

# 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  
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

## 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 MANUFACTURERS'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.

ATTIC TEMPERATURE	130 DEGREE	
Total Array Area	589.05	SqFt
Total Roof Area	3256.660	SqFt
Total Percentage of Roof Covered	18.09%	SqFt
<small>Total Array Area / Total Roof Area * 100</small>		

## ROOF ACCESS POINT

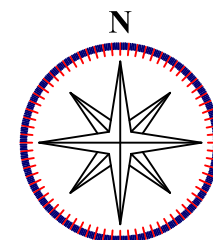
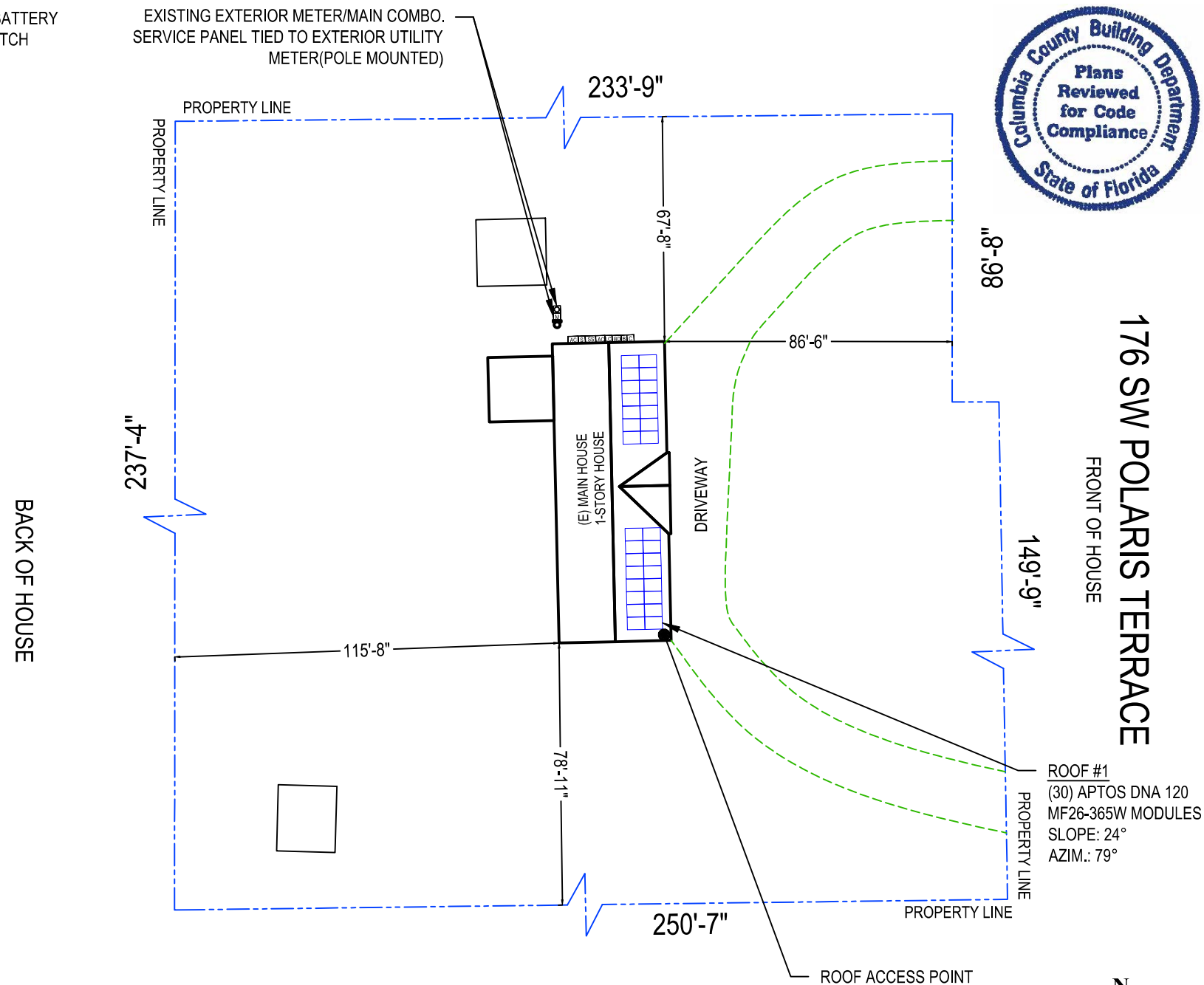
ROOF ACCESS POINT SHALL NOT BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES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

## SHEET INDEX:

PV 0.0: COVER SHEET  
PV 1.0: SITE PLAN  
PV 2.0: ATTACHMENT DETAILS  
E 1.1: 3-LINE DIAGRAM  
E 1.2: NOTES  
E 1.3: WARNING LABELS  
DS 1.0+: EQUIPMENT SPEC SHEETS

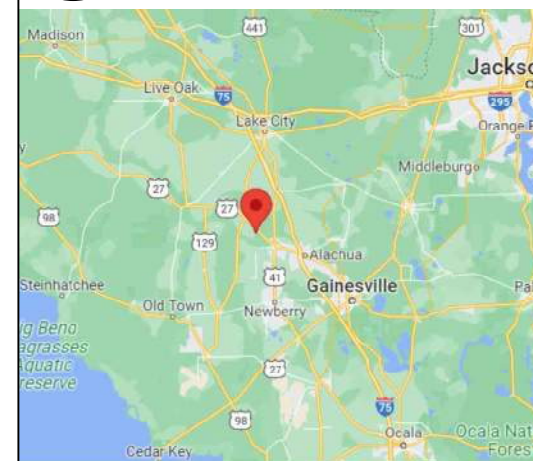
## SYSTEM LEGEND

- EXISTING EXTERIOR METER/MAIN COMBO. SERVICE PANEL & POINT OF INTERCONNECTION. TIED TO EXTERIOR UTILITY METER.(POLE MOUNTED)
- NEW DEDICATED PV SYSTEM COMBINER PANEL
- NEW VISIBLE LOCKABLE LABELED AND 100A NON-FUSED SERVICE DISCONNECT
- NEW 1-ENPHASE ENCHARGE 10 BATTERY
- NEW BACKUP LOADS SUB PANEL
- NEW ENPHASE ENPOWER SMART SWITCH
- NEW ENPHASE IQ LOAD CONTROLLER
- NEW ALTERNATIVE POWER SOURCE AC DISCONNECT
- NEW BATTERY DISCONNECT SWITCH



## 2 SATELLITE VIEW

PV 0.0 SCALE: NTS



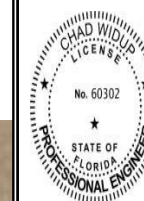
## 3 VICINITY MAP

PV 0.0 SCALE: NTS



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Sheet Name  
COVER SHEET

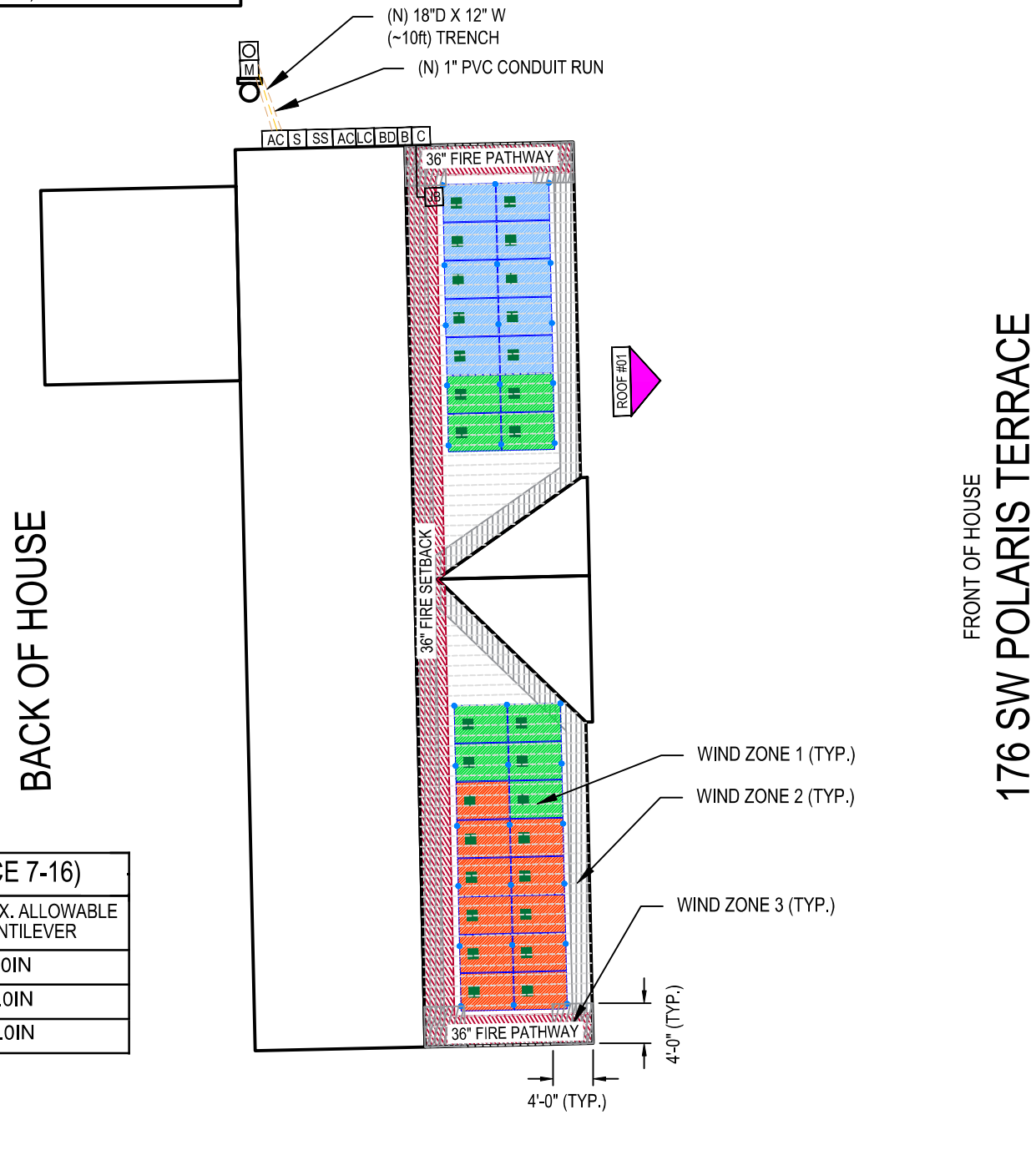
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PV 0.0

## 1 PLOT PLAN

PV 0.0 SCALE: 3/128" = 1'-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 7° TO A MAXIMUM 26° (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.

**SYSTEM LEGEND**

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- NEW ENPHASE ENPOWER SMART SWITCH
- NEW ENPHASE IQ LOAD CONTROLLER
- NEW ALTERNATIVE POWER SOURCE AC DISCONNECT
- NEW BATTERY DISCONNECT SWITCH
- 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 - 24°  
AZIMUTH - 79°  
MATERIAL - METAL ROOF

**CIRCUIT(S)**

- CIRCUIT #1 - 10 MODULES
- CIRCUIT #2 - 09 MODULES
- CIRCUIT #3 - 11 MODULES

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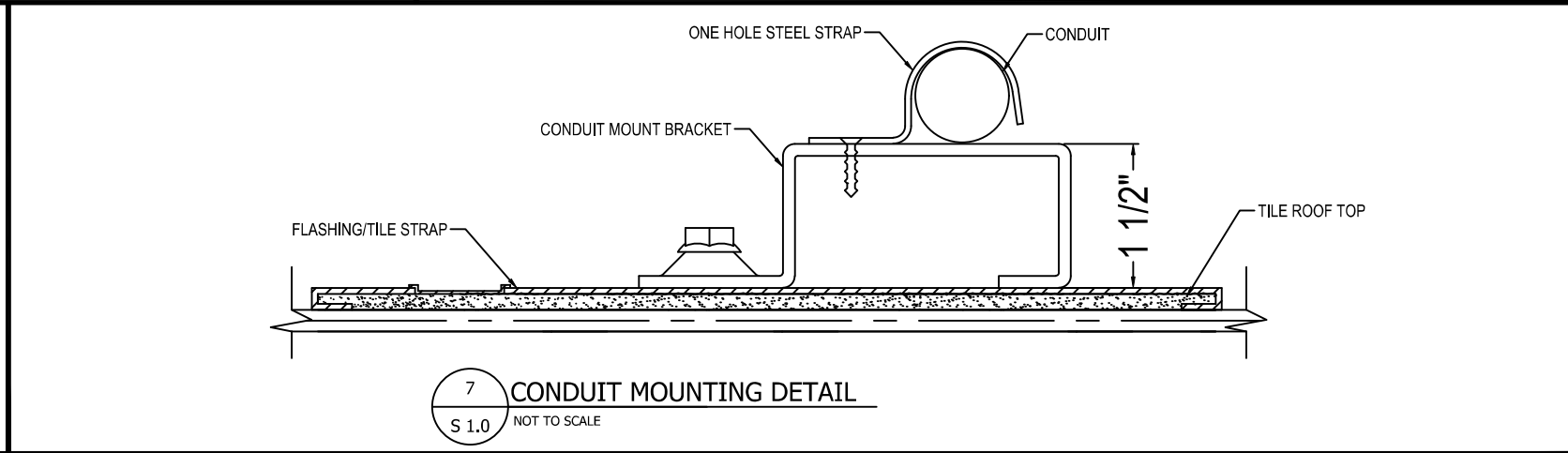
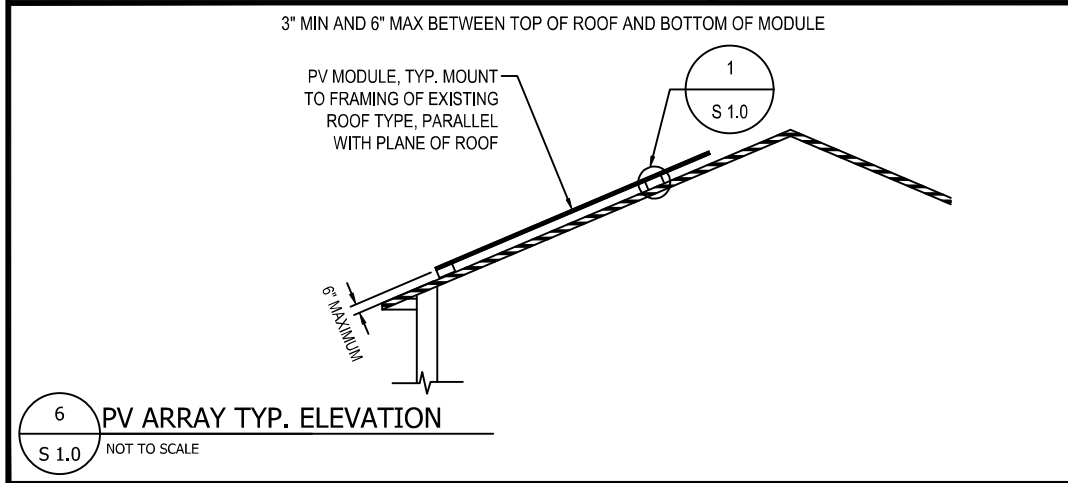
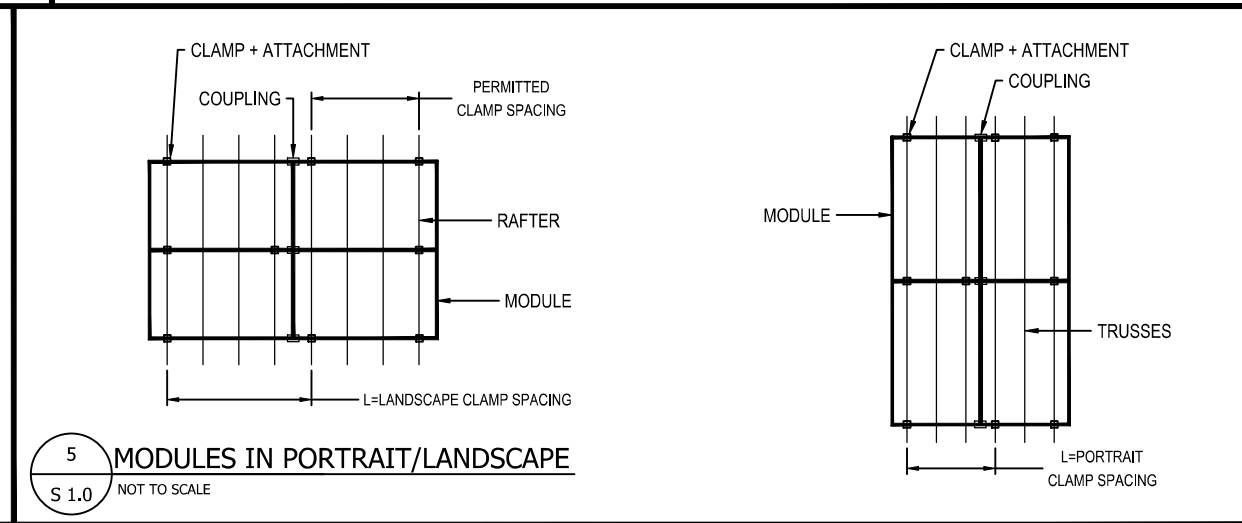
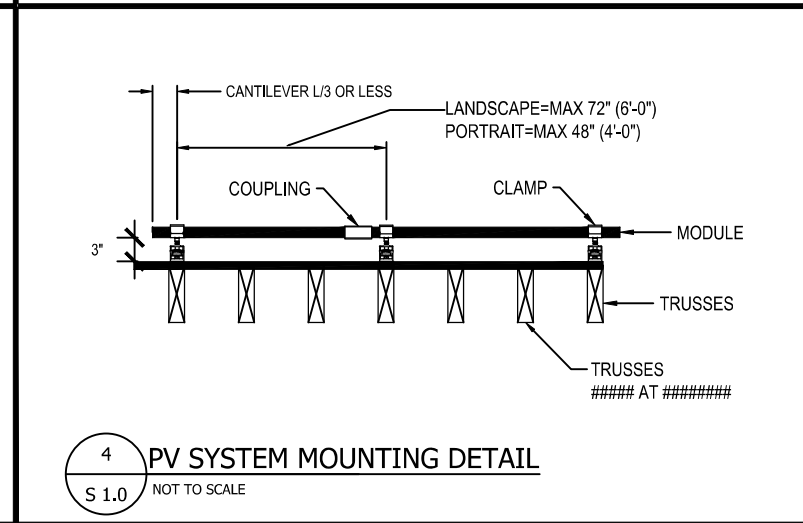
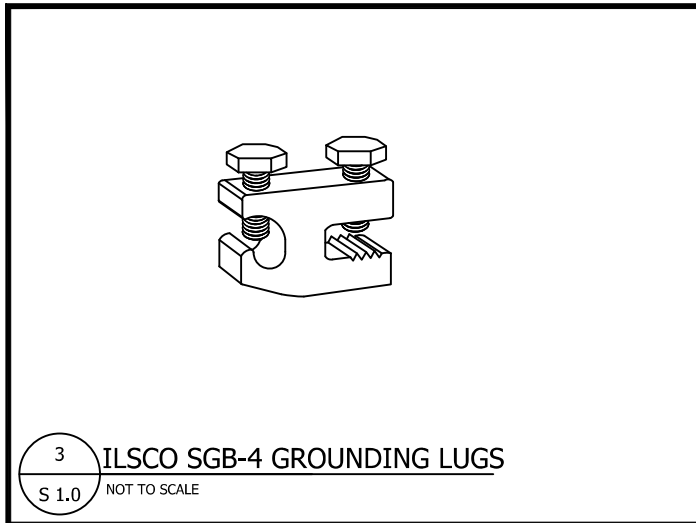
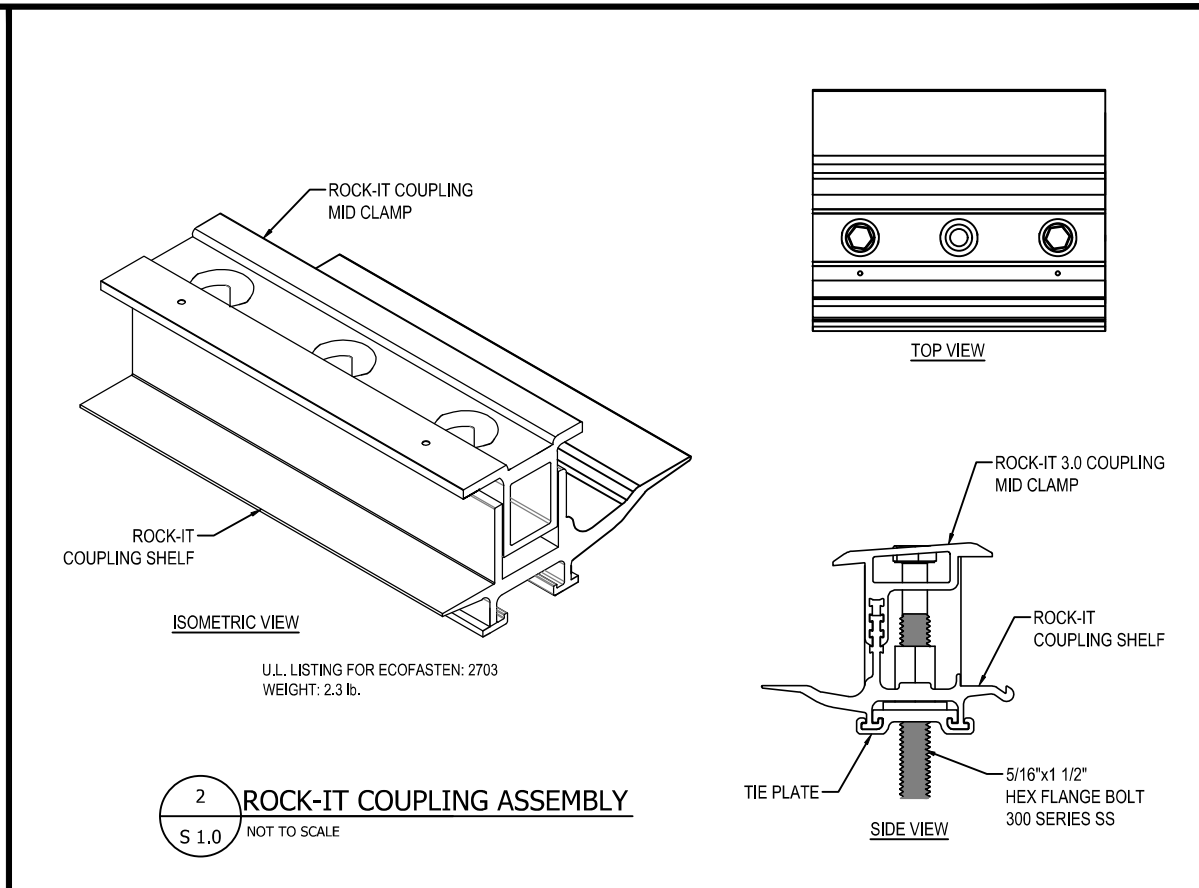
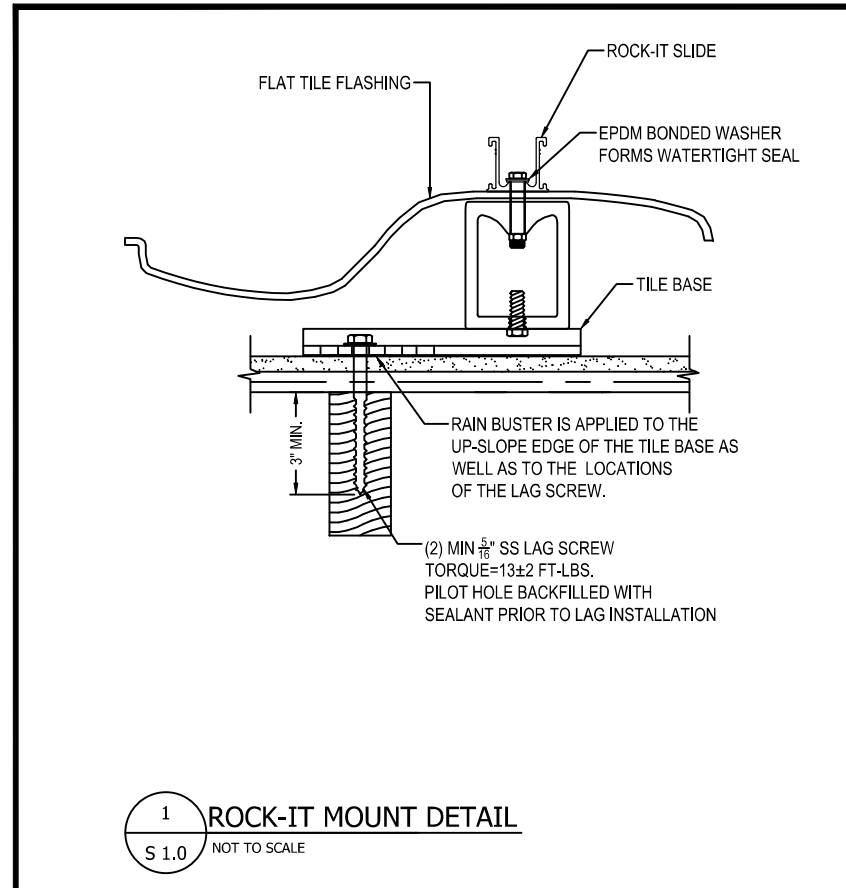
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Sheet Name  
**SITE PLAN**

Sheet Number  
**PV 1.0**

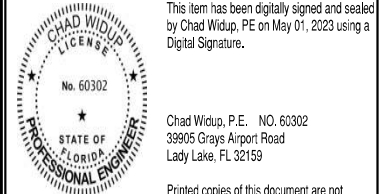
**GENERAL STRUCTURAL NOTES:**

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 3" 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"



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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

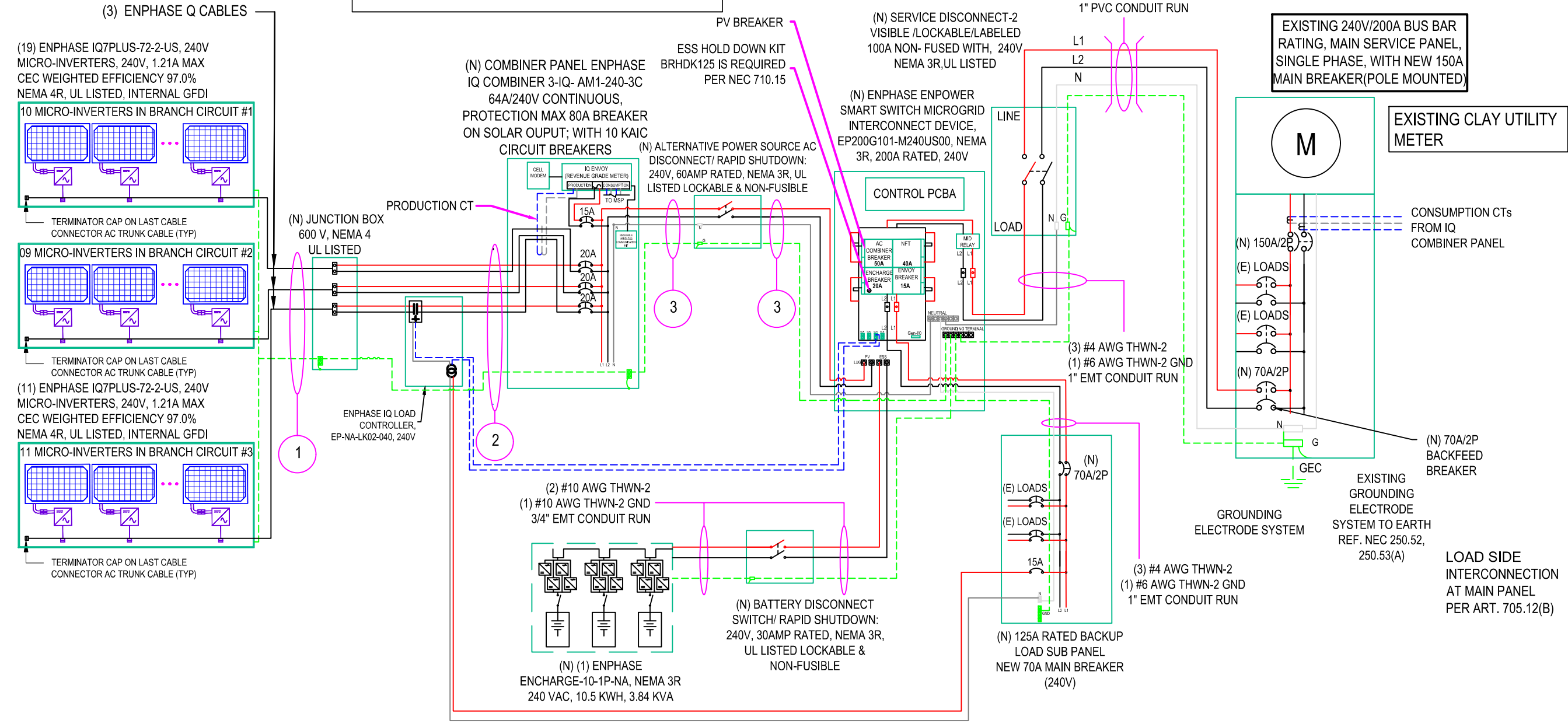
(GN) GENERAL CONDUIT NOTE :  
 CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV  
 PROTECTED (EX. -EMT,SCH 80 PVC OR RMC)\*FMC MAYBE USED  
 IN INDOOR APPLICATIONS WHERE PERMITTED BY NEC ART .348

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

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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 75°C 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	90°	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	90°	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	90°	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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 KK  
 DATE: 04/28/2023  
 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	3°
AMBIENT TEMP (HIGH TEMP 2%)	33°
CONDUIT HEIGHT	7/8"
CONDUCTOR TEMPERATURE RATE	90°

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	-0.26° %/°C

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:**

- 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.
- ENPHASE Q CABLE HAS NO NEUTRAL WIRE - (2 WIRE DOUBLE INSULATED CABLING)
- MODULES ARE BONDED TO RAIL USING IRONRIDGE INTEGRATED GROUNDING.
- RAILS ARE BONDED WITH UL 2703 RATED LAY-IN LUGS
- SYSTEM IS UNGROUNDED
- BARE COPPER IS TRANSITIONED TO THHN/THWN-2 VIA IRREVERSIBLE CRIMP; GEC TO BE CONTINUOUS PER CEC 250.64(C)
- SUB-BRANCHES ARE CENTER-FED AT JBOX TO MAKE ONE TOTAL BRANCH CIRCUIT.
- ENPHASE IQ ENVOY INSIDE IQ COMBINER REQUIRES A NEUTRAL TO BE LANDED AT THE NEUTRAL BUSS AT MAIN PANEL PER ENPHASE INSTALLATION INSTRUCTIONS.
- 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:-
- 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).
  - ENCHARGE BATTERY STORAGE DISCONNECT SHALL BE SECURED USING AN EATON TYPE-BR CIRCUIT BREAKER HOLD DOWN KIT #BRHDK125 (2017 NEC 710.15(E))
  - ETHERNET OR WIFI IS THE PRIMARY COMM'S FOR ENVOY TO ENLIGHTEN.
  - CONSUMPTION CTs PLACEMENT.
  - SINGLE LARGEST BREAKER IN BACKED UP LOAD PANEL CANNOT EXCEED THE (ESS) STORAGE OUTPUT CAPACITY (20 AAC) PER NEC 710.15
  - 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.
  - 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.

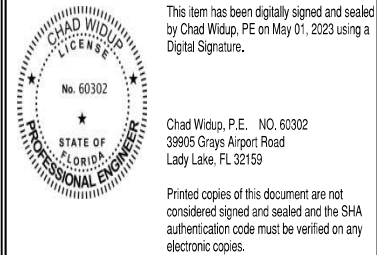
**NOTES**

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT. THE TERMINALS ARE RATED FOR 75 DEGREE C.
- THE WIRES ARE SIZED ACCORDING TO NEC 110.14.
- 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.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE .
- 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.
- RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
- CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).
- THIS SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN OF PV CONDUCTORS IN COMPLIANCE WITH NEC 690.12.
- LABELING IN COMPLIANCE WITH NEC 690.12 AND 690.56(C) IS SHOWN ON SHEET E-03.
- ALL CONDUITS TO BE INSTALLED A MIN OF 7/8" ABOVE THE ROOF SURFACE.



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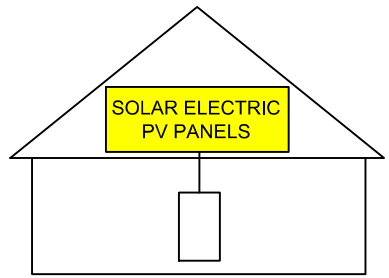
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E 1.2

**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

- ELECTRICAL NOTES:**
- UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
  - WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
  - ALL EQUIPMENT INSTALLED SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) PER NEC ARTICLE 110.3.
  - RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
  - 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.
  - CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.8 (D).
  - CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.8 (C)

**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 CONNECTION  
DO NOT RELOCATE THIS OVERCURRENT DEVICE

**SOLAR CONECTION BACKFEED BREAKER**

**BATTERY**

**1 OF 1**

LABEL LOCATION: BATTERY

**CAUTION: ALTERNATE POWER SOURCE**

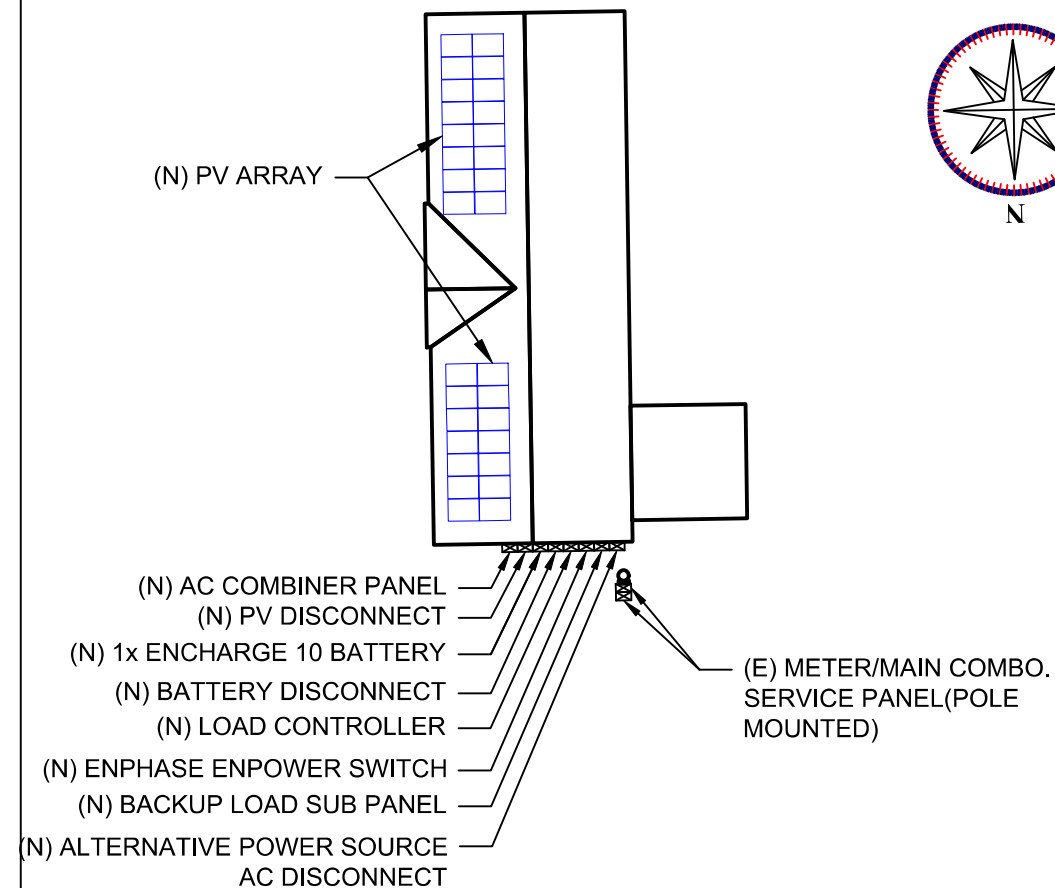
LABEL LOCATION: ALL BATTERY ASSOCIATED CONDUIT TO BE LABELED EVERY 10FT CAUTION: ALTERNATE POWER SOURCE

**MAIN BATTERY DISCONNECT**

LABEL LOCATION: STORAGE / BATTERY DISCONNECT, POINT OF INTERCONNECTION [PER 2020 NEC 706.15(A)(2)]

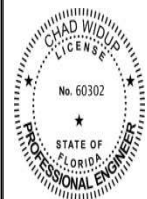
**CAUTION:**

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



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Sheet Name  
**WARNING LABELS**

Sheet Number  
**E 1.3**

# DNA™ 120

Solar for Innovators

Residential | Commercial

## Designed & Engineered in Silicon Valley 370W | 365W | 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-efficiencies in extreme temperatures. Contact our sales team today to learn more about our line of high-efficiency 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

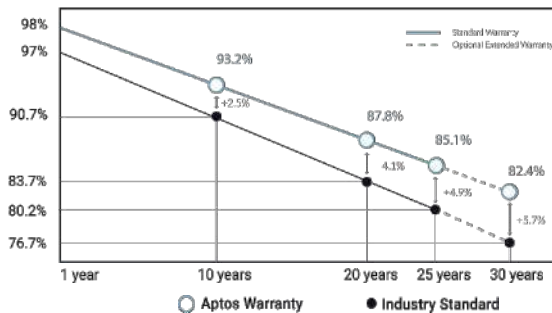
Ideal solution for applications affected by shading

All-black design for pristine aesthetics  
No excessive silver bussing or ribbons

Robust product design is resilient in extreme weather. Up to 5400 Pa snow load and 210 mph wind speeds



### Linear Performance Warranty



30 Year Warranty

3X IEC Standards

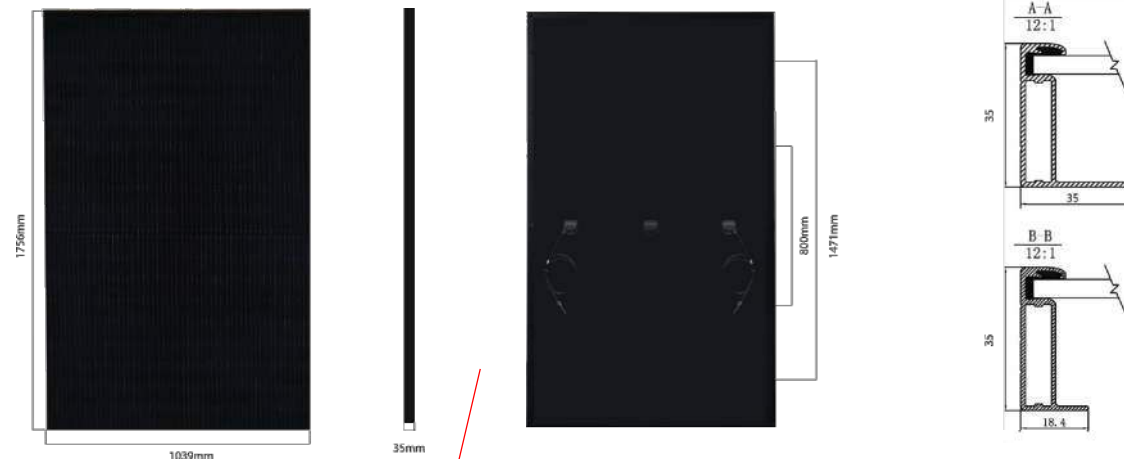
RETc Top Performer



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

## DNA™ 120

Solar for Innovators



Electrical Specifications	DNA-120-MF26-370W	DNA-120-MF26-365W	DNA-120-MF26-360W
STC rated Output $P_{mp}$ (W)	360W	365W	370W
Module Efficiency	19.73%	20.01%	20.29%
Open Circuit Voltage $V_{oc}$ (V)	40.8	40.7	40.8
Short Circuit Current $I_{sc}$ (A)	11.64	11.36	11.51
Rated Voltage $V_{mp}$ (V)	33.8	33.96	34.06
Rated Current $I_{mp}$ (A)	10.66	10.75	10.87

Standard Test Conditions for front-face of panel: 1000 W/m<sup>2</sup>, 25°C, measurement uncertainty ±3%

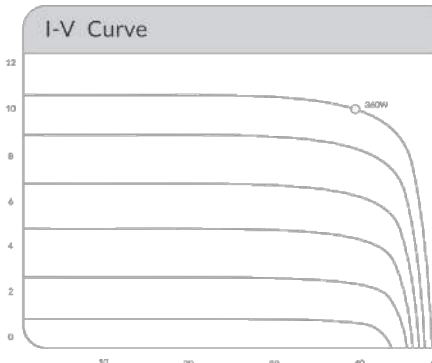
Temperature Coefficients	
Temperature Coefficients $P_{mp}$	-0.36%
Temperature Coefficients $I_{sc}$	+0.05%/°C
Temperature Coefficients $V_{oc}$	-0.29%/°C
Normal Operating Cell Temperature (NOCT)	44°C

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	4mm <sup>2</sup> (EU)12AWG,39.37in.(1200mm)
Weight	45.19lbs.(20.5kg)
Cable Length	1200mm
Encapsulant	POE

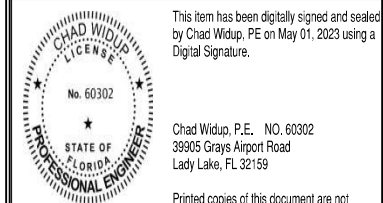


Certifications	
intertek	CE
UL61730-1, UL61730-2	



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DATE: 04/28/2023

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EQUIPMENT SPEC SHEETS

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## 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.

## Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings <sup>1</sup>	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell/ 20 half-cell PV modules only		60-cell/120 half-cell and 72-cell/144 half-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range <sup>2</sup>	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit <sup>3</sup>	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	18 mA		18 mA	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

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

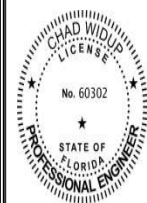
To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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



## 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

## Enphase IQ Combiner 3C

MODEL NUMBER	
IQ Combiner 3C 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 CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%). <small>* Consumption monitoring is required for Enphase Storage Systems</small>
Wireless USB adapter 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 BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-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 • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	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 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](https://enphase.com)

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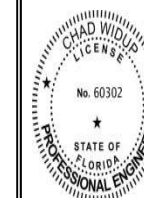


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**ROCKIT**

INSTALLATION GUIDE



**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

**ROCKIT**

INSTALLATION GUIDE

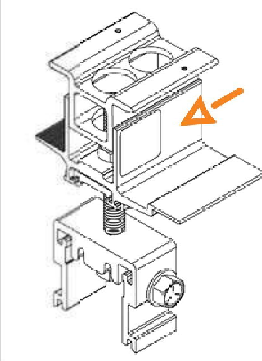


**RATINGS**

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 - 21:2
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:**



**TORQUE SPECIFICATIONS**

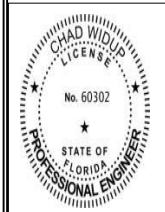
Component	Torque (in-lb)	Notes
Lag Screws	N/A	Fully Seat. Use visual indicator of the black EPDM ring around the bonded washer for torquing.
Mount	200	
Coupling	200	
Steeldeck Slide Screw	N/A	Fully Seat. Use visual indicator of the black EPDM ring around the bonded washer for torquing.
MLPE Module Mount	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.



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RATINGS

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 DS 2.2

## 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.



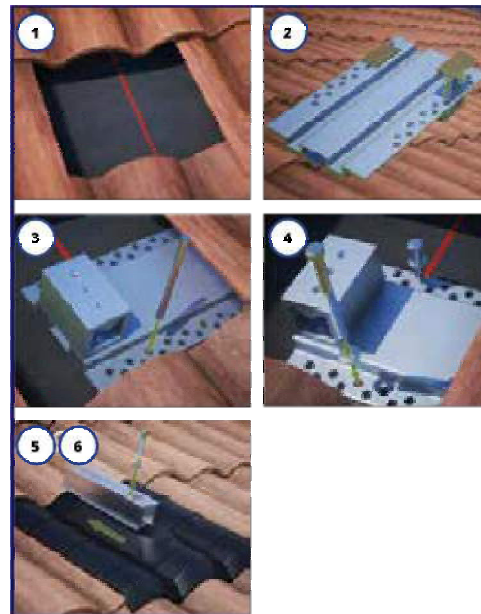
- 11 INSTALL THE REMAINDER OF ROCKIT COMPONENTS**  
Install balance of PV modules, ensuring that the Rockit pedestals are in the appropriate position, then torque mid clamps to secure modules.

**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).

## ROCKIT TILE INSTALLATION

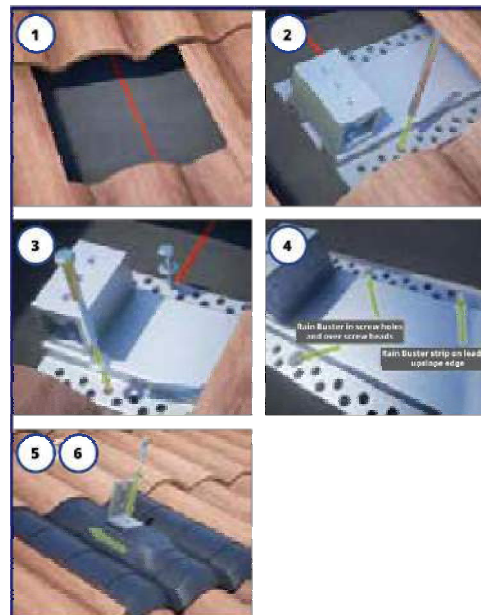


### TILE FLASHING INSTALLATION

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.)

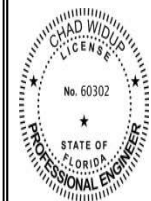
Re-align adjacent tiles as necessary to create a watertight roof connection.

### 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.

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Sheet Name  
EQUIPMENT SPEC SHEETS

Sheet Number  
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## 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

## Enphase Encharge 10

MODEL NUMBER	
ENCHARGE-10-1P-NA	Encharge 10 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes: - Three Encharge 3.36 kWh base units (B03-A01-US00-1-3) - One Encharge 10 cover kit with cover, wall mounting bracket, watertight conduit hubs, and interconnect kit for wiring between batteries (B10-C-1050-0)
ACCESSORIES	
ENCHARGE-HNDL-R1	One set of Encharge base unit installation handles
OUTPUT (AC) @ 240 VAC <sup>1</sup>	
Rated (continuous) output power	3.84 kVA
Peak output power	5.7 kVA (10 seconds)
Nominal voltage / range	240 / 211 – 264 VAC
Nominal frequency / range	60 / 57 – 61 Hz
Rated output current	16 A
Peak output current	24.6A (10 seconds)
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Maximum units per 20 A branch circuit	1 unit (single phase)
Interconnection	Single-phase
Maximum AC short circuit fault current over 3 cycles	69.6 Arms
Round trip efficiency <sup>2</sup>	89%
BATTERY	
Total capacity	10.5 kWh
Usable capacity	10.08 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2 V
Maximum DC voltage	73.5 V
Ambient operating temperature range	-15° C to 55° C (5° F to 131° F) non-condensing
Optimum operating temperature range	0° C to 30° C (32° F to 86° F)
Chemistry	Lithium iron phosphate (LFP)
MECHANICAL DATA	
Dimensions (WxHxD)	1070 mm x 664 mm x 319 mm (42.13 in x 26.14 in x 12.56 in)
Weight	Three individual 44.2 kg (97.4 lbs) base units plus 21.1 kg (48.7 lbs) cover and mounting bracket; total 154.7 kg (341 lbs)
Enclosure	Outdoor – NEMA type 3R
IQ 8X-BAT microinverter enclosure	NEMA type 6
Cooling	Natural convection – No fans
Altitude	Up to 2500 meters (8200 feet)
Mounting	Wall mount
FEATURES AND COMPLIANCE	
Compatibility	Compatible with grid-tied PV systems. Compatible with Enphase M215/M250 and IQ Series Micros, Enphase Enpower, and Enphase IQ Envoy for backup operation.
Communication	Wireless 2.4 GHz
Services	Backup, self-consumption, TOU, Demand Charge, NEM Integrity
Monitoring	Enlighten Manager and MyEnlighten monitoring options; API integration
Compliance	UL 9540, UN 38.3, UL 9540A, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell Module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2, UL 1741SA, CAN/CSA C22.2 No. 107.1-16, and IEEE 1547
LIMITED WARRANTY	
Limited Warranty <sup>3</sup>	>70% capacity, up to 10 years or 4000 cycles
<ol style="list-style-type: none"> <li>1. Supported in backup/off grid operations</li> <li>2. AC to Battery to AC at 50% power rating.</li> <li>3. Whichever occurs first. Restrictions apply.</li> </ol>	

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

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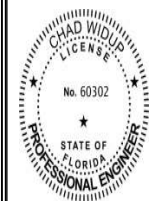


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EQUIPMENT SPEC SHEETS

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## 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<sup>1</sup> 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](https://enphase.com)



## Enphase Enpower

<b>MODEL NUMBER</b>											
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.										
<b>ACCESSORIES and REPLACEMENT PARTS</b>											
XA-E3-PCBA-ENS	Replacement Enpower controller printed circuit board										
EP200G-NA-HD-200A	Enphase type 3R circuit breaker hold-down screw kit, BRHDK125										
EP200G-HNDL-R1	Enpower installation handle kit (order separately)										
Circuit breakers (as needed) <sup>2, 3</sup>	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										
<b>ELECTRICAL SPECIFICATIONS</b>											
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 / 55 - 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 <sup>4</sup>	80A										
Maximum overcurrent protection device rating for PV combiner branch circuit <sup>4</sup>	80A										
Neutral Forming Transformer (NFT)	• Breaker rating (pre-installed): 40A between L1 and Neutral; 40A between L2 and Neutral • Continuous rated power: 3600VA • Maximum continuous unbalance current: 30A @ 120V • Peak rated power: 8800VA for 30 seconds • Peak unbalanced current: 80A @ 120V for 30 seconds										
<b>MECHANICAL DATA</b>											
Dimensions (WxDxH)	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 +59° 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)										
<b>WIRE SIZES</b>											
Connections (All lugs are rated to 90C)	<table border="0"> <tr> <td>• Main lugs and backup load lugs</td> <td>Cu/Al: 1 AWG - 300 KCMIL</td> </tr> <tr> <td>• CSR breakers</td> <td>Cu/Al: 2 AWG - 300 KCMIL</td> </tr> <tr> <td>• BR breakers (wire provided)</td> <td>6 AWG</td> </tr> <tr> <td>• AC combiner lugs, Encharge lugs, and generator lugs</td> <td>14 AWG - 2 AWG</td> </tr> <tr> <td>• Neutral (large lugs)</td> <td>Cu/Al: 6 AWG - 300 KCMIL</td> </tr> </table>	• Main lugs and backup load lugs	Cu/Al: 1 AWG - 300 KCMIL	• CSR breakers	Cu/Al: 2 AWG - 300 KCMIL	• BR breakers (wire provided)	6 AWG	• AC combiner lugs, Encharge lugs, and generator lugs	14 AWG - 2 AWG	• Neutral (large lugs)	Cu/Al: 6 AWG - 300 KCMIL
• Main lugs and backup load lugs	Cu/Al: 1 AWG - 300 KCMIL										
• CSR breakers	Cu/Al: 2 AWG - 300 KCMIL										
• BR breakers (wire provided)	6 AWG										
• AC combiner lugs, Encharge lugs, and generator lugs	14 AWG - 2 AWG										
• Neutral (large lugs)	Cu/Al: 6 AWG - 300 KCMIL										
Neutral and ground bars	<table border="0"> <tr> <td>Large holes (5/16-24 UNF)</td> <td>14 AWG - 1/0 AWG</td> </tr> <tr> <td>Small holes (10-32 UNF)</td> <td>14 AWG - 6 AWG</td> </tr> </table>	Large holes (5/16-24 UNF)	14 AWG - 1/0 AWG	Small holes (10-32 UNF)	14 AWG - 6 AWG						
Large holes (5/16-24 UNF)	14 AWG - 1/0 AWG										
Small holes (10-32 UNF)	14 AWG - 6 AWG										
<b>COMPLIANCE</b>											
Compliance	UL 1741, UL 1741 SA, UL 1741 PCS, UL1998, UL869A*, UL67*, UL508*, UL508*, 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.

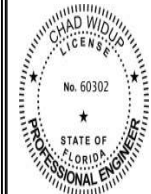
To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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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.



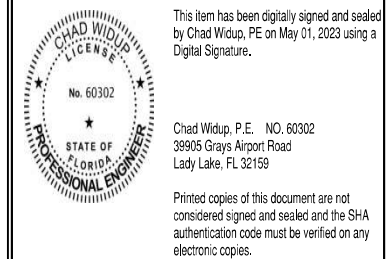
Figure 2 – Module tested in UL Project Number 4788656362

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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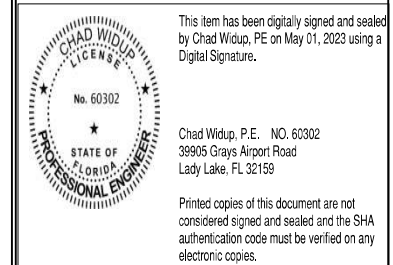
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**DS 2.7**

Listed to UL 1973?	No
Listed by UL to 1973?	Yes, File number E499298- unlisted component
UL 9540A Report	UL Project 4788656362, 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.

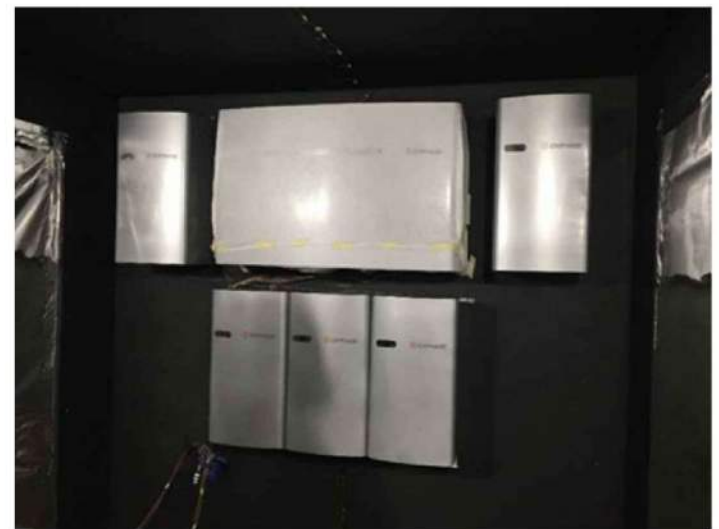
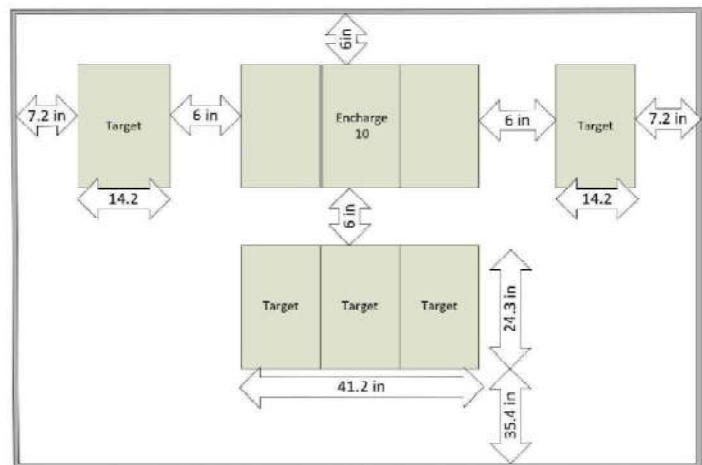


Figure 4 – Test configuration and unit spacing

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

# CERTIFICATE OF COMPLIANCE

Certificate Number E488100  
Report Reference E488100-20200514  
Issue Date 2020-MAY-18

Issued to: ENPHASE ENERGY INC  
1420 N McDowell Blvd  
Petaluma CA 94954-6515

This certificate confirms that representative samples of ENERGY STORAGE SYSTEMS AND EQUIPMENT  
Utility Interactive Energy Storage System.  
Model: ENCHARGE-3-1P-NA and ENCHARGE-10-1P-NA

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.  
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.

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Bruce Maxenhelz, Director, North American Certification Program  
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