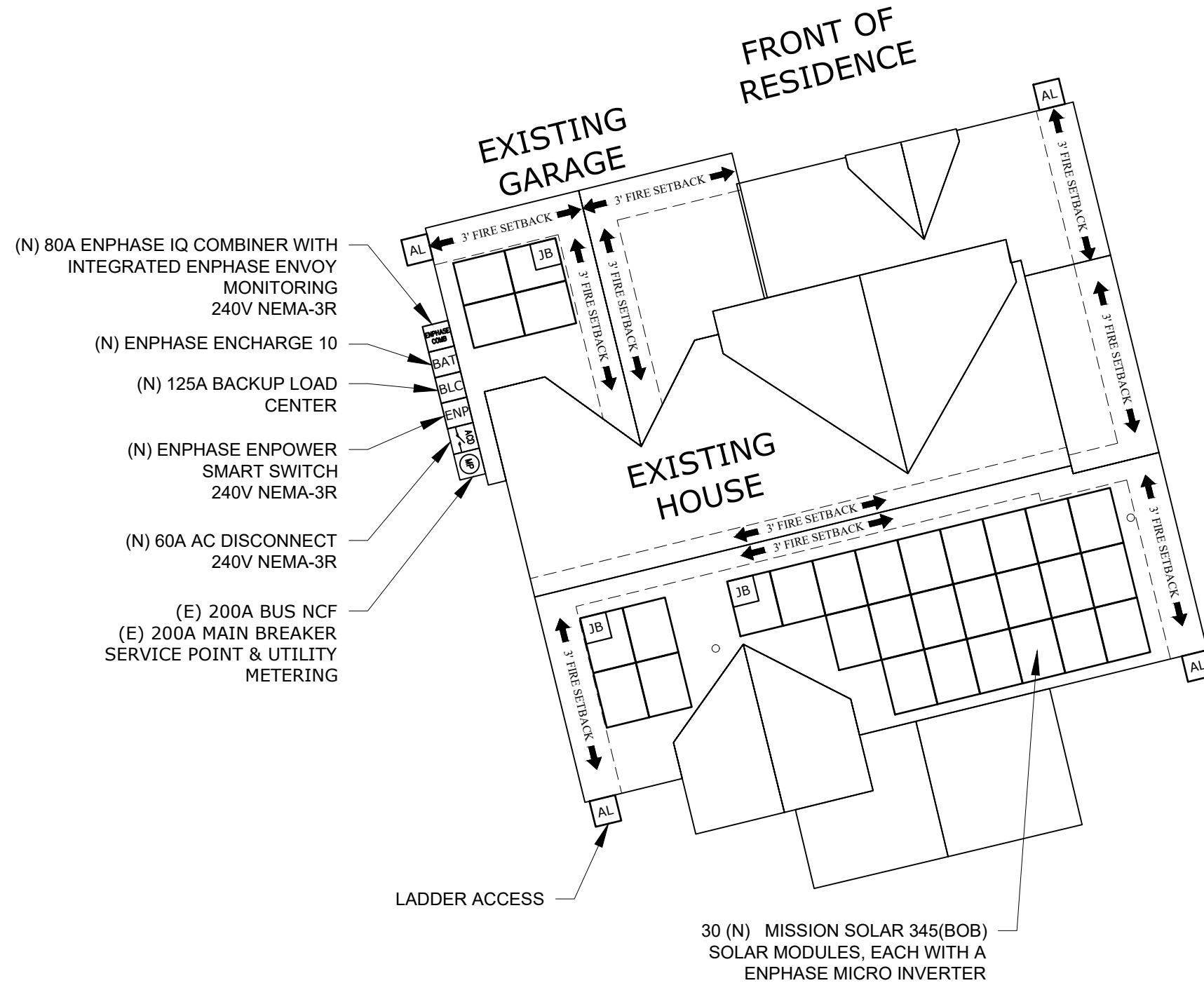


# DANNY RICHARDS

8.70 kW (AC), 10.35 (DC) kW PHOTOVOLTAIC SYSTEM  
19 KENTUCKY DERBY LN LILLINGTON, NC 27546



VON LOOR & SLOOF ENERGY, LLC  
10861 HAMILTON CLUB DR.  
#306 RALEIGH, NC 27617



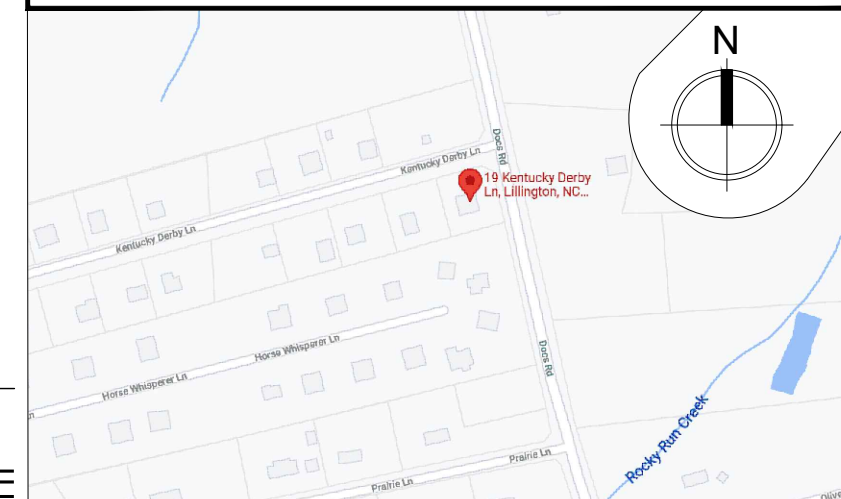
## SCOPE OF WORK:

- |                             |                        |
|-----------------------------|------------------------|
| 30 - MISSION SOLAR 345(BOB) | (N) SOLAR PANELS       |
| -                           | SOLAR PANELS           |
| 30 - IQ7PLUS-72-2-US        | (N) INVERTER           |
| -                           | INVERTER               |
| 1 - ENPHASE ENCHARGE 10     | (N) BATTERY BACKUP     |
| -                           | BATTERY BACKUP         |
| 1 - 200A/200A               | (E) MAIN SERVICE PANEL |

## SHEET INDEX:

- |                |                   |
|----------------|-------------------|
| E1 - SITE PLAN | E6.1 - NOT USED   |
| E2 - NOTES     | E7 - SINGLE LINES |
| E3 - NOT USED  | E7.1 - NOT USED   |
| E4 - NOT USED  | E8 - ELECT. NOTES |
| E5 - ROOF PLAN | E9's - SIGNAGE    |
| E6 - DETAILS   | SPEC SHEETS       |

## VICINITY MAP



NOTE: ALL SCALES SET TO 11X17 SHEET SIZE

PROPOSED SOLAR PHOTOVOLTAIC SYSTEM FOR:

**DANNY RICHARDS**

19 KENTUCKY DERBY LN  
LILLINGTON, NC 27546

PROJECT:

DRAWN BY: DINESH SAHU  
DATE: 11/15/21  
(DC) kW: 10.35  
(AC) kW: 8.70  
PROJECT #:

SHEET NUMBER:

**E1**

# SOLAR PHOTOVOLTAIC SYSTEM NOTES:

ALL MATERIALS, EQUIPMENT, INSTALLATION AND WORK SHALL COMPLY WITH THE FOLLOWING APPLICABLE CODES:

- 2015 IBC
- 2017 NEC
- 2015 IFC
- 2015 IRC
- 2018 NC BUILDING CODE
- 2018 NC ENERGY CODE
- 2017 NATIONAL ELECTRICAL CODE
- 2018 NC FIRE PREVENTION CODE
- 2018 NC MECHANICAL CODE
- 2018 NC PLUMBING CODE
- 2018 NC RESIDENTIAL CODE
- AUTHORITY HAVING JURISDICTION
- FIRE AUTHORITY HAVING JURISDICTION

1. EXISTING PLUMBING VENTS, SKYLIGHTS, EXHAUST OUTLETS, VENTILATIONS INTAKE AIR OPENINGS SHALL NOT BE COVERED BY THE SOLAR PHOTOVOLTAIC SYSTEM.
2. EQUIPMENT. INVERTERS, MOTOR GENERATORS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AC PHOTOVOLTAIC MODULES, SOURCE-CIRCUIT COMBINERS, AND CHARGE CONTROLLERS INTENDED FOR USE IN PHOTOVOLTAIC POWER SYSTEMS SHALL BE IDENTIFIED AND LISTED FOR THE APPLICATION. (CEC 690.4(B))
3. ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED, INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND NON ROOF SWITCHES. ROOF SWITCHES TO BE NEMA 4 RATED.
4. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH CEC ARTICLE 250.
5. PROTECTION DEVICES FOR PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS ALSO CONNECTED TO SOURCES HAVING SIGNIFICANTLY HIGHER CURRENT AVAILABILITY (E.G., PARALLEL STRINGS OF MODULES, UTILITY POWER), SHALL BE PROTECTED AT THE SOURCE FROM OVERCURRENT. [ CEC 690.9(A)]
6. PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION THAT CONTROLS SPECIFIC CONDUCTORS. [ CEC 690.12]
7. THE UTILITY INTERACTIVE INVERTERS SHALL AUTOMATICALLY DE-ENERGIZE ITS OUTPUT TO THE CONNECTED ELECTRICAL PRODUCTION AND DISTRIBUTION NETWORK UPON LOSS OF VOLTAGE IN THE SYSTEM AND SHALL REMAIN IN THAT STATE UNTIL THE ELECTRICAL PRODUCTION AND DISTRIBUTION NETWORK VOLTAGE HAS BEEN RESTORED. [ CEC 705.41]
8. ALL CONDUCTOR EXPOSED TO WEATHER SHALL BE LISTED AND IDENTIFIED FOR USE IN DIRECT SUNLIGHT. [ CEC 310.10(D)(1)]
10. THE MODULE CONDUCTORS MUST BE TYPE USE-2 OR LISTED FOR PHOTOVOLTAIC (PV) WIRE. ( CEC 690.31(C))

10. ALL CONDUCTORS SHALL BE MARKED ON EACH END FOR UNIQUE IDENTIFICATION.
11. AN INSULATED GROUNDED CONDUCTOR OF 6 AWG OR SMALLER SHALL BE IDENTIFIED AS A CONTINUOUS WHITE FINISH. [ CEC 200.6]
12. THE OUTPUT OF AN INTERCONNECTED ELECTRICAL POWER SOURCE SHALL BE PERMITTED TO BE CONNECTED TO THE LOAD SIDE. INTERCONNECTING PROVISIONS FOR OTHER POWER SOURCES SHALL COMPLY WITH 705.12(B)(1) THROUGH 705.12(B)(5)
13. EACH SOURCE INTERCONNECTION OF ONE OR MORE POWER SOURCES INSTALLED IN ONE SYSTEM SHALL BE MADE AT A DEDICATED CIRCUIT BREAKER OR FUSIBLE DISCONNECTING MEANS [ CEC 705.12(B)(1)]
14. THE SUM OF THE AMPERE RATING OF THE OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO THE BUSBAR OR CONDUCTOR SHALL NOT EXCEED 120% OF THE RATING OF BUSBAR OR CONDUCTOR. [ CEC 705.12(B)(2)(3)(B)]
15. A CONNECTION AT EITHER END, BUT NOT BOTH ENDS, OF A CENTER-FED PANEL BOARD IN DWELLINGS SHALL BE PERMITTED WHERE THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR DOES NOT EXCEED 120 PERCENT OF THE CURRENT RATING OF THE BUSBAR. [CEC 705.12(B)(2)(3)(D)]
16. EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUS BAR OR CONDUCTOR SHALL BE MARKED TO INDICATE THE PRESENCE OF ALL SOURCES. [ CEC 705.12(B)(3)]
17. CIRCUIT BREAKER, IF BACKFED, SHALL BE SUITABLE FOR SUCH OPERATION. [ CEC 705.12(B)(4)]
18. TO MINIMIZE OVERHEATING OF THE BUSBAR IN PANELBOARD, THE PANELBOARD MAIN CIRCUIT BREAKER AND THE PV POWER SOURCE CIRCUIT BREAKER SHALL BE PHYSICALLY LOCATED AT THE OPPOSITE END OF THE BUSBAR.
19. ALL THE CEC REQUIRED WARNING SIGNS, MARKINGS, AND LABELS SHALL BE POSTED ON EQUIPMENT AND DISCONNECTS PRIOR TO ANY INSPECTIONS TO BE PERFORMED BY THE BUILDING DEPARTMENT INSPECTOR.
20. WHERE PV SYSTEM DC CIRCUIT'S RUN INSIDE A BUILDING, THEY SHALL BE CONTAINED IN METAL RACEWAYS TYPE MC METAL CLAD CABLE OR METAL ENCLOSURES FROM POINT OF PENETRATION OF THE SURFACE OF THE BUILDING TO THE FIRST READILY ACCESSIBLE DISCONNECTING MEANS. [ CEC 690.31(G)]

20. FLEXIBLE, FINE-STRANDED CABLES SHALL BE TERMINATED ONLY WITH TERMINALS, LUGS, DEVICES OR CONNECTOR THAT ARE IS IN ACCORDANCE WITH CEC 110.14
21. CONNECTORS SHALL BE OF LATCHING OR LOCKING TYPE. CONNECTORS THAT ARE READILY ACCESSIBLE AND OPERATING AT OVER 30V DC OR 15V AC SHALL REQUIRE TOOL TO OPEN AND MARKED "DO NOT DISCONNECT UNDER LOAD" OR "NOT FOR CURRENT INTERRUPTING". [ CEC 690.33(C) & (E)(2)]
22. EQUIPMENT GROUNDING CONDUCTOR FOR PV MODULES SMALLER THAN 6AWG SHALL BE PROTECTED FROM PHYSICAL DAMAGE BY A RACEWAY OR CABLE ARMOR. [ CEC 690.46 & 250.120(C)]
23. AN EQUIPMENT GROUNDING CONDUCTOR SHALL NOT BE SMALLER THAN 14 AWG. [ CEC 690.45]
24. FINE STRANDED CABLES USED FOR BATTERY TERMINALS, DEVICES, AND CONNECTIONS REQUIRE LUGS AND TERMINALS IS IN ACCORDANCE WITH CEC 110.14
25. GROUNDING ELECTRODE CONDUCTOR(S) SHALL BE INSTALLED IN ONE CONTINUOUS LENGTH WITHOUT A SPLICE OR JOINT. IF NECESSARY, SPLICES OR CONNECTIONS SHALL BE MADE AS PERMITTED. (CEC 250.64 C)
26. ALL SMOKE ALARMS, CARBON MONOXIDE ALARMS AND AUDIBLE NOTIFICATION DEVICES SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 217 AND UL 2034. THEY WILL BE INSTALLED IN ACCORDANCE WITH NFPA 72 AND NFPA 720. (IRC 2019 R314 & R315).
27. SMOKE ALARMS AND CARBON MONOXIDE ALARMS WILL BE RETROFITTED INTO THE EXISTING DWELLING. THESE SMOKE ALARMS ARE REQUIRED TO BE IN ALL BEDROOMS, OUTSIDE EACH BEDROOM, AND AT LEAST ONE ON EACH FLOOR OF THE HOUSE. CARBON MONOXIDE ALARMS ARE REQUIRED TO BE RETROFITTED OUTSIDE EACH BEDROOM AND AT LEAST ONE ON EACH FLOOR OF THE HOUSE. THESE ALARMS MAY BE SOLELY BATTERY OPERATED IF THE PHOTOVOLTAIC PROJECT DOES NOT INVOLVE THE REMOVAL OF INTERIOR WALL AND CEILING FINISHES INSIDE THE HOME, OTHERWISE, THE ALARMS MUST BE HARD WIRED AND INTERCONNECTED.

# ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
AHJ	AUTHORITY HAVING JURISDICTION
BLDG	BUILDING
CONC	CONCRETE
CB	COMBINER BOX
CEC	CALIFORNIA ELECTRICAL CODE
CU	COPPER
DP	DISTRIBUTION PANEL
DC	DIRECT CURRENT
EGC	EQUIPMENT GROUNDING CONDUCTOR
(E)	(EXISTING)
FV	FIELD VERIFIED
GALV	GALVANIZED
GEC	GROUNDING ELECTRODE CONDUCTOR
GND	GROUND
HDG	HOT DIPPED GALVANIZED
I	CURRENT
Imp	CURRENT AT MAX POWER
INVT	INVERTER
Isc	SHORT CIRCUIT CURRENT
kVA	KILOVOLT AMPERE
kW	KILOWATT
LBW	LOAD BEARING WALL
MIN.	MINIMUM
MCB	MAIN CIRCUIT BREAKER
MSP	MAIN SERVICE PANEL
(N)	(NEW)
N3R	NEMA 3R, RAIN TIGHT OUTSIDE RATED
NEC	NATIONAL ELECTRICAL CODE
NTS	NOT TO SCALE
OC	ON CENTER
OCPD	OVERCURRENT PROTECTION DEVICE
P	POLES -BREAKER POLES-
PL	PROPERTY LINES
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
RR	ROOF RAFTER
SBC	SOLID BARE COPPER
SP	SOLAR PLANE
SPL	SUBPANEL
SCH	SCHEDULE
SS	STAINLESS STEEL
PTC	PRACTICAL TESTING CONDITIONS
SWH	SOLAR WATER HEATER
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VOLT
Vmp	VOLTAGE AT MAX POWER
Voc	VOLTAGE AT OPEN CIRCUIT
W	WATT

- \* OCCUPANCY TYPE: R-3
- \* CONSTRUCTION TYPE: TYPE V-B
- \* UNSPRINKLERED

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19 KENTUCKY DERBY LN  
LILLINGTON, NC 27546

PROJECT:

DRAWN BY:	DINESH SAHU
DATE:	11/15/21
(DC) kW:	10.35
(AC) kW:	8.70
PROJECT #:	----

SHEET NUMBER:

**E2**

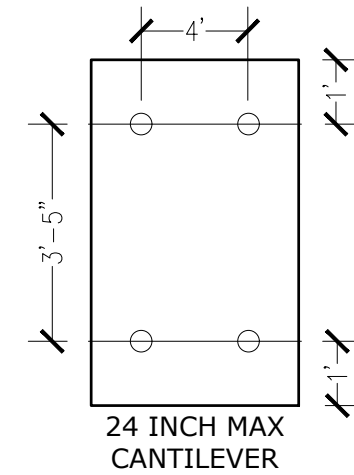
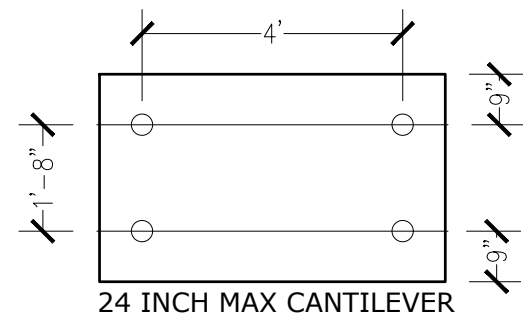
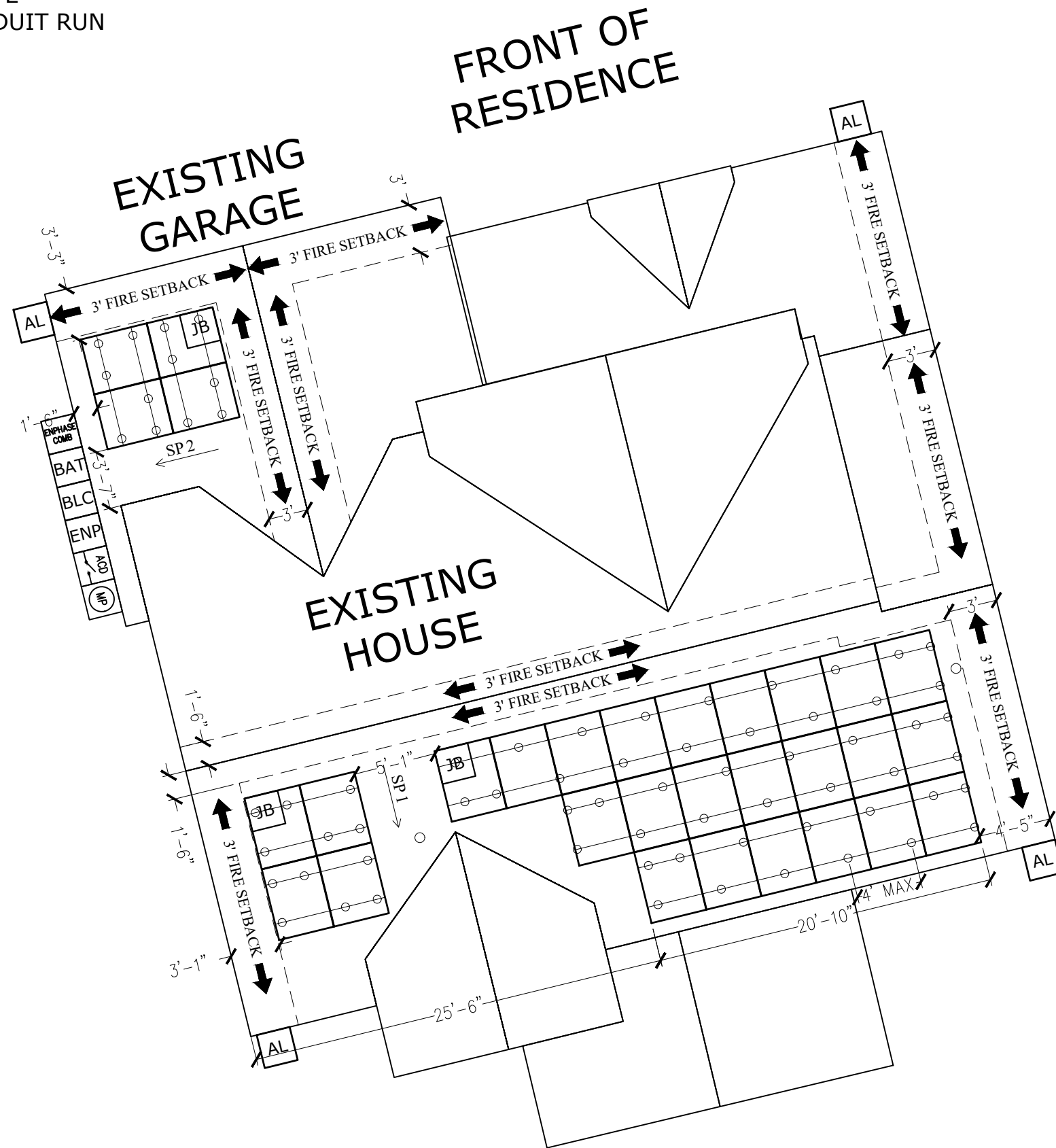


ROOF#	1	PITCH	39°	AZIMUTH	166°	MATERIAL	COMP SHINGLES	SP SQ.FT	975.50	ARRAY SQ.FT	515.61	RAFTER SPECS	2X4@24"O.C.
-------	---	-------	-----	---------	------	----------	---------------	----------	--------	-------------	--------	--------------	-------------

ROOF#	1	PITCH	44°	AZIMUTH	256°	MATERIAL	COMP SHINGLES	SP SQ.FT	281.03	ARRAY SQ.FT	79.33	RAFTER SPECS	2X4@24"O.C.
-------	---	-------	-----	---------	------	----------	---------------	----------	--------	-------------	-------	--------------	-------------

NEW PV CONDUIT TO BE RUN UNDER EVE  
WHENEVER POSSIBLE. PROPOSED CONDUIT RUN  
SUBJECT TO CHANGE BY INSTALLER.

70 ATTACHMENTS INSTALLED  
@ 48" O.C. MAX (TYP)



ARRAY AREA & ROOF AREA  
CALC'S

# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
30	594.94	3296.98	18.04

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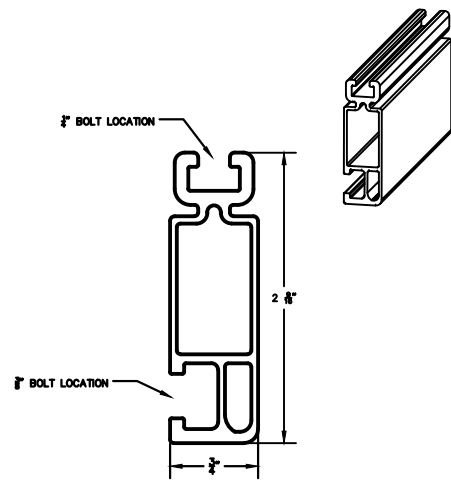
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DRAWN BY:	DINESH SAHU
DATE:	11/15/21
(DC) kW:	10.35
(AC) kW:	8.70
PROJECT #:	----

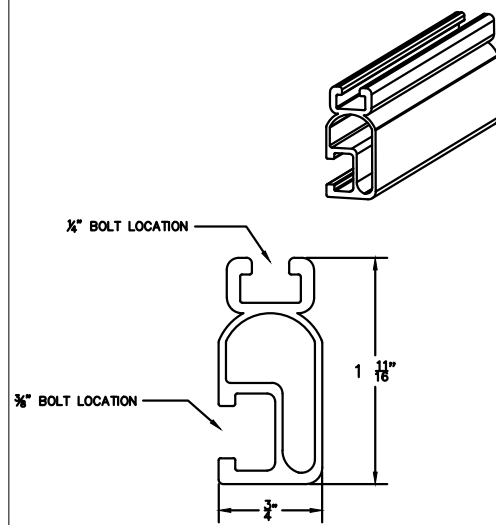
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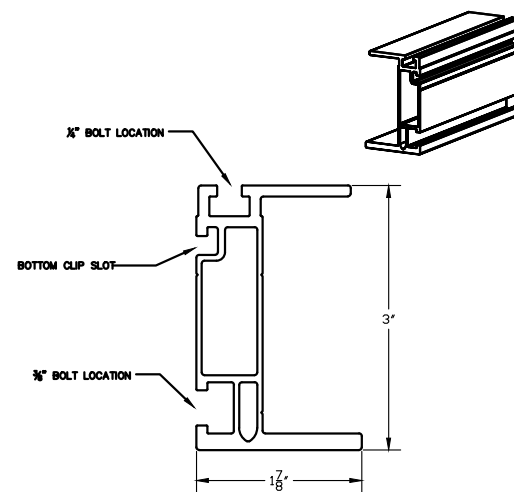
**ROOF PLAN**  
SCALE: 1/8" = 1'-0"



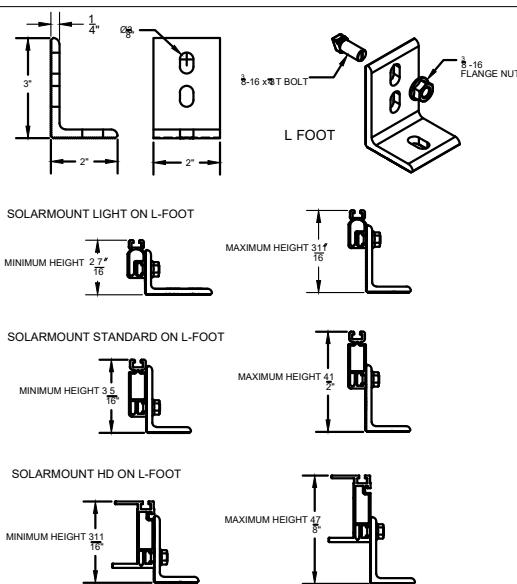
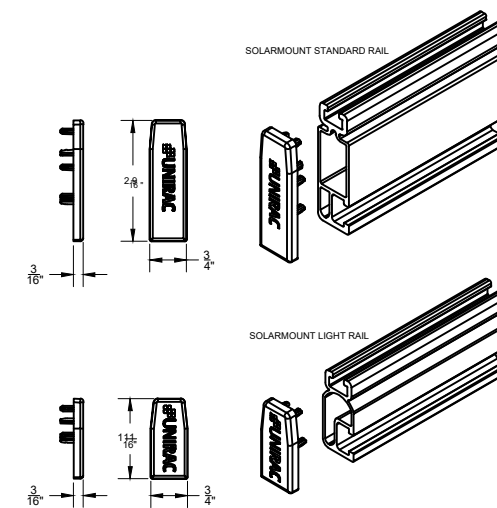
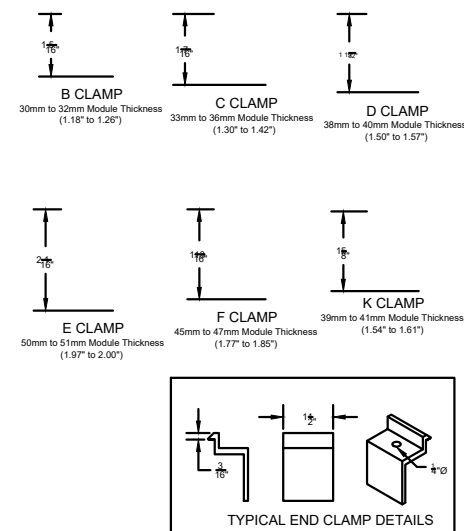
Standard Rail Lengths:  
132"  
168"  
208"  
240"



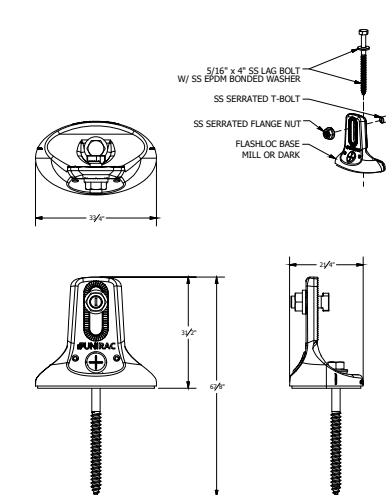
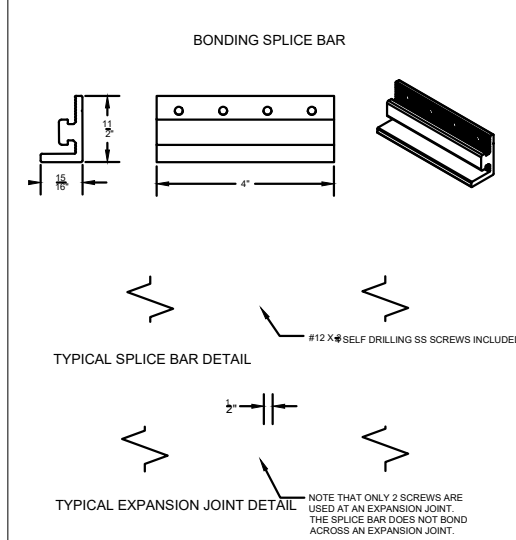
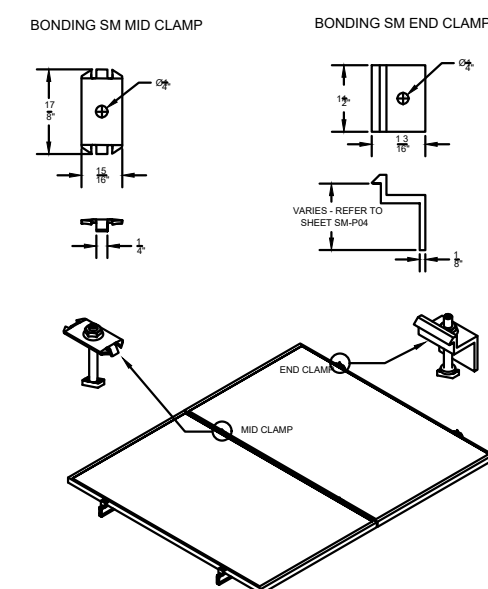
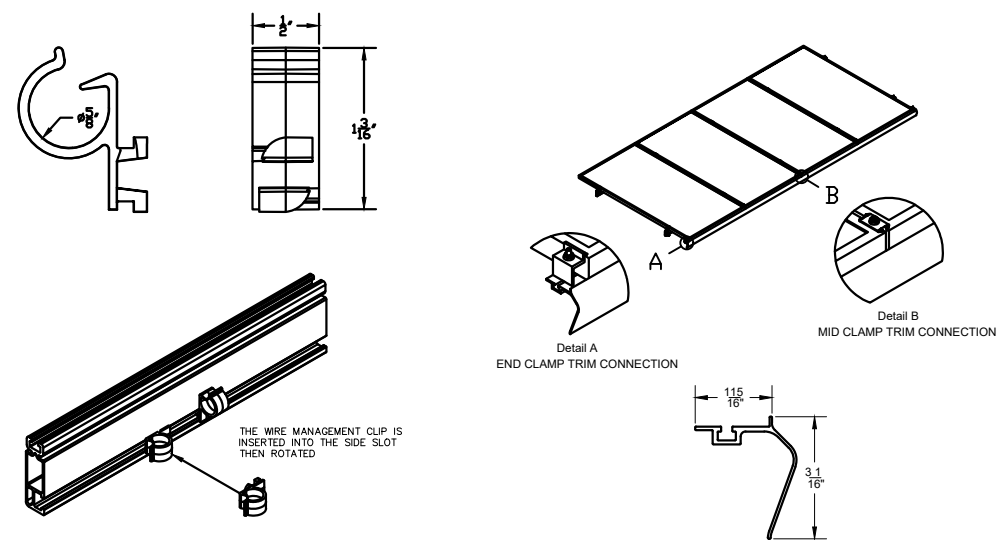
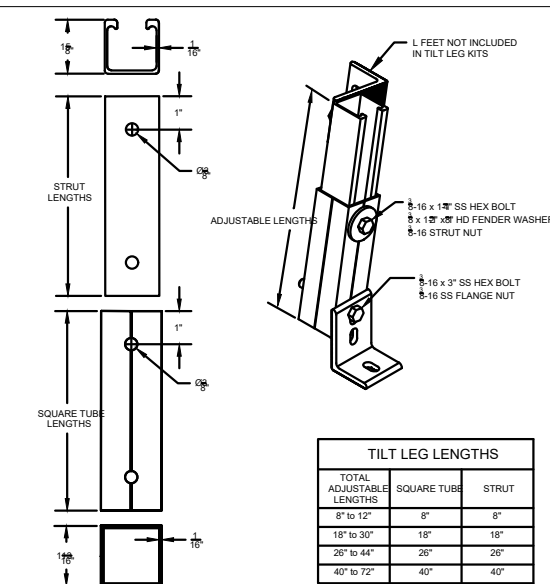
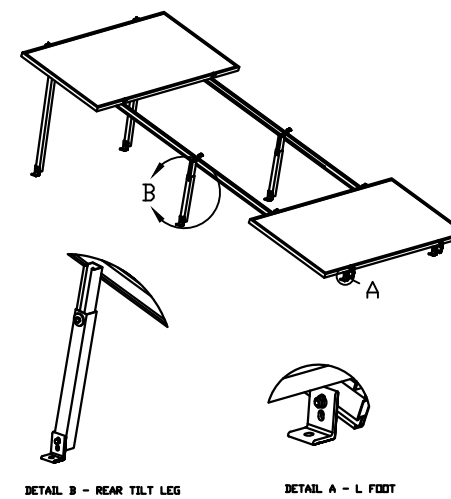
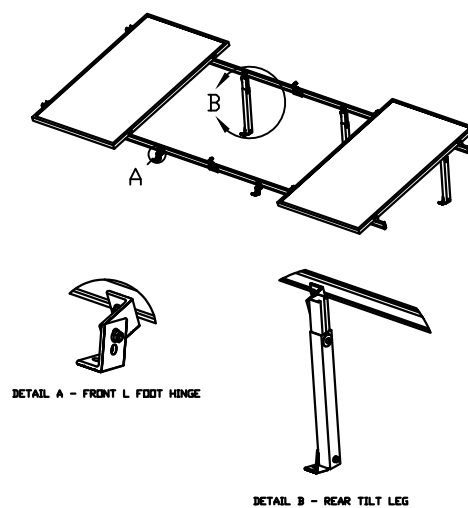
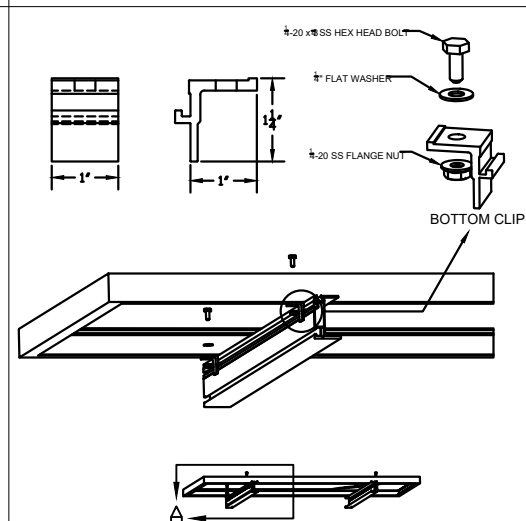
Standard Rail Lengths:  
168"  
240"



Standard Rail Lengths:  
144"  
168"  
204"  
240"



NOTE: L-FOOT CAN BE INSTALLED IN TWO ORIENTATIONS. PLEASE REFER TO INSTRUCTIONS IN THE QUICK START GUIDE



VON LOOR & SLOOF ENERGY, LLC  
10861 HAMILTON CLUB DR.  
#306 RALEIGH, NC 27617



PROPOSED SOLAR PHOTOVOLTAIC SYSTEM FOR:  
**DANNY RICHARDS**

19 KENTUCKY DERBY LN  
LILLINGTON, NC 27546

PROJECT:

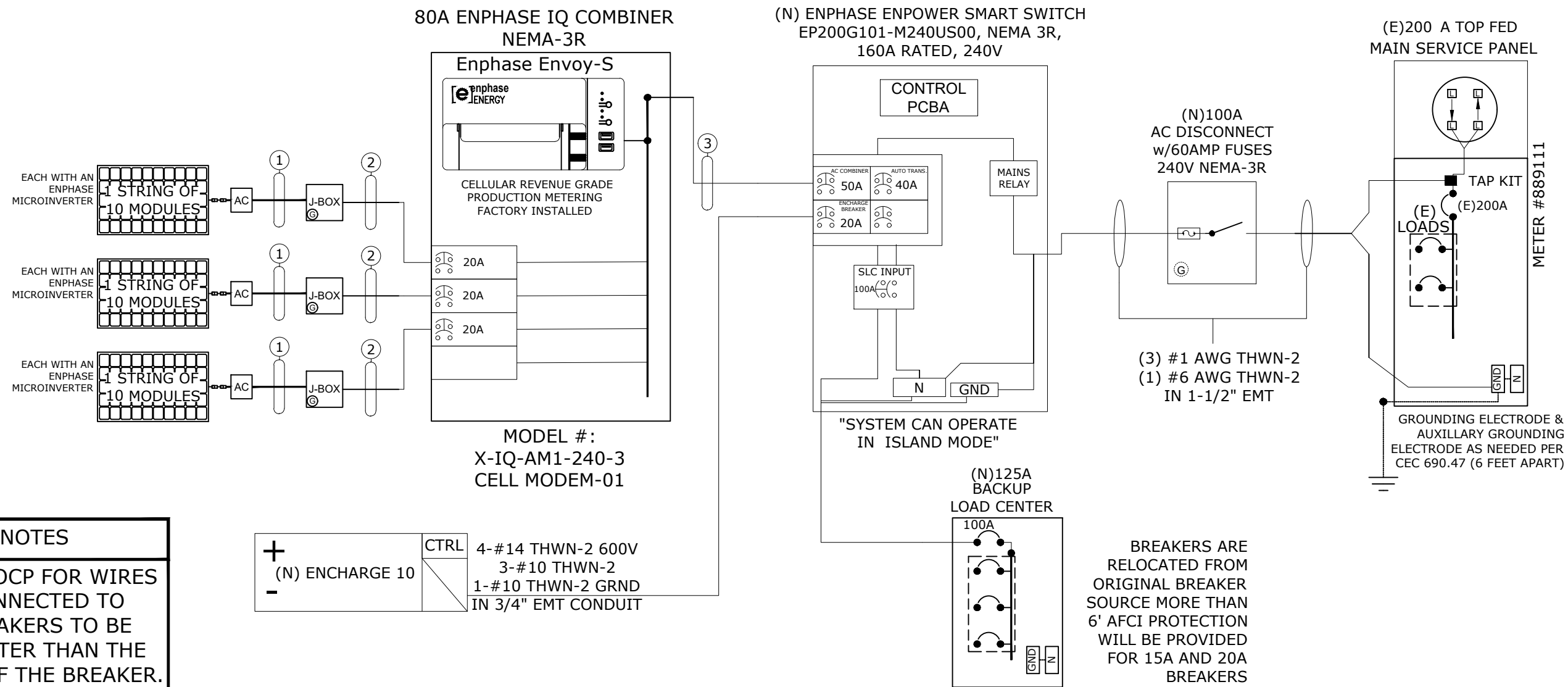
DRAWN BY: DINESH SAHU  
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**E6**

**ATTACHMENT DETAIL**  
SCALE: 187/256" = 1'-0"



SERVICE INFO		INVERTER SPECS			MODULE SPECS				ASHRAE AMBIENT TEMPERATURE SPECS			
UTILITY COMPANY: DUKE ENERGY	MSP VOLTAGE: 120/240	INVERTER: IQ7PLUS-72-2-US	QTY: 30	WATTAGE: 345	FRAME COLOR: BLACK	High Temp	DISTANCE ABOVE ROOF	EXTREME	2% Avg.	1"	MIN	
MSP LOC: RIGHT	SERV. TYPE: UNDERGROUND	MSP GROUND: (N) ROD	VOLTAGE: 240V	WATTAGE: 290	CEC EFF: 97.5%	Voc: 41.0	Isc: 10.92	Imp: 10.34	Vpmax: 33.37	36.2° C	NO TEMP ADDER PER 310.15(B)(3)(C)	-9.9° C



**NOTES**

WIRE OCP FOR WIRES CONNECTED TO BREAKERS TO BE GREATER THAN THE SIZE OF THE BREAKER.

EQUIPMENT TERMINALS ARE RATED AT 75°C. STRING AMPERAGE NOT TO EXCEED THE 75°C RATING OF THE WIRE THAT IS ATTACHED TO THE TERMINALS.

WIRE TAG #	CONDUIT	WIRE QTY	WIRE GAUGE	WIRE TYPE ENPHASE TRUNK CABLE INCLUDES #12 GROUND	TEMP RATING	WIRE AMP	TEMP DE-RATE	CONDUIT FILL	WIRE OCP	TERMINAL 75°C RATING	INVERTER QTY	NOC	NEC	STRING AMPS	GRND SIZE	GRND WIRE TYPE
1	Open Air	2	12	Trunk Cable	90°C	30	x 0.91	x 1	= 27.3A	25	15	x 1.21	x 1.25	= 22.69 A	#6	SBC
2	3/4" EMT	2	10	THWN-2	90°C	40	x 0.91	x 1	= 36.4A	35	15	x 1.21	x 1.25	= 22.69 A	#6	THWN-2
3	1" EMT	3	6	THWN-2	90°C	75	x 0.91	x 1	= 68.2A	65	30	x 1.21	x 1.25	= 45.38 A	#8	THWN-2

**WARNING:**  
THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR.

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19 KENTUCKY DERBY LN  
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SHEET NUMBER:  
**E7**

# ELECTRICAL NOTES:

- 1) ALL MODULES WILL BE GROUNDED IN ACCORDANCE WITH CODE AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 2) ALL PV EQUIPMENT SHALL BE LISTED BY A RECOGNIZED TESTED LAB.
- 3) NOTIFY SERVING UTILITY BEFORE ACTIVATION OF PV SYSTEM.
- 4) WHEN A BACKFED BREAKER IS THE METHOD OF UTILITY INTERCONNECTION, BREAKER SHALL NOT READ LINE AND LOAD.
- 5) WHEN A BACKFED BREAKER IS THE METHOD OF UTILITY INTERCONNECTION, THE BREAKER SHALL BE INSTALLED AT THE OPPOSITE END OF THE BUS BAR OF THE MAIN BREAKER.
- 6) WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER  
[CEC 110.26(A)(1), 110.26(A)(2) & 110.26(A)(3)]
- 7) ALL EXTERIOR CONDUITS, FITTINGS AND BOXES SHALL BE RAIN-TIGHT AND APPROVED FOR USE IN WET LOCATIONS PER  
[CEC 314.15].
- 8) ALL METALLIC RACEWAYS AND EQUIPMENT SHALL BE BONDED AND ELECTRICALLY CONTINUOUS.
- 9) ALL PV EQUIPMENT, SYSTEMS AND ALL ASSOCIATED WIRING AND INTERCONNECTIONS SHALL BE INSTALLED BY QUALIFIED PERSONS.
- 10) THE PHOTOVOLTAIC SYSTEM CONDUCTORS SHALL BE IDENTIFIED AND GROUPED. THE MEANS OF IDENTIFICATION SHALL BE PERMITTED BY SEPARATED COLOR CODING, MARKING TAPE, TAGGING OR OTHER APPROVED MEANS. [CEC 690.31(B)(1)]
- 11) ADEQUATE SPACING MUST BE MAINTAINED BETWEEN ANY PLUMBING SEWER VENTS EXTENDING THROUGH THE ROOF AND THE UNDERSIDE OF THE PHOTOVOLTAIC PANELS (6" MINIMUM RECOMMENDED).
- 12) PV EQUIPMENT, SYSTEMS AND ALL ASSOCIATED WIRING AND INTERCONNECTIONS SHALL ONLY BE INSTALLED BY QUALIFIED PERSONS [CEC 690.4 C].
- 13) THE SUM OF 125 PERCENT OF THE INVERTER(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED THE AMPACITY OF THE BUSBAR.  
[CEC 705.12(B)(2)(3)(A)]
- 14) A CONNECTION AT EITHER END, BUT NOT BOTH ENDS, OF A CENTER-FED PANEL BOARD IN DWELLINGS SHALL BE PERMITTED WHERE THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR DOES NOT EXCEED 120 PERCENT OF THE CURRENT RATING OF THE BUSBAR.  
[CEC 705.12(B)(2)(3)(D)]

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PROPOSED  
SOLAR PHOTOVOLTAIC SYSTEM FOR:  
**DANNY RICHARDS**

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19 KENTUCKY DERBY LN  
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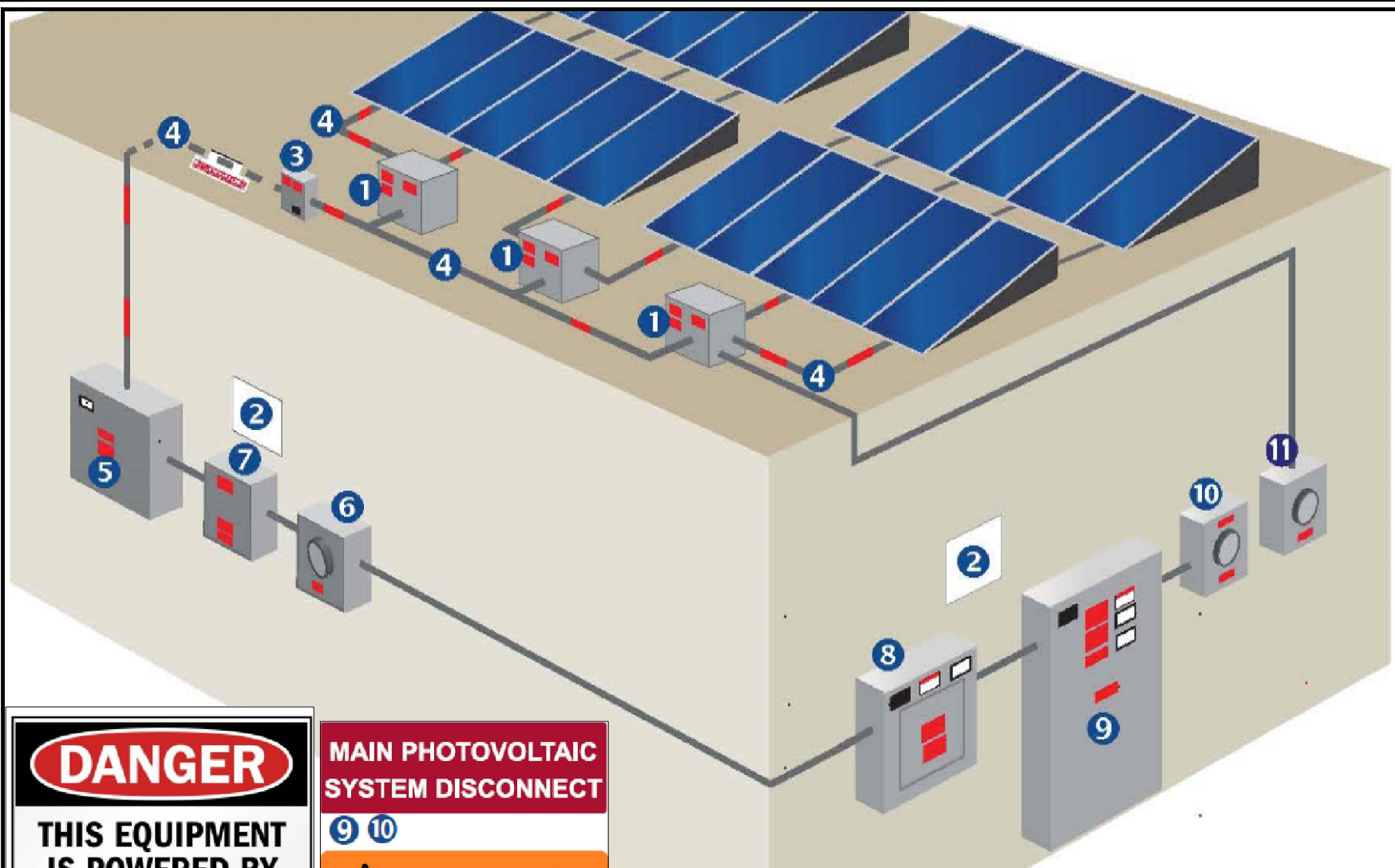
PROJECT:

DRAWN BY: DINESH SAHU  
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(DC) kW: 10.35  
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SHEET NUMBER:

**E8**





**DANGER**  
THIS EQUIPMENT IS POWERED BY MULTIPLE SOURCES  
9  
**PHOTOVOLTAIC AC DISCONNECT**  
7

**MAIN PHOTOVOLTAIC SYSTEM DISCONNECT**  
9 10  
**WARNING**  
POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.  
8 9

**CAUTION**  
TRI POWER SOURCE  
SECOND POWER SOURCE IS AC BATTERY  
THIRD SOURCE IS PV INVERTER  
8 9

**WARNING**  
ELECTRICAL SHOCK HAZARD  
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION  
7 8 9

**DO NOT DISCONNECT UNDER LOAD**  
8 9

**CAUTION**  
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED  
8 9

**WARNING** DUAL POWER SOURCE  
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM  
8 9

**WARNING**  
THE DISCONNECTION OF THE GROUNDED CONDUCTOR(S) MAY RESULT IN OVERVOLTAGE ON THE EQUIPMENT  
5

**WARNING: PHOTOVOLTAIC POWER SOURCE**  
4

**WARNING**  
ELECTRICAL SHOCK HAZARD  
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION  
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT  
3

**PHOTOVOLTAIC DC DISCONNECT**  
3

**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**  
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY  
9 11

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**  
11

**A = BLACK  
B = RED  
C = BLUE  
NEUTRAL = WHITE**

**WARNING**  
SHOCK HAZARD  
TERMINALS ON THE LINE BE ENERGIZED IN THE OPEN POSITION  
8 9

**WARNING**  
TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL  
1 8 9

**WARNING**  
ELECTRICAL SHOCK HAZARD  
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION  
7 8 9

- MARKING PV CIRCUIT**
- MARKING IS REQUIRED ON ALL INTERIOR AND EXTERIOR PV CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, AND JUNCTION BOXES TO ALERT THE FIRE SERVICE TO AVOID CUTTING THEM. MARKING SHALL BE PLACED EVERY 10 FEET, AT TURNS AND ABOVE AND/OR BELOW PENETRATIONS, AND AT ALL PV COMBINER AND JUNCTION BOXES.
- REFLECTIVE WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (DURABLE ADHESIVE MATERIALS MUST MEET THIS REQUIREMENT)
- MARKING CONTENT AND FORMAT PER [ CEC 110.21(B) ] WITH REFERENCE TO ANSI Z535.4-2011
- BACKGROUND PER ANSI Z535.4-2011
  - LETTERING PER ANSI Z535.4-2011
  - MINIMUM 3/8" LETTER HEIGHT
  - ALL CAPITAL LETTERS
  - ARIAL OR SIMILAR FONT, NON BOLD
- 1 LABEL FOR COMBINER BOX / CIRCUITS / CONDUIT COMBINER BOX / ENCLOSURES / EMT ENCLOSURES
  - 2 LABEL FOR MAIN SERVICE PANEL PLACARD
  - 3 LABEL FOR DC DISCONNECT / BREAKER / RECOMBINER BOX
  - 4 WARNING LABEL SHALL BE PLACED ON INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, JUNCTION BOXES, AND DISCONNECTS. MARKING SHALL BE PLACED ON INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES EVERY 10 FEET (3048 MM), 1 FOOT OF TURNS OR BENDS AND WITHIN 1 FOOT ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS OR BARRIERS.
  - 5 LABEL FOR WALL MOUNTED INVERTER (IF USED)
  - 6 LABEL FOR PRODUCTION / NET METER
  - 7 LABEL FOR AC DISCONNECT / BREAKER / POINTS OF CONNECTION
  - 8 LABEL FOR BREAKER PANEL / PULL BOXES
  - 9 LABEL FOR MAIN SERVICE DISCONNECT / UTILITY METER
  - 10 LABEL FOR MAIN SERVICE DISCONNECT / UTILITY METER
  - 11 LABEL FOR RAPID SHUTDOWN DEVICE



SOLAR LOAD CENTER  
NO ADDITIONAL LOADS ALLOWED

8 LABEL TO BE INSTALLED ON THE INSIDE AND THE OUTSIDE OF THE LOAD CENTER

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT: 36.30 A  
NOMINAL OPERATING AC VOLTAGE: 240 V

INVERTER  
AMPERAGE

5 7 8

PHOTOVOLTAIC POWER SOURCE

OPERATING AC VOLTAGE: 240 V  
MAXIMUM OPERATING AC OUTPUT  
CURRENT: 52.30 AMPS

THIS IS THE  
COMBINED  
AMPERAGE OF  
INVERTER AND  
BATTERY

LABEL FOR MAIN SERVICE PANEL COVER

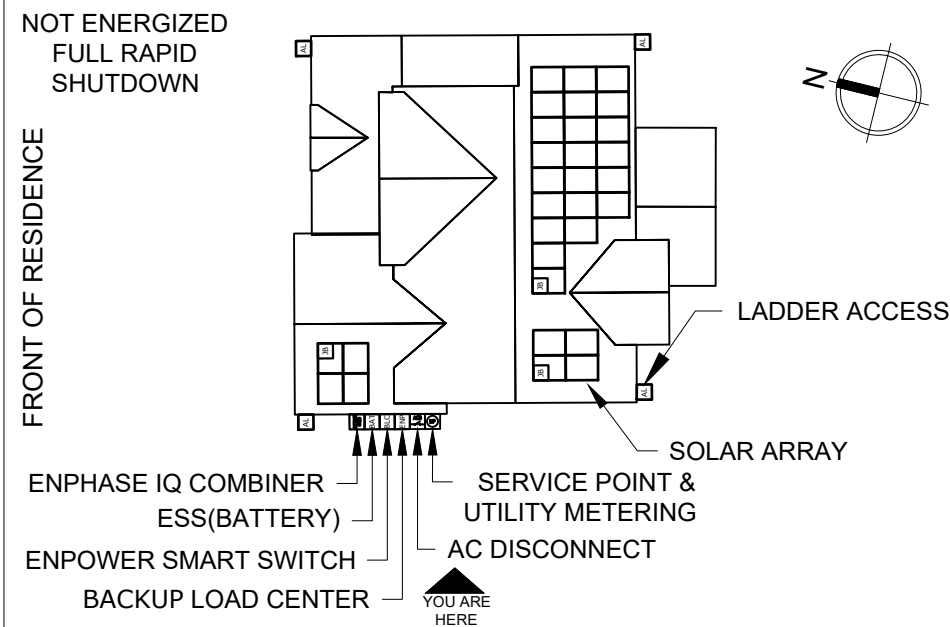
ENERGY STORAGE SYSTEM

NOMINAL ESS VOLTAGE: 240 VAC  
OPERATING CURRENT: 16 AAC

LABEL FOR ESS BATTERY ,  
QTY-1

# CAUTION

POWER TO THIS BUILDING IS ALSO  
SUPPLIED FROM THE FOLLOWING  
SOURCES WITH DISCONNECTS  
LOCATED AS SHOWN:



2 PLACARD RIVITED TO THE MAIN SERVICE PANEL

VON LOOR & SLOOF  
ENERGY, LLC  
10861 HAMILTON CLUB DR.  
#306 RALEIGH, NC 27617



PROPOSED  
SOLAR PHOTOVOLTAIC SYSTEM FOR:  
**DANNY RICHARDS**

19 KENTUCKY DERBY LN  
LILLINGTON, NC 27546

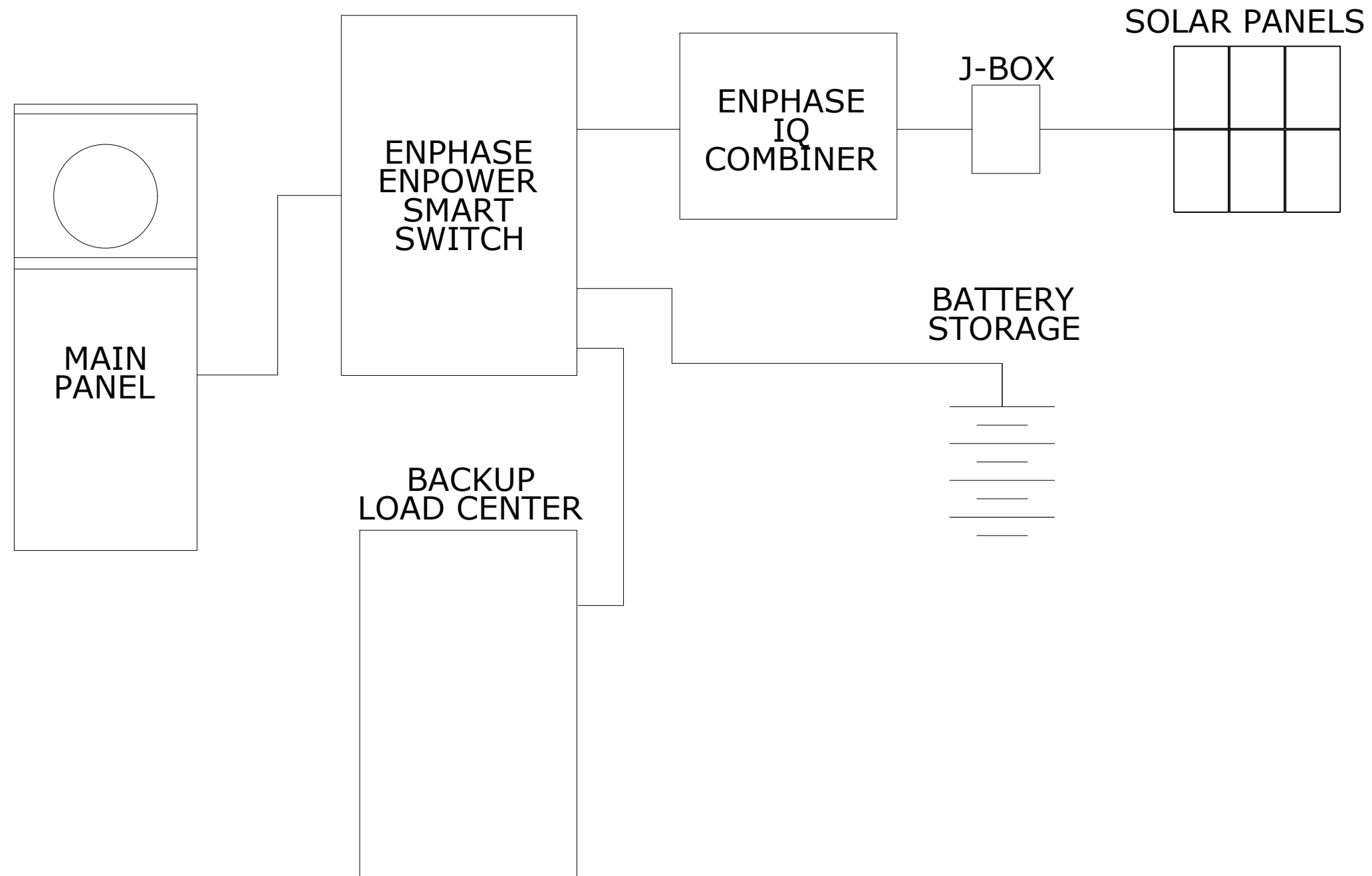
PROJECT:

DRAWN BY: DINESH SAHU  
DATE: 11/15/21  
(DC) KW: 10.35  
(AC) KW: 8.70  
PROJECT #: ----

SHEET NUMBER:

**E9.1**

# SINGLE LINE PLACARD CAUTION SITE MAP



VON LOOR & SLOOF  
ENERGY, LLC  
10861 HAMILTON CLUB DR.  
#306 RALEIGH, NC 27617



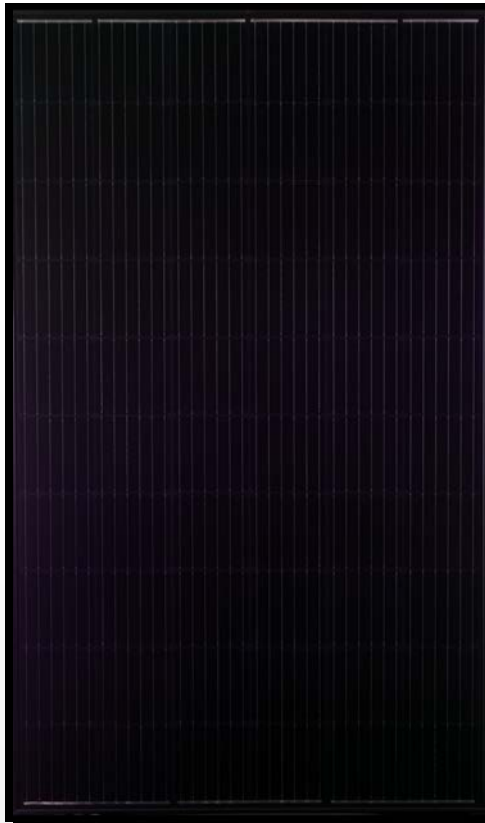
PROPOSED  
SOLAR PHOTOVOLTAIC SYSTEM FOR:  
**DANNY RICHARDS**

19 KENTUCKY DERBY LN  
LILLINGTON, NC 27546

PROJECT:

DRAWN BY: DINESH SAHU  
DATE: 11/15/21  
(DC) kW: 10.35  
(AC) kW: 8.70  
PROJECT #: ----

SHEET NUMBER:  
**E9.3**



### CLASS LEADING POWER OUTPUT

# 345 W

POSITIVE POWER TOLERANCE

## -0 to +3 %

### The True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas, where we manufacture our modules. We produce American, high quality solar modules ensuring the highest in class power output and best in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long-term. Demand the best, demand Mission Solar Energy.



#### 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
- > 40mm frame



#### BAA COMPLIANT FOR GOVERNMENT PROJECTS

- > Buy American Act
- > American Recovery & Reinvestment Act



#### FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2% in year one and 0.7% annually from years two to 30 with 81.2% 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/](http://www.missionsolar.com/warranty/)



### ELECTRICAL SPECIFICATION

Product Type	MSExxxSX5T (xxx=P <sub>max</sub> )					
Power Output	P <sub>max</sub>	W <sub>p</sub>	<b>330</b>	<b>335</b>	<b>340</b>	<b>345</b>
Module Efficiency	%		17.9	18.2	18.5	18.7
Tolerance	%		0/+3	0/+3	0/+3	0/+3
Short Circuit Current	I <sub>sc</sub>	V	10.72	10.78	10.86	10.92
Open Circuit Voltage	V <sub>oc</sub>	A	40.40	40.58	40.82	41.00
Rated Current	I <sub>mp</sub>	V	10.05	10.14	10.24	10.34
Rated Voltage	V <sub>mp</sub>	V	32.85	33.03	33.20	33.37
Fuse Rating	A		20	20	20	20
System Voltage	V		1000	1000	1000	1000

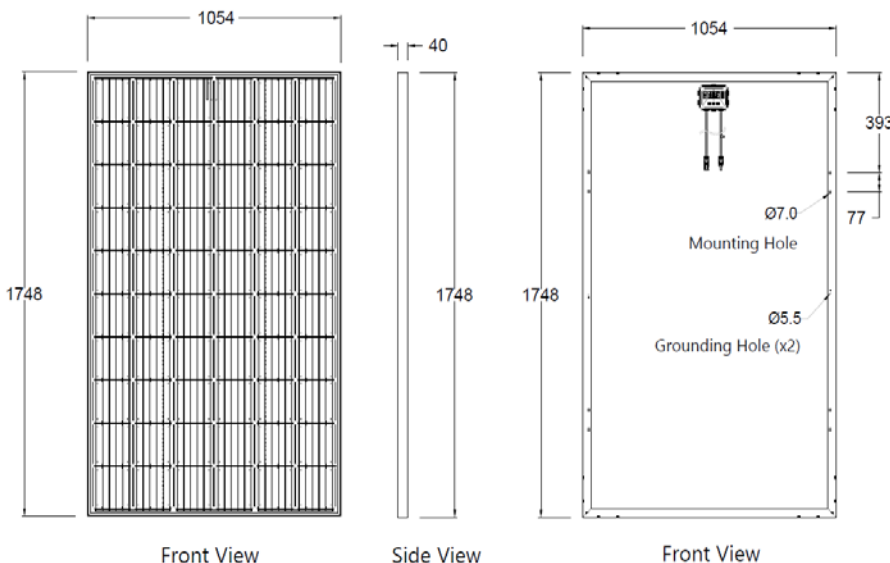
### TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44.43°C (±3.7%)
Temperature Coefficient of P <sub>max</sub>	-0.361%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.262%/°C
Temperature Coefficient of I <sub>sc</sub>	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

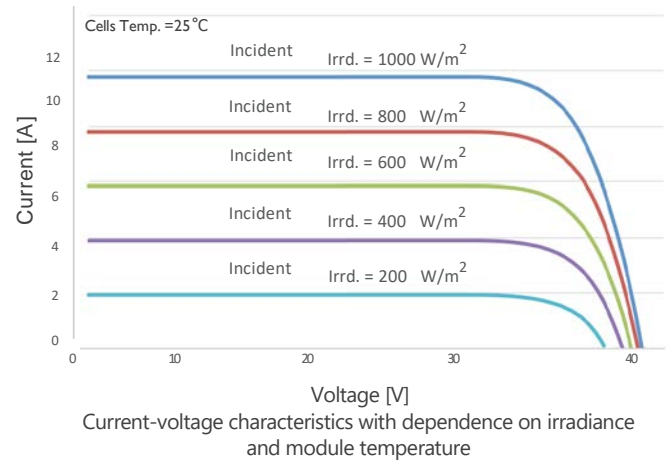
### BASIC DIMENSIONS (UNITS: mm)



### 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 <sup>2</sup> (12AWG)
Connector	Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MC4, Renhe 05-8

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



### CERTIFICATIONS & TESTS

IEC	61215, 61730, 61701
UL	61730



CEC



### SHIPPING INFORMATION

Container FT	Ship To	Pallet	Panels	345 W Bin
53'	Most states	34	884	304.98 kW
Double Stack	California	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)	

# Enphase Encharge 10

MODEL NUMBER	
ENCHARGE-10-1P-NA	Encharge 10 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes: - Three Encharge 3.36 kWh base units (B03-A01-US00-1-3) - One Encharge 10 cover kit with cover, wall mounting bracket, watertight conduit hubs, and interconnect kit for wiring between batteries (B10-C-1050-0)
ACCESSORIES	
ENCHARGE-HNDL-R1	One set of Encharge base unit installation handles
OUTPUT (AC)	
	@ 240 VAC <sup>1</sup>
Rated (continuous) output power	3.84 kVA
Peak output power	5.7 kVA (10 seconds)
Nominal voltage / range	240 / 211 – 264 VAC
Nominal frequency / range	60 / 57 – 61 Hz
Rated output current	16 A
Peak output current	24.6A (10 seconds)
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Maximum units per 20 A branch circuit	1 unit (single phase)
Interconnection	Single-phase
Maximum AC short circuit fault current over 3 cycles	69.6 Arms
Round trip efficiency <sup>2</sup>	89%
BATTERY	
Total capacity	10.5 kWh
Usable capacity	10.08 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2 V
Maximum DC voltage	73.5 V
Ambient operating temperature range	-15° C to 55° C (5° F to 131° F) non-condensing
Optimum operating temperature range	0° C to 30° C (32° F to 86° F)
Chemistry	Lithium iron phosphate (LFP)
MECHANICAL DATA	
Dimensions (WxHxD)	1070 mm x 664 mm x 319 mm (42.13 in x 26.14 in x 12.56 in)
Weight	Three individual 44.2 kg (97.4 lbs) base units plus 21.1 kg (48.7 lbs) cover and mounting bracket; total 154.7 kg (341 lbs)
Enclosure	Outdoor – NEMA type 3R
IQ 8X-BAT microinverter enclosure	NEMA type 6
Cooling	Natural convection – No fans
Altitude	Up to 2500 meters (8200 feet)
Mounting	Wall mount
FEATURES AND COMPLIANCE	
Compatibility	Compatible with grid-tied PV systems. Compatible with Enphase M215/M250 and IQ Series Micros, Enphase Enpower, and Enphase IQ Envoy for backup operation.
Communication	Wireless 2.4 GHz
Services	Backup, self-consumption, TOU, Demand Charge, NEM Integrity
Monitoring	Enlighten Manager and MyEnlighten monitoring options; API integration
Compliance	UL 9540, UN 38.3, UL 9540A, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell Module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2, UL 1741SA, CAN/CSA C22.2 No. 1071-16, and IEEE 1547
LIMITED WARRANTY	
Limited Warranty <sup>3</sup>	>70% capacity, up to 10 years or 4000 cycles

1. Supported in backup/off grid operations
2. AC to Battery to AC at 50% power rating.
3. Whichever occurs first. Restrictions apply.

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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Data Sheet  
Enphase Storage System

## Enphase Encharge 10

The **Enphase Encharge 10™** all-in-one AC-coupled storage system is **reliable, smart, simple, and safe**. It is comprised of three base Encharge 3™ storage units, has a total usable energy capacity of 10.08 kWh and twelve embedded grid-forming microinverters with 3.84 kW power rating. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



### Reliable

- Proven high reliability IQ Series Microinverters
- Ten-year limited warranty
- Three independent Encharge storage base units
- Twelve embedded IQ 8X-BAT Microinverters
- Passive cooling (no moving parts/fans)

### Smart

- Grid-forming capability for backup operation
- Remote software and firmware upgrade
- Mobile app-based monitoring and control
- Support for self consumption
- Utility time of use (TOU) optimization

### Simple

- Fully integrated AC battery system
- Quick and easy plug-and-play installation
- Interconnects with standard household AC wiring

### Safe

- Cells safety tested
- Lithium iron phosphate (LFP) chemistry for maximum safety and longevity

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



# Install the Enphase Encharge Storage System

To install the Enphase **Encharge 3™** storage system or **Encharge 10™** storage system and the Enphase wall-mount bracket, read and follow all warnings and instructions in this guide. Safety warnings are listed on the back of this guide. These instructions are not meant to be a complete explanation of how to design and install an energy storage system. All installations must comply with national and local electrical codes and standards. **Only qualified electricians shall install, troubleshoot, or replace the Encharge 3 or Encharge 10.**

The Encharge™ storage system includes the Enphase Encharge Battery(ies) with integrated Enphase IQ™ Microinverters. The Enphase IQ Envoy™ communication gateway measures PV production and home energy consumption. The Encharge storage system senses when it is optimal to charge or discharge the battery so that energy is stored when it is abundant and used when scarce. Encharge storage systems are capable of providing backup power when an Enphase Enpower™ smart switch is installed at the site.

Five unique installation scenarios are shown:

**Whole home backup with Enpower as service entrance and PV combiner connected to Enpower.** This is the preferred configuration for backup of the entire main load panel. This configuration supports up to an 80A breaker for the PV circuit and an 80A breaker for battery storage.

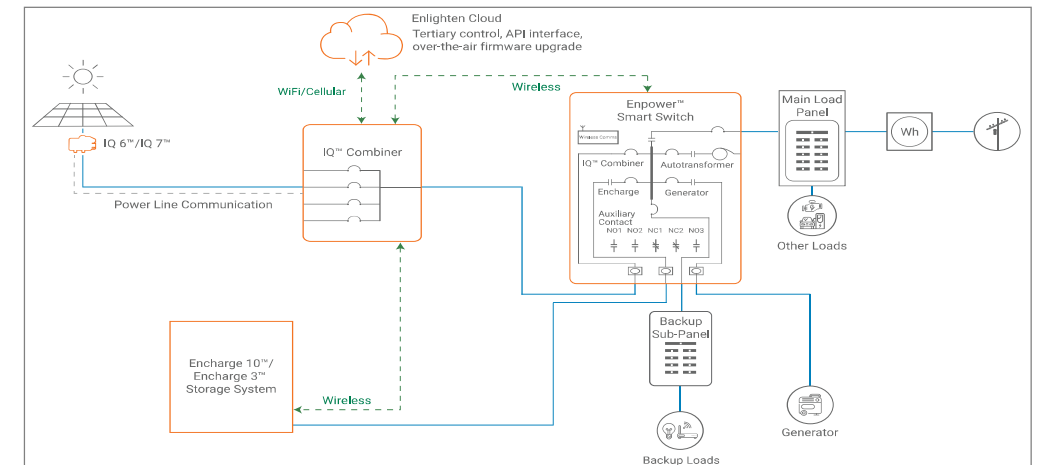
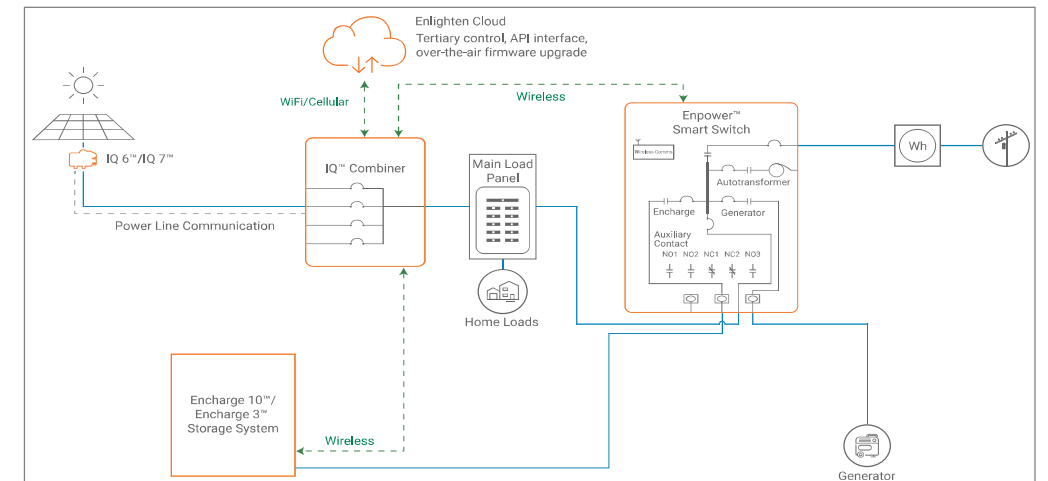
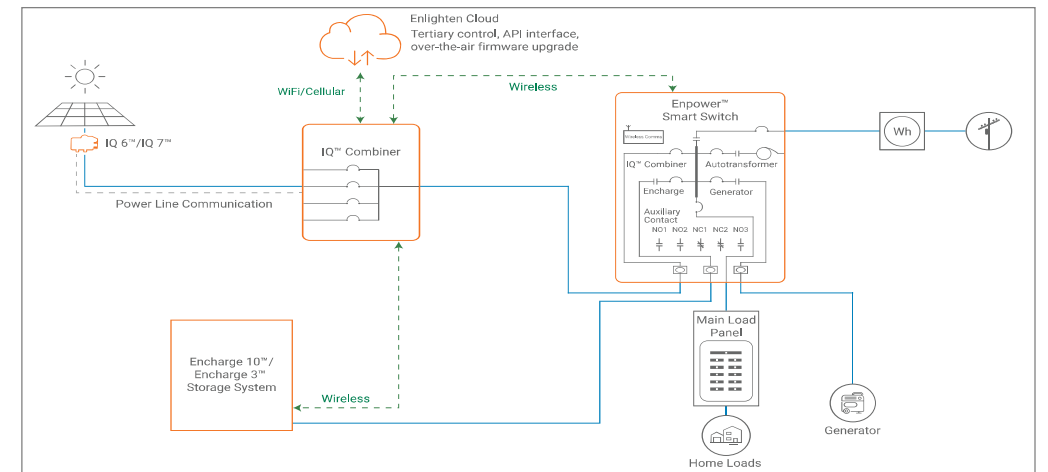
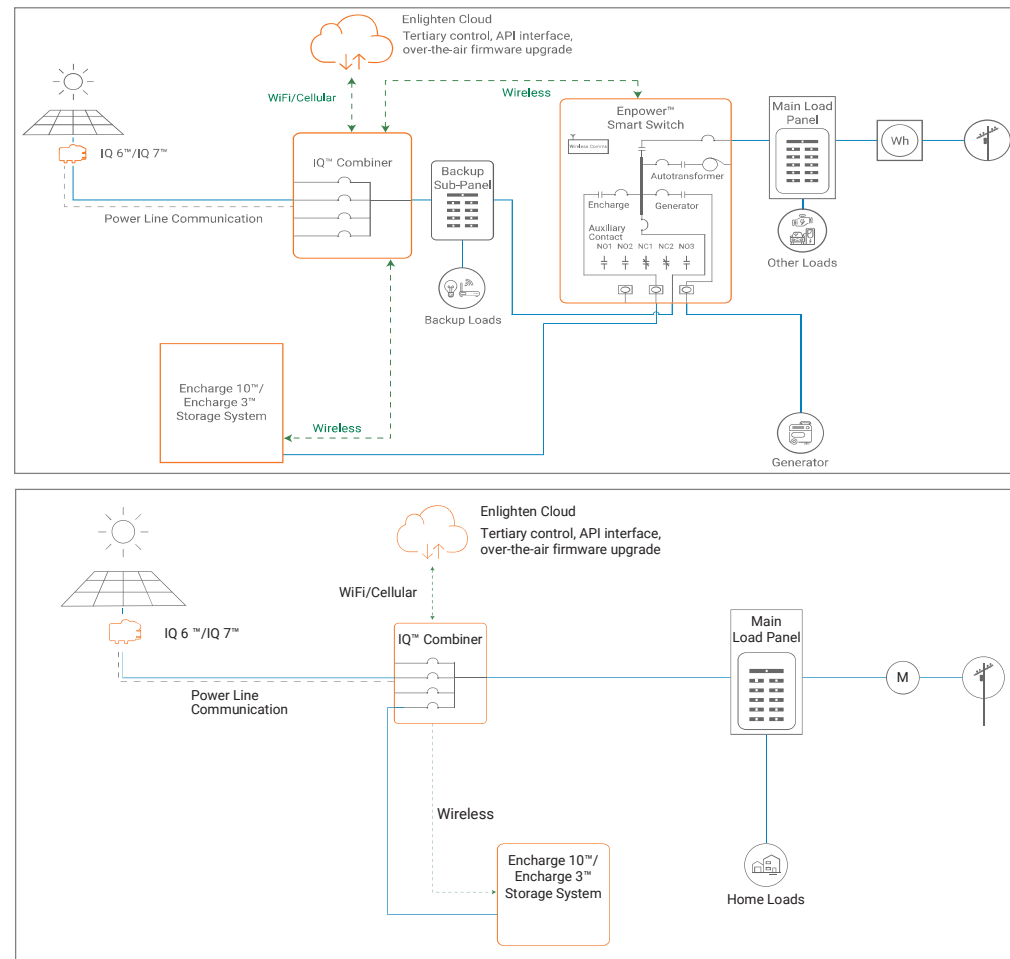
**NOTE:**  
 1. For M215/M250 connection to Ensemble, refer tech brief at <https://enphase.com/en-us/storage-m-series>  
 2. M series microinverters require Envoy-S metered.

**Whole home backup with Enpower as service entrance and PV combiner connected to main load panel.** This is the preferred configuration when you back up the entire main load panel, and the size of the PV combiner circuit in Enpower is left vacant. When existing PV combiner circuits are connected to the main load panel, and you want to add battery storage to the system, you can keep the PV combiner connected to the main load panel and connect only the battery storage system to Enpower.

**Partial home backup with main load panel as service entrance and PV combiner connected to Enpower.** When PV circuits breaker size is less than 80A, this is the preferred configuration for partial home backup with subpanel.

**Partial home backup with main load panel as service entrance and PV combiner connected to subpanel.** This is the preferred connection configuration for partial home backup using a subpanel when the PV circuit breaker size is more than 80A. The space available in Enpower for combiner (solar) connection is left vacant.

**Self consumption, no Enpower smart switch.** The preferred configuration when adding battery storage and PV for self-consumption in a grid-tied application with no option for backup during outages. PV and Encharge will not operate when the grid is unavailable.



## PREPARATION

- A) Inspect the packaging and the Encharge Battery(ies) for damage, such as cracks, dents, or leaking electrolyte. **Do not install or use the Encharge Battery(ies) if it has been damaged in any way.** If damaged, contact your distributor for replacement.
- B) Ensure that your kit includes the following Encharge components:
- The **Encharge 10** includes three batteries and two inter-unit raceways, an Encharge 10 triple-width cover, and a triple-width mounting bracket.
  - The **Encharge 3** includes one battery, and single-width cover with mounting bracket.

**NOTE:** Check the "Energize By" label on the shipping box to verify that the Encharge Battery(ies) will be installed by the date shown. If the date has passed, contact your distributor for next steps.

**WARNING:** Risk of injury. Take care when lifting. The Encharge Battery unit is heavy (44.2 kg/ 97.4 lbs) and requires two persons to lift.

- C) Ensure you have the following **required Enphase items for backup systems:**
- An Enphase Enpower smart switch with microgrid interconnect device (MID) functionality and an Enphase IQ™ Combiner.
  - The Enphase Encharge system requires an Internet connection through the IQ Envoy in the IQ Combiner. Failure to maintain an Internet connection may have an impact on the warranty. See [enphase.com/warranty](https://enphase.com/warranty) for full terms.
  - Wireless communications kit (COMMS-KIT-01) to be installed at the IQ Envoy for communications with Encharge and Enpower. Includes USB cable for connection to IQ Envoy / IQ Combiner and allows wireless communication with Encharge and Enpower.
  - Encharge lifting handles, two pieces (ENCHARGE-HNDL-R1).

- D) Make sure you also have the following **required items:**
- Mounting location that is structurally suited to bearing the weight of the Encharge Battery(ies). Total weight for the Encharge 3, including the Encharge base unit, cover and wall mount bracket, is 52 kg (114.6 lbs). Total weight for the Encharge 10, including the three Encharge

base units, cover, and wall mount bracket, is 154.7 kg (341 lbs). The wall must contain blocked studs that can bear the battery weight or can be of masonry or other suitable structure.

- Tools: conduit (with fittings and fitting tools), drill, 5/32 inch pilot bit (or metric equivalent), screwdriver, socket wrench, torque wrench, level, wire stripper, and stud finder if installing on studs.
- Fasteners for wall mount bracket. Slots are 6.8mm (0.27"). Check with a structural engineer and local standards for requirements:
  - Single-wide bracket: Three 1/4" lag bolts or screws, 7.6 cm (3 inches) long (depending on attachment wall).
  - Triple-wide bracket: Nine 1/4" lag bolts or screws, 7.6 cm (3 inches) long (depending on attachment wall).
- Washers for use between fastener heads and wall-mount bracket.
- Copper conductors: No. 14 - 8 AWG (11mm/7/16 inch strip length) copper conductors (rated at 75° C or 90° C) for terminals.
- Conduit fittings: 3/4 inch (left side) and 1/2 inch (right side) hubs are required for **all** installations, and NEMA Type 3R conduit fittings (hubs) are needed when installing out of doors (one for each used conduit opening). Also needed are conduit plugs to close unused conduit openings and conduit grounding nuts.
- Over current protection: The overcurrent protection in Encharge is not branch circuit overcurrent protection and cannot be relied upon for that purpose. The branch circuit overcurrent protection is located in Enpower or, when combining, in a separate combiner. See the Enphase Enpower Quick Install Guide for more information.
- Personal protective equipment (PPE) for handling lithium batteries as required by local safety standards.

- E) Verify that main service is 120/240 VAC, and not 208/120 VAC. Encharge batteries cannot be installed where L1 to L2 measures 208 VAC.
- F) Install the PV system and the IQ Combiner as directed by the Enphase installation manuals.



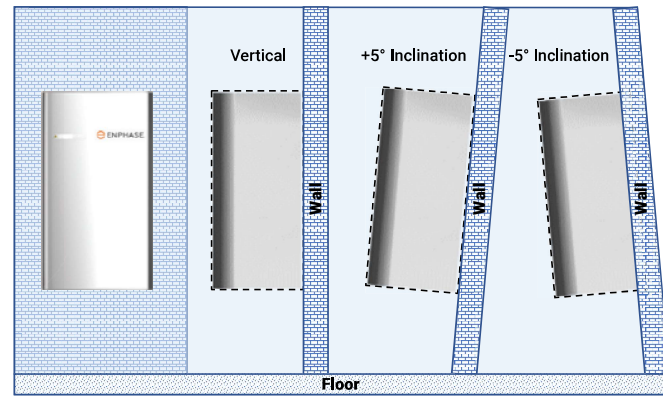


#### 4 Install the Encharge 3 (single width) or Encharge 10 (triple width) wall mount bracket

Follow the instruction below for the bracket style (single-width or triple-width) you are installing.

**⚠ WARNING!** Risk of injury and equipment damage. Attach the wall mount to the wall so that it is no more than five percent from vertical. See the following image for reference:

##### Allowable tilt from vertical for Encharge installation



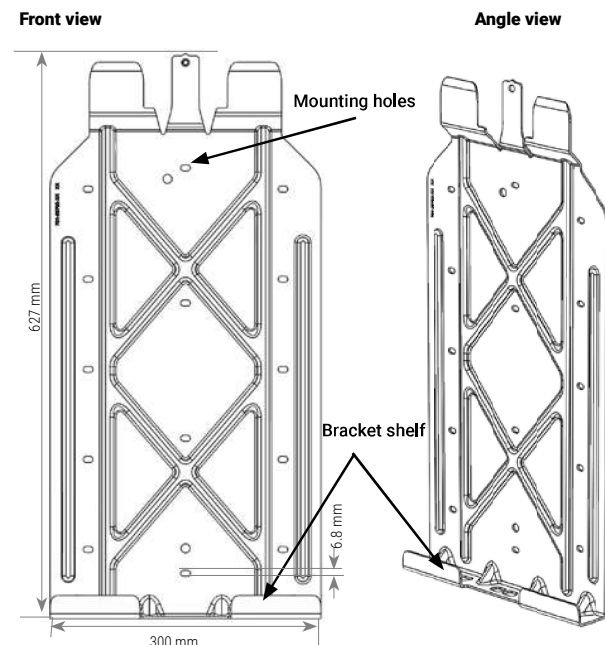
#### Encharge 3 – single-width bracket

- Place the wall-mount bracket on the wall so that the mounting holes in the middle of the bracket align with the center of the stud.
- Use a level to keep the bottom of the wall-mount bracket level.
- Use 1/4" screws (or masonry attachments for masonry) to attach the bracket using one screw and washer for each slot (6.8mm / 0.27"). Tighten all the screws to manufacturer's specified torque values.
- Verify that the wall-mount bracket is solidly attached to the wall. You must use four screws in each mounting bracket.
 

**⚠ WARNING!** Risk of injury and equipment damage. Do not mount an Encharge 3 on a bracket that is not properly mounted.
- If installing additional batteries, install adjacent wall-mount brackets, as needed. Be sure to align the mounting holes in the wall-mount bracket to the center of the wall stud. You may install another row of brackets above the one already installed. Maintain at least 15 cm (six inches) vertical clearance between rows of Encharge installations, and ensure that the wall can support the structural load (weight) of the installation.
 

**⚠ WARNING!** Risk of injury and equipment damage. Do not install more than three Encharge 3 units per 20A branch circuit.

#### Encharge 3 wall mount bracket



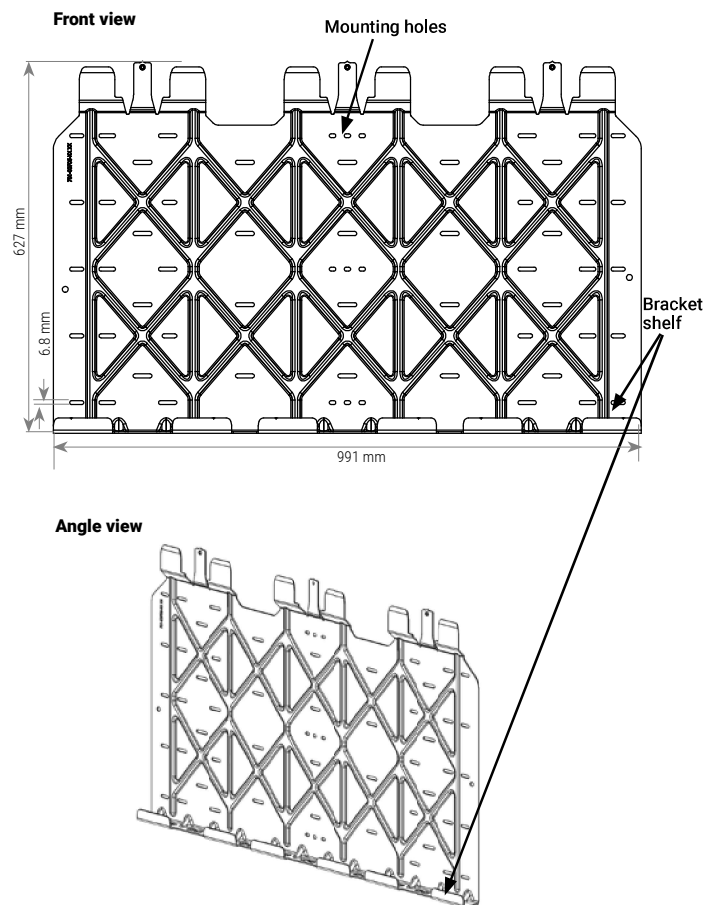
#### Encharge 10 – triple-width bracket

- Place the wall-mount bracket on the wall so that the mounting holes in the middle of the bracket align with the center of the stud, and the mounting holes on the left and right align with the adjacent studs.
- Use a level to keep the bottom of the wall-mount bracket level.
- Use 1/4" screws (or masonry attachments for masonry) to attach the bracket using one screw and washer for each slot (6.8mm / 0.27"). Use screws in each section of the mounting bracket to support the three Encharge battery units. There is an array of slots so that you can choose those that allow you to mount the bracket on studs. Tighten all the screws to manufacturer's specified torque values.
- Verify that the wall-mount bracket is solidly attached to the wall.
 

**⚠ WARNING!** Risk of injury and equipment damage. Do not mount Encharge 10 batteries on a bracket that is not properly mounted.
- If installing additional batteries, install adjacent wall-mount brackets, as needed. Be sure to align the mounting holes in the wall-mount bracket to the center of the wall stud. You may install another row of brackets above the one already installed. Maintain at least 15 cm (six inches) vertical clearance between rows of Encharge installations, and ensure that the wall can support the structural load (weight) of the installation.
 

**⚠ WARNING!** Risk of injury and equipment damage. Do not install more than one Encharge 10 unit per 20A branch circuit.

#### Encharge 10 wall mount bracket



## INSTALLATION

### 1 Plan a location for the Encharge batteries

The Encharge housing is NEMA type 3R and can be installed indoors or outdoors. The terminal blocks accepts copper conductors of No. 14 - 8 AWG.

- Following local standards**, choose a well-ventilated location where the ambient temperature and humidity are within -15° C to 55° C (5° F to 131° F) and 5% to 100% RH, non-condensing, preferably out of direct sunlight. The optimum ambient temperature range for installation location is 0° C to 30° C (32° F to 86° F).
- Ensure that the mounting location can sustain the total weight of the Encharge batteries and mounting bracket.** Total weight for the Encharge 3, including the Encharge base unit, cover and wall mount bracket, is 52 kg (114.6 lbs). Total weight for the Encharge 10, including the three Encharge base units, cover, and wall mount bracket, is 154.7 kg (341 lbs).
 

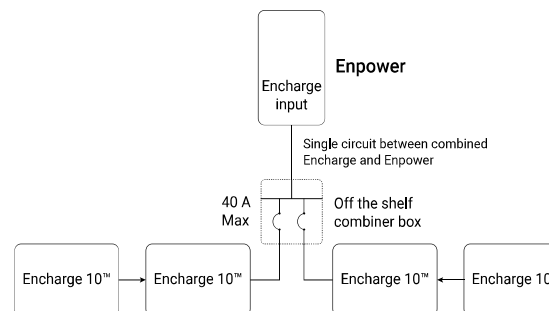
**⚠ WARNING:** The installer should install blocking between studs to ensure that no single stud carries the entire weight load of the Encharge batteries.
- Plan the mounting location to be at least 15cm (six inches) off the ground and 15cm (six inches) from the ceiling. Keep the Encharge away from falling or moving objects, including motor vehicles.
 

**⚠ WARNING:** If mounted in the path of a motor vehicle, we recommend a mounting height that is 91 cm (36-inch) minimum above the floor.
- Ensure that there are no pipes or electrical wires where you plan to drill.
- Plan to maintain at least three feet of clearance in front of each Encharge. Allow at least 15cm (six inches) clearance on top and bottom of the Encharge so that the vents on the top and bottom of the units are not blocked for air circulation.
- Consider the dimensions of the Encharge batteries, easy access, height, and length of cable when selecting the location.
- Select a location where you can interconnect to the Enphase Enpower smart switch.
- Follow all local standards.
- Review your external conduit plan to determine to which side of the field wiring compartment you will connect conduit.
- Up to two Encharge 10 (or six Encharge 3) units can be daisy chained on a single branch circuit. For installations with more than this number of units, there must be a separate load center, subpanel, or circuit combiner with over current protection to combine the daisy chained circuits, and you must run only one circuit for all the Encharge units to the Enpower (or to Enphase IQ Combiner for grid-tied-only installations). You must select proper conductors and circuit breakers for these circuits according to local codes, standards, and other applicable requirements. Enpower supports up to a maximum of 80 A breaker for Encharge connection circuit.

The subpanel could be a small, two circuit box with circuit breakers. The circuit breakers in the box would have to be suitable for back-feeding, per NEC 408.36(D).

Select the right size subpanel and breakers based on the number of Encharge units being installed. Up to four Encharge 10s or twelve Encharge 3s can be safely connected to 80A load center.

To do this, you must purchase an off-the-shelf subpanel and install as shown in the following image:



**⚠ WARNING!** Parallel power production sources only. Do not connect load circuits.

### 2 Install the AC disconnect

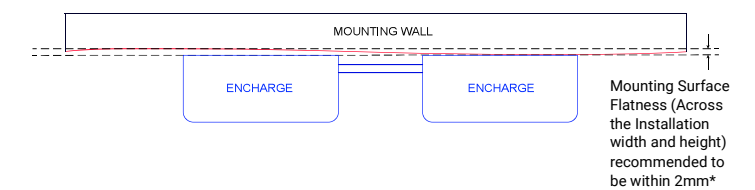
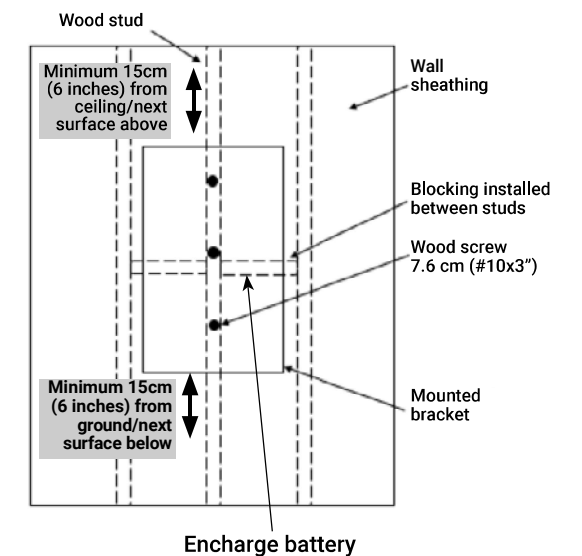
Following all local codes and standards:

- Install an AC disconnect that can break the maximum rated current of the branch circuit under load. The AC disconnect must be readily accessible and located within line-of-sight of Encharge, per NEC 2017 706.7(A).
- Each Encharge unit is suitable for use with up to No. 8 AWG wires on a maximum 40 A branch circuit. If more than 32 A of Encharge batteries (corresponding to a 40 A branch circuit) are installed, a separate subpanel must be installed between the Encharge units and Enpower to combine the Enpower circuits together. All circuit breakers in the subpanel must be suitable for back-feeding, per NEC 408.36(D).
- Verify that AC voltage at the site is within range: single-phase L1 to L2 voltage must measure between 211 and 264 VAC, while L-N should measure between 106 and 132 VAC.

### 3 Prepare to install the wall-mount bracket

- Make sure that the planned position for the wall-mount bracket meets clearance requirements as shown. The image depicts a single bracket, but clearances and requirements are the same for the triple-width bracket.
- Ensure that the mounting location can sustain the weight of the Encharge batteries and mounting bracket. Total weight for the Encharge 3 including the mounting brackets and cover is 52 kg (114.6 lbs), while the total weight for Encharge 10 including the mounting bracket and cover add up to 154.7 kg (341 lbs).
- Starting at installation position closest to the power source, mark a level line on the wall as a guide.

**⚠ WARNING!** Multiple risks. Make sure not to drill or attach into electric wiring or pipes that are in the wall!



**NOTE:** The above specified surface flatness requirement is applicable to all the combinations of Encharge 3 and 10.

\* If the difference in flatness is more than 2mm, recommend installing a substructure like unistrut for better alignment of the units.

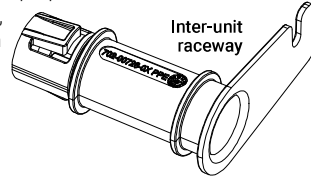
## 6 Install conduit and field wiring, continued

**⚠ DANGER!** Risk of electric shock. Check that the dedicated circuit breaker protecting the branch where the Encharge Battery(ies) will be connected is turned off before wiring.

**⚠ WARNING!** Risk of equipment damage. The DC switch must be OFF before installing, otherwise Encharge will try to form a grid.

D) If installing an Encharge 10, install the inter-unit raceways. The left-side and right-side conduit openings are different diameters, so you must install the raceway in the proper direction.

- Face the fronts of the batteries, and insert the raceway through the right-hand unit's left-side conduit opening from within the field wiring compartment, with the arm of the raceway pointing up.
- Push the raceway through the right-hand unit's left-side conduit opening and into the left-side unit's right-side conduit, opening until the two snap features on the raceway engage the left-side unit's enclosure.
- Once fully inserted, rotate the "arm" toward you until it stops.
- The left-side conduit opening of each battery unit has a flat surface, without additional features. The larger seal (green) on the raceway mates with this opening. The right-side conduit opening has a groove around the hole to fit the O-ring (red) of the raceway. Make sure that the O-ring is captured in the groove between the Encharge enclosure and the raceway flange adjacent to the O-ring.



E) Using the conductors and suitable conduits, connect the AC disconnect and the first adjacent Encharge Battery. Use the conduit openings provided to connect the conduit and pass the wires through them. Note that if an Enphase Enpower is in line-of-sight, the breaker can service as a disconnect.

**⚠ WARNING!** Risk of equipment damage. Do not modify or rewire the pre-installed wiring or bonding connections in the field wiring compartment.

**⚠ WARNING!** Risk of equipment damage. Always connect to two Lines (active) and one ground.

F) Connect each wire in the field wiring compartment to its corresponding conductor (Lines and Ground). Each terminal accepts two 14-8 AWG conductors (11mm/7/16 inch strip length). Tighten to 14 lb-in.

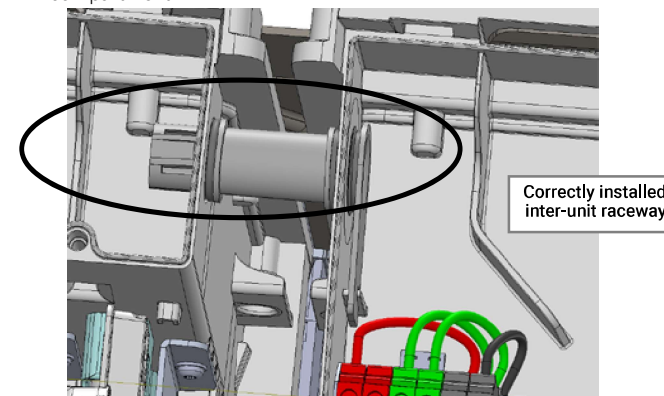
G) If installing an Encharge 10, route the wires from the first Encharge Battery to the adjacent Encharge Battery through the inter-unit raceway. There are two positions for each line and for ground in the terminal block to allow for daisy-chaining.

**⚠ WARNING!** Risk of equipment damage. Do not daisy chain more than six total Encharge 3 or two Encharge 10 on a single branch circuit.

H) After all wires in the field wiring compartment are connected and secured, check that there are no exposed conductors.

I) If connecting additional Encharge Batteries, use another conduit and another set of wires to connect between field wiring compartments.

J) Gently arrange all the wires and connectors inside the field wiring compartment.

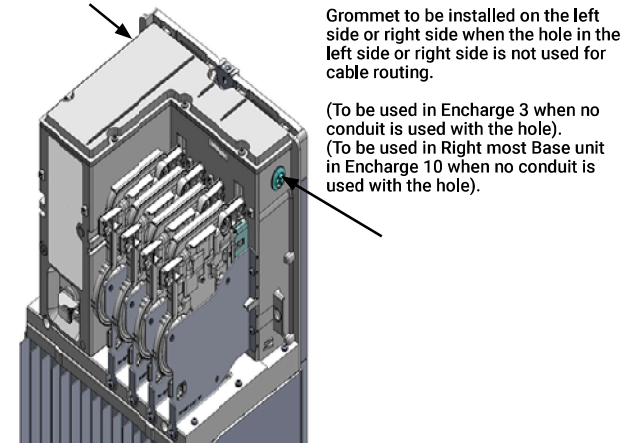


K) Plug any unused conduit openings before proceeding.

L) Replace the field wiring compartment cover. Use a cross-head screw driver to tighten the cover screws to 2.3Nn (20.3 lb-in).

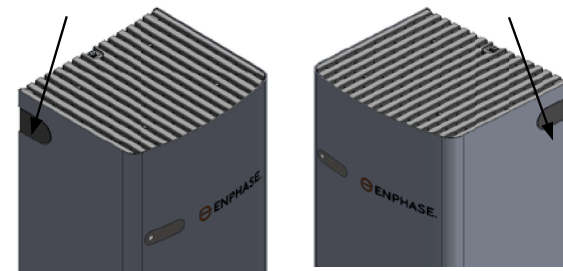
**⚠ WARNING!** Risk of equipment damage. Ensure that no wires are pinched before replacing the cover.

**⚠ DANGER!** Risk of electric shock. The system is not ready to be energized! Do not close the circuit breaker or turn on the DC switch



## 7 Dismounting of Encharge 3 Cover

A) Remove the conduit covers from either sides of the Encharge cover



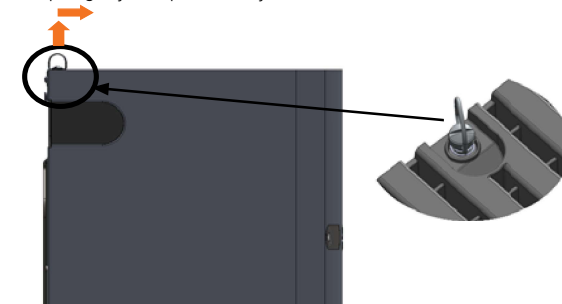
B) Lift up the ring of the quarter turn screw.



C) Turn the ring in the anticlockwise direction to unlock the screw.



D) After unlocking, hold the ring of the screw and lift the top cover up slightly and pull it away from the wall in the indicated direction.



E) While pulling out the cover, make sure that the indicated snaps at the bottom of the unit are being unlocked.

F) Similarly for dismounting the Encharge 10 Cover, please follow the instructions from A to E.

## 5 Mount the Encharge Battery(ies) on the wall

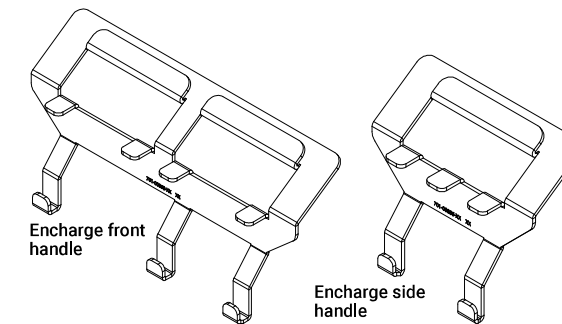
**⚠ WARNING!** Risk of injury. Take care when lifting. Each Encharge battery base unit is heavy (44.2 kg/ 97 lbs) and requires two persons to lift.

**⚠ WARNING!** Risk of injury and equipment damage. Avoid dropping the Encharge Battery(ies). Doing so may create a hazard, cause serious injury, and/or damage the equipment.

**⚠ WARNING!** Risk of injury and equipment damage. Protect the Encharge Battery(ies) from impact damage and improper use.

A) Two person together must lift a single Encharge battery base unit from the packaging and place it right side up on a flat surface.

B) Locate the Encharge lifting handles:



C) If installing multiple battery units, plan to install the Encharge battery unit located closest to the main supply.

D) The first person lifting must slide the longer front handle under the front edge of the Encharge battery, then tilt the handle up so that handle tabs engage with the slots on the front side of the battery.

E) The second person lifting must slide the shorter side handle under the left or right side (as needed) of the Encharge battery, and support the upper back of the Encharge battery with their free hand.

F) Together, lift the Encharge battery and bring it to the already mounted bracket.

G) Hold the Encharge battery at an angle so the top of the unit sets into the top of the wall-mount bracket.

**⚠ WARNING!** Risk of injury and equipment damage. Do not release the Encharge battery unit until you ensure that the Encharge battery unit is fully seated in the wall-mount bracket shelf.

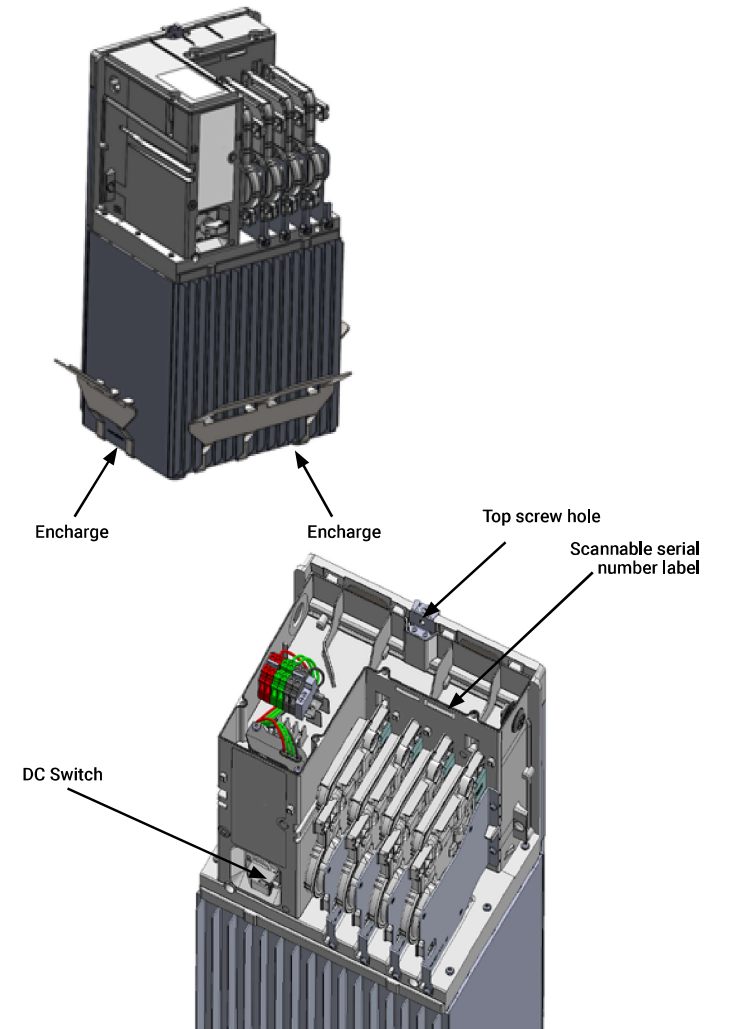
H) Once the top of the battery is engaged with the top tabs of the wall-mount bracket, keep the battery vertical, make sure the battery is flush against the bracket, and lower the battery down until fully seated with the wall-mount bracket and set into the bracket shelf.

I) Remove the handles and reserve for the next Encharge battery installation.

J) Use a Phillips screw driver to loosen the screws securing the field wiring compartment cover and remove the cover. Keep the cover and screws handy as you will need them later.

K) Attach the battery to the mounting bracket aligning the screw hole at the top of the battery with the screw hole at the top of the bracket.

L) To record the installation of each Encharge battery base unit, scan the serial number label using Enphase Installer Toolkit™ and your mobile device.



## 6 Install conduit and field wiring

**⚠ DANGER!** Risk of electric shock. The DC switch must be in the Locked position before performing this step.

A) If not already done, use a Phillips screw driver to loosen the screws securing the field wiring compartment cover and remove the cover. Keep the cover and screws handy as you will need them later.

B) Remove the sealing plug for entry into the field wiring compartment. If installing only one battery or when installing the last battery in the array, seal up the hole with the supplied sealing plug.

C) Size the conductors (Lines and Ground) to account for voltage rise and to conform to the tables below. Design for a voltage rise total of less than 2%. Encharge can use any circuit breaker size between 10 A and 40 A. Breaker rating and wire size are installation dependent.

Number of Encharge E3/E10 units	Current (A)	Minimum wire size (AWG)	Breaker rating (A)
1*E3	5.3	14	10
2*E3	10.7	14	15
3*E3 or 1*E10	16.0	12	20
4*E3 or (1*E10 + 1*E3)	21.3	10	30
5*E3 or (1*E10 + 2*E3)	27.7	8	35
6*E3 or 2*E10 or (1*E10 + 3*E3)	32.0	8	40

\*E3 refers to Encharge 3

\*E10 refers to Encharge 10

In all cases in the table, it is possible to always use larger conductors and a breaker sized for that conductor or smaller. For Example in row 3, with 3\*E3 or 1\*E10, it is possible to use:

- 12 AWG wire with 20 A breaker, or
- 10 AWG wire with 20 A or 30 A breaker, or
- 8 AWG wire with 30, 35, or 40 A breaker



# SAFETY

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS. This guide contains important instructions that you must follow during installation and maintenance of the Enphase Encharge Battery(ies). Failing to follow any of these instructions may void the warranty ([enphase.com/warranty](http://enphase.com/warranty)).

## In Case of Fire or Other Emergency

### In all cases:

- If safe to do so, switch off the AC breaker for the Encharge Battery circuit, and if an isolator switch is present, switch off the AC isolator for the Encharge Battery circuit.
- Contact the fire department or other required emergency response team.
- Evacuate the area.

### In case of fire:

- When safe, use a fire extinguisher. Suitable types are A, B, and C dry chemical fire extinguishers. Additional extinguishing media include carbon dioxide, or alcohol-resistant foams.

### In case of flooding:

- Stay out of the water if any part of the Encharge Battery(ies) or wiring is submerged.
- If possible, protect the system by finding and stopping the source of the water, and pumping it away.
- If water has contacted the battery, call your installer to arrange an inspection. If you are sure that water has never contacted the battery, let the area dry completely before use.

### In case of unusual noise, smell or smoke:

- Ensure nothing is in contact with the Encharge Battery(ies) or in the venting area of the Encharge Battery(ies).
- Ventilate the room.
- Contact Enphase Customer Support at [enphase.com/en-us/support/contact](http://enphase.com/en-us/support/contact).

## Safety and Advisory Symbols

	<b>DANGER:</b> This indicates a hazardous situation, which if not avoided, will result in death or serious injury.
	<b>WARNING:</b> This indicates a situation where failure to follow instructions may be a safety hazard or cause equipment malfunction. Use extreme caution and follow instructions carefully.
	<b>NOTE:</b> This indicates information particularly important for optimal system operation. Follow instructions carefully.

## Safety Instructions

	<b>DANGER:</b> Risk of electric shock. Risk of fire. Only qualified electricians should install, troubleshoot, or replace the Encharge Battery(ies).
	<b>DANGER:</b> Risk of fire or explosion. Only qualified personnel, using personal protective equipment (PPE) should transport or handle the Encharge Battery(ies).
	<b>DANGER:</b> Risk of explosion. Do not dispose of Encharge Battery(ies) in a fire or by burning. The Encharge Battery(ies) can explode.
	<b>DANGER:</b> Risk of fire or explosion. This product is designed for stationary installation only and should be used accordingly. It is not designed for mobile applications such as installation and on vehicles and trailers and should not be used in such applications.
	<b>DANGER:</b> Risk of fire. During use, when stored, or during transport, keep the Encharge Battery(ies) in an area that is well ventilated and protected from the elements, where the ambient temperature and humidity are within -15° C to 55° C (5° F to 131° F) and 5% to 100% RH, non-condensing, preferably out of direct sunlight. Do not install the Encharge Battery(ies) at elevations over 2500 m (8,200 feet) above sea level.
	<b>DANGER:</b> Risk of fire. If the Encharge Battery(ies) generate smoke, remove AC power from the Enphase System and turn the DC connect switch to the off position so that charging/discharging stops.
	<b>DANGER:</b> Risk of electric shock. Risk of fire. Do not attempt to repair the Encharge Battery(ies). DO NOT OPEN THE ENCLOSURE – NO SERVICEABLE PARTS. Tampering with or opening the Encharge Battery(ies) will void the warranty. If the Encharge Battery(ies) fail, contact Enphase Customer Support for assistance at <a href="http://enphase.com/en-us/support/contact">enphase.com/en-us/support/contact</a> .
	<b>DANGER:</b> Risk of electric shock. Do not use Enphase equipment in a manner not specified by the manufacturer. Doing so may cause death or injury to persons, or damage to equipment.
	<b>DANGER:</b> Risk of electric shock. Do not install the Encharge Battery(ies) without first removing AC power from the photovoltaic system. Disconnect the power coming from the photovoltaics before servicing or installing.
	<b>DANGER:</b> Risk of electric shock. Always de-energize the AC branch circuit during an emergency and/or before servicing the Encharge Battery(ies). Never disconnect the DC switch under load.
	<b>DANGER:</b> Risk of electric shock. Risk of high short-circuit current. Observe the following precautions when working on batteries: <ul style="list-style-type: none"> <li>• Remove watches, rings, or other metal objects.</li> <li>• Use tools with insulated handles.</li> <li>• Wear insulating gloves and boots.</li> <li>• Do not lay tools or metal parts on top of batteries.</li> </ul>
	<b>DANGER:</b> Risk of electric shock. Risk of fire. Do not work alone. Someone should be in the range of your voice or close enough to come to your aid when you work with or near electrical equipment.
	<b>DANGER:</b> Risk of fire. Do not allow or place flammable, sparking, or explosive items near the Encharge Battery(ies).

## Safety Instructions, continued

	<b>DANGER:</b> Risk of electric shock. In areas where flooding is possible, install the Encharge Battery(ies) at a height that prevents water ingress.
	<b>DANGER:</b> Risk of electric shock. AC voltage is present at the output when the DC switch is on.
	<b>DANGER:</b> Risk of electric shock. Branch circuit protection must be off before switching DC power on or off.
	<b>DANGER:</b> Risk of electric shock. The DC switch must be locked in the OFF position for shipping and service.
	<b>WARNING:</b> Risks of electric shock, energy hazard, and chemical hazard. Do not disassemble.
	<b>WARNING:</b> Risk of equipment damage. During use, storage, transport, or installation, always keep the Encharge Battery(ies) in an upright position.
	<b>WARNING:</b> You must install the Encharge Battery(ies) only on a suitable wall using an Enphase wall-mount bracket.
	<b>WARNING:</b> Before installing or using the Encharge Battery(ies), read all instructions and cautionary markings in this guide and on the equipment.
	<b>WARNING:</b> Do not install or use the Encharge Battery(ies) if it has been damaged in any way.
	<b>WARNING:</b> Do not exceed the maximum number (3) of Encharge Batteries in a 20 A AC branch circuit.
	<b>WARNING:</b> Do not sit on, step on, place objects on, or insert objects into the Encharge Battery(ies).
	<b>WARNING:</b> Do not place beverages or liquid containers on top of the Encharge Battery(ies). Do not expose the Encharge Battery(ies) to liquids or flooding.
	<b>WARNING:</b> When placing the Encharge Battery(ies) in storage, ensure that AC power is not present and that the DC switch is in the Locked position. While in storage, damage to the battery can occur from over-charge. If the battery state of charge falls to 0%, the Encharge Battery(ies) can be damaged or destroyed. Because of this, the Encharge Battery(ies) must only be stored for a limited amount of time. <ul style="list-style-type: none"> <li>• The Encharge Battery(ies) must be installed and energized by the "Must Energize By" date on the shipping box label.</li> <li>• The Encharge Battery(ies) must have a charge state of no more than 30% when placed in storage. To do this, the Encharge Battery(ies) must be placed in <b>Sleep Mode</b>.</li> <li>• If the Encharge Battery(ies) is already been installed, it must be placed into <b>Sleep Mode</b> prior to uninstalling. A battery in <b>Sleep Mode</b> can be stored a maximum of two months after being placed into <b>Sleep Mode</b>.</li> </ul>
	<b>NOTE:</b> Perform installation and wiring, including protection against lightning and resulting voltage surge, in accordance with all applicable local electrical codes and standards.
	<b>NOTE:</b> Because Encharge Battery(ies) are grid forming, you must install signage in accordance with NEC articles 705, 706, and 710.
	<b>NOTE:</b> Using unapproved attachments or accessories could result in damage or injury.
	<b>NOTE:</b> Install properly rated over current protection as part of the system installation.
	<b>NOTE:</b> To ensure optimal reliability and to meet warranty requirements, the Encharge Battery(ies) must be installed and/or stored according to the instructions in this guide.
	<b>NOTE:</b> The Encharge Battery(ies) are compatible only with the <b>IQ Envoy communications gateway properly fitted with USB hub, USB radios, and production and consumption CTs</b> . The <b>IQ Envoy</b> is required for operation of the Encharge Battery(ies). Earlier versions of the Enphase Envoy communications gateway are incompatible.
	<b>NOTE:</b> The Enphase Encharge Battery(ies) are intended to operate with an Internet connection. Failure to maintain an Internet connection may have an impact on the warranty. See Limited Warranty for full terms and services ( <a href="http://enphase.com/warranty">enphase.com/warranty</a> ).
	<b>NOTE:</b> When replacing Enphase Encharge Battery(ies), you must replace with an Encharge Battery(ies) of the same type, with the same AC current rating.
	<b>NOTE:</b> When disconnected and stored, no automatic charge of the battery is possible.
	<b>NOTE:</b> Properly mount the Encharge Battery(ies). Ensure that the mounting location is structurally suited to bearing the weight of the Encharge Battery(ies).
	<b>NOTE:</b> During use, storage, and transport, keep the Encharge Battery(ies): <ul style="list-style-type: none"> <li>• Properly ventilated</li> <li>• Away from water, other liquids, heat, sparks, and direct sunlight</li> <li>• Away from excessive dust, corrosive and explosive gases, and oil smoke</li> <li>• Away from direct exposure to gas exhaust, such as from motor vehicles</li> <li>• Free of vibrations</li> <li>• Away from falling or moving objects, including motor vehicles. If mounted in the path of a motor vehicle, we recommend a 91 cm (36-inch) minimum mounting height</li> <li>• At an elevation of lower than 2,500m (8,200 feet) above sea-level</li> <li>• In a location compliant with fire safety regulations</li> <li>• In a location compliant with local building codes and standards</li> </ul>
	<b>NOTE:</b> Conditions for the Encharge installation site apply also to storage conditions.



## Environmental Protection

**ELECTRONIC DEVICE: DO NOT THROW AWAY.** Waste electrical products should not be disposed of with household waste. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

## 8 Cover and energize the system

**WARNING:** Before energizing, make sure that ALL Encharge Batteries in the system are properly installed and conductors terminated.

**NOTE:** Check the box for updates on cover installation instructions.

A) Check that the field wiring compartment cover(s) for all Encharge Batteries in the system are closed and secured.

**WARNING:** Complete the Enphase Enpower and Enphase Combiner installations before turning the DC switch(es) ON.

**DANGER: Risk of electric shock.** Before continuing, check that Encharge units are properly wired, and ground connection does not have a L1 or L2 connection, as this introduces a safety hazard.

- Apply AC power to the Encharge circuits. Do NOT turn on the DC switch on Encharges.
- Using a voltmeter measure the Encharge chassis metal to ground (e.g., grounded conduit) and ensure there is no AC voltage source present. If wiring is incorrect, a ground fault may exist, and the AC voltage may read ~120VAC. If voltage is present, DO NOT touch the chassis, and immediately remove AC power from the Encharge circuits.
- Remove AC power to the Encharge circuits and correct the wiring.

**WARNING!** Risk of electric shock and equipment damage. If the DC switch is ON, AC voltage might be present at the terminals.

**DANGER: Risk of electric shock. AC voltage might be present at the output when the DC switch is on.**

**WARNING:** Branch Circuit protection for Encharge MUST be ON (with AC voltage present) before turning DC switch ON. Wait for 15 seconds after turning branch circuit protection ON and check that LED on Encharge is ON (Any color LED is ON) before turning DC switch ON.

B) Turn on the AC power first (branch circuit protection) and then turn on the DC switches of the Encharge batteries.

**NOTE:** Do NOT leave the Encharge unit's DC switch in the ON position for any extended period of time (such as overnight or for more than 24 hours) unless Encharge is commissioned (communicating with Envoy), connected to AC, and has passed functional testing and is operational. Leaving the DC switch ON without AC connection and communication with the system will drain the battery and may cause damage to the battery cells such that they no longer be able to charge. Damage resulting from this improper installation and misuse is not covered under the product's limited warranty.

C) Place enclosure cover(s) over the battery(ies) as follows.

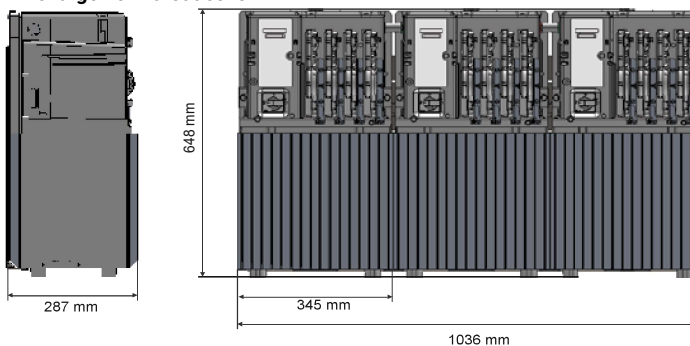
### Encharge 3 (single-width battery cover)

- Pick up the Encharge 3 Battery cover, stand in front of the battery so that the cover and battery are on a level, and slide the cover over the battery so that the interior guides of the cover slide easily over the guides on the battery unit.
- Check that the screw hole on top of the battery cover aligns with that on the battery.
- Use the included screw to attach the cover to the battery. Tighten the screw as needed.

### Encharge 10 (triple-width battery cover)

- The Encharge 10 Battery cover in wide and may require two persons to guide smoothly over the battery units.
- Pick up the Encharge 10 Battery cover, stand in front of the battery so that the cover and battery are on a level, and slide the cover over the battery so that the interior guides of the cover slide easily over the guides on the battery units.
- Check that the screw holes on top of the battery cover align with those on the batteries.
- Use the included screws to attach the cover to the batteries. Tighten the screws as needed.

### Encharge 10 without cover



## CONFIGURE and ACTIVATE

A) Use the Enphase Installer Toolkit to commission the Encharge Battery(ies). Once connected to the IQ Envoy, refer to the Installer Toolkit help topics for more information.

B) After the IQ Envoy has detected the Encharge Battery(ies), the Encharge LEDs operate as described in the following section.

## OPERATION

### a LED overview

After being commissioned, the LED flashes yellow while each Encharge Battery boots up. If the LED rapidly flashes green for more than two minutes, the battery is in trickle charge mode and will remain so until it reaches a minimum state of charge (up to 30 minutes). After the Encharge Battery is booted up, the LED becomes blue or green depending on the charge level. If the LED flashes yellow after one hour or changes to a flashing red state, contact Enphase Customer Support at [enphase.com/en-us/support/contact](http://enphase.com/en-us/support/contact).

State	Description
<b>Uncommissioned</b>	
Flashing blue	After booting up, when Encharge has paired with an IQ Envoy but has not passed the commissioning three-way handshake to confirm that it is an Enphase device.
Flashing green	After passing the three-way handshake with the IQ Envoy.
<b>After commissioning (normal operation)*</b>	
Rapidly flashing yellow	Starting up / Establishing communications
Red flashes in sequences of 2	Error. See "Troubleshooting".
Solid yellow	Not operating due to high temperature. See "Troubleshooting".
Solid blue or green	Idle. Color transitions from blue to green as state of charge increases. You can check Enlighten for charge status.
Slowly flashing blue	Discharging
Slowly flashing green	Charging
Slowly flashing yellow	Sleep mode activated
Off	Not operating. See "Troubleshooting".

\* Encharge batteries have a one-hour orphan timer. If the IQ Envoy stops communicating with them, after one hour the Encharge batteries return to an "uncommissioned" state.

### b Troubleshooting

If the Encharge Battery(ies) are not operating correctly, perform the following steps. If the issue persists, contact Enphase Customer Support at [enphase.com/en-us/support/contact](http://enphase.com/en-us/support/contact).

A) If the Encharge Battery(ies) do not operate, check the temperature in the room and increase cooling and/or ventilation as required. Check that the front, top, and sides of the Encharge batteries have at least 15cm (six inches) of unobstructed clearance.

B) If the Encharge LED is off, turn off the breaker for the branch circuit, wait for at least one minute, and turn it back on.

**NOTE:** During a brownout or blackout, the Encharge powers down automatically. This is normal. When power is restored, it automatically starts up again.

C) If you do not see Encharge information in Enlighten, check that the IQ Envoy and the Internet connection are working. If the issue persists, contact Enphase Customer Support at [enphase.com/en-us/support/contact](http://enphase.com/en-us/support/contact).

### Limitation of Use:

Your Encharge storage unit is not intended for use as a primary or backup power source for life-support systems, other medical equipment, or any other use where product failure could lead to injury, loss of life, or catastrophic property damage. Enphase disclaims any and all liability arising out of any such use of your Encharge storage unit. Further, Enphase reserves the right to refuse to provide support in connection with any such use and disclaims any and all liability arising out of Enphase's provision of, or refusal to provide, support for your Encharge storage device in such circumstances.

# 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/120 half-cell and 72-cell/144 half-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/144 half-cell modules.



To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



## Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings <sup>1</sup>	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell/120 half-cell PV modules only		60-cell/120 half-cell and 72-cell/144 half-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range <sup>2</sup>	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 <sup>3</sup>	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	18 mA		18 mA	
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	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (HxWxD)	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, NEC 2017, and NEC 2020 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](https://enphase.com)





# Enphase IQ Combiner 3-ES/3C-ES

X-IQ-AM1-240-3-ES  
X-IQ-AM1-240-3C-ES

The **Enphase IQ Combiner 3-ES/3C-ES™** with Enphase IQ Envoy™ and integrated LTE-M1 cell modem (included only with IQ Combiner 3C-ES) 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
- Includes LTE-M1 cell modem (included only with IQ Combiner 3C-ES)
- Includes solar shield to match Ensemble esthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

## Simple

- Reduced size from IQ Combiner+ (X-IQ-AM1-240-2)
- 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
- Two years labor reimbursement program coverage included for both the Combiner SKU's
- UL listed



X-IQ-AM1-240-3C-ES

X-IQ-AM1-240-3-ES



To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



# Enphase IQ Combiner 3-ES / 3C-ES

## MODEL NUMBER

IQ Combiner 3-ES (X-IQ-AM1-240-3-ES)	IQ Combiner 3-ES with Enphase IQ Envoy printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the Encharge storage system and Enpower smart switch and to deflect heat.
IQ Combiner 3C-ES (X-IQ-AM1-240-3C-ES)	IQ Combiner 3C-ES with Enphase IQ Envoy printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect LTE-M1 (CELLMODEM-M1), a plug-and-play industrial-grade cell modem 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.) Includes a silver solar shield to match the Encharge storage system and Enpower smart switch and to deflect heat.

## ACCESSORIES and REPLACEMENT PARTS

(not included, order separately)

Ensemble Communications Kit (COMMS-CELLMODEM-M1)	Includes COMMS-KIT-01 and CELLMODEM-M1 with 5-year data plan for Ensemble sites
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-SOLARSHIELD-ES	Replacement solar shield for Combiner 3-ES / 3C-ES
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3-ES / 3C-ES (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3-ES / 3C-ES

## ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 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. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Envoy breaker included
Envoy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Envoy
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

## MECHANICAL DATA

Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" 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"> <li>• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors</li> <li>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors</li> <li>• Main lug combined output: 10 to 2/0 AWG copper conductors</li> <li>• Neutral and ground: 14 to 1/0 copper conductors</li> </ul> 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
Cellular	CELLMODEM-M1-06 4G based LTE-M1 cellular modem (included only with IQ Combiner 3C-ES). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (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) Consumption metering: accuracy class 2.5
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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# SOLARMOUNT



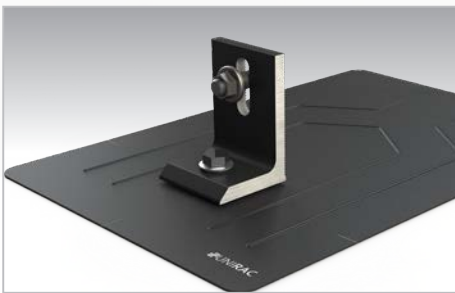
**SOLARMOUNT** is the professionals' choice for residential PV mounting applications. Every aspect of the system is designed for an easier, faster installation experience. **SOLARMOUNT** is a complete solution with revolutionary universal clamps, **FLASHKIT PRO**, full system UL 2703 certification and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

CONCEALED  
UNIVERSAL  
CLAMPS

OPTIONAL  
FRONT TRIM

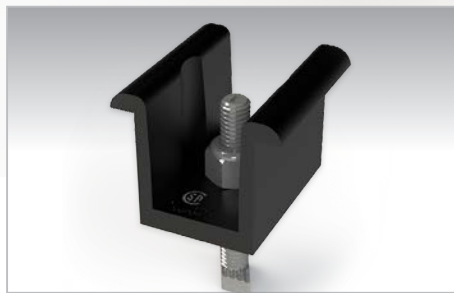
UNIRAC  
25  
YEAR  
FULL-SYSTEM  
WARRANTY

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](http://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 slow 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 INDUSTRIES MOST EXPERIENCED TEAM

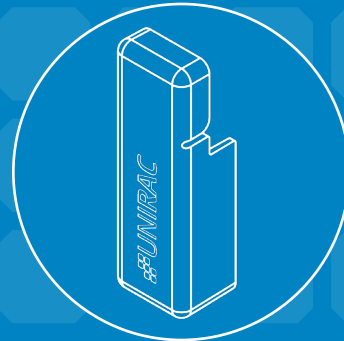
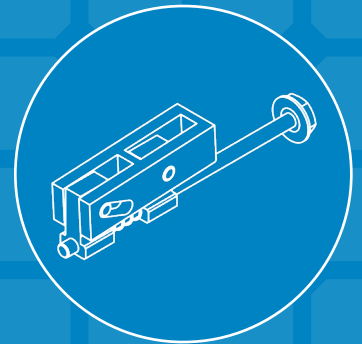
Professional support for professional installers and designers. You have access to our technical support and training groups. Whatever your support needs, we've got you covered. Visit [Unirac.com/solarmount](http://Unirac.com/solarmount) for more information.



# UL2703

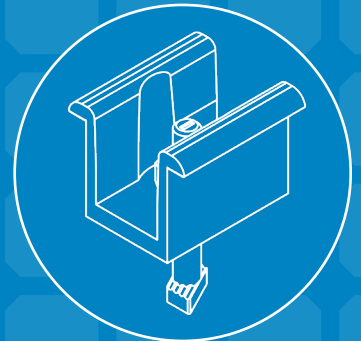
BONDING & GROUNDING  
MECHANICAL LOADING  
SYSTEM FIRE CLASSIFICATION

### CONCEALED UNIVERSAL ENDCLAMPS



### END CAPS INCLUDED WITH EVERY ENDCLAMP


### UNIVERSAL SELF STANDING MIDCLAMPS



### U-BUILDER ONLINE DESIGN TOOL SAVES TIME & MONEY

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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

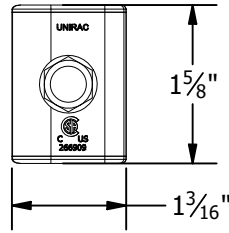
Don't leave your project to chance, Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are providing products of exceptional quality. SOLARMOUNT is covered by a 25 year limited product warranty and a 5 year limited finish warranty.

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

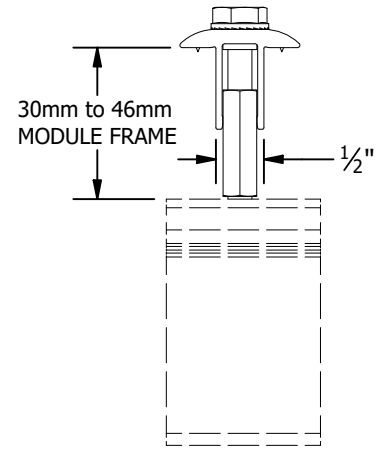
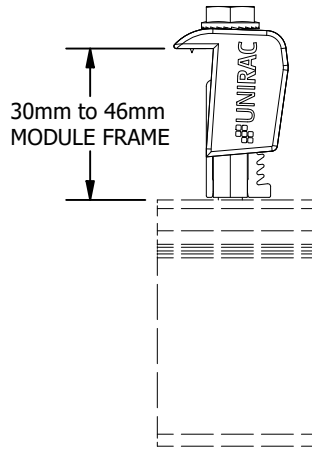
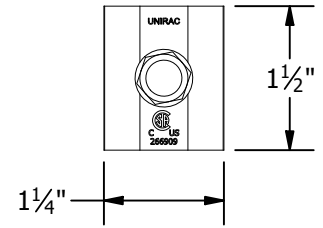


PART # TABLE	
P/N	DESCRIPTION
302045M	UNIVERSAL AF MID CLAMP - MILL
302045D	UNIVERSAL AF MID CLAMP - DRK
302050M	UNIVERSAL AF END CLAMP - MILL
302050D	UNIVERSAL AF END CLAMP - DRK

UNIVERSAL AF  
END CLAMP

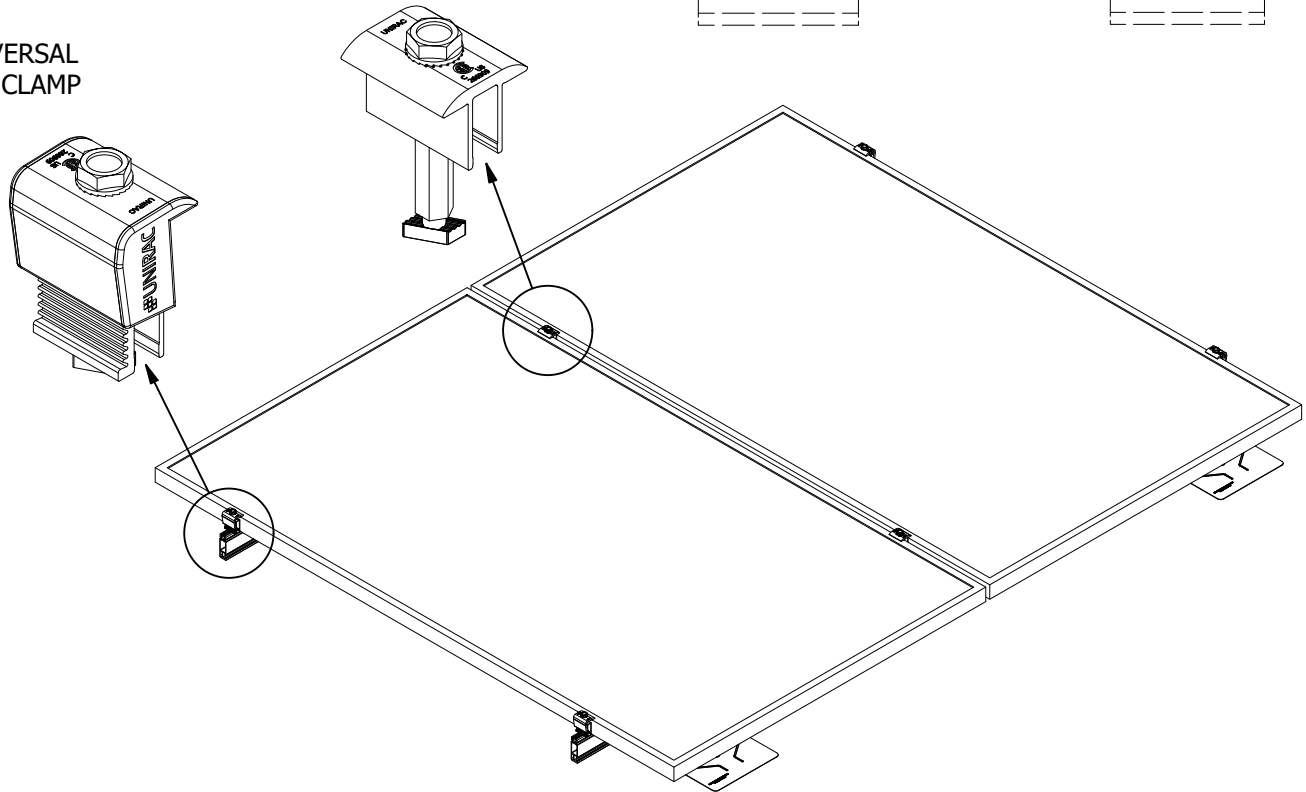


UNIVERSAL AF  
MID CLAMP



UNIVERSAL  
MID CLAMP

UNIVERSAL  
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:	UNIVERSAL AF CLAMPS
REVISION DATE:	9/28/2020

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

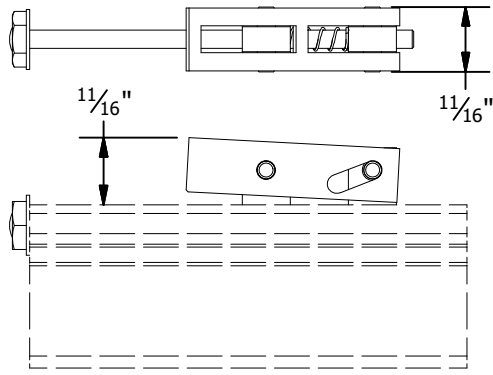
PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A01B

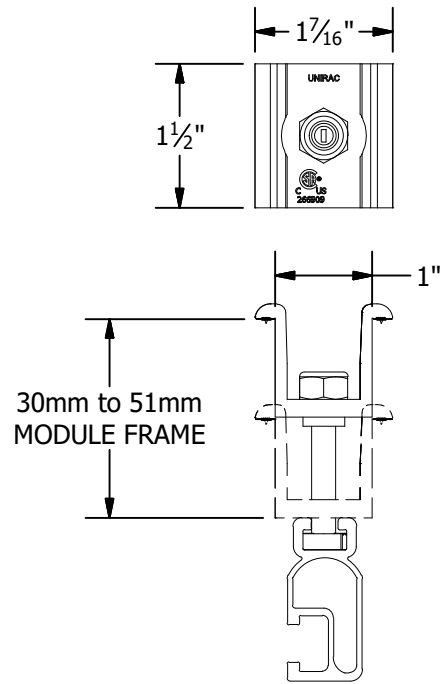
SHEET



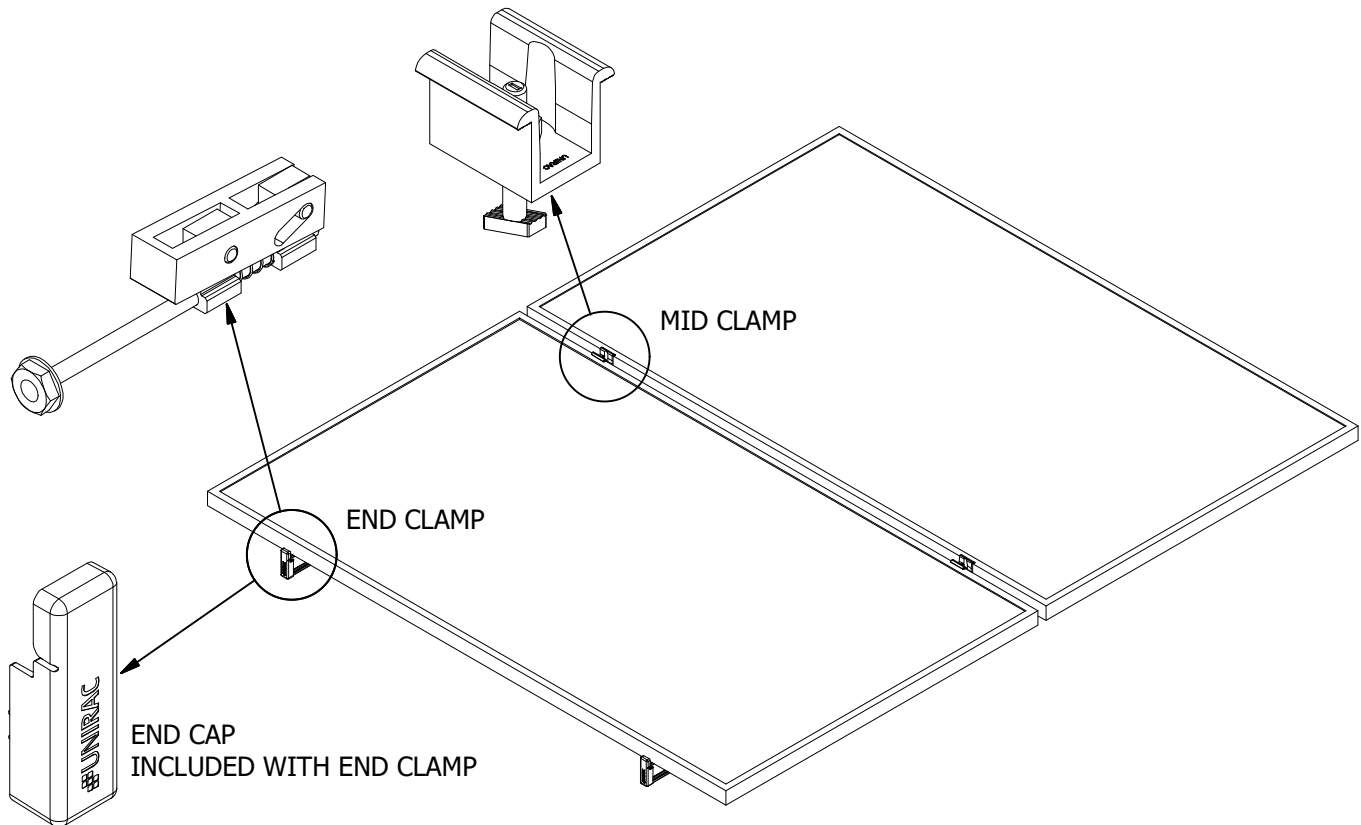
PRO SERIES END CLAMP



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

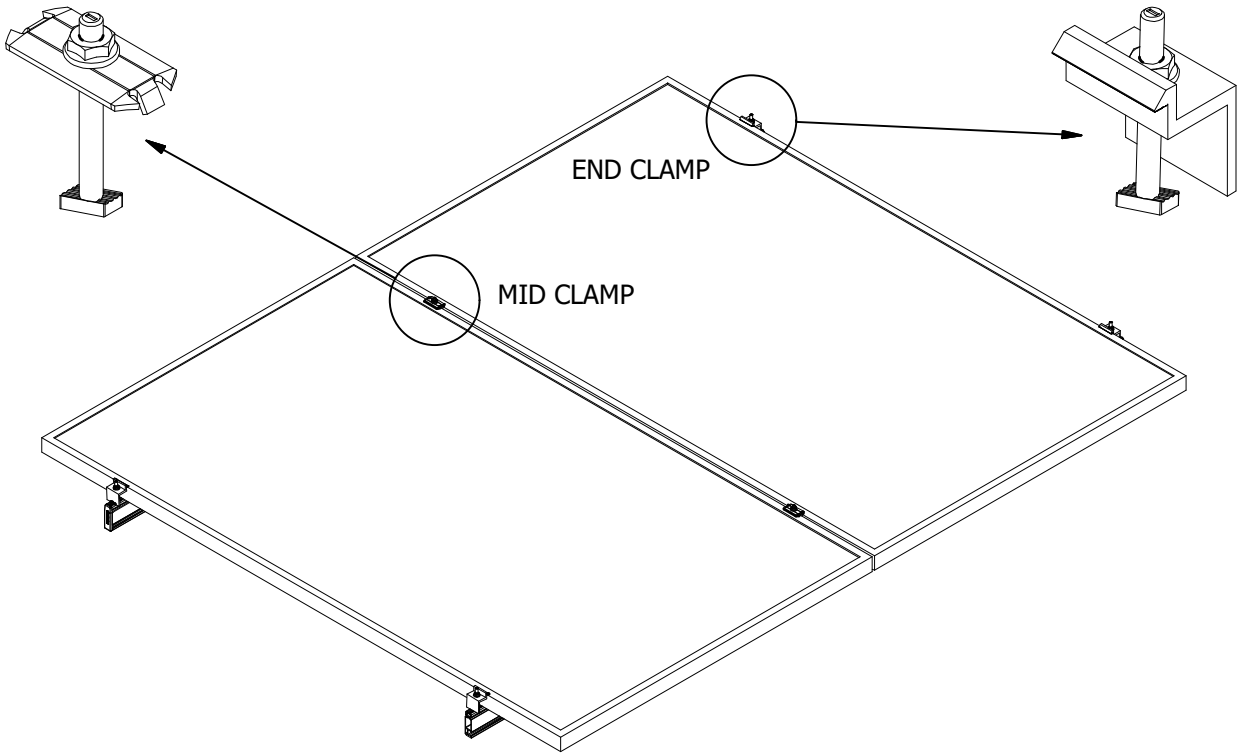
DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS

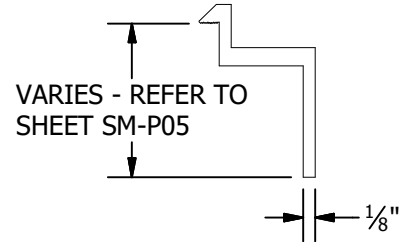
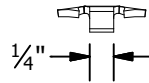
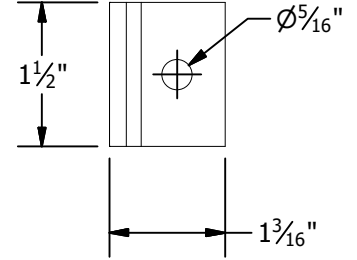
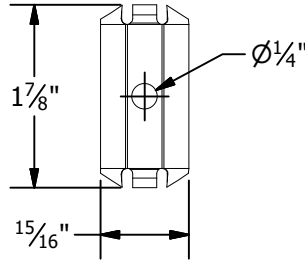
LEGAL NOTICE

SM-A01

SHEET



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



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
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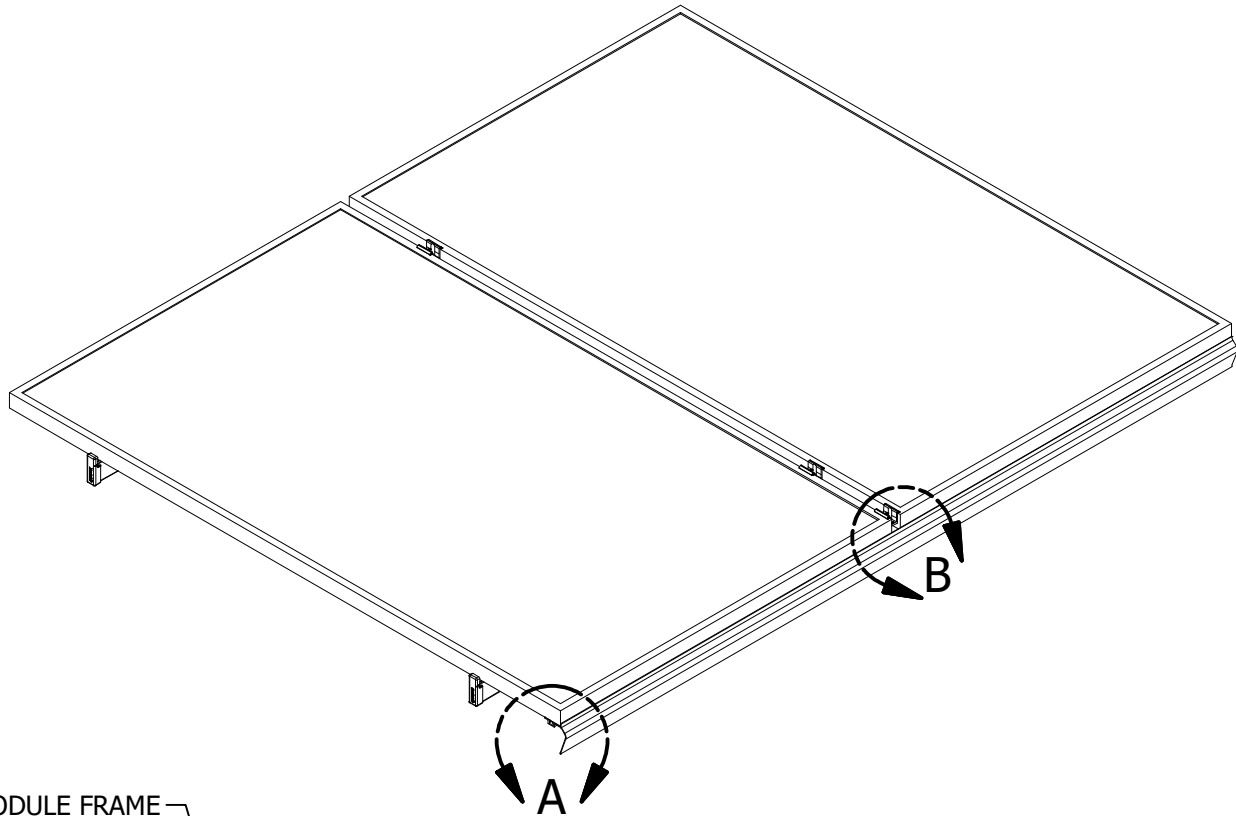
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DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING TOP CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

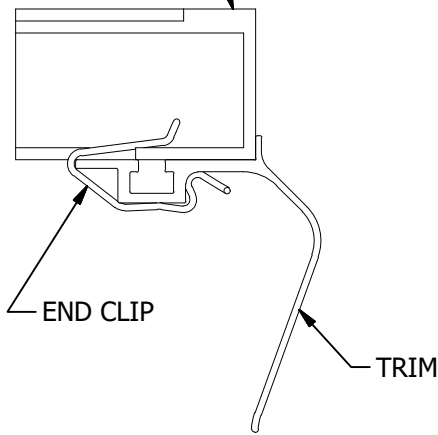
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SM-A01A

SHEET



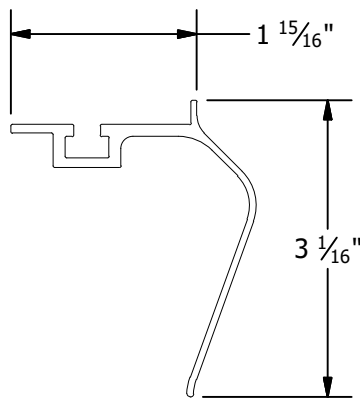
MODULE FRAME



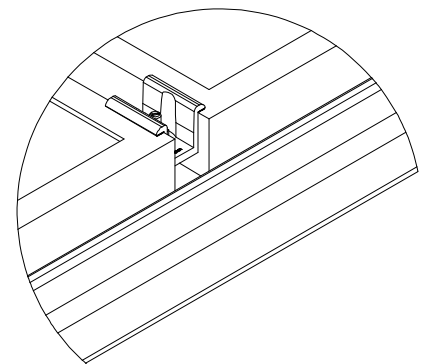
END CLIP

TRIM

DETAIL A  
TRIM END CLIP



TRIM



DETAIL B  
MID CLAMP TRIM CONNECTION

PART # TABLE		
P/N	DESCRIPTION	LENGTH
206072D-B	SM TRIM DRK	168"
008025S	SM TRIM END CLIP	-



1411 BROADWAY BLVD. NE  
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	SM TRIM END CLIP
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
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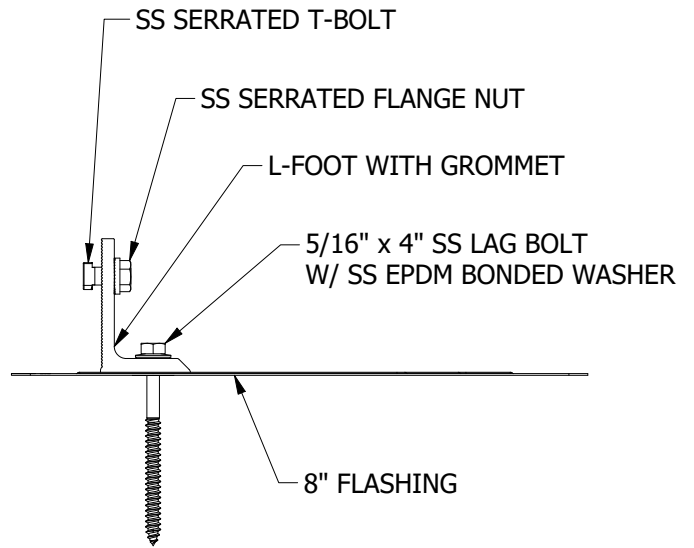
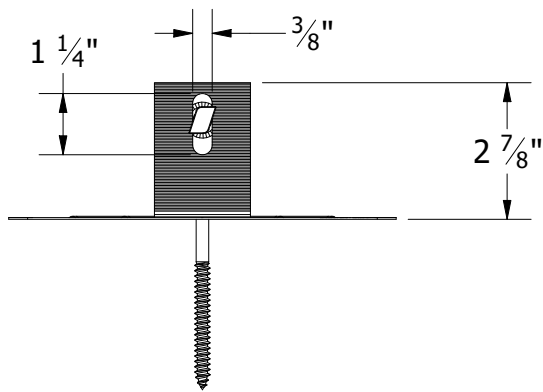
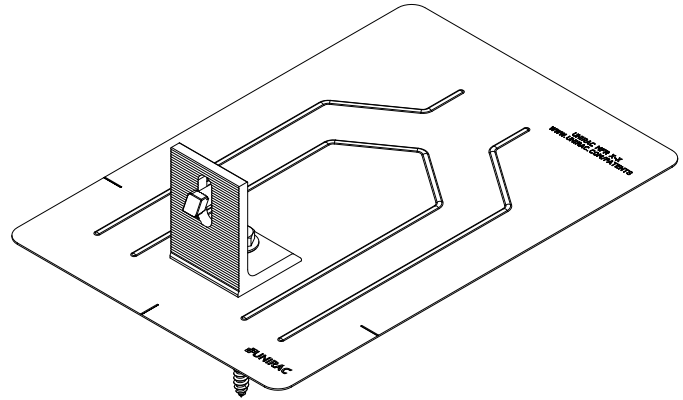
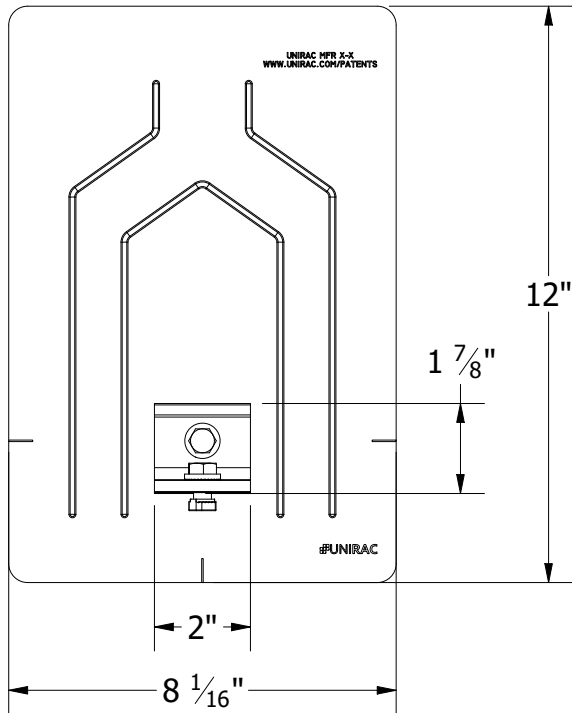
SM-A02

SHEET



**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:	4/28/2020

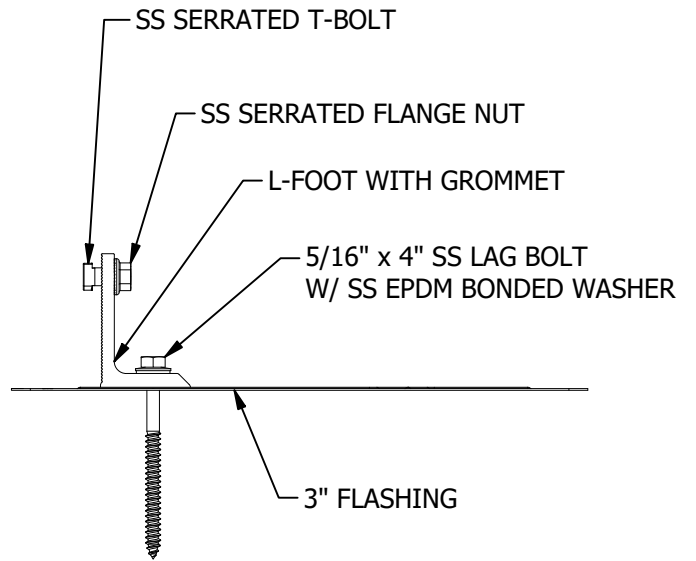
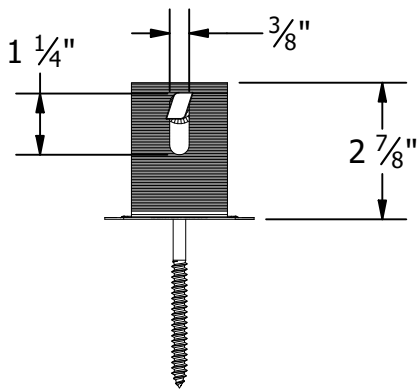
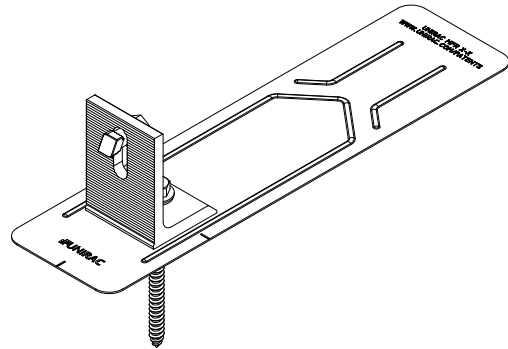
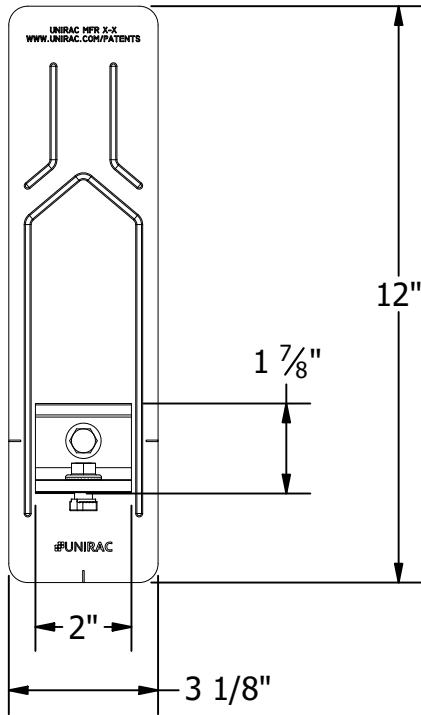
DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
 LEGAL NOTICE

**SM-A03**  
 SHEET

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
004015M	FLASHKIT PRO SB, MILL
004015D	FLASHKIT PRO SB, DRK



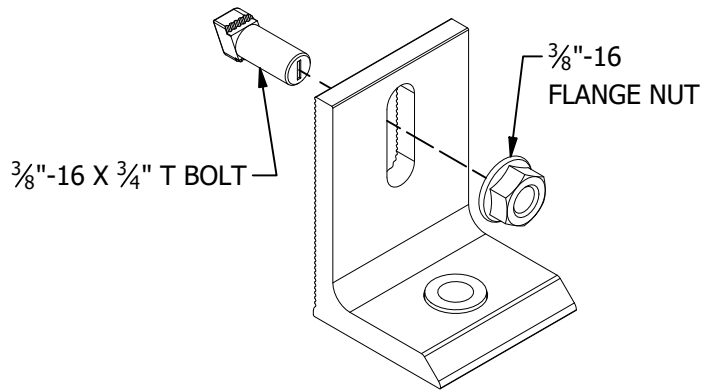
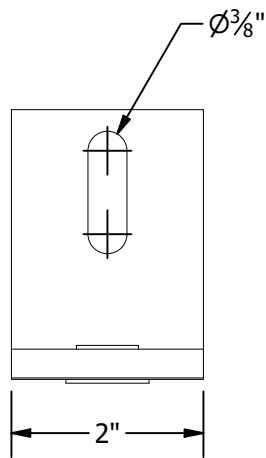
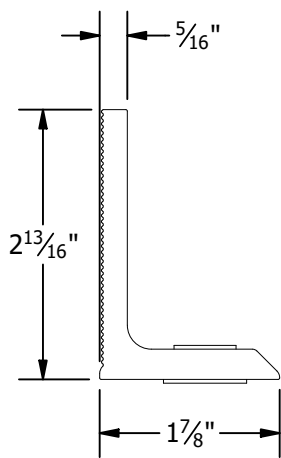
1411 BROADWAY BLVD. NE  
 ALBUQUERQUE, NM 87102 USA  
 PHONE: 505.242.6411  
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	KIT DETAIL
DESCRIPTION:	FLASHKIT PRO SB
REVISION DATE:	4/20/2021

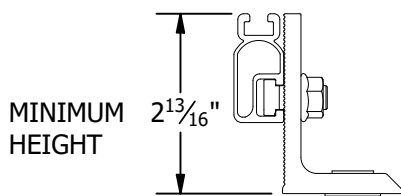
DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
 LEGAL NOTICE

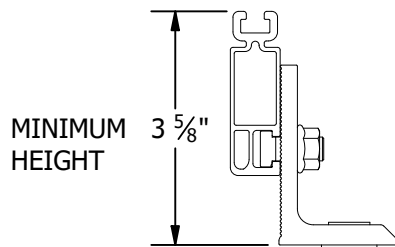
**SM-A16**  
 SHEET



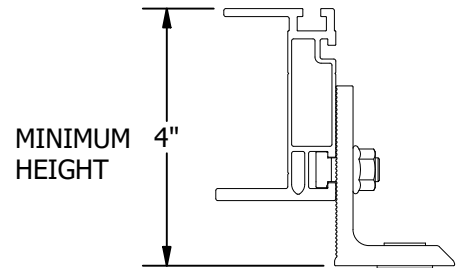
L-FOOT



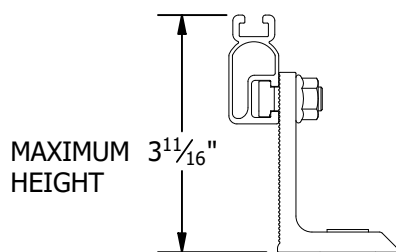
MINIMUM HEIGHT



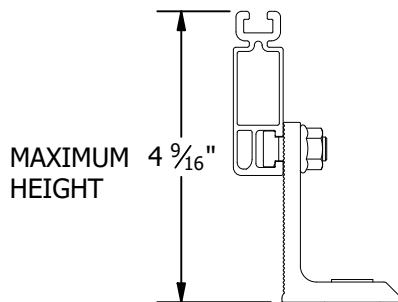
MINIMUM HEIGHT



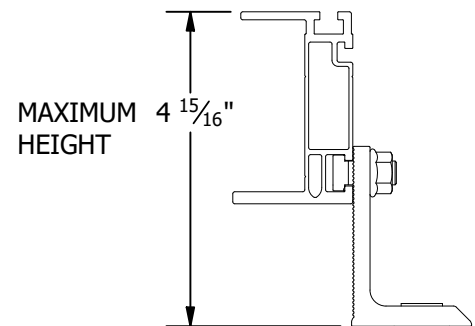
MINIMUM HEIGHT



MAXIMUM HEIGHT



MAXIMUM HEIGHT



MAXIMUM HEIGHT

SOLARMOUNT LIGHT ON L-FOOT

SOLARMOUNT STANDARD ON L-FOOT

SOLARMOUNT HD ON L-FOOT



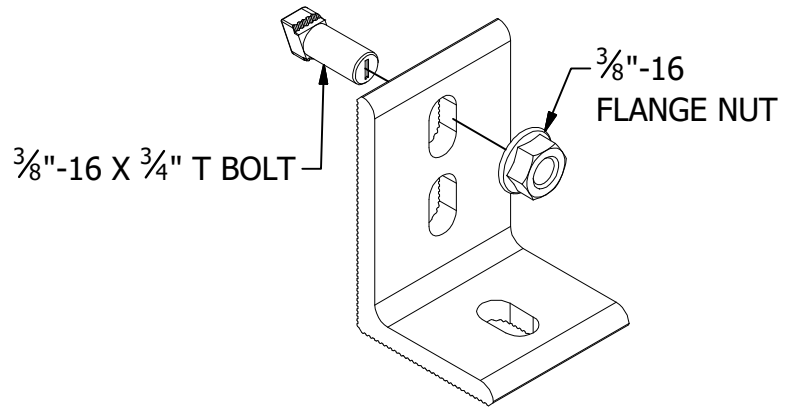
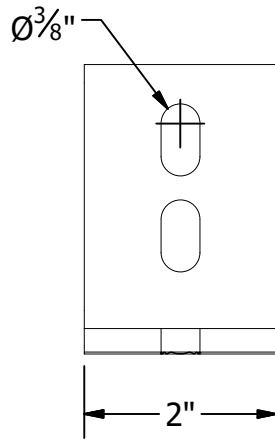
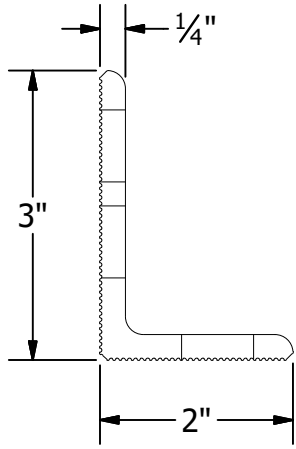
1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	L-FOOT
REVISION DATE:	11/19/2018

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

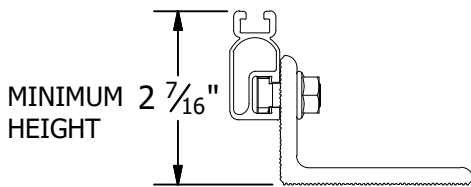
PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A11  
SHEET

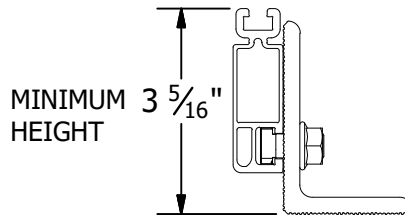


L-FOOT

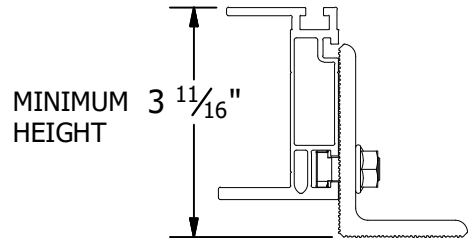
PART # TABLE	
P/N	DESCRIPTION
304001C	L-FOOT SERR W/T-BOLT CLR
304001D	L-FOOT SERR W/T-BOLT DRK



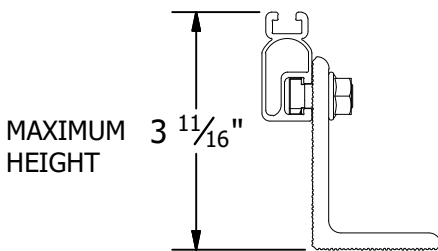
MINIMUM HEIGHT



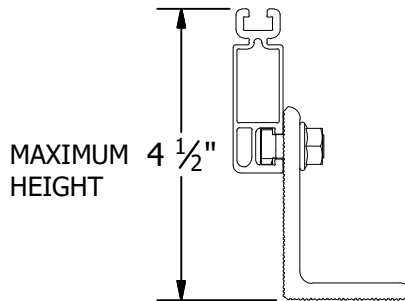
MINIMUM HEIGHT



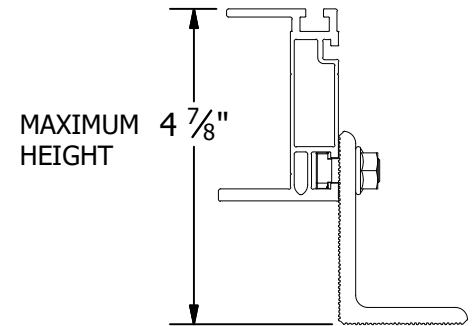
MINIMUM HEIGHT



MAXIMUM HEIGHT



MAXIMUM HEIGHT



MAXIMUM HEIGHT

SOLARMOUNT LIGHT ON L-FOOT

SOLARMOUNT STANDARD ON L-FOOT

SOLARMOUNT HD ON L-FOOT

NOTES:

1. L-FOOT CAN BE INSTALLED IN TWO ORIENTATIONS, PLEASE REFER TO INSTRUCTIONS IN THE QUICK START GUIDE.



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	L-FOOT
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

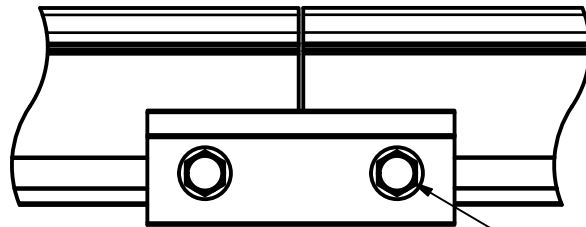
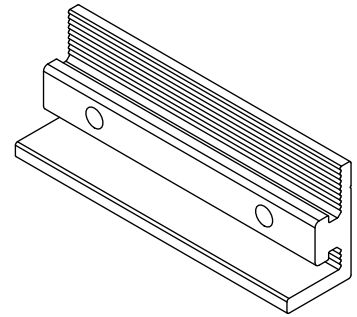
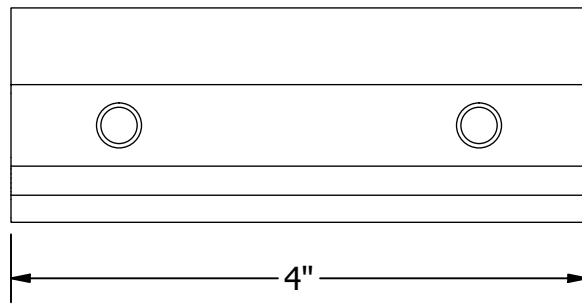
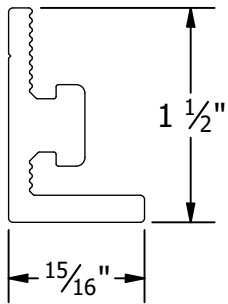
PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A04

SHEET

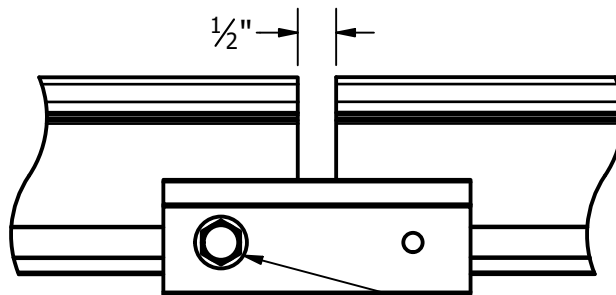


## BONDING SPLICE BAR



TYPICAL SPLICE BAR DETAIL

5/16"-18 TYPE F THREAD  
CUTTING SCREWS INCLUDED



TYPICAL EXPANSION JOINT DETAIL

NOTE THAT ONLY 1 SCREW IS  
USED AT AN EXPANSION JOINT.  
THE SPLICE BAR DOES NOT BOND  
ACROSS AN EXPANSION JOINT.  
SEE INSTALLATION GUIDE FOR  
INSTRUCTION.

PART # TABLE

P/N	DESCRIPTION
303019M	BND SPLICE BAR PRO SERIES MILL
303019D	BND SPLICE BAR PRO SERIES DRK



1411 BROADWAY BLVD. NE  
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING SPLICE BAR PRO SERIES
REVISION DATE:	9/17/2019

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

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PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS

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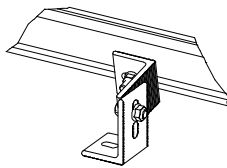
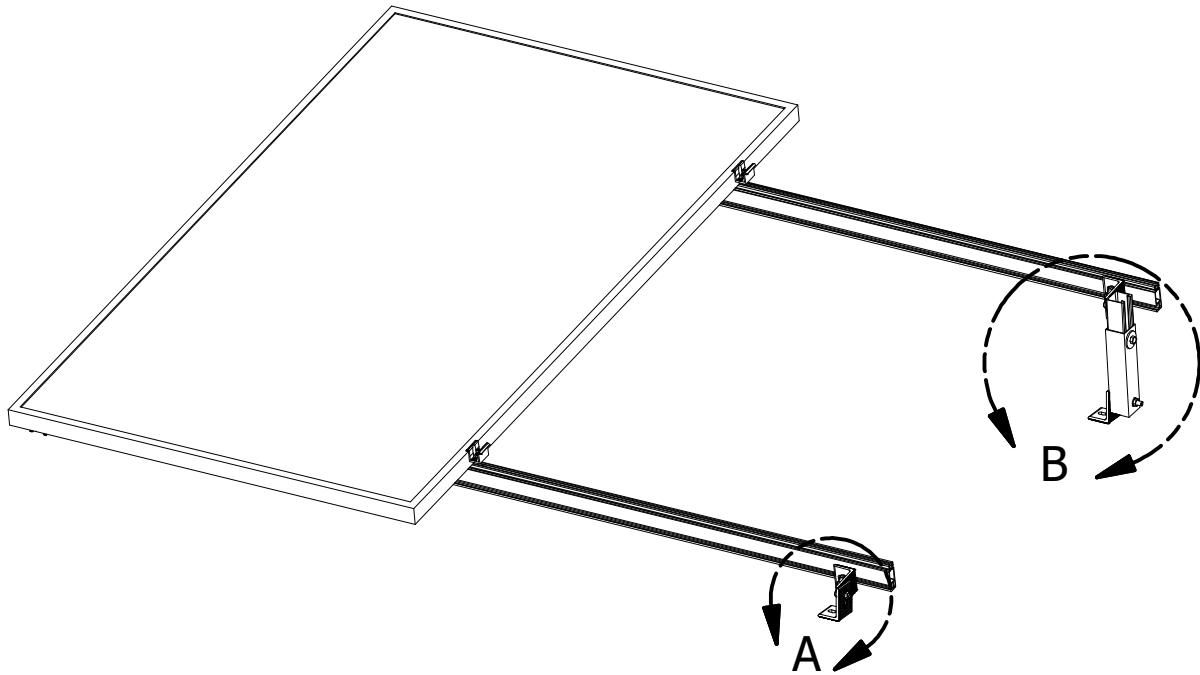
**SM-A05**

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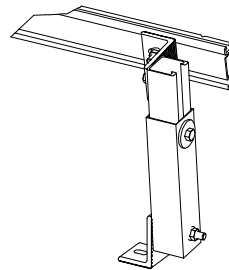
SHEET

NOTES:

1. SEE SM T1H INSTALLATION GUIDE FOR ASSEMBLY INSTRUCTIONS.



**DETAIL A**  
FRONT L-FOOT HINGE



**DETAIL B**  
REAR TILT LEG



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ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
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PRODUCT LINE:	SOLARMOUNT TILT
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	LOW PROFILE TILT
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

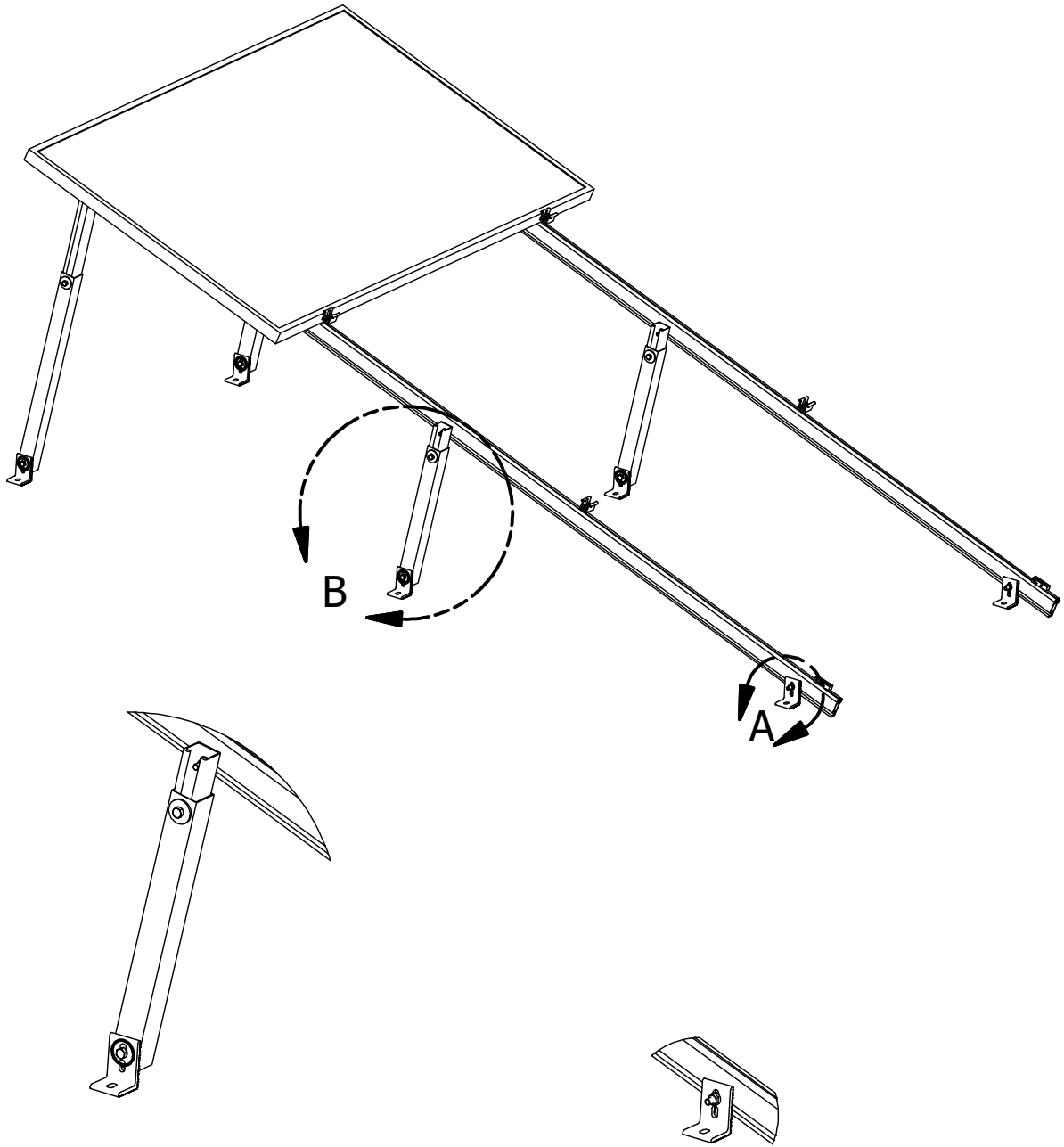
PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

**SM-A07**

SHEET

NOTES:

1. SEE SM T1H INSTALLATION GUIDE FOR ASSEMBLY INSTRUCTIONS.



DETAIL B  
REAR TILT LEG

DETAIL A  
L FOOT



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
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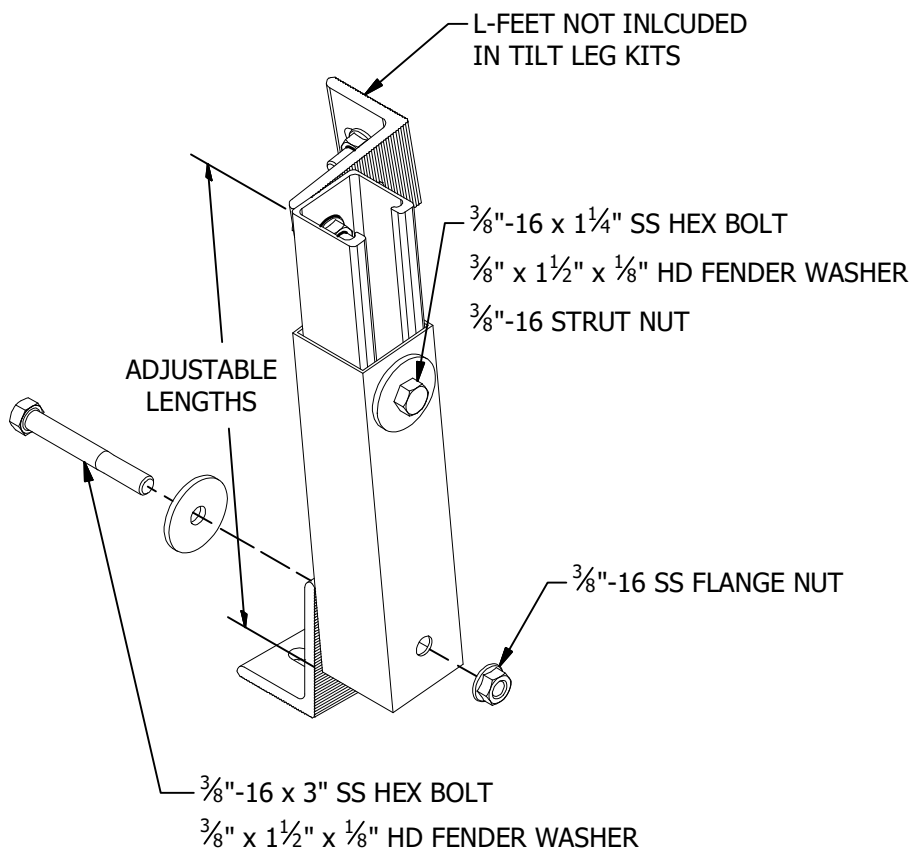
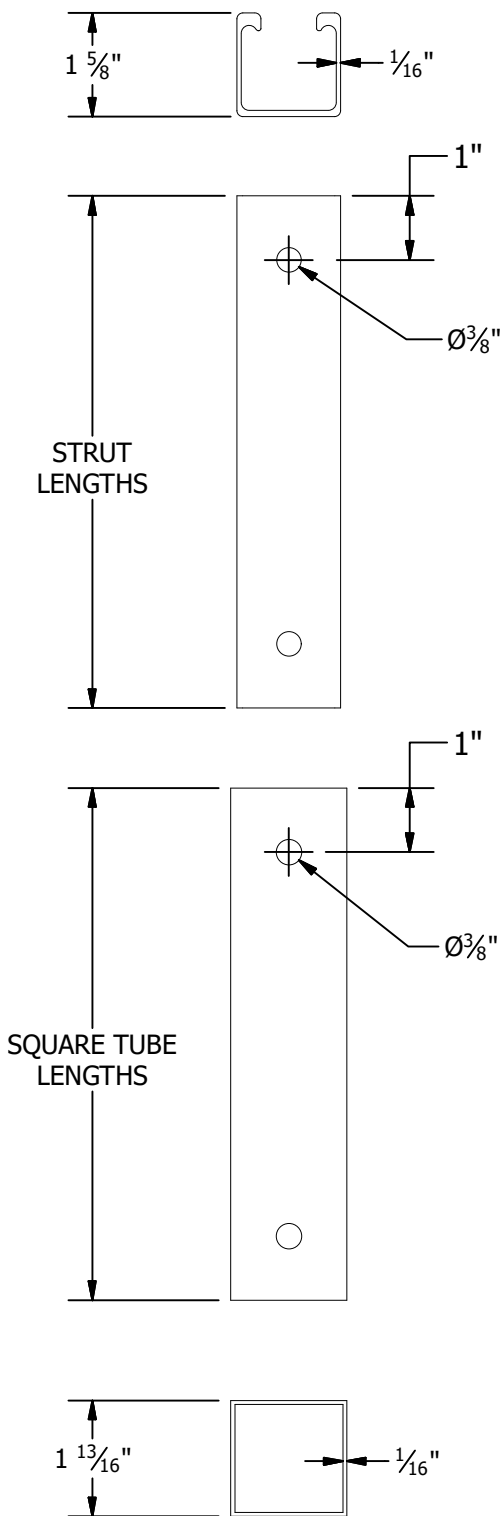
PRODUCT LINE:	SOLARMOUNT TILT
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	HIGH PROFILE TILT
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

**SM-A08**

SHEET



TILT LEG TABLE				
P/N	DESCRIPTION	TOTAL ADJUSTABLE LENGTHS	SQUARE TUBE	STRUT
307107M	SM ADJ TILT LEG, 8"-12", W/HDW	8" to 12"	8"	8"
307115M	SM ADJ TILT LEG, 18"-30", W/HDW	18" to 30"	18"	18"
307120M	SM ADJ TILT LEG, 26"-44", W/HDW	26" to 44"	26"	26"
307134M	SM ADJ TILT LEG, 40"-72", W/HDW	40" to 72"	40"	40"



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PHONE: 505.242.6411  
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PRODUCT LINE:	SOLARMOUNT TILT
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	ADJUSTABLE TILT LEG
REVISION DATE:	9/27/2017

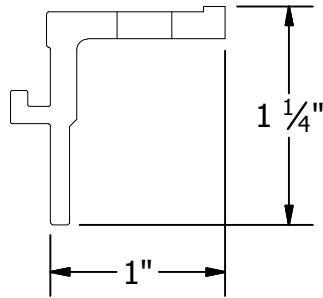
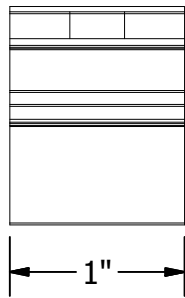
DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
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SM-A09

SHEET

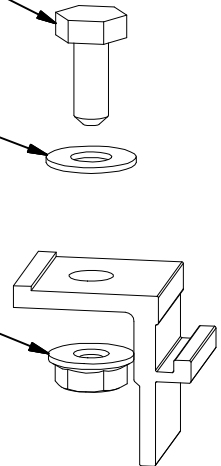




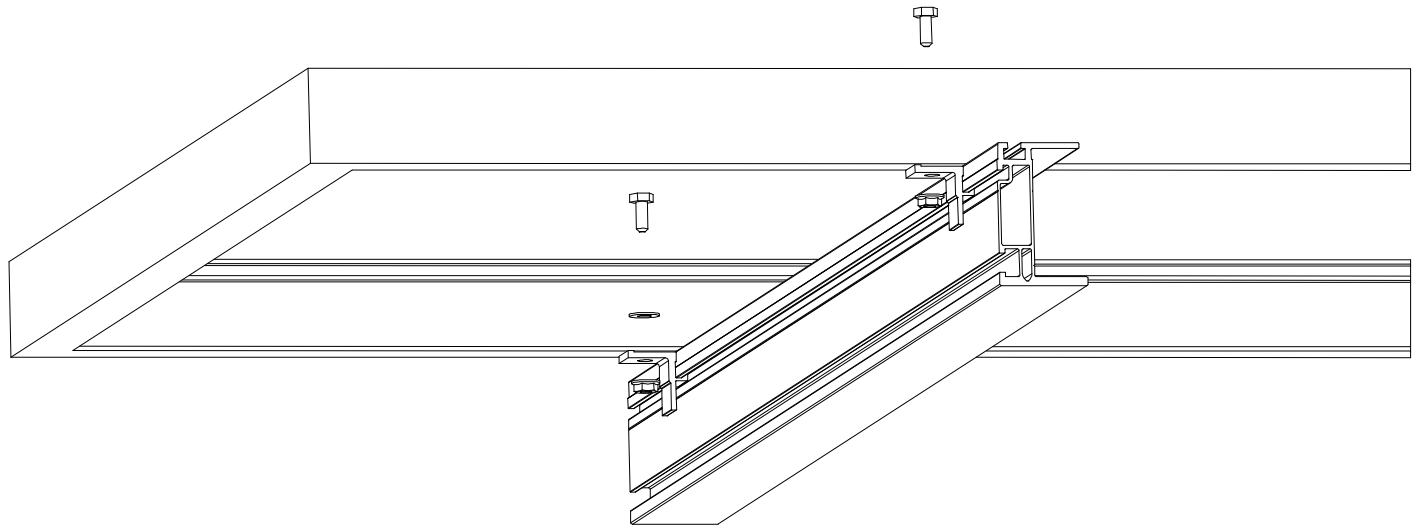
1/4"-20 X 3/4" SS HEX HEAD BOLT

1/4" FLAT WASHER

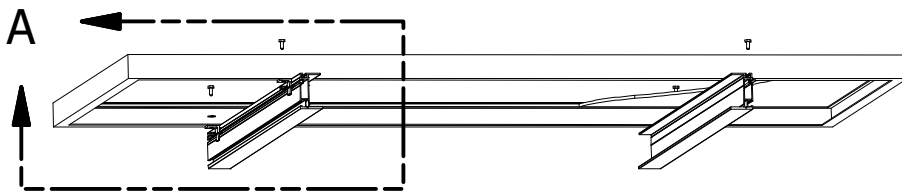
1/4"-20 SS FLANGE NUT



### BOTTOM CLIP



### DETAIL A



#### PART # TABLE

P/N	DESCRIPTION
302000C	SMHD BOTTOM CLIPS W/HDW CLR



1411 BROADWAY BLVD. NE  
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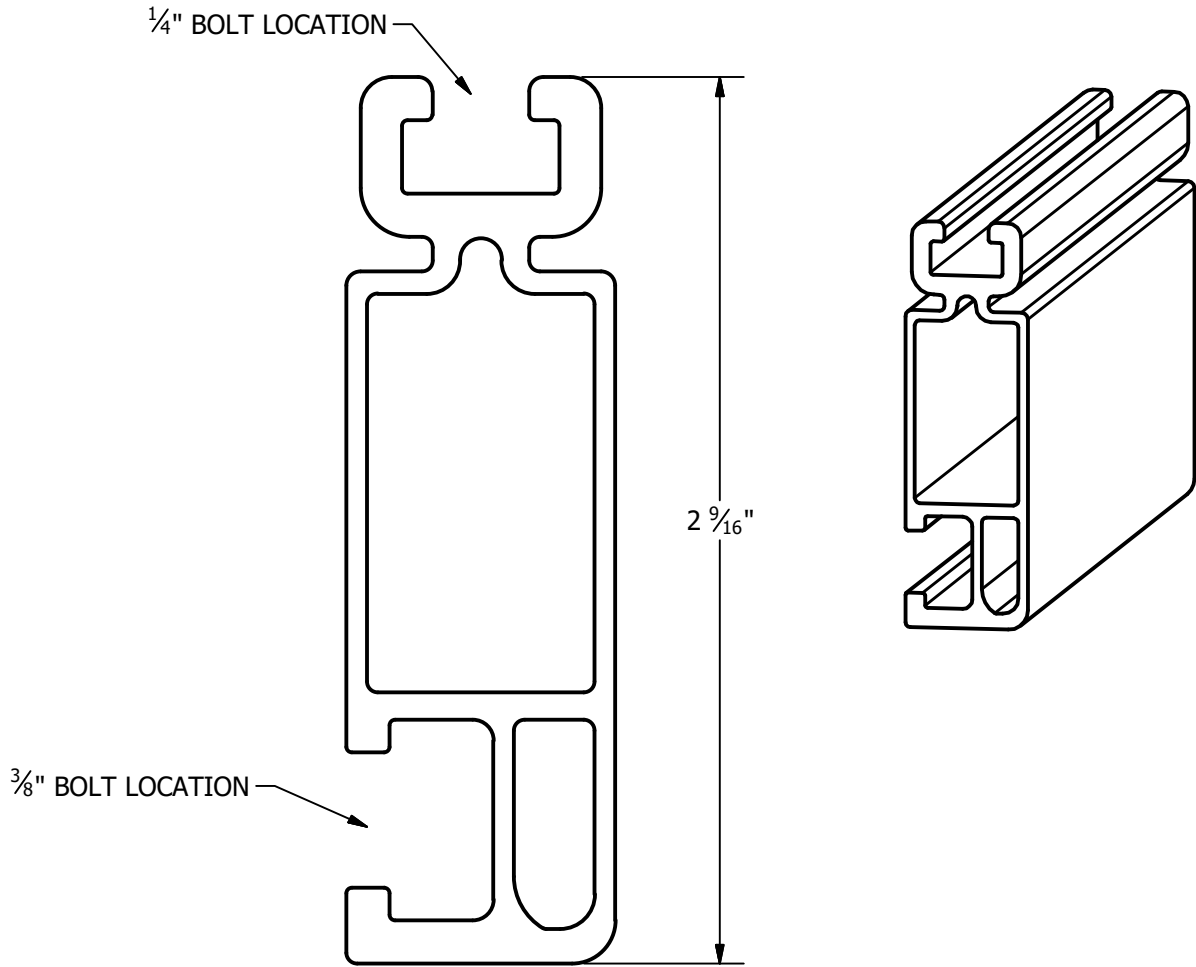
PRODUCT LINE:	SOLARMOUNT HD
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BOTTOM CLIP
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
 LEGAL NOTICE

**SM-A10**

SHEET



PART # TABLE		
P/N	DESCRIPTION	LENGTH
320132M	SM RAIL 132" MILL	132"
310132C	SM RAIL 132" CLR	132"
320168M	SM RAIL 168" MILL	168"
310168C	SM RAIL 168" CLR	168"
320168D	SM RAIL 168" DRK	168"
320208M	SM RAIL 208" MILL	208"
310208C	SM RAIL 208" CLR	208"
320240M	SM RAIL 240" MILL	240"
310240C	SM RAIL 240" CLR	240"
310240D	SM RAIL 240" DRK	240"

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 ALBUQUERQUE, NM 87102 USA  
 PHONE: 505.242.6411  
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	STANDARD RAIL
REVISION DATE:	9/11/2017

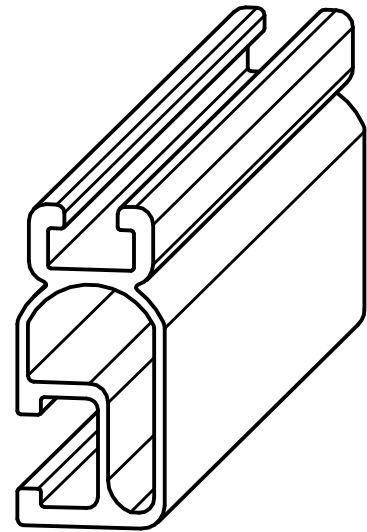
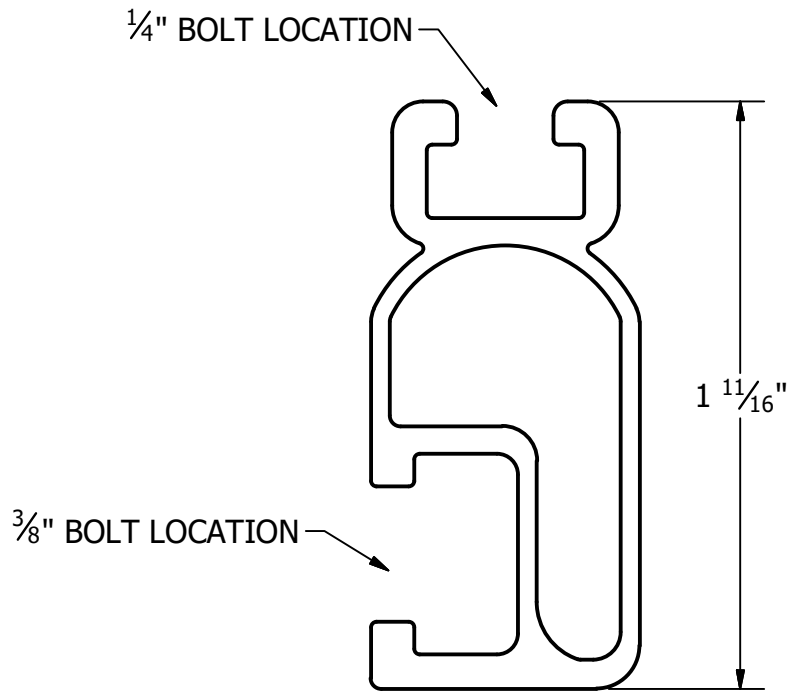
DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
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**SM-P01**

SHEET



PART # TABLE		
P/N	DESCRIPTION	LENGTH
315168M	SM LIGHT RAIL 168" MILL	168"
315168D	SM LIGHT RAIL 168" DRK	168"
315240M	SM LIGHT RAIL 240" MILL	240"
315240D	SM LIGHT RAIL 240" DRK	240"



1411 BROADWAY BLVD. NE  
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PRODUCT LINE: SOLARMOUNT

DRAWING TYPE: PART DETAIL

DESCRIPTION: LIGHT RAIL

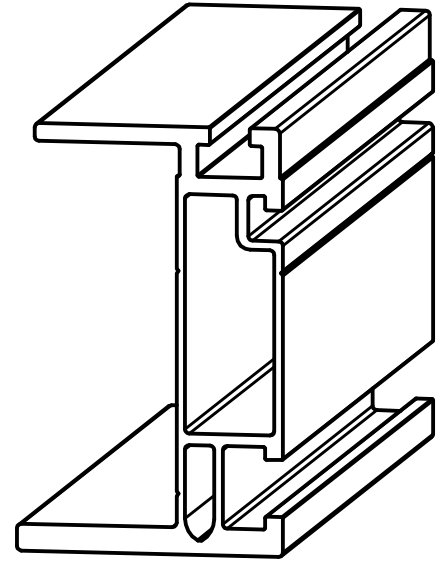
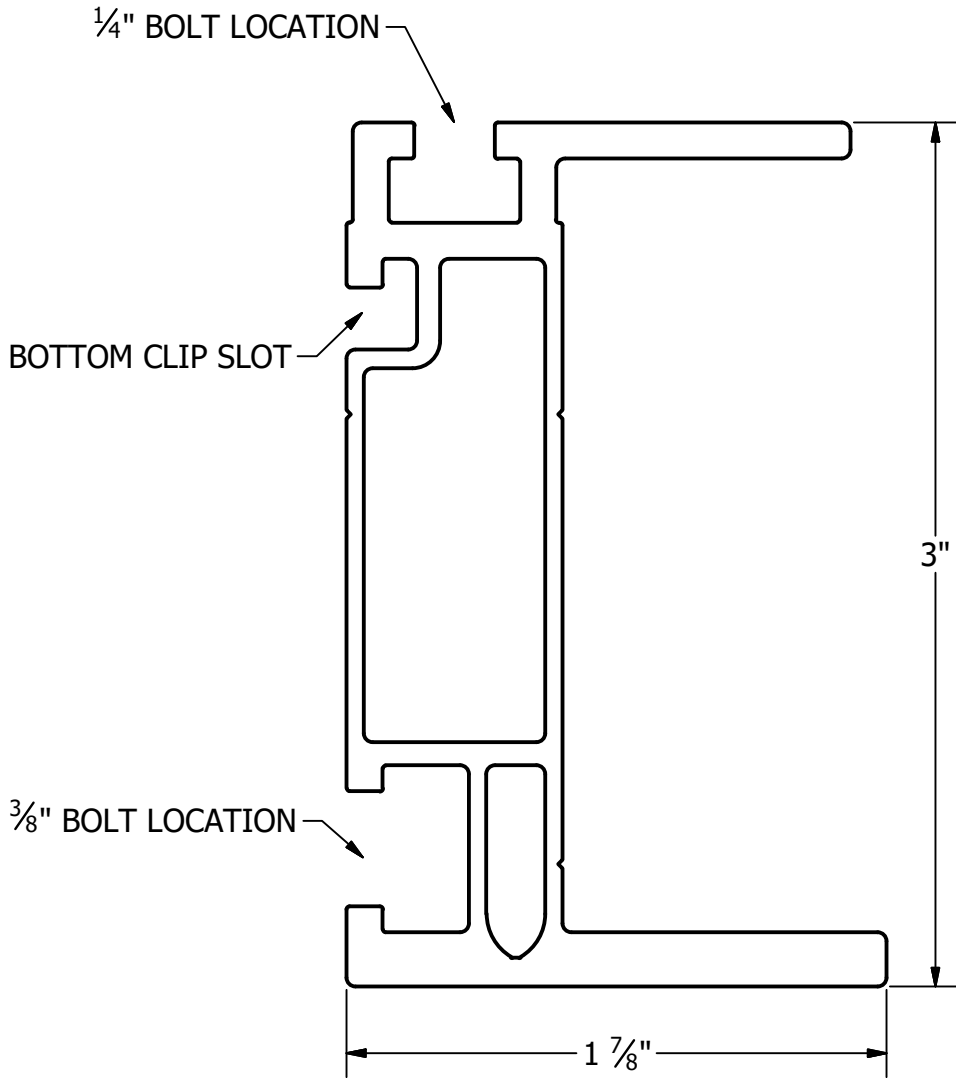
REVISION DATE: 9/11/2017

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
 LEGAL NOTICE

**SM-P02**

SHEET



PART # TABLE		
P/N	DESCRIPTION	LENGTH
410144M	SMHD, RAIL 144" MILL	144"
410168M	SMHD, RAIL 168" MILL	168"
410204M	SMHD, RAIL 204" MILL	204"
410240M	SMHD, RAIL 240" MILL	240"



1411 BROADWAY BLVD. NE  
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 PHONE: 505.242.6411  
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PRODUCT LINE: SOLARMOUNT

DRAWING TYPE: PART DETAIL

DESCRIPTION: HD RAIL

REVISION DATE: 9/11/2017

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

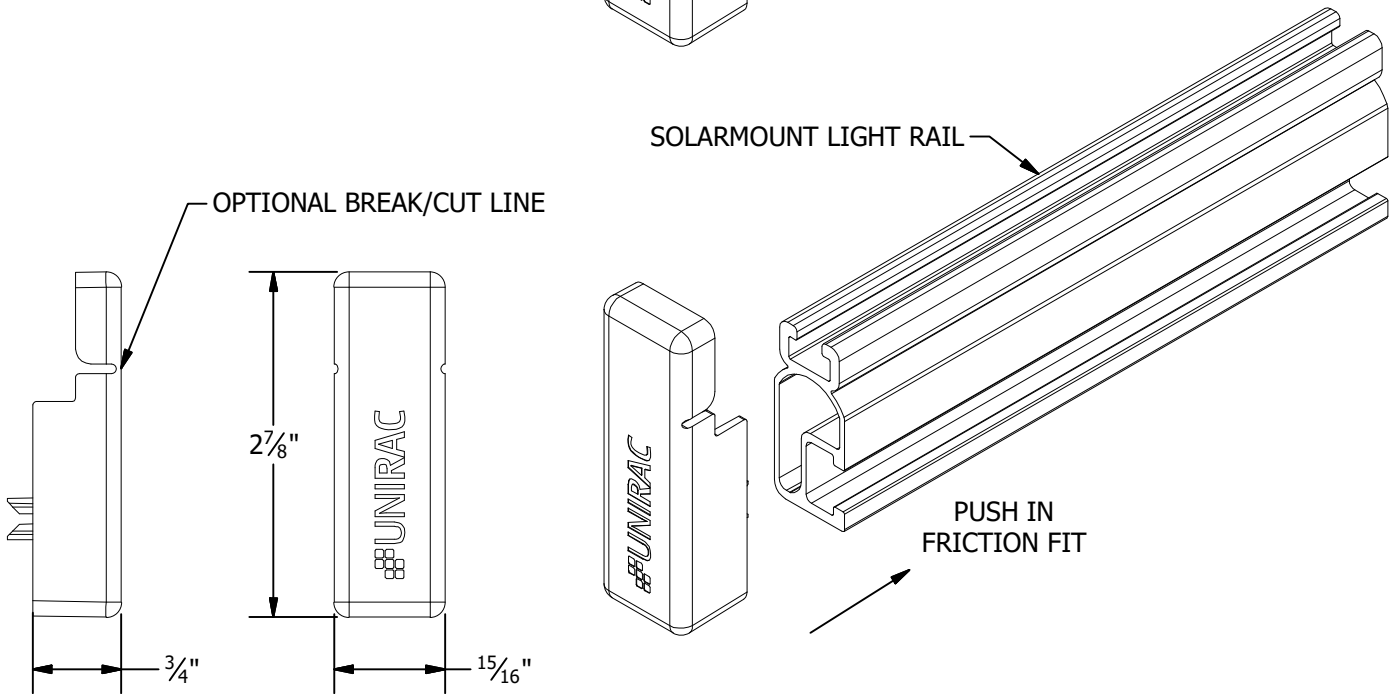
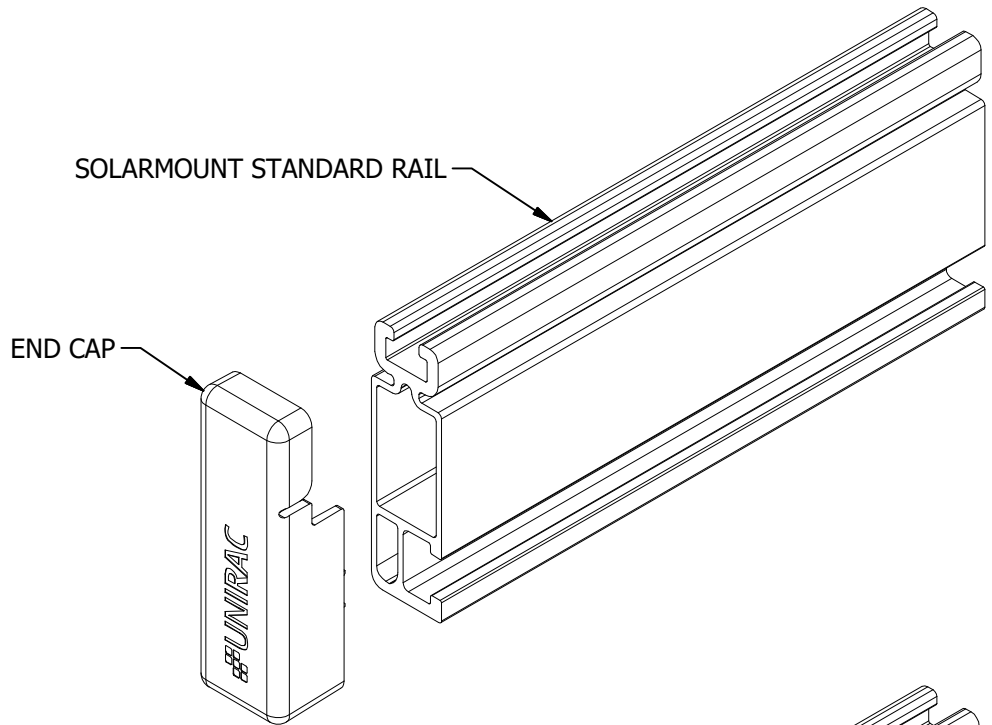
PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
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SM-P03

SHEET

NOTES:

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



1411 BROADWAY BLVD. NE  
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PRODUCT LINE: SOLARMOUNT

DRAWING TYPE: PART DETAIL

DESCRIPTION: END CAPS

REVISION DATE: 9/27/2017

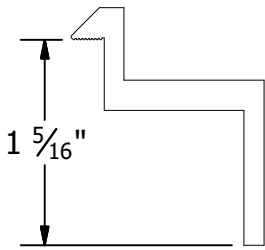
DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

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LEGAL NOTICE

SM-P04

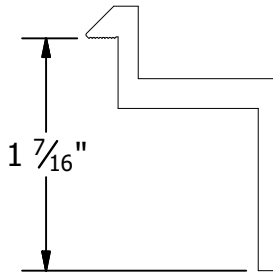
SHEET





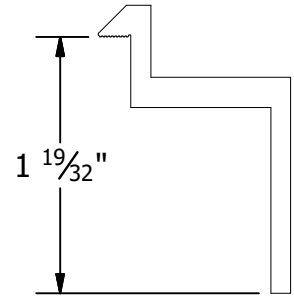
**B CLAMP**

30mm to 32mm Module Thickness  
(1.18" to 1.26")



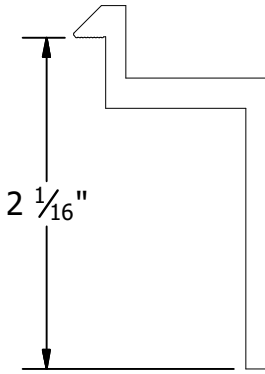
**C CLAMP**

33mm to 36mm Module Thickness  
(1.30" to 1.42")



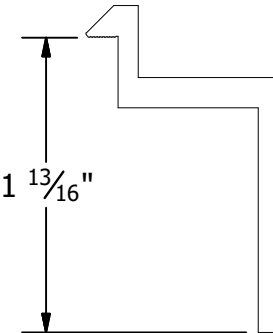
**D CLAMP**

38mm to 40mm Module Thickness  
(1.50" to 1.57")



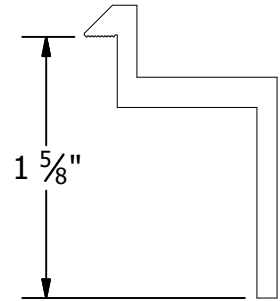
**E CLAMP**

50mm to 51mm Module Thickness  
(1.97" to 2.00")



**F CLAMP**

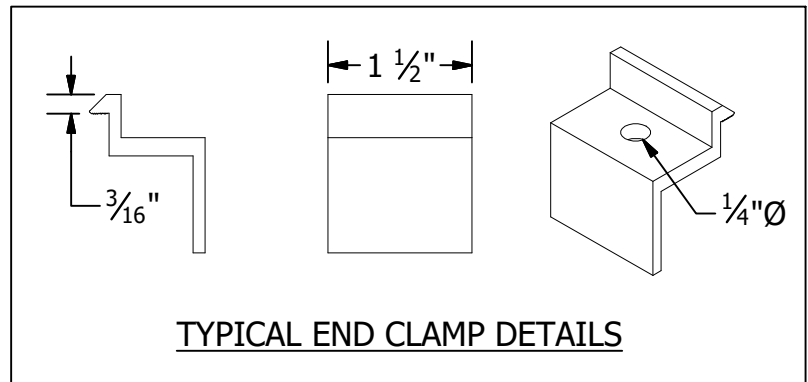
45mm to 47mm Module Thickness  
(1.77" to 1.85")



**K CLAMP**

39mm to 41mm Module Thickness  
(1.54" to 1.61")

PART # TABLE	
P/N	DESCRIPTION
302021C	SM ENDCLAMP B CLR AL
302021D	SM ENDCLAMP B DRK AL
302022C	SM ENDCLAMP C CLR AL
302022D	SM ENDCLAMP C DRK AL
302023C	SM ENDCLAMP D CLR AL
302023D	SM ENDCLAMP D DRK AL
303024C	SM ENDCLAMP E CLR AL
302024D	SM ENDCLAMP E DRK AL
302025C	SM ENDCLAMP F CLR AL
302025D	SM ENDCLAMP F DRK AL
302026C	SM ENDCLAMP K CLR AL
302026D	SM ENDCLAMP K DRK AL



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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	END CLAMPS - TOP MOUNTING
REVISION DATE:	9/27/2017

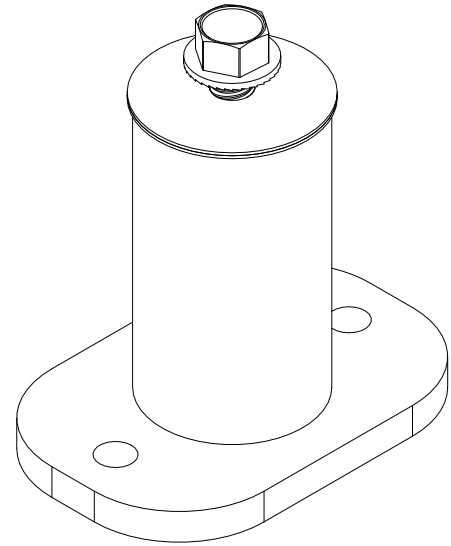
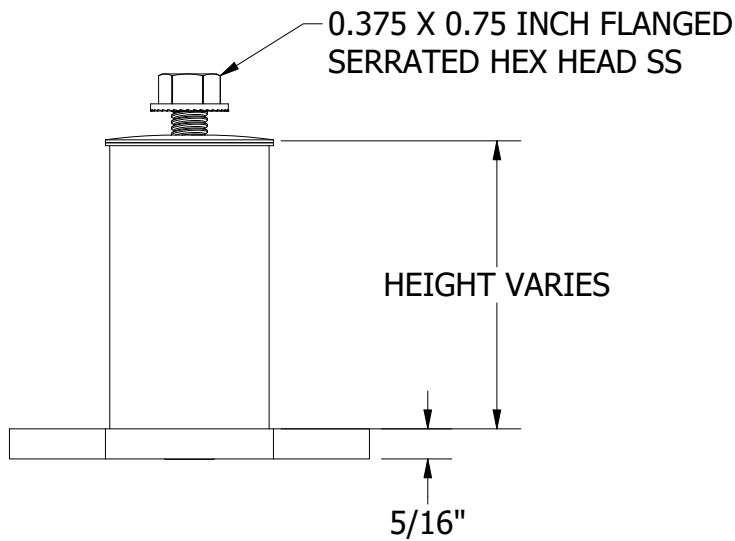
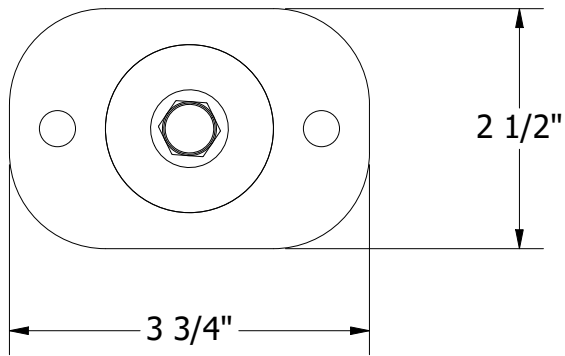
DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS

LEGAL NOTICE

**SM-P05**

SHEET



PART # TABLE	
P/N	DESCRIPTION
004300M	3" 2 PIECE STANDOFF MILL
004300D	3" 2 PIECE STANDOFF DARK
004400M	4" 2 PIECE STANDOFF MILL
004400D	4" 2 PIECE STANDOFF DARK
004600M	6" 2 PIECE STANDOFF MILL
004600D	6" 2 PIECE STANDOFF DARK
004700M	7" 2 PIECE STANDOFF MILL
004700D	7" 2 PIECE STANDOFF DARK



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

PRODUCT LINE:	SM
DRAWING TYPE:	ASSEMBLY DETAIL
DESCRIPTION:	STANDOFF
REVISION DATE:	5/19/2020

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
 LEGAL NOTICE

SM-A12

SHEET