# PHOTOVOLTAIC ROOF MOUNT SYSTEM

30 MODULES-ROOF MOUNTED - 10.95 kW DC, 8.70 kW AC, 176 SW POLARIS TERRACE, FORT WHITE, FL 32038

## PHOTOVOLTAIC SYSTEM SPECIFICATIONS:

| | |
|---|---|
| SYSTEM SIZE: | 10.95 KW DC<br>8.70 KW AC |
| MODULE TYPE & AMOUNT: | (30) APTOS DNA 120 MF26-365W MODULES |
| MODULE DIMENSIONS: | (L/W/H) 69.13"/40.9"/1.38" |
| INVERTER: | (30) ENPHASE IQ7PLUS-72-2-US, 240V |
| INTERCONNECTION METHOD: | BACKFEED BREAKER |

BATTERY : - 1 - (N) ENPHASE ENCHARGE 10-1P-NA BATTERY
SMART SWITCH : 1 - (N) ENPHASE ENPOWER SMART SWITCH

| | |
|---|---|
| ATTIC TEMPERATURE | 130 DEGREE |

| | | |
|---|---|---|
| Total Array Area | 589.05 | SqFt |
| Total Roof Area | 3256.660 | SqFt |
| Total Percentage or Roof Covered<br>*Total Array Area / Total Roof Area)*100* | 18.09% | SqFt |

### ROOF ACCESS POINT

ROOF ACCESS POINT SHALL NOT BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

### GOVERNING CODES

ALL WORK SHALL CONFORM TO THE FOLLOWING CODES
1. FLORIDA RESIDENTIAL CODE, 7TH EDITION 2018 (FRC)
2. FLORIDA BUILDING CODE, 7TH EDITION 2020 (FBC)
3. FLORIDA FIRE CODE, 7TH EDITION 2020 (FFC)
4. NATIONAL ELECTRICAL CODE 2017 (NEC) ASCE 7-16

### GENERAL NOTES:

1) THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURER'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.

2) THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.

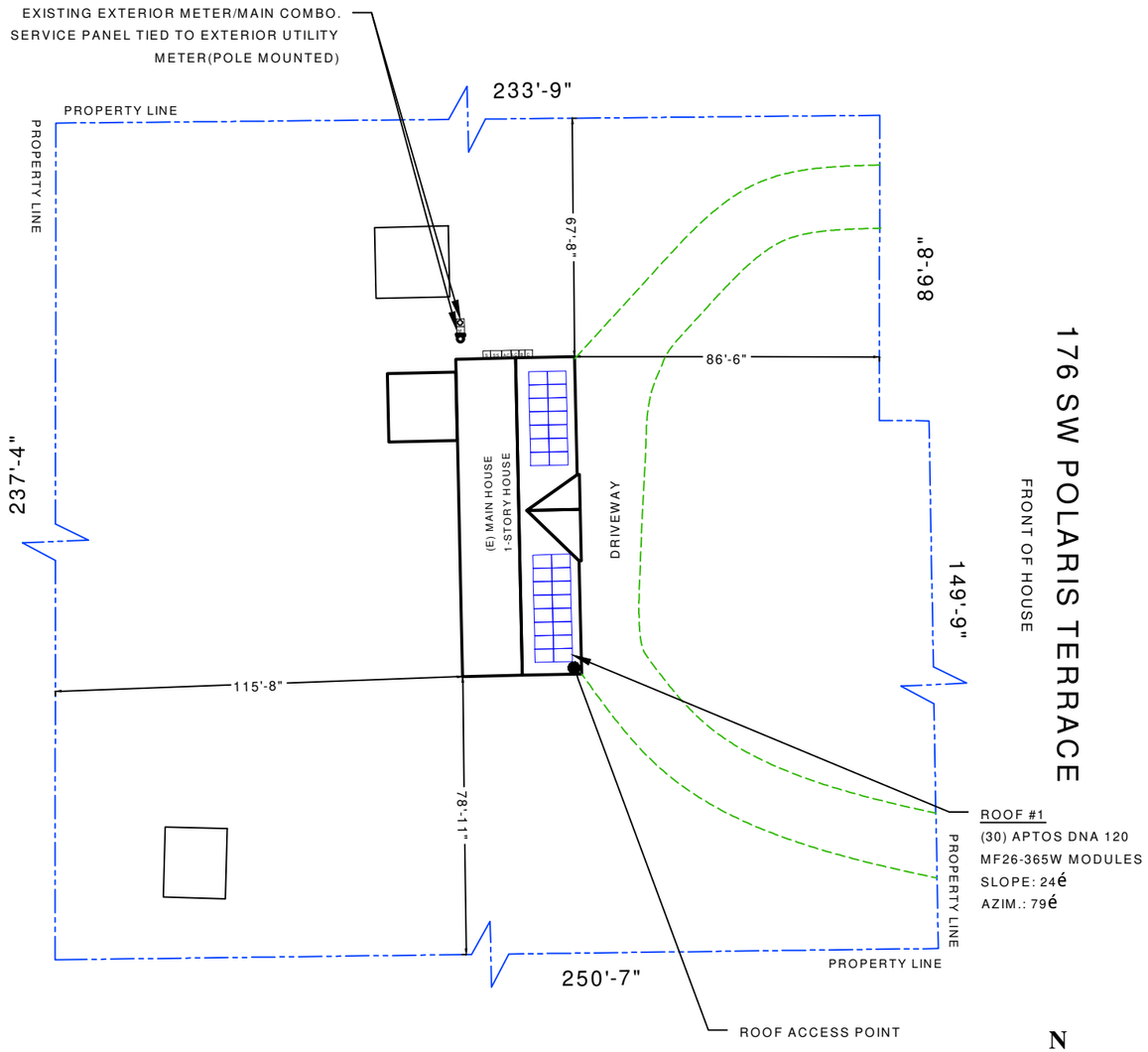
3) GROUND FAULT DETECTION AND INTERRUPTION (GFDI) DEVICE IS INTEGRATED WITH THE MICRO-INVERTER IN ACCORDANCE WITH NEC 690.41(B)

4) ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4: PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY

5) MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.

6) ALL INVERTERS, PHOTOVOLTAIC MODULES,PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4. SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].

7) ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.




1 PLOT PLAN
PV 0.0
SCALE: 3/128" = 1'-0"

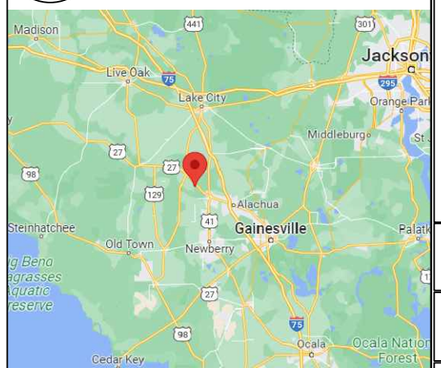
## SHEET INDEX:



## SYSTEM LEGEND

- O M — EXISTING EXTERIOR METER/MAIN COMBO. SERVICE PANEL & POINT OF INTERCONNECTION. TIED TO EXTERIOR UTILITY METER.(POLE MOUNTED)
- C — NEW DEDICATED PV SYSTEM COMBINER PANEL.
- B — NEW 1-ENPHASE ENCHARGE 10 BATTERY
- S — NEW BACKUP LOADS SUB PANEL
- SS — NEW ENPHASE ENPOWER SMART SWITCH
- LC — NEW ENPHASE IQ LOAD CONTROLLER
- AC — NEW ALTERNATIVE POWER SOURCE AC DISCONNECT

2 SATELLITE VIEW
PV 0.0
SCALE: NTS




3 VICINITY MAP
PV 0.0
SCALE: NTS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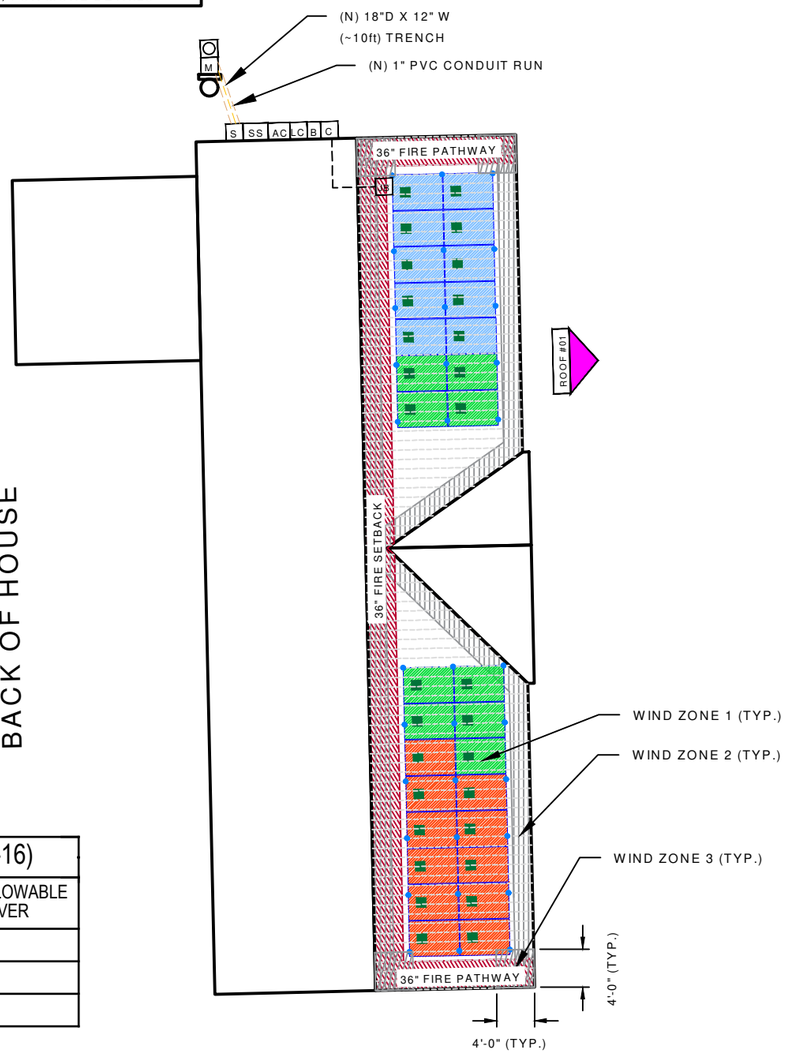
KK
DATE: 07/06/2023

Sheet Name
COVER SHEET

Sheet Number
PV 0.0

NOTE:
1" IMC, RMC, FMC, LFMC, PVC, HDPE, NUCC, RTRC, LFNC, FMT, ENT OR EMT CONDUIT RUN.

NOTE : SOLAR PANEL LAYOUT IS CONCEPTUAL, BUT AS PROVIDED, CONFORMS WITH THE REQUIREMENTS SET IN SHEET PV-2 CONTRACTOR MAY ADJUST PANEL LOCATION. SOLID CORNERS (4'X4') SHOWN THE PLAN IS WIND ZONE 3. SEE 2018 FLORIDA RESIDENTIAL CODE (7TH EDITION) FOR MORE DETAILS




| ANCHOR PLACEMENT PARAMETERS (ASCE 7-16) | | | |
|---|---|---|---|
| WIND PRESSURE ZONE | MODULE WIND EXPOSURE | MAX. ANCHOR SPACING | MAX. ALLOWABLE CANTILEVER |
| ZONE 1/2e | NORMAL | 48.0IN | 16.0IN |
| ZONES 2n/2r/3e | NORMAL | 48.0IN | 16.0IN |
| ZONES 3r | NORMAL | 24.0IN | 8.0IN |

No Exposed or Edge Placements Allowed

1. APPLICABLE CODE: 2020 FLORIDA BUILDING CODE (7TH EDITION) & ASCE 7-16 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.
2. LAG SCREW DIAMETER AND EMBEDMENT LENGTHS ARE DESIGNED PER 2020 FLORIDA BUILDING CODE (7TH EDITION) REQUIREMENTS. ALL BOLT CAPACITIES ARE BASED ON A SOUTHER YELLOW PINE (SYP) RESIDENTIAL WOOD ROOF RAFTERS AS EMBEDMENT MATERIAL.
3. ALL WIND DESIGN CRITERIA AND PARAMETERS ARE FOR HIP AND GABLE RESIDENTIAL ROOFS, CONSIDERING FROM A 7é TO A MAXIMUM 26é (5/12 TO A MAXIMUM 7/12 PITCH) ROOF IN SCHEDULE. CONTRACTOR TO FIELD VERIFY THAT MEAN ROOF HEIGHT DOES NOT EXCEED 15'-0".
4. ROOF SEALANTS SHALL CONFORM TO ASTM C920 AND ASTM 6511, AND IS THE RESPONSIBILITY OF THE CONTRACTOR TO PILOT DRILL AND FILL ALL HOLES.
5. ALL DISSIMILAR MATERIALS SHALL BE SEPARATED WITH NEOPRENE WASHERS, PADS, ETC OR SIMILAR.
6. ALL ALUMINIUM COMPONENTS SHALL BE ANODIZED ALUMINIUM 6105-T5 UNLESS OTHERWISE NOTED.
7. ALL LAG SCREW SHALL BE ASTM A276 STAINLESS STEEL UNLESS OTHERWISE NOTED.
8. ALL SOLAR RAILING AND MODULES SHALL BE INSTALLED PER MANUFACTURER INSTRUCTIONS.
9. CONTRACTOR SHALL ENSURE ALL ROOF PENETRATIONS TO BE INSTALLED AND SEALED PER 2020 FLORIDA BUILDING CODE (7TH EDITION) OR LOCAL GOVERNING CODE.

1 SITE PLAN
PV 1.0
SCALE: 1/16" = 1'-0"

## SYSTEM LEGEND

- M — EXISTING EXTERIOR METER/MAIN COMBO. SERVICE PANEL & POINT OF INTERCONNECTION. TIED TO EXTERIOR UTILITY METER.(POLE MOUNTED)
- C — NEW DEDICATED PV SYSTEM COMBINER PANEL.
- B — NEW 1-ENPHASE ENCHARGE 10 BATTERY
- S — NEW BACKUP LOADS SUB PANEL
- SS — NEW ENPHASE ENPOWER SMART SWITCH
- LC — NEW ENPHASE IQ LOAD CONTROLLER
- AC — NEW ALTERNATIVE POWER SOURCE AC DISCONNECT

30 NEW APTOS DNA 120 MF26-365W MODULES WITH NEW 30 - ENPHASE IQ7PLUS-72-2-US, 240V INVERTERS, MOUNTED ON THE BACK OF EACH MODULES.

- = ROOF OBSTRUCTIONS, VENT
- = ATTACHMENT POINTS
- = EXTERIOR RUN
- = ATTIC RUN
- = CONDUIT ROOF TOP JUNCTION BOX
- = CONDUIT ATTIC RUN JUNCTION BOX
- =SEAMS
- = WIND ZONE
- = FIRE SETBACK & PATHWAY

## ROOF SECTIONS

ROOF #01
MODULE - 30
SLOPE - 24é
AZIMUTH - 79é
MATERIAL - METAL ROOF

## CIRCUIT(S)

- CIRCUIT #1 - 10 MODULES
- CIRCUIT #2 - 09 MODULES
- CIRCUIT #3 - 11 MODULES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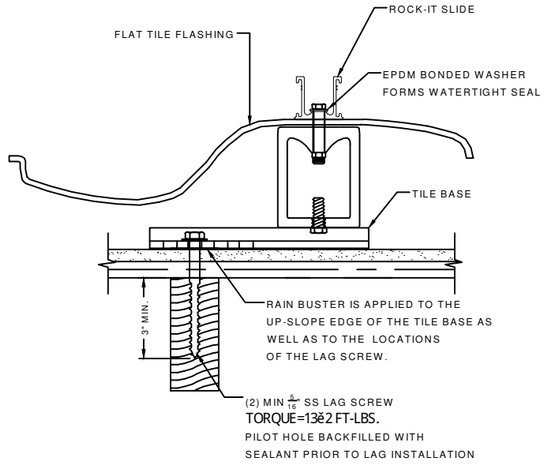
Sheet Name
SITE PLAN

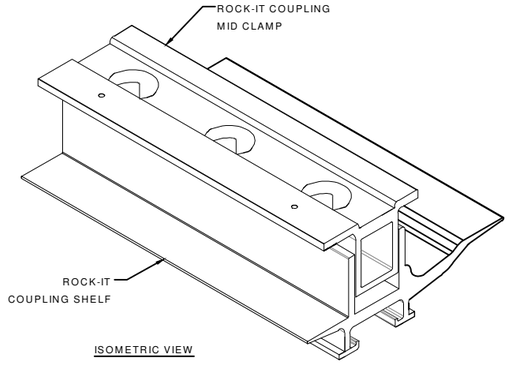
Sheet Number
PV 1.0

## GENERAL STRUCTURAL NOTES:

1. THE SOLAR PANELS ARE TO BE MOUNTED TO THE ROOF FRAMING ROCK IT ECOFASTEN ATTACHMENT. THE MOUNTING FEET ARE TO BE SPACED AS SHOWN IN THE DETAILS, AND MUST BE STAGGERED TO ADJACENT FRAMING MEMBERS TO SPREAD OUT THE ADDITIONAL LOAD.
2. UNLESS NOTED OTHERWISE, MOUNTING ANCHORS SHALL BE 5/16" LAG SCREWS WITH A MINIMUM OF 2-1/2" PENETRATION INTO ROOF FRAMING.
3. THE PROPOSED PV SYSTEM ADDS 2.6 PSF TO THE ROOF FRAMING SYSTEM.
4. ROOF LIVE LOAD = 20 PSF TYPICAL, 0 PSF UNDER NEW PV SYSTEM.
5. SNOW LOAD = 0 LB/SQFT
6. WIND SPEED = 130 MPH
7. EXPOSURE CATEGORY = C
8. MAX SPACING BETWEEN ATTACHMENTS (INCHES) = 48"

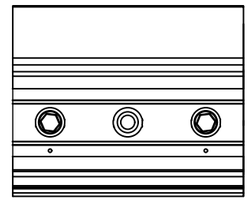



1 / S 1.0 ROCK-IT MOUNT DETAIL
NOT TO SCALE

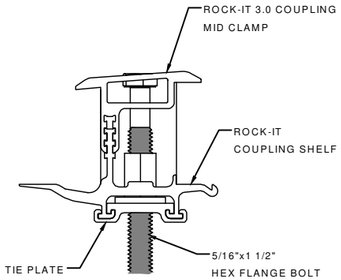



ISOMETRIC VIEW

U.L. LISTING FOR ECOFASTEN: 2703
WEIGHT: 2.3 lb.

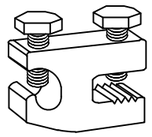


TOP VIEW

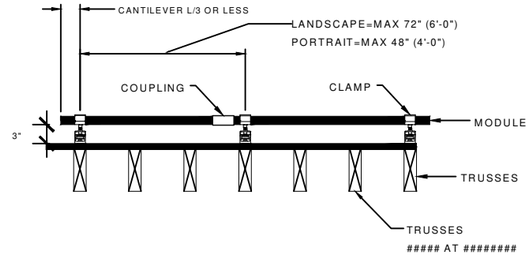



SIDE VIEW

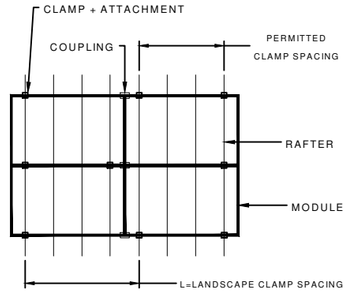
2 / S 1.0 ROCK-IT COUPLING ASSEMBLY
NOT TO SCALE

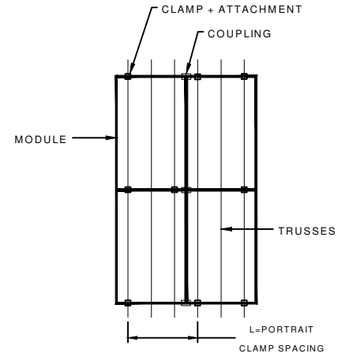


3 / S 1.0 ILSCO SGB-4 GROUNDING LUGS
NOT TO SCALE

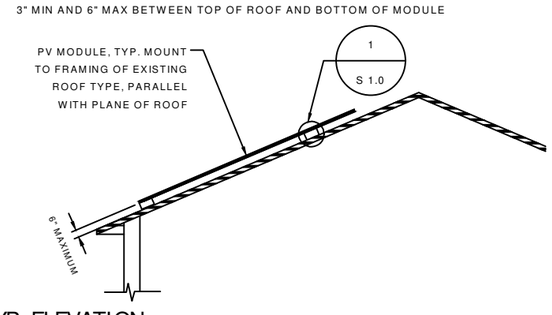



4 / S 1.0 PV SYSTEM MOUNTING DETAIL
NOT TO SCALE

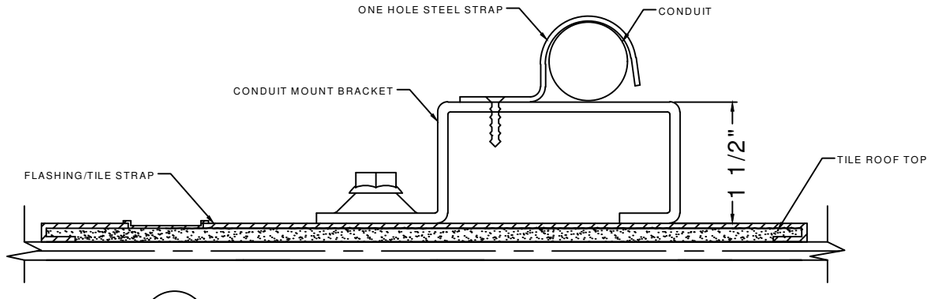



5 / S 1.0 MODULES IN PORTRAIT/LANDSCAPE
NOT TO SCALE




6 / S 1.0 PV ARRAY TYP. ELEVATION
NOT TO SCALE




7 / S 1.0 CONDUIT MOUNTING DETAIL
NOT TO SCALE

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Sheet Name
ATTACHMENT DETAIL

Sheet Number
PV 2.0

MODULE TYPE & AMOUNT: (30) APTOS DNA 120 MF26-365W MODULES
MICRO-INVERTER: (30) ENPHASE IQ7PLUS-72-2-US, 240V
(1) CIRCUIT OF 10 MODULES CONNECTED IN PARALLEL
(1) CIRCUIT OF 09 MODULES CONNECTED IN PARALLEL
(1) CIRCUITS OF 11 MODULES CONNECTED IN PARALLEL
SYSTEM SIZE: 10.95 KW DC
8.70 KW AC

(GN) GENERAL CONDUIT NOTE :
CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV PROTECTED (EX. -EMT,SCH 80 PVC OR RMC)*FMC MAYBE USED IN INDOOR APPLICATIONS WHERE PERMITTED BY NEC ART .348

CONDUIT NOTE:
APPROVED USE OF CONDUITS AND THEIR APPLICATIONS:
IN AMBIENT TEMRATURES<122FARENHEIT:PVC(NEC 352.12)
AC IN ATTICS:NM-B,
AC OR DC IN ATTICS:FNC,FMC,TYPE AC
OUTSIDE BUILDINGS: PVC SCH40, LFNC-B,LFMC,EMT
OUTSIDE BUILDINGS EXPOSED TO DAMAGE:PVC SCH80
NOTES: LFMC OR LFNC CAN BE USED AS NECESSARY ,IF "USES PERMITTED" OF THE CURRENT SIZING REFER TO CHAPTER 9 TABLES, NEC
NEC 690.45-46,
TABLE 250.66, TABLE 250.122

**120% RULE**

BUS BAR RATING X 120%) - MAIN BREAKER RATING = MAX. PV OCPD

(200A x 120%) - 150 = 90A

MAIN BREAKER DERATED FROM 200A TO 150A

EXISTING 240V/200A BUS BAR RATING, MAIN SERVICE PANEL, SINGLE PHASE, WITH NEW 150A MAIN BREAKER(POLE MOUNTED)

EXISTING CLAY UTILITY METER

(3) ENPHASE Q CABLES

(19) ENPHASE IQ7PLUS-72-2-US, 240V MICRO-INVERTERS, 240V, 1.21A MAX CEC WEIGHTED EFFICIENCY 97.0% NEMA 4R, UL LISTED, INTERNAL GFDI

10 MICRO-INVERTERS IN BRANCH CIRCUIT #1

TERMINATOR CAP ON LAST CABLE CONNECTOR AC TRUNK CABLE (TYP)

09 MICRO-INVERTERS IN BRANCH CIRCUIT #2

TERMINATOR CAP ON LAST CABLE CONNECTOR AC TRUNK CABLE (TYP)

(11) ENPHASE IQ7PLUS-72-2-US, 240V MICRO-INVERTERS, 240V, 1.21A MAX CEC WEIGHTED EFFICIENCY 97.0% NEMA 4R, UL LISTED, INTERNAL GFDI

11 MICRO-INVERTERS IN BRANCH CIRCUIT #3

TERMINATOR CAP ON LAST CABLE CONNECTOR AC TRUNK CABLE (TYP)

(N) JUNCTION BOX 600 V, NEMA 4 UL LISTED

ENPHASE IQ LOAD CONTROLLER, EP-NA-LK02-040, 240V

PRODUCTION CT

(N) COMBINER PANEL ENPHASE IQ COMBINER 3-IQ- AM1-240-3C 64A/240V CONTINUOUS, PROTECTION MAX 80A BREAKER ON SOLAR OUPUT; WITH 10 KAIC CIRCUIT BREAKERS

CELL MODEM, IQ ENVOY (REVENUE GRADE METER), PRODUCTION, CONSUMPTION, TO MSP

15A, 20A, 20A, 20A

(N) ALTERNATIVE POWER SOURCE AC DISCONNECT/ RAPID SHUTDOWN: 240V, 60AMP RATED, NEMA 3R, UL LISTED LOCKABLE & NON-FUSIBLE

PV BREAKER

(N) ENPHASE ENPOWER SMART SWITCH MICROGRID INTERCONNECT DEVICE, EP200G101-M240US00, NEMA 3R, 200A RATED, 240V

CONTROL PCBA

AC COMBINER BREAKER 60A, NFT 40A, ENCHARGE BREAKER 20A, RESERVED FOR GENERATOR, MID RELAY, 100A MAIN BREAKER, 100A LOAD BREAKER, NEUTRAL, GROUNDING TERMINAL

(3) #4 AWG THWN-2
(1) #6 AWG THWN-2 GND
1" PVC CONDUIT RUN

L1
L2
N

(3) #4 AWG THWN-2
(1) #6 AWG THWN-2 GND
1" EMT CONDUIT RUN

M

CONSUMPTION CTs FROM IQ COMBINER PANEL

(N) 150A/2P

(E) LOADS

(E) LOADS

(N) 70A/2P

N

G

GEC

(N) 70A/2P BACKFEED BREAKER

EXISTING GROUNDING ELECTRODE SYSTEM TO EARTH REF. NEC 250.52, 250.53(A)

GROUNDING ELECTRODE SYSTEM

LOAD SIDE INTERCONNECTION AT MAIN PANEL PER ART. 705.12(B)

(2) #10 AWG THWN-2
(1) #10 AWG THWN-2 GND
3/4" EMT CONDUIT RUN

(N) (1) ENPHASE ENCHARGE-10-1P-NA, NEMA 3R 240 VAC, 10.5 KWH, 3.84 KVA

(E) LOADS

(E) LOADS

15A

(3) #4 AWG THWN-2
(1) #6 AWG THWN-2 GND
1" EMT CONDUIT RUN

(N) 125A RATED BACKUP LOAD SUB PANEL, (240V)

| WIRE TAG # | WIRE FROM - - | CONDUIT | WIRE QTY | WIRE GAUGE: | WIRE TYPE ENPHASE TRUNK CABLE INCLUDES #12 GROUND | TEMP RATING: NEC 310. 15(B)(3)(c) | WIRE AMP | TEMP DE-RATE: NEC 310.15 (B)(2)(a) | CONDUIT FILL: NEC 310.15 (B)(3)(a) | WIRE OCP: | TERMINAL 75éC RATING: | INVERTER QTY: | NOC: | NEC: | STRING AMPS NEC 690.8(B) | GRND SIZE | GRND WIRE TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ARRAY TO JUNCTION BOX | PV WIRE | 3 | #12 | TRUNK CABLE | 90é | 30A x 0.96 x 1.00 | =28.80A | | | 25A | 11 x 1.21 x 1.25 | = 16.64A | | | #6 | SBC |
| 2 | JUNCTION BOX TO COMBINER PANEL | 3/4" EMT | 6 | #10 | THWN-2 | 90é | 40A x 0.96 x 0.80 | =30.72A | | | 35A | 11 x 1.21 x 1.25 | =16.64A | | | #10 | THWN-2 |
| 3 | COMBINER PANEL TO ENPOWER | 3/4" EMT | 3 | #6 | THWN-2 | 90é | 75A x 0.96 x 1.00 | = 72.0A | | | 65A | 33 x 1.21 x 1.25 | =49.91A | | | #8 | THWN-2 |


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Sheet Name
3-LINE DIAGRAM

Sheet Number
E 1.1

Rooftop conductor ampacities designed in compliance with art. 690.8, Tables 310.15(B)(2)(a), 310.15(B)(3)(a), 310.15(B)(3)(c), 310.15(B)(16), Chapter 9 Table 4, 5, & 9. Location specific temperature obtained from ASHRAE 2017 data tables

| | |
|---|---|
| RECORD LOW TEMP | 3é |
| AMBIENT TEMP (HIGH TEMP 2%) | 33é |
| CONDUIT HEIGHT | 7/8" |
| CONDUCTOR TEMPERATURE RATE | 90é |

| SOLAR MODULE PER MANUFACTURER SPECIFICATIONS | |
|---|---|
| MANUFACTURER | Aptos DNA 120 MF26-365W |
| MAX. POWER-POINT CURRENT (IMP) | 10.75 AMPS |
| MAX. POWER-POINT VOLTAGE (VMP) | 33.96 VOLTS |
| OPEN-CIRCUIT VOLTAGE (VOC) | 40.07 VOLTS |
| SHORT-CIRCUIT CURRENT (ISC) | 11.36 AMPS |
| NOM. MAX. POWER AT STC (PMAX) | 365 WATT |
| VOC TEMPERATURE COEFFICIENT | -0.26é %/éC |

| MICRO-INVERTER PER MANUFACTURER SPECIFICATIONS | |
|---|---|
| MANUFACTURER | ENPHASE ENERGY IQ7PLUS-72-2-US |
| MAX. DC VOLT RATING | 60 VOLTS |
| MAX. POWER AT 40 C | 290 WATTS |
| NOMINAL AC VOLTAGE | 240 VOLTS |
| MAX. AC CURRENT | 1.21 AMPS |
| MAX. OCPD RATING | 20 AMPS |
| MAX. PANELS/CIRCUIT | 13 |
| SHORT CIRCUIT CURRENT | 15 AMPS |

| THIS PANEL IS FED BY MULTIPLE SOURCES (UTILITY AND SOLAR AND STORAGE) | |
|---|---|
| AC OUTPUT CURRENT | 52.30A |
| NOMINAL AC VOLTAGE | 240V |

ENPHASE Q CABLE TO BE ATTACHED TO RAIL MIN. 3-1/2" ABOVE ROOF SURFACE

## SYSTEM NOTES:

1. ENPHASE IQ7PLUS-72-2-US, (240V) MICROINVERTERS DO NOT REQUIRE GROUNDING ELECTRODE CONDUCTORS OR EQUIPMENT GROUNDING CONDUCTORS. THE MICROINVERTERS ITSELF HAS CLASS II DOUBLE-INSULATED RATING, WHICH INCLUDES GROUND FAULT PROTECTION.
2. ENPHASE Q CABLE HAS NO NEUTRAL WIRE - (2 WIRE DOUBLE INSULATED CABLING)
3. MODULES ARE BONDED TO RAIL USING IRONRIDGE INTEGRATED GROUNDING.
4. RAILS ARE BONDED WITH UL 2703 RATED LAY-IN LUGS
5. SYSTEM IS UNGROUNDED
6. BARE COPPER IS TRANSITIONED TO THHN/THWN-2 VIA IRREVERSIBLE CRIMP; GEC TO BE CONTINUOUS PER CEC 250.64(C)
7. SUB-BRANCHES ARE CENTER-FED AT JBOX TO MAKE ONE TOTAL BRANCH CIRCUIT.
8. ENPHASE IQ ENVOY INSIDE IQ COMBINER REQUIRES A NEUTRAL TO BE LANDED AT THE NEUTRAL BUSS AT MAIN PANEL PER ENPHASE INSTALLATION INSTRUCTIONS.
9. ENPHASE MICROINVERTERS ARE ALL RAPID SHUTDOWN READY PER NEC 690.12

| ENPHASE ENCHARGE 10 | |
|---|---|
| MANUFACTURER | ENCHARGE-10-1P-NA |
| NOMINAL VOLTAGE /RANGE | 240 /211-264 VAC |
| PEAK OUTPUT POWER | 5.7 KVA (10 SECONDS) |
| RATED CONTINUOUS OUTPUT POWER | 3.84 KVA |
| RATED OUTPUT CURRENT | 16 AMPS |
| PEAK OUTPUT CURRENT | 24.6A (10 SECONDS) |
| NOMINAL DC VOLTAGE | 67.2 V |
| MAX. DC VOLTAGE | 73.5 V |

| ENPHASE ENPOWER | |
|---|---|
| MANUFACTURER | EP200G101-M240US00 |
| SYSTEM VOLTAGE | 120/240 VAC, 60HZ |
| MAX. CONT. CURRENT | 160 AMPS |
| MAX. OUTPUT OCPD | 200 AMPS |
| MAX. OCPD FOR STORAGE BRANCH | 80 AMPS |
| MAX. OCPD FOR PV COMBINER BRANCH | 80 AMPS |

NOTE:-

(1) ENCHARGE BATTERY SYSTEM ENERGY CAPACITY SHALL BE SIZED TO SUPPLY ALL DESIRED LOADS DURING AN OUTAGE. POWER CAPACITY OF THE ENCHARGE BATTERY SYSTEM SHALL BE CAPABLE OF SUPPLYING THE LARGEST LOAD ON SITE, PER 2017 NEC 710.15(A) & NEC 710.15(E).

(2) ENCHARGE BATTERY STORAGE DISCONNECT SHALL BE SECURED USING AN EATON TYPE-BR CIRCUIT BREAKER HOLD DOWN KIT #BRHDK125 (2017 NEC 710.15(E)

(3) ETHERNET OR WIFI IS THE PRIMARY COMM'S FOR ENVOY TO ENLIGHTEN.

(4) CONSUMPTION CTs PLACEMENT.

(5) SINGLE LARGEST BREAKER IN BACKED UP LOAD PANEL CANNOT EXCEED THE (ESS) STORAGE OUTPUT CAPACITY (20 AAC) PER NEC 710.15

(6) SINGLE LARGEST LOAD IN BACKED UP LOAD PANEL CANNOT EXCEED THE (ESS) STORAGE OUTPUT CAPACITY, CONTINUOUS RATING (16 AAC) AND SURGE OF (24.6 AAC) FOR 10 SECONDS PER NEC 710.15.

(7) ENPOWER'S MAIN INPUT & OUTPUT LUGS ARE RATED FOR #1-350 KCMIL, FOR WIRES SMALLER THAN #1 REMOVE LUG AND USE AN APPROVED UL RING TERMINAL.

## NOTES

1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT. THE TERMINALS ARE RATED FOR 75 DEGREE C.
3. THE WIRES ARE SIZED ACCORDING TO NEC 110.14.
4. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
5. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
6. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
7. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
8. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
9. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
10. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
11. THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE .
12. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE. 13. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
14. RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
15. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
16. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).
17. THIS SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN OF PV CONDUCTORS IN COMPLIANCE WITH NEC 690.12.
18. LABELING IN COMPLIANCE WITH NEC 690.12 AND 690.56(C) IS SHOWN ON SHEET E-03.
19. ALL CONDUITS TO BE INSTALLED A MIN OF 7/8" ABOVE THE ROOF SURFACE.


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BAY AREA PROJECT SOLUTION LLC
379 DOUGLAS RD E A,
OLDSMAR, FL 34677


Chad E Widup

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39905 Grays Airport Road
Lady Lake, FL 32159

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COUNTY- COLUMBIA

DRAWN BY
KK
DATE: 07/06/2023

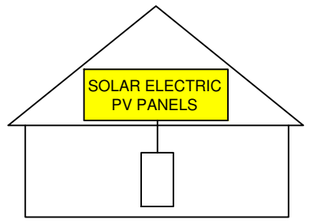
Sheet Name
NOTES

Sheet Number
E 1.2

WARNING: PHOTOVOLTAIC POWER SOURCE

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY




AC DISCONNECT

SOLAR BREAKER

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

PHOTOVOLTAIC SYSTEM AC DISCONNECT
OPERATING VOLTAGE: 240 VOLTS
OPERATING CURRENT: 52.30 AMPS

AC COMBINER BOX

PHOTOVOLTAIC MICROINVERTERS LOCATED UNDER EACH PV MODULE IN ROOFTOP ARRAY

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN
RATED AC OUTPUT CURRENT: 52.30 A
NOM. OPERATING VOLTAGE: 240 V

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

_____KW SOLAR DISCONNECT LOCATED

___ FT ⇦

⇨ FT ___

CAUTION:
BATTERY POWER SOURCE INSTALLED AS PART OF ELECTRICAL SYSTEM

LABEL LOCATION:
MAIN SERVICE PANEL

WARNING
INVERTER OUTPUT CONNCTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

SOLAR CONECTION BACKFEED BREAKER

BATTERY

1 OF 1

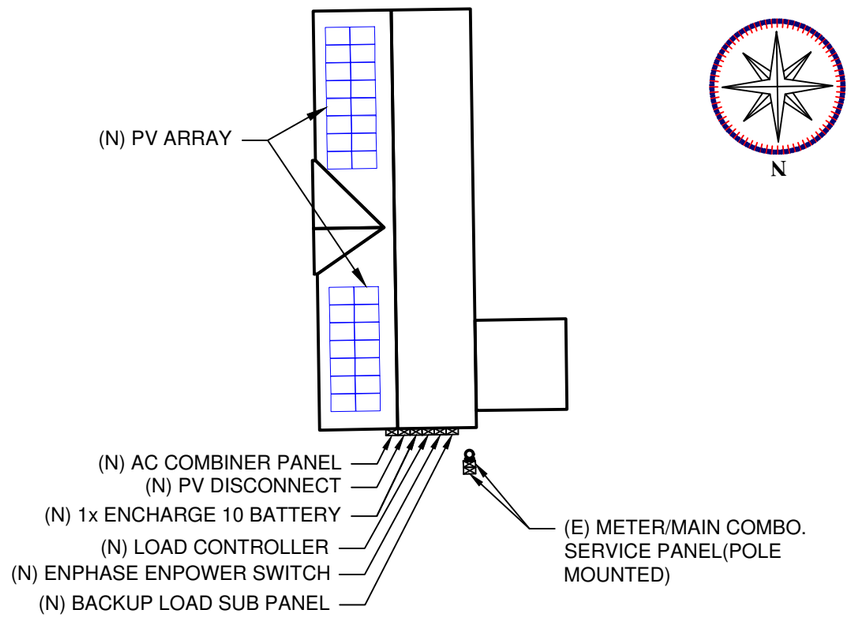
LABEL LOCATION:
BATTERY

CAUTION:
ALTERNATE POWER SOURCE

LABEL LOCATION:
ALL BATTERY ASSOCIATED CONDUIT TO BE LABELED EVERY 10FT CAUTION: ALTERNATE POWER SOURCE

# CAUTION:

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




ELECTRICAL NOTES :

1). UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
2). WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
3). ALL EQUIPMENT INSTALLED SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) PER NEC ARTICLE 110.3.
4). RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
5). ALL LABELS OR MARKINGS SHALL BE VISIBLE AFTER INSTALLATION. THE LABELS SHALL BE REFLECTIVE, AND ALL LETTERS SHALL BE CAPITALIZED AND SHALL BE A MINIMUM HEIGHT OF 9.5 MM (3/8 IN) IN WHITE ON A RED BACKGROUND.
6). CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.8 (D).
7). CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.8 (C)

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Sheet Name
WARNING LABELS

Sheet Number
E 1.3

# DNA™ 120

Solar for Innovators

Residential I Commercial

## Designed & Engineered in Silicon Valley

### 370W I 365W I 360W

Our DNA™ Split Cell Series impressively combines advanced solar technologies to maximize performance. Our patented Dual Nano Absorber (DNA™) Technology allows the panel to operate at high-efficencies in extreme temperatures. Contact our sales team today to learn more about our line of high-efficienty solar panels.

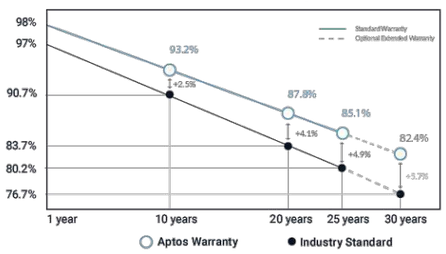
- Patented DNA™ technology boosts power performance & module efficiency
- Advanced split cell technology with 9 ultra-thin busbars allows for less resistance and more photon capture
- Ideal solution for applications affected by shading
- All-black design for pristine aesthetics
  No excessive silver bussing or ribbons
- Robust product design is reslient in extreme weather. Up to 5400 Pa snow load and 210 mph wind speeds

30 Year Warranty | 3X IEC Standards | RETC Top Performer


aptos™ solar technology

3140 De La Cruz Blvd., Ste 200
Santa Clara, CA 95054
wwww.aptossolar.com
info@aptossolar.com

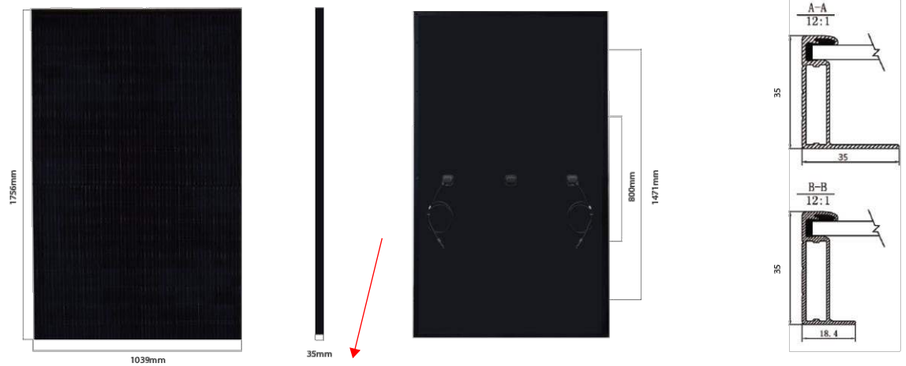

## Linear Performance Warranty





DNA™ 120

Solar for Innovators


| Electrical Specifiactions | DNA-120-MF26-360W | DNA-120-MF26-365W | DNA-120-MF26-370W |
|---|---|---|---|
| STCrated Output $P_{mpp}$ (W) | 360W | 365W | 370W |
| Module Efficiency | 19.73% | 20.01% | 20.29% |
| Open Circuit Voltage $V_{OC}$ (V) | 40.4 | 40.7 | 40.8 |
| Short Circiut Current $I_{SC}$ (A) | 11.24 | 11.36 | 11.51 |
| Rated Voltage $V_{mmp}$ (V) | 33.8 | 33.96 | 34.06 |
| Rated Voltage $I_{mmp}$ (A) | 10.66 | 10.75 | 10.87 |

Standard Test Conditions for front-face of panel: 1000 W/m², 25°C, measurement uncertainty <3%

| Temperature Coefficients | |
|---|---|
| Temperature Coefficients $P_{mmp}$ | -0.36% |
| Temperature Coefficients $I_{sc}$ | +0.05%/°C |
| Temperature Coefficients $V_{OC}$ | -0.29%/°C |
| Normal Operating Cell Temperature (NOCT) | 44°C |

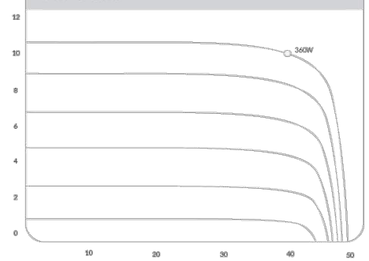
| Test Operating Conditions | |
|---|---|
| Maximum Series Fuse | 20A |
| Maximum System Voltage | 1,500 VDC (UL&IEC) |
| Maximum Load Capacity (Per UL 1703) | 5400 PA Snow Load / 210mph Wind Rating |
| Fire Performance Class | Class C/Type 1 |

| Packaging Configuration | |
|---|---|
| Number of Modules per Pallet | 30 |
| Number of Pallets per 40ft. Container | 26 |
| Pallet Dimensions | 1740 X 1140 X 1165 |
| Pallet Weight (kg) | 640 |
| Container Weight (kg) | 16640 |

Aptos Solar Technology reserves the right to make specification changes without notice

| Mechanical Properties | |
|---|---|
| Cell Type | Monocrystalline |
| Glass | 3.2mm, anti-reflection coating, high transmission, low iron, tempered glass |
| Frame | Anodized Aluminum Alloy |
| Junction Box | IP68 |
| Dimensions | 1756 X 1039 X 35mm |
| Output Cable | 4mm2 (EU)12AWG,39.37in.(1200mm) |
| Weight | 45.19lbs.(20.5kg) |
| Cable Length | 1200mm |
| Encapsulant | POE |

## I-V Curve




## Certifications

UL61730-1, UL61730-2

aptos™ solar technology

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OLDSMAR, FL 34677

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COUNTY- COLUMBIA

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KK
DATE: 07/06/2023

Sheet Name
EQUIPMENT SPEC SHEETS

Sheet Number
DS 1.0

Data Sheet
**Enphase Microinverters**
Region: AMERICAS

# Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.


### Easy to Install

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

### Productive and Reliable

- Optimized for high powered 60-cell/120 half-cell and 72-cell/144 half-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

### Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell/144 half-cell modules.

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

## Enphase IQ 7 and IQ 7+ Microinverters

| INPUT DATA (DC) | IQ7-60-2-US | IQ7PLUS-72-2-US |
|---|---|---|
| Commonly used module pairings[1] | 235 W - 350 W + | 235 W - 440 W + |
| Module compatibility | 60-cell/120 half-cell PV modules only | 60-cell/120 half-cell and 72-cell/144 half-cell PV modules |
| Maximum input DC voltage | 48 V | 60 V |
| Peak power tracking voltage | 27 V - 37 V | 27 V - 45 V |
| Operating range | 16 V - 48 V | 16 V - 60 V |
| Min/Max start voltage | 22 V / 48 V | 22 V / 60 V |
| Max DC short circuit current (module Isc) | 15 A | 15 A |
| Overvoltage class DC port | I | II |
| DC port backfeed current | 0 A | 0 A |
| PV array configuration | 1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit | |

| OUTPUT DATA (AC) | IQ 7 Microinverter | | IQ 7+ Microinverter | |
|---|---|---|---|---|
| Peak output power | 250 VA | | 295 VA | |
| Maximum continuous output power | 240 VA | | 290 VA | |
| Nominal (L-L) voltage/range[2] | 240 V / 211-264 V | 208 V / 183-229 V | 240 V / 211-264 V | 208 V / 183-229 V |
| Maximum continuous output current | 1.0 A (240 V) | 1.15 A (208 V) | 1.21 A (240 V) | 1.39 A (208 V) |
| Nominal frequency | 60 Hz | | 60 Hz | |
| Extended frequency range | 47 - 68 Hz | | 47 - 68 Hz | |
| AC short circuit fault current over 3 cycles | 5.8 Arms | | 5.8 Arms | |
| Maximum units per 20 A (L-L) branch circuit[3] | 16 (240 VAC) | 13 (208 VAC) | 13 (240 VAC) | 11 (208 VAC) |
| Overvoltage class AC port | III | | III | |
| AC port backfeed current | 18 mA | | 18 mA | |
| Power factor setting | 1.0 | | 1.0 | |
| Power factor (adjustable) | 0.85 leading ... 0.85 lagging | | 0.85 leading ... 0.85 lagging | |

| EFFICIENCY | @240 V | @208 V | @240 V | @208 V |
|---|---|---|---|---|
| Peak efficiency | 97.6 % | 97.6 % | 97.5 % | 97.3 % |
| CEC weighted efficiency | 97.0 % | 97.0 % | 97.0 % | 97.0 % |

| MECHANICAL DATA | |
|---|---|
| Ambient temperature range | -40°C to +65°C |
| Relative humidity range | 4% to 100% (condensing) |
| Connector type | MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter) |
| Dimensions (HxWxD) | 212 mm x 175 mm x 30.2 mm (without bracket) |
| Weight | 1.08 kg (2.38 lbs) |
| Cooling | Natural convection - No fans |
| Approved for wet locations | Yes |
| Pollution degree | PD3 |
| Enclosure | Class II double-insulated, corrosion resistant polymeric enclosure |
| Environmental category / UV exposure rating | NEMA Type 6 / outdoor |

| FEATURES | |
|---|---|
| Communication | Power Line Communication (PLC) |
| Monitoring | Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy. |
| Disconnecting means | The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690. |
| Compliance | CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions. |

1. No enforced DC/AC ratio. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE



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COUNTY- COLUMBIA

DRAWN BY
KK
DATE: 07/06/2023

Sheet Name
EQUIPMENT SPEC SHEETS

Sheet Number
DS 2.0

Data Sheet
Enphase Networking

# Enphase IQ Combiner 3C

(X-IQ-AM1-240-3C)

The **Enphase IQ Combiner 3C**™ with Enphase IQ Envoy™ and integrated LTE-M cell modem with 5-year data plan consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

## Smart

- Includes IQ Envoy for communication and control
- Includes LTE-M cell modem and 5-year data plan
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

## Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

## Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- UL listed

LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

## Enphase IQ Combiner 3C

| | |
|---|---|
| **MODEL NUMBER** | |
| IQ Combiner 3C<br>X-IQ-AM1-240-3C | IQ Combiner 3C with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect LTE-M cell modem and five-year data plan. A plug-and-play industrial-grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) |
| **ACCESSORIES** and **REPLACEMENT PARTS** | (not included, order separately) |
| Consumption Monitoring* CT<br>CT-200-SPLIT<br>* Consumption monitoring is required for Enphase Storage Systems | Split core current transformers enable whole home consumption metering (+/- 2.5%). |
| Wireless USB adapter<br>COMMS-KIT-01 | Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows redundant wireless communication with Encharge and Enpower. |
| Circuit Breakers<br>BRK-10A-2-240<br>BRK-15A-2-240<br>BRK-20A-2P-240 | Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers.<br>Circuit breaker, 2 pole, 10A, Eaton BR210<br>Circuit breaker, 2 pole, 15A, Eaton BR215<br>Circuit breaker, 2 pole, 20A, Eaton BR220 |
| EPLC-01 | Power line carrier (communication bridge pair), quantity - one pair |
| XA-PLUG-120-3 | Accessory receptacle for Power Line Carrier in IQ Combiner 3C (required for EPLC-01) |
| XA-ENV-PCBA-3 | Replacement IQ Envoy printed circuit board (PCB) for Combiner 3C |
| **ELECTRICAL SPECIFICATIONS** | |
| Rating | Continuous duty |
| System voltage | 120/240 VAC, 60 Hz |
| Eaton BR series busbar rating | 125 A |
| Max. continuous current rating (output to grid) | 65 A |
| Max. fuse/circuit rating (output) | 90 A |
| Branch circuits (solar and/or storage) | Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included) |
| Max. continuous current rating (input from PV) | 64 A |
| Max. total branch circuit breaker rating (input) | 80A of distributed generation / 90A with IQ Envoy breaker included |
| Production Metering CT | 200 A solid core pre-installed and wired to IQ Envoy |
| **MECHANICAL DATA** | |
| Dimensions (WxHxD) | 37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets. |
| Weight | 7.5 kg (16.5 lbs) |
| Ambient temperature range | -40° C to +46° C (-40° to 115° F) |
| Cooling | Natural convection, plus heat shield |
| Enclosure environmental rating | Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction |
| Wire sizes | • 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors<br>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors<br>• Main lug combined output: 10 to 2/0 AWG copper conductors<br>• Neutral and ground: 14 to 1/0 copper conductors<br>Always follow local code requirements for conductor sizing. |
| Altitude | To 2000 meters (6,560 feet) |
| **INTERNET CONNECTION OPTIONS** | |
| Integrated Wi-Fi | 802.11b/g/n |
| Cellular | CELLMODEM-M1 (4G based LTE-M) |
| Ethernet | Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included) |
| **COMPLIANCE** | |
| Compliance, Combiner | UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003<br>Production metering: ANSI C12.20 accuracy class 0.5 (PV production) |
| Compliance, IQ Envoy | UL 60601-1/CANCSA 22.2 No. 61010-1 |

To learn more about Enphase offerings, visit **enphase.com**


2019-11-04

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Sheet Name
EQUIPMENT SPEC SHEETS

Sheet Number
DS 2.1

## ROCKIT

The RockIt system conforms to UL 2703 and is the industry's premier rail-less PV racking system for composition shingle, tile, and metal pitched rooftops. Designed in conjunction with installers, RockIt quickly & easily installs with a single tool. It features an easy-to-position mount alignment and a top-down leveling system. RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that compliments both commercial and residential applications.

## FEATURES

- Patented Watertight Technology
- Fully integrated bonding
- Top-down leveling system
- North-South adjustability
- Single tool install

FEATURES + BENEFITS



REVISION DATE: 12/2/22 | VERSION: v3.1

ROCKIT INSTALLATION GUIDE

EcoFasten. For Installers. By Installers.

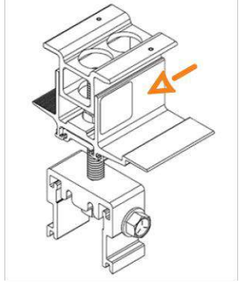
## RATINGS

| | |
|---|---|
| **Fire Ratings** | Class A* and B** System Fire Rating |
| **Max System Voltage** | 1500V |
| **Max Fuse Rating** | 40A |
| **Certification** | Conforms to UL STD 2703 |
| **Markings** | Product listing label is located on RockIt Mount |
| **Roof Pitch** | 2:12 - 21:12 |
| **UL 2703 Allowable Design Load Rating** | 30 psf downward, 30 psf upward and 20 psf lateral |
| **Max Module Size** | 24 sq. ft. |
| **Maximum Cantilever** | 1/3 of span |
| **Maximum Span** | 6 ft Landscape, 4 ft Portrait |
| **Multiple use Rated Components (Position Independent)** | RockIt Mount, RockIt Coupling & MLPE Module Mount |

*Class A System fire rating with Type 1, 2, and 29 PV modules with no skirt required. Class A System fire rating with Type 4 and 5 modules with south edge skirt required. Any roof-to-module gap is permitted. This rating is applicable with any roof attachment.
**Class B System fire rating with Type 4 and 5 modules, no skirt required. Any roof-to-module gap is permitted. This rating is applicable with any roof attachment.
***Modules with flange widths shorter than 22mm cannot be installed in portrait.

### UL 2703 MARKING EXAMPLE:

EcoFasten
An Esdec Solar Group Company
ROCKIT SYSTEM
MFG ID CODE: SSS-QQ-YYYY
ETL LISTED US XXXXXXX
Intertek
Conforms to UL STD 2703



### TORQUE SPECIFICATIONS

| Component | Torque (in-lb) | Notes |
|---|---|---|
| **Lag Screws** | N/A | Fully Seat. Use visual indicator of the black EPDM ring around the bonded washer for torquing. |
| **Mount** | 200 | |
| **Coupling** | 200 | |
| **Steeldeck Slide Screw** | N/A | Fully Seat. Use visual indicator of the black EPDM ring around the bonded washer for torquing. |
| **MLPE Module Mount** | 144 | |
| **Ground Lug** | N/A | Refer to specific ground lug manufacturer's installation manual |
| **RockIt Pedestal Screw** | 150 | |

System components should be periodically re-inspected for loose components, loose fasteners, and corrosion such that if found, the affected components are to be immediately replaced.

RATINGS



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# SYSTEM INSTALLATION





### 9 INSTALL SECOND ROW OF ROCKIT COUPLINGS

Install RockIt couplings on the upslope side of 1st row of panels.

### 10 INSTALL ROCKIT ARRAY SKIRT ONTO EAVE MOUNTS

Torque 2nd row of mid clamps on RockIt mounts and RockIt couplings to 200 in-lb.

### 11 INSTALL THE REMAINDER OF ROCKIT COMPONENTS

Install balance of PV modules, ensuring that the RockIt pedestals are in the appropriate position, then torque mid clamps to secure modules.

**NOTE: MANAGE WIRES AFTER EACH ROW OF MODULES IS INSTALLED**

### 12 INSTALL ROCKIT COUPLINGS WITH A LOAD BEARING FOOT

When assembly is complete, level all subsequent rows of panels by adjusting flange level nuts (flange level nuts have no torque value).

INSTALLATION

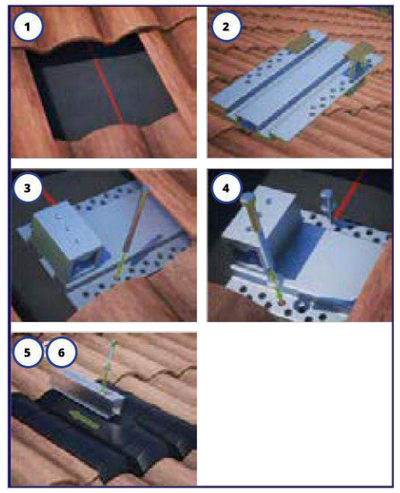


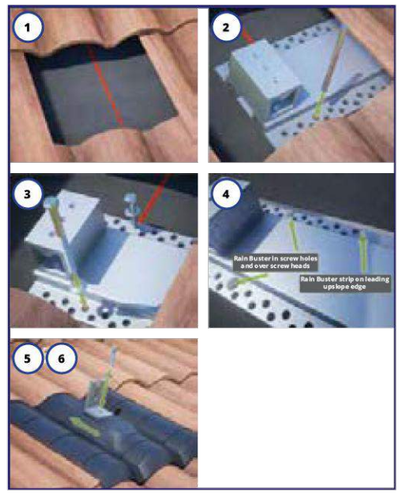
REVISION DATE: 12/8/20 | VERSION: v2.4

ROCKIT INSTALLATION GUIDE

EcoFasten For Installers. By Installers.

# ROCKIT TILE INSTALLATION




### TILE FLASHING INSTALLATION

1. Locate rafter in the typical manner. Remove tile.
2. Remove clear film and align edges of base with edges of butyl tape. Press down firmly on the tile base.
3. Pre-drill lag bolt holes through base and butyl tape.
4. Remove release paper from bottom of butyl tape.
   - **Place base in proper location and press down firmly.**
   - **Backfill holes with sealant. Install lag bolts in pre-drilled locations.**
5. Install Flashing.
   - **Always install one flashing prior to installing fasteners to verify layout**
6. Attach compression bracket with provided 5/16"-18 x 1.25" Hex Bolt and EPDM bonded washer, torque to 120-150 in-lb. (May be attached in either North-South orientation.)

**Re-align adjacent tiles as necessary to create a watertight roof connection.**

### CONDUIT MOUNT BRACKET FOR TILE ROOFS INSTALLATION

1. Locate rafter in the typical manner.
   - **Remove tile.**
2. Pre-drill lag bolts holes through base and backfill holes with RainBuster.
3. Place base in proper location and install lag bolts with washers in pre-drilled locations.
4. Apply RainBuster over screw heads and along leading upslope edge of the base.
5. Install Flashing.
   - **Always install one flashing prior to installing fasteners to verify layout**
6. Attach compression bracket with provided 5/16"-18 X 1.25" Hex Bolt and EPDM bonded washer, torque to 120-150 in-lb. Re-align adjacent tiles as necessary to create a watertight roof connection.

INSTALLATION



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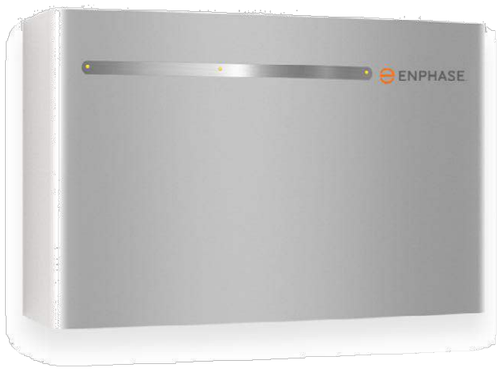
Sheet Number
DS 2.3

Data Sheet
Enphase Storage System

# Enphase Encharge 10

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




## Reliable

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

## Smart

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

## Simple

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

## Safe

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

To learn more about Enphase offerings, visit **enphase.com**

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## Enphase Encharge 10

| | |
|---|---|
| **MODEL NUMBER** | |
| ENCHARGE-10-1P-NA | Encharge 10 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes:<br>- Three Encharge 3.36 kWh base units (B03-A01-US00-1-3)<br>- One Encharge 10 cover kit with cover, wall mounting bracket, watertight conduit hubs, and interconnect kit for wiring between batteries (B10-C-1050-O) |
| **ACCESSORIES** | |
| ENCHARGE-HNDL-R1 | One set of Encharge base unit installation handles |
| **OUTPUT (AC)** | **@ 240 VAC[1]** |
| Rated (continuous) output power | 3.84 kVA |
| Peak output power | 5.7 kVA (10 seconds) |
| Nominal voltage / range | 240 / 211 – 264 VAC |
| Nominal frequency / range | 60 / 57 – 61 Hz |
| Rated output current | 16 A |
| Peak output current | 24.6A (10 seconds) |
| Power factor (adjustable) | 0.85 leading ... 0.85 lagging |
| Maximum units per 20 A branch circuit | 1 units (single phase) |
| Interconnection | Single-phase |
| Maximum AC short circuit fault current over 3 cycles | 69.6 Arms |
| Round trip efficiency[2] | 89% |
| **BATTERY** | |
| Total capacity | 10.5 kWh |
| Usable capacity | 10.08 kWh |
| Round trip efficiency | 96% |
| Nominal DC voltage | 67.2 V |
| Maximum DC voltage | 73.5 V |
| Ambient operating temperature range | -15º C to 55º C (5º F to 131º F) non-condensing |
| Optimum operating temperature range | 0º C to 30º C (32º F to 86º F) |
| Chemistry | Lithium iron phosphate (LFP) |
| **MECHANICAL DATA** | |
| Dimensions (WxHxD) | 1070 mm x 664 mm x 319 mm (42.13 in x 26.14 in x 12.56 in) |
| Weight | Three individual 44.2 kg (97.4 lbs) base units plus 21.1 kg (48.7 lbs) cover and mounting bracket; total 154.7 kg (341 lbs) |
| Enclosure | Outdoor – NEMA type 3R |
| IQ 8X-BAT microinverter enclosure | NEMA type 6 |
| Cooling | Natural convection – No fans |
| Altitude | Up to 2500 meters (8200 feet) |
| Mounting | Wall mount |
| **FEATURES AND COMPLIANCE** | |
| Compatibility | Compatible with grid-tied PV systems. Compatible with Enphase M215/M250 and IQ Series Micros, Enphase Enpower, and Enphase IQ Envoy for backup operation. |
| Communication | Wireless 2.4 GHz |
| Services | Backup, self-consumption, TOU, Demand Charge, NEM Integrity |
| Monitoring | Enlighten Manager and MyEnlighten monitoring options; API integration |
| Compliance | UL 9540, UN 38.3, UL 9540A, UL 1998, UL 991, NEMA Type 3R, AC156<br>EMI: 47 CFR, Part 15, Class B, ICES 003<br>Cell Module: UL 1973, UN 38.3<br>Inverters: UL 62109-1, IEC 62109-2, UL 1741SA, CAN/CSA C22.2 No. 107.1-16, and IEEE 1547 |
| **LIMITED WARRANTY** | |
| Limited Warranty[3] | >70% capacity, up to 10 years or 4000 cycles |

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

To learn more about Enphase offerings, visit **enphase.com**



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Sheet Name
EQUIPMENT SPEC SHEETS

Sheet Number
DS 2.4

Data Sheet
**Enphase Ensemble** energy management system

# Enphase Enpower

The **Enphase Enpower**™ smart switch connects the home to grid power, the Encharge storage system, and solar PV. It provides microgrid interconnection device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure. It consolidates interconnection equipment into a single enclosure and streamlines grid independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for residential applications.


## Reliable

- Durable NEMA type 3R enclosure
- Ten-year limited warranty

## Smart

- Controls safe connectivity to the grid
- Automatically detects grid outages
- Provides seamless transition to backup

## Simple

- Connects to the load or service equipment[1] side of the main load panel
- Centered mounting brackets support single stud mounting
- Supports conduit entry from the bottom, bottom left side, and bottom right side
- Supports whole home and partial home backup and subpanel backup
- Up to 200A main breaker support
- Includes neutral-forming transformer for split phase 120/240V backup operation

1. Enpower is not suitable for use as service equipment in Canada.

To learn more about Enphase offerings, visit **enphase.com**

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## Enphase Enpower

| | |
|---|---|
| **MODEL NUMBER** | |
| EP200G101-M240US00 | Enphase Enpower smart switch with neutral-forming transformer (NFT), Microgrid Interconnect Device (MID), breakers, and screws. Streamlines grid-independent capabilities of PV and storage installations. |
| **ACCESSORIES and REPLACEMENT PARTS** | |
| XA-E3-PCBA-ENS | Replacement Enpower controller printed circuit board |
| EP200G-NA-HD-200A | Eaton type BR circuit breaker hold-down screw kit, BRHDK125 |
| EP200G-HNDL-R1 | Enpower installation handle kit (order separately) |
| Circuit breakers (as needed)[2, 3] | Not included, must order separately: |
| BRK-100A-2P-240V | • Main breaker, 2 pole, 100A, 25kAIC, CSR2100 |
| BRK-125A-2P-240V | • Main breaker, 2 pole, 125A, 25kAIC, CSR2125N |
| BRK-150A-2P-240V | • Main breaker, 2 pole, 150A, 25kAIC, CSR2150N |
| BRK-175A-2P-240V | • Main breaker, 2 pole, 175A, 25kAIC, CSR2175N |
| BRK-200A-2P-240V | • Main breaker, 2 pole, 200A, 25kAIC, CSR2200N |
| BRK-20A-2P-240V-B | • Circuit breaker, 2 pole, 20A, 10kAIC, BR220B |
| BRK-30A-2P-240V | • Circuit breaker, 2 pole, 30A, 10kAIC, BR230B |
| BRK-40A-2P-240V | • Circuit breaker, 2 pole, 40A, 10kAIC, BR240B |
| BRK-60A-2P-240V | • Circuit breaker, 2 pole, 60A, 10kAIC, BR260 |
| BRK-80A-2P-240V | • Circuit breaker, 2 pole, 80A, 10kAIC, BR280 |
| **ELECTRICAL SPECIFICATIONS** | |
| Assembly rating | Continuous operation at 100% of its rating |
| Nominal voltage / range (L-L) | 240 VAC / 100 - 310 VAC |
| Voltage measurement accuracy | ±1% V nominal (±1.2V L-N and ±2.4V L-L) |
| Auxiliary contact for load control and excess PV control | 24V, 1A |
| Nominal frequency / range | 60 Hz / 56 - 63 Hz |
| Frequency measurement accuracy | ±0.1 Hz |
| Maximum continuous current rating | 160A |
| Maximum input overcurrent protection device | 200A |
| Maximum output overcurrent protection device | 200A |
| Maximum overcurrent protection device rating for storage branch circuit[4] | 80A |
| Maximum overcurrent protection device rating for PV combiner branch circuit[4] | 80A |
| Neutral Forming Transformer (NFT) | • Breaker rating (pre-installed): 40A between L1 and Neutral; 40A between L2 and Neutral<br>• Continuous rated power: 3600VA<br>• Maximum continuous unbalance current: 30A @ 120V<br>• Peak rated power: 8800VA for 30 seconds<br>• Peak unbalanced current: 80A @ 120V for 30 seconds |
| **MECHANICAL DATA** | |
| Dimensions (WxHxD) | 50cm x 91.6cm x 24.6cm (19.7 in x 36 in x 9.7 in) |
| Weight | 38.5 kg (85 lbs) |
| Ambient temperature range | -40° C to +50° C (-40° F to 122° F) |
| Cooling | Natural convection, plus heat shield |
| Enclosure environmental rating | Outdoor, NEMA type 3R, polycarbonate construction |
| Altitude | To 2500 meters (8200 feet) |

| **WIRE SIZES** | | |
|---|---|---|
| Connections<br>(All lugs are rated to 90C) | • Main lugs and backup load lugs<br>• CSR breakers<br>• BR breakers (wire provided)<br>• AC combiner lugs, Encharge lugs, and generator lugs<br>• Neutral (large lugs) | Cu/Al: 1 AWG – 300 KCMIL<br>Cu/Al: 2 AWG – 300 KCMIL<br>6 AWG<br>14 AWG – 2 AWG<br>Cu/Al: 6 AWG - 300 KCMIL |
| Neutral and ground bars | Large holes (5/16-24 UNF)<br>Small holes (10-32 UNF) | 14 AWG – 1/0 AWG<br>14 AWG – 6 AWG |
| **COMPLIANCE** | | |
| Compliance | UL 1741, UL 1741 SA, UL 1741 PCS, UL1998, UL869A[5], UL67[5], UL508[5], UL50E[5]<br>CSA 22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003, AC156. | |

2. Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.
3. The Enpower is rated 22 kAIC
4. Not included. Installer must provide properly rated breaker per circuit breaker list above.
5. Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

To learn more about Enphase offerings, visit **enphase.com**



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DS 2.5

# UL 9540A Test Report
# for
# Enphase Energy Inc

All testing was conducted according to UL 9540A, Fourth Edition, dated November 12, 2019.

## Battery Energy Storage Description

### Battery Energy Storage System Configuration

Table 1 – Product details

| Unit | |
|---|---|
| Manufacturer | Enphase Energy Inc |
| Model Number | Encharge 10 |
| Electrical Ratings | 240 Vac and 3.84kVA |
| Electrical Configuration | 3 separate Encharge 3 modules. Each module is connected to integrated Enphase microinverters and BMU. Each module has a 21S1P cell configuration. |
| Dimensions | 1070 mm wide x 317 mm deep x 664 mm high |
| Number of Modules per Encharge 10 | 3 |
| Listed to UL 9540? | No |
| Listed by UL to 9540? | No |
| Construction Description | Plastic cover with slotted openings on the top. The cover is installed over the top and sides of the three Encharge 3 modules. |
| Fire Protection Features | None |


Figure 1 – Photo of Encharge 10 unit





| Module | |
|---|---|
| Manufacturer | Enphase Energy Inc |
| Model Number | WX12I3250 (21S1P) |
| Electrical Ratings | 67.2 Vdc and 50 Ah |
| Electrical Configuration | 21 series x 1 parallel |
| Dimensions | 279 mm wide x 236 mm deep x 298 mm high |
| Construction Description | Plastic enclosure on the top, bottom, and ends. Metal heat sink strip on the long sides. |
| Fire Protection Features | None |
| Listed to UL 1973? | No |
| Listed by UL to 1973? | No |

Figure 2 – Photo of WX12I3250 (21S1P) module utilized in unit test

| | |
|---|---|
| UL 9540A Report | UL Project 4788656362 September 2019 |
| Deviations from 9540A Report | The unit's module is identical to UL 9540A tested module. |

Figure 2 – Module tested in UL Project Number 4788656362

| Cell | |
|---|---|
| Manufacturer | Enphase Energy Inc |
| Model Number | #WX12I3250 |
| Chemistry | Lithium iron phosphate |
| Electrical Ratings | 3.2 Vdc and 50 Ah |
| Dimensions | 206 mm x 226.0 mm x 0.162mm |
| Construction Description | Prismatic pouch |





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| | |
|---|---|
| Listed to UL 1973? | No |
| Listed by UL to 1973? | Yes, File number E499298- unlisted component |
| UL 9540A Report | UL Project 4788656362,<br>August 2019 |
| Deviations from 9540A Report | The cell is identical. |
|  | |

Figure 3 – Photo of cell

## Unit Level Test Description

### Overall Test Configuration

The overall layout of test equipment and measurement locations is illustrated in Figure 5. The layout includes 1 initiating cabinet, 3 target cabinets, and instrumented wall.

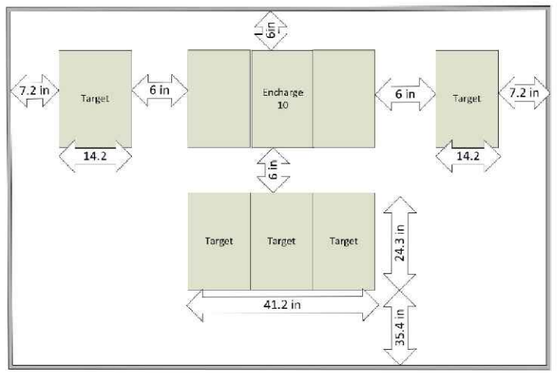






Figure 4 – Test configuration and unit spacing

Table 2 – Test configuration

| Test Configuration | |
|---|---|
| Clearance between Initiating Unit and Target Unit 1 | 6 in. |
| Clearance between Initiating Unit and Target Unit 2 | 6 in. |
| Clearance between Initiating Unit and Target Unit 3 | 6 in. |
| Clearance between Initiating Unit and Wall | Units were mounted on the 8ft. x 8ft wall opposite from the test room door. The units were installed on the surface of this wall. |
| Clearance between Initiating Unit and Ceiling | 6 in. |
| Doors | No doors on the unit |
| Physical barriers between units | None |





BAPS
Engineering & Permitting
BAY AREA PROJECT SOLUTION LLC
379 DOUGLAS RD E A,
OLDSMAR, FL 34677

Chad E Widup

Digitally signed by Chad E Widup
Date: 2023.07.19 06:53:29 -04'00'

CHAD WIDUP LICENSE No. 60302 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Chad Widup, PE on Jul 19, 2023 using a Digital Signature.

Chad Widup, P.E. NO. 60302
39905 Grays Airport Road
Lady Lake, FL 32159

Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

Project Name & Address

JAMES RUDEBECK RESIDENCE
176 SW POLARIS TERRACE,
FORT WHITE, FL 32038
COUNTY- COLUMBIA

DRAWN BY
KK
DATE: 07/06/2023

Sheet Name
EQUIPMENT SPEC SHEETS

Sheet Number
DS 2.7

# CERTIFICATE OF COMPLIANCE

| | |
|---|---|
| **Certificate Number** | E488100 |
| **Report Reference** | E488100-20200514 |
| **Issue Date** | 2020-MAY-18 |
| **Issued to:** | ENPHASE ENERGY INC<br>1420 N McDowell Blvd<br>Petaluma CA 94954-6515 |
| **This certificate confirms that representative samples of** | ENERGY STORAGE SYSTEMS AND EQUIPMENT<br>Utility Interactive Energy Storage System.<br>Model: ENCHARGE-3-1P-NA and ENCHARGE-10-1P-NA<br><br>Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate. |
| **Standard(s) for Safety:** | ANSI/CAN/UL 9540, Energy Storage Systems and Equipment.<br>UL 991, Tests for Safety-Related Controls Employing Solid-State Devices |
| **Additional Information:** | See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information. |

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/



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COUNTY- COLUMBIA

DRAWN BY
KK
DATE: 07/06/2023

Sheet Name
EQUIPMENT SPEC SHEETS

Sheet Number
DS 2.8