
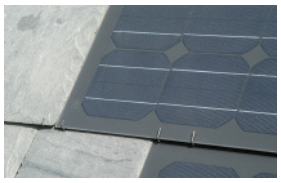


Nu-lok™ SolarRoof™ Installation Manual

Please read this guide completely before installing or using the solar electric modules

WARNING: ELECTRICAL HAZARD

All instructions should be read and understood before attempting to install, wire, operate, and maintain the module. Contact with electrically active parts of the module such as terminals can result in burns, sparks, and lethal shock whether the module is connected or disconnected. Modules produce electricity when sunlight or other sources illuminate the front face. The voltage from a single module is not considered a shock hazard. When modules are connected in series, voltages are additive. When modules are connected in parallel, current is additive. Consequently, a multi-module system can produce high voltages and current, which constitute an increased hazard and could cause serious injury or death.

Designed and manufactured specifically for Nu-lok Roofing Systems, by Atlantis Energy Systems, Inc.

DISCLAIMER OF LIABILITY

SINCE THE USE OF THIS GUIDE AND THE CONDITIONS OR METHODS OF INSTALLATION, OPERATION, USE, AND MAINTENANCE OF THE MODULE ARE BEYOND NU-LOK ROOFING SYSTEMS AND ATLANTIS ENERGY SYSTEMS CONTROL, NU-LOK ROOFING SYSTEMS AND ATLANTIS ENERGY SYSTEMS DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIMS LIABILITY FOR LOSS, DAMAGE, OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH SUCH INSTALLATION, OPERATION, USE, OR MAINTENANCE. NO RESPONSIBILITY IS ASSUMED BY NU-LOK ROOFING SYSTEMS AND ATLANTIS ENERGY SYSTEMS FOR ANY INFRINGEMENT OF PATENTS OR OTHER RIGHTS OF THIRD PARTIES THAT MAY RESULT FROM USE OF THE MODULE. NO LICENSE IS GRANTED BY IMPLICATION OR OTHERWISE UNDER ANY PATENT OR PATENT RIGHTS. THE INFORMATION IN THIS GUIDE IS BASED ON NU-LOK ROOFING SYSTEMS AND ATLANTIS ENERGY SYSTEMS KNOWLEDGE AND EXPERIENCE AND IS BELIEVED TO BE RELIABLE; BUT SUCH INFORMATION INCLUDING PRODUCT SPECIFICATIONS (WITHOUT LIMITATIONS) AND SUGGESTIONS DO NOT CONSTITUTE A WARRANTY, EXPRESSED OR IMPLIED. NU-LOK ROOFING SYSTEMS AND ATLANTIS ENERGY SYSTEMS RESERVE THE RIGHT TO MAKE CHANGES TO THE PRODUCT, SPECIFICATIONS, OR GUIDE WITHOUT PRIOR NOTICE.

GENERAL INFORMATION

THE INSTALLATION OF MODULES REQUIRES A GREAT DEGREE OF SKILL AND SHOULD ONLY BE PERFORMED BY QUALIFIED LICENSED PROFESSIONALS, INCLUDING, WITHOUT LIMITATION, LICENSED CONTRACTORS AND LICENSED ELECTRICIANS. THE INSTALLER ASSUMES THE RISK OF ALL INJURY THAT MIGHT OCCUR DURING INSTALLATION, INCLUDING, WITHOUT LIMITATION, THE RISK OF ELECTRIC SHOCK. NU-LOK ROOFING SYSTEMS AND ATLANTIS ENERGY SYSTEMS ELECTRIC MODULES DO NOT REQUIRE THE USE OF SPECIAL CABLE ASSEMBLIES. ALL MODULES COME WITH A PERMANENTLY ATTACHED JUNCTION BOX THAT WILL ACCEPT A VARIETY OF WIRING APPLICATIONS OR WITH A SPECIAL CABLE ASSEMBLY FOR EASE OF INSTALLATION. IT IS RECOMMENDED TO UTILIZE A QUALIFIED INSTALLER OR RESELLER FOR SERVICE.

GENERAL SAFETY

Follow All Permit, Installation, and Inspection Requirement

- Before installing a module, contact appropriate authorities to determine permit, installation, and inspection requirements that should be followed. This should be done not only for installations in conjunction with buildings, but also for marine and motor vehicle applications for which additional requirements may apply.
- Electrically ground metal parts for all systems of any voltage.
- If not otherwise specified, it is recommended that the latest National and International Electrical Code requirements be followed.
- The word "module" as used in this Guide refers to one or more solar electric modules.
- Avoid electrical hazards when installing, wiring, operating and maintaining the module.
- A module generates DC electricity when exposed to sunlight or other light sources.
- Do not touch terminals while module is exposed to light or during installation. Provide suitable guards to prevent contact with 30VDC or greater. As an added precaution, use properly insulated tools only.
- When installing or working with module or wiring, cover module face completely with opaque material to halt production of electricity.
- It is recommended that the module remains packed in the box until time of installation.
- Work only under dry conditions, with a dry module and tools.
- Do not drop module or allow objects to fall on module.
- Do not stand or step on module.
- Since sparks may be produced, do not install module where flammable gases or vapors are present.
- Special construction may be required to help provide proper installation. When installing modules on any structure above ground, avoid any possible falling safety hazards by following appropriate safety practice(s) and using required safety equipment. Both roof construction and module installation design have an effect on the fire resistance of the building. Improper installation may contribute to hazards in the event of fire. Additional devices such as ground fault, fuses, and disconnects may be required.
- Do not use modules of different configurations in the same system.
- Follow all safety precautions of other used components.
- Never leave a module unsupported or unsecured. If a module should fall, the glass can break. A module with broken glass cannot be repaired and must not be used.
- Keep back surface free from foreign objects.
- It must be assured that other system components do not generate any hazard of any mechanical or electrical nature to the module.
- Do not artificially concentrate sunlight on the module.
- Avoid sharp edges.
- Module installation and operation should be performed by qualified personnel only. Children should not be allowed near the solar electric installation.
- If not otherwise specified, it is recommended that requirements of the latest local, national or regional electrical codes are followed.
- Use module for its intended function only. Follow all module manufacturers' instructions. Do not disassemble the module, or remove any part or label installed by the manufacturer. Do not treat the back of the module with paint or adhesives.
- Retain this instruction booklet for future reference

Module Specifications

Dimensions

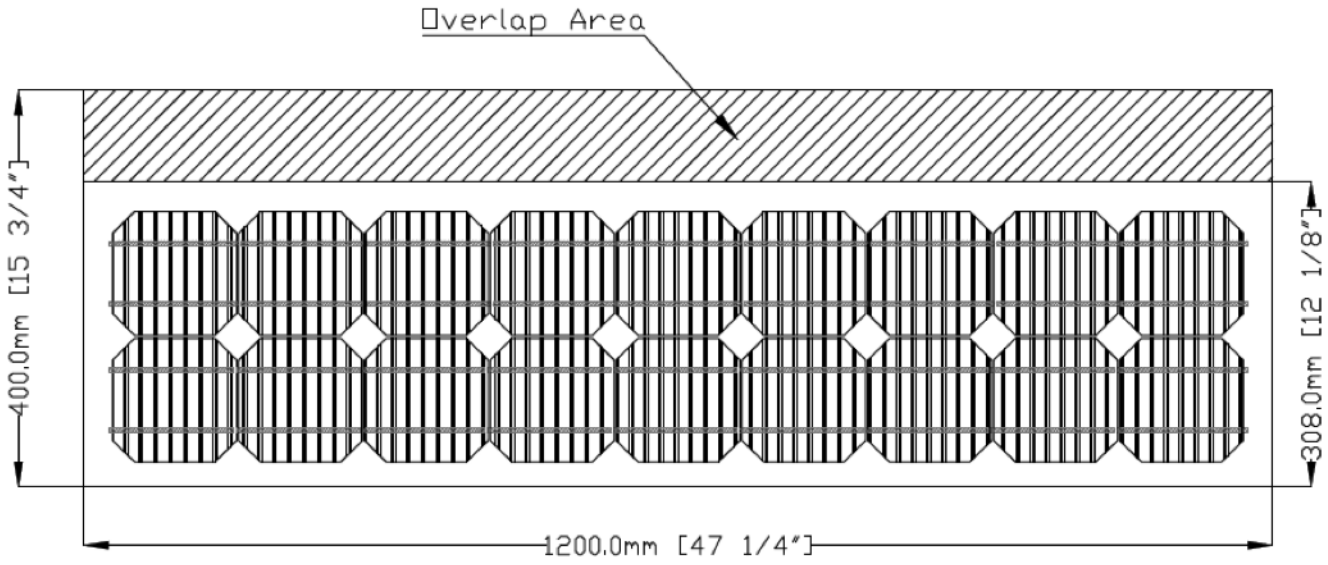

Figure 1 – Dimensions

Module weight

17 lbs.

Module Electrical Characteristics

The electrical characteristics are within ±5% of the indicated values of I_{sc}, V_{oc} and P_{max} under Standard Test Conditions (STC)[1]. Depending on ambient conditions, time of day, time of year, and shading, the modules may produce more current and/or voltage than reported at STC. Accordingly, the rated values of I_{sc} and V_{oc} should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, fuse size and the size of controls connected to the PV output.

Note: All characteristics are at STC

Model	TS125LM
Power	42 Watts
I_{SC}	5.20 ADC
V_{oc}	11.1 VDC
I_{MPP}	4.77 ADC
V_{MPP}	8.8 VDC
Series fuse rating:	10 Amp

This product adheres to UL Standard 1703 and is CEC listed. All module components rated for 600 VDC. Do not exceed module maximum voltage rating of 600 VDC.

[1]Standard Test Conditions (STC): 1000 W/m^2 irradiance, 25°C temperature, and AM 1.5 spectrum

Installation

General Guidelines

When installing the modules, be sure to:

1. Use only the provided cable for module interconnection. For all other use stranded copper single-conductor type USE-2 cable, rated sunlight resistant. Refer to the National Electric Code and local requirements for proper wiring.
2. Observe the requirements described under *Module Electrical Characteristics* in the *Module Specifications* section of this Guide.
3. The module is non-framed and grounding of the module is not required, however all metallic parts used in the installation have to be properly grounded. Refer to NEC articles 690 and 250.
4. All modules should be handled with care using proper safety equipment. Due to the weight of the module one should never try to move a module without safety precautions and glass lifting equipment. Any glass lifting/handling equipment can be used that is designed for the proper module weight and size.
5. Follow recommendations made by the licensed structural engineer or architect providing the project and installation details.
6. Use only approved hardware. All hardware used to support the module has to be approved by a licensed structural engineer for the specific project.
7. Make sure that two modules will never physically touch each other. Never use the module's outer edges for support, this may damage the module and void warranty.
8. When handling glass always wear safety glasses and follow all safety instructions in this manual.

Roof Preparation

Before installation of the solar modules, the roof needs to be properly prepared according to all local building codes. Ensure that damaged/rotting plywood is repaired and that roofing felt (min. 30 lb) is installed for water-proofing.

Basic Components

The Nu-lok SolarRoof™ modules are installed by integrating them directly into the Nu-lok slate support system. The basic hardware for the solar panel installation consists of the same Nu-lok™ Link Channel, clip (Figure 2) and the primary batten (Figure 3), that hold the roofing slate .

Figure 2 - Nu-lok™ Link Channel and Clip

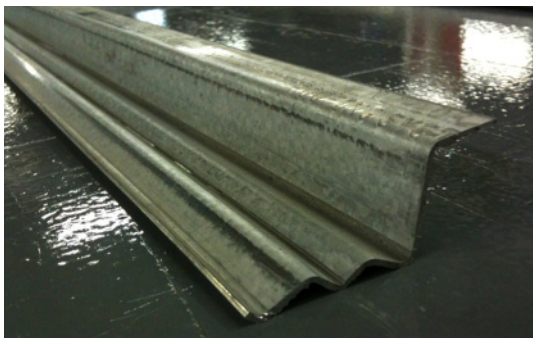

Figure 3 - Nu-lok™ Primary Battens

Installation Procedure

Counter Battens

Before laying the Nu-lok™ Primary Battens, vertical counter battens must be installed. This prevents moisture from collecting between the horizontal primary battens. It is recommended that a cedar lath or a 3/8" rubber shim is used for the vertical counter battens. The counter battens must be nailed directly into the rafters.

Nu-lok™ Primary Battens

The horizontal primary battens are fastened into the counter battens at a distance of 12 1/4" center-to-center.

SolarRoof™ module installation using Nu-lok™ Link Channels and Clips

The link channels slide onto the primary battens as shown in Figure 4. Three link channels should be used to support the center of each solar module, while an additional two link channels should be used to support the ends of the module (Figure 5). Adjacent modules will share one link channel at the boundary between the two modules. The total number of link channels needed for any given row of solar modules is equal to: [4 x (# of modules in the row)] + 1

Figure 4 – Installing the Link Channel

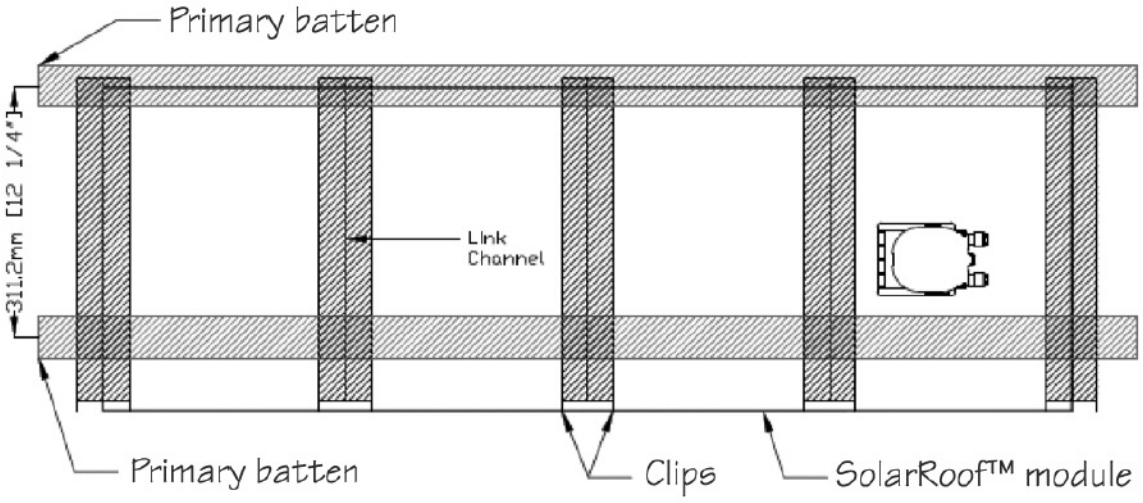

Figure 5 – Rear view of solar module and Nu-lok™ hardware

SolarRoof™ module installation using Nu-lok™ Link Channels and Clips (continued)

To install a SolarRoof™ module, simply slide it into the wire clips at the bottom of the link channels (Figure 6). Because the modules overlap, it is best to start at the bottom row and work your way up the roof. An example diagram of a SolarRoof™ layout is shown in Figure 7.

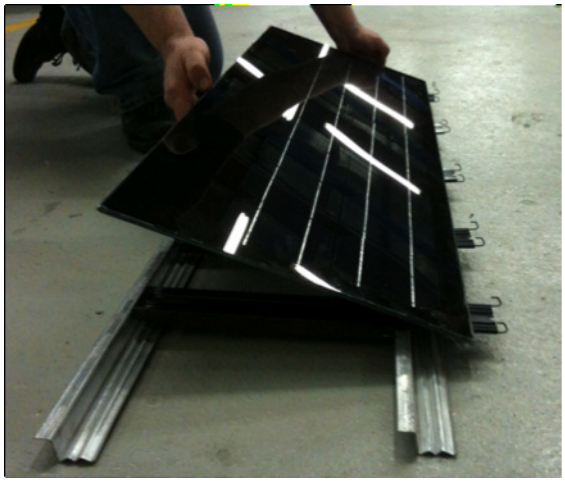

Figure 6 – Installing SolarRoof™ Module

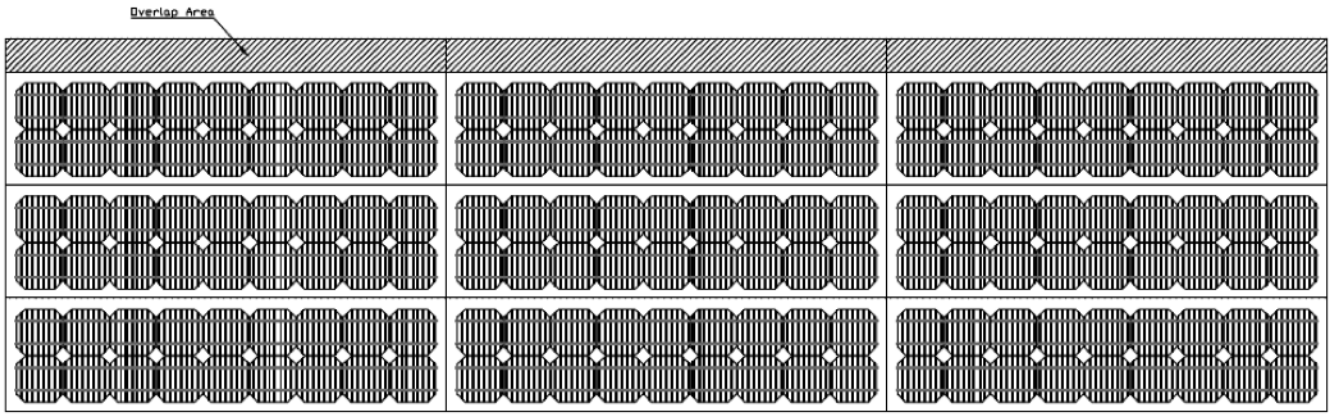

Figure 7 - SolarRoof™ Array Layout

Wiring

Cables for module-to-module interconnections will be provided with your SolarRoof™ modules. The cables are constructed of 12 gauge USE-2 sunlight resistant wire and Tyco SOLARLOK connectors (Figure 8).
In addition to module-to-module cables, home run cables are needed to connect the series strings to a combiner/splice box. Home run cables are available upon request. Please determine required length/quantity of home run cables and contact your Nu-lok™ Roofing System sales representative for a quote.

Figure 8 – Tyco Junction Box and Cables

WARNING
Unplugging Under Load: PV plug connections must NOT be unplugged while under load. They can be placed in a no load state by switching off the DC / AC converter or breaking the AC circuit. Plugging and unplugging while under voltage is permitted. Make sure that the “DO NOT DISCONNECT UNDER LOAD” label is properly attached to each cable. Always use the provided cables, if custom cables are required please contact the manufacturer or your local distributor for assistance.

800 94 nulok (800 946 8565) • www.nu-lokusa.com
Nu-lok™ Roofing Systems, LLC • P.O. Box 134 • Upper Road • Poultney, Vermont 05764