stamped on ILSCO SGB-4 Grounding Lug
* For single-use only
Recommended Placement & Spacing of Roof Attachments

The SolaRack® Adjustable S-Tile Hook is fully adjustable in height to accommodate all curved tiles. For measurements related to clearances and roof setbacks, please refer to your local building and safety office or other authorities having jurisdiction. When using the Adjustable S-Tile with SolaRack® MCR 2.0 Rails, attachments may be spaced up to 48". For proper installation, please refer to the detailed installation guide on page 11. Lag screw must be installed in the center of a roof rafter and sealant must be applied during installation. Installation must be performed by licensed professionals to avoid roof damage. Deforming tiles in any way during installation can and will shorten the lifespan of the roofing. Be sure not to install systems on poor quality or damaged surfaces.

IMPORTANT:
Maximum span allowed is 4 ft between attachments.

Mounting Instructions: Portrait

Please follow this instruction graphic when solar modules are mounted in portrait alignment. Rail must be mounted 8"-18" from the top and bottom edge of the solar module.

Some solar module manufacturers may have specific requirements rail placement that differs from these instructions, please check with your module manufacture for compliance regarding mounting requirements.

Rail must not exceed 16" cantilever past the last attachment.

Mounting Instructions: Landscape

Please follow this instruction graphic when solar modules are mounted in landscape alignment. Rail must be mounted 4"-7" from the top and bottom edge of the solar module.

Some solar module manufacturers may have specific requirements rail placement that differs from these instructions, please check with your module manufacture for compliance regarding mounting requirements.

Rail must not exceed 16" cantilever past the last attachment.
Grounding Component & Electrical Diagram

Solar Module

Mid Clamp

End Clamp

Fault Current Ground Path

Minimum 10 AWG Copper Wire

Grounded Splice Kit

ILSCO SGB-4 Ground Lug
UL Requirement & Guidelines

Please read carefully and follow the following guidelines set by UL to comply with the UL certification issued to SolaRack®. SolaRack® is certified by UL for the following listing: UL 1703 Fire Rating & UL 2703 Grounding and Bonding. The components evaluated and tested by UL that passed and received the UL 2703 as follow:

- SolaRack® Integrated Grounding & Bonding Series IGB-SR-MUNI2846 Universal Mid Clamp both in clear anodized and black electrophoresis.
- SolaRack® Integrated Grounding & Bonding Series IGB-SR-EUNI2846 Universal End Clamp both in clear anodized and black electrophoresis.
- SolaRack® Integrated Grounding & Bonding Series IGB-SR-SK Splice Kit both in clear anodized and black electrophoresis.

Qualified PV frames

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<tr>
<th>Panel Manufacturer</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunpower Corp.</td>
<td>UL Listed Sunpower Corp modules - SPR-EYY-###. (where YY represents numbers 18, 19, 20 or 21, and ### represents the wattage)</td>
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<tr>
<td>Trina Solar</td>
<td>UL Listed Trina Solar Ltd - TSM-###PD05.08, (where ### represents the wattage)</td>
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<tr>
<td>Canadian Solar</td>
<td>NRTL Listed Canadian Solar - CS6P-###P (where ### represents the wattage), 40mm frames and model identifier CS6Y-xxxZ; where “Y” can be K, P, V, or X; and “Z” can be M, P, PX, or P-SD.</td>
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<td>Solar World</td>
<td>NRTL Listed Solar World - SW ### Mono (where ### represents the wattage)</td>
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<tr>
<td>LG Electronics</td>
<td>NRTL Listed LG Electronics Inc - LG###S1C-B3 (where ### represents the wattage)</td>
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<tr>
<td>Suntech</td>
<td>Vd, Vem, Wdb, Wde, and Wd series modules with 35, 40, and 50mm frames.</td>
</tr>
<tr>
<td>Silfab</td>
<td>Modules with 38mm frames and model identifier SYY-Z-xxx; where “YY” can be SA or LA; SG or LG; and “Z” can be M, P, or X.</td>
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UL 1703

SolaRack® racking systems have been tested and listed by UL for system fire classification Class A Type 1 & 2. Testing was performed and passed at 5” above the roof, allowing installation without limitation of height between the roof and solar modules. System assembly to be mounted over a fire resistant roof covering rated for application. Re-inspect the installation for loose components, loose fasteners and any corrosion. If found, the affected components are to be replaced immediately.

UL 2703

SolaRack® system components were evaluated assuming a 20 Amp maximum series fuse size. SolaRack® mid & end clamps bond and ground the system by penetrating the anodized surface of the solar module with our stainless steel pointed pins. (Fig 1,2) The system is grounded to the rails by stainless steel channel nut. At the end of every array, an ILSCO SGB-4 ground lug must be used for grounding (Fig 3), ILSCO SGB-4 acceptable wire size is 4-14 SOL-STR and is suitable for use with either copper or aluminum wire. The size of grounding wire will be determined by electrical code. The SolaRack® splice kit was tested as a grounding & bonding method and is also listed under UL 2703 (Fig 4). SolaRack® does not require jumpers! Periodic inspection is required. Re-inspect installation for loose components, loose fasteners and any corrosion, such that if found the affected components are to be replaced immediately.

Important

- All bare copper must be separated from any aluminum surface.
- Check with your local AHJ regarding roof setbacks or any special requirements.
- Some jurisdiction’s require visible labels to easily identify UL listed systems.
Universal End Clamp

- M6 SUS304 Screw
- Top Portion Aluminum End Clamp
- Bottom Portion Aluminum End Clamp
- Channel Nut with 6 Grounding Pins
- Module Supporting Lip

Universal Mid Clamp

- M6 SUS304 Screw
- 2 x SUS304 Grounding Pins
- Module Supporting Lip
- Channel Nut with 6 Grounding Pins

M6 SUS Lock Washer
- M6 SUS Star Washer
- 4 x SUS304 Grounding Pins
- Stainless Steel Spring
- PVC Spring Support Base
- 6005-T5 Anodized Aluminum Clamp

Detail Sectional Drawing

- Solar Module
- Module Clamp
- SUS 304 T-Bolt
- SolaRack® MRC 2.0 Rail
- SolaRack® Adjustable S-Tile

- 5/16" x 3" SUS 304 Lag Screw
- Roof Rafter
SolaRack® MCR 2.0 Span Chart

Design Code References
The following engineering references were considered in determining the values of the wing load conditions and material properties of the aluminum railing.
- IBC 2015 / CALIFORNIA BUILDING CODE 2016
- ASCE 7-10 (wind loading)
- Aluminum Design: Aluminum Design Manual 2010

Worst Case Loading
Worst case loading conditions were based on the following two load combinations per section 2.4 of ASCE 7-10:
1) 0.6D + 0.6W
2) D + 0.75L + 4W + 0.75S (L=0)

Design Criteria
The following parameters were considered in determining the values of the allowable span charts of the railing.
- Maximum Building Height Considered = 30ft
- Exposure Categories Considered: B & C
- Wind Pressure Based on Section 30.4 (C&C Method 1)
- Gust Factor, G = 0.85
- Topography Factor, Kzt = 1.0
- Directionality Factor, Kd = 0.85
- Importance Factor, I = 1.0
- Zone 2 Pressures Only Considered
- Minimum 2 Rails Per Panel
- Maximum Cantilever of Railing from Anchor 12 Inches
- Tilt Angles Considered: 0 to 30 degrees
- Performance Not Limited to Deflection
- Adequacy of Attachments Based on Evaluation Report

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<th>GROUND SNOW LOAD (PSF)</th>
<th>RACKING MAX. RAIL SPAN (FT) FOR ZONE 2*</th>
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<tr>
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* Maximum Building Height Considered = 30ft
SolaRack® Optional Water Deflector Flahing
Tools Required

- Cordless Drill (non-impact)
- Impact Driver (for lag screw)
- Torque Wrench (0-250 in-lbs)
- M6 Allen Head
- 13mm Socket (for lag screw)
- 15mm Socket (for T-Bolts)
- 11mm Socket (for SGB-4)

Torque Values

- Adjustable S-Tile Lag Screw (13mm Socket): Fully seat
- T-Bolt to Rail (15mm Socket): 18.5 ft lb
- ILSCO SGB-4 Ground Lag (11mm Socket): 35 in-lbs
- Splice Kit (M6 Allen Head): 10ft lb
- Universal Mid Clamp (M6 Allen Head): 16 ft lb
- Universal End Clamp (M6 Allen Head): 14 ft lb
- Micro Attachment Kit (M6 Allen Head): 20 ft lb

Step by Step Installation Guide for Single Composition

The SolaRack Adjustable S-Tile kit is designed to be installed on S, M, W and Clay roofs. This system has been listed by UL 2703 for Grounding & Bonding and has passed UL 1703 Class A Type 1&2. Installation of the SolaRack® Adjustable S-Tile Hook doesn't require any modification to existing roofing materials and will provide a watertight seal when installed according to the following installation guide. Please follow the steps below to achieve a complete seal and proper installation. The product warranty will be VOIDED if installed differently then specified in this manual or if any alterations or modifications are made to the product. Roof must be in good condition prior to installation. (condition of roof is to be verified and determined by the contractor / installer and SolaRack doesn't take any responsibility of determining the quality of the roof prior installation).

**Step 1**

Locate the roof penetrations at the rafter locations.

Use a crow or nail bar to lift the roofing material where the Hook is installed, make sure to remove or loosen any nails on the way.

Mark the location of your roof penetrations at the rafter locations as outlined in your plans and engineering documents.

Drill 2 1/4” Pilot hole at the center of the roof rafter. * Check local jurisdiction regarding minimum embedment.

Recommended to use all 3 Leg Screws. The 3rd Lag Screw can be installed without a rafter.

Backfill the pilot hole with sealant.

![Roof Penetrations Diagram]

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Step 2
Place the SolaRack® Adjustable S-Tile hook on top of the rafter which it will be installed. Make sure the hook is installed at the ridge point of the tile and secure the connecting bolt to lock in the height.

Drive (3) 5/16x3 Lag Screws to connect the hook to the roof until fully seated. (2 Lag screws must be to the rafter).

Step 3
Re-install the tile to its original location. Slight alteration to the bottom of the tile may be suggested where the hook protrudes.
Step 4
Insert SolaRack® T-Bolt through the Adjustable S-Tile opening into the rail opening. Torque 18.5 ft lb

Step 5
Insert SolaRack® Integrated Grounding Splice Kit at the rail opening. Splice bar must be installed 50% set in each rail segment.

Use the Integrated Grounding & Bonding splice kit at all connections between two rails. Maximum distance from L-Foot is no more then 36" from each side of the Splice Kit Torque to 10 ft lb.
Step 6
Insert SolaRack Integrated Grounding & Bonding Universal Mid Clamp by lifting the Plastic Support Base with two fingers and tilting the Chanel nut into the rails upper opening. Release the Plastic Support Base and the Mid Clamp will stay in the open position.

Step 7
Fasten and install at locations where two solar modules meet. Location of mid clamps from rail end should comply with module manufacture guidelines. Torque to 16 ft lb. Once Mid Clamps are fasten the Stainless Steel Pins will penetrate the anodization coating on the module frame for bonding (red circles below show grounding points).
Step 8
Insert SolaRack Integrated Grounding & Bonding Universal End Clamp by sliding it into the rail upper opening. Make sure the lip at the front of the End Clamp is placed below the Module frame.

Step 9
Fasten and install at the end of each array Minimum 2 End Clamps per Module. Location of End clamps should comply with module manufacture guidelines. Torque to 14 ft lb. Once End Clamps are fasten the Stainless Steel Pins will penetrate the anodization coating on the module frame for bonding.
Step 10
Install ILSCO SGB-4 Grounding Lug at the end of a rail (please refer to Grounding Diagram on page 6). Run copper wire to connect all grounding lugs. Copper wire must not touch any aluminum surface. Tighten each bolt to 35 in-lbs as recommended by ILSCO. Acceptable wire size is 4-14SOL-STR. Suitable for use with either copper or aluminum. Size of grounding wire will be determined by electrical code.

Installing Micro Inverters / Optimizers

Step 1
Insert the Micro Bolt Attachment by tilting it into the upper opening of the rail.
Step 2
Slide The Micro Inverter / Optimizer into place, make sure the washer is on top of the Micro Inverter / Optimizer Plate.

Step 3
Tighte the Micro Bolt to secure the Micro Inverter / Optimizer in place, Torque to 20 ft lb.
LIMITED WARRANTY

This warranty is for SolaRack® “products” manufactured after March of 2014, SolaRack ® provides the following warranties, for the products installed according to our installation manual on the proper roofing structure that the product was designed for: SolaRack®, warrants product(s) that SolaRack® manufactures (“product”) at the original installation site that the “product” shall be free from defects in material and workmanship for a period of fifteen (15) years, except for anodized finish, which finish shall be free from visible peeling, cracking or chalking under normal atmospheric conditions for a period of five (5) years, from the 1) The date installation of the product completed, or 2) 30 days after the purchase of the product (“Finish Warranty”).

The “Finish Warranty” does not apply to any foreign residue deposited on the finish. All installation in corrosive atmospheric conditions (at SolaRack® sole discretion) are excluded. The “Finish Warranty” is VOID if the practices specified by AAMA 609 & 610-02 “Cleaning and Maintenance for Architecturally Finished Aluminum” (www.aamanet.org) are not followed by GEC.

This warranty does not cover damaged products that occurs during its shipment, storage or installation.

This warranty shall be VOIDED if installation of the product is not preformed according with SolaRack® written installation manual (guide), or if the product has been modified, repaired, painted or reworked in a manner not previously authorized by SolaRack® in writing, or if the product is consequential, contingent or incidental damages arising out of the use of the product by any circumstances.

If within the specified Warranty periods the “Products” shall be reasonably proved to be defective, then SolaRack® shall correct the defect by repair, replacement, or credit at SolaRack’s sole discretion.

Refurbished products may be used to repair or replace the defective components. Transportation, installation, or any other costs associated with product repayment are not covered by these warranties and are not reimbursable. These warranties additionally do not cover normal wear, or damage resulting from misuse, overloading, abuse, improper installation, or accident, negligence, or from force majeure acts including any natural disasters, war or criminal acts. Such repair or replacement shall completely satisfy and discharge all of SolaRack’s liability in respect to these warranties.

A formal document providing the purchase location, installation address and purchase date of the “Product” is required with any warranty claim.

Except as set forth above, SolaRack® sell products on “AS IS” basis, which may not be free of errors or defects, AND ALL EXPRESS OR IMPLIED REPRESENTATION AND WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, QUALITY, WORKMANSHIP, EFFORT, CORRESPONDENCE TO DESCRIPTION, DESIGN, TITLE OR NON-INFRINGEMENT, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR TRADE PRACTICE, ARE HEREBY DISCLAIMED.