Crystalline silicon PV modules Installation manual (IEC version)

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Contents

Crystalline Silicon Module Products Installation Manual (IEC)

1 Scope

- This manual contains information regarding the installation and safe handling of the photovoltaic module (hereafter is referred to as ''module'') produced Luxen Solar Energy Co.,Ltd (hereinafter referred to as '' LN'').
- This manual does not have any warranty significance,Expressed or implied. Installers must read and understand the manual before installation. The installer should conform to all safety precautions in the manual and local laws & regulations when installing module; before installing a solar photovoltaic system, installers should be familiar with the mechanical and electrical requirements for such a system.
- Keep this manual in a safe place for future reference (care and maintenance) and in case of sale or disposal of the modules.
- Any questions, please contact with the salesman or customer service personnel of LN solar for further explanations.
- This manual is applicable to the following products shown in table 1.

Table1 Product model code

Type	Product model
Mono	LNET-××× M （210-132 pcs） LNEK-××× M （210-120 pcs） LNVH -××× M （182-156 pcs） LNVU -××× M （182-144 pcs） LNVT -××× M （182-132 pcs） LNVK -××× M （182-120 pcs） LNVB -××× M （182-108 pcs） LNSU -××× M （166&158.75-144 pcs） LNST -××× M （166-132 pcs） LNSK -××× M （166&158.75-120 pcs） LNSF-××× M （158.75&156.75-72 pcs） LNSE-××× M （158.75&156.75-60 pcs） LNSD-××× M （156.75-54 pcs） LNSC-××× M （156.75-48 pcs） LNSA-××× M （156.75-36 pcs）
Notes：××× represent module power grade, each 5W consists of a grade;	

2 Disclaimer of Liability

2.1 Because using of this manual and the conditions or methods of the module installation, handling, use and maintenance are beyond the control range of LN solar, so If the conditions or methods of the module installation, handling, use and maintenance of the customer are beyond the range specified in this manual and cause damage, LN solar does not assume responsibility for any loss, damage or expense thus caused.

2.2 LN solar has the right to refuse to compensate for the product damage due to construction or design defects of the solar photovoltaic system.

2.3 No responsibility is assumed by LN solar for any infringement of patent right or other rights of third parties, which may result from the customer's use of the LN solar's modules. No patent license or patent rights is granted to customer, express or implied, due to its use of LN solar's modules.

2.4 Failure to comply with the requirements listed in this manual will invalidate the ''Limited Warranty for PV Modules'' provided by salesman of LN solar. Meanwhile, recommendations provided in this manual are in order to improve the security of installation.

2.5 The information in this manual is based on LN solar's best knowledge and experience and is believed to be reliable; but such information including product specification (without limitations) and suggestions do not give any guarantee, Expressed or implied.

2.6 LN solar reserves the right to make changes to the product specifications or installation manual without prior notice.

3 Safety precautions

3.1 General safety

3.1.1 LN solar's modules have been evaluated by according to IEC61215 and IEC61730,fire safety classaccording to UL790 class C, modules rated for use in this application class may be used in system operating at greater than 50V DC or 240W.

3.1.2 The installer should abide by the relevant local laws and regulations when installing module. It is need to obtain the required certificates in advance when necessary, such as the building permit, please don't work under no protective measures.

3.1.3 Installing solar photovoltaic systems require specialized skills and knowledge. Installation should be performed only by qualified person. Installers should assume the risk of all injuries that might occur during installation, such as electric shock.

3.1.4 Photovoltaic modules are designed for outdoor use. Modules may be mounted on ground, rooftops, vehicles or boats. Proper design of support structures is the responsibility of the system designers or installers. When modules are mounted on rooftops, fire-protection rating of the final structure should be considered, and also the later maintenance. The rooftops and support structure for PV system should only be certified by architectural experts or engineer, which have a formal complete structure analysis results.

3.1.5 For your safety， Do not install or handle the modules under wet or adverse environment, including but not limited to strong wind, gusty wind, frosted roof surfaces ,wet environment.

3.2 Electrical properties safety

3.2.1 When exposed to direct sunlight, one individual PV module may generate DC voltages greater than 30 volts, so it is extremely dangerous to contact the metal part of the wire, which may get a shock, burn and kill. And do not touch or lean on a working module.

3.2.2 In order to avoid arc and electric shock, please do not disconnect electrical connections under load, Keep all electrical connectors dry and clean, and ensure that they are in proper working condition. Never insert metal objects into the module connector.

3.2.3 Do not apply paint or adhesive to module surface.

3.2.4 Do not use mirrors or other magnifiers to focus sunlight on the modules. Do not expose the backside of modules directly to sunlight for a long time.

3.2.5 Do not change the configuration of the bypass diodes, Do not disassemble the modules or remove any attached nameplates or components from the modules.

3.2.6 Do not contact with module surface when the module is wet unless to clean the modules, please following requirements mentioned in this manual when cleaning.

3.3 Handling safety

3.3.1 Store pallets in a ventilated, rain-proof and dry location until the modules are ready to be unpacked, Keep children and unauthorized person away from the modules while transporting or installing them. Improper transportation or placing may lead to glass breakage or power loss of the modules, resulting in the loss of the use value of modules.

3.3.2 Handle modules with care, lift and put down modules gently. It is forbidden to carry or lift the modules by grabbing the junction box or cables. Carry a module by its edges with two or more persons.

3.3.3 To avoid module damage, do not place excessive loads on the module or twist the module frame. Do not stack the modules horizontally for transportation.

3.3.4 Pay more attention not to collide, scratch or press the module backside when transporting or installing.

3.3.5 To avoid module damage, do not stand or step on the module. Do not drop or place objects on the modules, Do not put tools on the module, Do not put the module on any hard surface, which maybe cause the cells broken.

3.3.6 Inappropriate transportation may damage the module. Control the vehicle speed when the road condition is relatively poor.

3.4 Installation safety

3.4.1 Abide by the safety regulations for all other components used in the PV system, including wiring and cables, connectors, controllers, inverters, storage batteries, etc., and use suitable equipment, connectors, wiring and mounting system for a PV system. It is better to use the same type modules in one system.

3.4.2 Do not install or handle the modules when they are wet or during strong wind. Keep the junction box's cover closed.

3.4.3 The front side of modules is constructed with tempered glass, which shall be handled with care. Improper operations may cause the tempered glass breakage. If the front glass is broken or if the back sheet is damaged, contact with any module surface or the aluminum frame can cause electrical shock, particularly when the module is wet. Broken or damaged modules must be disposed properly by professional.

3.4.4 When exposed to direct sunlight, one individual solar module may generate DC voltages greater than 30 volts. It is extremely dangerous to contact it.

3.4.5 Completely cover the module with an opaque material during installation to prevent electricity generation. Do not wear metallic rings, watchbands, ear, nose, lip rings or other metallic devices while installing or repairing photovoltaic systems. Use insulated tools that are approved for working on electrical

installations and always keep them dry.

3.4.6 The triangle hole punched on the backside frame of the module is the drainage hole which cannot be blocked.

3.4.7 The maximum system voltage indicated in the rating label is 1500 V. Attention: During the system Installation, the maximum open circuit voltage in series cannot exceed the maximum system voltage.

3.4.8 During modules interconnection, ensure to fix the connecting cables to supporting bracket, so as to restrict the swing amplitude of the slack part of the cables.

3.4.9 Abide by the allowable minimum bending radius of the cables (suggest no less than 43mm).

3.4.10 Always protect the cable with conduit where animals or children can touch it.

3.4.11 Please use the connector which is specially designed for photovoltaic system, and assemble it with the tools recommended or specified by the manufacturer. In case that the connector applicable to the solar photovoltaic system is required, please contact the local supplier. Ban different connectors to plug each other.

3.4.12 Make sure that the polarity is correct when connecting the module with inverter, storage battery or combiner box to avoid the damage of bypass diodes in the modules due to incorrect polarity.

3.4.13 Do not drill holes in the frame, this may reduce the mechanical load ability and cause corrosion of the frame.

3.4.14 Do not scratch the anodized coating of the frame (except for grounding connection), this may cause corrosion of the frame or reduce the mechanical load ability.

4 Module specifications

4.1 Electrical characteristics

4.1.1 The deviation of electric characteristics between the measured value and nominal value is within ±3%(the electric characteristics including Isc, Voc and Pmax tested Under Standard Test Conditions 1000W/m², AM1.5 and 25ºC (77°F)).

4.1.2 The rated fuse current value of the PV module,Please check PV Module nameplate label.

4.1.3 Open circuit voltage temperature coefficient: -0.28% / °C.

4.1.4 Short circuit current temperature coefficient: +0.05% / °C.

4.1.5 Maximum power temperature coefficient: -0.36% / °C.

4.1.6 Safety class: Class Ⅱ

4.1.7 Fire class: Class C

4.1.8 The maximum nominal voltage for all module series is 1500V according to IEC standards.

4.2 Product identification

Each module has labels providing the following information:

4.2.1 Rating label Describes the product type, rated power, rated current, rated voltage, open circuit voltage, short circuit current, all are measured at STC; weight, dimension, maximum system voltage and the fuse rating are all shown on the rating label.

4.2.2 Barcode Each module has a unique serial number. It contains the relevant production information of the module.

4.3 Current sorting

Each module has a specific label on either side of long aluminum frame (as shown in FIG 1) with the

following information.

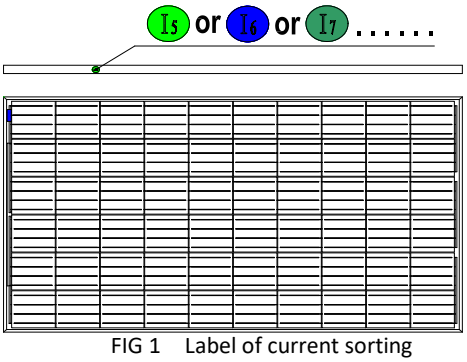


FIG 1 Label of current sorting

4.3.1 Modules are sorted by Pmax firstly,then sorted by Impp (current at maximum power point) in the same Pmax. Different color labels with distinct alphabetical letters are use to represent the Impp class.

4.3.2 LN solar recommends connecting the same Impp class modules in series in order to avoid or minimize power loss due to mismatch effects in arrays.

5 Installation Conditions

5.1 Operating environment

LN solar's PV module should operate in the following environmental conditions:

5.1.1 Ambient temperature:-20℃ to +40℃

5.1.2 Operating temperature of the module:-40℃ to +70℃

5.1.3 Humidity:85%RH

5.1.4 Designed mechanical load and safety factor: Positive:3600Pa(1.5 times safety factor).
Negative:1600Pa(1.5 times safety factor).

Notes: Professional system installers are responsible for mechanical load calculations when Design photovoltaic systems.

5.2 Installation location

5.2.1 In most applications, PV modules should be installed in a location where they will receive maximum sunlight throughout the year. In the northern hemisphere, modules should typically face south, and in the southern hemisphere, modules should typically face north.

5.2.2 The module shall be installed in the place where the sunshine is adequate. the module surface shall not be partly shaded by trees, building, clothes, tools, packaging materials, etc. because these objects will form shadow in the module surface leading to loss of system output power.

5.2.3 The module shall be installed in the well-ventilated place; meanwhile, enough space for airiness shall be sated at the back and sides of the module, so that the heat generated during operation can be radiated in time.

5.2.4 Modules must not be installed nor operated in locations with serious salt mist, hail, snow cover, sandstorm, smoke dust, air pollution, acid rain, soot, etc. and harsh environment. We suggest that the module shall be installed in dry areas with the moderate climate.

5.2.5 Never place the module near a naked flame or inflammable gas. LN solar's modules must be installed on suitable buildings with appropriate mounting structures, or other place suitable for modules installation,

such as ground, carports, building facades, rooftops, PV trackers.

5.2.6 Lighting protection is necessary for PV systems in this area with high probability of lighting strikes.

5.2.7 Do not install the modules in this location with water immersion or near the sprinkler.

5.2.8 Modules must not be sited in locations with strong corrosive substances, such as salt, salt mist or other type of corrosive agent, which could affect the safety and/or performance of the modules. In case of the special installation environments such as the seaside, farm, high humidity environment and sandstorm environment, please contact the local dealer for professional support and confirmation.

5.2.9 The installation of PV modules should not exceed 2000 meters above sea level.

5.3 Tilt angle selection

5.3.1 The tilt angle of the Modules is measured between the surface of the modules and a horizontal ground surface, the modules generates maximum power output when it faces the sun directly.

5.3.2 Modules connected in series should be at the same tilt and azimuth. Differing tilt or azimuth may cause mismatch of power output due to differing amount of sunlight exposure for each module and reduce the efficiency of the PV system.

5.3.3 Do consider the power output in winter when choosing the optimal tilt angle for the module, which will lead to enough power output throughout the year.

5.3.4 For detailed information on the best installation angle, please refer to standard solar photovoltaic Installation guides or consults a reputable solar installer or systems integrator.

6 Installation instructions

6.1 Conventional requirement

6.1.1 Ensure that the installed modules and supporting rail of modules are strong enough, the entire PV system consisting of modules must be able to withstand anticipated mechanical pressure. The installer must provide the guarantee. The installation supporting rail must be tested by the third-party organization with the analysis ability of Static Mechanical according to the local national or international standards.

6.1.2 The supporting rail must be made of environmental corrosion, anti-rust and UV-resistant materials.

6.1.3 Modules must be securely fastened to the supporting rail.

6.1.4 Drilling holes on the surface of module glass or drilling additional mounting holes on module frames may void the warranty.

6.1.5 Forces generated during thermal expansion and contraction of the supporting rail may influence the performance and use of the module, so make ensure that the minimum distance between two neighboring frames is 10mm, but in order to ensure good ventilation. Suggest this distance between two neighboring frames is 30mm.

6.1.6 Dust gathering on the surface of module will reduce the power output, so solar system installer should calculate the optimal tilt of the module to make it easier for dust to be washed off by rain.

6.1.7 The bearing surface of the supporting system must be smooth without any twist or deformation, and all of them shall be at the same height without dislocation.

6.2 Two kinds of mounting

6.2.1 Roof mounting

6.2.1.1 It is necessary to provide a special supporting rail for the roof mounting. When installing a module on

a roof or building, ensure that it is securely fastened and cannot fall or be damaged as a result of strong winds or heavy snow. During roof mounting, check the building codes being used to ensure that the building and its structure where the module is installed have adequate bearing and sealing capacity. The roof when penetrated during module installation shall be properly sealed to avoid rainwater leakage.

6.2.1.2 To be suitable for operation, reduce steam condensation and facilitate the ventilation & heat dissipation of the module during tile installation, the module shall be parallel to the wall or roof surface of the building, and the distance between module and surface of the wall or roof shall be at least 115mm to prevent wiring damage and to allow air circulation, ventilation and heat dissipation behind the module. For stacking type installation, the module shall be installed on the fire-resistant roof. The Fire Resistance Rated Class of the modules is Class C, and the modules are suitable for mounting on an above Class C roof. Do not install modules on a roof or building during strong wind.

6.2.1.3 For the roof system installed in the area with relatively heavy snowfall or snow cover in the meteorological records, the installer shall reinforce the supporting system at the lower frame of the module, in order to prevent the lower frame from being pressed and damaged by the falling snow or freezing of the melt ed snow. LN solar suggests selecting the support reinforcing mechanism shown in Figure 2.

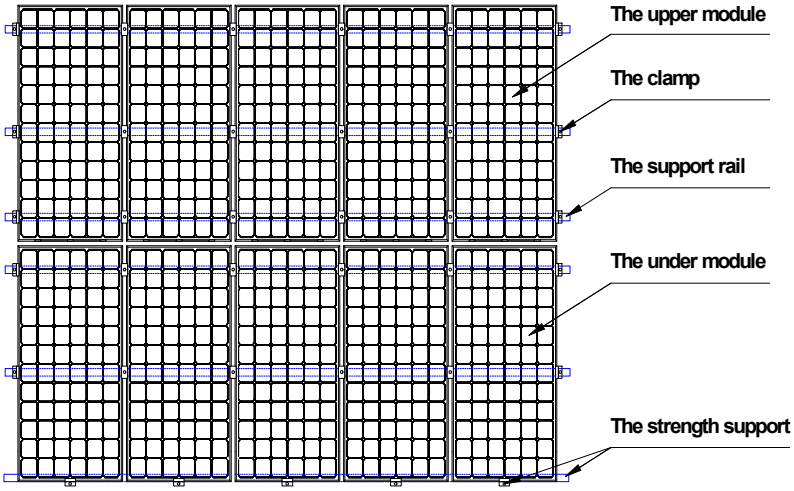


FIG 2 Schematic diagram of reinforcement mounting of module

6.2.2 Ground mounting

Select the height of the mounting system to prevent the lowest edge of the module from being covered by snow for a long time in winter in areas with heavy snowfalls. The module shall be installed on the supporting rail with appropriate height instead of being directly laid on the ground. In addition, the lowest portion of the module shall be high enough (≥500 mm) from ground, so that it is not shaded by plants and trees, or damaged by sand and stone driven by wind, or not shaded by the mud splashed by rain water.

6.3 Installation methods

6.3.1 General rules

a) Modules can be fastened on the supporting system using clamps. Modules must be installed according to the following methods or instructions. If not the warranty may be void.

b) The modules have been passed the mechanical load test according to IEC standard. For standard installation, the four symmetry holes close to the inner side on module frames or clamps shall be used to fasten the module to the supporting rail. LN solar's modules can sustain 2400 Pa wind pressure and 5400

Pa snow load. System designer and installer are responsible for load calculations.

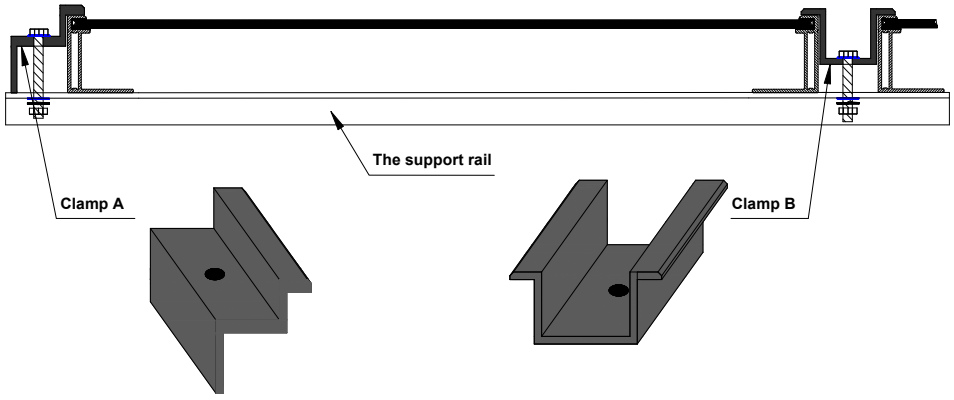
c) The supporting rail and other materials required (such as screw) shall be made of durable, resistance to environmental corrosion, anti-rust and UV-resistant materials.

6.3.2 Clamp fasten the module

6.3.2.1 Using suitable number of clamps to fasten the module to the supporting rail, LN SOLAR suggest installer clamp the module by the long side of the module frame, and the area of module frame fastened by each clamp shall be no less than 800 mm^2.(clamp length ≥50mm, the clamped width of module frame shall be in this area: 9-11mm).

6.3.2.2 Do not contact the front glass, and do not scratch or deform the module frame in any way when fastening the module. Avoid shading effects from the clamps. Drainage holes on the modules frame must not be plugged.

6.3.2.3 Using at least four clamps to fasten each module，two clamps should be fastened on each long side of the module. According to local Environment (depending on wind power and snow loads), additional clamps may be required to ensure modules and PV system to withstand anticipated mechanical pressure. We recommends using the following clamps（as shown in Figure 3）,or approved by reputable solar installer or systems integrator.



Clamp A: Fasten the Fringe modules Clamp B: Fasten the Middle modules

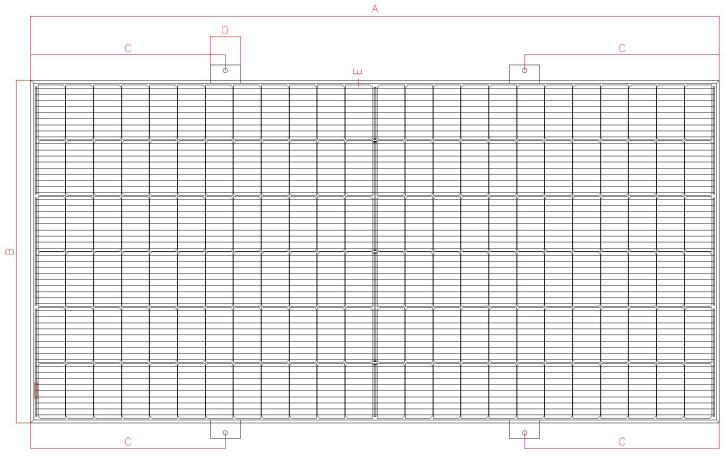
FIG 3 Schematic diagram of module fastened by clamp method

6.3.2.4 The modules should be fastened to the supporting rail using anti-corrosion clamps, screws, spring washers and flat washers. And the clamps should always be mounted in a symmetric position respect to the center. LN solar suggested selecting M8 screw together with matched nut. Recommended torque should be 8 Newton-meters.

6.3.2.5 Under normal circumstances,LN solar suggests the installers to selecting the clamping methods of +5400Pa/-2400Pa mechanical loading to clamp the module (as shown in Table 3) to improve the bearing capacity for snow load at front side and wind pressure at back side, and enhance the system capacity.

Table 3　Range of clamp to fasten the module

Module type	Mechanical Loading/Pa	A/mm	B/mm	C/mm	D/mm	E/mm
LNET-×××M（210）	2400/5400	2384	1303	600±50	≥50	9～11
LNEK-×××M（210）	2400/5400	2172	1303	550±50	≥50	9～11
LNVH-×××M（182）	2400/5400	2465	1134	600±50	≥50	9～11
LNVU-×××M（182）	2400/5400	2279	1134	550±50	≥50	9～11
LNVT-×××M（182）	2400/5400	2094	1134	500±50	≥50	9～11
LNVK-×××M（182）	2400/5400	1910	1134	450±50	≥50	9～11
LNVB-×××M（182）	2400/5400	1722	1134	400±50	≥50	9～11
LNSU-×××M（166）	2400/5400	2108 /2095	1048 /1039	500±50	≥50	9～11
LNST-×××M（166）	2400/5400	1925	1039	450±50	≥50	9～11
LNSK-×××M（166）	2400/5400	1765 /1756	1048 /1039	400±50	≥50	9～11
LNSU-×××M（158.75）	2400/5400	2008	1002	500±50	≥50	9～11
LNSK-×××M（158.75）	2400/5400	1684	1002	400±50	≥50	9～11
LNSF-×××M（158.75）	2400/5400	1979	1002 /996	450±50	≥50	9～11
LNSE-×××M（158.75）	2400/5400	1658	1002 /996	400±50	≥50	9～11
LNSF-×××M（156.75）	2400/5400	1956	992	450±50	≥50	9～11
LNSE-×××M（156.75）	2400/5400	1640	992	400±50	≥50	9～11
LNSD-×××M（156.75）	2400/5400	1482	992	350±50	≥50	9～11
LNSC-×××M（156.75）	2400/5400	1324	992	300±50	≥50	9～11
LNSA-×××M（156.75）	2400/5400	1482	676	350±50	≥50	9～11



Note:
A: Length of this type of module.
B: Width of this type of module.
C: The distance of clamp center from the edge of this type of module.
D: Clamped length of the module frame by the clamp of this type of module.
E: Clamped width of the module frame by the clamp of this type of module.

*** Notes:** LN solar's limited warranty will be void in cases where improper clamps or installation methods deviating from this manual are used. When using clamps to fasten the modules, pay attention to the following requirements:

(b) Take care of the module frames, not to twist or deform them.
(c) Avoid the clamps' shading influence the module.
(d) Not to damage the surface of module frame.
(e) Make sure that the module's drainage holes not be plugged.

6.3.2.6 For matters concerning clamp or installation not mentioned in this manual, contact the local dealer for professional support.

7 Electrical installations

7.1 General with regard to electrical installation

7.1.1 Under normal outdoor conditions, a module is likely to produce different current and voltage than the values measured under STC in the specification of LN solar's module. Therefore, when determining the parameters (for example, nominal voltage, conductor capacity, fuse capacity and controller capacity, etc.) related to the power output of the PV system, the values of short-circuit current and open circuit voltage of the modules should be multiplied by a factor of 125% during design and installation.

7.1.2 Try to use the modules with the same configuration in the same PV system. If the modules are connected in series, the total voltage is the sum of voltages of all the modules. The maximum voltage of string does not exceed the maximum system voltage of the modules (the maximum system voltage of LN solar modules is 1500V), the maximum number of modules that can be connected in a series string must be calculated in accordance with applicable regulations, make sure the open circuit voltage of string does not exceed the maximum system voltage of the modules and the other electrical DC components required at the minimum temperature at the PV system location. Using the following formula:

$$\text{System voltage} = N * Voc * [1 + \lambda v_{oc} (Tmin - 25℃)]$$

N——number of modules in series
Voc——open circuit voltage at STC (refer to product label or data sheet)
λv_{oc}——Thermal coefficient of Voc of each module (refer to product data sheet)
Tmin——minimum ambient temperature at the PV system location

7.1.3 If the PV system requires the installation of high current, several PV modules can be connected in parallel, and total current is the sum of current of all the modules. The maximum parallel number of the modules N= Imax (fuse rating) /Isc,

7.1.4 An over-current protection device with appropriately rated must be used when reverse current could exceed the value of the maximum fuse rating of the module, an over-current protection devices is required for each series string if more than two series strings are connected in parallel.

7.1.5 When installing the module, place the end with the junction box up and try to avoid the rain.

7.1.6 Do not carry out installation in rainy weather, because humidity will void the insulation protection, Thus cause safety accidents.

7.2 Cables and wiring

7.2.1 The junction boxes with IP67 protection class have been designed to be easily interconnected in series

by the connectors. Each module has two single-conductor wires, one positive and one negative, which are pre-wired inside the junction box. Installers can connect two modules by firmly inserting the positive connector of a module into the negative connector of the other module.

7.2.2 Never perform pretreatment to modules including connector, junction box and cable with lubricating oil or cleaning agent made of alkanet materials during installation.

7.2.3 The cross section area of the cable and connector capacity selected must satisfy the maximum short-circuit current of the system (It is recommended that the cross section area of the cable used for the single module is 4mm^2, Please note that the temperature limit range of the cable is -40℃～+85℃).

7.2.4 When fastening the cables to the supporting rail, pay attention to avoid mechanical damage to the cables or modules, and also making a special design to protect the cables from environmental corrosion and direct sunshine, for example, put the cable into the supporting beam or special pipes with UV-resistant materials.

7.2.5 The cables designed are sunlight resistant and waterproof, but also to avoid direct sunlight exposure and water immersion of the cables

7.3 Junction box and Connectors

7.3.1 When connecting modules, make sure that the connectors of the same series module shall come from the same manufacturer or totally be compatible with each others, the connector should be mated with its original female or male connector of the same supplier,and the same requirements shall go to the connection terminals of series string and PV system, because the connectors from different manufacturers may not be compatible with each others, which easily leads to mismatch risk.

7.3.2 The junction box, connector and diode model list is as follows:

Junction box:

Supplier 1: Suzhou XTONG Photovoltaic Technologies Co.,Ltd.

Model 1:PV-XT1609Nxyz
Model 2:PV-XT1302abc
Model 3:PV-XT1206xy

Connector:

Supplier 1: Suzhou XTONG Photovoltaic Technologies Co.,Ltd.

Model 1:PV-XT101.1

The connector should be mated with its original female or male connector of the same supplier.

Bypass diode:

Supplier 1: Suzhou XTONG Photovoltaic Technologies Co.,Ltd.

Model 1:XT4550M-B

Supplier 2: Suzhou XTONG Photovoltaic Technologies Co.,Ltd.

Model 2:XT4050M-A

Supplier 3: Yangzhou Yangjie Electronic Technology Co.,Ltd.

Model 3:25SQ045

7.3.3 Ensure that connector caps are tightened before connecting the modules, keep connectors dry and clean. Do not attempt to make an electrical connection when the connectors are wet, soiled, or otherwise

faulty conditions. Avoid sunlight exposure and water immersion of the connectors.

7.4 Bypass diodes

The junction boxes of LN Solar's modules contain bypass diodes wired in parallel with the PV cell strings. In case of partial cell shading or damaged, the parallel diodes will bypass the current generated by the non-shaded cells, thereby limiting modules heating and performance losses. Take care, the bypass diodes are not over-current protection devices.

7.5 Grounding

7.5.1 LN Solar modules use anti-corrosion and oxidation resistance aluminum frame as rigid supporting. In order to protect the module from lightning strike, electrostatic damage, and personnel safety, all module frames and mounting racks must be properly grounded, as shown in Figure 4: grounding hole and grounding label. Use the recommended connector terminal, or an equivalent, to connect the cable to the frame, and assure good electrical contact as shown in Figure 5: Grounding method.

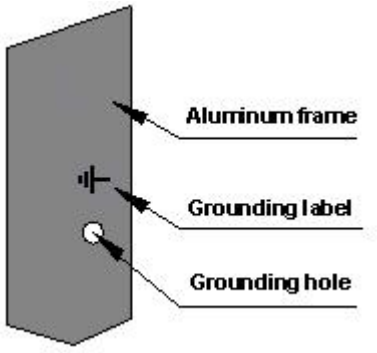


FIG 4 Grounding hole and ground label

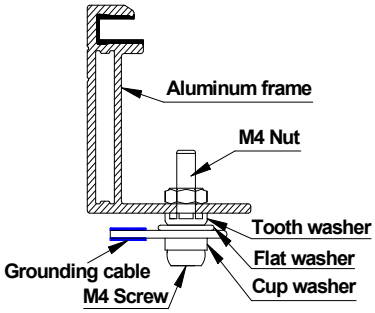


FIG 5 Grounding method

7.5.2 The frames have pre-drilled grounding holes and brand with signs, these holes should be only used for grounding purposes, but not for mounting the modules. And do not drill any additional grounding holes on the frames of the module, which may void the warranty.

7.5.3 If the supporting system is made of metal, the surface must be electroplated and have excellent conductivity.

7.5.4 The grounding cables must be fully contact with inside of the aluminum alloy, and the connection terminal must penetrate the oxidation coating of frame during grounding. Connecting the module frames and supporting beams using suitable grounding conductors can achieve good grounding.

7.5.5 The grounding cables must be connected to the earth through a suitable grounding electrode. Recommend to use the grounding accessories (lugs) to connect the cables. Welding grounding cable to the jack of lugs, then inserting M4 screws into the ring of the lugs and the grounding holes of module frames, fastening with M4 nuts. Spring washers should be used to prevent the screws from loosening and lead to poor grounding.

7.5.6 LN solar modules passes the most rigorous PID testing before leaving the factory, and the negative pole of the component usually does not need to be grounded, so it can be compatible with isolated (with transformer) or non isolated types Inverter.

① Under the combined effects of high humidity, high temperature, and high voltage, photovoltaic modules sometimes experience potential induced attenuation (PID). Components may experience PID attenuation in

the following situations:

1) Installation in warm and humid climate conditions
2) Installation in long-term humid locations (such as near water bodies)

② To reduce the risk of PID, we recommend that the negative electrode on the DC side of the photovoltaic array be correctly grounded in a high temperature and humidity installation environment. The recommended grounding method for inverters is as follows:

1) For isolated photovoltaic inverters, the negative electrode of the photovoltaic DC measurement can be directly grounded
2) For non isolated photovoltaic inverter, virtual ground mode can be adopted after adding isolation transformer (usually the inverter manufacturer needs to provide grounding method guidance).

8 Maintenance

8.1 Usual maintenance

8.1.1 In the warranty period，the user must carry out regular inspection and maintenance using，which is the user's responsibility. And the user must inform the supplier within one week when founding the damages of modules.

8.1.2 When modules are working. There should not be environmental influence factors to cover shadows in the modules, such as other modules, supporting rail, plants, large number of dust etc., which may directly reduce the power output and may even cause regional hot–spot effect. Therefore clean the glass surface on a regular basis, clean modules take measures so as:

(a) In general, normal rainfall can keep the glass surface clean， if the dirt accumulated too much, using water and a soft sponge or cloth for cleaning. If necessary, a mild, non-abrasive cleaning agent can be used to remove stubborn dirt.

(b) Avoid pressing part of the module hard during cleaning, which may cause glass deformation, cell damage and reduction of the module's life.

(c) Remove the snow covered on the module in time to avoid the module damage caused by long-term accumulation of snow cover and freezing of melted snow.

(d) Do not clean module with cold water when the module temperature is highest in the daytime, and the thermal shocks might damage the module.

(e) when cleaning the back of the module needs to avoid piercing back-sheet, module needs to be often cleaned for horizontal installation（the cleaning frequency depends on the degree of dirt）.

8.2 Visual inspection of modules

Inspect the modules visually to find whether there are appearance defects, the following need special attention:

(a) Check whether the module glass is broken ;

(b) Check whether there is burning vestige or back up on the back-sheet;

(c) Check whether there is corrosion along the cell bus–bar or damaged of encapsulation materials or a large area of the bubbles etc;

(d) Check aluminum frame holes are normal; the screws of installation are tightness and electrical cables are situation.

8.3 Check cables and connectors

8.3.1 Carry out regular inspection of mechanics and electric, ensure the cleaning of the connector and be reliable connected.

8.3.2 Check whether all electrical connections are tight or corrosion free.

8.3.3 Maintenance should be carried out at least once a year.

8.3.4 Completely cover the module with an opaque material during repairing the module to prevent electric shock. When exposed to direct sunlight, one individual PV module may generate high DC voltages, so please be cautious of repairing. And repairing modules must be disposed properly by professional.

Note 1: If any problem arises, have it consulted by a competent specialist.

Note 2:If the maintenance measures are not included in this manual, please contact the local dealer for professional support.

8.4 Electrical ratings for all models

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STC：1000W/m²、25℃、AM1.5G	LNET-635M	LNET-640M	LNET-645M	LNET-650M	LNET-655M	LNET-660M	LNET-665M	LNET-670M	LNET-675M
Voc [V] /Tolerance±2%	44.57	44.73	44.90	45.00	45.12	45.35	45.54	45.71	45.86
Isc [Adc] /Tolerance±2%	18.40	18.45	18.51	18.59	18.66	18.69	18.73	18.78	18.84
Vmp [V]	37.03	37.20	37.37	37.54	37.71	37.88	38.04	38.22	38.37
Imax [Adc]	17.15	17.20	17.26	17.31	17.37	17.42	17.48	17.53	17.59
Pmp [W] /Tolerance±3%	635	640	645	650	655	660	665	670	675
NMOT：800W/m²、20℃、AM1.5G、1m/s	**LNET-635M**	**LNET-640M**	**LNET-645M**	**LNET-650M**	**LNET-655M**	**LNET-660M**	**LNET-665M**	**LNET-670M**	**LNET-675M**
Open Circuit Voltage (Voc)	40.64	40.82	41.01	41.19	41.38	41.56	41.74	41.92	42.10
Short Circuit Current (Isc)	15.38	15.42	15.46	15.50	15.54	15.58	15.62	15.66	15.70
Voltage at Maximum Power (Vmpp)	33.52	33.70	33.89	34.07	34.25	34.43	34.61	34.79	34.97
Current at Maximum Power (Impp)	14.38	14.42	14.46	14.50	14.54	14.58	14.62	14.66	14.70
Maximum Power (Pmax)	482	486	490	494	498	502	506	510	514
STC：1000W/m²、25℃、AM1.5G			**LNEK-580M**	**LNEK-585M**	**LNEK-590M**	**LNEK-595M**	**LNEK-600M**	**LNEK-605M**	**LNEK-610M**
Voc [V] /Tolerance±2%			40.99	41.17	41.34	41.52	41.69	41.87	42.03
Isc [Adc] /Tolerance±2%			18.31	18.36	18.42	18.47	18.53	18.58	18.64
Vmp [V]			34.00	34.18	34.37	34.55	34.72	34.91	35.08
Imax [Adc]			17.06	17.11	17.17	17.22	17.28	17.33	17.39
Pmp [W] /Tolerance±3%			580	585	590	595	600	605	610
NMOT：800W/m²、20℃、AM1.5G、1m/s			**LNEK-580M**	**LNEK-585M**	**LNEK-590M**	**LNEK-595M**	**LNEK-600M**	**LNEK-605M**	**LNEK-610M**
Open Circuit Voltage (Voc)			38.32	38.52	38.72	38.92	39.11	39.31	39.50
Short Circuit Current (Isc)			14.86	14.90	14.94	14.98	15.02	15.06	15.10
Voltage at Maximum Power (Vmpp)			31.50	31.65	31.80	31.94	32.09	32.24	32.38
Current at Maximum Power (Impp)			13.97	14.03	14.09	14.15	14.21	14.27	14.33
Maximum Power (Pmax)			440	444	448	452	456	460	464

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STC：1000W/m²、25℃、AM1.5G							**LNVB-390M**	**LNVB-395M**	**LNVB-400M**	**LNVB-405M**	**LNVB-410M**	**LNVB-415M**
Voc [V] /Tolerance±2%							36.99	37.24	37.49	37.74	37.98	38.22
Isc [Adc] /Tolerance±2%							13.49	13.56	13.63	13.70	13.77	13.84
Vmp [V]							30.95	31.18	31.40	31.62	31.83	32.05
Imax [Adc]							12.60	12.67	12.74	12.81	12.88	12.95
Pmp [W] /Tolerance±3%							390	395	400	405	410	415
NMOT：800W/m²、20℃、AM1.5G、1m/s							**LNVB-390M**	**LNVB-395M**	**LNVB-400M**	**LNVB-405M**	**LNVB-410M**	**LNVB-415M**
Open Circuit Voltage (Voc)							34.97	35.25	35.54	35.82	36.10	36.38
Short Circuit Current (Isc)							10.81	10.85	10.89	10.93	10.97	11.01
Voltage at Maximum Power (Vmpp)							28.85	29.13	29.41	29.68	29.95	30.22
Current at Maximum Power (Impp)							10.19	10.23	10.27	10.31	10.35	10.39
Maximum Power (Pmax)							294	298	302	306	310	314
STC：1000W/m²、25℃、AM1.5G				**LNVK-425M**	**LNVK-430M**	**LNVK-435M**	**LNVK-440M**	**LNVK-445M**	**LNVK-450M**	**LNVK-455M**	**LNVK-460M**	**LNVK-465M**
Voc [V] /Tolerance±2%				41.36	41.56	41.75	41.94	42.12	42.31	42.49	42.68	42.86
Isc [Adc] /Tolerance±2%				13.37	13.44	13.51	13.58	13.65	13.72	13.79	13.86	13.93
Vmp [V]				34.05	34.26	34.47	34.67	34.87	35.07	35.27	35.47	35.66
Imax [Adc]				12.48	12.55	12.62	12.69	12.76	12.83	12.90	12.97	13.04
Pmp [W] /Tolerance±3%				425	430	435	440	445	450	455	460	465
NMOT：800W/m²、20℃、AM1.5G、1m/s				**LNVK-425M**	**LNVK-430M**	**LNVK-435M**	**LNVK-440M**	**LNVK-445M**	**LNVK-450M**	**LNVK-455M**	**LNVK-460M**	**LNVK-465M**
Open Circuit Voltage (Voc)				38.74	39.02	39.29	39.56	39.83	40.09	40.35	40.62	40.88
Short Circuit Current (Isc)				10.75	10.79	10.83	10.87	10.91	10.95	10.99	11.03	11.07
Voltage at Maximum Power (Vmpp)				31.49	31.76	32.03	32.29	32.56	32.82	33.08	33.33	33.59
Current at Maximum Power (Impp)				10.13	10.17	10.21	10.25	10.29	10.33	10.37	10.41	10.45
Maximum Power (Pmax)				319	323	327	331	335	339	343	347	351
STC：1000W/m²、25℃、AM1.5G				**LNVT-470M**	**LNVT-475M**	**LNVT-480M**	**LNVT-485M**	**LNVT-490M**	**LNVT-495M**	**LNVT-500M**	**LNVT-505M**	**LNVT-510M**
Voc [V] /Tolerance±2%				45.67	45.84	46.01	46.18	46.34	46.51	46.67	46.83	46.99
Isc [Adc] /Tolerance±2%				13.39	13.46	13.53	13.60	13.67	13.74	13.81	13.88	13.95
Vmp [V]				37.60	37.79	37.97	38.16	38.34	38.52	38.70	38.88	39.05
Imax [Adc]				12.50	12.57	12.64	12.71	12.78	12.85	12.92	12.99	13.06
Pmp [W] /Tolerance±3%				470	475	480	485	490	495	500	505	510
NMOT：800W/m²、20℃、AM1.5G、1m/s				**LNVT-470M**	**LNVT-475M**	**LNVT-480M**	**LNVT-485M**	**LNVT-490M**	**LNVT-495M**	**LNVT-500M**	**LNVT-505M**	**LNVT-510M**
Open Circuit Voltage (Voc)				42.76	43.02	43.27	43.53	43.78	44.03	44.28	44.52	44.77
Short Circuit Current (Isc)				10.77	10.81	10.85	10.89	10.93	10.97	11.01	11.05	11.09
Voltage at Maximum Power (Vmpp)				34.78	35.03	35.29	35.54	35.79	36.04	36.28	36.53	36.77
Current at Maximum Power (Impp)				10.15	10.19	10.23	10.27	10.31	10.35	10.39	10.43	10.47
Maximum Power (Pmax)				353	357	361	365	369	373	377	381	385
STC：1000W/m²、25℃、AM1.5G			**LNVU-510M**	**LNVU-515M**	**LNVU-520M**	**LNVU-525M**	**LNVU-530M**	**LNVU-535M**	**LNVU-540M**	**LNVU-545M**	**LNVU-550M**	**LNVU-555M**
Voc [V] /Tolerance±2%			49.14	49.29	49.44	49.59	49.74	49.89	50.04	50.18	50.32	50.47
Isc [Adc] /Tolerance±2%			13.34	13.41	13.48	13.55	13.62	13.69	13.76	13.83	13.90	13.97
Vmp [V]			40.96	41.13	41.30	41.47	41.63	41.80	41.96	42.12	42.28	42.43
Imax [Adc]			12.45	12.52	12.59	12.66	12.73	12.80	12.87	12.94	13.01	13.08
Pmp [W] /Tolerance±3%			510	515	520	525	530	535	540	545	550	555
NMOT：800W/m²、20℃、AM1.5G、1m/s			**LNVU-510M**	**LNVU-515M**	**LNVU-520M**	**LNVU-525M**	**LNVU-530M**	**LNVU-535M**	**LNVU-540M**	**LNVU-545M**	**LNVU-550M**	**LNVU-555M**
Open Circuit Voltage (Voc)			46.19	46.43	46.68	46.92	47.16	47.40	47.63	47.87	48.10	48.33
Short Circuit Current (Isc)			10.75	10.79	10.83	10.87	10.91	10.95	10.99	11.03	11.07	11.11
Voltage at Maximum Power (Vmpp)			38.01	38.25	38.49	38.73	38.97	39.21	39.44	39.67	39.90	40.13
Current at Maximum Power (Impp)			10.13	10.17	10.21	10.25	10.29	10.33	10.37	10.41	10.45	10.49
Maximum Power (Pmax)			385	389	393	397	401	405	409	413	417	421
STC：1000W/m²、25℃、AM1.5G	**LNVH-550M**	**LNVH-555M**	**LNVH-560M**	**LNVH-565M**	**LNVH-570M**	**LNVH-575M**	**LNVH-580M**	**LNVH-585M**	**LNVH-590M**	**LNVH-595M**	**LNVH-600M**	**LNVH-605M**
Voc [V] /Tolerance±2%	52.83	52.97	53.10	53.23	53.37	53.50	53.62	53.75	53.88	54.00	54.12	54.05
Isc [Adc] /Tolerance±2%	13.24	13.31	13.38	13.45	13.52	13.59	13.66	13.73	13.80	13.87	13.94	14.06
Vmp [V]	44.57	44.72	44.87	45.02	45.17	45.31	45.45	45.60	45.74	45.88	46.01	46.15
Imax [Adc]	12.34	12.41	12.48	12.55	12.62	12.69	12.76	12.83	12.90	12.97	13.04	13.11
Pmp [W] /Tolerance±3%	550	555	560	565	570	575	580	585	590	595	600	605
NMOT：800W/m²、20℃、AM1.5G、1m/s	**LNVH-550M**	**LNVH-555M**	**LNVH-560M**	**LNVH-565M**	**LNVH-570M**	**LNVH-575M**	**LNVH-580M**	**LNVH-585M**	**LNVH-590M**	**LNVH-595M**	**LNVH-600M**	**LNVH-605M**
Open Circuit Voltage (Voc)	48.10	48.33	48.57	48.79	49.02	49.25	49.47	49.69	49.91	50.13	50.35	50.56
Short Circuit Current (Isc)	11.07	11.11	11.15	11.19	11.23	11.27	11.31	11.35	11.39	11.43	11.47	11.51
Voltage at Maximum Power (Vmpp)	39.90	40.13	40.36	40.59	40.81	41.03	41.25	41.47	41.69	41.91	42.12	42.33
Current at Maximum Power (Impp)	10.45	10.49	10.53	10.57	10.61	10.65	10.69	10.73	10.77	10.81	10.85	10.89
Maximum Power (Pmax)	417	421	425	429	433	437	441	445	449	453	457	461

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STC：1000W/m²、25℃、AM1.5G		LNSK-350M	LNSK-355M	LNSK-360M	LNSK-365M	LNSK-370M	LNSK-375M	LNSK-380M
Voc [V] /Tolerance±2%		40.38	40.59	40.79	40.99	41.18	41.37	41.57
Isc [Adc] /Tolerance±2%		11.02	11.10	11.18	11.26	11.34	11.42	11.50
Vmp [V]		33.27	33.49	33.71	33.92	34.13	34.34	34.55
Imax [Adc]		10.52	10.60	10.68	10.76	10.84	10.92	11.00
Pmp [W] /Tolerance±3%		350	355	360	365	370	375	380
NMOT：800W/m²、20℃、AM1.5G、1m/s		LNSK-350M	LNSK-355M	LNSK-360M	LNSK-365M	LNSK-370M	LNSK-375M	LNSK-380M
Open Circuit Voltage (Voc)		37.23	37.34	37.45	37.55	37.66	37.76	37.86
Short Circuit Current (Isc)		8.89	8.95	9.01	9.07	9.13	9.19	9.25
Voltage at Maximum Power (Vmpp)		30.69	30.82	30.96	31.09	31.22	31.35	31.48
Current at Maximum Power (Impp)		8.44	8.50	8.56	8.62	8.68	8.74	8.80
Maximum Power (Pmax)		259	262	265	268	271	274	277
STC：1000W/m²、25℃、AM1.5G		LNST-385M	LNST-390M	LNST-395M	LNST-400M	LNST-405M	LNST-410M	LNST-415M
Voc [V] /Tolerance±2%		45.12	45.33	45.56	45.79	46.01	46.23	46.45
Isc [Adc] /Tolerance±2%		11.06	11.13	11.19	11.26	11.32	11.39	11.45
Vmp [V]		36.42	36.69	36.93	37.17	37.41	37.64	37.88
Imax [Adc]		10.57	10.63	10.70	10.76	10.83	10.89	10.96
Pmp [W] /Tolerance±3%		385	390	395	400	405	410	415
NMOT：800W/m²、20℃、AM1.5G、1m/s		LNST-385M	LNST-390M	LNST-395M	LNST-400M	LNST-405M	LNST-410M	LNST-415M
Open Circuit Voltage (Voc)		38.82	38.89	38.97	39.03	39.10	39.17	39.24
Short Circuit Current (Isc)		9.35	9.41	9.47	9.53	9.59	9.65	9.71
Voltage at Maximum Power (Vmpp)		31.57	31.70	31.82	31.94	32.06	32.17	32.29
Current at Maximum Power (Impp)		8.90	8.96	9.02	9.08	9.14	9.20	9.26
Maximum Power (Pmax)		281	284	287	290	293	296	299
STC：1000W/m²、25℃、AM1.5G	LNSU-420M	LNSU-425M	LNSU-430M	LNSU-435M	LNSU-440M	LNSU-445M	LNSU-450M	LNSU-455M
Voc [V] /Tolerance±2%	48.80	49.00	49.20	49.40	49.60	49.79	49.98	50.17
Isc [Adc] /Tolerance±2%	11.18	11.24	11.30	11.36	11.42	11.48	11.54	11.60
Vmp [V]	40.19	40.40	40.60	40.81	41.01	41.20	41.40	41.59
Imax [Adc]	10.45	10.52	10.59	10.66	10.73	10.80	10.87	10.94
Pmp [W] /Tolerance±3%	420	425	430	435	440	445	450	455
NMOT：800W/m²、20℃、AM1.5G、1m/s	LNSU-420M	LNSU-425M	LNSU-430M	LNSU-435M	LNSU-440M	LNSU-445M	LNSU-450M	LNSU-455M
Open Circuit Voltage (Voc)	45.39	45.45	45.45	45.48	45.51	45.54	45.56	45.59
Short Circuit Current (Isc)	8.90	8.96	9.03	9.09	9.16	9.22	9.29	9.35
Voltage at Maximum Power (Vmpp)	37.23	37.32	37.46	37.56	37.67	37.77	37.88	37.98
Current at Maximum Power (Impp)	8.38	8.44	8.49	8.55	8.60	8.66	8.71	8.77
Maximum Power (Pmax)	312	315	318	321	324	327	330	333

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STC：1000W/m²、25℃、AM1.5G		LNSK-325M	LNSK-330M	LNSK-335M	LNSK-340M	LNSK-345M
Voc [V] /Tolerance±2%		40.78	41.07	41.37	41.67	41.96
Isc [Adc] /Tolerance±2%		10.24	10.32	10.39	10.47	10.54
Vmp [V]		33.78	34.06	34.30	34.55	34.79
Imax [Adc]		9.62	9.69	9.77	9.84	9.92
Pmp [W] /Tolerance±3%		325	330	335	340	345
NOCT：800W/m²、20℃、AM1.5G、1m/s	LNSK-320M	LNSK-325M	LNSK-330M	LNSK-335M	LNSK-340M	LNSK-345M
Open Circuit Voltage (Voc)	37.67	38.00	38.38	38.72	39.06	39.40
Short Circuit Current (Isc)	8.15	8.21	8.26	8.32	8.37	8.43
Voltage at Maximum Power (Vmpp)	33.43	33.70	34.02	34.31	34.60	34.88
Current at Maximum Power (Impp)	7.12	7.18	7.23	7.29	7.34	7.40
Maximum Power (Pmax)	238	242	246	250	254	258
STC：1000W/m²、25℃、AM1.5G	LNSU-390M	LNSU-395M	LNSU-400M	LNSU-405M	LNSU-410M	LNSU-415M
Voc [V] /Tolerance±2%	49.03	49.47	49.85	50.34	50.77	51.25
Isc [Adc] /Tolerance±2%	10.26	10.29	10.33	10.35	10.38	10.40
Vmp [V]	40.63	40.93	41.24	41.54	41.84	42.13
Imax [Adc]	9.60	9.65	9.70	9.75	9.80	9.85
Pmp [W] /Tolerance±3%	390	395	400	405	410	415
NOCT：800W/m²、20℃、AM1.5G、1m/s	LNSU-390M	LNSU-395M	LNSU-400M	LNSU-405M	LNSU-410M	LNSU-415M
Open Circuit Voltage (Voc)	45.72	45.99	46.26	46.53	46.79	47.05
Short Circuit Current (Isc)	8.17	8.23	8.29	8.35	8.41	8.47
Voltage at Maximum Power (Vmpp)	37.48	37.71	37.93	38.15	38.36	38.58
Current at Maximum Power (Impp)	7.71	7.77	7.83	7.89	7.95	8.01
Maximum Power (Pmax)	289	293	297	301	305	309

STC：1000W/m²、25℃、AM1.5G	LNSE-310M	LNSE-315M	LNSE-320M	LNSE-325M	LNSE-330M	LNSE-335M	LNSE-340M
Voc [V] /Tolerance±2%	39.80	40.12	40.43	40.74	41.05	41.35	41.64
Isc [Adc] /Tolerance±2%	10.05	10.12	10.19	10.26	10.33	10.40	10.47
Vmp [V]	32.56	32.85	33.13	33.40	33.67	33.94	34.21
Imax [Adc]	9.52	9.59	9.66	9.73	9.80	9.87	9.94
Pmp [W] /Tolerance±3%	310	315	320	325	330	335	340
NMOT：800W/m²、20℃、AM1.5G、1m/s	**LNSE-310M**	**LNSE-315M**	**LNSE-320M**	**LNSE-325M**	**LNSE-330M**	**LNSE-335M**	**LNSE-340M**
Open Circuit Voltage (Voc)	37.28	37.72	38.15	38.59	39.01	39.43	39.85
Short Circuit Current (Isc)	7.94	7.98	8.02	8.06	8.10	8.14	8.18
Voltage at Maximum Power (Vmpp)	30.57	30.94	31.31	31.67	32.03	32.38	32.73
Current at Maximum Power (Impp)	7.49	7.53	7.57	7.61	7.65	7.69	7.73
Maximum Power (Pmax)	229	233	237	241	245	249	253
STC：1000W/m²、25℃、AM1.5G	**LNSF-375M**	**LNSF-380M**	**LNSF-385M**	**LNSF-390M**	**LNSF-395M**	**LNSF-400M**	**LNSF-405M**
Voc [V] /Tolerance±2%	47.96	48.27	48.62	48.94	49.26	49.58	49.90
Isc [Adc] /Tolerance±2%	10.07	10.13	10.18	10.24	10.29	10.35	10.40
Vmp [V]	39.23	39.54	39.81	40.11	40.40	40.68	40.96
Imax [Adc]	9.56	9.61	9.67	9.72	9.78	9.83	9.89
Pmp [W] /Tolerance±3%	375	380	385	390	395	400	405
NMOT：800W/m²、20℃、AM1.5G、1m/s	**LNSF-375M**	**LNSF-380M**	**LNSF-385M**	**LNSF-390M**	**LNSF-395M**	**LNSF-400M**	**LNSF-405M**
Open Circuit Voltage (Voc)	45.34	45.55	45.76	45.97	46.17	46.38	46.58
Short Circuit Current (Isc)	7.94	7.98	8.02	8.06	8.10	8.14	8.18
Voltage at Maximum Power (Vmpp)	37.30	37.50	37.70	37.89	38.09	38.28	38.47
Current at Maximum Power (Impp)	7.48	7.52	7.56	7.60	7.64	7.68	7.72
Maximum Power (Pmax)	279	282	285	288	291	294	297

156.75：

STC：1000W/m²、25℃、AM1.5G			LNSE-285M	LNSE-290M	LNSE-295M	LNSE-300M	LNSE-305M
Voc [V] /Tolerance±2%			38.59	38.87	39.16	39.42	39.74
Isc [Adc] /Tolerance±2%			9.55	9.63	9.70	9.77	9.84
Vmp [V]			31.36	31.69	32.01	32.33	32.62
Imax [Adc]			9.09	9.15	9.22	9.28	9.35
Pmp [W] /Tolerance±3%			285	290	295	300	305
NMOT：800W/m²、20℃、AM1.5G、1m/s	**LNSE-275M**	**LNSE-280M**	**LNSE-285M**	**LNSE-290M**	**LNSE-295M**	**LNSE-300M**	**LNSE-305M**
Open Circuit Voltage (Voc)	36.54	36.89	37.23	37.57	37.90	38.22	38.55
Short Circuit Current (Isc)	7.47	7.54	7.60	7.67	7.73	7.80	7.86
Voltage at Maximum Power (Vmpp)	29.15	29.55	29.94	30.33	30.71	31.09	31.45
Current at Maximum Power (Impp)	7.17	7.22	7.28	7.33	7.39	7.44	7.50
Maximum Power (Pmax)	209	213	218	222	227	231	236
STC：1000W/m²、25℃、AM1.5G	**LNSF-340M**	**LNSF-345M**	**LNSF-350M**	**LNSF-355M**	**LNSF-360M**	**LNSF-365M**	**LNSF-370M**
Voc [V] /Tolerance±2%	46.54	46.90	47.26	47.61	47.96	48.31	48.65
Isc [Adc] /Tolerance±2%	9.50	9.55	9.61	9.66	9.72	9.77	9.83
Vmp [V]	38.15	38.38	38.61	38.83	39.05	39.26	39.47
Imax [Adc]	8.91	8.99	9.07	9.14	9.22	9.30	9.37
Pmp [W] /Tolerance±3%	340	345	350	355	360	365	370
NMOT：800W/m²、20℃、AM1.5G、1m/s	**LNSF-340M**	**LNSF-345M**	**LNSF-350M**	**LNSF-355M**	**LNSF-360M**	**LNSF-365M**	**LNSF-370M**
Open Circuit Voltage (Voc)	42.78	43.13	43.47	43.81	44.15	44.49	44.78
Short Circuit Current (Isc)	7.53	7.58	7.64	7.69	7.75	7.80	7.86
Voltage at Maximum Power (Vmpp)	34.69	35.00	35.31	35.62	35.92	36.22	36.51
Current at Maximum Power (Impp)	7.15	7.20	7.25	7.30	7.35	7.40	7.45
Maximum Power (Pmax)	248	252	256	260	264	268	272

STC: 1000W/m², 25℃, AM1.5G	LNSD-255M	LNSD-260M	LNSD-265M	LNSD-270M	LNSD-275M
Voc [V] /Tolerance±2%	35.49	35.90	36.29	36.69	37.07
Isc [Adc] /Tolerance±2%	9.36	9.43	9.50	9.57	9.64
Vmp [V]	28.78	29.12	29.44	29.77	30.09
Imax [Adc]	8.86	8.93	9.00	9.07	9.14
Pmp [W] /Tolerance±3%	255	260	265	270	275
STC: 1000W/m², 25℃, AM1.5G		**LNSC-230M**	**LNSC-235M**	**LNSC-240M**	**LNSC-245M**
Voc [V] /Tolerance±2%		33.56	34.00	34.42	34.85
Isc [Adc] /Tolerance±2%		8.99	9.06	9.13	9.20
Vmp [V]		27.09	27.45	27.81	28.16
Imax [Adc]		8.49	8.56	8.63	8.70
Pmp [W] /Tolerance±3%		230	235	240	245
STC: 1000W/m², 25℃, AM1.5G		**LNSA-170M**	**LNSA-175M**	**LNSA-180M**	**LNSA-185M**
Voc [V] /Tolerance±2%		27.70	28.22	28.73	29.23
Isc [Adc] /Tolerance±2%		8.13	8.20	8.27	8.34
Vmp [V]		22.28	22.73	23.17	23.60
Imax [Adc]		7.63	7.70	7.77	7.84
Pmp [W] /Tolerance±3%		170	175	180	185

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