

SOLAR MODULE

SERIES AS-P6/AS-P7
AS-M6/AS-M7

AEG

perfekt in form und funktion

Thank you for choosing our product!

These instructions are intended for dealers and installers involved in the planning, installation and commissioning of photovoltaic systems with polycrystalline or monocrystalline solar modules by AEG Industrial Solar. They are meant to provide you with valuable information to ensure that your PV installation runs smoothly and achieves optimal yields over its whole lifecycle.

AEG Industrial Solar PV-Module are made of carefully selected materials. They are tested and approved by acknowledged independent certification authorities and may only be installed by qualified professional companies. Please observe the standards and regulations applying to photovoltaic systems in the relevant countries, as well as the rules of the employers' liability insurance associations for accident protection. Failure to comply with these can result in major injuries and damage.

Important information for your safety is specially marked. It is essential to comply with these instructions in order to avoid accidents and prevent damage to the product:



WARNING:

This warns you of dangers to your health and indicates possible injury risks



CAUTION:

This refers to possible hazards to the product or other objects.



NOTE:

This highlights tips and information.

OVERVIEW

1.0 PRODUCT IDENTIFICATION

2.0 SAFETY

- 2.1 GENERAL SAFETY
- 2.2 HANDLING SAFETY
- 2.3 INSTALLATION SAFETY
- 2.4 FIRE SAFETY

3.0 INSTALLATION

- 3.1 MECHANICAL INSTALLATION
 - 3.1.1 INSTALLATION USING FRAME MOUNTING HOLES
 - 3.1.2 INSTALLATION USING PRESSURE CLAMPS
 - 3.1.3 INSERTION SYSTEMS
 - 3.1.4 MODULE RESISTANCE
- 3.2 ELECTRICAL INSTALLATION
 - 3.2.1 GENERAL INDICATIONS
 - 3.2.2 SYSTEM GROUNDING

4.0 MODULE MAINTENANCE

- 4.1 GENERAL MAINTENANCE
- 4.2 CLEANING

5.0 MODULE END OF LIFE

- 5.1 MEANING OF THE SYMBOL „WHEELIE BIN“

6.0 MODULE SPECIFICATION

7.0 DISCLAIMER OF LIABILITY

8.0 CONTACT INFORMATION

A1 ANNEX 1 - ILLUSTRATIONS

- A1.1 INSTALLATION USING FRAME MOUNTING HOLES
- A1.2 INSTALLATION USING PRESSURE CLAMPS
- A1.3 INSERTION SYSTEMS

1.0 PRODUCT IDENTIFICATION

Each module can be identified by means of the following embedded information::

Nameplate - It is to be found on the module backside. According to EN 50380 Directives it provides information about the main parameters of the module: Product Type, Maximum Power, Current at Maximum Power, Voltage at Maximum power, Open Circuit Voltage, Short Circuit Current, all as measured under Standard Test Conditions, Weight, Dimensions, Maximum System Voltage, Maximum Series Fuse etc.

Serial Number - Each individual module is identified by a unique serial number coupled with a barcode. They are permanently inserted inside the laminate, under the front glass of the module, visible when viewing from the front of the module. There is only one serial number coupled with one barcode on the module.

2.0 SAFETY

2.1 Safety

All PV modules shall be installed according to all local and national applicable standards, codes and regulations. Installation should be performed only by qualified persons. The installators bear the risk of all injury that might occur during installation including, without limitation, the risk of electric shock. Check and follow all safety precautions specified even for the other components of the system.

WARNING:

- Rooftop installations should be placed over fire-resistant roofs only.

CAUTION:

- Do not apply paint or adhesive to module top surface.
- Do not use mirrors or other magnifiers to artificially concentrate sunlight on the modules.
- Do not expose back sheet foils directly to sunlight.
- Do not attempt to disassemble the modules, and do not remove any attached nameplates or components

2.2. Handling safety

CAUTION:

- Do not exceed the maximum height of pallets stacked on top of each other. Maximum height is 2 pallets (standard packaging for shipment).
- Do not scratch or damage the module surface.
- Do not use the junction box and cables as a grip.
- Do not drop the module or allow objects to fall on the module.
- To avoid glass breakage, do not place any heavy objects on the module.
- Do not stand or step on the module.
- Do not set the module down hard on a surface.
- Inappropriate transport and installation may break the module.



Zerbrechlich

Vorsichtig
Behandeln

Nicht betreten

Stapel
Beschränkung

2.1 Installation safety

Installing solar photovoltaic systems requires specialized skills and knowledge. One individual module may generate DC voltages greater than 30 V when exposed to light of any intensity. Contact with a DC voltage of 30 V or more is potentially hazardous. Series or parallel connection of the modules increases the voltage or electric current respectively.

WARNING:

When installing solar modules, please remember:

- at installation, modules should be kept entirely away from light or covered with a dark opaque material. When working with modules without any cover, the safety regulations for live electrical equipment need to be followed;
- use only equipment, connectors, wiring and support frames suitable for a solar electric system;
- do not wear metallic rings, watchbands, ear, nose or lip rings or other metallic devices while installing or troubleshooting photovoltaic systems in order to avoid electric shock;
- do not disconnect modules under load to avoid electrical arcs;
- do not insert electrically conductive parts into the plugs and sockets;
- do not install solar modules and wiring with wet plugs and sockets;
- exercise extreme caution when carrying out any work on the wiring. High contact voltage can occur in the inverter when it is isolated;
- abide with the safety regulations for all other components used in the PV system, including wiring and cables, connectors, charging regulators, inverters, storage batteries and rechargeable batteries, etc.

CAUTION:

When installing solar modules, please remember:

- always use the same type of module within a particular photovoltaic system;
- use only insulated tools that are approved for working on electrical installations;
- protect solar modules from overvoltage e.g. voltage peaks of battery charges, generators, etc.;
- do not attempt to repair any part of the PV module.

2.4 Fire safety

The PV modules by AEG are tested according to the provisions of IEC EN 61730 Directive with Application Class A. Fire safety has been rated as Class C. Please be aware that rooftop installations can affect the fire safety of a building.

WARNING:

- Rooftop installations should be placed over fire resistant roofs only; fire class A is recommended.
- For rooftop installations only fire-resistant components should be used.
- Do not install the solar panels in the proximity of sources of flammable gases and vapors or open flames.

3.0 INSTALLATION

i NOTE:

- AEG PV modules should be installed in a location where they can receive the maximum amount of sunlight throughout the year. In the Northern Hemisphere modules should face south, while in the Southern Hemisphere they should face north.

AEG PV modules connected in series should be installed at the same orientation and tilt angle. Different orientations or angles may cause a loss of power output due to the change in sunlight exposure.

The modules should not be immersed in liquid (IP67). Corrosion risk incurs if the module is exposed to salt (i.e. marine environments) or sulfur sources. Therefore, the installation distance of the modules to sea water or lakes should be at least 500 mt. The module should not be exposed to unusual chemical loads.

Protect the solar modules from overvoltage, e.g. voltage peaks of battery charges, generators, etc. Should the module be connected to a storage battery, all precautions as prescribed by the battery manufacturer should be taken into account.

When designing the final layout of the modules in a photovoltaic system, keep suitable access space to allow easy maintenance and inspection works.

⚠ WARNING:

- Do not carry out the installation in high winds and prevent the falling of objects from the roof. Secure the work area so that nobody on or beneath the roof can be injured.

AEG PV modules must be installed and stored in the following conditions:

Operating temperature	from -40°C	to +85°C
Storage temperature	from -40°C	to +60°C
Humidity	below 85 Relative Humidity (%)	

When installing a module on a roof or building, please ensure that it is securely fastened and cannot fall as a result of wind or snow loads.

i NOTE:

- Provide adequate ventilation under the modules for cooling. We recommend 10 cm minimum clearance between the module and the mounting surface.

The modules should not be shaded at any time by trees, antennas, cables, houses etc. If a module is shaded or even partially shaded, it will fail to perform at ideal conditions and this will result in lower power outputs.

3.1 Mechanical installation

Always use structures and materials specifically developed and certified for photovoltaic module installation.

The minimum distance between two fixed modules for linear thermal expansion of the module frames should be 5 mm. Nevertheless, we recommend a distance of 20 mm between two solar modules to allow wind circulation and to reduce pressure loads whilst improving module ventilation.

i NOTE:

- We recommend a distance between two solar modules of 20 mm to allow wind circulation, in order to reduce pressure loads and improve module ventilation.

The PV module should not be mounted in such a way that the drain holes of the PV module can incur blockage.

AEG PV modules can be installed in either landscape or portrait orientation. In choosing the orientation, please keep in mind the internal PV module bypass diode configuration to ensure the optimum electrical behaviour from any potential shading over the module.

Galvanic corrosion can occur between the aluminum frame of the PV module and mounting hardware, if such hardware is composed of dissimilar metals, especially in harsh environments (such as environments with high humidity). In those cases, it is recommended to place neoprene tape, PVC washers or stainless steel washers between the PV module frame and the support structure to prevent corrosion. Additionally, all module support structures used to support PV modules at correct tilt angles should be wind and snow load rated by appropriate local and civil Directives prior to installation.

△ CAUTION:

- Do not dismount, drill or modify the frame or any other part of the PV module. Please contact our Technical Service should you need any clarification concerning the installation instructions.

AEG PV modules can be installed by means of the following processes:

- Installation by means of frame mounting holes
- Installation by means of pressure clamps
- Installation by means of insertion systems

3.1.1 Installation using frame mounting holes

Modules must be securely fixed to the mounting structure using the four pre-drilled mounting holes (14mm * 9mm) placed in the long frame rails at 400 mm from the middle. Use M8 stainless steel hardware, spring washers and flat washers with a torque of approximately 10 newton metre [N • m] for normal installation. Galvanized or hot dipped zinc plated hardware is also acceptable. Please refer to the drawings on the Annex 1 to get more information about the proper use of mounting holes and load resistance of all module types.

i NOTE:

- Should excessive wind or snow loads be expected for the PV installation, we recommend to use all eight mounting holes.

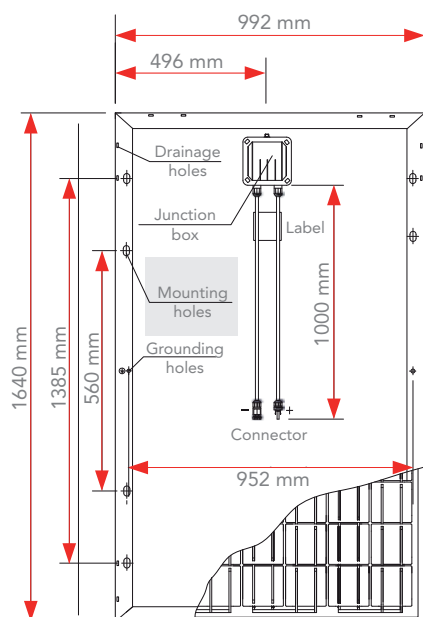


FIG.1: EXAMPLE OF MOUNTING HOLES, AS-P6 SERIES

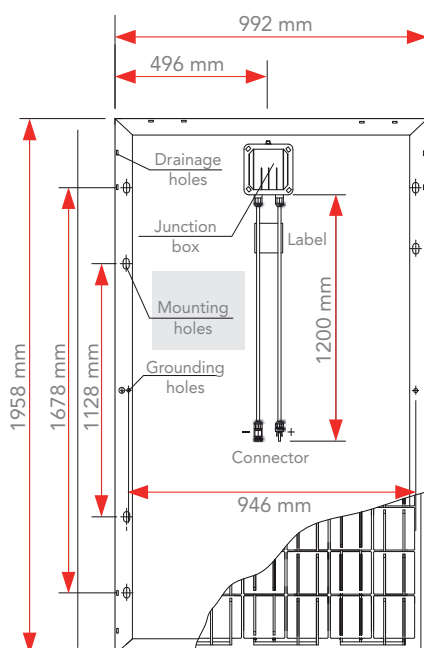


FIG.2: EXAMPLE OF MOUNTING HOLES, AS-P7 SERIES

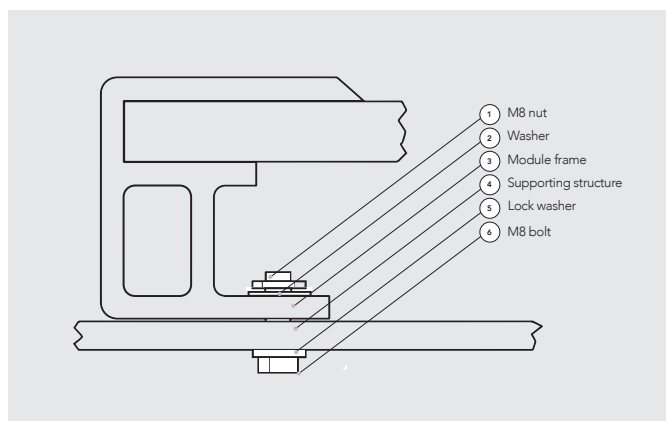


FIG.3: INSTALLATION USING MOUNTING HOLES

3.1.2 Installation using pressure clamps

Installation using pressure clamps may be executed along both sides of the module frame according to instructions on Annex 1. The obligatory position of the clips along the frame depends on which side of the module is used for the installation as follows:

Fixing on the long side: the clamps must be mounted along the frame at the position of the mounting hole. The clamps must be fixed at a distance 25% of the total side length from the frame edge with a tolerance of ± 50 mm.

Fixing on the short side: the clamps must be mounted along the frame at the edges of the module, the clamp fixing area lies within 25% of the overall length of the short side from the frame edge.

Note that on both sides of the module the pressure clamps should be mounted always in a symmetric position with respect to the middle line for a proper load distribution. Please refer to the drawings on the Annex 1.

Please ensure that clamps are installed according to the manufacturer's specific instructions. Do not apply excessive pressure on the frame, as this could lead to frame deformation. We recommend a torque of approximately 10 newton metre [$\text{N} \cdot \text{m}$] – please refer to the clamp manufacturer for specific hardware and torque requirements.

△ CAUTION:

- The clamps must fasten the modules by means of contact with the frame only. Do not allow any contact between the clamps and the glass.
- Avoid shadowing effects from the module clamps.
- Please make sure that pressure clamps are not mounted outside of the specified areas, as this could affect the module's mechanical resistance.

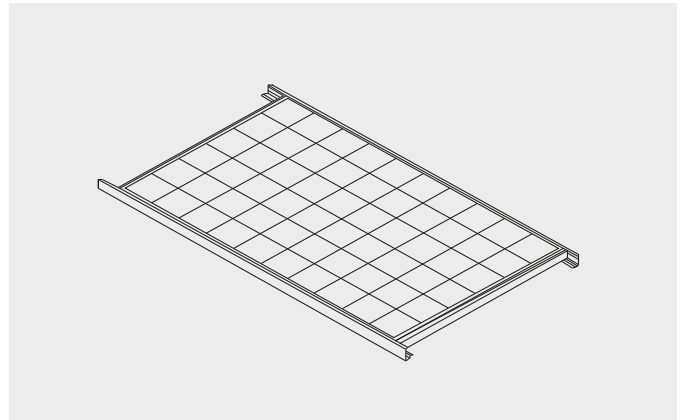


FIG.5:INSERTION SYSTEMS

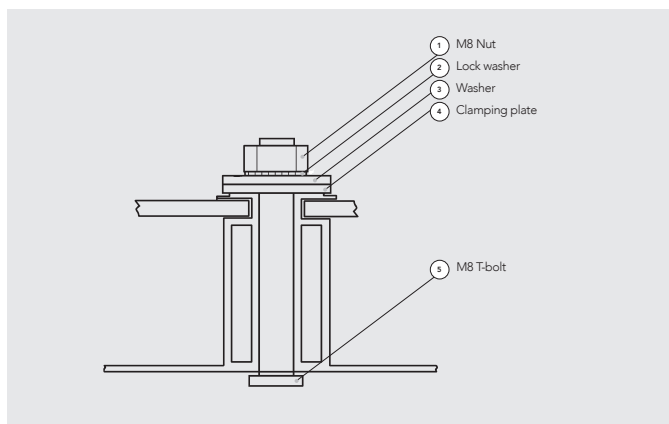


FIG.4: INSTALLATION USING PRESSURE CLAMPS

3.1.3 Insertion systems

Insertion systems on the short sides of the module are allowed with a limitation of 2400 Pa on the maximum load resistance. Insertion systems on the long side of the module do not incur in any limitation and are allowed with a maximum of 5400 Pa for snow load. Please refer to Annex 1 for more information.

i NOTE:

- If insertion systems are used for installation where modules slide through the inner side of the rails, we recommend to use PVC frame protectors in order to prevent damages to the anodized layer of the frame.

3.1.4 Module load resistance

Wind load: 2400 Pa

Snow load: 5400 Pa

According to IEC61215 clause 10.16, 2400 Pa corresponds to a wind pressure of 130 km/h (approximately +/- 800 Pa) with a safety factor of 3 for gusty winds. Please note that the information provided above could vary according to the different mounting systems and configurations as described in the Annex 1.

3.2 Electrical installation**⚠ WARNING:**

- The installation requires the execution of electrical connection works, for which thorough knowledge of the relevant safety requirements is necessary. Having them carried out by unqualified personnel would be a risk.

Modules electrically connected together in a series/parallel configuration generate DC electrical energy which may be converted to AC by mean of a solar inverter. The resulting PV system can therefore be connected to the local utility grid system. As the policies of local utilities and technical rules concerning the connection of renewable energy systems to power grids vary from region to region, please consult a qualified system designer or integrator to design a system compliant with the related directives. Permits

are normally required for installing a PV system and the utility must formally approve and inspect the system before its connection to the grid can be accepted. The connection of the inverter to the grid needs to be done by a competent, authorized company.

The electrical installation of the PV system must be executed in accordance with the respective National Electrical Codes or applicable National Regulations.

△ CAUTION:

- Use only insulated tools that are approved for working on electrical installations. Abide by the safety regulations for all the components used in the system, including wiring and cables, connectors, charge regulators, inverters, storage batteries etc.
- To avoid conductor loops the strings (+and -) should be laid together. The cable groove on the cross profile can hereby be used. If possible roof penetration should only be at one point.

3.2.1 General indications

The modules are fitted with two pre-assembled sunlight resistant, isolated cable leads, which end with PV fast connectors. The positive (+) terminal features a female connector while the negative (-) terminal features a male connector. These cable leads and connectors must not be removed or cut off.

- A number of modules are connected in series and then in parallel to form a PV array, especially for applications with high operating voltages. When modules are connected in series, the total voltage of the resulting string corresponds to the sum of the individual voltages of the modules. To avoid mismatch, power loss or damage to the PV system, do not use different module types within the same circuit.

When selecting the size of the cables that connect the module strings to the solar inverter, it is recommended to refer to the nameplate electrical parameters of the related module type. For electrical design considerations, when determining component voltage ratings, conductor current ratings, fuse sizes and the rest of electrical hardware connected to the module strings, the values provided on the module label or on the datasheet of the related module type should be multiplied by a factor of 1.25 for Short Circuit Current (Isc) and 1.10 for Open Circuit Voltage (Voc). Do consult rated local wiring regulations to determine system wire size, type, and temperature allowed for your installation.

Parallel interconnection of more than two strings requires the installation of string fuses. The maximum fuse current is stated to be 15 amps. If more than two strings are interconnected in parallel this value might be exceeded in the event of a fault.

3.2.2 Grounding

AEG PV modules are certified for Class A applications (IEC 61730) Safety Class II, 1000Vdc Maximum System Voltage. Refer to respective National Electrical Code requirements and standards for safety-related grounding of racking system and/or module frames.

i NOTE:

In case of executing the grounding of the module frames, we recommend taking into account the following aspects:

- the long frame rails are equipped with pre-drilled grounding holes in their middle section. These holes shall be used only for grounding purposes and must not be used for mounting purposes;
- proper grounding is achieved by connecting the module frame(s) and structural members contiguously using a suitable grounding conductor. The grounding wire must be properly fastened to the module frame to assure good

electrical contact. Use copper, copper alloy or any other conductive material accepted by the applicable National Electrical Regulation;

- make electrical contact by penetrating the anodized coating of the aluminium frame. To break the anodized layer, we suggest to deploy a stainless steel toothed washer to be inserted between the nut and the frame.

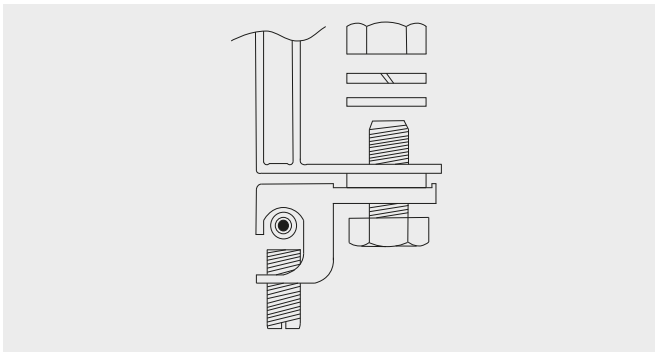


FIG.8: GROUNDING BOLT

⚠ CAUTION:

- When carrying out the grounding of the modules, the aluminium frame must not enter in permanent direct contact with dissimilar metals, as the contact could result in galvanic corrosion. Stainless steel flat washers can be inserted between frame and grounding lug.
- We recommend the use of stainless steel grounding bolts or grounding lugs specifically designed for photovoltaic applications.

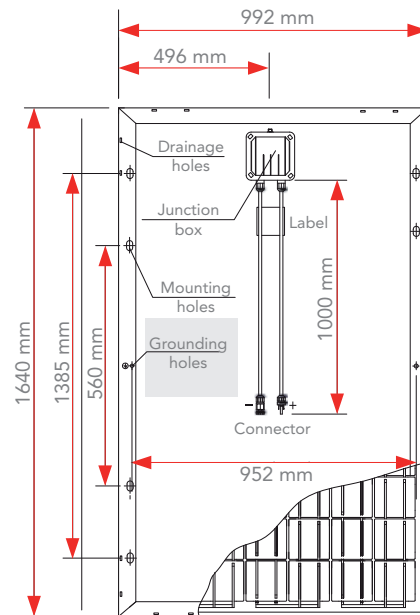


FIG.7: EXAMPLE OF GROUNDING HOLES, AS-P6 SERIES

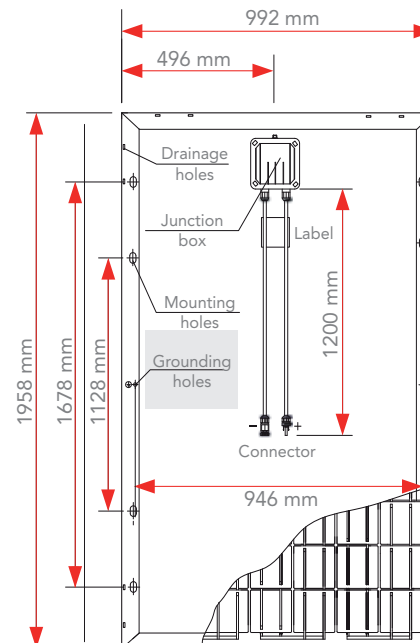


FIG.8: EXAMPLE OF GROUNDING HOLES, AS-P7 SERIES

4.0 MODULE MAINTENANCE

4.1 General maintenance

We recommend the following maintenance in order to ensure optimum performance of the module:

- check the electrical and mechanical connections every six months to verify that they are clean, secure and undamaged;
- check that mounting hardware, terminal screws and grounding components are tightly secured and are not affected by corrosion;
- replacement modules must be of the same type of those to be replaced;
- modules generate high voltage when exposed to sunlight. Please cover the front surface of modules with an opaque no scratching material when repairing;
- follow the maintenance instructions for all components used in the system, such as support frames, charge regulators, inverters, batteries etc.;
- use appropriate safety equipment (insulated tools, insulating gloves, etc.) when handling modules.

CAUTION:

- If any problem arises, have them investigated by a competent specialist; repairing works must be performed by specialized and properly trained personnel only.

WARNING:

- Do not touch live parts or cables and connectors.
- Do not disconnect the grounding when doing system maintenance works.
- For any electrical maintenance, the PV system must be first shut down.

Improper maintenance can cause lethal electric shock and/or burns.

4.2. Cleaning

Dirt and dust can accumulate on the glass surface of the PV module over time, particularly in installations with low inclination. This can cause a general decrease of power output and also sedimentation on the lower edge of the modules due to dirt accumulation. We recommend a periodic cleaning of PV modules to ensure maximum power output, especially in regions with high quantity of dust in the air or low precipitations as follows:

- under most weather conditions, normal rainfall is enough to keep the PV module glass surface clean. Clean the glass surface of the module as necessary and consider that lower inclination requires higher cleaning frequency;
- always use water and a soft sponge or cloth for cleaning. A mild, non-abrasive cleaning agent can be used to remove stubborn dirt. High mineral content water is not recommended, as it may leave residual deposits on the module. To avoid a possible thermal shock clean the modules during early morning, when the module is still cold. This is especially recommended in regions with hotter temperatures;
- in cold environments with snow do not try to remove the frozen snow or ice from the module scratching on the front glass. Only soft snow can be removed gently with a soft brush in order to improve the production.

⚠ CAUTION:

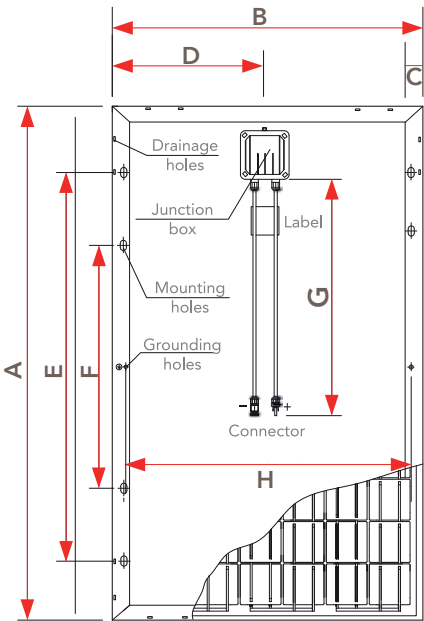
- Do not use abrasive sponges or aggressive tools that could scratch the module surface; under no circumstance should the dirt be dry removed, as this would cause micro-scratches which could have a negative impact on the module's performances.

⚠ WARNING:

- Do not clean modules having broken glass or exposed wiring. This can cause a general electrical failure of the module or electrical shock hazard.

ℹ NOTE:

- For the technical data of your purchased module always refer to the related product datasheet, which you can also download from a dedicated section at www.aeg-industrialsolar.de. Specifications are subject to change without prior notice.



5.0 MODULE END OF LIFE

5.1 Meaning of the symbol „Wheelie Bin“



Please return any electrical equipment that you no longer use to the collection points provided for their disposal. Information concerning where the equipment can be disposed of can be obtained from your local authorities.

6.0 MODULE IDENTIFICATION

	AS-P6	AS-P7
A (mm)	1640	1958
B (mm)	992	992
C (mm)	40	50
D (mm)	496	496
E (mm)	1385	1678
F (mm)	560	1128
G (mm)	1000	1200
H (mm)	952	946
Cable (mm)	1000	1200
Weight (kg)	18,5	23,2
Solar Cells	Polycrystalline	Polycrystalline
Cell Configuration	6 x 10 (60)	6 x 12 (72)
Connector	MC4-compatible	MC4-compatible
Max Fuse Rating	15A	15A

Following is the exemplificative representation of a standard PV module by AEG.

7.0 DISCLAIMER OF LIABILITY

Installers must follow all safety precautions as described in this installation manual as well as local requirement and regulations by law or authorised organisations.

Because the use of this manual and the conditions or methods of installation, operation, use and maintenance of photovoltaic (PV) product are beyond AEG Industrial Solar control, AEG Industrial Solar will not accept any responsibility and expressly disclaims any liability for loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance. No responsibility will be assumed by AEG Industrial Solar for any infringement of patents or other rights of third parties which may result from use of the PV module. No license is granted by implication or otherwise under any patent or patent rights.

The information in this manual is based on AEG Industrial Solar's knowledge and experience and it is believed to be reliable. Nevertheless such information, including product specification (without limitations) and suggestions do not constitute a warranty, expresses or implied. AEG Industrial Solar reserves the right to change the manual, the PV modules, the specifications, or product information sheets without prior notice.

8.0 CONTACTS

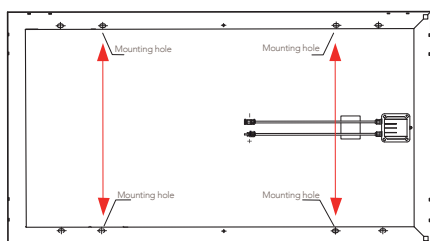
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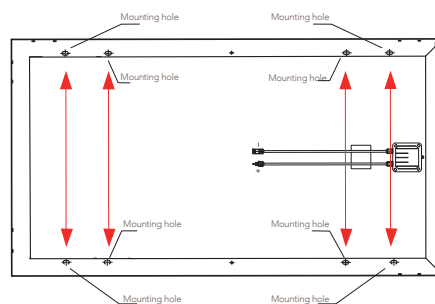
9.0 ANNEX 1 - ILLUSTRATIONS

A1.1 Installation using frame mounting holes

Snow load: 2400 Pa / Wind load: 2400 Pa



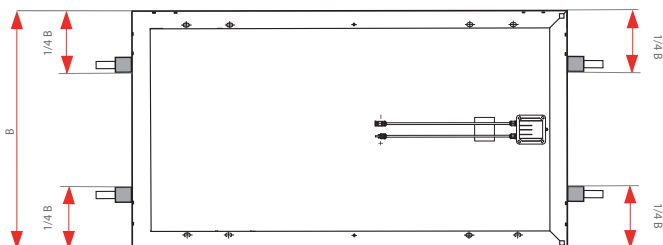
Snow load: 5400 Pa / Wind load: 2400 Pa



A1.2 Installation using pressure clamps

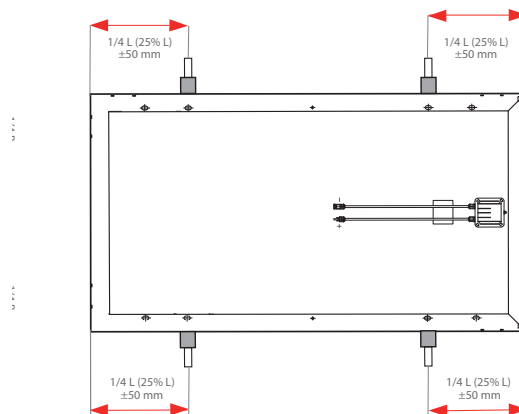
Clamping on the short side

Snow load: 2400 Pa / Wind load: 2400 Pa



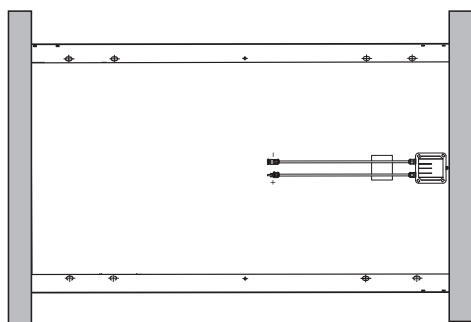
Clamping on the long side

Snow load: 5400 Pa / Wind load: 2400 Pa

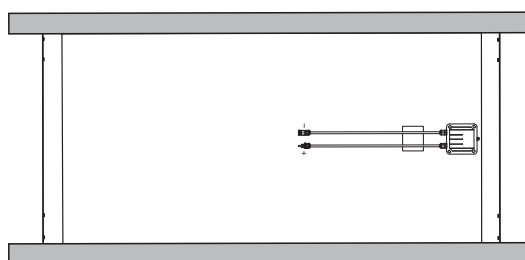


A1.3 Insertion systems

Snow load: 2400 Pa / Wind load: 2400 Pa



Snow load: 5400 Pa / Wind load: 2400 Pa



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AEG
perfekt in form und funktion