VARIANCE NARRATIVE

Requesting a variance for installation of solar panels on a pitched roof of a Hillside home at,
5709 E Arroyo Rd Paradise Valley, Arizona 85253
This installation conforms to the 6 variance requirements in the following ways,

1. "Such variance … will serve not merely as a convenience to the applicant, but [is] necessary to alleviate some demonstrable hardship or difficulty so great as warrant a variance under the circumstances."

Applicants' property was built at its MAXIMUM allowable amount of disturbed ground area, thus requiring roof mounted solar panels. If a Ground mount solar installation is to be done, the ground mount would add another 1000 square feet of disturbed land to lot usage percentage. This along with the conduit run that would to be trenched would only add 1.5 square feet per linear foot of disturbed land to lot usage percentage.

PROPERTY PERCENTAGES		
LOT SIZE	46,540 SQFT	
BUILDING PERCENTAGE	7,176 SQFT	15%
LOT USAGE PERCENTAGE	13,728 SQFT	30%
UNDISTURBED PERCENTAGE	32,812 SQFT	70%
NEW LOT DISTURBED PERCENTAGE	0FT	0%

2. The "special circumstances, hardship, or difficulty [do not] arise out of a misunderstand or mistake…"

The applicant did not have a misunderstand or made a mistake regarding the cost of electricity and the power bills associated with it. Since the customer is over max usage of his lot, this would mean that the customer would not be able to achieve a ground mount. If the customer was not able to do the solar on his property due to the restrictions of the ground-mount and the Province not wanting them on the Roof then the customer would be out an average of $609 a month of generated Revenue that would average $7,308 dollars a year and $73,080 every 10 years. This would be a disservice to the customer as he is trying to help the community and the utility have a lower carbon footprint.

3. "Such variance from … the strict application of the terms of [the Zoning Ordinance] … are in harmony with its general purposes and intents …"

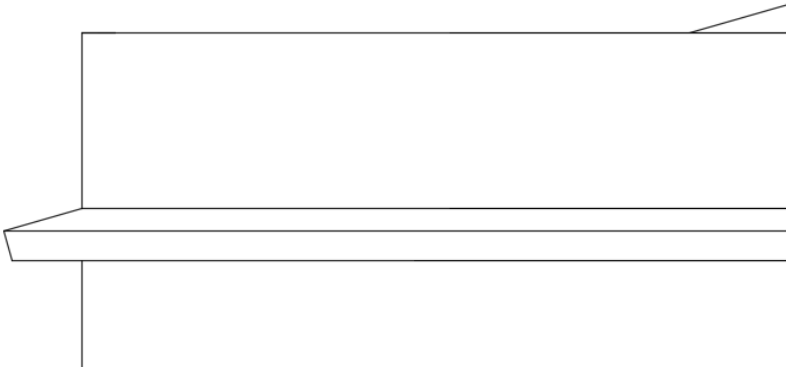
The power generating system [rooftop] solar will be installed in such a way that is both aesthetically appealing and non-disruptive to the overall aesthetic of the area. This is in line with the general purpose and intent of the Zoning Ordinance. With the neighbors to the South being down a significantly steep slope, the customer's rooftop and solar system would not be visible from their backyard, front yard or driveway. The neighbors to the North live up the hill that continuously varies from an 80° to a 45° slope that is significantly higher than the customer's rooftop in which solar system would not be visible from their backyard, front yard or driveway. The neighbors to the East live down the street which is down the hill and would not be able to view the customer's solar system from their backyard, front yard or driveway because it would be on the west face not East.

4. "The special circumstances, hardship, or difficult applicable to the property are [not] self- imposed by the property owner, or predecessor…"

A certain amount of power is required for any residence to operate in a manner which is considered normal and reasonable. This requirement is common and natural for this residence as well, and not through any intentional actions of the homeowner beyond the normal power consumption of living in the residence.

5. "Because of special circumstances applicable to the property, including its size, shape, topography, location, or surroundings, the strict application of the zoning ordinance will deprive such property of privileges enjoyed by other property of the same classification in the same zoning district."

Other properties within the same zoning classification have been allowed to have solar power systems installed on their rooftops. This was primarily allowed since the profile of their roofs allowed for the solar modules to be hidden from view through various means such as an existing parapet wall on a flat roof section of the home. This applicant's property does not have parapet walls on any viable roof surfaces. The area of the roof with parapets is very small, and has obstructions that create significantly higher shade levels, making it detrimental to system production. To add parapet walls to this customer's house, it would not only negatively impact the Aesthetics of the home but would look completely awkward to have a parapet wall constructed on top of a sloped roof. Thus not only creating a sore eye for the community that would be visible on his 12 degree roof but a negative value impact to the home. Also, after talking to my structural engineer, adding a parapet wall could add unnecessary weight to the structure that the structure might not be able to support.



The roof surfaces selected for the solar panels will give all panels a low maximum height, and place most of them far enough from the edges of the roof that they are obscured from view by residences north of the property who are located at a higher elevation than the surrounding lots.

Therefore, for the applicant to enjoy the same privilege of a solar power system on their residence, some power generating modules must be placed in a southern, visible location. Also, modules are currently placed in locations ideal for photovoltaic production. Other locations on the roof would be more visible to the North, East, and have greatly reduced production. Adding visual screenings or parapets to the areas surrounding the currently proposed panel locations would cause a significant amount of shading on those roof surfaces. This would have a highly negative effect to the photovoltaic system, thus *greatly* reducing production.

6. The variance would not "Constitute a grant of special privilege inconsistent with the limitations upon other properties in the vicinity and zone in which such property is located"

This variance would not violate the primary purpose of such ordinance in that it will be installed in such a way to maintain the aesthetic appeal of the property. Therefore, this variance does not allow for a privilege that is inconsistent with the existing Zoning Ordinance's limitation on other properties in the area.

The applicants design is already using a high efficiency panel with a high-power density as such there is no way to decrease the size of the system while maintaining the required levels of power generation needed to satisfy the service requirements of the residence.

Additionally, the system is designed to be placed on a particular roof surface to optimize power production in a way that is necessary for the electrical needs of the home. To place the modules on a different roof surface would negatively affect the production of the system and require additional modules.

This request is compliant with the height restrictions as at no point are the panels higher than the peak of the roof. They sit close to the roof tiles and stand no more than 8 inches off the existing roof materials and sit 3 feet below the ridge. The slant of the modules will match the slant of the roof to which it is secured. All conduits will be painted to match all surfaces to which they are attached. All railing and module frames shall have a low *sheen black finish* (please refer to the specification sheets provided in solar plan set).

2425 S. Stearman Drive
Ste. 220
Chandler, AZ 85286
866.624.5291

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Module:	(##) PANASONIC N330E VBHN330SA17E
Inverter:	(##) ENPHASE IQ7X-96-2-US-240V
DC System Size:	##### kW
AC System Size:	##### kW

SITE PLAN

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

Design:	EC
Scale:	1/32" = 1'-0"
Date:	7/16/2021
Project:	Behshad

PROPERTY PERCENTAGES		
LOT SIZE	46,540 SQFT	
BUILDING PERCENTAGE	7,176 SQFT	15%
LOT USAGE PERCENTAGE	13,728 SQFT	30%
UNDISTURBED PERCENTAGE	32,812 SQFT	70%
NEW LOT DISTURBED PERCENTAGE	0FT	0%

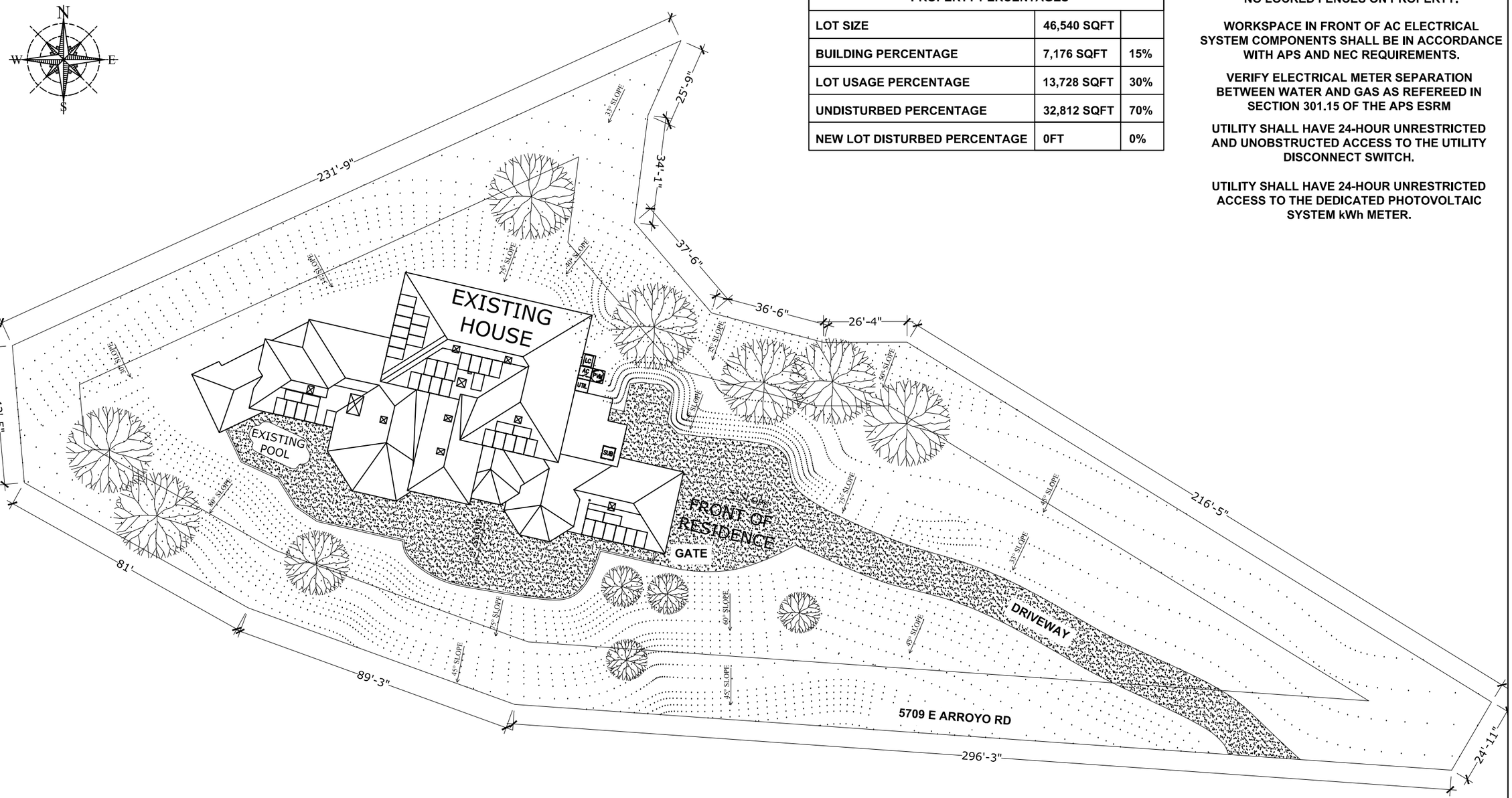
NO LOCKED FENCES ON PROPERTY.

WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH APS AND NEC REQUIREMENTS.

VERIFY ELECTRICAL METER SEPARATION BETWEEN WATER AND GAS AS REFEREED IN SECTION 301.15 OF THE APS ESRM

UTILITY SHALL HAVE 24-HOUR UNRESTRICTED AND UNOBSTRUCTED ACCESS TO THE UTILITY DISCONNECT SWITCH.

UTILITY SHALL HAVE 24-HOUR UNRESTRICTED ACCESS TO THE DEDICATED PHOTOVOLTAIC SYSTEM kWh METER.



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DC System Size: ##### kW

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PARADISE VALLEY, ARIZONA 85253

Signature:

Design: EC

Scale: 1/32" = 1'-0"

Date: 7/16/2021

Project: Behshad

PV 2.1

VICINITY MAP

GENERAL NOTES

1. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE 2014 NEC, 2015 IRC, 2015 IFC AND ALL OTHER APPLICABLE REQUIREMENTS OF PARADISE VALLEY

2. PHOTOVOLTAIC ARRAYS SHALL BE PROVIDED WITH DC GROUND-FAULT PROTECTION. NEC 690.5

3. DC GROUNDING ELECTRODE CONDUCTOR SHALL BE SIZED ACCORDING TO NEC 250.166. NEC690.47 B

4. DC GROUNDING ELECTRODE SHALL BE BONDED TO THE AC GROUNDING ELECTRODE AND THE CONDUCTOR SHALL BE NO SMALLER THAN THE LARGEST GROUNDING ELECTRODE CONDUCTOR, EITHER AC OR DC. NEC 690.47 C 7

5. THE AC GROUNDING ELECTRODE CONDUCTOR SHALL BE SIZED ACCORDING TO NEC 250.66 AND TABLE 310.15 B 6 FOR DWELLINGS. NEC 690.47 C 2

6. GROUNDING BUSHINGS ARE REQUIRED AROUND PRE-PUNCHED CONCENTRIC KNOCKOUTS ON THE DC SIDE OF THE SYSTEM. NEC 250.97

7. GROUNDING SHALL BE CONTINUOUS AND INSTALLED TO ALLOW FOR PANEL REMOVAL WITHOUT DISRUPTING CONTINUITY. ALL MODULE GROUND CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC 690.4 (C)

8. WORKING CLEARANCES AROUND THE EXITING ELECTRICAL EQUIPMENT AS WELL AS THE NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26

9. ALL PHOTOVOLTAIC SYSTEM CONDUCTORS WILL BE 90 DEGREE C RATED. NEC 690.31B, TABLE 310.16, TABLE 310.17

10. WHERE DC CONDUCTORS ARE RUN INSIDE THE BUILDING (OR ATTIC), THEY SHALL BE CONTAINED IN A METAL RACEWAY. NEC 690.31 E)

11. ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE RAIN-TIGHT AND APPROVED FOR USE IN WET LOCATIONS. NEC314.15

12. ANY CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT. NEC 300.6 C1, 310.8 D

13. ALL METALLIC RACEWAYS AND EQUIPMENT SHALL BE BONDED AND ELECTRICALLY CONTINUOUS. NEC 250.90, 250.96

14. ALL EQUIPMENT SHALL BE LISTED AND LABELED BY A RECOGNIZED ELECTRICAL TESTING LABORATORY AND INSTALLED PER THE LISTING REQUIREMENTS AND THE MANUFACTURERS INSTRUCTIONS. NEC 690.9(A)

FOR MORE INFO SEE NOTES AND REFERENCES PAGE

ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
AHJ	AUTHORITY HAVING JURISDICTION
BLDG	BUILDING
CB	COMBINER BOX
CP	COMBINER PANEL
DC	DIRECT CURRENT
EGC	EQUIPMENT GROUNDING CONDUCTOR
EMT	ELECTRICAL METALLIC TUBING
EQ	EQUAL
FSB	FIRE SETBACK
GALV	GALVANIZED
GEC	GROUNDING ELECTRODE CONDUCTOR
GND	GROUND
I	CURRENT
IBC	INTERNATIONAL BUILDING CODE
IFC	INTERNATIONAL FIRE CODE
Imp	CURRENT AT MAX POWER
INV(S)	INVERTER(S)
Isc	SHORT-CIRCUIT CURRENT
kVA	KILOVOLT AMPERE
kW	KILOWATT
LBW	LOAD BEARING WALL
LC	LOAD CENTER
MAX	MAXIMUM
MIN	MINIMUM
MP	MOUNTING PLANE
NEC	NATIONAL ELECTRIC CODE
NTS	NOT TO SCALE
OC	ON CENTER
Pnom	NOMINAL POWER
POI	POINT OF INTERCONNECTION
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
RBC	RESIDENTIAL BUILDING CODE
SFD	SINGLE FAMILY DWELLING
STC	STANDARD TESTING CONDITIONS
SUB	SUB PANEL
SWH	SOLAR WATER HEATER
TCF	TEMPERATURE CORRECTION FACTOR
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLT
Vmp	VOLTAGE AT MAX POWER
Voc	OPEN-CIRCUIT VOLTAGE
W	WATT

LEGEND

INV	INVERTER (INTEGRATED DC DISCO)
UTIL	UTILITY METER & SERVICE ENTRANCE
MSP	MAIN SERVICE PANEL
UM	UTILITY METER
PVM	PV SYSTEM METER
DC	DC DISCONNECT
AC	AC DISCONNECT (UNFUSED)
AC	AC FUSED DISCONNECT
LC	LOAD CENTER
	FENCE/BLOCK WALL
	PROPERTY LINE
	TRENCH
	CONDUIT

SCOPE OF WORK

INSTALL (42) PANASONIC N330E VBHN330SA17E MODULE

INSTALL J-BOX ENPHASE MONITORING
INSTALL J-BOX, RACEWAYS, AND WIRING
INSTALL 100A AC DISCONNECT
INSTALL 70A 2 POLE PV BREAKER
TOTAL SYSTEM SIZE 13.86 kW (DC)
INSTALL NEW IQ ENPHASE COMBINER BOX
INSTALL NEW 150A MAIN CIRCUIT BREAKER
INSTALL BLACK PAINTED RAILING

PAGE INDEX

elevation home energy solutions
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Inverter: (42) ENPHASE IQ7X-96-2-US-240V
DC System Size: 13.86 kW
AC System Size: 13.23 kW

COVER PAGE

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

Design: EC
Scale: NTS
Date: 1/15/2021
Project: Behshad

PV 1

NO LOCKED FENCES ON PROPERTY.

WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH APS AND NEC REQUIREMENTS.

VERIFY ELECTRICAL METER SEPARATION BETWEEN WATER AND GAS AS REFEREED IN SECTION 301.15 OF THE APS ESRM

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UTILITY SHALL HAVE 24-HOUR UNRESTRICTED ACCESS TO THE DEDICATED PHOTOVOLTAIC SYSTEM kWh METER.

N
W E
S

LC
AC
PVM
UTIL
SUB

DRIVEWAY

GATE

FRONT OF HOUSE

5709 E ARROYO RD

LEGEND

UTIL ALL-IN-ONE UTIL. METER & MAIN SERVICE PANEL	UM (E) UTILITY METER	AC (N) FUSED UTILITY DISCONNECT	INV (N) INVERTER (W/ DC DISCONNECT)	LC (N) LOAD CENTER (COMBINER PANEL)	FENCE/BLOCK WALL
MSP MAIN SERVICE PANEL (MSP)	PVM (N) PV SYSTEM PRODUCTION METER	AC (N) UNFUSED UTILITY DISCONNECT	DC (N) DC DISCONNECT	SUB (E) SUB PANEL	PROPERTY LINE
					CONDUIT
					TRENCH

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SITE PLAN

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

Design:	EC
Scale:	1/16" = 1'-0"
Date:	1/21/2021
Project:	Behshad

PV 2

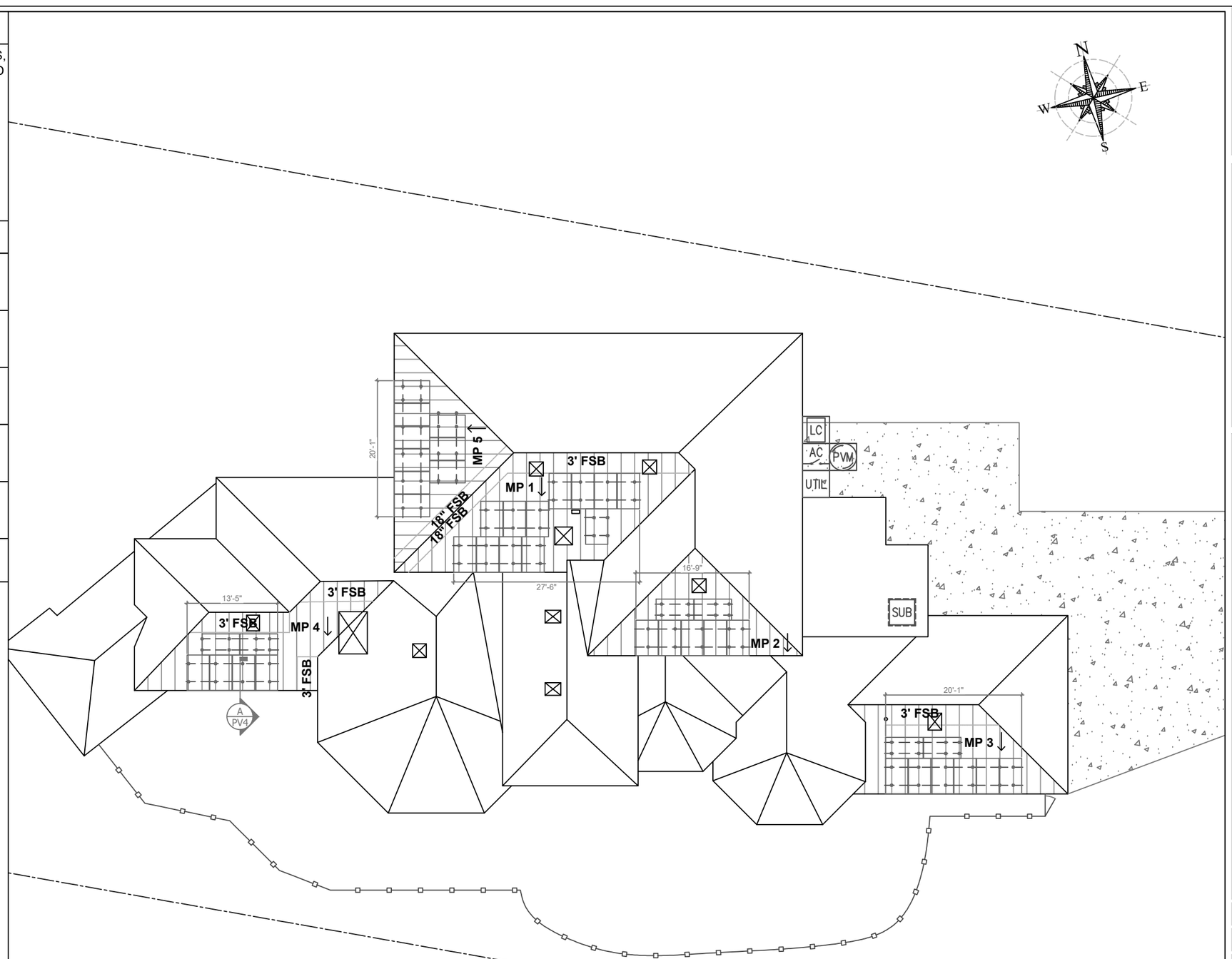
NOTES

1. EXISTING PLUMBING VENTS, SKYLIGHTS, EXHAUST OUTLETS, VENTILATIONS INTAKE AIR OPENINGS SHALL NOT BE COVERED BY THE SOLAR PHOTOVOLTAIC SYSTEM.
2. STANDOFF SPACING 4' MAX.
3. RAIL SPACING UNDER ARRAY IS 50% OF PANEL WIDTH PERPENDICULAR TO THE RAIL.
4. DC CIRCUIT THAT RUNS INTERIOR TO THE STRUCTURE SHALL BE IN RIGID OR ELECTRICAL METALLIC TUBING AND LOCATED A MINIMUM OF 18" BELOW THE ROOF OR ALONG THE BOTTOM OF LOAD BEARING MEMBERS.

	ROOF		ARRAY	
MP 5	AZIMUTH:	283	AZIMUTH:	283
	PITCH:	18°	PITCH:	18°
	ROOF TYPE:	FLAT TILE	STORY:	2 STORY
MP 4	AZIMUTH:	193	AZIMUTH:	193
	PITCH:	18°	PITCH:	18°
	ROOF TYPE:	FLAT TILE	STORY:	1 STORY
MP 3	AZIMUTH:	193	AZIMUTH:	193
	PITCH:	18°	PITCH:	18°
	ROOF TYPE:	FLAT TILE	STORY:	1 STORY
MP 2	AZIMUTH:	193	AZIMUTH:	193
	PITCH:	18°	PITCH:	18°
	ROOF TYPE:	FLAT TILE	STORY:	2 STORY
MP 1	AZIMUTH:	193	AZIMUTH:	193
	PITCH:	18°	PITCH:	18°
	ROOF TYPE:	FLAT TILE	STORY:	2 STORY

LEGEND

- UTIL — ALL-IN-ONE UTIL. METER & MAIN SERVICE PANEL
- MSP — MAIN SERVICE PANE (MSP)
- UM — (E) UTILITY METER
- AC — (N) UNFUSED UTILITY AC DISCONNECT
- AC — (N) FUSED UTILITY AC DISCONNECT
- PVM — (N) PV PRODUCTION METER
- INV — (N) INVERTER (INTEGRATED DC DISCO)
- DC — (N) DC DISCONNECT
- LC — (N) LOAD CENTER (COMBINER PANEL)
- SUB — (E) SUB PANEL
- FENCE/BLOCK WALL
- PROPERTY LINE
- CONDUIT



elevation
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DC System Size: 13.86 kW
AC System Size: 13.23 kW

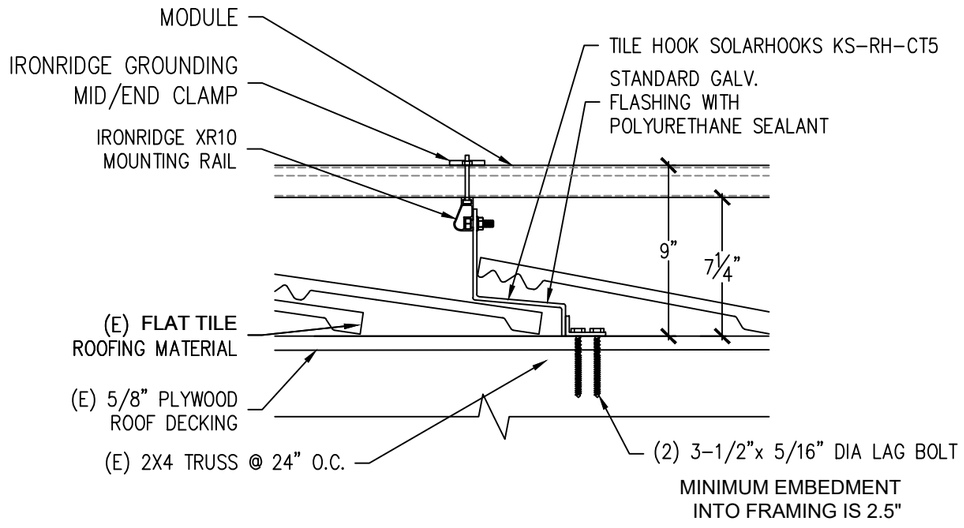
PV LAYOUT

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

Design: EC
Scale: 1/16" = 1'-0"
Date: 1/21/2021
Project: Behshad

PV 3



A STANDOFF DETAIL

Scale: 1' 1/2" = 1'

System Weight	
Total system weight	2,126.0 lbs
Weight/attachment	28.0 lbs
Racking weight	320.0 lbs
Distributed weight	2.8 psf

Load Assumptions	
Wind exposure	B
Wind speed	115 mph
Ground snow load	0 psf
Attachment spacing portrait	4.0'

Roof Information			
Roof material	Tile - Flat	**Building height**	20 ft
Roof attachment	All Tile Hook	**Roof slope**	18 °
Attachment hardware	Square	**Risk category**	II

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Inverter: (42) ENPHASE IQ7X-96-2-US-240V

DC System Size: 13.86 kW

AC System Size: 13.23 kW

DETAILS & UPLIFT CALCULATIONS

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

Design: EC

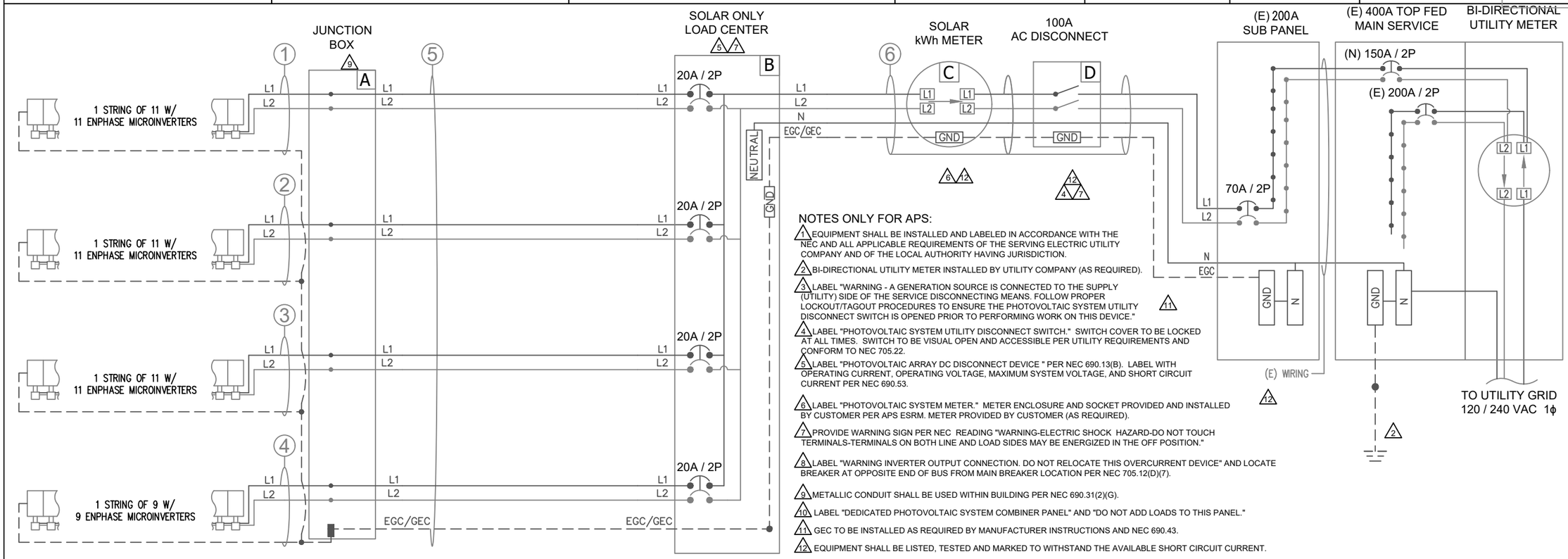
Scale: NTS

Date: 1/21/2021

Project: Behshad

PV 4

MODULE SPECS	INVERTER SPECS	GENERAL NOTES	MAIN PANEL SPECS	AC CALCS	120% RULE	GROUND SPECS
(42) PANASONIC N330E VBHN330SA17E Voc = 69.70 V Vmp = 58.00 V Isc = 6.07 A Imp = 5.70 A Tvoc = −0.110%/°C ***ALL MODULES WILL BE GROUNDED IN ACCORDANCE WITH ELECTRICAL CODE AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS***	(42) ENPHASE IQ7X−96−2−US−240V INVERTER; 315W, 120 / 240 VAC 1ϕ DC UNGROUNDED	1. PV BREAKER TO BE LOCATED ON OPPOSITE END OF BUS FROM MAIN BREAKER AND/OR FEEDERS 2. ALL SUPPLIED EQUIPMENT IS UL LISTED. *MAXIMUM PHOTOVOLTAIC SYSTEM VOLTAGE CALCULATED WITH MODULE OPEN−CIRCUIT VOLTAGE TEMPERATURE COEFFICIENTS	(E) 400A MAIN PANEL (E) 200A/2P MAIN CIRCUIT BREAKER (E) 200A SUB PANEL (N) 150A/2P MAIN CIRCUIT BREAKER UNDERGROUND SERVICE ENTRANCE	TOTAL INVERTER MAX AC CONTINUOUS OUTPUT x 125% (1.31 x 42) x 1.25 = 68.775 PROPOSED PV SYSTEM: 70A	BUS BAR RATING: 200A MAIN BREAKER RATING: 150A (200A x 1.2) − 150A= 90A 90A MAX BACK FEED	GROUNDING ELECTRODE CONDUCTOR MUST TIE INTO AC GROUNDING ELECTRODE SYSTEM AND BE INSTALLED IN ACCORDANCE WITH NEC 250.64 AND 690.47(C)(2). CONDUCTORS MUST BE CONTINUOUS AND CONNECTIONS MUST BE IRREVERSIBLE.



NOTES ONLY FOR APS:

1. EQUIPMENT SHALL BE INSTALLED AND LABELED IN ACCORDANCE WITH THE NEC AND ALL APPLICABLE REQUIREMENTS OF THE SERVING ELECTRIC UTILITY COMPANY AND OF THE LOCAL AUTHORITY HAVING JURISDICTION.
2. BI-DIRECTIONAL UTILITY METER INSTALLED BY UTILITY COMPANY (AS REQUIRED).
3. LABEL "WARNING - A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE SERVICE DISCONNECTING MEANS. FOLLOW PROPER LOCKOUT/TAGOUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE."
4. LABEL "PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH." SWITCH COVER TO BE LOCKED AT ALL TIMES. SWITCH TO BE VISUAL OPEN AND ACCESSIBLE PER UTILITY REQUIREMENTS AND CONFORM TO NEC 705.22.
5. LABEL "PHOTOVOLTAIC ARRAY DC DISCONNECT DEVICE " PER NEC 690.13(B). LABEL WITH OPERATING CURRENT, OPERATING VOLTAGE, MAXIMUM SYSTEM VOLTAGE, AND SHORT CIRCUIT CURRENT PER NEC 690.53.
6. LABEL "PHOTOVOLTAIC SYSTEM METER." METER ENCLOSURE AND SOCKET PROVIDED AND INSTALLED BY CUSTOMER PER APS ESRM. METER PROVIDED BY CUSTOMER (AS REQUIRED).
7. PROVIDE WARNING SIGN PER NEC READING "WARNING-ELECTRIC SHOCK HAZARD-DO NOT TOUCH TERMINALS-TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OFF POSITION."
8. LABEL "WARNING INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE" AND LOCATE BREAKER AT OPPOSITE END OF BUS FROM MAIN BREAKER LOCATION PER NEC 705.12(D)(7).
9. METALLIC CONDUIT SHALL BE USED WITHIN BUILDING PER NEC 690.31(2)(G).
10. LABEL "DEDICATED PHOTOVOLTAIC SYSTEM COMBINER PANEL" AND "DO NOT ADD LOADS TO THIS PANEL."
11. GEC TO BE INSTALLED AS REQUIRED BY MANUFACTURER INSTRUCTIONS AND NEC 690.43.
12. EQUIPMENT SHALL BE LISTED, TESTED AND MARKED TO WITHSTAND THE AVAILABLE SHORT CIRCUIT CURRENT.

AC SIDE

EQUIP.

A	B	C	D	POI
(1) JUNCTION BOX (OR EQUIVALENT) J−BOX; 600VDC, NEMA 3R	(1) ENPHASE #X−IQ−AM1−240−B (OR EQUIVALENT) COMBINER BOX (1) BREAKER; 20A/2P, 2 SPACE (1) BREAKER; 20A/2P, 2 SPACE (1) BREAKER; 20A/2P, 2 SPACE (1) BREAKER; 20A/2P, 2 SPACE	(1)Milbank U−5929−XL−INS METER SOCKET; 240V, 100A, 4T, A RING TYPE, FORM 2S W/ ISOLATED NEUTRAL	(1) CUTLER−HAMMER DG223URB (OR EQUIVALENT) DISCONNECT; 100A, 240VAC, UN−FUSED, NEMA 3R	(1) BREAKER; 70A/2P, 2 SPACE PV BACKFEED BREAKER

WIRING

1	(1) AWG #10, ENPHASE WIRE, Black (1) AWG #10, ENPHASE WIRE, Red (1) AWG #6, SOLID BARE COPPER GEC	Vmp = 240 VAC Imax = 14.4 AAC		
2	(1) AWG #10, ENPHASE WIRE, Black (1) AWG #10, ENPHASE WIRE, Red (1) AWG #6, SOLID BARE COPPER GEC	Vmp = 240 VAC Imax = 14.4 AAC		
3	(1) AWG #10, ENPHASE WIRE, Black (1) AWG #10, ENPHASE WIRE, Red (1) AWG #6, SOLID BARE COPPER GEC	Vmp = 240 VAC Imax = 14.4 AAC		
4	(1) AWG #10, ENPHASE WIRE, Black (1) AWG #10, ENPHASE WIRE, Red (1) AWG #6, SOLID BARE COPPER GEC	Vmp = 240 VAC Imax = 11.8 AAC		
5		(4) AWG #10, THWN−2, Black (4) AWG #10, THWN−2, Red (1) AWG #10, THWN−2, Green EGC/GEC (1) Conduit kit; 3/4" EMT	Vmp = 240 VAC Imax = 14.4 AAC	
6				(1) AWG #4, THWN−2, Black (1) AWG #4, THWN−2, Red (1) AWG #4, THWN−2, White NEUTRAL (1) AWG #6, THWN−2, Green EGC/GEC (1) Conduit kit; 3/4" EMT Vmp = 240 VAC Imax = 55.0 AAC

NOTE: ALL LUGS/TERMINATIONS TO BE 75°C MINIMUM

WIRE SIZING

TEMP SPECS		CALC NOTES
AVG. AMBIENT TEMP:	80°F	WIRE OCP = AMP RATING x CONDUIT FILL x TEMP DE−RATE MAX AC & DC Isc TO BE LESS OR EQUAL TO WIRE OCP FOR WIRE TO BE APPROVED BY 2011 NEC
RECORD LOW:	9°F	
CONDUIT HEIGHT:	2"	
ROOF TOP ADDER:	40°F	
ROOF TOP TEMP:	120F	
CONDUCTOR TEMP RATE:	90°C	
TEMP CORRECTION:	0.87	
PER NEC 310.15 (B)(2)(a)		

AC WIRE SIZING CALCS (MAX CONTINUOUS Isc x 1.25%)

1	2	3	4	5	6
CONT. Imax: 18.01A	CONT. Imax: 18.01A	CONT. Imax: 18.01A	CONT. Imax: 14.74A	CONT. Imax: 18.01A	CONT. Imax: 68.78A
WIRE GAUGE: #10	WIRE GAUGE: #10	WIRE GAUGE: #10	WIRE GAUGE: #10	WIRE GAUGE: #10	WIRE GAUGE: #4
TEMP RATING: 90c	TEMP RATING: 90c	TEMP RATING: 90c	TEMP RATING: 90c	TEMP RATING: 90c	TEMP RATING: 90c
AMP RATING: 40A	AMP RATING: 40A	AMP RATING: 40A	AMP RATING: 40A	AMP RATING: 40A	AMP RATING: 35A
CONDUIT FILL: 1.0	CONDUIT FILL: 1.0	CONDUIT FILL: 1.0	CONDUIT FILL: 1.0	CONDUIT FILL: 0.8	CONDUIT FILL: 1.0
TEMP DE−RATE: 0.82	TEMP DE−RATE: 0.82	TEMP DE−RATE: 0.82	TEMP DE−RATE: 0.82	TEMP DE−RATE: 0.82	TEMP DE−RATE: 0.87
WIRE OCP: 32.8A	WIRE OCP: 32.8A	WIRE OCP: 32.8A	WIRE OCP: 32.8A	WIRE OCP: 26.2A	WIRE OCP: 30.5A

elevation home energy solutions
2425 S. Stearman Drive
Ste: 220
Chandler, AZ 85286
866.624.5291

Module:	Inverter:	DC System Size:	AC System Size:
(42) PANASONIC N330E VBHN330SA17E	(42) ENPHASE IQ7X−96−2−US−240V	13.86 kW	13.23 kW

THREE-LINE DIAGRAM

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

Design: EC
Scale: NTS
Date: 1/21/2021
Project: Behshad

PV 5

Residential Standard Calculation

9/25/1997

Keramat Behshad AZ--9-20-OP-73654

by: John Sokolik — Version 2011 L

ELEVATION
2425 S Stearman Dr
Chandler, Arizona
866.547.6601
9/29/2020 10:40 ---

STEP 1 Article 220.42 & 220.52

sq. ft	5108	General Lighting load	15,324 VA
	2	Small Appliance	3,000 VA
	1	Laundry circuit	1,500 VA
	Gen.Lgt, Sm App.& Laun. Load		19,824 VA
		3,000 VA @ 100%=	3,000 VA
		16,824 VA @ 35% =	5,888 VA
		VA @ 25% =	VA

General Lighting Demand Load **8,888 VA**

STEP 2 Article 220.50 & 220.51

A/C Condenser & Fixed Electric Space Heating

					QTY
A/C #1	VA	AHU 1	5kW	5,800 VA	1
A/C #2	VA	AHU 2	5kW	5,800 VA	1
A/C #3	VA	AHU 3	Select	VA	Qty
A/C #4	VA	AHU 4	Select	VA	Qty
A/C #5	VA	AHU 5	Select	VA	Qty

Total 2

Heating Load	11,600 VA
CU Load	VA

Greater of Heat @ 100% vs.A/C @ 100% **11,600 VA**

STEP 3 Article 220.53

4,500 VA		Water Heater	VA	
1,400 VA	1	Refrigerator	1,400 VA	
600 VA		Freezer	VA	
1,030 VA	1	Dishwasher	1,030 VA	
690 VA	1	Disposal	690 VA	
400 VA		R / Hood	VA	
1,630 VA	1	Microwave	1,630 VA	
4,000 VA		Microwave	VA	
170 VA		Mini Refrig	VA	
400 VA		Wine Clr	VA	
5,000 VA		Insta Hot	VA	
1,500 VA		Ironing Center	VA	
select		Jacuzzi Tub	VA	
select		Sprinkler Pump	VA	
select		Well Pump	VA	
select		Fountain Pump	VA	
select		Elevator	VA	
		Pool Equip. Panel	VA 100% Demand	
		GATES	VA No Demand	
		Other load	VA No Demand	

Appliance Demand Load **3,563 VA**

Dryer Demand Load **VA**

Range Demand Load **VA**

Service Demand **24,051 VA**

Demand Load **100 A**

Neutral Demand **52 A**

Min.Service Req. **110 A**

Min. Feeder size **3**
Min. Neutral size **6**
Eq. Grding Cond. **6**
☐ **Copper**

Total Appliance Load **4,750 VA**

4 or more demand @ 75% plus 100% demand loads **3,563 VA**

STEP 4 Article 220.54

Electric Clothes Dryers

STEP 5 Article 220.55

Electric Ranges — Col C demand **0**

or Number of appliances

☐ Check Box for Gas Range

Cooktop — Col B demand
Cooktop — Col B demand
Oven(s) — Col B demand
Oven(s) — Col B demand

Number of appliances **0** Dem. Factor **0%**

Cooktop & Oven Demand Load **W**

jmp1jds@comcast.net

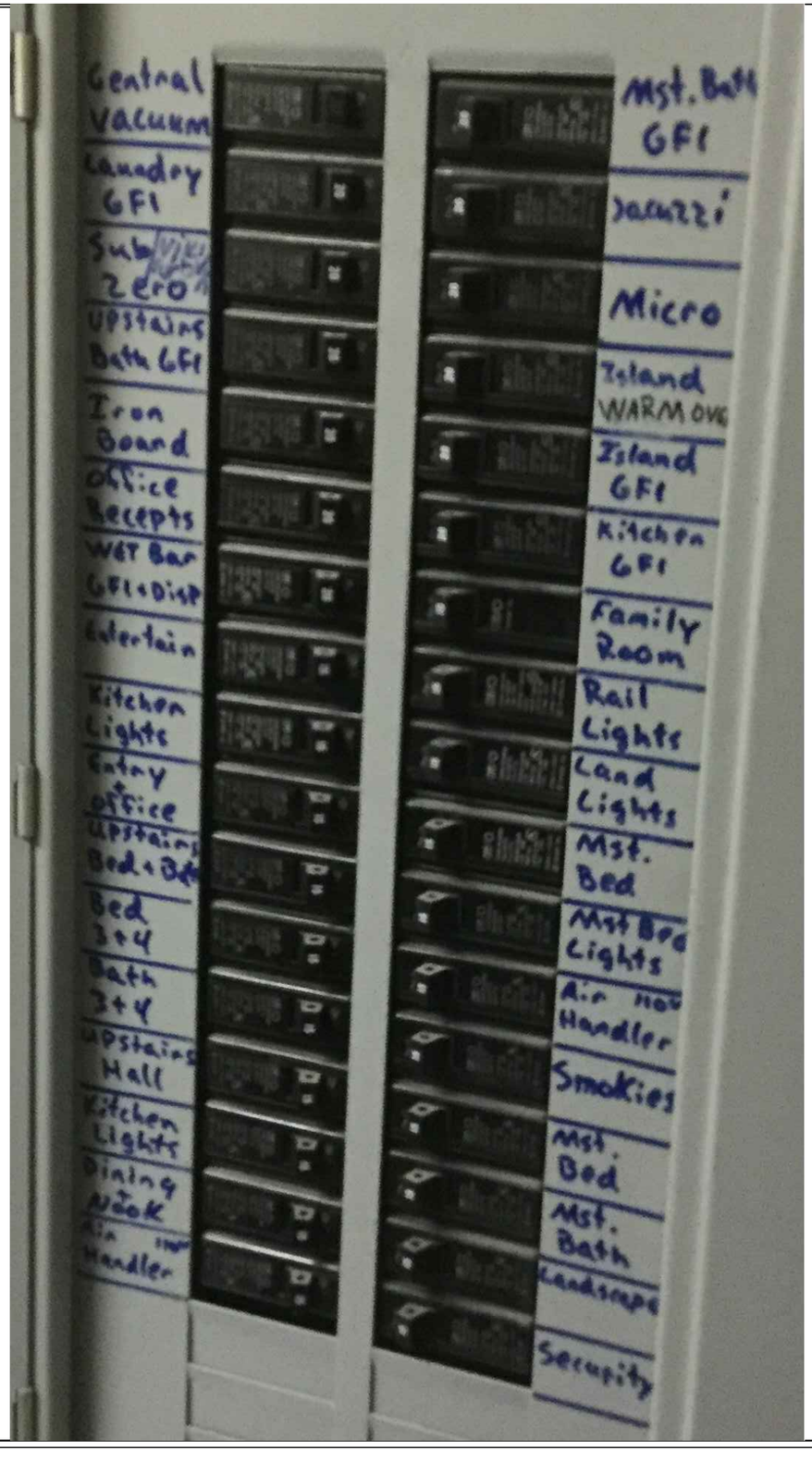
>>>>>>>>>><<<<<<<<<<

Pool Panel Feeder Calculation		(See Note)	A	B	N
Continuous Motors	0	.....	0	0	0
Non-continuous	0	.....	0	0	0
Spa heater 11 kVA		.....	0	0	
Pool heater 3.5 ton		.....	0	0	
Pool heater 5 ton		.....	0	0	
Pool Light select	0	.....	0	0	0
Blower select	0	☐ 240v	0	0	0
other load	0	☐ 240v	0	0	0
other load	0	☐ 240v	0	0	0
☐ Min.Copper Pool Feeder		AWG	A	A	A
Minimum Panel Rating		A	Phase Amperes		Neut. load

Continuous Motors		Non-continuous Motors	
select	☐ 240v	select	☐ 240v
select	☐ 240v	select	☐ 240v
select	☐ 240v	select	☐ 240v
select	☐ 240v	select	☐ 240v
select	☐ 240v	select	☐ 240v

0.0 Motor Neutral Load

Max.Unbalanced Neutral Load



elevation home energy solutions
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866.624.5291

Module: (42) PANASONIC N330E VBHN330SA17E
Inverter: (42) ENPHASE IQ7X-96-2-US-240V
DC System Size: 13.86 kW
AC System Size: 13.23 kW

LOAD CALCULATIONS

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

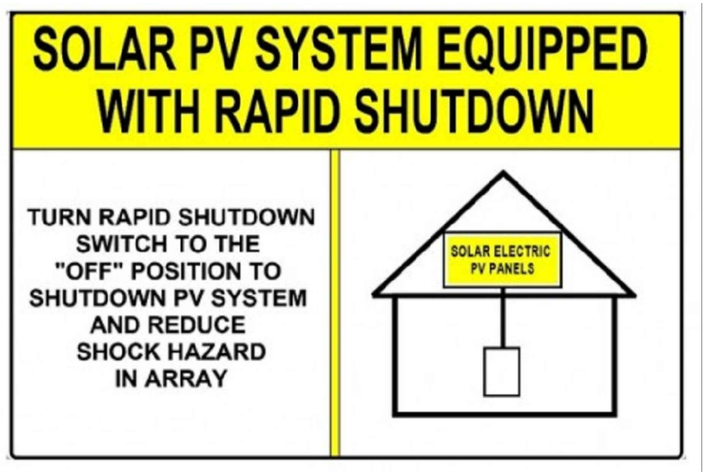
Design: EC
Scale: NTS
Date: 1/21/2021
Project: Behshad

PV 5.1

INVERTER

NEC 690.5(C) GROUNDED SYSTEMS

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



UNGROUNDED AND MAY BE
ENERGIZED.

NEC 690.14(C)(2)

PHOTOVOLTAIC DISCONNECT
FOR UTILITY OPERATIONS

AC DISCONNECT

NEC 690.14(C)(2)

PHOTOVOLTAIC DISCONNECT
FOR UTILITY OPERATIONS

NEC 690.54

PHOTOVOLTAIC ARRAY
AC DISCONNECT
OPERATING CURRENT 68.775 A
OPERATING VOLTAGE: 240 V

CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES & JUNCTION BOXES

NEC 690.31(E)(3) CONDUIT

Warning: Photovoltaic Power Source

NEC 690.35(F) UNGROUNDED SYSTEMS JUNCTION BOX

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

LOAD CENTER

WARNING!
THIS LOAD CENTER IS
DEDICATED TO
PHOTOVOLTAIC SYSTEM
ADD NO ADDITIONAL LOADS

MAIN SERVICE PANEL

NEC 705.12(D)(4)

WARNING
THIS SERVICE ALSO SERVED
BY A PHOTOVOLTAIC SYSTEM

NEC 705.12(D)(7)

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL TO BE INSTALLED DIRECTLY NEXT TO PV BACKFEED BREAKER. IF INSTALLED ANYWHERE ELSE ON DEADFRONT THEN A PERMANENT ARROW FROM LABEL POINTING TO PV BACKFEED BREAKER REQUIRED.

NEC 690.54

PHOTOVOLTAIC POWER SOURCE

OPERATING AC VOLTAGE: 240 V
MAXIMUM OPERATING AC OUTPUT
CURRENT: 68.775 AMPS

NEC 690.14(C)(2)

PHOTOVOLTAIC DISCONNECT
FOR UTILITY OPERATIONS

FOR MAIN BREAKER DOWNSIZE

DO NOT UPSIZE MAIN BREAKER
BREAKER HAS BEEN DOWN-SIZED
FOR PV SOLAR SYSTEM CONNECTION

Marking PV Circuit (INSTALL APPLICABLE LABELS ONLY)

Marking is required on all interior and exterior PV conduit, raceways, enclosures, cable assemblies, and junction boxes to alert the fire service to avoid cutting them. Marking shall be placed every 10', within 1' of turns or bends, above and/or below penetrations, and at all PV combiner and junction boxes.

Reflective weather resistant material suitable for the environment (durable adhesive materials must meet this requirement)

elevation home energy solutions
2425 S. Stearman Drive
Ste. 220
Chandler, AZ 85286
866.624.5291

Module: (42) PANASONIC N330E VBHN330SA17E
Inverter: (42) ENPHASE IQ7X-96-2-US-240V
DC System Size: 13.86 kW
AC System Size: 13.23 kW

LABELS

BEHSHAD RESIDENCE
5709 E ARROYO RD
PARADISE VALLEY, ARIZONA 85253

Signature:

Design: EC
Scale: NTS
Date: 1/21/2021
Project: Behshad

PV 6

HIT® Photovoltaic Module

AC SERIES

Panasonic

N330E

HIT® AC Series Advantage

More power from every roof

An Enphase IQ 7X microinverter with Individual MPPT (Module-level Power Point Tracker) is integrated with HIT® high efficiency solar technology to deliver maximum power production from every roof size and shape. The result is the HIT® AC Series, offering extreme efficiency and high power output for residential solar systems.

Easy to Install

No inverter installation and no DC wire management required. The built-in microinverter is factory mounted on the module, saving installation time, labor and money.

Simple Logistics

The Enphase IQ 7X recesses into the frame of the module, saving storage space, reducing trips up the ladder, and simplifying the purchasing process.

Lower operations and maintenance (O&M) costs

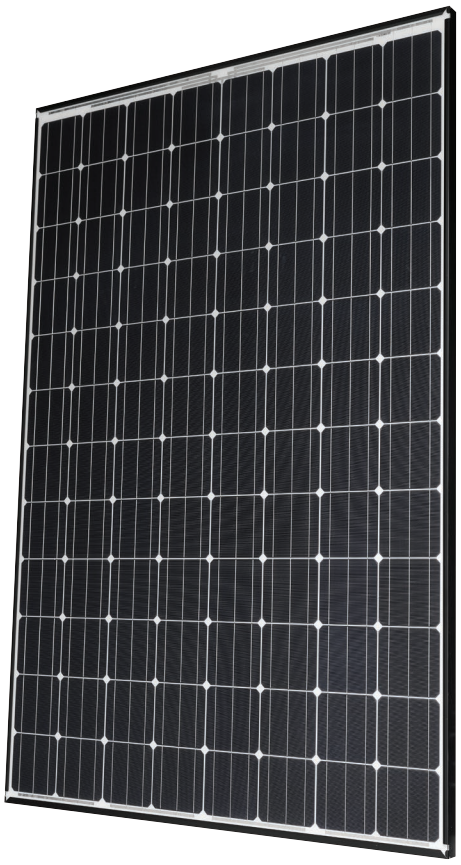
Each microinverter is field-replaceable without the need to replace the entire solar module. The operation and maintenance costs savings help maximize the ROI on your home solar system.

High Efficiency at High Temperatures

Where most modules weaken and underperform in hot summer temperatures, HIT® AC Series outperforms like no other module. Our industry-low temperature coefficient of -0.258%/° generates more solar power than competing models on the warmest days.

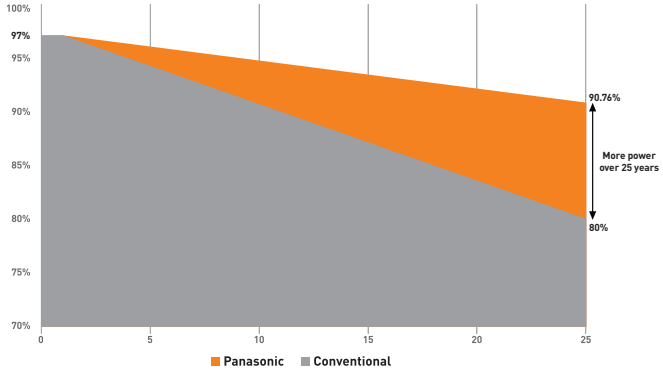
25-year warranty provides complete system protection

Backed by one of America's longest-standing brands, our comprehensive module warranty covers performance, workmanship and parts for 25 years. Our guaranteed minimum 90.76% rated power output after 25 years means you'll produce more electricity and save more money year after year.

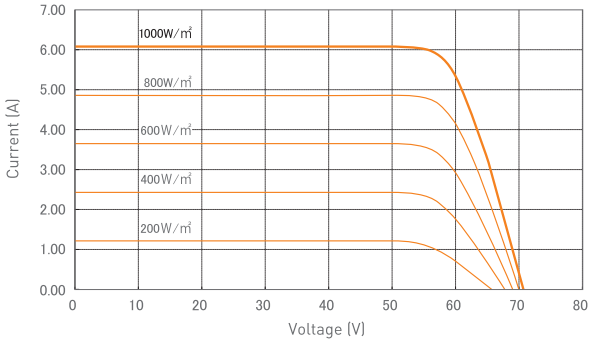


ENPHASE.

PERFORMANCE WARRANTY



DEPENDENCE ON IRRADIANCE



Reference data for model: VBHN330SA17
(Cell temperature: 25°C)

HIT® Photovoltaic Module

AC SERIES

Panasonic

N330E

AC ELECTRICAL SPECIFICATIONS

Model	VBHN330SA17E
Peak Power Output	320VA
Maximum Continuous Output Power	315VA
Nominal (L-L) voltage/range†	240V / 211 – 264V
Maximum Continous Output Current	1.31A @ 240VAC / 1.51A @ 208VAC
Maximum Units per 20 A (L-L) branch circuit	12 @ 240VAC / 10 @ 208VAC
Nominal Frequency	60Hz
Extended Frequency Range	47 – 68Hz
AC Short Circuit Fault Current Over 3 Cycles	5.8Arms
Overvoltage Class AC Port	III
AC Port Backfeed Current	0A
Power Factor Setting	1.0
Power Factor (adjustable)	0.7 leading / 0.7 lagging
CEC Weighted Efficiency	97.5% @ 240V / 96.5% @ 208V

DC ELECTRICAL SPECIFICATIONS

Model	VBHN330SA17E
Rated Power (Pmax)[1]	330W
Temperature Coefficient (Pmax)	-0.258%/°C
CEC PTC Rating	311.7W
CEC PTC to STC Ratio	94.45%
Cell Efficiency	22.09%
Module Efficiency	19.7%
Watts per Ft.²	18.3W
Warranted Tolerance (-/+)	+10%/-0%*

FEATURES

Model	VBHN330SA17E
Communication	Power Line Communication (PLC)
Communication	Enlighten Manager and MyEnlighten monitoring options. Compatible with 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 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 to manufacturer's instructions

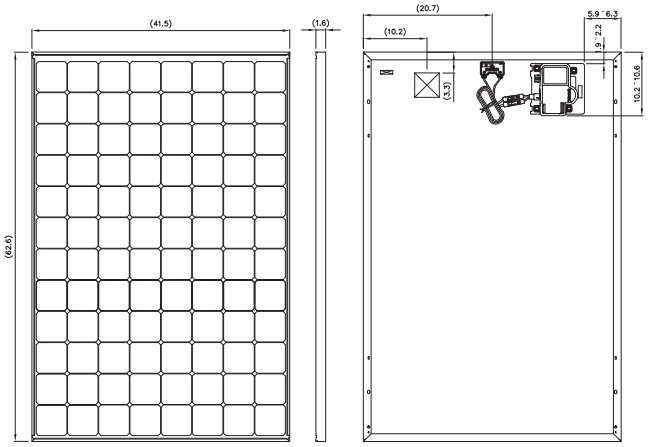
MECHANICAL SPECIFICATIONS

Model	VBHN330SA17E
Internal Bypass Diodes	4 Bypass Diodes
Module Area	18.02 Ft.² (1.67m²)
Weight	42.99 Lbs. (19.5kg)
Dimensions LxWxH	62.6x41.5x1.6 in. (1590x1053x40 mm)
Static Wind / Snow Load	112 PSF (5400Pa)
Pallet Dimensions LxWxH	65.3 x 43.7 x 48.5 in.
Quantity per Pallet / Pallet Weight	24 pcs./1098 Lbs. (498 kg)
Quantity per 40' Container	672 pcs.
Quantity per 20' Container	288 pcs.

OPERATING CONDITIONS & SAFETY RATINGS

Model	VBHN330SA17E
Operating Temperature	-22°F to 185°F (-30°C to 85°C)
Hail Safety Impact Velocity	1" hailstone (25mm) at 52 mph (23m/s)
Safety & Rating Certifications	UL 1703, UL 1741, CEC
UL 1703 Fire Classification	Type 2
Limited Warranty	Module: 25** Yrs Workmanship and Power Output (Linear)*** Microinverter: 25 Yrs Workmanship and Materials‡
Manufacturing Locations	USA

DIMENSIONS



NOTE: Standard Test Conditions: Air mass 1.5; irradiance = 1000W/m²; cell temp. 25°C
* Maximum power at delivery. For guarantee conditions, please check our guarantee document.
** Installation need to be registered through our website **www.panasonicusahitwarranty.com** within 60 days in order to receive twenty-five (25) year Product workmanship. Otherwise, Product Workmanship will be only fifteen (15) years.
*** 1st year 97%, after 2nd year 0.26% annual degradation to year 25.
† Nominal voltage range can be extended beyond nominal if required by the utility.
†† Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.
‡ Microinverter warranty provided by Enphase. Please refer to Panasonic's HIT AC Module Limited Warranty Document for further information.
[1] STC: Cell temp. 25°C, AM1.5, 1000W/m²
[2] Safety locking clip (PV-SSH4) is not supplied with the module.
NOTE: Specifications and information above may change without notice.

Panasonic

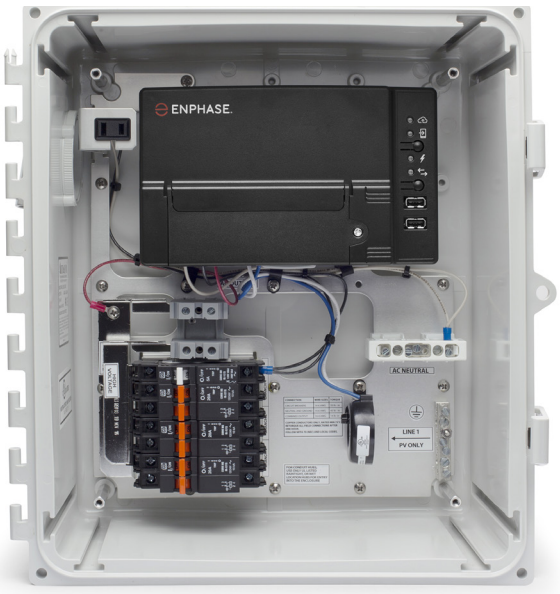
Panasonic Life Solutions Company of America
Two Riverfront Plaza, 5th Floor, Newark, NJ 07102
panasonicHIT@us.panasonic.com
na.panasonic.com/us/solarpanels

RS19008SS_R2

Enphase IQ Combiner

(X-IQ-AM1-240-B)

The **Enphase IQ Combiner**™ with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV installations by providing a consistent, pre-wired solution for residential applications.



Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular

Simple

- Three pre-installed 20 A / 240 VAC circuit breakers
- Provides production metering and optional consumption monitoring.

Reliable

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

UL LISTED

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

ENPHASE.

Enphase IQ Combiner

MODEL NUMBER	
IQ Combiner X-IQ-AM1-240-B	IQ Combiner with Enphase IQ Envoy™ for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%).
ACCESSORIES (order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 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%).
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
Solar branch circuit breakers	Three 2-pole 20 A/240 VAC DIN rail-mounted breakers
Maximum system voltage	240 VAC
Rated output current	48 A
Rated input current, each input	16 A
Maximum fuse/circuit breaker rating (output)	60 A
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	38.0 x 38.7 x 20.3 cm (15.0” x 15.3” x 8.0”)
Weight	5.1 kg (11.2 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Vented, natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire size	14 to 6 AWG copper conductors for branch inputs. 14 to 4 AWG copper conductors for combined output. 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	802.3, Cat5E (or Cat 6) UTP Ethernet cable - not included
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) - not included
COMPLIANCE	
Compliance, Combiner	UL 1741
Compliance, IQ Envoy	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5

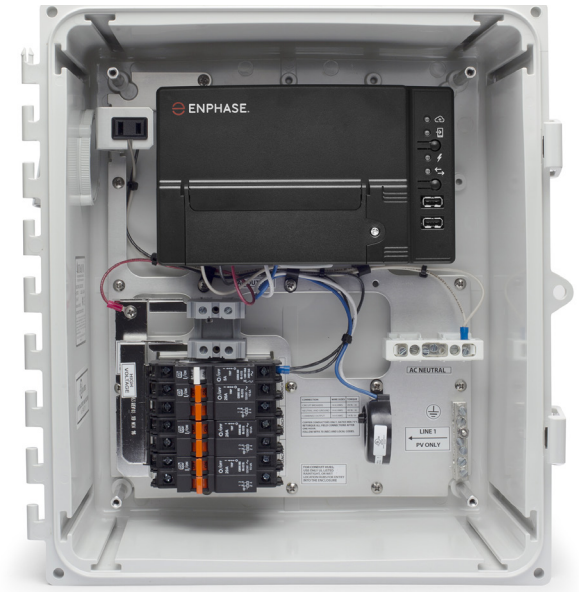
To learn more about Enphase offerings, visit **enphase.com**

2017-08-17

ENPHASE.

Enphase AC Combiner Box

The **Enphase AC Combiner Box**™ with Enphase Envoy-S™ consolidates interconnection equipment into a single enclosure and streamlines PV installations by providing a consistent, pre-wired solution for residential applications.



Smart

- Includes Envoy-S for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular

Simple

- Three pre-installed 20 A / 240 VAC circuit breakers
- Pre-configured revenue-grade metering available

Reliable

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

UL LISTED

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

ENPHASE.

Enphase AC Combiner Box

MODEL NUMBERS	
XAM1-120-B (880-00834) or XAM1-120 (880-00211)	AC Combiner with Enphase Envoy-S Metered™ for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%).
ACCESSORIES (order separately)	
Enphase Mobile Connect™ CELLMODEM-01 (3G) or CELLMODEM-03 (4G)	Plug and play industrial grade cellular modem with five-year 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%).
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
Solar branch circuit breakers	Three 2-pole 20 A / 240 VAC DIN rail-mounted breakers
Maximum system voltage	240 VAC
Rated output current	48 A
Rated input current, each input	16 A
Maximum fuse/circuit breaker rating (output)	60 A
Production Metering CT	200 A solid core pre-installed on solar busbar and wired to Envoy-S
MECHANICAL DATA	
Dimensions (WxHxD)	38.0 x 38.7 x 20.3 cm (15.0” x 15.3” x 8.0”)
Weight	5.1 kg (11.2 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Vented, natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Altitude	To 2000 meters (6,560 feet)
Wire size:	Follow local code requirements for conductor sizing.
Model XAM1-120-B	• 14 to 6 AWG copper conductors for branch inputs. • 14 to 4 AWG copper conductors for combined output.
Model XAM1-120	• 12 to 6 AWG copper conductors for branch inputs. • 12 to 4 AWG copper conductors for combined output.
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable - (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) - (not included)
COMPLIANCE	
Compliance, Combiner Box	UL 1741
Compliance, Envoy-S	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5

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

2017-04-14

ENPHASE.

Datasheet

IRONRIDGE

Flush Mount System

Built for solar's toughest roofs.

IronRidge builds the strongest mounting system for pitched roofs in solar. Every component has been tested to the limit and proven in extreme environments.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 20-year warranty.

Strength Tested

All components evaluated for superior structural performance.

PE Certified

Pre-stamped engineering letters available in most states.

Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.

Design Assistant

Online software makes it simple to create, share, and price projects.

UL 2703 Listed System

Entire system and components meet newest effective UL 2703 standard.

20-Year Warranty

Twice the protection offered by competitors.

XR Rails

XR10 Rail

A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear and black finish

XR100 Rail

The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

XR1000 Rail

A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

Bonded Splices

All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

Clamps & Grounding

UFOs

Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

Stopper Sleeves

Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

Grounding Lugs

Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

Microinverter Kits

Mount MIs or POs to XR Rails.

- Bonds devices to rails
- Kit comes assembled
- Listed to UL 2703

Attachments

FlashFoot2

Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

Slotted L-Feet

Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

Bonding Hardware

Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

Flush Standoffs

Raise Flush Mount System to various heights.

- Works with vent flashing
- 4" and 7" lengths
- Ships assembled

Resources

Design Assistant

Go from rough layout to fully engineered system. For free.

Go to IronRidge.com/design

NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

Go to IronRidge.com/training

5709 E Arroyo Rd
Paradise Valley,
Arizona 85253

HILLSIDE MAP

VICINITY MAP

AERIAL MAP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E Glen Dr
E Glen Dr
E Arroyo Rd
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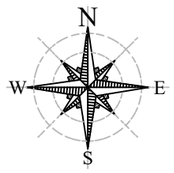
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