Project Description

1) Modules: (32) LG LG340S2W-G4, 340W modules
2) Inverter: (1) SolarEdge SE10000A-US
3) Optimizers: (32) Solar Edge P400 optimizers
4) System size: 10,880 STC W
5) Metal frame building made by Empire steel with a raised seam corrugated metal roof utilizing IronRidge roof clamp mounting @ 18° pitch
6) 1-story building
7) 2"× 10" @ 24" OC rafters plus plywood sheathing over
8) Standoff: S-5-E Clamp mount
9) Monitoring system with SolarEdge monitoring device
10) Standard components include: racking and mounting components, wiring, conduit, and over-current protection, roofing sealant or flashing, as needed
11) No battery back-up systems
12) Main electrical panel, inverter and controller panels will be labeled with warning labels (See page #3)
13) This drawing is diagrammatic in some respect. Field verify exact conditions prior to beginning work
14) These plans (this installation) will require full compliance with the CAL FIRE Solar Photovoltaic Installation Guideline
15) Panel layout subject to changes based on field conditions
16) All outdoor wiring will be weather rated.
17) All Metal parts of module frames, equipment and conductor enclosures will be grounded
18) System and Racking Built to 2016 CBC/CRC/CEC
19) Solar photovoltaic system to be installed on residential structure
20) Design complying with the latest edition of California Electrical Code and all local news letters, ordinances and policies

APPLICABLE CODES

- 2016 California Buliding Code
- 2016 California Residential Code
- 2016 California Electrical Code
- 2016 California Fire Code
- 2016 California Mechanical Code
- 2016 California Plumbing Code
- 2016 Title 24 Energy Code

ATTACHED SUPPORT DOCUMENTS

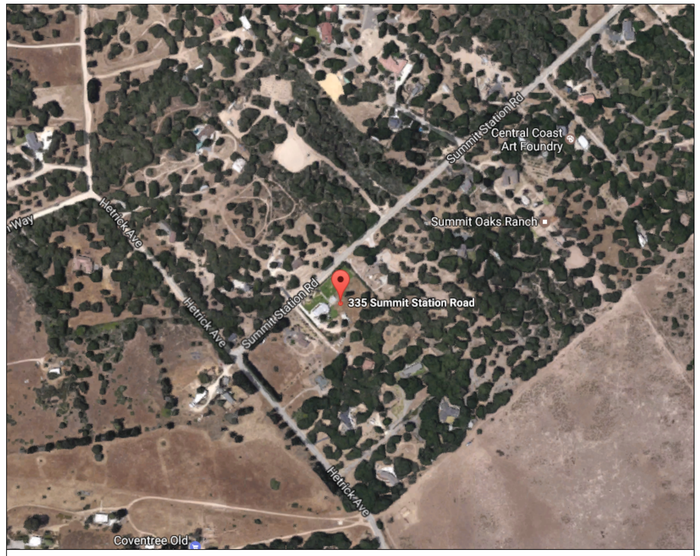
1. PV module specifications
2. Inverter specifications
3. Standoff specifications
4. Rail specifications
5. Bonding specifications

GENERAL SYSTEM INFO
Residential, Roof Mounted
Grid-tied, SolarEdge System
10.880 kW DC STC Size

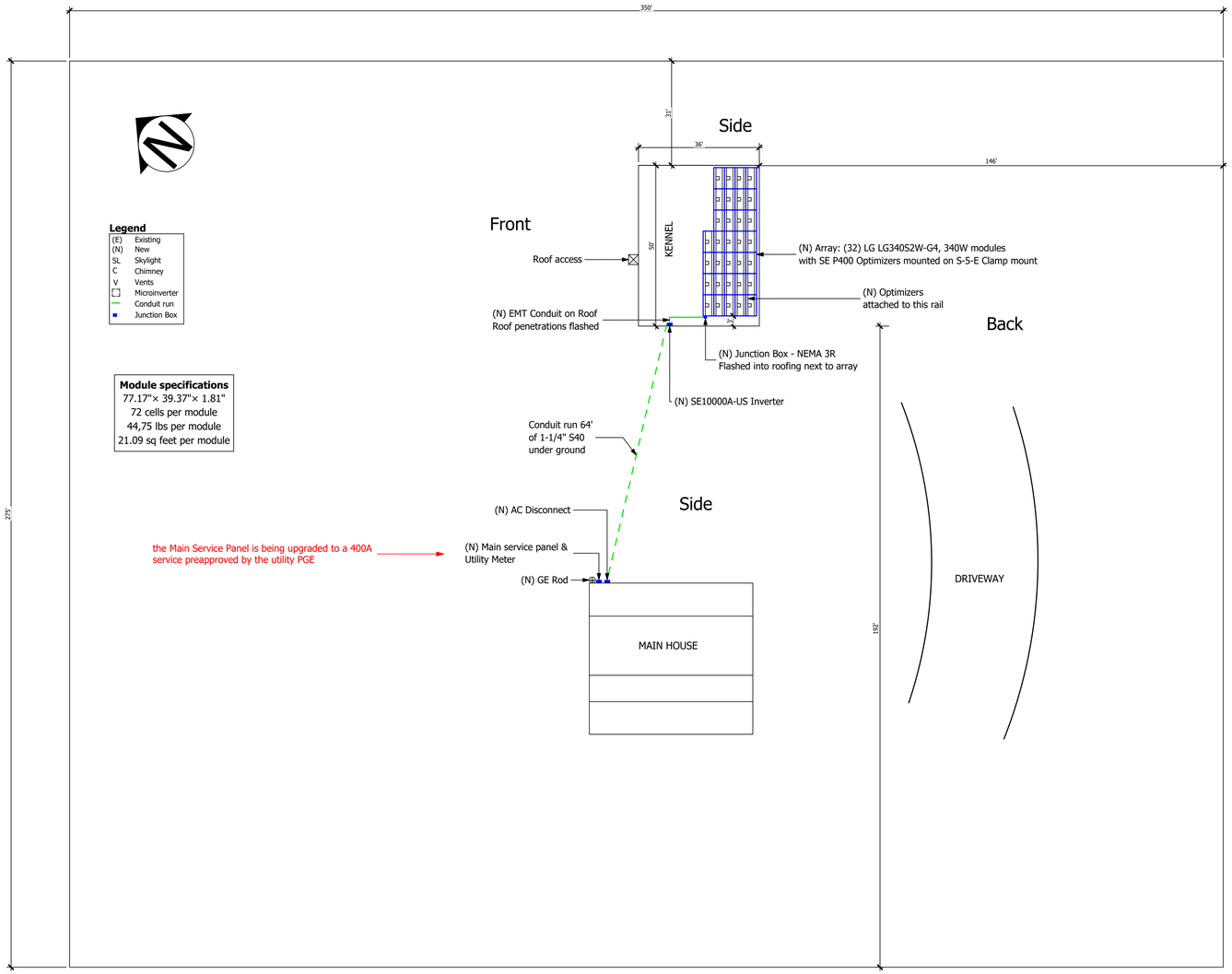
NOTES

Contractor or Homeowner will obtain "Permission to Operate" from utility prior to permanent activation of PV system

Smoke and carbon-monoxide alarms are required in house to meet R314.1 & R315.1 of the CRC



VICINITY MAP



Legend

(E)	Existing
(N)	New
SL	Skylight
C	Chimney
V	Vents
	Microinverter
	Conduit run
	Junction Box

Module specifications
77.17"× 39.37"× 1.81"
72 cells per module
44,75 lbs per module
21.09 sq feet per module

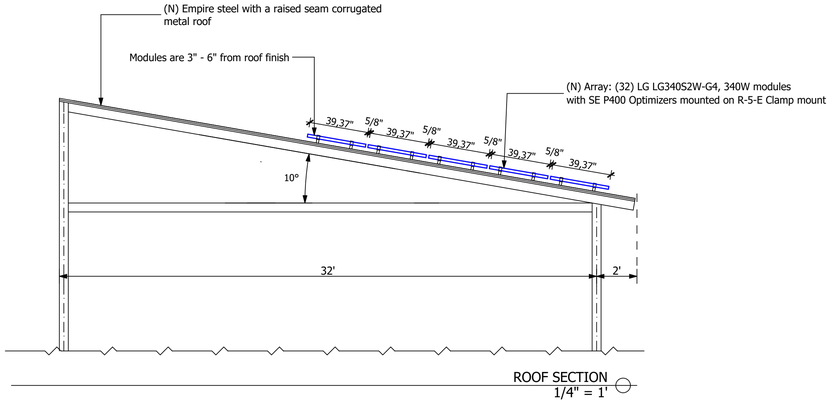
Prepared by:

PACIFICBEACH TOWER INC
CA state B, C10, C7 #831865 WC policy #57WECEQ6194
461 Orcas St. Morro Bay CA 93442

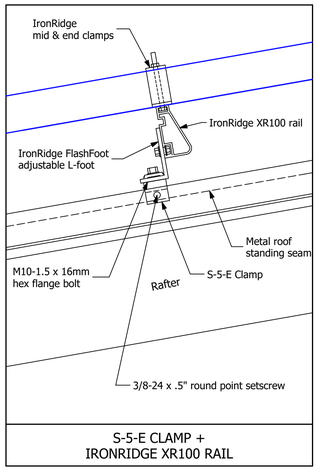
DRAWN	July/17/2017	**SITE PLAN**
		RANCHO SANDBERG 335 Summit Station Road, Arroyo Grande, CA 93420 Phone 805-896-0339
		SCALE 1"=20' — SHEET E1 OF E5

(E) Existing
(N) New

Module specifications
78.15"× 38.98"× 1.81"
72 cells per module
57,3 lbs per module
21.15 sq feet per module

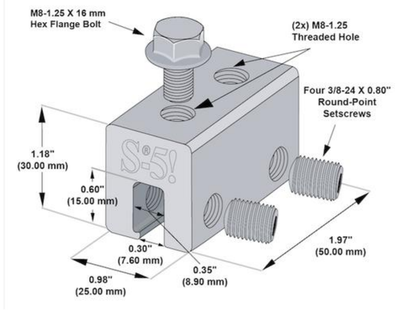


ROOF SECTION
1/4" = 1'



S-5-E CLAMP +
IRONRIDGE XR100 RAIL

IRONRIDGE ADJUSTABLE L FEET



S-5-E CLAMP

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 falls 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.

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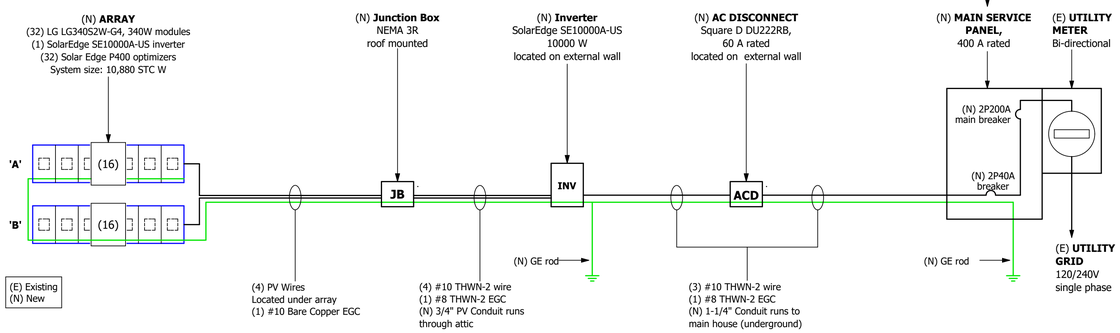
461 Orcas St. Morro Bay CA 93442

DRAWN	July/17/2017	**STRUCTURAL**
		RANCHO SANDBERG 335 Summit Station Road, Arroyo Grande, CA 93420 Phone 805-896-0339
		SCALE 1/4"=1' — SHEET E2 OF E5

SINGLE LINE DIAGRAM

Currently 200A upgrading to 400A. PGE has approved the upgrade

the Main Service Panel is being upgraded to a 400A service preapproved by the utility PGE



SPECS & AMPERAGE CALCULATIONS for LG LG340S2W-G4, 340W modules

Panels (DC)

Pmax:	340W
Imp:	9.02A
Vmp:	37.7V
Voc:	46.4A
Isc:	9.54

Single Line NOTES

1. The Inverter grounding electrode conductor is connected directly to the building grounding electrode or irreversibly connected to the building GEC or run to the grounding busbar in the associated AC equipment.
2. All wire sizes are as indicated or larger.
3. Wire sizes meet the criteria of 125% continuous use factor.
4. All equipment is bonded by mechanical means or by a grounding conductor.
5. The system is grounded at the neutral buss in the main electrical panel.
7. Rapid Shutdown Kits on all Solaredge inverters.

the Main Service Panel is being upgraded to a 400A service preapproved by the utility PGE

705.12(D)(2) - INTERCONNECTION CALCULATION

400A (Busbar) x **1.20** [(705.12(D)(2)] - **400A** (Main OCPD) = **80A** (Available)

30.5 (Inverter) x **1.25** (OCP) = **38.125A** (System Output)

38.125A (40A OCPD) < **80A** (Available) **CEC 220.5(B)**

System Specifications
SolarEdge SE 10000A-US

AC Output

Vop:	240 V
Iop:	30.50 A 38.125 A@125%
Watts:	10000 W

LABELS - Per NEC the following signs at a minimum should be installed

NEC 690.35(F)
THE PHOTOVOLTAIC POWER SOURCE SHALL BE LABELED WITH THE FOLLOWING WARNING AT EACH JUNCTION BOX, COMBINER BOX, DISCONNECT, AND DEVICE WHERE ENERGIZED, UNGROUNDED CIRCUITS MAY BE EXPOSED DURING SERVICE:

WARNING
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

NEC 690.17
PLACE THIS LABEL ON ALL DISCONNECTING MEANS WHERE ENERGIZED IN AN OPEN POSITION

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION

ELECTRICAL PANEL

CAUTION
DUAL POWER SUPPLY

CAUTION
SOLAR ELECTRIC SYSTEM CONNECTED

CAUTION
SOLAR PV SYSTEM INSTALLED. WHEN POWER DISCONNECTED, SOLAR PANELS AND WIRING MAY REMAIN ENERGIZED DURING DAYLIGHT HOURS.

INVERTER

PHOTOVOLTAIC INVERTER

NEC 690.53 & NEC 690.14(c)
PLACE THIS LABEL ON ALL PHOTOVOLTAIC DC DISCONNECTING MEANS (ON INVERTER IF INTEGRATED DC DISCONNECTS AND AT A SEPARATE DC DISCONNECT IF APPLICABLE)

PHOTOVOLTAIC SYSTEM DISCONNECT: Solar Edge SE10000A-US

RATED MAXIMUM POWER POINT CURRENT:	**30.50A**
RATED MAXIMUM POWER POINT VOLTAGE:	**350 Vdc**
MAXIMUM SYSTEM VOLTAGE:	**500 Vdc**
MAXIMUM CIRCUIT CURRENT:	**30A**

NEC 690.64(B)(7)
PLACE THIS LABEL AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT (I.E. MAIN PANEL (AND SUBPANEL IF APPLICABLE)) THIS LABEL IS ONLY NECESSARY WHEN BREAKERS FEEDING PANEL EXCEEDS 100% OF BUSS RATING

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

EXTERIOR / INTERIOR CONDUIT

CAUTION: SOLAR CIRCUIT

NEC 690.54
PLACE THIS LABEL AT "INTERACTIVE POINT OF INTERCONNECTION" (AT MAIN SERVICE PANEL AND SUBPANEL IF APPLICABLE)

INTERACTIVE PHOTOVOLTAIC POWER SOURCERATED AC OUTPUT CURRENT:	**30.5A**
NOMINAL OPERATING AC VOLTAGE:	**240V**

DC DISCONNECT(S)

PHOTOVOLTAIC DC DISCONNECT

NEC 690.56
PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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

LABEL NOTES

ALL LABELS AND AND MARKINGS SHALL BE ATTACHED ACCORDING TO REQUIREMENTS BY NEC AND THE LOCAL AHJ. THE AHJ MAY HAVE SPECIAL LABEL REQUIREMENTS BEYOND THE SCOPE OF THIS DOCUMENT. THIS MAY ENCOMPASS LANGUAGE INCLUDING, BUT NOT LIMITED TO, THAT FOUND IN CEC ARTICLES 690.5(C), 690.14(C)(2), 690.17, 690.53, 690.53(F), 690.54, 690.64(B)(7) AND 705.10.

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PACIFICBEACH TOWER INC
CA state B, C10, C7 #831865 WC policy #57WECEQ6194
461 Orcas St. Morro Bay CA 93442

DRAWN	July/17/2017	**SINGLE LINE DIAGRAM**
		RANCHO SANDBERG 335 Summit Station Road, Arroyo Grande, CA 93420 Phone 805-896-0339
		SCALE NA SHEET E3 OF E5

LG_LG340S2W-G4-72cell_340 1:1,395 LG_LG340S2W-G4-72cell_340 1:1,397 se-P5-series-add-on-power-optimizer-datasheet-na 1:1,361 se-P5-series-add-on-power-optimizer-datasheet-na 1:1,362

PV MODULE DATASHEET 1/2

LG
Life's Good

Innovation for a Better Life™

LG MonoX® 72cell LG340S2W-G4

72 cell

LG Mono X® Plus is LG Electronics' high-quality monocrystalline module. The quality is the result of our strong commitment to developing a module to improve benefits for customers. Features of Mono X® Plus include durability, convenient installation, and aesthetic exterior.

Intertek

Enhanced Performance Warranty

LG Mono X® 72cell comes with the enhanced performance limited warranty. The initial degradation has been improved from -3% to -2%, and the annual degradation has also changed from -0.7%/yr to -0.6%/yr.

Reduced LID (LLY Technology)

LG Mono X® 72cell has improved the initial degradation by applying LG's new LLY(LID-improvement for Lifetime Yield) Technology, which controls formation of Boron-Oxygen pair, the key factor of LID.

Improved Product Warranty

In addition to the enhanced performance limited warranty, LG has extended the limited product warranty of LG Mono X® 72cell for additional 2 years with its newly reinforced frame design.

Light and Convenient

LG Mono X® 72cell is carefully designed to benefit installers by allowing quick installation with a weight of just 44.75 lb. and better grips.

Convenient Installation

LG modules are carefully designed to benefit installers by allowing quick and easy installations throughout the carrying,grounding, and connecting stages of modules.

About LG Electronics

LG Electronics is a global player who has been committed to expanding its capacity, based on solar energy business as its future growth engine. We embarked on a solar energy source research program in 1985, supported by LG Group's rich experience in semi-conductor, LCD, chemistry, and materials industry. We successfully released the first Mono X® series to the market in 2010, which were exported to 32 countries in the following 2 years, thereafter. In 2013, NeON® (previously known as Mono X® NeON) & 2015 NeON2 with CELLO technology won "Intersolar Award", which proved LG is the leader of innovation in the industry.

PV MODULE DATASHEET 2/2

LG MonoX® 72cell LG340S2W-G4

Mechanical Properties

Cells	6 x 12
Cell Vendor	LG
Cell Type	Monocrystalline / P-type
Cell Dimensions	156.75 x 156.75 mm / 6 inches
# of Busbar	3
Dimensions (L x W x H)	1960 x 1000 x 46 mm 77.17 x 39.37 x 1.81 inch
Front Load	60 psf
Rear Load	60 psf
Weight	20.3 ± 0.5 kg / 44.75 ± 1.1 lbs
Connector Type	MC4
Junction Box	IP67 with 3 Bypass Diodes
Length of Cables	1200mm x 2 ea / 47.24 x 2 ea
Glass	High Transmission Tempered Glass
Frame	Anodized Aluminum

Certifications and Warranty

Certifications	UL 1703 ISO 9001 IEC 62716 (Ammonia Corrosion Test)* IEC 61701 (Salt Mist Corrosion Test)*
Module Fire Performance (USA)	Type 2 (UL1703)
Fire Rating (for CANADA)	Class C (ULC/ORD C1703)
Product Warranty	12 years
Output Warranty of Pmax	Linear warranty**

* In progress
** 1) 1st year : 98%, 2) after 2nd year : 0.6% annual degradation, 3)83.6% for 25 years

Temperature Characteristics

NOCT	46 ± 3 °C
Pmax	-0.42 %/°C
Voc	-0.30 %/°C
Isc	0.03 %/°C

Characteristic Curves

Electrical Properties (STC *)

Module Type	340 W
MPP Voltage (Vmpp)	37.7
MPP Current (Impp)	9.02
Open Circuit Voltage (Voc)	46.4
Short Circuit Current (Isc)	9.54
Module Efficiency (%)	17.4
Operating Temperature (°C)	-40 ~ +90
Maximum System Voltage (V)	1000
Maximum Series Fuse Rating (A)	20A
Power Tolerance (%)	0 ~ +3

* STC (Standard Test Condition): Irradiance 1000 W/m², module temperature 25 °C, AM 1.5
* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.

Electrical Properties (NOCT*)

Module Type	340 W
Maximum Power (Pmax)	251
MPP Voltage (Vmpp)	34.6
MPP Current (Impp)	7.26
Open Circuit Voltage (Voc)	43.3
Short Circuit Current (Isc)	7.68

* NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m², ambient temperature 20°C, wind speed 1 m/s

Dimensions (mm/in)

The distance between the center of the mounting/grounding holes.

LG
Life's Good

North America Solar Business Team
LG Electronics U.S.A. Inc.
1000 Sylvan Ave. Englewood Cliffs, NJ 07632

Contact: lg.solar@lge.com
www.lgsolarusa.com

Product specifications are subject to change without notice.
DS-N2-60-C-Ce-F-EN-50305

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01/01/16

Innovation for a Better Life

INVERTER DATASHEET 1/2

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POWER OPTIMIZER

SolarEdge Power Optimizer

Module Add-On For North America

P300 / P320 / P370 / P400 / P405

25 Year Warranty

PV power optimization at the module-level

- 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
- Module-level voltage shutdown for installer and firefighter safety

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INVERTER DATASHEET 2/2

solaredge

SolarEdge Power Optimizer

Module Add-On for North America

P300 / P320 / P370 / P400 / P405

	P300 (for 60-cell modules)	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)	
INPUT						
Rated Input DC Power(1)	300	320	370	400	405	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	Vdc
Maximum Short Circuit Current (Isc)	10	11		10.1		Adc
Maximum DC Input Current	12.5	13.75		12.63		Adc
Maximum Efficiency	99.5					%
Weighted Efficiency	98.8					%
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					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 27.5 / 5 x 5.97 x 1.08			128 x 152 x 35 / 5 x 5.97 x 1.37	128 x 152 x 50 / 5 x 5.97 x 1.96	mm / in
Weight (including cables)	630 / 1.4			750 / 1.7	845 / 1.9	gr / lb
Input Connector	MC4 Compatible		MC4 / Amphenol AH4	MC4 Compatible		
Output Wire Type / Connector	Double Insulated; MC4 Compatible		Double Insulated; MC4 / Amphenol AH4	Double Insulated; MC4 Compatible		
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.

PV SYSTEM DESIGN USING A SOLAREDGE INVERTER(2)(3)	SINGLE PHASE HD-WAVE		SINGLE PHASE	THREE PHASE 208V	THREE PHASE 480V	
Minimum String Length (Power Optimizers)	8			10	18	
Maximum String Length (Power Optimizers)	25			25	50	
Maximum Power per String	5700 (6000 with SE7600H-US)	5250		6000	12750	W
Parallel Strings of Different Lengths or Orientations	Yes					

(2) For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf.
(3) It is not allowed to mix P405 with P300/P370/P400/P600/P700 in one string.

CE

se-single-phase-us-inverter-datasheet 1:1,361 se-single-phase-us-inverter-datasheet 1:1,362 du222rb-42928 1:1,363

INVERTER DATASHEET 1/2

solaredge

INVERTERS

SolarEdge Single Phase Inverters

For North America

SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US / SE7600A-US / SE10000A-US / SE11400A-US

The best choice for SolarEdge enabled systems

- Specifically designed to work with power optimizers
- Integrated arc fault protection for NEC 2011 690.11 compliance
- Rapid shutdown for NEC 2014 690.12
- Superior efficiency (98%)
- Small, lightweight and easy to install on provided bracket
- Built-in module-level monitoring
- Internet connection through Ethernet or Wireless
- Outdoor and indoor installation
- Fixed voltage inverter, DC/AC conversion only
- Pre-assembled Safety Switch for faster installation
- Optional – revenue grade data, ANSI C12.20

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INVERTER DATASHEET 2/2

solaredge

Single Phase Inverters for North America

SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US / SE7600A-US / SE10000A-US / SE11400A-US

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	SE10000A- US	SE11400A-US	
OUTPUT								
Nominal AC Power Output	3000	3800	5000	6000	7600	9980 @ 208V 10000 @240V	11400	VA
Max. AC Power Output	3300	4150	5400 @ 208V 5450 @240V	6000	8350	10800 @ 208V 10950 @240V	12000	VA
AC Output Voltage Min.-Nom.-Max.(1) 183 - 208 - 229 Vac	-	-	✓	-	-	✓	-	
AC Output Voltage Min.-Nom.-Max.(1) 211 - 240 - 264 Vac	✓	✓	✓	✓	✓	✓	✓	
AC Frequency Min.-Nom.-Max.(1)	59.3 - 60 - 60.5							Hz
Max. Continuous Output Current	12.5	16	24 @ 208V 21 @ 240V	25	32	48 @ 208V 42 @ 240V	47.5	A
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							Yes
INPUT								
Maximum DC Power (STC)	4050	5100	6750	8100	10250	13500	15350	W
Transformer-less, Ungrounded	Yes							
Max. Input Voltage	500							Vdc
Nom. DC Input Voltage	325 @ 208V / 350 @ 240V							Vdc
Max. Input Current(2)	9.5	13	16.5 @ 208V 15.5 @ 240V	18	23	33 @ 208V 30.5 @ 240V	34.5	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	97.7	98.2	98.3	98.3	98	98	98	%
CEC Weighted Efficiency	97.5	98	97 @ 208V 98 @ 240V	97.5	97.5	97 @ 208V 97.5 @ 240V	97.5	%
Nighttime Power Consumption	< 2.5					< 4		W
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, RS232, Ethernet, ZigBee (optional)							
Revenue Grade Data, ANSI C12.20	Optional(3)							
Rapid Shutdown – NEC 2014 690.12	Yes							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL16998, UL1998 , CSA 22.2							
Grid Connection Standards	IEEE1547							
Emissions	FCC part15 class B							
INSTALLATION SPECIFICATIONS								
AC output conduit size / AWG range	3/4" minimum / 16-6 AWG					3/4" minimum / 8-3 AWG		
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 16-6 AWG					3/4" minimum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	30.5 x 12.5 x 7.2 / 775 x 315 x 184					30.5 x 12.5 x 10.5 / 775 x 315 x 260		in / mm
Weight with Safety Switch	51.2 / 23.2		54.7 / 24.7			88.4 / 40.1		lb / kg
Cooling	Natural Convection				Natural convection and internal fan (user replaceable)	Fans (user replaceable)		
Noise	< 25					< 50		dBA
Min.-Max. Operating Temperature Range	-13 to +140 / -25 to +60 (-40 to +60 version available(4))							°F / °C
Protection Rating	NEMA 3R							

(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.
(3) Revenue grade inverter P/N: SExxxxA-US000NNR2A (for 7600W inverter:SE7600A-US002NNU4).
(4) 60 version P/N: SExxxxA-US060NNU4 (for 7600W inverter:SE7600A-US060NNU4).

RoHS

AC DISCONNECT DATASHEET 1/1

Product Data Sheet

DU222RB

Safety Switch , 60A, Non-Fusible, 2-Pole

SQUARE D
by Schneider Electric

List Price $353.00 USD

Availability: **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Number of Poles	2-Pole
Terminal Type	Lugs
Type of Duty	General Duty
Maximum Voltage Rating	240VAC
Wire Size	#10 to #2 AWG(AI) - #14 to #2 AWG(Cu)
Action	Single Throw
Ampere Rating	60A
Approvals	UL Listed File Number E2875
Enclosure Rating	NEMA 3R
Enclosure Type	Raingroof and Sleet/Ice proof (Indoor/Outdoor)
Factory Installed Neutral	No
Disconnect Type	Non-Fusible
Mounting Type	Surface

Shipping and Ordering

Category	00106 - Safety Switch, General Duty, 30 - 200 Amp, NEMA3R
Discount Schedule	DIE1A
GTIN	00785901491491
Package Quantity	1
Weight	4.7 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	MX

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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Prepared by:

PACIFICBEACH TOWER INC
CA state B, C10, C7 #831865 WC policy #57WECEQ6194
461 Orcas St. Morro Bay CA 93442

DRAWN	July/17/2017	**DATASHEETS**
		RANCHO SANDBERG 335 Summit Station Road, Arroyo Grande, CA 93420 Phone 805-896-0339
		SCALE NA SHEET E4 OF E5

RAIL DATASHEET 1/2

Tech Brief

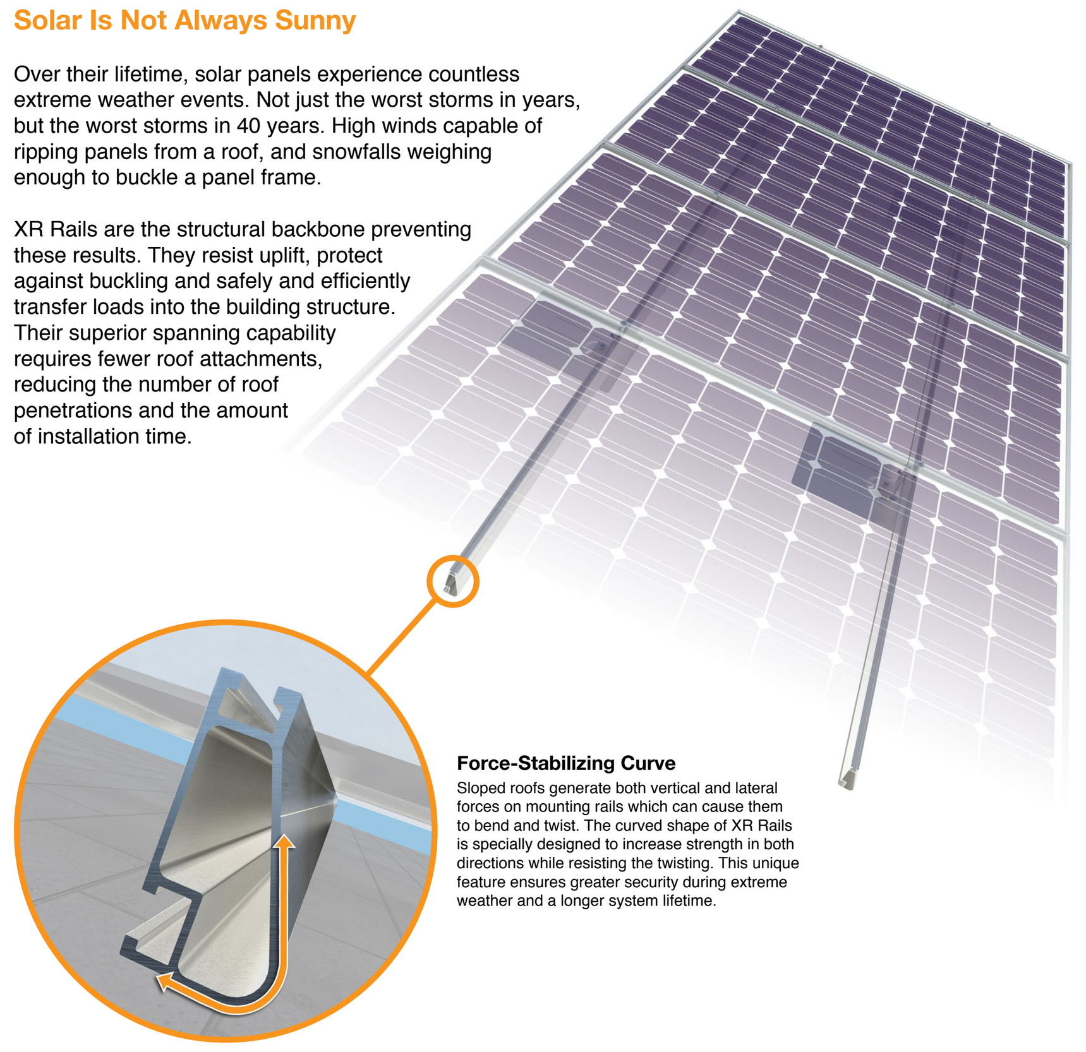
IRONRIDGE

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

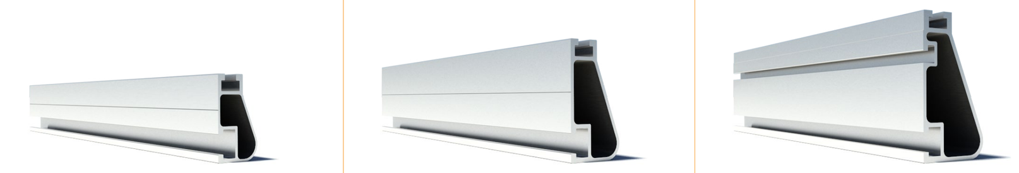
All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

RAIL DATASHEET 2/2

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 & black 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						
	120						
	140	XR10		XR100		XR1000	
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

CERTIFICATION 1/6

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IronRidge
1435 Baechtel Rd.
Willits, CA 95490

April 11, 2012

page 1 of 2

Attn: Mr.William Kim, Chief Executive Officer

Subject: IronRidge Roof Flush Mounting System
Green Fasten GF-1 Anchors by EcoFasten Solar

Dear Sir:

This letter is a supplement to the standard letter for the IronRidge Rail, Roof Flush Mounting System to address the requirements for use with Green Fasten GF-1 Anchors.

We have reviewed the Test Report for the GF-1 anchor prepared by Smith Emery Laboratories (SEL), dated April 5, 2011 and the subsequent IAPMO ES Evaluation Report No.0216 dated 04/2011. We have also reviewed loading and anchorage requirements for the IronRidge Roof Flush Mounting System for both the Standard and Light rails and determined that, subject to the limitations outlined below, the GF-1 is a suitable anchorage system for the IronRidge Roof Flush Mounting System.

The anchorage of the GF-1 is provided by a 5/16" dia. lag screw with a threaded length of 2-1/2". The SEL report indicates the failure mode is the pullout of the anchor from the wood framing and the bending of the attached aluminum L bracket.

The test determined the maximum allowable loads for pullout (uplift) and lateral shear for two values of specific gravity (G) and moisture content (M/C) of the timber framing supporting the panels to be as follows:

1. DFL#2 timber with G=0.52 and 20% M/C
Allowable Uplift = 741 lbs, Allowable Shear = 298 lbs

2. DFL#2 timber with G=0.42 and 16% M/C
Allowable Uplift = 653 lbs, Allowable Shear = 293 lbs

Per the IAPMO Report, these values include a Duration of Load Factor for Wind Loads and no further increase is permitted.

CERTIFICATION 2/6

IronRidge
Mr.William Kim
IronRidge Roof Flush Mounting System – GF-1 Anchors

April 11, 2012

page 2 of 2

The allowable loads are not to exceed the applied loads which can be obtained from the online Design Assistant for the system at IronRidge.com. The Design Assistant covers a wide range of system configurations and loading and allows the user to customize the input to match the specific project conditions.

The following tables are derived from the Design Assistant data and shows the limit conditions under which the GF-1 anchors may be used for any roof slope up to 45 deg. The values shown tables are for the rails installed at their maximum allowable spans. For rail spans less than maximum, the requirements are less stringent and can be obtained from the online Design Assistant as described above.

MAXIMUM ALLOWABLE WIND SPEED (mph)				
Roof Height (ft)	Wind Exposure Category	Roof Wind Zone 1	2	3
15	B	130	90	-
15	C	120	85	-
15	D	110	-	-
30	B	130	90	-
30	C	110	-	-
30	D	-	-	-
45	B	120	-	-
45	C	100	-	-
45	D	-	-	-
60	B	120	-	-
60	C	-	-	-
60	D	-	-	-

MAXIMUM ALLOWABLE SNOW LOAD (psf)			
Wind Speed (mph)	Wind Exposure Category B	C	D
85	80	80	40
90	80	80	40
100	80	80	50
110	80	80	50
120	80	80	50
130	80	80	50
140	80	80	50
150	80	90	50

Notes:
Allowable GF-1 Loads per IAPMO-ES Report # 0216, dated April, 2011
Wind Loads & Snow Loads per ACSE 7-05
Maximum Allowable Snow Loads are valid for All Roof Zones and Heights up to 60 ft
Maximum Panel Dimension = 78 in

Please feel free to contact me at your convenience if you have any questions.

Respectfully yours,

Tres J. Warner, P.E.
Design Division Manager

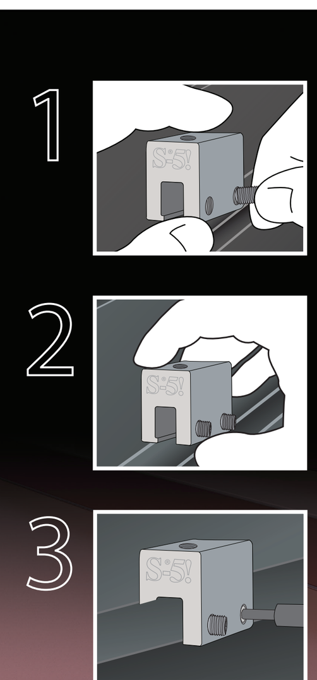
REGISTERED PROFESSIONAL ENGINEER TRES J. WARNER C 71973 EXP. 12-31-13 CIVIL STATE OF CALIFORNIA

4.11.12

STANDOFF DATASHEET 1/2

S-5!®

The Right Way!



S-5-E Clamp

The S-5-E clamp is designed specially for double-folded standing seam roof profiles having the appropriate dimensioning.

Although a bit smaller and less expensive than the S-5-U, for these profiles, the S-5-E is just as strong.

The S-5-E is perfect for use with S-5!® ColorGard® snow retention systems and other heavy-duty applications.

Installation is as simple as placing the clamp on the seam and tightening the patented round-point setscrews to the specified tension. Then, affix ancillary items using the bolt provided. Go to www.S-5.com/tools for information and tools available for properly attaching and tensioning S-5! clamps.

S-5-E Mini Clamp

The S-5-E Mini is a bit shorter than the S-5-E and has one setscrew rather than two. The mini is the choice for attaching all kinds of rooftop accessories: signs, walkways, satellite dishes, antennas, rooftop lighting, lightning protection systems, solar arrays, exhaust stack bracing, conduit, condensate lines, mechanical equipment—just about anything!*

*S-5! mini clamps are not compatible with, and should not be used with S-5! SnoRail™/SnoFence™ or ColorGard® snow retention systems.

The S-5-E clamp is secured with our patented round-point setscrews without piercing the metal roof panel, thereby preserving the roof manufacturer's warranty!

The right way to attach almost anything to metal roofs!

S-5-E and S-5-E Mini

888-825-3432 | www.S-5.com

STANDOFF DATASHEET 2/2

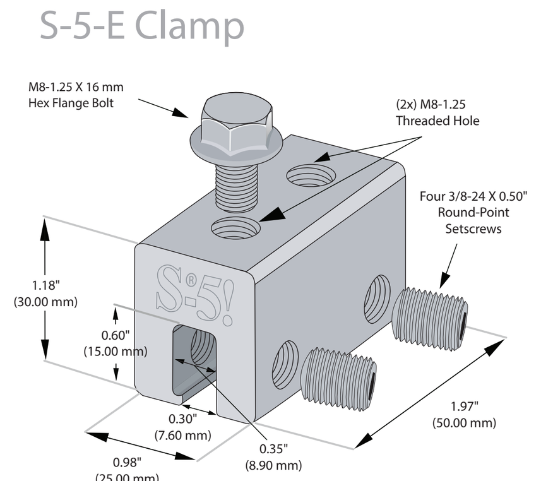
S-5!® The Right Way!

The strength of the S-5-E clamp is in its simple design. The patented setscrews will slightly dimple the metal seam material but will not puncture it—leaving roof warranties intact.

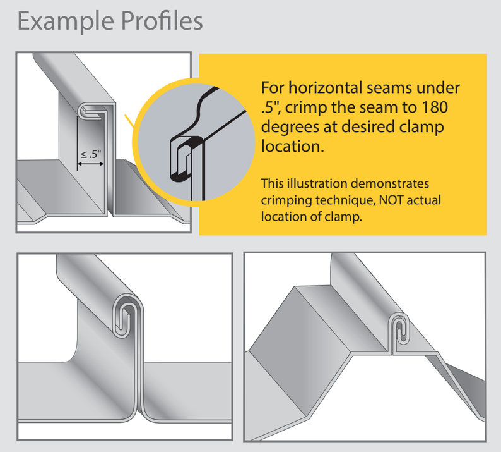
The **S-5-E and S-5-E Mini clamps** are each furnished with the hardware shown to the right. Each box also includes a bit tip for tightening setscrews using an electric screw gun. A structural aluminum attachment clamp, the S-5-E is compatible with most common metal roofing materials excluding copper. All included hardware is stainless steel. Please visit **www.S-5.com** for more information including CAD details, metallurgical compatibilities and specifications.

The S-5-E and S-5-E Mini clamps have been tested for load-to-failure results on a variety of double-folded standing seam roofs, from leading manufacturers of panels and panel-forming machines. The independent lab test reports found on our website at www.S-5.com prove that S-5!® holding strength is unmatched in the industry.

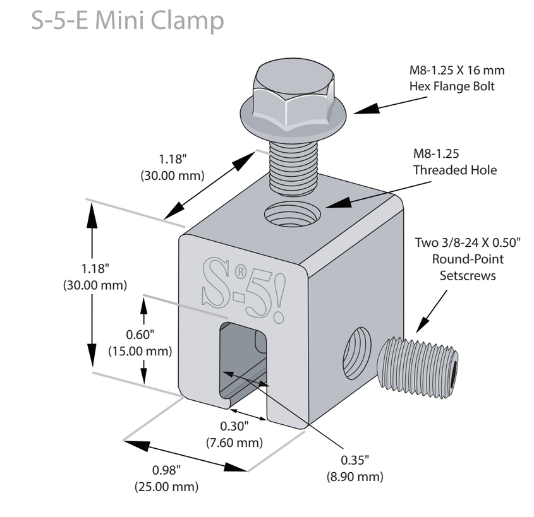
S-5-E Clamp



Example Profiles



S-5-E Mini Clamp



Please note: All measurements are rounded to the second decimal place.

S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. Visit the website at www.S-5.com for complete information on patents and trademarks. For maximum holding strength, setscrews should be tensioned and re-tensioned as the seam material compresses. Clamp setscrew tension should be verified using a calibrated torque wrench between 160 and 180 inch pounds when used on 22ga steel, and between 130 and 150 inch pounds for all other metals and thinner gauges of steel. Consult the S-5! website at www.S-5.com for published data regarding holding strength.

Distributed by

BONDING EGC TO RAIL - WEEBLug 6.7

WEEBLug

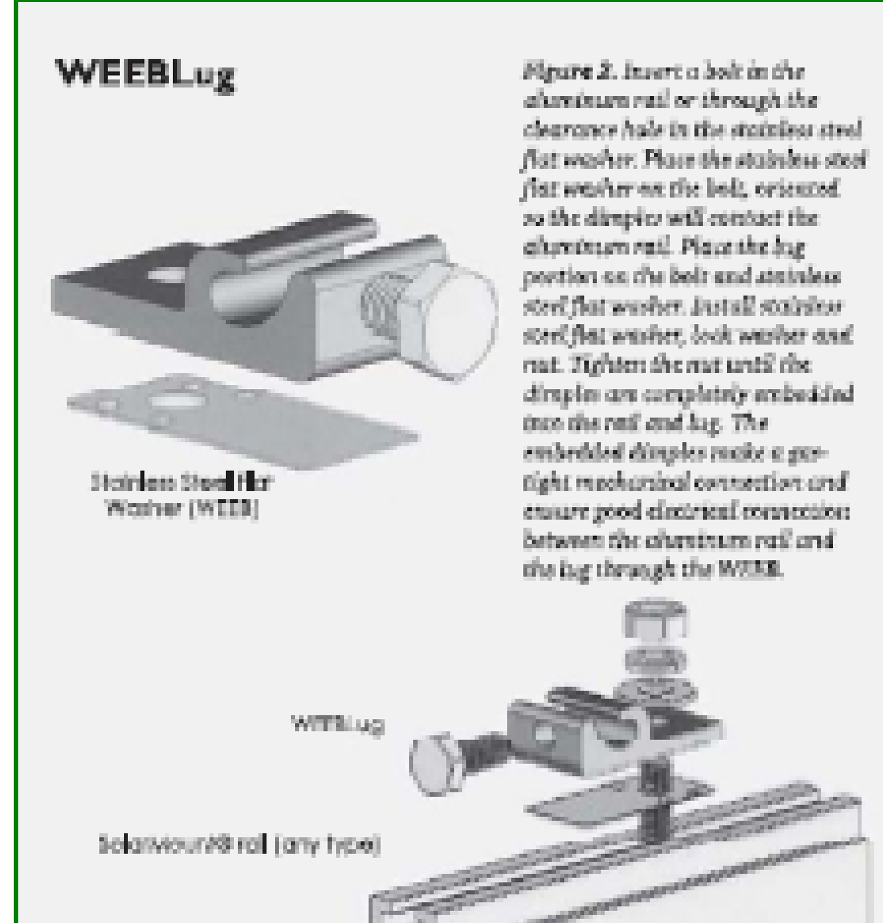
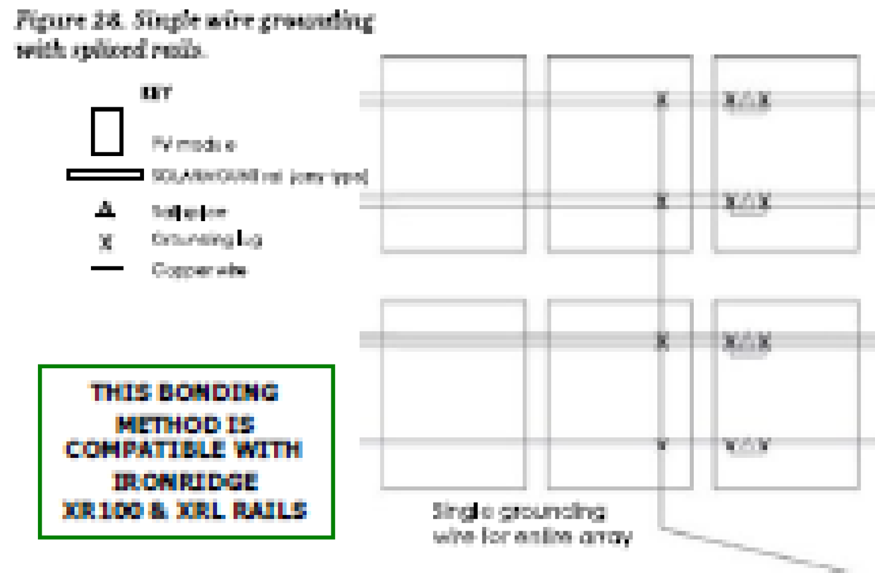
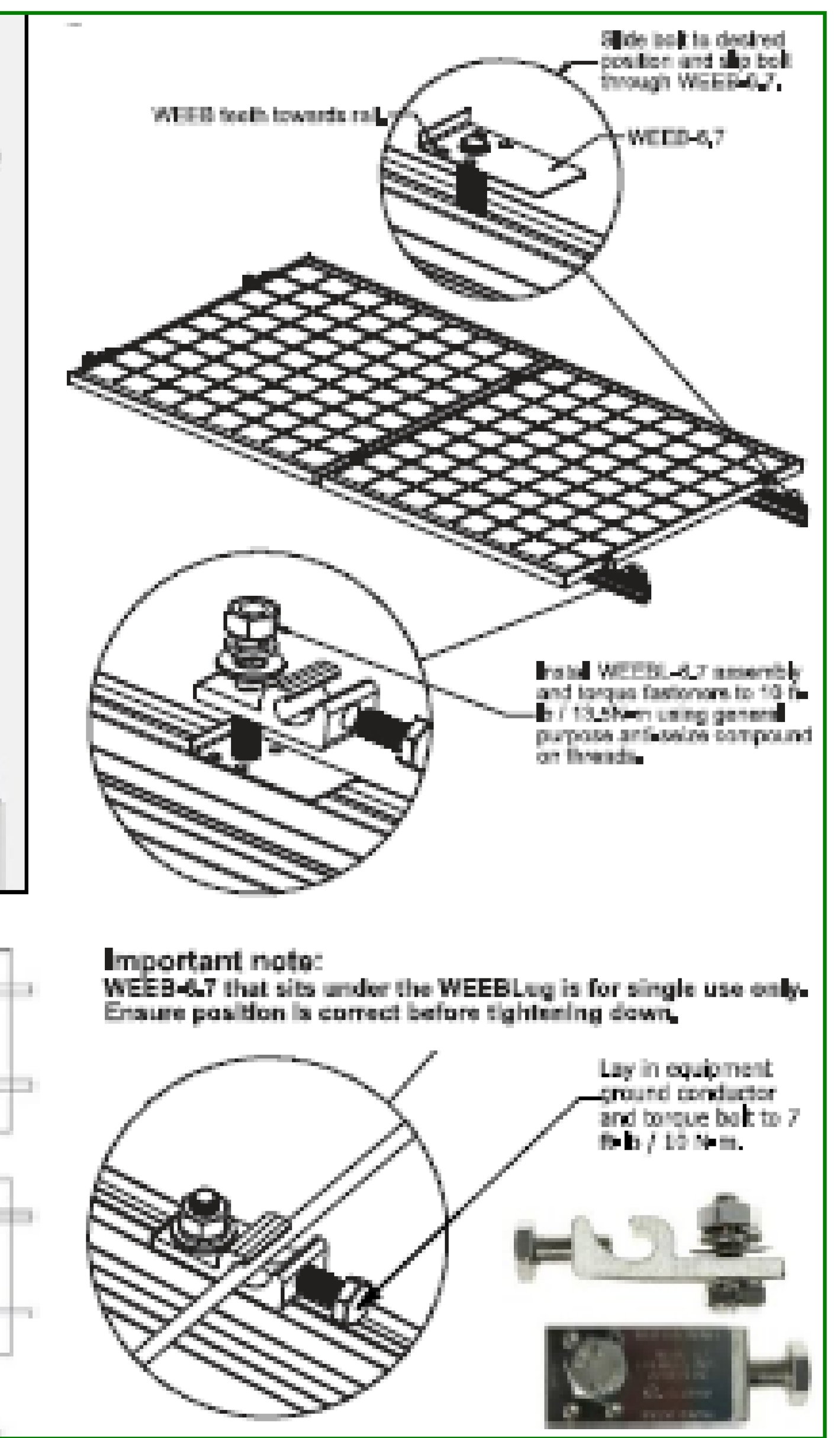


Figure 2. Insert a bolt in the aluminum rail or through the clearance hole in the stainless steel flat washer. Place the stainless steel flat washer on the bolt, oriented so the dimples will contact the aluminum rail. Place the lug portion on the bolt and stainless steel flat washer. Install stainless steel flat washer, lock washer and nut. Tighten the nut until the dimples are completely embedded into the rail and lug. The embedded dimples make a gas-tight mechanical connection and ensure good electrical connection between the aluminum rail and the lug through the WEEB.

Figure 28. Single wire grounding with spliced rails.





Important note:
WEEB-6.7 that sits under the WEEBLug is for single use only. Ensure position is correct before tightening down.

THIS BONDING METHOD IS COMPATIBLE WITH IRONRIDGE XR100 & XRL RAILS

BONDING RAIL TO MODULE - UGC-1

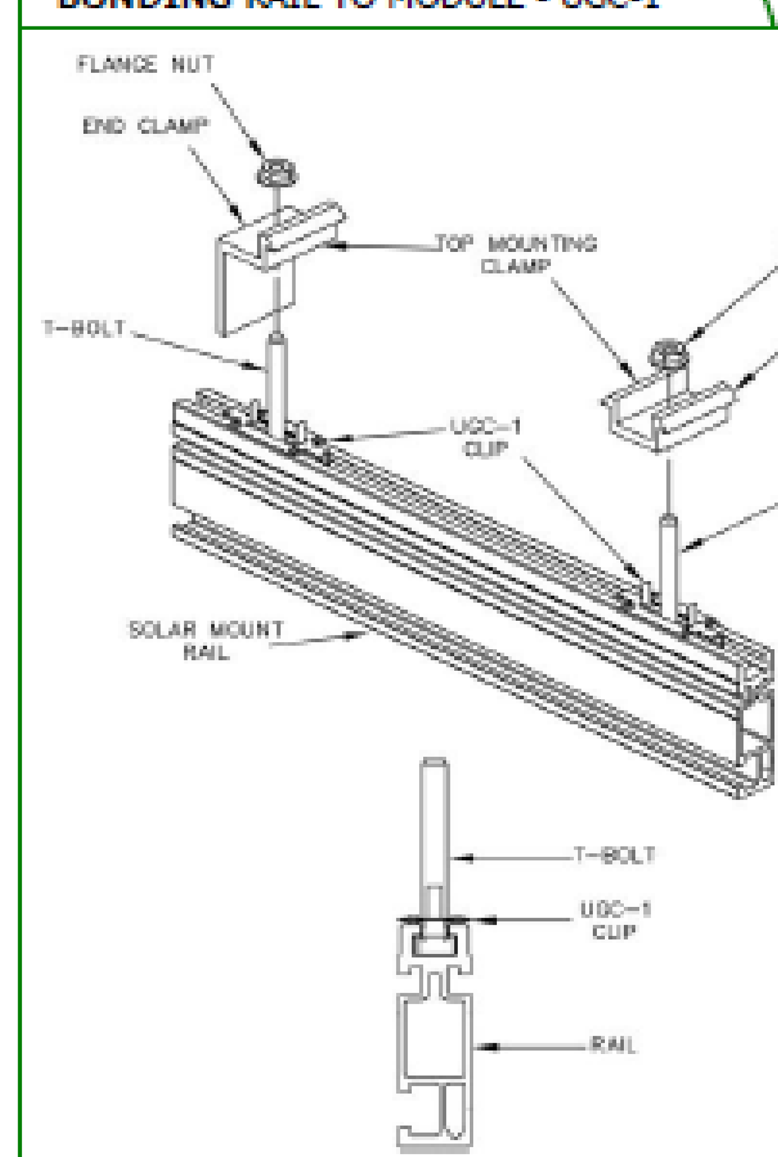


Figure 27. UGC-1 layout for even and odd number of modules in row. "X" denotes places to install UGC-1.

Even Number of Modules in row

Odd Number of Modules in row

UGC-1

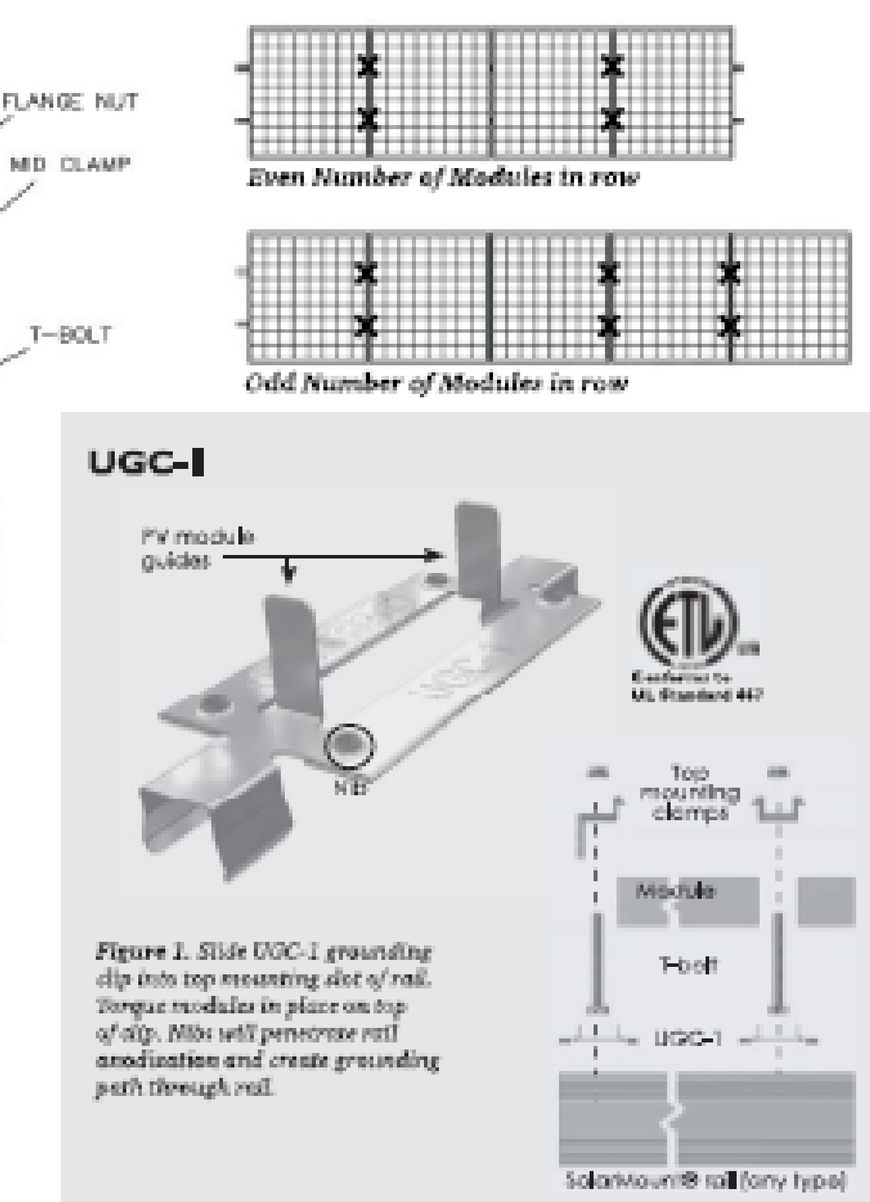


Figure 1. Slide UGC-1 grounding clip into top mounting slot of rail. Torque modules in place on top of clip. Nibs will penetrate rail anodization and create grounding path through rail.

THIS BONDING METHOD IS COMPATIBLE WITH IRONRIDGE XR100 & XRL RAILS

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		SCALE NA
		SHEET E5 OF E5

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