PRINCIPAL Engineering

1011 N Causeway Blvd, Suite 19 ♦ Mandeville, Louisiana 70471 ♦ Phone: 985.624.5001 ♦ Fax: 985.624.5303

MARCH 2023

Property Owner: JOHN MASON

Property Address: 1004 FARNELL RD, LAKE CITY, FL 32024

RE: Goundmount Installation

The photovoltaic ground mount structure offered by Unirac is found to be of sufficient capacity for the design loads when installed in accordance with the drawings and calculations attached, and manufacturer's instructions. The foundation shall be installed as marked on the drawings to the depth specified in the drawing table. To the best of my professional knowledge and belief, the product and system installation will be in compliance with all state and local building codes and guidelines at the time of our review.

Evaluation Criteria:

Windspeed: 120
Applied Codes: ASCE 7-16 FBC 2020 NEC 2017
Risk Category: II
Wind Exposure Category: B
Ground Snow Load: 0 PSF
Footing Depth: 6.91'
N-S Leg Spacing: 81.29" E-W Leg Spacing: 67.60"

This item has been digitally signed and sealed by Henry I. DiFranco, Jr., P.E. on **March 16, 2023**
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Connection of Array to Ground:

Manufacturer: UNIRAC
Model: ULA (Unirac Large Array)
Foundation Type: Drilled Cast-In-Hole Concrete Pile

Limitations

Unirac's ground mount system is to be installed per manufacturer's specifications and in accordance with accepted industry-wide safety standards. Electrical engineering is beyond our scope of the installation.

PRINCIPAL ENGINEERING, INC.
1011 N. CAUSEWAY BLVD. STE 19
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FLORIDA FIRM NO. 30649

NEW PHOTOVOLTAIC SYSTEM 9.48 KW DC
1004 FARNELL RD, LAKE CITY, FL 32024

PRINCIPAL Engineering

SDVOSB

GENERAL NOTES

1.1.1 PROJECT NOTES:
1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION
1.1.4 GROUND FAULT DETECTION AND INTERRUPTION (GFDI) DEVICE IS INTEGRATED WITH THE MICRO-INVERTER IN ACCORDANCE WITH NEC 690.41(B)
1.1.5 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4: PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY
1.1.6 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
1.1.7 ALL INVERTERS, PHOTOVOLTAIC MODULES,PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4. SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].
1.1.8 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

1.2.1 SCOPE OF WORK:
1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR GROUND-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT

1.3.1 WORK INCLUDES:
1.3.2 PV RACKING SYSTEM INSTALLATION - UNIRAC SOLAR
1.3.3 PV MODULE AND INVERTER INSTALLATION - CANADIAN SOLAR INC. CS3N-395MS / ENPHASE IQ8PLUS-72-2-US INVERTER
1.3.4 PV EQUIPMENT GROUND MOUNT
1.3.5 PV SYSTEM WIRING TO A GROUND-MOUNTED JUNCTION BOX
1.3.6 PV LOAD CENTERS (IF INCLUDED)
1.3.7 PV METERING/MONITORING (IF INCLUDED)
1.3.8 PV DISCONNECTS
1.3.9 PV GROUNDING ELECTRODE & BONDING TO (E) GEC
1.3.10 PV FINAL COMMISSIONING
1.3.11 (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV
1.3.12 SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE

PROJECT INFORMATION

OWNER
NAME: JOHN MASON

CONTRACTOR NAME
ADT SOLAR LLC
PHONE: 5052180838

SCOPE OF WORK
SYSTEM SIZE: STC:24 X 395W= 9.48 kW DC
PTC: 24 x 372.75W = 8.95 kW DC
(24) CANADIAN SOLAR INC. CS3N-395MS
(24) ENPHASE IQ8PLUS-72-2-US

ATTACHMENT TYPE: GROUND MOUNT
MSP UPGRADE: NO
UTILITY METER UPGRADE: NO

AUTHORITIES HAVING JURISDICTION
BUILDING: COLUMBIA COUNTY OF (FL)
ZONING: COLUMBIA COUNTY OF (FL)
UTILITY: CLAY ELECTRIC COOPERATIVE, INC (FL)
METER NO: 156 220 741

DESIGN SPECIFICATION
OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: REFER STRUCTURAL LETTER
WIND EXPOSURE: REFER STRUCTURAL LETTER
WIND SPEED: 120 MPH

APPLICABLE CODES & STANDARDS
BUILDING: IBC 2018, IRC 2018, FBC 2020 (7TH EDITION)
ELECTRICAL: NEC 2017
FIRE: IFC 2020

VICINITY MAP

SATELLITE VIEW

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R-007	RESOURCE DOCUMENT
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R-009	RESOURCE DOCUMENT
R-010	RESOURCE DOCUMENT
R-011	RESOURCE DOCUMENT

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE
DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

HENRY I. DIFRANCO, JR. LICENSE No. 71950 STATE OF FLORIDA PROFESSIONAL ENGINEER

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SHEET TITLE

COVER PAGE

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

G-001

2.1.1 SITE NOTES:

2.1.2 A LADDER WILL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2.1.3 THE PV MODULESARECONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
2.1.4 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
2.1.5 PROPERACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PERSECTION NEC 110.26.
2.1.6 ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.
2.2.1 EQUIPMENT LOCATIONS:

2.2.2 ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.
2.2.3 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).
2.2.4 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.
2.2.5 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
2.2.6 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
2.2.7 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

2.3.1 STRUCTURAL NOTES:

2.3.2 RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUSTALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAI MANUFACTURER'S INSTRUCTIONS.
2.3.3 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.
2.3.4 ROOFTOP PENETRATIONS FOR PV RACEWAY WILLBE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.
2.3.5 ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.
2.3.6 WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.

2.4.1 WIRING & CONDUIT NOTES:

2.4.2 ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS AREBASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
2.4.3 CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
2.4.4 VOLTAGE DROP LIMITED TO 1.5%.
2.4.5 DC WIRING LIMITED TO MODULE FOOTPRINT. MICROINVERTER WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY W/ SUITABLE WIRING CLIPS.
2.4.6 AC CONDUCTORS COLORED OR MARKED AS FOLLOWS: PHASE A OR L1- BLACK PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE PHASE C OR L3- BLUE, YELLOW, ORANGE**, OR OTHER CONVENTION NEUTRAL- WHITE OR GREY IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].

2.5.1 GROUNDING NOTES:

2.5.2 GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVISES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.
2.5.3 PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.
2.5.4 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).
2.5.5 EQUIPMENT GROUNDING CONDUCTORS SHALLBE SIZED ACCORDING TO NEC 690.45 AND MICROINVERTER MANUFACTORERS' INSTRUCTIONS.
2.5.6 EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURERDOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.
2.5.7 THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OFA MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.
2.5.8 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]
2.5.9 THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.
2.5.10 GROUND-FAULT DETECTION SHALL COMPLY WITH NEC 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS

2.6.1 DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:
2.6.2 DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHENTHE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARECONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).
2.6.3 DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
2.6.4 PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D).
2.6.5 ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.
2.6.6 MICROINVERTER BRANCHES CONNECTED TO A SINGLE BREAKER OR GROUPED FUSES IN ACCORDANCE WITH NEC 110.3(B).
2.6.7 IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.

2.7.1 INTERCONNECTION NOTES:

2.7.2 LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 705.12 (B)]
2.7.3 THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(B)(2)(3)(b)].
2.7.4 THE SUM OF 125 PERCENT OF THE POWER SOURCE(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, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(B)(2)(3)].
2.7.5 AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (B)(2)(3)(C).
2.7.6 FEEDER TAP INTERCONECTION (LOADSIDE) ACCORDING TO NEC 705.12 (B)(2)(1)
2.7.7 SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42
2.7.8BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (B)(5)].

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE
DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

HENRY I. DIFRANCO, JR. LICENSE No. 71950 STATE OF FLORIDA PROFESSIONAL ENGINEER

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FLORIDA FIRM NO. 30649

SHEET TITLE

NOTES

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

G-002

(24) CANADIAN SOLAR INC. CS3N-395MS
(24) ENPHASE IQ8PLUS-72-2-US

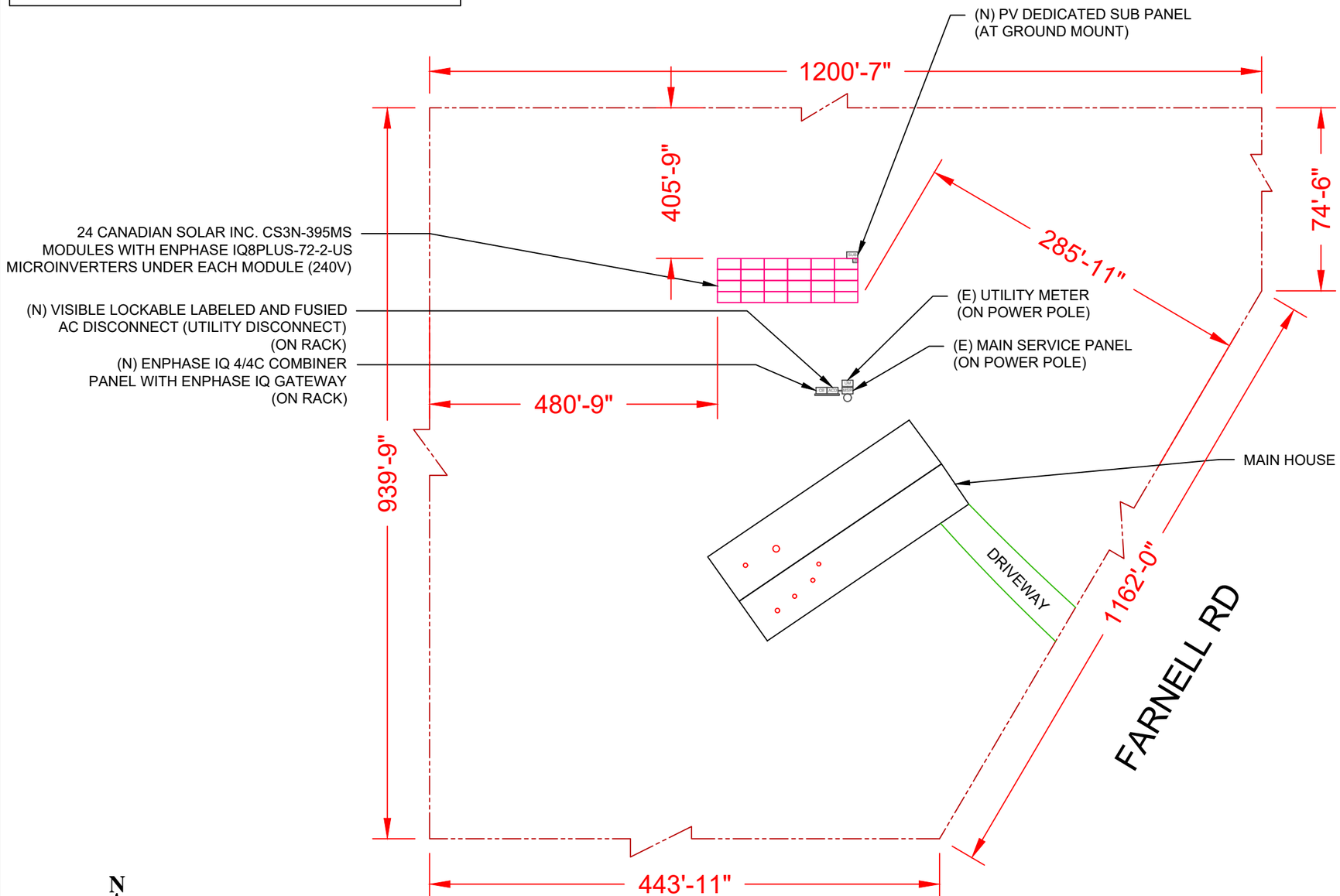
ADDRESS : 1004 FARNELL RD
CITY ZIP : LAKE CITY, FL 32024

METER NO: 156 220 741

LEGEND

- FIRE SETBACK
- PROPERTY LINE
- JB - JUNCTION BOX
- SKYLIGHT (ROOF OBSTRUCTION)
- CHIMNEY (ROOF OBSTRUCTION)
- VENT, ATTIC FAN (ROOF OBSTRUCTION)

DC SIZE 24 X 395W = 9.480 kW DC-STC
AC SIZE 24X 290W = 6.960 kW AC



N
W E
S

1 SITE PLAN

SCALE: 1/32" = 1'-0"

TOTAL ARRAY SQUARE FOOTAGE IS: 525.84 FT²

CONTRACTOR

ADT Solar

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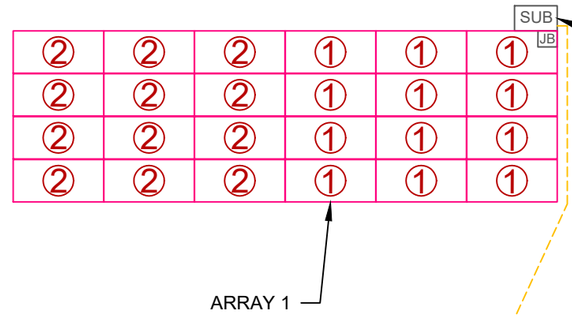
SHEET TITLE
SITE PLAN

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER
A-101

LEGEND

- FIRE SETBACK
- PROPERTY LINE
- JB - JUNCTION BOX
- SKYLIGHT (ROOF OBSTRUCTION)
- CHIMNEY (ROOF OBSTRUCTION)
- VENT, ATTIC FAN (ROOF OBSTRUCTION)



ARRAY(S)

ARRAY 1	TILT - 30° AZIMUTH - 180° MODULE - 24 SYSTEM SIZE (KW)- 9.48

① - MODULE STRING

② - MODULE STRING

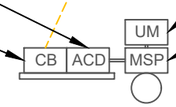
(N) 18" DEEP ,45 FEET APPROX TRENCH CONDUIT
(N)24" DEEP,45 TRENCH CONDUIT OR 24" DIRECT BURIAL

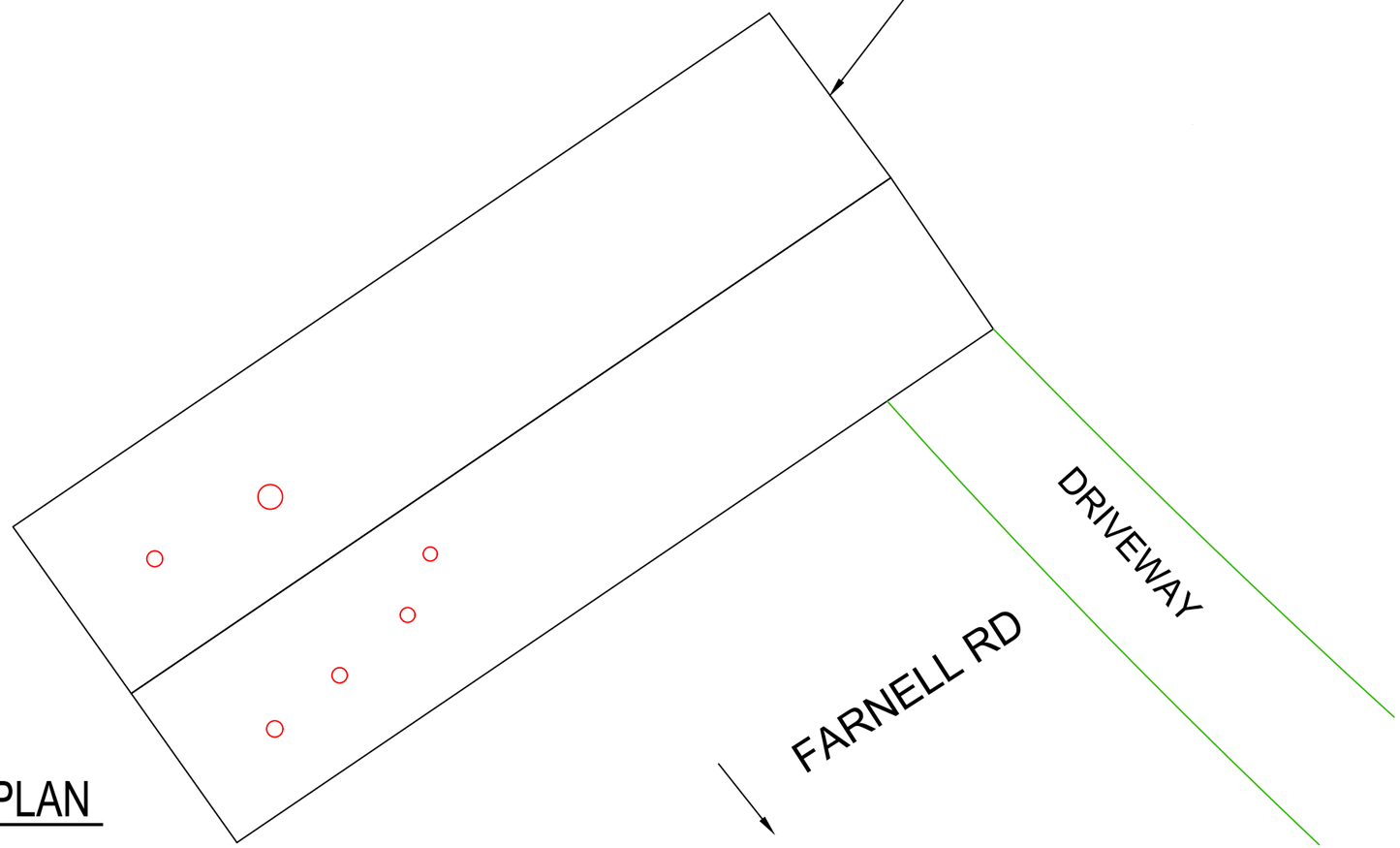
(N) VISIBLE LOCKABLE LABELED AND FUSIED AC DISCONNECT (UTILITY DISCONNECT) (ON RACK)

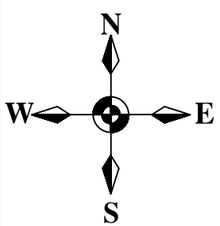
(N) ENPHASE IQ 4/4C COMBINER PANEL WITH ENPHASE IQ GATEWAY (ON RACK)

(E) UTILITY METER (ON POWER POLE)

(E) MAIN SERVICE PANEL (ON POWER POLE)







1 | ELECTRICAL PLAN

SCALE:3/32" = 1'-0"

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

NESTOR J. HOUGHTON LICENSE No. 64501 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Nestor J. Houghton, P.E. on **March 16, 2023** Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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SHEET TITLE

ELECTRICAL PLAN

DRAWN DATE	3/14/2023
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SHEET NUMBER

A-102

- CLAMP

- SM HD RAIL

- SQUARE BRACE

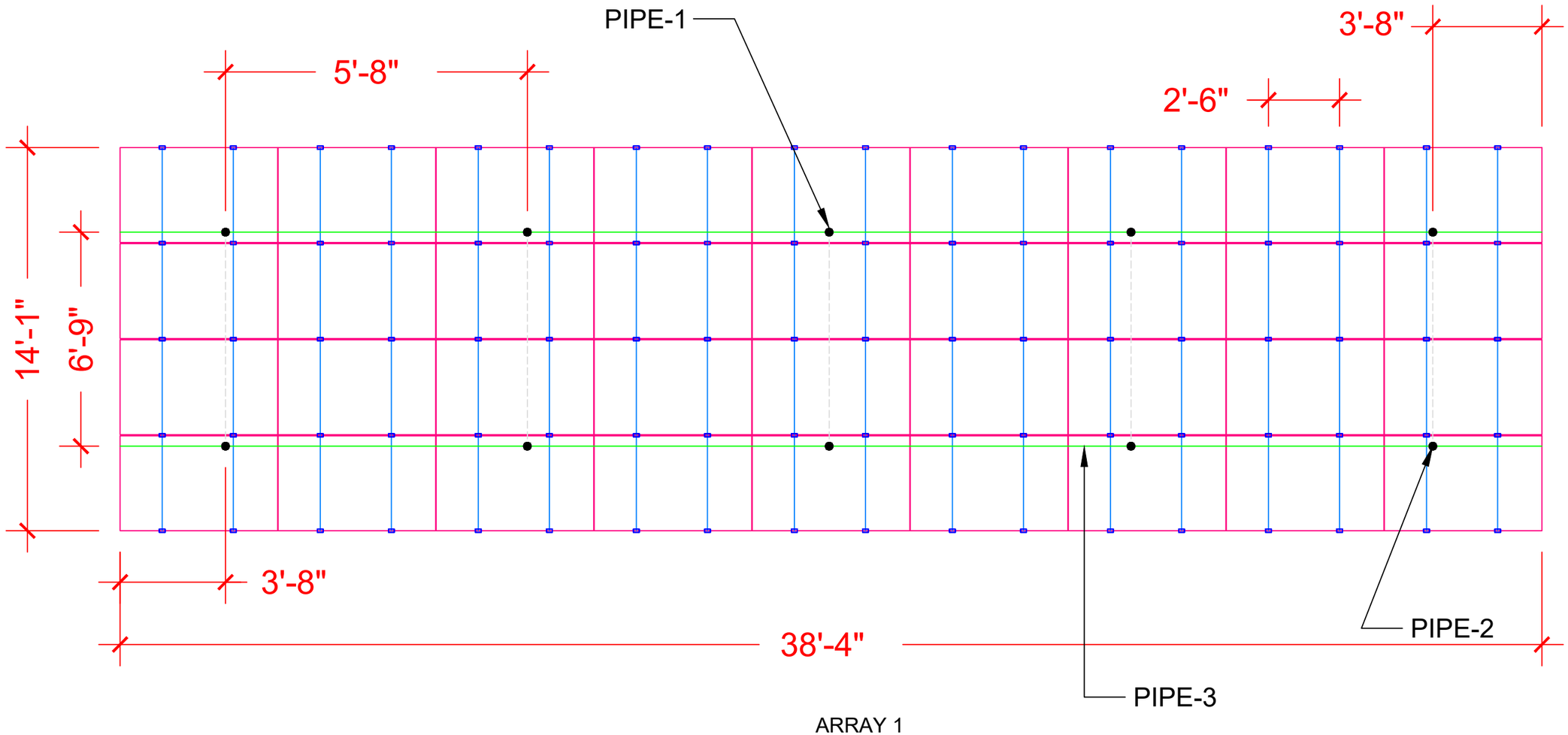
- PIPE-1,2 (2" SCH 40 GAL PIPE)

- PIPE 3 (2" SCH 40 GAL PIPE)

Note 1: Windspeed value is design 3-sec gust in accordance with ASCE 7-16

FOOTING DEPTH - 6.91'

FOOTING DIAMETER - 18.00"



ARRAY 1
TILT- 30 DEG
AZIMUTH - 180 DEG

1 ATTACHMENT PLAN

SCALE: 1/4"=1'-0"

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

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ATTACHMENT PLAN

DRAWN DATE	3/14/2023
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SHEET NUMBER

A-103

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	CANADIAN SOLAR INC. CS3N-395MS
VMP	37.0V
IMP	10.68A
VOC	44.3V
ISC	11.44A
TEMP. COEFF. VOC	-0.26%/°C
MODULE DIMENSION	76.4"L x 41.3"W x 1.38"D (In Inch)

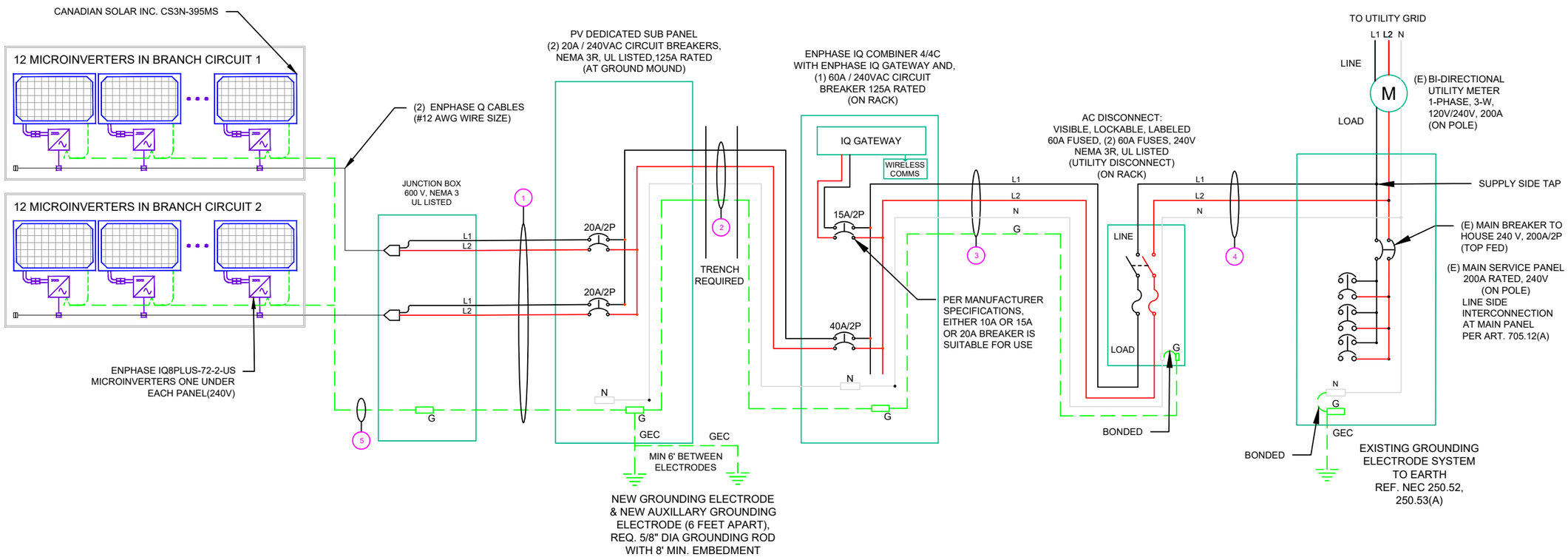
INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ8PLUS-72-2-US MICROINVERTER
MIN/MAX DC VOLT RATING	30V MIN/ 58V MAX
MAX INPUT POWER	235W-440W
NOMINAL AC VOLTAGE RATING	240V/ 211-264V
MAX AC CURRENT	1.21A
MAX MODULES PER STRING	13 (SINGLE PHASE)
MAX OUTPUT POWER	290 VA

DC SIZE 24 X 395W = 9.480 kW DC-STC
AC SIZE 24X 290W = 6.960 kW AC

WIRE /CONDUIT SCHEDULE	
TAG	DESCRIPTION
1	(4)#10 THWN-2 ON EXTERIOR & (1)#10 THWN-2 GROUND / (GN)
2	(3)#6 THWN-2 & (1)#10 THWN-2 GROUND /(GN) (IN TRENCH 18" DEEP, 45 FEET APPROX. CONDUIT) (3)#4 USE-2 AL & (1)#8 USE-2 AL DIRECT BURIAL (IN TRENCH 24" DEEP, 45 FEET APPROX. CONDUIT)
3	(3)#6 THWN-2 & (1)#10 THWN-2 GROUND / (GN)
4	(3)#6 THWN-2 / (GN)
5	(1)#6 BARE GROUND

(GN) GENERAL CONDUIT NOTE :
CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV PROTECTED (EX. -EMT,SCH 80 PVC OR RMC)*FMC MAYBE USED IN INDOOR APPLICATIONS WHERE PERMITTED BY NEC ART .348

METER NO: 156 220 741



CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE
DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

NESTOR J. HOUGHTON LICENSE No. 64501 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Nestor J. Houghton, P.E. on **March 16, 2023**
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

PRINCIPAL ENGINEERING, INC.
1011 N. CAUSEWAY BLVD. STE 19
MANDEVILLE, LA 70471
985.624.5001
INFO@PI-AEC.COM
FLORIDA FIRM NO. 30649

SHEET TITLE

LINE DIAGRAM

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

E-601

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-5°
AMBIENT TEMP (HIGH TEMP 2%)	34°
CONDUIT HEIGHT	0.5"
CONDUCTOR TEMPERATURE RATE	90°

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS
.80	4-6
.70	7-9
.50	10-20

CALCULATIONS:

1. CURRENT CARRYING CONDUCTOR

(A) BEFORE PV DEDICATED SUB PANEL

AMBIENT TEMPERATURE - (34)°C ...NEC 310.15(B)(3)(c)
TEMPERATURE DERATE FACTOR - 0.96 ...NEC 310.15(B)(2)(a)
GROUPING FACTOR - 0.8...NEC 310.15(B)(3)(a)

CONDUCTOR AMPACITY
= (INV O/P CURRENT) x 1.25 / A.T.F / G.F ...NEC 690.8(B)
= [(12 x 1.21) x 1.25] / [0.96 x 0.8]
= 23.63A
SELECTED CONDUCTOR - #10 THWN-2 ...NEC 310.15(B)(16)

(B) AFTER PV DEDICATED SUB PANEL
TEMPERATURE DERATE FACTOR - 0.96
GROUPING FACTOR - 1

CONDUCTOR AMPACITY
= (TOTAL INV O/P CURRENT) x 1.25 / 0.96/ 1 ...NEC 690.8(B)
= [(24 x 1.21) x 1.25] / [0.96 x 1]
= 37.81 A
SELECTED CONDUCTOR - #6 THWN-2 ...NEC 310.15(B)(16)

(C) AFTER IQ COMBINER PANEL
TEMPERATURE DERATE FACTOR - 0.96
GROUPING FACTOR - 1

CONDUCTOR AMPACITY
= (TOTAL INV O/P CURRENT) x 1.25 / 0.96/ 1 ...NEC 690.8(B)
= [(24 x 1.21) x 1.25] / [0.96 x 1]
= 37.81 A
SELECTED CONDUCTOR - #6 THWN-2 ...NEC 310.15(B)(16)

2. PV OVER CURRENT PROTECTION ...NEC 690.9(B)

= TOTAL INVERTER O/P CURRENT x 1.25
= (24 x 1.21) x 1.25 = 36.30 A

3. VOLTAGE DROP CALCULATION

VOLTAGE DROP= (0.2 x LENGTH OF CONDUCTOR x CURRENT x RESISTANCE IN CONDUCTOR) / 240
= (0.2 x 45 x 29.04 x 0.49 (FOR #6 AWG WIRE)) / 240
= 0.53%

VOLTAGE DROP IS WITHIN PERMISSIBLE LIMIT OF 2%.HENCE OK

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FLORIDA FIRM NO. 30649

SHEET TITLE
ELECTRICAL CALCULATIONS

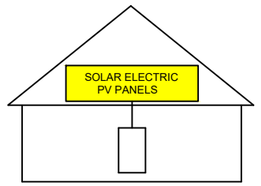
DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER
E-602

WARNING: PHOTOVOLTAIC POWER SOURCE

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



AC DISCONNECT

AC COMBINER BOX

PHOTOVOLTAIC MICROINVERTERS LOCATED UNDER EACH PV MODULE IN ROOFTOP ARRAY

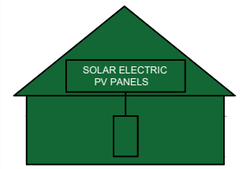
PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

RATED AC OUTPUT CURRENT:____
NOM. OPERATING VOLTAGE:____

⚠ WARNING ⚠
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE 'OFF' POSITION TO SHUTDOWN ENTIRE PV SYSTEM.



THE LABEL SHALL BE REFLECTIVE, WITH ALL LETTERS CAPITALIZED AND HAVING A MINIMUM HEIGHT OF 3/8 IN. (9.5 MM), IN WHITE ON A RED BACKGROUND.

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

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

PHOTOVOLTAIC SYSTEM AC DISCONNECT
OPERATING VOLTAGE: 240 VOLTS
OPERATING CURRENT: 29.04 AMPS

_____KW SOLAR DISCONNECT LOCATED

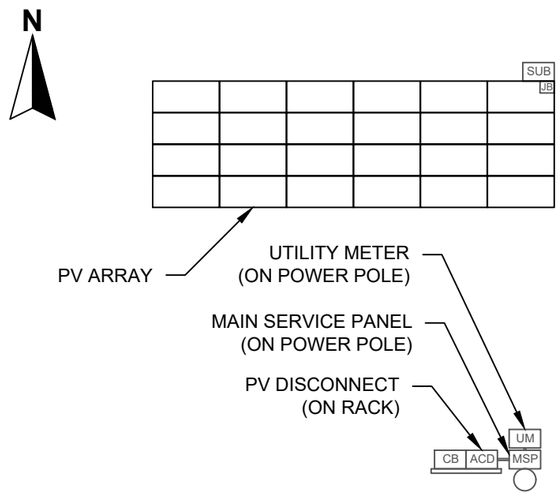
SOLAR CONNECTION LINE SIDE TAP

___ FT ←

→ FT ___

CAUTION

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



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FLORIDA FIRM NO. 30649

SHEET TITLE

PLACARD

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

E-603

NEW

CanadianSolar

HiKuBlack Mono PERC

BLACK FRAME ON BLACK BACKSHEET

F23 Frame

380 W ~ 405 W

CS3N-380|385|390|395|400|405MS

MORE POWER

- 405 W — Module power up to 405 W
  Module efficiency up to 19.9 %
- Lower LCOE & BOS cost
- Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation
- Better shading tolerance

MORE RELIABLE

- Minimizes micro-crack impacts
- Heavy snow load up to 8100 Pa, enhanced wind load up to 6000 Pa*

* For detailed information, please refer to Installation Manual.

- 25 Years — **Industry Leading Product Warranty on Materials and Workmanship***
- 25 Years — **Linear Power Performance Warranty***

1st year power degradation no more than 2%
Subsequent annual power degradation no more than 0.55%

*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on residential rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001: 2015 / Quality management system
ISO 14001: 2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE
FSEC (US Florida) / UL 61730 / IEC 61701 / IEC 62716

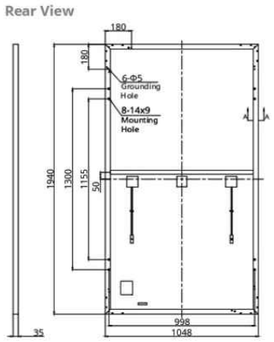
* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

CSI SOLAR (USA) CO., LTD. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 20 years, it has successfully delivered over 63 GW of premium-quality solar modules across the world.

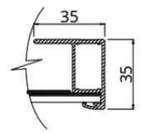
CSI SOLAR (USA) CO., LTD.
1350 Treat Blvd. Suite 500, Walnut Creek, CA 94598, USA | www.csisolar.com/na | service.ca@csisolar.com

ENGINEERING DRAWING (mm)

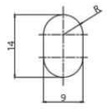
Rear View



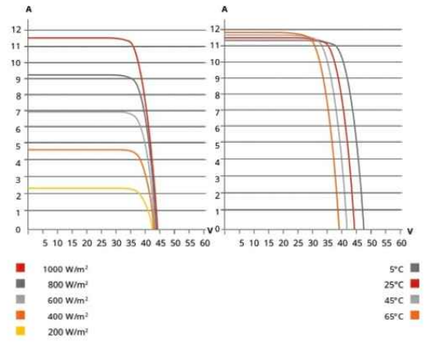
Frame Cross Section A - A



Mounting Hole



CS3N-400MS / I-V CURVES



ELECTRICAL DATA | STC*

CS3N	380MS	385MS	390MS	395MS	400MS	405MS
Nominal Max. Power (Pmax)	380 W	385 W	390 W	395 W	400 W	405 W
Opt. Operating Voltage (Vmp)	36.4 V	36.6 V	36.8 V	37.0 V	37.2 V	37.4 V
Opt. Operating Current (Imp)	10.44 A	10.52 A	10.60 A	10.68 A	10.76 A	10.83 A
Open Circuit Voltage (Voc)	43.7 V	43.9 V	44.1 V	44.3 V	44.5 V	44.7 V
Short Circuit Current (Isc)	11.26 A	11.32 A	11.38 A	11.44 A	11.50 A	11.56 A
Module Efficiency	18.7%	18.9%	19.2%	19.4%	19.7%	19.9%
Operating Temperature	-40°C ~ +85°C					
Max. System Voltage	1000V (UL)					
Module Fire Performance	TYPE 2 (UL 61730 1000V)					
Max. Series Fuse Rating	20 A					
Application Classification	Class A					
Power Tolerance	0 ~ + 10 W					

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

CS3N	380MS	385MS	390MS	395MS	400MS	405MS
Nominal Max. Power (Pmax)	284 W	288 W	291 W	295 W	299 W	303 W
Opt. Operating Voltage (Vmp)	34.0 V	34.2 V	34.4 V	34.6 V	34.7 V	34.9 V
Opt. Operating Current (Imp)	8.35 A	8.42 A	8.48 A	8.54 A	8.60 A	8.66 A
Open Circuit Voltage (Voc)	41.2 V	41.4 V	41.6 V	41.8 V	41.9 V	42.1 V
Short Circuit Current (Isc)	9.08 A	9.13 A	9.18 A	9.23 A	9.28 A	9.33 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	132 [2 X (11 X 6)]
Dimensions	1940 X 1048 X 35 mm (76.4 X 41.3 X 1.38 in)
Weight	23.4 kg (51.6 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	12 AWG (UL)
Cable Length (Including Connector)	Portrait: 400 mm (15.7 in) (+) / 280 mm (11.0 in) (-) (supply additional cable jumper: 2 lines/pallet); landscape: 1250 mm (49.2 in)*
Connector	T4 or MC4 series
Per Pallet	30 pieces
Per Container (40' HQ)	720 pieces

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.34 % / °C
Temperature Coefficient (Voc)	-0.26 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

PARTNER SECTION

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

Jan. 2022 | All rights reserved | PV Module Product Datasheet v2.9C25_F23_J3_NA

CONTRACTOR

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SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

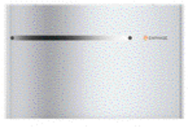
R-001

ENPHASE

DATA SHEET

IQ8 and IQ8+ Microinverters

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



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

Enphase 25 year limited warranty

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

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

Easy to install

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

High productivity and reliability

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

Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

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IQ8SP-DS-0002-01-EN-US-2021-10-19

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings[1]	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current[2] [module Isc]	A	15	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		**IQ8-60-2-US**	**IQ8PLUS-72-2-US**
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range[3]	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
Max units per 20 A (L-L) branch circuit[4]		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Acoustic noise at 1m		<60 dBA	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
Certifications		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, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility (2) Maximum continuous input DC current is 10.6A (3) Nominal 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.

IQ8SP-DS-0002-01-EN-US-2021-10-19

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SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-002

Data Sheet
Enphase Networking

Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C

X-IQ-AM1-240-4C

X-IQ-AM1-240-4

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

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CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

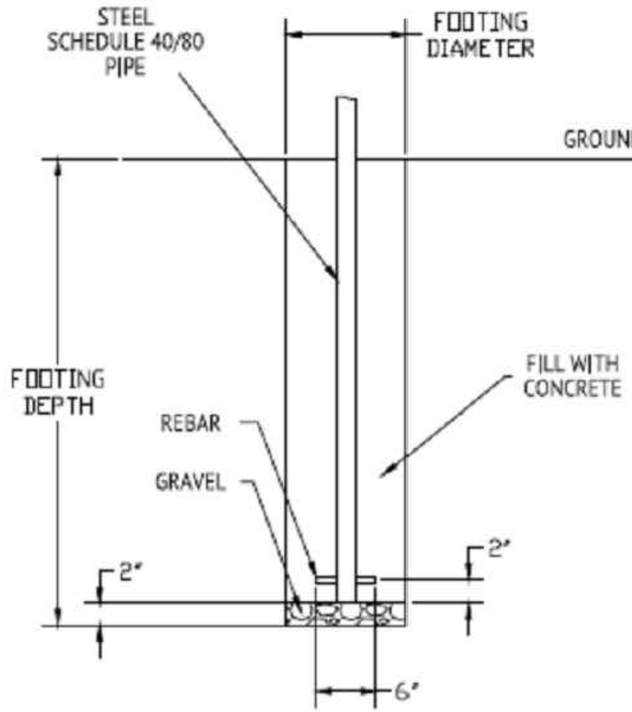
SYSTEM SIZE
DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-003



UNIRAC

1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA

WWW.UNIRAC.COM

PRODUCT LINE:	ULA
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	ULA FOUNDATION
REVISION DATE:	APRIL 2016

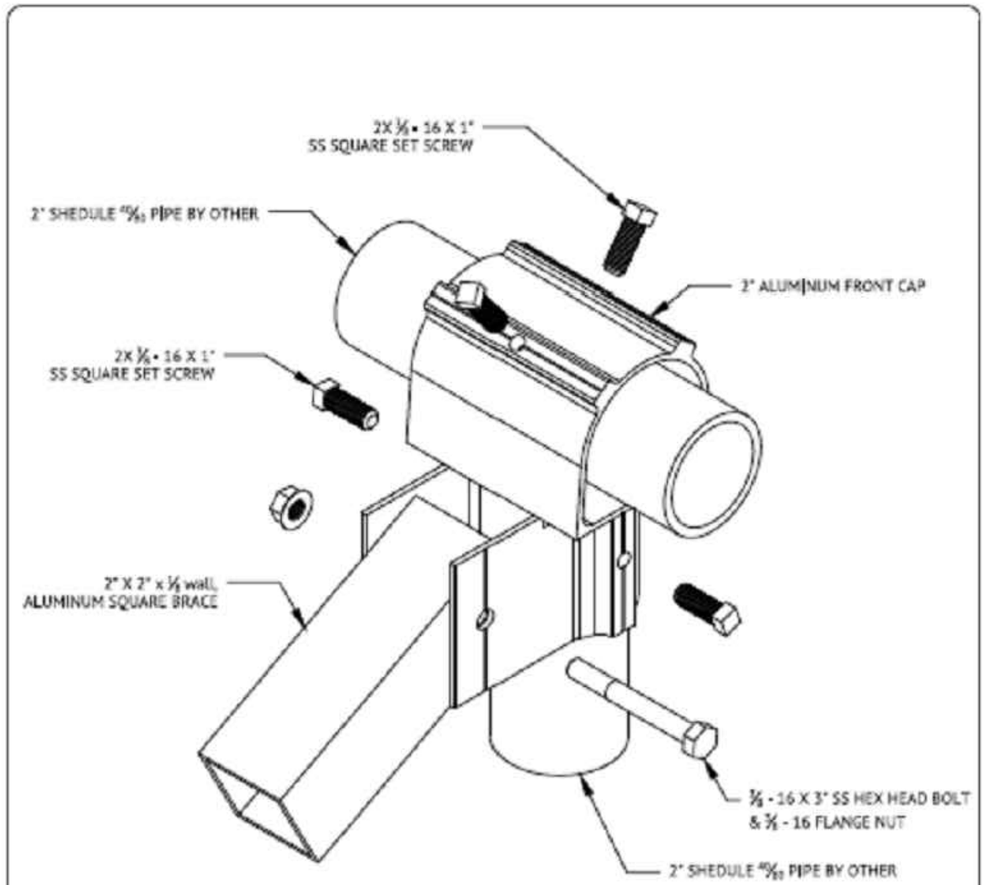
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS

LEGAL NOTICE

ULA-A03

SHEET



UNIRAC

1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA

WWW.UNIRAC.COM

PRODUCT LINE:	ULA
DRAWING TYPE:	PART
DESCRIPTION:	ALUM FRONT CAP
REVISION DATE:	APRIL 2016

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS

LEGAL NOTICE

ULA-A04

SHEET

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

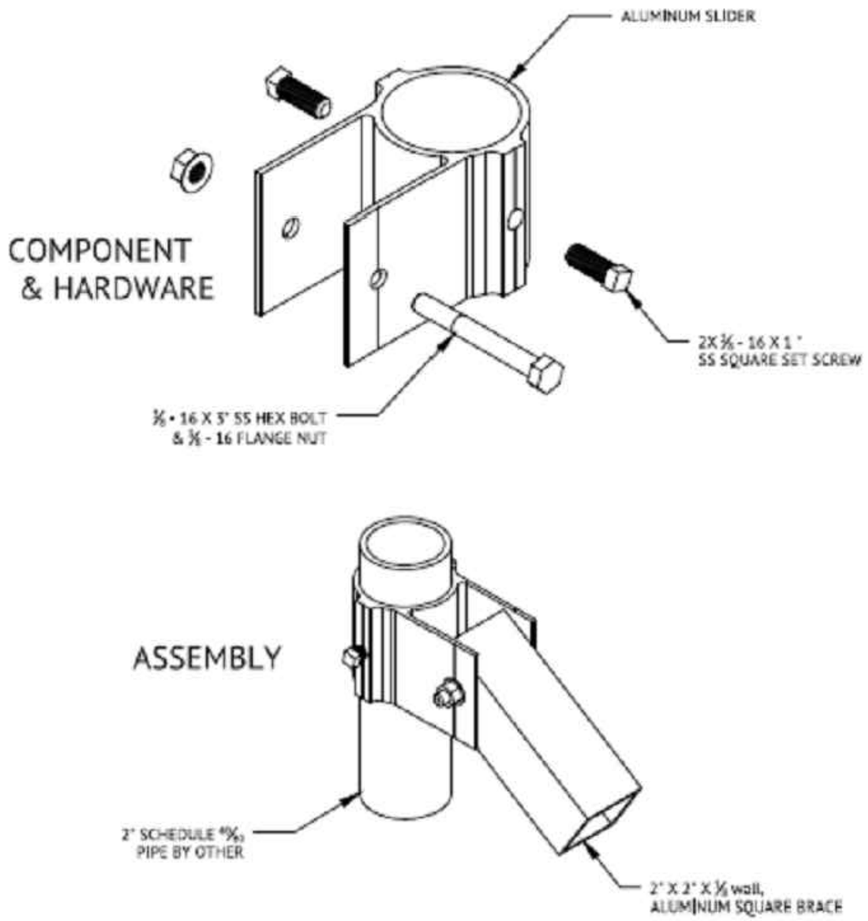
SHEET TITLE

RESOURCE DOCUMENT

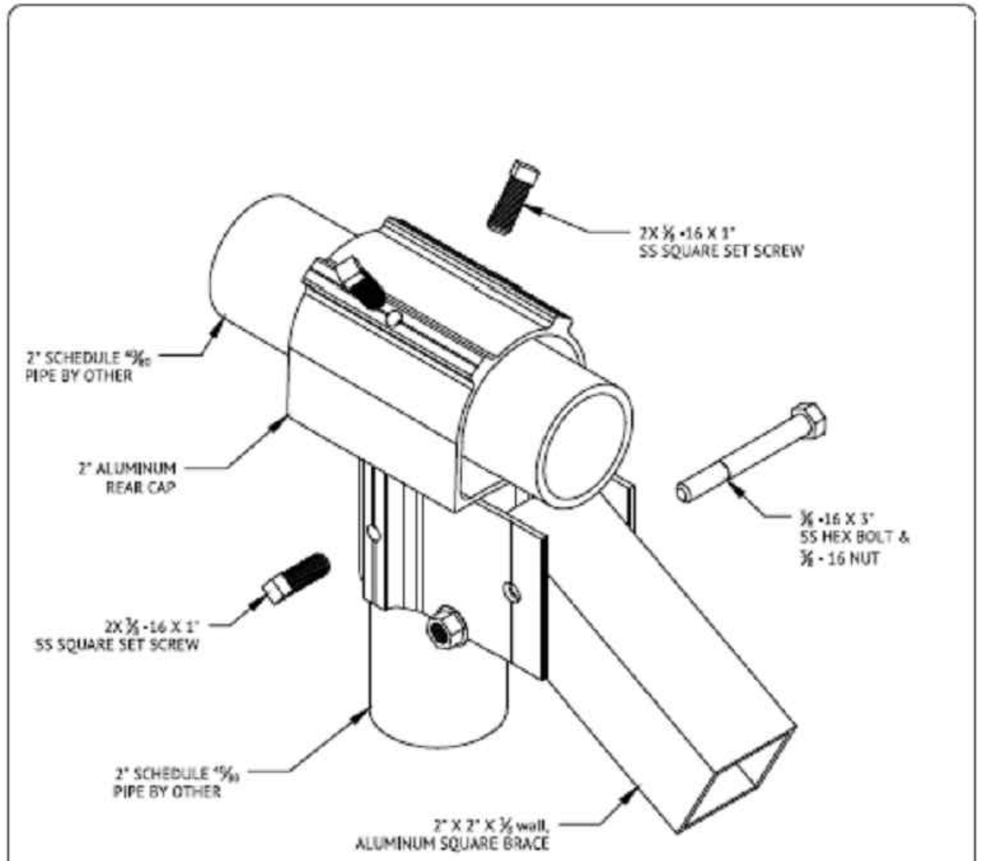
DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-004



UNIRAC	
1411 BROADWAY BLVD NE ALBUQUERQUE, NM 87102 USA	
WWW.UNIRAC.COM	
PRODUCT LINE:	ULA
DRAWING TYPE:	PART
DESCRIPTION:	ALUM SLIDER
REVISION DATE:	APRIL 2016
DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL	
PRODUCT PROTECTED BY ONE OR MORE US PATENTS	
LEGAL NOTICE	
ULA-A06	
SHEET	



UNIRAC	
1411 BROADWAY BLVD NE ALBUQUERQUE, NM 87102 USA	
WWW.UNIRAC.COM	
PRODUCT LINE:	ULA
DRAWING TYPE:	PART
DESCRIPTION:	ALUMINUM REAR CAP
REVISION DATE:	APRIL 2016
DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL	
PRODUCT PROTECTED BY ONE OR MORE US PATENTS	
LEGAL NOTICE	
ULA-A05	
SHEET	

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

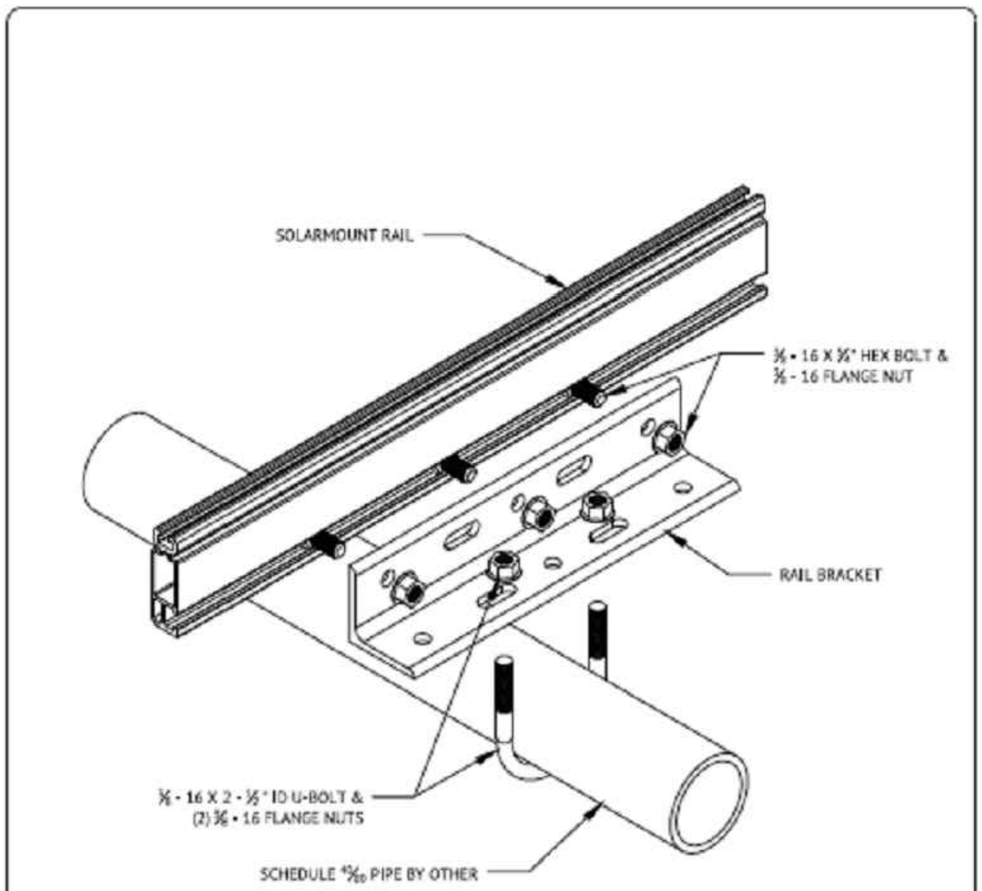
DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-005



UNIRAC

1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA
WWW.UNIRAC.COM

PRODUCT LINE:	ULA
DRAWING TYPE:	PART
DESCRIPTION:	UNIVERSAL RAIL BRACKET
REVISION DATE:	APRIL 2016

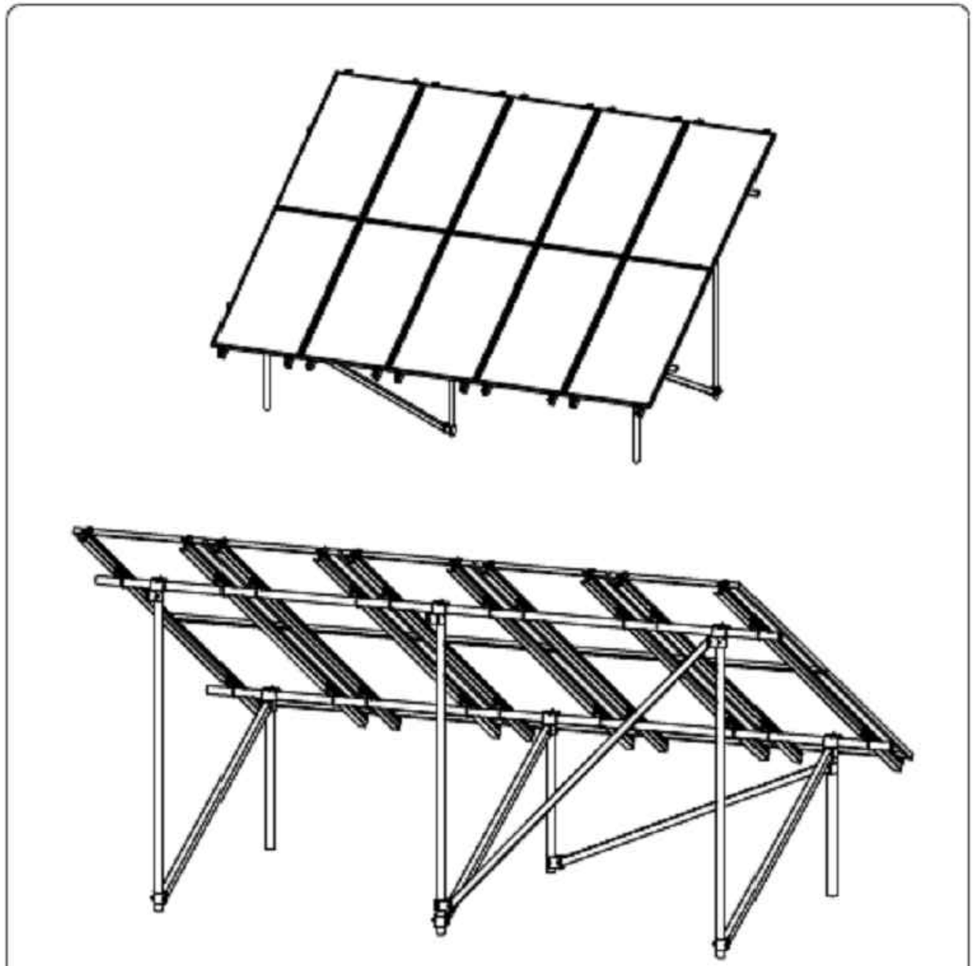
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS

LEGAL NOTICE

ULA-A07

SHEET



UNIRAC

1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA
WWW.UNIRAC.COM

PRODUCT LINE:	ULA
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	PORTRAIT ORIENTATION
REVISION DATE:	APRIL 2016

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS

LEGAL NOTICE

ULA-A08

SHEET

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

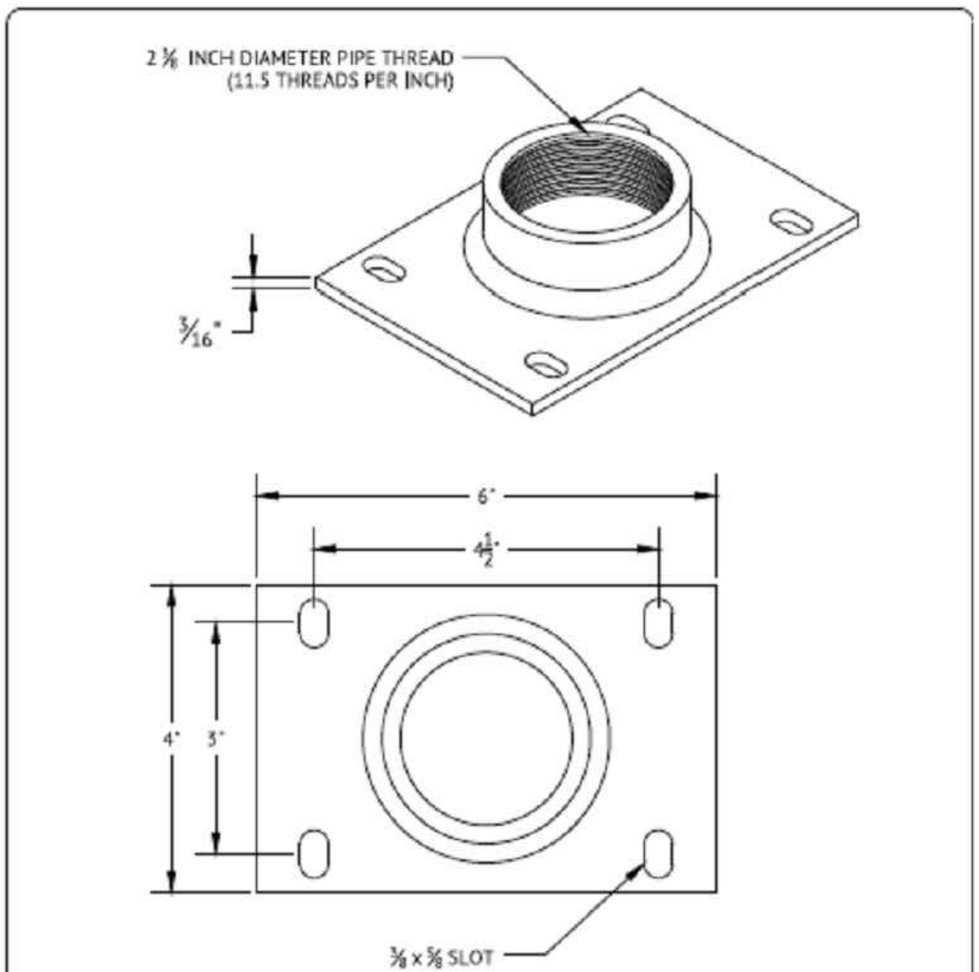
SHEET TITLE

RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-006



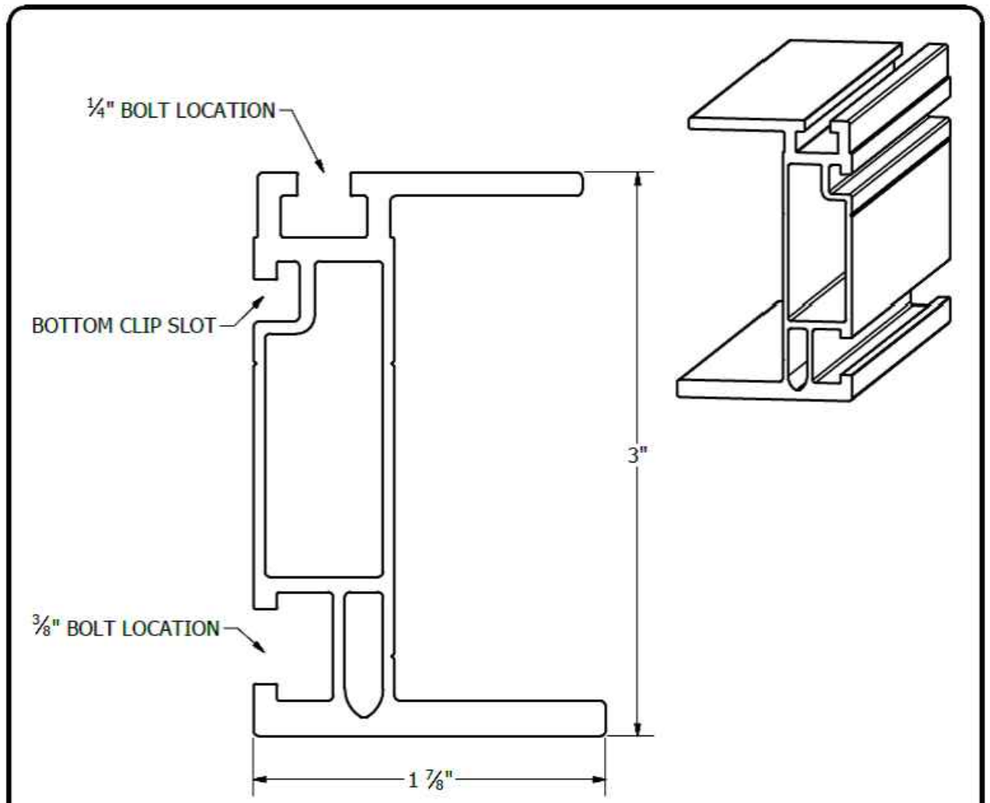
PRODUCT LINE:	ULA
DRAWING TYPE:	PART
DESCRIPTION:	STEEL THREADED FOOT
REVISION DATE:	APRIL 2016

UNIRAC
1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA
WWW.UNIRAC.COM

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

ULA-P01
SHEET



PART # TABLE		
P/N	DESCRIPTION	LENGTH
410144M	SMHD, RAIL 144" MILL	144"
410168M	SMHD, RAIL 168" MILL	168"
410204M	SMHD, RAIL 204" MILL	204"
410240M	SMHD, RAIL 240" MILL	240"

UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	HD RAIL
REVISION DATE:	9/11/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

SM-P03
SHEET

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

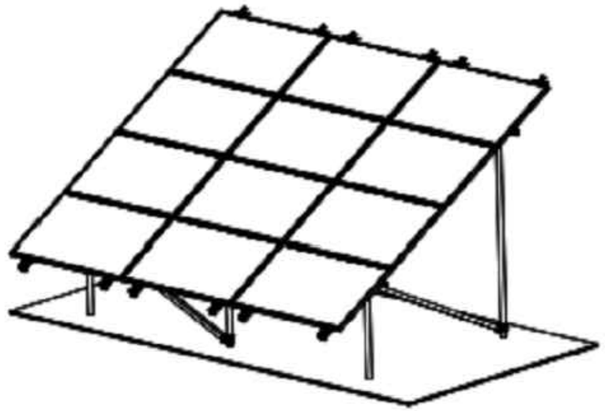
SYSTEM SIZE
DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

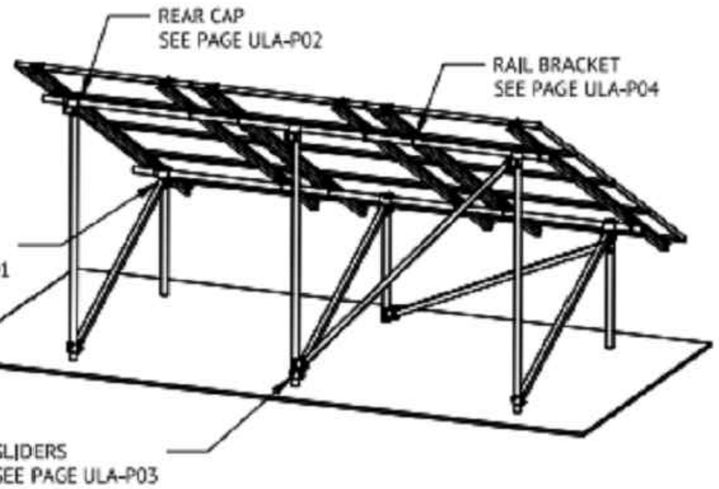
SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-007





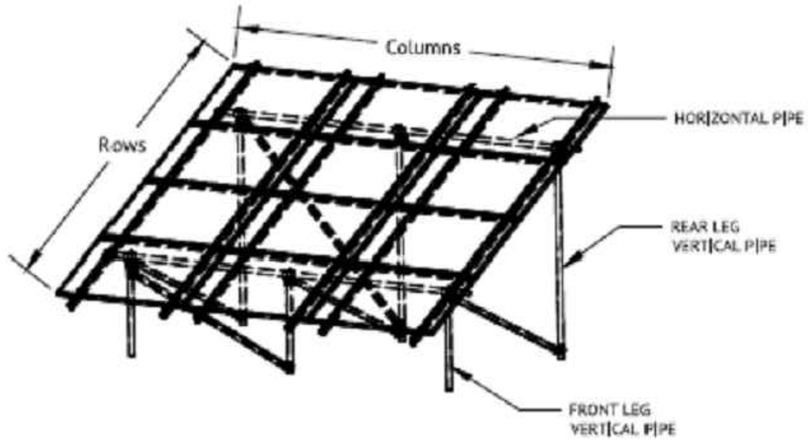
UNIRAC
1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA
WWW.UNIRAC.COM

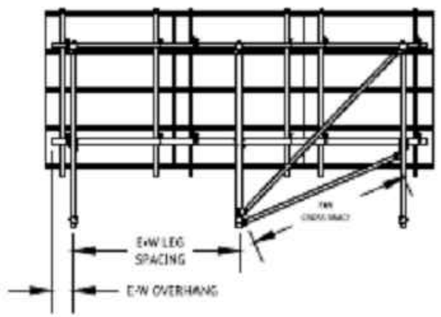
PRODUCT LINE:	ULA
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	ASSEMBLY EXAMPLE
REVISION DATE:	APRIL 2016

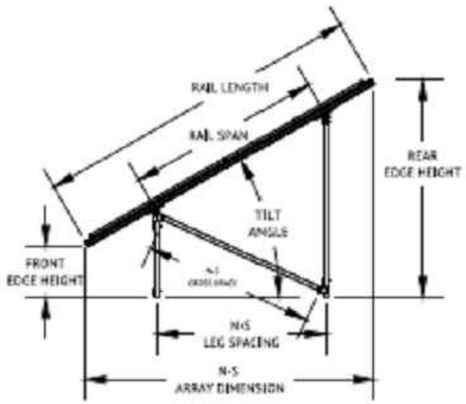
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

ULA-A01
SHEET







UNIRAC
1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA
WWW.UNIRAC.COM

PRODUCT LINE:	ULA
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	ASSEMBLY EXAMPLE
REVISION DATE:	APRIL 2016

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

ULA-A02
SHEET

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

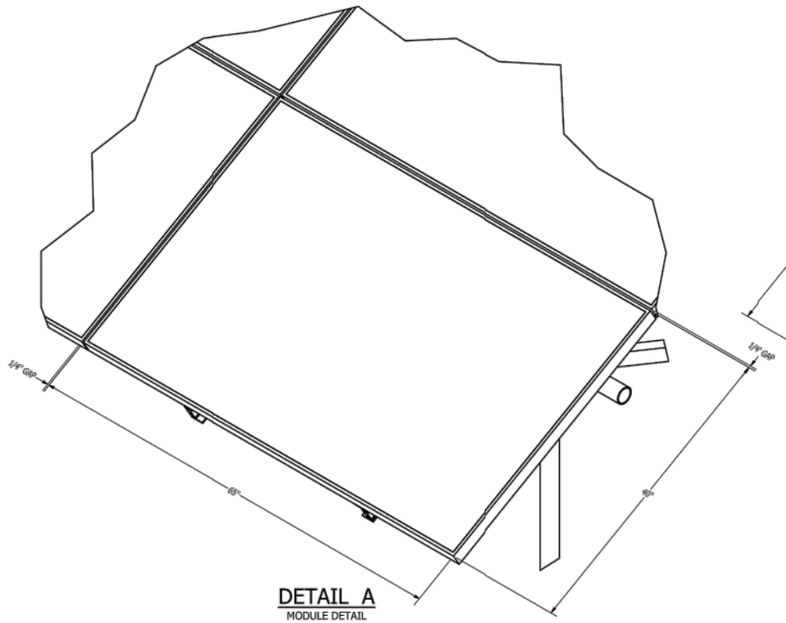
SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

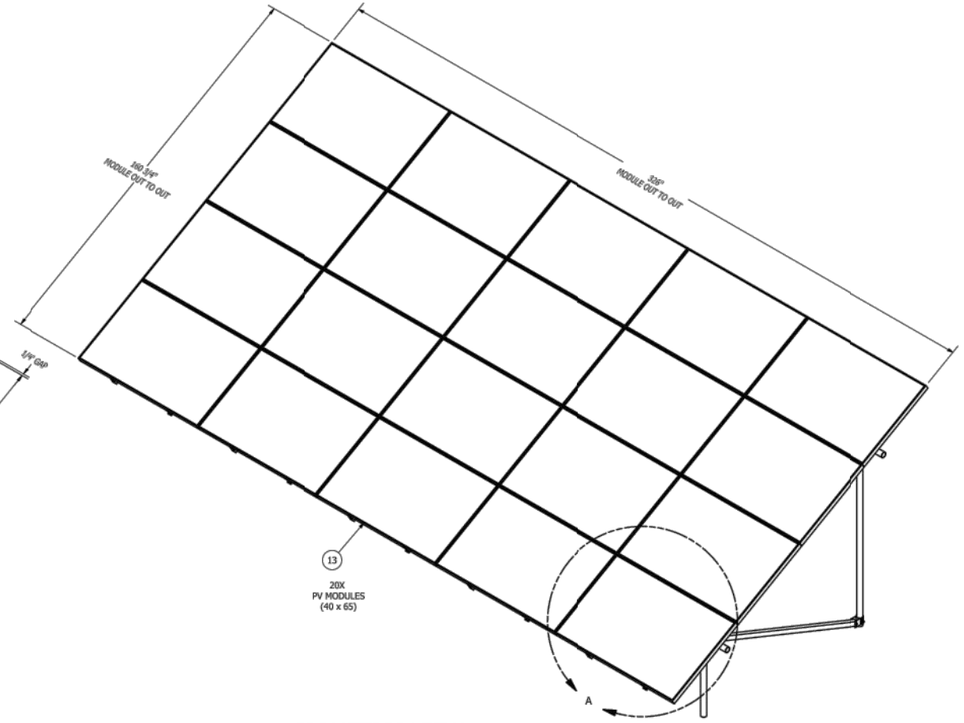
SHEET NUMBER

R-008

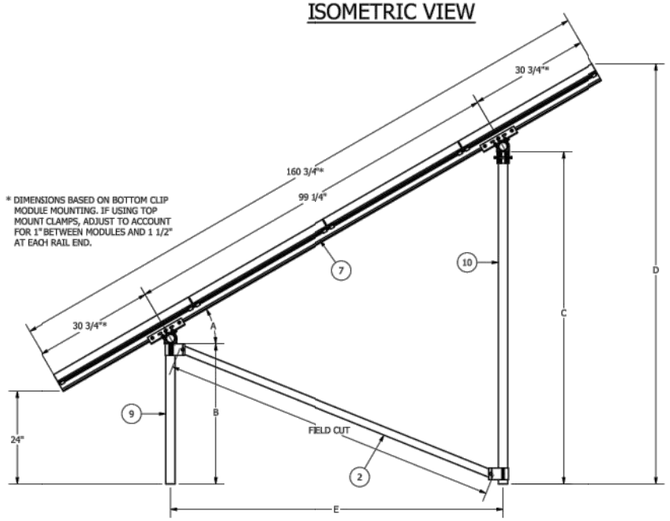
REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
A	ORIGINAL RELEASE	12/19/2011	AS



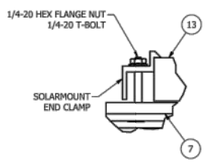
DETAIL A
MODULE DETAIL
SCALE 1 / 8



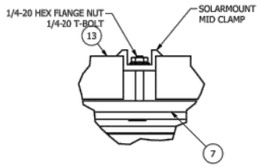
ISOMETRIC VIEW



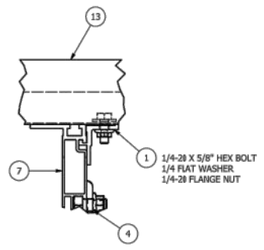
* DIMENSIONS BASED ON BOTTOM CLIP MODULE MOUNTING. IF USING TOP MOUNT CLAMPS, ADJUST TO ACCOUNT FOR 1" BETWEEN MODULES AND 1 1/2" AT EACH RAIL END.



TOP MOUNT END CLAMP
TYPICAL MODULE MOUNTING



TOP MOUNT MID CLAMP
TYPICAL MODULE MOUNTING



BOTTOM UP CLIP
TYPICAL MODULE MOUNTING

Tilt Angle A - (degrees)	Front Leg Length B - (inches)	Rear Leg Length C - (inches)	Rear Edge Height D - (inches)	North-South Leg Span E - (inches)
30	34	76 1/4	96 1/2	73
29	33 3/4	74 1/2	94 1/2	73 3/4
28	33 1/4	72 3/4	92 1/4	74 1/2
27	32 3/4	71	90 1/4	75
26	32 1/2	69 1/2	88	75 3/4
25	32	67 3/4	86	76 1/4
24	31 1/2	66	83 3/4	77
23	31 1/4	64	81 1/2	77 1/2
22	30 3/4	62 1/4	79 1/2	78
21	30 1/4	60 1/2	77 1/4	78 3/4
20	30	58 3/4	75	79 1/4
19	29 1/2	57	72 3/4	79 3/4
18	29	55	70 1/2	80 1/4
17	28 1/2	53 1/4	68 1/4	80 1/2
16	28 1/4	51 1/2	65 3/4	81
15	27 3/4	49 1/2	63 1/2	81 1/2
14	27 1/4	47 3/4	61 1/4	81 3/4
13	26 3/4	45 3/4	59	82
12	26 1/2	44	56 1/2	82 1/2
11	26	42	54 1/4	82 3/4
10	25 1/2	40 1/4	52	83
9	25	38 1/4	49 1/2	83 1/4
8	24 1/2	36 1/4	47 1/4	83 1/2
7	24 1/4	34 1/2	44 3/4	83 1/2
6	23 3/4	32 1/2	42 1/2	83 3/4
5	23 1/4	30 1/2	40	84
4	22 3/4	28 3/4	37 3/4	84
3	22 1/4	26 3/4	35 1/4	84 1/4
2	21 3/4	24 3/4	33	84 1/4
1	21 1/2	22 3/4	30 1/2	84 1/4
0	21	21	28 1/4	84 1/4

QUOTE #LA-JDM-080422-1452, REV. 1

NOTE: PARTS LIST BELOW IS FOR A 30° MODULE TILT. REFER TO CHART ON SHEET 1 FOR PIPE LENGTHS ASSOCIATED WITH OTHER TILT ANGLES.

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	80	302000C	SM BOTTOM UP CLIP
2	7	403201C	ULA 2" SQUARE BRACE (CUT TO 87 3/8")
3	7	403211C	ULA 2" ALUMINUM FRONT CAP
4	20	403213C	SM 2" RAIL MOUNTING BRACKET
5	7	403214C	ULA 2" ALUMINUM REAR CAP
6	7	403215C	ULA 2" ALUMINUM SLIDER
7	10	410168M	SM HD RAIL 168" (CUT TO 160 3/4")
8	2	PIPE COUPLER 2IN	
9	7	PIPE-1	2" SCH 40 GAL PIPE (CUT TO 36 1/4")
10	7	PIPE-2	2" SCH 40 GAL PIPE (CUT TO 85 7/8")
13	20	PV MODULE	40 x 65 MODULE
11	2	PIPE-3	2" SCH 40 GAL PIPE (CUT TO 17'-0")
12	2	PIPE-4	2" SCH 40 GAL PIPE CUT TO 10'-2")

DESIGNED: Nick Quintana
PROFESSIONAL ENGINEER:
DRAWING:
DESIGNED:
UNIRAC
1411 Broadway Blvd. NE
Albuquerque NM 87102 USA
Phone: 505.242.6411
WWW.UNIRAC.COM
TITLE:
UNIRAC PCULA
4x5 2° ALUMINUM HD ULA ASSEMBLY
DRAWING NUMBER: 40X65-120D-SNOW-20-SEIS-0
DATE: 12/19/2011
SIZE: D
REV: A
SHEET: 1 OF 3

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C:_Vault_Working_Folder\Designs\PROJECT MTD\PCULA\40X65-120D-SNOW-20-SEIS-0.idw

CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

SHEET TITLE

RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-009

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
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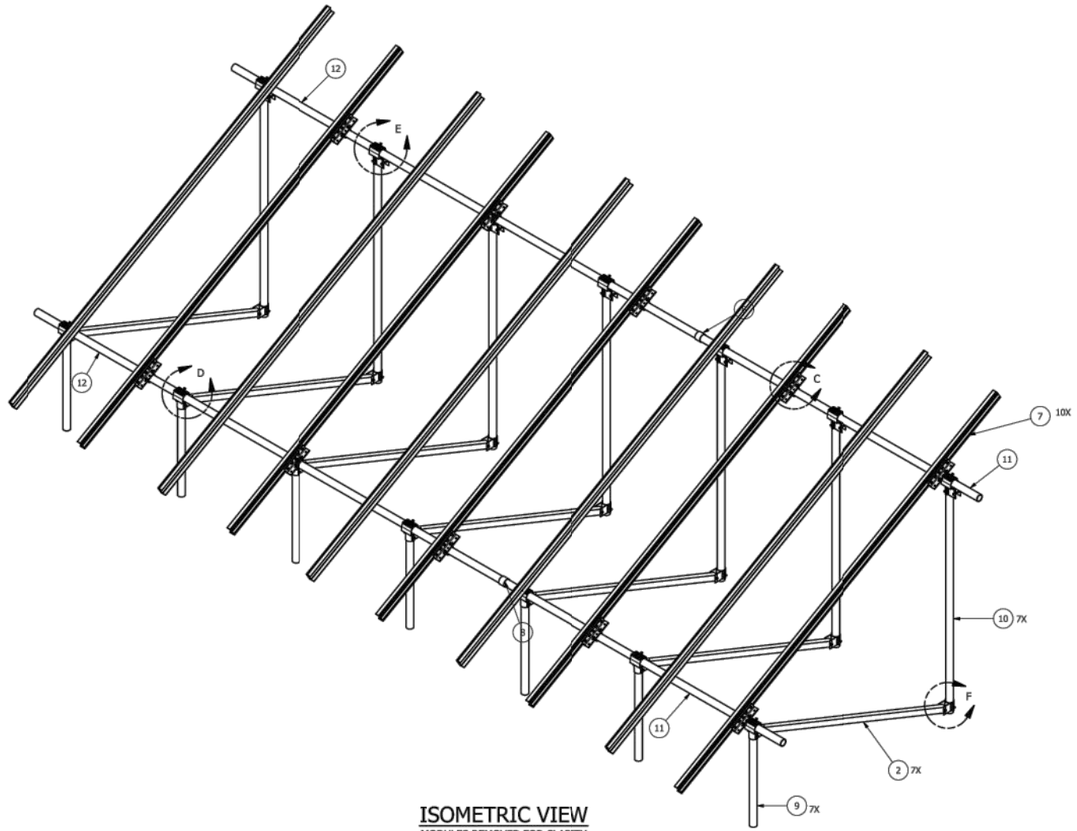
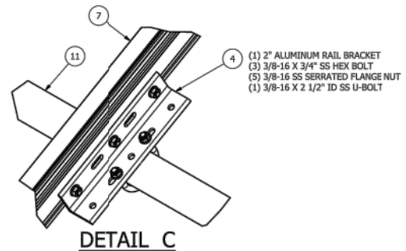
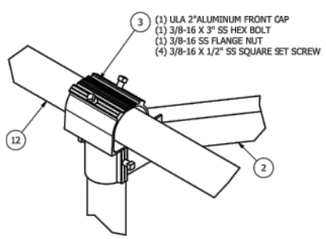


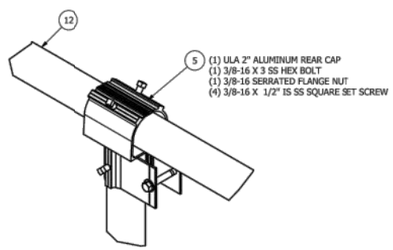
ISOMETRIC VIEW
MODULES REMOVED FOR CLARITY



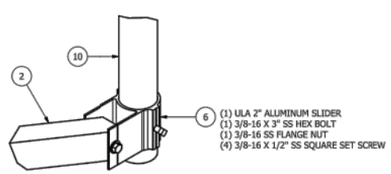
DETAIL C
SCALE 1 / 4



DETAIL D
SCALE 1 / 4



DETAIL E
SCALE 1 / 4



DETAIL F
SCALE 1 / 4

QUOTE #LA-JDM-080422-1452, REV. 1

NOTE: PARTS LIST BELOW IS FOR A 30° MODULE TILT. REFER TO CHART ON SHEET 1 FOR PIPE LENGTHS ASSOCIATED WITH OTHER TILT ANGLES.

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	80	302000C	SM BOTTOM UP CLIP
2	7	403201C	ULA 2" SQUARE BRACE (CUT TO 87 3/8")
3	7	403211C	ULA 2" ALUMINUM FRONT CAP
4	20	403213C	SM 2" RAIL MOUNTING BRACKET
5	7	403214C	ULA 2" ALUMINUM REAR CAP
6	7	403215C	ULA 2" ALUMINUM SLIDER
7	10	410168M	SM HD RAIL 168" (CUT TO 160 3/4")
8	2	PIPE COUPLER 2IN	
9	7	PIPE-1	2" SCH 40 GAL PIPE (CUT TO 36 1/4")
10	7	PIPE-2	2" SCH 40 GAL PIPE (CUT TO 85 7/8")
11	2	PIPE-3	2" SCH 40 GAL PIPE (CUT TO 17'-0")
12	2	PIPE-4	2" SCH 40 GAL PIPE CUT TO 10'-2")
13	20	PV MODULE	40 x 65 MODULE

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DRAWN BY:	Nick Quintana
ENGINEERING APPROVAL:	
QUALITY APPROVAL:	
PM APPROVAL:	
RELEASE:	
DATE:	12/19/2011

UNIRAC
1411 Broadway Blvd. NE
Albuquerque NM 87102 USA
Phone: 505.242.6411
WWW.UNIRAC.COM

TITLE: UNIRAC PCULA
4x5 2" ALUMINUM HD ULA ASSEMBLY

DRAWING NUMBER: 40X65-120D-SNOW-20-SEIS-0

SIZE: D | REV: A | SHEET: 2 OF 3

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CONTRACTOR

ADT Solar

22171 MCH RD
MANDEVILLE, LA 70471

PHONE: 9152011490

PROJECT NAME & ADDRESS

JOHN MASON

1004 FARNELL RD,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 9.480 KW DC-(STC)
AC SIZE: 6.960 KW AC

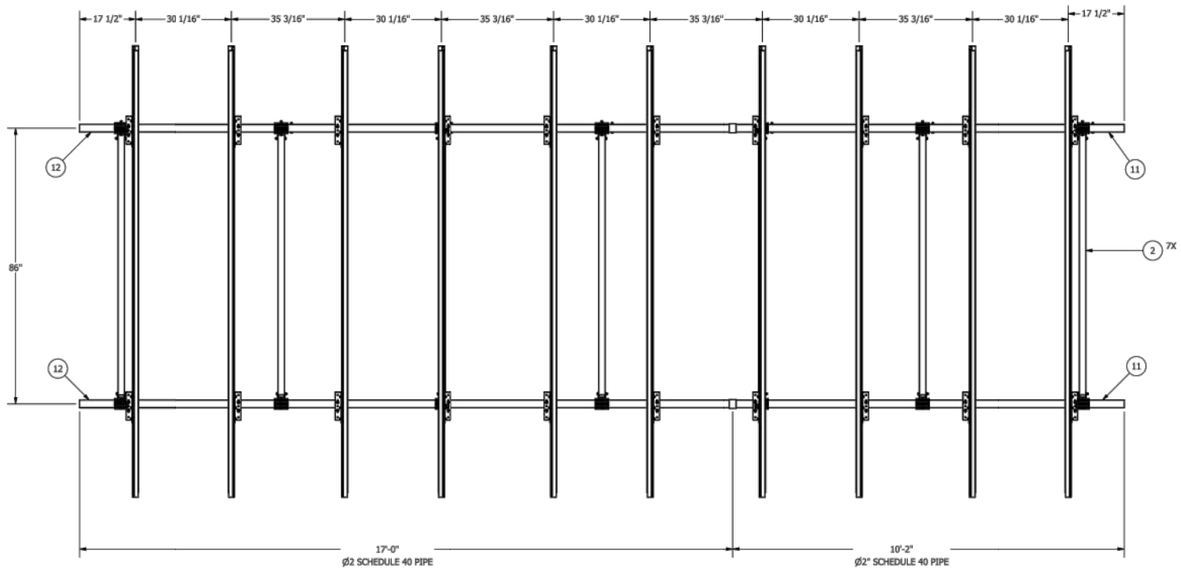
SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

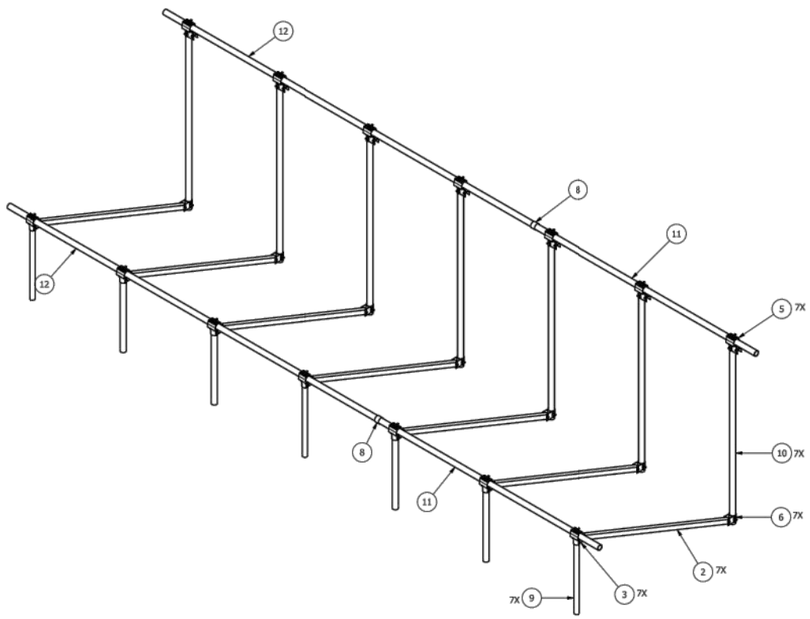
SHEET NUMBER

R-010

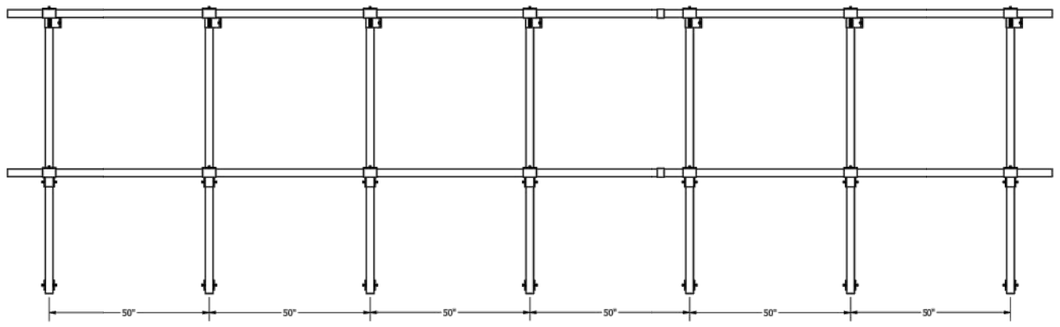
REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
A	ORIGINAL RELEASE	12/19/2011	AS



TOP VIEW
MODULES REMOVED FOR CLARITY



ISOMETRIC VIEW
MODULES AND RAILS REMOVED FOR CLARITY



FRONT VIEW
MODULES AND RAILS REMOVED FOR CLARITY

QUOTE #LA-JDM-080422-1452, REV. 1

NOTE: PARTS LIST BELOW IS FOR A 30° MODULE TILT. REFER TO CHART ON SHEET 1 FOR PIPE LENGTHS ASSOCIATED WITH OTHER TILT ANGLES.

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DESIGNED: Nick Quintana
ENGINEERING APPROVAL:
PRE-APPROVAL:
QA APPROVAL:

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TITLE: UNIRAC PCULA
4x5 2" ALUMINUM SM ULA ASSEMBLY

DRAWING NUMBER: 40X65-120D-SNOW-20-SEIS-0
DATE: 12/19/2011 SIZE: D REV: A SHEET: 3 OF 3

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AC SIZE: 6.960 KW AC

SHEET TITLE
RESOURCE DOCUMENT

DRAWN DATE	3/14/2023
DRAWN BY	TSP

SHEET NUMBER

R-011