

SCOPE OF WORK

TO INSTALL A SOLAR PHOTOVOLTAIC (PV) SYSTEM AT THE OSTERHOUT RESIDENCE, LOCATED AT 42 OAKLAND DRIVE, SANFORD, 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

9.480 kW DC STC
7.800 kW AC

EQUIPMENT SUMMARY

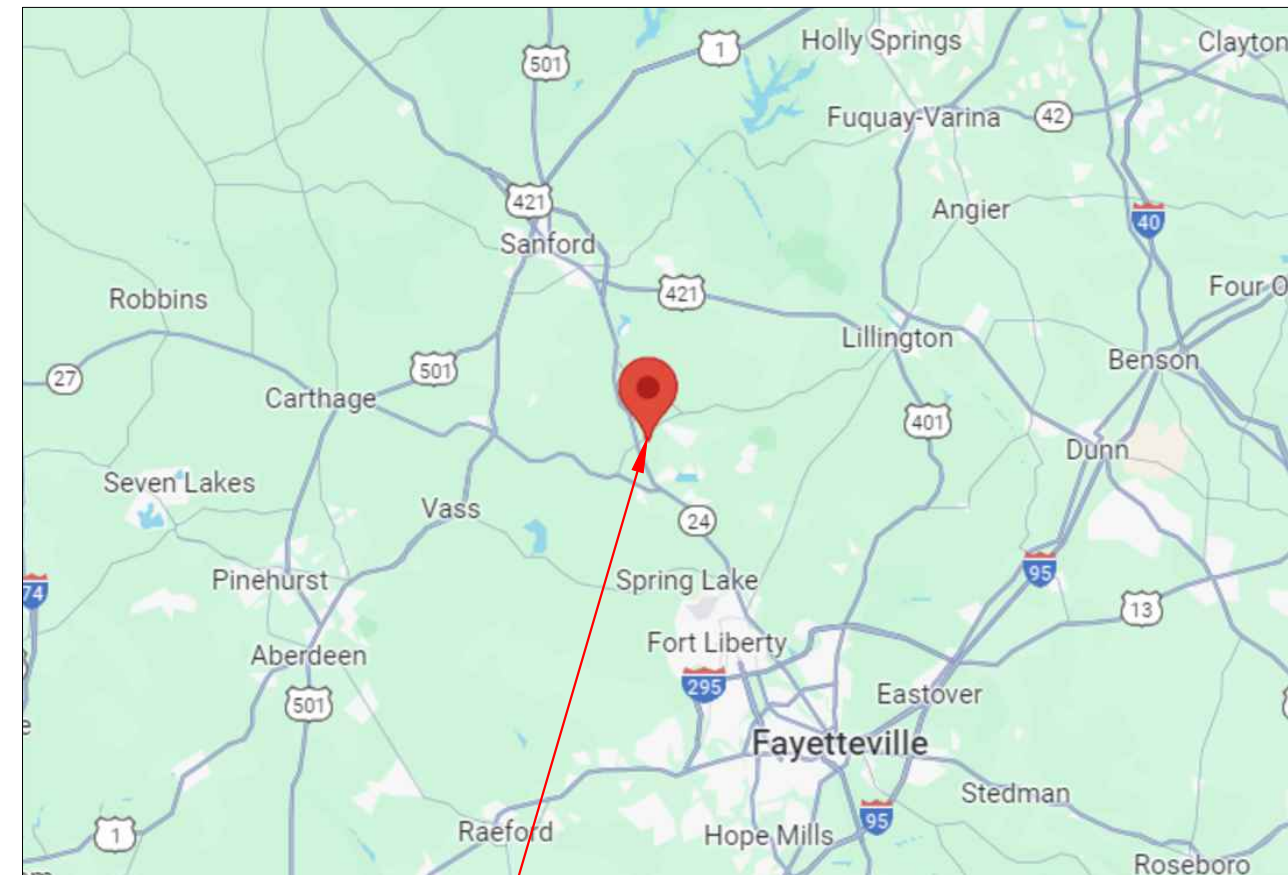
(24) MISSION SOLAR MSE395SX9R (395W) PV MODULES
(24) ENPHASE IQ8M-72-M-US [240V] PV INVERTERS

SHEET INDEX

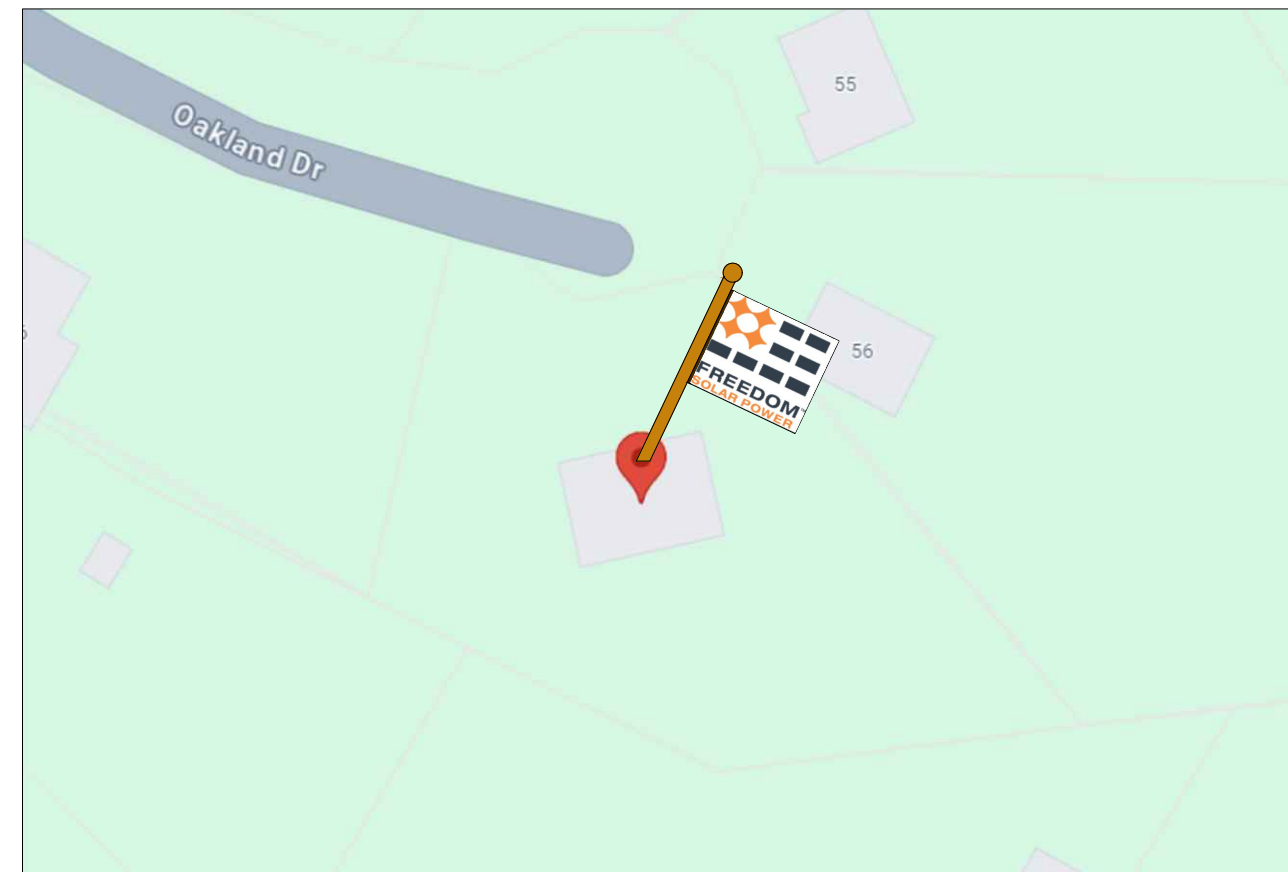
PV-0 COVER
PV-1 SITE MAP AND PV LAYOUT
PV1A RACKING PLAN
PV-2 STRING MAP AND MONITORING LAYOUT
PV-3 ELECTRICAL DIAGRAM
PV-4 EQ WALL
PV-5 MOUNTING DETAIL
PV-6 SYSTEM LABELING DETAIL
PV-7 SITE DIRECTORY PLACARD
PV-8 SAFETY PLAN

GOVERNING CODES

2017 NATIONAL ELECTRICAL CODE
2018 INTERNATIONAL RESIDENTIAL CODE
2018 INTERNATIONAL FIRE CODE
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269



PROJECT LOCATION



VICINITY MAP

CONTRACTOR

FREEDOM
SOLAR POWER

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

| REVISIONS | | |
|---------------|------------|-----|
| DESCRIPTION | DATE | REV |
| DESIGN PACKET | 06/03/2024 | - |
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PE STAMP

PROJECT NAME

LEE T OSTERHOUT
42 OAKLAND DRIVE
SANFORD, NORTH CAROLINA,
27332
(910) 885-2872
PROJECT ID: 114630

SHEET NAME

COVER

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-0

LEAD ID: 114630

CONSTRUCTION SUMMARY

- (24) (MISSION SOLAR MSE395SX9R (395W)) SOLAR MODULES, 9.480 kW DC STC
MODULE DIMENSIONS = 41.5" X 75.1" X 1.57"
- (24) ENPHASE IQ8M-72-M-US [240V] PV INVERTERS
COMBINED INVERTER OUTPUT = 7.800 kW AC.
- (01) TESLA POWERWALL 3 1707000-XX-Y [240V] PV INVERTER
- (01) TESLA ENERGY GATEWAY -2
- (01) ENPHASE IQ GATEWAY

RACKING: PEGASUS RAIL
ATTACHMENT: PEGASUS INSTAFLASH

SITE DETAILS

ROOF TYPE: ASPHALT SHINGLE
ARRAY #1 - TILT = 34°, AZIMUTH = 168°
ARRAY #2 - TILT = 34°, AZIMUTH = 168°

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
IF DESIGN PACK IS NOT STAMPED, MUST
INCLUDE EXCEPTION STATEMENT IN RED:

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

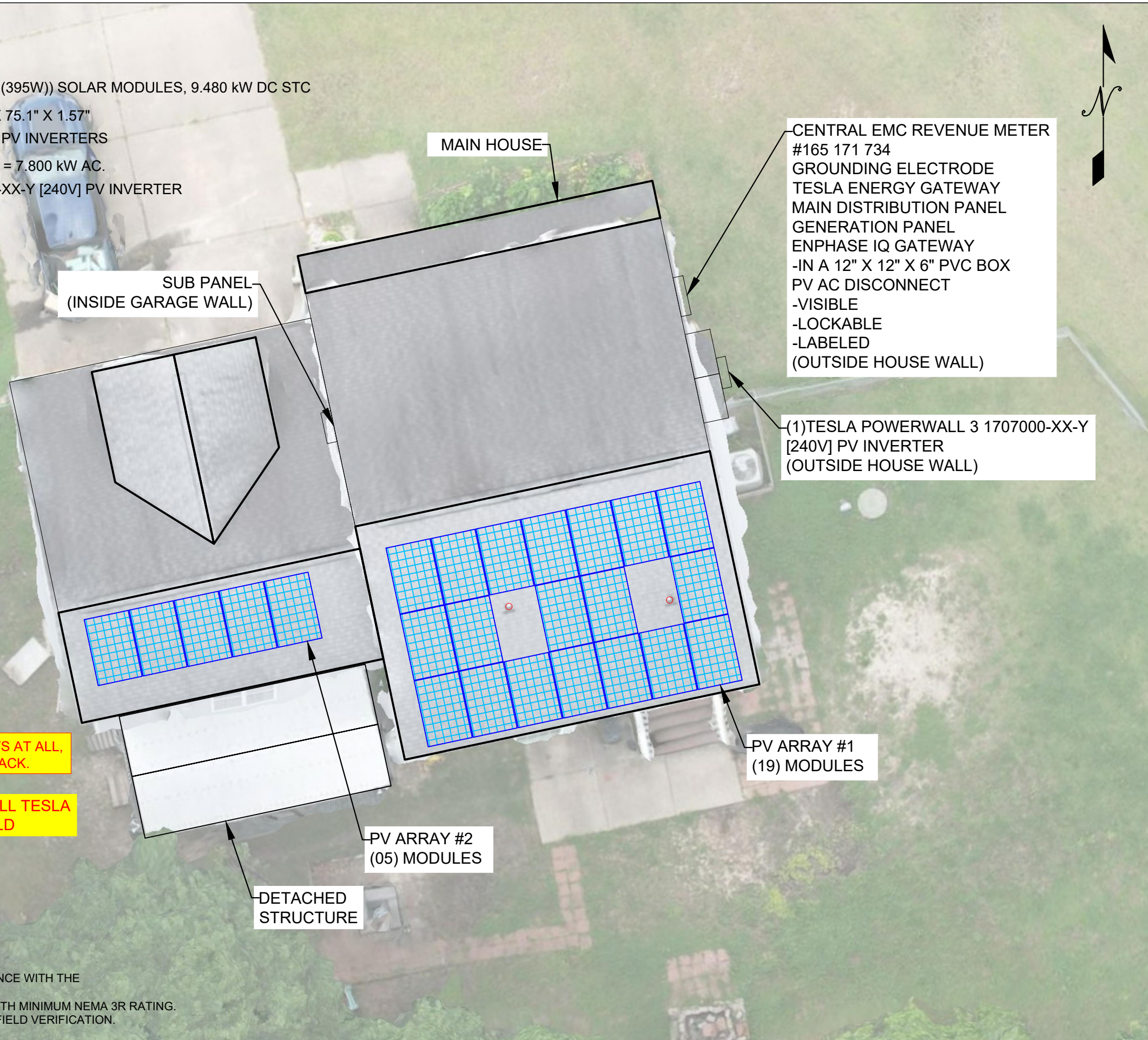
NO CUTTING AND COVERING PLUMBING VENTS AT ALL,
PVC PIPES CAN BE RELOCATED WITH ROOF JACK.

-UTILITY SHUTDOWN NEEDED TO INSTALL TESLA
ENERGY GATEWAY-2 & SERVICE REBUILD

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 RAIN TIGHT WITH MINIMUM NEMA 3R RATING.
- 3.) ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.



MAIN HOUSE

SUB PANEL
(INSIDE GARAGE WALL)

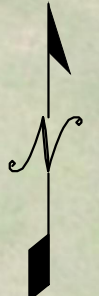
CENTRAL EMC REVENUE METER
#165 171 734
GROUNDING ELECTRODE
TESLA ENERGY GATEWAY
MAIN DISTRIBUTION PANEL
GENERATION PANEL
ENPHASE IQ GATEWAY
-IN A 12" X 12" X 6" PVC BOX
PV AC DISCONNECT
-VISIBLE
-LOCKABLE
-LABELED
(OUTSIDE HOUSE WALL)

(1)TESLA POWERWALL 3 1707000-XX-Y
[240V] PV INVERTER
(OUTSIDE HOUSE WALL)

PV ARRAY #1
(19) MODULES

PV ARRAY #2
(05) MODULES

DETACHED
STRUCTURE



CONTRACTOR

**FREEDOMTM
SOLAR POWER**

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SHEET NAME

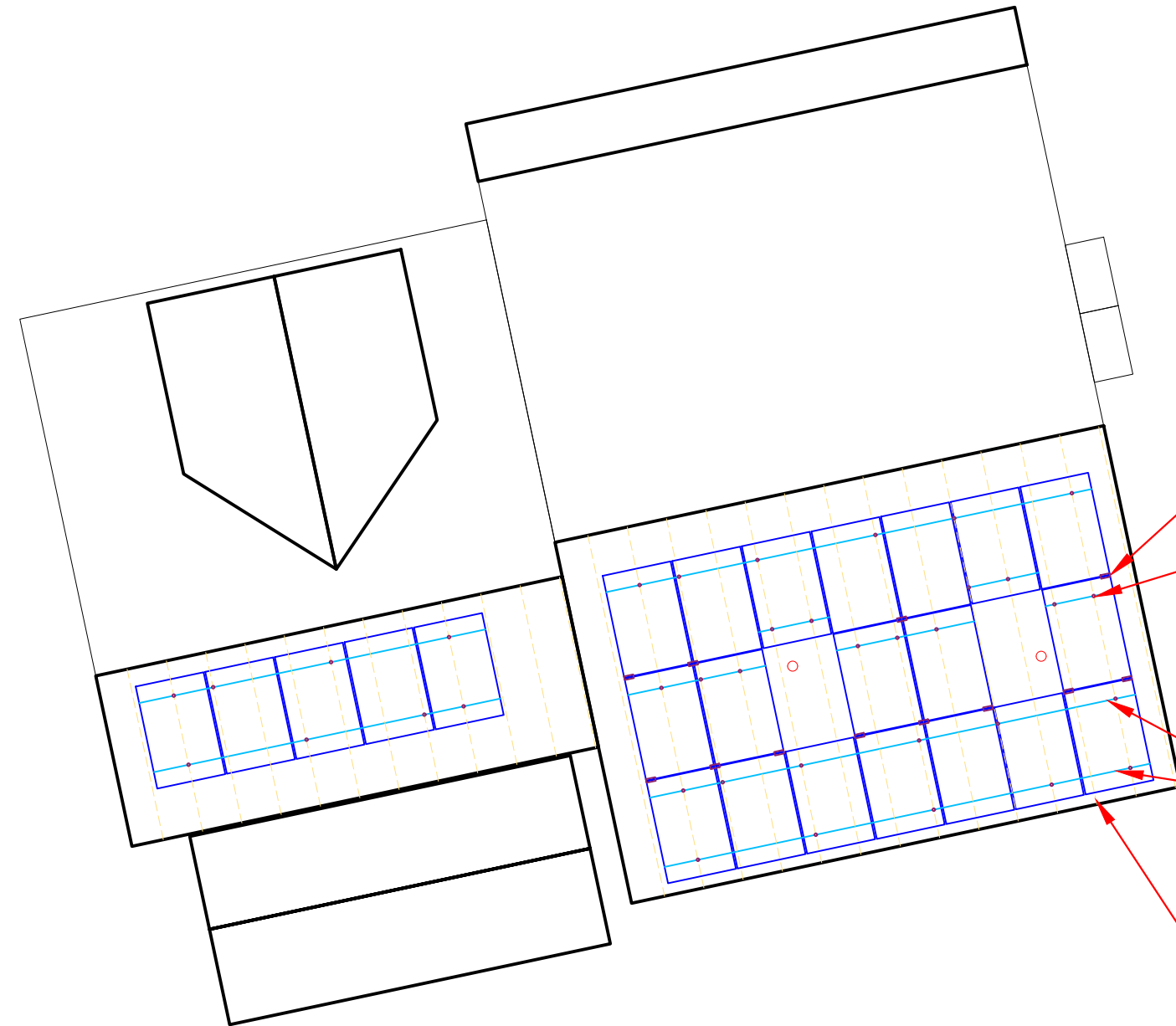
SITE MAP &
PV LAYOUT

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-1



PEGASUS SKIP RAIL CLAMP

PEGASUS INSTAFLASH BLACK,
5/16" X 4.0" SS LAG WITH MIN.
2.5" EMBEDMENT INTO THE FRAMING
AT MAX 48" & 72" O.C. ALONG RAILS

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

2"X4" MANUFACTURED
TRUSSES AT 24" O.C. TYP.

CONSTRUCTION NOTES

- 1.) ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
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- 3.) ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.

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SHEET NAME

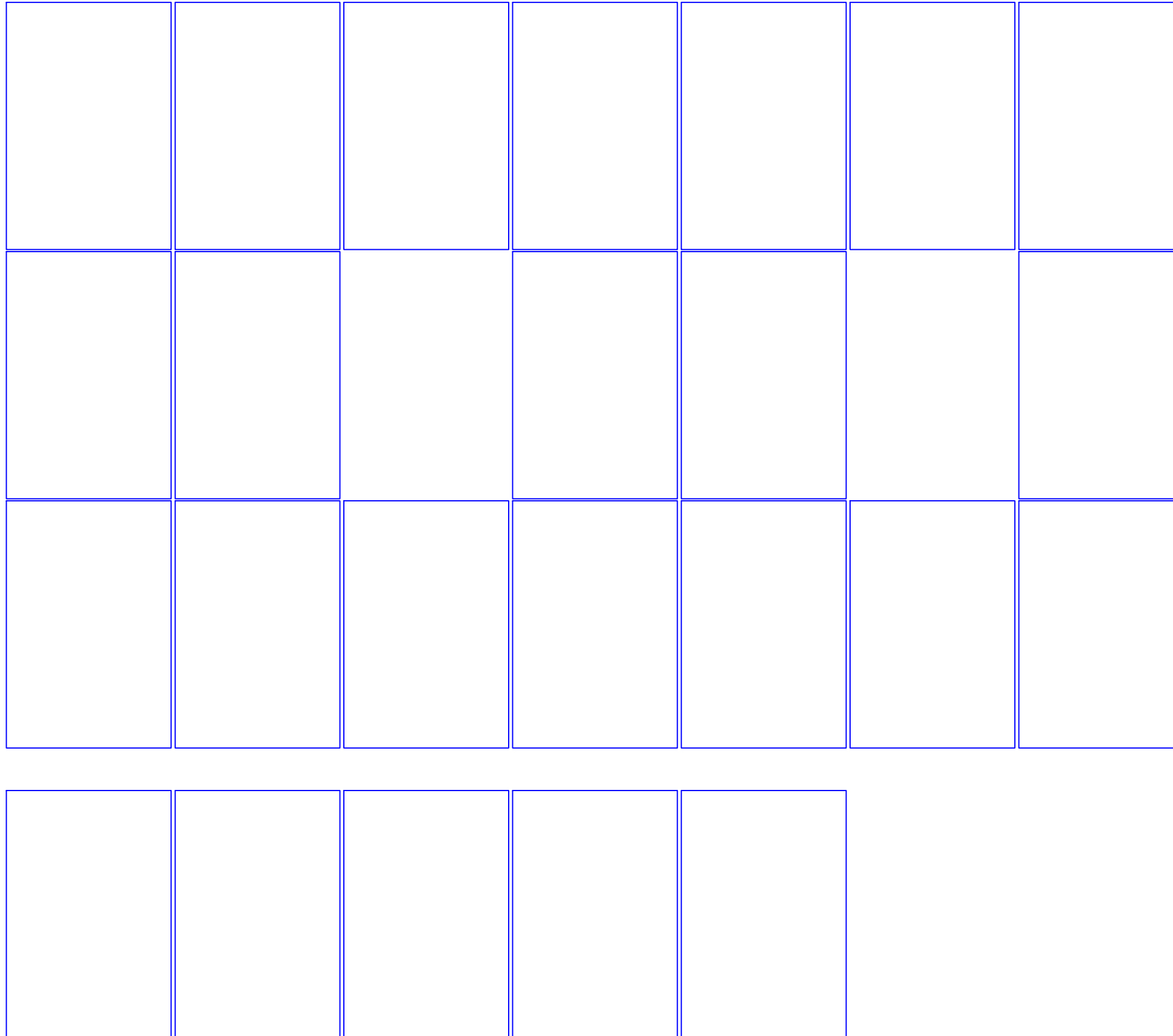
RACKING PLAN

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-1A



CONTRACTOR

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SHEET NAME

**STRING MAP &
MONITORING
LAYOUT**

SHEET SIZE

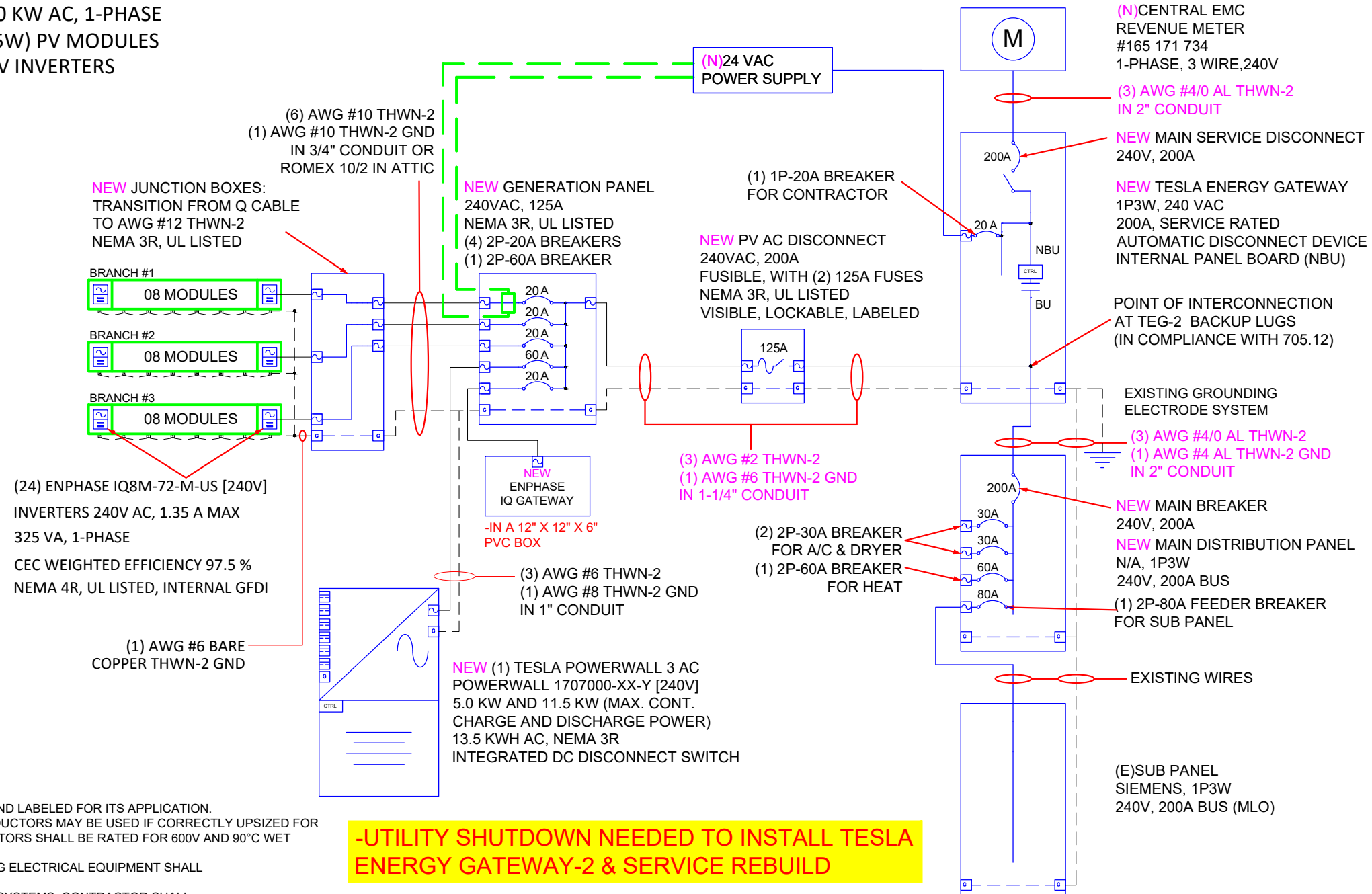
**ANSI B
11" x 17"**

SHEET NUMBER

PV-2

ENPHASE ENVOY S/N _____

SOLAR ARRAY - 9.480 KW DC STC, 7.800 KW AC, 1-PHASE
 (24) MISSION SOLAR MSE395SX9R (395W) PV MODULES
 (24) ENPHASE IQ8M-72-M-US [240V] PV INVERTERS



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 ACCESSORIES 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 LESS THAN 75 FT AND THERE ARE LESS THAN 8 CURRENT-CARRYING CONDUCTORS WITHIN THE RACEWAY.

-UTILITY SHUTDOWN NEEDED TO INSTALL TESLA ENERGY GATEWAY-2 & SERVICE REBUILD

| CALCULATIONS FOR CURRENT CARRYING CONDUCTORS | CALCULATIONS FOR OVERCURRENT DEVICES |
|---|---|
| <p>INVERTER OUTPUT WIRE AMPACITY CALCULATION [NEC 690.8(A)(3)]: 1.35A PER INVERTER ENPHASE IQ8M-72-M-US [240V] MAXIMUM INVERTER BRANCH CURRENT = (11)(1.35A) = 14.85A CONTINUOUS USE: #10 WIRE 75°C DERATED AMPACITY = (0.80)(35.0A) = 28.0A 28.0A > 14.85A CONDITIONS OF USE: #10 WIRE 90°C DERATED AMPACITY = (0.91)(0.80)(40.0A) = 29.12A 29.12A > 14.85A</p> <p>GENERATION PANEL OUTPUT WIRE AMPACITY CALCULATION [NEC 690.8(A)(3)]: 1.35A PER INVERTER ENPHASE IQ8M-72-M-US [240V] 48.0A PER TESLA POWERWALL 3 BATTERY INVERTER COMBINED CURRENT = (24)(1.35A)+(1 x 48.0A) = 80.4A CONTINUOUS USE: #2 WIRE 75°C DERATED AMPACITY = (0.80)(115A) = 92.00A 92.00A > 80.4A CONDITIONS OF USE: #2 WIRE 90°C DERATED AMPACITY = (0.91)(130A) = 118.30A 118.30A > 80.4A</p> | <p>INVERTER BRANCH AC CURRENT CALCULATION [NEC 690.8(A)(3)]: 1.35A PER INVERTER ENPHASE IQ8M-72-M-US [240V] MAXIMUM BRANCH INVERTER CURRENT = (11)(1.35A) = 14.85A MINIMUM OCPD = (14.85A)(1.25) = 18.56A USE 2P-20A BREAKERS IN GENERATION PANEL FOR INVERTER BRANCH OCPD</p> <p>SYSTEM AC CURRENT CALCULATION [NEC 690.8(A)(3)]: 1.35A PER INVERTER ENPHASE IQ8M-72-M-US [240V] 48.0A PER TESLA POWERWALL 3 BATTERY INVERTER COMBINED CURRENT = (24)(1.35A)+(1 x 48A) = 80.4A MINIMUM OCPD = (80.4A)(1.25) = 100.5A USE (2) 125A FUSES IN PV AC DISCONNECT FOR SYSTEM OCPD NOTE: AWG #2 CONDUCTORS ARE ADEQUATELY PROTECTED BY 125A FUSES</p> <p>CALCULATION FOR OVERCURRENT POWERWALL DEVICES</p> <p>TESLA POWERWALL OUTPUT CURRENT CALCULATION 48.0A PER TESLA POWERWALL 3 BATTERY INVERTER COMBINED CURRENT = (1)(48.0A) = 48.0A MINIMUM OCPD = (48.0A)(1.25) = 60.0A USE (1) 2P-60A BREAKER IN GENERATION PANEL FOR POWERWALL OCPD</p> |

CONTRACTOR

FREEDOM[™] SOLAR POWER

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

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PE STAMP

PROJECT NAME

**LEE T OSTERHOUT
 42 OAKLAND DRIVE
 SANFORD, NORTH CAROLINA,
 27332
 (910) 885-2872
 PROJECT ID: 114630**

SHEET NAME

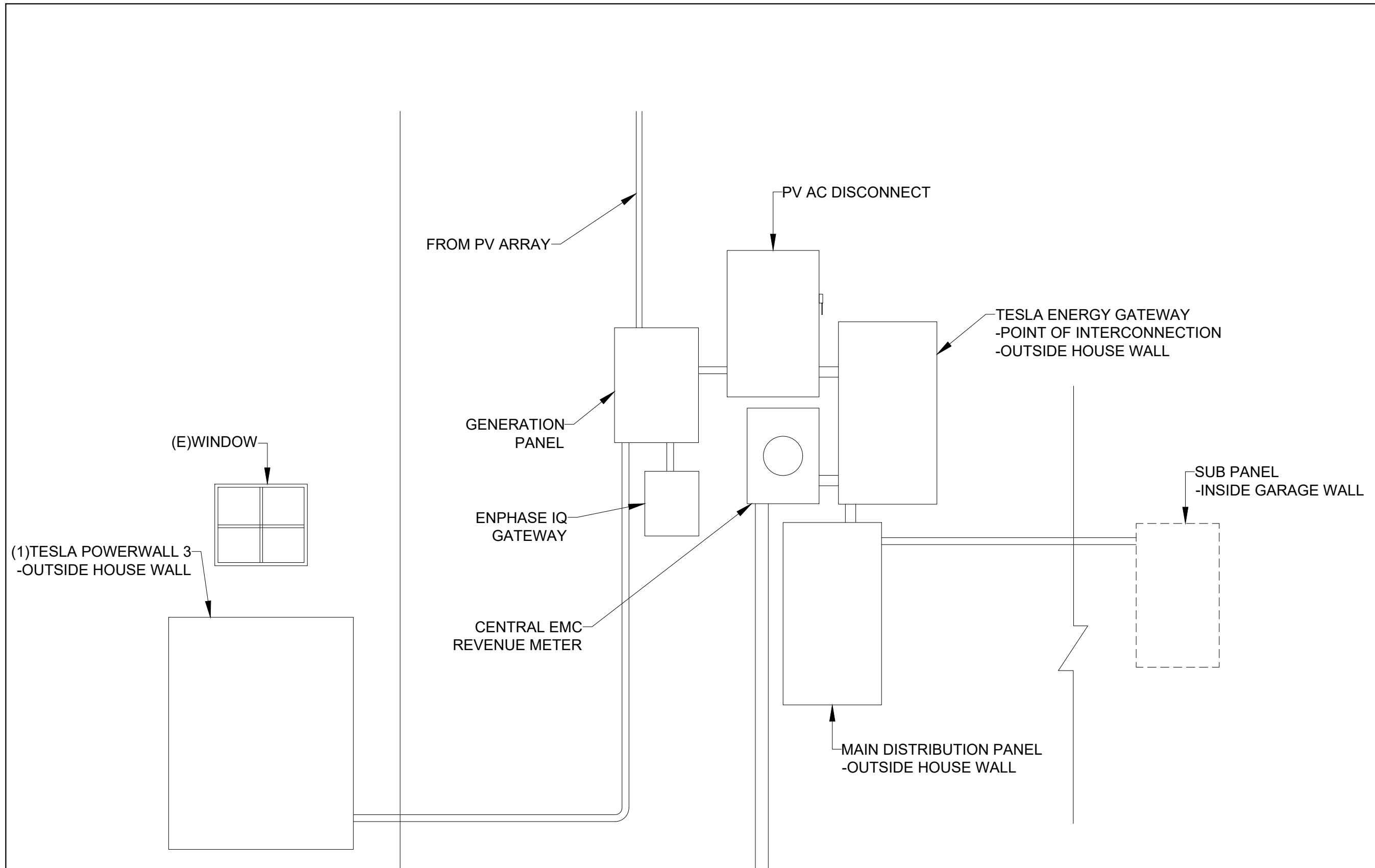
**ELECTRICAL
 DIAGRAM**

SHEET SIZE

**ANSI B
 11" x 17"**

SHEET NUMBER

PV-3



CONTRACTOR

**FREEDOMTM
SOLAR POWER**

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

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27332
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PROJECT ID: 114630

SHEET NAME

EQ.WALL

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-4

CONTRACTOR



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SOLAR POWER**

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4801 FREIDRICH LN, STE 100
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SHEET NAME

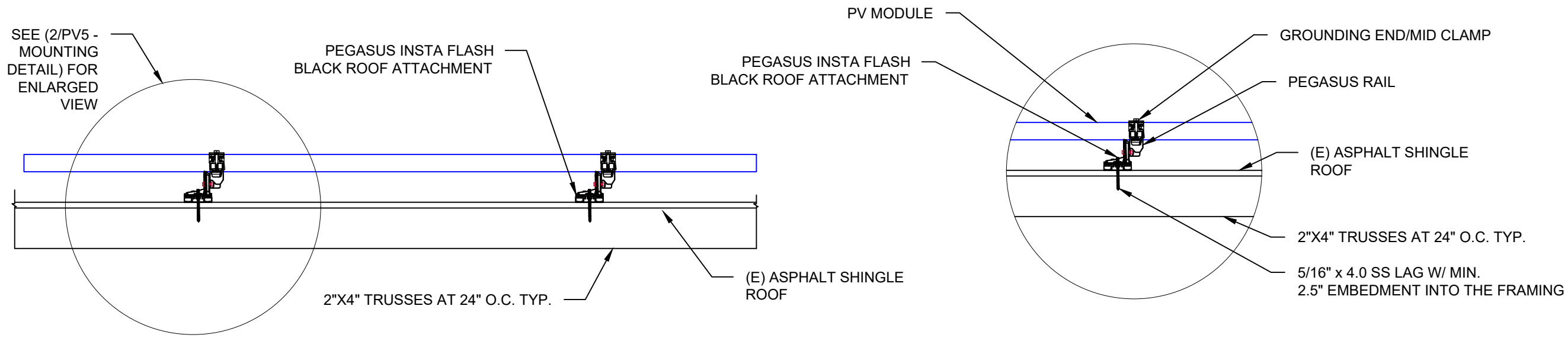
MOUNTING DETAIL

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-5



MOUNTING METHOD
NTS

1

MOUNTING DETAIL
NTS

2

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)

MONITORING

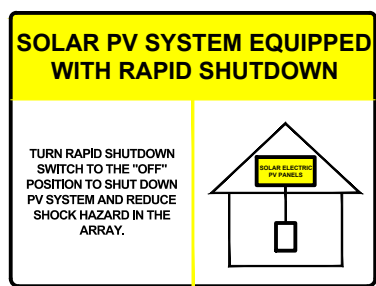
REQ'D BY: FREEDOM SOLAR G
 APPLY TO:
 MONITORING DEVICE ENCLOSURE

**RAPID SHUTDOWN SWITCH
 FOR SOLAR PV SYSTEM**

REQ'D BY: NEC 690.56(C)(2) H
 APPLY TO:
 PV DISCONNECT

**PHOTOVOLTAIC SYSTEM
 AC DISCONNECT
 OPERATING CURRENT: 80.4A
 OPERATING VOLTAGE: 240 VAC**

REQ'D BY: 690.56(1)(a) I
 APPLY TO:
 PV DISCONNECT



690.56(C)(1)(a) NEC BY: REQ'D J
 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 K
 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

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SHEET NAME

SYSTEM LABELING DETAIL

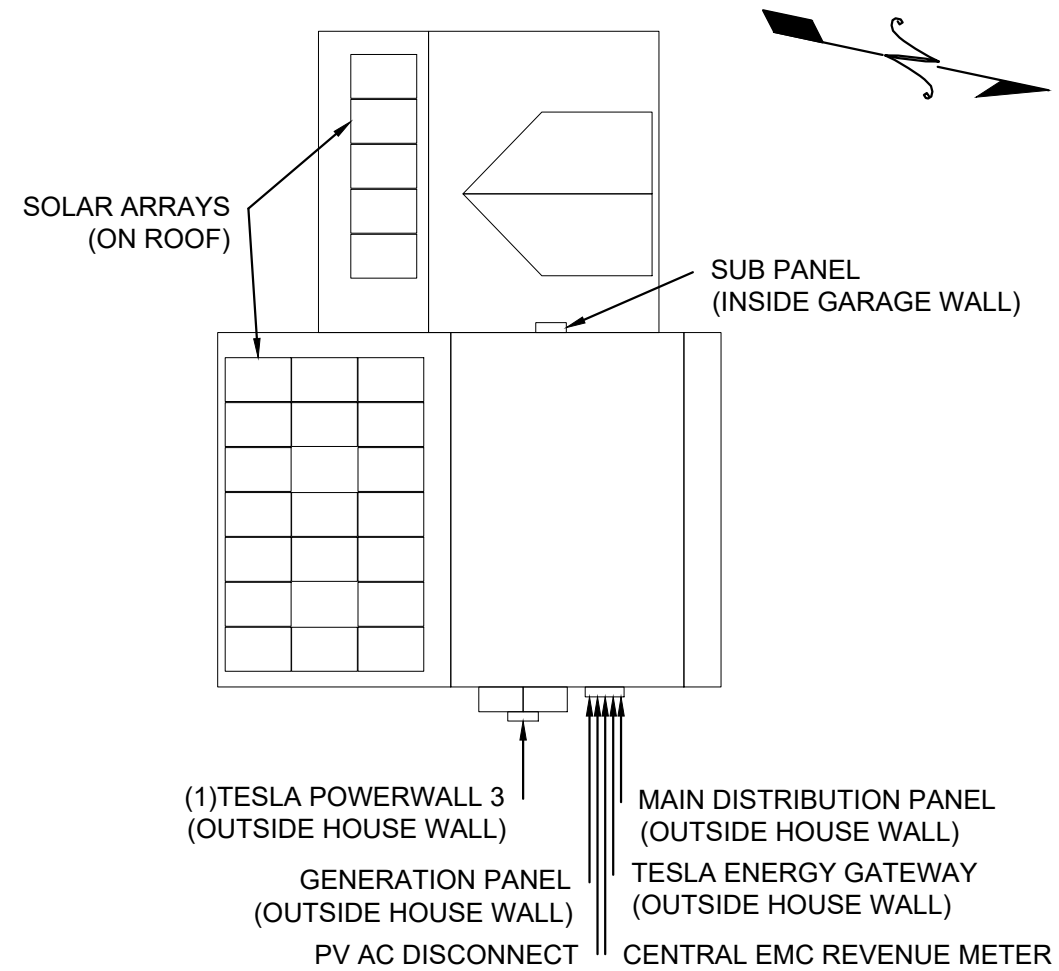
SHEET SIZE

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



CONTRACTOR

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SHEET NAME

SITE
DIRECTORY
PLACARD

SHEET SIZE

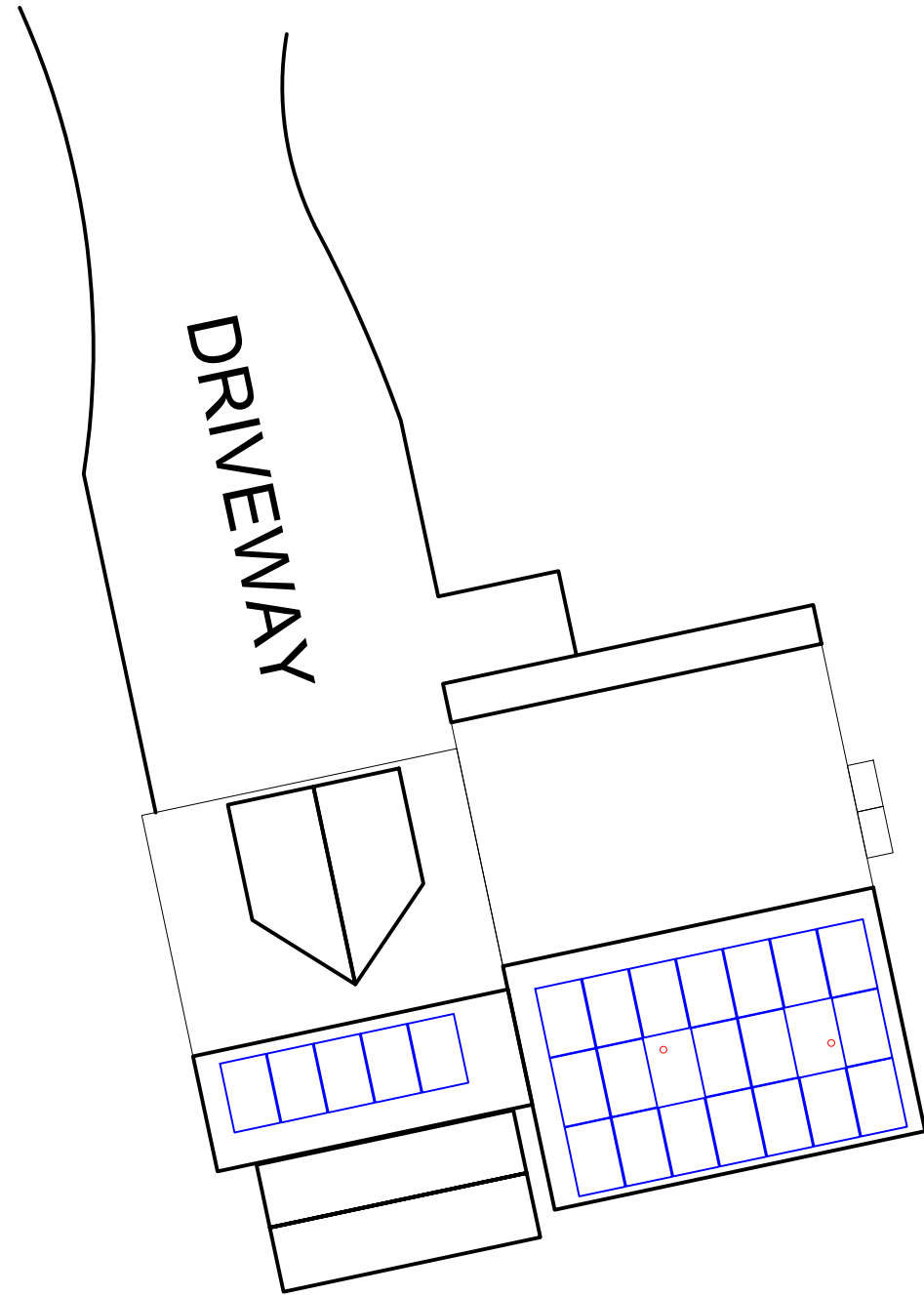
ANSI B
11" x 17"

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



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PE STAMP

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: _____

PROJECT NAME

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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%

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

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



UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

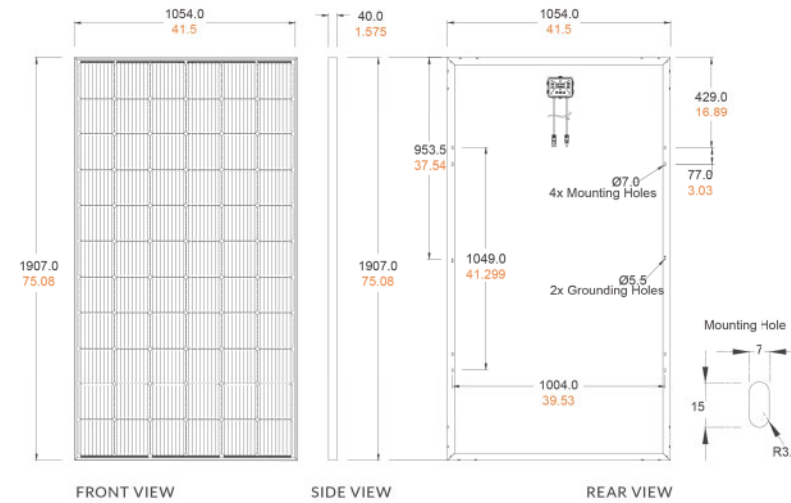
If you have questions or concerns about certification of our products in your area, please contact Mission Solar Energy.



Class Leading 390-400W

BASIC DIMENSIONS

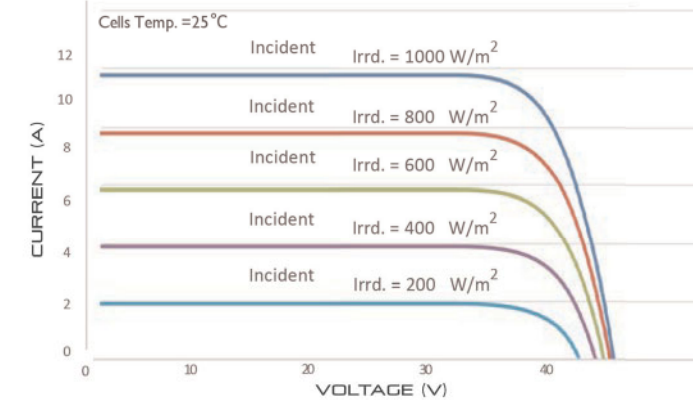
[UNITS: MM/IN]



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 |



CEC



Mission Solar Energy

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

Mission Solar Energy reserves the right to make specification changes without notice.
C-SA2-MKTG-0027 REV 4 03/18/2022

MSE PERC 66

ELECTRICAL SPECIFICATION

| PRODUCT TYPE | MSE _{xxx} SX9R (xxx = P _{max}) | | | | |
|-----------------------|---|----------------|-------|-------|-------|
| Power Output | P _{max} | W _p | 390 | 395 | 400 |
| 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) | 43.75°C (±3.7%) |
| Temperature Coefficient of P _{max} | -0.367%/°C |
| Temperature Coefficient of V _{oc} | -0.259%/°C |
| Temperature Coefficient of I _{sc} | 0.033%/°C |

OPERATING CONDITIONS

| | |
|---------------------------------|---|
| Maximum System Voltage | 1,000Vdc |
| 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 05-8 |

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 |

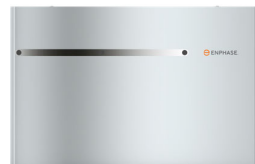
PALLET [26 PANELS]

| | | | |
|---------------------|----------------------|-------------------|-------------------|
| 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) |



IQ8M and IQ8A Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built using advanced 55-nm technology with high-speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to the IQ8 Series Microinverters that have integrated MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conform with various regulations when installed according to the manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-and-play connectors
- Power line communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB 3rd Ed.)

NOTE:

- IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, and so on) in the same system.
- IQ Gateway is required to change the default grid profile at the time of installation to meet the local Authority Having Jurisdiction (AHJ) requirements.

IQ8M and IQ8A Microinverters

| INPUT DATA (DC) | UNITS | IQ8M-72-M-US | IQ8A-72-M-US |
|--|------------------|--|--------------|
| Commonly used module pairings ¹ | W | 260-460 | 295-500 |
| Module compatibility | | To meet compatibility, PV modules must be within the following maximum input DC voltage and maximum module I_{sc} . Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator | |
| MPPT voltage range | V | 30-45 | 32-45 |
| Operating range | V | | 16-58 |
| Minimum/Maximum start voltage | V | | 22/58 |
| Maximum input DC voltage | V | | 60 |
| Maximum continuous input DC current | A | | 12 |
| Maximum input DC short-circuit current | A | | 25 |
| Maximum module I_{sc} | A | | 20 |
| Overvoltage class DC port | | | II |
| DC port backfeed current | mA | | 0 |
| PV array configuration | | 1 x 1 ungrounded array; no additional DC side protection required; AC side protection requires max 20 A per branch circuit | |
| OUTPUT DATA (AC) | UNITS | IQ8M-72-M-US | IQ8A-72-M-US |
| Peak output power | VA | 330 | 366 |
| Maximum continuous output power | VA | 325 | 349 |
| Nominal grid voltage (L-L) | V | 240, split-phase (L-L), 180° | |
| Minimum and Maximum grid voltage ² | V | 211-264 | |
| Maximum continuous output current | A | 1.35 | 1.45 |
| Nominal frequency | Hz | 60 | |
| Extended frequency range | Hz | 47-68 | |
| AC short-circuit fault current over three cycles | A _{rms} | 2 | |
| Maximum units per 20 A (L-L) branch circuit ³ | | 11 | |
| Total harmonic distortion | % | <5 | |
| Overvoltage class AC port | | III | |
| AC port backfeed current | mA | 30 | |
| Power factor setting | | 1.0 | |
| Grid-tied power factor (adjustable) | | 0.85 leading ... 0.85 lagging | |
| Peak efficiency | % | 97.8 | 97.7 |
| CEC weighted efficiency | % | 97.5 | 97 |
| Nighttime power consumption | mW | 21 | 22 |
| MECHANICAL DATA | | | |
| Ambient temperature range | | -40°C to 60°C (-40°F to 140°F) | |
| Relative humidity range | | 4% to 100% (condensing) | |
| DC connector type | | Stäubli MC4 | |
| Dimensions (H x W x D) | | 212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2") | |
| Weight | | 1.1 kg (2.43 lbs) | |
| Cooling | | Natural convection—no fans | |
| Approved for wet locations | | Yes | |
| Pollution degree | | PD3 | |
| Enclosure | | Class II double-insulated, corrosion-resistant polymeric enclosure | |
| Environmental category/UV exposure rating | | NEMA Type 6/outdoor | |

(1) No enforced DC/AC ratio.

(2) Nominal voltage range can be extended beyond nominal if required by the utility.

(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8M and IQ8A Microinverters

| COMPLIANCE | |
|----------------|--|
| Certifications | CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3rd Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV Systems, for AC and DC conductors, when installed according to the manufacturer's instructions. |

IQ8M and IQ8A Microinverters

Revision history

| REVISION | DATE | DESCRIPTION |
|--------------------|----------------|---|
| DSH-00205-2.0 | November 2023 | Updated the nighttime power consumption values. Included NEC 2023 specification in the "Compliance" section. |
| DSH-00205-1.0 | September 2023 | Updated the module compatibility specification. |
| Previous releases. | | |

Enphase Q Cable and Accessories

The **Enphase Q Cable™** and accessories are part of the sixth generation Enphase IQ System™. These products provide simplicity, reliability, and faster installation times.



Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- Four-wire (three-phase) option also available
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste



Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

Enphase Q Cable Accessories

Q CABLE SPECIFICATIONS

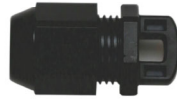

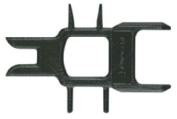
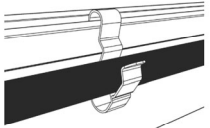
| | |
|---------------------------------|-------------------------------------|
| Voltage rating | 600V (connector rating up to 250 V) |
| Cable temperature rating | 90° C wet/dry |
| UV exposure rating | EN ISO 492-2 |
| Environmental protection rating | IEC 60529 IP67 |
| Compliance | RoHS, OIL RES I, CE, UV resistant |
| Cable insulator rating | H07BQ-F |
| Flame rating | IEC 60332-1-2 |

Q CABLE TYPES / ORDERING OPTIONS

| Model Number | Max Nominal Voltage | Ampacity Rating | Connector Spacing | PV Module Orientation | Connector Count per Box |
|------------------------------|---------------------|-----------------|-------------------|-----------------------|-------------------------|
| Q-25-10-240 (single-phase) | 250 VAC | 25 A | 1.3 m | Portrait | 240 |
| Q-25-17-240 (single-phase) | 250 VAC | 25 A | 2.0 m | Landscape (60-cell) | 240 |
| Q-25-20-200 (single-phase) | 250 VAC | 25 A | 2.3 m | Landscape (72-cell) | 200 |
| Q-25-10-3P-200 (three-phase) | 250 VAC | 25 A | 1.3 m | Portrait | 200 |
| Q-25-17-3P-160 (three-phase) | 250 VAC | 25 A | 2.0 m | Landscape (60-cell) | 160 |
| Q-25-20-3P-160 (three-phase) | 250 VAC | 25 A | 2.3 m | Landscape (72-cell) | 160 |

ENPHASE Q CABLE ACCESSORIES

| Name | Model Number | Description |
|-----------------------------------|-----------------|--|
| Raw Q Cable (single-phase) | Q-25-RAW-300 | 300 meters cable with no connectors |
| Raw Q Cable (three-phase) | Q-25-RAW-3P-300 | 300 meters cable with no connectors |
| Field-wireable connector (male) | Q-CONN-R-10M | Make connections using single-phase cable |
| Field-wireable connector (male) | Q-CONN-3P-10M | Make connections using three-phase cable |
| Field-wireable connector (female) | Q-CONN-R-10F | Make connections from any Q Cable (single-phase) open connector |
| Field-wireable connector (female) | Q-CONN-3P-10F | Make connections from any Q Cable (three-phase) open connector |
| Cable Clip | ET-CLIP-100 | Used to fasten cabling to the racking or to secure looped cabling |
| Disconnect tool | Q-DISC-10 | Disconnect tool for Q Cable connectors, DC connectors, and AC module mount |
| Disconnect tool | Q-DISC-3P-10 | Disconnect tool for three-phase Field wireable connectors |
| Q Cable sealing caps (female) | Q-SEAL-10 | One needed to cover each unused connector on the cabling |
| Terminator (single-phase) | Q-TERM-R-10 | Terminator cap for unused single-phase cable ends |
| Terminator (three-phase) | Q-TERM-3P-10 | Terminator cap for unused three-phase cable ends |
| Replacement DC Adaptor (MC4) | Q-DCC-2-INT | DC adaptor to MC4 (max voltage 100 VDC) |

| | | | |
|---|---|---|--|
|  | TERMINATOR Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-R-10 / Q-TERM-3P-10)) |  | SEALING CAPS Sealing caps for unused cable connections, sold in packs of ten (Q-SEAL-10) |
|  | DISCONNECT TOOL Plan to use at least one per installation, sold in packs of ten (Q-DISC-10) Three-phase model (Q-DISC-3P-10) |  | CABLE CLIP Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (ET-CLIP-100) |

IQ Gateway



IQ Gateway

The IQ Gateway delivers solar production and energy consumption data to Enphase Installer Portal monitoring and analysis software for comprehensive, remote maintenance, and management of Enphase systems.

With integrated production metering and optional consumption monitoring, the IQ Gateway is the platform for total energy management. It integrates with the IQ System Controller and IQ Battery.



IQ Series Microinverters
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) dramatically simplify the installation process.



IQ System Controller
Provides microgrid interconnect device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.



IQ Battery
All-in-one AC coupled storage system that is reliable, smart, simple, and safe. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



IQ Load Controller
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.

Smart

- Enables web-based monitoring and control
- Provides bidirectional communications for remote upgrades
- Supports power export limiting and zero-export applications

Simple

- Easy system configuration using Enphase Installer App
- Flexible networking with Wi-Fi, Ethernet, or cellular

Reliable

- Designed for installation indoors or outdoors in a NEMA 3R rated enclosure
- 5-year limited warranty
- ENV2-IQ-AM1-240 complies with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

| | | |
|---|---|---------------------------------|
| MODEL NUMBER | | ENV-IQ-AM1-240, ENV2-IQ-AM1-240 |
| IQ Gateway ENV-IQ-AM1-240 ENV2-IQ-AM1-240 (IEEE 1547:2018) | IQ Gateway integrates revenue grade PV production metering (ANSI C12.20 ±0.5%), consumption metering (±2.5%), and battery metering (±2.5%) with IQ Battery 5P. Includes one 200 A continuous rated Production current transformer (CT). | |
| ACCESSORIES - ORDER SEPARATELY | | |
| Mobile Connect COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05 | - Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan | |
| Consumption monitoring CT and IQ Battery 5P metering CT CT-200-SPLIT CT-200-CLAMP | Split-core and clamp style CTs with 2.5% accuracy enable whole home and IQ Battery 5P metering | |
| Communications Kit COMMS-KIT-01 COMMS-KIT-02 | Installed at the IQ Gateway. For communications with IQ Battery and IQ System Controller. Includes USB cable for connection to IQ Gateway or IQ Combiner and allows wireless communication with IQ Battery and IQ System Controller. | |
| POWER REQUIREMENTS | | |
| Power requirements | 120/240 VAC split-phase maximum 20 A overcurrent protection required | |
| Typical power consumption | 5 W | |
| CAPACITY | | |
| Number of microinverters polled | Up to 300 | |
| MECHANICAL & ELECTRICAL DATA | | |
| Dimensions (W×H×D) | 21.3 cm × 12.6 cm × 4.5 cm (8.4 in × 5 in × 1.8 in) | |
| Weight | 1.09 lb | |
| Ambient temperature range | -40°C to 65°C (-40°F to 149°F) [ENV-IQ-AM1-240] -40°C to 50°C (-40°F to 122°F) [ENV2-IQ-AM1-240] -40°C to 46°C (-40°F to 115°F) if installed in an enclosure | |
| Environmental rating | IP30. For installation indoors or in an NRTL-certified, NEMA type 3R or better-rated enclosure, if installing outdoors. | |
| Altitude | Up to 2,600 meters (8,530 feet) | |
| COMMUNICATION INTERFACES | | |
| Integrated Wi-Fi | 802.11b/g/n (2.4 GHz, 5 GHz), for connecting the Enphase Cloud via the internet. | |
| Wi-Fi range (recommended) | 10 m | |
| Ethernet | Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included), for connecting to the Enphase Cloud via the internet. | |
| Mobile Connect | CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (to be purchased separately, mandatory for sites with IQ Battery) | |
| Digital I/O | Digital input/output for grid operator control | |
| USB 2.0 | For Mobile Connect and Communications Kit | |
| Access point (AP) mode | For a connection between the IQ Gateway and a mobile device running the Enphase Installer App | |
| Metering ports | Up to two Consumption CTs, one Production CT, and one battery CT (for IQ Battery 5P) | |
| Power line communication (PLC) | 90-110 kHz (Class B), to microinverters. | |
| Web API | Refer to https://developer-v4.enphase.com | |
| Local API | Refer to guide for local API | |
| LED indicators | From top to bottom: Cloud connectivity, Wi-Fi access point mode, PV production state, PLC communications state | |
| Configured via | Enphase Installer App and Enphase Installer Platform | |

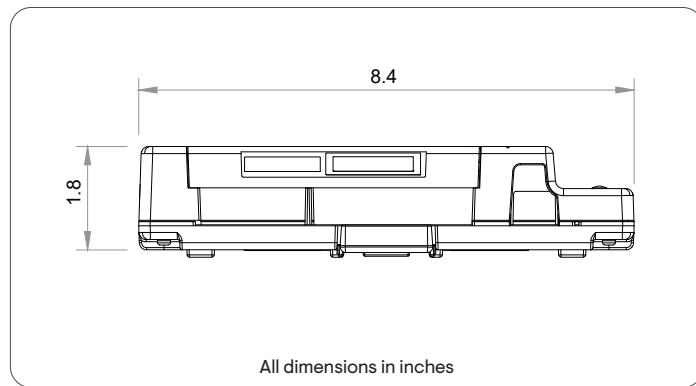
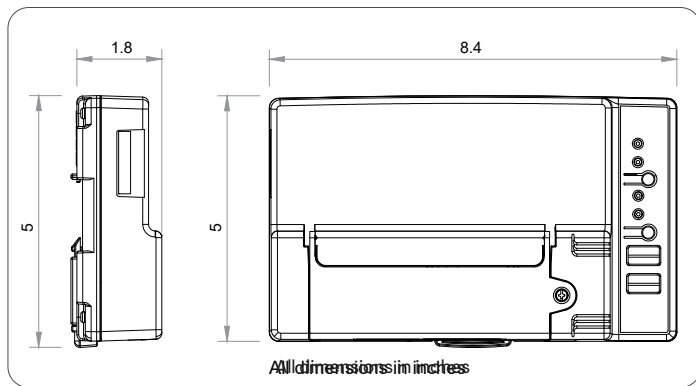


| POWER PRODUCTION/EXPORT LIMITING VIA THE IQ GATEWAY'S DIGITAL IQ | |
|--|---|
| Maximum relays read | 4 |
| Capabilities supported | Power production limiting (Production CT/s required), power export limiting (Production CT/s required and Consumption CT/s – "Load with Solar" configuration) |
| Minimum IQ Gateway version | v7.3.120 |
| Cable configurations | 18 AWG, UL-Std. 62, 600 V, 105°C, and min 0.03 inches average thickness |
| Signal voltage range | 2.5 V–5 V (digital high), 0 V–1.9 V (digital low) |
| Terminal blocks | Five terminals, up to 0.002 in ² |
| Configuration via | Enphase Installer App, Enphase Installer Platform (site settings) |

| SCOPE OF DELIVERY | |
|--------------------------------|---------------------------|
| Package dimensions (H x W x D) | 6.3" x 10.8" x 3.9" |
| Package weight | 2.2 lb |
| Aluminium DIN rail | 4.9 in |
| Current transformers (CTs) | One CT-200-SOLID included |

| COMPLIANCE | |
|------------|--|
| Compliance | CA Rule 21 (UL 1741-SA), IEEE 1547:2018 - UL 1741-SB, 3rd Ed.(ENV2-IQ-AM1-240), UL 61010-1 CAN/CSA C22.2 No. 61010-1 Title 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5 (PV production only) |

| COMPATABILITY | |
|----------------------|--|
| IQ System Controller | SC200D111C240US01, SC200G111C240US01, EP200G101-M240US01, EP200G101-M240US00 |
| IQ Battery | IQBATTERY-5P-1P-NA, ENCHARGE-3T-1P-NA, ENCHARGE-10T-1P-NA |
| Microinverter | IQ6, IQ7, and IQ8 Series Microinverters |



Revision history

| REVISION | DATE | DESCRIPTION |
|---------------|-------------|--|
| DSH-00111-2.0 | August 2023 | Updated temperature specification for ENV2-IQ-AM1-240 |
| DSH-00111-1.0 | June 2023 | Updated altitude and recommended maximum microinverters on a site. |

Accessories



Enphase Mobile Connect

4G-based LTE-M1 cellular modem with a 5-year data plan
(CELLMODEM-M1-06-SP-05 for Sprint and
CELLMODEM-M1-06-AT-05 for AT&T)



Circuit breakers

BRK-10A-2-240V Circuit breaker, 2-pole, 10 A, Eaton BR210
BRK-15A-2-240V Circuit breaker, 2-pole, 15 A, Eaton BR215
BRK-20A-2P-240V Circuit breaker, 2-pole, 20 A, Eaton BR220
BRK-15A-2P-240V-B Circuit breaker, 2-pole, 15 A, Eaton BR215B
with hold-down kit support
BRK-20A-2P-240V-B Circuit breaker, 2-pole, 20 A, Eaton
BR220B with hold-down kit support



CT-200-SOLID

200 A revenue grade solid core Production CT
with <0.5% error rate (replacement SKU)



CT-200-CLAMP

200 A clamp-style consumption and battery
metering CT with <2.5% error rate (replacement
SKU)



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



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.



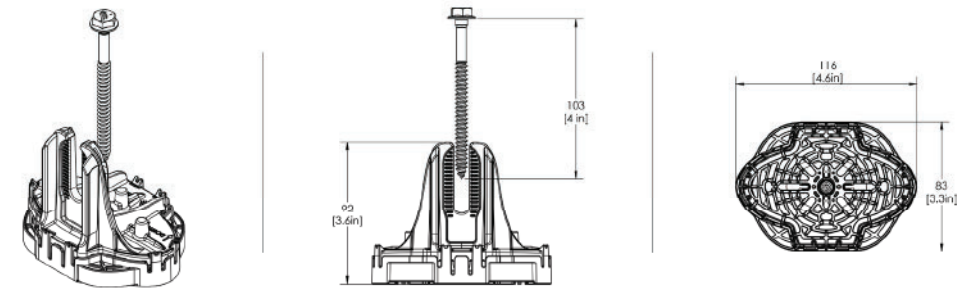
3

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 | | | | |

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SCAN FOR INSTALLATION VIDEO



SCAN FOR FREE TRIAL



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.



RAIL SYSTEM



| Pegasus Rail | Pegasus Max Rail | Splice and Max Splice | Dovetail T-bolt |
|--------------|------------------|-----------------------|-----------------|
|--------------|------------------|-----------------------|-----------------|

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

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

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

Dovetail shape for extra strength.
Uses 1/2" socket.



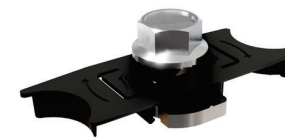
| Multi-Clamp | Hidden End Clamp | Ground Lug | N-S Bonding Jumper |
|-------------|------------------|------------|--------------------|
|-------------|------------------|------------|--------------------|

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

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

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

Installs by hand, eliminates row-to-row copper wire.
UL2703 listed as reusable only with Pegasus Rail.



| MLPE Mount | Cable Grip | Wire Clip | End Cap and Max End Cap |
|------------|------------|-----------|-------------------------|
|------------|------------|-----------|-------------------------|

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

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

Hand operable.
Holds wires in channel.
Won't slip.

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



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

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

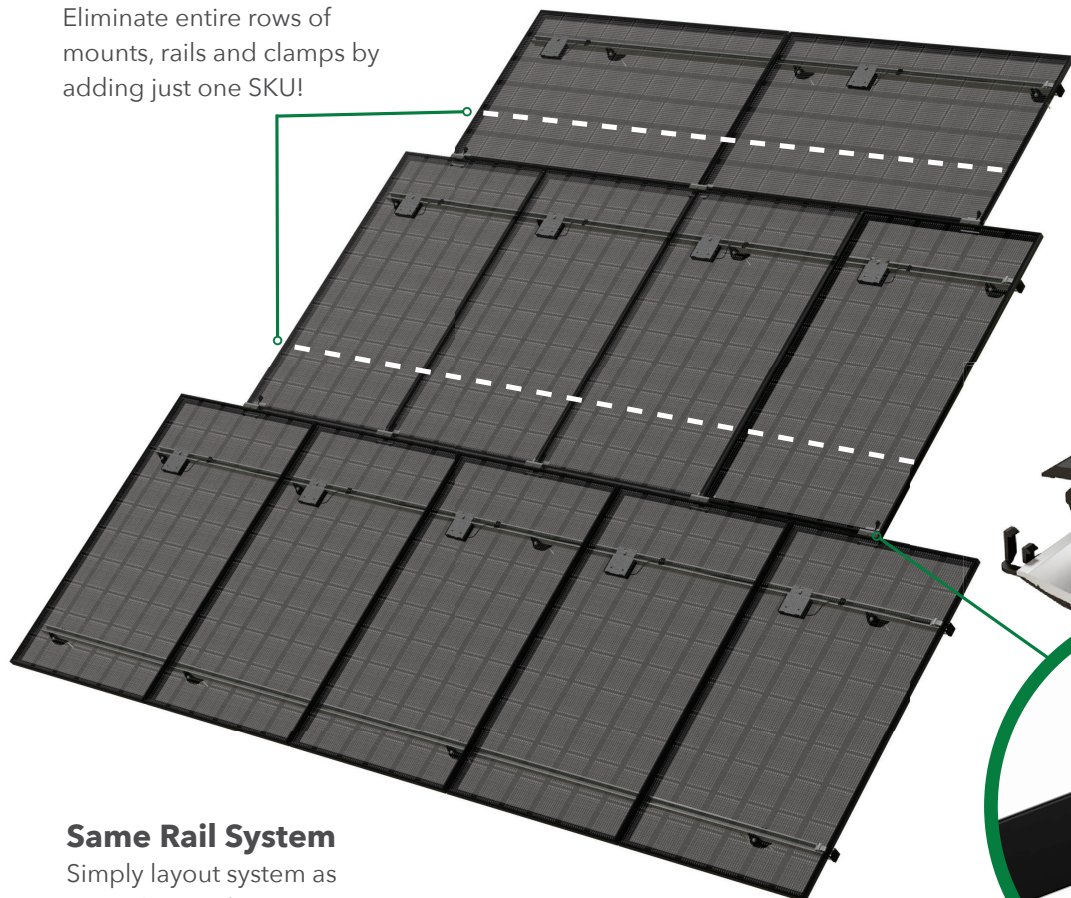
For reference only. Spans above are calculated using 7-16 for a Gable Roof, Exposure Category B, 0-20deg roof angle, 30ft mean roof height with non-exposed modules. For PE certified span tables, visit www.pegasussolar.com/spans.



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

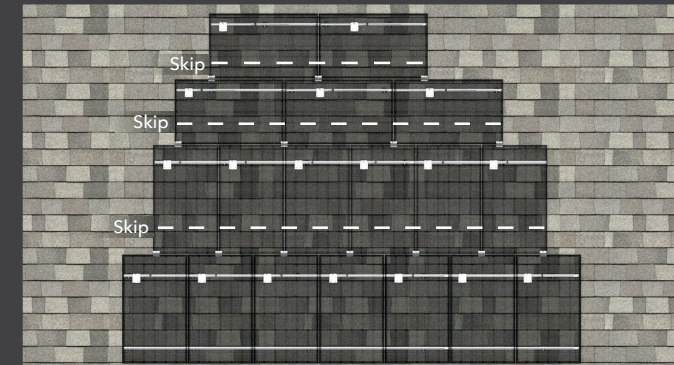
Comp, Tile, Metal, other.
Low slope, steep slopes
Easily work around roof obstructions
Mixed portrait / landscape



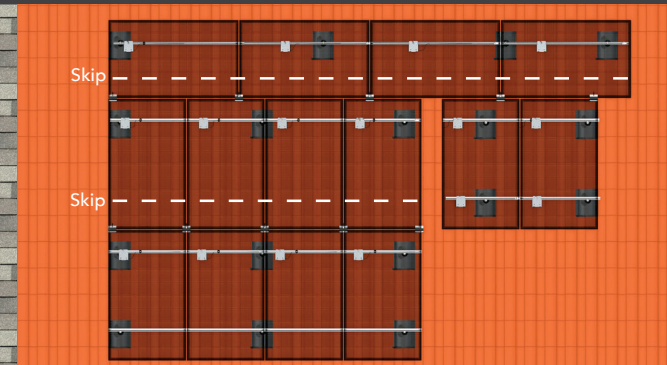
SK'PRAIL

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



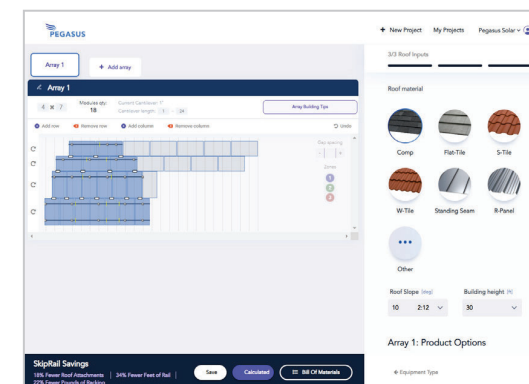
Example of Comp Roof Array



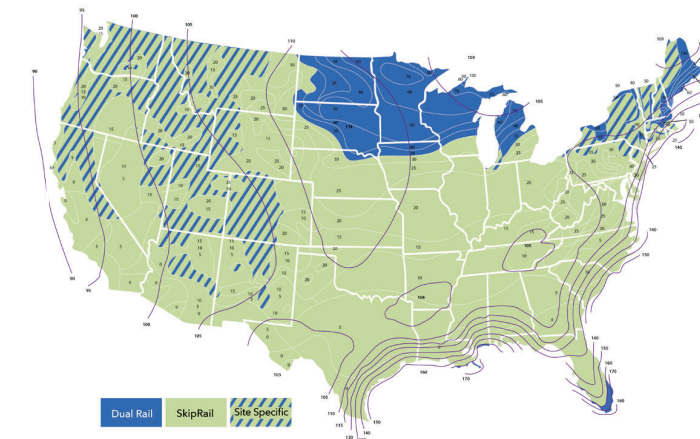
Example of Tile Roof Array

Free Design Tool:

pegasussolar.com/portal



Where SkipRail Works



Specifications

| | PSR-SRC | PSR-SRCK |
|-------------------------|-----------------------------|---------------------------------------|
| 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 |

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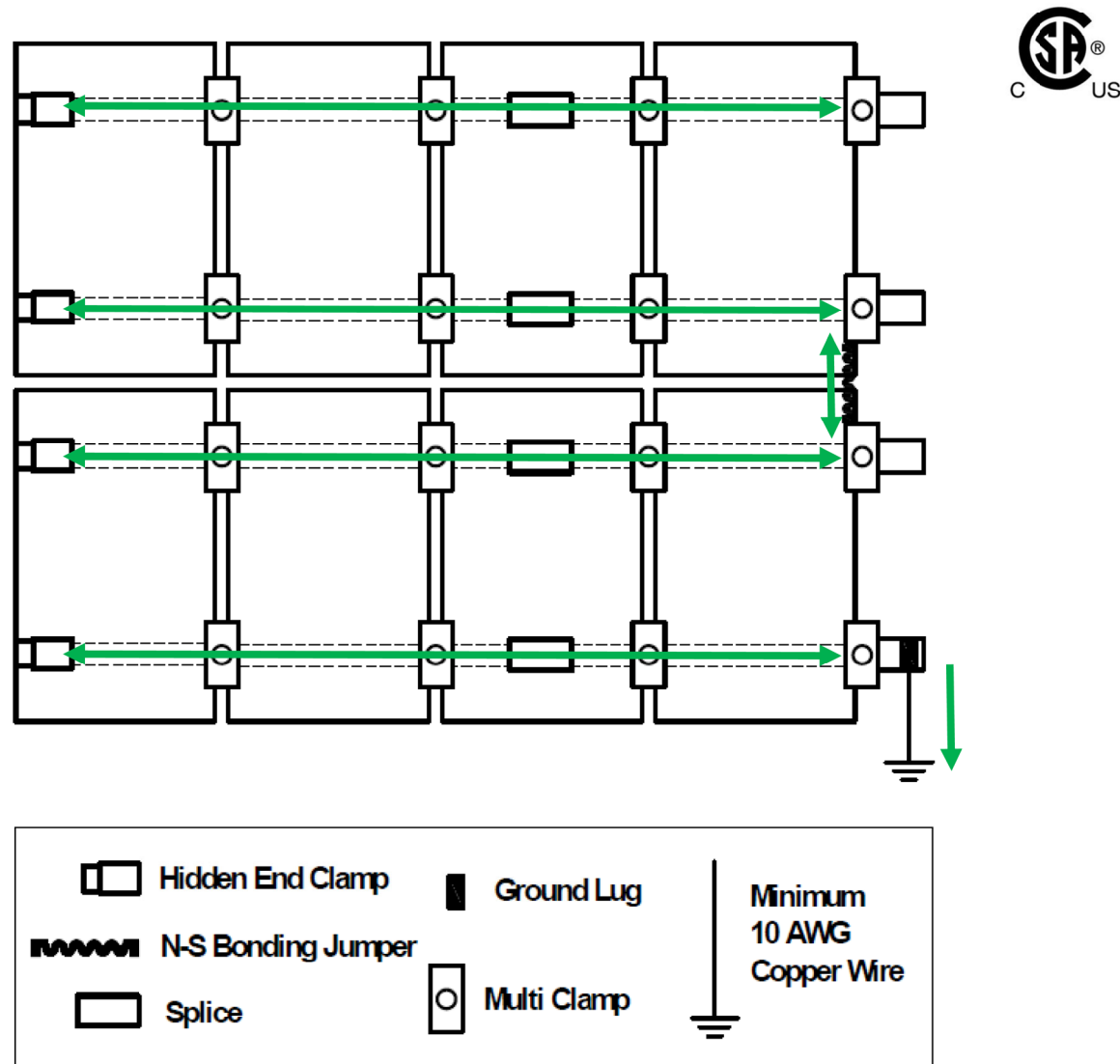
SCAN FOR VIDEO



SCAN FOR FREE TRIAL

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.

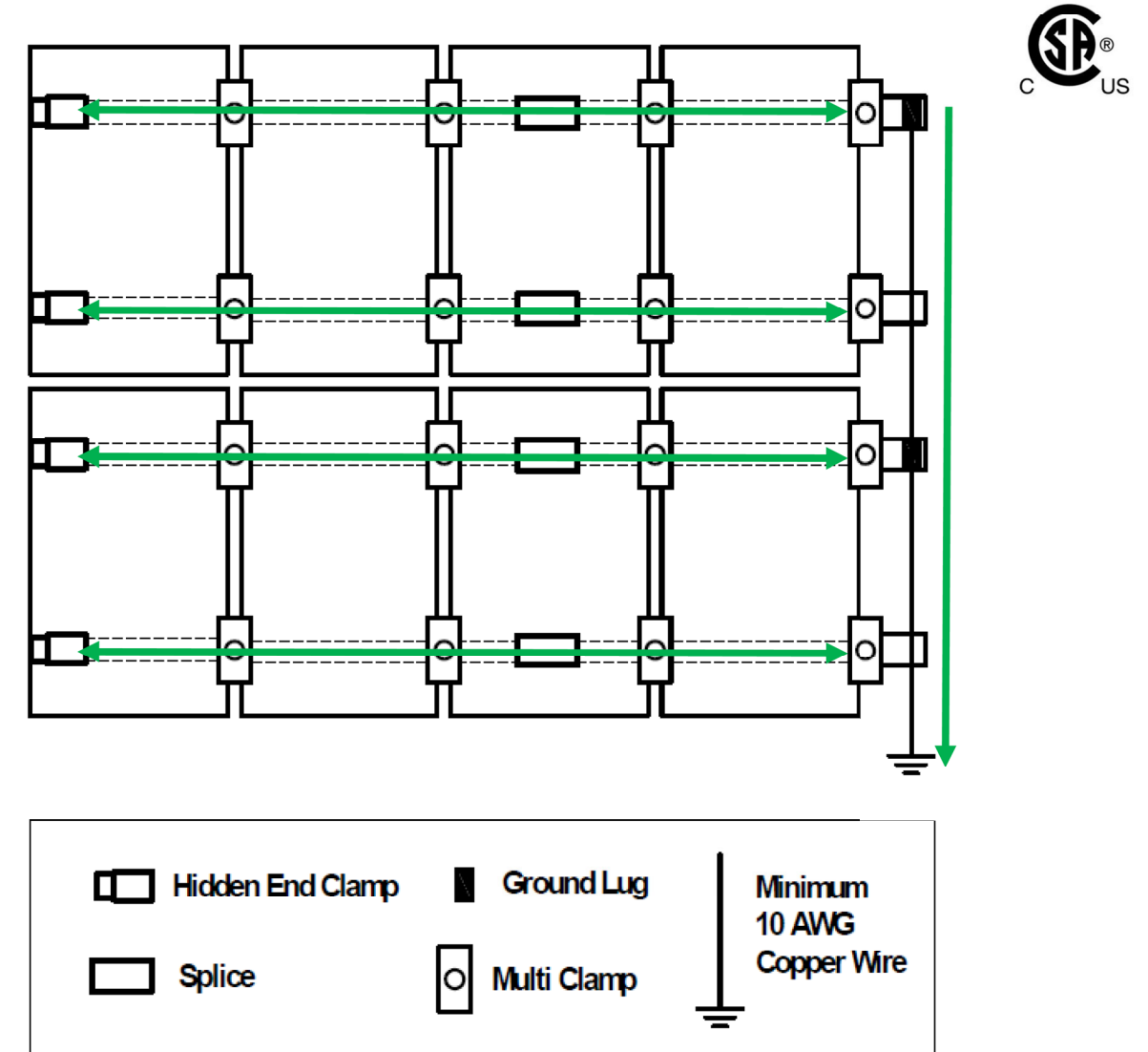
The N-S Bonding Jumper may only be used with the Pegasus Rail System, and is not certified for use with any other mounting system.

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

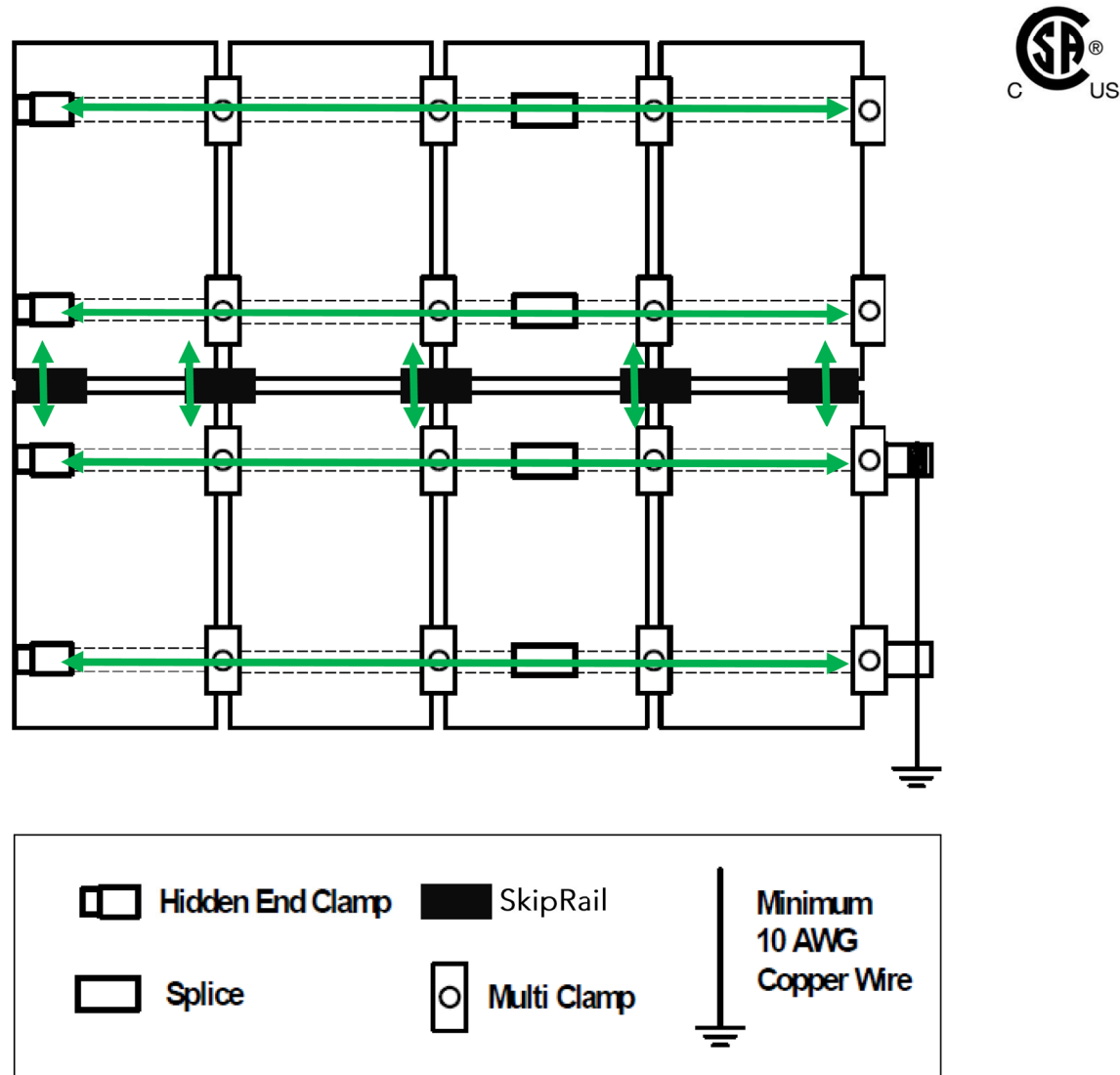


Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. One Ground Lug is required per row of PV Modules, with a final earth ground connection at the terminal end of the ground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



Pegasus Rail System - Bond Path to Ground

SkipRail System

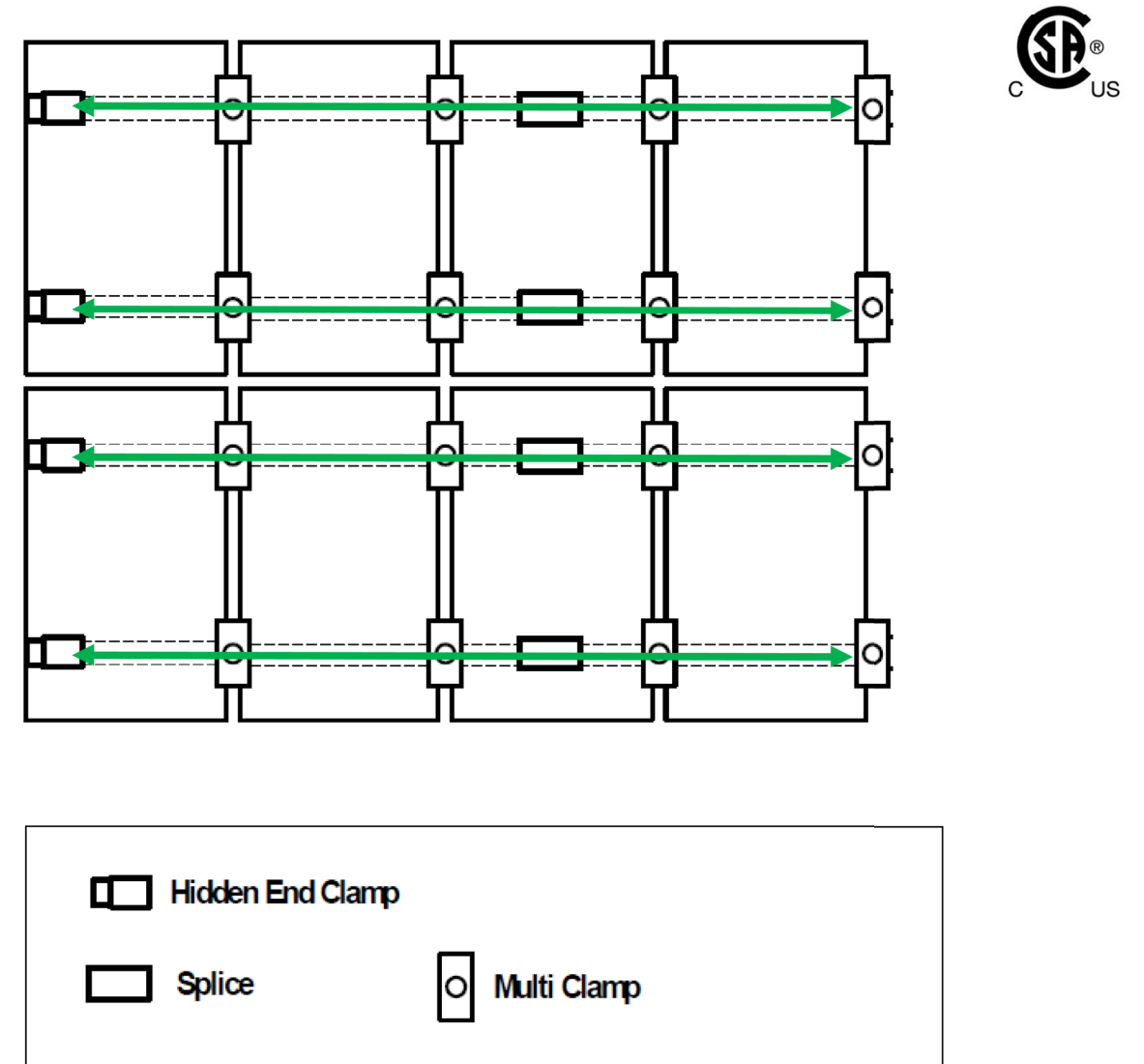


Multi-Clamps bond adjacent PV modules to one another and to the Rail. The Splice provides a bond connection between two Rail sections, including when a 1" thermal gap is utilized. The SkipRail Splices will provide a bonding path between rows of PV modules, so that one Ground Lug per array is necessary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



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 | AXN6M61Z1-xxx |
| 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-SxxxHI; HiS-SxxxHI; 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-60V; 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; 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-L5; LGxxxN2W-V5; 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; 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; VEHNxxxSA17E; 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 L-G5 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 BLK Q2; RECxxxTP2 BLK Q2; RECxxxTP2M; RECxxxTP2S 72; RECxxxAA; RECxxxAA Black; RECxxxAA 72; RECxxxNP3; RECxxxNP3 Black; RECxxxNP2; RECxxxNP2 Black; RECxxxAA Pure; 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; LR4-60I IPI I-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 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 BLK Q2; 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 |



Non-Fusible Switching Devices & Safety Switches

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 | | | DC 250V | NEMA 1 Enclosure Indoor Catalog Number | NEMA 3R Enclosure Rainproof Catalog Number |
|--|---------------|---------------------|---|----------|---------------------|---------|--|--|
| | | | Single-Phase AC 120V | 240V | Three-Phase AC 240V | | | |
| Cartridge Type—Three-Pole, Three-Wire (Three Blades, Three Fuses)—240 Vac | | | | | | | | |
| | 30 | — | — | — | — | — | ② | ② |
| | 60 | — | — | — | — | — | ② | ② |
| | 100 | — | — | — | — | — | ② | ② |
| | 200 | H | — | 15 | 25-60 | — | DG324FGK ^{③④} | ② |
| | 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 | | | | | | | | |
| | 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 | | | DC 250V | NEMA 1 Enclosure Indoor Catalog Number | NEMA 3R Enclosure Rainproof Catalog Number |
|--|---------------|----------------------------|------|---------------------|---------|--|--|
| | | Single-Phase AC 120V | 240V | Three-Phase AC 240V | | | |
| Two-Pole, Two-Wire (Two Blades)—240 Vac | | | | | | | |
| | 30 | 2 | 3 | — | — | DG221UGB ^④ | DG221URB ^④ |
| | 60 | 3 | 10 | — | — | DG222UGB ^④ | DG222URB ^④ |
| | 100 | — | 15 | — | — | DG223UGB ^④ | DG223URB ^④ |
| | 200 | — | 15 | — | — | ④⑤ | DG224URK ^④ |
| Three-Pole, Three-Wire (Three Blades)—240 Vac | | | | | | | |
| | 30 | 2 | 3 | 7-1/2 | — | DG321UGB ^④ | DG321URB ^④ |
| | 60 | 3 | 10 | 15 | — | DG322UGB ^④ | DG322URB ^④ |
| | 100 | — | 15 | 30 | — | DG323UGB ^④ | DG323URB ^④ |
| | 200 | — | 15 | 60 | — | DG324UGK ^④ | DG324URK ^④ |
| | 400 | — | — | 125 | — | DG325UGK ^④ | DG325URK ^④ |
| | 600 | — | — | 200 | — | DG326UGK ^④ | DG326URK ^④ |

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.

Fusible Switching Devices & Safety Switches

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.



DP221NGB



DG321NRB

2

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

| System | Ampere Rating | Fuse Type Provision | Maximum Horsepower Ratings ^① | | | | NEMA 1 Enclosure Indoor | | NEMA 3R Enclosure Rainproof | |
|--------|---------------|---------------------|---|----------|------------|----------|-------------------------|---------------|-----------------------------|---------------|
| | | | Single-Phase ac | | 3-Phase ac | dc | Catalog Number | Price U.S. \$ | Catalog Number | Price U.S. \$ |
| | | | 120 Volt | 240 Volt | 240 Volt | 250 Volt | | | | |

Fusible — Plug Type^②

2-Wire (One Blade, One Fuse, S/N) — 120 Vac

| | | | | | | | | | | |
|--|----|-----------------------|-------|---|---|---|---|----------|---|---|
| | 30 | Plug (Type S, T or W) | 1/2-2 | — | — | — | — | DP111NGB | — | — |
|--|----|-----------------------|-------|---|---|---|---|----------|---|---|

3-Wire (Two Blades, Two Fuses, S/N) — 120/240 Vac

| | | | | | | | | | | |
|--|----|-----------------------|-------|---------|---|---|---|----------|---|---|
| | 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 | — | ③ | — | ③ | — |
| | 60 | — | — | 3-10 | 7-1/2-15 | — | ③ | — | ③ | — |
| | 100 | — | — | 7-1/2-15 | 15-30 | — | ③ | — | ③ | — |
| | 200 | — | — | 15 | 25-60 | — | ③ | — | ③ | — |
| | 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

| | | | | | | | | | | |
|--|-----|---|---|----------|-----------------------|----|---|----------|---|----------|
| | 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.

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-30ID or FRS-R-7ID.

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

Low voltage, branch circuit fuses

**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)**

1.1

Loadcenters and Circuit Breakers

Type CH Loadcenters and Circuit Breakers

1

CH42L225G



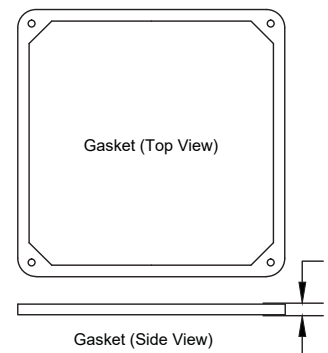
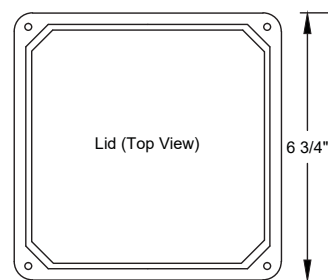
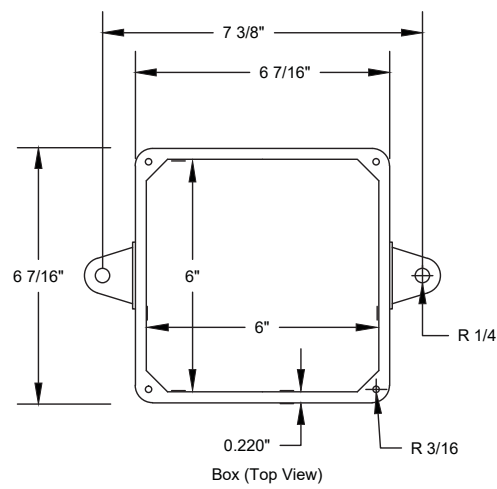
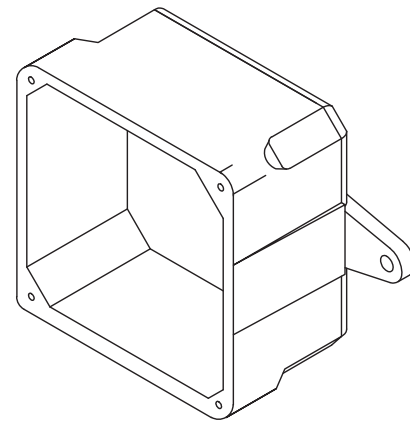
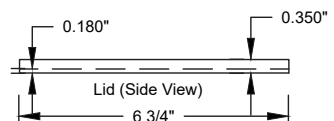
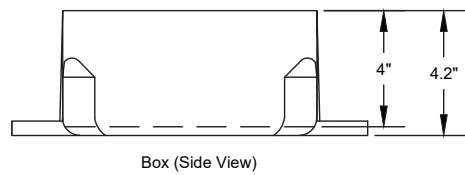
Single-Phase Three-Wire—120/240 Vac—Insulated/Bondable Split Neutral—Factory-Installed Ground Bar

| Main Ampere Rating | Maximum Number 3/4-Inch (19.1 mm) Poles | Enclosure Type | Box Size | Wire Size Range Cu/Al 60 °C or 75 °C for Main Lugs | Loadcenter Catalog Number | Loadcenter Cover Catalog Number | Combination | Surface |
|--------------------|---|----------------|----------|--|---------------------------|---------------------------------|-------------|---------|
| 125 | 12 | Indoor | B | #6–2/0 | CH12L125B ① | CH8BF | CH8BS | |
| | 12 | Outdoor | B | #6–2/0 | CH12L125R ①② | — | — | |
| | 16 | Indoor | B | #6–2/0 | CH16L125B ① | CH8BF | CH8BS | |
| | 16 | Outdoor | B | #6–2/0 | CH16L125R ①② | — | — | |
| | 20 | Indoor | C | #6–2/0 | CH20L125C ① | CH8CF | CH8CS | |
| | 20 | Outdoor | C | #6–2/0 | CH20L125R ①② | — | — | |
| | 24 | Indoor | C | #6–2/0 | CH24L125C ① | CH8CF | CH8CS | |
| | 24 | Outdoor | C | #6–2/0 | CH24L125R ①② | — | — | |
| 150 | 24 | Indoor | D | #4–300 kcmil | CH24L150D ① | CH8DF | CH8DS | |
| | 24 | Outdoor | D | #4–300 kcmil | CH24L150R ②③ | — | — | |
| | 32 | Indoor | D | #4–300 kcmil | CH32L150D ① | CH8DF | CH8DS | |
| | 32 | Outdoor | D | #4–300 kcmil | CH32L150R ②③ | — | — | |
| 200 | 12 | Indoor | D | #4–300 kcmil | CH12L200D ① | CH8DF | CH8DS | |
| | 12 | Outdoor | D | #4–300 kcmil | CH12L200R ②③ | — | — | |
| | 16 | Indoor | D | #4–300 kcmil | CH16L200D ① | CH8DF | CH8DS | |
| | 16 | Outdoor | D | #4–300 kcmil | CH16L200R ②③ | — | — | |
| 225 | 24 | Indoor | D | #4–300 kcmil | CH24L225D ① | CH8DF | CH8DS | |
| | 24 | Outdoor | D | #4–300 kcmil | CH24L225R ②③ | — | — | |
| | 32 | Indoor | D | #4–300 kcmil | CH32L225D ① | CH8DF | CH8DS | |
| | 32 | Outdoor | D | #4–300 kcmil | CH32L225R ②③ | — | — | |
| | 42 | Indoor | G | #4–300 kcmil | CH42L225G ③ | CH8GF | CH8GS | |
| | 42 | Outdoor | G | #4–300 kcmil | CH42L225R ②③ | — | — | |
| 400 | 42 | Indoor | P | (2) 1/0–300 kcmil (1) 750 kcmil | CH42PL400 ④ | CH7PF ⑤ | CH7PS | |

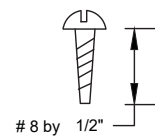
Notes

- ① Suitable for use as service equipment when not more than six disconnecting means are provided and when not used as a lighting and appliance panelboard (see Article 408.34 of the NEC).
- ② Rainproof panels are furnished with hub closure plates. For rainproof hubs, refer to **Page V1-T1-25**.
- ③ Suitable for use as service equipment when a circuit breaker is used as a main breaker. The main breaker is backfed and requires hold-down bracket kit catalog number **CH125RB**.
- ④ Suitable for use as service equipment when a circuit breaker is used as a main breaker. The main breaker is backfed and must be a Type CHB.
The breaker cannot be a Type CH.
- ⑤ This cover is for flush application only (not combination).

Box sizes **Pages V1-T1-27** and **V1-T1-28**.



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

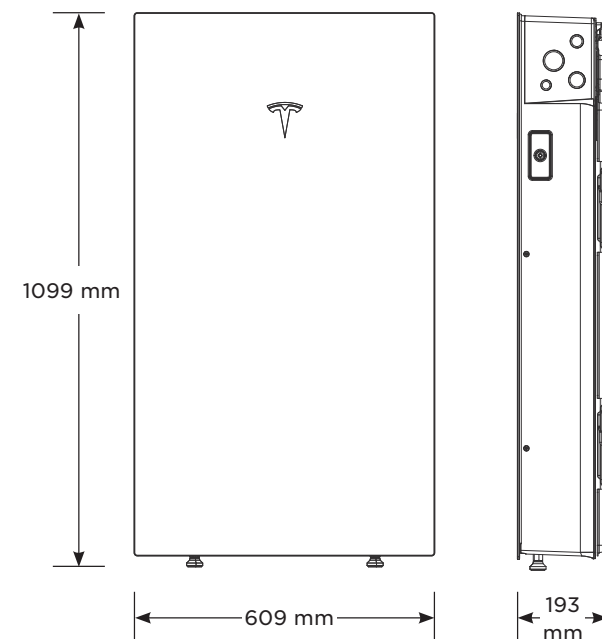
⁶ Performance may be de-rated at operating temperatures above 40°C (104°F).

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.

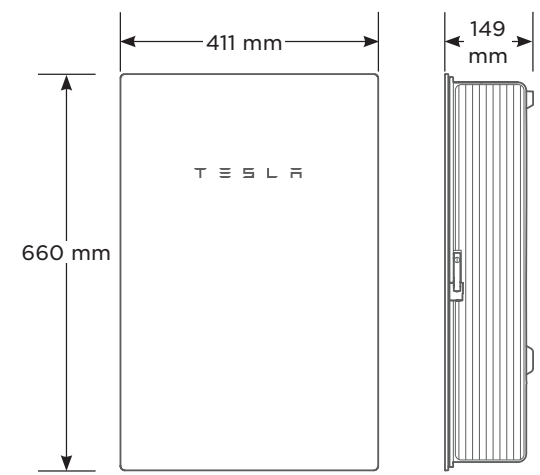
In this system configuration, Powerwall 3 acts as the Site Controller, with the Backup Gateway 2 Site Controller disabled.

| | | | | |
|-----------------------------------|---|--|--|--|
| Performance Specifications | Model Number | 1232100-xx-y | User Interface | Tesla App |
| | AC Voltage (Nominal) | 120/240 V | Operating Modes | Support for solar self-consumption, time-based control, and backup |
| | Feed-in Type | Split phase | Backup Transition | Automatic disconnect for seamless backup |
| | Grid Frequency | 60 Hz | Modularity | Supports up to 10 AC-coupled Powerwalls |
| | Current Rating | 200 A | 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 |
| | Maximum Supply Short Circuit Current | 10 kA ⁸ | Warranty | 10 years |
| | Overcurrent Protection Device | 100 - 200 A, Service entrance rated ⁹ | 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. | |
| | Overvoltage Category | Category IV | 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. | |
| | 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 | | | |

| | | |
|-------------------------------------|--------------------------------|-------------------------------|
| 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 | Lee Osterhout |
| | | Project Number | 114630 |
| Project Address | 42 Oakland Drive, Sanford, NC 27332 USA | AHJ/ASCE | Harnett County / 7-16 |
| | | Wind / Exp. Cat. / Snow | 120.0mph / B / 10 psf |

Equipment Type

Summary

| | | | |
|----------|---------------------------------|-------------------|---------------|
| Module | Mission Solar MSE395SX9R | Total modules | 24 |
| Inverter | - | Total watts | 9480 W |
| Battery | -- | Total Attachments | 37 |

Location preview



Arrays

Array 1



Roof Type: **Gable**

Roof Material: **Comp**

SkipRail: **Yes**

Roof Slope: **34°**

Array 2



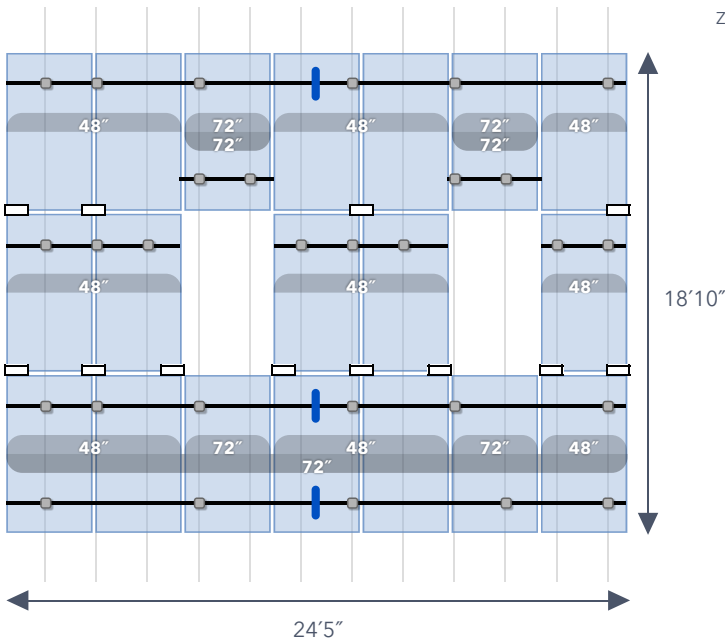
Roof Type: **Gable**

Roof Material: **Comp**

SkipRail: **Yes**

Roof Slope: **34°**

Array 1 SkipRail



Zones: Details

- 1 Roof Type: **34° Comp Gable**
- 2 Rafter Spacing: **24.0"**
- 3 SkipRail: **Yes**
- Use Scrap Rail: **Yes**

Hidden End Clamp: **Yes**
 Attachment Type: **Instaflash**
 Rail: **4 x 7ft, 6 x 14ft**

Layout

Panels: **19** Panel Size: **75.08" x 41.5" x 33mm**

Design Notes

System Weight: **1048.7 lbs** System Weight/Attachment: **36.2 lbs**
 Attachments: **29** Total Area: **519 sqft**

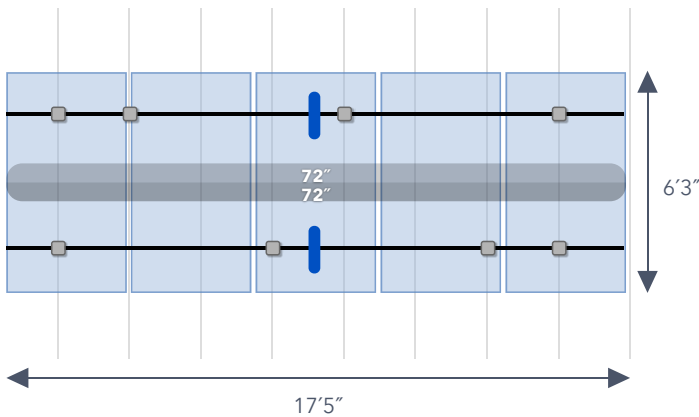
Engineering

Max span values for SkipRail system are displayed on the diagram

Maximum Rail Cantilever

| Attachment Span | Max Rail Cantilever |
|-----------------|------------------------|
| 72" | 28" |
| 64" | 25" |
| 48" | 19" |
| 32" | 12" |
| 24" | 9" |
| Other | 40% of attachment span |

Array 2 SkipRail



Zones: Details

- 1 Roof Type: **34° Comp Gable**
- 2 Rafter Spacing: **24.0"**
- 3 SkipRail: **Yes**
- Use Scrap Rail: **Yes**

Hidden End Clamp: **Yes**
 Attachment Type: **Instaflash**
 Rail: **0 x 7ft, 4 x 14ft**

Layout

Panels: **5** Panel Size: **75.08" x 41.5" x 33mm**

Design Notes

System Weight: **288.5 lbs** System Weight/Attachment: **36.1 lbs**
 Attachments: **8** Total Area: **519 sqft**

Engineering

Max span values for SkipRail system are displayed on the diagram

Maximum Rail Cantilever

| Attachment Span | Max Rail Cantilever |
|-----------------|------------------------|
| 72" | 28" |
| 64" | 25" |
| 48" | 19" |
| 32" | 12" |
| 24" | 9" |
| Other | 40% of attachment span |

Bill of Materials

| Part Info | Array 1 | Array 2 | Spares | Total QTY |
|---|----------------|----------------|---------------|------------------|
| PSR-B84 Pegasus Rail - Black 84" | 4 | - | - | 4 |
| PSR-B168 Pegasus Rail - Black 168" | 6 | 4 | - | 10 |
| PSR-SPLS Pegasus - Bonded Structural Splice | 3 | 2 | - | 5 |
| PSR-MCB Pegasus - Multi-Clamp - Mid/End 30-40mm - Full Black | 24 | 8 | - | 32 |
| PSR-HEC Pegasus - Hidden End Clamp | 12 | 4 | - | 16 |
| PSR-SRC Pegasus - SkipRail Clamp | 12 | - | - | 12 |
| PSR-MLP Pegasus - MLPE Mount | 19 | 5 | - | 24 |
| PSR-LUG Pegasus - Ground Lug | 1 | 1 | - | 2 |
| PSR-WMC Pegasus - Wire Management Clip | 29 | 8 | - | 37 |
| PSR-CBG Pegasus - Cable Grip | 4 | 1 | - | 5 |
| PSR-CAP Pegasus - End Cap | 12 | 4 | - | 16 |
| PIF-RBDT Pegasus InstaFlash - Black - Dovetail T-bolt | 29 | 8 | - | 37 |