ELECTRICAL RESIDENTIAL

910-893-7525

www.harnett.org

PERMIT NUMBER

ERES2109-0038

JOB ADDRESS: 32 BLALOCK DR	**PERMIT SUBTYPE:** RESIDENTIAL SOLAR PANELS	**PARCEL NO:** 0664-84-9149.000
DESCRIPTION: roof mounted solar panels	**DATE ISSUED:** 10/27/2021	**DATE EXPIRED:**
PLAN NAME:	**ZONING DISTRICT:** RA-30 - 1.44 acres (100.0%)	

APPLICANT: Sigora Solar 1222 Harris Street Charlottesville, VA 22903	**PHONE:** (434)465-6788 **EMAIL:** permitting@sigorasolar.com
CONTRACTOR: ,	**PHONE:** **EMAIL:**
OWNER: BAKER ROBERT S 32 BLALOCK DR FUQUAY-VARINA, NC 27526 FUQUAY-VARINA, NC 27526-0000	**PHONE:** **EMAIL:**

REQUIRED INSPECTIONS

INSPECTION TYPE	APPROVAL	DATE	COMMENTS
FINAL**			
ROUGH IN			

W CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE

Scott E. Wyssling, PE, PP, CME

Scott E. Wyssling, PE
76 North Meadowbrook Drive
Alpine, UT 84004
office (201) 874-3483
swyssling@wysslingconsulting.com

September 15, 2021

Sigora Solar
1222 Harris Street
Charlottesville, VA 22903

Re: Engineering Services
Baker Residence
32 Blalock Drive, Fuquay-Varina, NC
13.870 kW System Size

To Whom it May Concern:

Pursuant to your request, we have reviewed the following information regarding solar panel installation on the roof of the above referenced home:

1. Site Visit/Verification Form prepared by a Sigora Solar representative identifying specific site information including size and spacing of rafters for the existing roof structure.
2. Photographs of the interior and exterior of the roof system identifying existing structural members and their conditions.

Based on the above information we have evaluated the structural capacity of the existing roof system to support the additional loads imposed by the solar panels and have the following comments related to our review and evaluation:

Description of Residence:

The existing residence is typical wood framing construction with the roof system consisting of truss system with all chords constructed of 2 x 4 dimensional lumber at 24" on center. The attic space is unfinished and photos indicate that there was free access to visually inspect the size and condition of the roof rafters. All wood material utilized for the roof system is assumed to be Doug-Fir #2 or better with standard construction components. The existing roofing material consists of composite asphalt shingles. Photos of the dwelling also indicate that there is a permanent foundation.

A. Loading Criteria Used

- 115 MPH wind loading based on ASCE 7-10 Exposure Category "C" at a slope of 13, 31 and 32 degrees
- 7 PSF = Dead Load roofing/framing Live Load = 20 PSF Snow Load = 15 PSF
- 3 PSF = Dead Load solar panels/mounting hardware

Total Dead Load =10 PSF

The above values are within acceptable limits of recognized industry standards for similar structures in accordance with the North Carolina Residential Code (2018). Analysis performed of the existing roof structure utilizing the above loading criteria indicates that the existing rafters will support the additional panel loading without damage, if installed correctly.

B. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent "*SnapNrack Installation Manual*", which can be found on the SnapNrack website (*http://snapnrack.com/*). If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. Maximum allowable pullout per lag screw is 235 lbs/inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications for Southern Pine *assumed*. Based on our evaluation, the pullout value, utilizing a penetration depth of 2 ½", is less than what is allowable per connection and therefore is adequate. Based on the variable factors for the existing roof framing and installation tolerances, using a thread depth of 2 ½" with a minimum size of 5/16" lag screw per attachment point for panel anchor mounts should be adequate with a sufficient factor of safety.
3. Considering the roof slopes, the size, spacing, condition of roof, the panel supports shall be placed no greater than 48" o/c.
4. Panel supports connections shall be staggered to distribute load to adjacent trusses.

Based on the above evaluation, it is the opinion of this office that with appropriate panel anchors being utilized the roof system will adequately support the additional loading imposed by the solar panels. This evaluation is in conformance with the North Carolina Residential Code, current industry and standards, and based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

Scott E. Wyssling, PE
North Carolina License No. 46546

North Carolina Firm License No. 46546

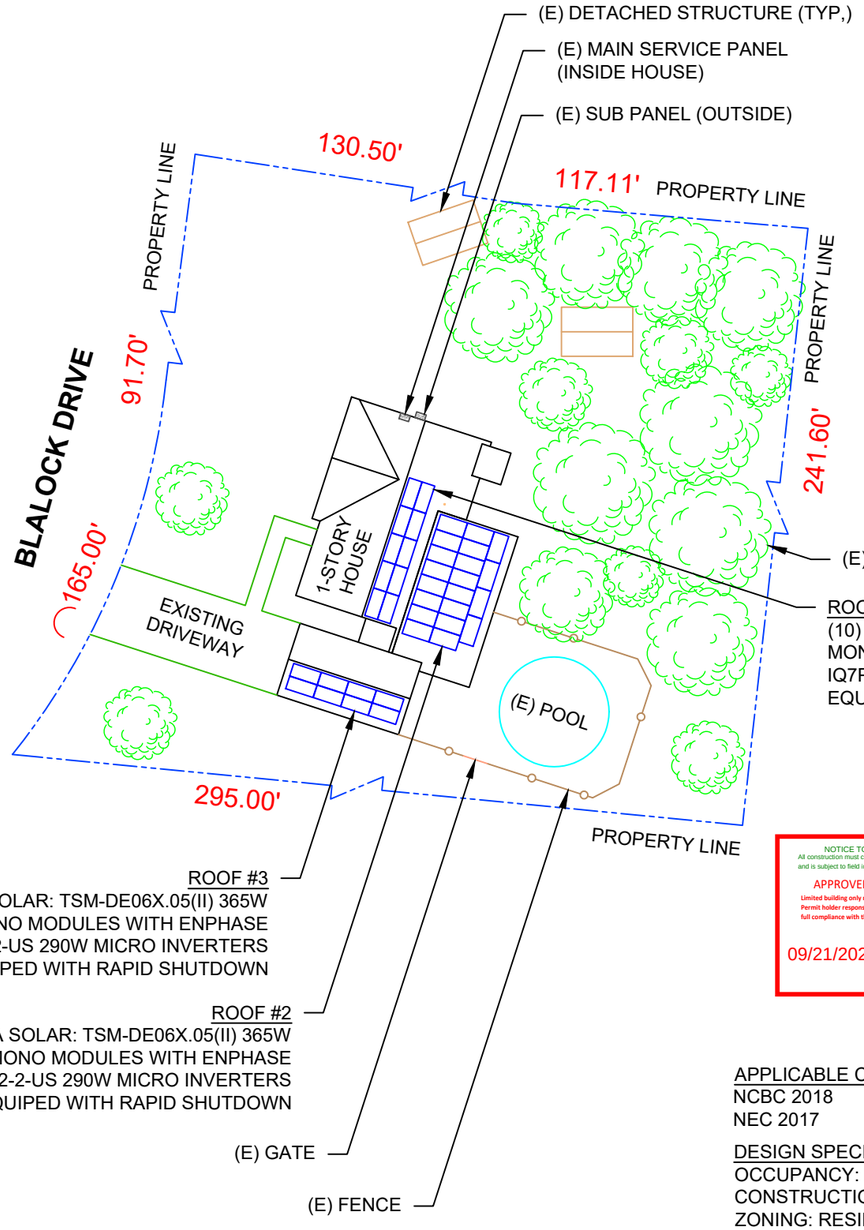
PROJECT DESCRIPTION:

38 x TRINA SOLAR: TSM-DE06X.05(II) 365W MONO MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 13.870kW DC
AC SYSTEM SIZE: 11.020kW AC

EQUIPMENT SUMMARY
38 TRINA SOLAR: TSM-DE06X.05(II) 365W MONO MODULES
38 ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS
EQUIPED WITH RAPID SHUTDOWN

ROOF ARRAY AREA #1:- 198.50 SQ FT.
ROOF ARRAY AREA #2:- 397.00 SQ FT.
ROOF ARRAY AREA #3:- 158.80 SQ FT.

AUTHORITIES HAVING JURISDICTION
BUILDING: HARNETT, COUNTY OF (NC)
ZONING: HARNETT, COUNTY OF (NC)



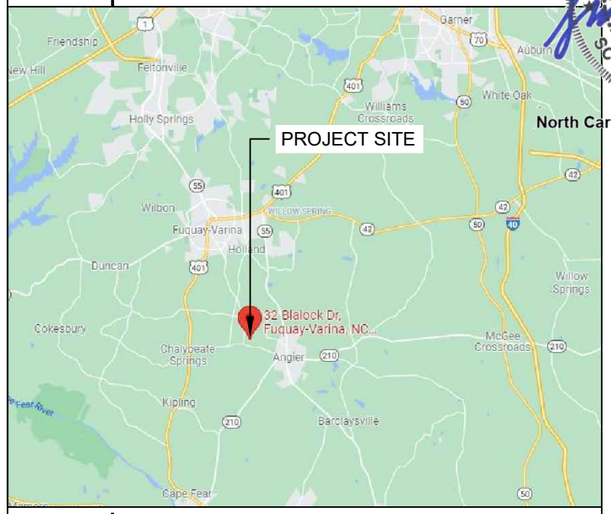
1 PLOT PLAN WITH ROOF PLAN
PV-1 SCALE: 1/32" = 1'-0"

NOTICE TO CONTRACTOR
All construction must comply with current NC Building Codes and is subject to field inspection and verification.
APPROVED
Limited building only review
Permit holder responsible for full compliance with the code
09/21/2021
Harnett COUNTY NORTH CAROLINA

APPLICABLE CODES & STANDARDS
NCBC 2018
NEC 2017

DESIGN SPECIFICATION
OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: REFER STRUCTURAL LETTER
WIND EXPOSURE: REFER STRUCTURAL LETTER
WIND SPEED: REFER STRUCTURAL LETTER

2 HOUSE PHOTO
PV-1 SCALE: NTS



3 VICINITY MAP
PV-1 SCALE: NTS

SHEET INDEX

PV-1	PLOT PLAN WITH ROOF PLAN
PV-2	ROOF PLAN & MODULES
PV-2A	CIRCUIT LAYOUT
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	PLACARD
PV-6	MICRO INVERTER CHART
PV-7	MODULE SPECIFICATIONS
PV-8	INVERTER SPECIFICATIONS
PV-9	COMBINER SPECIFICATIONS
PV-10	RAIL SPECIFICATIONS
PV-11	ATTACHMENT SPECIFICATIONS
PV-12	SOLADECK SPECIFICATIONS

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	09/09/2021	
LAYOUT CHANGE	09/14/2021	A

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046546 SCOTT E. WYSSLING

North Carolina Firm License No. 46546
DATE:09/09/2021

PROJECT NAME & ADDRESS
ROBERT BAKER RESIDENCE
32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

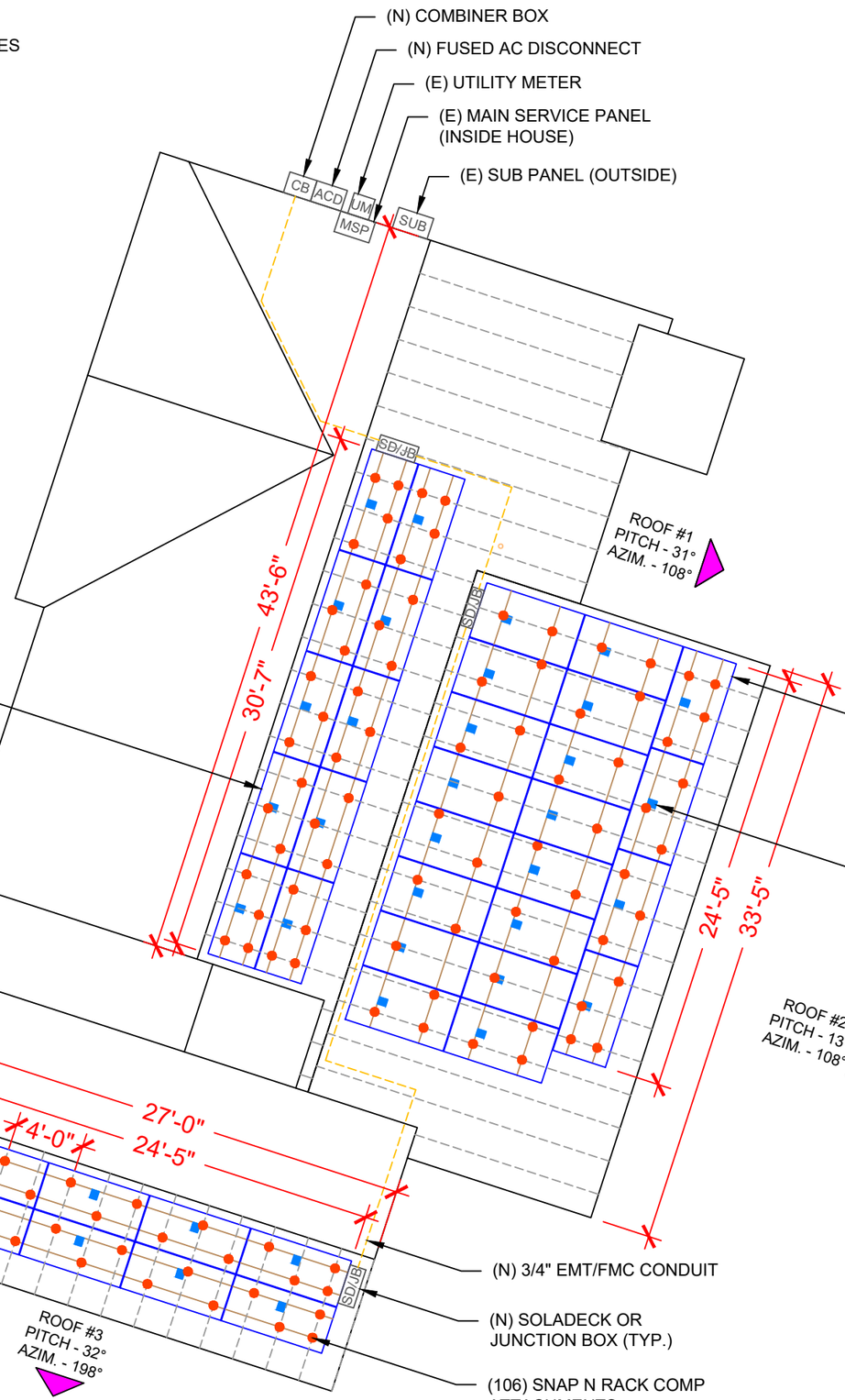
SHEET NAME
PLOT PLAN WITH ROOF PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 38 MODULES
MODULE TYPE = TRINA SOLAR: TSM-DE06X.05(II) 365W MONO MODULES
MODULE WEIGHT = 43.40 LBS / 19.7KG
MODULE DIMENSIONS = 72.91"x 39.21" = 19.85 SF



ROOF #1
(10) TRINA SOLAR: TSM-DE06X.05(II) 365W MONO MODULES WITH ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN

ROOF #2
(20) TRINA SOLAR: TSM-DE06X.05(II) 365W MONO MODULES WITH ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN

(38) ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN

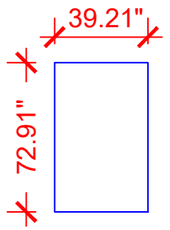
(N) SNAP N RACK ULTRA RAIL 40

ROOF #3
(8) TRINA SOLAR: TSM-DE06X.05(II) 365W MONO MODULES WITH ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN

(N) 3/4" EMT/FMC CONDUIT

(N) SOLADECK OR JUNCTION BOX (TYP.)

(106) SNAP N RACK COMP ATTACHMENTS



TRINA SOLAR:
TSM-DE06X.05(II)
365W MODULES

ROOF DESCRIPTION

ROOF TYPE				ASPHALT SHINGLE	
ROOF LAYER				1 LAYER	
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	10	31°	108°	2X4	24"
#2	20	13°	108°	2X4	24"
#3	8	32°	198°	2X4	24"

ARRAY AREA & ROOF AREA CALC'S

TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
754.30	2197.66	34

LEGEND

CB	- COMBINER BOX	INV	- INVERTER
ACD	- AC DISCONNECT	SD/JB	- SOLADECK OR JUNCTION BOX
LC	- LOAD CENTER		- VENT, ATTIC FAN (ROOF OBSTRUCTION)
UM	- UTILITY METER		- ROOF ATTACHMENT
MSP	- MAIN SERVICE PANEL		- TRUSS
			- CONDUIT

1 ROOF PLAN & MODULES
PV-2 SCALE: 1/8" = 1'-0"

SIGORA SOLAR
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490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

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North Carolina Firm License No. 46546

DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE
32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

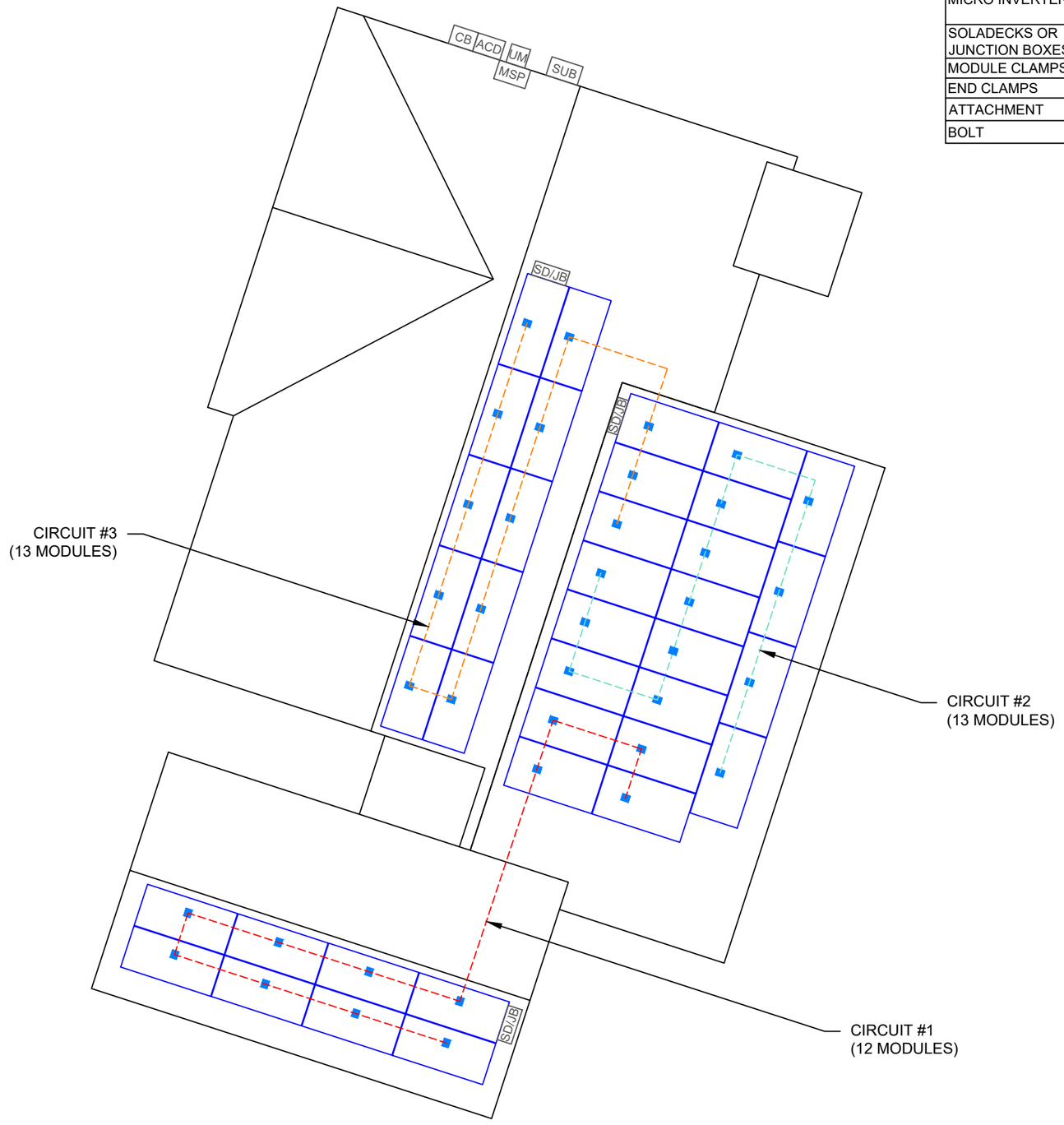
DRAWN BY
ESR

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

CIRCUIT LEGENDS
CIRCUIT #1
CIRCUIT #2
CIRCUIT #3



BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	38	TRINA SOLAR: TSM-DE06X.05(II) 365W
MICRO INVERTERS	38	ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN
SOLADECKS OR JUNCTION BOXES	3	SOLADECKS OR JUNCTION BOXES
MODULE CLAMPS	62	MID MODULE CLAMPS
END CLAMPS	28	END CLAMPS / STOPPER SLEEVE
ATTACHMENT	106	SNAP N RACK COMP
BOLT	106	LAG BOLT

1 ROOF PLAN WITH CIRCUIT LAYOUT
PV-2A
SCALE: 1/8" = 1'-0"

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

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PROJECT NAME & ADDRESS

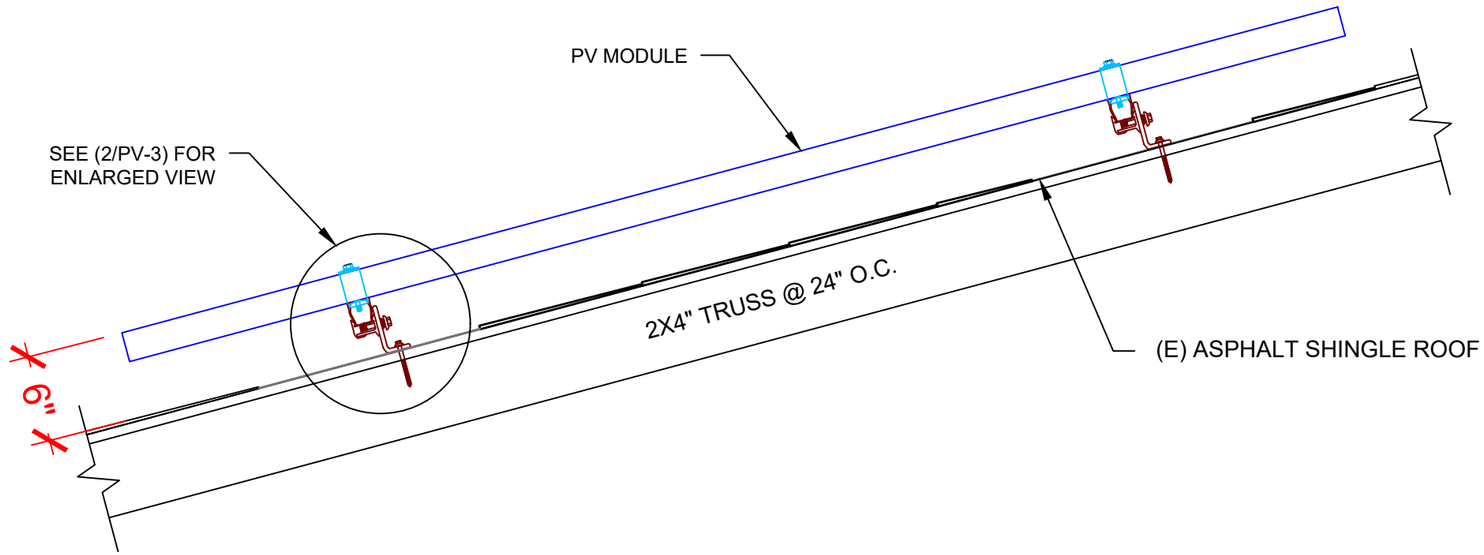
ROBERT BAKER RESIDENCE
32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
CIRCUIT LAYOUT

SHEET SIZE
ANSI B
11" X 17"

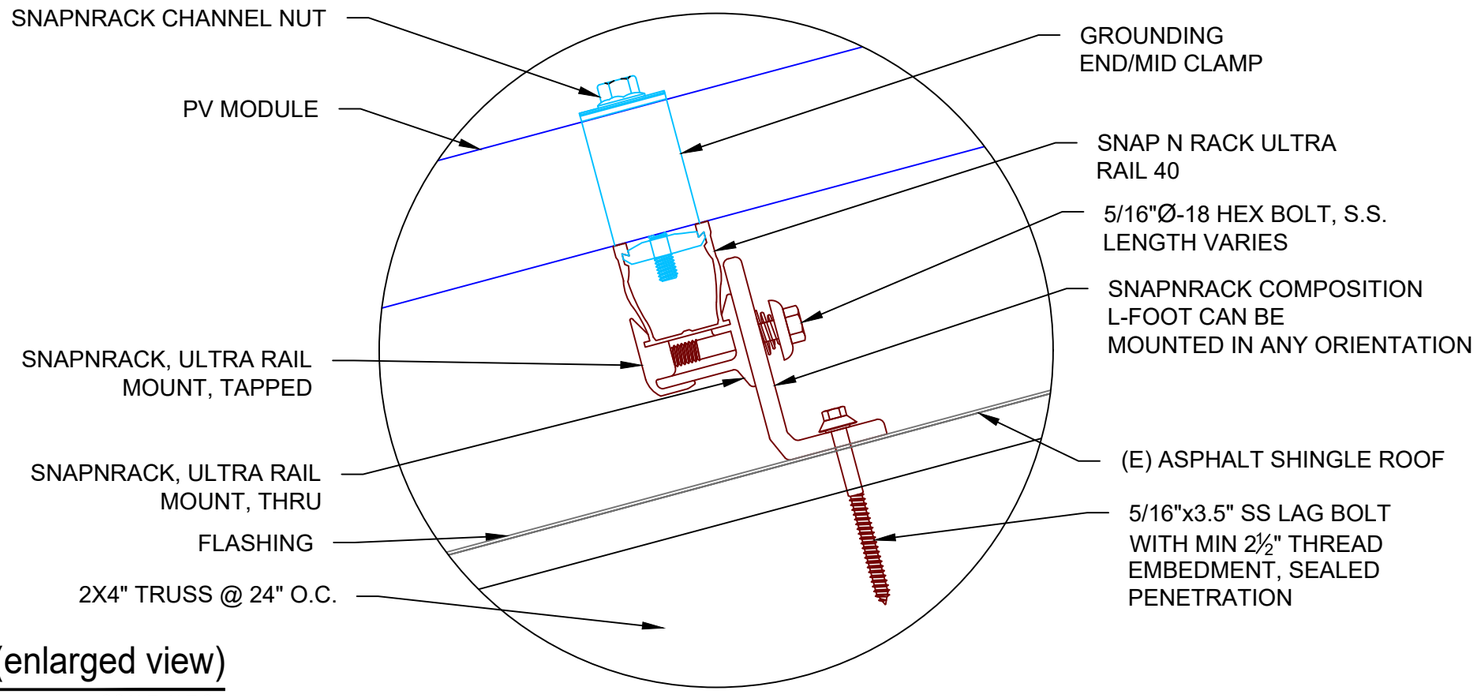
SHEET NUMBER
PV-2A



1 | PV-3

STRUCTURAL ATTACMENT (SIDE VIEW)

SCALE: N.T.S



2 | PV-3

ATTACHMENT DETAIL (enlarged view)

SCALE: N.T.S

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

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North Carolina Firm License No. 46546

DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE

32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

DRAWN BY

ESR

SHEET NAME

ATTACHMENT DETAIL

SHEET SIZE

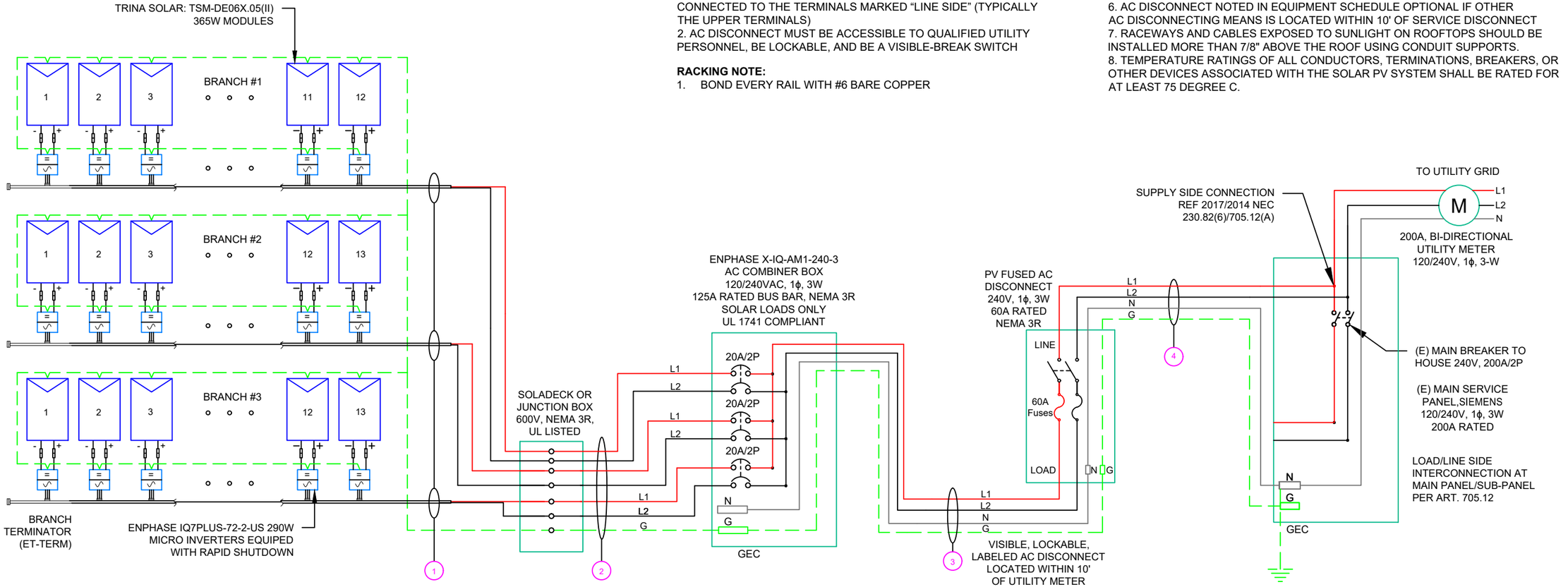
ANSI B
11" X 17"

SHEET NUMBER

PV-3

DC SYSTEM SIZE: 13.870 kW DC
AC SYSTEM SIZE: 11.020 kW AC

(38) TRINA SOLAR: TSM-DE06X.05(II) 365W MONO MODULES
WITH (38) ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS
EQUIPED WITH RAPID SHUTDOWN
(1) BRANCH CIRCUIT OF 12 MODULES AND
(2) BRANCH CIRCUITS OF 13 MODULES CONNECTED IN PARALLEL



INTERCONNECTION NOTES:
1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.64].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95] AND [NEC 690.5]
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

DISCONNECT NOTES:
1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED “LINE SIDE” (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH

RACKING NOTE:
1. BOND EVERY RAIL WITH #6 BARE COPPER

GROUNDING & GENERAL NOTES:
1. A SECOND FACILITY GROUNDING ELECTRODE IS NOT REQUIRED PER [NEC 690.47(C)(3)]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. SOLADECK OR JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - SOLADECK OR JUNCTION BOX DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT
7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.
8. TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.

	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(6)	#12AWG -	ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
	(1)	#6AWG -	BARE COPPER IN FREE AIR		
2	(6)	#10AWG -	CU,THWN-2	EMT OR FMC IN ATTIC	3/4"
	(1)	#10AWG -	CU,THWN-2 GND		
3	(2)	#6AWG -	CU,THWN-2	EMT, LFMC OR PVC	3/4"
	(1)	#6AWG -	CU,THWN-2 N		
	(1)	#8AWG -	CU,THWN-2 GND		
4	(2)	#6AWG -	CU,THWN-2	EMT, LFMC OR PVC	3/4"
	(1)	#6AWG -	CU,THWN-2 N		
	(1)	#8AWG -	CU,THWN-2 GND		

1 ELECTRICAL LINE DIAGRAM
PV-4 SCALE: NTS

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

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LAYOUT CHANGE	09/14/2021	A

DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE
32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

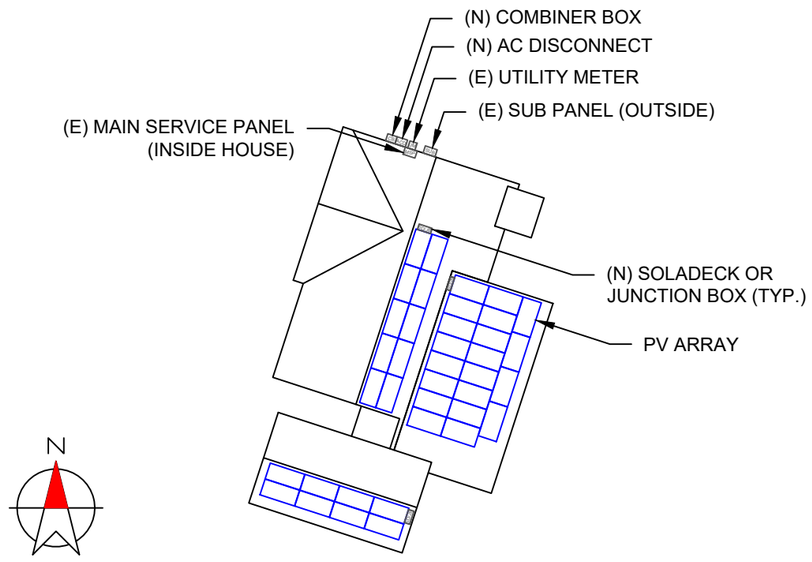
SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM MULTIPLE SOURCES OF POWER WITH SAFETY DISCONNECTS AS SHOWN:



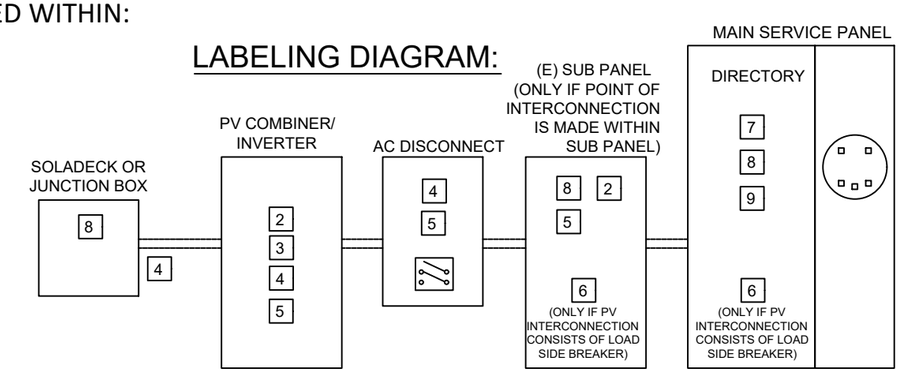
32 BLALOCK DRIVE,FUQUAY-VARINA, NC 27526

DIRECTORY

PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS OUTLINED WITHIN: NEC 690.56(B)&(C), [NEC 705.10])

LABELING DIAGRAM:



** ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VERY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ELECTRICAL DIAGRAM PAGE. **

LABELING NOTES:

1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2. LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21]
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

SIGORA SOLAR

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490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

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DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER
RESIDENCE

32 BLALOCK DRIVE,
FUQUAY-VARINA, NC 27526

DRAWN BY

ESR

SHEET NAME

PLACARD

SHEET SIZE

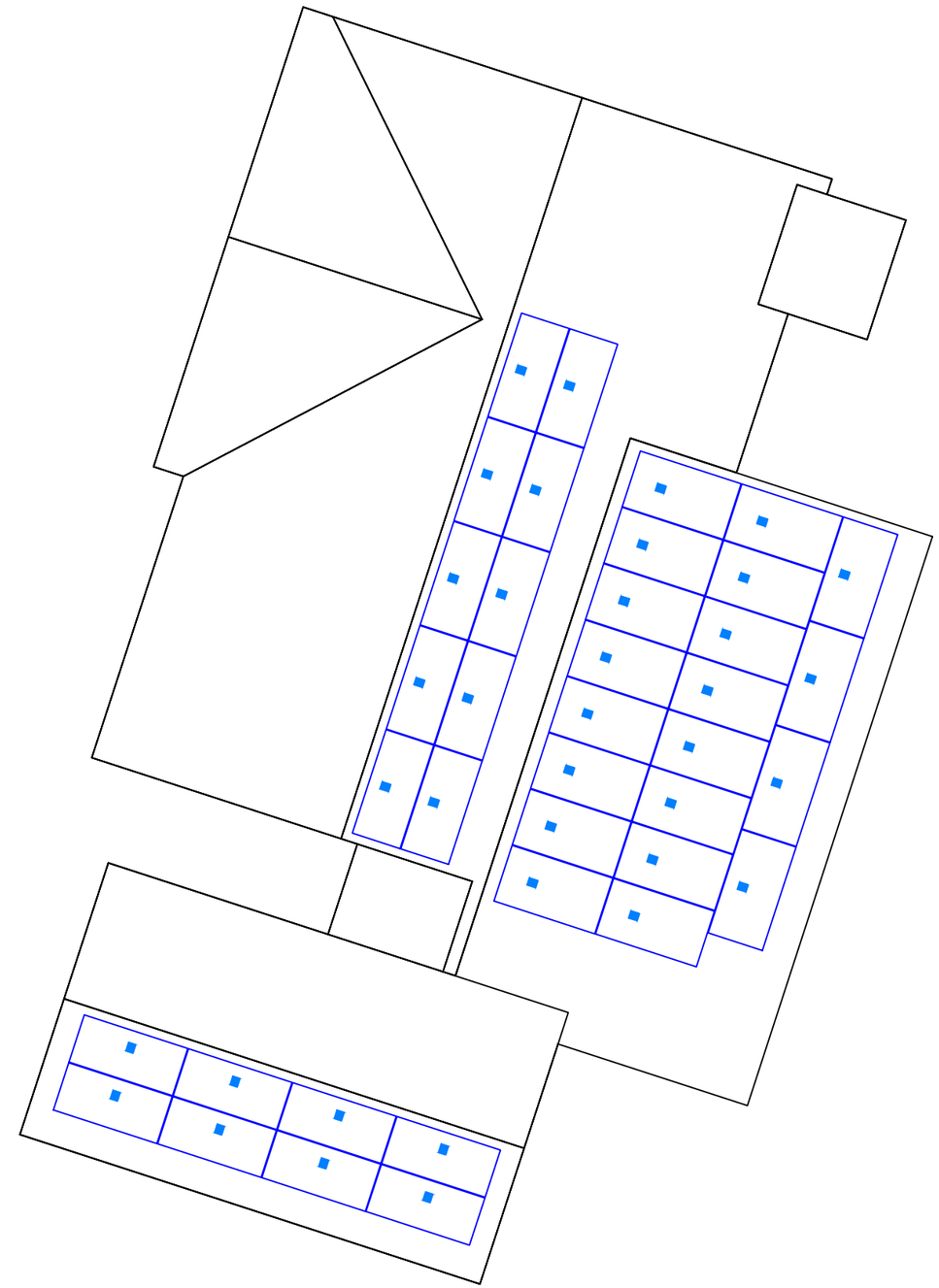
ANSI B
11" X 17"

SHEET NUMBER

PV-5

	1-10	11-20	21-30	31-40	41-50	51-60	61-70
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

MICRO INVERTER CHART



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DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE

32 BLALOCK DRIVE,
FUQUAY-VARINA, NC 27526

DRAWN BY

ESR

SHEET NAME

MICRO INVERTER CHART

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

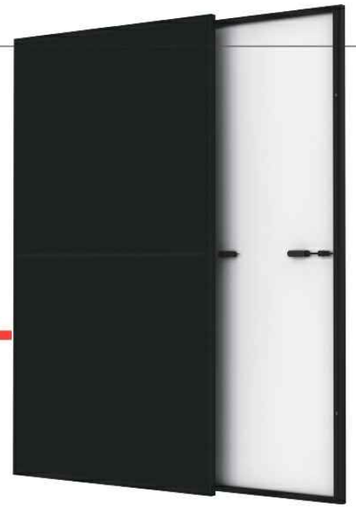
PV-6

Mono Multi Solutions

THE

Residential Module

MULTI-BUSBAR MONO PERC MODULE



132-Cell
MONOCRYSTALLINE MODULE

355-380W
POWER OUTPUT RANGE

20.6%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

PRODUCTS	POWER RANGE
TSM-DE06X.05(II)	355-380W

High power and High Efficiency

- Up to 380W front power and 20.6% module efficiency with half-cut and MBB (Multi Busbar) technology bringing more BOS savings
- Reduce BOS cost with higher power bin and 1500V system voltage

Outstanding visual appearance

- Designed with aesthetics in mind
- High standard Production, Excellent cell color control by dedicated cell blackening treatment and machine selection
- Thinner wires that appear all black at a distance

High reliability

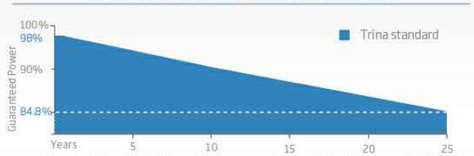
- Ensured PID resistance through cell process and module material control
- Resistant to salt, acid and ammonia
- Mechanical performance: Up to 5400 Pa positive load and 2400 Pa negative load

Certified to withstand the most chanllenging environmental conditions

- Excellent IAM and low light performance validated by 3rd party with cell process and module material optimization
- Lower temp co-efficient (-0.34%) and NOCT bring more energy leading to lower LCOE
- Better anti-shading performance and lower operating temperature

PERFORMANCE WARRANTY

25 Year Product Warranty · 25 Year Power Warranty



From the 2nd year to the 25th year, the average annual power decline will be no more than 0.55%.

Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

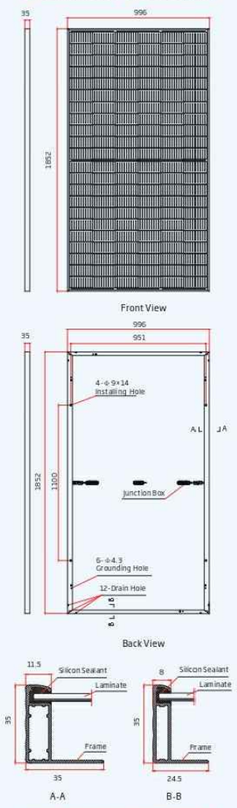
IEC61215/IEC61730/IEC61701/IEC62716/UL61730
ISO9001: Quality Management System
ISO14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
OHSAS 18001: Occupation Health and Safety Management System

Trinasolar

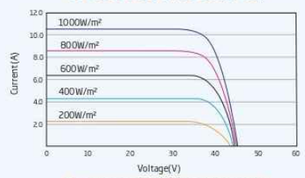
Residential Module

MULTI-BUSBAR MONO PERC MODULE

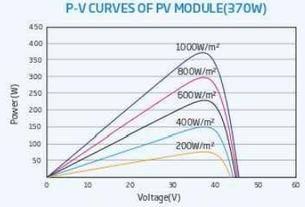
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(370W)



P-V CURVES OF PV MODULE(370W)



ELECTRICAL DATA (STC)

Peak Power Watts-P_{MAX}(Wp)*	355	360	365	370	375	380
Power Output Tolerance-P_{MAX}(W)			0~+5			
Maximum Power Voltage-V_{MPP}(V)	36.8	37.0	37.2	37.4	37.6	37.8
Maximum Power Current-I_{MPP}(A)	9.66	9.74	9.82	9.90	9.98	10.07
Open Circuit Voltage-V_{OC}(V)	44.6	44.8	45.0	45.2	45.3	45.5
Short Circuit Current-I_{SC}(A)	10.24	10.30	10.35	10.40	10.45	10.51
Module Efficiency η_m(%)	19.2	19.5	19.8	20.1	20.3	20.6

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

ELECTRICAL DATA (NOCT)

Maximum Power-P_{MAX}(Wp)	268	272	276	279	283	287
Maximum Power Voltage-V_{MPP}(V)	34.4	34.7	34.9	35.1	35.3	35.6
Maximum Power Current-I_{MPP}(A)	7.80	7.85	7.90	7.96	8.01	8.06
Open Circuit Voltage-V_{OC}(V)	42.0	42.2	42.4	42.6	42.6	42.8
Short Circuit Current-I_{SC}(A)	8.25	8.30	8.34	8.38	8.42	8.47

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

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	132 cells
Module Dimensions	1852 × 996 × 35 mm (72.91 × 39.21 × 1.38 inches)
Weight	19.7 kg (43.4 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	Black-White
Frame	35 mm (inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), Portrait: N 280mm/P 280mm(11.02/11.02inches) Landscape: N 1400 mm /P 1400 mm (55.12/55.12 inches)
Connector	MC4 EVO2
Fire Type	Type 2

TEMPERATURE RATINGS

NOCT(Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P_{MAX}	-0.34%/°C
Temperature Coefficient of V_{OC}	-0.25%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	20A

WARRANTY

25 year Product Workmanship Warranty
25 year Linear Power Warranty
(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 31 pieces
Modules per 40' container: 744 pieces

Trinasolar

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

Version number: TSM_DE06X.05(II)_NA_2020_PA3 www.trinasolar.com

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	09/09/2021	
LAYOUT CHANGE	09/14/2021	A

DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE
32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
MODULE SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

Data Sheet
Enphase Microinverters
Region: AMERICAS

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.

UL CERTIFIED SAFETY US-CA E341165

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US	IQ7PLUS-72-2-US
Commonly used module pairings[1]	235 W - 350 W +	235 W - 440 W +
Module compatibility	60-cell PV modules only	60-cell and 72-cell PV modules
Maximum input DC voltage	48 V	60 V
Peak power tracking voltage	27 V - 37 V	27 V - 45 V
Operating range	16 V - 48 V	16 V - 60 V
Min/Max start voltage	22 V / 48 V	22 V / 60 V
Max DC short circuit current (module Isc)	15 A	15 A
Overvoltage class DC port	II	II
DC port backfeed current	0 A	0 A
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range[2]	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit[3]	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	

EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %

MECHANICAL DATA	
Ambient temperature range	-40ºC to +65ºC
Relative humidity range	4% to 100% (condensing)
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection - No fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environmental category / UV exposure rating	NEMA Type 6 / outdoor

FEATURES	
Communication	Power Line Communication (PLC)
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.

1. No enforced DC/AC ratio. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

2019-3-26

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS		
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INITIAL	09/09/2021	
LAYOUT CHANGE	09/14/2021	A

DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE

32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
INVERTER SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

Data Sheet
Enphase Networking

Enphase IQ Combiner 3

(X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed

LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and **REPLACEMENT PARTS** (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity 2
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)
COMPLIANCE	
Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit **enphase.com**

2018-09-13

ENPHASE

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	09/09/2021	
LAYOUT CHANGE	09/14/2021	A

DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE

32 BLALOCK DRIVE,
FUQUAY-VARINA, NC 27526

DRAWN BY

ESR

SHEET NAME

COMBINER SPECIFICATION

SHEET SIZE

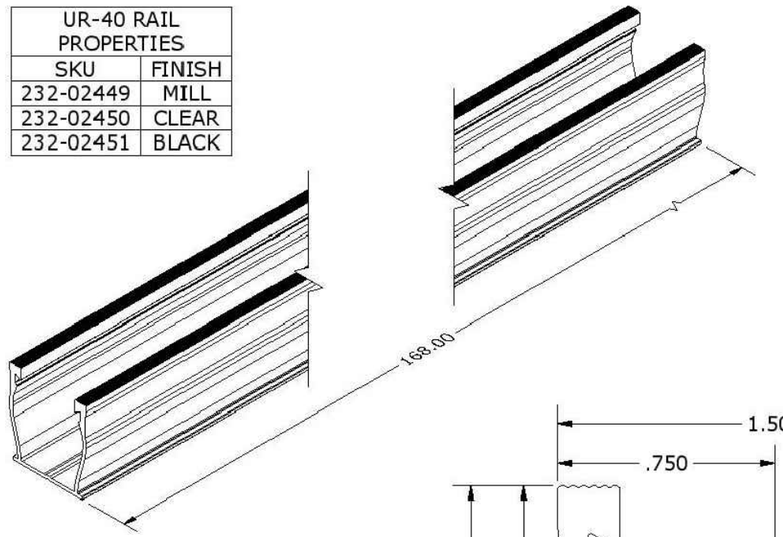
ANSI B
11" X 17"

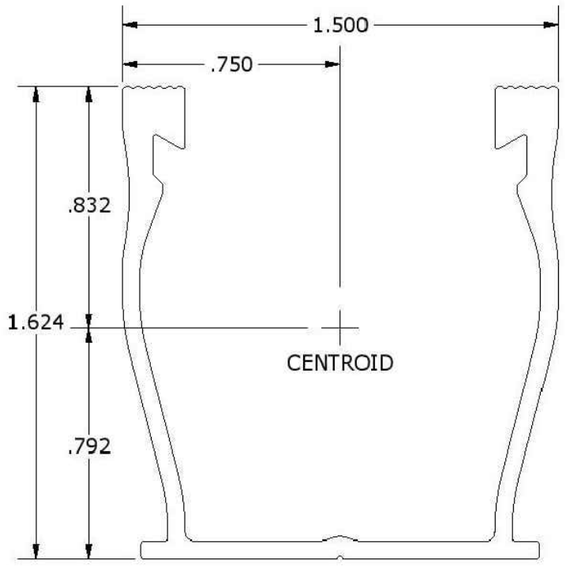
SHEET NUMBER

PV-9

DESCRIPTION:	DRAWN BY:	SnapNrack™ Solar Mounting Solutions
SNAPNRACK, UR-40 RAIL	mwatkins	
PART NUMBER(S):	REVISION:	595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA. PHONE (415) 580-6900 • FAX (415) 580-6902
232-02449, 232-02450, 232-02451	B	THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF SUNRUN SOUTH LLC.

UR-40 RAIL PROPERTIES	
SKU	FINISH
232-02449	MILL
232-02450	CLEAR
232-02451	BLACK





SECTION PROPERTIES	
A	0.357 in²
Ixx	0.125 in⁴
Iyy	0.132 in⁴
Sx (TOP)	0.150 in³
Sx (BOT)	0.158 in³
Sy (LEFT)	0.175 in³
Sy (RIGHT)	0.175 in³

ALL DIMENSIONS IN INCHES

MATERIALS:	6000 SERIES ALUMINUM	OPTIONS:
DESIGN LOAD (LBS):	N/A	CLEAR / BLACK ANODIZED
ULTIMATE LOAD (LBS):	N/A	MILL FINISH
TORQUE SPECIFICATION:	N/A LB-FT	BUNDLES OF 144
CERTIFICATION:	UL 2703, FILE E359313	BOXES OF 8
WEIGHT (LBS):	5.85	

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

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DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE
32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

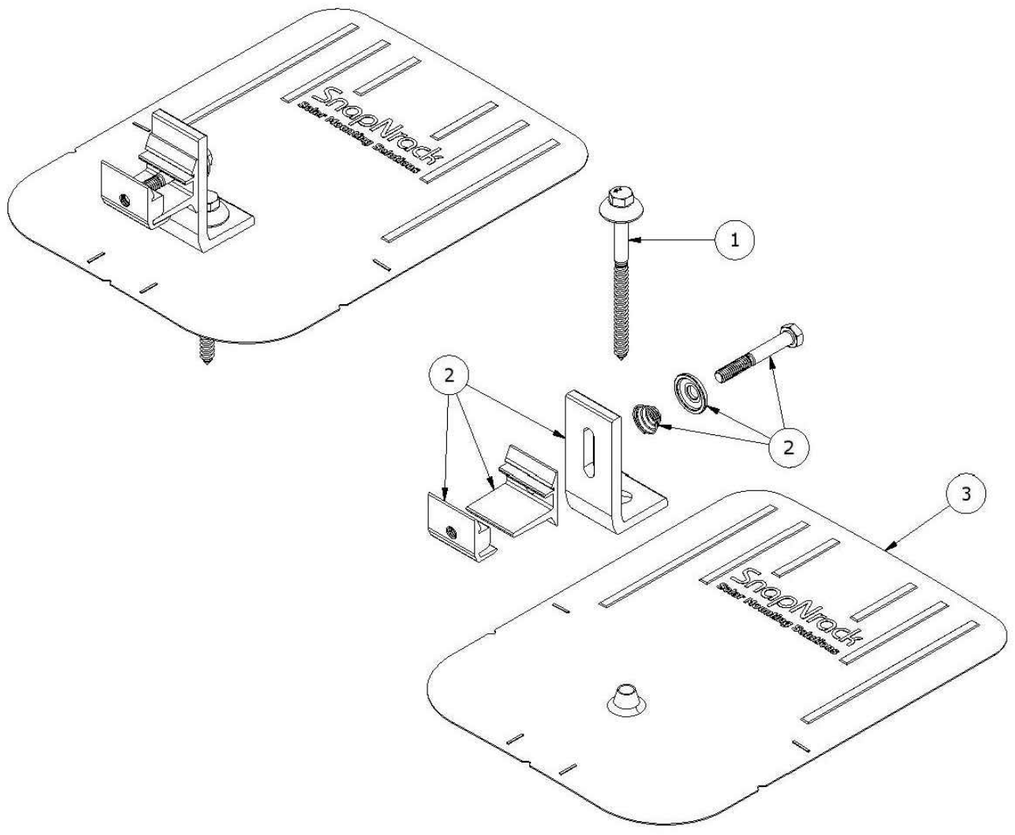
DRAWN BY
ESR

SHEET NAME
RAIL SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

DESCRIPTION:	DRAWN BY:	SnapNrack™ Solar Mounting Solutions
SNAPNRACK, ULTRA RAIL COMP KIT	mwatkins	
PART NUMBER(S):	REVISION:	595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE (415) 580-6900 • FAX (415) 580-6902
SEE BELOW	B	THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF SUNRUN SOUTH LLC.



PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	242-92266	SNAPNRACK, UMBRELLA LAG, TYPE 3, 4IN, SS
2	1	242-01219, 242-01220	SNAPNRACK, ULTRA FOOT FOR U FLASHING, SILVER / BLACK
3	1	232-01375, 232-01376	SNAPNRACK, COMP FLASHING, 9IN X 12IN, SILVER / BLACK ALUM

MATERIALS:	6000 SERIES ALUMINUM, STAINLESS STEEL, RUBBER
DESIGN LOAD (LBS):	802 UP, 1333 DOWN, 356 SIDE
ULTIMATE LOAD (LBS):	2005 UP, 4000 DOWN, 1070 SIDE
TORQUE SPECIFICATION:	12 LB-FT
CERTIFICATION:	UL 2703, FILE E359313; WIND-DRIVEN RAIN TEST FROM UL SUBJECT 2582
WEIGHT (LBS):	0.80

DESCRIPTION:	DRAWN BY:	SnapNrack™ Solar Mounting Solutions
SNAPNRACK, ULTRA RAIL COMP KIT	mwatkins	
PART NUMBER(S):	REVISION:	595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE (415) 580-6900 • FAX (415) 580-6902
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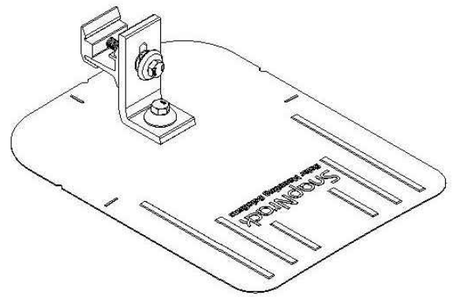
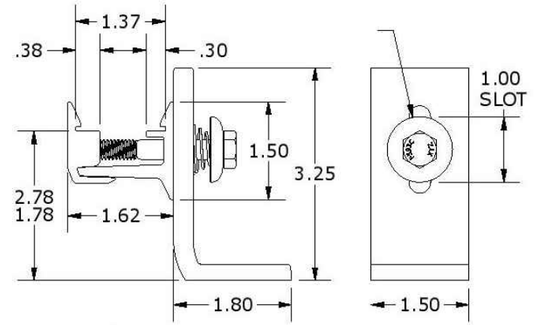
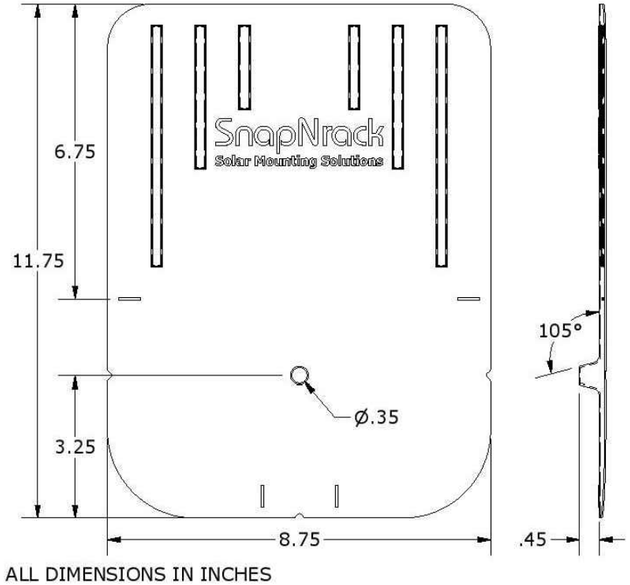
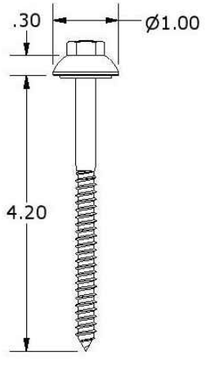


UMBRELLA L FOOT PROPERTIES	
SKU	DESCRIPTION
242-01219	ULTRA RAIL UMBRELLA L FOOT, SILVER
242-01220	ULTRA RAIL UMBRELLA L FOOT, BLACK



COMP FLASHING PROPERTIES	
SKU	DESCRIPTION
232-01375	COMP FLASHING, 9" X 12", BLACK ALUM
232-01376	COMP FLASHING, 9" X 12", SILVER ALUM





ALL DIMENSIONS IN INCHES

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS		
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DATE:09/09/2021

PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE

32 BLALOCK DRIVE,
FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
ATTACHMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included

SolaDeck Model SD 0783

SolaDeck UL50 Type 3R Enclosures

Available Models:
Model SD 0783 - (3" fixed Din Rail)
Model SD 0786 - (6" slotted Din Rail)

SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

****Typical System Configuration**

4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
1- Power Distribution Block 600VDC 175AMP
1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

****Typical System Configuration**

4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
4- Din Rail Mounted Terminal Blocks
Bus Bars with UL lug

**Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.

Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.

Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.

Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

RSTC Enterprises, Inc • 2219 Heimstead Road • Eau Cliare, WI 54703
For product information call 1(866) 367-7782

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

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PROJECT NAME & ADDRESS

ROBERT BAKER RESIDENCE

32 BLALOCK DRIVE, FUQUAY-VARINA, NC 27526

DRAWN BY

ESR

SHEET NAME

SOLADECK SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-12