

## Safety Instructions



### **Important Warnings**

- All safety instructions in this Installation and operation guide should be read and understood before attempting to install, wire, operate or maintain this module.
- The installer is responsible to follow all applicable local, regional and national building and electrical codes when installing this product.
- All installations should be performed by qualified and authorized personnel.
- Repair or modification of this module made in the field will void the warranty.



### **Handle with care: fragile glass, plastic and exposed wires**

- Handle modules using the aluminum frame rails.
- Do not pick up modules by the junction box or wires.
- Do not handle modules when wet or during periods of high wind.
- Do not stand on, drop or allow objects to sit or drop on the modules.
- Protect the glass surface and backing from damage from tools or other objects during installation.
- Do not set modules down on the frame corners; use the entire frame edge.
- Wear gloves and use safety glasses when handling modules.



### **Fire: Modules are Type 2 fire rated**

- The fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions
- Fire Classification A, B or C is dependent on UL2703 Racking used (as per racking manufacturer instructions)
- "Class C" fire classification for Canada only
- Use ground and arc fault circuit protection as required by local codes for roof mounting.
- Maintain a minimum clearance of 1.5" from roof (3"- 6" is optimal for air flow).
- Roof surface must be a fire resistant covering appropriate for the application.
- Refer to local fire marshal for special requirements when installing this module.
- Rated for unlimited roof pitch.



### **Electrical: Contact with electrical voltage and current can be hazardous**

- Do not expose modules to artificially concentrated sunlight.
- Do not connect or disconnect modules under load or while exposed to light.
- Use insulated tools, safety glasses and gloves to reduce the risk of electrical shock.
- Damaged modules should not be installed due to the risk of hazardous electrical shorts.
- Do not subject modules to insulation testing above the system rating of 600\1000 Volts DC; damage to internal components may occur and void the warranty.
- The rating of the over-current protection device shall not exceed 15 Amps DC.

### **Disclaimer of Liability**

- The use of this panel and **Installation and Operations Manual** are beyond the control of Itek Energy, therefore Itek Energy does not assume responsibility and expressly disclaims liability for loss, damage, injury, or expense associated with such installation, operation use or maintenance of this panel.
- Itek Energy assumes no responsibility for any infringement of patents or other rights of third parties that may result from the use of this panel. No license is granted by implication or other-wise under any patent or patent rights.
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This document may be provided in multiple languages. If there is a conflict between versions, the English version shall take precedence.

## Mechanical Installation

### General

- The module is considered to be in compliance with UL 1703 only when the module is mounted in the manner specified by the mounting instruction below.
- Modules must be securely fastened to the mounting structure; follow the torque guidelines of the rail manufacturers or fastener suppliers (minimum torque guidelines for common fasteners).
- Frame holes are large enough to accommodate 3/8" SS bolts if additional strength is needed for a particular application as determined by the system designer.
- Use Stainless Steel fasteners or an equivalent fastener designed for attachment to aluminum in order to minimize galvanic corrosion.
- It is recommended that anti-seize lubricant be used to prevent galling of Stainless Steel fasteners.
- The installer must verify that the mounting structure and all fasteners can handle the applicable wind, snow and seismic loads in addition to the weight of the modules, as required by local building codes.
- Follow the minimum attachment guidelines as outlined in Attachment Guideline table, exceeding the loads in the mounting tables will void the warranty and will not meet the UL listing tests performed on this module.
- Do not drill additional holes in the mounting frame; this will void the warranty.
- Allow minimum of 3/8" (10mm) between modules for thermal expansion.
- Always keep the backsheet clear of foreign objects and structural elements that may contact the module during mechanical loading from wind, snow or seismic activity.
- Any module without a frame (laminated) shall not be considered to comply with the requirements of UL 1703 unless the module is mounted with hardware that has been tested and evaluated with the module under this standard or by a field inspection certifying that the installed module complies with the requirements of UL 1703.

### Installation Methods

- I. **Method #1 - Bolted to base flange** Bolting with user supplied minimum 4 each 1/4"-20 Stainless Steel bolts (Grade 5 or better), with 1 nut, 2 SAE large flat washers 1 lock washer per bolt, attached through the mounting holes in the foot of the Frame. Can substitute 4 each 1/4" – 20 Knurled Flange Bolts and Nuts for washers and lock nut on nut side. Follow "Attachment Guidelines" in Table #1 pg. 4 for specific load configurations.

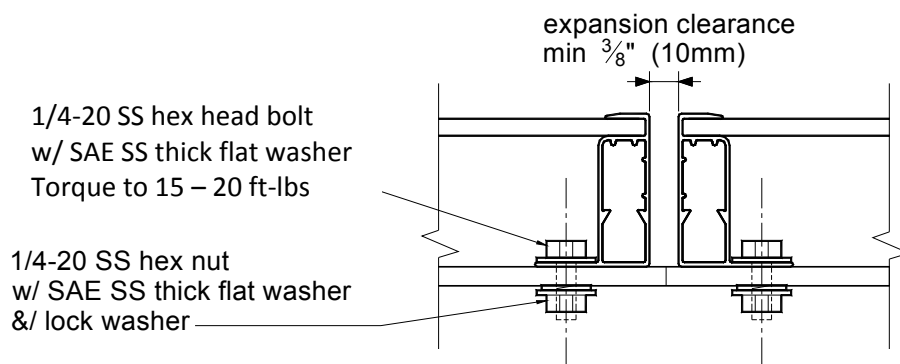
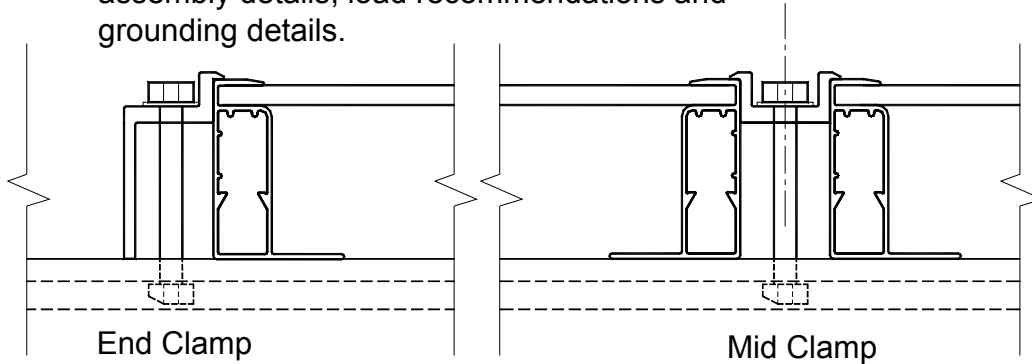


Fig. 1

- II. **Method # 2 - Clamp and Rail Style** - Using mounting clamps, supplied by various module rail manufacturers, such as Unirack, S-5 Clamps, Schletter, Sunmodo or equivalent. Follow "Attachment Guidelines" in Table #1 pg. 4 for specific load configurations.

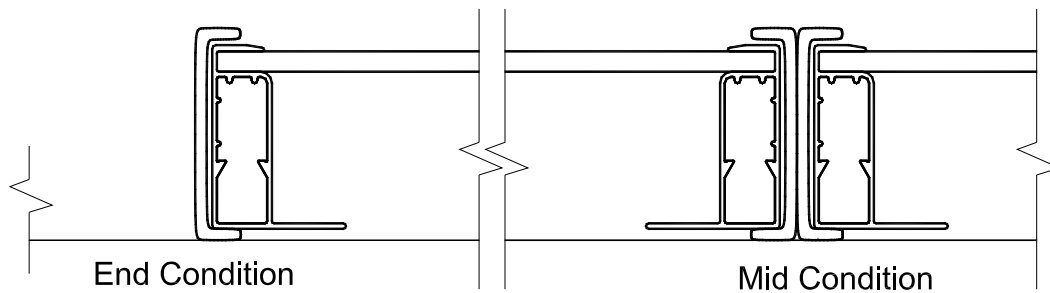
Refer to specific clamp/rail manufacturers for assembly details, load recommendations and grounding details.



**Fig. 2**

- III. **Method # 3 – Insertion Style Rails** – where frame slides into and is captured by a "C" channel rail (see Fig 3), such as Solar Flex Rack or equivalent. Follow "Attachment Guidelines" in Table #1 pg. 4 for specific load configurations.

Refer to specific insertion rail manufacturers for assembly details, load recommendations and grounding details.



**Fig. 3**

- IV. **Method # 4 UL2703 Integrated Grounding Bond Racking** – Grounding when installed using UL2703 Certified Racking in accordance with the racking manufacturer installation instructions is acceptable.

	2400 Pa Load 50 psf	3800 Pa Load 90 psf	5400 Pa Load 113 psf
<b>Bolted to Flange</b> <i>Note: Long axis of frame only</i> <i>Note: do not attach through holes on short rail!</i>	<p>Use min. (4) 1/4-20 SS bolts</p>	<p>Use min. (6) SS 1/4-20 bolts</p>	<p>Use min. (8) SS 1/4-20 bolts</p>
<b>Clamping/Rails System</b> <i>Rails perpendicular to long axis of frame</i>	<p>Use 4 clamps Attach clamps in clamping zone</p>	<p>Use 4 clamps Attach clamps at clamp points</p>	<p>Use 4 clamps Attach clamps at clamp points</p>
<b>Insertion System</b>	<p>Use insertion system on short frame</p>	<p>Use insertion system on long frame</p>	<p>Use insertion system on long frame</p>
<b>Attachment Guidelines</b>			

**Table 1 Mounting and Load Details**

**Note: Loads in Table 1 are maximum loads tested. System designers and/or engineers are responsible for applying the appropriate Factor of Safety for the application.**

## Electrical Installation

### General

- This product must be installed by a licensed electrician in accordance with the applicable electrical code (i.e. the NEC for the USA and CEC for Canada).
- In Canada, installation shall be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electric Code, Part I.
- Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of ISC marked on this module should be multiplied by a factor of 1.25 when determining component conductor ampacities, fuse sizes, and size of controls connected to the PV output.
- Refer to Section 690.8 of the National Electrical Code for an additional multiplying factor of 125 percent (80 percent de-rating) which may be applicable.
- Use Connectors supplied for making series connections between modules or attaching directly to a micro inverter. Modification of the connectors supplied with the module will void the warranty and the UL listing of this module.
- If additional wire lengths are needed between modules, use a minimum wire size of 12 AWG RHW-2, USE-2 or PV Wire, 90C rated for connecting modules as required by local codes for your specific application.
- Use only matching brand connectors (MC4 or Renhe 05-6) when extending module wire, unless transitioning to a different wiring system. Mismatched connectors can become a fire hazard and will void module warranty.
- Transitions to other wiring systems should occur in a junction box or listed DC combiner box as per NEC code requirements.
- Provide 15 amp maximum series fuse as required by NEC 690.

### Grounding Method

- A module with exposed conductive parts is considered to be in compliance with UL 1703 only when it is electrically grounded in accordance with the instructions presented below and the requirements of the NEC
- Frames of modules and the racking system they are attached to must be grounded per NEC Article 690 and 250 to meet local code requirements.
- Frames of each module are factory bonded and tested, so only one grounding point per module is required, unless otherwise specified by the UL 467 listing requirements of the specific bonding method being used.
- Additional bonding to ground of mounting structure may be required, please refer to specific mounting system manufacturer for recommended methods and local codes for requirements as per NEC Article 250.
- Minimum Grounding wire size is 14 AWG if mechanically protected or inaccessible, otherwise 6 AWG must be used; refer to local codes for specifics.
- Any grounding method listed to UL 467 “Standards for safety for Grounding and Bonding Equipment”, UL 1703 or 1741 may be used to bond the module frame and structure if strictly following all manufacturers’ instructions and recommendations for grounding specific to that method are followed.
- Itek energy has been tested and approved by Wiley for using the WEEB grounding system.
- Use the following Default Minimum Installation Torque values unless otherwise specified by the listing specification given by the manufacturer.
- Any racking system listed to UL 2703 for grounding, mechanical load, and Fire class may be used provided all manufacturer instructions for that system are followed.

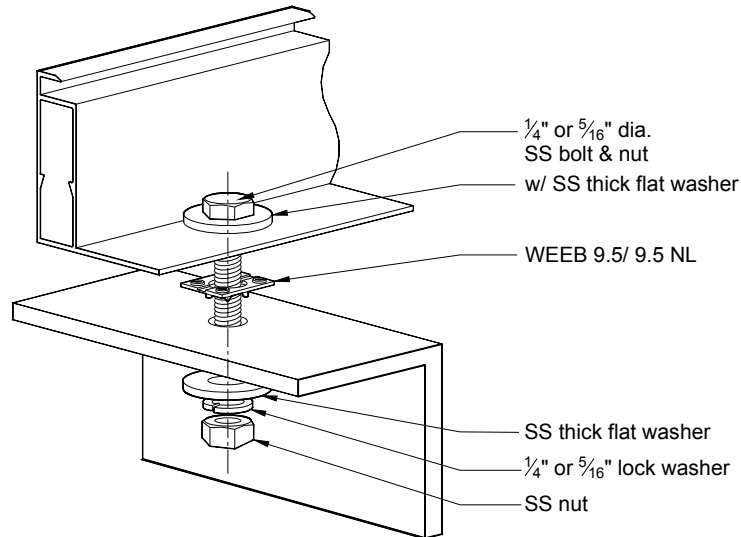
Installation Torque Specifications

Stainless Steel Fastener size	Installation Torque with anti-seize
1/4"	10 ft-lb (13.5 N-m)
5/16"	15 ft-lb (20.5 N-m)
3/8"	30 ft-lb (41 N-m)

**Table 2 Torque Specifications**

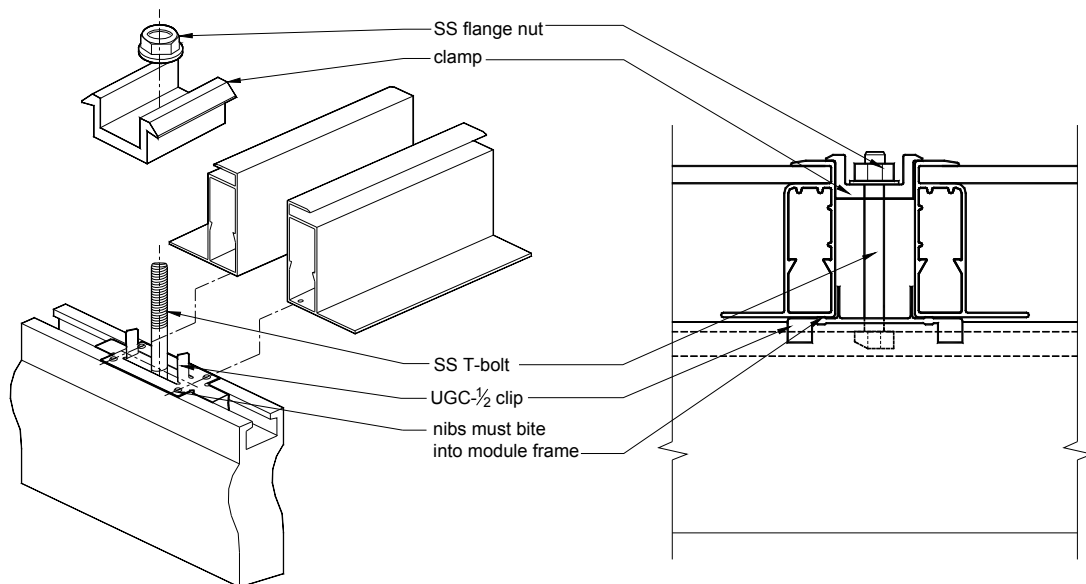
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- I. **Method #1 Direct Bond** - Bonding of Module to bolted conductive rail or frame using WEEB9.5/9.5L between the module and rails or an equivalent listed product. The rail then needs to be connected to a grounding conductor using **Method # 3 Lay-in Lug** or an equivalent listed device.



**Fig 4**

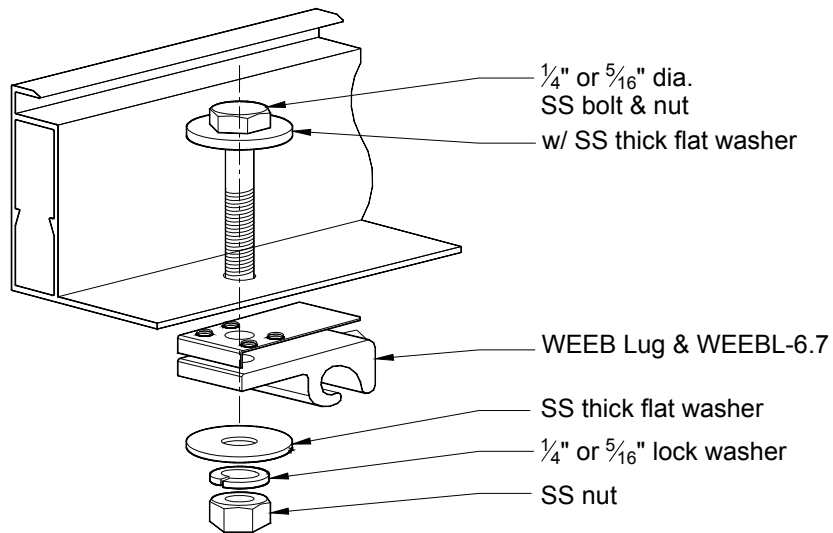
- II. **Method #2 Grounding Clip** – Grounding clips such as UGC-1/2 (UNIRACK) or WEEB-XXX (Wiley, XXX designates manufacturer's style of rail or structure, see Wiley website [www.wiley\\_llc.com](http://www.wiley_llc.com)), or an equivalent listed device used to bond the modules to the rail or mounting structure. The rail then needs to be connected to a grounding conductor using the **Method # 3 Lay-in Lug** or an equivalent listed device.



**Fig 5**

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- III. **Method # 3 Lay-in Lug** - Attach grounding conductor to a lay-in lug on each module using marked grounding holes in module or any unused mounting holes using a WEEB-Lug or an equivalent listed device. This method can also be used to attach ground wire to mounting rails.



**Fig 6**

- IV. **Method # 4 UL2703 Integrated Grounding Bond Racking** – Grounding when installed using UL2703 Certified Racking in accordance with the racking manufacturer installation instructions is acceptable.

## Electrical Specifications at Standard Test Conditions\*

Maximum system voltage – 600/1000 VDC Maximum Fuse Rating - 15 Amps DC\*\*

Electrical Data*	235 SE	240 SE	245 SE	250 SE	255 SE	260 SE	265 SE	270 SE	275 SE	280 SE	285 SE	290 SE	295 SE	300 SE	305 SE	310 SE	315 SE
Maximum Power – $P_{max}$ (Wp)	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
Maximum Power Voltage – $V_{MPP}$ (V)	31.9	32.1	32.2	32.4	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.8	32.9	33.1	33.2	33.3
Maximum Power Current – $I_{MPP}$ (A)	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3
Open Circuit Voltage – $V_{OC}$ (V)	37.7	37.9	38.1	38.3	38.4	38.6	38.7	38.9	39.0	39.2	39.3	39.5	39.7	39.8	40.0	40.1	40.3
Short Circuit Current – $I_{SC}$ (A)	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0
Power Density (W/m <sup>2</sup> )	140.2	143.1	149.6	146.1	152.1	155.1	158.1	161.0	164.0	167.0	170.0	173.0	175.9	178.9	181.9	184.9	187.9

\* Electrical characteristics may vary within  $\pm 2\%$  of the indicated values at Standard Test Conditions (STC):

Irradiance of 1000W/m<sup>2</sup> AM 1.5 spectrum, cell temperature 25°C(77°F).

\*\*Junction Box, Cables, and connectors will be marked 600 or 1000 VDC Installer is responsible to insure correct voltage is used for the application.

### Mechanical Specifications

Cell	60 each 156.75mm Monocrystalline
Diodes	3 each, 1 per 20 cells, 15A ZJRH PS4025 6 each, 2 per 20 cells, 15A ZJRH PS4512 3 each, 1 per 20 cells, 15A ZJRH PVS105
Junction Box	RENHE ZJRH PVRH701L 600VDC RENHE ZJRH PVRH701L 1000VDC
Connectors	MultiContact (PV-KST4, PV-KBT4), RENHE (05-6) 600 VDC MultiContact (PV-KST4, PV-KBT4), RENHE (05-6) 1000 VDC
Wire	PV 12AWG, 42" 600VDC; PV 12AWG, 42" 2000VDC
Dimensions	1.675mm x 1001mm x 50mm (65.95" x 39.41" x 1.97")
Weight	20 kg 43 lbs.

### Temperature Coefficients

Voltage - $T_{kvoc}$	-0.29 %/C
Current - $T_{klsc}$	0.04 %/C
Power - $T_p$	-0.39 %/C

