



RESIDENTIAL ROOFTOP SOLAR PERMIT PACKAGE

Katherine Crean
2122 NW Killarney Ln
Lee's Summit, Missouri 64081
3149735259



1403 N 630 E
Orem, Utah 84097
(800) 377-4480
BlueRavenSolar.com

SCOPE OF WORK

INSTALLATION OF ROOFTOP MOUNTED
PHOTOVOLTAIC SOLAR SYSTEM

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
02/15/2024 9:32:19



SHEET INDEX
PV1 COVER SHEET
PV2 SITE PLAN
PV3 ROOF PLAN
PV4 STRUCTURAL
PV5 ELECTRICAL 3-LINE
PV6 ELECTRICAL CALCULATIONS
PV7 LABELS
PV8 PLACARD
SS SPEC SHEETS

TYPICAL STRUCTURAL INFORMATION
ROOF MATERIAL: Comp Shingle
SHEATHING TYPE: OSB
FRAMING TYPE: Manufactured Truss
RACKING TYPE: UNIRAC NXT UMOUNT
ATTACHMENT TYPE: UNIRAC STRONGHOLD
TOTAL ATTACHMENTS: 24

NEW PV SYSTEM INFORMATION
DC SYSTEM SIZE: 4.62kW DC
AC SYSTEM SIZE: 3.465 kW AC
MODULE TYPE: (11) REC Solar REC420AA Pure-R
INVERTER TYPE: Enphase IQ7X-96-2-US

TOTAL DC SYSTEM SIZE
4.62 kW DC

TOTAL AC SYSTEM SIZE
3.47 kW AC

INFORMATION FOR INSTALLER
ECOBEE QTY: 0
LED LIGHTBULB QTY: 0

GENERAL NOTES



2/8/2024

AHJ	Digitally signed by John A. Calvert
City of Lee's Summit	Date: 2024.02.08
UTILITY COMPANY	
Evergy MO West	14:24:55 -07'00'

DESIGN CRITERIA
WIND SPEED: 115
WIND EXPOSURE FACTOR: C
RISK CATEGORY: II
GROUND SNOW LOAD: 20
ROOF SNOW LOAD: 14
SEISMIC DESIGN CATEGORY: B

WEATHER STATION DATA
WEATHER STATION: KANSAS CITY INTL ARPT
HIGH TEMP 2% AVG: 35°C
EXTREME MINIMUM TEMP: -21°C

APPLICABLE CODES
*2017 NATIONAL ELECTRIC CODE (NEC)
*2018 INTERNATIONAL BUILDING CODE (IBC)
*2018 INTERNATIONAL RESIDENTIAL CODE (IRC), 2018 UNIFORM PLUMBING CODE (UPC), AND ALL STATE AND LOCAL BUILDING, ELECTRICAL, AND PLUMBING CODES

CUSTOMER NAME:	AHJ:	UTILITY COMPANY:
Katherine Crean		Evergy MO West
2122 NW Killarney Ln		
Lee's Summit, Missouri 64081		
PROJECT ID:		
927225		
DC SYSTEM SIZE:		
4.62 kW DC		
AC SYSTEM SIZE:		
3.47 kW AC		
REVISIONS:		
A	2/8/2024	
B	----	
C	----	
D	----	
DRAWN BY:		
Jonah Sundrud		
PLOT DATE:		
February 8, 2024		
DRAWING TITLE:		
Cover Sheet		
DRAWING NUMBER:		
PV1		



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City of Lee's Summit

Every MO West



2/8/2024

FRONT OF HOME
2122 NW Killarney Ln

SITE PLAN
SCALE: 1/32" = 1'-0"

LEGEND

	ROOF TOP JUNCTION BOX		BREAKER ENCLOSURE		GENERATOR ATS PANEL		REMOTE POWER OFF SWITCH		NEW PV SYSTEM
	UTILITY METER		AC DISCONNECT		UTILITY METER CT CABINET		FIRE SETBACK HATCH		
	MAIN SERVICE PANEL		PV PRODUCTION METER		SUNPOWER HUB+		TRENCH OR OVERHEAD		
	SUBPANEL		COMBINER BOX		SUNVAULT ESS		PROPERTY LINE		

PV SYSTEM SPECIFICATIONS

NEW PV SYSTEM INFORMATION

PV MODULE: (11) REC Solar REC420AA Pure-R, **POWER RATING:** 420 W
MICROINVERTER: Enphase IQ7X-96-2-US, **POWER RATING:** 315 W

COMPASS

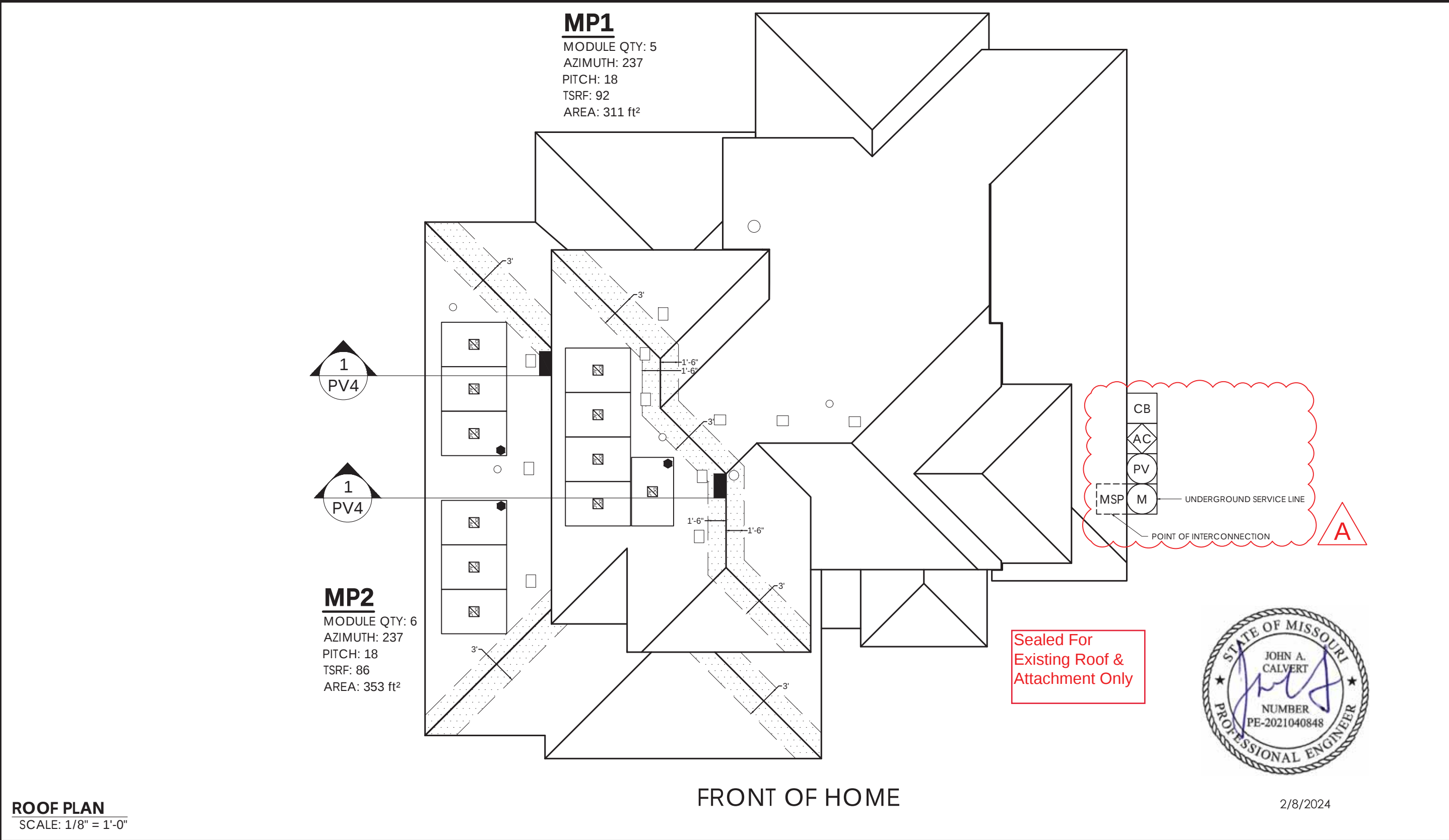


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Jonah Sundrud

PLOT DATE:
February 8, 2024

DRAWING TITLE:
Site Plan

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BLUE RAVEN
SOLAR

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AHJ: City of Lee's Summit

UTILITY COMPANY: Evergy MO West

PROJECT ID: 927225

DC SYSTEM SIZE: 4.62 kW DC

AC SYSTEM SIZE: 3.47 kW AC

REVISIONS:

A	2/8/2024
B	----
C	----
D	----

LEGEND									
	ROOF TOP JUNCTION BOX		BREAKER ENCLOSURE		GENERATOR ATS PANEL		REMOTE POWER OFF SWITCH		NEW PV SYSTEM
	UTILITY METER		AC DISCONNECT		UTILITY METER CT CABINET		FIRE SETBACK HATCH		TRENCH OR OVERHEAD
	MAIN SERVICE PANEL		PV PRODUCTION METER		SUNPOWER HUB+		PROPERTY LINE		
	SUBPANEL		COMBINER BOX		SUNVAULT ESS				

PV SYSTEM SPECIFICATIONS	
NEW PV SYSTEM INFORMATION	
PV MODULE: (11) REC Solar REC420AA Pure-R, POWER RATING: 420 W MICROINVERTER: Enphase IQ7X-96-2-US, POWER RATING: 315 W	

COMPASS



DRAWN BY: Jonah Sundrud

PLOT DATE: February 8, 2024

DRAWING TITLE: Roof Plan

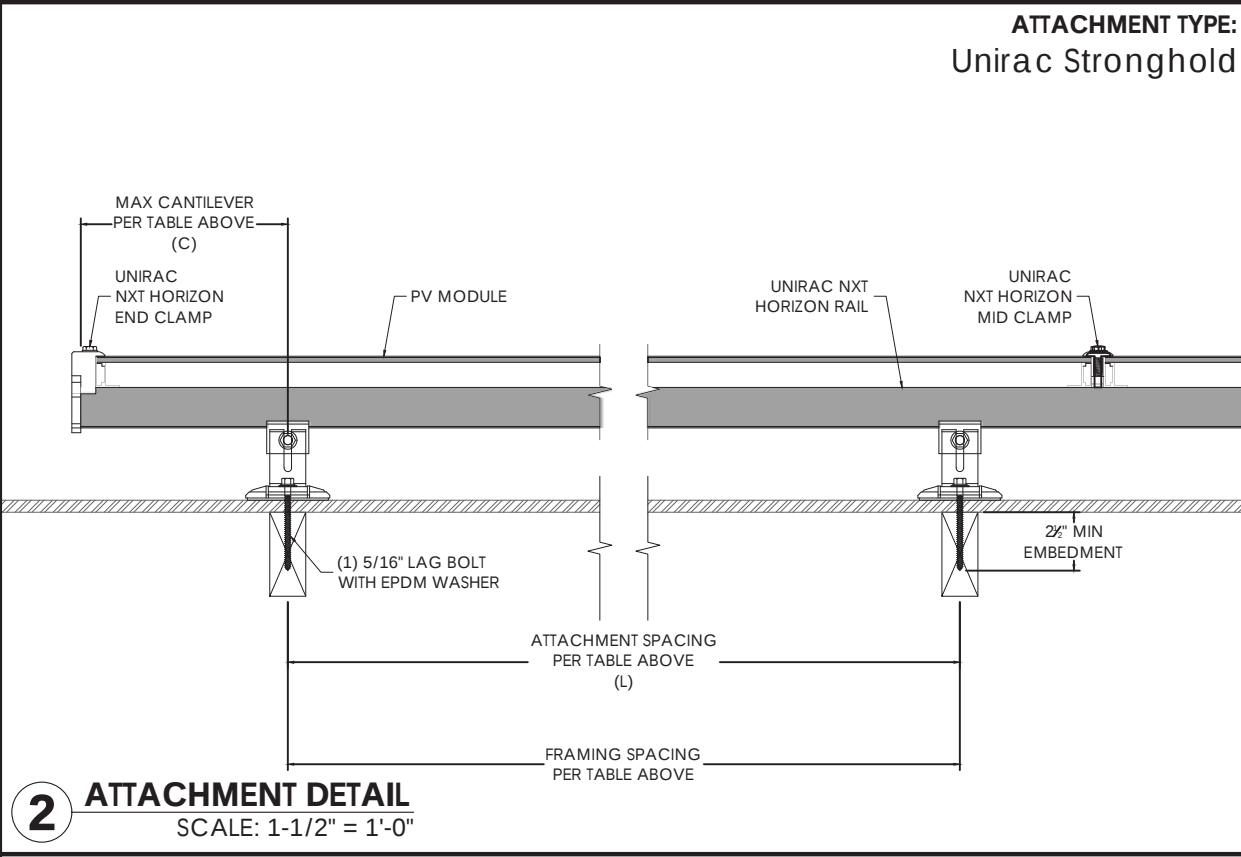
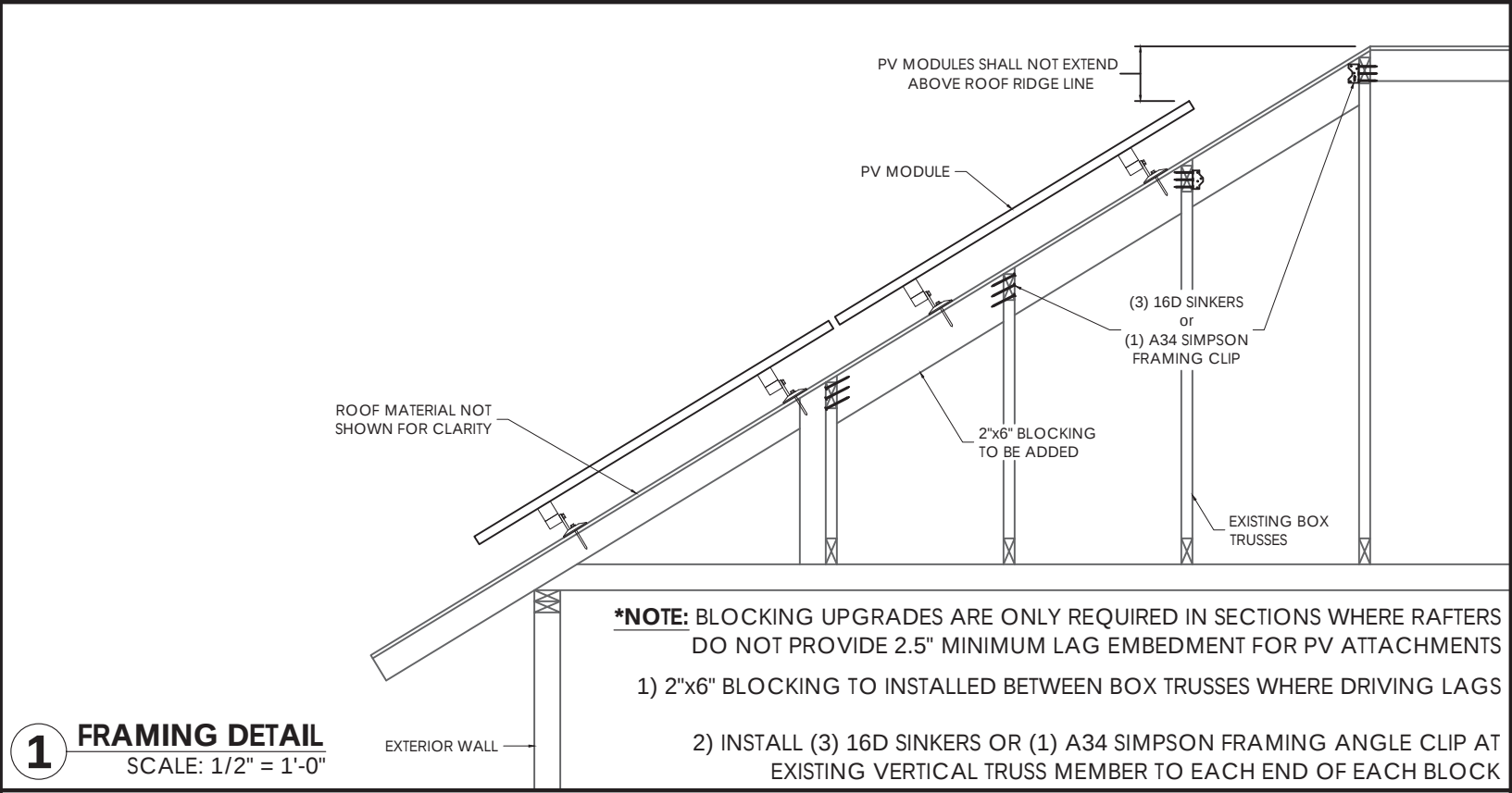
DRAWING NUMBER: PV3

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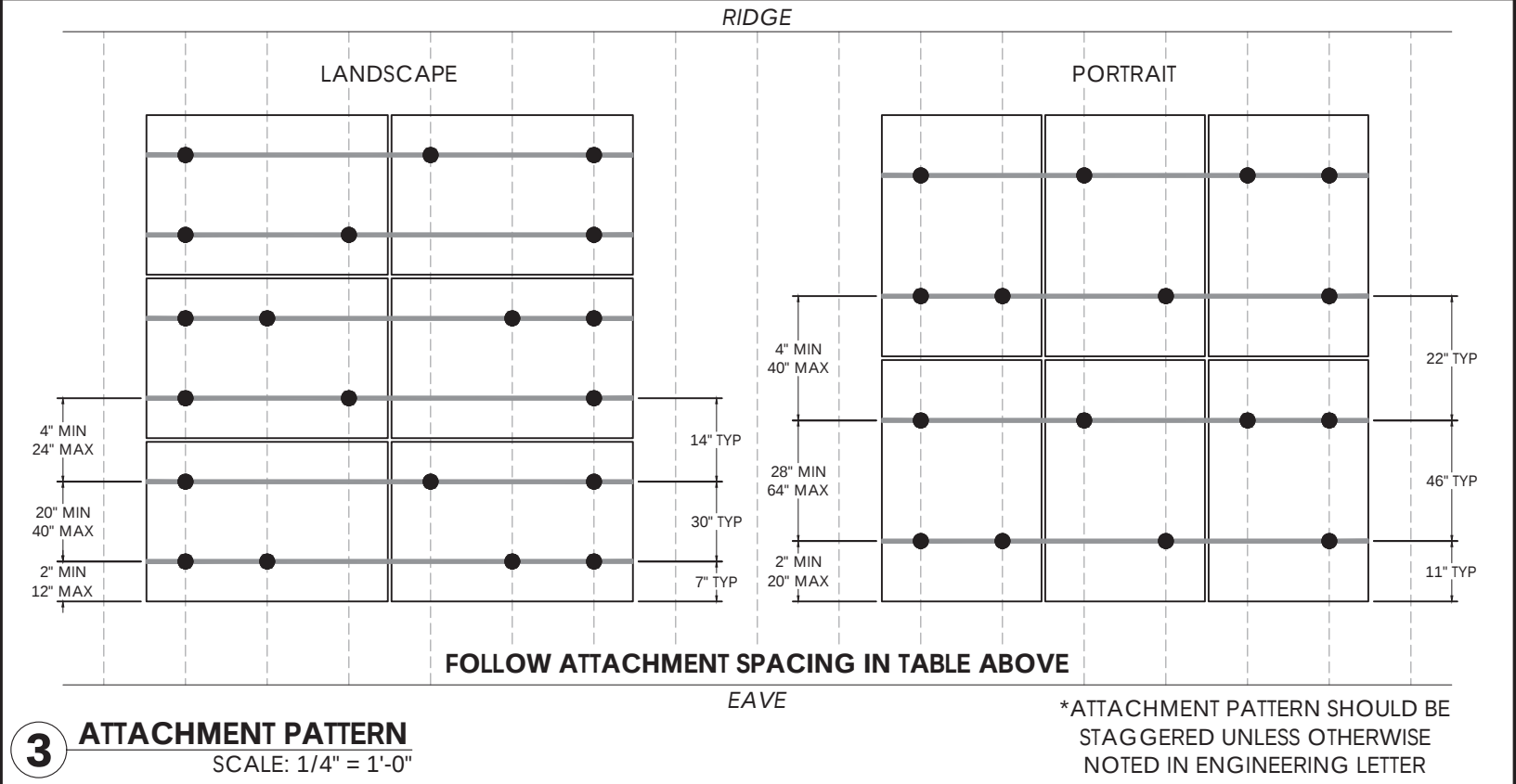
	PANEL COUNT	AZIMUTH (DEG)	PITCH (DEG)	TSRF (%)	AREA (ft²)	ROOF MATERIAL	SHEATHING TYPE	FRAMING TYPE	FRAMING SIZE AND SPACING	CEILING JOIST/ PURLINS SIZE AND SPACING	RACKING TYPE	ATTACHMENT TYPE	MAXIMUM ATTACHMENT SPACING (S)	MAXIMUM CANTILEVER (C)	TOTAL PV ARRAY AREA (ft²)	228.89
															TOTAL ROOF AREA (ft²)	3038
															DISTRIBUTED LOAD (psf)	2.28
															ROOF COVERAGE (%)	7.53
															TOTAL PV ARRAY WEIGHT (lbs)	521.4
															TOTAL PV ATTACHMENTS	24
															POINT LOAD (lbs/att.)	21.7
MP1	5	237	18	92	311	Comp Shingle	OSB	Manufactured Truss	2x4 @ 24 in OC	2x4 @ 24 in OC	UNIRAC NXT UMount	UNIRAC STRONGHOLD	72"L / 48"P	24"L / 16"P		
MP2	6	237	18	86	353	Comp Shingle	OSB	Manufactured Truss	2x4 @ 24 in OC	2x4 @ 24 in OC	UNIRAC NXT UMount	UNIRAC STRONGHOLD	72"L / 48"P	24"L / 16"P		
MP3	0															
MP4	0															
MP5	0															
MP6	0															
MP7	0															
MP8	0															
MP9	0															
MP10	0															



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Every MO West



NOTES
BLOCKING REQUIRED on both MP's.

Sealed For Existing Roof & Attachment Only

STATE OF MISSOURI
JOHN A. CALVERT
PROFESSIONAL ENGINEER
NUMBER PE-2021040848

2/8/2024

PROJECT ID:	927225
DC SYSTEM SIZE:	4.62 kW DC
AC SYSTEM SIZE:	3.47 kW AC
REVISIONS:	
A	2/8/2024
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D	---
DRAWN BY:	Jonah Sundrud
PLOT DATE:	February 8, 2024
DRAWING TITLE:	Structural
DRAWING NUMBER:	PV4

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4

L1 (1) 6 AWG THHN/THWN-2 CU BLACK
L2 (1) 6 AWG THHN/THWN-2 CU RED
N (1) 6 AWG THHN/THWN-2 CU WHITE
G (1) 10 AWG THHN/THWN-2 CU GREEN
3/4 INCH EMT

Exterior

3

L1 (1) 10 AWG THHN/THWN-2 CU BLACK
L2 (1) 10 AWG THHN/THWN-2 CU RED
G (1) 10 AWG THHN/THWN-2 CU GREEN
*TYPE UF CABLE MAY BE SUBSTITUTED FOR USE IN CONDUIT WHERE NEC CODE PERMITS

3/4 INCH EMT

2

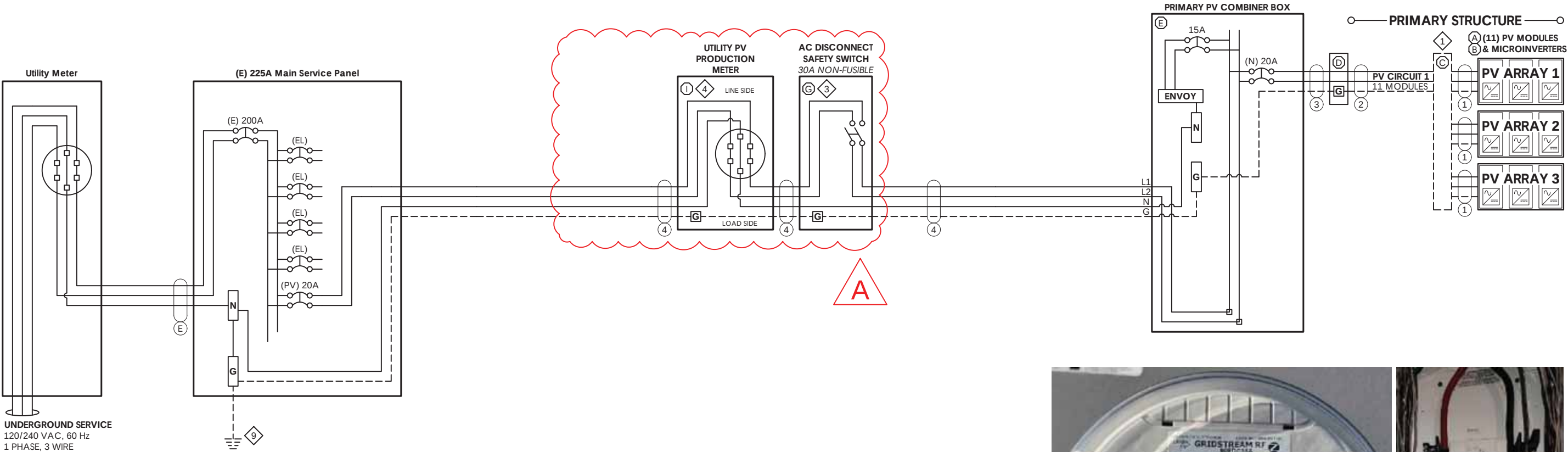
L1 (1) 10 AWG THHN/THWN-2 CU BLACK
L2 (1) 10 AWG THHN/THWN-2 CU RED
G (1) 10 AWG THHN/THWN-2 CU GREEN
*TYPE NM (ROMEX)/UF CABLE IS PERMITTED FOR INTERIOR OR ATTIC RUNS AND SHALL BE USED WHEN NEC CODE PERMITS

3/4 INCH

1

L1 (1) 12 AWG THHN/THWN-2 CU BLACK
L2 (1) 12 AWG THHN/THWN-2 CU RED
G (1) 6 AWG BARE, CU
ENPHASE Q-CABLE, 2-WIRE, FREE AIR

Exterior



GENERAL NOTES

Utility Meter Number: 24620097
Load Side Breaker in interior MSP.

EQUIPMENT NOTES

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- FINAL CONFIGURATION OF PV CIRCUITS TO BE DECIDED BY INSTALLER. MUST COMPLY WITH MAX MICROINVERTERS PER CIRCUIT AS LISTED ON ATTACHED SPEC SHEET.
- KNIFE HANDLED SAFETY SWITCH TO BE INSTALLED IN READILY ACCESSIBLE LOCATION
- UTILITY PV METER FOR PRODUCTION MONITORING.
- GROUNDING ELECTRODE SYSTEM SHALL BE IN ACCORDANCE WITH NEC 250.53.

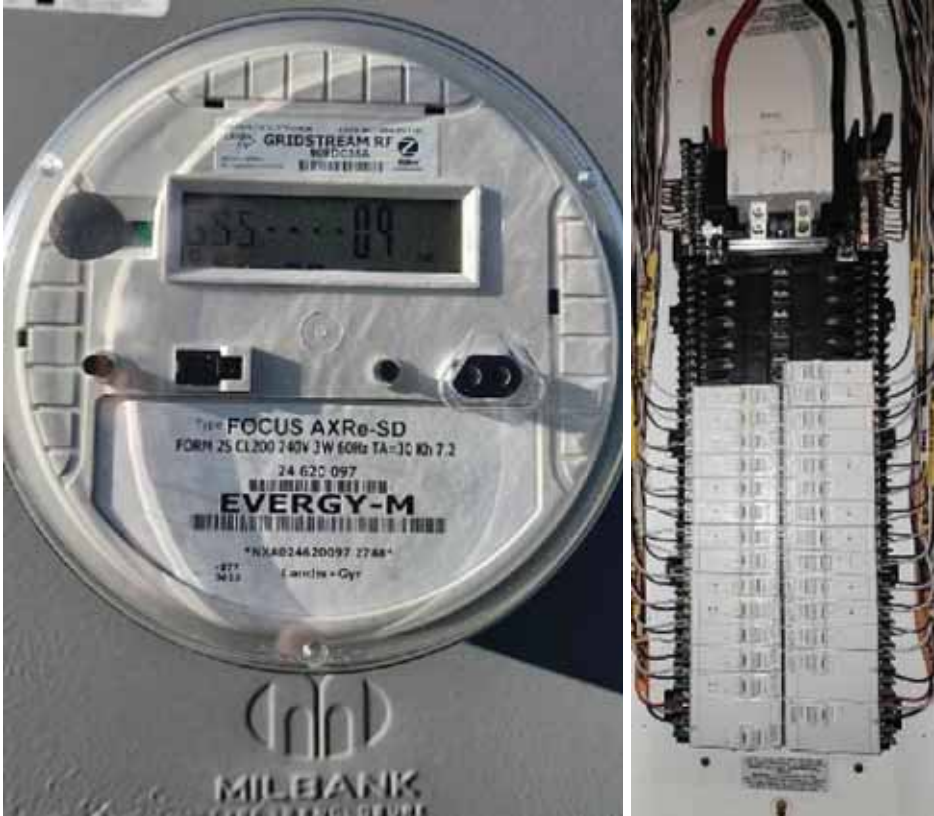
LEGEND

(E) EXISTING	(PV) PV BREAKER
(N) NEW	(FIB) FACTORY INSTALLED BREAKER
(EL) EXISTING LOADS	SPD SURGE PROTECTIVE DEVICE
(RL) RELOCATED LOADS	MI MECHANICAL INTERLOCK

EQUIPMENT DESCRIPTIONS

- A
- B
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P
- Q
- R
- S
- T
- PV MODULE: REC Solar REC420AA Pure-R, 420 W DC, UL 1703 / UL 61730 COMPLIANT
- MICROINVERTER: ENPHASE IQ7X-96-2-US, 315 W AC (0.315 kW), 1 PHASE, UL 1741 COMPLIANT
- ROOFTOP JUNCTION BOX: EZ SOLAR JB-1.2 JUNCTION BOX
- JUNCTION BOX: PVC 4 X 4 JUNCTION BOX
- PV COMBINER BOX: ENPHASE IQ COMBINER 4 (X-IQ-AM1-240-4)
- SQUARE-D SAFETY SWITCH 30A, 2P, 240VAC, FUSIBLE (D221NRB)
- EATON B-LINE 011, METER SOCKET, 125A, RINGED, NEMA 3R

OTHER NOTES



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Evergy MO West

CUSTOMER NAME:

AH:

UTILITY COMPANY:

PROJECT ID:

927225

DC SYSTEM SIZE:

4.62 kW DC

AC SYSTEM SIZE:

3.47 kW AC

REVISIONS:

A	2/8/2024
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DRAWN BY:

Jonah Sundrud

PLOT DATE:

February 8, 2024

DRAWING TITLE:

Electrical
3 Line

DRAWING NUMBER:

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ELECTRICAL INFORMATION	
UTILITY ELECTRICAL SYSTEM	
1-Phase, 3-Wire, 60Hz, 120/240V	
NEW PV SYSTEM	
1-Phase, 3-Wire, 60Hz, 120/240V	
AC SYSTEM SIZE	3.465kW AC
DC SYSTEM SIZE	4.62kW DC
PV MODULES	
QUANTITY	11
TYPE	REC Solar REC420AA Pure-R
WATTAGE	420W DC
MICROINVERTERS	
TYPE	Enphase IQ7X-96-2-US
OUTPUT CURRENT	1.31A AC
NOMINAL VOLTAGE	240V AC
OUTPUT POWER	315W AC

DESIGN LOCATION AND TEMPERATURES	
DATA SOURCE	ASHRAE Weather Station Data
STATE	Missouri
CITY	Lee's Summit
WEATHER STATION	KANSAS CITY INTL ARPT
HIGH TEMP 2% AVG	35°C
EXTREME MINIMUM TEMP	-21°C

PV BREAKER BACKFEED CALCULATIONS			
NEC 705.12(B) -- "120% RULE"			
(BUSBAR RATING * 120%) - OCPD RATING = AVAILABLE BACKFEED			
	MAIN SERVICE PANEL	SUBPANEL 1	SUBPANEL 2
BUSBAR RATING	225A	----A	----A
PANEL OCPD RATING	200A	----A	----A
AVAILABLE BACKFEED (120% RULE)	70A	##A	##A
PV BREAKER RATING	20A	20A	20A
THESE CALCULATIONS ARE ONLY APPLICABLE IF PV INTERCONNECTION IS A LOAD SIDE BREAKER			
PV BREAKER MUST BE RATED LESS THAN OR EQUAL TO AVAILABLE BACKFEED FOR CODE COMPLIANCE			

WIRE SIZE SPECIFICATIONS										
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
MINIMUM CONDUCTOR AMPACITY	18.01A AC	18.01A AC	18.01A AC	18.05A AC	----A AC	----A AC	----A AC	----A AC	----A AC	----A AC
CONDUCTOR MATERIAL	CU	CU	CU	CU	----	----	----	----	----	----
CONDUCTOR TYPE	THHN/THWN-2	THHN/THWN-2	THHN/THWN-2	THHN/THWN-2	----	----	----	----	----	----
CONDUCTOR SIZE	12 AWG	10 AWG	10 AWG	6 AWG	----	----	----	----	----	----
CONDUCTOR AMPACITY	30A	40A	40A	75A	----A	----A	----A	----A	----A	----A
AMBIENT TEMPERATURE ADJUSTMENT FACTOR	0.96	0.96	0.96	0.96	----	----	----	----	----	----
CONDUIT FILL ADJUSTMENT FACTOR	1	1	1	1	----	----	----	----	----	----
ADJUSTED CONDUCTOR AMPACITY	28.8A	38.4A	38.4A	72A	----A	----A	----A	----A	----A	----A
WIRE RUN DISTANCE (FT)	72	75	20	5	----	----	----	----	----	----
CALCULATED VOLTAGE DROP	0%	1.12%	0.3%	0.03%	0%	0%	0%	0%	0%	0%

PV CIRCUIT SPECIFICATIONS													
	PRIMARY STRUCTURE								DETACHED STRUCTURE				
	CIRCUIT 1	CIRCUIT 2	CIRCUIT 3	CIRCUIT 4	CIRCUIT 5	CIRCUIT 6	CIRCUIT 7	CIRCUIT 8	CIRCUIT 1	CIRCUIT 2	CIRCUIT 3	CIRCUIT 4	CIRCUIT 5
NUMBER OF MODULES PER CIRCUIT	11	0	0	0	0	0	0	0	0	0	0	0	0
RATED AC OUTPUT CURRENT (I _{OUT})	14.4A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A
MINIMUM AMPACITY (I _{OUT} x 125%)	18.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A
OVERCURRENT PROTECTION RATING	20A	20A	20A	20A	20A	20A	20A	20A	20A	20A	20A	20A	20A
COMBINED AC OUTPUT CURRENT (C _{OUT})	14.4A								0.0A				
MINIMUM AMPACITY (C _{OUT} x 125%)	18.0A								0.0A				
COMBINED PV BREAKER RATING	20AA								0AA				

TOTAL VOLTAGE DROP	
	VOLTAGE DROP
WIRE TAG #1	0%
WIRE TAG #2	1.12%
WIRE TAG #3	0.3%
WIRE TAG #4	0.03%
WIRE TAG #5	0%
WIRE TAG #6	0%
TOTAL	1.450000%



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927225

DC SYSTEM SIZE:

4.62 kW DC

AC SYSTEM SIZE:

3.47 kW AC

REVISIONS:

A 2/8/2024

B ----

C ----

D ----

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DRAWING TITLE:

Electrical
Calculations

DRAWING NUMBER:

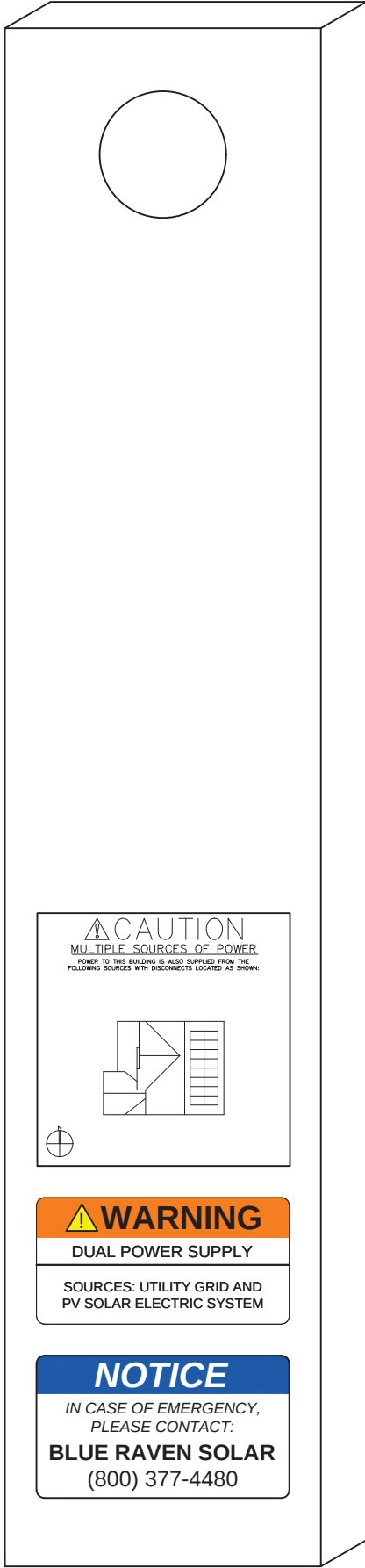
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PV0

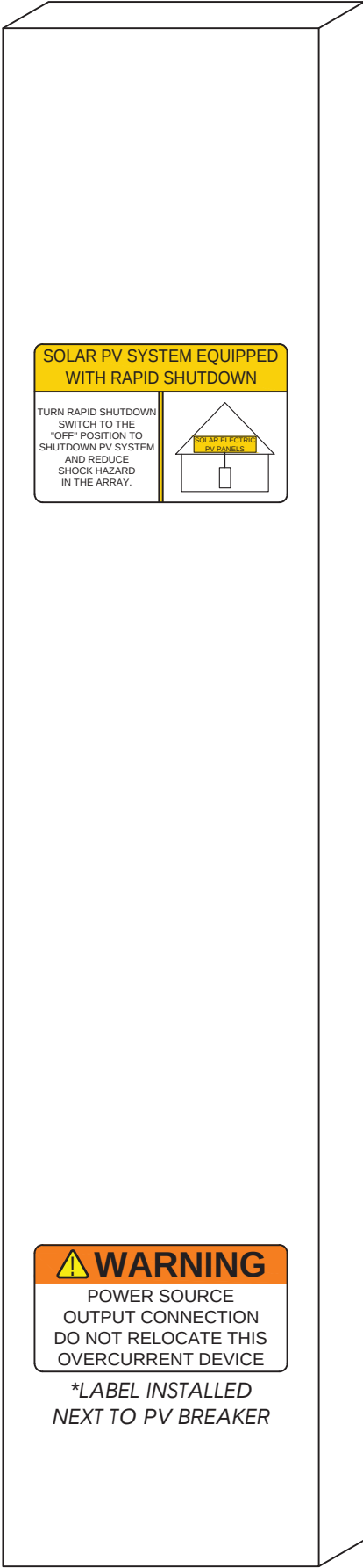
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WARNING LABELS FOR PHOTOVOLTAIC SYSTEM

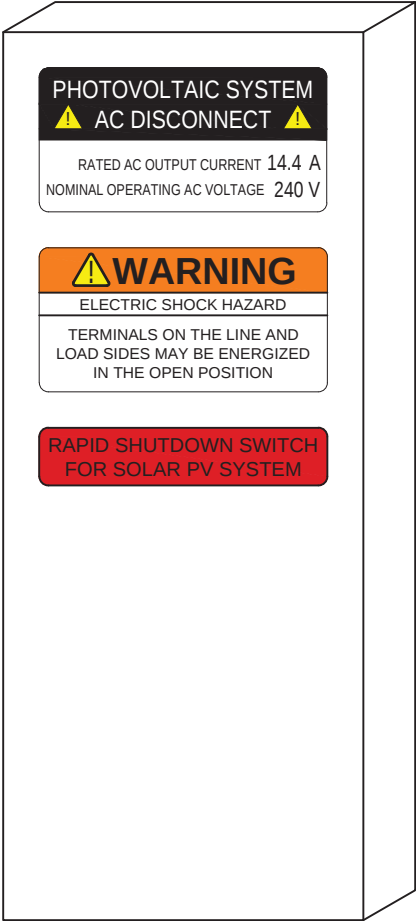
UTILITY METER



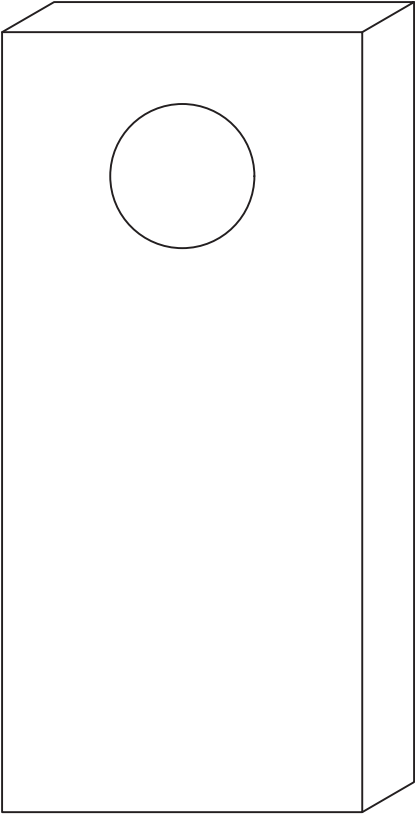
MAIN SERVICE PANEL



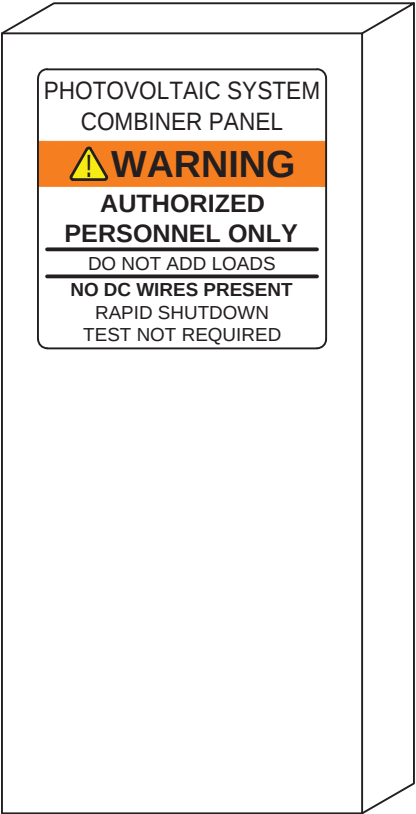
AC DISCONNECT



PV METER



PV COMBINER BOX



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DRAWING TITLE:

Warning
Labels

DRAWING NUMBER:

PV 7

LABELS WITH ROUND CORNERS ARE ADHESIVE STICKERS
LABELS WITH SQUARE CORNERS ARE PLASTIC ENGRAVED PLACARDS

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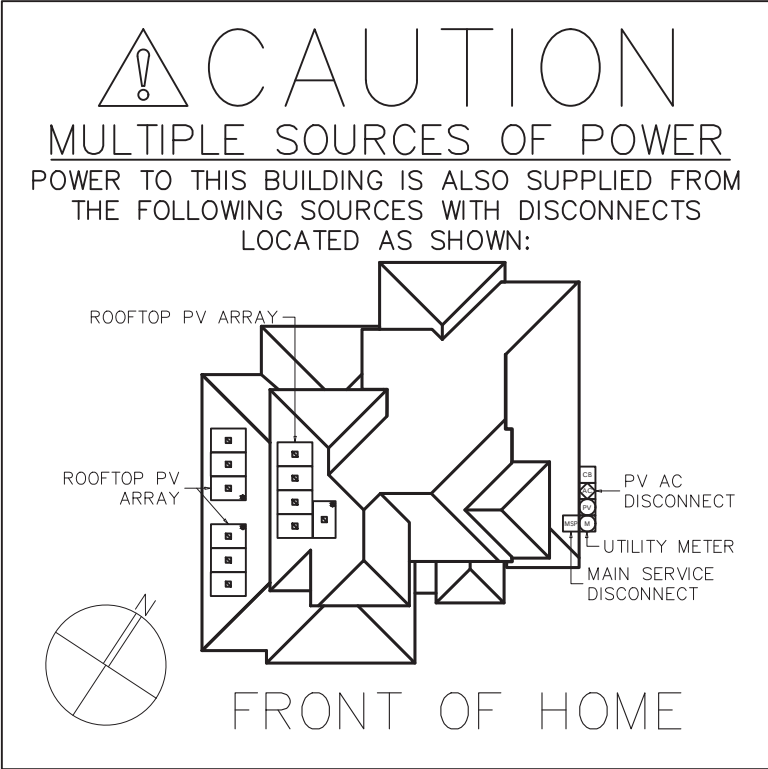


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SOLAR'S MOST TRUSTED



REC ALPHA
PURE-R SERIES

PRODUCT SPECIFICATIONS

COMPACT PANEL SIZE

9 A MODULE CURRENT
COMPATIBLE WITH MLPE

430 WP
20.7 W/FT²
22.3% EFFICIENCY



PRODUCT
REC
25 YEAR
PROTRUST
WARRANTY
LABOR
PERFORMANCE
ELIGIBLE



LEAD-FREE
ROHS COMPLIANT

EXPERIENCE

α

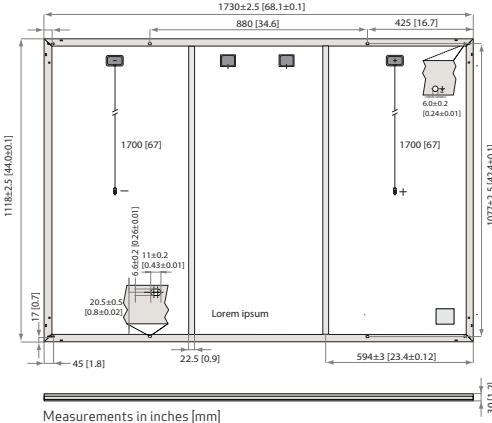
PERFORMANCE

REC ALPHA PURE-R SERIES
PRODUCT SPECIFICATIONS

 SOLAR'S MOST TRUSTED

GENERAL DATA

Cell type:	80 half-cut REC bifacial, heterojunction cells with lead-free, gapless technology
Glass:	0.13in (3.2mm) solar glass with anti-reflective surface treatment in accordance with EN 12150
Backsheet:	Highly resistant polymer (black)
Frame:	Anodized aluminum (black)
Junction box:	4-part, 4 bypass diodes, lead-free IP68 rated, in accordance with IEC 62790
Connectors:	Stäubli MC4 PV-KBT4/KST4 (12 AWG) in accordance with IEC 62852, IP68 only when connected
Cable:	12 AWG (4 mm ²) PV wire, 67 + 67 in (1.7 + 1.7 m) in accordance with EN 50618
Dimensions:	68.1 x 44.0 x 1.2 in (20.77 ft ²) / 1730 x 1118 x 30 mm (1.93 m ²)
Weight:	47.4 lbs (21.5 kg)
Origin:	Made in Singapore



ELECTRICAL DATA

Product Code*: RECxxxAA PURE-R

Power Output - P _{MAX} (Wp)	400	410	420	430
Watt Class Sorting - (W)	0/+10	0/+10	0/+10	0/+10
Nominal Power Voltage - V _{MPP} (V)	48.8	49.4	50.0	50.5
Nominal Power Current - I _{MPP} (A)	8.20	8.30	8.40	8.52
Open Circuit Voltage - V _{OC} (V)	58.9	59.2	59.4	59.7
Short Circuit Current - I _{SC} (A)	8.80	8.84	8.88	8.91
Power Density (W/ft ²)	19.26	19.74	20.22	20.70
Panel Efficiency (%)	20.7	21.2	21.8	22.3

Values at standard test conditions (STC: air mass AM 1.5, irradiance 1075 W/sq ft (1000 W/m²), temperature 77°F (25°C), based on a production spread with a tolerance of P_{MAX}, V_{OC} & I_{SC} ±3% within one watt class. Nominal module operating temperature (NMOT): air mass AM 1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s). * Where xxx indicates the nominal power class (P_{MAX}) at STC above.

MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
System voltage:	1000 V
Test load (front):	+ 7000 Pa (146 lbs/ft ²)
Test load (rear):	- 4000 Pa (83.5 lbs/ft ²)
Series fuse rating:	25 A
Reverse current:	25 A

* See installation manual for mounting instructions.
Design load = Test load / 1.5 (safety factor)

WARRANTY

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

See warranty documents for details. Conditions apply

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 61730
IEC 62804 PID
IEC 61701 Salt Mist
IEC 62716 Ammonia Resistance
UL 61730 Fire Type 2
IEC 62782 Dynamic Mechanical Load
IEC 61215-2:2016 Hailstone (35mm)
IEC 62321 Lead-free acc. to RoHS EU 863/2015
ISO 14001, ISO 9001, IEC 45001, IEC 62941



TEMPERATURE RATINGS*

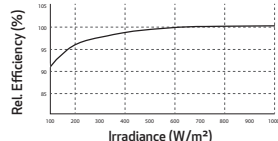
Nominal Module Operating Temperature: 44°C (±2°C)
Temperature coefficient of P_{MAX}: -0.24 %/°C
Temperature coefficient of V_{OC}: -0.24 %/°C
Temperature coefficient of I_{SC}: 0.04 %/°C

*The temperature coefficients stated are linear values

DELIVERY INFORMATION

Panels per pallet: 33
Panels per 40 ft GP/high cube container: 858 (26 pallets)
Panels per 53 ft truck: 858 (26 pallets)

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:


Available from:

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.

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NABCEP
CERTIFIED

PV INSTALLATION
PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
385-498-6700

DRAWING BY:

PLOT DATE:

PROJECT NUMBER:

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SPEC SHEET

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IQ7X Microinverter

The high-powered, smart grid-ready **IQ7X Microinverter** dramatically simplifies the installation process while achieving the highest system efficiency for systems with 96-cell modules.

Part of the Enphase Energy System, the IQ7X Microinverter integrates with the IQ Gateway, IQ Battery, and the Enphase Installer App monitoring and analysis software.

The 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.



To learn more about Enphase offerings, visit enphase.com
IQ7X-DS-0099-EN-US-12-27-2022

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014, 2017 & 2020)

Efficient and Reliable

- Optimized for high powered 96-cell* modules
- Highest CEC efficiency of 97.5%
- 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) and IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

* The IQ7X is required to support 96-cell modules.

IQ7X Microinverter

INPUT DATA (DC)		IQ7X-96-2-US	
Commonly used module pairings ¹	320W - 460W		
Module compatibility	96-cell PV modules		
Maximum input DC voltage	79.5V		
Peak power tracking voltage	53V - 64V		
Operating range	25V - 79.5V		
Min/Max start voltage	33V/79.5V		
Max DC short circuit current (module Isc)	10A		
Overvoltage class DC port	II		
DC port backfeed current	0A		
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)		@ 240VAC	@ 208VAC
Peak output power	320VA		
Maximum continuous output power	315VA		
Nominal (L-L) voltage/range ²	240V/211-264V		208V/183-229V
Maximum continuous output current	1.31A (240VAC)		1.51A (208VAC)
Nominal frequency	60 Hz		
Extended frequency range	49 - 68 Hz		
AC short circuit fault current over 3 cycles	5.8 Arms		
Maximum units per 20A (L-L) branch circuit ³	12 (240VAC)		10 (208VAC)
Overvoltage class AC port	III		
AC port backfeed current	18 mA		
Power factor setting	1.0		
Power factor (adjustable)	0.85 leading ... 0.85 lagging		
EFFICIENCY		@240VAC	@208VAC
CEC weighted efficiency	97.5 %		97.0 %
MECHANICAL DATA			
Ambient temperature range	-40°C to +60°C		
Relative humidity range	4% to 100% (condensing)		
Connector type (IQ7X-96-2-US)	MC4 (or Amphenol H4 UTX with optional Q-DCC-5 adapter)		
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)		
Weight	1.08 kg (2.38 lbs)		
Cooling	Natural convection - No fans		
Approved for wet locations	Yes		
Pollution degree	PD3		
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure		
Environmental category/UV exposure rating	NEMA Type 6/outdoor		
FEATURES			
Communication	Power Line Communication (PLC)		
Monitoring	Enphase Installer App and monitoring options Compatible with IQ Gateway		
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), IEEE 1547:2018 (UL 1741-SB, 3 rd Ed.) HEI Rule 14H SRD 2.0 UL 62109-1, 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. Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at <https://link.enphase.com/module-compatibility>.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

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IQ7X-DS-0099-EN-US-12-27-2022



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Scott Gurney
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Enphase Q Cable Accessories

The **Enphase Q Cable™** and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.



Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste

Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

Enphase Q Cable Accessories

CONDUCTOR SPECIFICATIONS

Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable
Flame test rating	FT4
Compliance	RoHS, OIL RES I, CE, UV Resistant, combined UL for Canada and United States
Conductor type	THHN/THWN-2 dry/wet
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.

Q CABLE TYPES / ORDERING OPTIONS

Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200

ENPHASE Q CABLE ACCESSORIES

Name	Model Number	Description
Raw Q Cable	Q-12-RAW-300	300 meters of 12 AWG cable with no connectors
Field-wireable connector (male)	Q-CONN-10M	Make connections from any open connector
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector
Cable Clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling
Terminator	Q-TERM-10	Terminator cap for unused cable ends
Enphase EN4 to MC4 adaptor ¹	ECA-EN4-S22	Connect PV module using MC4 connectors to IQ micros with EN4 (TE PV4-S SOLARLOK). 150mm/5.9" to MC4.
Enphase EN4 non-terminated adaptor ¹	ECA-EN4-FW	For field wiring of UL certified DC connectors. EN4 (TE PV4-S SOLARLOK) to non-terminated cable. 150mm/5.9"
Enphase EN4 to MC4 adaptor (long) ¹	ECA-EN4-S22-L	Longer adapter cable for EN4 (TE PV4-S SOLARLOK) to MC4. Use with split cell modules or PV modules with short DC cable. 600mm/23.6"
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)

1. Qualified per UL subject 9703.

 TERMINATOR Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)	 SEALING CAPS Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)
 DISCONNECT TOOL Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)	 CABLE CLIP Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)

To learn more about Enphase offerings, visit enphase.com

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IQ Combiner 4/4C



To learn more about Enphase offerings, visit enphase.com
IQ-C-4-4C-DS-0103-EN-US-12-29-2022

The **IQ Combiner 4/4C** with IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure. It streamlines IQ Microinverters 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 Gateway for communication and control
- Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Supports Wi-Fi, Ethernet, or cellular connectivity
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Mounts on single stud with centered brackets
- Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC plug-in breakers (not included)
- 80A 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 IQ Combiner SKU's
- UL listed
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)



IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	IQ Combiner 4 with IQ Gateway 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 IQ Battery and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018)	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), 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 IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Supported microinverters:	IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8)
Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	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 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
X-IQ-NA-HD-125A	Hold-down kit for Eaton circuit breaker with screws
Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A pair of 200A split core current transformers
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240VAC, 60 Hz
Eaton BR series busbar rating	125A
Max. continuous current rating	65A
Max. continuous current rating (input from PV/storage)	64A
Max. fuse/circuit rating (output)	90A
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 Gateway breaker included
IQ Gateway breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200A solid core pre-installed and wired to IQ Gateway
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40°C to +46°C (-40°F to 115°F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20A to 50A breaker inputs: 14 to 4 AWG copper conductors • 60A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors • Always follow local code requirements for conductor sizing.
Altitude	Up to 3,000 meters (9,842 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	IEEE 802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations.
Ethernet	Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3 rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, Title 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 Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

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IQ-C-4-4C-DS-0103-EN-US-12-29-2022



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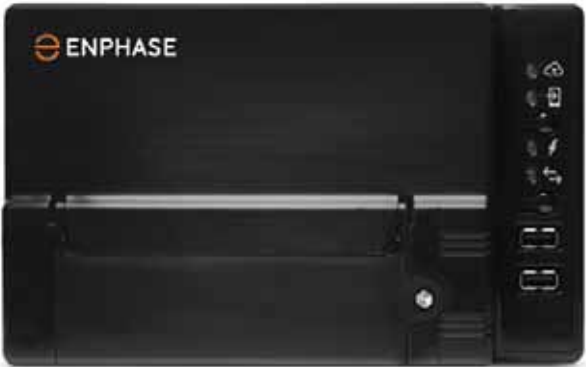
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Enphase IQ Envoy

The **Enphase IQ Envoy™** communications gateway delivers solar production and energy consumption data to Enphase Enlighten™ monitoring and analysis software for comprehensive, remote maintenance and management of the Enphase IQ System.

With integrated revenue grade production metering and optional consumption monitoring, Envoy IQ is the platform for total energy management and integrates with the Enphase Ensemble™and the Enphase IQ Battery™.



Smart

- Enables web-based monitoring and control
- Bidirectional communications for remote upgrades
- Supports power export limiting and zeroexport applications

Simple

- Easy system configuration using Enphase Installer Toolkit™ mobile app
- Flexible networking with Wi-Fi, Ethernet, or cellular

Reliable

- Designed for installation indoors or outdoors
- Five-year warranty



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Envoy

MODEL NUMBERS	
Enphase IQ Envoy™ ENV-IQ-AM1-240	Enphase IQ Envoy communications gateway with integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%). Includes one 200A continuous rated production CT (current transformer).
ACCESORIES (Order Separately)	
Enphase Mobile Connect™ CELLMODEM-M1 (4G based LTE-M/5-year data plan) CELLMODEM-M1-B (4G-based LTE-M1/5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring CT CT-200-SPLIT	Split-core consumption CTs enable whole home metering.
Ensemble Communications Kit COMMS-KIT-01	Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows wireless communication with Encharge and Enpower.
POWER REQUIREMENTS	
Power requirements	120/240 VAC split-phase. Max 20 A overcurrent protection required.
Typical Power Consumption	5W
CAPACITY	
Number of microinverters polled	Up to 600
MECHANICAL DATA	
Dimensions (WxHxD)	21.3 x 12.6 x 4.5 cm (8.4" x 5" x 1.8")
Weight	17.6 oz (498 g)
Ambient temperature range	-40° to 65° C (-40° to 149° F) -40° to 46° C (-40° to 115° F) if installed in an enclosure
Environmental rating	IP30. For installation indoors or in an NRTL-certified, NEMA type 3R enclosure.
Altitude	To 2000 meters (6,560 feet)
Production CT	- Limited to 200A of continuous current / 250A OCPD – 72kW AC - Internal aperture measures 19.36mm to support 250MCM THWN conductors (max) - UL2808 certified for revenue grade metering
Consumption CT	- For electrical services to 250A with parallel runs up to 500A - Internal aperture measures 0.84" x 0.96" (21.33mm x 24.38mm) to support 3/0 THWN conductor - UL2808 certified, for use at service entrance for services up to 250Vac
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Mobile	CELLMODEM-M1 (4G) or CELLMODEM-M1-B (4G). Not included. Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
COMPLIANCE	
Compliance	UL 61010-1 CAN/CSA C22.2 No. 61010-1 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5 (PV production only)

To learn more about Enphase offerings, visit enphase.com

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Single Meter Sockets - Without Bypass

125 & 200 Amp



Application

- Single meter position
- Receive ANSI C12.10 watt-hour meters
- Surface or flush mount (see chart)

Construction

- Ring type
- NEMA Type 3R
- ANSI 61 gray painted finish
- Aluminum snap ring included



Standards

- UL 414 Listed
- ANSI C12.7

Accessories

- 5th Jaw Kit - see chart
- AW Hub

Part/UPC Number	Catalog Number	Amp Rating	Jaws	Service Type	Access	Connections			Overall Dimensions			Top Provision	Knockout Layout	5th Jaw Kit
						Line	Load	Neutral	Height	Width	Depth			
78205142000	011	125	4	1Ø/3W	OH/UG	#8 - 2/Ø	#8 - 2/Ø	#8 - 2/Ø	11"	8 1/4"	3 5/8"	AW Hub	Fig.5	MSR5TK
78205142040	011 F	125	4	1Ø/3W	OH/UG	#14 - 2/Ø	#14 - 2/Ø	#14 - 2/Ø	12"	8"	4 5/8"	2" max KO	Fig. 1	50365
78205142045	011 MS73	125	4	1Ø/3W	OH/UG	#8 - 2/Ø	#8 - 2/Ø	#8 - 2/Ø	11"	8 1/4"	3 5/8"	AW Hub	Fig. 5	MSR5TK
78205142050	011 SF	125	4	1Ø/3W	OH/UG	#14 - 2/Ø	#14 - 2/Ø	#14 - 2/Ø	12"	8"	4 5/8"	None	None	50365
78205102315	011 SS	125	4	1Ø/3W	OH/UG	#14 - 2/Ø	#14 - 2/Ø	#14 - 2/Ø	12"	8"	4 5/8"	None	None	50365
79903882585	011 SS6	125	4	1Ø/3W	OH/UG	#14 - 2/Ø	#14 - 2/Ø	#14 - 2/Ø	12"	8"	4 5/8"	None	None	50365
79903882586	011 MS25A	125	4	1Ø/3W	OH/UG	#14 - 2/Ø	#14 - 2/Ø	#14 - 2/Ø	12"	8"	4 5/8"	AW Hub	Fig. 1	50365
79903856283	011 MS25	125	4	1Ø/3W	OH/UG	#14 - 2/Ø	#14 - 2/Ø	#14 - 2/Ø	12"	8"	4 5/8"	AW Hub	Fig. 1	50365
79903868944	011 MS-18	125	4	1Ø/3W	OH/UG	#8 - 2/Ø	#8 - 2/Ø	#8 - 2/Ø	11"	8 1/4"	3 5/8"	AW Hub	Fig.5	MSR5TK
79903878861	011 SRP	125	4	1Ø/3W	OH/UG	#8 - 2/Ø	#8 - 2/Ø	#8 - 2/Ø	11"	8 1/4"	3 5/8"	AW Hub	Fig.5	MSR5TK
79903878953	011 SRP MS18	125	4	1Ø/3W	OH/UG	#8 - 2/Ø	#8 - 2/Ø	#8 - 2/Ø	11"	8 1/4"	3 5/8"	AW Hub	Fig.5	MSR5TK
78205144030	927	100	7	3Ø/4W	OH/UG	#14 - 1/Ø	#14 - 2/Ø	#14 - 2/Ø	17"	8"	4 5/8"	AW Hub	Fig. 1	50365
78205156000	204	200	4	1Ø/3W	OH	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	8"	4 5/8"	AW Hub	Fig. 2	50365
78205156020	204 F	200	4	1Ø/3W	OH	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	8"	6"	2" max KO	Fig. 2	50365
78205108796	204 SS	200	4	1Ø/3W	OH	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	8"	6"	None	None	50365
79903882318	U204 PSE	200	4	1Ø/3W	UG	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	12"	6"	None	Fig. 7	50365
78205122640	U204 F SS	200	4	1Ø/3W	UG	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	12"	6"	None	None	50365
78205134301	U204 SS	200	4	1Ø/3W	UG	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	12"	6"	None	None	50365
78205153193	U204 MS73 SS	200	4	1Ø/3W	UG	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	12"	6"	None	None	50365
78205156080	U204 MS21 SS	200	4	1Ø/3W	UG	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	12"	6"	None	None	50365
78205156030	204 F MS73	200	4	1Ø/3W	OH	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	8"	6"	2" max KO	Fig. 2	50365
78205156040	204 MS68	200	4	1Ø/3W	OH	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	8"	4 5/8"	AW / 2" Hub	Fig. 2	50365
78205156035	204 MS68A	200	4	1Ø/3W	OH	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	8"	4 5/8"	AW / 2" Hub	Fig. 2	50365
78205108490	204 MS73	200	4	1Ø/3W	OH	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	8"	4 5/8"	AW Hub	Fig. 2	50365
78205156005	U204	200	4	1Ø/3W	UG	#6 - 35ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15 1/8"	11 1/4"	4 1/2"	None	Fig. 6	MSR5TK
78205156045	U204 F	200	4	1Ø/3W	OH/UG	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	12"	6"	(2) 2" max KO	Fig. 3	50365
78205156060	U204 MS21	200	4	1Ø/3W	OH/UG	#6 - 35ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15 1/8"	11 1/4"	4 1/2"	AW / Cap	Fig. 6	MSR5TK
78205156060	U204 F MS73	200	4	1Ø/3W	UG	#6 - 25ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15"	12"	6"	None	Fig. 3	50365
78205156070	U204 MS73	200	4	1Ø/3W	OH/UG	#6 - 35ØMCM	#6 - 35ØMCM	#6 - 35ØMCM	15 1/8"	11 1/4"	4 1/2"	(2) 2" max KO	Fig. 6	MSR5TK
78205156140	U207	200	7	3Ø/4W	OH/UG	#6 - 25ØMCM	#6 - 25ØMCM	#6 - 25ØMCM	18"	12"	5"	AW Hub	Fig. 4	50365
78205156170	U207 F	200	7	3Ø/4W	OH/UG	#6 - 25ØMCM	#6 - 25ØMCM	#6 - 25ØMCM	18"	12"	5"	2 1/2" max KO	Fig. 4	50365
78205156180	U207 MS73	200	7	3Ø/4W	OH/UG	#6 - 25ØMCM	#6 - 25ØMCM	#6 - 25ØMCM	18"	12"	5"	AW Hub	Fig. 4	50365

Data subject to change without notice. Consult local utility for area acceptance. All dimensions are in inches.

Single Meter Sockets - Without Bypass

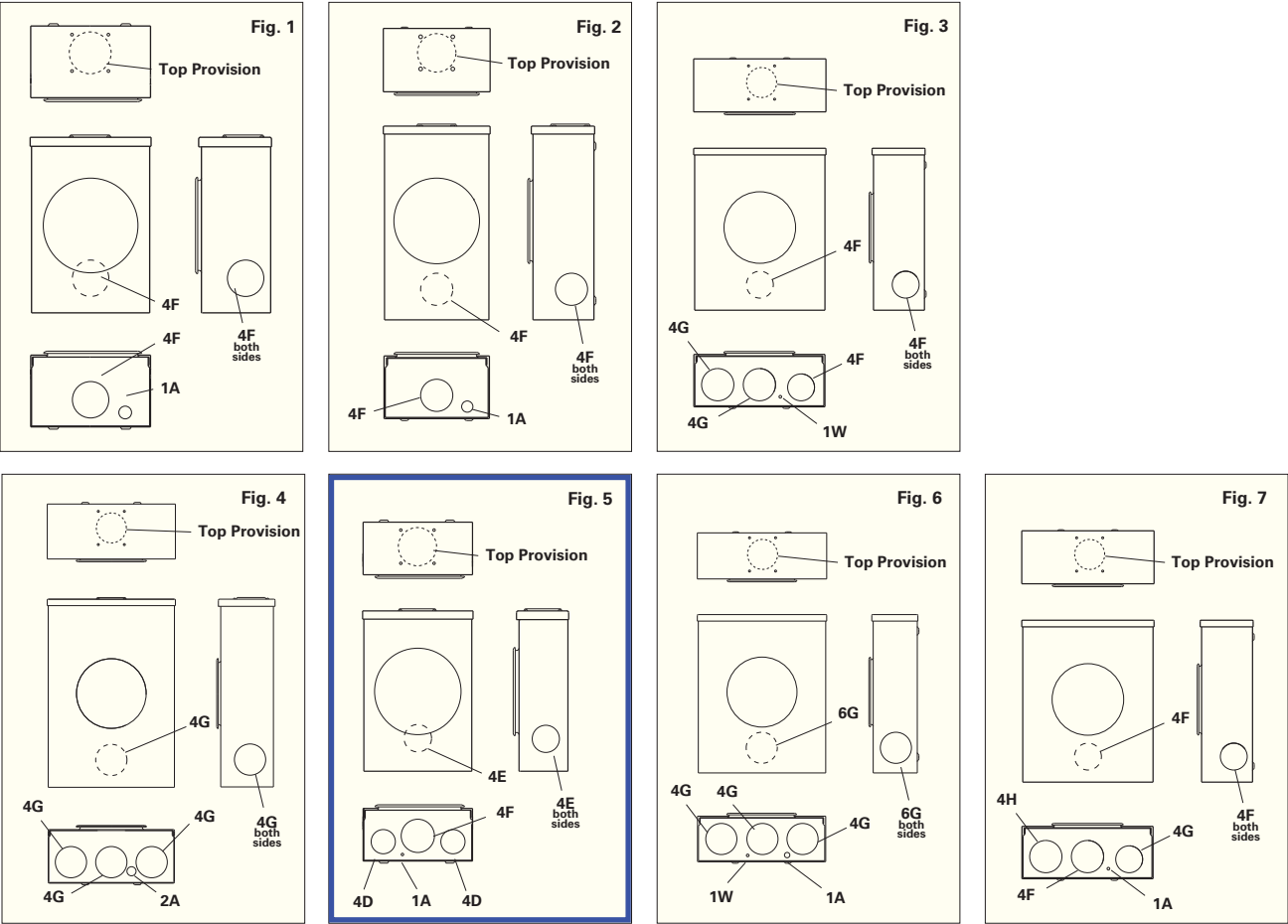
125 & 200 Amp

Style #	Suffixes
011	F - Flush Mount
(U) 207	MS18 - Lexan Cover
(U) 204	MS21 - Top Hub Provision
(U) 207	MS25 - Solar Ready
(U) 207	MS25A - MS25 + MS18
927	MS68 - 2" Conduit Hub
	MS68A - MS73 + MS68
	MS73 - AL Screw Type Ring
	SF - Semi Flush Mount
	SS - Stainless Steel 304 *
	SS6 - Stainless Steel 316 *

Knockouts - Conduit Sizes
1W = 1/4"
1A = 1/2"
2A = 1/2" - 1/4"
4D = 1 1/4" - 1" - 3/4" - 1/2"
4E = 1 1/2" - 1 1/4" - 1" - 3/4"
4F = 2" - 1 1/2" - 1 1/4" - 1"
4G = 2 1/2" - 2" - 1 1/2" - 1 1/4"
4H - 3" - 2 1/2" - 2" - 1 1/2"
6G = 2 1/2" - 2" - 1 1/2" - 1 1/4" - 1" - 3/4"
Top Provision = See Chart

* Knockouts and top provisions are not available in Stainless Steel (SS) finish

Knockout Layouts



Data subject to change without notice. Consult local utility for area acceptance. All dimensions are in inches.



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PV INSTALLATION
PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
385-498-6700

DRAWING BY:

PLOT DATE:

PROJECT NUMBER:

SHEET NAME:

SPEC SHEET
RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
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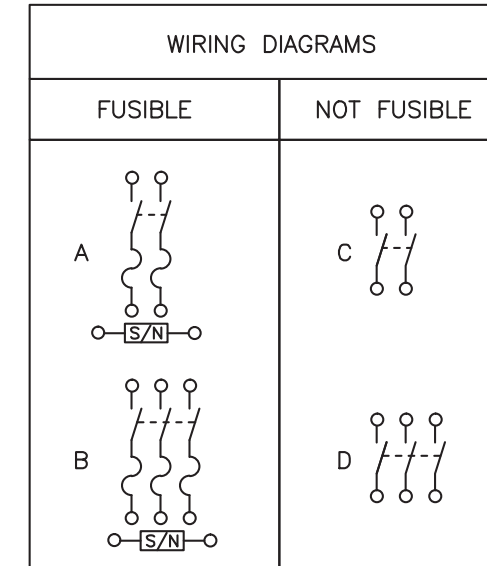
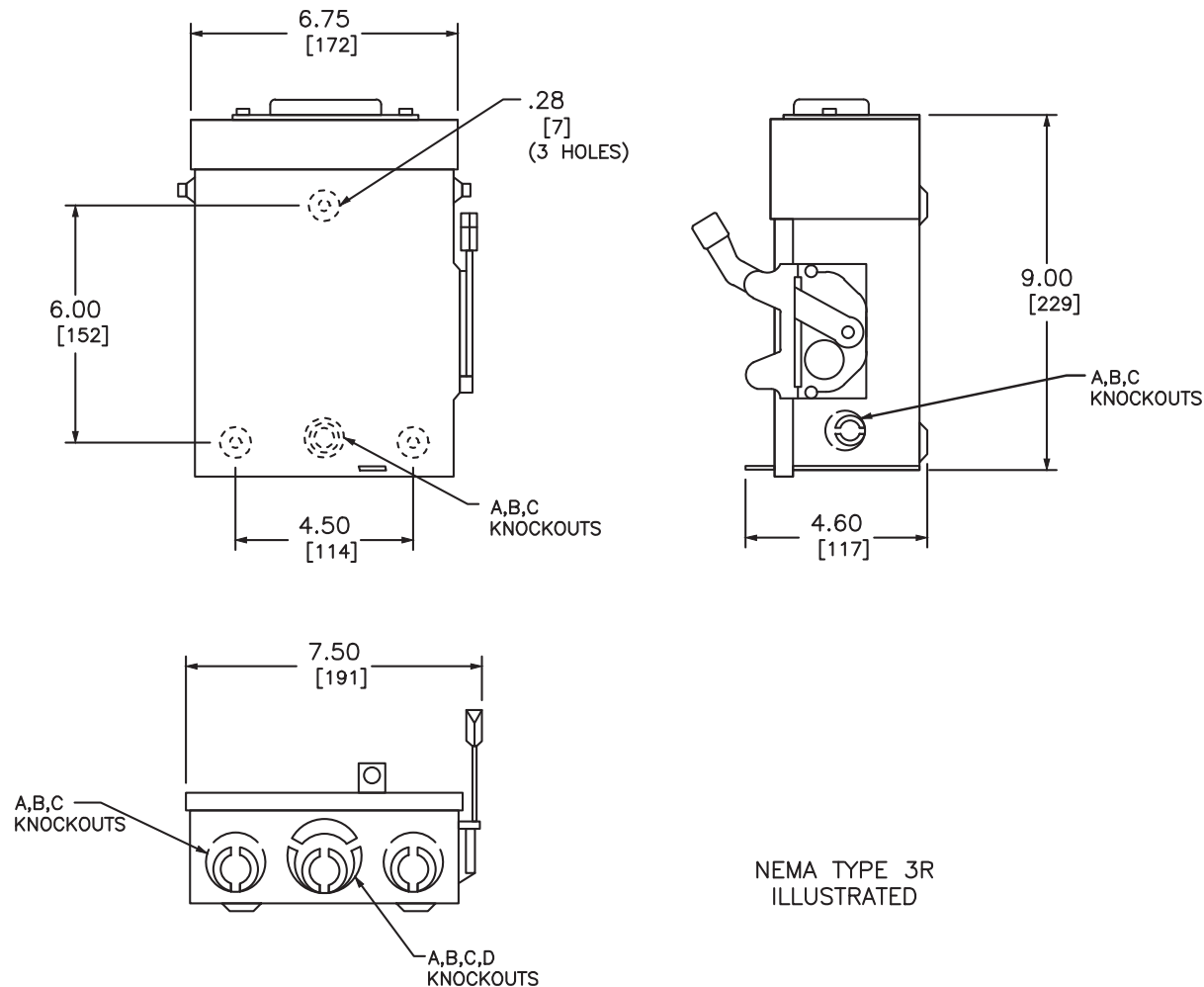
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PV INSTALLATION
PROFESSIONAL

Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
385-498-6700



TERMINAL LUGS ‡			
AMPERES	MAX. WIRE	MIN. WIRE	TYPE
30	# 6 AWG	# 12 AWG	AL
	# 6 AWG	# 14 AWG	CU

KNOCKOUTS				
SYMBOL	A	B	C	D
CONDUIT SIZE	.50	.75	1	1.25

DUAL DIMENSIONS: INCHES
MILLIMETERS

CATALOG NUMBER	VOTAGE RATINGS	WIRING DIAG.	HORSEPOWER RATINGS					
			120VAC		240VAC			
			STD.	MAX.	STD.		MAX.	
			1 Ø	1 Ø	1 Ø	3 Ø	1 Ø	3 Ø
D211NRB●■	240VAC	A	1/2	2	1 1/2	—	3	—
D221NRB	240VAC	A	—	—	1 1/2	3*	3	7 1/2*
D321NRB	240VAC	B	—	—	1 1/2	3	3	7 1/2
DU221RB	240VAC	C	—	—	—	—	3	—
DU321RB	240VAC	D	—	—	—	—	3	7 1/2

NOTES:
FINISH — GRAY BAKED ENAMEL ELECTRODEPOSITED OVER CLEANED PHOSPHATIZED STEEL.
UL LISTED — FILE E-2875
ALL NEUTRALS — INSULATED GROUNDABLE
SUITABLE FOR USE AS SERVICE EQUIPMENT
TOP OF NEMA TYPE 3R SWITCHES HAVE PROVISIONS FOR MAXIMUM 2 1/2" BOLT-ON HUB.
SHORT CIRCUIT CURRENT RATINGS:
● 10,000 AMPERES.
■ 10,000 AMPERES WHEN USED WITH OR PROTECTED BY CLASS H OR K FUSES.
■ 100,000 AMPERES WITH CLASS R FUSES.
* FOR CORNER GROUNDING DELTA SYSTEMS.
■ PLUG FUSES
‡ LUGS SUITABLE FOR 60°C OR 75° CONDUCTORS.

GENERAL DUTY SAFETY SWITCHES
VISIBLE BLADE TYPE
30 AMPERE
ENCLOSURE — NEMA TYPE 3R RAINPROOF



DWG# 1852
NO.

A. System Specifications and Ratings

- Maximum Voltage: 1,000 Volts
- Maximum Current: 80 Amps
- Allowable Wire: 14 AWG – 6 AWG
- Spacing: Please maintain a spacing of at least ½” between uninsulated live parts and fittings for conduit, armored cable, and uninsulated live parts of opposite polarity.
- Enclosure Rating: Type 3R
- Roof Slope Range: 2.5 – 12:12
- Max Side Wall Fitting Size: 1”
- Max Floor Pass-Through Fitting Size: 1”
- Ambient Operating Conditions: (-35°C) - (+75°C)
- Compliance:
 - JB-1.2: UL1741
 - Approved wire connectors: must conform to UL1741
- System Marking: **Interek Symbol and File #5019942**
- Periodic Re-inspections: If re-inspections yield loose components, loose fasteners, or any corrosion between components, components that are found to be affected are to be replaced immediately.

Table 1: Typical Wire Size, Torque Loads and Ratings

	1 Conductor	2 Conductor	Torque				
			Type	NM	Inch Lbs	Voltage	Current
ABB Z56 terminal block	10-24 awg	15-24 awg	Sol/Str	0.5-0.7	6.2-8.85	600V	30 amp
ABB Z510 terminal block	6-24 awg	11-20 awg	Sol/Str	1.0-1.6	8.85-14.16	600V	40 amp
ABB Z516 terminal block	4-24 awg	10-20 awg	Sol/Str	1.6-2.4	14.6-21.24	600V	60 amp
ABB M6/8 terminal block	8-22 awg		Sol/Str	.08-1	8.85	600V	50 amp
Ideal 452 Red WING-NUT Wire Connector	8-18 awg		Sol/Str	Self Torque	Self Torque	600V	
Ideal 451 Yellow WING-NUT Wire Connector	10-18 awg		Sol/Str	Self Torque	Self Torque	600V	
Ideal, In-Sure Push-In Connector Part #39	10-14 awg		Sol/Str	Self Torque	Self Torque	600V	
WAGO, 2204-1201	10-20 awg	16-24 awg	Sol/Str	Self Torque	Self Torque	600V	30 amp
WAGO, 221-612	10-20 awg	16-24 awg	Sol/Str	Self Torque	Self Torque	600V	30 amp
Dottie DRC75	6-12 awg		Sol/Str	Snap-In	Snap-In		
ESP NG-53	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		
ESP NG-717	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		
Brumall 4-5,3	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		

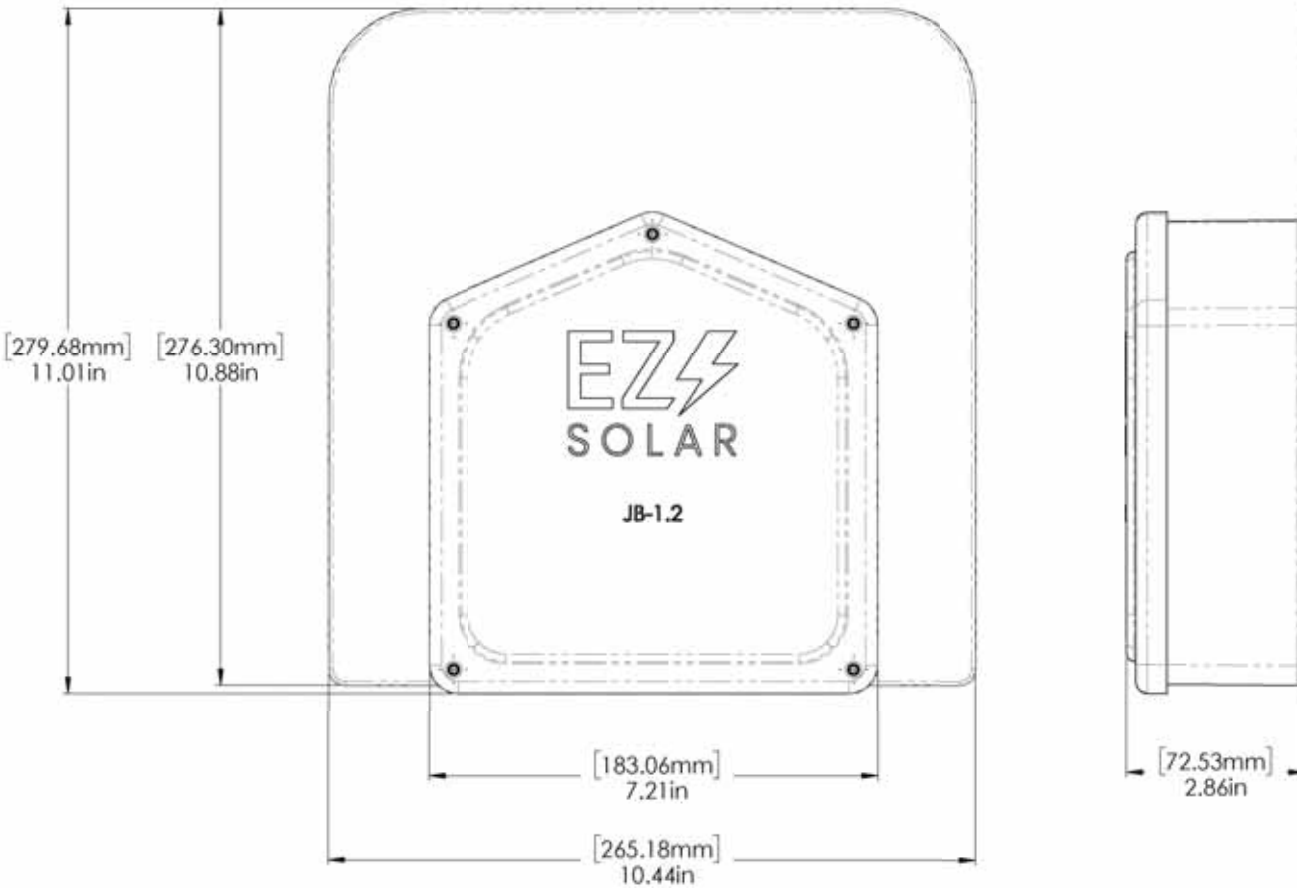
Table 2: Minimum wire-bending space for conductors through a wall opposite terminals in mm (inches)

Wire size, AWG or		Wires per terminal (pole)			
		1	2	3	4 or More
kcmil	(mm2)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
14-10	(2.1-5.3)	Not specified	-	-	-
8	(8.4)	38.1 (1-1/2)	-	-	-
6	(13.3)	50.8 (2)	-	-	-

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	JB-1.2 BODY	POLYCARBONATE WITH UV INHIBITORS	1
2	JB-1.2 LID	POLYCARBONATE WITH UV INHIBITORS	1
3	#10 X 1-1/4" PHILLIPS PAN HEAD SCREW		6
4	#8 X 3/4" PHILLIPS PAN HEAD SCREW		6

SIZE	DWG. NO.	REV
B	JB-1.2	
SCALE: 1:2	WEIGHT: 1.45 LBS	SHEET 1 OF 3

TORQUE SPECIFICATION:	15-20 LBS
CERTIFICATION:	UL STANDARD 1741, NEMA 3R
WEIGHT:	1.45 LBS



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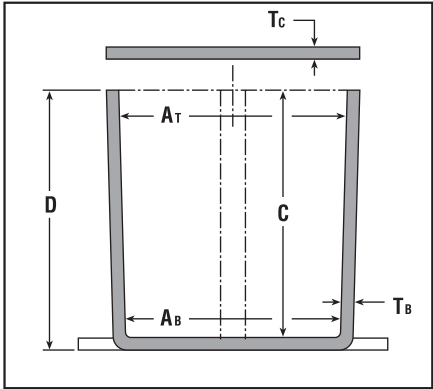
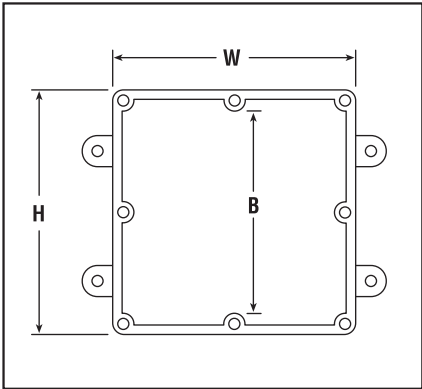
SHEET NAME:

Rigid Nonmetallic Conduit – Junction Boxes

Molded Nonmetallic Junction Boxes
6P Rated

It's another first from Carlon® - the first nonmetallic junction boxes UL Listed with a NEMA 6P rating per Section 314.29, Exception of the National Electrical Code. Manufactured from PVC or PPO thermoplastic molding compound and featuring foam-in-place gasketed lids attached with stainless steel screws, these rugged enclosures offer all the corrosion resistance and physical properties you need for direct burial applications.

Type 6P enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against contact with enclosed equipment, falling dirt, hose-directed water, entry of water during prolonged submersion at a limited depth, and external ice formation.



- All Carlon Junction Boxes are UL Listed and maintain a minimum of a NEMA Type 4/4x Rating.
- Parts numbers with an asterisk (*) are UL Listed and maintain a NEMA Type 6P Rating and Type 4/4X Rating.

Part No.	Size in Inches H x W x D	Std. Ctn. Qty.	Min. A _T	Min. A _B	Min. B	Min. C	T _a	T _c Typical	Material		Std. Ctn. Wt. (Lbs.)
									PVC	Thermo-plastic	
E989NNJ-CAR*	4 x 4 x 2	5	3 11/16	3 5/8	N/A	2	.160	.155	X		3
E987N-CAR*	4 x 4 x 4	5	3 11/16	3 1/2	N/A	4	.160	.155	X		4
†E989NNR-CAR*	4 x 4 x 6	4	3 11/16	3 3/8	N/A	6	.160	.200	X		5
E989PPJ-CAR*	5 x 5 x 2	4	4 11/16	4 1/2	N/A	2	.110	.150		X	3
E987R-CAR*	6 x 6 x 4	2	6	5 5/8	N/A	4	.190	.190		X	3
E989RRR-UPC*	6 x 6 x 6	8	5 5/8	5 3/8	N/A	6	.160	.150		X	14
E989N-CAR	8 x 8 x 4	1	8	8	N/A	4	.185	.190		X	2
E989SSX-UPC	8 x 8 x 7	2	7 21/32	7 5/16	N/A	7	.160	.150		X	6
E989UUN	12 x 12 x 4	3	11 5/8	11 1/2	11 1/8	4	.160	.150		X	12
E989R-UPC	12 x 12 x 6	2	11 5/16	11 7/8	11 7/16	6	.265	.185		X	10

VIEW SHOWN LESS COVER FOR CLARITY

SIZE	A	B	C
E989NNJ E989NNJB E989NNJ-CAR E989NNJCL E989NNJL (4X4X2)	2.00 (50,8)	4.63 (117,6)	5.13 (130,2)
E989NNR E989NNR-CAR (4X4X6)	6.00 (152,4)	5.00 (127,0)	5.50 (139,7)

NOTES:
1. MATERIAL: PVC
2. NEMA TYPES: 4/4X, 6P

GENERAL NOTES

1. ALL DIMENSIONS ARE FOR REFERENCE ONLY.
2. DIMENSIONS IN BRACKETS [] ARE IN METRIC UNITS.

REVISIONS

F	SEE ERN 2016195 FOR APPROVAL SIGNATURES & RELEASE DATE. PROJECT NO: 5AM000006
---	--

Thomas & Betts
www.tnb.com

DESCRIPTION: MOLDED NON-METALLIC ENCLOSURE

ORIGINAL PROJECT NO / (ERN NO)	SHEET NO:	REV. NO:	DRAWING NO:
/ ()	2 OF 2	F	WSD-AC01977

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PV INSTALLATION
PROFESSIONAL
Scott Gurney
#PV-011719-015866

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Heyco®-Tite Liquid Tight Cordgrips for Enphase Q Cables

Straight-Thru, NPT Hubs with Integral Sealing Ring

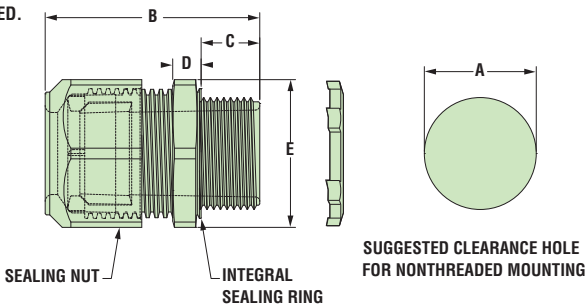
The Ultimate in Liquid Tight Strain Relief Protection

ALL NEW
PRODUCT!

- Two new cordgrips now accommodate the Enphase Q Cable – M3231GCZ (1/2" NPT) and M3234GDA-SM (3/4" NPT).
- The 1/2" version provides liquid tight entry for one Enphase Q Cable – .24 x .38" (6,1 x 9,7 mm).
- The 3/4" version provides liquid tight entry for up to two Enphase Q Cables – .24 x .38" (6,1 x 9,7 mm) and an additional .130" (3,3 mm) dia. hole for a #8 solid grounding cable.
- The 3/4" version utilizes our skinned-over technology so any unused holes will retain a liquid tight seal.
- Rated for use with DG Cable.

GLAND CONFIGURATION			PART NO.	DESCRIPTION	UL/CSA or ENEC	PART DIMENSIONS							
Type	Size	No.				A Clearance Hole Dia.	B Max. O.A. Length	C Thread Length	D Wrenching Nut Thickness	E Flat Size			
	mm.		Black			in.	mm.	in.	mm.	in.	mm.	in.	mm.
Oval Gland													
Q Cable	6,1 x 9,7	1	M3231GCZ	LTCG 1/2 6.1x9.7MM	UL/CSA	.875	22,2	1.70	43,2	.61	15,5	.21	5,3
Break-Thru Skinned Over Gland													
Q Cables plus Ground	6,1 x 9,7 3,3	2 1	M3234GDA-SM	SMCG 3/4 2-6.1x9.7MM 1-3.3MM	UL/CSA	1.040	26,4	2.00	50,8	.62	15,7	.25	6,4

Metal Locknuts INCLUDED.

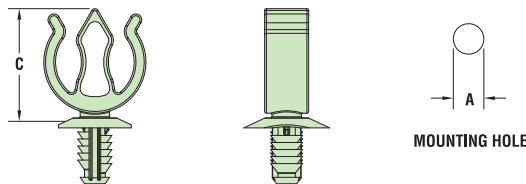


Material	Nylon 6/6 with TPE Sealing Gland
Certifications	UL Listed under Underwriters' Laboratories File E504900 CSA Certified by the Canadian Standards Association File 93876
Flammability Rating	94V-2
Temperature Range	Static -40°F (-40°C) to 239°F (115°C) Dynamic -4°F (-20°C) to 212°F (100°C)
IP Rating	IP 68

Heyco® Helios® UVX Clip – Blind Mount

ALL NEW
PRODUCT!

PANEL THICKNESS RANGE		WIRE DIAMETER RANGE		PART NO.	DESCRIPTION	MOUNTING HOLE DIA.		OVERALL HEIGHT	
Minimum	Maximum	Minimum	Maximum			A		C	
in.	mm.	in.	mm.			in.	mm.	in.	mm.
1-2 Wires									
.028	0,7	.250	6,4	.23 (5,8 mm) - .32 (8,0 mm) each cable	S6520 Helios UVX Clip 100 Pack S6560 Helios UVX Clip Bulk	.260	6,6	.96	24,4



Material	Nylon 6/6 with extended UV Capabilities
Flammability Rating	94V-2
Temperature Range	Dynamic -4°F (-20°C) to 185°F (85°C)

- The jersey pine tree mounting style installs easily with superior holding power.
- UVX nylon protects from corrosion due to outdoor exposure.
- Installs into .260" (6,6 mm) mounting hole.
- Holds up to 2 cables between .230 - .315" (5,8 - 8,0 mm) each.
- Cables install with fingertip pressure.
- Molded from our robust UVX nylon 6/6 with extended UV capabilities for our Solar 20 Year Warranty.

DISCOVER YOUR NXT UMOUNT™

The culmination of over two decades of experience. Thoughtful design, rigorous engineering, world-class support, and a reliable supply chain are the foundation of what makes us confident that NXT UMOUNT™ is the NXT Level of DESIGN, SIMPLICITY, and VALUE.

STRONGHOLD™ RAIL CLAMP

DARK: SHCLMPD1
MILL: SHCLMPM1

Adaptable rail connection to attachments allows click-in feature compatibility with almost all of Unirac's attachments.

NEW NXT UMOUNT™ CLAMP

DARK: SHCLMPD2
MILL: SHCLMPM2

Clicks into rail anywhere (even where there are cables!) Self-standing clamp with spring combines as both mid and end clamp. Clamps 30-40 mm modules

1/2 inch module spacing for efficiency.

Unirac-quality bonding that works both as mid and end clamps.

NXT UMOUNT™ COMBO CLAMP

DARK: CCLAMPD1
MILL: CCLAMPM1

Clicks into rail anywhere (even where there are cables!) Self-standing clamp with spring combines as both mid and end clamp. Clamps 30-40 mm modules

1/2 inch module spacing for efficiency.

Unirac-quality bonding that works both as mid and end clamps.

NXT UMOUNT™ CAP KIT

ENDCAPD1

Make the install look clean with the end cap kit designed to complement the module end clamp and rail ends.

FlashLoc technology combined with new features: click-in rail & open slot L-Foot for the best flash-less install experience.

BUTYL™ ATTACHMENT KIT

DARK: SBUTYLD1
MILL: SBUTYLM1

NXT UMOUNT™ RAIL

DARK: 168RLD1
MILL: 168RLM1

Strong, lightweight open channel rail with invisible, easy, unfailing and integrated wire management system.

WIRE MANAGEMENT OPTIONS

NXT UMOUNT™ MLPE & LUG CLAMP

LUGMLPE1

Works as either MLPE Mount or Grounding Lug connection to the rail. Why source two parts when one can do the job?

NXT UMOUNT™ WIRE MANAGEMENT CLIP

WRMCLPD1

Aesthetic, yet functional accessory that works to help installers keep wires inside the rail. No zip-ties required. Optional zip tie loop for extra wire management capabilities!

NXT UMOUNT™ N/S WIRE MGMT CLIP

WRMCNSD1

An elegant solution to help installers get to the home run. The same hardware works to provide both easy entry to rail and adjustability for cable thickness.

NXT UMOUNT™ RAIL SPLICE

RLSPLCM1

Structural internal splice that does not interfere with roof connection nor module connection. Pre-assembled thread cutting bolts.

STRONGHOLD™ ATTACHMENT KIT

DARK: SHCPKTD1
MILL: SHCPKTM1

Rail clicks into the clamps attached to the STRONGHOLD™ base. Open slot in L-foot allows drop-in rail clamp.

Alternative attachment options:



SOLARHOOKS
All varieties



FLASHKIT PRO
DARK: 004055D
MILL: 004055M



FLASHLOC™ DUO
DARK: 004275D
MILL: 004275M

BUTYL™ PADS

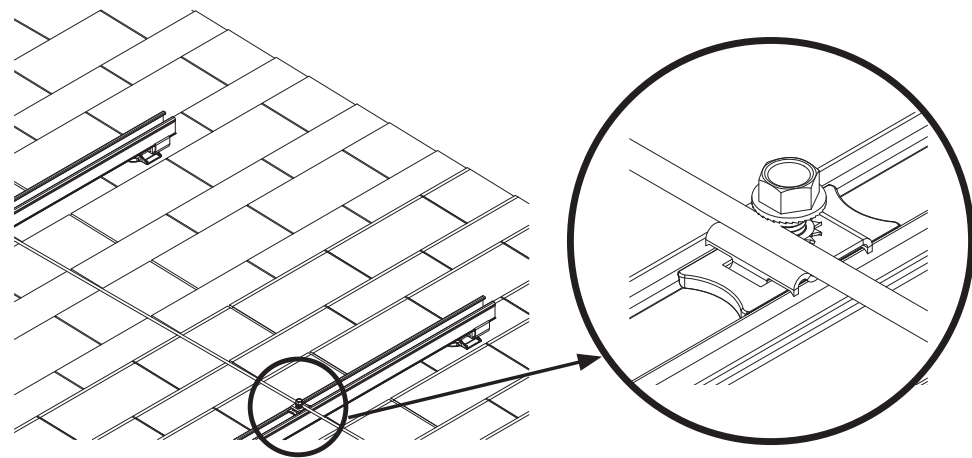
XTRABUTL-SH

DIRECT-TO-DECK SCREWS

003250W

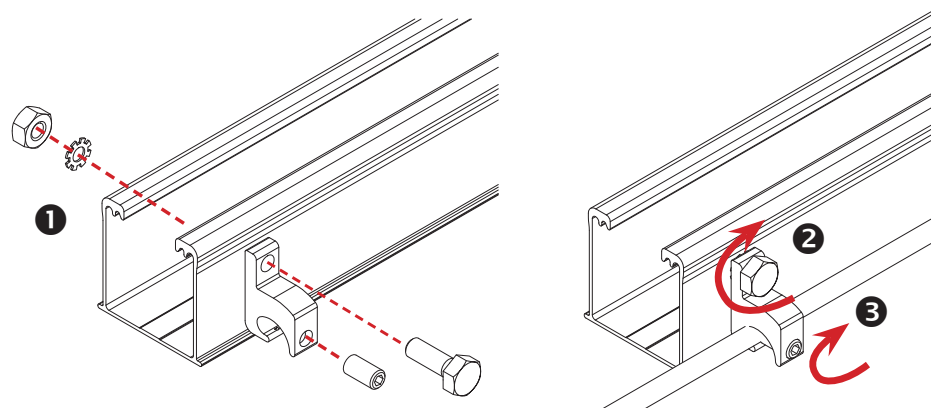
The pre-applied butyl pad removes the need for additional flashing. Just peel the liner, place the attachment, and fasten it to the roof. Butyl conforms to the screws and roof for a robust, dependable seal with no extra work!

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL 505-242-6411



SYSTEM GROUNDING: Rails can be bonded using an NXT UMount MLPE & Lug Clamp, GROUND WEEBLUG #1 or ILSCO LAY IN LUG (GBL4DBT). At least one rail per row of modules in an array must be bonded to electrical ground. Each additional row of modules must be grounded with at least one rail lug per row or with a row-to-row bonding device listed here.

Note: See Page 5 for additional lugs required for expansion joints.



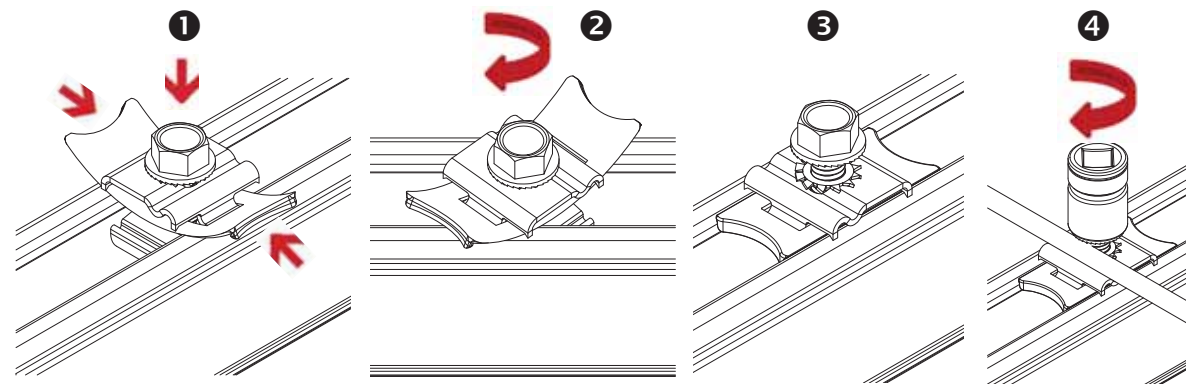
ALTERNATE SYSTEM GROUNDING WITH ILSCO LAY-IN LUG - UNIRAC P/N 008009P: Alternate Grounding Lug. Drill hole in rail 7/32" in diameter, deburr hole and bolt through one wall of rail.

BOLT TORQUE VALUE: 5 ft lbs.

TERMINAL TORQUE: 4-6 AWG: 35in-lbs, 8 AWG: 25 in-lbs.



WARNING
Ensure Copper does contact Aluminum to avoid corrosion.

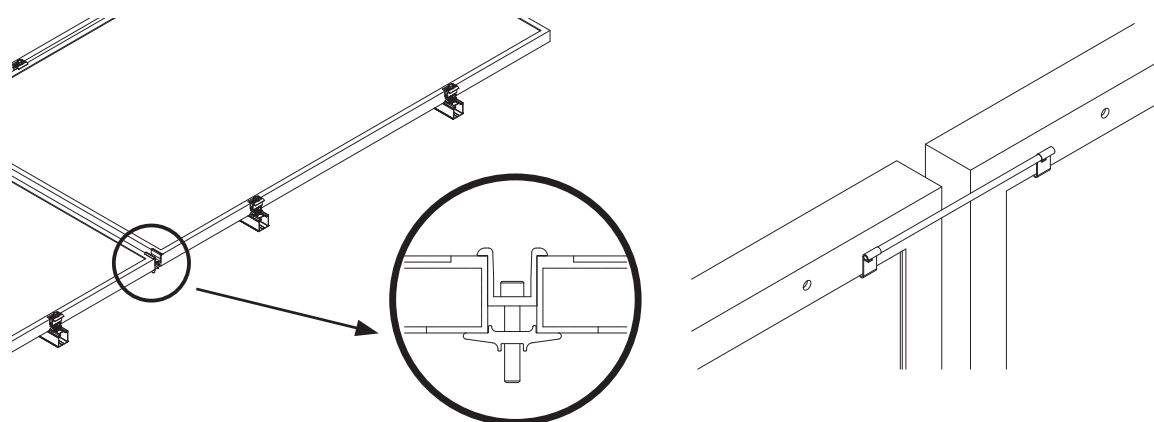


SYSTEM GROUNDING WITH MLPE & LUG CLAMP: Insert the rail nut profile in the opening by lifting the flaps of the plastic clip. Rotate the clamp 90 deg and release the flaps to get flush with rail. Ensure that the rail nut is engaged in the rail profile. Align the ground wire in the depression of the washer. Tighten bolt.

TORQUE VALUE: 6-8 AWG SOLID COPPER: 12 ft lbs.



CAUTION
MLPE & Lug Clamp cannot be used to simultaneously mount a MLPE and ground wire.



ALTERNATE ROW GROUNDING WITH N/S BONDING CLAMP:
Insert clamp between module rows and tighten bolt.

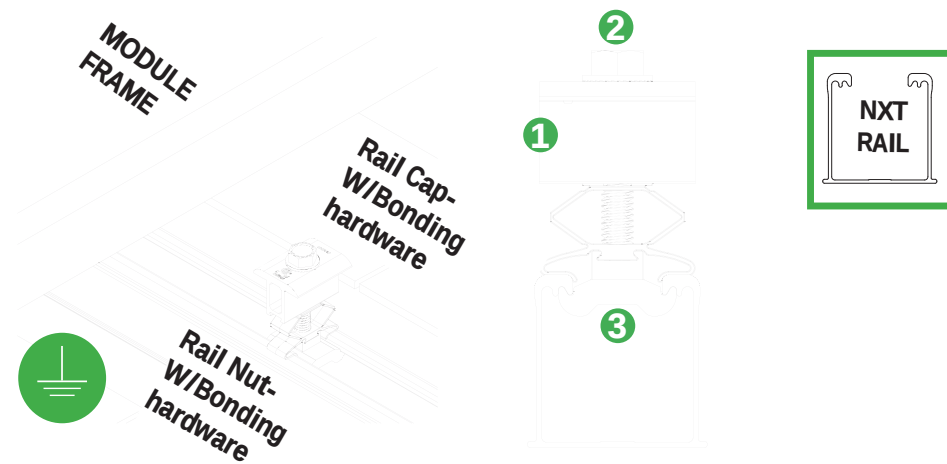
TORQUE VALUE: 20 ft-lbs.

ALTERNATE ROW GROUNDING WITH N/S BONDING CLIP:
Fully seat bonding clip on each module flange to provide bond across N/S module gap.

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BONDING COMBO MID-END CLAMP ASSEMBLY

- 1 Aluminum combo mid-end clamp cap with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
- 2 Stainless steel bolt bonds aluminum clamp to stainless steel Hex bolt
- 3 Aluminum combo mid-end clamp rail nut with stainless steel bonding pins that pierce rail anodization to bond module to module through clamp

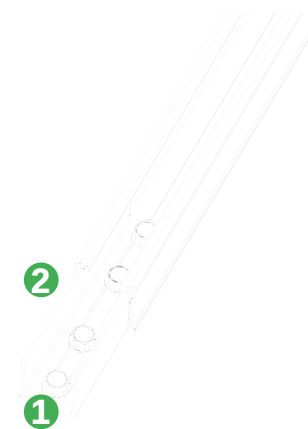
NOTE: See Page 19 for installation details.



BONDING BETWEEN THERMAL BREAKS

- 1 Lug is connected at the end of each thermal break to the rail.
- 2 Solid copper wire is connected across the gap to bond the two ends.

NOTE: See Page 5 for installation details.

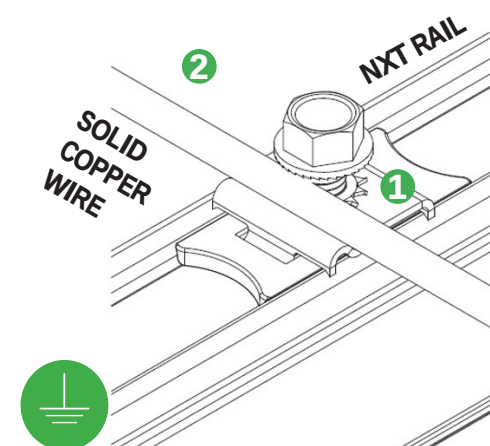


BONDING RAIL SPLICE

- 1 Bonding Hardware creates bond between Splice bar and each rail section.
- 2 Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

NOTE:

- See Page 15 for installation details
- Splice certified for single-use only



RACK SYSTEM GROUNDING

- 1 Tabs on the stainless-steel washer pierce anodization on the rail to bond rail to ground wire.
- 2 Solid copper wire connected to lug is routed to provide final system ground connection.

NOTE: See Page 16 for installation details and alternate racking system grounding methods.

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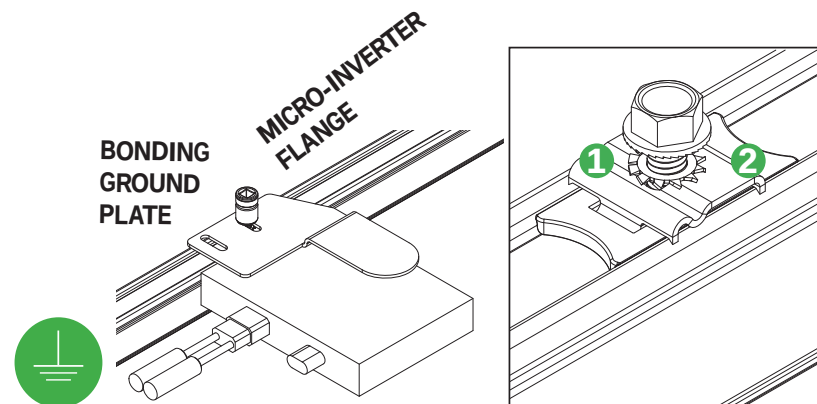
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BONDING CONNECTIONS & GROUNDING PATHS

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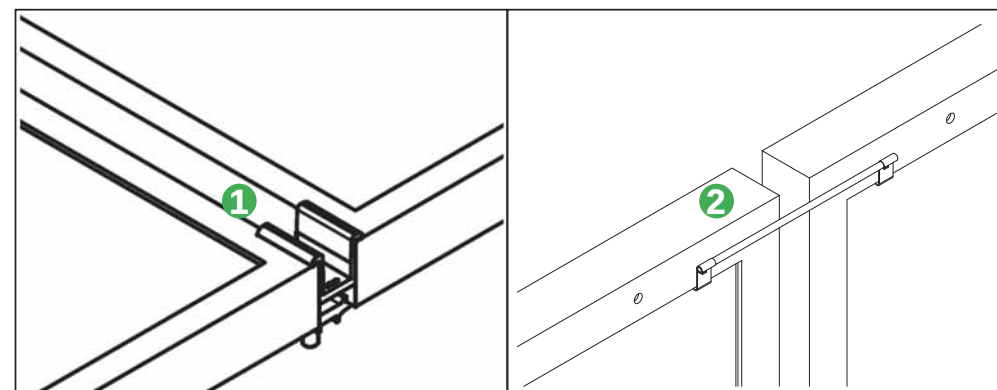
BONDING MICROINVERTER MOUNT

- 1 Stainless steel Tooth lock washer beneath the MLPE flange remove anodization on the MLPE and bonds.
- 2 Tabs on the stainless steel washer remove anodization on the rail and bonds.

NOTE: See Page 17 for installation details

CAUTION

- If loose components or loose fasteners are found during periodic inspection, re-tighten immediately.
- Any components showing signs of corrosion or damage that compromise safety shall be replaced immediately.



ALTERNATE ROW-TO-ROW BONDING PATHS

- 1 Row-to-row module bonding is accomplished with bonding clamp with 2 integral bonding pins.
- 2 Alternate method by connecting clips on either module to complete the bonding path.

NOTE:

- See Page 16 for installation details
- Row-to-row module bonding certified for single-use only

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BONDING CONNECTIONS & GROUNDING PATHS

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RACKING SYSTEM GROUND

Note: Only one lug per module row required

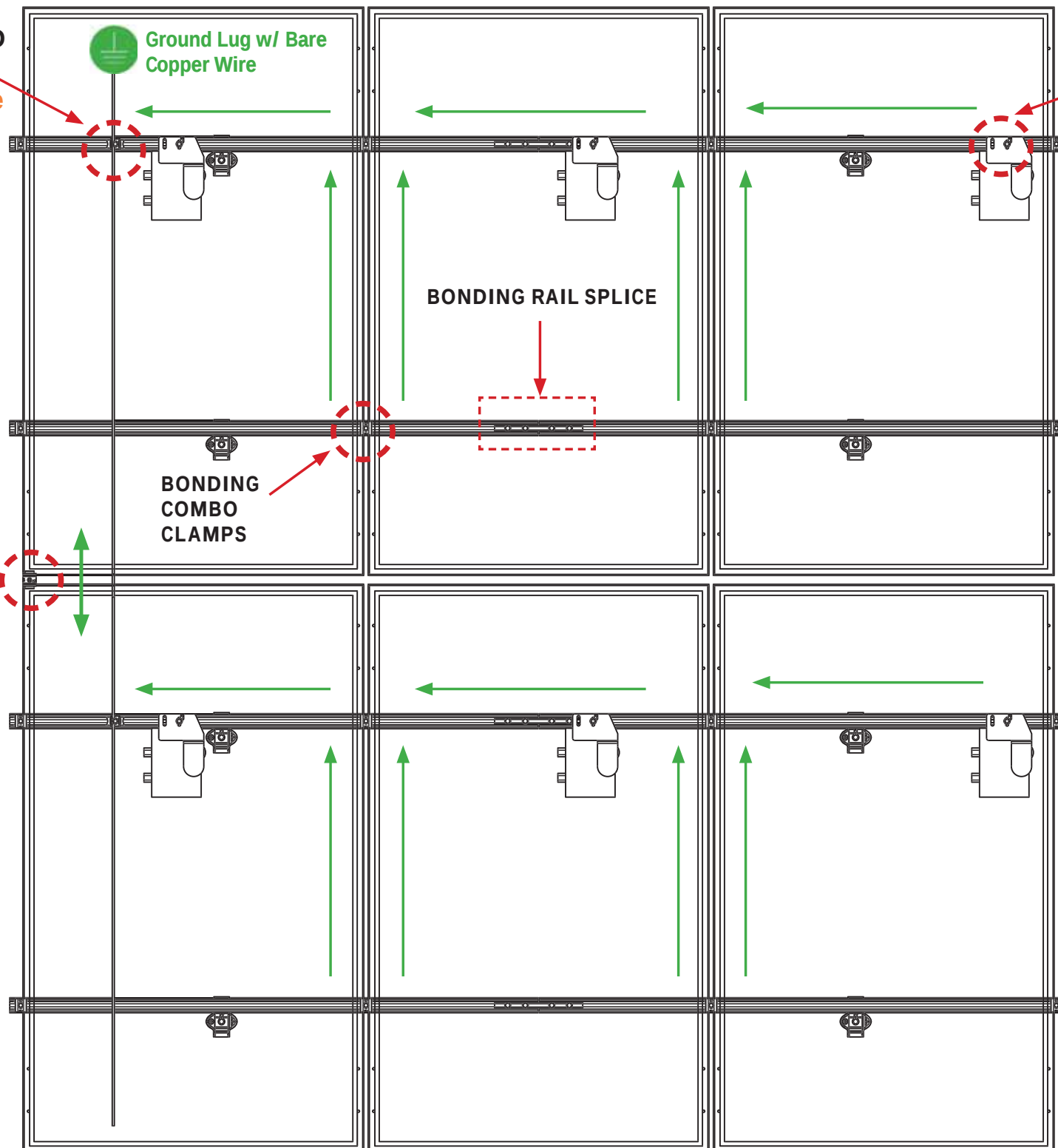
Ground Lug w/ Bare Copper Wire

BONDING MICROINVERTER MOUNTS

BONDING RAIL SPLICE

BONDING COMBO CLAMPS

ALTERNATE ROW-TO-ROW BONDING METHOD



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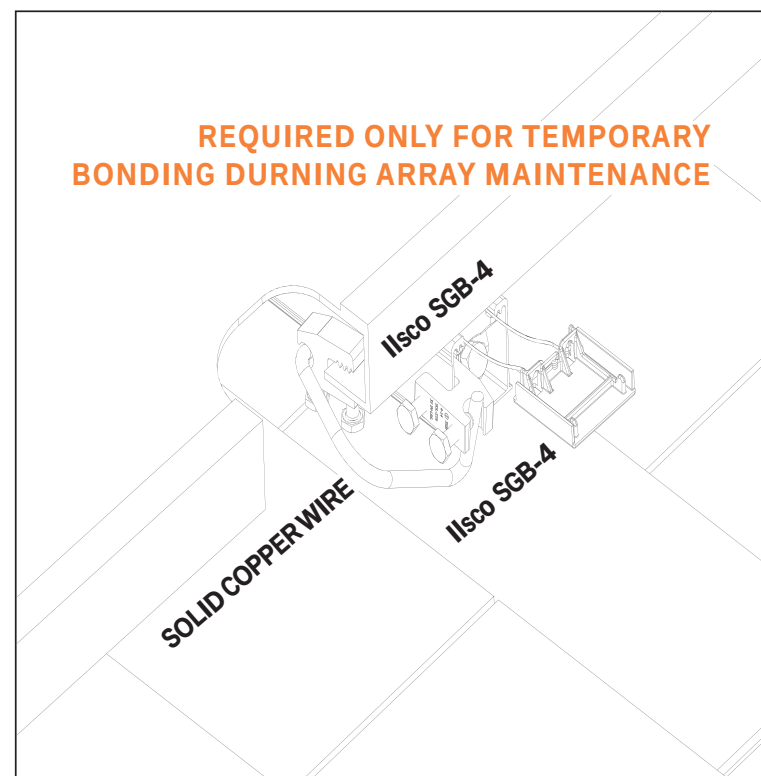
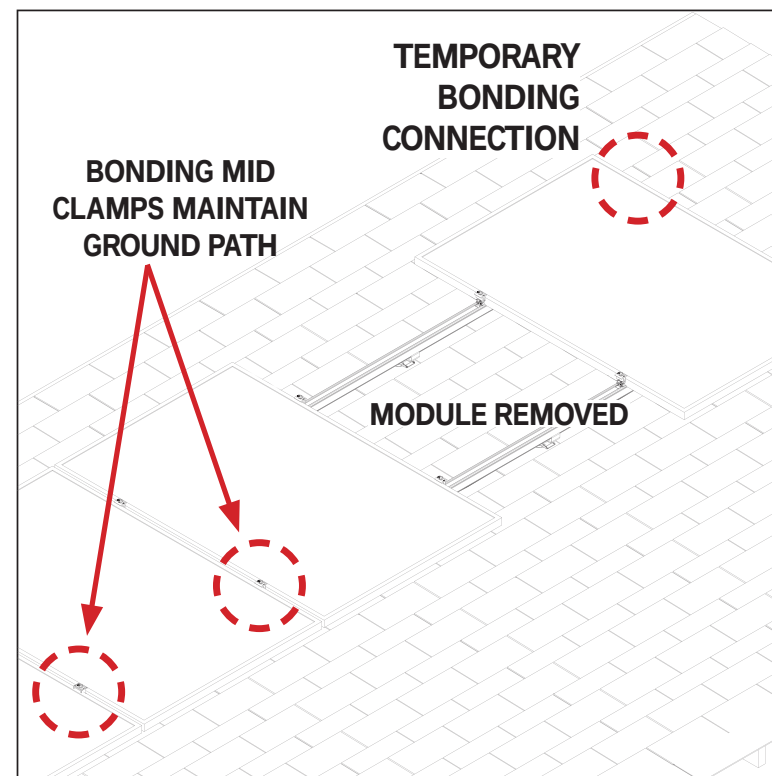
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BONDING CONNECTIONS & GROUNDING PATHS

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TEMPORARY BONDING CONNECTION DURING ARRAY MAINTENANCE

When removing modules for replacement or system maintenance, any module left in place that is secured with a bonding Midclamp will be properly grounded. If a module adjacent to the end module of a row is removed or if any other maintenance condition leaves a module without a bonding mid clamp, a temporary bonding connection must be installed as shown

- Attach IlSCO SGB4 to wall of rail
- Attach IlSCO SGB4 to module frame
- Install solid copper wire jumper to IlSCO lugs



Module removal may disrupt the bonding path and could introduce the risk of electric shock. Follow above mentioned instructions to maintain the bonding path.

ELECTRICAL CONSIDERATIONS

NXT UMOUNT is intended to be used with PV modules that have a system voltage less than or equal to that allowable by NEC. For standard system grounding a minimum 10AWG, 105°C copper grounding conductor should be used to ground a system, according to the National Electric Code (NEC). It is the installer's responsibility to check local codes, which may vary. See below for interconnection information.

INTERCONNECTION INFORMATION

There is no size limit on how many NXT UMOUNT & PV modules can be mechanically interconnected for any given configuration, provided that the installation meets the requirements of applicable building and fire codes.

GROUNDING NOTES

The installation must be conducted by a licensed and bonded electrician or solar contractor in accordance with the National Electric Code (NEC) and the authority having jurisdiction. Please refer to these resources in your location for required grounding lug quantities specific to your project.

The grounding / bonding components may overhang parts of the array so care must be made when walking around the array to avoid damage.

Conductor fastener torque values depend on conductor size. See product data sheets for correct torque values.

PERIODIC INSPECTION

Conduct periodic inspections for loose components, loose fasteners or any corrosion, immediately replace any affected components.

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The NXT UMount system has been certified and listed to the UL 2703 standard (Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels). This standard included electrical grounding, electrical bonding, mechanical load and fire resistance testing.

SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the NXT UMount Installation Guide. NXT UMount has been classified to the system level fire portion of UL 2703. NXT UMount has achieved system level performance for steep sloped roofs and low sloped roofs. System level fire performance is inherent in the NXT UMount design, and no additional mitigation measures are required. See table below for definition of steep sloped and low sloped roofs. The system is to be mounted over fire resistant roof covering rated for the application. There is no required minimum or maximum height limitation above the roof deck to maintain the system fire rating for NXT UMount. Approved Module Types & System Level Fire Ratings are listed below:

Roof Type	Module Type	System Level Fire Rating	Rail Direction	Module Orientation
Steep Slope - roof pitches $\geq$ 2 in/ft	Type 1, 2, 3 with metal frame, 10 with metal frame, 19, 22, 25, 29, & 30	Class A	Parallel OR Perpendicular to Ridge	Landscape OR Portrait
Low Slope - roof pitches < 2in/ft	Type 1, 2, 29, & 30			

MECHANICAL LOAD TEST MODULES

The modules selected for UL 2703 mechanical load testing were selected to represent the broadest range possible for modules on the market. The tests performed covers module frame thicknesses greater than or equal to 1.0 mm, single and double wall frame profiles (some complex frame profiles could require further analysis to determine applicability), and clear and dark anodized aluminum frames. PV modules may have a reduced load rating, independent of the NXT UMount rating. Please consult the PV module manufacturer's installation guide for more information.

Tested Module	UL2703 Certification Load Ratings	Tested Loads	Tested Module Area
SunPower SPR-A440 -COM	Down: 50 psf, Up: 50 psf , Slope: 15 psf	Down: 75 psf, Up: 75 psf , Slope: 23 psf	21.86 sq ft
Jinko JKM-xxxM 72HL4-V	Down: 39.47 psf, Up: 22.28 psf, Slope: 8 psf	Down: 59.20 psf, Up: 33.42 psf, Slope: 12 psf	27.76 sq ft

UL2703 CERTIFICATION MARKING:

Unirac NXT UMount is listed to UL 2703. Certification marking is embossed on all Combo Clamps as shown. Labels with additional certification information are provided with clamps and must be applied to the NXT UMount Rail at the edge of the array.

Note: This racking system may be used to ground and/or mount a PV module complying with UL1703/UL61730 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.



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Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the NXT UMount system.

Manufacture	Module Model / Series
Aionrise	AION60G1, AION72G1
Aleo	P-Series & S-Series
Aptos Solar	DNA-120-(MF/BF)10-xxxW DNA-120-MF10 DNA-120-(MF/BF)23 DNA-144-(MF/BF)23 DNA-120-(MF/BF)26 DNA-144-(MF/BF)26 DNA-108-(MF/BF)10-xxxW
Astronergy	CHSM6612 M, M/HV CHSM6612P Series CHSM6612P/HV Series CHSM72M-HC CHSM72M(DG)/F-BH
Auxin	AXN6M610T AXN6P610T AXN6M612T AXN6P612T
Axitec	AC-xxx(M/P)/60S, AC-xxx(M/P)/72S AC-xxxP/156-60S AC-xxxMH/120(S/V/SB/VB) AC-xxxMH/144(S/V/SB/VB)
Boviet	BVM6610, BVM6612
BYD	P6K & MHK-36 Series

Manufacture	Module Model / Series
Canadian Solar	CS1(H/K/U/Y)-MS CS3K-(MB/MB-AG/MS/P/P HE/PB-AG) CS3L-(MS/P), CS3N-MS CS3U-(MB/MB-AG/MS/P/P HE/PB/PB-AG) CS3W-(MB-AG/MS/P/P-PB-AG) CS3Y-MB-AG, CS5A-M CS6K-(M/MS/MS AllBlack/P/P HE) CS6P-(M/P), CS6R-MS CS6U-(M/P/P HE), CS6W-(MB-AG/MS) CS6X-P, CSX-P, CS7L-MB-AG CS7L-xxxMB-AG ELPS CS6(A/P)-MM
Centrosolar America	C-Series & E-Series
CertainTeed	CT2xxMxx-01, CT2xxPxx-01, CTxxxMxx-01 CTxxxPxx-01, CTxxxMxx-02, CTxxxMxx-03 CTxxxMxx-04, CTxxxHC11-04
Eco Solargy	Orion 1000 & Apollo 1000
ET Solar	ET AC Module, ET Module ET-M772BH520-550WW/WB
First Solar	FS-6XXX(A) FS-6XXX(A)-P, FS-6XXX(A)-P-I
Flextronics	FXS-xxxBB
Freedom Forever	FF-MP-BBB-xxx, FF-MP1-BBB-xxx
FreeVolt	PVGraf
GCL	GCL-P6 & GCL-M6 Series

Manufacture	Module Model / Series
Hansol	TD-AN3, TD-AN4 UB-AN1, UD-AN1
Hanwha SolarOne	HSL 60
Heliene	36M, 36P 60M, 60P, 72M & 72P Series 144HC M6 144HC M10 SL Bifacial
H-SAAE	HT60-156M-C HT60-156M(V)-C HT72-156(M/P) HT72-156P-C, HT72-156P(V)-C HT72-156M(PDV)-BF, HT72-156M(PD)-BF HT72-166M, HT72-18X
Hyperion Solar	HY-DH108P8(B), HY-DH108N8B HY-DH144P8
Hyundai	KG, MG, RW, TG, RI, RG, TI, KI, HI Series HiA-SxxxHG, HiD-SxxxRG(BK), HiN-SxxxXG(BK), HiS-S400PI, HiS-SxxxYH(BK), HiS-SxxxXG(BK)
ITEK	iT-SE Series
Japan Solar	JPS-60 & JPS-72 Series

- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- **Listed models can be used to achieve a Class A fire system rating, for steep slope or low slope applications, only when modules of fire typed mentioned in Appendix A, Page 26 are used.**

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Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the NXT UMount system.

Manufacture	Module Model / Series	Manufacture	Module Model / Series	Manufacture	Module Model / Series
JA Solar	JAM54S31 xxx/MR JAM72D30MB, JAM78D10MB JAM72S30 /MR JAP6 60-xxx JAM6(k)-60/xxx, JAP6(k)-72-xxx/4BB JAP72S##-xxx/** JAP6(k)-60-xxx/4BB, JAP60S##-xxx/** JAM6(k)-72-xxx/**, JAM72S##-xxx/** JAM6(k)-60-xxx/**, JAM60S##-xxx/** i. ##: 01, 02, 03, 09, 10 ii. **: SC, PR, BP, HiT, IB, MW, MR ** = Backsheet, ## Cell technology	LG Electronics	LGxxx(E1C/E1K/N1C/N1K/N2T/N2W/S1C/S2W/Q1C/Q1K)-A5 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/QAC/QAK)-A6 LGxxxN2W-B3 LGxxxN2T-B5 LGxxxN1K-B6	Mitrex	Mxxx-L3H, Mxxx-I3H
	LG Electronics (Cont.)		LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxx(N1C/N1K/N2W/S1C/S2W)-G4 LGxxxN2T-J5 LGxxx(N1K/N1W/N2T/N2W)-L5 LGxxx(M1C/N1C/Q1C/Q1K)-N5 LGxxx(N1C/N1K/N2W/Q1C/Q1K)-V5 LGxxxN3K-V6	Mitsubishi	MJE & MLE Series
		LONGi	LR4-60(HPB/HPH) LR4-72(HPH) LR6-60 LR6-60(BK/HPB/HPH/HV/PB/PE/PH) LR6-72 LR6-72(BK/HV/PB/PE/PH) RealBlack LR4-60HPB RealBlack LR6-60HPB	Neo Solar Power Co.	D6M Series
			Maxeon	SPR-MAX3-xxx-COM	NE Solar
	Meyer Burger		Meyer Burger Black, Meyer Burger White Meyer Burger Glass	Panasonic	VBHNxxxSA06/SA06B/SA11/SA11B VBHNxxxSA15/SA15B/SA16/SA16B, VBHNxxxKA, VBHNxxxKA03/04, VBHNxxxSA17/SA17G/SA17E/SA18/SA18E, VBHNxxxZA01/ZA02/ZA03/VBHNxxxZA04 EVPVxxx EVPVxxx(H/K/PK/HK)
Mission Solar Energy	MSE Mono, MSE Perc MSExxx(SR8T/SR8K/SR9S/SX5T) MSExxx(SX5K/SX6W)		Peimar		SGxxxM (FB/BF) SMxxxM
		Phono Solar	PSxxxM1-20/U PSxxxM1H-20/U PSxxxM1-20UH PSxxxM1H-20UH PSxxxM4(H)-24/TH PSxxxM1-20/UH PSxxxM1H-20/UH PSxxxM-24/T PSxxxMH-24/T PSxxxM-24/TH PSxxxMH-24/TH		
			Prism Solar	P72 Series, P72X-xxx	

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the NXT UMount system.

Manufacture	Module Model / Series	Manufacture	Module Model / Series	Manufacture	Module Model / Series
Q.Cells	Plus, Pro, Peak, G3, G4, Peak G5(SC) , G6(+)(SC)(AC), G7, G8(+), Plus, Pro, Peak L-G2, L-G4, L-G5 Peak L-G5, L-G6, L-G7, L-G8(BFF) Q.PEAK DUO(BLK)-G6+ Q.PEAK DUO BLK-G6+/TS	REC	RECxxxAA (BLK/Pure/Pure-R) RECxxxNP (N-PEAK) RECxxxNP2 (Black) RECxxxNP3 Black RECxxxPE, RECxxxPE72 RECxxxTP, RECxxxTP72 RECxxxTP2(M/BLK2) RECxxxTP2S(M)72 RECxxxTP3M (Black) RECxxxTP4 (Black)	Solaria	PowerXT-xxxR-(AC/PD/BD) PowerXT-xxxC-PD PowerXT-xxxR-PM (AC) PowerX-400R
	Q.PEAK DUO (BLK)-G7 Q.PEAK DUO L-(G7/G7.1/G7.2/G7.3/G7.7) Q.PEAK DUO (BLK) G8(+) Q.PEAK DUO L-(G8/G8.1/G8.2/G8.3) Q.PEAK DUO L-G8.3 (BFF/BFG/BGT) Q.PEAK DUO (BLK) ML-G9(+) Q.PEAK DUO XL-(G9/G9.2/G9.3) Q.PEAK DUO XL-G9.3/BFG Q.PEAK DUO-G10+ Q.PEAK DUO BLK G10(+) Q.PEAK DUO BLK G10+ /AC Q.PEAK DUO (BLK) ML-G10(a)(+) Q.PEAK DUO BLK ML-G10+ / t Q.PEAK DUO XL-(G10/G10.2/G10.3/G10.c/ G10.d) Q.PEAK DUO XL-G10.3/BFG Q.PEAK DUO XL-G10.d/BFG Q.PEAK DUO XL-G11S Q.PEAK DUO XL-(G11.2/G11.3) Q.PEAK DUO XL-G11.3/BFG		Renesola All 60-cell modules	Solartech	STU HIT, STU PERC & Quantum PERC
Q.Cells (Cont.)		Risen	RSM Series, RSM110-8-xxxBMDG	SolarWorld	Sunmodule Protect, Sunmodule Plus/Pro
		S-Energy	SN72 & SN60 Series	Sonali	SS-M-360 to 390 Series SS-M-390 to 400 Series SS-M-440 to 460 Series SS-M-430 to 460 BiFacial Series
		SEG Solar	SEG-xxx-BMD-HV SEG-xxx-BMD-TB	Sun Edison	F-Series, R-Series
		Seraphim	SEG-(6PA/6PB/6MA/6MA-HV/6MB/E01/E11) SRP-(6QA/6QB) SRP-xxx-6MB-HV, SRP-320-375-BMB-HV, SRP-xxx-BMC-HV, SRP-390-450-BMA-HV, SRP-xxx-BMZ-HV, SRP-390-405-BMD-HV	Suniva	MV Series & Optimus Series (35mm)
		Sharp	NU-SA & NU-SC Series	Sunmac Solar	M754SH-BB Series
		Silfab	SLA-M, SLA-P, SLG-M, SLG-P & BC Series SILxxx(BG/BK/BL/HC/HC+/HL/HM/HN/ML/ NL/NT/NX/NU)	SunPower	AC, X-Series, E-Series & P-Series SPR E20 435 COM (G4 Frame) Axxx-BLK-G-AC, SPR-Mxxx-H-AC
		Solar4America	S4Axxx-108MH10BB, S4Axxx-72MH5BB	SunTech	STP, STPXXXS - B60/Wnhb
		SolarEver USA	SE-166*83-xxxM-120N SE-182*91-xxxM-108N	Talesun	TP572, TP596, TP654, TP660 TP672, Hipor M, Smart TD6172M
				Tesla	SC, SC B, SC B1, SC B2, TxxxS, TxxxH
				Trina	PA05, PD05, DD05, DD06, DE06, DE09.05 PD14, PE14, DD14, DE14, DE15, DE15V(II) DEG15HC.20(II), DEG15MC.20(II) DEG15VC.20(II), DE18M(II), DEG18MC.20(II) DE19, DEG19C.20

- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- **Listed models can be used to achieve a Class A fire system rating, for steep slope or low slope applications, only when modules of fire typed mentioned in Appendix A, Page 26 are used.**

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COMPATIBLE MODULES : 30

SYSTEM CERTIFICATION : PAGE



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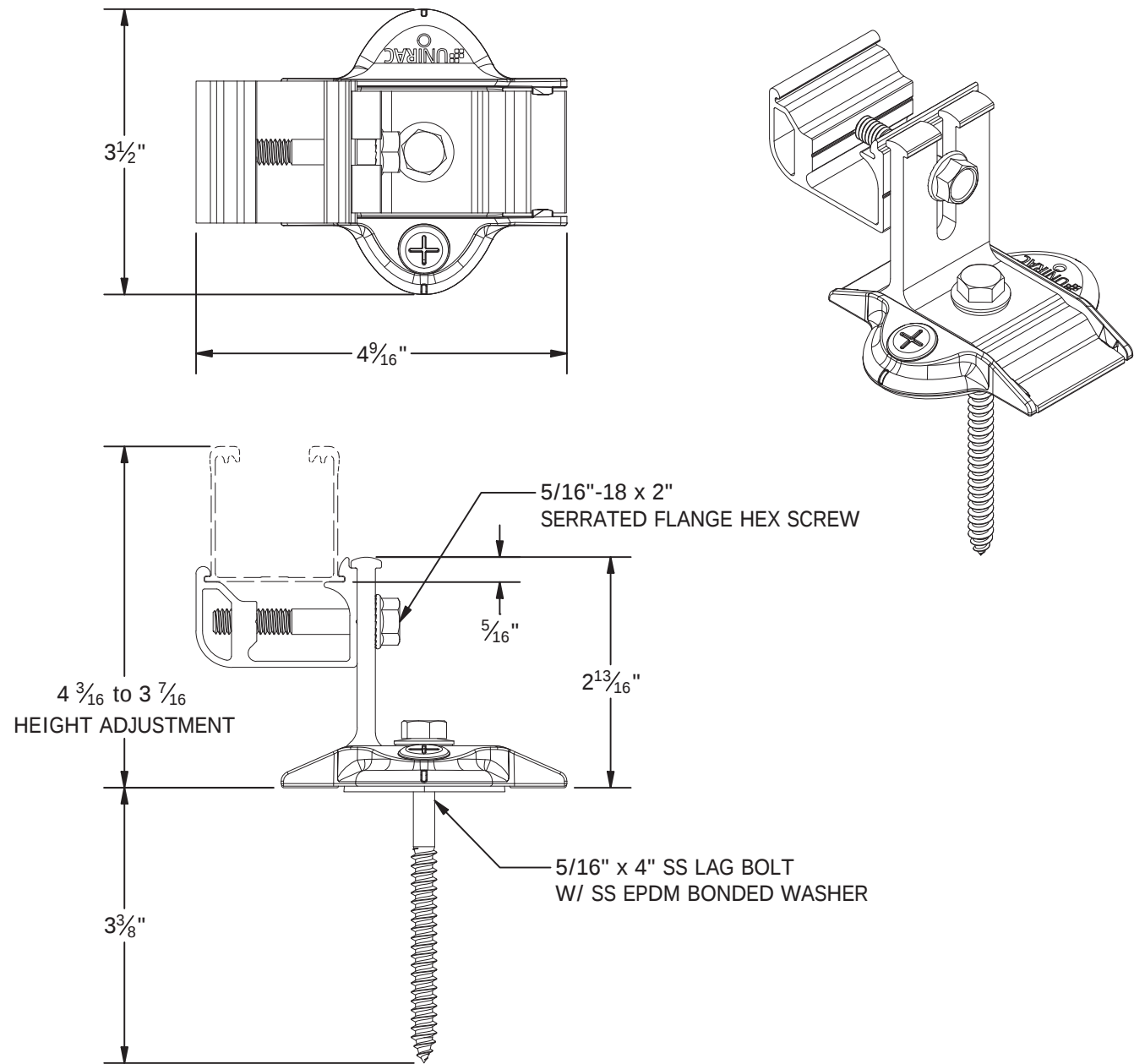
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Manufacture	Module Model / Series
Yingli	YGE & YLM Series
Yotta Energy	YSM-B450-1
ZNShine Solar	ZXM6-72 Series, ZXM6-NH144 ZXM6-NHLDD144, ZXM7-SH108 Series

Manufacture	Module Model / Series
TSMC	TS-150C2 CIGSw
Universal Solar	UNI4xx-144BMH-DG UNI5xx-144BMH-DG UNIxxx-108M-BB UNIxxx-120M-BB UNIxxx-120MH
Upsolar	UP-MxxxP, UP-MxxxM(-B)
URECO	D7Kxxx(H7A/H8A), D7Mxxx(H7A/H8A) FAKxxx(C8G/E8G), FAMxxxE7G-BB FAMxxxE8G(-BB), FBKxxxM8G F6MxxxE7G-BB FBMxxxMFG-BB
Vikram	Eldora, Somera, Ultima PREXOS VSMDHT.60.AAA.05 PREXOS VSMDHT.72.AAA.05
Vina	VNS-72M1-5-xxxW-1.5, VNS-72M3-5-xxxW-1.5, VNS-144M1-5-xxxW-1.5, VNS-144M3-5-xxxW-1.5, VNS-120M3-5-xxxW-1.0
VSUN	VSUNxxx-60M-BB, VSUNxxx-72MH VSUN4xx-144BMH, VSUN4xx-144BMH-DG VSUN5xx-144BMH-DG, VSUNxxx-108M-BB VSUNxxx-120M-BB, VSUNxxx-120BMH VSUNxxx-132BMH, VSUNxxx-108BMH
Waaree	Arka Series WSMDi
Winaico	WST & WSP Series

- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- **Listed models can be used to achieve a Class A fire system rating, for steep slope or low slope applications, only when modules of fire typed mentioned in Appendix A, Page 26 are used.**

PART # TABLE	
P/N	DESCRIPTION
SHCPKTM1	STRONGHOLD ATT KIT COMP MILL
SHCPKTD1	STRONGHOLD ATT KIT COMP DRK
SHCPKTM1-NS	STRONGHOLD ATT COMP MILL (NS)
SHCPKTD1-NS	STRONGHOLD ATT COMP DRK (NS)




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

PRODUCT LINE:	NXT UMount
DRAWING TYPE:	PARTS ASSEMBLY
DESCRIPTION:	STRONGHOLD ATTACHMENT
REVISION DATE:	11/17/2022

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

NU-A04

SHEET