SCOPE OF WORK

TO INSTALL A SOLAR PHOTOVOLTAIC (PV) SYSTEM AT THE MOSBY RESIDENCE, LOCATED AT 510 ROLLING PINES DR, SPRING LAKE, NORTH CAROLINA.
THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ELECTRICAL SERVICE EQUIPMENT.
THE PV SYSTEM DOES NOT INCLUDE STORAGE BATTERIES.

SYSTEM RATING

13.175	kW DC STC
11.904	kW AC

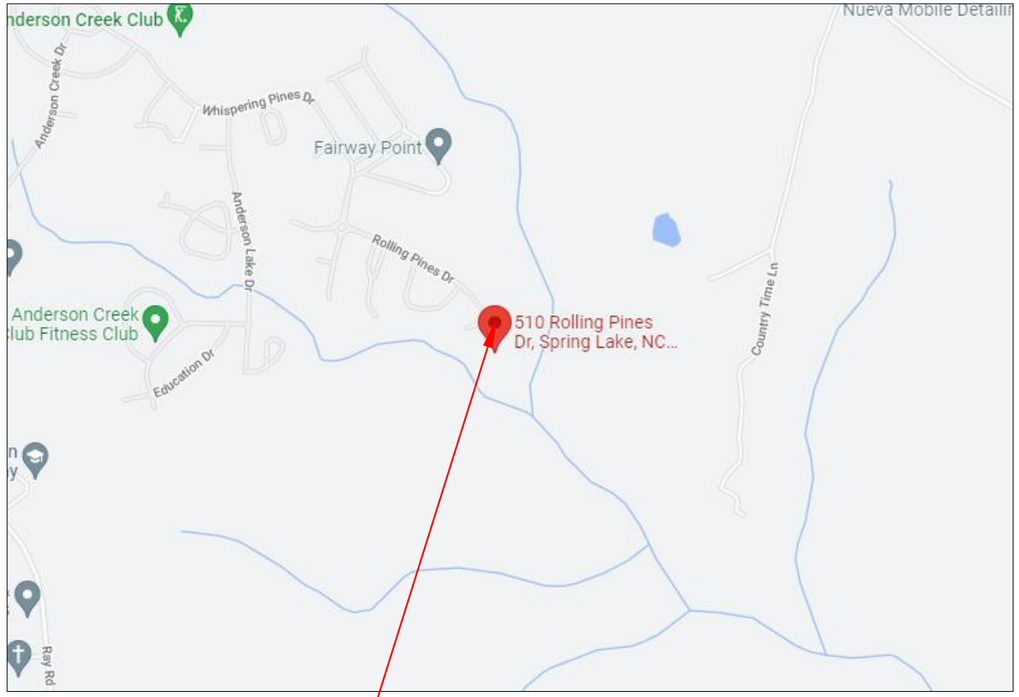
EQUIPMENT SUMMARY

(31)	SUNPOWER SPR-M425-H-AC PV MODULES
(31)	SUNPOWER SPR-M425-H-AC [240V] PV INVERTERS
(237)	(22 X 10.75') LINEAR FEET SUNPOWER INVISIMOUNT

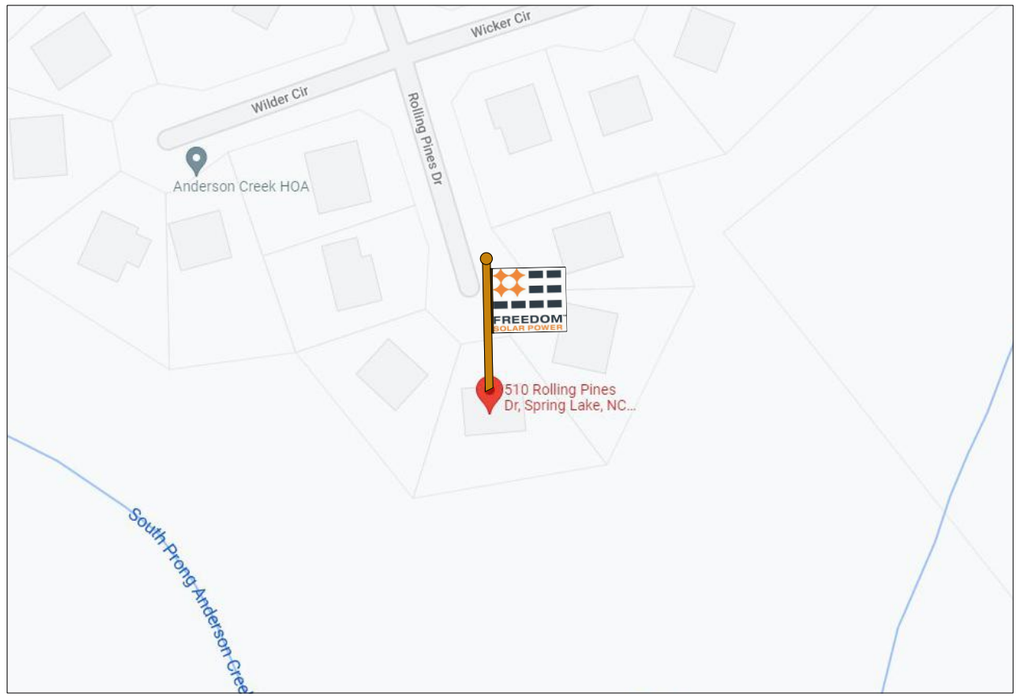
SHEET INDEX

GOVERNING CODES

2020 NATIONAL ELECTRICAL CODE WITH STATE AMENDMENTS
2018 NORTH CAROLINA STATE BUILDING CODE
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269



PROJECT LOCATION



VICINITY MAP

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

CONTRACTOR

FREEDOM SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

PROJECT NAME

MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA, 28390
(808) 469-5030

SHEET NAME
COVER

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-0

LEAD ID: 108985

CONSTRUCTION SUMMARY

(31) (SUNPOWER SPR-M425-H-AC) SOLAR MODULES, 13.175 kW DC STC
MODULE DIMENSIONS = 40.6" X 73.7" X 1.57"

(31) SUNPOWER SPR-M425-H-AC [240V] PV INVERTERS
COMBINED INVERTER OUTPUT = 11.904 kW AC.

(237) (22 X 10.75') LINEAR FEET SUNPOWER INVISIMOUNT

(84) QUICKBOLT QB2 ROOF ATTACHMENTS

(1) SUNPOWER MONITORING

SITE DETAILS

ROOF TYPE: ASPHALT SHINGLE
ARRAY #1 - TILT = 29°, AZIMUTH = 175°
ARRAY #2 - TILT = 34°, AZIMUTH = 265°
ARRAY #3 - TILT = 32°, AZIMUTH = 265°
ARRAY #4 - TILT = 33°, AZIMUTH = 85°
ARRAY #5 - TILT = 33°, AZIMUTH = 265°

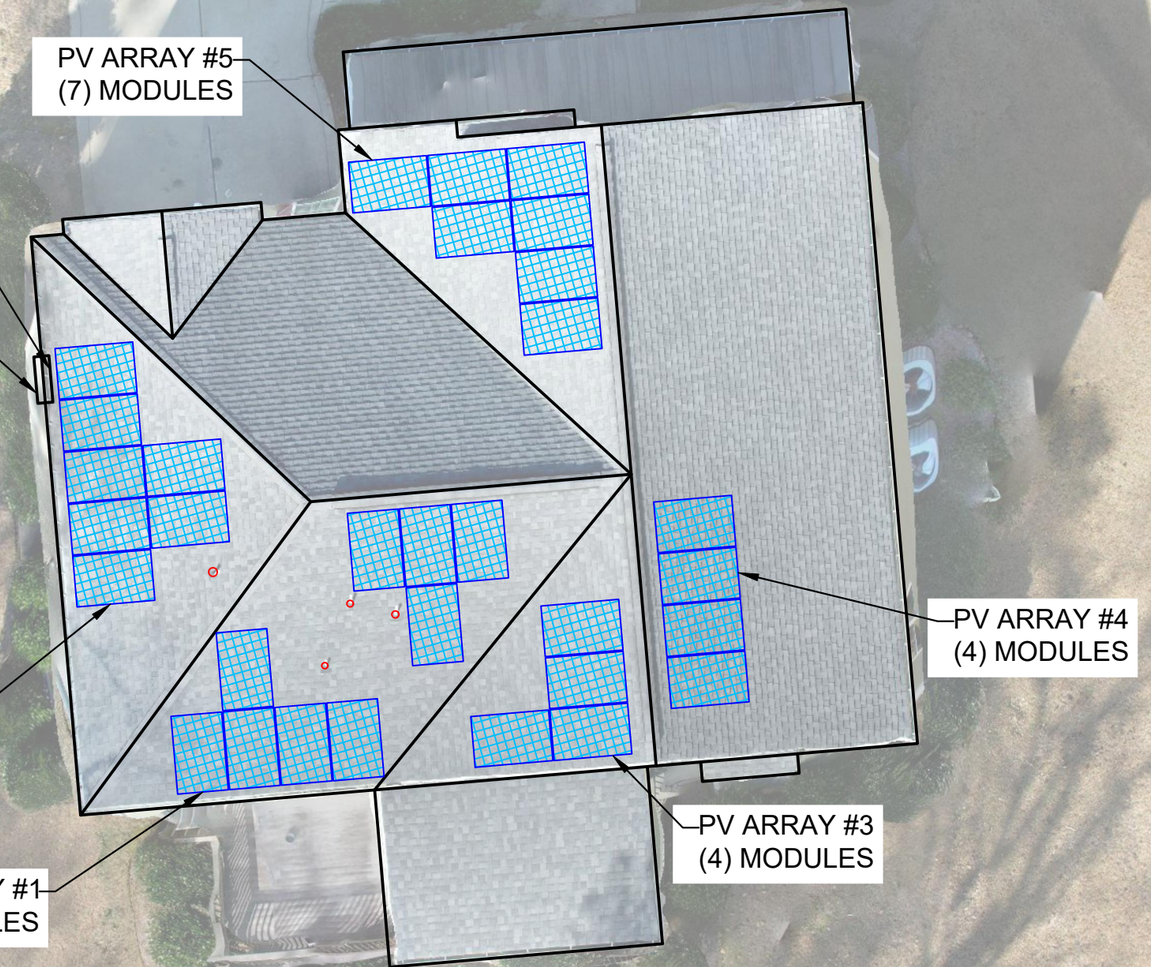
INSTALLATION DIFFICULTY = 11 => HARD

MAIN DISTRIBUTION PANEL
GROUNDING ELECTRODE
(INSIDE GARAGE WALL)

SOUTH RIVER EMC
REVENUE METER
#135 393 182
PV AC DISCONNECT
-VISIBLE
-LOCKABLE
-LABELED DISCONNECT
SOLAR LOAD CENTER
MONITORING
(OUTSIDE GARGAE WALL)

WEIGHT OF PV ARRAY < 3 PSF
LAYER OF ASPHALT SHINGLES =1
ROOFING MATERIAL = ASPHALT SHINGLES
WIND SPEED = 118 MPH
THEREFORE NC REGISTERED DESIGN
PROFESSIONAL SEAL IS NOT REQUIRED

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.

THE HEDGE IN FRONT OF THE EQUIPMENT WALL NEEDS TO BE REMOVED

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

CONTRACTOR

FREEDOM™ SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

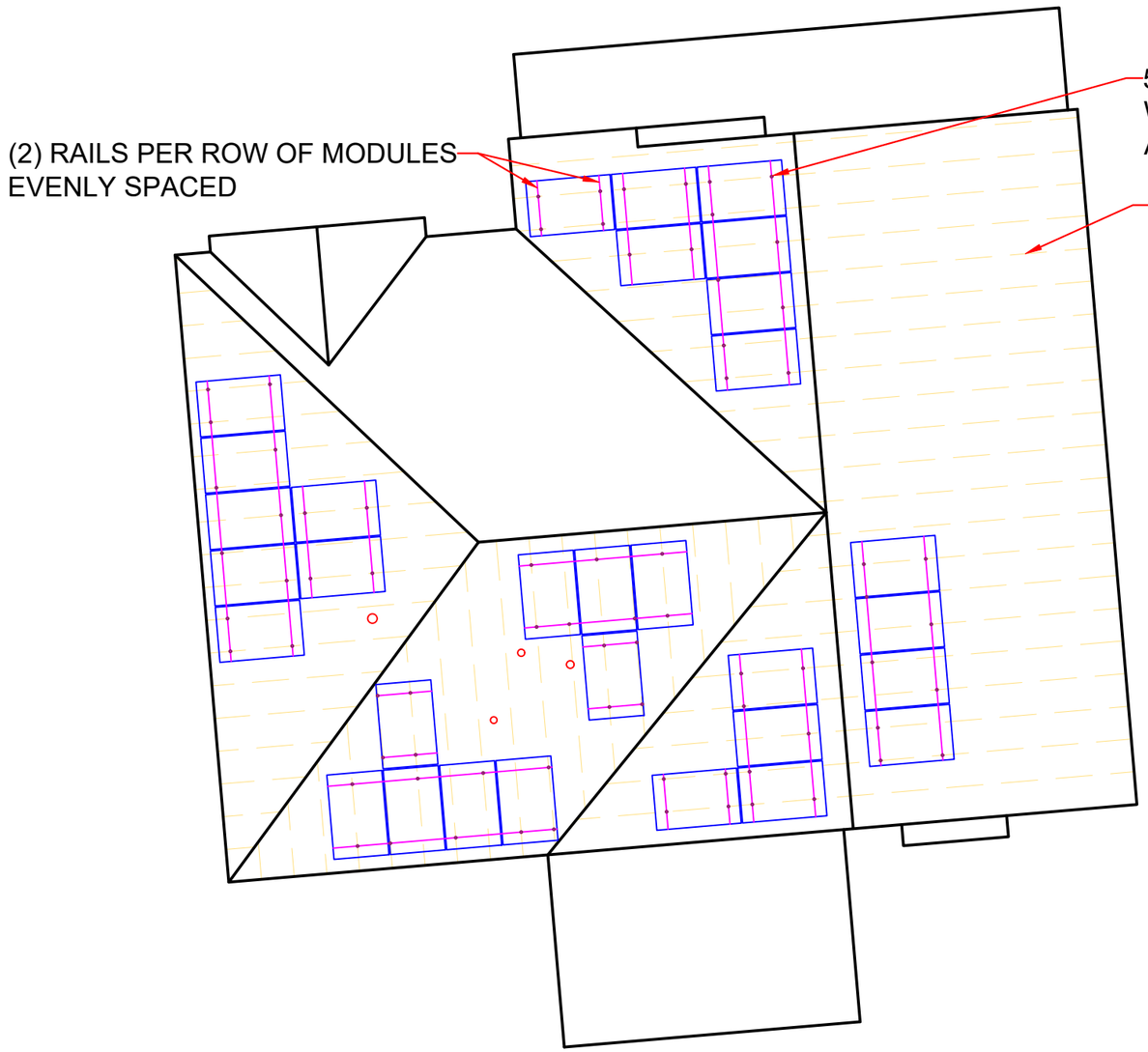
PROJECT NAME

MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA, 28390
(808) 469-5030

SHEET NAME
SITE MAP & PV LAYOUT

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-1



PV ARRAY #1-
WEIGHT CALCULATION:
MODULE WEIGHT =48 LBSXMODULE=(9)(48 LBS)=432 LBS
WEIGHT FOR INVISIMEOUNT RAILS =9 OZ/FT X 0.5625 LBS/FT = (76 FT)(0.56225 LBS/FT)=42.73 LBS
ROOF ATTACHMENT WEIGHT=2 LBS/ ATTACHEMENT=(24)(2 LBS)=48 LBS
TOTAL WEIGHT = 432 LBS + 42.731 LBS+ 48 LBS= 522.731 LBS
ARRAY AREA= 187.15 SF
DISTRIBUTED WEIGHT = 522.731 / 187.15 SF = 2.79 LBS

PV ARRAY #2-
WEIGHT CALCULATION:
MODULE WEIGHT =48 LBSXMODULE=(7)(48 LBS)= 336 LBS
WEIGHT FOR INVISIMEOUNT RAILS =9 OZ/FT X 0.5625 LBS/FT = (65 FT)(0.56225 LBS/FT)=36.54 LBS
ROOF ATTACHMENT WEIGHT=2 LBS/ ATTACHEMENT=(15)(2 LBS)=30 LBS
TOTAL WEIGHT = 336 LBS + 36.54 LBS+ 30 LBS= 402.54 LBS
ARRAY AREA= 145.56 SF
DISTRIBUTED WEIGHT = 402.54 / 145.56 SF = 2.76 LBS

PV ARRAY #3-
WEIGHT CALCULATION:
MODULE WEIGHT =48 LBSXMODULE=(4)(48 LBS)= 192.0 LBS
WEIGHT FOR INVISIMEOUNT RAILS =9 OZ/FT X 0.5625 LBS/FT = (43 FT)(0.56225 LBS/FT)=24.17 LBS
ROOF ATTACHMENT WEIGHT=2 LBS/ ATTACHEMENT=(11)(2 LBS)=22 LBS
TOTAL WEIGHT = 192.0 LBS + 24.17 LBS+ 22 LBS=238.17 LBS
ARRAY AREA= 83.17 SF
DISTRIBUTED WEIGHT = 238.17 / 83.17 SF = 2.86 LBS

PV ARRAY #4-
WEIGHT CALCULATION:
MODULE WEIGHT =48 LBSXMODULE=(4)(48 LBS)= 192.0 LBS
WEIGHT FOR INVISIMEOUNT RAILS =9 OZ/FT X 0.5625 LBS/FT = (43 FT)(0.56225 LBS/FT)=24.17 LBS
ROOF ATTACHMENT WEIGHT=2 LBS/ ATTACHEMENT=(8)(2 LBS)=16 LBS
TOTAL WEIGHT = 192.0 LBS + 24.17 LBS+ 16 LBS=232.17 LBS
ARRAY AREA= 83.17 SF
DISTRIBUTED WEIGHT = 232.17 / 83.17 SF = 2.79 LBS

PV ARRAY #5-
WEIGHT CALCULATION:
MODULE WEIGHT =48 LBSXMODULE=(7)(48 LBS)= 336 LBS
WEIGHT FOR INVISIMEOUNT RAILS =9 OZ/FT X 0.5625 LBS/FT = (65 FT)(0.56225 LBS/FT)=36.54 LBS
ROOF ATTACHMENT WEIGHT=2 LBS/ ATTACHEMENT=(17)(2 LBS)=34 LBS
TOTAL WEIGHT = 336 LBS + 36.54 LBS+ 34 LBS= 406.54 LBS
ARRAY AREA= 145.56 SF
DISTRIBUTED WEIGHT = 406.54 / 145.56 SF = 2.79 LBS

ARRAY WEIGHT < 3 PSF, THEREFORE SEALED PLANS NOT REQUIRED .

WEIGHT OF PV ARRAY < 3 PSF
LAYER OF ASPHALT SHINGLES =1
ROOFING MATERIAL = ASPHALT SHINGLES
WIND SPEED = 118 MPH
THEREFORE NC REGISTERED DESIGN
PROFESSIONAL SEAL IS NOT 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.

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

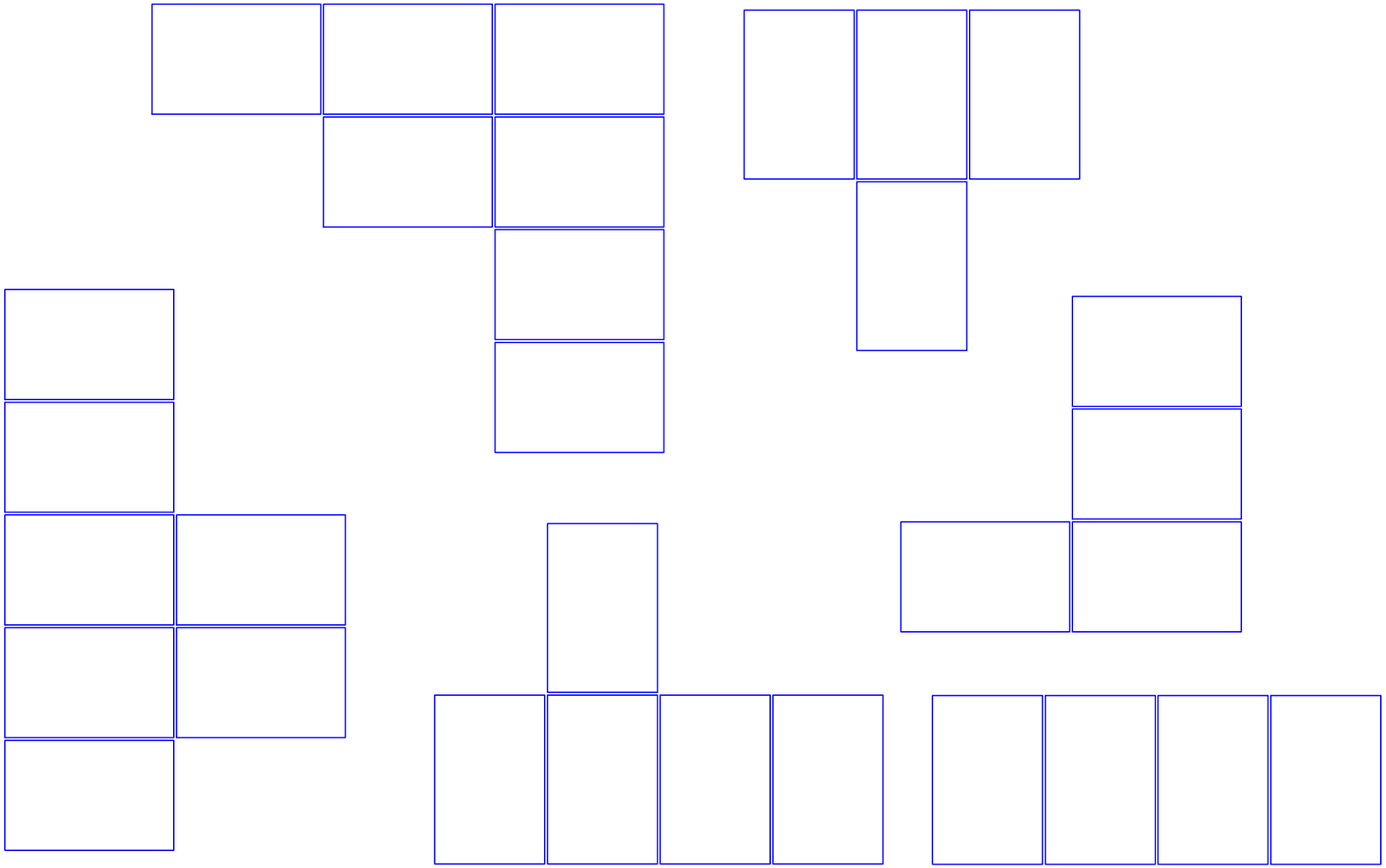
CONTRACTOR
FREEDOM™ SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

PROJECT NAME
MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA, 28390
(808) 469-5030

SHEET NAME
RACKING PLAN

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-1A



SUNPOWER SUPERVISOR S/N_____

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

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CONTRACTOR

FREEDOM™
SOLAR POWER

FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

PROJECT NAME

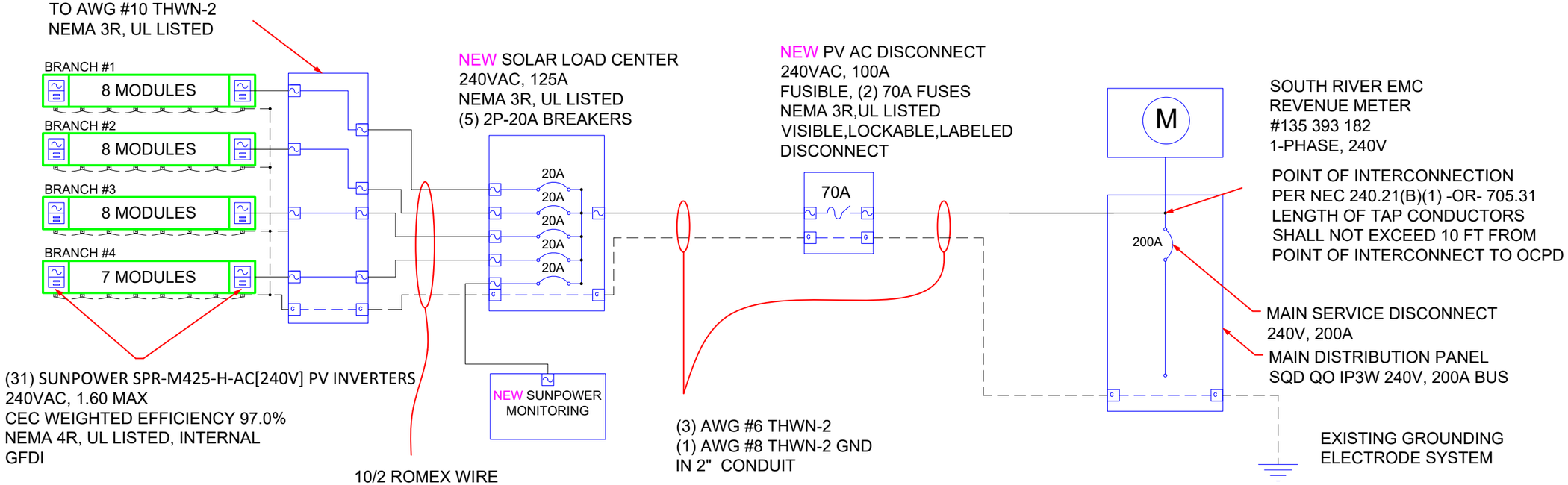
MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA,
28390
(808) 469-5030

SHEET NAME
STRING MAP
&
MONITORING
LAYOUT

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-2

SOLAR ARRAY - 13.175kW DC STC, 11.904 kW AC
(31) SUNPOWER SPR-M425-H-AC PV MODULES
MODULES



ELECTRICAL NOTES

1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90°C WET ENVIRONMENT UNLESS OTHERWISE NOTED.
3.) IN CASE WIRING, CONDUIT, AND RACEWAYS ARE MOUNTED ON ROOFTOPS, THEY SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY, NO LESS THAN 7/8" ABOVE THE ROOF SURFACE.
4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY. SPECIFIED CONDUIT SIZES ARE MINIMUM REQUIREMENTS AND LARGER DIAMETERS SHALL BE PERMITTED.
7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8.) 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
9.) MINIMUM HORIZONTAL CLEARANCE FROM GAS REGULATOR TO ANY ELECTRICAL ENCLOSURE IS 36", EXCEPT AUSTIN ENERGY WHICH REQUIRES 48" CLEARANCE FROM GAS TO METER SOCKET
10.) PV DISCONNECT SHALL BE VISIBLE, LOCKABLE AND LABELED AND THE DOOR CANNOT BE OPENED WHEN HANDLE IS IN ON POSITION
11.) 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.
12.) ALL EQUIPMENT TERMINATIONS SHALL BE RATED FOR 75 DEGREES OR GREATER
13.) 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.
14.) 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.

CALCULATIONS FOR CURRENT CARRYING CONDUCTORS	CALCULATIONS FOR OVERCURRENT DEVICES
INVERTER OUTPUT WIRE AMPACITY CALCULATION [NEC 690.8(A)(1)(e)]: 1.60A PER INVERTER ((SUNPOWER SPR-M425-H-AC [240V])) MAXIMUM INVERTER BRANCH CURRENT = (10)(1.60A) = 16A CONTINUOUS USE: #10 WIRE 75°C DERATED AMPACITY = (0.80)(35.0A) = 28.0A 28.0A > 16A CONDITIONS OF USE: #10 WIRE 90°C DERATED AMPACITY = (0.91)(0.80)(30.0A) = 29.1A 29.1A > 16A SOLAR LOAD CENTER OUTPUT WIRE AMPACITY CALCULATION [NEC 690.8(A)(1)(e)]: 1.60A PER INVERTER ((SUNPOWER SPR-M425-H-AC [240V])) COMBINED CURRENT = (31)(1.60A) = 49.60A CONTINUOUS USE: #6 WIRE 75°C DERATED AMPACITY = (0.80)(65A) = 52.0A 52.0A > 49.60A CONDITIONS OF USE: #6 WIRE 90°C DERATED AMPACITY = (0.91)(75A) = 68.25A 68.25A > 49.60A	INVERTER BRANCH AC CURRENT CALCULATION [NEC 690.8(A)(1)(e)]:1.60A PER INVERTER ((SUNPOWER SPR-M425-H-AC [240V])) MAXIMUM BRANCH INVERTER CURRENT = (10)(1.60A) = 16A MINIMUM OCPD = (16A)(1.25) = 20A USE 2P-20A BREAKERS IN SOLAR LOAD CENTER FOR INVERTER BRANCH OCPD SYSTEM AC CURRENT CALCULATION [NEC 690.8(A)(1)(e)]: 1.60A PER INVERTER ((SUNPOWER SPR-M425-H-AC [240V])) COMBINED CURRENT = (31)(1.60A) = 49.60A MINIMUM OCPD = (49.60A)(1.25) = 62.00A USE (2) 70A FUSES IN PV AC DISCONNECT FOR SYSTEM OCPD NOTE : AWG #6 CONDUCTORS ARE ADEQUATELY PROTECTED BY 70A FUSES

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

CONTRACTOR

FREEDOM™ SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

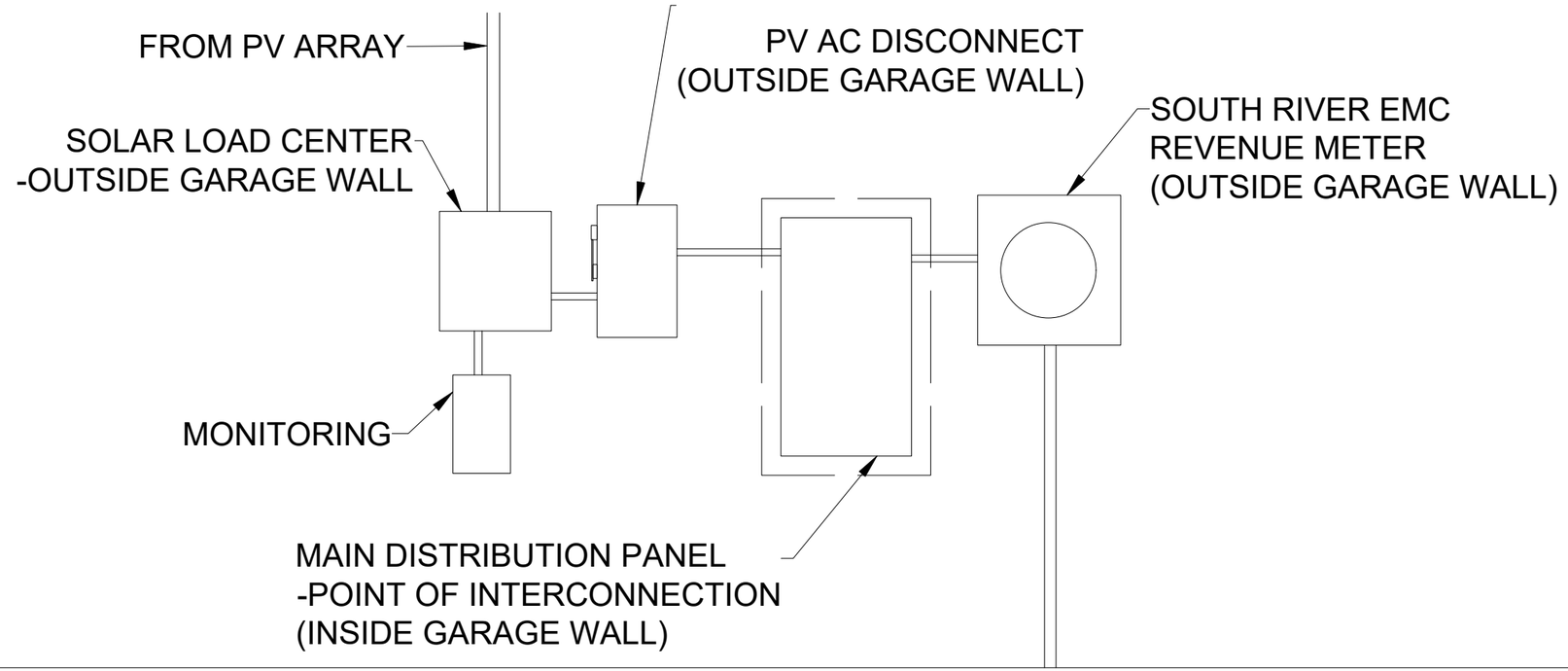
PROJECT NAME

MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA, 28390
(808) 469-5030

SHEET NAME
ELECTRICAL DIAGRAM

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-3

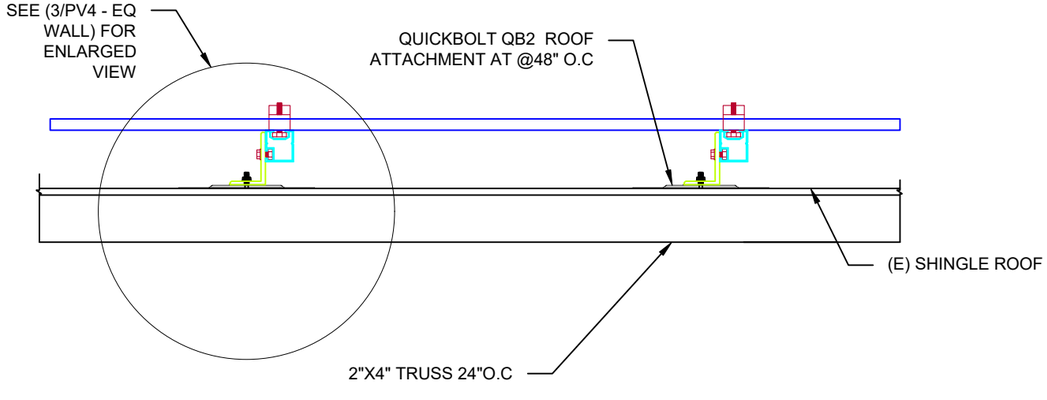


EQUIPMENT ELEVATION

NTS

1

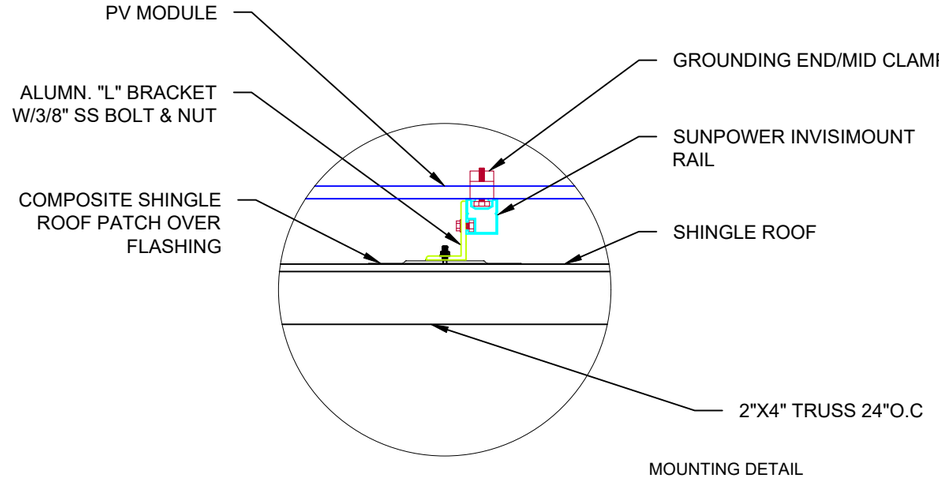
QB2 ATTACHMENT



MOUNTING METHOD

NTS

2



MOUNTING DETAIL

NTS

3

DESIGN BY:

FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

CONTRACTOR

FREEDOM™ SOLAR POWER

FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

PROJECT NAME

MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA, 28390
(808) 469-5030

SHEET NAME

EQ.WALL & MOUNTING DETAIL

SHEET SIZE

ANSI B
11" x 17"

SHEET NUMBER

PV-4

NOTE: NOT ALL LABELS MAY BE APPLICABLE

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

REQ'D BY: NEC 690.13 (B) — A

APPLY TO:
PV DISCONNECT

WARNING
-SOLAR LOAD CENTER-
THIS EQUIPMENT FED BY MULTIPLE SOURCES, TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICES, SHALL NOT EXCEED AMPACITY OF BUSBAR.

REQ'D BY: 705.12(B)(3)(3) — B

APPLY TO:
SOLAR LOAD CENTER

PV SYSTEM DISCONNECT

OPERATING CURRENT: 49.60 A
OPERATING VOLTAGE: 240 VAC

REQ'D BY: NEC 690.13(B); 690.54 — C

APPLY TO:
PV DISCONNECT

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

REQ'D BY: NEC 705.12(B)(3)(2) — D

APPLY TO:
PV SYSTEM BREAKER

WARNING
DUAL POWER SUPPLY SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

REQ'D BY: NEC 705.12(C) — E

APPLY TO:
MAIN SERVICE PANEL

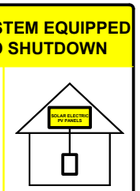
WARNING: PHOTOVOLTAIC POWER SOURCE

REQ' BY: NEC 690.31(D)(2)* — F

APPLY TO:
CONDUIT EVERY 10 FT
(*ONLY REQUIRED FOR RACEWAYS WITH PV **DC** CIRCUITS)

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.



REQ'D BY: FREEDOM SOLAR — G

APPLY TO:
MAIN DISTRIBUTION PANEL

CAUTION:
MULTIPLE SOURCES OF POWER

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* — H

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 LABEL

ENERGY STORAGE SYSTEM DISCONNECT
NOMINAL AC VOLTAGE: XXX V
MAXIMUM DC VOLTAGE: XXX V
FAULT CURRENT:XXX V
DATE OF CALCULATION:MM/DD/YY

REQ'D BY: 706.15(C) — I

APPLY TO:
PW AC DISCONNECT

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

CONTRACTOR
FREEDOM™ SOLAR POWER
FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

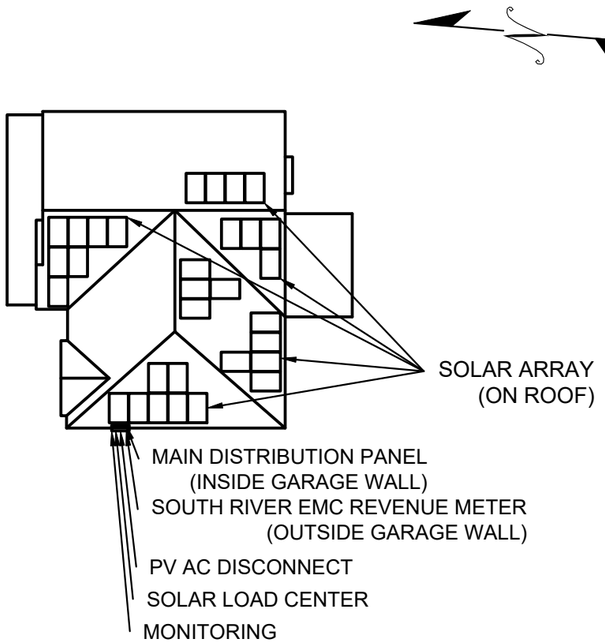
PROJECT NAME
MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA, 28390
(808) 469-5030

SHEET NAME
SYSTEM LABELING DETAIL

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-5

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



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

FREEDOM SOLAR POWER

510 ROLLING PINES DR
PROJECT ID: 108985

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

CONTRACTOR

FREEDOM SOLAR POWER

FREEDOM SOLAR LLC
4801 FREIDRICH LN, STE 100
AUSTIN, TX 78744
TECL # 28621
TBPE FIRM # F-17690

PROJECT NAME

MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA,
28390
(808) 469-5030

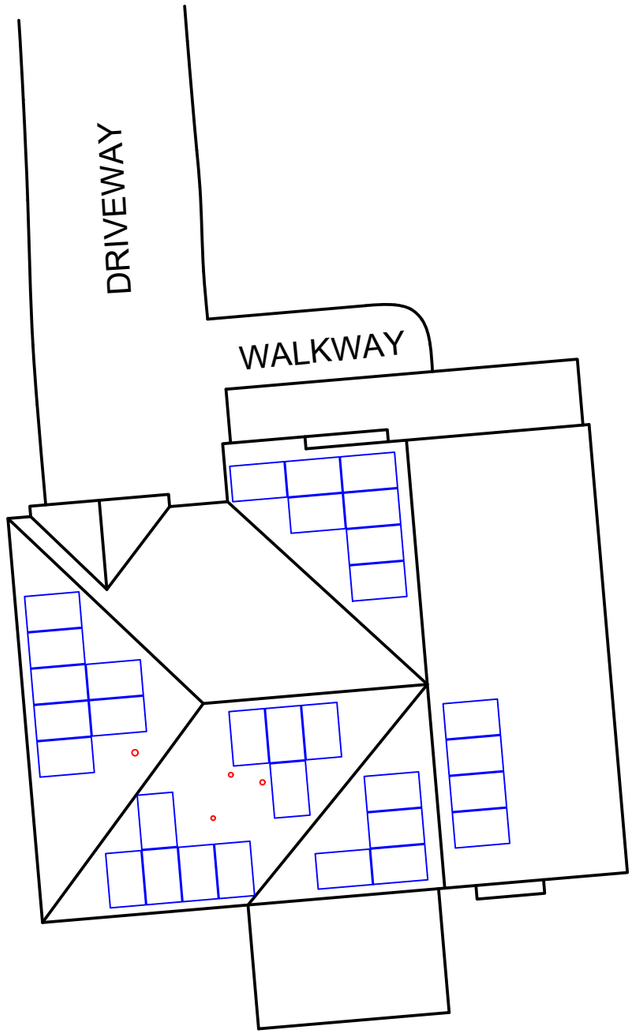
SHEET NAME
SITE
DIRECTORY
PLACARD

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-6

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. _____

GUEST SIGN IN

1. _____
2. _____
3. _____

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

DESIGN BY:
FREEDOM SOLAR LLC

REVISIONS

DESCRIPTION	DATE	REV
DESIGN PACKET	01/28/2023	A

CONTRACTOR

FREEDOM™ SOLAR POWER

FREEDOM SOLAR LLC
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TECL # 28621
TBPE FIRM # F-17690

PROJECT NAME

MOSBY, DAMON
510 ROLLING PINES DR
SPRING LAKE, NORTH CAROLINA, 28390
(808) 469-5030

SHEET NAME
SAFETY PLAN

SHEET SIZE
ANSI B
11" x 17"

SHEET NUMBER
PV-7

SUNPOWER®

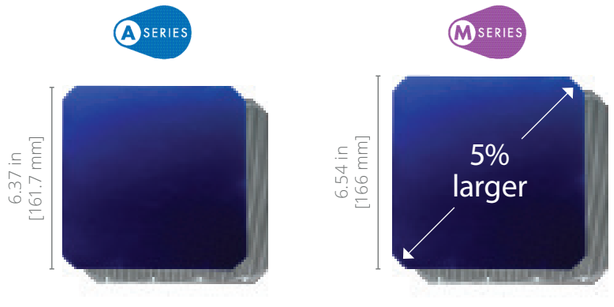
420-440W Residential AC Module

SunPower® Maxeon® Technology

Built specifically for use with the SunPower Equinox® system, the only fully integrated solar solution designed, engineered, and warranted by one company.

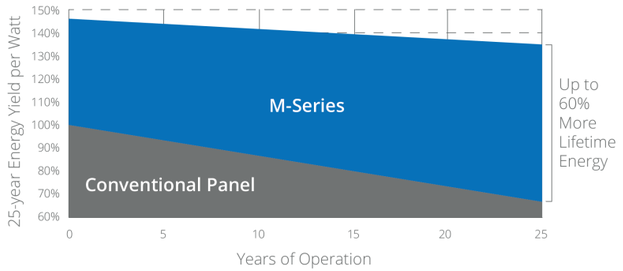
Highest Power AC Density Available.

The patented, solid-copper foundation Maxeon Gen 6 cell is over 5% larger than prior generations, delivering the highest efficiency AC solar panel available.[1]



Highest Lifetime Energy and Savings

Designed to deliver 60% more energy over 25 years in real-world conditions like partial shade and high temperatures.[2]

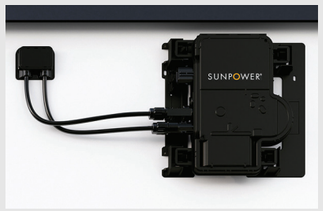


Best Reliability, Best Warranty

With more than 42.6 million and 15 GW modules deployed around the world, SunPower technology is proven to last. That's why we stand behind our module and microinverter with the industry's best 25-year Combined Power and Product Warranty.

Part of the SunPower Equinox® Solar System

- Compatible with mySunPower™ monitoring
- Seamless aesthetics



Factory-integrated Microinverter

- Highest-power integrated AC module in solar
- Engineered and calibrated by SunPower for SunPower AC modules

M-Series: M440 | M435 | M430 | M425 | M420 SunPower® Residential AC Module

AC Electrical Data		
Inverter Model: Type H (Enphase IQ7HS)	@240 VAC	@208 VAC
Peak Output Power (VA)	384	369
Max. Continuous Output Power (VA)	384	369
Nom. (L–L) Voltage/Range[3] (V)	240 / 211–264	208 / 183–229
Max. Continuous Output Current (Arms)	1.60	1.77
Max. Units per 20 A (L–L) Branch Circuit[4]	10	9
CEC Weighted Efficiency	97.0%	96.5%
Nom. Frequency	60 Hz	
Extended Frequency Range	47–68 Hz	
AC Short Circuit Fault Current Over 3 Cycles	4.82 A rms	
Overvoltage Class AC Port	III	
AC Port Backfeed Current	18 mA	
Power Factor Setting	1.0	
Power Factor (adjustable)	0.85 (inductive) / 0.85 (capacitive)	

DC Power Data	SPR-M440-H-AC	SPR-M435-H-AC	SPR-M430-H-AC	SPR-M425-H-AC	SPR-M420-H-AC
Nom. Power[6] (Pnom) W	440	435	430	425	420
Power Tolerance	+5/–0%				
Module Efficiency	22.8%	22.5%	22.3%	22.0%	21.7%
Temp. Coef. (Power)	–0.29% / °C				
Shade Tolerance	Integrated module-level max. power point tracking				

Tested Operating Conditions	
Operating Temp.	-40° F to +185°F (-40°C to +85°C)
Max. Ambient Temp.	122°F (50°C)
Max. Test Load[8]	Wind: 125 psf, 6000 Pa, 611 kg/m² back Snow: 187 psf, 9000 Pa, 917 kg/m² front
Max. Design Load	Wind: 75 psf, 3600 Pa, 367 kg/m² back Snow: 125 psf, 6000 Pa, 611 kg/m² front
Impact Resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)

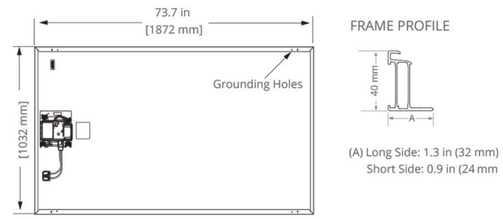
Mechanical Data	
Solar Cells	66 Maxeon Gen 6
Front Glass	High-transmission tempered glass with anti-reflective coating
Environmental Rating	Outdoor rated
Frame	Class 1 black anodized (highest AAMA rating)
Weight	48 lb (21.8 kg)
Recommended Max. Module Spacing	1.3 in. (33 mm)

Warranties, Certifications, and Compliance	
Warranties	• 25-year limited power warranty • 25-year limited product warranty
Certifications and Compliance	• UL 1703 • UL 1741 / IEEE-1547 • UL 1741 AC Module (Type 2 fire rated) • UL 61730 • UL 62109-1 / IEC 62109-2 • FCC Part 15 Class B • ICES-0003 Class B • CAN/CSA-C22.2 NO. 107.1-01 • CA Rule 21 (UL 1741 SA)[5] (includes Volt/Var and Reactive Power Priority) • UL Listed PV Rapid Shutdown Equipment[7] Enables installation in accordance with: • NEC 690.6 (AC module) • NEC 690.12 Rapid Shutdown (inside and outside the array) • NEC 690.15 AC Connectors, 690.33(A)–(E)(1) When used with AC module Q Cables and accessories (UL 6703 and UL 2238)[7]: • Rated for load break disconnect When used with InvisiMount racking and InvisiMount accessories (UL 2703): • Module grounding and bonding through InvisiMount • Class A fire rated
PID Test	1000 V: IEC 62804

Packaging Configuration	
Modules per pallet	25
Packaging box dimensions	**75.4** × 42. (1915 × 1072 × 1220 mm)
Pallet gross weight	1300.7 lb (590 kg)
Pallets per container	32
Net weight per container	41,623 lb (18,880 kg)

1 Based on datasheet review of websites of top 20 manufacturers per Wood Mackenzie US PV Leaderboard Q3 2021.
2 Maxeon 435 W, 22.5% efficient, compared to a Conventional Panel on same-sized arrays (260 W, 16% efficient, approx. 1.6 m²), 7.9% more energy per watt (based on PVSyst pan files for avg. US climate), 0.5%/yr slower degradation rate (Jordan, et. al. "Robust PV Degradation Methodology and Application."PVSC 2018).
3 Voltage range can be extended beyond nominal if required by the utility.
4 Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.
5 Factory set to IEEE 1547a-2014 default settings. CA Rule 21 default settings profile set during commissioning.
6 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25°C). All DC voltage is fully contained within the module.
7 UL Listed as PVRSE and conforms with NEC 2017 and NEC 2020 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors; when installed according to manufacturer's instructions.
8 Please read the safety and installation instructions for more information regarding load ratings and mounting configurations.

See www.sunpower.com/company for more reference information.
Specifications included in this datasheet are subject to change without notice.



Please read the safety and installation instructions for details.

AC MODULE
CERTIFIED SUPPORT UTILITY INTERACTIVE
PV RAPID SHUTDOWN EQUIPMENT
LISTED E478330
Module Fire Performance: Type 2

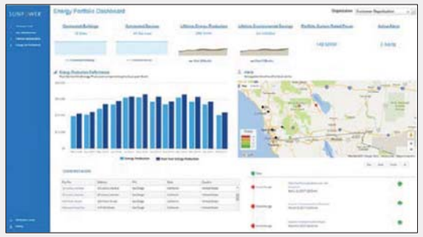
539973 RevD
April 2022

SunPower® EnergyLink™ | Residential and Commercial PVS6

Improve Support, Reduce Maintenance Costs

An intuitive monitoring website enables you to:

- See a visual map of customer sites
- Remotely manage hundreds of sites
- Receive elective system reports
- Locate system issues and remotely diagnose
- Diagnose issues online
- Drill down for the status of individual devices



Add Value for Customers

With the SunPower Monitoring System customers can:

- See what their solar system produces each day, month, or year
- Optimize their solar investment and save on energy expenses
- See their energy use and estimated bill savings
- See their solar system's performance using the SunPower monitoring website or mobile app

SunPower EnergyLink—Plug-and-Play Installation

This complete solution for residential and commercial monitoring and control includes the SunPower® PV Supervisor 6 (PVS6) which improves the installation process, overall system reliability, and customer experience.

- Compact footprint for improved aesthetics
- Robust cloud connectivity and comprehensive local connectivity
- Flexible configuration of devices during installation
- Consumption metering
- Revenue-grade production metering (pending)
- Web-based commissioning
- Remote diagnostics of PVS6 and inverters
- Durable UL Type 3R enclosure reduces maintenance costs
- Easy integration with SunPower eBOS

Robust Cloud Connectivity

Multiple options to maintain optimal connectivity:

- Hardwired Ethernet
- Wi-Fi
- Cellular backup

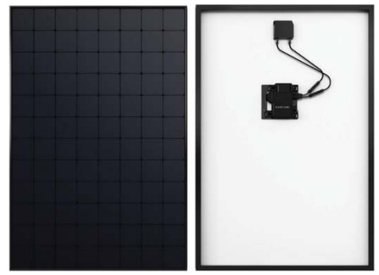
SunPower® EnergyLink™ | Residential and Commercial PVS6

SunPower Monitoring Websites

PVS6

Multiple communication options include Ethernet, Wi-Fi, and cellular.

SunPower AC Modules



Site Requirements	
Number of SunPower AC modules supported per PVS6	85
Internet access	High-speed internet access via accessible router or switch
Power	• 100–240 VAC (L–N), 50 or 60 Hz • 208 VAC (L–L in 3-phase), 60 Hz

Mechanical	
Weight	5.5 lbs (2.5 kg)
Dimensions	11.8 × 8.0 × 4.2 in. (30.5 × 20.5 × 10.8 cm)
Enclosure rating	UL50E Type 3R

Web and Mobile Device Support	
Customer site	monitor.us.sunpower.com
Partner site	pvsmgmt.us.sunpower.com
Browsers	Firefox, Safari, and Chrome
Mobile devices	iPhone®, iPad®, and Android™
Customer app	1. Create account online at: monitor.us.sunpower.com. 2. On a mobile device, download the SunPower Monitoring app from Apple App Store℠ or Google Play™ store. 3. Sign in using account email and password.

Operating Conditions	
Temperature	−22°F to +140°F (−30°C to +60°C)
Humidity (maximum)	95%, non-condensing

Communication	
RS-485	Inverters and meters
Integrated Metering	• One channel of revenue-grade production metering • Two channels of consumption metering
Ethernet	1 LAN (or optional WAN) port
PLC	PLC for SunPower AC modules
Wi-Fi	802.11b/g/n 2.4 GHz and 5 GHz
Cellular	LTE Cat-M1/3G UMTS
ZigBee	IEEE 802.15.4 MAC, 2.4GHz ISM band
Data Storage	60 days
Upgrades	Automatic firmware upgrades

Warranty and Certifications	
Warranty	10-year Limited Warranty
Certifications	UL, cUL, CE, UL 61010-1 and -2, FCC Part 15 (Class B)

FCC ID: YAW529027

E503346

530536 RevC

SUNPOWER®

SunPower® InvisiMount™ | Residential Mounting System

Simple and Fast Installation

- Integrated module-to-rail grounding
- Pre-assembled mid and end clamps
- Levitating mid clamp for easy placement
- Mid clamp width facilitates consistent, even module spacing
- UL 2703 Listed integrated grounding

Flexible Design

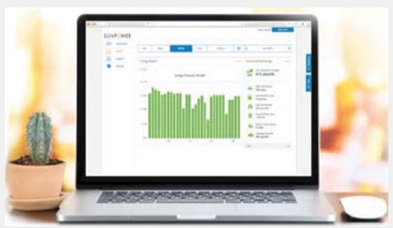
- Addresses nearly all sloped residential roofs
- Design in landscape and portrait with up to 8′ rail span
- Pre-drilled rails and rail splice
- Rails enable easy obstacle management

Customer-Preferred Aesthetics

- #1 module and #1 mounting aesthetics
- Best-in-class system aesthetics
- Premium, low-profile design
- Black anodized components
- Hidden mid clamps and capped, flush end clamps

Part of Superior System

- Built for use with SunPower DC and AC modules
- Best-in-class system reliability and aesthetics
- Optional rooftop transition flashing, rail-mounted J-box, and wire management rail clips
- Combine with SunPower modules and SunPower EnergyLink® monitoring app



Elegant Simplicity

SunPower® InvisiMount™ is a SunPower-designed rail-based mounting system. The InvisiMount system addresses residential sloped roofs and combines faster installation time, design flexibility, and superior aesthetics. The InvisiMount product was specifically envisioned and engineered to pair with SunPower modules. The resulting system-level approach amplifies the aesthetic and installation benefits—for homeowners and for installers.

sunpower.com

SunPower® InvisiMount™ | Residential Mounting System

InvisiMount Components

Module[1] / Mid Clamp and Rail

Module[1] / End Clamp and Rail

Ground Lug Assembly

Row-to-Row Spacer

End Clamp

Mid Clamp

Row-to-Row Grounding Clip

Rail and Rail Splice

InvisiMount Component Details		
Mid clamp	Black oxide stainless steel 300 series	63 g (2.2 oz)
End clamp	Black anodized aluminum 6000 series	110 g (3.88 oz)
Rail	Black anodized aluminum 6000 series	830 g/m (9 oz/ft)
Rail splice	Aluminum alloy 6000 series	830 g/m (9 oz/ft)
Rail bolt	M10-1.5 × 25 mm; custom T-head SS304	18 g (0.63 oz)
Rail nut	M10-1.5; DIN 6923 SS304	nominal
Ground lug assembly	SS304; A2-70 bolt; tin-plated copper lug	106.5 g (3.75 oz)
Row-to-row grounding clip	SS 301 with SS 304 M6 bolts	75 g (2.6 oz)
Row-to-row spacer	Black POM-grade plastic	5 g (0.18 oz)

InvisiMount Component LRFD Capacities[2]		
Mid clamp	Uplift	664 lbf
	Shear	540 lbf
End clamp	Uplift	899 lbf
	Shear	220 lbf
Rail	Moment: upward	548 lbf-ft
	Moment: downward	580 lbf-ft
Rail splice	Moment: upward	548 lbf-ft
	Moment: downward	580 lbf-ft
L-foot	Uplift	1000 lbf
	Shear	390 lbf

InvisiMount Operating Conditions	
Temperature	−40° C to 90° C (−40° F to 194° F)
Max. Load (LRFD)	• 3000 Pa uplift • 6000 Pa downforce

Roof Attachment Hardware Supported by Design Tool	
Application	• Composition Shingle Rafter Attachment • Composition Shingle Roof Decking Attachment • Curved and Flat Tile Roof Attachment • Universal interface for other roof attachments

InvisiMount Warranties And Certifications	
Warranties	• 25-year product warranty • 5-year finish warranty
Certifications	• UL 2703 Listed • Class A Fire Rated

Roof Attachment Hardware Warranties
Refer to roof attachment hardware manufacturer's documentation.

[1] Module frame that is compatible with the InvisiMount system required for hardware interoperability.
[2] SunPower recommends that all Equinox™, InvisiMount™, and AC module systems always be designed using the InvisiMount Span Tables #524734. If a designer decides to instead use the component capacities listed in this document to design a system, note that the capacities shown are Load and Resistance Factor Design (LRFD) design loads, and are NOT to be used for Allowable Stress Design (ASD) calculations; and that a licensed Professional Engineer (PE) must then stamp all calculations. If you have any questions please contact SunPower Technical Support at 1-855-977-7867.

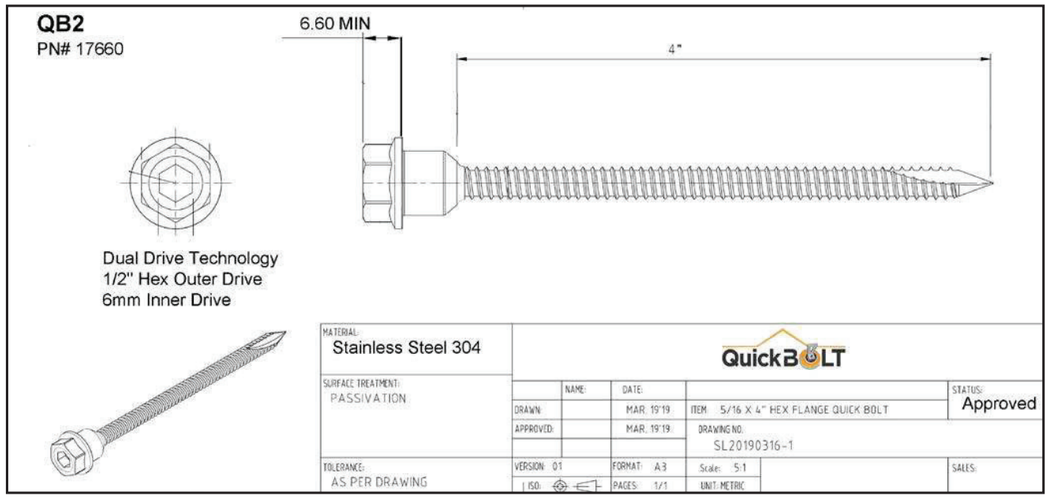
sunpower.com
509506 RevF

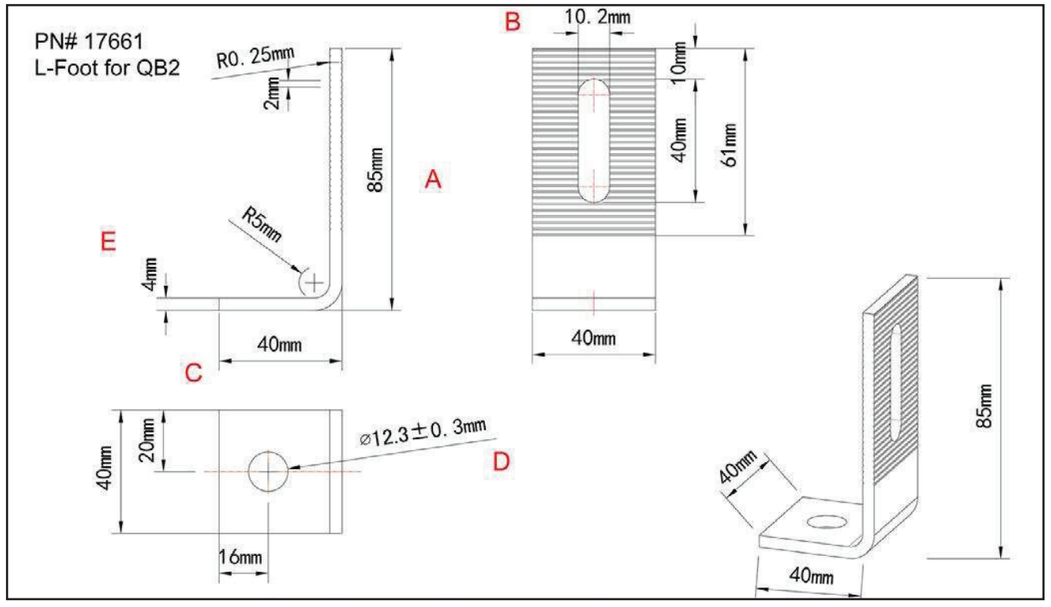
Datasheet

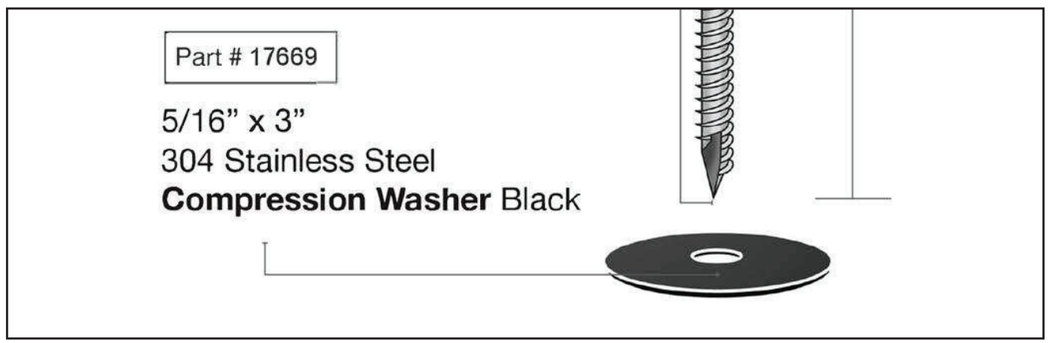
SUNPOWER®

SPEC SHEET

Part #	Box Quantity
17660	4” QB2 (25)
17662	3” Microflashing® (25); 4” QB2 (25); L-Foot (25)







5830 Las Positas Road, Livermore CA 94551 | 3948 Airway Drive, Rock Hill SC 29732
Phone: (844) 671-6045 | Fax: (800) 689-7975 | www.quickbolt.com
QuickBOLT is a division of Quickscrews International Corp.

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	—	—	—	—	—	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								
N/S	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** 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.

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**										
N/S	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	—	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										
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.

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)

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).

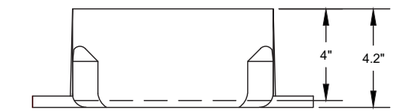
② Rainproof panels are furnished with hub closure plates. For rainproof hubs, refer to **Page V1-T1-25**.

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**.

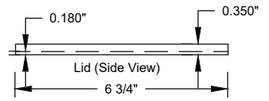
④ Suitable for use as service equipment when a circuit breaker is used as a main breaker. The main breaker is backfed and must be a Type CHB. **The breaker cannot be a Type CH**.

⑤ This cover is for flush application only (not combination).

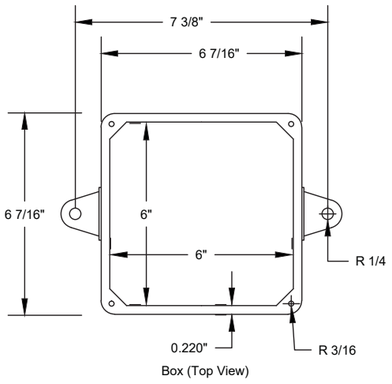
Box sizes **Pages V1-T1-27** and **V1-T1-28**.



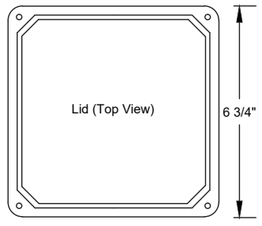
Box (Side View)



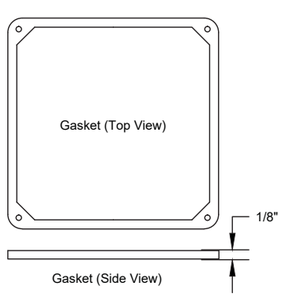
Lid (Side View)



Box (Top View)

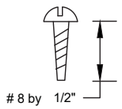


Lid (Top View)

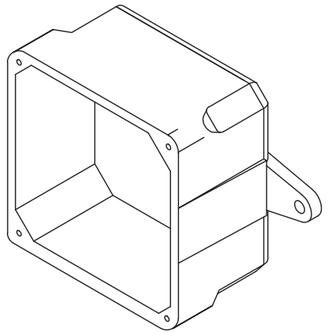


Gasket (Top View)

Gasket (Side View)



8 by



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

1.4 Listings, Compatibility, and Classification

The SunPower InvisiMount Residential Mounting System is UL 2703 Listed. The InvisiMount Listing **includes** the following modules, which have been tested for grounding and mechanical load with the InvisiMount system.

For Classic InvisiMount certification information, refer to UL at their site https://www.ul.com or the at the UL portal https://www.ul.com/resources/apps/myul-client-portal and view *File E314938* and *File E466981*. For Universal InvisiMount certification information, refer to Intertek at https://ramuk.intertekconnect.com/WebClients/ITS/DLP/products.nsf/$$Search?OpenForm and view *Control Number 5024883.*

SunPower DC Modules	SunPower AC Modules	
• SPR-A400-BLK-DC • SPR-A400-DC • SPR-A410-DC • SPR-E19-320 • SPR-E20-327 • SPR-X21-335-BLK • SPR-X21-350-BLK • SPR-X21-345 • SPR-X22-360 • SPR-X22-370	• SPR-A400-BLK-G-AC • SPR-A390-G-AC • SPR-A400-G-AC • SPR-A410-G-AC • SPR-A415-G-AC • SPR-A425-G-AC • SPR-M415-BLK-H-AC • SPR-M425-BLK-H-AC • SPR-M420-H-AC • SPR-M435-H-AC • SPR-M440-H-AC	• SPR-X22-370-E-AC • SPR-X22-360-E-AC • SPR-X21-350-BLK-E-AC • SPR-X21-335-BLK-E-AC • SPR-X20-327-BLK-E-AC • SPR-X21-345-E-AC • SPR-X21-335-E-AC • SPR-X20-327-E-AC • SPR-E20-327-E-AC • SPR-E19-320-E-AC

With Universal InvisiMount:

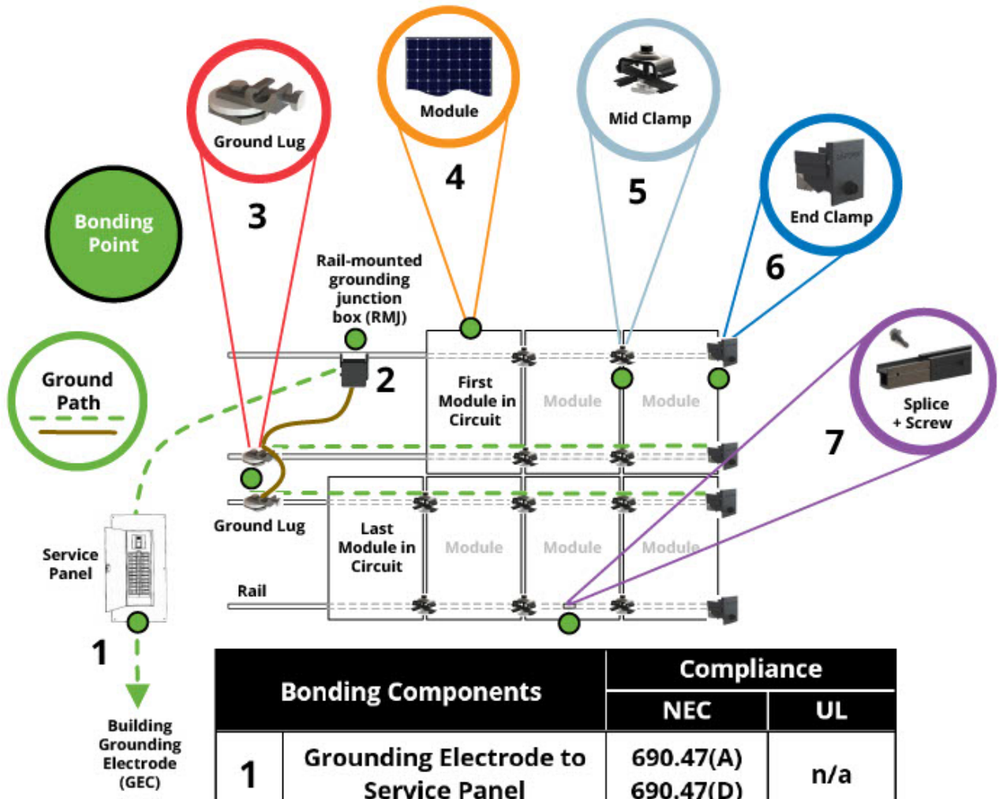
Manufacturer	Module Model / Series
SunPower	• SPR-Axxx-COM (may be followed by -BLK), where xxx can be 380–460. • SPR-Axxx-yyy-MLSD, where xxx can be 350–460 and where yyy can be -COM and/or -300 V.
Aptos	• DNA-120-MF26-xxxW, where xxx is wattage. • DNA-108-BF10-xxxW, where xxx is wattage. • DNA-120-BF26-xxxW where xxx is 350–370.
Hanwha	• Q.PEAK DUO BLK ML-G10.a+ xxx, where *xxx* can be 370–425.
REC	• RECxxxNP2, where xxx can be 350–380. • RECxxxNP2 Black, where xxx can be 350–380. • RECxxxTP4, where xxx can be 350–380. • RECxxxTP4 Black, where xxx can be 350–380. • RECxxxAA, where xxx can be 340–385. • RECxxxAA Black, where xxx can be 340–385. • RECxxxAA Pure, where xxx can be 380–415.
Trina	• TSM-xxxDE06X.05(II), where xxx can be 355–380.
Jinko	• JKMxxxM-6RL3-B, where xxx can be 365–400.
Canadian Solar	• Canadian Solar: CS3NxxxMS where xxx is 380–405.
Waaree	• WSMDi-xxx where xxx is 395–415.

System Design Load Rating: 10 PSF downward, 5 PSF upward, 5 PSF lateral. Actual system structural capacity is defined by the *InvisiMount Span Tables 524734*.

Grounding from the module to the rail is accomplished through the clamps. See Section 1.5 for more information. The Listing also includes the following components, which have been evaluated for both mounting and bonding in accordance with UL 2703:

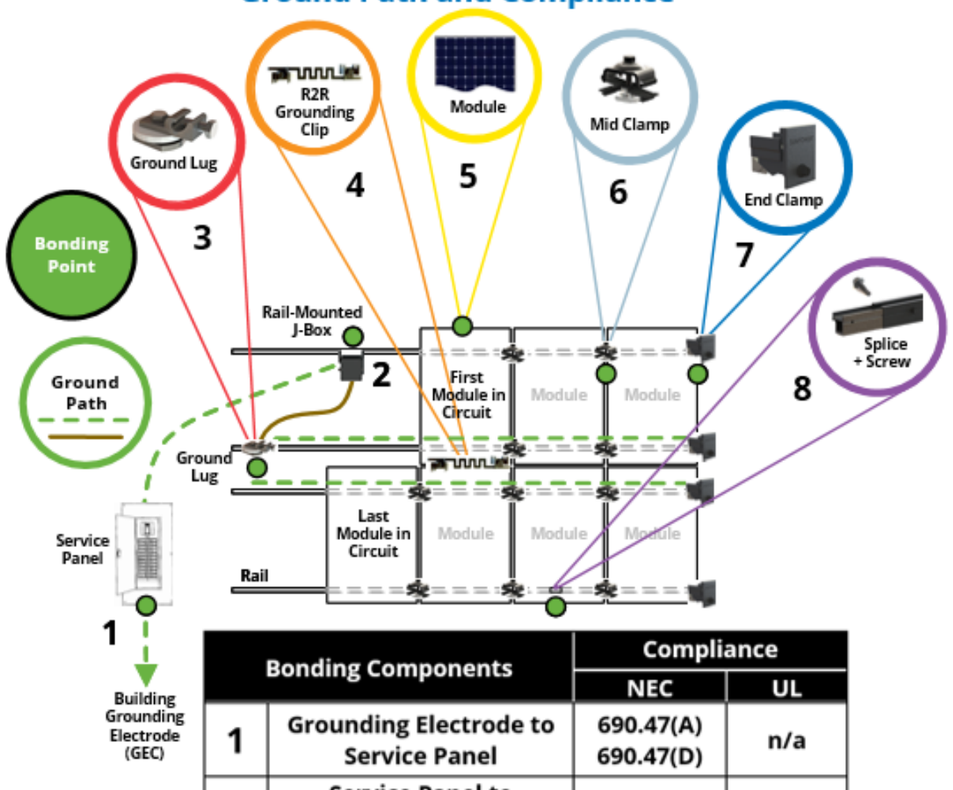
- End clamp
- Mid clamp
- Rail
- Splice and splice screw
- Ground lug assembly
- L-foot
- Row-to-row (R2R) grounding clip
- Row-to-row (R2R) grounding jumper
- Row-to-row (R2R) spacer
- Rail-mounted grounding junction box (RMJ)

SunPower Classic InvisiMount™ Ground Path and Compliance



Bonding Components		Compliance	
		NEC	UL
1	Grounding Electrode to Service Panel	690.47(A) 690.47(D)	n/a
2	Service Panel to Ground Wire	690.43(C)	1741
3	Ground Wire to Ground Lug to Rail	690.43(C)	2703
4	Module Frame	n/a	1703
5	Rail to Mid Clamp to Module Frame	690.43(A) 690.43(C) 690.43(D)	2703
6	Module Frame to End Clamp to Rail	690.43(A) 690.43(C) 690.43(D)	2703
7	Rail to Splice	690.43(A) 690.43(C) 690.43(D)	2703

SunPower Classic InvisiMount™ with R2R Grounding Clip Ground Path and Compliance



Bonding Components		Compliance	
		NEC	UL
1	Grounding Electrode to Service Panel	690.47(A) 690.47(D)	n/a
2	Service Panel to Ground Wire	690.43(C)	1741
3	Ground Wire to Ground Lug to Rail	690.43(C)	2703
4	Module Frame to Module Frame	690.43(C)	2703
5	Module Frame	n/a	1703
6	Rail to Mid Clamp to Module Frame	690.43(A) 690.43(C) 690.43(D)	2703
7	Module Frame to End Clamp to Rail	690.43(A) 690.43(C) 690.43(D)	2703
8	Rail to Splice	690.43(A) 690.43(C) 690.43(D)	2703