



**CLICKFIT**<sup>®</sup>

# UL 3741 PV HAZARD CONTROL

# ADDENDUM GUIDE

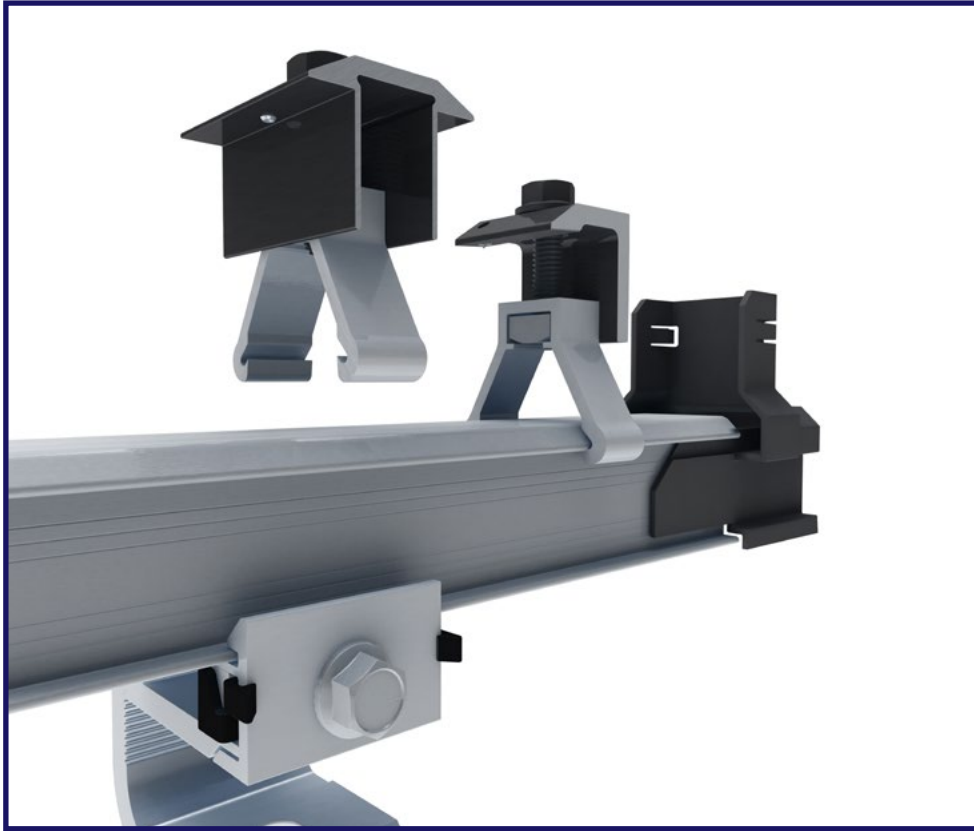
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**VERSION:** v1.6



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## CLICKFIT

ClickFit conforms to UL 2703 and UL 3741 and is one of the fastest installing rail-based systems in the industry. Thanks to its Click-In Rail assembly, the rails can be connected to any of EcoFasten's composition shingle, tile, and metal roof mounts in seconds. The ClickFit system is made of robust materials, to ensure longevity. ClickFit has been tested in extreme weather conditions including wind, fire, and snow.

## FEATURES

- Fully integrated bonding
- Click-on Mid & End Clamps
- Compatible with a variety of EcoFasten roof attachments



## DISCLAIMER

This manual describes proper installation procedures and provides necessary standards required for product reliability. Warranty details are available on the website. 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.

### IT IS THE INSTALLER'S RESPONSIBILITY TO:

- 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. 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 EcoFasten parts or parts recommended by EcoFasten; substituting parts may void any applicable warranty.
- Review the Design Assistant and Certification Letters to confirm design specifications.
- 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 and any 3rd party manufacturer's documentation for compatibility and compliance with warranty terms and conditions. Installers shall refer to the ClickFit System installation manual for complete installation instructions.
- ClickFit rails shall not be used as scaffolding, a roof jack, or any form of an anchoring point for roof personnel.
- Ensure that the roof is in good condition prior to installing any EcoFasten components.

DISCLAIMER

# RATINGS

|   |  |
|---|--|
| <b>Max PVHCS System Voltage</b>   | 1000 VDC   |
| <b>Certification</b>  | Conforms To ANSI/UL STD 3741 Standard For Safety Photovoltaic Hazard Control System  |
| <p><b>List Of Approved PV Hazard Control Equipment Or Components Evaluated At 1000V</b></p> <p><b>NOTE:</b> Clickfit was evaluated up to 1000 Vdc. However, per NEC 690.7, PV system DC circuits on one- or two family dwellings are limited to 600 Vdc maximum. PV system DC circuits on other types of buildings are limited to 1000 Vdc maximum.</p> <p>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 inverters and power conversion systems listed within this PVHCS install addendum additionally comply with the 30V in 30 seconds requirements outside the PV array as required in 690.12 (B)(1).</p> | <p><b>CLICKFIT ATTACHMENTS &amp; COMPONENTS</b><br/>Refer to Clickfit Installation Guide for installation methods and list of approved components and roof attachments for Composition Shingle, Metal, Tile and Low Slope Roofs.</p>   |
|   | <p><b>ELECTRICAL BALANCE OF SYSTEM COMPONENTS</b></p> <ul style="list-style-type: none"> <li>• PV Connectors (UL 6703 Listed) shall be compatible and approved for the application</li> <li>• PV Wire (UL 4703 Listed)</li> <li>• Clickfit Wire Management Clip (2012020)</li> <li>• ClickFit Wire Management Clamp (4011016)</li> <li>• Ecofasten Side Clip and Mid Clip (UL 1565)</li> <li>• Ecofasten Junction Box (UL 1741)</li> <li>• Wiley ACC-FPV and ACC-FPV180 Wire Clips (UL 1565 Listed)</li> <li>• Heyco Sunrunner Wire Clips (UL 1565 Listed)</li> <li>• PV Modules with Max Module Size 30.5 sqft (refer to Page 15 for approved module list)</li> </ul> |
|   | <p><b>LISTED CONDUIT</b></p> <ul style="list-style-type: none"> <li>• Electrical Metallic Tubing (EMT) (UL 797 Listed)</li> <li>• Rigid Metal Conduit (RMC) (UL 6 Listed)</li> <li>• Intermediate Metal Conduit (IMC) (UL 1242 Listed)</li> <li>• Flexible Metal Conduit (UL 1 Listed)</li> <li>• Liquid Flexible Metal Conduit (UL 360 Listed)</li> <li>• Schedule 40/80 Rigid PVC Conduit (UL 651 Listed)</li> <li>• Listed Conduit Fittings and Grounding Components</li> </ul>   |
|   | <p><b>PV HAZARD CONTROL EQUIPMENT</b></p> <ul style="list-style-type: none"> <li>• Tesla - Page 5, 6</li> <li>• Solis - Page 7</li> </ul>  |
|   | <p><b>COMMERCIAL INVERTERS</b><br/>See Ecofasten Systems Commercial Inverter Appendix</p>  |

## MARKINGS:



**5028986, 5017913,  
5030706, 5031449  
CONFORMS TO UL STD 3741**



**MARKINGS  
LOCATED ON  
END CLAMP**

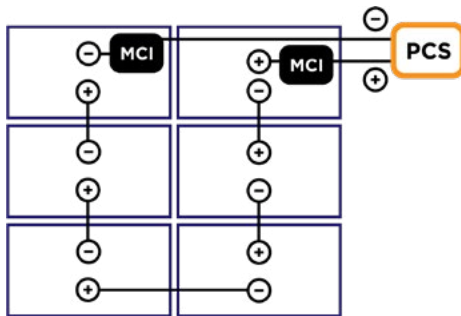
**UL 3741 LISTED SYSTEM PV HAZARD CONTROL EQUIPMENT**  
**APPROVED TESLA EQUIPMENT WITH MAX SYSTEM VOLTAGE 600V - MCI-1**

| PHOTOVOLTAIC RAPID SHUTDOWN EQUIPMENT (PVRSE)    | POWER CONVERSION SYSTEM (PCS) |                        |
|--|-------------------------------|------------------------|
|  | PV INVERTER (PVI)             | ENERGY STORAGE SYSTEMS |
| Tesla MCI-1                                      | 7.6 kW (1538000)              | Powerwall+ (1850000)   |
| Max Voltage = 600V, Max Imp = 13A, Max Isc = 19A | 3.8 kW (1534000)              | Powerwall 3 (1707000)  |

**IMPORTANT:** Refer to the applicable Tesla Inverter or Powerwall Installation Manual for specific instructions, including MCI-1 mounting, clearances, ratings, compatible connectors, and rapid shutdown initiation methods. MCI-1 installation configurations shown below are specific to the Ecofasten ClickFit UL 3741 Listing and supersede MCI-1 configurations shown in the Tesla installation manuals. If using the MCI-2, please refer to and follow Tesla’s UL 3741 Listing and installation instructions.

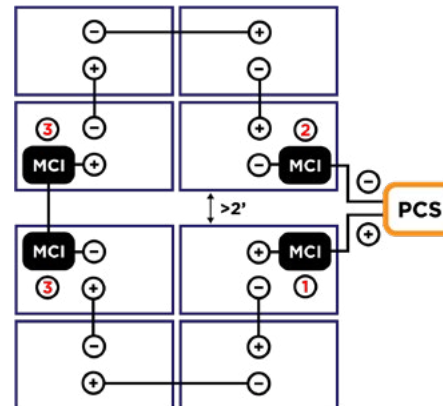
[View Tesla Installation Manual](#)

**CONTIGUOUS ARRAYS**



Where one or more PV strings are connected within a single contiguous array as shown in the figure, Tesla MCI-1s shall at a minimum be installed at both the positive and negative ends of each string between the last module and the homerun to the PCS. If there are multiple arrays each shall be equipped with MCI-1s as shown in the figure.

**NON-CONTIGUOUS SUB-ARRAYS**



Where any string is connected across non-contiguous sub-arrays separated by more than 2' (see example figure), MCI-1s shall be installed as follows:

1. At the positive end of the string between the last module and the PCS homerun.
2. At the negative end of the string between the last module and the PCS homerun.
3. At both ends of the connection between sub-arrays.

**Note:** Use the ClickFit MLPE Mount to mount the MCI-1 to the ClickFit Rail. See Clickfit Install Guide for additional instructions.

TESLA EQUIPMENT

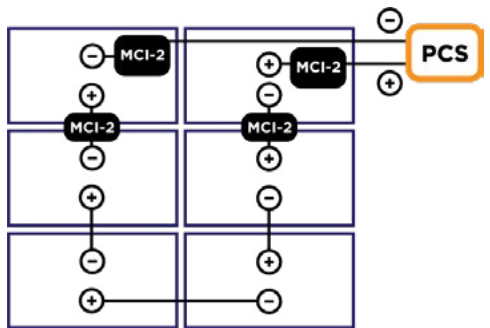
**UL 3741 LISTED SYSTEM PV HAZARD CONTROL EQUIPMENT**  
**APPROVED TESLA EQUIPMENT WITH MAX SYSTEM VOLTAGE 600V - MCI-2**

| PHOTOVOLTAIC RAPID SHUTDOWN EQUIPMENT (PVRSE)  | POWER CONVERSION SYSTEM (PCS) |                        |
|--|-------------------------------|------------------------|
|  | PV INVERTER (PVI)             | ENERGY STORAGE SYSTEMS |
| <b>Tesla MCI-2*</b><br>Max Device Voltage 165V,<br>Max System Voltage 600V<br><br>*Always Four Rule - must install four MCI-2s per series string. Review Tesla MCI-2 technical documents for ratings and installation methods. | 3.8 kW (1534000)              | Powerwall+ (1850000)   |
|  | 7.6 kW (1538000)              | Powerwall 3 (1707000)  |

**IMPORTANT:** Refer to the applicable Tesla Inverter or Powerwall Installation Manual for specific instructions, including MCI-2 mounting, clearances, ratings, compatible connectors, and rapid shutdown initiation methods. MCI-1 installation configurations shown below are specific to the Ecofasten ClickFit UL 3741 Listing and supersede MCI-2 configurations shown in the Tesla installation manuals.

[View Tesla Installation Manual](#)

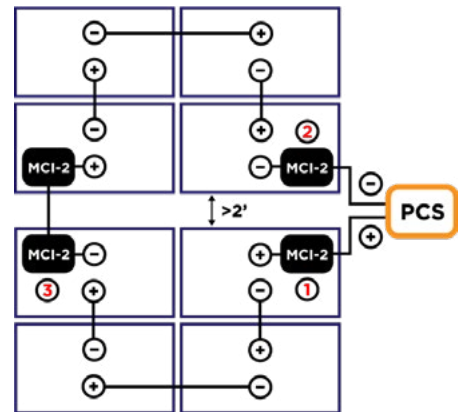
**CONTIGUOUS ARRAYS**



Where one or more PV strings are connected within a single contiguous array as shown in the figure, Tesla MCI-2s shall at a minimum be installed at both the positive and negative ends of each string between the last module and the homerun to the PCS. Two more MCI-2s are required anywhere within the string, but suggested to be placed between near ends of each string as shown in figure above.

**MCI-2s are not allowed to be plugged directly into each other due torisk of damaging the connectors from rotating them.**

**NON-CONTIGUOUS SUB-ARRAYS**



Where any string is connected across noncontiguous sub-arrays separated by more than 2' (see example figure), MCI-2s shall be installed as follows:

1. At the positive end of the string between the last module and the PCS homerun.
2. At the negative end of the string between the last module and the PCS homerun.
3. At both ends of the connection between sub-arrays.

**MULTIPLE SUB-ARRAYS**

Avoid cases where a string is split over more than 2 sub-arrays. If this cannot be avoided, please use Tesla's 165V inside-the-array PVHCS listing.

**Note:** Use the approved wire management devices on page 4 to mount the MCI-2 to the Clickfit Rail by supporting the MCI-2 at the wire leads. See Tesla MCI-2 Installation instructions for more details.



TESLA EQUIPMENT

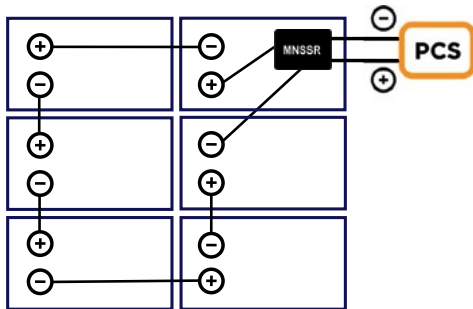
**UL 3741 LISTED SYSTEM PV HAZARD CONTROL EQUIPMENT  
APPROVED SOLIS EQUIPMENT WITH MAX SYSTEM VOLTAGE 600V:**

| PHOTOVOLTAIC RAPID SHUTDOWN EQUIPMENT (PVRSE)  | POWER CONVERSION SYSTEM (PCS)  |  |
|--|--|--|
|  | SOLIS 4G GRID-TIED INVERTER WITH INTEGRATED APSMART PLC TRANSMITTER* | SOLIS HV HOME ENERGY STORAGE INVERTER WITH INTEGRATED APSMART PLC TRANSMITTER* |
| Midnite Solar MNSSR-600S<br><br>Max Voltage = 600V<br><br>Max. Imp = 10A<br><br>Max. Isc = 12A | 3.6 kW (Solis-1P3.6K-4G-US)  | 3.8kW (S6-EH1P3.8K-H-US)   |
|  | 5 kW (Solis-1P5K-4G-US)  | 5kW (S6-EH1P5K-H-US)   |
|  | 6 kW (Solis-1P6K-4G-US)  | 7.6kW (S6-EH1P7.6K-H-US)   |
|  | 7.6 kW (Solis-1P7.6K-4G-US)  | 9.9kW (S6-EH1P9.9K-H-US)   |
|  | 10 kW (Solis-1P10K-4G-US)  | 10kW (S6-EH1P10K-H-US)   |
|  |  | 11.4kW (S6-EH1P11.4K-H-US)   |

\*When ordering, add -APST to end of model name

**IMPORTANT:** Refer to the applicable Solis and Midnite Installation Manuals for specific instructions, including MNSSR mounting, clearances, ratings, compatible connectors, and rapid shutdown initiation methods.

**PVRSE INSTALLATION INSTRUCTIONS**



Where one or more PV strings are connected within a single contiguous array as shown in the figure, the positive and negative ends of each string shall be connected to the MNSSR. The leads of each MNSSR get connected to the PCS. If there are multiple arrays, then each array each shall be equipped with an MNSSR as shown in the figure.

**Note:** MNSSR products shall be mounted the module frame. Refer to the Midnite Solar installation manual for additional instructions.

SOLIS EQUIPMENT

## INTRODUCTION:

# UNDERSTANDING UL 3741 AND NEC 690.12

### 2020/2023 NEC 690.12(B)(2) Controlling Conductors Within the Array Boundary

The ClickFit Photovoltaic Hazard Control System (PVHCS) is a UL 3741 Listed system that complies with NEC 690.12(B)(2), when installed by qualified persons per the installation procedures outlined in the ClickFit 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).

### 2020/2023 NEC 690.12 Background

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 - The PV System shall comply with one of the following:
  - (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 (NEC 2020 only)

#### (C) Initiation Devices

- Initiation device(s) shall initiate the rapid shutdown function of the PV system

#### (D) NEC 2020 - Equipment

Equipment that performs rapid shutdown functions other than initiation devices, such as listed disconnect switches, circuit breakers, or control switches.

#### (D) NEC 2023 - Building with Rapid Shutdown

Buildings with PV systems shall have a permanent label located at each service equipment location to which the PV systems are connected or at an approved readily visible location and shall indicate the location of rapid shutdown initiation devices.

† 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.

† NEC 690.12(B) defines the array boundary as 1ft from array in all directions. This indicates that the array boundary can extend 1 ft from the edge of the Clickfit racking or module.

**INTRODUCTION:****INSTALLATION METHODS PER UL 3741 AND NEC 690.12**

The following case studies are provided by EcoFasten to show examples of installation configurations that comply with NEC 690.12(B), however compliance is not limited to these examples.

**Case 1: UL 3741 Listed System, Single Arrays, – Page 8**

**Case 2: UL 3741 Listed System, Contiguous Sub-Array – Page 9**

**Case 3: UL 3741 Listed System, Multiple Arrays – Page 10**

The simplest installation method to comply with NEC690.12(B) is to utilize the Clickfit UL 3741 system with a single array (Case 1). Installations where sub-arrays can be included within a 1-ft array boundary, or 2-ft total, can be considered a contiguous array (Case 2). With multiple arrays, and more than a 2-ft gap between them, see Case 3.

All inverter and/or energy storage input circuits (DC) outside of the PV array boundary will require the use of Photovoltaic Rapid Shutdown Equipment (PVRSE) to de-energize circuits leaving the array per 690.12(B)(1) after initiation (DC disconnect, AC breaker or AC disconnect).

Inverter and/or energy storage output circuits (AC) are outside of the array boundary and meet the 690.12(B)(1) requirement after initiation (AC breaker or AC disconnect).

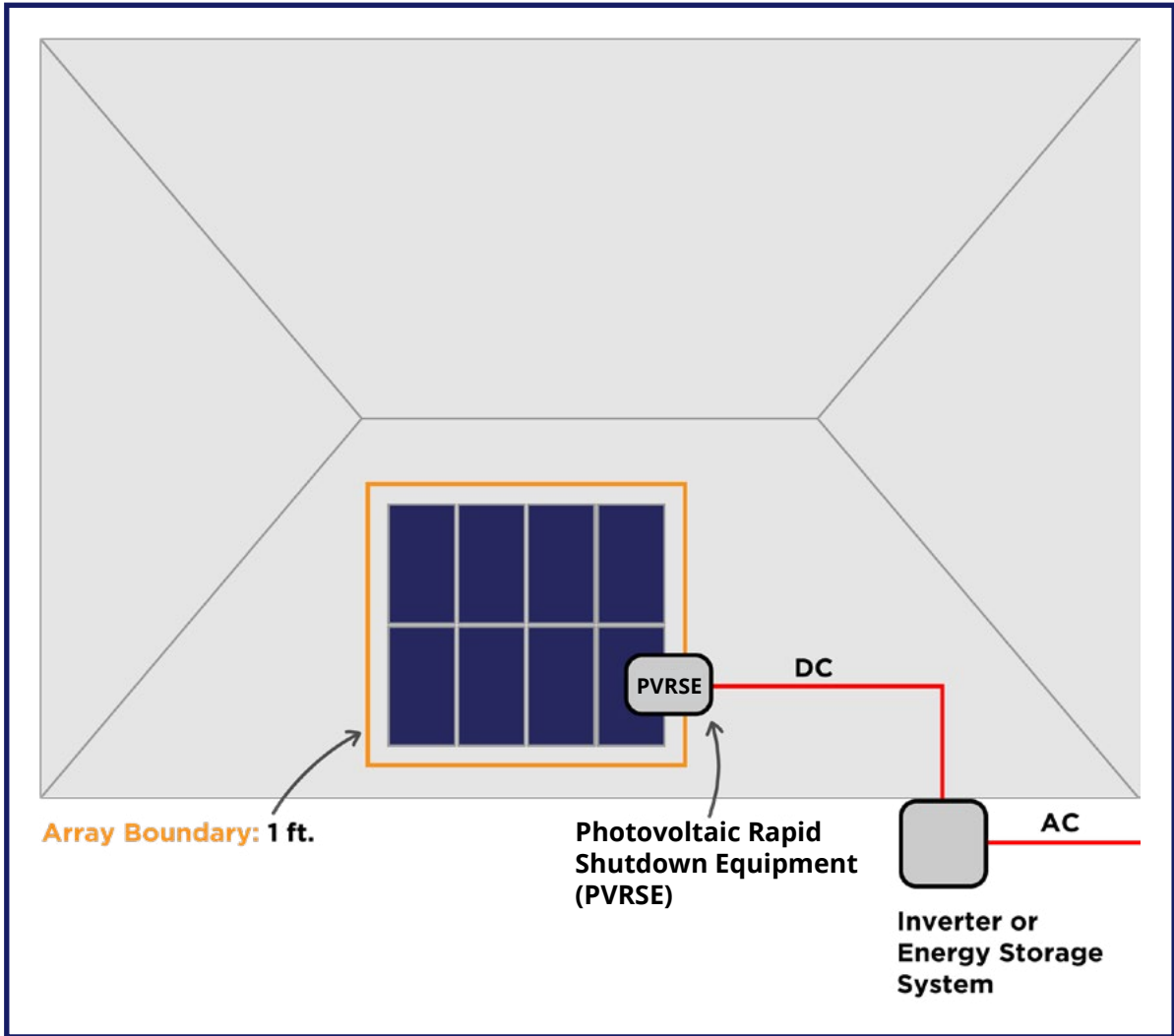
Case studies and NEC guidance have not been verified by Intertek.

### UL 3741 LISTED SYSTEM:

## CASE 1 SINGLE ARRAY

Single arrays comply with NEC 690.12(B)(2)(1)

- **Outside Array Boundary:** ≤ 30V within 30 Seconds
- **Inside Array Boundary:** ≤ 600V Residential, 1000V Commercial



### Case 1: Maintaining NEC compliance for single arrays.

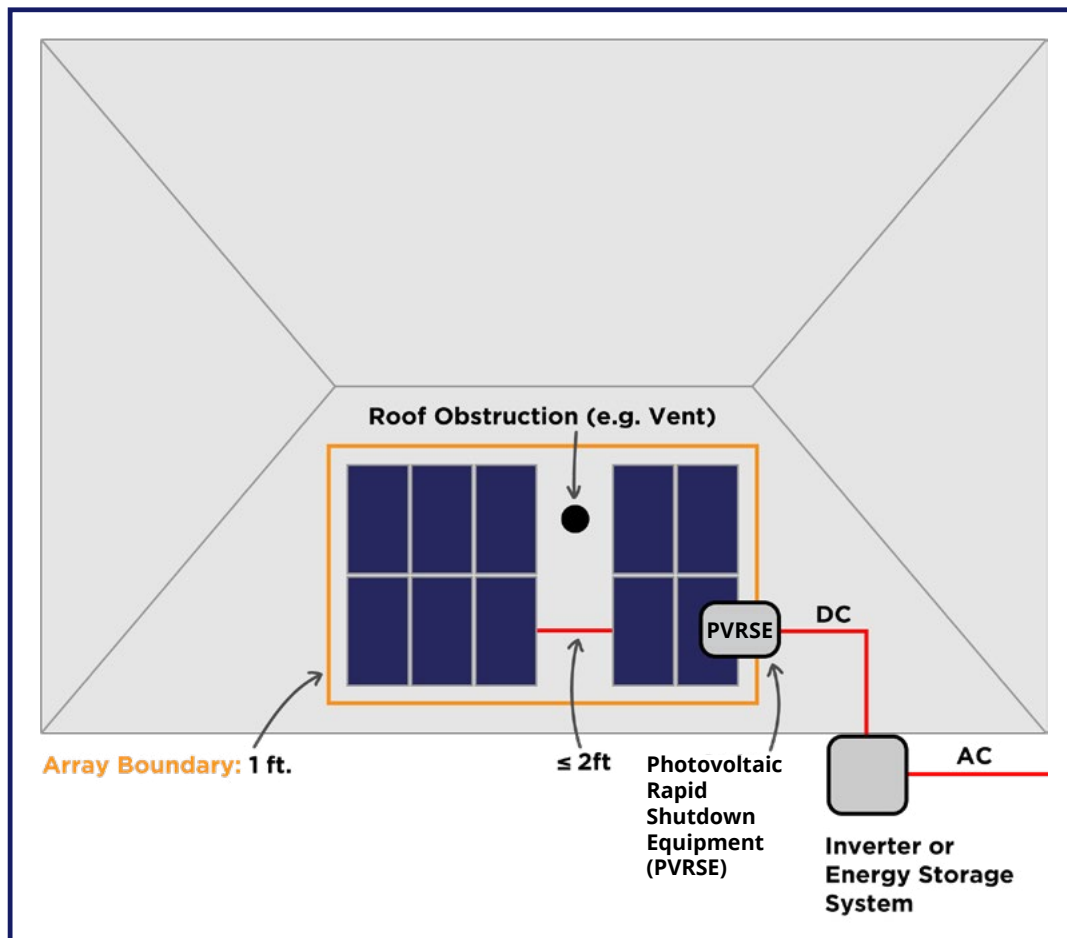
Single arrays require the use of a PVRSE as shown in the figure above to control the conductors outside of the array boundary.

**IMPORTANT:** Review electrical equipment page(s) for specific approved PVRSE(s) and install methods.

**UL 3741 LISTED SYSTEM:****CASE 2 CONTIGUOUS SUB-ARRAY**

Sub-array(s) within the same array boundary ( $\leq 2$ ft) are considered contiguous and comply with NEC 690.12(B)(2)(1)

- **Outside Array Boundary:**  $\leq 30$ V within 30 Seconds
- **Inside Array Boundary:**  $\leq 600$ V Residential, 1000V Commercial

**Case 2: Maintaining NEC Compliance with sub-array(s) within array boundary.**

Multiple arrays with maximum 2 ft. spacing between array and sub-array result in a contiguous single array boundary and will require the use of a PVRSE as shown above to control conductors outside of the array boundary.

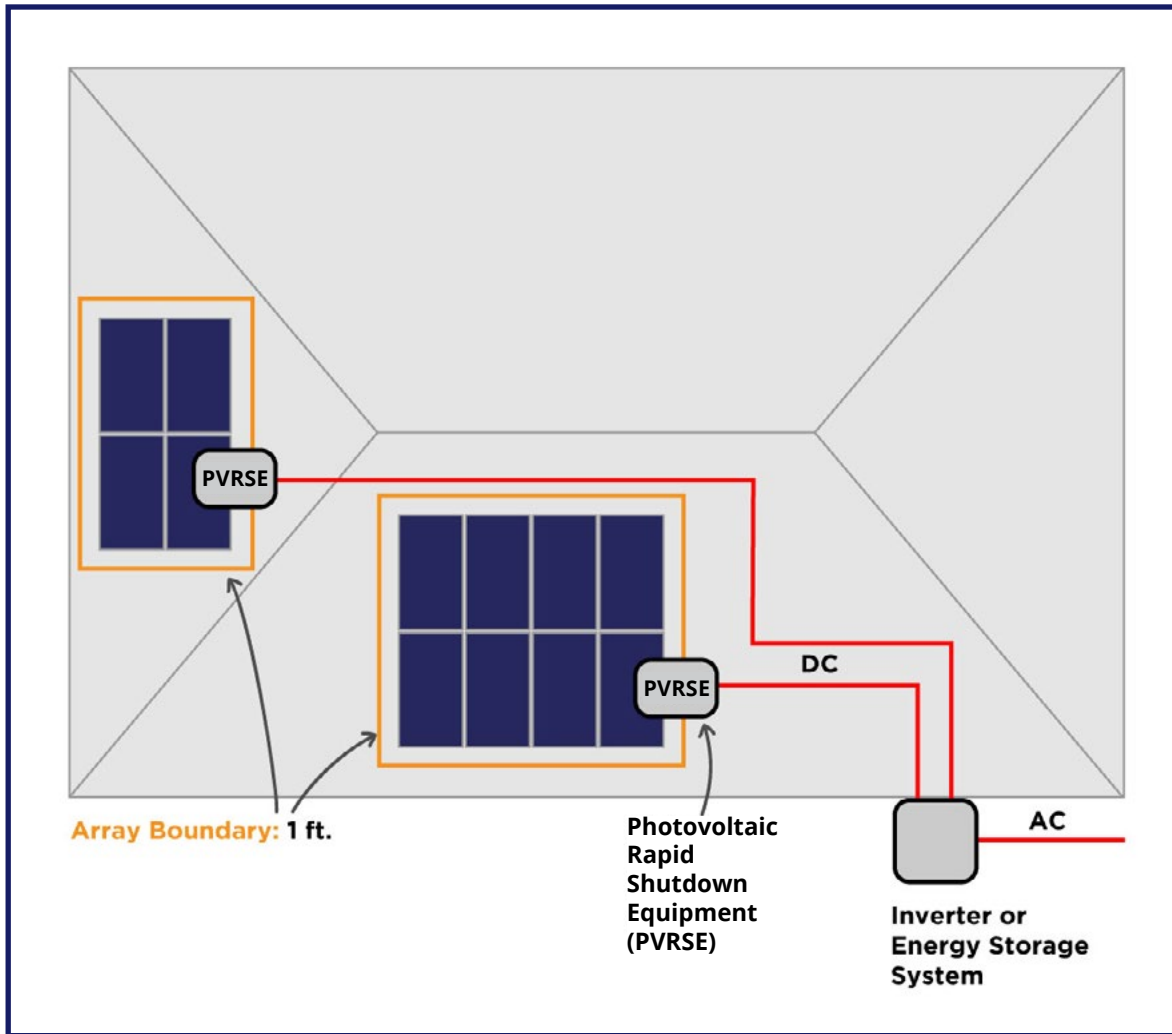
**IMPORTANT:** Review electrical equipment page(s) for specific approved PVRSE(s) and install methods.

### UL 3741 LISTED SYSTEM:

# CASE 3 MULTIPLE ARRAYS

Multiple arrays with multiple strings comply with NEC 690.12(B)(2)(1)

- **Outside Array Boundary:** ≤ 30V within 30 Seconds
- **Inside Array Boundary:** ≤ 600V Residential, 1000V Commercial



### Case 3: Maintaining NEC Compliance with multiple arrays.

In multiple arrays with multiple strings, each string will require a PVRSE. When a string is split across non-contiguous (>2ft) sub-arrays, a PVRSE must be installed on both ends of the connection between sub-arrays as shown

**IMPORTANT:** Review electrical equipment page(s) for specific approved PVRSE(s) and install methods.

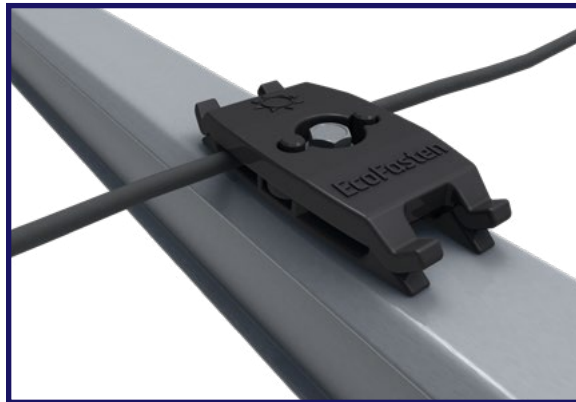
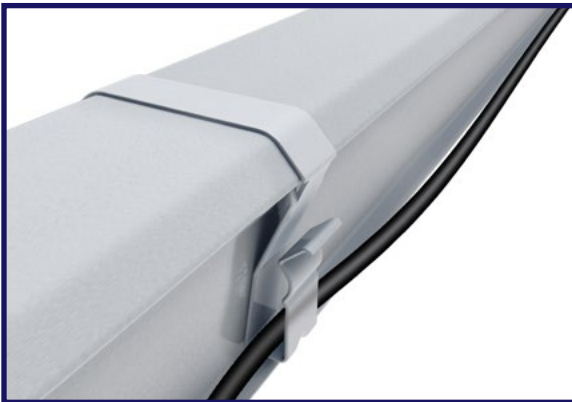
### UL 3741 LISTED SYSTEM:

## WIRE MANAGEMENT GUIDELINES

The Clickfit wire management components noted in the list of approved PVHCS equipment on page 2 were evaluated and approved for providing wire positioning to prevent potential Fire Fighter (FF) interactions.

Proper wire management is critical for UL 3741 compliance and requires that all wires be routed in a manner that prevents exposure to potential FF interactions, such as routing wires under modules or through approved listed raceway for wires running between arrays.

When running PV wires parallel to the CF Rail, use the Clickfit Wire Management Clip as shown below. When running wire perpendicular to the rail, use the Clickfit Wire Management Clamp as shown below.



***UL 3741 LISTED SYSTEM:*****WIRE MANAGEMENT GUIDELINES**

When running wires under a module, attach the approved wire clips to the frame flange and secure wires to the wire management clips, as shown below. All wires must remain underneath the module after installation. There shall be no visibly exposed wires after installation of modules.

Any wires running to subarrays or other components that cannot be covered by a module shall be installed in approved electrical raceways such as the Listed Conduit types shown on page 2.



## UL 3741 APPROVED MODULE LIST

The ClickFit System has been tested and evaluated to UL 3741 and UL 2703. See approved modules below.

Unless otherwise noted, “xxx” refers to the module power rating and both black and silver frames are included in the certification.

| MANUFACTURER         | LIST OF UL 3741 APPROVED PV MODULES  |
|----------------------|--|
| <b>Adani</b>         | Adani modules with 30 or 40 mm frames<br>ASB-Y-ZZZ-AAA<br>where “S” can be blank or S; “Y” can be 7 or G12R; “ZZZ” can be blank or 132; and “AAA” is the power rating  |
| <b>Aionrise</b>      | AIONRISE modules with 35 and 40 mm frames<br>AIONyyG1-xxx<br>Where “yy” can be 60 or 72  |
| <b>Aptos Solar</b>   | Aptos modules with 35 and 40 mm frames<br>DNA-yy-zzaa-xxx<br>Where “yy” can be 108, 120 or 144; “zz” can be BF, BFN, MF or MFN; and “aa” can be 10 or 26   |
| <b>Auxin</b>         | Auxin modules with 35 and 40 mm frames<br>AXNCMzAxxxB<br>Where “C” can be 6, 10 or G1; “z” can be blank, 610 or 612; and “A” can be blank or M; and “B” can be blank, A, B, C or W   |
| <b>Axitec</b>        | Axitec Modules with 30 and 35 mm frames<br>AC-xxxY/ZZb<br>Where “Y” can be MH, MBT or TGB; “ZZ” can be 108, 120, or 144; “b” can be BB, TS, US, V or VB  |
| <b>Bluesun Solar</b> | Bluesun modules with 35 mm frames<br>BSMxxxY-AAA<br>Where “Y” can be M or M10; and “AAA” can be 54HPH or 60HPH   |
| <b>Boviet</b>        | Boviet modules with 33 or 35 mm frames<br>BVMZZyyM-xxxAAA<br>Where “ZZ” can be 66, 76 or 86; “yy” can be 10, 11 or 12; and “AAA” can be H, H-HC, H-HC-BF, L-H-HC-BF, L-H-BF, L-H and L-H-HC, R-H-HC-BF, S-H-HC-BF and S-H-HC |
| <b>BYD</b>           | BYD modules with 35 mm frames<br>BYDxxxMLTK-36   |



| MANUFACTURER            | LIST OF UL 3741 APPROVED PV MODULES   |
|-------------------------|---|
| <b>Canadian Solar</b>   | Canadian Solar modules with 30, 35 and 40 mm frames<br>CSbY-xxxZ<br>Where "b" can be 1, 3, 6, 6.1 or 6.2; "Y" can be L, N, R, U, W, Y, -48TM, -54TM or -66TM; and "Z" can be blank, H, M,MS, MS-HL or T |
| <b>CertainTeed</b>      | CertainTeed modules with 30, 35 and 40 mm frames<br>CTBBxxxHCyy-AA<br>Where "BB" can be blank, M10 or TC; "yy" can be 11 or 12, and "AA" can be 06, 08 or 09  |
| <b>Crossroads Solar</b> | Crossroads Solar modules with 40 mm frames<br>Crossroads Solar xxx  |
| <b>CSUN</b>             | CSUN modules with 40 mm frames<br>CSUNxxx-72MM5BB   |
| <b>Dehui</b>            | Dehui modules with 35 mm frames<br>DH-MYYYY-xxx<br>Where "YYY" can be 760, 772, 860, or 872; and "Z" can be B or W  |
| <b>Emmvee</b>           | Emmvee modules with 35 mm frames<br>Exxx-YYZZZ-A<br>Where "YY" can be M, P, HCM, HCMW, HCBG, HCBT; "ZZZ" can be 72, 108, 120, 132 or 144; and "A" can be blank, B, T, or BT                             |
| <b>ET Solar</b>         | ET Solar modules with 35 and 40 mm frames<br>ET-MZZZxxxAA<br>Where "ZZZ" can be 660BH, 672, 672BH, 754BH, 766BH, 772BH; and "AA" can be TB, TW, WB or WW  |
| <b>Freedom Forever</b>  | Freedom Forever modules with 35 mm frames<br>FF-MPa-BBB-xxx<br>Where "a" can be blank or 1  |
| <b>Freevolt</b>         | Freevolt modules with 35 mm frames<br>ECP-PVGRAF-144HC-xxx  |
| <b>GCL</b>              | GCL modules with 35 mm frames<br>GCL-M3/72DH  |
| <b>GreenWatts Solar</b> | GreenWatts modules with 30 and 35mm frames<br>HSYY-A-xxx-ZZ<br>Where "YY" can be 54, 60, 66, 72 or 78; "A" can be blank or F; and "ZZ" can be MN or BOB   |
| <b>Goldi</b>            | Goldi modules with 35 mm frames<br>GS10-Byyy-zz-xxx<br>Where "yyy" can be 108 or 144; and "zz" can be GF or TF  |



| MANUFACTURER        | LIST OF UL 3741 APPROVED PV MODULES  |
|---------------------|--|
| <b>Grape Solar</b>  | Grape modules with 35 mm frames<br>GS-M120-xxx-FAB1  |
| <b>Hansol</b>       | Hansol modules with 35 and 40 mm frames<br>HSxxxYY-HH2<br>Where "YY" can be UB or UD   |
| <b>Heliene</b>      | Heliene modules with 35 and 40 mm frames<br>YYZZxxxA<br>Where "YY" can be 96, 108, 120, 132, 144 or 156; "ZZ" can be HC or M; and "A" can be blank, Bifacial, M10-SL, M10 TPC SL, M10-SL-BLK, M10 Bifacial, M10 SL-Bifacial, M10 NTYP SL or M10 NTYP SL Bifacial |
| <b>HT-SAAE</b>      | HT-SAAE modules with 35 mm frames<br>HTyy-aaaZ-xxx<br>Where "yy" can be 60, 66, 72 or 78, "aaa" can be 18 or 166; and "Z" can be M or X  |
| <b>Hyundai</b>      | Hyundai modules with 32, 35 and 40 mm frames<br>HiY-SxxxZZ<br>Where "Y" can be A or S; "S" can be M or S; and "ZZ" can be HG, OJ, PI, TI, YH(BK) or XG(BK)   |
| <b>Jakson Solar</b> | Jakson Solar modules with 35mm frames<br>JH-xxxYY<br>Where "YY" can be BB or BT  |
| <b>JA Solar</b>     | JA Solar modules with 30, 35 and 40 mm frames<br>JAMzzbb-xxx/MR<br>Where "zz" can be 54, 66, 72 or 78; "bb" can be S10, S20, S30 or S31  |
| <b>Jinko</b>        | Jinko modules with 35 and 40 mm frames<br>JKMxxxZ-aa<br>Where "Z" can be M or N; "aa" can be 54HL4-B, 6RL3-B, 6TL3-B, 72HBL-V, 72HL4-V, 72HL4-TV, 7RL3-V or 7RL3-TV  |
| <b>KB Solar</b>     | KB Solar modules with 35 mm frames<br>KBS-xxx-Mono-YY<br>Where "YY" can be blank or BF   |
| <b>LA Solar</b>     | LA Solar modules with 35 mm frames<br>LSxxxYY<br>Where "YY" can be BF, BL, BLA, HC or ST   |
| <b>LG</b>           | LG modules with 35 and 40 mm frames<br>LGxxxYaZ-bb<br>Where "Y" can be A, M, N or Q; "a" can be A, 1, 2 or 3 "Z" can be C, K, T, or W; and "bb" can be A6, B6, E6, E6.AW5, L5, N5, V6  |



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| <b>Longi</b>                  | Longi modules with 30 and 35 mm frames<br>LRa-YYZZ-xxxM<br>Where "a" can be 4 or 5; "YY" can be 54, 60, 66, or 72; and "ZZ" can be HPB or HPH   |
| <b>Magnus Green Solar</b>     | Magnus Green Solar modules with 35 mm frames<br>MGS-xxxW-yyy-M10<br>Where "yyy" can be M54H, M60H or M72H   |
| <b>Maxeon</b>                 | Maxeon modules with 35, 40 and 46 mm frames<br>SPR-AAAY-xxx-zzz<br>Where "AAA" can be X or MAX; "Y" can be 3, 5, 6, 7, 21 or 22; and "zzz" can be blank, R, BLK, BLK-R or COM   |
| <b>Meyer Burger</b>           | Meyer Burger Modules with 35 mm frames<br>Meyer Burger Black or White   |
| <b>Mission Solar (mSolar)</b> | Mission Solar modules with 30, 35 and 40 mm frames<br>YYYbb-xxxZZaa<br>Where "YYY" can be MSE, MSI, MSN, MSX, TXI or TXS; "bb" can be blank, 6 or 10; "ZZ" can be blank, HN, HT, SQ, SX, 108, 120 or 144; and "aa" can be blank, 0B, 2B, BB, BW, 4G, 4T, 5K, 5R, 5T, 6J, 6S, 6W, 6Z, 9R, 9S or 9Z |
| <b>Mitrex</b>                 | Mitrex modules with 30 and 40 mm frames<br>Mxxx-XYZ<br>Where "X" can be A, B, I or L; "Y" can be 1 or 3; and "Z" can be F or H  |
| <b>Navitas</b>                | Navitas Modules with 35 mm frames<br>NSMxxx-yyy<br>Where "yyy" can be 120, 132 or 144   |
| <b>NE Solar</b>               | NE Solar modules with 30 and 35 mm frames<br>NESExxx-zzMH-yy<br>Where "zz" can be 54, 60 or 72; and "yy" can be M6 or M10   |
| <b>Neo Solar Power</b>        | NE Solar modules with 35 mm frames<br>D6MxxxE4A   |
| <b>Panasonic (EverVolt)</b>   | Panasonic modules with 30 mm frames<br>EVPVxxxA<br>Where "A" can be blank or H, K, HK, HK2 or PK  |
| <b>Philadelphia Solar</b>     | Philadelphia modules with 30, 35 and 40 mm frames<br>PS-YzzAA-xxxW<br>Where "Y" can be M, MNB, or P; "zz" can be 60, 72, 108, 132, 144 or 156; "AA" can be blank, (BF), (HC) or (HCBF); and "W" can be blank or W   |



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| <b>Phono Solar</b>  | Phono Solar modules with 30, 35 and 40 mm frames<br>PSxxxY-ZZ/A<br>Where "Y" can be M, M1, MH, M4, M4H, M6, M6H, M8, or M8H; "ZZ" can be 18, 20 or 24; and "A" can be TH, THB, UH, UHB or VHB   |
| <b>Prism Solar</b>  | Prism Solar modules with 35 mm frames<br>PST-xxxW-M72Y<br>Where "Y" can be H, HB or HBI   |
| <b>Q CELLS</b>      | Q CELLS Modules with 30, 32, 35, 40 mm frames<br>Q.YY-ZZ-xxx<br>where "YY" can be PEAK DUO or Tron; and "ZZ" can be M-G2+, BLK M-G2+, BLK M-G2.H+, BLK M-G2+/AC, BLK M-G2.H1+/AC, L-G7.3, BLK-G6+/HL, BLK-G10, BLK-G10+, BLK G10+/AC, BLK-G10+/HL, ML-G10, BLK ML-G10, ML-G10+, BLK ML-G10+, ML-G10.a, BLK ML-G10.a, ML-G10.a+, BLK ML-G10.a+, BLK ML-G10.B+, BLK ML-G10.C+, BLK ML-G10 +/t, BLK ML-G10+/TS, XL-G10.2, XL-G10.3, XL-G10.c, XL-G10.d, XL-G11.2 or XL-G11.3 |
| <b>Rayzon Solar</b> | Rayzon Solar modules with 35 and 40 mm frames<br>RSYxxxWC<br>Where "Y" can be blank or B  |
| <b>REC Solar</b>    | REC modules with 30 and 38 mm frames<br>RECxxxYYZZ<br>Where "YY" can be AA, NP2, NP3, TP3M or TP4; and "ZZ" can be blank, 72, Black, Pure, Pure-R, Pure-RX or Pure 2  |
| <b>Renogy</b>       | Renogy Modules with 35 and 40 mm frames<br>RYY-xxxD-AAA<br>Where "YY" can be NG or SP; "AAA" can be blank, 144, BB-108, BB-120 or BK-120  |
| <b>Saatvik</b>      | Saatvik Modules with 35 mm frames<br>SGExxx-YYYZZZ<br>Where "YYY" can be 108 or 144; and "ZZZ" can be MHC, MBHC or MHCB   |
| <b>S-Energy</b>     | S-Energy modules with 35 and 40 mm frames<br>SABB-CCYYY-xxxV<br>Where "A" can be C, L or N; "BB" can be 20, 40 or 45; "CC" can be blank, 60 or 72; "YYY" can be blank MAE, MAI, MBE, MBI, MCE or MCI  |
| <b>SEG Solar</b>    | SEG Solar with 35 mm frames<br>SEG-xxxZZ-AA<br>Where "ZZ" can be BMA, BMB, BMD; and "AA" can be HV or TB  |



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| <b>Seraphim USA</b>     | Seraphim modules with 35 mm frames<br>SRP-xxx-YYY-HV<br>Where "YYY" can be BMA or BMD  |
| <b>Shinsung E&amp;G</b> | Shinsung Modules with 35 mm frames<br>SSVxxx-144MH   |
| <b>Silfab</b>           | Silfab Modules with 35 and 38 mm frames<br>SIL-xxxYY<br>YY" can be BG, BK, BL, HC, HC+, HL, HM, HN, NL, NU, NX, QD, QM, XL, XM or XM+  |
| <b>Sinotec</b>          | Sinotec Modules with 30 and 35 mm frames<br>STS-xxxP-aabb<br>Where "aa" can be 54 or 72; and "bb" can be BB, DB or DD  |
| <b>Sirius PV</b>        | Sirius PV Modules with 35 mm frames<br>ELNSMzzM-HC-yy-xxx<br>Where "zz" can be 54 or 72; and "yy" can be blank or BF   |
| <b>Solar4America</b>    | Solar4America modules with 30, 35 and 40 mm frames<br>S4Axxx-YYzzAA<br>Where "YY" can be 60, 72, 108 or 144; "zz" can be MH5, MH10, TH10 or TH16; and "AA" can be blank or BB, BW, SW or STT |
| <b>Solarever</b>        | Solarever modules with 30, 35 mm frames<br>SE-zzz*yy-xxxM-aaa<br>Where "zzz" can be 166 or 182; "yy" can be 83, 91 or 105; and "aaa" can be 96-BD, 108, 120-BH, 144 or 144N                  |
| <b>Solaria</b>          | Solaria modules with 35 mm frames<br>PowerA-xxxY-ZZ<br>Where "A" can be X or XT, "Y" can be R; and "ZZ" can be PL or 4T  |
| <b>SolarSpace</b>       | SolarSpace modules with 30 mm frames<br>SS8-54HSB-xxxM   |
| <b>SolarTech</b>        | SolarTech modules with 40 mm frames<br>AAA-xxx<br>Where "AAA" can be PERCB-B, PERCB-W, HJT B-B, HJT B-W  |
| <b>Sonali</b>           | Sonali Modules with 35 and 40 mm frames<br>SS-M-xxx-yyy<br>Where "M" can be blank or M; and "yyy" can be blank, 108M-B or W-M60H M10   |



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| <b>Star Solar</b>   | Star Solar modules with 35 mm frames<br>Star-xxxW-YYY-ZZZ<br>Where "YYY" can be M60H or M60HB; and "ZZZ" can be blank or M10  |
| <b>Sungold</b>      | Sungold Modules with 35 mm frames<br>SG-xxxWM   |
| <b>Sunket</b>       | Sunket modules with 35 mm frames<br>SKTxxxM10-144S1   |
| <b>Sunmac Solar</b> | Sunmac modules with 30 and 35 mm frames<br>SMxxxMaaaZZ-YY<br>Where "aaa" can be 660, 754 or 772; "ZZ" can be NH or SH; and "YY" can be BB or TB                       |
| <b>Sunpower</b>     | Sunpower standard (G3 or G4) or InvisiMount (G5) 35, 40 or 46 mm frames<br>SPR-Z-xxx-YY<br>Where "Z" can be A, M or P19; "YY" can be COM, BLK-G-AC, H-AC or BLK-H-AC  |
| <b>Sunspark</b>     | Sunspark modules with 40 mm frames<br>SST-xxxZ-A<br>Where "Z" can be M3 or M3B; and "A" can be 60 or 72   |
| <b>Suntech</b>      | Suntech Modules with 35 and 40 mm frames<br>STPxxxS-zz/aa<br>Where "zz" can be 24, A60, A72U, B60 or B72; and "aa" can be Vfh, Vfw, Vnh, Wfhh or Wnhb                 |
| <b>Talesun</b>      | Talesun modules with 30, 35 and 40 mm frames<br>TPByZZaa-xxx<br>Where "B" can be 6 or 7; "y" can be blank, F, G or L; "ZZ" can be 54, 60 or 72; "aa" can be M or M(H) |
| <b>Tesla</b>        | Tesla modules with 40 mm frames<br>TxxxY<br>Where "Y" can be H or S   |
| <b>Thornova</b>     | Thornova Modules with 30 and 35 mm frames<br>TS-YYZZ(XXX)-X<br>Where "YY" can be BB, BBT or BWT; "ZZ" can be 54, 60 or 72; and "X" can be blank, G11 or X             |
| <b>Topco Solar</b>  | Topco Solar modules with 30mm frames<br>TPM7-SH108-xxx/M  |



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| <b>Trina</b>     | Trina Modules with 30 and 35 mm frames<br>TSM-xxxYYZZ<br>Where "YY" can be DE15V, DE18M, DE09, DE19, DE06X, NE09RC, NE09RH.05 or NE19RC ; and "ZZ" can be blank, .05, .05(II), C.05, C.05(II), C.07, C.07(II), (II), .08(II), 19 |
| <b>Universal</b> | Universal Solar Modules with 35 mm frames<br>UNI-xxx-yyyZZZ-aa<br>Where "yyy" can be 108, 120 or 144; "ZZZ" can be M, MH, BMH; and "aa" can be blank or BB   |
| <b>URE</b>       | URE modules with 35 mm frames<br>DyZxxxxaa<br>Where "D" can be D or F, "y" can be A, B or 6; "Z" can be F, K or M; and "aa" can be C8G, DFG-BB, H4A, E7G-BB, E8G, E8G-BB, MFG, MFG-BB or M7G-BB                                  |
| <b>Vikram</b>    | Vikram solar modules with 35 mm frames<br>XVSyy.ZZ.AAA.05<br>Where "X" can be Prexos or Somera; "yy" can be MDHT, MH or MHBB; "ZZ" can be 54, 60 or 72; "AAA" is the module power rating   |
| <b>Waaree</b>    | Waaree modules with 35 mm frames<br>XXYYxxx<br>Where "XX" can be Bi or WS; and "YY" can be MDI, MDIB, 33 or 57   |
| <b>VSUN</b>      | VSUN modules with 30, 35 and 40 mm frames<br>VSUNxxxA-YYz-aa<br>Where "A" can be blank or N; "YY" can be 60, 72, 108, 120, 132, 144; "z" can be M, MH or BMH; and "aa" can be blank, BB, BW, or DG"                              |
| <b>Yingli</b>    | Yingli modules with 30 and 35 mm frames<br>YLxxxD-yy<br>Where "yy" can be 34d, 37e 1/2, 37e 1500V 1/2, 40d, 49e 1/2 or 49e 1500V 1/2   |
| <b>Zeus</b>      | Zeus Solar Modules with 40 mm frames<br>ZxxxM-HB   |
| <b>ZN Shine</b>  | ZN Shine modules with 30 and 35 mm frames<br>ZXMY-AAA-xxx/M<br>Where "Y" can be 6, 7 or 8; "AAA" can be 72, NH120, NH144, NHDB144, SH108, SH144, SHDB120, SHDB144 or TP120   |

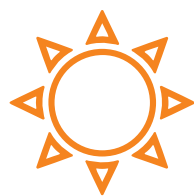
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UL 3741 ADDENDUM GUIDE

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