

SKYWORTH/Solavita Solar Module Installation Manual

This manual contains important safety instructions for the Photovoltaic Modules (hereafter referred to as "Modules") of Shenzhen Qiming Photovoltaic Technology Co., Ltd. (hereafter referred to as SKYWORTH/Solavita Solar). Installers should follow all safety precautions described in this guide as well as local codes when installing Modules.

Installing photovoltaic systems requires specialized skills and knowledge. Installation should only be performed by qualified personnel.

Before installing a photovoltaic system, installers should familiarize themselves with its mechanical and electrical requirements. Keep this guide in a safe place for future reference and in case of sale or disposal of the Modules.

For any questions, please contact our Global Quality and Customer Service department for further information.

1. INTRODUCTION

Thank you for choosing SKYWORTH/SOLAVITA SOLAR modules!

This Installation Manual contains essential information for electrical and mechanical installation that you must know before handling and installing SKYWORTH/Solavita Solar Modules. This Manual also contains safety information you need to be familiar with. All the information described in this Manual is the intellectual property of SKYWORTH/Solavita Solar and is based on the technologies and experience that have been acquired and accumulated by SKYWORTH/Solavita Solar.

This Manual does not constitute a warranty, expressed or implied. SKYWORTH/Solavita Solar does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with installation, operation, use or maintenance of Modules. No responsibility is assumed by SKYWORTH/Solavita Solar for any infringement of patents or other rights of third parties that may result from use of Modules. SKYWORTH/Solavita Solar reserves the right to make changes to the product, specifications or installation manual without prior notice.

Failure to comply with the requirements listed in this manual will invalidate the Limited Warranty for Modules as provided by SKYWORTH/Solavita Solar. Additional recommendations are provided to enhance safety practices and performance results. Please provide a copy of this manual to the PV system owner for their reference, and inform them of all relevant aspects of safety, operation, and maintenance.

2. CODES AND REGULATIONS

The mechanical and electrical installation of PV systems should be performed in accordance with all applicable codes, including electrical codes, building codes and electric utility interconnection requirements. Such requirements may vary for mounting location. Requirements may also vary with system voltage, and for DC or AC application. Contact local authorities for governing regulations.

3. GENERAL

3.1. Product Identification

3.1.1. Nameplate:

Nameplate describes the product type, peak power, Max. power voltage, open circuit voltage, short circuit current, maximum system voltage, maximum overcurrent protection rating, certifications mark, the maximum system voltage etc.

3.1.2. Barcode:

Each individual module has a unique serial number. The serial number has 22 digits. The 13th and the 14th digits are the year code, the 15th and the 16th digits are the month code. For example, XXXXXXXXXXXXX2310XXXXXX means the module was assembled and tested in October 2023. Each module has only one bar code. It is permanently attached to the interior of the module and is visible from the top front of the module. This barcode is inserted prior to laminating.

3.2. Conventional safety requirement

SKYWORTH/Solavita Solar Modules are designed to meet the requirements of IEC 61215 and IEC 61730, with protection class: Class II. Modules rated for use in this application class may be used in system greater than 50V DC or 240W, where general contact access is anticipated.

When modules are mounted on rooftops, the roof must have a fire-resistant covering suitable for this application. Rooftop PV systems should only be installed on rooftops capable of handling the additional weighted load of PV system components, including modules, and have a complete analysis of the structure performed by a certified building specialist or engineer.

For your safety, do not attempt to work on a rooftop until safety precautions have been identified and taken, including without limitation fall protection measures, ladders or stairways, and personal protective equipment.

For your safety, do not install or handle modules under adverse conditions, including without limitation strong or gusty winds, and wet or frosted roof surfaces.

3.3. Electrical performance safety

Photovoltaic modules can produce DC electricity when exposed to light and therefore can produce an electrical shock. DC voltage of 30 Volts or higher is potentially lethal.

Modules produce voltage even when they are not connected to an electrical circuit or load. Please use insulated tools and appropriately rated rubber gloves when working with modules in sunlight.

Modules have no on/off switch. Modules can be rendered inoperative only by removing them from sunlight, or by fully

covering them with cloth, cardboard, or other completely opaque material.

In order to avoid arcs and electrical shock, please do not disconnect electrical connections under load. Faulty connections can also result in arcs and electrical shock. So please keep connectors dry and clean, and ensure that they are in proper working condition. Never insert metal objects into the connector, or modify them in any way in order to secure an electrical connection.

Also, in order to avoid the sand or water vapor entering which may cause a safety issue with the connection, the modules need to be installed and connected to the combiner box once they are taken out from the carton box; keep the connectors dry and clean during the installation, if the modules are not be installed within a week, rubber connector covers shall be added as a protective measure. Note that pollution from sand, dust and water will result in arcs and electrical shock of connectors. We suggest that customers add rubber connector covers as protection method especially in areas with heavy dust or seaside areas with higher salinity or serious polluted areas.

Reflection from snow or water can increase sunlight and therefore boost current and power. In addition, colder temperature can substantially increase voltage and power. If the glass or other material is damaged, please wear personal protection equipment and separate the module from the circuit.

Work only under dry conditions, and use only dry tools. Do not handle modules when they are wet unless wearing appropriate protective equipment. If you need to clean the modules, please follow the cleaning requirements mentioned in the manual.

Installation must be carried out under the guidance of a qualified electrician.

3.4. Operating safety

Do not open the package of SKYWORTH/Solavita Solar modules until they are ready to be installed during transportation and storing.

At the same time please protect the package against exposure to damage. Secure pallets from falling over. Do not exceed the maximum height of pallets to be stacked, as indicated on the pallet packaging. Store pallets in a ventilated, rain-proof and dry location until the Modules are ready to be unpacked. Please unpack the package of SKYWORTH/Solavita Solar modules according to "SKYWORTH/Solavita Solar Modules Unpacking Instruction" or similar documents.

Do not lift the modules by grasping the module's junction box or electrical leads in any condition.

Do not stand or step on the Modules.

Do not drop the Modules on another Module.

Do not place any heavy objects on the Modules to avoid glass breakage.

Be cautious when setting the modules down on to a surface, especially on the corner of the modules. Inappropriate transport and installation may break the modules.

Do not attempt to disassemble the modules, and do not remove any attached nameplates or components from the

modules.

Do not apply paint or adhesive to the modules' top surface.

Do not drill holes in the frame. This may compromise the frame strength and cause corrosion of the frame.

Do not scratch the anodized coating of the frame (except for grounding connection). It may cause corrosion of the frame or compromise the frame strength.

Do not attempt to repair the modules with damaged glass.

The scrapped modules shall be recovered and disposed by the qualified institution.

In dry areas, modules are easily affected by static electricity during installation. The installation personnel should wear anti-static assembly to ensure that the equipment and installation personnel are not affected or hurt by static electricity.

3.5. Fire safety

Fire Rating Class C

Consult your local authority for guidelines and requirements for building or structural fire safety.

SKYWORTH/Solavita Solar modules have been designed in accordance with IEC 61730 standard.

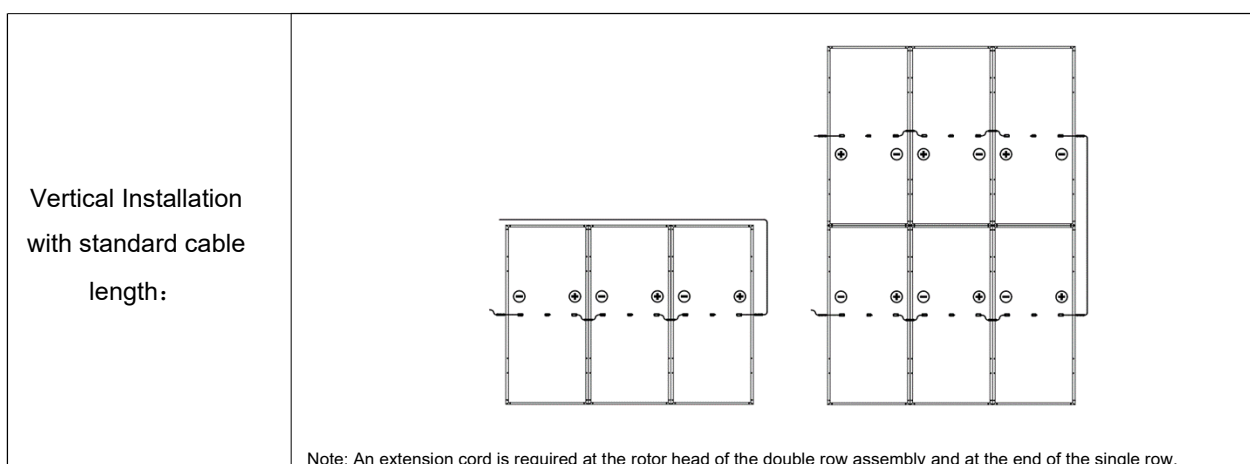
For roof installations, modules should be mounted over a fire-resistant covering suitable for this application, with adequate ventilation between the module backside and the mounting surface.

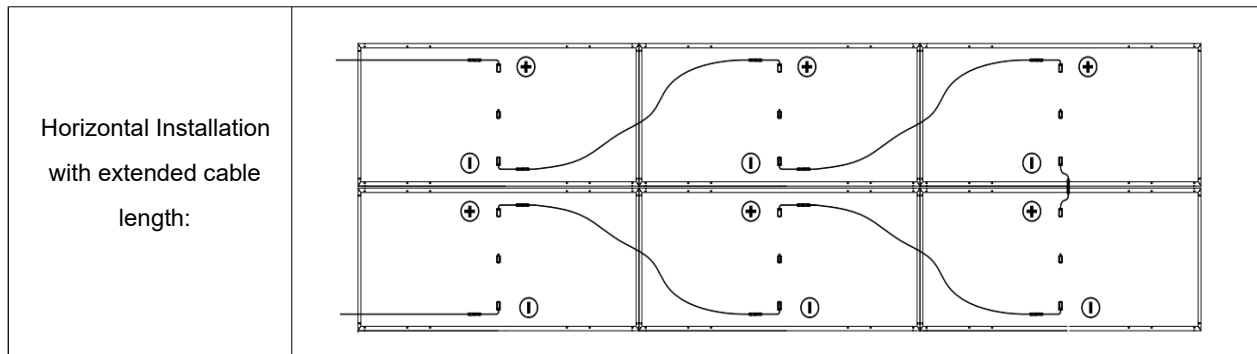
Roof constructions and installations may affect the fire safety of the building. Improper installation may create hazards in the event of a fire.

Use appropriate components such as fuses, circuit breaker and grounding connector as requires by local authority.

Do not use modules where flammable gasses may be generated.

3.6. Wiring Method





4. INSTALLATION

4.1. Installation position and working environment

SKYWORTH/Solavita Solar modules are intended for use in terrestrial applications, no outer space use. Do not use mirrors or other magnifiers to concentrate sunlight onto the modules.

Modules must be mounted on appropriate mounting structures positioned on suitable buildings, the ground, or other structures suitable for modules (e. g., carports, building facades or PV trackers).

Modules must not be installed in locations where they could be submerged in water.

The recommended ambient temperature should be within $-40^{\circ}\text{C}(-40^{\circ}\text{F})$ to $40^{\circ}\text{C}(104^{\circ}\text{F})$. The temperature limits are defined as the monthly average high and low of the installation site. The limit operating temperature should be $-40^{\circ}\text{C}(-40^{\circ}\text{F})$ and $70^{\circ}\text{C}(158^{\circ}\text{F})$. The limit storage temperature should be $-40^{\circ}\text{C}(-40^{\circ}\text{F})$ and $40^{\circ}\text{C}(104^{\circ}\text{F})$.

Ensure modules are not subject to wind or snow loads exceeding the maximum permissible loads.

The modules should be installed in a location where there's no shading throughout the year. Ensure there's no obstacle to block light near the installation site.

Lightning protection is recommended for PV systems that are to be installed in locations with high probability of lightning strikes.

Do not use modules near equipment or in locations where flammable gas may be generated or collected.

Modules cannot be installed or used in extreme areas or weather conditions, and highly corrosive areas should be considered carefully.

Please adopt appropriate measures to ensure the performance and safety of the modules when they are installed or operated in areas with heavy snow, extremely cold, strong wind, or near an island or desert that is prone to produce salty fog, or near water.

SKYWORTH/Solavita Solar modules have passed salt-mist test based on IEC 61701, but galvanic corrosion can occur between the aluminum frame of the modules and mounting or grounding hardware if such hardware is comprised of dissimilar metals. SKYWORTH/Solavita Solar Modules can be installed at seaside locations 50m to 500m from the sea, but the components should be protected against corrosion.

Modules cannot be applied for some special requirements, e.g., for buildings, marine and vehicle applications. Please refer to local law and regulations for details.

It is recommended that the maximum installation altitude of the module should not exceed 2000 m.

4.2. Tilt angel selection

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

In the northern hemisphere, modules should typically face south, and in the southern hemisphere, modules should typically face north.

For detailed information regarding the best installation angle, please refer to standard solar photovoltaic installation guides or consult a reputable solar installer or systems integrator.

Dust building up on the surface of the modules can impair module performance. SKYWORTH/Solavita Solar recommends installing the modules with a tilt angle of at least 10 degrees, making it easier for dust to be washed off by rain.

5. MECHANICAL INSTALLATION

5.1. Conventional requirements

Ensure the installation method and supporting system of modules is strong enough to withstand all the load conditions. The Installer must provide this guarantee. The installation supporting system must be tested by third-party organization with the analysis ability of Static Mechanical, according to the local national or international standards.

The modules mounting structure must be made of durable, corrosion-resistant and UV-resistant material.

Modules must be securely attached to the mounting structure.

In regions with heavy snowfall in winter, select the height of the mounting system so that the lowest edge of the modules is not covered by snow for any length of time. In addition, ensure that the lowest portion of the modules is placed high enough so that it is not shaded by plants or trees or damaged by flying sand.

When the modules are supported parallel to the surface of a building wall or roof, a minimum clearance of 10cm between the modules frame and the surface of the wall or the roof is required to allow air to circulate behind the modules and to prevent wiring damage.

Do not attempt to drill holes in the glass surface and the frames of the modules as this will void the warranty.

Before installing modules on a roof, ensure that the roof construction is suitable. In addition, any roof penetration required to mount the modules must be properly sealed to prevent leaks.

Observe the linear thermal expansion of the module frames (the recommended minimum distance between two modules is 10 mm). The module frames will warp at low temperature.

Avoid the frame receiving the lateral tension and pressure, which may damage the frame and glass.

Modules have been tested for a maximum static load on the back side of 2400Pa (with 1.5 safety factor) (i.e., wind load) and a maximum static load on the front side of either 2400Pa or 5400Pa (with 1.5 safety factor) (i.e., wind and snow load), depending on the modules type (please refer to the following installation methods for details).

The mounting method must not result in the direct contact of dissimilar metals with the aluminum frame of the modules as it will result in galvanic corrosion. IEC 60950 standard recommends metal combinations not exceed an electrochemical potential difference of 0.6 Volts.

SKYWORTH/Solavita Solar modules can be mounted in landscape or portrait orientation. For the bifacial modules, in order to maintain the energy yield of module's rear side, the distance between the bottom of modules and the

roof or ground surface is recommended to be at least 1m.

5.2. Installation methods

Modules can be installed to the racks by clamps or hooks. Modules must be installed according to the following examples and recommendation. If Modules are not mounted according to these instructions, please consult SKYWORTH/Solavita Solar in advance and it must be approved by SKYWORTH/Solavita Solar, otherwise this act may damage the Modules and void the warranty.

5.2.1. Modules installed with clamp

A. Module should be attached on a supporting structure rail by metal clamps.

It is recommended to use the clamps under the following condition or parts approved by :

Width: $\geq 50\text{mm}$; Thickness: $\geq 3\text{mm}$; Material: Aluminum Alloy, 6063-T5; Bolt: Stainless Steel M8;

Nut: Stainless Steel M8; Washer: Stainless Steel M8

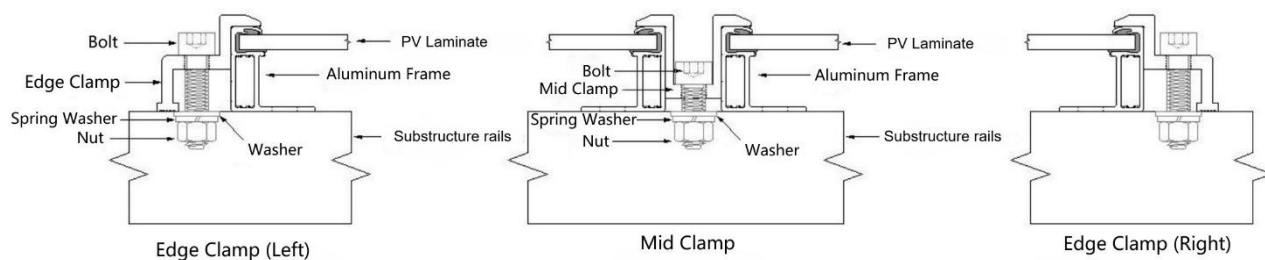


Figure 1: Mounting details

B. Recommended bolt torque range: 16N.m to 20N.m.

C. When using bolt holes for installation, a flat stainless steel washer with a minimum thickness of 1.5mm and an outer diameter greater than 16mm should be used;

D. The modules clamps should not contact the front glass or deform the frame in any way. Avoid shading effects from the module's clamps. Drainage holes on the modules frame should not be closed or obscured by the clamps. Besides, two or more screws or two full threads of a single screw shall engage the metal.

5.2.2. Modules installed with mounting hole

Modules should be bolted to support structures through mounting holes located in the frame's back flanges. Refer to what is shown in Figure 2 (Mounting Details).

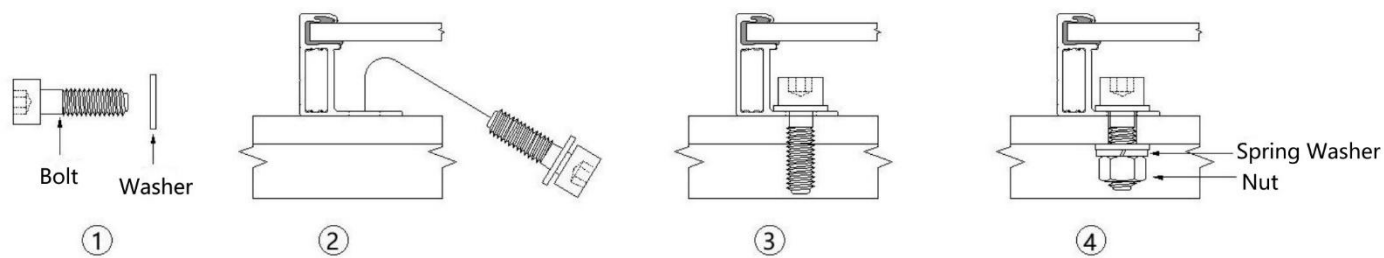


Figure 2: Mounting Details

For your reference, please use the components specified below:

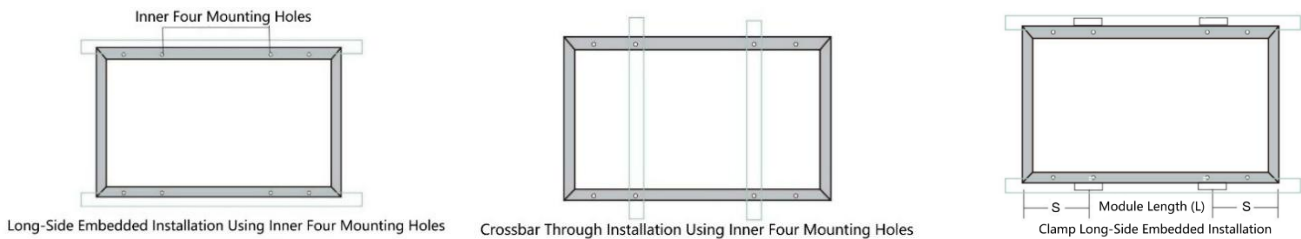
Accessory Name	Bolt	Washer	Spring Washer	Nut
Material	M8 Stainless Steel	EPDM	M8 Stainless Steel	M8 Stainless Steel

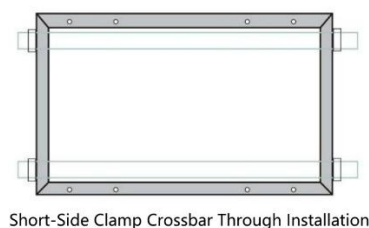
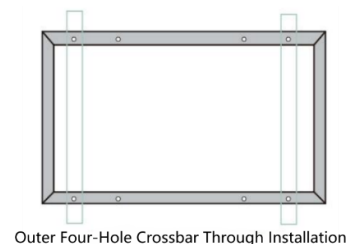
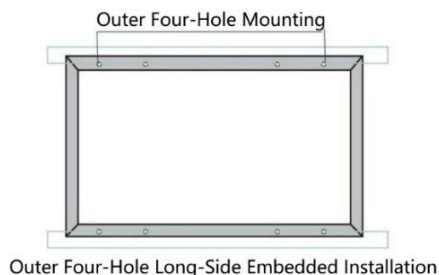
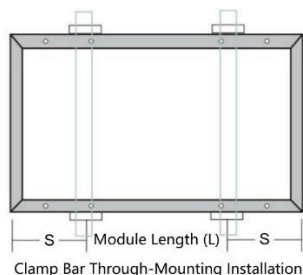
5.3. Installation position and corresponding static loads

The low/normal level of load condition is applicable to the installation in most of environmental conditions: the maximum static load on the back of the modules is 2400Pa (with 1.5 safety factor) (i.e. wind load), and the maximum static load on the front of modules is 2400Pa (with 1.5 safety factor) (i.e. wind and snow load).

The high level of load condition is applicable to the installation in harsher environmental conditions such as storm, heavy snow, etc. The maximum static load on the back of the modules is 2400Pa (with 1.5 safety factor) (i.e. wind load), and the maximum static load on the front of modules is 5400Pa (with 1.5 safety factor) (i.e. wind and snow load), depending on the pressure level that it would endure according to IEC/UL standard.

For the dynamic loads, such as wind, the safety factor needs to be increased by 3 times. It means that the maximum dynamic load is 800Pa when the wind speed is less than 130 km/h.





Installation Methods Module Types	Inner Four- Hole Long- Side Embedded Installation	Inner Four- Hole Crossbar Through Installation	Clamp Long- Side Embedded Installation, $S = 1/4 L \pm 50$	Clamp Crossbar 9 Through Installation $S=1/4L+50$	Outer Four- Hole Long- Side Embedded Installation	Outer Four- Hole Crossbar Through Installation	Short-Side Clamp Crossbar Through Installation
QM182NTHCD-xxx-78 QM182NTHCDQ-xxx-78 QM182NTHCDZ-xxx-78	±2400	+5400/-3600	+5400/-2400	+5400/-3600	N/A	N/A	+5400/-3600
QM182NTHCD-xxx-72 QM182NTHCDQ-xxx-72 QM182NTHCDZ-xxx-72	±2400	+5400/-3600	±2400	+5400/-3600	±2400	+5400/-2400	+5400/-3600
QM182NTHCD-xxx-60 QM182NTHCDQ-xxx-60 QM182NTHCDZ-xxx-60	±2400	+5400/-3600	±2400	+5400/-3600	N/A	N/A	+5400/-3600
QM182NTHCDH-xxx-54 QM182NTHCDQH-xxx-54 QM182NTHCDZH-xxx-54	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM182NTHCDCr-xxx- XX (78/72/60/54 Type) QM182NTHCDCo-xxx- XX (78/72/60/54 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400

QM182NTHCDCy-xxx- XX (78/72/60/54 Type) QM182NTHCDCg-xxx- XX (78/72/60/54 Type) QM182NTHCDCb-xxx- XX (78/72/60/54 Type) QM182NTHCDCi-xxx- XX (78/72/60/54 Type) QM182NTHCDCp-xxx- XX (78/72/60/54 Type)							
QM182NTHCDW-xxx-XX (14/8/4 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM210THCD-xxx-XX (66/60 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM210NTHCD-xxx-XX (66/60 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM210RTHCDH-xxx-XX (54/48 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM182BTHCD-xxx-XX (66 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM210THCD-xxx-XX (66/60 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM210RTHCD-xxx-XX (66/60 Type)	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM210VTHCD-xxx-78	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400
QM192AFCD-xxx-72	±2400	+5400/-2400	±2400	+5400/-2400	±2400	±2400	+5400/-2400

Figure 3: Installation Position and Corresponding Load Relation

Note: Design load=Test load $\div$ 1.5 (safety factor)

The load data listed in this manual are all the test loads.

6. ELECTRICAL INSTALLATION

6.1. Electrical property

The rated electrical characteristics, I_{sc} is within $\pm 3\%$ and V_{oc} is within $\pm 3\%$ of measured values at Standard Test Conditions, but for the P_{max} , it is within $\pm 3\%$. Standard Test Conditions: $1000W/m^2$ Irradiance, $25^{\circ}C$ Cell Temperature and 1.5 AM. The bifacial nameplate irradiance is $1\,000\,W/m^2$ on the module front and $135\,W/m^2$ on the module rear.

Under normal conditions, the photovoltaic modules may experience conditions that produce more current and/or voltage than

reported at Standard Test Conditions. Accordingly, the values of short circuit current, I_{sc} , and open circuit voltage, V_{oc} , marked on modules should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fusing sizes, and size of controls connected to the module output.

Voltages are additive when modules are connected directly in series, and modules currents are additive when modules are connected directly in parallel, as illustrated in Figure 4. Modules with different electrical characteristics must not be connected directly in series.

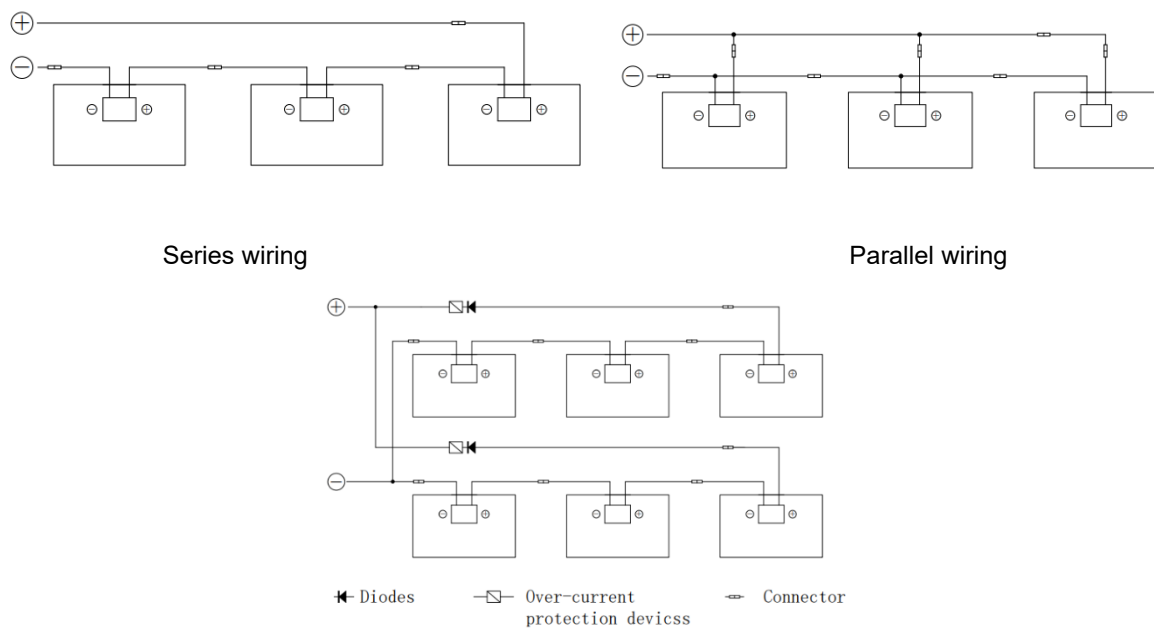


Figure 4: Electrical diagrams of series and parallel wiring

The maximum number of modules that can be connected in a series string must be calculated in accordance with applicable regulations in such a way that the specified maximum system voltage (The maximum system voltage of SKYWORTH/Solavita modules is available in two options: DC 1000 V and DC 1500 V.) of the modules and all other electrical DC components will not be exceeded in open-circuit operation at the lowest temperature expected at the PV system location.

Correction factor for the open-circuit voltage can be calculated based on the following formula: $C_{voc} = 1 - \beta_{voc} \cdot (25 - T)$. T is the lowest expected ambient temperature at the system location. β (%/°C) is the temperature coefficient of the selected module V_{oc} (refer to corresponding datasheet).

An appropriately rated over-current protection device must be used when the reverse current could exceed the value of the maximum fuse rating of the modules. An overcurrent protection device is required for each series string if more than two series strings are connected in parallel, in Figure 4.

6.2. Cables and Wiring

PV Module's junction boxes with the IP68 protective level, can provide the safety protection for cable and wiring connection, also for contact protection of non-insulating electric parts. Each module has two individual wires connecting the junction box, one is negative pole and the other is positive pole. Two modules can be in series connection by inserting the positive pole at one end of wire of one module into the negative pole of the adjoining module. According to local fire protection, building and

electrical regulation, apply proper cable and connector; ensure the electrical and mechanical property of the cables (the cables should be put in a catheter with anti-UV aging properties, and if exposed to air, the cable itself should have anti-UV aging capability). The installer can only use single-wire cable, $\geq 4\text{mm}^2$ (12 AWG), 90 °C , with proper insulation capability to withstand the maximum open circuit voltage (such as EN50618 approval). Need to select appropriate wire specifications to reduce voltage drop.

Use field wiring with suitable cross-sectional areas that are approved for use at the maximum short-circuit current of the modules. SKYWORTH/Solavita Solar recommends installers use only sunlight resistant cables qualified for direct current (DC) wiring in PV systems.

Rating Required Minimum Field Wiring

Test Standard	Wire Size	Temperature Rating
IEC 62930 and EN 50618	4mm ²	-40°C~+90°C

Cables should be fixed to the mounting structure in such a way that mechanical damage of the cable and/or the modules is avoided. Do not apply stress to the cables. The minimum cables bending radius should not be less than 8 times of the cable diameter. Any cable damage caused by bending too much or cable management system is not covered under SKYWORTH/Solavita Solar's warranty. For fixing, use appropriate means, such as sunlight resistant cable ties and/or wire management clips specifically designed to attach to the module frame. While the cables are sunlight resistant and waterproof, where possible, avoid direct sunlight exposure and water immersion of the cables. Cable arrangement must comply with local laws and regulations.

6.3. Connectors

Keep connectors dry and dean, and ensure that connector caps are hand tight before connecting the modules. Do not attempt making an electrical connection with wet, soiled, or otherwise faulty connectors. Avoid sunlight exposure and water immersion of the connectors. Avoid connectors resting on the ground or roof surface.

During the installation process, do not forcefully pull or tug on the connector, faulty connections can result in arcs and electrical shock. Check that all electrical connections are securely fastened. Make sure that all locking connectors are fully engaged and locked. The modules need to be connected as soon as possible after installation, and the connectors should meet the requirements of IP68 (IEC60529) after connection. At the same time, the masking tape used to fix the connecting wires at the factory should be removed, and residual adhesive should be removed as soon as possible.

The electrical connections between modules, combiner boxes, inverters, etc. must ensure that the connectors are of the same brand and model, otherwise there is a risk of connector mismatch and the module warranty will be lost. When different types of connectors are needed for interconnection, it is recommended to use adapter cables, and SKYWORTH/Solavita will provide necessary support.

For special environments such as deserts, beaches, and other special installation areas, it is recommended to use connector protection devices before inserting connectors, to avoid insertion and removal difficulties or other functional issues due to sand, dust, water vapor inside the connectors.

Do not contact organic solvents and other corrosive materials in connector connection and the using environment, such as alcohol, gasoline, pesticides, herbicides, etc. Please consult SKYWORTH/Solavita for details. Otherwise,

SKYWORTH/Solavita will not be responsible for connector cracking caused by this aspect. Two examples of incorrect usage are listed below:



The unlock method of connectors is different according to local laws and regulations, please pay attention.

Connector Manufacturer	Type / Model	Standard	Junction box type	Junction box Manufacturer
Jiangsu Tonglin Electric Co., Ltd.	TL-CABLE01S	IEC 62852	TL-BOX216x	Jiangsu Tonglin Electric Co., Ltd.
Suzhou UKT New Technology Co., Ltd.	PV-CNT03-xy(x=1 or 2 or 3 or 4, y=A)	IEC 62852	PV-JB12x	SUZHOU UKT NEWTECHNOLOGY CO., LTD.
QC Solar (Suzhou) Corporation	QC4.10-abs	IEC 62852	3Qxy	QC Solar (Suzhou) Corporation
Zerun Co.,Ltd.	Z4S-abcde	IEC 62852	Z8-abcd	Zerun Co., Ltd.
Stäubli Electrical Connectors AG	PV-KST4-EVO 2/xy_UR; PV-KBT4-EVO 2/xy_UR	IEC 62852		
	PV-KST4-EVO2A/xy; PV-KBT4-EVO2A/xy	IEC 62852		
Tyco Electronics Austria GmbH	PV4-S a b cc	IEC 62852	BET2101-abc (a=1, or 2)	Suzhou Bright Photovoltaic Electronic Technology Co., Ltd.
Suzhou Bright Photovoltaic Electronic Technology Co., Ltd.	B01	IEC 62852		
	B05x (x=1)	IEC 62852		
Stäubli Electrical Connectors AG	PV-KST4-EVO2/xy_UR; PV-KBT4-EVO 2/xy_U	IEC 62852	PV-HY06	Ningbo huayu Photovoltaic Technology Co., Ltd
Ningbo huayu Photovoltaic Technology Co., Ltd	PV-H4	IEC 62852		
Staubli Electrical connectors AG	PV-KST4-EVO2/xy_UR PV-KBT4-EVO2/xy_UR,	IEC 62852		

Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.	PV-ZH202B	IEC 62852	PV-ZH011C-5	Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.
Staubli Electrical connectors AG	PV-KST4-EVO 2/xy_UR PV-KBT4- EVO2/xy_UR,	IEC 62852		
Jiangxi Jinko PV Material Co., Ltd	PV-JK03M2/xy	IEC 62852		
DAS SOLAR CO., LTD.	PV-DA01M2/XY	IEC 62852		
Taizhou Chuangda Electronic Co., Ltd	CD2	IEC 62852		
Hefei GCL System Integration New Energy Material Co., Ltd.	GCL-01	IEC 62852	BET2401-abc	Suzhou Bright Photovoltaic Electronic Technology Co., Ltd.
Staubli Electrical connectors AG	PV-KST4-EVO 2/xy_UR PV-KBT4- EVO2/xy_UR,	IEC 62852		
Zhejiang Minghe New Energy Technology Co., Ltd.	PV-MH5	IEC 62852	MH2z	Zhejiang Minghe New Energy Technology Co., Ltd.
	PV-MH8	IEC 62852		
Staubli Electrical Connectors AG	PV-KST4-EVO 2/xy-UR; PV-KBT4-EVO 21xy-UR	IEC 62852		
ZheJiang ChuangYuan Photovoltaic Technology Co.,Ltd.	PV-CY20L	IEC 62852	PV-CY1808x (x=-B, -F, -S, -M)	ZheJiang ChuangYuan Photovoltaic Technology Co.Ltd.
Staubli Electrical Connectors AG	PV-KST4-EVO 2/xy_UR; PV-KBT4-EVO 2/xy_UR	IEC 62852		

6.4. Bypass diodes

The junction boxes used with SKYWORTH/Solavita Solar modules contain bypass diodes wired in parallel with the PV cell strings. In the case of partial shading, the diodes bypass the current generated by the non-shaded cells, thereby limiting modules heating and performance losses. Bypass diodes are not over-current protection devices.

In the event of a known or suspected diode failure, installers or maintenance providers should contact SKYWORTH/Solavita. Never attempt to open the junction box by yourself.

Please pay attention to guard against inductive lightning, backflow and wrong connection.

7. GROUNDING

The grounding is only used on the framed bifacial modules.

SKYWORTH/Solavita Solar modules use an oxidized aluminum frame to resist corrosion. The frame of modules must be connected to the equipment grounding conductor to prevent thunder and static hurt.

The grounding device should fully contact with the inside of the aluminum alloy, and penetrate the surface of the frame

oxidation film.

Please don't drill any additional grounding hole on the frame of the modules, otherwise SKYWORTH/Solavita Solar expressly disclaim liability for voiding the warranty.

Besides equipment grounding, to reduce PID risk, negative system grounding is also recommended by SKYWORTH/Solavita. Failure to comply with this requirement maybe reduce the performance of the system.

The grounding method should not result in the direct contact of dissimilar metals with the aluminum frame of the modules that will result in galvanic corrosion. The recommended electrochemical potential difference between contacting metals shall not exceed 0.6 V.

The frame rails have pre-drilled holes marked with a grounding sign. These holes should be used for grounding purposes and must not be used for mounting the modules.

The following grounding methods are available.

7.1. Grounding by using grounding bolt

There is a grounding hole with 4mm diameter on the edge side closer to the middle of the modules. The middle line of the grounding mark is overlapped with the grounding hole, and the direction is same as the longer frame.

The grounding between modules must be approved by a qualified electrician. The grounding device must be produced by a qualified electrical manufacturer. The recommended torque value is 2.3 N.m. 12 AWG copper wire can be used as the equipment grounding conductor in conjunction with the grounding bolt. The copper wire should not be squashed during the installation.

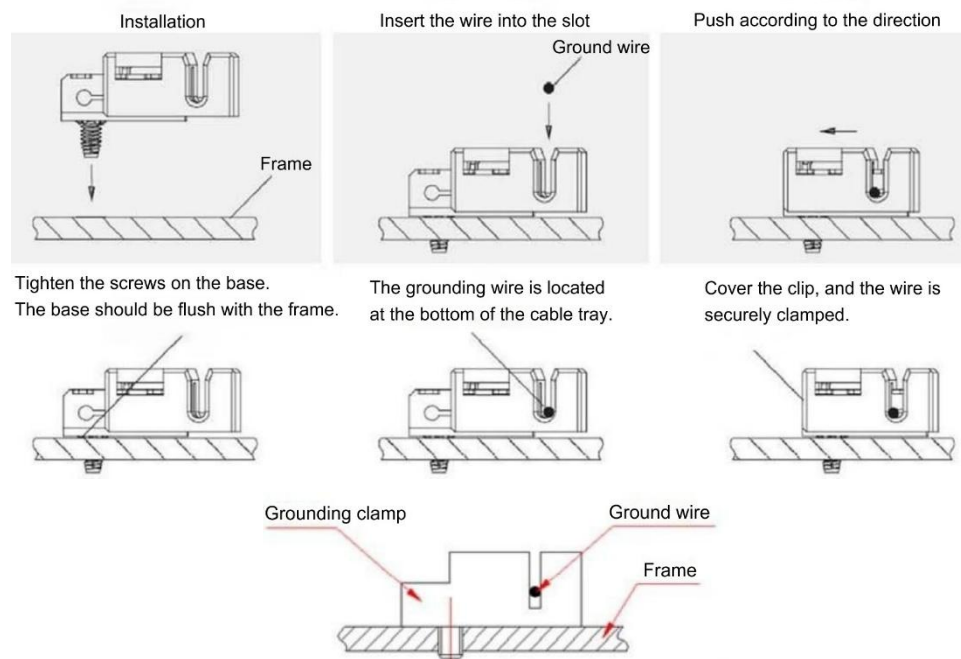


Figure 5: Installation method

7.2. Grounding by using unused mounting hole

The existing mounting holes which have not been used can be used for grounding.

- Direct the grounding clamp to the mounting hole on the frame. Thread the grounding clamp and the frame with grounding bolt.
- Put the toothed gasket into the other side, then tighten and lock the nut. The recommended torque of locking the

nut is 2.0N.m~2.2N.m.

- Thread the grounding clamp with grounding wire. The material and size of grounding wire should meet relevant requirements of the national, regional and local code, law and standard.
- Finish the mounting with tightening the binding bolt of the grounding wire.

7.3. Additional third-party grounding devices

SKYWORTH/Solavita Solar modules can be grounded using third party grounding devices so long as they are certified for grounding modules and the devices are installed according to the manufacturer's specified instructions.

8. OPERATION AND MAINTENANCE

 Meaning of crossed –out wheeled dustbin: Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new ones, the retailer is legally obligated to take back your old appliance for disposals at least free of charge.

It is required to perform regular inspection and maintenance of the Modules, especially within warranty scope. It is the user's responsibility to report to the supplier regarding the damages found within 2 weeks.

8.1. Cleaning

The dust accumulated on the front transparent substrate may reduce the power output, and may even cause regional hot-spot effect. Industrial effluents or bird drops may be a serious case, and the extent of the severity depends on the transparency of the foreign objects. It's usually not dangerous for the accumulated dust to reduce the sunshine, because the light intensity is still homogeneous and the power reduction usually is not obvious.

When Modules are operational, there may exist environmental factors that may distinctly reduce the power output. SKYWORTH/Solavita Solar advises that there should be no obstructed object over the Module's surface at any time.

When cleaning, pay attention to wear suitable clothes and insulated gloves. Check the integrity of the PV modules before and after cleaning, to ensure that there is no damage, loose joints, etc. to prevent the risk of electric shock.

The cleaning frequency depends on the accumulating velocity of the fouling. In many instances the front substrate is cleaned with rain, and we can decrease the cleaning frequency. It is recommended to wipe the glass surface with wet sponge or soft cloth. Please do not clean the glass with cleaning agent which contains acid or alkali. Please refer to "cleaning manual" for specific contents.

It is recommended that the time of cleaning should be in the early morning or late evening, when the light intensity is weak or the temperature is relatively low, to reduce the risk of potential electric shock or burns.

For double-glass modules, the back side of the module needs to be cleaned periodically, and the cleaning precautions should be referred to as above.

8.2. The visual inspection of the modules

Inspect the Modules visually to find if there are appearance defects, pay more attention to the following situation:

- Whether the glass is broken;

- Corrosion along the cells' bus-bar. The corrosion is caused by the dampness infiltrated into the Modules when the surface encapsulation material is damaged during the installation or transportation;
- If there is burning vestige on the backsheet;
- Whether the fixing screws between PV modules are loose or damaged; whether the PV connector connection is tight, and make timely adjustment or repair;
- Whether the grounding is good;
- Whether there are obstacles and foreign objects covering the surface of PV modules.

8.3. Inspection of the connector and the cables

It's recommended to implement the following preventive maintenance every 6 months:

- Check the encapsulation of the connector with the cable.
- Check the sealing gel of the junction box to ensure it is not cracked.

9. CONTACT US

Company: Shenzhen Qiming Photovoltaic Technology Co., Ltd.

Manufacturer Address:

201, Building 10, No. 2-1,Xiguangyue Third Road, Loucun Community,Xinhu Street, Guangming District,Shenzhen

518107 GuangdongP.R. China

Email: cwgf@skyworth.com

10. PRODUCT SUPPLEMENT

The installation manual is applicable for module types below. The module types are subject to changes without prior notice due to continuous product innovation, research and development.

All electrical data should be measured under below test conditions: STC: AM=1.5 , E=1000W/m² , Tc=25°C; The additional test conditions for Bifacial PV modules: BNPI: E=1000W/m² + ϕ •135W/m² BSI: E=1000W/m² + ϕ •300W/m² Pmax of any individual module will be within $\pm 3\%$ tolerance of these specified values. Voc of any individual module will be within $\pm 3\%$ tolerance of these specified values. Isc of any individual module will be within $\pm 3\%$ tolerance of these specified values.

Type Name or Model Type	Maximum Power (Pmax) [W]	Open Circuit Voltage (Voc) [V]	Short Circuit Current (Isc) [A]	Voltage at Maximum Power	Current at Maximum Power	Fuse Rating [A]	Maximum System Voltage (Vsys)[V]
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				(Vmp)	(Imp)		
Under STC							
QM182NTHCD-xxx-78 (xxx=610-650, in steps of 5, 156 cells)	610	55.20	14.10	45.98	13.27	30	1500
	615	55.97	13.58	47.14	13.04	30	1500
	620	56.06	13.64	47.32	13.11	30	1500
	625	56.15	13.70	47.47	13.17	30	1500
	630	56.24	13.76	47.62	13.23	30	1500
	635	56.31	13.82	47.77	13.30	30	1500
	640	56.39	13.88	47.92	13.36	30	1500
	645	56.47	13.94	48.07	13.42	30	1500
	650	56.54	14.00	48.22	13.48	30	1500
QM182NTHCD-xxx-72 (xxx=565-595, in steps of 5, 144 cells)	565	51.04	14.17	42.68	13.24	25	1500
	570	51.86	13.48	44.49	12.82	25	1500
	575	52.05	13.55	44.66	12.88	25	1500
	580	52.24	13.62	44.83	12.94	25	1500
	585	52.43	13.69	45.00	13.00	25	1500
	590	52.63	13.75	45.17	13.06	25	1500
	595	52.83	13.82	45.34	13.12	25	1500
QM182NTHCD-xxx-60 (xxx=470-500, in steps of 5, 120 cells)	470	42.41	14.15	35.46	13.26	25	1500
	475	42.73	13.28	37.76	12.57	25	1500
	480	42.85	13.38	37.87	12.67	25	1500
	485	42.97	13.48	37.98	12.77	25	1500
	490	43.10	13.58	38.09	12.86	25	1500
	495	43.22	13.68	38.20	12.96	25	1500
	500	43.85	14.25	36.92	13.54	25	1500
QM182NTHCDH-xxx-54 (xxx=425-450, in steps of 5, 108 cells)	425	39.05	13.17	34.08	12.48	25	1500
	430	39.18	13.28	34.19	12.57	25	1500
	435	39.31	13.39	34.30	12.68	25	1500
	440	39.44	13.50	34.41	12.79	25	1500
	445	39.57	13.61	34.52	12.89	25	1500
	450	39.60	14.20	33.39	13.48	25	1500
QM182NTHCDQ-xxx-78 QM182NTHCDZ-xxx-78 (xxx=615-650, in steps of 5, 156 cells)	615	55.97	13.58	47.14	13.04	25	1500
	620	56.06	13.64	47.32	13.11	25	1500
	625	56.15	13.70	47.47	13.17	25	1500
	630	56.24	13.76	47.62	13.23	25	1500
	635	56.31	13.82	47.77	13.30	25	1500
	640	56.39	13.88	47.92	13.36	25	1500
	645	56.47	13.94	48.07	13.42	25	1500

	650	56.54	14.00	48.22	13.48	25	1500
QM182NTHCDQ- xxx-72 QM182NTHCDZ- xxx-72 (xxx=570- 595, in steps of 5, 144 cells)	570	51.86	13.48	44.49	12.82	25	1500
	575	52.05	13.55	44.66	12.88	25	1500
	580	52.24	13.62	44.83	12.94	25	1500
	585	52.43	13.69	45.00	13.00	25	1500
	590	52.63	13.75	45.17	13.06	25	1500
	595	52.83	13.82	45.34	13.12	25	1500
QM182NTHCDQ- xxx-60 QM182NTHCDZ- xxx-60 (xxx=475- 500, in steps of 5, 120 cells)	475	42.73	13.28	37.76	12.57	25	1500
	480	42.85	13.38	37.87	12.67	25	1500
	485	42.97	13.48	37.98	12.77	25	1500
	490	43.10	13.58	38.09	12.86	25	1500
	495	43.22	13.68	38.20	12.96	25	1500
	500	43.85	14.25	36.92	13.54	25	1500
QM182NTHCDQH- xxx-54 QM182NTHCDZH- xxx-54 (xxx=425- 450, in steps of 5, 108 cells)	425	39.05	13.17	34.08	12.48	25	1500
	430	39.18	13.28	34.19	12.57	25	1500
	435	39.31	13.39	34.30	12.68	25	1500
	440	39.44	13.50	34.41	12.79	25	1500
	445	39.57	13.61	34.52	12.89	25	1500
	450	39.60	14.20	33.39	13.48	25	1500
QM188RTHCDH- xxx-54 (xxx = 435- 450, in steps of 5, 108 cells)	435	39.65	13.96	33.31	13.06	30	1500
	440	39.85	14.03	33.51	13.13	30	1500
	445	40.05	14.10	33.71	13.20	30	1500
	450	40.25	14.17	33.91	13.27	30	1500
QM182NTHCDW- xxx-14 (xxx=105- 110, in steps of 5, 28 cells)	105	10.22	13.25	8.50	12.40	25	1500
	110	10.24	13.45	8.55	12.92	25	1500
QM182NTHCDW- xxx-8 (xxx=60, 16 cells)	60	5.53	13.72	4.69	12.89	25	1500
QM182NTHCDW- xxx-4 (xxx=30, 8 cells)	30	2.86	13.45	2.37	12.86	25	1500
QM182NTHCDCr- xxx-78 (xxx=350- 375, in steps of 5, 156 cells)	350	56.47	7.81	49.15	7.13	25	1500
	355	56.48	7.91	49.16	7.23	25	1500
	360	56.50	8.02	49.18	7.33	25	1500
	365	56.51	8.13	49.19	7.43	25	1500
	370	56.53	8.24	49.20	7.53	25	1500
	375	56.55	8.35	49.22	7.62	25	1500
QM182NTHCDCo- xxx-78 (xxx=410-	410	56.66	9.12	49.32	8.32	25	1500
	415	56.68	9.22	49.33	8.42	25	1500

435, in steps of 5, 156 cells)	420	56.69	9.33	49.35	8.52	25	1500
	425	56.71	9.43	49.36	8.62	25	1500
	430	56.72	9.54	49.37	8.71	25	1500
	435	56.74	9.65	49.39	8.81	25	1500
QM182NTHCDCy- xxx-78 (xxx=470- 490, in steps of 5, 156 cells)	470	56.85	10.41	49.49	9.50	25	1500
	475	56.87	10.51	49.50	9.60	25	1500
	480	56.89	10.62	49.52	9.70	25	1500
	485	56.89	10.73	49.52	9.80	25	1500
	490	56.90	10.84	49.53	9.90	25	1500
QM182NTHCDCg- xxx-78 (xxx=480- 500, in steps of 5, 156 cells)	480	56.89	10.62	49.52	9.70	25	1500
	485	56.89	10.73	49.52	9.80	25	1500
	490	56.90	10.84	49.53	9.90	25	1500
	495	56.90	10.95	49.53	10.00	25	1500
	500	56.92	11.06	49.55	10.10	25	1500
QM182NTHCDCb- xxx-78 (xxx=540- 560, in steps of 5, 156 cells)	540	57.05	11.91	49.66	10.88	25	1500
	545	57.06	12.02	49.67	10.98	25	1500
	550	57.08	12.13	49.69	11.07	25	1500
	555	57.10	12.23	49.70	11.17	25	1500
	560	57.11	12.34	49.72	11.27	25	1500
QM182NTHCDCi- xxx-78 (xxx=425- 445, in steps of 5, 156 cells)	420	56.69	9.33	49.35	8.52	25	1500
	425	56.71	9.43	49.36	8.62	25	1500
	430	56.72	9.54	49.37	8.71	25	1500
	435	56.74	9.65	49.39	8.81	25	1500
	440	56.76	9.76	49.40	8.91	25	1500
	445	56.77	9.87	49.42	9.01	25	1500
QM182NTHCDCp- xxx-78 (xxx=465- 490, in steps of 5, 156 cells)	465	56.84	10.30	49.47	9.40	25	1500
	470	56.85	10.41	49.49	9.50	25	1500
	475	56.87	10.51	49.50	9.60	25	1500
	480	56.89	10.62	49.52	9.70	25	1500
	485	56.89	10.73	49.52	9.80	25	1500
	490	56.90	10.84	49.53	9.90	25	1500
QM182NTHCDCr- xxx-72 (xxx=325- 345, in steps of 5, 144 cells)	325	52.33	7.82	45.02	7.23	25	1500
	330	52.38	7.93	45.07	7.33	25	1500
	335	52.43	8.05	45.12	7.43	25	1500
	340	52.48	8.16	45.17	7.53	25	1500
	345	52.51	8.27	45.20	7.64	25	1500
QM182NTHCDCo- xxx-72 (xxx=380-	380	52.68	9.08	45.37	8.38	25	1500
	385	52.70	9.20	45.39	8.49	25	1500

400, in steps of 5, 144 cells)	390	52.71	9.31	45.40	8.60	25	1500
	395	52.73	9.43	45.42	8.70	25	1500
	400	52.74	9.55	45.43	8.81	25	1500
QM182NTHCDCy- xxx-72 (xxx=435- 450, in steps of 5, 144 cells)	435	53.03	10.33	45.72	9.52	25	1500
	440	53.06	10.44	45.75	9.62	25	1500
	445	53.09	10.55	45.78	9.73	25	1500
	450	53.12	10.66	45.81	9.83	25	1500
QM182NTHCDCg- xxx-72 (xxx=445- 460, in steps of 5, 144 cells)	445	53.09	10.55	45.78	9.73	25	1500
	450	53.12	10.66	45.81	9.83	25	1500
	455	53.15	10.78	45.84	9.93	25	1500
	460	53.19	10.89	45.88	10.03	25	1500
QM182NTHCDCb- xxx-72 (xxx=500- 515, in steps of 5, 144 cells)	500	53.39	11.79	46.08	10.86	25	1500
	505	53.41	11.90	46.10	10.96	25	1500
	510	53.43	12.02	46.12	11.06	25	1500
	515	53.44	12.13	46.13	11.17	25	1500
QM182NTHCDCi- xxx-72 (xxx=390- 410, in steps of 5, 144 cells)	390	52.71	9.31	45.40	8.60	25	1500
	395	52.73	9.43	45.42	8.70	25	1500
	400	52.74	9.55	45.43	8.81	25	1500
	405	52.75	9.67	45.44	8.92	25	1500
	410	52.76	9.80	45.45	9.03	25	1500
QM182NTHCDCp- xxx-72 (xxx=430- 450, in steps of 5, 144 cells)	430	53.01	10.21	45.70	9.42	25	1500
	435	53.03	10.33	45.72	9.53	25	1500
	440	53.06	10.44	45.75	9.63	25	1500
	445	53.09	10.55	45.78	9.73	25	1500
	450	53.12	10.66	45.81	9.83	25	1500
QM182NTHCDCr- xxx-60 (xxx=270- 285, in steps of 5, 120 cells)	270	44.36	7.67	36.58	7.39	25	1500
	275	44.38	7.81	36.60	7.52	25	1500
	280	44.40	7.94	36.62	7.65	25	1500
	285	44.42	8.08	36.64	7.79	25	1500
QM182NTHCDCo- xxx-60 (xxx=315- 335, in steps of 5, 120 cells)	315	44.54	8.91	36.76	8.58	25	1500
	320	44.56	9.04	36.78	8.71	25	1500
	325	44.58	9.18	36.80	8.84	25	1500
	330	44.60	9.32	36.82	8.97	25	1500
	335	44.62	9.48	36.84	9.10	25	1500
QM182NTHCDCy- xxx-60 (xxx=360- 375, in steps of 5, 120 cells)	360	44.72	10.14	36.94	9.75	25	1500
	365	44.74	10.27	36.96	9.88	25	1500
	370	44.76	10.41	36.98	10.01	25	1500
	375	44.78	10.54	37.00	10.14	25	1500

QM182NTHCDCg- xxx-60 (xxx=370- 385, in steps of 5, 120 cells)	370	44.76	10.41	36.98	10.01	25	1500
	375	44.78	10.54	37.00	10.14	25	1500
	380	44.80	10.68	37.02	10.27	25	1500
	385	44.82	10.82	37.04	10.40	25	1500
QM182NTHCDCb- xxx-60 (xxx=415- 430, in steps of 5, 120 cells)	415	44.94	11.63	37.16	11.18	25	1500
	420	44.96	11.76	37.18	11.30	25	1500
	425	44.98	11.89	37.21	11.43	25	1500
	430	45.00	12.03	37.23	11.56	25	1500
QM182NTHCDCi- xxx-60 (xxx=325- 340, in steps of 5, 120 cells)	325	44.58	9.18	36.80	8.84	25	1500
	330	44.60	9.32	36.82	8.97	25	1500
	335	44.62	9.48	36.84	9.10	25	1500
	340	44.64	9.59	36.86	9.23	25	1500
QM182NTHCDCp- xxx-60 (xxx=360- 375, in steps of 5, 120 cells)	360	44.72	10.14	36.94	9.75	25	1500
	365	44.74	10.27	36.96	9.88	25	1500
	370	44.76	10.41	36.98	10.01	25	1500
	375	44.78	10.54	37.00	10.14	25	1500
QM182NTHCDCr- xxx-54 (xxx=245- 260, in steps of 5, 108 cells)	245	39.88	7.74	33.82	7.25	25	1500
	250	39.90	7.90	33.84	7.40	25	1500
	255	39.92	8.05	33.86	7.54	25	1500
	260	39.94	8.20	33.88	7.68	25	1500
QM182NTHCDCo- xxx-54 (xxx=285- 300, in steps of 5, 108 cells)	285	40.04	8.97	33.98	8.40	25	1500
	290	40.06	9.12	34.00	8.54	25	1500
	295	40.08	9.27	34.02	8.68	25	1500
	300	40.10	9.42	34.04	8.82	25	1500
QM182NTHCDCy- xxx-54 (xxx=325- 340, in steps of 5, 108 cells)	325	40.20	10.18	34.14	9.53	25	1500
	330	40.22	10.33	34.16	9.67	25	1500
	335	40.24	10.48	34.18	9.81	25	1500
	340	40.26	10.64	34.20	9.95	25	1500
QM182NTHCDCg- xxx-54 (xxx=335- 345, in steps of 5, 108 cells)	335	40.24	10.48	34.18	9.81	25	1500
	340	40.26	10.64	34.20	9.95	25	1500
	345	40.28	10.79	34.22	10.09	25	1500
QM182NTHCDCb- xxx-54 (xxx=375- 385, in steps of 5, 108 cells)	375	40.40	11.69	34.34	10.93	25	1500
	380	40.42	11.84	34.36	11.07	25	1500
	385	40.44	11.99	34.38	11.21	25	1500
QM182NTHCDCi- xxx-54 (xxx=290- 305, in steps of 5, 108 cells)	290	40.06	9.12	34.00	8.54	25	1500
	295	40.08	9.27	34.02	8.68	25	1500
	300	40.10	9.42	34.04	8.82	25	1500
	305	40.12	9.58	34.06	8.96	25	1500

QM182NTHCDCp-xxx-54 (xxx=320-340, in steps of 5, 108 cells)	320	40.18	10.03	34.12	9.39	25	1500
	325	40.20	10.18	34.14	9.53	25	1500
	330	40.22	10.33	34.16	9.67	25	1500
	335	40.24	10.48	34.18	9.81	25	1500
	340	40.26	10.64	34.20	9.95	25	1500
QM210THCD-xxx-66 (xxx=695-725, in steps of 5, 132 cells)	695	48.30	18.28	40.30	17.25	30	1500
	700	48.60	18.32	40.50	17.29	30	1500
	705	48.80	18.36	40.70	17.33	30	1500
	710	49.00	18.40	40.90	17.36	30	1500
	715	49.20	18.44	41.10	17.40	30	1500
	720	49.40	18.49	41.30	17.44	30	1500
	725	49.60	18.53	41.50	17.48	30	1500
QM210NTHCD-xxx-66 (xxx=695-725, in steps of 5, 132 cells)	695	48.30	18.28	40.30	17.25	30	1500
	700	48.60	18.32	40.50	17.29	30	1500
	705	48.80	18.36	40.70	17.33	30	1500
	710	49.00	18.40	40.90	17.36	30	1500
	715	49.20	18.44	41.10	17.40	30	1500
	720	49.40	18.49	41.30	17.44	30	1500
	725	49.60	18.53	41.50	17.48	30	1500
QM210NTHCD-xxx-60 (xxx=630-655, in steps of 5, 120 cells)	630	43.90	18.24	36.60	17.22	30	1500
	635	44.20	18.27	36.80	17.26	30	1500
	640	44.50	18.30	37.00	17.30	30	1500
	645	44.80	18.33	37.20	17.34	30	1500
	650	45.10	18.36	37.40	17.38	30	1500
	655	45.40	18.39	37.60	17.43	30	1500
QM182BTHCD-xxx-66 (xxx=610-640, in steps of 5, 132 cells)	610	48.00	16.07	40.22	15.18	35	1500
	615	48.17	16.14	40.35	15.25	35	1500
	620	48.34	16.21	40.48	15.33	35	1500
	625	48.51	16.28	40.63	15.41	35	1500
	630	48.68	16.35	40.73	15.48	35	1500
	635	48.85	16.42	40.85	15.55	35	1500
	640	49.02	16.49	40.98	15.62	35	1500
QM210THCD-xxx-66 (xxx=605-630, in steps of 5, 132 cells)	605	48.70	15.83	40.50	14.94	25	1500
	610	49.00	15.86	40.80	14.96	25	1500
	615	49.30	15.89	41.10	14.97	25	1500
	620	49.60	15.91	41.40	14.98	25	1500
	625	49.90	15.92	41.70	14.99	25	1500
	630	50.20	15.93	42.00	15.01	25	1500

QM210RTHCD-xxx-66 (xxx=605-630, in steps of 5, 132 cells)	605	48.70	15.83	40.50	14.94	25	1500
	610	49.00	15.86	40.80	14.96	25	1500
	615	49.30	15.89	41.10	14.97	25	1500
	620	49.60	15.91	41.40	14.98	25	1500
	625	49.90	15.92	41.70	14.99	25	1500
	630	50.20	15.93	42.00	15.01	25	1500
QM210RTHCD-xxx-60 (xxx=550-570, in steps of 5, 120 cells)	550	44.00	15.93	35.30	15.58	25	1500
	555	44.30	15.96	35.50	15.63	25	1500
	560	44.60	15.99	35.70	15.69	25	1500
	565	44.90	16.03	35.90	15.74	25	1500
	570	45.20	16.06	36.10	15.79	25	1500
QM210RTHCDH-xxx-54 (xxx=495-510, in steps of 5, 108 cells)	495	39.80	15.81	32.85	15.07	25	1500
	500	40.00	15.88	33.05	15.13	25	1500
	505	40.20	15.95	33.25	15.19	25	1500
	510	40.40	16.02	33.45	15.25	25	1500
QM210RTHCDH-xxx-48 (xxx=440-455, in steps of 5, 96 cells)	440	34.98	15.98	29.50	14.92	25	1500
	445	35.19	16.06	29.70	14.99	25	1500
	450	35.40	16.14	29.90	15.06	25	1500
	455	35.59	16.22	30.10	15.12	25	1500
QM210VTHCD-xxx-78 (xxx=725-740, in steps of 5, 156 cells)	725	57.70	16.00	48.38	14.99	30	1500
	730	57.90	16.05	48.55	15.04	30	1500
	735	58.10	16.10	48.71	15.09	30	1500
	740	58.27	16.16	48.88	15.14	30	1500
QM192AFCD-xxx-72 (xxx=650-685, in steps of 5, 144 cells)	650	54.00	15.06	45.30	14.35	30	1500
	655	54.10	15.12	45.40	14.43	30	1500
	660	54.20	15.18	45.50	14.51	30	1500
	665	54.40	15.24	45.60	14.59	30	1500
	670	54.60	15.30	45.70	14.67	30	1500
	675	54.80	15.36	45.80	14.74	30	1500
	680	55.00	15.42	45.90	14.82	30	1500
	685	55.20	15.48	46.00	14.90	30	1500