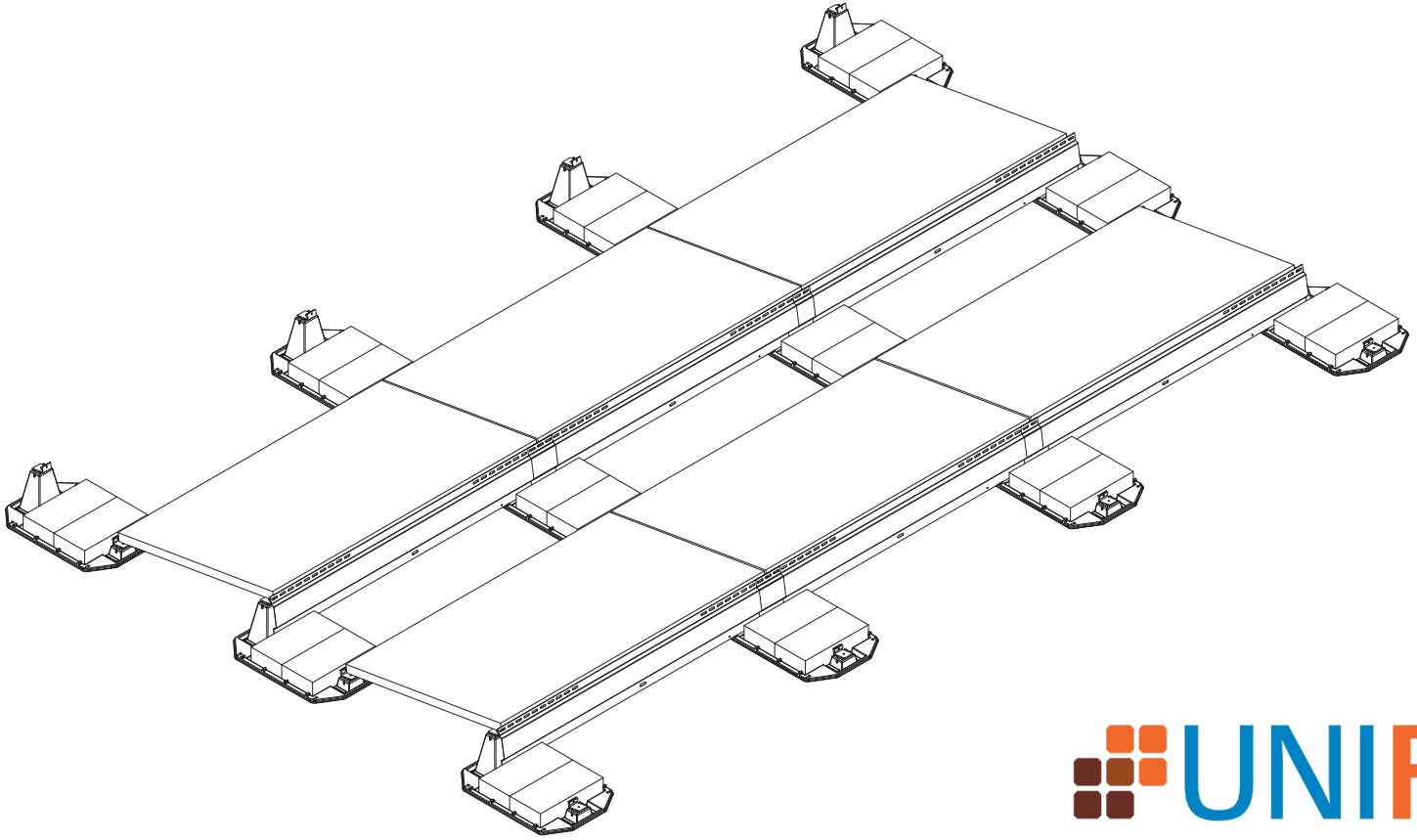
EcoFoot2+

10-DEGREE BALLASTED RACKING SYSTEM

INSTALLATION GUIDE



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UNIRAC Code-Compliant Installation Manual

UNIRAC welcomes input concerning the accuracy and user-friendliness of this publication. Please write to publications@unirac.com.

PUB2024AUG23

EcoFoot2+

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INSTALLATION GUIDE

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Legal Notices

Field Support Contact Information

Unirac proudly offers dedicated engineering expertise and superior customer support. For questions about the installation procedures or a specific application, please contact our Field Support Specialists at 866-488-6794 or FieldSupport@Unirac.com.
Installer Responsibility

The installer is solely responsible for:

- Utilizing all necessary safety equipment, as required by applicable rules and regulations.
- Complying with all applicable local and national building codes, including any that may supersede this manual.
- Ensuring that Unirac® EcoFoot2+® and other products are appropriate for the specific installation and are designed for the installation environment.
- Ensuring that the roof, its rafters, connections, and other structural support members can support the array under all conditions.
- Maintaining the waterproof integrity of the roof including selection of appropriate flashing if the system is being installed using attachments.
- Ensuring safe installation of all electrical aspects of the entire system

Disclaimer of Liability

Unirac® does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of, or in any way connected with installation, operation, use, or maintenance by using this manual.

Unirac assumes no responsibility for any infringement of patents or other rights of third parties, which may result from use of modules. No license is granted by implication or under any patent or patent rights. The information in this manual is believed to be reliable, but does not constitute an expressed and/or implied warranty.

Unirac reserves the right to make changes to the product, specifications, data sheets and this manual without prior notice. This document is not prescriptive regarding safety and does not purport to address all the safety concerns that may arise with its use. Contractors should become familiar with all applicable safety, health, and regulatory requirements before beginning work.

Unauthorized field modification of Unirac components or assemblies may affect Unirac warranty coverage. Provide written drawings for Unirac's review, comment and approval prior to attempting any field modifications.

Warnings & Safety

Both electrical and roofing knowledge are required to correctly and safely install a solar photovoltaic system. Only qualified and certified installation professionals should install EcoFoot2+. Failure to follow the methods and procedures outlined in this guide may result in injury and/or damage to property.
Carefully read this guide before starting any work. Store a copy of this guide on the job site at all times and contact Unirac with any installation questions related to EcoFoot2+.

⚠ WARNING

Please note the following warnings when installing EcoFoot2+:

- EcoFoot2+ components fit together tightly and could cause pinch injuries.
- EcoFoot2+ components may be hot to the touch if left in the sun.

Please follow the safety requirements below when installing EcoFoot2+:

- Always keep children and unauthorized people away from work areas.
- Always wear required OSHA approved Personal Protective Equipment (PPE).
- Always use insulated tools when working with or near electrical systems.
- Always provide OSHA approved fall protection for all installation personnel.
- Never wear jewelry during mechanical and electrical installation work.
- Never work in rain, snow or extremely windy conditions.
- Never leave a module unsupported or unsecured on the roof.
- Never install broken photovoltaic modules.
- Never use photovoltaic modules as a work surface.

EcoFoot2+ General Application Notes

Site-Specific System Design: Unirac provides drafting services on all EcoFoot2+ projects. This service produces a site-specific design package with an Engineered Stamped Layout including detailed ballast plan and bill of materials.

Roof Type: EcoFoot2+ is designed to mount photovoltaic modules to a range of roof surfaces, including: EPDM, TPO, PVC, Mineral Cap Sheet (a.k.a. Rolled Asphalt), Tar and Gravel.

Roof Slope Range: 0-7 degrees maximum, 3-degree limit for unattached seismic.

Wind Zone: EcoFoot2+ is designed to mount photovoltaic modules on flat roof surfaces with a maximum pitch of 7 degrees in areas with extreme wind conditions. Please contact Unirac for clarification or assistance.

Installation Requirements: EcoFoot2+ is ballasted photovoltaic racking designed as a system which requires all EcoFoot2+ components, the specific module, and ballast placement prescribed in the PE stamped design. The absence of any of these elements in any given sub-array could present a compromised condition on the roof. Arrays shall not be left unattended in such a state during an installation.

This install guide officially documents the components used and proper methods for an EcoFoot2+ installation. Bonding elements are incorporated into EcoFoot2+ components. As the system is built on the roof, components and modules are bonded together. Specific steps to ensure a bonded system are described through the installation guide. It is the installer's responsibility to ensure that the system is safely and properly installed, and that the system is bonded back to a final ground point.

When wiring the array, keep bare copper from contacting bare aluminum.

Thermal and Seismic Design Requirements: EcoFoot2+ is a flexible and expandable design that accommodates various array geometries.

Maximum widths for arrays are as follows:

- 60-cell modules, 26 modules in a row
- 72-cell modules, 22 modules in a row

Minimum spacing between sub-arrays is 6". Site specifics may further limit array sizes and spacing.

Re-Inspection: Unirac recommends periodic re-inspection of the installation for loose components, loose fasteners, and any corrosion, such that if found, the affected components are to be immediately replaced. Any components showing signs of damage that compromise safety shall be replaced immediately.

Compatible Modules: Unirac has evaluated many photovoltaic modules for installation compatibility with the EcoFoot 2+ 10-degree racking system. A list of compatible modules may be found in "EcoFoot2+ Install Guide Compatible Modules Page" on our website: www.unirac.com

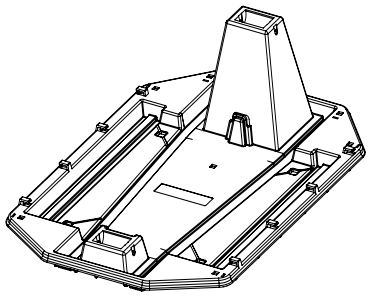
UL2703 Qualification: In cases where UL 2703 certification is required, the EcoFoot2+ system conforms to the UL2703 Standard for grounding and bonding and fire ratings. The EcoFoot2+ system may be used to ground and/or mount a PV module complying with UL1703 only when the specific module has been evaluated for grounding and /or mounting in compliance with the included instructions.

EcoFoot2+ system is to be installed over a fire resistant roof covering rated for the application. EcoFoot2+ Racking maintains a Class A fire rating when installed in landscape orientation according to the installation instructions, on a low slope roof Class A roof with Type 1, Type 2, Type 3 module with a metal frame, Type 19, Type, 22, & Type 25. Type 29 and Type 30 modules whose encapsulation thickness matches the criteria for Type 3 modules are also an approved fire type. Contact Unirac with any questions about fire type compatibility.

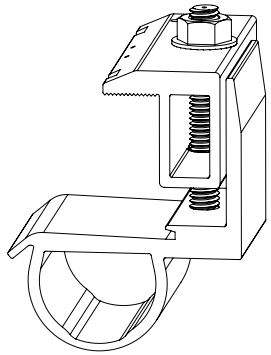
Further information about Unirac's UL2703 Listing, including module load ratings may be found in APPENDIX-A of this manual or at www.unirac.com.

EcoFoot2+ Core Components

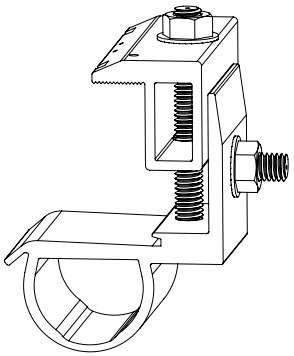
A EcoFoot2+ Base



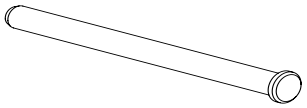
B Clamp-Lower



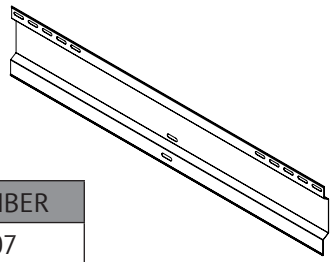
C Clamp-Upper



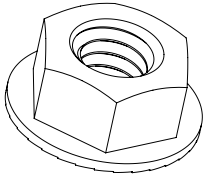
D Clevis Pin



E Deflector



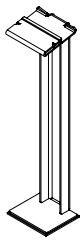
F Nut



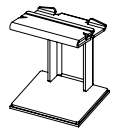
C.NO.	DESCRIPTION	PART NUMBER
A	EcoFoot2+ Base	ES20207
B	Universal Clamp Lower	ES10459
C	Universal Clamp Upper	ES10458
D	Clevis Pins	ES10476-CP
E	Deflector	ES20311
F	Nut	ES10277
G	Mid-Support Upper	ES11207
H	Mid-Support Lower	ES11208

C.NO. - Component Number

G Mid-Support Upper

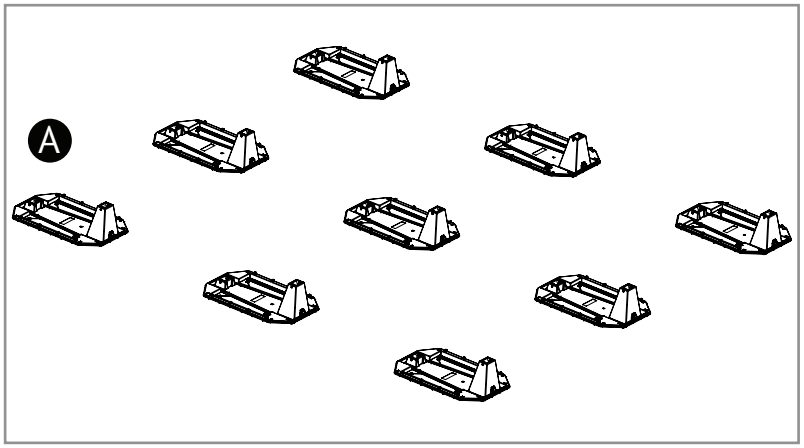


H Mid-Support Lower



EcoFoot2+ Installation Instructions

STEP 1: Chalk lines on roof denoting two outside edges of the EcoFoot2+® according to project drawing. Place EcoFoot2+® Bases (A) in position.



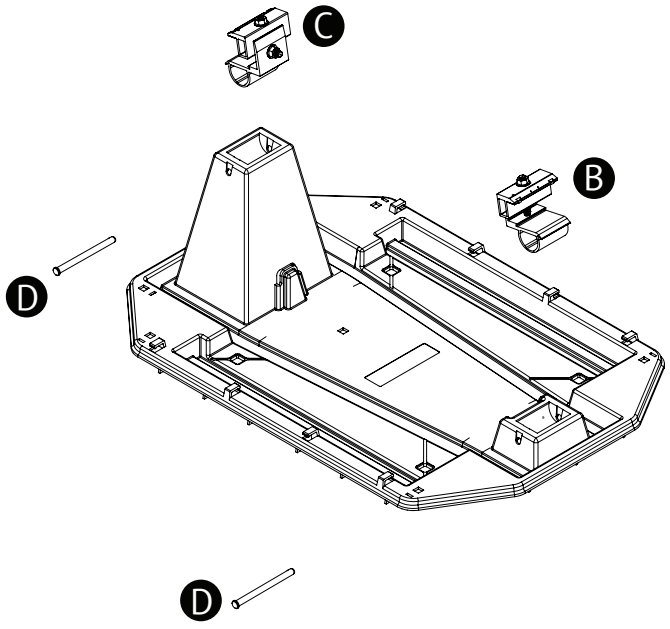
TIPS

- Ensure lines are square using 3-4-5 principle.
- As you build the array, panels will space Bases. Roughly place a few rows of Bases at a time so that they are within reach of final location.
- If installation requires 2 blocks or fewer on the north row, north row Bases can be turned around 180 degrees and tucked under the panel.
- If installation requires butyl, then butyl will be pre-installed on the bottom of the Base with protective tape. Ensure these butyl components are placed where specified in project drawing.

⚠ CAUTION

Remove protective tape after Step 6

STEP 2: Place Lower Clamp (B) and Upper Clamp (C) into EcoFoot2+ Base (A) as shown. Push Clevis Pin (D) completely into EcoFoot2+® Base(A) to secure Rocker.

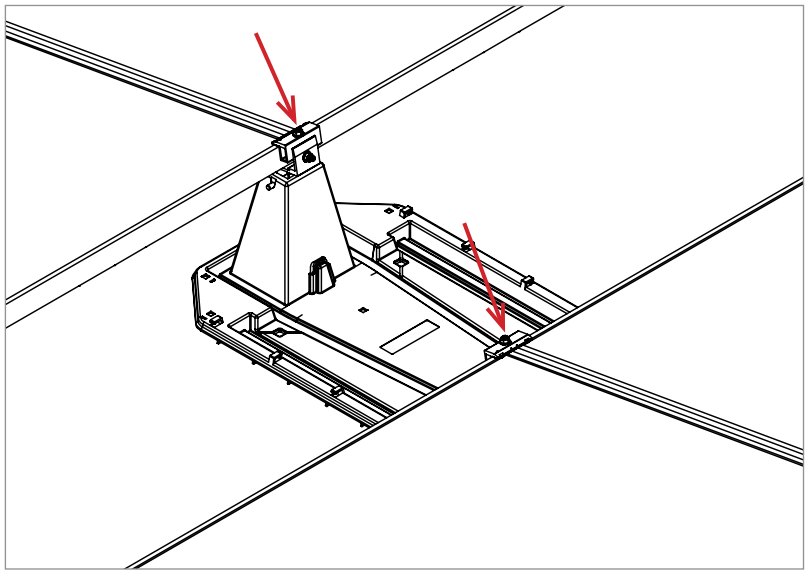


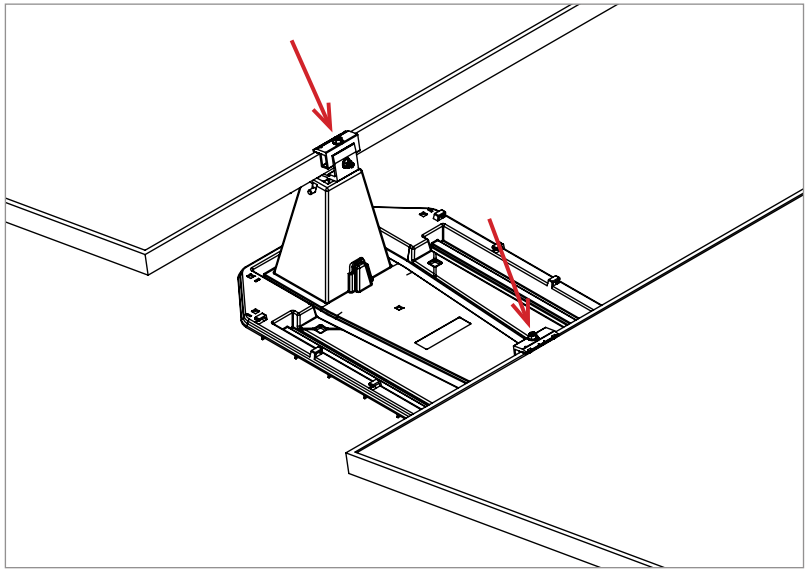
TIP

Only install Clamps where modules will rest. Refer to diagram below for correct placement and orientation of Clamps.

STEP 3: Place module onto EcoFoot2+® Base (A). Using a 1/2" deep socket, Torque nuts (F). Space modules 1/2“ apart using the alignment marks on the Clamps.

Torque Nuts (F) to 14 ft-lbs.





STEP 4: Place Ballast (not included) as required per PE Certified Ballast Plan provided.

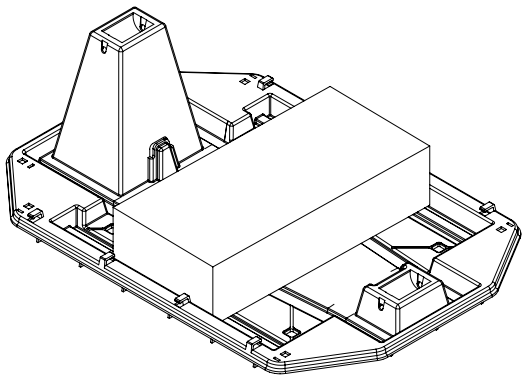
NOTE;

In freeze/thaw environments, use concrete block with minimum compressive strength of 3,000psi (ref ASTM C1491-03 Standard Specifications for Concrete Roof Pavers).

EcoFoot2+® Ballast Block Placement

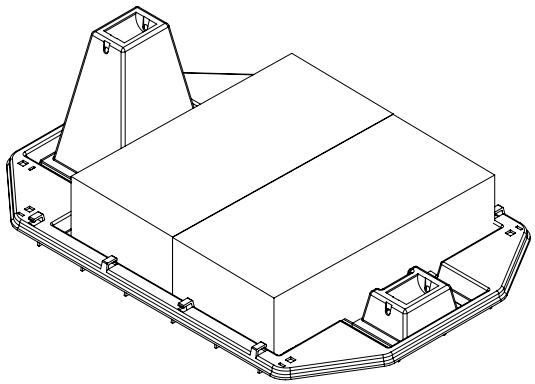
One Block

When using a single ballast block, lay the block flat in the center of EcoFoot2+ Base tray



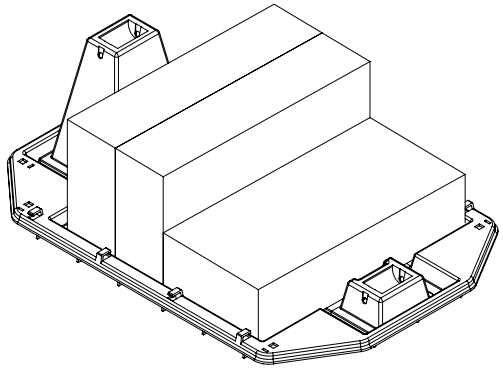
Two Blocks

When using two ballast blocks, lay the blocks flat in the EcoFoot2+ Base tray.



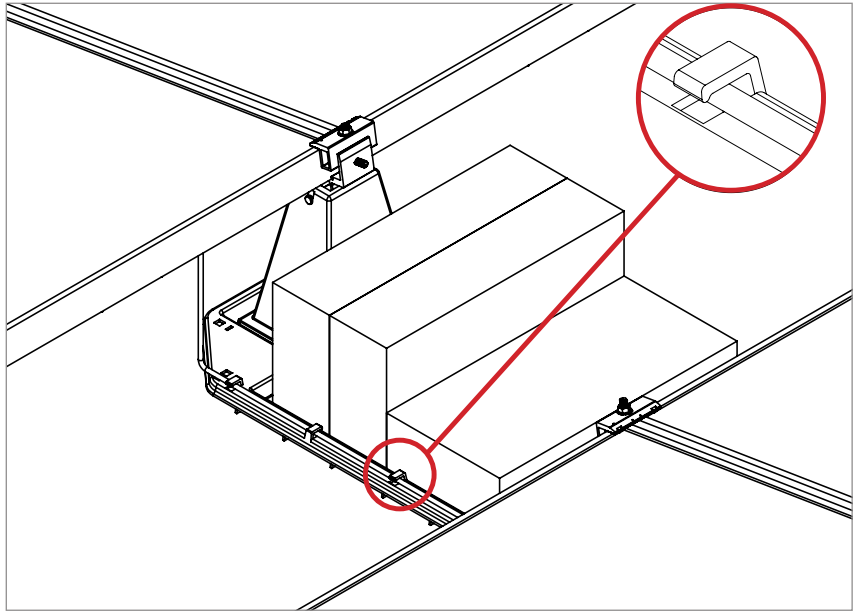
Three Blocks

When placing three ballast blocks in the EcoFoot2+ Base tray, lay one block flat and two on the long edge. This configuration helps to prevent blocks from becoming dislodged accidentally.



STEP 6: Route, connect, and secure conductors.

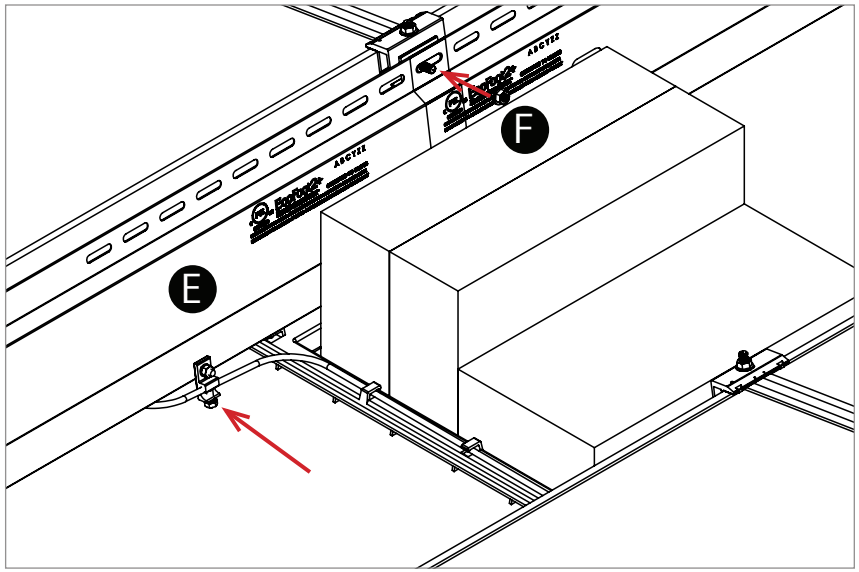
TIP:
Wire clips attached to the module flange (not included) can be used to dress conductors in a row of modules. Integrated snap features in the Base can be used to dress conductors bridging rows.

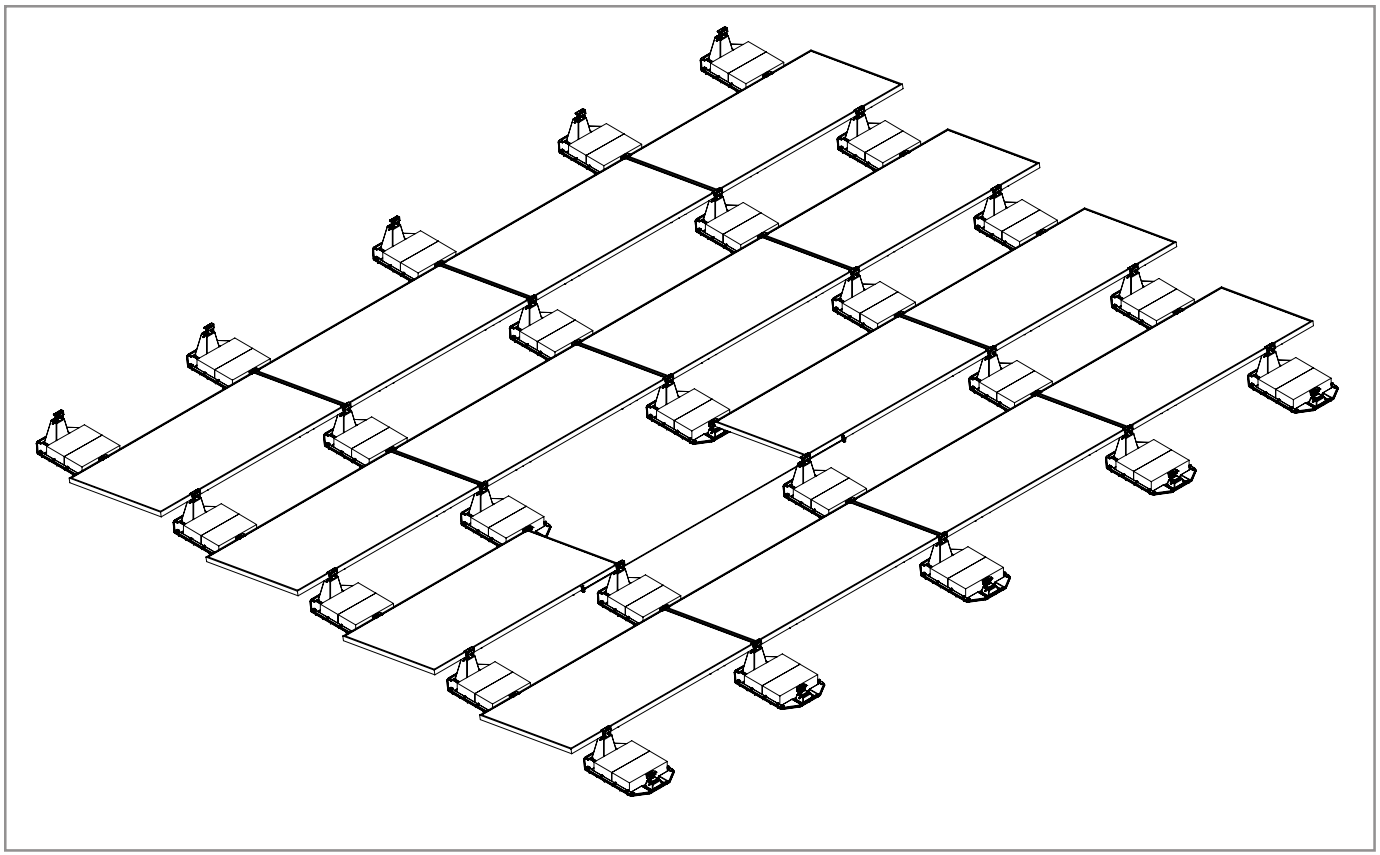


STEP 7: For systems that utilize mid supports, install them prior to installing wind deflectors in the next step. See Mid Support Installation section for instructions

STEP 8: Place Deflectors (E) into slot on EcoFoot2+® Base and attach to Rocker using Nut (F) provided. Using a 1/2" deep socket, torque Nut (F). Application of anti-seize on threaded post is recommended.

Torque Nut to 14 ft-lbs.





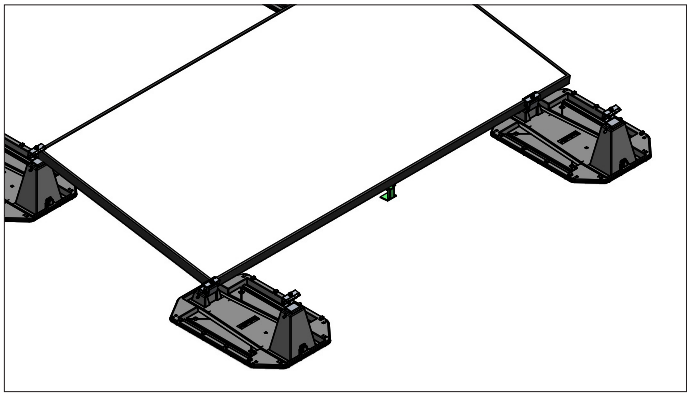
STEP 9: FINAL CHECK

Check all fasteners to ensure that the torque values are correct and that the modules are properly positioned.

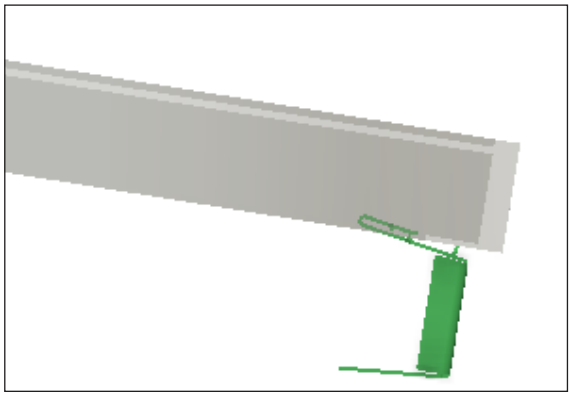
MID SUPPORT KIT INSTALLATION

The Mid Support Kit is a non-standard item and only used in heavy load conditions or with light-duty panels. The design team at Unirac will indicate use when required.

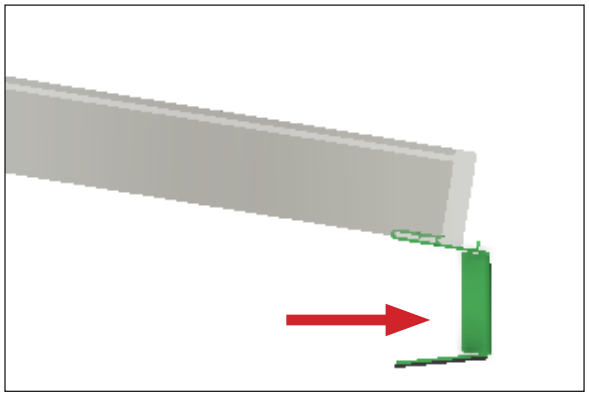
INSTALLING LOWER MID-SUPPORT



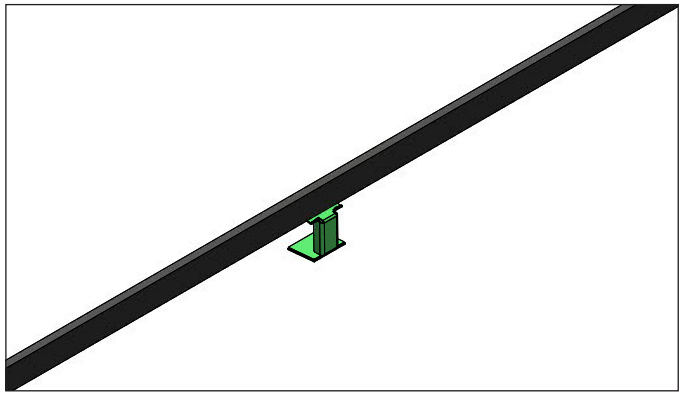
Locate module center point +/-1" using PV module cell lines.



Slide the Lower Mid-Support slots onto module frame.



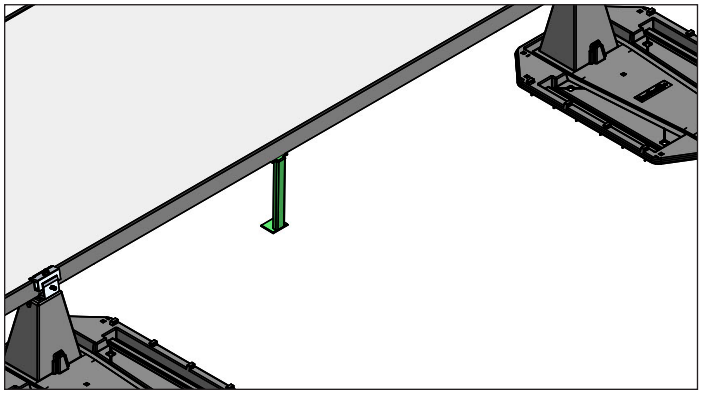
Pull outwards to sit flat on the roof.



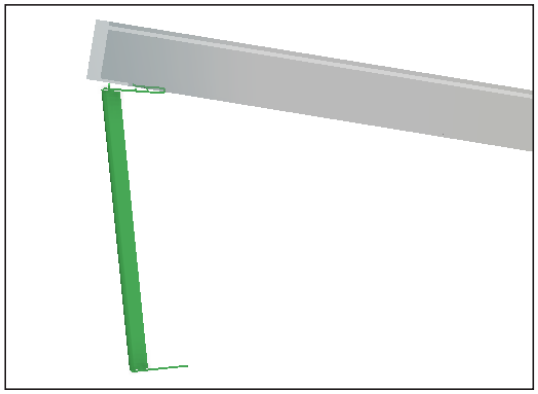
Ensure the Mid Support positioned flat on the roof.

MID SUPPORT INSTALLATION

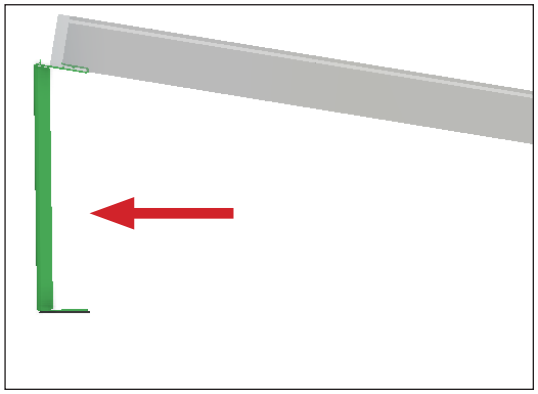
INSTALLING UPPER MID-SUPPORT



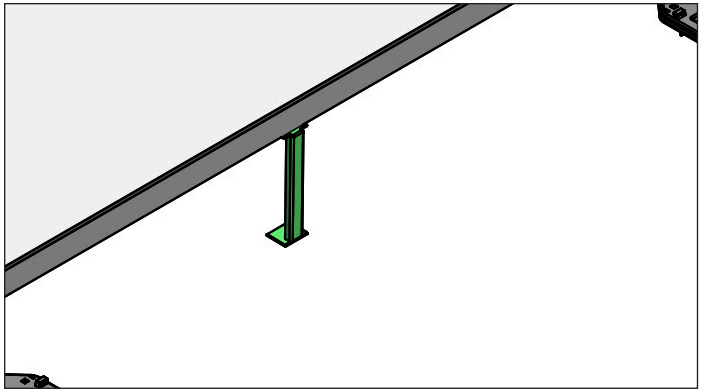
Locate module center point +/-1" using PV module cell lines.



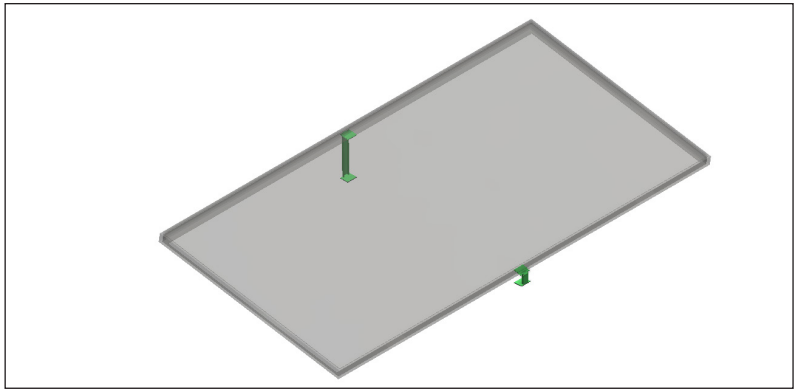
Slide the Lower Mid-Support slots onto module frame.



Pull outwards to sit flat on the roof.

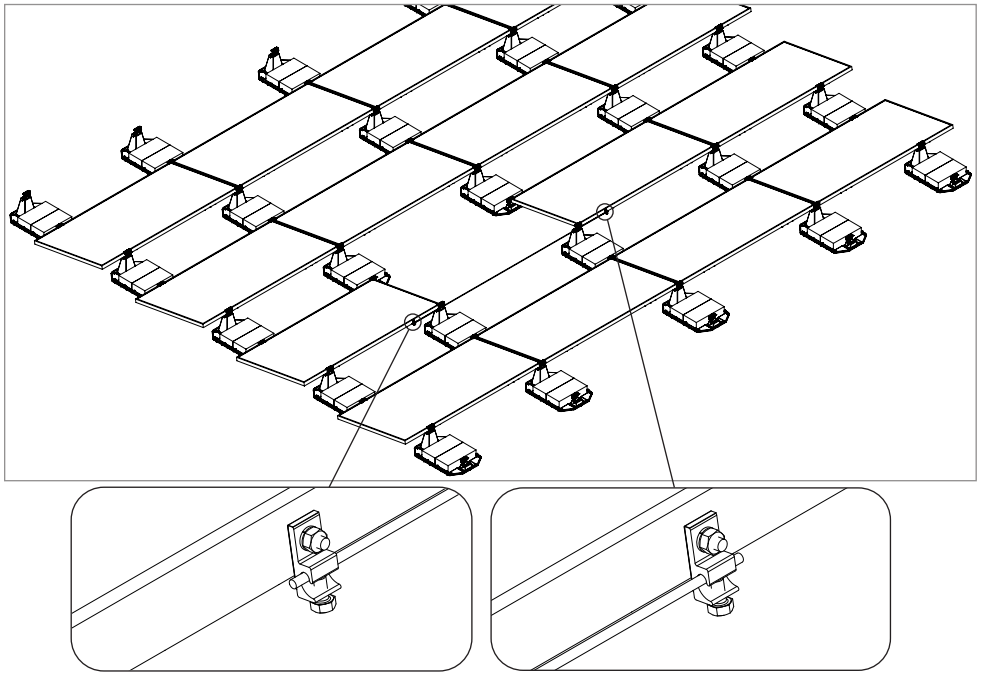


Ensure the Mid Support positioned flat on the roof.



Typical view of Mid supports after installation

Module Removal



CAUTION

- **Module removal may disrupt the bonding path and could introduce the risk of electric shock.**
- **See Grounding and Bonding Paths section to determine when module removal may disrupt the bonding path.**
- **Follow Steps A through C to maintain the bonding path. Modules should only be removed by qualified persons in compliance with these instructions.**

If a module is to be removed from an array, the following steps must be taken.

STEP A: Determine module to be removed

Identify and mark the module to be removed.

STEP B: Install ground lug on adjacent modules

Install a WEEB Lug 6.7 on both modules adjacent to the module to be removed. Utilize the grounding hole on the frame of the module.

STEP C: Connect Bonding Jumper

Lay a bare #6 CU conductor into the two lay in lugs connected to the adjacent modules. Tighten lay-in lug terminal screw onto the conductor and torque to 7 ft- lbs. When wiring the array, keep bare copper from contacting bare aluminum.

ROOF ATTACHMENT WITH STRUT

INSTALLATION OF ROOF ATTACHMENT WITH STRUT

Overview of Attachment System

TOOLS REQUIRED

1. 1/2" Deep Socket
2. 9/16" Deep Socket
3. 1/2" Box End Wrench
4. Calibrated Torque Wrench
5. Power Drill with 3/8" Drill Bit

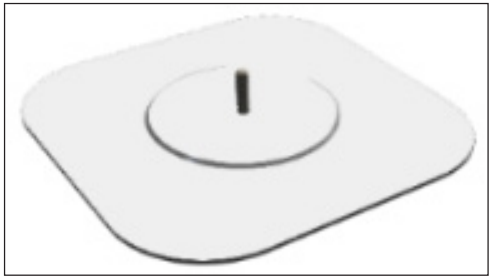
Torque fasteners to 14 ft-lbs.

COMPONENTS

EcoFoot Roof to Strut Hardware Kit
P/N: ES10843

EcoFoot Strut to Module Hardware Kit
P/N: ES10844

Strut (1-5/8" x 1-5/8")
Length specified on array layout.



Roof Attachment
Specified based on roof type.

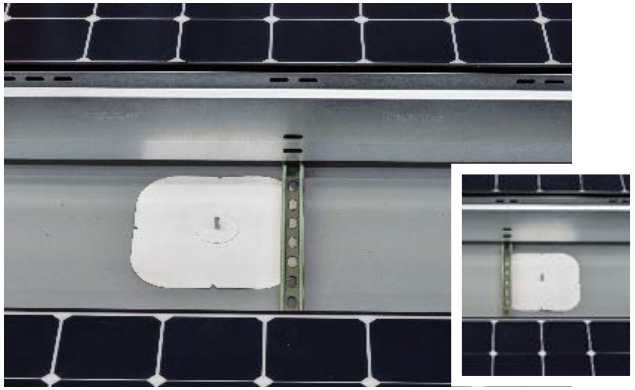
Note:
Roof Attachments require roofing screws, available by others. Check with building engineer or attachment manufacturer for screw requirements.

Note: P/N: Part Number

ATTACHMENT WITH STRUT

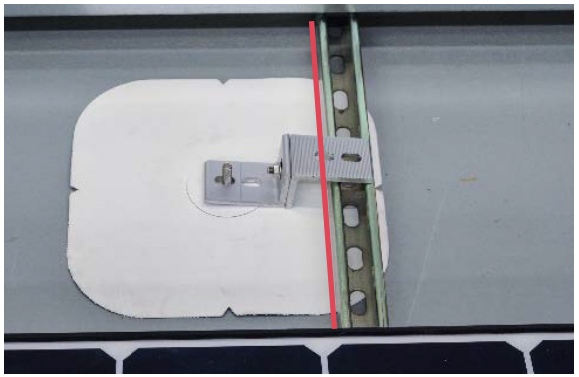
Strut runs North/South under PV modules, near the center of the module, placed as indicated on array layout. Strut does not connect to EcoFoot2 Bases. Strut is attached to Roof Attachment, low or south edge of PV modules and Wind Deflector.

STEP 1:
Position Strut under and near center of PV module in line with center slots on Wind Deflector. Position Strut throughout the array as shown on array design layout.



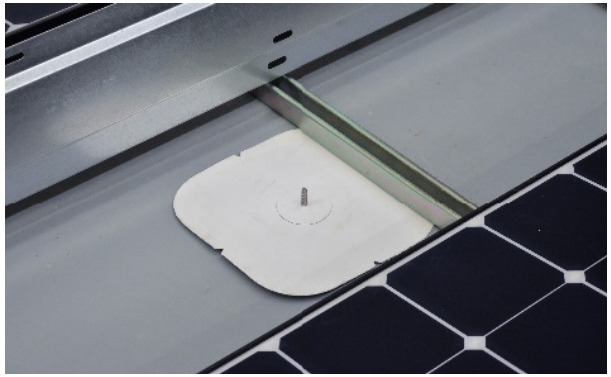
STEP 2:
Determine which side of Strut you will install Roof Attachment.
Mid supports will be installed slightly off center and opposite of roof attachment to allow room for roof attachment hardware.

ROOF ATTACHMENT WITH STRUT

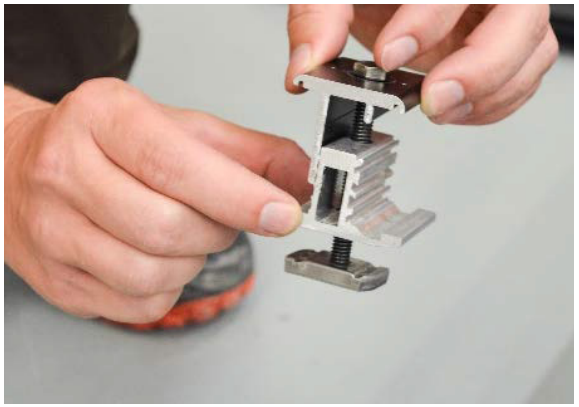


STEP 3:
Place Roof Attachment within 1.5”- 4” from attachment-side edge of Strut, illustrated by Red line.

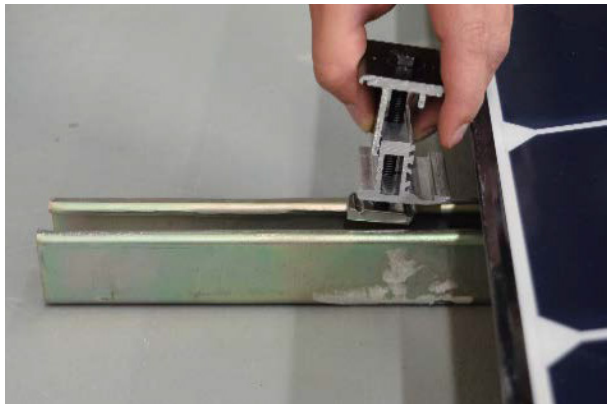
STEP 4:
Slide Strut away and install Roof Attachment per manufacturer’s instructions.



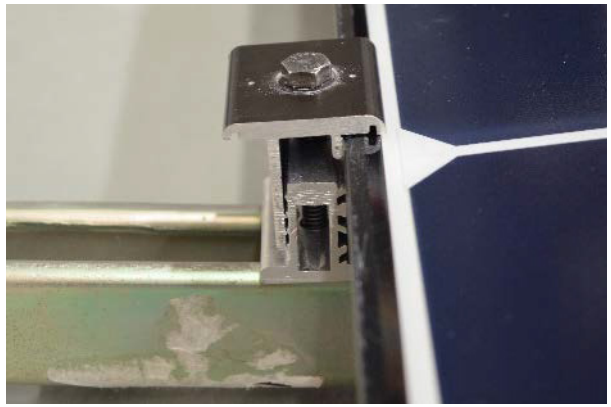
STEP 5:
Slide Strut back into position over Roof Attachment.



STEP 6:
Assemble Clamp components as shown. Attach South row Module Clamps onto Strut and Modules.



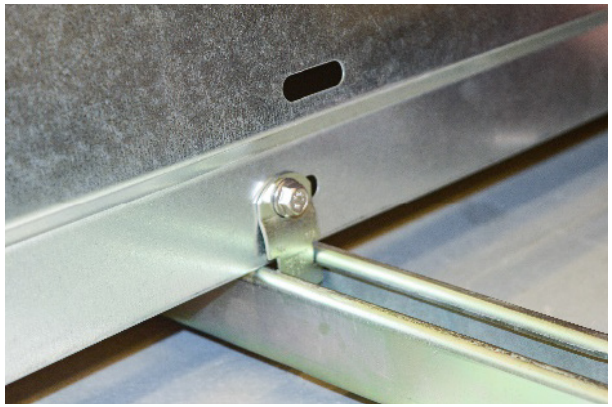
STEP 7:
Place Strut Nut into Strut channel.



STEP 8:
Slide Clamp to Module Frame.
Torque Bolt to 14 ft-lbs.

ROOF ATTACHMENT WITH STRUT

STEP 9:
Using Strut Strap Components shown, attach North row Strut Strap to Wind Deflector and Strut.

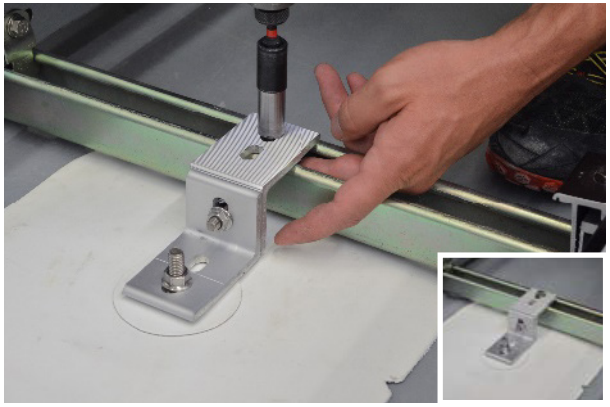


STEP 10:
Place Bolt behind Wind Deflector and bottom of Strut Strap in Strut channel.
Torque Bolt to 14 ft-lbs.

STEP 11:
Attach L-Bracket 1 to Roof Attachment.
Place long side of L-Bracket on Roof Attachment and secure L-Bracket 1 to Roof Attachment with Bolt.
Torque Bolt to 14 ft-lbs.

STEP 12:
Attach L-Bracket 2 to L-Bracket 1 by butting flat sides and bolting together.
Use included L-Bracket Bolt to secure two L-Feet together.
Torque Bolt to 14 ft-lbs.

NOTE:
If you are using OMG Roof Attachment, see guidelines on the next page for correct installation of L-Bracket 2.



STEP 13:
Attach L-Bracket 2 to Strut.
Place L-Bracket 2 on Strut and secure with L-Bracket Bolt.

STEP 14:
Repeat steps 9 and 10 as needed to attach North row Wind Deflector to Strut.

NOTE:

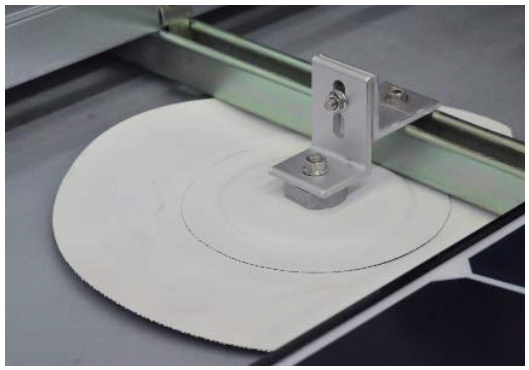
When using U-Anchor Roof Attachment, the short side of L-Bracket 2 butts to the short side of L-Bracket 1, as shown in step 13.

If you are using OMG Roof Attachment, see guidelines below for correct installation of L-Bracket 2.

INSTALLATION STEPS FOR OMG ROOF ATTACHMENT

STEP 15:
Attach L-Bracket 1 to Roof Attachment.
Place short side of L-Bracket on Roof Attachment and secure L-Bracket 1 to Roof Attachment with Bolt.

STEP 16:
Attach L-Bracket 2 to L-Bracket 1 by butting flat sides and bolting together. Use included L-Bracket Bolt to secure two L-Feet together.



STEP 17:
Attach L-Bracket 2 to Strut. Place L-Bracket 2 on Strut and secure with L-Bracket Bolt.

Torque all bolts to 14 ft-lbs

STRUT INSTALLATION NOTES

1. As per the array layout plan, Strut attachment locations may cover one, two or more modules per attachment location. Strut length and number of connected modules are specified on the array layout. Strut may need to be cut to meet the attachment requirements in the project's Layout Plan or engineering report.
2. Note that EcoFoot5D ballast trays will not be installed where strut is located.

FIELD SUPPORT CONTACT INFORMATION

UNIRAC proudly offers dedicated engineering expertise and superior customer support. For questions about the installation procedures or a specific application, please visit our website: www.unirac.com.

The EcoFoot2+ ™ system has been tested by SolarPTL and conforms to UL 2703 for Grounding and Bonding when installed per the published installation instructions.

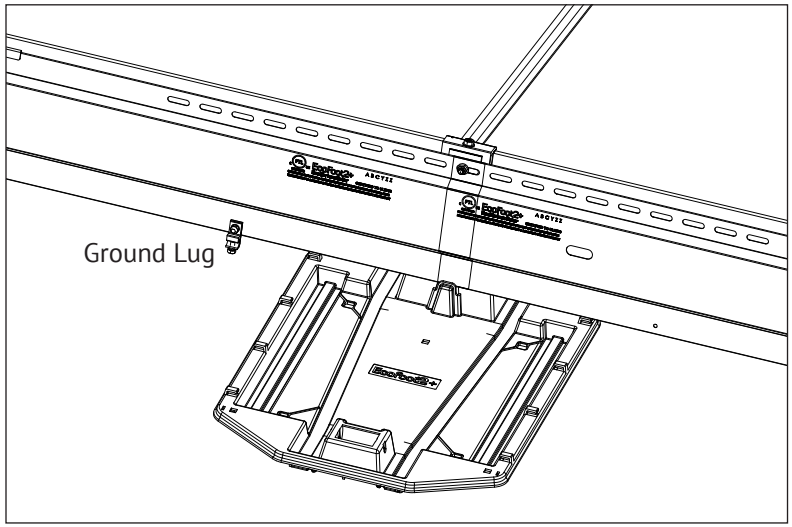
EcoFoot2+ carries module-to-module ground bond through the Wind Deflector, Item E listed in the "System Components Section" in this document.

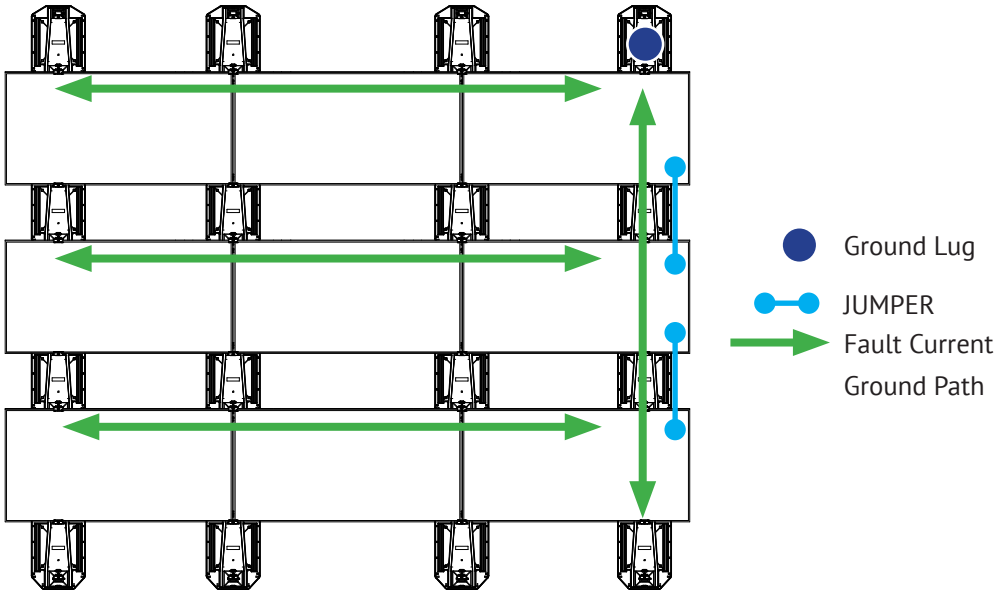
Each row of modules/wind deflectors in an array of up to 400 modules must be grounded per the NEC and ANSI/NFPA 70 either through the designated ground hole in the Wind Deflector, or by drilling a ¼" ground hole into the Wind Deflector a minimum of ½" from any edge. One Ground Lug is required for every 400 modules connected within an array.

Unirac recommends using #6 copper ground wire in conjunction with WEEB grounding devices such as the WEEB-LUG-6.7 or WEEB DSK516. Lugs are a single use component.

Other grounding methods must be reviewed and approved by a licensed master Electrician or Electrical Engineer and Authority Having Jurisdiction (AHJ).

Ground Hole with Lug Installed





Wind Deflectors carry module-to-module East/West ground bond. Bonding jumpers carry row-to-row North/South ground bond.

UL2703 System Label: The label shown below is stamped into to the Wind Deflector (identified as component "E" in the installation guide).

*The Date Code **A B C Y Z Z** shown above will appear on production parts, defined as follows:*

- ***A B C*** will be used to identify the source factory
- ***Y*** shall be the quarter of manufacture
- ***ZZ*** shall be the last two digits of the year of manufacture

MECHANICAL LOAD TEST

SYSTEM CERTIFICATION

The EcoFoot2+ ™ system has been certified and listed to the UL 2703 standard (Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels). This standard includes electrical grounding, electrical bonding, mechanical load and fire resistance testing.

In conducting these tests, specific modules are selected for their physical properties so that the certifications can be broadly applied. The following lists the specific modules that were tested and the applicability of those certifications to other modules that might come onto the market. PV modules may have a reduced mechanical load rating, independent of the EcoFoot2+ ™ load rating. Please consult the PV module manufacturer's installation guide for more information.

In addition to UL 2703 certification, Unirac performs internal testing beyond the requirements of certification tests in order to establish system functional limits, allowable loads, and factors of safety. These tests include functional system tests, and destructive load testing.

MECHANICAL LOAD TEST MODULES

The modules selected for UL 2703 mechanical load testing were selected to represent the broadest range possible for modules on the market.
The tests performed cover the following basic module parameters:

- Frame thicknesses greater than or equal to 1.0 mm.
- Basic single and double wall frame profiles (some complex frame profiles could require further analysis to determine applicability).
- Clear and dark anodized aluminum frames.
- All installation configurations have achieved a minimum of 5psf design load in the downslope direction, tested with the Q Cells Q.PEAK DUO XL-G11.3/BFG module listed in this table

Module Manufacturer	Model / Series	Area [sq ft]	Design Load without Mid Supports [psf]	Design Load down with Mid Supports [psf]
Boviet Solar	BVM6612 M	20.89	11.8 up / 30 down	50
Canadian Solar	CS6P-XXXM	17.31	30 up / 30 down	N/A
	CS6X-XXXP	20.65	15 up / 38 down	50
	CS6U-XXXM	20.93	13.3 up / 25 down	50
	CS3W-MB-AG	24.05	13.87 up / 13.8 down	40.55
	CS3U-MB-AG	21.59	13.33 up / N/A down	40
ET Solar	ET-M672XXXWW	20.86	15 up / 20 down	40
Hansol	HSXXXTD-AN4	21.46	15 up / 20 down	35
Heliene	72M-XXX	20.89	15 up / 25 down	34
Hyundai	HiS-MXXXTI	21.06	10.2 up / 30 down	40
	HiS-MXXXRI	21.06	15 up / 20 down	33.3

Module Manufacturer	Model / Series	Area [sq ft]	Design Load without Mid Supports [psf]	Design Load down with Mid Supports [psf]
JA Solar	JAM72S10-XXX/MR	21.6	16.7 up / 27.2 down	51.3
Jinko	JKMXXXP-60	17.62	30 up / 30 down	N/A
	JKMXXXP-72	20.89	15 up / 30 down	N/A
LG	LGXXXN2W-G4	21.10	15 up / 35 down	N/A
	LGXXXN2W-A5	22.31	15 up / 18.8 down	30
Longi	LR6-72HPH-XXXM	21.48	15 up / 20 down	30
	LR6-72HV-XXXM	20.86	15 up / 20 down	40
	LR4-72-HBD-XXX	23.4	16.7 up / 20 down	43.9
Q Cells	Q.PRO BFR-G4	17.98	15.1 up / 20 down	55
	Q.PLUS L-G4.2	21.46	10.2 up / 30 down	33
	Q.PEAK DUO L-G8.3	23.06	17.16 up / 20.53 down	46.88
	Q.PEAK DUO XL-G10.3 / BFG	24.93	16.7 up / 16.7 down	43.5
	Q.PEAK DUO XL-G11.3/BFG	29.49	14.13 up / 14.27 down	41.63
REC	RECXXXTP2	17.97	15 up / 26 down	50
	RECXXXTP2S 72	21.60	15 up / 15.5 down	20
	RECXXXTP2S 72 XV	21.6	15 up / 25 down	34
ReneSola	JCXXXM-24/Ab	20.89	15 up / 30 down	N/A
	JCXXXM-24/Bb	20.89	30 up / 30 down	N/A
S-Energy	SNXXXP-15	21.00	10 up / 20 down	30
Silfab	SLGXXXM	21.00	13.1 up / 13.9 down	30
	SLA-P XXX	17.58	13.3 up / 30 down	40
	SIL-XXXNU	21.94	17.7 up / 27.2 down	46.7
SolarWorld	SW Poly Pro	18.04	30 up / 30 down	N/A
Talesun	TP672M-XXX	20.91	12 up / 20 down	30

Module Manufacturer	Model / Series	Area [sq ft]	Design Load without Mid Supports [psf]	Design Load down with Mid Supports [psf]
Trina	TSM-XXX PA05.08	17.64	30 up / 30 down	N/A
	TSM-XXXDE14A(II)	20.93	15 up / 30 down	40
	DE18M(II)	25.94	18.92 up / 19.01 down	37.85
VSUN	VSUNXXX-72MH	21.38	13.33 up / 20 down	50
Yingli	YGE 60	17.58	30 up / 30 down	N/A
ZN Shine	ZXM6-72	21.4	13.33 up / 16.27 down	40
	ZXM7-SHLDD144	27.96	16.57 up/ 12.6 down	37.08

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the EcoFoot2+ ™ system.

Manufacture	Module Model / Series
Aionrise	AION60G1 AION72G1
Aptos	DNA-120-MF10 DNA-120-MF26 DNA-120-BF26
Axitec	AXIbipremium XXL HC MW: AC-xxxMBT/144V AXIpremium XXL HC: AC-xxxMH/144V
BenQ Solar	PMxxxP01
Boviet	BVM661(0/2) P-xxx (BB) BVM661(0/2) M-xxx BVM661(0/2) P -xxx BVM661(0/2) M (BB)-xxx
Canadian Solar	CS1Y-MS CS3N MS CS3U-MB-AG CS3U-MS-AG CS3W-MB-AG CS3W-MS CS3W-PB-AG CS3Y-MB-G CS6K-xxx(M/P) CS6P-xxx(M/P) CS6R-MS-HL CS6U-xxx(M/P) CS6U-xxx(M/P) (1500V), CS6W-MB-AG CS6X-xxx(M/P)
CertainTeed	CTM10xxxHC11-09 (430-465 W)

Manufacture	Module Model / Series
ET Solar	ET-(M/P)660xxx(WW/WB/BB)
Freevolt	PVGraf
Hansol	HSxxxTD-AN4 HSxxxTD-AN3 HSxxxUD-AN1
Heliene	108HC M10 SL All Black Module 144 HC M10 SL-Bifacial, 144HC M10 SL Monofacial 60(P/M)-xxx, 60M-xxx (BLK) HOME PV 72M-xxx (BLK), 72P-xxx, HSPE-132HC-M10-SL-Monofacial,
Hyundai	HiS-SxxxKI HiS-(M/S)xxx (RI/TI)
Imperial Star	ISM7-SHDD120-xxx/M
JA Solar	JAM72D30 /MB JAM72S01-xxx/PR JAM72S09-xxx/PR JAM72S10/MR JAM72S10-xxx/PR JAM72S30xxx/MR JAM78D10 /MB JAP72S01-xxx/SC JAP72S09-xxx/SC
Jinko	JKMxxxN-72HL4-BDV JKMxxxN-72HL4-TV JKMxxxP-60/72 JKMxxxM-72HL-V

Manufacture	Module Model / Series
LG Electronics	LGxxx(A/M/N/Q)1C-A6 LGxxx(M/N/Q)1K-A6 LGxxx(N/Q)1C-N5 LGxxx(N/Q)1C-V5 LGxxx(N/Q)1K-V5 LGxxx(N/S)1C- (A5/G4) LGxxx(N/S)2W-(A5/B3/G4) LGxxxN1K-A5 LGxxxN1K-L5 LGxxxN2T-E6 LGxxxN2T-L5 LGxxxN2W-E6 LGxxxN2W-L5 LGxxxNX(W/T)-V5 LGxxxQ1K-N5, LGxxxQAC-A6 LGxxxQAK-A6
LONGi	LR4-72-HBD-xxx LR4-72HPH LR5-66HPH LR5-72HBD LR5-72HPH LR6-72HPH-xxxM LR6-72HV-xxxM LR6-72-xxxM
Meyer Burger	Black, White
NE Solar	NESE xxx 72MHB-M10 NESE xxx 72THB-M10 NESE xxx 72MHT-M10
Panasonic	EVPVxxx(K/PK/H)

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- Please see EcoFoot2+™ information at unirac.com to ensure the exact solar module selected is approved for use with EcoFoot2+™
- Listed models can be used to achieve a Class A fire system rating, for low slope applications, when modules fire typed 1, 2, 3 with a metal frame, 19, 22, 25, and modules typed 29 or 30.

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the EcoFoot2+ ™ system.

Manufacture	Module Model / Series
Philadelphia Solar	PS-M144(HCBF)
Q Cells	B.LINE (PRO or PLUS) BFR G4.1 xxx Q.(PLUS/PEAK) (L/BFR)-G4.1 xxx Q.(PLUS/PEAK) (L /BFR)-G4.2 xxx Q.(PRO or PLUS) BFR-G4.1 xxx Q.PEAK (BLK or BFR) G4.1/TAA xxx Q.PEAK BLK G4.1 xxx Q.(PRO or PLUS) G4 xxx Q.PEAK DUO-G10(+) Q.PEAK DUO XL-(G10.2, G10.3, G10.c or G10.d) Q.PEAK DUO XL-(G10.3 or G10.d)/BFG Q.PEAK DUO XL-G11.3/BFG Q.PEAK-G4.1 (MAX) xxx Q.PEAK L (G4.2 or G4.5) Q.PLUS BFR G4.1/MAX xxx Q.PLUS L G4.2, Q.PRO BFR-G4/G4.3 xxx Q.PRO EC-G4.4 xxx, Q.PEAK DUO BLK- (G9(+) or G10(+)) Q.PEAK DUO L-(G5.1, G5.2, G6, G6.1, G6.2, G6.3, G7.1, G7.2, G8, G8.1, G8.2 or G8.3) Q.PLUS DUO L-(G5.1or G5.2) Q.TRON BLK M-G2+ SERIES Q.TRON M-G2+ SERIES

Manufacture	Module Model / Series
REC	RECxxx(TP, PE, TP2 or NP) RECxxx(TP, PE, TP4 or NP2) (BLK) RECxxxTP2 (BLK/BLK2) RECxxxAA RECxxxAA 72 RECxxxAA Black RECxxxAA Pro M RECxxxAA Pure RECxxxAA Pure 2 RECxxxAA Pure R RECxxxAA Pure-RX RECxxxNP3 Black RECxxxTP2S 72
ReneSola	JCxxxM -24(Ab or Bb),
Risen Solar	RSM144-6-xxxBMDG
S-Energy	SNxxx(M/P)-10 (40T) SNxxxP-15, SNxxx(M/P)-10
Silfab	SIL-xxx BG SIL-xxx BK SIL-xxx HC+ SIL-xxx HM SIL-xxx HN SIL-xxxNU SIL-xxx QD SIL-xxx QM SLA-(P, M or X) xxx
Silfab (Cont.)	SSG-(P or M) xxx SLG-(P, M or X) xxx SSA-(P or M) xxx

Manufacture	Module Model / Series
Solar4America	S4A550-144MH10STT S4Axxx-108MH10BB
SolarWorld	Sunmodule Plus SW Mono Sunmodule Protect SW Mono SW Poly Pro, SW Poly 2.5
Sonali	SS-M-360 to 390 & 440 to 460 Series SS-M-430 to 460 BiFacial Series
SunPower	A440-COM-MLSD
Talesun	(+/- Hipro Mxxx+ or PID ZERO) TP672(M or P) TD6I72M TD7G72M
Tesla	TxxxH TxxxS
Trina	DE18M(II) DEG18MC.20(II) TSM-DE15H(II) TSM-DE15M(II) TSM-xxxDD14A(II) TSM-xxxDE14A(II) TSM-xxx PA05.08 TSM-xxxPD14 TSM-xxxPE14A DEG15MC.20(II) DEG15HC.20(II) DE09.05
Waaree	Bi-55-xxx

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- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- Please see EcoFoot2+™ information at unirac.com to ensure the exact solar module selected is approved for use with EcoFoot2+™
- Listed models can be used to achieve a Class A fire system rating, for low slope applications, when modules fire typed 1, 2, 3 with a metal frame, 19, 22, 25, and modules typed 29 or 30.

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the EcoFoot2+ ™ system.

Manufacture	Module Model / Series
Vikram	PARADEA VSMDH.72.AAA.05 PREXOX VSMDHT.60.AAA.05 VSMDHT.72.AAA.05
VSUN	VSUNxxx-144BMH VSUNxxx-144BMH-DG VSUNxxx-60M VSUNxxx-72MH VSUNxxx-72PH
Yingli	YLxxxC-30b YLxxxP-29b
ZN Shine	ZXM6-60 ZXM6-72 ZXM6-NHLDD144 ZXM7-SHDB144 ZXM7-SHLDD144 ZXM7-UHLDD144 ZXP6-72

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- Please see EcoFoot2+™ information at unirac.com to ensure the exact solar module selected is approved for use with EcoFoot2+™
- Listed models can be used to achieve a Class A fire system rating, for low slope applications, when modules fire typed 1, 2, 3 with a metal frame, 19, 22, 25, and modules typed 29 or 30.