ON-SITE
Residential Engineering

NORTH CAROLINA PROFESSIONAL SEAL 038587 ENGINEER JOHN F. DEAL
11-27-18

Project #	18-424
Location	3950 Cokesbury Road, Fuquay Varina
Client	Sun Dollar Energy
Contact	sundollarenergy@gmail.com

Page	1 of 2
Date	November 27, 2018

The purpose of this project is to determine the structural adequacy of the existing roof system, and design any necessary structural reinforcement, to support the addition of a solar panel energy system. The following structural specifications are based on information provided by the installer, Sun Dollar Energy. Directional indicators are referenced as if standing in front of, and facing the front of the residence. The engineer's seal applies only to structural items specifically addressed in this project.

(A) Solar Panel Energy System Addition

Observations

An array of solar panels is to be added to the roof of the residence. Per pictures sent by Sun Dollar Energy, the roof structure in this area is composed of Southern Pine 2x6 roof rafters spaced at 16" o.c., which span a maximum horizontally projected distance of 7'-7". The roof covering is composed of asphalt shingles.

Per Sun Dollar Energy:

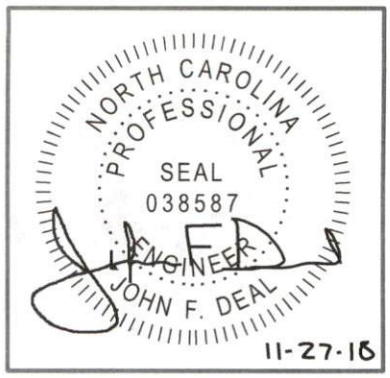
Total Solar Panel Array Area	690 sq ft
Total Solar Panel Array Weight	2,012 lb
Dead Load to be Added	**2.9 psf**

Per NC Residential Code, 2012 Edition:

Roof Live Load	20 psf	Table R301.2(1)
Roof Dead Load	7 psf	Section R301.4
Wind Speed / Exposure	100 mph / Exposure B	Figure R301.2(4)
Wind Load (Uplift)	15.0 psf	Table R301.2(2)

ON-SITE

Residential Engineering



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(A) Solar Panel Energy System Addition (continued)

Structural Specification

Upon structural analysis, it has been determined that the existing roof structure is adequate to support the design loads imposed by the NC Residential Code, 2012 Edition as well as the additional 2.9 psf dead load of the solar panel system.

The solar panel array is to be attached to the roof with footing plates per manufacturer. The total uplift on the solar panel array is approximately 10,360 lb, which is to be resisted by a total of 78 footing plates. Footing plates are therefore to withstand an uplift load of 133 lb per plate, which is within their allowable capacity. Plates are to be located above rafters and attached with one 5/16" lag screw with 3" penetration into the top of the rafter.

(919) 880-6958 John@On-SiteResidentialEngineering.com

SCOPE OF WORK

TO INSTALL A SOLAR PHOTOVOLTAIC (PV) SYSTEM
THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ELECTRICAL SERVICE EQUIPMENT.
THE PV SYSTEM DOES NOT INCLUDE BATTERIES.

ELECTRICAL NOTES

1) ALL EQUIPMENT TO BE LISTED BY THE UL OR OTHER NRTL AND LABELED FOR ITS APPLICATION.
2) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600V AND 90°C WET ENVIRONMENT.
3) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
4) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
7) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
9) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR THE ILSCO GBL-4DBT LAY-IN LUG.
10) THE POLARITY OF THE GROUNDED CONDUCTORS IS (positive/negative) OR THE DC SIDE OF THE PV SYSTEM IS UNGROUNDED AND SHALL COMPLY WITH NEC 690.35

GOVERNING CODES

2014 NATIONAL ELECTRICAL CODE
2013 INTERNATIONAL BUILDING CODE
2012 NC BUILDING CODE
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269

SHEET INDEX

VICINITY MAP

SUN DOLLAR ENERGY, LLC

Sun Dollar Energy, LLC
4904 Elaine Avenue
Raleigh, NC 27616
919-508-6907
NC Electrical License #: 30043U
NC GC License #: 73462

Michael Kleinigger
3950 Cokesbury Road
Fuquay Varina, NC 27526
860-392-9163

System:
- System Type: Grid Tied
- Module Type: Peimar SG310M (BF) 310 Watt Modules
- # of Modules: 39
- Inverter: (2) SMA Sunny Boy 6000-US
- Power Optimizers: SolarEdge P320
- Racking: Everest Rail
- Solar Mounts: Quickmount E-Mounts
- DC Watts: 12.09kW DC STC

Existing Home Electrical
- (E) Main Service Panel: 200A
- Grid Voltage: 120/240V

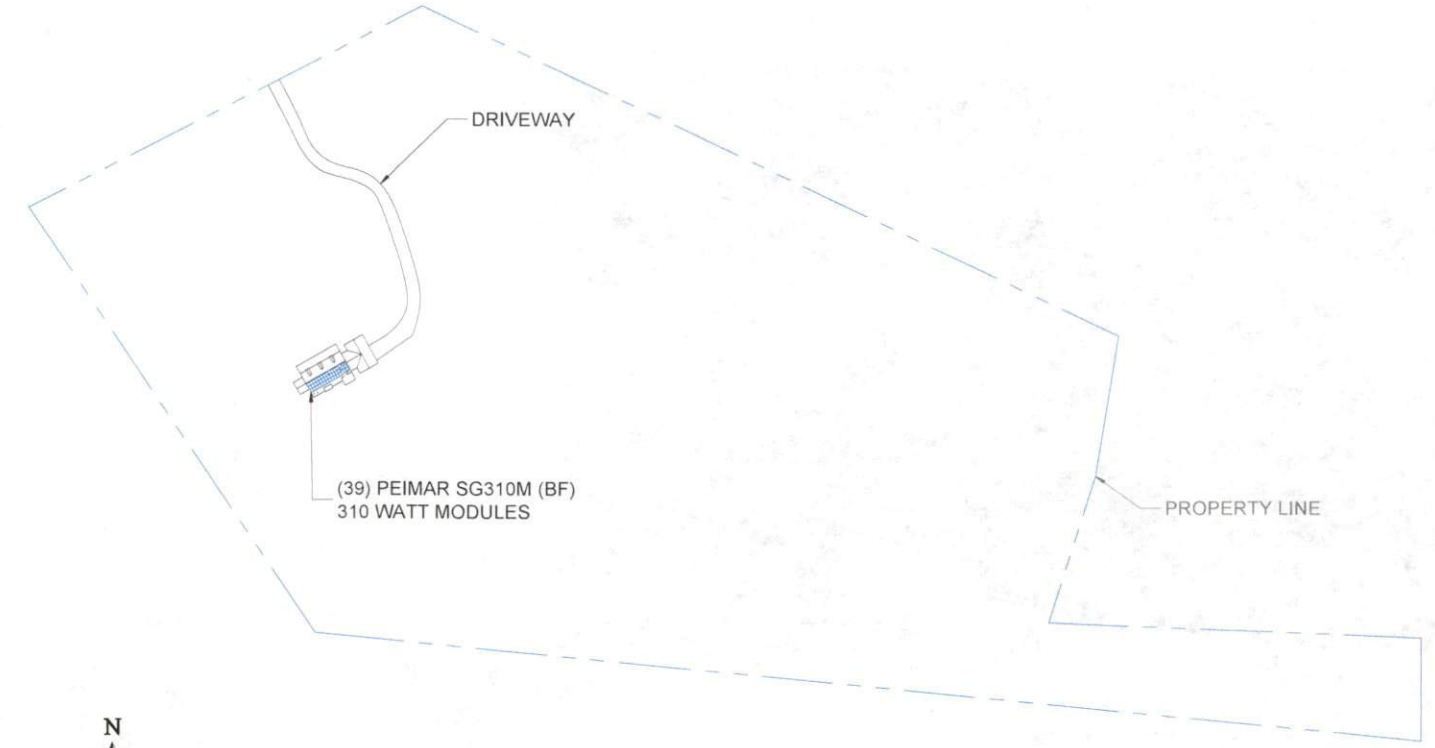
Special Info
- Roof Type: Comp Shingle
- Array 1 Rafter Size: 2x6 @ 16" o.c.
- Array 1 Pitch: 45°
- Array 1 Azimuth: 150°
- Average High Temp: 93.2°F
- Record Low Temp: 10.4°F

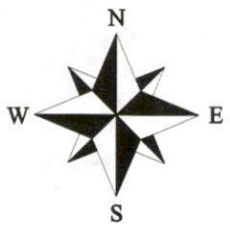
Date: 11/27/2018

COVER

PROPERTY PLAN

SCALE: 1/64"=1'-0"





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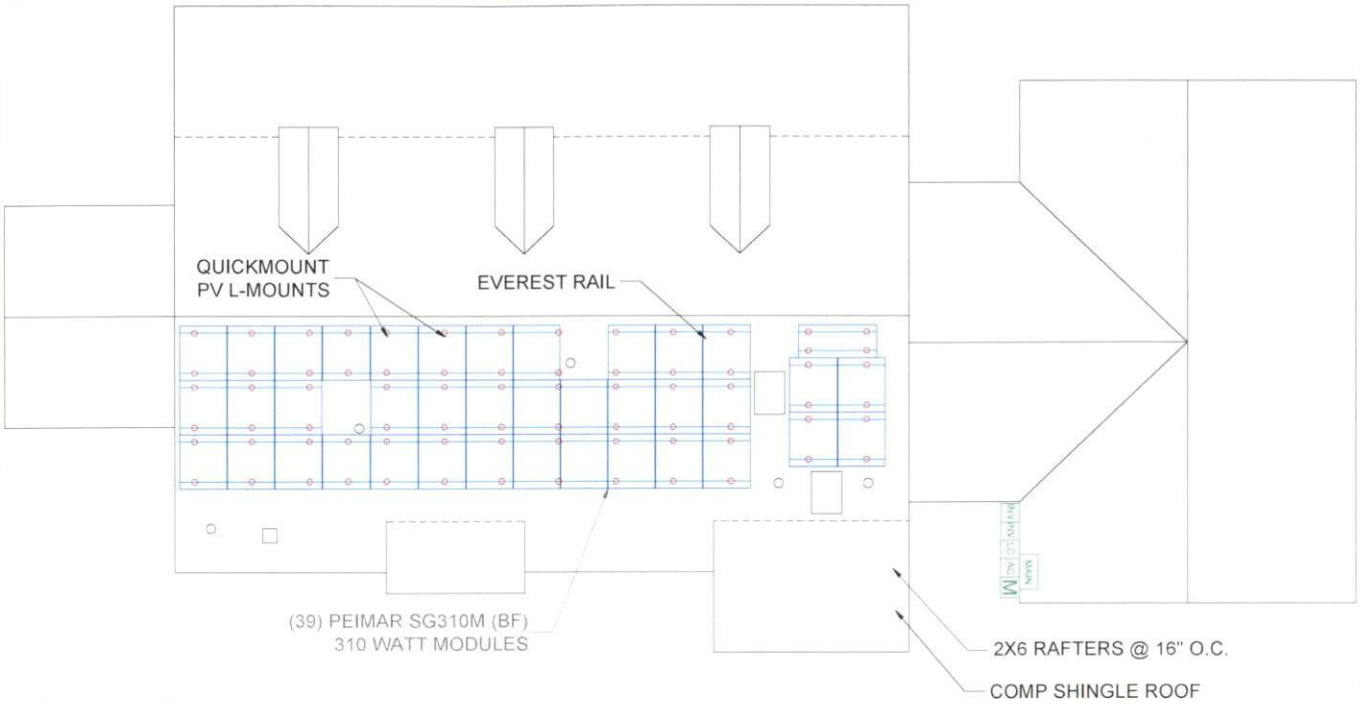
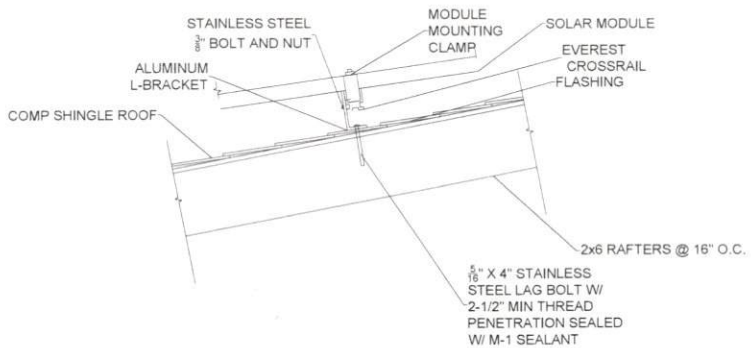
PV-1



ROOF PLAN

SCALE: 1/4"=1'-0"



SOLAR MOUNTING DETAIL

LEGEND

- M — UTILITY METER
- MAIN — MAIN SERVICE PANEL
- INV — INVERTER
- AC — AC DISCONNECT
- DC — DC DISCONNECT
- JB — JUNCTION BOX
- CB — COMBINER BOX
- SUB — SUBPANEL
- LC — LOAD CENTER
- M — PV METER/MONITORING
- X — SOLMETRIC READING
- CONDUIT RUN ON EXTERIOR
- G — GAS METER
- SOLAR ROOF MOUNTS

LOAD CALCULATIONS

Module Weight	39.7 lbs
# of Modules	39 Ea.
Module Sq. Ft.	17.5140 SQ. FT.
Total Module Weight	1548.3 Lbs.
Total Length of Rail	265 LF
Rail Weight Per Foot	0.56 Lbs.
Total Rail Weight	148.4 Lbs.
# of Standoffs	76
Weight Per Standoff	2 Lbs.
Total Standoff Weight	152 Lbs.
Total Array Weight	1848.7 Lbs.
Point Load	24.325 Lbs.
Total Array Area	683.4060 SQ. FT.
Array Dead Load	2.707 Lbs. per Ft.

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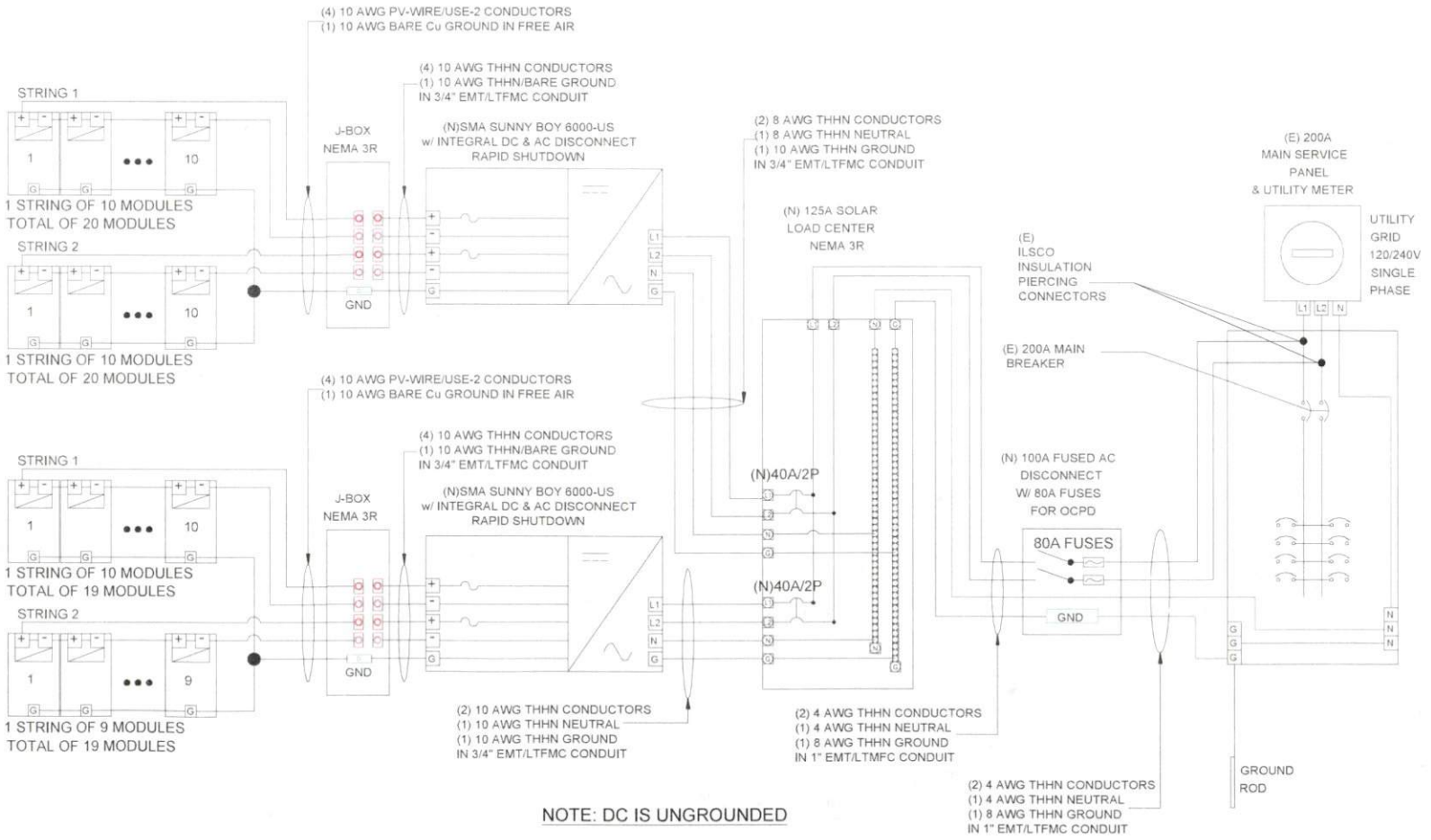
PV-2

MODULE DATA	
Make of Model	Peimar
Model Number	SG310M (BF)
Max Power Point (MPP) Voltage (Vmpp)	32.6 Volts
Max Power Point (MPP) Current (Impp)	9.51 Amps
Open Circuit Voltage (Voc)	40.7 Volts
Short Circuit Current (Isc)	9.8 Amps
Max Series Fuse (OCPD)	15 amps
Max Power (Pmax)	310 watts
Max Voltage (typically less than 600V DC)	1000 volts

Inverter Data (provided by manufacturer)	
Make of Model	SMA
Model Number	Sunny Boy 6000-US
Max DC Volt Rating	600 volts
Max AC Output	6000 Watts
Nominal AC Voltage	240 volts
Max AC Current	25 amps
Strings per Inverter	2
Number of Inverters	2

Temperature Data from ASHRAE	
Average High Temp. (°F)	93.2°F
Record Low Temp. (°F)	10.4°F



NOTE: DC IS UNGROUNDED

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Date: 11/27/2018

PV-3

Ampacity Calculations

Wiring Location: Module to Power Optimizer (Direct Current)
Wiring Location: Inverter to Service Entrance (Alternating Current)
All calculations show minimum sizing for ampacity
Actual wire sizing may be larger for voltage drop or other factors
All calculations are according to the 2014 National Electric Code

Modules: Peimar SG310M (BF) 310 Watt

Inverter: SMA Sunny Boy SB6.0-US

Initial Input Values						
Isc (Short Circuit Current)	9.8					
Number of circuits	9.8	x	1	=	9.8	
Maximum Circuit Current (NEC 690.8 (A)(1+2)	9.8	x	156%	=	15.288	
Minimum Overcurrent Device	15		Series Fuse Rating by Manufacturer			
	Size AWG #					
Chosen Conductor Type (THHN, RHW-2, or USE-2)	10					
Conductor Derating						
NEC 690.31 © ref (NEC 310.16)						
Conductor 90C Ampacity		30				
Conduit Fill Derating	2	30	x	1	=	30
Temperature Derating F	123-131	30	x	0.76	=	22.8
Ampacity vs Overcurrent Device						
Conductor Ampacity Check		22.8		15.288		OK
Conductor to Overcurrent Check		22.8		15		OK

Input Data Into Yellow Fields
Green Field must say OK

Use this calculation for over current protection and wire sizing for stringers coming from Solar Panels.
Isc comes from manufacturer

Ampacity Calculations

Wiring Location: Inverter to Service Entrance (Alternating Current)
All calculations show minimum sizing for ampacity
Actual wire sizing may be larger for voltage drop or other factors
All calculations are according to the 2014 National Electric Code

Modules: Peimar SG310M (BF) 310 Watt

Inverter: SMA Sunny Boy SB6.0-US

Initial Input Values						
Inverter Continuous AC Output Combined (Watts)	6000					
Minimum Operating Voltage	240	Watts		Volts		Amps
		6000	/	240	=	25
Inverter Continuous AC Amps		25				
Number of Inverters		25	x	1	=	25
Overcurrent Device Rating						
NEC 690.8 (B)(3)		25	x	125%	=	31.25
Minimum Overcurrent Device		40				
Circuit Breaker Size per NEC 240.6(A)		40A				
		Size AWG #				
Chosen Conductor Type THHN,THWN,RHW-2 or USE-2		8				
Conductor Derating						
NEC 690.31© ref (NEC 310.16)						
Conductor 90C Ampacity			55			
Conduit Fill Derating		2	55	x	1	= 55
Temperature Derating F		96-104	55	x	0.91	= 50.05
Ampacity vs Overcurrent Device						
Conductor Ampacity Check			50.05		31.25	OK
Conductor to Overcurrent Check			50.05		40	OK

Input Data into Yellow Fields
Green Fields must say OK

Use this calculation for over current protection and wire sizing for inverter

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PV-4

SIGNAGE REQUIREMENTS

> RED BACKGROUND
> WHITE LETTERING
> MIN. 3/8" LETTER HEIGHT
> ALL CAPITAL LETTERS
> ARIAL OR SIMILAR FONT
> REFLECTIVE, WEATHER RESISTANT MATERIAL, UL 969

WARNING
IF A GROUND FAULT IS INDICATED, THE NORMALLY GROUNDED CONDUCTORS MAY BE ENERGIZED AND UNGROUNDED.

REQ'D BY: NEC 690.5(C) — 1

APPLY TO:
SMA AND SOLAREDGE INVERTERS

SOLAR DC DISCONNECT

REQ' BY: NEC 690.14(C)(2) — 2

APPLY TO:
DC DISCONNECTS IF UTILIZED

SOLAR AC DISCONNECT

REQ' BY: NEC 690.14(C)(2) — 3

APPLY TO:
AC DISCONNECTS

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

REQ'D BY: NEC 690.17 — 4

APPLY TO:
DISCONNECTS
SOLAR LOAD CENTERS
COMBINER BOXES

SYSTEM CHARACTERISTICS

SYSTEM SIZE: ___kW
SYSTEM OPEN CIRCUIT VOLTAGE: ___VDC
SYSTEM OPERATINNG VOLTAGE: ___VDC
MAXIMUM ALLOWABLE DC VOLTAGE: ___VDC
SYSTEM OPERATING CURRENT: ___AMPS
SYSTEM SHORT CIRCUIT CURRENT: ___AMPS

RED'Q BY: NEC 690.53 — 5

APPLY TO:
INVERTER

PHOTOVOLTAIC SYSTEM DISCONNECT
AC CURRENT: ___ A
VOLTAGE: 240 VAC

REQ'D BY: NEC 690.54 — 6

APPLY TO:
PV SYSTEM BREAKER

CAUTION
DO NOT INSTALL ADDITIONAL LOADS IN THIS PANEL

REQ'D BY: NEC 690.64(B)(2) — 7

APPLY TO:
SOLAR LOAD CENTER IF UTILIZED

WARNING
INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

REQ'D BY: NEC 690.64(B)(7) — 8

APPLY TO:
PV SYSTEM BREAKER

WARNING
THIS SERVICE IS SUPPLIED FROM MULTIPLE SOURCES UTILITY AND PHOTOVOLTAIC

REQ'D BY: NEC 690.56(B) — 9

MAIN SERVICE PANEL

PHOTOVOLTAIC MICRO INVERTERS LOCATED UNDER EACH PV MODULE IN ROOFTOP ARRAY

REQ'D BY: NEC 690.14(D) — 10

APPLY TO:
MAIN SERVICE PANEL IF PV SYSTEM UTILIZES MICRO INVERTERS

WARNING: PHOTOVOLTAIC POWER SOURCE

REQ'D BY: AHJ — 11

APPLY TO:
SOLAR CONDUIT

WARNING
ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THE PV SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

REQ'D BY: NEC 690.35(F) — 12

UNGROUNDED ARRAYS ONLY
JUNCTION BOXES
COMBINER BOXES
DC DISCONNECTS
INVERTERS

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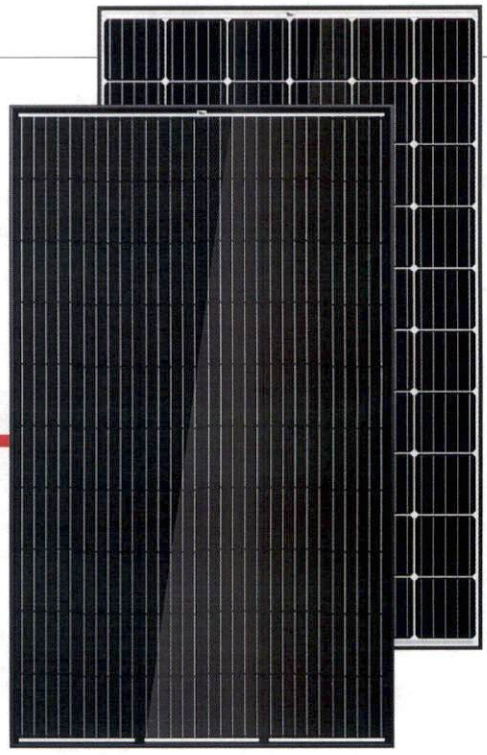
PV-5

THE

ALLMAX M PLUS

FRAMED 60-CELL MODULE



60 CELL
MONOCRYSTALLINE MODULE

275-315W
POWER OUTPUT RANGE

19.2%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading comprehensive solutions provider for solar energy. we believe close cooperation with our partners is critical to success. Trina Solar now distributes its PV products to over 60 countries all over the world. Trina is able to provide exceptional service to each customer in each market and supplement our innovative, reliable products with the backing of Trina as a strong, bankable partner. We are committed to building strategic, mutually beneficial collaboration with installers, developers, distributors and other partners.

Comprehensive Products And System Certificates

IEC61215/IEC61730/UL1703/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse gases Emissions Verification
OHSAS 18001: Occupation Health and Safety Management System

Trinasolar

Maximize limited space with top-end efficiency

- Up to 192W/m² power density
- Low thermal coefficients for greater energy production at high operating temperatures

Highly reliable due to stringent quality control

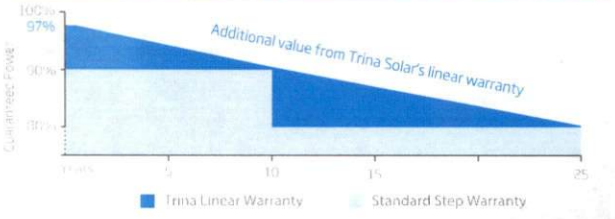
- Over 30 in-house tests (UV, TC, HF, and many more)
- In-house testing goes well beyond certification requirements
- PID resistant
- 100% EL double inspection
- Selective emitter, advanced surface texturing

Certified to withstand the most challenging environmental conditions

- 2400 Pa wind load
- 5400 Pa snow load
- 35 mm hail stones at 97 km/h

LINEAR PERFORMANCE WARRANTY

10 Year Product Warranty · 25 Year Linear Power Warranty

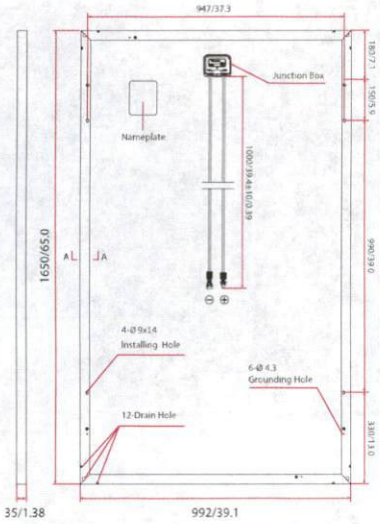


ALLMAX M PLUS

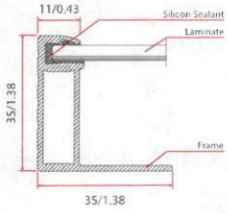
FRAMED 60-CELL MODULE

PRODUCTS	POWER RANGE
TSM-DD05A.08(II)	280-315W
TSM-DD05A.05(II)	275-310W

DIMENSIONS OF PV MODULE(mm/inches)

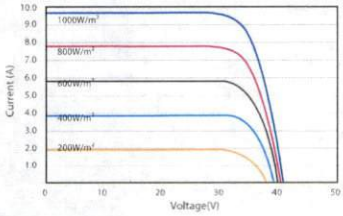


Back View

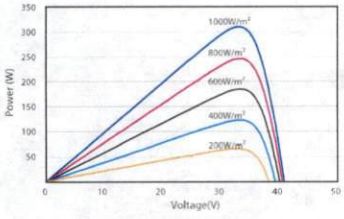


(A-A)

I-V CURVES OF PV MODULE(305W)



P-V CURVES OF PV MODULE(305W)



ELECTRICAL DATA (STC)

Peak Power Watts-P_{MAX} (Wp)*	275	280	285	290	295	300	305	310	315
Power Output Tolerance-P_{MAX} (W)	0 ~ +5								
Maximum Power Voltage-V_{MPP} (V)	31.4	31.7	31.8	32.2	32.5	32.6	32.9	33.1	33.3
Maximum Power Current-I_{MPP} (A)	8.76	8.84	8.97	9.01	9.08	9.19	9.28	9.37	9.46
Open Circuit Voltage-V_{OC} (V)	38.4	38.4	38.5	38.9	39.6	39.8	40.0	40.2	40.5
Short Circuit Current-I_{SC} (A)	9.24	9.42	9.51	9.66	9.68	9.77	9.85	9.94	10.0
Module Efficiency η_m (%)	16.8	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5.
*Measuring tolerance: ±3%.

ELECTRICAL DATA (NOCT)

Maximum Power-P_{MAX} (Wp)	205	209	212	216	220	223	227	231	235
Maximum Power Voltage-V_{MPP} (V)	29.1	29.4	29.5	29.9	30.1	30.2	30.5	30.7	30.9
Maximum Power Current-I_{MPP} (A)	7.04	7.10	7.21	7.24	7.30	7.38	7.46	7.53	7.60
Open Circuit Voltage-V_{OC} (V)	35.7	35.7	35.8	36.2	36.8	37.0	37.2	37.4	37.6
Short Circuit Current-I_{SC} (A)	7.46	7.61	7.68	7.80	7.82	7.89	7.95	8.03	8.10

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline 156.75 × 156.75 mm (6 inches)
Cell Orientation	60 cells (6 × 10)
Module Dimensions	1650 × 992 × 35 mm (65.0 × 39.1 × 1.38 inches)
Weight	18.6 kg (41.0 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Tempered Glass
Backsheet	White [DD05A.08(II)]; Black [DD05A.05(II)]
Frame	Black Anodized Aluminium Alloy [DD05A.08(II), DD05A.05(II)]
J-Box	IP 67 or IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), 1000 mm (39.4 inches)
Connector	MC4
Fire Type	Type 1 or Type 2

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	44°C (±2°C)
Temperature Coefficient of P_{MAX}	- 0.39%/°C
Temperature Coefficient of V_{OC}	- 0.29%/°C
Temperature Coefficient of I_{SC}	0.05%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1000V DC (IEC)
	1000V DC (UL)
Max Series Fuse Rating	15A (Power ≤285W)
	20A (Power ≥290W)

(DO NOT connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

10 year Product Workmanship Warranty

25 year Linear Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 30 pieces

Modules per 40' container: 840 pieces

Trinasolar

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

Version number: TSM_EN_2018_C

www.trinasolar.com

SUNNY BOY
3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US

Value-Added Improvements

- Superior integration with SMA's MLPE Power+ Solution
- World's first Secure Power Supply* now offers up to 2,000 W
- Full grid management capabilities ensure a utility-compliant solution for any market

Reduced Labor

- New Installation Assistant with direct access via smartphone minimizes time in the field
- Advanced communication interface with fewer components creates 50% faster setup and commissioning

Unmatched Flexibility

- SMA's proprietary OptiTrac™ Global Peak technology mitigates shade with ease
- Multiple independent MPPTs accommodate hundreds of stringing possibilities

Trouble-Free Servicing

- Two-part enclosure concept allows for simple, expedited servicing
- Equipped with SMA Smart Connected, a proactive service solution that is integrated into Sunny Portal

SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US

Reduce costs across your entire residential business model

The residential PV market is changing rapidly. Your bottom line matters more than ever—so we've designed a superior residential solution to help you decrease costs at every stage of your business operations. The Sunny Boy 3.0-US/3.8-US/5.0-US/6.0-US/7.0-US/7.7-US join the SMA lineup of field-proven solar technology backed by the world's #1 service team, along with a wealth of improvements. Simple design, improved stocking and ordering, value-driven sales support and streamlined installation are just some of the ways that SMA helps your business operate more efficiently. And, Sunny Boy's superior integration with the innovative Power+ Solution means installers have even more flexibility in addressing their toughest challenges. Finally, SMA Smart Connected will automatically detect errors and initiate the repair and replacement process so that installers can reduce service calls and save time and money.

Technical data	Sunny Boy 3.0-US		Sunny Boy 3.8-US		Sunny Boy 5.0-US	
	208 V	240 V	208 V	240 V	208 V	240 V
Input (DC)						
Max. PV power	4260 Wp		5396 Wp		7100 Wp	
Max. DC voltage	600 V					
Rated MPP voltage range	155 - 480 V		195 - 480 V		220 - 480 V	
MPPT operating voltage range	100 - 550 V					
Min. DC voltage / start voltage	100 V / 125 V					
Max. operating input current per MPPT	10 A					
Max. short circuit current per MPPT	18 A					
Number of MPPT tracker / string per MPPT tracker	2/1				3 / 1	
Output (AC)						
AC nominal power	3000 W	3000 W	3330 W	3800 W	5000 W	5000 W
Max. AC apparent power	3000 VA	3000 VA	3330 VA	3800 VA	5000 VA	5000 VA
Nominal 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	60 Hz / 50 Hz					
Max. output current	14.5 A	12.5 A	16.0 A	16.0 A	24.0 A	24.0 A
Power factor (cos φ)	1					
Output phases / line connections	1 / 2					
Harmonics	< 4 %					
Efficiency						
Max. efficiency	97.2 %	97.6 %	97.2 %	97.5 %	97.2 %	97.5 %
CEC efficiency	96 %	96.5 %	96.5 %	96.5 %	96.5 %	97 %
Protection devices						
DC disconnect device / DC reverse polarity protection	● / ●					
Ground fault monitoring / Grid monitoring	●					
AC short circuit protection	●					
All-pole sensitive residual current monitoring unit (RCMU)	●					
Arc fault circuit interrupter (AFCI)	●					
Protection class / overvoltage category	I / IV					
General data						
Dimensions (W / H / D) in mm (in)	535 x 730 x 198 (21.1 x 28.5 x 7.8)					
Packaging dimensions (W / H / D) in mm (in)	600 x 800 x 300 (23.6 x 31.5 x 11.8)					
Weight / packaging weight	26 kg (57 lb) / 30 kg (66 lb)					
Temperature range: operating / non-operating	-25°C ...+60°C / -40°C ...+60°C					
Environmental protection rating	NEMA 3R					
Noise emission (typical)	39 dB(A)					
Internal power consumption at night	< 5 W					
Topology / Cooling concept	Transformerless / Convection					
Features						
Ethernet ports	2					
Secure Power Supply	●*					
Display (2 x 16 characters)	●					
WLAN / Sensor module / External WLAN antenna	● / ○ / ○					
Cellular (4G / 3G) / Revenue Grade Meter	○ / ○**					
Warranty: 10 / 15 / 20 years	●/○/○					
Certificates and approvals	UL 1741, UL 1741 SA incl. Rule 21 RSD, UL 1998, UL 1699B, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1, HECO SRD-UL-1741-SA-V1.1					
Type designation	SB3.0-1SP-US-40 / SB3.0-1TP-US-40		SB3.8-1SP-US-40 / SB3.8-1TP-US-40		SB5.0-1SP-US-40 / SB5.0-1TP-US-40	

● Standard features ○ Optional features – Not available Data at nominal conditions

NOTE: US inverters ship with gray lids. * Not compatible with the Power+ Solution Shutdown functionality **Standard in SBX.X-1TP-US-40

Accessories

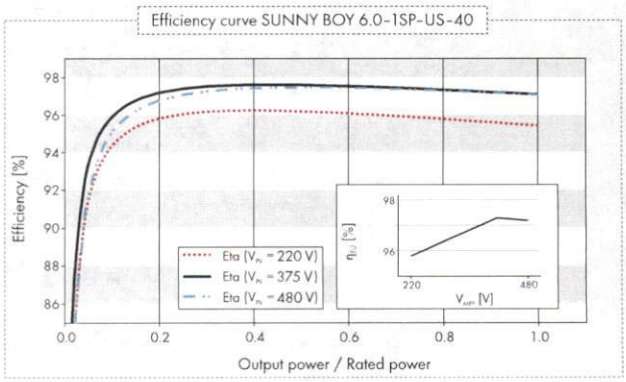

Sensor module
MD.SEN-US-40


External WLAN antenna
EXTANT-US-40


SMA Rooftop
Communication Kit
ROOFCOMMKIT-P2-US


Revenue Grade
Meter Kit
RGM05KIT-US-10


Cellular Modem Kit
CELLMODKIT-US-10



Technical data	Sunny Boy 6.0-US		Sunny Boy 7.0-US		Sunny Boy 7.7-US	
	208 V	240 V	208 V	240 V	208 V	240 V
Input (DC)						
Max. PV power	8520 Wp		9940 Wp		10905 Wp	
Max. DC Voltage			600 V			
Rated MPP Voltage range	220 - 480 V		245 - 480 V		270 - 480 V	
MPPT operating voltage range			100 - 550 V			
Min. DC voltage / start voltage			100 V / 125 V			
Max. operating input current per MPPT			10 A			
Max. short circuit current per MPPT			18 A			
Number of MPPT tracker / string per MPPT tracker			3 / 1			
Output (AC)						
AC nominal power	5200 W	6000 W	6660 W	7000 W	6660 W	7680 W
Max. AC apparent power	5200 VA	6000 VA	6660 VA	7000 VA	6660 VA	7680 VA
Nominal 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			60 Hz / 50 Hz			
Max. output current	25.0 A	25.0 A	32.0 A	29.2 A	32.0 A	32.0 A
Power factor (cos φ)			1			
Output phases / line connections			1 / 2			
Harmonics			< 4 %			
Efficiency						
Max. efficiency	97.2 %	97.6 %	97.1 %	97.5 %	97.1 %	97.5 %
CEC efficiency	96.5 %	97 %	96.5 %	97 %	96.5 %	97 %
Protection devices						
DC disconnect device / DC reverse polarity protection			● / ●			
Ground fault monitoring / Grid monitoring			●			
AC short circuit protection			●			
All-pole sensitive residual current monitoring unit (RCMU)			●			
Arc fault circuit interrupter (AFCI)			●			
Protection class / overvoltage category			I / IV			
General data						
Dimensions (W / H / D) in mm (in)			535 x 730 x 198 (21.1 x 28.5 x 7.8)			
Packaging Dimensions (W / H / D) in mm (in)			600 x 800 x 300 (23.6 x 31.5 x 11.8)			
Weight / packaging weight			26 kg (57 lb) / 30 kg (66 lb)			
Temperature range: operating / non-operating			-25°C ...+60°C / -40°C ...+60°C			
Environmental protection rating			NEMA 3R			
Noise emission (typical)	39 dB(A)				45 dB(A)	
Internal power consumption at night			< 5 W			
Topology / Cooling concept	Transformerless / Convection				Transformerless / Fan	
Features						
Ethernet ports			2			
Secure Power Supply			●*			
Display (2 x 16 characters)			●			
WLAN / Sensor module / External WLAN antenna			● / o / o			
Cellular (4G / 3G) / Revenue Grade Meter			o / o**			
Warranty: 10 / 15 / 20 years			●/o/o			
Certificates and approvals	UL 1741, UL 1741 SA incl. Rule 21 RSD, UL 1998, UL 1699B, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1, HECO SRD-UL-1741-SA-V1.1					
● Standard features o Optional features – Not available Data at nominal conditions NOTE: US inverters ship with gray lids. * Not compatible with the Power+ Solution Shutdown functionality NOTE: US inverters ship with gray lids. * Not compatible with the Power+ Solution Shutdown functionality **Standard in SBX.X-1TP-US-40						
Type designation	SB6.0-1SP-US-40 / SB6.0-1TP-US-40		SB7.0-1SP-US-40 / SB7.0-1TP-US-40		SB7.7-1SP-US-40 / SB7.7-1TP-US-40	

POWER+ SOLUTION

The SMA Power+ Solution combines legendary SMA inverter performance and intelligent DC module-level electronics in one cost-effective, comprehensive package. This means that you can achieve maximum solar power production for your customers while also realizing significant installation savings.

NEW! Advanced communication interface allows for 50% faster setup and commissioning thanks to reduced components and a simplified process.

Visit www.SMA-America.com for more information.

SUPERIOR INTEGRATION WITH THE POWER+ SOLUTION

SIMPLE, FLEXIBLE DESIGN

Speed the completion of customer proposals and maximize the efficiency of your design team with the Sunny Boy-US series, which provides a new level of flexibility in system design by offering:

» Hundreds of stringing configurations and multiple independent MPPTs

» SMA's proprietary OptiTrac™ Global Peak shade mitigation technology

» Diverse application options including on- and off-grid compatibility

VALUE-DRIVEN SALES ENABLEMENT

SMA wants to enable your sales team by arming them with an abundance of feature/benefit support. Show your customers the value of the Sunny Boy-US series by utilizing:

» Secure Power Supply, now with 2,000 W of opportunity power in the event of a grid outage, as an increased value-add or upsell opportunity

» SMA's 35 year history and status as the #1 global inverter manufacturer instills homeowners with peace of mind and the long-term security they demand from a PV investment

» An economical solution for shade mitigation and the challenges of complex roofs

IMPROVED STOCKING AND ORDERING

Ensure that your back office business operations run smoothly and succinctly while mitigating potential errors. The Sunny Boy-US series can help achieve cost savings in these areas by providing:

» An integrated DC disconnect that simplifies equipment stocking and allows for a single inverter part number

» All communications integrated into the inverter, eliminating the need to order additional equipment

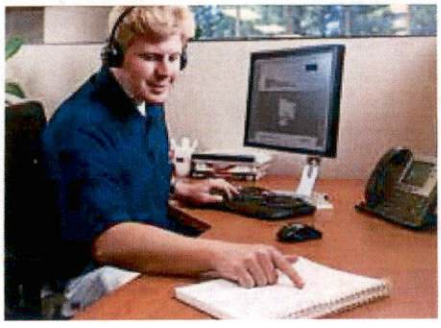
STREAMLINED INSTALLATION AND COMMISSIONING

Expedite your operations in the field by taking advantage of the new Sunny Boy's installer-friendly feature set including:

» Direct access via smartphone and utilization of SMA's Installation Assistant, which minimizes time/labor spent in the field and speeds the path to commissioning

» Simple commissioning and monitoring setup in a single online portal

» New! Advanced communication interface with fewer components allows for 50% faster commissioning



SUPERIOR SERVICE

SMA understands the factors that contribute to lifetime PV ownership cost, that's why the Sunny Boy-US series was designed for maximum reliability and backstopped by an unmatched service offering. Benefit from:

» SMA Smart Connected, a proactive service solution integrated into Sunny Portal that automatically detects errors and initiates the repair and replacement process

» The #1 service team in the PV industry, as recognized by IMS research, with experience servicing an installed base of more than 55 GW