



CITY OF INDIANOLA BOARD OF ADJUSTMENT MEETING

January 4, 2023

6:00 PM

City Council Chambers

Agenda

- 1. Call to Order**
- 2. Roll Call**
- 3. Agenda Approval**
 - A. Approval of the January 2023 agenda.
- 4. Minutes Approval**
 - A. Approval of October's meeting minutes.
- 5. New Business**
 - A. 2023 Election of Officers
 - B. Consider request from 1 Source Solar, on behalf of Jeff and Amy Brown, for a variance to allow a ground mounted solar energy system to be located in the in the front and side yard at 1017 South Y Street
 - C. Consider request from 1 Source Solar, on behalf of Jeff and Amy Brown, for a Special Use Permit for a ground mounted solar energy system located at 1017 South Y Street
 - D. Approval of the 2023 Calendar
- 6. Comments**
- 7. Adjourn**



MEMORANDUM

To: Board of Adjustment
From:
Date: January 4, 2023
Subject: Approval of the January 2023 agenda.

Recommendation:

Attachments: None



CITY OF INDIANOLA BOARD OF ADJUSTMENT MEETING

October 5, 2022

6:00 PM

City Council Chambers

Minutes

1. Call to Order

2. Roll Call

Commission members present: Amy Mitchell, Bill Mettee, Rene Soldwisch

Staff members present: Charlie Dissell, Emily Rizvic, Miranda Chadwick

Community members: Ryan Cambron, Tamme & Dan Klutman

3. Agenda Approval

A. Approval of October 2022 Board of Adjustment Agenda.

Rene Soldwisch makes a motion to approve the agenda. Amy Mitchell seconded the motion. Motion passed.

4. Minutes Approval

A. Approval of August's Board of Adjustment meeting minutes.

Rene Soldwisch makes a motion to approve the meeting minutes from September. Amy Mitchell seconds the motion.

5. New Business

A. Consider variance request to reduce required building separation from 10 feet to 3'6" and 1.B Consider variance request to allow the construction of a second driveway.

Amy Mitchell made a motion to approve the variance. Rene Soldwisch seconds the motion. Motion passed.

Rene Soldwisch made a motion to approve the construction of the second driveway. Amy Mitchell seconded the motion to approve the driveway. Motion passed.

B. Consider a variance request to permit the construction of an accessory structure within the front yard.

Rene Soldwisch made a motion to approve the variance. Amy Mitchell seconded the motion. Motion passed.

6. Comments

7. Adjourn

The meeting ended at 6:20.



MEMORANDUM

To: Board of Adjustment
From:
Date: January 4, 2023
Subject: 2023 Election of Officers

Recommendation:

Attachments: None



MEMORANDUM

To: Board of Adjustment

From:

Date: January 4, 2023

Subject: Consider request from 1 Source Solar, on behalf of Jeff and Amy Brown, for a variance to allow a ground mounted solar energy system to be located in the in the front and side yard at 1017 South Y Street

Recommendation:

- Attachments:**
- 1. 1. Staff Report
 - 2. 2. Variance Form
 - 3. 3. Variance Request
 - 4. 4. Site Permit Plan



community development

110 N. First Street, Indianola IA 50125-0299 • www.indianolaiowa.gov
(515) 961-9430 • comdev@indianolaiowa.gov

staff report

board of adjustment

Date of Meeting: January 4, 2023

Agenda Item: 5.B Consider request from 1 Source Solar, on behalf of Jeff and Amy Brown, for a variance to allow a ground mounted solar energy system to be located in the in the front and side yard at 1017 South Y Street

Application Type: Variance

Applicant: 1 Source Solar

Property Owner: Jeffrey A and Amy C Brown

Property Address/Parcel: 1017 South Y Street

Zoning: A-1, Agricultural/Open Space Zoning District

Application Summary

1 Source Solar, on behalf of Jeff and Amy Brown, is requesting approval of a variance that would allow a ground mounted solar system to be placed in the front and side yard of 1017 South Y Street. This property is 3.19 acres in size and the proposed placement of the system would be setback 209' from the front property line.

aerial map



applicable code sections

The following code sections of the Code of Ordinances of Indianola, Iowa apply to this request:

165.03 DEFINITIONS

Accessory use or structure: A use or structure on the same lot with the principal use or structure and serving a purpose customarily incidental and subordinate to the principal use or structure. An accessory use shall not be taller than, encompass more floor area or use a greater part of the lot than the principal permitted use or as further limited within this Zoning Regulations. A prohibited principal use is also a prohibited accessory use in the same district.

Yard, front - A yard extending across the full width of the lot and measured between the front lot line and the building or any projection thereof.

Yard, side - A yard extending from the front yard to the rear yard and measured between the side lot lines and the building line.

165.05(5)(B)(5)(b) Solar Energy Systems Setback - Solar energy systems must meet the accessory structure setback for the zoning district and principal land use associated with the lot on which the system is located, except as allowed below.

ii. **Ground-mounted Solar Energy Systems** - Ground-mounted solar energy systems may not extend into the side-yard or rear setback when oriented at minimum design tilt, except as otherwise allowed for building mechanical systems.

165.04(2) ACCESSORY BUILDINGS AND STRUCTURES

D. Locations and Setbacks. The following location and setback requirements shall apply to all accessory buildings and structures:

- (1) Accessory buildings and structures shall only be erected to the rear or any principal building. No accessory structure shall be located between any principal building and any street. A detached, private garage may be constructed along the side of a principal building provided that said garage is no closer than ten (10) feet from the principal building and does not extend past the front face of the principal building.

165.02(3)(B) POWERS AND DUTIES OF THE BOARD OF ADJUSTMENT. The Board of Adjustment has the following powers and duties:

3. Variances: Conditions Governing Applications; Procedures. To authorize upon appeal in specific cases such variance from the terms of this chapter as will not be contrary to the public interest where, owing to the special conditions, a literal enforcement of the provisions of this chapter would result in unnecessary hardship. A variance from the terms of this chapter shall not be granted by the Board of Adjustment unless and until:

A. A written application of a variance is submitted demonstrating:

- (1) That special conditions and circumstances exist which are peculiar to the land, structure, or building involved and which are not applicable to other lands, structures, or buildings in the same district;
- (2) That literal interpretation of the provisions of this chapter would deprive the applicant of rights commonly enjoyed by other properties in the same district under the terms of this chapter;
- (3) That the special conditions and circumstances do not result from the actions of the applicant;
- (4) That granting the variance requested will not confer on the applicant any special privilege that is denied by this chapter to other lands, structures, or buildings in the same district. No nonconforming use of neighboring lands, structures, or buildings in the same district, and no permitted use of land, structures or buildings in other districts shall be considered grounds for the issuance of a variance.

B. Notice of public hearing shall be given as in subsection 2(B) above.

C. The public hearing shall be held. Any party may appear in person, or by agent or by attorney.

D. The Board of Adjustment shall make findings that the requirements of paragraph A of this subsection have been met by the applicant for a variance.

E. The Board of Adjustment shall further make a finding that the reasons set forth in the application justify the granting of the variance, and that the variance is the minimum variance that will make possible the reasonable use of the land, building or structure.

F. The Board of Adjustment shall further make a finding that the granting of the variance will be in harmony with the general purpose and intent of this chapter, and will not be injurious to the neighborhood, or otherwise detrimental to the public welfare.

In granting any variance, the Board of Adjustment may prescribe appropriate conditions and safeguards in conformity with this chapter. Violations of such conditions and safeguards, when made a part of the terms under which the variance is granted, shall be deemed a violation of this chapter and punishable under Section 165.23 of this chapter. Under no circumstances shall the Board of Adjustment grant a variance to allow a use not permissible under the terms of this

chapter in the district involved, or any use expressly or by implication prohibited by the terms of this chapter in said district.

analysis

Subject Property

1 Source Solar, on behalf of Jeff and Amy Brown, is requesting approval of a variance that would allow a ground mounted solar system to be placed in the front and side yard of 1017 South Y Street. The proposed placement of the system would be setback 209' from the front property line. This property is 3.19 acres in size. It contains a single-family dwelling, built in 1986, that is setback about 235' from the front property line. The property also contains a detached pole barn garage structure that was built in 2003, that is setback about 185' from the front property line. This property was developed while in unincorporated Warren County and was annexed into the City of Indianola in 2008. The property takes access off South Y Street, a paved major collector.



Figure 1. Street view of the subject property (October 2007)

The subject property is in the A-1, Agricultural/Open Space zoning district. The subject property and its structures are considered legal, non-conforming as they do not meet the minimum lot size requirement of the A-1 zoning district (15 acres), and the detached garage is partially located within the front yard. Ground mounted solar energy systems are allowed as an accessory use and require approval of a Special Use Permit from the Board of Adjustment. A Special Use Permit has been requested by the applicant from the Board of Adjustment. The proposed ground mounted solar system is in both the side and front yards of this property, north of the existing detached pole barn garage.

To the north of the property exists a 0.53-acre lot, as well as a 3.31-acre lot that both contain a single-family dwelling. To the west exists a 16.68-acre undeveloped lot, and to the south contains a 4.56-acre lot that is in row-crop production. All the land to the north, west and south is zoned in the A-1, Agricultural/Open Space zoning district. To the east of the property are lots located in the

Deer Run Planned Unit Development (PUD) and contain a single-family dwelling and access to the Deer Run golf course.

Future Land Use

According to the “Elevate Indianola” Comprehensive Plan, the future land use of this area is designated as Low/Medium Density Residential. The low/medium density land use designation guides up to 15 dwelling units per gross acre, single-family detached dwellings, accessory dwelling units, single family attached (townhomes and row houses), multi-family (condos and apartments), and student housing, civic uses, and places of worship, and lastly, parks, open spaces, and trails.

findings of fact

According to Section 165.02.3.B.(3)b. of Indianola’s Zoning Code, in deciding whether to grant a variance request, the Board of Adjustment shall consider all the following legal principles. **All legal principles shall be satisfied in order for the Board of Adjustment to grant a variance.**

- i. **That special conditions and circumstances exist which are peculiar to the land, structure, or building involved and which are not applicable to other lands, structures, or buildings in the same district.**

Staff Comment: This parcel was developed while located in unincorporated Warren County. As such, the parcel currently contains an accessory structure (detached garage) that is located within the front yard. The applicant proposes to locate the ground-mounted solar behind the detached garage, but in the side and front yards of the property. However, the site plan shows the system will be setback 209’ from the front property line, and its location will be buffered by established shrubbery on the front and north side property lines. Additionally, the contour of this parcel west of the proposed location does begin to drop, making it more difficult to arrange the system in a manner that will achieve maximum exposure to the sun.

- ii. **That literal interpretation of the provisions of this chapter would deprive the applicant of rights commonly enjoyed by other properties in the same district under the terms of this chapter.**

Staff Comment: This property provides for a larger front setback than most residential properties within the City. The property is relatively flat in the front yard, with nearly 20 feet of fall from the front edge of the house to the rear property line.

- iii. **That the special conditions and circumstances do not result from the actions of the applicant.**

Staff Comment: The existing structures on the property were constructed prior to being annexed inside the City in 2008, and under Warren County zoning regulations.

- iv. **That granting the variance request will not confer on the applicant any special privilege that is denied by this chapter to other lands, structures, or buildings in the same district. No nonconforming use of neighboring lands, structures, or buildings in the same district, and no permitted use of land, structures, or buildings in other districts shall be considered grounds for the issuance of a variance.**

Staff Comment: Granting the variance request will not confer on the applicant any special privilege that is denied to other land and structures within the A-1 zoning district.

alternatives

The City of Indianola Board of Adjustment may consider the following alternatives:

- 1) The City of Indianola Board of Adjustment approves the variance request, as submitted.
- 2) The City of Indianola Board of Adjustment approved the variance request, with conditions.
- 3) The City of Indianola Board of Adjustment denies the variance request.
- 4) The City of Indianola Board of Adjustment remands the variance request back to the applicant and/or staff for further review and/or modifications and directs staff to place this item on a future Board of Adjustment agenda.

recommendation

Staff recommends that the Indianola Board of Adjustment move alternative 1, to approve the variance request as submitted.

BOARD OF ADJUSTMENT APPLICATION

Community Development

110 North 1st Street, Indianola, Iowa 50125-0299
(515) 961-9430 • comdev@indianolaiowa.gov



PROPERTY OWNER

(Last Name) Brown
(First Name) Jeff + Amy
(Address) 1017 S. Y Street
(City) Indianola (State) IA (Zip) 50125
(Phone) 515-210-1851 (Email) jeffb@jeffnamy.biz.com

APPLICANT (if not Property Owner)

(Last Name) _____
(First Name) Source Solar
(Address) 3020 SW Oralabor Rd
(City) Ankney (State) IA (Zip) 50023
(Phone) 515-289-1974 (Email) nathan@source.solar.com

APPEAL

Submittal Requirements:

All submittal requirements must be completed.
Incomplete applications will not be considered

- ☐ Completed Application
☐ Filing Fee: \$150 per request
☐ Written narrative indicating where it is alleged there is error in any order, requirement, decision, or determination made by the Administrative Officer in the enforcement of this Code of Ordinances of Indianola, Iowa.
☐ Other Information as required by Director

SPECIAL USE PERMIT

Submittal Requirements:

All submittal requirements must be completed.
Incomplete applications will not be considered

- ☒ Property Address: 1017 S. Y Street
☒ Completed Application
☐ Filing Fee: \$150 per request
☒ Site Plan and Elevations as outlined in 165.06
☒ Written narrative indicating the special use permit sought and response to the criteria outlined in Section 165.02(3)(B)(3)(c)(v) of the Code of Ordinances of Indianola, Iowa
☒ Other Information as required by Director

VARIANCE

Submittal Requirements:

All submittal requirements must be completed.
Incomplete applications will not be considered

- ☒ Property Address: 1017 Y Street
☒ Completed Application
☐ Filing Fee: \$150 per request
☒ Site Plan and Elevations
☒ Written narrative indicating justification for proposed variance and response to the criteria outlined in Section 165.02(3)(B)(3)(b) of the Code of Ordinances of Indianola, Iowa
☒ Other Information as required by Director

I certify that the information and exhibits submitted are true and correct to the best of my knowledge and that in filing this application I am acting with the knowledge, consent and authority of the owner(s) of the property. Pursuant to said authority, I hereby permit City officials to enter upon the property for the purpose of inspection related to this application.

Signature

Nathan Hamersley
Name (printed) Nathan Hamersley

Date

12/5/2022

FOR OFFICE USE ONLY:

Code to 45180

Date Received: _____
Receipt No: _____
Receipt Amount: _____
BOA Agenda Date: _____

Variance Request
1017 Y Street
Indianola, Iowa 50125

We are requesting this variance due to the larger size of the property that the solar will be installed on. We are currently over 200' from the front of the road with the solar set back. Trees locations and the natural contour of the ground makes the proposed area best for solar due to elevation variances outside this proposed area would make it difficult or unable to install.

Thanks for your consideration,

Nathan Hamersley
Solar Design Engineer
1 Source Solar

SCOPE OF WORK

PHOTOVOLTAIC SYSTEM SUMMARY

SYSTEM SIZE: DC - 10.920 KW
AC - 10.000 KW

MODULES: (24) VSUN455-144BMH (455W) MODULES

INVERTER: (1) SOLAREEDGE SE10000H-US INVERTER

ARRAY 1:-ARRAY TILT: 30°
ARRAY 1:-AZIMUTH: 180°

ELECTRICAL INFORMATION
UTILITY COMPANY: MIDAMERICAN ENERGY CO.
MAIN SERVICE AMPERAGE: 200A

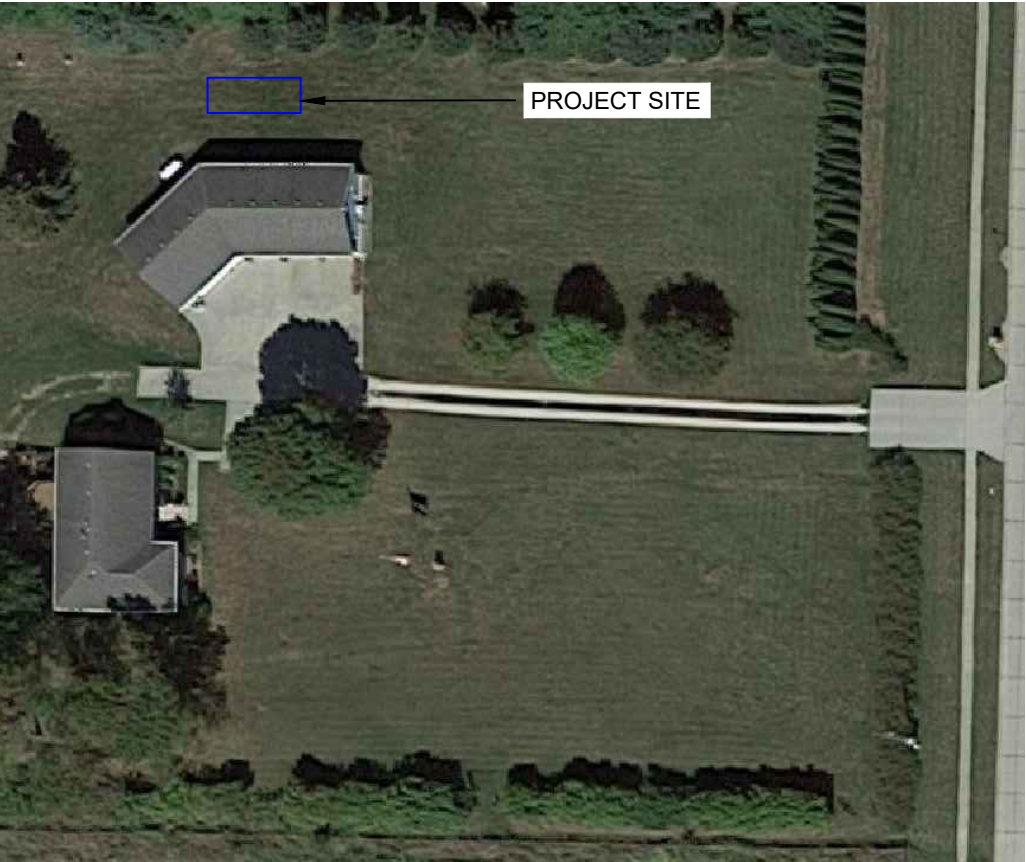
GOVERNING CODES & STANDARDS
INTERNATIONAL RESIDENTIAL CODE 2018
INTERNATIONAL BUILDING CODE 2018
INTERNATIONAL PLUMBING CODE 2018
INTERNATIONAL FIRE CODE 2018
NATIONAL ELECTRIC CODE 2020

GENERAL NOTES:

- CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO INITIATING CONSTRUCTION.
- CONTRACTOR SHALL REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
- ALL EQUIPMENT SHALL BE LISTED BY U.L. (OR EQUAL) AND LISTED FOR ITS SPECIFIC APPLICATION.
- ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.
- ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- ACCESS TO ELECTRICAL COMPONENTS OVER 150 VOLTS TO GROUND SHALL BE RESTRICTED TO QUALIFIED PERSONNEL.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
- PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER G.E.C. PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
- PV MODULE RACKING RAIL SHALL BE BONDED TO BARE COPPER G.E.C. VIA WEEB LUG, ILSCO GBL-4DBT LAY-IN LUG, OR EQUIVALENT LISTED LUG.
- GROUNDING ELECTRODE CONDUCTOR (G.E.C.) SHALL BE CONTINUOUS AND/OR IRREVERSIBLY SPLICED/WELDED.
- ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
- WORKING SPACE AROUND ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26

SHEET INDEX

- | | |
|------------|-------------------------|
| PV-0 | COVER SHEET |
| PV-1 | SITE PLAN |
| PV-2 | PV MODULES |
| PV-2A | ELECTRICAL SITE PLAN |
| PV-3 | ATTACHMENT DETAIL |
| PV-3A | ATTACHMENT DETAIL |
| PV-4 | ELECTRIC LINE DIAGRAM |
| PV-5 | WIRING CALCULATIONS |
| PV-6 | PLACARDS |
| PV-7 | OPTIMIZER CHART |
| PV-8 to 13 | EQUIPMENT SPECIFICATION |



1 AERIAL VIEW
PV-0 SCALE: NTS



2 VICINITY MAP
PV-0 SCALE: NTS

1

SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

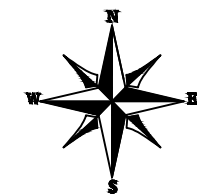
PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-0



1SOURCE
1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

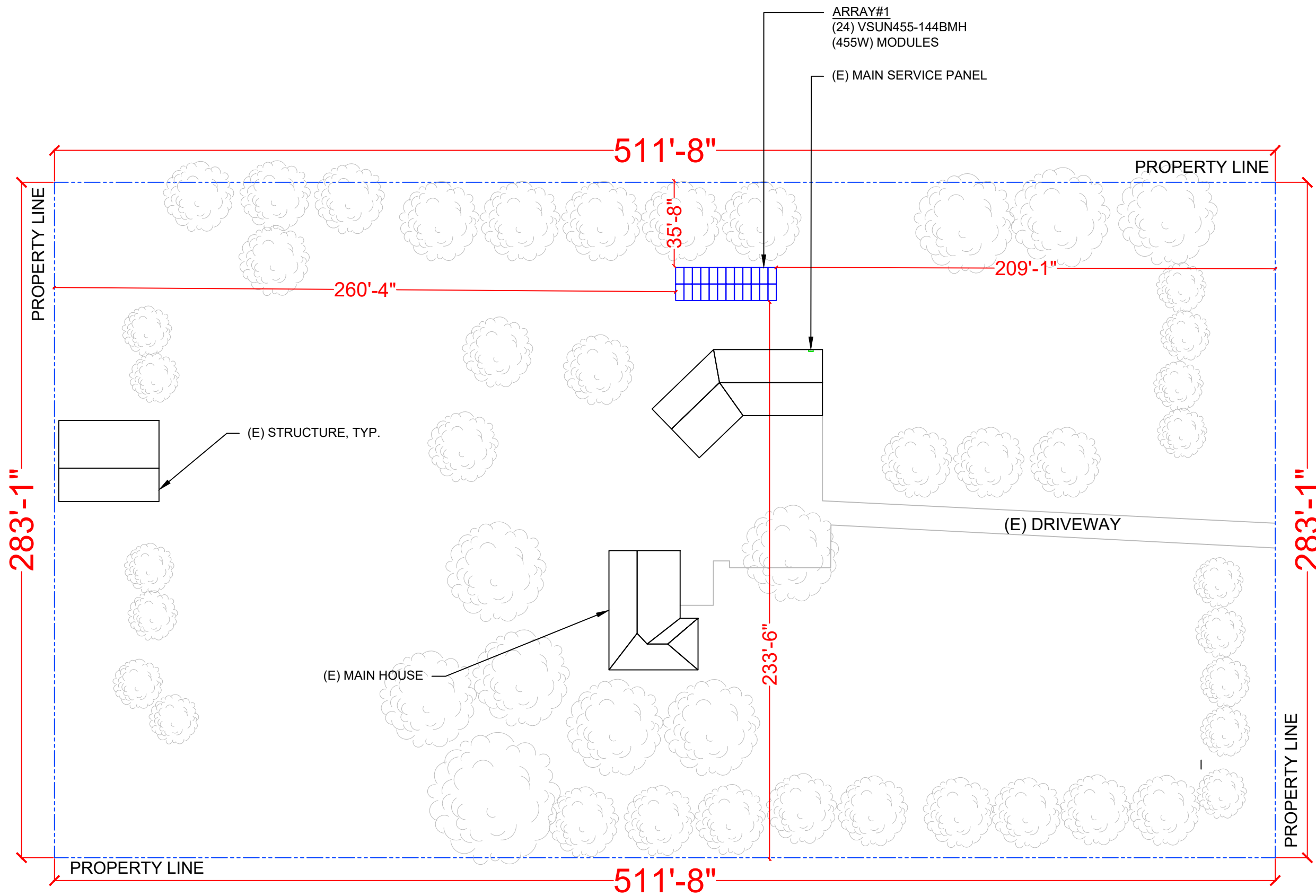
SITE PLAN

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

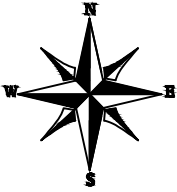
PV-1



MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 24 MODULES
MODULE TYPE = VSUN455-144BMH (455W) MODULES
MODULE WEIGHT = 53.79 LBS / 24.4 KG.
MODULE DIMENSIONS = 82.99" x 41.26" = 23.78 SF
UNIT WEIGHT OF ARRAY = 2.26 PSF

ARRAY DESCRIPTION			
ROOF TYPE		GROUND MOUNT	
ARRAY	ARRAY TILT	GROUND TILT	AZIMUTH
#1	30°	0°	180°



1 SOURCE SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

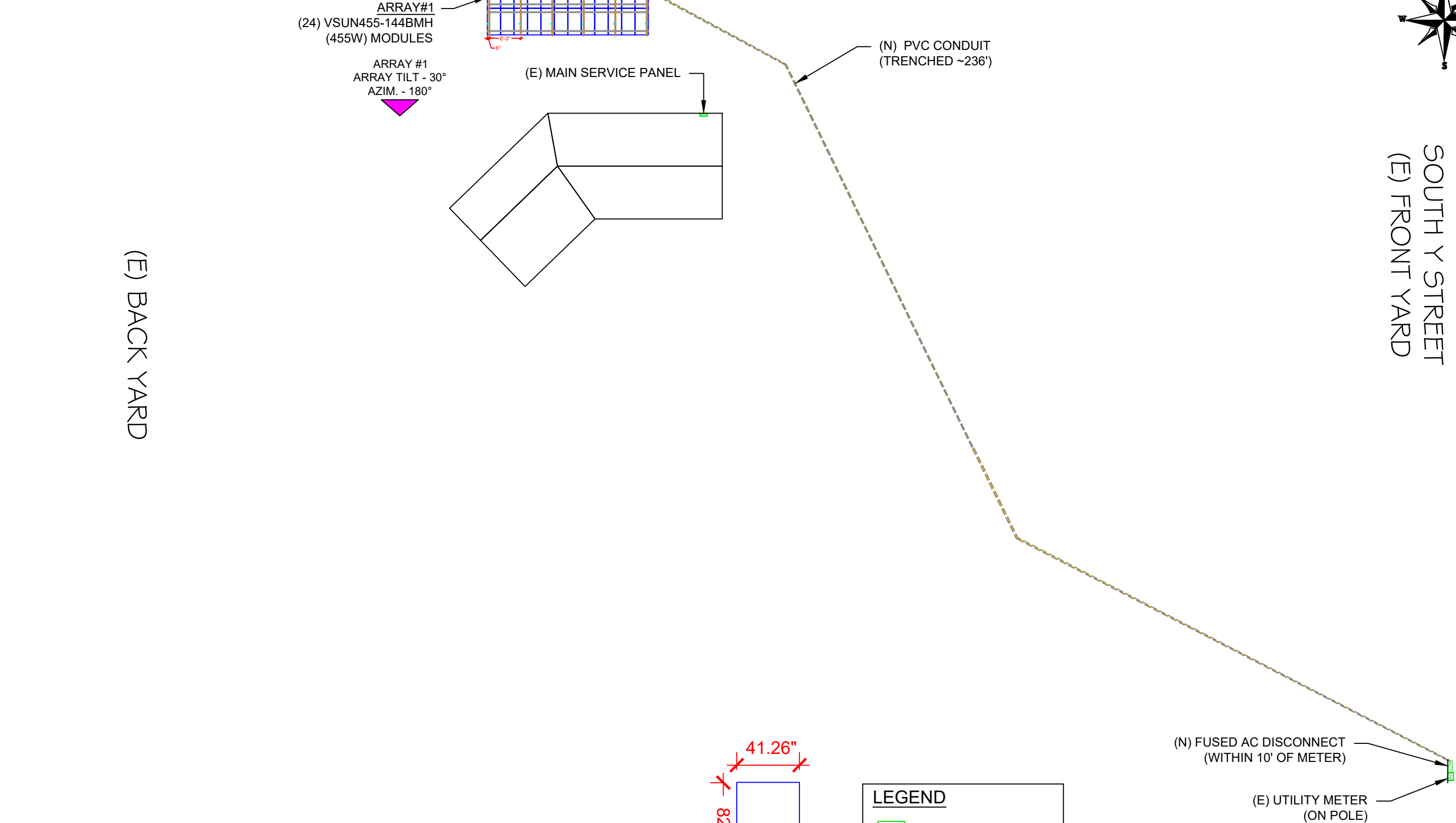
SHEET NAME
PV MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

(E) BACK YARD

SOUTH Y STREET
(E) FRONT YARD

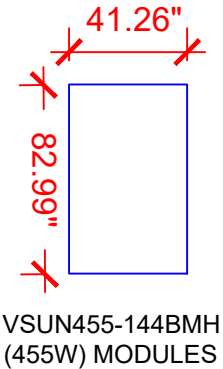


1

PV MODULES

PV-2

SCALE: 0.003122



LEGEND

MSP

 - MAIN SERVICE PANEL

JB

 - JUNCTION BOX

ACD

 - AC DISCONNECT

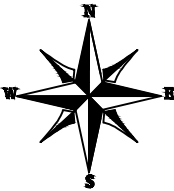
INV

 - INVERTER

- CONDUIT

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	24	VSUN455-144BMH (455W) MODULES
INVERTER	1	SOLAREEDGE SE10000H-US INVERTER
AC DISCONNECT	1	60A FUSED, 240V, NEMA 3R, UL LISTED,
OPTIMIZER	24	SOLAREEDGE POWER OPTIMIZER P505
MID CLAMPS	44	MID CLAMPS
END CLAMPS	8	END CLAMPS

DC SYSTEM SIZE- 10.920 KW
AC SYSTEM SIZE- 10.000 KW
(24) VSUN455-144BMH (455W) MODULES
(01) SOLAREEDGE SE10000H-US INVERTER
(02) CIRCUIT OF 12 MODULES



1SOURCE

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

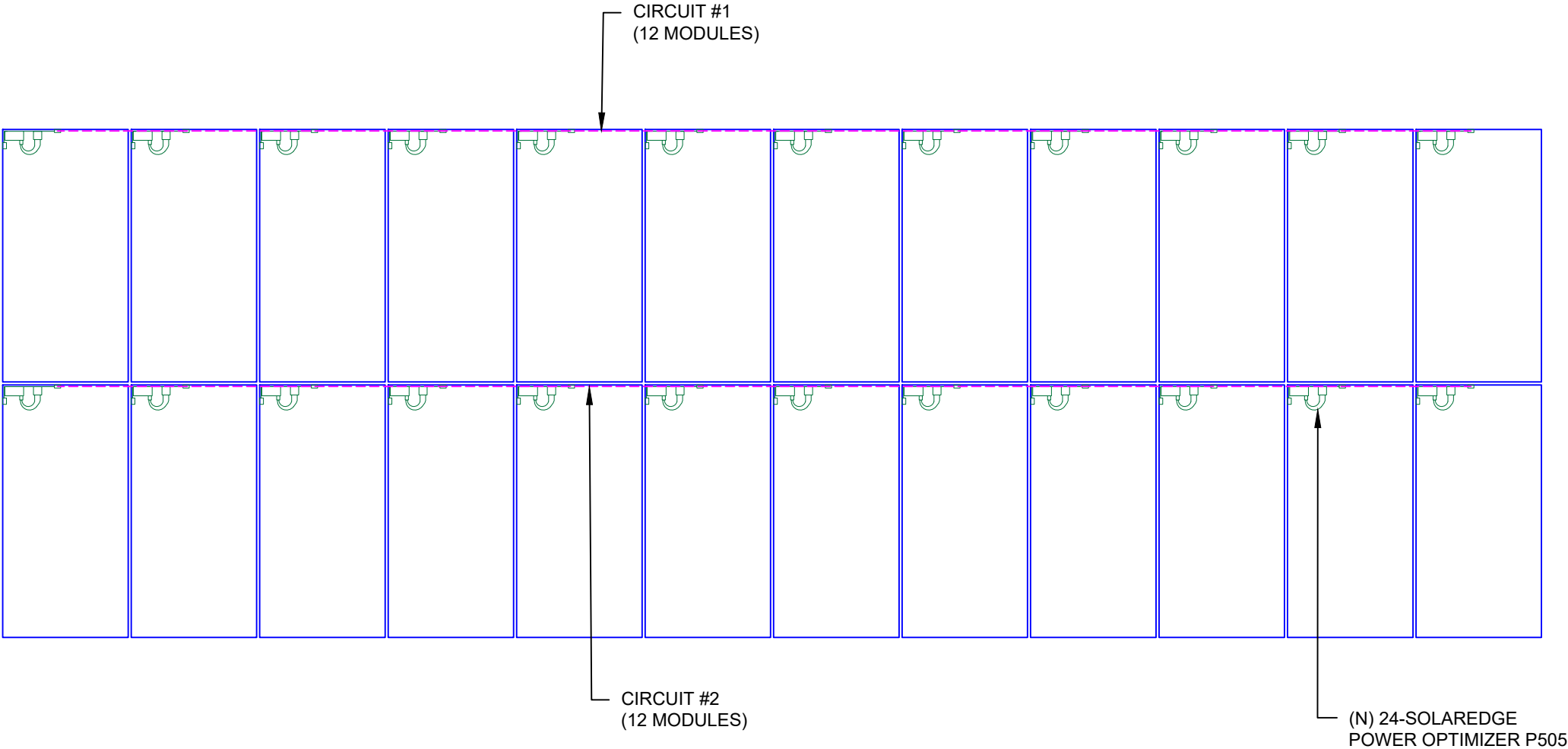
SHEET NAME
ELEC. SITE
PLAN

SHEET SIZE

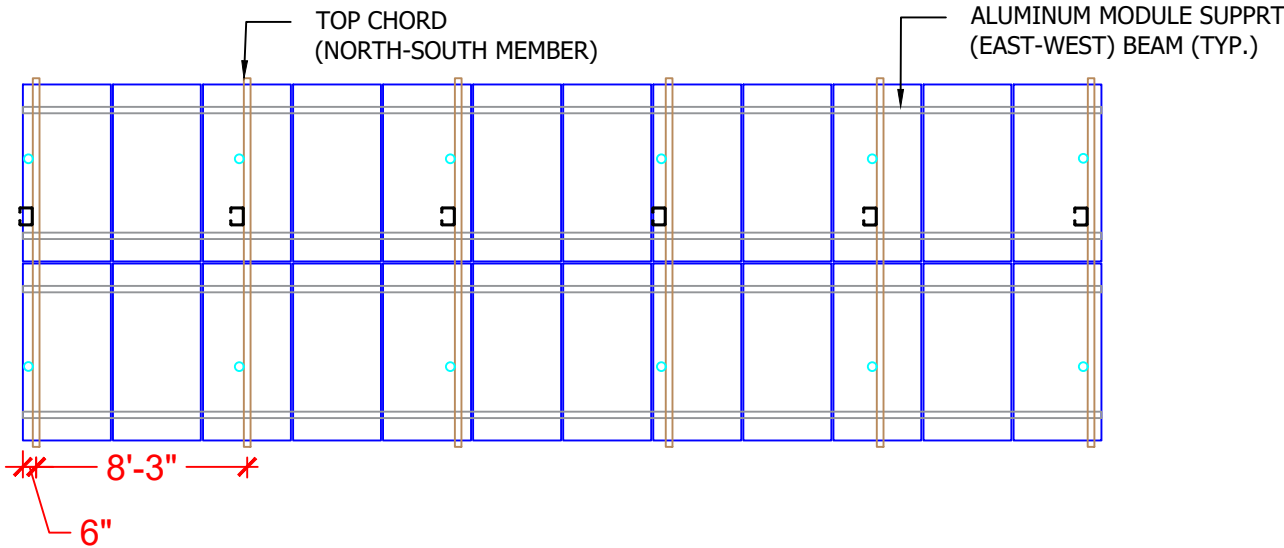
ANSI B
11" X 17"

SHEET NUMBER

PV-2A



ARRAY #1



20 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

(REFER TO SHEET SR-200 FOR PILE STICK-UP HEIGHT) (c)

FOUNDATION TYPE	DETAIL NUMBER	NO FROST DEPTH			FROST DEPTH = 3.5 FT OR LESS			FROST DEPTH = 5.0 FT		
		DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	DIMENSION "D"	DIMENSION "E"	DIMENSION "F"
FULL CAST IN-PLACE CONCRETE	400	6'-0" (a)	--	--	6'-0" (a)	--	--	8'-0"	--	--
CAST IN-PLACE CONCRETE	401	--	--	--	6'-0" (a)	--	--	8'-0"	--	--
PARTIAL DRIVEN PILE WITH FROST BREAK (b)	402	--	--	--	--	3'-6"	8'-0"	--	5'-0"	--
FULLY DRIVEN PILE (b)	403	--	--	8'-0"	--	--	8'-0"	--	--	10'-6"

(a) THIS 6'-0" EMBEDMENT REQUIRES CUTTING 24" OFF OF THE BOTTOM OF A 12'-6" LONG C-PILE. (DO NOT CUT THE END OF PILE WITH PRE-PUNCHED HOLES.) IF CUTTING IS NOT PREFERRED, AN 8'-0" CONCRETE FOUNDATION IS ACCEPTABLE.

(b) SHALLOWER EMBEDMENT DEPTHS ARE POSSIBLE, HOWEVER, PILE TESTING AND/OR APPROVAL FROM A GEOTECHNICAL OR PROFESSIONAL ENGINEER ARE REQUIRED.

(c) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 20 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 8'-1" OR GREATER, REQUIRE A 15 FT LONG PILE.

1SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

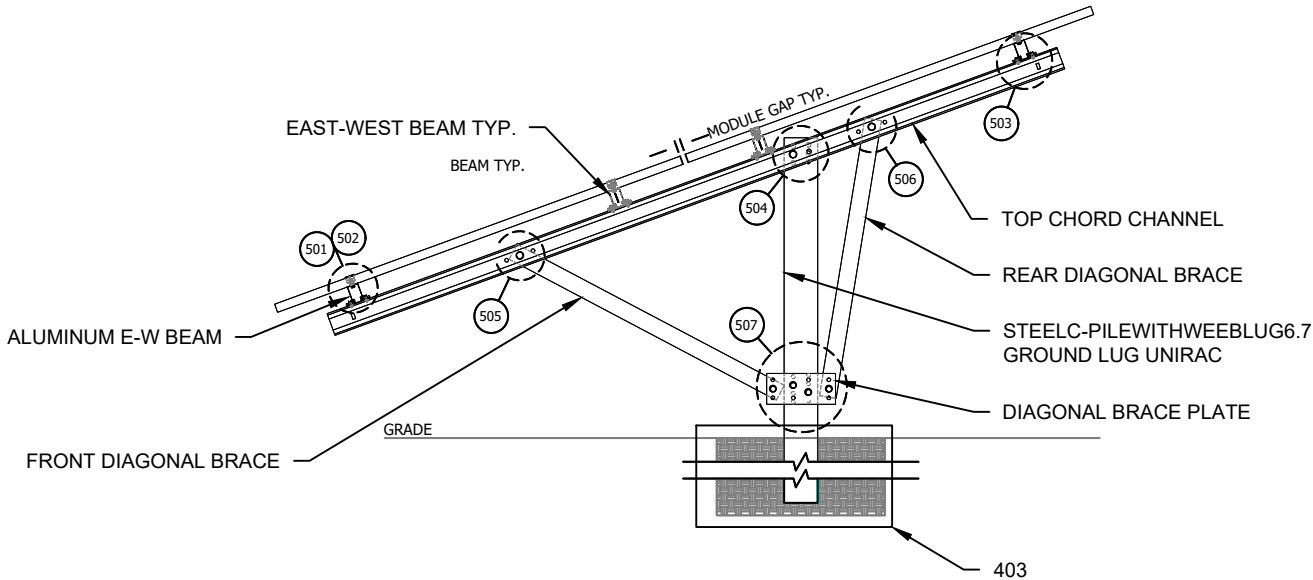
SHEET NAME
RACKING
DETAIL

SHEET SIZE

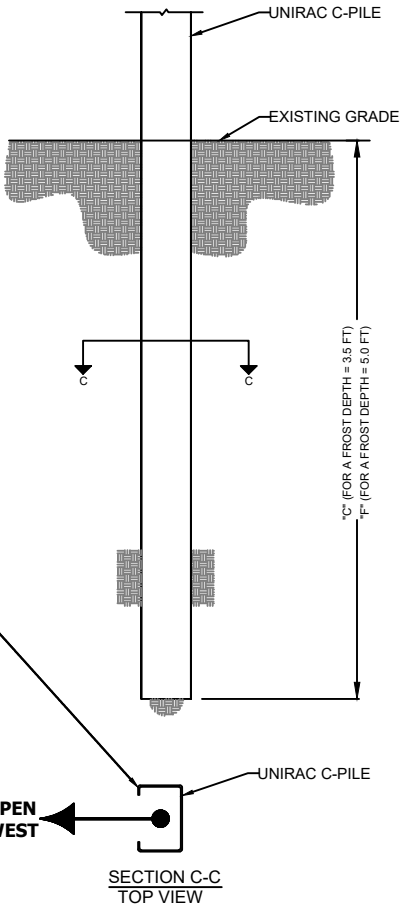
ANSI B
11" X 17"

SHEET NUMBER

PV-3



NOTE:
PILES MUST BE INSTALLED
WITH C-PILE OPEN TO THE
WEST - AS SHOWN

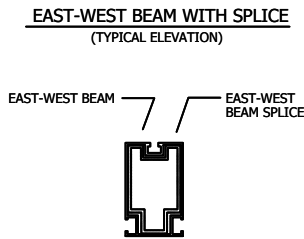
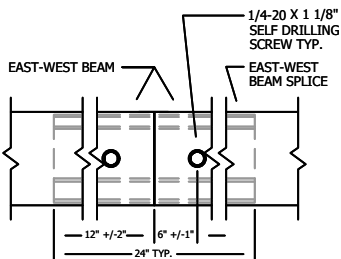
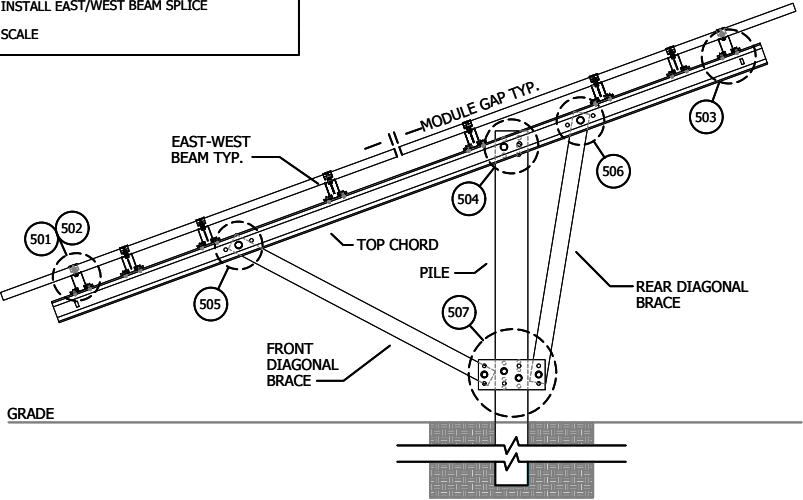


403 FULLY DRIVEN PILE
(ALTERNATE OPTION) NOT TO SCALE

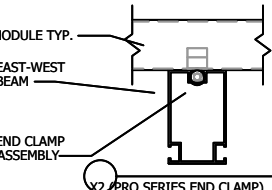
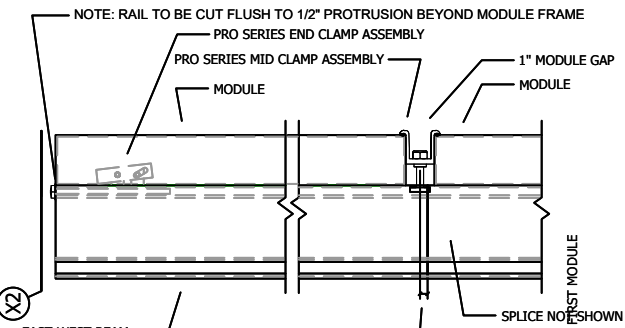
- FOUNDATION 403: FULLY DRIVEN PILE
1. DRIVEN PILE FOUNDATIONS MAY NOT BE USED IN SOILS THAT CONTAIN SILT OR CLAY WITH GROUNDWATER WITHIN 12 FEET OF THE SURFACE UNLESS APPROVED BY A GEOTECHNICAL ENGINEER. IT IS RECOMMENDED TO VERIFY GROUNDWATER IS NOT PRESENT IF USING THIS FOUNDATION TYPE IN FROST PRONE REGIONS.
 2. PILES MUST BE INSTALLED TO THE FULL DEPTH. PILES NOT DRIVEN TO FULL DEPTH ARE CONSIDERED FAILED PILES AND A DIFFERENT FOUNDATION MUST BE UTILIZED.
 3. FOUNDATIONS MUST NOT BE INSTALLED IN ORGANIC SOILS OR IN AREAS WITH GROUNDWATER NEAR THE SURFACE.
 4. PILE EMBEDMENT MUST BE DETERMINED BY A LICENSED CIVIL ENGINEER OR BY SITE PILE TESTS.

RACKING DETAIL NOTES:

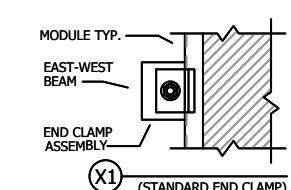
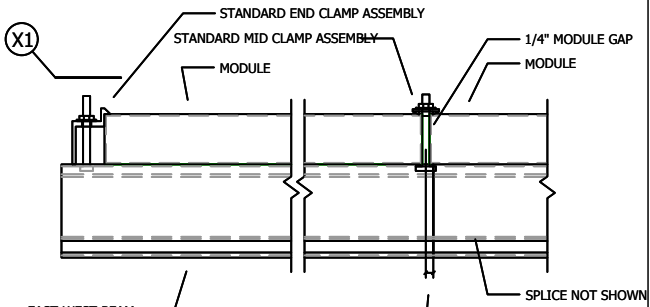
ADJUSTMENT INSTRUCTIONS
TO INSTALL EAST/WEST BEAM SPLICE
TO SCALE



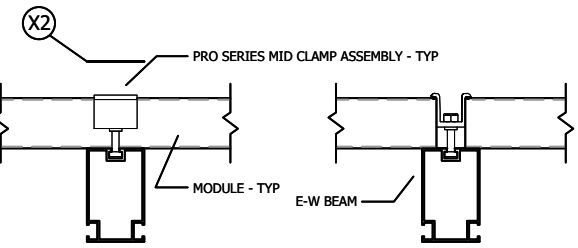
EAST-WEST BEAM WITH SPLICE
(TYPICAL SECTION)



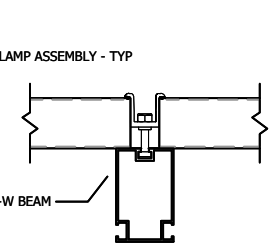
MODULE TO EAST-WEST BEAM END CLAMP CONNECTION



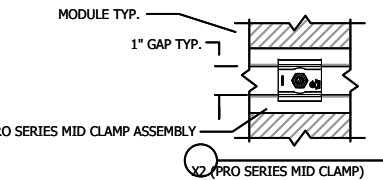
MODULE TO EAST-WEST BEAM END CLAMP CONNECTION



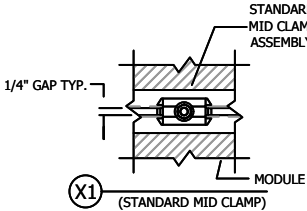
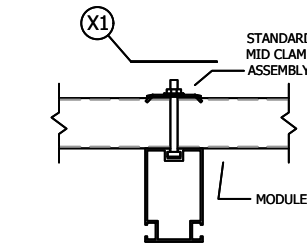
MODULE LONG SIDE CLAMPING
(UPPER & LOWER RAIL)



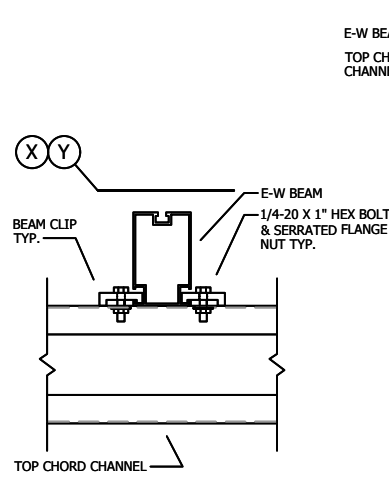
MODULE SHORT SIDE CLAMPING
(CENTER SHARED RAIL)



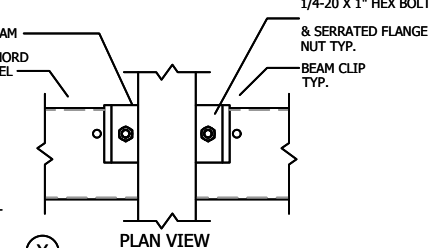
MODULE TO EAST-WEST BEAM MID CLAMP CONNECTION



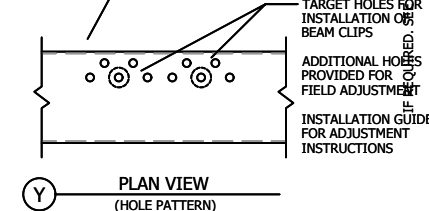
MODULE TO EAST-WEST BEAM MID CLAMP CONNECTION



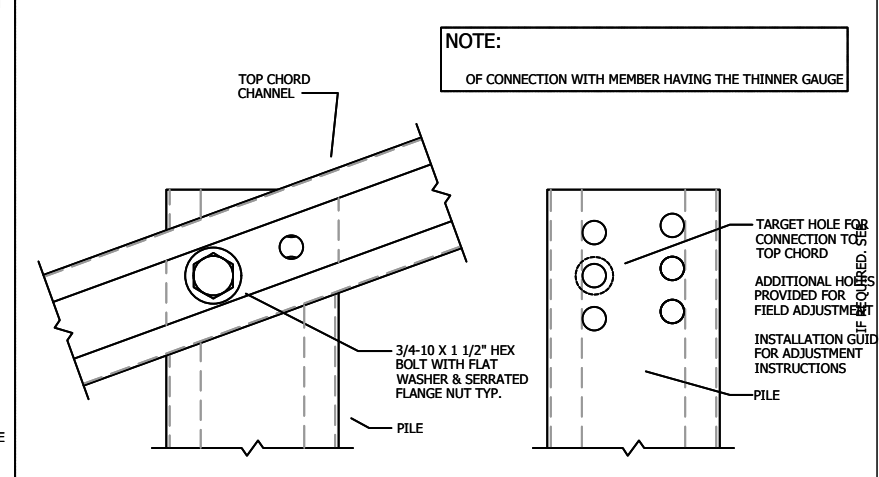
EAST-WEST BEAM TO TOP CHORD CONNECTION



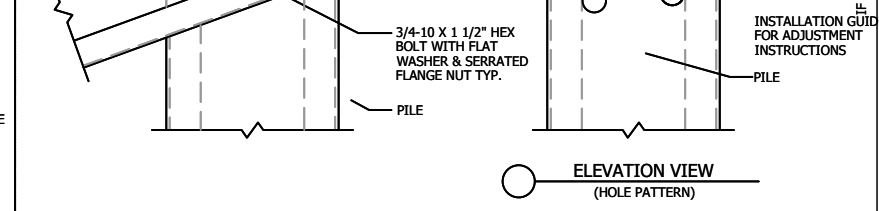
EAST-WEST BEAM TO TOP CHORD CONNECTION



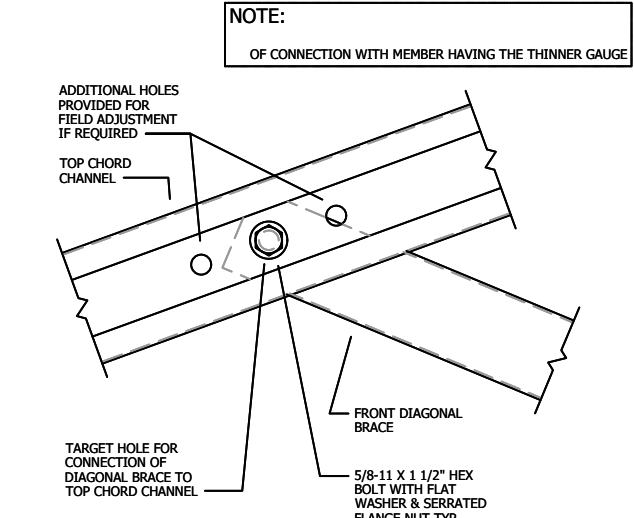
EAST-WEST BEAM TO TOP CHORD CONNECTION



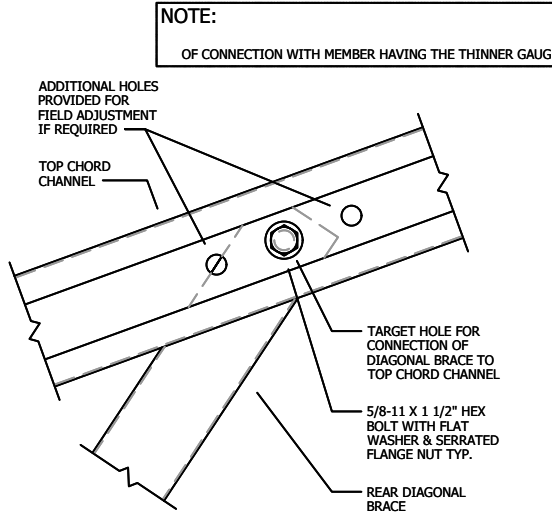
TOP CHORD TO PILE CONNECTION



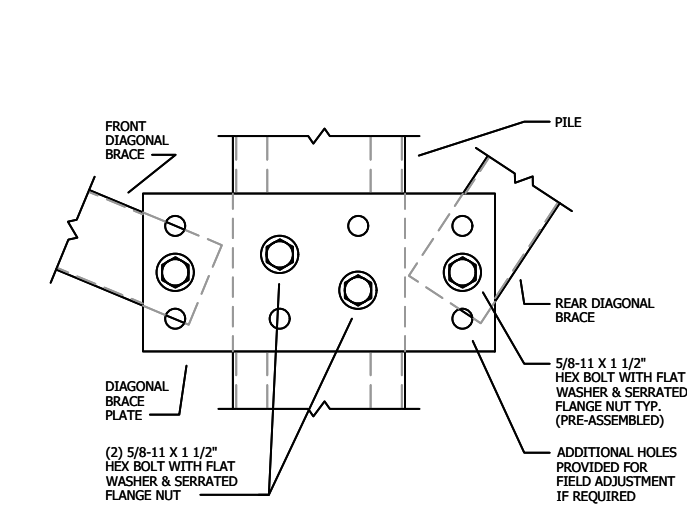
TOP CHORD TO PILE CONNECTION



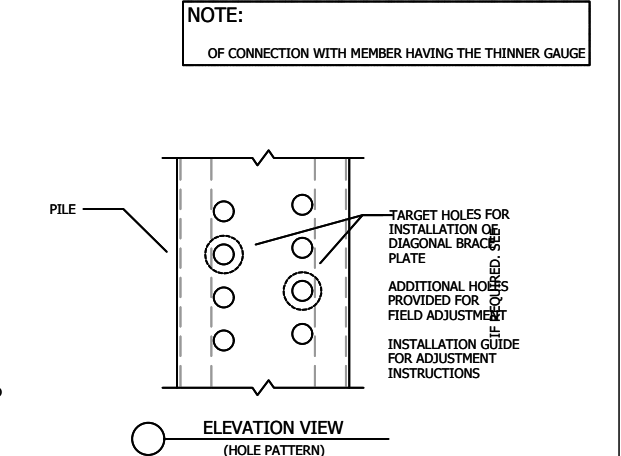
TOP CHORD TO DIAGONAL BRACE CONNECTION
(FRONT BRACE)



TOP CHORD TO DIAGONAL BRACE CONNECTION
(REAR BRACE)



DIAGONAL BRACE TO PILE CONNECTION



DIAGONAL BRACE TO PILE CONNECTION

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

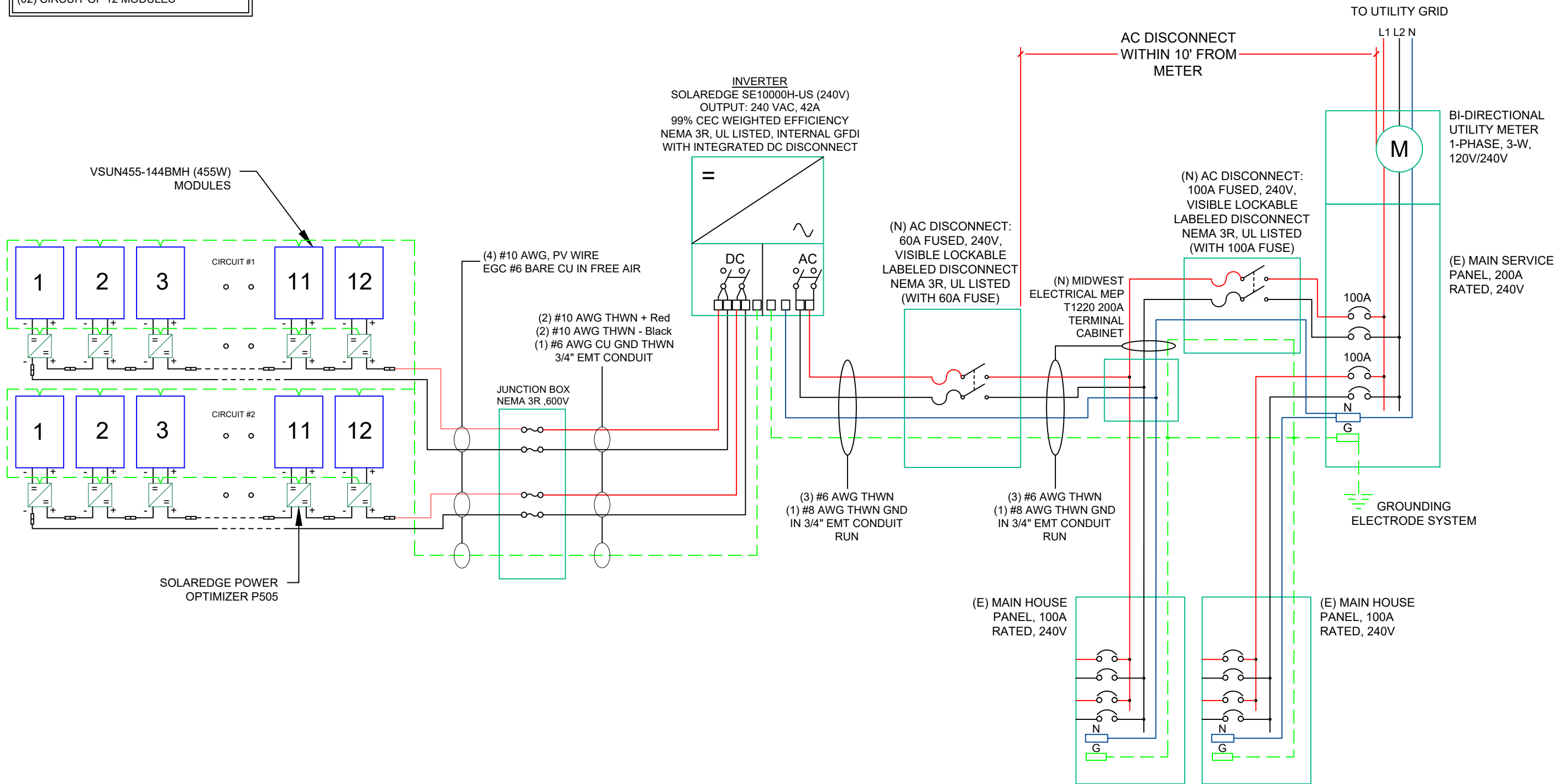
PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA, IA 50125

DC SYSTEM SIZE- 10.920 KW
AC SYSTEM SIZE- 10.000 KW

(24) VSUN455-144BMH (455W) MODULES
(01) SOLAREEDGE SE10000H-US INVERTER

(02) CIRCUIT OF 12 MODULES



1
PV-4

ELECTRICAL LINE DIAGRAM

SCALE: NTS

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
**ELECTRICAL
LINE DIAGRAM**

SHEET SIZE
**ANSI B
11" X 17"**

SHEET NUMBER
PV-4

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	VSUN455-144BMH (455W) MODULES
VMP	41.4V
IMP	11A
VOC	49.6V
ISC	11.6A
MODULE DIMENSION	82.99"L x 41.26"W x 1.38"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	SOLAREEDGE SE10000H-US
NOMINAL AC POWER	10.0 kW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	42A

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-25°
AMBIENT TEMP (HIGH TEMP 2%)	33°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	55°
CONDUCTOR TEMPERATURE RATE	90°
MODULE TEMPERATURE COEFFICIENT OF Voc	0.260000

DC CONDUCTOR AMPACITY CALCULATIONS:
ARRAY TO JUNCTION BOX :

EXPECTED WIRE TEMP (In Celsius)	33°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	0.80
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	18.75A
1.25 X MAX DC OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC (310.15)(B)(2)(a)	30.72A
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
Result should be greater than (18.75A) otherwise less the entry for circuit conductor size and ampacity	

DC CONDUCTOR AMPACITY CALCULATIONS:
FROM JUNCTION BOX TO INVERTER:

AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2)(c)	+22°
EXPECTED WIRE TEMP (In Celsius)	33°+22° = 55°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.76
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	0.80
CIRCUIT CONDUCTOR SIZE	10AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	18.75A
1.25 X MAX DC OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC (310.15)(B)(2)(a)	24.32A
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
Result should be greater than (18.75A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO MAIN PANEL :

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	33°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6AWG
CIRCUIT CONDUCTOR AMPACITY	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(B)	52.50A
1.25 X MAX INVERTER OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC (310.15)(B)(2)(a)	72.00A
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
Result should be greater than (52.50A) otherwise less the entry for circuit conductor size and ampacity	

ELECTRICAL NOTES

- 1.) ALL EQUIPMENT SHALL BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- 2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90°C WET ENVIRONMENT.
- 3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS
CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- 4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- 5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEM. CONTRACTOR SHALL FURNISH ALL NECESSARY
OUTLETS, SUPPORTS, FITTINGS , AND ACCESSORIES TO MEET APPLICABLE CODES AND STANDARDS.
- 6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE
THEM ACCORDINGLY.
- 7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND ACCESSIBLE.
- 8.) INSTALL MODULE AND RACKING GROUNDING HARDWARE PER MANUFACTURER'S INSTRUCTION.

1

SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
WIRING
CALCULATIONS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-5

⚠️ WARNING

ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED
NORMALLY GROUNDED CONDUCTORS
MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION:
DC DISCONNECT, INVERTER
(PER CODE: CEC 690.35(F))
[To be used when inverter is ungrounded]

⚠️ WARNING

ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS
PHOTOVOLTAIC SYSTEM ARE UNGROUNDED
AND MAY BE ENERGIZED

LABEL LOCATION:
DC DISCONNECT, INVERTER
(PER CODE: CEC 690.35(F))
[To be used when inverter is ungrounded]

⚠️ WARNING

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

DC VOLTAGE IS ALWAYS PRESENT
WHEN SOLAR MODULES ARE
EXPOSED TO SUNLIGHT

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: CEC 690.17(E))

⚠️ WARNING

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

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
PER CODE: CEC 690.17(E), CB

⚡ WARNING - Electric Shock Hazard ⚡

No user serviceable parts inside
Contact authorized service provider for assistance

LABEL LOCATION:
INVERTER, JUNCTION BOXES (ROOF), AC DISCONNECT
(PER CODE: CEC690.13.G.3 & CEC 690.13.G.4)

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

LABEL LOCATION:
CONDUIT, COMBINER BOX
(PER CODE: CEC690.31(G)(3)(4) & CEC 690.13(G)(4))

- ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
 - WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
 - ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]

**PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OPERATING CURRENT 42 AMPS
AC NOMINAL OPERATING VOLTAGE 240 VOLTS**

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: CEC690.54)

WARNING
INVERTER OUTPUT CONNECTION DO NOT
RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: CEC 705.12(D)(7))
[Not required if panelboard is rated not less than sum of ampere ratings
of all overcurrent devices supplying it]

CAUTION: SOLAR CIRCUIT

LABEL LOCATION:
MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES,
AND CABLE ASSEMBLIES AT LEAST EVERY 10 FT, AT TURNS AND ABOVE/BELOW PENETRATIONS
AND ALL COMBINER/JUNCTION BOXES. (PER CODE: IFC605.11.1.4)

SOLAR DISCONNECT

LABEL LOCATION:
DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: CEC690.13(B))

**CAUTION: SOLAR ELECTRIC
SYSTEM CONNECTED**

LABEL LOCATION:
WEATHER RESISTANT MATERIAL, DURABLE ADHESIVE,
UL969 AS STANDARD TO WEATHER RATING (UL LISTING
OF MARKINGS NOT REQUIRED), MIN 3/8" LETTER HEIGHT
ARIAL OR SIMILAR FONT NON-BOLD, PLACED WITHIN
THE MAIN SERVICE DISCONNECT, PLACED ON THE
OUTSIDE OF THE COVER WHEN DISCONNECT IS
OPERABLE WITH SERVICE PANEL CLOSED.
(PER CODE: CEC690.15, 690.13(B))

⚠️ WARNING

DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: CEC 705.12(D)(4))

INVERTER

PHOTOVOLTAIC DC DISCONNECT

MAXIMUM SYSTEM VOLTAGE:

480

VDC

MAXIMUM CIRCUIT CURRENT:

30

ADC

MAX RATED OUTPUT CURRENT OF THE CHARGE
CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED):

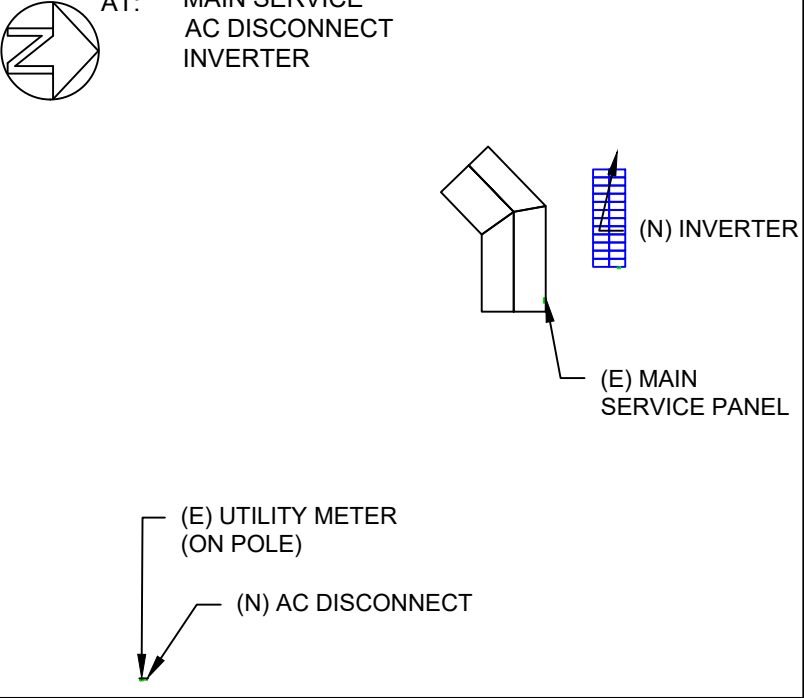
15

ADC

LABEL LOCATION:
INVERTER(S), DC DISCONNECT(S).
PER CODE(S): NEC 2017: 690.53, NEC 2014: 690.53, NEC 2011: 690.53

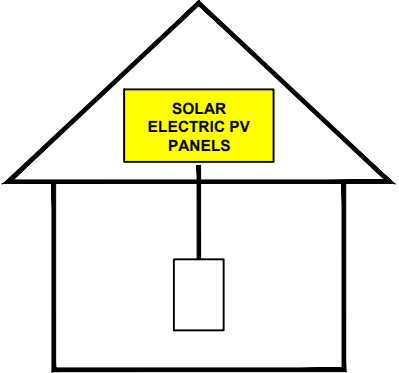
CAUTION

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



**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.



LABEL LOCATION:
ON OR NO MORE THAT 1 M (3 FT) FROM THE SERVICE DISCONNECTING
MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED.
PER CODE(S): NEC 2017: 690.56(C)(1)(a)

1 SOURCE SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

PLACARDS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-6

Page 22 of 66

1

SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

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REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

OPTIMIZER CHART

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-7

Page 28 of 66

VSUN455-144BMH

455W

Highest power output

20.60%

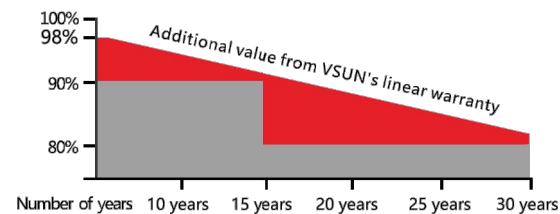
Module efficiency

25years

Material & Workmanship warranty

30years

Linear power output warranty



■ VSUN

■ Standard Warranty

Munich RE



PERC Cell Technology



Higher output power

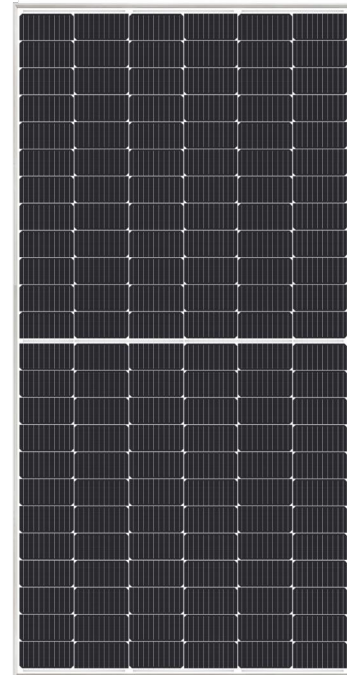


Lower risk of micro-crack



Positive tolerance offer

VSUN455-144BMH VSUN450-144BMH
VSUN445-144BMH VSUN440-144BMH



Lower risk of hot spot



Better shading tolerance



Certified for salt/ammonia corrosion resistance



Load certificates: wind to 2400Pa and snow to 5400Pa



Lower LCOE

VSUN, a BNEF Tier-1 PV module manufacturer invested by Fuji Solar, has been committed to providing greener, cleaner and more intelligent renewable energy solutions. VSUN is dedicated to bringing reliable, customized and high-efficient products into various markets and customers worldwide

最も信頼出来る再エネパートナー

Electrical Characteristics at Standard Test Conditions(STC)

Module Type	VSUN455-144BMH	VSUN450-144BMH	VSUN445-144BMH	VSUN440-144BMH
Maximum Power - Pmax (W)	455	450	445	440
Open Circuit Voltage - Voc (V)	49.6	49.4	49.2	49
Short Circuit Current - Isc (A)	11.6	11.52	11.44	11.36
Maximum Power Voltage - Vmpp (V)	41.4	41.2	41	40.8
Maximum Power Current - Imp (A)	11	10.93	10.86	10.79
Module Efficiency	20.60%	20.37%	20.14%	19.92%

Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1.5; module temperature 25°C. Pmax Sorting : 0~5W. Measuring Tolerance: ±3%.

Remark: Electrical data do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

Electrical Characteristics with different rear side power gain(reference to 450 front)

Pmax (W)	Voc (V)	Isc (A)	Vmpp (V)	Imp (A)	Pmax gain
475	49.6	12.10	41.4	11.48	5%
498	49.6	12.67	41.4	12.02	10%
542	49.7	13.82	41.3	13.12	20%
564	49.7	14.40	41.3	13.66	25%

Temperature Characteristics

NOCT	45°C(±2°C)
Voltage Temperature Coefficient	-0.26%/°C
Current Temperature Coefficient	+0.054%/°C
Power Temperature Coefficient	-0.32%/°C

Maximum Ratings

Maximum System Voltage [V]	1500
Series Fuse Rating [A]	20
Bifaciality	70%±5%

Material Characteristics

Dimensions	2108×1048×35mm (L×W×H) 82.99" x 41.26" x 1.38"
Weight	24.4kg
Frame	Silver anodized aluminum profile
Front Glass	White toughened safety glass, 3.2 mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate) or POE
Back Sheet	Transparent mesh backsheet
Cells	12×12 pieces bifacial monocrystalline solar cells series strings
Junction Box	IP68, 3 diodes
Cable&Connector	Potrait: 500 mm (cable length can be customized) , 1×4 mm 2 , compatible with MC4

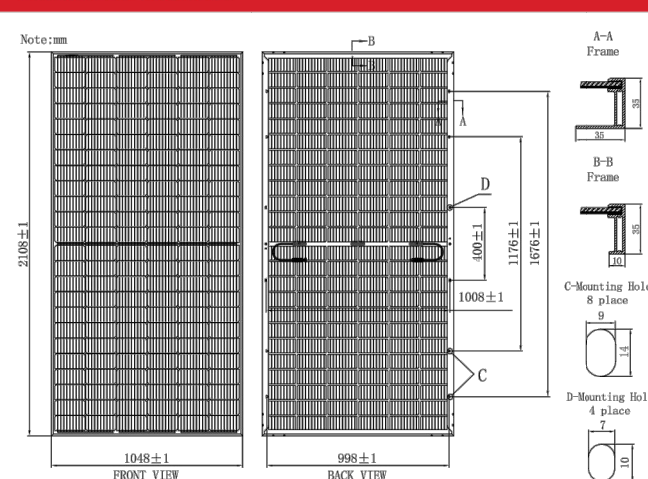
Packaging

Dimensions(L×W×H)	2140×1125×1181mm
Container 20'	155
Container 40'	341
Container 40'HC	682

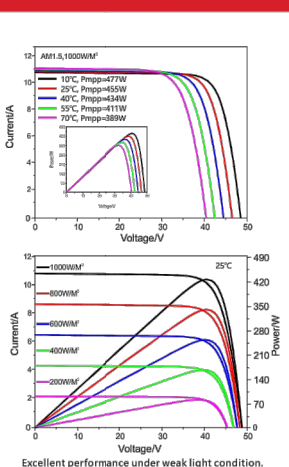
System Design

Temperature Range	-40 °C to + 85 °C
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s
Maximum Surface Load	5,400 Pa
Application class	class A

Dimensions



IV-Curves



Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-8

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P401 / P405 / P485 / P505



POWER OPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com



Power Optimizer
For North America

P320 / P340 / P370 / P400 / P401 / P405 / P485 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P401 (for high power 60 and 72 cell modules)	P405 (for high-voltage modules)	P485 (for high-voltage modules)	P505 (for higher current modules)
---	-------------------------------	--	---	------------------------------------	---	------------------------------------	------------------------------------	--------------------------------------

INPUT								
Rated Input DC Power ⁽¹⁾	320	350	370	400	405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	60	125 ⁽²⁾	83 ⁽²⁾	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	8-60	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11	11.02	11	10.1	11.75	11	14	Adc
Maximum DC Input Current		13.75		12.5	14.65	12.5	17.5	Adc
Maximum Efficiency					99.5			%
Weighted Efficiency				98.8			98.6	%
Overtoltage Category					II			

OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)								
Maximum Output Current				15				Adc
Maximum Output Voltage			60			85		Vdc

OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)								
Safety Output Voltage per Power Optimizer				1 ± 0.1				Vdc
STANDARD COMPLIANCE								
EMC				FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety				IEC62109-1 (class II safety), UL1741				
Material				UL94 V-0, UV Resistant				
RoHS				Yes				

INSTALLATION SPECIFICATIONS								
Maximum Allowed System Voltage			1000					Vdc
Compatible inverters			All SolarEdge Single Phase and Three Phase inverters					
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3			mm / in
Weight (including cables)	630 / 1.4	750 / 1.7	655 / 1.5	845 / 1.9	1064 / 2.3			gr / lb
Input Connector			MC4 ⁽³⁾		Single or dual MC4 ⁽³⁾⁽⁴⁾	MC4 ⁽³⁾		
Input Wire Length	0.16 / 0.52		0.16 or 0.9 / 0.52 or 2.95 ⁽⁵⁾		0.16 / 0.52			m / ft
Output Wire Type / Connector			Double Insulated / MC4					
Output Wire Length	0.9 / 2.95			1.2 / 3.9				m / ft
Operating Temperature Range ⁽⁶⁾			-40 to +85 / -40 to +185					°C / °F
Protection Rating			IP68 / NEMA6P					
Relative Humidity			0 - 100					%

(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed
(2) NEC 2017 requires max input voltage be not more than 80V
(3) For other connector types please contact SolarEdge
(4) For dual version for parallel connection of two modules use P485-4NMDMRM. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer connected to one PV module. When connecting a single module seal the unused input connectors with the supplied pair of seals
(5) Longer inputs wire length are available for use. For 0.9m input wire length order P401-xxlxxx
(6) For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter ⁽⁷⁾⁽⁸⁾		Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400, P401	8		10	18	
	P405, P485, P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50 ⁽⁹⁾	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000 ⁽¹⁰⁾	12750 ⁽¹¹⁾	W
Parallel Strings of Different Lengths or Orientations		Yes				

(7) For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf
(8) It is not allowed to mix P405/P485/P505 with P320/P340/P370/P400/P401 in one string
(9) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
(10) For 208V grid: it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W
(11) For 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W



1 SOURCE SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US



INVERTERS

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown per NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US

SE3000H-US		SE3800H-US		SE5000H-US		SE6000H-US		SE7600H-US		SE10000H-US		SE11400H-US	
OUTPUT													
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA					
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA					
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac					
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac					
AC Frequency (Nominal)	59.3 - 60 - 60.5 ⁽¹⁾							Hz					
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A					
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A					
GFDI Threshold	1							A					
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes												
INPUT													
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W					
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W					
Transformer-less, Ungrounded	Yes												
Maximum Input Voltage	480							Vdc					
Nominal DC Input Voltage	380				400			Vdc					
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Adc					
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5	-	-	27	Adc					
Max. Input Short Circuit Current	45							Adc					
Reverse-Polarity Protection	Yes												
Ground-Fault Isolation Detection	600k ω Sensitivity												
Maximum Inverter Efficiency	99	99.2						%					
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%					
Nighttime Power Consumption	< 2.5							W					
ADDITIONAL FEATURES													
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)												
Revenue Grade Data, ANSI C12.20	Optional ⁽³⁾												
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect												
STANDARD COMPLIANCE													
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07												
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)												
Emissions	FCC Part 15 Class B												
INSTALLATION SPECIFICATIONS													
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG					1" Maximum /14-4 AWG							
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 1-3 strings / 14-6 AWG							
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm					
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9		38.8 / 17.6	lb / kg					
Noise	< 25				<50			dBA					
Cooling	Natural Convection												
Operating Temperature Range	-13 to +140 / -25 to +60 ⁽⁴⁾ (-40°F / -40°C option) ⁽⁵⁾							°F / °C					
Protection Rating	NEMA 4X (Inverter with Safety Switch)												

^① For other regional settings please contact SolarEdge support.

^② A higher current source may be used; the inverter will limit its input current to the values stated.

^③ Revenue grade inverter P/N: SExxxxH-US000NMC2

^④ For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

^⑤ -40 version P/N: SExxxxH-US000NNJ4

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RoHS

1 SOURCE SOLAR		
1 SOURCE SOLAR		
3020 SW ORALABOR RD ANKENY, IOWA 50023 LICENSE # C132339		
REVISIONS		
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Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

PV-10

GROUND FIXED TILT UNIRAC

GROUND FIXED TILT (GFT) is an engineered system of standard, lightweight ground mount components that are in stock and ready to ship from North America's largest ground mount distribution network. UNIRAC's unmatched commercial project support makes construction easy, from permitting through installation, including region-specific engineering. GFT's refined solution, including a new shared rail design, delivers enhanced system and labor optimization. Plus, enjoy peace of mind with **SOLARMOUNT** Mounting Technology and UNIRAC's industry-leading 25-year warranty.



UNIRAC
25
YEAR
FULL-SYSTEM
WARRANTY



IN STOCK & READY TO SHIP
THE BEST SOLUTION IS AVAILABLE



COMMERCIAL PARTNERSHIP
EXPERIENCE THAT MAKES A DIFFERENCE



INSTALLATION EXPERIENCE
REFINED WITH YOU IN MIND

MAKE GROUND MOUNT SIMPLE

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

GROUND FIXED TILT UNIRAC

IN STOCK AND READY TO SHIP

THE BEST SOLUTION IS AVAILABLE

Single post configurations with 20° and 30° tilt options. Standardized components and kitted hardware bring ease of stockability and repeatability, from 2KW to multi-MW. North America's largest Ground Mount Distributor network ensures the fastest lead times and empowers you to finish your projects on schedule.

COMMERCIAL PARTNERSHIP

EXPERIENCE THAT MAKES A DIFFERENCE

Permit ready, pre-engineered regional designs save you valuable time. Standard construction drawings with general structural notes, table and component cross sections, foundation options and structural details speed permit submittal and construction. Industry leading commercial customer service supports you across your project, from design and logistics thru installation.

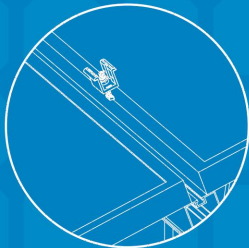
INSTALLATION EXPERIENCE

REFINED WITH YOU IN MIND

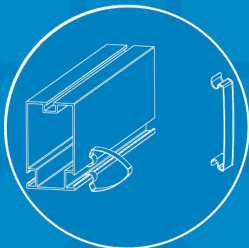
Kitted hardware, integrated bonding, and pre-assembled parts streamline construction, from pre-mobilization to installation. Straightforward connections ensure maximum strength and require no specialized labor or training. Lightweight components allow for one or two-person assembly. System flexibility enables you to mount 60 & 72 cell modules and choose from multiple foundation and rail options to optimize your projects.



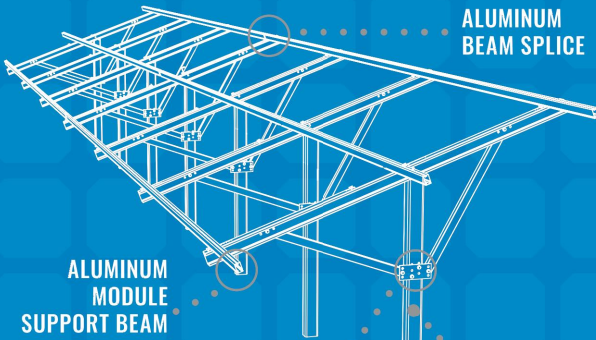
TOP MOUNTING
MODULE CLAMPS
W/ INTEGRATED BONDING



SNAP-ON
WIRE MANAGEMENT



ALUMINUM
BEAM SPLICE



ALUMINUM
MODULE
SUPPORT BEAM

DIAGONAL BRACE
ASSEMBLY

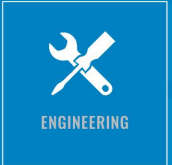
4.5" X 6"
C-PILE
FOUNDATION



UNMATCHED



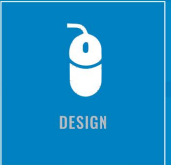
CERTIFIED



ENGINEERING



BANKABLE



DESIGN



PERMIT

ON-TIME DELIVERY

No waiting. Our goal is simple: Consistently deliver solutions and services correctly, efficiently and dependably to exceed your expectations. Our world-class operations provide a 99% on-time delivery to help you meet your commitment dates.

CERTIFIED QUALITY PROVIDER

UNIRAC is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and our commitment to first class business

BANKABLE WARRANTY

UNIRAC has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. GFT is covered by a 25-year manufacturing warranty on all parts.

PUB2018SEPT12 - PRINTED UPDATE

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

1 SOURCE
SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

DESCRIPTION	DATE	REV
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REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA, IA 50125

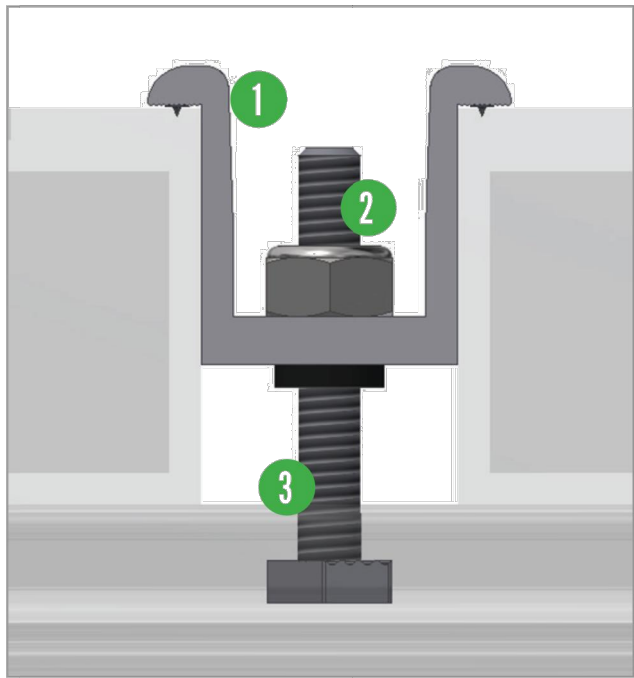
SHEET NAME
EQUIPMENT
SPECIFICATION

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ANSI B
11" X 17"

SHEET NUMBER

PV-11



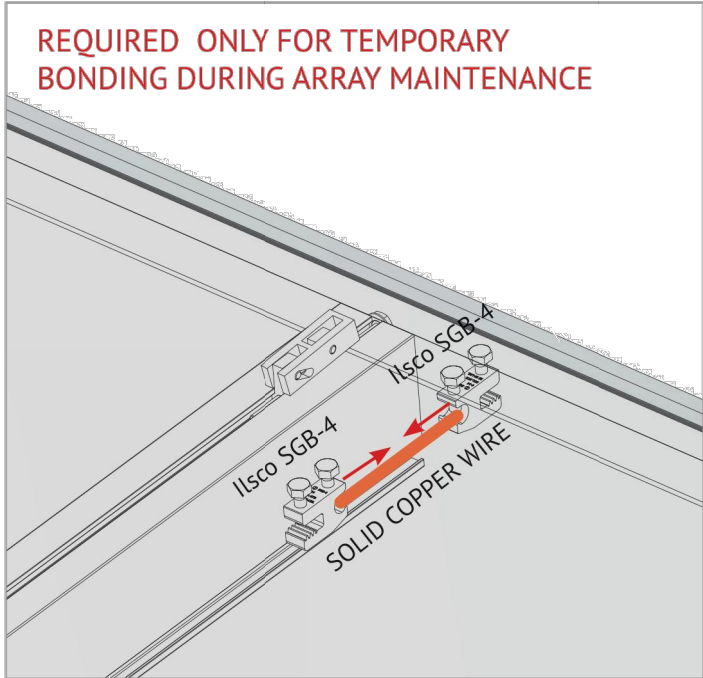
BONDING MIDCLAMP ASSEMBLY

- 1

Aluminum mid clamp with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
- 2

Stainless steel nut bonds aluminum clamp to stainless steel T-bolt
- 3

Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to SM rail



TEMPORARY BONDING CONNECTION DURING ARRAY MAINTENANCE

- When removing modules for replacement or system maintenance, any module left in place that is secured with a bonding Midclamp will be properly grounded. If a module adjacent to the end module of a row is removed or if any other maintenance condition leaves a module without a bonding mid clamp, a temporary bonding connection must be installed as shown
- Attach Ilco SGB4 to wall of GFT rail (Rail shown in picture is not a GFT rail but a representative rail for demonstration only)
 - Attach Ilco SGB4 to module frame
 - Install solid #6 AWG copper wire jumper to Ilco lugs

ELECTRICAL CONSIDERATIONS

GFT is intended to be used with PV modules that have a system voltage less than or equal to that allowable by NEC. For standard system grounding a minimum 10AWG, 105°C copper grounding conductor should be used to ground a system, according to the National Electric Code (NEC). It is the installer’s responsibility to check local codes, which may vary. See below for interconnection information.

INTERCONNECTION INFORMATION

There is no size limit on how many GFT & PV modules can be mechanically interconnected for any given configuration, provided that the installation meets the requirements of applicable building and fire codes.

GROUNDING NOTES

The installation must be conducted in accordance with the National Electric Code (NEC) and the authority having jurisdiction. Please refer to these resources in your location for required grounding lug quantities specific to your project.

The grounding / bonding components may overhang parts of the array so care must be made when walking around the array to avoid damage.

Conductor fastener torque values depend on conductor size. See product data sheets for correct torque values.

Mid clamps do not need to be repositioned for re-use.

1

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JEFF & AMY BROWN

POLRESIDENCE

1017 SOUTH Y STREET

INDIANOLA , IA 50125

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B 11" X 17"

SHEET NUMBER

PV-12



BONDING & GROUNDING
APPROVED

MODULE COMPATIBILITY

25

INSTALLATION GUIDE

PAGE

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the GROUND FIXED TILT system.

Manufacturer	Series/Model
Aleo	P18, P19, S18, S19, S59, S79
AU Optronics (BenQ Solar)	PM Series
Auxin	AXN6M610T, AXN6P610T, AXN6M612T & AXN6P612T
Axitec	AXIpower, AXIpremium, AXIblackpremium
Boviet	BVM6610 & BVM6612 Series
BYD	P6K Series & MHK-36
Canadian Solar	CS5A-M, CS6P-M, CS6P-P, CS6X-P, ELPS CS6P-MM, ELPS CS6A-MM, CS6U-P, CS6U-M, CS6K-MS, CS6K-M, CS6K-P, CS3U-P, CS3U-MS, CS3K-P, CS3K-MS, CS1K-MS, CS3W-P, CS3L-P, CS3K-MB, CS3K-PB, CS3U-MB, CS3U-PB, CS1H-MS, CS3U-MS
Centrosolar America	C-Series, E-Series
CertainTeed	CTxxxMxx-01, CTxxxP01, CTxxxMxx02, CTxxxMxx03
Eco Solargy	Orion 1000, Apollo 1000
ET Solar	ET AC Module, ET Module
Flextronics	FXS
GCL	GCL-P6 & GCL-M6 Series
Hansol	TD-AN3, TD-AN4, UB-AN1, UD-AN1
Hanwha SolarOne	HSL 60
Heliene	72M, 72P, 72M-BLK, 60M, 60P, 60M-BLK, 36M, 36P
Hyundai Heavy Industries	MG, RW, RG, KG, TG, KI, TI, RI Series
ITEK	iT HE and iT SE
JA Solar	JAP6(k)-72-xxx/4BB; JAP72SYY-xxx/ZZ; JAP6(k)-60-xxx/4BB; JAP60SYY-xxx/ZZ JAM6(k)-72-xxx/ZZ; JAM72SYY-xxx/ZZ; JAM6(k)-60-xxx/ZZ; JAM60SYY-xxx/ZZ Note: i. YY: 01, 02, 03, 09 ii. ZZ: SC, PR, BP, HiT, IB, MW YY = Backsheet, ZZ Cell technology

The modules selected for UL 2703 bonding and grounding testing represent the broadest possible range of modules on the market. The tests were performed for each specific bonding location using representative module frame profile sections. The tests performed cover the following basic module parameters:

- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A

Jinko 60 Cell	JKMxxxP-60, JKMxxxPP-60, JKMxxx PP-60B, JKM xxx M-60, JKM xxx M-60B, JK07B (JKMSxxxPP-60), JKMxxx PP-60(Plus), JKMxxxM-60HL, JKMxxxM-60L, JKMxxxM-60BL, JK-MxxxM-60LV, JKMxxxM-60-V, JKMxxxPP-60B-J4, JKMSxxxM-60, JKMSxxxPP-60B-J4, JKMSxxxPP-60, JKMSxxxP-60, JKMxxxP-72, JKMxxxPP-72, JKMSxxx-72, JKMSxxxP-72, JK07A (JKMSxxxPP-60 & JKMSxxxPP-72), JKMxxxM-72, JKMxxxM-72-V, JKMxxxM-72L-V, JK-MxxxM-72HL-V, JKMxxx-72L-V, JKMxxxPP-72-V, JKMxxxPP-72(Plus), JKMxxxPP-72B, JKMxxxP-72B,
Kyocera	KD-F Series, KU-60 Series
LG Electronics	LGxxxN1C-G4, LGxxxN2W-G4, LGxxxN1K-G4, LGxxxS1C-G4, LGxxxS2W-G4, LGxxxQ1C(Q1K)-A5, LGxxxN1C(N1K)-A5, LGxxxS1C-A5, LGxxxN2T-A5, LGxxxN2W-A5, LGxxxS2W-A5, LGxxxE1C-A5, LGxxxN1K-V5, LGxxxE1K-A5, LGxxxN1K-V5, LGxxxN1C-V5, LGxxxQ1C-V5, LGxxxN2W-V5, LGxxxE1K-A5, LGxxxN1K-V5
LONGi	LR6-60 & LR6-72 Series
Mission Solar	MSE Mono 60, MSE Mono 72 MSE PERC 60, MSE PERC 72
Mitsubishi	MJE, MLE, NSP
Panasonic	VBHNxxxSA06, VBHNxxxSA06B, VBHNxxxSA11, VBHNxxxSA11B, VBHNxxxSA15, VBHNxxxSA15B, VBHNxxxSA16, VBHNxxxSA16B, VBHNxxxKA, VBHNxxx SA17, VBHNxxxSA18, VBHNxxxKA03/04, VBHNxxxSA17G/17E, VBHNxxxSA18E
Peimar	SGxxxM, SGxxxM (BF), SGxxxM (FB)
Phono Solar Technology	All Standard Modules

1 SOURCE SOLAR

1 SOURCE SOLAR

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Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN

POLRESIDENCE

1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-13



MEMORANDUM

To: Board of Adjustment

From:

Date: January 4, 2023

Subject: Consider request from 1 Source Solar, on behalf of Jeff and Amy Brown, for a Special Use Permit for a ground mounted solar energy system located at 1017 South Y Street

Recommendation:

Attachments:

1. 1. Staff Report
2. 2. Special Use Permit
3. 3. Purpose of Solar Ground Array
4. 4. Site Permit Plan



community development

110 N. First Street, Indianola IA 50125-0299 • www.indianolaiowa.gov
(515) 961-9430 • comdev@indianolaiowa.gov

staff report

board of adjustment

Date of Meeting: January 4, 2023

Agenda Item: 5.C Consider request from 1 Source Solar, on behalf of Jeff and Amy Brown, for a Special Use Permit for a ground mounted solar energy system located at 1017 South Y Street

Application Type: Special Use Permit

Applicant: 1 Source Solar

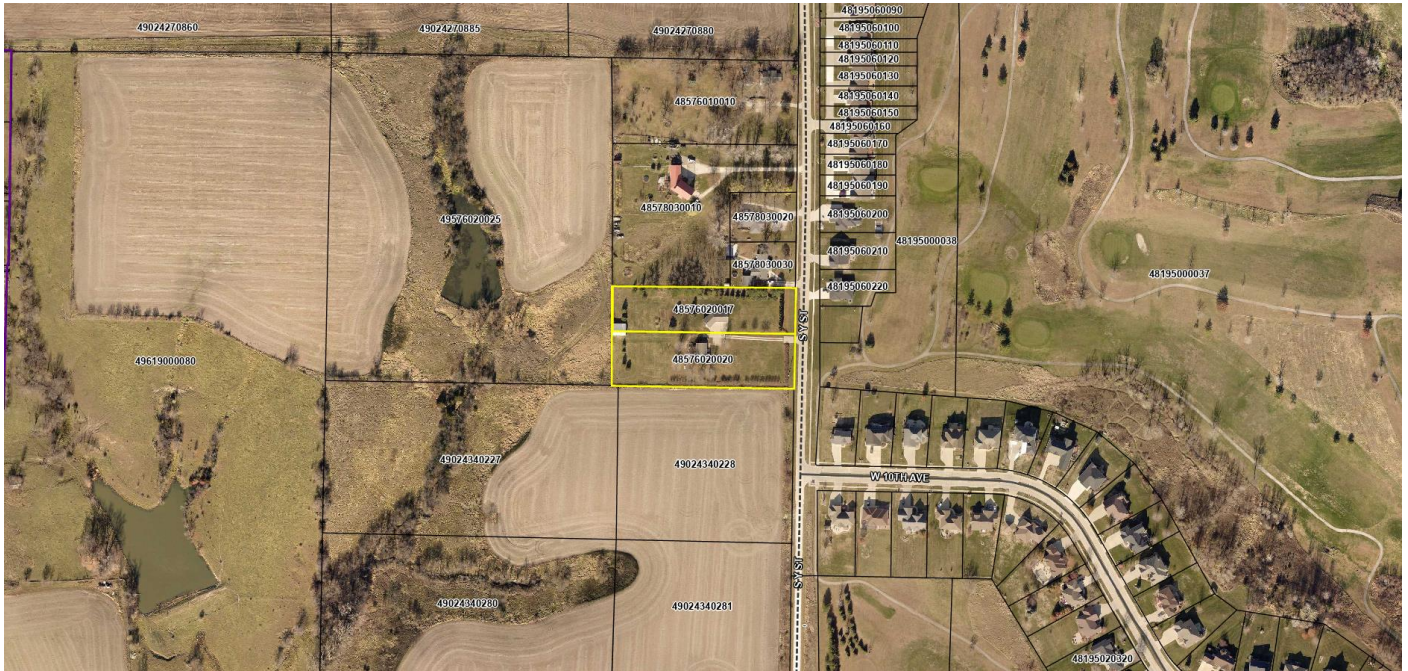
Property Owner: Jeffrey A and Amy C Brown

Property Address/Parcel: 1017 South Y Street

Zoning: A-1, Agricultural/Open Space Zoning District

Application Summary

1 Source Solar, on behalf of Jeff and Amy Brown, is requesting approval of a Special Use Permit for a ground mounted solar energy system at 1017 South Y Street.



applicable code sections

165.02 POWERS AND DUTIES OF THE BOARD OF ADJUSTMENT. The Board of Adjustment has the following powers and duties:

- i. Special Use Permit Application - A site plan (including number of copies), application form, and any additional information and details as specified and required by the Zoning Administrator as necessary to determine compliance with all applicable codes and requirements shall be submitted to the Zoning Administrator along with the Special Use Permit Application fee as established by resolution of the City Council.
- ii. Special Use Permit Procedure - The Special Use Permit Application shall be reviewed by the Zoning Administrator, or their designee, for completeness. Incomplete applications shall be returned to the applicant with a list of the missing items or details. Applications deemed completed shall be distributed to other city departments and other agencies as necessary for review and comment as to its compliance with all zoning regulations and other pertinent city codes, regulations, and policies.
- iii. Special Use Permit Review by Board of Adjustment - Subsequent to review by the Zoning Administrator and other city departments and agencies, the Zoning Administrator, or their designee, shall submit to all members of the Board a copy of the Special Use Permit

Application along with a written recommendation as to the application's conformity with the rules and regulations of the city.

- iv. The Board shall subsequently hold a duly noticed public hearing as prescribed by their rules of procedures, and the noticing requirements contained herein, and review the Application for conformity with the zoning regulations and standards. The Board may approve, approve with conditions, or deny the Special Use Permit Application.

Section 165.05(5)(B) Solar Energy Systems

- (1) Intent. The intent of this section is to establish provisions for using an alternate source of energy apart from the prevailing energy sources of natural gas and electricity, namely solar energy, and to provide standards for the construction and use of solar energy systems. The City finds these regulations are necessary to ensure that Solar Energy Systems are appropriately designed, sited and installed.
- (2) Definitions. The following terms are defined for this section:
 - a. "Building-integrated Solar Energy Systems" means a solar energy system that is an integral part of a principal or accessory building, rather than a separate mechanical device, replacing or substituting for an architectural or structural component of the building. Building-integrated systems include but are not limited to photovoltaic or hot water solar energy systems that are contained within roofing materials, windows, skylights, and awnings.
 - b. "Ground-mounted" means a solar energy system mounted on a rack or pole that rests or is attached to the ground. Ground-mounted systems are accessory to the principal use.
 - c. "Roof-mount" means a solar energy system mounted on a rack that is fastened to or ballasted on a structure roof. Roof-mount systems are accessory to the principal use.
 - d. "Solar Access" means unobstructed access to direct sunlight on a lot or building through the entire year, including access across adjacent parcel air rights, for the purpose of capturing direct sunlight to operate a solar energy system.
 - e. "Solar Carport" means a solar energy system of any size that is installed on a carport structure that is accessory to a parking area, and which may include electric vehicle supply equipment or energy storage facilities.
 - f. "Solar Mounting Devices" means racking, frames, or other devices that allow the mounting of a solar collector onto a roof surface or the ground.
- (3) Restrictions. Except as provided in this article, no solar energy system or solar collection device shall be erected, constructed, altered or maintained on any lot within the city, without first receiving a permit to do so and complying with the regulations herein this chapter.
- (4) General Regulations.
 - a. ***Building-integrated solar energy systems and roof-mounted and building-mounted solar energy systems*** are a permitted accessory use in all zoning districts where structures of any sort are allowed, subject to certain requirements as set forth below. Solar carports and associated electric vehicle charging equipment are a permitted accessory use on surface parking lots in all districts regardless of the existence of another building.

- b. **Ground-mounted solar energy systems** shall require approval of a Special Use Permit from the Board of Adjustment.

(5) Standards. All solar energy systems or solar collection devices shall meet the following standards and conditions:

- a. **Height** – Solar energy systems must meet the following height requirements:
- i. Building-mounted or roof-mounted solar energy systems shall not exceed the maximum allowed height in any zoning district. For purposes for height measurement, solar energy systems other than building-integrated systems shall be given an equivalent exception to height standards as building-mounted mechanical devices or equipment.
 - ii. Ground-mounted or pole-mounted solar energy systems shall not exceed 15 feet in height when oriented at maximum tilt.
 - iii. Solar carports in non-residential districts shall not exceed 20 feet in height.
- b. **Setback** - Solar energy systems must meet the accessory structure setback for the zoning district and principal land use associated with the lot on which the system is located, except as allowed below.
- i. Roof-mounted or Building-mounted Solar Energy Systems - The collector surface and mounting devices for roof-mounted solar energy systems shall not extend beyond the exterior perimeter of the building on which the system is mounted or built, unless the collector and mounting system has been explicitly engineered to safely extend beyond the edge, and setback standards are not violated. Exterior piping for solar hot water systems shall be allowed to extend beyond the perimeter of the building on a side-yard exposure. Solar collectors mounted on the sides of buildings and serving as awnings are considered to be building-integrated systems and are regulated as awnings.
 - ii. Ground-mounted Solar Energy Systems - Ground-mounted solar energy systems may not extend into the side-yard or rear setback when oriented at minimum design tilt, except as otherwise allowed for building mechanical systems.
- c. **Visibility** – Solar energy systems shall be designed to minimize visual impacts from the public street right-of-way.
- i. Building Integrated Photovoltaic Systems - Building integrated photovoltaic solar energy systems shall be allowed regardless of whether the system is visible from the public right-of-way, provided the building component in which the system is integrated meets all required setback, land use or performance standards for the district in which the building is located.
 - ii. Aesthetic restrictions - Roof-mounted or ground-mounted solar energy systems shall not be restricted for aesthetic reasons if the system is not visible from the closest edge of any public right-of-way other than an alley, or if the system meets the following standards.
 - (a) Roof-mounted systems on pitched roofs that are visible from the nearest edge of the front right-of-way shall have the same finished pitch as the roof and be no more than ten inches above the roof.
 - (b) Roof-mount systems on flat roofs that are visible from the nearest edge of the front right-of-way shall not be more than five feet above the finished roof and are exempt from any rooftop equipment or mechanical system screening.

- iii. **Reflectors** - All solar energy systems using a reflector to enhance solar production shall minimize glare from the reflector affecting adjacent or nearby properties.
- d. **Lot Coverage** – Ground-mounted systems total collector area shall not exceed half the building footprint of the principal structure.
 - i. Ground-mounted systems shall be exempt from lot coverage or impervious surface standards if the soil under the collector is maintained in vegetation and not compacted.
 - ii. Ground-mounted systems shall not count toward accessory structure limitations.
- e. All solar energy system components shall be located as to be accessible for required routine maintenance without trespassing on adjoining property or disassembling any major portion of the structure or building.
- f. All solar energy system components must be obtained from manufacturers who regularly engage in production of solar energy apparatus. The design and drawings of any system or apparatus shall be completed and sealed by a licensed design professional.

analysis

Subject Property

1 Source Solar, on behalf of Jeff and Amy Brown, is requesting approval of a special use permit that would allow a ground mounted solar system to be placed in the front and side yard of 1017 South Y Street. The proposed placement of the system would be setback 209' from the front property line. This property is 3.19 acres in size. It contains a single-family dwelling, built in 1986, that is setback about 235' from the front property line. The property also contains a detached pole barn garage structure that was built in 2003, that is setback about 185' from the front property line. This property was developed while in unincorporated Warren County and was annexed into the City of Indianola in 2008. The property takes access off South Y Street, a paved major collector.



Figure 1. Street view of the subject property (October 2007)

The subject property is in the A-1, Agricultural/Open Space zoning district. The subject property and its structures are considered legal, non-conforming as they do not meet the minimum lot size requirement of the A-1 zoning district (15 acres), and the detached garage is partially located within the front yard. Ground mounted solar energy systems are allowed as accessory use and require approval of a Special Use Permit from the Board of Adjustment. The proposed ground mounted solar system is in both the side and front yards of this property, north of the existing detached pole barn garage. A variance has been requested from the Board of Adjustment to allow this system in the front and side yard.

To the north of the property exists a 0.53-acre lot, as well as a 3.31-acre lot that both contain a single-family dwelling. To the west exists a 16.68-acre undeveloped lot, and to the south contains a 4.56-acre lot that is in row-crop production. All the land to the north, west and south is zoned in the A-1, Agricultural/Open Space zoning district. To the east of the property are lots located in the Deer Run Planned Unit Development (PUD) and contain a single-family dwelling and access to the Deer Run golf course.

Future Land Use

According to the "Elevate Indianola" Comprehensive Plan, the future land use of this area is designated as Low/Medium Density Residential. The low/medium density land use designation guides up to 15 dwelling units per gross acre, single-family detached dwellings, accessory dwelling units, single family attached (townhomes and row houses), multi-family (condos and apartments), and student housing, civic uses and places of worship, and lastly, parks, open spaces, and trails.

findings of fact

165.02(3)(B)(3)(c)(v), in order to approve a Special Use Permit, the Board shall make the following findings:

1. The proposed use, site improvements, and site plan comply with the minimum requirements of the zoning district in which it is proposed to be located

The applicant has provided a site plan with their application that shows the existing site features of the property. The proposed use and improvements meet the minimum requirements of the A-1 zoning district, so long as the variance request is approved by the Board of Adjustment. The site plan was reviewed by the city's development review team, with no comments provided.

2. The property is of adequate size to accommodate the proposed use and site improvements including setbacks, open space, stormwater management, and off-street parking

The property at 1017 South Y Street is 3.19 acres, or 138,956 square feet. The existing single-family dwelling located on the property is 1,232 square feet, while the detached garage is 1,658 square feet. The property is of sufficient size to accommodate the proposed ground mounted solar system.

3. The proposed use and site improvements will not unduly impact the health, safety, and general welfare of persons residing or working in adjoining property or surrounding areas

Based on the proposed use, the health, safety, and welfare of citizens would not be impacted. The site plan shows the system will be setback 209' from the front property line, and its location will be buffered by established shrubbery on the front and north side property lines.

4. The proposed use and site improvements shall not unduly increase traffic congestion

Traffic congestion will not increase with the proposed use. The property takes access off South Y Street, a paved major collector.

5. The proposed use and site improvements will not unduly burden public utilities or increase risk to flooding

The proposed ground mounted solar system would unduly not burden public utilities or increase risk to flooding. The property is located in Mid-American's electrical territory.

6. The proposed use and site improvements are compatible with the surrounding neighborhood and shall not diminish or impair established property values in adjoining or surrounding property

The proposed ground mounted solar system will be compatible with the surrounding neighborhood and will not diminish established property values in the surrounding area. As previously mentioned, the site plan shows the system will be setback 209' from the front property line, and its location will be buffered by established shrubbery on the front and north side property lines.

7. The issuance of the Special Use Permit will not endanger, jeopardize, or harm the health, safety or welfare of the properties and the community

As previously mentioned, the proposed use and site improvements will not endanger or harm the health, safety and welfare of properties or the community.

alternatives

The City of Indianola Board of Adjustment may consider the following alternatives:

- 1) The City of Indianola Board of Adjustment approves the variance request, as submitted.
- 2) The City of Indianola Board of Adjustment approved the variance request, with conditions.
- 3) The City of Indianola Board of Adjustment denies the variance request.
- 4) The City of Indianola Board of Adjustment remands the variance request back to the applicant and/or staff for further review and/or modifications and directs staff to place this item on a future Board of Adjustment agenda.

recommendation

Staff recommends that the Indianola Board of Adjustment move alternative 1, to approve the Special Use Permit request as submitted.

BOARD OF ADJUSTMENT APPLICATION

Community Development

110 North 1st Street, Indianola, Iowa 50125-0299
(515) 961-9430 • comdev@indianolaiowa.gov



PROPERTY OWNER

(Last Name) Brown
(First Name) Jeff + Amy
(Address) 1017 S. Y Street
(City) Indianola (State) IA (Zip) 50125
(Phone) 515-210-1851 (Email) jeffb@jeffnamy.biz.com

APPLICANT (if not Property Owner)

(Last Name) _____
(First Name) Source Solar
(Address) 3020 6W oralabor Rd
(City) Ankney (State) IA (Zip) 50023
(Phone) 515-289-1774 (Email) nathan@source.solar.com

APPEAL

Submittal Requirements:

All submittal requirements must be completed.
Incomplete applications will not be considered

- ☐ Completed Application
☐ Filing Fee: \$150 per request
☐ Written narrative indicating where it is alleged there is error in any order, requirement, decision, or determination made by the Administrative Officer in the enforcement of this Code of Ordinances of Indianola, Iowa.
☐ Other Information as required by Director

SPECIAL USE PERMIT

Submittal Requirements:

All submittal requirements must be completed.
Incomplete applications will not be considered

- ☒ Property Address: 1017 S. Y Street
☒ Completed Application
☐ Filing Fee: \$150 per request
☒ Site Plan and Elevations as outlined in 165.06
☒ Written narrative indicating the special use permit sought and response to the criteria outlined in Section 165.02(3)(B)(3)(c)(v) of the Code of Ordinances of Indianola, Iowa
☒ Other Information as required by Director

VARIANCE

Submittal Requirements:

All submittal requirements must be completed.
Incomplete applications will not be considered

- ☐ Property Address: _____
☐ Completed Application
☐ Filing Fee: \$150 per request
☐ Site Plan and Elevations
☐ Written narrative indicating justification for proposed variance and response to the criteria outlined in Section 165.02(3)(B)(3)(b) of the Code of Ordinances of Indianola, Iowa
☐ Other Information as required by Director

I certify that the information and exhibits submitted are true and correct to the best of my knowledge and that in filing this application I am acting with the knowledge, consent and authority of the owner(s) of the property. Pursuant to said authority, I hereby permit City officials to enter upon the property for the purpose of inspection related to this application.

Signature Nathan Hamersley
Name (printed) Nathan Hamersley Date 12/5/2022

FOR OFFICE USE ONLY: Code to 45180

Date Received: _____
Receipt No: _____
Receipt Amount: _____
BOA Agenda Date: _____

Purpose of Solar Ground Array

1017 S Y Street
Indianola, IA 50125

The purpose of the solar ground installation at 1017 S Y Street is to convert DC to AC current for self-generation on property. Solar array has been placed out of front or side viewing as requested per Section 165.2(3)(B)(c)(v) in the state of Iowa included in Ordinances of Indianola.

Nathan Hamersley
Designer/Engineer
1 Source Solar

SCOPE OF WORK

PHOTOVOLTAIC SYSTEM SUMMARY

SYSTEM SIZE: DC - 10.920 KW

AC - 10.000 KW

MODULES: (24) VSUN455-144BMH (455W) MODULES

INVERTER: (1) SOLAREEDGE SE10000H-US INVERTER

ARRAY 1:-ARRAY TILT: 30°

ARRAY 1:-AZIMUTH: 180°

ELECTRICAL INFORMATION

UTILITY COMPANY: MIDAMERICAN ENERGY CO.

MAIN SERVICE AMPERAGE: 200A

GOVERNING CODES & STANDARDS

INTERNATIONAL RESIDENTIAL CODE 2018

INTERNATIONAL BUILDING CODE 2018

INTERNATIONAL PLUMBING CODE 2018

INTERNATIONAL FIRE CODE 2018

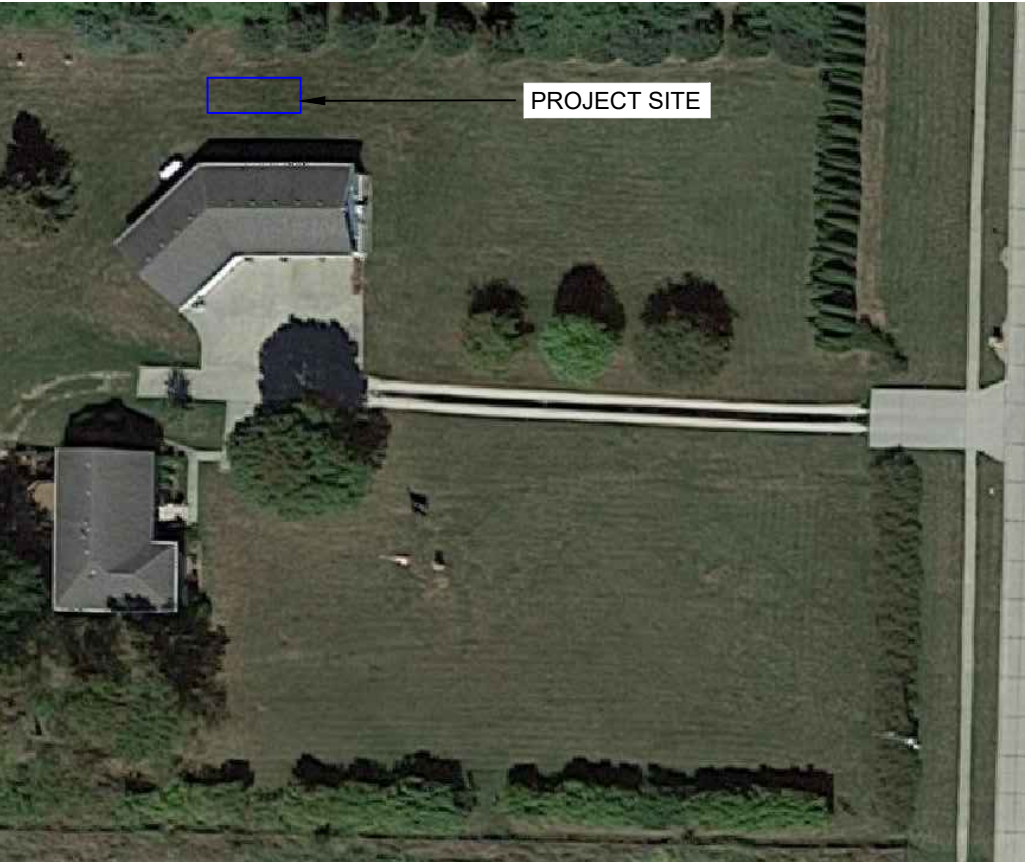
NATIONAL ELECTRIC CODE 2020

GENERAL NOTES:

- CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO INITIATING CONSTRUCTION.
- CONTRACTOR SHALL REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
- ALL EQUIPMENT SHALL BE LISTED BY U.L. (OR EQUAL) AND LISTED FOR ITS SPECIFIC APPLICATION.
- ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.
- ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- ACCESS TO ELECTRICAL COMPONENTS OVER 150 VOLTS TO GROUND SHALL BE RESTRICTED TO QUALIFIED PERSONNEL.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
- PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER G.E.C. PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
- PV MODULE RACKING RAIL SHALL BE BONDED TO BARE COPPER G.E.C. VIA WEEB LUG, ILSCO GBL-4DBT LAY-IN LUG, OR EQUIVALENT LISTED LUG.
- GROUNDING ELECTRODE CONDUCTOR (G.E.C.) SHALL BE CONTINUOUS AND/OR IRREVERSIBLY SPLICED/WELDED.
- ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
- WORKING SPACE AROUND ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26

SHEET INDEX

PV-0	COVER SHEET
PV-1	SITE PLAN
PV-2	PV MODULES
PV-2A	ELECTRICAL SITE PLAN
PV-3	ATTACHMENT DETAIL
PV-3A	ATTACHMENT DETAIL
PV-4	ELECTRIC LINE DIAGRAM
PV-5	WIRING CALCULATIONS
PV-6	PLACARDS
PV-7	OPTIMIZER CHART
PV-8 to 13	EQUIPMENT SPECIFICATION



1 AERIAL VIEW
PV-0 SCALE: NTS



2 VICINITY MAP
PV-0 SCALE: NTS

1

SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

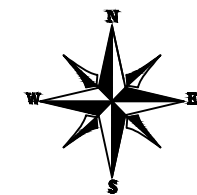
COVER SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-0



1SOURCE
1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

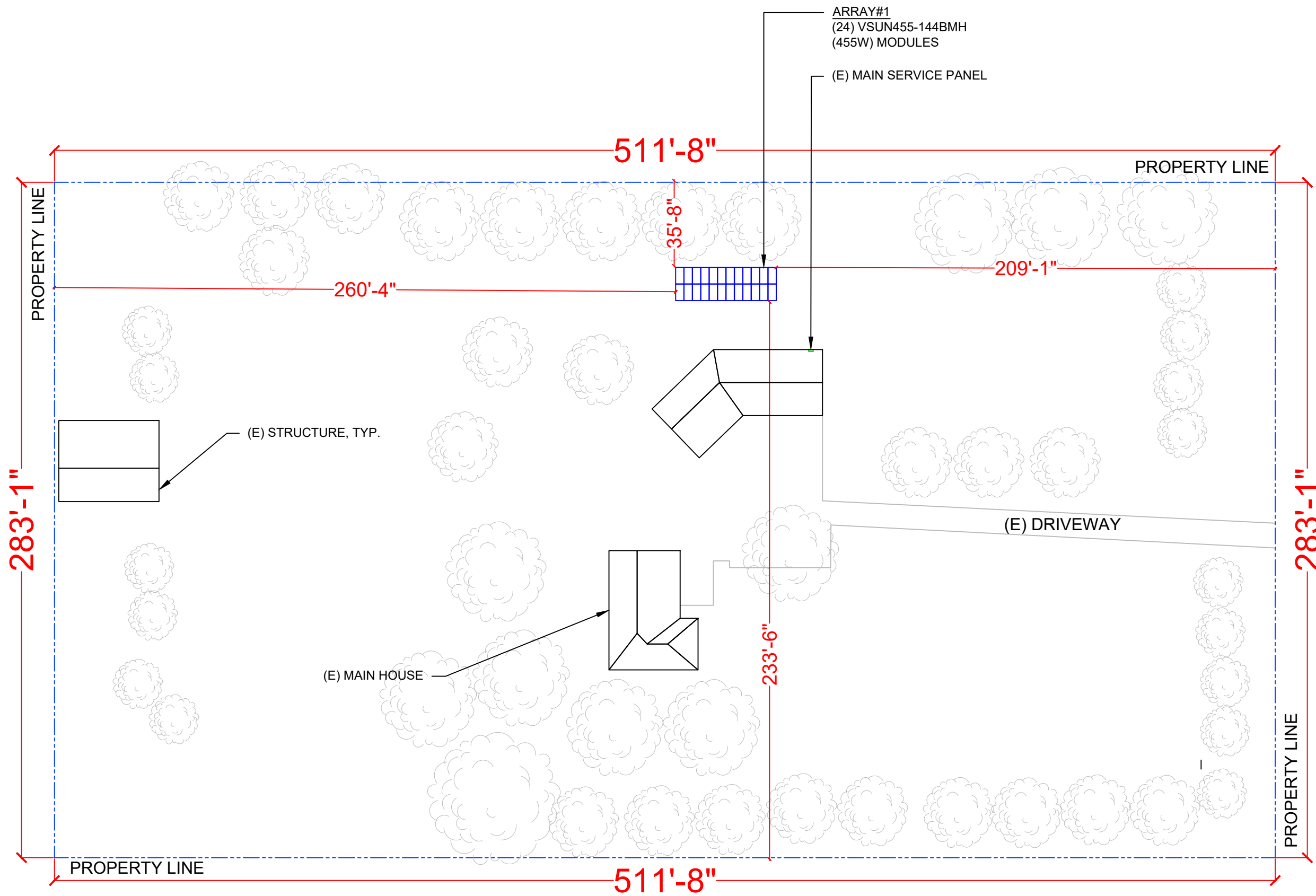
PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

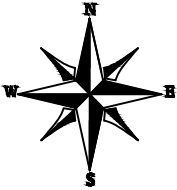
SHEET NUMBER
PV-1



MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 24 MODULES
MODULE TYPE = VSUN455-144BMH (455W) MODULES
MODULE WEIGHT = 53.79 LBS / 24.4 KG.
MODULE DIMENSIONS = 82.99" x 41.26" = 23.78 SF
UNIT WEIGHT OF ARRAY = 2.26 PSF

ARRAY DESCRIPTION			
ROOF TYPE		GROUND MOUNT	
ARRAY	ARRAY TILT	GROUND TILT	AZIMUTH
#1	30°	0°	180°



1 SOURCE SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

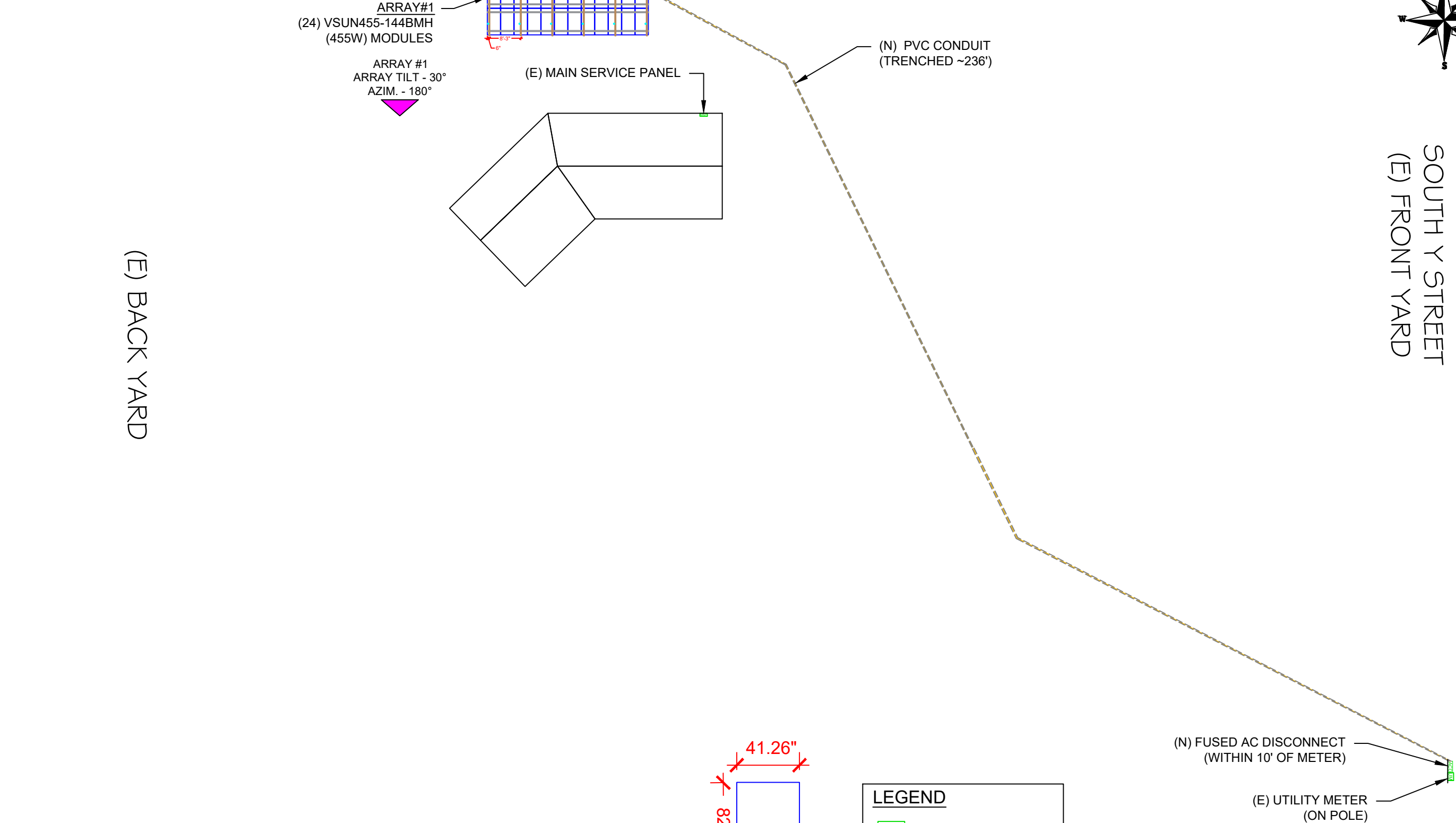
SHEET NAME
PV MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

(E) BACK YARD

SOUTH Y STREET
(E) FRONT YARD

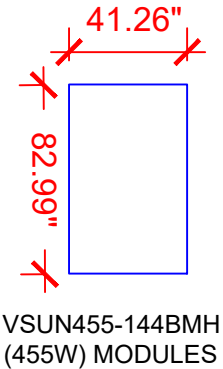


1

PV MODULES

PV-2

SCALE: 0.003122



LEGEND

MSP

 - MAIN SERVICE PANEL

JB

 - JUNCTION BOX

ACD

 - AC DISCONNECT

INV

 - INVERTER

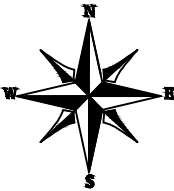
- CONDUIT

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	24	VSUN455-144BMH (455W) MODULES
INVERTER	1	SOLAREEDGE SE10000H-US INVERTER
AC DISCONNECT	1	60A FUSED, 240V, NEMA 3R, UL LISTED,
OPTIMIZER	24	SOLAREEDGE POWER OPTIMIZER P505
MID CLAMPS	44	MID CLAMPS
END CLAMPS	8	END CLAMPS

DC SYSTEM SIZE- 10.920 KW
AC SYSTEM SIZE- 10.000 KW

(24) VSUN455-144BMH (455W) MODULES
(01) SOLAREEDGE SE10000H-US INVERTER

(02) CIRCUIT OF 12 MODULES



1

SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

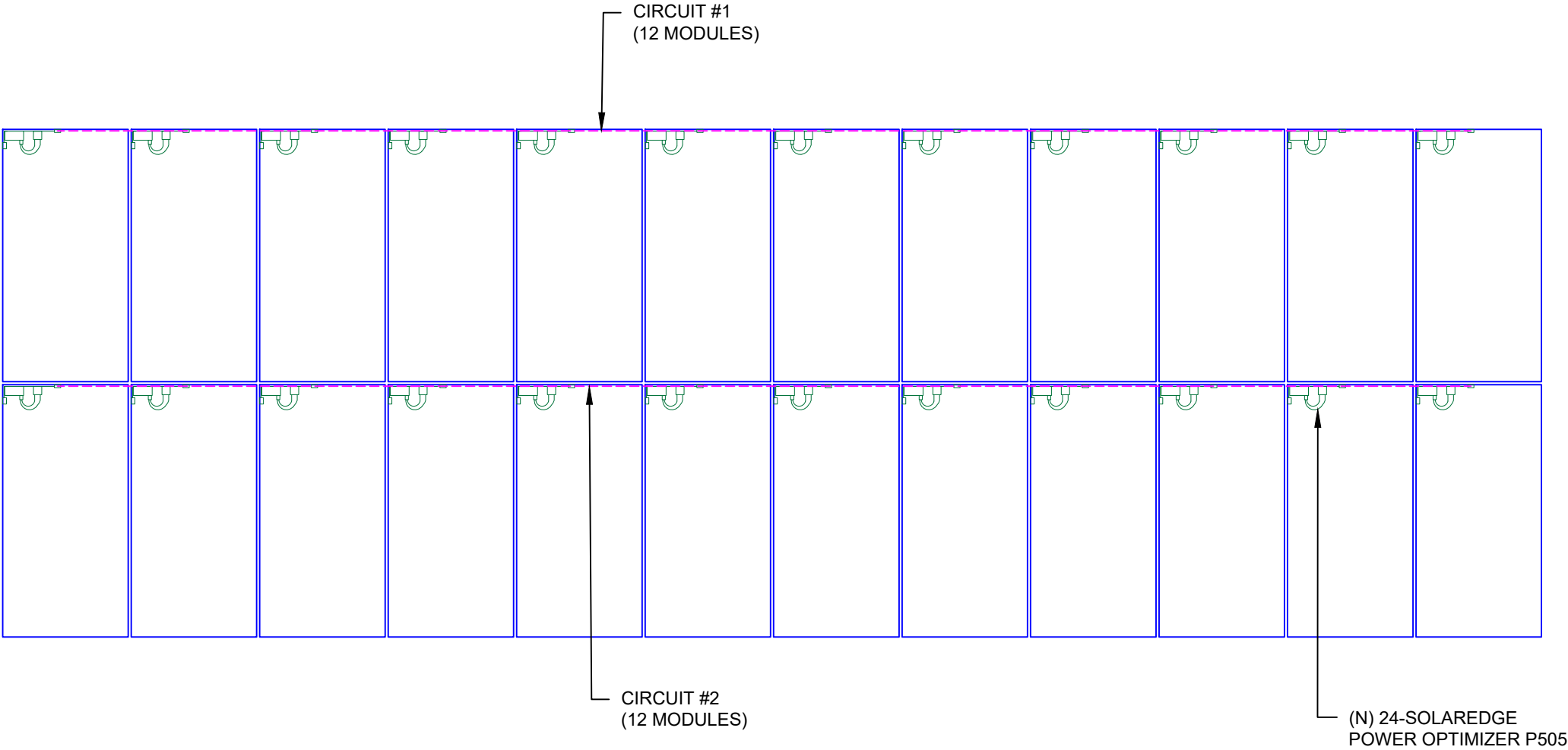
SHEET NAME
ELEC. SITE
PLAN

SHEET SIZE

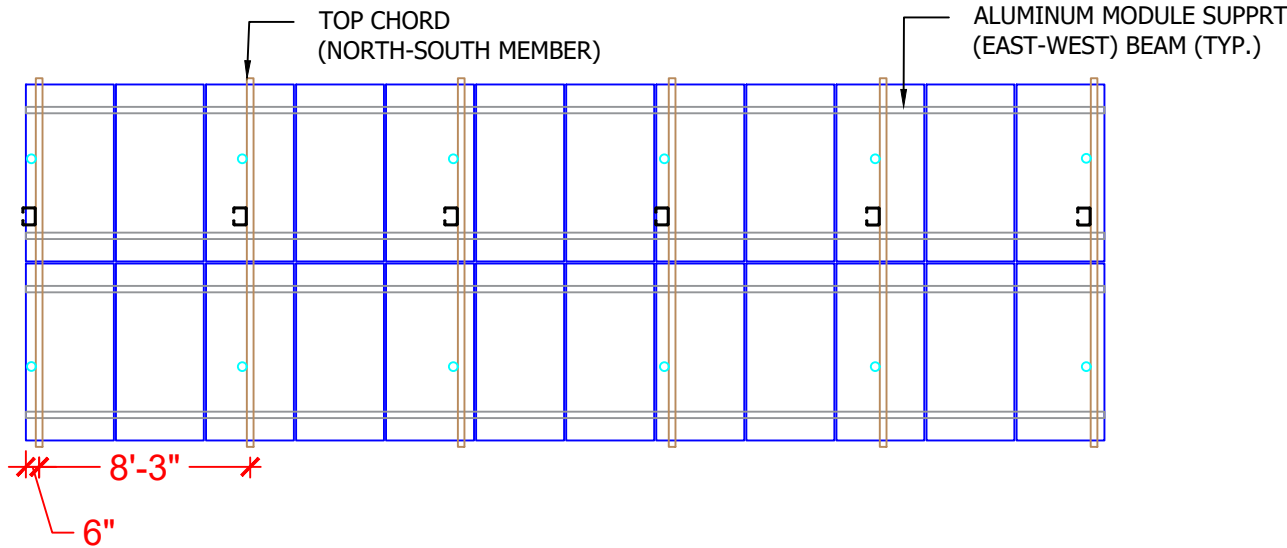
ANSI B
11" X 17"

SHEET NUMBER

PV-2A



ARRAY #1



20 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

(REFER TO SHEET SR-200 FOR PILE STICK-UP HEIGHT) (c)

FOUNDATION TYPE	DETAIL NUMBER	NO FROST DEPTH			FROST DEPTH = 3.5 FT OR LESS			FROST DEPTH = 5.0 FT		
		DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	DIMENSION "D"	DIMENSION "E"	DIMENSION "F"
FULL CAST IN-PLACE CONCRETE	400	6'-0" (a)	--	--	6'-0" (a)	--	--	8'-0"	--	--
CAST IN-PLACE CONCRETE	401	--	--	--	6'-0" (a)	--	--	8'-0"	--	--
PARTIAL DRIVEN PILE WITH FROST BREAK (b)	402	--	--	--	--	3'-6"	8'-0"	--	5'-0"	--
FULLY DRIVEN PILE (b)	403	--	--	8'-0"	--	--	8'-0"	--	--	10'-6"

(a) THIS 6'-0" EMBEDMENT REQUIRES CUTTING 24" OFF OF THE BOTTOM OF A 12'-6" LONG C-PILE. (DO NOT CUT THE END OF PILE WITH PRE-PUNCHED HOLES.) IF CUTTING IS NOT PREFERRED, AN 8'-0" CONCRETE FOUNDATION IS ACCEPTABLE.

(b) SHALLOWER EMBEDMENT DEPTHS ARE POSSIBLE, HOWEVER, PILE TESTING AND/OR APPROVAL FROM A GEOTECHNICAL OR PROFESSIONAL ENGINEER ARE REQUIRED.

(c) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 20 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 8'-1" OR GREATER, REQUIRE A 15 FT LONG PILE.

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

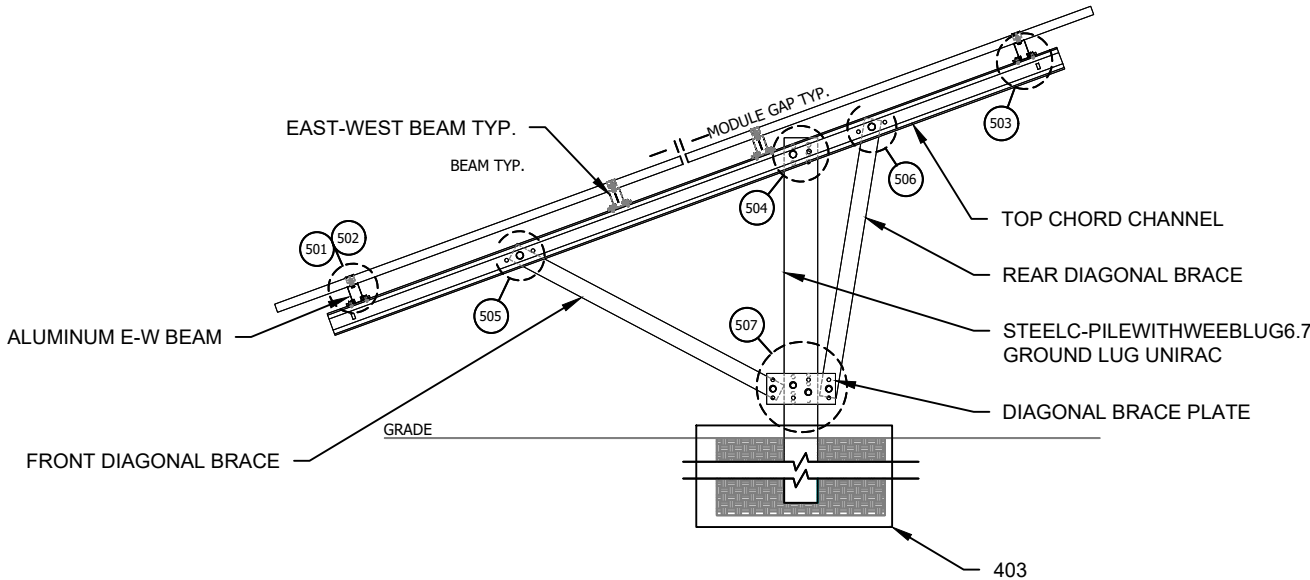
RACKING
DETAIL

SHEET SIZE

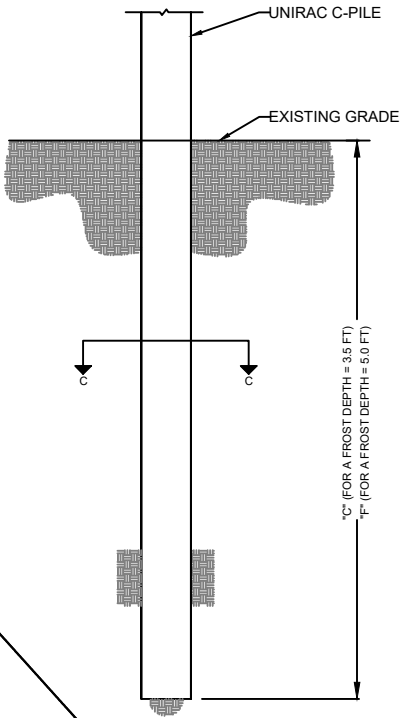
ANSI B
11" X 17"

SHEET NUMBER

PV-3



NOTE:
PILES MUST BE INSTALLED
WITH C-PILE OPEN TO THE
WEST - AS SHOWN



SECTION C-C
TOP VIEW

403

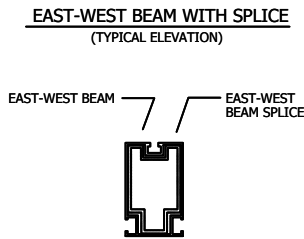
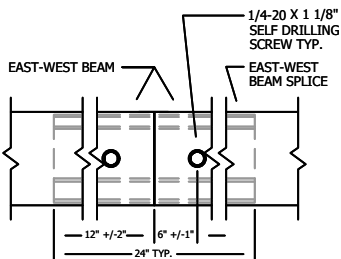
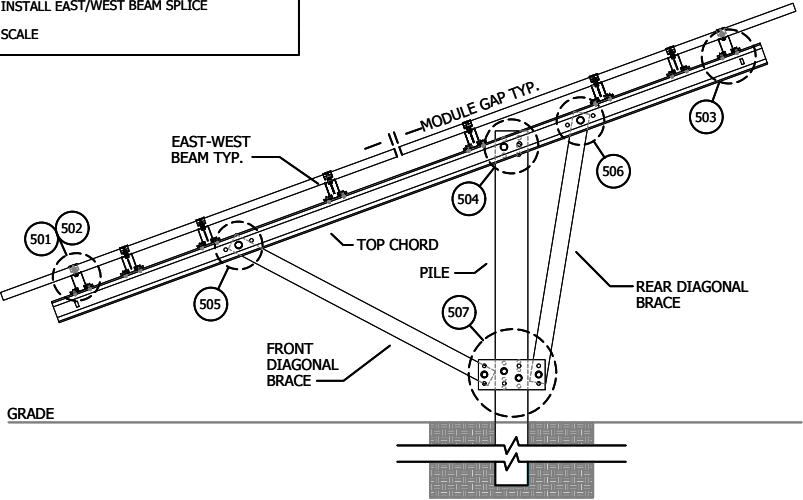
FULLY DRIVEN PILE
(ALTERNATE OPTION)

NOT TO SCALE

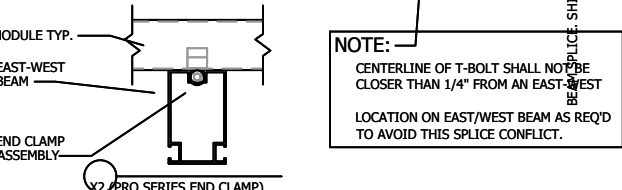
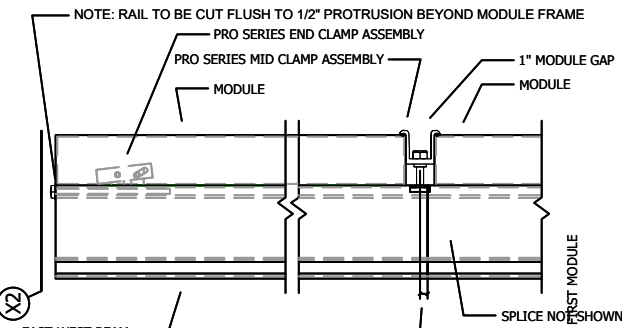
- FOUNDATION 403: FULLY DRIVEN PILE
1. DRIVEN PILE FOUNDATIONS MAY NOT BE USED IN SOILS THAT CONTAIN SILT OR CLAY WITH GROUNDWATER WITHIN 12 FEET OF THE SURFACE UNLESS APPROVED BY A GEOTECHNICAL ENGINEER. IT IS RECOMMENDED TO VERIFY GROUNDWATER IS NOT PRESENT IF USING THIS FOUNDATION TYPE IN FROST PRONE REGIONS.
 2. PILES MUST BE INSTALLED TO THE FULL DEPTH. PILES NOT DRIVEN TO FULL DEPTH ARE CONSIDERED FAILED PILES AND A DIFFERENT FOUNDATION MUST BE UTILIZED.
 3. FOUNDATIONS MUST NOT BE INSTALLED IN ORGANIC SOILS OR IN AREAS WITH GROUNDWATER NEAR THE SURFACE.
 4. PILE EMBEDMENT MUST BE DETERMINED BY A LICENSED CIVIL ENGINEER OR BY SITE PILE TESTS.

RACKING DETAIL NOTES:

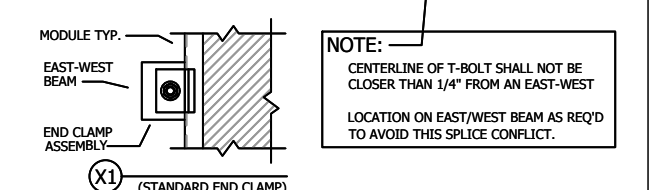
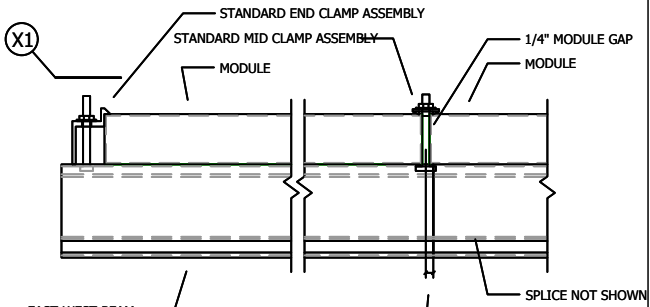
ADJUSTMENT INSTRUCTIONS
TO INSTALL EAST/WEST BEAM SPLICE
TO SCALE



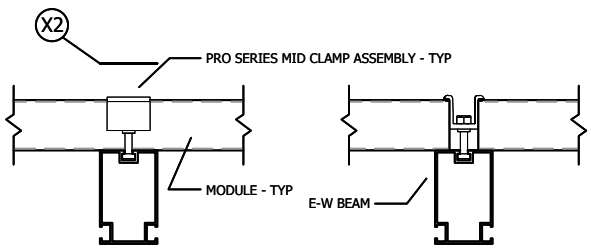
EAST-WEST BEAM WITH SPLICE
(TYPICAL SECTION)



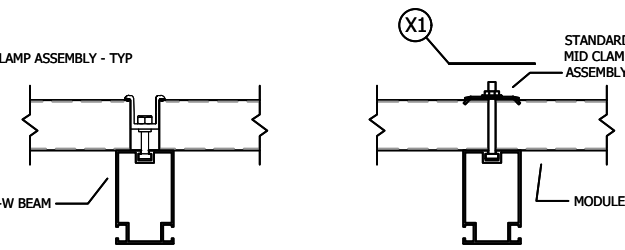
MODULE TO EAST-WEST BEAM END CLAMP CONNECTION



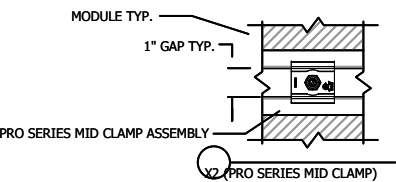
MODULE TO EAST-WEST BEAM END CLAMP CONNECTION



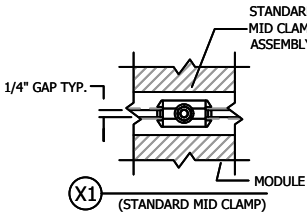
MODULE LONG SIDE CLAMPING
(UPPER & LOWER RAIL)



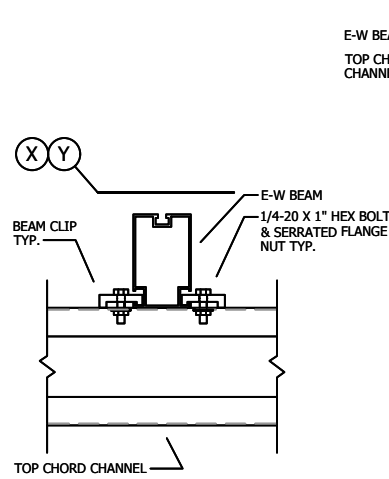
MODULE SHORT SIDE CLAMPING
(CENTER SHARED RAIL)



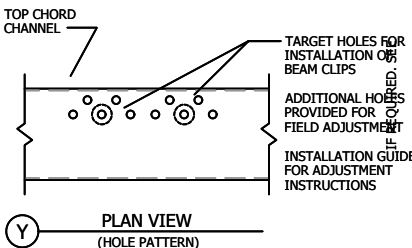
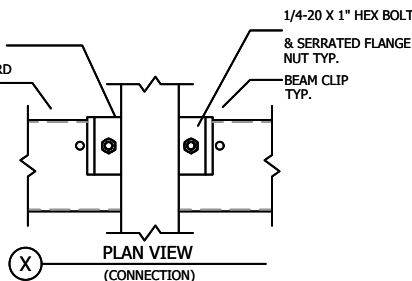
MODULE TO EAST-WEST BEAM MID CLAMP CONNECTION



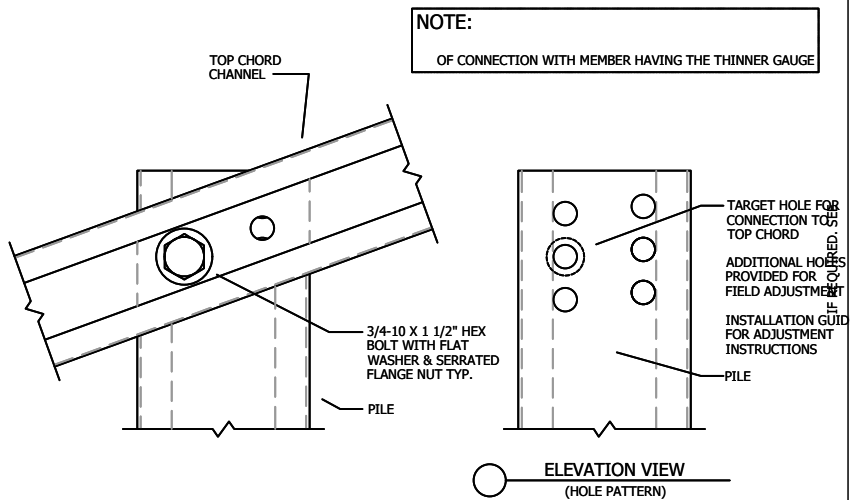
MODULE TO EAST-WEST BEAM MID CLAMP CONNECTION



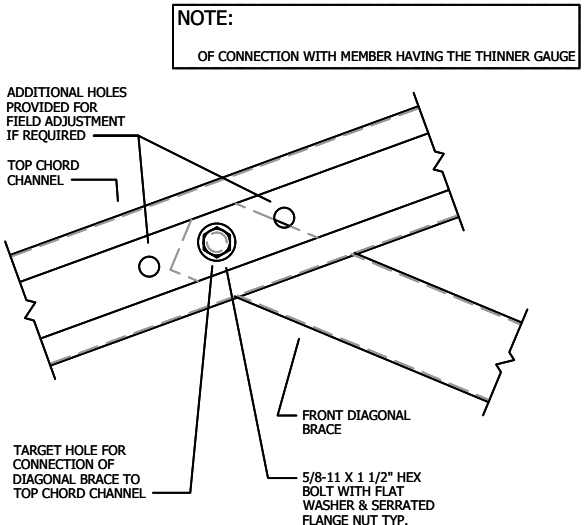
EAST-WEST BEAM TO TOP CHORD CONNECTION



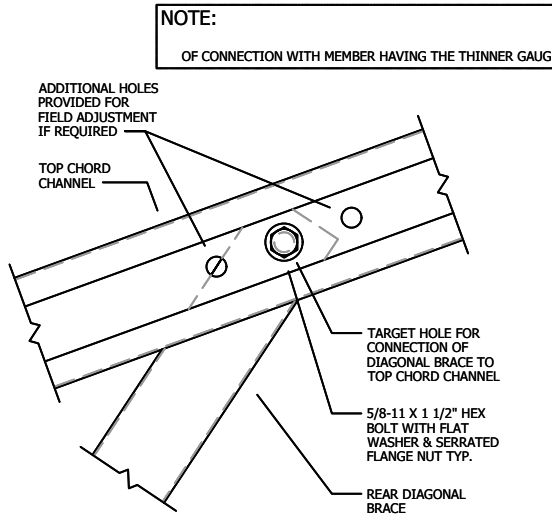
EAST-WEST BEAM TO TOP CHORD CONNECTION



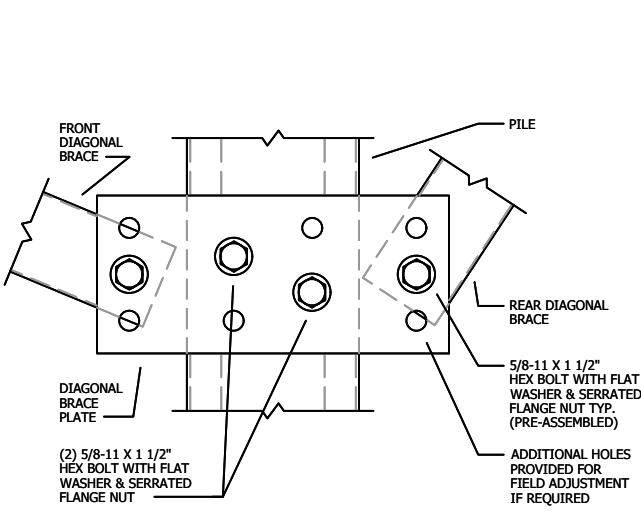
TOP CHORD TO PILE CONNECTION



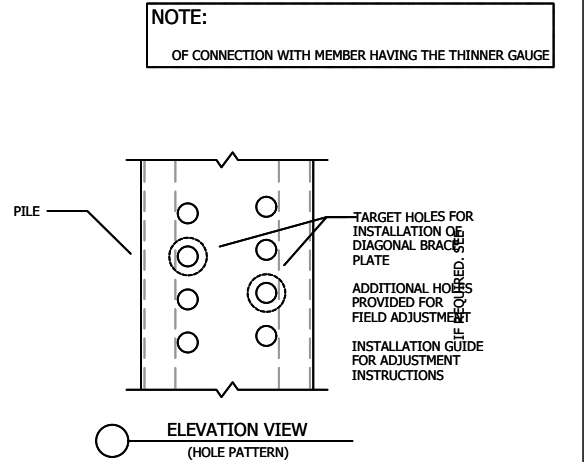
TOP CHORD TO DIAGONAL BRACE CONNECTION
(FRONT BRACE)



TOP CHORD TO DIAGONAL BRACE CONNECTION
(REAR BRACE)



DIAGONAL BRACE TO PILE CONNECTION



DIAGONAL BRACE TO PILE CONNECTION

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA, IA 50125

SHEET NAME
RACKING
DETAIL

SHEET SIZE

ANSI B
11" X 17"

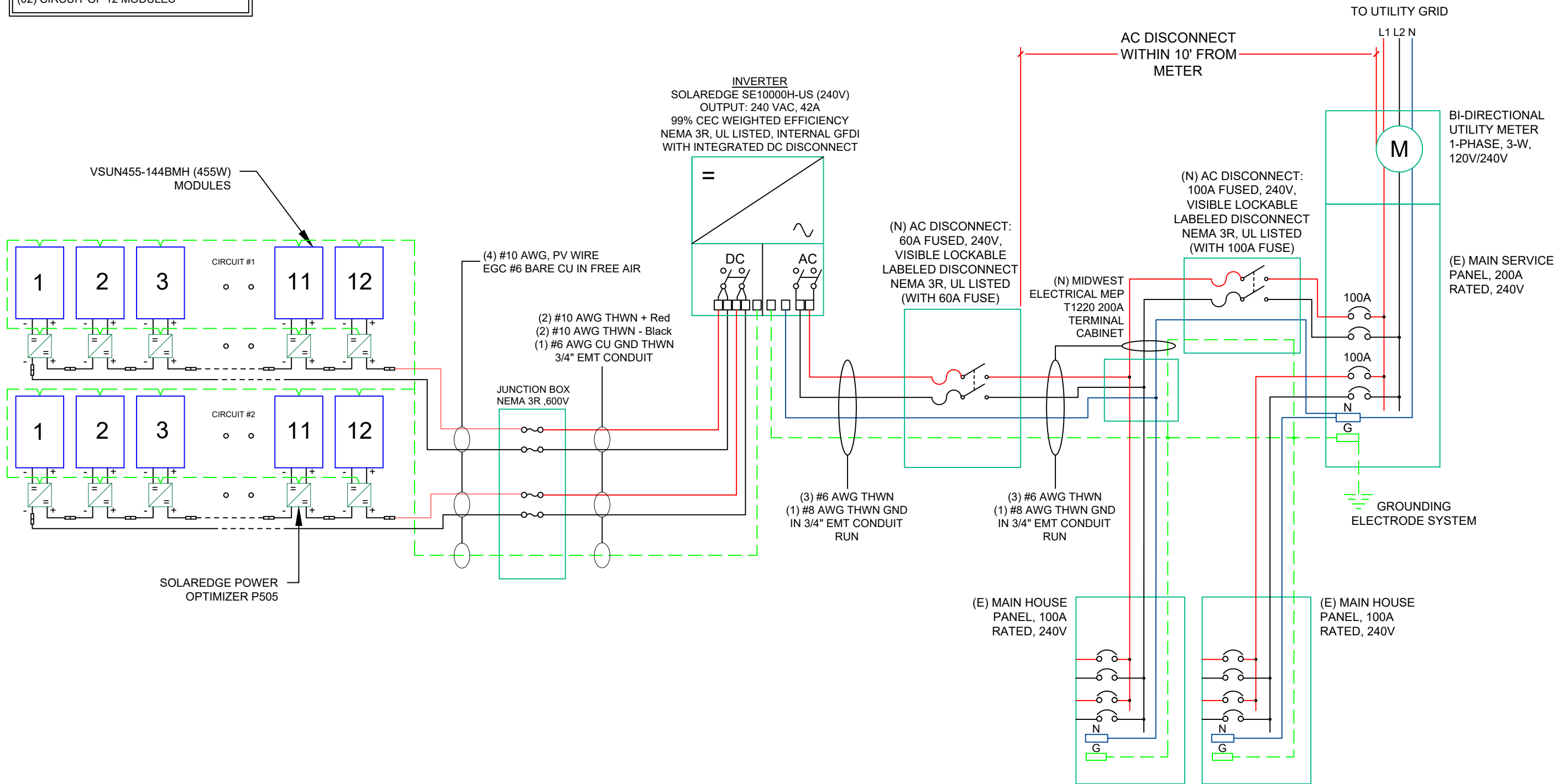
SHEET NUMBER

PV-3A

DC SYSTEM SIZE- 10.920 KW
AC SYSTEM SIZE- 10.000 KW

(24) VSUN455-144BMH (455W) MODULES
(01) SOLAREEDGE SE10000H-US INVERTER

(02) CIRCUIT OF 12 MODULES



1
PV-4

ELECTRICAL LINE DIAGRAM

SCALE: NTS

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
**ELECTRICAL
LINE DIAGRAM**

SHEET SIZE
**ANSI B
11" X 17"**

SHEET NUMBER
PV-4

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	VSUN455-144BMH (455W) MODULES
VMP	41.4V
IMP	11A
VOC	49.6V
ISC	11.6A
MODULE DIMENSION	82.99"L x 41.26"W x 1.38"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	SOLAREEDGE SE10000H-US
NOMINAL AC POWER	10.0 kW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	42A

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-25°
AMBIENT TEMP (HIGH TEMP 2%)	33°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	55°
CONDUCTOR TEMPERATURE RATE	90°
MODULE TEMPERATURE COEFFICIENT OF Voc	0.260000

DC CONDUCTOR AMPACITY CALCULATIONS:
ARRAY TO JUNCTION BOX :

EXPECTED WIRE TEMP (In Celsius)	33°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	0.80
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	18.75A
1.25 X MAX DC OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC (310.15)(B)(2)(a)	30.72A
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
Result should be greater than (18.75A) otherwise less the entry for circuit conductor size and ampacity	

DC CONDUCTOR AMPACITY CALCULATIONS:
FROM JUNCTION BOX TO INVERTER:

AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2)(c)	+22°
EXPECTED WIRE TEMP (In Celsius)	33°+22° = 55°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.76
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	0.80
CIRCUIT CONDUCTOR SIZE	10AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	18.75A
1.25 X MAX DC OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC (310.15)(B)(2)(a)	24.32A
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
Result should be greater than (18.75A) otherwise less the entry for circuit conductor size and ampacity	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM INVERTER TO MAIN PANEL :

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	33°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	1
CIRCUIT CONDUCTOR SIZE	6AWG
CIRCUIT CONDUCTOR AMPACITY	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(B)	52.50A
1.25 X MAX INVERTER OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC (310.15)(B)(2)(a)	72.00A
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
Result should be greater than (52.50A) otherwise less the entry for circuit conductor size and ampacity	

ELECTRICAL NOTES

- 1.) ALL EQUIPMENT SHALL BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- 2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90°C WET ENVIRONMENT.
- 3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS
CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- 4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- 5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEM. CONTRACTOR SHALL FURNISH ALL NECESSARY
OUTLETS, SUPPORTS, FITTINGS , AND ACCESSORIES TO MEET APPLICABLE CODES AND STANDARDS.
- 6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE
THEM ACCORDINGLY.
- 7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND ACCESSIBLE.
- 8.) INSTALL MODULE AND RACKING GROUNDING HARDWARE PER MANUFACTURER'S INSTRUCTION.

1

SOURCE

SOLAR

1

SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN

POLRESIDENCE

1017 SOUTH Y STREET

INDIANOLA , IA 50125

SHEET NAME

WIRING
CALCULATIONS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-5

⚠️ WARNING

ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED
NORMALLY GROUNDED CONDUCTORS
MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION:
DC DISCONNECT, INVERTER
(PER CODE: CEC 690.35(F))
[To be used when inverter is ungrounded]

⚠️ WARNING

ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS
PHOTOVOLTAIC SYSTEM ARE UNGROUNDED
AND MAY BE ENERGIZED

LABEL LOCATION:
DC DISCONNECT, INVERTER
(PER CODE: CEC 690.35(F))
[To be used when inverter is ungrounded]

⚠️ WARNING

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

DC VOLTAGE IS ALWAYS PRESENT
WHEN SOLAR MODULES ARE
EXPOSED TO SUNLIGHT

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: CEC 690.17(E))

⚠️ WARNING

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

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
PER CODE: CEC 690.17(E), CB

⚡ WARNING - Electric Shock Hazard ⚡
No user serviceable parts inside
Contact authorized service provider for assistance

LABEL LOCATION:
INVERTER, JUNCTION BOXES (ROOF), AC DISCONNECT
(PER CODE: CEC690.13.G.3 & CEC 690.13.G.4)

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

LABEL LOCATION:
CONDUIT, COMBINER BOX
(PER CODE: CEC690.31(G)(3)(4) & CEC 690.13(G)(4)

- ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
 - WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
 - ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]

**PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OPERATING CURRENT 42 AMPS
AC NOMINAL OPERATING VOLTAGE 240 VOLTS**

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: CEC690.54)

WARNING
INVERTER OUTPUT CONNECTION DO NOT
RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: CEC 705.12(D)(7))
[Not required if panelboard is rated not less than sum of ampere ratings
of all overcurrent devices supplying it]

CAUTION: SOLAR CIRCUIT

LABEL LOCATION:
MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES,
AND CABLE ASSEMBLIES AT LEAST EVERY 10 FT, AT TURNS AND ABOVE/BELOW PENETRATIONS
AND ALL COMBINER/JUNCTION BOXES. (PER CODE: IFC605.11.1.4)

SOLAR DISCONNECT

LABEL LOCATION:
DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: CEC690.13(B))

**CAUTION: SOLAR ELECTRIC
SYSTEM CONNECTED**

LABEL LOCATION:
WEATHER RESISTANT MATERIAL, DURABLE ADHESIVE,
UL969 AS STANDARD TO WEATHER RATING (UL LISTING
OF MARKINGS NOT REQUIRED), MIN 3/8" LETTER HEIGHT
ARIAL OR SIMILAR FONT NON-BOLD, PLACED WITHIN
THE MAIN SERVICE DISCONNECT, PLACED ON THE
OUTSIDE OF THE COVER WHEN DISCONNECT IS
OPERABLE WITH SERVICE PANEL CLOSED.
(PER CODE: CEC690.15, 690.13(B))

⚠️ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: CEC 705.12(D)(4))

INVERTER

PHOTOVOLTAIC DC DISCONNECT

MAXIMUM SYSTEM VOLTAGE:

480

VDC

MAXIMUM CIRCUIT CURRENT:

30

ADC

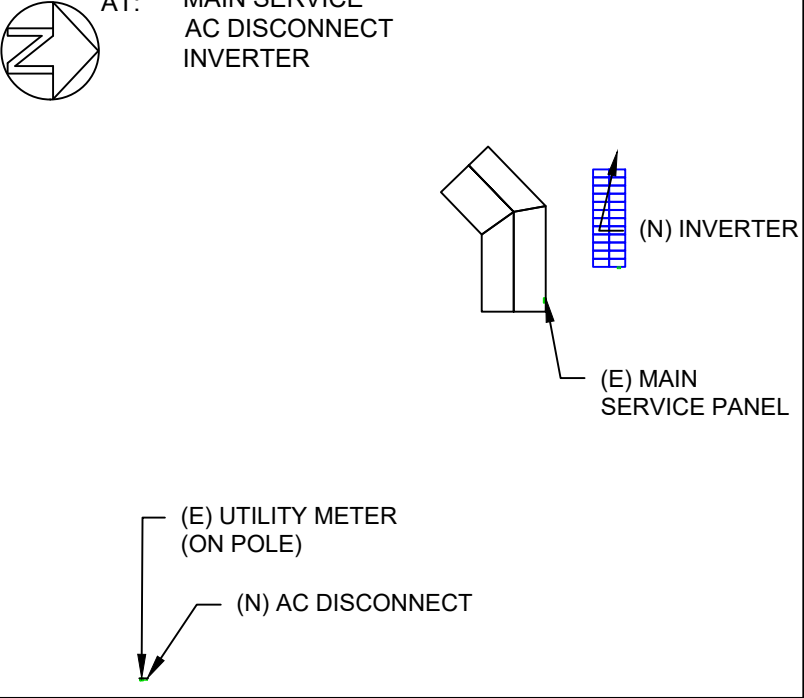
MAX RATED OUTPUT CURRENT OF THE CHARGE
CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED):

15

ADC

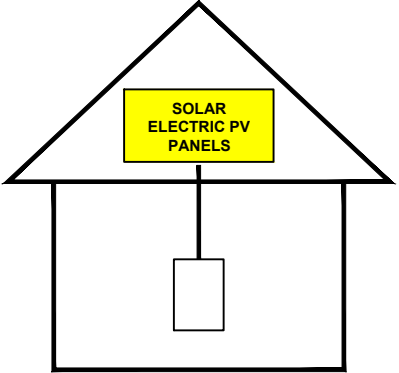
LABEL LOCATION:
INVERTER(S), DC DISCONNECT(S).
PER CODE(S): NEC 2017: 690.53, NEC 2014: 690.53, NEC 2011: 690.53

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



**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.



LABEL LOCATION:
ON OR NO MORE THAT 1 M (3 FT) FROM THE SERVICE DISCONNECTING
MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED.
PER CODE(S): NEC 2017: 690.56(C)(1)(a)

1 SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
PLACARDS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

Page 10 of 66

1

SOURCE

SOLAR

1 SOURCE SOLAR

3020 SW ORALABOR RD
ANKENY, IOWA 50023
LICENSE # C132339

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	10/13/2022	
REDESIGN	12/07/2022	A

Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

OPTIMIZER CHART

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-7

Page 66 of 66

VSUN455-144BMH

455W

Highest power output

20.60%

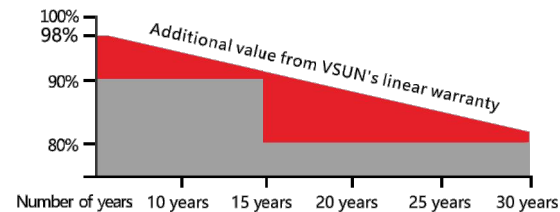
Module efficiency

25years

Material & Workmanship warranty

30years

Linear power output warranty



■ VSUN

■ Standard Warranty

Munich RE



PERC Cell Technology



Higher output power

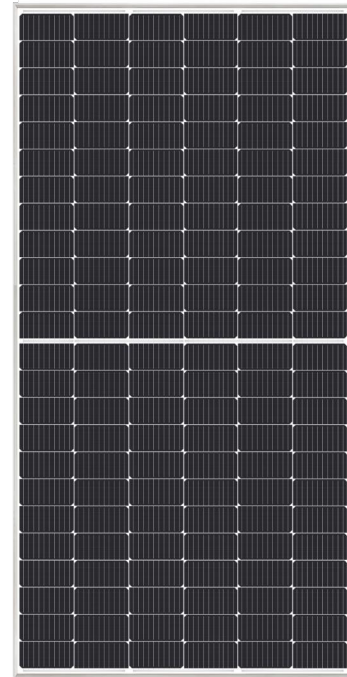


Lower risk of micro-crack



Positive tolerance offer

VSUN455-144BMH VSUN450-144BMH
VSUN445-144BMH VSUN440-144BMH



Lower risk of hot spot



Better shading tolerance



Certified for salt/ammonia corrosion resistance



Load certificates: wind to 2400Pa and snow to 5400Pa



Lower LCOE

VSUN, a BNEF Tier-1 PV module manufacturer invested by Fuji Solar, has been committed to providing greener, cleaner and more intelligent renewable energy solutions. VSUN is dedicated to bringing reliable, customized and high-efficient products into various markets and customers worldwide

最も信頼出来る再エネパートナー

Electrical Characteristics at Standard Test Conditions(STC)

Module Type	VSUN455-144BMH	VSUN450-144BMH	VSUN445-144BMH	VSUN440-144BMH
Maximum Power - Pmax (W)	455	450	445	440
Open Circuit Voltage - Voc (V)	49.6	49.4	49.2	49
Short Circuit Current - Isc (A)	11.6	11.52	11.44	11.36
Maximum Power Voltage - Vmpp (V)	41.4	41.2	41	40.8
Maximum Power Current - Imp (A)	11	10.93	10.86	10.79
Module Efficiency	20.60%	20.37%	20.14%	19.92%

Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1.5; module temperature 25°C. Pmax Sorting : 0~5W. Measuring Tolerance: ±3%.

Remark: Electrical data do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

Electrical Characteristics with different rear side power gain(reference to 450 front)

Pmax (W)	Voc (V)	Isc (A)	Vmpp (V)	Imp (A)	Pmax gain
475	49.6	12.10	41.4	11.48	5%
498	49.6	12.67	41.4	12.02	10%
542	49.7	13.82	41.3	13.12	20%
564	49.7	14.40	41.3	13.66	25%

Temperature Characteristics

NOCT	45°C(±2°C)
Voltage Temperature Coefficient	-0.26%/°C
Current Temperature Coefficient	+0.054%/°C
Power Temperature Coefficient	-0.32%/°C

Maximum Ratings

Maximum System Voltage [V]	1500
Series Fuse Rating [A]	20
Bifaciality	70%±5%

Material Characteristics

Dimensions	2108×1048×35mm (L×W×H) 82.99" x 41.26" x 1.38"
Weight	24.4kg
Frame	Silver anodized aluminum profile
Front Glass	White toughened safety glass, 3.2 mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate) or POE
Back Sheet	Transparent mesh backsheet
Cells	12×12 pieces bifacial monocrystalline solar cells series strings
Junction Box	IP68, 3 diodes
Cable&Connector	Potrait: 500 mm (cable length can be customized) , 1×4 mm 2 , compatible with MC4

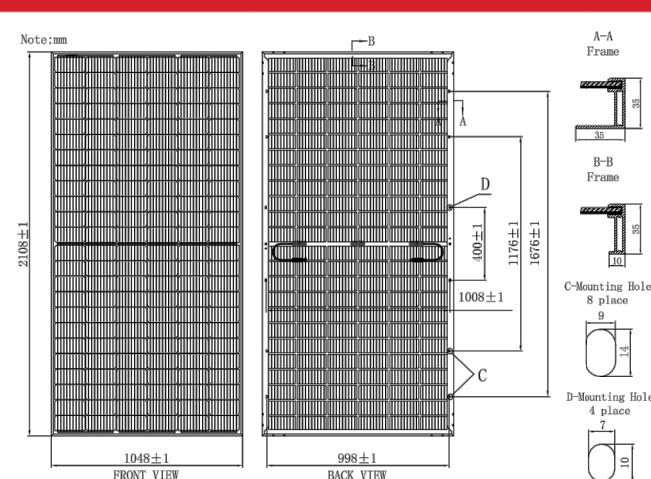
Packaging

Dimensions(L×W×H)	2140×1125×1181mm
Container 20'	155
Container 40'	341
Container 40'HC	682

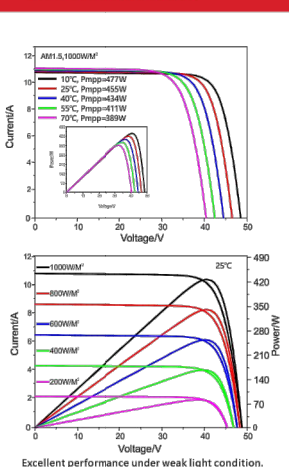
System Design

Temperature Range	-40 °C to + 85 °C
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s
Maximum Surface Load	5,400 Pa
Application class	class A

Dimensions



IV-Curves



Signature with Seal

PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-8

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P401 / P405 / P485 / P505



POWER OPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com



Power Optimizer
For North America

P320 / P340 / P370 / P400 / P401 / P405 / P485 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P401 (for high power 60 and 72 cell modules)	P405 (for high-voltage modules)	P485 (for high-voltage modules)	P505 (for higher current modules)
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INPUT								
Rated Input DC Power ⁽¹⁾	320	350	370	400	405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	60	125 ⁽²⁾	83 ⁽²⁾	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	8-60	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11	11.02	11	10.1	11.75	11	14	Adc
Maximum DC Input Current		13.75		12.5	14.65	12.5	17.5	Adc
Maximum Efficiency					99.5			%
Weighted Efficiency				98.8			98.6	%
Overvoltage Category					II			

OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)								
Maximum Output Current				15				Adc
Maximum Output Voltage			60			85		Vdc

OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)								
Safety Output Voltage per Power Optimizer				1 ± 0.1				Vdc
STANDARD COMPLIANCE								
EMC				FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety				IEC62109-1 (class II safety), UL1741				
Material				UL94 V-0, UV Resistant				
RoHS				Yes				

INSTALLATION SPECIFICATIONS								
Maximum Allowed System Voltage			1000					Vdc
Compatible inverters			All SolarEdge Single Phase and Three Phase inverters					
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3			mm / in
Weight (including cables)	630 / 1.4	750 / 1.7	655 / 1.5	845 / 1.9	1064 / 2.3			gr / lb
Input Connector			MC4 ⁽³⁾		Single or dual MC4 ⁽³⁾⁽⁴⁾	MC4 ⁽³⁾		
Input Wire Length	0.16 / 0.52		0.16 or 0.9 / 0.52 or 2.95 ⁽⁵⁾		0.16 / 0.52			m / ft
Output Wire Type / Connector			Double Insulated / MC4					
Output Wire Length	0.9 / 2.95			1.2 / 3.9				m / ft
Operating Temperature Range ⁽⁶⁾			-40 to +85 / -40 to +185					°C / °F
Protection Rating			IP68 / NEMA6P					
Relative Humidity			0 - 100					%

(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed
(2) NEC 2017 requires max input voltage be not more than 80V
(3) For other connector types please contact SolarEdge
(4) For dual version for parallel connection of two modules use P485-4NMDMRM. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer connected to one PV module. When connecting a single module seal the unused input connectors with the supplied pair of seals
(5) Longer inputs wire length are available for use. For 0.9m input wire length order P401-xxlxxx
(6) For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter ⁽⁷⁾⁽⁸⁾		Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400, P401	8		10	18	
	P405, P485, P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50 ⁽⁹⁾	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000 ⁽¹⁰⁾	12750 ⁽¹¹⁾	W
Parallel Strings of Different Lengths or Orientations		Yes				

(7) For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf
(8) It is not allowed to mix P405/P485/P505 with P320/P340/P370/P400/P401 in one string
(9) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
(10) For 208V grid: it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W
(11) For 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W



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PROJECT NAME & ADDRESS

JEFF & AMY BROWN
POLRESIDENCE
1017 SOUTH Y STREET
INDIANOLA , IA 50125

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-9

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US



INVERTERS

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown per NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US

SE3000H-US									SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
OUTPUT														
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA						
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA						
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac						
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac						
AC Frequency (Nominal)	59.3 - 60 - 60.5 ⁽¹⁾							Hz						
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A						
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A						
GFDI Threshold	1							A						
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes													
INPUT														
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W						
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W						
Transformer-less, Ungrounded	Yes													
Maximum Input Voltage	480							Vdc						
Nominal DC Input Voltage	380				400			Vdc						
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Adc						
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5	-	-	27	Adc						
Max. Input Short Circuit Current	45							Adc						
Reverse-Polarity Protection	Yes													
Ground-Fault Isolation Detection	600k ω Sensitivity													
Maximum Inverter Efficiency	99	99.2						%						
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%						
Nighttime Power Consumption	< 2.5							W						
ADDITIONAL FEATURES														
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)													
Revenue Grade Data, ANSI C12.20	Optional ⁽³⁾													
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect													
STANDARD COMPLIANCE														
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07													
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)													
Emissions	FCC Part 15 Class B													
INSTALLATION SPECIFICATIONS														
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG					1" Maximum /14-4 AWG								
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 1-3 strings / 14-6 AWG								
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm						
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9		38.8 / 17.6	lb / kg						
Noise	< 25				<50			dBA						
Cooling	Natural Convection													
Operating Temperature Range	-13 to +140 / -25 to +60 ⁽⁴⁾ (-40°F / -40°C option) ⁽⁵⁾							°F / °C						
Protection Rating	NEMA 4X (Inverter with Safety Switch)													

^① For other regional settings please contact SolarEdge support.

^② A higher current source may be used; the inverter will limit its input current to the values stated.

^③ Revenue grade inverter P/N: SE000H-US000NMC2

^④ For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

^⑤ -40 version P/N: SE000H-US000NNJ4

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RoHS

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SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

GROUND FIXED TILT

UNIRAC

GROUND FIXED TILT (GFT) is an engineered system of standard, lightweight ground mount components that are in stock and ready to ship from North America's largest ground mount distribution network. UNIRAC's unmatched commercial project support makes construction easy, from permitting through installation, including region-specific engineering. GFT's refined solution, including a new shared rail design, delivers enhanced system and labor optimization. Plus, enjoy peace of mind with **SOLARMOUNT** Mounting Technology and UNIRAC's industry-leading 25-year warranty.

UNIRAC
25
YEAR
FULL-SYSTEM
WARRANTY





IN STOCK & READY TO SHIP
THE BEST SOLUTION IS AVAILABLE



COMMERCIAL PARTNERSHIP
EXPERIENCE THAT MAKES A DIFFERENCE



INSTALLATION EXPERIENCE
REFINED WITH YOU IN MIND

MAKE GROUND MOUNT SIMPLE

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

GROUND FIXED TILT

UNIRAC

IN STOCK AND READY TO SHIP

THE BEST SOLUTION IS AVAILABLE

Single post configurations with 20° and 30° tilt options. Standardized components and kitted hardware bring ease of stockability and repeatability, from 2KW to multi-MW. North America's largest Ground Mount Distributor network ensures the fastest lead times and empowers you to finish your projects on schedule.

COMMERCIAL PARTNERSHIP

EXPERIENCE THAT MAKES A DIFFERENCE

Permit ready, pre-engineered regional designs save you valuable time. Standard construction drawings with general structural notes, table and component cross sections, foundation options and structural details speed permit submittal and construction. Industry leading commercial customer service supports you across your project, from design and logistics thru installation.

INSTALLATION EXPERIENCE

REFINED WITH YOU IN MIND

Kitted hardware, integrated bonding, and pre-assembled parts streamline construction, from pre-mobilization to installation. Straightforward connections ensure maximum strength and require no specialized labor or training. Lightweight components allow for one or two-person assembly. System flexibility enables you to mount 60 & 72 cell modules and choose from multiple foundation and rail options to optimize your projects.



UNMATCHED

CERTIFIED

ENGINEERING

BANKABLE

DESIGN

PERMIT

ON-TIME DELIVERY

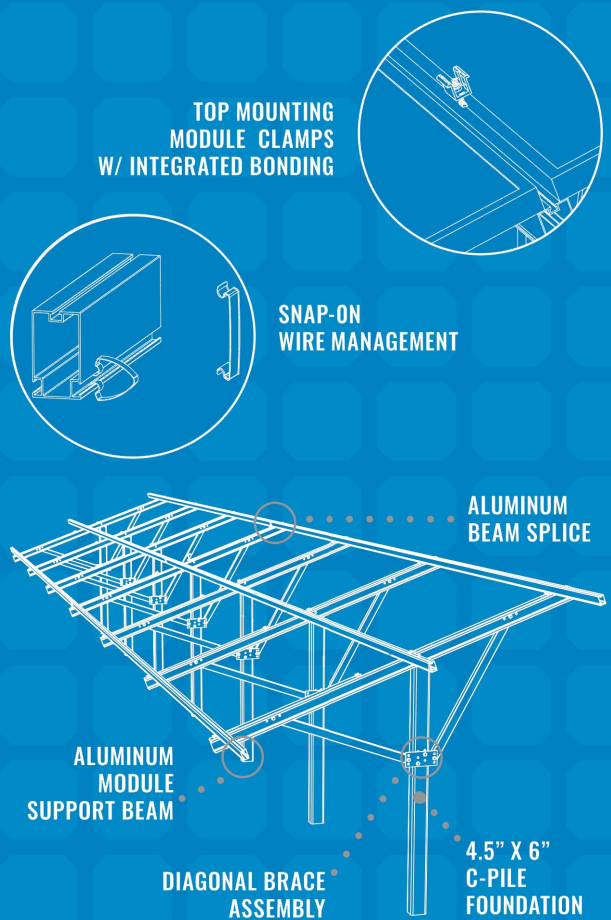
No waiting. Our goal is simple: Consistently deliver solutions and services correctly, efficiently and dependably to exceed your expectations. Our world-class operations provide a 99% on-time delivery to help you meet your commitment dates.

CERTIFIED QUALITY PROVIDER

UNIRAC is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and our commitment to first class business

BANKABLE WARRANTY

UNIRAC has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. GFT is covered by a 25-year manufacturing warranty on all parts.



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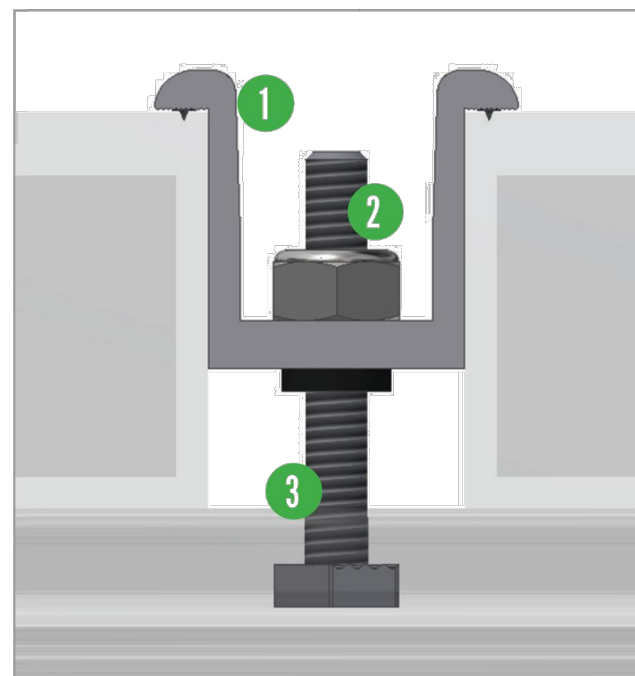
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BONDING CONNECTION GROUND PATHS

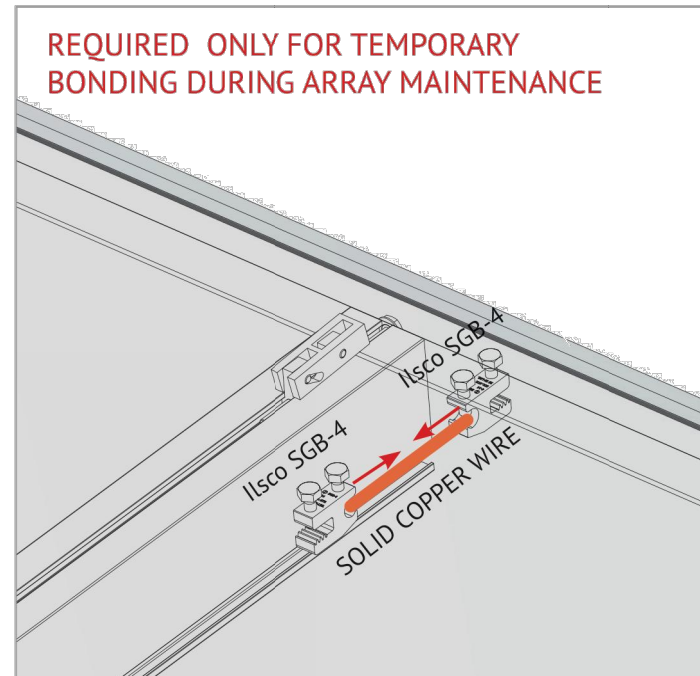
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INSTALLATION GUIDE : PAGE



BONDING MIDCLAMP ASSEMBLY

- 1 Aluminum mid clamp with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
- 2 Stainless steel nut bonds aluminum clamp to stainless steel T-bolt
- 3 Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to SM rail



TEMPORARY BONDING CONNECTION DURING ARRAY MAINTENANCE

When removing modules for replacement or system maintenance, any module left in place that is secured with a bonding Midclamp will be properly grounded. If a module adjacent to the end module of a row is removed or if any other maintenance condition leaves a module without a bonding mid clamp, a temporary bonding connection must be installed as shown

- Attach Ilco SGB4 to wall of GFT rail (Rail shown in picture is not a GFT rail but a representative rail for demonstration only)
- Attach Ilco SGB4 to module frame
- Install solid #6 AWG copper wire jumper to Ilco lugs

ELECTRICAL CONSIDERATIONS

GFT is intended to be used with PV modules that have a system voltage less than or equal to that allowable by NEC. For standard system grounding a minimum 10AWG, 105°C copper grounding conductor should be used to ground a system, according to the National Electric Code (NEC). It is the installer's responsibility to check local codes, which may vary. See below for interconnection information.

INTERCONNECTION INFORMATION

There is no size limit on how many GFT & PV modules can be mechanically interconnected for any given configuration, provided that the installation meets the requirements of applicable building and fire codes.

GROUNDING NOTES

The installation must be conducted in accordance with the National Electric Code (NEC) and the authority having jurisdiction. Please refer to these resources in your location for required grounding lug quantities specific to your project.

The grounding / bonding components may overhang parts of the array so care must be made when walking around the array to avoid damage.

Conductor fastener torque values depend on conductor size. See product data sheets for correct torque values.

Mid clamps do not need to be repositioned for re-use.

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BONDING & GROUNDING
APPROVED

MODULE COMPATIBILITY

25

INSTALLATION GUIDE

PAGE

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the GROUND FIXED TILT system.

Manufacturer	Series/Model
Aleo	P18, P19, S18, S19, S59, S79
AU Optronics (BenQ Solar)	PM Series
Auxin	AXN6M610T,AXN6P610T,AXN6M612T & AXN6P612T
Axitec	AXIpower,AXIpremium,AXIblackpremium
Boviet	BVM6610 & BVM6612 Series
BYD	P6K Series & MHK-36
Canadian Solar	CS5A-M, CS6P-M, CS6P-P, CS6X-P, ELPS CS6P-MM, ELPS CS6A-MM, CS6U-P, CS6U-M, CS6K-MS, CS6K-M, CS6K-P, CS3U-P, CS3U-MS, CS3K-P, CS3K-MS, CS1K-MS, CS3W-P, CS3L-P, CS3K-MB, CS3K-PB, CS3U-MB, CS3U-PB, CS1H-MS, CS3U-MS
Centrosolar America	C-Series, E-Series
CertainTeed	CTxxxMxx-01, CTxxxP01, CTxxxMxx02, CTxxxMxx03
Eco Solargy	Orion 1000, Apollo 1000
ET Solar	ET AC Module, ET Module
Flextronics	FXS
GCL	GCL-P6 & GCL-M6 Series
Hansol	TD-AN3, TD-AN4, UB-AN1, UD-AN1
Hanwha SolarOne	HSL 60
Heliene	72M, 72P, 72M-BLK, 60M, 60P, 60M-BLK, 36M, 36P
Hyundai Heavy Industries	MG, RW, RG, KG, TG, KI, TI, RI Series
ITEK	iT HE and iT SE
JA Solar	JAP6(k)-72-xxx/4BB; JAP72SYY-xxx/ZZ; JAP6(k)-60-xxx/4BB; JAP60SYY-xxx/ZZ JAM6(k)-72-xxx/ZZ; JAM72SYY-xxx/ZZ; JAM6(k)-60-xxx/ZZ; JAM60SYY-xxx/ZZ Note: i. YY: 01, 02, 03, 09 ii. ZZ: SC, PR, BP, HiT, IB, MW YY = Backsheet, ZZ Cell technology

The modules selected for UL 2703 bonding and grounding testing represent the broadest possible range of modules on the market. The tests were performed for each specific bonding location using representative module frame profile sections. The tests performed cover the following basic module parameters:

- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A

Jinko 60 Cell	JKMxxxP-60, JKMxxxPP-60, JKMxxx PP-60B, JKM xxx M-60, JKM xxx M-60B, JK07B (JKMSxxxPP-60), JKMxxx PP-60(Plus), JKMxxxM-60HL, JKMxxxM-60L, JKMxxxM-60BL, JK-MxxxM-60LV, JKMxxxM-60-V, JKMxxxPP-60B-J4, JKMSxxxM-60, JKMSxxxPP-60B-J4, JKMSxxxPP-60, JKMSxxxP-60, JKMxxxP-72, JKMxxxPP-72, JKMSxxx-72, JKMSxxxP-72, JK07A (JKMSxxxPP-60 & JKMSxxxPP-72), JKMxxxM-72, JKMxxxM-72-V, JKMxxxM-72L-V, JK-MxxxM-72HL-V, JKMxxx-72L-V, JKMxxxPP-72-V, JKMxxxPP-72(Plus), JKMxxxPP-72B, JKMxxxP-72B,
Kyocera	KD-F Series, KU-60 Series
LG Electronics	LGxxxN1C-G4, LGxxxN2W-G4, LGxxxN1K-G4, LGxxxS1C-G4, LGxxxS2W-G4, LGxxxQ1C(Q1K)-A5, LGxxxN1C(N1K)-A5, LGxxxS1C-A5, LGxxxN2T-A5, LGxxxN2W-A5, LGxxxS2W-A5, LGxxxE1C-A5, LGxxxN1K-V5, LGxxxE1K-A5, LGxxxN1K-V5, LGxxxN1C-V5, LGxxxQ1C-V5, LGxxxN2W-V5, LGxxxE1K-A5, LGxxxN1K-V5
LONGi	LR6-60 & LR6-72 Series
Mission Solar	MSE Mono 60, MSE Mono 72 MSE PERC 60, MSE PERC 72
Mitsubishi	MJE, MLE, NSP
Panasonic	VBHNxxxSA06, VBHNxxxSA06B, VBHNxxxSA11, VBHNxxxSA11B, VBHNxxxSA15, VBHNxxxSA15B, VBHNxxxSA16, VBHNxxxSA16B, VBHNxxxKA, VBHNxxx SA17, VBHNxxxSA18, VBHNxxxKA03/04, VBHNxxxSA17G/17E, VBHNxxxSA18E
Peimar	SGxxxM, SGxxxM (BF), SGxxxM (FB)
Phono Solar Technology	All Standard Modules

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PV-13



MEMORANDUM

To: Board of Adjustment
From:
Date: January 4, 2023
Subject: Approval of the 2023 Calendar

Recommendation:

Attachments: 1. 2023 BOA MEETING CALENDAR

2023 Board of Adjustment Calendar					
Meeting DATE 6:00 PM	REVIEW DEADLINE	NOTICES Mailed	AGENDA PACKET to Board	Draft MINUTES Complete	Appeal Period Ends
1/4/2023	12/19/2022	12/22/2023	12/30/2022	1/6/2023	2/3/2023
2/1/2023	1/16/2023	1/20/2023	1/27/2023	2/3/2023	3/3/2023
3/1/2023	2/13/2023	2/17/2023	2/24/2023	3/3/2023	3/31/2023
4/5/2023	3/20/2023	3/24/2023	3/31/2023	4/7/2023	5/5/2023
5/3/2023	4/17/2023	4/21/2023	4/28/2023	5/5/2023	6/2/2023
6/7/2023	5/22/2023	5/26/2023	6/2/2023	6/9/2023	7/7/2023
7/5/2023	6/19/2023	6/23/2023	6/30/2023	7/7/2023	8/4/2023
8/2/2023	7/17/2023	7/21/2023	7/28/2023	8/4/2023	9/1/2023
9/6/2023	8/21/2023	8/25/2023	9/1/2023	9/8/2023	10/6/2023
10/4/2023	9/18/2023	9/22/2023	9/29/2023	10/6/2023	11/3/2023
11/1/2023	10/16/2023	10/20/2023	10/27/2023	11/3/2023	12/1/2023
12/6/2023	11/20/2023	11/22/2023	12/1/2023	12/8/2023	1/5/2024