

- NOTES :**
- 1.) Unauthorized alteration or addition to a surveyor's Seal is a violation of Section 7209, Survey Education Law.
  - 2.) Only copies from the original of this survey map showing the Surveyor's inked seal or his/her embossed seal shall be valid.
  - 3.) Subject to all rights of ways or easements of record.
  - 4.) Subject to whatever state of facts a complete title search may disclose.
  - 5.) Certifications indicated hereon signify that this survey was made in accordance with the existing Code of Practice for Professional Land Surveyors of the New York State Association of Professional Land Surveyors to the person so noted. Certifications are not transferable to successors and/or assigns, or subsequent owners.
  - 6.) Subsurface structures not visible or readily apparent and extent are not certified.
  - 7.) Survey subject to covenants, easements, restrictions and other recorded instruments.

**MAP REFERENCE :**

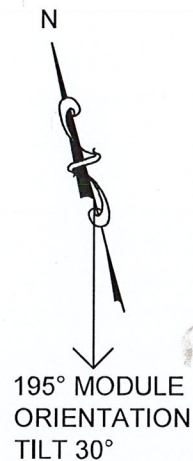
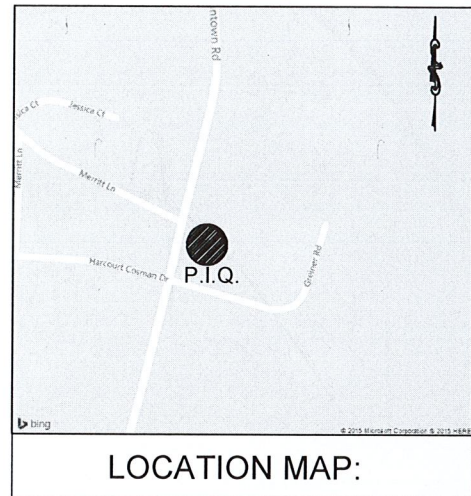
Parcel being lot 1 as shown on a map entitled "Greiner" filed with the Orange County Clerks Office No. 214-01, and is subject to all provisions noted thereon.

**TAX PARCEL NUMBER :**

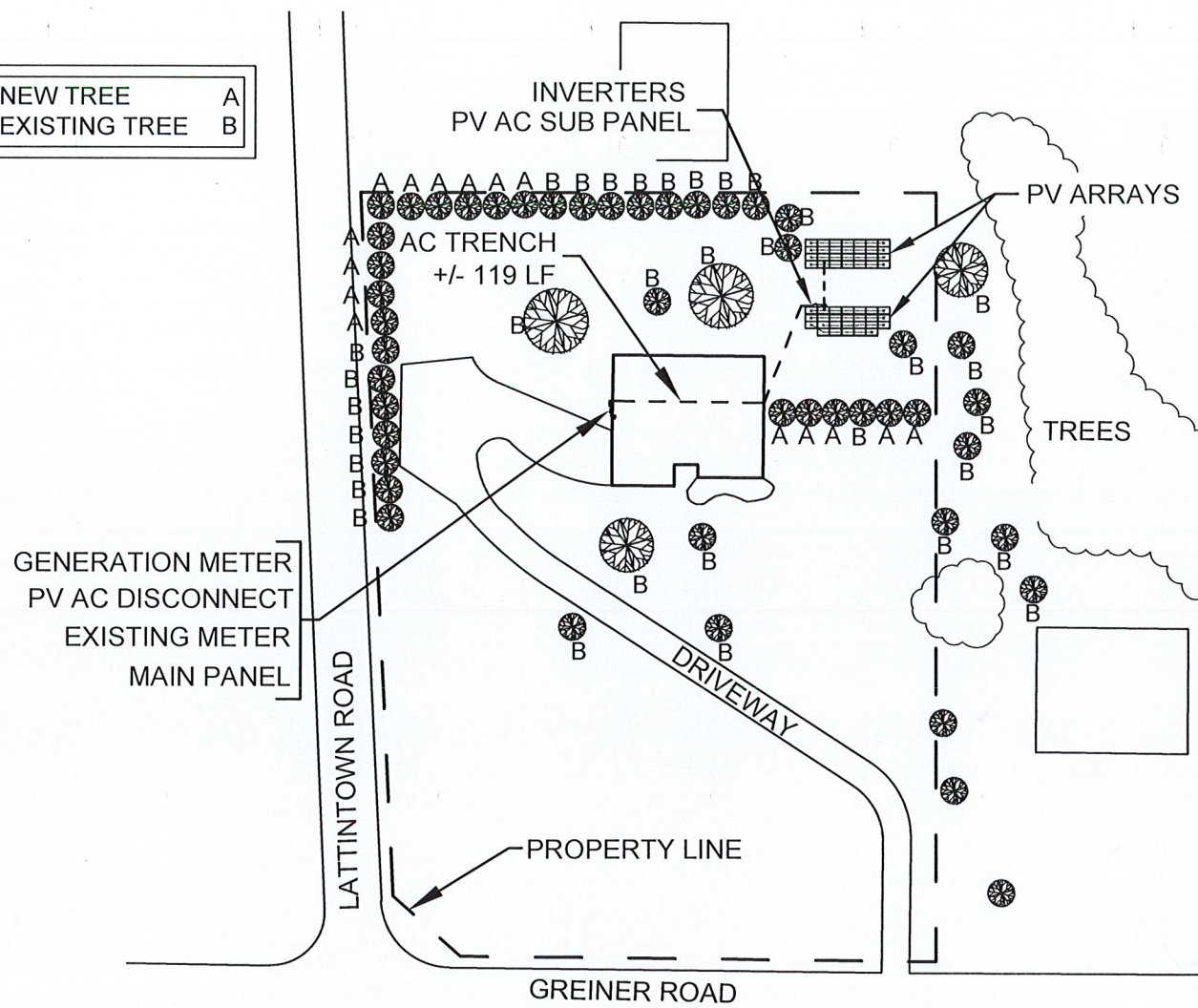
Town of Newburgh, Orange County, New York  
Section 7, Block 1, Portion of Lot 22.1

**DEED REFERENCE :**

Portion of:  
David D. Greiner and Harold H. Greiner  
- to -  
Hansta, L.L.C.  
Deed Liber 5677 Page 110  
Dated 25 October, 2001



NEW TREE A  
EXISTING TREE B



PROJECT DATA	
CODES	NYS-RC 2010 NEC-2011
BUILDING USE:	
EXISTING:	R - RESIDENTIAL SINGLE FAMILY
CONST. CLASS	5-B UNPROTECTED
SOLAR ARRAY:	
PANEL:	SUNPOWER E20 327
	54 MODULES
	6 STRINGS OF 7
	2 STRINGS OF 6
RACKING:	GROUNDMOUNT @ 30°
INVERTER:	(2) SMA SB5000TL-US-22 (1) SMA SB7000TL-US-22
SYSTEM RATING:	17,660 Watts DC - STC

LOADS:	
GROUND SNOW	30 PSF
WIND LOAD	90 MPH
SOLAR ARRAY	4.0 PSF

# CHRISTIANO RESIDENCE

## Net Metered 17.66-kW

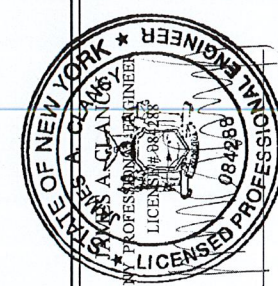
A-1:	COVER PAGE	A-5:	LABELS
A-2:	LAYOUT	A-6:	STRING SIZER
A-3:	STRUCTURAL	A-7:	DATA SHEETS
A-4:	ELECTRICAL	A-8:	DATA SHEETS

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THE POWERFUL ENERGY SOURCE

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877-546-3636

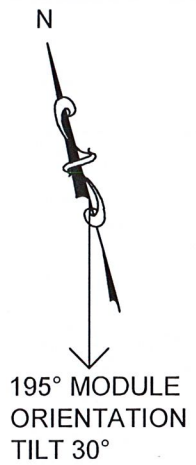
**JAMES A. CLANCY**  
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PHOTO-VOLTAIC ARRAY  
**CHRISTIANO RESIDENCE**  
1 GREINER ROAD  
NEWBURGH, NY 12550

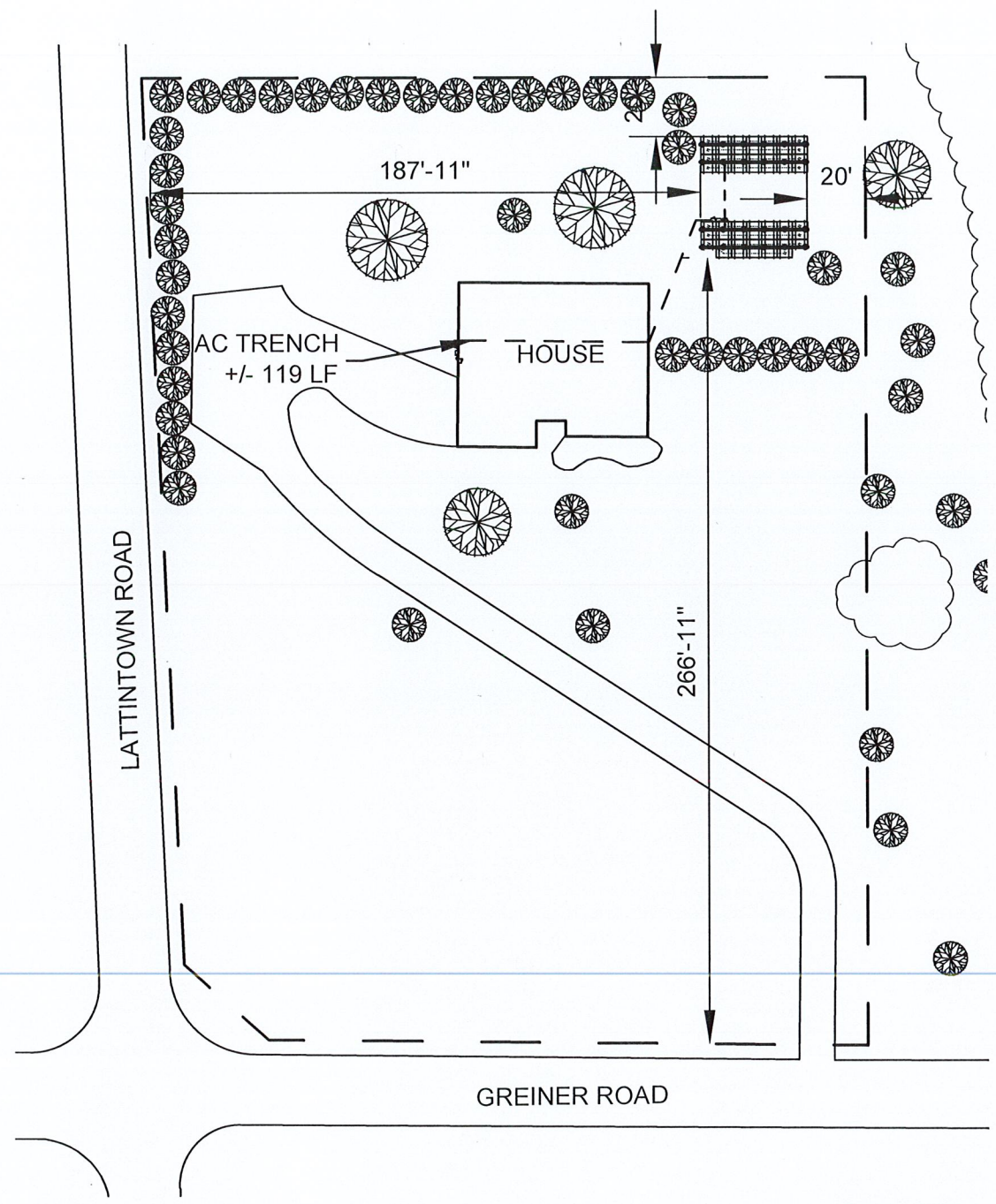
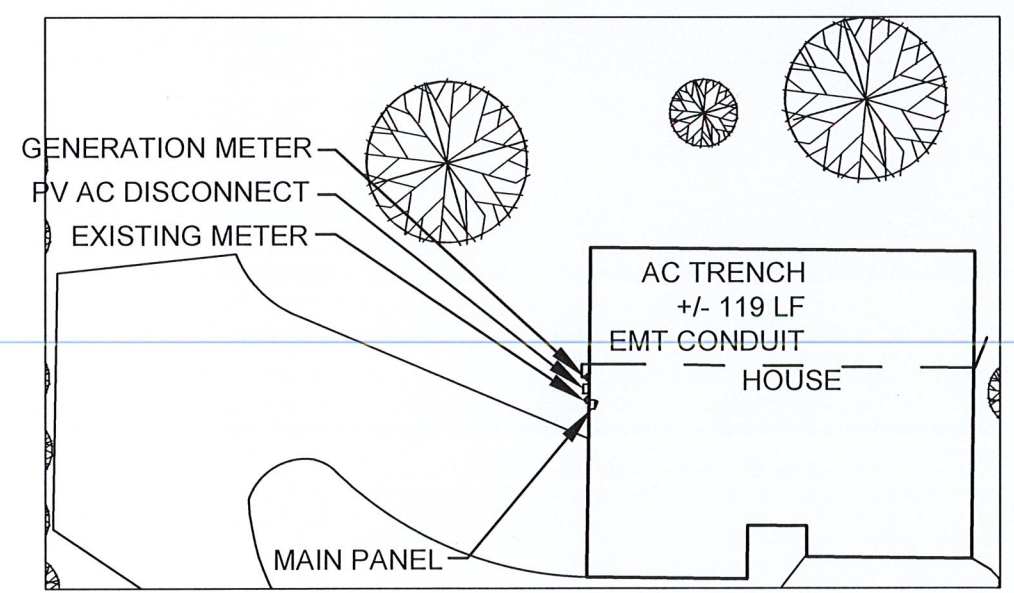


REVISIONS	
DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	09-15-15

**A-1**

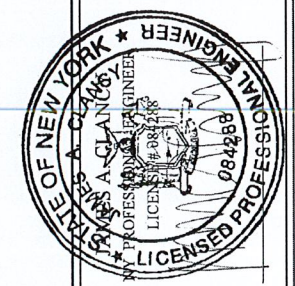


- 2-1 STRING LABEL (INVERTER-STRING)
- G RACKING GROUND CONNECTION
- INVERTER
- ▭ AC LOADCENTER
- AC DISCONNECT
- ▭ METER



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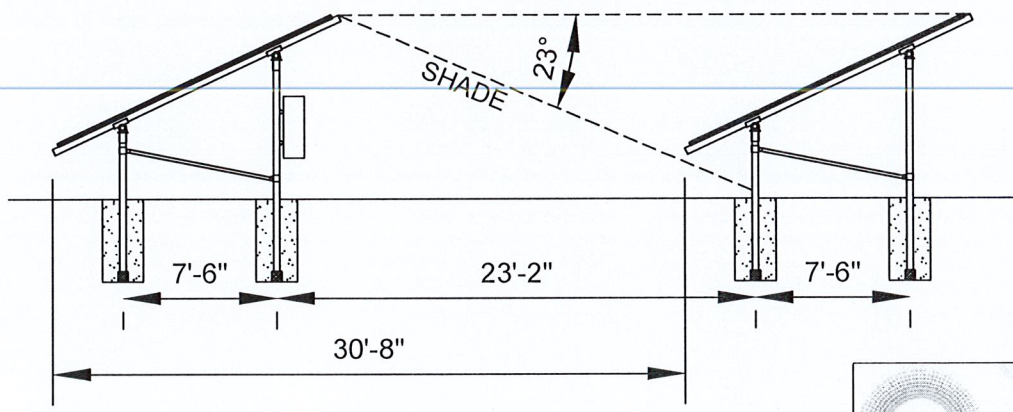
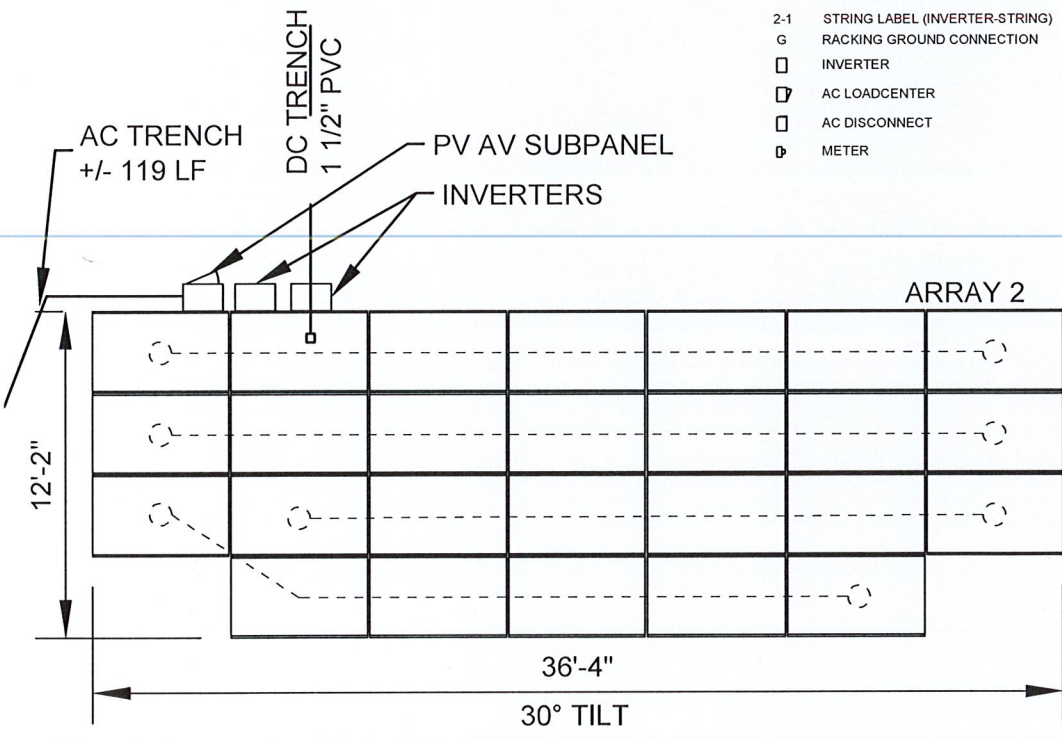
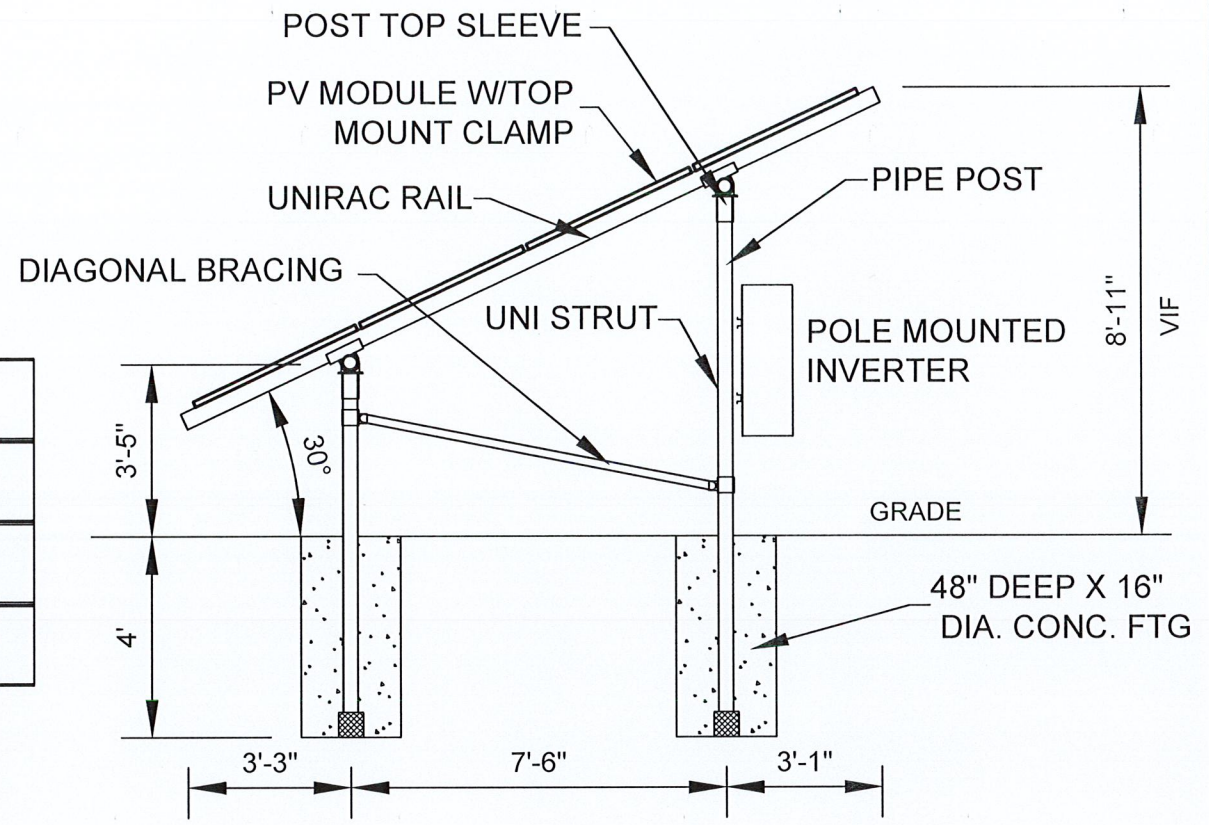
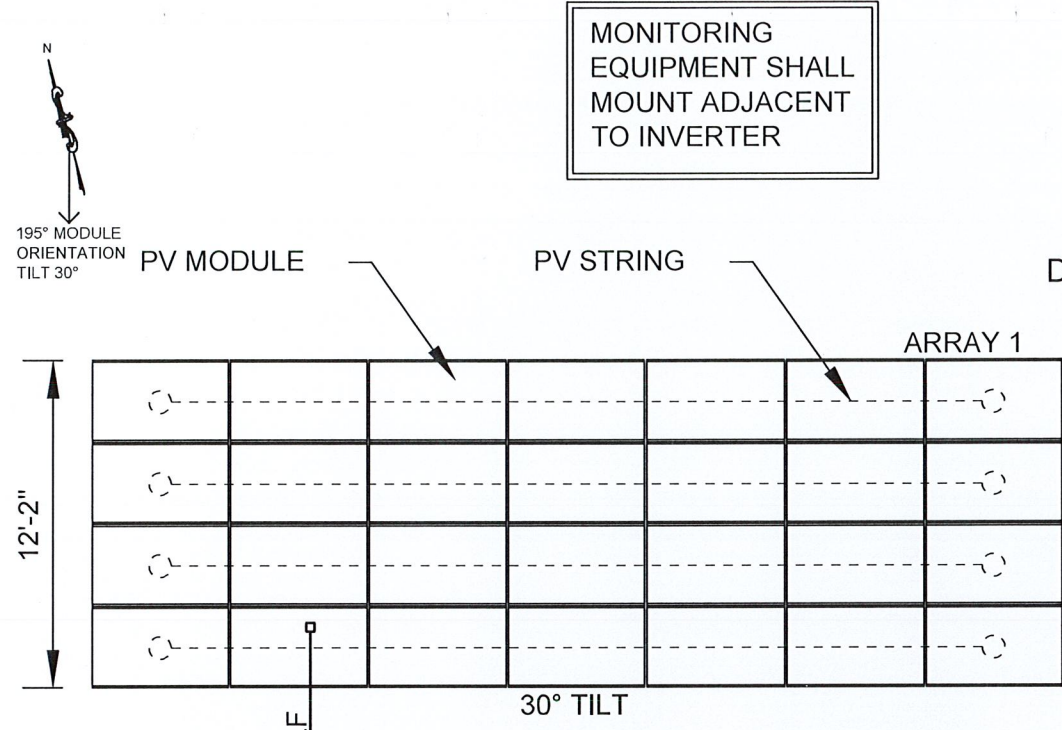


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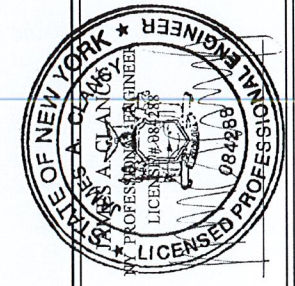
**A-2**



- 2-1 STRING LABEL (INVERTER-STRING)
- G RACKING GROUND CONNECTION
- INVERTER
- ▣ AC LOADCENTER
- AC DISCONNECT
- D METER

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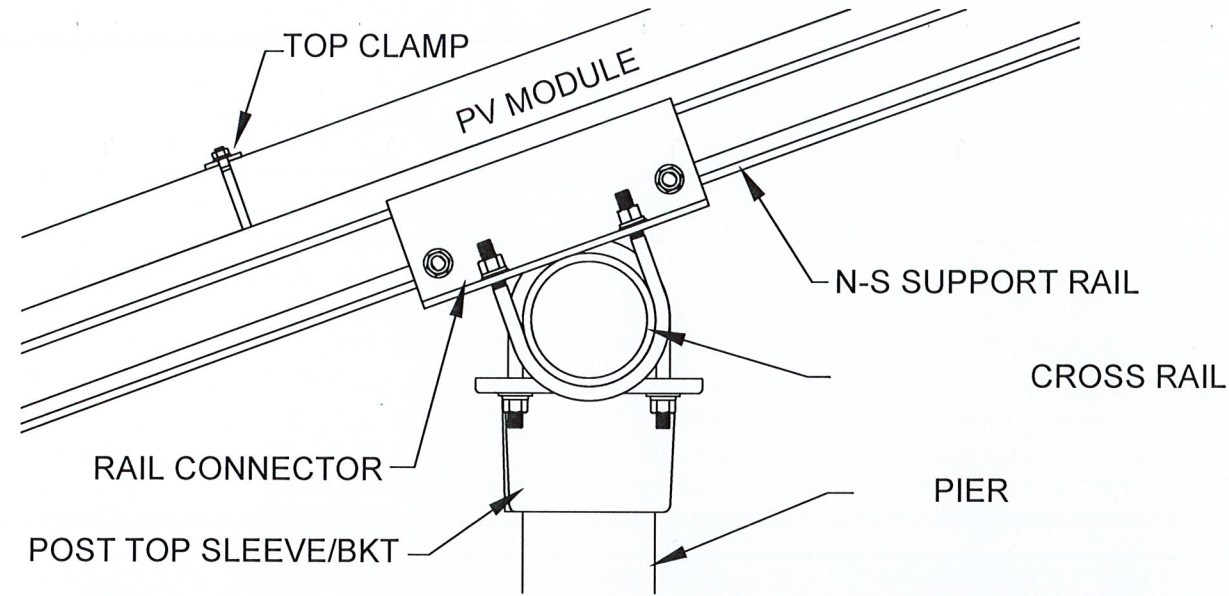
PHOTO-VOLTAIC ARRAY  
**CHRISTIANO RESIDENCE**  
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REVISIONS	
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SCALE	AS NOTED
DATE	09-15-15

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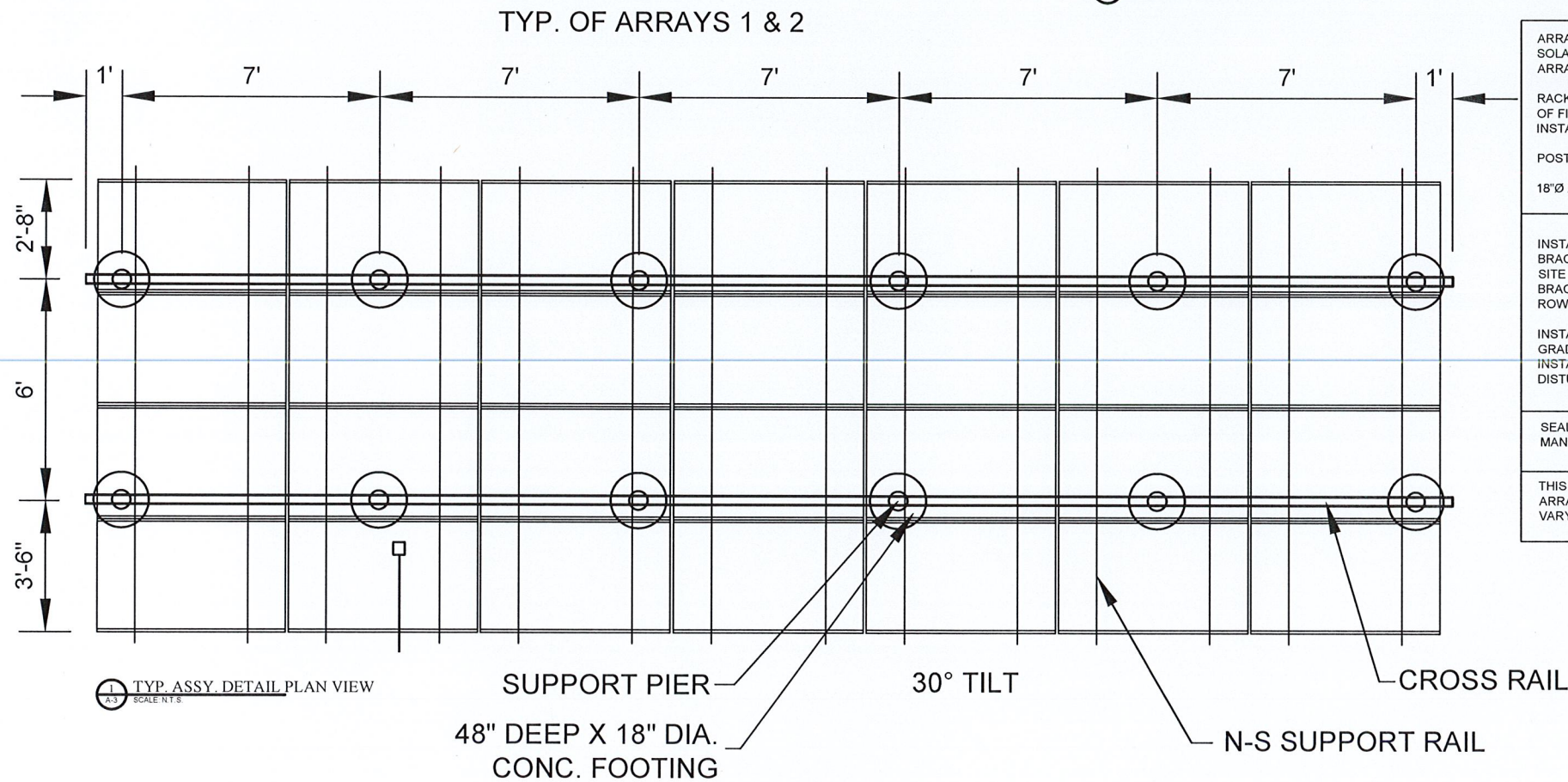
**A-3.1**



2 PIER AND RAIL ASSY.  
SCALE: N.T.S.



3 UNIRAC ASSEMBLY EXAMPLE  
SCALE: N.T.S.



1 TYP. ASSY. DETAIL PLAN VIEW  
SCALE: N.T.S.

ARRAY RACK ASSEMBLY:  
SOLAR GROUND MOUNT RACKING SHOWN FOR  
ARRANGEMENT ONLY:  
RACKING MFG'R TO PROVIDE SEALED SHOP DRAWINGS  
OF FINAL RACKING ASSEMBLY.  
INSTALL AS PER MFG'R STANDARD INSTALLATION DETAILS.  
POST SUPPORTED RACKING FOUNDATION AS SHOWN.  
18"Ø X 48" DEEP CONCRETE FNDN. WITH EMBEDDED POST.

INSTALLATION NOTE:  
BRACKET TO POST INSTALLATION HEIGHT MAY VARY WITH  
SITE GRADING. IT IS NOT NECESSARY FOR ALL POST TOP  
BRACKETS TO ALIGN AT A COMMON ELEVATION FOR EACH  
ROW (+/- 2").

INSTALLATION CONTRACTOR SHALL ENSURE THAT ALL  
GRADING AND COMPACTION OF SITE IS COMPLETED PRIOR TO  
INSTALLATION OF THE RACKING SYSTEM TO AVOID POTENTIAL  
DISTURBANCE OF FOUNDATIONS AND ALIGNMENT.

SEALED SHOP DRAWINGS TO BE PROVIDED BY RACKING  
MANUFACTURER PRIOR TO INSTALLATION OF PV ARRAY.

THIS DRAWING IS DIAGRAMMATIC FOR THE MODULE/RACK  
ARRANGEMENT. FINAL RACKING DETAILS AND ASSEMBLY MAY  
VARY WITH FINAL INSTALLATION.

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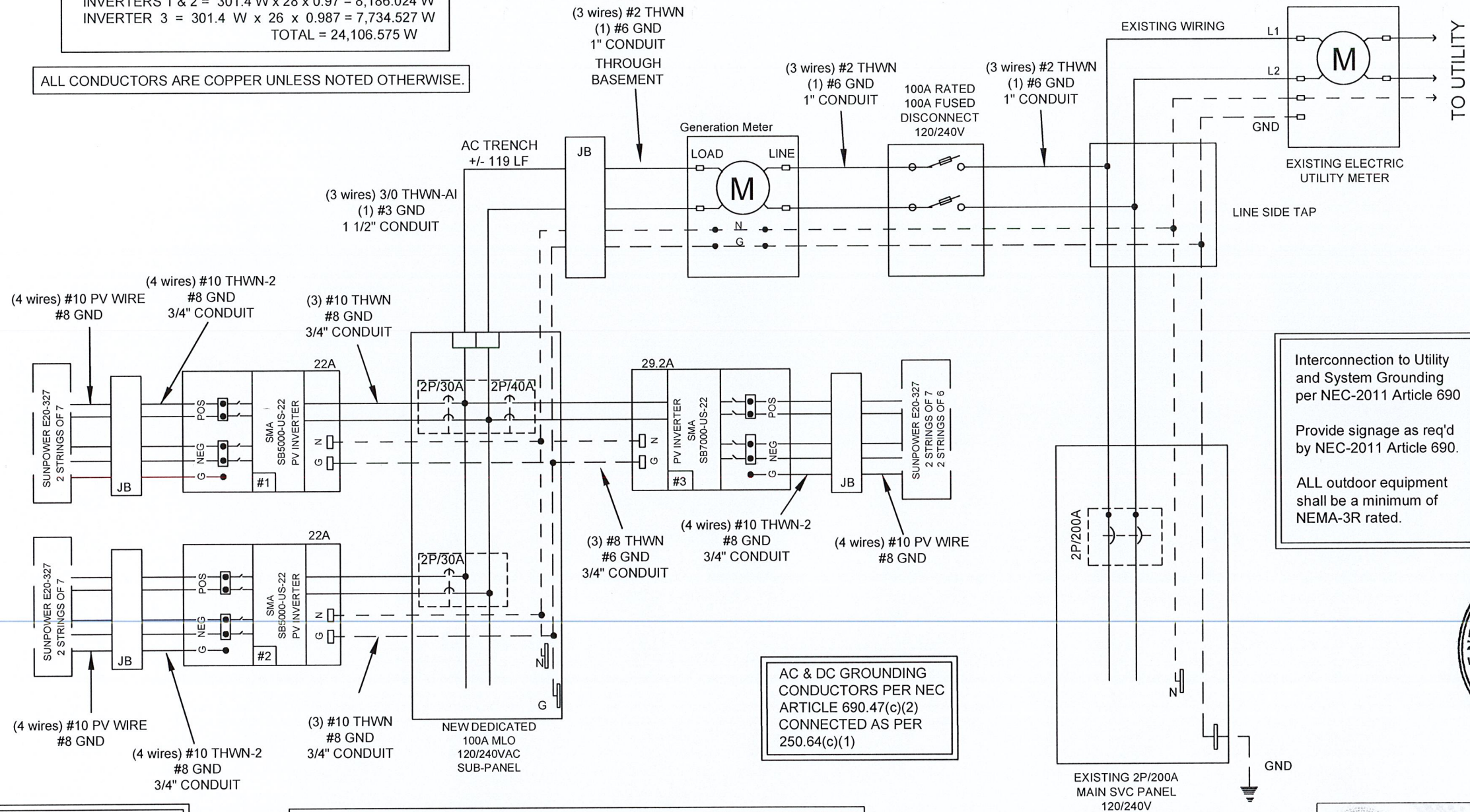


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**A-3.2**

POWER OUTPUT = PTC RATING x # MODULES x INV EFF'  
 INVERTERS 1 & 2 = 301.4 W x 28 x 0.97 = 8,186.024 W  
 INVERTER 3 = 301.4 W x 26 x 0.987 = 7,734.527 W  
 TOTAL = 24,106.575 W

ALL CONDUCTORS ARE COPPER UNLESS NOTED OTHERWISE.



Interconnection to Utility and System Grounding per NEC-2011 Article 690  
 Provide signage as req'd by NEC-2011 Article 690.  
 ALL outdoor equipment shall be a minimum of NEMA-3R rated.

AC & DC GROUNDING CONDUCTORS PER NEC ARTICLE 690.47(c)(2) CONNECTED AS PER 250.64(c)(1)

Confirm line side voltage at electric utility service entrance BEFORE connecting inverter and ensure proper operational range required by system inverter.

-Electrical contractor to verify interconnection requirements with Electrical Utility for connection location and standards.  
 -Electrical Contractor to provide expansion joints and anchoring of all conduit runs as per NEC requirements.  
 -Provide label/placard at existing utility connection with "WARNING - CUSTOMER OWNED ELECTRICAL GENERATION EQUIPMENT CONNECTED" with appropriate hazard and output ratings of PV System.

ALL EXTERIOR MOUNTED COMBINERS, JUNCTION BOXES, TROUGHS, DISCONNECTS, ETC. SHALL BE MIN. NEMA 3R RATED.

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**A-4**

**WARNING**  
**ELECTRIC SHOCK HAZARD !**  
 THE DIRECT CURRENT CIRCUIT CONDUCTORS OF THIS PHOTOVOLTAIC POWER SYSTEM ARE UNGROUNDED BUT MAY BE ENERGIZED WITH RESPECT TO GROUND DUE TO LEAKAGE PATHS AND/OR GROUND FAULTS

DC WARNING LABEL

**WARNING**  
**INVERTER OUTPUT CONNECTION**  
**DO NOT RELOCATE THIS OVERCURRENT DEVICE**

UTILITY DISCONNECT LABEL

**CAUTION**  
**SOLAR ELECTRIC SYSTEM CONNECTED**

AC PANELS

**PHOTOVOLTAIC INVERTER INPUT DC DISCONNECT**

**WARNING**  
**ELECTRIC SHOCK HAZARD !**

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

INTERACTIVE SOLAR PV SYSTEM RATING

RATED DC CURRENT	12	AMP
RATED DC VOLTAGE	363	VDC
MAXIMUM SYSTEM VOLTAGE	503	VDC
SHORT CIRCUIT CURRENT	30	AMP

SYSTEM INSTALLER: \_\_\_\_\_  
 FOR SERVICE CALL: \_\_\_\_\_

DC INPUT WARNING LABEL #1  
 INVERTERS 1 - 2

**PHOTOVOLTAIC INVERTER INPUT DC DISCONNECT**

**WARNING**  
**ELECTRIC SHOCK HAZARD !**

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

INTERACTIVE SOLAR PV SYSTEM RATING

RATED DC CURRENT	24	AMP
RATED DC VOLTAGE	363	VDC
MAXIMUM SYSTEM VOLTAGE	503	VDC
SHORT CIRCUIT CURRENT	36	AMP

SYSTEM INSTALLER: \_\_\_\_\_  
 FOR SERVICE CALL: \_\_\_\_\_

DC INPUT WARNING LABEL #2  
 INVERTER 3

**PHOTOVOLTAIC SYSTEM DISCONNECT FOR UTILITY OPERATION**

**WARNING**  
**ELECTRIC SHOCK HAZARD !**

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

INTERACTIVE SOLAR PV SYSTEM RATING

RATED OPERATING CURRENT	73.3	AMP
NORMAL OPERATING VOLTAGE	240	VAC

SYSTEM INSTALLER: \_\_\_\_\_  
 FOR SERVICE CALL: \_\_\_\_\_

UTILITY DISCONNECT WARNING LABEL

**WARNING**  
**DC SOLAR CIRCUIT**

DC CIRCUIT LABEL

**WARNING**  
 THIS METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM

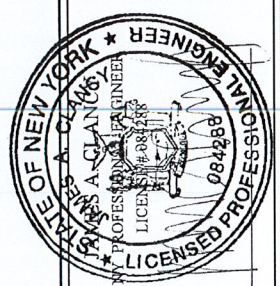
**PV CIRCUITS ONLY**  
 NO OTHER LOADS SHALL BE APPLIED TO THIS PANEL OTHER THEN PC COMPONENTS AS PER NEC ARTICLE 690

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**PHOTO-VOLTAIC ARRAY**  
**CHRISTIANO RESIDENCE**  
 1 GREINER ROAD  
 NEWBURGH, NY 12550



REVISIONS

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CHKD	JAC
SCALE	AS NOTED
DATE	09-15-15

**A-5**

### Evaluation of design

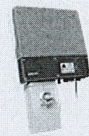
Project name: Nicholas Christiano  
Project number:

Location: United States of America / New York, NY  
Ambient temperature:  
Annual extreme low temperature: -14 °C  
Average high Temperature: 25 °C  
Annual extreme high temperature: 37 °C

#### Subproject 1

##### 2 x SB 5000TL-US-22 - 240VAC (PV system section 1)

Peak power: 9.16 kWp  
Total number of PV modules: 28  
Number of inverters: 2  
Max. DC power: 5.25 kW  
Max. AC power: 5.00 kW  
Grid voltage: 240V (120V / 240V)  
Nominal power ratio: 115 %



SB 5000TL-US-22 - 240VAC

#### Technical data

##### Input A: PV array 1

14 x SunPower SPR-327NE-WHT-D T5 (09/2012), Azimuth angle: 15 °, Tilt angle: 30 °, Mounting type: Ground mount

	Input A:	Input B:
Number of strings:	2	
PV modules per string:	7	
Peak power (input):	4.58 kWp	---
Typical PV voltage:	363 V	---
Min. PV voltage:	343 V	---
Min. DC voltage (Grid voltage 240 V):	125 V	125 V
Max. PV voltage:	503 V	---
Max. DC voltage:	600 V	600 V
Max. current of PV array:	12.0 A	---
Max. DC current:	15 A	15 A

#### PV/Inverter compatible

Version: 3.31.0.R

### Evaluation of design

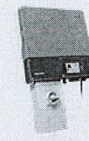
Project name: Nicholas Christiano  
Project number:

Location: United States of America / New York, NY  
Ambient temperature:  
Annual extreme low temperature: -14 °C  
Average high Temperature: 25 °C  
Annual extreme high temperature: 37 °C

#### Subproject 1

##### 1 x SB 7000TL-US-22 - 240VAC (PV system section 2)

Peak power: 8.50 kWp  
Total number of PV modules: 26  
Number of inverters: 1  
Max. DC power: 7.30 kW  
Max. AC power: 7.00 kW  
Grid voltage: 240V (120V / 240V)  
Nominal power ratio: 86 %



SB 7000TL-US-22 - 240VAC

#### Technical data

##### Input A: PV array 2

14 x SunPower SPR-327NE-WHT-D T5 (09/2012), Azimuth angle: 15 °, Tilt angle: 30 °, Mounting type: Ground mount

##### Input B: PV array 2

12 x SunPower SPR-327NE-WHT-D T5 (09/2012), Azimuth angle: 15 °, Tilt angle: 30 °, Mounting type: Ground mount

	Input A:	Input B:
Number of strings:	2	2
PV modules per string:	7	6
Peak power (input):	4.58 kWp	3.92 kWp
Typical PV voltage:	363 V	311 V
Min. PV voltage:	343 V	294 V
Min. DC voltage (Grid voltage 240 V):	125 V	125 V
Max. PV voltage:	503 V	431 V
Max. DC voltage:	600 V	600 V
Max. current of PV array:	12.0 A	12.0 A
Max. DC current:	18 A	18 A

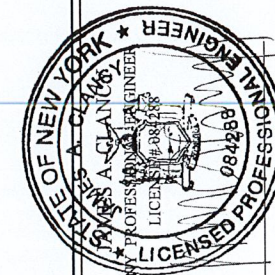
#### PV/Inverter partly compatible

PV array and inverter type are only partly compatible since the inverter is under-dimensioned for this combination (< 93 %).

Version: 3.31.0.R

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PHOTO-VOLTAIC ARRAY  
CHRISTIANO RESIDENCE  
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#### REVISIONS

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A-6



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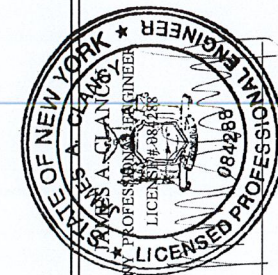
Technical data	Sunny Boy 4000TL-US		Sunny Boy 5000TL-US		Sunny Boy 6000TL-US	
	208 V AC	240 V AC	208 V AC	240 V AC	208 V AC	240 V AC
<b>Input (DC)</b>						
Max. usable DC power (@ cos φ = 1)	4200 W		5300 W		6300 W	
Max. DC voltage	600 V		600 V		600 V	
Rated MPPT voltage range	175 - 480 V		175 - 480 V		210 - 480 V	
MPPT operating voltage range	125 V - 500 V		125 V - 500 V		125 V - 500 V	
Min. DC voltage / start voltage	125 V / 150 V		125 V / 150 V		125 V / 150 V	
Max. input current / per MPP tracker	24 A / 15 A		30 A / 15 A		30 A / 15 A	
Number of MPP trackers / strings per MPP tracker			2 / 2			
<b>Output (AC)</b>						
AC nominal power	4000 W		4550 W		5000 W	
Max. AC apparent power	4000 VA		4550 VA		5000 VA	
Nominal AC voltage / adjustable	208 V / ● 240 V / ●		208 V / ● 240 V / ●		208 V / ● 240 V / ●	
AC voltage range	183 - 229 V 211 - 264 V		183 - 229 V 211 - 264 V		183 - 229 V 211 - 264 V	
AC grid frequency, range	60 Hz / 59.3 - 60.5 Hz		60 Hz / 59.3 - 60.5 Hz		60 Hz / 59.3 - 60.5 Hz	
Max. output current	20 A		22 A		25 A	
Power factor (cos φ)	1		1		1	
Output phases / line connections	1 / 2		1 / 2		1 / 2	
Harmonics	< 4%		< 4%		< 4%	
<b>Efficiency</b>						
Max. efficiency	97.2%	97.5%	97.2%	97.6%	97.0%	97.4%
CEC efficiency	96.5%	97.0%	96.5%	97.0%	96.5%	97.0%
<b>Protection devices</b>						
DC disconnection device			●			
DC reverse-polarity protection			●			
Ground fault monitoring / Grid monitoring			● / ●			
AC short circuit protection			●			
All-pole sensitive residual current monitoring unit			●			
Arc fault circuit interrupter (AFCI) compliant to UL 1699B			●			
Protection class / overvoltage category			I / IV			
<b>General data</b>						
Dimensions (W / H / D) in mm (in)			490 / 519 / 185 (19.3 / 20.5 / 7.3)			
DC Disconnect dimensions (W / H / D) in mm (in)			187 / 297 / 190 (7.4 / 11.7 / 7.5)			
Packing dimensions (W / H / D) in mm (in)			617 / 597 / 266 (24.3 / 23.5 / 10.5)			
DC Disconnect packing dimensions (W / H / D) in mm (in)			370 / 240 / 280 (14.6 / 9.4 / 11.0)			
Weight / DC Disconnect weight			24 kg (53 lb) / 3.5 kg (8 lb)			
Packing weight / DC Disconnect packing weight			27 kg (60 lb) / 3.5 kg (8 lb)			
Operating temperature range			-40 °C ... +60 °C [-40 °F ... +140 °F]			
Noise emission (typical)	< 25 dB(A)		< 29 dB(A)		< 29 dB(A)	
Internal consumption at night	< 1 W		< 1 W		< 1 W	
Topology	Transformerless		Transformerless		Transformerless	
Cooling concept	Convection		Convection		Active Cooling	
Electronics protection rating	NEMA 3R		NEMA 3R		NEMA 3R	
<b>Features</b>						
Secure Power Supply	●		●		●	
Display: graphic	●		●		●	
Interfaces: RS485 / Speedwire/Webconnect	o/o		o/o		o/o	
Warranty: 10 / 15 / 20 years	●/o/o		●/o/o		●/o/o	
Certificates and permits (more available on request)	UL 1741, UL 1998, UL 1699B, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1					
NOTE: US inverters ship with gray lids						
Type designation	SB 4000TL-US-22		SB 5000TL-US-22		SB 6000TL-US-22	

Sunny Boy 7000TL-US	
208 V	240 V
7300 W	7300 W
600 V	600 V
300 V - 480 V / 345 V	345 V - 480 V / 379 V
300 V / 360 V	345 V / 360 V
24.4 A	21.1 A
24.4 A	21.1 A
1	1
6	6
7000 W / 7000 VA	7000 W / 7000 VA
208 V / 183 V - 229 V	240 V / 211 V - 264 V
60 Hz / 59.3 Hz ... 60.5 Hz	
33.7 A	29.2 A
1	1
1 / 2	1 / 2
98 % / 98.6 %	98.5 % / 98.7 %
●	●
●	●
-	-
●	●
●	●
I	I
IV	IV
470 / 615 / 240 mm (18.4 / 24.1 / 9.5 inch)	
187 / 297 / 190 mm (7.28 / 11.7 / 7.5 inch)	
35 kg / 78 lb	35 kg / 78 lb
3.5 kg / 8 lb	3.5 kg / 8 lb
-40 °C ... +60 °C / -40 °F ... +140 °F	
46 dB(A)	46 dB(A)
0.15 W	0.15 W
Transformerless H5	Transformerless H5
OptiCool	OptiCool
NEMA 3R	NEMA 3R
NEMA 3R	NEMA 3R
100 %	100 %
Screw terminal	Screw terminal
Screw terminal	Screw terminal
Text line	Text line
o / o / o	o / o / o
● / o / o	● / o / o

iss A & B), CAN/CSA C22.2 107.1-1, UL 1699B

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**PHOTO-VOLTAIC ARRAY**  
**CHRISTIANO RESIDENCE**  
 1 GREINER ROAD  
 NEWBURGH, NY 12550



REVISIONS

DRWN	RCA
CHKD	JAC
SCALE	AS NOTED
DATE	08-15-15

**A-7**

**SOL PROVIDERS**  
 THE POWERFUL ENERGY SOURCE  
 143 OLD ROUTE 9  
 FISHKILL, NY 12524  
 877-546-3636

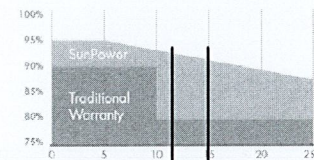
SUNPOWER

MORE ENERGY. FOR LIFE.<sup>®</sup>

E-SERIES SOLAR PANELS

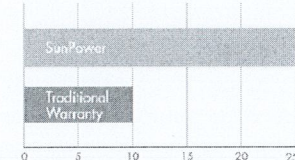
SUNPOWER OFFERS THE BEST COMBINED POWER AND PRODUCT WARRANTY

POWER WARRANTY



More guaranteed power: 95% for first 5 years, -0.4%/yr. to year 25.<sup>8</sup>

PRODUCT WARRANTY



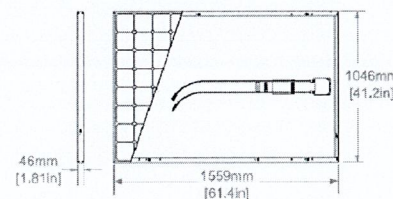
Combined Power and Product Defect 25 year coverage that includes panel replacement costs.<sup>9</sup>

ELECTRICAL DATA		
	E20-327	E19-320
Nominal Power <sup>12</sup> (P <sub>nom</sub> )	327 W	320 W
Power Tolerance	+5/-0%	+5/-0%
Avg. Panel Efficiency <sup>3</sup>	20.4%	19.9%
Rated Voltage (V <sub>mpp</sub> )	54.7 V	54.7 V
Rated Current (I <sub>mpp</sub> )	5.98 A	5.86 A
Open-Circuit Voltage (V <sub>oc</sub> )	64.9 V	64.8 V
Short-Circuit Current (I <sub>sc</sub> )	6.46 A	6.24 A
Maximum System Voltage	600 V UL & 1000 V IEC	
Maximum Series Fuse	20 A	
Power Temp. Coef. (P <sub>mpp</sub> )	-0.38% / °C	
Voltage Temp. Coef. (V <sub>oc</sub> )	-176.6 mV / °C	
Current Temp. Coef. (I <sub>sc</sub> )	3.5 mA / °C	

OPERATING CONDITION AND MECHANICAL DATA	
Temperature	-40°F to +185°F [-40°C to +85°C]
Max load	Wind: 50 psf, 2400 Pa, 245 kg/m <sup>2</sup> front & back Snow: 112 psf, 5400 Pa, 550kg/m <sup>2</sup> front
Impact resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)
Appearance	Class A
Solar Cells	96 Monocrystalline Maxeon Gen II Cells
Tempered Glass	High Transmission Tempered Anti-Reflective
Junction Box	IP-65 Rated
Connectors	MC4 Compatible
Frame	Class 1 black anodized, highest AAMA Rating
Weight	41 lbs (18.6 kg)

TESTS AND CERTIFICATIONS	
Standard tests	UL 1703, IEC 61215, IEC 61730
Quality tests	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSAS 18001:2007, lead-free, PV Cycle
Ammonia test	IEC 62716
Salt Spray test	IEC 61701 (passed maximum severity)
PID test	Potential-Induced Degradation free: 1000V <sup>10</sup>
Available listings	CEC, JET, KEMCO, MCS, FSEC, CSA, UL TUV

- REFERENCES:
- All comparisons are SP8-E20-327 vs. a representative conventional panel: 240W, approx. 1.6 m<sup>2</sup>, 15% efficiency.
  - PI/Evolution Labs "SunPower Sealing Study," Feb 2013.
  - Typically 7-9% more energy per watt, EEW/DNV Engineering "SunPower Yield Report," Jan 2013.
  - SunPower 0.25%/yr. degradation vs. 1.0%/yr. conv. panel. Campau, Z. et al. "SunPower Module Degradation Rate," SunPower white paper, Feb 2013; Jordan, Dirk "SunPower Test Report," NREL, Oct 2012.
  - "SunPower Module 40-Year Useful Life" SunPower white paper, Feb 2013. Useful life is 99 out of 100 panels operating at more than 70% of rated power.
  - Out of all 2600 panels listed in Photon International, Feb 2012.
  - 8% more energy than the average of the top 10 panel companies tested in 2012 (151 panels, 102 companies), Photon International, March 2013.
  - Compared with the top 15 manufacturers, SunPower Warranty Review, Feb 2013.
  - Some exclusions apply. See warranty for details.
  - 5 of top 8 panel manufacturers were tested by Fraunhofer ISE "PV Module Durability Initiative Public Report," Feb 2013.
  - Compared with the non-stress-tested control panel: Atlas 25+ Durability test report, Feb 2013.
  - Standard Test Conditions (1000 W/m<sup>2</sup> irradiance, AM 1.5, 25° C).
  - Based on average of measured power values during production.



See <http://www.sunpowercorp.com/facts> for more reference information. For further details, see supplementary specs: [www.sunpowercorp.com/data/sheets](http://www.sunpowercorp.com/data/sheets). Read safety and installation instructions before using this product.

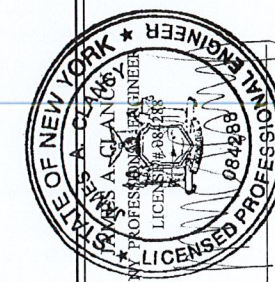
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Document # 504860 Rev. 3, LTR\_EH

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