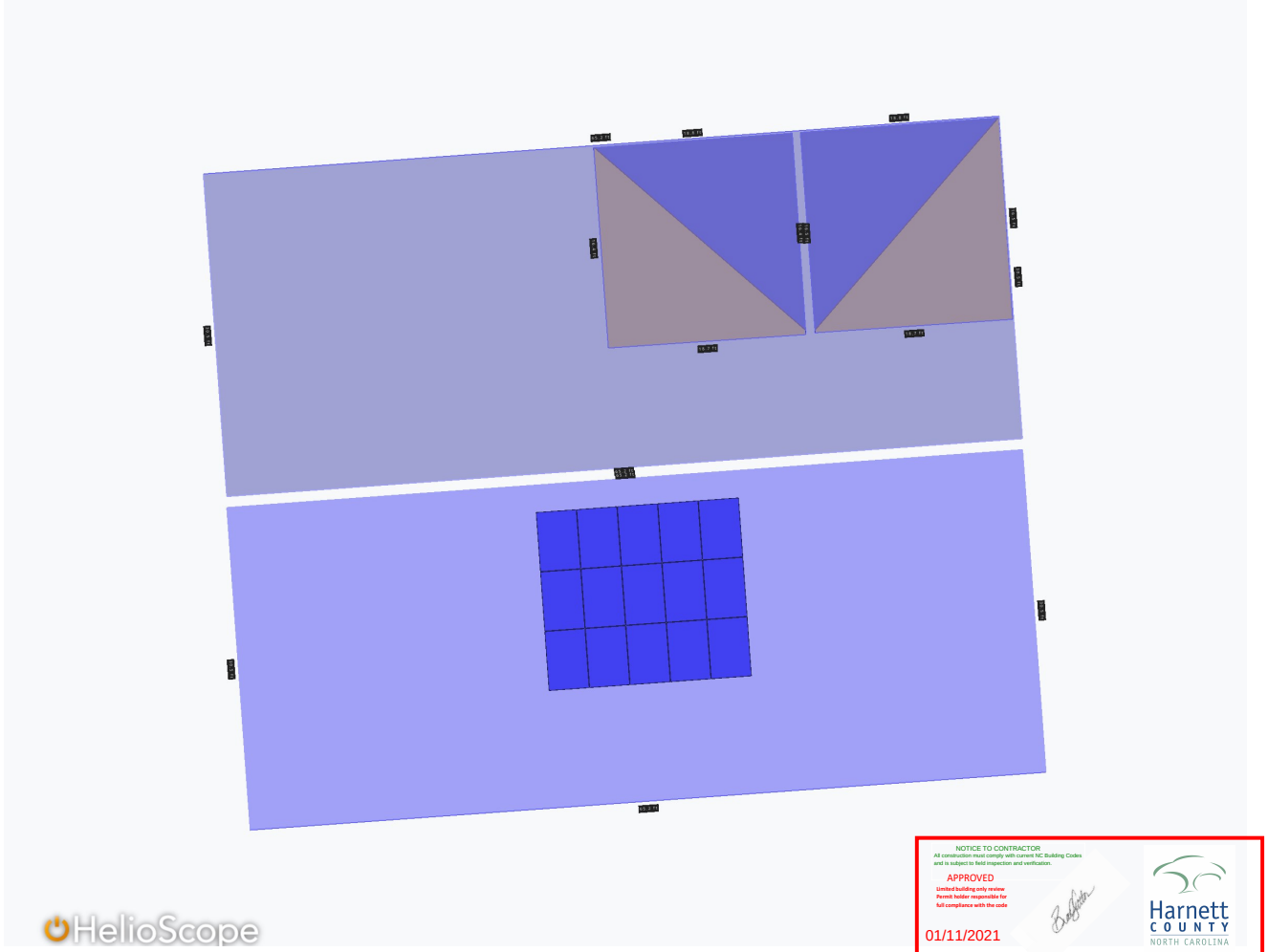
TITAN SOLAR POWER
10345 Nations Ford Rd Charlotte, NC 28273
SEpermitting@titansolarpower.com
(877) 997-7652

Customer Name	Address	Date	Phone
Kerri Barrett	84 Lahinch Dr, Fuquay Varina, NC 27526	11/2/2020	(910) 495-4683

20A 2-Pole Square-D Type HOM Breaker Required

Component	Name	Size
Modules	(15) Silfab Solar SIL-340 NL	5.1 kW-DC
Inverter(s)	(1) SolarEdge SE3800H-US	3.8 kW-AC
Optimizers	(15) SolarEdge Optimizers	5.1 kW

GENERAL NOTES	
1	Inverter and AC disconnect shall be installed in locations that satisfy minimum working clearances per NEC section 110.26.
2	Contractor shall use only components listed by a nationally recognized testing laboratory for the intended use.
3	Contractor is responsible for furnishing all related equipment, cables, additional conduits, boxes, raceways, and other accessories necessary for a complete and operational PV system.
4	The system shall comply with all manufacturers listing and installation instructions, as well as all relevant sections of the 2017 NEC (NFPA 70) and all other codes specified by the authority having jurisdictions (AHJ).
5	Where DC PV source or DC PV output circuits are run inside the building, they shall be contained in metal raceways, type MC metal-clad cable, or metal enclosures from the point of penetration into the building to the first readily accessible disconnecting means, per NEC section 690.31(G).



SITE PLAN (Aerial View)

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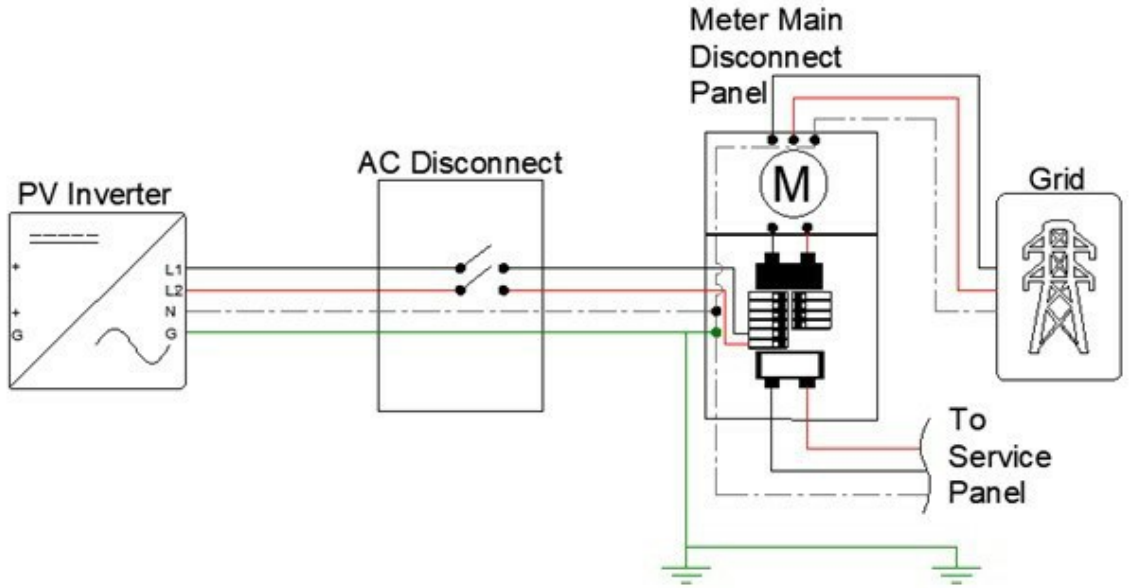
DUKE ENERGY PROGRESS



INTERCONNECTION DIAGRAM ()

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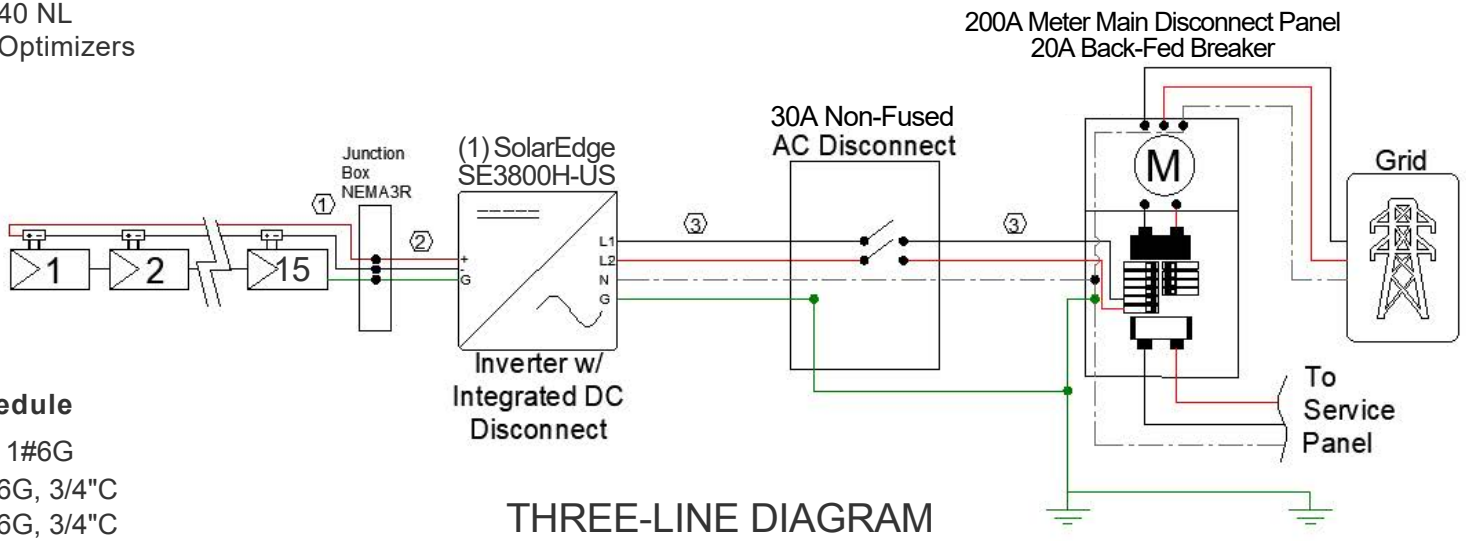
20A 2-Pole Square-D Type HOM Breaker Required

SOLAR PV OVERVIEW	
PV Array:	5.1 kW-DC
Inverter(s):	3.8 kW-AC - 16A
AC Utility:	240 VAC - 60 Hz

MODULE SPECIFICATIONS	
Panels	(15) Silfab Solar SIL-340 NL
STC Rating	340 W
Vmp	33 V
Imp	9 A
Voc	40 V
Isc	10 A

INVERTER SPECIFICATIONS	
Inverter(s)	(1) SolarEdge SE3800H-US
Max AC Power	3.8 kW-AC
Max Input Voltage	480 V
Min AC Power	0 W
Min Input Voltage	340 V

(15) Silfab Solar SIL-340 NL
(15) SolarEdge P340 Optimizers



THREE-LINE DIAGRAM

Feeder Schedule

1 2#10 PV WIRE, 1#6G
2 2#10 THHN, 1#6G, 3/4"C
3 3#10 THHN, 1#6G, 3/4"C

GROUNDING NOTES	
1	ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690
2	PV MODULES SHALL BE GROUNDED TO MOUNTING RAILS USING MODULE LUGS OR RACKING INTEGRATED GROUNDING CLAMPS AS ALLOWED BY LOCAL JURISDICTION. ALL OTHER EXPOSED METAL PARTS SHALL BE GROUNDED USING UL-LISTED LAY-IN LUGS
3	GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE
4	IF THE EXISTING MAIN SERVICE PANEL DOES NOT HAVE A VERIFIABLE GROUNDING ELECTRODE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE
5	AC SYSTEM GROUNDING ELECTRODE CONDUCTOR (GEC) SHALL BE A MINIMUM SIZE #8 AWG WHEN INSULATED, #6 AWG IF BARE WIRE
6	EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC ARTICLE 690.45, AND BE A MINIMUM OF #10 AWG WHEN NOT EXPOSED TO DAMAGE, AND #6 AWG SHALL BE USED WHEN EXPOSED TO DAMAGE
7	GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN, OR MARKED GREEN IF #4 AWG OR LARGER

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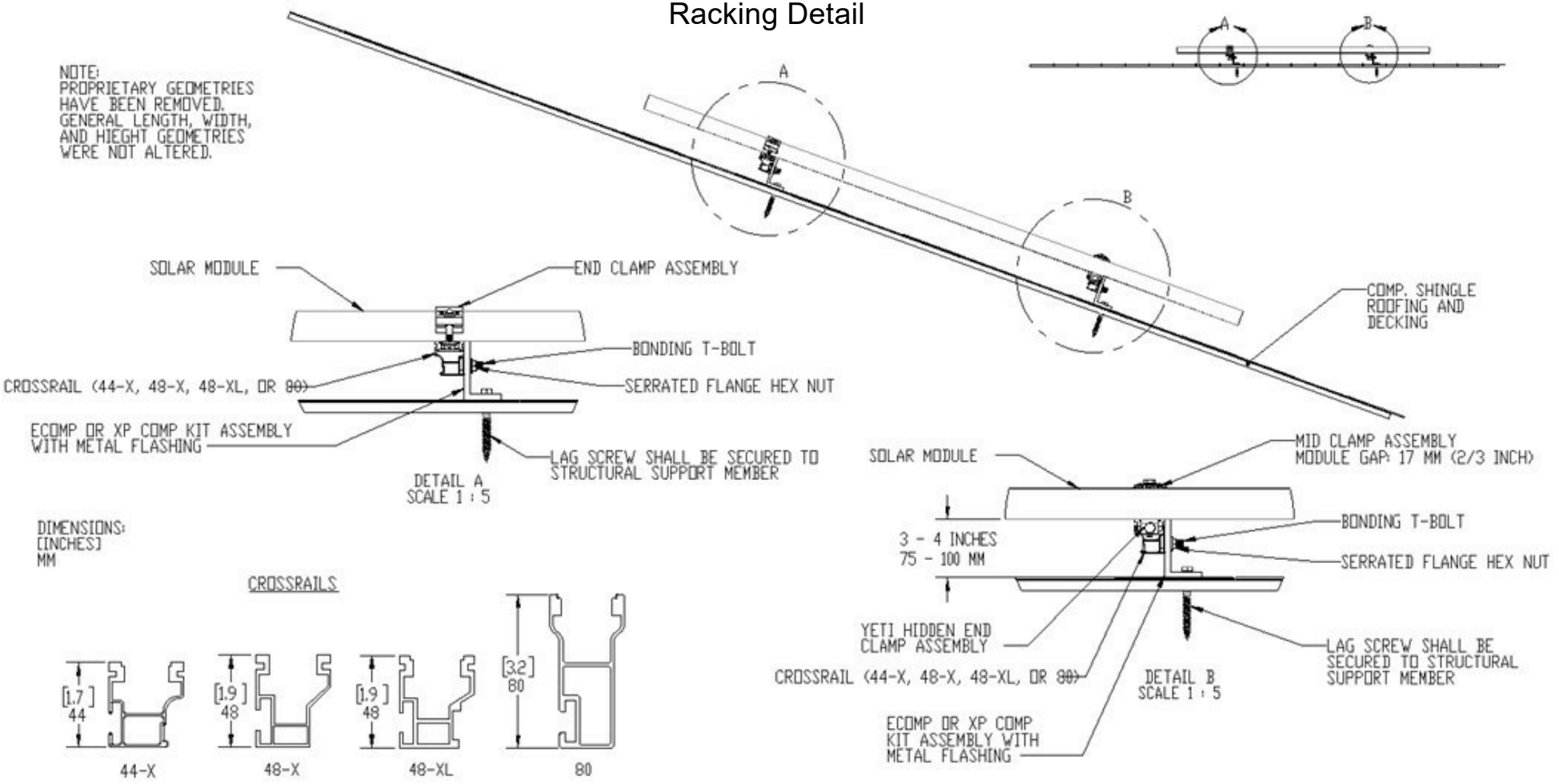
Racking Detail



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! WARNING

ELECTRICAL SHOCK HAZARD

1

WARNING: PHOTOVOLTAIC POWER SOURCE

2

PHOTOVOLTAIC SYSTEM EQUIPPED WITH
RAPID SHUTDOWN.

3

! WARNING - DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

4

PHOTOVOLTAIC
DC DISCONNECT

5

PHOTOVOLTAIC AC DISCONNECT
MAX AC OPERATING CURRENT: ___A
NOM OPERATING AC VOLTAGE: ___V

6

! CAUTION
PHOTOVOLTAIC SYSTEM IS BACKFED

7

DC RACEWAYS
2

MAIN SERVICE PANEL
4, 7

INVERTER w/ DC DISCONNECT
1, 3, 5

AC COMBINER PANEL
1, 4

AC DISCONNECT
1, 4, 6

UTILITY METER
4

LABELING NOTES

1	ALL PLAQUES AND SIGNAGE REQUIRED BY 2014 NEC AND 2015 IFC WILL BE INSTALLED AS REQUIRED.
2	LABELS, WARNING(S) AND MARKING SHALL COMPLY WITH ANSI Z535.4, WHICH REQUIRES THAT DANGER, WARNING, AND CAUTION SIGNS USED THE STANDARD HEADER COLORS, HEADER TEXT, AND SAFETY ALERT SYMBOL ON EACH LABEL. THE ANSI STANDARD REQUIRES A HEADING THAT IS AT LEAST 50% TALLER THAN THE BODY TEXT, IN ACCORDANCE WITH NEC SECTION 110.21(B).
3	A PERMANENT PLAQUE OR DIRECTORY SHALL BE INSTALLED PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION IN COMPLIANCE NEC SECTION 690.56(B).
4	WHERE THE INVERTERS ARE REMOTELY LOCATED FROM EACH OTHER, A DIRECTORY SHALL BE INSTALLED AT EACH DC PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS, AT EACH AC IS CONNECTING MEANS, AND AT THE MAIN SERVICE DISCONNECTING MEANS SHOWING THE LOCATION OF ALL AC AND DC PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IN THE BUILDING, IN ACCORDANCE WITH NEC SECTION 690.4(H).
5	LABEL(S) WITH MARKING "WARNING: PHOTOVOLTAIC POWER SOURCE" SHALL BE LOCATED AT EVERY 10 FEET OF EACH DC RACEWAY AND WITHIN ONE FOOT OF EVERY TURN OR BEND AND WITHIN ONE FOOT ABOVE AND BELOW ALL PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS AND BARRIERS. THE LABEL SHALL HAVE 3/8" TALL LETTERS AND BE REFLECTIVE WITH WHITE TEXT ON A RED BACKGROUND.
6	LABEL(S) WITH MARKING "PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN" SHALL BE LOCATED AT POINT-OF-INTERCONNECTION OR AT MAIN SERVICE DISCONNECT. THE LABEL SHALL HAVE 3/8" TALL LETTERS AND BE REFLECTIVE WITH WHITE TEXT ON A RED BACKGROUND.

TITAN SOLAR PANEL

60 Cell Monocrystalline PV Module

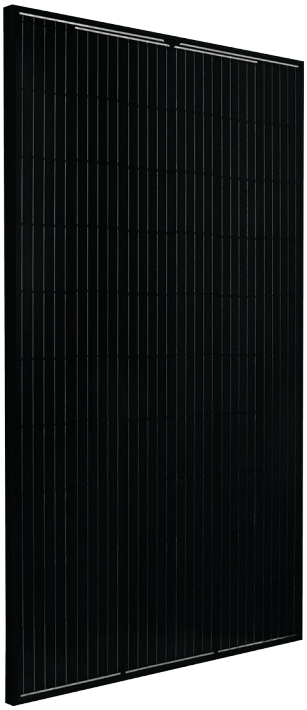
CHUBB
* Chubb provides error and omission insurance to Silfab Solar Inc.

SIL-340 NL
POWERED BY
SILFAB SOLAR

INDUSTRY LEADING WARRANTY
The Titan Solar Panel is manufactured by Silfab Solar and includes an industry leading 25-year product workmanship and 30-year performance warranty.

MAXIMUM ENERGY OUTPUT
Leveraging over 35+ years of worldwide experience in the solar industry, Silfab is dedicated to superior manufacturing processes and innovations such as Bifacial and Back Contact technologies, to ensure our partners, such as Titan Solar have the latest in solar innovation.

NORTH AMERICAN QUALITY
Silfab is the leading automated solar module manufacturer in North America. Utilizing premium quality materials and strict quality control management to deliver the highest efficiency, premium quality PV modules 100% made in North America.



BAA / ARRA COMPLIANT
Panels are designed and manufactured to meet Buy American Act Compliance. The US State Department, US Military and FAA have all utilized Silfab panels in their solar installations.

LIGHT AND DURABLE
Engineered to accommodate high wind load conditions for test loads validated up to 4000Pa uplift. The light-weight frame is exclusively designed for wide-ranging racking compatibility and durability.

QUALITY MATTERS
Total automation ensures strict quality controls during the entire manufacturing process at ISO certified facilities.

DOMESTIC PRODUCTION
Silfab Solar manufactures PV modules in two automated locations within North America. Our 500+ North American team is ready to help Titan Solar win the hearts and minds of customers, providing customer service and product delivery that is direct, efficient and local.

AESTHETICALLY PLEASING
All black sleek design, ideal for high-profile residential or commercial applications.

PID RESISTANT
PID Resistant due to advanced cell technology and material selection. In accordance to IEC 62804-1.

Electrical Specifications		SIL-340 NL mono PERC	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	340	241
Maximum power voltage (Vpmax)	V	33.7	30.4
Maximum power current (Ipmax)	A	10.1	7.9
Open circuit voltage (Voc)	V	40.9	37.1
Short circuit current (Isc)	A	10.5	8.3
Module efficiency	%	20.0	17.7
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	+/-3%	

Measurement conditions: STC 1000 W/m2 • AM 1.5 • Temperature 25 °C • NOCT 800 W/m^2 • AM 1.5 • Measurement uncertainty ≤ 3%
• Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by +/-3%.

Temperature Ratings	SIL-340 NL mono PERC
Temperature Coefficient Isc	0.064 %/°C
Temperature Coefficient Voc	-0.28 %/°C
Temperature Coefficient Pmax	-0.36 %/°C
NOCT (± 2°C)	46 °C
Operating temperature	-40/+85 °C

Mechanical Properties and Components	SIL-340 NL mono PERC
Module weight	41 ±0.4 lbs
Dimensions (H x L x D)	66.9 in x 39.4 in x 1.5 in
Maximum surface load (wind/snow)*	83.5/112.8 lb/ft^2
Hail impact resistance	ø 1 in at 51.6 mph
Cells	60 - Si mono PERC - 5 busbar, 6.25 x 6.25 Inch
Glass	0.126 in high transmittance, tempered, DSM anti-reflective coating
Cables and connectors (refer to installation manual)	47.2 in, ø 0.22 in, MC4 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, fluorine-free PV backsheet
Frame	Anodized Aluminum (Black)
Bypass diodes	3 diodes-30SQ045T (45V max DC blocking voltage, 30A max forward rectified current)
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP67 rated

Warranties	SIL-340 NL mono PERC			
Module product workmanship warranty	25 years**			
Linear power performance guarantee	30 years			
	≥ 97.1% end 1st year	≥ 91.6% end 12th year	≥ 85.1% end 25th year	≥ 82.6% end 30th year

Certifications	SIL-340 NL mono PERC
Product	ULC ORD C1703, UL1703, CEC listed***, UL 61215-1/-1-1/-2, UL 61730-1/-2, IEC 61215-1/-1-1/-2***. IEC 61730-1/-2***, CSA C22.2#61730-1/-2***, IEC 62716 Ammonia Corrosion; IEC61701:2011 Salt Mist Corrosion Certifed, UL Fire Rating: Type 2
Factory	ISO9001:2015

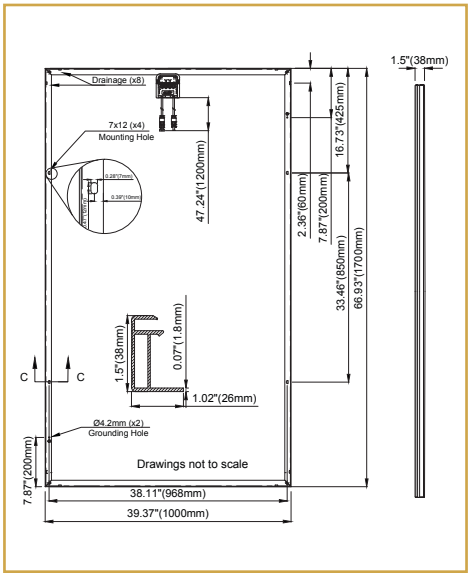
- Modules Per Pallet: 26
- Pallets Per Truck: 36
- Modules Per Truck: 936

*⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.

**12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at www.silfabsolar.com.

***September 2020 expected completion date.

PAN files generated from 3rd party performance data are available for download at: www.silfabsolar.com/downloads



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Bellingham WA 98225 USA
Tel +1 360-569-4733

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: embedded consumption metering and production revenue grade metering, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

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Single Phase Inverter with HD-Wave Technology for North America

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

MODEL NUMBER	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

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P401 / P405 / P485 / 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
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge

/ Power Optimizer
For North America
P320 / P340 / P370 / P400 / P401 / 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)	P401 (for high power 60 and 72 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	60	125[2]		83[2]	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	8-60	12.5 - 105		12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11			10.1	11.75	11		14	Adc
Maximum DC Input Current	13.75			12.5	14.65	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 153 x 29.5 /5.1 x 6 x 1.16	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	655 / 1.5	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						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 P485-4NMDMRM. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer connected to one PV module. When connecting a single module seal the unused input connectors with the supplied pair of seals.
(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, P401	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/P401 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 15,000W per string when the maximum power difference between each string is 2,000W

Intertek RoHS

June 2017

Application Note - SolarEdge String Sizing, North America

Introduction

There are two primary criteria for string sizing in a SolarEdge system. Maximum (STC) power per string, and minimum and maximum string lengths. This document explains how these values are determined and provides the string sizing rules for the different inverter and optimizer combinations. For additional system design information refer to the inverter and optimizer datasheets.

Sizing rules typically depend on the type of inverters and optimizers used:

- Inverters: single phase or three phase
- Optimizers: general or commercial

Commercial optimizers can be used only with three phase inverters, while general optimizers can be used with both single and three phase inverters.

General optimizers typically have one PV module per optimizer, and commercial optimizers typically have two modules. However these are not fixed requirements and as long as the cumulative power and voltage/current of the modules meets the optimizer specifications as detailed in the datasheet, connecting additional modules per optimizer is permitted (for example connecting 2x120W modules in series to a single P300 general optimizer). Refer to the Connecting Multiple Modules to Power Optimizers application note for details.

NOTE

In the context of this document, string length refers to the number of optimizers and modules in the string. When designing the installation make sure to maintain the maximum **physical** string length as well: The total cable length of the string (excluding power optimizers' conductors) should not exceed 1000ft./300m from DC+ to DC- of the inverter (2,300ft./700m when using the SE14.4KUS and SE33.3KUS inverters).

Maximum String Power

Maximum string power is simply the "Inverter Nominal DC Input Voltage" multiplied by the "Optimizer Maximum Output Current". These values can be found on the inverter and optimizer datasheets respectively. Table 1 details the values of available products.

Inverter Model	AC Grid Voltage [V]	Inverter Nominal DC Input Voltage [V]	Optimizer Max Output Current [A]	Maximum String Power [Wp]
Single phase inverters SE3000A-US – SE11400A-US	240	350	15	5,250
Single phase HD-Wave Inverters SE3000H-US – SE6000H-US	240	380	15	5,700
Single phase HD-Wave Inverter SE7600H-US	240	400	15	6000
SE9KUS, SE14.4KUS	120/208	400	15	6000 (or 6500 in some cases[1])
			18 (P800)	7200
SE10KUS, SE20KUS, SE33.3KUS	277/480	850	15	12750 (or 15000 in some cases[2])
			18 (P800)	15300

Table 1: Maximum string power

[1] For SE14.4KUS only, when used with P600/P700/P730, it is allowed to install up to 6500W per string when 3 strings are connected to the inverter and when the maximum power difference between the strings is up to 1000W.

[2] For SE33.3KUS only, when used with P600/P700/P730, it is allowed to install up to 15000W per string when 3 strings are connected to the inverter and when the maximum power difference between the strings is up to 2000W.

Minimum and Maximum String Length

The minimum number of optimizers per string depends on the "Maximum Output Voltage" of the optimizer and on the "Nominal DC Input Voltage" of the inverter: the optimizers connected in series in the string must be able to achieve the inverter's nominal voltage. There is a buffer added to ensure the operability of the string also in some shading or fault conditions.

The maximum number of optimizers per string was established to ensure proper communications between the optimizers and inverter.

NOTE

When connecting multiple modules to commercial optimizers, in case of an odd number of modules per string it is allowed to connect one optimizer with one module, as long the minimum number of modules per string is maintained as well.

		General optimizers	Commercial optimizers
Single phase inverters	Minimum	8	N/A
	Maximum	25	N/A
SE9KUS, SE14.4KUS	Minimum	10	8 optimizers, 16 modules
	Maximum	25	30 optimizers
SE10KUS, SE20KUS, SE33.3KUS	Minimum	18	13 optimizers, 26 modules
	Maximum	50	30 optimizers

Table 2: Minimum and maximum string length

MAN-01-00186-1.6

Rapid Shutdown Kit - Installation and Configuration (Single Phase Inverters)

This document describes how to install the rapid shutdown kit in the SolarEdge Safety Switch, and how to enable the rapid shutdown feature in the inverter in order to provide the functionality described in the Rapid Shutdown clause of NEC2014 690.12 (1) through (4).

Kit Contents

- Rapid shutdown cables
- Micro-SD card and SD card adapter with firmware files (Note: DO NOT THROW AWAY THE CARD AND THE ADAPTER; keep them for installation of other rapid shutdown kits)

Cable Installation

Perform this procedure before connecting the strings to the Safety Switch [Chapter 4: Connecting the AC and the Strings to the Safety Switch in the *SolarEdge Installation Guide*].

1. Turn the inverter ON/OFF switch to OFF. If installing the kit in an inverter that is already operating, wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.
2. Turn the Safety Switch and the AC switch on the main circuit board to OFF.

WARNING!

If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

3. Loosen the four Allen screws on the front cover of the Safety Switch, and open the cover.
4. Carefully disconnect the two DC cables from the left side of the switch and from the DC connection spring clamp terminals, as illustrated below[1]. Use a standard straight-bladed screwdriver to disconnect the cables from the terminals.

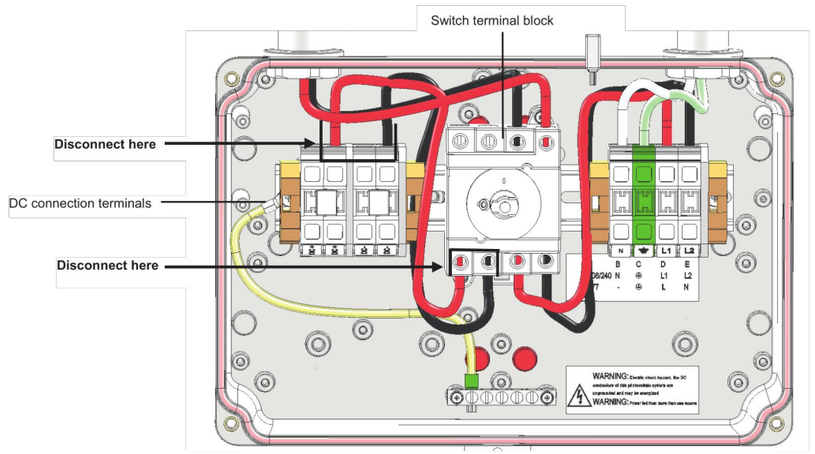


Figure 1: Inside the AC/DC Safety Switch

[1] The internal components may vary depending on the Safety Switch model; the figures in this documents show the AC/DC Safety Switch for single phase 7.6-11.4 kW inverters.

5. The rapid shutdown cables have a resistor connected to one end (on the red cable). Connect these ends to the switch, making sure that the red and black cables are reversed relative to the cables connected at the top of the switch (going into the DC side conduit between the inverter and the Safety Switch), as detailed below. Apply a torque of 2 N*m (18 lb*in):

- If the cables at the top are red and black from left to right, connect as shown below.

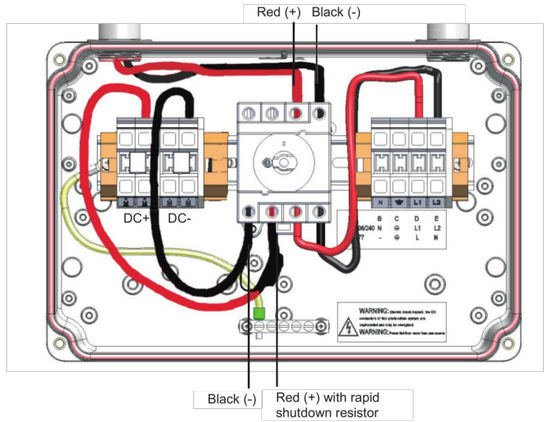


Figure 2: Rapid shutdown cable connected – option 1

- If the cables at the top are black and red from left to right, connect as shown below.

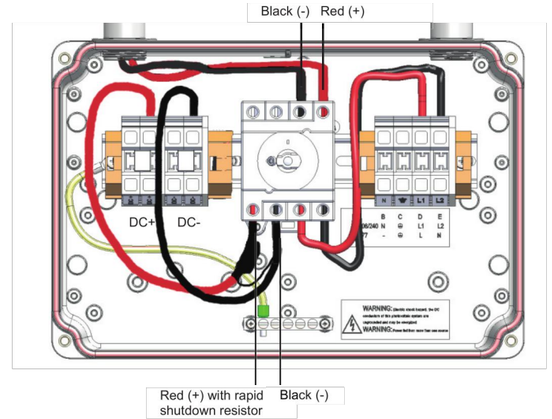


Figure 3: Rapid shutdown cable connected – option 2

6. Use a standard straight-bladed screwdriver to connect the other end of the rapid shutdown cables to the DC connection spring-clamp terminals: Connect the black cable from the switch to the DC- terminal block, and connect the red cable from the switch to the DC+ terminal block.
7. Check that the cables are located and connected in the correct positions to ensure the rapid shutdown functionality.
8. Close the cover: Attach the switch cover and secure it by tightening the four screws with a torque of 0.9 ft.*lb / 1.2 N*m.

RAPID SHUTDOWN SPECIFICATION SHEET

SOLOBOX

FEATURING FLASHLOC TECHNOLOGY

UNIRAC®

BETTER SOLAR STARTS HERE

OVERVIEW

SOLOBOX is the only junction box you need for comp shingle, roll comp, and rail-mounted applications.

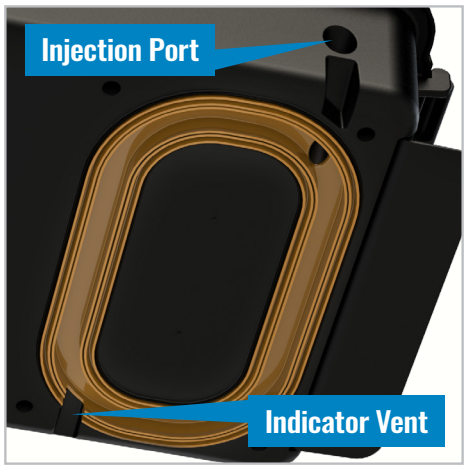
- Features Flashloc Technology – no more notching shingles, tearing up nails, and damaging the roof
- Works for all roof types – when you can't do an attic run, quickly mount it to the rail using rail mount tab and a Unirac J-box mount
- Accommodates up to (2) conduits running to the attic, with drill points on all 4 sides for maximum flexibility
- Built-in mounting points for a din rail or grounding blocks
- Pre-installed din rail option available
- Low profile for mounting under the panel (where permitted)
- Single screw and hinging top make for quick, easy wire access
- **25-year** warranty

PRODUCT SPECIFICATIONS

- NEMA 3R Rating
- UL1741 certified
- 8" x 8" x 3.5"
- Included hardware: 4-self drilling mounting screws for optional rail mounting

PART NUMBER	DESCRIPTION	LIST PRICE	PACK SIZE
SOLOBOX	SOLOBOX JUNCTION BOX	$51.47	8
SOLOBOX-D	SOLOBOX JUNCTION BOX WITH DIN RL	$54.40	8

UNIRAC 25 YEAR FULL-SYSTEM WARRANTY

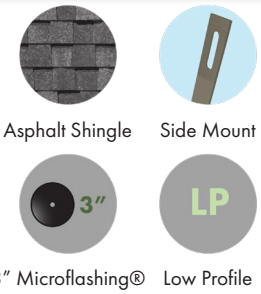


FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

Patent #8448407

LOW PROFILE **QUICKBOLT**
With 3″ Microflashing® | Fixed Height

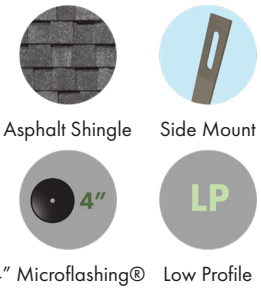


PN#	BOX QTY
17664	5.25″ Bolts (10)
17666	Bolts + 3″ Microflashing® (10ea.)
17667SS	Bolts + 3″ Microflashing® + SS L-Foot + Nuts (25ea.)

First & only Microflashing® in the industry
Stainless Steel L-Foot
Fastest installation in the industry
UL Certified

Patent #8448407

LOW PROFILE **QUICKBOLT**
With 4″ Microflashing® | Fixed Height

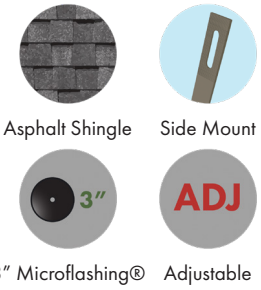


PN#	BOX QTY
17664	5.25″ Bolts (10)
17720	Bolts + 4″ Microflashing® (10ea.)
17721SS	Bolts + 4″ Microflashing® + SS L-Foot + Nuts (20ea.)

First & only Microflashing® in the industry
Stainless Steel L-Foot
4″ Microflashing® provides more coverage
Fastest installation in the industry
UL Certified

Patent #8448407

7″ **QUICKBOLT**
With 3″ Microflashing® | Adjustable

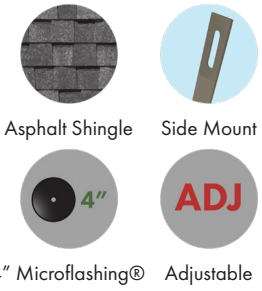


PN#	BOX QTY
17670	7″ Bolts (10)
17671	Bolts + 3″ Microflashing® (10ea.)
17672SS	Bolts (20) + 3″ Microflashing® (20) + SS L-Foot (20) + Nuts (40)

First & only Microflashing® in the industry
Stainless Steel L-Foot
UL Certified

Patent #8448407

7″ **QUICKBOLT**
With 4″ Microflashing® | Adjustable



PN#	BOX QTY
17670	7″ Bolts (10)
17723	Bolts + 4″ Microflashing® (10ea.)
17724SS	Bolts (15) + 4″ Microflashing® (15) + SS L-Foot (15) + Nuts (30)

First & only Microflashing® in the industry
Stainless Steel L-Foot
4″ Microflashing® provides more coverage
UL Certified

Microflashing™

Patent #8448407

3″ & 4″ **MICROFLASHING®**
For QuickBOLT


Asphalt Shingle

3″ Microflashing®

4″ Microflashing®

PN#	BOX QTY
17669	3″ Microflashing® (10)
17659	4″ Microflashing® (40)

First & only Microflashing® in the industry
Original Microflashing® design
EPDM on bottom, Stainless Steel on top
Compresses to composite shingle roof
Leak-proof seal
UL Certified

LOW PROFILE & OFFSET **L-FOOT**
For QuickBOLT

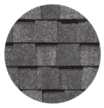

Asphalt Shingle


Side Mount

PN#	BOX QTY
15891SS	SS L-Foot (10)
15894SS	SS L-Foot (10)

Stainless Steel
Rail slot for adjustability when connecting T-Bolts

QUICK RATCHET CONDUIT CLAMP
For QuickBOLT Mounting Kits


Asphalt Shingle

PN#	BOX QTY	SCREW SIZE
16255	10 Clamps	N/A

For running conduit
Attaches directly to any QuickBOLT Mounting Kit
Offers flexibility in bundling cables/wires

L-FOOT MOUNTING KIT
Fixed Height | Black Galva Flashing


Asphalt Shingle

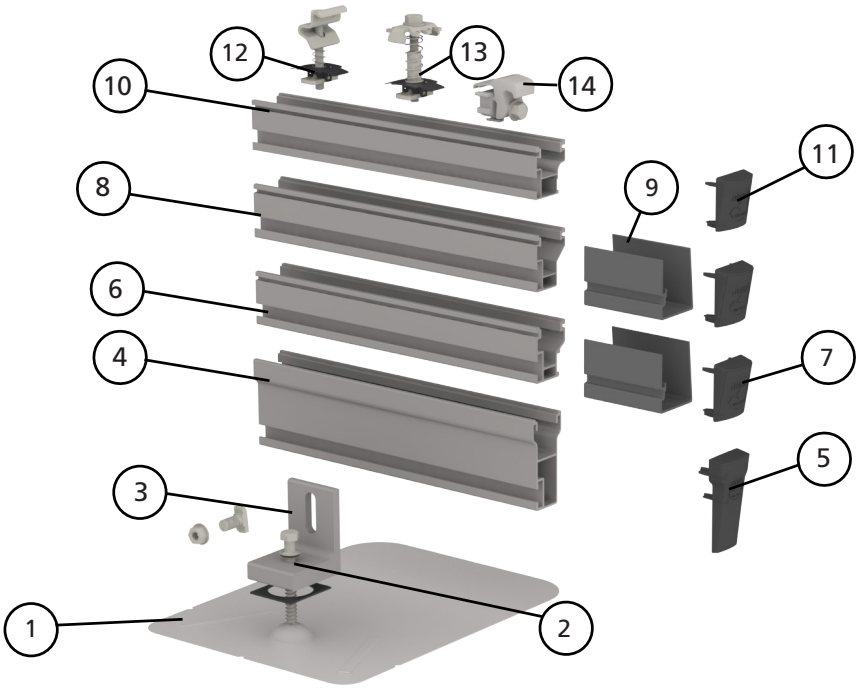

Side Mount

Screw Kits

PN#	BOX QTY	SCREW SIZE
17713	20 Flashing + L-Foot	5/16″ x 4″

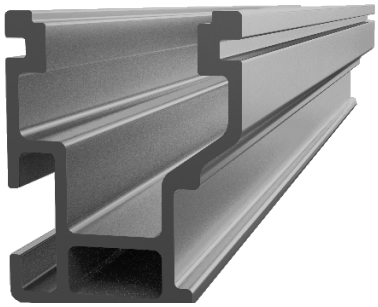
Stainless Steel L-Foot mounting system
Stronger than Aluminim Flashing

CrossRail System



Item No.	Description	Part No.
1	EverFlash XP Comp Kit, Mill or Dark	4000060, 4000061, 4000057
2	Lag Bolt D145/16 x 4" SS	4000359
3	L-Foot XP Set, Mill or Dark	4000036, 4000038
4	CrossRail 80 168" Rail, Mill	4000508
5	CrossRail 80 End Cap, Black	4001221
6	CrossRail 48-XL 166", Mill or Dark	4000695, 4000705
7	CrossRail 48-X/48-XL End Cap or Flat End Cap	4000433, 4000431
8	CrossRail 48-X 166" or 180", Mill or Dark	4000662, 4000675, 4000663
9	CrossRail 48-X/48-XL 3" Sleeve	4000583
10	CrossRail 44-X 166", Mill or Dark	4000019, 4000020
11	CrossRail 44-X End Cap	4000067
12	CR Mid Clamp Silver or Dark	4000601-H, 4000602-H
13	CR End Clamp Silver or Dark	4000429, 4000430
14	Yeti Clamp (Hidden End Clamp)	40000050-H

CrossRail 48-XL

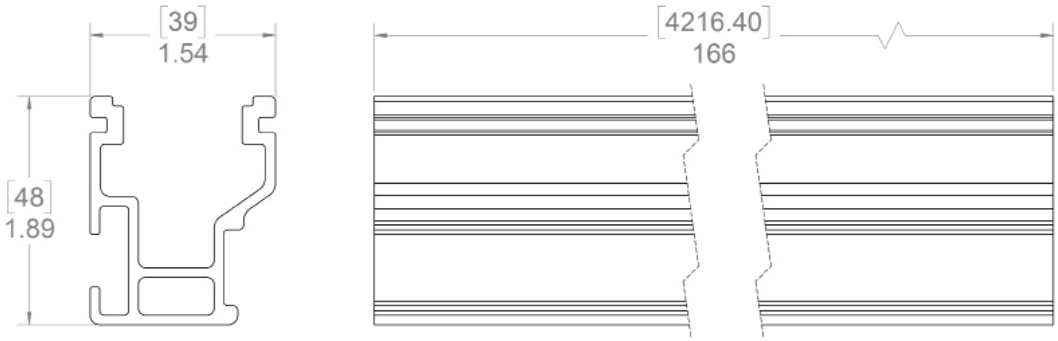


Mechanical Properties

	CrossRail 48-XL
Material	6000 Series Aluminum
Ultimate Tensile Strength	37.7 ksi (260 MPa)
Yield Strength	34.8 ksi (240 MPa)
Weight	0.76 lbs/ft (1.13 kg/m)
Finish	Mill or Dark Anodized

Section Properties

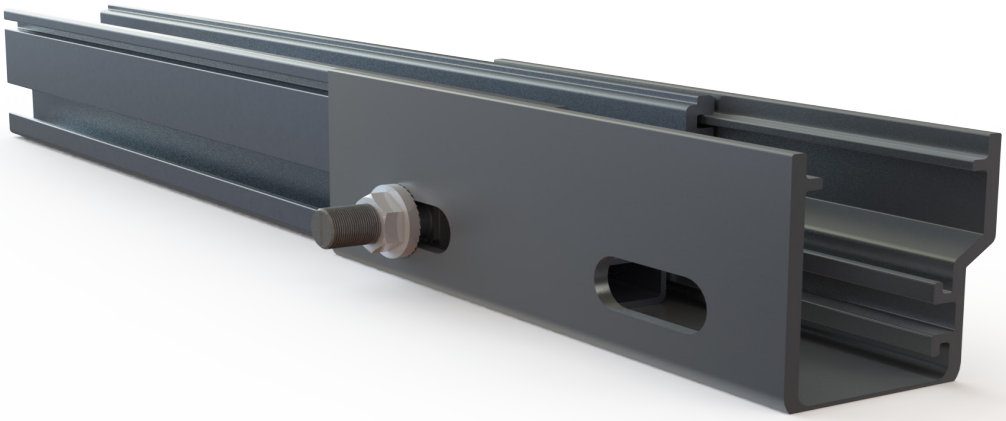
	CrossRail 48-XL
Sx	0.279 in^3 (4.571 cm^3)
Sy	0.257 in^3 (4.213 cm^3)
A (X-Section)	0.652 in^2 (4.207 cm^2)



Dimensions in [mm] Inches

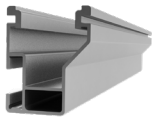
Notes:

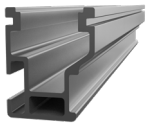
- Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-16
- UL2703 Listed System for Fire and Bonding



QUICK GUIDE

CrossRail 48-X/48-XL Rail Connector

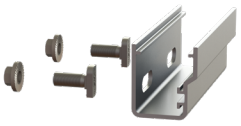




CrossRail 48-X/48-XL

Material: Aluminum

Part Number	Description
4000662	CrossRail 48-X 166'', Mill
4000663	CrossRail 48-X 166'', Dark
4000675	CrossRail 48-X 175'', Mill
4000695	CrossRail 48-XL 166", Mill
4000705	CrossRail 48-XL 166", Dark



CrossRail 48-X/48-XL Rail Connector

Material: Aluminum
Hardware: Stainless steel

Part Number	Description
4000385	RailConn CR 48-X,48-XL Struct Set, Mill
4000386	RailConn CR 48-X,48-XL Struct Set, Dark

TOOLS REQUIRED

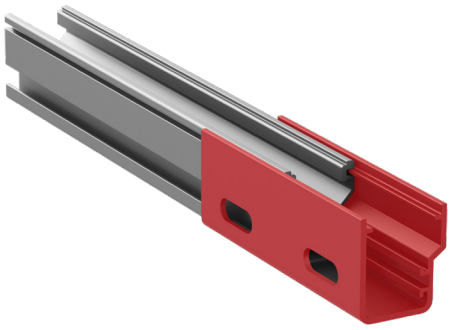
10-50 ft-lb

13 mm socket
- Torque 25.8 ft-lbs

1/2" socket
- Torque 25.8 ft-lbs

Assembly

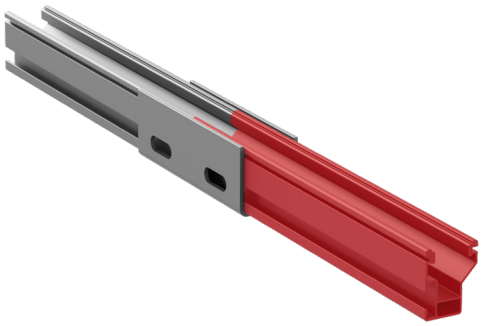
1 INSTALL RAIL CONNECTOR



Slide the rail connector onto CrossRail 48-X or 48-XL.

The rail connector contains mating features and must be inserted prior to aligning the rails together.

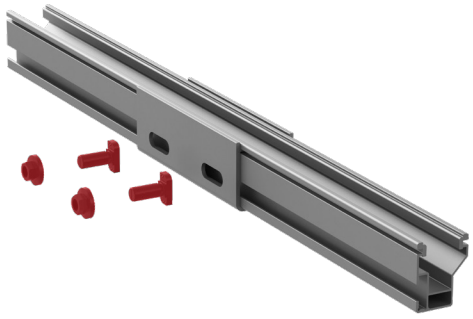
2 ALIGN RAILS



Align the two rail ends next to each other and center the rail connector between the two rails.

Note: CrossRail 48-X pictured.

3 CONNECT RAILS



Attach the rail connector using two M10 T-Bolts (use bonding T-Bolts with dark rail) and two hex nuts.

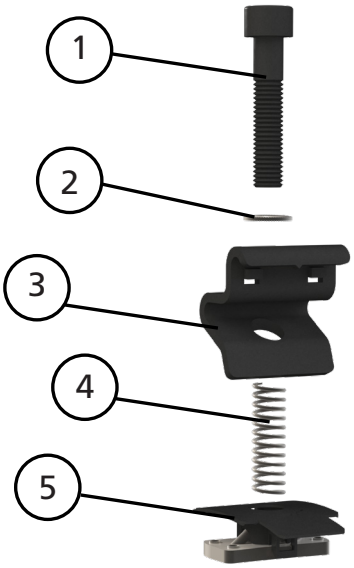
Ensure that the slot on the bottom of the T-Bolt is vertical, indicating that the T-Bolt head is properly engaged in the rail channel.

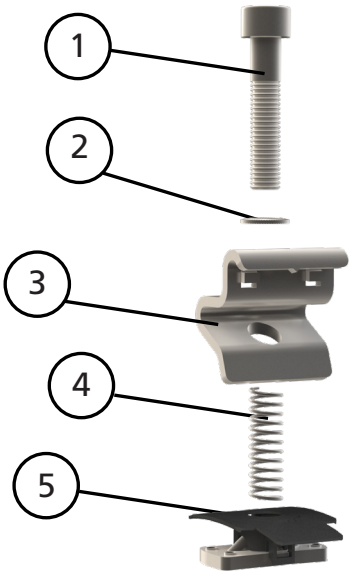
Torque: Torque the serrated hex nuts to 25.8 ft-lbs (35 Nm)

Note: Please refer to the system and state-specific engineering letters for allowable spans, limitations and installation notes regarding the capabilities of CrossRail 48-X or 48-XL and the CrossRail 48-X/48-XL Rail Connector.

Note: CrossRail 48-X pictured.

CrossRail End Clamp



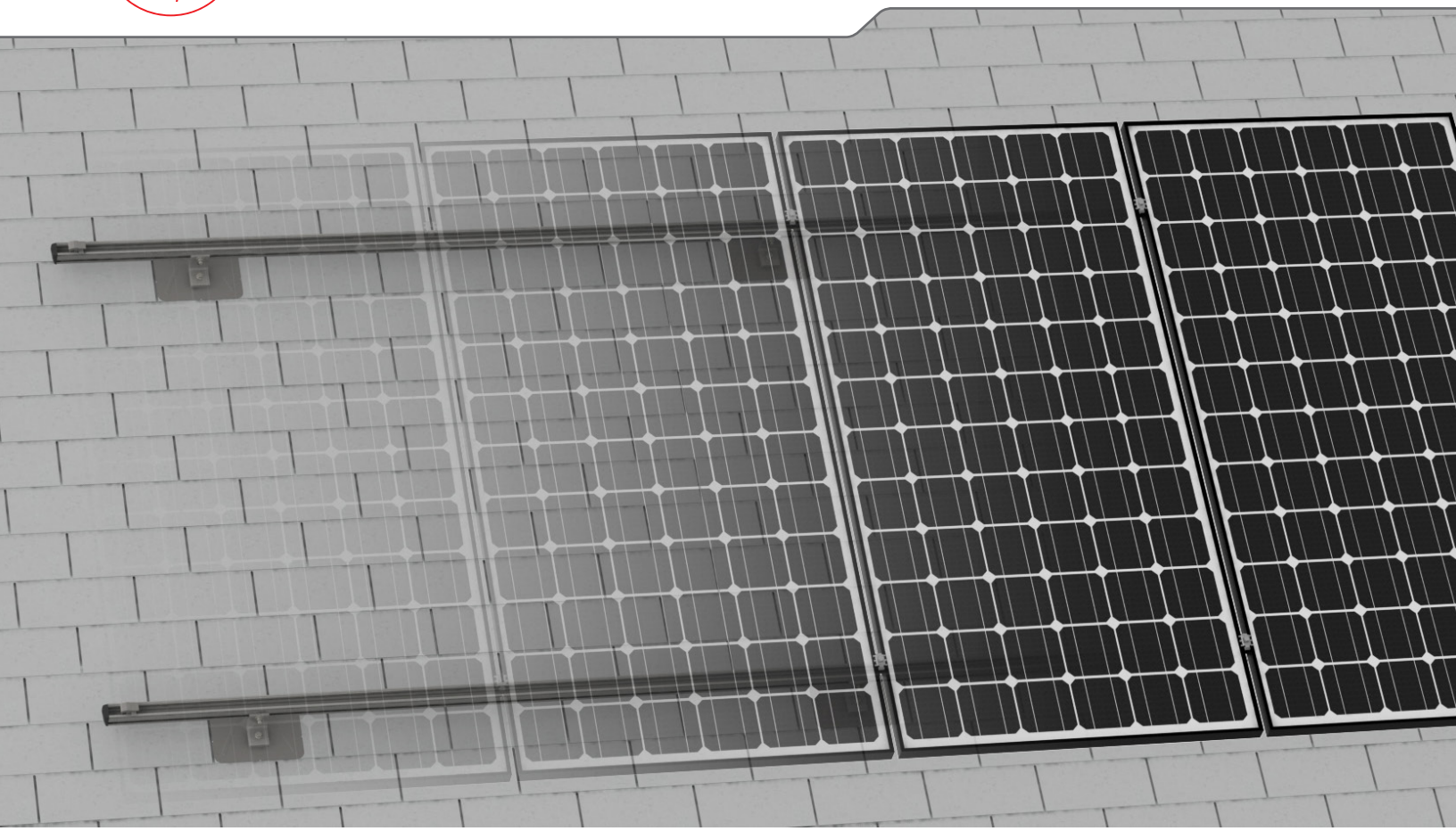


Item No.	Description	Part No.
1	Allen Bolt	4000429 CR EC Silver, 30-50mm, Shared RL 30-45mm
2	Lock Washer	4000430 CR EC Dark, 30-50mm, Shared RL 30-45mm
3	End Clamp	
4	Clamp Spring	
5	MK3 Slot Nut	

Technical data

	Mid Clamp
Scope of application	Used with all of our CrossRail based systems
Fastening type / roof fixture	Clamp
Module orientation	Vertical or horizontal
Material	Stainless steel
Compatible module frame size	30-50mm
Warranty	25 years

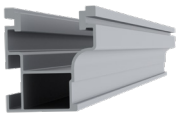
CrossRail System



- High quality, German-engineered system for residential and commercial installations
- 4 rail sizes available to suit all structural conditions
- Universal components for all rail types
- Use 2 innovative components to turn this system into Shared Rail or Tilt Up
- MK3 technology provides highest rail engagement
- Roof attachments for all roof types
- 100% code compliant, structural validation for all solar states
- Fast installation with minimal component count result in low total installed cost
- Simple to design using our code compliant online design tool, Base

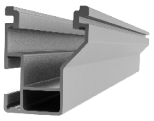
Product warranty 25 years in system alliance

Components



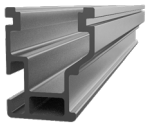
CrossRail 44-X

Part Number	Description
4000019	CrossRail 44-X 166'', Mill
4000020	CrossRail 44-X 166'', Dark
4000021	CrossRail 44-X 180", Mill
4000022	CrossRail 44-X 180", Dark



CrossRail 48-X

Part Number	Description
4000662	CrossRail 48-X 166'', Mill
4000663	CrossRail 48-X 166'', Dark
4000675	CrossRail 48-X 180'', Mill
4000665	CrossRail 48-X 180", Dark



CrossRail 48-XL

Part Number	Description
4000695	CrossRail 48-XL 166'', Mill
4000705	CrossRail 48-XL 166'', Dark

CrossRail 80

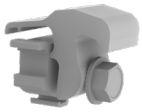
Part Number	Description
4000508	CrossRail 80 168" Rail Mill

CrossRail Mid Clamp Standoff

Part Number	Description
4000601-H	CR MC Silver, 30-50mm, 13 mm Hex
4000602-H	CR MC Dark, 30-50mm, 13 mm Hex

CrossRail End Clamp

Part Number	Description
4000429	CR EC Silver, 30-50mm, Shared RL 30-45mm
4000430	CR EC Dark, 30-50mm, Shared RL 30-45mm
4000003	Shared Rail EC Silver, SS 46-50mm
4000004	Shared Rail EC Dark, SS 46-50mm

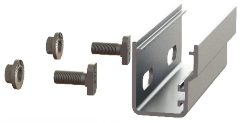


Yeti Clamp

Part Number	Description
4000050-H	Yeti Hidden EC for CR, Mill, 13 mm Hex

Aluminum End Clamp

Part Number	Description
4005344	CrossRail EC Silver, AL 32-33mm
4005169	CrossRail EC Silver, AL 34-36mm
4005290	CrossRail EC Silver, AL 37-38mm
4005170	CrossRail EC Silver, AL 39-41mm
4005291	CrossRail EC Silver, AL 42-44mm
4005171	CrossRail EC Silver, AL 45-47mm
4005292	CrossRail EC Silver, AL 48mm
4005172	CrossRail EC Silver, AL 49-50mm

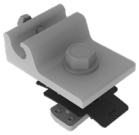


CrossRail Structural Rail Connector

Part Number	Description
4000051	Rail Connector CR 44-X, Set, Mill
4000052	Rail Connector CR 44-X, Set, Dark
4000385	RailConn CR 48-X,48-XL Struct Set, Mill
4000386	RailConn CR 48-X,48-XL Struct Set, Dark

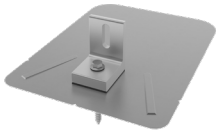
L-Foot Slotted Set

Part Number	Description
4000630	L-Foot Slotted Set, Mill
4000631	L-Foot Slotted Set, Dark



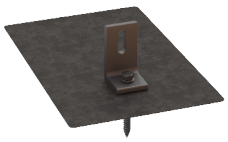
Everest Ground Lug

Part Number	Description
4000006-H	Everest Ground Lug Set, 13 mm Hex



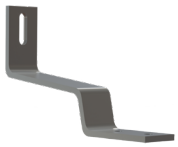
EverFlash XP Comp

Part Number	Description
4000054	EverFlash XP Slider Kit, Mill
4000055	EverFlash XP Slider Kit, Dark
4000057	EverFlash XP Kit, Mill LF, Dark Flash
4000060	EverFlash XP Comp Kit, Dark
4000061	EverFlash XP Comp Kit, Mill



EverFlash eComp

Part Number	Description
4000015	EverFlash eComp + SRS Slide Kit, Mill
4000366	EverFlash eComp Kit, Black
4000679	EverFlash eComp Kit, Mill LF, Dark Flash
4000367	EverFlash eComp Kit, Silver
4000027	EverFlash eComp+SR Slide Kit, Dark
4000029	EverFlash eComp+SR Slide, LF Mill, Dark



Flat Tile Hook

Part Number	Description
4000034	Flat Tile Hook, Set, W/ lags

TC Wire Management Clip

Part Number	Description
4000069	Wire Management Clip, TC