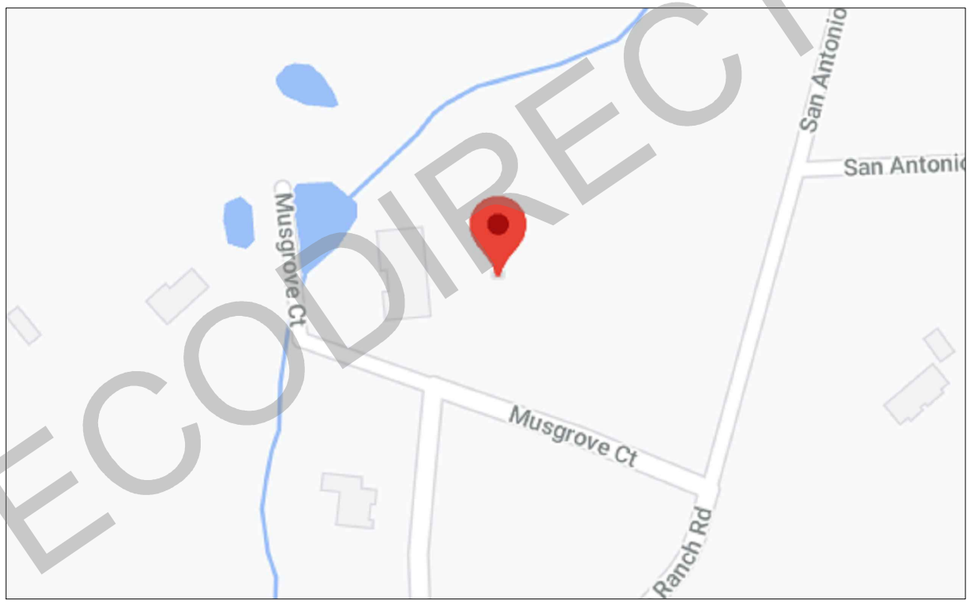
OWNER NAME RESIDENCE : PROJECT ADDRESS
27.6 KW DC GROUND MOUNTED PHOTOVOLTAIC SYSTEM

EQUIPMENT SUMMARY :

80 NO'S - HANWHA Q.PLUS-L-G4.2-345 345W MODULES
02 NO'S - FRONIUS PRIMO 15.0-1 INVERTERS
01 NO'S - SIGINEER HP15048D INVERTERS

SHEET INDEX :



VICINITY MAP

SINGLE FAMILY RESIDENCE

PROPERTY ADDRESS :

OWNER / INSTALLER :

OWNER / INSTALLER:

PROPERTY ADDRESS:

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ELECTRICAL CONSTRUCTION GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NEC (NATIONAL ELECTRIC CODE), NFPA (NATIONAL FIRE PROTECTION ASSOCIATION), AND ALL APPLICABLE LOCAL, STATE AND FEDERAL CODES, LAWS AND REGULATIONS.

2. ALL WORK SHALL CONFORM TO APPLICABLE STATE AND FEDERAL SAFETY CODES INCLUDING OSHA . NO 'HOT' WORK IS AUTHORIZED. ALL 'HOT WORK SHALL BE APPROVED IN WRITING WITH THE GENERAL CONTRACTOR AND OWNER.

3. WORK UNDER THIS CONTRACT SHALL INCLUDE, BUT NOT BE LIMITED TO, FURNISHING, INSTALLING AND CONNECTION OF ALL ELECTRICAL EQUIPMENT AND TESTING OF ALL SYSTEMS AND SUB-SYSTEMS WITHIN THE SCOPE OF THIS CONTRACT. ANY ERRORS, OMISSION, OR UNCERTAINTY SHALL BE BROUGHT TO THE ATTENTION OF THE PRIME CONTRACTOR AND OR OWNER PRIOR TO CONSTRUCTION.

4. COORDINATE ALL WORK WITH ARCHITECTURAL, MECHANICAL AND STRUCTURAL DRAWINGS. INSTALL ALL WORK TO CLEAR NEW AND EXISTING ARCHITECTURAL AND STRUCTURAL MEMBERS. NO ITEM SUCH AS PIPE, DUCT, ETC. SHALL BE IN CONTACT WITH ANY ELECTRICAL EQUIPMENT.

5. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY AND SECURITY OF THE WORKSITE. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

6. DO NOT SCALE DRAWINGS. LARGER SCALE DRAWINGS HAVE PRECEDENCE OVER SMALL SCALE DRAWINGS. SPECIFICATIONS HAVE PRECEDENCE OVER DRAWINGS. NOTIFY THE PRIME CONTRACTOR IMMEDIATELY AFTER DISCOVERY OF ANY DISCREPANCY BETWEEN DRAWINGS, SPECIFICATIONS OR FIELD CONDITIONS.

7. NOTIFY THE PRIME CONTRACTOR OR OWNER IMMEDIATELY AFTER DISCOVERING ANY HAZARDOUS MATERIAL.

8. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. VERIFY THE EXACT LOCATIONS AND CONDITIONS OF ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS PRIOR TO ANY WORK. LOCATIONS FOR EQUIPMENT SHALL BE TAKEN FROM THE OTHER SHEETS WHERE THEY OCCUR. EXTEND WIRING FROM ALL JUNCTION BOXES, CONTROL PANELS, PUMPS, RECEPTACLES, SWITCHES, ETC. AND MAKE ALL FINAL CONNECTIONS TO EQUIPMENT AS REQUIRED.

9. THE INTENT OF THESE DRAWINGS IS FOR A COMPLETE ELECTRICAL SYSTEM. ANY ERRORS OR UNCERTAINTY SHALL BE BROUGHT TO THE ATTENTION OF THE PRIME CONTRACTOR AND ENGINEER AS SOON AS FOUND.

10. THE COMPLETE ELECTRICAL INSTALLATION SHALL BE TESTED AS A COMPLETE WORKING SYSTEM.

11. RESTORE ALL DAMAGES RESULTING FROM WORK AND LEAVE PREMISES IN CLEAN CONDITION WHEN FINISHED WITH WORK.

12. ALL TYPES OF SWITCHES, RECEPTACLES, WALL PLATES AND LIGHTING FIXTURES SHALL BE AS APPROVED BY PRIME CONTRACTOR OR OWNER. VERIFY MATERIALS AND COLOR AND LOCATIONS, SUBMIT CATALOG CUTS OR SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT.

13. ALL ITEMS ARE NEW UNLESS NOTED AS EXISTING (E).

14. REMOVE ALL INDICATED ITEMS. REMOVE ALL EXPOSED CONDUITS. REMOVE WIRES TO NEAREST CONCEALED JUNCTION BOX OR PANEL. ABANDON IN PLACE EXISTING UNUSED CONCEALED CONDUITS NOT EXPOSED BY CONSTRUCTION.

15. ALL EQUIPMENT SHALL BE SECURED IN ACCORDANCE WITH GOVERNING SEISMIC REGULATIONS. PROVIDE EXPANSION AND DEFLECTION FITTINGS IN CONDUITS REQUIRED BY CEC (CALIFORNIA ELECTRIC CODE).

16. FIRE STOP ALL PENETRATIONS THROUGH FIRE RATED SURFACES. SEE DETAIL D/E5.

17. PROVIDE GROUND ROD, GROUNDING ELECTRODE AND BONDING FOR ALL SERVICE ENTRANCE EQUIPMENT, BUILDING STRUCTURAL STEEL, COLD WATER PIPE AND TRANSFORMER PER CEC (CALIFORNIA ELECTRIC CODE) 6' MIN. APART.

18. ALL NEW CIRCUIT BREAKER SHALL BE RATED 10,000 AIC OR HIGHER UNO.

19. ALL CONDUITS SHALL BE EMT, INTERMEDIATE METAL CONDUIT, OR RIGID STEEL. MINIMUM SIZE SHALL BE 1/2". ALL CONDUIT, BOXES AND ELECTRICAL FITTINGS SHALL BE STEEL.

20. DO NOT USE THE WORKING SPACE WITHIN ANY EXIT SIGN OR ASSOCIATED JUNCTION BOX FOR ANY OTHER CIRCUIT.

21. PROVIDE EXPANSION AND DEFLECTION FITTINGS IN CONDUITS CROSSING BUILDING EXPANSION AND SEISMIC JOINTS. SEE DETAIL E/E5.

22. PROVIDE JUNCTION AND/OR PULL BOXES WHEN NECESSARY OR REQUIRED BY CEC.

23. ALL CONDUCTORS SHALL BE COPPER, THHN, #12 AWG MINIMUM. UNLESS IN A WET LOCATION IN WHICH CASE THWN SHALL BE USED.

24. INSTALL GREEN INSULATED GROUND WIRE IN ALL CIRCUITS. SIZE PER NEC REQUIREMENTS OR THE SAME AS PHASE CONDUCTORS WHICH EVER IS LARGER. UNLESS INDICATED OTHERWISE.

25. ALL NEW WIRING, CONDUIT, AND JUNCTION BOXES SHALL BE CONCEALED WITHIN NEW WALLS, CEILINGS OR FLOOR SPACES. SURFACE MOUNT CONDUIT ON OLD WALLS AND CEILINGS. RUN ALL SURFACE RACEWAY TIGHT TO STRUCTURE, PARALLEL TO BUILDING LINES.

26. PAINT ALL EXPOSED ELECTRICAL CONDUITS AND BOXES, PATCH AND PAINT ALL SCUFF MARKS AND/OR DAMAGE RESULTING FROM CONSTRUCTION. SELECT NEW PAINT COLOR TO MATCH EXISTING PAINT COLOR.

27. NO FOREIGN EQUIPMENT SHALL BE LOCATED WITHIN THE SPACE ABOVE OR BELOW ELECTRIC PANELS

28. PROVIDE SIGNAGE ON ALL ELECTRIC PANELS TO KEEP THE SPACE 36" IN FRONT OF THE PANELS FREE OF OBSTRUCTIONS.

29. PROVIDE WARNING LABEL ON ALL PANELS "WARNING, ELECTRICAL ARC FLASH HAZARD, PERSONAL PROTECTION, EQUIPMENT REQUIRED, FAILURE TO COMPLY CAN RESULT, IN INJURY OR DEATH, REFER TO NFPA 70E."

30. UPDATE PANEL BOARD DIRECTORY AS CIRCUITS ARE INSTALLED. PREPARE NEW TYPE WRITTEN PANEL SCHEDULES.

31. ALL EXTERIOR EQUIPMENT SHALL BE IN WEATHERPROOF (NEMA 3R) ENCLOSURES. ALL NEW WIRING SHALL BE IN CONDUIT, SUITABLE FOR SUN EXPOSURE AND WET LOCATIONS. FIELD APPLIED COATING ARE NOT ACCEPTABLE.

32. DC SOLAR POWER SHALL BE NEGATIVELY GROUNDED.

33. ALL MARKING SHALL BE PER CODE REQUIREMENTS.

34. INVERTERS MUST COMPLY WITH UL 1741 TO PREVENT ISLANDING ON POWER FAILURE. THE INVERTER SHALL PUT NOT POWER ON TO THE GRID IF THE GRID IS OFF-LINE.

35. NOTHING IN THESE PLANS SHALL BE CONSTRUED TO CONTRADICT NEC, UL OR LOCAL CODES.

36. ALL SYSTEM COMPONENTS (MODULES AND INVERTERS ETC) SHALL BE UL LISTED.

37. MOUNT TO ROOF USING UL APPROVED MOUNTING HARDWARE. FOLLOWING MANUFACTURERS DIRECTIONS. MOUNTING HARDWARE EVERY 4' ON CENTER UNLESS OTHERWISE NOTED.

38. MARK ALL DC CONDUIT "CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED". MARK ALL DISCONNECTS INCLUDING DISCONNECTS INCLUDED IN INVERTERS WITH "CAUTION: SOLAR CIRCUIT DISCONNECT". MARK THE MAIN SERVICE WITH "CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED". USE DURABLE MARKING WITH 3/8" WHITE LETTERS ON RED BACKGROUND.

39. MARK THE NEC REQUIRED CLEAR SPACE ON THE FLOOR IN FRONT OF ALL DEVICES BEING INSTALLED.

40. SUPPORT ALL ROOF MOUNTED CONDUIT WITH FOAM 'SLEEPERS' IN UL APPROVED SYSTEM.

41.OBTAIN THE BEST INFORMATION ON UNDERGROUND UTILITIES IN AREAS BEING TRENCHED. USE 'DIG ALERT' OR OTHER LOCATING SERVICE BEFORE DIGGING.

42.SOLAR PANELS SHALL NOT BE INSTALLED OVER ANY PLUMBING OR MECHANICAL VENTS, EXHAUSTS OR CHIMNEYS.

43.REMOVAL OF INVERTER, METER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PHOTOVOLTAIC SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTOR.

44.All PV MODULES AND ASSOCIATED EQUIPMENT SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE, AND ACCESS BY UNQUALIFIED PERSONS.

45.NO PLASTIC ZIP TIES

STORM WATER PREVENTION NOTES:

STORM WATER POLLUTION PREVENTION DEVICES AND PRACTICES SHALL BE INSTALLED AND/OR INSTITUTED AS NECESSARY TO ENSURE COMPLIANCE WITH THE CITY WATER QUALITY STANDARDS CONTAINED IN LOCAL REGULATIONS, FEDERAL REGULATIONS AND ANY EROSION CONTROL PLAN ASSOCIATED WITH THIS PROJECT. ALL SUCH DEVICES AND PRACTICES SHALL BE MAINTAINED, INSPECTED AND/OR MONITORED TO ENSURE ADEQUACY AND PROPER FUNCTION THROUGHOUT THE DURATION OF THE CONSTRUCTION PROJECT.

COMPLIANCE WITH THE WATER QUALITY STANDARDS AND ANY EROSION CONTROL PLAN ASSOCIATED WITH THIS PROJECT INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. ALL POLLUTANTS SHALL BE RETAINED ON SITE UNTIL PROPERLY DISPOSED OF, AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES OR WIND.

2. STOCKPILES OF CONSTRUCTION-RELATED MATERIALS SHALL BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY FORCES OF WIND OR WATER FLOW.

3. TRASH AND CONSTRUCTION SOLID WASTES SHALL BE DEPOSITED INTO COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.

VISIBILITY FROM ADJACENT PROPERTY:

1. THE SOLAR PANELS MAY BE VISIBLE FROM ADJACENT PROPERTIES. PAINT ALL STRUCTURAL ELEMENTS TO MATCH THE EXISTING ROOFING.

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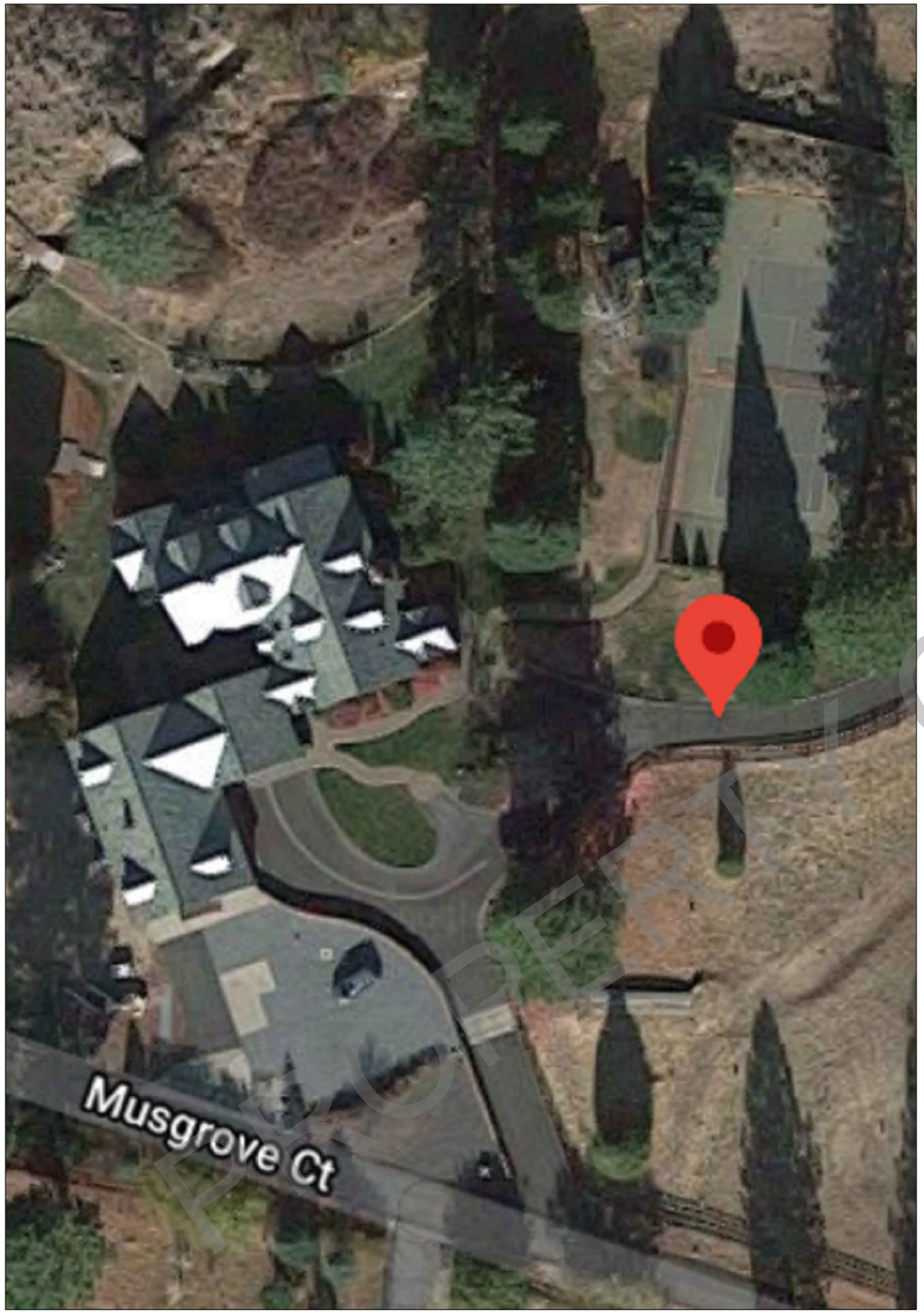
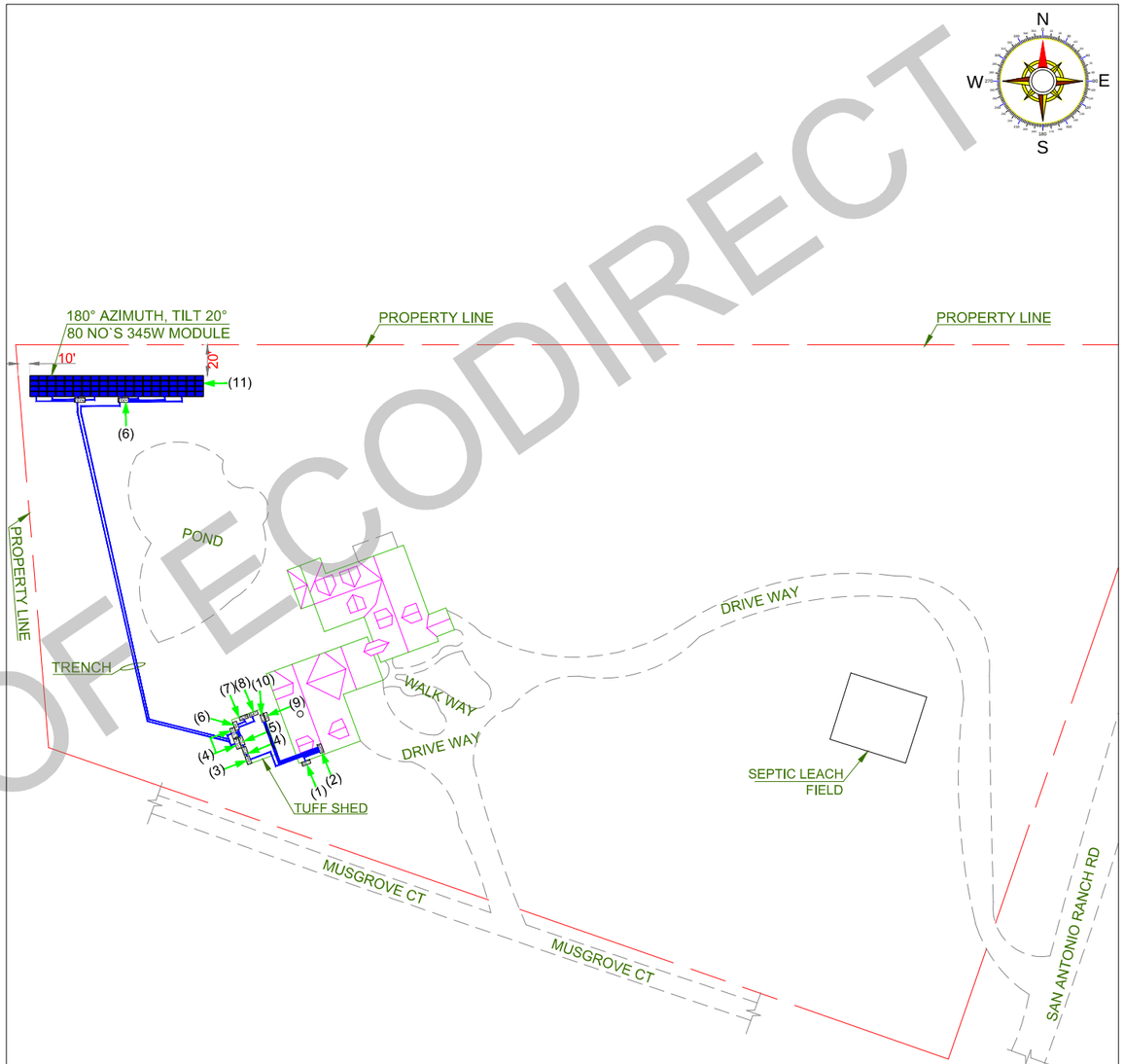


PROPERTY MAP



LEGEND:-

(1) Utility Meter
(2) Main Service Panel
(3) REC Meter
(4) AC Disconnect
(5) AC Combiner Panel
(6) Inverter
(7) Sub Panel
(8) Battery
(9) Generator
(10) Auto Transfer Switch
(11) Solar Panel

PROPERTY LAYOUT

OWNER / INSTALLER:

PROPERTY ADDRESS:

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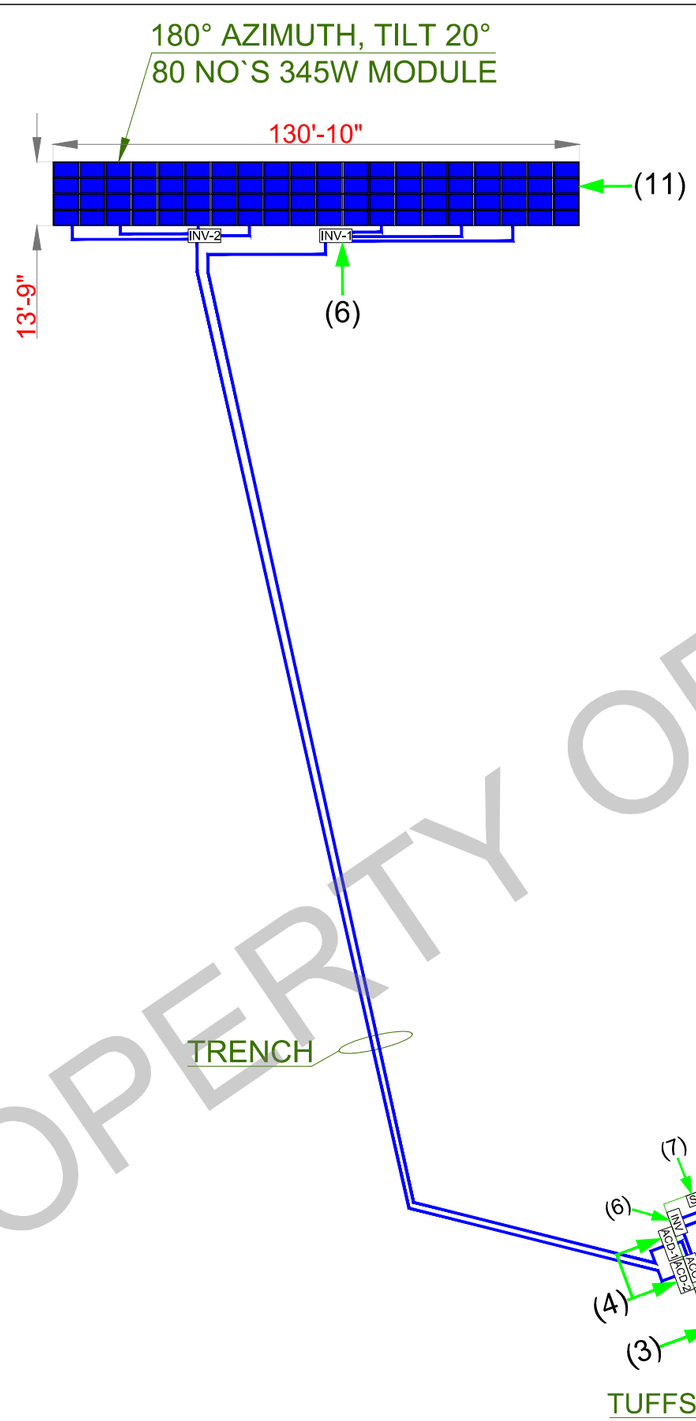

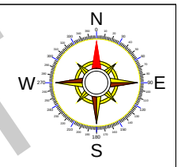

LEGEND:-

(1) Utility Meter
(2) Main Service Panel
(3) REC Meter
(4) AC Disconnect
(5) AC Combiner Panel
(6) Inverter
(7) Sub Panel
(8) Battery
(9) Generator
(10) Auto Transfer Switch
(11) Solar Panel

PV LAYOUT

OWNER / INSTALLER:

PROPERTY ADDRESS:

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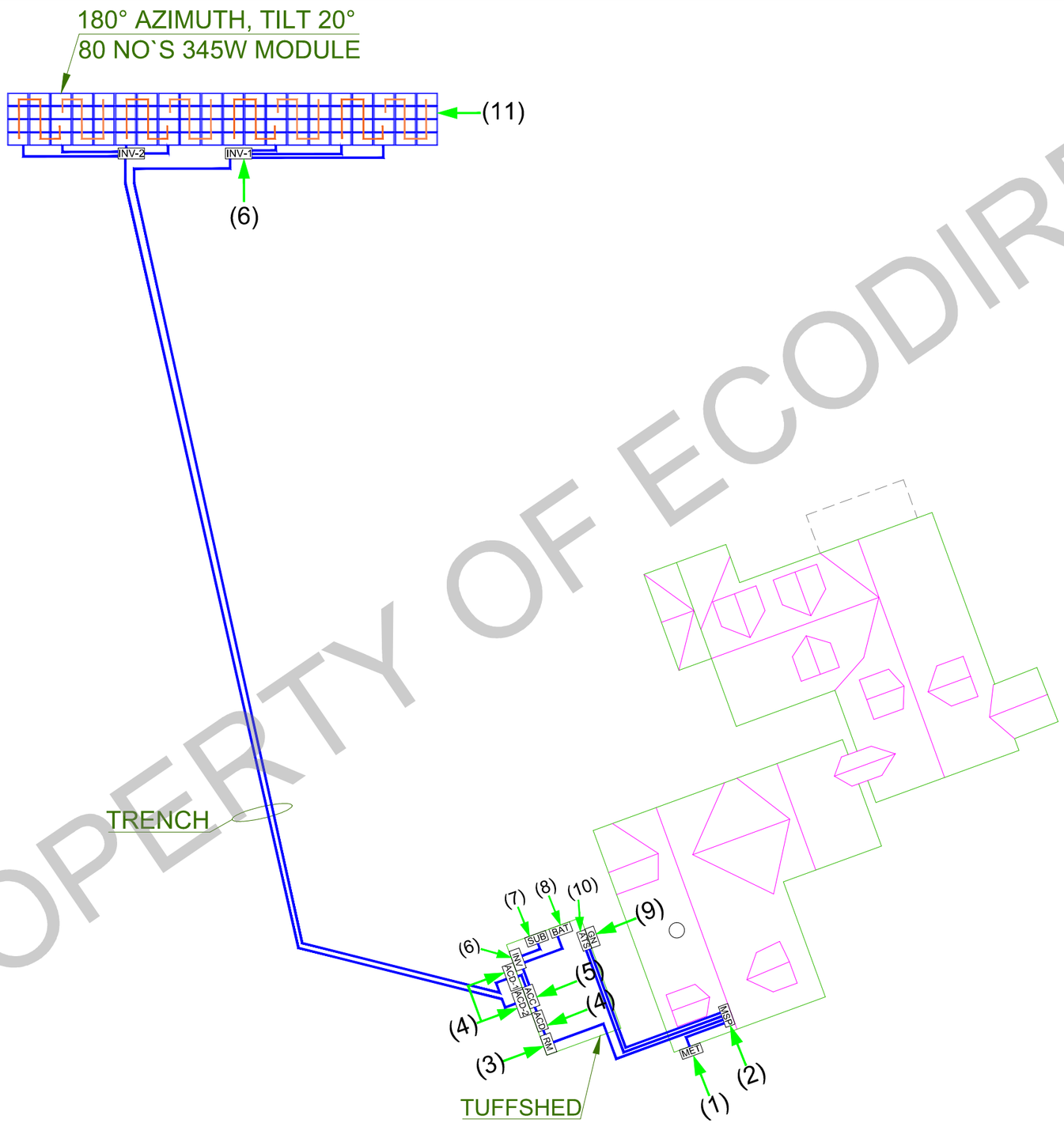

LEGEND:-

(1)	Main Service Panel
(2)	Inverter
(3)	AC Disconnect
(4)	Battery Combiner Box
(5)	Battery
(6)	Generator
(7)	PV Modules
(8)	Sub Panel
(9)	Main Pane
(10)	Auto Transfer Switch

STRING LAYOUT

OWNER / INSTALLER:

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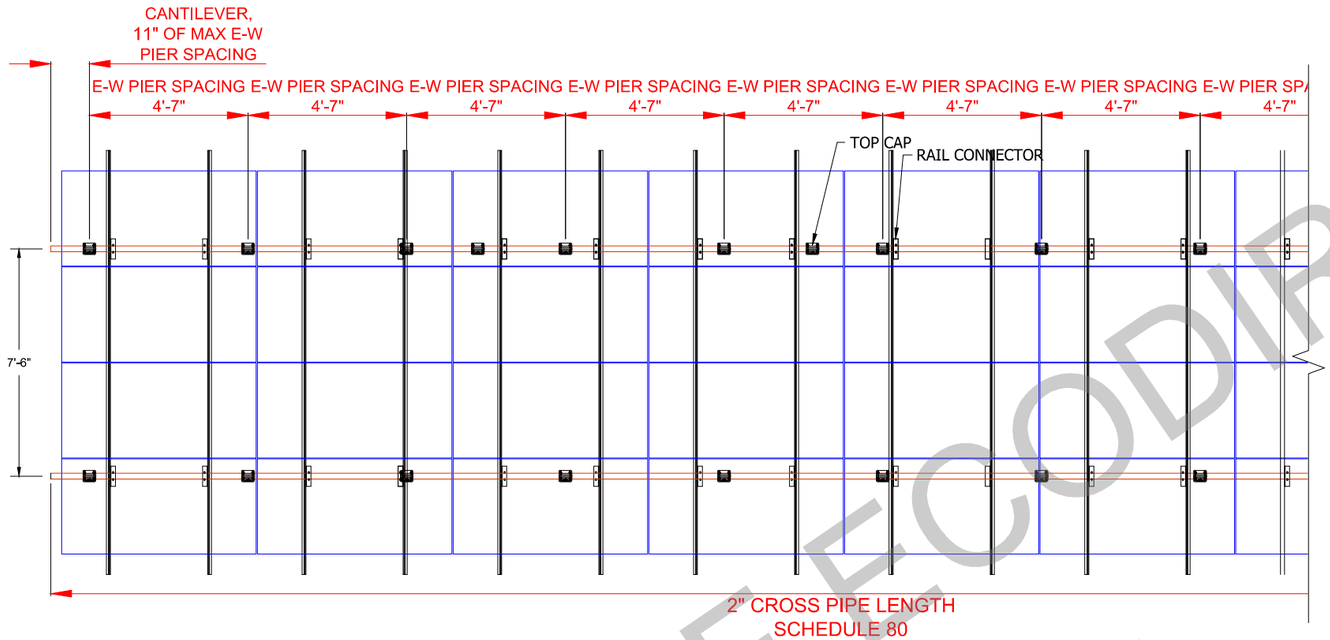
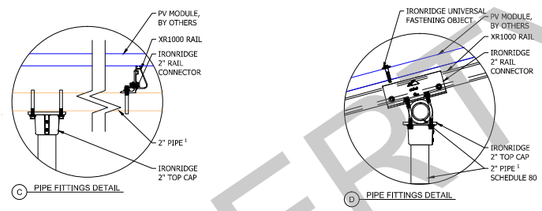
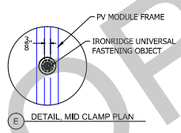


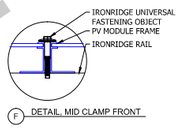


C PIPE FITTINGS DETAIL

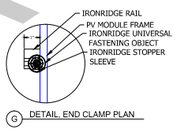
D PIPE FITTINGS DETAIL



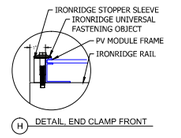
E DETAIL, MID CLAMP PLAN



F DETAIL, MID CLAMP FRONT



G DETAIL, END CLAMP PLAN



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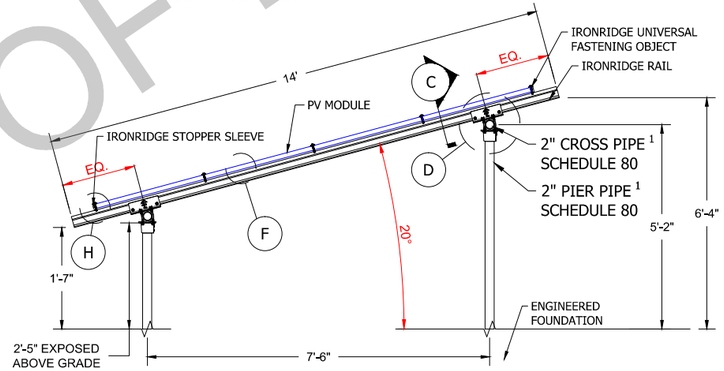
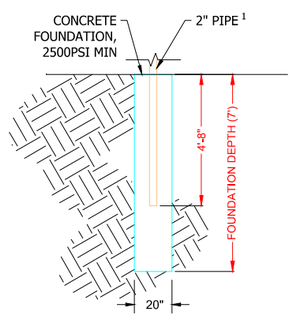
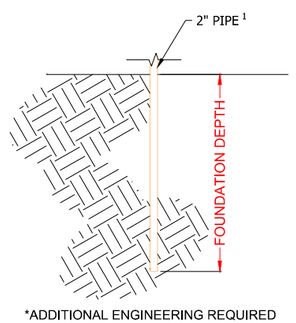
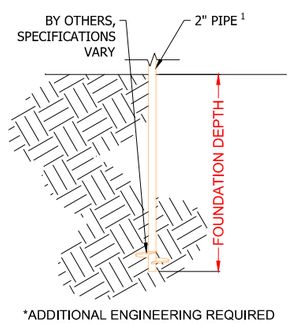




DRILL/POUR FOUNDATION



*ADDITIONAL ENGINEERING REQUIRED
DRIVEN PIER FOUNDATION



*ADDITIONAL ENGINEERING REQUIRED
HELICAL PILE FOUNDATION

*ADDITIONAL ENGINEERING REQUIRED

ATTACHMENT DETAILS

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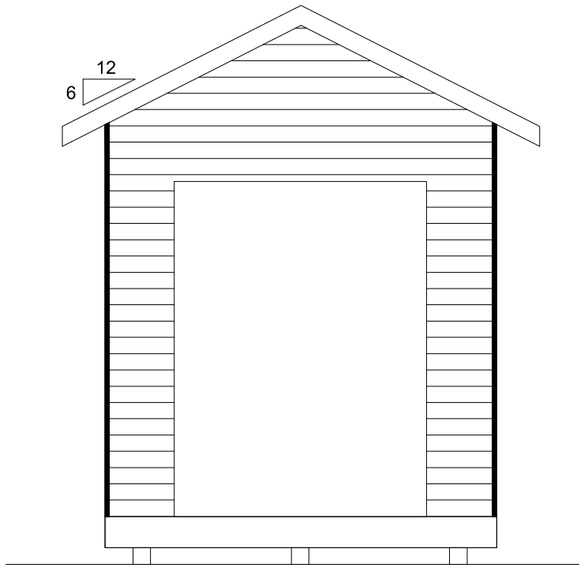
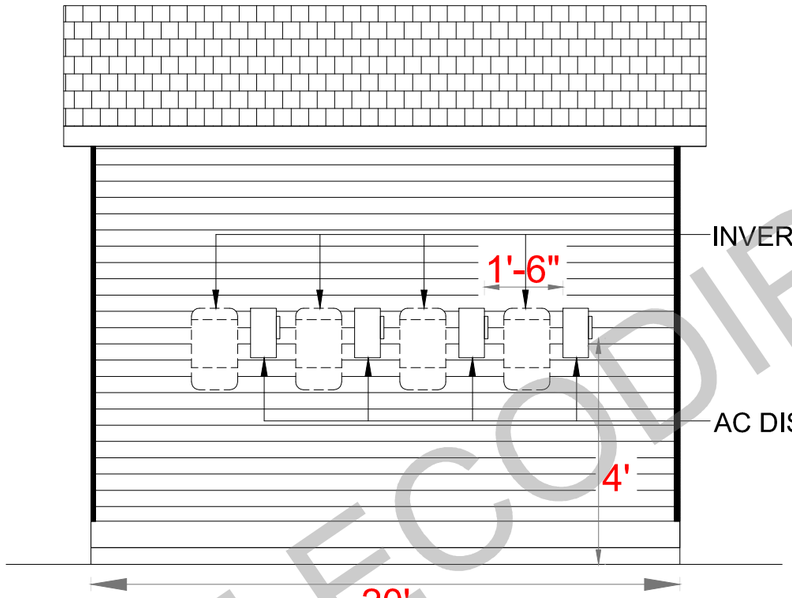
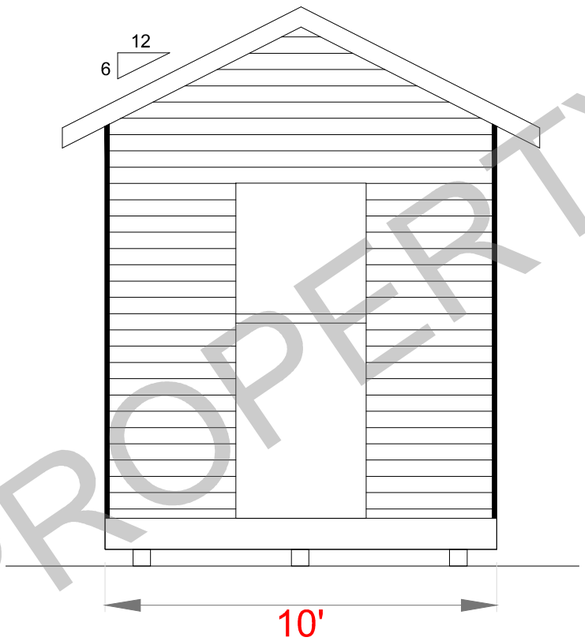


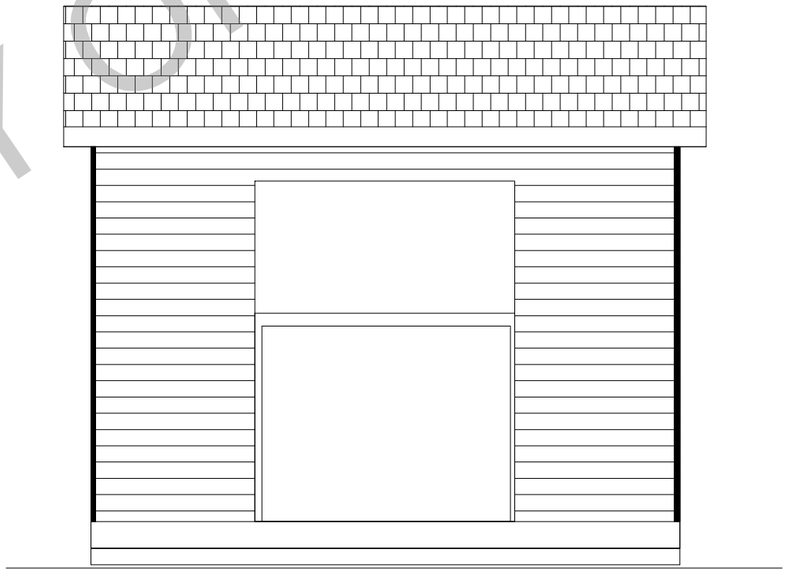
FRONT ELEVATION



LEFT SIDE ELEVATION



REAR ELEVATION



RIGHT SIDE ELEVATION

TUFF SHED-ELEVATION VIEW

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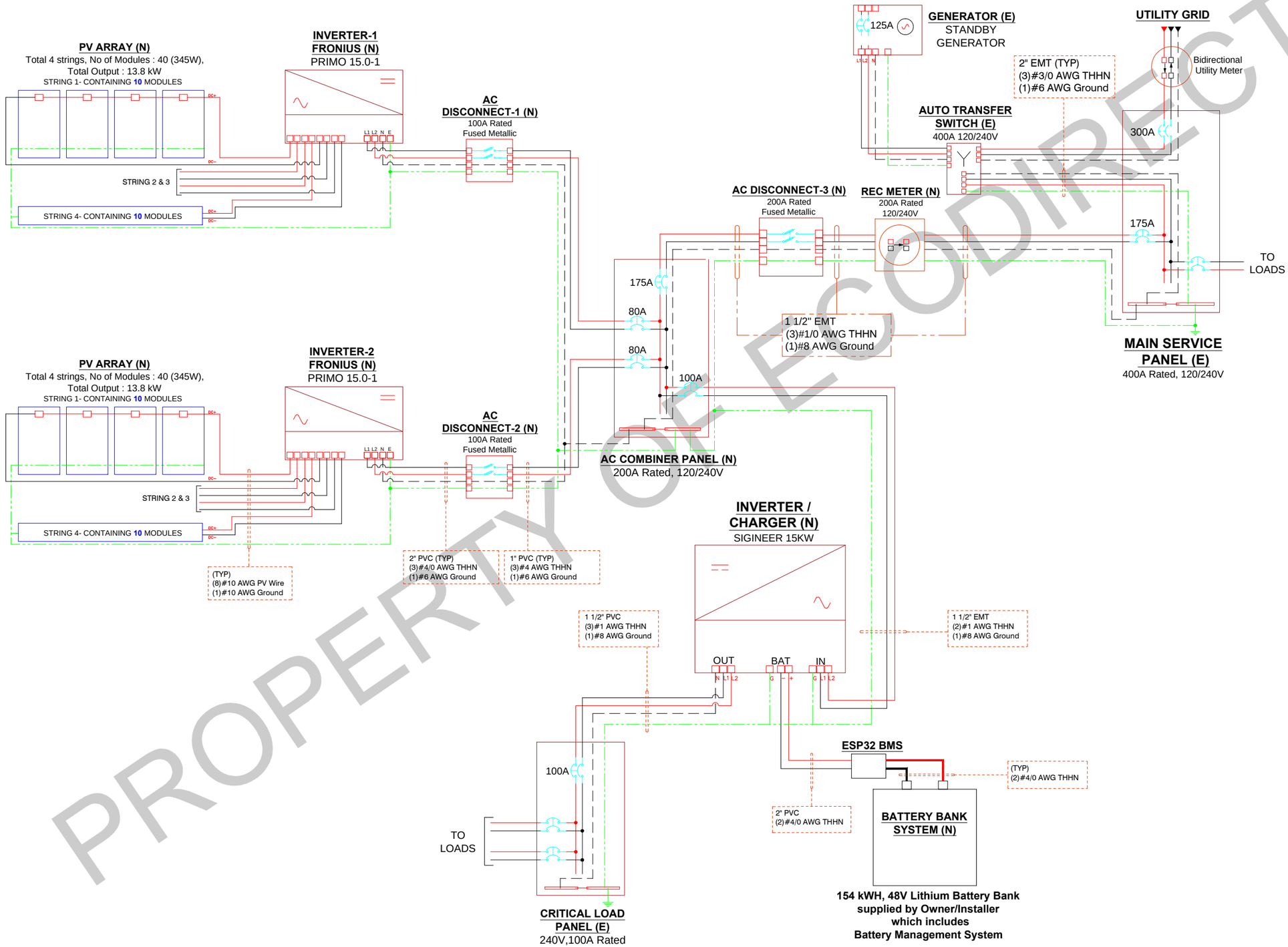
27.6 kW DC PROPOSED PV SYSTEM THREE LINE DIAGRAM



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WIRING AND CONDUIT SCHEDULE

DC SCHEDULE

ITEM		DESCRIPTION	ID	QTY	Voc (V)	Vmpp (V) STC	Impp (A) STC	ISC (A) STC	Max Circuit current (A)	Nominal Power	Minimum Ampacity (A)	Adjusted Ampacity (A)	OCPD rating (A)	Multiple conductor Derate	Temperature Derate	Max ONE WAY LENGTH (ft)	WIRE SIZE	Wire Ampacity (A)	Derated Ampacity (A)	GROUND	WIRE TYPE	R/1000FT	V LOSS %	TEMP MAX	TOTAL NO OF CONDUCTORS	NO. OF CURRENT CARRYING CONDUCTORS	CONDUIT
1	MODULE	HANWA Q CELLS		80	47.46	37.93	9.09	9.64	12.05	345	15.1	16.0	20	1.00	1	3.94	#10 AWG	35	35	#6 Bare	PV	1.24	0.02%	52 C	2	2	N/A
2	STRING WIRING	MODULE TO INVERTER (e.g: PV MODULES CONNECTED IN SERIES FOR ONE STRING)	A	4	474.6	379.3	9.09	9.64	12.05	3450	15.1	22.9	20	0.70	1	15	#10 AWG	40	28	#6 Bare	PV	1.24	0.31%	52 C	8	7	N/A
3		MODULE TO INVERTER	B	1	474.6	379.3	9.09	9.64	12.05	3450	15.1	22.9	20	0.70	1	15	#10 AWG	40	28	#10 AWG	PV	1.24	0.31%	52 C	8	7	N/A

		DESCRIPTION	ID	QTY	V nom (V)	I A/H	Multiple conductor Derate	Temperature Derate	Max ONE WAY LENGTH (ft)	WIRE SIZE	Wire Ampacity (A)	Derated Ampacity (A)	GROUND	WIRE TYPE	R/1000FT	TEMP MAX	TOTAL NO OF CONDUCTORS	NO. OF CURRENT CARRYING CONDUCTORS	CONDUIT
4		BATTERY BANK	C	1	48	154	1.0	1	5	#4/0 AWG	260	260	#6 AWG	THHN	0.06	28 C	2	2	N/A
5		INVERTER TO BATTERY BANK	D	1	48	154	1.0	1	20	#4/0 AWG	260	260	#6 AWG	THHN	0.06	28 C	2	2	2" PVC Min
					Total Nominal Power	27600									Total	0.65%			

AC SCHEDULE

ITEM		DESCRIPTION	ID	QTY	VOLTAGE (V)	Max Circuit Current (A)	Power	Minimum Ampacity (A)	Adjusted Ampacity (A)	OCPD rating (A)	Multiple conductor Derate	Temperature Derate	Max ONE WAY LENGTH (ft)	Wire Size	Wire Ampacity (A)	Derated Ampacity (A)	GROUND	WIRE TYPE	R/1000FT	V LOSS %	TEMP MAX	TOTAL NO OF CONDUCTORS	NO. OF CURRENT CARRYING CONDUCTORS	CONDUIT
7		INVERTER TO AC DISCONNECT	E	2	240	62.5	15000	78.1	83.1	80	1.00	0.96	500	#4/0 AWG	260	249.6	#6 AWG	THHN	0.06	1.58%	30 C	4	2	2 1/2" PVC Min
8		AC DISCONNECT TO AC COMBINER PANEL	F	2	240	62.5	15000	78.1	83.1	80	1.00	0.96	5	#4 AWG	95	91.2	#8 AWG	THHN	0.31	0.08%	30 C	4	2	1" EMT Min
9		AC COMBINER PANEL TO AC DISCONNECT TO MAIN SERVICE PANEL	G	1	240	125	-	156.3	166.2	175	1.00	0.96	10	#1/0 AWG	170	163.2	#8 AWG	THHN	0.12	0.13%	30 C	4	2	1 1/2" EMT Min
10		AC COMBINER PANEL TO INVERTER	H	1	240	80	-	100.0	106.4	100	1.00	0.96	5	#1 AWG	150	144	#6 AWG	THHN	0.04	0.01%	30 C	4	2	1 1/2" EMT Min
11		INVERTER TO CRITICAL LOAD PANEL	I	1	240	80	-	100.0	106.4	100	1.00	0.96	5	#1 AWG	150	144	#8 AWG	THHN	0.15	0.05%	30 C	4	2	1 1/2" PVC Min
12		MAIN SERVICE PANEL TO AUTO TRANSFER SWITCH	J	2	240	240	-	300.0	319.1	300	1.00	0.96	5	#3/0 AWG	225	216	#6 AWG	THHN	0.08	0.08%	30 C	4	2	2" EMT Min
						Total Nominal Power	30000												AC DROP	1.93%				

BILL OF MATERIAL

REF. DES.	QTY.	MANUFACTURER	MODEL NUMBER	DESCRIPTION						
SOLAR MODULES	80	HANWA Q CELLS	Q.PLUS L-G4.2 345	SOLAR PANEL	345	W	1000	V (UL)		
		NOTES: 1. TYPE-1 UL 1703 class C								
INVERTER	2	FRONIUS PRIMO	PRIMO 15.0-1	INVERTER	15	Kw	NEMA 4X		240	V AC
		NOTES: 1. UL1741, UL 1998, UL 1699B, IEEE 1547 2. DC INPUT WIRE RANGE (2) #12 to #2; AC OUTPUT WIRE RANGE (3) #12								
INVERTER	1	SIGINEER	HP15048D	INVERTER	15	Kw	NEMA 3R		240	V AC
		NOTES: 1. UL1741, UL 1998, UL 1699B, IEEE 1547 2. DC INPUT WIRE RANGE (2) #12 to #2; AC OUTPUT WIRE RANGE (3) #12								
AC DISCONNECT	2, 1	TBD	TBD	AC DISCONNECT	100, 200	A				
		NOTES: 1. UL1741, INPUT WIRE RANGE 12 AWG 2 AWG; OUTPUT WIRE RANGE IS 12 AWG to 2 AWG								
CRITICAL LOAD PANEL	1	TBD	TBD	CRITICAL LOAD PANEL, NEMA 3R ENCLOSURE	100	A	1	Ph	240	V AC
MSP	1	TBD	TBD	MAIN SERVICE PANEL, NEMA 3R ENCLOSURE	400	A	1	Ph	240	V AC
		NOTES: 1. USED AS PV UTILITY/SERVICE DISCONNECT 2. LOCKABLE HEAVY DUTY SWITCH WITH VISIBLE CONTACTS, UL LISTED								
BATTERY	1	LITHIUM BATTERY	TBD	BATTERY	154	KWH				

System Configuration

Number of strings	8	No's
Number of Modules	80	No's
Modules Per string	8 X 10	
Number of Inverter	3	No
Module Model	Q.PLUS L-G4.2 345	
Inverter Model	SMA 7.0-US & HP15048D	
PV Service Disconnect	175	A
DC Watts STC	27600	W
Max AC output Current	125	A
Operating AC Voltage	240	V

Inverter Rating Specs

FRONIUS PRIMO	PRIMO 15.0-1	
Nominal Input	51	A DC
Max.Short Circuit I/P	63.75	A DC
Output Voltage	240	V AC
Imax	62.5	A AC
Inec	78.125	A (@125%)
Outdoor	NEMA 4X	Enclosure
UL1741 / IEEE 1547		

PV System DC Disconnect

Operating Current	4 X 9.09	A DC
Operating Voltage	680	V DC
Max.System Voltage	1000	V DC
Short Circuit Current	4 X 12.05	A DC
Label Located on Inverter / DC Disconnect		

Module Rating Specs

HANWA Q CELLS		
Q.PLUS L-G4.2 345		
Pmax -	345	Wp
Vmp -	37.93	V
Imp -	9.09	A
Voc -	47.46	V
Isc -	9.64	A

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SYSTEM LABELING DETAIL:

All Plaques and signage required by the 2016 edition will be installed as required. Placards consist of white lettering on red background with text written in capitol lettering a minimum of 3/8" in height on plastic Engraved placards.

Alternate Power Source Placard shall be metallic or plastic with engraved or machine printed letters in a contrasting color to the plaque, include the location of meter, disconnects, inverter, the array and a footprint of the entire building and site. This plaque will be attached by pop rivets, screws or other approved fasteners. If exposed to sunlight, it shall be UV resistant.

Photovoltaic DC conductors entering the building shall be installed in a metallic raceway and shall be identified every 5 feet -- and within 1 foot of turns or bends and within 1 foot above and below penetrations of roof/ceiling assemblies, walls, or barriers labeled

"Caution Solar Circuit" or equivalent Examples of all required warning labels per NEC and CEC 690 below:

SIGNAGE REQUIREMENT :

RED BACKGROUND .WHITE LETTERING. ("WARNING"-3/8" LETTERS).ALL CAPITAL LETTERS.ARIAL OR SIMILAR FONT . WEATHER - RESISTANT MATERIAL,UL 969.

DC DISCONNECT WARNING

PHOTOVOLTAIC SYSTEM
DC DISCONNECT

OPERATING VOLTAGE	474.6	Vdc
OPERATING CURRENT	36.36	Adc
MAX SYSTEM VOLTAGE	1000	Vdc
SHORT CIRCUIT CURRENT	48.2	Adc

WARNING
ELECTRIC SHOCK HAZARD

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

PER NEC 680.14(C)(2), 680.17(4),680.54

Per NEC 690.53
operating voltage,operating current ,max system voltage short circuit current and maximum output current of the charge controller if one is installed

PLACE ON : Main Solar Disconnect

PHOTOVOLTAIC SYSTEM DISCONNECT

"PV System Disconnect " label NEC 690.14(C)(2) Required Disconnect Markings

AC DISCONNECT WARNING

PHOTOVOLTAIC SYSTEM
AC DISCONNECT

OPERATING VOLTAGE	240	VAC
OPERATING CURRENT	125	Amps

WARNING
ELECTRIC SHOCK HAZARD

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

PER NEC 680.14(C)(2), 680.17(4),680.54

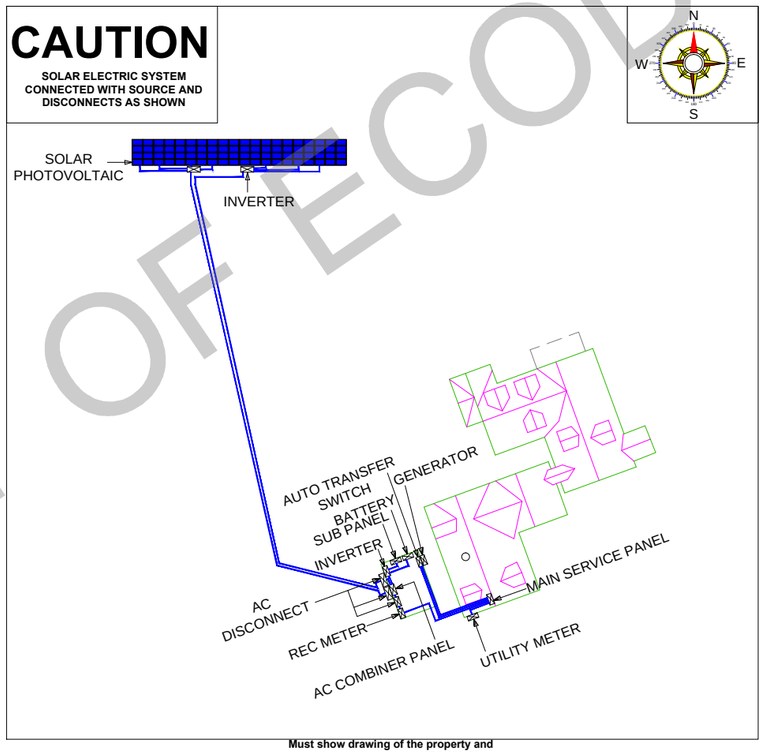
Per NEC 690.54
operating voltage,operating current

PLACE ON: Inverter Breaker Panel if sum of breaker exceeds panel rating

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE
THIS OVER CURRENT DEVICE

Inverter output connection *label NEC 705.12(7) Point Of Conection

CAUTION
SOLAR ELECTRIC SYSTEM CONNECTED WITH SOURCE AND DISCONNECTS AS SHOWN



Must show drawing of the property and equipment layout .per NEC 690.56

WARNING
INVERTER OUTPUT CONNECTION
SOURCES : UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

"Dual Power Supply" label NEC 690.64,705.12(4) point of connection

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

"Don Not Touch terminals" labels NEC 690.17(4) Switch or Circuit Breaker

THIS ELECTRIC SYSTEM
PHOTOVOLTAIC SYSTEM
IS ALSO SERVED BY A

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

MAIN SERVICE PANEL (SSC)
A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTLITY) SIDE OF THE SERVICE DISCONNECTING MEANS. FOLLOW PROPER LOCK-OUT/TAG-OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE

DC LABELS

PLACE ON 1.DC Junction Boxes 2.DC Combiner Boxes

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

"Electric Shock Hazard" label NEC 690.35(F) ungrounded PV system

PLACE ON 1.DC Junction Boxes 2.DC Combiner Boxes

PHOTOVOLTAIC POWER SOURCE

"PV Power Source " Label. NEC 690.31(E)(3) DC-PV Source Conductor

OTHERS

PLACE ON:All DC Source Markings and System Output Conductor Raceways

CAUTION SOLAR CIRCUIT

"Caution Solar Circuit "Label NEC 690.4(F),690.31(E)(4) place on conduit every 10 feet IFC 605.11.1.1 & IFC 605 .11.2 *MUST BE REFLECTIVE IF INDOORS OR IN ATTIC

PLACE ON : Next to inverter interconnection Breaker,Load center, & Service Panel

PV SOLAR BREAKER
DO NOT RELOCATE
THIS OVER CURRENT
DEVICE

PLACE ON : Inverter

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

Label NEC 690.56(C)

PLACE ON : Next GFI Reset

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

"Ground Fault Indicated" label Nec 690.5(C) Ground Fault Protection

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Q.PLUS L-G4.2 335-345

Q.ANTUM SOLAR MODULE

The Q.ANTUM solar module Q.PLUS L-G4.2 is the strongest module of its type on the market globally. Powered by 72 Q CELLS solar cells Q.PLUS L-G4.2 was specially designed for large solar power plants to reduce BOS costs. Only Q CELLS offers German engineering quality with our unique Yield Security.

Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY
Higher yield per surface area and lower BOS costs thanks to higher power classes and an efficiency rate of up to 17.6 %.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (2400 Pa).

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance warranty[2].

EUPD RESEARCH TOP BRAND PV MODULES AUSTRALIA 2016

Q CELLS YIELD SECURITY
- ANTI PID TECHNOLOGY (APT)
- HOT-SPOT PROTECT (HSP)
- TRACEABLE QUALITY (TRA.Q™)

Photon Q CELLS Best polycrystalline solar module 2014 6.PRO-02.235 176 modules tested

[1] APT test conditions: Cells at -1500 V against grounded, with conductive metal foil covered module surface, 25 °C, 168 h
[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

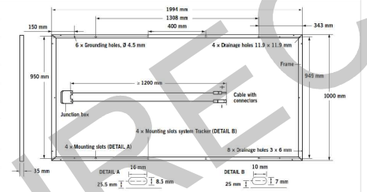
Ground-mounted solar power plants

Engineered in **Germany**

Q CELLS

MECHANICAL SPECIFICATION

Format	1994 mm × 1000 mm × 35 mm (including frame)
Weight	24 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Anodised aluminium
Cell	6 × 12 Q.ANTUM solar cells
Junction box	85-115 × 60-80 × 15-19 mm, Protection class ≥ IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥ 1200 mm, ≥ (-) 1200 mm
Connector	MC4-EVO2, IP68

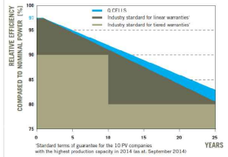


ELECTRICAL CHARACTERISTICS

POWER CLASS			335	340	345
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / -0 W)					
Minimum	Power at MPP[2]	P_{MPP}	335	340	345
	Short Circuit Current*	I_{SC}	9.54	9.59	9.64
	Open Circuit Voltage*	V_{OC}	46.81	47.07	47.46
	Current at MPP*	I_{MPP}	8.97	9.03	9.09
	Voltage at MPP*	V_{MPP}	37.33	37.63	37.93
	Efficiency[2]	η	≥ 16.8	≥ 17.1	≥ 17.3
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NOC[3]					
Minimum	Power at MPP[2]	P_{MPP}	248.4	252.1	255.8
	Short Circuit Current*	I_{SC}	7.69	7.73	7.77
	Open Circuit Voltage*	V_{OC}	43.68	43.92	44.29
	Current at MPP*	I_{MPP}	7.04	7.09	7.14
	Voltage at MPP*	V_{MPP}	35.29	35.56	35.83

[1] 1000 W/m², 25 °C, spectrum AM 1.5G [2] Measurement tolerances STC ±3 %; NOC ±5 % [3] 800 W/m², NOCT, spectrum AM 1.5G * typical values, actual values may differ

Q CELLS PERFORMANCE WARRANTY

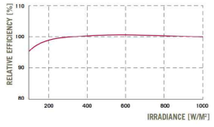


*Standard terms of guaranties for the 10 PV companies with the highest production capacity in 2014 (as at. September 2014)

At least 97 % of nominal power during first year. Thereafter max. 0.6 % degradation per year.
At least 92 % of nominal power up to 10 years.
At least 83 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	-0.29
Temperature Coefficient of P_{MPP}	γ	[%/K]	-0.40	Normal Operating Cell Temperature	NOCT	[°C]	45

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1500 (IEC) / 1500 (UL)	Safety Class	II
Maximum Reverse Current	I_R	[A]	15	Fire Rating	C / TYPE 1
Wind/Snow Load (in accordance with IEC 61215)		[Pa]	2400/5400	Permitted Module Temperature On Continuous Duty	-40 °C up to +85 °C

QUALIFICATIONS AND CERTIFICATES

IEC 61215 (Ed. 2); IEC 61730 (Ed. 1), Application class A
This data sheet complies with DIN EN 50380.

PARTNER

NOTE: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS Australia Pty Ltd
1402, 20 Berry St., North Sydney NSW 2060, Australia | **TEL** +61 (0) 2 9016 3033 | **FAX** +61 (0) 2 9016 3032 | **EMAIL** q-cells-australia@q-cells.com | **WEB** www.q-cells.com.au

Engineered in **Germany**

Q CELLS

MOUNT ACCORDING TO MOUNTING MFG INSTRUCTIONS AND CIVIL/STRUCTURAL DIRECTIONS.

USE FASTENERS SUITABLE TO SURFACE BEING ATTACHED. LAG-SCREWS FOR WOOD, NUTS (LOCKING) AND BOLTS FOR METAL STRUCTURES.

MOUNT 4' ON CENTER UNLESS OTHERWISE NOTED OR REQUIRED TO CONNECT TO STRUCTURAL MEMBERS.

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Pure Sine Wave Inverter/Charger User's Manual(up to 15KW)

Version 5.2 (PN:50000-2018168)

Sigineer Power

Chinese Power Inverter
But Not As We Know It

Get The Perfect Inverter Chargers
For Your Business

Shenzhen Sigineer Power CO.,LTD.
Email: info@sigineer.com
TEL: +86 755 2160 7078
FAX: +86 755 6165 8278
Add: Bld A, Jiali Industrial Zone, Yuanfen Rd, Longhua, Shenzhen, 518100, China

Manufacturer Information

Appendix 1 : High Power Inverter/Charger Spec Sheet

Pure Sine Wave Inverter & Charger Spec Sheet

Electrical Specifications												
	Model	1KW	1.5KW	2KW	3KW	4KW	5KW	6KW	8KW	10KW	12KW	15KW
Inverter Output	Continuous Output Power	1000W	1500W	2000W	3000W	4000W	5000W	6000W	8000W	10000W	12000W	15000W
	Surge Rating(20s)	3000W	4500W	6000W	9000W	12000W	15000W	18000W	24000W	30000W	36000W	45000W
	Capable of Starting Electric Motor	1HP	1.5HP	2HP	3HP	4HP	5HP	6HP	8HP	10HP	12HP	15HP
	Output Waveform	Pure Sine wave/Same as input(Bypass mode)										
	Nominal Efficiency	>88%(Peak)										
	Line Mode Efficiency	>95%										
	Power Factor	0.9-1.0										
	Nominal Output Voltage RMS	100-110-120Vac / 220-230-240Vac										
	Output Voltage Regulation	±10% RMS										
	Output Frequency	50/60Hz ± 0.3Hz										
	Short Circuit Protection	Yes, Current Limit Function (Fault after 1sec)										
	Typical transfer Time	10ms(Max)										
	THD	Typically <7%, Max 10% under full linear load										
DC Input	Nominal Input Voltage	12.0Vdc(*2 for 24Vdc, *4 for 48Vdc)										
	Minimum Start Voltage	10.0Vdc										
	Low Battery Alarm	10.5Vdc / 11.0Vdc										
	Low Battery Trip	10.0Vdc / 10.5Vdc										
	High Voltage Alarm & Fault	16.0Vdc										
	High DC Input Recovery	15.5Vdc										
	Low Battery Voltage Recover	13.0Vdc										
	Idle Consumption-Search Mode	< 25 W when Power Saver On										
Charge	Input Voltage Range	Narrow: 100–135VAC / 194–243VAC; Wide: 90–135VAC / 164–243VAC;										
	Input Frequency Range	Narrow: 47-55±0.3Hz for 50Hz, 57-65±0.3Hz for 60Hz Wide:43±0.3Hz plus for 50Hz/60Hz										
	Output Voltage	Depends on battery type										
	Charger Breaker Rating(230Vac)	10A	10A	10A	20A	20A	30A	30A	40A	40A	40A	40A
	Charger Breaker Rating(120Vac)	10A	20A	20A	30A	40A	63A	63A	N/A	N/A	N/A	N/A
	Max Charge Rate	15A to 120A +/-5A , depending on models										
	Over Charge Protection Shutdown	15.7V for 12Vdc (*2 for 24Vdc, *4 for 48Vdc)										
	Battery type	Fast Vdc					Float Vdc					
	Gel U.S.A	14.0					13.7					
	A.G.M 1	14.1					13.4					
	A.G.M 2	14.6					13.7					
	Sealed Lead Acid	14.4					13.6					

MOUNT ACCORDING TO MOUNTING MFG INSTRUCTIONS AND CIVIL/STRUCTURAL DIRECTIONS.

USE FASTENERS SUITABLE TO SURFACE BEING ATTACHED. LAG-SCREWS FOR WOOD, NUTS (LOCKING) AND BOLTS FOR METAL STRUCTURES.

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	Gel Euro	14.4				13.8						
	Open Lead Acid	14.8				13.3						
	Calcium	15.1				13.6						
	De-sulphation	15.5 for 4hrs										
	Remote Control	Yes. Optional										
Bypass & Protection	Input Voltage Waveform	Sine wave (Grid or Generator)										
	Nominal Voltage	120Vac				230Vac						
	Low Voltage Trip	80V/90V±4%				184V/154V±4%						
	Low Voltage re engage	90V/100V±4%				194V/164V±4%						
	High Voltage Trip	140V±4%				253V±4%						
	High Voltage re engage	135V±4%				243V±4%						
	Max Input AC Voltage	150VAC				270VAC						
	Nominal Input Frequency	50Hz or 60Hz (Auto detect)										
	Low Freq Trip	Narrow: 47±0.3Hz for 50Hz, 57±0.3Hz for 60Hz Wide:40±0.3Hz for 50Hz/60Hz										
	Low Freq re engage	Narrow: 48±0.3Hz for 50Hz, 58±0.3Hz for 60Hz Wide:45±0.3Hz for 50Hz/60Hz										
	High Freq Trip	Narrow: 55±0.3Hz for 50Hz, 65±0.3Hz for 60Hz Wide: No up limit for 50Hz/60Hz										
	High Freq re engage	Narrow: 54±0.3Hz for 50Hz, 64±0.3Hz for 60Hz Wide: No up limit for 50Hz/60Hz										
	Output Short circuit protection	Circuit breaker										
	Bypass breaker rating(230Vac)	10A	15A	20A	30A	30A	40A	40A	50A	63A	63A	100A
	Bypass breaker rating(120Vac)	20A	20A	30A	40A	50A	80A	80A	N/A	N/A	N/A	N/A
Other Features	Auto Generator Start	Available										
	Battery Temp Sensing	Available										
Mechanical Specification	Mounting	Wall mount										
	Inverter Dimensions(L*W*H)	362*173*135mm			505*222*180mm		598*222*180mm		588*415*200mm			706*415*213mm
	Inverter Weight	11KG	13KG	20KG	24KG	29KG	31KG	33KG	60KG	71KG	76KG	85KG
	Shipping Dimensions(L*W*H)	475*230*205mm			670*320*320mm		780*320*320mm		750*520*310mm			880*545*410mm
	Shipping Weight	13KG	15KG	22KG	26KG	32KG	34KG	36KG	72KG	81KG	86KG	92KG
	Display	Status LEDs+LCD										
	Standard Warranty	1 Year										

MOUNT ACCORDING TO MOUNTING MFG INSTRUCTIONS AND CIVIL/STRUCTURAL DIRECTIONS.

USE FASTENERS SUITABLE TO SURFACE BEING ATTACHED. LAG-SCREWS FOR WOOD, NUTS (LOCKING) AND BOLTS FOR METAL STRUCTURES.

MOUNT 4' ON CENTER UNLESS OTHERWISE NOTED OR REQUIRED TO CONNECT TO STRUCTURAL MEMBERS.

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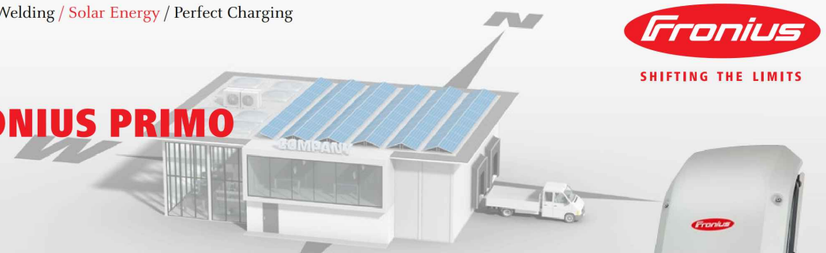
/ Perfect Welding / Solar Energy / Perfect Charging

Fronius

SHIFTING THE LIMITS

FRONIUS PRIMO



/ SnapINverter mounting system

/ Wireless monitoring

/ Open data communication

/ Smart Grid Ready

/ Arc Fault Circuit Interruption

The transformerless Fronius Primo is the ideal compact single-phase inverter for residential and small-scale commercial applications with power categories from 3.8 to 8.2 kW. In accordance with ESA rules for residential applications, the Fronius Primo can operate efficiently at a maximum input voltage of 600 V. And for increased efficiency and additional cost savings for commercial applications, the Fronius Primo can operate at the maximum input voltage of 1,000 V. Industry-leading features now come standard with the Fronius Primo, including: dual maximum power point tracking, arc fault protection, integrated wireless monitoring and SunSpec Modbus interfaces for seamless monitoring and datalogging via Fronius' online and mobile platform, Fronius Solar.web.

TECHNICAL DATA FRONIUS PRIMO

GENERAL DATA	FRONIUS PRIMO 3.8 - 8.2	FRONIUS PRIMO 10.0-15.0
Dimensions (width x height x depth)	16.9 x 24.7 x 8.1 in. / 42.9 x 62.7 x 20.6 cm	20.1 x 28.5 x 8.9 in. / 51.1 x 72.4 x 20.6 cm
Weight	47.4 lb. / 21.5 kg	82.5 lbs. / 37.4 kg
Degree of protection	NEMA 4X	
Night time consumption	< 1 W	
Inverter topology	Transformerless	
Cooling	Controlled forced ventilation, variable speed fan	
Installation	Indoor and outdoor installation	
Ambient operating temperature range	-40 to 131 F / -40 to 55 C	-40 to 140 F / -40 to 60 C
Permitted humidity	0 - 100 %	
DC connection terminals	2x DC+1, 2x DC+2 and 4x DC- screw terminals for solid: copper and aluminium stranded / fine stranded: copper and aluminium	4x DC+1, 2x DC+2 and 6x DC- screw terminals for copper (solid / stranded / fine stranded) or aluminum (solid / stranded)
AC connection terminals	Screw terminals 12 - 6 AWG	
Revenue Grade Metering	Optional (ANSI C12.1 accuracy)	
Certificates and compliance with standards	UL 1741-2015, UL1998 (for functions: AFCI, RCMU and isolation monitoring), IEEE 1547-2003, IEEE 1547.1-2003, ANSI/IEEE C62.41, FCC Part 15 A & B, NEC 2014 Article 690, C22. 2 No. 107.1-01 (September 2001) , UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 -2013	UL 1741-2015, UL1998 (for functions: AFCI, RCMU and isolation monitoring), IEEE 1547-2003, IEEE 1547.1-2003, ANSI/IEEE C62.41, FCC Part 15 A & B, NEC Article 690-2014, C22. 2 No. 107.1-01 (September 2001) , UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 -2013

PROTECTIVE DEVICES	STANDARD WITH ALL PRIMO MODELS
AFCI	Yes
Ground Fault Protection with Isolation Monitor Interrupter	Yes
DC disconnect	Yes
DC reverse polarity protection	Yes

INTERFACES	AVAILABILITY	AVAILABLE WITH ALL FRONIUS PRIMO MODELS
USB (A socket)	Standard	Datalogging and inverter update via USB
2x RS422 (RJ45 socket)	Standard	Fronius Solar Net, interface protocol
Wi-Fi*/Ethernet/Serial/Datalogger and webserver	Optional	Wireless standard 802.11 b/g/n / Fronius Solar.web, SunSpec Modbus TCP, JSON / SunSpec Modbus RTU
6 inputs or 4 digital inputs/outputs	Optional	External relay controls

*The term Wi-Fi® is a registered trademark of the Wi-Fi Alliance.

TECHNICAL DATA FRONIUS PRIMO 3.8-1 TO 8.2-1

INPUT DATA	PRIMO 3.8-1	PRIMO 5.0-1	PRIMO 6.0-1	PRIMO 7.6-1	PRIMO 8.2-1
Max. permitted PV power (kWp)	5.7 kW	7.5 kW	9.0 kW	11.4 kW	12.3 kW
Max. usable input current (MPPT 1/MPPT 2)	18 A / 18 A	18 A / 18 A	18 A / 18 A	18 A / 18 A	18 A / 18 A
Total max. DC current	36 A				
Max. admissible input current (MPPT 1/MPPT 2)	27 A				
Operating voltage range	80 V - 1,000 V				
Max. input voltage	1,000 V				
Nominal input voltage	410 V	420 V	420 V	420 V	420 V
Admissible conductor size DC	AWG 14 - AWG 6				
MPP voltage range	200 - 800 V	240 - 800 V	240 - 800 V	250 - 800 V	270 - 800 V
Number of MPPT	2				

OUTPUT DATA		PRIMO 3.8-1	PRIMO 5.0-1	PRIMO 6.0-1	PRIMO 7.6-1	PRIMO 8.2-1
Max. output power	240 V	3,800 W	5,000 W	6,000 W	7,600 W	8,200 W
	208 V	3,800 W	5,000 W	6,000 W	7,600 W	7,900 W
Max. output fault current / Duration	240 V	584 A Peak / 154 ms	584 A Peak / 154 ms	584 A Peak / 154 ms	584 A Peak / 154 ms	584 A Peak / 154 ms
Max. continuous output current	240 V	15.8 A	20.8 A	25.0 A	31.7 A	34.2 A
	208 V	18.3 A	24.0 A	28.8 A	36.5 A	38.0 A
Recommended OCPD/AC breaker size	240 V	20 A	30 A	35 A	40 A	45 A
	208 V	25 A	30 A	40 A	50 A	50 A
Max. efficiency (Lite version)	97.9 %					
CEC efficiency (Lite version)	240 V	95.5 %	96.5 %	96.5 %	97.0 %	97.0 %
Admissible conductor size AC	AWG 14 - AWG 6					
Grid connection	208 / 240 V					
Frequency	60 Hz					
Total harmonic distortion	< 5.0 %					
Power factor (cos $\varphi_{ac,r}$)	0.85 - 1 ind./cap					

TECHNICAL DATA FRONIUS PRIMO 10.0-1 TO 15.0-1

INPUT DATA	PRIMO 10.0-1	PRIMO 11.4-1	PRIMO 12.5-1	PRIMO 15.0-1
Max. permitted PV power (kWp)	15.00 kW	17.10 kW	18.75 kW	22.50 kW
Max. usable input current (MPPT 1/MPPT 2)	33.0 A / 18.0 A			
Total max. DC current	51 A			
Max. admissible input current (MPPT 1/MPPT 2)	49.5 A / 27.0 A			
Operating voltage range	80 V - 1,000 V			
Max. input voltage	1,000 V			
Nominal input voltage	655 V	660 V	665 V	680 V
Admissible conductor size DC	AWG 14 - AWG 6 copper direct, AWG 6 aluminum direct, AWG 4 - AWG 2 copper or aluminum with optional input combiner			
MPP Voltage Range	220 - 800 V	240 - 800 V	260 - 800 V	320 - 800 V
Number of MPPT	2			

OUTPUT DATA		PRIMO 10.0-1	PRIMO 11.4-1	PRIMO 12.5-1	PRIMO 15.0-1
Max. output power	240 V	9,995 W	11,400 W	12,500 W	15,000 W
	208 V	9,995 W	11,400 W	12,500 W	13,750 W
Max. output fault current / Duration	240 V	916 A Peak / 6.46 ms	916 A Peak / 6.46 ms	916 A Peak / 6.46 ms	916 A Peak / 6.46 ms
Max. continuous output current	240 V	41.6 A	47.5 A	52.1 A	62.5 A
	208 V	48.1 A	54.8 A	60.1 A	66.1 A
Recommended OCPD/AC breaker size	240 V	60 A	60 A	70 A	80 A
	208 V	60 A	70 A	80 A	90 A
Max. efficiency (Lite version)	97.9 %				
CEC efficiency (Live version)	240 V	96.5 %	96.5 %	96.5 %	97.0 %
Admissible conductor size AC	AWG 10 - AWG 2 copper (solid / stranded / fine stranded) , AWG 6 - AWG 2 copper (solid / stranded)			
Grid connection	208 / 240 V			
Frequency	60 Hz			
Total harmonic distortion	< 2.5 %			
Power factor (cos $\varphi_{ac,r}$)	0-1 ind./cap.			

December 12, 2016

Fronius Canada Ltd. / 2875 Argentia Road, Units 3 - 6 / Mississauga, ON L5N 8G6 / www.fronius.ca / 905-288-2100

MOUNT ACCORDING TO MOUNTING MFG INSTRUCTIONS AND CIVIL/STRUCTURAL DIRECTIONS.

USE FASTENERS SUITABLE TO SURFACE BEING ATTACHED. LAG-SCREWS FOR WOOD, NUTS (LOCKING) AND BOLTS FOR METAL STRUCTURES.

MOUNT 4' ON CENTER UNLESS OTHERWISE NOTED OR REQUIRED TO CONNECT TO STRUCTURAL MEMBERS.

OWNER / INSTALLER:

PROPERTY ADDRESS:

DESIGNED BY

NORDIC ASIA
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Tech Brief

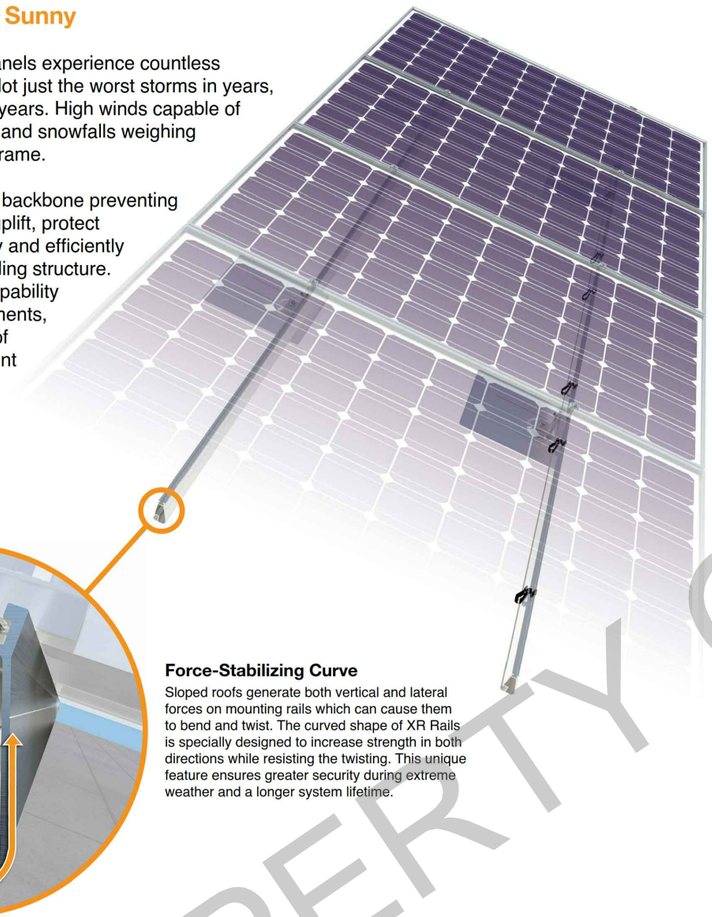
IRONRIDGE

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

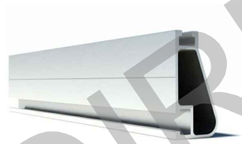
XR Rail Family

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.

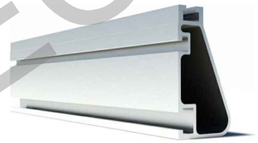
- 6' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available



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						

MOUNT ACCORDING TO MOUNTING MFG INSTRUCTIONS AND CIVIL/STRUCTURAL DIRECTIONS.

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Datasheet

IRONRIDGE

Ground Mount System

Mount on all terrains, in no time.

The IronRidge Ground Mount System combines our XR1000 rails with locally-sourced steel pipes, or mechanical tubing, to create a cost-effective structure capable of handling any site or terrain challenge.

Installation is simple with only a few structural components and no drilling, welding, or heavy machinery required. In addition, the system works with a variety of foundation options, including concrete piers and driven piles.

Rugged Construction
Engineered steel and aluminum components ensure durability.

PE Certified
Pre-stamped engineering letters available in most states.

Simple Assembly
Just a few simple components and no heavy equipment.

Design Software
Online tool generates engineering values and bill of materials.

Flexible Architecture
Multiple foundation and array configuration options.

20 Year Warranty
Twice the protection offered by competitors.

Datasheet

360° Product Tour
Visit ironridge.com

Substructure

Top Caps

Connect vertical and cross pipes.

Rail Connectors

Attach Rail Assembly to horizontal pipes.

Diagonal Braces

Optional Brace provides additional support.

Cross Pipe & Piers

Steel pipes or mechanical tubing for substructure.

Rail Assembly

XR1000 Rails

Curved rails increase spanning capabilities.

Top-Down Clamps

Secure modules to rails and substructure.

Under Clamps

Alternative clamps for pre-attaching modules to rails.

Accessories

Wire Clips and End Caps provide a finished look.

Resources

Design Assistant
Go from rough layout to fully engineered system. For free.
Go to ironridge.com/gm

NABCEP Certified Training
Earn free continuing education credits, while learning more about our systems.
Go to ironridge.com/training

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FLEXpower Radian

FULLY PRE-ASSEMBLED 4 AND 8KW INVERTER SYSTEMS

Three Reasons to Choose the FLEXpower Radian Integrated System from OutBack Power:

1. ENGINEERED FOR FASTER, EASIER INSTALLATION

- **Factory tested, pre-wired and pre-configured** system for fast installation
- Includes a fully integrated GS load center for quick and easy connections
- Charge controller, programming and networking components are completely integrated—just install the mounting bracket, hang the system on a wall, make the necessary connections, site specific programming and the system is fully operational
- Optimized system footprint for cleaner installations in half the time

2. DESIGNED FOR FLEXIBILITY

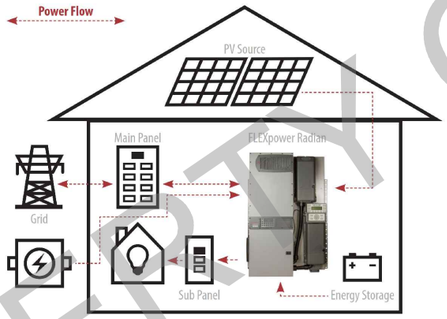
- **4kW**: Ideal for smaller power applications including homes, cabins, remote communication sites and backup power systems.
- **8kW**: Ideal for medium-sized power requirements including larger homes, light commercial or backup power systems.
- Radian inverter/charger is programmable for seven different operational modes, with generator assist
- Advanced Battery Charging (ABC) programmability accommodates traditional and advanced chemistry batteries
- 300VDC models provide up to 99% peak efficiency with FLEXmax 100 charge controller

3. BUILT FOR DEPENDABLE, LONG-TERM USE

- **Extensive quality and reliability testing**
- 15 years of experience manufacturing and improving products for fault-intolerant, mission-critical applications
- Monitor, command and control from any internet-connected device with OPTICS RE
- Standard 5 year warranty (extended 10 year warranty available)
- Field-upgradable software, field-serviceable modular design and global technical support
- Components carry all of the necessary ETL certifications

FLEXpower Radian FPR-8048A-300VDC)

OutBack FLEXpower Radian Typical System Integration:



OUTBACK POWER—MASTERS OF THE OFF-GRID. FIRST CHOICE FOR THE NEW GRID.

MAKE THE POWER

- FLEXpower Integrated Systems
- Inverter/Chargers & Charge Controllers

STORE THE ENERGY

- EnergyCell PLC, PL and OPzV Batteries
- Battery Enclosures and Racking

MANAGE THE SYSTEM

- OPTICS RE System Monitoring and Control
- MATE3s System Display and Communications

FLEXpower Radian SPECIFICATIONS

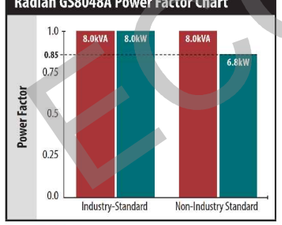
06/2018

Model*	Description	Inverter	GSLC	Bypass	Inverter OCPD**	PV OCPD**	GFDI	RTS	Charge Controller
FPR-4048A-300VDC	GS4048A FLEXpower Radian	GS4048A	GSLC-PV1-300VDC	120/240VAC	175A	80A	Yes	Yes	(1) FLEXmax 100
FPR-4048A-01	GS4048A FLEXpower Radian	GS4048A	GSLC175-PV1-120/240	120/240VAC	175A	80A	Yes	Yes	(1) FLEXmax 80
FPR-8048A-300VDC	GS8048A FLEXpower Radian	GS8048A	GSLC-PV1-300VDC	120/240VAC	(2x) 175A	(2x) 80A	Yes	Yes	(2) FLEXmax 100
FPR-8048A-01	GS8048A FLEXpower Radian	GS8048A	GSLC175-PV1-120/240	120/240VAC	(2x) 175A	(2x) 80A	Yes	Yes	(2) FLEXmax 80

Details	FLEXpower Radian 4048A 300VDC	FLEXpower Radian 4048A	FLEXpower Radian 8048A 300VDC	FLEXpower Radian 8048A
Finished Dimensions H x W x D (in/cm)	47.0 x 33.5 x 9.84 / 119.4 x 85.1 x 24.9	47.0 x 33.5 x 9.84 / 119.4 x 85.1 x 24.9	47.0 x 33.5 x 9.84 / 119.4 x 85.1 x 24.9	47.0 x 33.5 x 9.84 / 119.4 x 85.1 x 24.9
Finished Weight (lb/kg)	201 / 91.2	195 / 88.5	262 / 118.8	250 / 113.4
Shipping Dimensions H x W x D (in/cm)	48 x 40 x 18 / 121.9 x 101.6 x 45.7	48 x 40 x 18 / 121.9 x 101.6 x 45.7	48 x 40 x 18 / 121.9 x 101.6 x 45.7	48 x 40 x 18 / 121.9 x 101.6 x 45.7
Shipping Weight (lb/kg)	220 / 99.8	213 / 96.6	284 / 128.8	272 / 123.4

*All pre-wired systems include a Radian Series inverter/charger, FLEXmax charge controller(s), MATE3s system display and communications, FLEXnet DC system monitor, AC and DC wiring boxes, HUB10.3 communications, surge protector and remote temperature sensor (RTS). The FLEXpower Radian is also equipped with battery and PV array breakers, GFDI and input-output-bypass. (Note: GFDI is integrated in the FM100 charge controller with 300VDC models.)
See individual product specsheets or product guide for full specifications. **Overcurrent protective device.

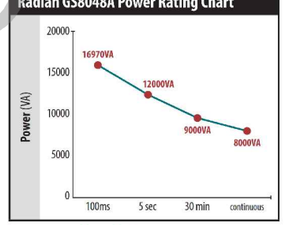
Radian GS8048A Power Factor Chart



Power Rating Notes

Inverters that specify power in VA but do not use the unity standard Power Factor (PF) **could have misleading power specifications.** Volt-Amps (VA) is a total inverter output, while Watts (W) represent the power consumed by the electrical loads. PF, which varies by types of loads, is the ratio of W to VA, and the difference between the two is power in the circuit that does no useful work. At 1.0PF (unity), all power is used. This is the industry-standard used by OutBack Power.

Radian GS8048A Power Rating Chart



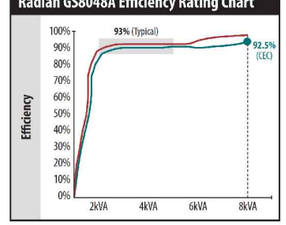
Instantaneous Power Rating
Most stringent, massive load start **GS8048A**: 16970VA

Surge Power Rating
Less stringent load start **GS8048A**: 12000VA

Peak Power Rating
Frequent "heavy duty" load requirements **GS8048A**: 9000VA

Continuous Power Rating
Sustained "real world" load requirements **GS8048A**: 8000VA

Radian GS8048A Efficiency Rating Chart



INVERTING | SELLING

Typical Efficiency Rating
Real world efficiency with variable loads **GS8048A**: 93%

CEC Efficiency Rating
Most stringent US rating **GS8048A**: 92.5%

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Radian Series

A-SERIES 60HZ, 120/240V INVERTER/CHARGERS

LISTED TO UL 1741 SB
NOW WITH
GRID SUPPORT
FUNCTIONALITY

Three Reasons to Choose the Radian Series Inverter/Charger Series from OutBack Power:

1. ENGINEERED FOR RELIABILITY

- **Extensive quality and reliability** testing, including Highly Accelerated Life Testing (HALT)
- 15 years of experience manufacturing products for fault-intolerant, mission-critical applications
- Standard 5 year warranty (extended 10 year warranty available)
- Field upgradeable software

2. DESIGNED FOR FLEXIBILITY

- **Modular**, **stackable**: up to nine units can be combined for three-phase operation and ten in parallel, single-phase operation
- Compliant with California Rule 21 and Hawaii 14H grid support requirements
- Seven different programmable operational modes, with generator assist
- Advanced Battery Charging (ABC) programmability accommodates traditional and advanced chemistry batteries
- GridZero operating mode minimizes grid dependence in areas where incentives are changing and utility sell-back is limited
- 8000 and 4000VA of continuous power with dual AC inputs and peak operating efficiency of 96%
- Off-grid and grid-tied functionality in one unit
- Integrates both grid and generator with dual inputs

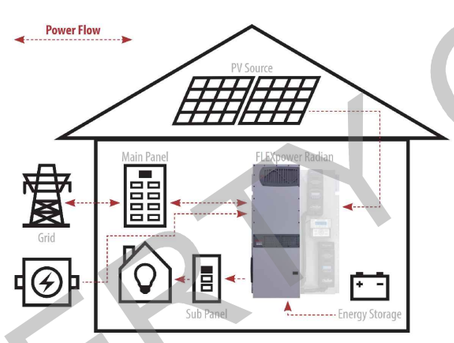
3. EASY-TO-INSTALL AND MAINTAIN

- **System configures quickly** with smart programming wizards
- Pre-wired GS load center (GSLC) option allows for quick, easy installation
- Complete balance-of-system components available
- Field-serviceable modular design and global technical support
- Monitor, command and control from any internet-connected device with OPTICS RE

GS8048A/GS4048A

Optional GS Load Center (GSLC)

OutBack FLEXpower Radian Typical System Integration (w/ Radian Inverter/Charger):



OUTBACK POWER—MASTERS OF THE OFF-GRID. FIRST CHOICE FOR THE NEW GRID.

MAKE THE POWER
- FLEXpower Integrated Systems
- Inverter/Chargers & Charge Controllers

STORE THE ENERGY
- EnergyCell RE, GH, NC and OPzV Batteries
- Battery Enclosures and Racking

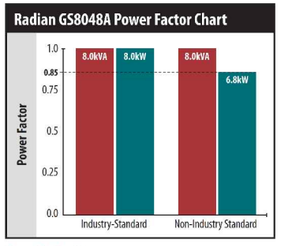
MANAGE THE SYSTEM
- OPTICS RE System Monitoring and Control
- MATE3 System Display and Communications

Radian A-Series SPECIFICATIONS

08/2017

Models:	GS8048A	GS4048A
Instantaneous Power (100ms)	16970VA	8500VA
Surge Power (5 sec)	12000VA	6000VA
Peak Power (30 min)	9000VA	4500VA
Continuous Power Rating (@ 25°C)	8000VA	4000VA
Nominal DC Input Voltage	48VDC	48VDC
AC Output Voltage (selectable)	120/240VAC (200-260VAC)	120/240VAC (200-260VAC)
AC Output Frequency (selectable)	60Hz (50Hz)	60Hz (50Hz)
Continuous AC Output Current (@ 25°C)	33.3AAC @ 240VAC	16.7AAC
Idle Power	**Invert mode, no load**: 34W **Search:** 10W	**Invert mode, no load**: 34W **Search:** 10W
Typical Efficiency	93%	93%
CEC Weighted Efficiency	92.5%	92.5%
Total Harmonic Distortion	**Typical:** <2% **Maximum**: <5%	**Typical:** <2% **Maximum**: <5%
Output Voltage Regulation	±2%	±2%
AC Input Voltage Range (MATE3 Adjustable)	**L1-N** or **L2-N**: 85 to 140VAC	**L1-N or L2-N**: 85 to 140VAC
AC Input Frequency Range	@ **60Hz**: 54 to 66Hz @ **50Hz**: 45 to 55Hz	—
Grid-Interactive Voltage Range	**L1-N** or **L2-N**: 85 to 140VAC	**L1-N or L2-N**: 108 to 132VAC
Grid-Interactive Frequency Range	59.3 to 60.5Hz	59.3 to 60.5Hz
Maximum AC Input Current	50AAC @ 240VAC	50AAC @ 240VAC
Maximum Utility Interactive Current	30A	15A
Continuous Battery Charge Output	115ADC	57.5ADC
Advanced Battery Charging	Flooded, gel, AGM, lithium-ion and flow chemistry	Flooded, gel, AGM, lithium-ion and flow chemistry
DC Input Voltage Range	40 to 64VDC	40 to 64VDC
Accessory Ports	Remote temperature sensor (included), MATE3 and HUB communications	Remote temperature sensor (included), MATE3 and HUB communications
Warranty	Standard 5 year, extended 10 year available	Standard 5 year, extended 10 year available
Weight (lb/kg)	**Unit**: 125 / 56.7 **Shipping**: 140 / 63.5	**Unit**: 82 / 37.2 **Shipping:** 94 / 42.6
Dimensions H x W x L (in/cm)	**Unit**: 28 x 16 x 8.7 / 71.1 x 40.6 x 22.1 **Shipping**: 34.5 x 21 x 14.5 / 87.6 x 53.3 x 36.8	**Unit**: 28 x 16 x 8.7 / 71.1 x 40.6 x 22.1 **Shipping:** 34.5 x 21 x 14.5 / 87.6 x 53.3 x 36.8
Temperature Range	**Rated:** -20 to 50°C **Maximum:** -40 to 60°C	**Rated:** -20 to 50°C **Maximum:** -40 to 60°C
Listings/Certifications	ETL listed to UL 1741 SA, CE, CSA C22.2 No. 107.1, UL 778 Annex F, IEC 62109-1 ETL, RoHS compliant per directive 2011/65/EU, FCC Class B, IEEE 1574.1, EN61000-6-1, EN61000-6-3, EN61000-3-2, EN61000-3-3	ETL listed to UL 1741 SA, CE, CSA C22.2 No. 107.1, UL 778 Annex F, IEC 62109-1 ETL, RoHS compliant per directive 2011/65/EU, FCC Class B, IEEE 1574.1, EN61000-6-1, EN61000-6-3, EN61000-3-2, EN61000-3-3
Non-Volatile Memory	Yes	Yes
Field Upgradeable Firmware	Yes	Yes
Chassis Type	Vented	Vented

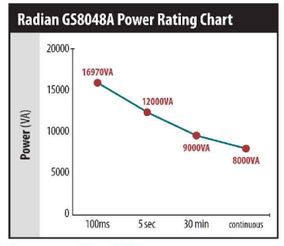
Radian GS8048A Power Factor Chart



Power Rating Notes

Inverters that specify power in VA but do not use the unity standard Power Factor (PF) **could have misleading power specifications.** Volt-Amps (VA) is a total inverter output, while Watts (W) represent the power consumed by the electrical loads. PF, which varies by types of loads, is the ratio of W to VA, and the difference between the two is power in the circuit that does no useful work. At 1.0PF (unity), all power is used. This is the industry-standard used by OutBack Power.

Radian GS8048A Power Rating Chart



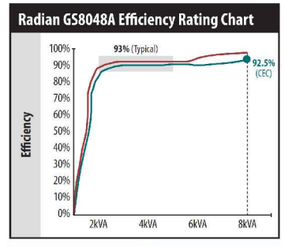
Instantaneous Power Rating
Most stringent, massive load start **GS8048A**: 16970VA

Surge Power Rating
Less stringent load start **GS8048A**: 12000VA

Peak Power Rating
Frequent "heavy duty" load requirements **GS8048A**: 9000VA

Continuous Power Rating
Sustained "real world" load requirements **GS8048A**: 8000VA

Radian GS8048A Efficiency Rating Chart



INVERTING **SELLING**

Typical Efficiency Rating
Real world efficiency with variable loads **GS8048A**: 93%

CEC Efficiency Rating
Most stringent US rating **GS8048A**: 92.5%

MOUNT ACCORDING TO MOUNTING MFG INSTRUCTIONS AND CIVIL/STRUCTURAL DIRECTIONS.

USE FASTENERS SUITABLE TO SURFACE BEING ATTACHED. LAG-SCREWS FOR WOOD, NUTS (LOCKING) AND BOLTS FOR METAL STRUCTURES.

MOUNT 4' ON CENTER UNLESS OTHERWISE NOTED OR REQUIRED TO CONNECT TO STRUCTURAL MEMBERS.

OWNER / INSTALLER:

PROPERTY ADDRESS:

DESIGNED BY

NORDIC ASIA
www.nordicasia.net

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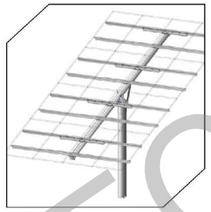
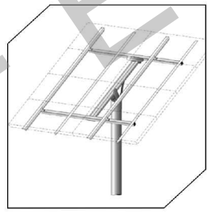




POWER-FAB® Top-of-Pole PV Mounting System

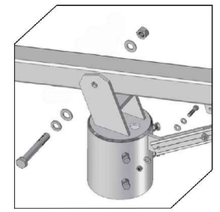
The POWER-FAB TPM is designed to install quickly and provide a secure mounting structure for PV modules on a single pole. The module specific design reduces the number of components and provides for an easier assembly. The TPM utilizes high strength welded steel components and corrosion resistant hardware for long term reliability. Seasonal adjustability for maximizing production is provided by six different tilt-angle settings and is a single person operation.

Key Benefits

- Maximum Strength
- Module Specific Design
- Ease of Assembly – Reduced Parts
- Single Ground Penetration
- Seasonal Elevation Adjustment

Maximum Strength – Durable Design

- Standard mounts designed to withstand 90 MPH wind zones
- MIG welded steel strong backs and mounting sleeves
- Two coats of industrial urethane enamel paint
- 6000 series structural Aluminum mounting rails
- Stainless Steel module mounting hardware
- Zinc plated rack assembly hardware



Application Flexibility

- Several sizes available from 1 through 24 modules
- Installs over standard Schedule 40 or 80 rigid steel pipe (Installer Supplied)
- 15° to 65° tilt angle settings (10° increments)
- Mount up to 4.1kW on a single pole

Ordering Guideline

TPM8-D-SHARP-NE170UC1-HWV-AA

- Upgrade Options
- Module Manufacturer's Part Number*
- Module Manufacturer
- DPW Module Series
- Number of Modules

*Important: Include complete module part # as listed on module manufacturer's specification sheet

DPW SOLAR

PLP PREFORMED LINE PRODUCTS

4000-B Vassar Drive NE
Albuquerque, New Mexico 87107
USA

Telephone: 800.260.3792
Fax: 505.889.3548
Web Site: www.DPWSolar.com
E-mail: info@power-fab.com

SL-SS-1079-4
06.13.1M

Ease of Assembly – Reduced Labor Costs

- Module Specific design reduces number of parts
- No measuring required
- Array tilts flat for easy module placement
- Factory set module hole placement locations create uniform spacing
- Easy access bottom flange bolting

Options / Upgrades

- High Wind Version – 130 MPH Exposure C
- Hot Dip Galvanized or Powder Coated Finish on steel components
- Anodized Module rails
- Stainless Steel Rack Assembly Hardware Package
- Tamper-Resistant Module Mounting Hardware Package

Foundation Design Support available from DPW Solar's staff of engineers.

MOUNT ACCORDING TO MOUNTING MFG INSTRUCTIONS AND CIVIL/STRUCTURAL DIRECTIONS.

USE FASTENERS SUITABLE TO SURFACE BEING ATTACHED. LAG-SCREWS FOR WOOD, NUTS (LOCKING) AND BOLTS FOR METAL STRUCTURES.

MOUNT 4' ON CENTER UNLESS OTHERWISE NOTED OR REQUIRED TO CONNECT TO STRUCTURAL MEMBERS.

OWNER / INSTALLER:

PROPERTY ADDRESS:

DESIGNED BY

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