



Leapton Solar(Changshu) co., Ltd.

Carefully read through these installation instructions before installing, operating or servicing PV system. Failure to follow these instructions may result in bodily injury or damage to property. Keep these instructions!

Working on a PV system (installation, setup, maintenance, repairs) must be carried out by qualified and authorized persons.

This installation instruction is for mono and poly modules:

Electrical Characteristics

The tolerance of Electrical Characteristics is $\pm 3\%$ under standard conditions (irradiance of $1000\text{mW}/\text{cm}^2$, AM 1.5 spectrum, and cell temperature of 25°C (77°F)).

Warning:

Danger of death from electric shock!

- Solar modules generate electricity as soon as they are exposed to light. One module on its own is below the safety extra low volt level, but multiple modules connected in series (summing the voltage) or in parallel (summing the current) represent a danger. The following points must be observed when handling the solar modules to avoid the risk of fire, sparking and fatal electric shock.
- Do not insert electrically conducting parts into the plugs or sockets! Do not fit solar modules and wiring with wet plugs and sockets!
- Exercise utmost caution when carrying out work on wiring and safety equipment (use insulated tools, insulated gloves, ect.)!
- Do not use damaged modules! Do not dismantle modules! Do not mark on the rear of the module using sharp objects!
- Exercise utmost caution when working on wiring and the inverter. Be sure carefully to follow manufacture's installation instructions! Artificially concentrated sunlight shall not be directed on the module or panel.



Danger of death from arcing

Modules generate direct current when light shines on them. An arc may be produced when connections are separated. We therefore recommended covering modules with a lightproof cloth during installation. When breaking a connected string of modules (e.g. when disconnecting the DC line from the inverter under load), a lethally strong arc can occur:

- Never disconnect the solar generator from the inverter while the inverter is connected to the mains grid—remove the fuse from the AC side on the inverter first!
- Ensure cable connections in perfect condition (no splitting, soiling or other contamination)!

Unpacking the modules and storage

The utmost care is required when handling the modules. Be careful when unpacking, transporting, and storing the modules:

- Transport modules in an upright position.
- Carry modules with both hands. Do not use the connection socket as a handle.
- Ensure modules do not bow under their own weight.
- Do not place modules on top of each other.
- Do not subject to load, do not stand on them.
- Do not mark using sharp implements.
- Do not stand on the panel.
- Keep all electrical contacts clean and dry.

If it is necessary to store the modules temporarily, a dry, ventilated room should be used.

General safety information

Ensure that the module is used only in applications for which it is suitable (see "Installing the modules"). All work on a PV system (installation, setup, maintenance, repairs) must be carried out only by appropriately qualified and authorized persons.

The appropriate DIN standards, construction rules and safety instructions are to be followed for installation.

Installing the modules

When installing the modules, please pay attention to: the assembly is to be mounted over a fire resistant roof covering rated for the application.

• Keeping within the maximum permitted load

The maximum mechanical load on the module must not exceed 5400pa. To avoid exceeding the maximum mechanical load, site-specific live loads such as wind and snow should be taken into account.

• Environmental conditions

The module is intended for use in temperate climatic conditions. The module is “non-explosion-protected equipment”. Hence it must not be installed in the proximity of highly inflammable gases and vapors (e.g. filling stations, gas containers, paint equipment).

The module must not be installed near to naked flames or flammable materials.

Do not expose modules to concentrated light sources.

It must not be immersed in water or constantly exposed to water (e.g. from fountains).

If there is exposure to salt (it is recommended that modules are installed at least 500m from the sea) and sulfur (sulfur sources, volcanoes), there is a risk of corrosion.

• Requirements of installation

Make sure the modules’ electrical performances in a system are the same. When connected in series, modules must all have the same amperage. When connected in parallel, the modules must all have the same voltage. Connect the quantity of modules that match the voltage specifications of the devices used in the system. The modules must not be connected together to create a voltage higher than the permitted system voltage.

To minimize risk in the event of an indirect lightning strike avoid forming loops when designing the system. Artificially concentrated sunlight shall not be directed on the module or panel.

Modules must not be fitted as overhead glazing. Ensure that the mounting system can also withstand the anticipated wind and snow loads.

Precipitation can run off through small openings on the back side of the module. Make sure that these openings are not masked after mounting.

• Optimum orientation and tilt

To achieve the maximum annual yield figure out what the optimum orientation and tilt of the PV modules is. If sunlight shines vertical onto the PV modules you have the best conditions to generate maximum power.

• Avoid overshadowing

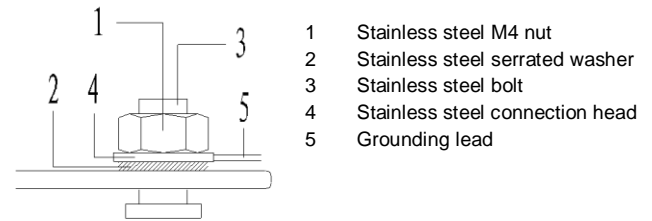
Even the slightest partial shading (e.g. from dirt deposits) will cause a reduction in yield. A module is considered “shadow-free” if it is unobscured across its entire surface for the whole year and even on the shortest day of the year unobstructed sunlight can reach the module.

• Reliable ventilation

Functioning ventilation prevents the build-up of heat, which would reduce performance.

• Earthing

Although the modules are certified to safety class II, we still recommend earthing them. The earth connection must be made by a qualified electrician. Connect module frames to each other using cables with cable lugs. Use the hole (ϕ 4.5mm) attached with a green label that are provided for this purpose. To create the conductive connection (frame is anodized), use a serrated washer or a self-tapping screw (ϕ 5mm). The earth connection should be made by a qualified electrician.



All the junctions on the conductive connection must be fixed. The fastness does not depend on soldering.

The metal containing iron in the conductive connection should be handled by some way, such as anodization, spray-painting, galvanization. Stainless steel does not need to be handled.

• Maximum number of modules in parallel and in series

When designing the system, we recommend that the maximum number of modules in parallel should be no more than four while the maximum number of modules in series no more than twelve.

Recommended maximum series/parallel module configurations:
 $[V_{sys}/(1.25V_{oc})]/2$

Bypass diodes

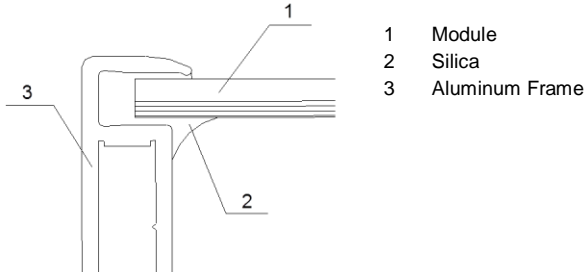
bypass diodes Type: 12SQ045 and 12SQ045S.

Roof Installing

- Use fasteners to fasten the modules to the mounting support structure. Modules should be bolted to support structures through mounting holes located in the frame’s back flanges only. Stainless-steel bolts, with nuts, washers, and locks washers, are recommended for module mounting. Creation of additional holes for mounting is not recommended and will invalidate the warranty. Modules should not be mounted by supports at the ends.
- Mounting support structure should withstand forces from wind and snowfall pressure etc. Mounting support structure should use proper materials and corrosive treatment.
- Installation the modules on the roof should has proper ventilation. A clearance of 4.5 inches (about 115mm) or more behind the modules is recommended to permit air circulation and cooler module operation. Elevated temperatures lower operating voltage and power, and shorten module lifetime. Clearance of 1/4 inch (6.35mm) or more between modules is required to allow for thermal expansion of the frames.
- The mounting support structure should be fire-proof.

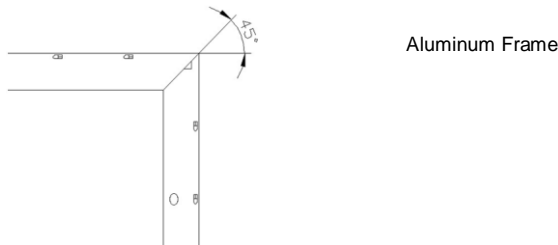
Mounting

● Installation of Frame and Module



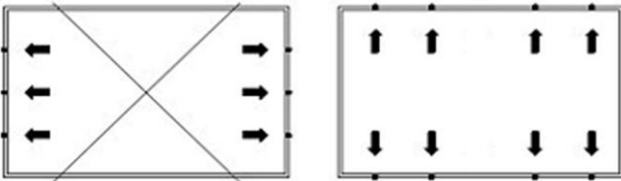
The depth is no less than 3mm when installing the module into the frame.

● Connection between frames



● Installation Requirements

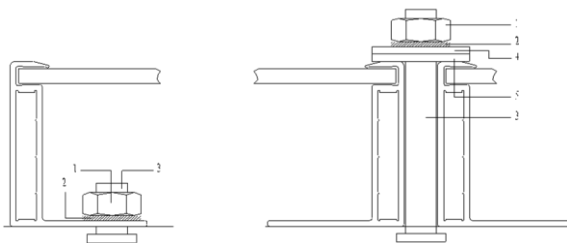
Each module must be securely fastened at a minimum of 4 points. The frame has been stress tested for mounting on the long sides. The module must not be secured by its short sides.



Example for mounting the PV modules to the substructure:

Example A:
Bolting

Example B:
Clamping on



- 1 Stainless steel M8 nut
- 2 Stainless steel spring washer
- 3 Stainless steel M8 t-head bolt
- 4 Aluminum clamping plate
- 5 EPDM washer 2mm

We recommend using a torque wrench for installation. In example B, the tightening torque (using stainless steel M8 bolts) should be around 15-20Nm. Use the existing holes for securing the module and do not drill additional holes (doing so would void the warranty). Use appropriate corrosion-proof fastening materials.

Wiring

For the wiring, pay attention to:

• Correct wiring scheme

When designing the system, avoid forming loops (to minimize risk in the event of an indirect lighting strike). Check that wiring is correct before starting up the generator. If the measured open circuit voltage (Voc) and short-circuit current (Isc) differ from the specifications, then there is a wiring fault.

• Correct connection of connectors

The connector is PV-GZX0601-1 made by GZX, The area of the cable mating with the connector recommended to be 4-6 mm². The plug connector has its own polarity. Make sure that the connection is safe and tight. The plug connector should not receive outer stress. The connector should only be used to connect the circuit, but never be used to turn the circuit on and off.

• Use of suitable materials

Use cable extensions and plugs that are designed for outdoor applications. Ensure that they are in perfect electrical and mechanical condition. Use only cables having one conductor. Select the appropriate cable diameter to minimize voltage drop (to calculate the minimum cable diameter, the fuse, and to calculate controls, multiply the Isc and Uoc by a factor of 1.25). Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, fuse sizes, and size of controls connected to the PV output.

Maintenance and cleaning

Do not change the PV components optionally (diode, junction box, plug connectors).

Given a sufficient tilt (at least 15°), it is not generally necessary to clean the modules (rainfall will have a self-cleaning effect). In case of heavy soiling (which will result in output reductions), we recommend cleaning the modules using plenty of water (from a hose) with mild detergent and using a gentle cleaning implement (a sponge). **CAUTION: DON'T USE DETERGENTS CONSISTING OF ABRASIVE, ACETONE OR OTHER CORROSIVE ELEMENTS.** Do not clean the modules with cold water during the warmer hours of the day in order to avoid creating any thermal shock that may damage the module. Dirt must never be scraped or rubbed away when dry, as this will cause micro-scratches. We recommend the system is inspected at regular intervals.

Checklists:

- All fastenings are tight and secure and free of corrosion.
- All cable connections are secure, tight, clean and free of corrosion.
- Cables are not damaged in any way.
- Checking the earthing resistivity of metals.

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Mono

Parameter Type	Maxpower (W)	Dimension (mm)	Cell Type	Cell Efficiency	Weight (KG)	Imp (A)	Vmp (V)	Isc (A)	Voc (V)
LP156*156-M-72-360	360W	1960*990*40	156.75*156.75/6*12	21.3%	22	9.56	37.66	10.06	45.94
LP156*156-M-72-355	355W	1960*990*40	156.75*156.75/6*12	21.0%	22	9.45	37.57	9.95	45.86
LP156*156-M-72-350	350W	1960*990*40	156.75*156.75/6*12	20.7%	22	9.34	37.47	9.84	45.72
LP156*156-M-72-345	345W	1960*990*40	156.75*156.75/6*12	20.4%	22	9.23	37.38	9.73	45.63
LP156*156-M-72-340	340W	1960*990*40	156.75*156.75/6*12	20.1%	22	9.12	37.28	9.62	45.53
LP156*156-M-72-335	335W	1960*990*40	156.75*156.75/6*12	19.8%	22	9.01	37.18	9.51	45.50
LP156*156-M-72-330	330W	1960*990*40	156.75*156.75/6*12	19.6%	22	8.90	37.08	9.40	45.40
LP156*156-M-72-325	325W	1960*990*40	156.75*156.75/6*12	19.3%	22	8.79	37.00	9.29	45.30
LP156*156-M-72-320	320W	1960*990*40	156.75*156.75/6*12	18.9%	22	8.68	36.90	9.18	45.20
LP156*156-M-72-315	315W	1960*990*40	156.75*156.75/6*12	18.7%	22	8.56	36.80	9.06	45.10
LP156*156-M-60-310	310W	1640*990*35	156.75*156.75/6*10	22.0%	18	9.82	31.57	10.27	38.65
LP156*156-M-60-305	305W	1640*990*35	156.75*156.75/6*10	21.7%	18	9.69	31.48	10.14	38.51
LP156*156-M-60-300	300W	1640*990*35	156.75*156.75/6*10	21.3%	18	9.56	31.38	10.01	38.42
LP156*156-M-60-295	295W	1640*990*35	156.75*156.75/6*10	21.0%	18	9.43	31.28	9.88	38.29
LP156*156-M-60-290	290W	1640*990*35	156.75*156.75/6*10	20.6%	18	9.30	31.18	9.75	38.20
LP156*156-M-60-285	285W	1640*990*35	156.75*156.75/6*10	20.3%	18	9.17	31.08	9.62	38.09
LP156*156-M-60-280	280W	1640*990*35	156.75*156.75/6*10	19.9%	18	9.04	30.97	9.49	37.99
LP156*156-M-60-275	275W	1640*990*35	156.75*156.75/6*10	19.5%	18	8.90	30.90	9.35	37.92
LP156*156-M-60-270	270W	1640*990*35	156.75*156.75/6*10	19.2%	18	8.77	30.80	9.22	37.80
LP156*156-M-60-265	265W	1640*990*35	156.75*156.75/6*10	18.8%	18	8.63	30.70	9.08	37.70



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Poly

Parameter Type	Maxpower (W)	Dimension (mm)	Cell Type	Cell Efficiency	Weight (KG)	Imp (A)	Vmp (V)	Isc (A)	Voc (V)
LP156*156-P-72-340	340W	1960*990*40	156.75*156.75/6*12	19.4%	22	9.17	37.08	9.79	45.40
LP156*156-P-72-335	335W	1960*990*40	156.75*156.75/6*12	19.2%	22	9.07	36.93	9.67	45.34
LP156*156-P-72-330	330W	1960*990*40	156.75*156.75/6*12	18.9%	22	8.97	36.79	9.55	45.24
LP156*156-P-72-325	325W	1960*990*40	156.75*156.75/6*12	18.6%	22	8.86	36.68	9.43	45.18
LP156*156-P-72-320	320W	1960*990*40	156.75*156.75/6*12	18.3%	22	8.75	36.57	9.31	45.11
LP156*156-P-72-315	315W	1960*990*40	156.75*156.75/6*12	18.0%	22	8.65	36.40	9.20	45.00
LP156*156-P-72-310	310W	1960*990*40	156.75*156.75/6*12	17.8%	22	8.54	36.30	9.08	44.90
LP156*156-P-72-305	305W	1960*990*40	156.75*156.75/6*12	17.5%	22	8.43	36.20	8.96	44.80
LP156*156-P-72-300	300W	1960*990*40	156.75*156.75/6*12	17.2%	22	8.32	36.06	8.84	44.72
LP156*156-P-72-295	295W	1960*990*40	156.75*156.75/6*12	16.9%	22	8.21	35.93	8.72	44.64
LP156*156-P-60-290	290W	1640*990*35	156.75*156.75/6*10	19.9%	18	9.15	31.69	9.99	37.65
LP156*156-P-60-285	285W	1640*990*35	156.75*156.75/6*10	19.6%	18	9.03	31.56	9.85	37.53
LP156*156-P-60-280	280W	1640*990*35	156.75*156.75/6*10	19.2%	18	8.91	31.43	9.71	37.45
LP156*156-P-60-275	275W	1640*990*35	156.75*156.75/6*10	18.9%	18	8.79	31.29	9.57	37.32
LP156*156-P-60-270	270W	1640*990*35	156.75*156.75/6*10	18.5%	18	8.67	31.14	9.43	37.23
LP156*156-P-60-265	265W	1640*990*35	156.75*156.75/6*10	18.2%	18	8.55	31.00	9.30	37.10
LP156*156-P-60-260	260W	1640*990*35	156.75*156.75/6*10	17.8%	18	8.45	30.80	9.16	37.00
LP156*156-P-60-255	255W	1640*990*35	156.75*156.75/6*10	17.5%	18	8.34	30.60	9.02	36.90
LP156*156-P-60-250	250W	1640*990*35	156.75*156.75/6*10	17.2%	18	8.23	30.38	8.88	36.79
LP156*156-P-60-245	245W	1640*990*35	156.75*156.75/6*10	16.8%	18	8.12	30.17	8.74	36.68