Prepared by:
Solar PV Permit
www.solarpvpermit.com
info@solarpvpermit.com

PROJECT DESCRIPTION

THIS ROOF-MOUNTED PHOTOVOLTAIC (PV) SYSTEM IS TO BE INSTALLED AT THE COMMERCIAL PROPERTY IN **OREGON HOUSE,CALIFORNIA**.
THE ENERGY PRODUCED BY THE PV SYSTEM SHALL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ON-SITE ELECTRICAL EQUIPMENT VIA A BACK-FED BREAKER IN THE MAIN SERVICE PANEL.

GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE LATEST CALIFORNIA CODE OF REGULATIONS (CCR),NATIONAL ELECTRICAL CODE EDITION AND ALL APPLICABLE LOCAL CODES AND REGULATIONS. (CONSTRUCTION SHALL COMPLY WITH 2019 CBC, CMC, CPC, CEC, CRC,CFC)

2. ALL PANELS, SWITCHES, ETC. SHALL HAVE SUFFICIENT GUTTER SPACE AND LUGS IN COMPLIANCE TO UL REQUIREMENTS TO ACCOMMODATE CONDUCTORS SHOWN

3.WHERE WIRE SIZES ARE INDICATED ON PLANS FOR INDIVIDUAL CIRCUITS, THE WIRE SIZE INDICATED SHALL APPLY TO THE COMPLETE CIRCUIT, UNLESS OTHERWISE NOTED.

4.CONTRACTOR SHALL EXTEND WIRING FROM ALL JUNCTION BOXES, SWITCHES, ETC. AND MAKE FINAL CONNECTIONS AS REQUIRED TO ALL BUILDING EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS.

5.DRAWINGS AND DIAGRAMMIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. FOLLOW DRAWING AND LAYOUT WORK AND CHECK DRAWINGS OR OTHER TRADES RELATING TO WORK TO VERIFY SPACE IN WHICH WORK WILL BE INSTALLED. MAINTAIN HEADROOM AND MINIMUM CODE REQUIRED WORKING CLEARANCES AT ALL TIMES.

6.ALL EXTERIOR ELECTRICAL DEVICES AND EQUIPMENT INCLUDING THOSE THAT ARE EXPOSED TO OUTSIDE ENVIRONMENT SHALL BE WEATHERPROOF TYPE NEMA 3R.

7.DISCONNECT SWITCHES SHALL BE MOUNTED ON INDIVIDUAL SUPPORTS, OR OTHERWISE DIRECTLY ON EQUIPMENT, PROVIDED NO MODIFICATION TO EQUIPMENT IS NECESSARY.

8.ALL ELECTRICAL MATERIAL SHALL BE LISTED BY "UL" FOR THE TYPE OF APPLICATION AND "UL" LABEL SHALL APPEAR ON ALL ELECTRICAL EQUIPMENT.

9.WIRING METHOD SHALL BE EMT ABOVE GROUND MOUNTED IN CONCEALED SPACES (UNLESS APPROVED OTHERWISE) AND SCHEDULE- 40 PVC FOR BELOW GROUND INSTALLATION UNLESS NOTED OTHERWISE.

10.AN OSHA APPROVED LADDER PROVIDING ACCESS TO ALL PORTIONS OF THE ARRAY SHALL BE SECURED IN PRIOR TO REQUESTING INSPECTION.

11.SMOKE ALARMS AND CARBON MONOXIDE DETECTORS WILL MEET THE NECESSARY REQUIREMENTS PER CRC R314, R315

12.UTILITY COMPANY WILL BE NOTIFIED PRIOR TO ACTIVATION OF THE SOLAR PV SYSTEM.

13.ALL EXTERIOR CONDUIT PAINTED TO MATCH EXTERIOR SURFACE. (IF APPLICABLE)

14. NO PLUMBING, MECHANICAL OR BLDG VENTS TO BE COVERED OR OFFSET AROUND ARRAYS

15.EXISTING PLUMBING VENTS, SKYLIGHTS, EXHAUST OUTLETS, VENTILATION'S INTAKE AIR OPENINGS SHALL NOT BE COVERED BY THE SOLAR PHOTOVOLTAIC SYSTEM.

16.ALL EQUIPMENT SHALL BE LISTED AND LABELED BY A RECOGNIZED ELECTRICAL TESTING LABORATORY AND INSTALLED PER THE LISTING REQUIREMENTS AND THE MANUFACTURER'S INSTRUCTIONS. [NEC 690.4(D)]

17.ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED, INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.

18.PAINT PV CONDUIT TO MATCH THE DWELLING EXTERIOR.

19.CONTACT THE SERVICING UTILITY BEFORE POWERING ON THE PHOTOVOLTAIC SYSTEM.

VICINITY MAP

AERIAL VIEW

SITE VIEW

GOVERNING CODES

ALL MODULES AND RAIL ARE LISTED BY UNDERWRITERS LABORATORIES FOR ELECTRICAL AND FIRE SAFETY(CLASS A FIRE RATING)

NOTE:
1) NO DISCHARGE OF ANY POLLUTANTS TO ANY STORM DRAIN SYSTEM.

2) UL 1703 FOR MODULES & UL 1741 FOR INVERTERS PER CITY SOLAR REQUIREMENTS.

THIS PROJECT SHALL COMPLY WITH THE **:**
2019 CA BUILDING CODE
2019 CA PLUMBING CODE
2019 CA RESIDENTIAL CODE
2019 CA ENERGY CODE
2019 CA MECHANICAL CODE
2019 CA FIRE CODE
2019 CA ELECTRICAL CODE - 2017 NEC`
ORDINANCES OF THE CITY OF OR COUNTY OF **YUBA**

SCOPE OF WORK

SYSTEM SIZE:
16.375 KW-AC
17.680 KW-DC

ROOF MOUNT PV SOLAR
ROOF TYPE: COMP.SHINGLE
2 X 6 @ 24" O.C. RAFTERS

ARRAY/ROOF PITCH: 26°
AZIMUTH: 100°,280°
SINGLE STORY BUILDING

MODULES :
(52) HANWHA,
QPEAK DUO BLK G6+340

INVERTER(S):
(2)SOLAREDGE, SE7600H-US

POWER OPTIMIZERS:
(52)SOLAREDGE,P340

MAIN PANEL/BUS-BAR: (E)200A
MAIN BREAKER : (E)200A

PV RAIL:
UNIRAC RAIL - SOLARMOUNT

PV MOUNT:
UNIRAC FLASHKIT PRO

INDEX SHEET

CONTRACTOR

LEDBETTER ELECTRIC INC
1004 YUBA STREET,
MARYSVILLE, CA 95901
PHONE: (530)692-9552

STATE LICENSE# : 994171

LICENSE TYPE : C 10

EXPIRATION DATE : 09/30/2020

STAMP/ SIGNATURE :

LEDBETTER ELECTRIC
Lic.#994171

OWNER / ADDRESS

[redacted]
OREGON HOUSE, CA 95962

OCCUPANCY R3 /
TYPE 5 STRU.
APN#: [redacted]

SYSTEM SIZE

16.375 KW-AC
17.680 KW-DC

MODULES :
(52) HANWHA,
QPEAK DUO BLK G6+340

INVERTER(S) :
(2) SOLAREDGE SE7600H-US

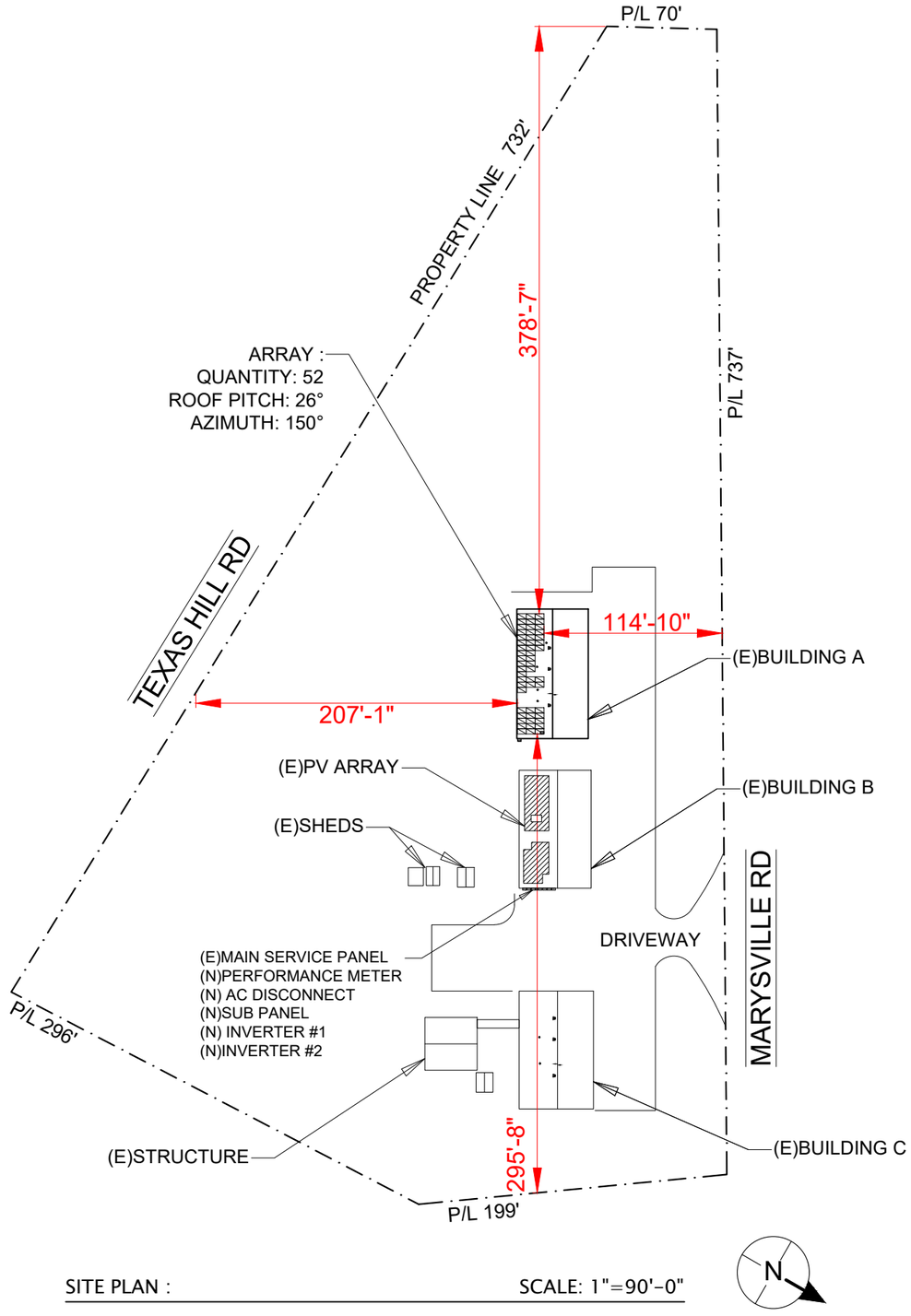
DATE: 7/23/20

REVISION :

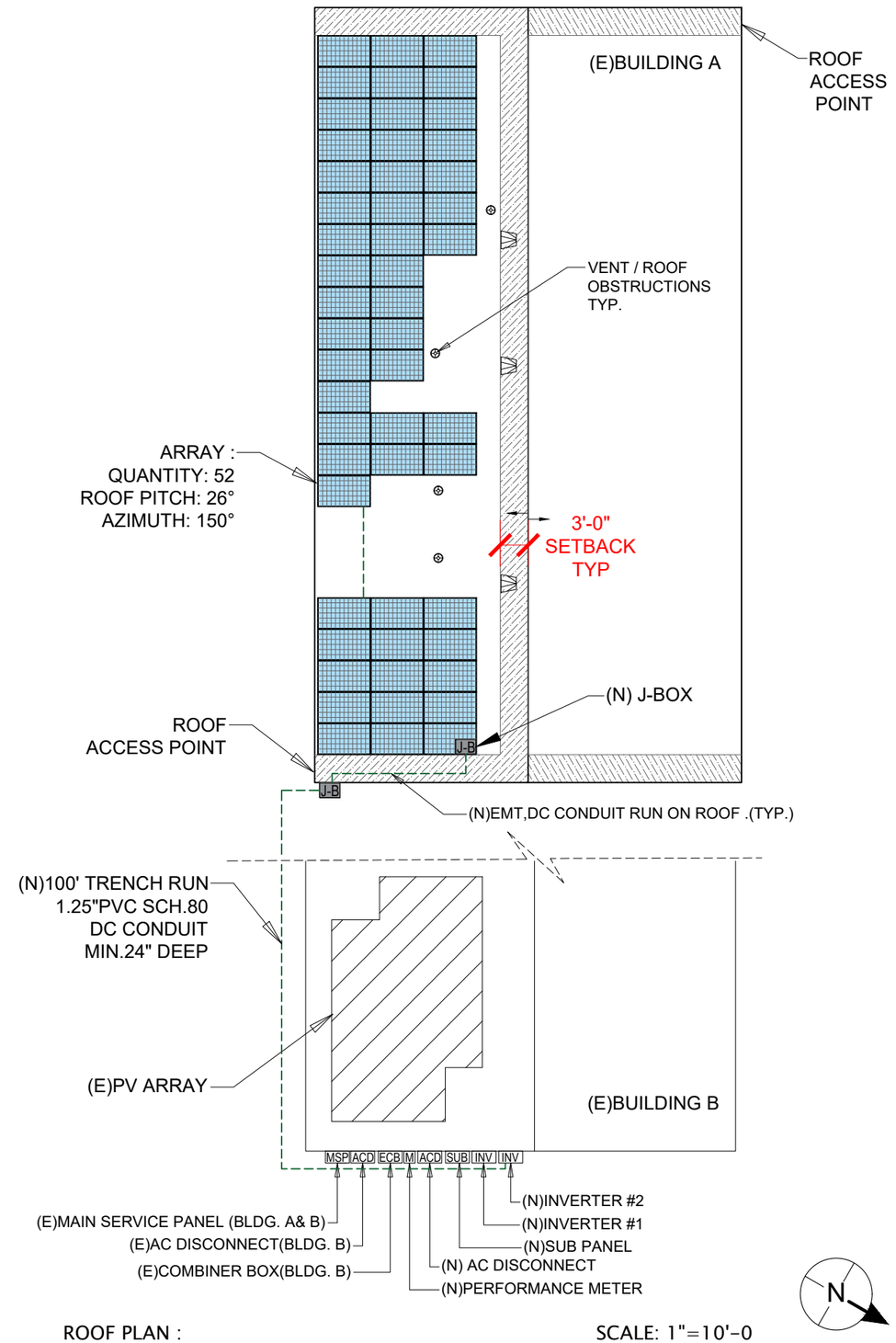
PAGE INFORMATION

TITLE:
COVER PAGE

PV-01



SITE PLAN : SCALE: 1"=90'-0"



ROOF PLAN : SCALE: 1"=10'-0

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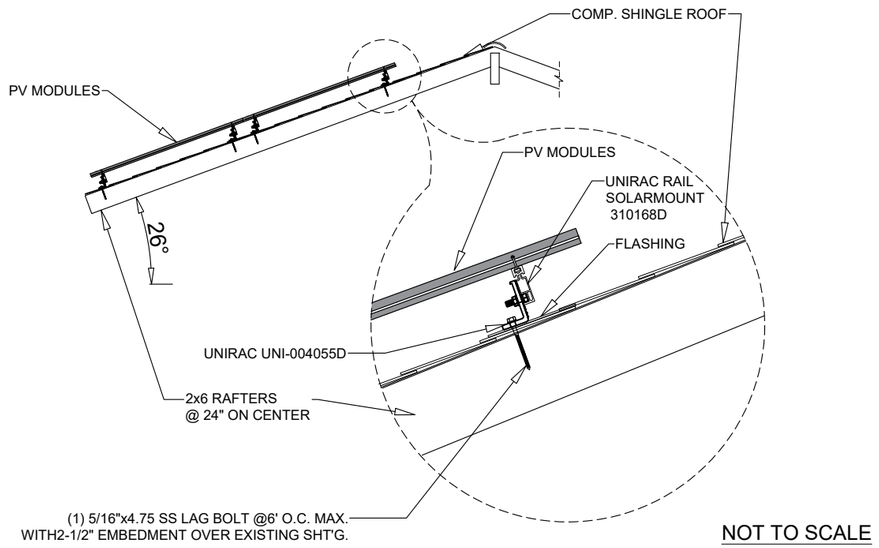
REVISION :

PAGE INFORMATION

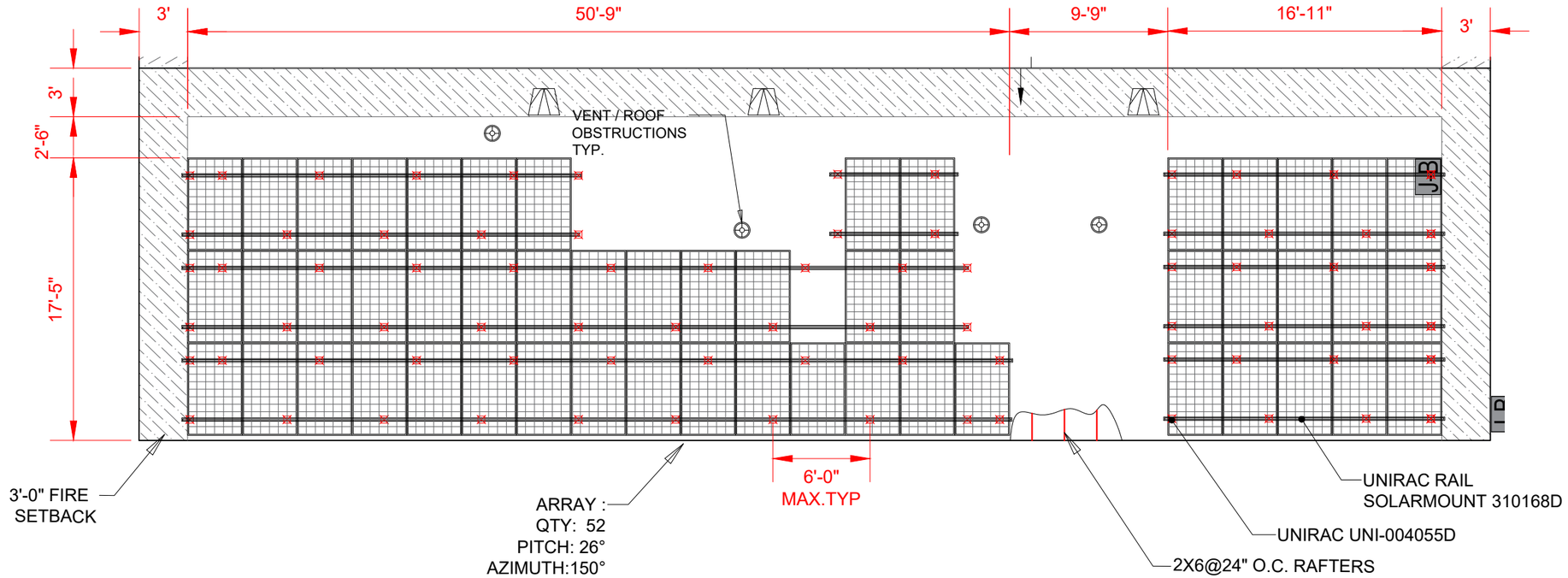
TITLE:
PLOT PLAN / ROOF PLAN

PV-02

SYSTEM WEIGHT / MODULE INFO			
DESCRIPTION	QTY	WEIGHT / UNIT (lbs)	TOTAL WEIGHT (lbs)
MODULE	52	43.9	2282.8
OPTIMIZER/ MICRO-INV.	52	1.4	72.8
RAIL	366ft	0.7	256.2
STANDOFF	78	1	78
TOTAL SYSTEM WEIGHT			2689.8
TOTAL MODULES AREA= 936ft²			
LOADING WEIGHT PER ft² = 2.9lbs			
LOADING WEIGHT PER STANDOFF = 39.7lbs			



NOT TO SCALE



ARRAY LAYOUT TYP SCALE: 1/8"=1'-0

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PAGE INFORMATION

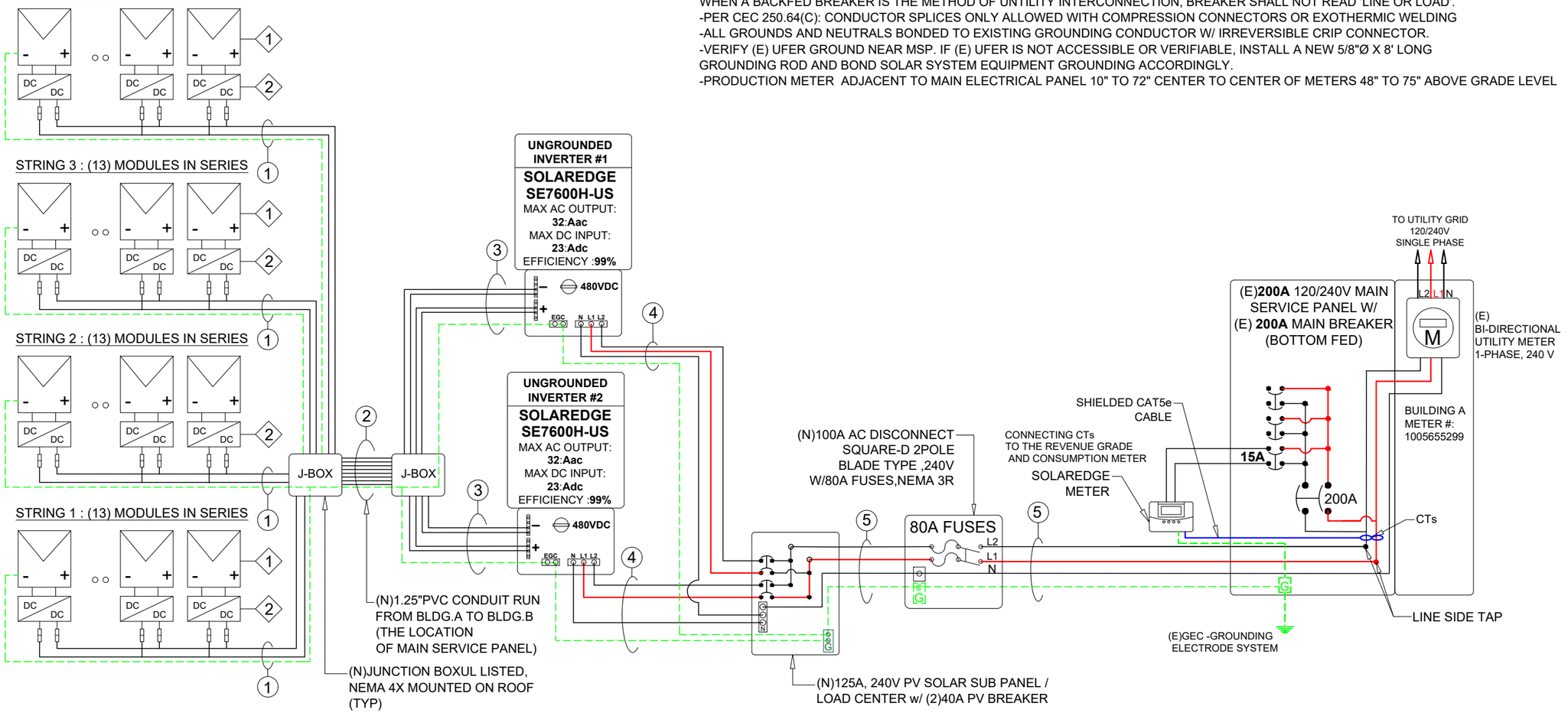
TITLE:
ROOF LAYOUT
RAFTER SIDE VIEW

PV-03

WIRE TAG#	MAX AMPS X NEC MULT= DESIGN AMPS	BREAKER SIZE AMPS	WIRE TYPE	EGC / GRND.SIZE	WIRE RATING IN 90° X TEMP DERATE X CONDUCTOR DERATE = DERATE WIRE	TERMINAL 60°C RATING	CONDUIT SIZE CONDUIT FILL
1	15.0 x 1.25 =18.8A	20A	(2) #10 PV WIRE	(1)#6 THWN-2 BARE COPPER EGC	40 x 0.65 x 1.0 =26.0 >=18.8	20> =18.8	OPEN AIR
2	15.0 x 1.25 =18.8A	20A	(8) #8 THWN-2	(1)#8 THWN-2 EGC	55 x 0.65 x 0.7 =25.0 >=18.8	40> =18.8	1 1/4" PVC FILL: 0.3294 , 27%
3	15.0 x 1.25 =18.8A	20A	(4) #8 THWN-2	(1)#8 THWN-2 EGC	55 x 0.65 x 8.0 =286.0 >=18.8	40> =18.8	3/4" EMT FILL: 0.1351 , 25%
4	32.0 x 1.25 =40.0A	40A	(3) #8 THWN-2	(1)#8 THWN-2 EGC	55 x 0.91 x 1.0 =50.1 >=40.0	40> =40.0	3/4" EMT FILL: 0.1464 , 28%
5	64.0 x 1.25 =80.0A	80A	(3) #3 THWN-2	(1)#8 THWN-2 EGC	115 x 0.91 x 1.0 =104.7 >=80.0	85> =80.0	1" EMT FILL: 0.3285 , 38%

EQUIPMENT LIST			QTY
1	HANWHA,QPEAK DUO BLK G6+340	Voc:40.66V Vmp:33.94V Isc:10.52A Imp:10.02A	52
2	POWER OPTIMIZER SOLAREDGE,P340	MAX. INPUT VOLTAGE :48Vdc MPPT RANGE : 8 TO 48Vdc MAX. INPUT CURRENT : 13.75Adc MAX. OUTPUT CURRENT :15Vdc	52

NOTES:
-SOLID BARE E.G.C. (FREE-AIR) MOUNTED UNDER ARRAY
-PER NEC 250.120(C): WHERE CONDUCTORS & GROUND WIRE ARE RUN EXPOSED ON ROOF FROM ARRAY TO J-BOX, CONDUCTORS & BARE GROUND WIRE SHALL BE CONCEALED INSTALL IN CONDUIT
-PER NEC ARTICLE 690.35 INVERTER GROUND FAULT PROTECTION PROVIDED
-ALL GROUNDS AND NEUTRALS BONDED TO EXISTING GROUNDING CONDUCTOR W/ IRREVERSIBLE CRIP CONNECTOR.
-BACKFED BREAKERS MUST BE LOCATED @ OPPOSITE END OF BUS BAR FROM MAIN BREAKER OR MAIN LUG ON GRID SIDE. WHEN A BACKFED BREAKER IS THE METHOD OF UNTILITY INTERCONNECTION, BREAKER SHALL NOT READ 'LINE OR LOAD'.
-PER CEC 250.64(C): CONDUCTOR SPLICES ONLY ALLOWED WITH COMPRESSION CONNECTORS OR EXOTHERMIC WELDING
-ALL GROUNDS AND NEUTRALS BONDED TO EXISTING GROUNDING CONDUCTOR W/ IRREVERSIBLE CRIP CONNECTOR.
-VERIFY (E) UFER GROUND NEAR MSP. IF (E) UFER IS NOT ACCESSIBLE OR VERIFIABLE, INSTALL A NEW 5/8"Ø X 8' LONG GROUNDING ROD AND BOND SOLAR SYSTEM EQUIPMENT GROUNDING ACCORDINGLY.
-PRODUCTION METER ADJACENT TO MAIN ELECTRICAL PANEL 10" TO 72" CENTER TO CENTER OF METERS 48" TO 75" ABOVE GRADE LEVEL



CONTRACTOR

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OCCUPANCY R3 /
TYPE 5 STRU.
APN#: [redacted]

SYSTEM SIZE

16.375 KW-AC
17.680 KW-DC

MODULES :
(52) HANWHA,
QPEAK DUO BLK G6+340

INVERTER(S) :
(2) SOLAREDGE SE7600H-US

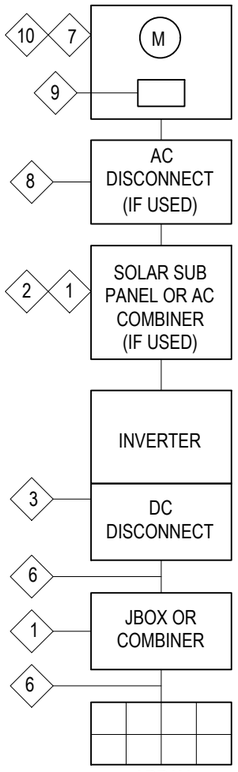
DATE: 7/23/20

REVISION :

PAGE INFORMATION

TITLE:
ELECTRICAL DIAGRAM

PV-04



5

MAXIMUM VOLTAGE 500V
MAXIMUM CIRCUIT CURRENT 15A

MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED) 15A

690.53

6

WARNING: PHOTOVOLTAIC POWER SOURCE

REFLECTIVE STICKER, 690.31(G)(3)(4)

7

⚠WARNING

DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

ORANGE WARNING AREA, 705.12(B)(3)

8

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT 64A

NOMINAL OPERATING AC VOLTAGE 240V

690.13(B), 690.54

9

⚠WARNING

POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

ORANGE WARNING AREA, 705.12(B)(2)(3)(b)

1

⚠WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

ORANGE WARNING AREA, 690.13(B)

2

⚠WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

ORANGE WARNING AREA, 110.27(C)

3

⚠WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

ORANGE WARNING AREA, 690.13(B)

4

PHOTOVOLTAIC

DC DISCONNECT

690.13(B)

RAPID SHUTDOWN SWITCH FOR SOLAR SYSTEM

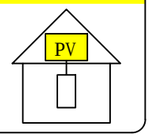
REFLECTIVE STICKER, 690.56(C)(2)

1. ARTICLES 690 AND 705 MARKINGS SHOWN HEREON
2. ALL MARKINGS SHALL CONSIST OF THE FOLLOWING:
   A. UV RESISTANT SIGN MATERIAL WITH ENGRAVED OR MACHINE PRINTED LETTERS OR ELECTRO-PLATING
   B. RED BACKGROUND COLOR WITH WHITE TEXT AND LINE WORK UON
   C. ARIAL FONT
3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATIONS SPECIFIED.
4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT USING PERMANENT ADHESIVE, POP-RIVETS, OR SCREWS

10

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

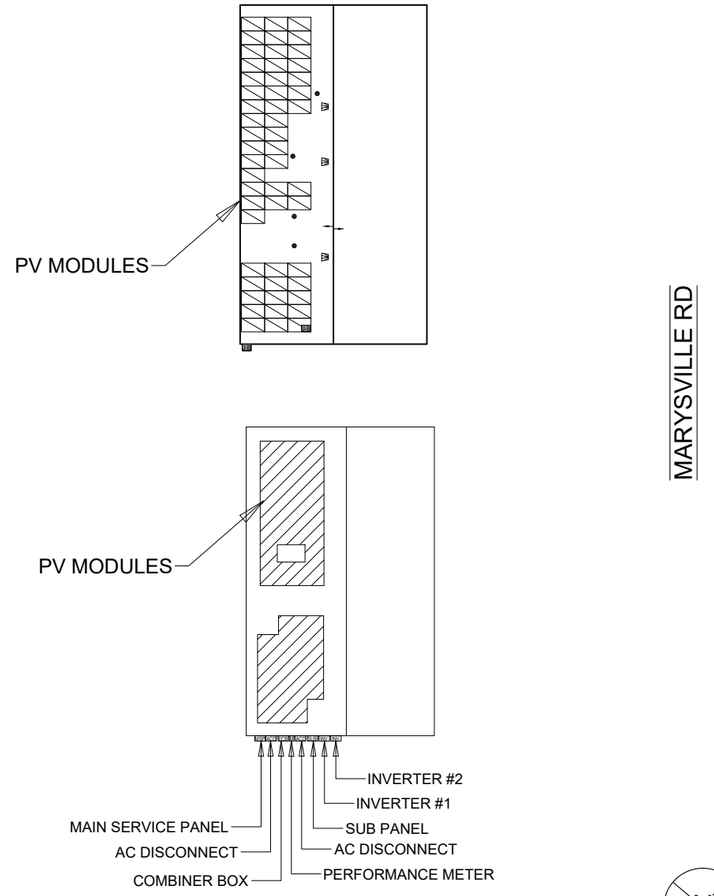


The title "SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN" shall utilize capitalized characters with a minimum height of 9.5 mm (3⁄8 in.) in black on yellow background and the remaining characters shall be capitalized with a minimum height of 4.8 mm (3⁄16 in.) in black on white background. 690.56(C)(1)(a)

MIN.6"X8" PLACARD SHALL BE IN RED COLOR WITH PRINTED IN WHITE TO GO ON MAIN SERVICE PANEL CEC 705.10

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECT(S) LOCATED AS SHOWN. DANGEROUS VOLTAGE MAY BE PRESENT AT ALL TIMES.



"WARNING"
PHOTOVOLTAIC ARRAY
DISCONNECTION OF NEUTRAL OR GROUNDED CONDUCTORS MAY RESULT IN OVERVOLTAGE ON ARRAY OR INVERTER

PLAQUE SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS.

CONTRACTOR

LEDBETTER ELECTRIC INC
1004 YUBA STREET,
MARYSVILLE, CA 95901
PHONE: (530)692-9552

STATE LICENSE# : 994171

LICENSE TYPE : C 10

EXPIRATION DATE : 09/30/2020

STAMP/ SIGNATURE :

LEDBETTER ELECTRIC
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OWNER / ADDRESS

[redacted]
OREGON HOUSE, CA 95962

OCCUPANCY R3 /
TYPE 5 STRU.
APN#: [redacted]

SYSTEM SIZE

16.375 KW-AC
17.680 KW-DC

MODULES :
(52) HANWHA,
QPEAK DUO BLK G6+340

INVERTER(S) :
(2) SOLAREDGE SE7600H-US

DATE: 7/23/20

REVISION :

PAGE INFORMATION

TITLE:
WARNING LABELS

PV-05

powered by Q.ANTUM DUO

Q.PEAK DUO BLK-G6+

330-345

ENDURING HIGH PERFORMANCE

Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.5 %.

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 and Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING

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

A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty[2].

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 (–1500 V, 168 h)
[2] See data sheet on rear for further information

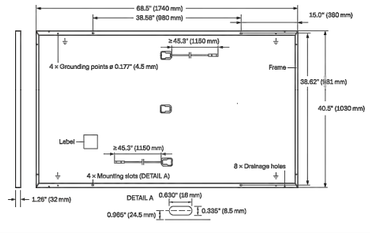
THE IDEAL SOLUTION FOR:

Rooftop arrays on residential buildings

Engineered in Germany

MECHANICAL SPECIFICATION

Format	68.5 × 40.6 × 1.26 in (including frame) (1740 × 1030 × 32 mm)
Weight	43.9 lbs (19.9 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 × 1.26-2.36 × 0.59-0.71 in (53-101 × 32-60 × 15-18 mm), Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥ 45.3 in (1150 mm), (–) ≥ 45.3 in (1150 mm)
Connector	Stäubli MC4, Hanwha Q CELLS HQC4, Amphenol UTX, Renhe 05-6, Tongling TL-Cable01S, JMTHY JM601; IP68 or Friends PV2e; IP67

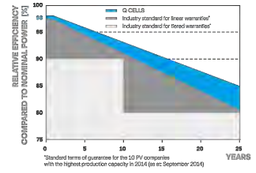


ELECTRICAL CHARACTERISTICS

POWER CLASS			330	335	340	345
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W)						
Minimum	Power at MPP[1]	P_{MPP} [W]	330	335	340	345
	Short Circuit Current[1]	I_{SC} [A]	10.41	10.47	10.52	10.58
	Open Circuit Voltage[1]	V_{OC} [V]	40.15	40.41	40.66	40.92
	Current at MPP	I_{MPP} [A]	9.91	9.97	10.02	10.07
	Voltage at MPP	V_{MPP} [V]	33.29	33.62	33.94	34.25
	Efficiency[1]	η [%]	≥18.4	≥18.7	≥19.0	≥19.3
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]						
Minimum	Power at MPP	P_{MPP} [W]	247.0	250.7	254.5	258.2
	Short Circuit Current	I_{SC} [A]	8.39	8.43	8.48	8.52
	Open Circuit Voltage	V_{OC} [V]	37.86	38.10	38.34	38.59
	Current at MPP	I_{MPP} [A]	7.80	7.84	7.89	7.93
	Voltage at MPP	V_{MPP} [V]	31.66	31.97	32.27	32.57

[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

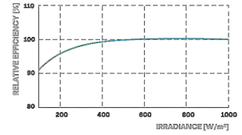
Q CELLS PERFORMANCE WARRANTY



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 organization of your respective country.

PERFORMANCE AT LOW IRRADIANCE



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]	–0.36	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 / ft²]	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 / ft²]	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	28
Number of Pallets per 40' HC-Container	24
Pallet Dimensions (L × W × H)	71.5 × 45.3 × 48.0 in (1815 × 1150 × 1220 mm)
Pallet Weight	1505 lbs (683 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

CONTRACTOR

LEDBETTER ELECTRIC INC
1004 YUBA STREET,
MARYSVILLE, CA 95901
PHONE: (530)692-9552

STATE LICENSE# : 994171

LICENSE TYPE : C 10

EXPIRATION DATE : 09/30/2020

STAMP/ SIGNATURE :

LEDBETTER ELECTRIC
Lic.#994171

OWNER / ADDRESS

[redacted]
OREGON HOUSE, CA 95962

OCCUPANCY R3 /
TYPE 5 STRU.
APN#: [redacted]

SYSTEM SIZE

16.375 KW-AC
17.680 KW-DC

MODULES :
(52) HANWHA,
QPEAK DUO BLK G6+340

INVERTER(S) :
(2) SOLAREDGE SE7600H-US

DATE: 7/23/20

REVISION :

PAGE INFORMATION

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PV-06

HANWHA Q.CELLS QUALITY

QUALITY TESTED · MODULES

The safest test standard for your investment

Hanwha Q.CELLS is the first solar module manufacturer to participate in the **Quality Tested** program of the German independent certification authority VDE. Quality Tested by VDE considerably expands the well-known module tests of IEC 61215 and IEC 61730, in terms of the **approval certification**, the **quality controls** during the production process and the **frequency of the testing cycle.** Unlike any other quality program, Quality Tested by VDE ensures the continuously high safety and quality of our modules over the long term.

QUALITY TESTED MEANS

The best modules on the market with independently confirmed:

- **High reliability**
- **Optimized durability**
- **Low degradation**
- **Continuous line monitoring.**

THE ADVANTAGES FOR YOU ARE:

- **Reliable system performance** thanks to comprehensive approval certification.
- **High yields over the long run** thanks to additional safety tests.
- **Increased investment security** thanks to testing repeated quarterly.
- **Increased bankability** thanks to independent certification by an internationally recognized testing and certification authority.

VDE
Quality Tested
high reliability
optimized durability
low degradation
continuous line monitoring
ID. 40032587

Q.CELLS

TOUGHER REQUIREMENTS TO GAIN VDE APPROVAL

- Double thermal cycling test in acc. with IEC (400 cycles)
- 1.5-fold damp heat test in acc. with IEC (1,500 hours)
- Twice the amount of tested modules per test string
- Twice the amount of junction box tests
- Additional dynamic load test following UV treatment
- Allowed performance loss after VDE testing is at most 5 % (instead of 8 % in acc. with IEC)

Longer testing cycles and the low acceptable performance loss threshold of 5 % make Quality Tested by VDE the most comprehensive testing program for solar modules.

STRICTER QUALITY CONTROLS IN PRODUCTION

- 100 % electroluminescence test following lamination
- Wet leakage test on 1 % of all modules
- Daily test of grounding behavior
- Daily reverse-current carrying capacity test

The additional tests protect against the risk of module damage and system failures thanks to high production consistency.

UNIQUE IN THE PV INDUSTRY: REPEATED TESTS

- Quarterly testing for the accuracy of the power data on the module via remeasurement
- Quarterly recurrence of testing cycles on 20 modules from running production
- Quarterly climatic testing on 4 modules from running production

Continuous testing guarantees the production of solar modules of the highest quality – every time and at all production sites.

Visit www.vde.com for further information on the Quality Tested program for solar modules.

HANWHA Q.CELLS GMBH
OT Thalheim, Sonnenallee 17–21
06766 Bitterfeld-Wolfen, Germany
TEL +49 (0)3494 66 99-23444
FAX +49 (0)3494 66 99-23000
EMAIL sales@q-cells.com
WEB www.q-cells.com

Q.CELLS

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17.680 KW-DC

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QPEAK DUO BLK G6+340

INVERTER(S) :
(2) SOLAREDGE SE7600H-US

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PV-07

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

12-25 YEAR WARRANTY

INVERTERS

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, adjustable -0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V[2]	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V[2]	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

[1] For other regional settings please contact SolarEdge support
[2] A higher current source may be used; the inverter will limit its input current to the values stated

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PV-08

METERING

Energy Meter with Modbus Connection

for North America

SE-MTR240-NN-S-S1

Energy Meter for Residential Installations:

- Simple installations and connectivity
- Type NEMA 3R enclosure for outdoor protection
- Provides high accuracy meter readings
- Communicates over RS485 to provide monitoring data
- Suitable for export limitation, consumption monitoring and StorEdgeTM applications

solaredge.com

solaredge

Energy Meter with Modbus Connection

for North America

SE-MTR240-NN-S-S1

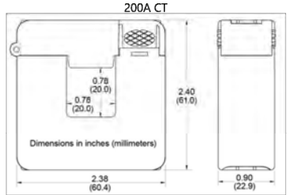
SUPPORTED INVERTERS	SINGLE PHASE INVERTERS		UNITS
ELECTRICAL SERVICE			
AC Input Voltage (Nominal)	240		Vac
AC Frequency (Nominal)	60		Hz
Max AC Input Current	100		mA
Connector Type	Terminal block - 22 to 12		AWG
Grids supported	L1 / L2 / N / PE L1 / L2 / PE		
Power Consumption (Nominal)	3		W
METER ACCURACY (@ 77°F / 25°C, PF:0.7- 1)			
1 - 100% of Rated Current CT	±1.0		%
CURRENT TRANSFORMERS[1]			
Nominal Input (at CT Rated Current)	CT1, CT2: 0.333		Vac RMS
Rated RMS current[2]	200	400	A
Dimensions (Internal / External)	0.8 x 0.8; 2.4 x 2.4 / 20 x 20; 61 x 61	1.26 x 1.83; 3.3 x 4.5 / 32 x 46.5; 83.4 x 114	in/mm
STANDARD COMPLIANCE			
Safety	UL 1741:2010 Ed.2(Supplement SA)+R: 07 Sep 2016		
Emmissions	FCC 47 CFR Part 15 Subpart B		
ENVIRONMENTAL			
Operating Temperatures	-40 to +140 / -40 to +60		°F / °C
Relative Humidity (noncondensing)	5-90		%
Enclosure type	High impact, ABS and/or ABS/PC plastic UL 94V-0, IEC FV-0		
Protection Rating	NEMA Type 3R		
INSTALLATION SPECIFICATIONS			
Dimensions (HxWxD)	8.1 x 12.4 x 4.6 / 206.6 x 316 x 117.5		in / mm
Weight	3.9 / 1.8		lb / kg
Conduit Entry Diameters	0.75 or 1 / 19 or 25		in
Mounting Type	Bracket mount		

[1] Current Transformers should be ordered separately: SEACT0750-200NA-20 (200A) or SEACT1250-400NA-20 (400A), 20 per box

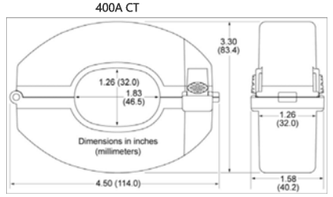
[2] For other ratings contact SolarEdge

Current Transformer Dimensions

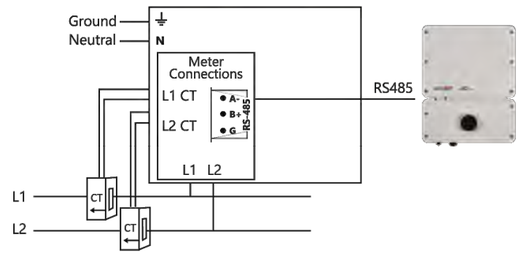
200A CT



400A CT



Connecting the Energy Meter



* Current Transformers (CTs) should be ordered separately: SEACT0750-200NA-20 (200A); SEACT1250-400NA-20 (400A). Each comes in boxes of 20.

FC RoHS

DISCLAIMER: If any Errors, Discrepancies or Omissions appear in these drawings, specifications or other contract documents; The Owner or General Contractor shall notify the Designer, in writing, of such error or omission. In the event that the Owner or General Contractor falis to give such notice, before construction and/or fabrication of the work, the Owner or General Contractor will be held responsible to the result of any errors, discrepancies or omissions and the cost of rectifying them.

CONTRACTOR

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[redacted]
OREGON HOUSE, CA 95962

OCCUPANCY R3 /
TYPE 5 STRU.
APN#: [redacted]

SYSTEM SIZE

16.375 KW-AC
17.680 KW-DC

MODULES :
(52) HANWHA,
QPEAK DUO BLK G6+340

INVERTER(S) :
(2) SOLAREDGE SE7600H-US

DATE: 7/23/20

REVISION :

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SPECS

PV-09

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P485 / P505

POWEROPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com

solaredge

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P485 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for high-voltage modules)	P485 (for high-voltage modules)	P505 (for higher current modules)	
INPUT								
Rated Input DC Power[1]	320	340	370	400	405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125[2]		83[2]	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105		12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11			10.1			14	Adc
Maximum DC Input Current	13.75			12.5			17.5	Adc
Maximum Efficiency	99.5							%
Weighted Efficiency	98.8						98.6	%
Overvoltage Category	II							
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)								
Maximum Output Current	15							Adc
Maximum Output Voltage	60				85			Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)								
Safety Output Voltage per Power Optimizer	1 ± 0.1							Vdc
STANDARD COMPLIANCE								
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3							
Safety	IEC62109-1 (class II safety), UL1741							
Material	UL94 V-0 , UV Resistant							
RoHS	Yes							
INSTALLATION SPECIFICATIONS								
Maximum Allowed System Voltage	1000							Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters							
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1		129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9			129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	630 / 1.4		750 / 1.7	845 / 1.9			1064 / 2.3	gr / lb
Input Connector	MC4[3]					Single or dual MC4[3][4]	MC4[3]	
Input Wire Length	0.16 / 0.52							m / ft
Output Wire Type / Connector	Double Insulated / MC4							
Output Wire Length	0.9 / 2.95	1.2 / 3.9	1.2 / 3.9	1.2 / 3.9			1.2 / 3.9	m / ft
Operating Temperature Range[5]	-40 - +85 / -40 - +185							°C / °F
Protection Rating	IP68 / NEMA6P							
Relative Humidity	0 - 100							%

[1] Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed
[2] NEC 2017 requires max input voltage be not more than 80V
[3] For other connector types please contact SolarEdge
[4] For dual version for parallel connection of two modules use the P485. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer
[5] For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details.

PV System Design Using a SolarEdge Inverter[6][7]		Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400	8		10	18	
	P405, P485, P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50[8]	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000[9]	12750[10]	W
Parallel Strings of Different Lengths or Orientations		Yes				

[6] For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf
[7] It is not allowed to mix P405/P485/P505 with P320/P340/P370/P400 in one string
[8] A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
[9] For 208V grid: it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W
[10] For 277/480V grid: it is allowed to install up to 17,550W per string when the maximum power difference between each string is 2,000W

Intertek RoHS

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SPECS

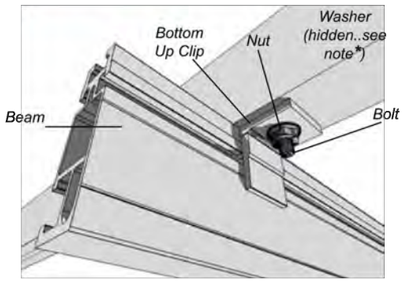
PV-10

SolarMount Technical Datasheet

Pub 110818-1td V1.0 August 2011

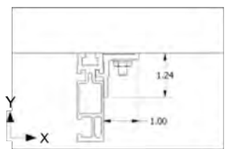
SolarMount Module Connection Hardware

SolarMount Bottom Up Module Clip
Part No. 302000C



- **Bottom Up Clip material:** One of the following extruded aluminum alloys: 6005-T5, 6105-T5, 6061-T6
- **Ultimate tensile:** 38ksi, Yield: 35 ksi
- **Finish:** Clear Anodized
- **Bottom Up Clip weight:** ~0.031 lbs (14g)
- Allowable and design loads are valid when components are assembled with SolarMount series beams according to authorized UNIRAC documents
- Assemble with one ¼"-20 ASTM F593 bolt, one ¼"-20 ASTM F594 serrated flange nut, and one ¼" flat washer
- Use anti-seize and tighten to 10 ft-lbs of torque
- Resistance factors and safety factors are determined according to part 1 section 9 of the 2005 Aluminum Design Manual and third-party test results from an IAS accredited laboratory
- Module edge must be fully supported by the beam

* **NOTE ON WASHER:** Install washer on bolt head side of assembly. **DO NOT** install washer under serrated flange nut

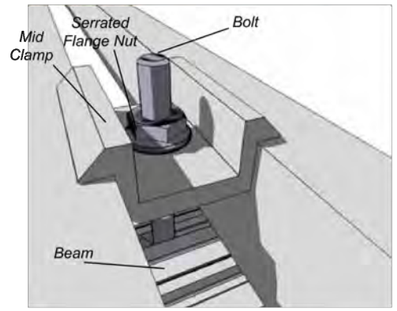


Dimensions specified in inches unless noted

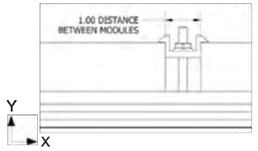
Applied Load Direction	Average Ultimate lbs (N)	Allowable Load lbs (N)	Safety Factor, FS	Design Load lbs (N)	Resistance Factor, Φ
Tension, Y+	1566 (6967)	686 (3052)	2.28	1038 (4615)	0.662
Transverse, X±	1128 (5019)	329 (1463)	3.43	497 (2213)	0.44
Sliding, Z±	66 (292)	27 (119)	2.44	41 (181)	0.619

SOLARMOUNT Technical Datasheets

SolarMount Mid Clamp
Part No. 302101C, 302101D, 302103C, 302104D, 302105D, 302106D



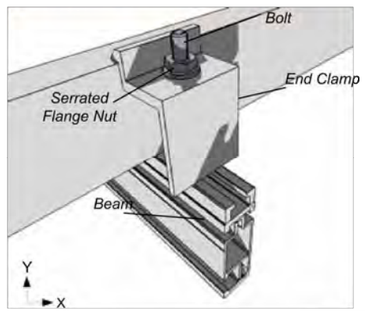
- **Mid clamp material:** One of the following extruded aluminum alloys: 6005-T5, 6105-T5, 6061-T6
- **Ultimate tensile:** 38ksi, Yield: 35 ksi
- **Finish:** Clear or Dark Anodized
- **Mid clamp weight:** 0.050 lbs (23g)
- Allowable and design loads are valid when components are assembled according to authorized UNIRAC documents
- Values represent the allowable and design load capacity of a single mid clamp assembly when used with a SolarMount series beam to retain a module in the direction indicated
- Assemble mid clamp with one Unirac ¼"-20 T-bolt and one ¼"-20 ASTM F594 serrated flange nut
- Use anti-seize and tighten to 10 ft-lbs of torque
- Resistance factors and safety factors are determined according to part 1 section 9 of the 2005 Aluminum Design Manual and third-party test results from an IAS accredited laboratory



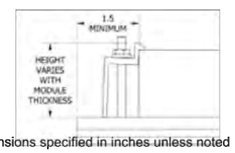
Dimensions specified in inches unless noted

Applied Load Direction	Average Ultimate lbs (N)	Allowable Load lbs (N)	Safety Factor, FS	Design Load lbs (N)	Resistance Factor, Φ
Tension, Y+	2020 (8987)	891 (3963)	2.27	1348 (5994)	0.667
Transverse, Z±	520 (2313)	229 (1017)	2.27	346 (1539)	0.665
Sliding, X±	1194 (5312)	490 (2179)	2.44	741 (3295)	0.620

SolarMount End Clamp
Part No. 302001C, 302002C, 302002D, 302003C, 302003D, 302004C, 302004D, 302005C, 302005D, 302006C, 302006D, 302007D, 302008C, 302008D, 302009C, 302009D, 302010C, 302011C, 302012C



- **End clamp material:** One of the following extruded aluminum alloys: 6005-T5, 6105-T5, 6061-T6
- **Ultimate tensile:** 38ksi, Yield: 35 ksi
- **Finish:** Clear or Dark Anodized
- **End clamp weight:** varies based on height: ~0.058 lbs (26g)
- Allowable and design loads are valid when components are assembled according to authorized UNIRAC documents
- Values represent the allowable and design load capacity of a single end clamp assembly when used with a SolarMount series beam to retain a module in the direction indicated
- Assemble with one Unirac ¼"-20 T-bolt and one ¼"-20 ASTM F594 serrated flange nut
- Use anti-seize and tighten to 10 ft-lbs of torque
- Resistance factors and safety factors are determined according to part 1 section 9 of the 2005 Aluminum Design Manual and third-party test results from an IAS accredited laboratory
- Modules must be installed at least 1.5 in from either end of a beam



Dimensions specified in inches unless noted

Applied Load Direction	Average Ultimate lbs (N)	Allowable Load lbs (N)	Safety Factor, FS	Design Loads lbs (N)	Resistance Factor, Φ
Tension, Y+	1321 (5876)	529 (2352)	2.50	800 (3557)	0.605
Transverse, Z±	63 (279)	14 (61)	4.58	21 (92)	0.330
Sliding, X±	142 (630)	52 (231)	2.72	79 (349)	0.555

CONTRACTOR

LEDBETTER ELECTRIC INC
1004 YUBA STREET,
MARYSVILLE, CA 95901
PHONE: (530)692-9552

STATE LICENSE# : 994171

LICENSE TYPE : C 10

EXPIRATION DATE : 09/30/2020

STAMP/ SIGNATURE :

LEDBETTER ELECTRIC
Lic.#994171

OWNER / ADDRESS

[redacted]
OREGON HOUSE, CA 95962

OCCUPANCY R3 /
TYPE 5 STRU.
APN#: [redacted]

SYSTEM SIZE

16.375 KW-AC
17.680 KW-DC

MODULES :
(52) HANWHA,
QPEAK DUO BLK G6+340

INVERTER(S) :
(2) SOLAREDGE SE7600H-US

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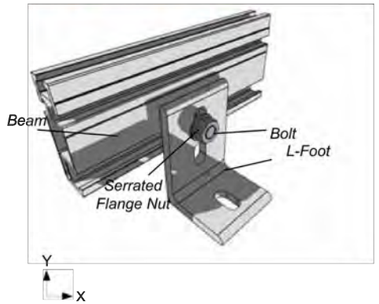
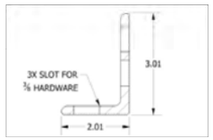
UNIRAC A HILTI GROUP COMPANY

SolarMount Beam Connection Hardware

SolarMount L-Foot
Part No. 304000C, 304000D





Dimensions specified in inches unless noted

- **L-Foot material:** One of the following extruded aluminum alloys: 6005-T5, 6105-T5, 6061-T6
- **Ultimate tensile:** 38ksi, Yield: 35 ksi
- **Finish:** Clear or Dark Anodized
- **L-Foot weight:** varies based on height: ~0.215 lbs (98g)
- Allowable and design loads are valid when components are assembled with SolarMount series beams according to authorized UNIRAC documents
- **For the beam to L-Foot connection:**
  - Assemble with one ASTM F593 ⅜"-16 hex head screw and one ASTM F594 ⅜"serrated flange nut
  - Use anti-seize and tighten to 30 ft-lbs of torque
- Resistance factors and safety factors are determined according to part 1 section 9 of the 2005 Aluminum Design Manual and third-party test results from an IAS accredited laboratory

NOTE: Loads are given for the L-Foot to beam connection only; be sure to check load limits for standoff, lag screw, or other attachment method

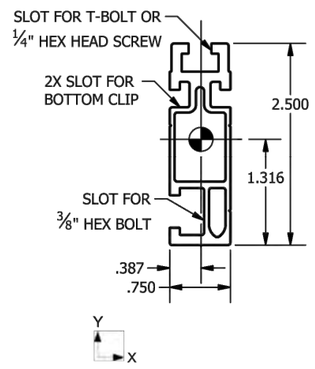
Applied Load Direction	Average Ultimate lbs (N)	Allowable Load lbs (N)	Safety Factor, FS	Design Load lbs (N)	Resistance Factor, Φ
Sliding, Z±	1766 (7856)	755 (3356)	2.34	1141 (5077)	0.646
Tension, Y+	1859 (8269)	707 (3144)	2.63	1069 (4755)	0.575
Compression, Y-	3258 (14492)	1325 (5893)	2.46	2004 (8913)	0.615
Traverse, X±	486 (2162)	213 (949)	2.28	323 (1436)	0.664

SOLARMOUNT Technical Datasheets

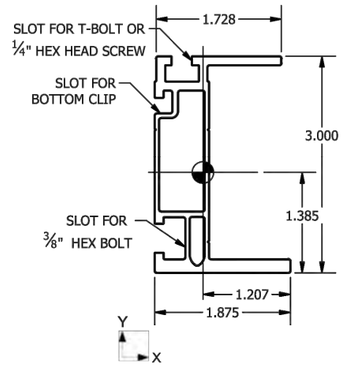
UNIRAC A HILTI GROUP COMPANY

SolarMount Beams
Part No. 310132C, 310132C-B, 310168C, 310168C-B, 310168D
310208C, 310208C-B, 310240C, 310240C-B, 310240D,
410144M, 410168M, 410204M, 410240M

Properties	Units	SolarMount	SolarMount HD
Beam Height	in	2.5	3.0
Approximate Weight (per linear ft)	plf	0.811	1.271
Total Cross Sectional Area	in^2	0.676	1.059
Section Modulus (X-Axis)	in^3	0.353	0.898
Section Modulus (Y-Axis)	in^3	0.113	0.221
Moment of Inertia (X-Axis)	in^4	0.464	1.450
Moment of Inertia (Y-Axis)	in^4	0.044	0.267
Radius of Gyration (X-Axis)	in	0.289	1.170
Radius of Gyration (Y-Axis)	in	0.254	0.502



SolarMount Beam



SolarMount HD Beam

For product and purchasing inquiries contact:

ecoDIRECT CLEAN ENERGY SOLUTIONS
www.ecodirect.com

Dimensions specified in inches unless noted

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SM SOLAR MOUNT — APPENDIX G System Certification

The SOLARMOUNT system has been certified and listed to the UL 2703 standard (Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels). This standard included electrical grounding, electrical bonding, mechanical load and fire resistance testing.

In conducting these tests, specific modules are selected for their physical properties so that the certifications can be mostly broadly applied. The following lists the specific modules that were tested and the applicability of those certifications to other modules that might come onto the market.

In addition to UL 2703 certification, Unirac performs internal testing beyond the requirements of certification tests in order to establish system functional limits, allowable loads, and factors of safety. These tests include functional system tests, and destructive load testing.

Mechanical Load Test Modules

The modules selected for UL 2703 mechanical load testing were selected to represent the broadest range possible for modules on the market. The tests performed cover the following basic module parameters:

- 60 cell framed modules only
- Frame thicknesses greater than or equal to 1.2mm
- Basic single and double wall frame profiles (some complex frame profiles could require further analysis to determine applicability)
- Clear and dark anodized aluminum frames
- Certification loads: 50 psf up, 113 psf down

Tested Modules	
Module Manufacturer	Model / Series
Trina	TSM-PA05
CentroSolar	VISION C2
CentroSolar	E Series 60 cell
CentroSolar	T-Series 60 cell

System Level Fire Classification

The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. SOLARMOUNT has achieved Class A system level performance for steep sloped roofs when used in conjunction with type 1, type 2, type 3 and type 10 module constructions. Class A system level fire performance is inherent in the SOLARMOUNT design, and no additional mitigation measures are required. The fire classification rating is only valid on roof pitches greater than 2:12 (slopes ⩾ 2 inches per foot, or 9.5 degrees). There is no required minimum or maximum height limitation above the roof deck to maintain the Class A fire rating for SOLARMOUNT.

Module Type	System Level Fire Rating	Rail Direction	Module Orientation	Mitigation Required
Type 1, Type 2, Type 3, & Type 10	Class A	East-West	Landscape OR Portrait	None Required
		North-South		

SM SOLAR MOUNT — FIRE CODE COMPLIANCE NOTES INSTALLATION GUIDE D PAGE

SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. SOLARMOUNT has achieved Class A system level performance for steep sloped roofs when used in conjunction with type 1, type 2, type 3 and type 10 module constructions. Class A system level fire performance is inherent in the SOLARMOUNT design, and no additional mitigation measures are required. The fire classification rating is only valid on roof pitches greater than 2:12 (slopes ⩾ 2 inches per foot, or 9.5 degrees). There is no required minimum or maximum height limitation above the roof deck to maintain the Class A fire rating for SOLARMOUNT.

Module Type	System Level Fire Rating	Rail Direction	Module Orientation	Mitigation Required
Type 1, Type 2, Type 3 & Type 10	Class A	East-West	Landscape OR Portrait	None Required
		North-South	Landscape OR Portrait	None Required

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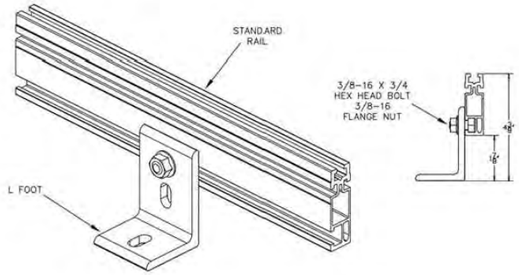
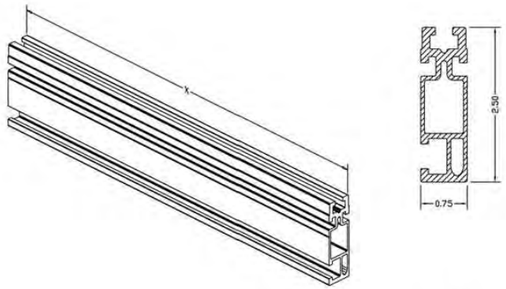
SM SOLAR MOUNT INSTALLATION GUIDE



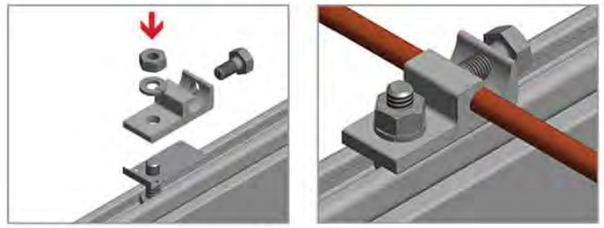


UNIRAC®

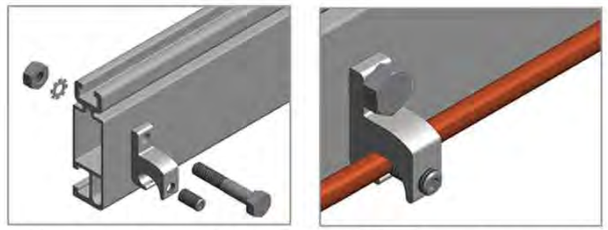
Installation Detail

SolarMount Rail
L-Foot Connection

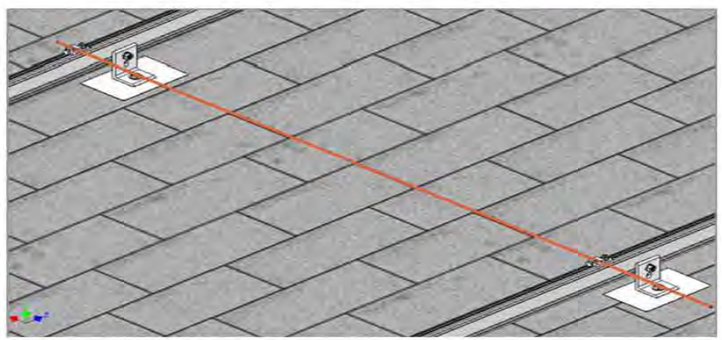
SYSTEM GROUNDING



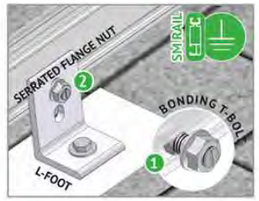
WEEBLUG CONDUCTOR - UNIRAC P/N 008002S:
Apply Anti Seize and insert a bolt in the aluminum rail and through the clearance hole in the stainless steel flat washer. Place the stainless steel flat washer on the bolt, oriented so the dimples will contact the aluminum rail. Place the lug portion on the bolt and stainless steel flat washer. Install stainless steel flat washer, lock washer and nut. Tighten the nut until the dimples are completely embedded into the rail and lug.



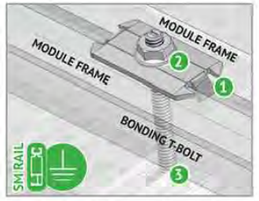
ILSCO LAY-IN LUG CONDUCTOR - UNIRAC P/N 008009P: Alternate Grounding Lug - Drill and bolt thru both rail walls per table.



BONDING CONNECTION GROUND PATHS

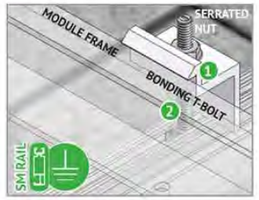


RAIL TO L-FOOT w/BONDING T-BOLT
1. Serrated flange nut removes L-foot anodization to bond L-Foot to stainless steel T-bolt
2. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail

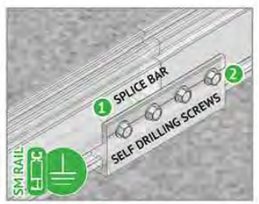


BONDING MID CLAMP ASSEMBLY
1. Stainless steel mid clamp points, 2 per module, pierce module frame anodization to bond module to module through clamp.
2. Serrated flange nut bonds stainless steel clamp to stainless steel T-bolt
3. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to grounded SM rail

RACK SYSTEM GROUND
1. Weeb washer dimples pierce anodized rail to create bond between rail and lug
2. Solid copper wire connected to lug is routed to provide final system ground connection.



END CLAMP ASSEMBLY
1. Serrated flange nut bonds aluminum end clamp to stainless steel T-bolt
2. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and end clamp to grounded SM rail



BONDING RAIL SPLICE BAR
1. Stainless steel self drilling screws drill and tap into splice bar and rail creating bond between splice bar and each rail section
2. Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

CONTRACTOR

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FLASHKIT PRO

UNIRAC
FEATURING SHED & SEAL TECHNOLOGY

FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Featuring Unirac's patented **SHED & SEAL** technology, a weather proof system which provides the ultimate protection against roof leaks. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With **FLASH**KIT pro, you have everything you need for a quick, professional installation.

TRUSTED WATER SEAL FLASHINGS
FEATURING SHED & SEAL TECHNOLOGY

YOUR COMPLETE SOLUTION
Flashings, lags, continuous slot L-Feet and hardware

CONVENIENT 10 PACKS
Packaged for speed and ease of handling

FLASHKIT PRO

INSTALLATION GUIDE

UNIRAC
FEATURING SHED & SEAL TECHNOLOGY

FLASHKIT PRO IS THE COMPLETE FLASHING AND ATTACHMENT SOLUTION FOR COMPOSITION ROOFS.

INSTALL **FLASH**KIT PRO FLASHING

INSTALL L-FOOT

ATTACH L-FOOT TO RAIL

PRE-INSTALL

- Locate roof rafters and snap chalk lines to mark the installation point for each roof attachment.
- Drill a 7/32" pilot hole at each roof attachment. Fill each pilot hole with sealant.

STEP 1 INSTALL **FLASH**KIT PRO FLASHING

- Add a U-shaped bead of roof sealant to the underside of the flashing with the open side of the U pointing down the roof slope. Slide the aluminum flashing underneath the row of shingles directly up slope from the pilot hole as shown. Align the indicator marks on the lower end of the flashing with the chalk lines on the roof to center the raised hole in the flashing over the pilot hole in the roof. When installed correctly, the flashing will extend under the two courses of shingles above the pilot hole.

STEP 2 INSTALL L-FOOT

- Fasten L-foot and Flashing into place by passing the included lag bolt and pre-installed stainless steel-backed EPDM washer through the L-foot EPDM grommet, and the raised hole in the flashing, into the pilot hole in the roof rafter.
- Drive the lag bolt down until the L-foot is held firmly in place. It is normal for the EPDM on the underside of the stainless steel backed EPDM washer to compress and expand beyond the outside edge of the steel washer when the proper torque is applied.

TIP:

- Use caution to avoid over-torqueing the lag bolt if using an impact driver.
- Repeat Steps 1 and 2 at each roof attachment point.

STEP 3 ATTACH L-FOOT TO RAIL

- Insert the included 3/8"-16 T-bolts into the lower slot on the Rail (sold separately), spacing the bolts to match the spacing between the roof attachments.
- Position the Rail against the L-Foot and insert the threaded end of the T-Bolt through the continuous slot in the L-Foot. Apply anti-seize to bolt threads to prevent galling of the T-bolt and included 3/8" serrated flange nut. Place the 3/8" flange nut on the T-bolt and finger tighten. Repeat STEP 3 until all L-Feet are secured to the Rail with a T-bolt. Adjust the level and height of the Rail and torque each bolt to 30ft-lbs.

THE COMPLETE ROOF ATTACHMENT SOLUTION
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FASTER INSTALLATION. 25-YEAR WARRANTY.
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

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