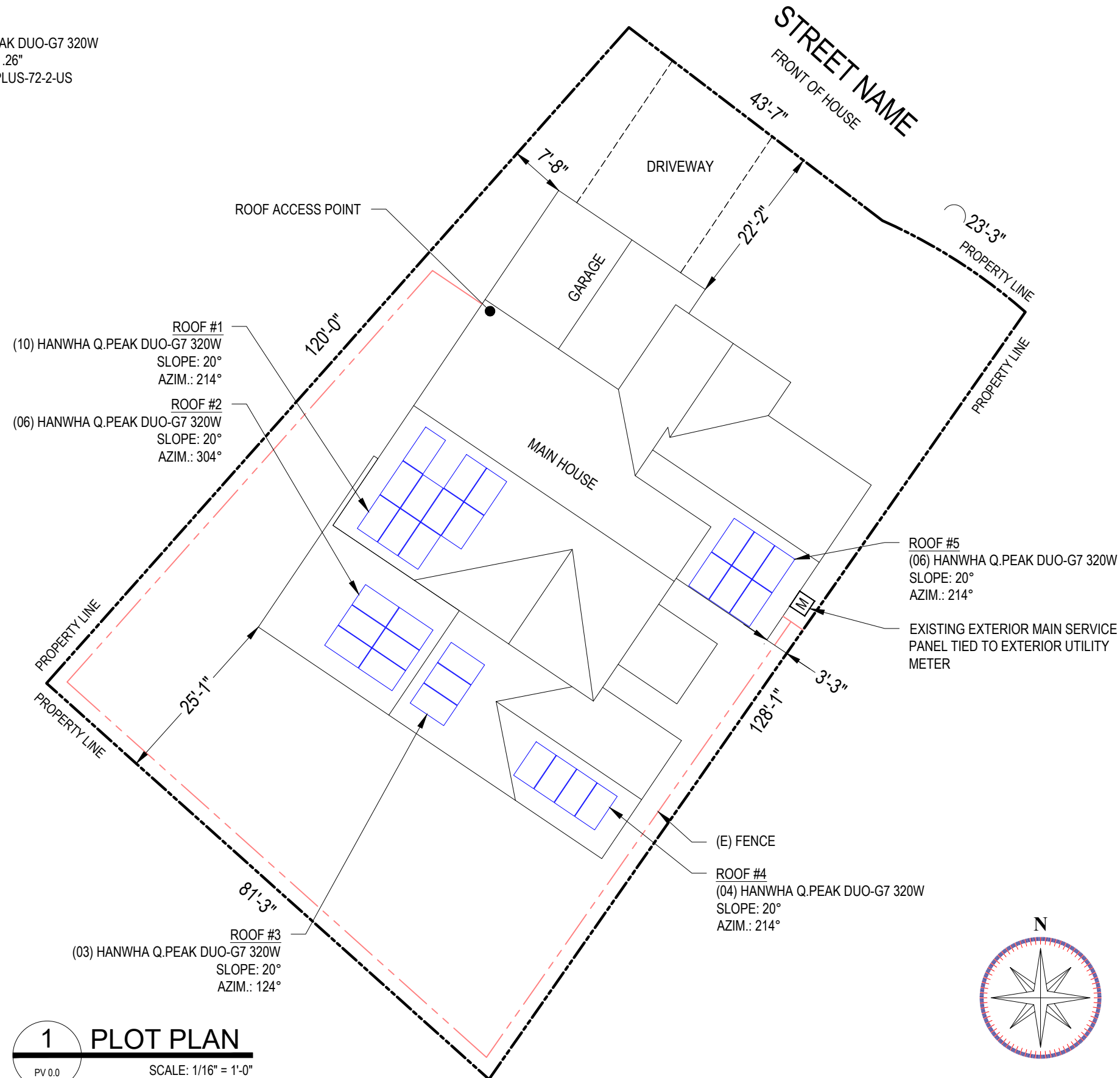


29 MODULES-ROOF MOUNTED - 9.280 kW DC, 8.410 kW AC, ADDRESS

SYSTEM SIZE:	9.280 kW DC 8.410 kW AC
MODULE TYPE & AMOUNT:	(29) HANWHA Q.PEAK DUO-G7 320W
MODULE DIMENSIONS:	(L/W/H) 66.3"/39.4"/1.26"
INVERTER:	(29) ENPHASE IQ7PLUS-72-2-US
INTERCONNECTION METHOD:	LOAD BREAKER

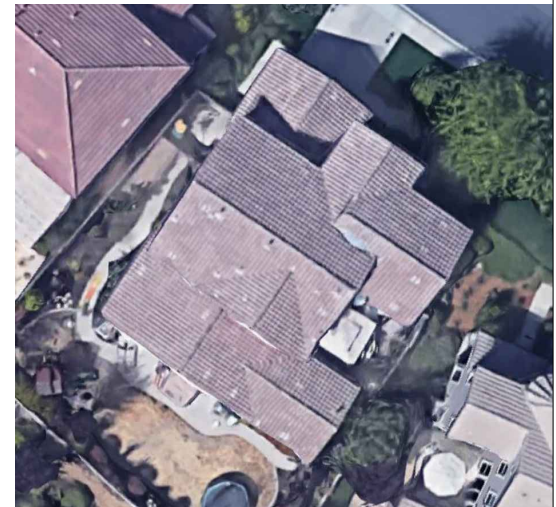
1. 2019 CA BUILDING CODE
2. 2019 CA ELECTRICAL CODE
3. 2019 CA FIRE CODE TITLE 24 SUPPLEMENT
4. 2019 CA RESIDENTIAL CODE
5. ANY OTHER LOCAL AMENDMENTS

- a. INSTALLATION OF SOLAR PHOTOVOLTAIC SYSTEM SHALL BE IN ACCORDANCE WITH NEC ARTICLE 690, AND ALL OTHER APPLICABLE NEC CODES WHERE NOTED OR EXISTING.
- b. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL COMPLY WITH NEC ARTICLE 110.
- c. ALL CONDUCTORS, INCLUDING THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE IN ACCORDANCE WITH NEC ARTICLE 250.
- d. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE; THIS SYSTEM IS UTILITY INTERACTIVE PER UL 1741 AND DOES NOT INCLUDE STORAGE BATTERIES OR OTHER ALTERNATIVE STORAGE SOURCES.
- e. ALL DC WIRES SHALL BE SIZED ACCORDING TO [NEC 690.8]
- f. DC CONDUCTORS SHALL BE WITHIN PROTECTED RACEWAYS IN ACCORDANCE WITH [NEC 690.31]
- g. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL JURISDICTIONAL BUILDING CODE.
- h. PV MODULES TO BE RATED UL 1703 CLASS C FIRE RATING OR BETTER.
- i. ALL EQUIPMENT TO BE CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY.



PV 0.0:	COVER SHEET
PV 1.0:	SITE PLAN
S 1.1:	MOUNT DETAILS
E 1.1:	3-LINE DIAGRAM
E 1.2:	NOTES
E 1.3:	WARNING LABELS
E 1.4:	ENPHASE MICRO-INVERTER CHART
-	DATA SHEET

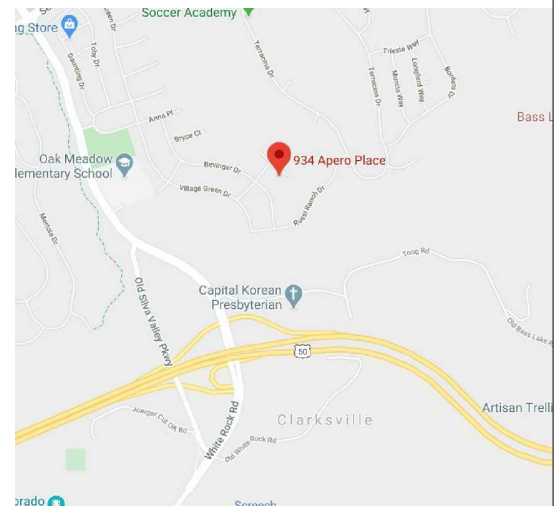
ROOF ACCESS POINT SHALL NOT BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES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



2 HOUSE PHOTO

PV 0.0

SCALE: NTS



3 VICINITY MAP

PV 0.0

SCALE: NTS

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COVER SHEET

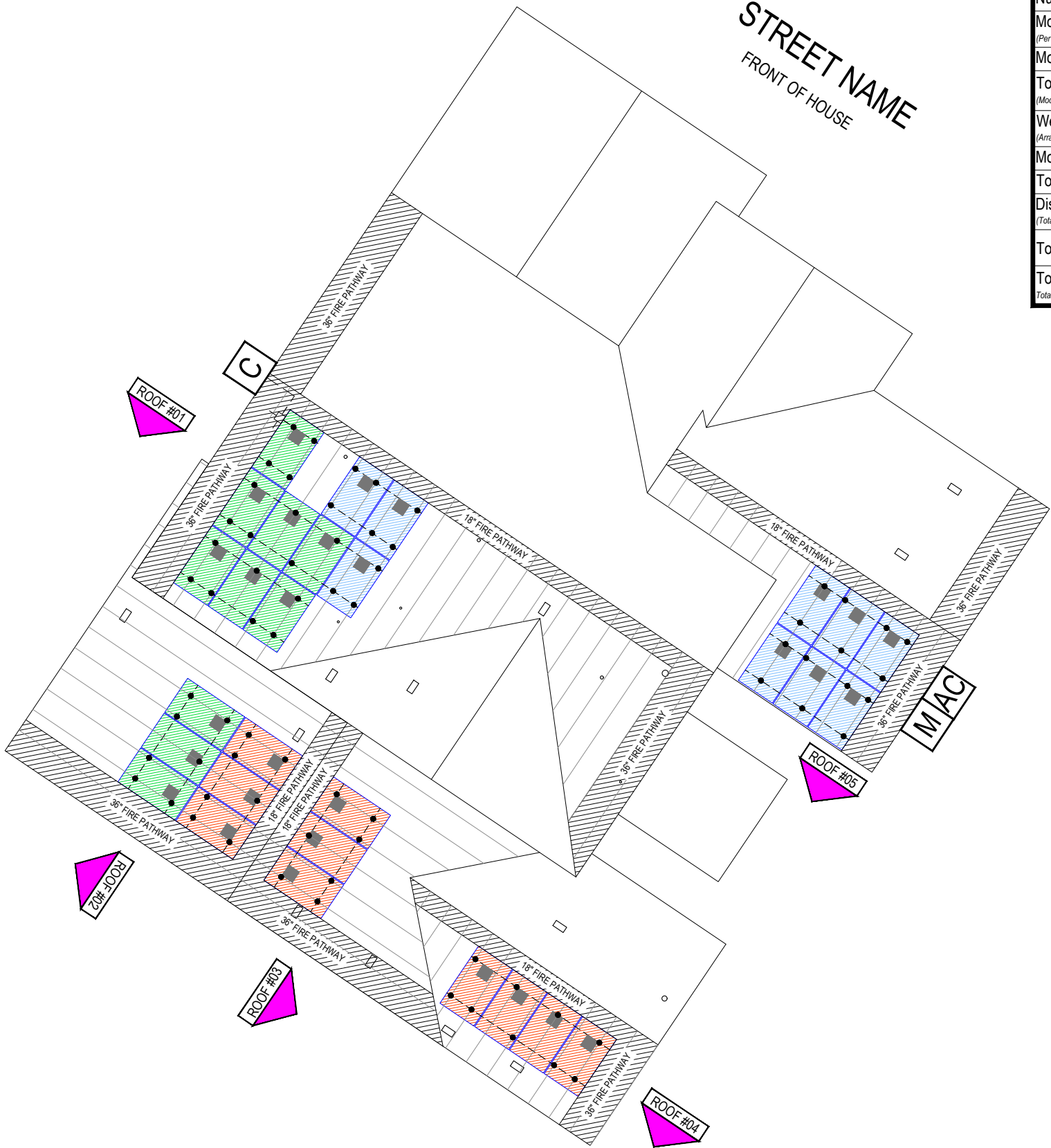
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MODULE, ARRAY WEIGHT (LOAD CALC'S)		
Number of Modules	29	
Module Weight	41.2	LBS
Total Module (Array) Weight	1194.80	LBS
Number of Attachment point	70	
Mounting System Weight <small>(Per Module)</small>	1.5	LBS
Mounting System Weight	105.00	LBS
Total System Weight <small>(Module Weight + Mounting System Weight)</small>	1299.80	LBS
Weight at Each Attachment Point <small>(Array Weight / Number of Attachment Point)</small>	17.07	LBS
Module Area (66.3"x39.4")	18.14	SqFt
Total Array Area	526.07	SqFt
Distributed Load <small>(Total System Weight / Total Array Area)</small>	2.35	Per SqFt
Total Roof Area	3782.19	SqFt
Total Percentage or Roof Covered <small>Total Array Area / Total Roof Area*100</small>	13.91%	

SYSTEM LEGEND

M

EXISTING EXTERIOR MAIN SERVICE PANEL & POINT OF INTERCONNECTION. TIED TO EXTERIOR UTILITY METER.

AC

NEW PHOTOVOLTAIC UTILITY DISCONNECT SWITCH. LOCATED WITHIN 10' OF MSP.

29 NEW HANWHA Q.PEAK DUO-G7 320W MODULES WITH NEW 29 - ENPHASE IQ7PLUS-72-2-US INVERTERS, MOUNTED ON THE BACK OF EACH MODULES.

C

NEW DEDICATED PV SYSTEM COMBINER PANEL.

= FIRE PATHWAY

= ROOF OBSTRUCTIONS

= ATTACHMENT POINTS

= TRUSS

= RACKING SYSTEM

= EXTERIOR RUN

= ATTIC RUN

= CONDUIT ROOF TOP JUNCTION BOX

= CONDUIT ATTIC RUN JUNCTION BOX

ROOF SECTIONS

ROOF #01

MODULE - 10
SLOPE - 20°
AZIMUTH - 214°
MATERIAL - S-TILE
TRUSS SIZE & SPACING - 2X4 @ 24 O.C.

ROOF #02

MODULE - 06
SLOPE - 20°
AZIMUTH - 304°
MATERIAL - S-TILE
TRUSS SIZE & SPACING - 2X4 @ 24 O.C.

ROOF #03

MODULE - 03
SLOPE - 20°
AZIMUTH - 124°
MATERIAL - S-TILE
TRUSS SIZE & SPACING - 2X4 @ 24 O.C.

ROOF #04

MODULE - 04
SLOPE - 20°
AZIMUTH - 214°
MATERIAL - S-TILE
TRUSS SIZE & SPACING - 2X4 @ 24 O.C.

ROOF #05

MODULE - 06
SLOPE - 20°
AZIMUTH - 214°
MATERIAL - S-TILE
TRUSS SIZE & SPACING - 2X4 @ 24 O.C.

CIRCUIT(S)

CIRCUIT #1 - 10 MODULES

CIRCUIT #2 - 10 MODULES

CIRCUIT #3 - 09 MODULES

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SITE PLAN

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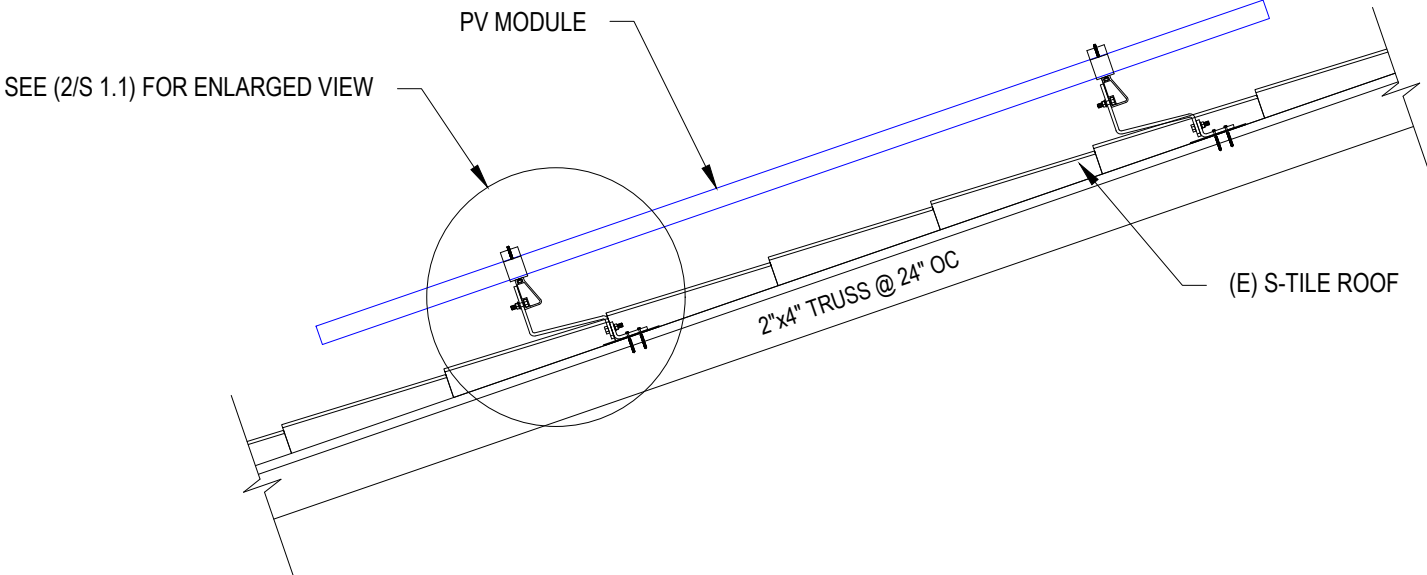
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PV 1.0

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GENERAL STRUCTURAL NOTES:

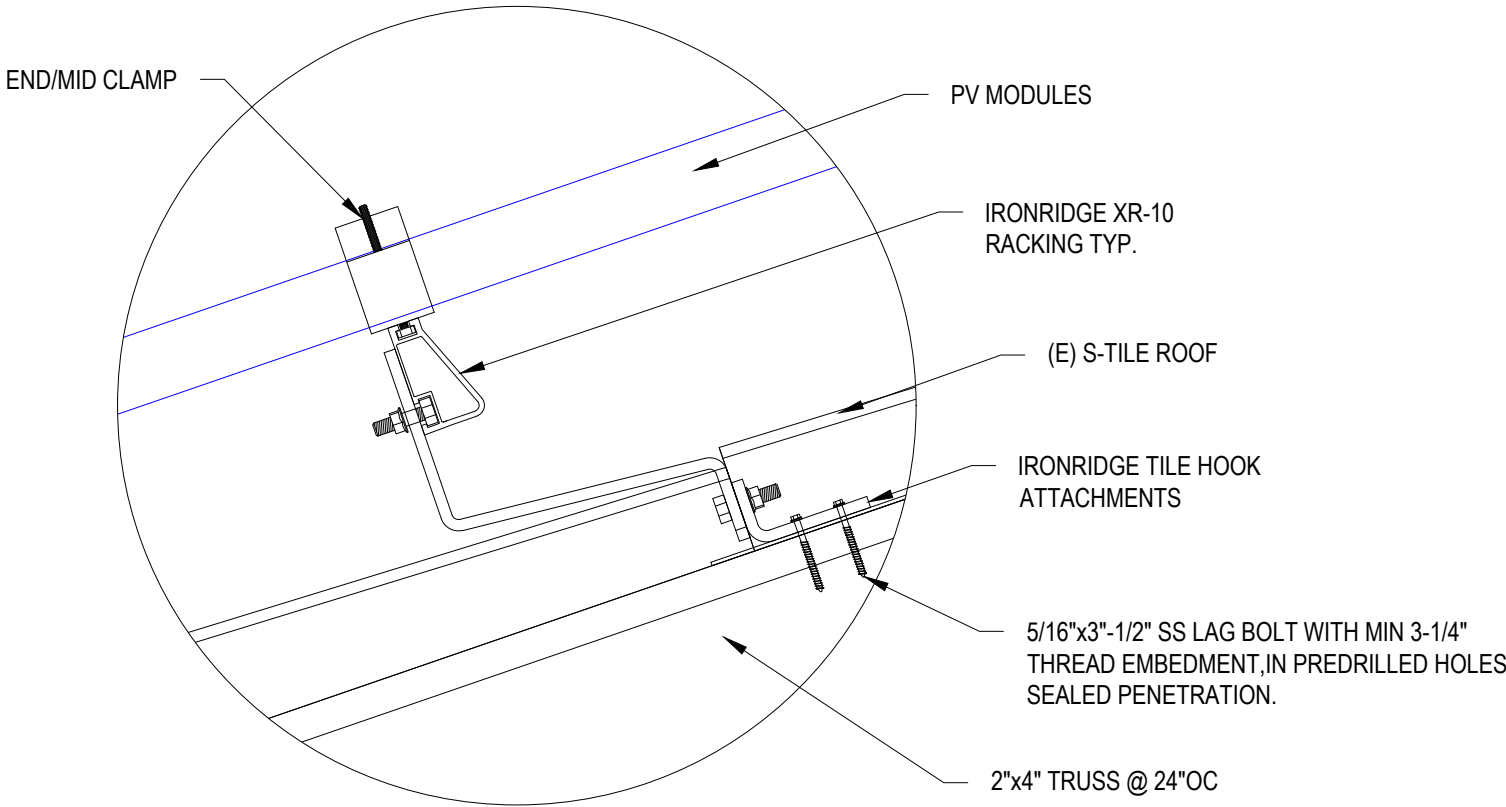
1. THE SOLAR PANELS ARE TO BE MOUNTED TO THE ROOF FRAMING USING THE IRONRIDGE XR-10 RAIL WITH S-TILE ATTACHMENTS
2. THE MOUNTING FEET ARE TO BE SPACED AS SHOWN IN THE DETAILS, AND MUST BE STAGGERED TO ADJACENT FRAMING MEMBERS TO SPREAD OUT THE ADDITIONAL LOAD.
3. UNLESS NOTED OTHERWISE, MOUNTING ANCHORS SHALL BE 5/16" LAG SCREWS WITH A MINIMUM OF 2-1/2" PENETRATION INTO ROOF FRAMING.
4. THE PROPOSED PV SYSTEM ADDS 2.6 psf TO THE ROOF FRAMING SYSTEM.
5. ROOF LIVE LOAD = 2.27 psf TYPICAL, 0 psf UNDER NEW PV SYSTEM.
6. GROUND SNOW LOAD = 0 psf
7. WIND SPEED = 110 mph
8. EXPOSURE CATEGORY = II



1 ATTACHMENT DETAIL (SIDE VIEW)

S 1.1

SCALE: NTS



2 ATTACHMENT DETAIL ENLARGED VIEW

S 1.1

SCALE: NTS

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MOUNT DETAIL

Sheet Size

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Sheet Number

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INVERTER SPECIFICATIONS	
MANUFACTURER	ENPHASE ENERGY IQ7PLUS-72-2-US
MAX. DC VOLT RATING	60 VOLTS
MAX. POWER AT 40 C	235 WATTS
NOMINAL AC VOLTAGE	290 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)	
AC OUTPUT CURRENT	35A
NOMINAL AC VOLTAGE	240V

PV MODULE RATING @ STC	
MANUFACTURER	HANWHA Q.PEAK DUO-G7 320W
MAX. POWER-POINT CURRENT (IMP)	9.56 AMPS
MAX. POWER-POINT VOLTAGE (VMP)	33.47 VOLTS
OPEN-CIRCUIT VOLTAGE (VOC)	40.10 VOLTS
SHORT-CIRCUIT CURRENT (ISC)	10.04 AMPS
NOM. MAX. POWER AT STC (P _{MAX})	320 WATT
MAX. SYSTEM VOLTAGE	1000V
VOC TEMPERATURE COEFFICIENT	-0.27° %/°C

120% RULE
BUS BAR RATING X 120%) - MAIN BREAKER RATING = MAX. PV OCPD
(200A x 120%) - 175 = 65A

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%)	38°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	60°
CONDUCTOR TEMPERATURE RATE	90°

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

- SYSTEM NOTES:
1.

ENPHASE IQ7 / 7PLUS 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.

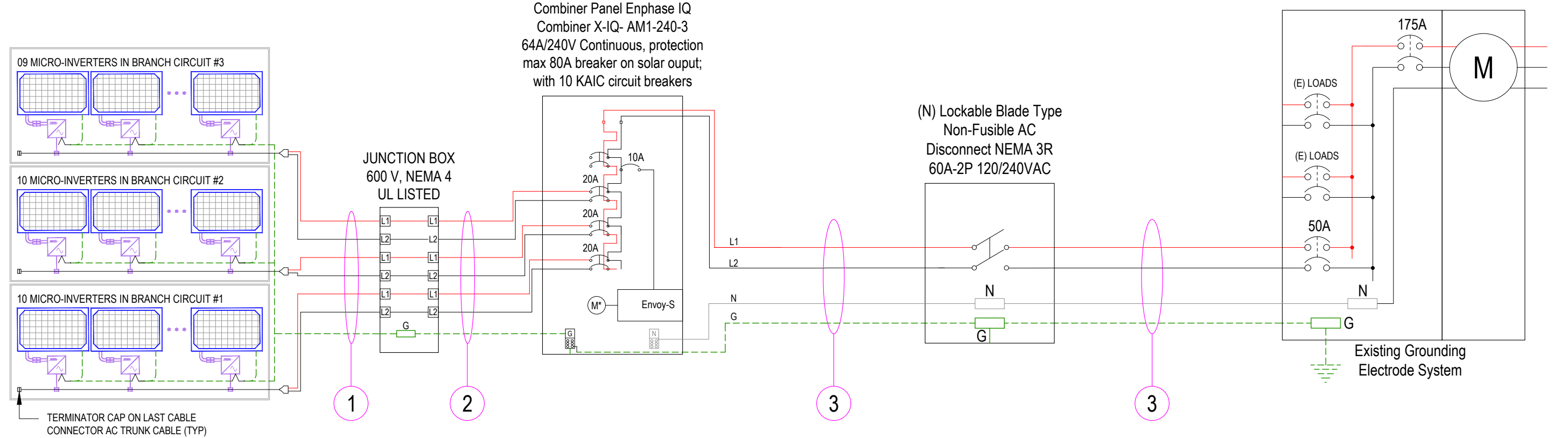
SYSTEM IS UNGROUNDED
6.

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



WIRE TAG #	WIRE FROM --	CONDUIT	WIRE QTY	WIRE GAUGE:	WIRE TYPE ENPHASE TRUNK CABLE INCLUDES #12 GROUND	TEMP RATING:	WIRE AMP	TEMP DE-RATE:	CONDUIT FILL:	WIRE OCP:	TERMINAL 75°C RATING:	INVERTER QTY:	NOC:	NEC:	STRING AMPS	GRND SIZE	GRND WIRE TYPE
①	ARRAY TO JUNCTION BOX	PV WIRE	6	#12	TRUNK CABLE	90°	30A	x 0.91A	x 0.80A	= 21.84A	25A	10	x 1.21	x 1.25	= 15.13A	#6	SBC
②	JUNCTION BOX TO COMBINER PANEL	3/4" EMT	6	#10	THWN-2	90°	40A	x 0.71A	x 0.80A	= 22.72A	35A	10	x 1.21	x 1.25	= 15.13A	#8	THWN-2
③	COMBINER PANEL TO MSP	3/4" EMT	3	#8	THWN-2	75°	50A	x 0.88A	x 1.00A	= 44.00A	50A	29	x 1.21	x 1.25	= 43.86A	#8	THWN-2

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DIAGRAM

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NOTES

1.

THIS SYSTEM SHALL COMPLY WITH ALL APPLICABLE CODES INCLUDING: THE 2019 CALIFORNIA BUILDING CODE, CALIFORNIA FIRE CODE, CALIFORNIA ELECTRIC CODE, CALIFORNIA MECHANICAL CODE CALIFORNIA RESIDENTIAL CODE, CALIFORNIA PLUMBING CODE, CALIFORNIA BUILDING STANDARDS CODE, CALIFORNIA HEALTH AND SAFETY CODE, IEEE STANDARD 929, UL STANDARD 1741, 2019 RESIDENTIAL CODE, AND THE MANUFACTURERS' LISTINGS AND INSTALLATION INSTRUCTIONS.
2.

ALL WORK TO COMPLY WITH CEC ARTICLE 690
3.

UTILITY SHALL BE NOTIFIED BEFORE ACTIVATION OF PV SYSTEM
4.

REMOVAL OF A UTILITY-INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BUILDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PV SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTOR
5.

ALL PV SYSTEM COMPONENTS SHALL BE LISTED BY A RECOGNIZED TESTING AGENCY
6.

WIRING MATERIALS SHALL COMPLY WITH MAXIMUM CONTINUOUS CURRENT OUTPUT AT 25° C; WIRE SHALL BE WET RATED AT 90°C
7.

EXPOSED PHOTOVOLTAIC SYSTEM CONDUCTORS ON THE ROOF WILL BE USE-2 OR PV TYPE WIRE.
8.

ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE RAIN-TIGHT AND APPROVED FOR USE IN WET LOCATIONS (NEC 314.15)
9.

ALL METALLIC RACEWAYS AND EQUIPMENT SHALL BE BONDED AND ELECTRICALLY CONTINUOUS (NEC 250.90, 250.96)
10.

FOR UNGROUNDED SYSTEMS, THE PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUITS SHALL BE PROVIDED WITH A GROUND-FAULT PROTECTION DEVICE OR SYSTEM THAT DETECTS A GROUND FAULT, INDICATES THAT FAULT HAS OCCURED, AND AUTOMATICALLY DISCONNECTS ALL CONDUCTORS OR CAUSES THE INVERTER TO AUTOMATICALLY CEASE SUPPLYING POWER TO OUTPUT CIRCUITS (CEC 690.35(C))
11.

ANY REQUIRED GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT (CEC 250.64C)
12.

ALL PV MODULES AND ASSOCIATED EQUIPMENT SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE
13.

ALL FIELD-INSTALLED JUNCTION, PULL, AND OUTLET BOXES LOCATED BEHIND MODULES SHALL BE ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE SECURED BY REMOVABLE FASTENERS
14.

FOR GROUNDED SYSTEMS, THE INVERTER IS EQUIPPED WITH GROUND FAULT PROTECTION AND A GFI FUSE PORT FOR GROUND FAULT INDICATION
15.

WHEN BACKFED BREAKER IS THE METHOD OF UTILITY INTERCONNECTION, THE BREAKERS SHALL NOT READ "LINE AND LOAD"
16.

THE INSTALLED SOLAR SYSTEM HAS A DISTRIBUTED WEIGHT OF LESS THAN 4 PSF
17.

THE CONCENTRATED LOAD FOR EACH VERTICAL SUPPORT IS LESS THAN 45 LBS
18.

AC DISCONNECT IS A "KNIFE BLADE" TYPE DISCONNECT
19.

THE WORKING CLEARANCES AROUND THE EXISTING ELECTRICAL EQUIPMENT AS WELL AS THE NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26
20.

THE PHOTOVOLTAIC INVERTER WILL BE LISTED AS UL 1741 COMPLIANT
21.

SMOKE ALARMS AND CARBON MONOXIDE ALARMS ARE REQUIRED TO BE RETROFITTED ONTO THE EXISTING DWELLING AS PER THE 2019 CRC. THESE SMOKE ALARMS ARE REQUIRED TO BE IN ALL BEDROOMS, OUTSIDE EACH BEDROOM, AND AT LEAST ONE ON EACH FLOOR OF THE HOUSE. CARBON MONOXIDE ALARMS ARE REQUIRED TO BE RETROFITTED OUTSIDE EACH BEDROOM AND AT LEAST ONE ON EACH FLOOR OF THE HOUSE. THESE ALARMS MAY BE SOLELY BATTERY OPERATED IF THE PHOTOVOLTAIC PROJECT DOES NOT INVOLVE THE REMOVAL OF INTERIOR WALL AND CEILING FINISHES INSIDE THE HOME; OTHERWISE, THE ALARMS MUST BE HARD WIRED AND INTERCONNECTED. (CRC R314, R315)
22.

SMOKE AND CARBON MONOXIDE ALARMS ARE REQUIRED PER CRC SECTIONS R314 AND 315 TO BE VERIFIED AND INSPECTED BY THE INSPECTOR IN THE FIELD.
23.

WHEN APPLYING THE 120% RULE OF CEC 705.12(D)(2), THE SOLAR BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUS FROM THE MAIN BREAKER PER 705.12(D)(7)
24.

PLUMBING AND MECHANICAL VENTS THROUGH THE ROOF SHALL NOT BE COVERED BY SOLAR MODULES - NO BUILDING, PLUMBING, OR MECHANICAL VENTS TO BE COVERED OR OBSTRUCTED

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WARNING

ELECTRICAL SHOCK HAZARD

DO NOT TOUCH TERMINALS.
TERMINALS ON LINE AND LOAD
SIDES MAY BE ENERGIZED IN
THE OPEN POSITION

LABEL LOCATION:
INVERTER(S), AC DISCONNECT(S), AC
COMBINER PANEL (IF APPLICABLE).
PER CODE(S): CEC 2019: 690.17(B),
NEC 2014: 690.17(E), NEC 2011: 690.17(4)

!

WARNING

ELECTRICAL SHOCK HAZARD

THE DC CONDUCTORS OF THIS
PHOTOVOLTAIC SYSTEM ARE
UNGROUND AND MAY BE
ENERGIZED

LABEL LOCATION:
INVERTER(S), DC DISCONNECTS.
PER CODE(S): CEC 2016: 690.35(F), NEC 2014:
690.35(F), NEC 2011: 690.35(F)

!

WARNING

INVERTER OUTPUT CONNECTION

DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL LOCATION:
ADJACENT TO PV BREAKER (IF APPLICABLE).
PER CODE(S): CEC 2019: 705.12(B),
NEC 2014: 705.12(D)(2)(3)(b), NEC 2011: 705.12(D)(7)

WARNING: PHOTOVOLTAIC
POWER SOURCE

LABEL LOCATION:
INTERIOR AND EXTERIOR DC CONDUIT EVERY 10 FT, AT EACH
TURN, ABOVE AND BELOW PENETRATIONS, ON EVERY JB/PULL
BOX CONTAINING DC CIRCUITS.
PER CODE(S): CEC 2019: 690.13, NEC 2014: 690.31(G)(3),
690.31(G)(4), NEC 2011: 690.31(E)(3), 690.31(E)(4), IFC 2012:
605.11.1.4

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT: 35.09 AMPS

NOMINAL OPERATING AC VOLTAGE: 240 VAC

LABEL LOCATION:
AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF
INTERCONNECTION.
PER CODE(S): CEC 2019: 690.53, NEC 2014: 690.54, NEC 2011: 690.54

!

WARNING

ELECTRICAL SHOCK HAZARD

IF GROUND FAULT IS INDICATED
ALL NORMALLY GROUNDED
CONDUCTORS MAY BE
UNGROUND AND ENERGIZED

LABEL LOCATION:
INVERTER(S), ENPHASE ENVOY ENCLOSURE
(IF APPLICABLE).
PER CODE(S): CEC 2019: 690.15,
NEC 2014: 690.5(C), NEC 2011: 690.5(C)

!

WARNING

DUAL POWER SUPPLY

SOURCES: UTILITY GRID
AND PV SOLAR ELECTRIC
SYSTEM

LABEL LOCATION:
UTILITY SERVICE METER AND MAIN SERVICE
PANEL.
PER CODE(S): NEC 2014: 705.12(D)(3),
NEC 2011: 705.12(D)(4)

!

WARNING

PHOTOVOLTAIC SYSTEM
COMBINER PANEL

DO NOT ADD LOADS

LABEL LOCATION:
PHOTOVOLTAIC AC COMBINER (IF APPLICABLE).
PER CODE(S): CEC 2016: 705.12(D)(2)(3)(c), NEC
2014: 705.12(D)(2)(3)(c), NEC 2011: 705.12(D)(4)

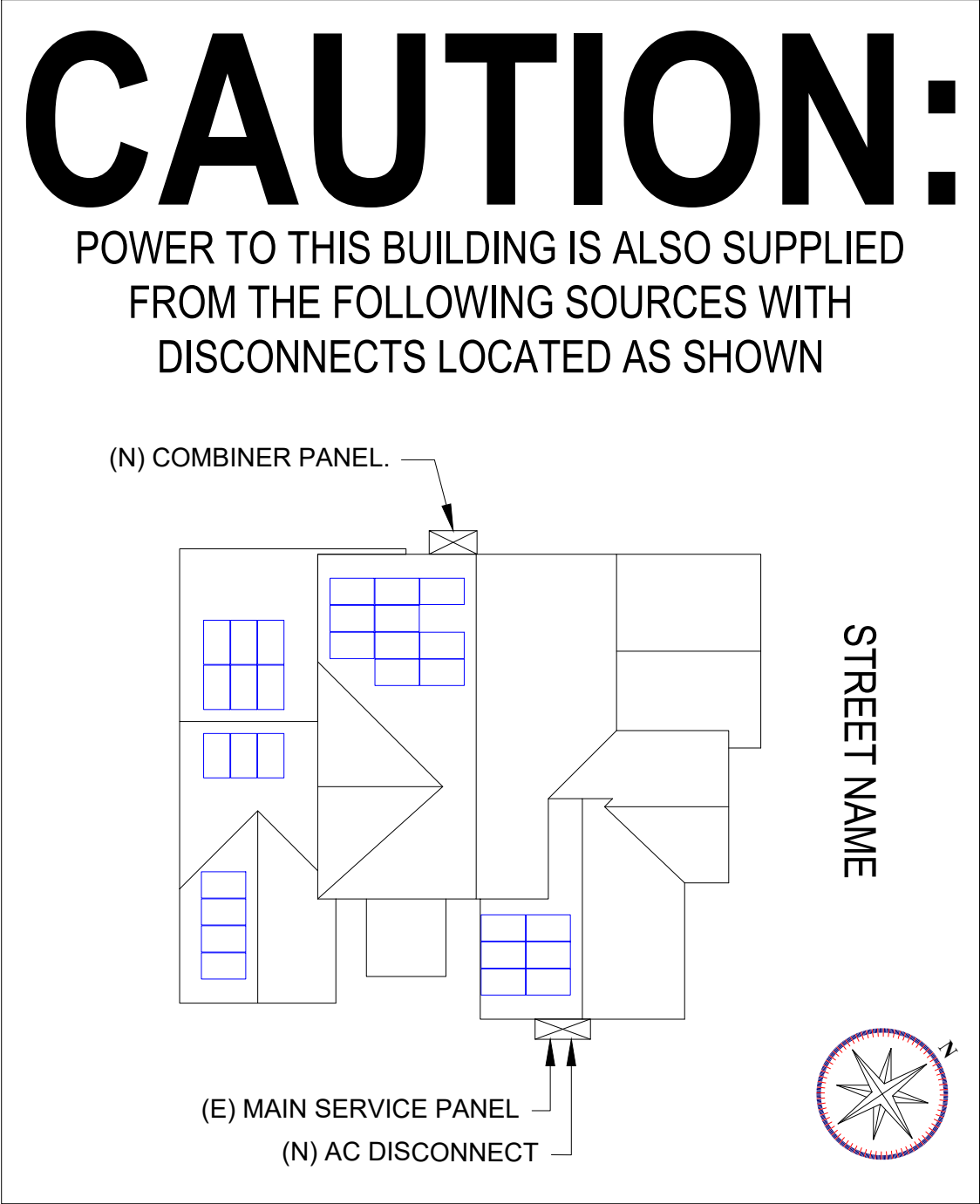
PHOTOVOLTAIC SYSTEM
EQUIPPED WITH RAPID SHUTDOWN

LABEL LOCATION:
WEATHER RESISTANT MATERIAL, DURABLE PLAQUE, UL969 AS STANDARD TO WEATHER RATING (UL
LISTING OF MARKINGS NOT REQUIRED), MIN 3/8" LETTER HEIGHT ARIAL OR SIMILAR FONT NON-BOLD,
PLACED WITHIN THE MAIN SERVICE DISCONNECT, PLACED ON THE OUTSIDE OF THE COVER WHEN
DISCONNECT IS OPERABLE WITH SERVICE PANEL CLOSED. (PER CODE: CEC690.12, 690.56(C))

- NOTES AND SPECIFICATIONS:
- SIGNS AND LABELS SHALL MEET THE REQUIREMENTS OF THE CEC 2016
ARTICLE 110.21(B), UNLESS SPECIFIC INSTRUCTIONS ARE REQUIRED
BY SECTION 690, OR IF REQUESTED BY THE LOCAL AHJ.
 - SIGNS AND LABELS SHALL ADEQUATELY WARN OF HAZARDS USING
EFFECTIVE WORDS, COLORS AND SYMBOLS.
 - LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR
WIRING METHOD AND SHALL NOT BE HAND WRITTEN.
 - LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE
ENVIRONMENT INVOLVED.
 - SIGNS AND LABELS SHALL COMPLY WITH ANSI Z535.4-2011, PRODUCT
SAFETY SIGNS AND LABELS, UNLESS OTHERWISE SPECIFIED.
 - DO NOT COVER EXISTING MANUFACTURER LABELS.

SOLAR PV SYSTEM
EQUIPPED WITH RAPID
SHUTDOWN

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



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WARNING
LABELS

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11-20

21-30

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41-50

51-60

ENPHASE MICRO-INVERTER CHART

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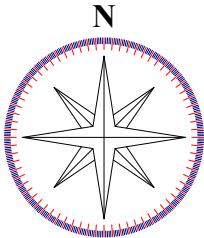
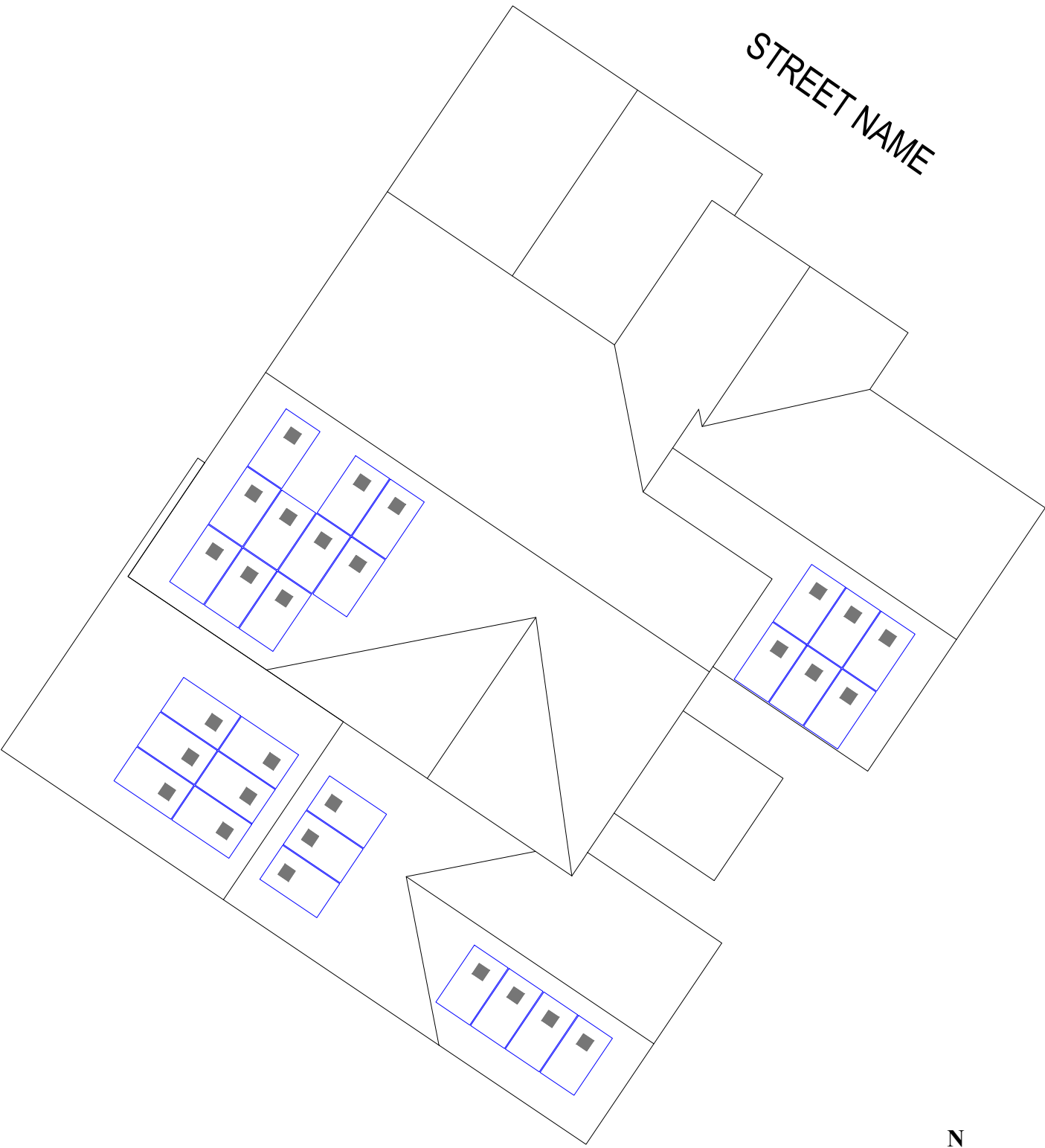
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Sheet Name
ENPHASE
MICRO-INVERTER
CHART

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powered by
Q.ANTUM DUO

Q.peak DUO-G7

315-330

ENDURING HIGH PERFORMANCE



Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.9%.



INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400Pa) and wind loads (4000 Pa).



A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance warranty².



STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

¹ APT test conditions according to IEC/TS 62804-1:2015, method B (-1500V, 168h)
² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:



Rooftop arrays on residential buildings



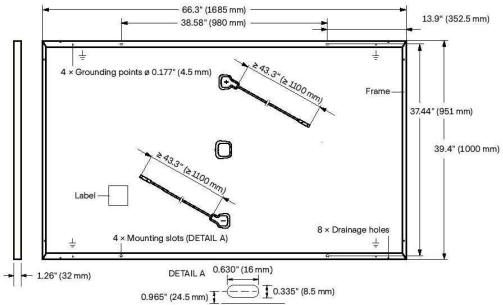
Rooftop arrays on commercial and industrial buildings

Engineered in Germany



MECHANICAL SPECIFICATION

Format	66.3 in × 39.4 in × 1.26 in (including frame) (1685 mm × 1000 mm × 32 mm)
Weight	41.2 lbs (18.7 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 43.3 in (1100 mm), (-) ≥ 43.3 in (1100 mm)
Connector	Stäubli MC4, Hanwha Q CELLS HQC4, Amphenol UTX, Renhe 05-6, Tongling TL-Cable01S, JMTHY JM601; IP68 or Friends PV2e; IP67

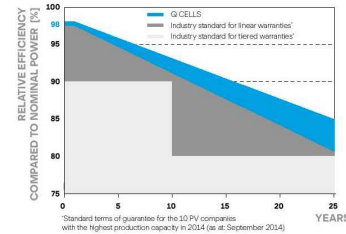


ELECTRICAL CHARACTERISTICS

POWER CLASS		315	320	325	330
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)					
Minimum	Power at MPP ¹	P _{MPP} [W]	315	320	325
	Short Circuit Current ¹	I _{SC} [A]	9.99	10.04	10.10
	Open Circuit Voltage ¹	V _{OC} [V]	39.84	40.10	40.36
	Current at MPP	I _{MPP} [A]	9.51	9.56	9.61
	Voltage at MPP	V _{MPP} [V]	33.14	33.47	34.14
	Efficiency ¹	η [%]	≥ 18.7	≥ 19.0	≥ 19.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²					
Minimum	Power at MPP	P _{MPP} [W]	235.9	239.6	243.4
	Short Circuit Current	I _{SC} [A]	8.05	8.09	8.14
	Open Circuit Voltage	V _{OC} [V]	37.56	37.81	38.06
	Current at MPP	I _{MPP} [A]	7.48	7.52	7.57
	Voltage at MPP	V _{MPP} [V]	31.53	31.85	32.17

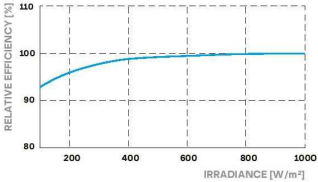
¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2°C, AM 1.5 according to IEC 60904-3 • ² 800 W/m², NMOT, spectrum AM 1.5

Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I _{SC}	α	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.35	Normal Module Operating Temperature	NMOT	[°F]	109 ± 5.4 (43 ± 3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1000 (IEC) / 1000 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 1703	C (IEC) / TYPE 2 (UL)
Max. Design Load, Push / Pull ³	[lbs / ft ²]	75 (3600 Pa) / 55 (2667 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push / Pull ³	[lbs / ft ²]	113 (5400 Pa) / 84 (4000 Pa)		

³ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 1703, VDE Quality Tested, CE-compliant, IEC 61215:2016, IEC 61730:2016, Application Class II, U.S. Patent No. 9.893.215 (solar cells)



PACKAGING INFORMATION

Number of Modules per Pallet	32
Number of Pallets per 53' Trailer	30
Number of Pallets per 40' HC-Container	26
Pallet Dimensions (L × W × H)	69.3 × 45.3 × 46.9 in (1760 × 1150 × 1190 mm)
Pallet Weight	1415 lbs (642 kg)

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

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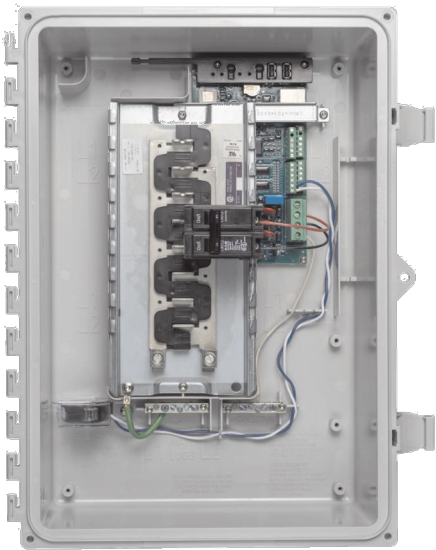
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Specifications subject to technical changes © Q CELLS Q.peak DUO-G7 315-330_2019-07_Rev01_NA

Enphase IQ Combiner 3 (X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ 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
- 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



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 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%).
ACCESSORIES and REPLACEMENT PARTS (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G/12-year data plan) CELLMODEM-01 (3G/5-year data plan) CELLMODEM-M1 (4G based LTE-M/5-year data plan) Consumption Monitoring* CT CT-200-SPLIT * Consumption monitoring is required for Enphase Storage Systems	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.) Split core current transformers enable whole home consumption metering (+/- 2.5%).
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 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
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)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" 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
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (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

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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 and 72-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 modules.



To learn more about Enphase offerings, visit enphase.com



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 PV modules only		60-cell and 72-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 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 and NEC-2017 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

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Enphase IQ Envoy

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

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



Smart

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

Simple

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

Reliable

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



Enphase IQ Envoy

MODEL NUMBERS	
Enphase IQ Envoy™ ENV-IQ-AM1-240	Enphase IQ Envoy communications gateway with integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%). Includes one 200A continuous rated production CT.
ACCESSORIES (order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring CT CT-200-SPLIT	Split-core current transformers enable whole home metering.
POWER REQUIREMENTS	
Power requirements	120/240 VAC split-phase. Max 20 A overcurrent protection required.
CAPACITY	
Number of microinverters polled	Up to 600
MECHANICAL DATA	
Dimensions (WxHxD)	21.3 x 12.6 x 4.5 cm (8.4" x 5" x 1.8")
Weight	17.6 oz (498 g)
Ambient temperature range	-40° to 65° C (-40° to 149° F) -40° to 46° C (-40° to 115° F) if installed in an enclosure
Environmental rating	IP30. For installation indoors or in an NRTL-certified, NEMA type 3R enclosure.
Altitude	To 2000 meters (6,560 feet)
Production CT	- Is limited to 200A of continuous current / 250A OCPD – 72kW AC - Internal aperture measures 19.36mm to support 250MCM THWN conductors (max)
Consumption CT	- For electrical services to 250A with parallel runs up to 500A - Internal aperture measures 0.84" x 0.96" (21.33mm x 24.38mm) to support 3/0 THWN conductor - CT wire insulation rating of 600V
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable, not included
Mobile	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G), not included
COMPLIANCE	
Compliance	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5

To learn more about Enphase offerings, visit enphase.com

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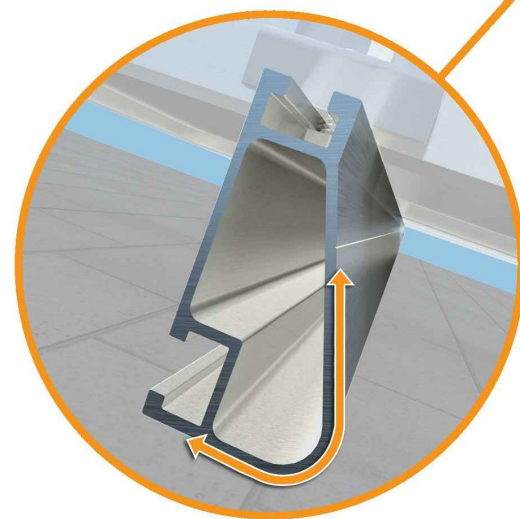
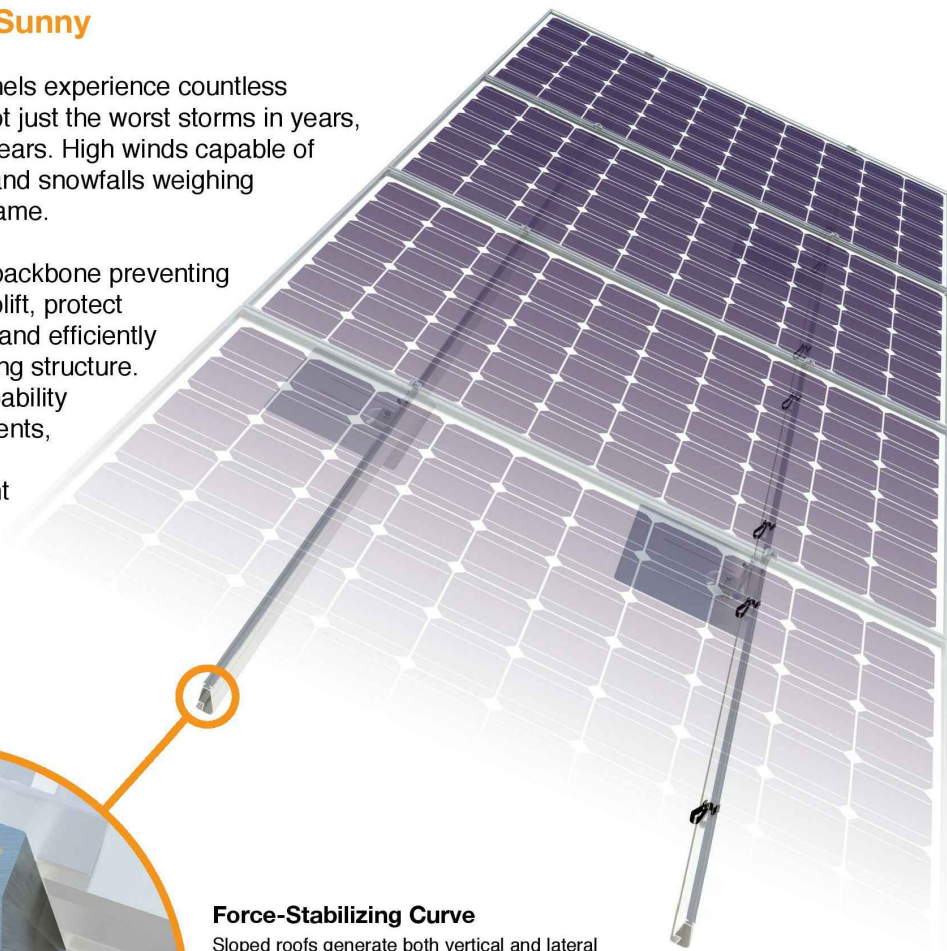
Tech Brief

XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs



XR Rails are compatible with FlashFoot and other pitched roof attachments.



IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.



XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.



XR10

XR10 is a sleek, low-profile mounting rail, perfectly matched to regions without snow. It achieves 6 foot spans, while also staying light and economical.

- 6' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available



XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30-40	100						
	120						
	140						
	160						
50-70	160						
80-90	160						

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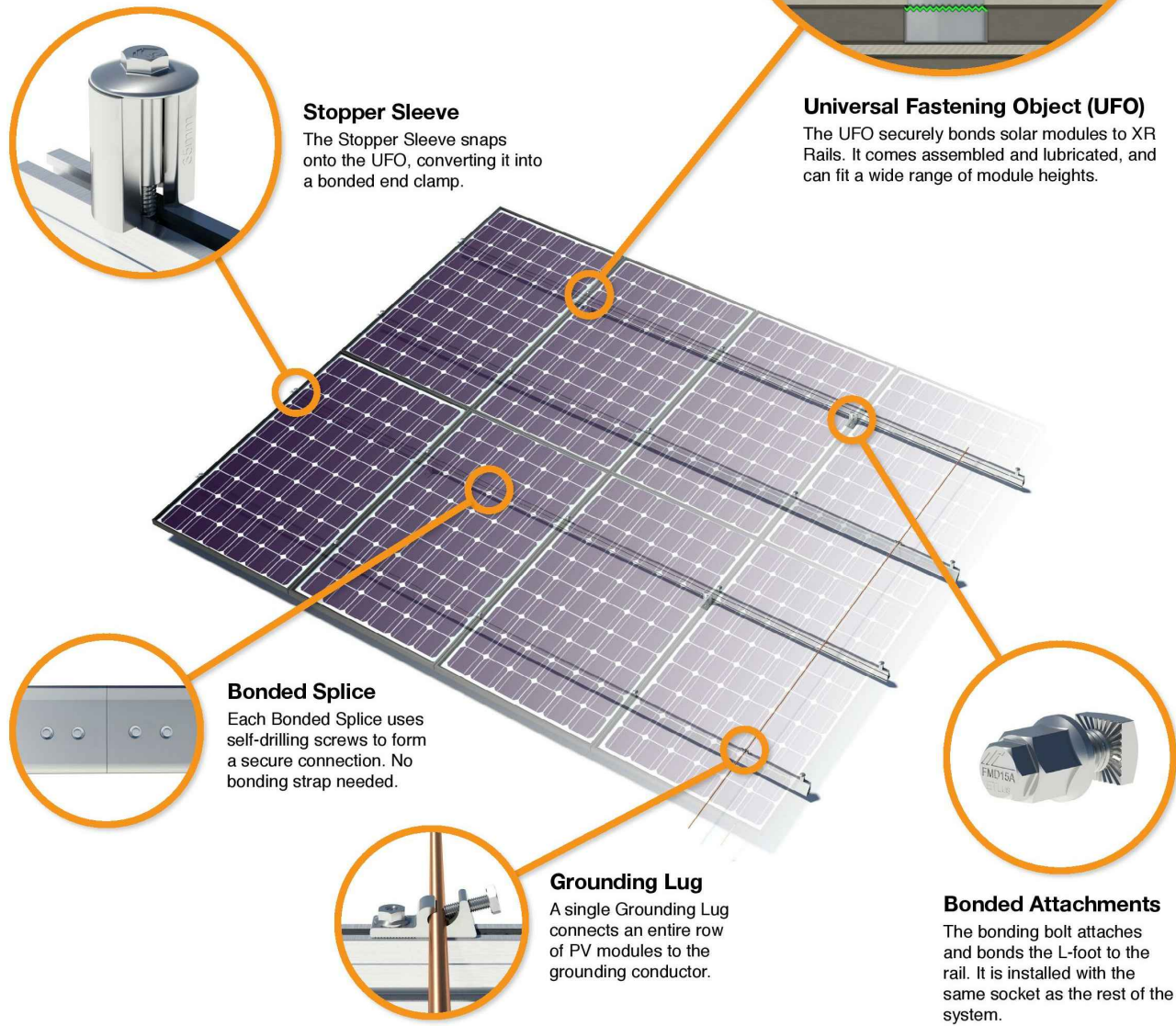
UFO Family of Components

Tech Brief

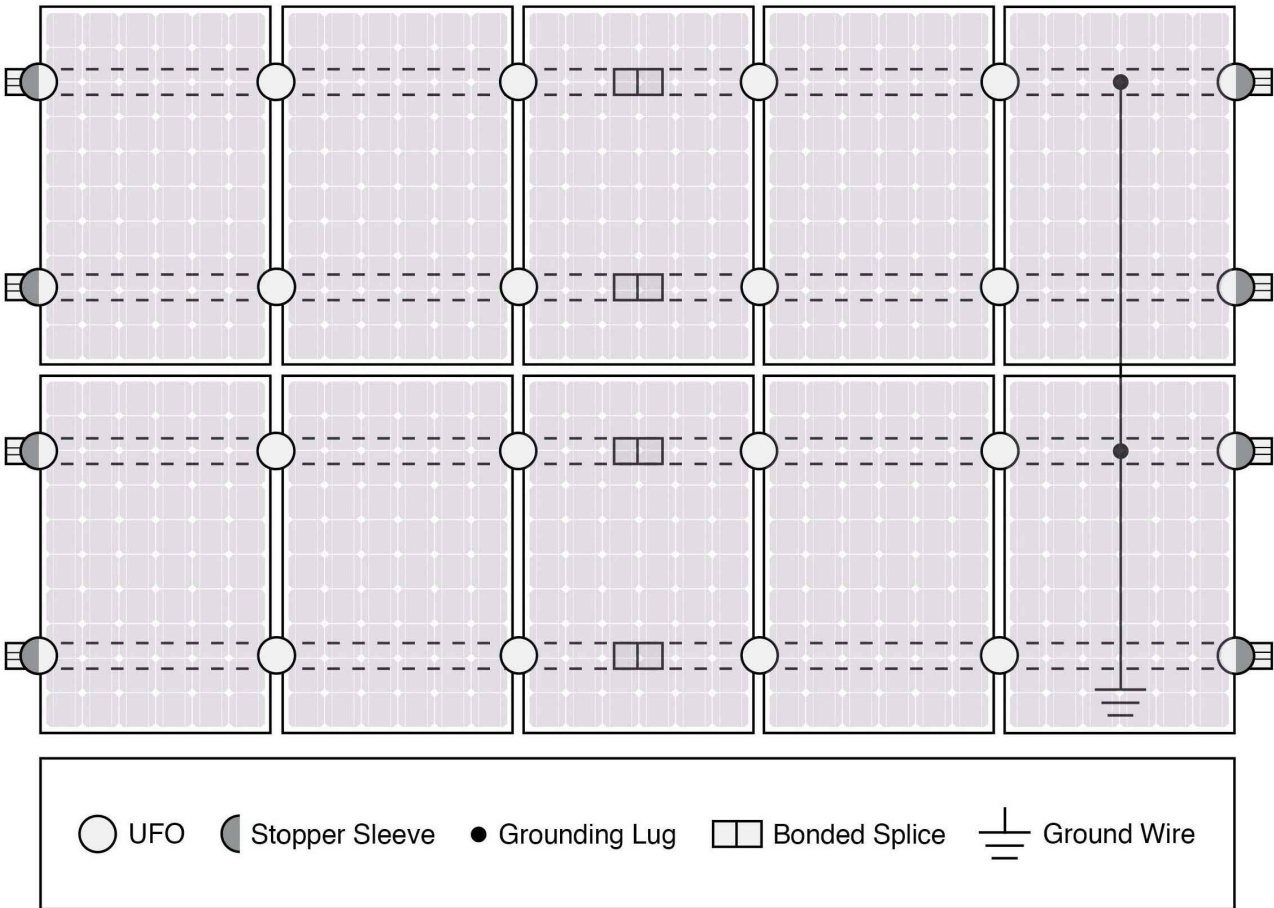
Simplified Grounding for Every Application

The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



System Diagram



Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

Go to IronRidge.com/UFO

Cross-System Compatibility			
Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails	✓	✓	XR1000 Only
UFO/Stopper	✓	✓	✓
Bonded Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		

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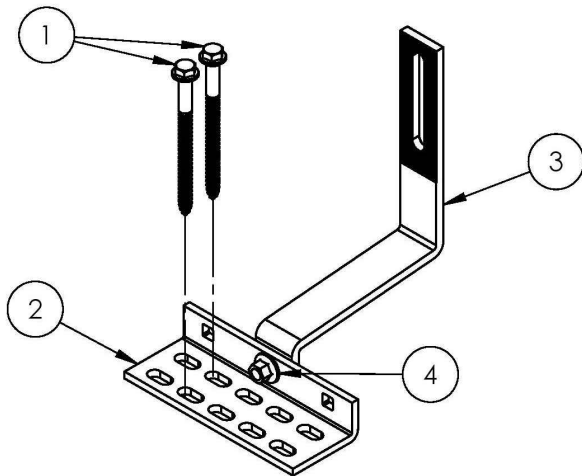
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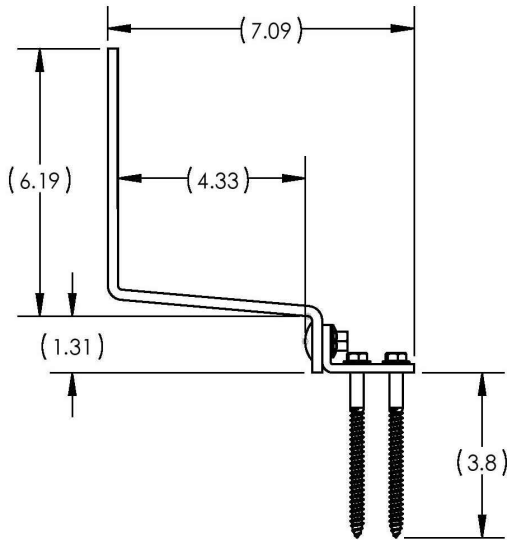
All Tile Hook

Cut Sheet



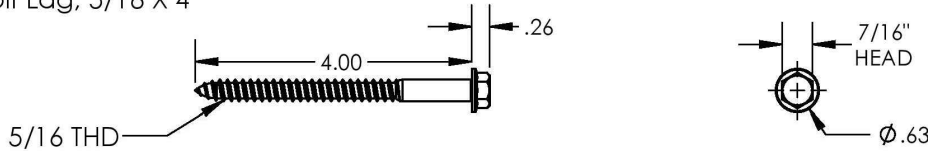
ITEM NO.	DESCRIPTION	QTY IN KIT
1	BOLT, LAG 5/16 X 4"	2
2	ASSY, BASE, CLEAR	1
3	ASSY, ARM, CLEAR	1
4	BOLT, CARRIAGE 5/16 X 1"	1

Part Number	Description
ATH-01-M1	All Tile Hook

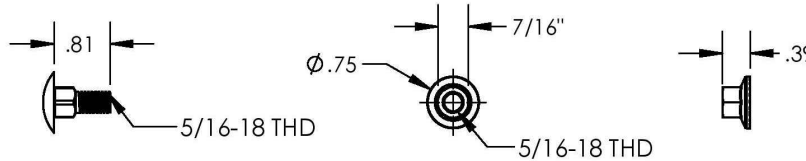


v1.0

1) Bolt Lag, 5/16 X 4"

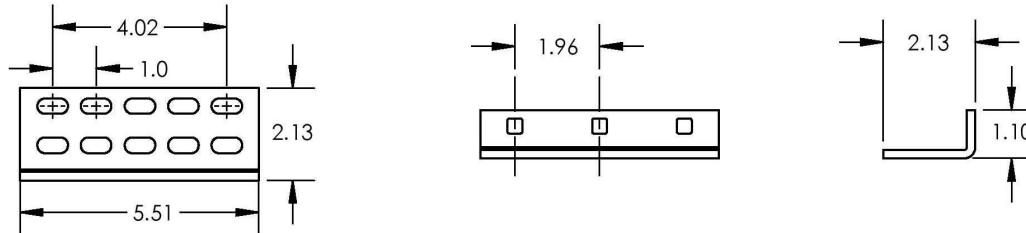


2) Bolt, Carriage 5/16 X 1"

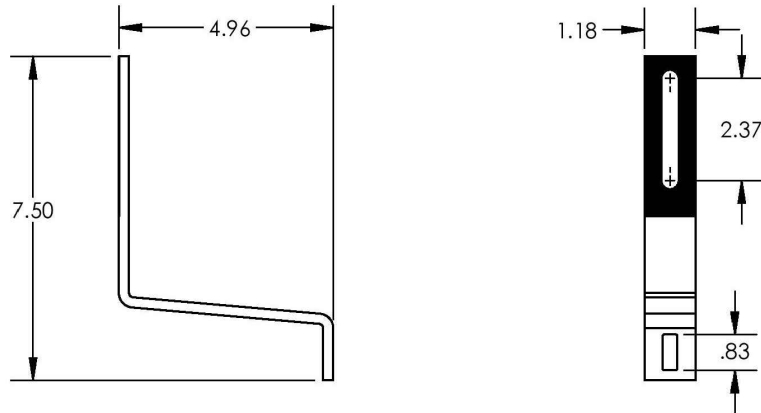


Items	Property	Value
1 & 2	Material	300 Series Stainless Steel
	Finish	Clear

3) Base, Clear



4) Arm, Clear



Items	Property	Value
3 & 4	Material	300 Series Stainless Steel
	Finish	Clear

v1.0

LOGO

COMPANY NAME
ADDRESS
PHONE NO.

REVISIONS

Description	Date	Rev
Initial Design	MD/YYYY	00

Signature with Seal

Project Name &
Address

CUSTOMER NAME
ADDRESS
APN
PHONE NO.

Sheet Name

DATA SHEET

Sheet Size

ANSI B
11" X 17"

Sheet Number

D-7

QC BY
