



RESIDENTIAL ROOFTOP SOLAR PERMIT PACKAGE

Barry Norfleet  
605 Serenity Walk Parkway  
Fuquay-Varina, North Carolina 27526  
13474237609



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



CEC-AC SYSTEM SIZE: 6.352 kW AC

TYPICAL STRUCTURAL INFORMATION

ROOF MATERIAL: Comp Shingle  
SHEATHING: OSB  
FRAMING: Manufactured Truss  
RACKING: PEGASUS RAIL  
ROOF ATTACHMENT: PEGASUS INSTAFLASH 2  
TOTAL ATTACHMENTS: 38

NEW PV SYSTEM INFORMATION

DC SYSTEM SIZE: 6.9 kW DC  
AC SYSTEM SIZE: 5.7 kW AC  
MODULE TYPE: (15) REC Solar REC460AA Pure-RX  
INVERTER TYPE: (15) Enphase IQ8X-80-M-US



2/5/2025  
Firm No. : D-0449

TOTAL PV DC SYSTEM SIZE  
6.900 kW DC

TOTAL PV AC SYSTEM SIZE  
5.700 kW AC

DESIGN CRITERIA

WIND SPEED: 115  
WIND EXPOSURE FACTOR: C  
RISK CATEGORY: II  
GROUND SNOW LOAD: 15  
ROOF SNOW LOAD: 10.5  
SEISMIC DESIGN CATEGORY: B

WEATHER STATION DATA

WEATHER STATION: SEYMOUR-JOHNSON AFB  
HIGH TEMP 2% AVG: 35°C  
EXTREME MINIMUM TEMP: -10°C

APPLICABLE CODES

\*2017 NATIONAL ELECTRIC CODE (NEC)  
\*2018 NORTH CAROLINA BUILDING CODE (NCBC)  
\*2018 NORTH CAROLINA RESIDENTIAL CODE (NCRS), PLUMBING CODE (NCPCL), AND ALL STATE AND LOCAL BUILDING, ELECTRICAL, AND PLUMBING CODES

GENERAL NOTES

AHJ Digitally signed by John A. Calvert  
Harnett County NC Date: 2025.02.05  
UTILITY COMPANY Duke Energy Progress

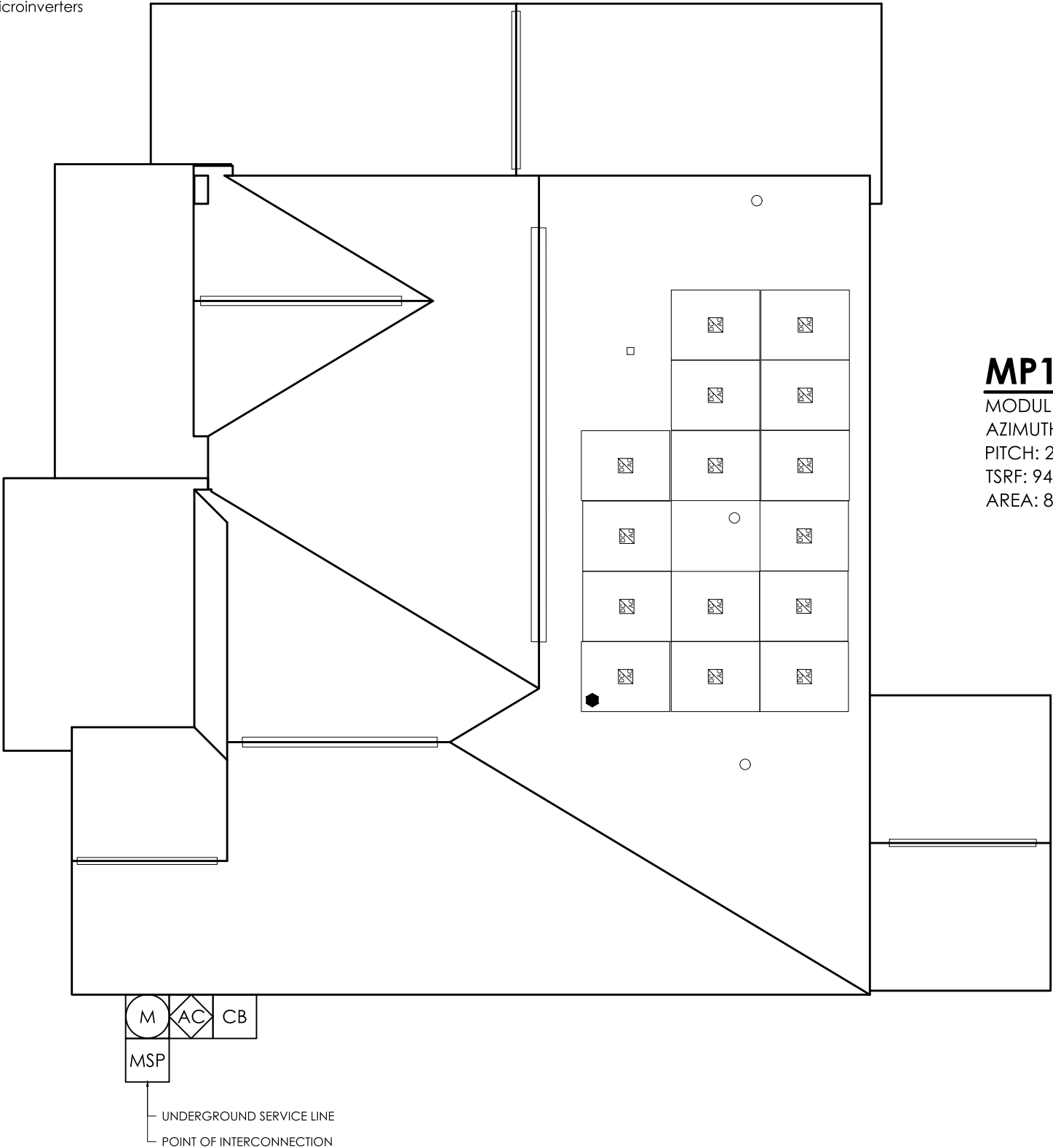
CUSTOMER NAME: Barry Norfleet  
605 Serenity Walk Parkway  
Fuquay-Varina, North Carolina 27526  
AHJ: Harnett County NC  
UTILITY COMPANY: Duke Energy Progress

PROJECT ID: 1286515  
PV DC SYSTEM SIZE: 6.900 kW DC  
PV AC SYSTEM SIZE: 5.700 kW AC  
REVISIONS:  
DRAWN BY: Diego Guerra  
PLOT DATE: January 31, 2025  
DRAWING TITLE: Cover Sheet  
DRAWING NUMBER: PV1



DC SYSTEM SIZE: 6.9 KW DCMODULE: REC 460INVERTER(S): Enphase IQ8X Microinverters

FRONT OF HOME



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



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

CUSTOMER NAME:  
**Barry Norfleet**

605 Serenity Walk Parkway  
Fuquay-Varina, North Carolina 27526

AHJ:  
Harnett County NC

UTILITY COMPANY:  
Duke Energy Progress

PROJECT ID:

1286515

PV DC SYSTEM SIZE:

6.900 kW DC

PV AC SYSTEM SIZE:

5.700 kW AC

REVISIONS:

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

DRAWN BY:

Diego Guerra

PLOT DATE:

January 31, 2025

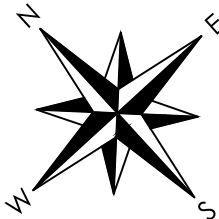
DRAWING TITLE:

Roof Plan

DRAWING NUMBER:

PV3

COMPASS



PV SYSTEM SPECIFICATIONS

NEW PV SYSTEM INFORMATION

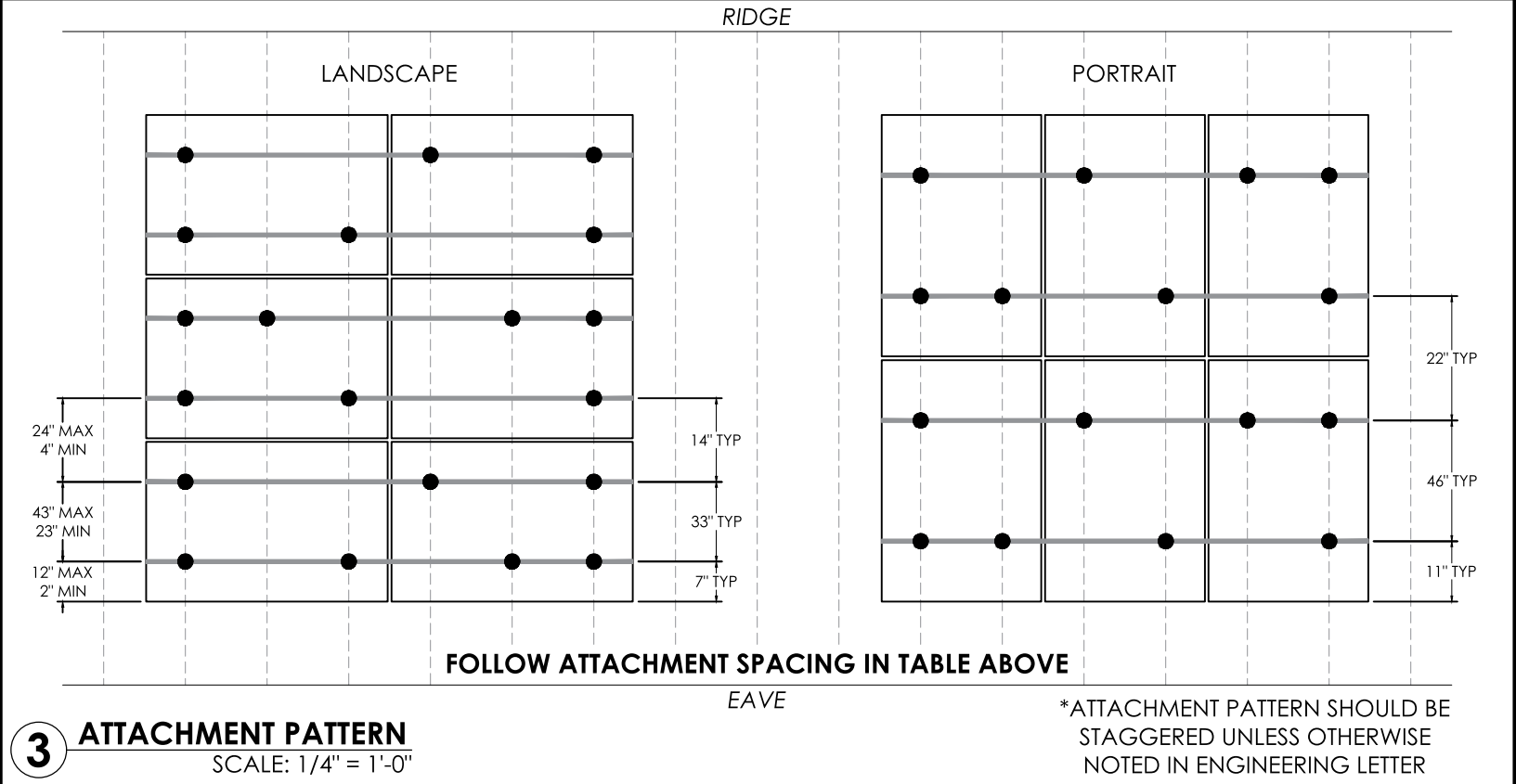
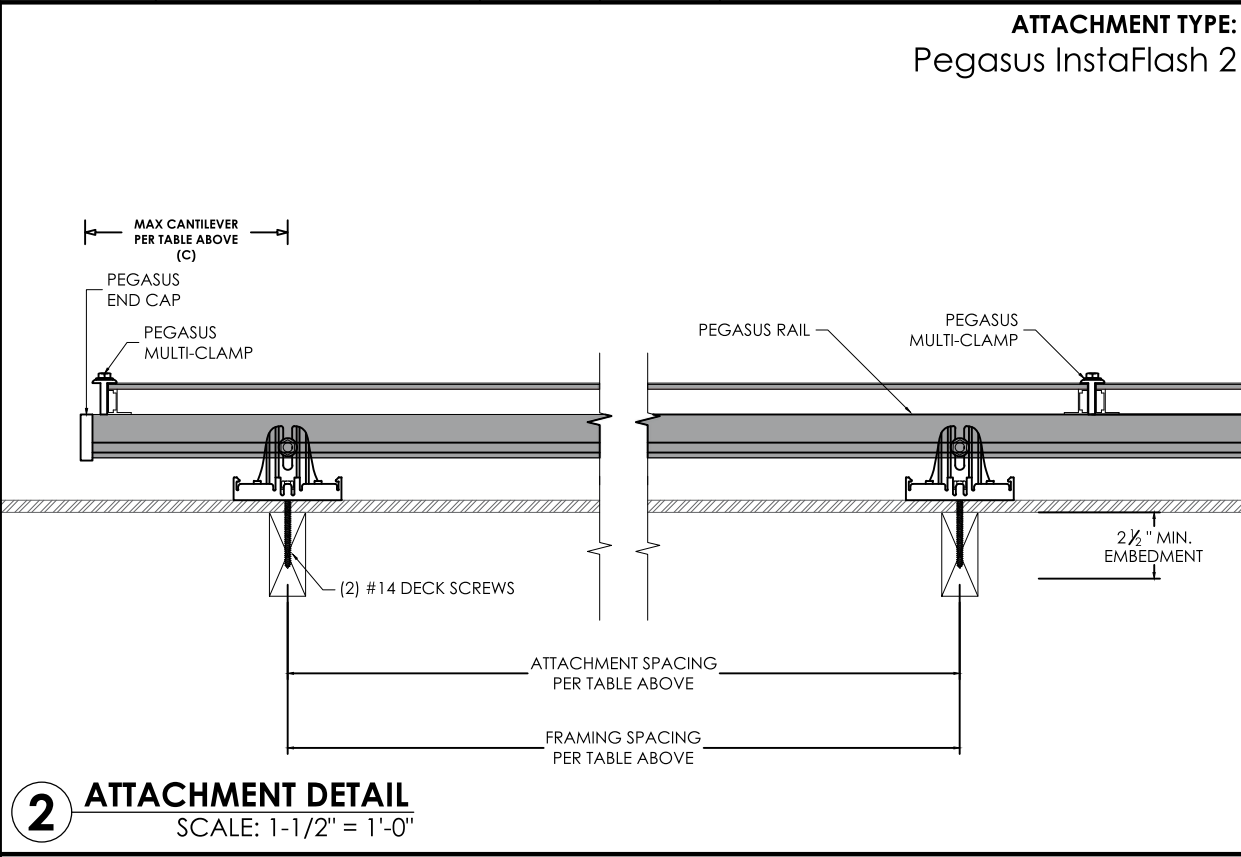
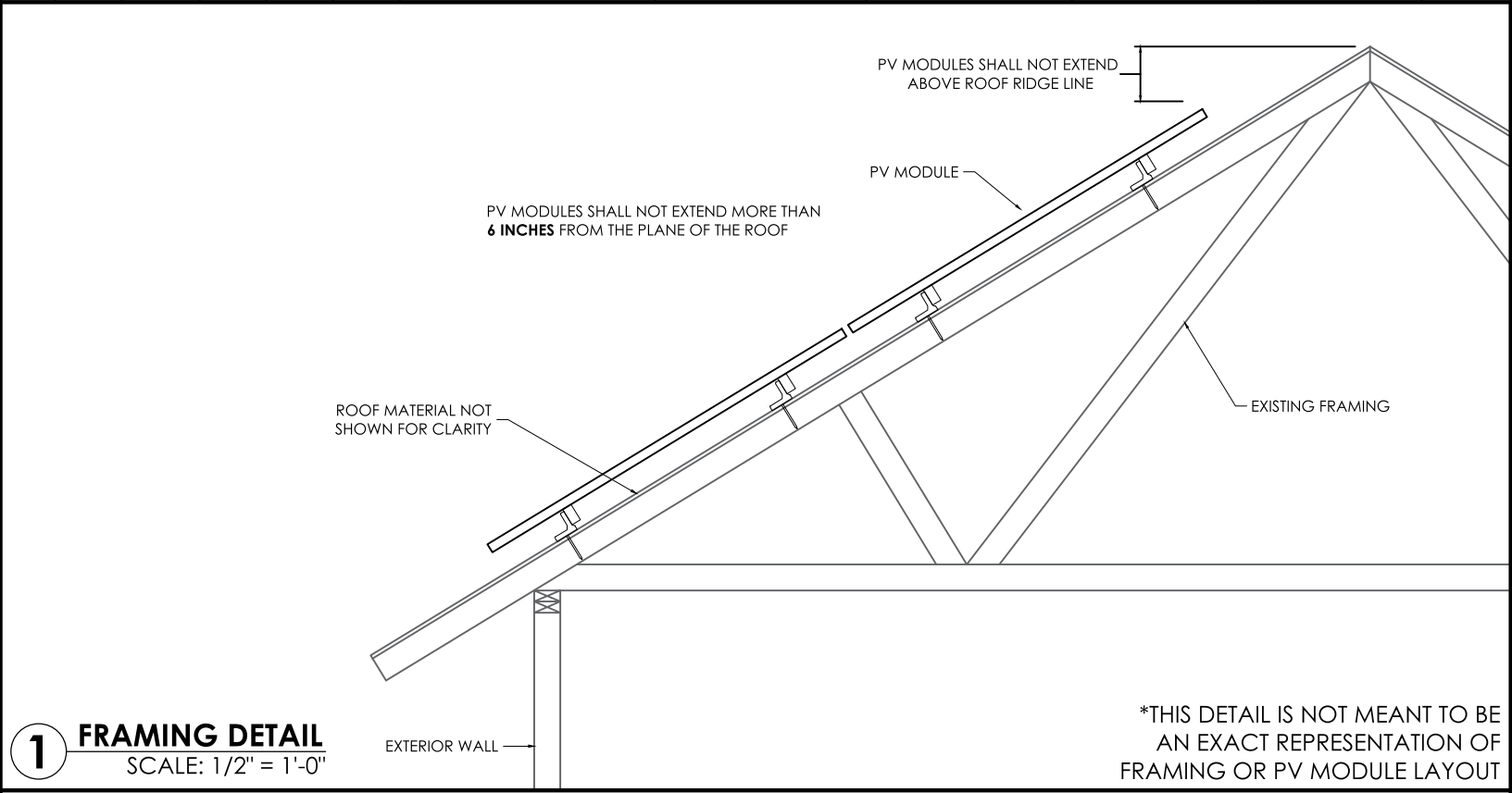
**PV MODULE:** (15) REC Solar REC460AA Pure-RX, **POWER RATING:** 460 W  
**INVERTER:** (15) Enphase IQ8X-80-M-US, **POWER RATING:** 380 W



|      | 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) | PRIMARY PV ARRAY AREA (ft²) |                               | 336.24 | PRIMARY ROOF AREA (ft²) |                           | 3304.93 | PRIMARY ROOF COVERAGE (%) |                             | 10.17 |      |
|------|-------------|---------------|-------------|----------|------------|---------------|----------------|--------------------|--------------------------|-----------------------------------------|--------------|----------------------|--------------------------------|------------------------|-----------------------------|-------------------------------|--------|-------------------------|---------------------------|---------|---------------------------|-----------------------------|-------|------|
| MP1  | 15          | 132           | 27          | 94       | 890        | Comp Shingle  | OSB            | Manufactured Truss | 2x6 @ 24 in OC           | 2x6 @ 24 in OC                          | PEGASUS RAIL | PEGASUS INSTAFLASH 2 | 72"L / 48"P                    | 24"L / 16"P            | * IF APPLICABLE             | SECONDARY PV ARRAY AREA (ft²) |        |                         | SECONDARY ROOF AREA (ft²) |         |                           | SECONDARY ROOF COVERAGE (%) |       |      |
| MP2  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | SECONDARY PV ARRAY AREA (ft²) |        |                         | SECONDARY ROOF AREA (ft²) |         |                           | SECONDARY ROOF COVERAGE (%) |       |      |
| MP3  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | SECONDARY PV ARRAY AREA (ft²) |        |                         | SECONDARY ROOF AREA (ft²) |         |                           | SECONDARY ROOF COVERAGE (%) |       |      |
| MP4  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | SECONDARY PV ARRAY AREA (ft²) |        |                         | SECONDARY ROOF AREA (ft²) |         |                           | SECONDARY ROOF COVERAGE (%) |       |      |
| MP5  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
| MP6  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
| MP7  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
| MP8  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
| MP9  | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
| MP10 | 0           |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
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|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.7 |
|      |             |               |             |          |            |               |                |                    |                          |                                         |              |                      |                                |                        |                             | TOTAL PV ARRAY WEIGHT (lbs)   |        | 750                     | TOTAL PV ATTACHMENTS      |         | 38                        | POINT LOAD (lbs/att.)       |       | 19.  |



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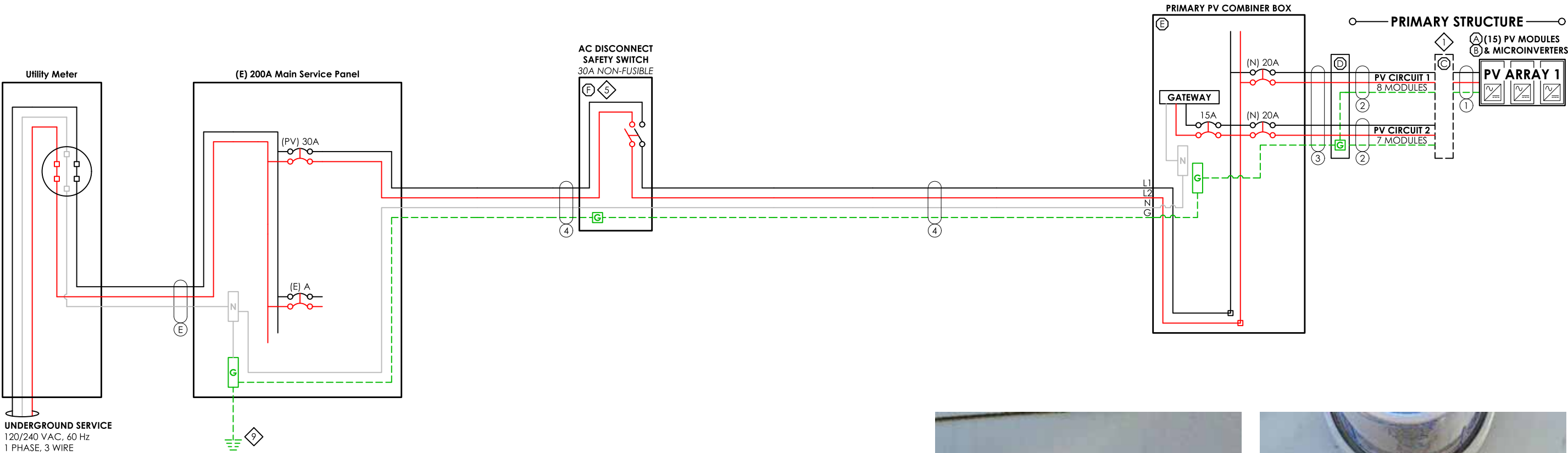
NOTES

Sealed For Existing Roof & Attachment Only

2/5/2025  
Firm No. : D-0449

|                    |                                                                                                                                 |  |  |   |  |   |  |   |  |   |  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------|--|--|---|--|---|--|---|--|---|--|
| CUSTOMER NAME:     | Barry Norfleet                                                                                                                  |  |  |   |  |   |  |   |  |   |  |
|                    | 605 Serenity Walk Parkway<br>Fuquay-Varina, North Carolina 27526                                                                |  |  |   |  |   |  |   |  |   |  |
| AHJ:               | Harnett County NC                                                                                                               |  |  |   |  |   |  |   |  |   |  |
| UTILITY COMPANY:   | Duke Energy Progress                                                                                                            |  |  |   |  |   |  |   |  |   |  |
| PROJECT ID:        | 1286515                                                                                                                         |  |  |   |  |   |  |   |  |   |  |
| PV DC SYSTEM SIZE: | 6.900 kW DC                                                                                                                     |  |  |   |  |   |  |   |  |   |  |
| PV AC SYSTEM SIZE: | 5.700 kW AC                                                                                                                     |  |  |   |  |   |  |   |  |   |  |
| REVISIONS:         | <table><tr><td>A</td><td></td></tr><tr><td>B</td><td></td></tr><tr><td>C</td><td></td></tr><tr><td>D</td><td></td></tr></table> |  |  | A |  | B |  | C |  | D |  |
| A                  |                                                                                                                                 |  |  |   |  |   |  |   |  |   |  |
| B                  |                                                                                                                                 |  |  |   |  |   |  |   |  |   |  |
| C                  |                                                                                                                                 |  |  |   |  |   |  |   |  |   |  |
| D                  |                                                                                                                                 |  |  |   |  |   |  |   |  |   |  |
| DRAWN BY:          | Diego Guerra                                                                                                                    |  |  |   |  |   |  |   |  |   |  |
| PLOT DATE:         | January 31, 2025                                                                                                                |  |  |   |  |   |  |   |  |   |  |
| DRAWING TITLE:     | Structural                                                                                                                      |  |  |   |  |   |  |   |  |   |  |
| DRAWING NUMBER:    | PV4                                                                                                                             |  |  |   |  |   |  |   |  |   |  |

|   |                                                                                                                                                                                                                                    |               |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 4 | L1 (1) 10 AWG THHN/THWN-2 CU BLACK<br>L2 (1) 10 AWG THHN/THWN-2 CU RED<br>N (1) 10 AWG THHN/THWN-2 CU WHITE<br>G (1) 10 AWG THHN/THWN-2 CU GREEN<br>3/4 INCH EMT                                                                   | Exterior      |
| 3 | L1 (2) 10 AWG THHN/THWN-2 CU BLACK<br>L2 (2) 10 AWG THHN/THWN-2 CU RED<br>G (1) 10 AWG THHN/THWN-2 CU GREEN<br>*TYPE UF CABLE MAY BE SUBSTITUTED FOR USE IN CONDUIT WHERE ELECTRICAL CODE PERMITS                                  | 3/4 INCH EMT* |
| 2 | L1 (1) 10 AWG THHN/THWN-2 CU BLACK<br>L2 (1) 10 AWG THHN/THWN-2 CU RED<br>G (1) 10 AWG THHN/THWN-2 CU GREEN<br>*TYPE NM (ROMEX) OR UF CABLE IS PERMITTED FOR INTERIOR OR ATTIC RUNS AND SHALL BE USED WHEN ELECTRICAL CODE PERMITS | 3/4 INCH *    |
| 1 | L1 (1) 12 AWG THHN/THWN-2 CU BLACK<br>L2 (1) 12 AWG THHN/THWN-2 CU RED<br>G (1) 6 AWG BARE, CU<br>ENPHASE Q-CABLE, 2-WIRE, FREE AIR                                                                                                | Exterior      |



UTILITY METER  
120/240 VAC, 60 Hz  
1 PHASE, 3 WIRE

INTERCONNECTION NOTES

Utility Meter Number: 338445941  
Supply Side Breaker in Exterior MSP

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 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.
- GROUNDING ELECTRODE SYSTEM SHALL BE IN ACCORDANCE WITH NEC 250.53.

EQUIPMENT DESCRIPTIONS

- A
- B
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P
- Q
- R
- S
- T
- A) PV MODULE:** REC Solar REC460AA Pure-RX, 460 W DC, UL 1703 / UL 61730 COMPLIANT  
**B) MICROINVERTER:** ENPHASE IQ8X-80-M-US, 380 W AC (0.380 kW), 1 PHASE, UL 1741 COMPLIANT  
**C) ROOFTOP JUNCTION BOX:** EZ SOLAR JB-1.2 JUNCTION BOX  
**D) JUNCTION BOX:** PVC 4 X 4 JUNCTION BOX  
**E) PV COMBINER BOX:** ENPHASE COMBINER 5 (X-IQ-AM1-240-5)  
**F) SQUARE-D SAFETY SWITCH** 30A, 2P, 240VAC, NON-FUSIBLE (DU221RB)



OTHER NOTES

15 MICROINVERTERS X 380 W AC = 5.7 KW AC;PANEL WATTAGE = 460 W DC



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**Barry Norfleet**  
605 Serenity Walk Parkway  
Fuquay-Varina, North Carolina 27526

AHJ: Harnett County NC  
UTILITY COMPANY: Duke Energy Progress

CUSTOMER NAME:

PROJECT ID:

1286515

PV DC SYSTEM SIZE:

6.900 kW DC

PV AC SYSTEM SIZE:

5.700 kW AC

REVISIONS:

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

DRAWN BY:

Diego Guerra

PLOT DATE:

January 31, 2025

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                  | 5.7kW AC                   |
| DC SYSTEM SIZE                  | 6.9kW DC                   |
| PV MODULES                      |                            |
| QUANTITY                        | 15                         |
| TYPE                            | REC Solar REC460AA Pure-RX |
| WATTAGE                         | 460W DC                    |
| INVERTERS                       |                            |
| TYPE                            | Enphase IQ8X-80-M-US       |
| OUTPUT CURRENT                  | 1.58A AC                   |
| NOMINAL VOLTAGE                 | 240V AC                    |
| OUTPUT POWER                    | 380W AC                    |

| PV BREAKER BACKFEED CALCULATIONS                                                                                                                                              |                    |            |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|------------|
| "120% RULE"                                                                                                                                                                   |                    |            |            |
| (BUSBAR RATING * 120%) - OCPD RATING = AVAILABLE BACKFEED                                                                                                                     |                    |            |            |
|                                                                                                                                                                               | MAIN SERVICE PANEL | SUBPANEL 1 | SUBPANEL 2 |
| BUSBAR RATING                                                                                                                                                                 | 200A               | A          | A          |
| PANEL OCPD RATING                                                                                                                                                             | NoneA              | A          | A          |
| AVAILABLE BACKFEED (120% RULE)                                                                                                                                                | ##A                | ##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* |                    |            |            |

| DESIGN LOCATION AND TEMPERATURES |                             |
|----------------------------------|-----------------------------|
| DATA SOURCE                      | ASHRAE Weather Station Data |
| STATE                            | North Carolina              |
| CITY                             | Fuquay-Varina               |
| WEATHER STATION                  | SEYMOUR-JOHNSON AFB         |
| HIGH TEMP 2% AVG                 | 35°C                        |
| EXTREME MINIMUM TEMP             | -10°C                       |

| WIRE SIZE SPECIFICATIONS              |             |             |             |             |      |      |      |      |      |      |
|---------------------------------------|-------------|-------------|-------------|-------------|------|------|------|------|------|------|
|                                       | ①           | ②           | ③           | ④           | ⑤    | ⑥    | ⑦    | ⑧    | ⑨    | ⑩    |
| MINIMUM CONDUCTOR AMPACITY            | 15.8A AC    | 15.8A AC    | 15.8A AC    | 29.63A 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      | 10 AWG      |      |      |      |      |      |      |
| CONDUCTOR AMPACITY                    | 30A         | 40A         | 40A         | 40A         | 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      | 38.4A       | A    | A    | A    | A    | A    | A    |
| WIRE RUN DISTANCE (FT)                | 52          | 50          | 20          | 5           |      |      |      |      |      |      |
| CALCULATED VOLTAGE DROP               | 0.62%       | 0.65%       | 0.26%       | 0.12%       | 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                 | 7         | 0         | 0         | 0         | 0         | 0         | 0         | 0                  | 0         | 0         | 0         | 0         |
| RATED AC OUTPUT CURRENT (I <sub>out</sub> )    | 12.6A             | 11.1A     | 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 <sub>out</sub> x 125%)     | 15.8A             | 13.8A     | 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 <sub>out</sub> ) | 23.7A             |           |           |           |           |           |           |           | 0.0A               |           |           |           |           |
| MINIMUM AMPACITY (C <sub>out</sub> x 125%)     | 29.6A             |           |           |           |           |           |           |           | 0.0A               |           |           |           |           |
| COMBINED PV BREAKER RATING                     | 30AA              |           |           |           |           |           |           |           | 0AA                |           |           |           |           |

| TOTAL PV VOLTAGE DROP |              |
|-----------------------|--------------|
|                       | VOLTAGE DROP |
| WIRE TAG #1           | 0.62%        |
| WIRE TAG #2           | 0.65%        |
| WIRE TAG #3           | 0.26%        |
| WIRE TAG #4           | 0.12%        |
| WIRE TAG #5           | 0%           |
| WIRE TAG #6           | 0%           |
| TOTAL                 | 1.650000%    |



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Harnett County NC

Duke Energy Progress

CUSTOMER NAME:

AHJ:

UTILITY COMPANY:

PROJECT ID:

1286515

PV DC SYSTEM SIZE:

6.900 kW DC

PV AC SYSTEM SIZE:

5.700 kW AC

REVISIONS:

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

DRAWN BY:

Diego Guerra

PLOT DATE:

January 31, 2025

DRAWING TITLE:

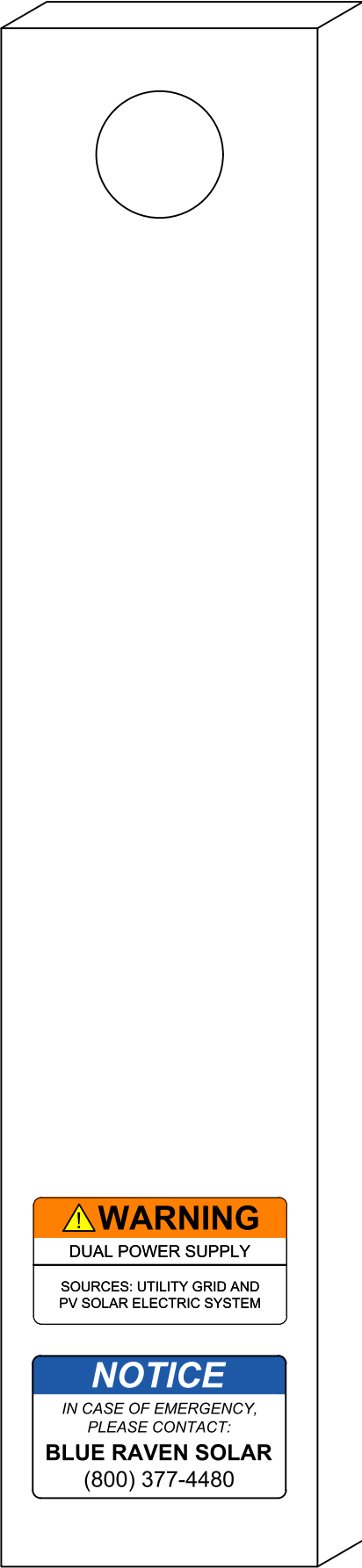
Electrical  
Calculations

DRAWING NUMBER:

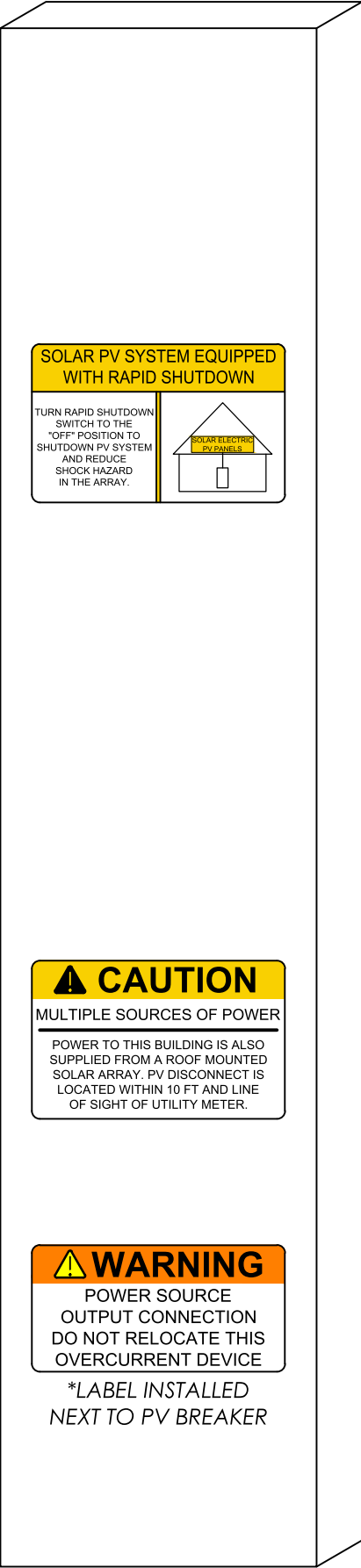
PV6

# WARNING LABELS

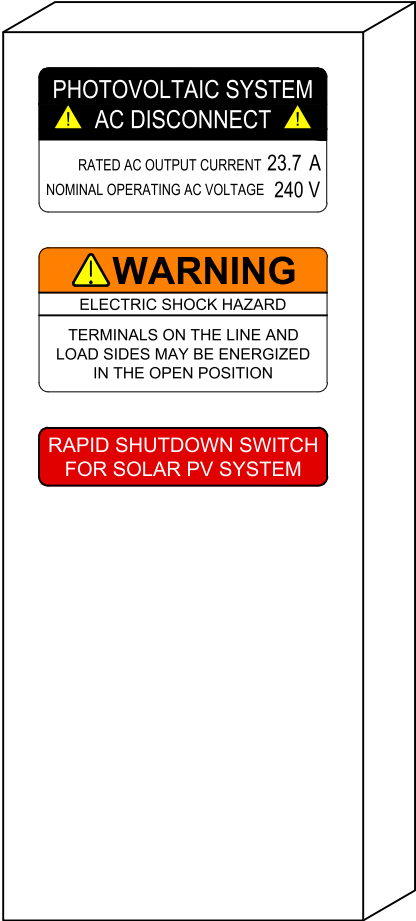
UTILITY METER



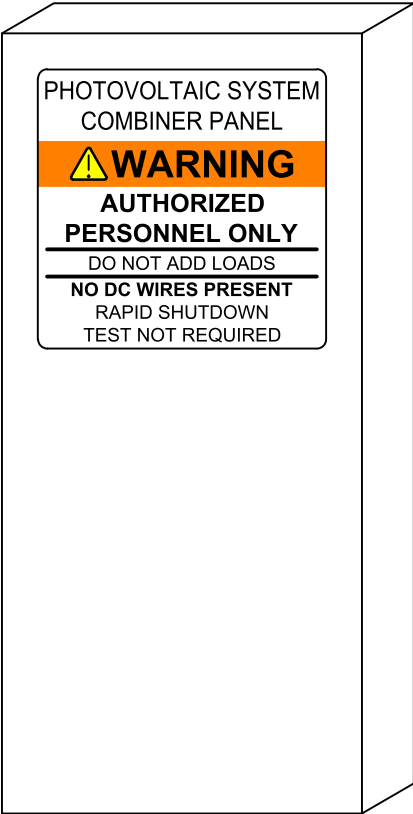
MAIN SERVICE PANEL



PV AC DISCONNECT



PV COMBINER BOX



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PROJECT ID:

1286515

PV DC SYSTEM SIZE:

6.900 kW DC

PV AC SYSTEM SIZE:

5.700 kW AC

REVISIONS:

A  
B  
C  
D

DRAWN BY:

Diego Guerra

PLOT DATE:

January 31, 2025

DRAWING TITLE:

Warning  
Labels

DRAWING NUMBER:

PV7



# REC ALPHA<sup>®</sup> PURE-RX SERIES

## DATASHEET

470 W<sub>P</sub>  
22.6% EFFICIENCY  
226 W/M<sup>2</sup>

SOLAR'S MOST TRUSTED



9 A MODULE CURRENT  
COMPATIBLE WITH MLPE



EXPERIENCE



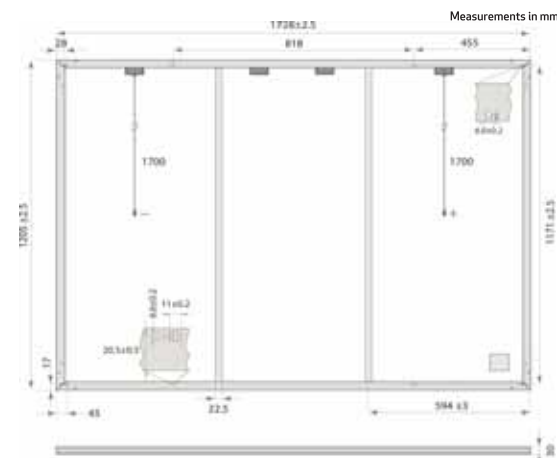
PERFORMANCE

## REC ALPHA<sup>®</sup> PURE-RX SERIES DATASHEET



### GENERAL DATA

|              |                                                                                                      |
|--------------|------------------------------------------------------------------------------------------------------|
| Cell Type    | 88 half-cut bifacial REC heterojunction cells, with gapless technology                               |
| Glass        | 3.2 mm solar glass with anti-reflective surface treatment in accordance with EN12150                 |
| Backsheet    | Highly resistant polymer (Black)                                                                     |
| Frame        | Anodized aluminum (Black)                                                                            |
| Junction Box | 4-part, 4 bypass diodes, IP68 rated, in accordance with IEC 62790                                    |
| Connectors   | Stäubli MC4 PV-KBT4/KST4 (4 mm <sup>2</sup> ) in accordance with IEC 62852, IP68 only when connected |
| Cable        | 4 mm <sup>2</sup> solar cable, 1.7 m + 1.7 m in accordance with EN50618                              |
| Dimensions   | 1728 x 1205 x 30 mm (2.08 m <sup>2</sup> )                                                           |
| Weight       | 22.7 kg                                                                                              |
| Origin       | Made in Singapore                                                                                    |



### ELECTRICAL DATA

PRODUCT CODE\*: RECxxxAA Pure-RX

STC

|                                                   |       |        |       |
|---------------------------------------------------|-------|--------|-------|
| Power Output - P <sub>MAX</sub> (W <sub>p</sub> ) | 450   | 460    | 470   |
| Watt Class Sorting - (W)                          | 0/+10 | 0/- .0 | 0/+10 |
| Nominal Power Voltage - V <sub>MPP</sub> (V)      | 54.3  | 54.9   | 55.4  |
| Nominal Power Current - I <sub>MPP</sub> (A)      | 8.29  | 8.38   | 8.49  |
| Open Circuit Voltage - V <sub>OC</sub> (V)        | 65.1  | 65.3   | 65.6  |
| Short Circuit Current - I <sub>SC</sub> (A)       | 8.81  | 8.88   | 8.95  |
| Power Density (W/m <sup>2</sup> )                 | 216   | 221    | 226   |
| Panel Efficiency (%)                              | 21.6  | 22.1   | 22.6  |

NMOT

|                                                   |      |      |      |
|---------------------------------------------------|------|------|------|
| Power Output - P <sub>MAX</sub> (W <sub>p</sub> ) | 343  | 350  | 358  |
| Nominal Power Voltage - V <sub>MPP</sub> (V)      | 51.2 | 51.7 | 52.2 |
| Nominal Power Current - I <sub>MPP</sub> (A)      | 6.70 | 6.77 | 6.86 |
| Open Circuit Voltage - V <sub>OC</sub> (V)        | 61.3 | 61.6 | 61.8 |
| Short Circuit Current - I <sub>SC</sub> (A)       | 7.11 | 7.17 | 7.23 |

### MAXIMUM RATINGS\*

|                           |                                   |
|---------------------------|-----------------------------------|
| Operational Temperature   | -40 °C - 85 °C                    |
| System Voltage            | 1000 V                            |
| Maximum Test Load (front) | +7000 Pa (713 kg/m <sup>2</sup> ) |
| Maximum Test Load (rear)  | -4000 Pa (407 kg/m <sup>2</sup> ) |
| Max Series Fuse Rating    | 25 A                              |
| Max Reverse Current       | 25 A                              |

\* See installation manual for mounting instructions.  
Design load = Test load / 15 (safety factor)

### TEMPERATURE RATINGS\*

|                                             |              |
|---------------------------------------------|--------------|
| Nominal Module Operating Temperature        | 44 °C ± 2 °C |
| Temperature coefficient of P <sub>MAX</sub> | -0.24% / °C  |
| Temperature coefficient of V <sub>OC</sub>  | -0.24% / °C  |
| Temperature coefficient of I <sub>SC</sub>  | 0.04% / °C   |

\*The temperature coefficients stated are linear values

### DELIVERY INFORMATION

|                                         |                  |
|-----------------------------------------|------------------|
| Panels per Pallet                       | 33               |
| Panels per 40 ft GP/high cube container | 594 (18 Pallets) |
| Panels per 13.6 m truck                 | 660 (20 Pallets) |

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.

### CERTIFICATIONS

IEC 61215:2015; IEC61730:2016; UL61730  
ISO 11925-2 Ignitability (EN 13501-1 Class E)  
IEC 62716 Ammonia Resistance  
IEC 61701 Salt Mist (SM6)  
IEC 61215:2016 Hailstone (35 mm)  
UL 61730 Fire Type 2  
ISO 14001; ISO9001; IEC45001; IEC62941



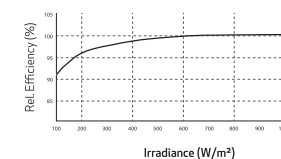
### WARRANTY

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

The REC ProTrust Warranty is only available on panels purchased through an REC Certified Solar Professional installer. Warranty conditions apply. See [www.recgroup.com](http://www.recgroup.com) for more details

### LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



REC Solar PTE. LTD.  
20 Tuas South Ave. 14  
Singapore 637312  
[post@recgroup.com](mailto:post@recgroup.com)  
[www.recgroup.com](http://www.recgroup.com)



DRAWING NUMBER:

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PRELIMINARY DATASHEET



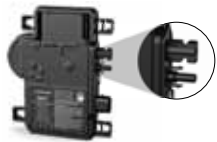
# IQ8X Microinverter

Our newest IQ8 Series Microinverters are the industry’s first microgrid-forming\*, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid mode. This chip is built using advanced 55-nm technology with high-speed digital logic and superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

IQ8X Microinverter is the latest addition to this family, designed to support PV modules with high input DC voltage and cell counts, such as 80-half-cut cells, 88-half-cut cells and 96-cells.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.



Connect PV modules quickly and easily to the IQ8 Series Microinverters with integrated MC4 connectors.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conform with regulations when installed according to the manufacturer’s instructions.

\*Meets UL 1741 only when installed with IQ System Controller 2 and 3.

## IQ8X Microinverter

| INPUT DATA (DC)                            |  | UNIT | IQ8X-80-M-US                                                                                                                                                                                                                                                                                           |
|--------------------------------------------|--|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Commonly used module pairings <sup>1</sup> |  | W    | 320–540                                                                                                                                                                                                                                                                                                |
| Module compatibility                       |  | —    | To meet compatibility, PV modules must be within the following maximum input DC voltage and maximum module I <sub>sc</sub> .<br>Module compatibility can be checked at <a href="https://enphase.com/installers/microinverters/calculator">https://enphase.com/installers/microinverters/calculator</a> |
| MPPT voltage range                         |  | V    | 43–60                                                                                                                                                                                                                                                                                                  |
| Operating range                            |  | V    | 25–79.5                                                                                                                                                                                                                                                                                                |
| Minimum and maximum start voltage          |  | V    | 30–79.5                                                                                                                                                                                                                                                                                                |
| Maximum input DC voltage                   |  | V    | 79.5                                                                                                                                                                                                                                                                                                   |
| Maximum continuous operating DC current    |  | A    | 10                                                                                                                                                                                                                                                                                                     |
| Maximum input DC short-circuit current     |  | A    | 16                                                                                                                                                                                                                                                                                                     |
| Maximum module I <sub>sc</sub>             |  | A    | 13                                                                                                                                                                                                                                                                                                     |
| Overvoltage class DC port                  |  | —    | II                                                                                                                                                                                                                                                                                                     |
| DC port backfeed current                   |  | mA   | 0                                                                                                                                                                                                                                                                                                      |
| PV array configuration                     |  | —    | Ungrounded array; no additional DC side protection required; AC side protection requires maximum 20 A per branch circuit                                                                                                                                                                               |

| OUTPUT DATA (AC)                                         |  | UNIT             | IQ8X-80-M-US @240 VAC        | IQ8X-80-M-US @208 VAC                      |
|----------------------------------------------------------|--|------------------|------------------------------|--------------------------------------------|
| Peak output power                                        |  | VA               | 384                          | 366                                        |
| Maximum continuous output power                          |  | VA               | 380                          | 360                                        |
| Nominal grid voltage (L-L)                               |  | V                | 240, split-phase (L-L), 180° | 208, single-phase (L-L), 120° <sup>4</sup> |
| Minimum and maximum grid voltage <sup>2</sup>            |  | V                | 211–264                      | 183–229                                    |
| Max. continuous output current                           |  | A                | 1.58                         | 1.73                                       |
| Nominal frequency                                        |  | Hz               |                              | 60                                         |
| Extended frequency range                                 |  | Hz               |                              | 47–68                                      |
| AC short circuit fault current over three cycles         |  | A <sub>rms</sub> |                              | 2.70                                       |
| Maximum units per 20 A (L-L) branch circuit <sup>3</sup> |  | —                | 10                           | 9                                          |
| Total harmonic distortion                                |  | %                |                              | <5                                         |
| 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              |
| Peak efficiency                                          |  | %                | 97.3                         | 97.0                                       |
| CEC weighted efficiency                                  |  | %                | 96.5                         | 96.5                                       |
| Nighttime power consumption                              |  | mW               | 26                           | 12                                         |

| MECHANICAL DATA                              |                                                                    |
|----------------------------------------------|--------------------------------------------------------------------|
| Ambient temperature range                    | –40°C to 65°C (–40°F to 149°F)                                     |
| Relative humidity range                      | 4% to 100% (condensing)                                            |
| DC connector type                            | Stäubli MC4                                                        |
| Dimensions (H × W × D); Weight               | 212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs)  |
| Cooling                                      | Natural convection – no fans                                       |
| Approved for wet locations; Pollution degree | Yes; PD3                                                           |
| Enclosure                                    | Class II double-insulated, corrosion-resistant polymeric enclosure |
| Environmental category; UV exposure rating   | NEMA Type 6; outdoor                                               |

| COMPLIANCE     |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Certifications | CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01<br>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 C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to the manufacturer’s instructions. |

(1) No enforced DC/AC ratio.  
(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.  
(4) IQ8X is not certified for use with Enphase Three Phase Network Protection Relay (NPR-3P-208-NA) and therefore designed for single-phase operation only. Check with the local utility requirements if you wish to install single phase inverter across three phases.



DRAWING NUMBER:

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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 <sup>1</sup>         | 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 <sup>1</sup> | 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) <sup>1</sup>  | 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.

|                                                                                       |                                                                                                       |                                                                                       |                                                                                                                                   |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|  | <b>TERMINATOR</b><br>Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)           |  | <b>SEALING CAPS</b><br>Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)                       |
|  | <b>DISCONNECT TOOL</b><br>Plan to use at least one per installation, sold in packs of ten (Q-DISC-10) |  | <b>CABLE CLIP</b><br>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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2020-06-26



DRAWING NUMBER:

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DATA SHEET



X-IQ-AM1-240-5  
X-IQ-AM1-240-5C

# IQ Combiner 5/5C

The IQ Combiner 5/5C consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications. IQ Combiner 5/5C uses wired control communication and is compatible with IQ System Controller 3/3G and IQ Battery 5P.

The IQ Combiner 5/5C, IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provide a complete grid-agnostic Enphase Energy System.



**IQ Series Microinverters**  
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) simplify the installation process.



**IQ System Controller 3/3G**  
Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.



**IQ Battery 5P**  
Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters.



**IQ Load Controller**  
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.



5-year limited warranty



\*For country-specific warranty information, see the <https://enphase.com/installers/resources/warranty> page.

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IQC-5-5C-DSH-00007-3.0-EN-US-2024-03-01

## IQ Combiner 5/5C

| MODEL NUMBER                                                       |                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IQ Combiner 5 (X-IQ-AM1-240-5)                                     | IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSIC12.20 ±0.5%), consumption monitoring (± 2.5%), and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat.                                                                                       |
| IQ Combiner 5C (X-IQ-AM1-240-5C)                                   | IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%) and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05) <sup>1</sup> . Includes a silver solar shield to deflect heat. |
| WHAT'S IN THE BOX                                                  |                                                                                                                                                                                                                                                                                                                                       |
| IQ Gateway printed circuit board                                   | IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System                                                                                                                                                                                             |
| Busbar                                                             | 80 A busbar with support for 1 × IQ Gateway breaker and 4 × 20 A breaker for installing IQ Series Microinverters and IQ Battery 5P                                                                                                                                                                                                    |
| IQ Gateway breaker                                                 | Circuit breaker, 2-pole, 10 A/15 A                                                                                                                                                                                                                                                                                                    |
| Production CT                                                      | Pre-wired revenue-grade solid-core CT, accurate up to ±0.5%                                                                                                                                                                                                                                                                           |
| Consumption CT                                                     | Two consumption metering clamp CTs, shipped with the box, accurate up to ±2.5%                                                                                                                                                                                                                                                        |
| IQ Battery CT                                                      | One battery metering clamp CT, shipped with the box, accurate up to ±2.5%                                                                                                                                                                                                                                                             |
| CTRL board                                                         | Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P                                                                                                                                                                                                                                            |
| Enphase Mobile Connect (only with IQ Combiner 5C)                  | 4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan                                                                                                                                                                                                                                               |
| Accessories kit                                                    | Spare control headers for the COMMS-KIT-02 board                                                                                                                                                                                                                                                                                      |
| ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY) |                                                                                                                                                                                                                                                                                                                                       |
| CELLMODEM-M1-06-SP-05                                              | 4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan                                                                                                                                                                                                                                                                       |
| CELLMODEM-M1-06-AT-05                                              | 4G-based LTE-M1 cellular modem with a 5-year AT&T data plan                                                                                                                                                                                                                                                                           |
| Circuit breakers (off-the-shelf)                                   | Supports Eaton BR2XX, Siemens Q2XX and GE/ABB THQL21XX Series circuit breakers (XX represents 10, 15, 20, 30, 40, 50, or 60). Also supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with the hold-down kit.                                                                                                      |
| Circuit breakers (provided by Enphase)                             | BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (more details in the "Accessories" section)                                                                                                                                                                                                 |
| XA-SOLARSHIELD-ES                                                  | Replacement solar shield for IQ Combiner 5/5C                                                                                                                                                                                                                                                                                         |
| XA-ENV2-PCBA-5                                                     | IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 5/5C                                                                                                                                                                                                                                                               |
| X-IQ-NA-HD-125A                                                    | Hold-down kit compatible with Eaton BR-B Series circuit breakers (with screws)                                                                                                                                                                                                                                                        |
| XA-COMMS2-PCBA-5                                                   | Replacement COMMS-KIT-02 printed circuit board (PCB) for IQ Combiner 5/5C                                                                                                                                                                                                                                                             |
| ELECTRICAL SPECIFICATIONS                                          |                                                                                                                                                                                                                                                                                                                                       |
| Rating                                                             | 80 A                                                                                                                                                                                                                                                                                                                                  |
| System voltage and frequency                                       | 120/240 VAC, 60 Hz                                                                                                                                                                                                                                                                                                                    |
| Busbar rating                                                      | 125 A                                                                                                                                                                                                                                                                                                                                 |
| Fault current rating                                               | 10 kAIC                                                                                                                                                                                                                                                                                                                               |
| Maximum continuous current rating (input from PV/storage)          | 64 A                                                                                                                                                                                                                                                                                                                                  |
| Branch circuits (solar and/or storage)                             | Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included)                                                                                                                                                                                                                 |
| Maximum total branch circuit breaker rating (input)                | 80 A of distributed generation/95 A with IQ Gateway breaker included                                                                                                                                                                                                                                                                  |
| IQ Gateway breaker                                                 | 10 A or 15 A rating GE/Siemens/Eaton included                                                                                                                                                                                                                                                                                         |
| Production metering CT                                             | 200 A solid core pre-installed and wired to IQ Gateway                                                                                                                                                                                                                                                                                |
| Consumption monitoring CT (CT-200-CLAMP)                           | A pair of 200 A clamp-style current transformers is included with the box                                                                                                                                                                                                                                                             |
| IQ Battery metering CT                                             | 200 A clamp-style current transformer for IQ Battery metering, included with the box                                                                                                                                                                                                                                                  |

1. A plug-and-play industrial-grade cell modem for systems of up to 60 microinverters. Available in the United States, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.



DRAWING NUMBER:

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IQC-5-5C-DSH-00007-3.0-EN-US-2024-03-01



| MECHANICAL DATA                         |                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions (W × H × D)                  | 37.5 cm × 49.5 cm × 16.8 cm (14.75" × 19.5" × 6.63"). Height is 21.06" (53.5 cm) with mounting brackets                                                                                                                                                                                                                                                                             |
| Weight                                  | 7.5 kg (16.5 lbs)                                                                                                                                                                                                                                                                                                                                                                   |
| Ambient temperature range               | -40°C to 46°C (-40°F to 115°F)                                                                                                                                                                                                                                                                                                                                                      |
| Cooling                                 | Natural convection, plus heat shield                                                                                                                                                                                                                                                                                                                                                |
| Enclosure environmental rating          | Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction                                                                                                                                                                                                                                                                                                                   |
| Wire sizes                              | <ul style="list-style-type: none"><li>• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors</li><li>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors</li><li>• Main lug combined output: 10 to 2/0 AWG copper conductors</li><li>• Neutral and ground: 14 to 1/0 copper conductors</li><li>• Always follow local code requirements for conductor sizing</li></ul> |
| Communication (in-premise connectivity) | Built-in CTRL board for wired communication with IQ Battery 5P and IQ System Controller 3/3G. Integrated power line communication for IQ Series Microinverters                                                                                                                                                                                                                      |
| Altitude                                | Up to 2,600 meters (8,530 feet)                                                                                                                                                                                                                                                                                                                                                     |

| COMMUNICATION INTERFACES  |                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Integrated Wi-Fi          | 802.11b/g/n (dual band 2.4 GHz/5 GHz), for connecting the Enphase Cloud through the internet                                  |
| Wi-Fi range (recommended) | 10 m (32.8 feet)                                                                                                              |
| Bluetooth                 | BLE4.2, 10 m range to configure Wi-Fi SSID                                                                                    |
| Ethernet                  | Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included), for connecting to the Enphase Cloud through the internet |
| Cellular/Mobile Connect   | CELLMODEM-M1-06-SP-05 or CELLMODEM-M1-06-AT-05 (included with IQ Combiner 5C)                                                 |
| Digital I/O               | Digital input/output for grid operator control                                                                                |
| USB 2.0                   | Mobile Connect, COMMS-KIT-01 for IQ Battery 3/3T/10/10T, COMMS-KIT-02 for IQ Battery 5P                                       |
| Access point (AP) mode    | For connection between the IQ Gateway and a mobile device running the Enphase Installer App                                   |
| Metering ports            | Up to two Consumption CTs, one IQ Battery CT, and one Production CT                                                           |
| Power line communication  | 90–110 kHz                                                                                                                    |
| Web API                   | See <a href="https://developer-v4.enphase.com">https://developer-v4.enphase.com</a>                                           |
| Local API                 | See <a href="#">guide for local API</a>                                                                                       |

| COMPLIANCE                                                                                                                                                                                                                                                                |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| IQ Combiner with IQ Gateway                                                                                                                                                                                                                                               |  |
| UL 1741, CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003, NOM-208-SCFI-2016, UL 60601-1/CANCSA 22.2 No. 61010-1, IEEE 1547: 2018 (UL 1741-SB, 3rd Ed.), IEEE 2030.5/CSIP Compliant, Production metering: ANSI C12.20 accuracy class 0.5 (PV production) |  |

| COMPATIBILITY             |                        |                                                                            |
|---------------------------|------------------------|----------------------------------------------------------------------------|
| PV                        | Microinverters         | IQ6, IQ7, and IQ8 Series Microinverters                                    |
|                           | IQ System Controller   | EP200G101-M240US00                                                         |
| COMMS-KIT-01 <sup>2</sup> | IQ System Controller 2 | EP200G101-M240US01                                                         |
|                           | IQ Battery             | ENCHARGE-3-1P-NA, ENCHARGE-10-1P-NA, ENCHARGE-3T-1P-NA, ENCHARGE-10T-1P-NA |
| COMMS-KIT-02 <sup>3</sup> | IQ System Controller 3 | SC200D111C240US01, SC200G111C240US01                                       |
|                           | IQ Battery             | IQBATTERY-5P-1P-NA                                                         |

## Accessories



### Mobile Connect

4G-based LTE-M1 cellular modem with a 5-year data plan  
(CELLMODEM-M1-06-SP-05 for Sprint and CELLMODEM-M1-06-AT-05 for AT&T)



### Circuit breakers

BRK-10A-2-240V Circuit breaker, 2-pole, 10 A, Eaton BR210  
BRK-15A-2-240V Circuit breaker, 2-pole, 15 A, Eaton BR215  
BRK-20A-2P-240V Circuit breaker, 2-pole, 20 A, Eaton BR220  
BRK-15A-2P-240V-B Circuit breaker, 2-pole, 15 A, Eaton BR215B with hold-down kit support  
BRK-20A-2P-240V-B Circuit breaker, 2-pole, 20 A, Eaton BR220B with hold-down kit support



### CT-200-SOLID

200 A revenue-grade solid core Production CT with <0.5% error rate (replacement SKU)

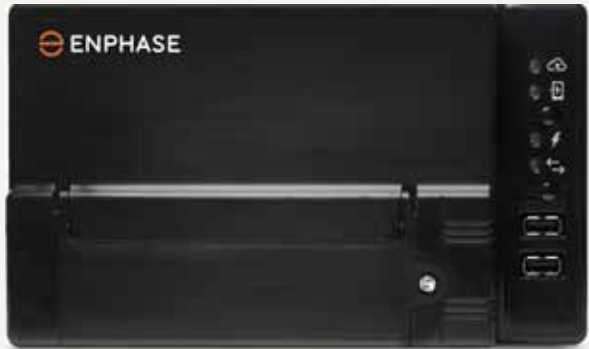


### CT-200-CLAMP

200 A clamp-style consumption and battery metering CT with <2.5% error rate (replacement SKU)

2. For information about IQ Combiner 5/5C compatibility with the 2<sup>nd</sup>-generation batteries, refer to the [compatibility matrix](#).

3. IQ Combiner 5/5C comes pre-equipped with COMMS-KIT-02.



# IQ Gateway

The IQ Gateway delivers solar production and energy consumption data to Enphase Installer Portal monitoring and analysis software for comprehensive, remote maintenance, and management of Enphase systems.

With integrated production metering and optional consumption monitoring, the IQ Gateway is the platform for total energy management. It integrates with the IQ System Controller and IQ Battery.



**IQ Series Microinverters**  
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) dramatically simplify the installation process.



**IQ System Controller**  
Provides microgrid interconnect device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.



**IQ Battery**  
All-in-one AC coupled storage system that is reliable, smart, simple, and safe. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



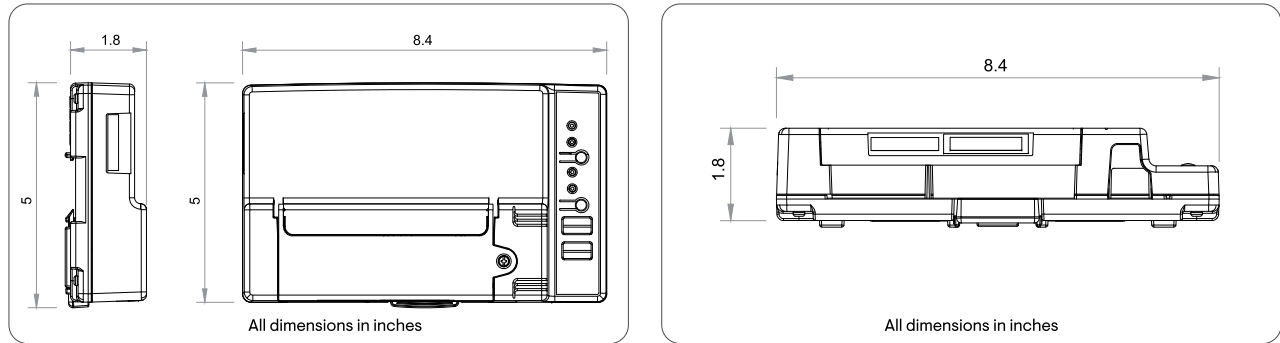
**IQ Load Controller**  
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.



## IQ Gateway

| MODEL NUMBER                                                                              |                                                                                                                                                                                                                                         | ENV-IQ-AM1-240, ENV2-IQ-AM1-240 |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| IQ Gateway<br>ENV-IQ-AM1-240<br>ENV2-IQ-AM1-240 (IEEE® 1547:2018)                         | IQ Gateway integrates revenue grade PV production metering (ANSI C12.20 ±0.5%), consumption metering (±2.5%), and battery metering (±2.5%) with IQ Battery 5P. Includes one 200 A continuous rated Production Current Transformer (CT). |                                 |
| ACCESSORIES - ORDER SEPARATELY                                                            |                                                                                                                                                                                                                                         |                                 |
| Mobile Connect<br>COMMS-CELLMODEM-M1-06<br>CELLMODEM-M1-06-SP-05<br>CELLMODEM-M1-06-AT-05 | - Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan<br>- 4G based LTE-M1 cellular modem with 5-year Sprint data plan<br>- 4G based LTE-M1 cellular modem with 5-year AT&T data plan                          |                                 |
| Consumption monitoring CT and IQ Battery 5P metering CT<br>CT-200-SPLIT<br>CT-200-CLAMP   | Split-core and clamp style CTs with 2.5% accuracy enable whole home and IQ Battery 5P metering                                                                                                                                          |                                 |
| Communications Kit<br>COMMS-KIT-01<br>COMMS-KIT-02                                        | Installed at the IQ Gateway. For communications with IQ Battery and IQ System Controller. Includes USB cable for connection to IQ Gateway or IQ Combiner and allows wireless communication with IQ Battery and IQ System Controller.    |                                 |
| POWER REQUIREMENTS                                                                        |                                                                                                                                                                                                                                         |                                 |
| AC power requirements                                                                     | 120/240 V, 120/208Y V, or 127/220Y V. Three-wire. 60 Hz.                                                                                                                                                                                |                                 |
| IQ Gateway breaker                                                                        | 2-pole and maximum 20 A overcurrent protection required                                                                                                                                                                                 |                                 |
| Typical power consumption                                                                 | 5 W                                                                                                                                                                                                                                     |                                 |
| CAPACITY                                                                                  |                                                                                                                                                                                                                                         |                                 |
| Number of microinverters polled                                                           | Up to 300                                                                                                                                                                                                                               |                                 |
| MECHANICAL AND ELECTRICAL DATA                                                            |                                                                                                                                                                                                                                         |                                 |
| Dimensions (W × H × D)                                                                    | 21.3 cm × 12.6 cm × 4.5 cm (8.4 in × 5 in × 1.8 in)                                                                                                                                                                                     |                                 |
| Weight                                                                                    | 1.09 lb                                                                                                                                                                                                                                 |                                 |
| Ambient temperature range                                                                 | -40°C to 65°C (-40°F to 149°F) [ENV-IQ-AM1-240]<br>-40°C to 50°C (-40°F to 122°F) [ENV2-IQ-AM1-240]<br>-40°C to 46°C (-40°F to 115°F) if installed in an enclosure                                                                      |                                 |
| Environmental rating                                                                      | IP30. For installation indoors or in an NRTL-certified, NEMA type 3R or better-rated enclosure, if installing outdoors.                                                                                                                 |                                 |
| Altitude                                                                                  | Up to 2,600 meters (8,530 feet)                                                                                                                                                                                                         |                                 |
| COMMUNICATION INTERFACES                                                                  |                                                                                                                                                                                                                                         |                                 |
| Integrated Wi-Fi                                                                          | 802.11b/g/n (2.4 GHz, 5 GHz), for connecting the Enphase Cloud via the internet.                                                                                                                                                        |                                 |
| Wi-Fi range (recommended)                                                                 | 10 m                                                                                                                                                                                                                                    |                                 |
| Ethernet                                                                                  | Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included), for connecting to the Enphase Cloud via the internet.                                                                                                              |                                 |
| Mobile Connect                                                                            | CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (to be purchased separately, mandatory for sites with IQ Battery)                                                                                                                          |                                 |
| Digital I/O                                                                               | Digital input/output for grid operator control                                                                                                                                                                                          |                                 |
| USB 2.0                                                                                   | For Mobile Connect and Communications Kit                                                                                                                                                                                               |                                 |
| Access point (AP) mode                                                                    | For a connection between the IQ Gateway and a mobile device running the Enphase Installer App                                                                                                                                           |                                 |
| Metering ports                                                                            | Up to two Consumption CTs, one Production CT, and one battery CT (for IQ Battery 5P)                                                                                                                                                    |                                 |
| Power line communication (PLC)                                                            | 90 kHz–110 kHz (Class B), to microinverters.                                                                                                                                                                                            |                                 |
| Web API                                                                                   | Refer to <a href="https://developer-v4.enphase.com">https://developer-v4.enphase.com</a>                                                                                                                                                |                                 |
| Local API                                                                                 | Refer to <a href="#">guide for local API</a>                                                                                                                                                                                            |                                 |
| LED indicators                                                                            | From top to bottom: Cloud connectivity, Wi-Fi access point mode, PV production state, PLC communications state                                                                                                                          |                                 |
| Configured via                                                                            | Enphase Installer App and Enphase Installer Platform                                                                                                                                                                                    |                                 |

| POWER PRODUCTION/EXPORT LIMITING VIA THE IQ GATEWAY'S DIGITAL IO |                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum relays read                                              | 4                                                                                                                                                                                                                                                                                                                    |
| Capabilities supported                                           | Power production limiting (Production CT/s required), power export limiting (Production CT/s required and Consumption CT/s – <b>Load with Solar</b> configuration)                                                                                                                                                   |
| Minimum IQ Gateway version                                       | v7.3.120                                                                                                                                                                                                                                                                                                             |
| Cable configurations                                             | 18 AWG, UL-Std. 62, 600 V, 105°C, and minimum 0.03 inches average thickness                                                                                                                                                                                                                                          |
| Signal voltage range                                             | 2.5 V–5 V (digital high), 0 V–1.9 V (digital low)                                                                                                                                                                                                                                                                    |
| Terminal blocks                                                  | Five terminals, up to 0.002 in²                                                                                                                                                                                                                                                                                      |
| Configuration via                                                | Enphase Installer App, Enphase Installer Platform (site settings)                                                                                                                                                                                                                                                    |
| SCOPE OF DELIVERY                                                |                                                                                                                                                                                                                                                                                                                      |
| Package dimensions (H × W × D)                                   | 6.3 in × 10.8 in × 3.9 in                                                                                                                                                                                                                                                                                            |
| Package weight                                                   | 2.2 lb                                                                                                                                                                                                                                                                                                               |
| Aluminium DIN rail                                               | 4.9 in                                                                                                                                                                                                                                                                                                               |
| Current transformers (CTs)                                       | One CT-200-SOLID included                                                                                                                                                                                                                                                                                            |
| COMPLIANCE                                                       |                                                                                                                                                                                                                                                                                                                      |
| Compliance                                                       | CA Rule 21 (UL 1741-SA), IEEE® 1547:2018 – UL 1741-SB, 3rd Ed.(ENV2-IQ-AM1-240),<br>UL 61010-1<br>CAN/CSA C22.2 No. 61010-1<br>Title 47 CFR, Part 15, Class B, ICES 003<br>IEC/EN 61010-1:2010,<br>EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2<br>Metering: ANSI C12.20 accuracy class 0.5 (PV production only) |
| COMPATABILITY                                                    |                                                                                                                                                                                                                                                                                                                      |
| IQ System Controller                                             | SC200D111C240US01, SC200G111C240US01, EP200G101-M240US01, EP200G101-M240US00                                                                                                                                                                                                                                         |
| IQ Battery                                                       | IQBATTERY-5P-1P-NA, ENCHARGE-3T-1P-NA, ENCHARGE-10T-1P-NA                                                                                                                                                                                                                                                            |
| Microinverter                                                    | IQ6, IQ7, and IQ8 Series Microinverters                                                                                                                                                                                                                                                                              |



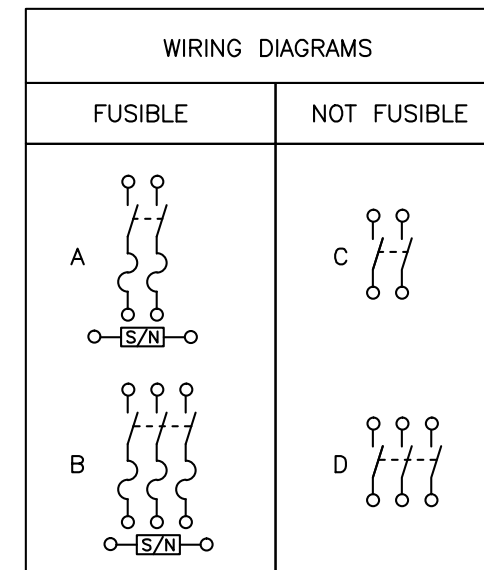
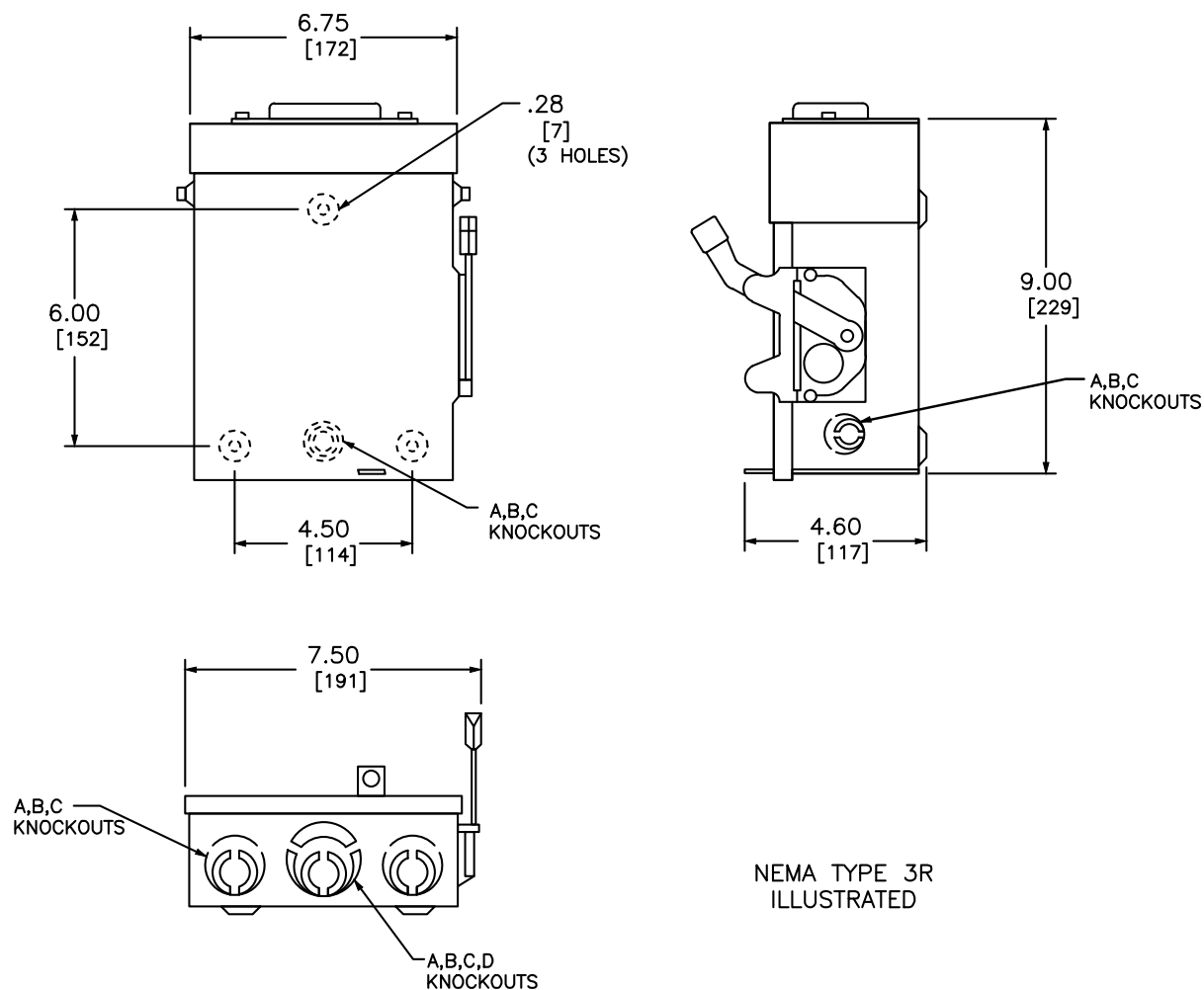
## Accessories

|                                                                                     |                                                                                                                                                                  |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Enphase Mobile Connect</b><br>4G-based LTE-M1 cellular modem with a 5-year data plan<br>(CELLMODEM-M1-06-SP-05 for Sprint and CELLMODEM-M1-06-AT-05 for AT&T) |  | <b>Circuit breakers</b><br>BRK-10A-2-240V Circuit breaker, 2-pole, 10 A, Eaton BR210<br>BRK-15A-2-240V Circuit breaker, 2-pole, 15 A, Eaton BR215<br>BRK-20A-2P-240V Circuit breaker, 2-pole, 20 A, Eaton BR220<br>BRK-15A-2P-240V-B Circuit breaker, 2-pole, 15 A, Eaton BR215B with hold-down kit support<br>BRK-20A-2P-240V-B Circuit breaker, 2-pole, 20 A, Eaton BR220B with hold-down kit support |
|  | <b>CT-200-SOLID</b><br>200 A revenue grade solid core Production CT with <0.5% error rate (replacement SKU)                                                      |  | <b>CT-200-CLAMP</b><br>200 A clamp-style consumption and battery metering CT with <2.5% error rate (replacement SKU)                                                                                                                                                                                                                                                                                    |

## Revision history

| REVISION      | DATE          | DESCRIPTION                                                        |
|---------------|---------------|--------------------------------------------------------------------|
| DSH-00111-3.0 | December 2023 | Updated power requirement and added IG Gateway breaker values.     |
| DSH-00111-2.0 | August 2023   | Updated temperature specification for ENV2-IQ-AM1-240.             |
| DSH-00111-1.0 | June 2023     | Updated altitude and recommended maximum microinverters on a site. |





| 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

SQUARE D  
by Schneider Electric

DWG# 1852  
NO.

**A. System Specifications and Ratings**

- Maximum Voltage: 1,000 Volts
- Maximum Current: **JB-1.2:** 80 Amps; **JB-1.XL:** 120 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, CSA C22.2 No. 290; **JB-1.XL:** UL1741, CSA C22.2 No. 290
  - Approved wire connectors: must conform to UL1741, CSA C22.2 No. 290
- 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**

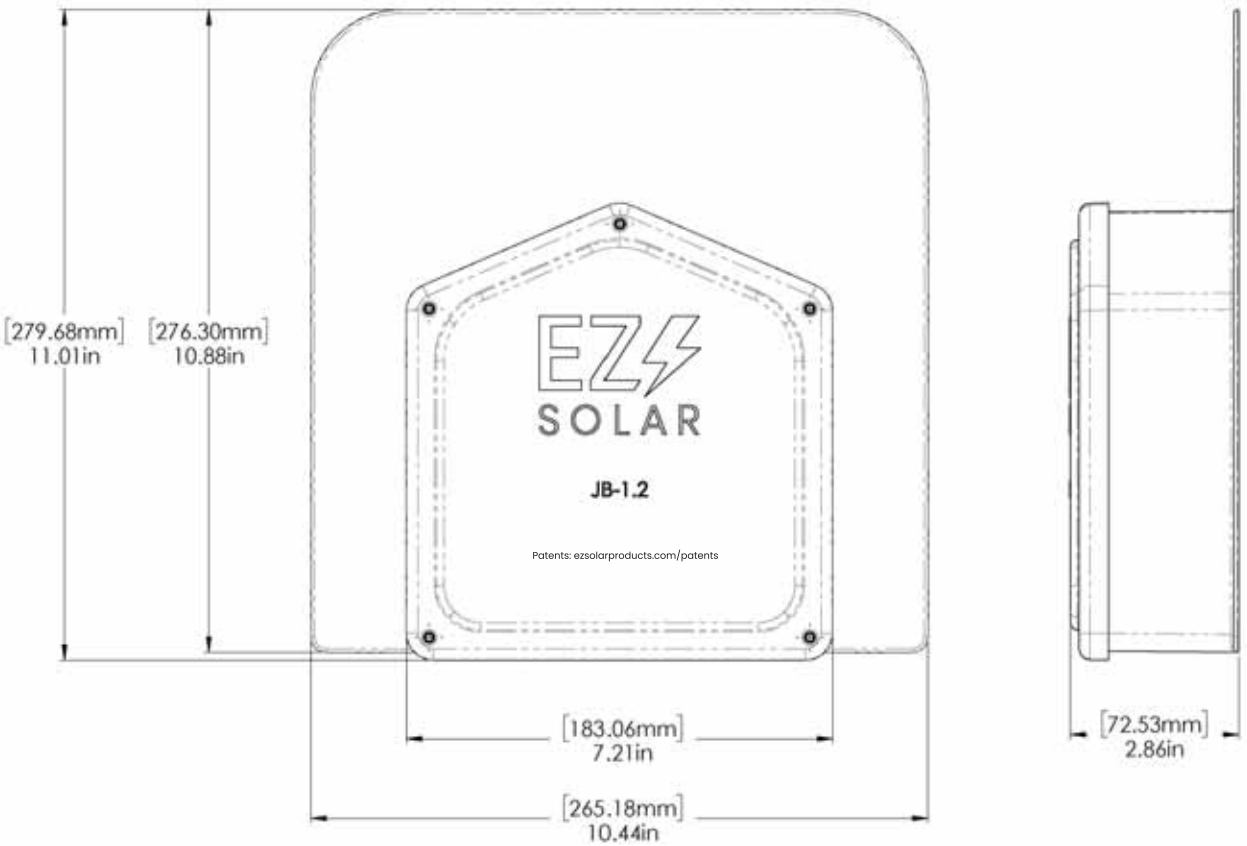
|                                                          | 1 Conductor | 2 Conductor | Torque  |             |             |         |         |
|----------------------------------------------------------|-------------|-------------|---------|-------------|-------------|---------|---------|
|                                                          |             |             | 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 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 <small>WING-NUT Wire Connector</small>     | 8-18 awg    |             | Sol/Str | Self-Torque | Self-Torque | 600V    |         |
| Ideal 451 Yellow <small>WING-NUT Wire Connector</small>  | 10-18 awg   |             | Sol/Str | Self-Torque | Self-Torque | 600V    |         |
| Ideal, In-Sure <small>Push-In Connector Part #39</small> | 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<br>kcmil (mm2) | Wires per terminal (pole) |                |                |                        |
|----------------------------------|---------------------------|----------------|----------------|------------------------|
|                                  | 1<br>mm (inch)            | 2<br>mm (inch) | 3<br>mm (inch) | 4 or More<br>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<br><b>B</b>      | DWG. NO.<br><b>JB-1.2</b> | REV                                   |
| SCALE: 1:2            | WEIGHT: 1.45 LBS          | SHEET 1 OF 3                          |
| TORQUE SPECIFICATION: |                           | 15-20 LBS                             |
| CERTIFICATION:        |                           | UL 1741, NEMA 3R<br>CSA C22.2 NO. 290 |
| WEIGHT:               |                           | 1.45 LBS                              |



**PROPRIETARY AND CONFIDENTIAL:** THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF EZ SOLAR. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF EZ SOLAR IS PROHIBITED.



RIGID PVC CONDUIT FITTINGS

JB444 JUNCTION BOXES

ISSUE DATE:  
DATE D'EMISSION: 2009 04 30

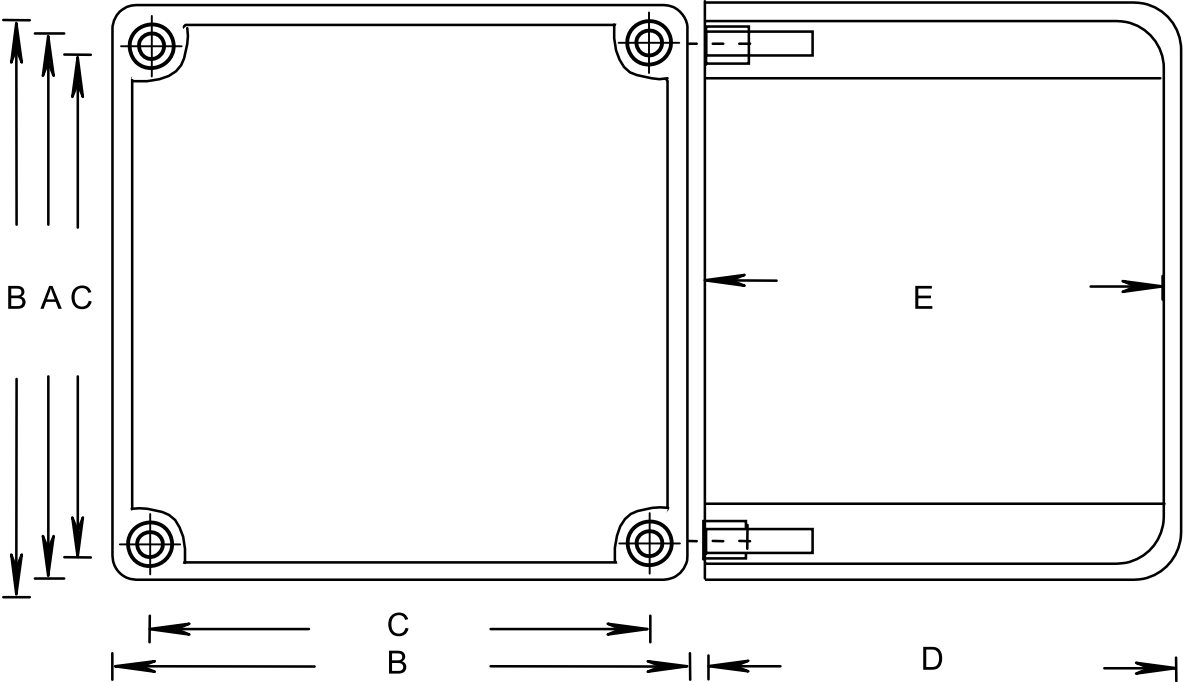
SUPERCEDES:  
REPLACE: 2004 07 15

RIGID PVC CONDUIT FITTINGS

JB444 JUNCTION BOXES

ISSUE DATE:  
DATE D'EMISSION: 2009 04 30

SUPERCEDES:  
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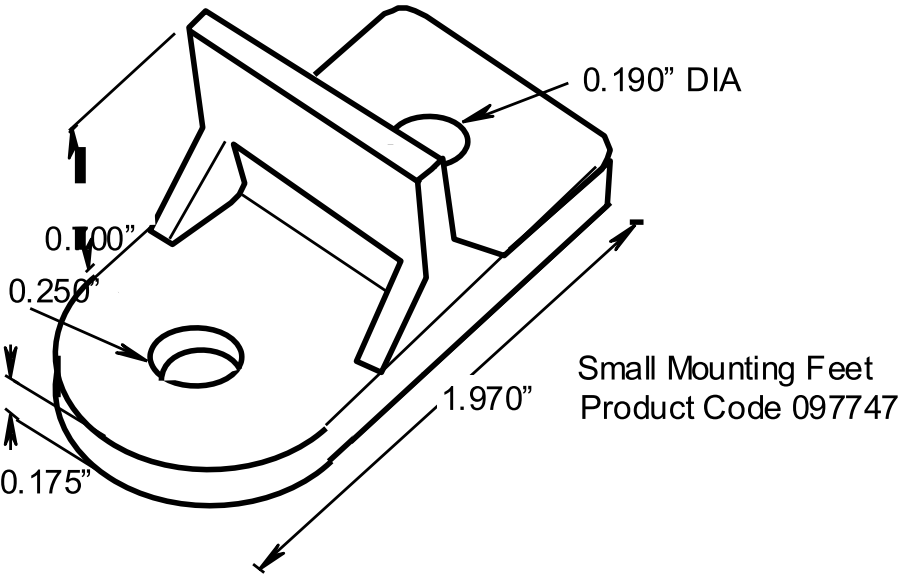
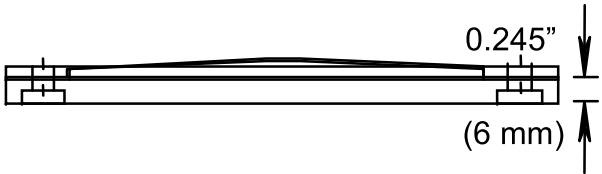
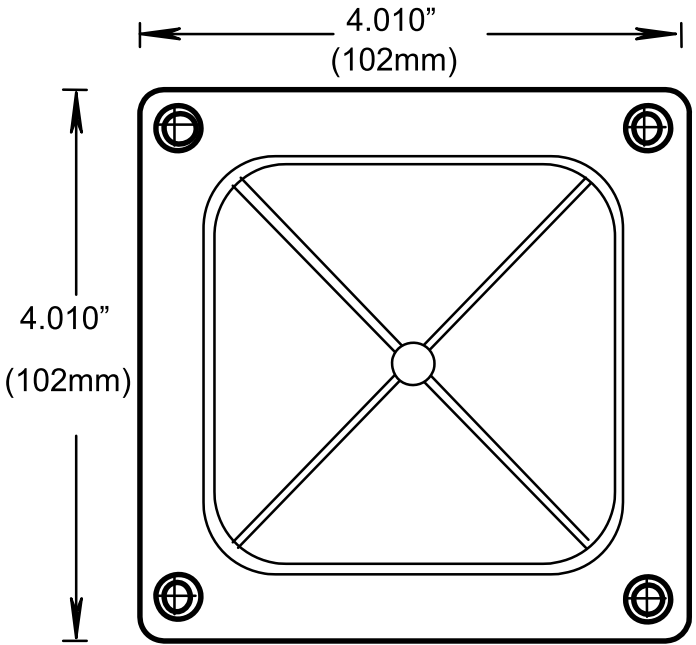
| PRODUCT CODE | PART NUMBER      | NOMINAL SIZE |      | A     |      | B     |      | C     |      |
|--------------|------------------|--------------|------|-------|------|-------|------|-------|------|
|              |                  | (in)         | (mm) | (in)  | (mm) | (in)  | (mm) | (in)  | (mm) |
| 076668       | J444 STAHLIN     | 4            | 103  | 3.675 | 93   | 4.000 | 102  | 3.450 | 88   |
| 076259       | AMJB444 ALLIED   | 4            | 103  | 3.675 | 93   | 4.000 | 102  | 3.450 | 88   |
| 077643*      | 2037-424T CANLET | 4            | 103  | 3.675 | 93   | 4.000 | 102  | 3.450 | 88   |
| 077696       | JB 444           | 4            | 103  | 4.000 | 101  | 4.395 | 112  | 3.950 | 101  |

| PRODUCT CODE | PART NUMBER      | NOMINAL SIZE |      | D     |      | E     |      | VOLUME   |          |
|--------------|------------------|--------------|------|-------|------|-------|------|----------|----------|
|              |                  | (in)         | (mm) | (in)  | (mm) | (in)  | (mm) | (cu. In) | (cu. Cm) |
| 076668       | J444 STAHLIN     | 4            | 103  | 4.180 | 106. | 3.850 | 98   | 51.5     | 844.6    |
| 076259       | AMJB444 ALLIED   | 4            | 103  | 4.180 | 106  | 3.850 | 98   | 51.5     | 844.6    |
| 077643*      | 2037-424T CANLET | 4            | 103  | 4.180 | 106  | 3.850 | 98   | 51.5     | 844.6    |
| 077696       | JB 444           | 4            | 103  | 4.170 | 106  | 3.930 | 100  | 51.5     | 844.6    |

| PRODUCT CODE | PART NUMBER      | NOMINAL SIZE |      | GASKET CODE | INSERT CODE              | SCREW CODE               | M.FEET CODE |
|--------------|------------------|--------------|------|-------------|--------------------------|--------------------------|-------------|
|              |                  | (in)         | (mm) |             |                          |                          |             |
| 076668       | J444 STAHLIN     | 4            | 103  |             | 072538 (4)               |                          |             |
| 076259       | AMJB444 ALLIED   | 4            | 103  |             | 072538 (4)               |                          |             |
| 077643*      | 2037-424T CANLET | 4            | 103  |             | 072538 (4)               |                          |             |
| 077696       | JB 444           | 4            | 103  | 097731      | 072538 (4)<br>072539 (2) | 072522 (4)<br>072513 (2) | 097747      |

\* BOX WITH MOLDED MOUNTING FEET, INSERT ONLY; NO COVER, OR GASKET, UL LISTED 576J

COVER DIMENSIONS





“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

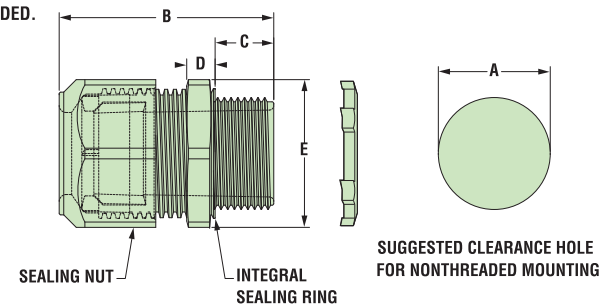
*The Ultimate in Liquid Tight Strain Relief Protection*

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. |
| <b>Oval Gland</b>                    |                  |        |             |                                 |                 |                       |                    |                 |                           |             |      |     |     |
| 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 |
| <b>Break-Thru Skinned Over Gland</b> |                  |        |             |                                 |                 |                       |                    |                 |                           |             |      |     |     |
| Q Cables plus Ground                 | 6,1 x 9,7<br>3,3 | 2<br>1 | M3234GDA-SM | SMCG 3/4 2-6.1x9.7MM<br>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<br>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)<br>Dynamic -4°F (-20°C) to 212°F (100°C)                                            |
| IP Rating           | IP 68                                                                                                                     |

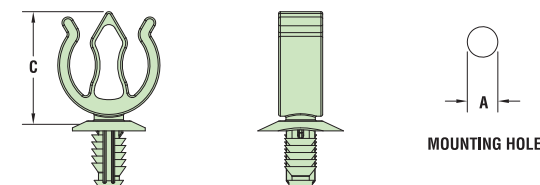
- Two new cordgrips now accommodate the Enphase Q Cable – M3231GCZ (1/2" NPT) and M3234GDA-SM (3/4" NPT).
- The 1/2" version provides liquid tight entry for one Enphase Q Cable – .24 x .38" (6,1 x 9,7 mm).
- The 3/4" version provides liquid tight entry for up to two Enphase Q Cables – .24 x .38" (6,1 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. A |     | OVERALL HEIGHT C |      |
|-----------------------|---------|---------------------|---------|----------------------------------------|--------------------------------------------------------------|----------------------|-----|------------------|------|
| Minimum               | Maximum | Minimum             | Maximum |                                        |                                                              | in.                  | mm. | in.              | mm.  |
|                       |         |                     |         |                                        |                                                              |                      |     |                  |      |
| <b>1-2 Wires</b>      |         |                     |         |                                        |                                                              |                      |     |                  |      |
| .028                  | 0,7     | .250                | 6,4     | .23 (5,8 mm) - .32 (8,0 mm) each cable | S6520 Helios UVX Clip 100 Pack<br>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.



# RAIL SYSTEM

## Instant Bonding

The N-S Bonding Jumper bonds row to row with no tools.

## One Clamp Anywhere

The Multi-Clamp works as mid- or end-clamp, and fits standard 30-40mm frames.

## Lifetime Wire Management

Open rail channel holds and protects wires. Clamps won't pinch wires after tightening.

## Bonding Structural Splice

Connect rails instantly, without tools, interference or limitations.

## Next-Level Solar Mounting

A complete system for hassle-free rooftop installation, from watertight mounts to lifetime wire management.



### Simplicity

1/2" socket for everything.  
One clamp for mid or end.  
No tool splicing and bonding.  
Easy wire management.



### Code Compliant

UL 2703 listed  
LTR-AE-001-2012 listed  
Class A fire rating for any slope  
ASCE 7-16 PE Certified  
FL Cert of Approval FL41396



### Premium Aesthetics

The narrowest panel gap available. Optional Hidden End Clamps and End Caps provide a flush look on the edge of the array.



### Watertight for Life

Secured on industry-leading Pegasus Mounts, for composite shingle and tile roofs. Backed by a 25-year warranty.

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# RAIL SYSTEM



### Pegasus Rail

Available in 14' and 7' lengths for easy layout and shipping.  
Open-channel design holds MC4 connectors, PV wire and trunk cables.  
Black and Mill finish



### Pegasus Max Rail

Maximum-strength design.  
Meets specifications for high snow-load and hurricane zones.  
Black and Mill finish



### Splice and Max Splice

Installs by hand.  
Works over mounts.  
Structurally connects and bonds rails automatically; UL2703 listed as reusable.



### Dovetail T-bolt

Dovetail shape for extra strength.  
Uses 1/2" socket.



### Multi-Clamp

Fits 30-40mm PV frames, as mid- or end-clamp.  
Twist-locks into position; doesn't pinch wires in rail.  
Bonds modules to rail; UL2703 listed as reusable



### Hidden End Clamp

Offers premium edge appearance.  
Preinstalled pull-tab grips rail edge, allowing easy, one-hand installation.  
Tucks away for reuse.



### Ground Lug

Holds 6 or 8 AWG wire.  
Mounts on top or side of rail.  
Assembled on MLPE Mount.  
UL2703 listed as reusable.



### N-S Bonding Jumper

Installs by hand, eliminates row-to-row copper wire.  
UL2703 listed as reusable only with Pegasus Rail.



### MLPE Mount

Secures and bonds most micro-inverters and optimizers to rail.  
Connectors and wires easily route underneath after installation.  
UL2703 listed as reusable.



### Cable Grip

Secures four PV wires or two trunk cables.  
Stainless-steel backing provides durable grip.  
Eliminates sagging wires.



### Wire Clip

Hand operable.  
Holds wires in channel.  
Won't slip.



### End Cap and Max End Cap

Fits flush to PV module and hides raw or angled cuts.  
Hidden drain quickly clears water from rail.

### Certifications:

- UL 2703, Edition 1
- LTR-AE-001-2012
- ASCE 7-16 PE certified
- Class A fire rating for any slope roof
- FL Cert of Approval FL41396



### FREE PEGASUS SOLAR Design Tool

Quickly calculate the most efficient layout, spans and materials needed to suit your job. Visit the Pegasus Customer Portal. [pegasussolar.com/portal](http://pegasussolar.com/portal)

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| LOAD       |            | SPAN |     |     |     |      |
|------------|------------|------|-----|-----|-----|------|
| SNOW (psf) | WIND (MPH) | 32"  | 48" | 72" | 96" | 120" |
| 0          | 100        |      |     |     |     |      |
|            | 130        |      |     |     |     |      |
| 10         | 140        |      |     |     |     |      |
| 30         | 190        |      |     |     |     |      |
| 50         |            |      |     |     |     |      |
| 100        |            |      |     |     |     |      |
| 120        |            |      |     |     |     |      |

PEGASUS RAIL

PEGASUS MAX RAIL

For reference only. Spans above are calculated using 7-16 for a Gable Roof, Exposure Category B, 0-20deg roof angle, 30ft mean roof height with non-exposed modules. For PE certified span tables, visit [www.pegasussolar.com/spans](http://www.pegasussolar.com/spans).

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DRAWING NUMBER:

SS

## Appendix A - Compatible PV Mod-

Pegasus Rail System may be used to ground a PV module complying with UL 2703 only when the specific module has been evaluated for grounding and/or mounting in compliance with this installation manual. Unless otherwise specified, "xxx" refers to the power rating of the PV module. Both black & silver frames are included in the UL2703 listing.



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## Appendix A - Compatible PV Modules (cont.)

Pegasus Rail System may be used to ground a PV module complying with UL 2703 only when the specific module has been evaluated for grounding and/or mounting in compliance with this installation manual. Unless otherwise specified, "xxx" refers to the power rating of the PV module. Both black & silver frames are included in the UL2703 listing.

[illegible]





# INSTAFLASH<sup>®</sup> 2

### Rafter or Deck Attach!

- No pilot holes
- Pre-installed sealant
- No caulking, no ripping shingles



### Pre-installed sealant

**Before:** Sealant contained by protective cage. No contact with hands or tools.

### Install in any season

Install in 0 to 170° F weather, including rain and sleet. Watertight for life.

### Instant, watertight seal

**After:** Non-hardening sealant automatically fills all gaps, overlays and butt joints.

## The Ultimate Comp Roof Attachment

Simple to use. Works for rafter or deck attach. No caulking, no ripped shingles, no mess. Pre-installed sealant acts as a chemical flashing and fills all gaps, voids, and butt joints for an instant, watertight seal.



### 25-Year Warranty

Manufactured with advanced materials and coatings to outlast the roof itself



### Code Compliant

Fully IBC/CBC Code Compliant  
Exceeds ASCE 7-22 Standards  
UL2703 Certified



### Self-Healing

Proprietary non-hardening sealant will flex and reseal over years of thermal expansion and contraction



### Larger Spans

Extra-large L-foot and proprietary screws result in larger spans between mounts

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# INSTAFLASH<sup>®</sup> 2

**1** Release Safety.

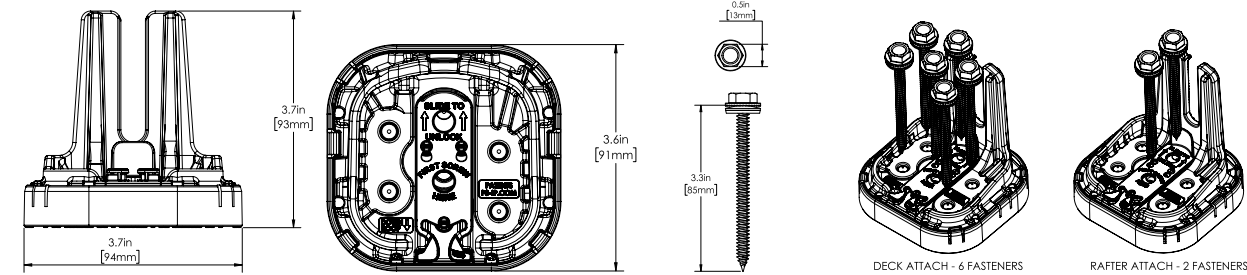
**2** Install screw through center hole, and drive into roof until InstaFlash2 pushes through cage and seats onto the roof.

**3** If screw hits rafter, drive second screw in hole above. Ensure screws are embedded at least 2.5" into rafter. Installation complete.

**4** If first screw misses rafter, install second screw into the left or right screw holes over rafter.

**5** Continue until 2 screws are embedded at least 2.5" into rafter.

**6** For deck attach, use 6 screws.  
*Note: Deck attach may reduce max span.*



| SPECIFICATIONS           | INSTAFLASH KITS                                                                                    |                                    |                  |                                   |
|--------------------------|----------------------------------------------------------------------------------------------------|------------------------------------|------------------|-----------------------------------|
|                          | PIF2-B0                                                                                            | PIF2-BDT                           | PIF2-M0          | PIF2-MDT                          |
| Finish                   | Black                                                                                              |                                    | Mill             |                                   |
| Kit Contents             | Black InstaFlash2                                                                                  | Black InstaFlash2, Dovetail T-bolt | Mill InstaFlash2 | Mill InstaFlash2, Dovetail T-bolt |
| Attachment Type          | Rafter & Deck Attach                                                                               |                                    |                  |                                   |
| Roof Fasteners           | 1/2" Socket Driven; PF-DRW85 (sold separately in boxes of 24)                                      |                                    |                  |                                   |
| Roof Type                | Sloped Roof: Composition Shingle, Rolled Asphalt   Flat Roof: Modified Bitumen Roof, Built-Up Roof |                                    |                  |                                   |
| Flashing Type            | Factory Installed Non-Drying, Non-Skinning Butyl Based Chemical Flashing                           |                                    |                  |                                   |
| Installation Temperature | 0° F to 170° F                                                                                     |                                    |                  |                                   |
| Cure Time                | Instantly Waterproof; Non-Hardening                                                                |                                    |                  |                                   |
| Service Temperature      | -40° F to 195° F                                                                                   |                                    |                  |                                   |
| Certifications           | IBC, ASCE/SEI 7-16 & 7-22, UL2703                                                                  |                                    |                  |                                   |
| Install Application      | Most Railed Systems                                                                                |                                    |                  |                                   |
| Kit Quantity             | 24                                                                                                 |                                    |                  |                                   |
| Boxes Per Pallet         | 36                                                                                                 |                                    |                  |                                   |

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SCAN FOR  
INSTALLATION  
VIDEO



SCAN FOR  
FREE TRIAL

DRAWING NUMBER:

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