## SCOPE OF WORK

TO INSTALL A SOLAR PHOTOVOLTAIC (PV) SYSTEM AT THE SPIES RESIDENCE, LOCATED AT 102 SERENDIPITY DRIVE, FUQUAY VARINA, NORTH CAROLINA. THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE NEW ELECTRICAL SERVICE EQUIPMENT. THE PV SYSTEM DOES INCLUDE STORAGE BATTERIES.

## SYSTEM RATING

6.300 kW DC STC
11.500 kW AC

## EQUIPMENT SUMMARY

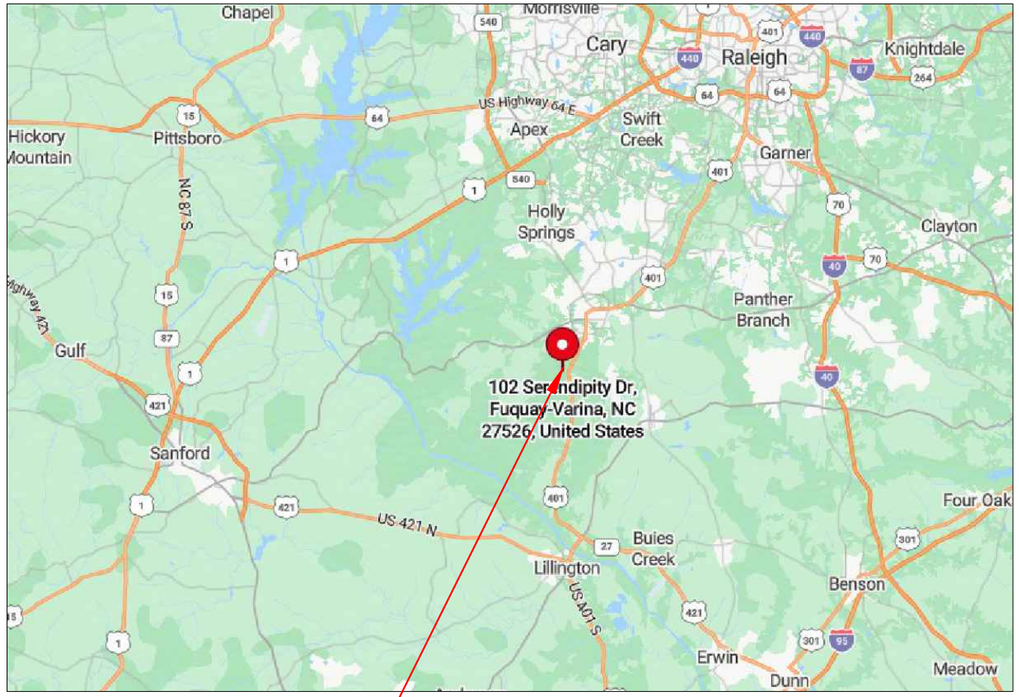
(15) REC SOLAR REC420AA PURE-R (420W) PV MODULES
(1) TESLA POWERWALL 3 1707000-XX-Y [240V] PV INVERTERS
(08) TESLA MID-CIRCUIT INTERRUPTERS (MCI-2) RAPID SHUTDOWN
(1) TESLA ENERGY GATEWAY

## SHEET INDEX

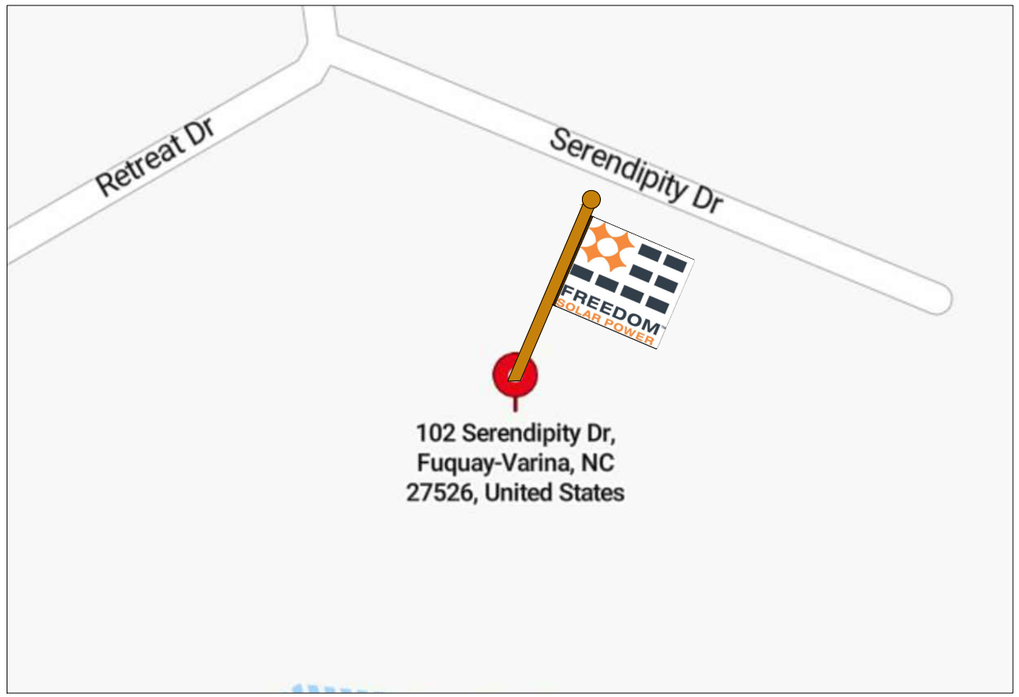


## GOVERNING CODES

2017 NATIONAL ELECTRICAL CODE
2018 NORTH CAROLINA RESIDENTIAL CODE
2018 NORTH CAROLINA STATE BUILDING CODE
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269




PROJECT LOCATION




VICINITY MAP


CONTRACTOR
FREEDOM™ SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
512-759-8313
TECL # 28621


REVISIONS

| DESCRIPTION | DATE | REV |
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| DESIGN PACKET | 04/29/2024 | - |
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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID:114400

SHEET NAME
COVER

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-0

LEAD ID: 114400

CONSTRUCTION SUMMARY

(15) (REC SOLAR REC420AA PURE-R (420W)) SOLAR MODULES, 6.300 kW DC STC

MODULE DIMENSIONS = 44.0" X 68.1" X 1.2"

(1) TESLA POWERWALL 3 1707000-XX-Y [240V] PV INVERTERS

COMBINED INVERTER OUTPUT = 11.500 kW AC.

(08) TESLA MID-CIRCUIT INTERRUPTERS (MCI-2) RAPID SHUTDOWN

(1) TESLA ENERGY GATEWAY

RACKING: PEGASUS RAIL

ATTACHMENT: PEGASUS INSTAFLASH

SITE DETAILS

ROOF TYPE: ASPHALT SHINGLE
ARRAY #1 - TILT = 27°, AZIMUTH = 201°

NOTE : PE STAMPS REQUIRED IF:
-WEIGHT OF ARRAY IS >3PSF
-MORE THAN 1-LAYER OF SHINGLE
-ROOF TYPE IS OTHER THAN COMP SHINGLES
-WIND SPEED IS GREATER THAN 140 MPH

-PANEL WEIGHT EQUALS 2.5 LBS PER SQ FT, LESS THAN 3 LBS PER SQ FT.

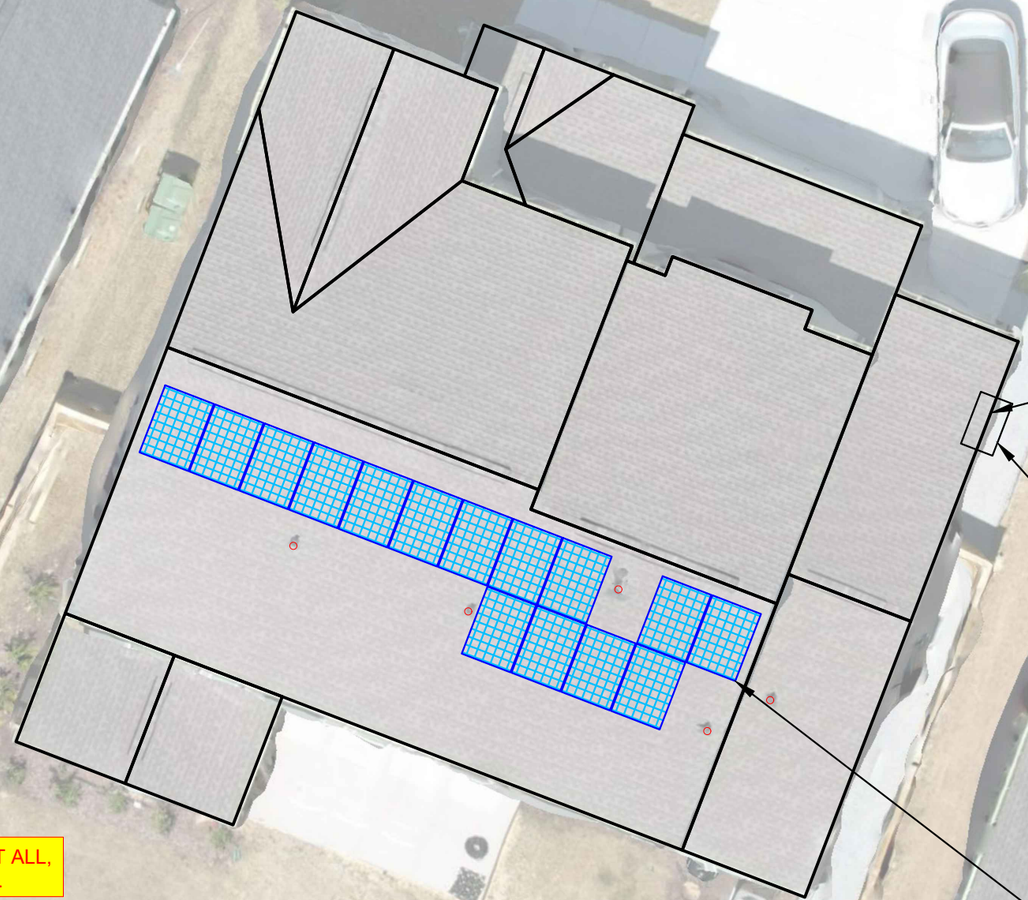
NO CUTTING AND COVERING PLUMBING VENTS AT ALL, PVC PIPES CAN BE RELOCATED WITH ROOF JACK.

-UTILITY SHUTDOWN NEEDED TO INSTALL TESLA ENERGY GATEWAY-2

**FALL PROTECTION REQUIRED**

CONSTRUCTION NOTES

1.) ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2.) ALL OUTDOOR EQUIPMENT SHALL BE RAINTIGHT WITH MINIMUM NEMA 3R RATING.
3.) ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.



MAIN DISTRIBUTION PANEL
(INSIDE GARAGE WALL)

DUKE ENERGY REVENUE METER
#349 491 409
GROUNDING ELECTRODE
TESLA ENERGY GATEWAY
(1)TESLA POWERWALL 3
(1707000-XX-Y) [240V] PV INVERTER
PV AC DISCONNECT
-VISIBLE
-LOCKABLE
-LABELED
-KNIFE BLADE DISCONNECT
(OUTSIDE GARGE WALL)

PV ARRAY #1
(15) MODULES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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME

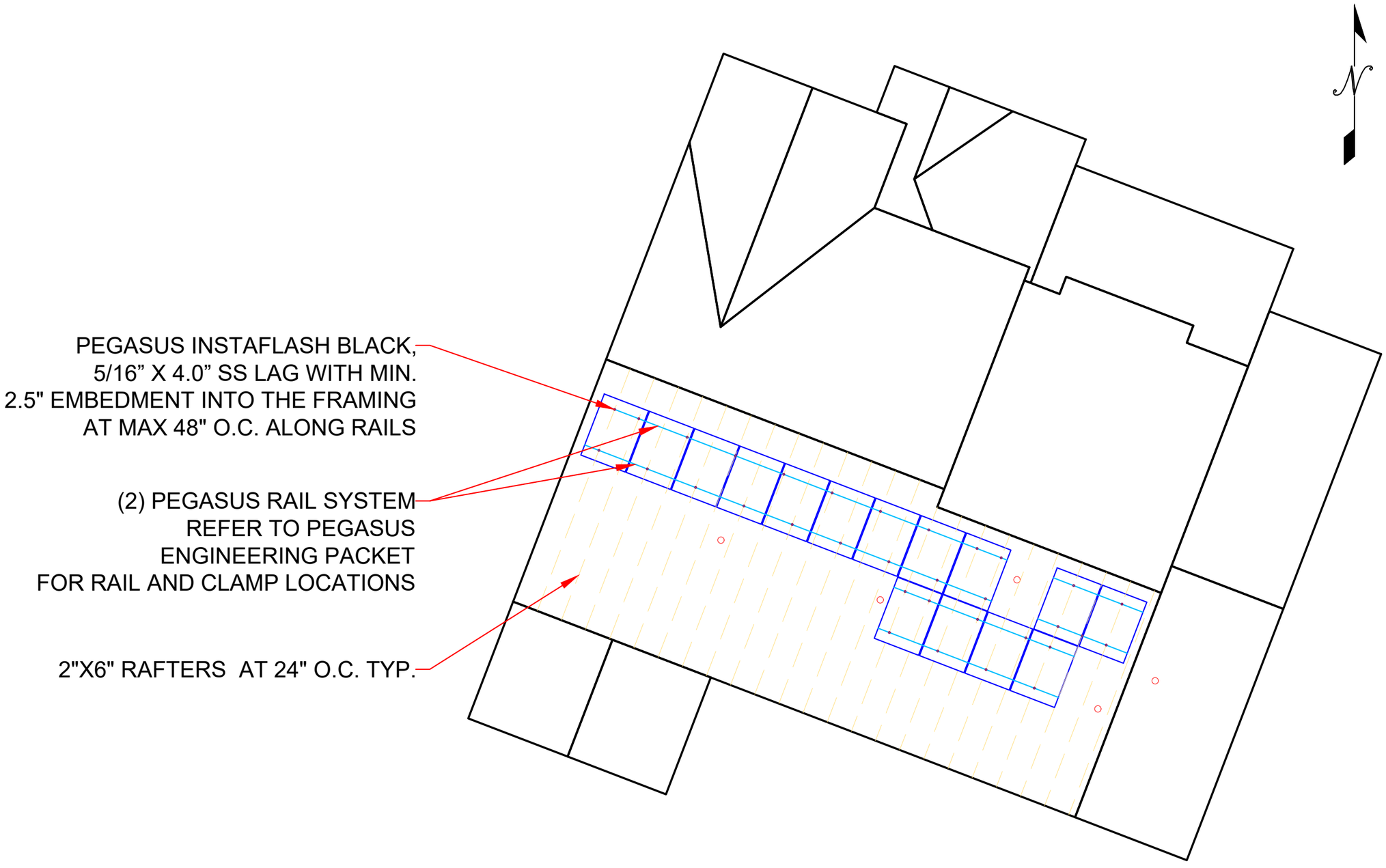
SITE MAP & PV LAYOUT

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-1




CONSTRUCTION NOTES

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2.) ALL OUTDOOR EQUIPMENT SHALL BE RAINTIGHT WITH MINIMUM NEMA 3R RATING.
3.) ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.

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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME

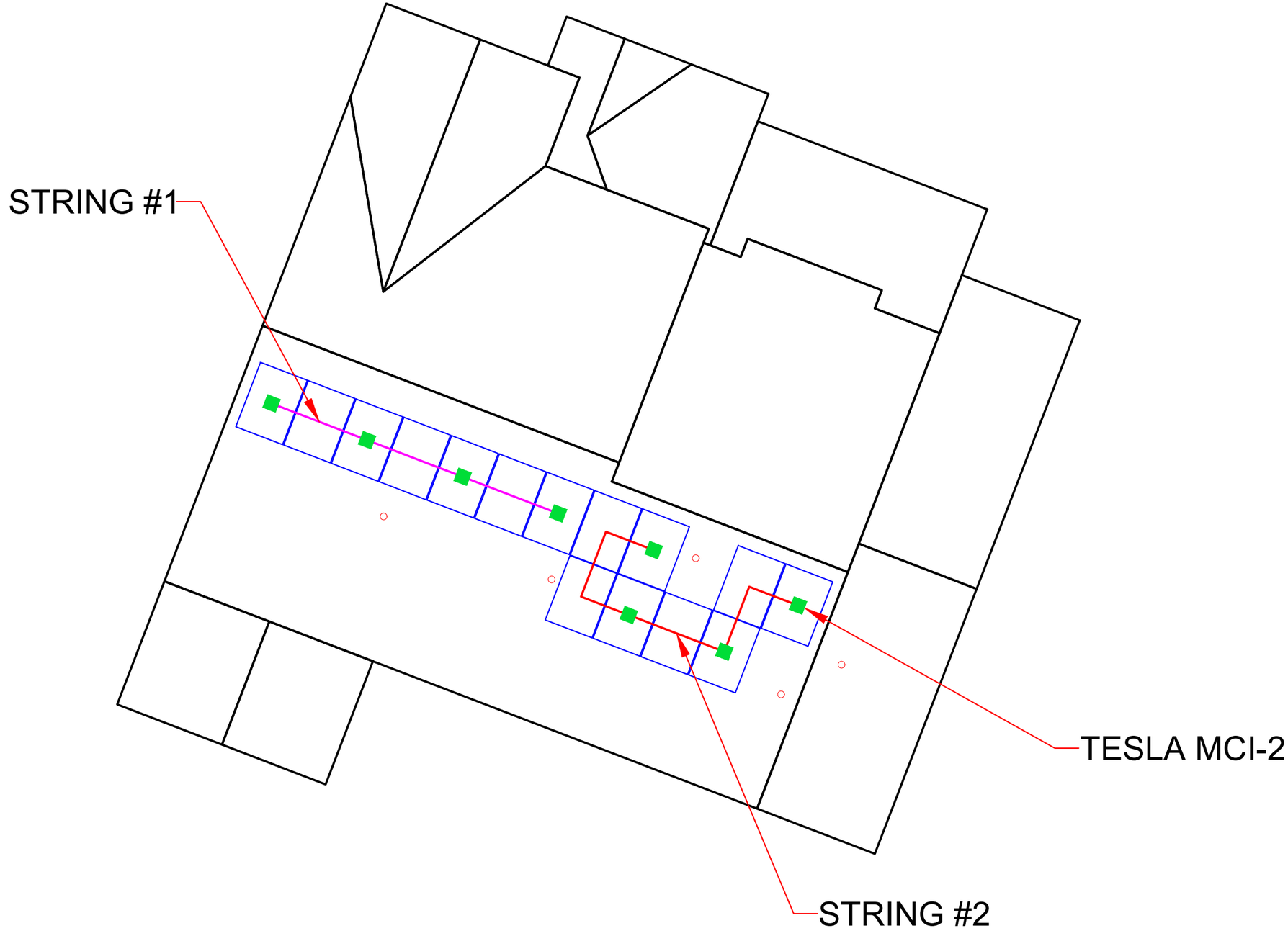
RACKING PLAN

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-1A

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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME

STRING MAP LAYOUT

SHEET SIZE

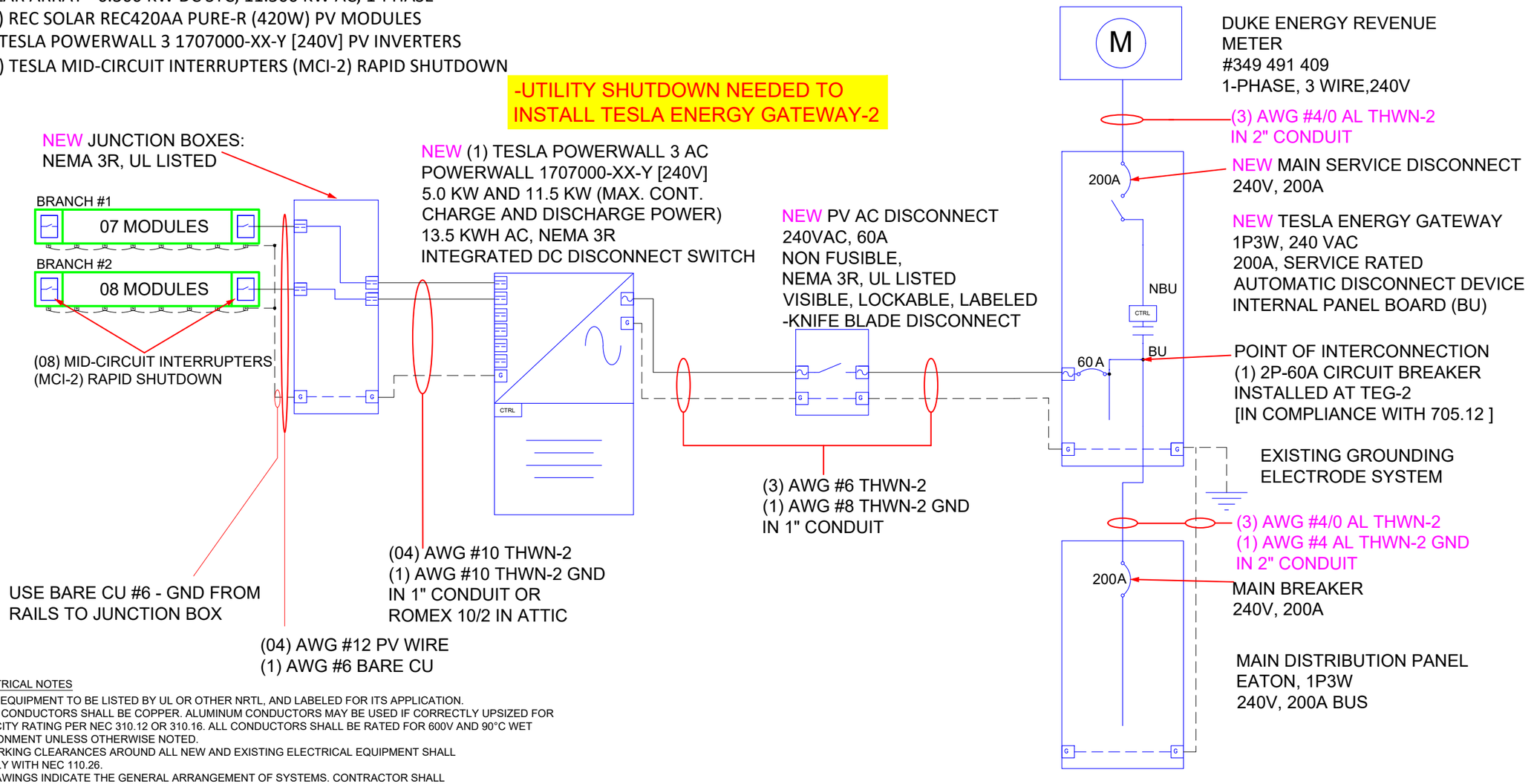
ANSI B
11" x 17"

SHEET NUMBER

PV-2

SOLAR ARRAY - 6.300 KW DC STC, 11.500 KW AC, 1-PHASE
(15) REC SOLAR REC420AA PURE-R (420W) PV MODULES
(1) TESLA POWERWALL 3 1707000-XX-Y [240V] PV INVERTERS
(08) TESLA MID-CIRCUIT INTERRUPTERS (MCI-2) RAPID SHUTDOWN

-UTILITY SHUTDOWN NEEDED TO INSTALL TESLA ENERGY GATEWAY-2




ELECTRICAL NOTES

1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2.) ALL CONDUCTORS SHALL BE COPPER. ALUMINUM CONDUCTORS MAY BE USED IF CORRECTLY UPSIZED FOR AMPACITY RATING PER NEC 310.12 OR 310.16. ALL CONDUCTORS SHALL BE RATED FOR 600V AND 90°C WET ENVIRONMENT UNLESS OTHERWISE NOTED.
3.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
4.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
5.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY. SPECIFIED CONDUIT AND WIRE SIZES ARE MINIMUM REQUIREMENTS AND LARGER SIZES SHALL BE PERMITTED.
6.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
7.) MAXIMUM MOUNTING HEIGHT FROM GRADE TO CENTER OF METER SOCKET SHALL BE 72" FOR RESIDENTIAL SINGLE PHASE METER SOCKETS 0-320 AMPS. MINIMUM MOUNTING HEIGHT IS 30" FROM FOR AUSTIN ENERGY, AND 48" FOR ALL OTHER JURISDICTIONS
8.) MINIMUM HORIZONTAL CLEARANCE FROM GAS REGULATOR TO ANY ELECTRICAL ENCLOSURE IS 36", EXCEPT AUSTIN ENERGY WHICH REQUIRES 48" CLEARANCE FROM GAS TO METER SOCKET
9.) PV DISCONNECT SHALL BE VISIBLE, LOCKABLE AND LABELED AND THE DOOR CANNOT BE OPENED WHEN HANDLE IS IN ON POSITION
10.) BY DEFAULT THE MONITORING DEVICE IS SHOWN CONNECTED TO A 20-AMP BREAKER IN THE SOLAR LOAD CENTER. ALTERNATIVELY, THE MONITORING DEVICE MAY BE CONNECTED TO A 20-AMP BREAKER AT THE MAIN DISTRIBUTION PANEL.
11.) ALL EQUIPMENT TERMINATIONS SHALL BE RATED FOR 75 DEGREES OR GREATER
12.) ALL CT WIRES SHALL BE CONSIDERED CLASS 1 PER NEC ARTICLE 725, AND BE MARKED AS RATED FOR 600V. PER 725.48(A) CLASS 1 CIRCUITS SHALL BE PERMITTED TO OCCUPY THE SAME RACEWAY AS OTHER CIRCUITS PROVIDED ALL CONDUCTORS ARE INSULATED FOR THE MAXIMUM VOLTAGE OF ANY CONDUCTOR IN THE RACEWAY.
13.) AWG #10 COPPER CONDUCTORS ARE SPECIFIED AS THE DEFAULT WIRE REQUIRED FROM THE PV ARRAY TO THE SOLAR LOAD CENTER, HOWEVER, AWG #12 COPPER CONDUCTORS MAY BE UTILIZED IF BOTH OF THE FOLLOWING CONDITIONS ARE MET: THE LENGTH OF THE CONDUCTOR IS LES

| CALCULATIONS FOR CURRENT CARRYING CONDUCTORS | CALCULATIONS FOR OVERCURRENT DEVICES |
|---|---|
| PV SOURCE CIRCUIT WIRE AMPACITY CALCULATION<br>[NEC 690.8(A)(3)]: MODULE STRING MAX DC CURRENT = (1.25)(8.88A) = 11.10A<br>CONTINUOUS USE:<br>#10 WIRE 75°C DERATED AMPACITY = (0.80)(35.0A) = 28.00A<br>28.00A > 11.10A<br>CONDITIONS OF USE:<br>#10 WIRE 90°C DERATED AMPACITY = (0.91)(0.80)(40.0A) = 29.12A<br>29.12A > 11.10A<br><br>POWERWALL 3 OUTPUT WIRE AMPACITY CALCULATION<br>[NEC 690.8(A)(3)]: 48.00A PER TESLA POWERWALL 3 1707000-XX-Y [240V]<br>AC OUTPUT CURRENT = (1)(48.00A) = 48.00A<br>CONTINUOUS USE:<br>#6 WIRE 75°C DERATED AMPACITY = (0.80)(65A) = 52.00A<br>52.00A > 48.00A<br>CONDITIONS OF USE:<br>#6 WIRE 90°C DERATED AMPACITY = (0.91)(75A) = 68.25A<br>68.25A > 48.00A | NEC 690.8: USING MANUFACTURER TEMPERATURE CORRECTION FACTOR<br>STC Voc = 59.4V<br>Tmin = -10°C, Tmax= 35°C BELOW STC<br>VOLTAGE TEMPERATURE COEFFICIENT = ((-0.259%/°C x 59.4Voc) -1) = 0.14V PER Δ°C<br>((-10°C - STC 25°C) X 0.13PER Δ°C) = 4.55V PER MOD<br>MAXIMUM Voc = 4.55V + 59.4V = 63.95V<br>MAXIMUM DC VOLTAGE = (8)(63.95) = 511.6V<br><br>SYSTEM AC CURRENT CALCULATION<br>[NEC 690.8(A)(3)]: 48.00A PER TESLA POWERWALL 3 1707000-XX-Y [240V]<br>COMBINED CURRENT = (1 x 48.00A) = 48.00A<br>MINIMUM OCPD = (48.00A)(1.25) = 60.00A<br><br>USE (1) 2P-60A BREAKER IN TEG-2 FOR SYSTEM OCPD |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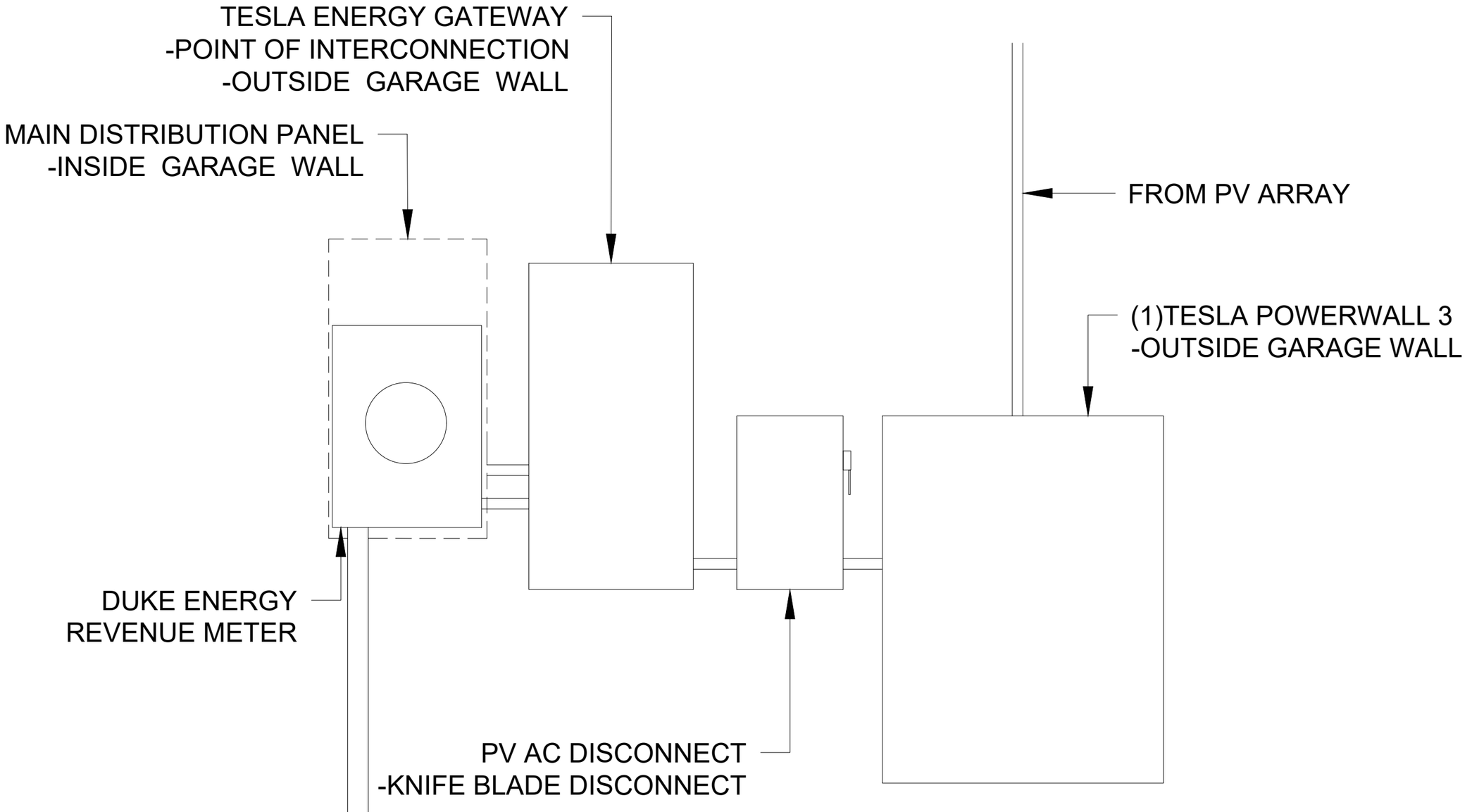
PE STAMP

PROJECT NAME
RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME
ELECTRICAL DIAGRAM

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-3

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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME
EQ.WALL

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-4

NOTE: NOT ALL LABELS MAY BE APPLICABLE

## SIGNAGE REQUIREMENTS

> RED BACKGROUND
> WHITE LETTERING
> MIN. 3/8" LETTER HEIGHT
> ALL CAPITAL LETTERS
> ARIAL OR SIMILAR FONT
> REFLECTIVE, WEATHER RESISTANT MATERIAL, UL 969

**PV SYSTEM DISCONNECT**

REQ'D BY: NEC 690.13(B) — A

APPLY TO:
PV DISCONNECT

**WARNING**
**ELECTRIC SHOCK HAZARD. DO NOT TOUCH TERMINALS. TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.**

REQ'D BY: NEC 690.13(B) — B

APPLY TO:
PV DISCONNECT

**WARNING: PHOTOVOLTAIC POWER SOURCE**

REQ'D BY: NEC 690.31(G)(3) — C

APPLY TO:
RACEWAYS, CABLE TRAYS, OTHER WIRING METHODS, AND ENCLOSURES THAN CONTAIN PV SYSTEM DC CONDUCTORS

**WARNING**
**POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE**

REQ'D BY: NEC 705.12(B)(2)(3)(b) — D

APPLY TO:
DISTRIBUTION EQUIPMENT ADJACENT TO BACK-FED BREAKER

**2" ADDRESS NUMBERS**

REQ' BY: AHJ — E

APPLY TO:
REVENUE METER SOCKET
(IF APPLICABLE)

**REVENUE METER**

REQ'D BY: AHJ — F

APPLY TO:
REVENUE METER SOCKET
(IF APPLICABLE)

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

REQ'D BY: NEC 690.56(C)(2) — G

APPLY TO:
PV DISCONNECT

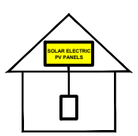
**PHOTOVOLTAIC SYSTEM**
**AC DISCONNECT**
**OPERATING CURRENT:** 48.00**A**
**OPERATING VOLTAGE: 240 VAC**

REQ'D BY: 690.56(1)(a) — H

APPLY TO:
PV DISCONNECT

**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY.




690.56(C)(1)(a) NEC BY:REQ'D — I

APPLY TO:
MAIN DISTRIBUTION PANEL

**CAUTION**

**POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS AS SHOWN:**

**UTILITY SUPPLY & CUSTOMER SERVICE PANEL**

**PV AC DISCONNECT**

**RAPID SHUTDOWN SWITCH**

**FRONT**

REQ'D BY: 705.10 — J

APPLY TO:
MAIN DISTRIBUTION PANEL
(*ONLY REQUIRED IF PV SYSTEM DISCONNECT IS NOT GROUPED WITH MAIN SERVICE DISCONNECT)
**SEE SHEET PV-6 FOR SITE SPECIFIC LABELS**

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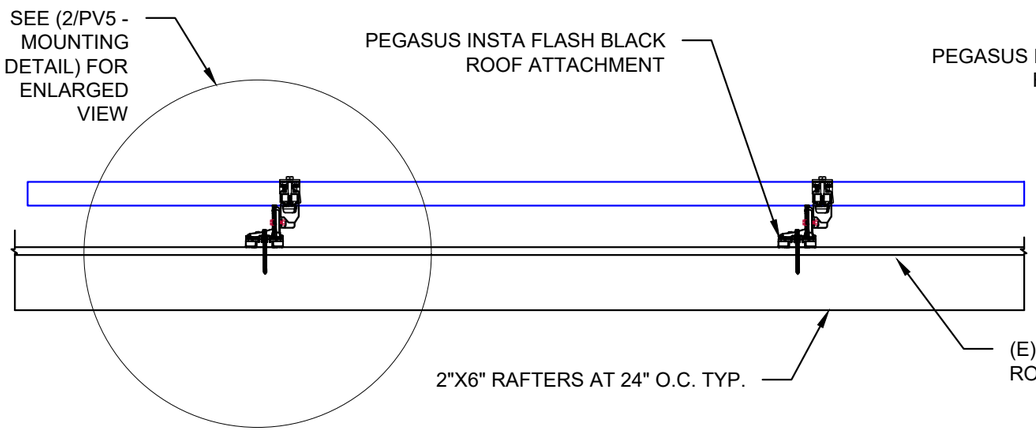
PE STAMP

PROJECT NAME
RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME
SYSTEM LABELING DETAIL

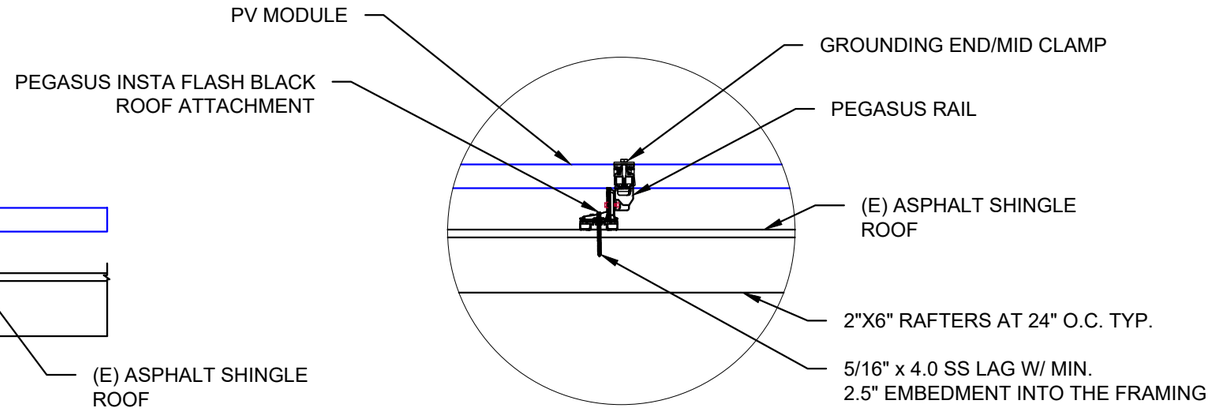
SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-6




MOUNTING METHOD 1

NTS




MOUNTING DETAIL 2

NTS

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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME

MOUNTING DETAIL

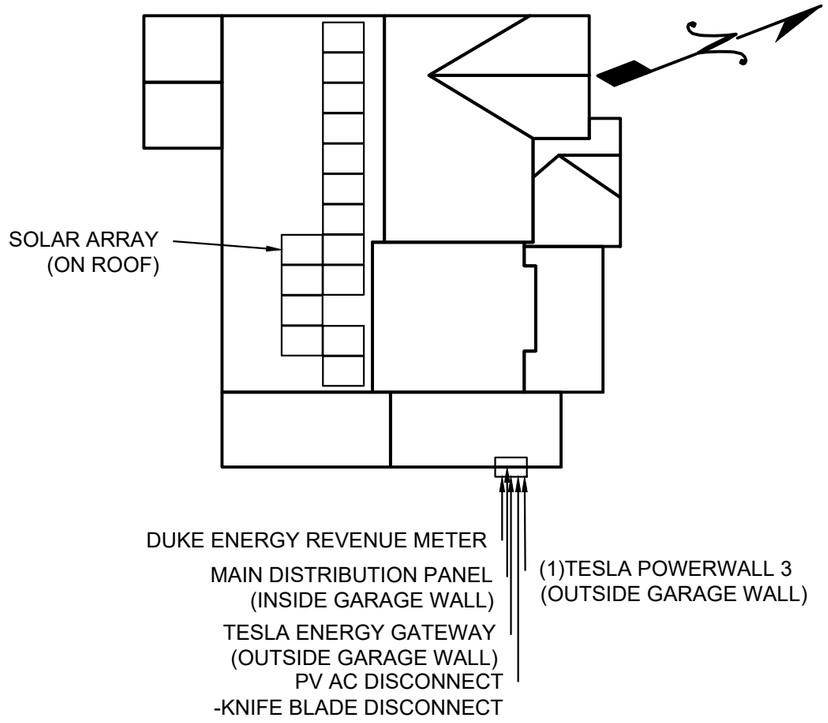
SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-5

# CAUTION:
# MULTIPLE SOURCES OF POWER
## LOCATION OF EACH POWER SOURCE
## DISCONNECTING MEANS SHOWN BELOW




QUESTIONS, CALL:
800-504-2337
www.freedomsolarpower.com

FREEDOM SOLAR POWER
102 SERENDIPITY DRIVE
PROJECT ID: 114400


CONTRACTOR

FREEDOM™ SOLAR POWER

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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

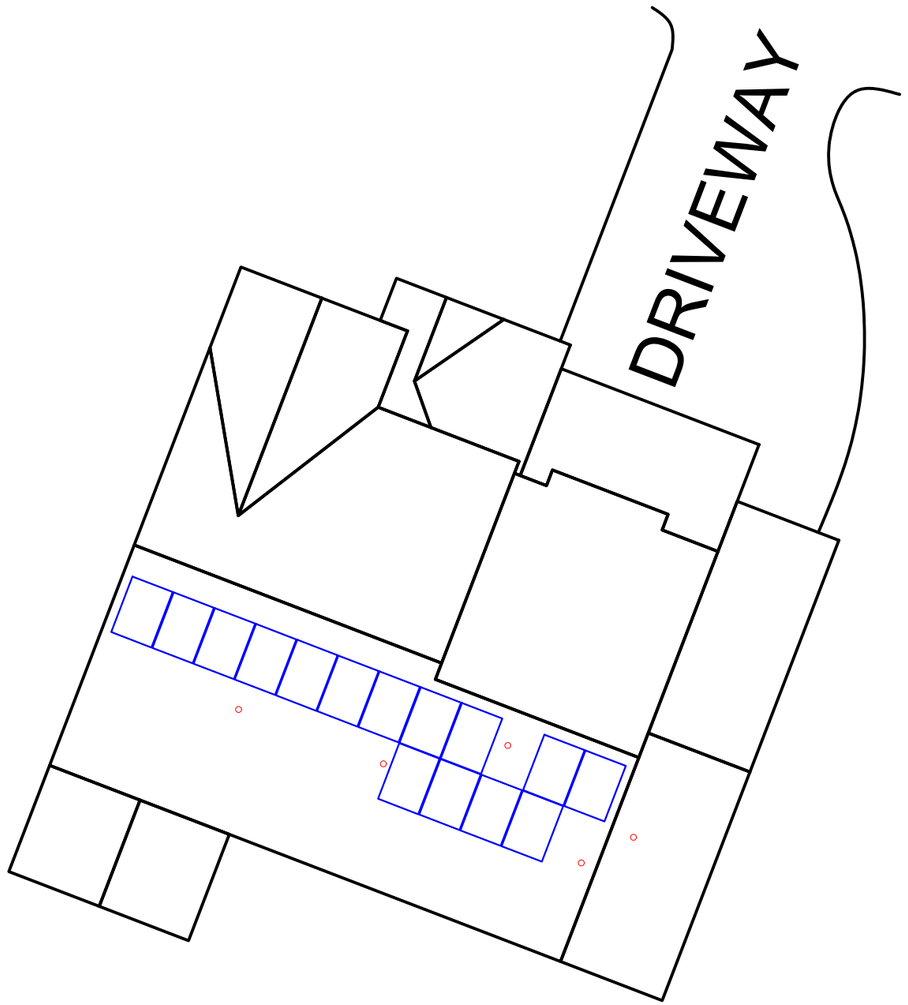
SHEET NAME
SITE DIRECTORY PLACARD

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-7

**USE THE SAFETY SYMBOL KEY TO DRAW IN THE CONTROLLED ACCESS ZONE (CAZ), LADDER PLACEMENT, METER LOCATION, FALL PROTECTION ANCHOR POINT, AND ANY OTHER HAZARD.**

**HARD HAT IS REQUIRED AT ALL TIMES IN CAZ**




## SAFETY SYMBOL KEY

| | |
|---|---|
| ------ | CAZ |
| L | LADDER |
| M | METER |
| ═══ | POWER LINES |
| R | RESTRAINT ANCHOR |
| A | ARREST ANCHOR |

**CONDUCT SAFETY MEETING WITH ALL CREW MEMBERS ON SITE AT THE BEGINNING OF EACH JOB. USE SIGN IN SHEET BELOW.**

1. _____
2. _____
3. _____
4. _____
5. _____

**COMPETENT PERSON:** _____ **JOB START DATE:** _____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PE STAMP

PROJECT NAME

RAINER SPIES
102 SERENDIPITY DRIVE
FUQUAY VARINA, NORTH CAROLINA, 27526
9253571103
PROJECT ID: 114400

SHEET NAME
SAFETY PLAN

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-8

SOLAR'S MOST TRUSTED

REC

# REC ALPHA PURE-R SERIES

## PRODUCT SPECIFICATIONS

COMPACT PANEL SIZE

9 A MODULE CURRENT COMPATIBLE WITH MLPE

430 WP

20.7 W/FT²

22.3% EFFICIENCY

PRODUCT REC 25 YEAR ProTrust WARRANTY PERFORMANCE LABOR

ELIGIBLE

LEAD-FREE ROHS COMPLIANT

EXPERIENCE α PERFORMANCE

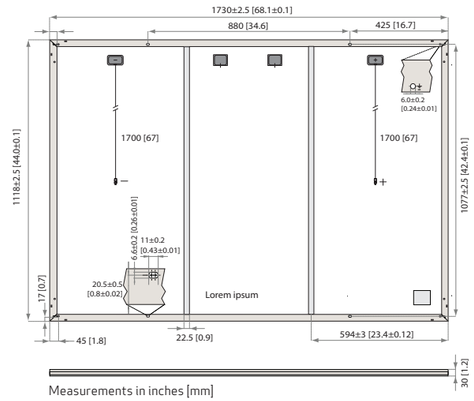
# REC ALPHA PURE-R SERIES

## PRODUCT SPECIFICATIONS

SOLAR'S MOST TRUSTED

### GENERAL DATA

| | |
|---|---|
| Cell type: | 80 half-cut REC bifacial, heterojunction cells with lead-free, gapless technology |
| Glass: | 0.13 in (3.2 mm) solar glass with anti-reflective surface treatment in accordance with EN 12150 |
| Backsheet: | Highly resistant polymer (black) |
| Frame: | Anodized aluminum (black) |
| Junction box: | 4-part, 4 bypass diodes, lead-free IP68 rated, in accordance with IEC 62790 |
| Connectors: | Stäubli MC4 PV-KBT4/KST4 (12 AWG) in accordance with IEC 62852, IP68 only when connected |
| Cable: | 12 AWG (4 mm²) PV wire, 67 + 67 in (1.7 + 1.7 m) in accordance with EN 50618 |
| Dimensions: | 68.1 x 44.0 x 1.2 in (20.77 ft²) / 1730 x 1118 x 30 mm (1.93 m²) |
| Weight: | 47.4 lbs (21.5 kg) |
| Origin: | Made in Singapore |




Measurements in inches [mm]

### ELECTRICAL DATA — Product Code*: RECxxxAA PURE-R

| | | | | |
|---|---|---|---|---|
| STC | | | | |
| Power Output - $P_{MAX}$ (Wp) | 400 | 410 | 420 | 430 |
| Watt Class Sorting - (W) | 0/+10 | 0/+10 | 0/+10 | 0/+10 |
| Nominal Power Voltage - $V_{MPP}$ (V) | 48.8 | 49.4 | 50.0 | 50.5 |
| Nominal Power Current - $I_{MPP}$ (A) | 8.20 | 8.30 | 8.40 | 8.52 |
| Open Circuit Voltage - $V_{OC}$ (V) | 58.9 | 59.2 | 59.4 | 59.7 |
| Short Circuit Current - $I_{SC}$ (A) | 8.80 | 8.84 | 8.88 | 8.91 |
| Power Density (W/ft²) | 19.26 | 19.74 | 20.22 | 20.70 |
| Panel Efficiency (%) | 20.7 | 21.2 | 21.8 | 22.3 |
| NMOT | | | | |
| Power Output - $P_{MAX}$ (Wp) | 305 | 312 | 320 | 327 |
| Nominal Power Voltage - $V_{MPP}$ (V) | 46.0 | 46.6 | 47.1 | 47.6 |
| Nominal Power Current - $I_{MPP}$ (A) | 6.64 | 6.70 | 6.80 | 6.88 |
| Open Circuit Voltage - $V_{OC}$ (V) | 55.5 | 55.8 | 56.0 | 56.3 |
| Short Circuit Current - $I_{SC}$ (A) | 7.11 | 7.16 | 7.20 | 7.24 |

Values at standard test conditions (STC: air mass AM 1.5, irradiance 10.75 W/sq ft (1000 W/m²), temperature 77°F (25°C), based on a production spread with a tolerance of $P_{MAX}$, $V_{OC}$ & $I_{SC}$ ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM 1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s). * Where xxx indicates the nominal power class ($P_{MAX}$) at STC above.

### CERTIFICATIONS

| | |
|---|---|
| IEC 61215:2016, IEC 61730:2016, UL 61730 | |
| IEC 62804 | PID |
| IEC 61701 | Salt Mist |
| IEC 62716 | Ammonia Resistance |
| UL 61730 | Fire Type Class 2 |
| IEC 62782 | Dynamic Mechanical Load |
| IEC 61215-2:2016 | Hailstone (35mm) |
| IEC 62321 | Lead-free acc. to RoHS EU 863/2015 |
| ISO 14001, ISO 9001, IEC 45001, IEC 62941 | |

Intertek Lead-Free

### TEMPERATURE RATINGS*

| | |
|---|---|
| Nominal Module Operating Temperature: | 44°C (±2°C) |
| Temperature coefficient of $P_{MAX}$: | -0.24 %/°C |
| Temperature coefficient of $V_{OC}$: | -0.24 %/°C |
| Temperature coefficient of $I_{SC}$: | 0.04 %/°C |

*The temperature coefficients stated are linear values

### MAXIMUM RATINGS

| | |
|---|---|
| Operational temperature: | -40 ... +85°C |
| System voltage: | 1000 V |
| Test load (front): | +7000 Pa (146 lbs/ft²)* |
| Test load (rear): | -4000 Pa (83.5 lbs/ft²)* |
| Series fuse rating: | 25 A |
| Reverse current: | 25 A |

* See installation manual for mounting instructions. Design load = Test load / 1.5 (safety factor)

### WARRANTY

| | Standard | REC ProTrust |
|---|---|---|
| Installed by an REC Certified Solar Professional | No | Yes |
| System Size | All | ⩽25 kW |
| Product Warranty (yrs) | 20 | 25 |
| Power Warranty (yrs) | 25 | 25 |
| Labor Warranty (yrs) | 0 | 25 |
| Power in Year 1 | 98% | 98% |
| Annual Degradation | 0.25% | 0.25% |
| Power in Year 25 | 92% | 92% |

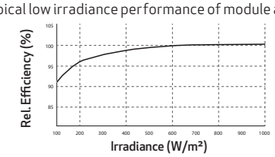
See warranty documents for details. Conditions apply

### DELIVERY INFORMATION

| | |
|---|---|
| Panels per pallet: | 33 |
| Panels per 40 ft GP/high cube container: | 858 (26 pallets) |
| Panels per 53 ft truck: | 858 (26 pallets) |

### LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:




Available from:

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.

www.recgroup.com

Specifications subject to change without notice.

Ref: PD-DS-AAPR Rev 3.1 03.23

PEGASUS

# INSTAFLASH™

**Never Deal With Caulking Again!**
Factory-installed, non-hardening sealant

***Before*** **InstaFlash Installed:**
Sealant is contained above roof surface by a protective cage.

***After*** **InstaFlash Installed:**
Sealant is compressed to fill all holes and voids.

**Protective Cage**
Prevents sealant from getting on hands or roof. Collapses upon lag installation.

## Effortless Lifetime Roof Protection

The non-hardening sealant completely fills any missed pilot holes, shingle rips, voids, or other potential water ingress points under the entire footprint of the 4.6" wide base.

**25-Year Warranty**
Manufactured with advanced materials and coatings to outlast the roof itself

**Code Compliant**
Fully IBC/CBC Code Compliant
Exceeds ASCE 7-16 Standards
FL Cert of Approval FL41396
UL2703 Certified

**Self-Healing**
The proprietary non-hardening sealant will flex and reseal over years of thermal expansion and contraction

**Larger Spans**
The extra-large L-foot and proprietary lag screw result in larger spans between mounts

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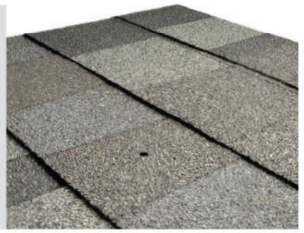
PEGASUS

INSTAFLASH™

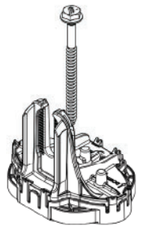
**1**
Drill pilot hole in the center of the rafter using a 7/32" bit.

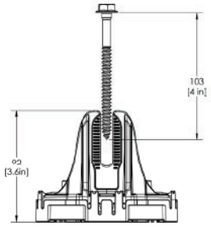


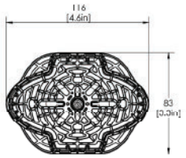
**2**
Place the InstaFlash over the pilot hole. **Note:** the direction of the InstaFlash Down arrows should point down the roof.

**3**
Insert the lag screw through the center hole into the pilot hole.

**4**
Drive the lag until the InstaFlash is fully seated to the roof.






| SPECIFICATIONS | INSTAFLASH KITS | | | | |
|---|---|---|---|---|---|
| | PIF-RB0 | PIF-RBDT | PIF-RBSH | PIF-RM0 | PIF-RMDT |
| Finish | Black | | | Mill | |
| Kit Contents | Black InstaFlash, 5/16" x 4.0" SS Lag | Black InstaFlash, 5/16" x 4.0" SS Lag, Dovetail T-bolt w/ Nut | Black InstaFlash, 5/16" x 4.0" SS Lag, M10 Hex Bolt w/ Nut | Mill Insta-Flash, 5/16" x 4.0" SS Lag | Mill InstaFlash, 5/16" x 4.0" SS Lag, Dovetail T-bolt w/ Nut |
| Attachment Type | Rafter Attached | | | | |
| Roof Type | Sloped Roof: Composition Shingle, Rolled Asphalt \| Flat roof: Modified Bitumen Roof, Built-Up Roof | | | | |
| Sealant Application | Factory Installed | | | | |
| Installation Temperature | 0°F to 170° F | | | | |
| Cure Time | Instantly Waterproof; Non-hardening | | | | |
| Service Temperature | -40°F to 195° F | | | | |
| Certifications | IBC, ASCE/SEI 7-16, FL Cert of Approval FL41396, TAS 100(A), UL2703 | | | | |
| Install Application | Most Railed Systems, Pegasus Tilt Leg Kit | | | | |
| Kit Quantity | 24 | | | | |
| Boxes per Pallet | 36 | | | | |

**SCAN FOR INSTALLATION VIDEO**

**SCAN FOR FREE TRIAL**



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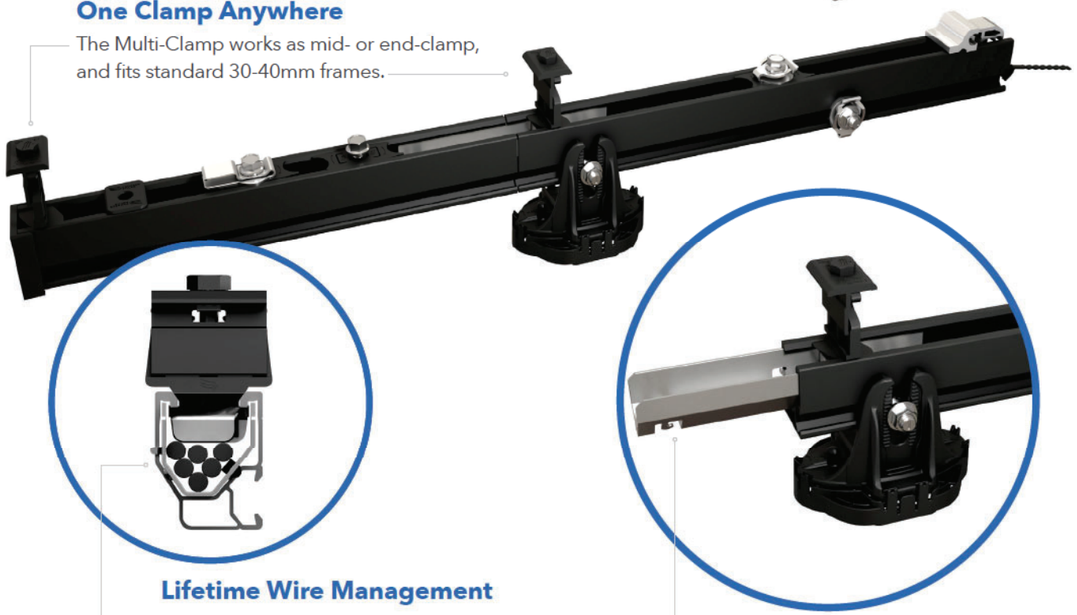
# RAIL SYSTEM

### Instant Bonding
The N-S Bonding Jumper bonds row to row with no tools.

### One Clamp Anywhere
The Multi-Clamp works as mid- or end-clamp, and fits standard 30-40mm frames.





### Lifetime Wire Management
Open rail channel holds and protects wires. Clamps won't pinch wires after tightening.



### Bonding Structural Splice
Connect rails instantly, without tools, interference or limitations.

## Next-Level Solar Mounting

A complete system for hassle-free rooftop installation, from watertight mounts to lifetime wire management.

**Simplicity**
1/2"socket for everything.
One clamp for mid or end.
No tool splicing and bonding.
Easy wire management.

**Code Compliant**
UL 2703 listed
LTR-AE-001-2012 listed
Class A fire rating for any slope
ASCE 7-16 PE Certified
FL Cert of Approval FL41396

**Premium Aesthetics**
The narrowest panel gap available. Optional Hidden End Clamps and End Caps provide a flush look on the edge of the array.

**Watertight for Life**
Secured on industry-leading Pegasus Mounts, for composite shingle and tile roofs.
Backed by a 25-year warranty.

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PEGASUS RAIL SYSTEM

**Pegasus Rail**
Available in 14' and 7' lengths for easy layout and shipping.
Open-channel design holds MC4 connectors, PV wire and trunk cables.
Black and Mill finish

**Pegasus Max Rail**
Maximum-strength design.
Meets specifications for high snow-load and hurricane zones.
Black and Mill finish

**Splice and Max Splice**
Installs by hand.
Works over mounts.
Structurally connects and bonds rails automatically; UL2703 listed as reusable.

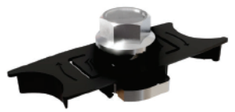
**Dovetail T-bolt**
Dovetail shape for extra strength.
Uses ½" socket.

**Multi-Clamp**
Fits 30-40mm PV frames, as mid- or end-clamp.
Twist-locks into position; doesn't pinch wires in rail.
Bonds modules to rail; UL2703 listed as reusable

**Hidden End Clamp**
Offers premium edge appearance.
Preinstalled pull-tab grips rail edge, allowing easy, one-hand installation.
Tucks away for reuse.

**Ground Lug**
Holds 6 or 8 AWG wire.
Mounts on top or side of rail.
Assembled on MLPE Mount.
UL2703 listed as reusable.

**N-S Bonding Jumper**
Installs by hand, eliminates row-to-row copper wire.
UL2703 listed as reusable only with Pegasus Rail.



**MLPE Mount**
Secures and bonds most micro-inverters and optimizers to rail.
Connectors and wires easily route underneath after installation.
UL2703 listed as reusable.

**Cable Grip**
Secures four PV wires or two trunk cables.
Stainless-steel backing provides durable grip.
Eliminates sagging wires.

**Wire Clip**
Hand operable.
Holds wires in channel.
Won't slip.

**End Cap and Max End Cap**
Fits flush to PV module and hides raw or angled cuts.
Hidden drain quickly clears water from rail.

**Certifications:**
- UL 2703, Edition 1
- LTR-AE-001-2012
- ASCE 7-16 PE certified
- Class A fire rating for any slope roof
- FL Cert of Approval FL41396

**FREE**
PEGASUS SOLAR
**Design Tool**
Quickly calculate the most efficient layout, spans and materials needed to suit your job. Visit the Pegasus Customer Portal. **pegasussolar.com/portal**



| LOAD | | SPAN | | | | |
|---|---|---|---|---|---|---|
| SNOW (psf) | WIND (MPH) | 32" | 48" | 72" | 96" | 120" |
| 0 | 100 | | | | | |
| | 130 | | | | | |
| 10 | 140 | | | | | |
| 30 | 190 | | | | | |
| 50 | | | | | | |
| 100 | | | | | | |
| 120 | | | | | | |

PEGASUS RAIL
PEGASUS MAX RAIL

For reference only. Spans above are calculated using 7-16 for a Gable Roof, Exposure Category B, 0-20deg roof angle, 30ft mean roof height with non-exposed modules. For PE certified span tables, visit *www.pegasussolar.com/spans*.

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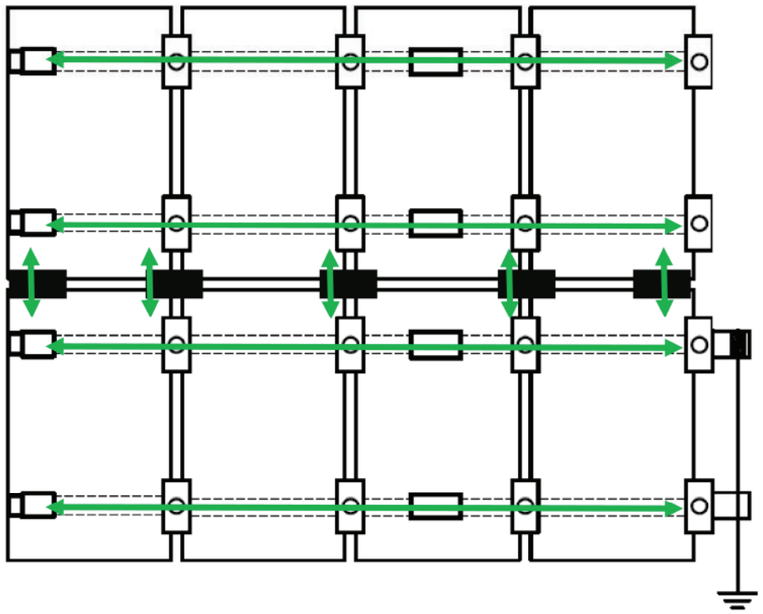
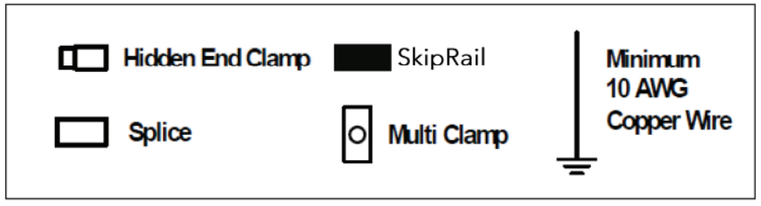
# Pegasus Rail System - Bond Path to Ground

## SkipRail System



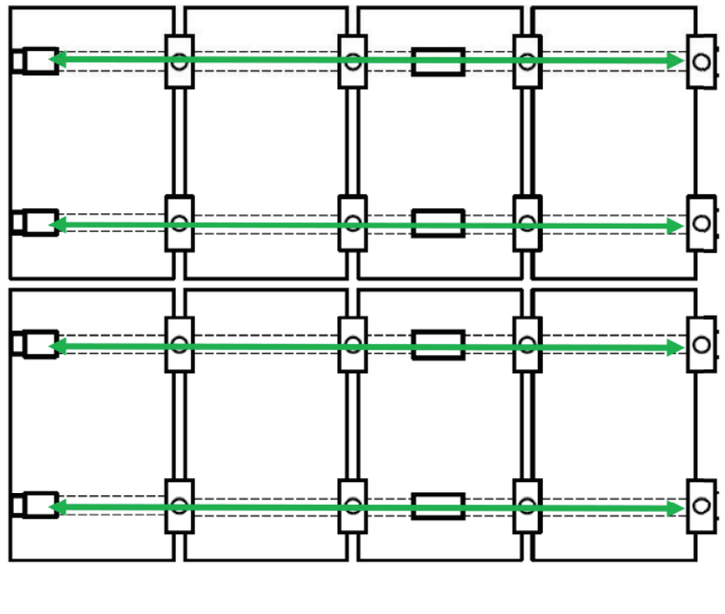


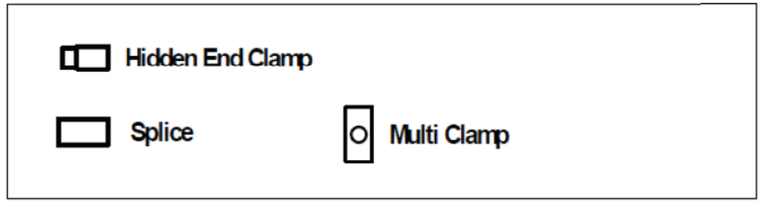

Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. The SkipRail Splices will provide a bonding path between rows of PV modules, so that one Ground Lug per array is necessary for earth ground. If a thermal break is left between two sections or Rail, the Multi-Clamps will provide a bond path across the two Rails through the PV module frame.



# Pegasus Rail System - Bond Path to Ground

## Using Enphase Products





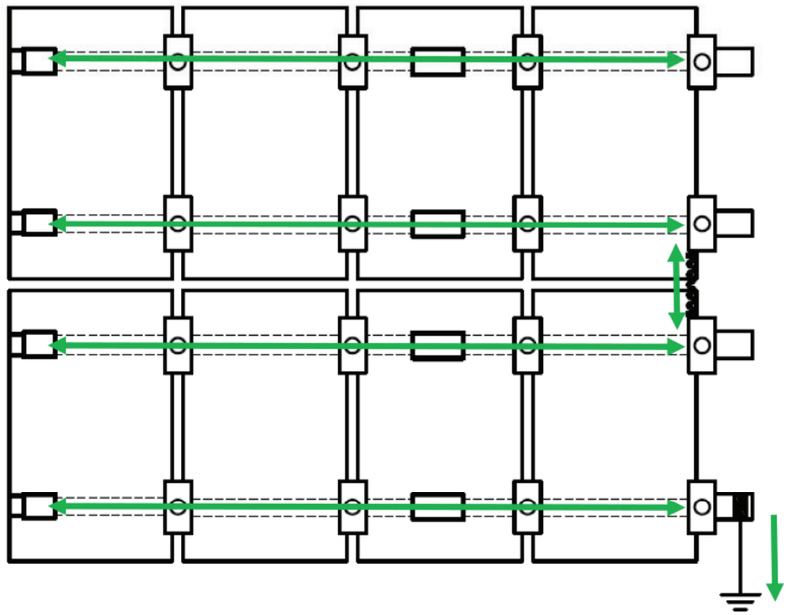

Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. The MLPE Mount creates a bond connection to the MLPE. When using Enphase products, Ground Lug, N-S Bonding Jumpers, or other equipment ground conductors (EGC) are not required, and the use of the Enphase products satisfies the UL2703 bonding and grounding requirements.

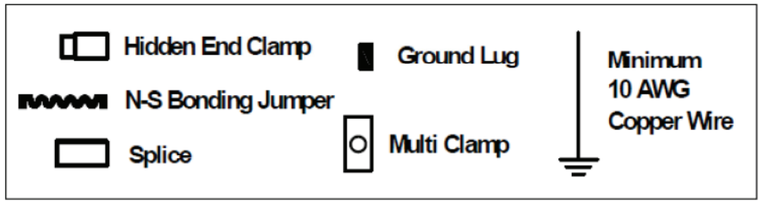
Compatible Enphase products:

- Microinverters M250-72, M250-60, M215-60, C250-72; with Engage cables ETXX-240, ETXX-208, ETXX-277

# Pegasus Rail System - Bond Path to Ground

## Ground Lug & N-S Bonding Jumper






Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. The N-S Bonding Jumper will provide a bonding path between rows of PV modules, so that one Ground Lug per array is necessary for earth ground. If a thermal break is left between two sections or Rail, the Multi-Clamps will provide a bond path across the two Rails through the PV module frame.

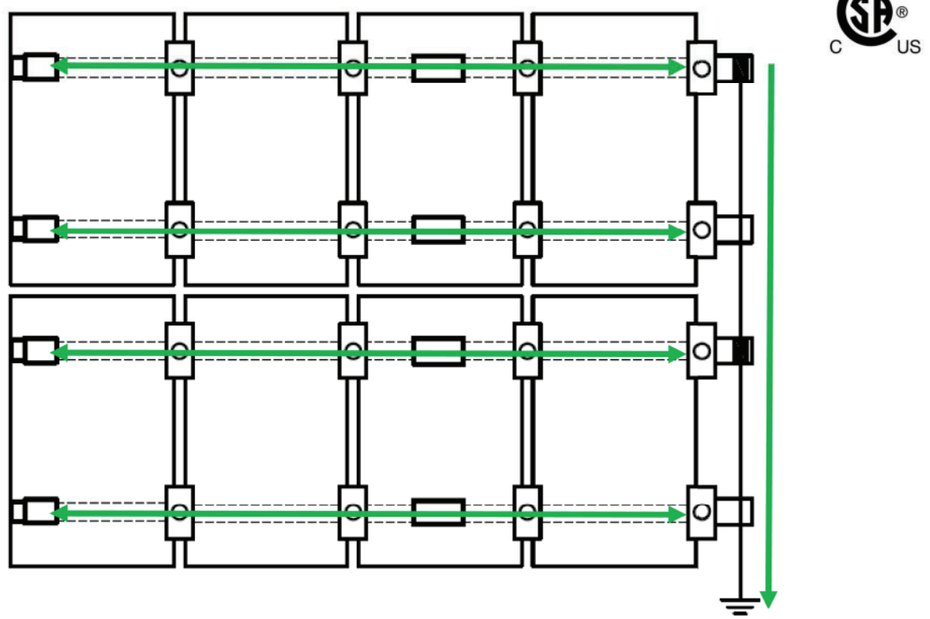
The N-S Bonding Jumper may only be used with the Pegasus Rail System, and is not certified for use with any other mounting system.

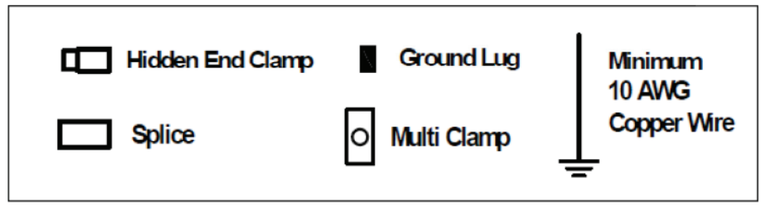
If the N-S Bonding Jumper needs to be removed during maintenance, a second N-S Bonding Jumper shall first be



# Pegasus Rail System - Bond Path to Ground

## Ground Lug for each PV Module Row






Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. One Ground Lug is required per row of PV Modules, with a final earth ground connection at the terminal end of the ground wire. If a thermal break is left between two sections or Rail, the Multi-Clamps will provide a bond path across the two Rails through the PV module frame.

# Appendix A - Compatible PV Mod-

Pegasus Rail System may be used to ground a PV module complying with UL 2703 only when the specific module has been evaluated for grounding and/or mounting in compliance with this installation manual. Unless otherwise specified, "xxx" refers to the power rating of the PV module. Both black & silver frames are included in the UL2703 listing.

C US

| Manufacturer | Model |
|---|---|
| Auxin | AXN6M612Txxx |
| Aptos | DNA-144-BF26-xxxW; DNA-144-MF26-xxxW; DNA-120-BF26-xxxW; DNA-120-MF26-xxxW; DNA-120-MF10-xxxW; DNA-120-BF10-xxxW; DNA-108-BF10-xxxW; DNA-108-MF10-xxxW |
| Axitec | AC-xxxM/156-60S; AC-xxxM/60S; AC-xxxMH/120S; AC-xxxMH/144S |
| Boviet | BVM6610M-xxx; BVM6610P-xxx |
| Canadian Solar | CS1H-xxxMS: CS1K-xxxMS; CS1Y-xxxMS; CS3K-xxxMS; CS3U-xxxMS; CS6K-xxxM; CS6K-xxxMS; CS6K-xxxP; CS6U-xxxM; CS6U-xxxP; CS6X-xxxM; CS6X-xxxP; BiHiKu CS3W-xxxMB-AG; CS3L-xxxMS; CS6R-xxxMS; CS3W-xxxPB-AG; CS3W-xxxP; CS3W-xxxMS; CS3L-xxxP; CS3L-xxxMS; CS3N-xxxMS; CS6W-xxxMB-AG; CS7N-xxxMB-AG |
| CertainTeed | CTxxxHC11-04; CTxxxM10-02; CTxxxM11-02; CTxxxM11-03; CTxxxHC00-04; CTxxxHC12-06; CTxxxHC11-06 |
| Chint Solar | CHSM6612M-xxx |
| Freedom Forever | FF-MP-BBB-xxx |
| Hansol | HSxxxTD-AN3 |
| Heliene | Heliene20M xxx; Heliene36M xxx; Heliene36P xxx; Heliene60M xxx; Heliene60P xxx; Heliene72M Bifacial xxx; Heliene72P xxx; Heliene96M xxx Bifacial; Heliene96M xxx; Heliene 96P xxx; HSPE-144M M6 HC Bifacial xxx; HSPE 120M M6 HC Monofacial xxx; 144HC-M10-Bifacial; 460-144M-HC-M6 |
| Hyundai | HiD-SxxxRG(BK); HiS-MxxxRG; HIS-SxxxKI; HiS-SxxxRG; HiS-SxxxRG(BK); HiS-SxxxRI; HiS-SxxxTI; HIA-SxxxHI |
| JA Solar | JAM72S01-xxx/PR; JAP72S01-xxx/SC; JAM72D20-xxx/MB |
| Jinko | JKMxxxM-60: JKMxxxM-60B; JKMxxxM-60BL; JKMxxxM-60HBL; JKMxxxM-60HL; JKMxxxM-60L; JKMxxxM-60-V; JKMxxxM-72; JKMxxxM-72HL-V; JKMxxxM-72H-V; JKMxxxM-72-V; JKMxxxP-60; JKMxxxPP-60; JKMxxxN-6RL3; JKMxxxM-6RL3-B; JKMxxxM-7RL3-TV |
| LG | LGN1K-G4; LGS1C-A5; LGxxxA1C-A5; LGxxxE1C-A5; LGxxxE1K-A5; LGxxxN1C-A3; LGxxxN1C-A5; LGxxxN1C-B3; LGxxxN1C-G3; LGxxxN1C-G4; LGxxxN1C-V5; LGxxxN1C-Z4; LGxxxN1K-A5; LGxxxN1K-G4; LGxxxN1K-V5; LGxxxN1K-Z4; LGxxxN2T-A5; LGxxxN2W-A5; LGxxxN2W-G4; LGxxxN2W-V5; LGxxxN2W-L5; LGxxxQ1C-A5; LGxxxQ1C-V5; LGxxxQ1K-A5; LGxxxQ1K-V5; LGxxxS1C-A5; LGxxxS1C-G4; LGxxxS2W-A5; LGxxxN1K-L5; LGxxxNIC-N5; LGxxxM1K-A6; LGxxxN1K-B6; LGxxxQ1C-A6; LGxxxQAC-A6; LGxxxQAK-A6; LGxxxM1C-A6; LGxxxN2W-E6; LGxxxN2T-E6; LGxxxN1K-E6; LGxxxN3K-V6; LGxxxN1C-A6 |
| Longi | LR6-60BP-xxx; LR6-60HPB-xxx; LR6-60HPH-xxx; LR6-60PB-xxx; LR6-60PE-xxx; LR6-60-xxx; LR4-60HPH-xxxM; LR4-HPB-xxxM; LR4-72HPH-xxxM; LR4-72HBD-xxxM; LR5-54HPH-xxxM; LR5-72HBD-xxxM |
| Maxeon | SPR-MAX3-xxx-COM; SPR-MAX3-xxx-BLK; SPR-MAX5-xxx-COM; SPR-MAX6-xxx-COM; SPR-X21/22-xxx-COM; SPR-MAX3-XXX-BLK-R; |
| Mission Solar | MSE60Axxx; MSExxxSB1A; MSExxxSO6J; MSExxxSQ5K; MSExxxSQ5T; MSExxxSQ8K; MSExxxSQ8T; MSExxxSQ9S; MSExxxSX6S; MSExxxSX6W; MSExxxSX5T; MSExxxSX5K; MSExxxSX5R; MSExxxSX6Z; MSExxxSX9R; MSExxxSX9Z |
| Mitrex | Mxxx-L3H; Mxxx-I3H; Mxxx-H1H; Mxxx-B1F; Mxxx-A1F |
| Panasonic | VBHNxxxKA01; VBHNxxxKA03; VBHNxxxSA16; VBHNxxxSA16B; VBHNxxxSA17; VBHNxxxSA17E; EVPVxxx; EVPVxxxK; EVPVxxxPK; EVPVxxxH |
| Philadelphia Solar | PS-M60(BF)-xxx; PS-M72(BF)-xxx |
| QCells | Q.Peak 265; Q.PEAK BLK-G3.1 xxx; Q.PEAK BLK-G4.1 xxx; Q.PEAK DUO BLK-G5 xxx; Q.PEAK DUO BLK-G5/SC xxx; Q.PEAK DUO BLK-G6+ xxx; Q PEAK DUO G6+ xxx AC ENP IQ7+; Q PEAK DUO BLK G9+ xxx; Q.PEAK DUO L-G5.2 xxx; Q.PEAK DUO L-G5.3 xxx; Q.Peak Duo-G5 xxx; Q.PEAK DUO-G5/SC xxx; Q.PEAK DUO-G7 xxx; Q.PEAK G4.1 xxx; Q.PEAK G4.1/ Max xxx; Q.PEAK G4.1/SC xxx; Q.PEAK G4.1/TAA xxx; Q.PEAK L-G4.2 xxx; Q.PLUS BFR G4.1 xxx; Q.PLUS BFR-G4.1/TAA xxx; Q.PLUS L-G4.1 xxx; Q.PLUS L-G4.2 xxx; Q.PLUS L-G4.2/TAA xxx; Q.PRO BFR-G4.1 xxx; Q.PEAK DUO L-G8.2 xxx; Q.PEAK DUO BLK-G8 xxx; Q.PEAK DUO BLK-G8+ xxx; Q.PEAK DUO BLK ML G9 xxx; Q.PEAK DUO BLK ML G9+ xxx; Q.PEAK DUO BLK-G10 xxx; Q.PEAK DUO BLK-G10+ xxx; Q.Peak DUO ML-G10+; Q.Peak DUO BLK ML-G10.a+; Q.Peak Duo XL 10.d/BFG; Q.PEAK DUO-G10 xxx; Q.PEAK DUO-G10+ xxx; Q.PEAK DUO-G10.a xxx; Q.PEAK DUO-G10.a+ xxx; Q.PEAK DUO BLK-G10.a xxx; Q.PEAK DUO BLK-G10.a+ xxx; Q.PEAK DUO ML-G10 xxx; Q.PEAK DUO ML-G10.a xxx; Q.PEAK DUO ML-G10.a+ xxx; Q.PEAK DUO BLK ML-G10 xxx; Q.PEAK DUO BLK ML-G10+ xxx; Q.PEAK DUO BLK ML-G10.a xxx; Q.Peak Duo ML-G10+/t xxx; Q.Tron BLK M-G2+ xxx; Q.Tron M-G2+ xxx; |
| REC | RECxxxNP; RECxxxNP Black; RECxxxPE; RECxxxPE 72; RECxxxPE(BLK); RECxxxTP; RECxxxTP BLK; RECxxxTP2; RECxxxTP2 BLK; RECxxxTP2 BLK Q2; RECxxxTP2 BLK2; RECxxxTP2M; RECxxxTP2S 72; RECxxxAA; RECxxxAA Pure; RECxxxAA Black; RECxxxAA 72; RECxxxAA PURE-R; |
| S-Energy | SNxxxM-10; SNxxxM-10(B); SNxxxM-10T; SC20-60MBE-xxxM |
| SEG | SEG-xxx-BMA-HV; SEG-xxx-BMA-TB; SEG-xxx-BMA-BG; SEG-xxx-BMB-HV; SEG-xxx-BMA-BG; SEG-xxx-BMD-HV_; SEG-xxx-BMD-TB; SEG-xxx-BMB-BG; SEG-xxx-BMC-HV; SEG-xxx-BMC-TB; SEG-xxx-BMC-BG |
| Silfab | SILxxxBL; SILxxxNL; SLAxxxM; SLAxxxM; SLGxxxM; SSAxxxM; SIL-xxxNX; SIL-xxxHL; SIL-xxxNX; SIL-xxxBK; SIL-xxxHC; SIL-xxxHC+; SIL-xxxBG; SIL-xxxHN; SIL-xxxHM |
| Solar4America | S4A410-72MH5BB, S4A33-60MH5BB |



# Appendix B - SkipRail Compatible PV Modules

The following PV modules are structurally compatible with the SkipRail installation method.

| Manufacturer | Model |
|---|---|
| Aptos | DNA-144-BF26-xxxW; DNA-144-MF26-xxxW; DNA-120-BF26-xxxW; DNA-120-MF26-xxxW; DNA-120-MF10-xxxW; DNA-120-BF10-xxxW; DNA-108-BF10-xxxW; DNA-108-MF10-xxxW |
| Jinko | JKMxxxM-72HL-V; JKMxxxM-72HBL-V; JKMxxxM-6RL3-V; JKMxxxM-6RL3-B |
| Longi | LR6-60BP-xxx; LR6-60HPB-xxx; LR6-60HPH-xxx; LR6-60PB-xxx; LR6-60PE-xxx; LR6-60-xxx; LR4-60HPH-xxxM; LR4-60HPB-xxxM; LR4-72HPH- xxxM; LR4-72HBD-xxxM; LRS-54HPH-xxxM; LRS-54HPB-xxxM; LRS-54HABB-xxxM; LRS-54HABD-xxxM; LRS-66HPH-xxxM |
| QCells | Q.PEAK DUO BLK-G10 xxx; Q.PEAK DUO BLK-G10+ xxx; Q.Peak DUO ML-G10+; Q.Peak DUO BLK ML-G10.a+; Q.Peak Duo XL 10.d/BFG; Q.PEAK DUO-G10 xxx; Q.PEAK DUO-G10+ xxx; Q.PEAK DUO-G10.a xxx; Q.PEAK DUO-G10.a+ xxx; Q.PEAK DUO BLK-G10.a xxx; Q.PEAK DUO BLK-G10.a+ xxx; Q.PEAK DUO ML-G10 xxx; Q.PEAK DUO ML-G10.a xxx; Q.PEAK DUO ML-G10.a+ xxx; Q.PEAK DUO BLK ML-G10 xxx; Q.PEAK DUO BLK ML-G10+ xxx; Q.PEAK DUO BLK ML-G10.a xxx; Q.Peak Duo ML-G10+/t xxx |
| Mission Solar | MSExxxSX6W; MSExxxSX5T; MSExxxSX5K; MSExxxSX6Z; MSExxxSX6S; MSExxxSX9R; MSExxxSX9Z |
| REC | RECxxxNP; RECxxxNP Black; RECxxxPE; RECxxxPE 72; RECxxxPE(BLK); RECxxxTP; RECxxxTP BLK; RECxxxTP2; RECxxxTP2 BLK; RECxxxTP2 BLK Q2; RECxxxTP2 BLK2; RECxxxTP2M; RECxxxTP2S 72; RECxxxAA; RECxxxAA Black; RECxxxAA 72; RECxxxNP3; RECxxxNP3 Black; RECxxxNP2; RECxxxNP2 Black; RECxxxAA Pure; RECxxxAA Pure-R |
| SEG Solar | SEG-xxx-BTB-BG; SEG-xxx-BTD-BG; SEG-xxx-BMB-HV; SEG-xxx-BMD-HV; SEG-xxx-BMB-BG; SEG-xxx-BMD-BG; SEG-xxx-BMB-TB; SEG-xxx-BMD-TB |
| Silfab | SIL-xxxHC |
| URE Co. | FBMxxxMFG; FBMxxxMFG-BB |
| Waaree | WSMDi-xxx |
| ZN Shine | ZXM7-UHLDD144-xxx/N; ZXM7-SHLDD144-xxx/M; ZXM6-NHLDD144xxx/M |

# Eaton general duty cartridge fuse safety switch

**DG222NRB**

**UPC:**782113144221

**Dimensions:**

- **Height:** 14.37 IN
- **Length:** 7.35 IN
- **Width:** 8.4 IN

**Weight:**10 LB

**Notes:**Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

**Warranties:**

- Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

**Specifications:**

- **Type:** General duty, cartridge fused
- **Amperage Rating:** 60A
- **Enclosure:** NEMA 3R
- **Enclosure Material:** Painted galvanized steel
- **Fuse Class Provision:** Class H fuses
- **Fuse Configuration:** Fusible with neutral
- **Number Of Poles:** Two-pole
- **Number Of Wires:** Three-wire
- **Product Category:** General duty safety switch
- **Voltage Rating:** 240V

**Supporting documents:**

- Eatons Volume 2-Commercial Distribution
- Eaton Specification Sheet - DG222NRB

**Certifications:**

- UL Listed

**Product compliance:** No Data

pe.eaton.com

# Eaton general duty non-fusible safety switch

**DG222URB**

**UPC:**782113144238

**Dimensions:**

- **Height:** 14.38 IN
- **Length:** 7.38 IN
- **Width:** 8.69 IN

**Weight:**9 LB

**Notes:**WARNING! Switch is not approved for service entrance unless a neutral kit is installed.

**Warranties:**

- Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

**Specifications:**

- **Type:** Non-fusible, single-throw
- **Amperage Rating:** 60A
- **Enclosure:** NEMA 3R, Rainproof
- **Enclosure Material:** Painted galvanized steel
- **Fuse Configuration:** Non-fusible
- **Number Of Poles:** Two-pole
- **Number Of Wires:** Two-wire
- **Product Category:** General duty safety switch
- **Voltage Rating:** 240V

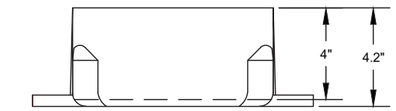
**Supporting documents:**

- Eatons Volume 2-Commercial Distribution
- Eaton Specification Sheet - DG222URB

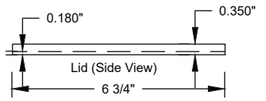
**Certifications:**

- UL Listed

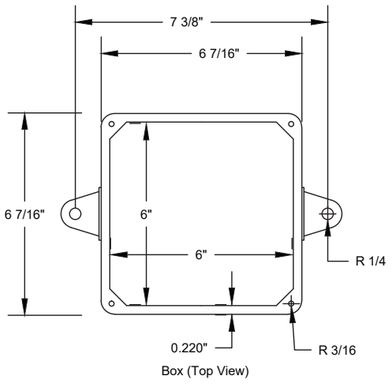
**Product compliance:** No Data



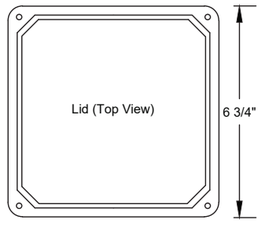

Box (Side View)



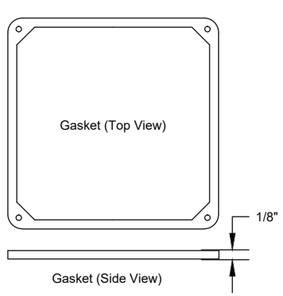

Lid (Side View)




Box (Top View)

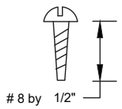


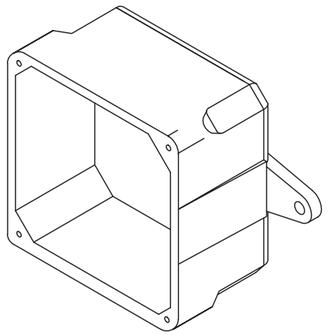

Lid (Top View)




Gasket (Top View)

Gasket (Side View)



UL Listed
Marine Listed
UL File # E205935 (QCUP)
UL Control # 92CM
Material is Rigid PVC
132 cu in Volume (2163 cu cm)
Screws are Zinc Plated Steel
Gasket is neoprene

CANTEX INC.
Fort Worth, TEXAS

# Junction Box 6 x 6 x 4

| Drawn By: O.M. | Date: 6/19/17 | 5133710 |
|---|---|---|

# Powerwall 3

## Power Everything

—

Powerwall 3 is a fully integrated solar and battery system, designed to accelerate the transition to sustainable energy. Customers can receive whole home backup, cost savings, and energy independence by producing and consuming their own energy while participating in grid services. Once installed, customers can manage their system using the Tesla App to customize system behavior to meet their energy goals.

Powerwall 3 achieves this by supporting up to 20 kW DC of solar and providing 11.5 kW AC of continuous power per unit. It has the ability to start heavy loads up to 185 A LRA, meaning a single unit can support the power needs of most homes. Powerwall 3 is designed for mass production, fast and efficient installations, easy system expansion, and simple connection to any electrical service.



# Powerwall 3 Technical Specifications

## System Technical Specifications

| | |
|---|---|
| **Model Number** | 1707000-xx-y |
| **Nominal Grid Voltage (Input & Output)** | 120/240 VAC |
| **Grid Type** | Split phase |
| **Frequency** | 60 Hz |
| **Overcurrent Protection Device** | Configurable up to 60 A |
| **Solar to Battery to Home/Grid Efficiency** | 89% [1,2] |
| **Solar to Home/Grid Efficiency** | 97.5% [3] |
| **Supported Islanding Devices** | Backup Gateway 2, Backup Switch |
| **Connectivity** | Wi-Fi (2.4 and 5 GHz), Dual-port switched Ethernet, Cellular (LTE/4G [4]) |
| **Hardware Interface** | Dry contact relay, Rapid Shutdown (RSD) certified switch and 2-pin connector, RS-485 for meters |
| **AC Metering** | Revenue Grade (+/- 0.5%) |
| **Protections** | Integrated arc fault circuit interrupter (AFCI), Isolation Monitor Interrupter (IMI), PV Rapid Shutdown (RSD) using Tesla Mid-Circuit Interrupters |
| **Customer Interface** | Tesla Mobile App |
| **Warranty** | 10 years |

## Solar Technical Specifications

| | |
|---|---|
| **Maximum Solar STC Input** | 20 kW |
| **Withstand Voltage** | 600 V DC |
| **PV DC Input Voltage Range** | 60 — 550 V DC |
| **PV DC MPPT Voltage Range** | 150 — 480 V DC |
| **MPPTs** | 6 |
| **Maximum Current per MPPT ($I_{mp}$)** | 13 A [5] |
| **Maximum Short Circuit Current per MPPT ($I_{sc}$)** | 15 A [5] |

## Battery Technical Specifications

| | |
|---|---|
| **Nominal Battery Energy** | 13.5 kWh AC [2] |
| **Maximum Continuous Discharge Power** | 11.5 kW AC |
| **Maximum Continuous Charge Power** | 5 kW AC |
| **Output Power Factor Rating** | 0 - 1 (Grid Code configurable) |
| **Maximum Continuous Current** | 48 A |
| **Maximum Output Fault Current** | 10 kA |
| **Load Start Capability (1 s)** | 185 A LRA |
| **Power Scalability** | Up to 4 Powerwall 3 units supported |

[1] Typical solar shifting use case.

[2] Values provided for 25°C (77°F), at beginning of life. 3.3 kW charge/discharge power.

[3] Tested using CEC weighted efficiency methodology.

[4] Cellular connectivity subject to network service coverage and signal strength.

[5] Where the DC input current exceeds the MPPT rating, a jumper can be used to combine two MPPTs into a single input to intake DC current up to 26 A $I_{MP}$ / 30 A $I_{SC}$.

# Powerwall 3 Technical Specifications

## Environmental Specifications

| | |
|---|---|
| **Operating Temperature** | –20°C to 50°C (–4°F to 122°F) [6] |
| **Operating Humidity (RH)** | Up to 100%, condensing |
| **Storage Temperature** | –20°C to 30°C (–4°F to 86°F), up to 95% RH, non-condensing, State of Energy (SOE): 25% initial |
| **Maximum Elevation** | 3000 m (9843 ft) |
| **Environment** | Indoor and outdoor rated |
| **Enclosure Rating** | NEMA 3R |
| **Ingress Rating** | IP67 (Battery & Power Electronics)<br>IP45 (Wiring Compartment) |
| **Pollution Rating** | PD3 |
| **Operating Noise @ 1 m** | < 50 db(A) typical<br><62 db(A) maximum |

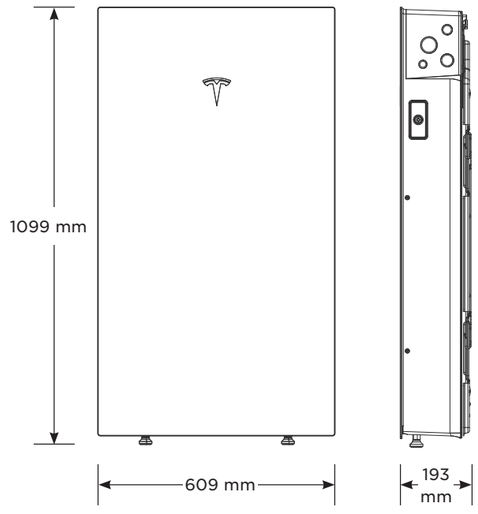
[6] Performance may be de-rated at operating temperatures above 40°C (104°F).

## Compliance Information

| | |
|---|---|
| **Certifications** | UL 1642, UL 1699B, UL 1741, UL 1741 SA, UL 1741 SB, UL 1741 PCS, UL 3741, UL 1973, UL 1998, UL 9540, IEEE 1547-2018, IEEE 1547.1, UN 38.3 |
| **Grid Connection** | United States |
| **Emissions** | FCC Part 15 Class B |
| **Environmental** | RoHS Directive 2011/65/EU |
| **Seismic** | AC156, IEEE 693-2005 (high) |
| **Fire Testing** | Meets the unit level performance criteria of UL 9540A |

## Mechanical Specifications

| | |
|---|---|
| **Dimensions** | 1099 x 609 x 193 mm (43.25 x 24 x 7.6 in) |
| **Weight** | 130 kg (287 lb) |
| **Mounting Options** | Floor or wall mount |






# Solar Shutdown Device Technical Specifications

—

The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is part of the PV system rapid shutdown (RSD) function in accordance with Article 690 of the applicable NEC. When paired with Powerwall 3, solar array shutdown is initiated by any loss of AC power.

## Electrical Specifications

| **Model** | **MCI-1** | **MCI-2** |
|---|---|---|
| **Nominal Input DC Current Rating ($I_{MP}$)** | 13 A | 13 A |
| **Maximum Input Short Circuit Current ($I_{SC}$)** | 19 A | 17 A |
| **Maximum System Voltage (PVHCS)** | 600 V DC | 1000 V DC [7] |

[7] Maximum System Voltage is limited by Powerwall to 600 V DC.

## RSD Module Performance

| | | |
|---|---|---|
| **Maximum Number of Devices per String** | 5 | 5 |
| **Control** | Power Line Excitation | Power Line Excitation |
| **Passive State** | Normally Open | Normally Open |
| **Maximum Power Consumption** | 7 W | 7 W |
| **Warranty** | 25 years | 25 years |

## Environmental Specifications

| | | |
|---|---|---|
| **Operating Temperature** | -40°C to 50°C<br>(-40°F to 122°F) | -45°C to 70°C<br>(-49°F to 158°F) |
| **Storage Temperature** | –30°C to 70°C<br>(–22°F to 158°F) | –30°C to 70°C<br>(–22°F to 158°F) |
| **Enclosure Rating** | NEMA 4X / IP65 | NEMA 4X / IP65 |

## Mechanical Specifications

| | | |
|---|---|---|
| **Electrical Connections** | MC4 Connector | MC4 Connector |
| **Housing** | Plastic | Plastic |
| **Dimensions** | 125 x 150 x 22 mm<br>(5 x 6 x 1 in) | 173 x 45 x 22 mm<br>(6.8 x 1.8 x 1 in) |
| **Weight** | 350 g (0.77 lb) | 120 g (0.26 lb) |
| **Mounting Options** | ZEP Home Run Clip<br>M4 Screw (#10)<br>M8 Bolt (5/16")<br>Nail / Wood screw | Wire Clip |

## Compliance Information

| | |
|---|---|
| **Certifications** | UL 1741 PVRSE, UL 3741,<br>PVRSA (Photovoltaic Rapid Shutdown Array) |
| **RSD Initiation Method** | External System Shutdown Switch or<br>Powerwall 3 Enable Switch |

## UL 3741 PV Hazard Control (and PVRSA) Compatibility

See Powerwall 3 Installation Manual

# Backup Gateway 2

—

Backup Gateway 2 controls connection to the grid when paired with Powerwall 3, automatically detecting outages and providing seamless transition to backup power. Backup Gateway 2 also provides energy metering for solar self-consumption, time-based control, and backup operation.

In this system configuration, Powerwall 3 acts as the Site Controller, with the Backup Gateway 2 Site Controller disabled.

## Performance Specifications

| | |
|---|---|
| **Model Number** | 1232100-xx-y |
| **AC Voltage (Nominal)** | 120/240 V |
| **Feed-in Type** | Split phase |
| **Grid Frequency** | 60 Hz |
| **Current Rating** | 200 A |
| **Maximum Supply Short Circuit Current** | 10 kA [8] |
| **Overcurrent Protection Device** | 100 - 200 A, Service entrance rated [9] |
| **Overvoltage Category** | Category IV |
| **Internal Primary AC Meter** | Revenue accurate (+/- 0.2%) |
| **Internal Auxiliary AC Meter** | Revenue accurate (+/- 2%) |
| **Primary Connectivity** | Ethernet, Wi-Fi |
| **Secondary Connectivity** | Cellular (3G, LTE/4G) [10] |
| **User Interface** | Tesla App |
| **Operating Modes** | Support for solar self-consumption, time-based control, and backup |
| **Backup Transition** | Automatic disconnect for seamless backup |
| **Modularity** | Supports up to 10 AC-coupled Powerwalls |
| **Optional Internal Panelboard** | 200 A 6-space / 12 circuit breakers Siemens QP or Square D HOM breakers rated 10 - 80A or Eaton BR breakers rated 10 - 125A |
| **Warranty** | 10 years |

[10] When protected by Class J fuses, Backup Gateway 2 is suitable for use in circuits capable of delivering not more than 22kA symmetrical amperes.

[11] The customer is expected to provide internet connectivity for Backup Gateway 2; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.

## Environmental Specifications

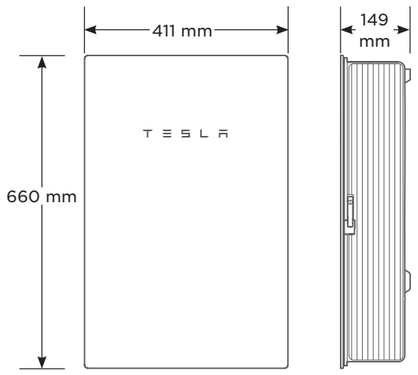
| | |
|---|---|
| **Operating Temperature** | -20°C to 50°C (-4°F to 122°F) |
| **Operating Humidity (RH)** | Up to 100%, condensing |
| **Maximum Elevation** | 3000 m (9843 ft) |
| **Environment** | Indoor and outdoor rated |
| **Enclosure Type** | NEMA 3R |

## Compliance Information

| | |
|---|---|
| **Certifications** | UL 67, UL 869A, UL 916, UL 1741 PCS, CSA 22.2 0.19, CSA 22.2 205 |
| **Emissions** | FCC Part 15, ICES 003 |

## Mechanical Specifications

| | |
|---|---|
| **Dimensions** | 660 x 411 x 149 mm (26 x 16 x 6 in) |
| **Weight** | 20.4 kg (45 lb) |
| **Mounting options** | Wall mount, Semi-flush mount |



## Project information

| | | | |
|---|---|---|---|
| Installer | **Freedom Solar Power** | Project Name | **Rainer Spies** |
| | | Project Number | **114400** |
| Project Address | **102 Serendipity Drive, Fuquay-Varina, NC 27526 USA** | AHJ/ASCE | **Harnett County/7-16** |
| | | Wind / Exp. Cat. / Snow | **115.0mph / B / 15 psf** |

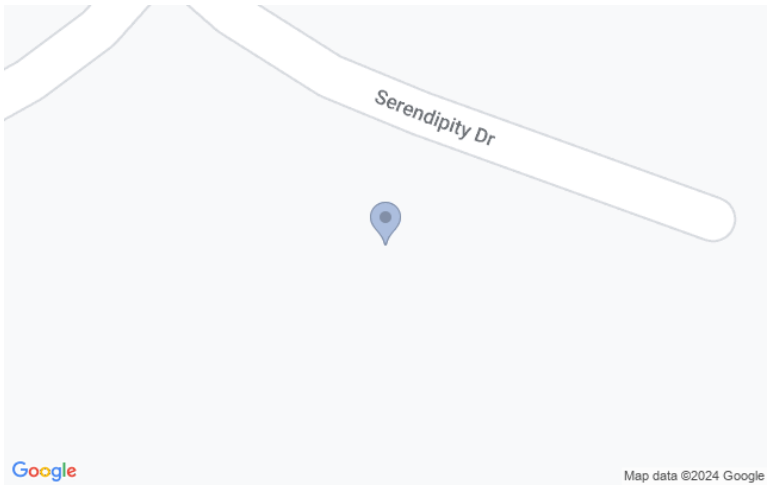
## Equipment Type

| | |
|---|---|
| Module | **REC REC420AA-Pure-R** |
| Inverter | **-** |
| Battery | **--** |

## Summary

| | |
|---|---|
| Total modules | **15** |
| Total watts | **6300 W** |
| Total Attachments | **33** |

## Location preview

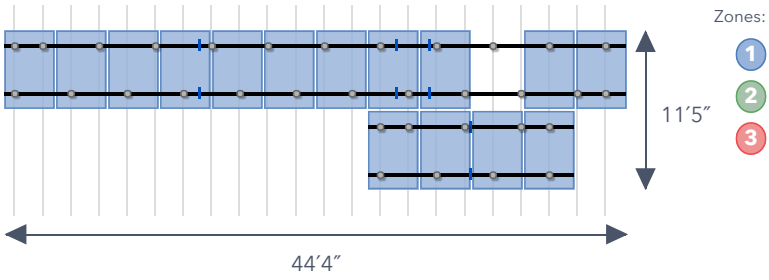




## Arrays

| | | | |
|---|---|---|---|
| **Array 1** | | Roof Type: **Gable**<br>Roof Material: **Comp** | SkipRail: **No**<br>Roof Slope: **27°** |

## Array 1 Dual Rail




### Details

Roof Type: **27° Comp Gable**
Rafter Spacing: **24.0"**
SkipRail: **No**
Use Scrap Rail: **Yes**
Hidden End Clamp: **Yes**
Attachment Type: **Instaflash**
Rail: **1 x 7ft, 10 x 14ft**

### Layout

Panels: **15**
Panel Size: **68.11″ x 44.02″ x 30mm**

### Design Notes

System Weight: **827.9 lbs**
System Weight/Attachment: **25.1 lbs**
Attachments: **33**
Total Area: **312 sqft**

### Engineering

**Exposed Mounts:**

| Landscape | Portrait |
|---|---|
| Zone 1: **100.0″** | Zone 1: **73.1″** |
| Zone 2: **99.5″** | Zone 2: **68.5″** |
| Zone 3: **97.2″** | Zone 3: **62.3″** |

**Non-exposed Mounts:**

| Landscape | Portrait |
|---|---|
| Zone 1: **100.0″** | Zone 1: **73.1″** |
| Zone 2: **99.5″** | Zone 2: **73.1″** |
| Zone 3: **97.2″** | Zone 3: **73.1″** |

## Bill of Materials

| Part Info | Array 1 | Spares | Total QTY |
|---|---|---|---|
| **PSR-B84** \| Pegasus Rail - Black 84" | 1 | - | 1 |
| **PSR-B168** \| Pegasus Rail - Black 168" | 10 | - | 10 |
| **PSR-SPL** \| Pegasus - Bonded Structural Splice | 8 | - | 8 |
| **PSR-MCB** \| Pegasus - Multi-Clamp - Mid/End 30-40mm - Full Black | 28 | - | 28 |
| **PSR-HEC** \| Pegasus - Hidden End Clamp | 8 | - | 8 |
| **PSR-MLP** \| Pegasus - MLPE Mount | 15 | - | 15 |
| **PSR-LUG** \| Pegasus - Ground Lug | 1 | - | 1 |
| **PSR-NSJ** \| Pegasus - North-South Bonding Jumper | 1 | - | 1 |
| **PSR-WMC** \| Pegasus - Wire Management Clip | 23 | - | 23 |
| **PSR-CBG** \| Pegasus - Cable Grip | 3 | - | 3 |
| **PSR-CAP** \| Pegasus - End Cap | 8 | - | 8 |
| **PIF-RBDT** \| Pegasus InstaFlash - Black - Dovetail T-bolt | 33 | - | 33 |