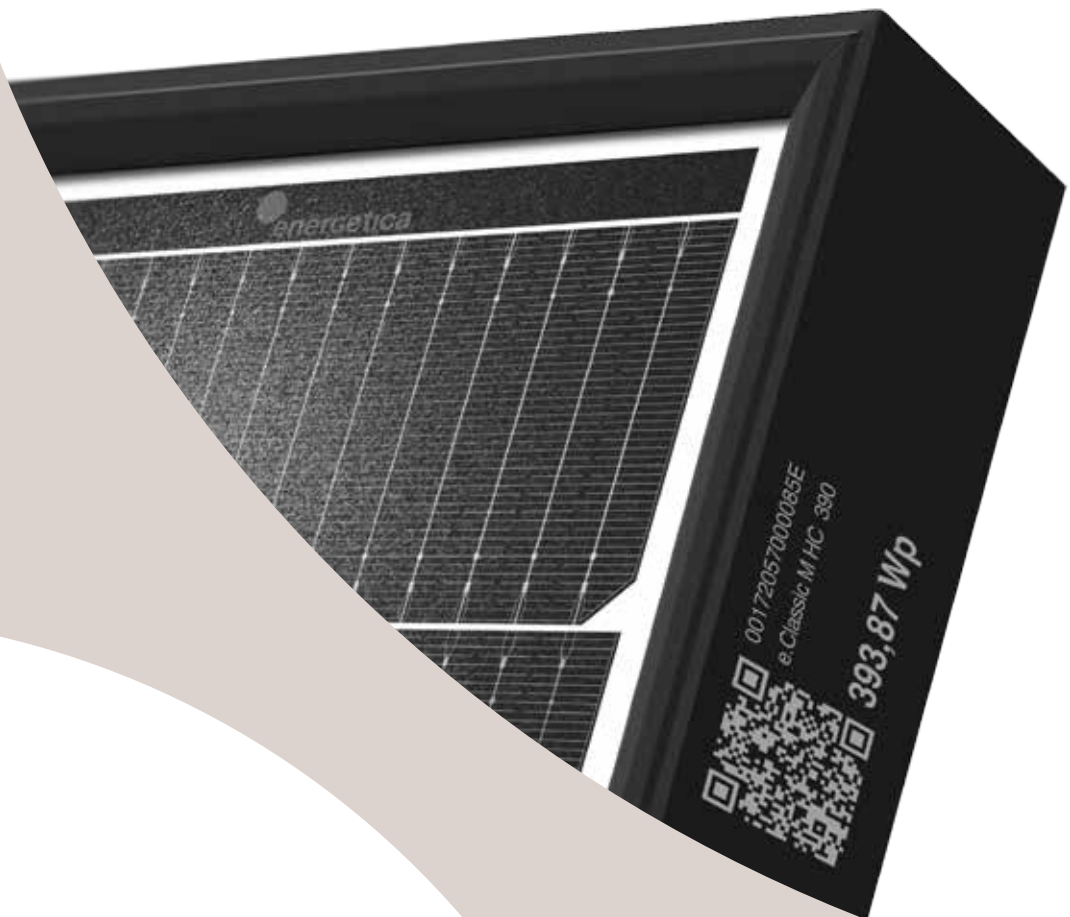


INSTALLATION MANUAL

e. CLASSIC M HC
e. CLASSIC M HC black



www.energetica-pv.com

V1.0 - 26.11.2020



#BePartOfTheChange

energetica
PHOTOVOLTAIC INDUSTRIES



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Thank you very much for choosing a photovoltaic module from Energetica Industries GmbH. With e.Classic M HC and e.Classic M HC black - these are just two high-performance modules from our constantly growing product range - you can convert the sun's energy directly into environmentally friendly photovoltaic electricity.

We have drawn up these installation instructions very carefully so that you can fully exploit the capabilities of your PV modules, and above all to protect you from potential dangers.

Therefore, please read the following manual carefully and observe the notes. Failure to do so can not only mean less yield - it can also lead to personal injury and property damage.

These installation instructions describe the safe installation of the photovoltaic modules e.Classic M HC / e.Classic M HC black from Energetica Industries GmbH, hereinafter referred to as the PV module.

- » Read this manual carefully before starting the installation. All installation instructions must be understood before beginning installation and implemented accordingly.
- » Before installing the PV modules, find out more about guidelines and approval requirements from the responsible local authorities and energy providers.
- » The installation and maintenance of PV modules may only be carried out by authorized and qualified personnel.
- » Keep this installation manual for the entire service life of the PV modules and ensure that this manual is accessible to the operator of the PV system at all times.
- » Make sure that the operating instructions are passed on to subsequent owners or users of the PV modules and that every supplement issued by the manufacturer is included.
- » Please also note other applicable documents.



Safety regulations

The operator of the photovoltaic module is responsible for compliance with all relevant legal regulations and guidelines.

Please commission, operate or maintain the photovoltaic modules only in accordance with the following regulations and standards:

- » Installation instructions;
- » Applicable documents (country-specific regulations on pressure equipment, operational safety, hazardous goods and environmental protection);
- » Plant-specific regulations and requirements;
- » Applicable country-specific laws, regulations and rules for planning, installing and operating solar power systems and for working on the roof;
- » Valid international, national and regional regulations, in particular for the installation of electrical devices and systems, for working with direct current and regulations of the responsible electricity provider for the parallel operation of solar power systems;
- » Accident prevention regulations and
- » other applicable standards and generally recognized codes of practice.

Staff qualifications

Operators or installers are responsible for ensuring that installation, maintenance, commissioning and dismantling are only carried out by trained specialists with recognized training certificates (from the respective state or federal organizations) for the respective specialist area.

All electrical work may only be carried out by an officially certified specialist in accordance with the applicable standards, VDE regulations, accident prevention regulations and the regulations of the local electricity company.

Validity

These instructions only apply to PV modules from Energetica Industries GmbH. Energetica Industries GmbH assumes no liability for damage resulting from failure to observe these instructions.

It is the responsibility of the system installer to observe the wiring and dimensioning of the system as well as all necessary safety regulations for their design and installation.

These instructions do not imply any liability on the part of Energetica Industries. Energetica is only liable within the framework of contractual agreements or within the framework of assumed guarantees. In addition, Energetica Industries assumes no responsibility for the functionality and safety of the PV modules.

Please also observe the instructions for other system components that are to be part of the photovoltaic system very carefully. If necessary, statics must be created for the entire project.

In case we do not adequately answer your questions in these instructions, please contact your system supplier first. It is the responsibility of the system supplier to ensure that all components of the system are technically coordinated and comply with each other.

Information for the operator

Keep these instructions for the entire service life of the photovoltaic system. For information on the formal requirements for PV systems, contact your system supplier.

For information on the formal requirements for PV systems, contact your system supplier.

Before installing the PV system, find out about the guidelines and approval requirements from the responsible local authorities and energy suppliers.

Only if you take these requirements into account can you ensure the economic success of your investment.

Applicable Documents

These installation instructions are only valid in conjunction with the following technical information.

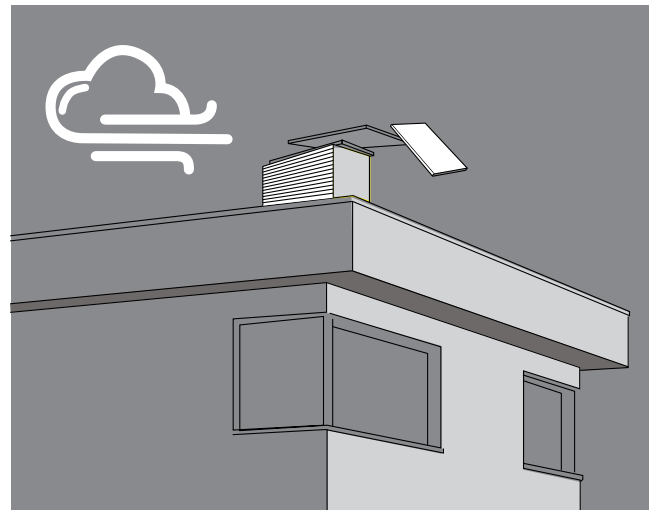
- » Product data sheet for the e.Classic M HC or e.Classic M HC black.
- » Information sheet: Packaging and transport of Energetica modules.



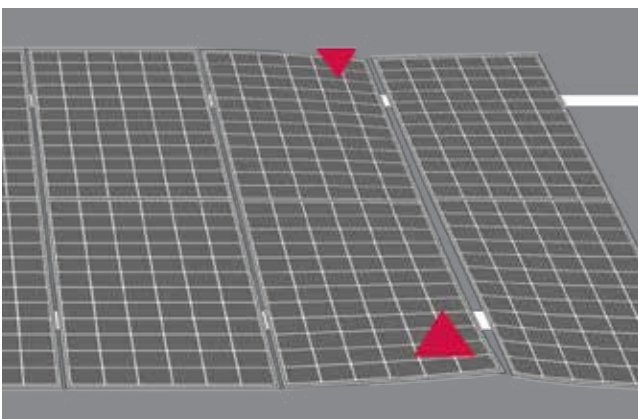
Before installation

- » Read this manual carefully before installation.
- » Have the installation and maintenance of the PV modules carried out by qualified and authorized specialists only.
- » All installation instructions must be read and understood before beginning the installation.
- » To avoid burns and other injuries, never touch the PV module with bare hands.
- » The PV module must not be dismantled.
- » After installation or repair, check that the PV module is working properly.
- » Should the solar module or parts of it be replaced, the replacement module or spare parts must correspond to the previous module type or the original parts.
- » Persons without specialist knowledge of the PV module or the measures to be taken in the event of a damaged module to avoid injuries or electric shock are not allowed to approach the device.
- » Keep all permits and licenses for installing the solar modules in a safe place.
- » Do not set up the solar module horizontally, as this can lead to delamination or glass deformation.
- » The modules are not designed for use indoors or on any means of transportation.
- » The nominal specifications according to the industry standard are determined under conditions of 1,000 W/m² Irradiance and 25 ° C (77 ° F) solar cell temperature.
- » The voltage and amperage can be significantly higher at colder temperatures.
- » Children are to be kept away from PV modules and systems at all times.
- » Leave the module in the packaging until installation.
- » Follow the packaging instructions and check the packaging for damage. If the packaging is damaged, contact the carrier.

- » Never step on the modules or put any mechanical loads on them. Do not drop any objects on the modules.
- » Do not store any flammable gases in the vicinity of the installation site.
- » Do not work alone. Work in a team of two or more people.
- » Make sure that the staff knows and adheres to the accident prevention and safety regulations.



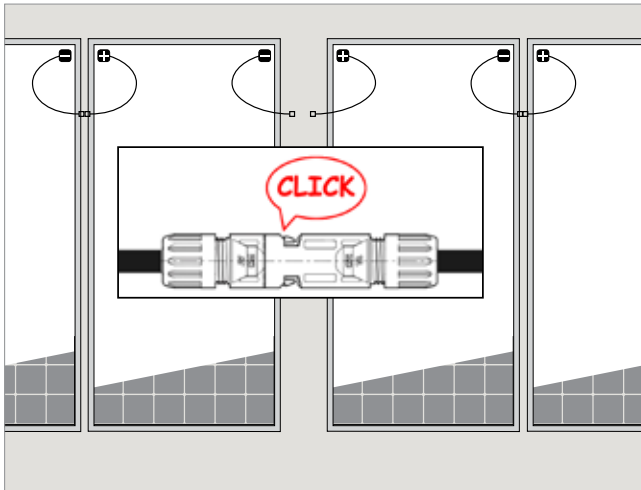
- » Secure the modules during installation, especially when storing them on the roof. Only mount the modules in dry and calm weather.
- » When handling tools on the junction box cable, be careful not to damage the cable..
- » Partial shading of modules can considerably reduce the power output of the system and damage the modules.
- » Small angles of inclination should be avoided as they can lead to the accumulation of dirt on the glass at the edge of the frame.



- » Do not expose the modules to any mechanical tension when screwing them onto the installation system. (Torsion)

After installation

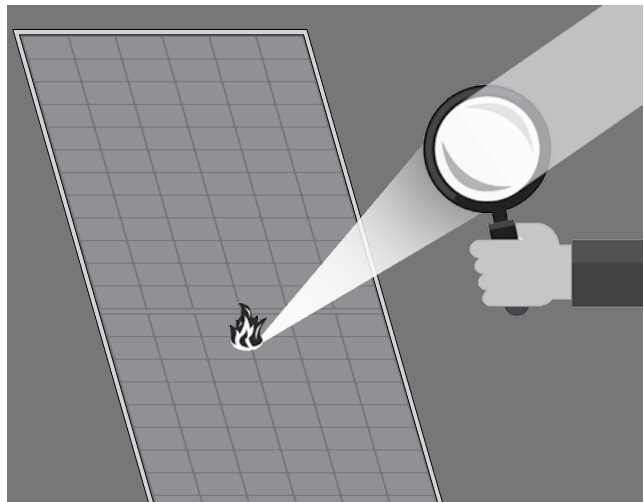
- » Check that the connectors are securely fastened and make sure that the cables work properly.
- » Check the modules regularly for damage to the glass surface, the back sheet, the frame, the junction box and the external electrical connections.



- » Check to see if the electrical connections are loose and show signs of corrosion.
- » Keep the back of the module free of foreign bodies and structural elements, especially if the module is subjected to mechanical loads.
- » Do not use oil or lubricant on any part of the module, as this can damage the photovoltaic module.

Electrical installation

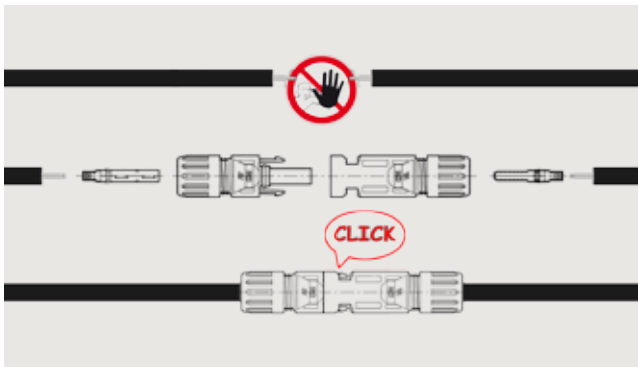
- » Avoid all electrical hazards during the installation, cabling, commissioning and maintenance of modules.
- » Do not group modules with different electrical properties or physical configurations in the same system.
- » Please pay close attention to the polarity of the cables and clamps in order not to damage the module when connecting.
- » If the return currents exceed the maximum value specified on the type label or in the data sheet, a correctly dimensioned and certified overcurrent device (fuse or circuit breaker) must be connected in series for each module or each module string.
- » The nominal capacity of the overcurrent device must not exceed the maximum permissible value of the backup fuse specified on the label or data sheet.
- » The module contains a factory-integrated electronic string shutdown (Energetica Integrated Shadow Protection – e.ISP).
- » To protect the system, it is recommended that a lightning rod be attached during installation.
- » Since the overvoltage generated by lightning can damage the system, conductor loops should be reduced to a minimum.
- » The junction box must not be opened. Opening the junction box will void the guarantee.



- » Never use light concentrators such as mirrors or lenses.
- » Modules suspected of having an electrical problem should be returned to Energetica Industries GmbH, Energieplatz 1, A-9556 Liebenfels, Austria, for inspection, possible repair or replacement in accordance with the guarantee.

Electrical connections

- » There is a risk of electric shock in the vicinity of the electrical connections of the solar module.
- » Modules can be connected in series and / or in parallel to obtain the required electrical output, provided the information in the product specifications is followed.
- » Use only modules of the same type in a combined circuit.
- » Do not disconnect modules under electrical load. There is a risk of electric shock in the vicinity of the connecting elements of the solar modules.
- » If you connect the module in series or in parallel (e.g. when using extension cables), the connection of all modules should be identical (with the appropriate plug from the same manufacturer).



- » Ensure the firm connection between the plugs. They audibly click into place when they are connected.

PLANNING / ELECTRICAL DESIGN

e.ISP – Energetica Integrated Shadow Protection

All Energetica modules have intelligent electronics integrated in the module called e.ISP (Energetica Integrated Shadow Protection).

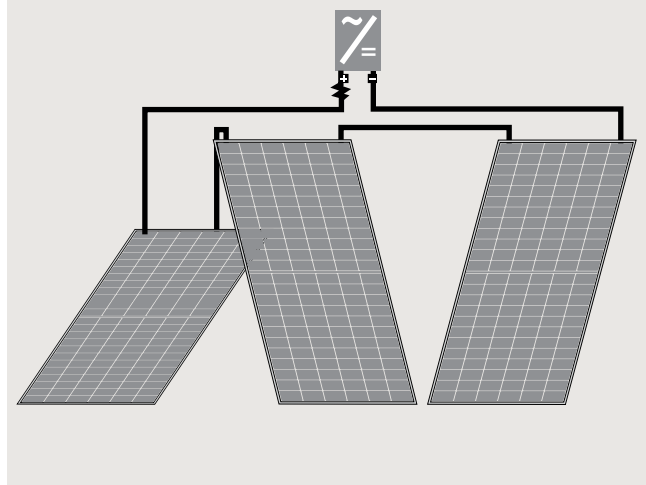
Thanks to their 80 percent lower power loss compared to conventional Schottky diodes in standard panels, a noticeable increase in energy yield is achieved. At the same time, e.ISP represents a much more effective protection of the module in the event of unforeseen shading and thus optimizes the power loss of the modules in the event of shading.

IMPORTANT SAFETY INFORMATION !!

Correct interconnection of the module strings

In order to reduce high voltages caused by indirect lightning strikes, the area of all conductor loops must be as small as possible. Before commissioning the generator, check the correct interconnection.

If the measured open circuit voltage deviates from the specification, there is a connection error. Pay attention to correct polarity.



Return currents

Please note the limit values for reverse current resistance of our photovoltaic modules according to the data sheet. In some cases, inverters can cause very high reverse currents in the module field due to their input capacities, which can destroy the photovoltaic modules or lead to personal injury and property damage.

When selecting an inverter, please ensure that the inverters used have reverse current protection!

Your inverter manufacturer can provide you with information on this.

If this is not the case, it is imperative to provide an external device adapted to the output, which reliably protects the module strings from excessively high reverse currents (e.g. blocking diode with the appropriate output). In this context, please observe the manufacturer's installation instructions.

Selection of modules

For detailed electrical data, please refer to the current product data sheet.

Available at www.energetica-pv.com.

Only interconnect modules of the same type and the same performance class to prevent damage to the modules.

Safety factors

During normal operation it is possible that modules deliver a higher current and / or higher voltage than under standardized test conditions:

- » When determining the current ratings (ISC) of conductors and
- » When dimensioning controls that are connected to the outputs of the solar modules
- » When determining the rated voltage values (VOC) of components.

The applicable national regulations for the installation of electrical systems must be followed.

Series connection

Series connection of the modules is only permitted up to the maximum system voltage specified in the applicable data sheet.

- » The design must take into account all operating cases, temperatures and relevant technical regulations and standards.
This ensures that the maximum system voltage, including the required safety margins, is not exceeded.
- » When designing the string length: Take into account the voltage limitation of the inverter when determining the number of modules.

Series connection

In case it is necessary to connect module strings in parallel in addition to the series connection, undesired reverse currents can occur.

In the case of reverse currents, not only modules can be damaged (caused by module defects, earth faults or insulation faults) but also personal injury and property damage.

IMPORTANT SAFETY INFORMATION !!

If the module strings are connected in parallel, external diodes (blocking diodes adapted to the output) are required because the internal electronics adapted to the module output cannot regulate the current flow, when individual module strings are shaded in the parallel connection.

Failure to observe this can damage the solar modules and internal electronics, resulting in personal injury and property damage.

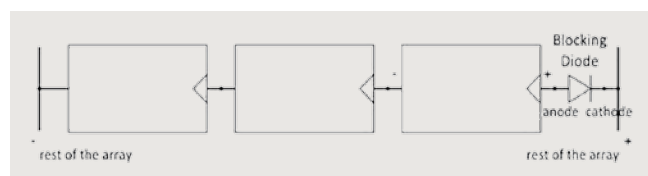
Ensure compliance with the maximum reverse current load specified in the data sheet !

In order to limit or prevent the reverse currents that occur, we recommend the following technical solutions:

Series connection

1) Design with a limited number of parallel-connected strings:

- » To limit the current, a maximum of two module strings can be operated in parallel on an inverter or an MPP tracker.
- » If more than two strings are operated in parallel on an MPP tracker or an inverter input, the use of blocking diodes adapted to the power to protect against reverse currents is mandatory.



2) Design with string protection:

- » Secure modules per string on the plus and minus side.
Use gPV fuses in accordance with IEC 60269-6. Observe the number of strings permitted in accordance with the specifications of the respective string fuse manufacturer and the technical guidelines.

IMPORTANT SAFETY INFORMATION !!

If the inverter does not have integrated reverse current protection, this must be provided externally in form of a blocking diode in the individual DC strings.

NOTE! When installing different product revisions, the minimum permissible reverse current load applies.

Inverter

Inverters with and without a transformer can be used. Please make sure beforehand that the inverters comply with all relevant standards in your country.

IMPORTANT SAFETY INFORMATION !!

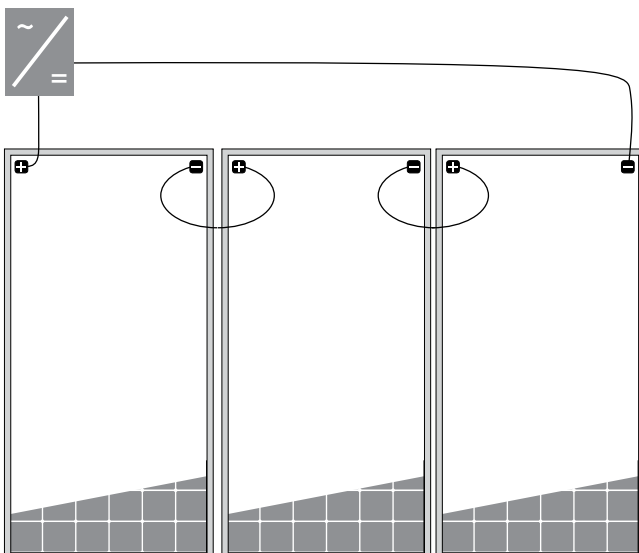
In some cases, the input capacities of the inverters can cause very high reverse currents in the module field, which can destroy the photovoltaic modules or lead to personal injury and property damage.

When selecting an inverter, please ensure that the inverters used have reverse current protection!

If this is not the case, a blocking diode must be provided per module string.

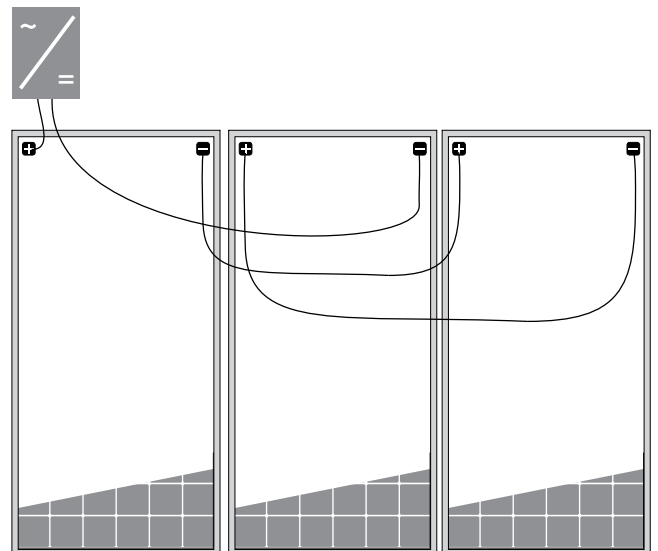
Series connection

- » The solar modules can be connected in series to achieve the desired voltage output.
- » The current intensity of all modules connected in series should be identical.
- » The maximum number of modules connected in series can be determined on the basis of the maximum system voltage, the safety factor of 125% and the module open circuit voltage (Voc), which can be found in the "Product specifications" on page 13 of this document.
- » The maximum solar module configuration can also be found in the "Product specifications" on page 13.



Parallel connection

- » The solar modules can be connected in parallel to achieve the desired amperage.
- » If the modules are connected in parallel, the total amperage is the sum of the amperages of the individual modules.
- » The voltage of all modules connected in parallel should be identical.
- » If several module rows are connected in parallel, each row or each PV module must be provided with a string diode before being combined with other rows.
- » The maximum permissible value of the back-up fuse for strings or the recommended string diodes can be found in the "Product specifications" on page 13.
- » Parallel connections are not limited if appropriate precautions are taken to block the reverse current, such as fuses and string diodes to protect the module and cable from overcurrent and reverse currents and to prevent uneven string voltage.



- » A multiplier is required for an increased output of the PV modules. Under normal conditions, a PV module is likely to produce a higher current and / or voltage than under standardized test conditions. With such an increased power output, the requirements under Article 690 of the American safety standard NEC (National Electrical Code) must be observed.

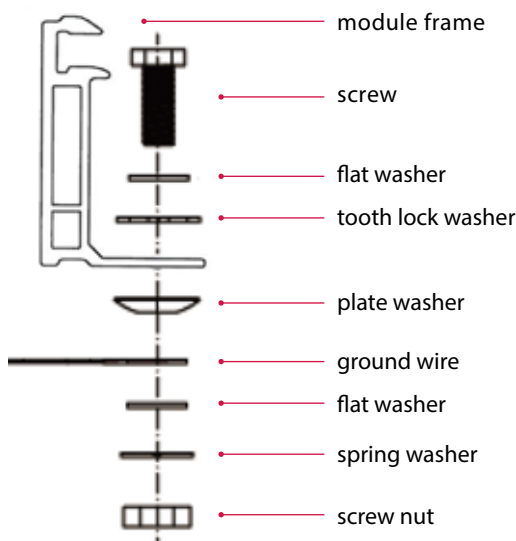
In the case of systems that are not subject to the requirements of the NEC: When designing the fuse sizes and sizes of the PV power regulator, the values for short circuit current (Isc) and open circuit voltage (Voc) specified on this PV module must be multiplied by a factor of 1.25.

General Wiring

- » Energetica Industries GmbH recommends double insulation of all cabling with a temperature resistance of at least 90 °C (194 °F).
- » All wiring should be made of flexible copper conductors (Cu).
- » The minimum size must be determined in accordance with the applicable regulations.
- » Energetica Industries GmbH recommends a minimum size of 6 mm.

Grounding

- » All work must be carried out in accordance with applicable national, regional and local regulations and standards.
- » For safety reasons and to maintain the system, the solar modules must be grounded by an authorized installer in accordance with applicable national, regional and local regulations and standards for electrical installations.
- » Specific information on the dimensions of the solar modules and the positioning of the grounding holes can be found in the product specifications on page 13.
- » One M4 stainless steel screw, one nut, one spring washer, two flat washers, one cup washer, one tooth lock washer and 12 AWG copper wire are recommended for each installation hole.
- » If customary earthing accessories (nuts, screws, washers) are used to install a listed earthing device, the installation must be carried out in accordance with the relevant manufacturer's instructions.



- » All parts used should be made of corrosion-resistant material such as stainless steel.
- » There is an earthing hole on the edge of the module frame. Using this hole, a grounding conductor and the frame of the solar module can be connected and grounded according to the drawing below.
- » All screws and nuts must be tightened with a torque of 4 ~ 5 Nm.
- » In order to prevent electric shocks or fires, protective earthing must be attached to the frame of the solar modules and systems, even if Energetica photovoltaic modules meet the requirements of safety class II. The national regulations must always be observed.

Module installation

- » The limited warranty for solar modules from Energetica Industries GmbH applies to modules that are installed in accordance with the specifications described in this section.
- » The solar modules fall under application class A and have safety class II. Thus, they can be operated in systems with 120 V DC and higher.
- » Energetica Industries recommends the use of corrosion-resistant materials such as screws, nuts and washers made of stainless steel for the installation.

Site conditions

Energetica photovoltaic modules should be installed in locations that meet the following requirements:

- » Maximum operating temperature: +90 °C (194 °F)
- » Minimum operating temperature: -40 °C (-40 °F)

Suitable environmental conditions

The module is intended for use in moderate climatic conditions. It must not be submerged or exposed to constant exposure to water. In ambient conditions with greater exposure to salt (distance from the sea 500m) and sulfur (sulfur springs, volcanoes) there is a risk of corrosion and the guarantee is void. The module must not be exposed to chemical strains (e.g. emissions from companies).

Free from shading

Optimal solar radiation leads to maximum energy yields:

- » Set up modules so that they face the sun.
- » Avoid shading (e.g. from buildings, chimneys, trees).
- » Avoid partial shading (e.g. from overhead lines, dirt, snow).
- » Energetica solar modules can be used up to an altitude of 4000 m.

INSTALLATION METHODS

General information

- » To maximize sun exposure, choose an appropriate orientation.
- » The module must be stored so that the glass faces up. At the same time, a suitable, water-repellent cover on the back prevents moisture from penetrating the connector and creating a security risk.
- » To avoid damage, never drop objects on the modules. Also, never step on the modules, do not subject them to mechanical stress or deform them through mechanical stress.
- » A suitable distance must be maintained between the frame of the solar modules and the respective underground, such as roof or floor, in order to avoid damage to the cabling and to allow air to circulate behind the solar module. The recommended minimum distance is 100mm.
- » Modules must never be mounted upside down. Cables and plugs must always point downwards.
- » When installing PV modules in snowy areas, Energetica Industries recommends taking appropriate measures to prevent damage to the backside of the frame from sliding snow. We recommend using corrosion-resistant materials for such additional structures.
- » Each module should be securely fastened at at least four points on two opposite sides.
- » Only use corrosion-resistant parts as installation rails and fastening material. Use suitable screw or clamp connections as required in the manufacturer's instructions.
- » After installation, there must be no electrical parts (such as cables) between the laminate and the substructure.
- » Make sure that the plug connections are never in the water.
- » Detailed information on the dimensions of the solar modules and the position of the installation holes can be found in the "Product Specifications" section.

Installation with clamps

- » The module can be attached to the substructure on both the long and the short edge using clamps.
- » You can find detailed information about the positioning of the clamps in the installation options on page 11.
- » If you use a special clamp, it must be tested for compatibility by Energetica Industries.

Planning

Check whether the maximum snow loads of the modules are suitable for the relevant snow load zone. For zones with a correspondingly high snow load, we recommend our e.Prime series with higher mechanical stability.

- » Adding additional installation holes can damage the solar module and affect the stability of the frame.
- » We recommend leaving a gap of 10 mm between the module frames in order to prevent tension due to thermal expansion.

Disclaimer of liability

- » The installer must read and fully understand this installation manual before beginning the installation process.
- » If you have any questions about the manual or any concerns, the installer should contact Energetica Industries and express them.

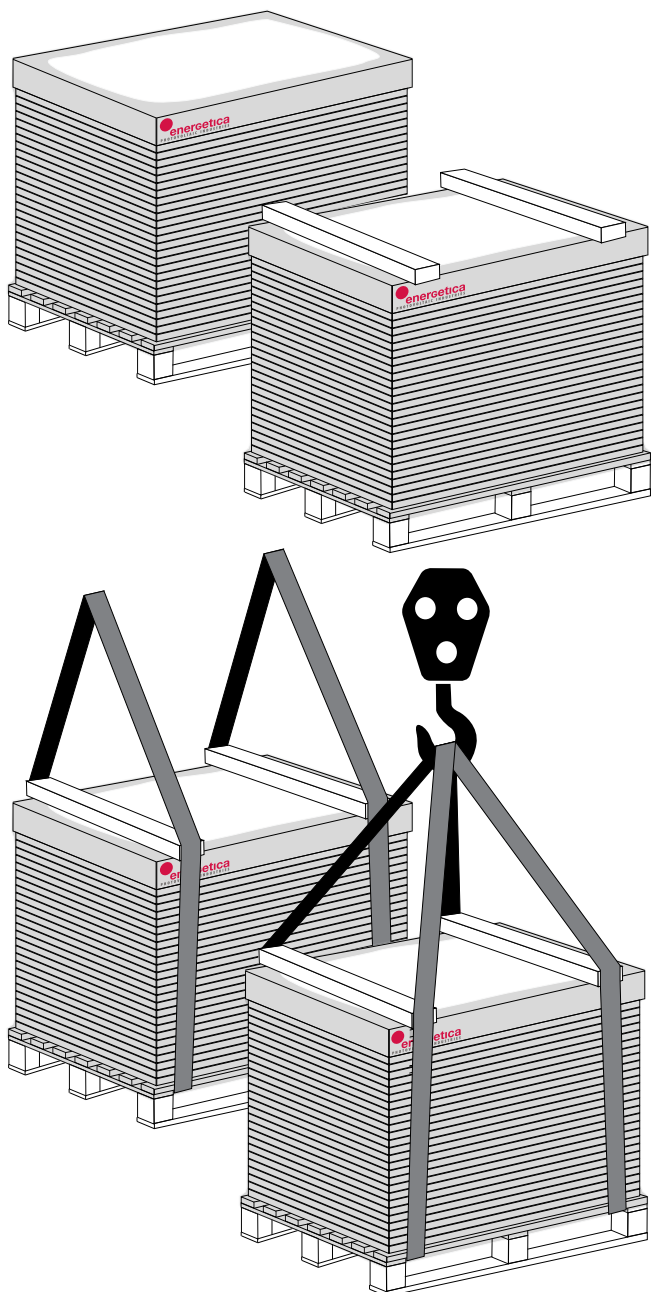
Recycling

Do not decommission module yourself, but hire a specialist company. Dispose of the modules in accordance with the local disposal regulations.

The original foil of the pallet packaging from Energetica Industries consists of biodegradable and recyclable plastic and was made from renewable raw materials (corn starch). Please dispose of the packaging in accordance with the country-specific disposal regulations.

Transport and Storage

- » Never loosen the straps on the packaging during transport. If the straps are released, the module is unsecured in the stack and can be damaged when accelerating, braking or lifting.
- » For transport, stack the product only on the special pallet provided by Energetica.
- » The maximum stacking height is two pallets. Stacking too high can put too much pressure on the lower modules and damage modules.
- » Never transport the module on one side of the frame or on the cable. This can cause damage to the frame or cables.



Cleaning

PV modules do not need to be cleaned to work effectively. However, by removing dirt or deposits (leaves, snow) on the front glass, their performance can be increased. Only clean the modules when they have cooled down. Do not wear any electrically conductive parts on your body or clothing.

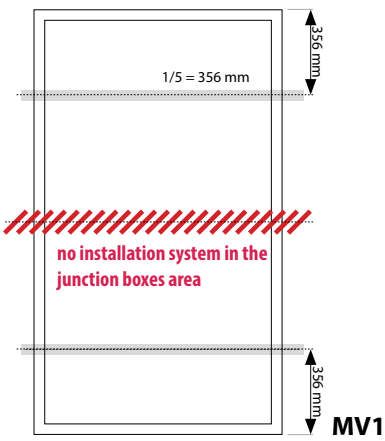
In order not to damage the module surface, clean the modules as follows:

- » Remove snow and ice carefully and without effort. For example, use a soft broom for this;
- » Do not scrape off dirt or leaves, but rinse with lukewarm water;
- » To do this, use an alcohol-based glass cleaner;
- » Do not use abrasive cleaning agents or tensides;
- » Carefully remove stubborn dirt with a cellulose cloth (kitchen roll) or a damp, soft sponge. Do not use microfiber or cotton cloths for this.
- » Stubborn soiling can be removed with isopropanol within one hour of its occurrence (observe safety instructions!).
- » Do not let any isopropanol run between the module and the frame or into the module edges.
- » Water, ethanol and microfiber cloths can be used for regular cleaning of the front glass.
- » Do not use calcareous groundwater to clean the glass.
- » The frame surface can be cleaned of foreign matter residues with a damp, non-scratching sponge or cloth and then dried in the air or with clean chamois leather.

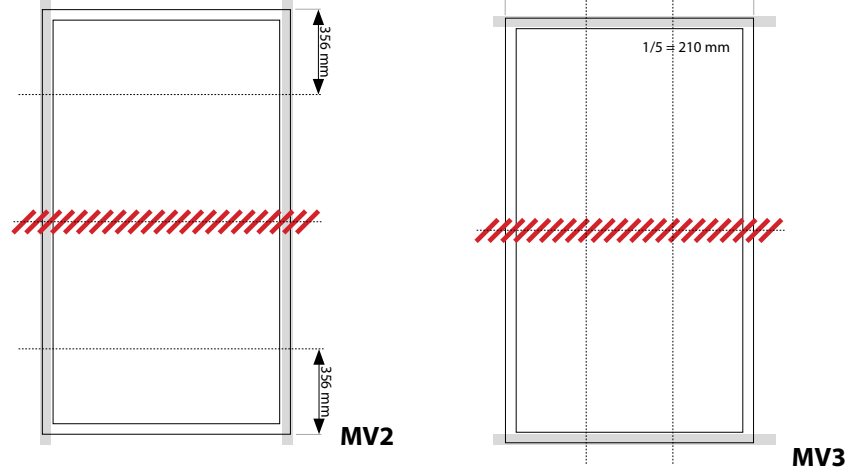


Installation with clamps

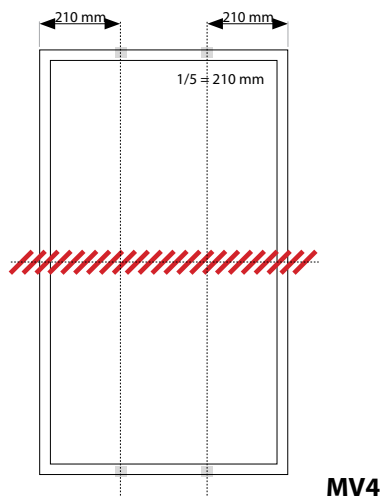
Point bearing with rail



Line bearing

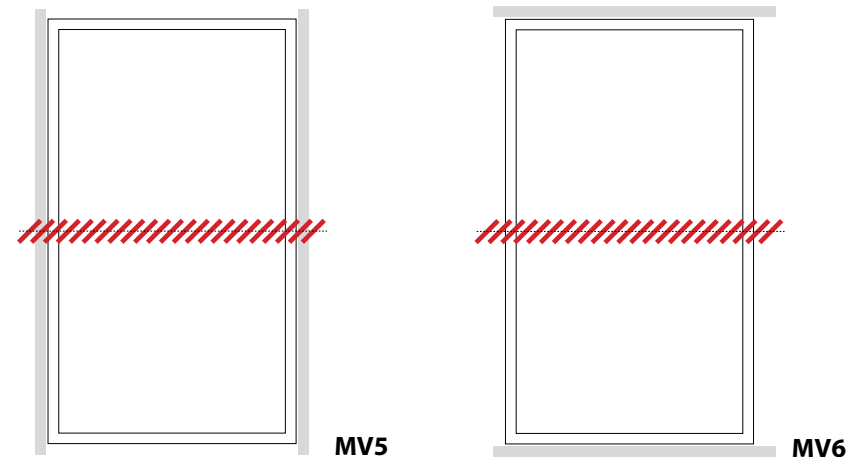


Point bearing without rail



Please note the specification of the permissible static load and the clamping range on the following page. The installation variants shown apply to installation in portrait and landscape format. No installation system may be installed in the middle area of the module (hatched area).

With insertion profile





Installation option	Clamping point [mm]	Test load pressure/tension [Pa]	Test load pressure/tension [Pa]
MV1 / MV2	356	5400 / 4000***	3600 / 2670
MV3	210	2400 / 2400	1600 / 1600
MV4	210	2400 / 2400	1600 / 1600
MV5		5400 / 4000	3600 / 2670

The following installation option is only possible under certain conditions.

MV6		2400 / 2200**	1600 / 1470**
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CAUTION

- » The loads given in the table relate to the mechanical strength of the solar modules. The mechanical strength of the frame system including the clamps must be assessed by the system supplier. The following parameters were used for the listed Energetica test load values: clamp width = 40 mm and clamp depth = 10 mm. The system installer is responsible for determining the site-specific load requirements.
- » Make sure that the substructure does not touch the junction box (even under load).
- » Make sure that the clamps or plug-in profiles do not touch the glass (even under load).
- » Make sure that the junction box connection cables do not run between the laminate and the rack rails.
- » Make sure that the supporting structure has a minimum depth of 15 mm on the back of the module for MV5, MV6, MV4, MV2 and MV3. Make sure that the supporting structure has a minimum depth of 10 mm on the front of the module for MV5 and MV6.
- » MV1, MV4 and MV2 with rails: Make sure that the module frame is attached directly to the rail of the substructure (no spacers allowed between the module and the substructure).
- » The module bends under load. For this reason, sharp objects (e.g. screws) must not be placed near the backside of the module.
- » Use corrosion-resistant M8 screws and washers (diameter ≥ 15.8 mm or ≥ 0.62 inches) for FB1 and FB2 racks.

* Loads according to IEC 61215-2: 2016 and UL 1703

** Test procedure according to IEC 61215-2: 2016 and UL 1703. Installation options do not meet the requirements of the standards

*** Only permitted with three rails.



Product line	e.Classic	
Type	e.Classic M HC	e.Classic M HC black
Performance classes Wp	365, 370, 375, 380, 385, 390	350, 355, 360, 365, 370
Length	1780 mm	1780 mm
Width	1042 mm	1042 mm
Frame thickness	36 mm	36 mm
Surface	1,85 m ²	1,85 m ²
Weight	20 kg	20 kg
Max. system voltage U _{sys}	1,05 kV / 1,5 kV	1,05 kV / 1,5 kV
Max. reverse current load	16 A	16 A
Acceptable temperature range	-40°C bis +90°C	-40°C bis +90°C
Protection class junction box	IP 68	IP 68
Protection class connector	Multicontact MC4 / IP68	Multicontact MC4 / IP68
Cable length	1150 mm	1150 mm
Fire class	Class C, Fire Class 1 (Italy)	Class C, Fire Class 1 (Italy)
Max. test load (push, pull)*	5400 Pa	5400 Pa
Max. permissible load (push, pull)*	2400 Pa	2400 Pa
Certificates	Quality Austria tested, CE-konform, IEC 61215, IEC 61730, UL 61730, IEC 62716, IEC 61701, ISO 9001, ISO 14001, OSHS 18001, protection class 2	
* Test load and permissible load according to IEC61215; 2016 depending on the installation variants		

