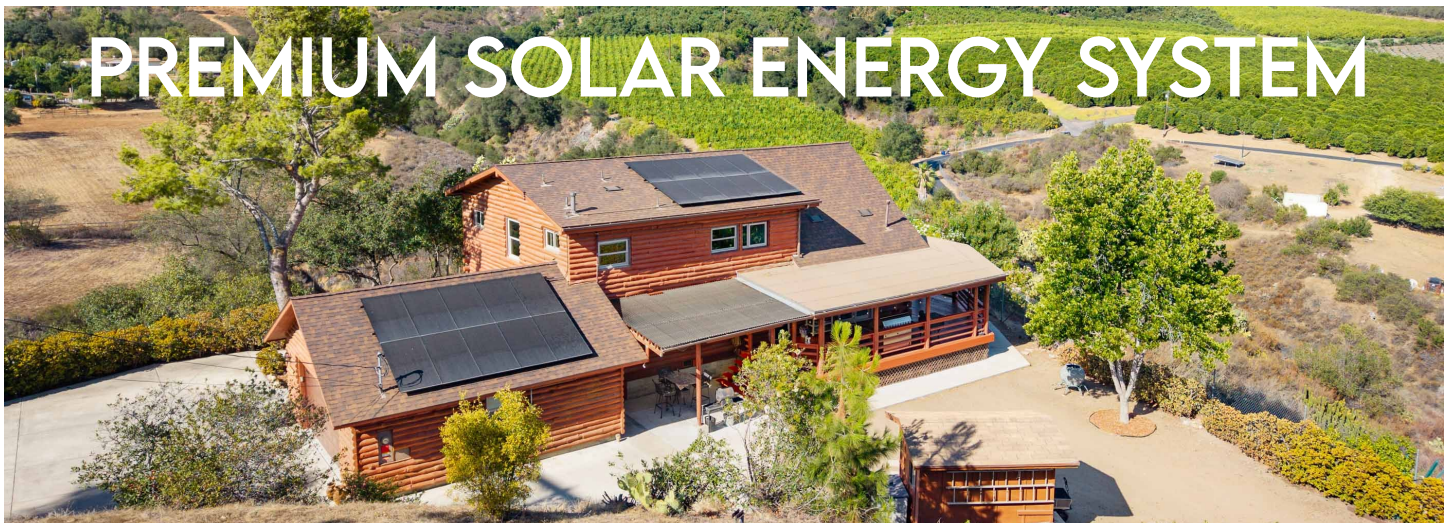




Clean Energy. Advanced Technology. Designed for Long-Term Performance

This home is equipped with a professionally designed 8.0 kW photovoltaic (PV) solar energy system, installed in 2022 and engineered to help offset electricity usage while providing reliable, efficient energy production. The system utilizes premium components from two of the industry's most respected manufacturers: Hanwha Q CELLS and Enphase Energy.

PREMIUM EQUIPMENT

Hanwha Q CELLS Q.PEAK DUO BLK ML-G10+ Solar Panels

- Premium all-black panel design
- 400-watt output per module
- 8.0 kW total system capacity
- Designed for high efficiency and long-term durability

ENPHASE IQ8H MICROINVERTERS

Unlike traditional systems that use a single central inverter, this home features **individual microinverters on every solar panel**, allowing each panel to operate independently for improved performance and reliability.

PROFESSIONALLY DESIGNED & PERMITTED

- Professionally engineered by New Leaf Electric
- Installed in accordance with the 2022 California Electrical, Residential, and Building Codes
- County of San Diego permitted and approved
- Designed for a residential roof with composite shingles
- Engineered to withstand 110 mph wind loads

DESIGNED FOR PERFORMANCE

The system includes:

- 20 premium 400-watt solar modules
- 20 Enphase IQ8H microinverters
- Enphase IQ Combiner with integrated monitoring and communications
- Grid-connected design utilizing the home's existing 200-amp electrical service

SYSTEM SPECIFICATIONS

FEATURE	DETAILS
Installation Year	2022
System Size	8.0 kW DC (7.43 kW AC)
Solar Panels	20 Hanwha Q CELLS Q.PEAK DUO BLK ML-G10+ Modules
Panel Rating	400 Watts Each
Total Panels	20
Inverters	20 Enphase IQ8H Microinverters
Monitoring	Enphase IQ Combiner with Integrated Gateway
Utility Service	Connected to Existing 200-Amp Main Service Panel

SOLAR LOAN INFORMATION

Buyer to assume responsibility of the solar loan at the close of escrow.

- Monthly Payment: \$223/month
- Buyer is encouraged to review the solar lease agreement and associated terms, including any transfer requirements, prior to the close of escrow.

Disclaimer:

The information provided on this sheet has been compiled from available solar system plans and information provided by the seller and is intended solely for informational purposes. While believed to be accurate, neither the seller nor listing broker guarantees its completeness or accuracy. Buyers are advised to independently verify all information, including but not limited to system specifications, performance, lease terms, transfer requirements, warranties, and any associated costs, through their own investigations and with the solar provider to their satisfaction prior to the close of escrow.

GENERAL NOTES:

1. SYSTEM TO BE INSTALLED ON A RESIDENTIAL STRUCTURE.
2. DESIGN COMPLYING WITH:
THE 2019 CALIFORNIA ELECTRICAL CODE,
THE 2019 CALIFORNIA RESIDENTIAL CODE,
THE 2019 CALIFORNIA BUILDING CODE,
COUNTY OF San Diego CONSOLIDATED FIRE CODE.
3. THE San Diego COUNTY AREA ELECTRICAL NEWS LETTERS AND ALL LOCAL ORDINANCES AND POLICIES.
4. THIS SYSTEM WILL NOT BE INTERCONNECTED UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND THE UTILITY IS OBTAINED.
5. EACH MODULE WILL BE GROUNDED USING UL 2703 COMPLIANT INTEGRATED GROUNDING.
6. THIS PROJECT HAS BEEN DESIGNED IN COMPLIANCE WITH THE CBC SECTION 1609 TO WITHSTAND A MINIMUM 110 MPH WIND LOAD.
7. THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL OR BUILDING ROOF VENTS.
8. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH CAL-OSHA REGULATIONS.
9. PROPER ACCESS AND WORKING CLEARANCE WILL BE PROVIDED AS PER SECTION 110.26 CEC.
10. THE HOUSE IS TWO STORY
11. ROOF TYPE - COMP SHINGLE
12. ROOF TRUSSES 2" x 6" @ 24"oc

SHEET INDEX:

- PV-1 SITE PLAN
- PV-2 ENLARGED EQUIPMENT PLAN
- PV-3 SINGLE LINE
- PV-4 PRODUCT DATA INVERTER
- PV-5 SHEET OMITTED
- PV-6 PRODUCT DATA MODULE
- PV-7 STANCHION AND CONDUIT DETAILS
- PV-8 UL 2703 SUPPORTING DOCUMENTATION
- PV-9 PLACARDS

PROJECT INFORMATION:

OWNER:
Diane Beasley
17552 S Mesa Dr
Pauma Valley, CA, 92061

SYSTEM DESIGNER:
Harold Rhodes
6901 Quail Place
San Diego, CA 92009
Phone: 619-279-1145

INVERTERS:
(20) Enphase IQ8H-240-72-2-US [240V] Micro-Inverter
Inverter Max DC Input: 45.00V
Inverter AC Output: 240V 1-PH,
Inverter Efficiency: 97.00%
Inverter Nominal Output Current A: 1.58
Max Modules per String: 10
NEMA 6 Enclosure

MODULES:
(20) Hanwha - Q.PEAK DUO BLK ML-G10+ 400
Module Voc (AT STC): 45.3V
Module Vmp (AT STC): 37.13V
Module Isc: 11.14A
Module Imp: 10.77A
Module Pmax (AT STC): 400W
Module PTC Rating: 371.5
Module Max DC Output: 600VDC.
Mule Series Fuse Rating: 20A
Totoal Modules: 20
Total Strings: = 2
Maximum Modules per String: 10
Cell Count: 66

SYSTEM SIZE:
kW DC (STC): 8.00
kW DC (PTC): 7.43
kW AC (CEC): 7.43
Array Tilt: 1.15°, 2.°, 3.
Array Azimuth: 1.292°, 2.°, 3.

DC SYSTEM CHARACTERISTICS:
Operating Current: 15A
Operating Voltage: 41.5V
Maximum System Voltage: 45VDCoc
Short-Circuit Current: 11.14A

MAX SYSTEM VOLTAGE:
The output voltage is 41.5 Voc X 1.12 (Lowest expected temperature during operation correction factor (-0.30°F)) calculated via coefficient on module cutsheet = 41.5VDCoc. 41.5VDCoc =< 600VDCoc.
This is also compatible with the 45VDCoc input allowed for the inverter.

COUNTY OF SAN DIEGO PLANNING & DEVELOPMENT SERVICES

PROVISIONAL APPROVAL

PLANS ACCEPTED FOR CONSTRUCTION SUBJECT TO THE REQUIREMENTS OF THE BUILDING ORDNANCES OF THE COUNTY OF SAN DIEGO, CALIFORNIA. THIS STAMP IS NO ASSURANCE THAT THE PLANS OR SPECIFICATIONS ARE CORRECT IN EVERY RESPECT. ERRORS IN DESIGN OR CONSTRUCTION MUST BE CORRECTED.

Total # of Pages:10

Record ID:PDS2022-RESALT-014008

Approved by: Shawn Sharareh

Date Approved: 10/28/2022

17552 S Mesa Dr

(E) 200A MAIN SERVICE PANEL WITH (E) 200A MAIN BREAKER PV COMBINER

(20) 400W SOLAR MODULES WITH (20) IQ8H-240-72-2-US [240V] INVERTER(S), SEE ENLARGED ROOF PLAN 1 SHEET PV-2 FOR CONNECTION TO STRUCTURE SEE DETAIL 2 SHEET PV-7

PROPERTY LINE

New Leaf Electric



(619) 787-2448
www.newleafelectric.com

Signature:

Eric Lieberman
CSLB# 1034853
C-10

PV System:
kWDC (STC):8.00

Beasley Residence

17552 S Mesa Dr
Pauma Valley, CA, 92061
Latitude: 33.30951368N by Longitude: -116.9480474W
Parcel No: 132-170-40-00
APN Legal Des: EX DOCS158199&176629REC68

REVISION	DATE

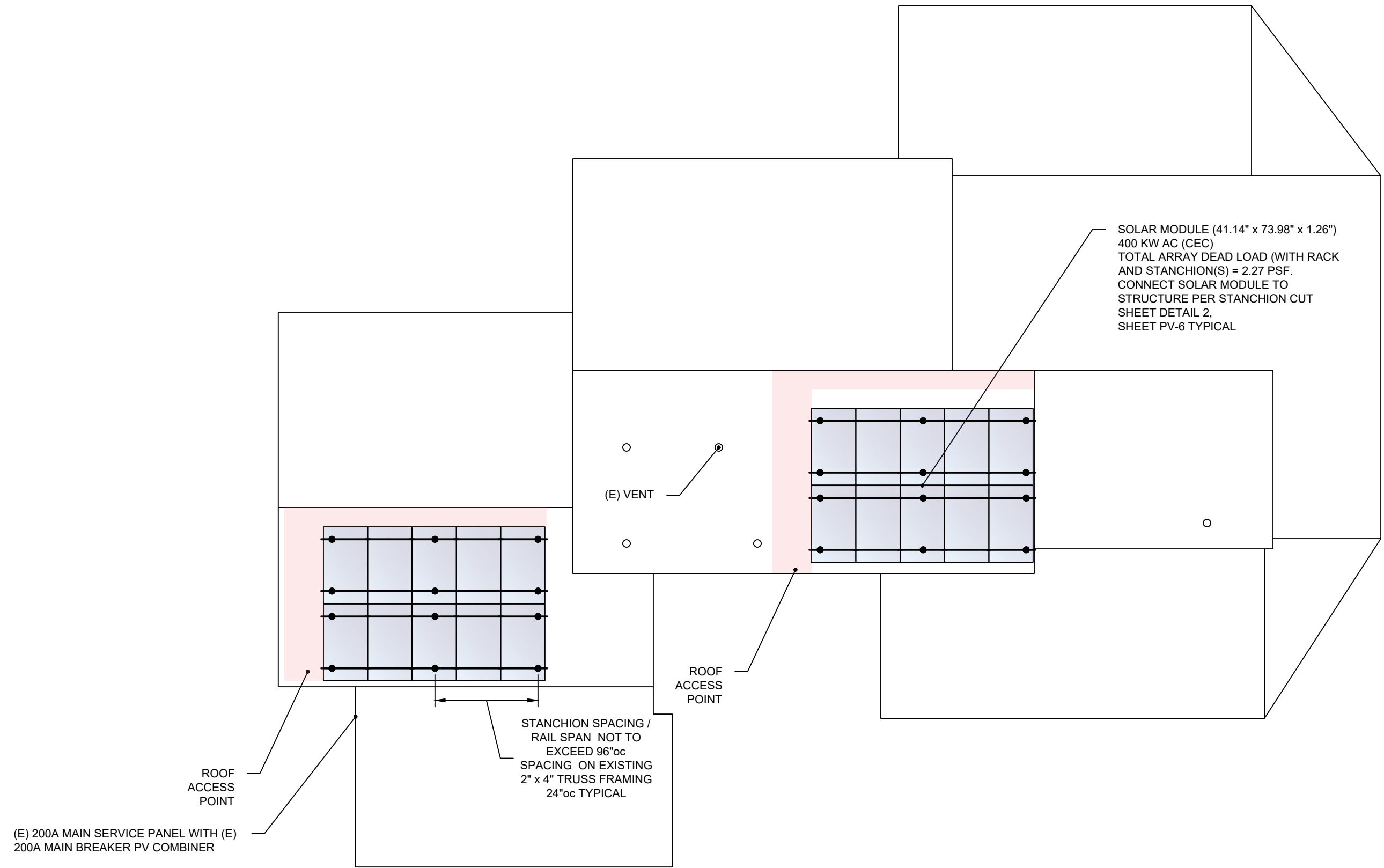
DRAWN BY: HBR
PROJECT#: 22-336
DATE:10/21/2022
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PV-1



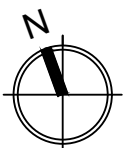
1/64" = 1'-0"

1 SITE PLAN



(E) 200A MAIN SERVICE PANEL WITH (E)
200A MAIN BREAKER PV COMBINER

1 ENLARGED EQUIPMENT PLAN



3/32" = 1'-0"

Signature:

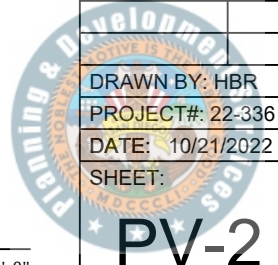
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kWDC (STC):8.00

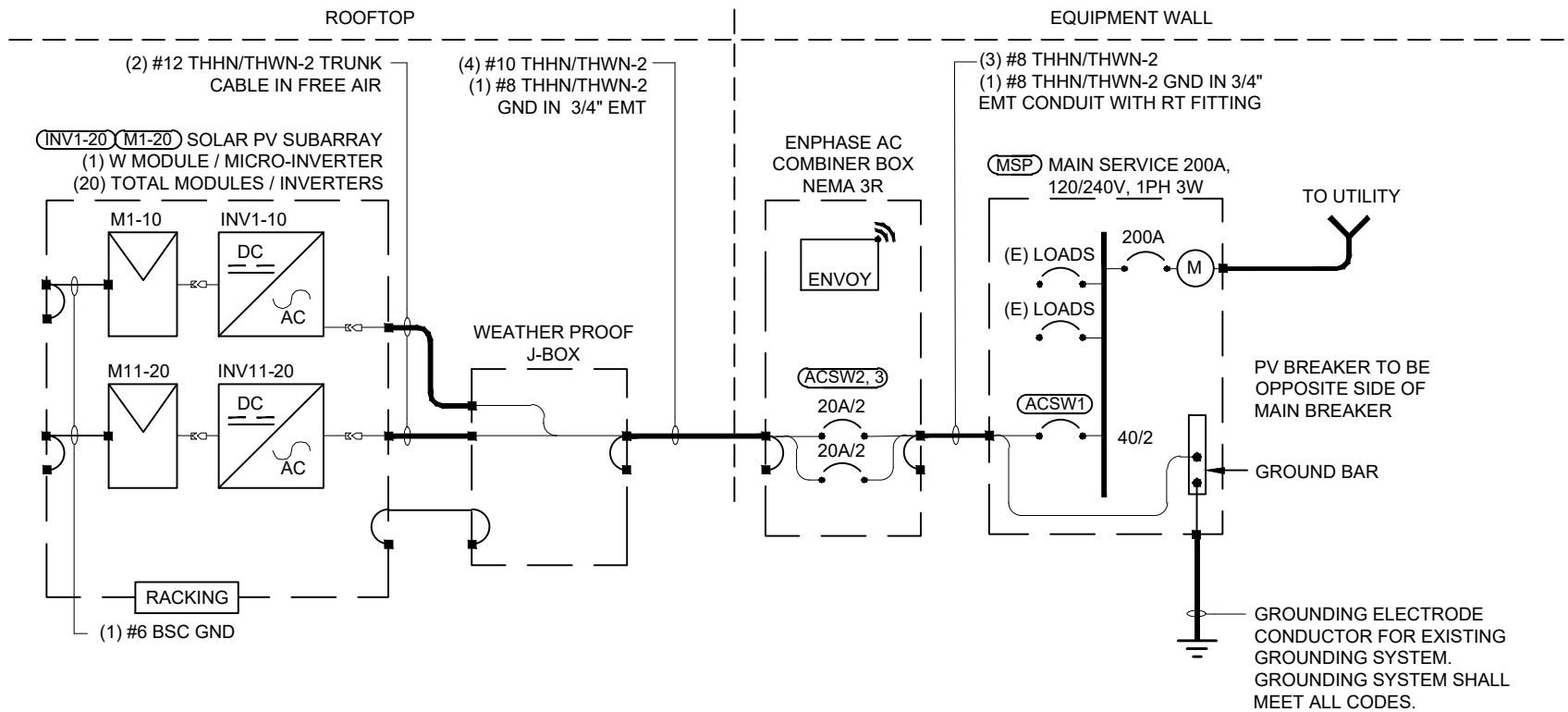
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SHEET:



PV-2



LEGEND:

- INV# INVERTER
- ACSW# AC DISCONNECT NO.
- M# MODULE
- MSP MAIN SERVICE PANEL

AMPACITY CALCULATION:

(20) INVERTERS ARE 1.58A x 1.25 x 20 = 39.50A OF PV BACKFEED.

CLOSEST BACKFEED PV BREAKER SIZE IS 40A

1 LINE DIAGRAM

NOTES:

- ALL PLACARDS AND SIGNAGE REQUIRED BY THE LATEST EDITION OF CALIFORNIA ELECTRICAL CODE AND THE SAN DIEGO AREA ELECTRICAL NEWSLETTER, WILL BE INSTALLED AS REQUIRED.
 - ALTERNATE POWER SOURCE PLACARD SHALL BE METALLIC OR PLASTIC, ENGRAVED OR MACHINE PRINTED LETTERS IN A CONTRASTING COLOR TO THE PLACARDS. THIS PLACARD WILL BE ATTACHED BY RIVETS OR SCREWS OR OTHER APPROVED METHOD.
 - IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT.
 - NO DC PHOTOVOLTAIC CONDUCTORS SHALL ENTER THE BUILDING.
 - EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENTS, AND CONDUCTOR ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.136 (A) REGARDLESS OF VOLTAGE. SEE DETAIL 3 ON PV-6
 - ALL EQUIPMENT SHALL BE PERMANENTLY AND EFFECTIVELY BONDED PER NEC REQUIREMENTS
 - EACH MODULE SHALL BE GROUNDED USING THE SUPPLIED CONNECTION POINT IDENTIFIED ON THE MODULE AND THE MANUFACTURER'S INSTRUCTIONS.
 - IF THE EXISTING GROUNDING ELECTRODE SYSTEM CAN NOT BE VERIFIED OR IS ONLY METALLIC WATER PIPING, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE.
 - IF THE EXISTING MAIN SERVICE PANEL DOES NOT HAVE VERIFIABLE GROUNDING ELECTRODE, IT IS THE PV CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE
 - TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION.
 - ALL EQUIPMENT IS NEW UNLESS NOTED EXISTING / (E).
- MAJOR PV SYSTEM COMPONENT INFORMATION:**
- MODULE MANUFACTURER'S NAME / MODEL NUMBER: Hanwha / Q.PEAK DUO BLK ML-G10+ 400.
 - INVERTER MANUFACTURER'S NAME / MODEL NUMBER: Enphase / IQ8H-240-72-2-US [240V].
 - MAIN BREAKER AMPERE RATING: 200A
 - SERVICE BUS AMPERE RATING: 200A
 - PV BACK-FED BREAKER AMPERE RATING: 40A

SYSTEM SPECIFICATIONS:

INVERTERS:
(20) Enphase IQ8H-240-72-2-US [240V] Micro-Inverter
Inverter Max DC Input: 45.00V
Inverter AC Output: 240V 1-PH,
Inverter Efficiency: 97.00%
Inverter Nominal Output Current A: 1.58
Max Modules per String: 10
NEMA 6 Enclosure

MODULES:
(20) Hanwha - Q.PEAK DUO BLK ML-G10+ 400
Module Voc (AT STC): 45.3V
Module Vmp (AT STC): 37.13V
Module Isc: 11.14A
Module Imp: 10.77A
Module Pmax (AT STC): 400W
Module PTC Rating: 371.5
Module Max DC Output: 600VDC.
Module Series Fuse Rating: 20A
Total Modules: 20
Total Strings: = 2
Maximum Modules per String: 10
Cell Count: 66

SYSTEM SIZE:
kW DC (STC): 8.00
kW DC (PTC): 7.43
kW AC (CEC): 7.43
Array Tilt: 1.15°, 2., 3.
Array Azimuth: 1292°, 2., 3.

DC SYSTEM CHARACTERISTICS:
Perating Current: 10.77A
Operating Voltage: 45.3V
Maximum System Voltage: 41.59VDCoc
Short-Circuit Current: 11.14A

MAX SYSTEM VOLTAGE:
The output voltage is 41.5 Voc X 1.12 (Lowest expected temperature during operation correction factor (-0.30°F)) calculated via coefficient on module cutsheet = 41.5VDCoc. 41.5VDCoc =< 600VDCoc. This is also compatible with the 45VDCoc input allowed for the inverter.

New Leaf
Electric



(619) 787-2448
www.newleafelectric.com

Signature:

Eric Lieberman
CSLB# 1034853
C-10

PV System:
kWDC (STC):8.00

Beasley Residence

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REVISION DATE

DRAWN BY: HBR

PROJECT#: 22-336

DATE: 10/21/2022

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PV-3



DATA SHEET



IQ8 Series Microinverters

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



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



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

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IQ8SE-DS-0001-01-EN-US-2022-03-01



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



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

IQ8 Series Microinverters

INPUT DATA (DC)		I08-60-2-US	I08PLUS-72-2-US	I08M-72-2-US	I08A-72-2-US	I08H-240-72-2-US	I08H-208-72-2-US ¹
Commonly used module pairings ²	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell		60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell			
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48			25 – 58		
Min/max start voltage	V	30 / 48			30 / 58		
Max input DC voltage	V	50			60		
Max DC current ³ [module Isc]	A			15			
Overtoltage class DC port				II			
DC port backfeed current	mA			0			
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA (AC)		I08-60-2-US	I08PLUS-72-2-US	I08M-72-2-US	I08A-72-2-US	I08H-240-72-2-US	I08H-208-72-2-US
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range ⁴	V			240 / 211 – 264			208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz			60			
Extended frequency range	Hz			50 – 68			
Max units per 20 A (L-L) branch circuit ⁵		16	13	11	11	10	9
Total harmonic distortion				<5%			
Overtoltage class AC port				III			
AC port backfeed current	mA			30			
Power factor setting				1.0			
Grid-tied power factor (adjustable)				0.85 leading – 0.85 lagging			
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW			60			
MECHANICAL DATA							
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)					
Relative humidity range		4% to 100% (condensing)					
DC Connector type		MC4					
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")					
Weight		1.08 kg (2.38 lbs)					
Cooling		Natural convection – no fans					
Approved for wet locations		Yes					
Acoustic noise at 1 m		<60 dBA					
Pollution degree		PD3					
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure					
Environ. category / UV exposure rating		NEMA Type 6 / outdoor					
COMPLIANCE							
Certifications		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 C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.					

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2022-03-01

New Leaf Electric



(619) 787-2448
www.newleafelectric.com

Signature:

Eric Lieberman
CSLB# 1034853
C-10

PV System:
kWDC (STC):8.00

Beasley Residence

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REVISION

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PV-4

Enphase
IQ Combiner 4/4C
X-IQ-AM1-240-4
X-IQ-AM1-240-4C



To learn more about Enphase offerings, visit enphase.com

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

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

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed



Enphase IQ Combiner 4/4C

MODEL NUMBER

IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.

ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)

Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.

ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 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. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

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-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)

COMPLIANCE

Compliance, IQ 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) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

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New Leaf
Electric



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Signature:

Eric Lieberman
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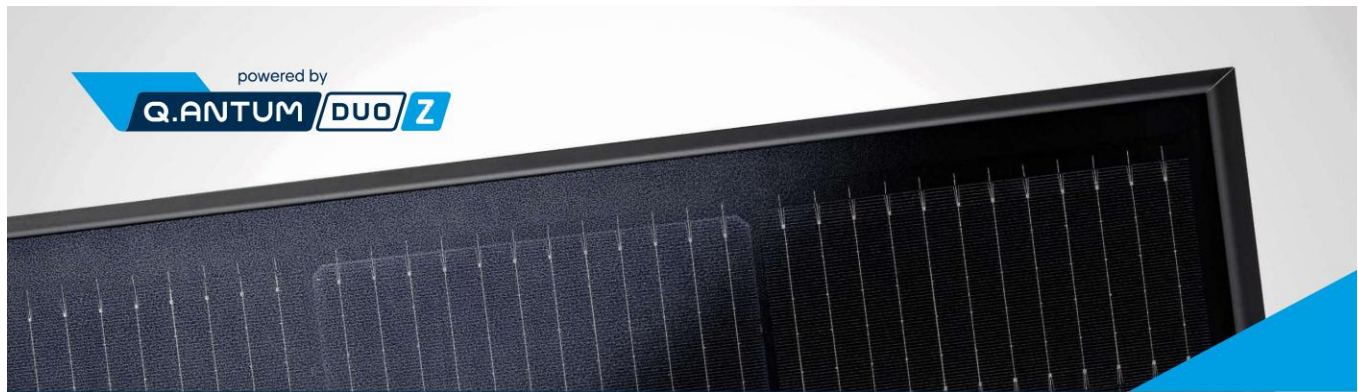
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PV-4



Q.PEAK DUO BLK ML-G10+
385-405
ENDURING HIGH
PERFORMANCE



BREAKING THE 20% EFFICIENCY BARRIER
Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY
Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



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



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 aluminum alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa).



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

¹ APT test conditions according to IEC / TS 62804-1:2015, method A (~1500V, 96h)
² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:



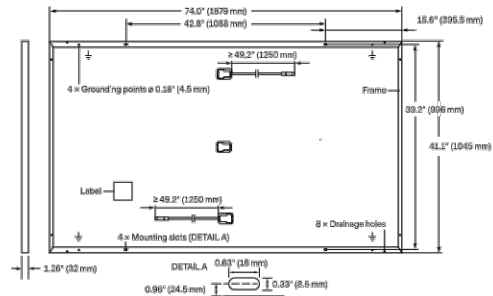
Rooftop arrays on residential buildings

Engineered in Germany



MECHANICAL SPECIFICATION

Format	74.0 in x 41.1 in x 1.26 in (including frame) (1879 mm x 1045 mm x 32 mm)
Weight	48.5 lbs (22.0 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 x 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in x 1.26-2.36 in x 0.59-0.71 in (53-101 mm x 32-60 mm x 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68

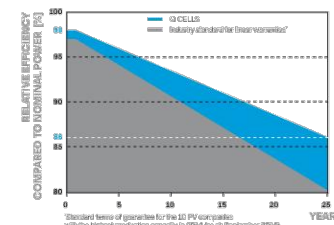


ELECTRICAL CHARACTERISTICS

POWER CLASS		385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)						
Minimum	Power at MPP ¹	P _{MPP} [W]	385	390	395	405
	Short Circuit Current ¹	I _{SC} [A]	11.04	11.07	11.10	11.17
	Open Circuit Voltage ¹	V _{OC} [V]	45.19	45.23	45.27	45.34
	Current at MPP	I _{MPP} [A]	10.59	10.65	10.71	10.83
	Voltage at MPP	V _{MPP} [V]	36.36	36.62	36.88	37.39
	Efficiency ¹	η [%]	≥ 19.6	≥ 19.9	≥ 20.1	≥ 20.4
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²						
Minimum	Power at MPP	P _{MPP} [W]	288.8	292.6	296.3	303.8
	Short Circuit Current	I _{SC} [A]	8.90	8.92	8.95	9.00
	Open Circuit Voltage	V _{OC} [V]	42.62	42.65	42.69	42.76
	Current at MPP	I _{MPP} [A]	8.35	8.41	8.46	8.57
	Voltage at MPP	V _{MPP} [V]	34.59	34.81	35.03	35.25

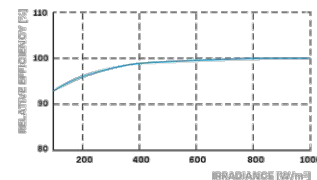
¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • *800 W/m², NMOT, spectrum AM 1.5

Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% 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]	-0.34	Nominal 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)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 2
Max. Design Load, Push / Pull ¹	[lbs/ft ²]	75 (3600Pa) / 55 (2660Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push / Pull ¹	[lbs/ft ²]	113 (5400Pa) / 84 (4000Pa)		

¹ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
Quality Controlled PV - TÜV Rheinland,
IEC 61215:2016, IEC 61730:2016,
U.S. Patent No. 9,883,215 (solar cells),
GCPV Certification ongoing.



PACKAGING INFORMATION

Horizontal packaging	78.4 in 1940 mm	43.3 in 1100 mm	48.0 in 1220 mm	1656 lbs 751 kg	24 pallets	24 pallets	32 modules
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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

New Leaf
Electric



(619) 787-2448
www.newleafelectric.com

Signature:

Eric Lieberman
CSLB# 1034853
C-10

PV System:
kWDC (STC): 8.00

Beasley Residence

17552 S Mesa Dr
Pajaro Valley, CA, 92061
Latitude: 33.30951368N by Longitude: -116.9480474W
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APN Legal Des: EX DOCS158199&176629REC68

REVISION DATE

DRAWN BY: HBR

PROJECT#: 22-336

DATE: 10/21/2022

SHEET:

PV-6

XR Rails ☺

XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear & black anod. finish

XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear & black anod. finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

Bonded Splices



All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

Clamps & Grounding ☺

UFOs



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear & black finish

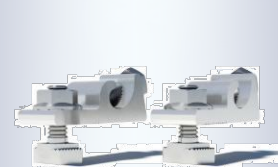
Stopper Sleeves



Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- 6 different sizes
- Clear & black anod. finish

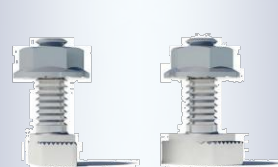
Grounding Lugs



Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

Microinverter Kits



Mount MIs or POs to XR Rails.

- Bonds devices to rails
- Kit comes assembled
- Listed to UL 2703

Attachments ☺

FlashFoot2



Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill & black finish

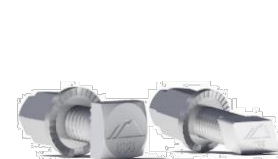
Slotted L-Feet



Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear & black anod. finish

Bonding Hardware



Bond and attach XR Rails to certified attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled & lubricated

Flush Standoffs



Raise Flush Mount System to various heights.

- Works with vent flashing
- 4" and 7" lengths
- Ships assembled

Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

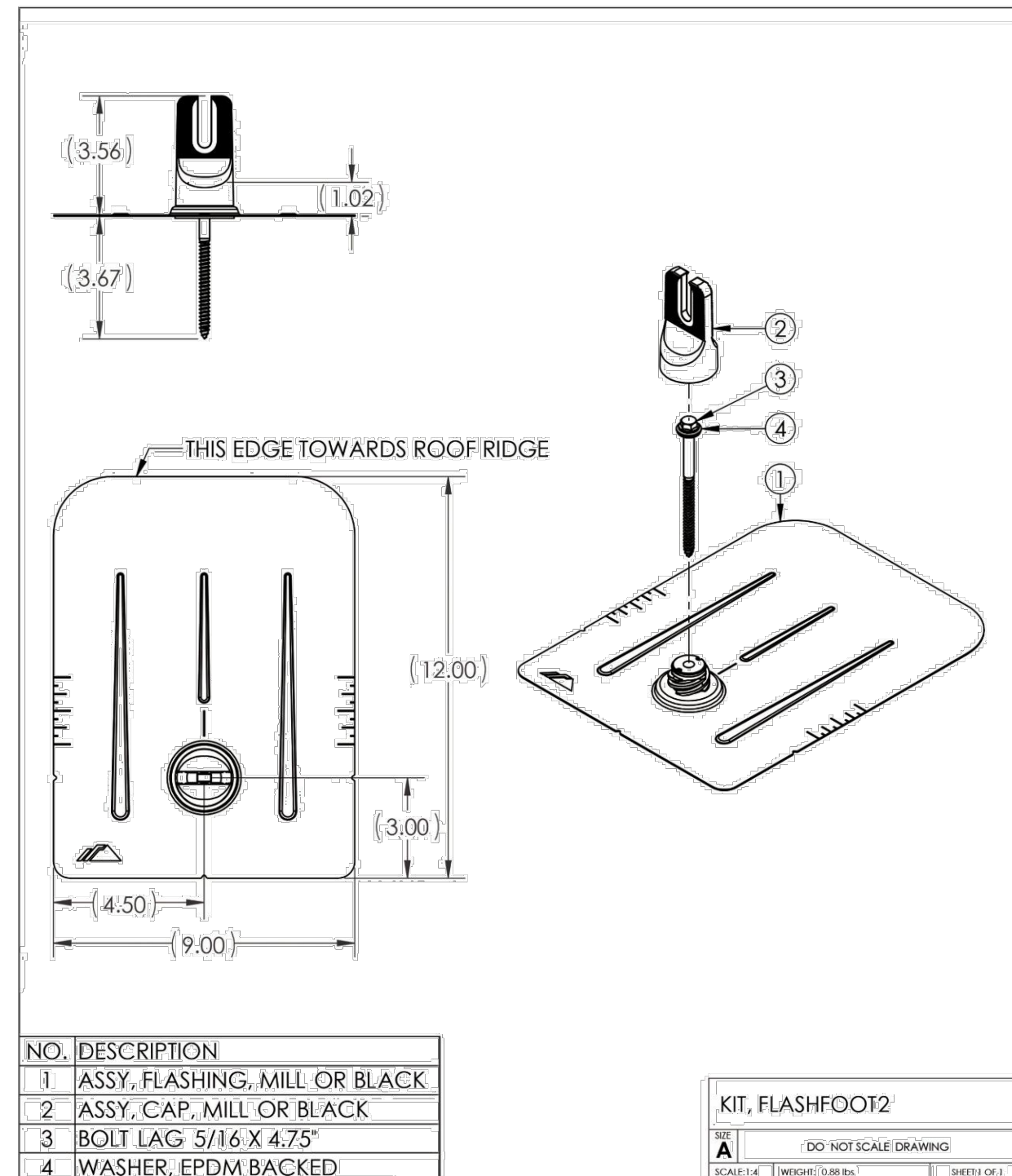
[Go to IronRidge.com/design](https://www.ironridge.com/design)



NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

[Go to IronRidge.com/training](https://www.ironridge.com/training)



Signature:

Eric Lieberman

Eric Lieberman
CSLB# 1034853
C-10

PV System:
kWDC (STC): 8.00

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PV-7

MODULE COMPATIBILITY

Ecosolargy	Ecosolargy modules with 35, 40, and 50 mm frames ECOxxxYzzA-bbD Where "Y" can be A, H, S, or T; "zz" can be 125 or 156; "A" can be M or P; "bb" can be 60 or 72; and "D" can be blank or B
ET Solar	ET Solar modules with 30, 35, 40, and 50 mm frames ET-YZZZxxxAA Where "Y" can be P, L, or M; "ZZZ" can be 660, 660BH, 672, 672BH, 754BH, 766BH, 772BH; and "AA" can be GL, TB, TW, WB, WW, BB, WBG, WWG, WBAC, WBCO, WWCO, WWBCO or BBAC
Flex	Flex modules with 35, 40, and 50 mm frames FXS-xxxYY-ZZ; Where "YY" can be BB or BC; and "ZZ" can be MAA1B, MAA1W, MAB1W, SAA1B, SAA1W, SAC1B, SAC1W, SAD1W, SBA1B, SBA1W, SBC1B, or SBC1W
GCL	GCL modules with 35 mm and 40 mm frames GCL-ab/YY xxx Where "a" can be M or P; "b" can be 3 or 6; and "YY" can be 60, 72, 72H, or 72DH
GigaWatt Solar	Gigawatt modules with 40 mm frames GWxxxYY Where "YY" can be either PB or MB
Hansol	Hansol modules with 35 and 40 frames HSxxxYY-zz Where "YY" can be PB, PD, PE, TB, TD, UB, UD, or UE; and "zz" can be AH2, AN1, AN3, AN4, HH2, HV1, or JH2
Hanwa Solar	Hanwha Solar modules with 40, 45, and 50 mm frames HSLaaP6-YY-1-xxxZ Where "aa" can be either 60 or 72; "YY" can be PA or PB; and "Z" can be blank or B
Hanwha Q CELL	Hanwha Q CELLS Modules with 32, 35, 40, and 42mm frames aaYY-ZZ-xxx where "aa" can be Q, or B.; "YY" can be PLUS, PRO, PEAK, LINE PRO, LINE PLUS, PLUS DUO or PEAK DUO; and "ZZ" can be G3, G3.1, G4, G4.1, L-G2, L-G2.3, L-G3, L-G3.1, L-G3y, L-G4, L-G4.2, L-G4y, LG4.2/TAA, BFR-G3, BLK-G3, BFR-G3.1, BLK-G3.1, BFR-G4, BFR-G4.1, BFR G4.3, BLK-G4.1, G4/SC, G4.1/SC, G4.1/TAA, G4.1/MAX, BFR G4.1/TAA, BFR G4.1/MAX, BLK G4.1/TAA, BLK G4.1/SC, EC-G4.4, G5, G5/SC, G5/TS, BLK-G5, BLK-G5/SC, BLK-G5/TS, L-G5, L-G5.1, L-G5.2, L-G5.2/H, L-G5.3, G6, G6/SC, G6/TS, G6+/TS, G6+, BLK-G6, L-G6, L-G6.1, L-G6.2, L-G6.3, G7, BLK-G6+, BLK-G6+/AC, BLK-G6+/HL, BLK-G6+/SC, BLK-G6/TS, BLK-G6+/TS, BLK-G7, G7.2, G8, BLK-G8, G8+, BLK-G8+ L-G7, L-G7.1, L-G7.2, L-G7.3, L-G8, L-G8.1, L-G8.2, L-G8.3, L-G8.3/BFF, L-G8.3/BFG, L-G8.3/BGT, ML-G9, BLK ML-G9, ML-G9+, BLK ML-G9+, ML-G10, BLK ML-G10, ML-G10+, BLK ML-G10+, ML-G10.a, BLK ML-G10.a, ML-G10.a+, BLK ML-G10.a+, XL-G9, XL-G9.2, XL-G9.3, XL-G9.3/BFG, XL-G10.2, XL-G10.3, XL-G10.c, XL-G10.d, XL-G10.d/BFG or XL-G10.3/BFG
Heliene	Heliene modules with 40 mm frames YYZZxxxA Where "YY" can be 36, 60, 72, 96, 120 or 144; "ZZ" can be HC, M, P, or MBLK; and "A" can be blank, HomePV, or Bifacial
HT-SAAE	HT-SAAE modules with 35 and 40 mm frames HTyy-aaaZ-xxx Where "yy" can be 60, 66, 72 or 78, "aaa" can be 18, 156 or 166, "Z" can be M, P, M-C, P-C, M(S), M(VS), M(V), P(V), M(V)-C, P(V)-C, or X
Hyundai	Hyundai modules with 33, 35, 40 and 50 mm frames HiY-SxxxZZ Where "Y" can be A, D or S; "S" can be M or S; and "ZZ" can be GI, HG, HI, KI, MI, MF, MG, PI, RI, RG, RG(BF), RG(BK), SG, TI or TG
Itek	Itek Modules with 40 and 50 mm frames IT-xxx-YY Where "YY" can be blank, HE, or SE, or SE72



25800 Commercentre Drive
Lake Forest, CA 92630 USA

Telephone: 949.448.4100
Facsimile: 949.448.4111
www.intertek.com

Test Verification of Conformity

In the basis of the tests undertaken, the sample(s) of the below product have been found to comply with the requirements of the referenced specifications at the time the tests were carried out.

Applicant Name & Address:	IronRidge, Inc. 1495 Zephyr Ave. Hayward, CA 94544
Product Description:	XR Rails with Integrated Grounding.
Ratings & Principle Characteristics:	<u>Fire Class Resistance Rating:</u> - Class A for Steep Slope Flush-Mount (symmetrical) Applications when using Type 1 and Type 2, Listed Photovoltaic Module. - Class A for Low Slope Flush-Mount and Tilt-Mount (symmetrical and asymmetrical) Applications when using Type 1, Listed Photovoltaic Module.
Models:	51-61GD-005, 51-61GD-005B, 51-5000-001, and 51-65-001
Brand Name:	N/A
Relevant Standards:	UL Subject 2703 (Section 15.2 and 15.3) Outline of Investigation for Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels, Issue Number: 2, Nov 13, 2012 Referencing UL1703 (Section 31.2) Standard for Safety for Flat-Plate Photovoltaic Modules and Panels, May 20, 2014
Verification Issuing Office:	Intertek Testing Services NA, Inc. 25800 Commercentre Dr. Lake Forest, CA 92630 08/27/2014 to 01/07/2015
Date of Tests:	08/27/2014 to 01/07/2015
Test Report Number(s):	101541132LAX-002

This verification is part of the full test report(s) and should be read in conjunction with them. This report does not automatically imply product certification.

Completed by:	Amar Kacel	Reviewed by:	Andrew Koretoff
Title:	PV Engineer	Title:	Reviewer
Signature:		Signature:	
Date:	01/26/2015	Date:	01/26/2015

This Verification is for the exclusive use of Intertek's client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Verification. Only the Client is authorized to permit copying or distribution of this Verification. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test/inspection results referenced in this Verification are relevant only to the sample tested/inspected. This Verification by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

New Leaf
Electric



(619) 787-2448
www.newleafelectric.com

Signature:

Eric Lieberman
CSLB# 1034853
C-10

PV System:
kWDC (STC):8.00

Beasley Residence

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REVISION	DATE
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DRAWN BY: HBR
PROJECT#: 22-336
DATE: 10/21/2022
SHEET:

PV-8

SIGNAGE:

PLACARD:

WARNING: PHOTOVOLTAIC
POWER SOURCE

LOCATION:

ON ALL INTERIOR AND EXTERIOR PV
CONDUIT, RACEWAYS, ENCLOSURES,
CABLE ASSEMBLIES AND JUNCTION
BOXES PLACED EVERY 10'

PLACARD:

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
OPERATING VOLTAGE 240 VOLTS
OPERATING CURRENT 31.6A AMPS

LOCATION:

AC DICONNECT

PLACARD:

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.

LOCATION:

NEAR MAP PLACARD

PLACARD:

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE
THIS OVERCURRENT DEVICE

LOCATION:

POINT OF INTERCONNECTION PANEL

PLACARD:

RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM

LOCATION:

AT RAPID SHUT DOWN SWITCH

PLACARD:

WARNING
THE DISCONNECTION OF THE
GROUNDED CONDUCTOR(S)
MAY RESULT IN OVERVOLTAGE
ON THE EQUIPMENT

LOCATION:

INVERTER

PLACARD:

WARNING
TURN OFF PHOTOVOLTAIC
AC DISCONNECT PRIOR TO
WORKING INSIDE PANEL

LOCATION:

MAIN SERVICE DISCONNECT

PLACARD:

WARNING
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

LOCATION:

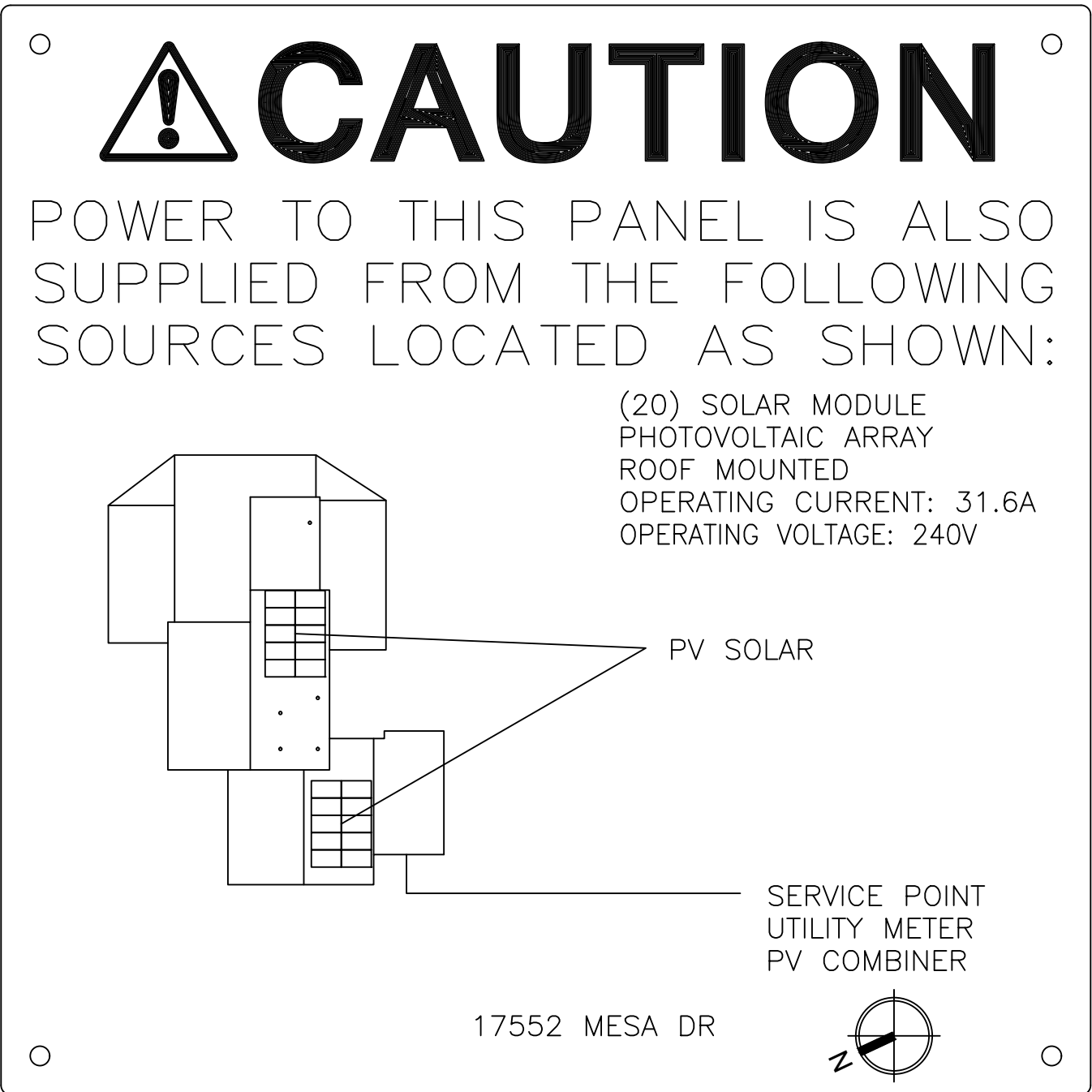
ON OR ADJACENT TO THE
DISCONNECTING MEANS

PLACARD:

PV SYSTEM
DISCONNECT

LOCATION:

ANY DC OR AC DISCONNECT
INCLUDING TRUNK CABLES APPROVED
AS MEANS OF DISCONNECT



DESCRIPTION OF PLACARDS:

- SIZE OF ALL SMALL PLACARDS TO BE 4" X 1.5"
- SIZE OF LARGE PLACARD IS 7" X 7"
- FONT SIZES ARE IN INCHES FROM LARGEST TO SMALLEST AS FOLLOWS:
 - A. 3/4 TITLE
 - B. 1/4 SUBTITLE
 - C. 1/8 CALLOUTS
 - D. 1/16 MAPPING
- PLACARD COLOR WILL BE RED ON FRONT WITH WHITE LETTERING ENGRAVED
- MOUNTING HOLES ARE 1/8" DIAMETER THRU 1/4" FROM EACH EDGE TYPICAL AT ALL 4 CORNERS.
- CHAMFER AND DEBUR ALL EDGES.

New Leaf
Electric



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Signature:

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PV-10

A. GENERAL

1. **Applicable codes.** All projects shall comply with the following referenced codes:

- 2019 California Electric Code (CEC)
- 2019 California Building Code (CBC) and/or 2016 California Residential Code (CRC)
- 2019 California Plumbing Code (CBC)
- 2019 California Mechanical Code (CMC)
- County of San Diego Consolidated Fire Code (latest version)

B. ROOF

1. **Roofing and weatherproofing.** All roofing and weatherproofing installation shall comply with the following methods and requirements:
- Any arrays integrated with the roofing material shall be Class "A" rated in accordance with ASTM E 108 or UL 790. (County of San Diego Building Code 92.1.1505.1, CBC 1505.8, CRC 902.3)
 - All roof penetrations shall be secure and weather-tight. (CRC 903..2)
 - Module installations shall not cover or block any roof plumbing or mechanical vent locations. (CPC 904, CPC 906, CMC 802.6, CMC 510.8)
2. **Firefighter access requirements.** All roof-mounted solar photovoltaic systems shall comply with the following:
- Roof access points shall be provided per the following and in conformance with CRC R324 or CBC 3111 as applicable:
 - Located in areas not requiring placement of ground ladders over openings such as doors or windows.
 - Located at strong points of building construction in locations where access point does not conflict with overhead obstructions such as tree limbs, wires, or signs.
 - Panels and modules installed on dwellings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway not less than 36 inches (914mm) wide shall be provided for emergency escape and rescue opening.
3. **Inspector access requirements.** A portable ladder complying with CAL-OSHA requirements shall be made available and secured in place for inspection.

C. ELECTRICAL

1. **Wiring methods.** All wiring installation shall comply with the following wiring methods and requirements:
- Corrosion resistant conduit shall be used for all underground runs and installations. (CEC 690)
 - All exposed wiring shall be listed for wet location and sunlight resistant. All outdoor equipment shall be NEMA 3R rated. (CEC 690.31, CEC 310.8)
 - Photovoltaic DC conductors entering the building shall be installed in a metallic raceway. (CEC 690.31)
 - Markings shall be placed on interior and exterior DC conduit, raceway, enclosures, and cable assemblies every 10 feet -- and within 1 foot of turns or bends and within 1 foot above and below penetrations of roof/ceiling assemblies, walls, or barriers -- with minimum 3/8-inch-high white lettering on red background reading: "WARNING: PHOTOVOLTAIC POWER SOURCE." (CEC 690.31)
 - DC breakers shall be listed and rated for PV use. (CEC 705.12)
 - All equipment shall be identified on a warning placard clearly showing the location of all pertinent equipment and disconnects. Alternate power source placard shall meet the specifications of the San Diego Area Newsletter. The placard shall be metal or plastic, with engraved letters in a contrasting color to the placard, include the location of meter, disconnects, inverter, the array, and a footprint of the entire building and site. The placard will be attached by pop-rivets, screws, or other approved fasteners. Refer to the sample placard for alternative power source (diagram on the right) for further requirements. (CEC 110)
 - PV connection in panel board shall be positioned at the opposite (load) end from the input feeder location or main circuit location. (CEC 705.12)
 - If approved plans show de-rating of the main breaker, a placard label is required at the panel stating: "THIS PANEL HAS BEEN DE-RATED TO (insert amperage size). DO NOT INSTALL LARGER BREAKERS." Refer to the sample placard for alternative power source (diagram on the right) for further requirements. (CEC 690.53, CEC 690.17, CEC 705.10)
 - Wire sizing and terminations shall be in conformance with the seventy-five-degree (75°) column of CEC Tables 310.15(B).
 - All exterior conduit placement and sizing shall have ambient temperature adjustments in conformance with the ASHRAE designated design temperate and comply with CEC 310.15(b)(3)(c).
 - Main service panel and buss bar ratings must be verifiable at time of inspection with fixed labeling.
 - Integrated and or micro-inverter systems shall have a rooftop AC disconnect and comply with CEC 690.14 (D) (1) and CEC 690.14 (D) (2).
 - PV system circuits installed on or in buildings shall include a rapid shutdown function that controls specific PV conductors in accordance with CEC 690.12 (1) through (5) and have the associated placard stating: "PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN". Refer to the sample placard for alternative power source (diagram on the right) for further requirements.
 - Above ground conduit and wiring methods outside of the building footprint shall be approved by the building inspector prior to installation.
2. **Grounding methods.** All grounding installation shall comply with the following grounding methods and requirements:
- All modules shall be grounded in accordance with the CEC and the manufacturer's installation instructions. Approved plans and all reference documents shall be available on site for inspection verification. (CEC 250)

- Third-party grounding devices must be specifically mentioned in the module manufacturer's installation instructions by device make and model. These installation instructions must be reviewed by the module listing agency as part of the listing of the module to UL 1703. Grounding devices listed to UL 2703 also may be acceptable if the device installation instructions mention the specific module make and model.
- PV system grounding configuration shall be in accordance with CEC 690.41 and grounding electrode system shall be in accordance to CEC 690.47.
- Electric service panels shall be grounded with a grounding electrode(s) that complies with CEC Article 250. Ground-rods shall be supplemented by a second ground-rod installed at least 6 feet apart. (CEC 690.47)
- If the existing main service panel does not have verifiable grounding electrode, it shall be the contractor's responsibility to install a supplemental grounding electrode. Service grounding electrode must be verified at the time of inspection for all buildings. Buildings with a metallic water pipe system as the sole grounding electrode shall have a supplemental electrode installed. (CEC 690.47)
- All proposed equipment shall be listed or field labeled for PV application by a nationally recognized testing agency. (CEC 690.4)
- Manufacturer's technical cut sheets and installation manuals for all equipment and components shall be provided on site.
- All terminals of the disconnecting means may be energized in the open position in conformance with CEC 690.17.
- All electrical terminus torqueing shall be in accordance with the CEC, San Diego Area News Letter, and the manufacturer's installation instructions. (CEC 110.3 (B), CEC 110.14)

D. MISCELLANEOUS

1. **Zoning requirements.** All roof-mounted solar photovoltaic systems shall comply with:
- County of San Diego zoning requirements per setbacks for Solar Photovoltaic Panels. Reference handout PDS#276 for further details.
2. **Manufactured or mobile home requirements.** All roof-mounted solar photovoltaic installations on manufactured or mobile homes require a permit from the State of California Department of Housing and Community Development (HCD). Contact HCD at (951) 782-4420 for further information.

E. GREEN BUILDING STANDARDS CODE (CALGREEN)

1. **Construction waste reduction, disposal, and recycling:** Reduce and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition debris. (CalGreen 4.408.1) Exception: Excavated soil and land-clearing debris. Exception: Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist or are not located reasonably close to the jobsite
The County of San Diego, Department of Public Works, Construction & Demolition (C&D) Facilities Guide is online at: http://www.sdcounty.ca.gov/dpw/recycling/Files/Construction_Guide_SJ8_Pgs_1-27.pdf.
2. **Construction waste management plan:** A construction waste management plan shall be prepared and available on site during construction. Documentation demonstrating compliance with the plan shall be accessible during construction for the enforcing agency. (CalGreen 4.408.2) The plan:
- Identify the construction and demolition waste materials to be diverted from disposal by recycling, reuse on the project or salvage for future use or sale
 - Specify if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream)
 - Identify diversion facilities where the construction and demolition waste materials will be taken
 - Identify construction methods employed to reduce the amount of construction and demolition waste generated
 - Specify that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

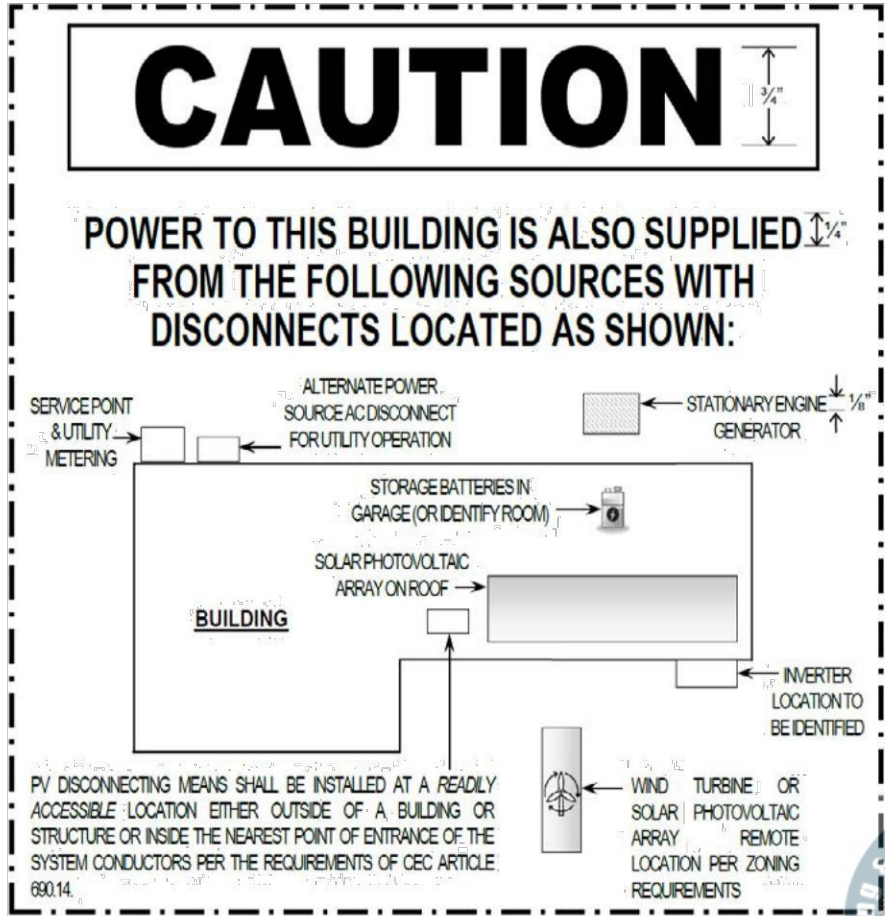
F. BATTERY BACKUP SYSTEM (BBS) AND ADVANCE ENERGY STORAGE (AES):

1. **General Requirements:** All battery and AES shall comply with the following:
- All battery, BBS, and AES systems shall be installed in accordance with the CEC and the manufacturer's installation instructions. Approved plans and all reference documents shall be available on site for inspection verification. Additional fire and engineering requirements maybe required based on site specific review and inspections.
 - All inverter, charger, racking, and storage products shall be individual component listed, or full system and equipment listed, for battery and advance energy storage use by a nationally recognized testing agency complying with CEC article 480 and CEC article 690.
2. **Electrical Requirements:** All battery and advance storage systems shall comply with the following:
- All combiner boxes, disconnects, and fuses shall be listed for DC current and listed by a nationally recognized testing agency complying with CEC article 480 and CEC article 690. Ground fault protection for battery, BBS, and AES shall comply with CEC 690.5 and storage overcurrent device(s) shall be installed in accordance with CEC 240.21 (H) and 690.71 (C).
 - All vented storage cells shall be equipped with flame arresters complying with CEC 480.10 (A) and all sealed storage cells shall be equipped with pressure-release vents complying with CEC 480.10 (B). The storage cells and battery locations shall comply with CEC 480.9 and CEC 690.71. The storage cells shall be located inside a lockable enclosure or room (CEC 690.71 (B) (2)) with adequate accessibility for all equipment (CEC 110.26 & CEC 480.8 (C)). Appropriate to the battery technology, sufficient ventilation shall be provided in accordance with CEC 480.9 (A). All racking and trays shall meet provisions within CEC 480.8.

- Critical loads and critical loads centers shall be clearly identified and load calculations shall be available on site for inspection verification. The residential total battery system voltage, system wiring, and conductor sizing shall be calculated in accordance to CEC 690.8 (A) (4) and not exceed 50 volts (CEC 690.71 (B) (1)). All breaker and/or fuse rating protecting the conductors shall comply with CEC 690.8 (B) (1).
- Circuit transformers and metering devices shall be listed for such use by a nationally recognized testing agency complying with CEC 690.60 and CEC 690.61.
- All charge controllers required for BBS and AES shall comply with CEC 690.72.
- All photovoltaic power system employing a diversion charge controller as the sole means of regulating the charging of a battery shall be equipped with a second independent means to prevent overcharging of the battery. (CEC 690.72 (B) (1))
- Circuits containing a DC diversion charge controller and a DC diversion load shall comply with CEC 690.72 (B) (2).
- All photovoltaic power system using utility-interactive inverters to control battery state-of-charge by diverting excess power into utility system shall comply with (CEC 690.72 (B) (3)).
- Buck/boost charge controllers and other DC power converters that increase or decrease the output current or output voltage with respect to the input current or input voltage shall comply with CEC 690.72 (C), 690.72 (C) (1), and 609.72 (C) (2).
- All photovoltaic power system employing energy storage shall also be marked with the maximum operation voltage, including any equalization voltage and the polarity of the ground circuit conductor per CEC 690.55.
- BBS or AES intended as stand-alone systems shall comply with all the requirements listed under CEC 690.16 (A) through (E).
- All battery, BBS and AES systems shall be protected from physical damage and comply with CEC 110.27.

SAMPLE PLACARD FOR ALTERNATE POWER SOURCE

This is a sample placard required when there is an alternate source of power connected to the premises wiring system. Specify the type of generation, such as stationary engine generator, solar photovoltaic (PV) array, wind turbine, batteries, fuel cell, etc. The placard must be metal or plastic, with engraved letters in a contrasting color, and must include the location of the service point, utility meter, AC and DC disconnects, inverter, and PV array, generator, or other type of generation source, and a footprint of the entire building and site. The placard shall be attached to the service disconnect with pop-rivets, machine screws, or other fasteners as approved by the County of San Diego, Building Division. *Epoxy is not an acceptable method of securing the placard.*



THESE ARE MINIMUM REQUIREMENTS AND SHALL NOT SUPERSEDE MORE RESTRICTIVE SPECIFICATIONS ON THE PLANS OR AS REQUIRED BY APPLICABLE CODE.

BUILDING RECORD ID:

OWNER OR CONTRACTOR SIGNATURE:

County of San Diego, Planning & Development Services
SOLAR PV MINIMUM CONSTRUCTION
SPECIFICATIONS
BUILDING DIVISION



Sheet Number

SPV-CS-1