Town of Erwin

Zoning Application & Permit

Planning & Inspections Department

Permit # 24-0169

Rev Jan2013

Each application should be submitted with an attached plot/site plan with the proposed use/structure showing lot shape, existing and proposed buildings, parking and loading areas, access drives and front, rear, and side yard dimensions.

Name of Applicant	Chad Preece // Freedom Solar Power	Property Owner	Vonda & Nathan Hamilton
Home Address	4801 Freidrich Ln, Ste 100	Home Address	619 Raiford Road
City, State, Zip	Austin, TX 78744	City, State, Zip	Erwin, NC 28339
Telephone	512-766-5765	Telephone	910-658-6608
Email	permitting@freedomsolarpower.com	Email	hamilton_stables@yahoo.com

Address of Proposed Property	619 RAIFORD RD // ERWIN, NC 28339		
Parcel Identification Number(s) (PIN)	06150601 0047 01	Estimated Project Cost	$110,978
What is the applicant requesting to build / what is the proposed use of the subject property? Be specific.	Roof-Mounted PV Solar System (Residential)		
Description of any proposed improvements to the building or property	Installation of PV, roof-mounted 19.750 kW solar system with 50 panels, 2 Tesla Powerwalls & 1 Tesla Energy Gateway (TEG) *SHUTDOWN REQUIRED FOR NEW UTILITY METER BASE & TEG INSTALLATION*		
What was the Previous Use of the subject property?	Residential		
Does the Property Access DOT road?			
Number of dwelling / structures on the property already	1		
Property / Parcel Size	1.32 acres		
MUST circle one that applies to property	Existing/Proposed Septic System X Or Existing/Proposed County/City Sewer		

Owner/Applicant Must Read and Sign

The undersigned property owner, or duly authorized agent/representative thereof certifies that this application and the forgoing answers, statements, and other information herewith submitted are in all respects true and correct to the best of their knowledge and belief. The undersigning party understands that any incorrect information submitted may result in the revocation of this application. Upon issuance of this permit, the undersigning party agrees to conform to all applicable town ordinances, zoning regulations, and the laws of the State of North Carolina regulating such work and to the specifications of plans herein submitted. The undersigning party authorizes the Town of Erwin to review this request and conduct a site inspection to ensure compliance to this application as approved.

Chad Preece	Chad Preece	06/05/2024
Print Name	Signature of Owner or Representative	Date

For Office Use

Zoning District	R-15	Existing Nonconforming Uses or Features	NA		
Front Yard Setback	35	Other Permits Required	__Conditional Use X Building __Fire Marshal __Other		
Side Yard Setback	10	Zoning Permit Status	X Approved ___Denied		
Rear Yard Setback	35	Fee Paid: $25	Date Paid:	Staff Initials:	

Comments	Building permits from Harnett County
Signature of Town Representative:	Date Approved/Denied: 6/5/24

SCOPE OF WORK

TO INSTALL A SOLAR PHOTOVOLTAIC (PV) SYSTEM AT THE HAMILTON JR RESIDENCE, LOCATED AT 619 RAIFORD ROAD, ERWIN, 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

19.750	kW DC STC
23.000	kW AC

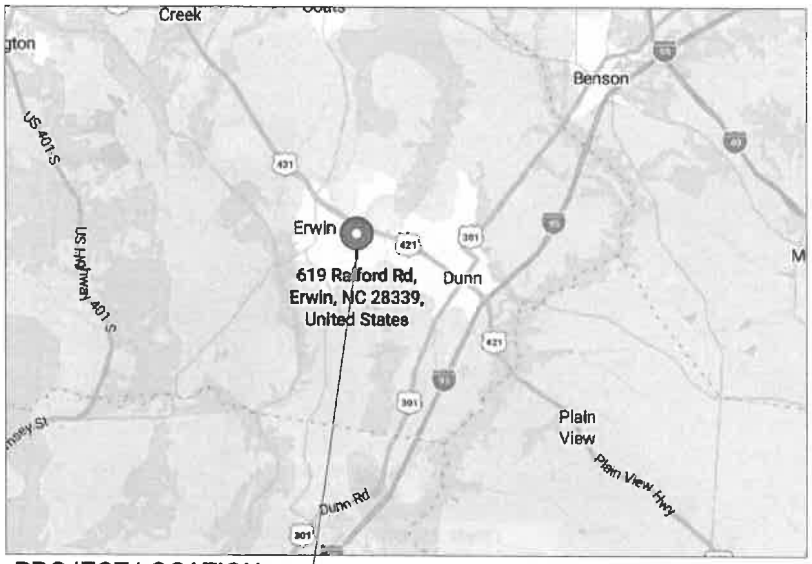
EQUIPMENT SUMMARY

(50)	MISSION SOLAR MSE395SX9R (395W) PV MODULES
(2)	TESLA POWERWALL 3 1707000-XX-Y [240V] PV INVERTERS
(26)	TESLA MID-CIRCUIT INTERRUPTERS (MCI-2) RAPID SHUTDOWN

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
512-759-6313
TECL # 28821

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	04/26/2024	-
REVISION	05/15/2024	A

Richard Pantel
Digitally signed by Richard Pantel
Date: 2024.06.17 10:31:49 -05'00'

Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326

PROJECT NAME

NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

SHEET NAME

COVER

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-0

LEAD ID: 114147

CONSTRUCTION SUMMARY

(50) (MISSION SOLAR MSE395SX9R (395W)) SOLAR MODULES, 19.750 kW DC STC
MODULE DIMENSIONS = 41.5" X 75.1" X 1.57"

(2) TESLA POWERWALL 3 1707000-XX-Y [240V] PV INVERTERS
COMBINED INVERTER OUTPUT = 23.000 kW AC.

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

(01) TESLA ENERGY GATEWAY

RACKING: PEGASUS RAIL

ATTACHMENT: RT-MINI

SITE DETAILS

ROOF TYPE: R-TYPE METAL ROOF
ARRAY #1 - TILT = 22°, AZIMUTH = 264°
ARRAY #2 - TILT = 23°, AZIMUTH = 84°

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.

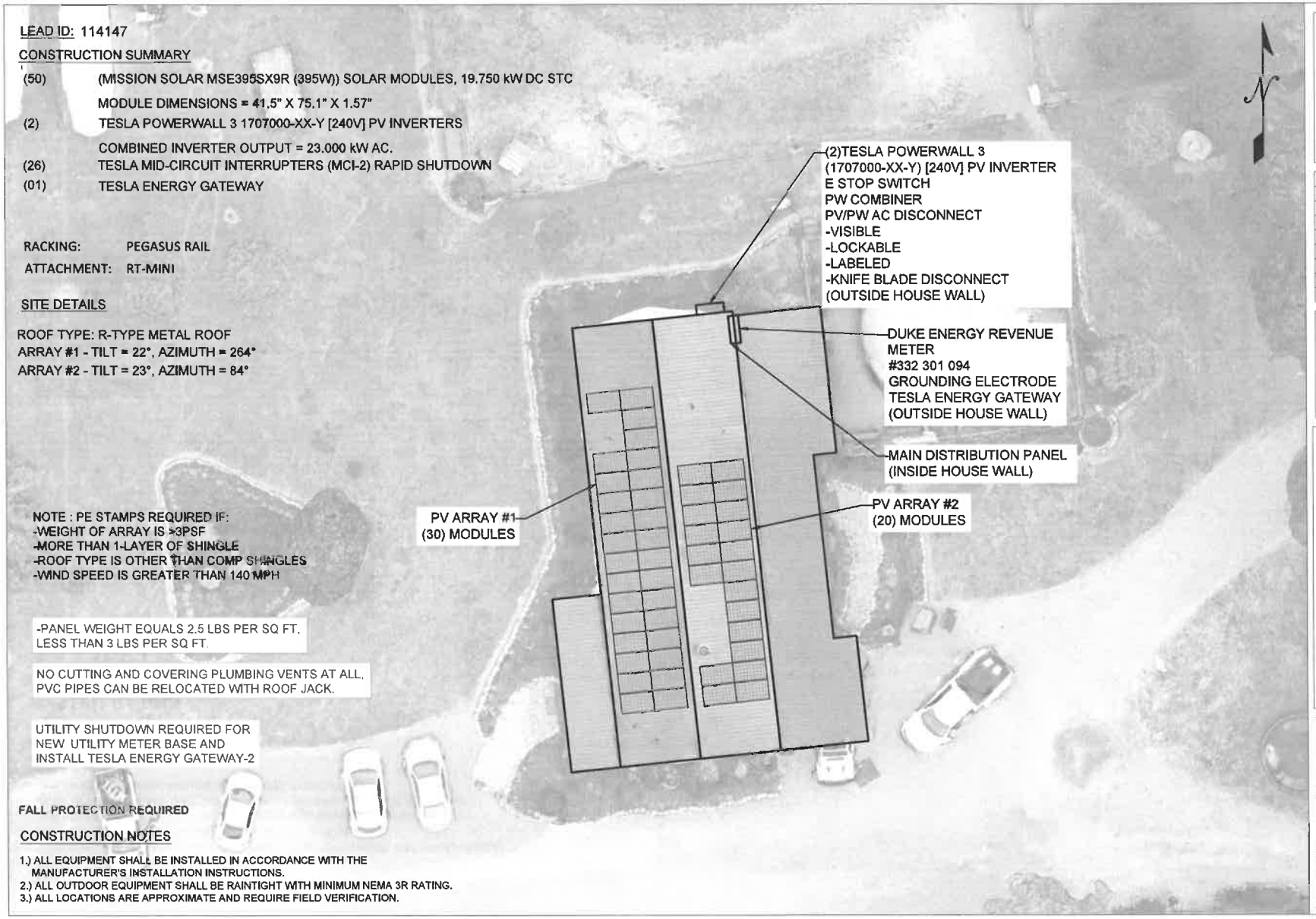
NO CUTTING AND COVERING PLUMBING VENTS AT ALL, PVC PIPES CAN BE RELOCATED WITH ROOF JACK.

UTILITY SHUTDOWN REQUIRED FOR NEW UTILITY METER BASE AND 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.



CONTRACTOR

FREEDOM SOLAR POWER

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

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	04/25/2024	-
REVISION	05/16/2024	A

PE STAMP

Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043328
05/17/2024

PROJECT NAME

NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

SHEET NAME

SITE MAP & PV LAYOUT

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

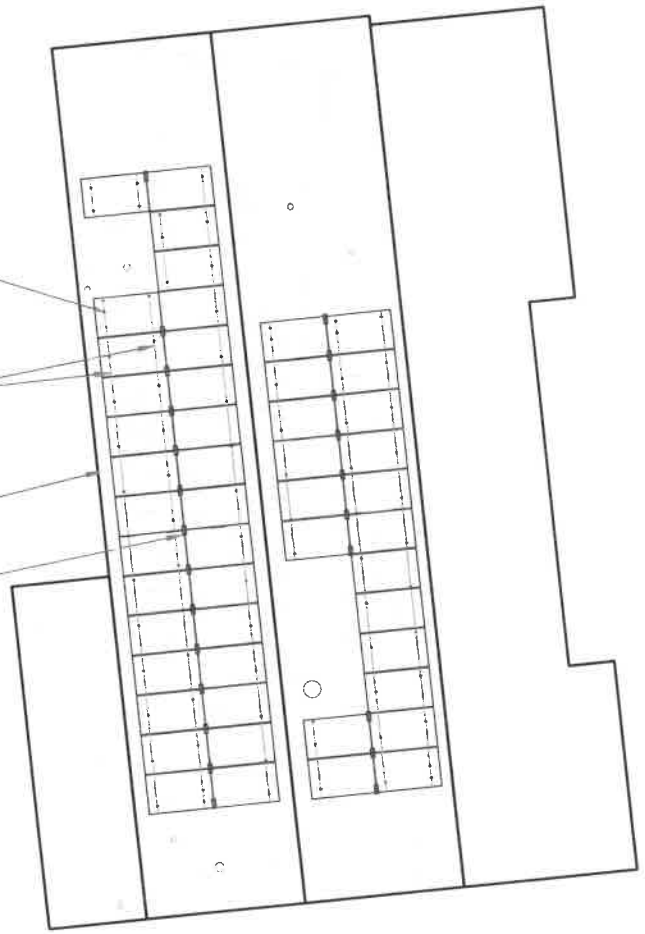
PV-1

5-M5 X 60MM SCREWS INTO DECKING PER ATTACHMENT MAXIMUM ATTACHMENT SPAN IS 48" O.C. STAGGERED ALONG RAILS

(2) PEGASUS RAIL SYSTEM REFER TO PEGASUS ENGINEERING PACKET FOR RAIL AND CLAMP LOCATIONS

SEAMS AT 12" O.C. TYP.

PEGASUS - SKIPRAIL CLAMP



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2.) ALL OUTDOOR EQUIPMENT SHALL BE RAINTIGHT WITH MINIMUM NEMA 3R RATING.
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CONTRACTOR

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

REVISIONS

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DESIGN PACKET	04/26/2024	-
REVISION	05/16/2024	A

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043326 RICHARD PANTEL

Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326
05/17/2024

PROJECT NAME

NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

SHEET NAME

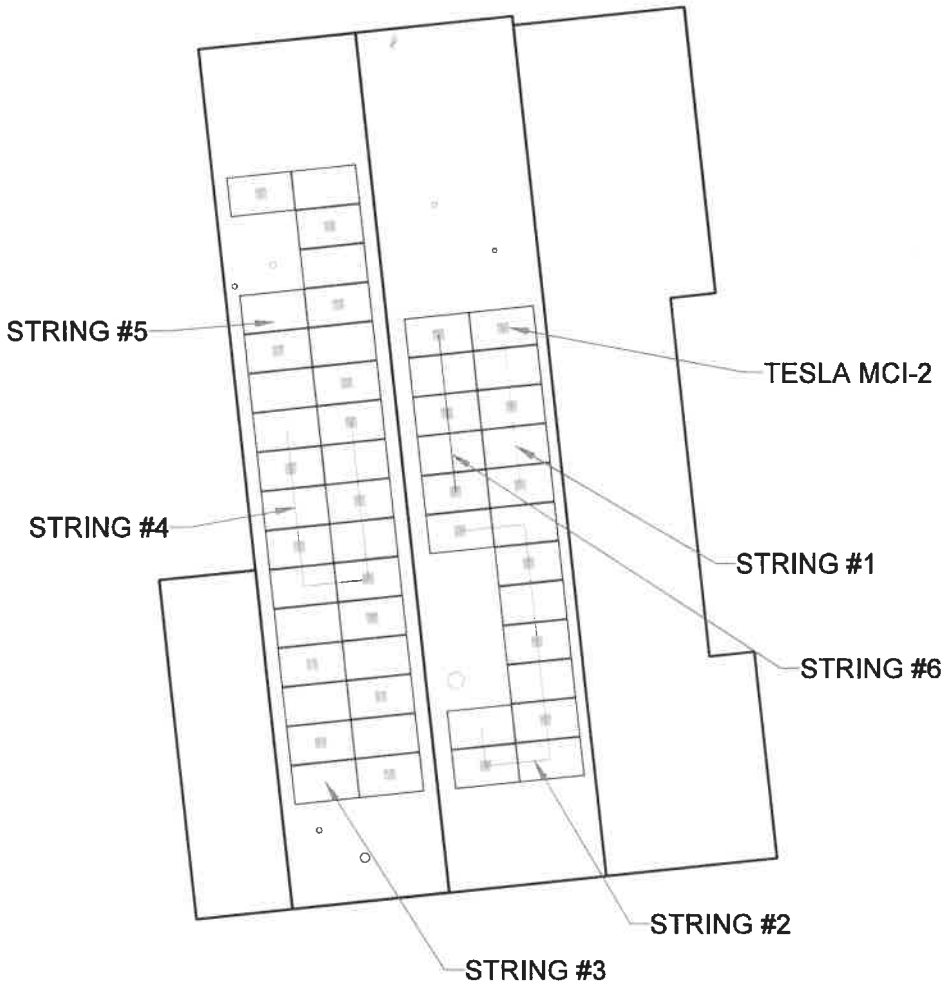
RACKING PLAN

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-1A



CONTRACTOR

FREEDOM SOLAR POWER

FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
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512-759-8313
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PE STATE OF NORTH CAROLINA
043376
ENGINEER
RICHARD PANTEL

Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326

PROJECT NAME

NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

SHEET NAME

STRING MAP & MONITORING LAYOUT

SHEET SIZE

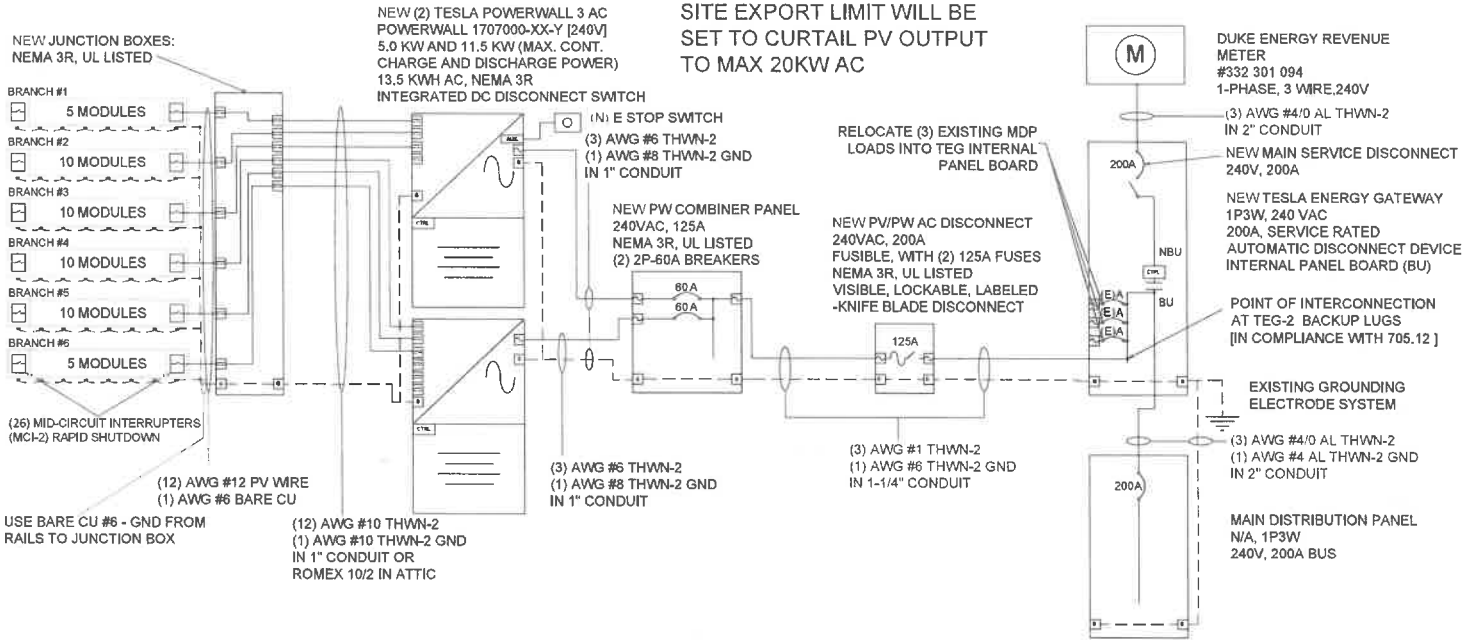
ANSI B
11" x 17"

SHEET NUMBER

PV-2

SOLAR ARRAY - 19.750 KW DC STC, 23.000 KW AC, 1-PHASE
(50) MISSION SOLAR MSE395SX9R (395W) PV MODULES
(2) TESLA POWERWALL 3 1707000-XX-Y [240V] PV INVERTERS
(26) TESLA MID-CIRCUIT INTERRUPTERS (MCI-2) RAPID SHUTDOWN

UTILITY SHUTDOWN REQUIRED FOR
NEW UTILITY METER BASE AND
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
PV SOURCE CIRCUIT WIRE AMPACITY CALCULATION [NEC 690.8(A)(3)]: MODULE STRING MAX DC CURRENT = (1.25)(11.24A) =14.05A CONTINUOUS USE: #10 WIRE 75°C DERATED AMPACITY = (0.80)(35.0A) = 28.00A 28.00A > 14.05A CONDITIONS OF USE: #10 WIRE 90°C DERATED AMPACITY = (0.91)(0.50)(40.0A) = 18.20A 18.20A > 14.05A POWERWALL 3 OUTPUT WIRE AMPACITY CALCULATION [NEC 690.8(A)(3)]: 48.0A PER TESLA POWERWALL 3 BATTERY INVERTER COMBINED CURRENT = (2)(48.00A) = 96.00A CONTINUOUS USE: #1 WIRE 75°C DERATED AMPACITY = (0.80)(130A) = 104.00A 104.00A > 96.00A CONDITIONS OF USE: #1 WIRE 90°C DERATED AMPACITY = (0.91)(145A) =131.95A 131.95A > 96.00A

CALCULATIONS FOR OVERCURRENT DEVICES
[NEC 690.8(A)(1)(c)]: USING MANUFACTURER TEMPERATURE CORRECTION FACTOR STC Voc = 45.18V Tmin = -4°C, Tmax= 36°C BELOW STC VOLTAGE TEMPERATURE COEFFICIENT = ((-0.259%/°C x 45.08Voc) -1) = 0.12V PER Δ°C ((-4°C - STC 25°C) X 0.13PER Δ°C) = 3.77V PER MOD MAXIMUM Voc = 3.77V + 45.18V = 48.95V MAXIMUM DC VOLTAGE = (7)(48.95) = 342.65V
SYSTEM AC CURRENT CALCULATION [NEC 690.8(A)(3)]: 48.0A PER TESLA POWERWALL 3 BATTERY INVERTER COMBINED CURRENT = (2)(48.00A) = 96.00A MINIMUM OCPD = (96.00A)(1.25) = 120.00A USE (2) 125A FUSES IN PV AC DISCONNECT #1 FOR SYSTEM OCPD NOTE: AWG #1 CONDUCTORS ARE ADEQUATELY PROTECTED BY 125A FUSES
CALCULATION FOR OVERCURRENT POWERWALL DEVICES
TESLA POWERWALL 3 1707000-XX-Y [240V] OUTPUT CURRENT CALCULATION OUTPUT CURRENT = 48.00A MINIMUM OCPD = (48.00A)(1.25) = 60.00A USE (2) 2P-60A BREAKER IN PW COMBINER FOR SYSTEM OCPD

CONTRACTOR
FREEDOM SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
512-759-3313
TECL # 28621

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	04/29/2024	-
REVISION	05/18/2024	A

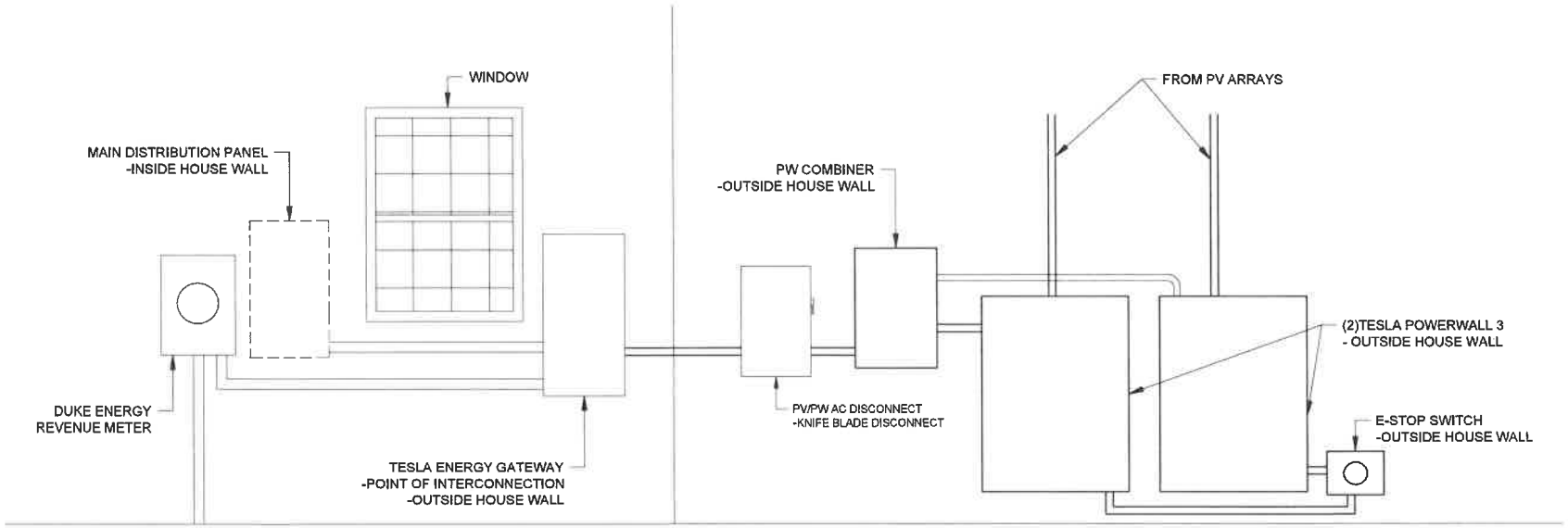
NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD PANTEL 043326
Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326

PROJECT NAME
NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

SHEET NAME
ELECTRICAL DIAGRAM

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-3



CONTRACTOR

FREEDOM SOLAR POWER

FREEDOM SOLAR LLC
4501 FREIDRICH LN, STE 100
AUSTIN, TX 78744
512-759-8313
TECL # 28621

REVISIONS

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NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD PANTEL 043326

Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326
05/17/2024

PROJECT NAME

NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 558-6608
PROJECT ID: 114147

SHEET NAME

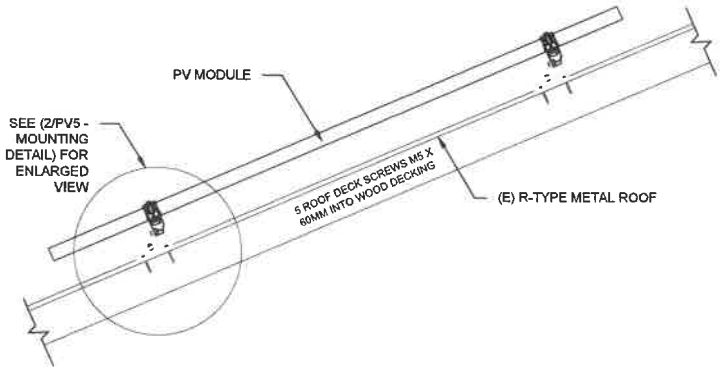
EQ.WALL

SHEET SIZE

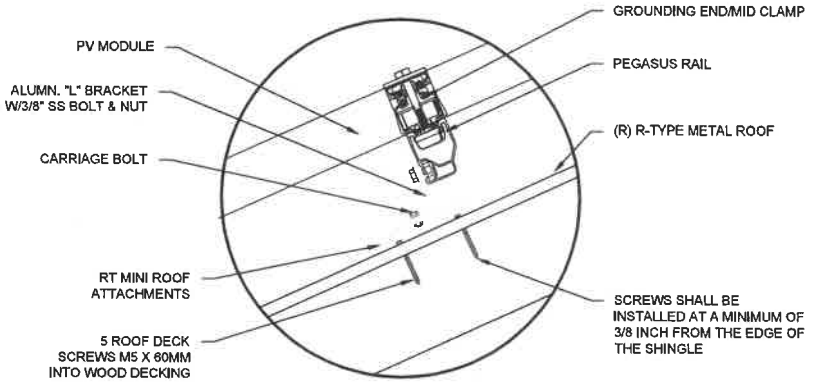
ANSI B
11" x 17"

SHEET NUMBER

PV-4



MOUNTING METHOD
NTS
1



MOUNTING DETAIL
NTS
2

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

REVISIONS

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PE NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD PANTEL
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PROJECT NAME
NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

SHEET NAME
MOUNTING DETAIL

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-5

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: 96.00A
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

CONTRACTOR
FREEDOM SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
512-750-8313
TECL # 28621

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Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326
05/17/2024

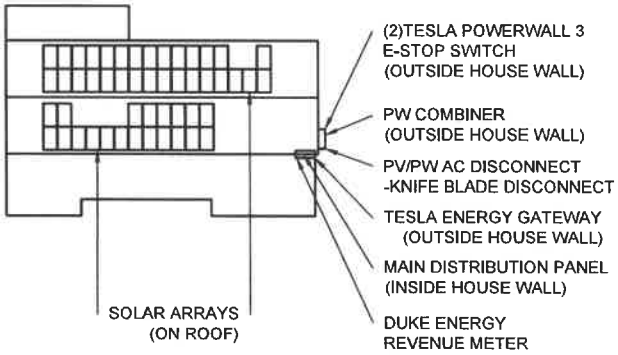
PROJECT NAME
NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

SHEET NAME
SYSTEM LABELING DETAIL

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-6

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
619 RAIFORD ROAD
PROJECT ID: 114147

CONTRACTOR
FREEDOM SOLAR POWER
FREEDOM SOLAR LLC
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PROJECT NAME
NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 658-6608
PROJECT ID: 114147

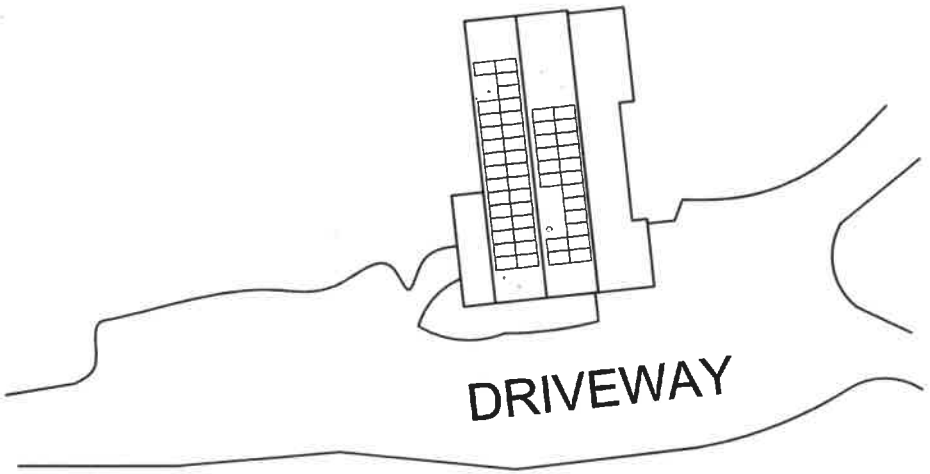
SHEET NAME
SITE DIRECTORY PLACARD

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:** _____

CONTRACTOR

FREEDOM SOLAR POWER

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

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	04/26/2024	-
REVISION	05/16/2024	A

PE

NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD PANTEL 043326

Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326
05/17/2024

PROJECT NAME

NATHAN H HAMILTON JR
619 RAIFORD ROAD
ERWIN, NORTH CAROLINA, 28339
(910) 558-5608
PROJECT ID: 114147

SHEET NAME

SAFETY PLAN

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-8

MSE PERC 66

MISSION SOLAR ENERGY

395W

Class leading power output

Positive Power Tolerance -0 to +3%

FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2% in year one and 0.58% annually from years two to 30 with 84.08% capacity guaranteed in year 25.
For more information, visit www.missionsolar.com/warranty

CERTIFICATIONS

CEC TÜV SÜD c UL us LISTED

UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

If you have questions or concerns about certification of our products in your area, please contact Mission Solar Energy.

True American Quality
True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas where we manufacture our modules. We produce American, high-quality solar modules ensuring the highest-in-class power output and best-in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long term.

Demand the best. Demand Mission Solar Energy.

Certified Reliability
- Tested to UL 61730 & IEC Standards
- PID resistant
- Resistance to salt mist corrosion

Advanced Technology
- 9 Busbar
- Passivated Emitter Rear Contact
- Ideal for all applications

Extreme Weather Resilience
- Up to 5,400 Pa front load & 3,600 Pa back load
- Tested load to UL 61730
- 40 mm frame

BAA Compliant for Government Projects
- Buy American Act
- American Recovery & Reinvestment Act

MADE IN THE USA

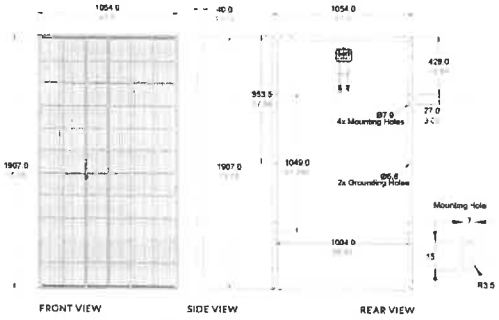
25 YEAR WARRANTY

Class Leading
390-400W

MSE PERC 66

BASIC DIMENSIONS

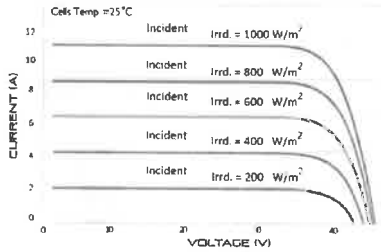
[UNITS: MM/IN]



CURRENT-VOLTAGE CURVE

MSE385SX9R: 385WP, 66 CELL SOLAR MODULE

Current-voltage characteristics with dependence on irradiance and module temperature



CERTIFICATIONS AND TESTS

IEC	61215, 61730, 61701
UL	61730

TÜV SÜD CEC c UL us LISTED

Mission Solar Energy
8303 S. New Braunfels Ave., San Antonio, Texas 78235
www.missionsolar.com | info@missionsolar.com

ELECTRICAL SPECIFICATION

PRODUCT TYPE			MSE [illegible] SX9R ([illegible] = Pmax)		
Power Output	P_{max}	W_p	[illegible]	[illegible]	[illegible]
Module Efficiency		%	19.4	19.7	19.9
Tolerance		%	0/+3	0/+3	0/+3
Short Circuit Current	I_{sc}	A	11.19	11.24	11.31
Open Circuit Voltage	V_{oc}	V	45.04	45.18	45.33
Rated Current	I_{mp}	A	10.63	10.68	10.79
Rated Voltage	V_{mp}	V	36.68	36.99	37.07
Fuse Rating		A	20	20	20
System Voltage		V	1,000	1,000	1,000

TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	43 [illegible]
Temperature Coefficient of Pmax	-0.3 [illegible]
Temperature Coefficient of Voc	-0.25 [illegible]
Temperature Coefficient of Isc	0.03 [illegible]

OPERATING CONDITIONS

Maximum System Voltage	1,000V [illegible]
Operating Temperature Range	-40°F to 185°F (-40°C to +85°C)
Maximum Series Fuse Rating	20A
Fire Safety Classification	Type 1*
Front & Back Load (UL Standard)	Up to 5,400 Pa front and 3,600 Pa back load, Tested to UL 61730
Hail Safety Impact Velocity	25mm at 23 m/s

*Mission Solar Energy uses quality sourced materials that result in a Type 1 fire rating. Please note, the 'Fire Class' Rating is designated for the fully-installed PV system, which includes, but is not limited to, the module, the type of mounting used, pitch and roof composition.

MECHANICAL DATA

Solar Cells	P-type mono-crystalline silicon
Cell Orientation	66 cells (6x11)
Module Dimension	1,907mm x 1,054mm x 40mm
Weight	48.5 lbs. (22 kg)
Front Glass	3.2mm tempered, low-iron, anti-reflective
Frame	40mm Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.2m, Wire 4mm2 (12AWG)
Connector	Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MC4, Renhe 05-B

SHIPPING INFORMATION

Container Feet	Ship To	Pallet	Panels	390W Bin
53'	Most States	30	780	304.20 kW
Double Stack	CA	26	676	263.64 kW

PALLET [26 PANELS]

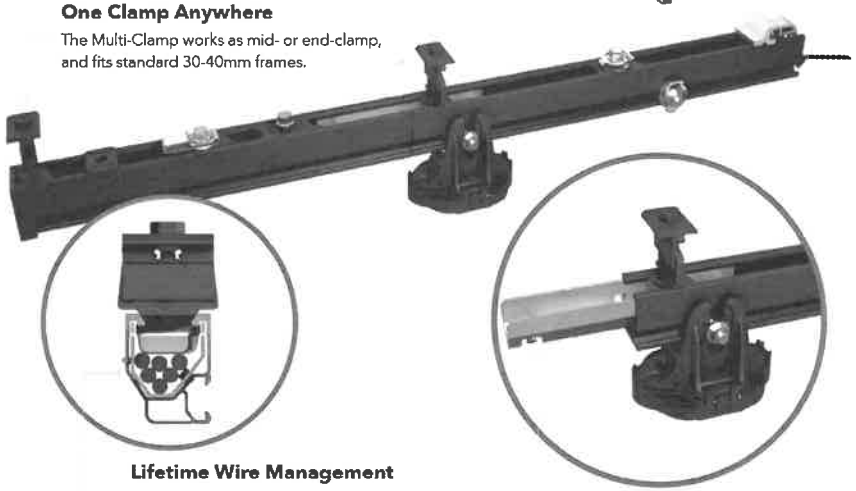
Weight	Height	Width	Length
1,300 lbs. (572 kg)	47.56 in (120.80 cm)	46 in (116.84 cm)	77 in (195.58 cm)

PEGASUS

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.

Pegasus Solar Inc | 506 West Ohio Avenue, Richmond, CA 94804 | www.pegassussolar.com

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 [illegible]

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, 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

C SP US

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

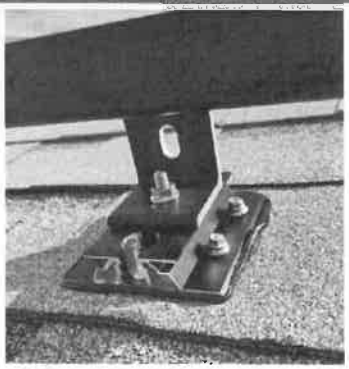
For reference only. Spans above are calculated using 7-16 for a Gable Roof. Exposure Category B, 0-20deg roof angle, 30ft mean roof height with non-exposed modules. For PE certified span tables, visit www.pegassussolar.com/spans

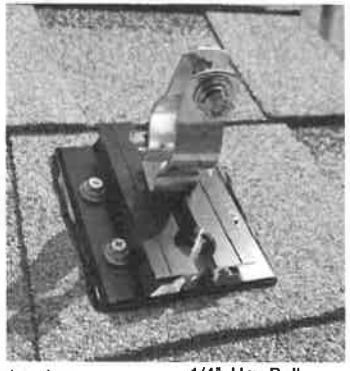
Pegasus Solar Inc | 506 West Ohio Avenue, Richmond, CA 94804 | www.pegassussolar.com

RT-MINI

Self-flashing base for asphalt & metal roof-top PV mounting systems

RT-MINI is suitable for mounting any rail system with a conventional L-Foot.



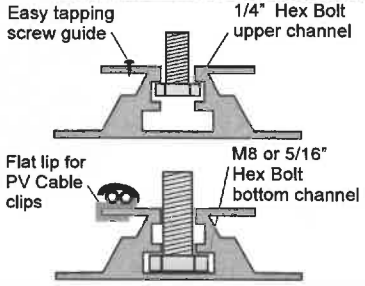


Dual bolt design: M8 or 5/16" for L-Foot & 1/4" for EMC

Installation Manual

ICC ES

ICC ESR 3575



RT-MINI

Flexible Flashing certified by the International Code Council (ICC)

Engineered to ASTM D 1761 (Standard Test Methods for Mechanical Fasteners in Wood)

Components

RT2-00-MINIBK

MINI base : 20 ea.
Screw : 40 ea.
Extra RT-Butyl : 10 ea.

Optional item

5 x 60mm Mounting screw (RT2-04-SD5-60) : 100 ea./Bag
5/16" Hex bolt, washer & nut set (RT-04-BN30SL-US) : 100 ea./Bag
RT-Butyl (RT2-04-BUTYLT) : 10 ea./Box

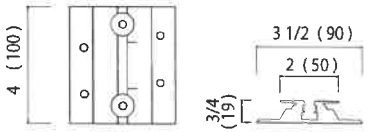
RT-Butyl is Roof Tech's flexible flashing used in one million residential PV systems for the last 26 years. It is the first PV mounting system with Flexible Flashing certified by the ICC. Engineered to withstand wind speeds up to 180 mph and ground snow up to 90 psf.

Metal Flashing Retrofit **Flexible Flashing**

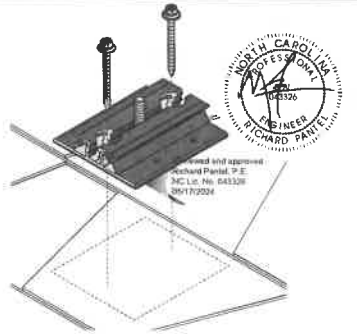
Shedding water? **100% Waterproof**

ICC ESR-3575 ASTM2140 testing UV testing (7500 hrs.)

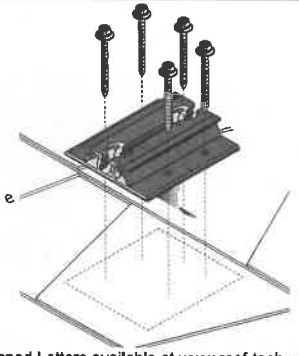
Dimensions in (mm)



Rafter installation



Deck installation



P.E. Stamped Letters available at www.roof-tech.us/support
TAS 100 A on metal and asphalt roof.

Roof Tech
The Standard for Waterproof Flexible Flashing Since 1994
www.roof-tech.us ch.us

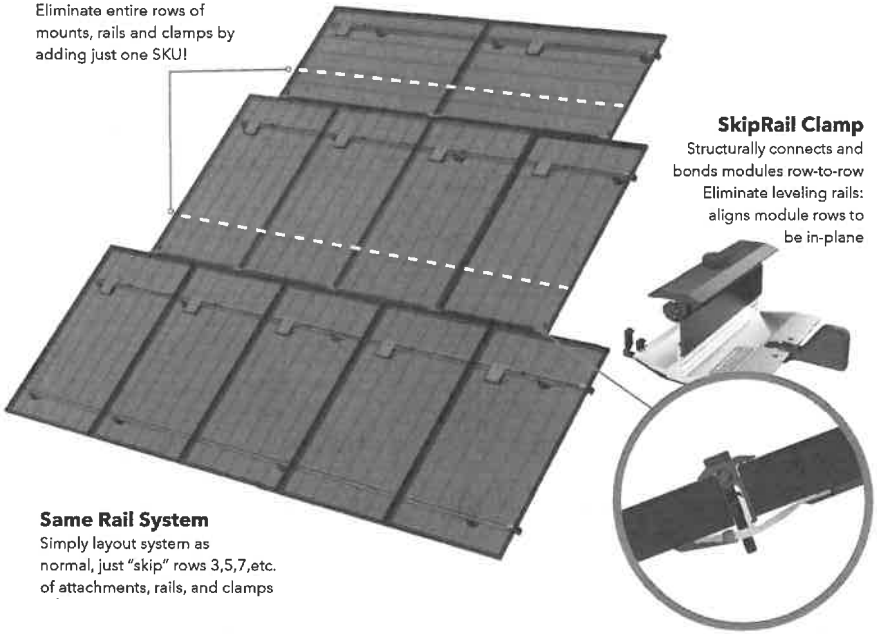
Roof Tech Inc.
www.roof-tech.us info@roof-tech.us
10620 Treena Street, Suite 230, San Diego, CA 92131
858.935.6064

March 2020

PEGASUS

SK•PRAIL

Skip Rows!
Eliminate entire rows of mounts, rails and clamps by adding just one SKU!



SkipRail Clamp
Structurally connects and bonds modules row-to-row
Eliminate leveling rails: aligns module rows to be in-plane

Same Rail System
Simply layout system as normal, just "skip" rows 3,5,7,etc. of attachments, rails, and clamps

A Revolution in Solar Installations

Lower your costs and provide your crews a faster system by eliminating entire rows of mounts, rails and clamps with just one SKU.

Dramatically Lower Costs
25% fewer rails and clamps
15% fewer roof penetrations
3500 lbs less per MW to ship, warehouse, pack, and load

Recruit the Best Crews
Less work = happier crews
300 lbs less per week to haul
Faster install
Auto-levels modules

Easy to Implement
Minimal to no training
Same layout as standard rail
Same open-channel wire management

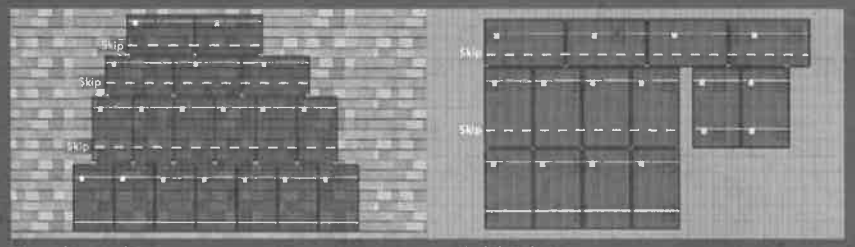
Universal to Any Roof
Comp, Tile, Metal, other.
Low slow, steep slopes
Easily work around roof obstructions
Mixed portrait / landscape

Pegasus Solar Inc | 506 West Ohio Avenue, Richmond, CA 94804 | **www.pegasussolar.com**

PEGASUS SK•PRAIL

SkipRail SAVINGS | 18% fewer attachments • 32% fewer feet of rails
22% fewer pounds to ship & warehouse

SkipRail SAVINGS | 21% fewer attachments • 30% fewer feet of rails
21% fewer pounds to ship & warehouse

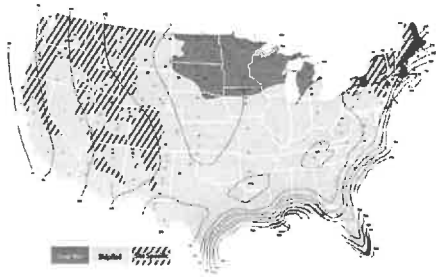


Example of Comp Roof Array

Example of Tile Roof Array

Free Design Tool:
pegasussolar.com/portal

Where SkipRail Works



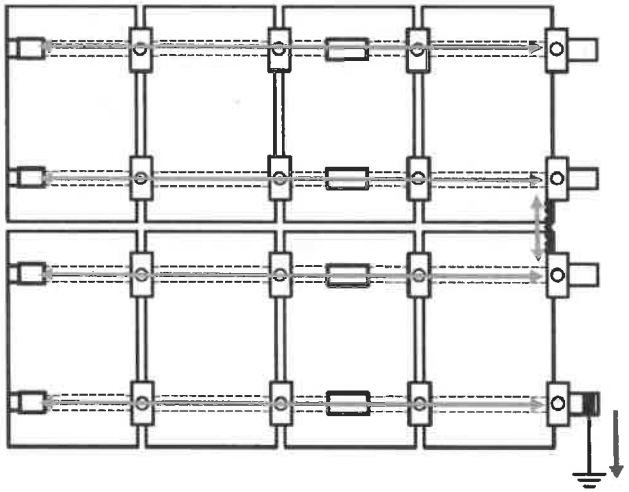
Specifications	SkipRail Kits	
SKU	PSR-SRC	PSR-SRCK
Type	Floating Clamp	Extra support with Kickstand
Finish	Black	
PV module frames	30, 32, 35, 40mm	
Certifications	ASCE 7-16, IBC, CBC, UL2703	
Applicable Roof Types	Any	
Compatible Rail Systems	Pegasus Rail System	
Kit Contents	Pegasus SkipRail Clamp	Pegasus SkipRail Clamp with Kickstand
Kit Quantity	20	30

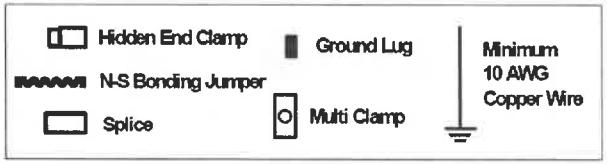
SCAN FOR VIDEO

SCAN FOR FREE TRIAL

Pegasus Solar Inc | 506 West Ohio Avenue, Richmond, CA 94804 | **www.pegasussolar.com**

Ground Lug & N-S Bonding Jumper





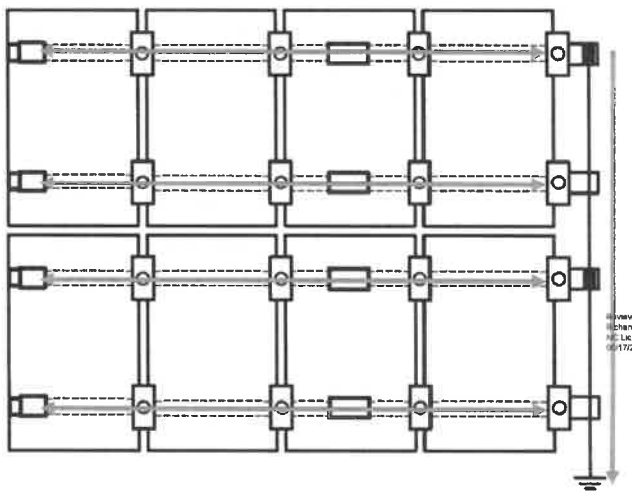
Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. The N-S Bonding Jumper will provide a bonding path between rows of PV modules, so that one Ground Lug per array is necessary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

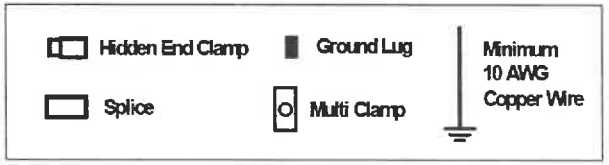
The N-S Bonding Jumper may only be used with the Pegasus Rail System, and is not certified for use with any other mounting system.

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

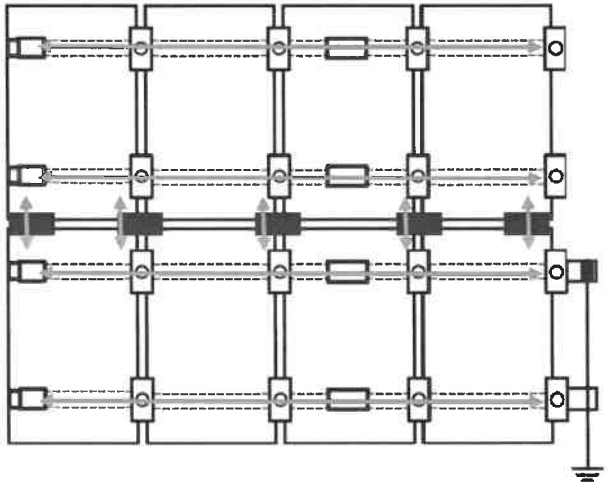




Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. One Ground Lug is required per row of PV Modules, with a final earth ground connection at the terminal end of the ground 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.

Pegasus Rail System - Bond Path to Ground

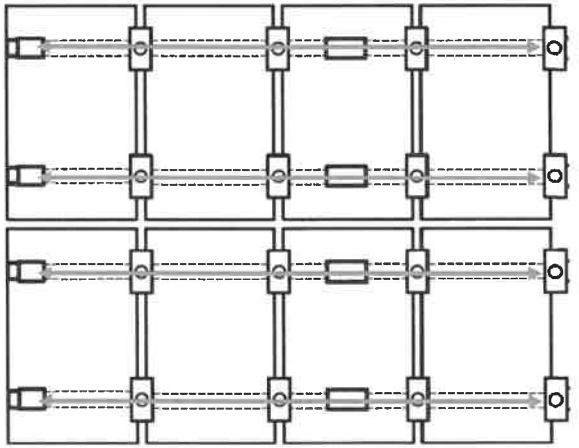
SkipRail System



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



Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326
05/17/2024

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

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.

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; CTxxx-HC11-06
Chint Solar	CHSM6612M xxx
Freedom Forever	FF-MP-BBB-xxx
Hansol	HSxxxTD-AN3
Heliene	Heliene 20M xxx; Heliene 36M xxx; Heliene 36P xxx; Heliene 60M xxx, Heliene 60P xxx, Heliene 72M Bifacial xxx; Heliene 72P xxx; Heliene 96M xxx Bifacial; Heliene 96M xxx; Heliene 96P xxx; HSPF-144M M6 HC Bifacial xxx, HSPF-120M M6 HC Monofacial xxx; 144HC-M10-Bifacial; 460-144M-HC-M6
Hyundai	HiD-SxxxRS(BK); HiS-MxxxHG; HiS-SxxxXJ; 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-AR1-3; JKMxxxM-6RL3-B; JKMxxxM-7RL3-TV
LG	LGN1K-G4, LG51C-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, LGxxxNK-N5; LGxxxN1K-A6, LGxxxN1K-B6, LGxxxQ1C-A6; LGxxxQAC-A6, LGxxxQAK-A6, LGxxxM1C-A6; LGxxxN2W-E6; LGxxxN21-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; LR4-60HPB-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	MSF60Axxx, MSFxxxSB1A; MSFxxxSQ6J, MSFxxxSQ5K; MSFxxxSQ5T; MSFxxxSQ8K; MSFxxxSQ8T, MSExxxSQ9S; MSFxxxSX6S, MSExxxSX6W; MSExxxSX5T, MSExxxSX5K; MSExxxSX5R; MSExxxSX6Z; MSExxxSX9R; MSExxxSX9Z
Mitrex	Mxxx-43H; 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 (07+; 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/ Mxx 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	S4A410-72MHSBB, S4A33-60MHSBB

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

Product Selection

UL listed File No. E5239

1

DG321NRB

120/240 Vac General-Duty, Fusible, Single-Throw, continued

System	Ampere Rating	Fuse Type Provision	Maximum Horsepower Ratings ① Single-Phase AC 120V	Single-Phase AC 240V	Three-Phase AC 240V	DC 250V	NEMA 1 Enclosure Indoor Catalog Number	NEMA 3R Enclosure Rainproof Catalog Number
Cartridge Type—Three-Pole, Three-Wire (Three Blades, Three Fuses)—240 Vac								
	30	—	—	—	—	—	④	⑤
	60	—	—	—	—	—	④	⑤
	100	—	—	—	—	—	④	⑤
	200	H	—	15	25–60	—	DG324FGK ③④	⑤
	400	H	—	—	50–125	—	DG325FGK ③④	DG325FRK ③④
	600	H	—	—	75–200	—	DG326FGK ③④	DG326FRK ③④
Cartridge Type—Four-Wire (Three Blades, Three Fuses, S/N)—120/240 Vac								
S/N	30	H	—	1-1/2–3	3–7-1/2	—	DG321NGB	DG321NRB
	60	H	—	3–10	7-1/2–15	—	DG322NGB	DG322NRB
	100	H	—	7-1/2–15	15–30	—	DG323NGB	DG323NRB
	200	H	—	15	25–60	—	DG324NGK	DG324NRK
	400	H	—	—	50–125	—	DG325NGK	DG325NRK
	600	H	—	—	75–200	—	DG326NGK	DG326NRK

DG322URB

120/240 Vac General-Duty, Non-Fusible, Single-Throw

System	Ampere Rating	Maximum Horsepower Ratings Single-Phase AC 120V	Single-Phase AC 240V	Three-Phase AC 240V	DC 250V	NEMA 1 Enclosure Indoor Catalog Number	NEMA 3R Enclosure Rainproof Catalog Number
Two-Pole, Two-Wire (Two Blades)—240 Vac							
	30	2	3	—	—	DG221UGB ③	DG221URB ⑤
	60	3	10	—	—	DG222UGB ③	DG222URB ⑤
	100	—	15	—	—	DG223UGB ③	DG223URB ⑤
	200	—	15	—	—	④⑥	DG224URK ⑤
Three-Pole, Three-Wire (Three Blades)—240 Vac							
	30	2	3	7-1/2	—	DG321UGB ③	DG321URB ⑤
	60	3	10	15	—	DG322UGB ③	DG322URB ⑤
	100	—	15	30	—	DG323UGB ③	DG323URB ⑤
	200	—	15	60	—	DG324UGK ③	DG324URK ⑤
	400	—	—	125	—	DG325UGK ③	DG325URK ⑤
	600	—	—	200	—	DG326UGK ③	DG326URK ⑤

Notes

① Maximum hp ratings apply only when dual element time delay fuses are used.

② Use four-wire catalog numbers below.

③ Solid neutral bars are not included. Order separately from table on **Page V2-T1-13.**

④ **WARNING!** Switch is not approved for service entrance unless a neutral kit is installed.

⑤ Use three-wire catalog numbers below.

All general-duty safety switches are individually packaged.

Accessories are limited in scope on general-duty safety switches. See **Page V2-T1-13** for availability. In addition, clear line shields are available as an accessory on 200–600A general-duty switches. Catalog Numbers: 200A = 70-7759-11, 400A = 70-8063-8, 600A = 70-8064-8.

EATON

Product Selection

120/240 Vac General-Duty, Fusible, Single Throw

Specifications

- 30 – 600 amperes.
- Suitable for service entrance applications unless otherwise noted.
- Horsepower rated.
- Bolt-on hub provision. Provided for general-duty switches in a NEMA 3R enclosure. See **Page 8-7** for selection.
- UL listed File No. E5239. Meets UL 98 for enclosed switches and NEMA Std. KS-1.
- 200 – 600 ampere switches incorporate K-Series design.

2

DP221NGB

DG321NRB

Table 8-40. 120/240 Vac General-Duty, Fusible, Single Throw

System	Ampere Rating	Fuse Type Provision	Maximum Horsepower Ratings ① Single-Phase ac 120 Volt	Single-Phase ac 240 Volt	3-Phase ac 240 Volt	dc 250 Volt	NEMA 1 Enclosure Indoor Catalog Number	NEMA 1 Enclosure Indoor Price U.S. $	NEMA 3R Enclosure Rainproof Catalog Number	NEMA 3R Enclosure Rainproof Price U.S. $
Fusible — Plug Type ②										
2-Wire (One Blade, One Fuse, S/N) — 120 Vac										
S/N	30	Plug (Type S, T or W)	1/2 – 2	—	—	—	DP111NGB		—	
3-Wire (Two Blades, Two Fuses, S/N) — 120/240 Vac										
S/N	30	Plug (Type S, T or W)	1/2 – 2	1-1/2 – 3	—	—	DP221NGB		Use cartridge-type fuse catalog number DG221NRB	
Fusible — Cartridge Type										
2-Pole 2-Wire (Two Blades, Two Fuses) — 240 Vac										
	30	—	—	1-1/2 – 3	3 – 7-1/2	—	⑤		⑤	
	60	—	—	3 – 10	7-1/2 – 15	—	⑤		⑤	
	100	—	—	7-1/2 – 15	15 – 30	—	⑤		⑤	
	200	—	—	15	25 – 60	—	⑤		⑤	
	400	H	—	—	50 – 125	—	DG225FGK ④⑤		DG225FRK ④⑤	
	600	H	—	—	75 – 200	—	DG226FGK ④⑤		DG226FRK ④⑤	
3-Wire (Two Blades, Two Fuses, S/N) — 120/240 Vac										
S/N	30	H	—	1-1/2 – 3	3 – 7-1/2 ⑥	—	DG221NGB		DG221NRB	
	60	H	—	3 – 10	7-1/2 – 15 ⑥	—	DG222NGB		DG222NRB	
	100	H	—	7-1/2 – 15	15 – 30 ⑥	—	DG223NGB		DG223NRB	
	200	H	—	15	25 – 60 ⑥	—	DG224NGK		DG224NRK	
	400	H	—	—	50 – 125 ⑥	50	DG225NGK		DG225NRK	
	600	H	—	—	75 – 200 ⑥	—	DG226NGK		DG226NRK	

① Maximum hp ratings apply only when dual element time delay fuses are used.

② These switches do not have an interlock which prevents door from being opened when switch is in the ON position.

③ Use 3-wire catalog numbers below.

④ Solid neutral bars are not included. Order separately from **Table 8-1** on **Page 8-5.**

⑤ **WARNING!** Switch is not approved for service entrance unless a neutral kit is installed.

⑥ Grounded B phase rating, UL listed.

Note: All general-duty safety switches are individually packaged.

Note: Accessories are limited in scope on general-duty safety switches. See **Page 8-5** for availability. In addition, clear line shields are available as an accessory on 200 – 600 ampere general-duty switches. Catalog Numbers: 200 A = 70-7759-11, 400 A = 70-8063-8, 600 A = 70-8064-8.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043326 Reviewed and approved Richard Bertal, P.E. NC Lic. No. 043326 05/17/2014 RD PANTEL

Discount Symbol **22CD**

FRN-R (250 V) and FRS-R (600 V) Class RK5 Fusetron™ energy efficient, dual-element, time-delay fuses

Dual-element, time-delay Class RK5 fuses. FRN-R — 10 seconds (minimum) at 500% rated amps (8 seconds for 0-30 A sizes). FRS-R — 10 seconds (minimum) at 500% rated amps. FRN-R and FRS-R available with optional indication on select ratings (see catalog numbers table). For superior electrical protection, Eaton recommends upgrading to Bussmann series Low-Peak LPN-RK (250 V) or LPS-RK (600 V) fuses, see pages 1-24 to 1-26. For dimensions, see page 1-3.

Ratings

- Volts
  - FRN-R
    - 250 Vac (or less)
    - 125 Vdc (1/10-60 A, 110-200 A)
    - 250 Vdc (225-600 A)
  - FRS-R
    - 600 Vac (or less)
    - 300 Vdc 1/10-30 A, 65-600 A
    - 250 Vdc* 35-60 A
- Amps 1/10-600 A
- IR
  - 200 kA RMS Sym.
  - 20 kA DC

* Does not apply to indicating versions.

Agency information

- FRN-R
  - UL Listed, Std 248-12, Class RK5, Guide JDDZ, File E4273
  - CSA Certified, Class 1422-01, File 53787
- FRS-R
  - UL Listed, Std 248-12, Class RK5, Guide JDDZ, File E4273
  - CSA Certified, Class 1422-02, File 53787
- CE

Features

- Separate overload and short-circuit elements provide time-delay for sizing as close as 125% of motor FLA
- 2:1 selective coordination amp ratio (within the Fusetron RK5 fuse family) helps prevent overcurrent events from opening upstream Fusetron fuses
- Insulated end caps for 225-600 A (FRN-R) and 65-600 A (FRS-R) fuses reduces exposure to live parts and extends air gap to distance between blades of adjacent mounted fuses or to housing

Typical applications

- Power panelboards
- Motor control centers
- Combination starters
- Machinery disconnects

Catalog no. (amps)			
250 V FRN-R			
FRN-R-1/10	FRN-R-2	FRN-R-10*	FRN-R-100
FRN-R-1/8	FRN-R-2-1/4	FRN-R-12*	FRN-R-110
FRN-R-15/100	FRN-R-2-1/2	FRN-R-15*	FRN-R-125
FRN-R-2/10	FRN-R-2-8/10	FRN-R-17-1/2*	FRN-R-150
FRN-R-1/4	FRN-R-3	FRN-R-20*	FRN-R-175
FRN-R-3/10	FRN-R-3-2/10	FRN-R-25*	FRN-R-200
FRN-R-4/10	FRN-R-3-1/2	FRN-R-30*	FRN-R-225
FRN-R-1/2	FRN-R-4	FRN-R-35*	FRN-R-250
FRN-R-6/10	FRN-R-4-1/2	FRN-R-40*	FRN-R-300
FRN-R-8/10	FRN-R-5	FRN-R-45*	FRN-R-350
FRN-R-1	FRN-R-5-6/10	FRN-R-50*	FRN-R-400
FRN-R-1-1/8	FRN-R-6	FRN-R-60*	FRN-R-450
FRN-R-1-1/4	FRN-R-6-1/4	FRN-R-70	FRN-R-500
FRN-R-1-4/10	FRN-R-7	FRN-R-75	FRN-R-600
FRN-R-1-1/2	FRN-R-7-1/2	FRN-R-80	
FRN-R-1-6/10	FRN-R-8*	FRN-R-85	
FRN-R-1-8/10	FRN-R-9*	FRN-R-90	
600 V FRS-R			
FRS-R-1/10	FRS-R-2	FRS-R-10*	FRS-R-100
FRS-R-1/8	FRS-R-2-1/4	FRS-R-12*	FRS-R-110
FRS-R-15/100	FRS-R-2-1/2	FRS-R-15*	FRS-R-125
FRS-R-2/10	FRS-R-2-8/10	FRS-R-17-1/2*	FRS-R-150
FRS-R-1/4	FRS-R-3	FRS-R-20*	FRS-R-175
FRS-R-3/10	FRS-R-3-2/10	FRS-R-25*	FRS-R-200
FRS-R-4/10	FRS-R-3-1/2	FRS-R-30*	FRS-R-225
FRS-R-1/2	FRS-R-4	FRS-R-35*	FRS-R-250
FRS-R-6/10	FRS-R-4-1/2	FRS-R-40*	FRS-R-300
FRS-R-8/10	FRS-R-5	FRS-R-45*	FRS-R-350
FRS-R-1	FRS-R-5-6/10	FRS-R-50*	FRS-R-400
FRS-R-1-1/8	FRS-R-6*	FRS-R-60*	FRS-R-450
FRS-R-1-1/4	FRS-R-6-1/4*	FRS-R-65	FRS-R-500
FRS-R-1-4/10	FRS-R-7*	FRS-R-70	FRS-R-600
FRS-R-1-1/2	FRS-R-7-1/2*	FRS-R-75	
FRS-R-1-6/10	FRS-R-8*	FRS-R-80	
FRS-R-1-8/10	FRS-R-9*	FRS-R-90	

* Available with indication To order, place "ID" at the end of the catalog number. Example: FRN-R-30**ID** or FRS-R-7**ID**.

Recommended blocks for Class RK5 fuses, see page 1-2.

Data sheet no. FRN-R; 1019 (up to 60 A), 1020 (70-600 A)
FRS-R 1017 (up to 60 A), 1018 (70-600 A)

Eaton CH main lug loadcenter

CH8L125RP

UPC:782114190548

Dimensions:

- **Height:** 3.69 IN
- **Length:** 13 IN
- **Width:** 11 IN

Weight:12 LB

Notes: Ground bar kits priced separately. Suitable for use as service equipment when not more than two service disconnecting mains are provided or when not used as a lighting and appliance panelboard.

Warranties:

- Limited lifetime

Specifications:

- **Special Features:** Cover included
- **Type:** Main lug only
- **Amperage Rating:** 125A
- **Box Size:** 7r
- **Bus Material:** Copper
- **Enclosure:** NEMA 3R
- **Enclosure Material:** Metallic
- **Feed Type:** Overhead
- **Main Circuit Breaker:** CH
- **Number Of Circuits:** 8
- **Number Of Wires:** Three-wire
- **Phase:** Single-phase
- **Voltage Rating:** 120/240V, 208Y/120, 240V
- **Wire Size:** #6-1/0 AWG

Supporting documents:

- Type CH Circuit Breakers and Loadcenters
- Loadcenters and Circuit Breakers
- Eatons Volume 1-Residential and Light Commercial

pe.eaton.com

Eaton CH main lug loadcenter

CH12L125R

UPC:782113097381

Dimensions:

- **Height:** 5.19 IN
- **Length:** 16.75 IN
- **Width:** 14.31 IN

Weight:15.8 LB

Notes: Suitable for use as service equipment when not more than six service disconnecting mains are provided or when not used as a lighting and appliance panelboard. Rainproof panels are furnished with hub closure plates. For rainproof hubs.

Warranties:

- Limited lifetime

Specifications:

- **Special Features:** Cover included
- **Type:** Main lug only
- **Amperage Rating:** 125A
- **Box Size:** B
- **Bus Material:** Copper
- **Enclosure:** NEMA 3R
- **Enclosure Material:** Metallic
- **Feed Type:** Overhead
- **Main Circuit Breaker:** CH
- **Number Of Circuits:** 12
- **Number Of Wires:** Three-wire
- **Phase:** Single-phase
- **Voltage Rating:** 120/240V
- **Wire Size:** #6-2/0 AWG

Supporting documents:

- Dimensional Drawing - CH 3/4 LOADCENTER, MAIN LUG ONLY, OUTDOOR NEMA 3R, 120/240 VAC, 1 PH

NORTH CAROLINA PROFESSIONAL 043326 ENGINEER RICHARD PANTEL

Reviewed and approved
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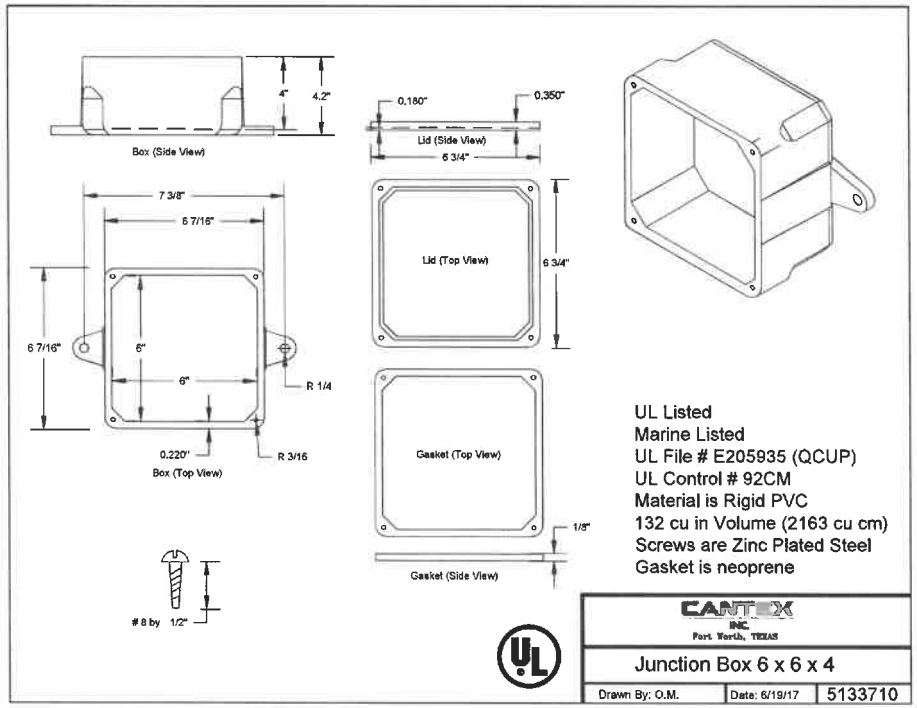
05/17/2024



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

NORTH CAROLINA PROFESSIONAL 043326 ENGINEER RICHARD PANTEL

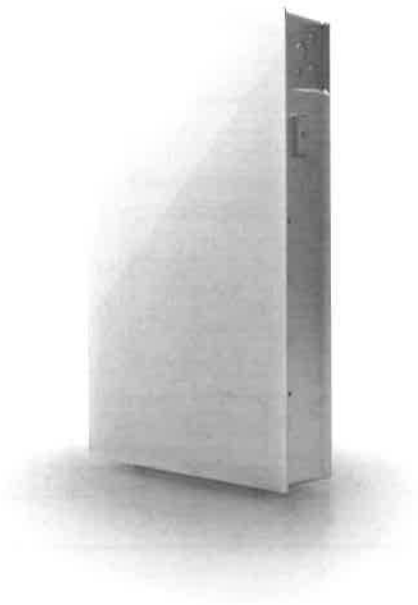
Reviewed and approved
Richard Pantel, P.E.
NC Lic. No. 043326
05/17/2024

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

Reviewed and approved
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05/17/2024

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) IP45 (Wiring Compartment)
Pollution Rating	PD3
Operating Noise @ 1 m	<50 db(A) typical <62 db(A) maximum

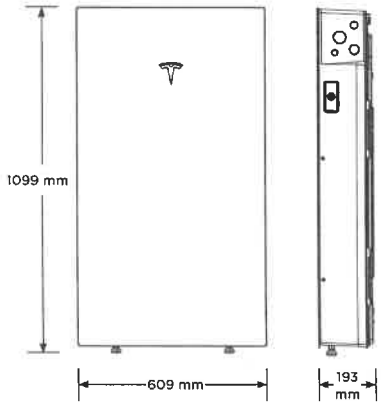
[6] Performance may be de-rated at operating temperatures above 40°C (104°F).

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 (-40°F to 122°F)	-45°C to 70°C (-49°F to 158°F)
Storage Temperature	-30°C to 70°C (-22°F to 158°F)	-30°C to 70°C (-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 (5 x 6 x 1 in)	173 x 45 x 22 mm (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 M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw	Wire Clip

Compliance Information

Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)
RSD Initiation Method	External System Shutdown Switch or 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

[9] 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

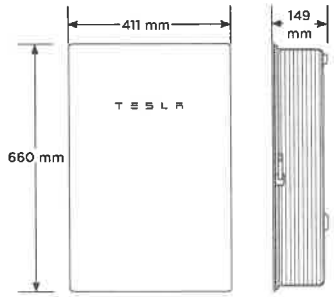
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Operating Humidity (RH)	Up to 100%, condensing
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R

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



NORTH CAROLINA PROFESSIONAL 043326 ENGINEER RICHARD PANTEL

Reviewed and approved
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05/17/2024

Product specifications

Eaton M22-C1-M3H

Photo is representative

Catalog Number: M22-C1-M3H

M22 Assembled One Element Control Station, 22.5 mm, 40 mm twist-to-release mushroom head, Maintained, Non-illuminated, Button: Red, NC, IP66, UL (NEMA) Type 4X, 13, Horizontal, Base: Black, Enclosure: Yellow

General specifications

Product Name	Catalog Number
Eaton M22 pushbutton control station	M22-C1-M3H
UPC	**Product Length/Depth**
786685282930	2.83 in
Product Height	**Product Width**
2.7 in	3.15 in
Product Weight	**Warranty**
0.85 lb	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.

Compliances	Certifications
GoST-R	CSA Certified
CE Marked	CCC Marked
Bureau Veritas	Lloyd's Register Certified

Catalog Notes

25% smaller depth than most competitor enclosures. Impact resistant polycarbonate enclosure.

defaultTaxonomyAttributeLabel

Type
Control Station, Emergency Stop Operator

Actuator function
Maintained

Button color
Red

Actuator
40 mm twist-to-release mushroom head

Environmental rating
IP66, NEMA 4X, NEMA 13

Orientation
Horizontal

Contact configuration
NC

Enclosure color
Yellow

Illumination
Non-illuminated

Series
M22

Size
22.5 mm

Base
Black

Resources

Catalogs
Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Specifications and datasheets
Eaton Specification Sheet - M22-C1-M3H

NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD PANTEL

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05/17/2024

Eaton Corporation plc
Eaton House
30 Pembroke Road
Dublin 4, Ireland
Eaton.com

Eaton.com/socialmedia

Project information

Installer	**Freedom Solar Power**
Project Address	**619 Raiford Road, Erwin, NC 28339 USA**

Project Name	**Vonda & Nathan Hamilton**
Project Number	**114147**
AHJ/ASCE	**Harnett County/7-16**
Wind / Exp. Cat. / Snow	**100.0mph / B / 0 psf**

Equipment Type

Module	**Mission Solar MSE395SX9R**
Inverter	-
Battery	--

Summary

Total modules	**50**
Total watts	**19750 W**
Total Attachments	**58**

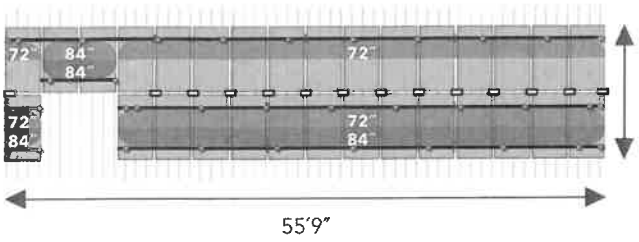
Location preview

Google Map data ©2024

Arrays

Array 1		Roof Type: **Hip**	SkipRail: **Yes**	**Array 2**		Roof Type: **Hip**	SkipRail: **Yes**
		Roof Material: **R-panel**	Roof Slope: **23°**			Roof Material: **R-panel**	Roof Slope: **23°**

Array 1 SkipRail



Zones: 1 2 3

Details

Roof Type: **23° R-panel Hip**
Rafter Spacing: **12.0"**
SkipRail: **Yes**
Use Scrap Rail: **Yes**
Hidden End Clamp: **Yes**
Attachment Type: **Other**
Rail: **2 x 7ft, 11 x 14ft**

Layout

Panels: **30**
Panel Size: **75.08" x 41.5" x 33mm**

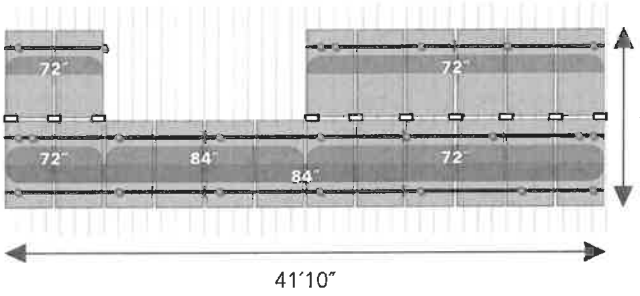
Design Notes

System Weight: **1617.5 lbs**
Attachments: **35**
System Weight/Attachment: **46.2 lbs**
Total Area: **1082 sqft**

Engineering

Max span values for SkipRail system are displayed on the diagram

Array 2 SkipRail



Zones: 1 2 3

Details

Roof Type: **23° R-panel Hip**
Rafter Spacing: **12.0"**
SkipRail: **Yes**
Use Scrap Rail: **Yes**
Hidden End Clamp: **Yes**
Attachment Type: **Other**
Rail: **1 x 7ft, 8 x 14ft**

Layout

Panels: **20**
Panel Size: **75.08" x 41.5" x 33mm**

Design Notes

System Weight: **1082.3 lbs**
Attachments: **23**
System Weight/Attachment: **47.1 lbs**
Total Area: **1082 sqft**

Engineering

Max span values for SkipRail system are displayed on the diagram

Bill of Materials

Part Info	Array 1	Array 2	Spares	Total QTY
PSR-B84 | Pegasus Rail - Black 84"	2	1	-	3
PSR-B168 | Pegasus Rail - Black 168"	11	8	-	19
PSR-SPL | Pegasus - Bonded Structural Splice	9	5	-	14
PSR-MCB | Pegasus - Multi-Clamp - Mid/End 30-40mm - Full Black	42	28	-	70
PSR-HEC | Pegasus - Hidden End Clamp	10	8	-	18
PSR-SRC | Pegasus - SkipRail Clamp	14	10	-	24
PSR-MLP | Pegasus - MLPE Mount	30	20	-	50
PSR-LUG | Pegasus - Ground Lug	1	1	-	2
PSR-WMC | Pegasus - Wire Management Clip	45	30	-	75
PSR-CBG | Pegasus - Cable Grip	5	4	-	9
PSR-CAP | Pegasus - End Cap	10	8	-	18
PSR-DTN | Pegasus - Dovetail T-bolt and nut	35	23	-	58
- | Customer Supplied R-Panel Mount	35	23	-	58