DIRECTORY OF PLAN PAGES

PROJECT DETAILS

PROPERTY OWNER	SAMPLE OWNER
OWNER PHONE	(000) 000-0000
OWNER EMAIL	OWNER@SAMPLECLIENT.COM
PROPERTY ADDRESS	123 SAMPLE STREET SAMPLE CITY, USA
PRN	31282
ZONING	RESIDENTIAL
CONST. TYPE	FLUSH ROOF-MOUNTED PHOTOVOLTAIC ARRAY
AHJ	HALIFAX COUNTY
UTILITY COMPANY	MECKLENBURG ELECTRIC COOPERATIVE
OBSERVED CODES	**VIRGINIA UNIFORM STATEWIDE BUILDING CODE (USBC)** **VIRGINIA CONSTRUCTION CODE (VCC 2021)** **VIRGINIA RESIDENTIAL CODE (VRC 2021)** **VIRGINIA EXISTING BUILDING CODE (VEBC 2021)** **VIRGINIA PROPERTY MAINTENANCE CODE (VPMC 2021)** **VIRGINIA ENERGY CONSERVATION CODE (VECC 2021)** **VIRGINIA MECHANICAL CODE (VMC 2021)** **VIRGINIA PLUMBING CODE (VPC 2021)** **VIRGINIA FUEL GAS CODE (VFGC 2021)** **VIRGINIA STATEWIDE FIRE PREVENTION CODE (VSFPC 2021)** **ICC A117.1-2017 ACCESSIBILITY STANDARD** **NFPA 70 NATIONAL ELECTRICAL CODE (NEC 2020)** **ALL APPLICABLE LOCAL AMENDMENTS AND AHJ REQUIREMENTS** **UNDERWRITERS LABORATORIES (UL) STANDARDS**
STRUCT. METHOD	ASCE7-16

OWNER-BUILDER INFORMATION

OWNER-BUILDER	SAMPLE OWNER
ADDRESS	123 SAMPLE STREET SAMPLE CITY, USA
PHONE	(000) 000-0000
EMAIL	OWNER@SAMPLECLIENT.COM
OWNER-BUILDER SIGNATURE	

PLAN DESIGNER INFORMATION

COMPANY	GEMINI SOLAR DESIGN, LLC.
NAME	GSD DESIGN TEAM
ADDRESS	GEMINISOLARDESIGN.COM NATIONWIDE DESIGN SERVICES
PHONE	(000) 000-0000
PLAN DESIGNER SIGNATURE	Sanjay Mallavadi

SYSTEM DETAILS

DC RATING OF SYSTEM	30,300W
TOTAL CONTINUOUS AC OUTPUT CURRENT	187.5A @ 240VAC
HYBRID INVERTER	(3) EG4 12000XP V2 OFF-GRID INVERTER
SOLAR MODULE	(42) AXITEC AXIBLACKPREMIUM XXL HC AC-400MH/108VB (30) PEIMAR DR10H450M (FB)
BATTERY MODULE	(9) EG4 WALLMOUNT 314AH INDOOR BATTERY
MODULE-LEVEL RAPID SHUTDOWN	(72) TIGO TS4-A-F
STANDBY GENERATOR	(1) BRIGGS AND STRATTON, MODEL: 40346
PROJECT TYPE	***GRID-TIED WITH DC-COUPLED BATTERY STORAGE (WHOLE-HOME BACKUP APPLICATION)***

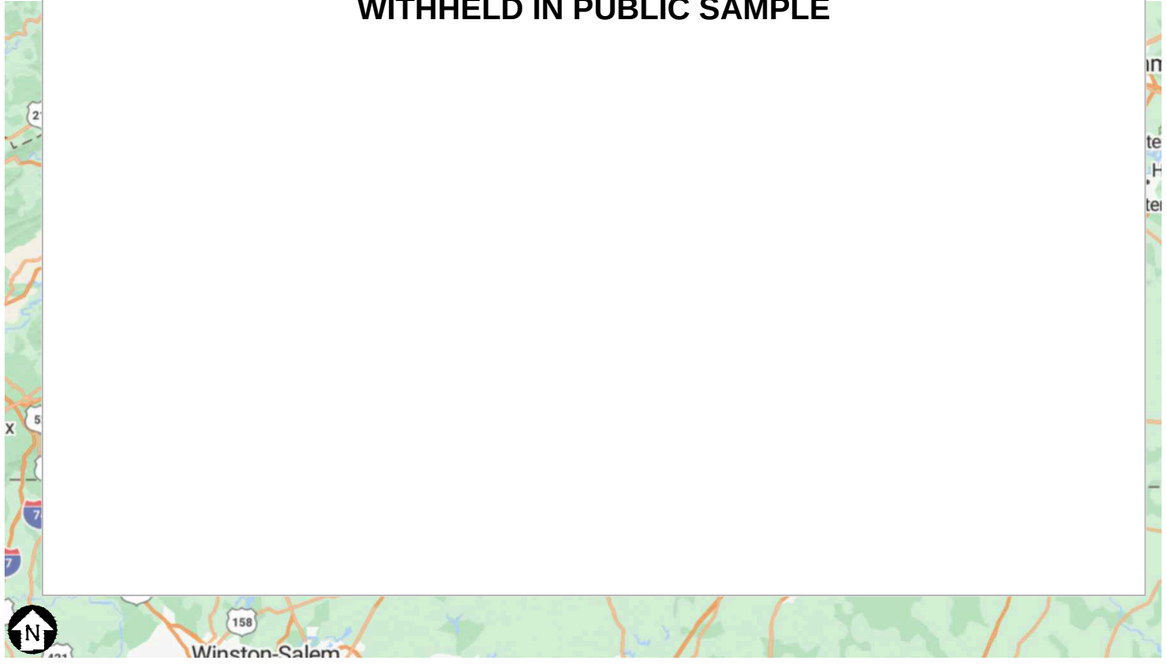
SITE SPECIFICATIONS

UTILITY SERVICE	***120 / 240VAC, 1-Ø, 3-WIRE***
MAIN SERVICE PANEL ("BACKED-UP LOADS PANEL")	***200A RATED BUSBAR*** ***200A / 2P MAIN BREAKER***
ASHRAE EXTREME ANNUAL MEAN MINIMUM DENSITY DRY BULB TEMP.	-14°C
ASHRAE 2% ANNUAL DRY DENSITY BULB TEMP.	31°C
DESIGN WIND SPEED	115 MPH
GROUND SNOW LOAD	20 PSF
WIND EXPOSURE CATEGORY	C
SEISMIC EXPOSURE CATEGORY	B
RISK CATEGORY	II

PROJECT LOCATION MAP
WITHHELD IN PUBLIC SAMPLE

Electrical is by others, unless stamped by Dean Levorsen.

VICINITY MAP
WITHHELD IN PUBLIC SAMPLE



2 / PV-1 LOCALE
SCALE: NTS

CONSTRUCTION NOTES

1	CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO INITIATING CONSTRUCTION.
2	CONTRACTOR SHALL REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
3	ALL EQUIPMENT SHALL BE LISTED BY THE U.L. (OR EQUAL) AND LISTED FOR ITS SPECIFIC APPLICATION.
4	ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.
5	ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	ACCESS TO ELECTRICAL COMPONENTS OVER 150 VOLTS TO GROUND SHALL BE RESTRICTED TO QUALIFIED PERSONNEL.
7	ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 VOLTS AND 90°C WET ENVIRONMENT, UNLESS OTHERWISE NOTED.
8	WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
9	PV MODULES FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER G.E.C. PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
10	PV MODULES RACKING RAIL SHALL BE BONDED TO BARE COPPER G.E.C VIA WEEB LUG, ILSCO GBL-4DBT LAY-IN LUG, OR EQUIVALENT LISTED LUG.
11	GROUNDING ELECTRODE CONDUCTOR (G.E.C) SHALL BE CONTINUOUS AND/OR IRREVERSIBLY SPLICED
12	ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
13	WORKING SPACE AROUND ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC SECTION 110.26.

SCOPE OF WORK DESCRIPTION

THE PROPOSED SYSTEM IS A ROOF MOUNTED PHOTOVOLTAIC ARRAY. THE PHOTOVOLTAIC (PV) SYSTEM IS TO BE INSTALLED ON THE RESIDENTIAL ZONED PROPERTY IN THE UNINCORPORATED COMMUNITY OF SAMPLE CITY ***LOCATED WITHIN HALIFAX COUNTY, VIRGINIA. THE ENERGY PRODUCED BY THE PV SYSTEM SHALL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ON-SITE ELECTRICAL EQUIPMENT.***

THE PROJECT WILL INCLUDE DC-COUPLED STORAGE BATTERIES EMPLOYED IN A WHOLE-HOME BACKUP CONFIGURATION. THE PROJECT WILL ALSO INCLUDE A STANDBY GENERATOR.

See structural letter for roof areas that require tighter connection spacing than listed.

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

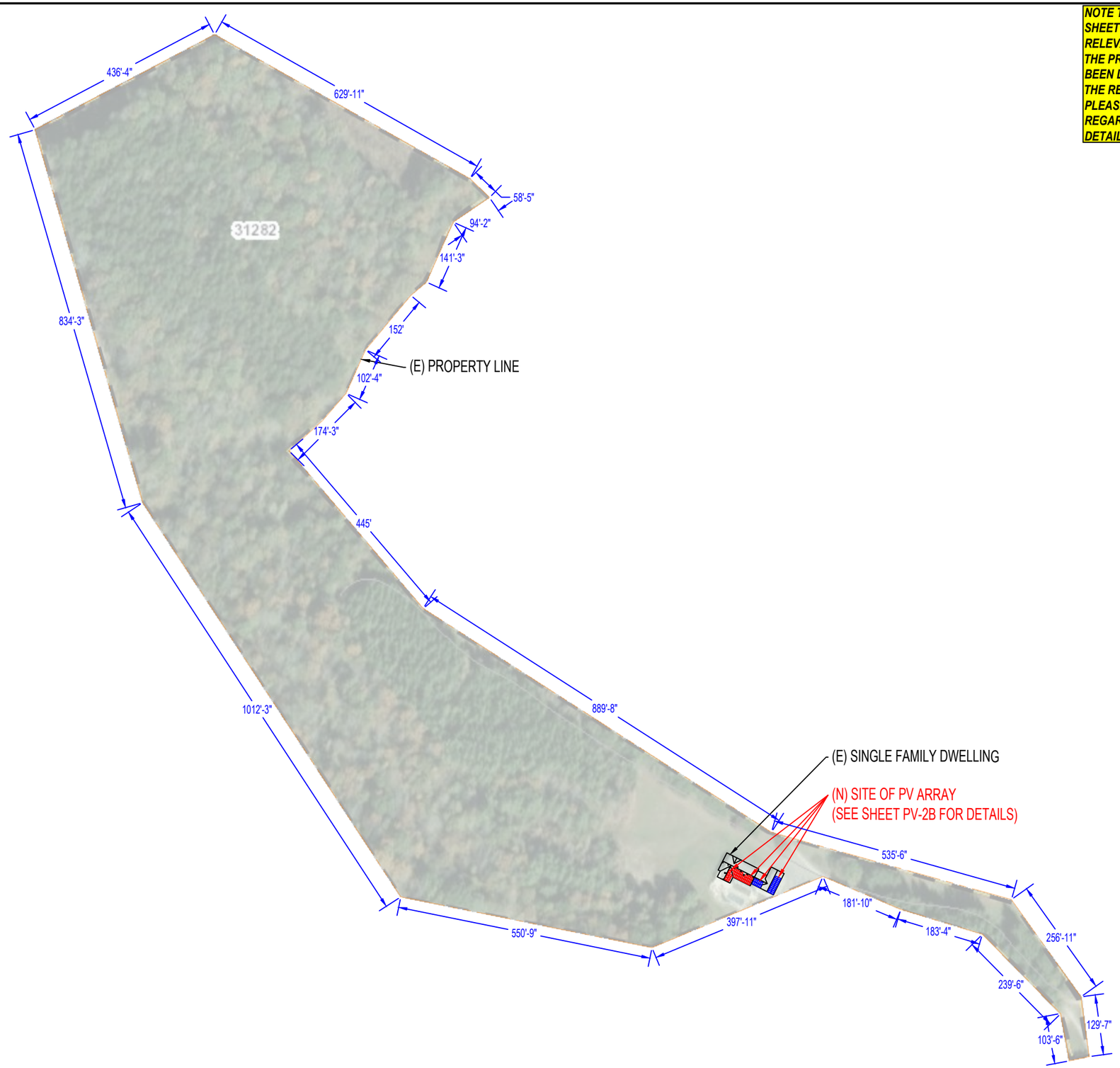
GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

PROJECT INFO

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-1



1 PV-2A SITE PLAN (GENERAL)
SCALE: 1" = 235'

NOTE TO PLAN REVIEWER:
SHEET PV-2A REPRESENTS A GENERAL SITE PLAN DEPICTING THE RELEVANT ELEMENTS OF THE PARCEL, AND THE SETBACKS FROM THE PROPOSED PV ARRAY TO THE PROPERTY LINES. THIS HAS BEEN DONE BECAUSE THE LOT LINES ARE RATHER LARGE, AND THE RESULTING SCALING MAKES THE READABILITY DIFFICULT. PLEASE REFER TO SHEET PV-2B FOR A DETAILED SITE PLAN WITH REGARDS TO THE DESIGN, AND ALL RELEVANT ELECTRICAL DETAILS. THANK YOU.

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

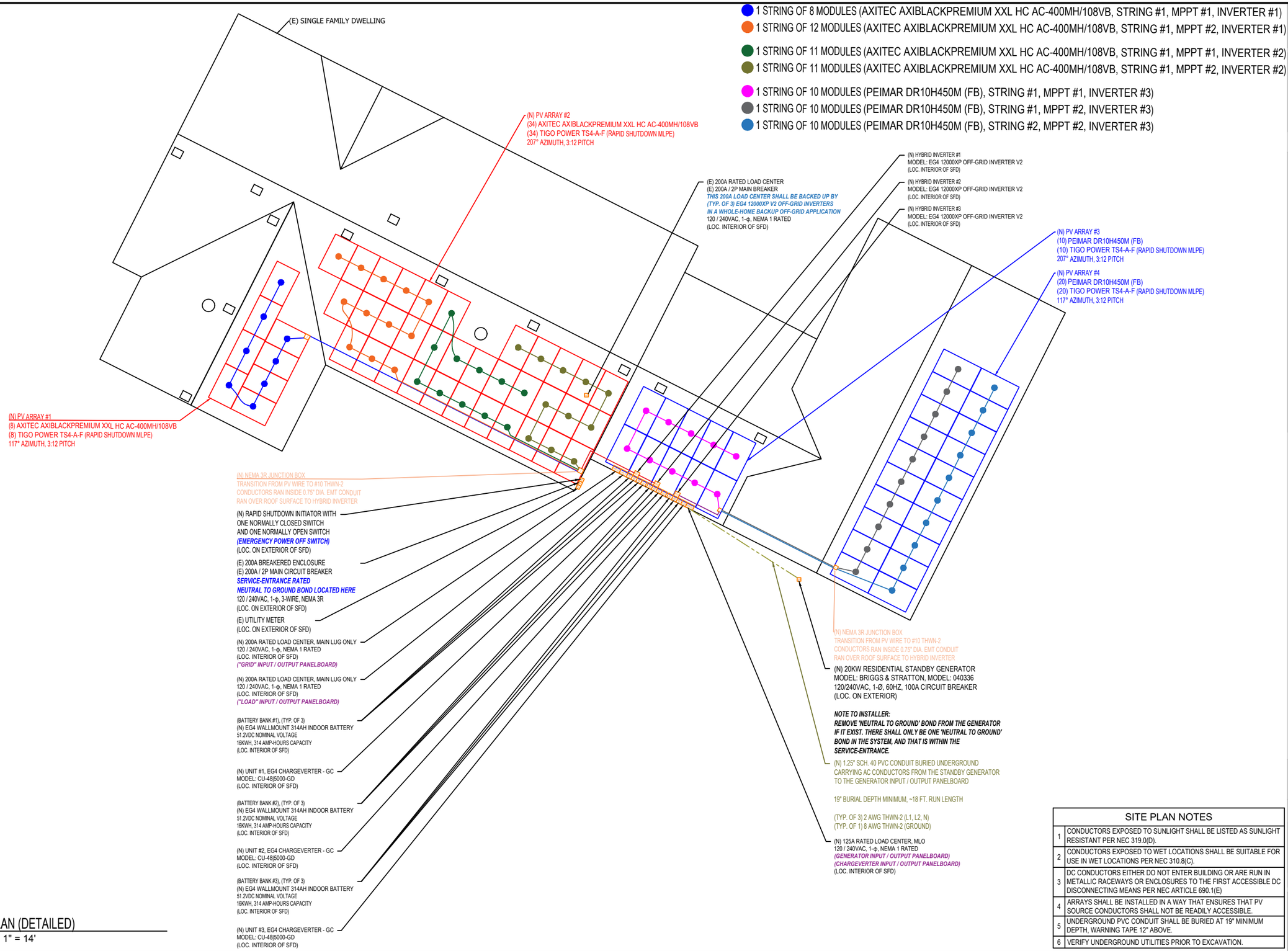
GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

SITE PLAN

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-2A



1 PV-2B SITE PLAN (DETAILED)
SCALE: 1" = 14'

SITE PLAN NOTES	
1	CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC 319.0(D).
2	CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC 310.8(C).
3	DC CONDUCTORS EITHER DO NOT ENTER BUILDING OR ARE RUN IN METALLIC RACEWAYS OR ENCLOSURES TO THE FIRST ACCESSIBLE DC DISCONNECTING MEANS PER NEC ARTICLE 690.1(E)
4	ARRAYS SHALL BE INSTALLED IN A WAY THAT ENSURES THAT PV SOURCE CONDUCTORS SHALL NOT BE READILY ACCESSIBLE.
5	UNDERGROUND PVC CONDUIT SHALL BE BURIED AT 19" MINIMUM DEPTH, WARNING TAPE 12" ABOVE.
6	VERIFY UNDERGROUND UTILITIES PRIOR TO EXCAVATION.

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

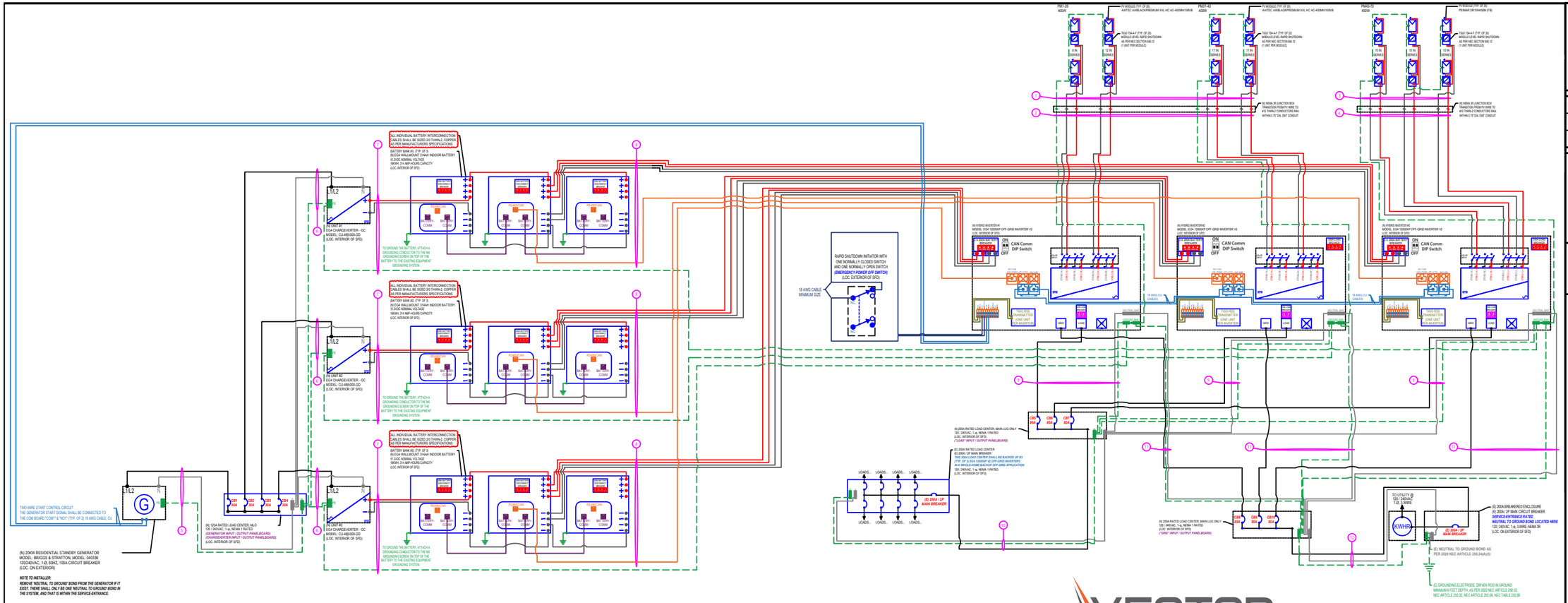
GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

SITE PLAN

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-2B



PLEASE SEE SHEET PV-3B FOR THE CORRESPONDING DATA TABLES, EQUIPMENT SPECIFICATIONS, AND OCPD / DISCONNECT SCHEDULES,

PLEASE SEE SHEET PV-3C FOR THE WIRE & CONDUCTOR SCHEDULE.

SEPARATE SHEETS WERE CREATED DUE TO SPACE LIMITATIONS.

VECTOR ENGINEERS®

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DRAPER, UTAH 84020

PHONE (801) 990-1775
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ELECTRICAL ONLY

COMMONWEALTH OF VIRGINIA
DEAN P. LEVORSEN
No. 0402062156
PROFESSIONAL ENGINEER

05/26/2026

Firm License Number: 0413000316
VSE Project Number: U2717.0110.261

The contractor must notify Vector Structural Engineering, LLC, should discrepancies between the as-built electrical system and what is shown on the permit plans be found. Vector Structural Engineering shall be notified of any changes from the approved design before installation. Vector Structural Engineering assumes no responsibility for improper installation of the solar system.

GEMINI SOLAR DESIGN

SAMPLE PROJECT

CONTACT: ON FILE

PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-SAMPLE

DRAWN BY: GSD

DATE: SAMPLE

PV-3A

PHOTOVOLTAIC MODULE

REF.	TYP.	MODULE	STC POWER	ISC	IMP	VOC	VMP	FUSE RATING
PM1-42	42	AXITEC AXIBLACKPREMIUM XXL HC AC-400MH/108VB	400W	13.79A	12.90A	37.07V	31.01V	25A
PM43-72	30	PEIMAR DR10H450M (FB)	450W	13.85A	13.27A	41.18V	33.91V	25A

HYBRID INVERTER

TYP.	HYBRID INVERTER	MPPT OPERATING VOLTAGE RANGE	NUMBER OF MPPT/ MAX SOLAR STRINGS PER MPPT	MAX. USABLE INPUT CURRENT (I_MP) PER MPPT	MAXIMUM PV INPUT VOLTAGE	NOMINAL POWER OUTPUT	EFFICIENCY RATINGS	RAPID SHUTDOWN COMPLIANT AS PER NEC 690.12
3	EG4 12000XP V2 OFF-GRID INVERTER	120-385VDC	2 MPPT IN TOTAL 2 STRINGS (MPPT 1) 2 STRINGS (MPPT 2)	35A / 35A	500VDC	W/ PV: 15,000W @ 240VAC W/ OUT PV: 15,000W @ 240VAC	(MPPT) - 99% (PV TO BATTERY) - 92.8% (AC TO BATTERY) - 92.5% (PV TO LOADS) - 93.5% (BATTERY TO LOADS) - 90.2%	YES

BATTERY MODULE

TYP.	BATTERY	CHEMISTRY	NOMINAL VOLTAGE	CAPACITY	NOMINAL ENERGY CAPACITY	COMMUNICATION PROTOCOL	MAX CONTINUOUS / RECOMMENDED CHARGE CURRENT	MAX CONTINUOUS / RECOMMENDED DISCHARGE CURRENT	INTEGRATED BATTERY CIRCUIT BREAKER
9	EG4 WALLMOUNT 314AH INDOOR BATTERY	LiFePO4	51.2VDC (48VDC)	314AH	16KWH	RS485/CAN	157A / 157A	200A / 157A	250ADC

STANDBY GENERATOR

TYP.	GENERATOR	AC LOAD	RUNNING WATTAGE	INTERNAL CIRCUIT BREAKER	COMPRESSION RATIO	DISPLACEMENT	ENGINE FUEL
1	BRIGGS AND STRATTON, MODEL: 40346	120 / 240VAC, 1-Ø	20,000W	100A / 2P BREAKER	8.5 : 1	993CC	LIQUID PROPANE (LP) NATURAL GAS (NG)

MODULE LEVEL RAPID SHUTDOWN

TYP.	MODEL	NEC 690.12 COMPLIANT	MAXIMUM OUTPUT POWER	MAXIMUM INPUT VOLTAGE	OPEARTING VOLTAGE RANGE	MAXIMUM INPUT CURRENT (Imp)	COMMUNICATION	RECOMMENDED FUSE RATING
72	TIGO TS4-A-F	YES	700W	80VDC	16VDC - 80VDC	15A	PLC	25A

SYSTEM SUMMARY (INVERTER #1)

ARRAY STC POWER	8,000W
ARRAY CIRCUITS	1 X 8 (MPPT #1) 1 X 12 (MPPT #2)
ARRAY VMP @ STC (25°C)	248.08VDC (MPPT #1) 372.12VDC (MPPT #2)
ARRAY VOC @ STC (25°C)	296.56VDC (MPPT #1) 444.84VDC (MPPT #2)
MAXIMUM ARRAY VOC @ MIN. TEMP (-14°C)	***328.94VDC (MPPT #1)*** ***493.41VDC (MPPT #2)***
ARRAY I_MP @ STC (SELF-LIMITING OVER 35A FOR MPPT 1 & MPPT 2)	***12.90A (MPPT #1)*** ***12.90A (MPPT #2)***
ARRAY I_SC (MAX) (MAXIMUM INPUT OF 44A FOR MPPT 1 & MPPT 2)	***13.79A (MPPT #1)*** ***13.79A (MPPT #2)***
MAXIMUM CONTINUOUS OUTPUT CURRENT	***15,000W, 62.5A @ 240VAC***

SYSTEM SUMMARY (INVERTER #2)

ARRAY STC POWER	8,800W
ARRAY CIRCUITS	1 X 11 (MPPT #1) 1 X 11 (MPPT #2)
ARRAY VMP @ STC (25°C)	341.11VDC (MPPT #1) 341.11VDC (MPPT #2)
ARRAY VOC @ STC (25°C)	407.77VDC (MPPT #1) 407.77VDC (MPPT #2)
MAXIMUM ARRAY VOC @ MIN. TEMP (-14°C)	***452.29VDC (MPPT #1)*** ***452.29VDC (MPPT #2)***
ARRAY I_MP @ STC (SELF-LIMITING OVER 35A FOR MPPT 1 & MPPT 2)	***12.90A (MPPT #1)*** ***12.90A (MPPT #2)***
ARRAY I_SC (MAX) (MAXIMUM INPUT OF 44A FOR MPPT 1 & MPPT 2)	***13.79A (MPPT #1)*** ***13.79A (MPPT #2)***
MAXIMUM CONTINUOUS OUTPUT CURRENT	***15,000W, 62.5A @ 240VAC***

SYSTEM SUMMARY (INVERTER #3)

ARRAY STC POWER	13,500W
ARRAY CIRCUITS	1 X 10 (MPPT #1) 2 X 10 (MPPT #2)
ARRAY VMP @ STC (25°C)	339.1VDC (MPPT #1) 339.1VDC (MPPT #2)
ARRAY VOC @ STC (25°C)	411.8VDC (MPPT #1) 411.8VDC (MPPT #2)
MAXIMUM ARRAY VOC @ MIN. TEMP (-14°C)	***458.37VDC (MPPT #1)*** ***458.37VDC (MPPT #2)***
ARRAY I_MP @ STC (SELF-LIMITING OVER 35A FOR MPPT 1 & MPPT 2)	***13.27A (MPPT #1)*** ***26.54A (MPPT #2)***
ARRAY I_SC (MAX) (MAXIMUM INPUT OF 44A FOR MPPT 1 & MPPT 2)	***13.85A (MPPT #1)*** ***27.7A (MPPT #2)***
MAXIMUM CONTINUOUS OUTPUT CURRENT	***15,000W, 62.5A @ 240VAC***

OCPD SCHEDULE

REF.	TYPE OF OCPD	POLES	CURRENT RATING	RATED VOLTAGE
CB1 (BACKFED CIRCUIT BREAKER, STANDBY GENERATOR)	CIRCUIT BREAKER	2	90A	240VAC
CB2 (FEEDER BREAKER, EG4 CHARGEVERTER)	CIRCUIT BREAKER	2	30A	240VAC
CB3 (FEEDER BREAKER, EG4 CHARGEVERTER)	CIRCUIT BREAKER	2	30A	240VAC
CB4 (FEEDER BREAKER, EG4 CHARGEVERTER)	CIRCUIT BREAKER	2	30A	240VAC
CB5 (CIRCUIT BREAKER, HYBRID INVERTER, "LOAD" OUTPUT)	CIRCUIT BREAKER	2	80A	240VAC
CB6 (CIRCUIT BREAKER, HYBRID INVERTER, "LOAD" OUTPUT)	CIRCUIT BREAKER	2	80A	240VAC
CB7 (CIRCUIT BREAKER, HYBRID INVERTER, "LOAD" OUTPUT)	CIRCUIT BREAKER	2	80A	240VAC
CB8 (CIRCUIT BREAKER, HYBRID INVERTER, "GRID" INPUT)	CIRCUIT BREAKER	2	80A	240VAC
CB9 (CIRCUIT BREAKER, HYBRID INVERTER, "GRID" INPUT)	CIRCUIT BREAKER	2	80A	240VAC
CB10 (CIRCUIT BREAKER, HYBRID INVERTER, "GRID" INPUT)	CIRCUIT BREAKER	2	80A	240VAC

VECTOR ENGINEERS

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ELECTRICAL ONLY

COMMONWEALTH OF VIRGINIA
DEAN P. LEVORSEN
No. 0402062156
PROFESSIONAL ENGINEER

05/26/2026

Firm License Number: 0413000316
VSE Project Number: U2717.0110.261

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING SET IS CONFIDENTIAL AND SHALL NOT BE DISCLOSED IN FULL OR IN PART TO ANYONE EXCEPT THOSE INVOLVED IN THE DESIGN AND INSTALLATION OF THE PV SYSTEM REPRESENTED IN THIS PLAN.

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-3B

CONDUCTOR SCHEDULE WITH NEC ELECTRICAL CALCULATIONS

ID	TYP	DESCRIPTION	CONDUCTOR	CONDUIT	NO. OF CURRENT CARRYING CNDRS. IN CNDT.	FILL %	RATED AMPS	OCPD	EGC	TEMP. CORR. FACTOR @ 90°C TEMP. RATING	FILL ADJ. FACTOR	CONT. CURRENT	MAX. CURRENT	TERMINAL RATING CHECK (ASSUME 75°C) SHALL EXCEED 1.25X CONT. CURRENT	BASE AMPACITY @ 90°C TEMP. RATING	CONDITIONS OF USE (COU) @ 90°C TEMP. RATING
1	4	PV SOURCE CIRCUIT: SERIES STRING OUTPUT TO JUNCTION BOX	12 AWG PV WIRE COPPER	***FREE AIR***	N/A	N/A	***13.79A (I_sc) - PER STRING***	N/A	***6 AWG BARE COPPER***	0.76 (53°C)	1.0	***17.24A (I_sc) - PER STRING***	***21.55A (I_sc) - PER STRING***	35A ≥ 21.55A PASS	***40A*** ***(IN FREE AIR)***	***30.4A*** ***(IN FREE AIR)***
2	1	PV SOURCE CIRCUIT (TRANSTIONED): JUNCTION BOX TO HYBRID INVERTER #1 / #2	10 AWG THWN-2 COPPER	***0.75" DIA. EMT***	***8*** ***4 X (DC +)*** ***4 X (DC -)***	35.7%	***13.79A (I_sc) - PER STRING***	INTEGRATED DC DISCONNECT WITHIN HYBRID INVERTER	***10 AWG THWN-2 COPPER***	0.76 (53°C)	0.7	***17.24A (I_sc) - PER STRING***	***21.55A (I_sc) - PER STRING***	35A ≥ 21.55A PASS	***40A*** ***(IN CONDUIT)***	***21.28A*** ***(IN CONDUIT)***
3	3	PV SOURCE CIRCUIT: SERIES STRING OUTPUT TO JUNCTION BOX	12 AWG PV WIRE COPPER	***FREE AIR***	N/A	N/A	***13.85A (I_sc) - PER STRING***	N/A	***6 AWG BARE COPPER***	0.76 (53°C)	1.0	***17.32A (I_sc) - PER STRING***	***21.65A (I_sc) - PER STRING***	35A ≥ 21.65A PASS	***40A*** ***(IN FREE AIR)***	***30.4A*** ***(IN FREE AIR)***
4	1	PV SOURCE CIRCUIT (TRANSTIONED): JUNCTION BOX TO HYBRID INVERTER #3	10 AWG THWN-2 COPPER	***0.75" DIA. EMT***	***6*** ***3 X (DC +)*** ***3 X (DC -)***	27.8%	***13.85A (I_sc) - PER STRING***	INTEGRATED DC DISCONNECT WITHIN HYBRID INVERTER	***10 AWG THWN-2 COPPER***	0.76 (53°C)	0.8	***17.32A (I_sc) - PER STRING***	***21.65A (I_sc) - PER STRING***	35A ≥ 21.65A PASS	***40A*** ***(IN CONDUIT)***	***24.32A*** ***(IN CONDUIT)***
5	1	STANDBY GENERATOR OUTPUT: STANDBY GENERATOR TO 125A LOAD CENTER ***(GENERATOR INPUT / OUTPUT)*** ***(CHARGEVERTER INPUT / OUTPUT)***	2 AWG THWN-2 COPPER	***1.25" DIA. SCH. 40 PVC*** ***(19" MINIMUM BURIAL DEPTH)***	***3*** ***1 X (L1, L2, N)***	26.5%	***83.33A***	90A / 2P (CB1)	***8 AWG THWN-2 COPPER***	0.96 (31°C)	1.0	***83.33A***	***104.16A***	115A ≥ 104.16A PASS	***130A*** ***(IN CONDUIT)***	***124.8A*** ***(IN CONDUIT)***
6	3	EG4 CHARGEVERTER OUTPUT: EG4 CHARGEVERTER TO 125A LOAD CENTER ***(GENERATOR INPUT / OUTPUT)*** ***(CHARGEVERTER INPUT / OUTPUT)***	10 AWG THWN-2 COPPER	***0.75" DIA. EMT***	***3*** ***1 X (L1, L2, N)***	15.9%	***20.83A***	30A / 2P (CB2) 30A / 2P (CB3) 30A / 2P (CB4)	***10 AWG THWN-2 COPPER***	0.96 (31°C)	1.0	***20.83A***	***26.04A***	35A ≥ 26.04A PASS	***40A*** ***(IN CONDUIT)***	***38.4A*** ***(IN CONDUIT)***
7	3	EG4 CHARGEVERTER OUTPUT: EG4 CHARGEVERTER TO BATTERY BANK	3 AWG THWN-2 COPPER	***1" DIA. EMT***	***2*** ***1 X (DC +)*** ***1 X (DC -)***	26.8%	***100A*** ***(MAXIMUM CONTINUOUS CHARGING CURRENT)***	(250A BREAKER) INTEGRATED BATTERY DISCONNECT BREAKER WITHIN BATTERY	***8 AWG THWN-2 COPPER***	0.96 (31°C)	1.0	***100A*** ***(MAXIMUM CONTINUOUS CHARGING CURRENT)***	***100A*** ***(MAXIMUM CONTINUOUS CHARGING CURRENT)***	100A ≥ 100A PASS	***110A*** ***(IN CONDUIT)***	***105.6A*** ***(IN CONDUIT)***
8	3	COMBINED BATTERY BANK OUTPUT: COMBINED BATTERY BANK TO HYBRID INVERTER (TYP. OF 3) **RS485 / CAN BATTERY BMS CONTROL CIRCUIT**	2 PARALLEL SETS OF 2/0 AWG THWN-2 COPPER **RS485 / CAN CABLE COPPER**	***2" DIA. EMT***	***4*** ***2 X (DC +)*** ***2 X (DC -)***	26.5%	***200A*** ***(MAXIMUM CONTINUOUS BATTERY CHARGING / DISCHARGING CURRENT)***	(2 X 200A BREAKER) INTEGRATED BATTERY DISCONNECT WITHIN HYBRID INVERTER	***TO GROUND THE BATTERY, ATTACH A GROUNDING CONDUCTOR TO THE M6 GROUNDING SCREW ON TOP OF THE BATTERY TO THE EXISTING EQUIPMENT GROUNDING SYSTEM.***	0.96 (31°C)	0.8	***200A*** ***(MAXIMUM CONTINUOUS BATTERY CHARGING / DISCHARGING CURRENT)***	***200A*** ***(MAXIMUM CONTINUOUS BATTERY CHARGING / DISCHARGING CURRENT)***	350A ≥ 200A PASS	***390A*** ***(IN CONDUIT)***	***299.52A*** ***(IN CONDUIT)***
9	3	HYBRID INVERTER OUTPUT: HYBRID INVERTER ("LOAD" TERMINAL) TO 200A LOAD CENTER ***("LOAD" INPUT / OUTPUT PANEL)***	4 AWG THWN-2 COPPER	***1.00" DIA. EMT***	***3*** ***1 X (L1, L2, N)***	33.0%	***62.5A***	80A / 2P (CB5) 80A / 2P (CB6) 80A / 2P (CB7)	***8 AWG THWN-2 COPPER***	0.96 (31°C)	1.0	***62.5A***	***78.13A***	85A ≥ 78.13A PASS	***95A*** ***(IN CONDUIT)***	***91.2A*** ***(IN CONDUIT)***
10	1	200A LOAD CENTER OUTPUT: 200A LOAD CENTER ***("LOAD" INPUT / OUTPUT PANEL)*** TO 200A LOAD CENTER ***(BACKED-UP LOADS PANEL)***	3/0 AWG THWN-2 COPPER	***2.00" DIA. EMT***	***3*** ***1 X (L1, L2, N)***	25.5%	***187.5A***	200A / 2P (EXISTING) (MAIN BREAKER)	***6 AWG THWN-2 COPPER***	0.96 (31°C)	1.0	***187.5A***	***200A*** ***(LIMITED BY 200A MAIN CIRCUIT BREAKER)***	200A ≥ 187.5A PASS	***225A*** ***(IN CONDUIT)***	***216A*** ***(IN CONDUIT)***
11	3	HYBRID INVERTER OUTPUT: HYBRID INVERTER ("GRID" TERMINAL) TO 200A LOAD CENTER ***("GRID" INPUT / OUTPUT PANEL)***	4 AWG THWN-2 COPPER	***1.00" DIA. EMT***	***3*** ***1 X (L1, L2, N)***	33.0%	***62.5A***	80A / 2P (CB8) 80A / 2P (CB9) 80A / 2P (CB10)	***8 AWG THWN-2 COPPER***	0.96 (31°C)	1.0	***62.5A***	***78.13A***	85A ≥ 78.13A PASS	***95A*** ***(IN CONDUIT)***	***91.2A*** ***(IN CONDUIT)***
12	1	200A LOAD CENTER OUTPUT: 200A LOAD CENTER ***("GRID" INPUT / OUTPUT PANEL)*** TO 200A BREAKERED ENCLOSURE	3/0 AWG THWN-2 COPPER	***2.00" DIA. EMT***	***3*** ***1 X (L1, L2, N)***	25.5%	***187.5A***	200A / 2P (EXISTING) (MAIN BREAKER)	***6 AWG THWN-2 COPPER***	0.96 (31°C)	1.0	***187.5A***	***200A*** ***(LIMITED BY 200A MAIN CIRCUIT BREAKER)***	200A ≥ 187.5A PASS	***225A*** ***(IN CONDUIT)***	***216A*** ***(IN CONDUIT)***

ALL CONDUCTORS, OCPD SIZES AND TYPES SPECIFIED ACCORDING TO NEC ARTICLES 690.8(A)(1), NEC ARTICLE 240, AND NEC ARTICLE 690.7.

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ELECTRICAL ONLY

COMMONWEALTH OF VIRGINIA
DEAN P. LEVORSEN
No. 0402062156
PROFESSIONAL ENGINEER

05/26/2026

Firm License Number: 0413000316
VSE Project Number: U2717.0110.261

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GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-3C

JUNCTION BOX

1 JUNCTION BOX

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

NEC 690.35(F)

2 JUNCTION BOX

⚠ DO NOT DISCONNECT UNDER LOAD ⚠

NEC 690.16(B)

3 JUNCTION BOX

⚠ WARNING ⚠
PHOTOVOLTAIC POWER SOURCE

NEC 690.35

HYBRID INVERTER #1

4 HYBRID INVERTER #1 NEC 690.53

PHOTOVOLTAIC SYSTEM
DC DISCONNECT

RATED MPP VOLTAGE	372.12 VDC
RATED MPP CURRENT (MPPT #1 / MPPT #2)	12.90 A 12.90 A
MAX SYSTEM VOLTAGE	493.41 VDC

5 HYBRID INVERTER #1

SOLAR DC DISCONNECT

NEC 690.13(B)

6 HYBRID INVERTER #1

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

NEC 690.35(F)

7 HYBRID INVERTER #1

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

NEC 690.5(C)

8 HYBRID INVERTER #1

SOLAR INVERTER MAXIMUM RATING

OPERATING CURRENT	62.5 AMPS
OPERATING VOLTAGE	240 VAC

NEC 690.54

9 HYBRID INVERTER #1

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT

HYBRID INVERTER #2

10 HYBRID INVERTER #2 NEC 690.53

PHOTOVOLTAIC SYSTEM
DC DISCONNECT

RATED MPP VOLTAGE	341.11 VDC
RATED MPP CURRENT (MPPT #1 / MPPT #2)	12.90 A 12.90 A
MAX SYSTEM VOLTAGE	452.29 VDC

11 HYBRID INVERTER #2

SOLAR DC DISCONNECT

NEC 690.13(B)

12 HYBRID INVERTER #2

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

NEC 690.35(F)

13 HYBRID INVERTER #2

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

NEC 690.5(C)

14 HYBRID INVERTER #2

SOLAR INVERTER MAXIMUM RATING

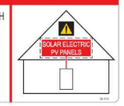
OPERATING CURRENT	62.5 AMPS
OPERATING VOLTAGE	240 VAC

NEC 690.54

15 HYBRID INVERTER #2

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT



HYBRID INVERTER #3

16 HYBRID INVERTER #3 NEC 690.53

PHOTOVOLTAIC SYSTEM
DC DISCONNECT

RATED MPP VOLTAGE	339.1 VDC
RATED MPP CURRENT (MPPT #1 / MPPT #2)	13.27 A 26.54 A
MAX SYSTEM VOLTAGE	458.37 VDC

17 HYBRID INVERTER #3

SOLAR DC DISCONNECT

NEC 690.13(B)

18 HYBRID INVERTER #3

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

NEC 690.35(F)

19 HYBRID INVERTER #3

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

NEC 690.5(C)

20 HYBRID INVERTER #3

SOLAR INVERTER MAXIMUM RATING

OPERATING CURRENT	62.5 AMPS
OPERATING VOLTAGE	240 VAC

NEC 690.54

21 HYBRID INVERTER #3

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT

RACEWAYS

22 RACEWAYS, CABLES PER 10 FT.

⚠ WARNING ⚠
PHOTOVOLTAIC POWER SOURCE

NEC 690.31(E)(3),(4)

200A LOAD CENTER ("BACKED UP LOADS PANEL")

23 200A LOAD CENTER ("BACKED UP LOADS PANEL")

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

NEC 690.17.4

24 200A LOAD CENTER ("BACKED UP LOADS PANEL")

BATTERY BACKED UP ELECTRICAL PANEL

25 200A LOAD CENTER ("BACKED UP LOADS PANEL")

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT

26 200A LOAD CENTER ("BACKED UP LOADS PANEL")

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

NEC 690.56(B)

BATTERY BANK

27 BATTERY BANK

⚠ MAIN BATTERY ⚠ SYSTEM DISCONNECT

ESS RAPID SHUTDOWN SWITCH

28 ESS RAPID SHUTDOWN SWITCH

⚠ MAIN BATTERY ⚠ SYSTEM DISCONNECT

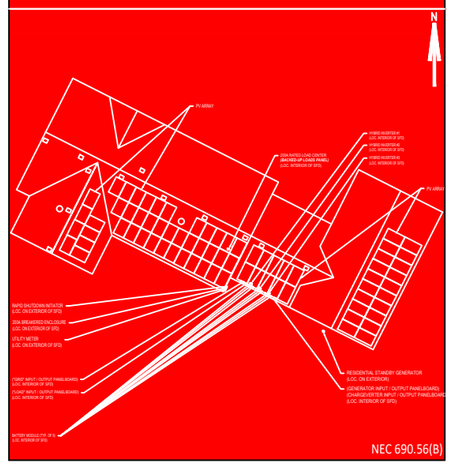
29 ESS RAPID SHUTDOWN SWITCH

⚠ ⚠
WARNING
BATTERY SYSTEM RAPID SHUTDOWN SWITCH. TURN DIAL TO OFF POSITION TO SHUTDOWN ESS

DIRECTORY PLACARD

30 DIRECTORY PLACARD

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



NEC 690.56(B)

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ELECTRICAL ONLY

COMMONWEALTH OF VIRGINIA
DEAN P. LEVORSEN
No. 0402062156
PROFESSIONAL ENGINEER

05/26/2026

Firm License Number: 0413000316
VSE Project Number: U2717.0110.261

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SIGNAGE REQUIREMENTS

1	***ALL PLACARDS AND SIGNAGE REQUIRED BY THE 2020 NATIONAL ELECTRICAL CODE, AND ANY OTHER STATE CODES OR LOCAL ORDINANCES WILL BE INSTALLED AS REQUIRED.***
2	RED BACKGROUND
3	WHITE LETTERING
4	MINIMUM 3/8" LETTER HEIGHT
5	ALL CAPITAL LETTERS
6	ARIAL OR SIMILAR FONT
7	WEATHER RESISTANT MATERIAL, PER UL 969

1 PV-4 PLACARDS
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

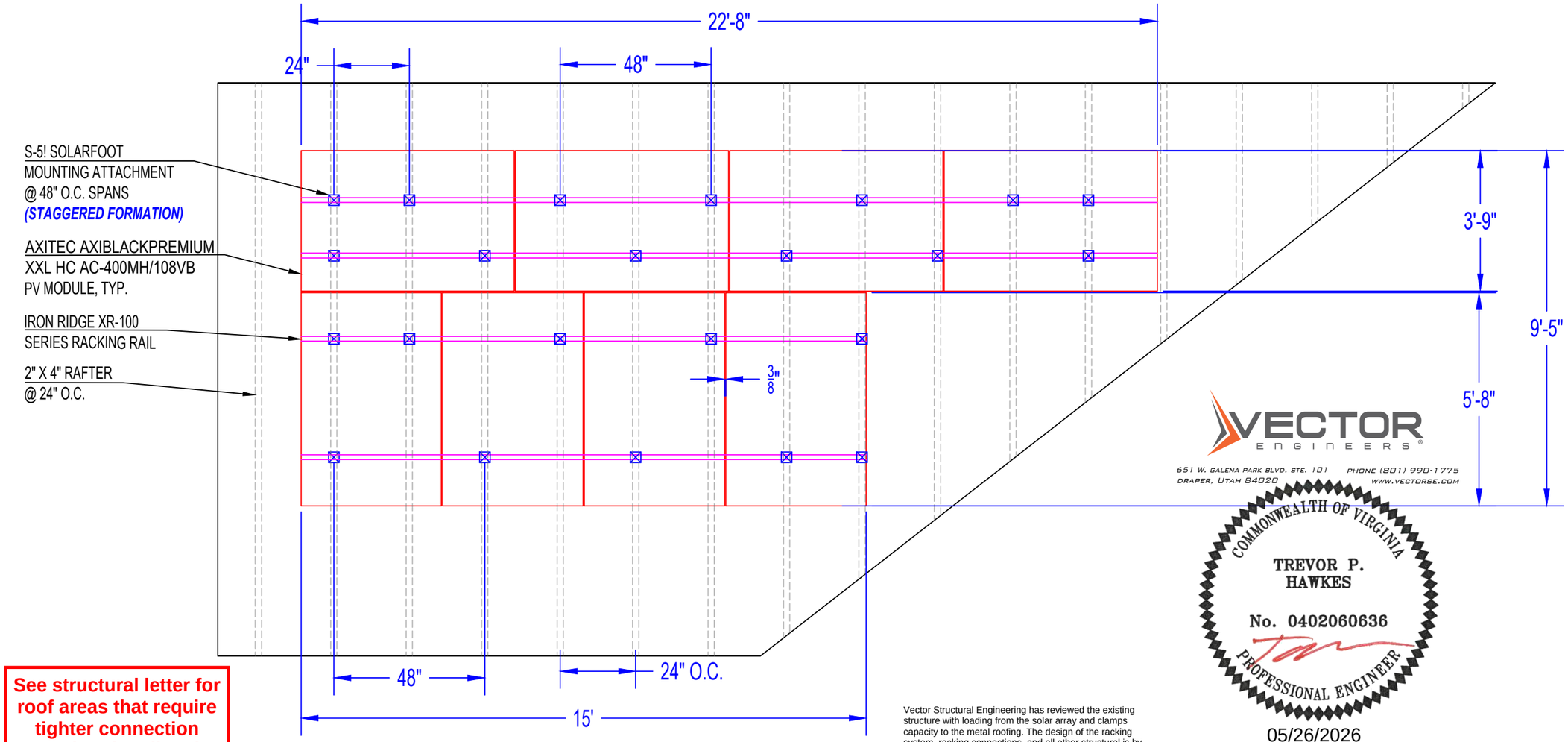
GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

PLACARDS

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-4



See structural letter for roof areas that require tighter connection spacing than listed.

Vector Structural Engineering has reviewed the existing structure with loading from the solar array and clamps capacity to the metal roofing. The design of the racking system, racking connections, and all other structural is by others. Mechanical, architectural, and all other nonstructural aspects of the design are by others. Electrical is by others, unless stamped by Dean Levorsen.

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COMMONWEALTH OF VIRGINIA
TREVOR P. HAWKES
No. 0402060636
PROFESSIONAL ENGINEER

05/26/2026

Firm License Number: 0413000316

VSE Project Number: U27170110-261

ROOF INFORMATION	
ROOF TYPE	EXPOSED FASTENER METAL ROOFING
PITCH	3:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 4"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	8
AREA	170.8 SQ. FT
AZIMUTH	117°
TOTAL WEIGHT OF ARRAY	482.7 LBS
DEAD LOAD	2.83 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	C
SEISMIC DESIGN CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	115 MPH
GROUND SNOW LOAD	20 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	*PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE S-5! SOLARFOOT MOUNTING ATTACHMENT TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.*
4	*PLEASE SEE SHEET PV-6E FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF VIRGINIA REGISTERED PROFESSIONAL ENGINEER (PE).*

1 PV-5A ATTACHMENT PLAN (ARRAY #1)
SCALE: 1" = 3'

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

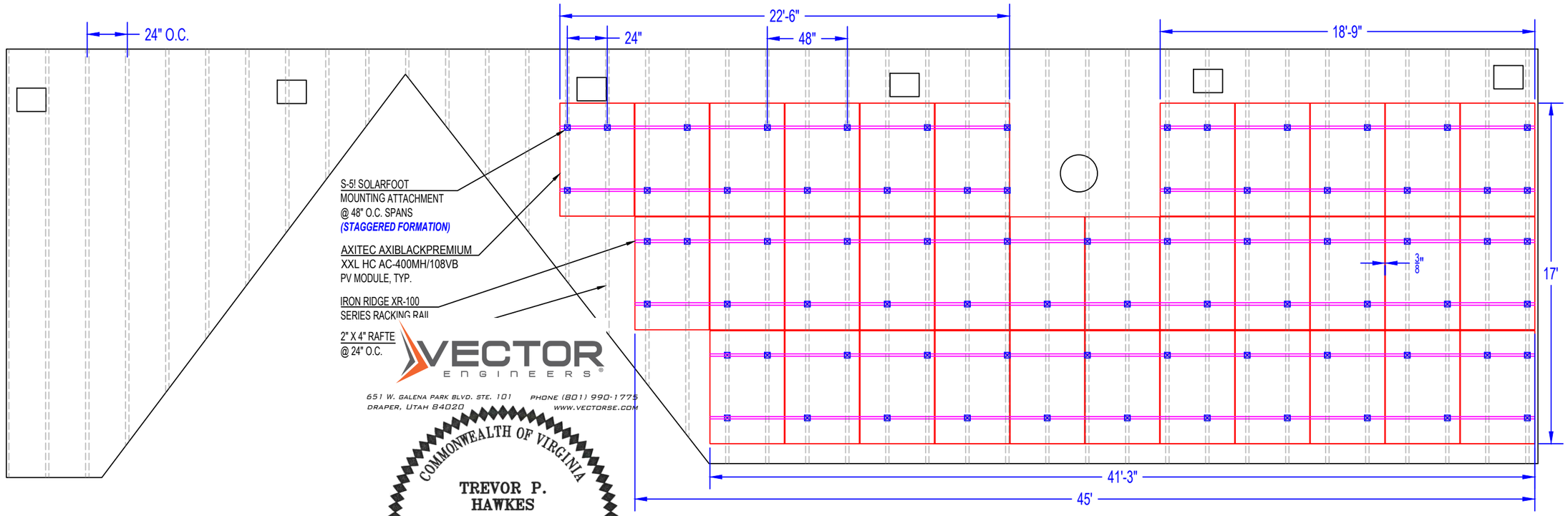
GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

ATTACHMENT PLAN

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-5A



See structural letter for roof areas that require tighter connection spacing than listed.

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No. 0402060636
PROFESSIONAL ENGINEER

05/26/2026

Firm License Number: 0413000316
VSE Project Number: U27170110-261

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ROOF INFORMATION	
ROOF TYPE	EXPOSED FASTENER METAL ROOFING
PITCH	3:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 4"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	34
AREA	725.9 SQ. FT
AZIMUTH	207°
TOTAL WEIGHT OF ARRAY	2,051.4 LBS
DEAD LOAD	2.83 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	C
SEISMIC DESIGN CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	115 MPH
GROUND SNOW LOAD	20 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE S-5! SOLARFOOT MOUNTING ATTACHMENT TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-6E FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF VIRGINIA REGISTERED PROFESSIONAL ENGINEER (PE).***

1 PV-5B — ATTACHMENT PLAN (ARRAY #2)
SCALE: 1" = 5'-6"

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

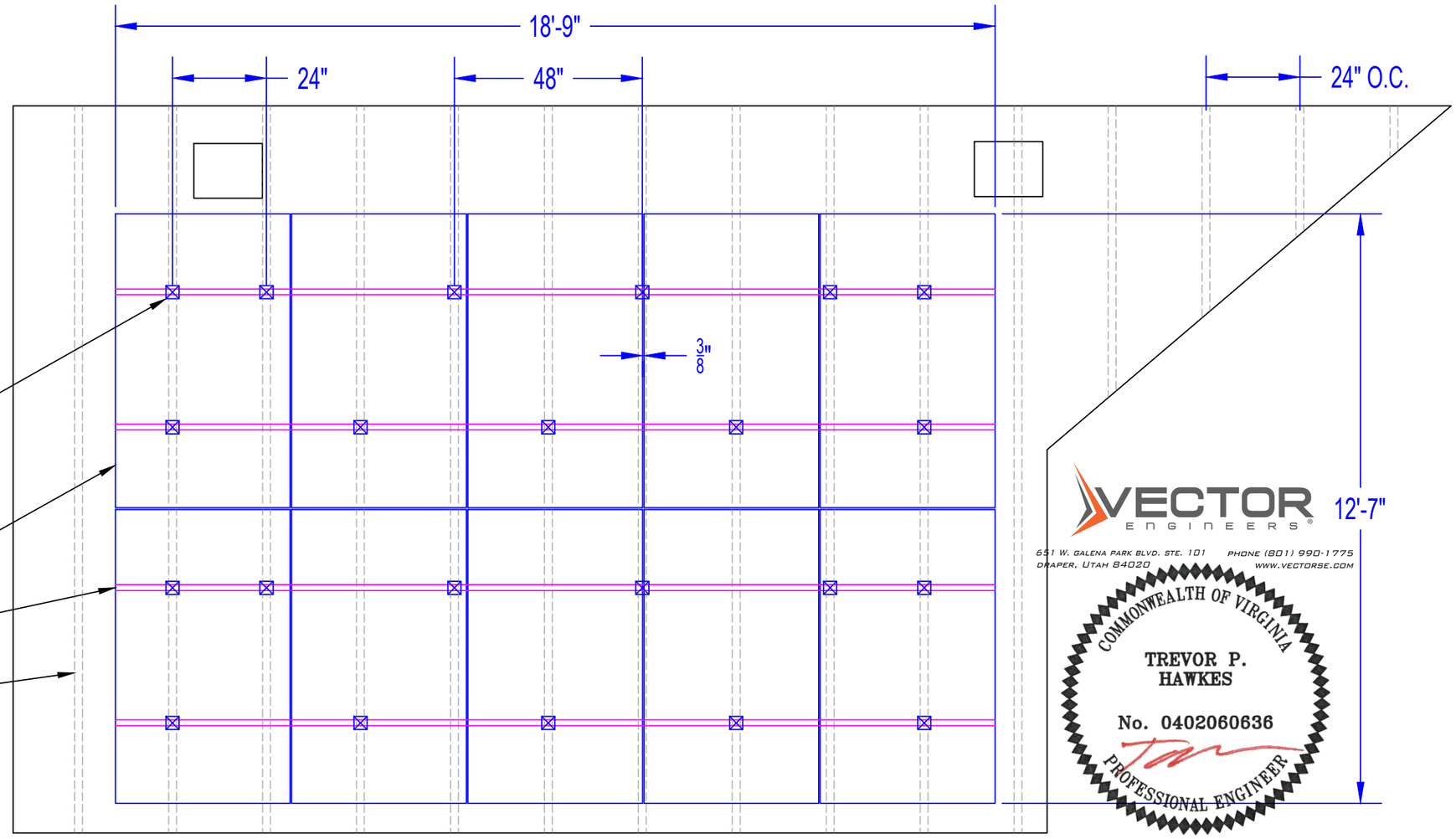
GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

ATTACHMENT PLAN

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-5B



See structural letter for roof areas that require tighter connection spacing than listed.

S-5! SOLARFOOT
MOUNTING ATTACHMENT
@ 48" O.C. SPANS
(STAGGERED FORMATION)

PEIMAR DR10H450M (FB)
PV MODULE, TYP.

IRON RIDGE XR-100
SERIES RACKING RAIL

2" X 4" RAFTER
@ 24" O.C.

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TREVOR P. HAWKES
No. 0402060636
PROFESSIONAL ENGINEER

05/26/2026
Firm License Number: 0413000316
VSE Project Number: U27170110-261

ROOF INFORMATION	
ROOF TYPE	EXPOSED FASTENER METAL ROOFING
PITCH	3:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 4"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	10
AREA	237.3 SQ. FT
AZIMUTH	207°
TOTAL WEIGHT OF ARRAY	696.4 LBS
DEAD LOAD	2.94 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	C
SEISMIC DESIGN CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	115 MPH
GROUND SNOW LOAD	20 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE S-5! SOLARFOOT MOUNTING ATTACHMENT TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-6E FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF VIRGINIA REGISTERED PROFESSIONAL ENGINEER (PE).***

1 PV-5C ATTACHMENT PLAN (ARRAY #3)
SCALE: 1" = 2'-9"

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

ATTACHMENT PLAN

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-5C

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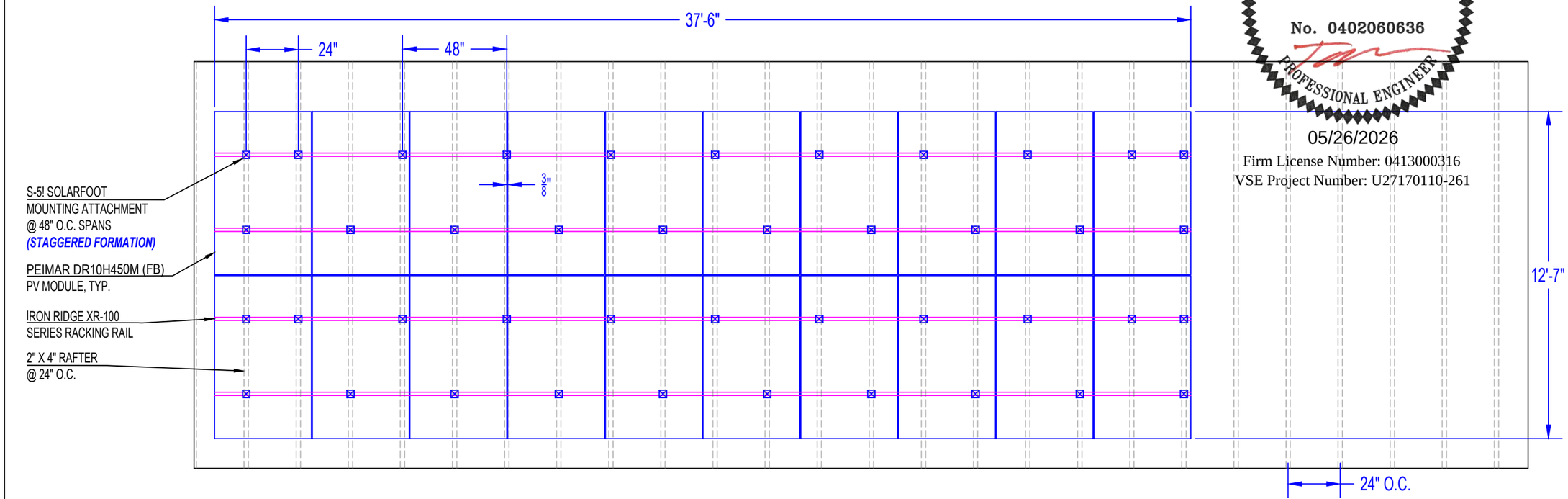

COMMONWEALTH OF VIRGINIA
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No. 0402060636
PROFESSIONAL ENGINEER

05/26/2026

Firm License Number: 0413000316
VSE Project Number: U27170110-261

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ROOF INFORMATION	
ROOF TYPE	EXPOSED FASTENER METAL ROOFING
PITCH	3:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 4"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	20
AREA	474.6 SQ. FT
AZIMUTH	117°
TOTAL WEIGHT OF ARRAY	1,392.8 LBS
DEAD LOAD	2.94 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	C
SEISMIC DESIGN CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	115 MPH
GROUND SNOW LOAD	20 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE S-5! SOLARFOOT MOUNTING ATTACHMENT TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
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1 PV-5D ATTACHMENT PLAN (ARRAY #4)
SCALE: 1" = 4'-4"

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

ATTACHMENT PLAN

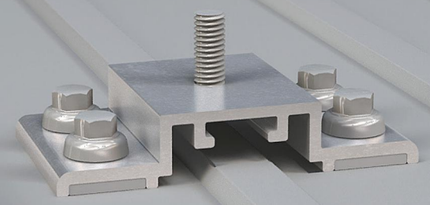
PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-5D

S-5!®
The Right Way!®

Introducing the new SolarFoot™ for exposed fastener metal roofing with the strength, testing, quality, and time-proven integrity you expect from S-5!. The SolarFoot provides an ideal mounting platform to attach the L-Foot (not included) of a rail-mounted PV system to the roof. This solution is The Right Way to secure rail-mounted solar systems to exposed fastener metal such as AG-Panel or R-Panel.

The right way to attach almost anything to metal roofs!

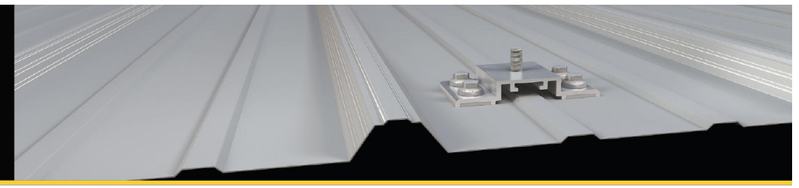


SolarFoot Features:

- Manufactured in the U.S.A. from certified raw material
- Fabricated in our own ISO 9002 certified factory
- All aluminum and stainless components
- Lifetime limited warranty
- Compatible with all commercial L-Foot products on the market
- Factory applied 40-year isobutylene/ isoprene crosslink polymer sealant for reliable weathertightness
- Sealant reservoir to prevent over compression of sealant
- Load-to-failure tested Normal to Seam by a nationally accredited laboratory on thousands of metal roof manufacturers, profiles and materials
- Four points of attachment into structure or deck with tested holding strength for engineered applications
- Integrated with M8-1.25x17mm stud and M8-1.25 stainless steel hex flange nut included

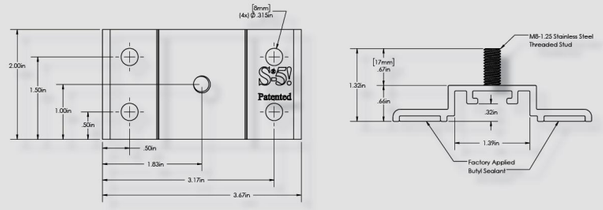
888-825-3432 | www.S-5.com | MADE IN THE USA

S-5!®
The Right Way!®



SolarFoot™: Mounting for Exposed Fastener Roofing

The SolarFoot is a simple, cost-effective pedestal for L-Foot (not included) attachment of rail-mounted solar PV. The unique design is compatible with all rail producer L-Foot components. The new SolarFoot assembly ensures a durable weathertight solution for the life of the roof. Special factory applied butyl co-polymeric sealant contained in a reservoir is The Right Way, allowing a water-tested seal. Stainless integrated stud and hex flange lock-nut secure the L-Foot into position. A low center of gravity reduces the moment arm commonly associated with L-Foot attachments. Direct attachment of the SolarFoot to the structural member or deck provides unparalleled holding strength.



*Fasteners sold separately. Fastener type varies with substrate. Contact S-5! on how to purchase fasteners and obtain our test results. L-Foot also sold separately.

Fastener Selection

Metal to Metal:
1/4-14 Self Drilling Screw
1-1/2" to 2-1/2"

Metal to Wood:
1/4-14 Type 17 AB Milled Point
1-1/2" to 2-1/2"

To source fasteners for your projects, contact S-5!

When other brands claim to be "just as good as S-5!", tell them to PROVE IT.

SolarFoot Advantages:

- Exposed fasten mounting platform for solar arrays attached via L-Foot and Rails
- Weatherproof attachment to exposed fastener roofing
- Butyl sealant reservoir provides long-term waterproof seal
- M8-1.25x17mm stud with M8 hex flange nut for attachment of all popular L-Foot/rail combinations
- Tool: 13 mm Hex Socket or ½" Hex Socket
- Electric screw gun with hex drive socket for self tapping screws
- Low Center of Gravity reduces moment arm commonly associated with L-Foot/Rail solar mounting scenarios
- Attaches directly to structure or deck for optimal holding strength
- S-5! Recommended substrate-specific (e.g. steel purlin, wood 2x4, OSB, etc.) fasteners provide excellent waterproofing and pull out strength
- Fastener through-hole locations comply with NDS (National Design Specification) for Wood Construction

S-5!® Warning! Please use this product responsibly!

The independent lab test data found at www.S-5.com can be used for load-critical designs and applications.

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, fastener torque, patents, and trademarks, visit the S-5! website at www.S-5.com. Copyright 2021, Metal Roof Innovations, Ltd. S-5! products are patent protected.

Distributed by:

1 PV-6A S-5! SOLARFOOT DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

S-5! SOLARFOOT

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-6A

S-5!®

The Right Way!

The right way to attach almost anything to metal roofs!

Please read these install instructions in their entirety before beginning work.

Installation Instructions

S-5!® Warning! Please use these products responsibly! Visit our website or contact your S-5! distributor for available load test results. The user and/or installer of these parts is responsible for all necessary engineering and design to ensure the Solar Feet™ have been properly spaced and configured.

Notice to S-5! users: Due to the many variables involved with specific panel products, climates, wind loads, snow loads, and job particulars, the manufacturer cannot and does not express any opinions as to the suitability of any S-5! assembly for any specific application and assumes no liability with respect thereto. S-5! products are tested for ultimate holding strength on various profile types and materials. This information is available from the S-5! website: **www.S-5.com**.

These install instructions serve to illustrate the correct procedure for securing the SolarFoot to a roof. Proper layout and frequency will vary on a job specific basis and should be determined by a qualified professional. This document is an installation guide only and the photographs and drawings herein are for the purpose of illustrating installation, tools and techniques, not system designs.

The SolarFoot™ is made for exposed-fastened metal roofing. It provides an ideal, weatherproof mounting platform to attach the L-foot of a rail mounted solar system or other ancillaries to the roof.

Tools Needed

- Electric Screw Gun
- Rag
- String Line
- Tape Measure
- 3/8" Hex Socket Drive
- 13 mm (or 1/2") Hex Socket Drive

Placement Tip

The SolarFoot should be placed in the flat of the panel, between the ribs. It is designed to straddle striations or minor stiffening ribs when necessary. The SolarFoot must be mounted directly over and into the supporting structure of the roof, i.e. wood decking, wood or steel purlins, or trusses, NEVER into the metal roofing material alone.

Fastener Selection

Fastener selection will depend on whether the supporting structure of the roof is metal or wood. When relying upon tested load values one of the below fasteners MUST be used.

To source fasteners visit www.S-5.com

Not Provided

Metal to Metal Screw Specifications: 1/4-14 Self Drilling Screw - 1-1/2" to 2-1/2" Length - 3/8" Hex Washer Head - Zinc/Aluminum Cap

Not Provided

Metal to Wood Screw Specifications: 1/4-14 Type 17-AB Milled Point - 1-1/2" to 2-1/2" Length - 3/8" Hex Washer Head - Zinc/Aluminum Cap

S-5!® Warning! Please use this product responsibly!

These instructions are for use by those experienced in the trade. Always follow appropriate safety precautions and use appropriate tools.

SolarFoot™ Install

888-825-3432 | www.S-5.com | MADE IN USA

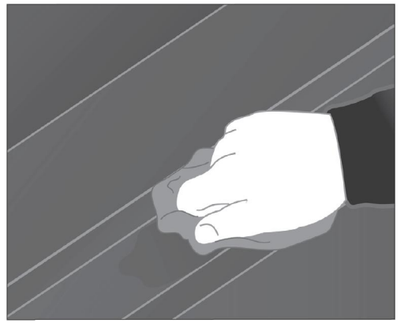
SolarFoot Installation Instructions

To Install SolarFoot™

1. Determine the location of the supporting structure of the roof. Wipe away excess oil and debris from the desired mounting location.
2. Peel the release paper from the base, align, and apply to roof surface so that fasteners will engage the structure below.
3. Install screws through the pre-punched holes in the SolarFoot into the structure below.
4. Install the L-Foot over the stud and secure in place with the provided M8-1.25 hex flange nut tightened to 160 inch pounds (13 ft lbs).

NOTE: Attachment frequency and spacing for PV arrays is the responsibility of the system designer. The makers of S-5! SolarFoot make no representations with respect to the variables involved in PV array design. Visit the S-5! website for load testing data.

1



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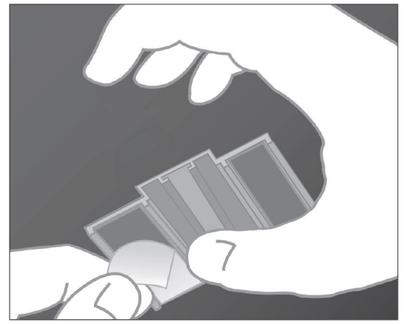

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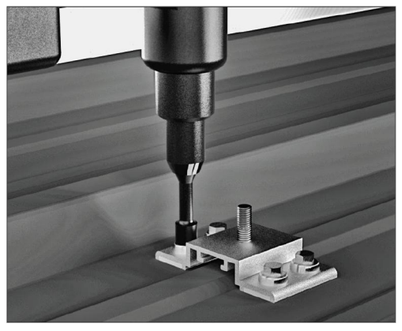

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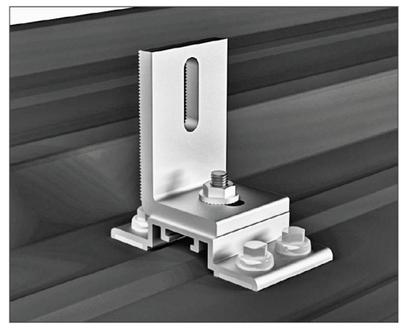


S-5!® Warning! Please use this product responsibly!

These instructions are for use by those experienced in the trade. Always follow appropriate safety precautions and use appropriate tools.

LP66-V1.0_08/17

1 PV-6B S-5! SOLARFOOT INSTALLATION
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

S-5! SOLARFOOT

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-6B

Tech Brief

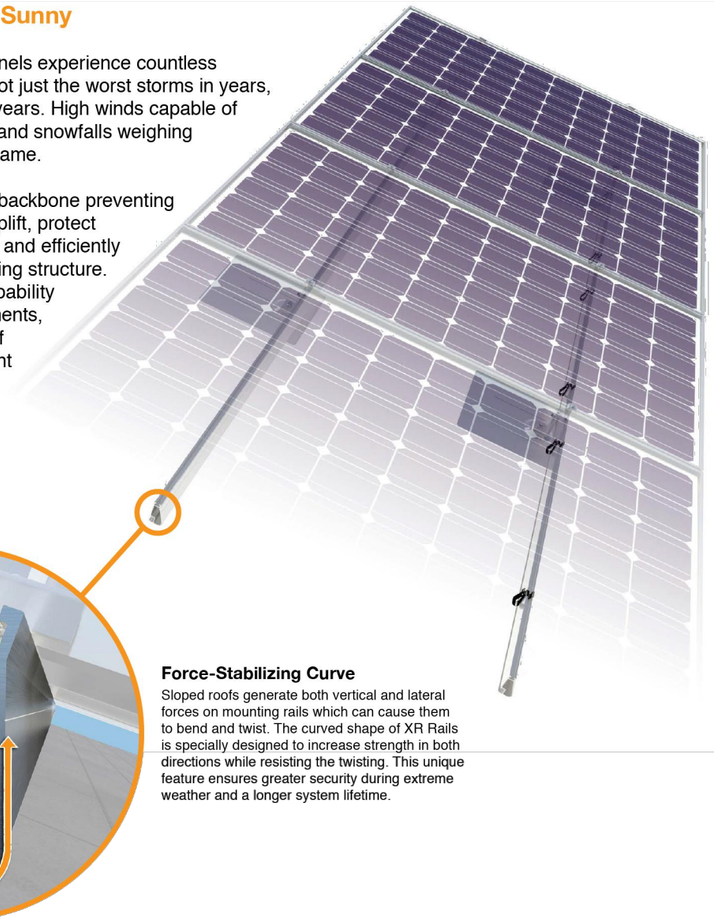
IRONRIDGE

XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

1 PV-6C RACKING RAILS DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

RAILS DATASHEET

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-6C

Intertek

8431 Murphy Drive
Middleton, WI 53562 USA

Telephone: 608.836.4400
Facsimile: 608.831.9279
www.intertek.com

Test Verification of Conformity

In the basis of the tests undertaken, the sample(s) of the below product have been found to comply with the requirements of the referenced specifications at the time the tests were carried out.

Applicant Name & Address:	IronRidge, Inc. 1495 Zephyr Ave. Hayward, CA 94544 USA
Product Description:	Flush Mount System with XR Rails.
Ratings & Principle Characteristics:	Fire Class Resistance Rating: -Flush Mount (Symmetrical). Class A Fire Rated for Low Slope applications when using Type 1, 2 and 3, listed photovoltaic modules. Class A Fire Rated for Steep Slope applications with Type1, 2 and 3, listed photovoltaic modules. Tested with a 5" gap (distance between the bottom the module frame and the roof covering), per the standard this system can be installed at any gap allowed by the manufacturers installation instructions. No perimeter guarding is required. This rating is applicable with any IronRidge or 3'rd party roof anchor.
Models:	IronRidge Flush Mount with XR Rails
Brand Name:	IronRidge Flush Mount
Relevant Standards:	UL 2703 (Section 15.2 and 15.3) Standard for Safety Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels, First Edition dated Jan. 28, 2015 **Referencing** UL1703 Third Edition dated Nov. 18, 2014, (Section 31.2) Standard for Safety for Flat-Plate Photovoltaic Modules and Panels.
Verification Issuing Office:	Intertek Testing Services NA, Inc. 8431 Murphy Drive Middleton, WI 53562
Date of Tests:	08/27/2014 to 03/17/2015
Test Report Number(s):	101769343MID-001r1, 101769343MID-001a, 101915978MID-001 & 101999492MID-001ar1-cr1.

This verification is part of the full test report(s) and should be read in conjunction with them. This report does not automatically imply product certification.

Completed by:	Chris Zimbrich	**Reviewed by:**	Chad Naggs
Title:	Technician II, Fire Resistance	**Title:**	Technician I, Fire Resistance
Signature:		**Signature:**	
Date:	05/25/2016	**Date:**	05/25/2016

Tech Brief

IRONRIDGE

Class A Fire Rating

Background

All roofing products are tested and classified for their ability to resist fire.

Recently, these fire resistance standards were expanded to include solar equipment as part of the roof system. Specifically, this requires the modules, mounting hardware and roof covering to be tested together as a system to ensure they achieve the same fire rating as the original roof covering.

These new requirements are being adopted throughout the country in 2016.

IronRidge Certification

IronRidge was the first company to receive a Class A Fire Rating—the highest possible rating—from Intertek Group plc., a Nationally Recognized Testing Laboratory.

IronRidge Flush Mount and Tilt Mount Systems were tested on sloped and flat roofs in accordance with the new UL 1703 & UL 2703 test standards. The testing evaluated the system's ability to resist flame spread, burning material and structural damage to the roof.

Refer to the table below to determine the requirements for achieving a Class A Fire Rating on your next project.

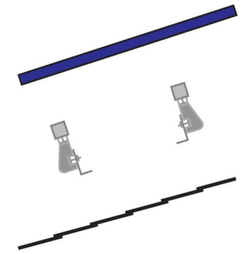
Fire Testing Process

Test Setup

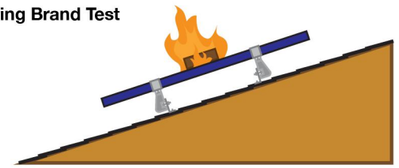
Solar Modules
Solar modules are given a Type classification based on their materials and construction.

Mounting System
Mounting is tested as part of a system that includes type-tested modules and fire-rated roof covering.

Roof Covering
Roof covering products are given a Fire Class Rating of A, B or C based on their tested fire resistance.

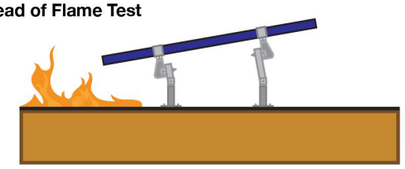


Burning Brand Test



A burning wooden block is placed on module as a fan blows at 12 mph. Flame cannot be seen on underside of roof within 90 minutes.

Spread of Flame Test



Flame at southern edge of roof is aimed up the roof as a fan blows at 12 mph. The flame cannot spread 6 feet or more in 10 minutes.

System	Roof Slope	Module	Fire Rating*
Flush Mount	Any Slope	Type 1, 2, & 3	Class A
Tilt Mount	≤ 6 Degrees	Type 1, 2, & 3	Class A

*Class A rated PV systems can be installed on Class A, B, and C roofs.

1 PV-6D CLASS A FIRE RATING DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING SET IS CONFIDENTIAL AND SHALL NOT BE DISCLOSED IN FULL OR IN PART TO ANYONE EXCEPT THOSE INVOLVED IN THE DESIGN AND INSTALLATION OF THE PV SYSTEM REPRESENTED IN THIS PLAN.

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

CLASS A FIRE RATING

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-6D

28357 Industrial Blvd.
Hayward, CA 94545
1-800-227-9523
IronRidge.com

Attn: Sean McDonald, CEO, IronRidge Inc.
Date: March 25th, 2024

Re: Structural Certification and Span Tables for the IronRidge Flush Mount System

This letter addresses the structural performance and code compliance of IronRidge's Flush Mount System. The contents of the letter shall be read in its entirety before applying to any project design. The Flush Mount System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum XR Rails and secured to the rails with IronRidge mounting clamps. The XR Rails are side mounted to a selected roof attachment with 3/8" stainless steel bonding hardware and then attached directly to the roof structure or to a stanchion that is fastened to the underlying roof structure. Assembly details of a typical Flush Mount installation and its core components are shown in Exhibit EX-0015.

The IronRidge Flush Mount System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- ASCE/SEI 7-16 Minimum Design Loads for Buildings and Other Structures (ASCE 7-16)
- 2021 International Building Code (IBC-2021)
- 2021 Virgina Uniform Statewide Building Code, Part 1, Construction
- 2020 Aluminum Design Manual (ADM-2020)
- Report SEAOC (Structural Engineer Association of California) PV2-2017 Wind Design for Solar Arrays

The span tables provided in this letter are certified based on the structural performance of IronRidge XR Rails only with no consideration of the structural adequacy of the chosen roof attachments, PV modules, or the underlying roof supporting members. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the aforementioned system components in regards to the applied or resultant loads of any chosen array configuration. This letter certifies the IronRidge products referenced within this document and provides no determination of the project specific conditions including site loads, building profile, & roof zones, which remain the responsibility of the installer or system designer.

Sincerely,

COMMONWEALTH OF VIRGINIA
NANCY SCHUBERT
Lic. No. 402066086
PROFESSIONAL ENGINEER

Nancy Schubert

Digitally signed by Nancy Schubert
Date: 2024.03.25 13:34:45 -04'00'

28357 Industrial Blvd.
Hayward, CA 94545
1-800-227-9523
IronRidge.com

Span values for *Exposed* and *Edge* module conditions, as defined below, are included in the attached span tables and shall be used when each condition exists. The maximum allowable span for *Exposed* or *Edge* modules shall be the lesser of the following two: (1) The span value for the *Exposed* or *Edge* module condition; (2) The span value determined by site wind speed and ground snow load. Additionally, irrespective of the lesser span, the shaded cells for the *Exposed* and *Edge* module conditions which reflect the UFO clamp usage limitation detailed in note 9 of page 2 shall apply to the respective condition.

1. Exposed Module conditions:

A module is defined as *Exposed* (per Section 29.4.4 of ASCE 7-16) if the distance from any of its free edges (an edge with no connectivity to other modules) to its facing roof edge (such as eave, ridge, rake, or hip) is greater than 0.5*h* (*h* is ASCE defined building height) AND if the distance from its free edge to any other adjacent array or panel is greater than 4 feet.

The allowable spans and cantilever shall only be applied to the portion of rail directly under *Exposed Modules*.

2. Edge Module conditions:

A module is defined as an *Edge Module* when its distance from any side of the module to its facing perimeter roof edge (such as eave, ridge, rake, or hip) is less than 2 times the height of the array ($2h_2$) where h_2 is measured from the roof surface to the top surface of the module.

The allowable spans and cantilever shall only be applied to the portion of rail directly under *Edge Modules*. Additionally, if the roof edge is the eave or ridge, only the rail nearest to that roof edge shall be considered for this span adjustment.

1 PV-6E STATE OF VIRGINIA ENGINEERING LETTER (IRONRIDGE RACKING)
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING SET IS CONFIDENTIAL AND SHALL NOT BE DISCLOSED IN FULL OR IN PART TO ANYONE EXCEPT THOSE INVOLVED IN THE DESIGN AND INSTALLATION OF THE PV SYSTEM REPRESENTED IN THIS PLAN.

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

ENGINEERING LETTER

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-6E

Tech Brief

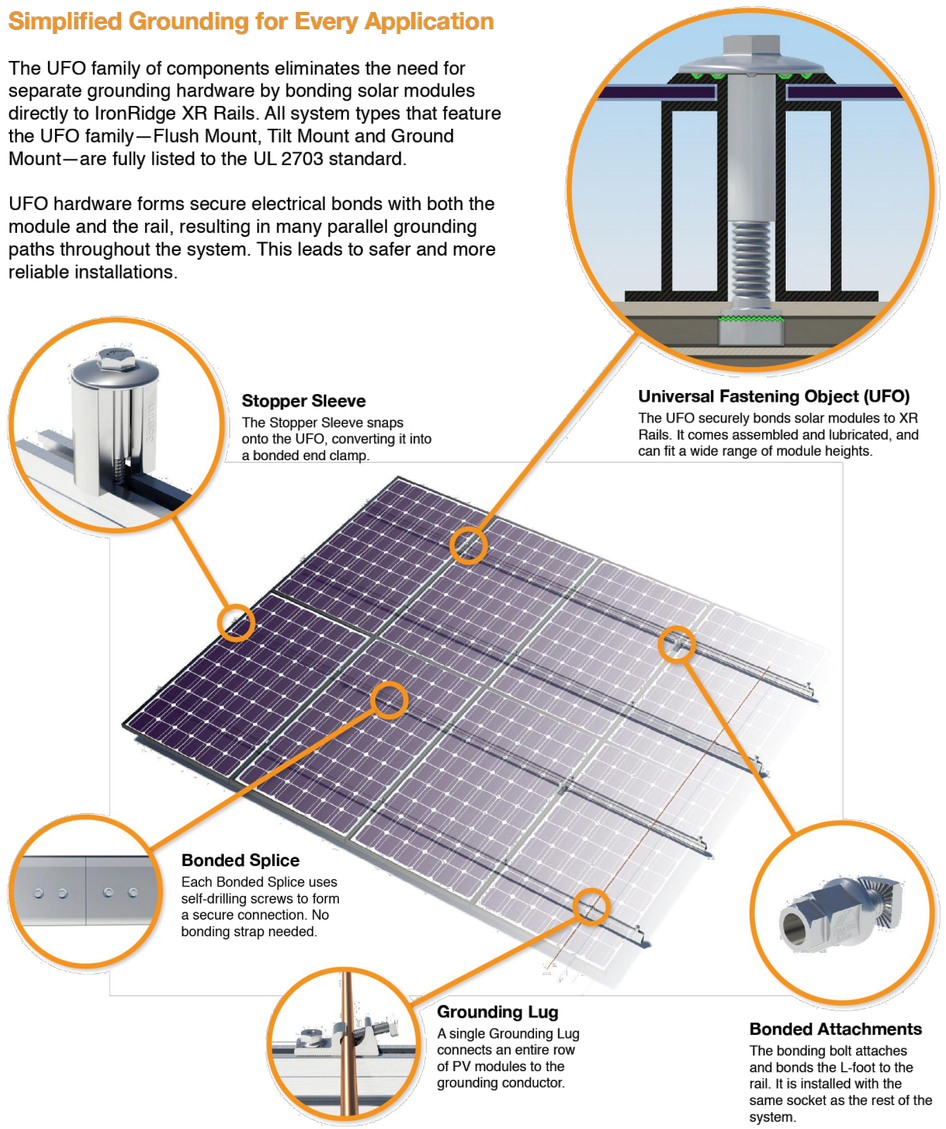
IRONRIDGE

UFO Family of Components

Simplified Grounding for Every Application

The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



Stopper Sleeve
The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.

Universal Fastening Object (UFO)
The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.

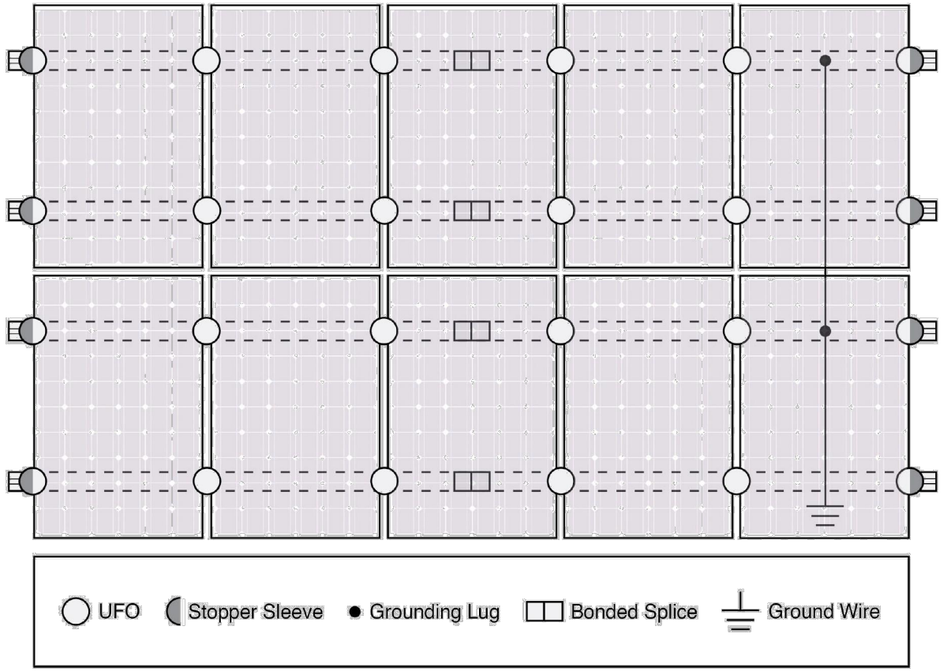
Bonded Splice
Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.

Grounding Lug
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.

Bonded Attachments
The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

Tech Brief

System Diagram



Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

Go to IronRidge.com/UFO

Cross-System Compatibility

Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails	✔	✔	XR1000 Only
UFO/Stopper	✔	✔	✔
Bonded Splice	✔	✔	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		

1 PV-6F GROUNDING DETAILS (IRON RIDGE RACKING)
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

GROUNDING DETAILS

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-6F

AXITEC®

AXIblackpremium XXL HC

400 - 420 Wp

High performance solar module
108 halfcell, monocrystalline

German-American-Engineering

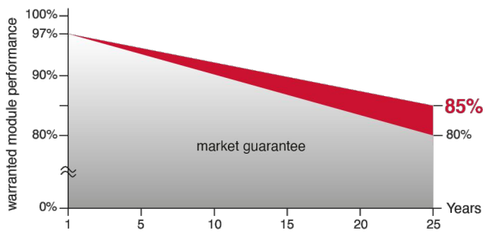
The advantages:

- 25 Years — 25 years Manufacturer's warranty
- HC — High module performance through Half-Cut-technology and selected materials
- Wp — Guaranteed positive power tolerance from 0-5 Wp by individual measurement
- 100% — 100 % visual electroluminescence inspection in production
- Frame — High stability due to innovative frame design
- IP 68 — High quality junction box and connector systems
- 25 Years — 25 years Performance guarantee

108MHEN250321A

Fig. similar

Exclusive linear AXITEC high performance guarantee!



AXITEC Warranty Added Value: up to 5% more power after 25 years

Intertek

Conforms to ETL STD No.1703
Certified to ULC/ORD Std. C1703

AXITEC, LLC, 150 N. Radnor Chester Road, Suite F-200, Radnor, PA 19087, www.axitecsolar.com

AXITEC®

AXIblackpremium XXL HC 400 - 420 Wp

Electrical data (at standard conditions (STC) irradiance 1000 watt/m², spectrum AM 1.5 at a cell temperature of 25°C)

Type	Nominal output Pmpp	Nominal voltage Umpp	Nominal current Impp	Short circuit current Isc	Open circuit voltage Uoc	Module conversion efficiency
AC-400MH/108VB	400 Wp	31.01 V	12.90 A	13.79 A	37.07 V	20.48 %
AC-405MH/108VB	405 Wp	31.21 V	12.98 A	13.87 A	37.23 V	20.74 %
AC-410MH/108VB	410 Wp	31.45 V	13.04 A	13.95 A	37.32 V	21.00 %
AC-415MH/108VB	415 Wp	31.61 V	13.13 A	14.02 A	37.45 V	21.25 %
AC-420MH/108VB	420 Wp	31.80 V	13.21 A	14.10 A	37.58 V	21.51 %

Design

Frontside	0.13 inch (3.2 mm) hardened, low-reflection white glass
Cells	108 monocrystalline high efficiency cells
Backside	Composite film
Frame	1.18 inch (30 mm) black aluminium frame

Mechanical data

L x W x H	67.80 x 44.65 x 1.18 inch(1722 x 1134 x 30 mm)
Weight	47.40 lbs (21.5 kg) with frame

Mechanical load

Design load (pressure/suction)	75.3 PSF / 33.3 PSF
Test load (pressure/suction)	113 PSF / 50 PSF

Power connection

Socket	Protection Class IP68
Wire	47.25 inch, AWG 12
Plug-in system	Plug/socket IP68, Stäubli MC4 / Stäubli EVO2

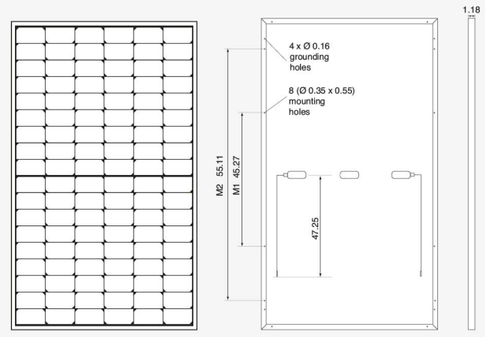


Fig. principle sketch

All dimensions in inch

Limit values

System voltage	1500 VDC (UL) 1500 VDC (IEC)
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)
NOCT (nominal operating cell temperature)*	45°C +/-2K
Reverse current feed IR	25.0 A
Permissible operating temperature	-40°C to 85°C / -40F to 185F

(No external voltages greater than Vo may be applied to the module)

* NOCT, irradiance 800 W/m2; AM 1.5; wind speed 1 m/s; Temperature 20°C

Temperature coefficients

Voltage Uoc	-0.28 %/K
Current Isc	0.045 %/K
Output Pmpp	-0.35 %/K

Low-light performance (Example for AC-420MH/108VB)

I-U characteristic curve	Current Ipp	Voltage Upp
200 W/m²	2.70 A	30.60 V
400 W/m²	5.45 A	30.96 V
600 W/m²	8.14 A	31.20 V
800 W/m²	10.76 A	31.47 V
1000 W/m²	13.21 A	31.80 V

Packaging

Module pieces per pallet	36
Module pieces per HC-container	936

1 PV-7A — PV MODULE DATASHEET (EXISTING)
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

MODULE DATASHEET

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-7A

PEIMAR
ITALIAN PHOTOVOLTAIC MODULES

DR10H450M (FB)

HALF CELL LINE

HALF-CELL MODULE

The 120 Half Cut module of the Half Cell Line combines the high production efficiency of the half cell technology with an excellent quality / price ratio.
The half-cell configuration improves the electrical distribution inside the panel to increase the yield of the product. For these reasons, the Half Cell Line is suitable not only for industrial installations but also for residential and commercial installations.

30 YEAR LINEAR POWER WARRANTY
25 YEAR PRODUCT WARRANTY

PERC TECHNOLOGY

ANTI-REFLECTIVE GLASS

QBE INSURANCE
Product Liability Insurance QBE

Cells

120 CELLS
MONO 9BB / 10BB M10 HALF | PERC

182 x 91 mm / 7.16 x 3.58"

Frame

COMPACT AND STURDY | 35 mm

ANCHORABLE ALSO ON
THE SHORT SIDE [5]

HALF CELL LINE

Electrical Characteristics (STC) [1]

	DR10H450M (FB)
Nominal Output (Pmax) [2]	450 W
Sorting Tolerance	0/+5 W
Voltage at Pmax (Vmp)	33.91 V
Current at Pmax (Imp)	13.27 A
Open Circuit Voltage (Voc) [2]	41.18 V
Short Circuit Current (Isc) [2]	13.85 A
Maximum System Voltage	1500 V
Maximum Series Fuse Rating	25 A
Module Efficiency	20.82 %
Protection class against electric shock	Class II

Mechanical Characteristics

Solar Cells	120 M10 HALF monocrystalline **PERC**
Solar Cells Size	182 x 91 mm / 7.16 x 3.58"
Front Cover	3.2 mm / 0.13" thick, low iron tempered glass
Back Cover	TPT (Tedlar-PET-Tedlar)
Encapsulant	EVA (Ethylene vinyl acetate)
Frame	Anodized aluminium alloy, double wall
Frame finishing	Black
Backsheet finishing	Black
Diodes	3 Bypass diodes serviceable
Junction Box	IP68 rated
Connector	MC4 or compatible connector
Cables Lenght	1200 mm / 47.24"
Cables Section	4.0 mm² / 0.006 in²
Dimensions	1906 x 1134 x 35 mm / 75.03 x 44.64 x 1.37"
Weight	24 Kg / 52.9 lbs
Max Load (Test Load) - SF	5400 Pa - 1.5 [5]

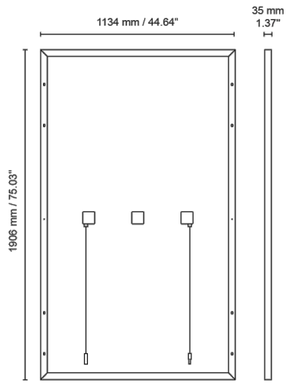
Temperature Characteristics

NMOT [3]	45±2 °C
Temperature Coefficient of Pmax	-0.37 %/°C
Temperature Coefficient of Voc	-0.29 %/°C
Temperature Coefficient of Isc	0.05 %/°C
Operating Temperature	-40 °C ~ +85°C

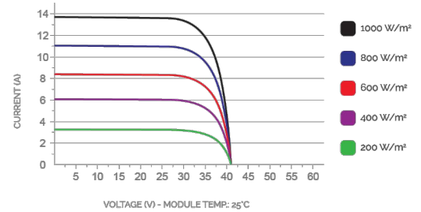
Packaging [4]

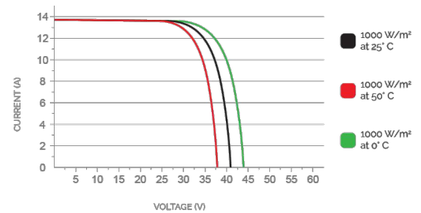
Pallet dimensions	1940 x 1130 x 1270 mm / 76.38 x 44.49 x 50.00"
Pieces per pallet	31
Weight	775 kg / 1708.58 lbs

Dimensions



Current/Voltage Characteristics





1. STC: (Standard Test Condition) Irradiance 1000W/m²; Module Temperature 25°C; Air Mass 1.5
2. Pmax, Voc, Isc measurement tolerance: ±3%
3. NMOT: Nominal Module Operating Temperature: Irradiance 800W/m²; Air 20°C; Wind speed 1m/s
4. Pallets can be stacked up to two
5. Consult the installation manual for the relative mounting configurations

www.peimar.com

CE

USA_2024_10_00

PEIMAR
ITALIAN PHOTOVOLTAIC MODULES

1 PV-7B PV MODULE DATASHEET (NEW)
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

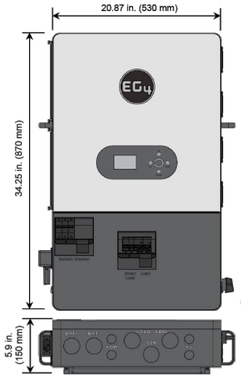
GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

MODULE DATASHEET

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-7B



EG4® 12000XP
OFF-GRID INVERTER

The EG4 12000XP is a 48V split-phase, off-grid inverter/charger capable of utilizing 24kW of PV input and efficiently outputting 15kW* of power while also charging your battery bank. Parallel up to 16 units for 240kW of output power and control multiple stations and units using the EG4 Monitor Center.

HIGH FREQUENCY SPLIT-PHASE DESIGN

5-YEAR WARRANTY

REMOTE ADJUSTMENT VIA EG4 SOFTWARE

ALL-IN-ONE OFF-GRID INVERTER
Capable of running entirely off the grid or using grid electricity.

UP TO 480 VDC INPUT
The extra high voltage enables lower cable sizing for the 2 MPPTs and a maximum utilized PV input of 24kW, eliminating the need for a combiner box.

PLUG-IN WI-FI DEVICE
Enables wireless connection between the 12000XP and the EG4 app or EG4 Monitor system.

CLOSED-LOOP COMMUNICATIONS
Able to communicate with EG4 48V batteries and other supported battery brands.

SMART LOADS
The smart load port enhances the efficiency and effectiveness of solar power systems by intelligently managing energy consumption. This allows the port to have multiple use cases via load shedding, accepting AC Couple power, or power shedding for individual smart appliances.

**15kW Output only with model #: IV-15000-XP-IN-01*

VERSION 1.2.6 | INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
MODEL #: IV-12000-XP-IN-01 | IV-15000-XP-IN-01*

EG4 ELECTRONICS

TECHNICAL SPECIFICATIONS

AC INPUT DATA	
NOMINAL AC VOLTAGE (GRID | GENERATOR)	120/240VAC; 120/208VAC (L1/L2/N required)
FREQUENCY (GRID | GENERATOR)	60 Hz (Default) | 50 Hz (Configurable)
GRID MAX. CONTINUOUS AC CURRENT	100A @ 240VAC
MAX. AC INPUT POWER	24000W
GENERATOR MAX. CONTINUOUS CURRENT	62.5A @ 240VAC
RECOMMENDED GENERATOR CAPACITY	6000W – 15000W
AC BYPASS (GRID | GENERATOR)	100A | 90A
AVAILABLE FAULT CURRENT	5kA
INPUT SHORT CIRCUIT CURRENT	150A peak @100us, per inverter
AC OUTPUT DATA	
OUTPUT VOLTAGE	120/240VAC; 208VAC
OUTPUT FREQUENCY	60 Hz (Default) | 50 Hz (Configurable)
MAX. CONTINUOUS OUTPUT CURRENT*	62.5A @ 240VAC | 62.5A @ 208V
NOMINAL POWER OUTPUT*	w/ PV: 15000W @ 240V | 13000W @ 208V w/ out PV: 12000W @ 240V | 12000W @ 208V
MAX. CONTINUOUS WATTAGE	15000W (L1-L2) | 7500W (L1-N or L2-N)
PEAK POWER (SURGE CAPACITY)**	15360W for ≈10s
POWER FACTOR VALUE	.99
THD (V)	<3%
SWITCHING TIME	<10 ms @ Single / <20 ms @ Parallel
PV INPUT DATA	
NUMBER OF MPPTS	2
INPUTS PER MPPT	2/2
MAX. USABLE INPUT CURRENT	35A/35A
MAX. SHORT CIRCUIT INPUT CURRENT	44A/44A
DC INPUT VOLTAGE RANGE***	100 – 480 VDC
MIN. STARTUP VOLTAGE	100 VDC
MPPT OPERATING VOLTAGE RANGE	120 – 385 VDC
NOMINAL MPPT VOLTAGE	320 VDC
MAX. PV INPUT VOLTAGE***	500 VDC
MAX. UTILIZED SOLAR POWER	24000W (12000 per MPPT)
MAX. RECOMMENDED SOLAR INPUT	28000W (14000 per MPPT)

*15kW nominal power output with model #: IV-15000-XP-IN-01 only. Previous models are limited to 12kW nominal output with max. continuous output current at 50A for 240 VAC, and 57.7A at 208 VAC.
**With battery only.
***When sizing the system, it is best practice to follow the DC Input Voltage Range. Do not exceed the Max. PV Input Voltage. Any damage caused by reaching >500 VDC will not be covered under warranty.

EG4 ELECTRONICS

EFFICIENCY	
MAXIMUM EFFICIENCY (MPPT)	99%
MAXIMUM EFFICIENCY (PV TO BATTERY)	92.8%
MAXIMUM EFFICIENCY (AC TO BATTERY)	92.5%
MAXIMUM EFFICIENCY (PV TO LOADS)	93.5%
MAXIMUM EFFICIENCY (BATTERY TO LOADS)	90.2%
IDLE CONSUMPTION (STANDBY MODE)*	<70W
BATTERY DATA	
COMPATIBLE TYPES	Lead-Acid/Lithium
MAX. CHARGE/DISCHARGE CURRENT (A)	250A
MAX. CHARGE/DISCHARGE POWER (W)	12000W
NOMINAL VOLTAGE	48 VDC
BATTERY VOLTAGE RANGE	46.4 – 60 VDC (Lithium) | 38.4 – 60 VDC (Lead-Acid)
RECOMMENDED BATTERY CAPACITY PER INVERTER	>400Ah
HIGH DC CUT-OFF VOLTAGE	59 VDC (Lithium) | 60 VDC (Lead-acid)
GENERAL DATA	
MAX. UNITS IN PARALLEL	16
PRODUCT DIMENSIONS (H×W×D)	34.25×20.87×5.91 in. (870×530×150 mm)
UNIT WEIGHT	104.7 lbs. (47.5 kg)
DESIGN TOPOLOGY	High Frequency - Transformerless
RELATIVE HUMIDITY	5 – 95% (non-condensing)
OPERATING ALTITUDE	<6561 ft. (<2000 m)
OPERATING AMBIENT TEMPERATURE RANGE	32°F – 113°F (0°C – 45°C) @ Full Load
STORAGE AMBIENT TEMPERATURE RANGE	5°F – 140°F (-15°C – 60°C)
NOISE EMISSION (TYPICAL)	<60 dB
LOCKED ROTOR AMPS (LRA)	195A
COOLING METHOD	Fan
COMMUNICATION INTERFACE	RS485/CAN/Wi-Fi
STANDARD WARRANTY**	5-year standard warranty
INGRESS PROTECTION RATING	IP20
SAFETY FEATURES	PV Reverse Polarity Protection, Surge Protection Device, Output Over-Voltage Protection, Output Over-Voltage Protection Varistor
STANDARDS AND CERTIFICATIONS	
UL1741	
FCC PART 15, CLASS B	

*Idle consumption value tested with constant 300 VDC PV source
**For information regarding warranty registration on EG4® Electronics products, please navigate to https://eg4electronics.com/warranty/ and select the corresponding product to begin the registration process.

1 PV-8A EG4 12000XP V2 HYBRID INVERTER DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

INVERTER DATASHEET

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-8A

CERTIFICATE
OF COMPLIANCE

intertek
Total Quality. Assured.

This certificate confirms the model(s) for the product listed are in compliance and authorized to bear the Certification Mark(s) shown below when made in accordance with the conditions set forth in the Certification Agreement and Listing Report.

EG4 Electronics LLC

Address: 1130 Como St S Sulphur Springs, TX 75482-4502

Country: USA

Report Issuing Office: Intertek Testing Services NA, Inc., Plano, TX

Control Number: 5027869, 5029656 **Authorized by:** Jordan Holbert
for C. Matthew Snyder, Certification Manager

VALID LISTING MARKS

C ETL LISTED US
Intertek

Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667

Standard(s):	Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources [UL 1741:2021 Ed.3+R:23Oct2024] Power Conversion Equipment [CSA C22.2#107.1:2016 Ed.4+U1]
Product:	PV Off-grid Inverter
Brand Name:	EG4 ELECTRONICS

CERTIFICATE
OF COMPLIANCE

intertek
Total Quality. Assured.

Models:	IV-12000-XP-IN- may be followed by 00-99, IV-15000-XP-IN- may be followed by 00-99

Certificate for Report: 241031211GZU-001 Page **2** of **2** Certificate Issued: November 20, 2025
TF-ETL-OP-23e (14-Feb-2022)

1 PV-8B EG4 12000XP V2 HYBRID INVERTER (UL CERTIFICATION)
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

INVERTER UL CERT.

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-8B

EG4® WALLMOUNT 314AH INDOOR BATTERY

The EG4® WallMount 314Ah Indoor battery delivers dependable, high-efficiency storage for clean, protected spaces. Each unit uses advanced lithium iron phosphate cells and provides about 16kWh of energy. The form factor stays compact and familiar, sized to fit where earlier models fit, which keeps retrofits and system expansions straightforward. This model includes EG4's smart BMS with active balancing, network connectivity, and over the air firmware updates. Installers and homeowners get faster setup, stronger control, and long-term performance support through the EG4 battery monitoring app.

FASTER COMMISSION TIME

REMOTE FIRMWARE UPDATES

UNIVERSALLY EXPANDABLE

LONGER CELL LIFE
Active balancing (2 – 3A) speeds up cell equalization for longer life.

AUTO CONFIGURATION
Eliminates manual DIP switch setup, detects and configures automatically for faster commissioning.

MULTIPLE COMPATIBLE INVERTERS
Smart BMS automatically detects and communicates with EG4 inverters for true plug-and-play operation.

CONFIGURABLE PORTS
NO/NC + 12V outputs for generator start, alarms, or custom triggers.

ENHANCED SAFETY
Internal fire arrestors, reinforced cell enclosures, and compliance with the latest UL and AHJ standards.

TECHNICAL SPECIFICATIONS

TYPE & MODEL #	
PARAMETER	**SPECIFICATION**
PRODUCT TYPE	LFP Battery
BATTERY TYPE	Lithium Iron Phosphate (LFP)
MODEL NUMBER	WM-48-314-IN-XX / WM48314INXX (XX is a number between 00 – 99)
ELECTRICAL CHARACTERISTICS	
NOMINAL ENERGY CAPACITY	16kWh
USABLE ENERGY [DOD%]	12.86kWh (80% recommended)
RECOMMENDED VOLTAGE RANGE	47.5 – 57.6 VDC
NOMINAL VOLTAGE	51.2 VDC
CAPACITY	314Ah
CHARGING VOLTAGE RANGE	56 – 57 VDC
DISCHARGING CUT-OFF VOLTAGE	47.5 VDC
MAX CONTINUOUS/RECOMMENDED CHARGE CURRENT	157A/157A
MAX CONTINUOUS/RECOMMENDED DISCHARGE CURRENT	200A/157A
CONTINUOUS CHARGE/DISCHARGE POWER	8/10.2 kW
RECOMMENDED CHARGING/DISCHARGING RATE	0.5C
SHORT CIRCUIT CURRENT	1700A, 15ms delay
PEAK POWER	12.8kW (3 sec)
ROUND-TRIP EFFICIENCY	95%
MAX PARALLEL UNITS	32
PROTECTION FEATURES	Over/Under Voltage, Over-Current, Short Circuit, High/Low Temp
BATTERY MANAGEMENT SYSTEM [BMS]	Integrated, Active Balancing
COMMUNICATION PROTOCOLS	RS485, CAN
BATTERY BREAKER	250A

BATTERY HEATER SPECIFICATIONS		
PARAMETER	**SPEC**	**CONDITION**
VOLTAGE	56V	-
POWER CONSUMPTION	448W	-
INTERNAL BATTERY TEMPERATURE	≤32°F (0°C)/≥37°F (3°C)	Heat On/Heat Off

ENVIRONMENTAL SPECIFICATIONS	
STORAGE TEMPERATURE RANGE*	-4 – 131°F (-20 – 55°C)
HUMIDITY RANGE	5% – 95% RH (non-condensing)
ALTITUDE	9843 ft. (<3000 m)
COOLING METHOD	Natural Convection
DIMENSIONS [H × W × D]	34.1 in. × 18.1 in. × 9.6 in. (865 mm × 460 mm × 245 mm)
OPERATING TEMPERATURE RANGE	Charge: 32 – 122°F (0 – 50°C) Discharging: -4 – 131°F (-20 – 55°C)

**Less than 3 months of storage. If longer than 3 months, recommended storage temperature will be 59°F – 86°F (15°C - 30°C). Refer to section 6.4 of the battery user manual for complete storage requirements.*

*For more information regarding warranty registration on EG4® Electronics products, please navigate to https://eg4electronics.com/warranty/ and select the corresponding product to begin the registration process.

1 PV-9A EG4 WALLMOUNT 314AH INDOOR BATTERY DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING SET IS CONFIDENTIAL AND SHALL NOT BE DISCLOSED IN FULL OR IN PART TO ANYONE EXCEPT THOSE INVOLVED IN THE DESIGN AND INSTALLATION OF THE PV SYSTEM REPRESENTED IN THIS PLAN.

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

BATTERY MODULE

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-9A

Test Verification of Conformity

Verification Number: 251120146GZU-VOC001

On the basis of the tests undertaken, the sample<s> of the below product has been tested by an accredited 3rd party laboratory in accordance to the referenced specification<s>/standard<s> at the time the tests were carried out. This verification is part of the full test report<s> and should be read in conjunction with it <them>.

Applicant Name & Address:	EG4 Electronics LLC 1130 Como Street South, Sulphur Springs, TX 75482, USA
Product Description:	Rechargeable Li-ion Battery
Ratings & Principle Characteristics:	See Appendix: Test Verification of Conformity
Models/Type References:	WM48314IN, WM-48-314-1-IN-, WM-48-314-2-IN-, WM-48-314-3-IN-, WM-48-314-4-IN-, WM-48-314-5-IN-, WM-48-314-6-IN-, may be followed by 00 to 99
Brand Names:	EG4 ELECTRONICS (EG4 ELECTRONICS)
Specification<s>/Standards:	ANSI/CAN/UL 9540A:2025 Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems Unit level test (clause 9.1-9.8)
Verification Issuing Office Name & Address:	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch. Room101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District, Guangzhou, Guangdong, China
Date of Tests:	01 September 2025 – 02 September 2025
Test Report Number(s):	251120146GZC-001. 28 November 2025

Additional information in Appendix.

Jason Fu

Signature

Name: Jason Fu
Position: Manager
Date: 28 November 2025

APPENDIX: Test Verification of Conformity

This is an Appendix to Test Verification of Conformity Number: 251120146GZU-VOC001.

Ratings & Principle Characteristics:

Model:	WM48314IN, WM-48-314-1-IN-, may be followed by 00 to 99	WM-48-314-2-IN-, may be followed by 00 to 99	WM-48-314-3-IN-, may be followed by 00 to 99
Rated capacity (Ah):	314 Ah	628 Ah	942 Ah
Rated energy (kWh):	16 kWh	32 kWh	48 kWh
Nominal voltage (V):	51.2 V		
Weight(kg):	133(±0.5) kg	266(±1) kg	399(±1.5) kg
Module series and/or parallel configuration:	1S1P	1S2P	1S3P
Total number of cells:	16	32	48
Standard charge method:			
Charge current (A):	157 A	314 A	471 A
End of charge voltage (V):	57 V		
Standard discharge method:			
Discharge current (A):	157 A	314A	471 A
End of discharge voltage (V):	44.8 V		
Rest time between charge and discharge	30 min		

Jason Fu

Signature

Name: Jason Fu
Position: Manager
Date: 28 November 2025

APPENDIX: Test Verification of Conformity

This is an Appendix to Test Verification of Conformity Number: 251120146GZU-VOC001.

Ratings & Principle Characteristics:

Model:	WM-48-314-4-IN-, may be followed by 00 to 99	WM-48-314-5-IN-, may be followed by 00 to 99	WM-48-314-6-IN-, may be followed by 00 to 99
Rated capacity (Ah):	1256 Ah	1570 Ah	1884 Ah
Rated energy (kWh):	64 kWh	80 kWh	96 kWh
Nominal voltage (V):	51.2 V		
Weight(kg):	532(±2) kg	665(±2.5) kg	798(±3) kg
Module series and/or parallel configuration:	1S4P	1S5P	1S6P
Total number of cells:	64	80	96
Standard charge method:			
Charge current (A):	628 A	785 A	942 A
End of charge voltage (V):	57 V		
Standard discharge method:			
Discharge current (A):	628 A	785 A	942 A
End of discharge voltage (V):	44.8 V		
Rest time between charge and discharge	30 min		

Jason Fu

Signature

Name: Jason Fu
Position: Manager
Date: 28 November 2025

1 PV-9B EG4 WALLMOUNT 314AH INDOOR BATTERY (UL CERTIFICATION)
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING SET IS CONFIDENTIAL AND SHALL NOT BE DISCLOSED IN FULL OR IN PART TO ANYONE EXCEPT THOSE INVOLVED IN THE DESIGN AND INSTALLATION OF THE PV SYSTEM REPRESENTED IN THIS PLAN.

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

BATTERY UL CERT.

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-9B

TS4-A-F

Module-level rapid shutdown

The TS4-A-F (Fire Safety) is the advanced add-on rapid shutdown solution that brings smart module functionality to standard PV modules for higher reliability. Ensure safety by upgrading existing PV systems or by adding safety features to new installations.

The TS4-A-F complies with NEC 2017, 2020, and 2023 690.12 Rapid Shutdown specifications when installed with the Tigo RSS Transmitter or an inverter with a built-in Tigo certified transmitter.

Features

- High input current rating – now rated for 20 A I_{MP}/25 A I_{SC} to better accommodate bifacial and high-current modules
- Simple, fast installation – snaps to a standard PV module frame or mounts to racking
- Power-line communications (PLC) signaling – rapid shutdown signaling over PV conductors
- Automatic shutdown – PV array enters rapid shutdown mode in the event of AC grid loss
- UL Standards-certified – tested and certified with hundreds of top inverter models
- 25-year warranty

Specifications

	20 A	25 A
Electrical		
Maximum current (I_{MP}/I_{SC})	15 A/20 A	20 A/25 A
Input voltage range (V_{MP})	16 – 80 V	
Maximum input voltage	80 V	
Maximum system voltage (V_{MAX})	1000 V/1500 V*	
Maximum output current (I_{MAX})	15 A	
Maximum output power (P_{MAX})	700 W	
Maximum fuse rating	25 A	30 A
Maximum efficiency	99.9%	
Rapid Shutdown		
TS4 conductor AWG	12	
Rapid shutdown time limit	<30 sec.	
PVRSE-controlled conductor limits	≤240 VA, ≤8 A, ≤30 V_{DC}	
UL 1741-compliant PVRSE	Yes	
Communications	PLC	
Connections		
Input (from module) cable lengths	0.12/0.62 m	
Output (to string) cable lengths	1.2/2 m	
Connectors	MC4/EVO2	

* Depending on UL/IEC certification

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Specifications

	20 A	25 A
Environmental		
Operating temperature range	-40 – 85 °C (-40 – 185 °F)*	
Storage temperature range	-40 – 85 °C (-40 – 185 °F)	
Maximum elevation	3000 m (9840 ft.)	
Outdoor IP rating	IP68/NEMA 3R	
Mechanical		
Dimensions (H/W/D)	139.7 x 138.4 x 22.9 mm (5.4 x 5.5 x 0.9 in.)	
Weight	490 g (1.1 lb.)	
General		
Standards compliance	UL 1741 PVSRE, UL 1741 PVRSS, CSA 22.2, IEC 62109, NEC 690.12	
Warranty	25 years	

* 20 A UL rating: -30 – 75 °C (-22 – 167 °F)

More Resources

Home | Help Center | Downloads

Ordering Information

Part Number	V_{MAX} Certifications UL/IEC	Cable Lengths	Connectors
20 A I_{SC}			
481-00252-20	1500 V/1000 V	1.2/2 m	MC4
481-00252-32	1500 V/1000 V	0.12/1.2 m	MC4
481-00252-62	1500 V/1000 V	0.62/1.2 m	MC4
481-00261-32	1500 V/1500 V	0.12/1.2 m	EVO2
481-00261-62	1500 V/1500 V	0.62/1.2 m	EVO2
481-01252-32	1500 V/1000 V	0.12/1.2 m	MC4
481-01252-62	1500 V/1000 V	0.62/1.2 m	MC4
481-01261-32	1500 V/1500 V	0.12/1.2 m	EVO2
481-01261-62	1500 V/1500 V	0.62/1.2 m	EVO2
25 A I_{SC}			
486-00252-32	1500 V/1000 V	0.12/1.2 m	MC4
486-00252-62	1500 V/1000 V	0.62/1.2 m	MC4
486-00261-32	1500 V/1500 V	0.12/1.2 m	EVO2
486-00261-62	1500 V/1500 V	0.62/1.2 m	EVO2
488-00252-32	1000 V*	0.12/1.2 m	MC4
488-00252-62	1000 V*	0.62/1.2 m	MC4
488-00261-32	1500 V*	0.12/1.2 m	EVO2
488-00261-62	1500 V*	0.62/1.2 m	EVO2

* IEC certified only

tigoenergy.com

1 PV-10 TIGO TS4-A-F MODULE-LEVEL RAPID SHUTDOWN DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

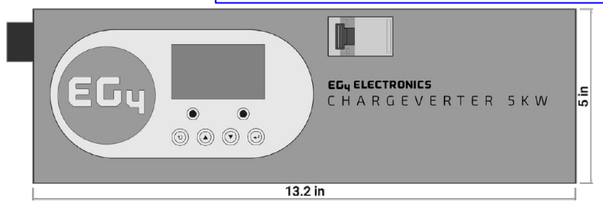
RAPID SHUTDOWN

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-10

EG4 ELECTRONICS

CHARGEVERTER-GC 5KW AC CHARGER



The EG4 Chargeverter-GC is a powerful 48V battery charger capable of rapidly charging at 100 amps, or more than 5000 watts, significantly faster than traditional chargers.

48V/100A BATTERY CHARGER

RS485 COMMUNICATION PORT

AUTO GENERATOR START

120VAC/208VAC/240VAC INPUT CAPABILITY

Optimized for 240VAC power supplies for maximum output. 120VAC or 208VAC input can be used with an optional adapter plug.

RS485 COMMUNICATIONS PORT

An RS485 port on the side of the Chargeverter-GC allows the user to establish closed-loop communication between the charger and battery. This facilitates the exchange of SOC information for user-defined charging thresholds. Without closed-loop communication (SOC information), the charger uses battery voltage for user-defined charging thresholds.

BUILT-IN BREAKER

The unit has a built-in breaker to quickly shut off the charger output for added safety and protection.

OPTIMIZED FOR GENERATOR USE

Plug the Chargeverter-GC directly into a generator to charge batteries without concern for generator power quality issues, commonly referred to as “dirty power.” Connect the automatic generator start circuit to the Chargeverter-GC dry contacts to allow the generator to charge the battery bank at preset start/stop voltages or SOC thresholds.

SCAN FOR UPDATED DOCUMENTS

EG4 ELECTRONICS

SPECIFICATION SHEET

CHARGER OUTPUT SPECIFICATIONS	
Battery Voltage	48VDC nominal
Charge Current (adjustable)	0-100A @240VAC, 0-45A @120VAC, 0-50A @208VAC
Charge Voltage (adjustable)	43-57VDC (default 54VDC)
Max. Output	5120W @240VAC, 3050W @120VAC
Max. Efficiency	94% @240VAC, 92% @120VAC
AC INPUT SPECIFICATIONS	
AC Input Voltage Range	90-264VAC
AC Frequency	50-60Hz
Max. Input Current	26A @240VAC, 28A @120VAC
Idle Consumption	~10W
ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature Range	14°F – 131°F (-10°C – 55°C)
Storage Temperature Range	5°F – 140°F (-15°C – 60°C)
Humidity	5% to 95% relative humidity (non-condensing)
Ingress Protection	IP21
Operating Altitude	0~4921 ft. (0~1500m)
DRY CONTACT SPECIFICATIONS	
Interface Connector	NO, NC, and C (RJ11 Jack)
GENERAL SPECIFICATIONS	
Communication Port	RS485 (RJ45 Jack)
Dimensions H x W x D	5” x 13.2” x 4.9” (127mm x 335mm x 124mm)
Net Weight	13 lbs. (5.9 kg)
Warranty	3 years (only when used indoors)

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VERSION 1.0 | INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
MODEL #: CU-48|5000-GD

1 PV-11 EG4 CHARGEVERTER DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
CONTACT: ON FILE
PROJECT INFO WITHHELD

GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

EG4 CHARGEVERTER

PROJECT NO: GSD-SAMPLE
DRAWN BY: GSD
DATE: SAMPLE

PV-11

17 & 20kW[1] STANDBY GENERATOR

BRIGGS & STRATTON®
THE SMART CHOICE

For the discerning homeowner that is looking for the smartest, most reliable permanent backup power solution.

5 YEAR PARTS · LABOR · TRAVEL LIMITED WARRANTY

Unique Airflow Technology
- Making these models 50% quieter than most portable generators
- The unique design pushes engine exhaust out the front, directly away from your home

Flexible Placement
- Approved for installation as close as 18" to a building[2]

Symphony® II Power Management System
- Customizable to your home's needs
- Automatically balances the power of your home's electrical load including high wattage items like air conditioning units and electric ovens
- Offers whole house power with a more affordable home generator

Commercial-Grade Briggs & Stratton Vanguard™ Engine
- Powerful V-Twin OHV engine
- Easy conversion between natural gas (NG) and liquid propane vapor (LP) during installation

Quality Clean Power
- Ensures your electronics are safely powered

Corrosion Resistant Enclosure & Base
- Made with automotive grade galvanneal steel to resist rust
- Powder-coated paint for years of protection against chips and abrasions

c UL us LISTED

GENERATOR SET RATINGS

	MODEL	VOLTAGE	PHASE	HZ	BREAKER	LIQUID PROPANE LP kW	LIQUID PROPANE LP AMPS	NATURAL GAS NG kW	NATURAL GAS NG AMPS	LIMITED WARRANTY[3] PARTS, LABOR, TRAVEL
17 kW	Briggs & Stratton 040549	120/240	1	60	80	17	70.8	15.3	63.8	5 Year
20 kW	Briggs & Stratton 040336	120/240	1	60	100	20	83.3	18	75	5 Year

[1] This generator is rated in accordance with UL (Underwriters Laboratories) 2200 (stationary engine generator assemblies) and CSA (Canadian Standards Association) standard C22.2 No. 100-04 (motors and generators).
[2] The installation manual contains specific instructions related to generator placement in addition to NFPA 97, including the requirement that carbon monoxide detectors be installed and maintained in your home.
[3] Warranty details available at www.briggsandstratton.com

ENGINE SPECIFICATIONS

ENGINE

Engine Model	Briggs & Stratton Vanguard™
Engine Model Type Trim Number	613275-0003-E1
Engine Speed (RPM)	3600
Engine Fuel	Liquid Propane (LP) or Natural Gas (NG)
Engine Cylinder Configuration	OHV
Number of Cylinders	2
Displacement (cc)	60.6 / 993
Bore & Stroke (in)	3.37 / 3.41
Compression Ratio	8.5:1
Governor Type	Electronic
Frequency Regulation	+/- 1 Hz
Valves	OHV with Hardened Seats
Ignition System	Fixed timing Magnetron® Electric Ignition
Starter Motor Rating Voltage	12 Volt
Battery	12 Volt

LUBRICATION

Oil Capacity (oz)	79
Lubrication System	Full Pressure
Recommended Oil	5W30 Full Synthetic
Low Oil Pressure Sensor	Yes

ALTERNATOR SPECS

Manufacturer	Briggs & Stratton
Type	Self-Excited, Rotation Field
Voltage Regulator	Automatic
Insulation	Class F

CONTROLLER FEATURES

Hour Meter	Yes
LED Digital Display	Yes
Fault Code Display	Yes
Weekly Exerciser	Yes

OPERATIONS

FUEL CONSUMPTION[1]

		50% Load		100% Load	
17kW	Liquid Propane	74 ft³ / hr	2.08 gal / hr	118 ft³ / hr	3.28 gal / hr
	Natural Gas	170 ft³ / hr	—	248 ft³ / hr	—
20kW	Liquid Propane	83 ft³ / hr	2.31 gal / hr	135 ft³ / hr	3.75 gal / hr
	Natural Gas	187 ft³ / hr	—	260 ft³ / hr	—

SOUND RATING AT 7 METERS

17kW	20kW
64 dBA	64 dBA

Lowest measurement of 12 microphones around generator. Sound level measurement at other locations around generator may be different depending upon installation configuration.

[1] Fuel consumption rates are estimated based on normal operating conditions. Generator operation may be greatly effected by elevation and the cycling operation of multiple electrical appliances – fuel flow rates may vary depending on these factors.

ADDITIONAL INFORMATION

OTHER FEATURES

Enclosure Material	Galvanneal Steel with Corrosion Resistant Paint
Overcrank Protection	Yes
Engine Warm Up (sec)	20 or 50 Automatic Transfer Switch Controlled
Engine Cool Down (min)	1
Response Time (sec)	26 or 56 Automatic Transfer Switch Controlled
Monitoring Options	Basic Wireless Monitor InfoHub™ Monitor
Continuous Battery Charging	Yes

WEIGHT AND DIMENSIONS

	17kW	20kW
Assembled Weight (lbs)	484	500
Overall Dimensions (in)	50.5 x 32.9 x 31	50.5 x 32.9 x 31
Packaged Weight (lbs)	597	613
Packaged Dimensions (in)	68.1 x 41 x 39.5	68.1 x 41 x 39.5

CERTIFICATION

CARB Compliant	Yes
NFPA Approved	Yes
cUL Listed to CSA 22.2 NO 100-04	Yes
NEMA Compliant	Yes
EPA Certified Fuel System	Yes

AVAILABLE ACCESSORIES

Maintenance Kit	6035
Cold Weather Kit	6231
Basic Wireless Monitor	6264
InfoHub	6260
Remote Status Monitor	6144

1 PV-12 STANDBY GENERATOR DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN

SAMPLE PROJECT
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GRID-TIED SOLAR SYSTEM 30.30kW

SAMPLE RESIDENCE
PROJECT ADDRESS WITHHELD
UNITED STATES

STANDBY GENERATOR

PROJECT NO: GSD-SAMPLE
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PV-12