



RESIDENTIAL ROOFTOP SOLAR PERMIT PACKAGE

William Hensley
1801 SW Merryman Dr
Lee's Summit, Missouri 64082
8163923167



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

SCOPE OF WORK
INSTALLATION OF ROOFTOP MOUNTED PHOTOVOLTAIC SOLAR SYSTEM



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: 46

NEW PV SYSTEM INFORMATION

DC SYSTEM SIZE: 6.72 kW DC
AC SYSTEM SIZE: 5.04 kW AC
MODULE TYPE: (16) REC Solar REC420AA Pure-R
INVERTER TYPE: Enphase IQ7X-96-2-US

TOTAL PV DC SYSTEM SIZE
6.720 kW DC

TOTAL PV AC SYSTEM SIZE
5.040 kW AC

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

GENERAL NOTES



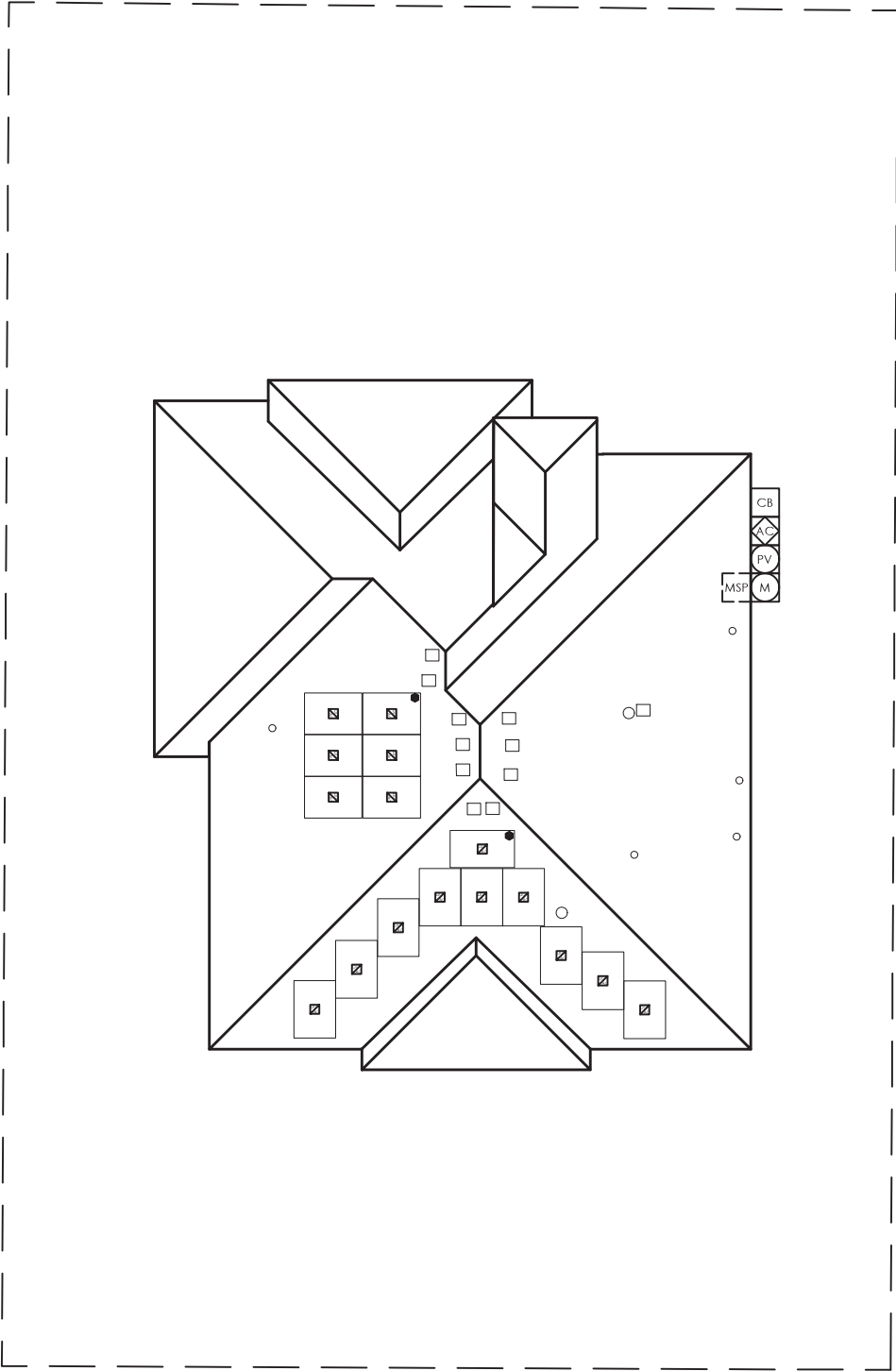
3/22/2024

AHJ Digitally signed
City of Lee's Summit by John A. Calvert
Date: 2024.03.22
UTILITY COMPANY
Evergy MO West 10:14:08 -06'00'

CUSTOMER NAME: William Hensley
1801 SW Merryman Dr
Lee's Summit, Missouri 64082
AHJ: City of Lee's Summit
UTILITY COMPANY: Evergy MO West

PROJECT ID: 945579
PV DC SYSTEM SIZE: 6.720 kW DC
PV AC SYSTEM SIZE: 5.040 kW AC
REVISIONS:
A ---
B ---
C ---
D ---
DRAWN BY: Brendan Fillmore
PLOT DATE: March 22, 2024
DRAWING TITLE: Cover Sheet
DRAWING NUMBER: PV1

FRONT OF HOME
1801 SW Merryman Dr



Sealed For
Existing Roof &
Attachment Only



3/22/2024

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



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6.720 kW DC

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REVISIONS:

A	----
B	----
C	----
D	----

DRAWN BY:

Brendan Fillmore

PLOT DATE:

March 22, 2024

DRAWING TITLE:

Site Plan

DRAWING NUMBER:

PV2

LEGEND

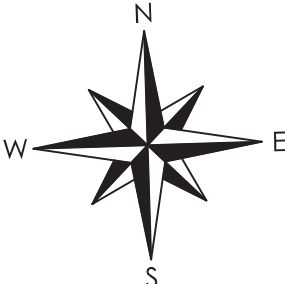
	ROOF TOP JUNCTION BOX		BREAKER ENCLOSURE		GENERATOR ATS PANEL		REMOTE POWER OFF SWITCH		TRENCH OR OVERHEAD
	UTILITY METER		AC DISCONNECT		UTILITY METER CT CABINET		FIRE SETBACK HATCH		PROPERTY LINE
	MAIN SERVICE PANEL		PV PRODUCTION METER		ESS - BATTERY		MICROINVERTER		NEW PV SYSTEM
	SUBPANEL		COMBINER BOX		ESS - CONTROLLER	ICONS WITH DOTTED OUTLINE INDICATE INTERIOR LOCATION			

PV SYSTEM SPECIFICATIONS

NEW PV SYSTEM INFORMATION

PV MODULE: (16) REC Solar REC420AA Pure-R, **POWER RATING:** 420 W
MICROINVERTER: Enphase IQ7X-96-2-US, **POWER RATING:** 315 W

COMPASS





PV3

	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)
MP1	6	272	27	80	612.28	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	10	182	27	98	526.47	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													

ATTACHMENT TYPE:
Unirac Stronghold

2 ATTACHMENT DETAIL
SCALE: 1-1/2" = 1'-0"

NOTES

Southeast corner of MP2 requires blocking, most of the plane does not.

BLOCKING REQUIRED. Structural Blocking upgrade may be required in hiproof MPs near the ridge to accommodate PV array standoff embedment. Approx. 46 blocks required. Install (3) 16D sinkers OR (1) A34 Simpson Clip at each vertical truss member to the end of each block. Material Required: (46) 2x6 lumber blocks at approx. 2 ft long. (276) 16D sinkers OR (92) A34 Simpson Clips.

Sealed For Existing Roof & Attachment Only

3/22/2024

1 FRAMING DETAIL
SCALE: 1/2" = 1'-0"

2) INSTALL (3) 16D SINKERS OR (1) A34 SIMPSON FRAMING ANGLE CLIP AT EXISTING VERTICAL TRUSS MEMBER TO EACH END OF EACH BLOCK

3 ATTACHMENT PATTERN
SCALE: 1/4" = 1'-0"

FOLLOW ATTACHMENT SPACING IN TABLE ABOVE

*ATTACHMENT PATTERN SHOULD BE STAGGERED UNLESS OTHERWISE NOTED IN ENGINEERING LETTER

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DRAWN BY:
Brendan Fillmore

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March 22, 2024

DRAWING TITLE:
Structural

DRAWING NUMBER:
PV4

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 (2) 10 AWG THHN/THWN-2 CU BLACK
L2 (2) 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

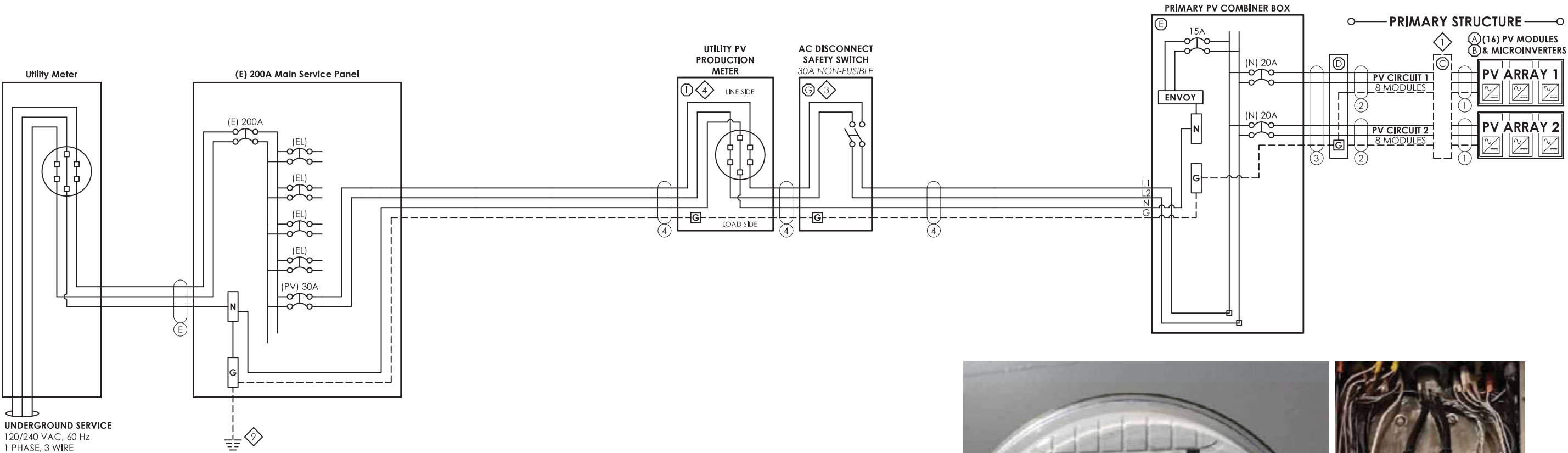
L1 (1) 10 AWG THHN/THWN-2 CU BLACK
L2 (1) 10 AWG THHN/THWN-2 CU RED
G (1) 10 AWG THHN/THWN-2 CU GREEN
*TYPE NM (ROMEX)/UF CABLE IS PERMITTED FOR INTERIOR OR ATTIC RUNS AND SHALL BE USED WHEN NEC CODE PERMITS

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: 23758558
Load side breaker in interior main panel on exterior wall.

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 ACCESSBILE 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 SAFTEY SWITCH 30A, 2P, 240VAC, FUSIBLE (D221NRB)
- EATON B-LINE 011, METER SOCKET, 125A, RINGED, NEMA 3R



OTHER NOTES



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DRAWN BY:

Brendan Fillmore

PLOT DATE:

March 22, 2024

DRAWING TITLE:

Electrical
3-Line

DRAWING NUMBER:

PV5

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	5.04kW AC
DC SYSTEM SIZE	6.72kW DC
PV MODULES	
QUANTITY	16
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	200A	----A	----A
PANEL OCPD RATING	200A	----A	----A
AVAILABLE BACKFEED (120% RULE)	40A	# #A	# #A
PV BREAKER RATING	30A	30A	30A
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	13.1A AC	13.1A AC	13.1A AC	26.25A 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	0.8	1	----	----	----	----	----	----
ADJUSTED CONDUCTOR AMPACITY	28.8A	38.4A	30.72A	72A	----A	----A	----A	----A	----A	----A
WIRE RUN DISTANCE (FT)	52	50	10	10	----	----	----	----	----	----
CALCULATED VOLTAGE DROP	0.62%	0.54%	0.11%	0.09%	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	8	8	0	0	0	0	0	0	0	0	0	0	0
RATED AC OUTPUT CURRENT (I _{OUT})	10.5A	10.5A	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%)	13.1A	13.1A	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})	21.0A								0.0A				
MINIMUM AMPACITY (C _{OUT} x 125%)	26.2A								0.0A				
COMBINED PV BREAKER RATING	30AA								0AA				

TOTAL VOLTAGE DROP	
	VOLTAGE DROP
WIRE TAG #1	0.62%
WIRE TAG #2	0.54%
WIRE TAG #3	0.11%
WIRE TAG #4	0.09%
WIRE TAG #5	0%
WIRE TAG #6	0%
TOTAL	1.360000%



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Every MO West

CUSTOMER NAME:

AHJ:

UTILITY COMPANY:

PROJECT ID:

945579

PV DC SYSTEM SIZE:

6.720 kW DC

PV AC SYSTEM SIZE:

5.040 kW AC

REVISIONS:

A	----
B	----
C	----
D	----

DRAWN BY:

Brendan Fillmore

PLOT DATE:

March 22, 2024

DRAWING TITLE:

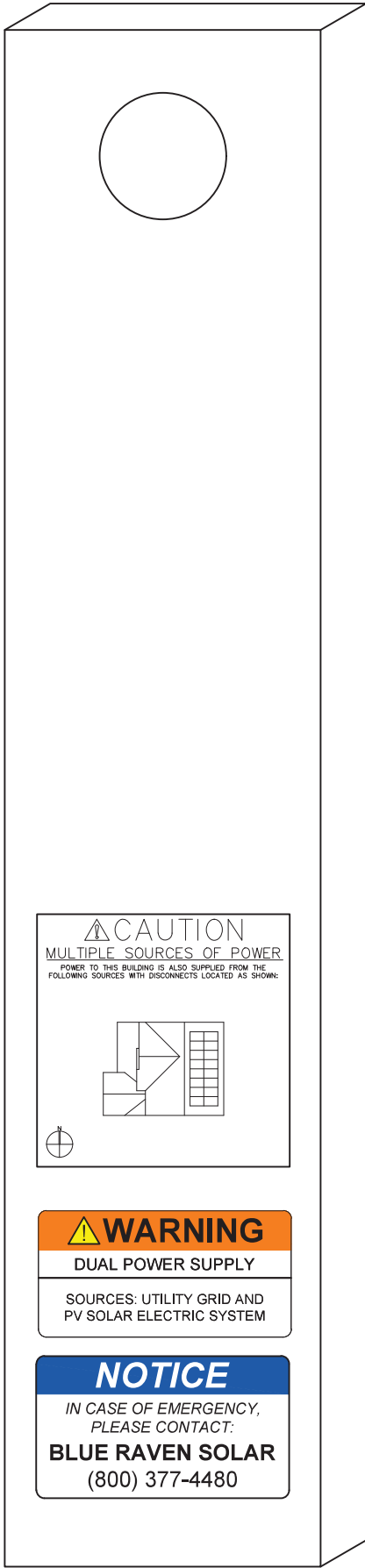
Electrical
Calculations

DRAWING NUMBER:

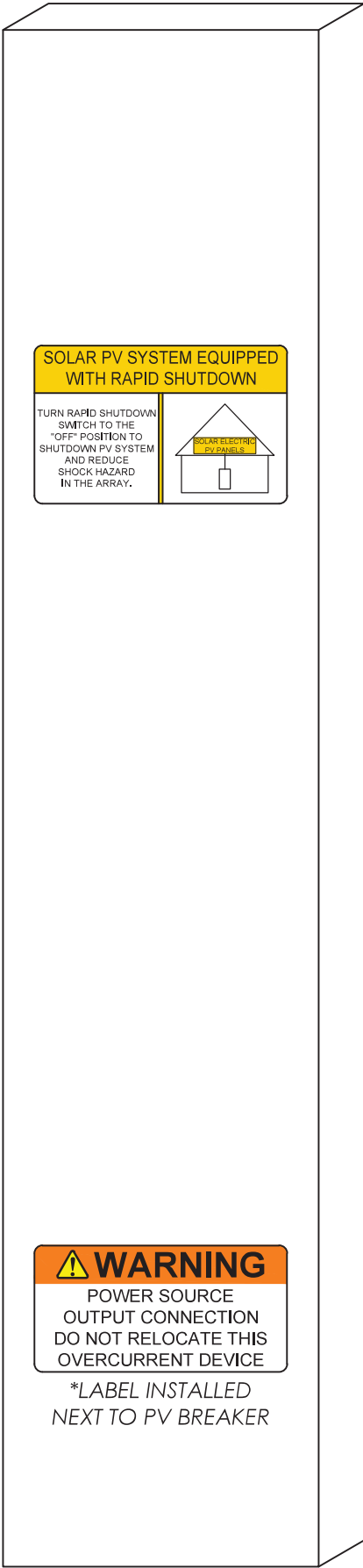
PV6

WARNING LABELS

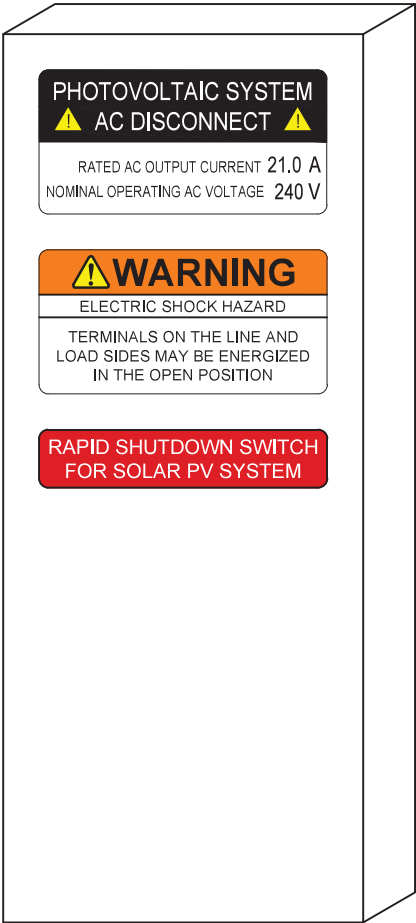
UTILITY METER



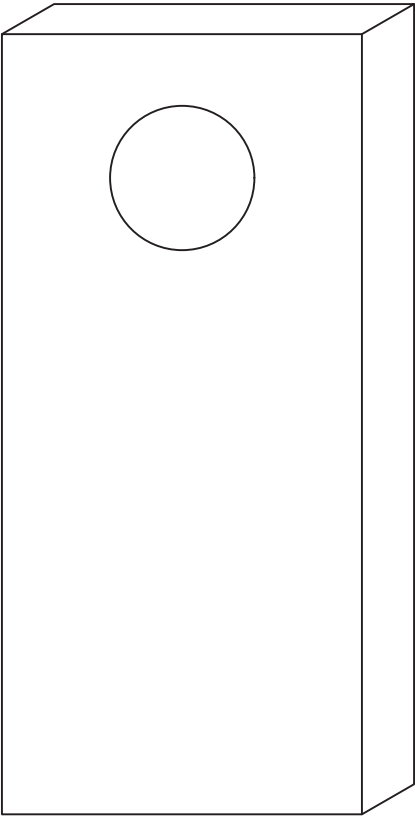
MAIN SERVICE PANEL



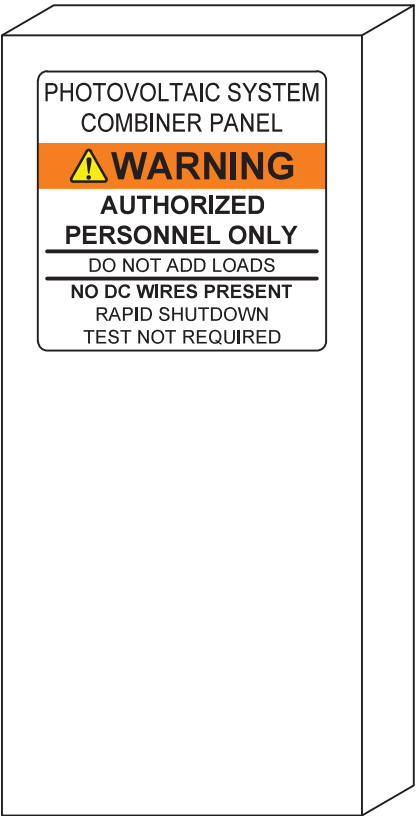
AC DISCONNECT



PV METER



PV COMBINER BOX



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C	---
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March 22, 2024

DRAWING TITLE:

Warning
Labels

DRAWING NUMBER:

PV7

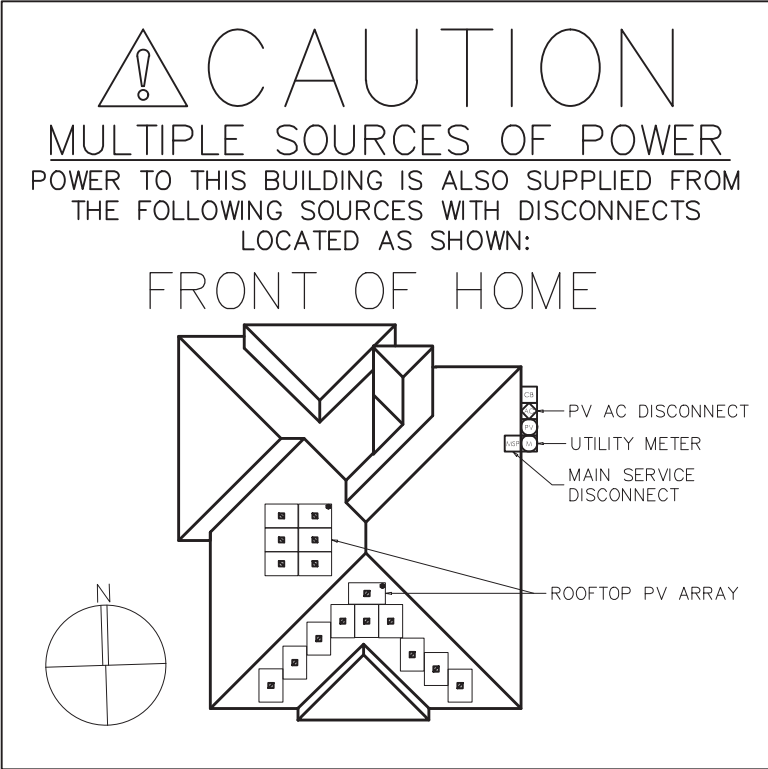


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PLOT DATE:
March 22, 2024

DRAWING TITLE:
Directory
Placard

DRAWING NUMBER:
PV8

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



ELIGIBLE



LEAD-FREE
ROHS COMPLIANT

EXPERIENCE



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:	0.13 in (3.2 mm) 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



Measurements in inches [mm]

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 AM1.5, irradiance 10.75 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 AM1.5, 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.

STC

Power Output - P _{MAX} (Wp)	305	312	320	327
Nominal Power Voltage - V _{MPP} (V)	46.0	46.6	47.1	47.6
Nominal Power Current - I _{MPP} (A)	6.64	6.70	6.80	6.88
Open Circuit Voltage - V _{OC} (V)	55.5	55.8	56.0	56.3
Short Circuit Current - I _{SC} (A)	7.11	7.16	7.20	7.24

NMOT

Power Output - P _{MAX} (Wp)	305	312	320	327
Nominal Power Voltage - V _{MPP} (V)	46.0	46.6	47.1	47.6
Nominal Power Current - I _{MPP} (A)	6.64	6.70	6.80	6.88
Open Circuit Voltage - V _{OC} (V)	55.5	55.8	56.0	56.3
Short Circuit Current - I _{SC} (A)	7.11	7.16	7.20	7.24

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.

REC Solar PTE. LTD.
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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:

SHEET NAME:
SPEC SHEET

REVISION:

PAGE NUMBER:
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Ref: PD-05-AAPR Rev 3.1 03/23 Specifications subject to change without notice.



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.*



Connect PV modules quickly and easily to IQ7X Microinverters using the included Q-DCC-2 adapter cable with plug-and-play MC4 connectors.



IQ7X Microinverters are UL Listed as PV rapid shutdown equipment and conform with various regulations when installed according to the manufacturer’s instructions.

* 25-year warranty is valid, provided an internet-connected IQ Gateway is installed.

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

- Easy to install**
- Lightweight and simple
 - Faster installation with improved, lighter two-wire cabling
 - Built-in rapid shutdown compliant (NEC 2014, 2017, 2020, and 2023)

- 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.)

INPUT DATA (DC)		UNITS	IQ7X-96-2-US	
Commonly used module pairings ¹		W	320–460	
Module compatibility		—	To meet compatibility, PV modules must be within the following maximum input DC voltage and maximum module I _{sc} . Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator .	
MPPT voltage range		V	53–64	
Operating range		V	25–79.5	
Minimum/Maximum start voltage		V	33/79.5	
Maximum input DC voltage		V	79.5	
Maximum continuous input DC current		A	6.5	
Maximum module I _{sc}		A	10	
Overvoltage class DC port		—	II	
DC port backfeed current		mA	0	
PV array configuration		—	1 x 1 ungrounded array; no additional DC side protection required; AC side protection requires a maximum of 20 A per branch circuit.	
OUTPUT DATA (AC)		UNITS	IQ7X-96-2-US@240 VAC	IQ7X-96-2-US@208 VAC
Peak output power		VA	320	
Maximum continuous output power		VA	315	
Nominal grid voltage (L-L)		V	240, split-phase (L-L), 180°	208, single-phase (L-L), 120°
Minimum and Maximum grid voltage ²		V	211–264	183–229
Maximum continuous output current		A	1.31	1.51
Nominal frequency		Hz	60	
Extended frequency range		Hz	49–68	
AC short-circuit fault current over three cycles		A _{rms}	5.8	
Maximum units per 20 A (L-L) branch circuit ³		—	12	10
Overvoltage class AC port		—	III	
AC port backfeed current		mA	18	
Power factor setting		—	1.0	
Grid-tied power factor (adjustable)		—	0.85 leading ... 0.85 lagging	
CEC weighted efficiency		%	97.5	97.0
MECHANICAL DATA		UNITS		
Ambient temperature range		°C (°F)	-40 to 60 (-40 to 140)	
Relative humidity range		%	4 to 100 (condensing)	
DC connector type		—	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)	
Dimensions (H × W × D)		mm (in)	212 (8.3) × 175 (6.9) × 30.2 (1.2)	
Weight		kg (lbs)	1.1 (2.4)	
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	
COMPLIANCE				
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 shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2015. Rule 64-218 rapid shutdown of PV Systems for AC and DC conductors when installed according to the manufacturer's instructions.		

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses.
(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.

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

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)

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**PV INSTALLATION
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BRS FIELD OPS
385-498-6700

DRAWING BY:

PLOT DATE:

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REVISION:	PAGE NUMBER:
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Single Meter Sockets - Without Bypass

125 & 200 Amp



Application

- Single meter position
- Receive ANSI C12.10 watthour 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

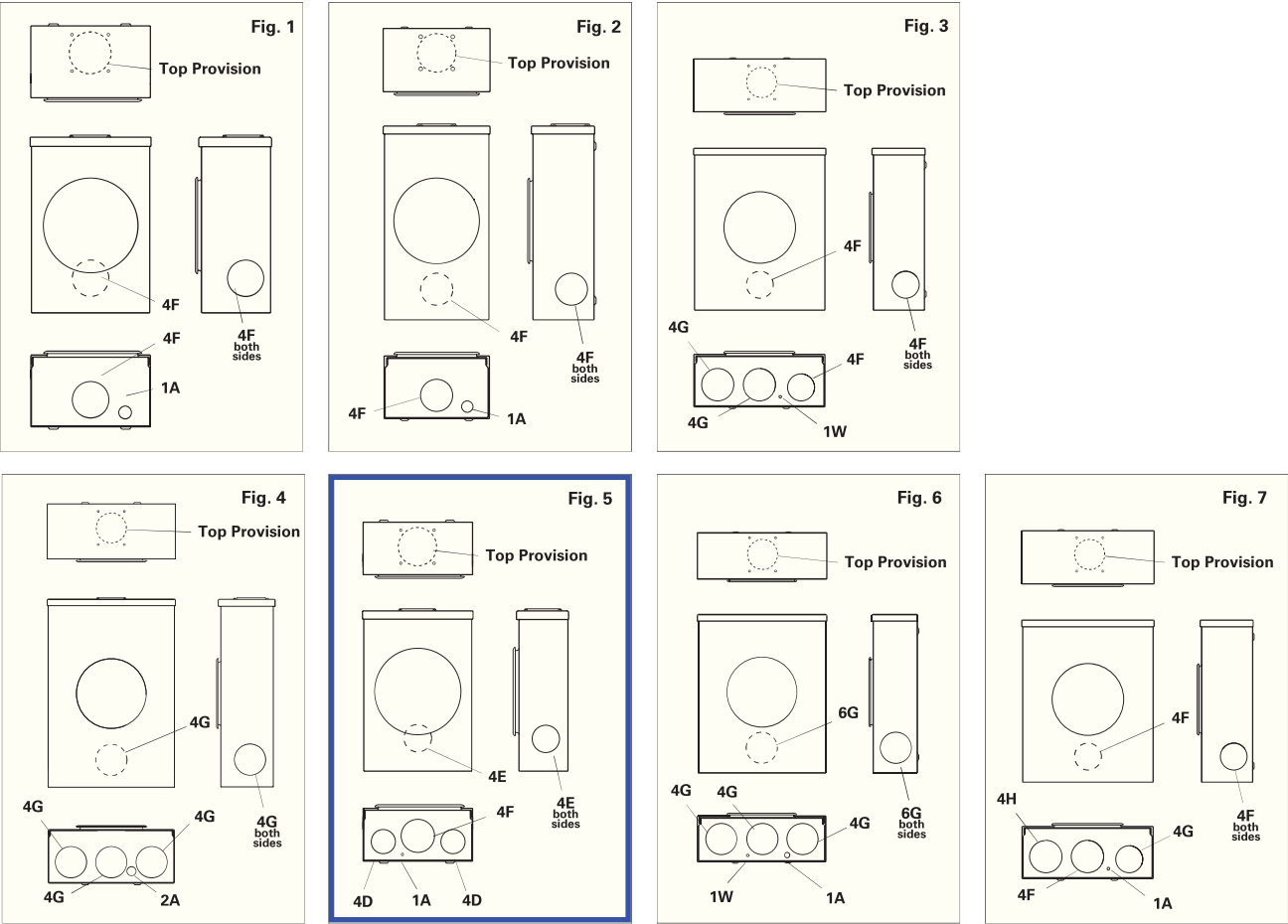
125 & 200 Amp

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



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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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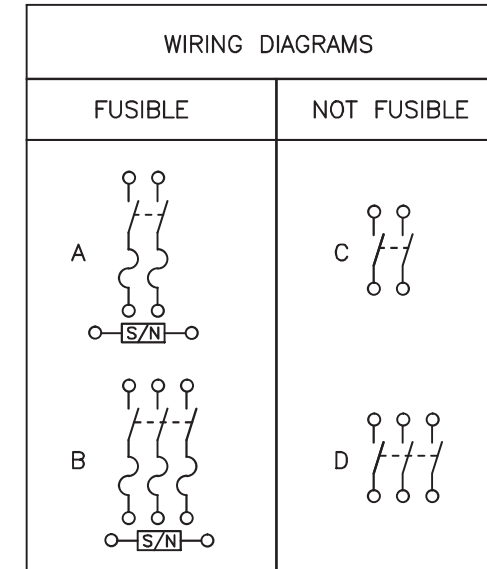
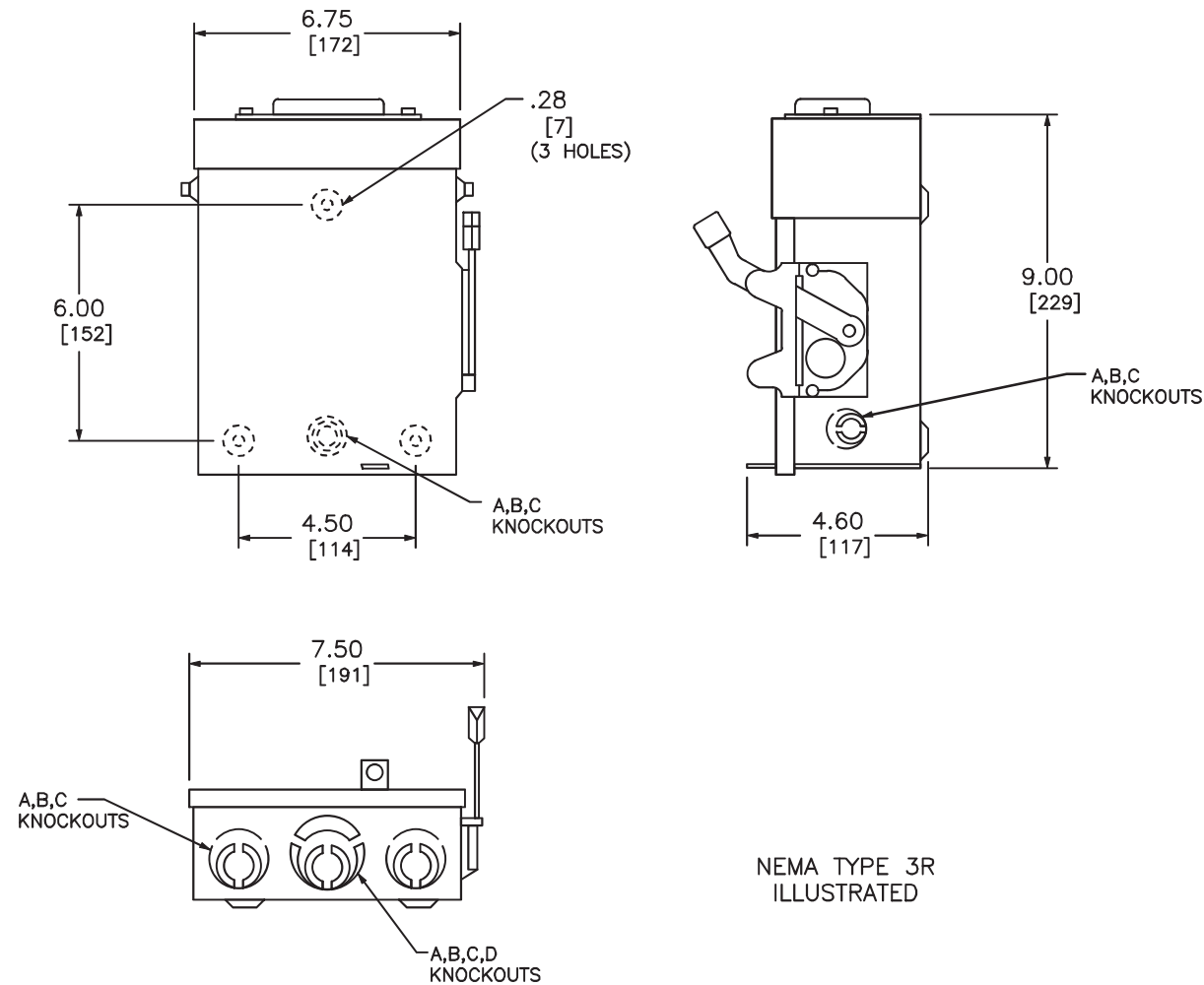
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385-498-6700



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 ELECTRODEPOSITIED 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 GROUNDED 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.

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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 ZS6 terminal block	10-24 awg	16-24 awg	Sol/Str	0.5-0.7	6.2-8.85	600V	30 amp
ABB ZS10 terminal block	6-24 awg	12-20 awg	Sol/Str	1.0-1.6	8.85-14.16	600V	40 amp
ABB ZS16 terminal bock	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	10-24 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		

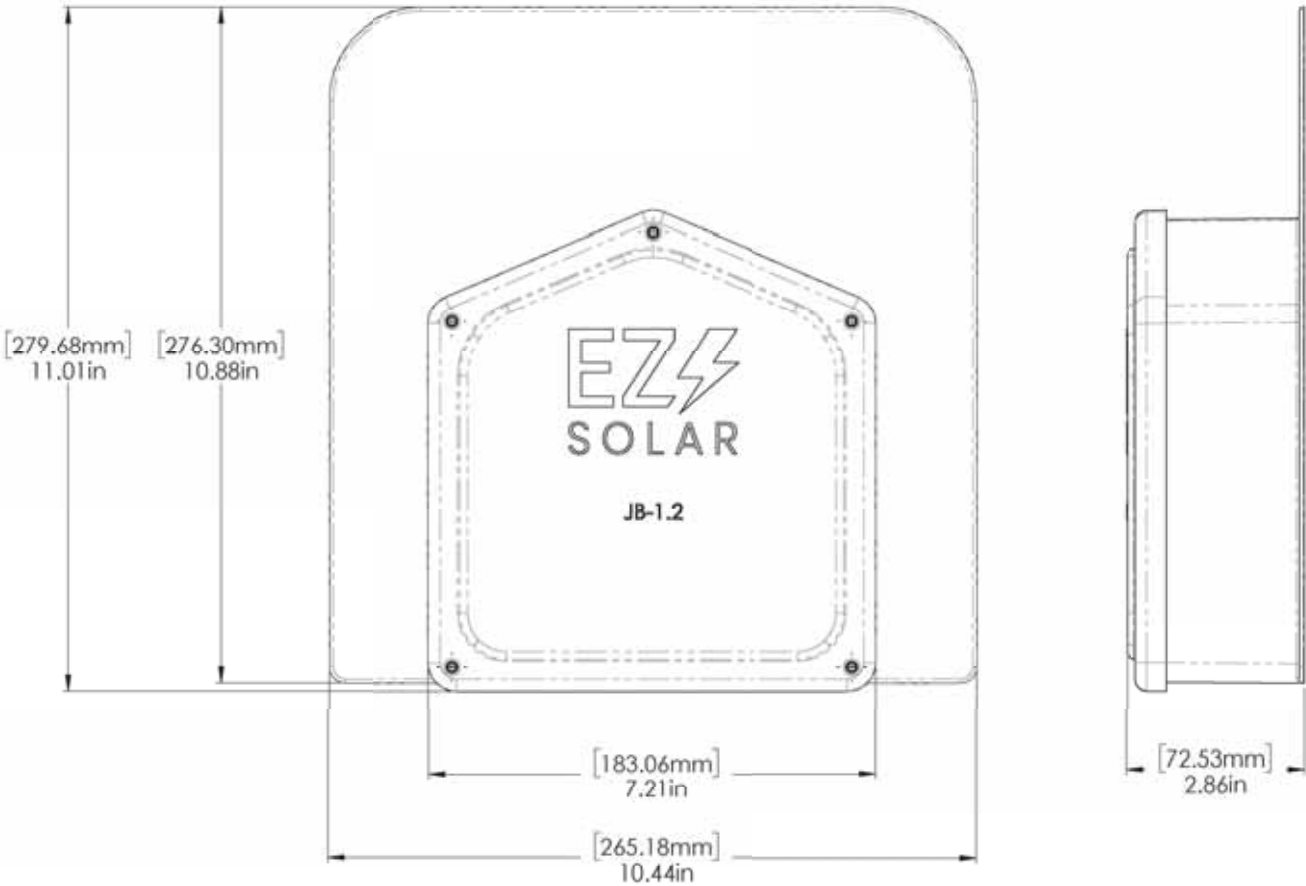
Table 2: Minimum wire-bending space for conductors through a wall opposite terminals in mm (inches)

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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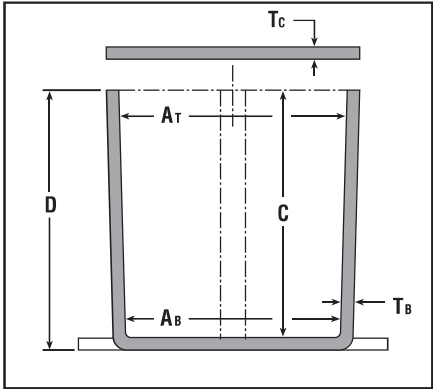
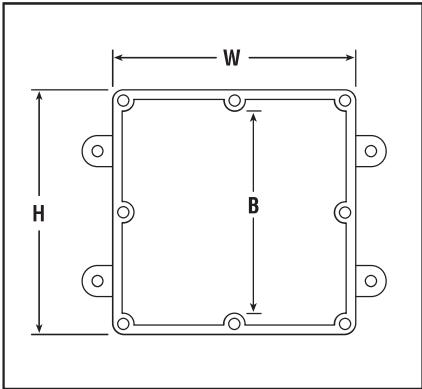
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Rigid Nonmetallic Conduit – Junction Boxes

Molded Nonmetallic Junction Boxes
6P Rated

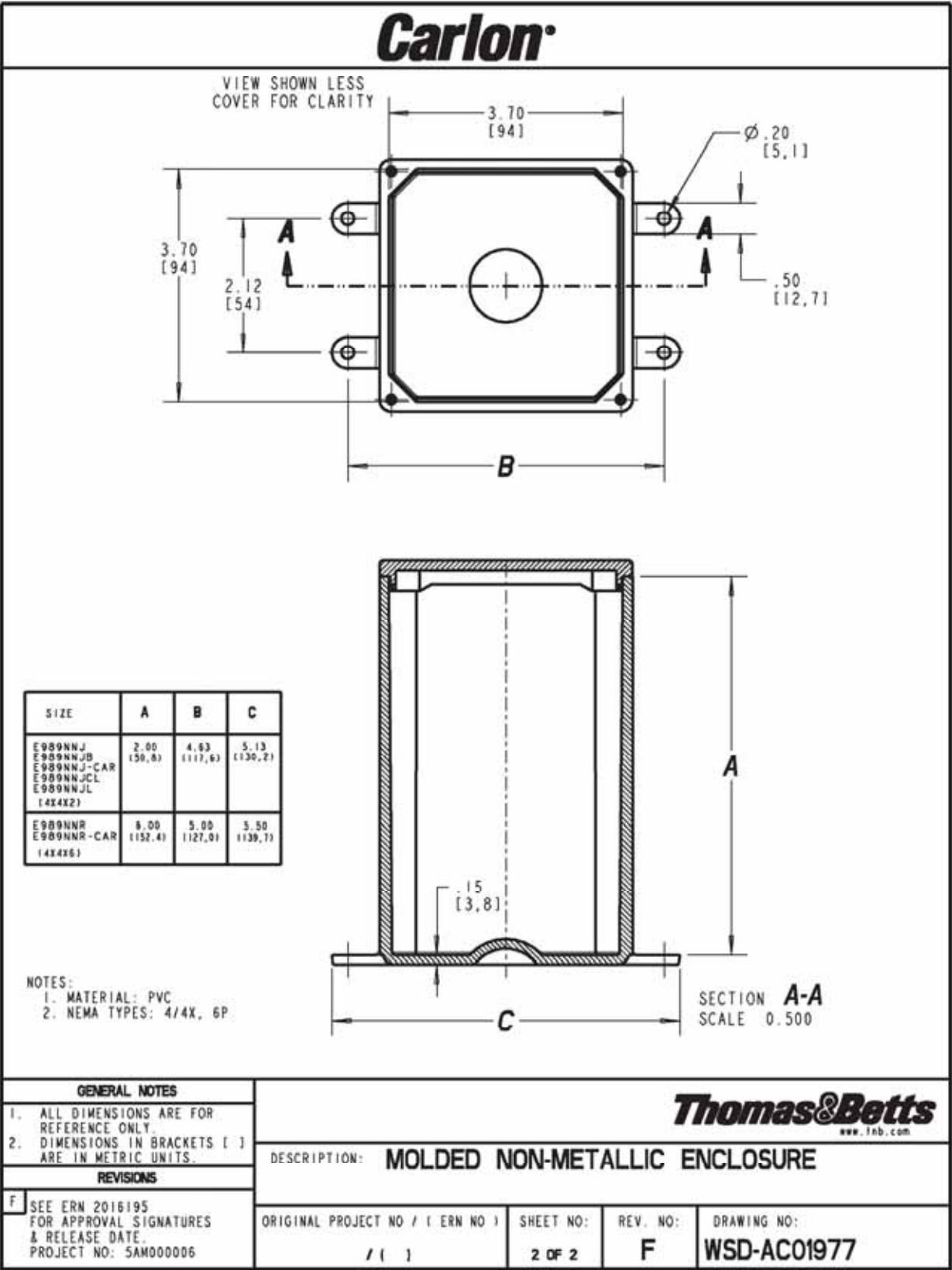
It's another first from Carlon® - the first nonmetallic junction boxes UL Listed with a NEMA 6P rating per Section 314.29, Exception of the National Electrical Code. Manufactured from PVC or PPO thermoplastic molding compound and featuring foam-in-place gasketed lids attached with stainless steel screws, 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



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“Stay Connected” with **HEYCO®** Solar Power Components
a PennEngineering® Company

Heyco®-Tite Liquid Tight Cordgrips for Enphase Q Cables

Straight-Thru, NPT Hubs with Integral Sealing Ring

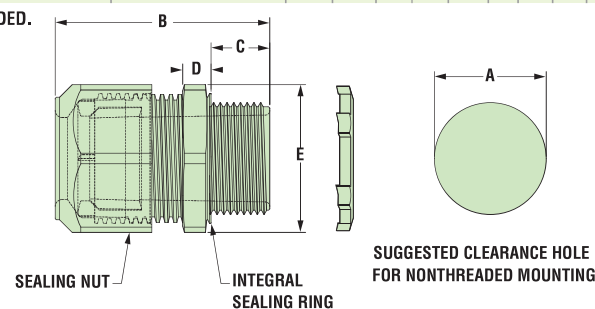
The Ultimate in Liquid Tight Strain Relief Protection

ALL NEW
PRODUCT!



GLAND CONFIGURATION			PART NO.	DESCRIPTION	UL/CSA or cULus	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

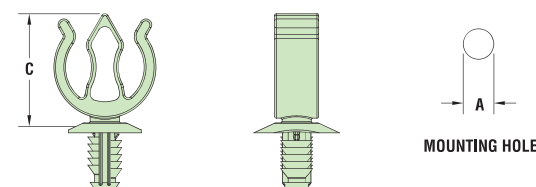
- Two new cordgrips now accommodate the Enphase Q Cable – M3231GCZ (1/2" NPT) and M3234GDA-SM (3/4" NPT).
- The 1/2" version provides liquid tight entry for one Enphase Q Cable – .24 x .38" (6,1 x 9,7 mm).
- The 3/4" version provides liquid tight entry for up to two Enphase Q Cables – .24 x .38" (6,1 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.



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.



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

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.



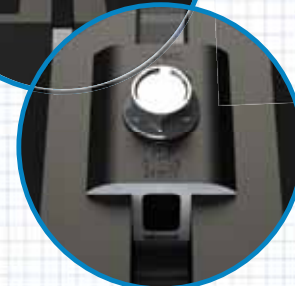
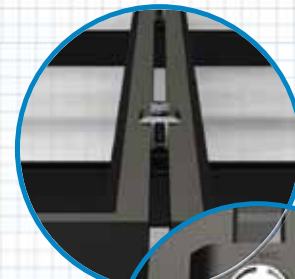
NXT UMOUNT™ COMBO CLAMP

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.



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!

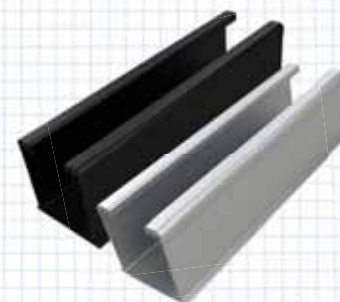
BUTYL™ ATTACHMENT KIT

DARK: SBUTYLD1
MILL: SBUTYLM1

NXT UMOUNT™ RAIL

DARK: 168RLD1
MILL: 168RLM1

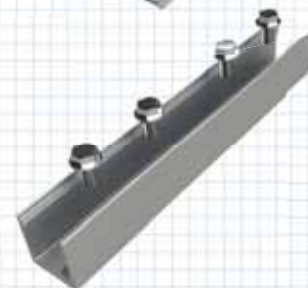
Strong, lightweight open channel rail with invisible, easy, unfailing and integrated wire management system.



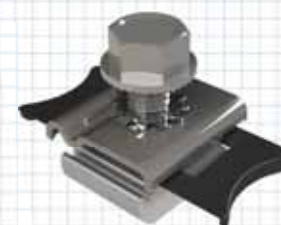
NXT UMOUNT™ RAIL SPLICE

RLSPLCM1

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



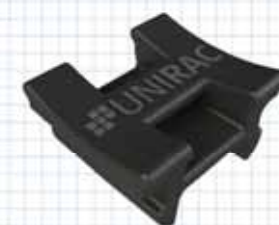
WIRE MANAGEMENT OPTIONS



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

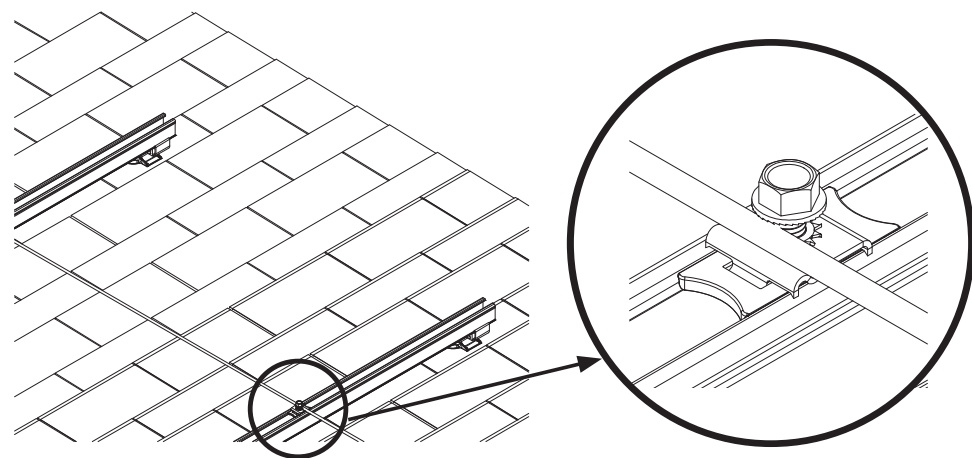
WRMCNSD1

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.

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

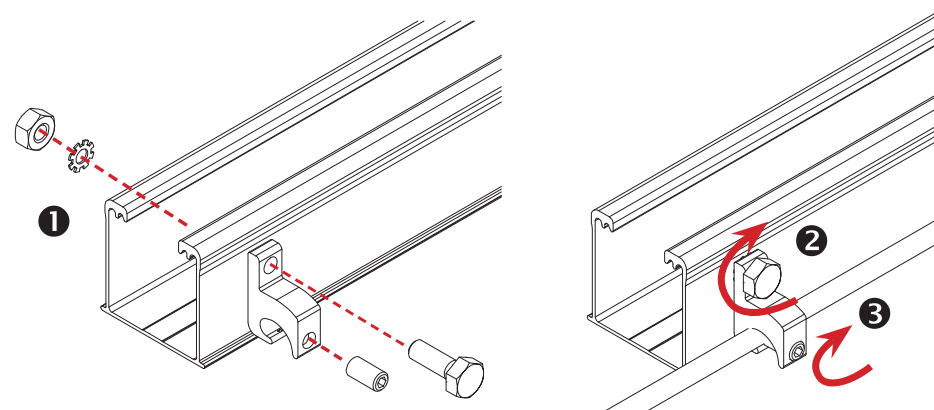
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SYSTEM GROUNDING: Rails can be bonded using an NXT UMount MLPE & Lug Clamp, GROUND WEEBLUG #1 or ILSCO LAY IN LUG (GBL4DBT). At least one rail per row of modules in an array must be bonded to electrical ground. Each additional row of modules must be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



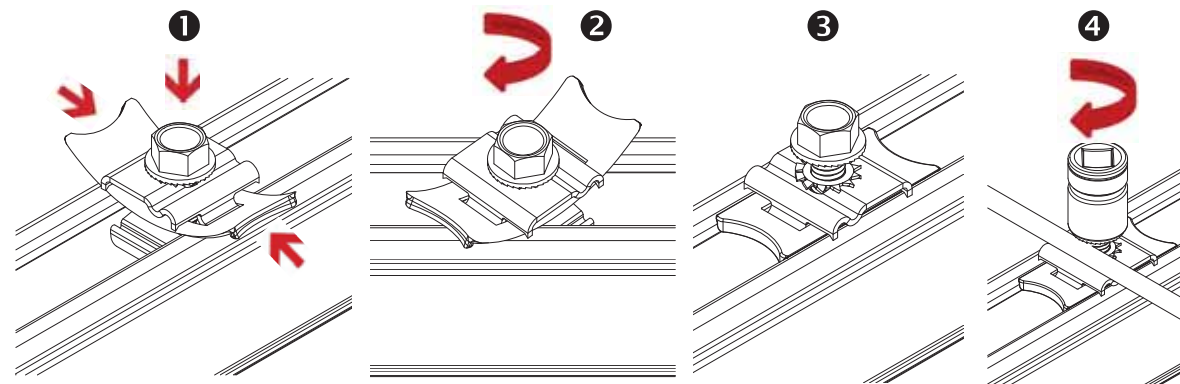
ALTERNATE SYSTEM GROUNDING WITH ILSCO LAY-IN LUG - UNIRAC P/N 008009P: Alternate Grounding Lug. Drill hole in rail 7/32" in diameter, deburr hole and bolt through one wall of rail.

BOLT TORQUE VALUE: 5 ft lbs.

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



Ensure Copper does contact Aluminum to avoid corrosion.

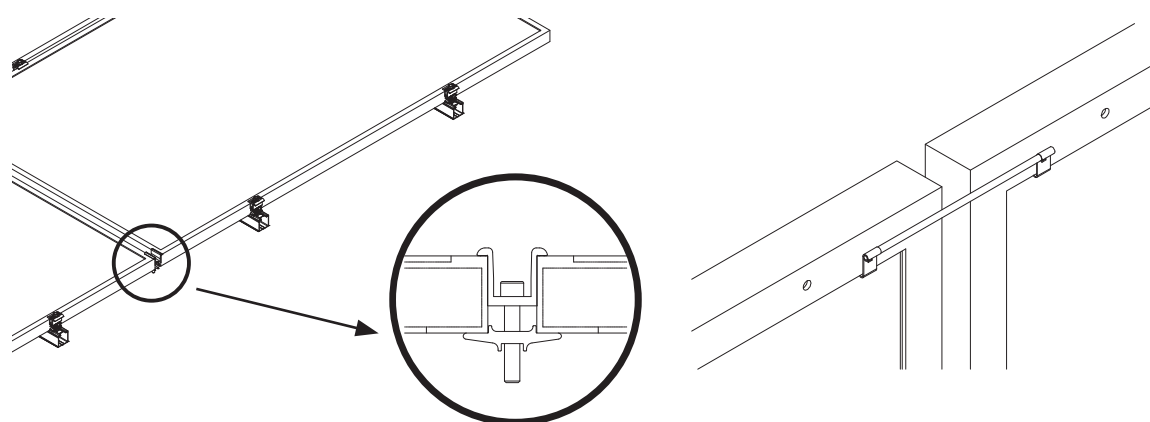


SYSTEM GROUNDING WITH MLPE & LUG CLAMP: Insert the rail nut profile in the opening by lifting the flaps of the plastic clip. Rotate the clamp 90 deg and release the flaps to get flush with rail. Ensure that the rail nut is engaged in the rail profile. Align the ground wire in the depression of the washer.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

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



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.

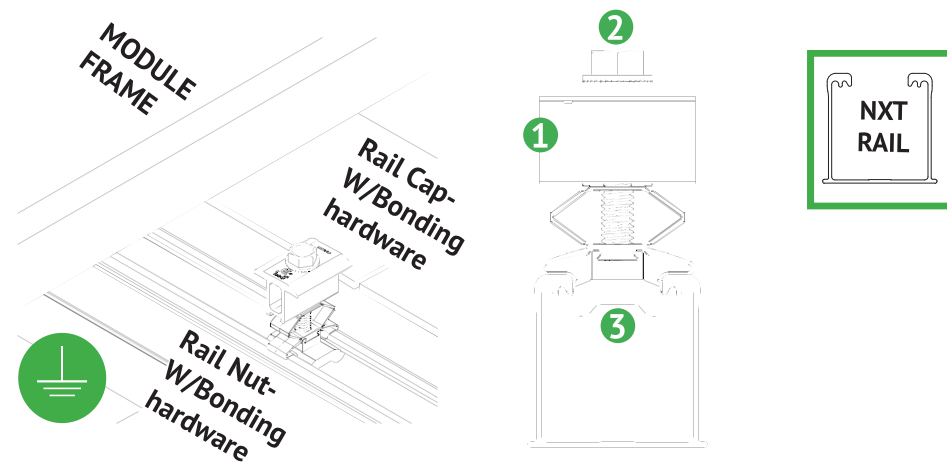
ALTERNATE ROW GROUNDING WITH N/S BONDING CLIP: Fully seat bonding clip on each module flange to provide bond across N/S module gap.

DRAWING TITLE:

SPEC SHEET

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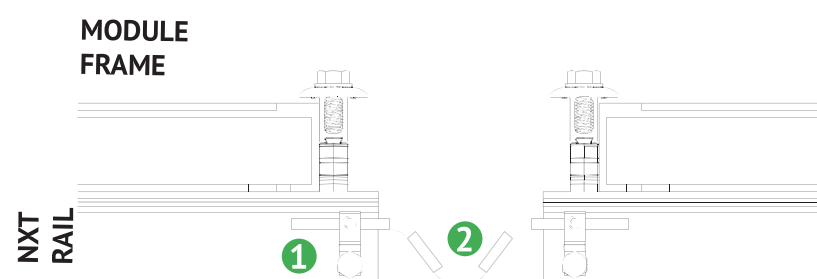
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BONDING COMBO MID-END CLAMP ASSEMBLY

- 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.

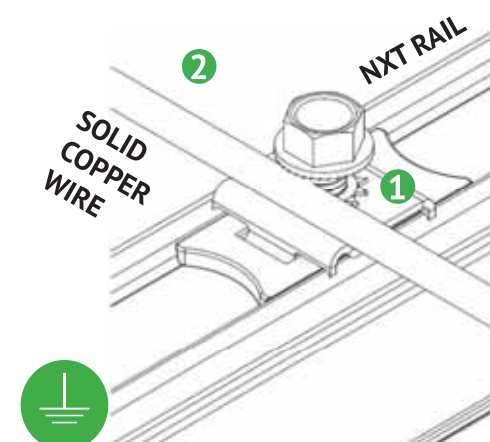


BONDING RAIL SPLICE

- 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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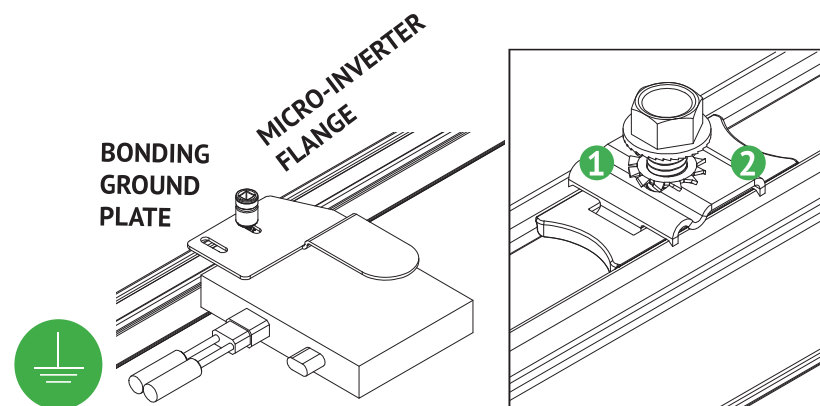
UMOUNT™

BONDING CONNECTIONS & GROUNDING PATHS

INSTALLATION GUIDE

23

PAGE



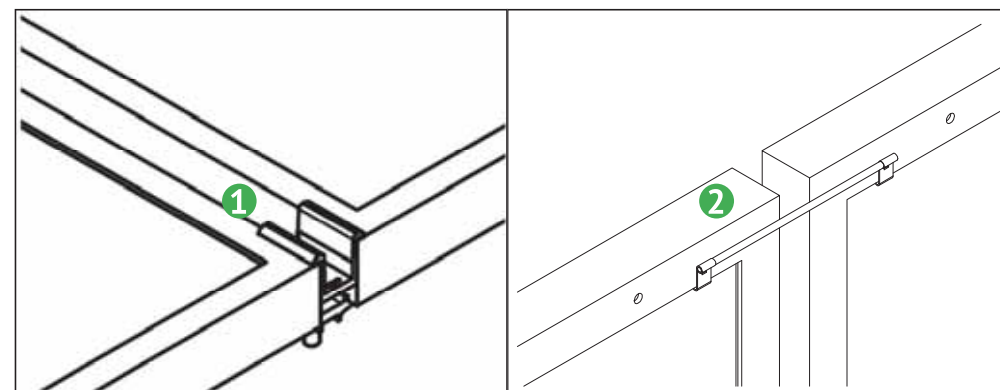
BONDING MICROINVERTER MOUNT

- 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

DRAWING TITLE:

SPEC SHEET

DRAWING NUMBER:

SS



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BONDING CONNECTIONS & GROUNDING PATHS

INSTALLATION GUIDE

24

PAGE

RACKING SYSTEM GROUND

Note: Only one lug per module row required

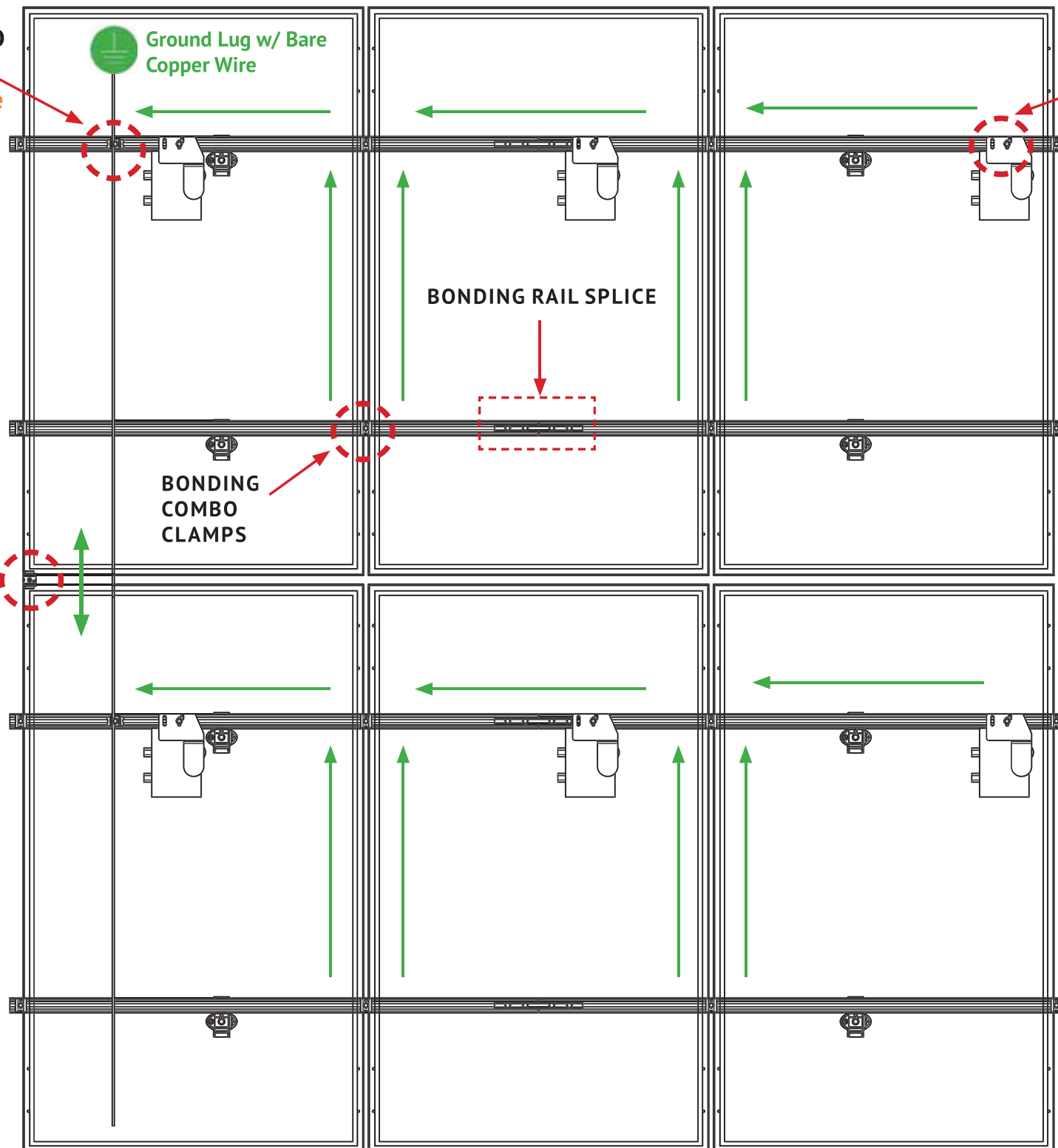
Ground Lug w/ Bare Copper Wire

BONDING MICROINVERTER MOUNTS

BONDING RAIL SPLICE

BONDING COMBO CLAMPS

ALTERNATE ROW-TO-ROW BONDING METHOD



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DRAWING NUMBER:

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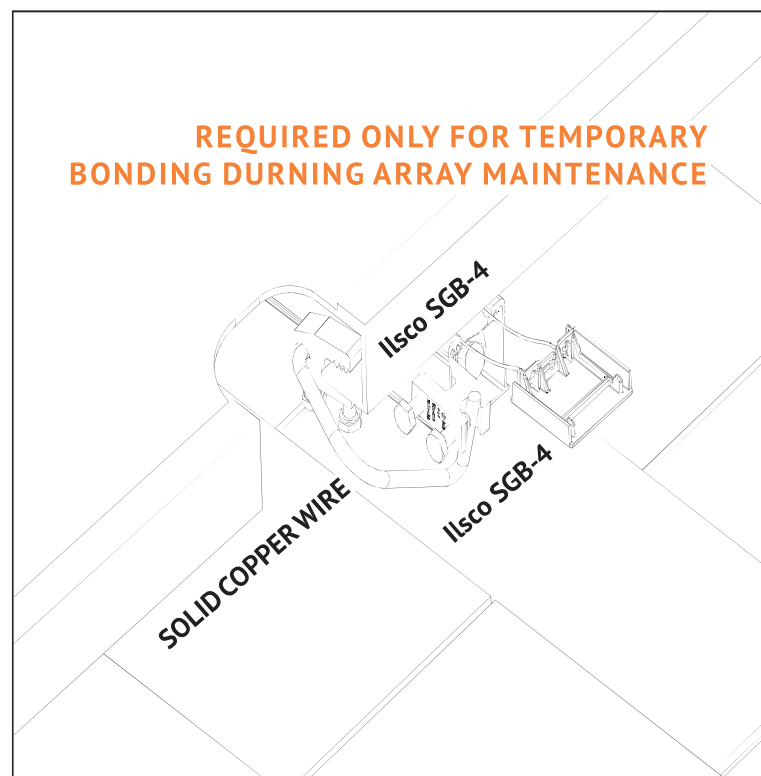
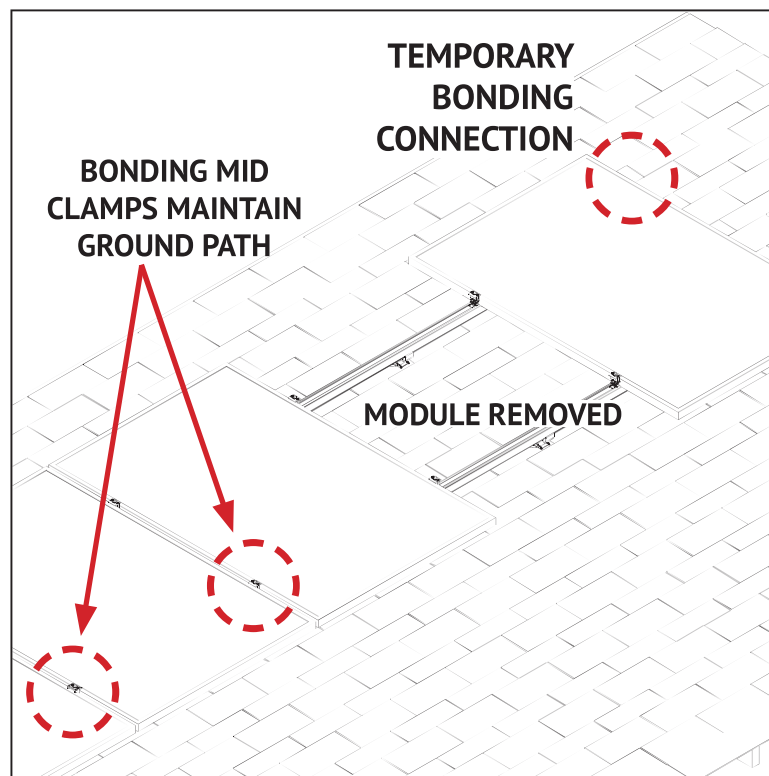
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BONDING CONNECTIONS & GROUNDING PATHS

25

INSTALLATION GUIDE | PAGE



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.

DRAWING TITLE:

SPEC SHEET

DRAWING NUMBER:

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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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SPEC SHEET

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SPEC SHEET

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SS

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	
Aionrise	AION60G1,AION72G1	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	Hansol	TD-AN3, TD-AN4 UB-AN1, UD-AN1	
Aleo	P-Series & S-Series		Centrosolar America	C-Series & E-Series	Hanwha SolarOne	HSL 60
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		CertainTeed	CT2xxMxx-01, CT2xxPxx-01, CTxxxMxx-01 CTxxxPxx-01, CTxxxMxx-02, CTxxxMxx-03 CTxxxMxx-04, CTxxxHC11-04	Heliene	36M, 36P 60M, 60P, 72M & 72P Series 144HC M6 144HC M10 SL Bifacial
	Astronergy		Eco Solargy	Orion 1000 & Apollo 1000	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
			ET Solar	ET AC Module, ET Module ET-M772BH520-550WW/WB		
Auxin	AXN6M610T AXN6P610T AXN6M612T AXN6P612T	First Solar	FS-6XXX(A) FS-6XXX(A)-P, FS-6XXX(A)-P-I	Hyperion Solar	HY-DH108P8(B), HY-DH108N8B HY-DH144P8	
	Axitec	Flextronics	FXS-xxxBB	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)	
		Freedom Forever	FF-MP-BBB-xxx, FF-MP1-BBB-xxx			
Boviet	BVM6610, BVM6612	FreeVolt	PVGraf	ITEK	iT-SE Series	
BYD	P6K & MHK-36 Series	GCL	GCL-P6 & GCL-M6 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.**



SPEC SHEET

DRAWING NUMBER:

SS

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
	Kyocera	KD-F & KU Series	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
LA Solar	LSxxxHC(166) LSxxxBL LSxxxHC	Prism Solar		P72 Series, P72X-xxx	

- 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.**

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
				Solartech	STU HJT, STU PERC & Quantum PERC
Q.Cells (Cont.)	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	SolarWorld	Sunmodule Protect, Sunmodule Plus/Pro
		Risen	RSM Series, RSM110-8-xxxBMDG	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
		S-Energy	SN72 & SN60 Series	Sun Edison	F-Series, R-Series
		SEG Solar	SEG-xxx-BMD-HV SEG-xxx-BMD-TB	Suniva	MV Series & Optimus Series (35mm)
		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	Sunmac Solar	M754SH-BB Series
		Sharp	NU-SA & NU-SC Series	SunPower	AC, X-Series, E-Series & P-Series SPR E20 435 COM (G4 Frame) Axxx-BLK-G-AC, SPR-Mxxx-H-AC
		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)	SunTech	STP, STPXXXS - B60/Wnhb
		Solar4America	S4Axxx-108MH10BB, S4Axxx-72MH5BB	Talesun	TP572, TP596, TP654, TP660 TP672, Hipor M, Smart TD6172M
		SolarEver USA	SE-166*83-xxxM-120N SE-182*91-xxxM-108N	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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SPEC SHEET

DRAWING NUMBER:

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30
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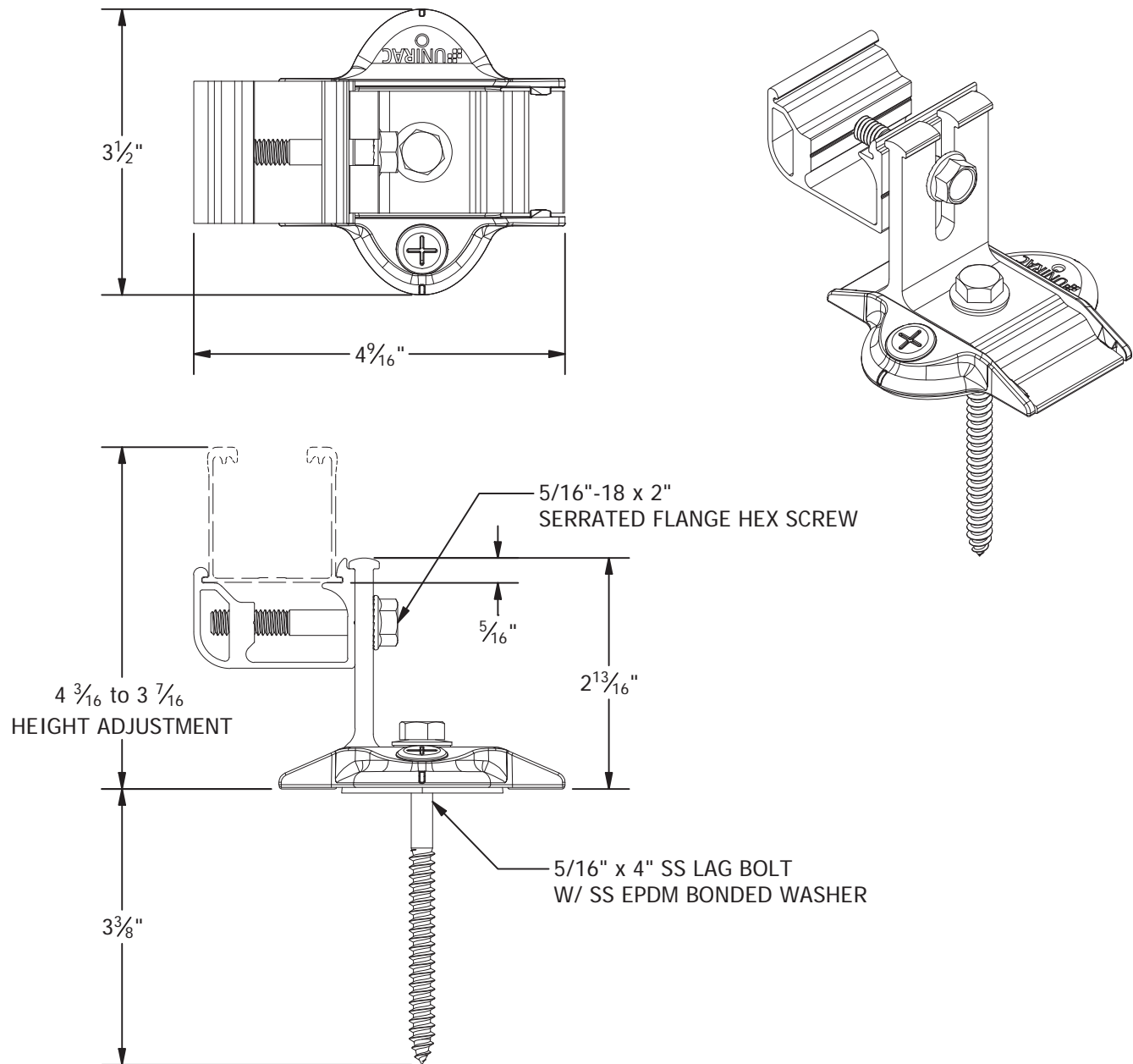
Manufacture	Module Model / Series
TSMC	TS-150C2 CIGSw
Universal Solar	UNI4xx-144BMH-DG UNI5xx-144BMH-DG UNIxxx-108M-BB UNIxxx-120M-BB UNIxxx-120MH
Upsolar	UP-MxxxP, UP-MxxxM(-B)
URECO	D7Kxxx(H7A/H8A), D7Mxxx(H7A/H8A) FAKxxx(C8G/E8G), FAMxxxE7G-BB FAMxxxE8G(-BB), FBKxxxM8G F6MxxxE7G-BB FBMxxxMFG-BB
Vikram	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

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

- 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"
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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

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DRAWING NUMBER:

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