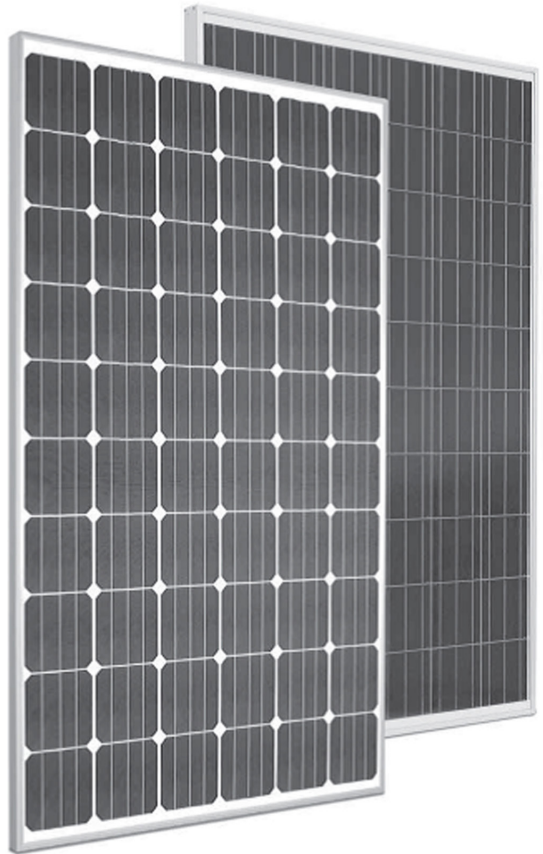


Solar Module | Installation Manual | North American Version

# Conergy PE 245P - 265P



CONERGY

## 1. Introduction

# 1. Introduction

### 1.1. About this installation manual

#### 1.1.1. Subject of this manual

This installation manual describes the procedures for installation and electrical connection of these solar modules in a grid-connected photovoltaic system.

Additional solar modules are installed with the same procedures.

#### 1.1.2. User group

The manual is intended to be used by the system owner and by qualified persons possessing technical skills and basic electrical, electronic and mechanical knowledge related to photovoltaic systems. Please retain this manual for future reference.

### 1.2. Standards and technical directives

The solar modules comply with the following standards:

**ULc/ORD-C1703 & UL 1703 (ETL)**

### 1.3. Intended use

The solar modules are designed for use in photovoltaic systems. Any other use is considered improper use. These solar modules do not comply with the technical regulations for overhead glazing and may not be used for such applications. These solar modules are not intended for use in mobile applications (e.g. vehicles) or marine applications (e.g. boats). Intended use also includes compliance with the specifications stated in this installation manual. Conergy shall not be held liable for damages arising from a failure to observe and follow the installation manual, particularly the safety instructions contained in it, or from any improper use of the product.

## 2. Safety

### 2.1. Responsibilities of the owner/operator

The system operator has safety-related responsibilities. He must ensure that:

- | local codes and other applicable laws concerning required permitting as well as installation & inspection requirements, rules and regulations are consulted and followed;
- | the installation is only carried out by qualified individuals with photovoltaic specialist technical knowledge and basic knowledge of mechanical engineering;
- | the electrical connection is only established by qualified persons;
- | Persons commissioned to perform the work can evaluate their assigned tasks and recognize possible risks;
- | those commissioned to perform the work are familiar with the system components;
- | the installation manual is made available during the installation;
- | the installation manual, and in particular the safety instructions, have been read and understood by the relevant personnel before installation;
- | suitable lifting gear and tools are used for the installation;
- | if replacements are required, only Conergy components are used and repairs are only carried out by qualified technicians authorized by Conergy, as otherwise the warranty will be voided;
- | only components (cable, plugs, mounting parts, etc.) that are suitable for use in photovoltaic systems are used;

- | the solar module is not installed near highly flammable gases or vapors because sparks could be generated;
- | the solar modules are installed over a fireproof roof covering when installed on a roof;
- | artificially concentrated sunlight shall not be directed on the module or panel;
- | the junction box and the cable are not exposed to direct sunlight for long periods of time,
- | the solar module is not in direct contact with water or exposed to moisture for long periods of time,
- | the solar module is not subjected to any extreme chemical loads (e.g. emissions from production operations),
- | the solar module is not subjected to mechanical loads higher than the approved levels,
- | the solar module is only used in the specified ambient temperature range,
- | no paint, coatings or adhesives are applied to the solar module;
- | the solar module is not dismantled and none of the parts provided on delivery are removed.
- | the solar modules are only transported in their original packaging.

### 2.2. Basic safety instructions

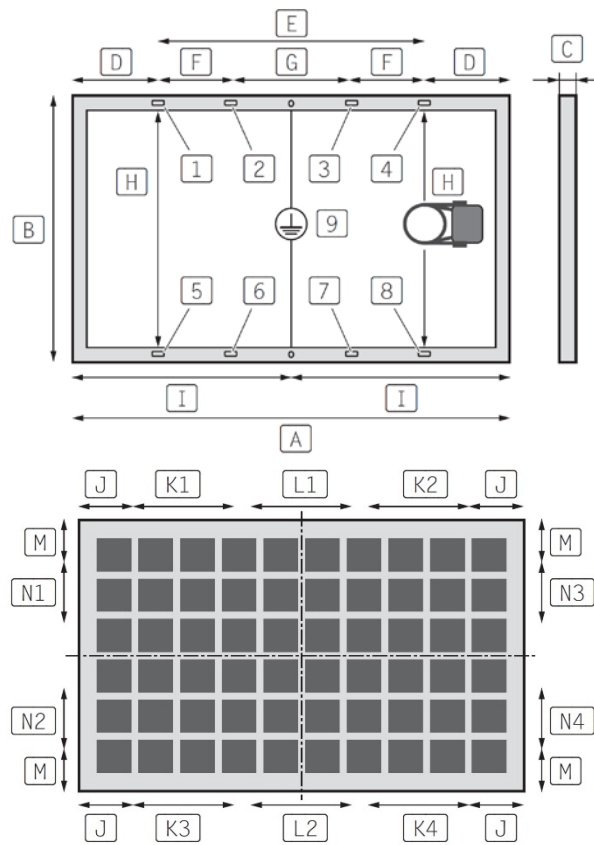
The following safety instructions and warnings form an essential part of this installation manual and are of fundamental importance when handling this product.

- | Make allowance for the loads that these modules may generate for the entire structure.
- | To avoid damage (e.g. broken glass) do not leave solar modules unsecured.
- | Check the mechanical integrity of the solar modules prior to installation. Only use undamaged solar modules.
- | Only use mounting systems recommended by Conergy that can withstand the expected loads for snow, wind, etc.
- | Make sure no other system components impair the mechanical or electrical function of the solar modules.
- | Only work in dry conditions with dry solar modules and dry tools.
- | Do not drill any holes into the module frame or the glass surface and do not perform any welding work on or in the direct vicinity of the solar module.
- | To avoid burns do not touch solar modules under load without wearing protective gear, i.e. insulating gloves, protective eyewear, etc.
- | Never touch solar modules with cracked or broken cover glass or damaged back sheets without wearing gloves.
- | Comply with the applicable occupational health and safety regulations (e.g. regarding protective clothing).
- | Carry out the entire installation in the presence of a second person so that assistance can be provided in case of an accident.
- | Keep a copy of this installation manual in the immediate vicinity of the system.

### 3. Installation

#### 3.1. General installation instructions

- | Make sure that all locally applicable standards, construction regulations and accident prevention regulations are complied with.
- | The modules must be installed in accordance with National Electrical Code (NEC) in the US and in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part I (CEC) in Canada.
- | Only use mounting systems recommended by Conergy that can withstand the expected loads for snow, wind, etc. The recommended minimum stand-off height is 54 mm.
- | Select an installation location with the maximum sunlight at all times of the year. Avoid shaded areas. Damage to modules can occur when continuously shaded.
- | In northern latitudes, orient the solar modules to the south. Determine the ideal setting angle according to the latitude of the installation location. Request this information from your dealer or find it in the official tables.
- | Always mount the solar modules with the same orientation and tilt angle. Otherwise special consideration will need to be given to system design and inverter selection.
- | Maintain an adequate distance between adjacent solar modules to allow for expansion in case of changing thermal conditions.
- | Maintain an adequate distance between the solar module and the mounting surface to ensure sufficient rear ventilation.
- | The solar modules can be mounted both vertically and horizontally.
- | You can find further installation instructions in the installation manual for the respective mounting system.
- | The solar modules may be bolted or clamped in place depending on the design of the frame. The mounting system must be made from material that is resistant to corrosion and atmospheric conditions and able to withstand the loads required.



<b>A</b>	1650 mm	2400 Pa	
<b>B</b>	991 mm	<b>J</b>	0 mm
<b>C</b>	40 mm	<b>K1, K2, K3, K4</b>	412.5 mm
<b>D</b>	175 mm	<b>L1, L2</b>	- mm
<b>E</b>	1300 mm	<b>M</b>	0 mm
<b>F</b>	250 mm	<b>N1, N2, N3, N4</b>	247.75 mm
<b>G</b>	800 mm	5400 Pa	
<b>H</b>	953 mm	<b>J</b>	362.5 mm
<b>I</b>	825 mm	<b>K1, K2, K3, K4</b>	100 mm
<b>1 - 8</b>	9.0 * 14.0 mm	<b>L1, L2</b>	100 mm
<b>9</b>	Φ 4.2 mm	<b>M</b>	0 mm
		<b>N1, N2, N3, N4</b>	247.75 mm

Figure 3-1: Dimensions (A), (B), (C) of the solar module; Sizes (1)–(8), positions and spacings (D), (E), (F), (G), (H) of the mounting holes; Sizes (9) and positions (I) of the grounding holes; Sizes (K), (L), (N) and spacings (J), (M) of the clamping areas of the frame corner

### 3. Installation

#### 3.2. Mounting solar modules on installation frame



The solar modules can be damaged if the proper procedure is not followed!

- | Secure the solar modules against slipping and falling.
- | Do not drop the solar modules.
- | Do not hold the solar module by its socket or connection cables.
- | Always grasp the solar modules simultaneously at two opposite points on the module frame when lifting. Never carry solar modules by just one part of the frame.
- | Do not expose the solar modules to mechanical impact.
- | Do not touch the solar modules with sharp or pointed objects.
- | To prevent lasting marks on the glass, only touch the solar modules with clean, soft and silicone-free protective gloves. Do not wear leather or powdered gloves.
- | Make sure the rear of the mounted solar module is not damaged even in the case of deflection due to mechanical stress (e.g. due to snow loads).
- | Do not drop any objects on the solar module and do not step on it.

Attach the solar module using the predrilled mounting holes on the underside of the frame (see Fig. 3-1). Use corrosion-resistant stainless steel bolts only.

##### I. Normal wind (up to 2400 Pa) and snow loads (up to 2400 Pa)

- Number of bolts to be used in each case on the long sides: 2
- Positioning of the screws: 1+4+5+8

##### II. High wind (up to 2400 Pa) and snow loads (up to 5400 Pa)

- Number of bolts to be used in each case on the long sides: 4
  - Positioning of the screws: 1+2+3+4+5+6+7+8
- The solar modules can be clamped in the provided clamping areas (see Fig. 3-1).

##### I. Normal wind (up to 2400 Pa) and snow loads (up to 2400 Pa)

- a. Clamping on the long side permitted? Yes
- Number of clamps to be used in each case on the long sides: 2
  - Positioning of the clamps on the long sides: K1+K2+K3+K4
- b. Clamping on the short side permitted? Yes
- Number of clamps to be used in each case on the short sides: 2
  - Positioning of the clamps on the short sides: N1+N2+N3+N4

##### II. High wind (up to 2400 Pa) and snow loads (up to 5400 Pa)

- a. Clamping on the long side permitted? Yes
- Number of clamps to be used in each case on the long sides: 2
  - Positioning of the clamps on the long sides: K1+K2+K3+K4
- b. Clamping on the short side permitted? Yes
- Number of clamps to be used in each case on the short sides: 2 (+1 long side)
  - Positioning of the clamps on the short sides: N1+N2+N3+N4+L1+L2

The clamping elements must not protrude past the edge of the frame on the glass side. Make sure the clamping elements do not damage the frame surface or bend the frame.

#### 3.3. Electrical installation

##### 3.3.1. Electrical values

All relevant electrical values are specified on the label on the reverse of the solar module.

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 this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, fuse sizes, and size of controls connected to the PV output.

Refer to Section 690-8 of the National Electrical Code for an additional multiplying factor of 125 percent (80 percent derating) which may be applicable.

The maximum series fuse rating for these modules is: 15A.

##### 3.3.2. General safety instructions

- | Carry out the cabling in accordance with the applicable regulations.
- | Make sure that the cables and connections are not damaged. Protect the cables from damage.



**Risk of electric shock. Risk of fire and injury from electric arc.**

- | Do not disconnect connections under load.
- | Ensure sufficient protection against contact with live parts.
- | Only use insulated tools.
- | Do not insert any electrically conducting parts into the connectors.
- | Never open the junction box.
- | Make sure there is no tension in the cable when positioning and heed the specified minimum bend radius.
- | Avoid large conductor loops.

##### 3.3.3. Parallel and serial connection

Solar modules of the same type can be connected in parallel. These solar modules are fundamentally designed for series connection.



**Material damage due to connection errors.**

- | Only use solar modules of the same type and output for parallel connection. Take measures for overcurrent protection (e.g. line fuse) if necessary. Never exceed the specified maximum series fuse rating of the solar modules.

Maximum number of module strings that are allowed to be switched in parallel:  $2 \text{ current (fuse rating) / (short-circuit} \times 1.25) + 1$ )

- | Make sure that only solar modules with the same amperage (IMPP) are connected in series and make sure that the string voltages are the same. Even at low temperatures, never exceed the maximum permissible system voltage of the solar modules.
- | Maximum number of modules that are allowed to be switched in series:  $20 \text{ (maximum system voltage / (open circuit voltage} \times 1.25))$
- | Make sure that the number and connection of the solar modules match the electrical values specified by the devices connected to the photovoltaic system.
- | Use only 90°C wet-rated, sunlight resistant, stranded or solid conductor cables for all module and interconnect wiring that may be exposed to weather.
- | Make sure that the polarity is correct.

### 3.3.4. Connecting the photovoltaic module

On the rear of the solar module, there is a connection box with the connection cables, the plug and the socket.

Connection cable length	1000	mm
Connection cable cross section	4.0	mm <sup>2</sup>
Allowable ambient temperature range for cables	From	-40 °C
	To	+85 °C

All details for wiring should be in accordance with NEC guidelines and the grounding method of the frame of arrays shall comply with the NEC, article 250.

### 3.3.5. Grounding

For grounding requirements please refer to section 7: Grounding Requirements (North America).

## 4. Maintenance and care

The solar modules are low-maintenance modules. However, Conergy recommends that a visual inspection of the mechanical and electrical connections be performed once a year to detect any damage.

Dirt on the solar modules reduces the output and the yield. If the solar modules are installed with an inclination angle of more than 15°, they will generally be adequately cleaned by the rain.



CAUTION

**Damage to the solar module surface can occur by scratching or extreme differences in temperature.**

- | Only use pH neutral liquid cleaner, even if there is excessive dirt build-up.
- | Do not use abrasive cleaning agents.
- | Ensure cleaning solutions are at roughly the same temperature as the solar module surface.
- | Wipe the solar module surface with water and a soft cloth.
- | Never attempt to rub or scratch off dirt particles.

## 5. Removal



DANGER

**Risk of electric shock.**

- | Do not touch any bare connection parts.
- | Only use insulated tools.

1. Disconnect the inverter from the supply network on the AC side so that the photovoltaic system has no load.
2. Disconnect the photovoltaic system from the inverter at the cut-off point on the DC side.
3. Make sure that the system is not supplied with voltage.
4. Remove the photovoltaic system in the same way as it was installed; observe the safety instructions.

## 6. Disposal

Do not dispose of old or defective solar modules with normal household waste. Please ask your installer, dealer or Conergy about disposal.

## 7. Grounding Requirements

### 7. Grounding Requirements (North America)

Equipment grounding requirements must be checked in accordance with the applicable regulations and standards before work is started.

The module frame or array must be grounded to avoid the hazards of electric shock or fire. The position of possible grounding connections can be found in Fig. 3-1.

An equipment grounding conductor can be fixed to the holes in the frame. Copper ground wire or equivalent to be used: #12awg

The grounding wire can be mounted on one of the designated holes in the module frame (see fig. 3-1).

Avoid contact corrosion when using different metals and observe electro-chemical insulation rating.

As an option, any appropriate bonding and grounding device tested by NRTL to comply with UL-467 standards, including Burndy (formerly WileyElectronics) Washer Electrical Equipment Bonding (WEEB) and similar devices, which penetrate the anodized layer of the module frame during installation can also be used for grounding the solar modules. These devices are available together with grounding terminals (for the connection of the mounting system to the earth) from the manufacturer.

Observe the applicable regulations.

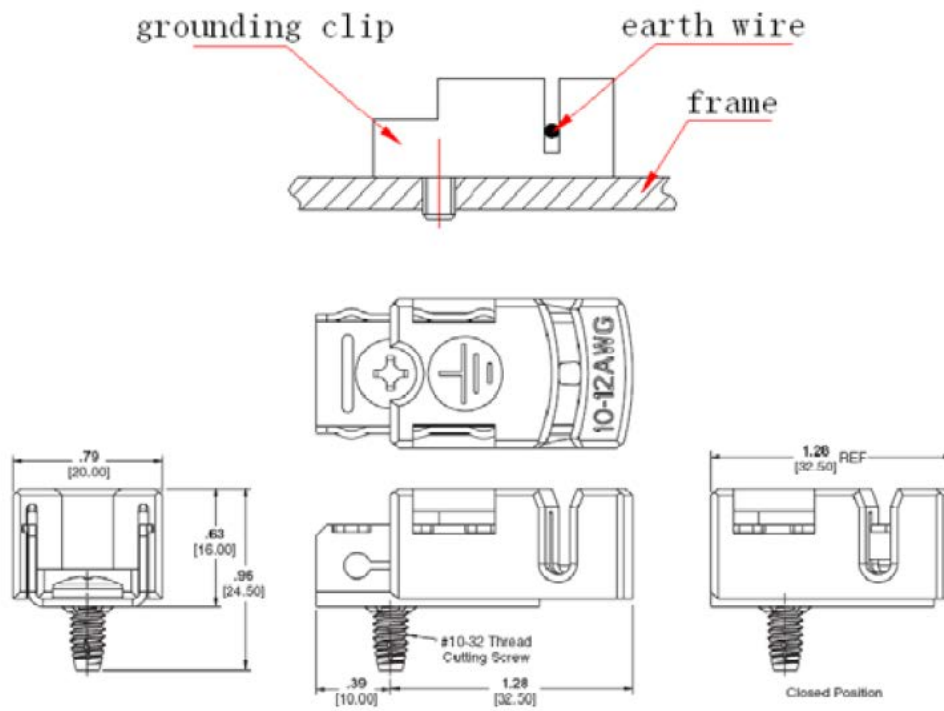


Fig. 7-1: Figure 7-1 above displays one method for grounding using Tyco lug 1954381-1 – (UL Certificate No. E69905)

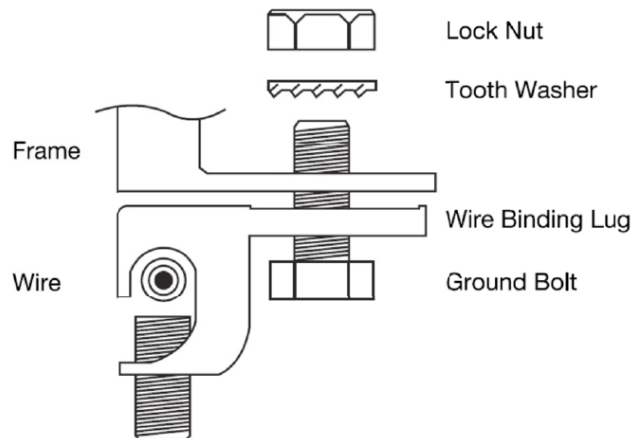


Fig. 7-2: Figure 7-2 above displays one method for grounding using an appropriate ground lug that has been tested and listed by NRTL to comply with UL-467 standards (such as the Burndy CL50-1TN)

## Technical Details

The electrical characteristics are within +/-3.0 percent of the indicated value of Pmax and within +/-10.0 percent of the indicated values of VmPP, ImPP, Voc and Isc under standard test conditions (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum and a cell temperature of 25 °C (77 °F)).

Module Type	Maximum Power (P <sub>MPP</sub> )	Maximum Power Voltage (V <sub>MPP</sub> )	Maximum Power Current (I <sub>MPP</sub> )	Open Circuit Voltage (Voc)	Short Circuit Current (Isc)	Maximum System Voltage (V)	Maximum Series Fuse Rating (A)
PE 245P	245Wp	29.59V	8.28A	37.50V	8.86A	1000V	15A
PE 250P	250Wp	29.94V	8.35A	37.66V	8.92A	1000V	15A
PE 255P	255Wp	30.29V	8.42A	37.82V	8.98A	1000V	15A
PE 260P	260Wp	30.63V	8.49A	37.98V	9.04A	1000V	15A
PE 265P	265Wp	30.96V	8.56A	38.14V	9.10A	1000V	15A



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The figures and drawings in these assembly instructions are for illustration only and may differ from reality  
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