CITY OF FAIRMONT
PUBLIC UTILITIES COMMISSION
AGENDA

Tuesday, January 7, 2025

1 Call to Order
- 7:30 AM City Hall Conference Room (Second Floor)

2 Roll Call

Chair Werre	_____
Commissioner Struss	_____
Commissioner Christ	_____
Commissioner Sharp	_____
Commissioner Zoch	_____

3 Public Discussion/Comments (Individual comments are limited to 3 minutes)

4 Approval of Minutes **(2 - 3)**
-Regular Meeting, December 17 , 2024

5 Election of Officers **(4)**

6 Approval of PO # 15352 for the Line Department **(5 - 9)**

7 Approval of DER 2024-0003 Richard Pooley **(10 - 38)**

10 Date and Time of Next Meetings:
- Regular Meeting - Tuesday, January 21, 2025
- Work Session - Tuesday, February 4, 2025

11 Adjournment

Fairmont Public Utilities Commission
January 7, 2025

Agenda Item: 4

From: Julie Zarling, Assistant Finance Director
To: Public Utilities Commission

Subject: PUC Minutes from Regular meeting on December 17, 2024

Policy/Action Requested:
Vote Required: __X__ Simple Majority _____ Roll Call

Recommendation: Approval

Overview:

Budget Impact: N/A

Attachments: PUC Minutes Regular Meeting, December 17, 2024

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PUC Action: _____ Date: _____

PUBLIC UTILITIES COMMISSION

REGULAR MEETING

Tuesday, December 17, 2024
7:30 AM
City Hall Conference Room
Meeting held in person

IN ATTENDANCE: Commissioners Werre, Struss, and Zoch

ALSO IN ATTENDANCE: Public Works/Utilities Director York, Finance Director Hoye, Water/Wastewater Superintendent Powers, Electric Superintendent Heide, Assistant Finance Director Zarling

ABSENT:

Commissioner Werre called the meeting to order at 7:30 AM.

Commissioner Werre called for Public Discussion and Comments. No individuals were present for public comment at the meeting.

A motion was made by Mr. Zoch, seconded by Mr. Struss, and carried to approve the November 19, 2024 minutes.

Assistant Finance Director Zarling presented the financial and capital expense report and production stats for November 2024. Discussion with no action taken.

Assistant Finance Director Zarling presented the disbursements for November 2024. Discussion was held. A motion was made by Mr. Struss, seconded by Mr. Zoch, and carried to approve the November 2024 disbursements.

Water/Wastewater Superintendent Powers updated the commission on the water and wastewater departments. They have moved to the shallow intake at the water plant. Staff is working on maintenance and cleaning. They have also had 4 water main breaks in the last few weeks that have kept them very busy. For wastewater, the digester is running, but still a few minor details to work out. An outside company is busy installing the three remaining lift stations that need to be updated. This should be done by the end of the week.

Electric Superintendent Heide updated the commission on the electric department. Crews are working on tree trimming and will continue this thru the winter months. The Relay project will start in January. Planning is continuing for the big substation projects. The master electrician for the City is retiring. They are working on filling that position as quickly as possible.

There was no other business; it was moved by Mr. Struss, seconded by Mr. Zoch, and approved to adjourn the meeting at 8:36 AM.

_____

Perry Struss, Secretary

Fairmont Public Utilities Commission
January 7, 2025

Agenda Item: 5

From: Julie Zarling, Assistant Finance Director
To: Public Utilities Commission

Subject: Election of Officers 2025

Policy/Action Requested:
Vote Required: _x_ Simple Majority _____ Roll Call

Recommendation: Approval

Overview:
A separate motion for each of the following PUC positions is needed for 2025:

1. Chairman
2. Vice Chairman
3. Secretary

The officers will be elected by voice vote of the commission and will serve until the annual election in 2026.

Budget Impact: N/A

Attachments: N/A

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PUC Action: _____ Date: _____

FAIRMONT

Fairmont Public Utilities Commission
January 7, 2025

Agenda Item: 6

From: Miles Heide, Line Department Superintendent
To: Public Utilities Commission

Subject: Purchase Approval PO# 15352

Policy/Action Requested:
Vote Required:____ Simple Majority _____ Roll Call

Recommendation: Approval to purchase High Voltage Switchgear as part of 2024 CIP to WESCO

Overview:

The Electric Department seeks approval to purchase (4) High Voltage Switches as part of the 2024 "Replace High Voltage Switches" CIP line item. These are slated for areas on the electric system to replace end of life switches and proactively combat switch failures.

Enclosed please find (2) bids for Federal Pacific Switchgear from WESCO and Electro Tech.

WESCO…….. $131,549.00
Electro Tech……....$134,253.00

Budget Impact: Remaining CIP funds (2024) $139,910.00

WESCO

FEDERAL PACIFIC™

FP QUOTATION

TO: Fairmont Public Utilities

DATE: December 18, 2024

SUBJECT: RFQ for Wesco-Fargo – Fairmont Utilities
FP Quotation #: 547382

TOTAL NUMBER OF PAGES 2 (including this sheet)

THE FOLLOWING BILL OF MATERIAL CONSTITUTES OUR COMPLETE OFFERING; NO OTHER WRITTEN SPECIFICATIONS WILL APPLY.

Item	Qty	Description
1	2	PSE-10-44400 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with four (4) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase). **Pricing**.....**$27,215.00 each** ✓ x2 54,430.00
2	1	PSE-11-44312 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with three (3) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase) and one (1) 3-phase set(s) of fuse mountings for SMU-20 fuses provided with 200 amp bushing wells (one (1) per phase). **Pricing**.....**$24,945.00 each** ✓
3	1	PSE-9-44222 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with two (2) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase) and two (2) 3-phase set(s) of fuse mountings for SMU-20 fuses provided with 200 amp bushing wells (one (1) per phase). **Pricing**.....**$23,161.00 each** ✓
4	1	PSE-46332 (37-3146-004) 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with three (3) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase) and three (3) 3-phase set(s) of fuse mountings for SMU-20 fuses provided with 200 amp bushing wells (one (1) per phase). **Pricing**.....**$48,889.00 each** ✓

Net Adders (If Required):

1. As Required: FP-3097 Fuse End Fittings
Price.....**$365.00 each** x9 = 3285.00

2. As Required: SMU-20 Fuse units
Price.....**$320.00 each**

3. As Required: LBI215 – Load Break Inserts (Spares)
Price.....**$60.00 each**

WESCO $131,549.00

Notes:

1. Fuse information (size & speed) must be available either at time of order entry or in time to receive the fuses at FP prior to padmount shipment. Otherwise, fuses must be shipped short and the freight charges for the fuse shipment will be prepaid and added to the invoice.

2. If the fuse data is not available as outlined above, steps can be taken to expedite the fuses by shipping via air from emergency stock, if available at time required, at a premium adder of 25% plus $150.00 plus cost of air shipment.

Comments and Clarifications:

This quotation is based upon information supplied to the Factory, which may or may not have been complete. Customer is responsible for reviewing this quotation for compliance, deviations, exclusions, and improper information supplied. If you feel an error or omission has been made, please contact Factory immediately.

Elbows are not included as a part of our proposal.

This quotation is valid for 30 days. In the event you delay the Shipment Date for any reason, we reserve the right to revise the prices listed herein or revoke the quote in its entirety..

Normal shipments shall begin within approximately **50-55 weeks** after our acceptance of your formal purchase order so long as you have provided all technical details and data required to release the equipment for manufacture (the "Shipment Date"). If a better shipping schedule is required, please consult the Factory for review of our current manufacturing schedule. When drawing approval is required, the Shipment Date will be delayed by the time necessary for the drawing approval process. Approval drawings (if required) will be submitted within approximately **3-4 weeks** after our acceptance of an order. Hold for approval orders not released within **30 days** shall be reviewed and subject to price increases. The Shipment Date is subject to change at time of order release based on current production backlog.

Freight Terms

(1) **Freight will be EXW Factory with seller paying freight.**

(2) The seller will determine the method of transportation and the routing of the shipment. Where the purchaser requires shipment by a method of transportation or routing other than that of the seller's selection, any additional transportation and/or packing expense is to be borne by the purchaser.

Ed Cole
Pad-Mount Sales & Application Engineer
1075 Old Airport Road, Bristol, VA 24201
(276) 645-8940 • FAX (276) 645-8212
Ed.Cole@electro-mechanical.com

ELECTRO TECH

FP QUOTATION

TO: Rick Sevald – ElectroTech **COPY: Leslie Case – Federal Pacific**

DATE: December 18, 2024

SUBJECT: RFQ for Fairmont Utilities
FP Quotation #: 547382

TOTAL NUMBER OF PAGES 2 (including this sheet)

THE FOLLOWING BILL OF MATERIAL CONSTITUTES OUR COMPLETE OFFERING; NO OTHER WRITTEN SPECIFICATIONS WILL APPLY.

Item	Qty	Description
1	2	PSE-10-44400 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with four (4) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase). **Pricing**.....**$ 27,759.60 each** x2 = 55,519.20
2	1	PSE-11-44312 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with three (3) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase) and one (1) 3-phase set(s) of fuse mountings for SMU-20 fuses provided with 200 amp bushing wells (one (1) per phase). **Pricing**.....**$ 25,444.80 each**
3	1	PSE-9-44222 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with two (2) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase) and two (2) 3-phase set(s) of fuse mountings for SMU-20 fuses provided with 200 amp bushing wells (one (1) per phase). **Pricing**.....~~**$ 23,624.40 each**~~
4	1	PSE-46332 (37-3146-004) 15KV, 95KV BIL, **Dead-front, Air Insulated,** Padmounted Switchgear with three (3) 3-pole 600 amp group operated Auto-jet switches provided with dead-break 600 amp bushings (one (1) per phase) and three (3) 3-phase set(s) of fuse mountings for SMU-20 fuses provided with 200 amp bushing wells (one (1) per phase). **Pricing**.....**$ 50,454.00 each**

Net Adders (If Required):

1.	As Required:	FP-3097 Fuse End Fittings **Price**.....**$ 315.00 each** ✓ x9 = 2835.00
2.	As Required:	SMU-20 Fuse Units **Price**.....**$ 280.00 each** ✓
3.	As Required:	LBI215 – Load Break Inserts (Spares) **Price**.....**$ 50.00 each** ✓

$134,253.00

Electro Tech.

Notes:

1. Fuse information (size & speed) must be available either at time of order entry or in time to receive the fuses at FP prior to padmount shipment. Otherwise, fuses must be shipped short and the freight charges for the fuse shipment will be prepaid and added to the invoice.

2. If the fuse data is not available as outlined above, steps can be taken to expedite the fuses by shipping via air from emergency stock, if available at time required, at a premium adder of 25% plus $150.00 plus cost of air shipment.

Comments and Clarifications:

This quotation is based upon information supplied to the Factory, which may or may not have been complete. Customer is responsible for reviewing this quotation for compliance, deviations, exclusions, and improper information supplied. If you feel an error or omission has been made, please contact Factory immediately.

Elbows are not included as a part of our proposal.

This quotation is valid for 30 days. In the event you delay the Shipment Date for any reason, we reserve the right to revise the prices listed herein or revoke the quote in its entirety..

Payment Terms are NET 30 Days.

Normal shipments shall begin within approximately **48-50 weeks** after our acceptance of your formal purchase order so long as you have provided all technical details and data required to release the equipment for manufacture (the "Shipment Date"). If a better shipping schedule is required, please consult the Factory for review of our current manufacturing schedule. When drawing approval is required, the Shipment Date will be delayed by the time necessary for the drawing approval process. Approval drawings (if required) will be submitted within approximately **3-4 weeks** after our acceptance of an order. Hold for approval orders not released within **30 days** shall be reviewed and subject to price increases. The Shipment Date is subject to change at time of order release based on current production backlog.

Freight Terms

(1) **Freight will be EXW Factory with seller paying freight.**

(2) The seller will determine the method of transportation and the routing of the shipment. Where the purchaser requires shipment by a method of transportation or routing other than that of the seller's selection, any additional transportation and/or packing expense is to be borne by the purchaser.

All transactions are subject to EMC's Sales Terms and Conditions found at:
https://www.electro-mechanical.com/sales-terms-and-conditions/
Please contact your customer service representative if you are unable to access the site listed above.

Fairmont Public Utilities Commission
January 7, 2025

Agenda Item: 7

From: Julie Zarling
To: Public Utilities Commission

Subject: DER 2024-0003 Richard Pooley Simplified Interconnection Application

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Policy/Action Requested:
Vote Required: _x_ Simple Majority _____ Roll Call

Recommendation: Approval

Overview:
Richard Pooley is working with Wolf River Electric to install a solar Photovoltaic System at 1911 Knollwood Dr. Wolf River Electric moved forward with the project without following proper protocol. The system proposal has been reviewed and approved by the Line Department. Wolf River will need to work with our Building Inspector to make sure that it meets their requirements.

Approval is recommended for the DER contract and agreement.

Budget Impact: N/A

Attachments: DER 2024-0003 application, spec sheets, and site layout

****

PUC Action: _____ Date: _____

Simplified Interconnection Application

Persons interested in applying for the interconnection of a distributed energy resource (DER) to the Utility's distribution system through the Simplified Process are to fill out this Simplified Interconnection Application. The Simplified Interconnection Application is to be used for inverter-based DER technologies with the capacity of 20 kW AC or less and is to be filled out completely by the Applicant. The Simplified Application shall be returned to the Utility with the requested material information and a non-refundable $100 application fee.

Proposed DER interconnections to the Utility's distribution submitted under the Simplified Process may be moved into the Fast Track Process if engineering screens are failed during the Simplified Interconnection Application review. Timeline for review of the Simplified Application is as follows:

- Upon receipt of a Simplified Interconnection Application the Utility has 10 business days to review the application for completeness.
- If the application is deemed incomplete, the Utility shall notify the Applicant of what additional information material is required.
- The Applicant has 5 business days to return the missing information material or their application may lose its queue position and be deemed withdrawn.
- The Utility shall have a total of 20 business days to review the Simplified Interconnection Application, not including time waiting for additional information material to deem the application completed.
- The Utility will notify the Application if the proposed DER system is preliminary approved for interconnection or if the proposed DER system will need to be moved in the Fast Track Process.

Checklist for Submission to Utility

The items below shall be included with submittal of the Simplified Application to the Utility. Failure to include all items will deem the Simplified Application incomplete.

	Included
$100 Non-Refundable Simplified Application Fee	☐ Yes
One-line diagram – Details required on one-line diagram specified at the end of the interconnection application.	☐ Yes
All Certified Equipment Manufacturer Specification Sheets	☐ Yes
Site Layout Drawing	☐ Yes
Copy of Insurance Declaration page or other acceptable proof of insurance	☐ Yes

<u>Possible Additional Documentation</u>

- If an Application Agent is being used for this project, the Site Layout Drawing must be signed by the Interconnection Customer indicating Site Control of the DER interconnection location.
- If the DER export capacity is limited, include information material explaining the limiting capabilities.
- If Energy Storage is included with the proposed DER system include the Energy Storage Application.

Simplified Interconnection Application

Interconnection Customer			
Full Name (must match the name of the existing service account): Richard Pooley			
Account Number: 009523-000	Meter Number: 94176108		
Mailing Address: 1911 Knollwood Dr, Fairmont, MN, 56031			
City: Fairmont	State: MN	Zip Code: 56031	
Email: rdpooley717@gmail.com	Phone: 507-236-8039		

Application Agent	
Is the Customer using an Application Agent for this application?	☒ Yes ☐ No
If Interconnection Customer is not using an Application Agent, please skip to the next section.	
Application Agent: Tawni Latterell	
Company Name: Wolf River Electric	
Email: tawni@wolfriverelectric.com	Phone: 612-412-4518

For Office Use Only		
Application ID:	Queue Number:	
Date Received:	Application Fee Received:	☐ Yes ☐ No
Date Preliminary Approval Provided to Applicant:		

Distributed Energy Resource Information

Location (if different from mailing address of Interconnection Customer):	
Will the Proposed DER system be interconnected to an existing electric service?	☒ Yes ☐ No
Is the Distributed Energy Resource a single generating unit or multiple?	☒ Single ☐ Multiple

DER Type *(Check all that apply)*:

☒ Solar Photovoltaic ☐ Wind ☐ Energy Storage

☐ Combined Heat and Power ☐ Solar Thermal ☐ Other (please specify)

DER systems with Energy Storage must also submit the Energy Storage Application to the Utility.

Inverter Manufacturer: Enphase	Model: IQ7HS
Phase Configuration of Proposed DER System:	☒ Single ☐ Three
Aggregate Inverter(s) Nameplate Rating: .384 kW_{ac}	.384 kVA_{ac}
Is the export capability of the DER limited?	☐ Yes ☒ No
If the DER export capacity is limited, include information material explaining the limiting capabilities.	
Aggregate DER Capacity (the sum of nameplate capacity of all generation and storage devices at the PCC):	12.672 kW_{ac}
Installed DER System Cost (before incentives):	$ 40,434.09
Estimated Installation Date:	

Equipment Certification

Is the DER equipment certified[1]?	☒ Yes ☐ No

Please list all certified IEEE 1547 equipment below. Include all certified equipment manufacturer specification sheets with the Simplified Application submission.

	Equipment Type	Certifying Entity
1	Enphase IQ7HS	UL-1741-SB
2		
3		

[1] Information regarding certified equipment can be found in Section 14 and Section 15 of the Overview Process document.

Interconnection Agreement

Proposed DER interconnections that are also deemed Qualifying Facilities under Minnesota Statutes §216B.164 are eligible to sign the Utility's Uniform Contract for Cogeneration and Small Power Production Facilities. Included in this agreement are payment terms for excess power generated by the proposed DER system the Utility may purchase. In lieu of the Utility's Uniform Contract for Cogeneration and Small Power Production Facilities, the Interconnection Customer may choose to instead sign the Municipal Minnesota Interconnection Agreement (MMIA).

The Interconnection Customer requests an MMIA to be executed in lieu of the Utility's Uniform Contract for Cogeneration and Small Power Production Facilities.	☐ Yes ☒ No

Disclaimers – Must be completed by Interconnection Customer

	Initials
The Interconnection Customer has opportunities to request a timeline extension during the interconnection process. Failure by the Interconnection Customer to meet or request an extension for a timeline outlined in the Interconnection Process could result in a withdrawn queue position and the need to re-apply.	R.D. P.
Propose DER interconnection to the Utility's distribution submitted under the Simplified Process may be moved into the Fast Track Process if engineering screens are failed during the Simplified Application review.	R.D. P.

Application Signature – Must be completed by Interconnection Customer

I designate the individual or company listed as my Application Agent to serve as my agent for the purpose of coordinating with the Area EPS Operators on my behalf throughout the interconnection process.

R.D. P.
Initials

I hereby certify that, to the best of my knowledge, the information provided in this Application is true, and that I have appropriate Site Control in conformance with the Interconnection Process. I agree to abide by the Municipal Minnesota Distributed Energy Resource Interconnection Process (M-MIP) and return the Certificate of Completion when the DER has been installed.

Richard D. Pooley
Applicant Signature:

11/14/2024
Date:

*****Please print clearly or type and return completed along with any additional documentation*****

RICHARD POOLEY

1911 KNOLLWOOD DR. FAIRMONT, MN, 56031

PHOTOVOLTAIC SYSTEM SPECIFICATIONS

SYSTEM SIZE:	33 MODULES- ROOF MOUNT 14.025 kW DC 12.672 kW AC
MODULE TYPE & AMOUNT:	(33) SPR-M425-H-AC
MODULE DIMENSIONS:	(L/W/H) 73.7"/40.6"/1.32"
INVERTER:	(33) IQ7HS (240V, 1 PHASE)
INTERCONNECTION METHOD:	SUPPLY SIDE TAP

GENERAL STRUCTURAL NOTES:

a. THE SOLAR PANELS ARE TO BE MOUNTED TO THE ROOF FRAMING USING THE PEGASUS & INVISIMOUNT RAIL SYSTEM. THE MOUNTING FEET ARE TO BE SPACED AS SHOWN IN THE DETAILS, AND MUST BE STAGGERED TO ADJACENT FRAMING MEMBERS TO SPREAD OUT THE ADDITIONAL LOAD.
b. UNLESS NOTED OTHERWISE, MOUNTING ANCHORS SHALL BE 516" LAG SCREWS WITH A MINIMUM OF 2 12" PENETRATION INTO ROOF FRAMING.
c. THE PROPOSED PV SYSTEM ADDS 3.0 psf TO THE ROOF FRAMING SYSTEM.
1. ROOF LIVE LOAD = 20 PSF TYPICAL, 0 psf UNDER NEW PV SYSTEM.
2. GROUND SNOW LOAD = 50 psf
3. WIND SPEED = 115 mph
4. EXPOSURE CATEGORY = B

GOVERNING CODES

ALL WORK SHALL CONFORM TO THE FOLLOWING CODES

A. 2023 NATIONAL ELECTRICAL CODE
B. 2020 MINNESOTA RESIDENTIAL CODE
C. 2020 MINNESOTA BUILDING CODE
D. 2024 MINNESOTA ENERGY CODE
E. 2020 MINNESOTA ACCESSIBILITY CODE
F. 2020 MINNESOTA MECHANICAL & FUEL GAS CODE
G. 2020 MINNESOTA PLUMBING CODE
H. 2020 MINNESOTA STATE FIRE CODE
I. ANY OTHER LOCAL AMENDMENTS

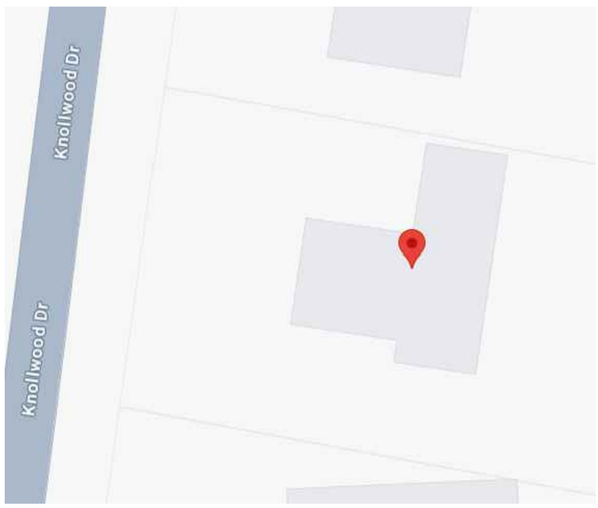
SHEET INDEX

AUTHORITIES HAVING JURISDICTION

BUILDING: CITY OF FAIRMONT
ZONING: CITY OF FAIRMONT
UTILITY: FAIRMONT PUBLIC UTILITY
UTILITY METER: #94176108

Satellite View

Vicinity Map



GENERAL ELECTRIC NOTES:

1. ALL COMPONENTS ARE UL LISTED AND CEC CERTIFIED, WHERE WARRANTED.
2. THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2023
3. THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
4. ALL CONDUCTORS OF A CIRCUIT, INCLUDING THE EGC, MUST BE INSTALLED IN THE SAME RACEWAY, OR CABLE, OR OTHERWISE RUN WITH THE PV ARRAY CIRCUIT CONDUCTORS WHEN THEY LEAVE THE VICINITY OF THE PV ARRAY.
5. WHERE METALLIC CONDUIT CONTAINING DC CONDUCTORS IS USED INSIDE THE BUILDING, IT SHALL BE IDENTIFIED AS "CAUTION: SOLAR CIRCUIT" EVERY 10FT.
6. HEIGHT OF THE AC DISCONNECT SHALL NOT EXCEED 6'-7" PER NEC CODE 240.24.
7. A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH CEC 690.47 AND 250.50 THROUGH 60 AND 250-166 SHALL BE PROVIDED. PER NEC GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE OR INADEQUATE A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT. GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO LARGER THAN #6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
8. PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
9. PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING. MECHANICAL, OR BUILDING ROOF VENTS.
10. ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE. WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF THE ROOF SURFACE.
11. ALL SINAGE TO BE PLACED IN ACCORDANCE WITH THE LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SINAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
12. AS SPECIFIED BY THE AHJ, EQUIPMENT USED IN UNGROUNDED SYSTEMS LABELED ACCORDING TO NEC 690.35(F).
13. INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE LISTED FOR THIS USE [NEC 690.35(G)].
14. THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
15. ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
16. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
17. SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41.
18. PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
19. DISCONNECTING MEANS SHALL BE LOCATED IN A VISIBLE, READILY ACCESSIBLE LOCATION WITHIN THE PV SYSTEM EQUIPMENT OR A MAXIMUM OF 10 FEET AWAY FROM THE SYSTEM [NEC 690.13(A)]
20. ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
21. WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3).
22. ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
23. ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.

WOLF RIVER ELECTRIC
101 ISANTI PARKWAY NE,
SUITE G ISANTI, MN 55040
ELECTRICAL LICENSE: EA777669
Building License : BC773271
Contact: (763) 229-6662
contact@wolfriverelectric.com

DESIGNED BY:
WOLF RIVER ELECTRIC

George Plumb
Designer Signature

Engineer Signature & Stamp

RICHARD POOLEY
1911 KNOLLWOOD DR.
FAIRMONT, MN 56031
AHJ: CITY OF FAIRMONT
UTILITY: FAIRMONT PUBLIC UTILITY

Revisions Table

Description	Date	Rev.

Sheet Name & Creation Date

COVER SHEET

10/25/2024

Sheet Number

PV-0.0

NOTE:
ATTIC RUN CONDUIT SHALL BE MINIMUM 18 INCHES FROM ROOF SHEATING

1 PV 1.0 SITE PLAN & PLOT PLAN
SCALE: NTS (NOT TO SCALE)

SYSTEM LEGEND

- EXISTING EXTERIOR UTILITY METER #94176108
- M — EXISTING INTERIOR MAIN SERVICE PANEL
- AC — **NEW** UTILITY AC DISCONNECT SWITCH.
- C — **NEW** ENPHASE 4 COMBINER PANEL
- 33 **NEW** SPR-M425-H-AC
  33 **NEW** - IQ7HS MICROINVERTERS (240V, 1 PHASE)(MOUNTED ON THE BACK OF EACH MODULE.
- = FIRE PATHWAY
- = ROOF OBSTRUCTIONS
- = ATTIC RUN CONDUIT
- = ATTIC RUN CONDUIT JUNCTION BOX
- = FENCE LINE

●ROOF ACCESS POINT

ROOF ACCESS POINTS SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES AND OR SIGNS

ROOF SECTIONS

ROOF #01
MODULE - 33
SLOPE - 7/12
AZIMUTH - 188.54°
MATERIAL - ASPHALT SHINGLES
RAFTER SIZE & SPACING - 2"X12" @ 24" O.C.

NOTE :

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2. ALL TESTING SHALL BE PERFORMED BY QUALIFIED PERSONNEL, WITH PROPER PERSONAL PROTECTIVE EQUIPMENT.
3. 24/ 7 UNESCORTED KEYLESS ACCESS IS TO BE PROVIDED FOR ALL UTILITY EQUIPMENT.
4. AC DISCONNECT SHOULD BE LOCATED TOGETHER IN A READILY ACCESSIBLE LOCATION WITHIN 10' OF THE MAIN SERVICE METER

N

SYSTEM LEGEND

LOT: .73 ACRES

PARCEL: 230530040

- PROPERTY LINE
- FENCE LINE
- DRIVEWAY

WOLF RIVER ELECTRIC

WOLF RIVER ELECTRIC
101 ISANTI PARKWAY NE,
SUITE G ISANTI, MN 55040
ELECTRICAL LICENSE:
EA777669
Building License :
BC773271
Contact: (763) 229-6662
contact@wolfriverelectric.com

DESIGNED BY:
WOLF RIVER ELECTRIC

George Plumb
Designer Signature

Engineer Signature & Stamp

RICHARD POOLEY
1911 KNOLLWOOD DR.
FAIRMONT, MN 56031
AHJ: CITY OF FAIRMONT
UTILITY: FAIRMONT PUBLIC UTILITY

Revisions Table

Description	Date	Rev.

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PLOT & SITE PLAN

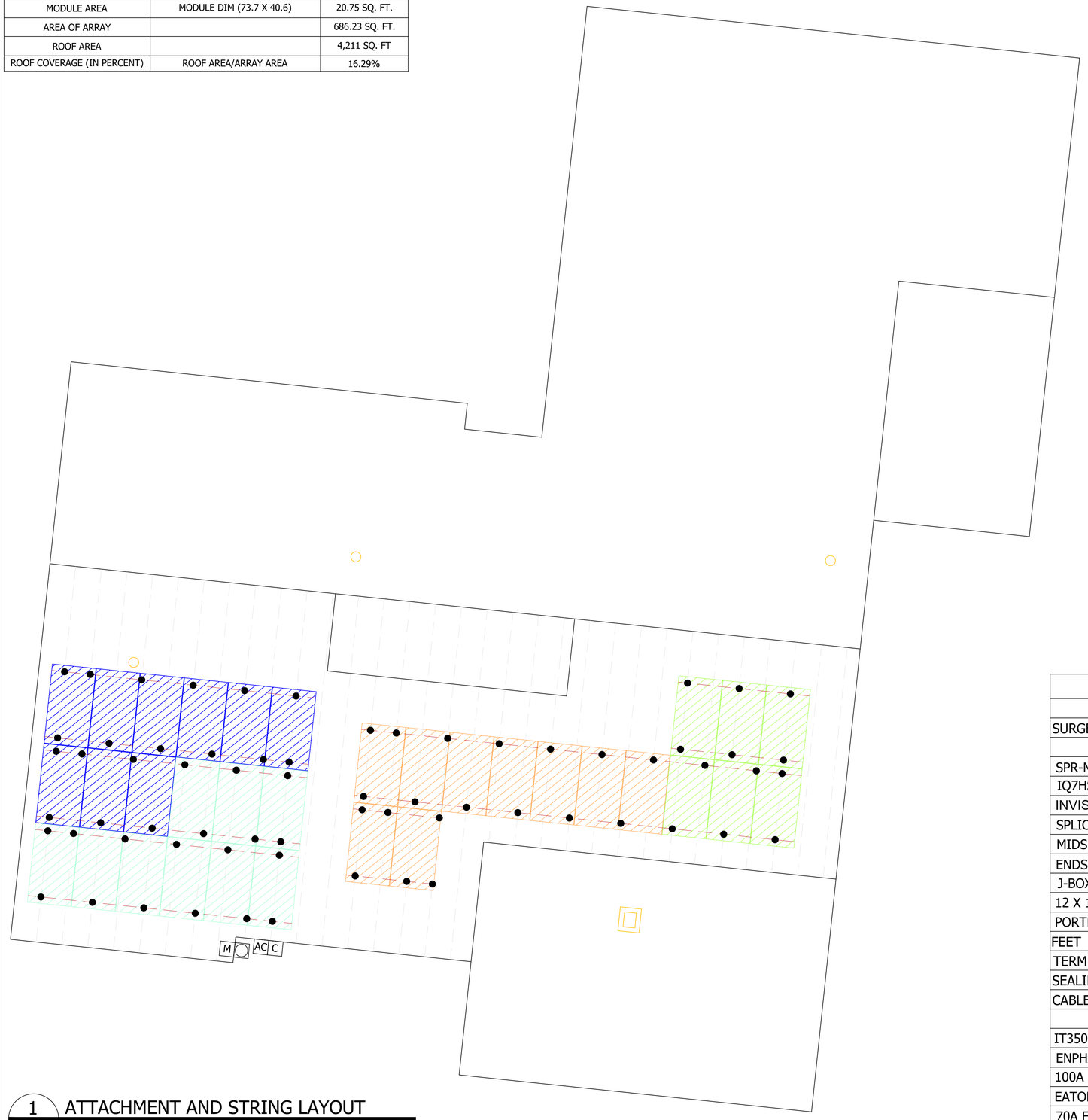
10/25/2024

Sheet Number

PV-1.0

NOTE: THE MAXIMUM CANTILEVER OF THE RAIL SHALL BE 1/3 OF THE ATTACHMENT SPACING.

ARRAY AREA		
MODULE AREA	MODULE DIM (73.7 X 40.6)	20.75 SQ. FT.
AREA OF ARRAY		686.23 SQ. FT.
ROOF AREA		4,211 SQ. FT
ROOF COVERAGE (IN PERCENT)	ROOF AREA/ARRAY AREA	16.29%



1 ATTACHMENT AND STRING LAYOUT
PV 1.1
SCALE: NTS (NOT TO SCALE)

N

SYSTEM LEGEND

- = ATTACHMENT POINTS(67 Nos)
- = RAFTER
- = RAIL SYSTEM

CIRCUIT(S)

CIRCUIT #01	# MODULE - 6
CIRCUIT #02	# MODULE - 9
CIRCUIT #03	# MODULE - 9
CIRCUIT #04	# MODULE - 9

ROOF SYSTEM= 2 x 12 @24" O.C. RAFTER SYSTEM

BOM		
CATEGORY	BRAND	QUANTITY
SURGE PROTECTION		1
SPR-M425-H-AC		33
IQ7HS MICROINVERTER		33
INVISIMOUNT		22
SPLICES		20
MIDS		36
ENDS		24
J-BOX		2
12 X 12 X 6 J-BOX		1
PORTRAIT AC TRUNK CABLE		37
FEET		67
TERM CAPS		4
SEALING CAPS		4
CABLE SPLICES		4
IT350		3
ENPHASE COMBINER		1
100A (FUSED) AC DISCONNECT NEMA3 1P, 3W 120/240V		1
EATON BR 20A 2-POLE BREAKER		5
70A FUSE 250V		2
CONSUMPTION		2

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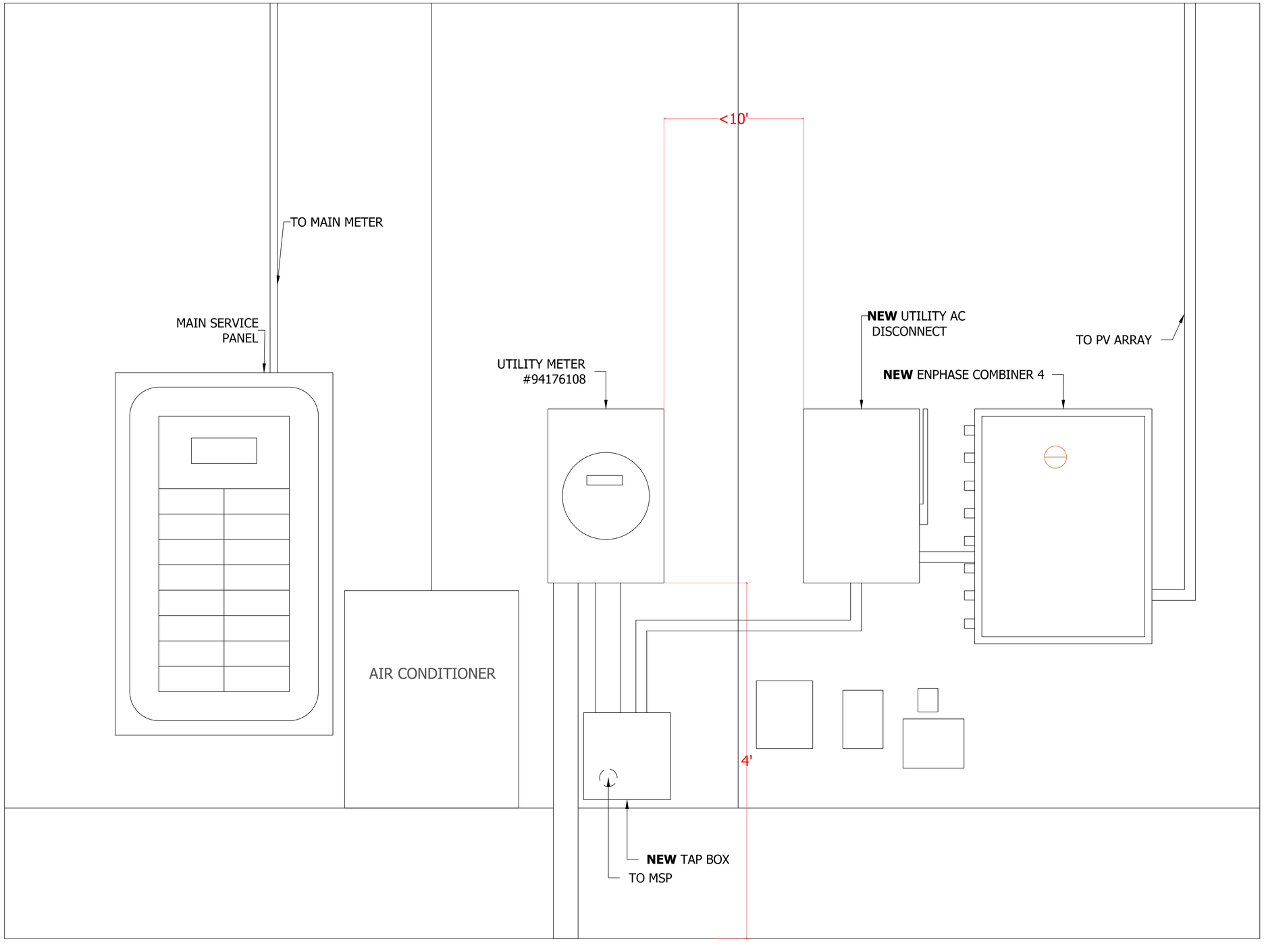
STRING PLAN

10/25/2024

Sheet Number

PV-1.1



1 EQUIPMENT ELEVATION

PV 1.2

SCALE: NTS

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EQUIPMENT ELEVATIONS

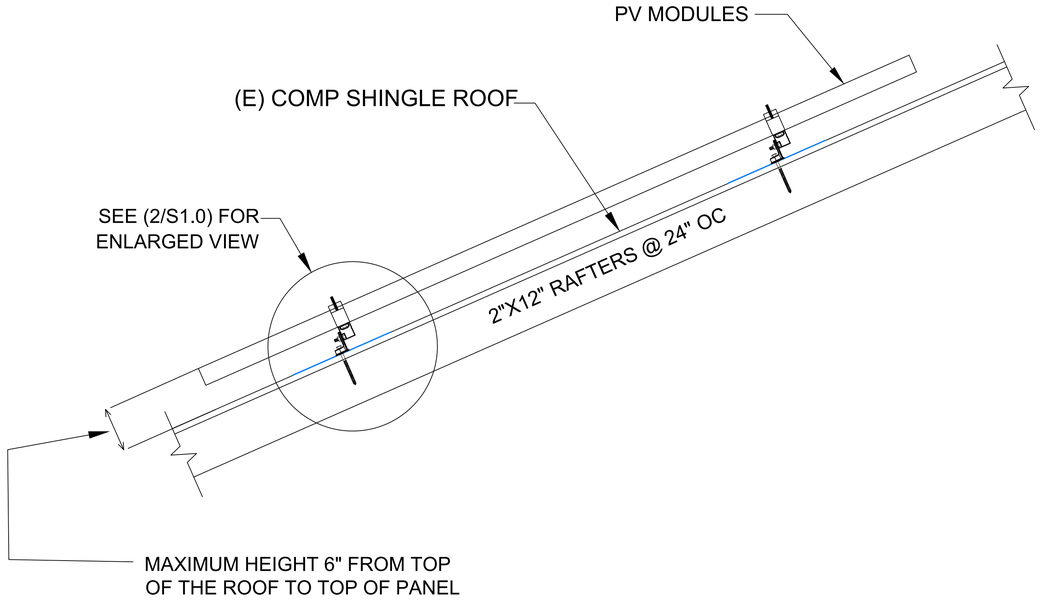
10/25/2024

Sheet Number

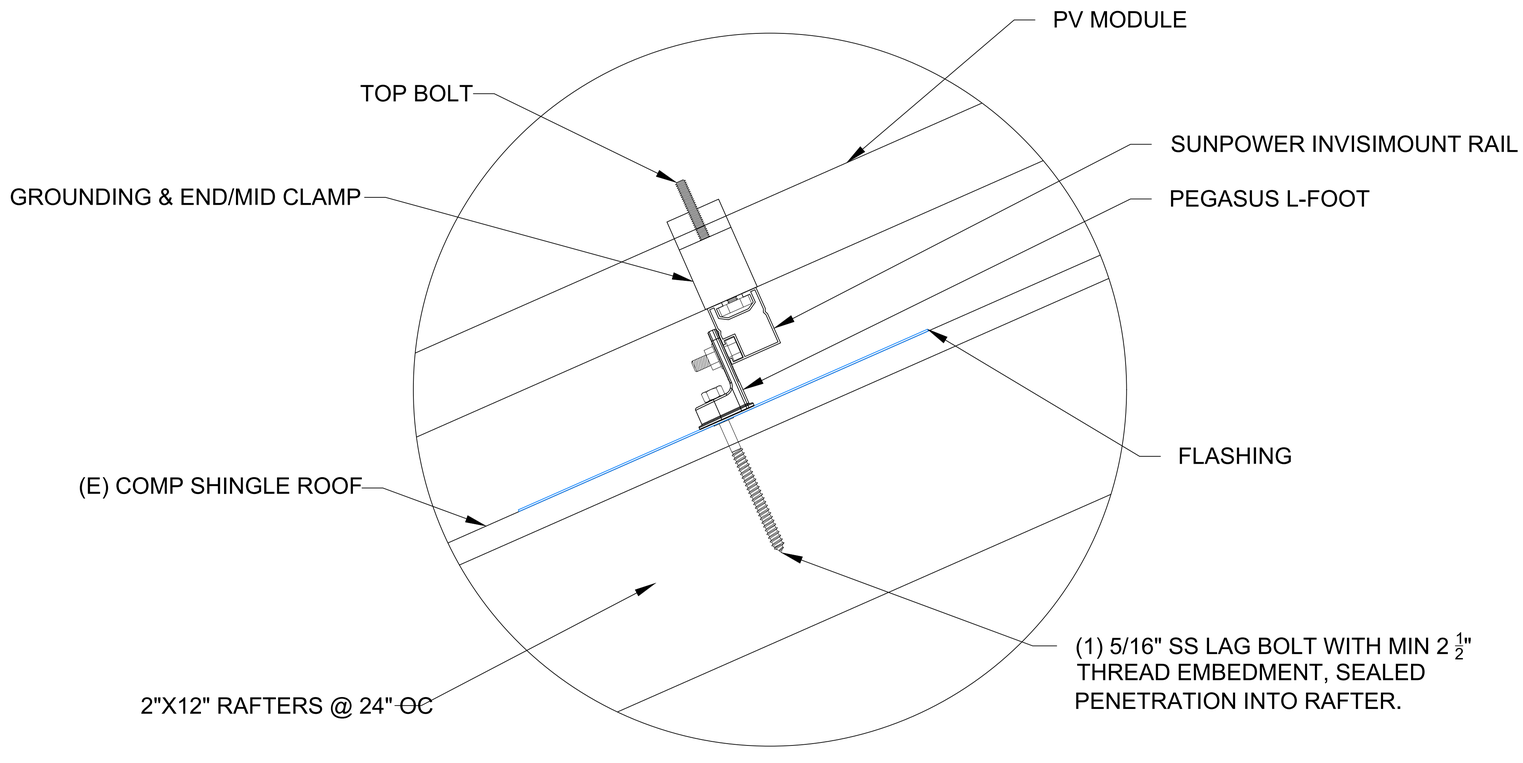
PV-1.2

GENERAL STRUCTURAL NOTES

A. THE SOLAR PANELS ARE TO BE MOUNTED TO THE ROOF FRAMING AND MUST BE STAGGERED TO ADJACENT FRAMING MEMBERS TO SPREAD OUT THE ADDITIONAL LOAD.
B. UNLESS NOTED OTHERWISE, MOUNTING ANCHORS SHALL BE $\frac{5}{16}$" LAG SCREWS WITH A MINIMUM OF 2 $\frac{1}{2}$" PENETRATION INTO ROOF FRAMING
C. THE PROPOSED PV SYSTEM ADDS 3.0 psf TO THE ROOF FRAMING SYSTEM
1. ROOF LIVE LOAD = 20 psf TYPICAL, 0 psf UNDER NEW PV SYSTEM.
2. GROUND SNOW LOAD = 50 psf
3. WIND SPEED = 115 mph
EXPOSURE CATEGORY =B



1 ATTACHMENT DETAIL
D-2.0
SCALE: NTS



2 ATTACHMENT DETAIL (ENLARGED VIEW
D-2.0
SCALE: NTS

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DETAILS
10/25/2024
Sheet Number
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3. 24/ 7 UNESCORTED KEYLESS ACCESS IS TO BE PROVIDED FORALL UTILITY EQUIPMENT.
4. THE PRODUCTION METER & AC DISCONNECT SHOULD BE LOCATED TOGETHER VISIBLE-OPEN LOCKABLE READILY ACCESSIBLE LOCATION WITHIN 10' OF THE MAIN SERVICE METER.
5. THE METER SOCKET FOR THE PV PRODUCTION METER SHALL BE MARKED WITH A STAMPED BRASS, ALUMINUM, OR STAINLESS STEEL TAG, INDICATING THE ADDRESS INCLUDING THE UNIT, TYPICALLY "PV PROD" IN ACCORDANCE WITH THE REQUIREMENTS FOR "METER IDENTIFICATION" IN SECTION 4.14.4 OF THE XCEL ENERGY STANDARD, OR AS MAY BE AMENDED.
6. THE PV PRODUCTION METER SHALL BE LOCATED WITHIN TEN (10) FEET OF THE EXISTING UTILITY METER. IF THERE IS ANY REASON THIS CANNOT BE ACCOMPLISHED, THE APPROVAL OF THE PROPOSED PV PRODUCTION METERING WILL NEED TO BE OBTAINED BY THE LOCAL ELECTRIC METER SHOP.

Photovoltaic System

DC SYSTEM SIZE	14.025 kW
AC SYSTEM SIZE	12.672 kW
TOTAL MODULE COUNT	33

NOTE: AC DISCONNECT TO BE INSTALLED WITHIN 10FT FROM UTILITY METER.

33 SPR-M425-H-AC1728 X 1205 X 30 MM (2.08M)
33 ENPHASE IQ7HS. INVERTERS TO BE MOUNTED ON THE RAIL BENEATH EACH OF THE PANELS

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CONDUIT CONDUCTOR SCHEDULE

SPECIFIED CONDUCTORS SHALL BE COPPER UNLESS OTHERWISE SPECIFIED

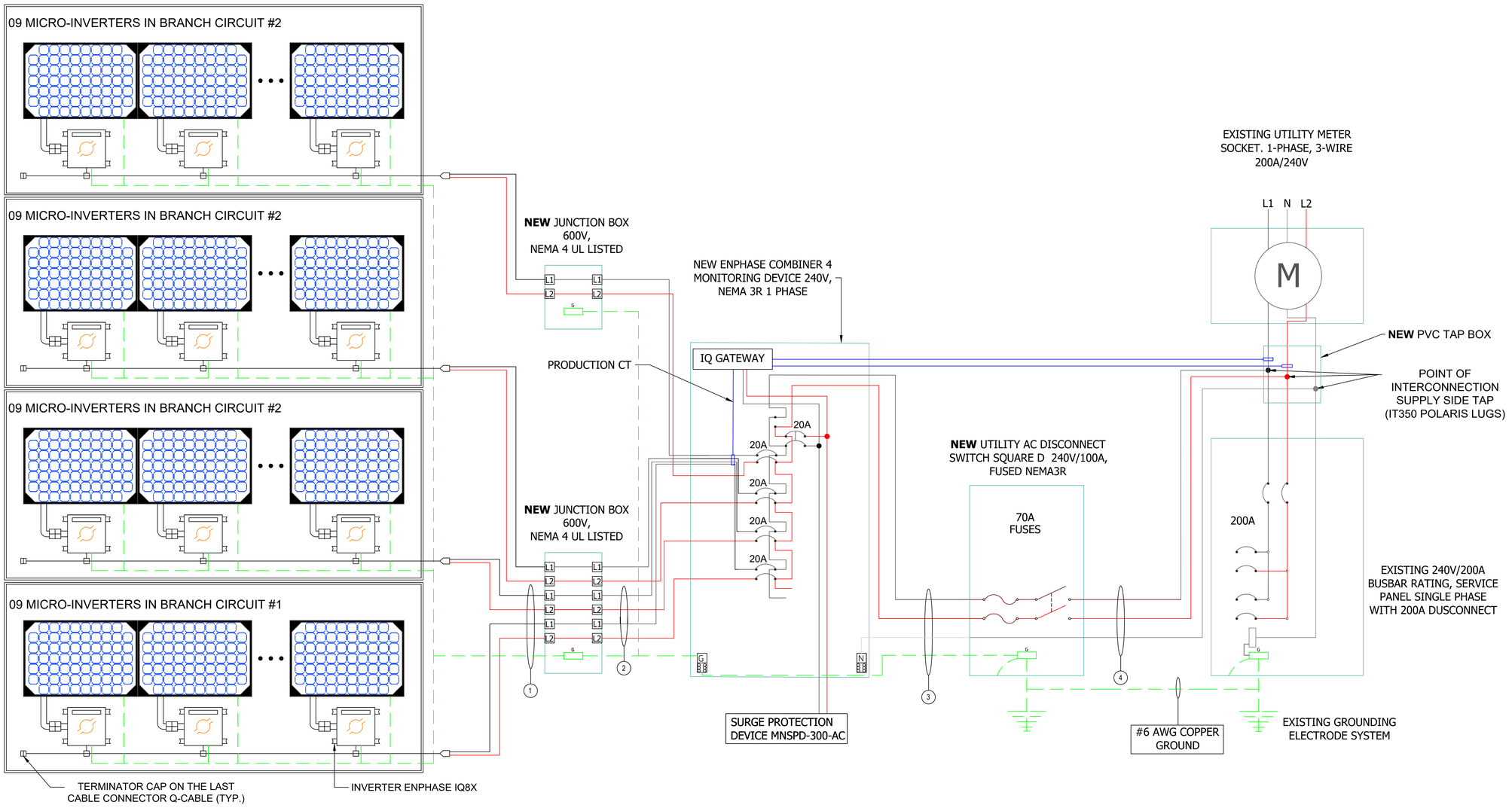
TAG #	DESCRIPTION	WIRE GAUGE	# OF CONDUCTORS/COLOR	CONDUIT TYPE	CONDUIT SIZE
1	INVERTER OUTPUT (ENPHASE Q CABLE)	#12 AWG	6(3L1, 3L2)	FREE AIR	N/A
1	EGC (BARE COPPER GROUND)	#6 AWG	1 BARE	FREE AIR	N/A
2	INVERTER OUTPUT (THWN-2)	#12 AWG	6(3L1, 3L2)	FMC	3/4"
2	EGC (THWN-2)	#12 AWG	1(GRN)	FMC	3/4"
3	INVERTER OUTPUT (THWN)	#3 AWG (AL)	3(L1,L2,N) B/R/W	SCH 80 PVC	1 1/4 "
3	EGC (THWN)	#6 AWG	1(GRN)	SCH 80 PVC	1 1/4 "
4	INVTER OUTPUT (THWN)	#3 AWG (AL)	3(L1,L2,N) B/R/W	SCH 80 PVC	1 1/4"

PV MODULE RATING @ STC

MANUFACTURER	SUNPOWER SPR-M425-H-AC-425
OUTPUT POWER	425W
POWER TOLERANCE	+5/-0%
MODULE EFFICIENCY	22.00%
TEMP. COEF. (POWER)	-0.29% / °C

INVERTER SPECIFICATIONS

MANUFACTURER	ENPHASE IQ7HS-66-M-US
MAX DC VOLT RATING	59 VOLTS
MAX POWER AT 40 C	384 WATTS
NOMINAL AC VOLTAGE	240 VOLTS
MAX AC CURRENT	1.60AMPS
MAX OCPD RATING	20 AMPS
MAX. PANEL/CIRCUIT	10
SHORT CIRCUIT CURRENT	15 AMPS



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3-LINE

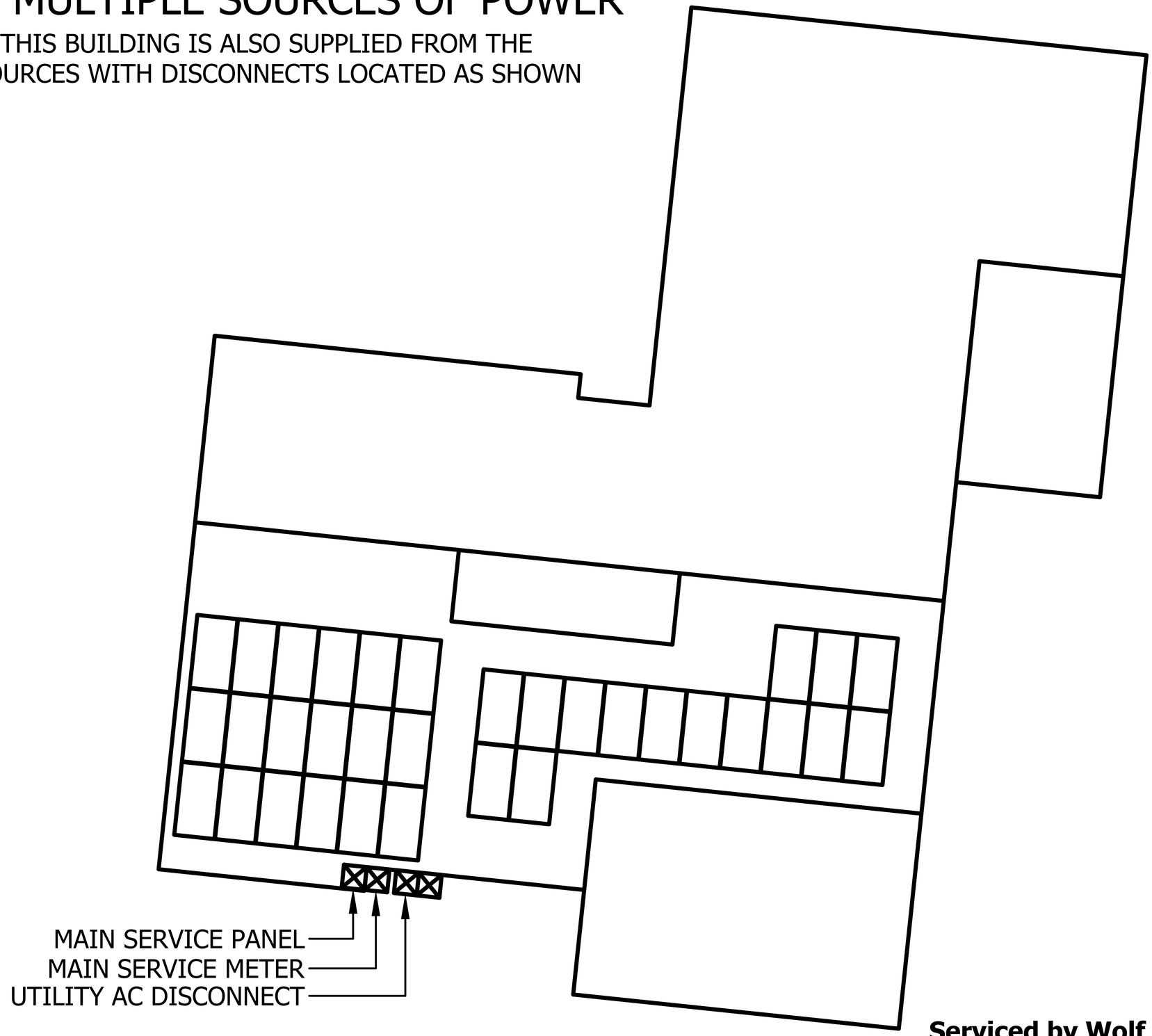
10/25/2024

Sheet Number

D-2.1

CAUTION ! MULTIPLE SOURCES OF POWER

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



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Contact: (763) 229-6662

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PLACARD STICKER TO BE INSTALLED @ MAIN SERVICE METER.

PLACARD LOCATION

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Revisions Table

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Creation Date

PLACARD SHEET

10/25/2024

Sheet Number

D-2.2

WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION: COMBINER PANEL, AC DISCONNECT, POINT OF INTERCONNECTION
PER CODE: NEC 706.15(C)(4), NEC 690.13(B)

WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT IOR TO WORKING INSIDE PANEL

LABEL LOCATION: COMBINER PANEL(S), MAIN SERVICE DISCONNECT
PER CODE: NEC 110.27(C), OSHA 1910.145(f)(7)

PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION: DC CONDUIT/RACEWAYS
PER CODE: NEC 690.31(D)(2)

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OUPUT CURRENT: 52.8A
NOMINAL OPERATING AC VOLTAGE: 240 V

LABEL LOCATION: AC DISCONNECT/POINT OF INTERCONNECTION
PER CODE: NEC 690.54

PHOTOVOLTAIC
UTILITY
AC DISCONNECT

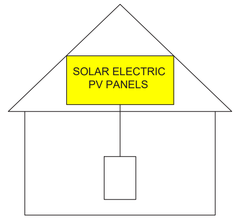
LABEL LOCATION: AC DISCONNECT
PER CODE: NEC 690.13(B)

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION: MAIN SERVICE DISCONNECT, PRODUCTION/NET METER
PER CODE: NEC 690.59, 705.12(C)

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: MAIN SERVICE DISCONNECT
PER CODE: NEC 690.56(C)

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL LOCATION: MAIN SERVICE DISCONNECT, UTILITY METER
PER CODE: NEC 690.13(B)

RAPID SHUTDOWN FOR SOLAR PV SYSTEM

LABEL LOCATION: RSD INITIATION DEVICE, AC DISCONNECT
PER CODE: NEC 690.56(C)(2)

DO NOT DISCONNECT UNDER LOAD

LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 690.15(B) & NEC 690.33(D)(2)

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WARNING SHEET

10/25/2024

Sheet Number

D-2.3

DEPARTMENT OF LABOR AND INDUSTRY

Solar PV Inspection Checklist for REI #ELE- _____Installer_____
Job Address_____City/Township_____

Required Documentation
- Manufacturer's specifications for the inverter(s)
- Manufacturer's specifications for the module(s)
- Manufacturer's specifications for the optimizer(s) (if used)
- Verification that the racking system grounding and bonding is listed

PV Inverter

- ☐ Is the PV system utility-interactive, stand alone or multimode?
- ☐ Is all the equipment listed for PV application or be evaluated for the application and have a field label applied? 690.4
- ☐ Is the system solidly grounded, ungrounded, or functionally grounded? 690.2 and 690.41
- ☐ Has DC Ground-Fault Protection been provided and properly labeled? 690.41(B)?
- ☐ What is the maximum PV system voltage and is the maximum 600 volts or less for a dwelling or 1000 volts or less for non-dwelling or 1500 volts or less when not located on a building? 690.7
- ☐ Is all listed equipment and conductors rated for the maximum voltage? 690.7
- ☐ Determine the maximum circuit current for the PV Source and Output Circuit; Inverter Output Circuit; Inverter Input Circuit; and DC to DC Converter Output (refer to inverter documentation). 690.8

System Grounding

- ☐ Is all exposed non-current carrying metal parts of the PV system grounded? 690.43 and 690.47
- ☐ Are the mounting structures or systems used for equipment grounding? 690.43
- ☐ Are the interconnecting devices used for equipment grounding listed and identified and are all connections properly torqued? 690.43 and 110.14
- ☐ Are the EGC properly sized and protected, if exposed not smaller than #6? 690.45, 250.122, and 250.120(C)
- ☐ Has the grounding electrode system been installed? 690.47
- ☐ If both are present, has the DC grounding electrode system been bonded to the AC GES? 690.47

Wiring Methods and Disconnecting Means

- ☐ Are the conductor and cable ampacities determined at 125% before adjustment factors? 690.8(B)
- ☐ How are the PV Source and Output Circuit protected from overcurrent? 690.9
- ☐ Do AC or DC OCPD's have the appropriate voltage, current and interrupt ratings? 690.9
- ☐ Has arc-fault circuit protection been provided for DC source and/or output circuits? 690.11
- ☐ Is a rapid shutdown required and if so, how is it accomplished and identified? 690.12 & 690.56(C)
- ☐ Are the PV disconnect permanently marked and installed in a readily accessible location? 690.13
- ☐ Are the Isolating devices or equipment disconnecting means installed in circuits connected to equipment at a location within the equipment, or within sight and 10 feet of the equipment? (Where the maximum circuit current is greater than 30 amperes an equipment disconnecting means shall be provided for isolation.) 690.15
- ☐ Has the fuse disconnecting means, if required, been installed? 690.15 and 240.40
- ☐ Are PV source or output circuits > 30 volts in a raceway or guarded if readily accessible? 690.31
- ☐ Is single conductor cable used outdoors sunlight resistant Type USE-2, Type RHW-2, or listed & labeled PV wire, and properly support and secured? 690.31(C)
- ☐ Are PV source or output circuits inside a building in a metal raceway and marked? 690.31(D)

Interconnection

- ☐ Has a plaque or directory been installed at each disconnecting means (capable of interconnection) denoting all electric power sources & power production sources? 705.10
- ☐ Has the point of connection to other sources been installed per 705.11 or 705.12?
- ☐ Are the utility interactive inverters connected to the system through a dedicated circuit breaker or fusible disconnecting means? 705.12
- ☐ Does the bus or conductor ampacity comply with 705.12?
- ☐ Have all the required labels been applied? (See label list.)

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SPEC SHEET

10/25/2024

Sheet Number

S-3.0

MIDNITE SOLAR INC.

Surge Protection

Surge Protection You Can Count On!

MidNite Solar Surge Protection Devices are type 1 devices, designed for indoor and outdoor applications. Engineered for both AC and PV DC electrical systems, they provide protection to service panels, load centers or electronic devices that are directly connected to a MidNite Surge Protection Device (SPD).

MidNite's SPD's are offered in four models to protect a variety of different voltage ranges. They achieve this protection by clamping surge voltage to a level that your system can sustain without damaging the components of the system.

Compare our SPD's against other surge protection devices. You will see there is no comparison in both our price and features. All our SPD's have a 5 year warranty.

With lightning you only get one chance, so get the best!

MNSPD300ACFM (Cut-in box)
(MNSPD-300-AC included)

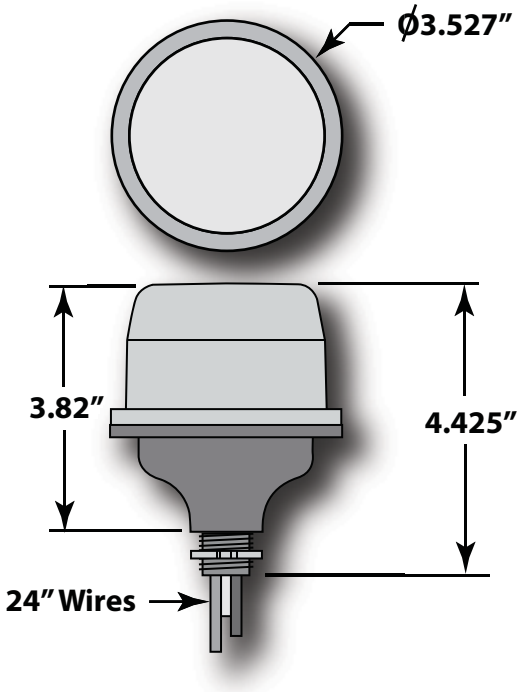
Four Models:

MNSPD-115
MNSPD-300-AC
MNSPD-300-DC
MNSPD-600

www.midnitesolar.com/spd
19115 - 62nd Ave. NE., Arlington, WA. 360-403-7207 FAX: 360-691-6862

MidNite Surge Protection Devices

PART NUMBER	MNSPD-115	MNSPD-300-AC	MNSPD-300-DC	MNSPD-600
Nominal Voltage	0 to 90 VAC 0 to 115 VDC	0 to 250 VAC	0 to 300 VDC	0 to 480 VAC 0 to 600 VDC
MCOV	180V	470V	470V	780V
VPR Line to Ground	600V	1200V	1200V	1800V
Suggested Placement	Up to 90VAC circuits, 12V, 24V, 48VDC battery circuits	120/240 VAC circuits	Off-grid PV combiners Charge controller inputs up to 300VDC	316V/480 VAC circuits Grid-tie PV combiners Grid-tie inverter input Non-Isolated Inverters
Type	UL1449 4th Ed. Type 1	UL1449 4th Ed. Type 1	UL1449 4th Ed. Type 1	UL1449 4th Ed. Type 1
Diagnostic Blue LED	MNSPD-300-AC LED indicates when voltage is present between L1 + ground and L2 + ground MNSPD-115, MNSPD-300-DC and MNSPD-600: LED indicates when voltage is present between L1 + L2 (PV+ PV-)			
Thermal Disconnector	Internal Fuse			
Response Time	<1 micro sec.			



Performance	
Surge Current Rating per Phase	80kA
Short Circuit Current Rating	10kA
Fusing	Individually fused MOVs
Thermal Fusing	Yes
Over current Fusing	Yes
Operating Frequency	0 to 500 Hz
Mechanical Description	
Enclosure	Polycarbonate UL94V-0
Environmental Rating	Type 4X
Connection Method	#12 AWG
Weight	1 lb.
Mounting Method	1/2" Conduit Knockout
Operating Altitude	Sea Level – 12,000' (3,658 Meters)
Storage Temp	-40° F to +185° F (-40° C to +85° C)
Operating Temp	-40° F to +185° F (-40° C to +85° C)
Diagnostics	
Blue status LED, one per leg	
Listings and Performance	
UL Standard for Safety, UL 1449 Surge Protective Devices-Fourth Edition	
CSA C22.2 No. 8-M1986 Electromangetic Interference (EMI) Filters, Fourth Edition	

Model No.	Max Operating Voltage	Surge Current per Phase	Configuration	MCOV	SCCR	VPR 600V/3kA L_G
MNSPD-115	100 VAC/150VDC	80kA	1Ø, 3-wire (2 Legs)	180V L-N	10kA	600V
MNSPD-300-AC	300VAC	80kA	1Ø, 3-wire (2 Legs)	470V L-N	10kA	1200V
MNSPD-300-DC	385VDC	80kA	1Ø, 3-wire (2 Legs)	470V L-N	10kA	1200V
MNSPD-600	480VAC/600VDC	80kA	1Ø, 3-wire (2 Legs)	780V L-N	10kA	1800V

19115 - 62nd Ave NE, Arlington, WA 98223 PH. 360-403-7207 FAX 360-691-6862

M SERIES

SUNPOWER®

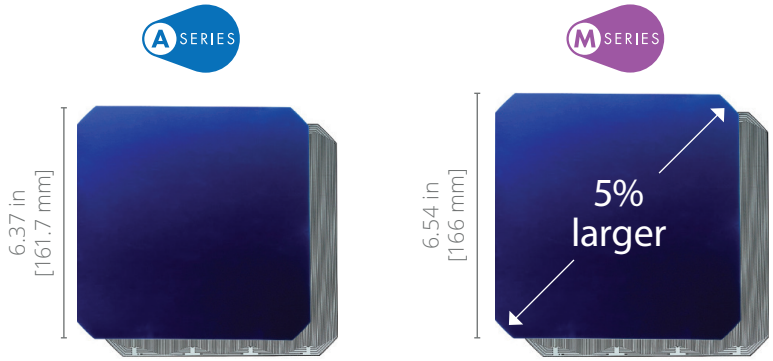
420-440W Residential AC Module

SunPower® Maxeon® Technology

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

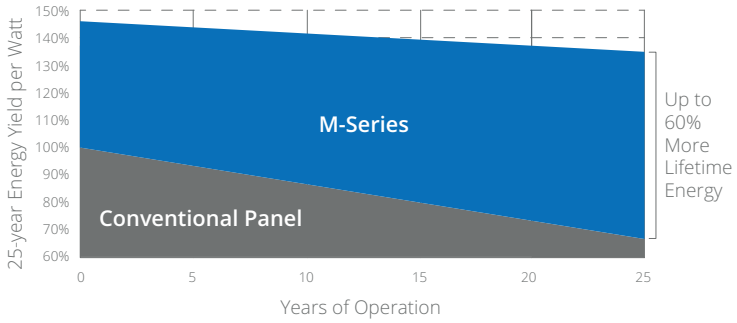
Highest Power AC Density Available.

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



Highest Lifetime Energy and Savings

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

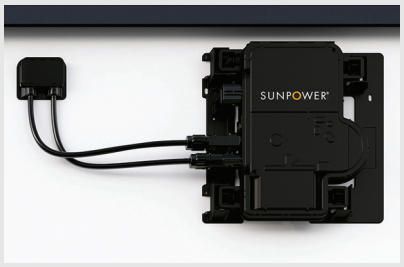


Best Reliability, Best Warranty

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

Part of the SunPower Equinox® Solar System

- Compatible with mySunPower™ monitoring
- Seamless aesthetics



Factory-integrated Microinverter

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

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

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

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

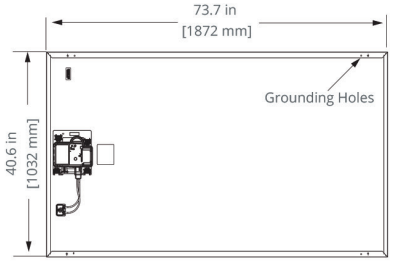
Tested Operating Conditions	
Operating Temp.	-40° F to +185°F (-40°C to +85°C)
Max. Ambient Temp.	122°F (50°C)
Max. Test Load[8]	Wind: 125 psf, 6000 Pa, 611 kg/m² back Snow: 187 psf, 9000 Pa, 917 kg/m² front
Max. Design Load	Wind: 75 psf, 3600 Pa, 367 kg/m² back Snow: 125 psf, 6000 Pa, 611 kg/m² front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

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

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

Packaging Configuration	
Modules per pallet	25
Packaging box dimensions	75.4 × 42.2 × 48.0 in. (1915 × 1072 × 1220 mm)
Pallet gross weight	1300.7 lb (590 kg)
Pallets per container	32
Net weight per container	41,623 lb (18,880 kg)

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



FRAME PROFILE

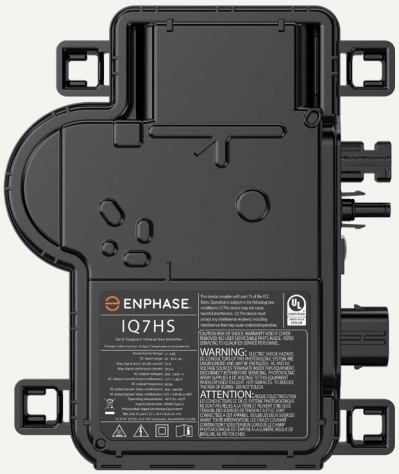
(A) Long Side: 1.3 in (32 mm)
Short Side: 0.9 in (24 mm)

Please read the safety and installation instructions for details.

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

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

539973 RevB
January 2022



IQ7HS Microinverter

The high-powered, smart grid-ready IQ7HS Microinverter with integrated MC4 connectors dramatically simplifies installation while achieving the highest system efficiency.

Part of the Enphase Energy System, the IQ7HS Microinverters integrate with the IQ Gateway, IQ Battery, and the Enphase Installer App monitoring and analysis software.

Enphase 25 year limited warranty

IQ7HS Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Connect PV modules quickly and easily to the IQ7HS Microinverters that have integrated MC4 connectors.

UL CERTIFIED SAFETY

IQ7HS Microinverters are UL Listed as PV rapid shutdown equipment and conform with various regulations when installed according to the manufacturer's instructions.

Easy to install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 , 2017, 2020, and 2023)

Productive and reliable

- Optimized for high powered 60-cell/120-half-cut-cell, 66-cell/132-half-cut-cell, and 72-cell/144-half-cut-cell PV modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL Listed

Smart grid-ready

- Complies with advanced grid support, voltage, and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB, 3rd Ed.) for single-phase systems

IQ7HS Microinverter

INPUT DATA (DC)	UNITS	IQ7HS-66-M-US
Commonly used module pairings[1]	W	320–460
Module compatibility	—	60-cell/120-half-cut-cell, 66-cell/132-half-cut-cell, and 72-cell/144-half-cut-cell PV modules
Maximum input DC voltage	V	59
Peak power tracking voltage	V	38–43
Operating range	V	20–59
Minimum/Maximum start voltage	V	30/59
Maximum input DC short-circuit current	A	25
Maximum module I_{sc}	A	20
Overvoltage class DC port	—	II
DC port back-feed current	A	0
PV array configuration	—	1 × 1 ungrounded array; no additional DC side protection required; AC side protection requires max. 20 A per branch circuit
OUTPUT DATA (AC)		
Peak output power	VA	384 @ 240 VAC, 369 @ 208 VAC
Maximum continuous output power	VA	384 @ 240 VAC, 369 @ 208 VAC
Nominal (L-L) voltage/Range[2]	V	240/211–264, 208/183–229
Maximum continuous output current	—	1.60 A (240 V), 1.77 A (208 V)
Nominal frequency	Hz	60
Extended frequency range	Hz	47–68
AC short-circuit fault current over three cycles	Arms	4.82
Maximum units per 20 A (L-L) branch circuit[3]	—	10 (240 VAC), 9 (208 VAC)
Overvoltage class AC port	—	III
AC port back-feed current	mA	18
Power factor setting	—	1.0
Power factor (adjustable)	—	0.85 leading ... 0.85 lagging
EFFICIENCY		
CEC weighted efficiency	%	97.0 @ 240 V, 96.5 @ 208 V
MECHANICAL DATA		
Ambient temperature range	°C (°F)	–40 to 60 (–40 to 140)
Relative humidity range	%	4 to 100 (condensing)
DC connector type	—	Stäubli MC4
Dimensions (H × W × D)	mm (in)	212 (8.3) × 175 (6.9) × 30.2 (1.2) without bracket
Weight	kg (lb)	1.1 (2.4)
Cooling	—	Natural convection—no fans
Approved for wet locations	—	Yes
Pollution degree	—	PD3

[1] Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at enphase.com/installers/microinverters/calculator.
[2] Nominal voltage range can be extended beyond nominal if required by the utility.
[3] Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

MECHANICAL DATA		
Enclosure	—	Class II double-insulated, corrosion-resistant polymeric enclosure
Environmental category/UV exposure rating	—	NEMA type 6/Outdoor

FEATURES	
Communication	Power line communication (PLC)
Monitoring	Enphase Installer App and monitoring options Compatible with IQ Gateway
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect means required by NEC 690 and C22.1-2018 Rule 64-220.
Compliance	CA Rule 21 (UL 1741-SA), IEEE 1547:2018 (UL 1741-SB 3rd Ed.) for single-phase systems HEI Rule 14H SRD 2.0 UL 62109-1, FCC Part 15 Class B, ICES-0003 Class B CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors, when installed according to manufacturer's instructions.

Revision history

REVISION	DATE	DESCRIPTION
DSH-00562-1.0	August 2024	Initial release.

SunPower® InvisiMount™ | Residential Mounting System

Simple and Fast Installation

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

Flexible Design

- Addresses nearly all sloped residential roofs
- Design in landscape and portrait
- Rails enable easy obstacle management

Customer-Preferred Aesthetics

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

Part of Superior System

- Built for use with SunPower DC and AC modules
- Best-in-class system reliability and aesthetics
- Combine with SunPower modules and monitoring app

Elegant Simplicity

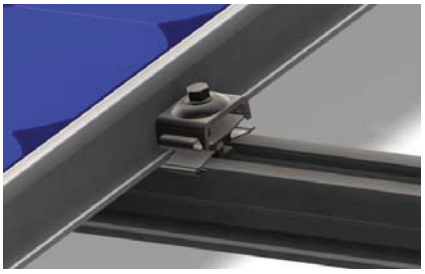
SunPower® InvisiMount™ is a SunPower-designed rail-based mounting system. The InvisiMount system addresses residential sloped roofs and combines faster installation time, design flexibility, and superior aesthetics. The InvisiMount product was specifically envisioned and engineered to pair with SunPower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

sunpower.com

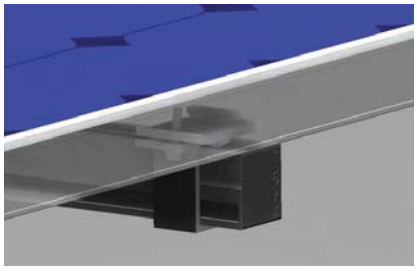
SunPower® InvisiMount™ | Residential Mounting System

InvisiMount Component Images

Module* / Mid Clamp and Rail



Module* / End Clamp and Rail



Mid Clamp

End Clamp

Rail & Rail Splice

Ground Lug Assembly

End Cap

InvisiMount Component Details		
Component	Material	Weight
Mid Clamp	Black oxide stainless steel AISI 304	63 g (2.2 oz)
End Clamp	Black anodized aluminum alloy 6063-T6	110 g (3.88 oz)
Rail	Black anodized aluminum alloy 6005-T6	830 g/m (9 oz/ft)
Rail Splice	Aluminum alloy 6005-T5	830 g/m (9 oz/ft)
Ground Lug Assembly	304 stainless (A2-70 bolt; tin-plated copper lug)	106.5 g/m (3.75 oz)
End Cap	Black acetal (POM) copolymer	10.4 g (0.37 oz)

Roof Attachment Hardware Supported by InvisiMount System Design Tool	
Application	• Composition Shingle Rafter Attachment • Composition Shingle Roof Decking Attachment • Curved and Flat Tile Roof Attachment • Universal Interface for Other Roof Attachments

InvisiMount Operating Conditions	
Temperature	–40° C to 90° C (–40° F to 194° F)
Max. Load	2400 Pa uplift 5400 Pa downforce

InvisiMount Warranties And Certifications	
Warranties	25-year product warranty 5-year finish warranty
Certifications	UL 2703 Listed Class A fire rating when distance between roof surface and bottom of SunPower module frame is ≤ 3.5″

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

*Module frame that is compatible with the InvisiMount system required for hardware interoperability.

sunpower.com
Document #509506 Rev B

SUNPOWER®

X-IQ-AM1-240-4
X2-IQ-AM1-240-4
(IEEE 1547:2018)
X-IQ-AM1-240-4C
X2-IQ-AM1-240-4C
(IEEE 1547:2018)

IQ Combiner 4/4C

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

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

IQ System Controller 2
Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.

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

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

Enphase 5 year limited warranty

5-year limited warranty

Smart

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

Simple

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

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two-years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL Listed
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

*Refer to the https://enphase.com/installers/resources/warranty page for country-specific warranty information.

IQ Combiner 4/4C

MODEL NUMBER	UNITS	DESCRIPTION
IQ Combiner 4 (X-IQ-AM1-240-4, X2-IQ-AM1-240-4)	—	IQ Combiner 4 with an IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%) and consumption monitoring (±2.5%). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C, X2-IQ-AM1-240-4C)	—	IQ Combiner 4C with an IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%) and consumption monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat.
WHAT'S IN THE BOX	**UNITS**	
IQ Gateway printed circuit board	—	IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System.
Busbar	—	80 A busbar with support for one IQ Gateway breaker and four 20 A breakers for installing IQ Series Microinverters and IQ Battery
IQ Gateway breaker	A	Circuit breaker, 2-pole, 10/15
Production CT	—	Pre-wired revenue-grade solid-core CT, accurate up to ±0.5%
Consumption CT	—	Two consumption metering split core or clamp-type CTs, shipped with the box, accurate up to ±2.5%
Emphase Mobile Connect (only with IQ Combiner 4C)	—	4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a five-year T-Mobile data plan
MICROINVERTERS, ACCESSORIES AND REPLACEMENT PARTS (not included; order separately)	**UNITS**	
Supported microinverters	—	IQ6, IQ7, and IQ8. Do not mix IQ6/IQ7 Microinverters with IQ8
Enphase Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	—	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with a 5-year T-Mobile data plan for Enphase sites - 4G-based LTE-M1 cellular modem with a five-year T-Mobile data plan - 4G-based LTE-M1 cellular modem with a five-year AT&T data plan
Circuit breakers (off-the-shelf)	—	Supports Eaton BR2xx, Siemens Q2xx and GE/ABB THQL21xx Series breakers (xx may be 10, 15, 20, 30, 40, 50, or 60). Supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with hold-down kit.
Circuit breakers (provided by Enphase)	—	BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B
XA-SOLARSHIELD-ES	—	Replacement solar shield for IQ Combiner 4/4C
XA-ENV2-PCBA-4	—	IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 4/4C
XA-PLUG-120-3	—	Accessory receptacle for power line carrier in IQ Combiner 4/4C (required for EPLC-01)
X-IQ-NA-HD-125A	—	Hold-down kit for Eaton circuit breaker with screws
ELECTRICAL SPECIFICATIONS	**UNITS**	
Rating	A	80
System voltage and frequency	—	120/240 VAC, 120/208 VAC, 60 Hz
Busbar rating	A	125
Fault current rating	kAIC	10
Maximum continuous current rating (input from PV/storage)	A	64
Maximum fuse/Circuit rating (output)	A	90
Branch circuits (solar and storage)	—	Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included)
Maximum total branch circuit breaker rating (input)	A	80 A of distributed generation/95 A with IQ Gateway breaker included

ELECTRICAL SPECIFICATIONS	UNITS	
IQ Gateway breaker	A	10 A or 15 A rating GE/Siemens/Eaton included
Production metering CT	A	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A	A pair of 200 A split core or clamp-type current transformers

MECHANICAL DATA	UNITS	DESCRIPTION
Dimensions (W × H × D)	cm (in)	37.5 × 49.5 × 16.8 (14.75 × 19.5 × 6.63). Height is 53.5 (21.06) with mounting brackets
Weight	kg (lb)	7.5 (16.5)
Ambient temperature range	°C (°F)	-40 to 46 (-40 to 115)
Cooling	–	Natural convection plus a heat shield
Enclosure environmental rating	–	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	–	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing
Altitude	m (ft)	Up to 2,600 (8,530)

COMMUNICATION INTERFACES	UNITS	DESCRIPTION
Integrated Wi-Fi	–	802.11b/g/n (dual band 2.4 GHz/5 GHz) for connecting the Enphase Cloud through the internet
Wi-Fi range (recommended)	m (ft)	10 (32.8)
Ethernet	–	Optional 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included) for connecting to the Enphase Cloud through the internet
Digital I/O	–	Digital input/output for grid operator control
USB 2.0	–	For Mobile Connect, Communications Kit 1 for IQ Battery 3/3T/10/10T, Communication Kit 2 for IQ Battery 5P
Access point (AP) mode	–	For connection between the IQ Gateway and a mobile device running the Enphase Installer App
Metering ports	–	Up to two Consumption CTs, one IQ Battery CT, and one Production CT
Power line communication	kHz	90–110
Web API	–	See https://developer-v4.enphase.com
Local API	–	See Guide for local API
Cellular/Mobile Connect	–	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G-based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all installations with Enphase IQ Batteries and/or IQ System Controllers

COMPLIANCE	
IQ Combiner with IQ Gateway	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003, NOM-208-SCFI-2016 Production metering: ANSI C12.20 accuracy class 0.5 (PV production), UL 61010-1, CAN/CSA 22.2 No. 61010-1, IEEE 2030.5/CSIP Compliant

COMPATIBILITY		
PV	Microinverters	IQ6, IQ7, and IQ8 Series Microinverters
COMMS-KIT-01	IQ System Controller	EP200G101-M240US00
	IQ System Controller 2	EP200G101-M240US01
	IQ Battery	ENCHARGE-3-1P-NA, ENCHARGE-10-1P-NA, ENCHARGE-3T-1P-NA, ENCHARGE-10T-1P-NA
COMMS-KIT-02[1]	IQ System Controller 3	SC200D111C240US01, SC200G111C240US01
	IQ Battery	IQBATTERY-5P-1P-NA

[1] For information about IQ Combiner 4/4C compatibility with the 3rd-generation batteries, refer to the compatibility matrix.

Revision history

REVISION	DATE	DESCRIPTION
DSH-00217-3.0	August 2024	Updated the system voltage value. Updated Sprint plan to T-Mobile data plan.
DSH-00217-2.0	April 2024	Updated the UL smart mark.
DSH-00217-1.0	February 2024	Initial release.
Previous releases.		

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FIGURE 1
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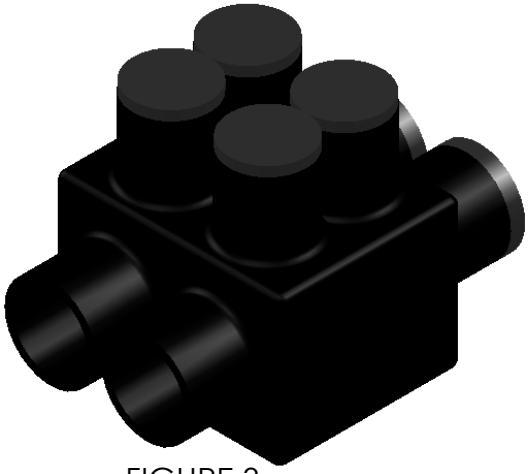

FIGURE 3
ITH

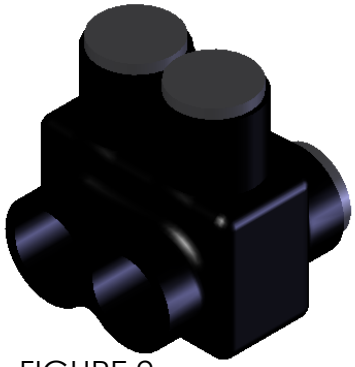

FIGURE 2
DUAL ENTRY

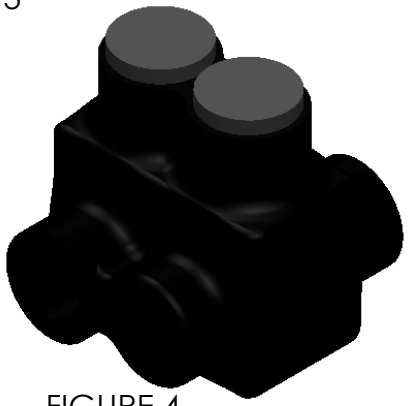

FIGURE 4
ITO

PART #	FIG. #	WIRE RANGE	HEX SIZE	L	W	H
IT4	1	4 - 14	SLOTTED	1.12	1.18	1.38
ITO4	4	4 - 14	SLOTTED	1.12	1.25	1.38
IT1/0	1	1/0 - 14	3/16	1.62	1.62	1.75
ITO1/0	4	1/0 - 14	3/16	1.62	1.75	1.75
IT3/0	1	3/0 - 6	1/4	1.84	1.75	1.87
ITO3/0	4	3/0 - 6	1/4	1.84	1.87	1.87
IT250	2	250 - 6	5/16	2.12	2.25	2.25
IT350	2	350 - 6	5/16	2.47	2.50	2.44
IT500	2	500 - 4	5/16	2.81	2.87	2.94
IT750*	2	750 - 250	3/8	3.48	3.50	3.50
IT600††	2	600 - 6	5/16	2.34	2.94	3.05
ITH750	3	750 - 250	5/16	3.48	4.50	3.50

†† 600 SERIES ARE AL7CU AND 75°C

*NOT UL LISTED

NOTES:
1. CONNECTOR MANUFACTURED FROM 6061-T6 ALUMINUM ALLOY.
2. UL LISTED PER UL486A/B SPECIFICATIONS FOR 600V.
3. DUAL RATED FOR 90°C COPPER AND/OR ALUMINUM CONDUCTOR.
4. COLD TEMPERATURE RATED TO -45°C.
5. HIGH DIELECTRIC STRENGTH INSULATION IS ABRASION, CHEMICAL AND UV RESISTANT.

CONTACT NSi FOR SALES @ 800.321.5847

POLARIS SALES . CO . INC

PROPRIETARY AND CONFIDENTIAL

11625 PROSPEROUS DRIVE ODESSA, FL 33556

TITLE: IT SERIES INSULATED CONNECTORS

	NAME	DATE
DRAWN BY	S.PARRY	6/13/2012

DWG. NO. IT SERIES

MATERIAL: N/A | NOT TO SCALE | SHEET: 1 OF 1