

SCOPE OF WORK:

TO INSTALL A ROOF MOUNTED SOLAR PHOTOVOLTAIC SYSTEM AT THE OWNER RESIDENCE LOCATED AT 2223 CHESTNUT ST. SAN ANGELO, TX 76901
THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ELECTRICAL SERVICE EQUIPMENT.
THE PV SYSTEM DOES NOT INCLUDE STORAGE BATTERIES

EQUIPMENT SUMMARY
43 MISSION SOLAR MSE345SX5T(345W) MODULES
43 ENPHASE IQ7-60-2-US(240V) MICROINVERTERS

GENERAL NOTES:

- THESE CONSTRUCTION DOCUMENTS HAVE BEEN BASED ON FIELD INSPECTIONS AND OTHER INFORMATION AVAILABLE AT THE TIME. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATIONS IN CONSTRUCTION DETAILS.
- ARCHITECT HAS NOT BEEN RETAINED TO SUPERVISE ANY CONSTRUCTION OR INSTALLATION OF ANY EQUIPMENT AT SITE.
- CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, OBTAINS ALL PERMITS, LICENSES AND PAY ALL REQUIRED FEES AND COMPLETE INSTALLATION.
- CONTRACTOR HAS THE FULL RESPONSIBILITY TO CHECK AND VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. ANY WORK STARTED BEFORE CONSULTATION AND ACCEPTANCE BY THE ENGINEER SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE SUBJECT TO CORRECTION BY THEM WITHOUT ADDITIONAL COMPENSATION.
- DAMAGE CAUSED TO THE EXISTING STRUCTURE, PIPES, DUCTS, WINDOWS, WALL, FLOORS, ETC. SHALL BE REPAIRED TO THE ORIGINAL CONDITION OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE PROPER INSTALLATION AND COMPLETION OF THE WORK WITH APPROVED MATERIALS.
- NO CHANGES ARE TO BE MADE WITHOUT THE CONSULTATION AND APPROVAL OF THE ARCHITECT.
- CONTRACTOR SHALL OBTAIN BUILDING PERMIT. NO WORK TO START UNLESS BUILDING PERMIT IS PROPERLY DISPLAYED.
- ALL WORKMANSHIP AND MATERIALS SHALL BE OF FIRST QUALITY AND IN COMPLIANCE WITH THE REQUIREMENTS OF THE TX BUILDING CODE, THE DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ALL PERTINENT AGENCIES.
- IT IS ESSENTIAL THAT ALL WORK PROCEED WITH THE MAXIMUM COOPERATION OF ALL PARTIES AND WITH MINIMUM INTERFERENCE TO THE OCCUPANTS WITHIN THE BUILDING. THE OWNER'S DIRECTIONS IN THIS REGARD SHALL BE FULLY COMPLIED WITH.
- ALL EXPOSED PLUMBING, HVAC, ELECTRICAL DUCTWORK, PIPING AND CONDUITS ARE TO BE PAINTED BY GENERAL CONTRACTOR.
- THE CONTRACTOR SHALL PERFORM THE WORK IN STRICT CONFORMANCE WITH THE LOCAL LAWS, REGULATIONS AND THE NATIONAL ELECTRIC CODE.
- THE CONTRACTOR SHALL OBTAIN ALL PERMITS, APPROVALS, AFFIDAVITS, CERTIFICATIONS, ETC. AND PAY ALL FEES AS REQUIRED BY THE LOCAL AUTHORITIES.
- CONTRACTORS SHALL OBTAIN FIRE CERTIF. UPON COMPLETION OF WORK.

ELECTRICAL NOTES:

- THE EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE INSTALLED ONLY BY QUALIFIED PEOPLE. A QUALIFIED PERSON IS ONE WHO HAS SKILLS AND KNOWLEDGE RELATED TO THE CONSTRUCTION AND OPERATION OF THE ELECTRICAL EQUIPMENT AND INSTALLATIONS AND HAS RECEIVED SAFETY TRAINING TO RECOGNIZE AND AVOID THE HAZARDS INVOLVED. (NEC 690.4(E) AND 705.6)
- LOCAL UTILITY PROVIDER SHALL BE NOTIFIED PRIOR TO USE AND ACTIVATION OF ANY SOLAR PHOTOVOLTAIC INSTALLATION. FOR A LINE SIDE TAP CONNECTION, UTILITY NEEDS TO BE NOTIFIED WELL IN ADVANCE TO COORDINATE BUILDING ELECTRICAL SHUT OFF.
- NEW CONDUIT ROUTING SHOWN IS ESSENTIALLY SCHEMATIC. SUBCONTRACTOR SHALL LAY OUT RUNS TO SUIT FIELD CONDITIONS AND THE COORDINATION REQUIREMENTS OF OTHER TRADES.
- ARRAY WIRING SHOULD NOT BE READILY ACCESSIBLE EXCEPT TO QUALIFIED PERSONNEL.
- ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE WATERTIGHT AND APPROVED FOR USE IN WET LOCATIONS. (NEC 314.15A).
- WIRING METHODS FOR PV SYSTEM CONDUCTORS AREN'T PERMITTED WITHIN 10 IN. OF THE ROOF DECKING OR SHEATHING EXCEPT WHERE LOCATED DIRECTLY BELOW THE ROOF SURFACE THAT'S COVERED BY PV MODULES AND ASSOCIATED EQUIPMENT WIRING
- BACK-FED BREAKER MUST BE AT THE OPPOSITE END OF BUS BAR FROM THE MAIN BREAKER OR MAIN LUG SUPPLYING CURRENT FROM THE UTILITIES.
- ALL CONDUCTORS AND WIRE TIES EXPOSED TO SUNLIGHT ARE LISTED AS UV RESISTANT.
- CONTRACTOR SHALL FOLLOW ALL ELECTRICAL EQUIPMENT LABELING REQUIREMENTS IN NEC 690 AND IFC 2015
- PV SOURCE, OUTPUT AND INVERTER CIRCUITS SHALL BE IDENTIFIED AT ALL POINTS OF TERMINATION, CONNECTION, AND SPLICES. THE MEANS OF ID CAN BE SEPARATE COLOR CODING, MARKING TAPE, TAGGING ETC. (NEC 690.4).
- MEASURE THE LINE-TO-LINE AND LINE-TO-NEUTRAL VOLTAGE OF ALL SERVICE ENTRANCE CONDUCTORS PRIOR TO INSTALLING ANY SOLAR EQUIPMENT. THE VOLTAGES FOR THE 240VAC RATED.

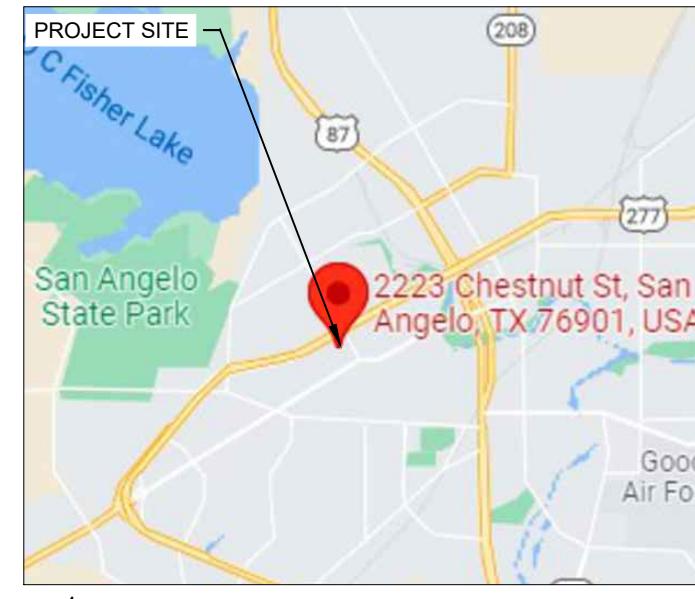
GOVERNING CODES
2015 INTERNATIONAL RESIDENTIAL CODE
2015 INTERNATIONAL FIRE CODE
2017 NATIONAL ELECTRICAL CODE

SYSTEM RATING
14.84 KWDC
10.75 KWAC

SHEET INDEX	
PV-0	COVER PAGE
PV-1	SITE PLAN
PV-2	ROOF PLAN & MODULES
PV-2A	STRING LAYOUT & BOM
PV-3	ATTACHMENT DETAIL
PV-3A	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM & CALCS.
PV-4A	SPECIFICATIONS & CALCULATION
PV-5	SIGNAGE
PV-6+	EQUIPMENT SPECIFICATIONS



1 PV-0 HOUSE PHOTO SCALE: NTS

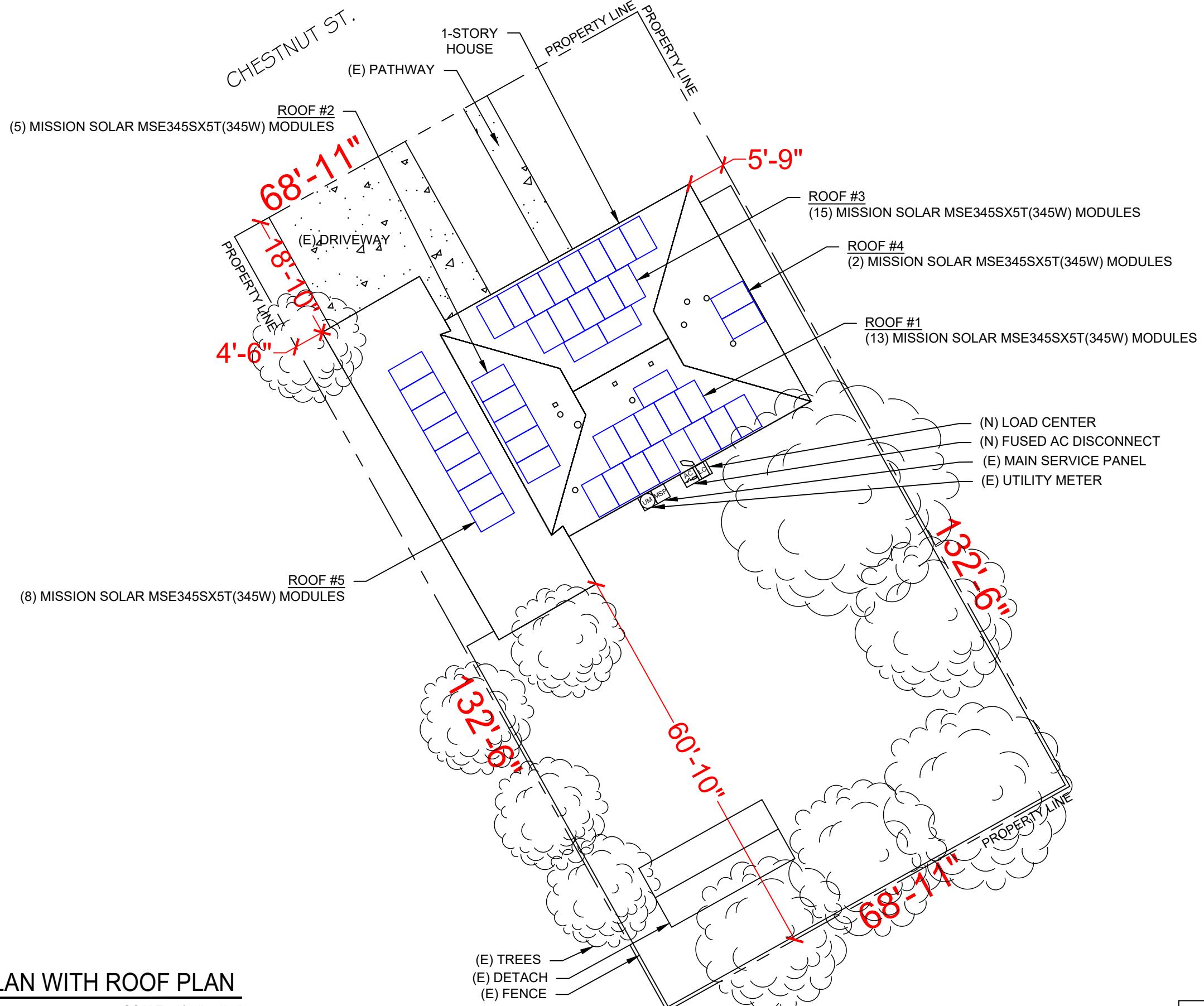


1 PV-0 VICINITY MAP SCALE: NTS

SYSTEM INFO.		
(43)MISSION SOLAR MSE345SX5T(345W)		
(43) ENPHASE IQ7-60-2-US(240V)		
DC SYSTEM SIZE: 14.84 KWDC		
AC SYSTEM SIZE: 10.75 KWAC		
REVISIONS		
DESCRIPTION	DATE	REV
Signature with Seal		
DATE:		
PROJECT NAME & ADDRESS		
MAXINE POTTER RESIDENCE 2223 CHESTNUT ST. SAN ANGELO, TX 76901		
SHEET NAME		
COVER PAGE		
SHEET SIZE		
ANSI B 11" X 17"		
SHEET NUMBER		
PV-0		

SITE NOTES

- A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS AN UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
- THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION [NEC 110.26]



1 PLOT PLAN WITH ROOF PLAN

PV-1

SCALE: 1/16" = 1'-0"

ESI ID# : 10204049772018932

**MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901**

**SHEET NAME
SITE PLAN**

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

**SHEET NUMBER
PV-1**

SYSTEM INFO.		
(43)MISSION SOLAR MSE345SX5T(345W)		
(43) ENPHASE IQ7-60-2-US(240V)		
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AC SYSTEM SIZE: 10.75 KWAC		
REVISIONS		
DESCRIPTION	DATE	REV
Signature with Seal		
DATE:		

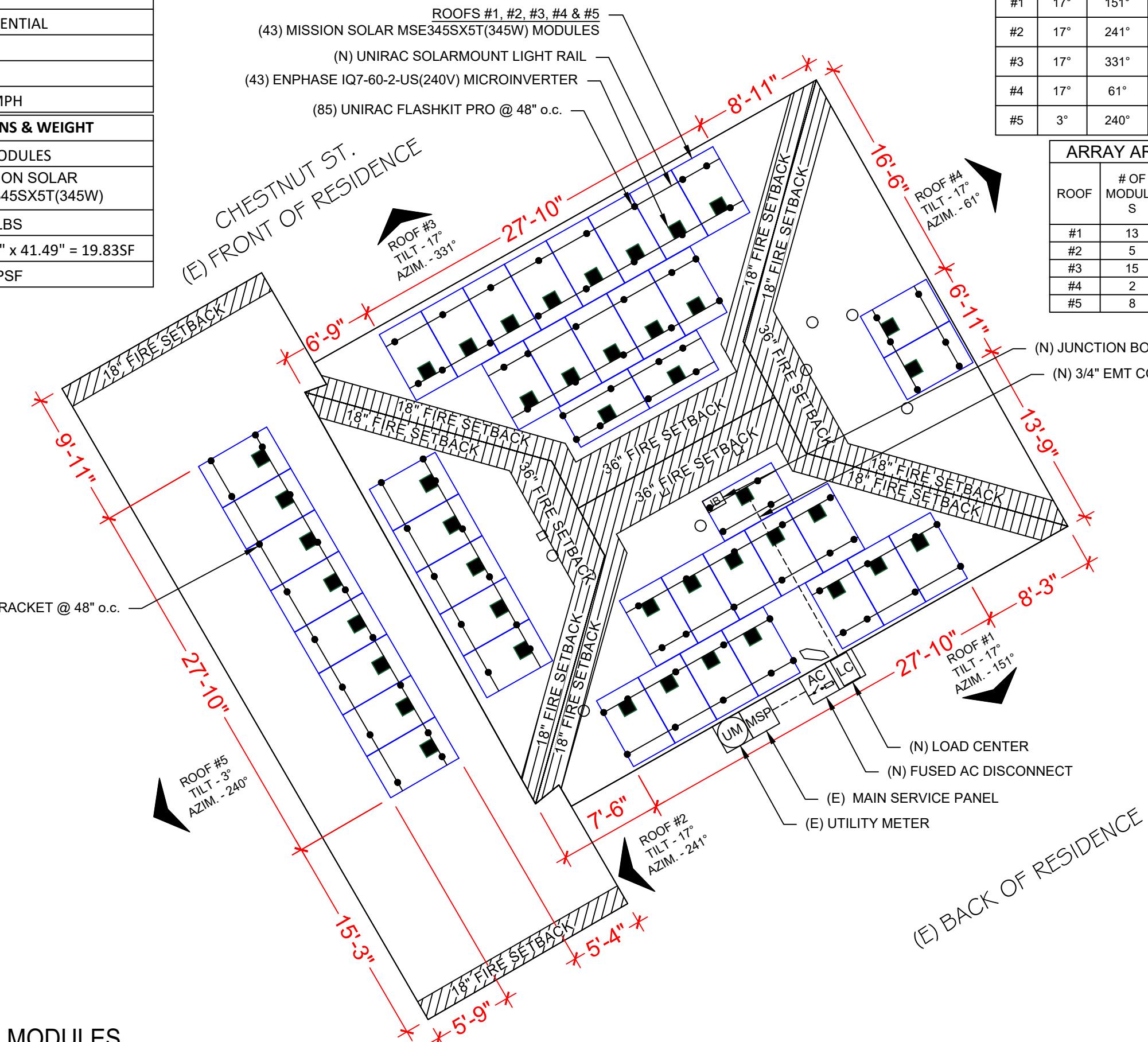
PROJECT NAME & ADDRESS

DESIGN SPECIFICATION	
RISK CATEGORY:	II
CONSTRUCTION:	SFD
ZONING:	RESIDENTIAL
SNOW LOAD (ASCE 7-10):	5 PSF
EXPOSURE CATEGORY:	B
WIND SPEED (ASCE 7-10):	115 MPH

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES:	43 MODULES
MODULE TYPE:	MISSION SOLAR MSE345SX5T(345W)
MODULE WEIGHT:	44.8 LBS
MODULE DIMENSIONS:	68.82" x 41.49" = 19.83SF
UNIT WEIGHT OF AREA:	2.26 PSF

LEGEND	
JB	(N) JUNCTION BOX
UM	(E) UTILITY METER
MSP	(E) MAIN SERVICE PANEL (MSP)
AC	(N) FUSED AC DISCONNECT
LC	(N) LOAD CENTER (COMBINER PANEL)
○ □	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
●	- ROOF ATTACHMENT
---	- CONDUIT



ROOF DESCRIPTION					
ROOF	ROOF TILT	AZIMUTH	RAFTER SIZE	RAFTER SPACING	ROOF MATERIAL
#1	17°	151°	2"X6"	24" o.c.	COMP. SHINGLE
#2	17°	241°	2"X6"	24" o.c.	COMP. SHINGLE
#3	17°	331°	2"X6"	24" o.c.	COMP. SHINGLE
#4	17°	61°	2"X6"	24" o.c.	COMP. SHINGLE
#5	3°	240°	2"X6"	24" o.c.	CORRUGATED METAL

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	13	247.98	505.27	49
#2	5	95.28	278.02	34
#3	15	286.40	505.92	57
#4	2	38.04	324.45	12
#5	8	159.27	823.72	19

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 AC SYSTEM SIZE: 10.75 KWAC

REVISIONS
 DESCRIPTION DATE REV

Signature with Seal

DATE:

PROJECT NAME & ADDRESS

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME	ROOF PLAN & MODULES
SHEET SIZE	ANSI B 11" X 17"
SHEET NUMBER	PV-2

41.49"
68.82"
15' 3"
5' 9"
8' 3"
9' 11"
6' 9"
27' 10"

MISSION SOLAR
MSE345SX5T(345W)
MODULES



BILL OF MATERIALS

EQUIPMENT	QTY	ITEM	DESCRIPTION
SOLAR PV MODULE	43	110-1272	MISSION, 345W PV MODULES, MC4, 1.0M (-39.4") PV WIRE, 40MM BLACK FRAME, BLACK BACK SHEET, BOB, 60 CELL MONO-PERC, 20A FUSE, 1000VDC, 688, BAA, 321.4 PTC, 25/25 WARRANTY (WITH REGISTRATION), MSE345SX5T
INVERTER	43	321-0215	ENPHASE, IQ 7 MICRO INVERTER, COMPATIBLE WITH 60-CELL PV, MODULES, 208/240 VOLT, 250VA PEAK POWER, IQ7-60-2-US
MOUNTING KIT	43	270-052	IRONRIDGE, MOUNTING KIT FOR MICROINVERTER & OPTIMIZER, INCLUDE ONE BONDING 1/4" X 3/4" SS T - BOLT AND HARDWARE, UFO SERIES, QTY. 1, BHW-M1-01-A1
JUNCTION BOX	1		JUNCTION BOX, NEMA 3R, UL LISTED
COMBINER BOX	1	570-1196	ENPAHSE, AC COMBINER-3 WITH IQ ENVOY AND 2 SPLIT CORE CONSUMPTION CTS, SINGLE PHASE, REVENUE GRADE ACCURACY (ANSI C12.20 +/-0.5%) WITH CALIBRATED SOLID CORE PRODUCTION CT, SPACE FOR 4 EATON BR 2 POLE BREAKER NOT INCLUDED, 80A INCLUDES SILVER SOLAR SHIELD, X-IQ-AM1-240-3-ES
AC DISCONNECT	1		60A FUSED AC DISCONNECT, (2) 60A FUSES, 240V, NEMA 3R, UL LISTED
ATTACHMENT	85	210-1074	UNIRAC, FLASH-KIT-PRO, 8X12" FLASHING, SLOTTED L-FOOT, LAG BOLT, & RAIL MOUNTING HARDWARE, MILL FINISH, 1 EA, 004055M
ATTACHMENT	17		S-5! PROTEA BRACKET
ATTACHMENT	68		1" SELF TAPPING SCREW
ENPHASE Q CABLE	58	360-0329	IQ, Q-CABLE, 240 VOLT FOR 60 CELL 1.7M LANDSCAPE MODULE PITCH. CONNECTOR PITCH IS 2.0M (78.7"), CONTINUOUS LENGTH, ORDER BY NUMBER OF CONNECTORS, Q-12-17-240
BRANCH TERMINATOR	3		BRANCH TERMINATOR
IQ WATER TIGHT CAP	15	360-0333	IQ WATER TIGHT CAPS, ENPHASE, IQ TERMINATOR CAP FOR Q-CABLE, QTY-1, Q-TERM-10
RAILS	35	210-1030	UNIRAC, SOLARMOUNT LIGHT RAIL, 168", MILL FINISH, QTY. 1,315168M
BONDED SPLICE	18	211-0494	SPLICE KIT, UNIRAC, SOLARMOUNT SPLICE-BAR, INTEGRATED BONDING, MILL, QTY. 1, 303019M
MID CLAMP	66	260-286	UNIVERSAL SELF STANDING MID CLAMPS, UNIRAC, UNIVERSAL AESTHETIC FASTENER (UNIVERSAL-AF) MID CLAMP, 30-46MM, PREASSEMBLED INTEGRATED BONDING, DARK FINISH, QTY. 1, 302045D
END CLAMP	40		CONCEALED UNIVERSAL END CLAMPS
GROUNDING LUG	10	590-0117	UNIRAC GROUNDING LUG, IRONRIDGE, GROUNDING LUG, LOW PROFILE, WITH 1/4" T-BOLT AND NUT, UFO SERIES, QTY-1, XR-LUG-03-A1

A B C

- MODULE STRINGING



1

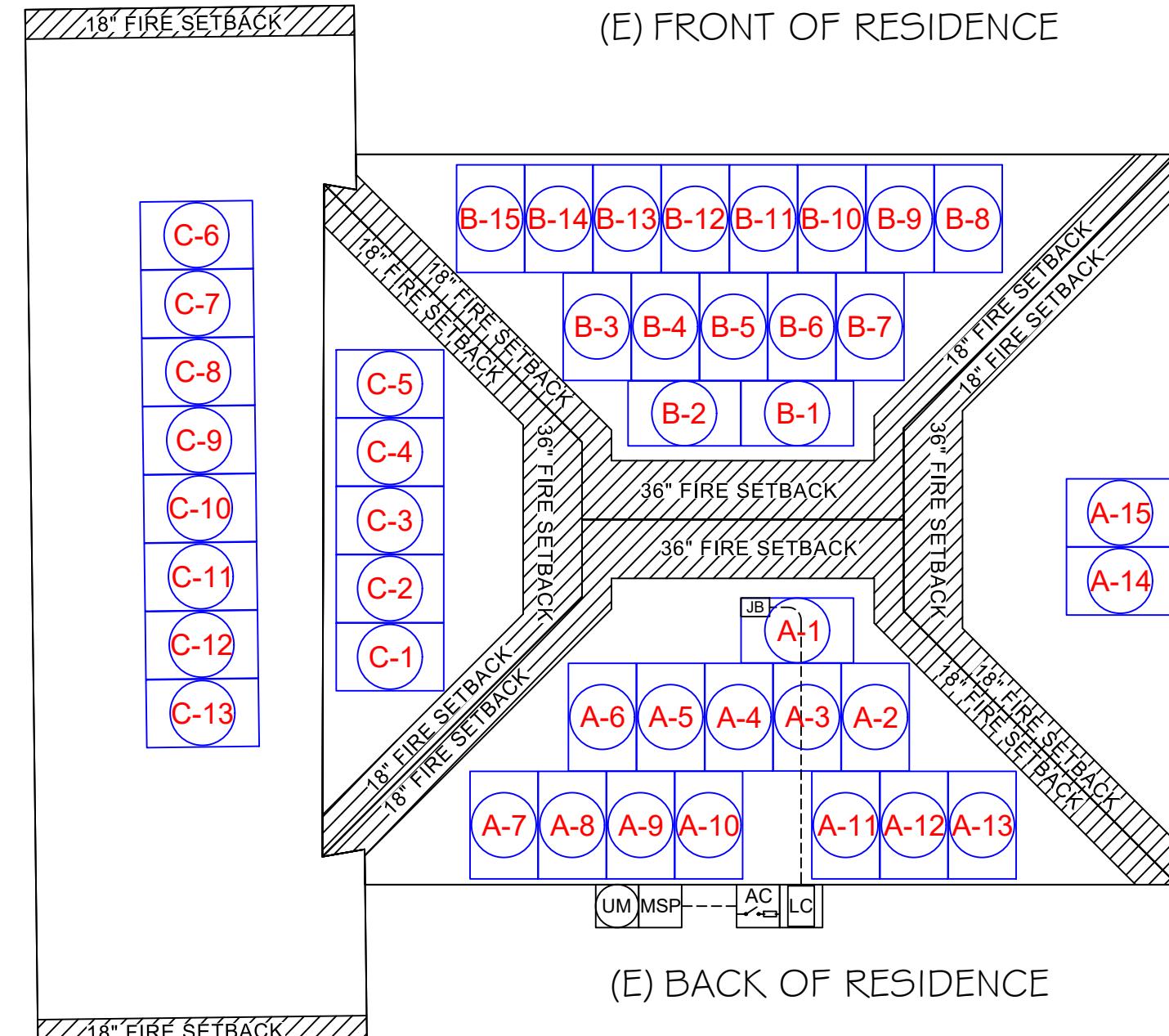
ROOF PLAN WITH STRING LAYOUT & BOM

PV-2A

SCALE: 1/8" = 1'-0"

CHESTNUT ST.

(E) FRONT OF RESIDENCE



(E) BACK OF RESIDENCE

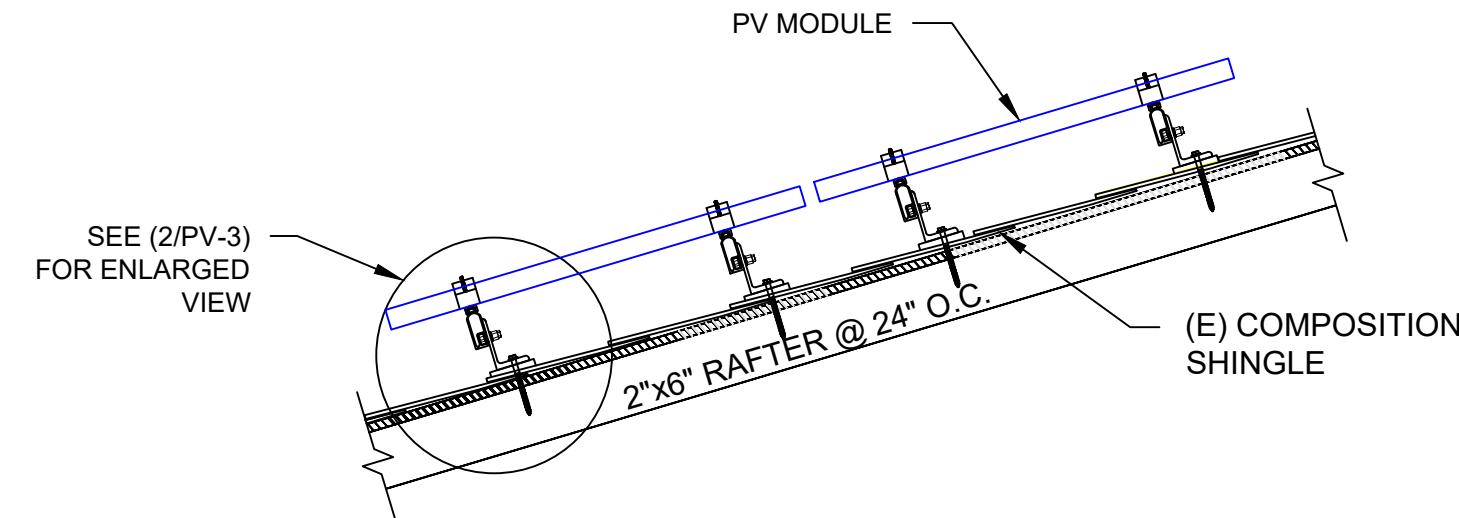
MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

STRING
LAYOUT & BOM

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER
PV-2A



SYSTEM INFO.
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DC SYSTEM SIZE: 14.84 KWDC
AC SYSTEM SIZE: 10.75 KWAC

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DESCRIPTION DATE REV

Signature with Seal

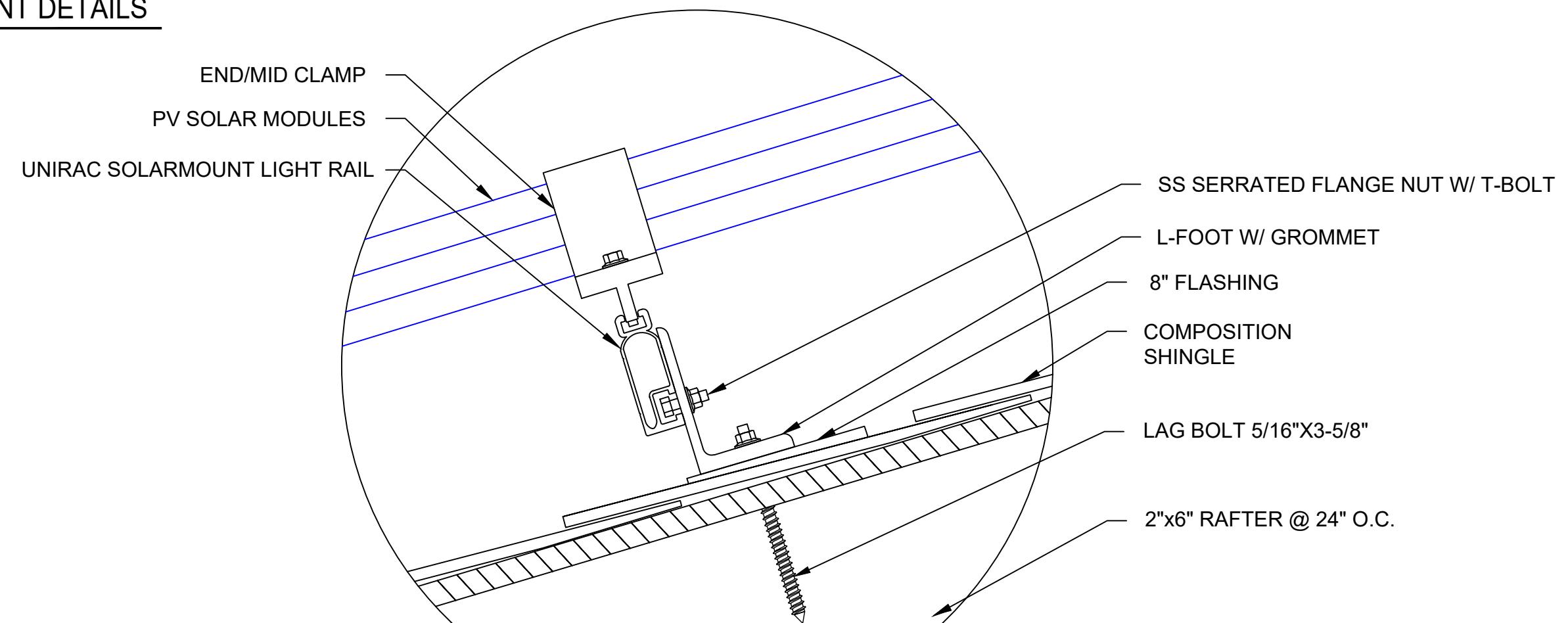
DATE:

PROJECT NAME & ADDRESS

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

1 ATTACHMENT DETAILS

PV-3



2 ENLARGED VIEW OF ATTACHMENT

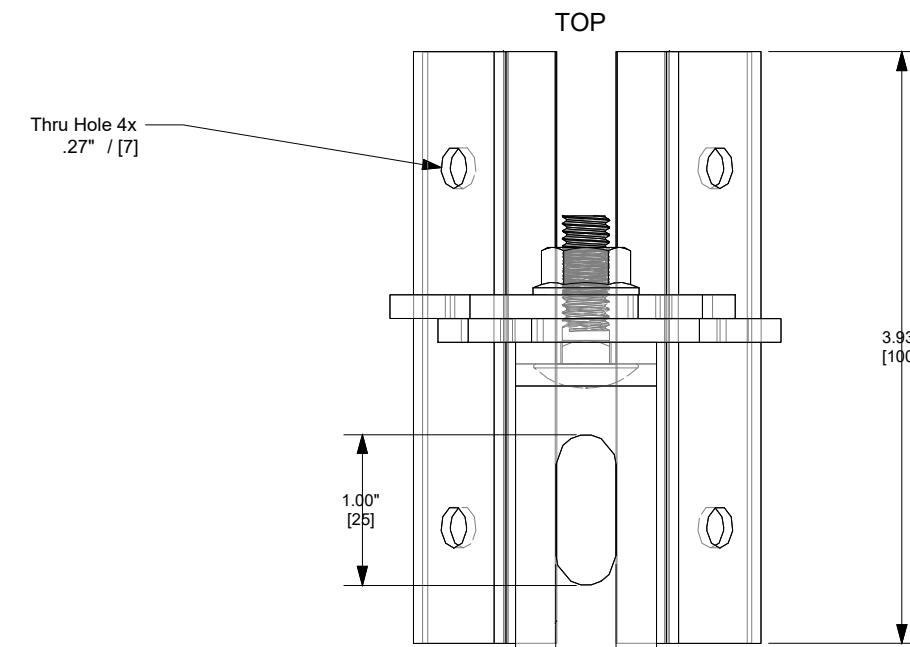
PV-3

SCALE: NTS

SHEET NAME
ATTACHMENT
DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3



2.27" [58]

.97" [25] .76" [19]

.43" [11] .33" [8]

.400" [10] .400" [10]

.15" [4]

1.61" [41]

2.61" [66]

.33" [8]

.400" [10]

.400" [10]

.77" [20]

2.39" [61]

.77" [20]

.39" [10]

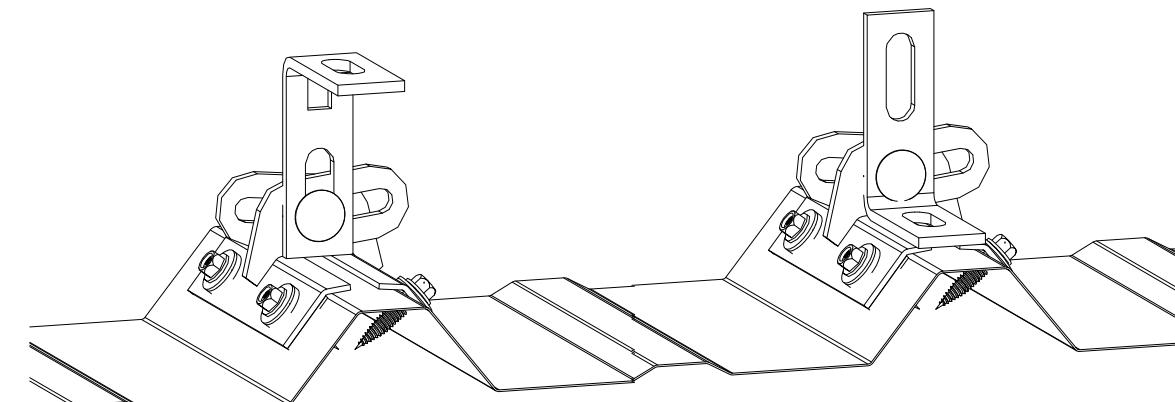
.39" [10]

LEFT

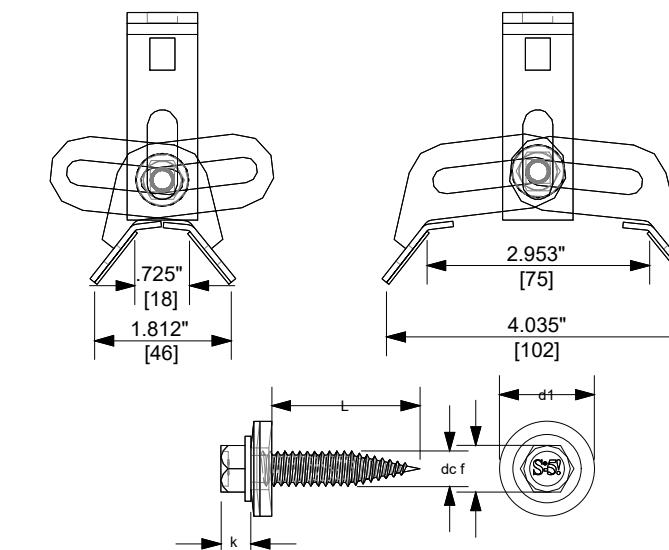
FRONT

RIGHT

Factory Applied Sealant



ProteaBracket



MM	k	dc	l	d1	f
INCH	.15	.24-.246	1	.58	.31

6mm X 25mm (8mm Hex W/16mm Washer)

FOR STANDING SEAM SPECIFIC MECHANICAL LOAD TEST INFORMATION AND CLAMP INSTALLATION INFORMATION PLEASE VISIT: WWW.S-5.COM

MATERIAL:

A2 Stainless

EST ASSEMBLY WEIGHT :

.526 lbs

SUPPLIED HARDWARE:

(4) 6mm X 25mm (8mm Hex W/Washer)

Bi-Metal Sheet Screw



METAL ROOF INNOVATIONS, LTD.
8655 TABLE BUTTE RD
COLORADO SPRINGS, CO 80908
719-495-0518
719-495-0045 (FAX)

TITLE

S-5! ProteaBracket

SCALE:

1:1

OTHER:

DRAWING NO. ProteaBracket_CCD_2015 DRAWN BY DMMH DATE 10/5/2015

S-5! PRODUCTS ARE PROTECTED BY MULTIPLE U.S. PATENTS INCLUDING 5,228,248, 5,983,588 AND 6,164,033 (OTHERS ISSUED AND PENDING). EUROPEAN PATENTS ARE ALSO APPLIED FOR AND PENDING UNDER THE PATENT COOPERATION TREATY WITH DIVISIONAL FILING RIGHTS RETAINED. METAL ROOF INNOVATIONS, LTD. (LICENSOR OF S-5! TECHNOLOGY) AGGRESSIVELY PROSECUTES PATENT INFRINGEMENT.

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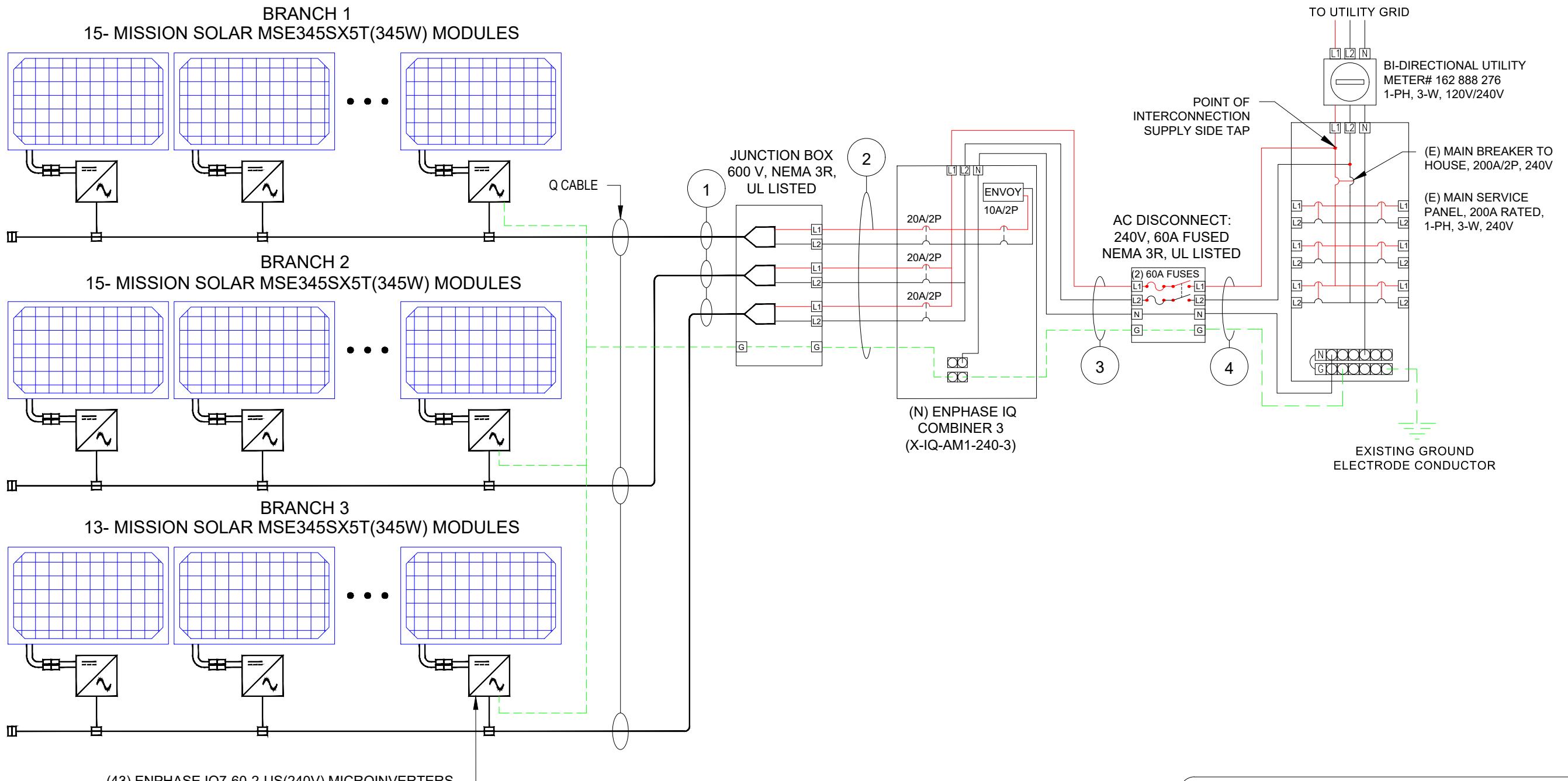
Signature with Seal
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PROJECT NAME & ADDRESS

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3A

ID	TYPICAL	INITIAL CONDUCTOR LOCATION	FINAL CONDUCTOR LOCATION	CONDUCTOR		CONDUIT	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CONDUIT	CONDUIT FILL PERCENT	OCPD	EGC		TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	LENGTH	VOLTAGE DROP		
1	3	ARRAY	JUNCTION BOX	12 AWG	Q CABLE	-	-	1	2	N/A	N/A	6 AWG	BARE COPPER	0.71	(59°C)	N/A	15.0A	18.8A	N/A	N/A	90°C	72FT	0.84%
2	1	JUNCTION BOX	IQ COMBINER BOX	10 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	3	6	26.72%	20A	8 AWG	THWN-2, COPPER	0.91	(37°C)	0.8	15.0A	18.8A	40A	29.1A	90°C	26FT	0.42%
3	1	IQ COMBINER BOX	FUSED AC DISCONNECT	6 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	3	36.53%	60A	8 AWG	THWN-2, COPPER	0.91	(37°C)	1	43.0A	53.8A	75A	68.3A	90°C	5FT	0.09%
4	1	FUSED AC DISCONNECT	MSP	6 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	3	36.53%	N/A	6 AWG	THWN-2, COPPER	0.91	(37°C)	1	43.0A	53.8A	75A	68.3A	90°C	5FT	0.09%



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(43) ENPHASE IQ7-60-2-US(240V)

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AC SYSTEM SIZE: 10.75 KWAC

REVISIONS

DESCRIPTION	DATE	REV
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Signature with Seal

DATE:

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RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
ELECTRICAL LINE & CALCS.

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

SHEET NUMBER
PV-4

SERVICE INFO.

UTILITY PROVIDER: AEP
MAIN SERVICE VOLTAGE: 240V
MAIN BREAKER RATING: 200A
MAIN SERVICE PANEL: 200A
MAIN SERVICE LOCATION: SOUTH
SERVICE FEED SOURCE: OVERHEAD

ESI ID# : 10204049772018932

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL	MISSION SOLAR MSE345SX5T(345W)
VMP	33.37 V
IMP	10.34 A
VOC	41.00 V
ISC	10.92 A
TEMP. COEFF. VOC	-0.262 %/°C
PTC RATING	321.24 W
MODULE DIMENSION	68.82" (L) x 41.49" (W)
PANEL WATTAGE	345W
INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL	ENPHASE IQ7-60-2-US(240V)
MAX DC SHORT CIRCUIT CURRENT	15 A
CONTINUOUS OUTPUT CURRENT	1.0A (240V)
AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-10°C
AMBIENT TEMP (HIGH TEMP 2%)	37°C
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	90°C
CONDUCTOR TEMPERATURE RATE	59°C
MODULE TEMPERATURE COEFFICIENT OF VOC	-0.262 %/°C
PERCENT OF VALUES	
NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT	
0.80	4-6
0.70	7-9
0.50	10-20

Voltage rise in Q Cable from the Microinverters to the Junction Box

For branch circuit #1 of 15 IQ 7 Micros, the voltage rise on the 240 VAC Q Cable is 0.84%

For branch circuit #2 of 15 IQ 7 Micros, the voltage rise on the 240 VAC Q Cable is 0.84%

For branch circuit #3 of 13 IQ 7 Micros, the voltage rise on the 240 VAC Q Cable is 0.64%

Voltage rise from the Junction Box to the IQ Combiner box

VRise = (amps/inverter × number of inverters) × (resistance in Ω/ft) × (2-way wire length in ft)

$$= (1 \text{ amp} \times 15) \times (0.001290 \Omega/\text{ft}) \times (26 \text{ ft} \times 2)$$

$$= 15 \text{ amps} \times 0.001290 \Omega/\text{ft} \times 52 \text{ ft}$$

$$= 1.01 \text{ volts}$$

$$\%VRise = 1.01 \text{ volts} \div 240 \text{ volts} = 0.42\%$$

The voltage rise from the Junction Box to the IQ Combiner Box is 0.42%

Voltage rise from the IQ Combiner box to AC Disconnect

VRise = (amps/inverter × number of inverters) × (resistance in Ω/ft.) × (2-way wire length in ft.)

$$= (1 \text{ amp} \times 43) \times (0.000491 \Omega/\text{ft}) \times (5 \text{ ft.} \times 2)$$

$$= 43 \text{ amps} \times 0.000491 \Omega/\text{ft} \times 10 \text{ ft.}$$

$$= 0.21 \text{ volts}$$

$$\%VRise = 0.21 \text{ volts} \div 240 \text{ volts} = 0.09\%$$

The voltage rise from the IQ Combiner Box to the AC Disconnect is 0.09%

Voltage rise from the AC Disconnect to the Main Service Panel

VRise = (amps/inverter × number of inverters) × (resistance in Ω/ft) × (2-way wire length in ft)

$$= (1 \text{ amp} \times 43) \times (0.000491 \Omega/\text{ft}) \times (5 \text{ ft} \times 2)$$

$$= 43 \text{ amps} \times 0.000491 \Omega/\text{ft} \times 10 \text{ ft}$$

$$= 0.21 \text{ volts}$$

$$\%VRise = 0.21 \text{ volts} \div 240 \text{ volts} = 0.09\%$$

The voltage rise from the AC Disconnect to the Main Panel is 0.09%

Total system voltage rise for all three wire sections

$$0.84 \% + 0.42\% + 0.09\% + 0.09\% = 1.44\%$$

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(43) ENPHASE IQ7-60-2-US(240V)		
DC SYSTEM SIZE: 14.84 KWDC		
AC SYSTEM SIZE: 10.75 KWAC		

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal
DATE:

PROJECT NAME & ADDRESS

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME SPECIFICATIONS & CALC.

SHEET SIZE ANSI B 11" X 17"

SHEET NUMBER PV-4A

1



LABEL LOCATION:
POINT OF INTERCONNECTION,
(PER CODE: NEC 690.17(E))

2



LABEL LOCATION:
INVERTER, JUNCTION BOXES (ROOF),
(PER CODE: NEC690.13.G.3 & NEC 690.13.G.4)

3



LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(D)(4))

4

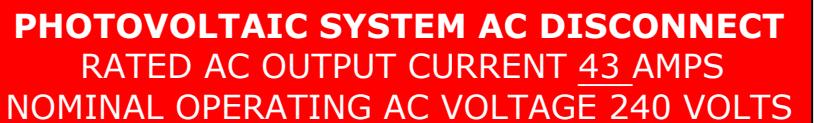


LABEL LOCATION:
CONDUIT, COMBINER BOX
(PER CODE: NEC690.31(G)(3)(4) & NEC 690.13(G)(4))

ADHESIVE FASTENED SIGNS:

- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
- WHERE REQUIRED ELSEWHERE IN THIS 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 605.11.3]

5



LABEL LOCATION:
POINT OF INTERCONNECTION,
(PER CODE: NEC 690.17(E))

6



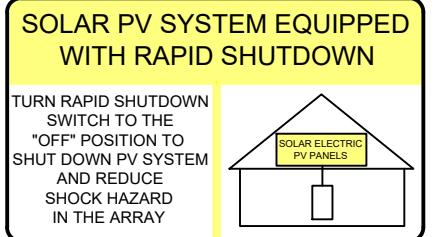
LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(D)(7))
[Not required if panelboard is rated not less than sum of ampere ratings of all overcurrent devices supplying it]

7



LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC690.15, 690.13(B))
INVERTER

8



LABEL PER NEC 690.56(C)- PROVIDE AT
AC DISCONNECT FOR RAPID
SHUTDOWN COMPLIANT SYSTEM

9



LABEL LOCATION:
MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS,
ENCLOSURES, AND CABLE ASSEMBLIES AT LEAST EVERY 10 FT, AT TURNS AND
ABOVE/Below PENETRATIONS AND ALL COMBINER/JUNCTION BOXES. (PER CODE:
IFC 605.11.4)

SYSTEM INFO.

(43)MISSION SOLAR MSE345SX5T(345W)

(43) ENPHASE IQ7-60-2-US(240V)

DC SYSTEM SIZE: 14.84 KWDC

AC SYSTEM SIZE: 10.75 KWAC

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE:

PROJECT NAME & ADDRESS

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
SIGNAGE

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

SHEET NUMBER
PV-5

AMERICA'S MODULE COMPANY™

MISSION SOLAR
ENERGY



MSE PERC 60

Distributed By:



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1(888)-515-6199



CERTIFIED RELIABILITY

- Tested to UL 61730 & IEC standards
- PID resistant
- Resistance to salt mist corrosion



ADVANCED TECHNOLOGY

- PERC and 6 busbar drive >18.7% module efficiency
- Ideal for all applications



EXTREME WEATHER RESILIENCE

- 5600 Pa front and 4800 Pa back load
- Tested load to UL 61730



BAA COMPLIANT FOR GOVERNMENT PROJECTS

- Buy American Act
- American Recovery & Reinvestment Act

FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2.5% in year one and 0.7% annually from years two to 30 with 80.7% guaranteed in year 25.

CERTIFICATIONS

UL 61730
IEC 61215 - IEC 61730
IEC 61701



CEC



Please contact Mission Solar Energy if you have questions or concerns about certification of our products in your area.

*Standard 12-year product warranty extendable to 25 years with registration:

www.missionsolar.com/warranty/

PERC 60

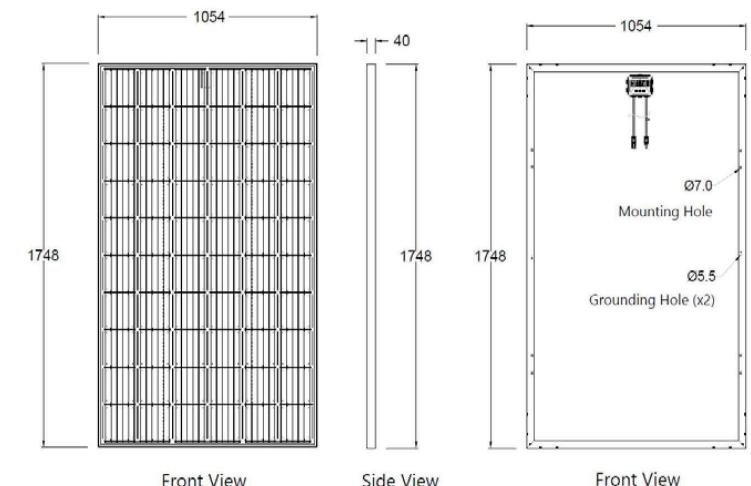
CLASS-LEADING 330-345 W

ELECTRICAL SPECIFICATION					
Product Type	MSExxxSX5T (xxx=P _{max})				
Power Output	P _{max}	W _p	330	335	340
Module Efficiency	%	17.9	18.2	18.5	18.7
Tolerance	%	0/+3	0/+3	0/+3	0/+3
Short Circuit Current	I _{sc}	V	10.72	10.78	10.86
Open Circuit Voltage	V _{oc}	A	40.40	40.58	40.82
Rated Current	I _{mp}	V	10.05	10.14	10.24
Rated Voltage	V _{mp}	V	32.85	33.03	33.20
Fuse Rating	A	20	20	20	20
System Voltage	V	1000	1000	1000	1000

TEMPERATURE COEFFICIENTS	
Normal Operating Cell Temperature (NOCT)	44.43°C (±3.7%)
Temperature Coefficient of P _{max}	-0.361%/°C
Temperature Coefficient of V _{oc}	-0.262%/°C
Temperature Coefficient of I _{sc}	0.039%/°C

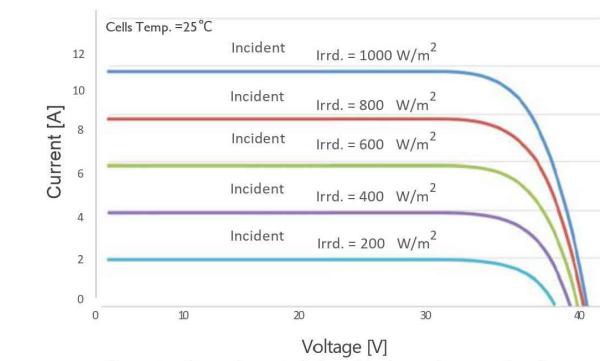
OPERATING CONDITIONS	
Maximum System Voltage	1,000Vdc
Operating Temperature Range	-40°C (-40°F) to +85°C (185°F)
Maximum Series Fuse Rating	20A
Fire Safety Classification	Type 1
Front & Back Load (UL Standard)	5600 Pa front and 4800 Pa back load Tested to UL 61730
Hail Safety Impact Velocity	25mm at 23 m/s

BASIC DIMENSIONS (UNITS: mm)



MECHANICAL DATA	
Solar Cells	P-type mono-crystalline silicon
Cell Orientation	60 cells (6x10)
Module Dimension	1748mm x 1054mm x 40mm
Weight	20.3 kg (44.8 lbs.)
Front Glass	3.2mm, tempered, low-iron, anti-reflective
Frame	Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.0m, Wire 4mm ² (12AWG)
Connector	Stäubli MC4, Renhe 05-8

MSE345SX5T: 345WP, 60 CELL SOLAR MODULE CURRENT - VOLTAGE CURVE



Current-voltage characteristics with dependence on irradiance and module temperature

CERTIFICATIONS & TESTS	
IEC	61215, 61730, 61701
UL	61730



SHIPPING INFORMATION			
Container FT	Pallets	Panels	345 W Bin
53'	Double Stack	36	936 322.92 kW
40'	Double Stack	28	728 251.16 kW
Pallet [26 Panels]			
Weight	Height	Width	Length
1263 lbs. (573 kg)	47.5 in (120.65 cm)	46 in (116.84 cm)	70.25 in (178.43 cm)

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-6

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.



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings ¹	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overshoot 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)
Overshoot class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-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)			
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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2019-3-26



MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-7

SYSTEM INFO.

(43)MISSION SOLAR MSE345SX5T(345W)

(43) ENPHASE IQ7-60-2-US(240V)

DC SYSTEM SIZE: 14.84 KWDC

AC SYSTEM SIZE: 10.75 KWAC

REVISIONS

DESCRIPTION	DATE	REV

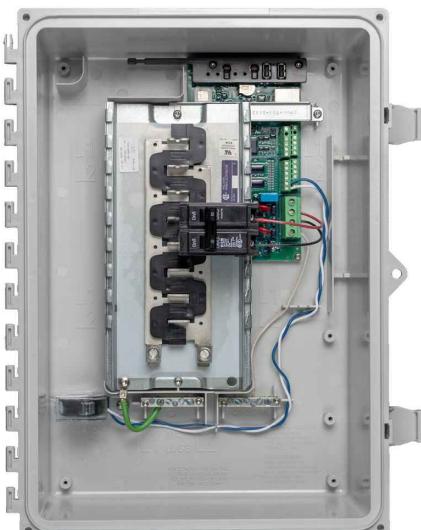
Signature with Seal

DATE:

PROJECT NAME & ADDRESS

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.

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 Empower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows redundant wireless communication with Encharge and Empower.
--------------------------------------	--

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
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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 <p>Always follow local code requirements for conductor sizing.</p>
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

ENPHASE.

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-8

SYSTEM INFO.

(43)MISSION SOLAR MSE345SX5T(345W)

(43) ENPHASE IQ7-60-2-US(240V)

DC SYSTEM SIZE: 14.84 KWDC

AC SYSTEM SIZE: 10.75 KWAC

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE:

PROJECT NAME & ADDRESS

FLASHKIT PRO



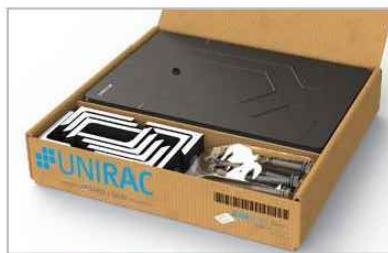
FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Featuring Unirac's patented **SHED & SEAL** technology, a weather proof system which provides the ultimate protection against roof leaks. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With **FLASHKIT** pro, you have everything you need for a quick, professional installation.



TRUSTED WATER SEAL FLASHINGS
FEATURING SHED & SEAL TECHNOLOGY



YOUR COMPLETE SOLUTION
Flashings, lags, continuous slot L-Foots and hardware



CONVENIENT 10 PACKS
Packaged for speed and ease of handling

THE COMPLETE ROOF ATTACHMENT SOLUTION

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FLASHKIT PRO

INSTALLATION GUIDE

FLASHKIT PRO IS THE COMPLETE FLASHING AND ATTACHMENT SOLUTION FOR COMPOSITION ROOFS.



INSTALL FLASHKIT PRO FLASHING



INSTALL L-FOOT



ATTACH L-FOOT TO RAIL

PRE-INSTALL

- Locate roof rafters and snap chalk lines to mark the installation point for each roof attachment.
- Drill a 7/32" pilot hole at each roof attachment. Fill each pilot hole with sealant.

STEP 1 INSTALL FLASHKIT PRO FLASHING

- Add a U-shaped bead of roof sealant to the underside of the flashing with the open side of the U pointing down the roof slope. Slide the aluminum flashing underneath the row of shingles directly up slope from the pilot hole as shown. Align the indicator marks on the lower end of the flashing with the chalk lines on the roof to center the raised hole in the flashing over the pilot hole in the roof. When installed correctly, the flashing will extend under the two courses of shingles above the pilot hole.

STEP 2 INSTALL L-FOOT

- Fasten L-foot and Flashing into place by passing the included lag bolt and pre-installed stainless steel-backed EPDM washer through the L-foot EPDM grommet, and the raised hole in the flashing, into the pilot hole in the roof rafter.

- Drive the lag bolt down until the L-foot is held firmly in place. It is normal for the EPDM on the underside of the stainless steel backed EPDM washer to compress and expand beyond the outside edge of the steel washer when the proper torque is applied.

TIP:

- Use caution to avoid over-torqueing the lag bolt if using an impact driver.
- Repeat Steps 1 and 2 at each roof attachment point.

STEP 3 ATTACH L-FOOT TO RAIL

- Insert the included 3/8"-16 T-bolts into the lower slot on the Rail (sold separately), spacing the bolts to match the spacing between the roof attachments.
- Position the Rail against the L-Foot and insert the threaded end of the T-Bolt through the continuous slot in the L-Foot. Apply anti-seize to bolt threads to prevent galling of the T-bolt and included 3/8" serrated flange nut. Place the 3/8" flange nut on the T-bolt and finger tighten. Repeat STEP 3 until all L-Foots are secured to the Rail with a T-bolt. Adjust the level and height of the Rail and torque each bolt to 30ft-lbs.

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
EQUIPMENT SPECIFICATION
SHEET SIZE
ANSI B 11" X 17"
SHEET NUMBER

FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

The right way to attach almost anything to metal roofs!

S-5!® The Right Way!

ProteaBracket™

ProteaBracket™ is the most versatile standing seam metal roof attachment solution on the market, fitting most trapezoidal sheet profiles with and without intermediate insulation. It features an adjustable attachment base and multiple solar module attachment options (illustrated on back) to accommodate varying widths and heights. There are no messy sealants to apply and no chance for leaks; the ProteaBracket comes with factory-applied, adhesive rubber sealant to ensure quick installation and a weather-proof fit.

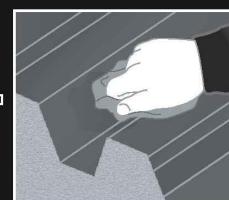
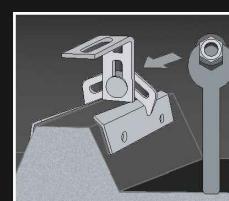
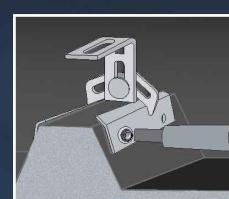
Installation is simple! The ProteaBracket is mounted directly onto the crown of the panel, straddling the profile. No surface preparation is necessary; simply wipe away excess oil and debris, align, and apply. Secure ProteaBracket through its pre-punched holes, using the hardened drill point S-5!® screws.

ProteaBracket is the perfect match for our S-5-PV Kit and spares you the hassle of cold-bridging! For a solar attachment solution that is both economical and easy to use, choose ProteaBracket.*

*When ProteaBracket is used in conjunction with the S-5-PV Kit, an additional nut is required during installation.



S-5!® ProteaBracket™ is a versatile bracket that adjusts easily to most trapezoidal roof profiles.

- 1 
- 2 
- 3 
- 4 

ProteaBracket™

Multiple Attachment Options:

Side Rail Option



Top Rail Option



S-5-PV Kit Option

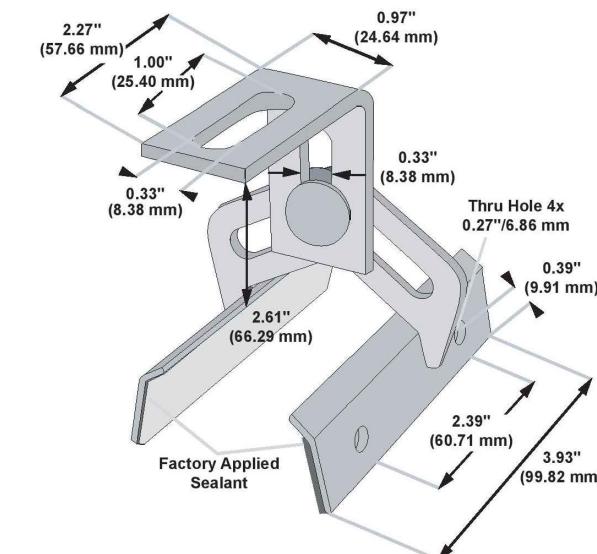


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S-5!®
The Right Way!

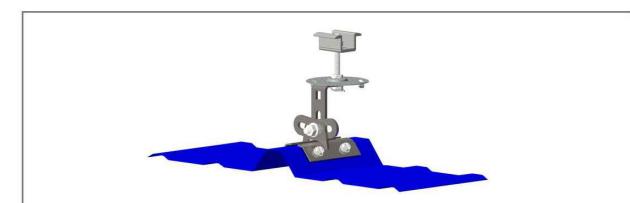
ProteaBracket™ is the perfect solar attachment solution for most trapezoidal exposed-fastened metal roof profiles! No messy sealants to apply. The factory-applied adhesive rubber sealant weather-proofs and makes installation easy!

ProteaBracket™



Please note: All measurements are rounded to the second decimal place.

Example Applications



S-5-PV Kit demonstrated with a ProteaBracket on a trapezoidal profile.

Example Profile



Distributed by

MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-9A

SOLARMOUNT

UNIRAC

SOLARMOUNT is the professionals' choice for residential PV mounting applications. Every aspect of the system is designed for an easier, faster installation experience. **SOLARMOUNT** is a complete solution with revolutionary universal clamps, **FLASHKIT PRO**, full system UL 2703 certification and 25-year warranty. Not only is **SOLARMOUNT** easy to install, but best-in-class aesthetics make it the most attractive on any block!



New & Improved:
THE PROFESSIONALS' CHOICE
With Superior Aesthetics



NOW FEATURING **FLASHKIT PRO**
The Complete Roof Attachment Solution
FEATURING **SHED & SEAL** TECHNOLOGY



NOW WITH **UNIVERSAL MIDCLAMPS**
Accommodates 30mm-51mm module frames
One tool, one-person installs are here!



REVOLUTIONARY NEW ENDCLAMPS
Concealed design and included End Caps

THE PROFESSIONALS' CHOICE FOR RESIDENTIAL RACKING

BEST INSTALLATION EXPERIENCE • CURB APPEAL • COMPLETE SOLUTION • UNIRAC SUPPORT
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

SOLARMOUNT

UNIRAC

BETTER DESIGNS

TRUST THE INDUSTRY'S BEST DESIGN TOOL

Start the design process for every project in our U-Builder on-line design tool. It's a great way to save time and money.

BETTER SYSTEMS

ONE SYSTEM - MANY APPLICATIONS

Quickly set modules flush to the roof on steep pitched roofs. Orient a large variety of modules in Portrait or Landscape. Tilt the system up on flat or low slope roofs. Components available in mill, clear, and dark finishes to optimize your design financials and aesthetics.

BETTER RESULTS

MAXIMIZE PROFITABILITY ON EVERY JOB

Trust Unirac to help you minimize both system and labor costs from the time the job is quoted to the time your teams get off the roof. Faster installs. Less Waste. More Profits.

BETTER SUPPORT

WORK WITH THE INDUSTRY'S MOST EXPERIENCED TEAM

Professional support for professional installers and designers. You have access to our technical support and training groups. Whatever your support needs, we've got you covered. Visit Unirac.com/solarmount for more information.

LISTED **UL2703** BONDING & GROUNDING
MECHANICAL LOADING
SYSTEM FIRE CLASSIFICATION

UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT



UNMATCHED
EXPERIENCE



CERTIFIED
QUALITY



ENGINEERING
EXCELLENCE



BANKABLE
WARRANTY



DESIGN
TOOLS



PERMIT
DOCUMENTATION

TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

BANKABLE WARRANTY

Don't leave your project to chance. Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are providing products of exceptional quality. **SOLARMOUNT** is covered by a 25 year limited product warranty and a 5 year limited finish warranty.

ENHANCE YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

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MAXINE POTTER
RESIDENCE
2223 CHESTNUT ST.
SAN ANGELO, TX 76901

SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

SYSTEM INFO.
(43)MISSION SOLAR MSE345SX5T(345W)
(43) ENPHASE IQ7-60-2-US(240V)
DC SYSTEM SIZE: 14.84 KWDC
AC SYSTEM SIZE: 10.75 KWAC

REVISIONS
DESCRIPTION DATE REV

Signature with Seal

DATE:

PROJECT NAME & ADDRESS

SOLARMOUNT

UNIRAC

SOLARMOUNT defined the standard in solar racking. Features are designed to get installers off the roof faster. Our grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Systems can be configured with standard or light rail to meet your design requirements at the lowest cost possible. The superior aesthetics package provides a streamlined clean edge for enhanced curb appeal, with no special brackets required for installation.



Now Featuring:

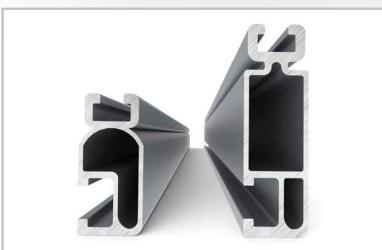
THE NEW FACE OF SOLAR RACKING

Superior Aesthetics Package



LOSE ALL OF THE COPPER & LUGS

System grounding through Enphase microinverters and trunk cables



SMALL IS THE NEXT NEW BIG THING

Light Rail is Fully Compatible with all SM Components



ENHANCED DESIGN & LAYOUT TOOLS

Featuring Google Map Capabilities within U-Builder

FAST INSTALLATION. SUPERIOR AESTHETICS

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

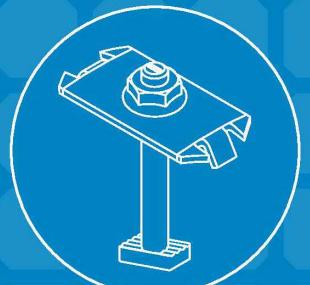
SOLARMOUNT

UNIRAC

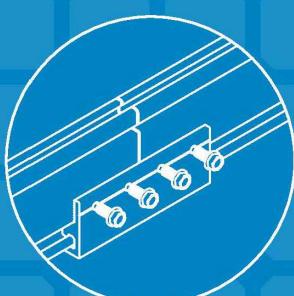
OPTIMIZED COMPONENTS

INTEGRATED BONDING & PRE-ASSEMBLED PARTS

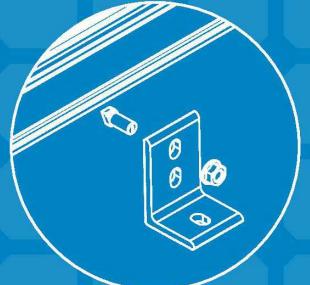
Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps or bonding jumpers to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.



INTEGRATED BONDING
MIDCLAMP



INTEGRATED BONDING
SPLICING BAR



INTEGRATED BONDING
L-FOOT w/ T-BOLT



INTEGRATED BONDING
MICROINVERTER MOUNT w/
WIRE MANAGEMENT

VERSATILITY

ONE PRODUCT - MANY APPLICATIONS

Quickly set modules flush to the roof or at a desired tilt angle. Change module orientation to portrait or landscape while securing a large variety of framed modules on flat, low slope or steep pitched roofs. Available in mill, clear and dark anodized finishes to outperform your projects financial and aesthetic aspirations.

AUTOMATED DESIGN TOOL

DESIGN PLATFORM AT YOUR SERVICE

Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers: there's no need to print results and send to a distributor, just click and share.

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