



Installation Instructions for the FLEX60 Photovoltaic Modules

Installation Instructions for the FLEX60 Photovoltaic Modules

Introduction

This manual provides important safety instructions for the Sunflare FLEX60 module and should be read and understood in its entirety prior to handling and installation. These modules have been certified by CSA Group to UL1703 and UL790 for installation on TPO, EPDM, and PVC roofing systems.

These installation instructions are valid for Sunflare FLEX60 modules with the following model numbers.

Introduction	Wmp	Voc	Isc	Vmp	Imp
FLEX60-160W	160	33	7.4	25.8	6.2
FLEX60-165W	165	34	7.4	26.6	6.2
FLEX60-170W	170	35	7.4	27.4	6.2
FLEX60-175W	175	36	7.4	28.2	6.2
FLEX60-180W	180	37	7.4	29	6.2
FLEX60-185W	185	38	7.4	29.8	6.2
FLEX60-190W	190	39	7.4	30.6	6.2
FLEX60-195W	195	40	7.4	31.4	6.2
FLEX60-200W	200	41	7.4	32.2	6.2

The electrical characteristics are within ± 10 percent of the indicated values of I_{sc} , V_{oc} , and P_{max} under standard test conditions (irradiance of 100 mW/cm², AM 1.5 spectrum, and a cell temperature of 25°C (77°F)).

Maximum System Voltage	UL/IEC	1000V
Temperature Coefficient Power		-0.35%/°C
Temperature Coefficient Voltage		-0.25%/°C
Temperature Coefficient Current		+0.03%/°C

Installation, commissioning, servicing and repairs to the module, and an array, should only be carried out by qualified and authorized persons in compliance with local and national electrical, fire, and health and safety codes. If there are any discrepancies between these instructions and the applicable local or national codes, the local and national codes take precedence.

These instructions are intended as a guideline for professional solar system integrators only. The

FLEX60 modules are not intended for installation by unqualified end users. These instructions are to be retained for future reference in case of maintenance, ownership change, or disposal.

General & Electrical Safety Information

- **Danger!** These modules can produce lethal electrical voltages when connected in series. Read all safety information prior to handling. Failure to adhere to the following safety guidelines can lead to arcs, fires, and electric shock hazards.
- The module is considered in compliance with UL 1703 only when the module is mounted in the manner specified by the mounting instructions below.
- Any module without a frame (laminated) shall not be considered to comply with the requirements of UL1703 unless the module is mounted with hardware that has been tested and evaluated with the module under this standard or by field inspection certifying that the installed module complies with the requirements of UL 1703.
- The PV modules should only be used for the purpose for which they are intended.
- Concentrated or artificial sunlight shall not be directed onto the PV module.
- All work on the PV system should be performed by qualified personnel only.
- **Warning!** Solar modules generate direct current (DC) when exposed to light. Breaking or opening a connection under load, i.e. when current is flowing, can cause an electric arc which will not self-extinguish.
- Never work on the system or module under load.
- Always turn off and disconnect the inverter or other loads before working on the system.

- Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. The requirements of the National Electrical Code (NEC) in Article 690 shall be followed to address these increased outputs. In installations not under the requirements of the NEC, the values of I_{sc} and V_{oc} marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, overcurrent device ratings, and size of controls connected to the PV output.
- A module without a frame (laminate) 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.
- 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 National Electrical Code.
- Installing solar photovoltaic panels and systems requires specialized skills and knowledge. Do not attempt to install these panels if not qualified to do so.
- Installation should only be performed by qualified persons.
- The installer assumes all risks of injury that might occur during installation, including but not limited to, the risk of electric shock.
- **Danger!** A single module generates more than 30V DC when exposed to sunlight and system voltages can be as high as 1000 V. Contact with voltages greater than 30V DC can be hazardous, leading to electric shock and possibly death.
- **Danger!** Even though it is safe to walk on the FLEX60 modules, it could become dangerous if the top surface has been damaged, degrading the dielectric resistance of the module. This could lead to electric shock. Have qualified personnel ensure all modules surfaces are undamaged before walking on them.
- **Danger!** Water exposure can lead to increased risk of electric shock if the module's encapsulation system has been compromised. Have qualified personnel ensure there is no leakage current and the system is in safe working order before walking on or working on the modules.
- **Danger!** The FLEX60 modules may become slippery when wet. This could cause a slip hazard. If modules are wet, walk carefully, and keep your center of gravity. Failure to do so could result in a fall hazard leading to personal injury. If working on a roof without a parapet or other curb type system, fall protection needs to be deployed.
- **Danger!** Do not stand or walk on modules unless they are clean. Dirt and debris could damage the outer surface of the module exposing electrical components leading to electric shock.
- **Danger!** Do not drop objects such as tools onto the modules. This could damage the modules encapsulation surfaces exposing electrical components leading to risk of electric shock.
- **Warning!** Short circuits on the DC side of the installation can cause arcing. Unlike arcs occurring in low voltage AC wiring, these arcs are not self-extinguishing. The high temperatures generated by these arcs can destroy connectors. If not handled and installed according to instructions, PV modules can present a lethal as well as a fire hazard.
- **Danger!** Damaged modules, cables, and connectors can present a shock hazard resulting in electrocution and death. Do not attempt to install, service, remove, touch or modify a damaged module. Damaged modules should only be removed by qualified professionals wearing appropriate personal protection equipment for high voltage. If damaged modules are found, they should be immediately identified and secured from access by unauthorized individuals. Never attempt to remove or otherwise service a damaged module if it is wet or raining.
- **Danger!** To service a module, (1) isolate the string from others in the system, (2) use blackout blankets on the entire string to remove voltage from the system and then (3) disconnect the target module. You may then remove the module from the roof keeping the blackout blanket over the module to prevent voltages from developing during removal. Failure to follow these procedures may lead to electric shock.
- All electrical work must be performed by qualified personnel only. All electrical material must be suitable for DC and rated

for the existing system voltage. If exposed to sunlight, the electrical material must be UVresistant.

- String configuration should be planned in accordance with inverter manufacturer's instructions.
- If the installation is taking place in Canada, it must be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part1.

Fire Safety

- The presence of photovoltaic modules and support structures (racking systems) on a roof can change the roofing system's fire performance.
- Roof construction and photovoltaic system support structures may affect the fire safety of a building. Improper installation may create a hazard in the event of a fire.
- The module is certified by CSA for use over a Class ATPO, EPDM and PVC roofing systems when installed per these instructions. They are not certified for other applications.
- The Sunflare wire tray is required to maintain the fire rating of the modules.
- Only Butyl based adhesives are certified to adhere the Flex60 modules to a roof membrane.
- Use components such as ground fault circuit breakers and fuses as required by local authorities.
- Provide rapid shutdown devices per the NEC.
- The fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions in this manual.
- Consult your local authority for guidelines and requirements for building and or structural fire safety.
- Do not install this module near flammable materials or materials with flammable off gasses.

Installation Safety

- Follow all local and national safety precautions when on a roof, including but not

limited to fall protection, gloves, helmets, and safety glasses.

- **Warning!** A photovoltaic panel can act as a sail in even low wind conditions knocking or pulling an installer off a roof. In addition, panels can become missiles if unsecured and blown away by the wind. A flying module can injure roofers or people on the ground. Use all appropriate precautions including fall protection and module capture devices to ensure safe handling in the event of winds or wind gusts. Note, wind gusts can be unpredictable and are not always preceded by increased wind speeds. Care must be taken to ensure panels are always safely secured.
- When handling electrical components use all appropriately rated personal protective equipment for handling any possible voltages at the job site.
- **Warning!** Do not install solar systems when it is raining or the work surfaces are wet, icy, or otherwise slippery. This could lead to personal injury.
- **Warning!** Do not install in the rain, snow or in windy conditions. This could lead to personal injury.
- Avoid exposing cables to direct sunlight to help prevent their degradation over time.
- **Danger!** Never open electrical connections (such as connectors) when the circuit is under load.
- **Danger!** Contact with electrically charged parts of the panels, such as terminals, can result in burns, sparks and lethal shock whether or not the panel is connected.
- Keep unqualified persons away from the work area and the system during transportation and installation.
- Completely cover the module with an opaque material during installation to prevent electricity from being generated.
- Do not wear metallic jewelry including ear, nose, and lip rings, watchbands, pins, or any other metallic object during installation or troubleshooting of photovoltaic systems.
- Use only insulated tools that are approved for working on electrical installation at the voltages possible present at the job site.
- Follow all safety regulations and instructions in the installation manuals for all components of the system.

- Do not remove or modify any leads or connectors provided with your module. Doing so could result in electrical shock, arcing, and fires as well as void the module's warranty.
- Use only MC4 connectors from Multi-Contact when connecting to these modules.
- When cutting the wire tray, use all relevant personal protections equipment per OSHA guidelines. Cut the tray and cover prior to installation and away from modules and the roof surface to prevent accidental damage to those components.
- **Warning!** Do not scratch, hit or damage the topsheet or the backsheets in any way. Damage to these components could create an electric shock hazard.
- A panel with a damaged or torn topsheet or backsheet cannot be repaired and must not be used.
- Work only under dry conditions, and use only dry tools. Do not handle panels when they are wet.

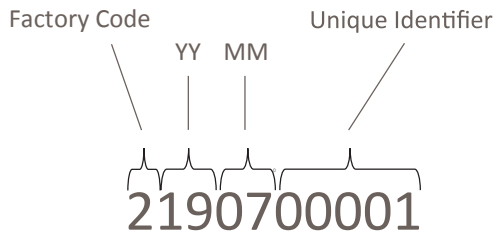
Handling Safety

- System designers and installers are responsible for proper support structure design. Sunflare is not responsible for supporting structures, including but not limited to the roof structure.
- Follow all local, regional, and national statutory regulations and obtain all required building permits.
- Only use equipment, connectors, wires, and support systems suitable for solar electric systems.
- Do not lift or carry the module by its junction box or electrical leads.
- Do not stand or step on the module until they are fully installed.
- Do not stand or walk on modules unless they are clean. Dirt and debris underfoot could cause damage to the surface of the module reducing its electrical performance.
- Do not drop the module or allow objects to fall on the module.
- Do not place heavy or sharp objects on the module.
- Use only original packaging when transporting or moving the modules.
- Do not disassemble the modules or remove any nameplates, serial numbers, or components from the modules.
- Do not apply paint or adhesive to the module.
- Do not modify the module in any way.
- **Danger!** Keep uninstalled panels in their box until it is time to install them. Make jumper connections to the J-boxes immediately upon installation to keep water and debris from penetrating the j-box connectors. If immediate connection isn't possible, take measures to prevent water and dirt from entering the j-box connectors. Failure to protect the electrical connections could result in electrical arcs leading to fire and possibly shock hazards.
- **Danger!** All electrical contacts should be kept dry and clean. Failure to do so could lead to electrical arcs resulting in fire and possible shock hazards.
- Keep all connectors and wires away from the roof or any area which may collect water.
- Modules should not be subjected to concentrated loads or stresses during or after installation other than those from environmental factors such as wind and snow loads.
- **Warning!** Do not attempt to roll or fold the modules. Doing so could result in internal electrical damage leading to arc faults and fires.

Unique Identifier

A record of the modules serial numbers should be made before installation and this should be included in the system documentation to be saved.

The module's serial number is located on the back of the module near the name plate and on the front side of the module on the top right next to the j-box. The serial number contains the factory identifier, date code, and a unique identifying number as shown in the example below:



Mechanical Installation

Approved Roof Systems

The FLEX60 module is certified by CSA as part of a Class A roofing system per UL 790 when installed over TPO, EPDM, and PVC roofing systems when the following requirements are met:

- The FLEX60 module with Heliobond and the Sunflare raceway wire management system is certified as Class A over any Class A TPO roofing constructions. The maximum slope is 1/4:12 unless the certified construction has a non-combustible barrier board directly under the roofing membrane. In that case, the max slope is equal to that of the certified roofing construction.
- The FLEX60 module with Heliobond and the Sunflare raceway wire management system maintains Class A fire ratings when installed in combination with any Class A EPDM or any Class A PVC roofing construction that includes a non-combustible barrier board directly under the membrane as specified in the roofing manufacturer’s listing. The max slope is equal to that of the certified roofing construction.

The following table outlines the allowable installation configurations:

Roofing Covering Material	Roofing System Class Requirement	Sunflare Approved Adhesive	Cover Board Required	Sunflare Wire Tray Required	Max Slope
TPO	Class A	HelioBond PVA 600BT	No	Yes	1/4:12
TPO	Class A	HelioBond PVA 600BT	Yes	Yes	Per Listing
EPDM	Class A	HelioBond PVA 600BT	Yes	Yes	Per Listing
PVC	Class A	HelioBond PVA 600BT	Yes	Yes	Per Listing

Notes: (1) Max slope “Per Listing” means per the roofing systems listing prior to the addition of the FLEX60 module. (2) The cover board must be directly under the roofing membrane.

Roofing Membrane Manufacture Approvals

The Flex60 module is fully engineered to reduce stresses on roofing membranes and provide a compatible interface. Never-the-less, before installing Flex60 with Heliobond PVA 600BT per these instructions, you must obtain approval

from the roof membrane manufacturer. Ensure you follow all their recommendations and requirements. Sunflare makes no guarantees nor warranties in relation to the roofing membrane and therefore takes no liability for damage or leaks in the membrane that might be caused from installing the modules.

Roof Membrane Prep

The roof surface must be thoroughly cleaned prior to installation and primed if required to meet load requirements. The surface needs to be free from dust and dirt prior to module adhesion. Failure to properly clean the roofing membrane can result in much lower load capacities than calculated and could result in module adhesive failures resulting in an electrical arc and flying debris hazards that could lead to fires and personal injury.

Besides dust and debris, the roof surface must be dry and free from water, ice or snow prior to module installation. In addition, the roofing surface must be between 40°F -120°F (4°C to 49°C) during installation. Failure to follow these requirements will result in poor adhesion that could lead to premature failure resulting in electrical arcs and fires, and flying debris and personal injury. In addition, poor adhesion due to insufficient roof prep can result in moisture conditions under the modules that facilitates unwanted microbial buildup. This could lead to mold and rot of the laminate and the roof membrane. Sunflare will not take liability for degradation or failure of the module or the roofing membrane resulting from poor installation.

To meet the required load capacity, it might be necessary to prime the roofing surface. Use only primers specified by the roof membrane manufacturer and follow all manufacturers instructions for application. Immediately install the FLEX60 module upon completion of the priming of the surface.

Module Installation

After the roof has been cleaned to the requirements above, the module can be stuck down to the roof. Use chalk lines or other methods to ensure a straight edge for placing the modules. Place the modules so their j-boxes are facing the modules of the next row as shown in Figure 1 to form a row pair. Ensure there is a 1.625” ± 0.25” (1-5/8” ± 1/4”) gap between adjacent module rows. Within a row, the modules should be installed right next to each other with a 0” gap between them. This is to ensure that water does not pond between modules. When sticking the modules down to the roof, first remove the release sheets from the adhesive on the back of the module. Align the j-box short edge of the modules to the chalk line and roll the module down onto the roof. The adhesive is pressure activated. Apply a pressure of 15 psi across all

areas of the modules that have adhesive. Use a soft clean roller to apply the force evenly across the module. Hard or dirty rollers as well as dirty modules may damage the modules top surface.

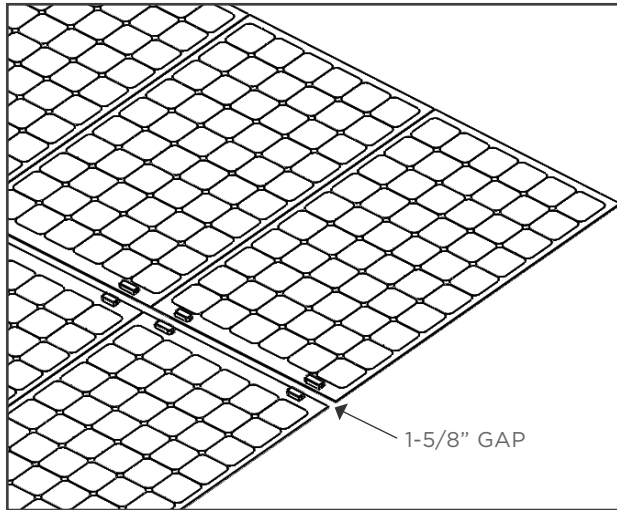


Figure 1 - Ensure proper gap between module pairs.

Wire Tray Installation

The Sunflare raceway is designed to manage wire runs and house module level power electronics, such as optimizers or microinverters. The raceway provides an aesthetic finish to your array while protecting the wires and power electronics from UV exposure.

There are four components to the raceway, the: (1) bottom tray, (2) top cover, (3) coupler, and (4) end cap. The tray is designed to fit between the j-boxes of the module as shown in Figure 2.

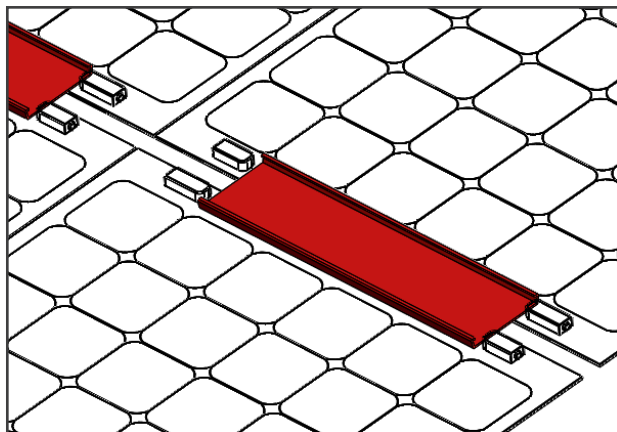


Figure 2 - Install wire trays between junction boxes.

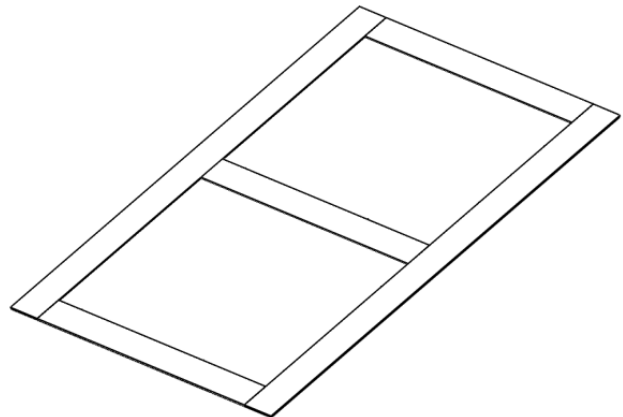
The tray comes with adhesive already applied along the bottom. Ensure proper alignment prior to installation since removal and realignment is very difficult after the adhesive touches the laminate or the roofing. Clean dust, dirt, and oils from the top of the modules and the roofing prior to applying the tape. In most circumstances soap and water is sufficient. If required, IPA can

be used to clean the module's top surface. Follow the roofing manufacturer's instructions for cleaning the roofing surface. Ensure all surfaces are dry and meet the adhesive application temperatures of 40°F -120°F (4 °C to 49 °C). Failure to follow these instructions could result in adhesive failure.

Butyl Adhesive

2-sided butyl adhesive is tape pre applied If products come without the pre-applied tapes, it can be field applied to the back side of the module and the bottom of the tray. Only HelioBond PVA 600BT by HB Fuller has been approved for use with Sunflare modules and wire trays. Do not use any other adhesive. Doing so could void your warranty and lead to product failures.

Install a 4" wide adhesive strip to the module and tray prior to installing them on the roof. Clean the adhesion areas to remove all oils and dirt. Ensure the module and tray are between 40°F -120°F (4 °C to 49°C). Apply the tape along all edges of the backside of the module and across the center as shown in Figure 3. Ensure the tape makes a complete seal all the way around the module to keep water from penetrating under the module. Apply the tape across the entire length of the bottom of the wire tray.



Electrical Installation

Modules in Series

The FLEX60-160W to FLEX60-185W modules are strung in pairs to match power ratings for typical MLPE devices. Electrically connect adjacent modules (across rows) using 1' jumper cables as shown in Figure 4. Jump only one j-box per module. The other j-box will be connected to the MLPE. Jump the same j-boxes for every module pair.

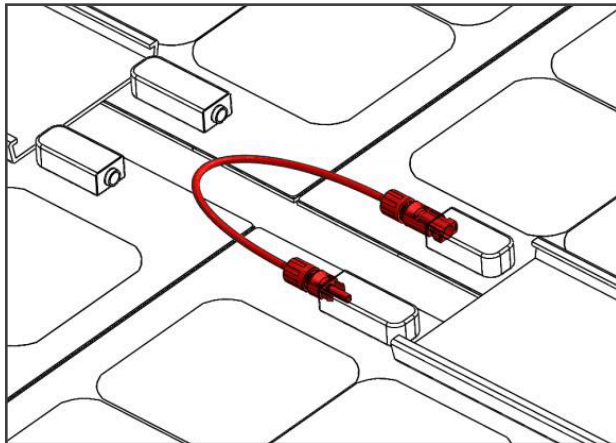


Figure 4 - Create MLPE module pairs using jumpers.

Modules with power ratings greater than 185W are typically connected directly to a single MLPE and thus will not be jumped to an adjacent module as shown in Figure 4.

MLPE Installation

The module level power electronics such as rapid shutdown devices or optimizers are placed inside the center of the wire tray and connect the remaining j-boxes as shown in Figure 5.

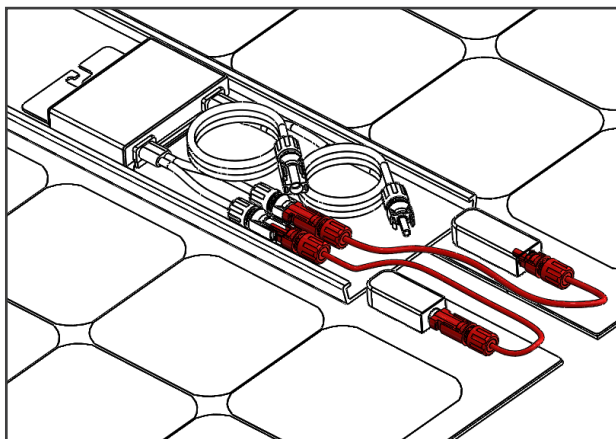


Figure 5 - Connect pair of modules to MLPE.

Once the MLPE is connected to the pair of modules it is ready to be connected to the MLPE of the neighboring pair of modules as shown in Figure 6.

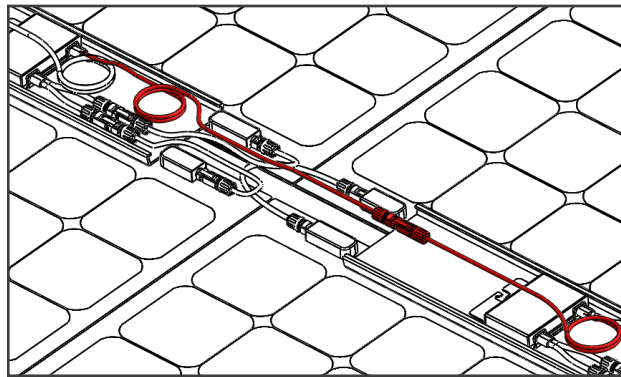


Figure 6 - Connect MLPEs together

Repeat this for every MLPE on the string and then homerun the first and last MLPEs all the way back to the combiner box or inverter.

Manage all wires such that they will stay hidden under the wire tray top cover once it is installed. Use only solar ties or other polymeric wire ties with application appropriate UV and environmental resistance. Do not use commercially available wire ties from the hardware stores even if they say UV rated. Do not use metal ties or clips.

Raceway Top Cover Installation

The raceway top cover provides an appealing aesthetic to the array by hiding the wires and MLPEs. It also protects these components from physical damage and degradation from UV exposure.

The top cover is three module widths long and snaps onto the tray. However, before installing the top covers, couplers need to be installed at the end of the rows as shown in Figure 7 and across every 3 adjacent modules as shown in Figure 8 so adjacent top covers can be joined together. The coupler comes with the same adhesive as the wire tray. Follow the same installation guidelines as the wire tray prior to sticking the coupler at its designated location. Ensure proper placement prior to fixing the coupler since removal and realignment can be difficult.

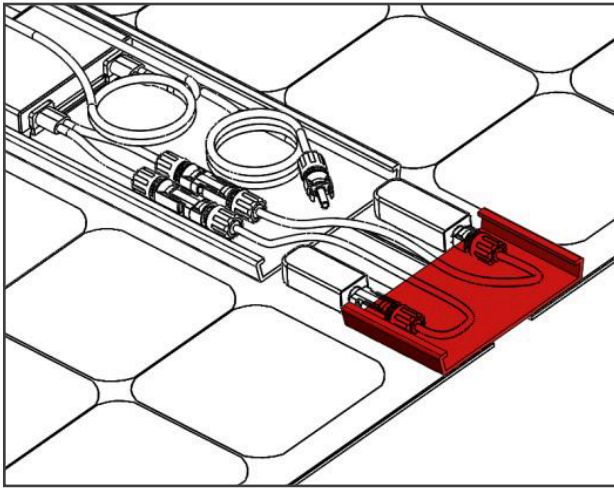


Figure 7 - Install couplers at the ends of rows.

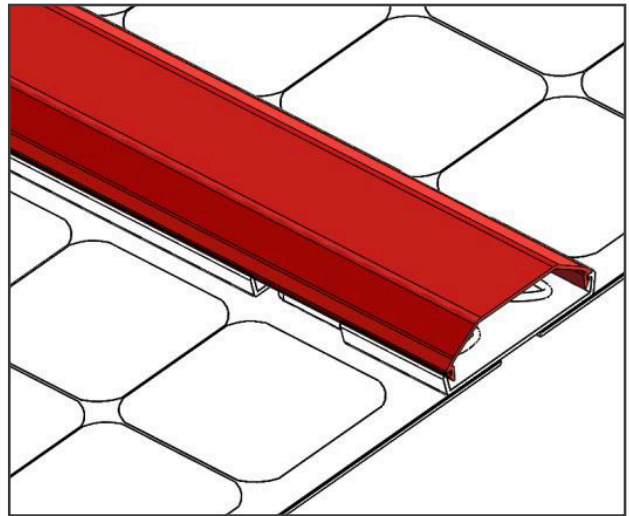


Figure 9 - Align top cover to end of row.

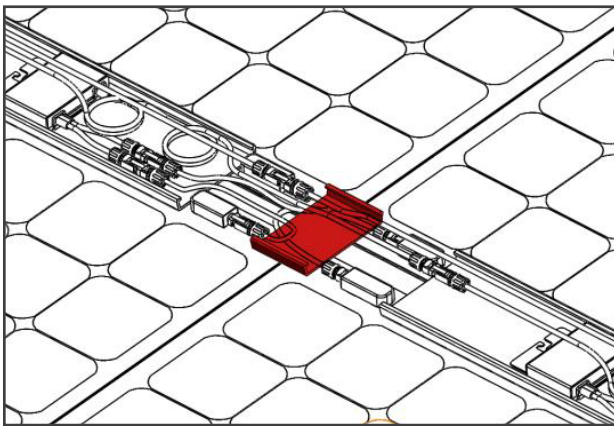


Figure 8 - Install couplers across every 3 modules

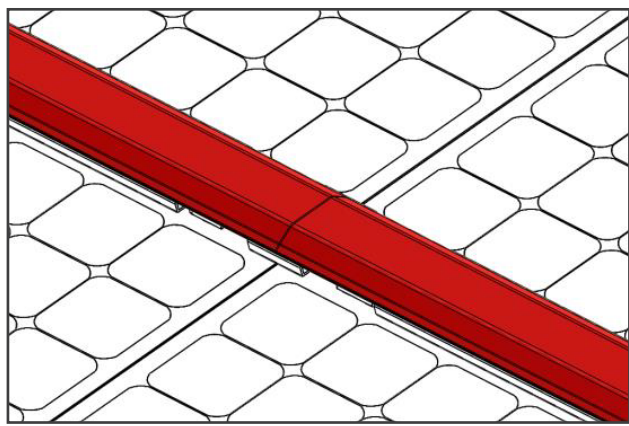


Figure 10 - Top covers joined at coupler.

Align the top cover to the edge of the row and snap it down to the wire tray as shown in Figure 9. Repeat this process across the row ensuring there are no gaps between the covers at the joining couplers as shown in Figure 10. Measure and cut the last cover to the required length prior to installation.

Finally, install the end caps to the top covers at both exposed ends of the row as shown in Figure 11. Use an outdoor rated PVC cement to join the end cap to the top cover. Do not cement the end cap to the coupler. Doing so will make removing the top cover difficult when servicing the system.

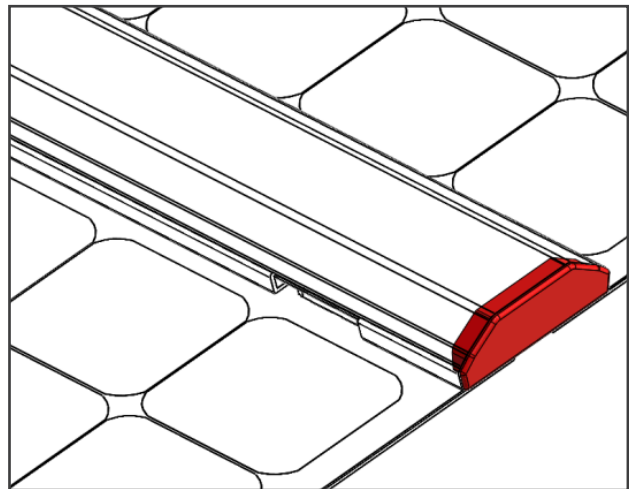


Figure 11 - Cement the end cap to the top cover

For additional information and a photo walkthrough of the installation process, refer to the "FLEX60 Installation Supplement" document.

Grounding

Per its certification, the Sunflare FLEX60 module is not to be grounded. It is double insulated and has no exposed metal components. Ensure you use only no conductive polymeric wire management devices and components within the

array. Using metal components could result in grounding requirements and a safety hazard.

Electrical Installation

Whenever possible use the jumper cables provided by Sunflare. They are cut to the correct size and have the proper mating connectors for the modules. For making homerun cables follow the instructions and requirements below.

Conductors

Use only USE-2 or UL 4703 “PV Wire” for jumpers and homerun cables. These wires meet NEC requirements per Section 690.31 (C) for use in outdoor exposures in solar arrays. Minimum wire gauge is AWG 12 (4mm²). Use larger gauge wire (lower gauge number) for longer runs or where reduced electrical resistance is desired. Follow all NEC guidelines for wire size and installation requirements.

Connectors

Use only Multi-Contact MC4 plug connectors from Staubli (www.staubli-alternative-energies.com). Using any other connector with a Sunflare FLEX60 module will void the warranty.

Fuses

All Sunflare FLEX60 modules must be protected by appropriate overcurrent protection devices per NEC guidelines. The maximum series fuse rating for the FLEX60 module is 12A. Follow all NEC guidelines for fuse rating requirements including size and type.

Connecting in Series

Only connect FLEX60 modules in series strings and protect each series from other paralleled strings with proper overcurrent protection. It is recommended that no more than 25 modules should be in series per string.

Maintenance and Repair

The Sunflare FLEX60 module is designed for a 25-year life and under normal circumstance should require no maintenance. However, due to the wide variety of environmental conditions and installation practices it is recommended to fully inspect the system and all connections every 6 months.

Read these installation instructions thoroughly before inspecting or servicing a Sunflare FLEX60 system. Inspection and service should only be carried out by qualified personnel using all appropriate OSHA recommended personal protection equipment. Disconnect the system prior to inspection. Replace any wires and connectors that shows signs of wear or damage. Replace any wire tray and cover that is damaged

or significantly degraded. If a module is damaged, leave it in place. Do not attempt to remove the module from the roofing surface unless it poses an electrical risk. Doing so might damage the roof membrane.

If service or inspection is required, disconnect the string with the damaged module from all other strings and use black out blankets to cover all modules in that string. Check that voltages are below 5V. Then, disconnect the broken module from the string and plug the ends of its j-box connections using the MC4 Staubli sealing caps PV-BVK4, and PV-SVK4. Then jumper around the module and reconnect the string.

If the damaged module has compromised electrical encapsulation it can be removed or encapsulated in place using a black silicone sealant. Sunflare will not be liable for roof damage if removing the module nor any issues that may arise from encapsulation by applying a sealant.

Cleaning

The Sunflare FLEX60 module does not require cleaning. If cleaning is found necessary to achieve desired power performance, then it should only be cleaned by professional cleaners. Prior to cleaning the system, it must be inspected for safety and approved for cleaning by qualified personnel. Failure to inspect the system could lead to electric shock and possibly death.

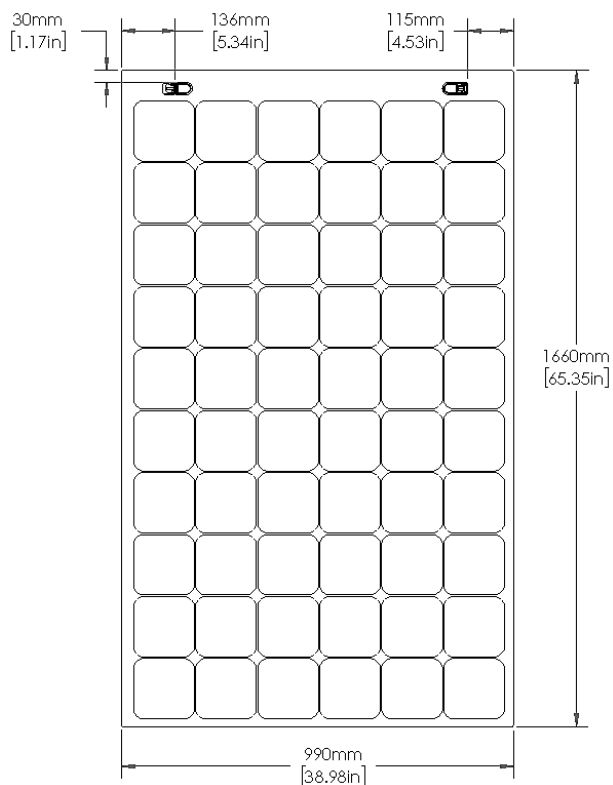
Never use brushes, soaps, detergents or robotic cleaners intended for use over glass modules to clean the FLEX60 modules. Use only water, and if required a soft sponge. Do not use soap or detergents to clean the module. Do not walk onto the array unless absolutely necessary. Do not walk on dirty modules or over clean modules with dirty shoes. Debris underfoot can damage the topsheet of the module leading to power loss and possibly module failure.

Mechanical Load Rating

For design purposes, ASC7-16 Section 30 “Components and Cladding” should be used for calculating the load requirements on the module. Do not use the photovoltaic specific paragraphs in Section 29 for load development on the FLEX60 product. Those sections are only relevant to products that are mounted above the roof surface and thus do not apply to the stick down FLEX60 module. Set the effective wind area equal to one panel.

Physical Dimensions

All dimensions have a tolerance of +/- 2 mm



document constitutes an expressed or implied warranty. Product warranties are not made in this document. Warranties are included in a separate warranty document, or through purchase agreements.

Contact Information

Sunflare Co.
1693 Yeager Avenue,
La Verne, CA. 91750 USA

Tel: 1-888-577-9935
Email: info@sunflaresolar.com
Web: www.sunflaresolar.com

Revision History

Document	Date of Revision
Sunflare_Installation_instruction_V1	07/13/2018
Sunflare_Installation_instruction_V2	07/27/2018
Sunflare_Installation_instruction_V3	08/02/2018
Sunflare_Installation_instruction_V4	10/05/2018
Sunflare_Installation_instruction_V5	02/11/2019
Sunflare_FLEX60_Installation_instruction_V6	02/22/2019
Sunflare_FLEX60_Installation_instruction_V7	11/12/2020
Sunflare_FLEX60_Installation_instruction_V8	04/19/2021

Liability Limitation

Sunflare is not in control of the installation of the module and hence does not accept responsibility nor liability for damages arising from improper use, incorrect installation, operation, or maintenance of the product.

The information provided by this manual is based upon Sunflare’s knowledge and understanding and is believed to be correct and reliable. However, the customer is responsible for the installation, operation and maintenance of the product and any damage that might occur to the product or the roof as a consequence of those activities even if the customer followed guidelines and descriptions set forth in this manual. Sunflare takes no responsibility for material incompatibility between Sunflare components, nor to any roofing products with which they may come in contact.

Sunflare accepts no liability for: damages, financial losses of any kind, business interruptions, or lost earnings, whether they be direct or incidental, as a result of the use of the information contained in these instructions, and whether or not they are based upon Sunflare’s negligence.

No suggestions, recommendations, power ratings, or any other guidance set forth in this

V2.0 Model list

Frameless module

Model series FLEXY-XXXW Z”, where “YY” suffix indicates the number of solar cells, “XXX” suffix the power classes “Z” suffix indicates the size of cells (127mm x 127mm), blank is default size (156mm x 156mm).

Cell technology is CIGS with bypass diode for each cell.

Model	Cell Size (mm)	Model Size (mm)	Voc (Vdc)	Isc (A)	Vmp (Vdc)	Imp (A)	Pmax (W)
FLEX60-XXXW	156 x 156	1660 x 990	38.00	7.70	30.30	6.60	200
			37.60	7.60	29.86	6.53	195
			36.93	7.54	29.26	6.49	190
			36.63	7.53	28.33	6.53	185
			36.4	7.43	28.68	6.28	180
			35.95	7.42	28.18	6.22	175
			35.74	7.38	27.37	6.21	170
			35.42	7.28	27.5	6.0	165
			35.11	7.19	27.63	5.8	160
FLEX55-XXXW	156 x 156	1860 x 828	33.83	7.40	26.2	6.3	165
FLEX54-XXXW	156 x 156	1520 x 990	33.4	7.40	25.7	6.3	162
FLEX50-XXXW	156 x 156	1702 x 828	30.8	7.54	24.6	6.5	160
			30.6	7.53	24.1	6.43	155
			30.4	7.43	23.9	6.28	150
			30	7.42	23.4	6.2	145
			29.8	7.38	22.9	6.11	140
FLEX48-XXXW	156 x 156	1344 x 990	29.6	7.4	23	6.4	145
		1976 x 670	29.6	7.4	23	6.4	145
FLEX45-XXXW	156 x 156	1544 x 828	27.7	7.4	21.4	6.3	135
FLEX44-XXXW	156 x 156	1818 x 670	27.1	7.4	21	6.3	132
FLEX42-XXXW	156 x 156	1186 x 990	25.8	7.4	20	6.3	126
FLEX40-XXXW	156 x 156	1386 x 828	25	7.54	19.8	6.55	130
		1660 x 670	24.8	7.53	19.4	6.43	126
			24.6	7.43	19.12	6.28	120
			24.2	7.42	18.55	6.2	115
			24	7.38	18	6.11	110
FLEX36-XXXW	156 x 156	1028 x 990	22.2	7.4	17.1	6.3	108
		1502 x 670					
		2018 x 512					
FLEX35-XXXW	156 x 156	1228 x 828	21.5	7.4	16.7	6.3	105
FLEX33-XXXW	156 x 156	1860 x 512	20.3	7.4	15.7	6.3	99
FLEX32-XXXW	156 x 156	1344 x 670	20	7.54	16	6.55	105
			19.7	7.53	15.3	6.53	100
			19.5	7.43	14.96	6.35	95
			19.3	7.42	14.5	6.21	90

Model	Cell Size (mm)	Model Size (mm)	Voc (Vdc)	Isc (A)	Vmp (Vdc)	Imp (A)	Pmax (W)
FLEX30-XXXW	156 x 156	870 x 990	18.5	7.40	14.3	6.30	90
		1070 x 828					
		1702 x 512					
FLEX28-XXXW	156 x 156	1186 x 670	17.2	7.40	13.3	6.30	84
FLEX27-XXXW	156 x 156	1544 x 512	16.6	7.40	12.9	6.30	81
FLEX25-XXXW	156 x 156	912 x 828	15.4	7.40	11.0	6.30	75
FLEX24-XXXW	156 x 156	712 x 990	14.8	7.40	11.4	6.30	72
		1028 x 670					
		1386 x 512					
		1976 x 354					
FLEX21-XXXW	156 x 156	1228 x 512	12.9	7.40	10	6.30	63
FLEX22-XXXW	156 x 156	1818 x 354	13.5	7.40	10.5	6.30	66
FLEX20-XXXW	156 x 156	754 x 828	12.9	7.50	9.9	6.55	65
		870 x 670	12.5	7.40	9.5	6.30	60
		1660 x 354	12	7.20	8.9	6.17	55
			11.6	7.10	8.4	6	50
FLEX18-XXXW	156 x 156	554 x 990	11	7.40	8.6	6.3	54
		1070 x 512					
		1502 x 354					
FLEX16-XXXW	156 x 156	712 x 670	9.9	7.40	7.6	6.3	48
		1344 x 354					
FLEX15-XXXW	156 x 156	596 x 828	9.3	7.40	7.1	6.3	45
		912 x 512					
FLEX14-XXXW	156 x 156	1186 x 354	8.6	7.40	6.7	6.3	42
FLEX12-XXXW	156 x 156	670 x 554	7.4	7.40	5.7	6.3	36
		754 x 512					
		1028 x 354					
FLEX10-XXXW	156 x 156	870 x 354	6.2	7.40	4.8	6.3	30
FLEX9-XXXW	156 x 156	512 x 596	5.6	7.40	4.3	6.3	27
FLEX8-XXXW	156 x 156	712 x 354	5	7.40	3.8	6.3	24
FLEX6XXXW	156 x 156	554 x 354	3.7	7.40	2.9	6.3	18
FLEX4-XXXW	156 x 156	396 x 354	2.5	7.40	1.9	6.3	12
Max Series Fuse Rating (A)		12					
Max System Voltage (V)		1000					

V2.0 Model list

Frame module

Model series FLEXY-XXXW-M20-A", where "YY" suffix indicates the number of solar cells, "XXX" suffix the power classes, "M20" indicates Module and 20mm frame height, "A" indicates Revision, blank is default size (156mm x 156mm)

Cell technology is CIGS with bypass diode for each cell.

Model	Cell Size (mm)	Model Size (mm)	Voc (Vdc)	Isc (A)	Vmp (Vdc)	Imp (A)	Pmax (W)
FLEX60-XXXW-M20-A	156 x 156	1666 x 996	38.00	7.70	30.30	6.60	200
			37.60	7.60	29.86	6.53	195
			36.93	7.54	29.26	6.49	190
			36.63	7.53	28.33	6.53	185
			36.4	7.43	28.68	6.28	180
			35.95	7.42	28.18	6.22	175
			35.74	7.38	27.37	6.21	170
			35.42	7.28	27.5	6.0	165
			35.11	7.19	27.63	5.8	160
Max Series Fuse Rating (A)		12					
Max System Voltage (V)		1000					

a factor of 1.25 when determining component voltage ratings, conductor current ratings, fuse sizes, and size of controls connected to the PV output.

Number of Cell:	60	60	60	60	60	60
Cell size:	156x156mm	156x156mm	156x156mm	156x156mm	156x156mm	156x156mm
Module Size:	990x1660mm	990x1660mm	990x1660mm	990x1660mm	990x1660mm	990x1660mm
Pmax:	160 W	165 W	170 W	175 W	180 W	185 W
Voc:	35.1 V	35.4 V	35.7 V	36.0 V	36.4 V	36.6 V
Isc:	7.2 A	7.3 A	7.4 A	7.4 A	7.4 A	7.5 A
Imp:	5.8 A	6.0 A	6.2 A	6.2 A	6.3 A	6.5 A
Vmp:	27.6 V	27.5 V	27.4 V	28.2 V	28.7 V	28.3 V
Temperature coefficient, Pmax:	-0.35 %/°C	-0.35 %/°C	-0.35 %/°C	-0.35 %/°C	-0.35 %/°C	-0.35 %/°C
Fuse:	12 A	12 A	12 A	12 A	12 A	12 A
Over current protection rating:	12 A	12 A	12 A	12 A	12 A	12 A
IEC rated max system voltage:	1000V	1000V	1000V	1000V	1000V	1000V
Connector:	MC4	MC4	MC4	MC4	MC4	MC4

The electrical characteristics are within ±10 percent of the indicated values of ISC, VOC, and Pmax under standard test conditions (irradiance of 100 mW/cm², AM 1.5 spectrum, and a cell temperature of 25°C (77°F)).

Liability Limitation

Sunflare accepts no liability for damages of any kind, as a result of the use of the information contained in this instruction. Sunflare is not in control of installation of the modules, hence we accept no liability for damage arising from improper use or incorrect installation, operation, use or maintenance of the product.

Product warranties are not made in this manual but are included in a separate, written purchase agreement or warranty for the modules.