

801 MILUK DR SOLAR PV & BATTERY INSTALLATION ELECTRICAL PLAN

APPLICABLE SPECIFICATIONS AND CODES

-ELECTRICAL:	NEC-2020
-BUILDING:	ASCE 07-10
-WIND SPEED:	130 mph
-WIND EXPOSURE:	C
-RISK CAT:	II
-SNOW LOAD:	20 lbs/sqft

SITE -

SITE ADDRESS: 801 Miluk Dr. Coos Bay, OR 97420

EPC CONTRACTOR: GSC CONSTRUCTION

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SCALE N.T.S.

3/16/2023 D.BRUECK FOR CONSTRUCTION 1	CC	DNS	ST	Rl	J	СТ	10	C	N
CONSTRUCTION		801 MILUK DR.	r_'	BATTERY BACK-UP	Coos Bay, OR 97420	TITLE PAGE			
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								D.BRUECK	ВΥ
									NO DATE

GSC

ELECTRICAL SPECIFICATIONS

GENERAL DESIGN

1. ALL AMPACITIES OF CONDUCTORS ENCLOSED IN CONDUIT SHALL BE CALCULATED AT A MAXIMUM OF 75°C INSULATION RATING OR THE TEMPERATURE RATING OF THE TERMINATION, WHICHEVER IS LOWER AS PER NEC TABLE 310.15(B)(16). 2. THE MAX AND MIN AMBIENT TEMPERATURES USED IN THIS DESIGN ARE 37°C AND (-)4°C AND ARE BASED ON DATA PROVIDED BY ASHRAE FOR CAPE ARAGO, OR.

NEW PHOTOVOLTAIC SYSTEM

1. THE PROPOSED PHOTOVOLTAIC SYSTEM IS INTENDED TO OPERATE IN PARALLEL WITH THE UTILITY DISTRIBUTION SYSTEM.

2. THE PHOTOVOLTAIC SYSTEM IS INTENDED TO CONNECT TO THE EXISTING ELECTRICAL SYSTEM ON THE CUSTOMER'S SIDE OF THE METER FOR NET METERING THIS CONNECTION SHALL BE IN COMPLIANCE WITH THE NEC AND UTILITY STANDARDS. 3. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT AN INTERCONNECTION APPLICATION TO THE UTILITY AND OBTAIN AN INTERCONNECTION AGREEMENT IN COORDINATION WITH LOCAL STANDARDS.

5. THE INVERTER FOR THE PROPOSED PHOTOVOLTAIC SYSTEM SHALL BE IDENTIFIED FOR USE IN SOLAR PHOTOVOLTAIC AND BATTERY BACK-UP SYSTEMS. 6. ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION FOR TESTING AND ISOLATION. ALL COMBINER BOXES SHALL HAVE DISCONNECTION MEANS IN OR NEAR THE COMBINER FOR ISOLATION AND TESTING.

7. ALL DISCONNECTS, COMBINERS, PULL/SPLICE BOXES, AND ENCLOSURES SHALL BE UL LISTED FOR ITS PURPOSE.

INVERTER

1. INVERTER SHALL BE HANDLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND DOCUMENTATION. ALL INSTRUCTIONS AND REFERENCE DOCUMENTS SHALL BE REVIEWED AND UNDERSTOOD BY THE CONTRACTOR PRIOR TO HANDLING AND UNPACKING THE EQUIPMENT.

2. CONTRACTOR SHALL INSPECT ALL PACKAGES FOR DAMAGE UPON DELIVERY. ANY DAMAGED PACKAGES SHALL BE OPENED SO THE INVERTER AND EQUIPMENT CAN BE INSPECTED. ANY DAMAGE TO THE PACKAGING OR EQUIPMENT SHALL BE DOCUMENTED AND REPORTED TO THE OWNER IMMEDIATELY. INVERTERS TO BE STORED SHALL BE PROPERLY REPLACED IN THE PACKAGING FOR STORAGE. 3. INVERTER SHALL BE STORED IN A SECURE AND CLEAN LOCATION PER THE MANUFACTURER'S RECOMMENDATIONS AND DOCUMENTATION. INVERTERS SHALL BE PROTECTED FROM THE ENVIRONMENT SUCH AS HEAT, COLD, MOISTURE, DUST, SNOW, ETC.

4. REFERENCE THE MANUFACTURER'S INSTRUCTIONS FOR UNPACKING THE EQUIPMENT, INVERTERS SHALL BE TRANSPORTED BY MEANS OUTLINED IN THE MANUFACTURER'S DOCUMENTATION ONLY.

5. THE CONTRACTOR IS TO ENSURE THAT WORKING CLEARANCES MEET THE REQUIREMENTS OF ALL APPLICABLE CODES AND THE MANUFACTURERS REQUIREMENT'S. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER IMMEDIATELY.

6. ALL DISCONNECT SWITCHES SHALL BE IN THE OPEN POSITION DURING INSTALLATION AND SHALL REMAIN IN THE OPEN POSITION UNTIL PROPER TESTING, INSPECTION, AND COMMISSIONING HAS BEEN COMPLETED. 7. DO NOT OPEN THE INVERTER OR ELECTRICAL CABINETS WHEN IT IS RAINING OR HUMIDITY EXCEEDS 95%.

8. ALL FASTENERS SHALL BE TORQUED PER THE MANUFACTURER'S DOCUMENTATION.

9. IT IS PROHIBITED TO MODIFY THE INVERTER OR INSTALL EQUIPMENT NOT EXPLICITLY RECOMMENDED BY THE MANUFACTURER. DO NOT STORE DOCUMENTS, INSTRUCTIONS, PLANS, OR ANY OTHER FOREIGN MATERIAL NOT INTENDED TO BE PART OF THE SYSTEM INSIDE THE INVERTER CABINETS. 10. COMPONENTS OF THE INVERTER MAY BE DAMAGED BY ELECTROSTATIC DISCHARGE (ESD). WHEN HANDLING THE ELECTRICAL COMPONENTS, OBSERVE ALL ESD SAFETY REGULATIONS.

11. ALL CONDUCTORS SHALL BE CONNECTED TO THE INVERTER PER THE MANUFACTURER'S DOCUMENTATION, MAKING NOTE OF RECOMMENDED TERMINATIONS, TORQUE VALUES, AND BOLT STACK UP DETAILS IF PROVIDED. ALL BUSS BARS, CONDUCTORS, AND TERMINATIONS SHALL BE CLEAN PRIOR TO MAKING THE CONNECTION.

12. PHOTOVOLTAIC SYSTEM DC GROUNDING CONFIGURATIONS MAY VARY BY MANUFACTURER AND TECHNOLOGY. THE GROUNDING CONFIGURATION SHALL BE NOTED BY THE CONTRACTOR FOR SAFETY AND PROPER INSTALLATION. 13. CONTRACTOR IS TO OBTAIN ALL ELECTRICAL APPROVALS BY THE AUTHORITIES HAVING JURISDICTION, APPROVAL FROM THE ELECTRIC UTILITY SERVICE PROVIDER, AND APPROVAL FROM THE OWNER PRIOR TO ENERGIZING ANY INVERTERS.

14. COMMISSIONING, INSPECTION, AND TESTING OF THE INVERTER SHALL BE PROPERLY DOCUMENTED AND SUBMITTED TO THE OWNER PRIOR TO ENERGIZING THE INVERTER.

WIRING AND WIRING METHODS

1. SEE ELECTRICAL DIAGRAM AND ELECTRICAL DETAILS FOR MORE GROUNDING 1. ALL WIRING METHODS AND INSTALLATION PRACTICES SHALL CONFORM TO THE NATIONAL ELECTRIC CODE. INFORMATION. 2. EXPOSED PV SOLAR PANEL WIRING WILL BE PV WIRE, 90 DEGREE C, 1000V, 2. ONLY ONE CONNECTION TO AC CIRCUITS SHALL BE USED FOR SYSTEM GROUNDING WET RATED. ALL EXPOSED CABLES, SUCH AS MODULE LEADS SHALL BE SECURED WITH 3. EQUIPMENT GROUNDING CONDUCTORS AND SYSTEM GROUNDING CONDUCTORS SHALL HAVE AS SHORT A DISTANCE TO GROUND AS POSSIBLE AND A MINIMUM MECHANICAL OR OTHER SUN-LIGHT RESISTANT MEANS. 3. ALL CONDUCTORS SHALL BE COPPER AND HAVE INSULATION RATING 1000 V, 90 NUMBER OF TURNS. DEGREE C, UNLESS OTHERWISE NOTED. 4. NON-CURRENT CARRYING METAL PARTS SHALL BE CHECKED FOR PROPER 4. USE THE FOLLOWING COLOR CONVENTION FOR DC CONDUCTORS: GROUNDING; NOTING THAT TERMINAL LUGS BOLTED ON AN ENCLOSURE'S **RED - POSITIVE** FINISHED SURFACE MAY BE INSULATED BECAUSE OF PAINT/FINISH. PAINT/FINISH AT POINT OF CONTACT SHALL BE PROPERLY REMOVED AND TREATED FOR RUST **BLACK - NEGATIVE GREEN - GROUND** PREVENTION.

WITH PERMANENT WIRE MARKERS TO IDENTIFY POLARITY AND GROUND. FACE TAPE SHALL NOT BE USED. 6. FLEXIBLE METAL CONDUIT IS GENERALLY SUITABLE FOR INSTALLATION IN DRY LOCATIONS. SHOULD IT BE EMPLOYED, SUPPORTS WILL BE NO MORE THAN 12 INCHES FROM BOXES (JUNCTION BOX, CABINETS OR CONDUIT FITTING) AND NO MORE THAN 54

INCHES APART 7. LIQUID TIGHT FLEXIBLE NON-METALLIC CONDUIT SHALL NOT BE USED.

8. EXPOSED PVC CONDUIT SHALL BE SCH 80. 9. LONG STRAIGHT METALLIC AND/OR PVC CONDUIT RUNS, 100 FEET OR MORE, SHALL HAVE EXPANSION FITTINGS.

10. IF USED, ALL WIRENUTS ARE TO BE SILICONE FILLED, EQUIVALENT TO IDEAL BLUE, AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS BY A QUALIFIED/CERTIFIED PERSON. WIRENUTS SHALL NOT BE INSTALLED ALONG THE PATH OF PV POWER GENERATION, OR FOR ANY EQUIPMENT NECESSARY FOR THE GENERATION OF PV POWER, WIRENUTS ARE ONLY ALLOWED FOR AUXILIARY EQUIPMENT. 11. FUSES AND WIRES SUBJECT TO TRANSFORMER INRUSH CURRENT SHALL BE SIZED ACCORDINGLY.

12. ALL DC MATERIALS SHALL BE UL LISTED FOR 1000VDC MINIMUM. 13. WIRING SHALL BE INSTALLED IN APPROVED METAL OR PVC CONDUITS OR RACEWAYS WITH LISTED FITTINGS, AS APPLICABLE, ADEQUATELY STRAP AND SUPPORT ALL CONDUIT WORK PER NEC. IN GENERAL SUPPORT ALL CONDUIT WITHIN THREE FEET (3') OF OUTLET BOX, CABINET OR PANEL AND MAXIMUM OF TEN FEET (10') ON CENTER THEREAFTER, EMT CONDUIT IS TO BE LISTED FOR WET LOCATION, IF USED. 14. THE PHOTOVOLTAIC SOURCE CIRCUITS AND PHOTOVOLTAIC OUTPUT CIRCUITS OF THIS PROPOSED SOLAR SYSTEM SHALL NOT BE CONTAINED IN THE SAME RACEWAY CABLE TRAY, CABLE, OUTLET BOX, JUNCTION BOX, OR SIMILAR FITTING AS FEEDERS OR BRANCH CIRCUITS OF OTHER SYSTEMS UNLESS THE CONDUCTORS OF THE DIFFERENT SYSTEMS ARE SEPARATED BY A PARTITION OR

ARE CONNECTED TOGETHER.

15. CONNECTORS TO BE TORQUED PER DEVICE LISTING, OR MANUFACTURERS RECOMMENDATIONS. ONLY 60 TON HYDRAULIC CRIMPS WITH HIGH VOLTAGE HEAT-SHRINK INSULATION ARE ACCEPTABLE. 16. SPLIT BOLTS / SPLICES / CONNECTORS SHALL BE INSULATED WITH APPROVED MEANS. UL LISTED ELECTRICAL TAPE ALONE IS NOT SUITABLE AS THE ONLY INSULATION MEANS. FOLLOW MANUFACTURERS INSTRUCTIONS FOR APPLICATION OF INSULATING PRODUCT.

MARKINGS

1. ALL INTERACTIVE SYSTEM POINTS OF INTERCONNECTION WITH OTHER SOURCES SHALL BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTION MEANS. 2. A PERMANENT PLAQUE OR DIRECTORY SHALL BE PROVIDED IDENTIFYING THE LOCATION OF THE SERVICE DISCONNECTION MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTION MEANS, IF NOT LOCATED AT THE SAME LOCATION. 3. PHOTOVOLTAIC MODULES SHALL BE MARKED TO IDENTIFY LEAD POLARITY, DEVICE RATINGS, AND SPECIFICATIONS FOR VOLTAGES, CURRENTS, AND POWER.

REQUIRED SAFETY SIGNS AND LABELS

REQUIRED SAFETY SIGNS AND LABELS SHALL BE PERMANENTLY ATTACHED BY ADHESIVE, OR OTHER MECHANICAL MEANS. LABELS SHALL COMPLY WITH ARTICLE 690 OF THE NEC OR OTHER APPLICABLE STATE, AND UTILITY CODES. SEE LABELS AND MARKING PAGE FOR MORE INFORMATION. 1. ANY SWITCH, FUSES, OR CIRCUIT BREAKERS THAT CAN BE ENERGIZED IN EITHER DIRECTION SHALL BE LABELED AS FOLLOWS WARNING:

ELECTRICAL SHOCK HAZARD DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION 2. THIS PHOTOVOLTAIC SYSTEM WILL BE EQUIPPED WITH A DC DISCONNECT WHICH

WILL BE LABELED AS FOLLOWS: PHOTOVOLTAIC MAINTENANCE

DC DISCONNECT SWITCH

3. THIS PHOTOVOLTAIC SYSTEM WILL BE EQUIPPED WITH AN AC DISCONNECT WHICH WILL BE LABELED AS FOLLOWS: PHOTOVOLTAIC AC DISCONNECT 4. A MARKING SPECIFYING THE PHOTOVOLTAIC POWER SOURCE RATED AS FOLLOWS SHALL BE PROVIDED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTION MEANS FOR THE POWER SOURCE: **OPERATING CURRENT (##) AMPS OPERATING VOLTAGE (##) VOLTS** MAXIMUM SYSTEM VOLTAGE (##) VOLTS SHORT CIRCUIT CURRENT (##) AMPS NOTE: ## VALUES TO BE PROVIDED BY CONTRACTOR PER ACTUAL INSTALLATION. 5. ALL MAJOR EQUIPMENT SHALL BE PROPERLY LABELED WITH ARC-FLASH HAZARD SIGNS AS REQUIRED BY NFPA 70E.

5. ALL FIELD WIRING THAT IS NOT COLOR CODED SHALL BE TAGGED AT BOTH ENDS

GROUNDING

5. 'PV' MODULE FRAMES SHALL BE BONDED TO RACKING STRUCTURE USING A METHOD APPROVED BY THE MODULE MANUFACTURER AND WITH A MEANS OF BONDING LISTED FOR THIS PURPOSE

6. THE CONNECTION TO THE MODULE OR PANEL OF THIS PROPOSED SOLAR ELECTRIC SYSTEM SHALL BE SO ARRANGED THAT REMOVAL OF A MODULE OR A PANEL FROM THE PHOTOVOLTAIC SOURCE CIRCUIT DOES NOT INTERRUPT A GROUNDED CONDUCTOR TO ANOTHER PHOTOVOLTAIC SOURCE CIRCUIT. SETS OF MODULES INTERCONNECTED AS SYSTEMS RATED AT 50 VOLTS OR HIGHER, WITH OR WITHOUT BLOCKING DIODES, AND HAVING A SINGLE OVER CURRENT DEVICE SHALL BE CONSIDERED AS A SINGLE SOURCE CIRCUIT.

7. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, INCLUDING BUT NOT LIMITED TO GROUND RODS, GROUNDING LUGS, GROUNDING CLAMPS, ETC. GROUNDING DEVICES EXPOSED TO THE ENVIRONMENT SHALL BE RATED FOR DIRECT BURIAL. GROUNDING LUGS SHALL BE LISTED FOR DIRECT-BURIAL, ILSCO GBL4-DBT OR EQUAL.

8. ALL FLEXIBLE CONDUITS SHALL HAVE AN EXTERIOR GROUND WIRE BETWEEN THE CONNECTORS AT BOTH ENDS. GROUND WIRE SHALL RUN ALONG THE CONDUIT. 9. ALL GROUNDING SYSTEMS FOR THE SOLAR PV INSTALLATION SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE, AND LOCAL STANDARDS.

PROTECTION

1. PHOTOVOLTAIC INVERTERS SHALL BE EQUIPPED WITH DC GROUND FAULT PROTECTION TO REDUCE FIRE HAZARDS. INVERTERS ARE ALSO EQUIPPED WITH ANTI-ISLANDING CIRCUITRY.

2. PHOTOVOLTAIC INVERTERS SHALL BE EQUIPPED WITH PV ARC FAULT PROTECTION TO REDUCE FIRE HAZARDS.

3. PHOTOVOLTAIC SYSTEM SHALL BE EQUIPPED WITH RAPID SHUTDOWN.

EQUIPMENT

1. EQUIPMENT AND COMPONENTS SHALL BE UL LISTED AND LABELED. OSHA STANDARDS ON EQUIPMENT ENCLOSURES, DOORS, ACCESS PLATES, AND BARRIERS AND LABEL ALL LOW VOLTAGE EQUIPMENT WITH THE OPERATING VOLTAGE.

PER MANUFACTURER'S INSTRUCTIONS. 4. EQUIPMENT SHALL BE INSTALLED IN APPROPRIATE ENVIRONMENT PER ITS NEMA RATING.

5. ALL OPENINGS INTO EQUIPMENT SHALL BE SEALED WITH GALVANIZED STEEL PLATE OR SCREEN TO PREVENT ENTRY OF INSECTS AND RODENTS.

DISCONNECTING MEANS

1. MEANS SHALL BE PROVIDED TO DISCONNECT ALL CURRENT CARRYING CONDUCTORS OF THE PHOTOVOLTAIC POWER SOURCE FROM ALL OTHER CONDUCTORS.

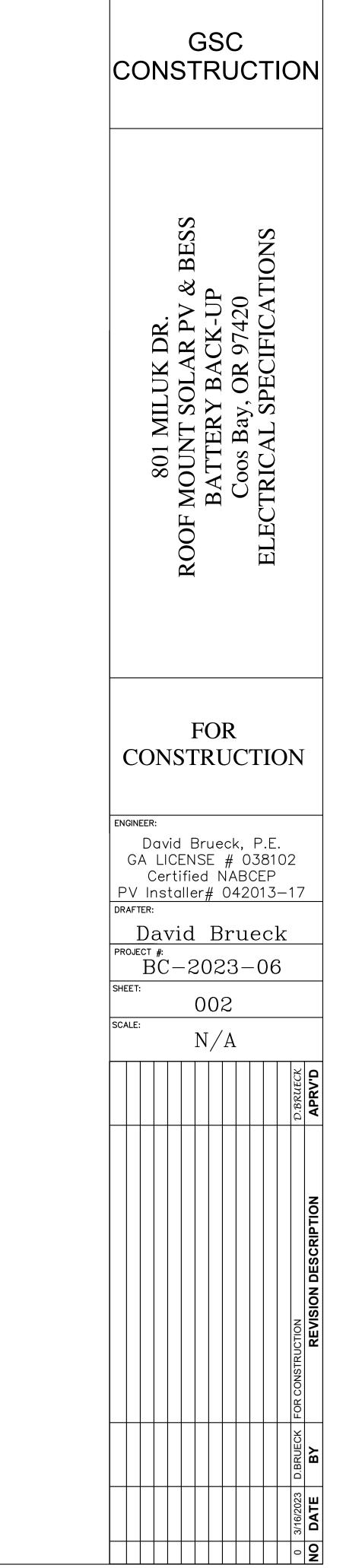
2. WHERE A CIRCUIT GROUNDING CONNECTION IS NOT DESIGNED TO BE AUTOMATICALLY INTERRUPTED AS PART OF THE GROUND-FAULT PROTECTION SYSTEM REQUIRED BY NEC ARTICLE 690-5, A SWITCH OR CIRCUIT BREAKER USED AS A DISCONNECTING MEANS SHALL NOT HAVE A POLE IN THE GROUNDED CONDUCTOR.

3. THE GROUNDED CONDUCTOR MAY HAVE A BOLTED OR TERMINAL DISCONNECTING MEANS TO ALLOW MAINTENANCE OR TROUBLESHOOTING BY QUALIFIED PERSONNEL.

4. THE DISCONNECTING MEANS SHALL NOT BE REQUIRED TO BE SUITABLE AS SERVICE EQUIPMENT AND SHALL BE RATED IN ACCORDANCE WITH NEC ARTICLE 690-17.

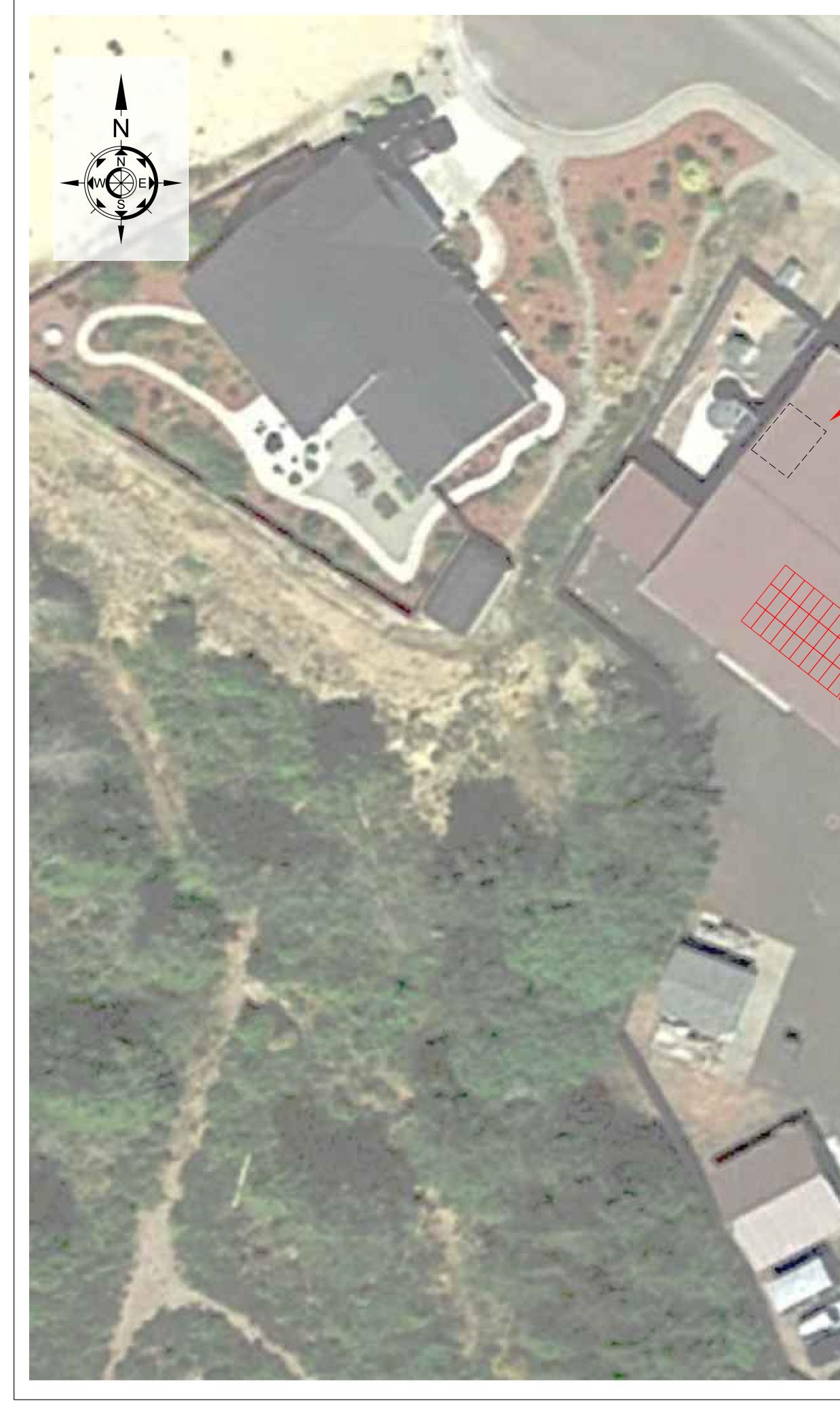
5. EQUIPMENT SUCH AS PHOTOVOLTAIC SOURCE CIRCUITS, OVER CURRENT DEVICES, AND BLOCKING DIODES SHALL BE PERMITTED ON THE PHOTOVOLTAIC SIDE OF THE PHOTOVOLTAIC DISCONNECTING MEANS. 6. MEANS SHALL BE PROVIDED TO DISCONNECT EQUIPMENT SUCH AS INVERTERS BATTERIES, CHARGE CONTROLLERS, AND THE LIKE FROM ALL UNGROUNDED CONDUCTORS OF ALL SOURCES. IF THE EQUIPMENT IS ENERGIZED FROM MORE THAN ONE SOURCE, THE DISCONNECTING MEANS SHALL BE GROUPED AND IDENTIFIED.

7. A SINGLE DISCONNECTING MEANS SHALL BE PERMITTED FOR THE COMBINED AC OUTPUT OF ONE OR MORE INVERTERS IN AN INTERACTIVE SYSTEM. 8. NEC 690-16. FUSES. DISCONNECTING MEANS SHALL BE PROVIDED TO DISCONNECT A FUSE FROM ALL SOURCES OF SUPPLY IF THE FUSE IS ENERGIZED FROM BOTH DIRECTIONS AND IS ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS. SUCH A FUSE IN A PHOTOVOLTAIC SOURCE CIRCUIT SHALL BE CAPABLE OF BEING DISCONNECTED INDEPENDENTLY OF FUSES IN OTHER PHOTOVOLTAIC SOURCE CIRCUITS.



2. PROVIDE DANGER, WARNING, AND CAUTION LABELS AS REQUIRED BY NEC, NFPA, OR

3. EQUIPMENT SHALL BE ANCHORED TO CONCRETE PADS, FOUNDATIONS, OR WALLS

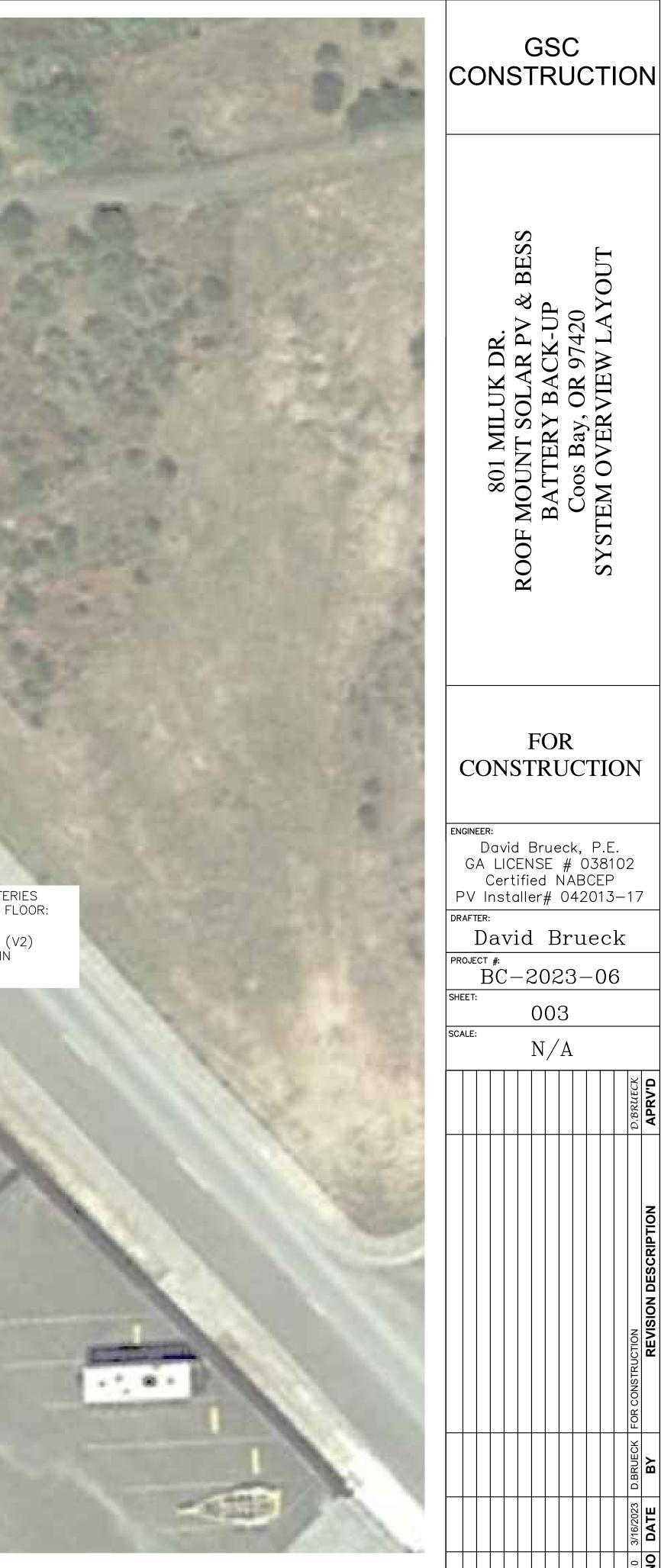


ELECTRICAL ROOM: 800A, 120/208V, 3PH, 4W MDP

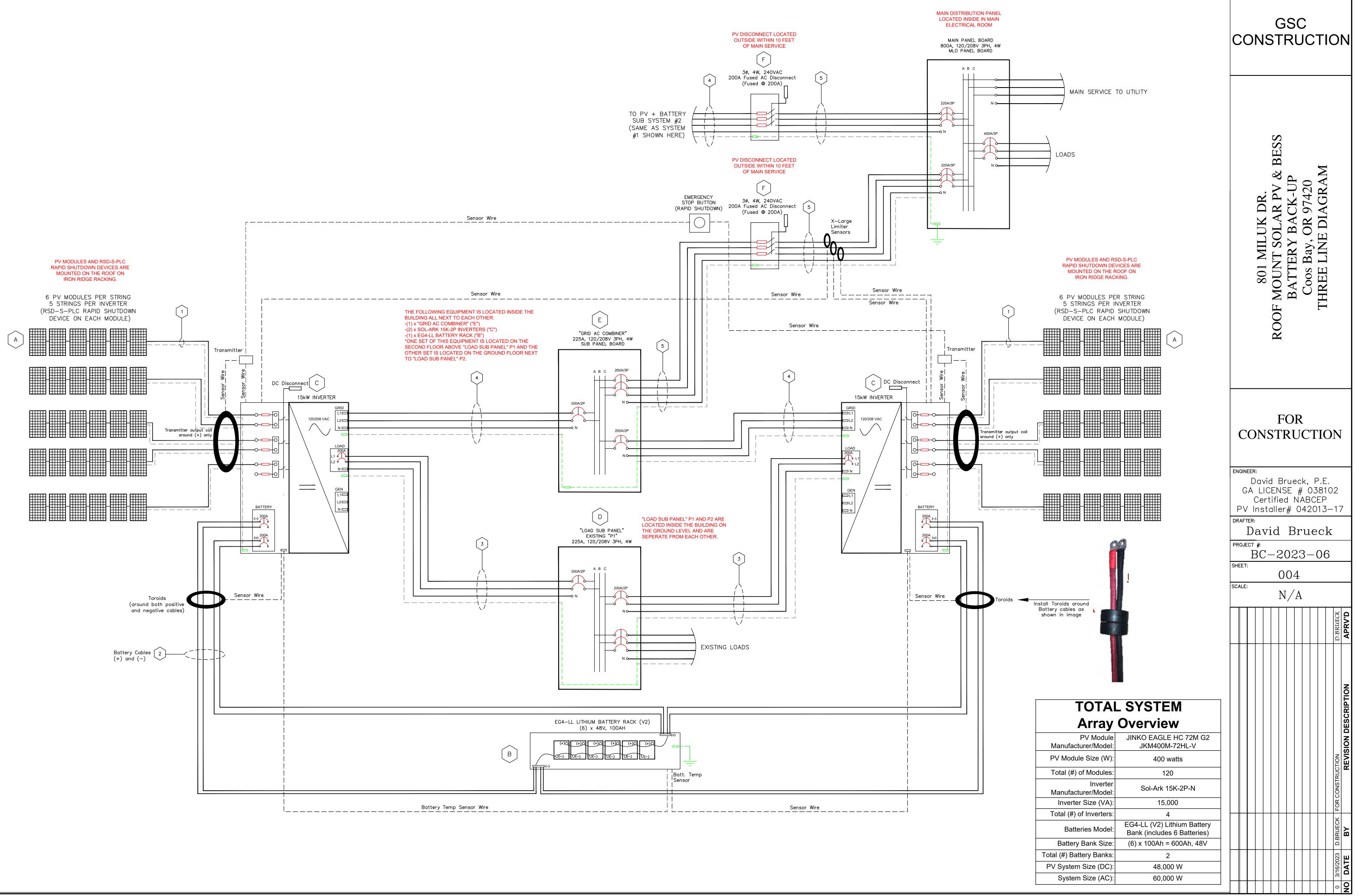
SUB PANEL 'P1' LOCATED INSIDE BUILDING ON GROUND FLOOD. INVERTERS AND BATTERIES LOCATED ON SECOND FLOOR DIRECTLY ABOVE 'P1': -(2) × SOL-ARK 15kW INVERTERS -(1) × EG4-LL LITHIUM BATTERIES KIT (V2) 30.72kWh, 6 BATTERY RACK IN PRE-ASSEMBLED ENCLOSURE

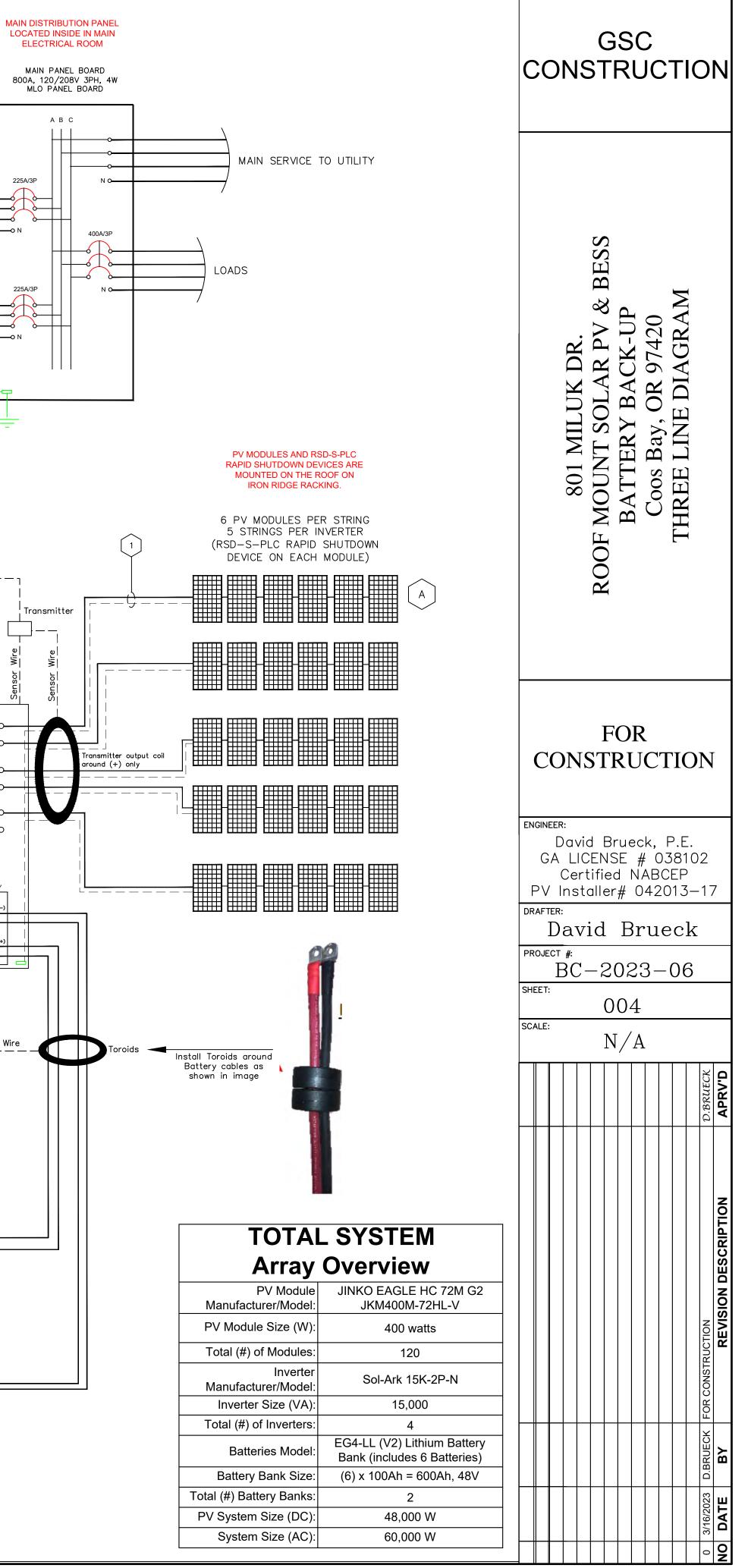
(120) x 400W PV MODULES

SUB PANEL 'P2', INVERTERS AND BATTERIES LOCATED INSIDE BUILDING ON GROUND FLOOR: -(2) × SOL-ARK 15kW INVERTERS -(1) × EG4-LL LITHIUM BATTERIES KIT (V2) 30.72kWh, 6 BATTERY RACK IN PRE-ASSEMBLED ENCLOSURE



No





CONDUIT FILL CALCULATION (DC CIRCUITS ONLY)

PER NEC ART. 352.22 FOR PVC AND 358.22 FOR EMT AREA OF 1000 VOLT #10PV WIRE = 0.0543 SQ. IN. AREA OF 1000 VOLT #6PV WIRE = 0.0956 SQ. IN.

EXAMPLE:

 $(12) \times 0.0543$ (#10 PV WIRES) = 0.66 SQ. IN. (1) \times 0.0956 (#6 PV WIRES) = 0.0956 SQ. IN. TOTAL = 0.76 SQ. IN.

-FROM NEC CHAPTER 9, TABLE 4 FOR RMC CONDUIT @ 40% FILL: 1-1/2" CONDUIT = 0.829 SQ. IN. AVAILABLE. -0.76 SQ. IN. IS LESS THAN 0.829 SQ. IN., SO 1-1/2" CONDUIT WORKS FOR DC CONDUIT WITH UP TO (12) #10 CU PV WIRES. *USE TABLE 4 IN NEC CHAPTER 9 FOR RMC CONDUIT. USE COLUMN FOR "OVER 2 WIRES 40%" TO DETERMINE MAX CROSS-SECTIONAL AREA AVAILABLE FOR WIRES AND MAKE SURE TOTAL WIRE CROSS-SECTIONAL AREA IS LESS THAN CONDUIT SIZE CROSS-SECTIONAL AREA AVAILABLE AT 40%

EQUIPMENT SCHEDULE

			_	
EQUIPMENT DESIGNATION	MANUFACTURER	MODEL #	QTY	
A	JINKO SOLAR	EAGLE HC 72M G2 JKM400M-72HL-V	120	MONO PERC HALF-CELL SOLAR MOD
A	AP SMART	RSD-S-PLC	120	MODULE LEVEL RAPID SHUTDOWN
В	EG4	EG4-LL (V2)	2	EG4-LL (V2) Lithium Battery Bank (inclu in Battery enclosure.
С	SOL-ARK	15K-2P-N	4	INVERTER WITH (3) x MPPTS WITH (2 BATTERY CONNECTION. GENERATO 120/208V (L1,L2,N). (2) INVERTERS C
D	TBD	"LOAD SUB PANEL"	2	225A, 120/208V, 3 PHASE, 4 WIRE, PA FROM SOL-ARK INVERTERS. NEUTRA
E	TBD	"GRID AC COMBINER PANEL"	2	225A, 120/208V, 3 PHASE, 4 WIRE, PA FOR FEED TO SOL-ARK INVERTERS.
F	TBD	"AC DISCONNECT"	2	200A, 240VAC, 3 POLE, 4 WIRE, AC FUNSTALLATION. NEUTRAL BUS, GRO

CONDUCTOR SCHEDULE - DC SIDE (PV STRINGS)

CIRCUIT Max One Way Short Circuit Euco/			AGE DROP C	CALCULATIONS CONDUCTOR & CONDUIT SCHEDULE										
	CIRCUIT DESCRIPTION	CIRCUIT ID #	Max One-Way Distance	Short Circuit Current (Isc)	Fuse/ Breaker		Distance(ft) x 2	Imp (A) x # of parallel strings	Conductor (Ohm/Kft) x 100	(Sys Nom. Voltage x # of modules in string) x 1000	Voltage Drop (%)	Wire Size & Type	Ground Wire Size & Type	Conduit Size & Qty
	PV STRING TO INV (MAX)	01	200 Ft	10.36A	20A		200 x 2 x	9.6 x 1 x	1.21 x 100	/ (* <mark>33.91V</mark> x 6 x 1000)	2.28%	2#10 CU PV WIRE	1#6 CU AWG	Max (12) #10 PV Wires in 1-1/2"
	*33.91V (COMES FF	ROM LIFETIME M	IN VOLTAGE OF	MODULES	AT F	HIGHEST RECOR	RD TEMP.		MAX TOTAL DC VOLT DROP:	2.28%			

CONDUCTOR SCHEDULE - DC SIDE (BATTERY BANK)

			1					•	-	1			
GENER	AL		OCPD VOLTAGE DR				AGE DROP C	CALCULATIONS		CONDUCTOR & CONDUIT SCHEDULE			
CIRCUIT DESCRIPTION	CIRCUIT ID #	Max One-Way Distance	Max (A) Circuit Current	Fuse/ Breaker	Distance(ft) x 2	Imp (A) x # of parallel strings	Conductor (Ohm/Kft) x 100	(Sys Nom. Voltage x # of modules in string) x 1000	Voltage Drop (%)	Wire Size & Type	Ground Wire Size & Type	Conduit Size & Qty	
INV TO BATTERY BANK (MAX)	02	20 Ft	160A	200A	20 x 2 x	160 x 1 x	0.0626 x 100	/ (<mark>48</mark> ∨ x 1000)	0.83%	2#4/0 CU BATTERY CABLES	1#6 CU AWG	N/A	Max
*48V I	S THE BAT	TTERY BANK VC	DLTAGE. 160A IS	THE MAX C	URRENT SIZED FOF	R 200A		MAX TOTAL DC VOLT DROP:	0.83%				

CONDUCTOR SCHEDULE - AC SIDE

GENER	AL		OCPI	D		VOLT	AGE DROP C	CALCULATIONS		CONDUCTOR	& CONDUIT SC	HEDULE	
	CIRCUIT	Max One-Way	Max (A) Circuit	Fuse/	Distance(ft) x 2	Max (A) / # AC	Conductor	System Naminal Valtage v1000	Voltage	Wire	Ground Wire	Conduit	PV Inp
CIRCUIT DESCRIPTION	ID #	Distance	Current	Breaker		parallel runs	(Ohm/Kft) x 100	System Nominal Voltage x1000	Drop (%)	Size & Type	Size & Type	Size & Qty	PV Strin
INV TO "LOAD SUB PANEL" (EXISTING SUB PANEL 'P1') (MAX)	1 03	50 Ft	160A	200A/2P	50 x 2 x	160 / 1	0.067 x 100	/ (208 x 1000)	0.51%	3#4/0 CU THWN-2	1#4 CU THWN-2	2" x (1)	
INV TO "GRID AC COMBINER" SUB PANEL (MAX)	1 04	50 Ft	160A	200A/2P	50 x 2 x	160 / 1	0.067 x 100	/ (208 x 1000)	0.51%	3#4/0 CU THWN-2	1#4 CU THWN-2	2" x (1)	20
"GRID AC COMBINER" SUB PANEL TO "MDP" (MAX)		200 Ft	160A	200A/3P	200 x 2 x	160 / 1	0.043 x 100	/ (208 x 1000)	1.32%	4#350 CU THWN-2	1#2 CU THWN-2	3" x (1)	
**MAX CURRENT OF 1	60A USED	IS TO REPRES	ENT THE MAX LO	DAD THAT CA	N BE PULLED FRO	PANEL.	MAX TOTAL AC VOLT DROP:	2.34%					

SUB S	YSTEM #1	SUB S	YSTEM #2
Ov	erview	Ov	rview
PV Module Manufacturer/Model:	JINKO EAGLE HC 72M G2 JKM400M-72HL-V	PV Module Manufacturer/Model:	JINKO EAGLE HC 72M G2 JKM400M-72HL-V
PV Module Size (W):	400 watts	PV Module Size (W):	400 watts
Total (#) of Modules:	60	Total (#) of Modules:	60
Inverter Manufacturer/Model:	Sol-Ark "Limitless 15kV-LV"	Inverter Manufacturer/Model:	Sol-Ark "Limitless 15kV-LV"
Inverter Size (VA):	15,000	Inverter Size (VA):	15,000
Total (#) of Inverters:	2	Total (#) of Inverters:	2
Batteries Model:	EG4-LL Lithium Battery Rack (V2)	Batteries Model:	EG4-LL Lithium Battery Rack (V2)
Battery Bank Size:	(6) x 100Ah = 600Ah, 48V	Battery Bank Size:	(6) x 100Ah = 600Ah, 48V
Total (#) Battery Banks:	1	Total (#) Battery Banks:	1
PV System Size (DC):	24,000 W	PV System Size (DC):	24,000 W
System Size (AC):	30,000 W	System Size (AC):	30,000 W

DESCRIPTION

DDULE RATED FOR 1500 VDC.

I DEVICE ON EACH MODULE.

ludes 6 Batteries). Each Battery is 100Ah, 48V. 6 Batteries connected in parallel

(2) INPUTS EACH AT 500VDC MAX FOR SOLAR PV. (2) x INPUTS FOR FOR CONNECTION IF NEEDED. 200A LOAD BREAKER. OUTPUT IS CONNECTED IN PARALLEL TO 3 PHASE 120/208V GRID AND LOAD.

PANELBOARD WITH MAIN LUGS AND (2) x 200A/2P BREAKERS FOR FEED RAL BUS, GROUND LUG KIT. BREAKERS FOR EXISTING LOADS.

PANELBOARD WITH 200A/3P MAIN BREAKER AND (2) x 200A/2P BREAKERS 5. NEUTRAL BUS, GROUND LUG KIT.

FUSED DISCONNECT (FUSED @ 200A), NEMA 3R FOR OUTSIDE OUND LUG KIT.

STC F

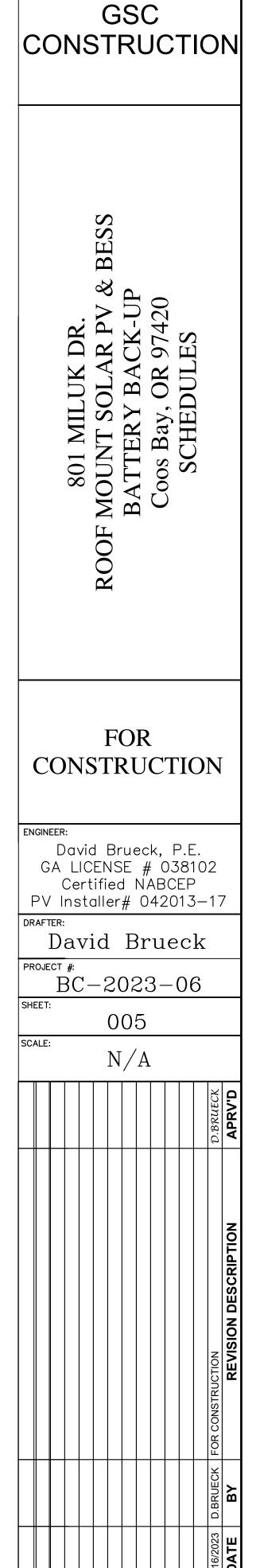
DC Input

Max Output (A

Max lax Out

Max

ΤΟΤΑ	L SYSTEM
Ov	erview
PV Module Manufacturer/Model:	JINKO EAGLE HC 72M G2 JKM400M-72HL-V
PV Module Size (W):	400 watts
Total (#) of Modules:	120
Inverter Manufacturer/Model:	Sol-Ark "Limitless 15kV-LV"
Inverter Size (VA):	15,000
Total (#) of Inverters:	4
Batteries Model:	EG4-LL Lithium Battery Rack (V2)
Battery Bank Size:	(6) x 100Ah = 600Ah, 48V
Total (#) Battery Banks:	2
PV System Size (DC):	48,000 W
System Size (AC):	60,000 W

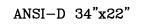


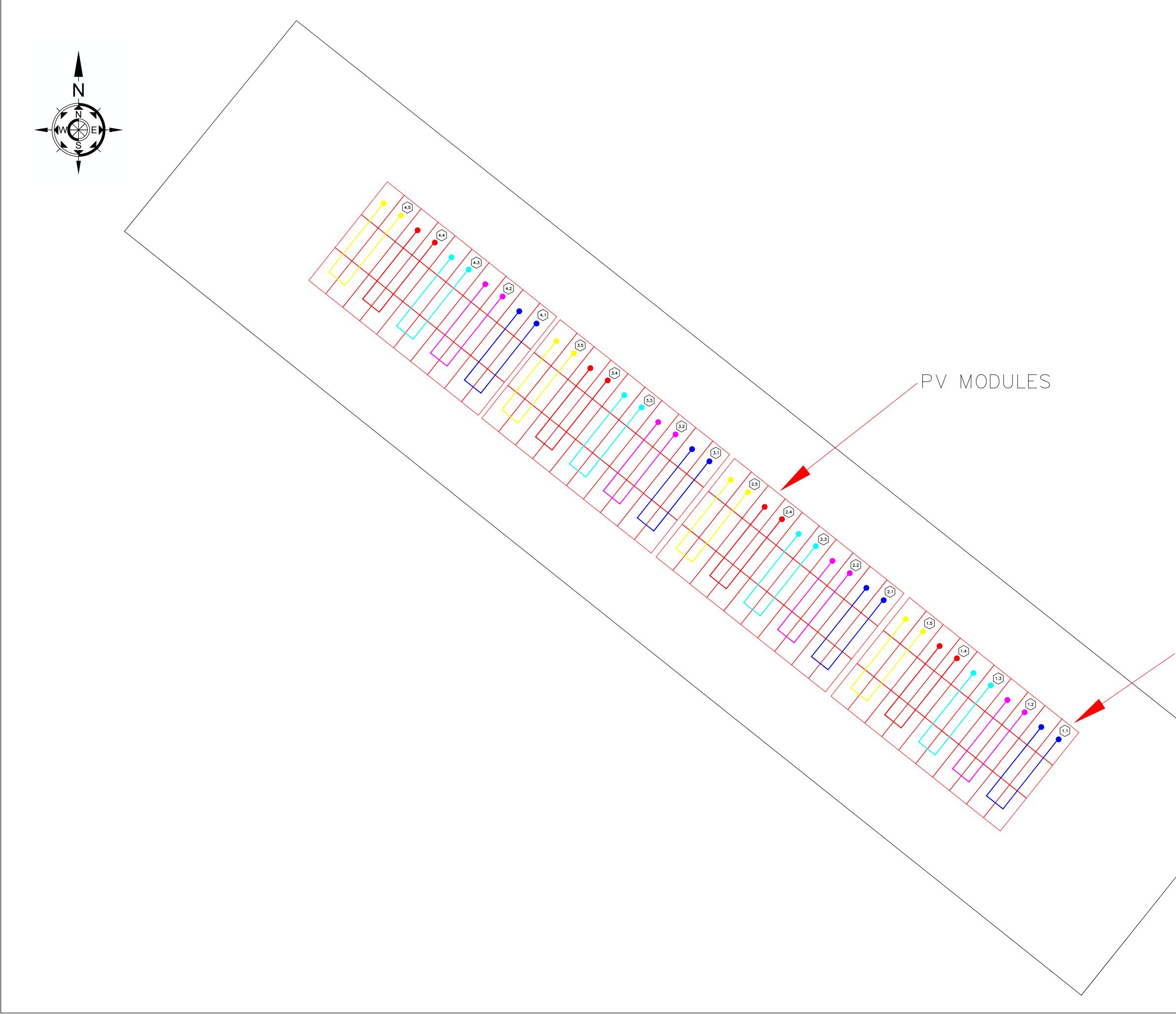
PV MODULE SPECIFICATIONS

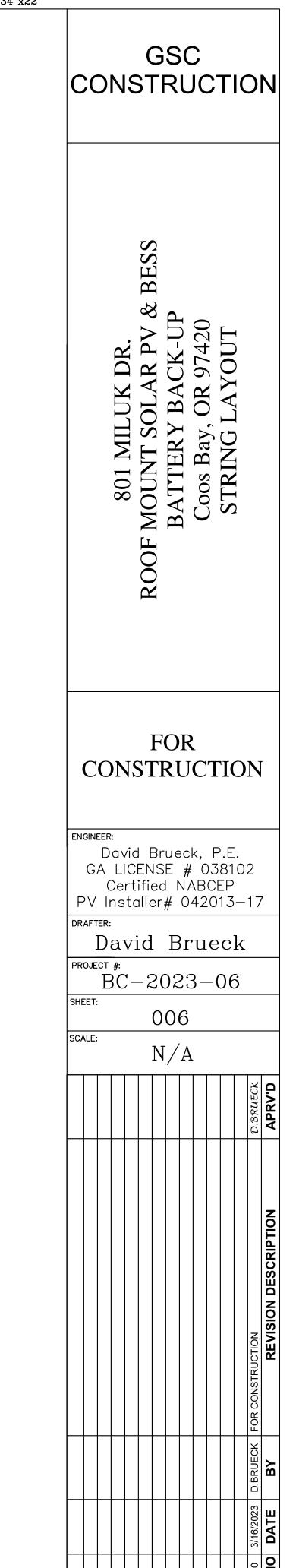
Module Name:	JINKO EAGLE HC 72M G2 JKM400M-72HL-V
Power Rating (W):	400
Voc (V):	49.8
Vmp (V):	41.7
lsc (A):	10.36
Imp (A):	9.60
Module Efficiency:	19.88%

INVERTER ELECTRICAL SPECIFICATIONS

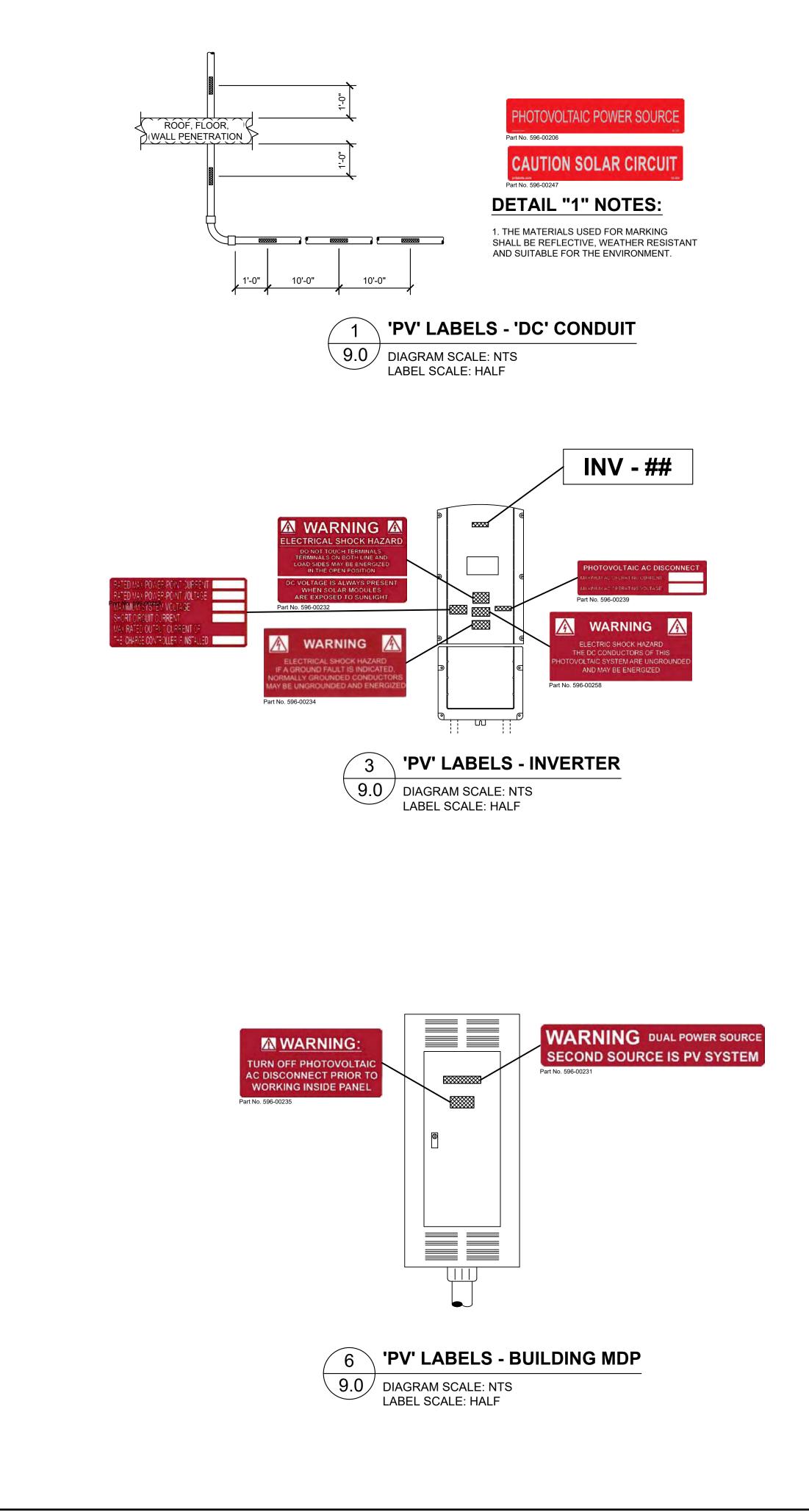
Inverter Name:	Sol-Ark 15k-2P-N
nput (Solar PV)	
Max DC Voltage (Voc):	500V
MPPT Voltage Range (V):	125 - 425V
Starting Voltage (V):	125V
Number of MPPT:	3
Max Solar Strings per MPPT:	2
Max DC Current per MPPT (A):	26A
out (AC)	
Rated Power (VA):	15,000
Nominal AC Voltage (V):	120/240/208V Split Phase
AC Frequency (Hz):	60
Max Output Current w/ PV (A):	72.2 L-L (208V)
<pre> output Current w/ Battery (A): </pre>	58A L-L (208V)
/lax Output Current w/ Grid (A):	200A L-L (208V)
PV DC Disconnect Switch:	Integrated
Ground Fault Detection:	Integrated
PV Rapid Shutdown:	Integrated
PV Arc Fault Detection:	Integrated
PV Input Lightening Protection:	Integrated
V String Input Reverse Polarity Protection:	Integrated
AC Output Breakers:	Integrated
200A x 2 Battery Breaker / Disconnect:	Integrated
Surge Protection:	DC Type II / AC Type II

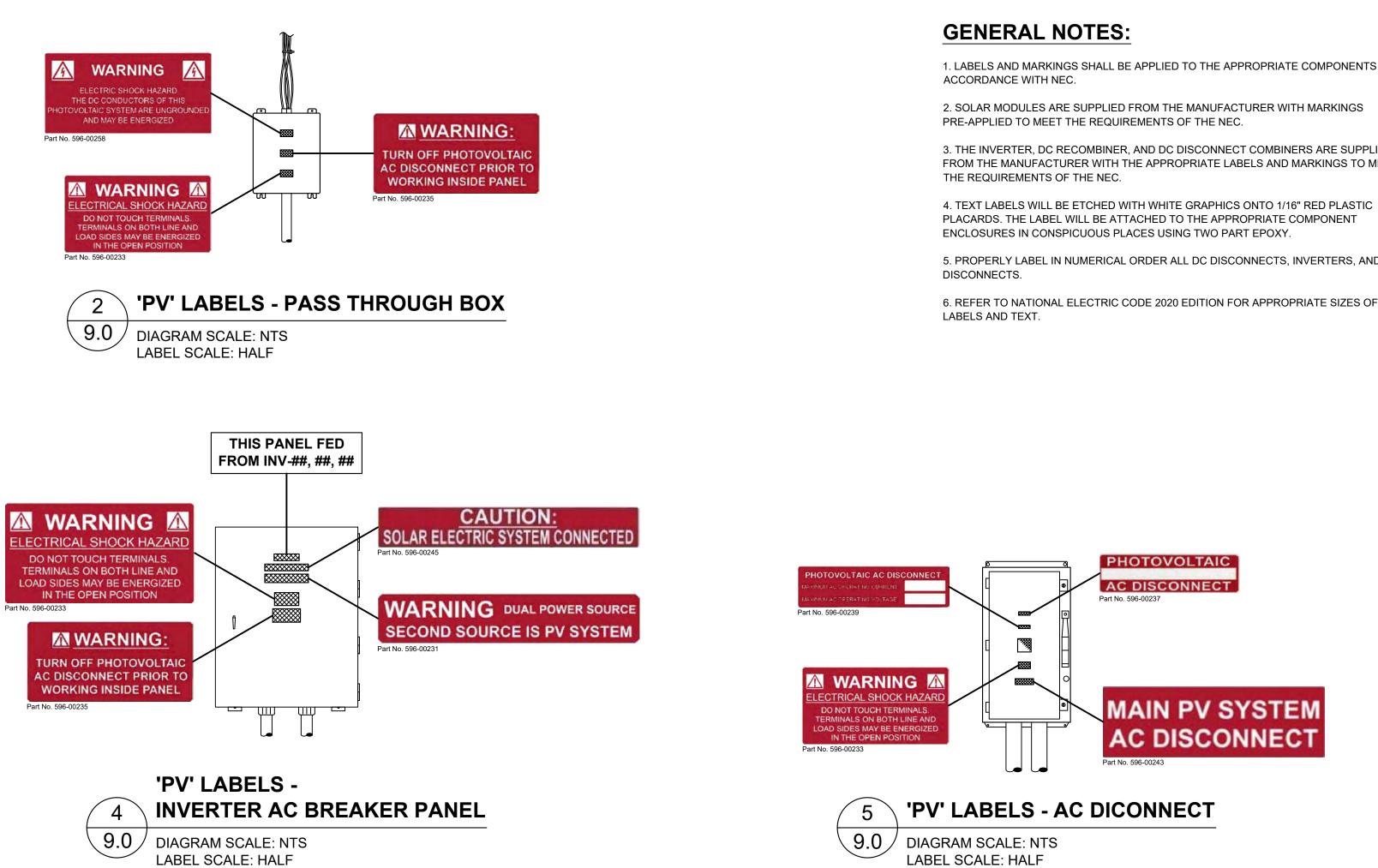


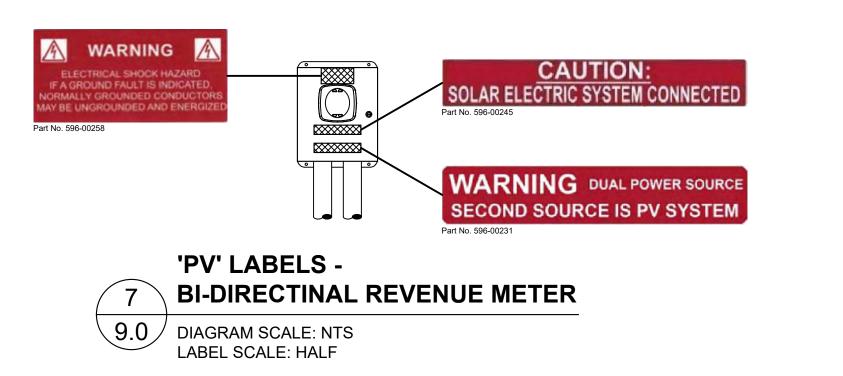




INVERTER/STRING ID (REFERENCE SLD)











1. LABELS AND MARKINGS SHALL BE APPLIED TO THE APPROPRIATE COMPONENTS IN

3. THE INVERTER, DC RECOMBINER, AND DC DISCONNECT COMBINERS ARE SUPPLIED FROM THE MANUFACTURER WITH THE APPROPRIATE LABELS AND MARKINGS TO MEET

5. PROPERLY LABEL IN NUMERICAL ORDER ALL DC DISCONNECTS, INVERTERS, AND AC

6. REFER TO NATIONAL ELECTRIC CODE 2020 EDITION FOR APPROPRIATE SIZES OF

LABEL SCALE: HALF

DETAIL "5" NOTES:

1. ARC FLASH AND SHOCK HAZARD WARNING LABEL TO BE PLACED ON ALL EQUIPMENT THAT HAS EXPOSED LIVE PARTS WHEN ENCLOSURE IS OPEN FOR SERVICING.

'PV' LABELS - ARC FLASH HAZARD

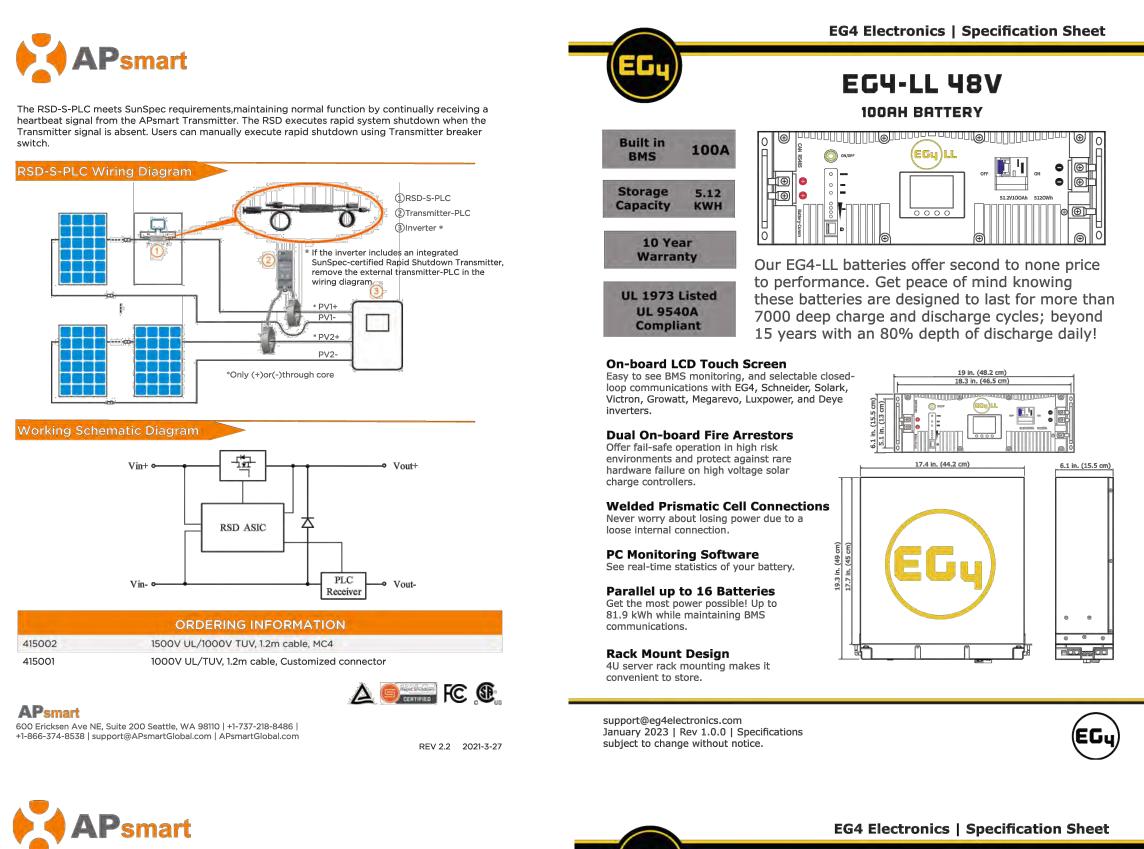
GSC CONSTRUCTION

BESS

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														D.BRUECK	APRV'D
														FOR CONSTRUCTION	REVISION DESCRIPTION
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														3/16/2023	VO DATE
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osolar.us	So JinKO Building Your Trust in Sol	lar	IRONRIDG	E		Tech B XR Rail [©] Farr	
and the second second					Sec. 1		
agle HC 72M G2			Ifetime, solar panels exp			Trank.	
80-400 Watt		extreme w but the wo	veather events. Not just th orst storms in 40 years. H	ne worst storms in years, igh winds capable of		SIT :	
itive power tolerance of 0~+3%			nels from a roof, and sno buckle a panel frame.	wraiis weigning	TH.	(TH)	
		preventing	are the structural backbo these results. They resi	st uplift,	FF	A	
		and efficie	ainst buckling and safely ently transfer loads into th ructure. Their superior		$\pm \pm \pm$		
		spanning (capability requires fewer ments, reducing the	*		IIII	
KEY F	EATURES	number of and the ar installatior			TH.		
	Diamond Cell Technology Uniquely designed high performance 5 busbar mono PERC half cell	Installation	rume.	/			
1000	High Voltage			6	- 7		
	UL and IEC 1500V certified; lowers BOS costs and yields better LCOE			1		111	
	Higher Module Power Decrease in current loss yields higher module efficiency		1	X			
	Shade Tolerance More shade tolerance due to twin arrays			Force-Stabiliz		2 0 1	
	PID FREE			forces on mountin bend and twist. Th	erate both vertical and later g rails which can cause the ne curved shape of XR Rail	em to s®	
17. 17. (B. 70)	Reinforced cell prevents potential induced degradation		KI	directions while re feature ensures g	ed to increase strength in l sisting the twisting. This ur reater security during extre ger system lifetime.	nique	
	Strength and Durability Certified for high snow (5400Pa) and wind (2400 Pa) loads						
ISO9001.2008 Quality Standards ISO14001:2004 Environmental Standards OHSAS18001 Occupational Health & Safety Standards							
UL1703 certified products	10 Year Product Warranty • 25 Year Linear Power Warranty						
Nomenclature: JKM400M-72HL-V de Cell Code Cell Code Certification		Compati	ible with Flat & Pitched R		Corrosion-Resistan		
ull Full null Normal null 1000V 97% - H Half L Diamond V 1600V	Additional value from Jinko Solar's linear warranty		XR Rails® are compatible with FlashFoot® and other pitched roof	a range of tilt leg options for flat	All XR Rails [®] are made of aluminum alloy, then prote anodized finish. Anodizing	cted with an prevents surface	
	Solar's linear warrant				and stand on land and and and the		
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ISTED BO2%-	5 12 25 yea		attachments.				
LISTED 0000 0000 0000 Engineering Drawings	5 12 25 yea	XR Rail [©] F The XR Rail [©] design loads, XR10 XR10 is a sler rail, designed no snow. It ac while remain designed no snow. It ac	Attachments.	applications.	a more attractive appearant targeted sizes. Eac our location, there is alal Solar i le also t. Solar i extrem feet fo . 12' . Ext h	Tech Brief	
ISTED 0000 0000 0000 00000 00000 00000 00000 0000	<figure>2 Service Ser</figure>	XR Rail [©] F The XR Rail [©] design loads, XR10 XR10 is a slee rail, designed no snow. It ac while remainit • 6' spanning • Moderate la • Internal spi Rail Selecc The table belo	attachments. Family Family offers the strengt while minimizing material Image: strengt with light of for regions with light of therees spans up to 6 feet, ng light and economical. up capability coad capability coa	applications. h of a curved rail in three I costs. Depending on your XR100 XR100 is the ultimate resident mounting rail. It supports a ran wind and snow conditions, whi maximizing spans up to 10 fee - 10' spanning capability - Heavy load capability - Clear & black anodized finis - Internal splices available	a more attractive appearant targeted sizes. Eac our location, there is all so the size (Comparison of the size of	Tech Brief th size supports specific an XR Rail® to match.	
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Ridge, Inc. All rights reversel). Visit www.inonridge.com or call 1-800-227-9623 for more information: Version 1.21





Raising	the	bar	in	innovative
DC MLP	E so	blar	po	wer systems

RSD-S-PLC

- Meets NEC 2017 & 2020 (690.12) requirements
- Executes rapid shutdown of system
- when Transmitter-PLC signal is absent Meets SunSpec requirements

RSD-S-PLC Technical Data 🧼

Model	RSD-S-PLC
Input Data (DC)	
Input Operating Voltage Range	8-80V
Maximum Cont. Input Current (Imax)	15A
Output Data (DC)	
Output Operating Voltage Range	8-80V
Maximum System Voltage	1000V/1500V
Mechanical Data	
Operating Ambient Temperature Range	-40 °F to +185 °F (-40 °C to + 85 °C)
Dimensions (without cable & connectors)	5" x 1.2" x 0.6"(129 mm x 30 mm x 16 mm)
Cable Length	Input 250mm/Output 1200mm
Cable Cross Section Size	TUV:4mm²/UL:12AWG
Connector	MC4 or Customize
Enclosure Rating	NEMA Type 6P/IP68
Over Temperature Protection	Yes
Features & Compliance	
Communication	PLC
Safety Compliance	NEC 2017 & 2020 (690.12); UL1741; CSA C22.2 No 330-17; IEC/EN62109-1; 2PFG2305
EMC Compliance	FCC Part15; ICES-003;IEC/EN61000-6-1/-2/-3/-4

REV 2.2 2021-3-27

Notifinal Operating Parameters			
Voltage	51.2V		
Capacity	100Ah		
Charging Voltage (Bulk/Absorb)	56.2V (+/-0.2V)		
Float	54V (+/-0.2V)		
Low DC Cutoff	47-44V (depending on load - start high, lower if needed)		
Charging Current	Max Constar	Max Constant Charge: 100A (30-50 recommended	
Discharging Current	Ma	ax Constant Discharge:	100A
Environmental Parameters			
Charging Range	32°F to 113°F (0°C to 45°C)		
Discharging Range	-4°F to 122°F (-20°C to 50°C)		
Storage Range	-4°F to 122°F (-20°C to 50°C)		
BMS Parameters			
Charge	Spec	Delay	Recovery
Cell Voltage Protection	3.8V	1 sec	3.45V
Module Voltage Protection	60.0V	1 sec	55.2 V
Over Charging Current 1	>102A	10 sec	1
Over Charging Current 2	≥120A	3 sec	
Temperature Protection	<-5°C or >70°C	1 sec	>-0°C or <60°C
Discharge			
Cell Voltage Protection	2.3V	1 sec	3.1V
Module Voltage Protection	44.8V	1 sec	48V
Over Charging Current 1	>102A	10 sec	60 sec
Over Charging Current 2	>150A	3 sec	60 sec
Short-Circuit	>250A	<0.1 mS	
Temperature Protection	<-20°C or >75°C	1 sec	>-10°C or <65°C
BMS	Para	Parameter	
PCB Temperature Protection	>105°C	Delay 1 sec	Recovery @ <80°C
Cell Balance	120mA	Passive Balance	Cell Voltage Difference >40mV
Temperature Accuracy	3%	Cycle Measurement	Measuring Range: -40 to 100+0
Voltage Accuracy	0.5%	Cycle Measurement	For Cells & Module
Current Accuracy	3%	Cycle Measurement	Measuring Range -200 to +200
SOC	5%		Integral Calculation
Power Consumption - Sleep/Off Mode	<300uA		Storage/Transport
Power Consumption - Operating Mode	<25mA		Charging/Discharging
Communication Ports	R548	35/CAN	

EG4-LL 48V

100AH BATTERY

support@eg4electronics.com January 2023 | Rev 1.0.0 | Specifications subject to change without notice.



GSC CONSTRUCTION
grated grated pe II / AC pe II CONSTRUCTION
ENGINEER: David Brueck, P.E. GA LICENSE # 038102 Certified NABCEP PV Installer# 042013–17 DRAFTER: David Brueck PROJECT #: BC-2023-06 SHEET: 008 SCALE: N/A
D.BRUECK
316/2023 D.BRUECK P. P. 316/2023 D.BRUECK P. P.