LG
Life's Good

Monocrystalline Solar Module

Multicrystalline Solar Module

Installation Instructions

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Before Installation

This manual contains general and safety instructions to be observed while installing and operating the LG Solar modules. Please read this manual carefully before installation. All installation and safety instructions should be clearly understood before attempting to install, wire, commission, or service the solar module. Non-adherence can lead to personal injury and material damages.

This manual is only intended for qualified persons and specialist technicians.

This manual is for the monocrystalline solar modules LG240M1C, LG235M1C, LG230M1C, the multicrystalline solar modules LG230P1C, LG225P1C and LG220P1C, and other power classes.

Solar modules from LG Electronics are photovoltaic solar modules for converting light into electrical energy. The solar modules are designed for use in photovoltaic systems. Any other application is not conventional.

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Exemption from Liability

No warranty or liability can be granted for any damages arising from improper installation.

Safety and Instruction Signs in the Manual

Electric voltage hazard 

Danger to life or health 

Danger of material damage 

Background or additional information 

Safety

Accident prevention guidelines, rules and regulations issued by the organisations and authorities concerned apply to installation, operation and maintenance. If applicable, observe the national and regional directives, in particular the fire protection regulations.

Please also follow the individual safety regulations for the other components used in the photovoltaic system.

Electric Voltage Hazard Warning

The following safety instructions and statutory directives must be observed and adhered to.

- Installation and maintenance may only be carried out by qualified persons and only in compliance with the local directives.
- Keep children away while installing the photovoltaic system and solar modules.
- There is mortal danger due to electric shock and arc load.
- Contact with electrically live parts of the solar module such as terminals could lead to burns, sparks and fatal electric shocks.

Safety

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- Observe the special safety directives on handling direct current and photovoltaic systems. The solar modules always generate direct current when exposed to sunlight. This can lead to life-threatening values in just one single solar module. The solar modules are protected only at the DC switch.
- Never disconnect under load. There may be life-threatening arc loads that cannot be put out independently.
- Do not touch the junction box, cable ends and plug connections with bare hands during the installation or in sunlight, regardless of whether the solar module is connected to the photovoltaic system or not.
- Do not insert any part in the connector plugs or jacks.
- Do not carry out any work in wet weather to avoid electric shock. Do not use any wet tools. Do not work on wet terminals of the solar module either.
- Use insulated tools and rubber gloves recommended for working on electrical equipment.
- Never leave the solar module unsecured.

Safety

Accident Hazard Warning

The following safety instructions and statutory directives must be observed and adhered to.

- Installation and maintenance may only be carried out by qualified persons and only in compliance with the local directives.
- Use suitable safety measures to prevent falls when working high above the ground. If applicable, observe the corresponding directives and recommendations of the occupational health agencies or relevant organisations.
- Do not work under rainy, snowy or windy conditions.
- While working at heights, be careful to avoid the danger of objects falling.
- Handle broken or damaged solar modules carefully and with appropriate safety gear.
- Do not touch the glass and rear side of the solar module with bare hands. Wear safety gloves to avoid injuries.
- The glass surface and module frame can heat up under the sun's rays, which may result in burning of the skin. Use safety gloves if required.

Safety

Warnings Related to the Use of Solar Modules

The following safety instructions and statutory directives must be observed and adhered to.

- Persons who have no knowledge of solar modules or, for instance, the measures to be taken when handling damaged solar modules should not go near the solar modules. This is to ensure there are no injuries or electric shocks.
- Do not concentrate the sunlight artificially on the solar module with the help of mirrors, lenses or other objects.
- Avoid any shadowing of the solar module, also partial shadowing. This will cause yield cuts and may damage the solar module in certain conditions.
- Position the solar modules in surroundings where the operating temperature will stay strictly within the range of -40°C to +90°C. It is especially important to ensure that there is sufficient air circulation behind the solar modules if they are mounted in hot ambient conditions.
- The solar modules may not be operated in a location where they could come in contact with salt water.
- Ensure that no inflammable gases could become present at the installation area.
- If the solar module is being installed on a roof, it may only be mounted on a fire-resistant roof covering designed for this purpose.
- If a solar module or component needs to be replaced, compare and check the properties and performance of the new solar module/component with the one being used.
- Do not clean the glass surface of the solar module with an alkaline cleaning agent.

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Safety

Warnings Related to the Installation of Solar Modules

The following safety instructions and statutory directives must be observed and adhered to.

- Mounting and installation may only be carried out by qualified persons and only in compliance with local directives.
- A general degree of care is needed when handling the solar modules.
- Damaged solar modules may not be used.
- Handle the solar module very carefully during transport. Do not allow the solar module to fall and avoid excessive load. The solar cells in the solar module are very thin and can break easily.
- Do not step on the solar module and do not let any object fall on the solar module.
- Do not damage or scratch the rear of the solar module.
- Do not strike any part of the solar module.
- Do not lift the solar module by the junction box and cables. Do not pull at the cables and do not twist or scratch the cables.
- Do not dismantle the solar module and never carry out any unauthorised changes on the solar module. Do not remove any labels. Do not drill any holes in the frame or glass. This could compromise the stability of the frame or glass.
- Do not cover the water drainage holes of the module frame. If the frame is filled with water, it can lead to frost damage.
- Do not allow the insulation coating of the frame to get scratched. This can lead to corrosion and may compromise the stability of the frame.
- Ensure that the plug connections are tight and check the functioning of the cabling.
- Use only those devices, plug connections, electric lines and mounting systems which are appropriate for use in photovoltaic systems.
- After installation, check that the solar module and photovoltaic system are functioning correctly.

Electrical Installation

Solar modules from LG Electronics dealt with here meet the requirements of Application Class A: Dangerous voltage (IEC 61730: more than 50 V DC; EN 61730: more than 120 V DC); systems with dangerous power where normally unlimited accessibility is expected.

For more information on solar modules from LG Electronics, please refer to the datasheets of the solar modules. These can be found at www.lg-solar.com.

In particular ambient conditions, a solar module can deliver a higher current and / or voltage than indicated in the standardised test conditions. For determining the rated values of components such as cabling, fuses and inverters connected to the solar module's outlet, the values for I_{sc} and U_{oc} are to be multiplied by a factor of 1.25 when the photovoltaic systems are designed.

General Wiring

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Solar modules from LG Electronics can be connected in series or parallel to get the desired electrical output.

Use only solar modules of the same type in a combined connection.

Electrical Installation

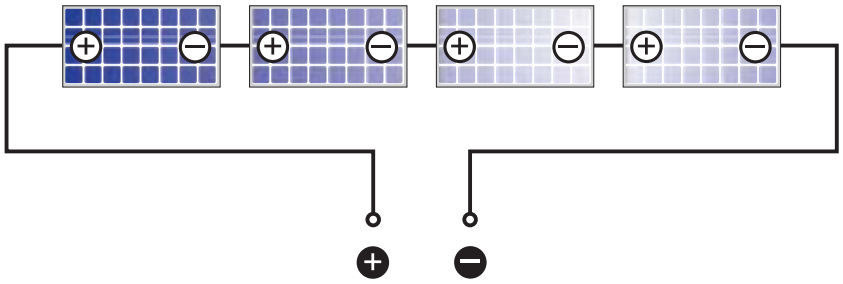
Series Connection

The maximum system voltage must not be exceeded.

The solar modules can be connected in series to receive a higher output voltage.

Series connection is preferred if the systems are not in shade. This has the following advantages.

- the solar modules can be mounted simply and quickly
- higher voltages make it possible to have smaller cable cross-sections
- higher voltages lead to lower currents with the same output and therefore to lower power losses



Series connection for increasing the system voltage

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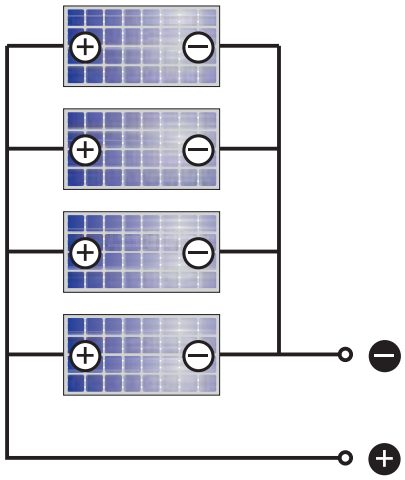
Parallel Connection

The solar modules can be connected in parallel to receive a higher output current.

Every string or solar module in series must be fused prior to combination with other strings. At its factory, LG Electronics pre-installs bypass diodes in the solar modules. Observe the corresponding regional and local directives regarding additional requirements for fuses and limiting the maximum number of solar modules in parallel connection.

The maximum number of solar modules in parallel connection without additional precautions such as fuse or blocking diode is one module string. The number of module strings in parallel connection is not restricted if relevant precautions have been taken for blocking the reverse current; meaning, for instance fuses to protect the solar module and the cable from over-current, or blocking diodes for unequal string voltage.

The solar modules or module strings should be connected in parallel if the system is in shade.



Parallel connection for increasing the system current

Mechanical Installation

The LG Electronics solar modules are designed for a maximum test load of 5,400 Pa - 1 Pascal = 1kg/m/s² – when they are installed in a mounting system which is also designed for these loads. Ensure that the regional wind and snow load zones do not exceed this test load.

In a roof mounting, ensure that the statics of the roof are sufficient to bear the loads arising from the photovoltaic system.

Solar modules from LG Electronics may only be mounted in accordance with the methods described in the sections below.

The solar modules can be fastened to the mounting system using mounting holes in the module frame or by using module clamps.

Solar modules from LG Electronics can be mounted at any positioning angle. However, their orientation must be adjusted to ensure that the front does not point downwards, since otherwise water can enter the junction box on the rear side of the module.

Select the orientation to ensure maximum solar irradiation on the solar modules. The ideal orientations are south-facing in the northern hemisphere and north-facing in the southern hemisphere. In Central Europe, the pitch angle should be 30°, whereas in the south it should be a little less. The pitch should not be less than 20° to 25°, as this will compromise the self-cleaning feature of the module surfaces.

Ensure that no shadow falls on the modules from antennae, chimneys, growing trees or similar objects.

For more information on solar modules from LG Electronics, please refer to the data sheets of the solar modules. The data sheets can be found at www.lg-solar.com.

Mechanical Installation

Mounting with Mounting Holes in the Module Frame

Do not remove the frame of the solar module. Do not modify the module frame, e.g. by adding holes, since this may damage the solar module and compromise the stability of the module frame.

Keep a space of at least 100 mm free behind the solar modules for the necessary air circulation.

The solar module can be fastened to a mounting system using the four mounting holes at the bottom of the module frame.

For fastening, use one hexagonal screw M6, spring washer, hexagonal nut and two shims for each mounting hole.

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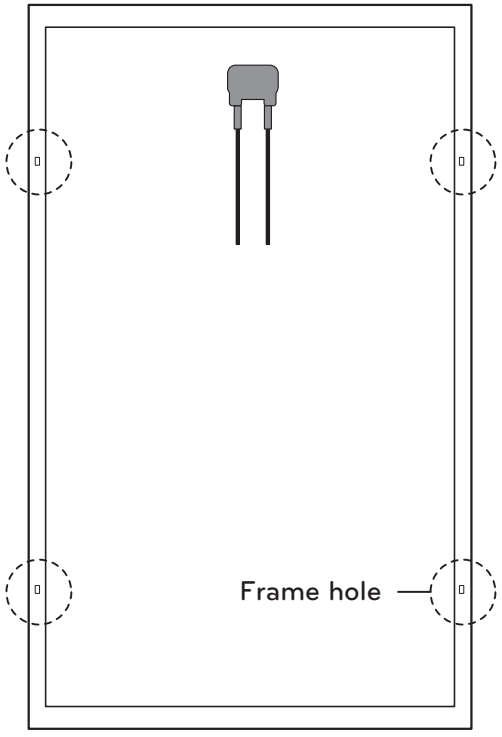


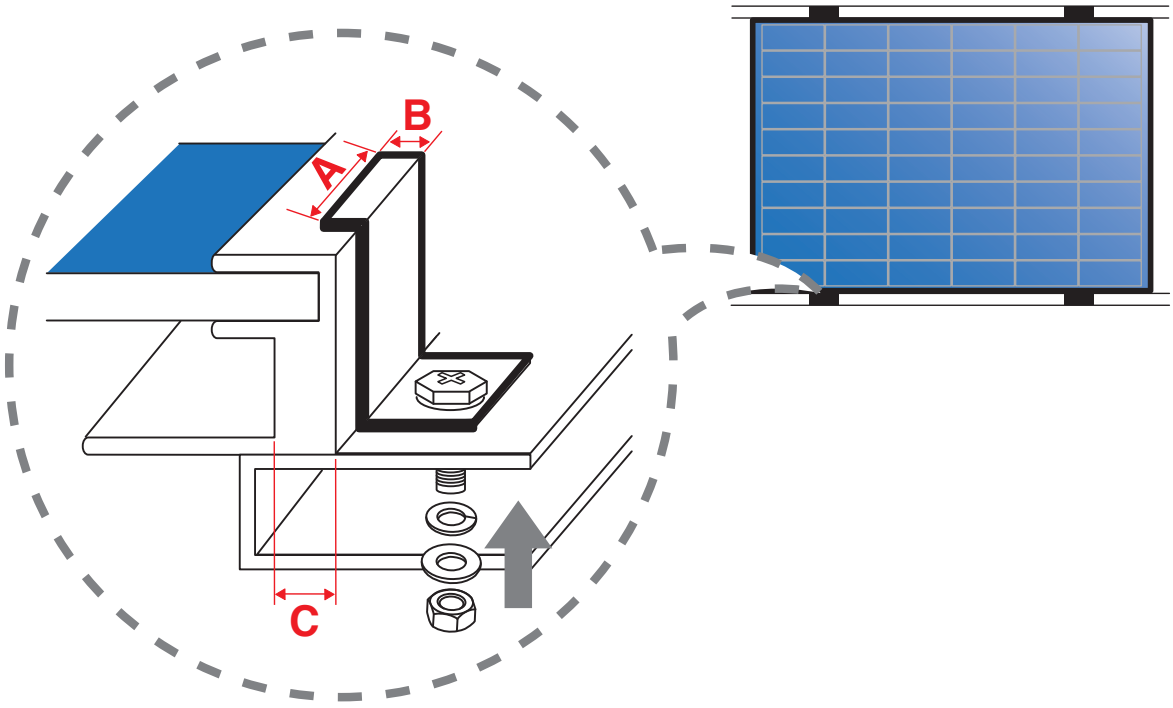
Position of the frame holes

Mechanical Installation

Mounting with Module Clamps on the Longer Module Side

Alternatively, the solar modules can be fastened to the mounting system with module clamps. To do this, use four module end clamps for every solar module. If you are mounting several module series one after the other, use middle module clamps between the solar modules. Using suitable module clamps, ensure that measurements A, B and C are observed in line with the following graphic.

Clamp width	A	min. 30 mm
Clamp depth	B	min. 5 mm
Bracket width	C	min. 10 mm



Necessary dimensions of the module clamps

Mechanical Installation

Position the module clamps uniformly on the solar module in accordance with the following graphic. In doing so, ensure that D is not below 170 mm and does not exceed 400 mm.

If you are mounting several solar modules next to each other, place a distance piece between adjacent solar modules. The solar modules should never be mounted directly next to each other, since the solar modules may sustain damage owing to temperature-induced variations in their dimensions. A minimum distance of 5 mm is recommended.

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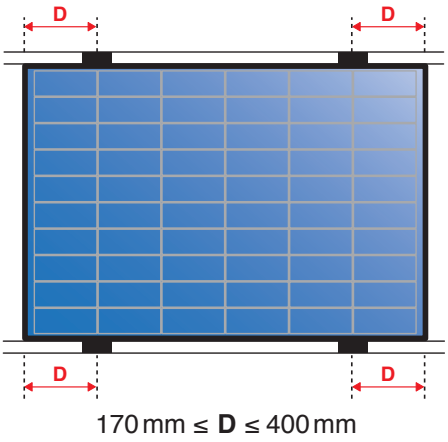
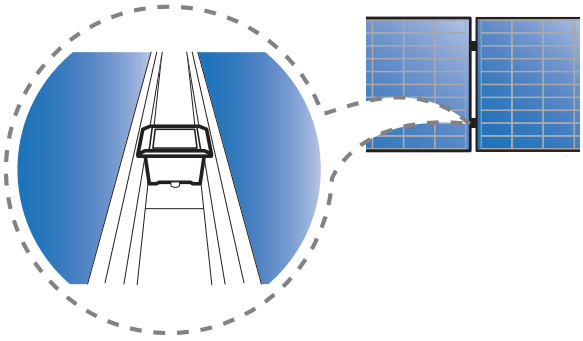


Permitted position of the module clamps



Distance between the solar modules

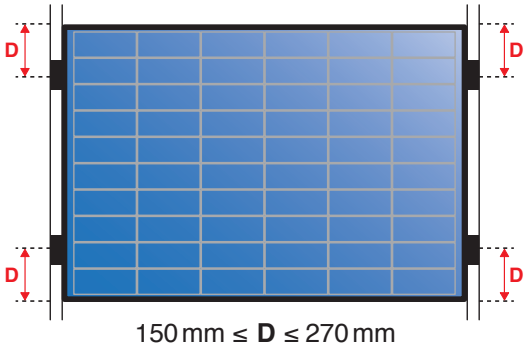
Mechanical Installation

Mounting with Module Clamps on the Shorter Module Side

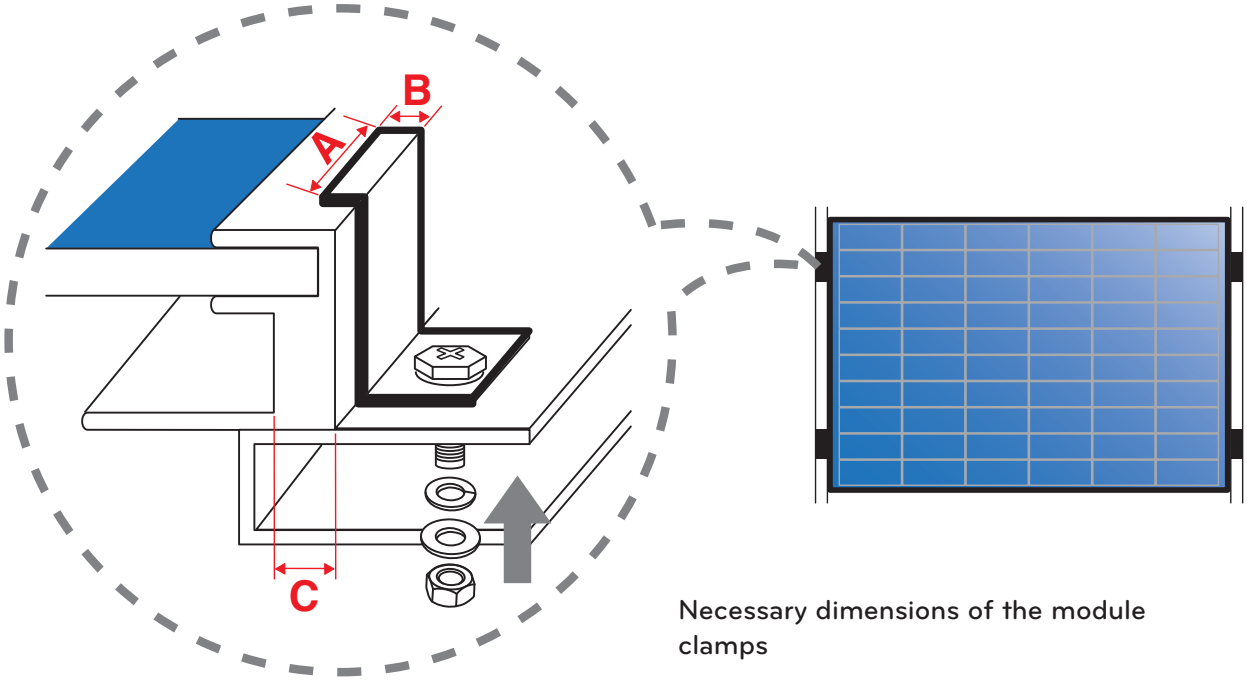
The solar modules can also be fastened to the mounting system with module clamps. To do this, use four module end clamps for every solar module. Using suitable module clamps, ensure that measurements A, B and C are observed in line with the following graphic.

Clamp width	A	min. 30 mm
Clamp depth	B	min. 5 mm
Bracket width	C	min. 10 mm

Position the module clamps uniformly on the solar module in accordance with the following graphic. In doing so, ensure that D is not below 150 mm and does not exceed 270 mm.



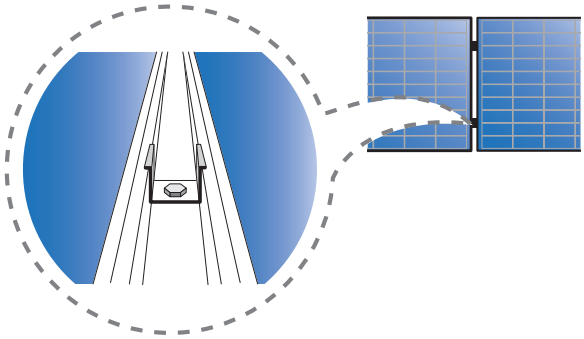
Permitted position of the module clamps



Necessary dimensions of the module clamps

Mechanical Installation

If you are mounting several module series consecutively use middle module clamps between the solar modules. The solar modules may never be mounted directly next to each other, since the solar modules may sustain damage owing to temperature-induced variations in their dimensions. A minimum distance of 5 mm is recommended.



Distance between the solar modules

Mounting with Inlay Systems

Solar modules from LG Electronics can also be installed with suitable inlay systems.

Mounting with In-Roof Systems

Solar modules from LG Electronics can also be installed with suitable in-roof systems. It is important to ensure that there is sufficient air circulation behind the solar modules.

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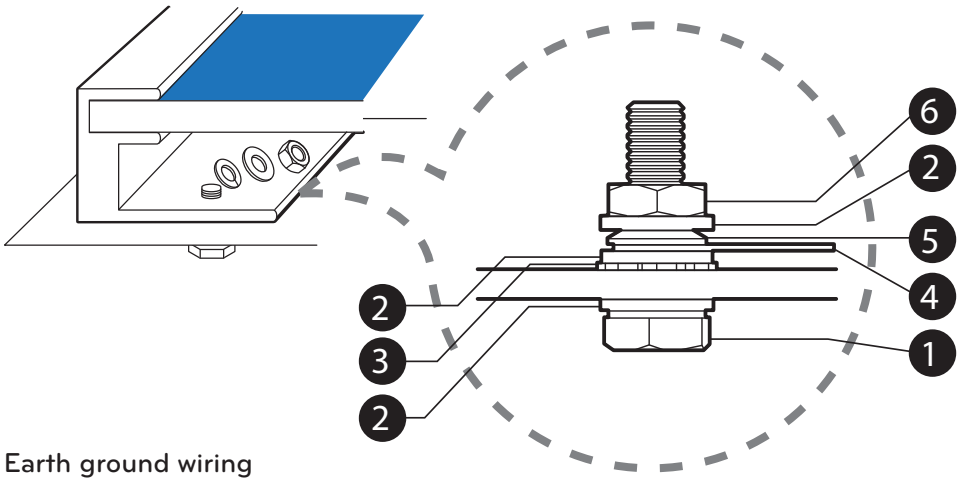
Earth Ground Wiring

Screws or other earth ground connections may not be used for fastening the photovoltaic system mechanically on the load-bearing surfaces or frames.

To avoid an electric shock or fire, the frame of the solar modules must be earthed. Follow the instructions in the graphic below.

No.	Description	Basic size	Material
1	Hexagonal screw	M4×15	rust-free
2	Shim	4.3	rust-free
3	Serrated washer	4.3	rust-free
4	Earth ground wire	AWG 12	Copper
5	Spring washer	4.3	rust-free
6	Hexagonal nut	M4	rust-free



Earth ground wiring

Maintenance and Inspection

Maintenance and Inspection

The LG solar modules may only be serviced and maintained by qualified persons.

Do not clean the glass surface with an alkaline cleaning agent. Do not allow water to remain on the glass for a sustained period.

Do not allow earth ground wiring to be broken or damaged during the routine maintenance of a solar module.

We recommend the following regular maintenance and inspections.

- Cleaning of the glass surfaces
- Removal of snow, if required
- Visual inspection of the fastening system
- Visual inspection of the solar modules
- Visual inspection of the electrical connections
- Checking the yields

Disposal

Please contact us at the address given overleaf if you have any queries related to the disposal or recycling of solar modules from LG Electronics.

EN

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