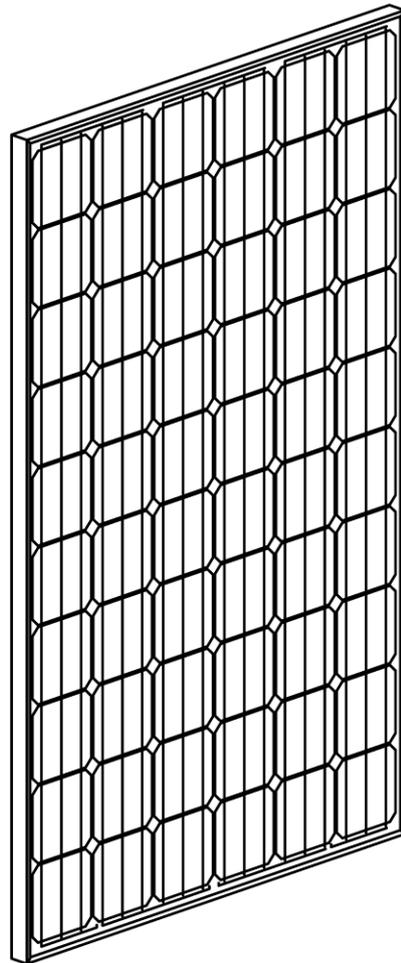


autarco

Installation and Operation Manual

Solar PV Module





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Other Information

This manual is an integral part of the unit. Please read the manual carefully before installation, operation or maintenance. Keep this manual for future reference.

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1. Introduction

1.1 Read this first

To reduce the risk of electrical shock, and to ensure the safe installation and operation of the Autarco solar PV modules, the following safety symbols appear throughout this document to indicate dangerous conditions and important safety instructions.



WARNING! Indicates safety instruction, which if not correctly followed, can result in injury or property damages.



RISK OF ELECTRIC SHOCK! Indicates safety instructions, which if not correctly followed, could result in electric shock.

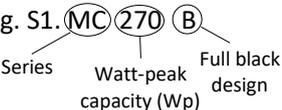
1.2 Target Audience

This manual is intended for anyone who uses Autarco solar PV modules. Before any further action, the operators must first read all safety regulations and be aware of the potential danger to operate high-voltage devices. Operators must also have a complete understanding of this device's features and functions.

1.3 Product versions covered by this document

The main purpose of this user manual is to provide instructions and detailed procedures for installing, operating, maintaining, and troubleshooting the following series Autarco solar PV modules:

- MA-series
- MB-series
- MC(E)-series
- MD(E)-series
- PC(E)-series
- PD(E)-series

The product code will be "S1.<product version>", e.g. S1. 

Please keep this user manual available at all times in case of emergency.

2. Preparation

2.1 Safety instructions

Solar modules generate electricity as soon as they are exposed to light. The voltage of a single module is less than 50VDC. When several modules are connected in series, the summed voltage can be dangerously high. When the modules are connected in parallel the currents are summed together.

Although touch protection is provided in the form of the fully insulated plug contacts, the following points must be observed when handling the solar modules to avoid the risk of fire, arcing and fatal electric shock:



NOTICE! The installation of solar PV voltage should be done by qualified professionals.



DANGER! Do not insert electrically conducting parts into the plugs or sockets.



DANGER! Do not wear metallic jewelry while performing mechanical or electrical installation.



DANGER! Do not fit solar modules and wiring with wet plugs and sockets. Tools and working conditions must be dry.



ATTENTION! Exercise extreme caution when carrying out work on wiring and use the appropriate safety equipment (insulated tools, insulated gloves, etc.).



ATTENTION! Do not use damaged modules, dismantle modules or remove any part or label fitted by the manufacturer.



ATTENTION! Do not treat the rear of the laminate with paint or adhesives, or mark it using sharp objects.

2.2 Unpacking the modules and storage

The utmost care is required when handling the modules. Take care when unpacking, transporting, and storing them.

- Leave modules in packaging until they are to be installed.
- Carry modules with both hands.
- Do not use the connection socket as a handle.
- Do not stand modules on hard or rough ground.
- Do not stand modules on their corners.
- Ensure modules do not bend.
- Do not subject to load over 5400N, do not stand on them, do not drop.
- Do not mark or work on them with sharp objects.
- Keep all electrical contacts clean and dry.
- If it is necessary to store the modules temporarily, a dry, ventilated room should be used.

2.3 General instructions

Ensure that the module is used for its intended purpose only. Pay attention to the local ordinances, building standards and accident prevention regulations during installation. The safety information for other system components must also be followed.

3. Installation



ATTENTION! Do not carry out installation work when there are strong winds. Secure yourself and other workers to avoid falling. Secure work materials to prevent articles from falling. Create a work zone to avoid accidents.



WARNING! The following paragraphs are very important. Failure to comply to these instructions can lead to system underperformance and will void the Autarco kWh guarantee.

3.1 Keeping within the maximum permitted load

Make sure the support structure adheres to maximum permissible load requirements as prescribed by local ordinances, particularly in regions of high snow accumulations and high wind velocities. Take notice to possible bending of the modules under high loads. If possible, avoid installing fasteners, cable ties, etc. between the module backside and support structure (i.e. on mounting rails) as any sharp edges can damage module.

3.2 Grounding

The company installing the PV module frame is also responsible for proper grounding. If the building is already equipped with an exterior lightning protection system, the PV-installation must be integrated in this protection system against direct effects of lightning. Country specific standards must be adhered to. A grounding method authorized by UL is mandatory in the US and Canada.

3.3 Fire safety

The roof construction and installation may affect the fire safety of a building; improper installation may contribute to hazards in the event of fire. For roof application, the modules should be mounted over a fire resistant covering rated for the application. The module is “non-explosion-protected equipment”. Hence it must not be installed in the proximity of highly flammable gases and vapors (e.g. filling stations, gas containers, paint spraying equipment). The module must not be installed near open flames or flammable materials.

3.4 Suitable environmental conditions

The module is intended for use in temperate climatic conditions. The module must not be subjected to concentrated light. It must not be immersed in water or constantly exposed to water spray (e.g. from fountains). It must not be exposed to high concentrations of salt and sulfur (e.g. from sea or volcanos). The module may not be exposed to extremely corrosive chemicals (e.g. emissions from manufacturing plants).

3.5 Suitable installation

Make sure the module meets the technical requirements of the system as a whole. Ensure that other system components do not exert damaging mechanical or electrical influences on the modules. When connected in series, modules must all have the same amperage. When connected in parallel, the modules must all have the same voltage. The modules must not be connected together to create a voltage higher than the permitted system voltage. Modules must not be fitted as overhead glazing or vertical glazing (façade). Ensure that the mounting system can also withstand the anticipated wind and snow loads. There are openings at the base of the module frame to allow water from precipitation to drain. Ensure that these openings are not blocked nor partially blocked by the module installation method. Ventilation of the module backside is necessary to avoid the build-up of heat that can reduce performance.

3.6 Optimum orientation and tilt

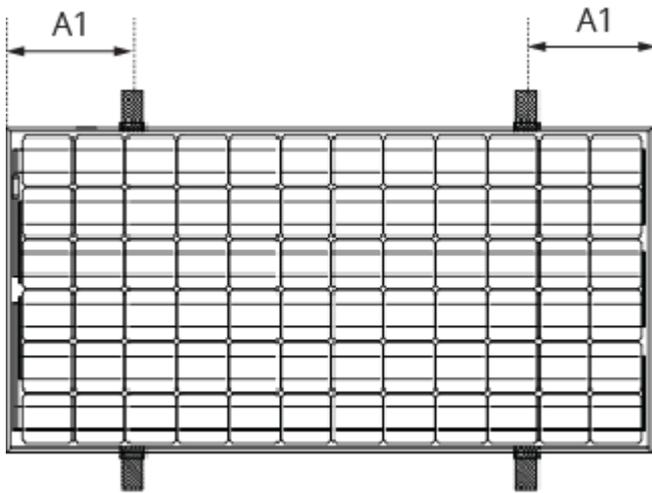
To obtain maximum yield from the system, we recommend that you determine the best direction and tilt angle for the modules. Conditions for generating electricity are considered ideal when the sun’s rays strike the module perpendicular to its surface. To avoid performance drops in series circuits, ensure that all modules have the same orientation and tilt. Failing to do so voids the Autarco AC power output guarantee.

3.7 Shading

Even partial shading will cause a yield reduction and can void the Autarco kWh guarantee. A module is “shade free” when the entire surface is shade free from 10:00 to 15:00 local time every day of the year.

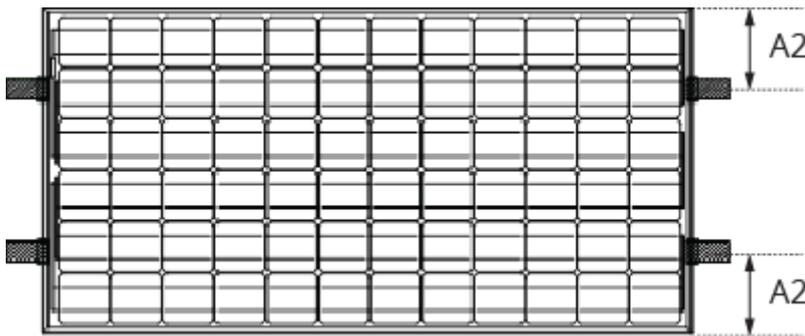
4. Mounting

Each module must be securely fastened at a minimum of four (4) points on two (2) opposite sides. The following clamping positions should be adhered to:



Clamping positions when clamping on the long sides

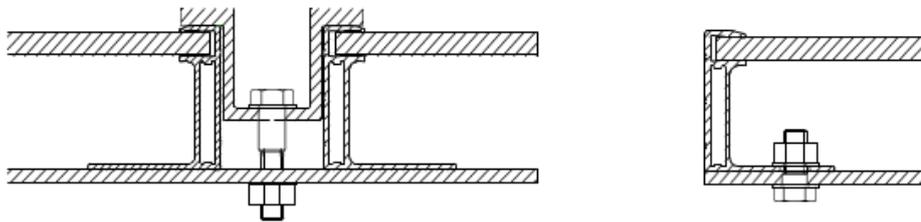
MA series	220 – 340mm
MB-series	220 – 340mm
MC(E)-series	220 – 340mm
MD(E)-series	340 – 550mm
PC(E)-series	220 – 340mm
PD(E)-series	340 – 550mm



Clamping positions when clamping on the short sides

MA series	150 – 200mm
MB-series	200 – 250mm
MC(E)-series	200 – 250mm
MD(E)-series	200 – 250mm
PC(E)-series	200 – 250mm
PD(E)-series	200 – 250mm

PV modules can be mounted to a substructure by clamping at the front side of the module frame or by screwing at the back side of the frame.



- The tightening torque must be 8-10 Nm.
- Do not drill any additional holes into the module.
- Use appropriate corrosion-proof fastening materials.



WARNING! Product warranty may be void in cases where above clamping positions, improper clamps or unsuitable installation methods are found.

5. Wiring



WARNING! The module is provided from the factory with pre-connected cables. Under no circumstances should the junction box be opened.



ATTENTION! Check that the module wiring is correct before commissioning. All DC cables should be as short as possible.



ATTENTION! If measured open circuit voltage differs from the specifications, there is a wiring fault.



WARNING! Make sure all connections are secure and tight and made in dry conditions.



Modules should be strung in a way that the resulting voltages and currents do not violate the max. voltage and max. current of the inverter and module which are stated on the product datasheets.

When Autarco modules are supplied as part of an integrally designed, complete Autarco solar PV system, the supplied wiring diagram should be followed.

Use Autarco supplied solar cable and connectors only. Ensure that they are in perfect electrical and mechanical condition. Use only single wire DC cables.

5.1 Cable protection

We recommend securing the cables to the mounting system using UV-resistant cable ties. Protect exposed cables from damage using suitable precautions (e.g. laying them in plastic pipes). Avoid direct exposure to sunlight.

6. Maintenance

Given a sufficient tilt (at least 15°), it is generally not necessary to clean the modules (rainfall will have a self-cleaning effect). In case of seriously dirty modules, we recommend cleaning them using plenty of water (from a hose) without any cleaning agents and using a gentle cleaning implement (a sponge). Dirt must never be scraped or rubbed away when dry, as this may cause micro-scratches.

7. Disclaimer of liability

Since compliance with this guide and the conditions and methods of installation, operation, use and maintenance of the modules are not checked or monitored by Autarco, Autarco accepts no liability for damage arising through improper use or incorrect installation, operation, use or maintenance.