



**SYMBOLS LEGEND:**

**ELECTRIC SYMBOLS:**

	FUSE		AUXILIARY TRANSFORMER		LV CONNECTION/TERMINATION
	SURGE PROTECTION DEVICE/ SURGE ARRESTER MOV STYLE		WYE/WYE TRANSFORMER W/ INTERNAL FUSING AND SURGE ARRESTERS		MV LIVE-FRONT BUSHING/TERMINATION
	CIRCUIT BREAKER		WYE/DELTA TRANSFORMER W/ INTERNAL FUSING AND SURGE ARRESTERS		MV DEAD-FRONT BUSHING/ TERMINATION
	GROUND		STRING COMBINER BOX		MEDIUM VOLTAGE- UNDERGROUND
	GROUNDING WYE		RESISTOR		EXISTING OVERHEAD CONDUCTORS
	DELTA		RECLOSER W/ VACUUM INTERRUPTER		DC CONDUCTORS- ABOVE GROUND
	MV DISCONNECT		RECLOSER W/ MULTIFUNCTIONAL RELAY		AC CONDUCTORS ABOVE GROUND
	NON-FUSED CUTOUT		TRACKER MOTOR		DC CONDUCTORS- UNDERGROUND
	POTENTIAL TRANSFORMER (PT)		PV MODULE		AC CONDUCTORS- UNDERGROUND
	CONTROL POWER TRANSFORMER		INDICATING LIGHT		COMMUNICATION
	CURRENT TRANSFORMER (CT)		SPECIAL PURPOSE OUTLET CONNECTION		(2 STRING) MODULE TRACKER
	CURRENT SENSOR (CS)		SHUNT-TRIP		(3 STRING) MODULE TRACKER
	VOLTAGE SENSOR (VS)		FUSED BOLTED-PRESSURE SWITCH (BPS) W/ GROUND-FAULT-PROTECTION (GFP)		(4 STRING) MODULE TRACKER
	METER		DC/DC OPTIMIZER/CONVERTER		
	INVERTER		PRIMARY REVENUE METER POLE		
	INVERTER WITH INTEGRATED DISCONNECT				
	PANELBOARD				
	MAIN DISTRIBUTION SWITCHBOARD				
	FUSED DISCONNECT				
	NON FUSED DISCONNECT				
	AIRBREAK (GOAB) DISCONNECT SWITCH				

**SITE LAYOUT SYMBOLS:**

	PARCEL BOUNDARY
	PARCEL SETBACKS
	ARRAY FENCE
	WETLANDS
	WETLAND SETBACK
	FLOODPLAIN
	FLOODPLAIN SETBACK
	BUILDING
	BUILDING SETBACK
	INVERTER STRINGING (11 STRINGS)
	INVERTER STRINGING (12 STRINGS)
	INVERTER STRINGING (13 STRINGS)
	DC TRENCHING
	AC TRENCHING
	POWER UNDERGROUND
	POWER OVERHEAD
	ACCESS ROAD
	MODULE
	TORQUE TUBE
	ACCESS GATE
	UTILITY/CUSTOMER POLES
	EQUIPMENT PAD
	INVERTER RACK
	MAIN SWITCHBOARD
	TRANSFORMER
	TRACKER MOTOR
	DC COMBINER BOX
	POLLINATOR
	TREE (VEGETATION)
	SHRUB (VEGETATION)
	AUXILLARY TRANSFORMER
	BESS EQUIPMENT PAD

**GENERAL NOTES/REQUIREMENTS:**

- THE WORK TO BE DONE UNDER THIS PROJECT INCLUDES PROVIDING ALL EQUIPMENT, MATERIALS, LABOR AND SERVICES NOT INCLUDED IN THE B.O.M, AND PERFORMING ALL OPERATIONS FOR COMPLETE AND OPERATING SYSTEMS. ANY WORK NOT SPECIFICALLY COVERED BUT NECESSARY TO COMPLETE THIS INSTALLATION, SHALL BE PROVIDED. ALL EQUIPMENT AND WIRING TO BE NEW AND PROVIDED UNDER THIS CONTRACT UNLESS OTHERWISE NOTED.
- ENTIRE INSTALLATION, INCLUDING MATERIALS, EQUIPMENT AND WORKMANSHIP, SHALL CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC CODE (NEC) AS WELL AS ALL APPLICABLE LAWS AND REGULATIONS AND REGULATORY BODIES HAVING JURISDICTION OVER THIS WORK.
- THE TERM "FURNISH" SHALL MEAN TO OBTAIN AND SUPPLY TO THE JOB SITE. THE TERM "INSTALL" SHALL MEAN TO FIX IN POSITION AND CONNECT FOR USE. THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL. THE TERM "CONTRACTOR" SHALL MEAN ELECTRICAL CONTRACTOR.
- ONLY WRITTEN CHANGES AND/OR MODIFICATIONS APPROVED BY THE ENGINEER, CONSULTING ENGINEER OR OWNER'S REPRESENTATIVE WILL BE RECOGNIZED.
- THE ELECTRICAL CONTRACTOR SHALL SUBMIT, FOR THE ENGINEER'S APPROVAL, DETAILED SHOP DRAWINGS OF ALL EQUIPMENT SPECIFIED.
- CONTRACTOR SHALL COORDINATE WITH SPECIFICATIONS PROVIDED BY OTHER TRADES.
- PROVIDE OPERATING AND MAINTENANCE MANUALS, PER SPECIFICATIONS, AND GIVE INSTRUCTIONS TO USER FOR ALL EQUIPMENT AND SYSTEMS PROVIDED UNDER THIS CONTRACT AFTER ALL ARE CLEANED AND OPERATING.
- KEEP PREMISES FREE FROM RUBBISH. REMOVE ALL ELECTRICAL RUBBISH FROM SITE.
- ALL WORK SHALL BE INSTALLED CONCEALED UNLESS OTHERWISE NOTED.
- THE WORK SHALL INCLUDE ALL PANELS, DEVICES, FEEDERS AND BRANCH CIRCUIT WIRING AS REQUIRED FOR THE DISTRIBUTION SYSTEM INDICATED AND CALLED FOR ON THE DRAWINGS, REQUIRED BY SPECIFICATIONS AND AS NECESSARY FOR COMPLETE FUNCTIONAL SYSTEMS PRESENTED AND INTENDED.
- THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR, TOOLS, EQUIPMENT, CONSUMABLES AND SERVICES REQUIRED FOR OBTAINING, DELIVERY, INSTALLATION, CONNECTION, DISCONNECTION, REMOVAL, RELOCATION, REPAIR, REPLACEMENT, TESTING AND COMMISSIONING OF ALL EQUIPMENT AND DEVICES INCLUDED IN OR NECESSARY FOR THE WORK, AS APPLICABLE. THIS INCLUDES SCAFFOLDING, LADDERS, RIGGING, HOISTING, ETC.
- ELECTRICAL WORK SHALL INCLUDE ALL REQUIRED CUTTING, PATCHING AND THE FULL RESTORATION OF WALL AND FLOOR STRUCTURE AND SURFACES. ALL EQUIPMENT, WALLS, FLOORS, ETC., DISTURBED OR DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER, AT THE CONTRACTORS EXPENSE.
- BEFORE SUBMITTING HIS BID, THE CONTRACTOR SHALL FULLY AQUAINT HIMSELF/HERSELF WITH THE JOB CONDITIONS AND DIFFICULTIES THAT WILL PERTAIN TO THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED, WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING UTILITIES.
- UPON COMPLETION OF THE ELECTRICAL WORK, THE CONTRACTOR SHALL TEST THE COMPLETE ELECTRICAL SYSTEM FOR SHORTS, GROUNDS, AND PROPER OPERATION, IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE.
- UPON COMPLETION OF WORK, THE CONTRACTOR SHALL CLEAN AND ADJUST ALL EQUIPMENT AND LIGHTING AND TEST SYSTEMS TO THE SATISFACTION OF OWNER AND ENGINEER. RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF FINISHED CONSTRUCTION PRIOR TO FABRICATION AND INSTALLATION OF FIXTURES AND EQUIPMENT.
- EXACT ROUTING OF CONDUITS AND "MC" CABLES SHALL BE DETERMINED IN THE FIELD.
- IF THE OWNER AND/OR HIS REPRESENTATIVE CONSIDERS ANY WORK TO BE INFERIOR, THE RESPECTIVE CONTRACTOR SHALL REPLACE SAME WITH CONTRACT STANDARD WORK WITHOUT ADDITIONAL CHARGE. ALL WORK SHALL BE DONE IN A NEAT, WORKMANLIKE MANNER, LEFT CLEAN AND FREE FROM DEFECTS, AND COMPLETELY OPERABLE.
- THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AS SHOWN ON THE DRAWINGS AND/OR AS SPECIFIED. ALL MATERIALS SHALL BE NEW, AND BEAR THE UL LABEL. ALL WORK SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER.
- DRAWINGS ARE TO BE CONSIDERED DIAGRAMMATIC, AND SHALL BE FOLLOWED AS CLOSELY AS CONDITIONS ALLOW TO COMPLETE THE INTENT OF THE CONTRACT. THE DRAWINGS AND SPECIFICATIONS COMPLIMENT ONE ANOTHER, AND WHAT IS SHOWN ON THE DRAWINGS AND NOT MENTIONED IN THE SPECIFICATIONS, AND VICE VERSA, IS TO BE INCLUDED IN THE SCOPE OF WORK.
- ALL EQUIPMENT CONNECTIONS SHALL BE INSTALLED PER APPLICABLE SEISMIC REQUIREMENTS.
- ENGINEER WILL MAKE A FINAL INSPECTION WITH THE OWNER AND CONTRACTOR AND WILL NOTIFY THE CONTRACTOR IN WRITING OF ALL PARTICULARS IN WHICH THIS INSPECTION REVEALS THAT THE WORK IS INCOMPLETE OR DEFECTIVE. THE CONTRACTOR SHALL IMMEDIATELY TAKE SUCH MEASURES AS ARE NECESSARY TO COMPLETE SUCH WORK OR REMEDY SUCH DEFICIENCIES.
- THE CONTRACTOR SHALL PERFORM ALL EXCAVATION, TRENCHING AND BACKFILL REQUIRED FOR ELECTRICAL WORK. BACKFILL SHALL BE SUITABLE MATERIAL PROPERLY COMPACTED TO 95% DENSITY IN EACH LAYER OF SIX (6) INCH DEPTH. CONDUIT SHALL BE MINIMUM 30" BELOW FINISHED GRADE.

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ELECTRICAL ENGINEER STAMP:

PROFESSIONAL ENGINEER STAMPS

ISSUANCE:

**INTERCONNETION  
PLAN SET**

LICENSED ELECTRICAL ENGINEER certifies that they prepared all the electrical "E" sheets in this drawing set.  
LICENSED STRUCTURAL ENGINEER certifies that they prepared all of the structural "S" sheets in this drawing set.  
LICENSED CIVIL ENGINEER certifies that they prepared all of the civil "C" sheets in this drawing set.  
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DRAWN BY: TLG		CHECKED BY: N/A	
SCALE: AS NOTED		JOB NO: 02063	

**SV CSG  
Dale, LLC**  
(44.27078, -88.73535)

SHEET TITLE  
GENERAL NOTES  
AND SYMBOLS

DWG. NO.  
**G-1.00**

**GENERAL NOTES/REQUIREMENTS:**

**2. PROJECT COORDINATION:**

- 2.1 THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE SITE AND NOTIFY THE OWNER OF ANY DISCREPANCIES, PRIOR TO COMMENCING WITH THE WORK.
- 2.2 THE CONTRACTOR SHALL REVIEW AND COORDINATE WITH THE DOCUMENTS OF ALL TRADES.
- 2.3 THE CONTRACTOR SHALL FURNISH A SCHEDULE INDICATING HIS PORTION OF TIME, WITHIN THE OVERALL SCHEDULE, REQUIRED TO COMPLETE THE WORK, IN CONJUNCTION WITH ALL TRADES. ALL WORK THAT MAY AFFECT OPERATION OF BUILDING SYSTEMS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE.
- 2.4 SHUT DOWN OF POWER SHALL BE COORDINATED WITH THE OWNER, ARCHITECT AND PROJECT MANAGER AT LEAST 14 WORKING DAYS PRIOR TO SHUT DOWN. SHUT DOWNS LONGER THAN 2 DAYS SHALL BE COORDINATED WITH THE ABOVE PERSONNEL AT LEAST ONE MONTH IN ADVANCE. TEMPORARY POWER FOR CONSTRUCTION SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR FOR SHUT DOWNS OVER 2 DAYS.
- 2.5 ALL CONDUITS AND DEVICE BOXES SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR, INCLUDING ALL TECHNOLOGY CONDUITS AND BOXES.
- 2.6 EXACT LOCATIONS OF OUTLETS AND EQUIPMENT SHALL BE COORDINATED WITH ARCHITECTURAL AND MILLWORK PLANS. ALL OUTLET AND EQUIPMENT LAYOUTS SHALL BE VERIFIED AND COORDINATED WITH WORK OF OTHER TRADES.
- 2.7 PROVIDE TEMPORARY LIGHTING AND POWER IN ACCORDANCE WITH ARTICLE 305 OF THE NEC. TEMPORARY LIGHTING FIXTURES IN UNFINISHED AREAS SHALL REMAIN CONNECTED UNTIL REMOVAL IS REQUESTED BY THE CONTRACTOR.
- 2.8 THE CONTRACTOR SHALL CONTACT THE BUILDING MANAGER TO OBTAIN A COPY OF THE GENERAL REQUIREMENTS AND/OR CONDITIONS TO BE USED FOR THIS PROJECT.

**3. CONNECTORS:**

- 3.1 DO NOT CROSS MATE CONNECTORS ON ANY SYSTEM. ENSURE THAT CONNECTOR SELECTION MEETS THE LEGAL BASIS THE EXCLUDE CROSS-CONNECTIONS OF:
  - PRODUCT NORMS ((IEC 62852 (EN62852)) AND UL 6703 PRODUCT NORM RESP. UL 1703 MODULE NORM
  - INSTALLATION NORMS AND LOCAL REGULATIONS
  - ASSEMBLY INSTRUCTIONS OF THE MANUFACTURER

VALID PV STANDARDS (IEC 60364-7-712:2017; E343181) STATE THAT "MALE AND FEMALE CONNECTORS [...] SHALL BE OF THE SAME TYPE FROM THE SAME MANUFACTURER" AND THAT UL CERTIFICATION FOR CONNECTORS ONLY APPLIES IF PRODUCTS FROM THE SAME PRODUCT FAMILY HAVE BEEN MATED

**4. WARRANTIES:**

- 4.1 ALL MATERIALS AND EQUIPMENT SHALL BE GUARANTEED IN WRITING FOR A MINIMUM OF ONE YEAR AFTER FINAL ACCEPTANCE BY OWNER.
- 4.2 WORKMANSHIP SHALL BE GUARANTEED IN WRITING FOR A MINIMUM OF 5 YEARS AFTER FINAL ACCEPTANCE BY OWNER
- 4.3 OBTAIN AND DELIVER TO THE OWNER'S REPRESENTATIVE ALL GUARANTEES AND CERTIFICATES OF COMPLIANCE.

**5. PERMITS:**

- 5.1 CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND INSPECTION FEES FOR ELECTRICAL WORK.

**6. RACEWAYS:**

- 6.1 ALL CONDUIT SHALL BE MINIMUM SIZE OF 1/2" FOR POWER CIRCUITS AND CONTROL CIRCUITS EXCEPT WHERE FLEXIBLE CONDUIT IS CALLED FOR ON PROJECT DOCUMENTS. ALL EXTERIOR EXPOSED CONDUIT SHALL BE PVC. ALL UNDERGROUND, IN SLAB OR UNDER SLAB SHALL BE SCH. 40 PVC. CHANGE TO SCH. 80 PVC CONDUIT BEFORE EXITING OUT OF UNDERGROUND SECTIONS. EMT IS ALLOWED IN INTERIOR DRY LOCATIONS WHERE NOT SUBJECT TO DAMAGE.
- 6.2 ALL FLEXIBLE CONDUIT IN WET OR DRY AREAS SHALL BE LIQUID TIGHT CONDUIT. NONMETALLIC FLEXIBLE CONDUIT IS SPECIFICALLY PROHIBITED.
- 6.3 CONDUIT SHALL BE RUN AT RIGHT ANGLES AND PARALLEL TO BUILDING LINES, SHALL BE NEATLY RACKED AND SECURELY FASTENED. JUNCTION BOXES SHALL BE PROVIDED WHERE REQUIRED TO FACILITATE INSTALLATION OF WIRES.
- 6.4 ALL CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN AN APPROVED MANNER.
- 6.5 ALL EMPTY RACEWAYS SHALL BE FURNISHED WITH A 200 LB. TEST NYLON DRAG LINE.
- 6.6 ARRANGEMENT OF CONDUIT AND EQUIPMENT SHALL BE AS INDICATED, UNLESS MODIFICATION IS REQUIRED TO AVOID INTERFERENCES.
- 6.7 ALL RACEWAY AND WIRING SHALL BE CONCEALED IN FINISHED AREAS. RACEWAY IN MECHANICAL ROOMS, BASEMENTS AND CRAWL SPACES MAY BE SURFACE MOUNTED.
- 6.8 FOR CONDUITS CROSSING EXPANSION JOINTS, PROVIDE EXPANSION FITTINGS FOR SIZE 1-1/4", AND LARGER. PROVIDE SECTIONS OF FLEXIBLE CONDUIT WITH GROUNDING JUMPERS FOR SIZES 1" AND SMALLER.
- 6.9 THE CONTRACTOR SHALL SEAL ALL PENETRATIONS THROUGH FIRE RATED WALLS AND FLOORS WITH APPROVED FIRE RATED SEALANT. ALL PENETRATIONS THROUGH ALL WALLS AND FLOORS SHALL BE SEALED. FOR ALL SLAB PENETRATIONS THE METHOD, DEPTHS AND LOCATIONS SHALL BE PRE-APPROVED BY THE BUILDING ENGINEER PRIOR TO THE START OF WORK.
- 6.10 THE CONTRACTOR SHALL INSTALL DETECTABLE UNDERGROUND TAPES FOR THE PROTECTION, LOCATION AND IDENTIFICATION OF UNDERGROUND CONDUIT INSTALLATION.
- 6.11 EXACT ROUTING OF CONDUITS AND CABLES SHALL BE DETERMINED IN FIELD.
- 6.12 ALL PENETRATIONS THROUGH FLOORS SHALL BE FIRE STOPPED AND SEALED WITH APPROVED SEALANT.
- 6.13 ELECTRICAL RACEWAY CONNECTIONS TO VIBRATING EQUIPMENT AND MACHINERY, SHALL BE MADE WITH FLEXIBLE LIQUID TIGHT METALLIC CONDUIT.
- 6.14 SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS IN HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK. MACHINE SCREWS IN METAL, BEAM CLAMPS IN FRAMEWORK AND WOOD SCREWS IN WOOD. NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO BUILDING LINES.
- 6.15 DO NOT RUN RACEWAYS CLOSER THAN 6 INCHES WHEN PARALLEL TO HOT WATER OR STEAM PIPES. WHEN CROSSING WATER OR STEAM PIPES CROSS A MINIMUM OF 3 INCHES ABOVE. IF CROSSING BELOW IS UNAVOIDABLE, PROVIDE DRIP SHIELDS EXTENDING 6 INCHES BEYOND THE WATER OR STEAMPIPE. BOXES INSTALLED IN PROXIMITY TO WATER OR STEAM PIPE SHALL BE RATED NEMA 4X.

**7. BOXES:**

- 7.1 INTERIOR JUNCTION BOXES SHALL BE SHEET STEEL. EXTERIOR JUNCTION BOXES SHALL BE NONMETALLIC, WITH SCREW COVERS. BOXES SHALL BE SUPPORTED INDEPENDENTLY OF CONDUITS.

**8. WIRING:**

- 8.1 ALL WIRE SHALL BE MADE OF COPPER WITH INSULATION SUITABLE FOR THE APPLICABLE ENVIRONMENT AND VOLTAGE. CONTRACTOR SHALL GET APPROVAL FOR ANY OTHER WIRE TYPE.
- 8.2 UNDER NO CIRCUMSTANCES SHALL FEEDERS BE SPLICED.
- 8.3 ALL ELECTRICAL TERMINAL TEMPERATURE RATINGS ASSUMED TO BE 75° C UNLESS SITE CONDITIONS REQUIRE OTHERWISE.
- 8.4 WIRE SIZES SHALL BE INCREASED WHERE NECESSARY TO LIMIT AC VOLTAGE DROP TO 1.5% TOTAL FROM INVERTER TO POINT OF COMMON COUPLING

**9. GROUNDING:**

- 9.1 PROVIDE A COMPLETE EQUIPMENT GROUND SYSTEM FOR THE ELECTRICAL SYSTEM AS REQUIRED BY ARTICLE 250 AND 690, OF THE NEC, AND AS SPECIFIED HEREIN.
- 9.2 ALL BRANCH CIRCUITS AND FEEDERS FOR POWER WIRING SHALL CONTAIN A COPPER GROUND WIRE. NO FLEXIBLE METAL CONDUIT OF ANY KIND OR LENGTH SHALL BE USED AS THE EQUIPMENT GROUNDING CONDUCTOR.

**10. MECHANICAL SYSTEMS POWER:**

- 10.1 DISCONNECT SWITCHES SHALL BE HEAVY DUTY, QUICK MAKE, QUICK BREAK TYPE, ENCLOSED IN A HEAVY SHEET METAL ENCLOSURE WITH HINGED INTERLOCKING COVER, IN PROPER NEMA RATED ENCLOSURES. FUSED OR NON-FUSED AS REQUIRED. DISCONNECT SWITCHES SHALL BE PROVIDED BY CONTRACTOR, EXCEPT AS NOTED ON DRAWINGS.
- 10.2 THE RATING FOR DISCONNECT SWITCHES SHALL BE THE SAME AS, OR GREATER THAN, THE PROTECTIVE DEVICE SERVING THE EQUIPMENT.
- 10.3 A STRUT FRAME SHALL BE PROVIDED AT ALL LOCATIONS WHERE STRUCTURE WILL NOT ADEQUATELY SUPPORT EQUIPMENT, OR FOR FREESTANDING EQUIPMENT.

**11. PANEL BOARDS:**

- 11.1 PANELBOARDS: SWITCHING UNITS SHALL BE 3 PHASE, 4 WIRE CIRCUIT BREAKER TYPE UNLESS OTHERWISE NOTED. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98% CONDUCTIVITY, AND SILVER OR TIN-PLATED JOINTS. CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME-PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN. HIGH DOORS) OR VAULT HANDLE, LOCK AND 3-POINT CATCH (LARGER THAN 48 IN. HIGH DOORS). HINGES SHALL BE SEMI-CONCEALED, 5-KNUCKLE STEEL WITH NONFERROUS PINS, 180-DEG OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. PROVIDE DOOR-IN-DOOR CONSTRUCTION. MINIMUM GUTTER SPACES FOR LIGHTING PANELS SHALL BE 5- BOTTOM. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER.
- 11.2 PROVIDE A NEW TYPE WRITTEN CIRCUIT DIRECTORY FOR EACH PANEL AFFECTED BY THIS PROJECT.
- 11.3 WHEREVER POSSIBLE, PANELBOARDS SHALL BE RECESSED IN WALL. SURFACE MOUNTED PANELBOARDS SHALL BE MOUNTED ON A PLYWOOD BACKBOARD. PLYWOOD SHALL BE MOUNTED ON TOP OF GYPSUM BOARD. PLYWOOD SHALL BE PAINTED ON ALL SIDES AND EDGES. COORDINATE WITH OWNER FOR COLOR.
- 11.4 PROVIDE LIGHTNING SURGE PROTECTION FOR MAIN SWITCHBOARD OR MAIN SERVICE PANEL BOARD. PROVIDE GROUNDING OF SURGE DEVICE PER THE NEC.
- 11.5 CONTRACTOR IS RESPONSIBLE FOR BALANCING LOADS ON ALL PHASES AND MAY ALTER ASSIGNMENT OF CIRCUITS FOR BALANCING PHASES.
- 11.6 CIRCUIT SCHEDULES ARE INTENDED TO REPRESENT THE GENERAL WIRING NEEDS OF THE EQUIPMENT SERVICED FROM THE PANEL. THE EXACT CIRCUIT ARRANGEMENT WILL BE DETERMINED BY PANEL SHOP DRAWING AND ARRANGEMENT WILL BE DETERMINED BY PANEL SHOP DRAWING AND PANELS ACTUALLY FURNISHED.

**12. IDENTIFICATION:**

- 12.1 REFER TO NEC LABELS DRAWING FOR LABELING REQUIREMENTS
- 12.2 INSTALL NAMEPLATES ON ALL MAJOR EQUIPMENT, INCLUDE STARTERS, TRANSFORMERS, PANELBOARDS, DISCONNECT SWITCHES AND OTHER ELECTRICAL BOXES AND CABINETS INSTALLED UNDER THIS CONTRACT.
- 12.3 APPLY CABLE/CONDUCTOR IDENTIFICATION MARKERS ON EACH CABLE AND CONDUCTOR IN EACH BOX, ENCLOSURE OR CABINET.

**13. RECORD DRAWINGS:**

- 13.1 THE CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS. THE APPROVAL OF SHOP DRAWINGS SHALL ONLY BE CONSTRUED TO APPLY TO THE GENERAL LAYOUT AND CONFORMANCE TO THE DESIGN CONCEPT OF THE PROJECT AND FOR THE COMPLIANCE WITH THE GENERAL REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL RETAIN THE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
- 13.2 PROVIDE SHOP DRAWINGS FOR THE LIGHTING FIXTURES, PANEL BOARDS, CIRCUIT BREAKERS, WIRING DEVICES, FIRE ALARM DEVICES AND SEALS FOR FIRE AND WATER STOPPING.
- 13.3 DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN A RECORD SET OF INSTALLATION PRINTS. HE SHALL NEATLY AND CLEARLY RECORD ON THESE PRINTS ALL DEVIATIONS FROM THE CONTRACT DRAWINGS IN SIZES, LOCATIONS AND DETAILS.
- 13.4 UPON PROJECT COMPLETION, THE CONTRACTOR SHALL COMPLETE THE MARK UP OF ALL PROJECT DRAWINGS TO RECORD INSTALLED CONDITIONS.
- 13.5 REPRODUCIBLE "RECORD" DRAWINGS PREPARED IN CAD FORMAT SHALL BE PROVIDED AS INSTALLED CONDITIONS OF THE WORK. A FULL SIZE PRINT OUT OF THE "RECORD" DRAWING FILE SHALL BE PROVIDED AFTER COMPLETION OF THE INSTALLATION.
- 13.6 UPON COMPLETION AND ACCEPTANCE OF WORK, THE CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE THE PROPER OPERATIONS AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

**14. PROTECTION OF WORK:**

- 14.1 EFFECTIVELY PROTECT ALL MATERIALS AND EQUIPMENT FROM ENVIRONMENTAL AND PHYSICAL DAMAGE UNTIL FINAL ACCEPTANCE. CLOSE AND PROTECT ALL OPENINGS DURING CONSTRUCTION. PROVIDE NEW MATERIALS AND EQUIPMENT TO REPLACE ITEMS DAMAGED.



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ELECTRICAL ENGINEER STAMP:

PROFESSIONAL ENGINEER STAMPS

ISSUANCE:

**INTERCONNETION  
PLAN SET**

LICENSED ELECTRICAL ENGINEER certifies that they prepared all the electrical "E" sheets in this drawing set.  
LICENSED STRUCTURAL ENGINEER certifies that they prepared all of the structural "S" sheets in this drawing set.  
LICENSED CIVIL ENGINEER certifies that they prepared all of the civil "C" sheets in this drawing set.  
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SCALE: AS NOTED		JOB NO: 02063	

**SV CSG  
Dale, LLC  
(44.27078, -88.73535)**

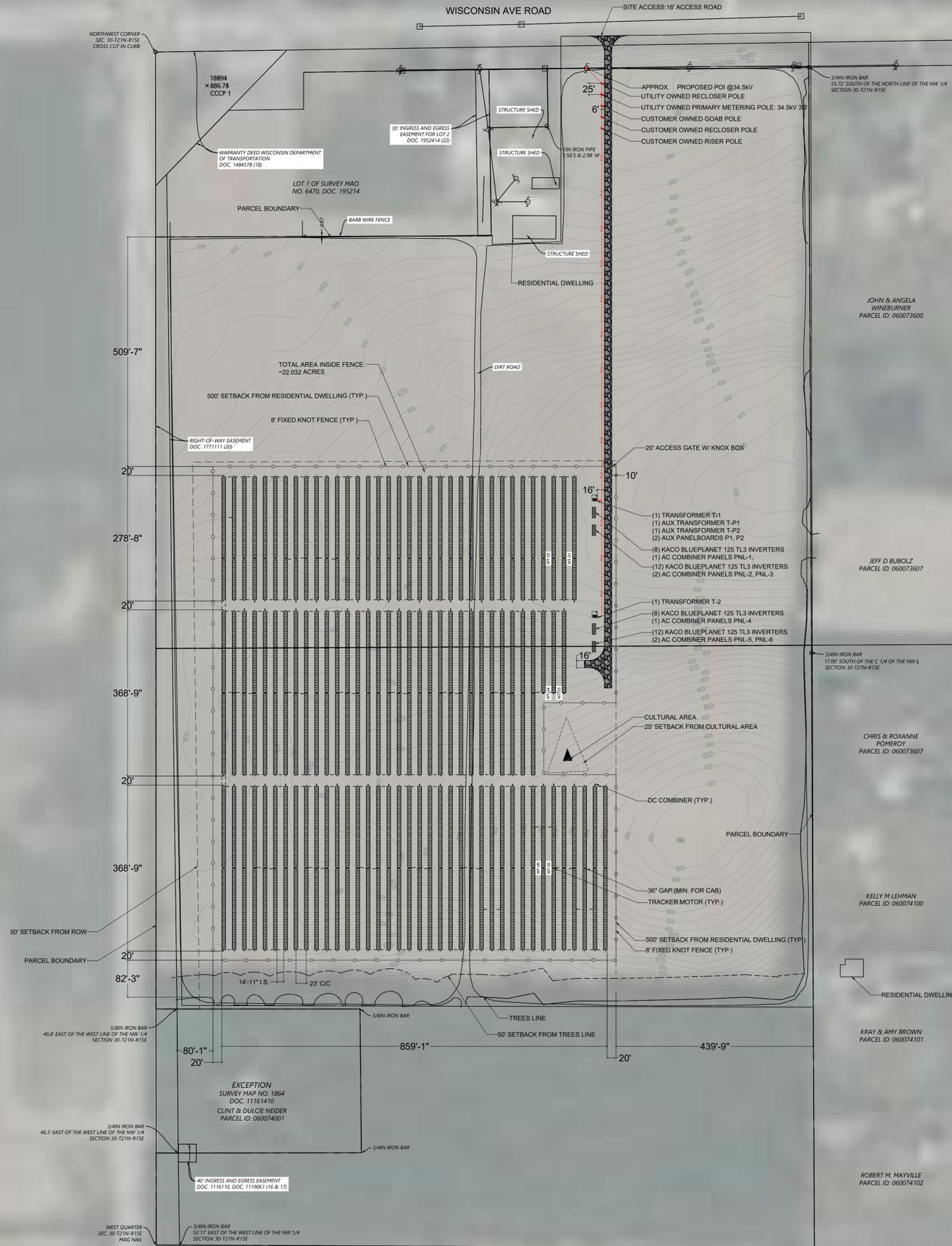
SHEET TITLE  
GENERAL NOTES

DWG. NO.

**G-2.00**

**SITE LAYOUT SYMBOL LEGEND:**

- PARCEL BOUNDARY
- - - PARCEL SETBACKS
- ARRAY FENCE
- WETLANDS
- - - WETLAND SETBACK
- FLOODPLAIN
- - - FLOODPLAIN SETBACK
- BUILDING
- - - BUILDING SETBACK
- - - INVERTER STRINGING (11 STRINGS)
- - - INVERTER STRINGING (12 STRINGS)
- - - INVERTER STRINGING (13 STRINGS)
- DC TRENCHING
- AC TRENCHING
- POWER UNDERGROUND
- POWER OVERHEAD
- ACCESS ROAD
- MODULE
- | TORQUE TUBE
- [ Y ] ACCESS GATE
- UTILITY/CUSTOMER POLES
- EQUIPMENT PAD
- INVERTER RACK
- MAIN SWITCHBOARD
- TRANSFORMER
- TRACKER MOTOR
- DC COMBINER BOX
- POLLINATOR
- TREE (VEGETATION)
- SHRUB (VEGETATION)
- AUXILLARY TRANSFORMER
- BESS EQUIPMENT PAD



ELECTRICAL ENGINEER STAMP:

PROFESSIONAL ENGINEER STAMPS

ISSUANCE:  
**INTERCONNETION  
PLAN SET**

SCALE: 1" = 124.99993'

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SCALE: AS NOTED JOB NO: 02063

**SV CSG**  
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SHEET TITLE  
ARRAY LAYOUT

DWG. NO.

**PV-1.00**



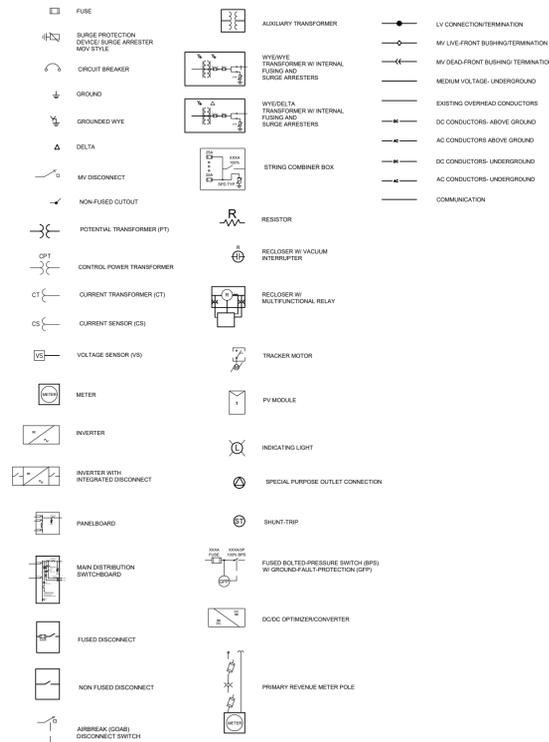
## PV SYSTEM DETAILS

ARRAY TYPE:	SINGLE AXIS TRACKER (SAT)
DC SYSTEM SIZE:	5.47992 MW DC
DC SYSTEM VOLTAGE:	1500 V
AC SYSTEM SIZE:	5000 MVA @PF=1
AC/DC RATIO:	1.095984
MODULE QTY/TYPE:	(9,288) HANWHA QCELL:Q.PEAK XL-G11S SERIES
MODULE WATTAGE:	590W
INVERTER QTY/TYPE:	(40) KACO TL3 M1 WM OD (XL) 600V:120.3A
INVERTER AC OUTPUT :	(40) 125KVA
STRING SIZE:	(24) MODULES PER STRING (387) TOTAL STRINGS
OPTIMIZER TYPE:	N/A

## ELECTRICAL NOTES

- INVERTER UNDERFREQUENCY AND OVER FREQUENCY SETTINGS SHALL BE COORDINATED WITH THE UTILITY STANDARDS.
- COORDINATE INVERTER SETTINGS WITH RECLOSING SETTINGS.
- INVERTERS SHALL COMPLY WITH IEEE 1547, IEEE 519 AND UL1741.
- PROVIDE A POLE MOUNTED VISIBLE OPEN, GANG OPERATED AIR BREAK, LOAD BREAK DISCONNECT SWITCH THAT IS VISIBLY MARKED "GENERATING FACILITY GENERATION DISCONNECT" AND IS ACCESSIBLE TO AND LOCABLE BY THE UTILITY AT ALL TIMES. LOCATE DISCONNECT IN CLOSE PROXIMITY TO THE UTILITY METER.
- PROVIDE VISIBLE LABEL "OF GENERATION BREAKER" ON MAIN BREAKERS. BREAKERS SHALL HAVE LOTO PROVISIONS.
- PROVIDE A POLE MOUNTED 3-PHASE VACUUM INTERRUPTER POLYMER RECLOSER, 27kV, 630A MIN, WITH INTEGRAL CURRENT TRANSFORMERS & (6) LEA VOLTAGE SENSORS ON BOTH SIDES OF RECLOSER. VOLTAGE SENSOR SHALL HAVE A MIN. ACCURACY PER IEEE1547. PROVIDE RECLOSER WITH 120V CPT AND SURGE ARRESTERS ON BOTH SOURCE & LOAD SIDE. PROVIDE WITH MANUFACTURER FURNISHED ADVANCED RECLOSER CONTROL RELAY WITH MINIMUM PROTECTION FUNCTIONS SHOWN AND WITH CONTROL CABLE AND POWER CABLE. PROVIDE WILDLIFE PROTECTORS. RECLOSER SHALL BE TAVRIDA ELECTRIC WITH SEL-651R RECLOSER OR APPROVED EQUAL IN STAINLESS STEEL CONTROL CABINET WITH BATTERY BACKUP AND HEATER PACKAGE. COMMUNICATE STATUS OF RECLOSER TO DAS.
- PROVIDE A PERMANENT AND WEATHERPROOF ONE-LINE DIAGRAM OF THE GENERATING FACILITY LOCATED AT THE POINT OF SERVICE CONNECTION TO THE UTILITY.
- PROVIDE MAIN TRANSFORMERS WITH EXTERNALLY ACCESSIBLE AND REPLACEABLE BAY-O-NET FUSES OR EQUIVALENT WITH SERIES CURRENT LIMITING FUSE.
- MAIN TRANSFORMERS SHALL BE RATED FOR PV APPLICATION WITH BI-DIRECTIONAL POWER FLOW CAPABILITY.
- INTERRUPTING AND WITHSTAND RATINGS SHALL BE CONFIRMED DURING CONSTRUCTION DESIGN PROCESS.
- DESIGN SHALL BE IN COMPLIANCE WITH NEC, WE ENERGIES AND ALL OTHER APPLICABLE CODES AND STANDARDS.

## ELECTRICAL SYMBOLS



## UTILITY INFORMATION

UTILITY COMPANY:	WE ENERGIES
UTILITY COMPANY CONTACT: TBD	PHONE: NA
UTILITY PROJECT MANAGER: TBD	PHONE: NA
INTERCONNECTION VOLTAGE:	34.5 KV



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PEWAUKEE, WI 53072  
PHONE: (262)-547-1200  
WWW.SUNVEST.COM

ELECTRICAL ENGINEER STAMP:

PROFESSIONAL ENGINEER STAMPS

ISSUANCE:  
**INTERCONNECTION  
PLAN SET**

LICENSED ELECTRICAL ENGINEER certifies that they prepared all the electrical "E" sheets in this drawing set.  
LICENSED STRUCTURAL ENGINEER certifies that they prepared all of the structural "S" sheets in this drawing set.  
LICENSED CIVIL ENGINEER certifies that they prepared all of the civil "C" sheets in this drawing set.  
It should be noted that any plan sheets not identified above have been prepared and certified by others and have been included herein for informational purposes only.

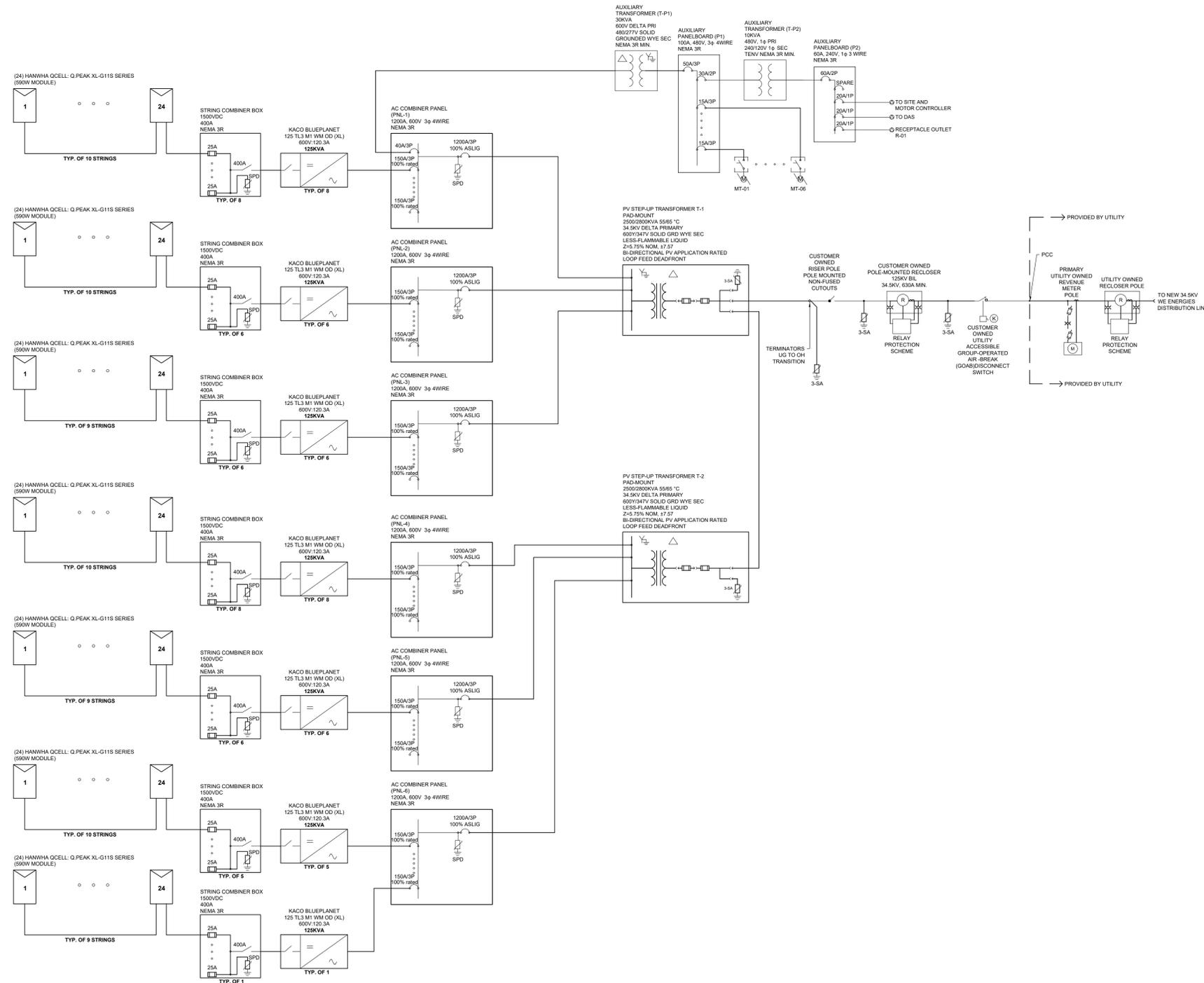
10		21	
9		20	
8		19	
7		18	
6		17	
5		16	
4		15	
3		14	
2		13	
1		12	
0	13/01/26	11	
REV	SET/DATE	REV	SET/DATE
DRAWN BY: TLG		CHECKED BY: N/A	
SCALE: AS NOTED		JOB NO: 02063	

**SV CSG**  
**Dale, LLC**  
(44.27078, -88.73535)

SHEET TITLE  
ONE LINE DIAGRAM

DWG. NO.

**E-1.00**



ELECTRICAL ENGINEER STAMP:

PROFESSIONAL ENGINEER STAMPS

ISSUANCE:  
**INTERCONNECTION  
PLAN SET**

LICENSED ELECTRICAL ENGINEER certifies that they prepared all the electrical "E" sheets in this drawing set.  
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10		21
9		20
8		19
7		18
6		17
5		16
4		15
3		14
2		13
1		12
0	13/01/26	11

REV SET/DATE REV SET/DATE

DRAWN BY: TLG CHECKED BY: NIA

SCALE: AS NOTED JOB NO: 02063

**SV CSG**  
**Dale, LLC**  
(44.27078, -88.73535)

SHEET TITLE  
SPEC SHEETS

DWG. NO.

**E-4.00**

# Q.PEAK DUO XL-G11S SERIES



590 - 605 Wp | 156 Cells  
21.7% Maximum Module Efficiency

MODEL Q.PEAK DUO XL-G11S.3/BFG



**Bifacial energy yield gain of up to 21%**  
Bifacial Q ANTUM solar cells make efficient use of light shining on the module rear-side for radically improved LCOE.

**Low electricity generation costs**  
QANTUM DUO technology with optimized module layout to boost module power and improve LCOE.

**A reliable investment**  
Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty.

**Enduring high performance**  
Long-term yield security with Anti-LID and Anti-PID Technology\*, Hot-Spot Protect.

**Frame for versatile mounting options**  
High-tech aluminum alloy frame protects from damage, enables use of a wide range of mounting structures and is certified regarding IEC for high snow (5400 Pa) and wind loads (3750 mph).

**Innovative all-weather technology**  
Optimal yields, whatever the weather with excellent low-light and temperature behavior.

\* See data sheet on rear for further information.  
\* All test conditions according to IEC 61204-2 (IEC method B) @ 1000 W/m²  
\* Including post-treatment according to IEC 61204-2 (IEC 2.3.20)  
\* See Installation Manual for instructions

The ideal solution for:  
Ground-mounted solar power plants

Solar power plants with tracker



American-made photovoltaic string inverters

## The trendsetter among inverters



### Features

- Optimized for solar power plants with 1500 volt modules
- Extensive grid management functions
- Special properties for extreme climatic conditions
- Farsighted technical features for future requirements
- Lean commissioning and maintenance via remote services
- 5 year standard warranty; optional 10 year warranty available

- Optimized for solar power plants with 1500 volt modules
- Extensive grid management functions
- Farsighted technical features for future requirements
- Lean commissioning and maintenance via remote services
- 5 year standard warranty; optional 10 year warranty available

### Technical Data

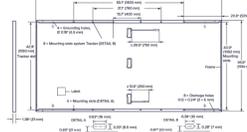
DC input data	125 TL3	155 TL3
MPP range	875 - 1300 V	875 - 1300 V
Operating range	875 - 1450 V	875 - 1450 V
Rated DC voltage / start voltage	900 V / 1000 V	900 V / 1000 V
Max. no-load voltage	1500 V	1500 V
Max. input current	160 A	188 A
Max. short circuit current I <sub>sc</sub>	300 A	300 A
Number of MPP tracker	1	1
Connection per tracker	1 - 2	1 - 2
AC output data	125 TL3	155 TL3
Rated output	125 000 VA	155 000 VA
Max. power	137 500 VA	155 000 VA
Line voltage	600 V (3P-PE)	600 V (3P-PE)
Voltage range (Ph-Ph)	480 - 760 V	480 - 690 V
Rated frequency (range)	50 Hz / 60 Hz (45 - 65 Hz)	50 Hz / 60 Hz (45 - 65 Hz)
Rated current	3 x 120.3 A	3 x 149.5 A
Max. current	3 x 132.3 A	3 x 152.0 A
Reactive power / cos phi	0 - 100 % S <sub>om</sub> / 0.3 ind. - 0.30 cap.	0 - 100 % S <sub>om</sub> / 0.30 ind. - 0.30 cap.
Max. total harmonic distortion (THD)	≤ 3 %	≤ 3 %
Number of grid phases	3	3

2

# Q.PEAK DUO XL-G11S SERIES

## Mechanical Specification

Format	96.9 in × 44.6 in × 1.38 in (including frame) (2462 mm × 1134 mm × 35 mm)
Weight	76.5 lbs (34.6 kg)
Front Cover	0.08 in (2.0 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	0.08 in (2.0 mm) anti-tempered glass
Frame	Anodized aluminum
Cell	6 × 26 monocrystalline QANTUM solar half cells
Junction box	2.09.38 × 1.26.23 × 0.59.07 in (53.30 mm × 32.40 mm × 15.18 mm), Protection class IP67 with bypass diodes
Cable	4 mm² Solar cable, 1 × 29.5 in (750 mm), 1 × 13.8 in (350 mm)
Connector	Solbus MC4, Solbus MC4-Evo2, IP68



## Electrical Characteristics

### POWER CLASS

	MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC (POWER TOLERANCE ±5W/-0W)								
	590	595	600	605	605				
Power at MPP	P <sub>max</sub> [W]	590	645.4	695	690.8	600	696.3	605	661.8
Short Circuit Current	I <sub>sc</sub> [A]	13.74	15.04	13.77	15.07	13.80	15.00	13.80	15.21
Open Circuit Voltage	V <sub>oc</sub> [V]	53.60	53.79	53.63	53.82	53.66	53.85	53.69	53.88
Current at MPP	I <sub>mp</sub> [A]	13.12	14.36	13.17	14.41	13.25	14.50	13.33	14.58
Voltage at MPP	V <sub>mp</sub> [V]	44.96	44.95	45.18	45.17	45.30	45.27	45.40	45.39
Efficiency	η [%]	21.1	21.5	21.5	21.5	21.7	21.7	21.7	21.7

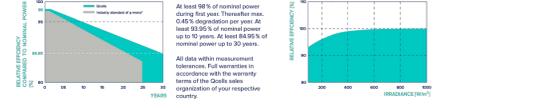
Bifaciality of P<sub>max</sub> and I<sub>sc</sub> 70% ± 5% - Bifaciality given for rear side irradiation on top of STC (front side) - According to IEC 60904-2  
 \* Measurement tolerances P<sub>max</sub> ± 3%, I<sub>sc</sub> ± 5% at STC 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3

### PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMO1\*

	590	595	600	605	
Power at MPP	P <sub>max</sub> [W]	444.3	448.0	451.8	455.5
Short Circuit Current	I <sub>sc</sub> [A]	11.07	11.09	11.1	11.20
Open Circuit Voltage	V <sub>oc</sub> [V]	50.69	50.72	50.75	50.78
Current at MPP	I <sub>mp</sub> [A]	10.34	10.38	10.45	10.51
Voltage at MPP	V <sub>mp</sub> [V]	42.97	43.15	43.24	43.33

\* Measurement tolerances P<sub>max</sub> ± 3%, I<sub>sc</sub> ± 5% at STC 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3, \* NMO1, NMO2, spectrum AM 1.5

### PERFORMANCE AT LOW IRRADIANCE



TEMPERATURE COEFFICIENTS	α [1/K]	+0.04	Temperature Coefficient of V <sub>oc</sub>	β [1/K]	-0.27
Temperature Coefficient of I <sub>sc</sub>	γ [1/K]	-0.34	Nominal Module Operating Temperature	NMO1 [°F]	109 ± 5.4 (42 ± 3 °C)

## Properties for System Design

Maximum System Voltage	V <sub>sys</sub> [V]	1500	PV module classification	Class B
Maximum Series Fuse Rating	I <sub>sc</sub> [A DC]	30	Fuse Rating based on ANSI/UL 61730	TYPE 2P*
Max. Pull Load†, Test Design	[lbs/ft²]	13 (5400 Pa) / 75 (2900 Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +105°F (-40°C up to +40°C)
Max. Pull Load†, Test Design	[lbs/ft²]	78 (3750 Pa) / 52 (2500 Pa)		

\* See Installation Manual for instructions. \* New type is similar to Type 3 but with metallic frame.

## Qualifications and Certificates



\* Contact your Dealer Sales Representative for details regarding the module's eligibility to be Buy American Act (BAA) compliant.

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American-made photovoltaic string inverters

## Technical Data (continued)

General data	125 TL3	155 TL3
Max. efficiency	99.2 %	99.1 %
Europ. efficiency	99.1 %	98.9 %
CEC efficiency	99.0 %	98.9 %
Standby consumption	< 10 W	7 W
Circuitry topology	transformerless	transformerless

### Mechanical data

125 TL3	155 TL3
Control units	webserver, supports mobile devices
Interfaces	Ethernet (Modbus TCP, SunSpec), RS485 (Modbus RTU, SunSpec, KACD-protocol), USB, optional: 4-DI, WiFi
Fault signalling relay	potential-free NOC max. 30 V / 1 A
DC connection	cable lug, max. two pairs of 240 mm² (500 MCM) Cu or Al conductors or one pair of 300 mm² (600 MCM) Cu or Al conductors
AC connection	cable lug, max of 240 mm² (500 MCM) per phase Cu or Al conductors
Ambient temperature	-13 °F - +140 °F / -25 °C - +60 °C
Humidity	0 - 100 %
Max. installation elevation (above MSL)	9843 ft / 3000 m
Min. distance from coast	1640 ft / 500 m
Cooling	temperature controlled fan
Protection class	IP66 / NEMA-4X
Noise emission	59.2 db(A)
H x W x D	28.3 x 27.5 x 17.7 in / 719 x 699 x 450 mm
Weight	172.4 lb / 78.2 kg

### Certifications

125 TL3	155 TL3
Safety	UL62109-1, UL1741 SA, UL1741 SB (pending), CSA-C22.2 No. 62109-1, CSA-C22.2 No. 62109-2, CSA-C22.2 No. 107.1, IEC 62109-1/-2, EN 61000-6-1/-2/-3, EN 61000-3-11/-12
	IEC 62109-1/-2, EN 61000-6-1/-2/-4, EN 61000-3-11/-12, EN 55011 group 1, class A EN 62920 Emission class A / Immunity class A (IEC 62109-1, UL1741 SA, UL1741 SB (pending), CSA-C22.2 No.107.1, CSA-C22.2 No.62109-1, CSA-C22.2 No.62109-2)

Grid connection rule overview see homepage / download area

Power derating at high ambient temperatures

Overview see homepage / download area

Power derating at high ambient temperatures

Overview see homepage / download area

Overview see homepage / download area