

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLING OR USING THE MODULES.
PLEASE PASS ALONG THIS USER MANUAL TO YOUR CUSTOMER.

INSTALLATION MANUAL – Crystalline Photovoltaic Module –

MODEL
 NU-SA /SC*** series,
 ND-RB*** series

- # IMPORTANT SAFETY INSTRUCTIONS p.1
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IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety instructions for the PV module that must be followed during the maintenance of PV modules.

To reduce the risk of electric shock, do not perform any servicing unless you are qualified to do so.

1. The installation must be performed by a certified installer /servicer to ensure system integrity and safety.
2. The installation is only allowed after referring and understanding of GENERAL INSTRUCTIONS and INSTALLATION MANUAL - PHOTOVOLTAIC MODULES-. If you don't have your personal copy, please contact your installer or local Sharp office listed in Sharp Solar web site : URL : <http://www.sharp-world.com/solar>
<http://www.sharp.eu>
3. Do not pull the PV cables.
4. Do not touch any surface of module.
5. Do not place/drop objects onto the PV modules.
6. Do not disassemble or attempt to repair the PV module by yourself.
7. Do not drop the PV module.
8. Do not damage, pull, bend, or place heavy material on cables.
9. Upon completion of any service or repairs, ask the installer/servicer to perform routine checks to determine that the PV modules are in safe and proper operating condition.

10. When replacement parts are required, be sure the installer/servicer uses parts specified by the manufacturer with same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazard.
11. Consult your local building and safety department for required permits and applicable regulations.
12. In regions with snow, the module can sustain a snow load of up to 50cm (20in) (when the module is mounted in the portrait orientation / short frame side facing down) or 100cm(39in) (when the module is mounted in the landscape orientation / long frame side facing down).
13. As a result of sliding snow, the mechanical load increases when the number of module rows in the matrix of a PV installation increases. When mounting the module in the portrait orientation for more than 3 rows, the accumulated snow load may cause the lower edge of the module frame to deform. Take necessary measures (e.g. snow stopper) to avoid possible damage.
14. Periodically remove any overhanging snow and/or ice from the module framework as it may cause deformation of the module frame.

CAUTION: HIGH VOLTAGE

To reduce the risk of electric shock, do not touch.

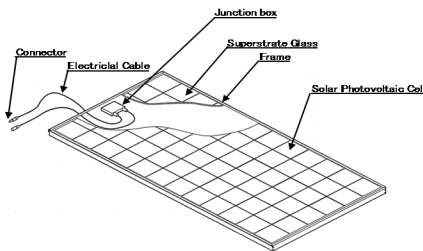


GENERAL INSTRUCTIONS

1. INTRODUCTION

Thank you for choosing SHARP photovoltaic (PV) module. This Installation Manual contains essential information for the electrical and mechanical installation that you must know before installing SHARP PV modules. This also contains safety information you need to be familiar with. All the information described in this manual are the intellectual property of SHARP and based on the technologies and experiences that have been acquired and accumulated in the long history of SHARP. This document does not constitute a warranty, expressed or implied. SHARP does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with installation, operation, use or maintenance of the PV modules. No responsibility is assumed by SHARP for any infringement of patents or other rights of third parties that may result from use of PV module. SHARP reserves the right to make changes to the product, specifications or installation manual without prior notice.

2. COMPONENTS



3. GENERAL INFORMATION (INCLUDING WARNING AND SAFETY)

The installation of PV modules requires a great degree of skill and should only be performed by a qualified licensed professional, including licensed contractors and licensed electricians. Please be aware that there is a serious risk of various types of injury occurring during the installation including the risk of electric shock. All SHARP PV modules are equipped with a permanently attached junction box that will accept variety of wiring applications or with a special cable assembly for ease of installation, and they do not require special assembly.

GENERAL WARNING

1. PV modules are heavy. Handle with care.
2. Before you attempt to install, wire, operate and maintain the PV module, please make sure that you completely understand the information described in this installation manual.
3. Contact with electrically active parts of a PV module such as terminals can result in burns, sparks and lethal shock whether the PV modules are connected or not.

*this image can be applicable for all models regardless number of cells

4. PV modules produce electricity when the sufficient sunlight or other sources illuminate the module surface. When the modules are connected in series, voltage is cumulative. When the modules are connected in parallel, current is cumulative. As a result, a large-scale PV system can produce high voltage and current which could present an increased hazard and may cause serious injury or death.
5. Do not connect the PV modules directly to the loads such as motor since the variation of the output power depending on the solar irradiation causes damage for the connected motor.
 - 1: In the case of a brushless motor, the lock function becomes active and the hall IC is most likely to be damaged.
 - 2: In the case of a brush type motor, the coil is most likely to be damaged.
6. In case of snow build-up, snow would slide easier on the smooth surface of the module than other parts of the roof. Snow may suddenly slide, fall off the roof and hit nearby objects/areas. Take preventive measures (e.g. snow stopper) when there is possible risk such case would cause an injury or a damage.

GENERAL SAFETY

1. Install PV modules and ground frames and other metal components in accordance with applicable codes and regulations.
 2. PV modules should be installed and maintained by qualified personnel. Only installation/service personnel should have access to the PV module installation site.
 3. Keep children away from PV modules.
 4. Prior to installation, do not store modules outdoors or in a damp environment to prevent glass from damage due to white efflorescence.
 5. When PV modules are installed on roofs or any other structures above ground, appropriate safety practices should be followed and appropriate safety equipment should be used in order to avoid possible safety hazards. Note that the installation of PV modules on some roof types may require the addition of fireproofing, as required by local building/fire codes.
 6. Roof mounted PV modules are to be mounted over a fire resistant roof.
 7. Only PV modules with the same cell size should be connected in series.
 8. Follow all safety precautions of other components used in the system.
 9. In order to avoid risk of injury or electrical shock, do not allow anyone to handle damaged PV modules if the person is unqualified or has limited knowledge of PV modules. Place defective PV modules in cartons so PV cells are completely shaded, because a defective PV module or module with broken glass may generate power even if it is removed from the system.
 10. Avoid uneven shade on the PV module surface. Shaded cells may become hot ("hot spot" phenomenon) which may result in permanent damage to the module (e.g., solder joints may peel off).
 11. Do not clean the glass surface with chemicals. Do not let water stay on the glass surfaces of PV modules for a long time. This creates a risk of permanent damage to the glass, such as white efflorescence, otherwise known as "glass disease," which may cause reduced power output.
 12. To avoid dirt accumulation or white efflorescence due to water accumulation, do not install PV modules horizontally (flat).
 13. In high snow load regions, appropriate measures are to be taken so that PV module frames (on lower edges of the modules) will not be damaged.
 14. Do not expose PV modules to sunlight concentrated with mirrors, lenses or other means. Turn off inverters and circuit breakers immediately, should a problem occur.
 15. The maximum open circuit voltage must not be greater than the specified maximum system voltage. Voltage is proportional to the number of PV modules in series and is affected by weather conditions. For strings connected in parallel take proper measures to block reverse current flow.
- Following clauses with *) describe requirement for US market only
16. *) When installing PV modules in a readily accessible location, the National Electrical Code (NEC) 690.33 requires installing the additional locking sleeve (Multi-Contact part # PV-SSH4) on the connector. Note that this sleeve is not included with the module. This

- requirement is for circuits operating in excess of 30 volts, nominal, maximum system voltage for DC or 30 volts for AC circuits.
18. *) Wiring and grounding method of the frame of arrays shall comply with the NEC, article 250.
 19. *) Grounding shall be achieved through securement to the array frame. The array frame shall be grounded in accordance with NEC, article 250.

HANDLING SAFETY

1. Do not expose the PV module to excessive loads on the surface of the PV module or twist the frame. The glass may break.
2. Do not stand or step on the PV module. The glass may be slippery, and there is a risk of injury or electric shock if glass is broken.
3. Do not hit or put excessive load on the glass or back sheet. PV cells may break.
4. To avoid damage to the back sheet, do not scratch or hit the back sheet.
5. To avoid damage to the terminal box and electricity leakage or shock, do not hit the terminal box; do not pull the interconnect cables; do not scratch the interconnect cable.
6. Avoid the connector from scratching or impacting the back sheet of the module.
7. Install connector such that it is not exposed to direct sunlight.
8. Do not twist the interconnect cable excessively.
9. Never touch the end of the interconnect cables with bare hands when the module is illuminated. Cover the surface of module with cloth or other sufficiently opaque material to block the module from incident light and handle the wires with insulated gloved hands to avoid electric shock.
10. Do not drill holes in the frame. It may compromise the frame strength and cause corrosion of the frame.
11. Do not scratch the anodized coating of the frame (except for grounding connection). It may cause corrosion of the frame or compromise the frame strength.
12. Do not touch the PV module with bare hands. The frame of the PV module has sharp edges and may cause injury. Wear suitable gloves, such as leather gloves with padding in the palm and finger areas.
13. Do not drop the PV module or allow objects to fall on the PV module.
14. Do not lift the PV module by only one side. The frame may bend. Always use two hands to lift and carry the PV module on the long side of the frame.
15. To prevent finger prints and/or any other stains on the glass, do not touch the anti-reflective coated glass.

INSTALLATION SAFETY

1. Always wear protective head gear, insulating gloves and safety shoes with rubber soles.
2. Keep the PV module packed in the carton until installation.
3. Do not touch the PV module unnecessarily during installation. The glass surface and the frame may be hot. There is a risk of burns and electric shock.
4. Do not work in rain, snow or windy conditions.
5. Due to the risk of electrical shock, do not perform any work if the terminals of the PV module are wet.
6. Use insulated tools and do not use wet tools.
7. When installing PV modules, do not drop any objects (e.g., PV modules or tools).
8. Make sure flammable gasses are not generated or present near the installation site.
9. Check all connections. Insert interconnect connectors fully and correctly.
10. The slack interconnect cable, excluding parts such as connectors, should be securely fastened to the module frame, the mounting racking or in a raceway to prevent movement of the interconnect cable over time. Cable support should be done in a way to avoid the connector from scratching or impacting the back sheet of the module.
11. Do not touch the terminal box and the end of the interconnect cables (connectors) with bare hands during installation or under sunlight, regardless of whether the PV module is connected to or disconnected from the system.
12. Do not unplug a connector if the system circuit is connected to an

- operating load.
13. Do not work alone (always work as a team of 2 or more people).
 14. Wear a safety harness when working above the ground.
 15. Do not wear metallic jewelry which may conduct electricity and enable electric shock during installation.
 16. Do not damage the back sheet of PV modules when fastening the PV modules to a support by bolts.
 17. Do not damage the surrounding PV modules or mounting structure when replacing a PV module.
 18. Use UV resistant cable ties or other wire management hardware to secure the interconnect cables. Drooping cables may cause various problems, such as leading to electrical shorts.
 19. Take proper measures for preventing the laminate (consisting of encapsulant, cells, glass, back sheet, etc.) from dropping out of the frame in case the glass is broken.
 20. Cables shall be located so that they will not be exposed to direct sunlight in order to prevent degradation of the interconnect cables.
 21. Do not cover the water drain function of the frame. There might be a risk of frost damage when the hollow portion of the frame is filled with water cumulation.

4. SITE SELECTION

In most applications, the PV modules should be installed in a location where there is no shading throughout the year. In the Northern Hemisphere, the PV modules should typically face south, and in the Southern Hemisphere, the PV modules should typically face north.

Please make sure that there are no obstructions in the surroundings of the site of installation. TAKE PROPER STEPS in order to maintain reliability and safety, in case the PV modules are used in areas such as: Heavy snow areas / Extremely cold areas / Strong wind areas / Installations over, or near, water / Areas where installations are prone to salt water damage/corrosive gas environment/ Small islands or desert areas.

The results of the ammonia test and the salt-mist-corrosion test on the modules, carried out under such strict test conditions, should be disclosed for reference purposes only. The decision on whether the modules are suitable and compatible for each installation field will depend on the user's judgement and responsibility.

5. TILT ANGLE SELECTION

The tilt angle of the PV module is measured between the surface of the PV module and a horizontal ground surface. The PV module generates maximum output power when it faces the sun directly.

5 degrees or more is recommended for the tilt angle of the PV module for the maintenance. (See 9. Maintenance)

For standalone systems with batteries where the PV modules are attached to a permanent structure, the tilt angle of the PV modules should be selected to optimize the performance based on seasonal load and sunlight. In general, if the PV output is adequate when irradiance is low (e.g., winter), then the angle chosen should be adequate during the rest of the year. For grid-connected installations where the PV modules are attached to a permanent structure, PV modules should be tilted so that the energy production from the PV modules will be maximized on an annual basis.

6. ELECTRICAL INSTALLATION (INCLUDING WIRING & GROUNDING)

To ensure proper system operation and maintain the guaranty, be careful to observe the correct cable connection polarity (Figure 1) when connecting the modules to a battery or to other modules. If not connected correctly, the bypass diode(s) could be destroyed.

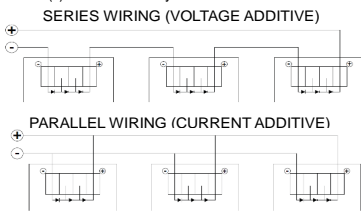


Figure 1

Maximum series configuration: please refer to Table-1 (This value is calculated under the condition of Voc at -40 °C.)

Maximum parallel configuration: Parallel connection of each string shall be conducted with following two options. Any other parallel connections are prohibited.

- a) Case of using the diodes; 1 diode per maximum 2 parallel strings (Connect a diode or more in series for every string or every 2 parallel strings for protection of module from reverse current over load.)
- b) Case of using the fuses; 1 fuse per every string (Connect a fuse for every single string for protection of module from reverse current over load.)

All PV modules must be grounded by electrical connection of the module frames to ground. Care must be taken to arrange the system ground so that the removal of one module from the circuit will not interrupt the grounding of any of the other modules.

Cable characteristics

Cable size : 12 AWG (4.0mm²)
 Rating temperature: -40°C to +90°C (-40°F to +194°F)

Grounding

The frame grounding must consider the local requirement and regulation at the installation site. When grounding is required, please refer to below example connection (Figure 2). Please be careful in arranging the system ground so that the removal of one module from the circuit will not interrupt the

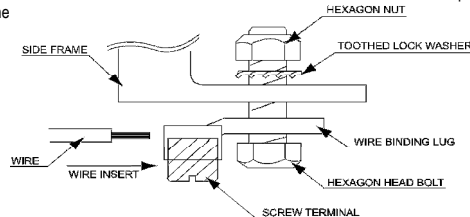


Figure 2. Example of acceptable ground connection

For grounding, each PV module has a hole in the frame with the appropriate symbol for either a bolt, nut and washer, a ground lug fastened by bolt or screw, or an appropriate screw (hardware not provided). In a connection of this type, the hardware (such as a star washer) must score the frame surface to make positive electrical contact with the frame. The ground wire must be considered within the local requirement of local and regulation at the site of installation.

(for US market)

Installation for wiring shall be in accordance with the NEC and grounding method shall comply with the NEC, article 250 and the relevant instructions below. In a connection of this type, the hardware (such as a star washer) must score the frame surface to make positive electrical contact with the frame. The ground wire must not be smaller than No.12 AWG (Insulated for 90 degree C Min.) and can be insulated with green colored insulation or insulated with green with yellow stripe(s) insulation. The ground wire should be sized according to the NEC and other laws.

If modules are installed in a readily accessible location (per NEC) where the circuit is operating in excess of 30 volts, nominal, maximum system voltage for DC or 30 volts for AC circuits, NEC requires installing the additional locking sleeve connector (Multi Contact #PV-SSH4, see Figure 3) on the connector.



Additional locking sleeve
 Figure 3 (MC; PV-SSH4)

Note that this sleeve is not included with the module.

- ✓ Where common grounding hardware (nuts, bolts, star washers, splitting lock washers, flat washers and the like) is used to attach a listed grounding/bonding device, the attachment must be made in conformance with the grounding device manufacturer's instructions.
- ✓ Common hardware items such as nuts, bolts, star washers, lock washers and the like have not been evaluated for electrical

conductivity or for use as grounding devices and should be used only for maintaining mechanical connections and holding electrical grounding devices in the proper position for electrical conductivity. Such devices, where supplied with the module and evaluated through the requirements in UL1703, may be used for grounding connections in accordance with the instructions provided with the module.

Grounding Using Existing Ground Hole (Figure 4, 1954381-2)

The grounding clip (SolKlip grounding Clip Assemblies 1954381-2, Tyco electronics corp., E69905) assembly consists of a slider, base and #8-32 or #10-32 screw (Material; stainless steel) and hex nut (Material; chromate treatment carbon steel).

1. Place the grounding onto the frame, making sure that the screw straddles the grounding hole.
2. Thread the hex nut onto the end of the screw, then using a 3/8" or 5/16" wrench, tighten the nut. Recommended torque is between 2.3(21) and 2.8 Nm (25bf.in.).
3. Insert the grounding wire into the wire slot. Press down on both ends of the wire (the wire slot will cause the wire to form a slight curve). The grounding cables can be insulated with green colored insulation or insulated with green with yellow stripe(s) insulation. The conductor grounding cables should be 12 AWG (Insulated for 90°C (194°F) Min.).
4. Manually, or using channel lock pliers, push the slider over the base until it covers the base. This will terminate the wire.

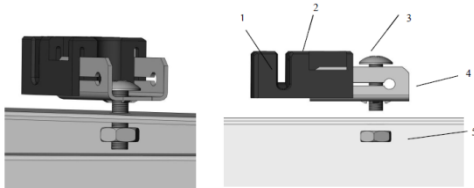


Figure 4. Tyco electronics corp. 1954381-2

1. Wire slot (available for 0.006 to 0.025in² cable), 2.Slider, 3.Bolt, 4.Base, 5.Nut Please contact "Tyco electronics corp." about detail information of "1954381-2".

7. MOUNTING

Please make sure that all the information described in the installation manual is still valid and proper for your installation. The approved way to mount SHARP PV modules to a support structure is described in this INSTALLATION MANUAL. Although SHARP does not specify or warrant frame clips or clamps, using frame clips (not provided) or clamps (not provided) is possible when they are designed for PV modules and with

minimum dimensions on the sides of the module in accordance with the instructions and drawings provided. If using frame clips or clamps, the modules should be fixed rigidly and there shall be no damage to the modules by deforming mounting structure against design load.

The SHARP module guaranty may be void if customer-selected frame clips are improper or inadequate for module properties (including strength or material) or installation. Note that if metal clips are used, there must be a path to ground from the clips, (for instance, using star washers in the clip hardware set).

Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your guaranty. These mounting methods are designed to allow module loading of 2400Pa. the module has passed a snow load test of 5400Pa according to IEC61215.Support structures that PV modules are mounted on should be rigid. SHARP PV modules are designed to ensure optimal electrical performance under the condition that they are mounted on rigid support structures. Deformation of support structure may damage PV module with its electric performance. When mounting the module on structure, ensure that no corner has a displacement of more than 2mm (0.08in) per every 1000mm (39.37in) of the diagonal.

(for US market)

- ✓ The modules have been evaluated by UL according to UL 1703 for maximum positive or negative design loading of 30lbs.ft².
- ✓ A clearance of at least 4.5in (recommended) is provided between modules frame and the surface of the wall or roof. If other mounting means are employed this may affect the UL Listing or the fire class ratings.

8. MAINTENANCE

SHARP PV modules are designed for long life and require very little maintenance. If the angle of the PV module is 5 degrees or more, normal rainfall is usually sufficient to keep the module glass surface clean under most weather conditions. If dirt build-up becomes excessive, clean the glass surface only with a soft cloth using water. If cleaning the back of the module is required, take utmost care not to damage the back side materials. In order to ensure proper operation of the system, please check all wiring connections and the condition of the wire insulation periodically.



9. DISPOSAL

Dispose photovoltaic modules properly. For Information about the proper disposal, contact your local recycling site.

INSTALLATION MANUAL -PHOTOVOLTAIC MODULES-

1. INSTALLATION

Please review the descriptions and drawings carefully; not mounting the modules according to one of these methods may void your guaranty. These mounting methods are basically designed to allow module loading of ±2400Pa (50lbs.ft²).

(for US market)

- ✓ The modules have been evaluated by UL according to UL 1703 for maximum positive or negative design loading of 30lbs.ft².

Mounting Using Clips: Clamping on Longer Frame (Figure2)

The modules can be mounted using clips (clamps) designed for solar modules as defined in the following Figures. Note that the mounting clips should meet the required dimensions as defined in the Figure1. Note that the **CLIP CENTER POSITION (e)** is important as specified in the Figure2. The module must be supported on the array system and should overlap the array rail by at least 10mm (0.39in). The array rails (see pointlist image, row or vertical row) must support the bottom of the frames and must be continuous piece (no breaks in the rail).

2. ELECTRICAL INSTALLATION INSTRUCTION

Refer to "6. ELECTRICAL INSTALLATION"

CONNECTOR requirement:

Multi-Contact AG (MC4 series: PV-KST4, PV-KBT4)

Keep all electrical CONNECTORS clean & dry before connecting.

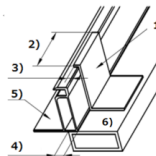


Figure 1. clips (clamps) requirement

- *available to all FRAME section
- 1) Clip: Al alloy, 3mm (0.12in) Min. thickness
 - 2) Catch length (50mm (2.0in) Min.)
 - 3) Covering depth (7mm (0.28in) Min. on the frame)
 - 4) Supporting depth (10mm (0.39in) Min.)
 - 5) Frame
 - 6) Array rail (applicable to parallel or crossed mounting)

Figure2. Clamping on longer Frame

- NU-SA***: 207mm (8.2in) < e < 330mm (12.9in)
 - NU-SC***: 250mm (9.9in) < e < 400mm (15.7in)
 - ND-RB***: 207mm (8.2in) < e < 330mm (12.9in)
- e : span from module corner to clip center

ELECTRICAL OUTPUT AND THERMAL CHARACTERISTICS

Table-1. Electrical characteristics at standard test conditions (STC:irradiance of 1000 W/m², AM 1.5 spectrum, and a cell temperature of 25°C (77°F))

Model name	Maximum Power (Pmax)	Power Selection	Open-Circuit Voltage (Voc)	Short-Circuit Current (Isc)	Voltage at point of max. Power (Vmpp)	Current at point of max. Power (Impp)	Maximum system voltage (UL/IEC)	Over-Current Protection	Application Class	Maximum series configuration(*)	Fire performance (UL1703)
NU-SA285	285W	+5%/-0%	39.3V	9.45A	31.8V	8.97A	1,000V	20A	A	20	type 2
NU-SA290	290W	+5%/-0%	39.5V	9.50A	32.2V	9.01A	1,000V	20A	A	20	type 2
NU-SA295	295W	+5%/-0%	39.7V	9.55A	32.5V	9.08A	1,000V	20A	A	20	type 2
NU-SA300	300W	+5%/-0%	39.9V	9.64A	32.6V	9.19A	1,000V	20A	A	20	type 2
NU-SC340	340W	+5%/-0%	46.5V	9.45A	38.2V	8.90A	1,000V	20A	A	17	type 2
NU-SC345	345W	+5%/-0%	46.7V	9.50A	38.4V	9.00A	1,000V	20A	A	17	type 2
NU-SC350	350W	+5%/-0%	46.9V	9.60A	38.5V	9.09A	1,000V	20A	A	17	type 2
NU-SC355	355W	+5%/-0%	47.0V	9.69A	38.7V	9.17A	1,000V	20A	A	17	type 2
NU-SC360	360W	+5%/-0%	47.2V	9.79A	38.9V	9.26A	1,000V	20A	A	17	type 2
ND-RB270	270W	+5%/-0%	38.4V	9.18A	30.9V	8.73A	1,000V	20A	A	21	type 2
ND-RB275	275W	+5%/-0%	38.5V	9.25A	31.1V	8.84A	1,000V	20A	A	21	type 2

note: Power measurement tolerance: $\pm 3\%$ / Rated electrical characteristics of Isc, Voc, are within ± 10 percent of the indicated values.

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 and Voc marked on the modules listed above should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, fuse sizes and size of controls connected to the module output.

(for US market)

Refer to Sec. 690-8 of the National Electric Code for an additional multiplying factor of 125 percent (80 percent de-rating) which may be applicable.

Application Class

This module is rated as "Application class A" according to IEC61730.

"Application class A" means: General access, hazardous voltage, hazardous power applications; Modules rated for use in this application class may be used in systems operating at greater than 50V DC or 240W, where general contact access is anticipated. Modules qualified as "Application class A" according to IEC 61730 are considered to meet the requirements for safety class II.

FIRE RATING

This module is rated as "Fire safety class C" according to IEC61730, and "class E" in accordance with EN13501-1.

(for US market)

- ✓ Any module mounting system has limitations on inclination required to maintain a specific System Fire Class Rating
- ✓ The fire rating of a SHARP PV module is valid only when mounted in the manner specified in this manual.
- ✓ The module is considered to be in compliance with UL1703 only when the module is mounted in the manner specified by the mounting instructions of this manual.
- ✓ A module with exposed conductive parts is considered to be in compliance with UL1703 only when it is electrically grounded in accordance with the instructions presented in this manual and the requirements of the National Electrical Code for UL listed products only.
- ✓ Any module without a frame (laminated) shall not be considered in compliance 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 via a field inspection certifying that the installed module complies with the requirements of UL1703.
- ✓ Review the related UL description files when checking the fire protection rank of the BOM concerned