PROJECT DESCRIPTION

THIS 2.344 MWSTC, ROOF MOUNTED PHOTOVOLTAIC (PV) SYSTEM IS TO BE INSTALLED AT THE WAREHOUSE IN LOS ANGELES, CALIFORNIA. THE ENERGY PRODUCED BY THE PV SYSTEM SHALL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE ON-SITE ELECTRICAL EQUIPMENT VIA A NEW SUPPLY-SIDE SERVICE CONNECTION. THIS PROJECT DOES NOT INCLUDE ENERGY STORAGE BATTERIES.

SHEET INDEX

COMPONENTS LIST

ELECTRICAL		
QTY	NAME	DESCRIPTION
6251	PV MODULE	LG LG375N2W-G4 (TOTAL: 132,038 SQ. FT.)
3	PV INVERTER	SMA SUNNY CENTRAL 630CP-US 630.0 KW, 315 VAC, 1283 A
1	TRANS-FORMER	1260 KVA, NEMA 3R PV-SIDE: 315 VAC, UTILITY-SIDE: 12.0 KVAC
1	TRANS-FORMER	630 KVA, NEMA 3R PV-SIDE: 315 VAC, UTILITY-SIDE: 12.0 KVAC

GOVERNING CODES & STANDARDS

2016 CA ELECTRICAL CODE: § 110, 240, 250, 690, 705
2016 CA BUILDING CODE: § 1507.17, 1510.7, 3111
2016 CA FIRE CODE: § 605.11
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269

SITE SPECIFICATIONS

EXPOSURE CATEGORY: C
RISK CATEGORY: II
WIND SPEED (ASCE 7-10): 120 MPH
SNOW LOAD (ASCE 7-10): 0 PSF

Project:
LOS ANGELES, CA 90001

Project Details:
2,344.13 kWstc, 1890.0 kW AC
AHJ: LADWP

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
ORIGINAL	6/12/2017	A
INVERTER LOCATION	8/4/2017	B

Sheet Title:
COVER

Sheet Number:
T1.0

Sheet Size:
ARCH D - 36" x 24"

DESIGN & DRAFTING BY:
SepiSolar
POWER BY DESIGN

Reviewed & Approved by:
RD

CONTRACTOR NOTES:

1.) THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY THE SYSTEM DESIGN ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND DRAWINGS.

2.) THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL WORK AS SHOWN IN THE CONSTRUCTION DOCUMENTS UNLESS OTHERWISE NOTED. ALL WORK SHALL BE PERFORMED IN AN ORDERLY, WORKMAN-LIKE AND SAFE MANNER BY WORKERS SKILLED AND EXPERIENCED IN THEIR TRADES.

3.) THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL INSPECTIONS TO BE WITNESSED BY THE AHJ AND/OR THE OWNER. THE CONTRACTOR SHALL WORK WITH THE OWNER'S INSPECTION AGENCY TO PLAN THE INSPECTIONS, AND NOTIFY ALL PARTIES INVOLVED SUFFICIENTLY IN ADVANCE TO ALLOW THE INSPECTIONS TO TAKE PLACE IN A TIMELY MANNER AND NOT DELAY THE PROGRESS OF THE WORK. THE OWNER AND SYSTEM DESIGN ENGINEER WILL NOT BE RESPONSIBLE FOR SCHEDULING, ARRANGING OR COORDINATING THE INSPECTIONS.

4.) THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE AREAS WHERE WORK IS TAKING PLACE, AS WELL AS ANY ADJOINING AREAS WHICH MAY BE AFFECTED BY THE WORK, TO PREVENT SUBJECTING THE OCCUPANTS, STRUCTURES, VEHICLES, EQUIPMENT, OR ANY OTHER PARTS OR CONTENTS OF THE SITE TO HAZARD OR DAMAGE.

5.) CONTRACTOR SHALL FURNISH ALL NECESSARY BOXES, OUTLETS, SUPPORTS, CONDUITS, FITTINGS, AND ACCESSORIES TO FULFILL APPLICABLE CODES, REGULATIONS, BUILDING STANDARDS, AND THE BEST PRACTICE OF THE TRADE FOR THE INSTALLATION OF ELECTRICAL WORK.

6.) THE CONTRACTOR SHALL, AT ALL TIMES DURING THE WORK, MAINTAIN ACCESSIBILITY FROM THE STREET TO ALL FIRE HYDRANTS, POWER OR LIGHT POLES, AND SIMILAR UTILITY AND PUBLIC SERVICE ITEMS WITHIN OR ADJACENT TO THE CONSTRUCTION SITE.

7.) WORK SHALL NOT RESTRICT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUITION FACILITIES (POWER POLES, PULLBOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO THE LOCATION OF THE HOOKUP.

8.) THE OWNERS AND THE AHJ SHALL BE NOTIFIED IN WRITING IN ADVANCE OF ANY REQUIRED CONSTRUCTION OPERATION THAT WILL INVOLVE INTERRUPTION OF THE HEATING, WATER, FIRE PROTECTION SYSTEMS, TELEPHONE, GAS OR ELECTRICAL SERVICES TO THE OTHER BUILDINGS AND AREAS OF THE SITE. THE CONTRACTOR SHALL COORDINATE ANY REQUIRED SHUTDOWN OF THE UTILITIES WITH THE OWNERS, THE AHJ, AND THE UTILITY COMPANY.

9.) UPON REVIEW OF ELECTRICAL DRAWINGS, THE ELECTRICAL CONTRACTOR SHALL INFORM THE SYSTEM DESIGN ENGINEER OF ANY DISCREPANCIES OR REQUEST CLARIFICATION, IF NECESSARY, CONCERNING THE INTENT OF THE PLANS AND SPECIFICATIONS TO PROVIDE A COMPLETE ELECTRICAL INSTALLATION.

10.) THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS WHOSE WORK MIGHT AFFECT THIS INSTALLATION. CONTRACTORS SHALL ARRANGE ALL PARTS OF THIS WORK AND EQUIPMENT IN PROPER RELATION TO THE WORK AND EQUIPMENT OF OTHERS AND WITH BUILDING CONSTRUCTION AND ARCHITECTURAL FINISH SO THAT IT WILL HARMONIZE IN SERVICE AND APPEARANCE.

11.) THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE OWNER'S INSPECTION AGENCY TO ARRANGE FOR INSPECTIONS RELATED TO ALL SPECIAL INSPECTIONS IN A TIMELY MANNER, AND SHALL BE PRESENT AS REQUIRED AT THE INSPECTIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT THE APPROPRIATE SUBCONTRACTORS ARE PRESENT DURING TESTS AND INSPECTIONS OF THE SYSTEMS FOR WHICH THE SUBCONTRACTORS ARE RESPONSIBLE.

PHOTOVOLTAIC NOTES:

1.) ALL ASPECTS OF WORK RELATED TO THE SOLAR PHOTOVOLTAIC (PV) SYSTEM SHALL BE IN ACCORDANCE WITH ALL STATE AND LOCAL CODES, UTILITY REQUIREMENTS, AND THE NEC, ESPECIALLY ARTICLE 690.

2.) SOLAR PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER E.G.C. PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.

3.) SOLAR PV SYSTEMS SHALL BE GROUNDED IN ACCORDANCE WITH NEC 690 PART V: GROUNDING.

4.) COMBINER BOXES, FUSING, WIRE SIZES, QUANTITIES AND CONDUIT SIZES BETWEEN SOLAR ARRAYS AND INVERTERS TO BE VERIFIED BY CONTRACTOR WITH SOLAR MODULE AND INVERTER MANUFACTURERS BEFORE INSTALLATION.

5.) ALL PV SOURCE CIRCUIT CONDUCTORS AND CONNECTORS SHALL BE SUPPORTED AND SECURED WITHOUT EXCESSIVE STRESS. NO WIRING SHALL BE PERMITTED TO TOUCH THE ROOF SURFACE.

6.) PV SOURCE CIRCUIT CONDUCTORS EXPOSED BETWEEN ARRAYS SHALL BE SECURED ON BOTH SIDES, AND BE PROTECTED FROM PHYSICAL DAMAGE AND ABRASION, INCLUDING FROM EDGES OF RACKING, CHANNEL EDGES, WIRE TRAYS, ETC.

7.) ANY CABLE TIES USED SHALL BE HEAT STABILIZED (-40C TO 105C), UV STABILIZED AND OUTDOOR RATED, SUITABLE AND DURABLE FOR THE ENVIRONMENT AND LIFE OF THE PV SYSTEM.

8.) WHERE EXPOSED TO SUNLIGHT, CONDUCTORS SHALL BE LISTED AND MARKED AS SUNLIGHT RESISTANT.

9.) ALL EQUIPMENT GROUND CONDUCTORS SMALLER THAN AWG #6 SHALL BE PROTECTED FROM PHYSICAL DAMAGE BY AN IDENTIFIED RACEWAY OR CABLE ARMOR UNLESS INSTALLED WITHIN THE HOLLOW SPACES OF THE FRAMING MEMBERS OF BUILDINGS OR STRUCTURES AND WHERE NOT SUBJECT TO PHYSICAL DAMAGE.

EQUIPMENT NOTES:

1.) ALL MATERIALS, SUPPLIES, AND EQUIPMENT SHALL BE LISTED, USED, AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS, AND APPLICABLE NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) REQUIREMENTS.

2.) ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.

3.) WORKING SPACE AROUND ELECTRIAL EQUPMENT SHALL COMPLY WITH NEC 110.26.

4.) THE APPROXIMATE LOCATIONS OF ALL JUNCTION BOXES, COMBINER BOXES, CONDUITS, ETC. SHALL BE DETERMINED FROM THE DRAWINGS, AND VERIFIED BY THE CONTRACTOR FOR INSTALLATION.

5.) ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.

6.) PROVIDE NEMA 3R RATED EQUIPMENT OR BETTER WHERE EXPOSED TO OUTDOORS.

7.) WHERE SIZES OF RACEWAYS OR BOXES ARE NOT INDICATED ON THE DRAWINGS, THE CONTRACTOR SHALL SIZE THESE ITEMS AS REQUIRED FOR THE INSTALLATION.

8.) ALL VERTICAL RUNS OF CONDUIT OR TUBING TERMINATING IN THE BOTTOM OF WALL BOXES OR CABINETS OR SIMILAR LOCATIONS, SHALL BE PROTECTED FROM THE ENTRANCE OF FOREIGN MATERIAL PRIOR TO THE INSTALLATION OF CONDUCTORS.

9.) METAL RACEWAYS, METAL ENCLOSURES OF ELECTRICAL DEVICES AND EQUIPMENT, MODULE FRAMES, AND OTHER EQUIPMENT SHALL BE COMPLETELY GROUNDED IN ACCORDANCE WITH THE NEC.

10.) PROPER HARDWARE FOR A COMPLETE GROUNDING AND BONDING SYSTEM SHALL BE INSTALLED BY THE CONTRACTOR, IF NECESSARY.

11.) GROUNDING RODS SHALL HAVE A RESISTANCE TO GROUND OF 25 OHMS OR LESS AND SHALL BE 5/8" x 8' MIN, COPPER-BONDED STEEL. ALL GROUND CLAMPS USED SHALL BE UL 467 LISTED.

12.) ALL PVC CONDUIT EXPOSED TO SUNLIGHT SHALL BE SCHEDULE 80 AND MARKED AS SUNLIGHT RESISTANT. ALL UNDERGROUND PVC CONDUIT SHALL BE SCHEDULE 40 OR 80.

13.) ALL CONDUIT SHALL BE MOUNTED AT A MINIMUM OF 1 INCHES ABOVE THE ROOF SURFACE.

ELECTRICAL NOTES:

1.) ELECTRICAL POWER MUST BE SHUT OFF PRIOR TO THE CONTRACTOR PERFORMING ANY WORK IN RACEWAYS WITH LIVE ELECTRICAL CIRCUITS OR ANY OTHER EQUIPMENT. WHEN SWITCHES OR CIRCUIT BREAKERS ARE OPENED FOR WORK ON ELECTRICAL EQUIPMENT OR WIRING, SIGNS OR TAGS SHOULD BE INSTALLED AT THE SWITCH OR BREAKER STATING THAT WORK IS BEING PERFORMED ON THEM. INCLUDE THE TIME, DATE, AND CONTRACTOR'S NAME ON THE SIGN OR TAG. IF DEVICE IS LOCKABLE, IT SHOULD BE PADLOCKED.

2.) THE ELECTRICAL WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE AHJ, NATIONAL FIRE PROTECTION AGENCY (NFPA), NATIONAL ELECTRICAL CODE (NEC), AND OSHA.

3.) PHASING OF NEW CONDUCTORS TO MATCH EXISTING CONDUCTORS. IF INSTALLATING A NEW CIRCUIT, THEN CONTRACTOR SHALL FOLLOW THE PHASING SCHEMES PROVIDED IN THE ELECTRICAL DIAGRAM.

4.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 90°C WET ENVIRONMENT, AND 1000 VOLTS DC OR 600 VOLTS AC, UNLESS OTHERWISE NOTED.

5.) GROUNDING ELECTRODE CONDUCTOR (G.E.C.) SHALL BE CONTINUOUS AND/OR IRREVERSIBLY SPLICED/WELDED.

6.) FLEXIBLE, FINE-STRANDED CABLES SHALL BE TERMINATED ONLY WITH TERMINALS, LUGS, DEVICES, OR CONNECTORS THAT ARE IDENTIFIED AND LISTED FOR SUCH USE PER NEC 690.31(F).

7.) ALL WIRES SHALL BE IDENTIFIED BY CIRCUITS IN ALL CABINETS, BOXES, WIRING TROUGHS, AND OTHER ENCLOSURES, AND AT ALL TERMINAL POINTS, I.E., RECEPTACLES, MECHANICAL LUGS, COMPRESSION FITTINGS. THE CIRCUIT DESIGNATIONS SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS OR AS DIRECTED BY THE SYSTEM DESIGN ENGINEER. LABELS OR TAGS SHALL BE APPLIED TO WIRES SO THAT THEY WILL BE READILY VISIBLE.

8.) FUSES FOR SWITCHES SHALL BE CURRENT-LIMITING TYPE WITH A MINIMUM INTERRUPTING CAPACITY OF 200,000 AMPERES RMS (UNLESS OTHERWISE NOTED) AND OF THE CONTINUOUS CURRENT RATINGS AS INDICATED ON THE DRAWINGS OR AS RECOMMENDED BY THE MANUFACTURER.

ELECTRICAL LEGEND

- = CIRCUIT CONDUCTORS
- = EQUIPMENT GROUNDING CONDUCTORS
- = TERMINAL BLOCK
- = FUSE
- = CIRCUIT BREAKER
- = THROW SWITCH (KNIFE-BLADE)
- = RECLOSING CIRCUIT BREAKER
- = RECLOSING DISCONNECT/RELAY
- = GROUNDING ELECTRODE SYSTEM
- = PV MODULE
- = INVERTER
- = MICROINVERTER
- = POWER OPTIMIZER
- = METER/MONITORING DEVICE
- = TRANSFORMER
- = GENERATOR
- = TRANSFER SWITCH
- = BATTERY
- = CURRENT TRANSFORMER (CT)

ELECTRICAL LEGEND - DC

- = POSITIVE TERMINAL (PHASED RED)
- = NEGATIVE TERMINAL (PHASED BLACK)
- G = GROUND TERMINAL (PHASED GREEN)

ELECTRICAL LEGEND - AC

- L1 = LINE 1 TERMINAL (PHASED BROWN)
- L2 = LINE 2 TERMINAL (PHASED ORANGE)
- L3 = LINE 3 TERMINAL (PHASED YELLOW)
- N = NEUTRAL TERMINAL (PHASED WHITE)
- G = GROUND TERMINAL (PHASED GREEN)

SITE/ARRAY PLAN LEGEND

- = CONDUIT ROUTES
- = CONDUIT ROUTES (UGND OR INDOORS)
- = PV MODULE
- = PV EQUIPMENT
- = RAFTER/TRUSS
- = STANDING SEAM
- = VENT
- = CHIMNEY
- = SKYLIGHT
- = HVAC UNIT
- = ROOF HATCH
- = PV ATTACHMENT FLASHING
- = RACKING RAIL
- = SETBACKS/PATHWAYS
- = SWINGING DOOR
- = TREE/BUSH

Project:
LOS ANGELES, CA 90001

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2,344.13 kWstc, 1890.0 kW AC
AHJ: LADWP

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Sheet Title:
PROJECT NOTES

Sheet Number:
T1.1

Sheet Size:
ARCH D - 36" x 24"

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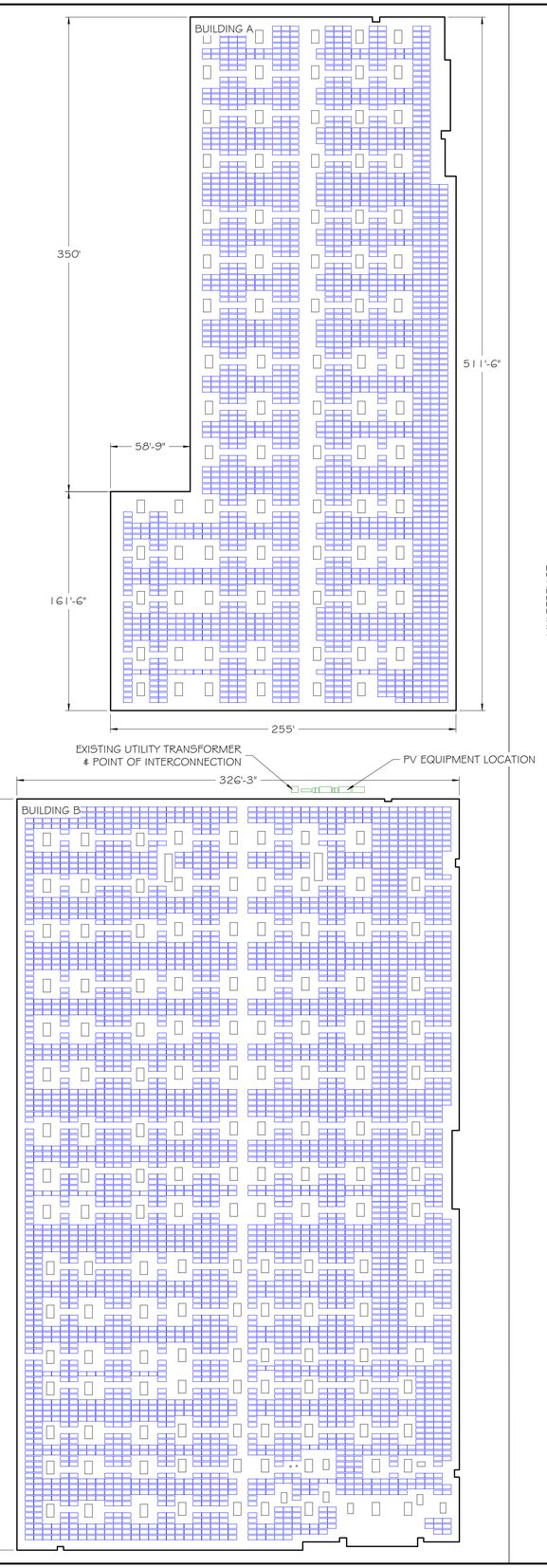
SepiSolar
POWER BY DESIGN

Reviewed & Approved by:
RD

SYMBOL LEGEND		
SYMBOL	NAME	DESCRIPTION
	ROOFTOP PV MOD.	LG 375W
	ROOF SKYLIGHT	
	ROOF VENT	



SCALE: 1" = 50'

25 ft — 50 ft — 100 ft

N

180°

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SITE PLAN

Sheet Number:

A1.0

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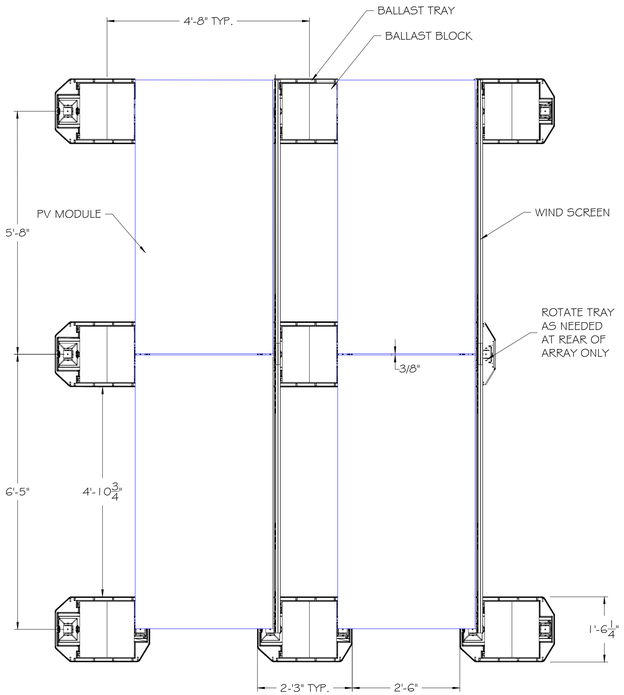
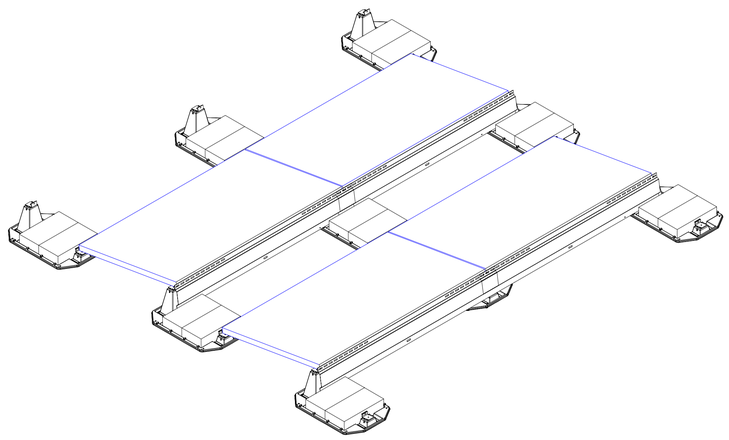
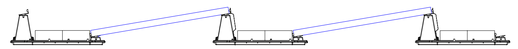


MOUNTING PLAN VIEW 1
SCALE: 1" = 1'-0"

8 in | 16 in | 32 in



MOUNTING ISO VIEW 2
SCALE: NTS

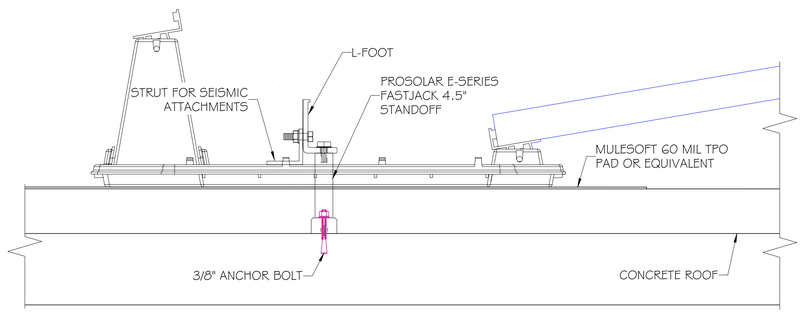


MOUNTING SIDE VIEW 3
SCALE: 1" = 1'-0"

8 in | 16 in | 32 in

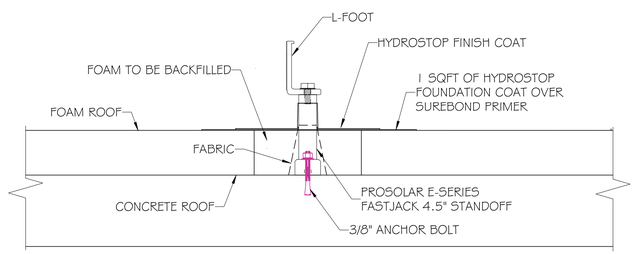
MOUNTING FRONT VIEW 4
SCALE: 1" = 1'-0"

8 in | 16 in | 32 in



SEISMIC DETAIL 5
SCALE: 1" = 4"

2 in | 4 in | 8 in



ATTACHMENT DETAIL 6
SCALE: 1" = 4"

2 in | 4 in | 8 in

Project:

LOS ANGELES, CA 90001

Project Details:

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Engineering Approval:

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Sheet Title:

MOUNTING & RACKING METHOD

Sheet Number:

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Sheet Size:

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DESIGN & DRAFTING BY:

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POWER BY DESIGN

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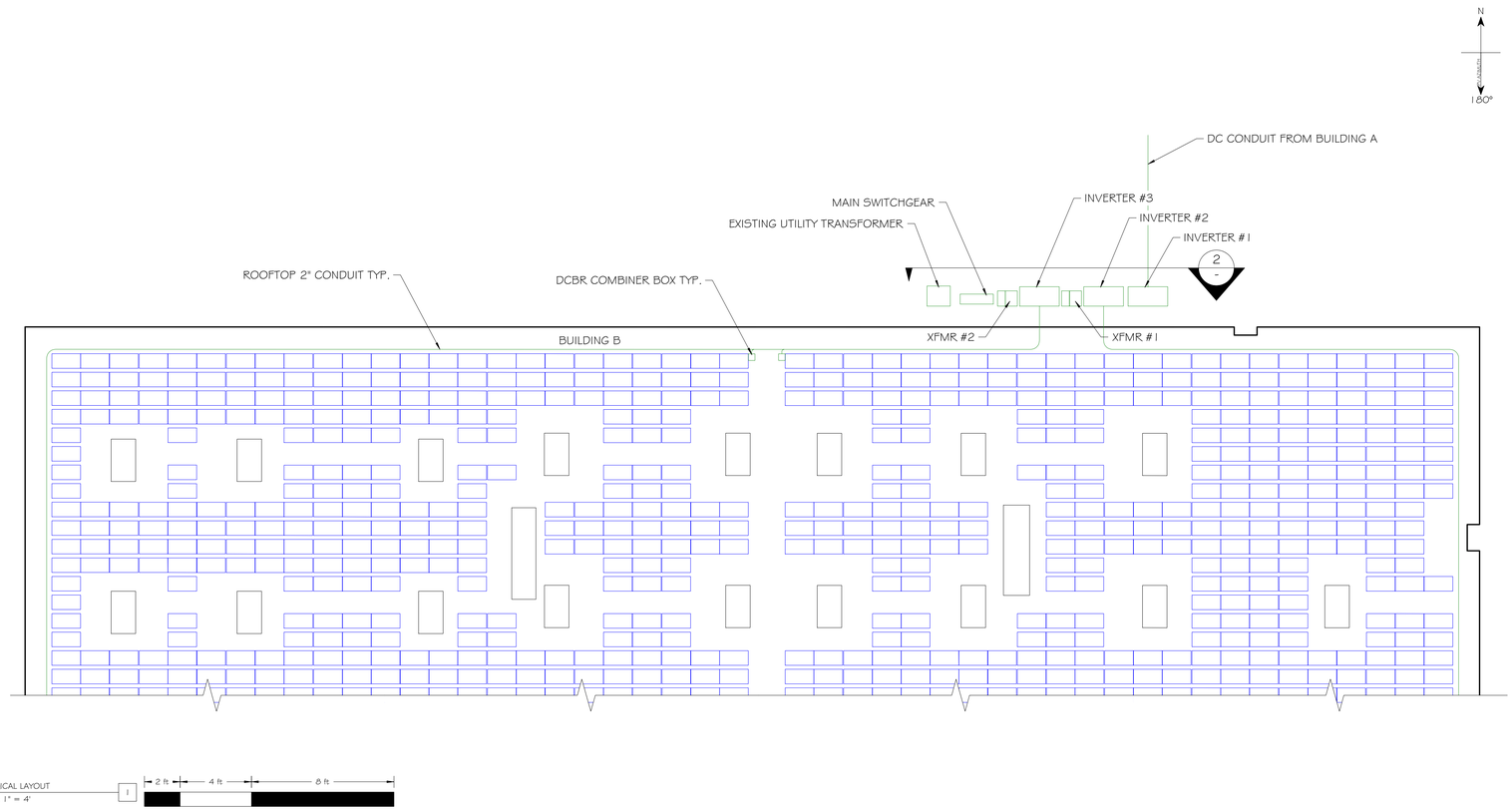
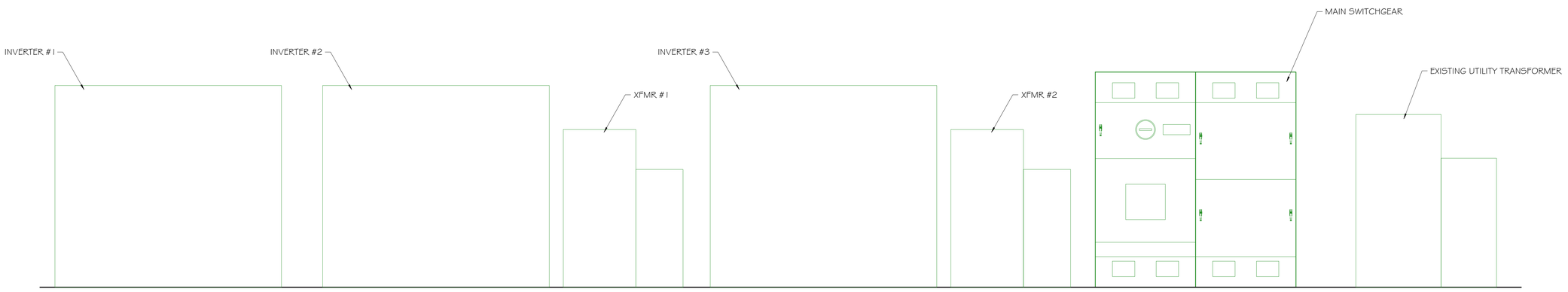


ELECTRICAL LAYOUT
SCALE: 1" = 4'



ELECTRICAL ELEVATION
SCALE: 1" = 2'

Project:
LOS ANGELES, CA 90001

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ELECTRICAL LAYOUT

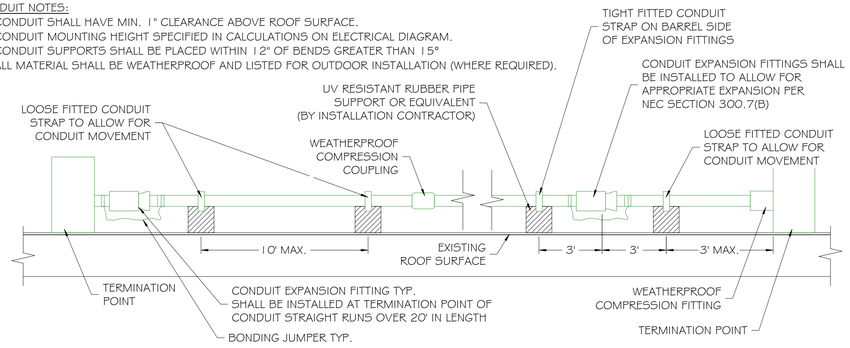
Sheet Number:
E1.0

Sheet Size:
ARCH D - 36" x 24"

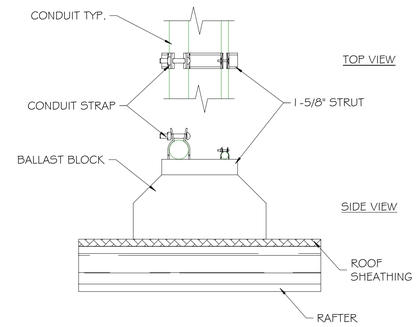
DESIGN & DRAFTING BY:
SepiSolar
POWER BY DESIGN

Reviewed & Approved by:
RD

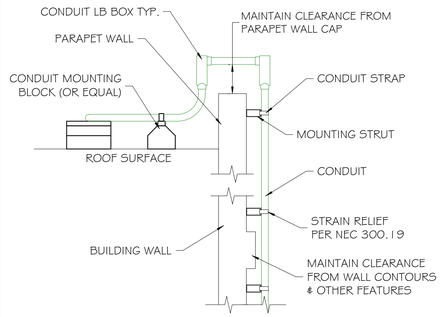
CONDUIT NOTES:
1.) CONDUIT SHALL HAVE MIN. 1" CLEARANCE ABOVE ROOF SURFACE.
2.) CONDUIT MOUNTING HEIGHT SPECIFIED IN CALCULATIONS ON ELECTRICAL DIAGRAM.
3.) CONDUIT SUPPORTS SHALL BE PLACED WITHIN 12" OF BENDS GREATER THAN 15°
4.) ALL MATERIAL SHALL BE WEATHERPROOF AND LISTED FOR OUTDOOR INSTALLATION (WHERE REQUIRED).



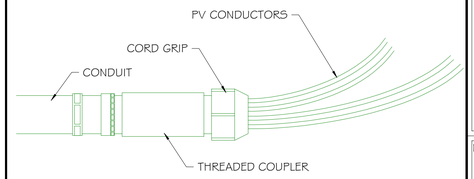
CONDUIT MOUNTING
SCALE: NTS
1



CONDUIT BALLAST
SCALE: NTS
2

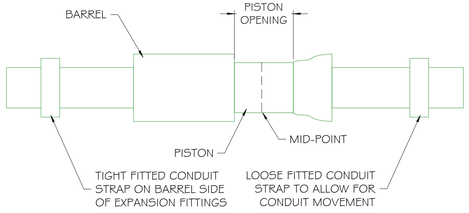


CONDUIT PARAPET
SCALE: NTS
3



CONDUIT ENTRY
SCALE: NTS
4

CONDUIT EXPANSION NOTES:
1.) CONDUIT EXPANSION FITTINGS SHALL BE INSTALLED ON ANY SINGLE OUTDOOR CONDUIT RUN 25' OR GREATER IN LENGTH, WHERE REQUIRED.
2.) MAXIMUM CONDUIT EXPANSION ALLOWANCE BEFORE AN EXPANSION FITTING IS REQUIRED IS 1/4"
3.) CONDUIT EXPANSION FITTINGS SHALL BE INSTALLED AT EVERY BUILDING EXPANSION JOINT.
4.) ALL CONDUIT EXPANSION FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS AND NEC SECTION 300.7(B).
5.) ALL MATERIAL SHALL BE WEATHERPROOF AND LISTED FOR OUTDOOR INSTALLATION, WHERE REQUIRED.

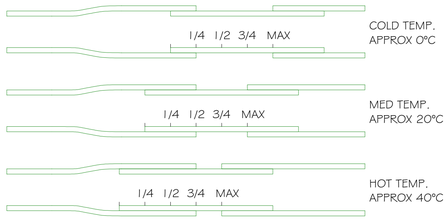


LENGTH OF RUN (FEET)	INCHES OF EXPANSION ALLOWANCE FOR TEMPERATURE CHANGES OF:				
	0-15°C	16-27°C	28-38°C	39-49°C	50°C +
25	1/8	1/8	1/8	1/4	3/8
50	1/4	3/8	3/8	1/2	1/2
75	3/8	1/2	5/8	5/8	7/8
100	1/2	5/8	3/4	1	1-1/8
125	5/8	3/4	1	1-1/8	1-3/8
150	3/4	1	1-1/8	1-1/2	1-5/8

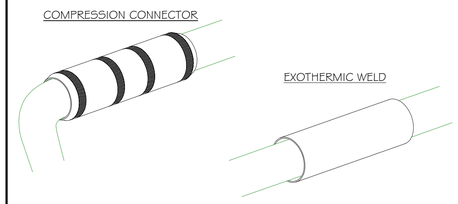
ESTIMATED RANGE OF TEMPERATURE FOR SITE: 29°C

CONDUIT EXPANSION
SCALE: NTS
5

NOTE:
CONDUIT EXPANSION FITTINGS PISTON/BARREL SETTINGS TO BE IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS BASED ON INSTALLATION TEMPERATURE.



SPLICE NOTES:
1.) IRREVERSIBLE SPLICES, AS REQUIRED IN THE NEC, SHALL BE PERFORMED BY USING COMPRESSION CONNECTORS OR EXOTHERMIC WELDS.
2.) ALL SPLICES SHALL BE MADE ACCORDING TO THE MANUFACTURER'S SPECIFIED REQUIREMENTS AND INSTRUCTIONS.
3.) CONNECTORS SHALL BE SIZED EXACTLY FOR THE CONDUCTOR GAUGE THEY ARE SPLICING.



IRREVERSIBLE SPLICE
SCALE: NTS
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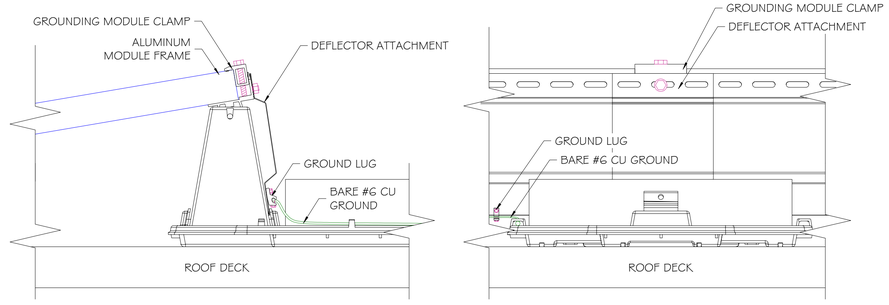
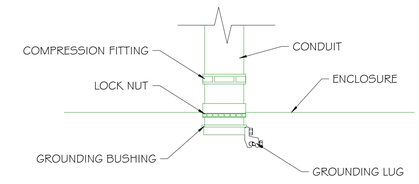
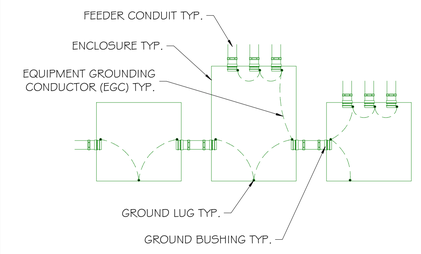


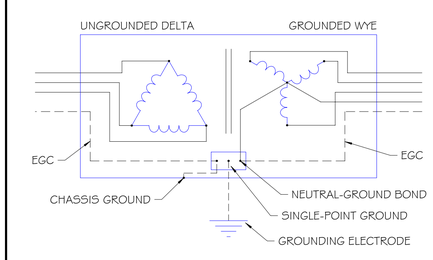
RACKING GROUNDING
SCALE: NTS
7



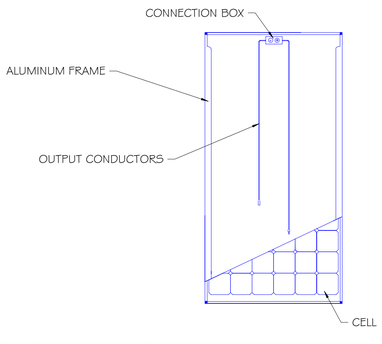
CONDUIT GROUNDING
SCALE: NTS
8



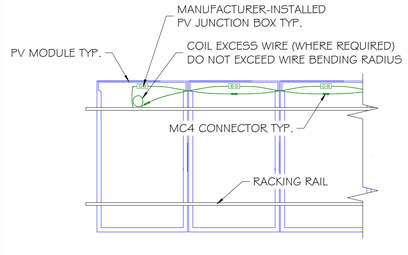
EQUIPMENT GROUNDING
SCALE: NTS
9



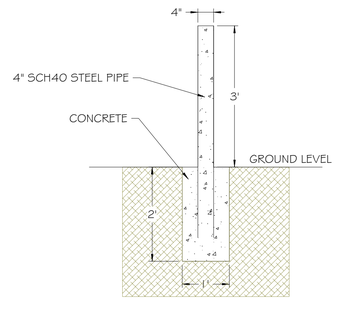
TRANSFORMER GROUNDING
SCALE: NTS
10



MODULE DETAIL
SCALE: NTS
11



STRINGING DETAIL
SCALE: NTS
12



BOLLARD DETAIL
SCALE: NTS
13

Project:
LOS ANGELES, CA 90001

Project Details:
2,344.13 kWstc, 1890.0 kW AC
AHJ: LADWP

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
ORIGINAL	6/12/2017	A
INVERTER LOCATION	8/4/2017	B

Sheet Title:
CONSTRUCTION DETAILS

Sheet Number:
E1.2

Sheet Size:
ARCH D - 36" x 24"

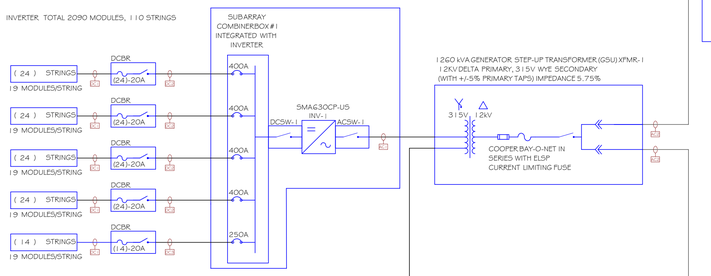
DESIGN & DRAFTING BY:
SepiSolar
POWER BY DESIGN

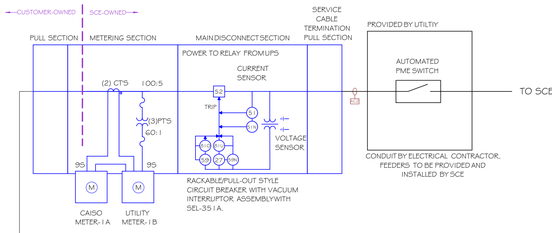
Reviewed & Approved by:
RD

= EQUIP. GROUNDING CONDUCTOR	= CIRCUIT CONDUCTOR	= FUSE	= CIRCUIT BREAKER	(N) = NEW EQUIP.	(E) = EXISTING EQUIP.	L1 = LINE 1 (BROWN)	L2 = LINE 2 (ORANGE)	L3 = LINE 3 (YELLOW)	N = NEUTRAL (WHITE)	G = GROUND (GREEN)	= POSITIVE (RED)	= NEGATIVE (BLACK)

WIRE AND CONDUIT SCHEDULE

TAG	# OF PARALLEL CONDUITS	CONDUIT SIZE	CONDUIT TYPE	PHASE CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT		NEUTRAL CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			GROUND CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			EST. DIST.
DC1	(1)	N/A	N/A	2/STRING	AWG #10	N/A	N/A	N/A	1	AWG #6	BARE CU	5
DC2	(1)	2"	EMT	2	500 kcmil	PV-WIRE	N/A	N/A	1	AWG #3/0	PV-WIRE	500
DC3	(1)	2"	EMT	2	AWG #4/0	PV-WIRE	N/A	N/A	1	AWG #3/0	PV-WIRE	500
AC1	(1)	3"	EMT	3	600 kcmil	THWN-2	1	AWG #3/0	THWN-2	1	AWG #3/0	THWN-2	10
AC2	(1)	1-1/2"	EMT	3	AWG #1/0	THWN-2	N/A	N/A	N/A	1	AWG #6	THWN-2	50





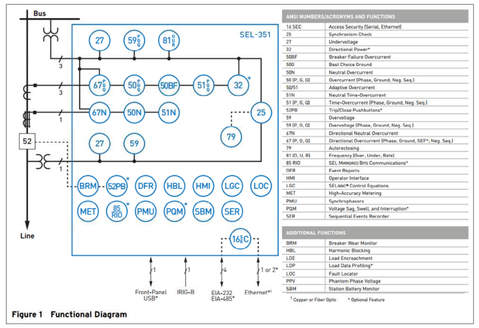


Figure 1 Functional Diagram

PROPOSED RELAY FUNCTIONS

DEVICE	DESCRIPTION
27-1	T/D UNDERVOLTAGE RELAY, 50%
27-2	T/D UNDERVOLTAGE RELAY, 88%
59-1	T/D OVERVOLTAGE RELAY, 110%
59-2	T/D OVERVOLTAGE RELAY, 120%
81U-1	T/D UNDERFREQUENCY, 57 HERTZ
81U-2	T/D UNDERFREQUENCY, 58.5 HERTZ
81O-1	T/D OVERFREQUENCY, 60.5 HERTZ

PV System Maximum Voltage Calculation per NEC 690.7(A)

Local Record Low Temp: **2 °C** Data Source: **FULLERTON MUNICIPAL**

Voc Temp Coefficient		25°C - Record Low Temp.		1 =	Voc Correction Factor
0.28%/°C	x	23°C	+ 1 =		1.064

Voc Correction Factor		Voc	x	Max # of Modules in Series	=	Temperature Corrected Open Circuit Voltage
1.064	x	48.3	x	19	=	976.8 Volts DC

Transformer #1 Calculations

PV Voltage:	315	VAC	Util. Voltage:	12000	VAC
PV Current:	2566	Amps	Util. Current:	67	Amps
Minimum Transformer kVA Rating:	1260.0	kVA			

Transformer #2 Calculations

PV Voltage:	315	VAC	Util. Voltage:	12000	VAC
PV Current:	1283	Amps	Util. Current:	34	Amps
Minimum Transformer kVA Rating:	630.0	kVA			

Utility-side AC System Summary

NOMINAL SYSTEM VOLTAGE:	12000	Volts AC
MAX CURRENT PER 690.8(A):	101	Amps
MAX CURRENT PER 690.8(B):	126	Amps

Inverter #1 - #3 Specifications

Model Number:	SMA SUNNY CENTRAL 630CP-US		
Nominal Power (kW AC):	630.00	Max App. Pwr (kW AC)	700.00
Nominal AC Voltage (V):	315	(3/N/PE)	
Max Output Current (A):	1283.0		
CEC Weighted Efficiency:	98.0%		
Maximum DC Voltage (V):	1000	Max Current MPPT A:	1350.0
DC Start Voltage (V):	550		
Max. MPPT Voltage (V):	820		
Min. MPPT Voltage (V):	500		
MPPT Quantity:	1		
Inverter Quantity:	3		

Array Configuration

System: 2344.13 kWstc, 1890 kW AC

Total PV Module Qty: 6251

Inverter I.D. #	Inv #1	Inv #2	Inv #3
Inverter AC Power (kW):	630.00	630.00	630.00
PV Power (kWstc):	783.75	783.75	776.63
Inverter DC:AC Ratio	1.24	1.24	1.23
Module Total Qty:	2090	2090	2071
MPPT "A" String Qty:	110	110	109
MPPT "A" String Length:	19	19	19
MPPT "A" Max Open Circuit Voltage:	977	977	977
MPPT "A" Min Open Circuit Voltage:	810	810	810
MPPT "A" Max Operating Voltage:	740	740	740
MPPT "A" Min Operating Voltage:	664	664	664
MPPT "A" Max Short Circuit Current:	1380.5	1380.5	1368.0
MPPT "A" Operating Current:	1045.0	1045.0	1035.5

PV Module Specifications

Model Number:	LG LG375N2W-G4		
Weight (lbs):	44.8		
Dimensions (in):	77.2 x 39.4 x 1.8		
Power @ STC (W):	375		
Voc (VDC):	48.3		
Vmp (VDC):	39.6	Voc Temp Coeff (%/°C):	-0.28
Isc (A):	10.04	Max Voltage (VDC):	1,000
Imp (A):	9.50	Module Quantity:	0

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS				REQUIRED CONDUCTOR AMPACITY						AMPACITY CHECK #1		CONDUCTOR TEMPERATURE DERATING				CONDUIT FILL DERATING		CORRECTED AMPACITY CALCULATION						AMPACITY CHECK #2		VOLTAGE DROP	
			MATERIAL	CONN. TEMP. RATING	TRADE SIZE	AMPACITY PER 310.15(B)(16) & 310.15(B)(17)	MAX CURRENT PER 690.8(A)(1)	x Isc (Amps)	# OF COMBINED STRINGS	=	MAX CURRENT PER 690.8(A)(1)	x CONT. OPERATION 690.8(B)(1)	= MAX CURRENT PER 690.8(B)(1)	MAX CURRENT PER 690.8(B)(1)	< CONDUCTOR AMPACITY	CIRCUIT ENVIRONMENT	LOCAL 2% AVG. HIGH TEMP (°C)	HEIGHT ABOVE ROOF (in)	TEMP. ADDER PER 310.15(B)(3)(c)	EXPECTED OPERATING TEMP (°C)	AMPACITY CORRECTION 310.15(B)(2)(a)	# OF UNGROUNDED CONDUCTORS	AMPACITY CORRECTION 310.15(B)(3)(a)	90°C CONDUCTOR AMPACITY	x TEMP DERATE	x CONDUIT FILL DERATE	= DERATED CONDUCTOR AMPACITY	MAX CURRENT PER 690.8(B)(2)	< DERATED CONDUCTOR AMPACITY	EST. ONE-WAY DISTANCE	VOLTAGE DROP
DC1	PV STRING	DCBR	COPPER	90°C	AWG #10	55 Amps	1.25	x 10.04	x 1	=	12.6 Amps	x 1.25	= 15.8 Amps	15.8 Amps	< 55.0 Amps	ROOFTOP, FREE AIR	31	-	N/A	31	0.96	N/A	1.00	55	x 0.96	x 1.00	= 52.8 Amps	12.6 Amps	< 52.8 Amps	5 ft	0.02%
DC2	DCBR	COMBINER BOX	COPPER	75°C	500 kcmil	380 Amps	1.25	x 10.04	x 24	=	301.2 Amps	x 1.25	= 376.5 Amps	376.5 Amps	< 380.0 Amps	ROOFTOP, IN CONDUIT	31	1	22	53	0.76	2	1.00	430	x 0.76	x 1.00	= 326.8 Amps	301.2 Amps	< 326.8 Amps	500 ft	0.03%
DC3	DCBR	COMBINER BOX	COPPER	75°C	AWG #4/0	230 Amps	1.25	x 10.04	x 14	=	175.7 Amps	x 1.25	= 219.6 Amps	219.6 Amps	< 230.0 Amps	ROOFTOP, IN CONDUIT	31	1	22	53	0.76	2	1.00	260	x 0.76	x 1.00	= 197.6 Amps	175.7 Amps	< 197.6 Amps	500 ft	0.08%

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS					REQUIRED CONDUCTOR AMPACITY							AMPACITY CHECK #1		CONDUCTOR TEMPERATURE DERATING				CONDUIT FILL DERATING		CORRECTED AMPACITY CALCULATION					AMPACITY CHECK #2		VOLTAGE DROP	
			MATERIAL	TERMINAL TEMP. RATING	TRADE SIZE	NUMBER OF PARALLEL CONDUCTORS	AMPACITY PER 310.15(B)(16) & 310.15(B)(17)	INVERTER OUTPUT CURRENT	x # OF INVERTERS	=	MAX CURRENT PER 690.8(A)(3)	x CONT. OPERATION 690.8(B)(1)	= MAX CURRENT PER 690.8(B)(1)	MAX CURRENT PER 690.8(B)(1)	< CONDUCTOR AMPACITY	CIRCUIT ENVIRONMENT	LOCAL 2% AVG. HIGH TEMP (°C)	EXPECTED OPERATING TEMP (°C)	AMPACITY CORRECTION 310.15(B)(2)(a)	# OF UNGROUNDED CONDUCTORS	AMPACITY CORRECTION 310.15(B)(3)(a)	90°C CONDUCTOR AMPACITY	x TEMP DERATE	x CONDUIT FILL DERATE	= DERATED CONDUCTOR AMPACITY	MAX CURRENT PER 690.8(B)(2)	< DERATED CONDUCTOR AMPACITY	EST. ONE-WAY DISTANCE	VOLTAGE DROP
AC1	INVERTER	TRANSFORMER	COPPER	75°C	600 kcmil	4	1680 Amps	1283.0	x 1	=	1283.0 Amps	x 1.25	= 1603.8 Amps	1603.8 Amps	< 1680 Amps	DIRECT SUNLIGHT (+15°C)	31	46	0.82	3	1.00	1900	x 0.82	x 1.00	= 1558 Amps	###### Amps	< 1558.0 Amps	10 ft	0.04%
AC2	TRANSFORMER	LINE SIDE CONN.	COPPER	75°C	AWG #1/0	1	150 Amps	SEE XFMR CALCS		=	101.0 Amps	x 1.25	= 126.3 Amps	126.3 Amps	< 150 Amps	DIRECT SUNLIGHT (+15°C)	31	46	0.82	3	1.00	170	x 0.82	x 1.00	= 139.4 Amps	101.0 Amps	< 139.4 Amps	50 ft	0.01%

⚠ WARNING
ELECTRIC SHOCK HAZARD
IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED
REQD BY: NEC 690.5(C) — APPLY TO: INVERTER(S), IF NOT APPLIED BY MFR — 1

SOLAR AC DISCONNECT
REQD BY: NEC 690.13(B) — APPLY TO: AC DISCONNECT SWITCHES — 2

SOLAR DC DISCONNECT
REQD BY: NEC 690.13(B) — APPLY TO: DC DISCONNECT SWITCHES — 3

⚠ WARNING
ELECTRIC SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
REQD BY: NEC 690.17(E) — APPLY TO: DISCONNECTS, FUSES, CIRCUIT BREAKERS — 4

PHOTOVOLTAIC POWER SOURCE
REQD BY: CEC 690.31 & CRC R331.2 — APPLY TO: JUNCTION BOXES, RACEWAYS, CABLE TRAYS, CONDUIT BODIES WITH AVAILABLE OPENINGS, EVERY 10', WITHIN 1' OF TURNS/PENETRATIONS — 5

⚠ WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM
REQD BY: NEC 705.12(D)(3) — APPLY TO: ANY/ALL ELECTRICAL PANELS CONNECTED TO MULTIPLE POWER SOURCES — 6

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN
REQD BY: NEC 690.56(C) — APPLY TO: PV SYSTEM MAIN AC DISCONNECT — 7

PHOTOVOLTAIC SYSTEM DISCONNECT
AC CURRENT: 126 A
VOLTAGE: 12 kVAC
REQD BY: NEC 690.54 — APPLY TO: POINT OF INTERCONNECTION — 8

GRID TIED PHOTOVOLTAIC POWER SOURCE
OPERATING CURRENT: 1045 A
OPERATING VOLTAGE: 740 V
MAX SYSTEM VOLTAGE: 977 V
MAX SYSTEM CURRENT: 1380 A
MAX INVERTER OUTPUT: 630 kW, 1283 A, 315 VAC
REQD BY: NEC 690.53 — APPLY TO: INVERTERS #1 & #2 — 9

GRID TIED PHOTOVOLTAIC POWER SOURCE
OPERATING CURRENT: 1035 A
OPERATING VOLTAGE: 740 V
MAX SYSTEM VOLTAGE: 977 V
MAX SYSTEM CURRENT: 1368 A
MAX INVERTER OUTPUT: 630 kW, 1283 A, 315 VAC
REQD BY: NEC 690.53 — APPLY TO: INVERTER #3 — 10

SIGNAGE REQUIREMENTS

1.) RED BACKGROUND W/ WHITE LETTERING, OR:
2.) WHITE BACKGROUND W/ BLACK LETTERING
3.) MIN. 3/8" LETTER HEIGHT
4.) ALL CAPITAL LETTERS
5.) ARIAL OR SIMILAR FONT
6.) WEATHER RESISTANT MATERIAL, PER UL 969

Project:
LOS ANGELES, CA 90001

Project Details:
2,344.13 kWstc, 1,890.0 kW AC
AHJ: LADWP

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
ORIGINAL	6/12/2017	A
INVERTER LOCATION	8/4/2017	B

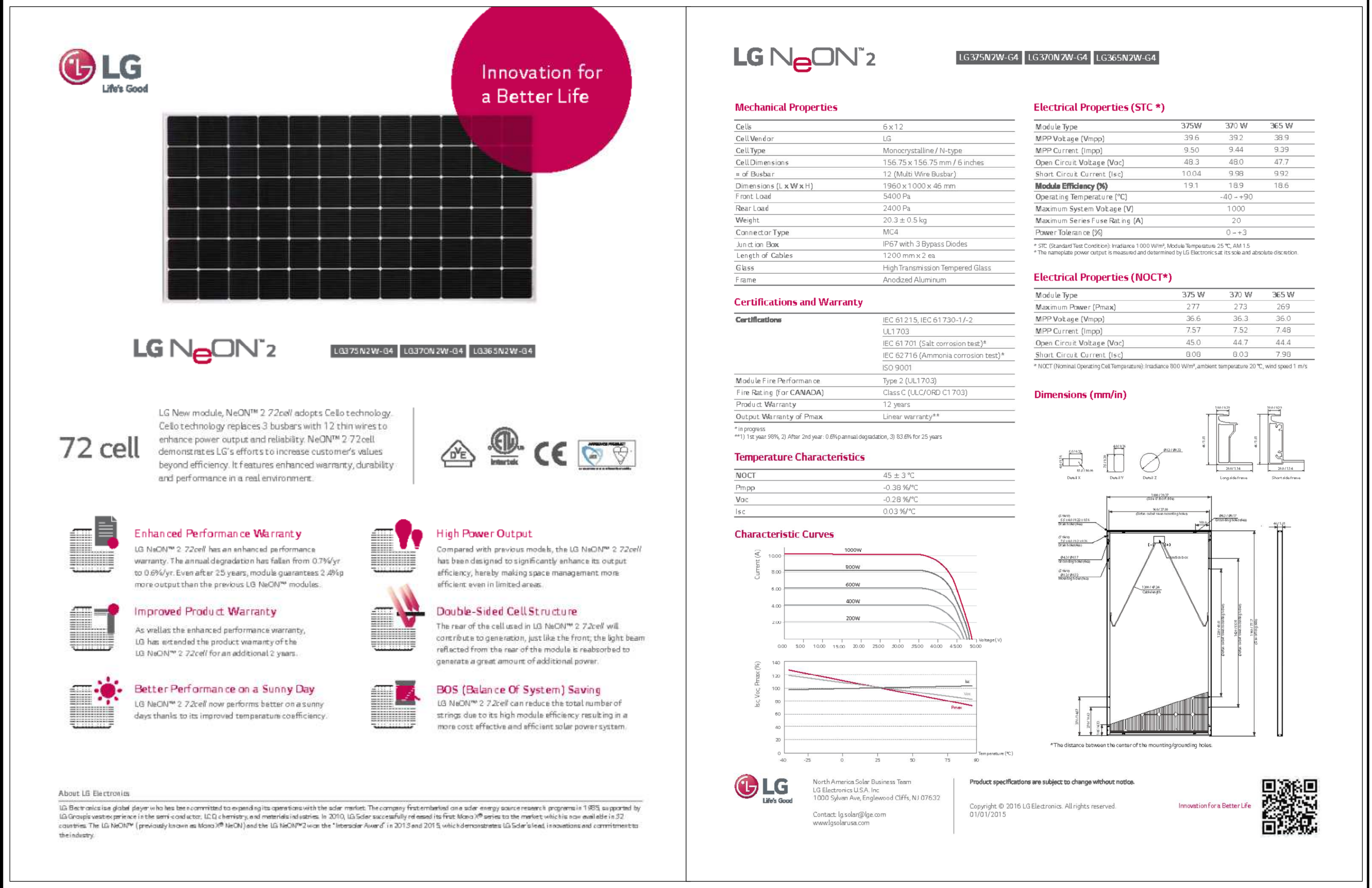
Sheet Title: ELECTRICAL DIAGRAM

Sheet Number: E2.0

Sheet Size: ARCH D - 36" x 24"

DESIGN & DRAFTING BY:
SepiSolar
POWER BY DESIGN

Reviewed & Approved by:
RD


LG NeON 2

Innovation for a Better Life

72 cell

Enhanced Performance Warranty

High Power Output

Improved Product Warranty

Double-Sided Cell Structure

Better Performance on a Sunny Day

BOS (Balance Of System) Saving

Mechanical Properties

Electrical Properties (STC *)

Certifications and Warranty

Electrical Properties (NOCT*)

Temperature Characteristics

Dimensions (mm/in)

Characteristic Curves


EcoFoot2+

The next step in the EcoFoot line:

PV installation professionals tested EcoFoot2, helped us find ways to make it even better, and the result is EcoFoot2+ — now with more validation, fewer parts, and increased design flexibility.

EcoFoot2 + Installer Feedback = EcoFoot2+™

Our design enhancements help you master the most challenging site and rooftop conditions

System Benefits
- Low part count
- Rapid system deployment
- Preassembled Universal Clamp
- Increased design flexibility
- More ballast capacity
- Simplified logistics (up to 50kW per pallet)

Validation Summary
- Class-A fire rated UL1703
- Bonding, grounding rated UL2703
- Wind tunnel tested to 150mph
- SEAOC seismic compliant
- CFD and structurally tested
- DNV GL rated at 13.5 panels per installer-hour

Three main components

The Foot

Our white UL rated resin has heat deflection properties that deliver advantages on fully-exposed rooftops, and is Class-A fire rated. UL1703

Preassembled Universal Clamp

The new preassembled universal clamp achieves integrated grounding without the use of grounding washers. UL2703

Wind Deflector

The corrosion-resistant wind deflector on every module helps minimize uplift and reduce ballast requirements.

Technical Specifications

Dimensions: 26.5"L x 18.25"H

Typical System Weight: 3.5-6 lbs. per sq. ft.

Module orientation: Landscape/Portrait

Tilt angle: Landscape 10°/Portrait 5°

Module inter-row spacing: 18.5"

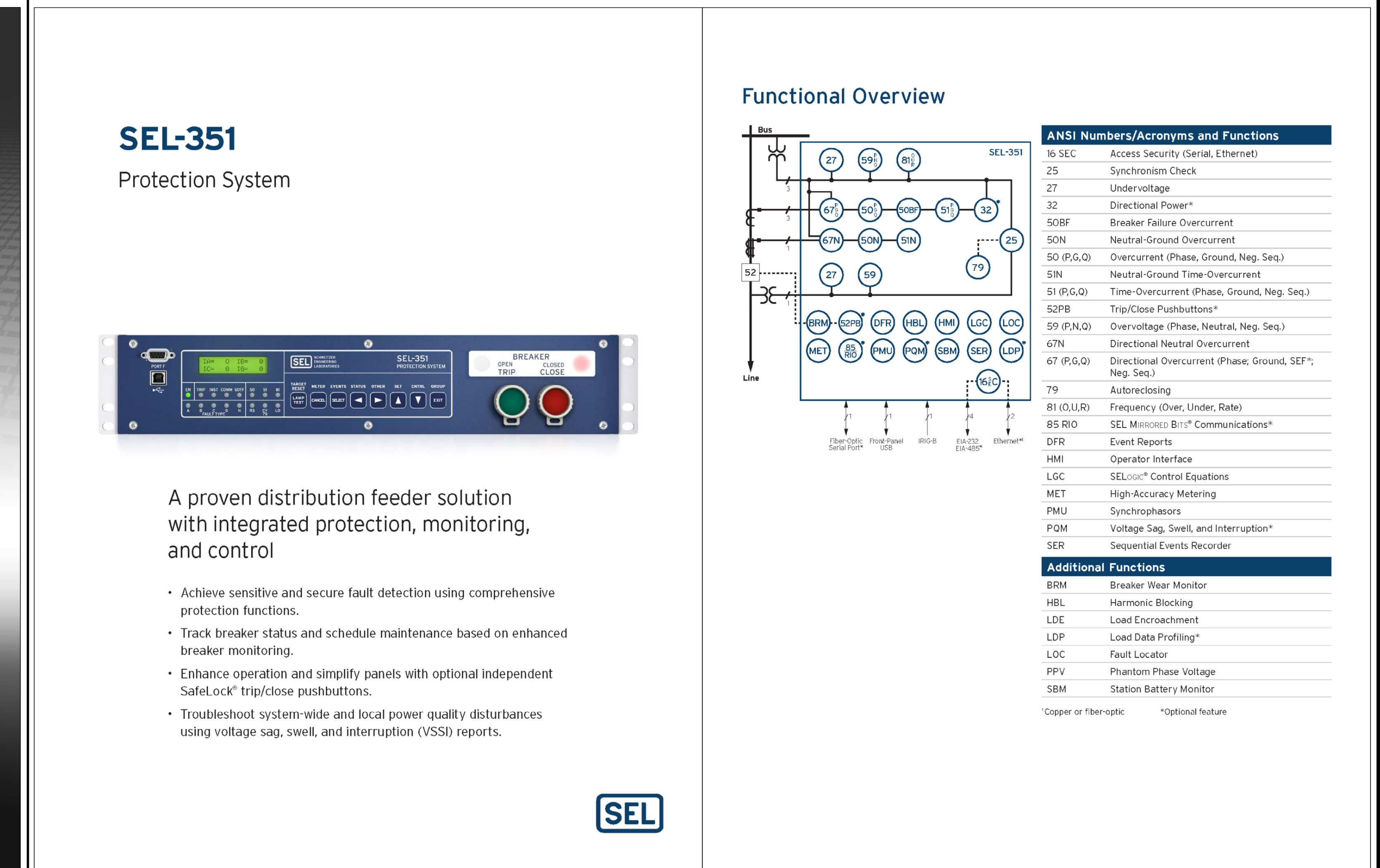
Roof pitch: 0° to 7°

Ballast requirements: 4" x 8" x 16"

Warranty: 25 years

244 W. State Street, Athens OH 45701 | 740-249-1877 | www.ecolibriumsolar.com

EcolibriumSolar


SEL-351

Protection System

A proven distribution feeder solution with integrated protection, monitoring, and control

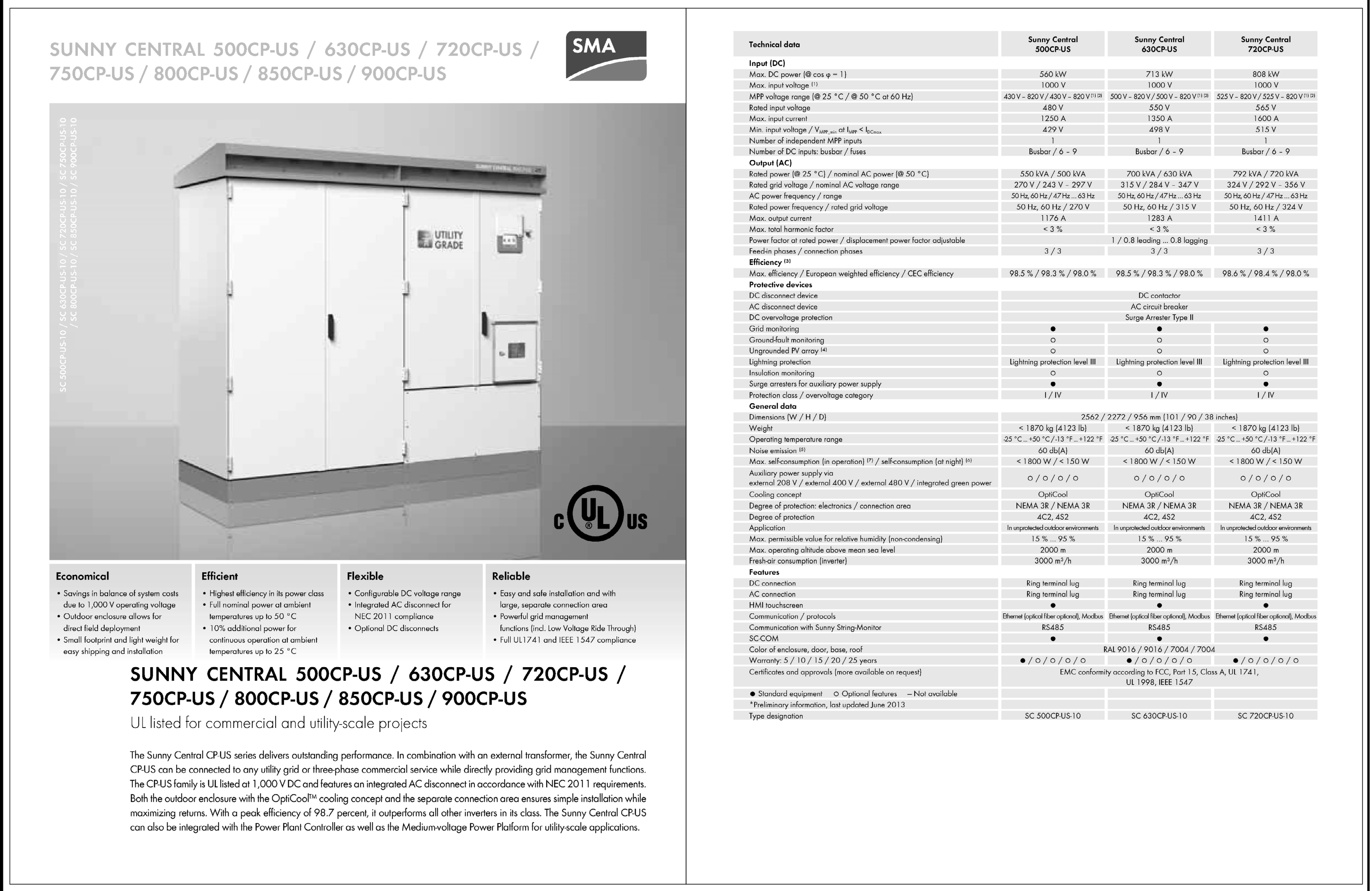
- Achieve sensitive and secure fault detection using comprehensive protection functions.
- Track breaker status and schedule maintenance based on enhanced breaker monitoring.
- Enhance operation and simplify panels with optional independent SafeLock® trip/close pushbuttons.
- Troubleshoot system-wide and local power quality disturbances using voltage sag, swell, and interruption (VSSI) reports.

SEL

Functional Overview

ANSI Numbers/Acronyms and Functions

Additional Functions


SUNNY CENTRAL 500CP-US / 630CP-US / 720CP-US / 750CP-US / 800CP-US / 850CP-US / 900CP-US

SMA

Economical

Efficient

Flexible

Reliable

SUNNY CENTRAL 500CP-US / 630CP-US / 720CP-US / 750CP-US / 800CP-US / 850CP-US / 900CP-US

UL listed for commercial and utility-scale projects

Project:

LOS ANGELES, CA 90001

Project Details:

2,344.13 kWstc, 1890.0 kW AC
AHJ: LADWP

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Sheet Title:

EQUIPMENT DATA SHEETS

Sheet Number:

D1.0

Sheet Size:

ARCH D - 36" x 24"

DESIGN & DRAFTING BY:

SepiSolar POWER BY DESIGN

Reviewed & Approved by:

RD