

FastRack 510 Installation Manual 5, 6 and 10°



Rev: 241202

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Introduction

Our mission is to provide innovative Solar PV Racking solutions that are intuitive, durable and cost effective. Our goal is to enable the installation of solar PV on every suitable flat roof/ground mount in the world.

Sollega simplifies and accelerates the adoption of solar energy technologies by reducing the mounting and installation costs associated with solar arrays. Our FR510 solar mounting system reduces installation time and overall project costs associated with the installation of solar PV.

As the solar industry expands at a quicker rate, speed of deployment is key to meeting demand. We see installation and labor as the logical next steps to reducing the cost of PV. Our one-piece injection molded FR510 arrives to the job site ready to install requiring no assembly. Our systems are efficient to ship, stage and install.

Product Profile

Sollega designs, tests, and manufactures solar mounting solutions. We injection mold our racking in Baldwin Park, California. The FastRack (FR510) is a patented, one-piece, injection molded solar racking system designed for both commercial low-pitch roofs and ballasted ground mount installations. It is injection molded utilizing Glass-filled Nylon for strength and durability (25 year warranty) in a lightweight part (4.6 lbs). It is also designed for simple assembly and disassembly at the end of its useful life and is 100% recyclable.

Sollega FR510 is compatible with most common solar panels currently on the market. Our universal design enables the installation of 60, 72, 96, 128, and 144 cell modules in landscape orientation. All attachments are top mount with one size wrench (1/2"), enabling easy access.

Headquartered in beautiful San Francisco, we welcome you to let us know how we can best serve your needs and look forward to providing you the highest quality, lowest cost solar racking solutions available.

Sincerely,

Elie Rothschild, CEO

Installation Process

The Sollega FastRack 510 Ballasted / Anchored hybrid racking solution is a “Build As You Go” system. FR510 ships with four bolts installed in specific locations on the bucket providing 5dg, 6dg or 10dg tilt. FR510 is intended to be installed on flat roof and ballasted ground mount.

Note: The 6dg does not have E-W spacing tab on the bucket and you will need to space them 3/8" apart. Do not remove preinstalled bolts unless you are changing the tilt/IR spacing on-site. See spec sheet for bolt locations.

Lifting and Staging FR510

Start installation on the far end of the roof opposite the roof loading (crane, all grade, forklift) location. Pallets are 50”x32”x91”H consisting of two stacks of (45) FR510s and weights (470#). When lifting to the roof ensure the pallets are strapped to the lift. Roof can be staged in single pallet (20-25 kW increments) as per the engineered layout.

Note: Lay the pallets down on the roof to avoid damage from wind. Don’t unpack until ready to install.

Note: FR510 rack mounting system is to be installed over a fire-resistant roof covering rated for the application.

Positioning FR510 – First Two Rows

Mark required fire access pathway setback from roof edge as specified in provided plan set with chalk line or string on the far end of the roof from the roof loading location. The key here is to build out the array (racking, modules, ballast block and mechanical anchors) as you go, keeping the roof open for easy access to the array and minimizing trip obstacles and enabling a quicker installation. If array is facing south the first two rows of FR510’s will be positioned in E-W direction. Note: you can build the system from the front to back or back to front depending on roof loading location. You can also build the system in columns which would be N-S. It is critical to properly align this first row or column as subsequent rows or columns are aligned by spacing of the module against the reference tabs on the FR510.

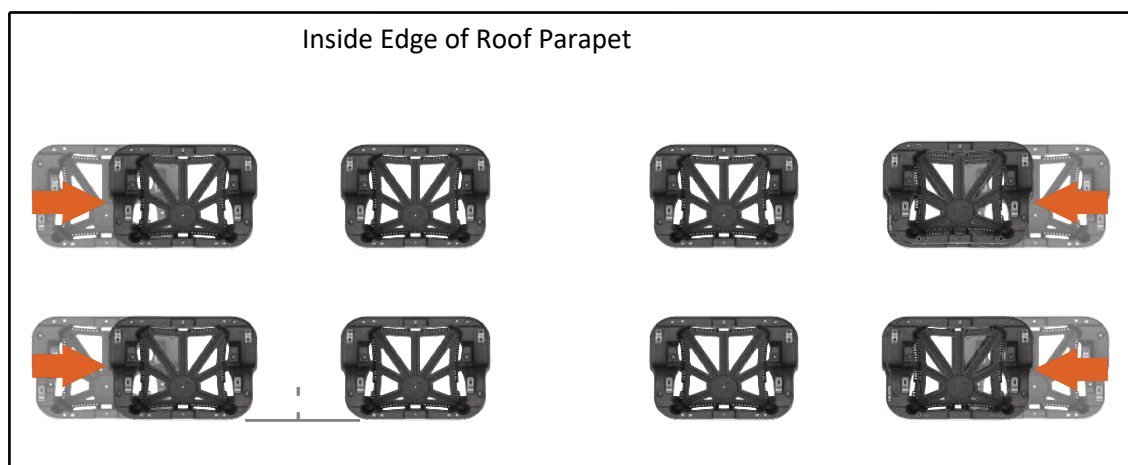


Figure 1

Note: FR510’s located at the ends of rows are pushed underneath the modules. The module can cantilever past the FR510 based on the clamping zone requirements as per the module manufacturer.

Tools Requirements

Required Tools: ½” Socket Driver, Torque Wrench, Cordless Drill (slow speed) with clutch setting.
Required Torque Module Attachment: All connections require 5 ft-lb of torque.

Note: Visually Confirm teeth on serrated flange nut (FR-N) have bit into the top of the aluminum end clamp (FR-EC) when tightened to 5 lbs/ft.

Note: Do not use impact drivers

Installation of First Row of Modules

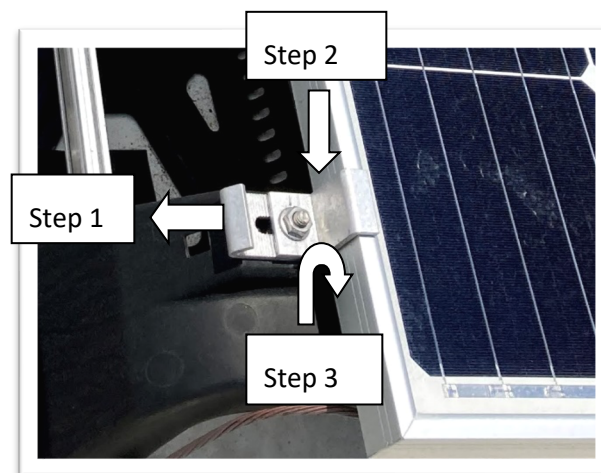
When installing the first two rows of buckets and first row of modules, it is helpful to put one ballast block in the FR510's to keep the racking from moving around. Slide the FR510 so the reference tab is up against the module. See below.

Once the FR510's are positioned (diagram 1) it is now time to install the hardware that holds the modules to the FR510. Locate the aluminum pull clamp (FR-PC) and aluminum end clamp (FR-EC)

Note: End clamps vary in size and must match the height of the module frame. They are available in size from 1.18”(30mm) – 1.97”(50mm). Install the pull clamp over the pre-installed bolts in the FR510, push the FR-PC out towards the edge of the FR510 completely. Next install the FR-EC over the bolt on top of the FR-PC. Next loosely install a serrated flange nut (FR-N) on the bolt. With the hardware in place, the modules can be installed, aligned, and fastened down and tightened. The reference tabs on the FR510 ensure the proper placement of the module on the FR510. There is a reference spacer on the short rail of the module for proper alignment and E-W spacing. Once the modules are aligned, pull the FR-PC back to ensure it is flush up against the lip of the flange on the bottom of the module. The FR-PC and FR-EC are indexed and when tightened form a locked together union.

Note: All serrated flange nuts should be threaded on by hand to avoid galling or seizing of the stainless fasteners, Sollega applies a coating to help alleviate galling.

Note: Do not use an impact driver for installation as this can cause galling and over tightening. We recommend using a calibrated torque wrench or hand wrench to avoid over tightening.



1. Pull FR-PC flush with bottom flange
2. Install FR-EC & FR-N on Bolt
3. Torque FR-N to 5 ft.lbs

Once the first row is positioned and all fasteners are tightened install the ballast as per Sollega provided ballast schedule. This locks the first row of modules down and enables proper placement of the second row of modules. Repeat process until the array is complete.

Note: All FR510's must have at least one ballast block or mechanical anchor attachment installed.



Figure 3- FR510-10 North Row

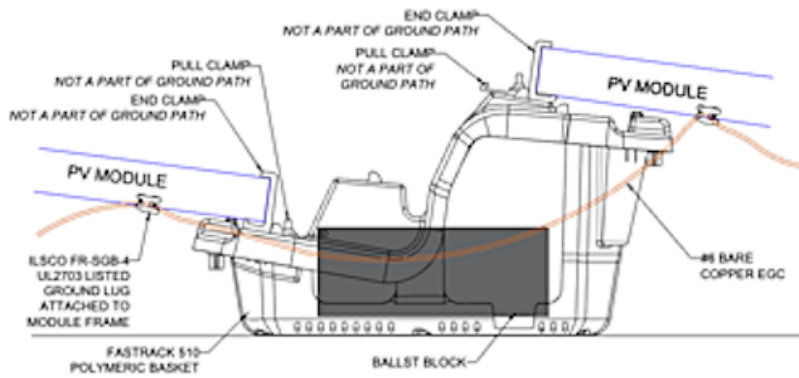
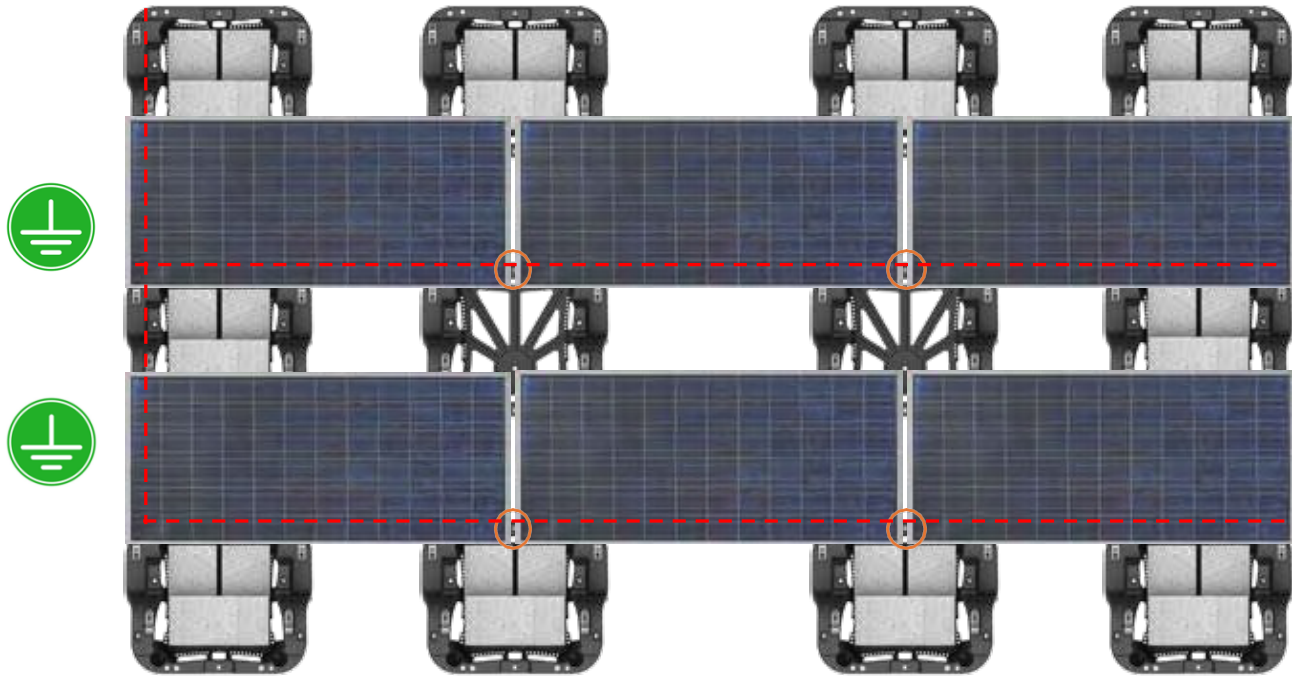
Mechanical Anchor Installation

Do not pre-install mechanical anchors prior to array being installed. If mechanical anchors are required, note placement in array and install Sollega supplied anchor assembly consisting of (3x Aluminum L feet/w T-bolt, 8' Aluminum Rail, 2x Carriage bolt (FR-CB), 2x Square Washer (FR-SQW), 2x $\frac{3}{4}$ " Washers (FR-W2), 1x $\frac{3}{8}$ " Nylon Lock Nut (FR-NLN), 1x mechanical anchor (FR-MA). **Install all connections loose and leave anchor attachment to the roof and flashing to the roof until the anchor position is confirmed accurate.** Install anchor screws (not supplied by Sollega) into the anchor plate as per specified in the project engineering packet. Anchor screws are deck dependent (wood, concrete, metal) and vary in length to accommodate varying thickness of insulation. The mechanical anchor is installed in between two adjoining FR510 as depicted below. See detail page.



Figure 4- Mechanical Anchor Assembly

Fault Current Path to Ground



Slip Sheets Installation

If slip sheets are required, center them under the FR510 during installation. Check with the roofing manufacturer to determine if they are required and if they need to be attached or installed loose. Sollega can provide slip sheets cut to size of the specific roofing material. Request a quote.

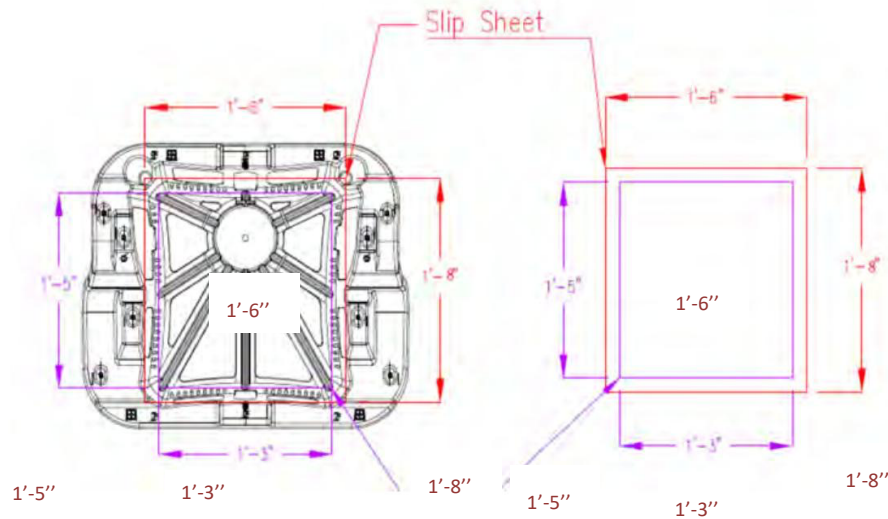


Figure 5 – Slip Sheet

Slide On Bonding Jumper (FR-SBJ) Installation

Sollega's latest racking innovation, the FR-SBJ (Patented) one piece slide-on bonding jumper provides module to module bonding. The easy to install, one piece spring stainless steel part installs without the need of tools. Simply position it between two adjoining modules and slide the end clips onto the adjoining module flanges. The part is designed to work in conjunction with the FR510 ballasted racking system but can be used as a standalone solution. **Note*** if module is removed install replacement module w/FR-SBJ or install FR-SGB4 ground lug on both adjoining modules and run bar copper to ensure bonding continuity. The bonding/grounding assemblies are part of the Sollega racking system and have been evaluated and tested for bonding to UL 2703 under the Sollega product Listing. The installation procedures described must be adhered to in order to satisfy NEC 690.43(A).

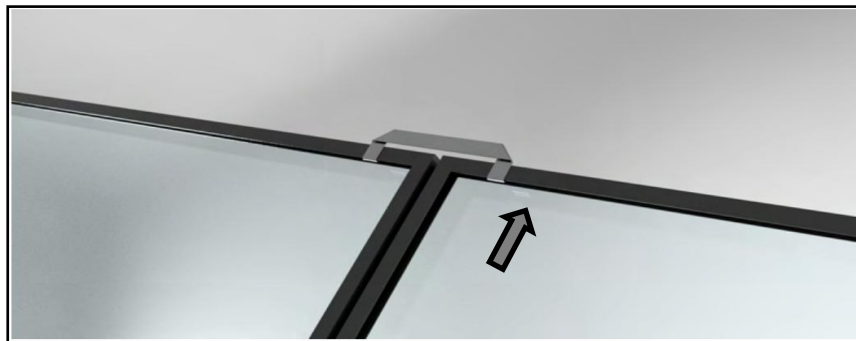


Figure 6 -Slide on Bonding Jumper (FR-SBJ) Installation

Note: FR-SBJ For single-use only

Row to Row Bonding Requirements

Attach supplied FR-SGB-4 IlSCO Grounding lug to the module flange of the last module in the row. Install one FR-SGB-4 lug per row and install bare copper (typically #6 or #8) as per single line diagram and connect to ground. Install as per manufacturers guidelines.

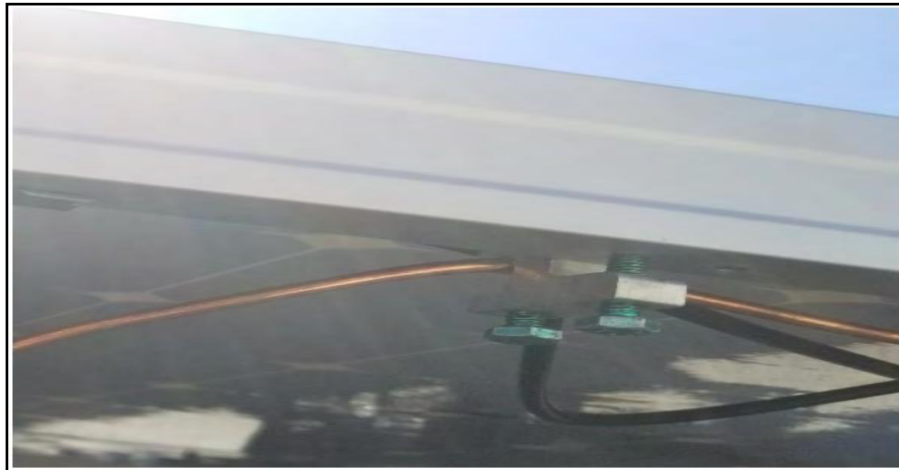
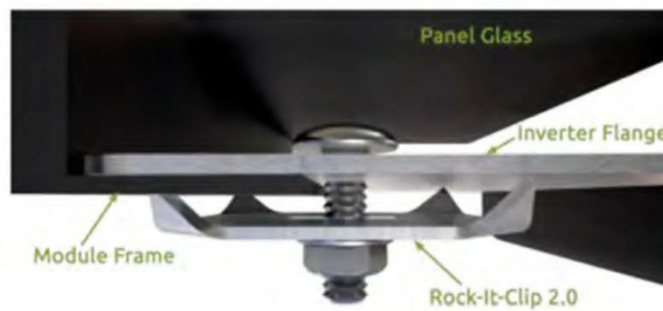


Figure 7- FR-SGB-4 Grounding Lug

Optimizer Mounting Detail – Rock-it Clip

ROCK-IT CLIP 2.0 INSTALL



- 1 Locate all parts
 - Locate the Rock-It Clip 2.0, micro-inverter/power optimizer, and the section of the module frame in which you will be mounting the micro-inverter/power optimizer.
- 2 Install the Rock-It Clip 2.0 (See below detail)
 - Slide the Rock-It Clip 2.0 onto the lip of the micro-inverter/power optimizer.
 - Slide the micro-inverter/power optimizer into the opposite lip of the module frame.
 - Tighten the bolt to 150 in-lb to clamp the Rock-It Clip 2.0 to the module frame and the micro-inverter/power optimizer to the Rock-It Clip 2.0.
 - Ensure that the lip on the clip is tight against the frame and that the micro-inverter/power optimizer flange is tight against the clip flange to avoid rotation during tightening.

Wire Management

Sollega provides the FR-W-CLP (UV rated Nylon wire clip with zip tie). This is designed to be installed on the module flange and overhang of the FR510 for N-S wire management. No wires should be exposed to UV.

Note - Leave adequate looping of jumper connections to accommodate expansion/contraction of modules.



Figure 8-Nylon Wire Management Zip-tie Clips (FR-W-CLP)

Ballast Requirements

Please follow all current and applicable building codes. For assistance with ballast requirements for a specific project, contact engineering@sollega.com. Approved roof pavers (ballast blocks or CMUs) dimensions are 16”L x 8”x 4”H with an average weight of 27 to 33 lbs. (Fig 1), unless otherwise noted.

- Pavers should have a minimum net area compressive strength of 3000 psi or must comply with ASTM Designation C1491.



Figure 9- Concrete Masonry Unit (FR-CMU) 4"x8"x16"

The Installer is Solely Responsible For

- Utilizing all necessary safety equipment as required by applicable rules and regulations.
- Complying with all applicable local or national building codes, including any that may supersede this manual.
- Ensuring that the FR510 and other products provided by Sollega are appropriate for the particular installations and are designed for the installation environment. Roof must be less than 7dg in slope.
- Ensuring that the roof, its rafters, connections, and other structural support members can support the array under live load conditions.
- Ensuring that lag screws used for roof anchoring have adequate pullout strength and shear capacities.
- Maintaining the waterproof integrity of the roof including selection of appropriate flashing.
- Ensuring safe installation of all electrical aspects of the entire system.
- Following the roofing manufacturer’s installation procedure and guidelines before beginning the installation.

Disclaimer of Liability

SOLLEGA 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.

SOLLEGA 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.

SOLLEGA 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.

Important Installation Details (continued)

Electrical Safety

Any work done with PV and electrical equipment presents a shock hazard. The FR510 is injection molded from non-conductive polymer and does not require bonding. The FR510 is mechanical solar mounting system and containing no “live” parts. All persons working on installation should coordinate in order to ensure that all personnel are aware of electrical hazards.

Assembly Modifications

Unauthorized field modification of Sollega components or assemblies will void Sollega warranty coverage. Do not cut or drill into the FR510.

General Information

The installation of solar modules requires a great degree of skill and should only be performed by qualified licensed Professionals, including, without limitation, licensed contractors and electricians.

The installer should be familiar with construction standards established by the Occupational Safety and Health Administration (OSHA). They should also plan for safe practice during any installation activity with respect to hazards from tripping, falling, lifting, repetitive stress, and any overhead or electrical hazards. When working close to building roof edges, consider protection options that reduce worker exposure to fall hazards. Refer to OSHA Sub Chapter 7, Group 1, Article 2.

Project Specific Design Modifications

On-site workers assisting in the installation process may encounter undocumented or unexpected obstacles requiring a modification of the project system design supplied by Sollega. PV arrays are intended to be primarily regular and repeating structures, any modifications to the original design should be noted on working drawings. If the array is disconnected or if the number of rows or length of a row is changed, contact Sollega engineering for a revised ballast layout.

Care for the Roof

Avoid concentrated loads on the roof that exceed the available reserve. Never drag components into place. Instead, elevate the component, and then move it manually or with a cart. Locate it and then place it “on spot.” To ensure roofing system warranty continuation, work with roofing contractors to ensure roofing system and array compatibility. Sollega recommends following roofing manufacturers guidelines when installing. Please consult roofing manufacturer’s specific requirements. If use of slip sheets is required, Sollega can provide a quote for roofing manufacturer specific material slip sheets.

Final inspection

Visually inspect assembled arrays. The suggested process consists of a row-by-row walk-through and then a perimeter walk-around, after mechanical assembly, before electrical completion. Report any distortion in the assembly to Sollega. Array substrate supports should be in full contact with the roof or the ground. Any indication of uneven distribution of weight should be evaluated and corrected before continuing with electrical finishing. **Note: Any loose components or fasteners shall be re-tightened in accordance with these instructions. Any components showing signs of damage that compromise safety shall be replaced immediately.**

Load Ratings and Configurations

UL 2703 LISTED

UL 3741 LISTED

Conforms to STD UL 2703 Standard for Safety First Edition: Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels.

- Max Overcurrent Protective Device (OCPD) Rating: 40A
- Max Module Size: 30.5ft²
- Module Orientation: Landscape
- System Level Allowable Design Load Rating: 30 PSF downward, 15 PSF upward, 5 PSF lateral.
- Actual system structural capacities are defined by PE stamped certification letters.

Class A System Fire Rating Per UL 2703

- Any System Tilt with Modules Types 1, 2, 3, 13, 19, 25 & 29 on Low Slope Roofs (< 7 degrees)
- Any module-to-roof gap is permitted with no perimeter guarding required. This rating is applicable with any Sollega or 3rd party roof attachment and with or without concrete blocks in the Chassis.
- Class A rated PV systems can be installed on Class A, B, and C roofs without affecting the roof fire rating.
- Conforms to STD UL 3741 Standard for Safety Photovoltaic Hazard Control System

Structural Certification

- Designed and Certified for Compliance with the International Building Code & ASCE/SEI-7
- Wind Tunnel Testing by I.F.I.
- Approved for use on roof pitches up to 7 degrees (<=7 degrees)

The Simple Solar Racking Solution™



FastRack510

The simple solar racking solution for flat roof or ground mount PV installations.

- 5°, 6°, 10° mounting solution
- Simple, modular, one piece design
- Universal design compatible with all framed modules
- Fully ballasted, heat welded, anchored and hybrid options
- Roof friendly with round edges and low point loads
- One size bolt with all top down connections
- Injection molded UV rated Nylon6
- PE stamp engineering and ballast layout services available
- UL 2703 Class "A" Type 1, 2, 3, 29 Modules
- UL 3741 PV Hazard Control
- 100% Recyclable
- Made in the U.S.A.

Easy to install:

1-Position FastRacks



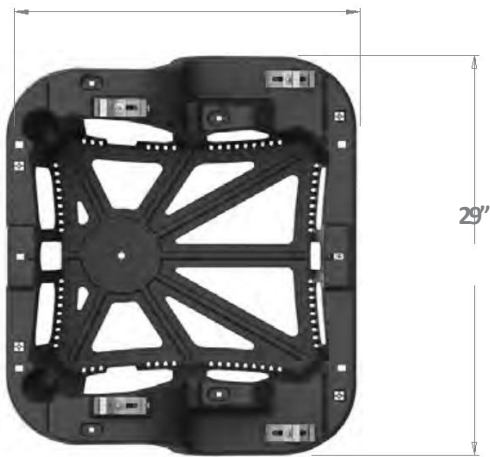
2-Add Ballast and Clamps



3-Attach Modules



The Simple Solar Racking Solution™



4 x 8 x 16" Ballast



Optimizer Mount



Pull Clamp (FR-PC-A) / End Clamp (FR-EC 30-50mm sizes available)

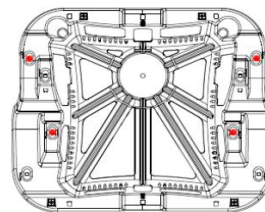


Grounding - Slide on Bonding Jumper (FR-SBJ)

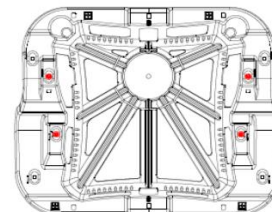
FastRack 510 (10° Shown)

| TiltAngle | 5° | 6° | 10° |
|---------------------|---|-------------|-------------|
| RowSpacing | 10" (254mm) | 8" (203mm) | 13"(330 mm) |
| LeadingEdge | 8"(203mm) | 8" (203 mm) | 5.3"(135mm) |
| CompatibleModules | All framed modules 31" - 44" inwidth (787mm and 1117mm) | | |
| Weight | 4.5 lbs. (2kg) | | |
| BallastRequirements | 4"x8"x16" Roof Paver (.31.5lbseach) based on ASTM Designation C1491- 01a. | | |
| Material | Injection molded UV rated Nylon6 | | |
| ModuleOrientation | Landscape | | |
| Wind LoadCriteria | MeetsASCE7-10 upto165mph | | |
| ULCertification | UL1703: Class 'A' Type 1,2,3,29, UL2703,UL3741 | | |
| Warranty | 25 Year Limited Warranty | | |
| Dimensions | (LxWxH) 24.25x 29x 14" 616x 737x 356mm | | |
| Disassembly | Simple disassembly and 100% recycdable content | | |
| Patent | Utility Patent #9,831,817 Design Patent #D800,055 | | |

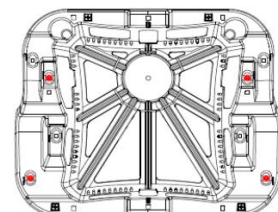
Bolt Location



5° (10" Inter-row)



6° (8" Inter-row)



10° (13" Inter-row)



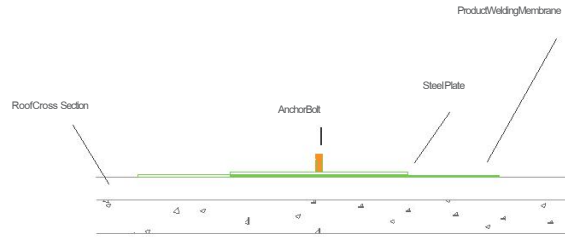
Sollega FastRack String Inverter Mount

- Invert in the array
- 20° Tilt
- Ballast & mechanical attachment options
- Flexible Strut configuration
- Mount most string inverters, combiner boxes and disconnects
- Quick to install

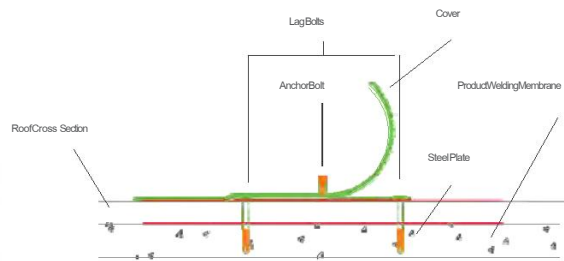


Mechanical Anchors - Styles and Cross Section Details

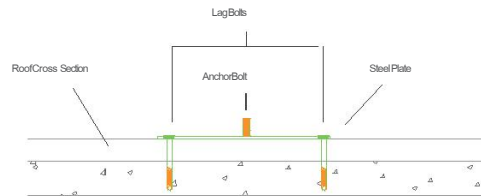
U-2000
Heatweld
only
Single
Ply Roof



U-2400
Mechanical
fastened
Single Ply
Roof



U-2600
Mechanical
fastened
builtup Roof



Mechanical Anchor Installation

The FR510 center mounting hole is utilized for attachment of aluminum L Foot/Rail/Anchor.

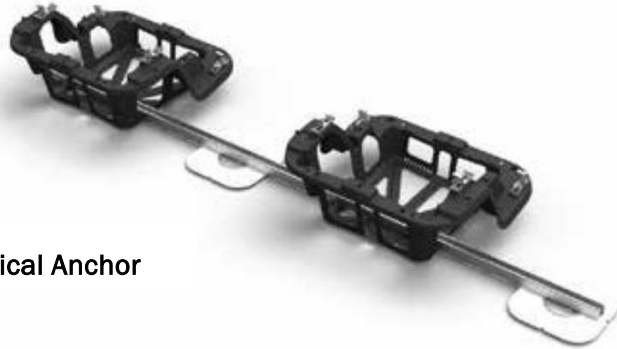
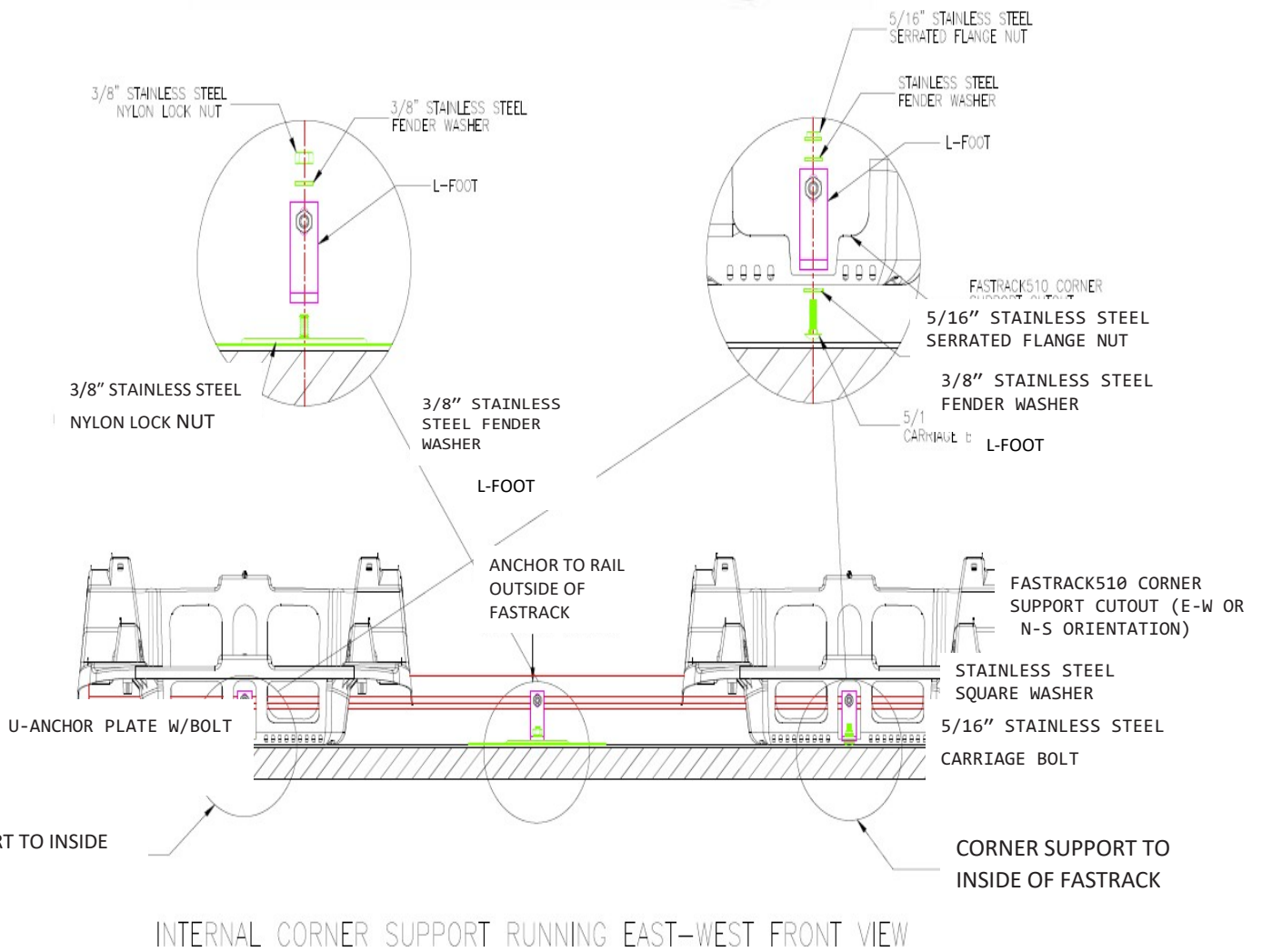


Figure 9- Mechanical Anchor



| Illustration 1a - List of approved modules when bonding modules with AK Stamp | |
|---|---|
| Manufacturer | Model |
| GCL | M6/72H |
| Illustration 1b - List of approved modules when bonding modules with Bonding Jumper | |
| Manufacturer | Model |
| GCL | M6/72H |
| Heliene | 144M M6 Monofacial 450W-460W |
| LG | LG335N1C-A5 LG405N2T-L5 |
| SunPower | SPR-A425-G-AC, SPR-A420-G-AC, SPR-A415-G-AC, SPR-A410-G-AC, SPR-A400-G-AC, SPR-A390-G-AC, SPR-A400-BLK-G-AC and SPR-A390-BLK-G-AC |
| Q-Cell | G4.4L Q.PEAK DUO XL-G10.3/BFG/BGT470-485, Q.PEAK DUO XL-G10/G10.2/G10.3470-485 Q.PEAK DUO XL-GG9.3/BFG/BGT440 - 460, Q.PEAK DUO XL-G9/G9.2/G9.3440 - 460 Q.PEAK DUO L-G8.3/BFG/BGT405 - 430, Q.PEAK DUO L-G8.3/BFF405 - 430 Q.PEAK DUO L-G8.3 405 - 430, Q.PEAK DUO L-G8.2 405 - 430 Q.PEAK DUO L-G8.1 405 - 430, Q.PEAK DUO L-G8 405 - 430 Q.PEAK DUO L-G7.7385-405, Q.PEAK DUO L-G7.4385-405 Q.PEAK DUO L-G7.3 385-405, Q.PEAK DUO L-G7.2 385-405 Q.PEAK DUO L-G7.1 385-405, Q.PEAK DUO L-G7 385-405 Q.PEAK DUO L-G6.3 405 - 430, Q.PEAK DUO L-G6.2 405 - 430 Q.PEAK DUO L-G6 405 - 430, Q.PEAK DUO L-G5.3 380-405 Q.PEAK DUO L-G5.2 380-405, Q.PEAK DUO L-G5380-405 Q.PLUS DUO L-G5.3 360-380, Q.PLUS DUO L-G5.2 360-380 Q.PLUS DUO L-G5 360-380, Q.PEAK L G4.5 365-385 Q.PEAK L G4.2 365-385, Q.PLUS L G4.2 340-355 |
| REC | Alpha 72 Series/RECxxxAA 72 where xxx is 430-450W |
| Trina | TSM-DE15H, TSM-DE15M, TSM-DD06M.05, TSM-DE06X.05(II), TSM- DEG15HC.20(II), TSM-DEG15MC.20(II), TSM-DE15V(II), TSM-DEG15VC.20(II), TSM- DE09.05 (II), TSM-DE19, TSM-DEG19C.20 |

The FR510 System may be used to ground and/or mount a PV module complying with UL 2703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. Unless otherwise noted, "xxx" refers to the module power rating and both black and silver frames are included in the certification.

| MAKE | MODELS |
|------------------|---|
| Adani | Adani modules with 35 and 40mm frames ASX-Y-ZZ-xxx. Where "X" can be B, Mor P, "Y" can be 6, 7 or M10 and "ZZ" can be blank, 144, PERC, B-PERC, or AB- PERC |
| AIONRISE | AIONRISE modules with 35 and 40mm frames AIONyyG1-xxx Where "yy" can be 60 or 72 |
| Amerisolar | Amerisolar modules with 35 and 40 mm frames AS-bYxxxZ Where "b" can be 5 or 6; "Y" can be M, P, M27, P27, M30, or P30; and "Z" can be blank, W or WB |
| Aptos Solar | Aptos modules with 35 and 40 mm frames DNA-yy-zzaa-xxx Where "yy" can be 120 or 144; "zz" can be MF or BF; and "aa" can be 23 or 26 |
| Astronergy Solar | Astronergy modules with 30, 35 and 40 mm frames aaSMbbyyC/zz-xxx Where "aa" can be CH or A; "bb" can be 60, 66, or 72; "yy" can be blank, 10 or 12; "C" can M, P, M(BL), M-HC, M(BL)-HC, P-HC, M(DG), or M(DGT); and "zz" can be blank, HV, F-B, or F-BH |
| ASUN | ASUN modules with 35 and 40 mm frames ASUN-xxx-YYZZ-aa Where "YY" can be 60 or 72; "ZZ" can be M, or MH5; and "aa" can be blank or BB |
| Auxin | Auxin modules with 40 mm frames AXN6y6zAxxxB Where "y" can be M or P; "z" can be 08, 09, 10, 11, or 12; and "A" can be F, M or T; and "B" can be blank, A, B or C |
| Axitec | Axitec Modules with 30, 35 and 40 mm frames AC-xxxY/aaZZb Where "Y" can be M, P, MB or MH; "aa" can be blank, 125- or 156-; "ZZ" can be 54, 60, 72, 108, 120, or 144; "b" can be S, X, V, VB, XV, or MX |
| Boviet | Boviet modules with 35 and 40mm frames BVMZZaaYY-xxxBcc Where "ZZ" can be 66 or 76; "aa" can be 9, 10 or 12; "YY" is M or P; and "B" can be blank, Lor S; and "cc" can be blank, H, H-BF, H-BF-DG, H-HC, H-HC-BF, H-HC-BF-DG, HC-BF or HC-BF-DG |
| BYD | BYD modules with 35 mm frames BYDxxxAY-ZZ Where "A" can be M6, P6, MH or PH; "Y" can be C or K; and "ZZ" can be 30 or 36 |
| Canadian Solar | Canadian Solar modules with 30, 32, 35 and 40 mm frames CSbY-xxxZ Where "b" can be 1, 3, 6 or 7 "Y" can be H, K, L, N, P, U, V, W, X or Y; and "Z" can be M, P, MS, PX, M-SD, P-AG, P-SD, MB-AG, PB-AG, MS-AG, or MS-SD |
| CertainTeed | CertainTeed modules with 35 and 40 frames CTxxxYZZ-AA Where "Y" can be M, P, or HC; "ZZ" can be 00, 01, 10, or 11; and "AA" can be 01, 02, 03, 04 or 06 |
| CSUN | Csun modules with 35 and 40 mm frames YYxxx-zzAbb Where "YY" is CSUN or SST; "zz" is blank, 60, or 72; and "A" is blank, P, M or MM; "bb" is blank, BB, 5BB, BW, or ROOF |
| Dehui | Dehui modules with 30, 35 and 40mm frames DH-MYYYZ-xxx Where "YYY" can be 760, 772, 860, 872; and "Z" can be B, F or W |

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| Ecosolargy | <p>Ecosolargy modules with 35 and 40 mm frames ECOxxxYzzA-bbD Where "Y" can be A, H, S, or T; "zz" can be 125 or 156; "A" can be M or P; "bb" can be 60 or 72; and "D" can be blank or B</p> |
| ET Solar | <p>ET Solar modules with 30, 35 and 40 mm frames ET-YZZZxxxAA Where "Y" can be P, L, or M; "ZZZ" can be 660, 660BH, 672, 672BH, 754BH, 766BH, 772BH; and "AA" can be GL, TB, TW, WB, WW, BB, WBG, WWG, WBAC, WBCO, WWCO, WWBCO or BBAC</p> |
| Flex | <p>Flex modules with 35 and 40 mm frames FXS-xxxYY-ZZ; Where "YY" can be BB or BC; and "ZZ" can be MAA1B, MAA1W, MAB1W, SAA1B, SAA1W, SAC1B, SAC1W, SAD1W, SBA1B, SBA1W, SBC1B, orSBC1W</p> |
| GCL | <p>GCL modules with 35 mm and 40 mm frames GCL-ab/YY xxx Where "a" can be M or P; "b" can be 3 or 6; and "YY" can be 60, 72, 72H, or 72DH</p> |
| Gigawatt Solar | <p>Gigawatt modules with 40 mm frames GWxxxYY Where "YY" can be either PB or MB</p> |
| Hansol | <p>Hansol modules with 35 and 40 frames HSxxxYY-zz Where "YY" can be PB, PD, PE, TB, TD, UB, UD, or UE; and "zz" can be AH2, AN1, AN3, AN4, HH2, HV1, orJH2</p> |
| Hanwa Solar | <p>Hanwa Solar modules with 40 mm frames HSLaaP6-YY-1-xxxZ Where "aa" can be either 60 or 72; "YY" can be PA or PB; and "Z" can be blank or B</p> |
| Hanwa Q CELLS | <p>Hanwa Q CELLS Modules with 32, 35, 40mm frames aaYY-ZZ-xxx where "aa" can be Q. or B.; "YY" can be PLUS, PRO, PEAK, LINE PRO, LINE PLUS, PLUS DUO or PEAK DUO; and "ZZ" can be G3, G3.1, G4, G4.1, L-G2, L-G2.3, L-G3, L-G3.1, L-G3y, L-G4, L-G4.2, L-G4y, LG4.2/TAA, BFR-G3, BLK-G3, BFR-G3.1, BLK-G3.1, BFR-G4, BFR-G4.1, BFR G4.3, BLK-G4.1, G4/SC, G4.1/SC, G4.1/TAA, G4.1/MAX, BFR G4.1/TAA, BFR G4.1/MAX, BLK G4.1/TAA, BLK G4.1/SC, EC-G4.4, G5, G5/SC, G5/TS, BLK-G5, BLK-G5/SC, BLK-G5/TS, L-G5, L-G5.1, L-G5.2, L-G5.2/H, L-G5.3, G6, G6/SC, G6/TS, G6+/TS, G6+, BLK-G6, L-G6, L-G6.1, L-G6.2, L-G6.3, G7, BLK-G6+, BLK-G6+/AC, BLK-G6+/HL, BLK-G6+/SC, BLK-G6/TS, BLK-G6+/TS, BLK-G7, G7.2, GS, BLK-G8, GS+, BLK-G8+ L-G7, L-G7.1, L-G7.2, L-G7.3, L-G8, L-G8.1, L-G8.2, L-G8.3, L-GS.3/BFF, L-GS.3/BFG, L-GS.3/BGT, ML-G9, BLK ML-G9, ML-G9+, BLK ML-G9+, BLK-G10+, BLK G10+/AC, ML-G10, BLK ML-G10, ML-G10+, BLK ML-G10+, ML-G10.a, BLK ML-G10.a, ML-G10.a+, BLK ML-G10.a+, XL-G9, XL-G9.2, XL-G9.3, XL-G9.3/BFG, XL-G10.2, XL-G10.3, XL-G10.c, XL-G10.d, XL-G10.d/BFG, XL-G10.3/BFG or XL-G11.3/BFG</p> |
| Heliene | <p>Heliene modules with 40 mm frames YYZZxxxA Where "YY" can be 36, 60, 72, 96, 120 or 144; "ZZ" can be HC, M, P, or MBLK; and "A" can be blank, Home-PV, Bifacial or M10 Bifacial</p> |
| HT-SAAE | <p>HT-SAAE modules with 35 and 40 mm frames HTyy-aaaZ-xxx Where "yy" can be 60, 66, 72 or 78, "aaa" can be 18, 156 or 166, "Z" can be M, P, M-C, P-C, M(S), M(VS), M(V), P(V), M(V)-C, P(V)-C, or X</p> |
| Hyundai | <p>Hyundai modules with 33, 35 and 40 mm frames HiY-SxxxZZ Where "Y" can be A, Dor S; "S" can be Mor S; and "ZZ" can be GI, HG, HI, KI, MI, MF, MG, PI, RI, RG, RG(BF), RG(BK), SG, TI or TG</p> |
| Itek | <p>Itek Modules with 40 mm frames IT-xxx-YY Where "YY" can be blank, HE, or SE, or SE72</p> |

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| JA Solar | <p>JA Solar modules with 30, 35 and 40 mm frames JAyyzz-bbww-xxx/aa Where "yy" can be M, P, M6 or P6; "zz" can be blank, (K), (L), (R), (V), (BK), (FA), (TG), (FA)(R), (L)(BK), (L)(TG), (R)(BK), (R)(TG), (V)(BK), (BK)(TG), or (L)(BK)(TG); "bb" can be 48, 54, 60, 66, 72 or 78; "ww" can be D09, D10, D20, D30, S01, S02, S03, S06, S09, S10, S12, S17, S20, S30 or S31; and "aa" can be BP, MB, MR, SI, SC, PR, 388, 488, 488/RE, 588</p> |
| Jinko | <p>Jinko modules with 35 and 40 mm frames JKMYxxxZZ-aa Where "Y" can either be blank or S; "ZZ" can be M, P, or PP; and "aa" can be blank, 60, 608, 60H, 60L, 60BL, 60HL, 60HB, 60HBL, 6HBL-EP, 60-J4, 60B-J4, 608-EP, 60(Plus), 60-V, 60-MX, 6RL3, 6RL3-B, 6TL3-B, 7RL3-V, 7RL3-TV, 72, 728, 72-J4, 72B-J4, 72(Plus), 72-V, 72H-V, 72L-V, 72HL-V, 72HL4-V, 72HL4-TV, 72-MX, 72H-BDVP, 72HL-TV, or 72HL-V-MX3</p> |
| Kyocera | <p>Kyocera Modules KYxxxZZ-AA Where "Y" can be Dor U; "ZZ" can be blank, GX, or SX; and "AA" can be LPU, LFU, UPU, LPS, LPB, LFB, LFBS, LFB2, LPB2, 3AC, 3BC, 3FC, 4AC, 4BC, 4FC, 4UC, SAC, SBC, SFC, SUE, 6BC, 6FC, 8BC, 6MCA, or 6MPA</p> |
| LG | <p>LG modules with 35 and 40 mm frames LGxxxYaZ-bb Where "Y" can be A, E, M, N, Q, S; "a" can be A, 1, 2 or 3 "Z" can be C, K, T, or W; and "bb" can be A3, AS, A6, 83, 86, E6, E6.AW5, G3, G4, JS, K4, LS, NS, VS, V6</p> |
| Longi | <p>Longi modules with 30, 35 and 40 mm frames LRa-YYZZ-xxxM Where "a" can be 4, 5 or 6; "YY" can be blank, 60, 66, or 72; and "ZZ" can be blank, BK, BP, HV, PB, PE, PH, HBD, HIB, HIH, HPB, HPH, or HIBD</p> |
| Maxeon | <p>Maxeon modules with 35, 40 and 46mm frames SPR-AAAY-xxx-zzz Where "AAA" can be MAX, P or X; "Y" can be 3, 5, 6, 21 or 22; and "zzz" can be BLK, COM or UPP</p> |
| Mission Solar | <p>Mission Solar modules with 33, 35 and 40 mm frames YYYbb-xxxZZaa Where "YYY" can be MSE or TXS; "bb" can be blank, 6 or 60A; "ZZ" can be blank, MM, SE, SO, SQ, SR, SX, TS, 120 or 144; and "aa" can be blank, BB, BW, 1J, 4J, 4S, SK, SR, ST, 60, 6J, 6S, 6W, 6Z, 8K, 8T, or 9S</p> |
| Mitsubishi | <p>Mitsubishi modules PV-MYYxxxZZ Where "YY" can be LE or JE; and "ZZ" can be either HD, HD2, or FB</p> |
| Moltech | <p>IM and XS series modules with 40 mm frames</p> |
| Next Energy Alliance | <p>Next Energy Alliance modules with 35 and 40mm frames yyNEA-xxxZZ where "yy" can be blank or US; "ZZ" can be M, MB or M-60</p> |
| Neo Solar Power | <p>Neo Solar Power modules with 35 mm frames D6YxxxZZaa Where "Y" can be M or P; "ZZ" can be 83A, 84A, E3A, E4A, H3A, H4A; and "aa" can be blank, (TF), ME or ME (TF)</p> |
| Panasonic (HIT) | <p>Panasonic modules with 35 and 40 mm frames VBHNxxxYYZZA Where "YY" can be either KA, RA, SA or ZA; "zz" can be either 01, 02, 03, 04, 06, 068, 11, 11B, 15, 158, 16, 168, 17, or 18; and "A" can be blank, E, G, or N</p> |
| Panasonic (EverVolt) | <p>Panasonic modules with 30 mm frames EVPVxxxA Where "A" can be blank or H, Kor PK</p> |
| Peimar | <p>Peimar modules with 40 mm frames SbxxxYzz Where "b" can be G, M or P; "Y" can be M or P; and "zz" can be blank, (BF) or (FB)</p> |

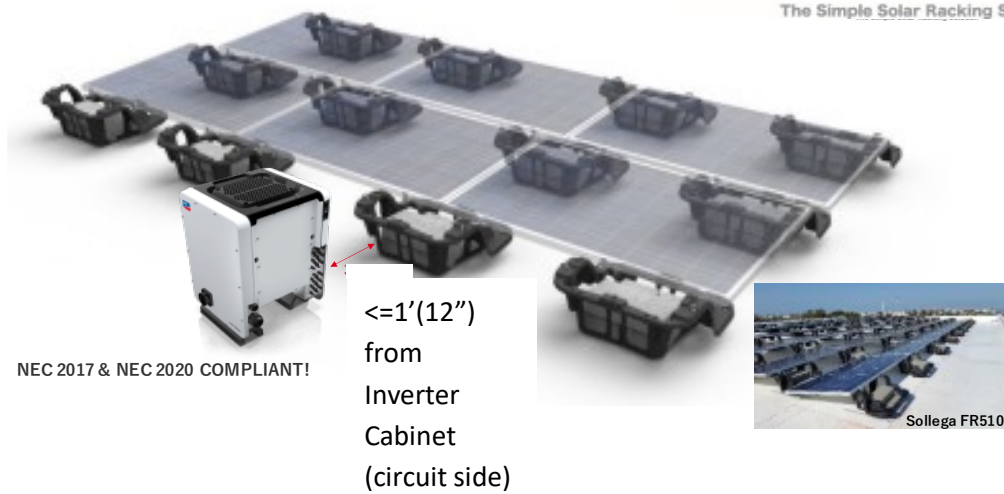
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| Philadelphia Solar | Philadelphia modules with 35 and 40 mm frames PS-YzzAA-xxx Where "Y" can be Mor P; "zz" can be 60, 72 or 144; and "AA" can be blank, (BF), (HC) or (HCBF) |
| Phono Solar | Phono Solar modules with 35 and 40 mm frames PSxxxY-ZZJA Where "Y" can be M, M1, MH, M1H, M4, M4H or P; "ZZ" can be 20 or 24; and "A" can be F, T, U, UH, or TH |
| Prism Solar | Prism Solar modules with 35mm frames PST-xxxW-M72Y Where "Y" can be H, HB or HBI |
| Recom | Recom modules with 35 and 40 mm frames RCM-xxx-6yy Where "yy" can be MA, MB, ME or MF |
| REC Solar | REC modules with 30 and 38 mm frames RECxxxYYZZ Where "YY" can be AA, M, NP, NP2, PE, PE72, TP, TP2, TP2M, TP2SM, TP2S, TP3M or TP4; and "ZZ" can be blank, Black, BLK, BLK2, SLV, 72, or Pure |
| Renesola | ReneSola modules with 35 and 40 mm frames AAxxxY-ZZ Where "AA" can be SPM(SLP) or JC; "Y" can be blank, F, M or S; and "ZZ" can be blank, Ab, Ab-b, Abh, Abh-b, Abv, Abv-b, Bb, Bb-b, Bbh, Bbh-b, Bbv, Bbv-b, Db, Db-b, or 24/Bb |
| Renogy | Renogy Modules with 40 mm frames RNG-xxxY Where "xxx" is the module power rating; and "Y" can be D or P |
| Risen | Risen Modules with 30, 35 and 40 mm frames RSMyy-a-xxxZZ Where "yy" can be 60, 72, 110, 120, 132 or 144; "a" can be 6, 7 or 8; and "ZZ" can be M, P or BMDG |
| S-Energy | S-Energy modules with 35 and 40mm frames SABB-CCYYY-xxxZ Where "A" can be C, D, Lor N; "BB" can be blank, 20, 25, 40 or 45; "CC" can be blank, 60 or 72; "YYY" can be blank, BOE, MAE, MAI, MBE, MBI, MCE or MCI; and "Z" can be V, M-10, P-10 or P-15 |
| SEG Solar | SEG Solar with 30, 35 and 40 mm frames SEG-aYY-xxxZZ Where "a" can be blank, 6 or B; "YY" can be blank, MA, MB, PA, or PB; and "ZZ" can be blank, BB, BG, BW, HV, WB, WW, BMB, BMA-HV, BMA-BG, BMA-TB, BMB-TB, BMB-HV, BMD-HV, BMB-BG |
| Seraphim USA | Seraphim modules with 30, 35 and 40 mm frames SRP-xxx-YYY-ZZ Where "xxx" is the module power rating; and "YYY" can be BMA, BMD, 6MA, 6MB, 6PA, 6PB, 6QA-XX-XX, and 6QB-XX-XX; ZZ is blank, BB, BG or HV |
| Sharp | Sharp modules with 35 and 40 mm frames NUYYxxx Where "YY" can be SA or SC |
| Shinsung E&G | Shinsung Modules with 35mm frames SSVxxx-144MH |
| Silfab | Silfab Modules with 35 and 38 mm frames SYY-Z-xxxAb Where "YY" can be IL, SA, LA, SG or LG; "Z" can be blank, M, P, or X; "A" can be blank, B, H, M, N; and "b" can be A, C, G, K, L, N, T, U or X |
| Solaria | Solaria modules with 35 and 40 mm frames PowerXT-xxxY-ZZ Where "Y" can be R or C; and "ZZ" can be AC, BO, BX, BY, PD, PL, PM, PM-AC, PX, PZ, WX or WZ |
| Solarcity (Tesla) | Solarcity modules with 40 mm frames SCxxxYY Where "YY" can be blank, B1 or B2 |
| SolarTech | SolarTech modules with 40 mm frames AM-xxxYY Where "AM" can be PERCB-B, PERCB-W, HJT-B, HJT-B-W or STU; "YY" can be blank, PERC or HJT |

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| SolarWorld AG | SolarWorld Sunmodule Plus, Protect, Bisun, XL, Bisun XL, may be followed by mono, poly, duo, black, bk, or clear; modules with 31 and 33 mm frames SW-xxx |
| SolarWorld Americas | SolarWorld Sunmodule Plus, Protect, Bisun, XL, Bisun XL, may be followed by mono, poly, duo, black, bk, or clear; modules with 33 mm frames SWA-xxx |
| Sonali | Sonali Modules with 35 and 40 mm frames SS-M-xxx Where "M" can be blank or M |
| Stion | Stion Thin film modules with 35 mm frames STO-xxx or STO-xxxA |
| SunEdison | SunEdison Modules with 35 and 40 mm frames SE-YxxxZABCDE Where "Y" can be B, F, H, P, R, or Z; "Z" can be 0 or 4; "A" can be B,C,D,E,H,I,J,K,L,M, or N ; "B" can be B or W; "C" can be A or C; "D" can be 3, 7, 8, or 9; and "E" can be 0, 1 or 2 |
| Suniva | Suniva modules with 35, 38 and 40 mm frames OPTxxx-AA-8-YYY-Z MVXxxx-AA-8-YYY-Z Where "AA" is either 60 or 72; "B" is either 4 or 5; "YYY" is either 100,101,700,1BO, or 1B1; and "Z" is blank or B |
| Sunpower | Sunpower standard (G3 or G4) or InvisiMount (G5) 35 and 40mm frames SPR-Zb-xxx-YY Where "Z" can be A, E, M, P or X; "b" can be blank, 17, 18, 19, 20, 21, or 22; and "YY" can be blank, BLK, COM, C-AC, D-AC, E-AC, BLK-E-AC, G-AC, H-AC, BLK-C-AC, or BLK-D-AC |
| Sunspark | Sunspark modules with 40 mm frames SYY-xxxZ-A Where "YY" can be MX or ST; and "Z" can be M, MB, M3, M3B, P or W; and "A" can be 60 or 72 |
| Suntech | Suntech Modules with 35 and 40mm frames STPxxxy-zz/aa Where "y" is blank or S; and "zz" can be 20, 24, A60, A72U, 860 or 872; and "aa" can be Vd, Vern, Vfw, Vfh, Vnh, Wdb, Wde, Wd, Wfhh or Wnhb |
| Talesun | Talesun modules with 30, 35 and 40mm frames TAByZZaa-xxx-b Where "A" can be D or P; "B" can be 6 or 7; "y" can be blank, F, G, H, I or L; "ZZ" can be 60, 66, 72 or 78; "aa" can be M, M(H), or P; and "b" can be blank, B, T, or (H) |
| Tesla | Tesla modules with 40 mm frames TxxxY Where "Y" can be H or S |
| Trina | Trina Modules with 30, 35 and 40mm frames TSM-xxxYYZZ Where "YY" can be OD05, DO06, DO14, DE14, DE15, DE15V, DEG15, DEG15VC, DE18M, DEG18MC, DE09, DE19, DEG19C.20, DE06X, PA05, PC05, PD05, PD06, PA14, PC14, PD14, PE14, or PE15; and "ZZ" can be blank, .05, .05(11), .08, .08(11), .10, .18, .08D, .18D, 0.82, .002, .00S, 05S, 08S, .20(11), A, A.05, A.08, A.10, A.18, (II), A(II), A.05(11), A.08(11), A.082(11), A.10(11), A.18(11), C.05, C.07, C.05(11), C.07(11), H, H(II), H.05(11), H.08(11), HC.20(11), HC.20(11), M, M(II), M.05(11), MC.20(11) |
| URE | URE modules with 35 mm frames DyZxxxaa Where "D" can be Dor F, "y" can be A, B, 6 or 7; "Z" can be Kor M; and "aa" can be H3A, H4A, H8A, E7G- BB, E8G-BB or MFG-BB |
| Vikram | Vikram solar modules with 35 and 40 mm frames XVSyy.ZZ.AAA.bb Where "X" can be blank, Paradea, Prexes or Somera; "yy" can be M, P, MBB, MDH, MDHT, MH, MS, MHBB, or PBB; "ZZ" can be 60 or 72; "AAA" is the module power rating; and "bb" can be 03, 04 or 05 |
| VSUN | VSUN modules with 30, 35 and 40 mm frames VSUNxxx-YYz-aa Where "YY" can be 60, 72, 108, 120, or 144; "z" can be M, P, MH, PH, or BMH; and "aa" can be blank, BB, BW, or DG |

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| Waaree | Waaree modules with 40 mm frames WSyy-xxx where "yy" can be blank, M, or MB |
| Winaico | Winaico modules with 35 and 40 mm frames Wsy-xxxZa Where "y" can be either P or T; "Z" can be either M, P, or MX; and "a" can be blank or 6 |
| Yingli | Yingli modules with 35 and 40 mm frames YLxxxZ-yy Where "Z" can be Dor P; "yy" can be 29b, 30b, 34d, 35b, 36b or 40d |
| ZN Shine | ZN Shine modules with 35 mm frames ZXMY-AAA-xxx/M Where "Y" can be 6 or 7, "AAA" can be 72, NH120, NH144, NHDB144, NHLDD144, SH144, SHDB144 or SHLDD144 |

Sollega FR510 UL3741 Installation Addendum- PV Hazard Control Array Boundary *Warning: To Reduce the Risk of Injury, read all instructions

PV Hazard Control Array – With No Extra Switches!



This addendum outlines the proper installation procedures and provides necessary standards required for product reliability. All installers must thoroughly read this manual and have a clear understanding of the installation procedures prior to installation. Failure to follow these guidelines may result in property damage, bodily injury or even death.

UL 3741 and NEC 690.12

2020 NEC 690.12(B)(2) Controlling Conductors within the array boundary The FR510 Photovoltaic Hazard Control System (PVHCS) is a UL 3741 Listed system that complies with NEC 690.12(B)(2) (1), when installed by qualified persons per the installation procedures outlined in the FR510 System Installation Manual and this Addendum. Please refer to the following pages of this addendum for various example cases of system designs that comply with 690.12(B)(2).

2020 NEC690.12

Rapid Shutdown of PV Systems on Buildings requires that all PV arrays installed on or in buildings shall include rapid shutdown functions to reduce shock hazard for Fire Fighters (FF) in accordance with 690.12(A) through (D): (A) Controlled Conductors (1) PV system DC circuits (2) Inverter output circuits originating from inverters located within array boundary (B) Controlled Limits (1) Outside Array Boundary: $\leq 30V$ within 30 seconds (2) Inside Array Boundary: (1) Listed PV Hazard Control System (UL 3741) (2) $\leq 80V$ within 30 seconds after rapid shutdown initiation (3) PV array without exposed wiring methods or conductive parts (C) Initiation devices

Initiation device(s) shall initiate the rapid shutdown function of the PV system (D) Equipment. Equipment that performs rapid shutdown functions other than initiation devices, such as listed disconnect switches, circuit breakers, or control switches.

NEC 690.2 defines the array as a mechanically and electrically integrated grouping of modules with support structure, including any attached system components such as inverter (s) or dc-to-dc converter(s) and attached associated wiring. This indicates the FR510 Racking and collocated inverters are part of the array. NEC 690.12(B) defines the array boundary as 1ft

Approved Inverters (reference www.sollega.com/downloads) FastRack: String Inverter Mount Engineering

Sollega FR510 UL3741 Installation Addendum PV Hazard Control Array Boundary *Warning: To Reduce the Risk of Injury, read all instructions

Sollega FR510 meets Rapid Shutdown when installed in conjunction with approved String inverter within 1' of the PV array boundary. Sub arrays outside the PV array boundary will require either A) separate inverter or B) Module Level Power Electronics (MLPE's) installed.

Ensure safe installation of all electrical aspects of the array. All electrical installation and procedures should be conducted by a licensed and bonded electrician or solar contractor. Routine maintenance of a module or panel shall not involve breaking or disturbing the bonding path of the system. All work must comply with national, state and local installation procedures, product and safety standards. Comply with all applicable local or national building and fire codes, including any that may supersede this manual. Ensure all products are appropriate for the installation, environment and array under the site's loading conditions. Use only Sollega parts or parts recommended by Sollega; substituting parts may void any applicable warranty. Ensure provided information is accurate. Issues resulting from inaccurate information are the installer's responsibility. Ensure bare copper grounding wire does not contact aluminum and zinc-plated steel components, to prevent risk of galvanic corrosion. If loose components or loose fasteners are found during periodic inspection, re-tighten immediately. Any components showing signs of corrosion or damage that compromise safety shall be replaced immediately. Provide an appropriate method of direct-to-earth grounding according to the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems. Disconnect AC power before servicing or removing modules, AC modules, microinverters and power optimizers. Review module manufacturer's documentation for compatibility and compliance with warranty terms and conditions. CAUTION: Module removal may disrupt the bonding path and could introduce the risk of electric shock. If during servicing a module is required to be removed, a bonding jumper shall be installed between the adjacent modules from where the module was removed to maintain the bond path. WARNING: To reduce the risk of injury, read all instructions

All PV wire must be attached to the Module Frame and FR510 racking using our FR-W-CLP (UV rated Nylon Zip Tie Wire Clip) with approved "Air Gap" providing proper insulation from the frame. PV wire must be isolated from the module frame.

All installation including metal conduit and assembly of grounding shall be done in accordance per National Electrical Code (NEC, NFPA 70). All Installation, operation and maintenance must comply with the guidelines in our installation manual. Please refer to 3rd party installation manual for PVHCS compliance and installation.

Note: UL 3741 listing only applies to component and conductors inside the array boundary and that additional precautions are required for conductors outside the array boundary to meet NEC requirements.

Sollega FR510 UL3741 Installation Addendum – PV Hazard Control Array Boundary

***Warning: To reduce the risk of injury read all instructions.**

PVHCS required components as per UL3741 18.5:

Sollega UL 2703 Conforms to STD ANSI/UL Standard for Safety Photovoltaic Hazard Control System, Max PVHCS System Voltage: 1000V

- **List of approved PV hazard Control Equipment or Components evaluated at 1000V Max System Voltage:** All Modules listed in the Module Compatibility Sections with max module size: 30.5 sq/ft
- **FR510 Components,** FR510-5dg Chassis, FR510-10dg Chassis, FR510-6dg Chassis, Pull Clam (FR-PC-A), End Clamp (FR-EC) (300-50mm)
- For conductors Outside Array Boundaries: Requirements for PV arrays addressed in UL 3741 are intended for compliance with the National Electrical Code (NEC), NFPA 70, 2017 and later editions and their requirements for controlling electrical shock hazards inside the array boundary as addressed in NEC section 690.12(B)(2), Rapid Shutdown of PV Systems on Buildings and with the Canadian Electrical Code (CE Code) C22.1. The following list of approved inverters are within this PVHCS additionally comply with the 30V in 30 seconds requirements outside the PV array as required in 690.12 (B)(1)
- **Approved Inverters:**
 - **SMA:** STP (33, 50, 62)-US-41, Sunny Tripower X: STP (20, 25, 30)-US-50
 - **Chint Power Systems:** CPS SCA (36K, 50K, 60K) TL-DO/US-480, CPS SCA25KTL-DO/US-208, CPS SCA25KTL-DO-R/US-480
 - **Solectria Renewables:** PVI (50, 60)TL-480, PVI 25TL-208, PVI 25TL-480(R), PVI 36TL-480-V2
 - **Ginlong Technologies (Solis):** S5-GC (75K, 80K, 90K, 100K)-US, S6-GC (25K, 33K, 36K, 40K, 50K, 60K)-US
 - **Solis Inverters:** Solis-(25K, 30K, 36K, 40K, 50K, 60K, 66K)-(SW, F-SW or LSW)
 - **Fronious:** Symo Advanced (10.0-3,12.0.3) 208-240/Lite, Symo Advanced (15.0-3, 20-0.3, 22.7-3, 24.0-3) 480/Lite
 - **Canadian Solar Inverters:**, CSI-(25K, 30K, 36K, 40K, 50K, 60K, 66K)-T480GL01-UB, CSI-(75K, 80K, 90K, 100K)-T480GL02-U, CSI-(75K, 80K, 90K, 100K)-T480GL03-U
 - **GoodWe:** SMT Series/GW(50K, 60K)-SMT-US
 - **Sungrow Inverters:** SG(36, 60)CX-US
- **HellermannTyton Edge Clip** (FR-W-CLP) and **Cable Ties** (FR-W-CBT) (UL 62275 Listed)
- **RayTray v2 Solar Wire Management System** (UL870 Listed)
- **Listed Conduit** (all sizes apply), **Electrical Metallic Tubing (EMT)** (UL797 Listed), **Rigid Metal Conduit (RMC)** (UL 6 Listed), **Intermediate Metal Conduit (IMC)** (UL 1242 Listed), **Listed Tubing, Fittings and Grounding Components.**
- **PV Connectors** (UL 4703 Listed), **PV Wire** (UL 4703 Listed)

The simplest installation method to comply with NEC690.12(B) is to utilize the FR510 UL 3741 system with a contiguous array (no separate sub-arrays) with one or more collocated inverters, as all inverter DC input circuits are within the 1 ft array boundary (Case 1). Installations where subarrays are required and cannot be included within the 1 ft array boundary can comply by using a single or combing one or more of the three options below (Cases 2-4).

The following case studies have been provided by Sollega to show examples of installation options that comply with NEC690.12(B), compliance is not limited to these examples. The following examples are Sollega recommendations.

Case 1: UL 3741 Listed System with Contiguous Array – Example not verified by Intertek

Case 2: UL 3741 Listed System with Contiguous Sub-Array - See Page 30 – Example not verified by Intertek

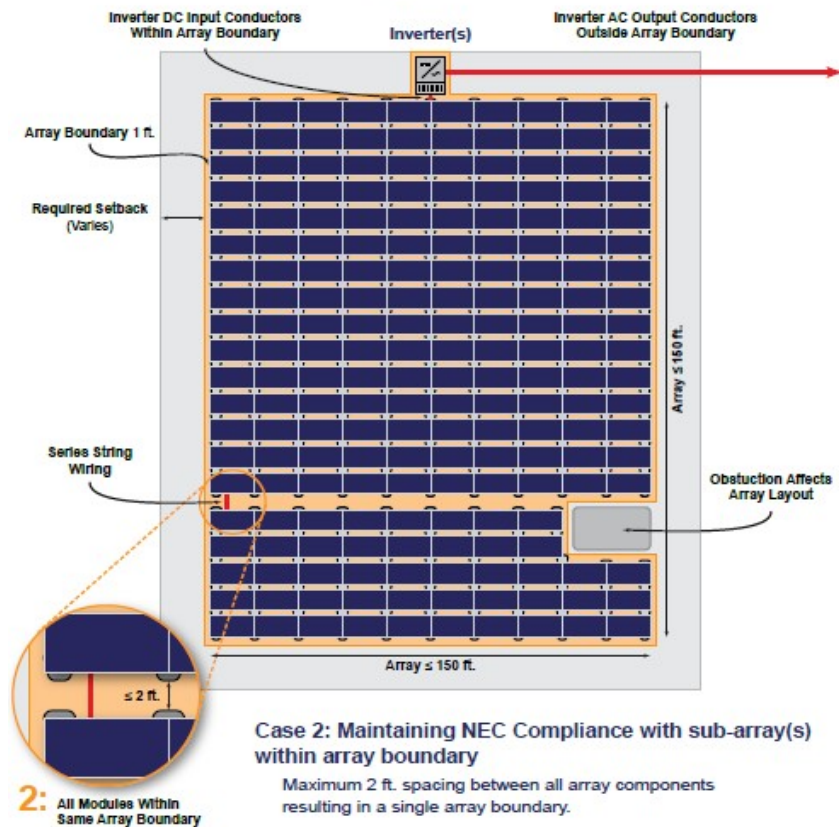
Case 3: UL 3741 Listed System with Non-Contiguous Sub-Array - See Page 31 – Example not verified by Intertek

Case 4: UL 3741 Listed System with MLPE Sub-Array - See Page 32

**Sollega FR510 UL3741 Installation Addendum PV Hazard Control Array Boundary *Warning:
To Reduce the Risk of Injury, read all instructions**

Case 2: Sub-Array(s) are within the same Array Boundary and Array(s) comply with NEC 690.12(B)(2)(1)

- Outside Array Boundary: $\leq 30V$ within 30 Seconds
- Inside Array Boundary: $\leq 1000V$

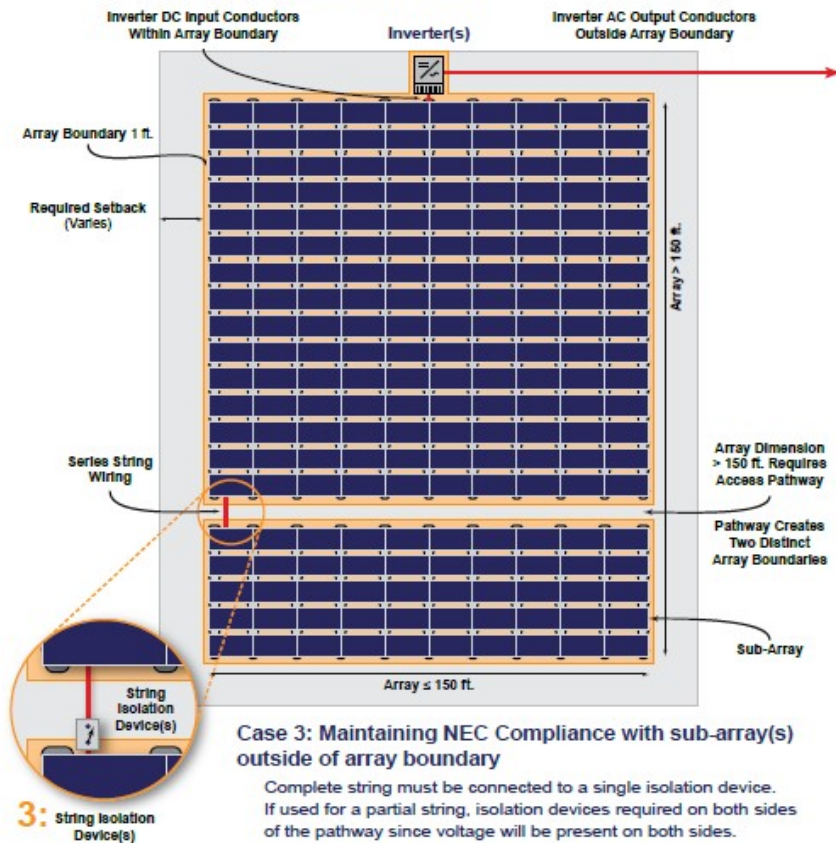


Note: Example only, not verified by Intertek

**Sollega FR510 UL3741 Installation Addendum PV Hazard Control Array Boundary *Warning:
To Reduce the Risk of Injury, read all instructions**

Case 3: (String Isolation Device): Conductors outside of Array Boundary are controlled via String Isolation Device(s)

- Outside Array Boundary: $\leq 30V$ within 30 Seconds
- Inside Array Boundary: $\leq 1000V$

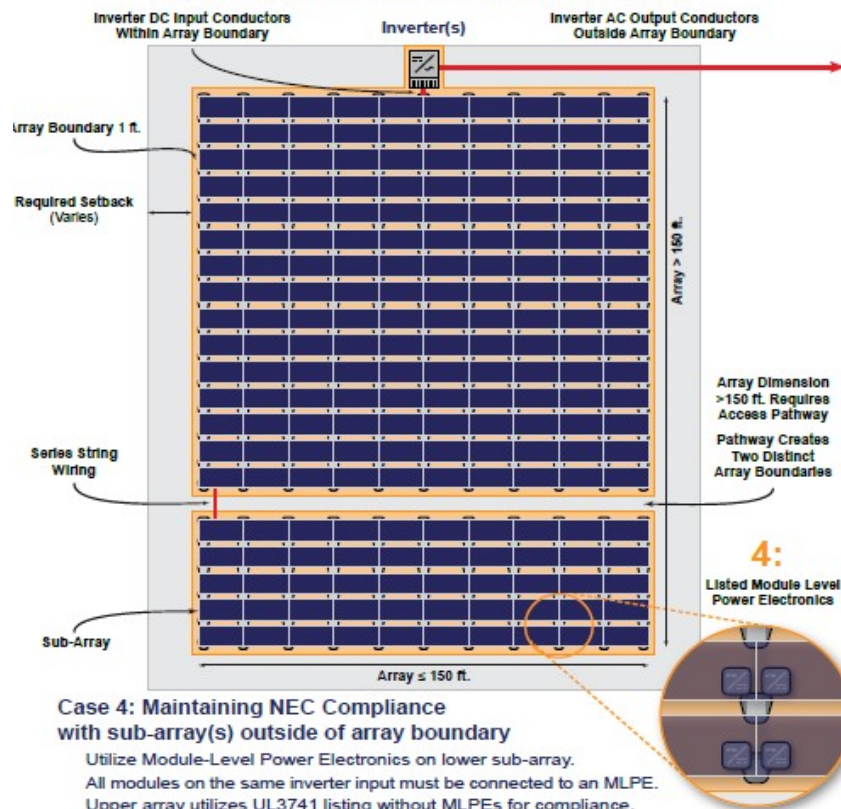


Note: Example only, not verified by Intertek

**Sollega FR510 UL3741 Installation Addendum PV Hazard Control Array Boundary *Warning:
To Reduce the Risk of Injury, read all instructions**

Case 4: (using MLPE): sub-array circuits are controlled to meet 690.12(B)(2)(2)

- Outside Array Boundary: ≤ 30V within 30 Seconds
- Inside Array Boundary: ≤ 1000V
- Inside Sub-Array Boundary: ≤ 80V within 30 Seconds



Note: Example only, not verified by Intertek

**Sollega FR510 UL3741 Installation Addendum- PV Hazard Control Array Boundary *Warning:
To Reduce the Risk of Injury, read all instructions**

The FR510 Wire management components noted in the list of approved PVHCS equipment on [page 3](#) were evaluated and approved for providing enhanced wire protection. To achieve enhanced wire protection as required per UL 3741, all wires shall be routed such that they are not exposed to potential FF interactions. Routing wires under the FR510 Chassis and under modules, or through approved listed raceway for wires crossing over a pathway, will ensure avoiding exposure to FF interactions.

When using the HellemannTyton Edge Clip Cable Tie, wrap the cable tie around the conductor(s) and tighten until wiring is secured in place. Do not overtighten or pinch the conductors. See photos for examples of under module and under chassis wire management.



All wiring managed under module, FR510 chassis or in listed raceway.



Examples of wire installation under module frame.



Examples of wire installation under FR510 Chassis.

**Sollega FR510 UL3741 Installation Addendum PV Hazard Control Array Boundary *Warning:
To Reduce the Risk of Injury, read all instructions**

Manage larger bundles of cables using RayTray or other listed raceway. When entering and exiting the raceway, installers should also ensure PV wires are routed away from exposure to Fire Fighter interactions.



Examples of wire Installation In approved wireways.

Sollega FastRack FR510 25-Year Warranty

SOLLEGA Inc.[™] is dedicated to providing excellent customer support and service and will continually evolve our warranty to enhance our dealers' and customers' experiences with SOLLEGA. The following policies and procedures are subject to change as our process evolves.

SOLLEGA Inc. warrants that its FastRack[™] Photo-voltaic (PV) Module Mounting System, when sold and delivered pursuant to a SOLLEGA Sales Order, will be new, will conform to the specifications in the applicable SOLLEGA Sales Order, and will be free from defects in material and/or workmanship for a period of Twenty Five (25) years from the date of shipment. Except for the foregoing limited warranties, SOLLEGA makes no other warranties express or implied for its SOLLEGA FastRack. This Warranty does not apply to damage incurred during shipment and does not apply to damage that is the result of improper handling. This Warranty will be void if during the warranty period, the SOLLEGA FastRack has been improperly or incorrectly installed, used, or maintained, or has been operated under abnormal conditions or contrary to applicable specifications.

This Warranty is granted to the original SOLLEGA FastRack owner only and is only applicable to the original installation of the SOLLEGA FastRack. This Warranty does not apply to damage to the SOLLEGA FastRack that is the result of weather conditions that exceed local building code limits that were applicable at the time that the SOLLEGA FastRack was originally installed. It is recognized and agreed that the foregoing limited warranties are in lieu of all other warranties, whether express or implied, and that SOLLEGA Inc. does not make any warranty of merchantability or any warranty of fitness for a particular purpose. In the event the SOLLEGA Inc. FastRack fails to satisfy the foregoing limited warranties, then SOLLEGA will repair or replace, at its option and cost, the defective product. The foregoing remedy shall be in lieu of all others that the SOLLEGA Purchaser may have, and the Purchaser waives all other remedies.

SOLLEGA Inc. will not assume expense or liability for correction of a defective SOLLEGA. FastRack by the Purchaser or by third parties without SOLLEGA's prior written authorization. In the event of the authorized correction of a defective SOLLEGA FastRack, the warranty period will be extended by the length of time during which the defective equipment was in the process of being repaired or replaced. Unauthorized field modification to SOLLEGA's final layout will affect warranty coverage. If any changes are made that significantly affect the structural integrity of the system, customer must provide written drawings for SOLLEGA's review, comment and approval prior to attempting any field modifications. Modifications may include but are not limited to changes in location of FastRacks, modules, windscreens, roof anchors, roof pavers or any other racking system components. SOLLEGA Inc.'s total liability hereunder for the repair or replacement of a SOLLEGA FastRack, or any defective components thereof, shall not exceed the original purchase price of the system. In no event will SOLLEGA Inc. be liable for or responsible to the Purchaser, or to any other party, for any consequential, incidental, or special, loss, cost, damage, or expense arising from the curtailment or interruption of photo-voltaic (PV) system operation or from the curtailment or interruption of any operations, processes, or equipment connected to the PV system.

This warranty grants the purchaser specific legal rights that may vary according to the state in which the Sollega FastRack is installed. In some states, sellers cannot limit the rights of the purchaser, so you may have access to legal remedies in addition to or greater than those specified here.

This warranty does not cover failures resulting from freeze damage, fire, flood, lightning, hurricane, tornado, hailstorm, windstorm, earthquake, or other acts of God, vandalism, explosions, exposure to harmful materials or fluids, or unauthorized alterations or repairs or any other cause beyond the control of SOLLEGA Inc.

