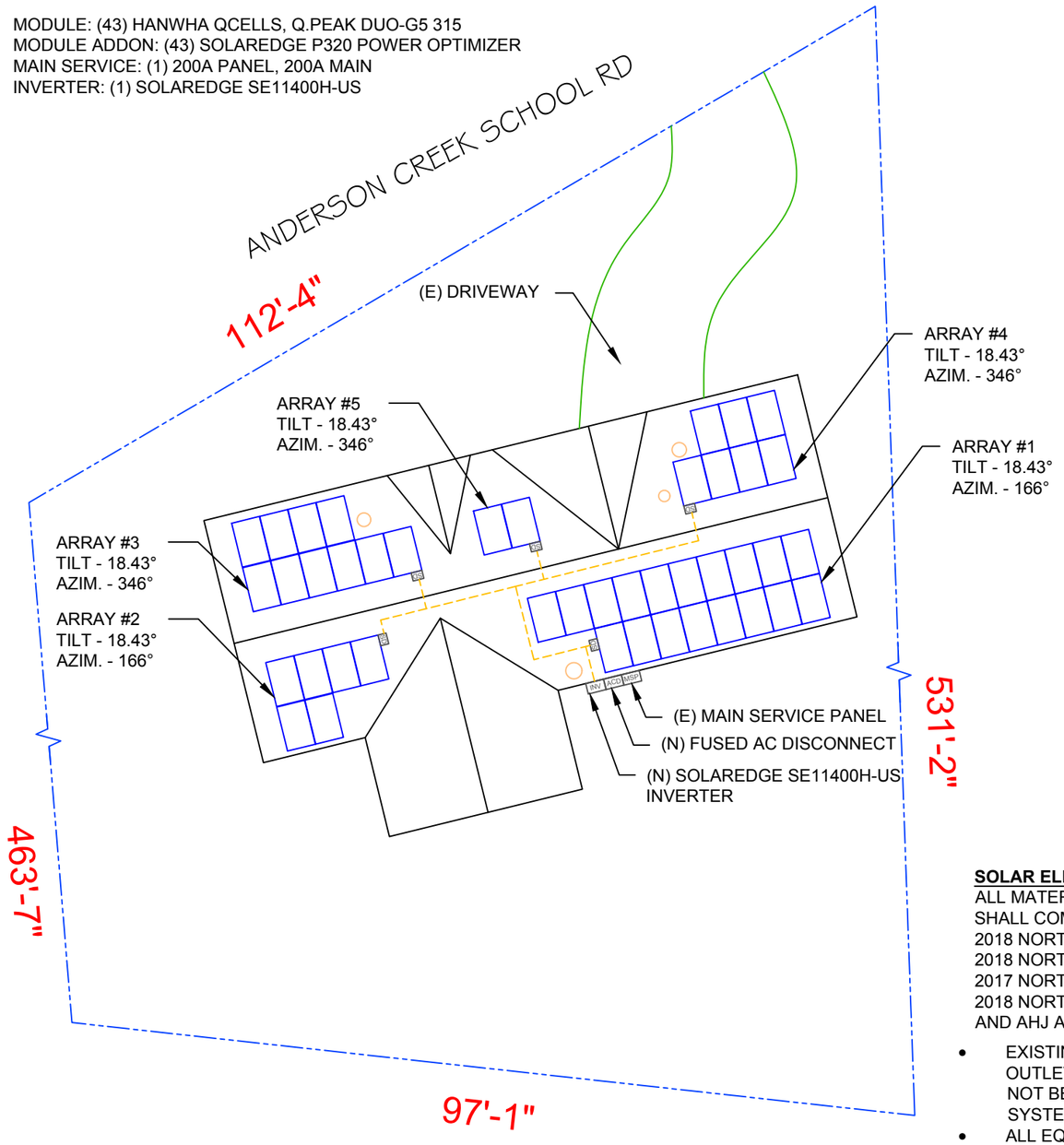
PROJECT DESCRIPTION:

ONE STORY
2 X 4 TRUSS @ 24" OC ONE LAYER METAL

MODULE: (43) HANWHA QCELLS, Q.PEAK DUO-G5 315
MODULE ADDON: (43) SOLAREDGE P320 POWER OPTIMIZER
MAIN SERVICE: (1) 200A PANEL, 200A MAIN
INVERTER: (1) SOLAREDGE SE11400H-US

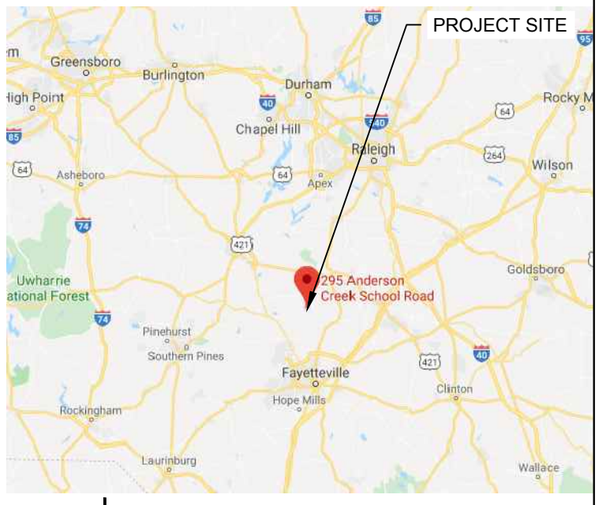


1 PLOT PLAN WITH ROOF PLAN
PV-1 SCALE: 1/16" = 1'-0"

SOLAR ELECTRIC SYSTEM NOTES:
ALL MATERIALS, EQUIPMENT, INSTALLATION AND WORK SHALL COMPLY WITH THE FOLLOWING APPLICABLE CODES:
2018 NORTH CAROLINA BUILDING CODE (2018 NCBC)
2018 NORTH CAROLINA RESIDENTIAL CODE (2018 NCRC)
2017 NORTH CAROLINA ELECTRICAL CODE (2017 NCEC)
2018 NORTH CAROLINA FIRE CODE (2018 NCFC)
AND AHJ AMENDMENTS

- EXISTING PLUMBING VENTS, SKYLIGHTS, EXHAUST OUTLETS, VENTILATION'S INTAKE AIR OPENINGS SHALL NOT BE COVERED BY THE SOLAR PHOTOVOLTAIC SYSTEM.
- 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)]
- ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED, INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- PAINT PV CONDUIT TO MATCH THE DWELLING EXTERIOR.
- CONTACT THE SERVICING UTILITY BEFORE POWERING ON THE PHOTOVOLTAIC SYSTEM

2 HOUSE PHOTO
PV-1 SCALE: NTS



3 VICINITY MAP
PV-1 SCALE: NTS

SHEET INDEX

PV-1	PLOT PLAN & VICINITY MAP
PV-2	ROOF PLAN & MODULES
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	SIGNAGE
PV-6 to 11	EQUIPMENT SPECIFICATIONS

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 10/23/2019

PROJECT NAME & ADDRESS

GEORGE T UNDERHILL II RESIDENCE
295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

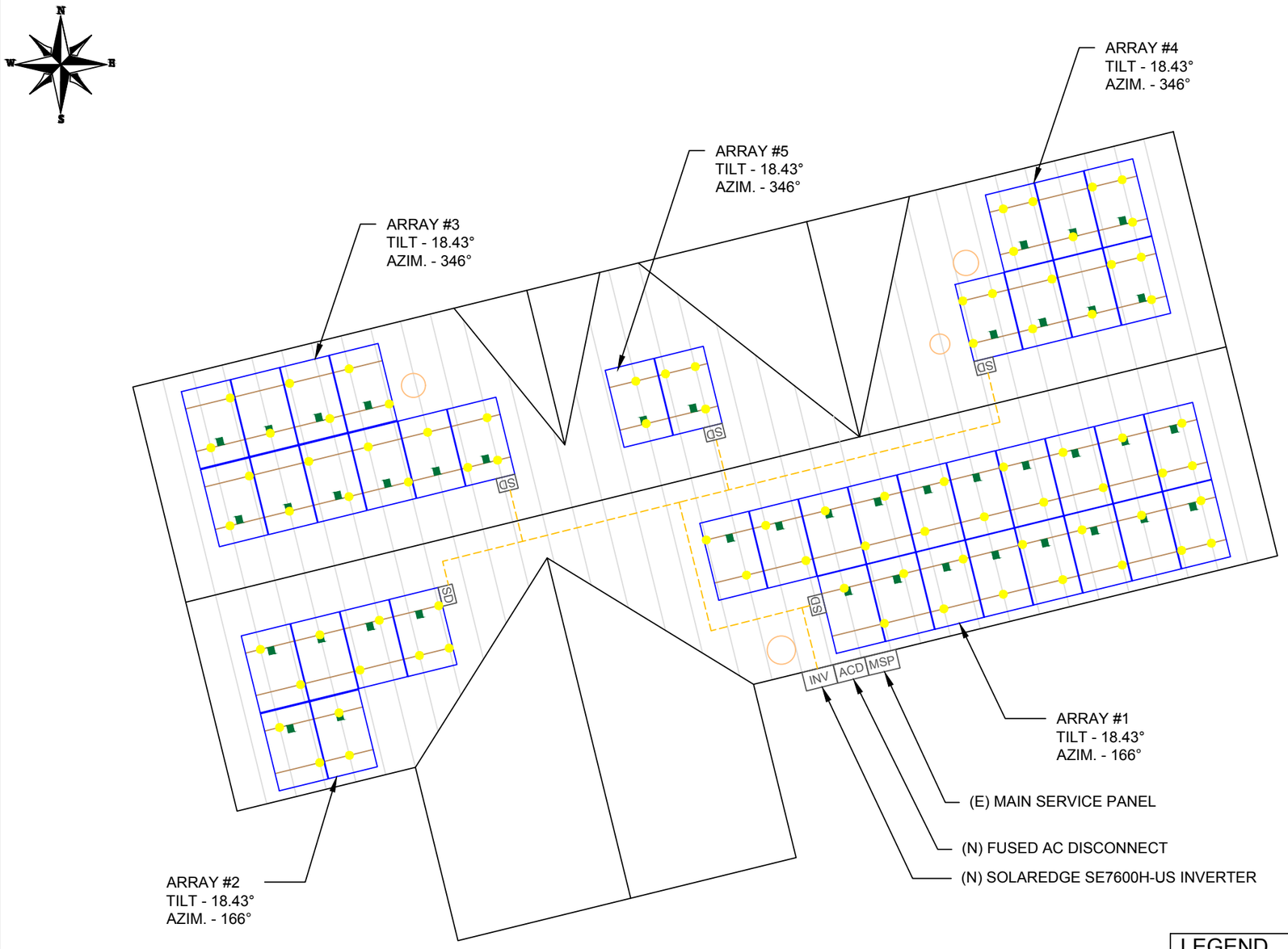
SHEET NAME
PLOT PLAN & VICINITY MAP

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

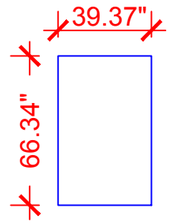
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 43 MODULES
MODULE TYPE = HANWHA QCELLS, Q.PEAK DUO-G5 315
MODULE WEIGHT = 41.23 LBS / 18.7 KG.
MODULE DIMENSIONS = 66.34"x 39.37" = 18.14 SF
UNIT WEIGHT OF ARRAY = 2.27 PSF



ROOF DESCRIPTION				
ROOF TYPE			CORRUGATED METAL	
ROOF	ROOF TILT	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1, 2	18.43°	166°	2X4	24"
#3, 4	18.43°	346°	2X4	24"
#5	18.43°	346°	2X4	24"

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	18	326.58	856.50	38
#2	6	108.84	856.50	13
#3	10	181.40	523.79	35
#4	7	126.98	308.96	41
#5	2	36.28	523.79	7



HANWHA QCELLS
MODULES

LEGEND

- SD - SOLADECK
- INV - INVERTER
- ACD - AC DISCONNECT
- MSP - MAIN SERVICE PANEL
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- RAFTERS
- CONDUIT

1 ROOF PLAN & MODULES
PV-2 SCALE: 1/8"=1'-0"

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REVISIONS

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PROJECT NAME & ADDRESS

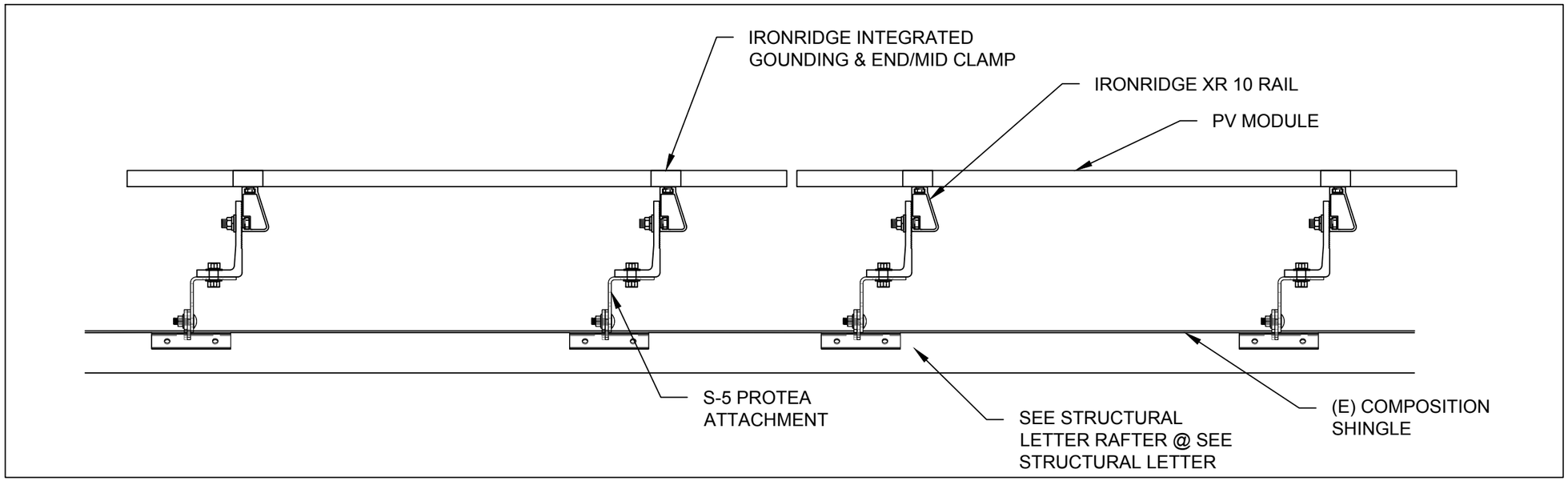
GEORGE T UNDERHILL II
RESIDENCE
295 ANDERSON CREEK SCHOOL
RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

SHEET NAME
ROOF PLAN & MODULES

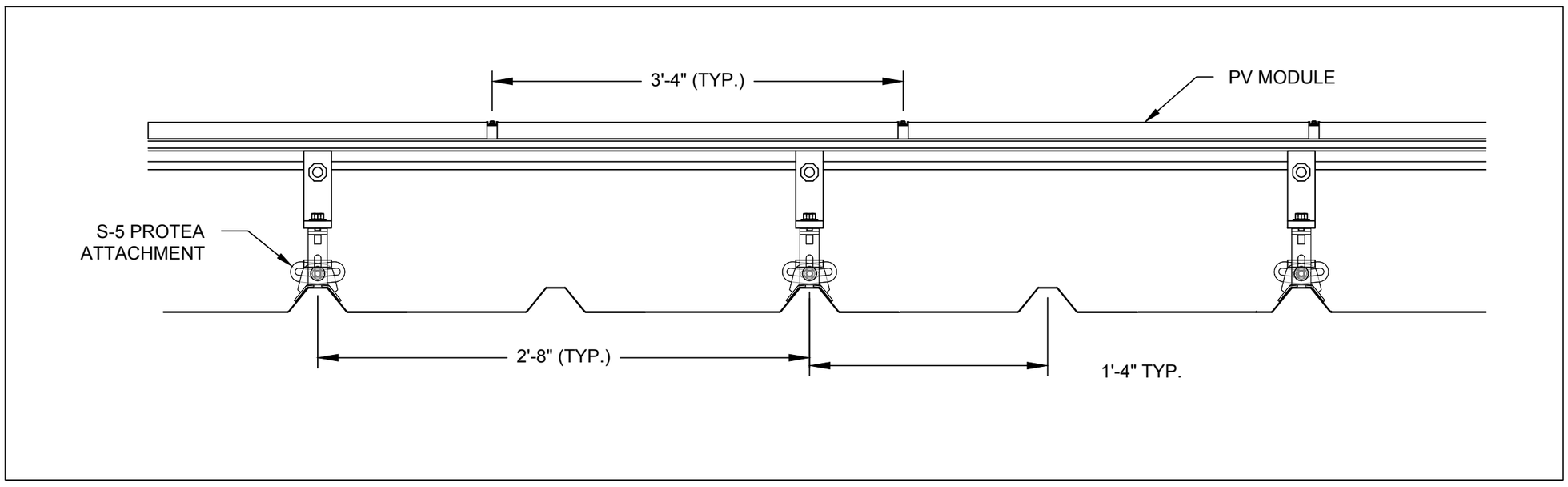
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2



1 STRUCTURAL ATTACMENT (SIDE VIEW)

PV-3 SCALE: 1" = 1'-0"



2 ATTACHMENT DETAIL (enlarged view)

PV-3 SCALE: 1" = 1'-0"

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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 10/23/2019

PROJECT NAME & ADDRESS

GEORGE T UNDERHILL II RESIDENCE
295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

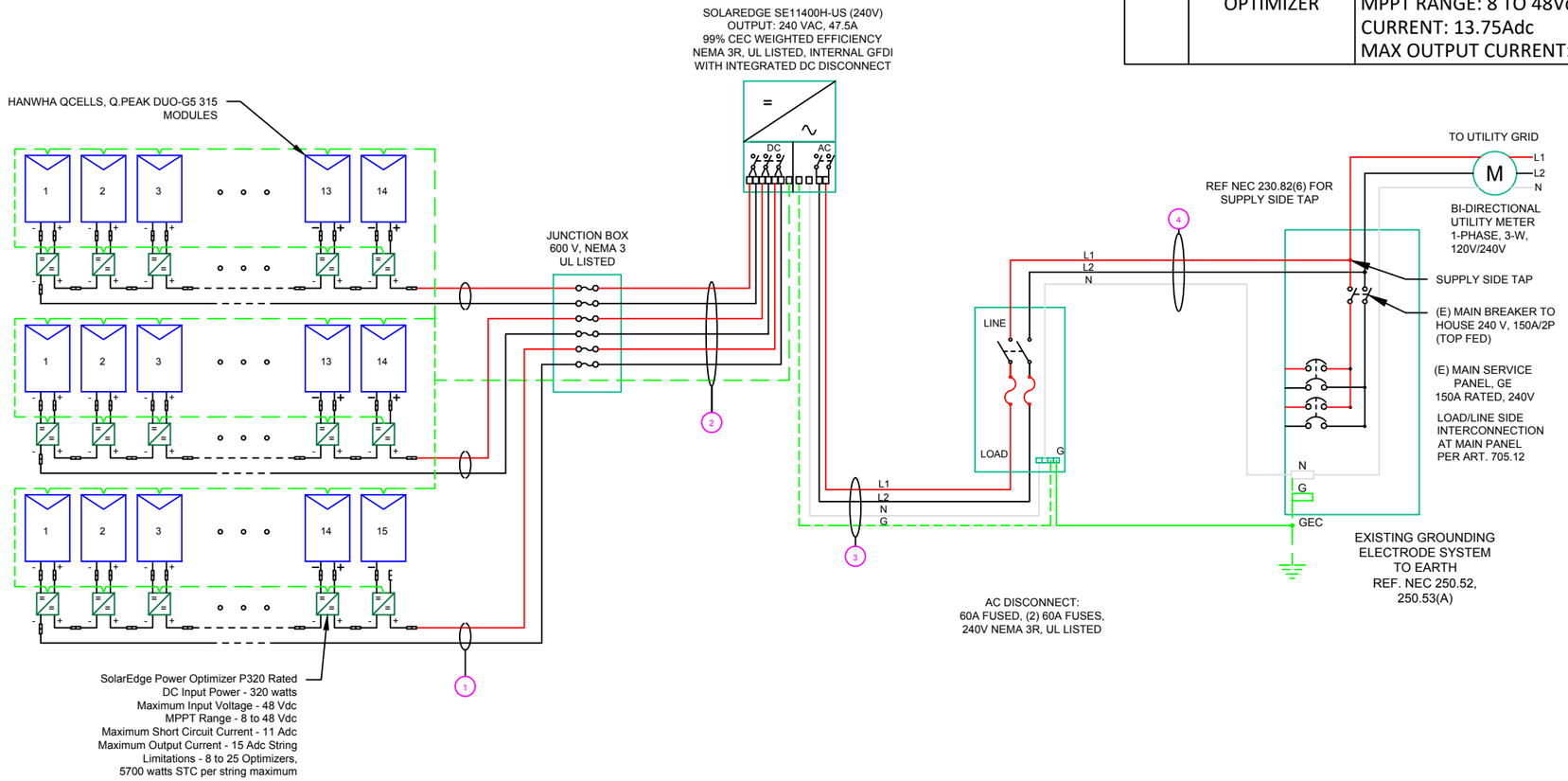
SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

WIRE CHART							
#	MAX AMPS NEC MULT = DESIGN AMPS	BREAKER SIZE (A)	WIRE TYPE	EGC	WIRE RATING X TEMP DERATE X CONDUCTOR DERATE = DERATED WIRE	TERMINATION AMPS @ 60˚C	CONDUIT SIZE
1	12 x 1.25 = 15	15	(6) #10 PV WIRE	(1) #10 BARE SOLID COPPER EGC	40 X 0.65 X 0.8 = 20.8 >= 15	30 >=15	FREE AIR
2	12 x 1.25 = 15	15	(4) #10 THWN-2	(1) #10 THWN-2 EGC	40 X 0.65 X 0.8 = 20.8 >= 15	30 >=15	0.75" EMT FILL:0.1477, 28%
3	29.2 x 1.25 = 36.5	40	(3) #8 THWN-2	(1) #10 THWN-2 EGC	55 X 0.87 X 1 = 47.85 >= 36.5	40 >=36.5	0.75" EMT FILL:0.1309, 25%
4	29.2 x 1.25 = 36.5	40	(3) #6 THWN-2	(1) #10 THWN-2 EGC	75 X 0.87 X 1 = 65.25 >= 36.5	55 >=36.5	0.75" EMT FILL:0.1732, 32%

ELECTRICAL EQUIPMENT LIST			
#	ITEM	DESCRIPTION	QTY
1	PV MODULE	Hanwha Q.Peak Duo G5-315 (315W) Voc =46.9V, Vmp = 37.8V Isc = 9.14A, Imp = 8.74A	43
2	INVERTER	SOLAREDGE SE11400H-US 99% CEC EFFICIENCY NOMINAL OUTPUT VOLTAGE 240Vac MAX OUTPUT CURRENT 48.5Aac MAX INPUT CURRENT 30.5Aac	1
3	JUNCTION BOX	6"x6"x4" UL LISTED, STEEL WATER TIGHT NEMA TYPE 3	5
4	AC DISCONNECT	EATON 60A, 2P BLADE TYPE 240V WITH 40A FUSE	1
5	MAIN SERVICE PANEL	(E) MAIN SERVICE PANEL & METER: 200A MAIN BUSBAR W/(E) 200A MAIN BREAKER	1
6	PV METER	PV UTILITY METER KWH METER FORM 2S 100A/240V MILBANK CAT#U5929-XL OR EQUIV	1
7	POWER OPTIMIZER	SolarEdge,P320 POWER OPTIMIZER INPUT POWER: 320WATTS MAX INPUT VOLTAGE: 48Vdc MPPT RANGE: 8 TO 48Vdc MAX INPUT CURRENT: 13.75Adc MAX OUTPUT CURRENT: 13.75Adc STRING	43



1 ELECTRICAL LINE DIAGRAM

PV-4 SCALE: NTS

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REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 10/23/2019

PROJECT NAME & ADDRESS

GEORGE T UNDERHILL II RESIDENCE

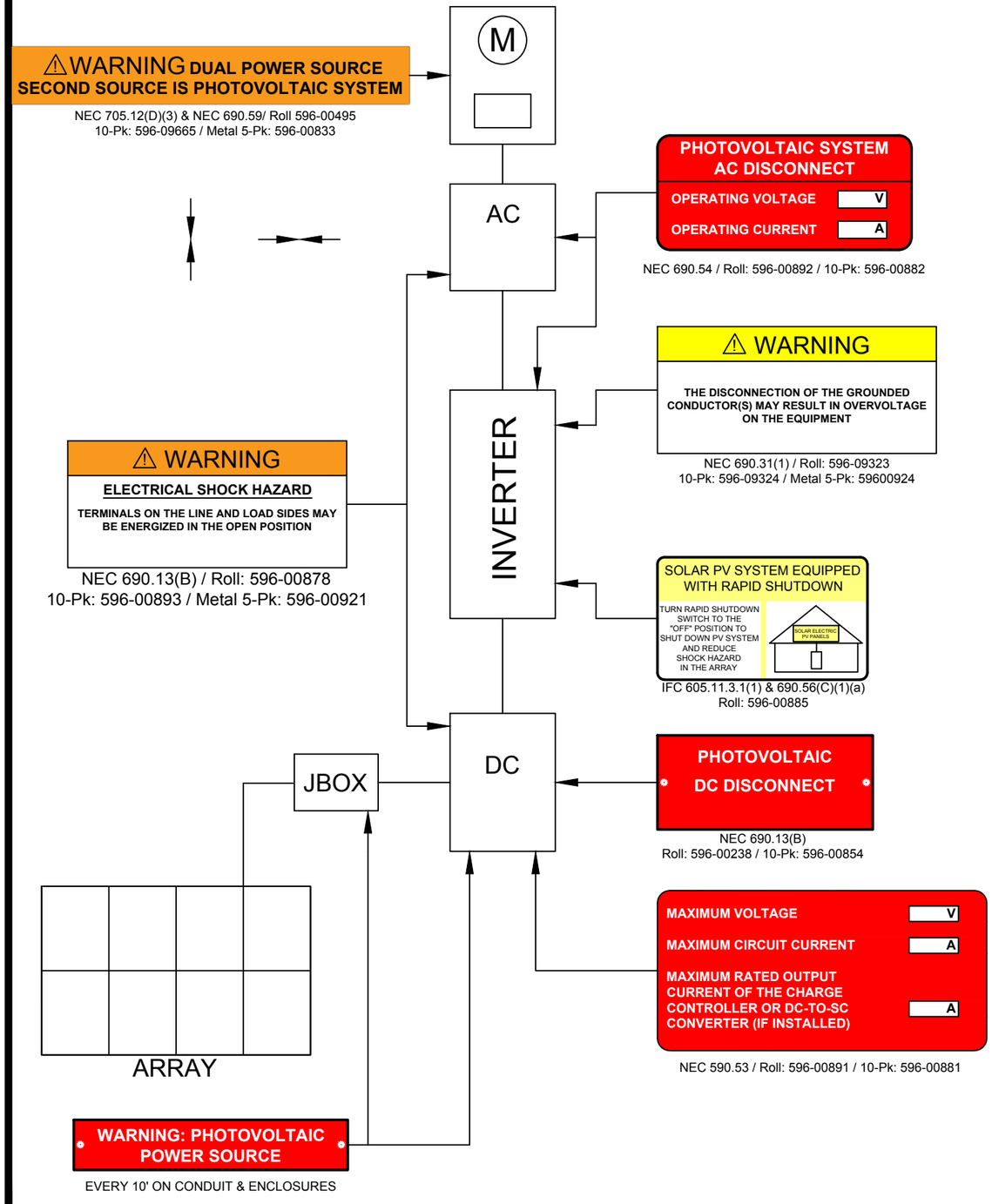
295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

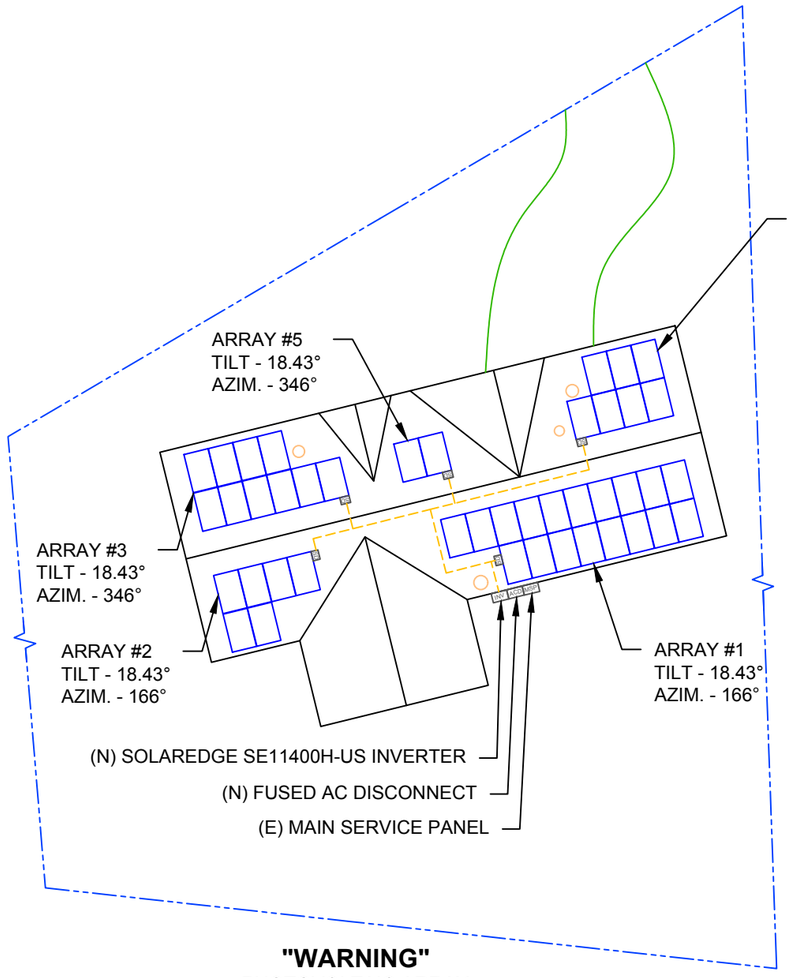
SHEET NUMBER
PV-4



NOTES
1. CEC ARTICLES 690 AND 705 AND CRC SECTION R324 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 COLOUR WITH WHITE TEXT AND LINE WORK
   C. ARIAL FONT
3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATION SPECIFIED
4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT USING POP-RIVETS OR SCREW
5. PLACARD ONLY REQUIRED WHEN PV UTILITY DISCONNECT & METER ARE NOT CO-RELATED WITH SES

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

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REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 10/23/2019

PROJECT NAME & ADDRESS

GEORGE T UNDERHILL II RESIDENCE
295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

SHEET NAME
SIGNAGE

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

Q.PEAK DUO-G5 315-330

Q.ANTUM SOLAR MODULE

The new Q.PEAK DUO-G5 solar module from Q CELLS impresses thanks to innovative Q.ANTUM DUO Technology, which enables particularly high performance on a small surface. Q.ANTUM's world-record-holding cell concept has now been combined with state-of-the-art circuitry half cells and a six-busbar design, thus achieving outstanding performance under real conditions – both with low-intensity solar radiation as well as on hot, clear summer days.

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

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

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

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

A RELIABLE INVESTMENT
Inclusive 12-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.

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2017

Q CELLS YIELD SECURITY

VDE Quality Tested www.VDE.info.com ID. 40032587

pv magazine award 2017 Top Innovation

[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

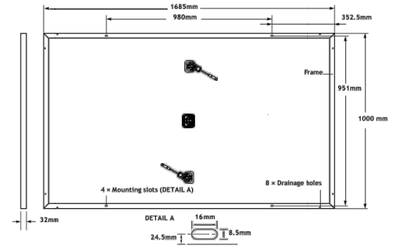
Rooftop arrays on commercial / industrial buildings

Engineered in **Germany**

Q CELLS

MECHANICAL SPECIFICATION

Format	1685 mm × 1000 mm × 32 mm (including frame)
Weight	18.7 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	70-85 mm × 50-70 mm × 13-21 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) 1100 mm, (–) 1100 mm
Connector	Multi-Contact, MC4, IP65 and IP68

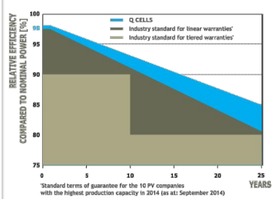


ELECTRICAL CHARACTERISTICS

POWER CLASS				315	320	325	330
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W)							
Minimum	Power at MPP[2]	P_{MPP}	[W]	315	320	325	330
	Short Circuit Current*	I_{SC}	[A]	10.04	10.09	10.14	10.20
	Open Circuit Voltage*	V_{OC}	[V]	39.87	40.13	40.40	40.66
	Current at MPP*	I_{MPP}	[A]	9.55	9.60	9.66	9.71
	Voltage at MPP*	V_{MPP}	[V]	32.98	33.32	33.65	33.98
	Efficiency[2]	η	[%]	≥ 18.7	≥ 19.0	≥ 19.3	≥ 19.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NOC[3]							
Minimum	Power at MPP[2]	P_{MPP}	[W]	233.4	237.2	240.9	244.6
	Short Circuit Current*	I_{SC}	[A]	8.09	8.14	8.18	8.22
	Open Circuit Voltage*	V_{OC}	[V]	37.30	37.54	37.79	38.04
	Current at MPP*	I_{MPP}	[A]	7.51	7.56	7.60	7.64
	Voltage at MPP*	V_{MPP}	[V]	31.07	31.39	31.70	32.01

[1] 1000 W/m², 25 °C, spectrum AM 1.5G [2] Measurement tolerances STC ±3%; NOC ±5% [3] 800 W/m², NOCT, spectrum AM 1.5G * typical values, actual values may differ

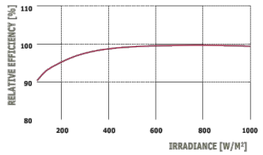
Q CELLS PERFORMANCE WARRANTY



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

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

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]	–0.28
Temperature Coefficient of P_{MPP}	γ	[%/K]	–0.37	Normal Operating Cell Temperature	NOCT	[°C]	45

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1000	Safety Class		II
Maximum Reverse Current	I_R	[A]	20	Fire Rating		C
Push / Pull Load (Test-load in accordance with IEC 61215)		[Pa]	5400 / 4000	Permitted Module Temperature On Continuous Duty		-40 °C up to +85 °C

VDE Quality Tested, IEC 61215 (Ed. 2); IEC 61730 (Ed. 1), Application class A
This data sheet complies with DIN EN 50380.

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 GmbH
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

Engineered in **Germany**

Q CELLS

LuminaSun

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 10/23/2019

PROJECT NAME & ADDRESS

GEORGE T UNDERHILL II RESIDENCE
295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

Single Phase Inverter with HD-Wave Technology

for North America

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

INVERTERS

12-25 YEAR WARRANTY

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
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Data, ANSI C12.20	Optional[3]							
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi station for local connection							
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	3/4" minimum / 14-6 AWG					3/4" minimum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	3/4" minimum / 1-2 strings / 14-6 AWG					3/4" minimum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9	38.8 / 17.6		lb / kg
Noise	< 25					<50		dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

LuminaSun

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 10/23/2019

PROJECT NAME & ADDRESS

GEORGE T UNDERHILL II RESIDENCE
295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

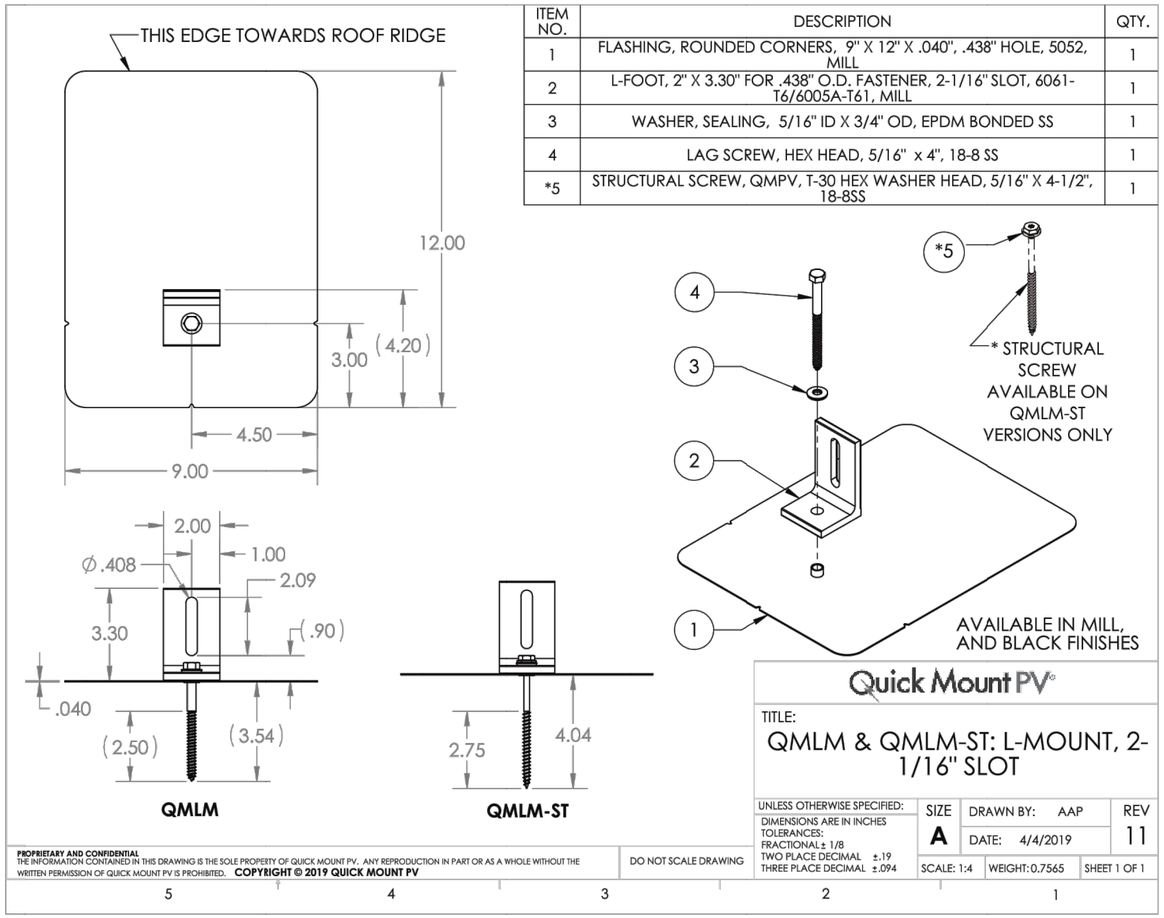
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

L-Mount | QMLM / QMLM-ST

Elevated Water Seal Technology®



ITEM NO.	DESCRIPTION	QTY.
1	FLASHING, ROUNDED CORNERS, 9" X 12" X .040", .438" HOLE, 5052, MILL	1
2	L-FOOT, 2" X 3.30" FOR .438" O.D. FASTENER, 2-1/16" SLOT, 6061-T6/6005A-T61, MILL	1
3	WASHER, SEALING, 5/16" ID X 3/4" OD, EPDM BONDED SS	1
4	LAG SCREW, HEX HEAD, 5/16" x 4", 18-8 SS	1
*5	STRUCTURAL SCREW, QMPV, T-30 HEX WASHER HEAD, 5/16" X 4-1/2", 18-8SS	1

AVAILABLE IN MILL, AND BLACK FINISHES

Quick Mount PV

TITLE:
QMLM & QMLM-ST: L-MOUNT, 2-1/16" SLOT

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: AAP	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ±.19 THREE PLACE DECIMAL ±.094	A	DATE: 4/4/2019	11
	SCALE: 1:4	WEIGHT: 0.7565	SHEET 1 OF 1

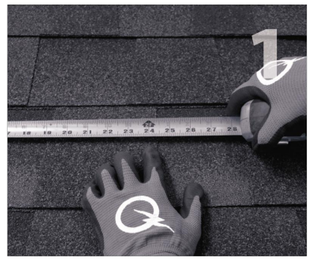
DO NOT SCALE DRAWING

5 4 3 2 1

L-Mount Installation Instructions

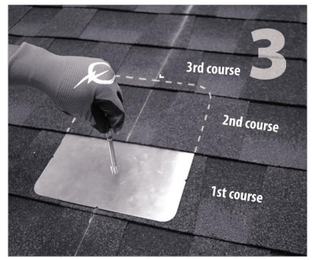
Installation Tools Required: tape measure, roofing bar, chalk line, stud finder, caulking gun, sealant compatible with roofing materials, drill with 7/32" or 1/8" bit, drill or impact gun with 1/2" socket.

WARNING: Quick Mount PV products are NOT designed for and should NOT be used to anchor fall protection equipment.



Locate, choose, and mark centers of rafters to be mounted. Select the courses of shingles where mounts will be placed.

Carefully lift composition roof shingle with roofing bar, just above placement of mount. Remove nails as required and backfill holes with aproved sealant. See "Proper Flashing Placement" on next page.

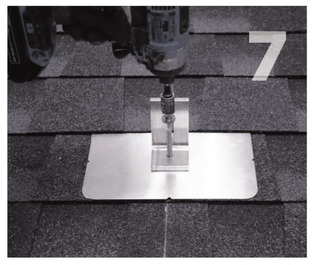


Insert flashing between 1st and 2nd course. Slide up so top edge of flashing is at least ¾" higher than the butt-edge of the 3rd course and lower flashing edge is above the butt-edge of 1st course. Mark center for drilling.

If attaching with lag bolt use a 7⁄32" bit (Lag). Use a ⅛" bit (ST) for attaching with the structural screw. Drill pilot hole into roof and rafter, taking care to drill square to the roof. Do not use mount as a drill guide. Drill a 2" deep hole into rafter.

Clean off any sawdust, and fill hole with sealant compatible with roofing materials.

Place L-foot onto elevated flute and rotate L-foot to desired orientation.



Prepare lag bolt or structural screw with sealing washer. Using a ½-inch socket on an impact gun, drive prepared lag bolt through L-foot until L-foot can no longer easily rotate. **DO NOT over-torque.** NOTE: Structural screw can be driven with T-30 hex head bit.

You are now ready for the rack of your choice. Follow all the directions of the rack manufacturer as well as the module manufacturer. NOTE: Make sure top of L-Foot makes solid contact with racking.

All roofing manufacturers' written instructions must also be followed by anyone modifying a roof system. Consult the roof manufacturer's specs and instructions prior to working on the roof.

BI 7.2.3-44

Apr-2019 Rev 6

Quick Mount PV®
RESPECT THE ROOF

LuminaSun

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 10/23/2019

PROJECT NAME & ADDRESS

GEORGE T UNDERHILL II RESIDENCE
295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

Tech Brief

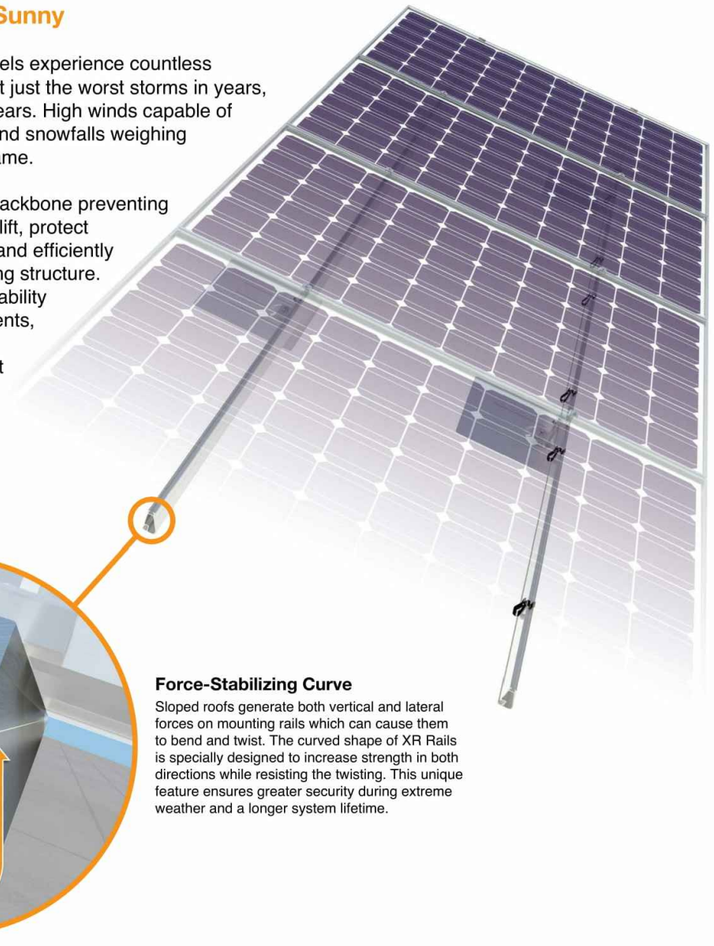
IRONRIDGE

XR Rail Family

Solar Is Not Always Sunny

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

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



Force-Stabilizing Curve

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

Compatible with Flat & Pitched Roofs

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

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

Corrosion-Resistant Materials

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

Tech Brief

XR Rail Family

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

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

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

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

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

XR1000

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

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

Rail Selection

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

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

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295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

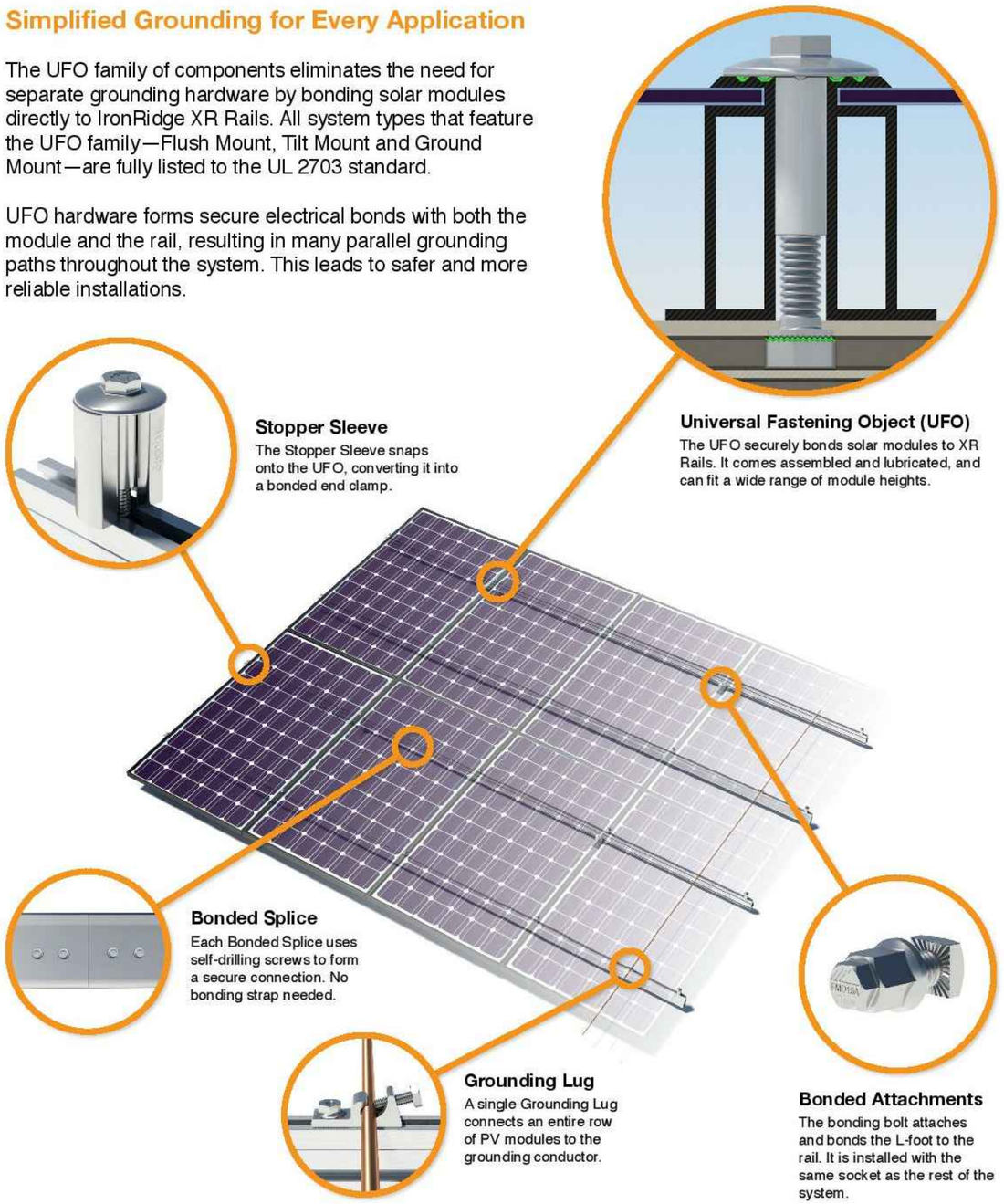
Tech Brief

UFO Family of Components

Simplified Grounding for Every Application

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

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



Stopper Sleeve
The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.

Universal Fastening Object (UFO)
The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.

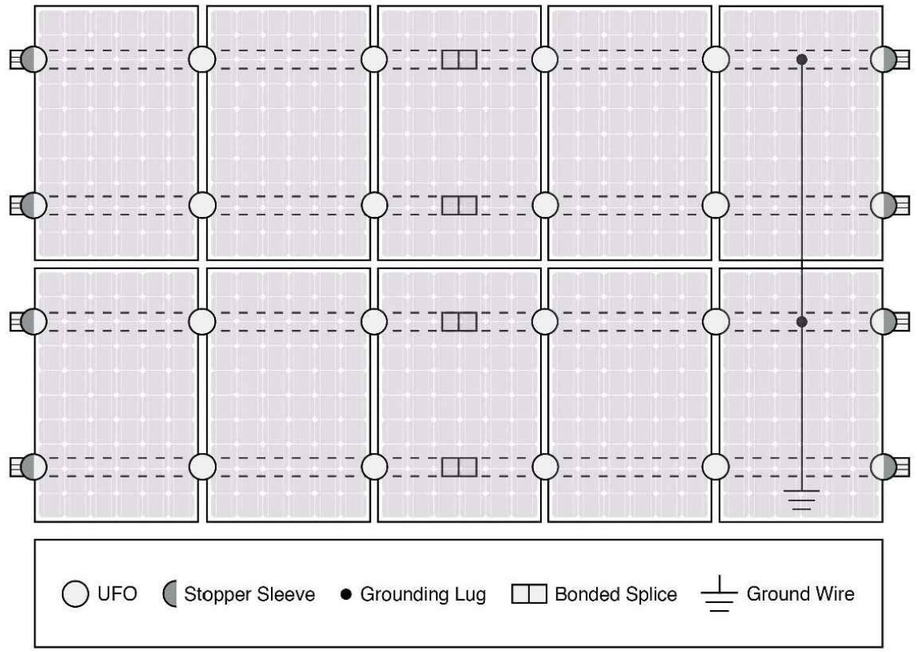
Bonded Splice
Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.

Grounding Lug
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.

Bonded Attachments
The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

Tech Brief

System Diagram



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

UL Certification

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

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

Go to IronRidge.com/UFO

Cross-System Compatibility

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

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295 ANDERSON CREEK SCHOOL RD BUNNLEVEL, NC 28323

DC SIZE:13.545kW
AC SIZE: 11.40kW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

solaredge

Power Optimizer

P320 / P370 / P400 / P405 / P505

POWER OPTIMIZER

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
- Compliant with arc fault protection and rapid shutdown NEC requirements (when installed as part of the SolarEdge system)
- Module-level voltage shutdown for installer and firefighter safety

www.solaredge.us

solaredge

Power Optimizer

P320 / P370 / P400 / P405 / P505

OPTIMIZER MODEL (typical module compatibility)	P320 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	P505 (for higher current modules)	
INPUT						
Rated Input DC Power[1]	320	370	400	405	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48	60	80	125	83	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		12.63		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					
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)	128 x 152 x 28 / 5 x 5.97 x 1.1		128 x 152 x 36 / 5 x 5.97 x 1.42	128 x 152 x 50 / 5 x 5.97 x 1.96	128 x 152 x 59 / 5 x 5.97 x 2.32	mm / in
Weight (including cables)	630 / 1.4		750 / 1.7	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4[2]					
Output Wire Type / Connector	Double Insulated; MC4					
Output Wire Length	0.95 / 3.0	1.2 / 3.9				m / ft
Operating Temperature Range	-40 - +85 / -40 - +185					°C / °F
Protection Rating	IP68 / NEMA6P					
Relative Humidity	0 - 100					%

[1] Rated STC power of the module. Module of up to +5% power tolerance allowed.
[2] For other connector types please contact SolarEdge

PV SYSTEM DESIGN USING A SOLAREDGE INVERTER[3][4]		SINGLE PHASE HD-WAVE	SINGLE PHASE	THREE PHASE 208V	THREE PHASE 480V	
Minimum String Length (Power Optimizers)	P320, P370, P400	8		10	18	
	P405 / P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50[5]	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000	12750	W
Parallel Strings of Different Lengths or Orientations		Yes				

[3] For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf.
[4] It is not allowed to mix P405/P505 with P320/P370/P400/P600/P700/P800 in one string.
[5] A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement

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