

HISTORIC AND DESIGN REVIEW COMMISSION

April 21, 2021

HDRC CASE NO: 2021-183
ADDRESS: 306 E CAROLINA ST
LEGAL DESCRIPTION: NCB 2956 BLK 0 LOT 16
ZONING: R-6,H
CITY COUNCIL DIST.: 1
DISTRICT: Lavaca Historic District
APPLICANT: Desiree Carmona/TriSMART Solar LLC
OWNER: KAARLSEN BRYAN & ROBIN
TYPE OF WORK: Solar panel installation
APPLICATION RECEIVED: April 02, 2021
60-DAY REVIEW: Not applicable due to City Council Emergency Orders
CASE MANAGER: Stephanie Phillips

REQUEST:

The applicant is requesting a Certificate of Appropriateness to install a 21-panel solar array on the primary structure at 306 E Carolina.

APPLICABLE CITATIONS:

Historic Design Guidelines, Chapter 3, Guidelines for Additions

6. Designing for Energy Efficiency

C. SOLAR COLLECTORS

- i. *Location*—Locate solar collectors on side or rear roof pitch of the primary historic structure to the maximum extent feasible to minimize visibility from the public right-of-way while maximizing solar access. Alternatively, locate solar collectors on a garage or outbuilding or consider a ground-mount system where solar access to the primary structure is limited.
- ii. *Mounting (sloped roof surfaces)*—Mount solar collectors flush with the surface of a sloped roof. Select collectors that are similar in color to the roof surface to reduce visibility.
- iii. *Mounting (flat roof surfaces)*—Mount solar collectors flush with the surface of a flat roof to the maximum extent feasible. Where solar access limitations preclude a flush mount, locate panels towards the rear of the roof where visibility from the public right-of-way will be minimized.

FINDINGS:

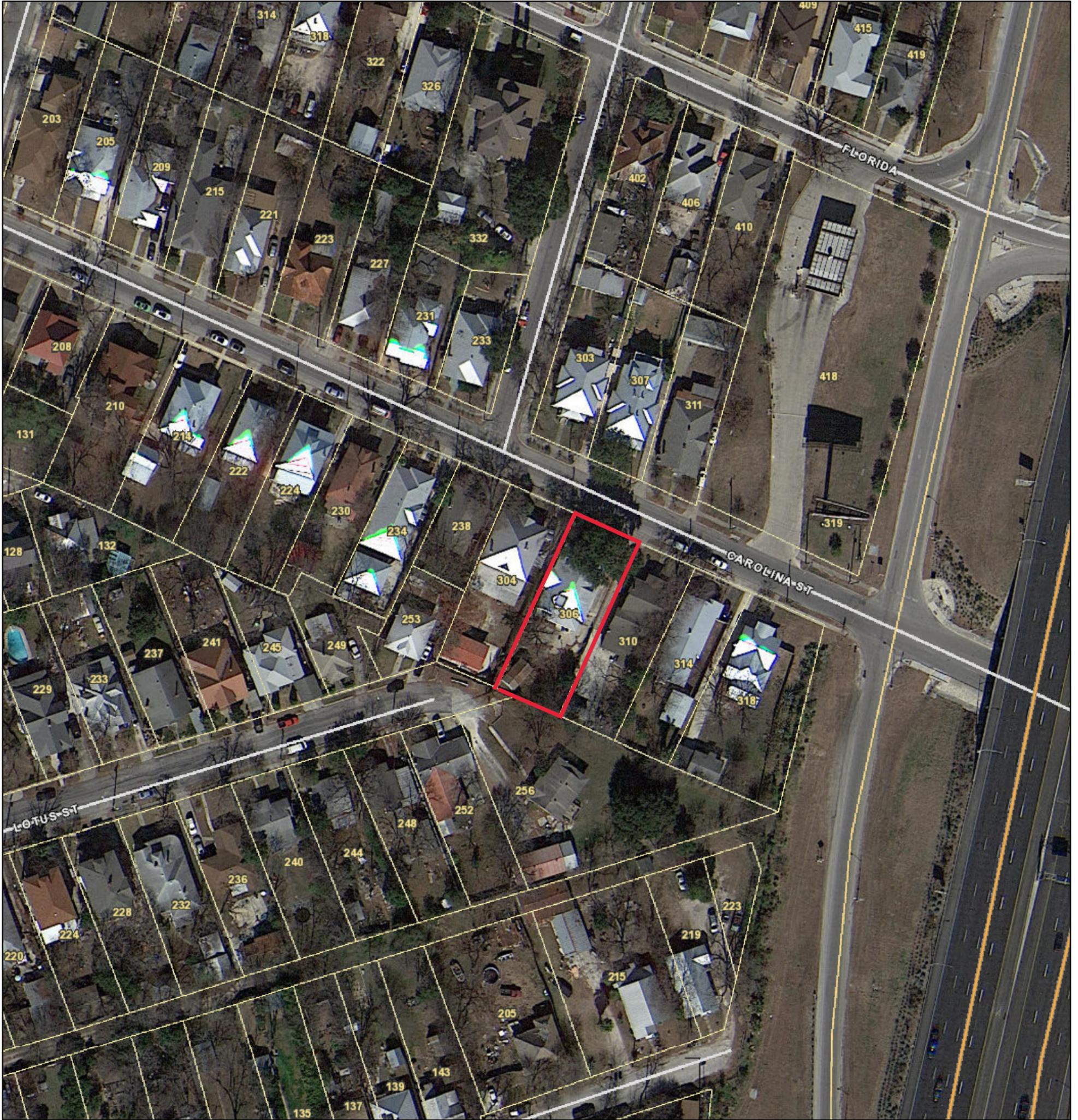
- a. The primary structure located at 306 E Carolina is a 1-story single family structure constructed circa 1910 in the Queen Anne style. The structure features a primary hipped roof configuration with a front gable, a full-width wraparound front porch with Corinthian columns, a woodlap façade with fish scale siding in the front gable, and wood windows. The structure is contributing to the Lavaca Historic District.
- b. LOCATION – The applicant is requesting approval to install 21 solar panels the primary structure. Seventeen panels will be located on the west roofline and four panels will be located on rear rooflines. According to the Historic Design Guidelines for Additions 6.C.i, solar collectors should be located on a side or rear roof pitch to the maximum extent possible to minimize visibility from the street. Staff finds the location of the panels appropriate.
- c. PITCH – The panels will be installed flush with the roof pitch. According to the Historic Design Guidelines, solar collectors should be mounted flush with the surface of a sloped roof and maintain distance from the roof eaves. Staff generally finds the pitch appropriate but finds that the panels on the rear roofline may be installed closer to the eaves than the stipulations listed in the recommendation.

RECOMMENDATION:

Staff recommends approval based on findings a through c with the following stipulations:

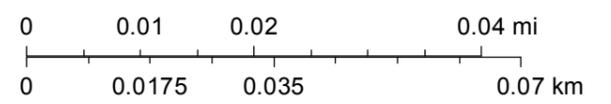
- i. That the solar panels maintain at least 18” of separation from the roof eaves and ridges.

City of San Antonio One Stop



April 15, 2021

1:1,000









SAN ANTONIO
GOOD NEIGHBOR
PROGRAM
CAROLINA STREET







PHOTOVOLTAIC ROOF MOUNT SYSTEM

21 MODULES-ROOF MOUNTED - 7.560 kW DC, 5.040 kW AC
 306 CAROLINA ST, SAN ANTONIO, TX, 78210



CONTRACTOR

256 N SAM HOUSTON
 PARKWAY E #125
 HOUSTON, TX 77060
 PHONE NUMBER: (717) 406-0288
 EMAIL: info@trismartsolar.com
 LICENSE# 32259

CURRENT INSIGHT
 ADDRESS : 2852 W. AMINI WAY
 SOUTH JORDAN, UT 84095

PROJECT NAME

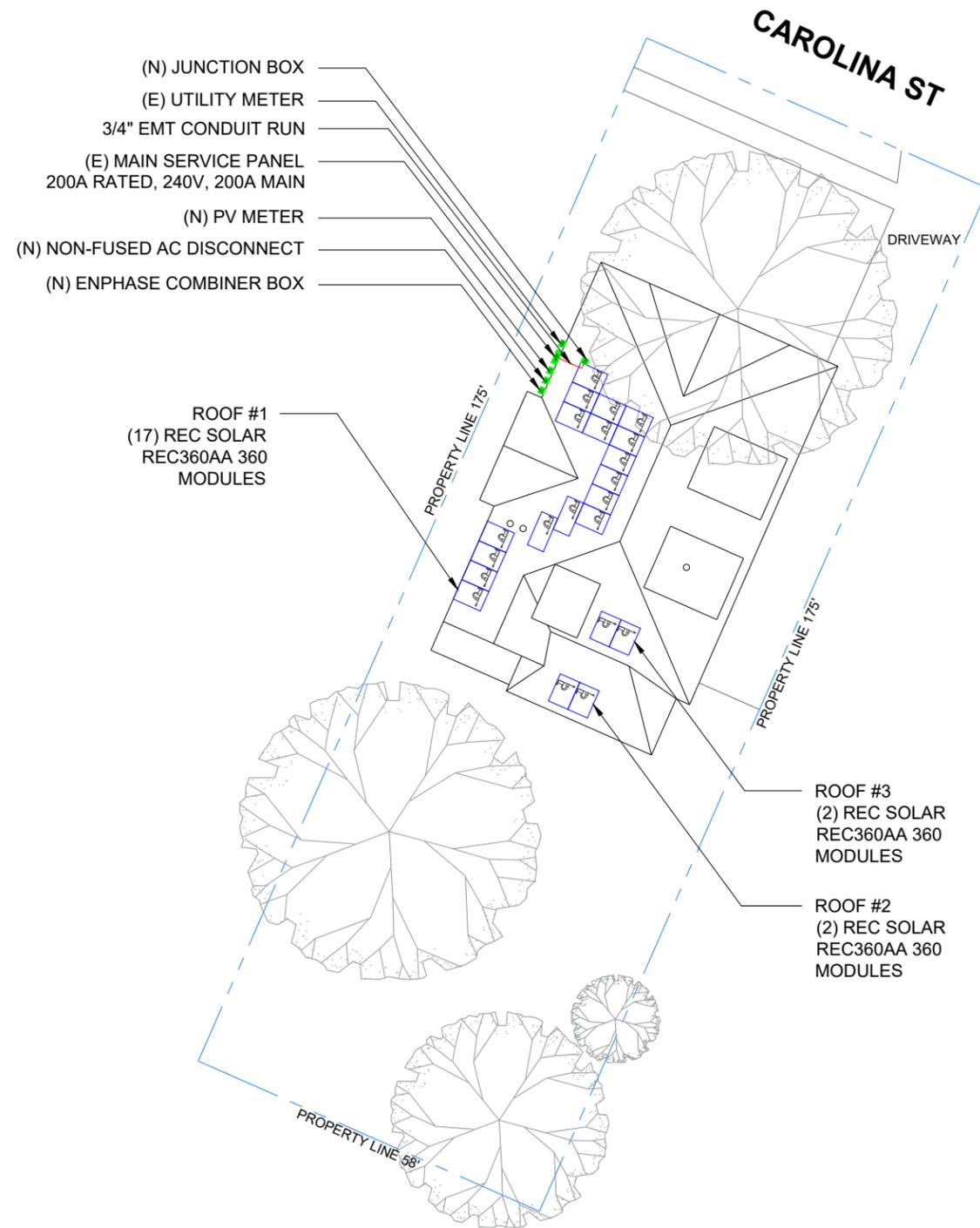
BRYAN K KAARLSEN
 29.40602, -98.48178
 306 CAROLINA ST
 SAN ANTONIO, TX, 78210

AHJ
 CITY OF SAN ANTONIO

SHEET NAME
SITE PLAN & VICINITY MAP

SHEET SIZE
**ANSI B
 17" X 11"**

SHEET NUMBER
PV-1



APPLICABLE CODES

2017 NATIONAL ELECTRICAL CODE (NEC)
 2018 INTERNATIONAL BUILDING CODE (IBC)
 2018 INTERNATIONAL RESIDENTIAL CODE (IRC)
 2018 INTERNATIONAL MECHANICAL CODE (IMC)
 2018 INTERNATIONAL PLUMBING CODE (IPC)
 2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)

DESIGN CRITERIA

- EXPOSURE CATEGORY = B
- WIND SPEED = 115MPH

SCOPE OF WORK

7.56 kW DC 5.04 kW AC

21 REC SOLAR (360W)
 REC360AA BLACK

21 ENPHASE: IQ7-60-2-US
 (240V) MICROINVERTERS

ELECTRICAL INFORMATION

EXISTING	1 ϕ , 3W, 120/240V
MAIN SERVICE PANEL BUSBAR RATING	200A
MAIN SERVICE BREAKER RATING	200A

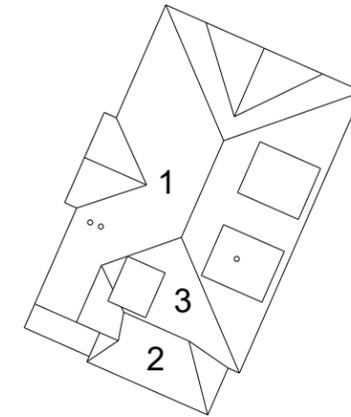
(1) STRINGS OF 11 MODULES CONNECTED IN SERIES &
 (1) STRING OF 10 MODULES CONNECTED IN SERIES

INTERCONNECTION TYPE: SOLAR BREAKER TIE-IN

ROOF TYPE	METAL ROOF
ROOF CONDITION	GOOD
RACKING INFORMATION	UNIRAC SOLAR MOUNT

SHEET INDEX

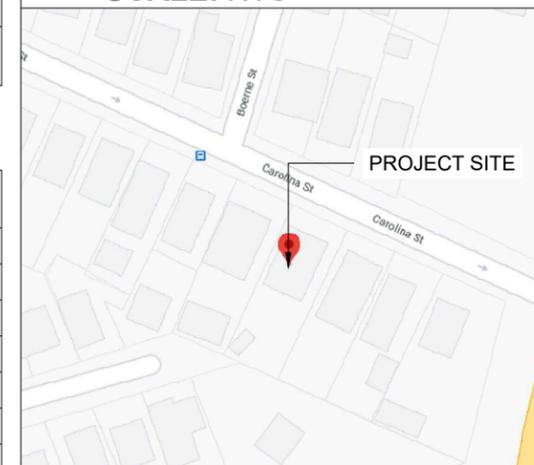
PAGE NUMBER	PAGE TITLE
PV-1	SITE PLAN WITH ROOF PLAN
PV-2	ROOF PLAN WITH MODULES
PV-3	STRING LAYOUT
PV-4	ATTACHMENT DETAIL
PV-5	SINGLE LINE DIAGRAM
PV-6	WIRING CALCULATION
PV-7	PLACARDS
PV-8+	EQUIPMENT SPECIFICATION



2 AERIAL VIEW
 SCALE: NTS



3 HOUSE PHOTO
 SCALE: NTS



4 VICINITY MAP
 SCALE: NTS

1 SITE PLAN WITH ROOF PLAN
 SCALE: 1" = 25'

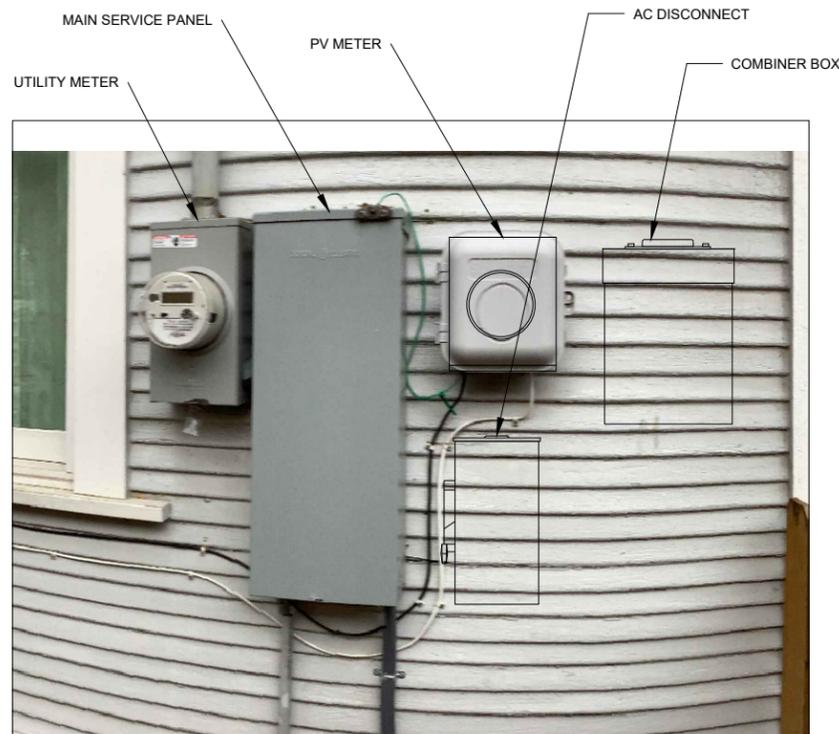


MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULE = 21 MODULES
 MODULE TYPE = REC SOLAR REC360AA (360W) MODULES
 MODULE WEIGHT = 43 LBS / 19.5 KG.
 SOLAR PANEL AREA = 67.75" X 40" = 18.82 SQFT
 INVERTER = 21 ENPHASE IQ7-60-2-US (240V) MICROINVERTERS

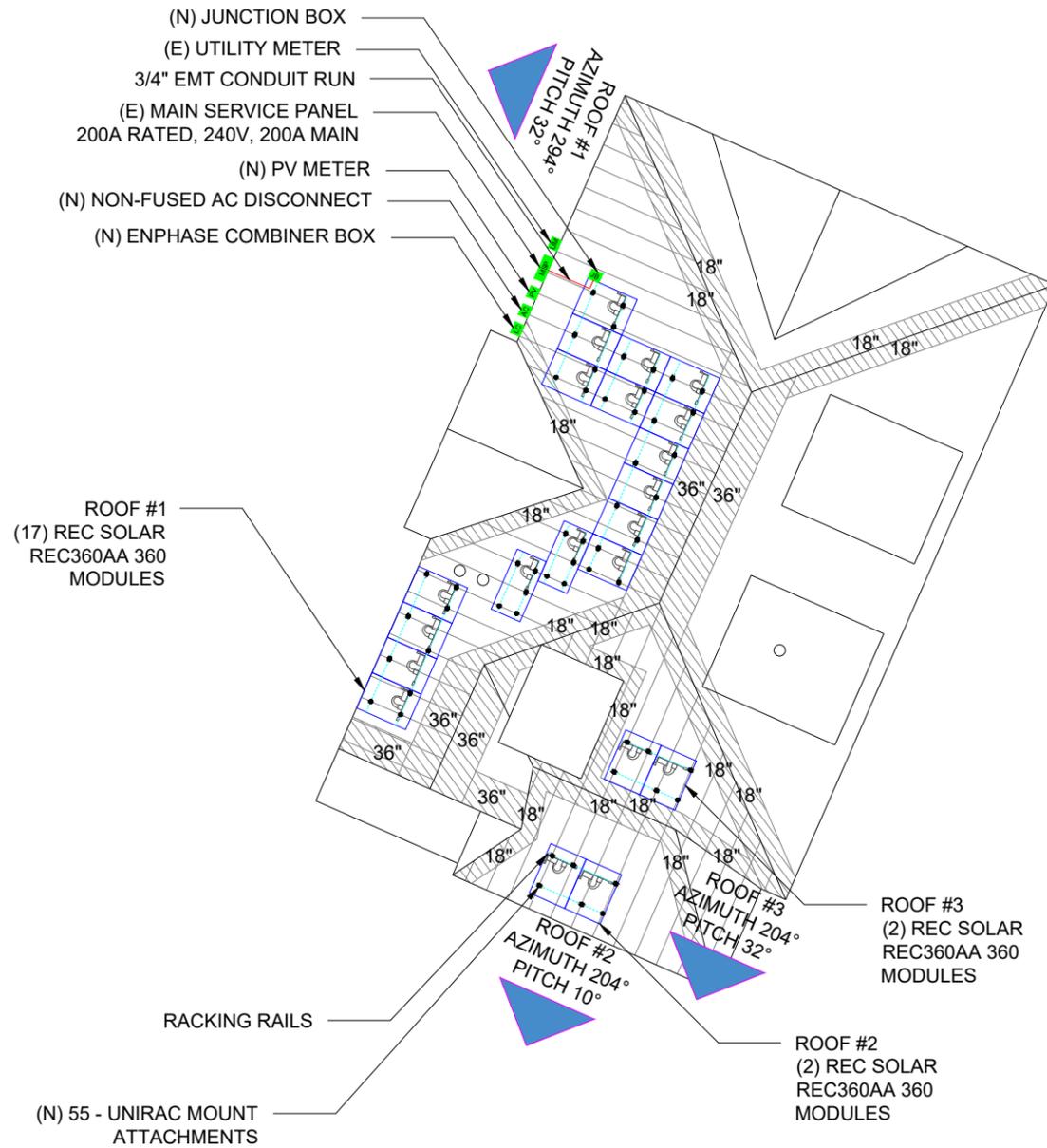
ROOF DESCRIPTION				
ROOF TYPE			METAL ROOF	
ROOF	ARRAY TILT	AZIMUTH	TRUSSES SIZE	TRUSSES SPACING
#1	32°	294°	2x4	24" O.C.
#2	10°	204°	2x4	24" O.C.
#3	32°	204°	2x4	24" O.C.

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	17	311.95	759.39	41.08
#2	2	36.70	203.71	18.02
#3	2	36.70	216.01	16.99



2 EQUIPMENT ELEVATION
NOT TO SCALE

1 ROOF PLAN WITH MODULES
SCALE: 1" = 15'



CONTRACTOR

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 LICENSE# 32259

CURRENT INSIGHT
 ADDRESS : 2852 W. AMINI WAY
 SOUTH JORDAN, UT 84095

PROJECT NAME

BRYAN K KAARLSEN
 29.40602, -98.48178
 306 CAROLINA ST
 SAN ANTONIO, TX, 78210

AHJ
 CITY OF SAN ANTONIO

SHEET NAME
 ROOF PLAN WITH MODULES

SHEET SIZE
 ANSI B
 17" X 11"

SHEET NUMBER
 PV-2





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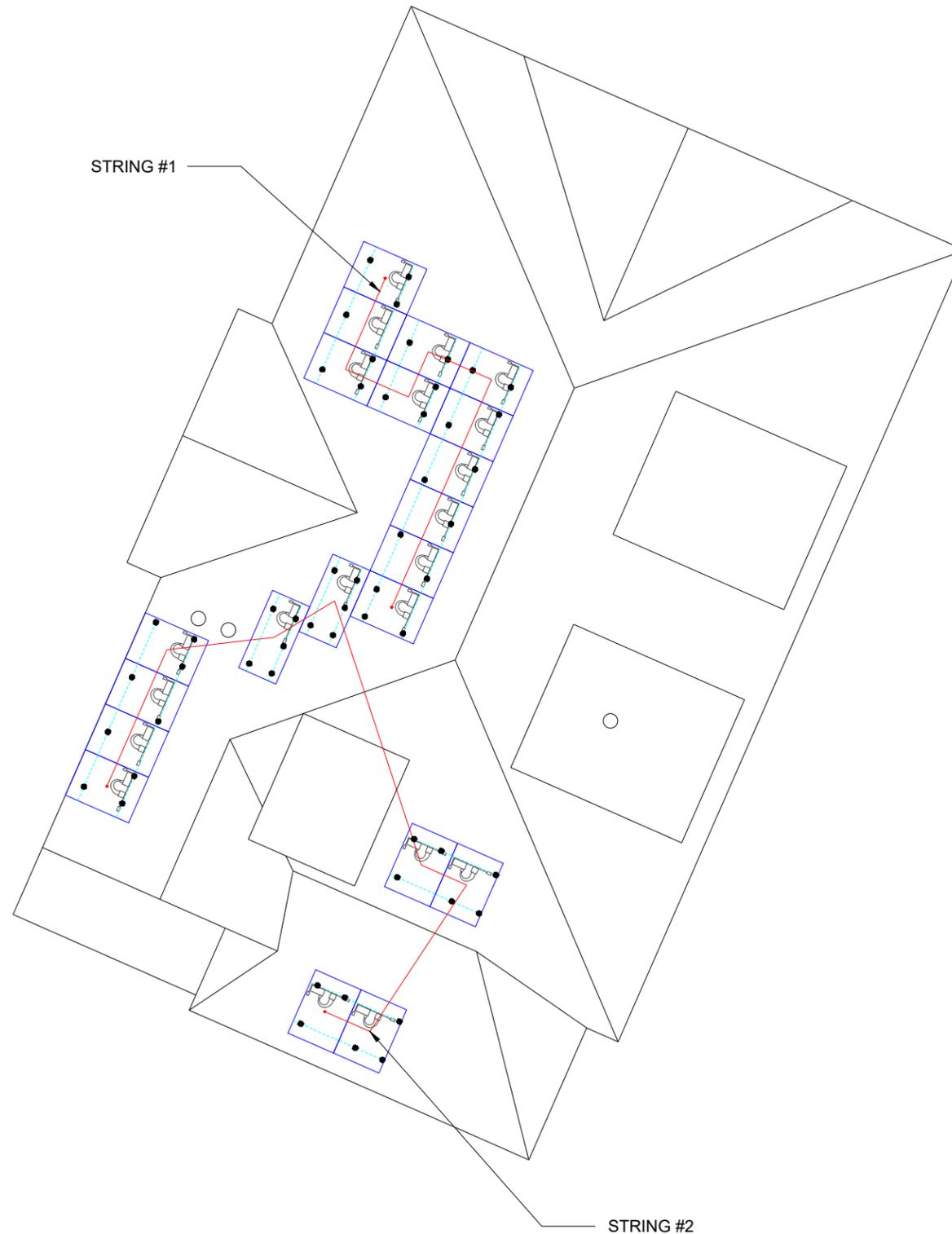
SHEET NAME
**STRING
LAYOUT**

SHEET SIZE
**ANSI B
17" X 11"**

SHEET NUMBER
PV-3

BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	21	REC SOLAR REC360AA 360 MODULES
INVERTER	21	ENPHASE: IQ7-60-2-US (240V) INVERTER
NON-FUSED AC DISCONNECT	1	NON-FUSED AC DISCONNECT, 30A, 2P, 240V 3R FUSED
PV METER	1	FM2S, CL 125, 240V, 3W
LOAD CENTER	1	ENPHASE IQ COMBINER 3 BOX, 120/240V
ATTACHMENT	55	UNIRAC MOUNT ATTACHMENTS
MID CLAMPS	33	MID CLAMPS
END CLAMPS	32	END CLAMPS
GROUNDING LUG	9	WEEBLUG



1 STRING LAYOUT
SCALE: 1" = 10'



BRYAN K KAARLSEN

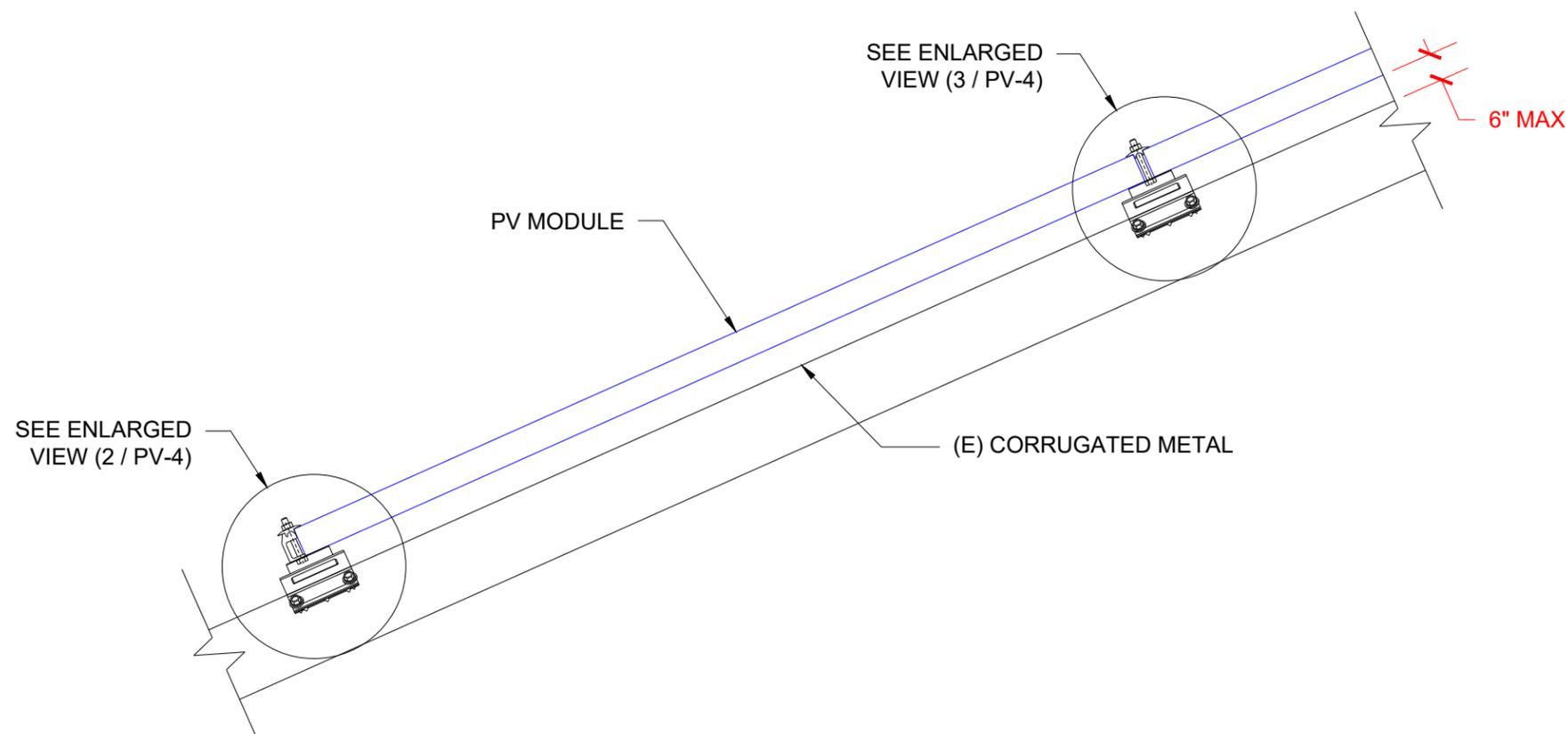
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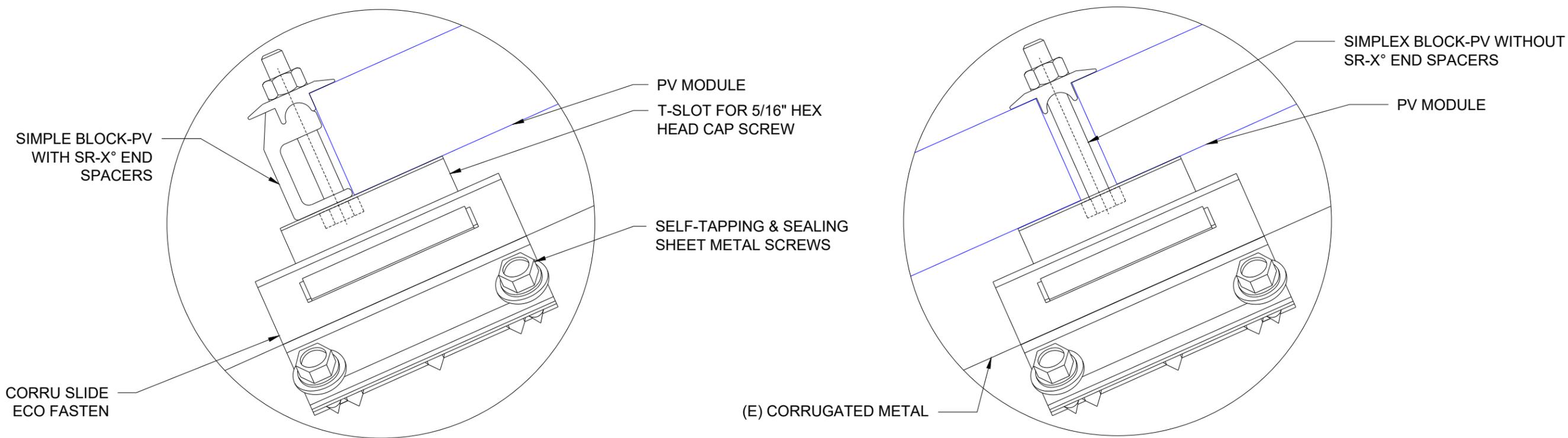
SHEET NAME
**ATTACHMENT
 DETAIL**

SHEET SIZE
**ANSI B
 17" X 11"**

SHEET NUMBER
PV-4



1 ATTACHMENT DETAIL
 SCALE: NTS



2 ATTACHMENT DETAIL (ENLARGED SECTION VIEW)
 SCALE: NTS

SCOPE
 7.560 KW DC / 5.040 KW AC
 (21) REC SOLAR REC360AA 360W MODULES
 (21) ENPHASE: IQ7-60-2-US (240V) MICROINVERTERS
 ELECTRICAL INFORMATION
 EXISTING : 1 ϕ , 3W, 120/240V
 MAIN SERVICE PANEL BUSBAR RATING : 200A
 MAIN SERVICE BREAKER RATING : 200A
 (1) STRINGS OF 11 MODULES CONNECT IN SERIES &
 (1) STRING OF 10 MODULES CONNECTED IN SERIES



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PROJECT NAME

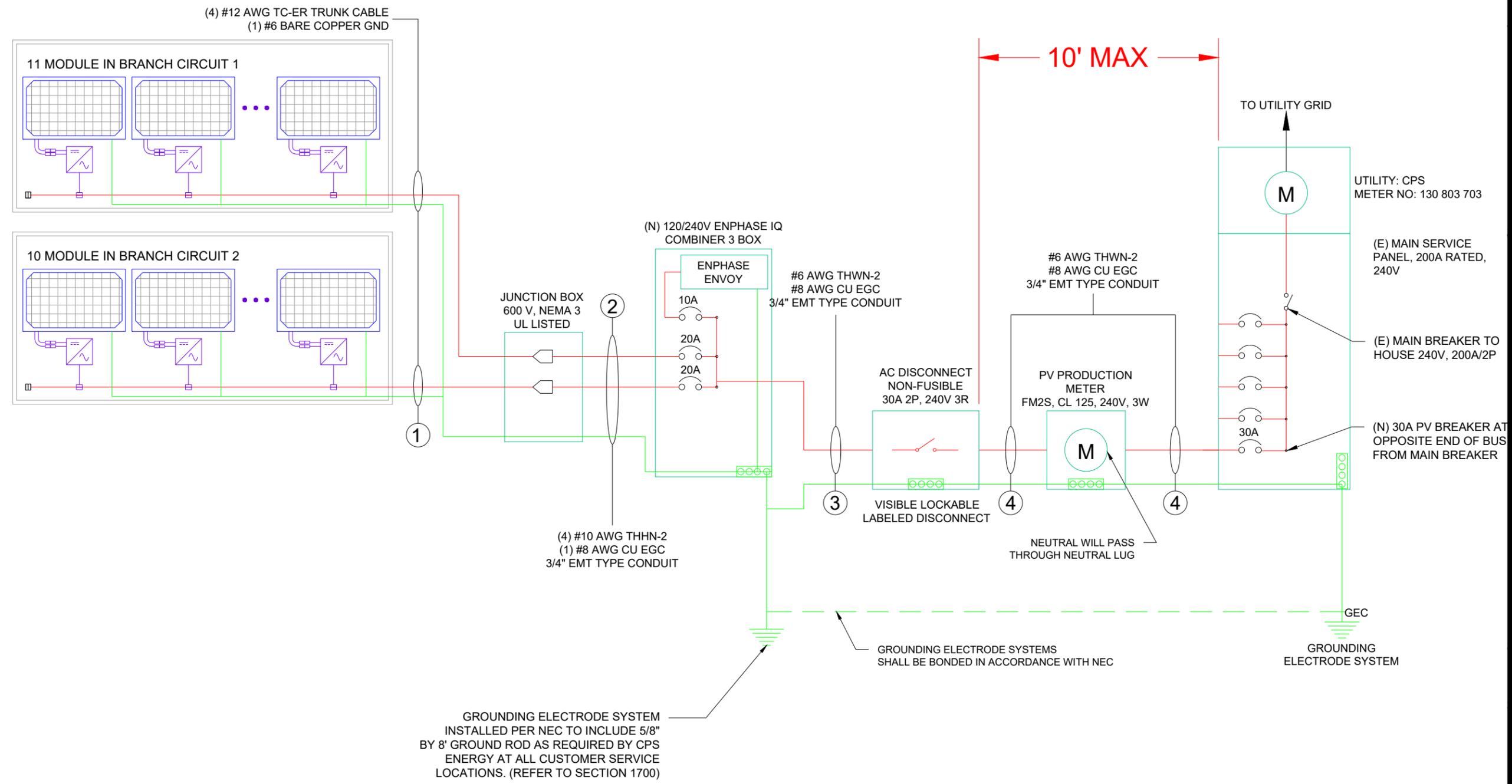
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SHEET NAME
SINGLE LINE DIAGRAM

SHEET SIZE
**ANSI B
 17" X 11"**

SHEET NUMBER
PV-5



1 ELECTRICAL SINGLE LINE DIAGRAM
 SCALE: NTS



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 ANTONIO

SHEET NAME
**WIRING
 CALCULATION**

SHEET SIZE
**ANSI B
 17" X 11"**

SHEET NUMBER
PV-6

TAG	WIRE CHART			
FROM PV MODULES TO JBOX				
①	(4)	#12 AWG ENPHASE TRUNK CABLE, PV WIRE		
	(1)	#6 AWG BARE CU EGC		
FROM JBOX TO COMBINER BOX				
②	(4)	#10 AWG THWN-2		
	(1)	#8 AWG CU EGC, 3/4" EMT TYPE CONDUIT		
		INVERTER OUTPUT MAX CURRENT	1.0	
		COEFFICIENT	1.25	
		ADJUSTMENT FACTOR	0.8	
		RACEWAY HEIGHT FROM ROOF	7/8"	
		TEMP. DERATING FACTOR	1.0	
		BRANCH CIRCUITS	2	
		BRANCH CIRCUIT 1 = 11 MODULES		
			11 * 1.0 * 1.25	13.8A
		BRANCH CIRCUIT 2 = 10 MODULES		
			10 * 1.0 * 1.25	12.5A
		BREAKER SIZE PER BRANCH CIRCUIT		20A
		ADJUSTED CONDUCTOR AMPACITY		
			13.8 / 1.0 / 0.8	17.25A
FROM COMBINER BOX TO FUSED DISCONNECT				
③	(3)	#6 AWG THWN-2		
	(1)	#8 AWG CU EGC, 3/4" EMT TYPE CONDUIT		
		NUMBER OF MICROINVERTERS	21	
		MAXIMUM INVERTER OUTPUT CURRENT	1.0	
		CONSIDER CONTINUOUS COEFFICIENT	1.25	
		CONSIDER CONTINUOUS (A)	21 * 1.0 * 1.25	26.3
		WALL TEMPERATURE FACTOR		0.91
		TEMPERATURE ADJUSTMENT (A)	21 * 1.0 * 1.25 / 0.91	28.8
FROM FUSED DISCONNECT TO MAIN SERVICE PANEL				
④	(3)	#6 AWG THWN-2		
	(1)	#8 AWG CU EGC		
		3/4" EMT TYPE CONDUIT		

ELECTRICAL NOTES

- 1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- 2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE 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.

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

LABEL LOCATION:
 AC DISCONNECT, COMBINER BOX,
 JUNCTION BOX, BREAKER PANEL, INVERTER

2 **WARNING: PHOTOVOLTAIC
 POWER SOURCE**

LABEL LOCATION:
 DC CONDUIT, COMBINER BOX

3 **CAUTION**
**PHOTOVOLTAIC SYSTEM CIRCUIT
 IS BACKFED**

LABEL LOCATION:
 MAIN SERVICE

4 **WARNING DUAL POWER SOURCE**
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
 POINT OF INTERCONNECTION

5 **PHOTOVOLTAIC SYSTEM AC DISCONNECT**
RATED AC OPERATING CURRENT 26.25 AMPS
AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
 AC DISCONNECT, POINT OF INTERCONNECTION, ALL BACKFED PANELS

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

LABEL LOCATION:
 POINT OF INTERCONNECTION, AC COMBINER PANEL,
 ALL BACKFED PANELS

7 **PHOTO VOLTAIC SYSTEM**
EQUIPPED WITH RAPID
SHUTDOWN

LABEL WILL BE REFLECTIVE, WITH $\frac{3}{8}$ " MINIMUM
 LETTERS PER NEC 690.56 (C).

8 **"RAPID SHUTDOWN**
SWITCH FOR SOLAR PV
SYSTEM"

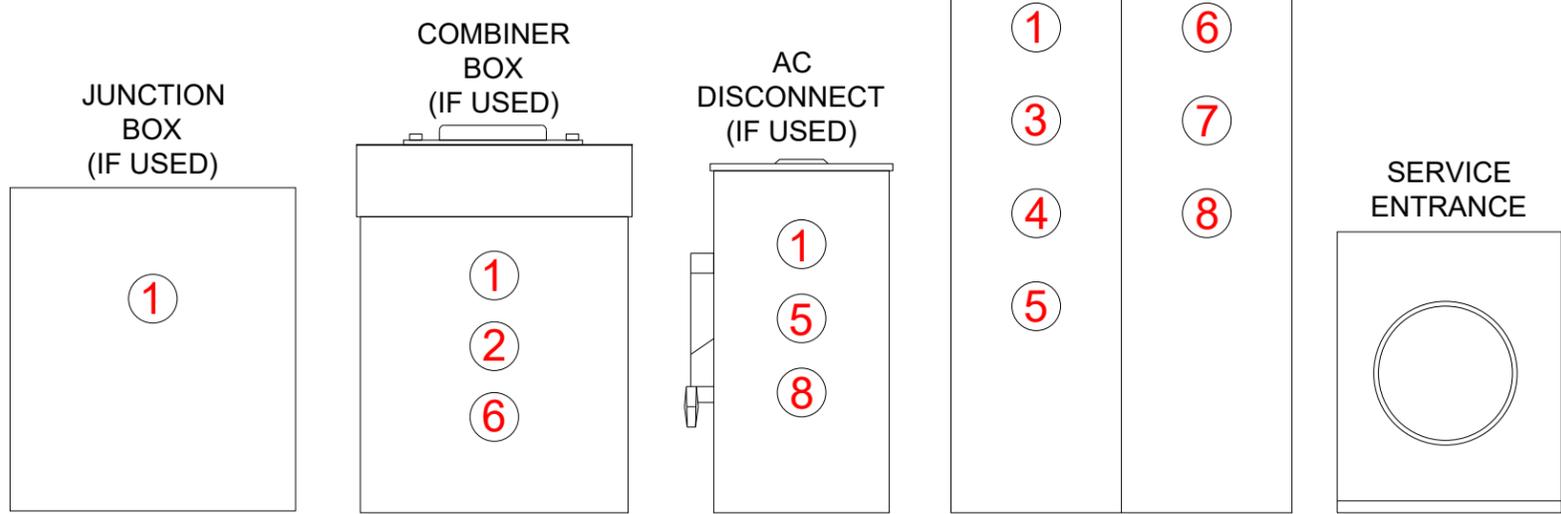
9 **WARNING**
DUAL POWER SUPPLY
SOURCES: UTILITY GRID
AND PV SOLAR ELECTRIC
SYSTEM

LABEL LOCATION:
 UTILITY SERVICE METER AND MAIN SERVICE
 PANEL, PV SYSTEM, AC DISCONNECT

- ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED
 - WHERE REQUIRED ELSEWHERE IN THE CODE. ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
 - ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]



MAIN SERVICE PANEL
 FOR ILLUSTRATION ONLY
 (NOT ACTUAL MSP)



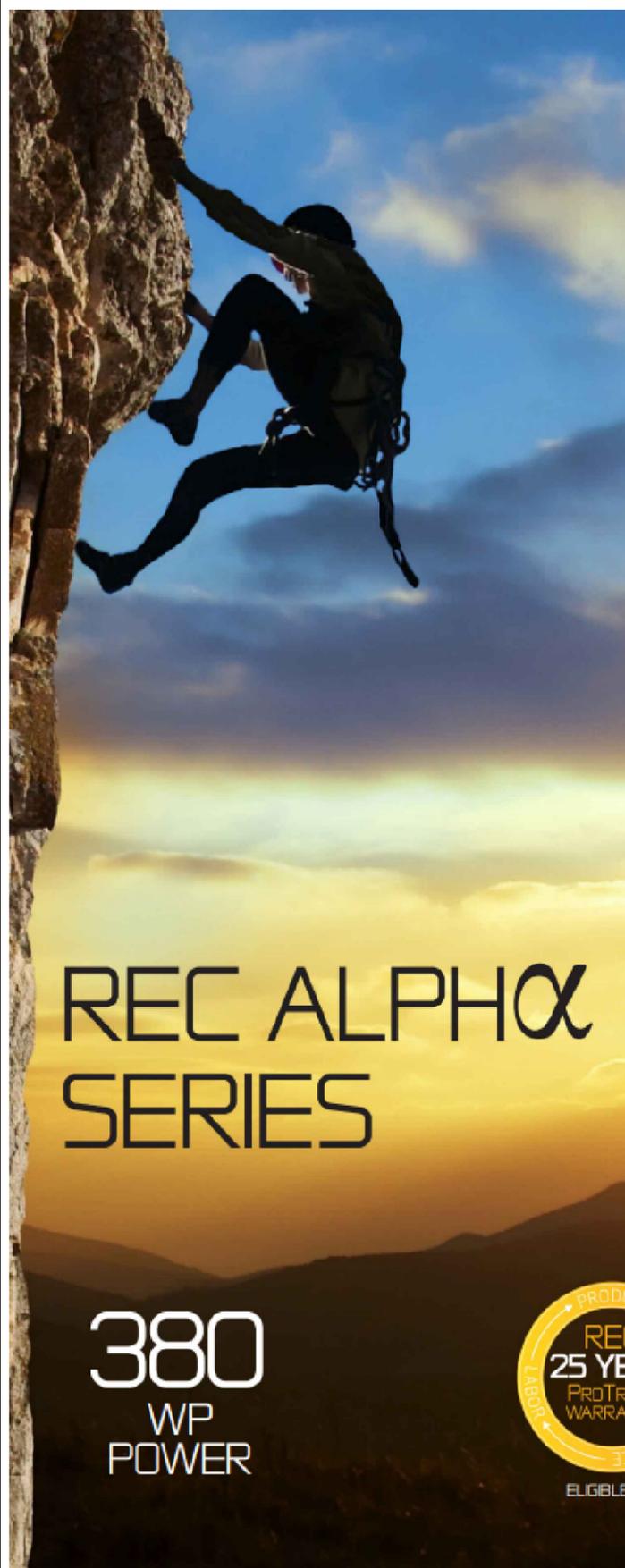
1 **EQUIPMENT ELEVATION**
 NOT TO SCALE

SOLAR'S MOST TRUSTED



REC ALPHA SERIES

PRODUCT DATASHEET



REC ALPHA SERIES

380
 WP
 POWER

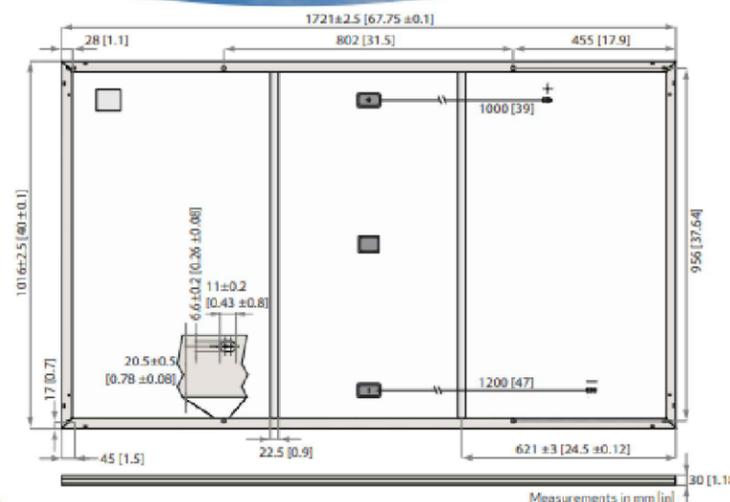
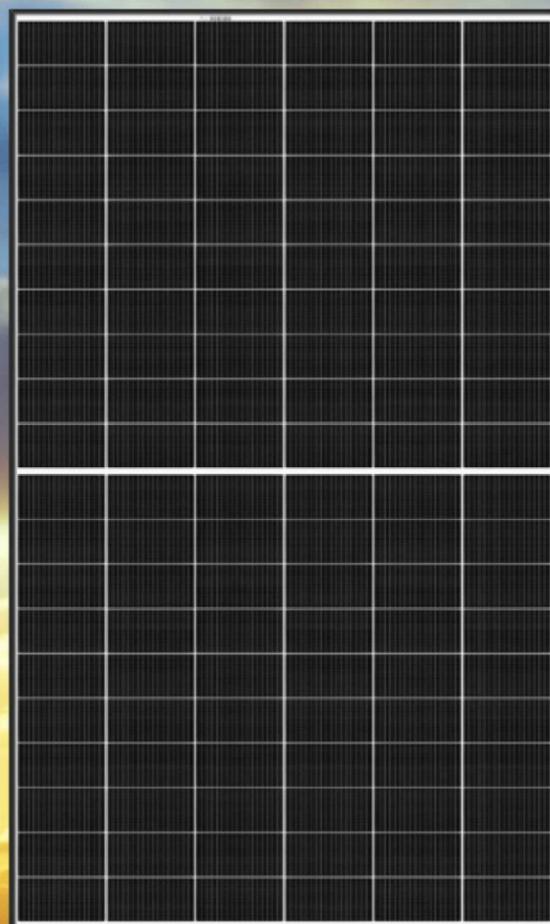


ELIGIBLE FOR

EXPERIENCE



PERFORMANCE



GENERAL DATA

Cell type:	120 half-cut cells with REC heterojunction cell technology 6 strings of 20 cells in series	Connectors:	Stäubli MC4 PV-KBT4/KST4, 12 AWG (4mm ²) in accordance with IEC 62852 IP68 only when connected
Glass:	0.13 in (3.2 mm) solar glass with anti-reflection surface treatment	Cable:	12 AWG (4 mm ²) PV wire, 39 + 47 in (1 + 1.2 m) in accordance with EN 50618
Backsheet:	Highly resistant polymeric construction	Dimensions:	678 x 40 x 1.2 in (1721 x 1016 x 30 mm) 18.8 sq ft (1.75 m ²)
Frame:	Anodized aluminum (black)	Weight:	43 lbs (19.5 kg)
Junction box:	3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790	Origin:	Made in Singapore

ELECTRICAL DATA

	Product Code: RECxxxAA				
Power Output - P _{Max} (Wp)	360	365	370	375	380
Watt Class Sorting - (W)	-0/+5	-0/+5	-0/+5	-0/+5	-0/+5
Nominal Power Voltage - V _{MPP} (V)	36.7	37.1	37.4	37.8	38.1
Nominal Power Current - I _{MPP} (A)	9.82	9.85	9.9	9.94	9.98
Open Circuit Voltage - V _{OC} (V)	43.9	44	44.1	44.2	44.3
Short Circuit Current - I _{SC} (A)	10.49	10.52	10.55	10.58	10.61
Power Density (W/sq ft)	19.15	19.41	19.68	19.94	20.21
Panel Efficiency (%)	20.6	20.9	21.2	21.4	21.7
Power Output - P _{Max} (Wp)	274	278	282	286	289
Nominal Power Voltage - V _{MPP} (V)	34.6	35.0	35.2	35.6	35.9
Nominal Power Current - I _{MPP} (A)	7.93	7.96	8.00	8.03	8.06
Open Circuit Voltage - V _{OC} (V)	41.4	41.5	41.6	41.6	41.7
Short Circuit Current - I _{SC} (A)	8.47	8.50	8.52	8.55	8.57

Values at standard test conditions (STC: air mass AM1.5, irradiance 1000 W/m², temperature 77°F (25°C), based on a production spread with a tolerance of P_{Max}, V_{OC} & I_{SC} ± 3% within one watt class. Nominal module operating temperature (NMOT: air mass AM1.5, irradiance 800 W/m², temperature 68°F (20°C), wind speed 3.3 ft/s (1 m/s). *Where xxx indicates the nominal power class (P_{Max}) at STC above.

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 1703, UL 61730	
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 1703	Fire Type Class 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
AS4040.2 NCC 2016	Cyclic Wind Load
ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007, IEC 62941	



WARRANTY

	Standard	REC ProTrust	
Installed by an REC Certified Solar Professional	No	Yes	Yes
System Size	All	<25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply.

MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
Maximum system voltage:	1000 V
Design load (+): snow	4666 Pa (97.5 lbs/sq ft) [*]
Maximum test load (+):	7000 Pa (146 lbs/sq ft) [*]
Design load (-): wind	2666 Pa (55.6 lbs/sq ft) [*]
Maximum test load (-):	4000 Pa (83.5 lbs/sq ft) [*]
Max series fuserating:	25 A
Max reverse current:	25 A

^{*}Calculated using a safety factor of 1.5
^{*}See installation manual for mounting instructions

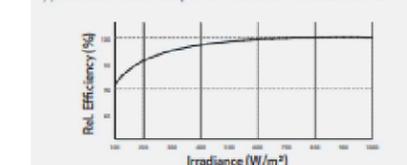
TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P _{Max} :	-0.26 %/°C
Temperature coefficient of V _{OC} :	-0.24 %/°C
Temperature coefficient of I _{SC} :	0.04 %/°C

*The temperature coefficients stated are linear values

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Ref: P04-05-12-01 Rev: 0 03.20

Founded in Norway in 1996, REC is a leading vertically integrated solar energy company. Through integrated manufacturing from silicon to wafers, cells, high-quality panels and extending to solar solutions, REC provides the world with a reliable source of clean energy. REC's renowned product quality is supported by the lowest warranty claims rate in the industry. REC is a Bluestar Elkem company with headquarters in Norway and operational headquarters in Singapore. REC employs around 2,000 people worldwide, producing 1.5 GW of solar panels annually.



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.

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US	IQ7-60-B-US	IQ7PLUS-72-2-US / IQ7PLUS-72-B-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	
Overtoltage 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)
Overtoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak CEC 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	-40°C to +65°C			
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)			
Connector type (IQ7-60-B-US & IQ7PLUS-72-B-US)	Friends PV2 (MC4 intermateable). Adaptors for modules with MC4 or UTX connectors: - PV2 to MC4: order ECA-S20-S22 - PV2 to UTX: order ECA-S20-S25			
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

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EMAIL: info@trismartsolar.com
LICENSE# 32259

CURRENT INSIGHT
ADDRESS : 2852 W. AMINI WAY
SOUTH JORDAN, UT 84095

PROJECT NAME

BRYAN K KAARLSEN
29.40602, -98.48178
306 CAROLINA ST
SAN ANTONIO, TX, 78210

AHJ
CITY OF SAN
ANTONIO

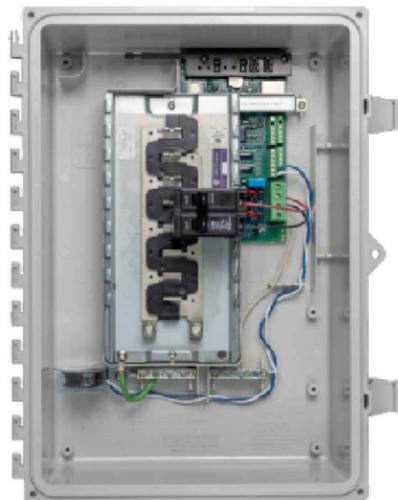
SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
17" X 11"

SHEET NUMBER
PV-9

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 limited warranty
- UL listed



To learn more about Enphase offerings, visit enphase.com



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%).
* Consumption monitoring is required for Enphase Storage Systems	
Wireless USB adapter COMMS-KIT-01	Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows redundant wireless communication with Encharge and Enpower.
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 - one pair
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	<ul style="list-style-type: none"> • 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

To learn more about Enphase offerings, visit enphase.com

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2019-11-04



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CITY OF SAN ANTONIO

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

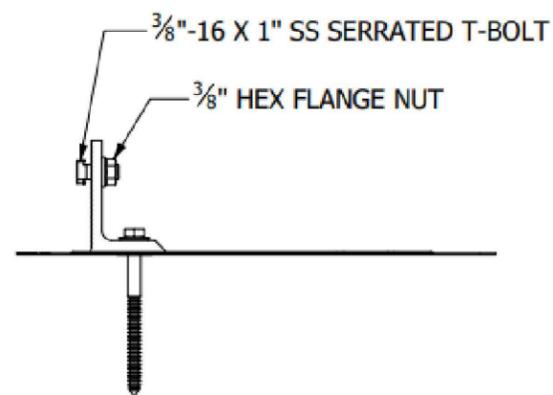
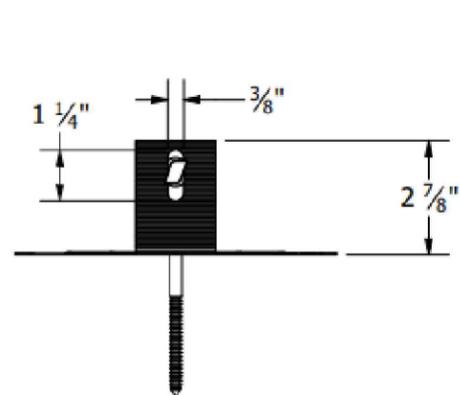
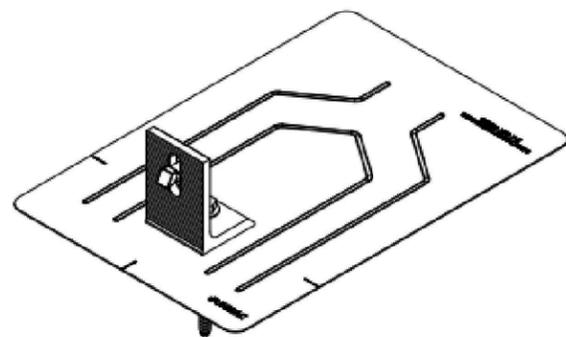
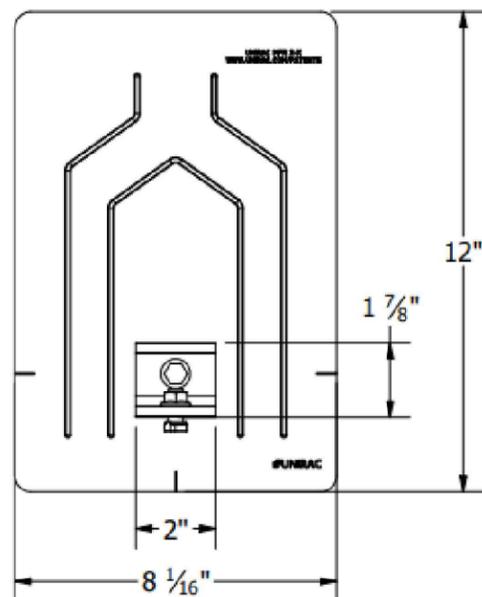
ANSI B
17" X 11"

SHEET NUMBER

PV-10

NOTES:

1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. PACKAGING: KITS OF 10



PART # TABLE	
P/N	DESCRIPTION
004055M	FLASHKIT PRO MILL
004055D	FLASHKIT PRO DRK



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	KIT DETAIL
DESCRIPTION:	FLASHKIT PRO
REVISION DATE:	9/24/2018

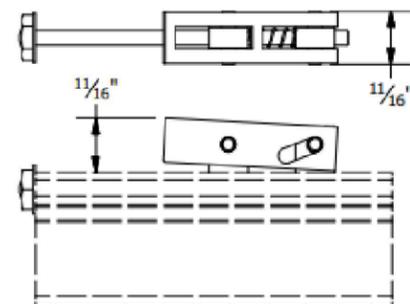
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

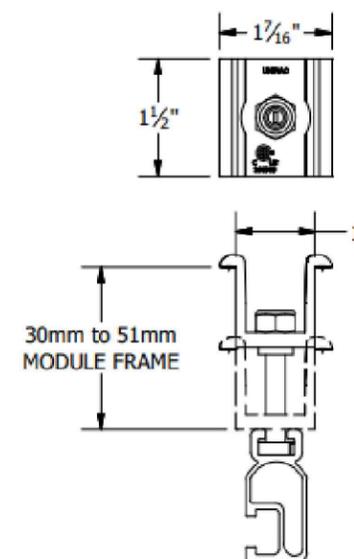
SM-A03

SHEET

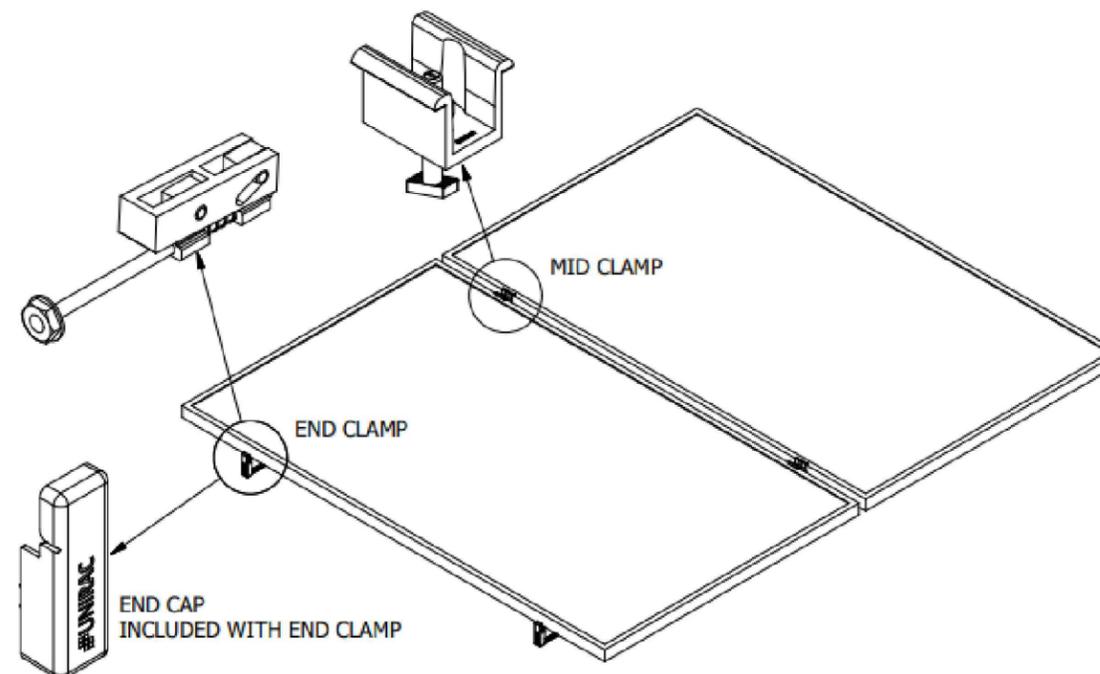
PRO SERIES END CLAMP



PRO SERIES MID CLAMP



PART # TABLE	
P/N	DESCRIPTION
302035M	ENDCLAMP PRO
302030M	MIDCLAMP PRO - MILL
302030D	MIDCLAMP PRO - DRK



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	PRO SERIES BONDING CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A01

SHEET



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HOUSTON, TX 77060
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ANTONIO

SHEET NAME

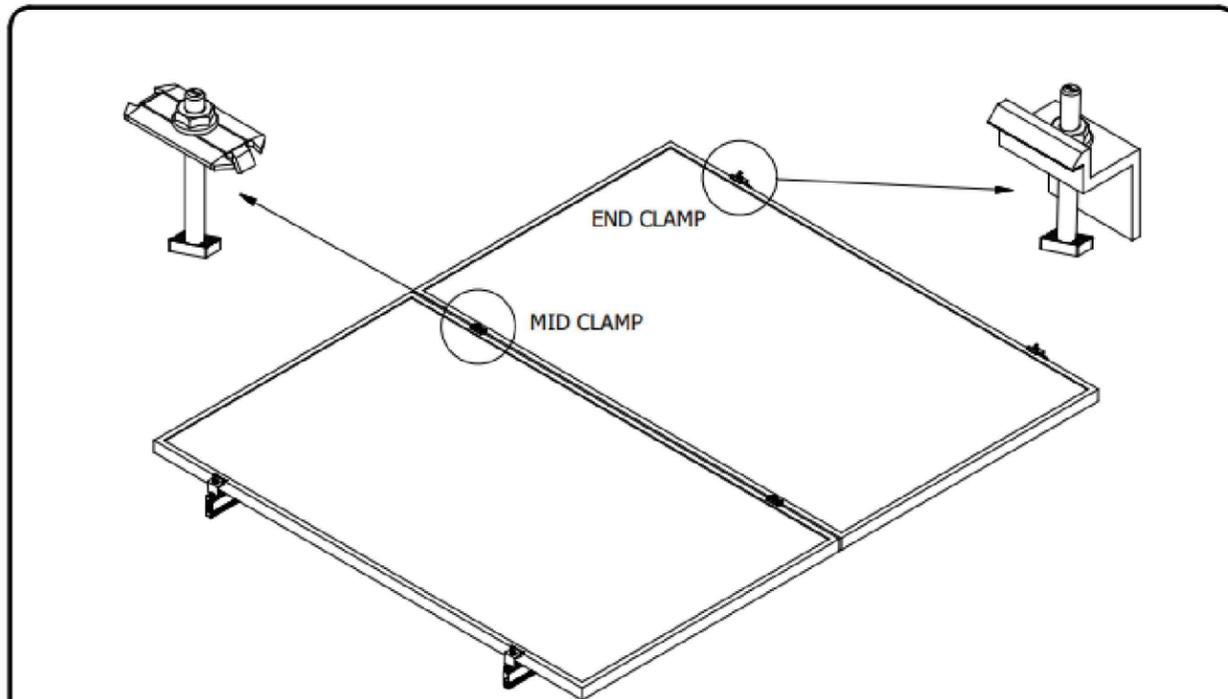
EQUIPMENT
SPECIFICATION

SHEET SIZE

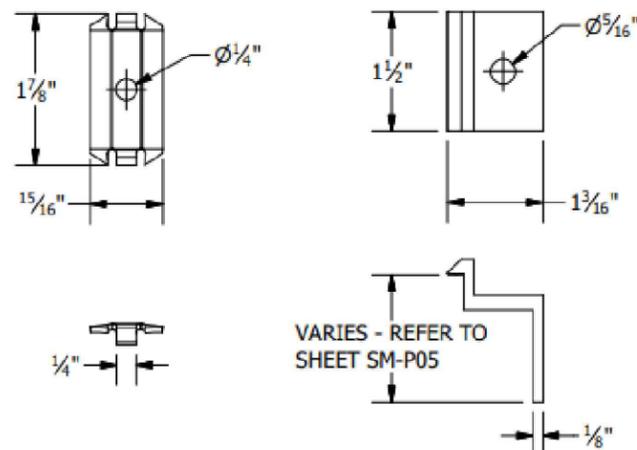
ANSI B
17" X 11"

SHEET NUMBER

PV-11



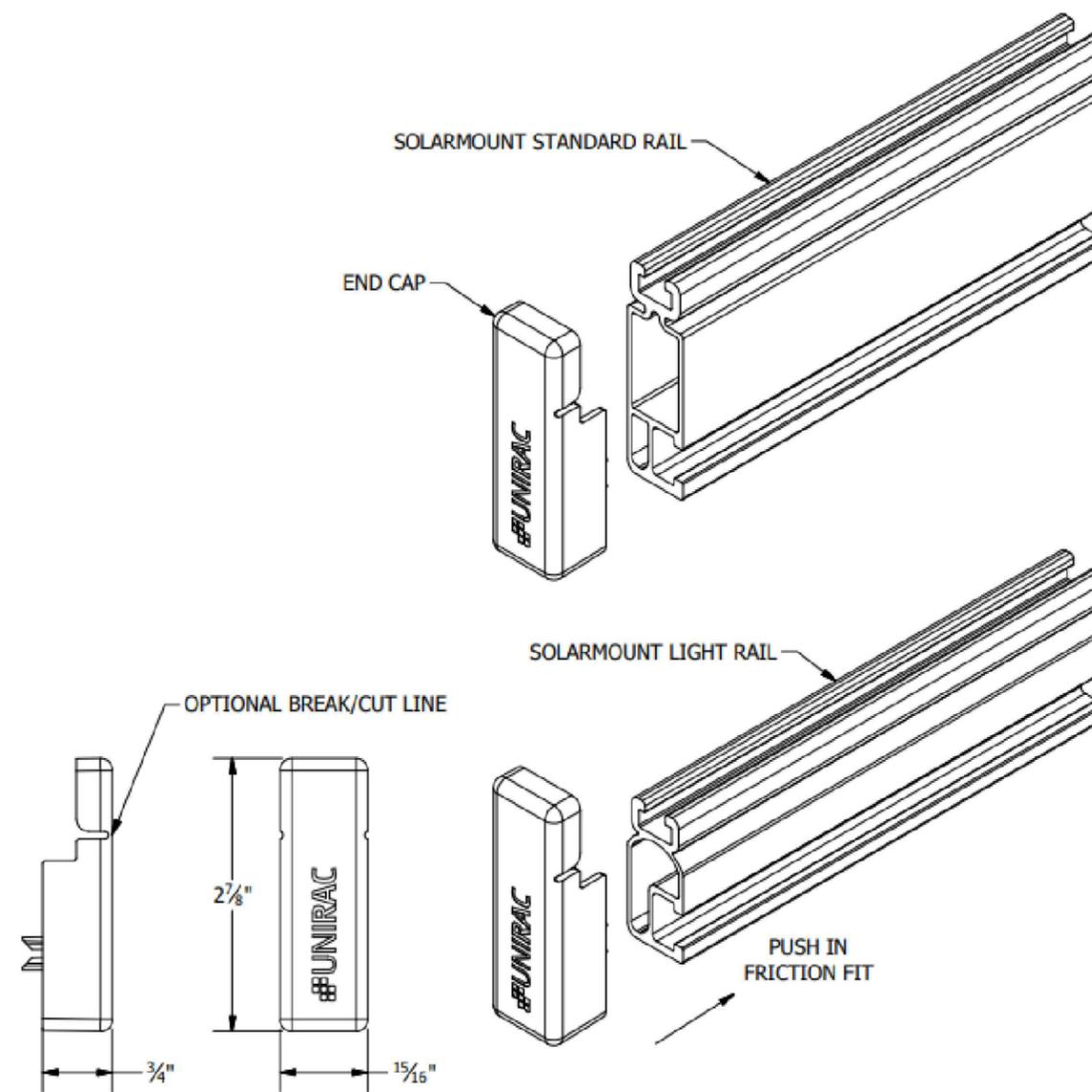
PART # TABLE	
P/N	DESCRIPTION
302027C	SM BND MIDCLAMP BC SS
302027D	SM BND MIDCLAMP BC DRK SS
302028C	SM BND MIDCLAMP EF SS
302028D	SM BND MIDCLAMP EF DRK SS
302029C	SM BND MIDCLAMP DK SS
302029D	SM BND MIDCLAMP DK DRK SS
FOR BONDING END CLAMP REFER TO SHEET SM-P05	



BONDING SM MID CLAMP BONDING SM END CLAMP

NOTES:

1. END CAP INCLUDED WITH EVERY END CLAMP.
2. END CAP FITS SOLARMOUNT LIGHT AND STANDARD RAIL PROFILES.



1411 BROADWAY BLVD. NE
 ALBUQUERQUE, NM 87102 USA
 PHONE: 505.242.6411
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING TOP CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY
 ONE OR MORE US PATENTS

LEGAL NOTICE

SM-A01A
 SHEET

1411 BROADWAY BLVD. NE
 ALBUQUERQUE, NM 87102 USA
 PHONE: 505.242.6411
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	END CAPS
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY
 ONE OR MORE US PATENTS

LEGAL NOTICE

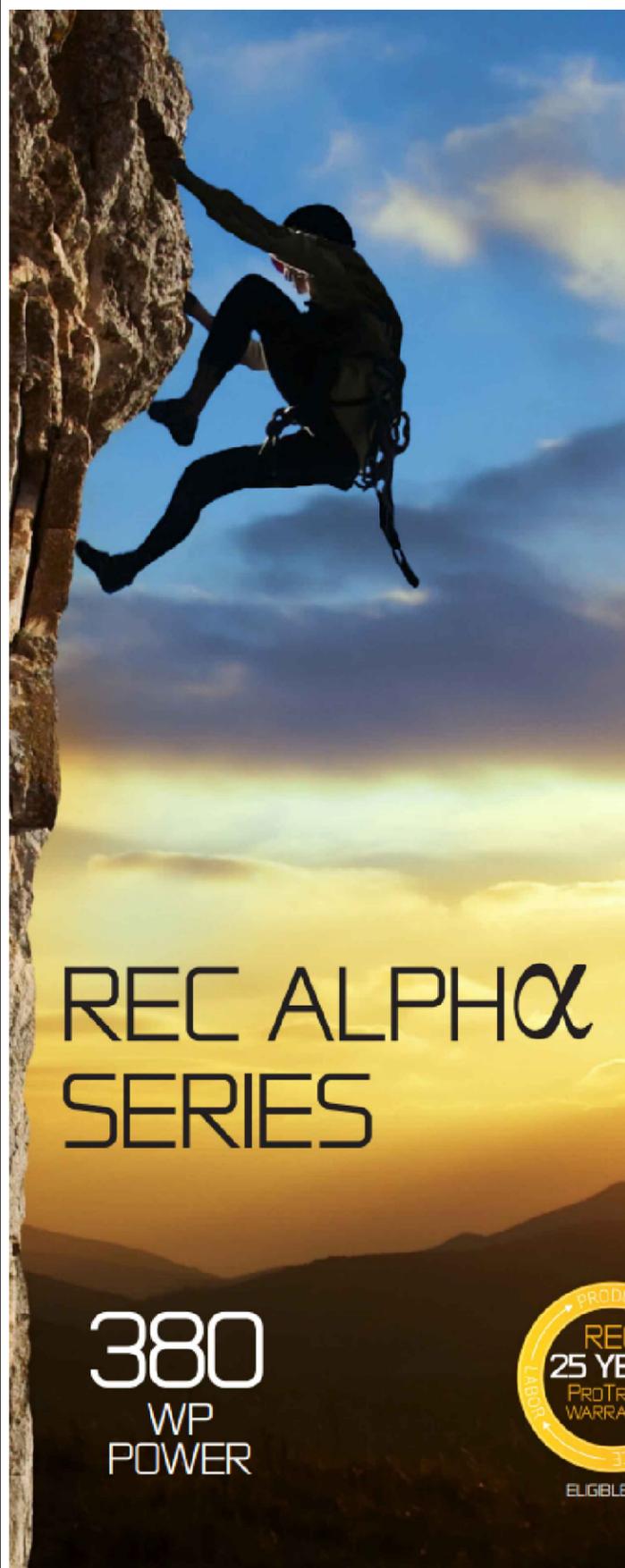
SM-P04
 SHEET

SOLAR'S MOST TRUSTED



REC ALPHA SERIES

PRODUCT DATASHEET



REC ALPHA SERIES

380
 WP
 POWER

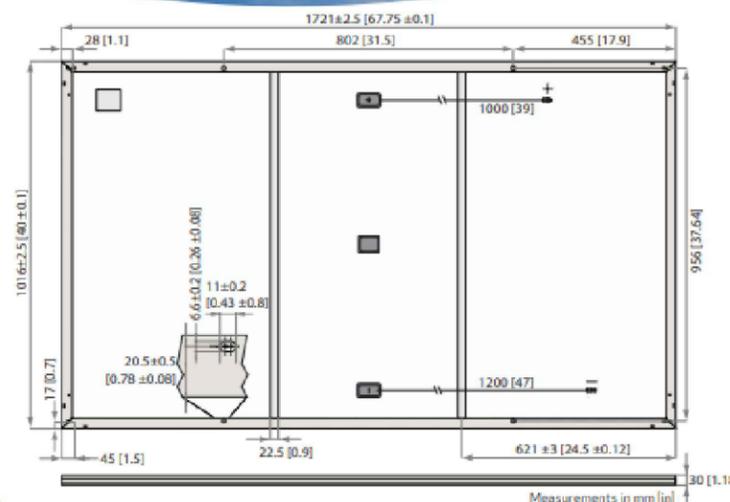
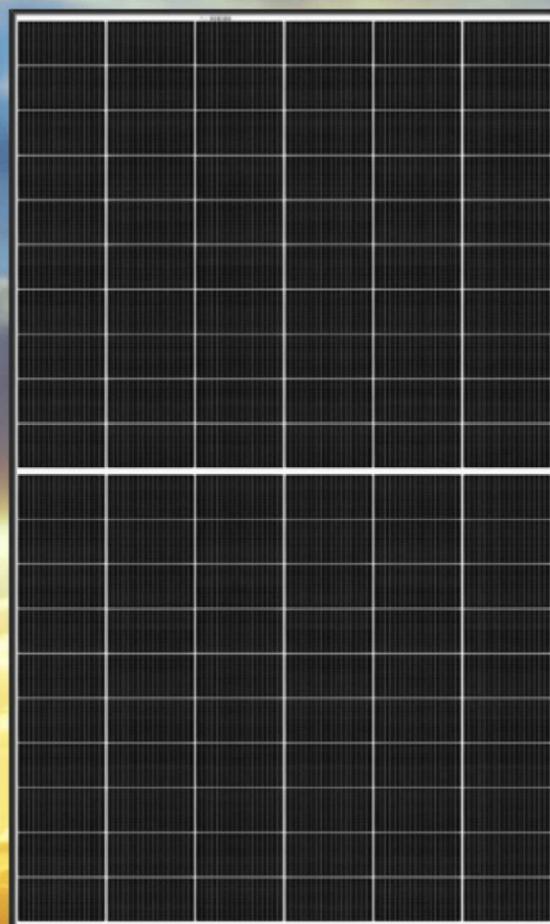


ELIGIBLE FOR

EXPERIENCE



PERFORMANCE



GENERAL DATA

Cell type:	120 half-cut cells with REC heterojunction cell technology 6 strings of 20 cells in series	Connectors:	Stäubli MC4 PV-KBT4/KST4, 12 AWG (4mm ²) in accordance with IEC 62852 IP68 only when connected
Glass:	0.13 in (3.2 mm) solar glass with anti-reflection surface treatment	Cable:	12 AWG (4 mm ²) PV wire, 39+47 in (1+1.2 m) in accordance with EN 50618
Backsheet:	Highly resistant polymeric construction	Dimensions:	678 x 40 x 1.2 in (1721 x 1016 x 30 mm) 18.8 sq ft (1.75 m ²)
Frame:	Anodized aluminum (black)	Weight:	43 lbs (19.5 kg)
Junction box:	3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790	Origin:	Made in Singapore

ELECTRICAL DATA

	Product Code: RECxxxAA				
Power Output - P _{Max} (Wp)	360	365	370	375	380
Watt Class Sorting (-W)	-0/+5	-0/+5	-0/+5	-0/+5	-0/+5
Nominal Power Voltage - V _{MPP} (V)	36.7	37.1	37.4	37.8	38.1
Nominal Power Current - I _{MPP} (A)	9.82	9.85	9.9	9.94	9.98
Open Circuit Voltage - V _{OC} (V)	43.9	44	44.1	44.2	44.3
Short Circuit Current - I _{SC} (A)	10.49	10.52	10.55	10.58	10.61
Power Density (W/sq ft)	19.15	19.41	19.68	19.94	20.21
Panel Efficiency (%)	20.6	20.9	21.2	21.4	21.7
Power Output - P _{Max} (Wp)	274	278	282	286	289
Nominal Power Voltage - V _{MPP} (V)	34.6	35.0	35.2	35.6	35.9
Nominal Power Current - I _{MPP} (A)	7.93	7.96	8.00	8.03	8.06
Open Circuit Voltage - V _{OC} (V)	41.4	41.5	41.6	41.6	41.7
Short Circuit Current - I _{SC} (A)	8.47	8.50	8.52	8.55	8.57

Values at standard test conditions (STC: air mass AM1.5, irradiance 1000 W/m², temperature 77°F (25°C), based on a production spread with a tolerance of P_{Max}, V_{OC} & I_{SC} ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM1.5, irradiance 800 W/m², temperature 68°F (20°C), wind speed 3.3 ft/s (1 m/s). *Where xxx indicates the nominal power class (P_{Max}) at STC above.

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 1703, UL 61730	
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 1703	Fire Type Class 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
AS4040.2 NCC 2016	Cyclic Wind Load
ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007, IEC 62941	



WARRANTY

	Standard	REC ProTrust	
Installed by an REC Certified Solar Professional	No	Yes	Yes
System Size	All	<25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply.

MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
Maximum system voltage:	1000 V
Design load (+): snow	4666 Pa (97.5 lbs/sq ft) [*]
Maximum test load (+):	7000 Pa (146 lbs/sq ft) [*]
Design load (-): wind	2666 Pa (55.6 lbs/sq ft) [*]
Maximum test load (-):	4000 Pa (83.5 lbs/sq ft) [*]
Max series fuserating:	25 A
Max reverse current:	25 A

^{*}Calculated using a safety factor of 1.5
^{*}See installation manual for mounting instructions

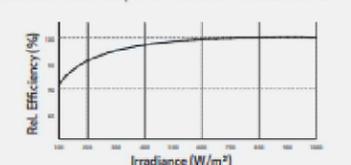
TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P _{Max} :	-0.26 %/°C
Temperature coefficient of V _{OC} :	-0.24 %/°C
Temperature coefficient of I _{SC} :	0.04 %/°C

*The temperature coefficients stated are linear values

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Ref: P04-05-12-01 Rev-D 03.20

Founded in Norway in 1996, REC is a leading vertically integrated solar energy company. Through integrated manufacturing from silicon to wafers, cells, high-quality panels and extending to solar solutions, REC provides the world with a reliable source of clean energy. REC's renowned product quality is supported by the lowest warranty claims rate in the industry. REC is a Bluestar Elkem company with headquarters in Norway and operational headquarters in Singapore. REC employs around 2,000 people worldwide, producing 1.5 GW of solar panels annually.



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.

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US	IQ7-60-B-US	IQ7PLUS-72-2-US / IQ7PLUS-72-B-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	
Overtoltage 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)
Overtoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak CEC 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	-40°C to +65°C			
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)			
Connector type (IQ7-60-B-US & IQ7PLUS-72-B-US)	Friends PV2 (MC4 intermateable). Adaptors for modules with MC4 or UTX connectors: - PV2 to MC4: order ECA-S20-S22 - PV2 to UTX: order ECA-S20-S25			
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

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ADDRESS : 2852 W. AMINI WAY
SOUTH JORDAN, UT 84095

PROJECT NAME

BRYAN K KAARLSEN
29.40602, -98.48178
306 CAROLINA ST
SAN ANTONIO, TX, 78210

AHJ
CITY OF SAN
ANTONIO

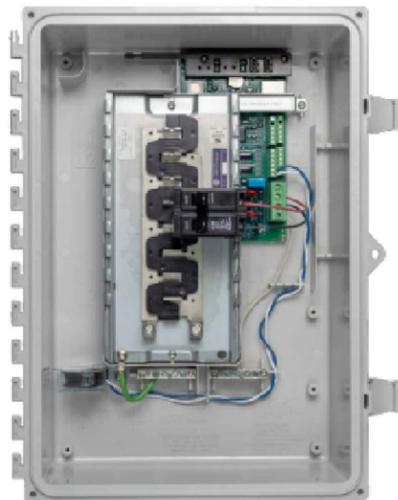
SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE
**ANSI B
17" X 11"**

SHEET NUMBER
PV-9

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 limited warranty
- UL listed



To learn more about Enphase offerings, visit enphase.com



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%).
* Consumption monitoring is required for Enphase Storage Systems	
Wireless USB adapter COMMS-KIT-01	Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows redundant wireless communication with Encharge and Enpower.
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 - one pair
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	<ul style="list-style-type: none"> • 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

To learn more about Enphase offerings, visit enphase.com

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2019-11-04



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AHJ

CITY OF SAN ANTONIO

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

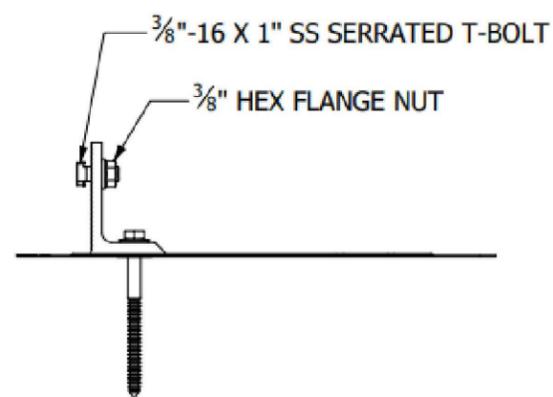
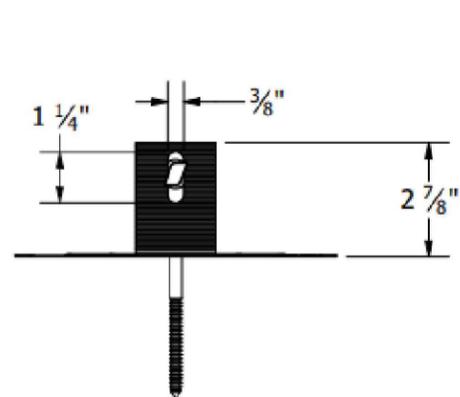
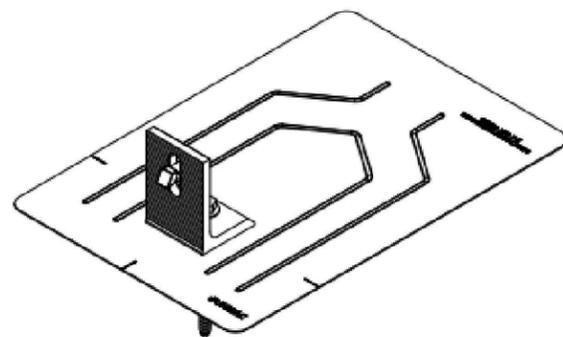
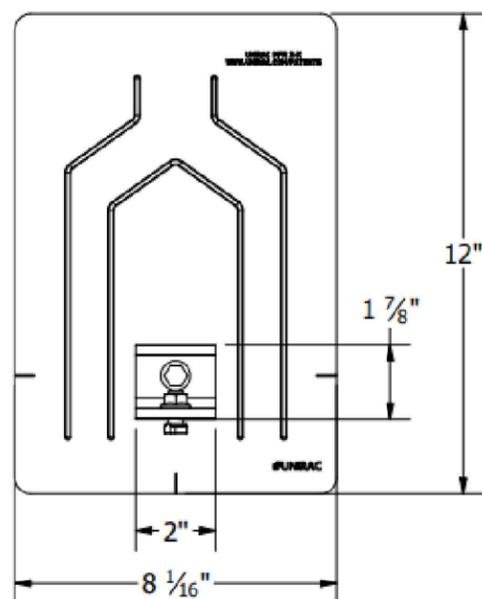
ANSI B
17" X 11"

SHEET NUMBER

PV-10

NOTES:

1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. PACKAGING: KITS OF 10



PART # TABLE	
P/N	DESCRIPTION
004055M	FLASHKIT PRO MILL
004055D	FLASHKIT PRO DRK

1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	KIT DETAIL
DESCRIPTION:	FLASHKIT PRO
REVISION DATE:	9/24/2018

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A03
SHEET

PRO SERIES END CLAMP

PRO SERIES MID CLAMP

PART # TABLE

P/N	DESCRIPTION
302035M	ENDCLAMP PRO
302030M	MIDCLAMP PRO - MILL
302030D	MIDCLAMP PRO - DRK

END CLAMP

MID CLAMP

END CAP INCLUDED WITH END CLAMP

1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	PRO SERIES BONDING CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A01
SHEET



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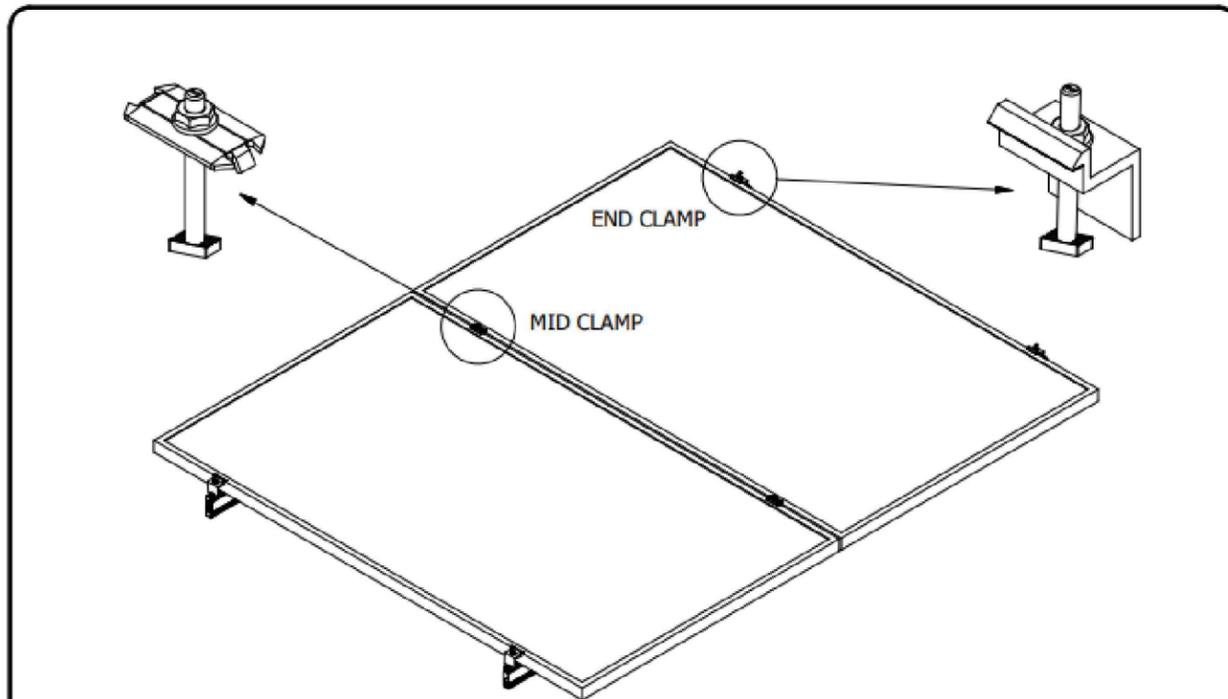
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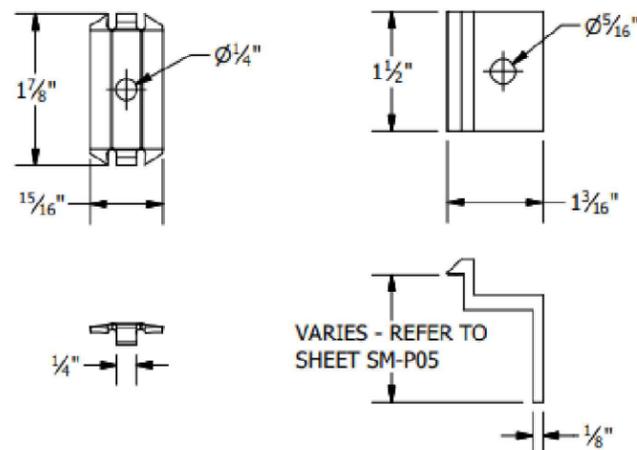
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
17" X 11"

SHEET NUMBER
PV-11



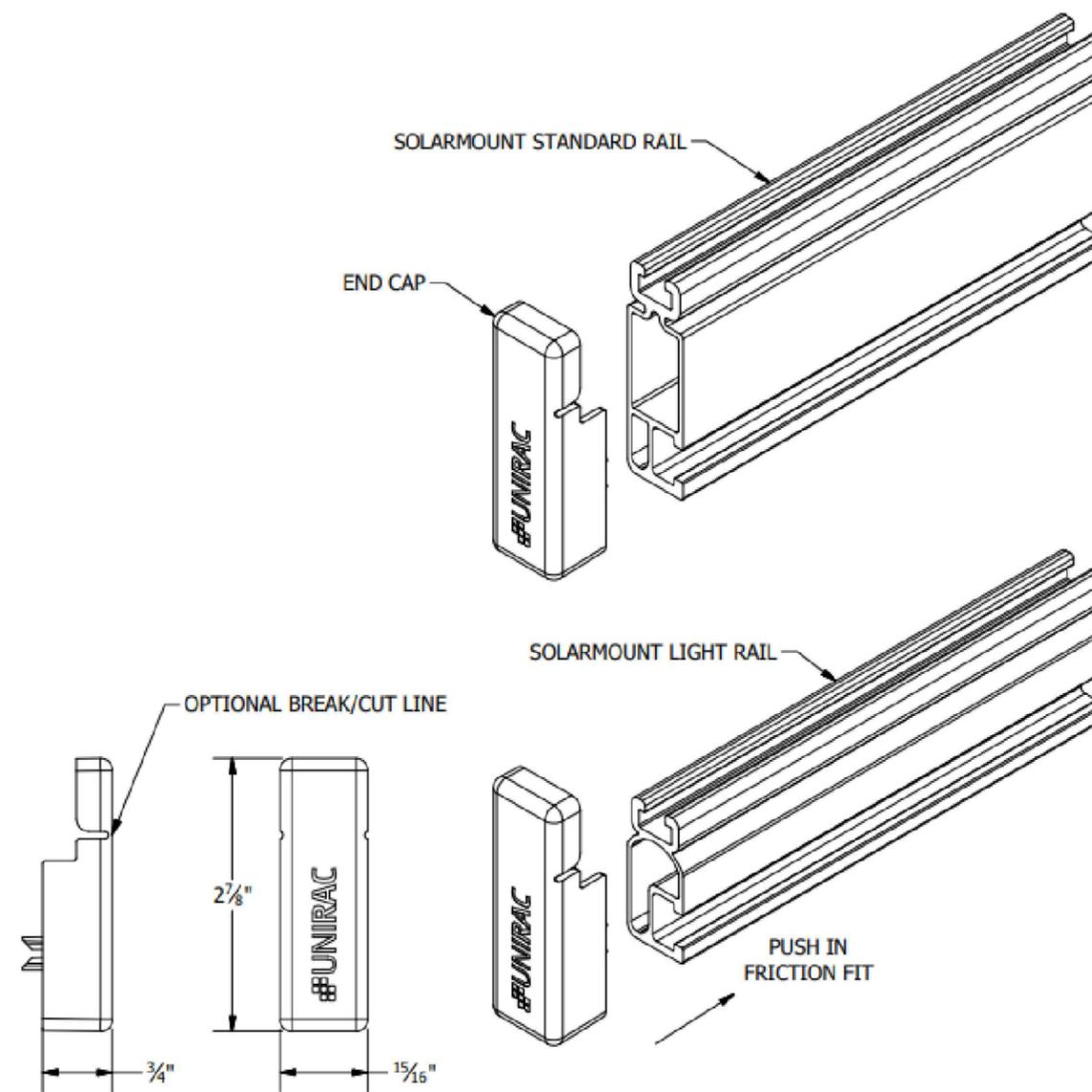
PART # TABLE	
P/N	DESCRIPTION
302027C	SM BND MIDCLAMP BC SS
302027D	SM BND MIDCLAMP BC DRK SS
302028C	SM BND MIDCLAMP EF SS
302028D	SM BND MIDCLAMP EF DRK SS
302029C	SM BND MIDCLAMP DK SS
302029D	SM BND MIDCLAMP DK DRK SS
FOR BONDING END CLAMP REFER TO SHEET SM-P05	



BONDING SM MID CLAMP BONDING SM END CLAMP

NOTES:

1. END CAP INCLUDED WITH EVERY END CLAMP.
2. END CAP FITS SOLARMOUNT LIGHT AND STANDARD RAIL PROFILES.



1411 BROADWAY BLVD. NE
 ALBUQUERQUE, NM 87102 USA
 PHONE: 505.242.6411
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING TOP CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY
 ONE OR MORE US PATENTS

LEGAL NOTICE

SM-A01A
 SHEET

1411 BROADWAY BLVD. NE
 ALBUQUERQUE, NM 87102 USA
 PHONE: 505.242.6411
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	END CAPS
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY
 ONE OR MORE US PATENTS

LEGAL NOTICE

SM-P04
 SHEET