

GENERAL NOTES

CODES AND STANDARDS

1. ALL WORK SHALL COMPLY WITH 2017 NATIONAL ELECTRIC CODE (NEC), 2018 NORTH CAROLINA BUILDING CODE (NCBC), 2015 INTERNATIONAL PLUMBING CODE, AND ALL STATE AND LOCAL BUILDING, ELECTRICAL, AND PLUMBING CODES.
2. DRAWINGS HAVE BEEN DETAILED ACCORDING TO UL LISTING REQUIREMENTS.

SITE NOTES / OSHA REGULATION

1. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS AN UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
3. THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
4. ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SHALL SERVE TO PROTECT THE BUILDING OR STRUCTURE.
5. NO. OF SHINGLE LAYERS- 2

SOLAR CONTRACTOR

1. MODULE CERTIFICATIONS WILL INCLUDE UL1703, IEC61646, IEC61730.
2. IF APPLICABLE, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE MARKED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.
3. AS INDICATED BY DESIGN, OTHER NRTL LISTED MODULE GROUNDING DEVICES MAY BE USED IN PLACE OF STANDARD GROUNDING LUGS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ.
4. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.
5. CONDUIT POINT OF PENETRATION FROM EXTERIOR TO INTERIOR TO BE INSTALLED AND SEALED WITH A SUITABLE SEALING COMPOUND.
6. DC WIRING LIMITED TO MODULE FOOTPRINT W/ ENPHASE AC SYSTEM.
7. ENPHASE WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY W/ SUITABLE WIRING CLIPS.
8. MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC UNLESS NOT AVAILABLE.
9. ALL INVERTERS, MOTOR GENERATORS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AC PHOTOVOLTAIC MODULES, DC COMBINERS, DC-TO-DC CONVERTERS, SOURCE CIRCUIT COMBINERS, AND CHARGE CONTROLLERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (B).
10. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE.
11. TERMINALS AND LUGS WILL BE TIGHTENED TO MANUFACTURER TORQUE SPECIFICATIONS (WHEN PROVIDED) IN ACCORDANCE WITH NEC CODE 110.14(D) ON ALL ELECTRICAL CONNECTIONS.

EQUIPMENT LOCATIONS

1. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION [NEC 110.26].
2. EQUIPMENT INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY [NEC 690.31 (A)-(B)] AND [NEC TABLE 310.15 (B)].
3. ADDITIONAL AC DISCONNECTS SHALL BE PROVIDED WHERE THE INVERTER IS NOT ADJACENT TO THE UTILITY AC DISCONNECT, OR NOT WITHIN SIGHT OF THE UTILITY AC DISCONNECT.
4. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
5. ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

AERIAL VIEW



DESIGN CRITERIA

WIND SPEED: 115 MPH
 GROUND SNOW LOAD: 15 PSF
 WIND EXPOSURE FACTOR: C
 SEISMIC DESIGN CATEGORY: B

SITE SPECIFICATIONS

OCCUPANCY - R3
 CONSTRUCTION - V-B
 ZONING: RESIDENTIAL

SHEET INDEX

- PV1 - COVER SHEET
- PV2 - PROPERTY PLAN
- PV3 - SITE PLAN
- PV4 - EQUIPMENT & ATTACHMENT DETAIL
- PV5 - ELECTRICAL SINGLE LINE DIAGRAM
- PV6 - ELECTRICAL CALCULATIONS & ELECTRICAL NOTES
- PV7 - MAIN BREAKER DERATE CALCS. (IF NEEDED)
- PV8 - LABELS & LOCATIONS
- PV9 - CUSTOM DIRECTORY PLACARD (IF NEEDED - NEC 690.56(B))

SCOPE OF WORK

INSTALLATION OF UTILITY INTERACTIVE PHOTOVOLTAIC SOLAR SYSTEM

11.895 kW DC PHOTOVOLTAIC SOLAR ARRAY
 ROOF TYPE: Comp Shingle
 MODULES: (39) Seraphim SEG-6MB-305BB
 INVERTER(S): Enphase IQ7-60-2-US,----
 RACKING: Unirac SFM Infinity



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CONTRACTOR:
 BRS FIELD OPS
 385.498.6700

SITE INFORMATION:

John Holak
 1229 South Lincoln Street
 Coats, North Carolina 27521
 DC SYSTEM SIZE: 11.895 kW DC

DRAWING BY
 Caleb D. Bydone

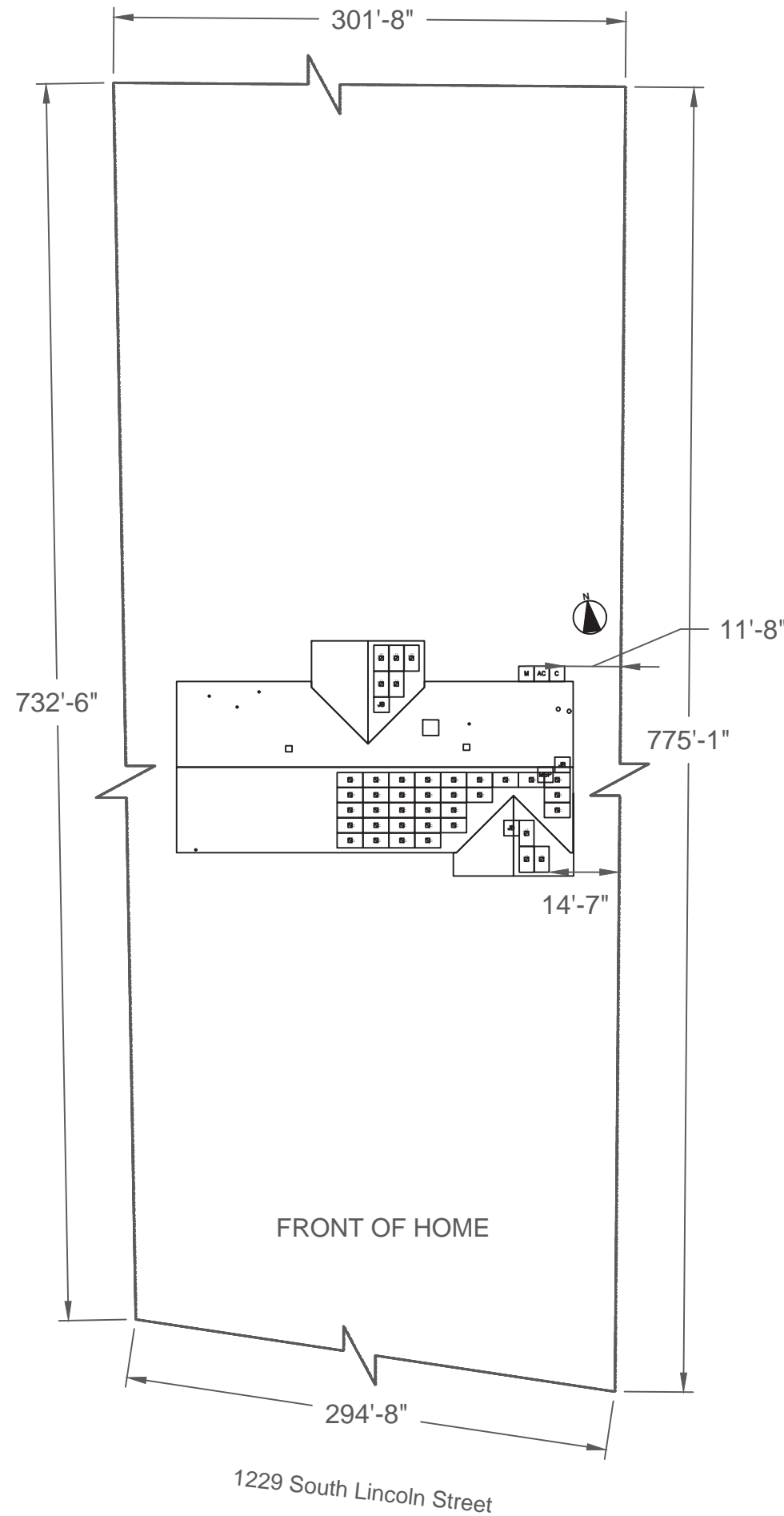
DATE
 June 22, 2020

PROJECT NUMBER
 72204559

SHEET NAME
COVER SHEET

PAGE NUMBER
PV1

REVISION
B



DC SYSTEM SIZE: 11.895 kW DC
 ROOF TYPE: Comp Shingle

(39) Seraphim SEG-6MB-305BB
 Enphase IQ7-60-2-US,----INVERTER

LEGEND

- INV INVERTER & DC DISCONNECT
- SUB (E) SUBPANEL
- LC (N) LOAD CENTER
- AC AC DISCONNECT
- M UTILITY METER
- MSP MAIN SERVICE PANEL
- JB JUNCTION BOX
- TS TRANSFER SWITCH
- C COMBINER BOX/AGGREGATOR
- PV PV REVENUE METER
- FIRE SETBACK
- EMT CONDUIT RUN (TO BE DETERMINED IN FIELD)
- PV WIRE STRING
- PROPERTY LINE



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John Holak
 1229 South Lincoln Street
 Coats, North Carolina 27521
 DC SYSTEM SIZE: 11.895 kW DC

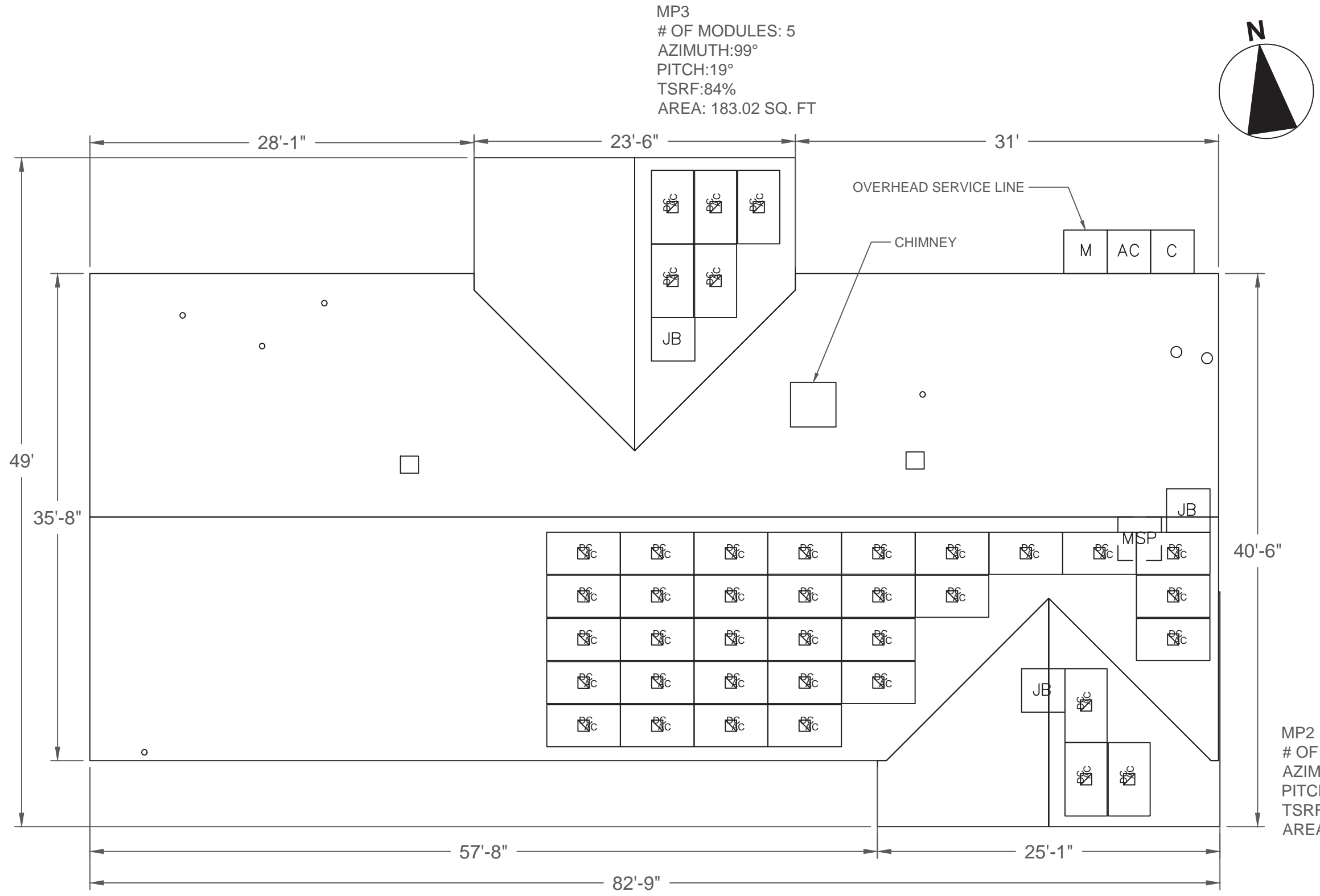
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DATE
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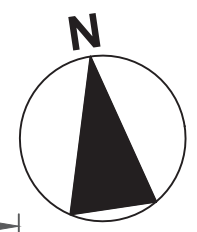
PROJECT NUMBER
 72204559

SHEET NAME
PROPERTY PLAN

| | |
|---------------------------|----------------------|
| PAGE NUMBER PV2 | REVISION B |
|---------------------------|----------------------|



MP3
 # OF MODULES: 5
 AZIMUTH:99°
 PITCH:19°
 TSRF:84%
 AREA: 183.02 SQ. FT



| LEGEND | |
|---------------|---|
| INV | INVERTER & DC DISCONNECT |
| SUB | (E) SUBPANEL |
| LC | (N) LOAD CENTER |
| AC | AC DISCONNECT |
| M | UTILITY METER |
| MSP | MAIN SERVICE PANEL |
| JB | JUNCTION BOX |
| TS | TRANSFER SWITCH |
| C | COMBINER BOX/AGGREGATOR |
| PV | PV REVENUE METER |
| [Hatched Box] | FIRE SETBACK |
| [Green Line] | EMT CONDUIT RUN (TO BE DETERMINED IN FIELD) |
| [Pink Line] | PV WIRE STRING |
| [Dashed Line] | PROPERTY LINE |

SCALE: 1/8" = 1'-0"

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**NABCEP
 CERTIFIED**
 PV INSTALLATION
 PROFESSIONAL
 Scott Gurney
 # PV-011719-015866

CONTRACTOR:
 BRS FIELD OPS
 385.498.6700

DC SYSTEM SIZE: 11.895 kW DC
 ROOF TYPE: Comp Shingle
 (39) Seraphim SEG-6MB-305BB
 Enphase IQ7-60-2-US,----INVERTER

MP1
 # OF MODULES: 31
 AZIMUTH:189°
 PITCH:19°
 TSRF:86%
 AREA: 1331.86 SQ. FT

MP2
 # OF MODULES: 3
 AZIMUTH:99°
 PITCH:19°
 TSRF:81%
 AREA: 132.36 SQ. FT

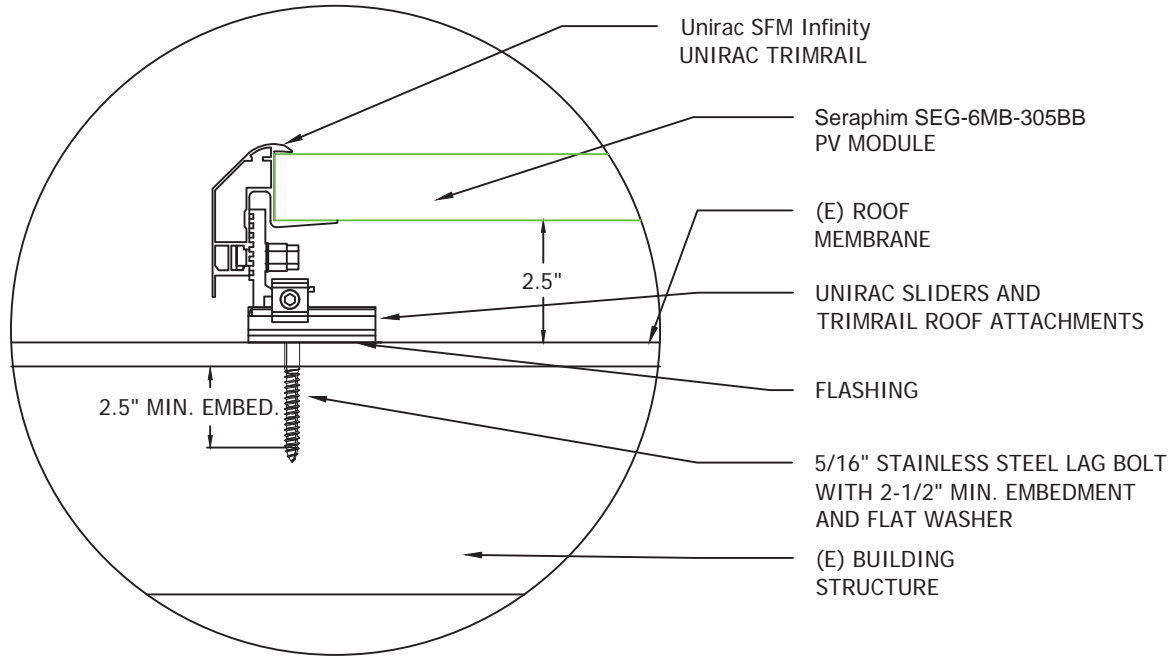
FRONT OF HOME

| | |
|---------------------------------|------------------------------|
| SITE INFORMATION: | |
| John Holak | DC SYSTEM SIZE: 11.895 kW DC |
| 1229 South Lincoln Street | |
| Coats, North Carolina 27521 | |
| DRAWING BY: Caleb D. Bydone | |
| DATE: June 22, 2020 | |
| PROJECT NUMBER: 72204559 | |
| SHEET NAME: SITE PLAN | |
| PAGE NUMBER: PV3 | REVISION: B |

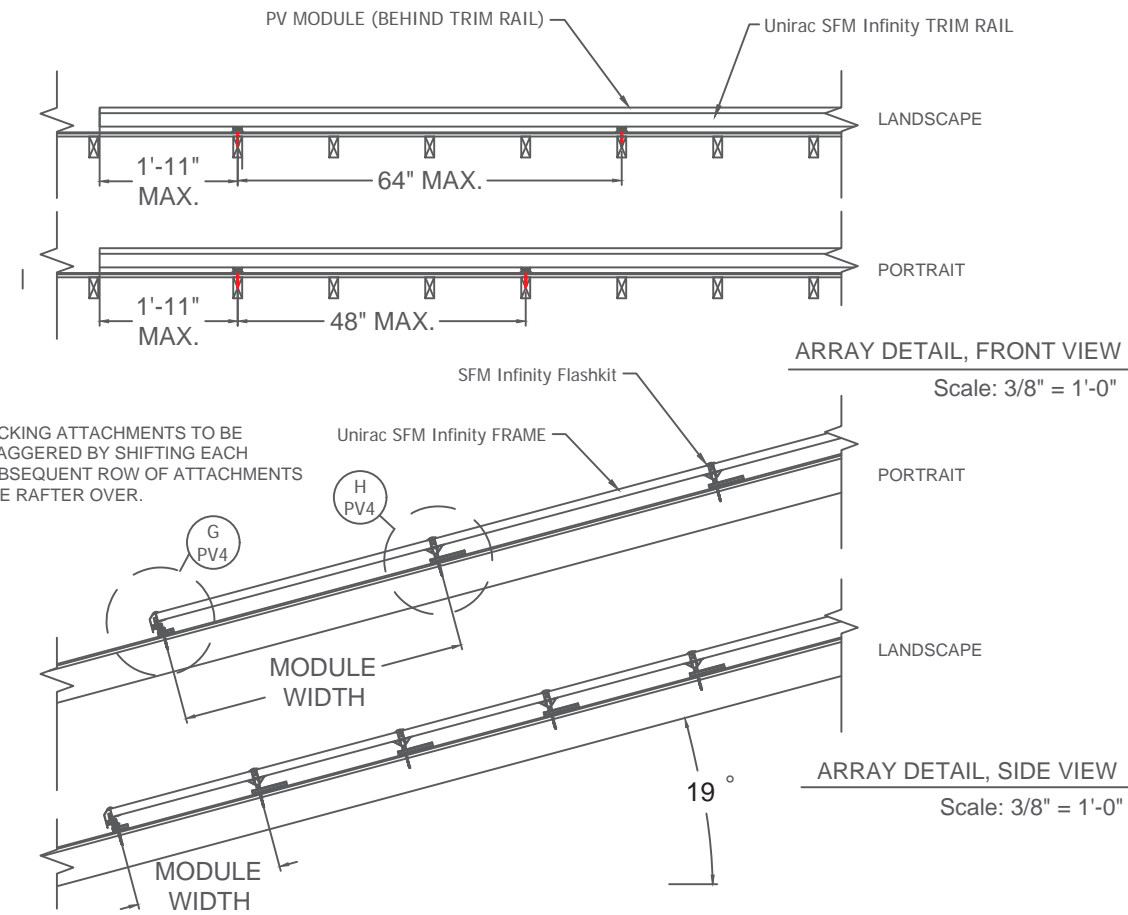
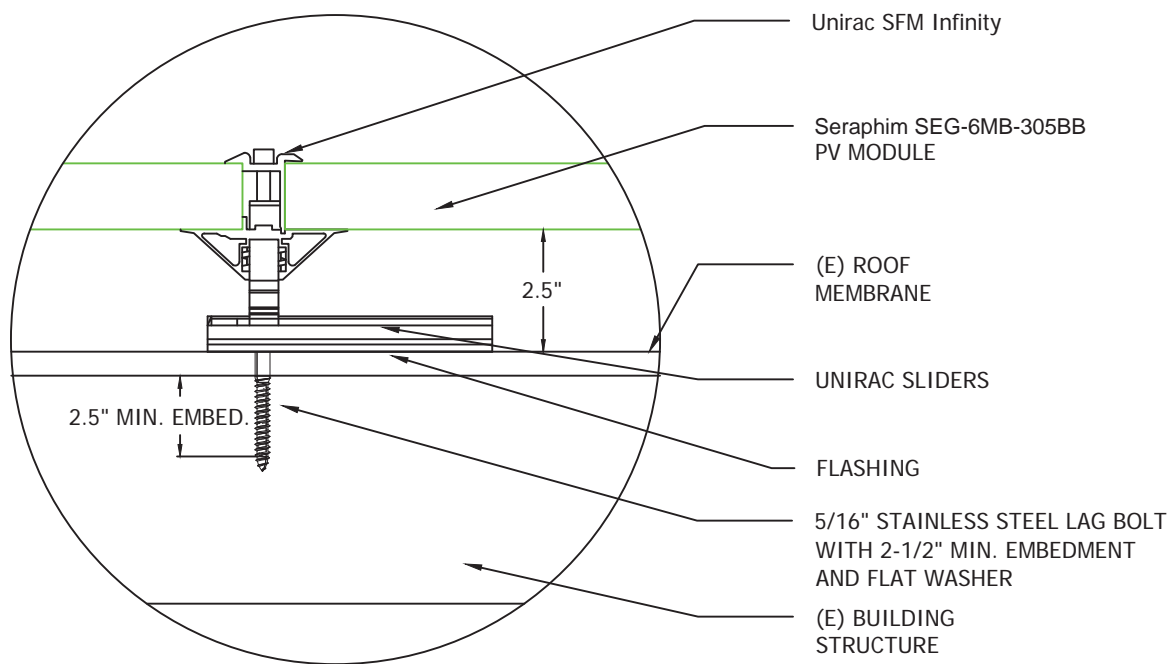
PV ARRAY INFORMATION

PV MODULE COUNT: 39 MODULES
OF ATTACHMENT POINTS: 74
ARRAY AREA: Module Count x 17.51ft² = 682.9ft²
ROOF AREA: 3267.9ft²
% OF ARRAY/ROOF: 20.9%
ARRAY WEIGHT: Module Count x 50lbs = 1950.0lbs
DISTRIBUTED LOAD: Array Weight ÷ Array Area = 2.86 lbs/ft²
POINT LOAD: Array Weight ÷ Attachments = 26.4lbs/attachment

DETAIL, BOTTOM STANDOFF
 Scale: 3" = 1'-0"
 G



DETAIL, MIDDLE/TOP STANDOFF
 Scale: 3" = 1'-0"
 H



ROOF TYPE: Comp Shingle
ROOF FRAMING TYPE: Rafter
RAFTER OR TOP CHORD(TRUSS) 2x6 @ 16"O.C.
CEILING JOIST OR BOTTOM CHORD(TRUSS) 2x4 @ 16"O.C.



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CONTRACTOR:
 BRS FIELD OPS
 385.498.6700

SITE INFORMATION:
 John Holak
 1229 South Lincoln Street
 Coats, North Carolina 27521
DC SYSTEM SIZE: 11.895 kW DC

DRAWING BY:
 Caleb D. Bydone

DATE:
 June 22, 2020

PROJECT NUMBER:
 72204559

SHEET NAME:
 EQUIP. DETAIL

| | |
|---------------------------|----------------------|
| PAGE NUMBER PV4 | REVISION B |
|---------------------------|----------------------|

| | | | | | | | | | | | |
|----|--|-----------|---|--|---------------|---|---|---------------|---|----------------------------------|---------------|
| 15 | (1) 6 AWG THHN/THWN-2, CU., BLACK (L1) | 39.0 A AC | 3 | (3) 10 AWG THHN/THWN-2, CU., BLACK (L1) | MAX 16.0 A AC | 2 | (1) 10 - 2 UF-B W/G, THHN/THWN-2, SOLID CU. | MAX 16.0 A AC | 1 | (1) 12-2 TC-ER, THHN/THWN-2, CU. | MAX 16.0 A AC |
| | (1) 6 AWG THHN/THWN-2, CU., RED (L2) | 240 V AC | | (3) 10 AWG THHN/THWN-2, CU., RED (L2) | 240 V AC | | (1) 6 AWG BARE, CU (EGC) | 240 V AC | | | |
| | (1) 10 AWG THHN/THWN-2, CU., WHITE (N) | | | (1) 10 AWG THHN/THWN-2, CU., GREEN (EGC) | | | | | | | |
| | (1) 10 AWG THHN/THWN-2, CU., GREEN (EGC) | | | | | | | | | | |
| | (1) 3/4 INCH EMT | EXTERIOR | | (1) 3/4 INCH EMT | EXTERIOR | | | EXTERIOR | | | EXTERIOR |



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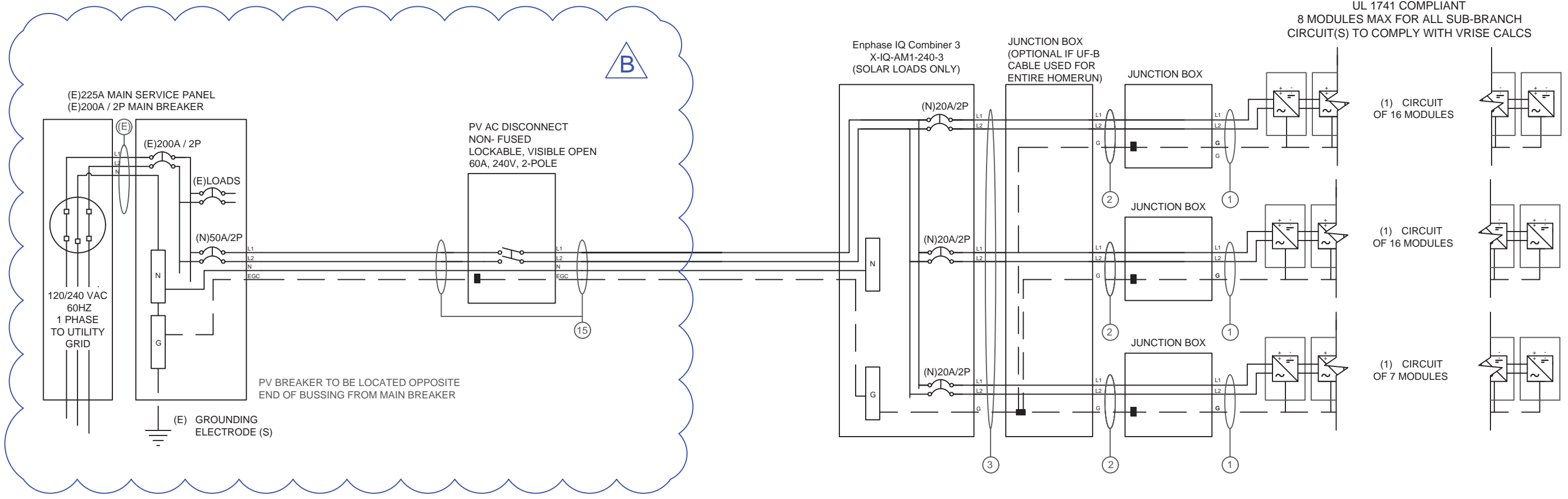
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SITE INFORMATION:
John Holak
1229 South Lincoln Street
Coats, North Carolina 27521
DC SYSTEM SIZE: 11.895 kW DC

39 INVERTERS x 240 W AC = 9.36 kW AC



INTERCONNECTION NOTES

1. ONE OF THE METHODS THAT FOLLOWS SHALL BE USED TO DETERMINE THE RATINGS OF BUSBARS AND PANELBOARDS. (a) THE SUM OF 125 PERCENT OF THE INVERTER(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED THE AMPACITY OF THE BUS BAR. (b) WHERE TWO SOURCES, ONE THE UTILITY AND THE OTHER AN INVERTER ARE LOCATED AT OPPOSITE ENDS OF A BUSBAR THAT CONTAINS LOADS, THE SUM OF 125 PERCENT OF THE INVERTER(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR [NEC 705.12].

DISCONNECT NOTES

1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH



| | |
|----------------------------------|---------------|
| DRAWING BY Caleb D. Bydone | |
| DATE June 22, 2020 | |
| PROJECT NUMBER 72204559 | |
| SHEET NAME ELEC. 3 LINE DIAG. | |
| PAGE NUMBER PV5 | REVISION B |

| MODULE SPECIFICATIONS | | Seraphim SEG-6MB-305BB |
|--|--|------------------------|
| RATED POWER (STC) | | 305 W |
| MODULE VOC | | 39.9 V DC |
| MODULE VMP | | 32.3 V DC |
| MODULE IMP | | 9.45 A DC |
| MODULE ISC | | 9.76 A DC |
| VOC CORRECTION | | -0.28 %/°C |
| VMP CORRECTION | | -0.38 %/°C |
| SERIES FUSE RATING | | 20 A DC |
| ADJ. MODULE VOC @ ASHRAE LOW TEMP | | 43.8 V DC |
| ADJ. MODULE VMP @ ASHRAE 2% AVG. HIGH TEMP | | 27.1 V DC |

| MICROINVERTER SPECIFICATIONS | | Enphase IQ7-60-2-US |
|-------------------------------------|--|---------------------|
| POWER POINT TRACKING (MPPT) MIN/MAX | | 22 - 48 V DC |
| MAXIMUM INPUT VOLTAGE | | 48 V DC |
| MAXIMUM DC SHORT CIRCUIT CURRENT | | 15 A DC |
| MAXIMUM USABLE DC INPUT POWER | | 350 W |
| MAXIMUM OUTPUT CURRENT | | 1 A AC |
| AC OVERCURRENT PROTECTION | | 20 A |
| MAXIMUM OUTPUT POWER | | 240 W |
| CEC WEIGHTED EFFICIENCY | | 97 % |

| AC PHOTOVOLTAIC MODULE MARKING (NEC 690.52) | |
|---|---------------|
| NOMINAL OPERATING AC VOLTAGE | 240 V AC |
| NOMINAL OPERATING AC FREQUENCY | 47 - 68 HZ AC |
| MAXIMUM AC POWER | 240 VA AC |
| MAXIMUM AC CURRENT | 1.0 A AC |
| MAXIMUM OCPD RATING FOR AC MODULE | 20 A AC |

| DESIGN LOCATION AND TEMPERATURES | |
|----------------------------------|--------------------------|
| TEMPERATURE DATA SOURCE | ASHRAE 2% AVG. HIGH TEMP |
| STATE | North Carolina |
| CITY | Coats |
| WEATHER STATION | SEYMOUR-JOHNSON AFB |
| ASHRAE EXTREME LOW TEMP (°C) | -10 |
| ASHRAE 2% AVG. HIGH TEMP (°C) | 35 |

| SYSTEM ELECTRICAL SPECIFICATIONS | CIR 1 | CIR 2 | CIR 3 | CIR 4 | CIR 5 | CIR 6 |
|------------------------------------|------------|-------|-------|-------|-------|-------|
| NUMBER OF MODULES PER MPPT | 16 | 16 | 7 | | | |
| DC POWER RATING PER CIRCUIT (STC) | 4880 | 4880 | 2135 | | | |
| TOTAL MODULE NUMBER | 39 MODULES | | | | | |
| STC RATING OF ARRAY | 11895W DC | | | | | |
| AC CURRENT @ MAX POWER POINT (IMP) | 16.0 | 16.0 | 7.0 | | | |
| MAX. CURRENT (IMP X 1.25) | 20 | 20 | 8.75 | | | |
| OCPD CURRENT RATING PER CIRCUIT | 20 | 20 | 20 | | | |
| MAX. COMB. ARRAY AC CURRENT (IMP) | 39.0 | | | | | |
| MAX. ARRAY AC POWER | 9360W AC | | | | | |

| AC VOLTAGE RISE CALCULATIONS | DIST (FT) | COND. | √RISE(V) | VEND(V) | %VRISE | IQ7-8 |
|-------------------------------------|-----------|--------|----------|---------|--------|-------|
| VRISE SEC. 1 (MICRO TO JBOX) | 28.8 | 12 Cu. | 0.93 | 240.93 | 0.39% | |
| VRISE SEC. 2 (JBOX TO COMBINER BOX) | 45 | 10 Cu. | 1.83 | 241.83 | 0.76% | |
| VRISE SEC. 3 (COMBINER BOX TO POI) | 10 | 6 Cu. | 0.40 | 240.40 | 0.17% | |
| TOTAL VRISE | | | 3.16 | 243.16 | 1.32% | |

| PHOTOVOLTAIC AC DISCONNECT OUTPUT LABEL (NEC 690.54) | |
|--|-----------|
| AC OUTPUT CURRENT | 39.0 A AC |
| NOMINAL AC VOLTAGE | 240 V AC |

| CONDUCTOR SIZE CALCULATIONS | |
|-----------------------------------|---|
| MICROINVERTER TO JUNCTION BOX (1) | MAX. SHORT CIRCUIT CURRENT (ISC) = 16.0 A AC MAX. CURRENT (ISC X1.25) = 20.0 A AC CONDUCTOR (TC-ER, COPPER (90°C)) = 12 AWG CONDUCTOR RATING = 30 A AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 28.8 > 20.0 |
| JUNCTION BOX TO JUNCTION BOX (2) | MAX. SHORT CIRCUIT CURRENT (ISC) = 16.0 A AC MAX. CURRENT (ISC X1.25) = 20.0 A AC CONDUCTOR (UF-B, COPPER (60°C)) = 10 AWG CONDUCTOR RATING = 30 A CONDUIT FILL DERATE = 1 AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 28.8 > 20.0 |
| JUNCTION BOX TO COMBINER BOX (3) | MAX. SHORT CIRCUIT CURRENT (ISC) = 16.0 A AC MAX. CURRENT (ISC X1.25) = 20.0 A AC CONDUCTOR (UF-B, COPPER (60°C)) = 10 AWG CONDUCTOR RATING = 30 A CONDUIT FILL DERATE = 0.8 AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 23.04 > 20.0 |
| COMBINER BOX TO MAIN PV OCPD (15) | INVERTER RATED AMPS = 39.0 A AC MAX. CURRENT (RATED AMPS X1.25) = 48.75 A AC CONDUCTOR (THWN-2, COPPER (75°C TERM.)) = 6 AWG CONDUCTOR RATING = 65 A CONDUIT FILL DERATE = 1 AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 62.4 > 48.8 |



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PV INSTALLATION
PROFESSIONAL
Scott Gurney
PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
385.498.6700

GROUNDING NOTES

- A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH [NEC 690-47] AND [NEC 250-50] THROUGH [NEC 250-60] SHALL BE PROVIDED. PER NEC, GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO AT THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, OR IS ONLY METALLIC WATER PIPING, A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT GROUND ROD WITH ACORN CLAMP.
- THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 AWG COPPER WIRE PER NEC 250-64B. THE GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT PER [NEC 250.64C].
- GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO GREATER THAN #6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
- PV SYSTEM SHALL BE GROUNDED IN ACCORDANCE TO [NEC 250.21], [NEC TABLE 250.122], AND ALL METAL PARTS OR MODULE FRAMES ACCORDING TO [NEC 690.46].
- MODULE SOURCE CIRCUITS SHALL BE GROUNDED IN ACCORDANCE TO [NEC 690.42].
- THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDED CONDUCTOR TO ANOTHER MODULE.
- EACH MODULE WILL BE GROUNDED USING THE SUPPLIED CONNECTIONS POINTS IDENTIFIED IN THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- ENCLOSURES SHALL BE PROPERLY PREPARED WITH REMOVAL OF PAINT/FINISH AS APPROPRIATE WHEN GROUNDING EQUIPMENT WITH TERMINATION GROUNDING LUGS.
- GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR DIRECT BURIAL.
- GROUNDING AND BONDING CONDUCTORS SHALL BE COPPER, SOLID OR

STRANDED, AND BARE WHEN EXPOSED.

- EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZE ACCORDING TO [NEC 690.45] AND BE A MINIMUM OF #10AWG WHEN NOT EXPOSED TO DAMAGE (#6AWG SHALL BE USED WHEN EXPOSED TO DAMAGE).
- GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN (OR MARKED GREEN IF #4 AWG OR LARGER)
- ALL CONDUIT BETWEEN THE UTILITY AC DISCONNECT AND THE POINT OF CONNECTION SHALL HAVE GROUNDED BUSHINGS AT BOTH ENDS.
- SYSTEM GEC SIZED ACCORDING TO [NEC 690.47], [NEC TABLE 250.66], DC SYSTEM GEC SIZED ACCORDING TO [NEC 250.166], MINIMUM #8AWG WHEN INSULATED, #6AWG WHEN EXPOSED TO DAMAGE.
- EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENTS, AND CONDUCTOR ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.136(A) REGARDLESS OF VOLTAGE.

WIRING & CONDUIT NOTES

- ALL CONDUIT SIZES AND TYPES, SHALL BE LISTED FOR ITS PURPOSE AND APPROVED FOR THE SITE APPLICATIONS
- BOLTED CONNECTION REQUIRED IN DC DISCONNECTS ON THE WHITE GROUNDED CONDUCTOR (USE POLARIS BLOCK OR NEUTRAL BAR)
- ANY CONNECTION ABOVE LIVE PARTS MUST BE WATERTIGHT. REDUCING WASHERS DISALLOWED ABOVE LIVE PARTS, MEYERS HUBS RECOMMENDED
- UV RESISTANT CABLE TIES (NOT ZIP TIES) USED FOR PERMANENT WIRE MANAGEMENT OFF THE ROOF SURFACE IN ACCORDANCE WITH NEC 110.2, 110.3(A-B), 300.4
- SOLADECK JUNCTION BOXES MOUNTED FLUSH W/ROOF SURFACE TO BE USED FOR WIRE MANAGEMENT AND AS FLASHED ROOF PENETRATIONS FOR INTERIOR CONDUIT RUNS.
- ALL PV CABLES AND HOMERUN WIRES BE TYPE USE-2, AND SINGLE-CONDUCTOR CABLE LISTED AND IDENTIFIED AS PV WIRE, TYPE TC-ER, OR EQUIVALENT; ROUTED TO SOURCE CIRCUIT COMBINER BOXES AS REQUIRED
- ALL CONDUCTORS AND OCPD SIZES AND TYPES SPECIFIED ACCORDING TO [NEC

690.8] FOR MULTIPLE CONDUCTORS

- ALL PV DC CONDUCTORS IN CONDUIT EXPOSED TO SUNLIGHT SHALL BE INSTALLED AT LEAST 7/8" ABOVE THE ROOF SURFACE AND DERATED ACCORDING TO [NEC TABLE 310.15 (B)(2)(a), NEC TABLE 310.15(B)(3)(a), & NEC 310.15(B)(3)(c)].
- EXPOSED ROOF PV DC CONDUCTORS SHALL BE USE-2, 90°C RATED, WET AND UV RESISTANT, AND UL LISTED RATED FOR 600V, UV RATED SPIRAL WRAP SHALL BE USED TO PROTECT WIRE FROM SHARP EDGES
- PHASE AND NEUTRAL CONDUCTORS SHALL BE DUAL RATED THHN/THWN-2 INSULATED, 90°C RATED, WET AND UV RESISTANT, RATED FOR 600V
- 4-WIRE DELTA CONNECTED SYSTEMS HAVE THE PHASE WITH THE HIGHER VOLTAGE TO GROUND MARKED ORANGE OR IDENTIFIED BY OTHER EFFECTIVE MEANS.
- ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION
- VOLTAGE DROP LIMITED TO 2% FOR DC CIRCUITS AND 3% FOR AC CIRCUITS
- NEGATIVE GROUNDED SYSTEMS DC CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS: DC POSITIVE- RED (OR MARKED RED), DC NEGATIVE- GREY (OR MARKED GREY)
- POSITIVE GROUNDED SYSTEMS DC CONDUCTORS COLOR CODED: DC POSITIVE- GREY (OR MARKED GREY), DC NEGATIVE- BLACK (OR MARKED BLACK)
- AC CONDUCTORS >4AWG COLOR CODED OR MARKED: PHASE A OR L1- BLACK, PHASE B OR L2- RED, PHASE C OR L3- BLUE, NEUTRAL- WHITE/GRAY
* USE-2 IS NOT INDOOR RATED BUT PV CABLE IS RATED THWN/THWN-2 AND MAY BE USED INSIDE
** USE-2 IS AVAILABLE AS UV WHITE
- RIGID CONDUIT, IF INSTALLED, (AND/OR NIPPLES) MUST HAVE A PULL BUSHING TO PROTECT WIRES.
- IF CONDUIT DETERMINED TO BE RAN THROUGH ATTIC IN FIELD THEN CONDUIT WILL BE EITHER EMT, FMC, OR MC CABLE IF DC CURRENT COMPLYING WITH NEC 690.31, NEC 250.118(10). DISCONNECTING MEANS SHALL COMPLY WITH 690.13 AND 690.15
- CONDUIT RAN THROUGH ATTIC WILL BE AT LEAST 18" BELOW ROOF SURFACE COMPLYING WITH NEC 230.6(4) AND SECURED NO GREATER THAN 6' APART PER NEC 330.30(B).

SITE INFORMATION:

John Holak

1229 South Lincoln Street

Coats, North Carolina 27521

DC SYSTEM SIZE: 11.895 kW DC

DRAWING BY

Caleb D. Bydone

DATE

June 22, 2020

PROJECT NUMBER

72204559

SHEET NAME

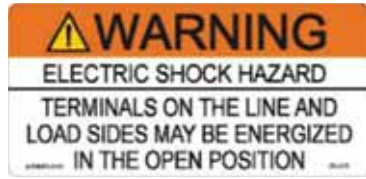
ELEC. CALCS.

PAGE NUMBER

PV6

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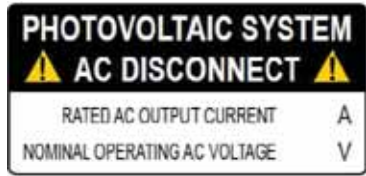
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LABEL 1
FOR PV DISCONNECTING MEANS WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION. [NEC 690.13(B), NEC 705.22]



LABEL 2
AT EACH DC DISCONNECTING MEANS, INCLUDING THE DC DISCONNECT AT THE INVERTER. [NEC 690.53, NEC 690.13(B)]



LABEL 3
AT POINT OF INTERCONNECTION, MARKED AT AC DISCONNECTING MEANS. [NEC 690.54, NEC 690.13 (B)]



LABEL 4
AT POINT OF INTERCONNECTION FOR EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUSBAR OR CONDUCTOR SUPPLIED FORM MULTIPLE SOURCES, EACH SERVICE EQUIPMENT AND ALL ELECTRIC POWER PRODUCTION SOURCE LOCATIONS. [NEC 705.12(B)(3)]



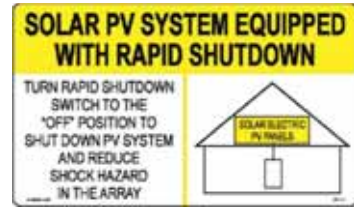
LABEL 5
PLACED ADJACENT TO THE BACK-FED BREAKER FROM THE INVERTER IF TIE IN CONSISTS OF LOAD SIDE CONNECTION TO BUSBAR. [NEC 705.12(B)(2)(3)(b)]



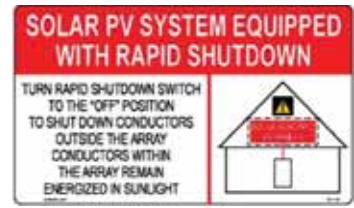
LABEL 6
(ONLY IF 3 OR MORE SUPPLY SOURCES TO A BUSBAR)
SIGN LOCATED AT LOAD CENTER IF IT CONTAINS 3 OR MORE POWER SOURCES. [NEC 705.12(B)(2)(3)(C)]



LABEL 7
AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS. [NEC 690.31(G)(3&4)]



LABEL 8
FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND CONDUCTORS LEAVING THE ARRAY: SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION. [NEC 690.56(C)(1)(A)]



LABEL 9
FOR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE ARRAY: SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION. [NEC 690.56(C)(1)(B)]



LABEL 10
SIGN LOCATED AT RAPID SHUT DOWN DISCONNECT SWITCH [NEC 690.56(C)(3)].



LABEL 11
PERMANENT DIRECTORY TO BE LOCATED AT MAIN SERVICE EQUIPMENT LOCATION IF ALL ELECTRICAL POWER SOURCE DISCONNECTING MEANS (SOLAR ARRAY RAPID SHUTDOWN SWITCH) ARE GROUPED AND IN LINE OF SITE OF MAIN SERVICE DISCONNECTING MEANS. [NEC 690.56(C) & NEC 705.10].

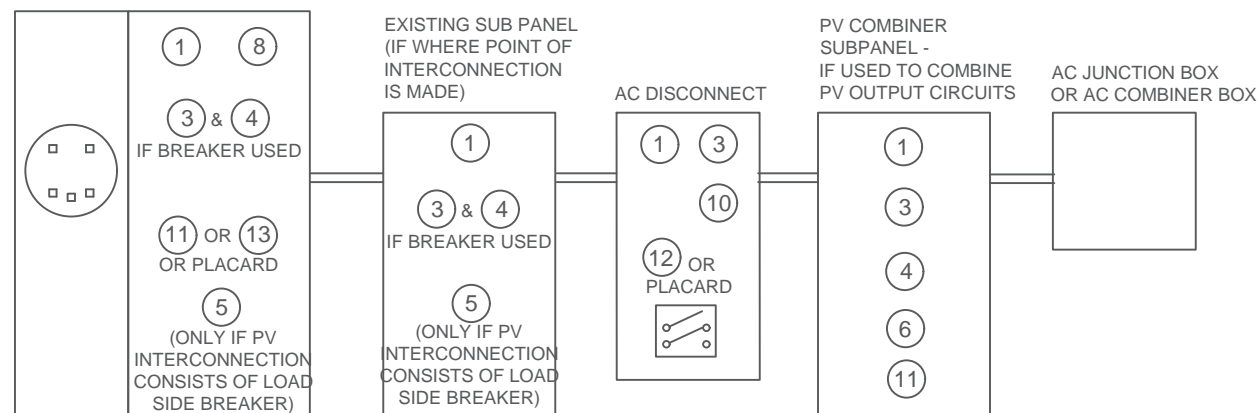


LABEL 12
PERMANENT DIRECTORY TO BE LOCATED AT SOLAR ARRAY RAPID SHUTDOWN SWITCH DENOTING THE LOCATION OF THE SERVICE EQUIPMENT LOCATION IF SOLAR ARRAY RAPID SHUT DOWN DISCONNECT SWITCH IS NOT GROUPED AND WITHIN LINE OF SITE OF MAIN SERVICE DISCONNECTING MEANS. [NEC 705.10]

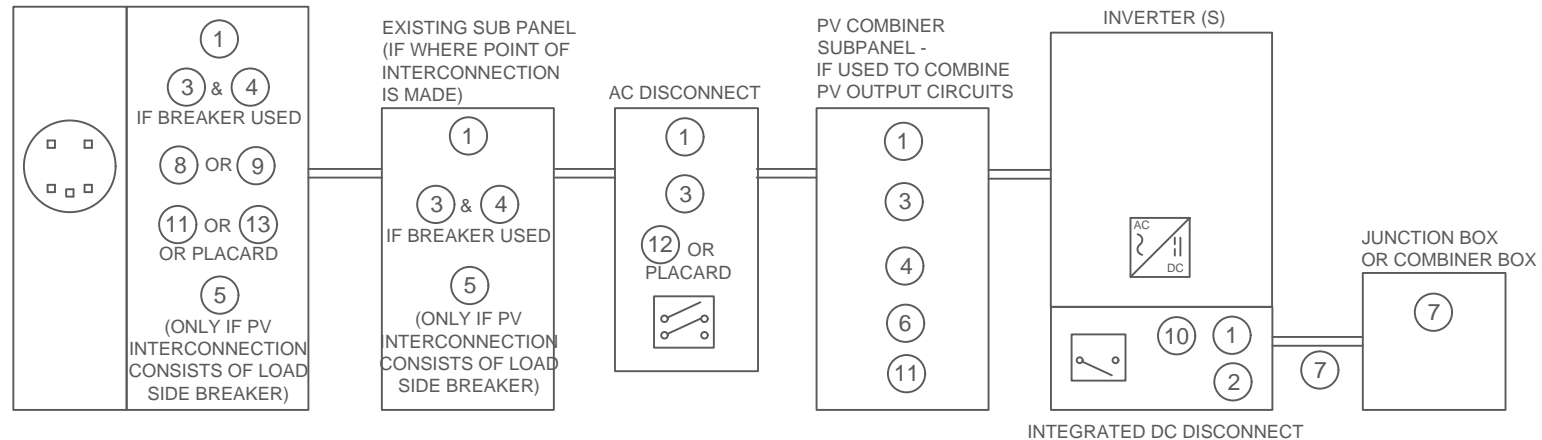


LABEL 13
PERMANENT DIRECTORY TO BE LOCATED AT MAIN SERVICE EQUIPMENT DENOTING THE LOCATION OF THE PV RAPID SHUTDOWN SYSTEM DISCONNECTING MEANS IF SOLAR ARRAY RAPID SHUT DOWN DISCONNECT SWITCH IS NOT GROUPED AND WITHIN LINE OF SITE OF MAIN SERVICE DISCONNECTING MEANS. [NEC 705.10, NEC 690.56(C)(1)]

LABELING DIAGRAM FOR MICRO INV.:
MAIN SERVICE PANEL



LABELING DIAGRAM FOR STRING INV. / DC OPTIMIZER INV.:
MAIN SERVICE PANEL



LABELING NOTES:

1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2. LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21]
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

*ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ON PV5 OF 3 LINE DIAGRAM. PV5 LINE DIAGRAM TO REFLECT ACTUAL REPRESENTATION OF PROPOSED SCOPE OF WORK.



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CONTRACTOR:
BRS FIELD OPS
385.498.6700

SITE INFORMATION:

John Holak
1229 South Lincoln Street
Coats, North Carolina 27521
DC SYSTEM SIZE: 11.895 kW DC

DRAWING BY
Caleb D. Bydone

DATE
June 22, 2020

PROJECT NUMBER
72204559

SHEET NAME
LABELS

PAGE NUMBER
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Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.

Enphase IQ 7 and IQ 7+ Microinverters

| INPUT DATA (DC) | IQ7-60-2-US | | IQ7PLUS-72-2-US | |
|--|---|----------------------|--------------------------------|----------------------|
| Commonly used module pairings ¹ | 235 W - 350 W + | | 235 W - 440 W + | |
| Module compatibility | 60-cell PV modules only | | 60-cell and 72-cell PV modules | |
| Maximum input DC voltage | 48 V | | 60 V | |
| Peak power tracking voltage | 27 V - 37 V | | 27 V - 45 V | |
| Operating range | 16 V - 48 V | | 16 V - 60 V | |
| Min/Max start voltage | 22 V / 48 V | | 22 V / 60 V | |
| Max DC short circuit current (module Isc) | 15 A | | 15 A | |
| Overvoltage class DC port | II | | II | |
| DC port backfeed current | 0 A | | 0 A | |
| PV array configuration | 1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20 | | per branch circuit | |
| OUTPUT DATA (AC) | IQ 7 Microinverter | | IQ 7+ Microinverter | |
| Peak output power | 250 VA | | 295 VA | |
| Maximum continuous output power | 240 VA | | 290 VA | |
| Nominal (L-L) voltage/range ² | 240 V / 211-264 V | 208 V / 183-229 V | 240 V / 211-264 V | 208 V / 183-229 V |
| Maximum continuous output current | 1.0 A (240 V) | 1.15 A (208 V) | 1.21 A (240 V) | 1.39 A (208 V) |
| Nominal frequency | 60 Hz | | 60 Hz | |
| Extended frequency range | 47 - 68 Hz | | 47 - 68 Hz | |
| AC short circuit fault current over 3 cycles | 5.8 Arms | | 5.8 Arms | |
| Maximum units per 20 A (L-L) branch circuit ³ | 16 (240 VAC) | 13 (208 VAC) | 13 (240 VAC) | 11 (208 VAC) |
| Overvoltage class AC port | III | | III | |
| AC port backfeed current | 18 mA | | 18 mA | |
| Power factor setting | 1.0 | | 1.0 | |
| Power factor (adjustable) | 0.85 leading ... 0.85 lagging | | 0.85 leading ... 0.85 lagging | |
| EFFICIENCY | @240 V | @208 V | @240 V | @208 V |
| Peak efficiency | 97.6 % | 97.6 % | 97.5 % | 97.3 % |
| CEC weighted efficiency | 97.0 % | 97.0 % | 97.0 % | 97.0 % |
| MECHANICAL DATA | | | | |
| Ambient temperature range | -40°C to +65°C | | | |
| Relative humidity range | 4% to 100% (condensing) | | | |
| Connector type | MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter) | | | |
| Dimensions (HxWxD) | 212 mm x 175 mm x 30.2 mm (without bracket) | | | |
| Weight | 1.08 kg (2.38 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 | | | |
| FEATURES | | | | |
| Communication | Power Line Communication (PLC) | | | |
| Monitoring | Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy. | | | |
| Disconnecting means | The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690. | | | |
| Compliance | CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, 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 Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions. | | | |

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.
 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.

To learn more about Enphase offerings, visit enphase.com

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Scott Gurney
 # PV-011719-015866

CONTRACTOR:
 BRS FIELD OPS
 385.498.6700



To learn more about Enphase offerings, visit enphase.com



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SEG-6MB-xxxBB
SERIES 6 INCH 60 CELLS



Safety



Resistance to salt mist corrosion at your request



Resistance to ammonia corrosion at your request



Product is certified by UL1703

Reliability



Anti-PID products using advanced module technology



World 1st company to pass "Thresher Test" and "On-site Power Measurement Validation" certificate



Bankable products

Performance



High efficiency and enhanced module durability



Outstanding power output capability at low irradiance

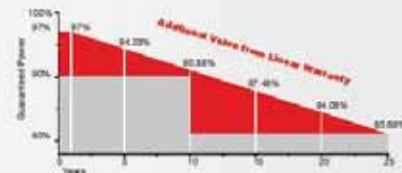


Withstand up to 2400Pa wind and 5400Pa snow loads(IEC), long lasting

295~310W PERC



WARRANTY



10 YEARS Guarantee on product material and workmanship

25 YEARS Linear power output warranty

MANAGEMENT SYSTEM

ISO 9001: Quality management system
ISO 14001: Standard for environmental management system
OHSAS 18001: International standard for occupational health and safety assessment system

PRODUCT CERTIFICATES



INSURANCE



Specifications are subject to change without notification SEG-DS-EN-2019V1.1 © Copyright 2019 Seraphim

SERAPHIM ENERGY GROUP, INC.

SEG-6MB-XXXBB SERIES 6 INCH 60 CELLS



BB-BLACKBACK-SHEET /BLACK FRAME PRODUCTS

Electrical Characteristics(STC)

| Module Type | SEG-6MB-295BB | SEG-6MB-300BB | SEG-6MB-305BB | SEG-6MB-310BB |
|---|--------------------|---------------|---------------|---------------|
| Maximum Power at STC · P _{max} (W) | 295 | 300 | 305 | 310 |
| Open Circuit Voltage -V _{oc} (V) | 39.5 | 39.7 | 39.9 | 40.2 |
| Short Circuit Current -I _{sc} (A) | 9.56 | 9.65 | 9.76 | 9.82 |
| Maximum Power Voltage -V _{mp} (V) | 31.9 | 32.1 | 32.3 | 32.6 |
| Maximum Power Current -I _{mp} (A) | 9.25 | 9.35 | 9.45 | 9.51 |
| Module Efficiency STC-η _m (%) | 18.13 | 18.44 | 18.75 | 19.05 |
| Power Tolerance (W) | (0, +4.99) | | | |
| Maximum System Voltage (V) | 1000 or 1500(UL) | | | |
| Maximum Series Fuse Rating (A) | 20 | | | |
| Fire Performance | Type2 or Type1(UL) | | | |

Electrical Characteristics(NOCT)

| Module Type | SEG-6MB-295BB | SEG-6MB-300BB | SEG-6MB-305BB | SEG-6MB-310BB |
|--|---------------|---------------|---------------|---------------|
| Maximum Power at NOCT · P _{max} (W) | 219 | 223 | 226 | 230 |
| Open Circuit Voltage -V _{oc} (V) | 36.5 | 36.7 | 36.8 | 37.1 |
| Short Circuit Current -I _{sc} (A) | 7.73 | 7.82 | 7.91 | 7.96 |
| Maximum Power Voltage -V _{mp} (V) | 30.1 | 30.3 | 30.4 | 30.7 |
| Maximum Power Current -I _{mp} (A) | 7.28 | 7.36 | 7.44 | 7.50 |

Temperature Characteristics

| | |
|---|------------|
| P _{max} Temperature Coefficient | -0.38%/°C |
| V _{oc} Temperature Coefficient | -0.28%/°C |
| I _{sc} Temperature Coefficient | +0.05%/°C |
| Operating Temperature | -40~+85 °C |
| Nominal Operating Cell Temperature (NOCT) | 45±2 °C |

Packing Configuration

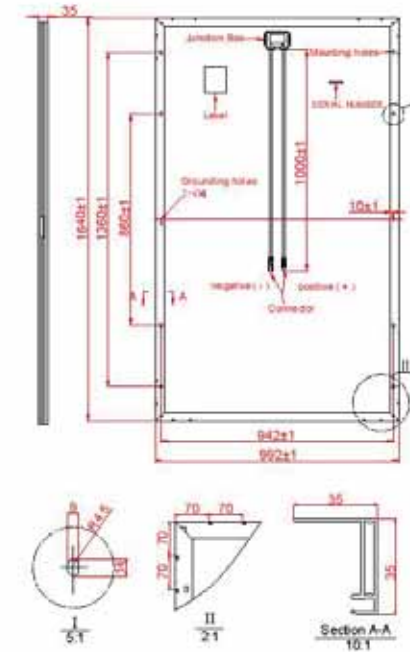
| | 1640x 992 x 35mm(54.57x39.06x1.37 inch) | |
|-----------------------|---|-------|
| Container | 20'GP | 40'GP |
| Pieces per Pallet | 30 | 30 |
| Pallets per Container | 12 | 28 |
| Pieces per Container | 360 | 840 |

Mechanical Specifications

| | |
|---------------------|---|
| External Dimensions | 1640 x 992 x 35 mm(54.57x39.06x1.37 inch) |
| Weight | 17.5 kg(38.5 lbs) |
| Solar Cells | Monocrystalline, 6 inch (60pcs.) |
| Front Glass | 3.2mm AR coating tempered glass, low iron |
| Frame | Anodized aluminum alloy |
| Junction Box | IP67 |
| Output Cables | 12AWG,cable length 1000mm |
| Connector | MCA Compatible |

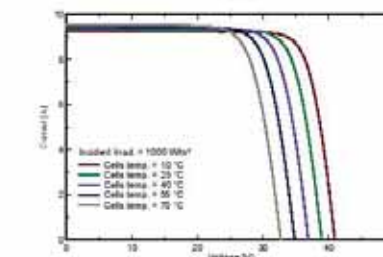
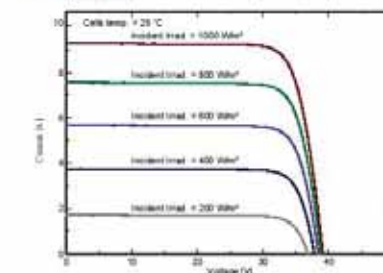
STC: Irradiance 1000 W/m², module temperature 25 °C, AM=1.5
NOCT: Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1m/s
Specifications are subject to change without further notification.

Specifications are subject to change without notification SEG-DS-EN-2019V1.1 © Copyright 2019 Seraphim



* All Dimensions in mm
* The above drawing is a graphical representation of the product.

I-V Curve



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PV-011719-015866

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385.498.6700

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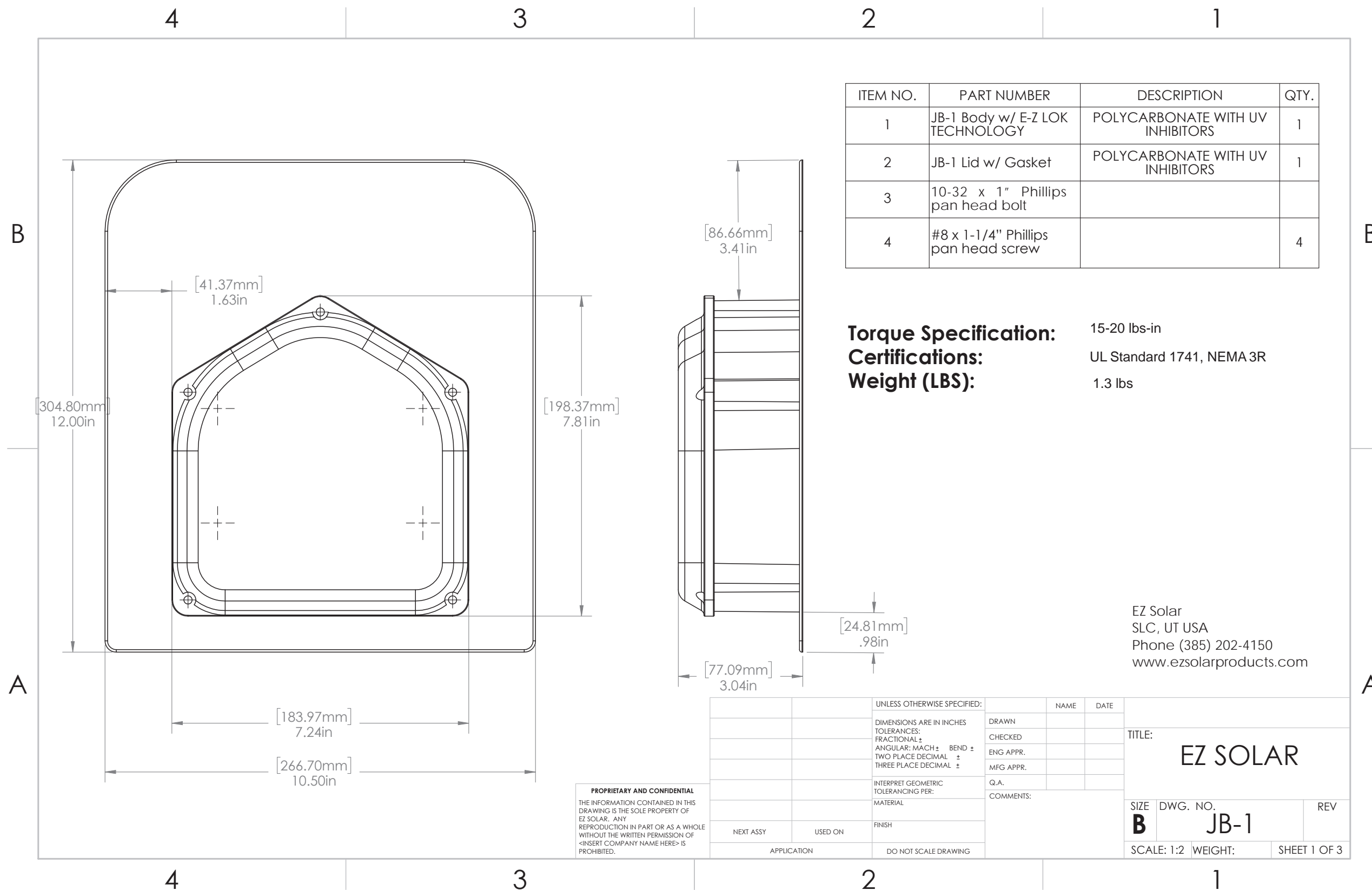


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| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------------------------------|----------------------------------|------|
| 1 | JB-1 Body w/ E-Z LOK TECHNOLOGY | POLYCARBONATE WITH UV INHIBITORS | 1 |
| 2 | JB-1 Lid w/ Gasket | POLYCARBONATE WITH UV INHIBITORS | 1 |
| 3 | 10-32 x 1" Phillips pan head bolt | | |
| 4 | #8 x 1-1/4" Phillips pan head screw | | 4 |

Torque Specification: 15-20 lbs-in
Certifications: UL Standard 1741, NEMA 3R
Weight (LBS): 1.3 lbs

EZ Solar
SLC, UT USA
Phone (385) 202-4150
www.ezsolarproducts.com



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| UNLESS OTHERWISE SPECIFIED: | | NAME | DATE |
|-----------------------------|--|------|------|
| DRAWN | | | |
| CHECKED | | | |
| ENG APPR. | | | |
| MFG APPR. | | | |
| Q.A. | | | |
| COMMENTS: | | | |

| | | | |
|------------|----------|--------------|--|
| TITLE: | | EZ SOLAR | |
| SIZE | DWG. NO. | REV | |
| B | JB-1 | | |
| SCALE: 1:2 | WEIGHT: | SHEET 1 OF 3 | |

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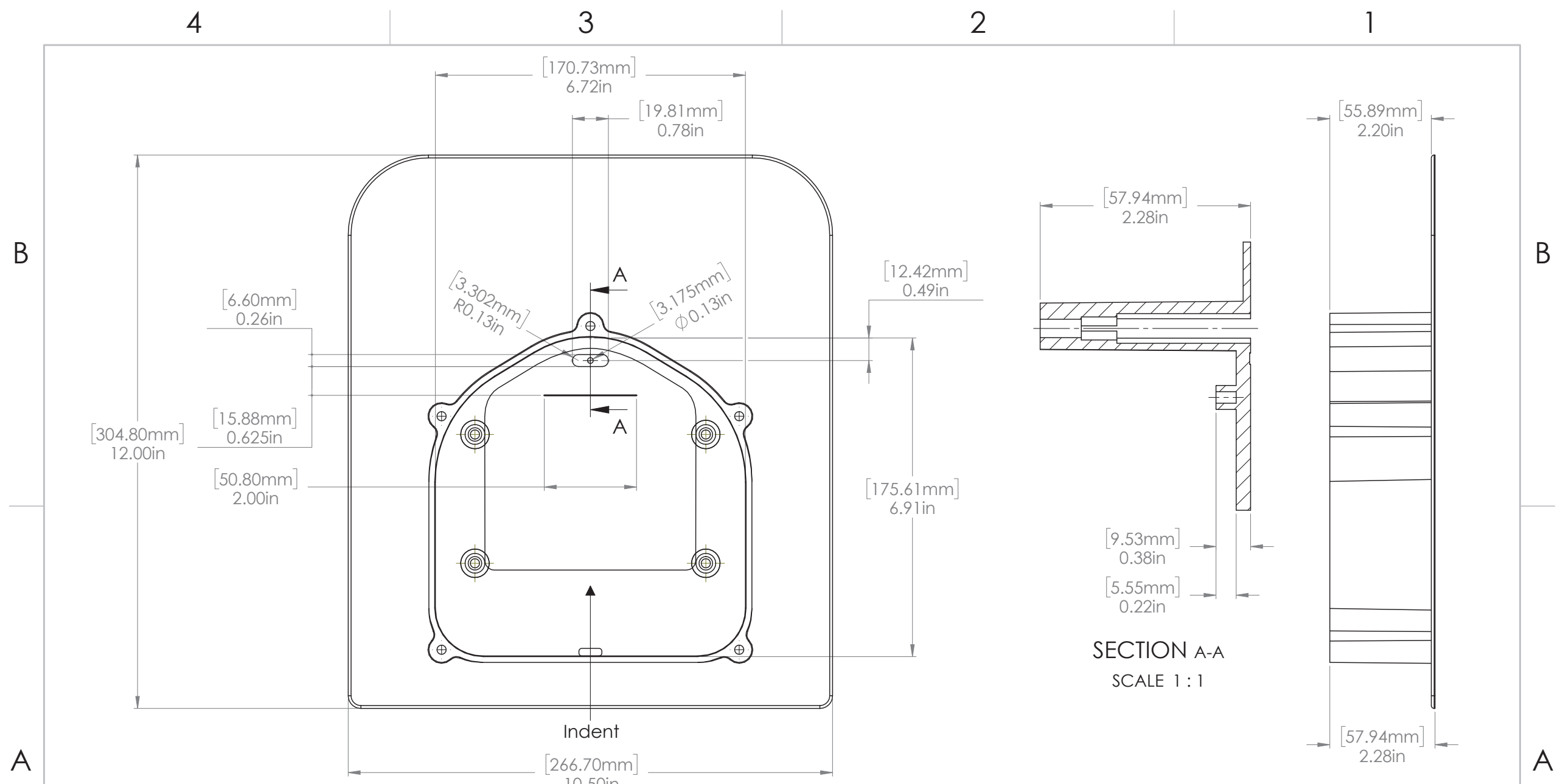


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| ANGULAR: MACH ± BEND ± | | ENG APPR. | |
| TWO PLACE DECIMAL ± | | MFG APPR. | |
| THREE PLACE DECIMAL ± | | Q.A. | |
| INTERPRET GEOMETRIC TOLERANCING PER: | | COMMENTS: | |
| MATERIAL | | | |
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| TITLE: EZ SOLAR | | |
| SIZE B | DWG. NO. JB-1 | REV |
| SCALE: 1:2 | WEIGHT: | SHEET 2 OF 3 |

SHEET NAME
SPEC SHEET

PAGE NUMBER
SS

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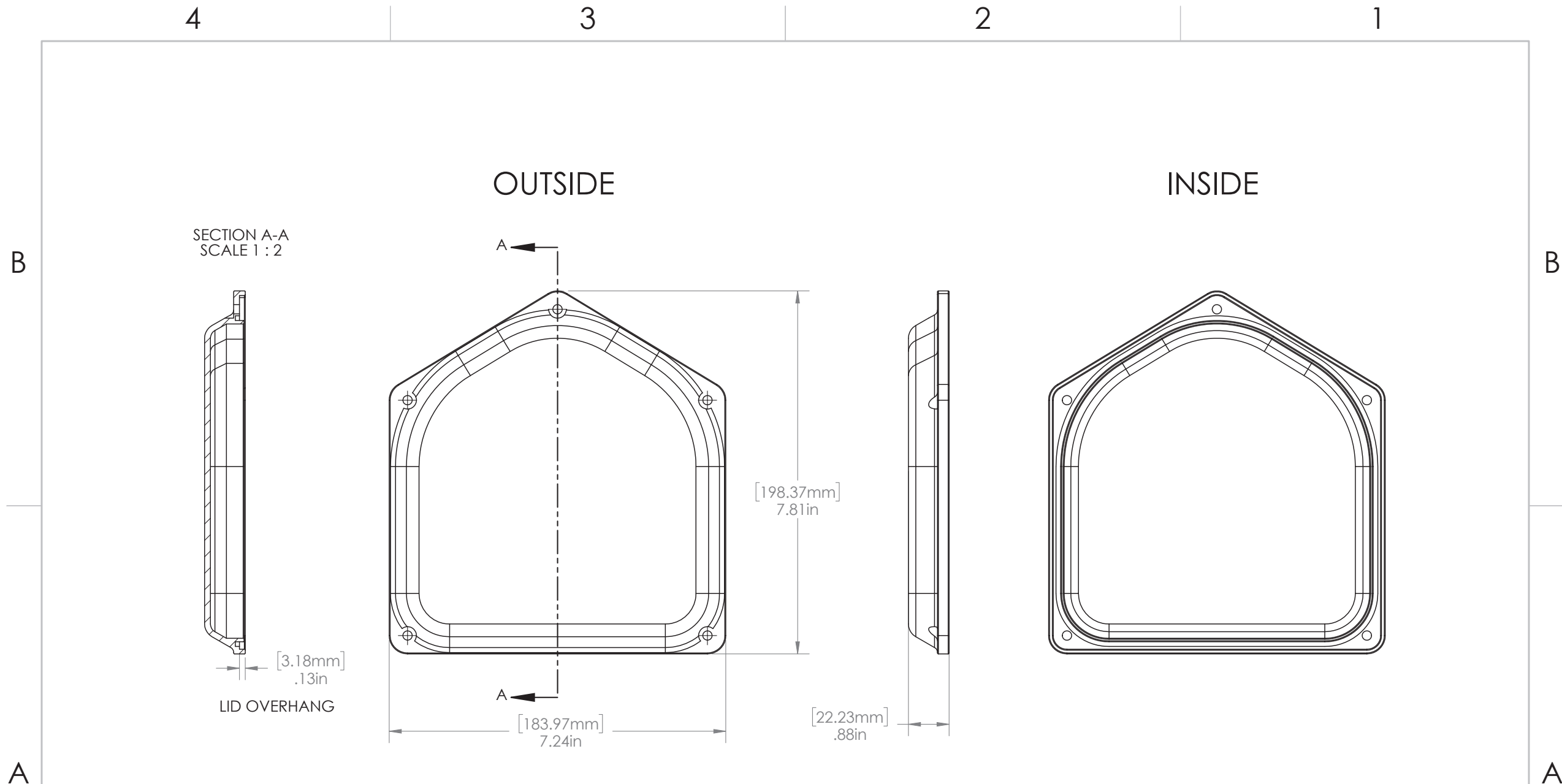
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Scott Gurney
PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
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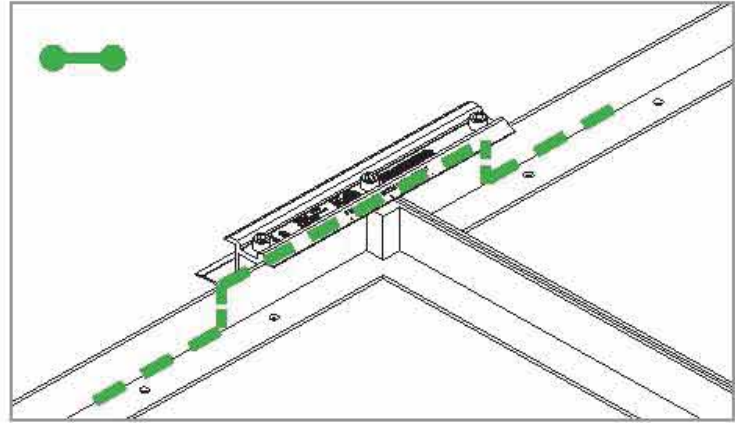
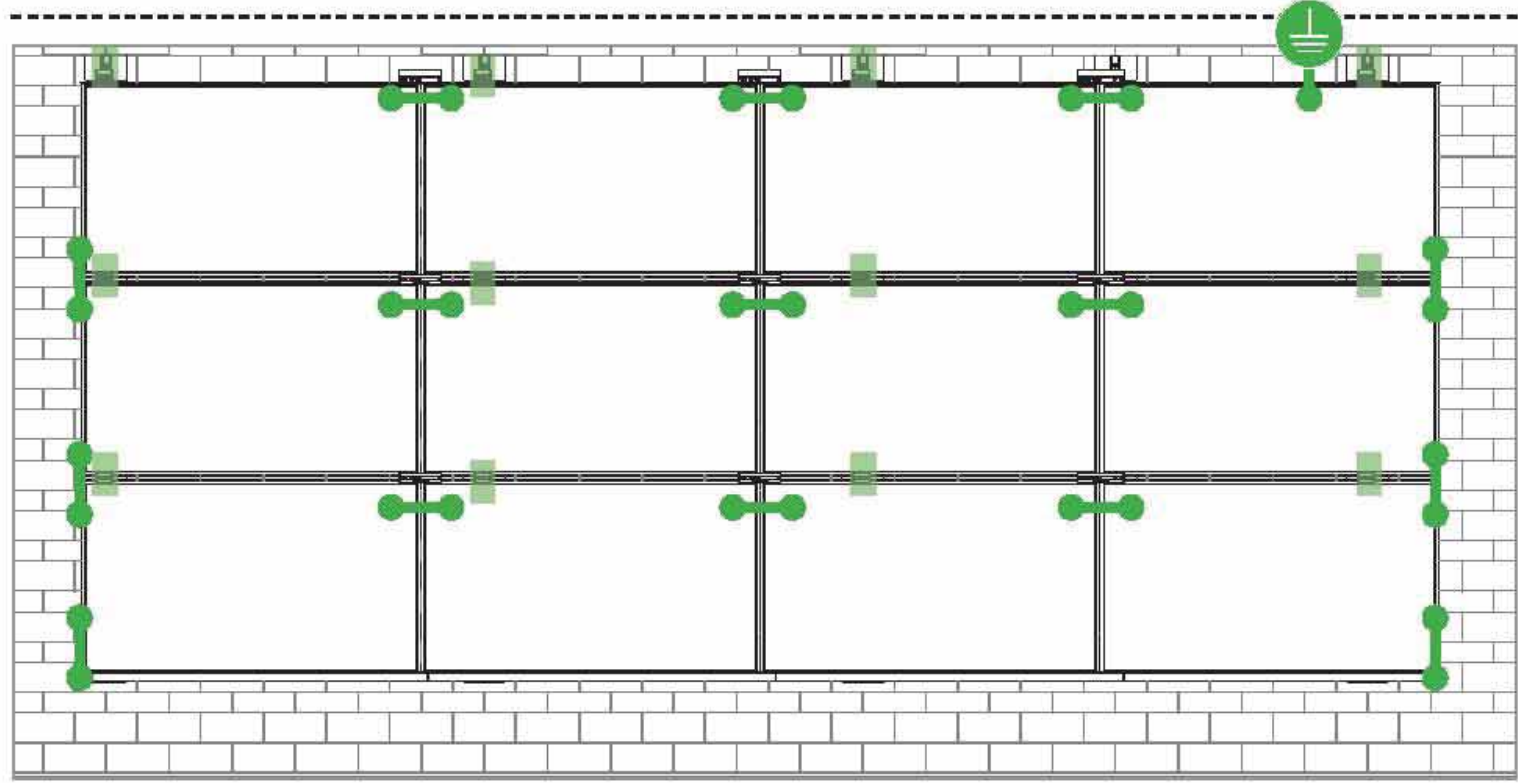
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| DIMENSIONS ARE IN INCHES | | DRAWN | | |
| TOLERANCES: | | CHECKED | | |
| FRACTIONAL: ± | | ENG APPR. | | |
| ANGULAR: MACH ± BEND ± | | MFG APPR. | | Q.A. |
| TWO PLACE DECIMAL ± | | COMMENTS: | | SIZE DWG. NO. REV |
| THREE PLACE DECIMAL ± | | | | B JB-1 |
| INTERPRET GEOMETRIC TOLERANCING PER: | | | | SCALE: 1:2 WEIGHT: SHEET 3 OF 3 |
| MATERIAL | | | | |
| NEXT ASSY | USED ON | | | |
| FINISH | | | | |
| APPLICATION | | DO NOT SCALE DRAWING | | |

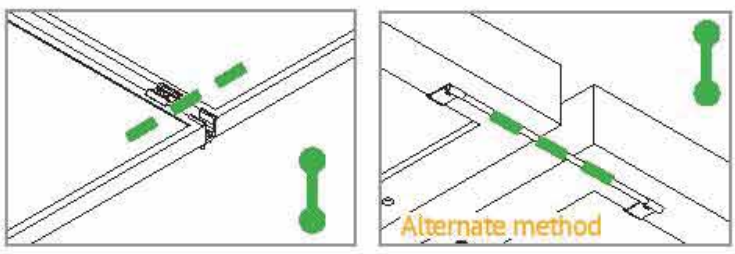
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SPEC SHEET

PAGE NUMBER
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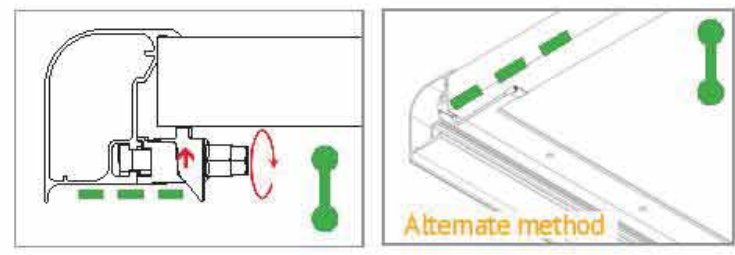
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E-W BONDING PATH:
E-W module to module bonding is accomplished with 2 pre-installed bonding pins which engage on the secure side of the Microrail™ and splice.



N-S BONDING PATH:
N-S module to module bonding is accomplished with bonding clamp with 2 integral bonding pins. (refer also to alternate method)



TRIMRAIL BONDING PATH:
Trimrail to module bonding is accomplished with bonding clamp with integral bonding pin and bonding T-bolt. (refer also to alternate method)

Star Washer is Single Use Only

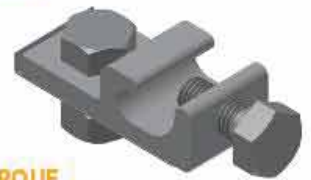


TERMINAL TORQUE,
Install Conductor and torque to the following:
4-6 AWG: 35in-lbs
8 AWG: 25 in-lbs
10-14 AWG: 20 in-lbs

TERMINAL TORQUE,
Install Conductor and torque to the following:
4-14 AWG: 35in-lbs



WEEBLUG Single Use Only



TERMINAL TORQUE,
Install Conductor and torque to the following:
6-14 AWG: 7ft-lbs

LUG DETAIL & TORQUE INFO
IlSCO Lay-In Lug (GBL-4DBT)

- 10-32 mounting hardware
- Torque = 5 ft-lb
- AWG 4-14 -Solid or Stranded

LUG DETAIL & TORQUE INFO
IlSCO Flange Lug(SGB-4)

- 1/4" mounting hardware
- Torque = 75 in-lb
- AWG 4-14 -Solid or Stranded

LUG DETAIL & TORQUE INFO
Wiley WEEBLug (6.7)

- 1/4" mounting hardware
- Torque = 10 ft-lb
- AWG 6-14 -Solid or Stranded

NOTE: ISOLATE COPPER FROM ALUMINUM CONTACT TO PREVENT CORROSION
System bonding is accomplished through modules. System grounding accomplished by attaching a ground lug to any module at a location on the module specified by the module manufacturer.

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

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| Address: 1411 Broadway Blvd NE Albuquerque, NM 87102 | Address: No. 688 ChaoSheng Road Cixi City Zhejiang Province 315311 |
| Country: USA | Country: China |
| Contact: Klaus Nicolaedis Tom Young | Contact: Jia Liu Robin Luo |
| Phone: 505-462-2190 505-843-1418 | Phone: +86-15267030962 +86-13621785753 |
| FAX: NA klaus.nicolaedis@unirac.com | FAX: NA |
| Email: toddg@unirac.com | Email: jia.liu@cxymj.com buwan.luo@cxymj.com |

Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Lake Forest, CA U.S.A.

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for Dean Davidson, Certification Manager



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| | |
|---------------------|--|
| Standard(s): | Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels [UL 2703: 2015 Ed.1] |
| Product: | Photovoltaic Mounting System, Sun Frame Microrail - Installed Using Unirac Installation Guide, Rev PUB2019MAR01 with Annex North Row Extension Installation Guide Rev PUB2019FEB20 |
| Brand Name: | Unirac |
| Models: | Unirac SFM |

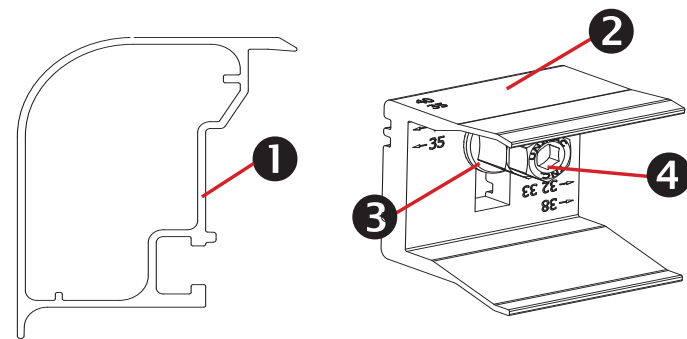


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CONTRACTOR:
BRS FIELD OPS
385.498.6700



Trimrail™ and Module Clips

Sub-Components:

1. Trim Rail
2. Module Clip
3. T-Bolt
4. Tri-Drive Nut

Trimrail™

Functions:

- Required front row structural support (with module clips)
- Module mounting
- Installation aid
- Aesthetic trim

Features:

- Mounts directly to L-feet
- Aligns and captures module leading edge
 - Supports discrete module thicknesses from 32, 33, 35, 38, and 40mm

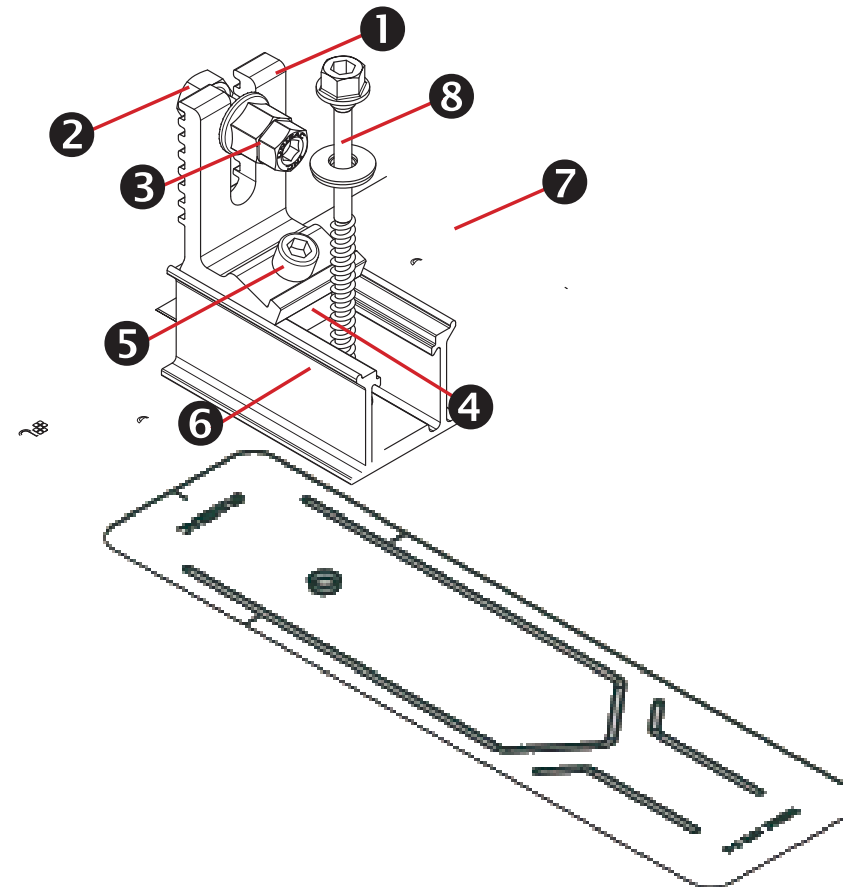
Module Clips

Functions:

- Required front row structural support (with trimrail)
- Module mounting

Features:

- Mounts to Trimrail™ with T-bolt and tri-drive nut
- Manually adjustable to fit module thicknesses 32, 33, 35, 38, and 40mm.



Trimrail™ Flashkit

Sub-Components:

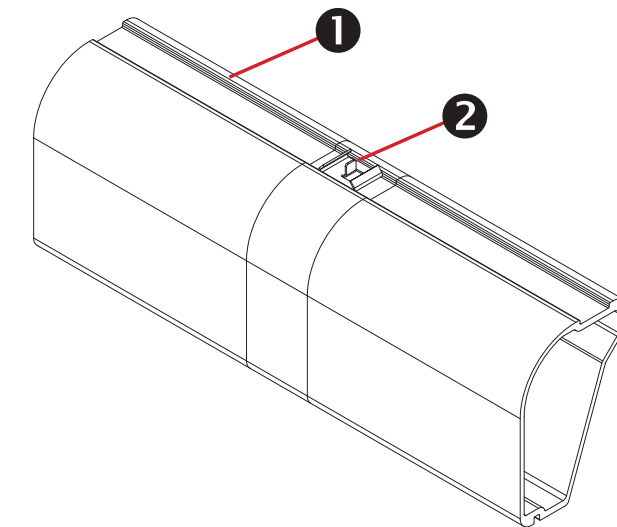
- L-Foot
- Hex bolt
- Tri-drive nut
- Channel Nut
- Socket Head Cap Screw
- 3\" Channel/Slider w/grommet
- 3\" Wide Flashing
- Structural Screw & SS EPDM Washer

Functions:

- Attach Trimrail™ to roof attachment / flashing
- Patented roof sealing technology at roof attachment point

Features:

- Slot provides vertical adjustments to level array
- Slider provides north/south adjustment along the slope of the roof
- Shed and Seal Technology



Trimrail™ Splice

Sub-Components:

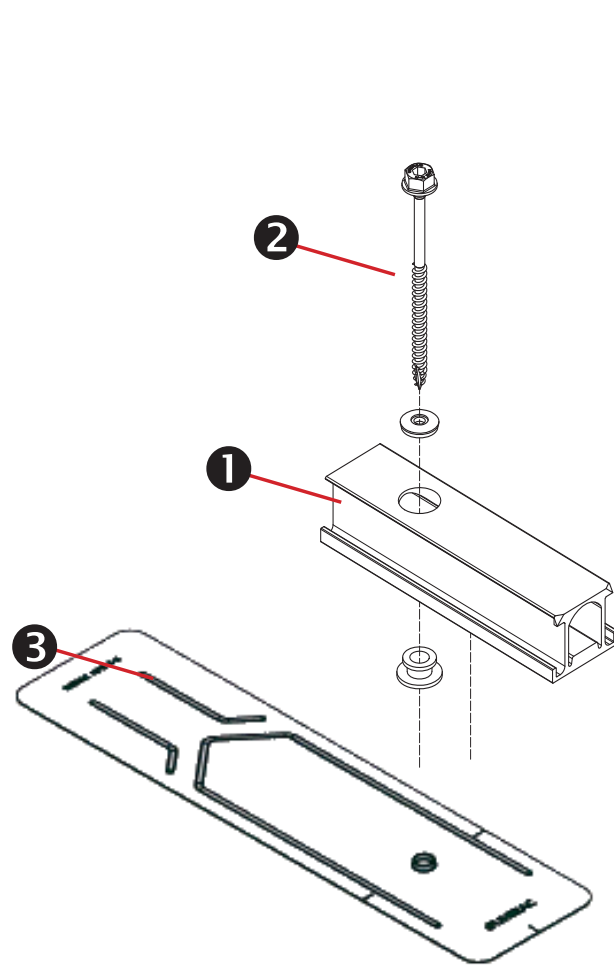
1. Structural Splice Extrusion
2. Bonding Clip

Functions:

- Front row structural support
- Installation aid
- Structurally connects 2 pieces of Trimrail™
- Electrically bonds 2 pieces of Trimrail™

Features:

- Aligns and connects Trimrail™ pieces
- Tool-less installation



SFM Slider Flashkit

Sub-Components:

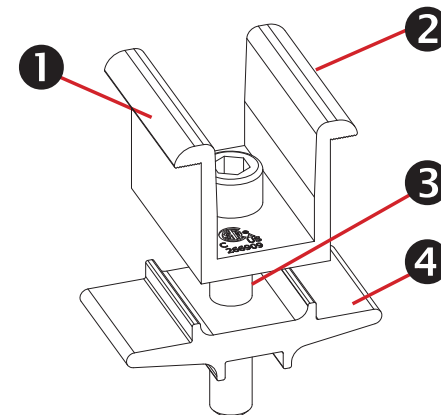
1. Slider w/grommet
2. Structural Screw & SS EPDM washer
3. 3" Wide Flashing

Functions:

- Patented Shed & Seal roof sealing technology at roof attachment point
- For use with compatible 2" Microrail or 8" Attached Splices

Features:

- Slider provides north/south adjustment along the slope of the roof
- Shed and Seal Technology



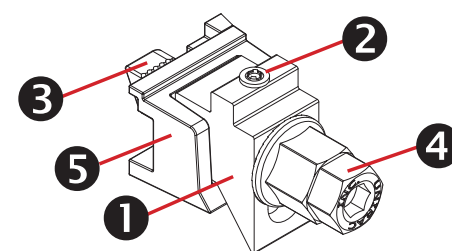
Module-to-Module N-S Bonding

Sub-Components:

1. Clamp
2. Bonding Pins (2)
3. 5/16" Socket Head Cap Screw
4. Clamp Base

Functions/ Features:

- Row to row bonding
- Single Use Only
- Fits module sizes 32-40mm



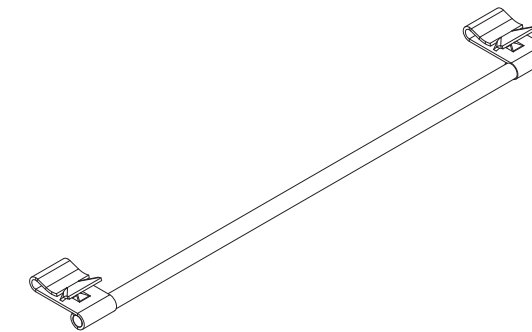
Trim -to- Module Bonding Clamp and Floating Trim Clamp

Sub-Components:

1. Wedge
2. Bonding Pin
3. T-Bolt
4. Nut
5. Cast Base

Functions/ Features:

- Module to Trimrail™ bonding - single use only
- Attaches Trimrail™ to module when fewer than 2 rafter attachment points are available
- Fits module sizes 32-40mm
- Fits module sizes 32-40mm



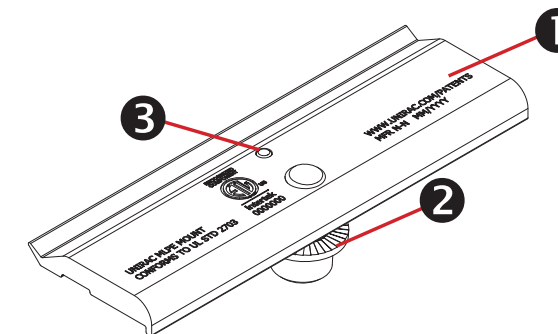
Wire Bonding Clip w/ 8AWG

Functions:

- Row to row bonding
- Module to Trimrail™ bonding
- Single Use Only

Features:

Tool-less installation



MLPE Mounting Assembly

Sub-Components:

1. MLPE Mount Base
2. 5/16 Socket Head Cap Screw
3. Bonding Pin

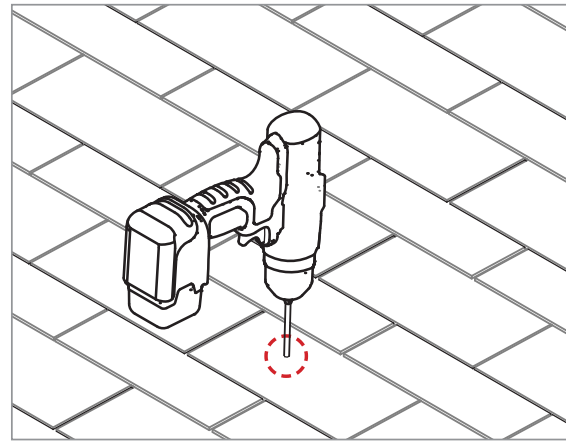
Functions:

- Securely mounts MLPE to module frames
- MLPE to module bonding

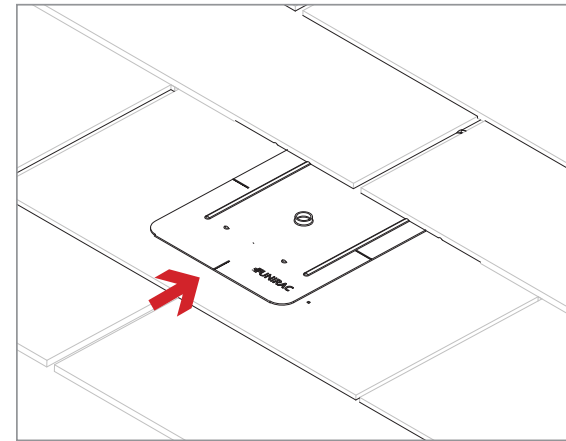
Features:

- Mounts easily to typical module flange
- UL2703 Recognized

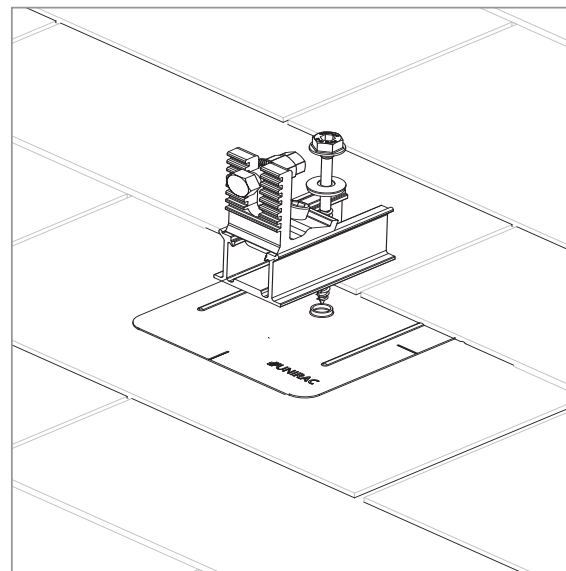
MLPE = Module Level Power Electronics,
e.g. microinverter or power optimizer



PILOT HOLES:
Drill pilot holes for lag screws or structural screws (as necessary) at marked attachment points



FLASHINGS:
Place flashings



INSTALL SLIDERS AND TRIMRAIL ROOF ATTACHMENTS:

- Insert flashings per manufacturer instructions

NOTE: Use Lag screw or structural fastener with a maximum diameter of 5/16"

- Attach sliders to rafters
- Verify proper row to row spacing for module size (Mod NS + 1")
- Ensure that Trimrail™ roof attachments in each row have sufficient engagement with slider dovetails for proper attachment.

