

KANEKA Thin Film PV
Installation Manual

MODULE TYPE: U-EA095

KANEKA CORPORATION






3-2-4, NAKANOSHIMA, KITA-KU









OSAKA 530-8288, JAPAN

reference No. U-EA095.001.0

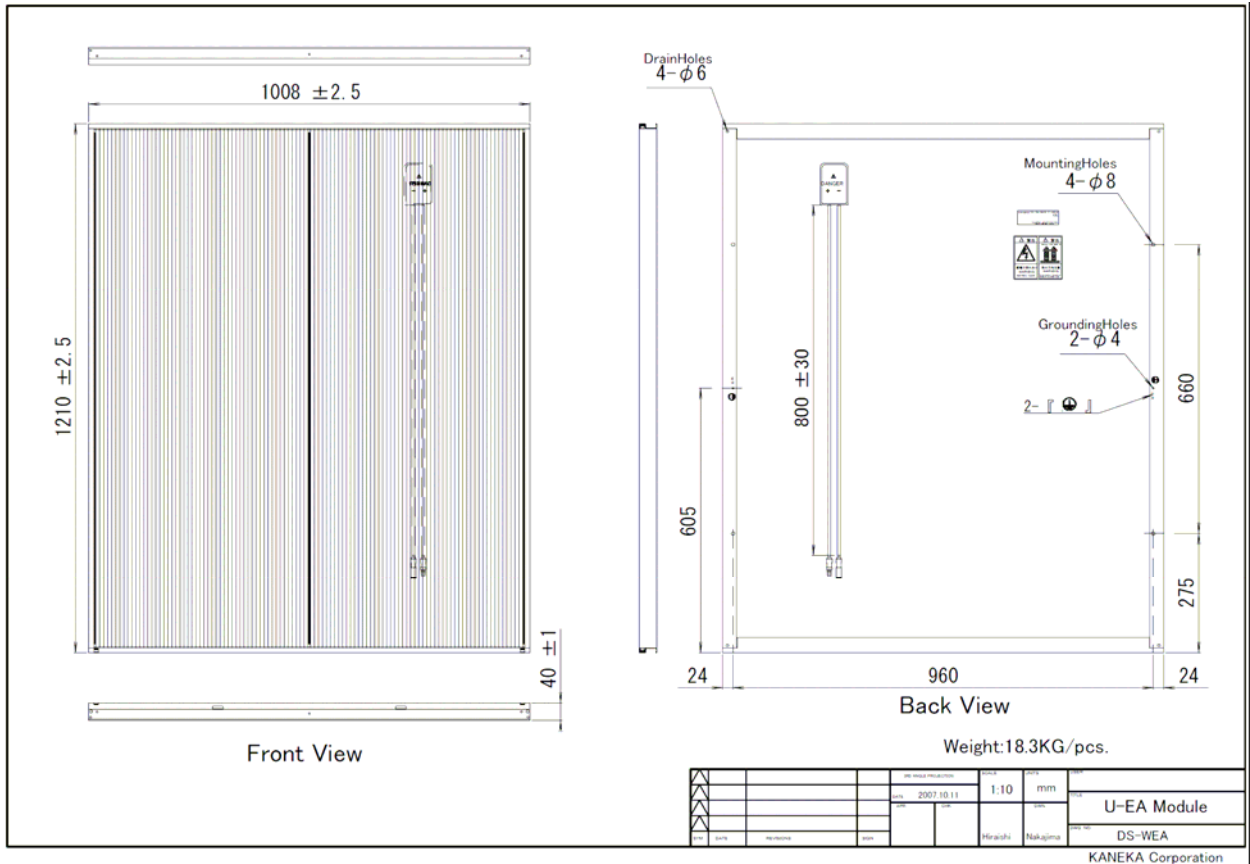
Warning

Meaning of signs

	Not Allowed		No Disassembly		No Touching
	Procedures Must be Followed.			Beware of Electric Shock	

<p>Do not disassemble Kaneka thin-film silicon photovoltaic module(s) (hereinafter referred to as the MODULE(S)), as this may cause fire, electric shock, and injury.</p> 	<p>Do not shock the MODULES (e.g. by stepping on it), as this may break the glass part and cause malfunction, electric shock and injury.</p> 
<p>Follow the procedure in this manual when installing the MODULE and its platform.</p> 	<p>Beware of electric shock and short-circuit, as the MODULE generates high-tension current when exposed to light.</p> 
<p>Wear a safety belt, protection footwear, and protection gloves when installing the MODULE to prevent falling and electric shock. (Install safety fence and scaffolding to prevent falling.)</p> 	<p>The platform, connection box, and the inverter (power conditioner) must be grounded based on the regulation about grounding method.</p> 
<p>Do not expose the MODULE to the artificially concentrated sunlight.</p> 	<p>Installers should be qualified personnel who are experienced with electrical work and the installation of PV systems.</p> 

1. Dimensions



2. Electrical Characteristics of MODULES

PRODUCT : THIN-FILM SILICON PV MODULE			
MODEL: U-EA095	DATE: April 01, 2009		
SPECIFICATION LISTS	UNIT	VALUE	REMARK
Performance at STC (stabilized)			
Nominal Power (Pmax)	W	95	
Open Circuit Voltage (Voc)	V	71.0	
Short Circuit Current (Isc)	A	2.25	
Voltage at Pmax (Vpm)	V	53.5	
Current at Pmax (Ipm)	A	1.78	
Max. System Voltage	V	600	
Maximum over-current protection rating	A	3.5	
Application class		Class A	
Fire Rating (ANSI/UL790)		Class C	
Dimension	mm	1210.0 ± 2.5 x 1008.0 ± 2.5	
Depth	mm	40.0 ± 1.0	
Weight	kg	18	

(REMARK)

1. During initial 6 weeks of operation, the MODULE has higher electrical output than rated output (See Performance at STC (stabilized)). The Pmax, Voc and Isc may be higher by 30%, 15% and 15% respectively.
2. The Electrical characteristics are within ±10% of the indicated values of Voc and Isc, and within +10/-5% of that of Pmax under standard test conditions (irradiance of 100mW/cm², AM1.5 spectrum, and a cell temperature of 25°C). Even though we don't define the tolerances of Vpm and Ipm, those tolerances are close to ±10% according to the tolerances of Voc and Isc.

3. Specifications subject to change without notice.
4. Under normal conditions, the MODULES may experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of Voc and Isc marked on the MODULES should be multiplied by a factor of 125% when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the MODULE output.
5. The type of over current protection is described as Series Fuse 3.5A, Bypass Diode 3.5A
6. The MODULE is applied to application class A. Application class A for PV-modules is defined as follows:

Class A: General access hazardous voltage, hazardous power applications.

Module rated for use in this application class may be used in systems operating at greater than 50 V DC or 240 W, where general contact access is anticipated. Modules qualified for safety through this part of IEC 61730-1 and IEC 61730-2 and within this application class are considered to meet the requirements for safety class II.

3. Installation of the MODULES

The assembly is to be mounted over a fire resistant roof covering rated for the application.

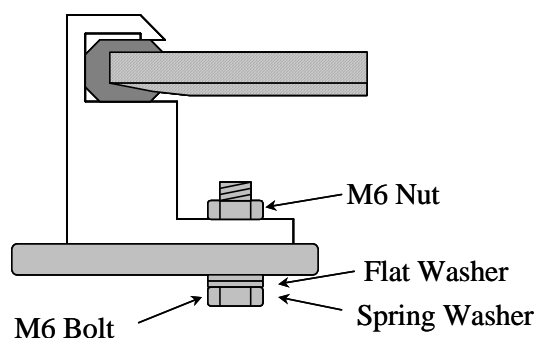
5 in/ft (127mm/305mm) required to maintain UL fire class rating.

Artificially concentrated sunlight shall not be directed on the MODULE.

See the Attachment A: Instruction for using U-type .

Method (1)

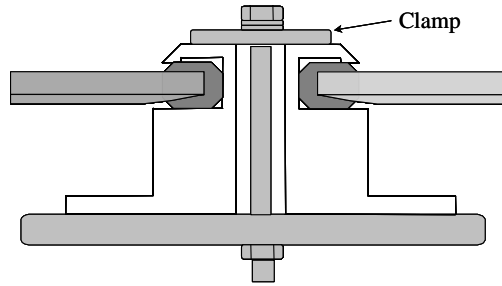
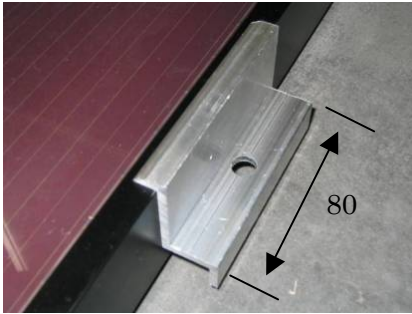
Fix the MODULES to rails with M6 bolts and nuts (4 pairs per module). The platform of the MODULES should have sufficient strength.



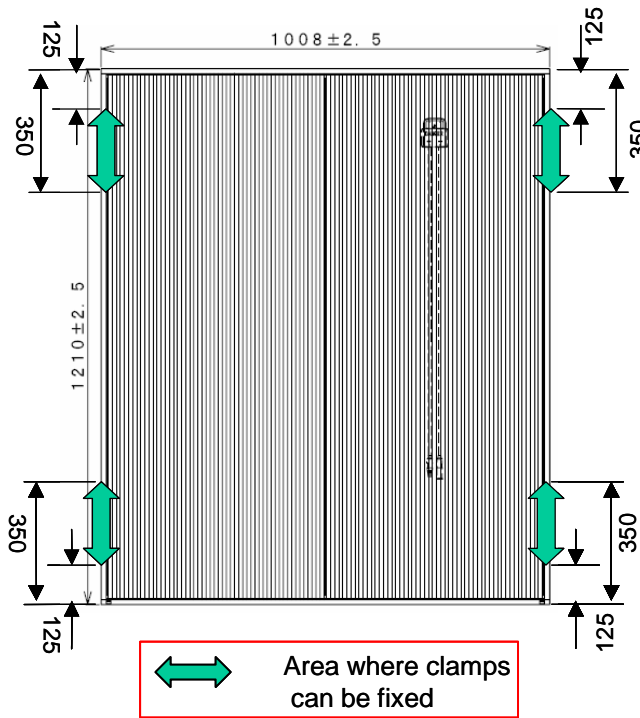
[the MODULE mounting diagram 1]

Method (2)

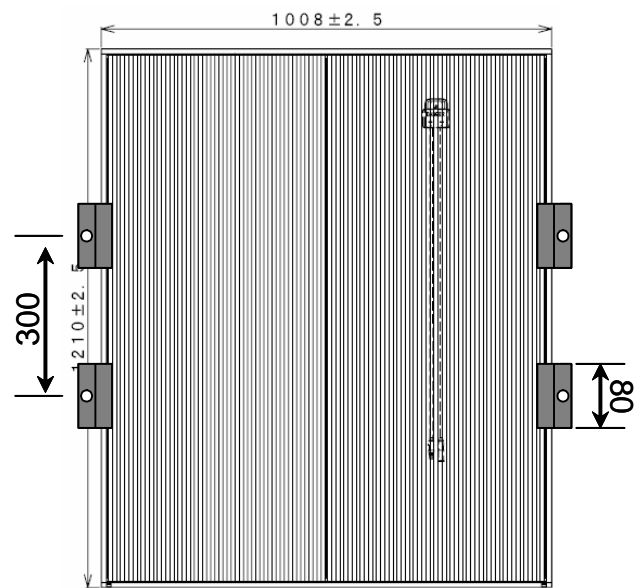
Fix the MODULES to rails with clamps as shown in the picture below, Module mounting diagram 2 and Clamping Method 1 to 2. The clamp length shall be 80mm or more.



[MODULE mounting diagram 2]



Clamping Method 1 (for roofing)



Clamping Method 2 (for free-land)

Handling Instruction to install a mounting system

- *Do not shock the MODULES (e.g. by stepping on it), as this may break the glass part and electric shock.
- *Wear a safety belt, protection footwear, and protection gloves when installing the module and mounting system to prevent falling and electric shock.
- * Beware of electric shock and as the MODULE generate high- tension current when exposed to

light.

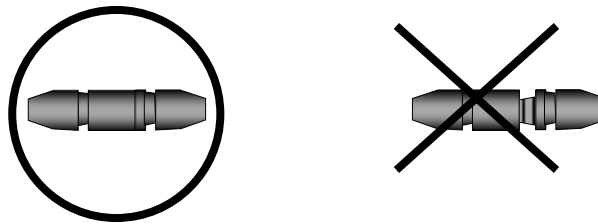
4. Connecting cables

All wiring should be done in accordance with applicable electrical codes.

Use 14 AWG (2.0 mm²) minimum, insulated for 90°C minimum cables.

Stranded Copper only.

When connecting cables, push the plus and minus connectors against each other while twisting them until they are fully engaged.



Plus cable connector: PV-KST3II (Multi-Contact)

Minus cable connector: PV-KBT3II (Multi-Contact)

Each PV has MC Connector system for photovoltaic, which is supplied from Multi-Contact. You can use the same connector as written above.

The MODULES employ factory assembled Multi-Contact connectors for interconnection between the MODULES during array assembly in the field.

More than six (6) MODULES should not be connected in series.

When the Modules are connected in parallel, each string should have a blocking diode or a fuse, which is a 3.5 A of capacity.

See the Attachment A: Instruction for using U-type.

5. Ground-connecting

Grounding should be done in accordance with the applicable regional and local codes. All the MODULES should be ground-connected with the ground holes of the MODULES.

Each exposed conductive part of the module that is accessible during normal use shall be bonded together, as verified by 10.4 of IEC 61730-2.

Routine maintenance of a module shall not involve breaking or disturbing the bonding path. A bolt, screw, or other part used for bonding purposes within a module or panel shall not be intended for securing the complete device to the supporting surface or frame.

Bonding shall be by a positive means, such as clamping, riveting, bolted or screwed connections, or welding, soldering or brazing. The bonding connection shall penetrate all

nonconductive coatings, such as paint, anodised coatings or vitreous enamel.

All joints in the bonding path shall be mechanically secure, independently of any soldering.

If the bonding connection depends upon screw threads, two or more screws or two full threads of a single screw shall engage the metal.

The diameter of the grounding screw or bolt shall be sized appropriately to the gauge of the bonding conductor, as per Table 2 of IEC 61730-1.

A ferrous metal part in the grounding path shall be protected against corrosion by metallic or non-metallic coatings, such as painting, galvanising, or plating. Stainless steel is acceptable without additional coating.

A metal-to-metal multiple-bearing pin-type hinge is considered to be an acceptable means for bonding.



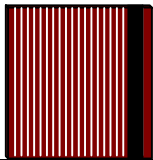
6. Maintenance

Under the normal use maintenance is not necessary. The dirt on the surface of the MODULES will be washed away by rain.

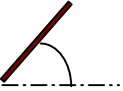
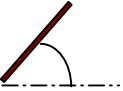

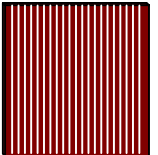
7. Limitation

See the Attachment A: Instruction for using U-type.


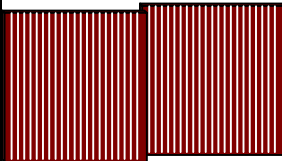
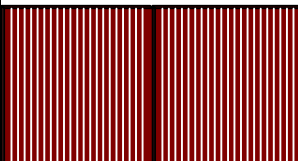
Attachment A : Instruction for using U-type (IEC grade)

Item	Prohibited acts	Assumed risks	Importance	Remarks
Installation and maintenance	Getting on the glass part of MODULE	It breaks MODULE.	Should be avoided	You should get on the frame part (with rubber-soled shoes in order to avoid slipping).
	Getting on the glass part of MODULE with your shoes attached with sand or hard things	It makes small scratches which break the glass with heat.	Prohibited	You must clean up your shoes. You should get on the frame part (with rubber-soled shoes in order to avoid slipping).
	Cleaning the PV MODULES with solvents	It causes deterioration of the glass, EVA and a cover film .	Prohibited	Please consult with Kaneka in order to check if the usage of solvent is allowed.
	Dismantlement of the PV MODULES	It causes an electrical hazard or an injury.	Prohibited	You must not dismantle the PV MODULES.
	Installation of broken PV MODULES	It causes insulation defectives which cause fatal PV system errors.	Prohibited	You must replace broken PV MODULES with normal PV MODULES.
	Touching the top of the connector	It causes an electrical shock.	Prohibited	You must not touch it especially with wet hands.
	Incomplete cable connecting 	It causes electric disconnection or electric shock.	Prohibited	You must connect cables firmly. 
	 Cover a few lines in dark in sunny condition.	It causes damage to cell	Prohibited	You must not hold modules or you must not put things on modules making this situation.


Attachment A : Instruction for using U-type (IEC grade)

Item	Prohibited acts	Assumed risks	Importance	Remarks
Design /1	 <p>Installation with angle less than 15° with every MODULE</p>	It causes dirt accumulation on the glass or inside of frames.	Not recommended	
	 <p>Installation with angle less than 5° for MODULES with Butyl seal</p>	It causes dirt accumulation on the glass or inside of frames that cause deterioration of durability.	Prohibited	
	Installation without the design of the strength against wind pressure, especially toward outside, considering the way of installation of the MODULES	It causes a lack of the strength or the durability.	Prohibited	Calculation of strength must be done and experimental test is recommended if necessary.
	 <p>Installation of the MODULES with the strings horizontally.</p>	In case that accumulated dirt covers up a string and power generation of the string stops completely, the power of the MODULE declines a lot, which makes durability deterioration.	Prohibited	 <p>You must set the MODULES with the strings vertically.</p>
	Installation of the MODULES upside down	It causes that rainwater stay inside of the frames and thus causes deterioration of durability.	Prohibited	You must follow the instruction "INSTALL THIS SIDE UP" indicated in the labels of the rear side of the MODULES.

Attachment A : Instruction for using U-type (IEC grade)

Item	Prohibited acts	Assumed risks	Importance	Remarks
Design /2	 <p>Putting furniture or clips whose shade cover up one string completely for a long time</p>	It causes great decline of power or durability deterioration.	Prohibited	The degree of decline fluctuates according to the quantity of scattered light.
	 <p>Having one string under shade completely for a long time (The figure shows the MODULES overlap with each other.)</p>	It causes great decline of power.	Prohibited	 <p>You must set the MODULES without overlap each other.</p>
	Connecting more than 6 MODULES in series.	It causes overload to the MODULES.	Prohibited	Max system voltage of the MODULES is 600V. The temperature coefficient of Voc at low temperature is also considered.
	Use inverter without transformer	It causes potential problem to the modules.	Prohibited	High negative or positive voltage from ground level will occur.
	Connecting without fuse or blocking diode in each strings.	It does not block reverse current and causes damage on the modules.	Not recommended	Please keep national electrical regulation as well.
Connecting some strings in parallel without overcurrent protection.	It causes high reverse current and causes damage on the modules.	Not recommended	<p>The maximum number of strings connected in parallel without overcurrent protection shall be “n_p”.</p> <ul style="list-style-type: none"> - n_p (integer) < (I_{ocp} / I_{sc}) + 1 - I_{ocp}: max. over-current protection rating 	

Attachment A : Instruction for using U-type (IEC grade)

Item	Prohibited acts	Assumed risks	Importance	Remarks
Design /2	Using central earth system and connect 10 modules in series	It cause potential problem to the modules.	Prohibited	Both high negative and positive voltage from ground level might cause damage on the modules.
	Grounding of PV array at positive pole.	Loading negative potential to the MODULES brings damage easily.	Not Recommended	Negative pole grounding of PV array is recommended.
Installation and environmental condition	 Installation method that makes the frames holds rainwater around the MODULES by blocking up the drain hole of the frames.	It causes decline of power by accumulated dirt on the glass or great influence on the MODULES with accumulated dirt into the frame. It also causes that rainwater stay inside of the frames and thus causes deterioration of durability.	Prohibited	You must make holes in the rails so that rainwater can drain well. You must also keep apart the vertically adjoining MODULES at least by 3 mm for the sake of the drainage of the MODULE- frames.
	Installation without the ground of the MODULE-frames	It causes an electrical hazard.	Not recommended	The MODULE-frames must be electrically grounded according to national laws and regulations.
	Installation nearby the seashore	It damages MODULES from salty breeze or salt water.	Prohibited	You must install PV system at least 500m away from the seashore.
	Installation in heavy snowfall area	In case that snow is piling up on MODULE more than MODULE's loading capacity, the MODULE breaks.	Prohibited	You must install PV system, considering the strength of PV system design against snowfall.
	Installation in the area where corrosive gasses and/or liquid is produced such as domestic animal houses or its surrounding area	Corrosive gasses and/or liquid such as ammonium cause the problem of the modules.	Prohibited	You must install PV system at least 50m away from such area.