UL3741

Hazard Control
Installation Addendum

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INSTALLER'S RESPONSIBILITY

IT IS THE INSTALLERS 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. 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 SunModo parts or parts recommended by SunModo; 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, retighten immediately. Any components showing signs of corrosion or damage that compromise safety shall be replaced immediately. A professional routine inspection is recommended every two years.
- 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.
- It is recommended that anti-seize compound be applied to the screw threads.
- All Photovoltaic Rapid Shutdown Equipment (PVRSE) components must be installed and maintained by qualified personnel in accordance with applicable electrical codes and instructions in the PVRSE Installation Manual.
- **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.

RATINGS

CONFORMS TO ANSI/CAN/UL STD 3741 STANDARD FOR SAFETY PHOTOVOLTAIC HAZARD CONTROL SYSTEM

- Max PVHCS System Voltage: 1000V

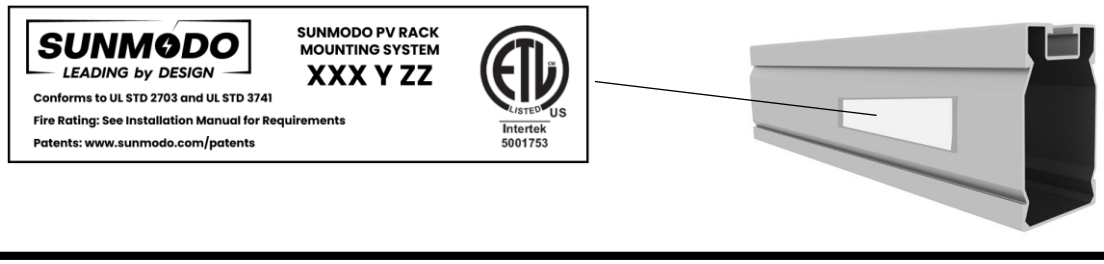
UL 2703 LISTED
UL 3741 LISTED

Intertek
5001753

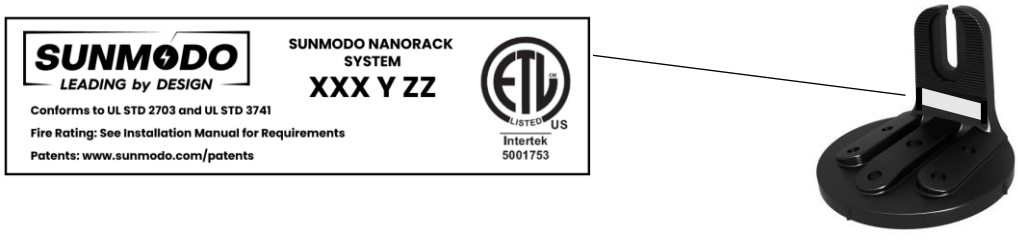
MARKINGS

Date Code: Letters "XXX Y ZZ" are defined as follows:

- **XXX** shall be used to identify the Manufacturer.
- **Y** shall be used to identify the Quarter of the year manufactured, i.e., 1, 2, 3, 4.
- **ZZ** shall be the last 2 digits of the Year manufactured, i.e., 25, 26, 27.



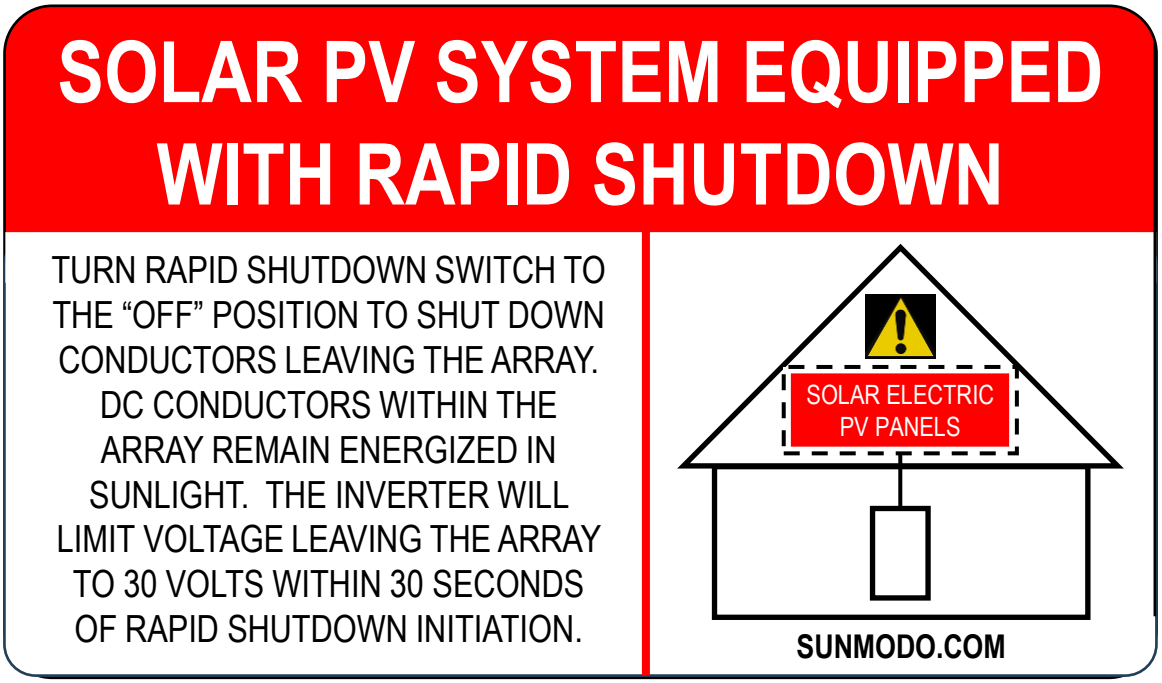
When requested the UL 2703 Label can be located on the Rail.



When requested the UL 2703 Label can be located on the NanoPlus

MARKINGS CONTINUED

Verify all rapid shutdown switches are marked with a label indicating the function of the rapid shutdown switch. Attach one label at or near each rapid shutdown switch.



Solar PV System Equipped With Rapid Shutdown labels are available at sunmodo.com.

APPROVED ELECTRICAL EQUIPMENT RACKING

List of approved PV Hazard Control Equipment or Components evaluated at 1000V Max System Voltage:

- All Modules listed in SunModo's Racking Manual's List of Compliant PV Modules section.

SunModo Racking Products

- SunModo PV Rack Mounting System
- NanoRack PV Mounting System

Wire Management

- PV Connectors (UL 6703 Listed) shall be compatible and approved for the application
- PV Wire (UL 4703 Listed)
- HellermannTyton Edge Clips and Cable Ties (UL 62275 Listed)
    - T50REC5B-PA66HS • T50REC5A-PA66HS • T50R0HSUVM4
- RayTray v2 Solar Wire Management System (UL 870 Listed)
- Liquid-Tight Flexible Nonmetallic Conduit (UL 1660 Listed)
- Listed Conduit (UL Listing Required - all sizes apply)
    - Schedule 40/80 Rigid PVC Conduit (UL 651 Listed)
    - Non-metallic Listed Tubing, Fittings

Approved Electrical Equipment Inverters

Approved Electrical Equipment [UL 1741 Listed]

Canadian Solar Inverters • CSI-75K-T480GL03-U • CSI-80K-T480GL03-U • CSI-90K-T480GL03-U • CSI-100K-T480GL03-U • CSI-66K-T480GL01-UB • CSI-60K-T480GL01-UB • CSI-50K-T480GL01-UB • CSI-40K-T480GL01-UB • CSI-36K-T480GL01-UB • CSI-30K-T480GL01-UB • CSI-25K-T480GL01-UB • CSI-60KTL-GS-B • CSI-40KTL-GS-FLB • CSI-30KTL-GS-FLB

Chint Inverters • CPS SCA25KTL-DO/US-208 • CPS SCA25KTL-DO-R/US-480 • CPS SCA36KTL- DO/US-480 • CPS SCA50KTL-DO/US-480 • CPS SCA60KTL-DO/US-480

Fronius Inverters • Symo Advanced 10.0-3 208-240/Lite • Fronius Symo Advanced 12.0-3 208-240/Lite • Fronius Symo Advanced 15.0-3 480/Lite • Fronius Symo Advanced 20.0-3 480/Lite • Fronius Symo Advanced 22.7-3 480/Lite • Fronius Symo Advanced 24.0-3 480/Lite

GoodWe • GW50K-SMT-US • GW60K-SMT-US • GW6000A-MS • GW7600A-MS • GW8600A-MS • GW9600A-MS

SolarEdge Inverters • SE43.2KUS • SE50KUS • SE66.6KUS • SE80KUS • SE85KUS • SE90KUS • SE100KUS • SE110KUS • SE120KUS • SE3000H-US • SE3800H-US • SE5000H-US • SE5700H-US • SE6000H-US • SE7600H-US • SE9600H-US • SE10000H-US • SE11400H-US

Solectria Inverters • Solectria Renewables PVI25TL-208 • Solectria Renewables PVI25TL-480-R • Solectria Renewables PVI-36TL-480-V2 • Solectria Renewables PVI50TL-480 • Solectria Renewables PVI60TL-480

Solis • S5-GC75K-US • S5-GC80K-US • S5-GC90K-US • S5-GC100K-US • Solis-75K-5G-US • Solis-80K-5G-US • Solis-90K-5G-US • Solis-100K-5G-US • Solis-25K-US (followed by -US-SW, -US-F- SW or -US-LSW) • Solis-30K-US (followed by -US-SW, -US-F-SW or -US-LSW) • Solis-36K-US (followed by -US-SW, -US-F-SW or -US-LSW) • Solis-36K-US (followed by -US-SW, -US-F-SW or -US-LSW) • Solis-50K-US (followed by -US-SW, -US-F-SW, -US-F-LSW or -US-LSW) • Solis-60K-US (followed by -US-F-SW, or -US-F-LSW) • Solis-66K-US (followed by -US-F-SW, or -US-F-LSW)

Sungrow Inverters • SG36CX-US • SG60CX-US

Tesla • 1538000 • 1534000

Approved Electrical Equipment Microinverters

Approved Module-Level Power Electronics (MLPE) Devices [UL 1741 Listed]

APsystems • QT2-208 • QT2-480 • DS3 • DS3-L • DS3-S

Chilicon Power • CP-250E-60/72-208/240-MC4

Enphase Energy • IQ7
Models IQ7-60, IQ7PLUS-72, IQ7X-96, IQ7XS-96, may be f/b -2, -5, -E, or -ACM, f/b -US, may be f/b - NM, may be f/b -RMA&. Models IQ7A, may be f/b S, may be f/b -66 or -72, may be f/b -2, -5, -E, or -ACM, f/b -US, may be f/b - NM, may be f/b -RMA&. Models IQ7PD-72-2-US& and IQ7PD-84-2-US&. Where "&" designates additional characters not affecting safety

Enphase Energy • IQ8
Models IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72, may be f/b -2, -5, -E, or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters.

NEP Northern Electric • BDM 550 • BDM 650 • BDM-800-208A • BDM-800-240A

Approved Electrical Equipment Optimizers

Approved Optimizer Devices [UL 1741 Listed]

SolarEdge Optimizers • P340 • P370 • P375 • P395 • P400 • P401 • P404 • P405 • P485 • P500 • P505 • P601 • P700 • P801 • P850 • P860 • P950 • P960 • P1100 • P1101 • S440 • S500 • S500B • S650B • S1000 • S1200 • S1400

Approved Electrical Equipment SIDs

Approved String Isolation Devices (SID) [UL 1741 Listed]

APsmart • RSD-D • RSD-S-PLC

Midnite Solar • MNSSR-600S-SS

Tigo Energy • TS4-A-2F • TS4-A-F • TS4-A-O • TS4-A-S

Note 1: All PVRSE (Photovoltaic Rapid Shutdown Equipment) components must be installed and maintained by qualified personnel in accordance with applicable electrical codes and instructions in the TS4-A with CCA and TAP Installation Manual.

Note 2: The TS4-A-O/S requires a Tigo Access Point (TAP) and Cloud Connect Advanced (CCA) data logger/gateway to function as a PVRSS (Photovoltaic Rapid Shutdown System).

Tesla • MCI-1

Subarray Combiner / Rapid Shutdown Disconnects

Approved Rapid Shutdown Disconnects (RSD) [UL 1741 Listed]

Eaton • DH361UGK • DH361NRK

Square D/Schneider • HU361RB • HU362RB

INTRODUCTION: UNDERSTANDING UL3741 AND NEC 690.12

2020 NEC 690.12(B)(2) Controlling Conductors within the array boundary

The SunModo Racking 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 SunModo Product 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 NEC 690.12 Background

2020 NEC 690.12 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: ≤30V within 30 seconds
2. Inside Array Boundary:
    1. Listed PV Hazard Control System (UL 3741)
    2. ≤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.

E. 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. This indicates the SunModo Racking and collocated inverters are part of the array.
- NEC 690.12(B) defines the array boundary as 1ft from array in all directions. This indicates that the array boundary can extend 1ft from the edge of the SunModo Racking, inverter, or module.

INSTALLATION METHODS PER UL3741 AND NEC 690.12 | COMMERCIAL

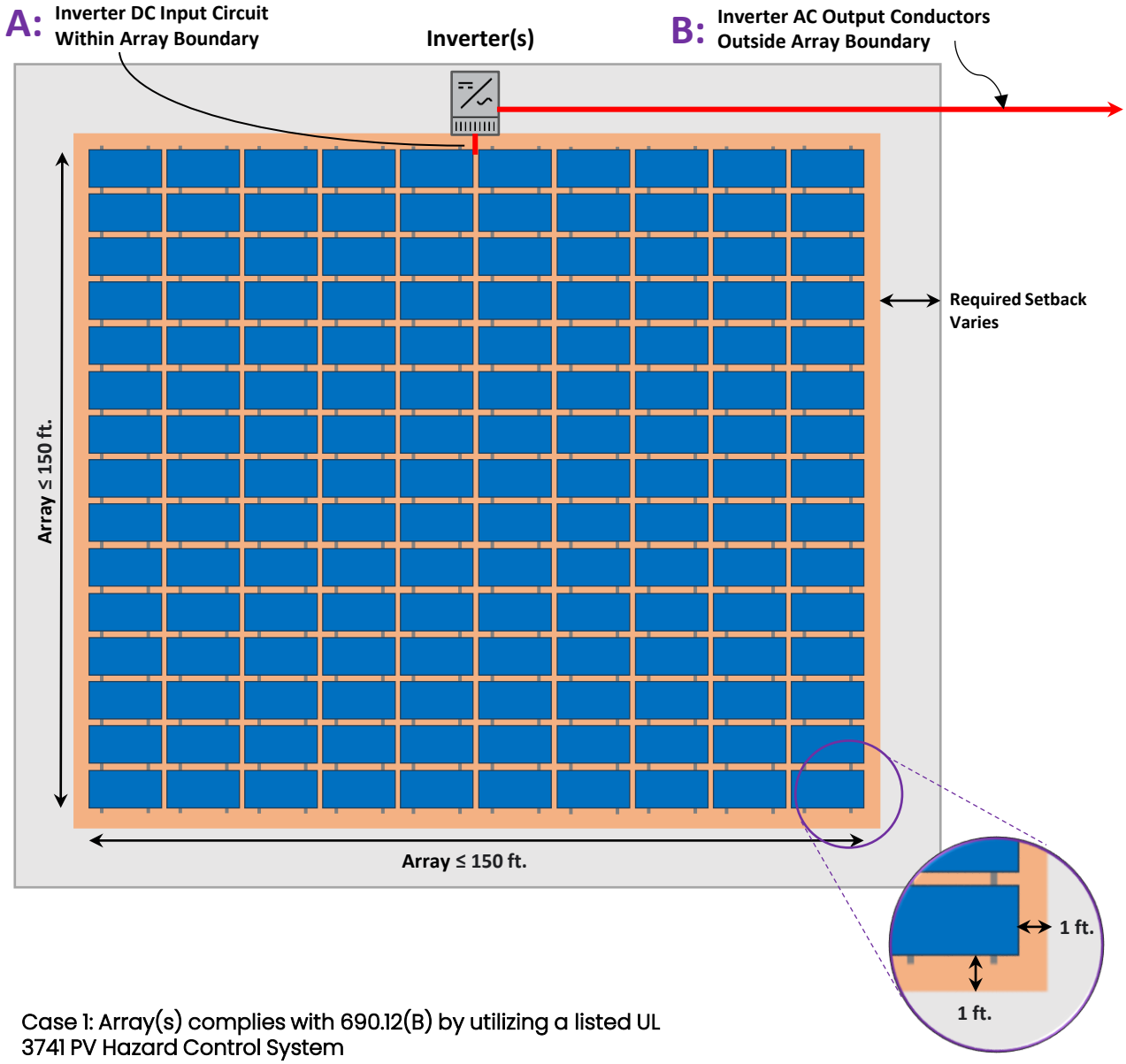
The following case studies are provided by SunModo to show examples of installation configurations that comply with NEC 690.12(B), compliance is not limited to these examples.

Case 1: UL 3741 Listed System – See page 10
Case 2: UL 3741 Listed System with Contiguous Sub-Array – See page 11
Case 3: UL 3741 Listed System with Non-Contiguous Sub-Array – See page 12
Case 4: UL 3741 Listed System with MLPE Sub-Array – See page 13

The simplest installation method to comply with NEC690.12(B) is to utilize the SunModo Racking UL 3741 system with a contiguous array with one or more collocated inverters, as all inverter DC input circuits are within the 1ft array boundary (Case 1). Installations where sub-arrays are required and cannot be included within the 1ft array boundary can comply by using a single or combining one or more of the three options below (Cases 2-4). Case studies and NEC guidance have not been verified by Intertek.

COMMERCIAL CASE 1: UL3741 LISTED SYSTEM

Case 1: Array(s) comply with NEC 690.12(B)(2)(1)
- Outside Array Boundary: ≤ 30V within 30 Seconds
- Inside Array Boundary: ≤ 1000V



Case 1: Array(s) complies with 690.12(B) by utilizing a listed UL 3741 PV Hazard Control System

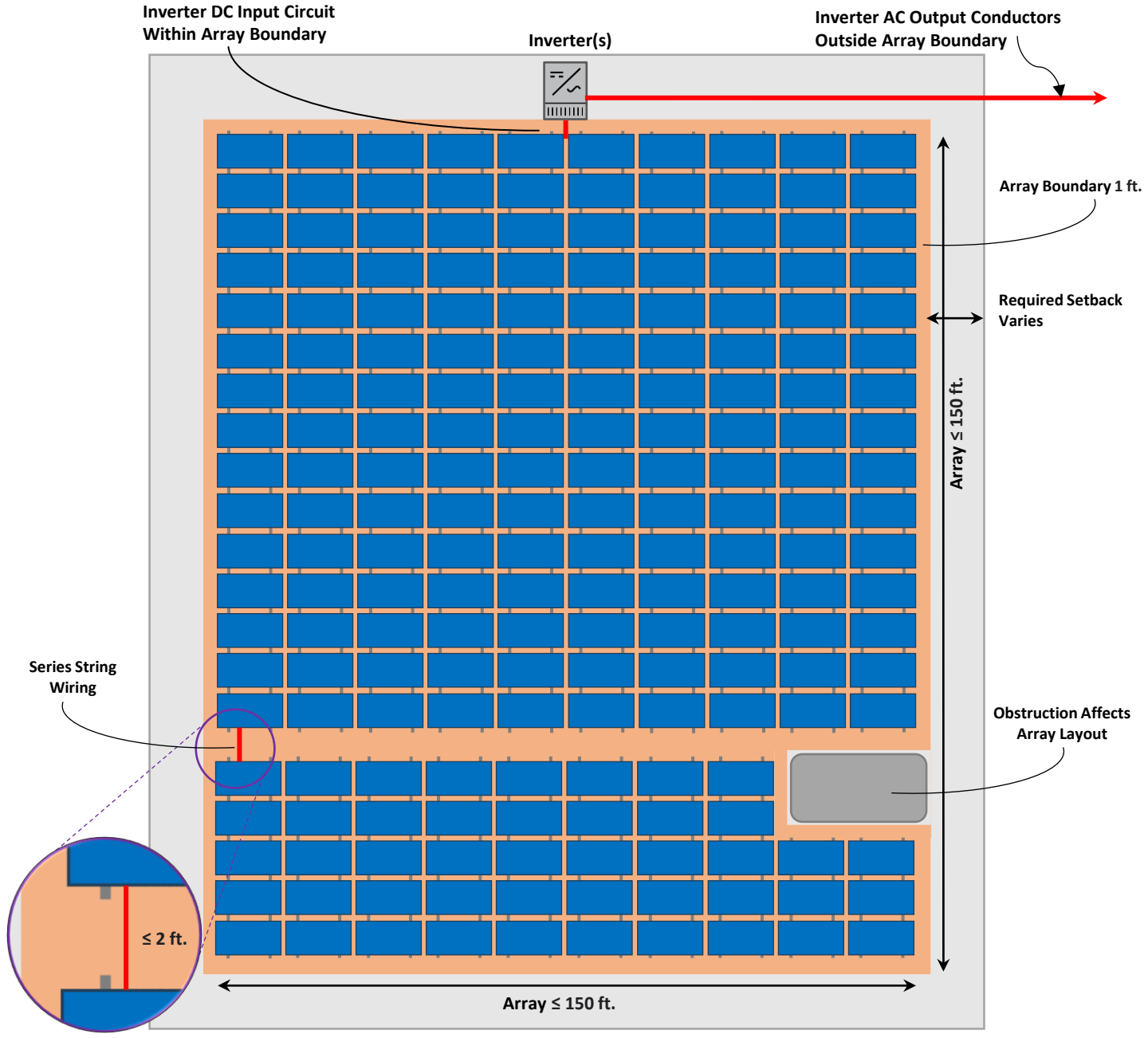
A: All inverter input circuits (DC) are contained within the PV array boundary and do not require additional measures to reduce string voltages per 690.12(B)(2)(1) after initiation (Inverter DC disconnect, AC breaker or AC disconnect).

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

COMMERCIAL CASE 2: UL3741 LISTED SYSTEM WITH CONTIGUOUS SUB-ARRAY

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: ≤ 30V within 30 Seconds
- Inside Array Boundary: ≤ 1000V



2: **All Modules Within Same Array Boundary**

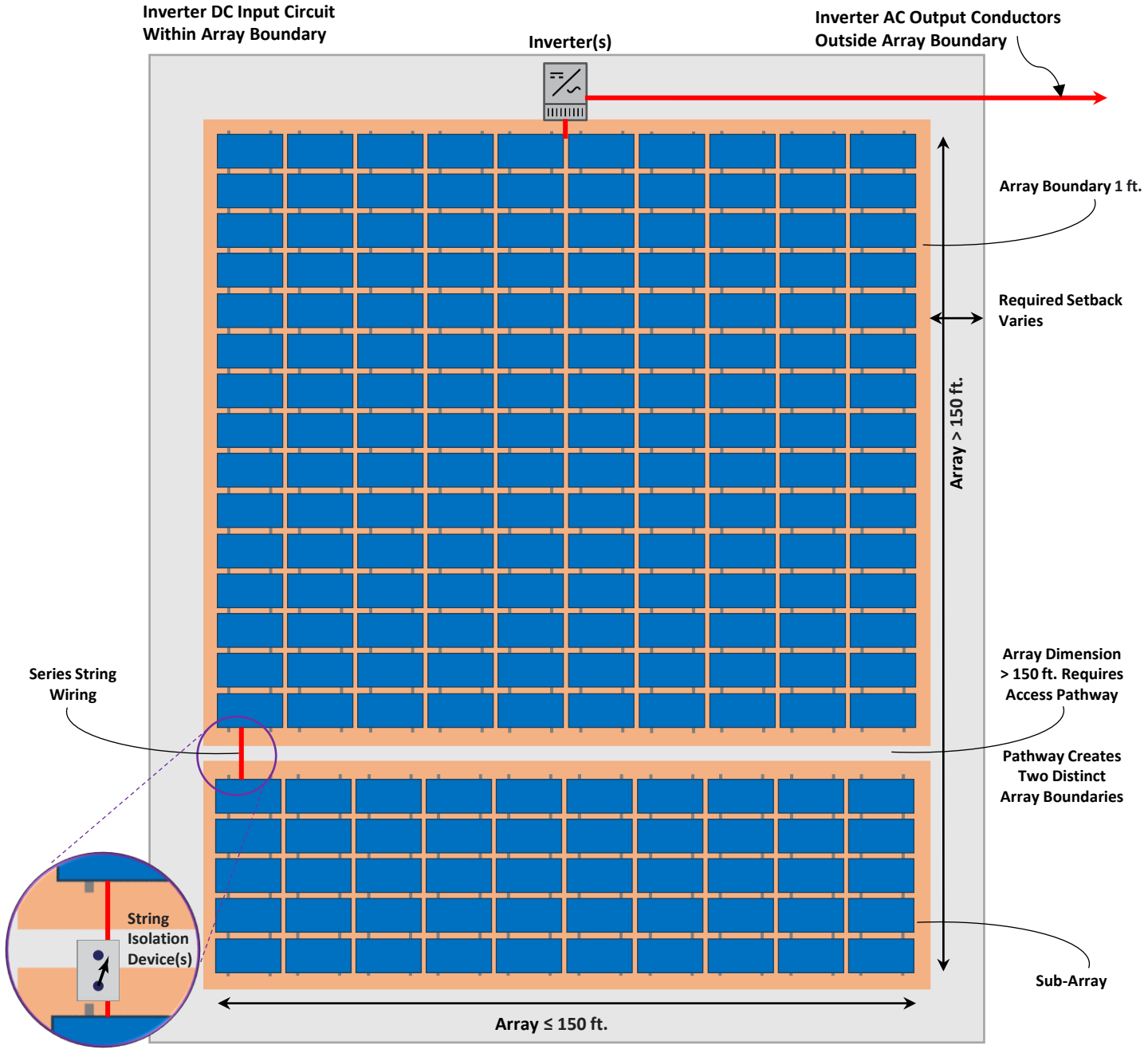
Case 2: Maintaining NEC Compliance with sub-array(s) within array boundary

Maximum 2 ft. spacing between all array components resulting in a single array boundary.

SUNMODO LEADING by DESIGN

COMMERCIAL CASE 3: UL3741 LISTED SYSTEM WITH NON-CONTIGUOUS SUB-ARRAY

Case 3: Multiple Sub-Arrays with conductors outside of Array Boundary are controlled via String Isolation Device(s)
- Outside Array Boundary: ≤ 30V within 30 Seconds
- Inside Array Boundary: ≤ 1000V



3: String Isolation Device(s) to control conductor outside of array boundary

Case 3: Maintaining NEC Compliance with sub-array(s) outside of array boundary

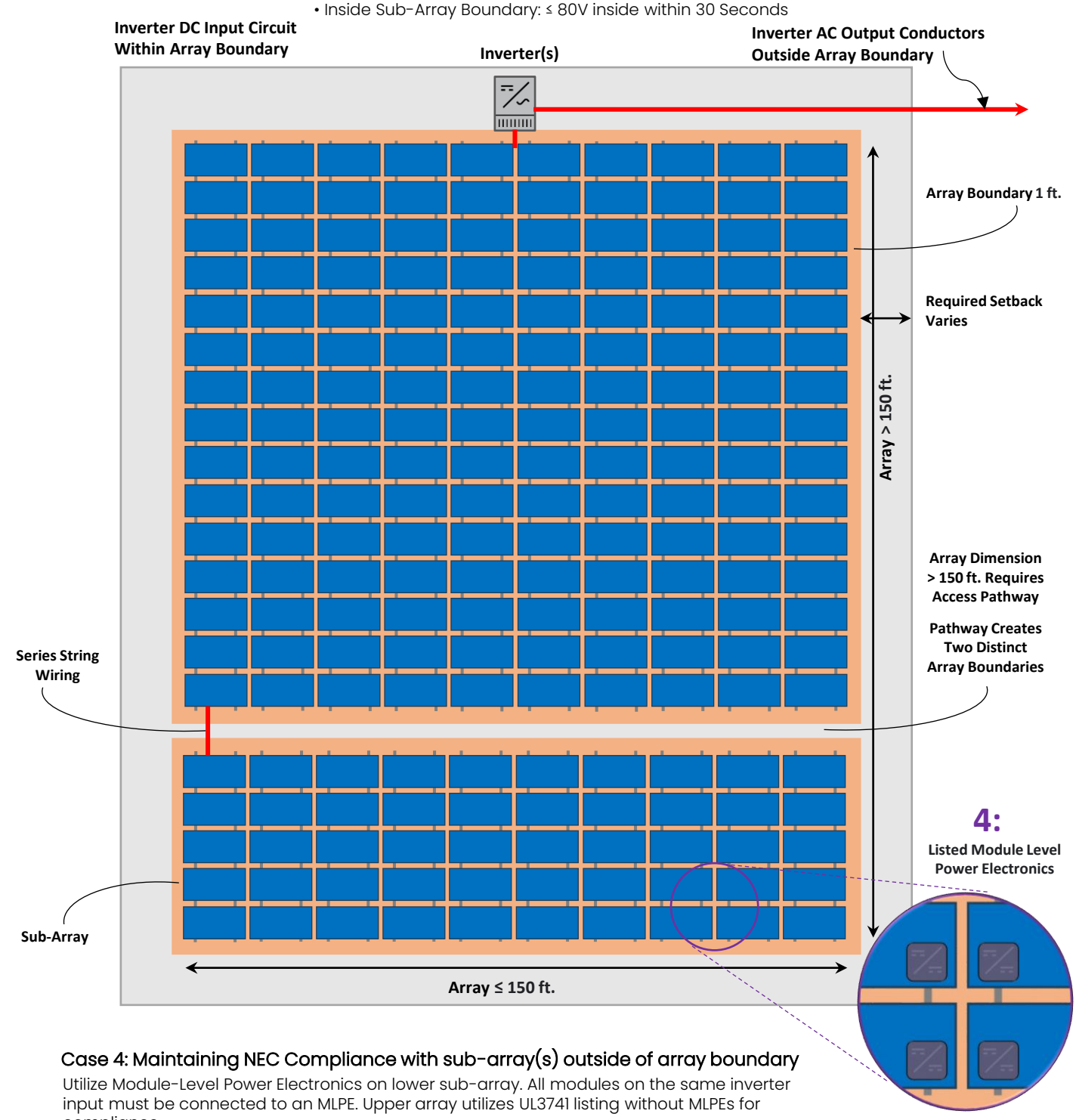
Complete string must be connected to a single isolation device. If used for a partial string, isolation devices required on both sides of the pathway since voltage will be present on both sides.

SUNMODO LEADING by DESIGN

COMMERCIAL CASE 4: UL3741 LISTED SYSTEM WITH WITH MPLE SUB-ARRAY

Case 4: Sub-array(s) using MLPEs to control circuits for 690.12(B)(1) and (B)(2) compliance

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



Case 4: Maintaining NEC Compliance with sub-array(s) outside of array boundary

Utilize Module-Level Power Electronics on lower sub-array. All modules on the same inverter input must be connected to an MLPE. Upper array utilizes UL3741 listing without MLPEs for compliance.

SUNMODO LEADING by DESIGN

NOTE: When using MLPE devices, review installation instructions for both the MLPE device and Inverter to verify that both devices are compatible and comply with UL1741 Rapid Shutdown requirements.

INSTALLATION METHODS PER UL3741 AND NEC 690.12 | RESIDENTIAL

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

Case 1: UL 3741 Listed System, Single Arrays, – See Page 15
Case 2: UL 3741 Listed System, Contiguous Sub-Array – Page 16
Case 3: UL 3741 Listed System, Multiple Arrays – Page 17

The simplest installation method to comply with NEC690.12(B) is to utilize the SunModo Racking UL 3741 system with a contiguous array with one or more collocated inverters, as all inverter DC input circuits are within the 1-ft array boundary (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.

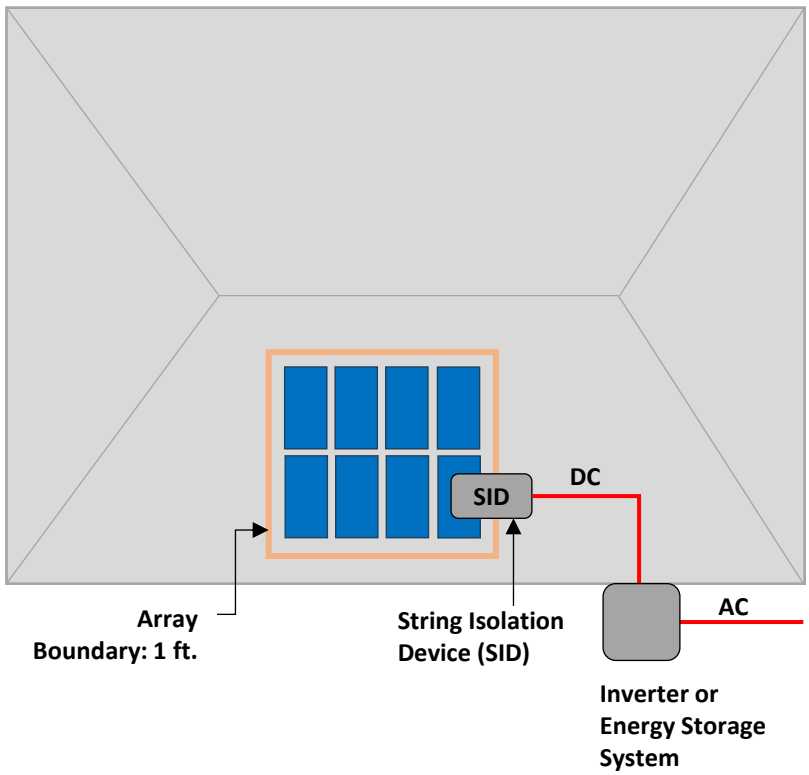
All inverter and/or energy storage input circuits (DC) outside of the PV array boundary will require the use of String Isolation Devices (SID) to de-energize circuits leaving the array per 690.12(B)(1) after initiation (DC disconnect, AC breaker or AC disconnect).

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.

Residential CASE 1: UL3741 Listed System Single Array

Case 1: 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: Maintain NEC compliance for single arrays.

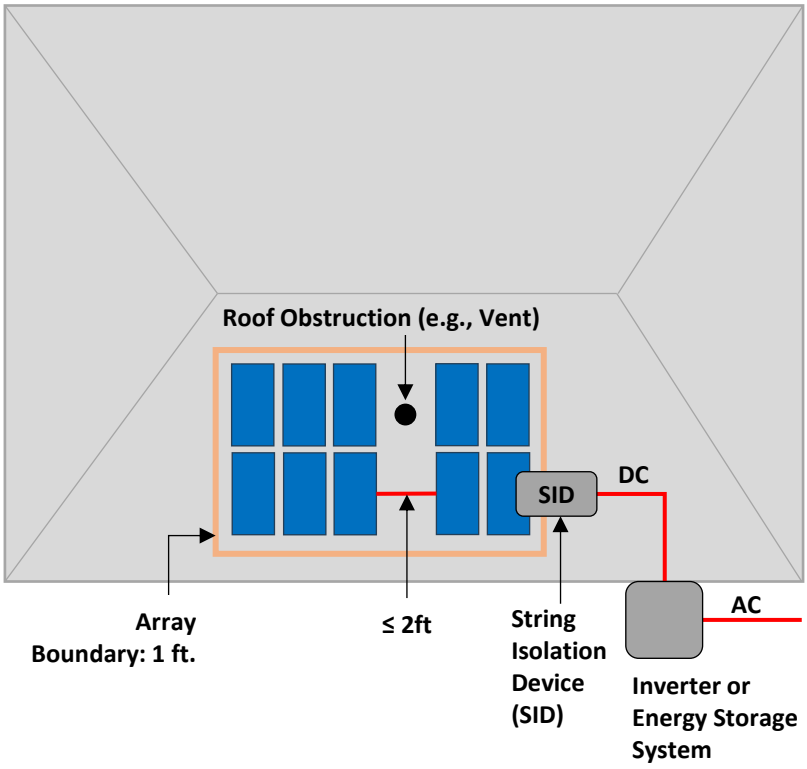
Single arrays require the use of a SID as shown in the figure above to control the conductors outside of the array boundary.

IMPORTANT: Review electrical page(s) for specific approved SID(s) and install methods.

RESIDENTIAL CASE 2: UL3741 LISTED SYSTEM CONTIGUOUS SUB-ARRAY

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

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



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

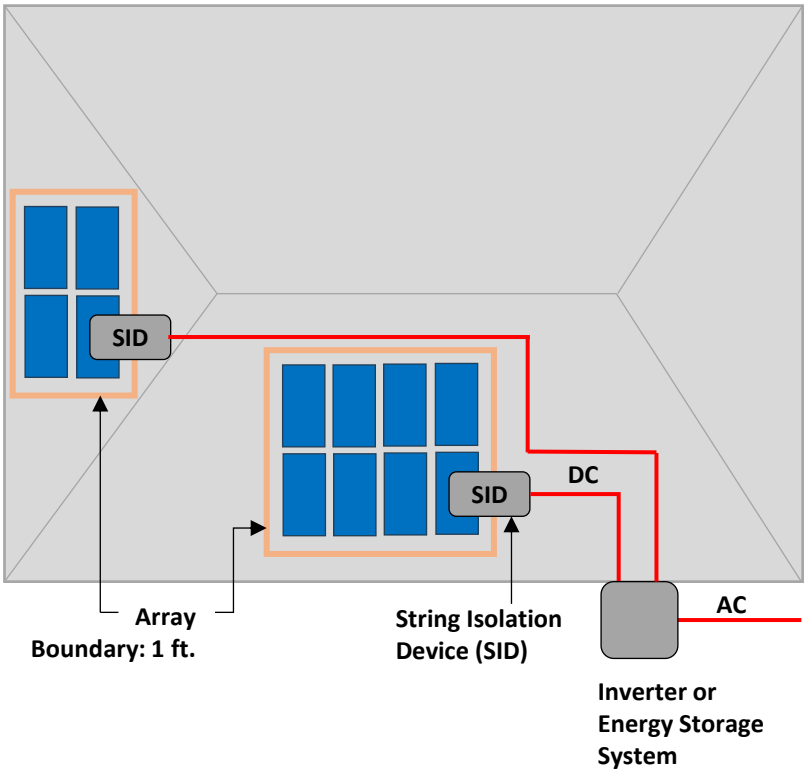
Multiple arrays with maximum 2 ft. spacing between array and sub-array result in a contiguous single array boundary and will require the use of a SID as shown above to control conductors outside of the array boundary.

IMPORTANT: Review electrical page(s) for specific approved SID(s) and install methods.

Residential CASE 3: UL3741 Listed System Multiple Arrays

Case 3: 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 1: Maintain NEC compliance with multiple arrays.

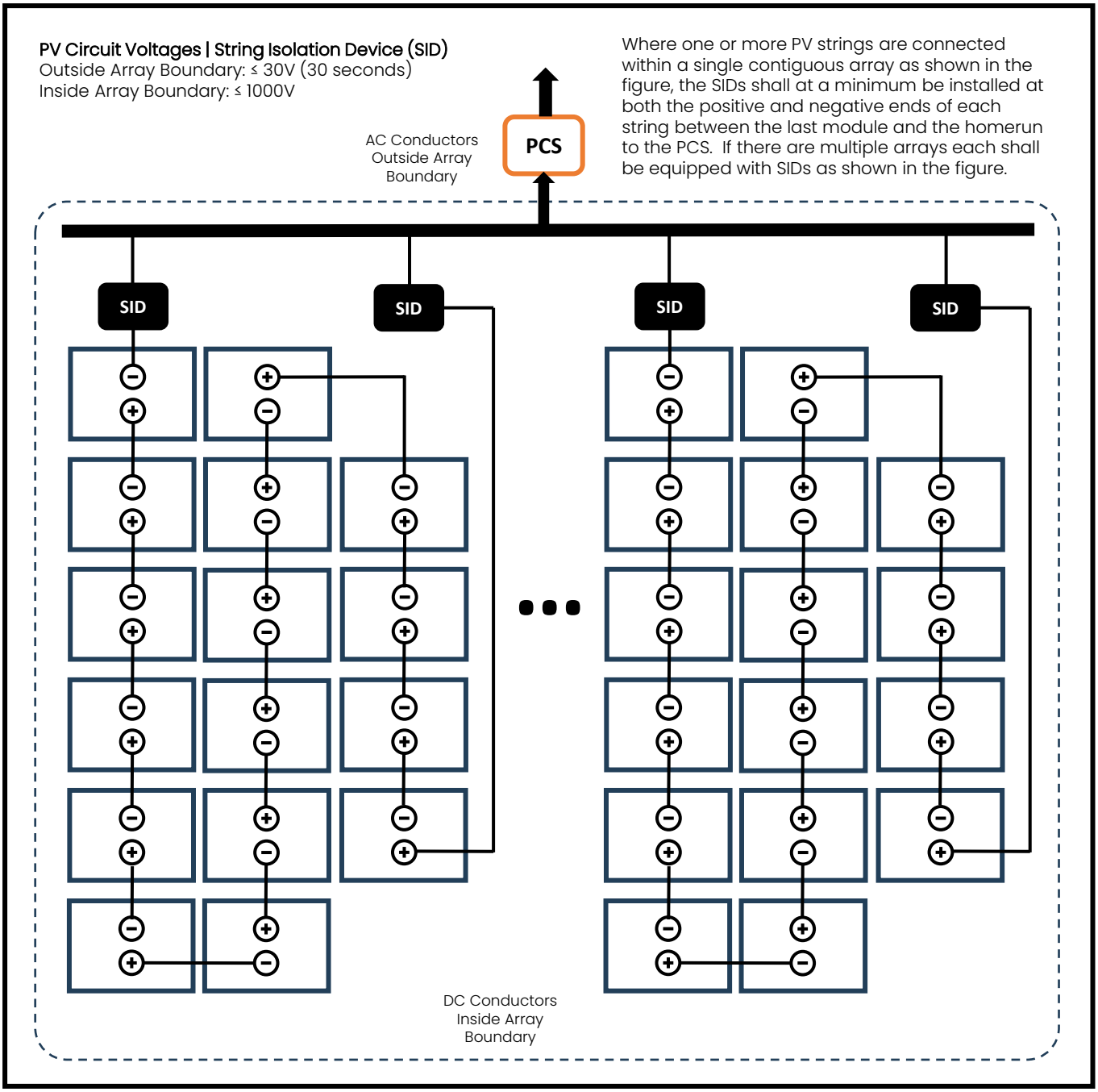
In multiple arrays with multiple strings, each string will require a SID. When a string is split across non-contiguous (>2ft) sub-arrays, a SID must be installed on both ends of the connection between sub-arrays as shown above to control conductors outside of the array boundary.

IMPORTANT: Review electrical page(s) for specific approved SID(s) and install methods.

NANORACK COMMERCIAL INSTALLATION WITH MAXIMUM SYSTEM VOLTAGE 1000V:

The Sunmodo Photovoltaic system complies with UL 3741, NEC 2020 690.12(B)(2)(3), and NEC 2023 section 690.12(B)(2)(1) when installed by qualified persons per the installation procedures outlined in the Sunmodo Installation Manual and Addendum. See figure on pages 23 and 24.

For Commercial installation, 1000V max inside array boundary (1 ft). Each group of 16 modules in series requires an interrupter based upon modules max Voc = 60V. Please confirm the maximum Voc from the module manufacturer's datasheet and adjust the maximum number of modules so that the total series Voc does not exceed 1000V.



NOTE: When using MLPE devices, review installation instructions for both the MLPE device and Inverter to verify that both devices are compatible and comply with UL1741 Rapid Shutdown requirements.

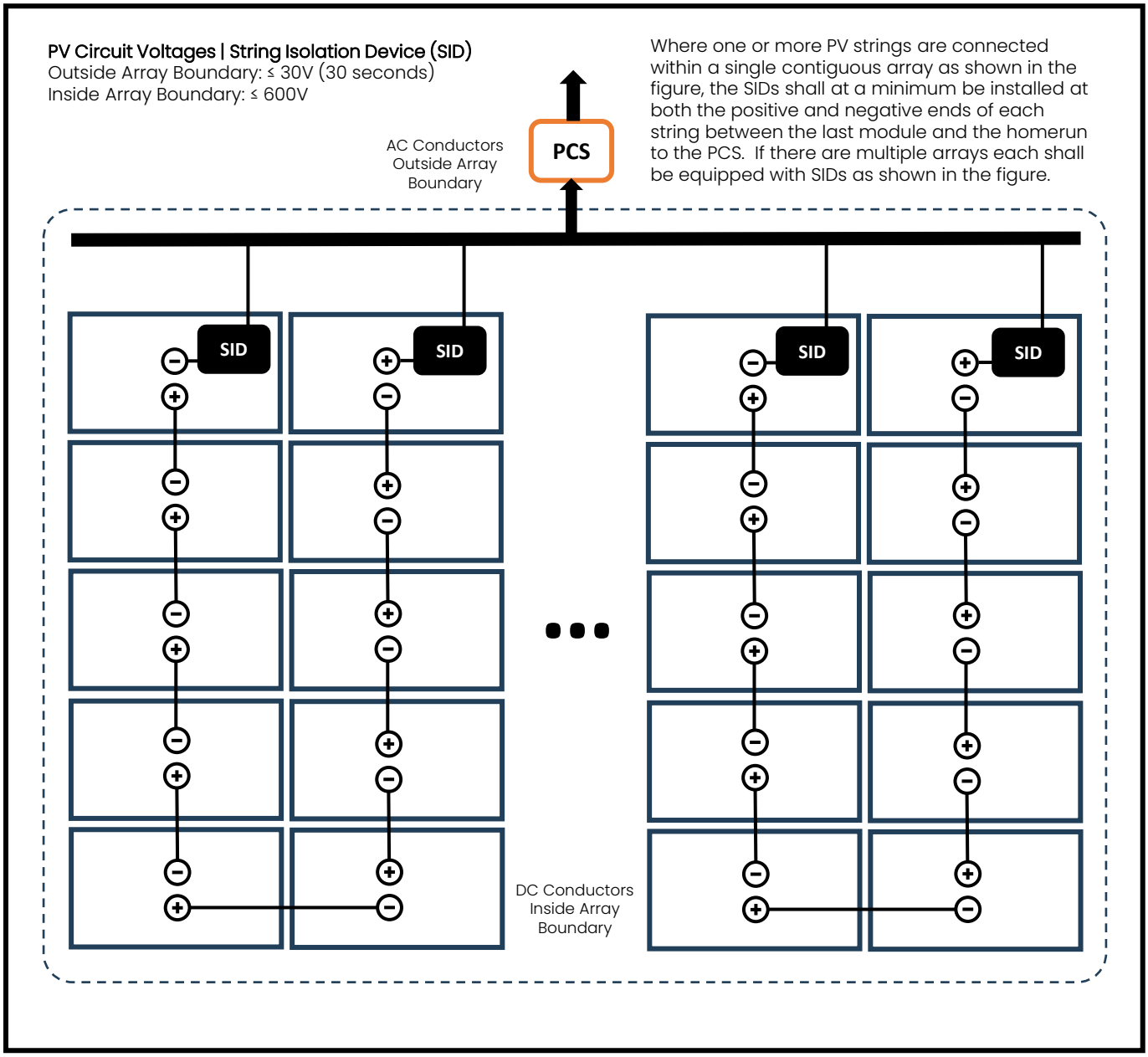
NANORACK RESIDENTIAL INSTALLATION WITH MAXIMUM SYSTEM VOLTAGE 600V:

The Sunmodo Photovoltaic system complies with UL 3741, NEC 2020 690.12(B)(2)(3), and NEC 2023 section 690.12(B)(2)(1) when in stalled by qualified persons per the installation procedures outlined in the Sunmodo Installation Manual and Addendum. See figures on pages 23 and 24.

For Residential installation, 600V max inside array boundary (1 ft). Each group of 10 modules in series requires an interrupter, such as a string isolation device, based upon modules max Voc = 60V. Please confirm the maximum Voc from the module manufacturer's datasheet and adjust the maximum number of modules so that the total series Voc does not exceed 600V.

PV Circuit Voltages | String Isolation Device (SID)
Outside Array Boundary: ≤ 30V (30 seconds)
Inside Array Boundary: ≤ 600V

Where one or more PV strings are connected within a single contiguous array as shown in the figure, the SIDs 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 SIDs as shown in the figure.



NOTE: When using MLPE devices, review installation instructions for both the MLPE device and Inverter to verify that both devices are compatible and comply with UL1741 Rapid Shutdown requirements.

NANORACK RAPID SHUTDOWN EQUIPMENT COMPATIBILITY CHART:

IMPORTANT: Refer to the applicable Inverter Installation Manual for specific instructions, including SID mounting, clearances, ratings, compatible connectors, and rapid shutdown initiation methods.

Inverters	Model	Rapid Shutdown
Canadian Solar Inverters	CSI-75K-T480GL03-U, CSI-80K-T480GL03-U, CSI-90K-T480GL03-U, CSI-100K-T480GL03-U, CSI-66K-T480GL01-UB, CSI-60K-T480GL01-UB, CSI-50K-T480GL01-UB, CSI-40K-T480GL01-UB, CSI-36K-T480GL01-UB, CSI-30K-T480GL01-UB, CSI-25K-T480GL01-UB, CSI-60KTL-GS-B, CSI-40KTL-GS-FLB, CSI-30KTL-GS-FLB	Note 1
Chint Inverters	CPS SCA25KTL-DO/US-208, CPS SCA25KTL-DO-R/US-480, CPS SCA36KTL-DO/US-480, CPS SCA60KTL-DO/US-480	APS RSD-S-PLC-A
Fronius Inverters	Fronius Symo Advanced 10.0-3 208-240/Lite, Fronius Symo Advanced 12.0-3-208-240/Lite, Fronius Symo Advanced 15.0-3 480/Lite, Fronius Symo Advanced 20.0-3 480/Lite, Fronius Symo Advanced 24.0-3 480/Lite	SMA JMS-F SunSpec Rapid Shutdown
GoodWe	GW50K-SMT-US, GW60K-SMT-US, GW6000A-MS, GW7600A-MS, GW8600A-MS, GW9600A-MS	Integrated - Note 1
Midnite Solar	MNSSR-600S-SS	Solis 1Px.xK-4G-US
SMA Inverters	STP 33-US-41, STP 50-US-41, STP 62-US-41, STP 20-US-50, STP 25-US-50, STP 30-US-50	Integrated - Note 1
Solectria Inverters	Solectria Renewables PVI25TL-208, Solectria Renewables PVI25TL-480-R, Solectria Renewables PVI-36TL-480-V2, Solectria Renewables PVI50TL-480, Solectria Renewables PVI60TL-480	Note 1
Solis	S5-GC75K-US, S5-GC80K-US, S5-GC90K-US, S5-GC100K-US, Solis-75K-5G-US, Solis-80K-5G-US, Solis-90K-5G-US, Solis-100K-5G-US, Solis-25K-US, Solis-30K-US, Solis-36K-US, Solis-40K-US, Solis-50K-US, Solis-60K-US, Solis-66K-US	Integrated - Note 1
Sungrow Inverters	SG36CX-US, SG60CX-US	Integrated - Note 1
Tesla	1538000, 1534000	MCI-1, MCI-2 PVRSE

Note 1: Use UL 3741 compliant SIDs where the SID voltage rating exceeds number of modules times 60V for each series string, and power rating exceeds Inverter Power rating.

Typical Interrupter: Midnite Solar MNSSR-600S-SS, Max V=600V, Max Imp=10A, Max Isc=12A

TESLA ELECTRICAL EQUIPMENT WITH MAXIMUM SYSTEM VOLTAGE 600V:

The SunModo Racking UL 3741 certification is applicable when used with Tesla's MCI-1 string isolation device in combination with either a Tesla PV Inverter, Powerwall+, or Powerwall 3 Power Conversion System (PCS).

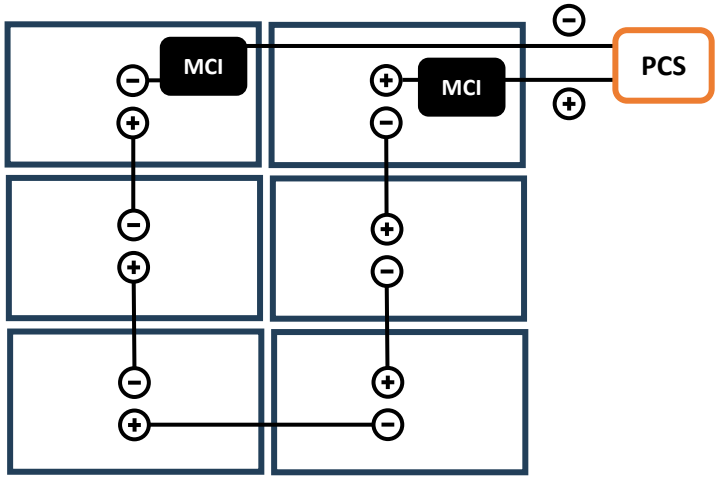
String Isolation Devices (SID)	PV Inverter (PVI)	Energy Storage Systems
Tesla MCI-1 (1550379-00-F)	7.6 kW (1538000)	Powerwall+ (1850000)
Max Voltage = 600V, Max Imp = 13A, Max Isc = 19A	3.8 kW (1534000)	Powerwall 3 (1707000)

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 SunModo racking UL 3741 Listing.

Contiguous Arrays

Maximum Voltages After Rapid Shutdown Initiation:
Outside Array Boundary: ≤ 30V (30 seconds)
Inside Array Boundary: ≤ 600V

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.

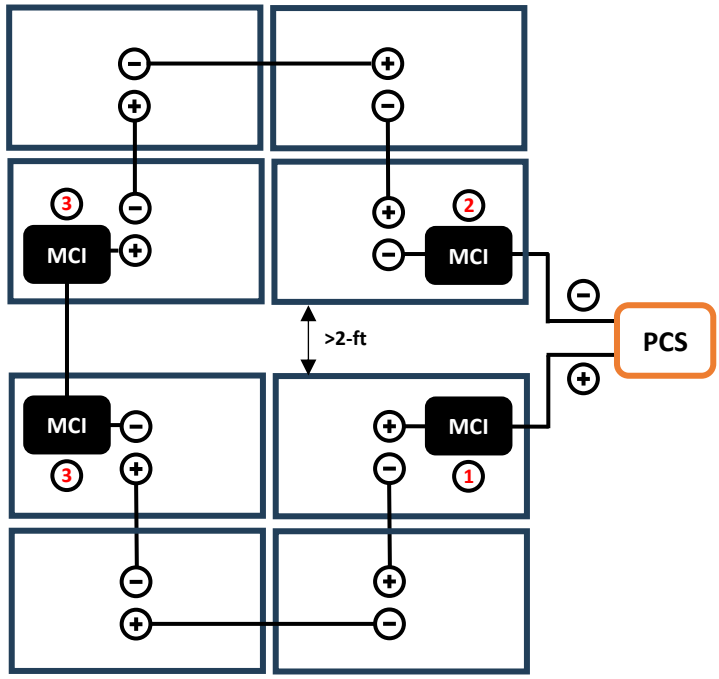


Non-Contiguous Sub-Arrays

Maximum Voltages After Rapid Shutdown Initiation:
Outside Array Boundary: ≤ 30V (30 seconds)
Inside Array Boundary: ≤ 600V

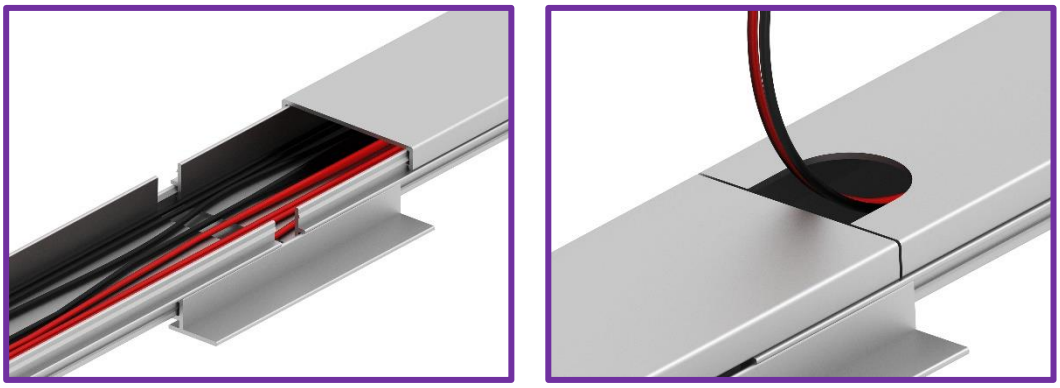
Where any string is connected across noncontiguous sub-arrays separated by more than 2' (see example figure), MCI-1s shall be installed as follows:

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.



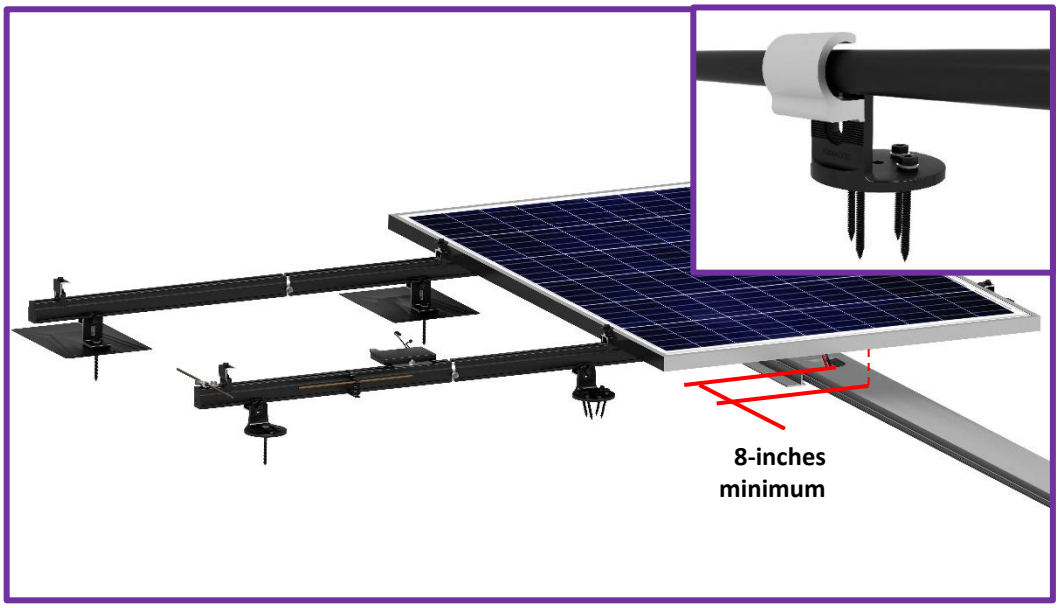
UL3741 Wire Management Guidelines

To achieve wire protection as required per UL 3741, all wires shall be routed such that they are not exposed to potential Fire Fighter interactions. Routing wires under the modules, or through approved listed raceway for wires crossing over a pathway, will ensure avoiding exposure to Fire Fighter interactions.



Ensure wires are protected when exposed between PV array rows and columns.

Any conductor that extends beyond the boundary of a module frame must be protected and contained in an approved conduit, cable pipe, or cable tray listed under "Wire Management" on page 5 of this document; this does not apply to the gap between adjacent modules in a row.



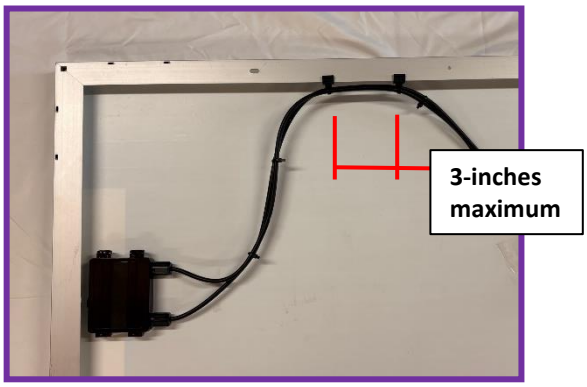
Cable tray or conduit cable entry points should be beneath the PV module and at least 8 inches back from the edges of the module. Refer to the manufacturer's Installation Manual for specific installation instructions.

UL3741 NanoRack
Wire Management Guidelines

All module wiring must be securely attached to the inside return flange of the module frame such that the wiring does not contact the module frame itself.

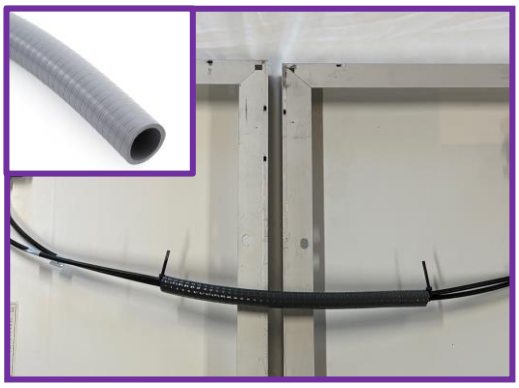
All jumpers (or extension wiring) running under the modules must be securely attached to the module frame such that that wiring never extends beyond the boundary of the module frame itself; this does not apply to the gap between adjacent modules in a row.

Where needed secure the Edge Clips to the module frame such that the wires are routed away from the metal frame.



Where needed to prevent wires from sagging secure two or more Edge Clips to the module frame such that the wires remain taut and not touching the metal frame.

Wires under modules must be secured to prevent contact with metallic surfaces.



Use a Flexible Nonmetallic Conduit to insulate wires from the metal frames between the module gaps. Cable Ties can be attached to either side of the insulate to keep it in place.

UL3741 SMR
Wire Management Guidelines

All module wiring must be securely attached to the inside return flange of the module frame such that the wiring does not contact the module frame itself.

All jumpers (or extension wiring) running under the modules must be securely attached to the module frame such that that wiring never extends beyond the boundary of the module frame itself; this does not apply to the gap between adjacent modules in a row.

Where needed secure the Edge Clips to the module frame such that the wires are routed away from the metal frame.

On the SMR Rail optional SMR Wire Management Clips can be used to secure the wires along the length of the Rail such that the wires do not contact the module frame or the Rail.

Use the SMR Wire Management Clips to isolate the wires from the metal of the module frames and the SMR Rail.

Use a Flexible Nonmetallic Conduit to insulate the wires from the metal of the module frames and the SMR Rail. Using the SMR Wire Management Clips or Cable Ties to secure the insulated wires to the Rail.