

# 安装说明书 Installation Instructions

(适用于 TCL 户用系列光伏组件)

(Suitable for TCL residential series photovoltaic modules)



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# 1. 概述 Overview

本手册包含关于TCL光伏科技有限公司生产的光伏组件的安装、维护和安全操作的信息。安装之前需要阅读和理解本说明。专业安装者在安装组件的时候需要遵从手册中的说明。如果存在任何问题请联系我司的销售部门寻求帮助。

This manual contains information on the installation, maintenance, and safe operation of PV modules produced by TCL Photovoltaic Technology Co., Ltd. Read and try to understand this note before installation. Professional installers are required to follow the instructions in the manual when installing the modules. If there is any problem please contact our sales department for help.

在安装太阳能光伏系统之前,安装者需要熟悉系统在机械和电气方面的要求。请妥善保管此手册以备后期使用。

Before installing solar PV system, the installers need to familiarize with the requirements of mechanical and electrical aspects. Please keep this manual for later use.

# 2. 免责声明 Disclaimer Notices

◇ 安装、操作和使用 TCL 系列组件已超出公司的控制,因此,TCL 不承担因不当安装、操作、使用和维护所带来的任何损失、损害、伤害及由此产生的费用。

The installation, operation and use of TCL series modules are beyond TCL's control. Thereby, TCL does not undertake any loss, damage, injury and consequent costs caused by improper installation, operation, use and maintenance.

◇ TCL 不承担对违反专利,第三方权力等使用光伏产品带来的责任。
TCL does not undertake any responsibilities for the violation of patent, third-party rights and other uses of PV products.

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Any modification towards any patent or patent right is not allowable if there is no authorization.

◇ 本手册基于 TCL 的科技与可靠的经验。但是包括产品规格的这些信息和建议并不构成任何保证。

This manual is made based on TCL's technology and reliable experience, but the information and recommendations including product specifications do not constitute any warranty.

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TCL keeps the rights of changing manuals, product information, technical specifications and product data without prior notice.

# 3. 安全防范 Safety Precautions

◇ 安装太阳能光伏系统需要专业的技术和知识,安装必须由专业人士施行。 The installation of solar photovoltaic systems requires professional skills and knowledge, thus the installation must be carried out by professionals.

- ◇ 安装者承担安装过程中可能发生的受伤风险,包括但不限于触电的风险。 In the process of installation, the installers assumes the risk of injuries, including but not limited to the risk of electric shock.
- ◇ 当暴露在直射日光下的时候,单个组件可能产生大于 30V 的直流电压。接触 30V 或者更高的直流电压存在潜在风险。

When exposed to direct sunlight, a single module may produce more than 30V DC voltage. The exposure with 30V or higher DC voltage has potential risks.

◇ 当断开或链接暴露在日光下的光伏组件的连线时,可能产生电弧。这个电弧可能造成烧伤,引起火灾或者引发其它问题。

The electric arcs may occur when disconnecting or linking the photovoltaic modules exposed to the sunlight. This arc may cause burns, a fire or other problems.



◇ 不要在有负载的情况下断开组件之间或组件与逆变器等设备之间的连接 线。

Do not disconnect the linking between the modules or between the modules and inverters in case of the load.

◇ 光伏电池组件把光能转换成直流电能。组件应用于地面、屋顶、车辆或船 只等户外环境。合理设计支撑结构是系统设计者或安装者的责任。

The photovoltaic modules could convert the power energy into DC power. The modules could be applied for the ground, roofs, vehicles or boat and other outdoor environment. It is system designer and installers' responsibility to reasonably design the support structure.

◇ 请不要拆解组件,也不要摘除其它附带铭牌或者部件。
Do not disassemble the modules or remove other attached brands or parts.

◇ 不要在组件的上下表面喷涂或者涂胶。

Do not spray or glue on the upper and lower surfaces of the modules.

◇ 不要利用反射镜或者其它放大镜设备人为的集中阳光到组件上。

Do not use the mirror or other magnifying glass equipment to concentrate the sunlight artificially to the modules.

◇ 在安装系统的时候,需要遵守所有的地方,区域和国家法令规定。必要的时候需要获得施工许可证。

It needs to comply with all the local, regional and national laws and obtain a construction permit when necessary in the process of installing the system.

◇ 在运输和安装机械与电气部件的时候,需要保持儿童远离系统。

It needs to keep the children away from the system when transporting and installing mechanical and electrical components.

◇ 在安装或者检修光伏系统的时候,不要佩戴金属戒指,手表带,耳,鼻, 唇环或者其它金属器件。

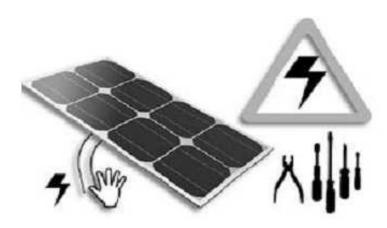
Do not wear metal rings, watch straps, ear, nose, lip rings or other metal parts when installing or inspecting the photovoltaic system.

# TCL



◇ 电气安装工作只能使用合格的绝缘工具。

The qualified insulating tools are the only choice for the electrical installation work.



◇ 遵从系统中使用的所有其它部件的安全规定,包括线路和电缆,连接器件,充电控制器,逆变器,蓄电池和充电电池等。

Comply with the safety requirements of all other modules used in the system, including wiring lines and cables, connection devices, charging controllers, inverters, batteries and rechargeable batteries.

◇ 只使用适合太阳能电力系统使用的设备,连接器件,线路和支撑架。在特定光伏系统中尽可能只使用一种型号的组件,同一光伏阵列中必须使用同一种型号的组件。

Use the equipment suitable for solar power system, connection device, wiring lines and support frame only. In a particular photovoltaic system, use a type of module as much as possible and use the same type of the module in the same PV array only. Each input voltage of the same tracking system of each inverter must be equal and the same type of modules must be used.



◇ 组件适用于环境温度(-40°C~+85°C)地域使用,建议使用工作温度为(-20°C~+50°C)。

The component is applicable to the ambient temperature (-40  $^{\circ}$  C to +85  $^{\circ}$  C). The recommended operating temperature is (-20  $^{\circ}$  C to +50  $^{\circ}$  C).

# 4. 拆箱及储存.Unpacking and Storage

◇ 在收货时,应检查交付的货物是否确实是订购的货物:每个包装箱的外面 均标有产品名称、箱号、组件条形码。

When receiving the goods, you should check whether the goods delivered are indeed ordered goods: the outside of each box are marked with the product name, packaging box number, module barcode.

◇ 包装箱应存储在干净、干燥区域、避免阳光直射和潮湿。

The packaging carton should be stored in a clean, dry area, away from direct sunlight and moisture.

◇ 在安装现场,注意保持组件,尤其是电气连接处的清洁干燥。如果接头的电缆潮湿,连接处可能会腐蚀,不得使用任何连接处腐蚀的组件。

At the installation site, pay attention to keep clean and dry for the components, especially the electrical connections. If the connector cable is wet, the connections may be corroded, and the components that be corroded at any connections should not be used.

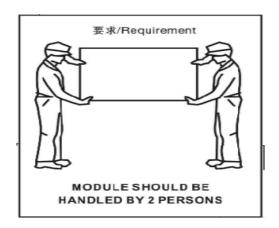
◇ 如果托盘临时存储在外,请铺上一层防护罩,以防止其受到天气的直接影响。

If the tray is temporarily stored outside, please put a protective cover to prevent it from being directly affected by the weather.

◇ 需要两名工作人员一起拆箱,取出组件时务必使用双手,禁止通过提拉组件的导线和接线盒搬运组件。

Two staff members are required to unpack the packaging carton. Be sure to use both hands when removing the modules. Do not carry the modules through the wires and junction boxes.





◇ 组件取出若需临时外放,需要保护好组件边缘。

If the modules needed to be temporarily stored outside, please protect the edge of the module well.

- ◇ 禁止任何情况下在组件上站立或者行走。

  It is forbidden to stand or walk on modules in any case.
- ◇ 禁止掉落或堆放物品在组件上。

  It is forbidden to drop or stack items on the modules.

# 5. 环境条件 Environment Conditions

◇ 组件可在下列环境中安装 25 年以上

The modules can be installed in the following environment for more than 25 years

环境温度 Ambient temperature: -40°Cto +85°C 运行温度 Operating Temperature: -40°Cto +85°C 存储温度 Storage Temperature: -20°Cto +85°C

## \*注意 Note:

湿度 Humidity:

-安装方法对于机械承载很重要,未能遵循本手册的安装,会有不同的雪压和风压荷载能力。

<85%RH

The installation method is very important for the mechanical load. Failure to follow the installation of this manual will result in different snow pressure and wind pressure load capacity.



-系统安装商需要确保安装方式符合当地法律法规。

The system builder needs to ensure that the installation is in accordance with local laws and regulations.

# 6. 机械安装 Mechanical Installation

## 6.1 选址 Site Selection

◇ 在北纬地区组件最好面向南,而在在南纬地区组件最好面向正北。组件正面与正午太阳光线方向垂直为最佳。

In north latitude area it is best to face south for the module, while in south latitude area, it is best to face north. It is best that the front of the module is perpendicular to the direction of the midday sun light.

◇ 固定支架安装,组件建议安装在一个最佳倾角,可以最大限度捕获太阳 光。根据右手螺旋定律,基本上与安装地点的纬度相同,面向赤道。设计 时务必要根据当地情况,选出最优的倾角。

Fix bracket installation, the module is recommended to be installed at an optimum angle of inclination for maximum capture of sunlight. According to the right hand helical law, basically the same latitude as the installation site, facing the equator. The design must be based on local conditions and choose the best inclination.

◇ 跟踪支架安装,安装方式同样为压块和螺栓安装2种,具体安装方法参考本安装说明,此时组件没有固定的安装倾角,也不会面向赤道,而是跟踪太阳的角度从东向西转动。

Track bracket installation, installation methods are also two kinds of block and bolt installation, specific installation methods refer to the installation instructions, at this time the module does not have a fixed installation inclination, nor will it face the equator, but the angle of tracking the sun from east to west.

◇ 当在屋顶安装太阳能电池组件时,务必在屋顶的边缘和太阳能电池阵列之间保持一个安全的工作区域。大型电站的阵列之间要有一定的安全距离,方便对阵列里面的组件进行清理,检测和维修。

When installing solar modules on the roof, be sure to maintain a safe working area between the edge of the roof and the solar arrays. There must be a certain



safety distance between arrays of large power stations in order to facilitate the cleaning, inspection, and maintenance of the modules inside the array.

◇ 组件应安装在阳光可以充分照射的位置,并确保在冬至日的9:00到15: 00不能被遮挡。

The components shall be installed in a position with full sunlight and shall not be covered from 9:00 to 15:00 on the winter solstice .

◇ 组件不能在产生或者存放可燃气体的设备或者地点附近使用。

The modules can not be used in the vicinity of the equipment or place where the flammable gas is generated or stored.

◇ 组件不能安装于因各种化学反应导致组件缺陷的环境区域内,如酸雨、碱性气体、盐雾等。

The modules can not be installed in the environmental area where module defects are caused by various chemical reactions, such as acid rain, alkaline gas, salt mist, etc.

◇ 组件不能安装在超出组件最大系统电压的环境区域内,如高压电线旁,组件的安装位置与高压电保持一定的安全距离,安全距离根据高压电等级而定。

The modules can not be installed in the environmental area that exceeds the maximum system voltage of the modules, such as high-voltage power lines. The module's position should be maintained at a safe distance from the high-voltage power while the safe distance is determined by the high voltage level.

◇ 若在住宅地面安装组件,需要遵守当地法规比如使用栅栏。(栅栏要与阵列保持一定的距离,避免栅栏的阴影对阵列产生影响)。

If the modules are to be installed on the floor of a dwelling, local regulations such as fences should be complied with (the fences should be kept at a certain distance from the array to avoid shading impact of the fence on the array).

◇ 请勿将光伏组件安装在可能浸入水中或持续暴露于洒水车或喷泉的位置。

Do not install the PV modules in places that may be immersed in water or continuously exposed to sprinklers or fountains.



# 6.2 安装支架选择 Mounting Bracket Options

◇ 在支架上安装组件时,选择能够承受当地预期地震等级的支柱和组件安装 结构。

When installing the modules on the bracket, the pillar and module installation structure should be chosen those can withstand the local expected earthquake level.

◇ 支架结构必须由耐用、防腐蚀、抗紫外线的材料制成。

The bracket structure must be made of a durable, anti-corrosion, anti-ultraviolet materials.

## 6.3 组件安装 Module Installation

◇ 搬运时两人双手抓住组件,并保持水平稳定状态,禁止剧烈晃动,禁止单人搬运组件,禁止拖拉组件,禁止扯拉接线盒连接线,禁止搬运两板及以上数量组件等。

When carrying the modules, two hands are required to grasp the modules and keep a level of stability. It is forbidden to shake severely, carry the module by one person, drag the module, pull the connecting lines of junction box and handle two and more modules.

◇ 放置组件时放置于平整的地面上,下面垫纸板,禁止玻璃面直接接触地面。

Place the modules on a flat ground, place the cardboard in the bottom and the glass surface is forbidden to directly touch the ground.

◇ 组件放置与地面时严禁堆放杂物,踩踏,坐卧等造成组件变形的动作。 When the module is placed on the ground, it is forbidden to stack debris, step on, sit down and have other actions that may cause deformation for the module.

◇ 安装时禁止踩踏组件,禁止在支架上拖曳组件。

Do not step on the module during installation. Do not drag the module on the bracket.

◇ 组件在建筑物或屋顶上安装时,要确保它被安全的固定并且不会因为强风 或大雪而损坏。



When the modules is installed on buildings or roofs, it needs to ensure that they are securely fastened and will not be damaged by strong wind or snow.

◇ 组件背面要确保通风流畅以便组件的散热。

Ensure that the back of the modules good ventilation for cooling the modules.

◇ 在屋顶安装组件时,要保证屋顶结构合适。此外,安装固定组件时所需要 穿透的屋顶必须适当密封,以防屋漏。

When installing the modules on the roofs, make sure the roof structure is suitable. In addition, the roofs must be properly sealed to prevent leakage.

◇ 组件框架和墙面或屋面之间的空隙建议至少保持 115 毫米。如果有其他安装方式,就可能影响防火等级的评估。

The gap between the module frame and the wall or roof should be at least 115mm. If there are other installation methods, it may affect the assessment of fire rating.

◇ 两个组件最小间距为10毫米。

The spacing between two modules should be at least 10mm.

◇ 安装方式不能阻塞组件排水孔。

The installation can not block the module' drain hole.

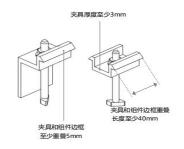
# 6.4 安装方式 Installation Method

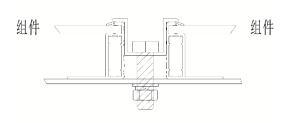
这里介绍的所有安装方式只供参考,本公司不负责提供相关的安装部件。 组件系统的设计、安装、机器载荷和安全性必须由专业的系统安装商或者有经 验的人来完成,安装方式夹具安装、安装孔安装任选其一。

All installation methods described here are for reference only, and our company is not responsible for providing relevant installation parts. The design, installation, mechanical load and safety of module system must be completed by professional system installers or experienced personnel.



## 6.4.1夹具安装 Fixture installation





图A 组件夹具

图B 组件夹具示例

Figure A Fixture of module

Figure B Module fixture example

## 注意事项 Cautions

◆ 请根据组件铝合金边框选择合适的夹具进行安装

Please select an appropriate fixture for installation according to the aluminum alloy frame of the component

◆ 有框组件夹具建议满足以下要求

Module with frame fixtures meet the following requirements

厚度: ≥3 mm 长度: ≥40 mm 材质: 铝合金

thickness: ≥3 mm Length :≥40 mm Material: Aluminum alloy

螺栓: M8 扭紧力矩: 16-20 N.m

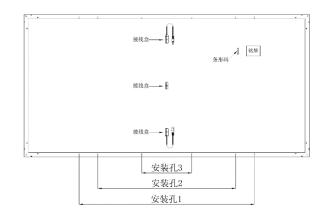
Bolts: M8 Tightening torque: 16-20 N.m

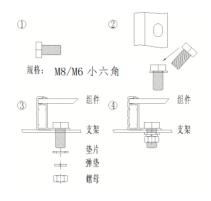
◆ 夹具不能使组件发生形变,安装导轨和夹具应避免遮挡电池片,夹具与边框接触面必须平整光滑,防止边框损坏伤害组件,排水孔不可被夹具遮挡。

The fixture can not deform the module; the installation guide rail and fixture should avoid blocking the cells; the contact surface between the fixture and the frame must be smooth to prevent the frame damage from damaging the modules; the drainage hole should not be blocked by the fixture.



## 6.4.2 安装孔安装 Installation holes





## 注意事项 Cautions

- ◆ 使用组件背面的安装孔,将组件固定在支架上。

  Use the mounting hole on the back of the module to fix the module on the bracket.
- ◆ 使用安装孔1和安装孔2安装螺栓、螺母和垫片建议满足以下要求。
  You are advised to use mounting holes 1 and 2 to install bolts, nuts, and washers

材质:不锈钢

Material: Stainless steel

尺寸和长度: M8

Dimensions and lengths: M8

30mm高度边框组件建议选择 L≤20mm长度紧固件

For 30mm height frame components, fastening L≤20mm is recommended

扭紧力矩: 16-20 N.m

Tightening torque: 16-20 N.m

◆ 使用安装孔3安装螺栓、螺母和垫片建议满足以下要求



Using mounting holes 3 Bolts, nuts, and washers must meet the following requirements

材质:不锈钢

Material: Stainless steel

尺寸和长度: M6

Dimensions and lengths: M6

30mm高度边框组件建议选择 L≤20mm长度紧固件

For 30mm height frame components, fastening L≤20mm is recommended

扭紧力矩: 8-12 N.m

Tightening torque: 8-12 N.m

# 6.5 安装点位置说明 Installation Point Location Description

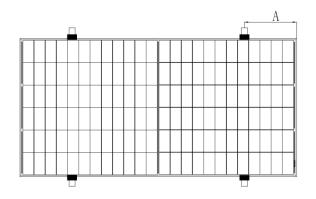
正常水平的载荷设计适用于大部分环境:组件背面承受的最大载荷为2400pa(相当于风压),正面承受的最大载荷为2400pa(相当于风压)。The normal level load design is suitable for most environments: the maximum load on the back of the module is 2400 pa( equivalent to wind pressure) and the maximum load on the front is 2400 pa( equivalent to wind pressure).

较高载荷设计适用于苛刻的环境条件(如风暴、大雪等):组件背面承受的最大载荷为 2400pa(相当于风压),正面承受的最大载荷为 5400pa(相当于风压和雪压)。选择不同的夹具数量、尺寸和安装范围可以获得不同的载荷承受力。

The higher load design is suitable for harsh environmental conditions (such as storm, heavy snow, etc.): the maximum load on the back of the module is 2400 pa( equivalent to wind pressure), and the maximum load on the front is 5400 pa( equivalent to wind pressure and snow pressure). Different load bearing can be obtained by selecting different fixture quantity, size and installation range.



## 6.5.1 夹具安装位置 Fixture InstallationPosition



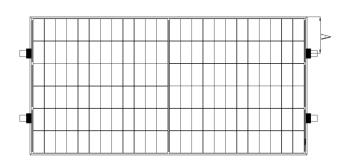


图 C 四点长边安装 横梁垂直长边 FigureC Vertical long side of beam

图 D 四点短边安装 横梁平行长边 FigureD Parallel long side of beam

有框双玻组件可承受的载荷强度如下表:

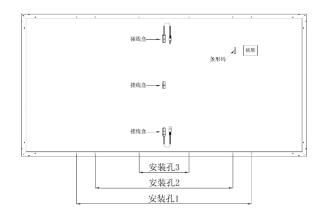
The load strength of module with frame is shown in the table below (L is the length of the module)

组件型号 Module	图 C 安装方式 Figure C:Vertical long side of beam (250mm≤A≤350mm)	图 D 安装方式 Figure D:Parallel long side of beam (150mm≤A≤250mm)
TCL-MRxxxDH182-54NT	+5400/-2400	+2400/-2400

## 6.5.2 安装孔安装位置 Installation Position

有框双玻使用安装孔安装组件情况下,横梁应垂直于组件长边,根据适用 版型选择安装孔1或者安装孔2进行固定。

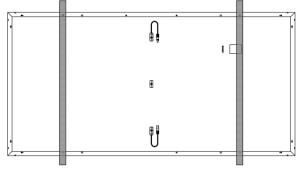
If you use mounting holes to install components, mounting rails cross the long frame, select either mounting holes 1 or 2 based on the applicable version, or both.





不同安装方式及可承受的载荷强度如下:

The load strength to be sustained is as follows:



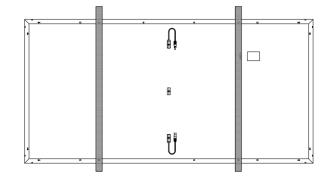


图 E 安装孔 1 安装

图 F 安装孔 2 安装

Figure E Mounting hole 1 Installation

Figure F Mounting hole 1 Installation

	图 E 安装方式	图F安装方式
组件型号	Figure E Installation	Figure F
Module	mode	Installation mode
TCL-MRxxxDH182-54NT	+2400/-2400	+5400/-2400

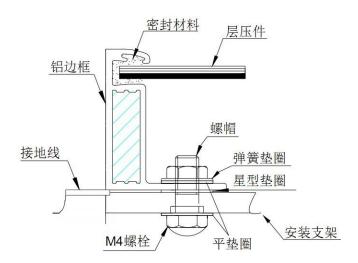
# 7. 电气安装 Electrical Installation

# 7.1 接地 Grounding Connection

- ◆ 所有的太阳能光伏组件边框和安装支架都必须按照相应的 《国家电气规程》或者当地 的电气法 规规定正确的接地。
- ♦ All solar pv module frames and mounting brackets must be aligned in accordance with the corresponding National Electrical Code or local electrical code regulations .
- ◆ 导体的材料推荐使用4-14mm2 的铜导线(AWG 6-12)作为接地导线。组件的接地孔位置有接地标识"—"。接地线也必须通过合适的接地电极连接到大地。所有的导电连接点必须牢固连接。
- ◆ You are advised to use a 4-14mm2 copper conductor (AWG 6-12) as the grounding conductor. The ground hole of the component is marked with



- " $\frac{1}{2}$ ". The ground wire must also be connected to the ground through a suitable ground electrode. All conductive connections must be securely connected.
- ◆ 接地孔在光伏组件背面的铝合金边框上,直径为4.2mm,使用单独的接地线和相关配件连接太阳能光伏组件的铝合金边框并将接地线连接到大地,建议使用M4 x 12mm 的接地螺栓并配套有M4 的螺母,星型垫圈及平垫圈,这样能确保组件被牢靠接地。您可以在TCL产品图纸上了解详细的产品接地孔数量,尺寸和位置,接地固定应用扭力矩为4-8N·m。
- ♦ the diameter of the ground hole is 4.2mm on the aluminum alloy frame at the rear of the photovoltaic module. Connect the ground cable and related accessories to the aluminum alloy frame of the solar photovoltaic module and connect the ground cable to the ground. It is recommended to use M4 x 12mm ground bolt with M4 nut, star washer and flat washer. This ensures that the component is securely grounded. You can learn about the number, size and position of the grounding holes in detail on the Product drawings of TCL. The torsional torque for grounding fixation is 4-8N·m.



- ◆ 除了使用接地孔来进行接地外,您也可以选用以下方式来进行接地
- ◆ In addition to using the ground hole for grounding, you can also use the following methods for grounding
- ◆ 使用未被使用的安装孔接地

# TCL

- Use unused mounting holes for grounding
- ◆ 其他专用接地装置不管采用哪一种接地方式,所有和光伏组件铝合金边框的接地电接触点都需要穿透铝边框的阳极氧化涂层。在使用专用接地装置等其他第三方的接地装置接地时,需要确保这些接地装置是可靠的,并且通过专业认证的产品,在安装时需要遵守接地装置生产商的使用规定。
- Other special grounding devices No matter which grounding method is adopted, all grounding electrical contacts with the aluminum alloy frame of the PHOTOVOLTAIC module need to penetrate the anodized coating of the aluminum frame. When grounding a third-party grounding device, such as a dedicated grounding device, ensure that the device is reliable and professionally certified. When installing the device, comply with the manufacturer's regulations.

# 7.2 测试,调试,与故障排除 Test.Debugging and Troubleshooting

◇ 串联组件连接到系统前的测试,使用数字万用表(推荐 fluke 170 系列或 DC 量程可以达到 1500V 的数字万用表)检查串联组件的开路电压。测量值应等于单个组件开路电压的总和。您将在所用类型组件的技术说明书中找到额定电压。

The serial modules are connected to the test before the system. Use digital multimeter (recommended Fluke 170 series or digital multimeter which DC range can reach 1500V) to check open-circuit voltage of the series modules. The measurement value should be equal to the sum of the open-circuit voltage of a single module and you will find the rated voltage in the technical specification of the type module you are using.

◇ 低电压故障排除。鉴别正常的低电压和故障低电压。这里提到的正常低电压是指组件开路电压的降低,它是由太阳能电池温度升高或辐照度降低造成的。故障低电压通常是由于终端连接不正确或旁路二极管损坏引起的。

Low voltage troubleshooting. Identify the normal low voltage and fault low voltage. The normal low voltage mentioned here refers to the decrease of the open circuit voltage of the module caused by the temperature increase of the solar cell or the decrease of the irradiance. Fault Low voltage is usually caused by improper terminal connection or bypass diode damage.



# 7.3 阻塞二极管和旁路二极管故障排除 Blocking Diode and Bypass

# **Diode Troubleshooting**

◇ 阻塞二极管能够在组件没有电流生成时阻止电流从蓄电池流向组件。如果 没有使用充电控制器,则推荐使用阻塞二极管。关于充电控制器请咨询专 业经销商。

Blocking diodes could prevent current from flowing from the battery to the module when the module is not generating current. If you do not use the charge controller, it is recommended to use blocking diodes. About charge controller, please consult a professional dealer.

◇ 在系统中,当组件的一部分被遮挡而其它部分暴露在阳光下时,会发生热 斑效应,导致电池过热甚至会损坏组件。在组件中使用旁路二极管可以保 护组件不受这种过高的反向电流影响。所有额定功率大于 55 瓦的组件都已 在接线盒中集成了旁路二极管。

In the system, hot spot effect occurs when part of the module is blocked and other parts are exposed to the sunshine and thereby lead to overheat of the battery and damage the module. Using bypass diodes in the module protects the module from being affected by this excessive reverse current. All modules those rated power are more than 55 watts have a bypass diode integrated in the junction box.

# 7.4 并网电气系统 On-grid Electrical System

◇ 在一个光伏发电系统中尽量使用相同的组件,组件串联数量(N) $\leq$ V (max)/[Voc(atSTC)]。V(max)为组件最大系统电压,Voc(atSTC)为组件标称状态下开路电压。

Try to use the same components in a photovoltaic power generation system, the number of modules in series  $(N) \leq V \pmod{\max}$  /[Voc(atSTC)].V (Max) is the maximum system voltage of the component, and Voc(atSTC) is the open-circuit voltage under the nominal state of the component.

◇ 几个组件串联,然后并联形成光伏阵列,这特别适用于电压较高的情况下。如果组件串联,总电压等于各个组件电压的总和。

Several modules in series, and then form a PV array in parallel, which is particularly suitable for high voltage situations. If the modules are connected in series, the total voltage is equal to the sum of the voltages of the individual modules.



◇ 需要使用高电流的情况下,可以将几个光伏组件并联,总电流等于各个组件电流的总和。

In the case of using high current, you can put several PV modules in parallel, the total current is equal to the sum of the current of each module.

◇ 组件可提供预制连接器,用于系统的电气连接。电缆线尺寸、类型和温度等参数的选择请参考相关的规程。

The module can provide prefabricated connectors for system's electrical connections. As for cable size, type and temperature and other parameters' choice, please refer to the relevant rules.

◇ 电缆横截面和连接器大小必须满足最大系统短路电流。否则电缆线和连接器会因为电流过大而过热!有烧坏的危险!

The cable cross-section surface and connector's size must meet the maximum system short-circuit current, otherwise the cables and connectors will overheat because of excessive current and has the danger of burning!

◇ 在调试或维修太阳能系统时要保护自己免遭电击,戴好绝缘手套和绝缘鞋等防护用品使用专用的电工工具进行维修。

Protect yourself from electric shock when debugging or repairing the solar system. Wear protective gloves and insulated shoes and other protective equipment. Use special electrician tools for repairs.

# 8. 维护 Maintenance

◇ 为保证电池板最佳性能,TCL 提交以下维护措施。

To ensure the best performance of the solar panels, TCL provide the following maintenance measures.

◇ 应在早晨或傍晚发电功率低或没有功率时进行电池板清洁。

The solar panel should be cleaned in the morning or evening when the power is low or no power is processing.

◇ 必要时清洗玻璃表面,清洁玻璃表面应使用清水和软质物体擦洗,可使用中性洗涤剂,切不可使用酸性或碱性或加研磨剂洗涤剂。

# TCL

Cleaning the glass surface when necessary through clean water and soft objects. The neutral detergent should be used for cleaning while the acidic or alkaline or abrasive detergent is forbidden.

◇ 在下雨天气时如果出现逆变器或其他电器设备断电不要进行送电,等待下雨天气过后对线路进行检查确保没有问题后再进行送电。

In case of rainy weather, do not deliver the electricity if the inverter or other electrical equipment is power off. It is better to check and ensure that there is no problem in the lines before sending the electricity.

◇ 清洗电池板时不能用高压水枪进行冲洗,以免电池板接头处因冲洗压力过 大进水导致线路漏电。

When cleaning, the solar panel can not be washed with a high-pressure water gun for avoiding line leakage caused by excessive pressure in the connection place of the solar panel.

◇ 每六个月进行一次机械和电器检查,确保表面清洁及连接可靠。

Conduct a mechanical and electrical inspection for every six months and ensure that the surface is clean and the connection is reliable.

◇ 如有任何其它异常情况出现,请咨询厂家或有经验的工程师。

If any other abnormal situation occurs, please consult factory or experienced engineer.

◇ 注意,遵守系统使用的所有部件,如支架、充电控制器、逆变器、电池等 的维护说明。

Observe the maintenance instructions for all parts used in the system, such as bracket, charge controller, inverter, solar cell, etc.

# Single phase string inverters





# **User Manual**

TCL-GS3K-G1/TCL-GS3.6K-G1/TCL-GS4K-G1
TCL-GS5K-G1/TCL-GS6K-G1

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## 1 Notes on this Manual

## 1.1 General Notes

TCL inverter is a transformerless solar inverter with two independent MPP trackers. It converts the direct current (DC) from a photovoltaic (PV) array to grid-compliant alternating current (AC) and feeds it into the grid.

## 1.2 Area of validity

This manual describes the mounting, installation, commissioning and maintenance of the following inverters:

- TCL-GS3K-G1
- TCL-GS3.6K-G1
- TCL-GS4K-G1
- TCL-GS5K-G1
- TCL-GS6K-G1

Observe all documentation that accompanies the inverter. Keep them in a convenient place and available at all times.

## 1.3 Target group

This manual is for qualified electricians only, who must perform the tasks exactly as described. All persons installing inverters must be trained and experienced in general safety which must be observed when working on electrical equipment. Installation personnel should also be familiar with local requirements, rules and regulations.

Qualified persons must have the following skills:

- Knowledge of how an inverter works and is operated
- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices
- Knowledge of all applicable laws, standards and directives
- Knowledge of and compliance with this document and all safety information

## 1.4 Symbols used in this manual

Safety instructions will be highlighted with the following symbols:



DANGER indicates a hazardous situation which, if not be avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not be avoided, can result in death or serious injury.



CAUTION indicates a hazardous situation which, if not be avoided, can result in minor or moderate injury.

# **NOTICE**

NOTICE indicates a situation which, if not be avoided, can result in property damage.



INFORMATION that is important for a specific topic or goal, but is not safety-relevant.

## 2.1 Intended use

- The inverter converts the direct current from PV array into grid-compliant alternating current.
- 2. The inverter is suitable for indoor and outdoor use.
- The inverter must only be operated with PV arrays (PV modules and cabling) of protection class II, in accordance with IEC 61730, application class A. Do not connect any sources of energy other than PV modules to the inverter.
- 4. PV modules with a high capacitance to ground must only be used if their coupling capacitance is less than  $1.0\mu F$ .
- 5. When the PV modules are exposed to sunlight, a DC voltage is supplied to the inverter.
- When designing the PV system, ensure that the values comply with the permitted operating range of all components at all times.
- 7. The product must only be used in countries for which it is approved or released by TCL and the grid operator.
- Use this product only in accordance with the information provided in this documentation
  and with the locally applicable standards and directives. Any other application may cause
  personal injury or property damage.
- 9. The type label must remain permanently attached to the product.

## 2.2 Important safety information

# **A** DANGER

Danger to life due to electric shock when live components or cables are touched

- All work on the inverter must only be carried out by qualified personnel who have read and fully understood all safety information contained in this manual.
- Do not open the product.
- Children must be supervised to ensure that they do not play with this device.



Danger to life due to high voltages of the PV array

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the inverter under load, an electric arc may occur leading to electric shock and burns.

- Do not touch non-insulated cable ends.
- Do not touch the DC conductors.
- Do not touch any live components of the inverter.
- Have the inverter mounted, installed and commissioned only by qualified persons with the appropriate skills.
- If an error occurs, have it rectified by qualified persons only.
- Prior to performing any work on the inverter, disconnect it from all voltage sources as
  described in this document(see Section 9 "Disconnecting the Inverter from Voltage
  Sources").

# **A** WARNING

Risk of injury due to electric shock

Touching an ungrounded PV module or array frame can cause a lethal electric shock.

 connect and ground the PV modules, array frame and electrically conductive surfaces so that there is continuous conduction.

# **A** CAUTION

Risk of burns due to hot enclosure parts

Some parts of the enclosure can get hot during operation.

During operation, do not touch any parts other than the enclosure lid of the inverter.

# **NOTICE**

Damage to the inverter due to electrostatic discharge

Internal components of the inverter can be irreparably damaged by electrostatic discharge.

• Ground yourself before touching any component.

## 2.3 Symbols on the label

Symbol	Explanation
•	Beware of a danger zone
	This symbol indicates that the product mus be additionally grounded if
	additional grounding or equipotential bonding is required at the installation
	site.
A	Beware of high voltage and operating current
14\	The inverter operates at high voltage and current. Work on the inverter must
	only be carried out by skilled and authorized electricians.
$\wedge$	Beware of hot surfaces
	The inverter can get hot during operation. Avoid contact during operation.
	The inverter can get not during operation. Avoid contact during operation.
40	WEEE designation
X	Do not dispose of the product together with the household waste but in
<b>1</b> _&	accordance with the disposal regulations for electronic waste applicable at
	the installation site.
	CE marking
	The product complies with the requirements of the applicable EU directives.
Type Approved Safety Regular Production Surveillance	Certification mark
CERTIFIED WWW.tuv.com	The product has been tested by TUV and got the quality certification mark.
Δ	RCM Mark
	The product complies with the requirements of the applicable Australian
رك	standards.



## Capacitors discharge

Before opening the covers, the inverter must be disconnected from the grid and PV array. Wait at least 5 minutes to allow the energy storage capacitors to fully discharge.



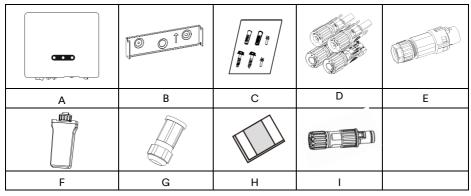
Observe the documentation

Observe all documentation supplied with the product

## 3 Unpacking

## 3.1 Scope of delivery

Object	Description	Quantity
Α	Inverter	1 piece
В	Wall mounting bracket	1 piece
0	Wall anchors and hexagon bolts (2×)	1 1
С	M5 screw (2×)	1 set
D	DC connector	2 pairs
E	AC Plug connector	1 piece
F	WiFi stick	1 piece
G	RS 485 COM plug (Optional)	2 pieces
Н	Documentation	1 set
I	Smart meter terminal (Optional)	1 piece



Carefully check all components. If anything is missing, contact your dealer.

## 3.2 Checking for transport damage

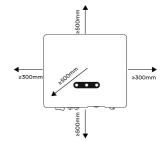
Thoroughly inspect the packaging upon delivery. If you detect any damage to the packaging which indicates the inverter may have been damaged, informthe responsible shipping company immediately. We will be glad to assist you if required.

## 4 Mounting

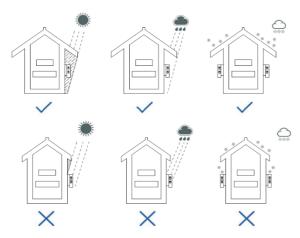
## 4.1 Ambient conditions

- 1. Be sure the inverter is installed out of the reach of children.
- 2. Mount the inverter in areas where it cannot be touched inadvertently.
- 3. Ensure good access to the inverter for installation and possible service.
- 4. Make sure that heat can dissipate, observe the following minimum clearance to walls, other inverters, or objects:

Direction	Min. clearance (mm)
above	500
below	500
sides	300



- 5. The ambient temperature is recommended below 40°C to ensure optimal operation.
- 6. Recommend to mount the inverter under the shaded site of the building or mount an awning above the inverter.
- 7. Avoid exposing the inverter to direct sunlight, rain and snow to ensure optimal operation and extend service life.



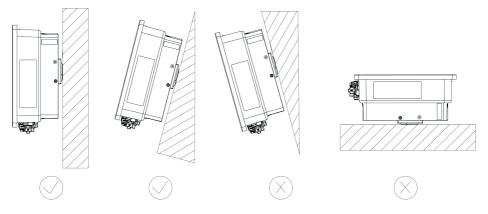
- 8. The mounting method, location and surface must be suitable for the inverter's weight and dimensions.
- If mounted in a residential area, we recommend mounting the inverter on a solid surface.
   Plasterboard and similar materials are not recommended due to audible vibrations when in use.
- 10. Do not put any objects on the inverter.
- 11. Do not cover the inverter.

## 4.2 Selecting the mounting location



## Danger to life due to fire or explosion

- Do not mount the inverter on flammable construction materials.
- Do not mount the inverter in areas where flammable materials are stored.
- Do not mount the inverter in areas where there is a risk of explosion.



- 1. Mount the inverter vertically or tilted backward by a maximum of 15°.
- 2. Never mount the inverter tilted forward or sideways.
- 3. Never mount the inverter horizontally.
- 4. Mount the inverter at eye level to make it easy to operate and to read the display.
- 5. The electrical connection area must point downwards.

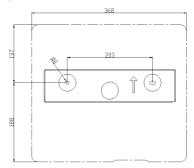


## Risk of injury due to the weight of the inverter

When mounting, be careful that the inverter weighs approx.:18.5kg.

## Mounting procedures:

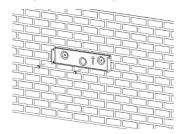
Use the wall bracket as a drilling template and mark the positions of the drill holes. Drill 2
holes with a 10 mm drill. The holes must be about 70 mm deep. Keep the drill vertical to the
wall, and hold the drill steady to avoid tilted holes.



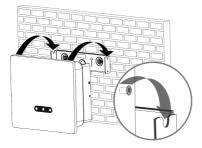


## Risk of injury due to the inverter falls down

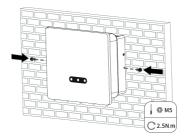
- Before inserting the wall anchors, measure the depth and distance of the holes.
- If the measured values do not meet the hole requirements, redrill holes.
- 2. After drilling holes in the wall, place three screw anchors into the holes, then attach the wall mounting bracket to the wall using the self-tapping screws delivered with the inverter.



3. Position and hang the inverter onto the wall bracket ensuring the two studs located on the outer ribs of the inverter are slotted into the respective slots in the wall bracket.



4. Check both sides of the heat sink to ensure that it is securely in place. insert one screw M5x12 each into the lower screw hole on both sides of the inverter anchorage bracket respectively and tighten them.



If a second protective conductor is required in installation site, ground the inverter and secure it so that it cannot drop from the housing (see section

5.4 "Second protective grounding connection").

Dismante the inverter in reverse order.

#### 5.1 Safety



#### Danger to life due to high voltages of the PV array

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the inverter under load, an electric arc may occur leading to electric shock and burns.

- Do not touch non-insulated cable ends.
- Do not touch the DC conductors.
- Do not touch any live components of the inverter.
- Have the inverter mounted, installed and commissioned only by qualified persons with the appropriate skills.
- If an error occurs, have it rectified by qualified persons only.
- Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this document(see Section 9 "Disconnecting the Inverter from Voltage Sources").

# **A** WARNING

#### Risk of injury due to electric shock

- The inverter must be installed only by trained and authorized electricians.
- All electrical installations must be done in accordance with the National Wiring Rules standards and all locally applicable standards and directives.

# **NOTICE**

### Damage to the inverter due to electrostatic discharge

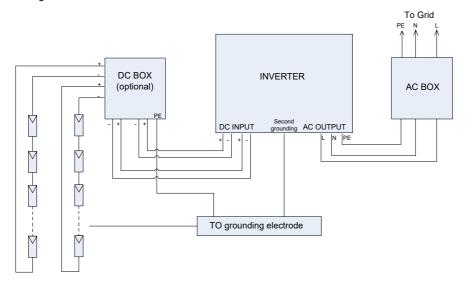
Touching electronic components can cause damage to or destroy the inverter through electrostatic discharge.

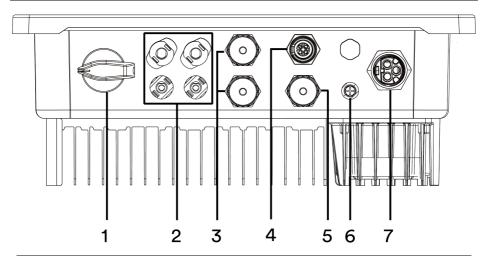
Ground yourself before touching any component.

### 5.2 System layout of units without integrated DC switch

Local standards or codes may require that PV systems are fitted with an external DC switch on the DC side. The DC switch must be able to safely disconnect the open-circuit voltage of the PV array plus a safety reserve of 20%.

Install a DC switch to each PV string to isolate the DC side of the inverter. We recommend the following electrical connection:





Object	Description
1	DC SWITCH: switch on or off for PV-load.
2	DC input: plug-in connector to connect the strings.
3	COM: Network port with protective cap.
4	Connector for meter.
5	WiFi: transmit and Wi-Fi signal.
6	Connection point for an additional grounding.
7	AC OUTPUT: plug-in connector, connect the grid.

#### 5.4 Second protective grounding connection

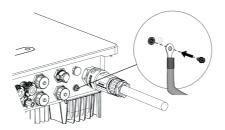
# **NOTICE**

In case of operation on a Delta-IT Grid type, in order to ensure safety compliance in accordance with IEC 62109, the following step should be taken:

The second protective earth/ground conductor, with a diameter of at least 10 mm<sup>2</sup> and be made from copper, should be connected to the designated earth point on the inverter.

#### Procedure:

- 1. Insert the grounding conductor into the suitable terminal lug and crimp the contact.
- 2. Align the terminal lug with the grounding conductor on the screw.
- 3. Tighten it firmly into the housing (screwdriver type: PH2, torque: 2.5 Nm).



#### Information on grounding components:

Object	Description
M5 screw	Screwdriver type: PH2, torque: 2.5Nm
Bootlace ferrule	Customer provided, type: M5
Grounding cable	Copper conductor cross-section: 6-16mm <sup>2</sup>

#### 5.5 AC connection



### Danger to life due to high voltages in the inverter

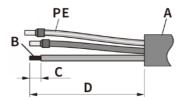
 Before establishing the electrical connection, ensure that the miniature circuitbreaker is switched off and cannot be reactivated.

### 5.5.1 Conditions for the AC connection

#### Cable Requirements

The grid connection is established using three conductors (L, N, and PE).

We recommend the following specifications for stranded copper wire. The AC plug housing has the lettering of length for stripping cable..



TCL-GS3K-G1/TCL-GS3.6K-G1/TCL-GS4K-G1/TCL-GS5K-G1/TCL-GS6K-G1

Object	Description	Value
Α	External diameter	10 to 16mm
В	Conductor cross-section	4 to 8 mm²
С	Stripping length of the insulated conductors	approx. 13 mm
D	Stripping length of the outer sheath of cable	approx. 53 mm

Larger cross-sections should be used for longer cables.

### Cable design

The conductor cross-section should be dimensioned to avoid power loss in cables exceeding 1% of rated output power.

The higher grid impedance of the AC cable makes it easier to disconnect from the grid due to excessive voltage at the feed-in point.

The maximum cable lengths depend on the conductor cross-section as follows:

Conductor	Maximum cable length				
cross- section	TCL-GS3K-G1	TCL-GS3.6K-G1	TCL-GS4K-G1	TCL-GS5K-G1	TCL-GS6K-G1
4 mm²	30m	24m	22m	18m	15m
6 mm²	45m	36m	34m	27m	22m
8 mm²	60m	48m	45m	36m	30m

The required conductor cross-section depends on the inverter rating, ambient temperature, routing method, cable type, cable losses, applicable installation requirements of the country of installation, etc.

# **A** WARNING

#### Risk of injury due to electric shock and fire caused by high leakage current

- The inverter must be reliably grounded in order to protect property and personal safety.
- The PE wire should longer 2 mm than L,N during strip the outer sheath of AC cable.

# **NOTICE**

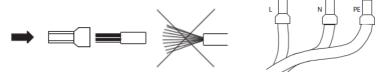
#### Damage to the seal of the cover in sub-zero conditions

If you open the cover in sub-zero condition, the sealing of the cover can be damaged. This can lead moisture entering the inverter.

- Do not open the inverter cover at ambient temperatures lower than -5°C.
- If a layer of ice has formed on the seal of the cover in sub-zero comditions, remove it
  prior to opening the inverter(e.g. by melting the ice with warm air). Observe the
  applicable safety regulation.

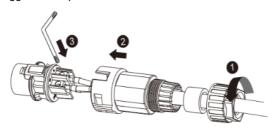
#### Procedure:

- Switch off the miniature circuit-breaker and secure it against being inadvertently switched back on.
- Shorten L and N by 2 mm each, so that the grounding conductor is 3 mm longer. This
  ensures that the grounding conductor is the last to be pulled from the screw terminal in the
  event of tensile strain.
- 3. Insert the conductor into a suitable ferrule acc. to DIN 46228-4 and crimp the contact.

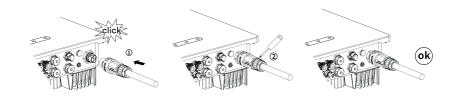


4. Insert the PE, N and L conductor through the AC connector housing and terminate them into the corresponding terminals of the AC connector terminal and make sure insert them

to the end in the order as shown, and then tighten the screws with an appropriately sized hex key with a suggested torque of 2.0 Nm.



5. Connect the AC connector plug to the inverter's AC output terminal.



#### 5.5.3 Residual current protection

The inverter is equipped with an all-pole sensitive residual current monitoring unit (RCMU) with an integrated differential current sensor which fulfills the requirements of DIN VDE 0100-712 (IEC60364-7-712:2002).

Therefore an external residual current device (RCD) is not required. If an external RCD needs to be installed because of local regulations, a RCD type A or type B can be installed as an additional safety measure.

The all-pole sensitive residual current monitoring unit (RCMU) detects alternating and direct differential currents. The integrated differential current sensor detects the current difference between the neutral conductor and the line conductor. If the current difference increases suddenly, the inverter disconnects from the grid. The function of the all-pole sensitive residual current monitoring unit (RCMU) has been tested in accordance with IEC 62109-2.



#### Rating of the external residual current device

- If an external residual current device (RCD) is required in a TT or TN-S system, install a residual current device which trips at a residual current of 100 mA or higher.
- For each connected inverter, a RCD with 100mA rated residual current has to be
  provided. The rated residual current of the RCD must be equal to at least the sum of
  the rated residual currents of the connected inverters. That means that, if, for
  example, two transformerless inverters are connected, the rated residual current of
  the RCD must be at least 200 mA.

#### 5.5.4 Overvoltage category

The inverter can be deployed in grids of installation category III or lower, as defined under IEC 60664-1. This means that it can be permanently connected at the grid-connection point in a building. In installations involving long outdoor cable routing, additional overvoltage-reducing measures must be taken so that the overvoltage category is reduced from IV to III.

#### 5.5.5 Grounding conductor monitoring

The inverter is equipped with a grounding conductor monitoring device. This grounding conductor monitoring device detects when there is no grounding conductor connected and disconnects the inverter from the utility grid if this is the case. Depending on the installation site and grid configuration, it may be advisable to deactivate the grounding conductor monitoring. This is necessary, for example, in an IT system if there is no neutral conductor present and you intend to install the inverter between two line conductors. If you are uncertain about this, contact your grid operator or TCL-TECH.

#### 5.5.6 Rating of miniature circuit-breaker



#### Danger to life due to fire

 You must protect each inverter with an individual miniature circuit- breaker in order that the inverter can be disconnected safely.

No load should be applied between the circuit-breaker and the inverter. Use dedicated circuit-breakers with load switch functionality for load switching. The selection of the circuit-breaker rating depends on the wiring design (wire cross-section area), cable type, wiring method, ambient temperature, inverter current rating etc. Derating of the circuit breaker rating may be necessary due to self-heating or if exposed to heat.

The maximum output overcurrent protection of the inverters can be found in section 10.2.

#### 5.6 DC Connection



#### Danger to life due to high voltages in the inverter

- Before connecting the PV array, ensure that the DC switch is switched off and that it cannot be reactivated.
- Do not disconnect the DC connectors under load.



#### Use of Y adapters for parallel connection of strings

The Y adapters must not be used to interrupt the DC circuit.

- Do not use the Y adapters in the immediate vicinity of the inverter.
   The adapters must not be visible or freely accessible.
- In order to interrupt the DC circuit, always disconnect the inverter as described in this document (see Section 9 "Disconnecting the Inverter from Voltage Sources").

#### Requirements for the PV modules of a string:

- PV modules of the connected strings must be of: the same type, identical alignment and identical tilt.
- The thresholds for the input voltage and the input current of the inverter must be adhered to (see Section 10.1 "Technical DC input data").
- On the coldest day based on statistical records, the open-circuit voltage of the PV array must never exceed the maximum input voltage of the inverter.
- The connection cables of the PV modules must be equipped with the connectors included in the scope of delivery.
- The positive connection cables of the PV modules must be equipped with the positive DC connectors. The negative connection cables of the PV modules must be equipped with the negative DC connectors.

#### 5.6.2 Assembling the DC connectors



### Danger to life due to high voltages on DC conductors

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC conductors can lead to lethal electric shocks.

- Cover the PV modules.
- Do not touch the DC conductors.

Assemble the DC connectors as described below. Be sure to observe the correct polarity. The DC connectors are marked with the symbols "+" and " - ".



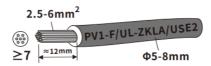
#### Cable requirements:

The cable must be of type PV1-F, UL-ZKLA or USE2 and comply with the following properties:

- ♦ External diameter: 5 mm to 8 mm
- ♦ Conductor cross-section: 2.5 mm² to 6 mm²
- Qty single wires: at least 7
- ♦ Nominal voltage: at least 600V

Proceed as follows to assemble each DC connector.

1. Strip 12 mm off the cable insulation.



2. Lead the stripped cable into the corresponding DC plug connector. Press the clamping bracket down until it audibly snaps into place.



3. Push the swivel nut up to the thread and tighten the swivel nut. (SW15, Torque: 2.0Nm).



#### 4. Ensure that the cable is correctly positioned:

Result	Measure	
If the stranded wires are visible in the	• Proceed to step 5.	
chamber of the clamping bracket, the		
cable is correctly positioned.		
If the stranded wires are not visible in the	Release the clamping bracket. To do so,	
chamber, the cable is not correctly	insert a flat-blade screwdriver (blade width: 3.5	
positioned.	mm) into the clamping bracket and lever it	
	open.	
	• Remove the cable and go back to step 2.	

5.6.3 Disassembling the DC connectors

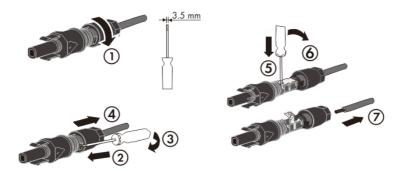


### Danger to life due to high voltages on DC conductors

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC conductors can lead to lethal electric shocks.

- Cover the PV modules.
- Do not touch the DC conductors.

To remove DC plug connectors and cables, use a screwdriver (blade width: 3.5mm) as following procedure.



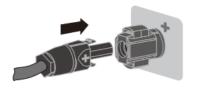
#### 5.6.4 Connecting the PV array

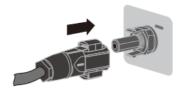
# **NOTICE**

### The inverter can be destroyed by overvoltage

If the voltage of the strings exceeds the maximum DC input voltage of the inverter, it can be destroyed due to overvoltage. All warranty claims become void.

- Do not connect strings with an open-circuit voltage greater than the maximum DC input voltage of the inverter.
- Check the design of the PV system.
- Ensure that the individual miniature circuit-breaker is switched off and ensure that it cannot be accidentally reconnected.
- Ensure that the DC switch is switched off and ensure that it cannot be accidentally reconnected.
- 3. Ensure that there is no ground fault in the PV array.
- 4. Check whether the DC connector has the correct polarity.
  If the DC connector is equipped with a DC cable having the wrong polarity, the DC connector must be reassembled. The DC cable must always have the same polarity as the DC connector.
- Ensure that the open-circuit voltage of the PV array does not exceed the maximum DC input voltage of the inverter.
- 6. Connect the assembled DC connectors to the inverter until they audibly snap into place.





7. Ensure that all DC connectors are securely in place.

# **NOTICE**

### Damage to the inverter due to moisture and dust penetration

- Seal the unused DC inputs so that moisture and dust cannot penetrate the inverter.
- Make sure all DC connectors are securely sealed.

### 5.7 Communication equipment connection



### Danger to life due to electric shock when live components are touched.

• Disconnect the inverter from all voltage sources before connect the network cable.

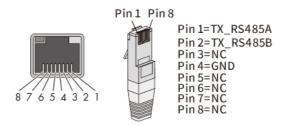
# **NOTICE**

#### Damage to the inverter due to electrostatic discharge

Internal components of the inverter can be irreparably damaged by electrostatic discharge

Ground yourself before touching any component.

The pin assignment of the RJ45 socket is as follows:



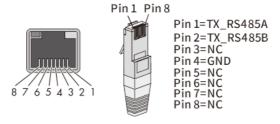
The network cable meeting the EIA/TIA 568A or 568B standard must be UV resistant if it is to be used outdoors.

#### Cable requirement:

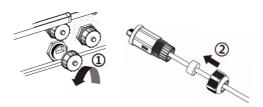
- Shielding wire
- CAT-5E or higher
- UV-resistant for outdoor use
- RS485 cable maximum length 1000m

#### Procedure:

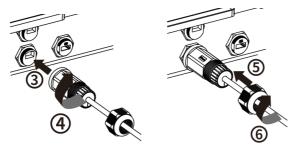
- 1. Take out the cable fixing accessory from the package.
- 2. Unscrew the swivel nut of the M25 cable gland, remove the filler-plug from the cable gland and keep it well. If there is only one network cable, please keep a filler-plug in the remaining hole of the sealing ring against water ingress.
- 3. RS485 cable pin assignment as below, strip the wire as shown in the figure, and crimp the cable to an RJ45 connector (according to DIN 46228-4, provided by the customer):



4. Unscrew the communication port cover cap in the following arrow sequence and insert the network cable into the RS485 communication client attached.



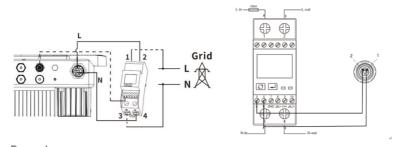
5. Insert the network cable into the corresponding communication terminal of the inverter according to the arrow sequence, tighten the thread sleeve, and then tighten the gland.



#### Disassemble the network cable in reverse order.

#### 5.7.2 Smart meter cable connection

### Connection diagram



#### Procedure:

 Loosen the gland of the connector. Insert the crimped conductors into the corresponding terminals and tighten screws with a screwdriver as shown. Torque: 0.5-0.6 Nm



2. Remove the dust cap from the terminal of the meter connector, and connect the meter plug.





#### 5.7.3 WiFi/4G stick connection

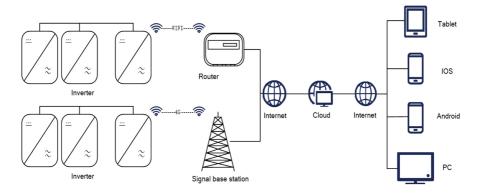
- 1. Take out the WiFi/4G modular included in the scope of delivery.
- 2. Attach the WiFi modular to the connection port in place and tighten it into the port by hand with the nut in the modular. Make sure the modular is securely connected and the label on the modular can be seen.



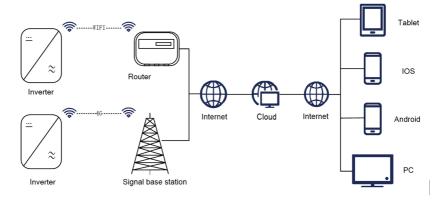


#### 6.1 System monitoring via WLAN/4G

User can monitor the inverter through the external WiFi/4G stick module. The connection diagram between the inverter and internet is shown as following two pictures, both two methods are available. Please note that each WiFi/4G stick can only connect to 5 inverters in method1.



Method 1 only one inverter with the 4G/WiFi Stick, the other inverter be connected through the RS 485 cable.



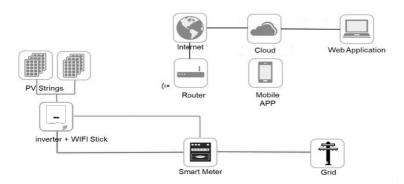
Mehod 2 every inverter with 4G/WiFi Stick, every inverter can connect to internet.

As shown above, we offer a remote monitoring platform called "TCL cloud". You can also install the "TCL APP" on a smart phone using Android or an iOS operating system. You can visit the

website (www.tcl.com/global/en/photovoltaic) for system information. And download the user manual for the Cloud Web or TCL APP.

#### 6.2 Active power control with Smart meter

The inverter can control active power output via connecting smart meter, following picture is the system connection mode through WiFi stick.



The smart meter should support the MODBUS protocol with a baud rate of 9600 and address set

1. Smart meter as above SDM230-Modbus connecting method and seting baud rate method for modbus please refer to it's user manual.



Possible reason of communication failure due to incorrect connection

- WiFi stick only support single inverter to do active power control.
- The overall length of the cable from inverter to smart meter is 100m.

The active power limit can be set on "TCL APP" application, the details can be found in the user manual for the TCL APP.



### **DRMS** application description

- Only applicable to AS/NZS4777.2:2015.
- DRM0, DRM5, DRM6, DRM7, DRM8 are available.

The inverter shall detect and initiate a response to all supported demand response commands, demand response modes are described as follows:

Mode	Requirement
DRM 0	Operate the disconnection device
DRM 1	Do not consume power
DRM 2	Do not consume at more than 50% of rated power
DRM 3	Do not consume at more than 75% of rated power AND Source reactive power
DRIVI 3	if capable
DRM 4	Increase power consumption (subject to constraints from other active DRMs)
DRM 5	Do not generate power
DRM 6	Do not generate at more than 50% of rated power
DRM 7	Do not generate at more than 75% of rated power AND Sink reactive power if
DKIVI /	capable
DRM 8	Increase power generation (subject to constraints from other active DRMs)

The RJ45 socket pin assignments for demand response modes as follows:

Pin1DRM 1/5	PIN 1> 8
Pin2 DRM 2/6	Pin Position
Pin3 DRM 3/7	554 34 12
Pin4 DRM 4/8	
Pin5 RefGen	DIM COOKET
Pin6 Com/DRM0	RJ45 SOCKET
Pin7N/A	
Pin8 N/A	

If DRMs support is required, the inverter should be used in conjunction with AiMonitor. the Demand Response Enabling Device (DRED) can be conneted to the DRED port on AiMonitor via RS485 cable. You can vist the website <a href="www.tcl.com/global/en/photovoltaic">www.tcl.com/global/en/photovoltaic</a> for more information and download the user manual for the AiMonitor.

### 6.4 Communication with third-party devices

TCL inverters can communicate with Solarlog or Meteocontrol, in other words, you can use Solarlog or Meteocontrol to monitor TCL inverters. For more information, please refer to their user manual.

#### 7 Commissioning

# **NOTICE**

#### Risk of injury due to incorrect installation

 We strongly recommend carrying out checks before commissioning to avoid possible damage to the device caused by faulty installation.

#### 7.1 Flectrical checks

Carry out the main electrical tests as follows:

 Check the PE connection with a multimeter: make sure that the inverter's exposed metal surface has a ground connection.



### Danger to life due to the presence of DC voltage

- Do not touch parts of the sub-structure and frame of PV array.
- Wear personal protective equipment such as insulating gloves.
- Check the DC voltage values: check that the DC voltage of the strings does not exceed the
  permitted limits. Refer to the Section 2.1 "Intended use" about designing the PV system for
  the maximum allowed DC voltage.
- 3. Check the polarity of the DC voltage: make sure the DC voltage has the correct polarity.
- 4. Check the PV array's insulation to ground with a multimeter: make sure that the insulation resistance to ground is greater than 1 MOhm.



### Danger to life due to the presence of AC voltage

- Only touch the insulation of the AC cables.
- Wear personal protective equipment such as insulating gloves.
- Check the grid voltage: check that the grid voltage at the point of connection of the inverter complies with the permitted value.

#### 7.2 Mechanical checks

Carry out the main mechanical checks to ensure the inverter is waterproof:

- ① Make sure the inverter has been correctly mounted with wall bracket.
- 2 Make sure the cover has been correctly mounted.
- 3 Make sure the communication cable and AC connector have been correctly wired and tightened.

#### 7.3 Safety code check

Choose suitable safety code according to the location of installation. please visit website (https://www.tcl.com/global/en/photovoltaic) and download the TCL Cloud APP manual for detailed information, you can find "Grid code settings" in the TCL Cloud APP manual where an installer needs ...



The TCL's inverters comply with local safety code when leaving the factory.

#### 7.4 Start-Up

After finishing the electrical and mechanical checks, switch on the miniature circuit-breaker and DC-switch in turn. Once the DC input voltage is sufficiently high and the grid-connection conditions are met, the inverter will start operation automatically. Usually, there are three states during operation:

**Waiting:** When the initial voltage of the strings is greater than the minimum DC input voltage but lower than the start-up DC input voltage, the inverter is waiting for sufficient DC input voltage and cannot feed power into the grid.

**Checking:** When the initial voltage of the strings exceeds the start-up DC input voltage, the inverter will check feeding conditions at once. If there is anything wrong during checking, the inverter will switch to the "Fault" mode.

**Normal:** After checking, the inverter will switch to "Normal" state and feed power into the grid. During periods of low radiation, the inverter may continuously start up and shut down. This is due to insufficient power generated by the PV array.

If this fault occurs often, please call service.



### **Quick Troubleshooting**

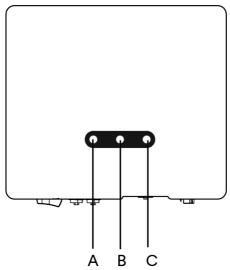
If the inverter is in "Fault" mode, refer to Section 11 "Troubleshooting".

### 8 Operation

The information provided here covers the LED indicators.

### 8.1 Overview of the panel

The inverter is equipped with three LEDs indicators.



Object	Description
А	Normal (White LED)
В	Communication (White LED)
С	Fault (Red LED)

#### 8.1.1 LEDs

The inverter is equipped with two LED indicators "white" and "red" which provide information about the various operating states.

### LED A:

The LED A is lit when the inverter is operating normally. The LED A is off The inverter is not feeding into the grid.

#### LED B:

The LED B flashes during communication with other devices e.g. AiCom/AiManager, Solarlog etc. Also, the LED B flashes during firmware update through RS485.

### LED C:

The LED C is lit when the inverter has stopped feeding power into the grid due to a fault. The corresponding error code will be shown on the APP.

#### 9 Disconnecting the Inverter from Voltage Sources

Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this section. Always adhere strictly to the prescribed sequence.

# **NOTICE**

#### Destruction of the measuring device due to overvoltage

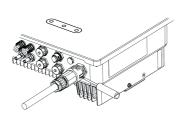
• Use measuring devices with a DC input voltage range of 0 V or higher.

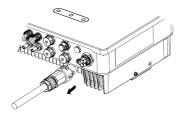
#### Procedure:

- 1. Disconnect the miniature circuit- breaker and secure against reconnection.
- 2. Disconnect the DC switch and secure against reconnection.
- 3. Use a current clamp meter to ensure that no current is present in the DC cables.
- Release and remove all DC connectors. Insert a flat-blade screwdriver or an angled screwdriver (blade width: 3.5 mm) into one of the slide slots and pull the DC connectors out downwards. Do not pull on the cable.



- 5. Ensure that no voltage is present at the DC inputs of the inverter.
- Remove the AC connector from the jack. Use a suitable measuring device to check that no voltage is present at the AC connector between L and N and L and PE.





## 10 Technical Data

### 10.1 DC input data

Туре	TCL-GS3K-G1	TCL-GS3.6K-G1		
Max. PV array power(STC)	4500Wp	5520Wp		
Max. input voltage	600V			
MPP voltage range	60V-560V			
Rated input voltage	360V			
Initial feeding-in voltage				
Min. feed-in power	20W	20W		
Max. input current per MPP input				
Isc PV(absolute maximum)	e 24A			
Number of independent MPP inputs	2			
Strings per MPP input	1/1			
Max. inverter backfeed current to the array	0A			

Туре	TCL-GS4K-G1	TCL-GS5K-G1	TCL-GS6K-G1
Max. PV array power(STC)	6000Wp	7500Wp	9000Wp
Max. input voltage		600V	
MPP voltage range		60V-560V	
Rated input voltage		360V	
Initial feeding-in voltage	100V		
Min. feed-in power	20W		
Max. input current per MPP input	16A/16A		
Isc PV(absolute maximum)	22.5A/22.5A		
Number of independent MPP inputs	2		
Strings per MPP input	1/1		
Max. inverter backfeed current to the array	OA		

### 10.2 AC output data

Туре	TCL-GS3K-G1	TCL-GS3.6K-G1	
Rated active power	3000W	3680W	
Rated apparent AC	7000\/A	7500\/A	
power	3000VA	3680VA	
Max. apparent AC	3300VA	3680VA	
power	3300VA	3000VA	
Nominal AC voltage/	220V,230V,24	0\//190\/_205\/	
range	220 4,230 4,24	0 V / 160 V - 293 V	
AC power frequency/	50, 60	/+5H <sub>7</sub>	
range	30, 60	/±3HZ	
Max. output current	15A	16A	
Max. output fault	40A	40A	
current	40A	40A	
Max. output	40A	40A	
overcurrent protection	40A		
Initial short-current AC	60A	60A	
current	00A	60A	
Inrush current	<20% of nominal AC curre	ent for a maximum of 10ms	
Power factor (@rated	1		
power)		l	
Adjustable displacement	0.8 inductive 0.8 capacitive		
power factor			
Feed-in phase /	1		
connection phase			
Harmonic distortion			
(THD) at rated output	<3%		

Туре	TCL-GS4K-G1	TCL-GS5K-G1	TCL-GS6K-G1
Rated active power	4000W	5000W	6000W
Rated apparent AC power	4000VA	5000VA	6000VA
Max. apparent AC power	4400VA	5500VA	6600VA
Nominal AC voltage/	22	0V,230V,240V/180V-29	95V
AC power frequency/	50, 60/±5Hz		
Max. output current	20A	25A	30A
Max. output fault current	40A	40A	42.5A
Max. output overcurrent protection	40A	40A	45 A
Initial short-current AC current	60A	60A	60A
Inrush current	<20% of nom	inal AC current for a max	imum of 10ms
Power factor (@rated power)	1		
Adjustable displacement power factor	0.8 inductive 0.8 capacitive		
Feed-in phase / connection phase	1		
Harmonic distortion (THD) at rated output	<3%		

### 10.3 General data

General data	TCL-GS3K-G1/TCL-GS3.6K-G1/TCL-GS4K-G1/TCL-GS5K-G1/TCL-GS6K-G1
communication: WIFI/Meter/RS485/ GPRS	●/●/0/○
Display	LED
Earth Fault Alarm	cloud based, audible(AU)
Zero power output	Via connecting Smart meter
Dimensions (W x H x D mm)	368x325x145
Weight	9.5Kg
Cooling concept	convection
Noise emission (typical)	< 30 dB(A)@1m
Installation	indoor & outdoor
Mounting information	wall mounting bracket
DC connection	WIW
technology	XLIX
AC connection	Plug-in Connector
technology	riug-in Connector
Operating temperature range	<b>-25</b> °C <b>+60</b> °C <b>/ -13</b> °F <b>+140</b> °F
Relative humidity (non-condensing)	0% 100%
Max. operating altitude	4000m(>4000m derating)
Degree of protection (according to IEC 60529)	IP66
Climatic category (according to IEC 60721-3-4)	4K4H
Topology	Transormerless
Self-consumption (night)	<1W
Radio technology	WLAN 802.11 b / g / n

Radio spectrum	2.4 GHz
Standby power	<5W

### 10.4 Safety regulations

Protective devices	TCL-GS3K-G1/TCL-GS3.6K-G1/TCL-GS4K-G1/TCL-GS5K-G1/TCL-GS6K-G1			
DC isolator	•			
PV iso / Grid monitoring	●/●			
DC reverse polarity protection /				
AC short- circuit current	●/●			
capability				
Residual current				
monitoring(GFCI) function	•			
Protection class (according to				
IEC 62103) / overvoltage	1 (11/00) 111/40)			
category (according to IEC	I / II(DC), III(AC)			
60664-1)				
Internal overvoltage protection	Integrated			
DC feed-in monitoring	Integrated			
Islanding protection	Integrated			
EMC immunity	EN61000-6-1, EN61000-6-2			
EMC emission	EN61000-6-3, EN61000-6-4			
1022	EN61000-3-2, EN61000-3-3			
Utility interference	EN61000-3-11, EN61000-3-12			

●—Standard O—Optional -—N/A

Tools and torque required for installation and electrical connections.

Tools, model		Object	Torque
Torque screwdriver, T25		Screws for the cover	2.5Nm
Torque screwdriver, T20		Screw for second protective grounding connection  Screws for connecting the inverter and wall bracket	1.6Nm
Flat-head screwdriver, blade with 3.5mm		DEVALAN DC connector	/
Flat-head screwdriver, blade 0.4×2.5		Smart meter connector	/
	/	Stick	Hand-tight
Socket	Open end of 33	Swivel nut of M25 cable gland	Hand-tight
wrench	Open end of 15	Swivel nut of devalan connector	2.0Nm
\	Wire stripper	Peel cable jackets	/
С	rimping tools	Crimp power cables	/
Hammer drill, drill bit of Ø10		Drill holes on the wall	/
Rubber mallet		Hammer wall plugs into holes	/
Cable cutter		Cut power cables	/
	Multimeter	Check electrical connection	/
Marker		Mark the positions of drill holes	/
ESD glove		Wear ESD glove when opening the inverter	/
Safety goggle		Wear safety goggle during drilling holes.	/
Anti-dust respirator		Wear anti-dust respirator during drilling holes.	/

### 11 Troubleshooting

When the PV system does not operate normally, we recommend the following solutions for quick troubleshooting. If an error occurs, the red LED will light up. There will have "Event Messages" display in the monitor tools. The corresponding corrective measures are as follows:

Object	Error	Corrective measures	
	code		
	6	Check the open-circuit voltages of the strings and make sure	
		it is below the maximum DC input voltage of the inverter.	
		If the input voltage is within the permitted range and the	
		fault still occurs, it might be that the internal circuit has	
		broken. Contact the service.	
	33	Check the grid frequency and observe how often major	
		fluctuations occur.	
		If this fault is caused by frequent fluctuations, try to modify	
		the operating parameters after informing the grid operator	
Presumable		first.	
Fault	34	Check the grid voltage and grid connection on inverter.	
		Check the grid voltage at the point of connection of inverter.	
		If the grid voltage is outside the permissible range due to local	
		grid conditions, try to modify the values of the monitored	
		operational limits after informing the electric utility company first.	
		If the grid voltage lies within the permitted range and this fault still	
		occurs, please call service.	
		Check the fuse and the triggering of the circuit breaker in	
	35	the distribution box.	
		Check the grid voltage, grid usability.	
		Check the AC cable, grid connection on the inverter.	
		If this fault is still being shown, contact the service.	
		Make sure the grounding connection of the inverter is	
	36	reliable.	
		Make a visual inspection of all PV cables and modules.	

		If this fault is still shown, contact the service.	
		Check the open-circuit voltages of the strings and make	
		sure it is below the maximum DC input voltage of the inverter.	
	37	If the input voltage lies within the permitted range and the	
		fault still occurs, please call service.	
		•Check the PV array's insulation to ground and make sure that	
		the insulation resistance to ground is greater than 1 MOhm.	
Presumable		Otherwise, make a visual inspection of all PV cables and	
Fault	38	modules.	
		Make sure the grounding connection of the inverter is	
		reliable.	
		If this fault occurs often, contact the service.	
		Check whether the airflow to the heat sink is obstructed.	
	40	Check whether the ambient temperature around the inverter	
		is too high.	
	41, 42	Disconnect the inverter from the grid and the PV array and	
	43, 44	reconnect after 3 minutes.	
	45, 47	If this fault is still being shown, contact the service.	
	61, 62	Check the DRED device communication or operation	
		Check if the ground line is connected with the inverter;	
	65	Make sure the grounding connection of the inverter is	
	65	connected and reliable.	
		If this fault occurs often, contact the service.	
	1, 2,3,	Disconnect the inverter from the utility grid and the PV array	
Permanent	4,5,6,	and reconnect it after LED turn off. If this fault is still being	
Fault	8,9	displayed, contact the service.	
1	l	1	

Contact the service if you meet other problems not in the table.

#### 12 Maintenance

Normally, the inverter needs no maintenance or calibration. Regularly inspect the inverter and the cables for visible damage. Disconnect the inverter from all power sources before cleaning. Clean the enclosure with a soft cloth. Ensure the heat sink at the rear of the inverter is not covered.

#### 12.1 Cleaning the contacts of the DC switch

Clean the contacts of the DC switch annually. Perform cleaning by cycling the switch to on and off positions 5 times. The DC switch is located at the lower left of the enclosure.

#### 12.2 Cleaning the heat sink



#### Risk of injury due to hot heat sink

- The heat sink may exceed 70°C during operation. Do not touch the heat sink during operation.
- Wait approx. 30 minutes before cleaning until the heat sink has cooled down.
- Ground yourself before touching any component.

Clean the heat sink with compressed air or a soft brush. Do not use aggressive chemicals, cleaning solvents or strong detergents.

For proper function and long service life, ensure free air circulation around the heat sink.

## 13 Recycling and disposal

Dispose of the packaging and replaced parts according to the rules applicable in the country where the device is installed.



Do not dispose the TCL inverter with normal domestic waste.



## INFORMATION

Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.

#### 14 EU Declaration of Conformity

within the scope of the EU directives

• Electromagnetic compatibility 2014/30/EU (L 96/79-106, March 29,2014) (EMC).



- Low Voltage Directive 2014/35/EU (L 96/357-374, March 29, 2014)(LVD).
- Radio Equipment Directive 2014/53/EU (L 153/62-106. May 22. 2014) (RED)

TCL PV Tech (Shenzhen) Co., Ltd. confirms herewith that the inverters described in this manual are in compliance with the fundamental requirements and other relevant provisions of the above mentioned directives.

The entire EU Declaration of Conformity can be found at www.tcl.com/global/en/photovoltaic.

#### 15 Warranty

The factory warranty card is enclosed with the package, please keep well the factory warranty card. Warranty terms and conditions can be downloaded at <a href="https://www.tcl.com/global/en/photovoltaic">www.tcl.com/global/en/photovoltaic</a>, if required. When the customer needs warranty service during the warranty period, the customer must provide a copy of the invoice, factory warranty card, and ensure the electrical label of the inverter is legible. If these conditions are not met, TCL has the right to refuse to provide with the relevant warranty service.

#### 16 Contact

If you have any technical problems concerning our products, please contact TCL service. We require the following information in order to provide you with the necessary assistance:

- Inverter device type
- Inverter serial number
- Type and number of connected PV modules
- Error code
- Mounting location
- Installation date
- Warranty card

TCL PV Tech (Shenzhen) Co., Ltd.

Web: www.tcl.com/global/en/photovoltaic

Add.:Room D301, Building A3, No. 2533, Guanguang Averue,

Fenghuang Community, Fenghuang Street, Guangming Districct, Shenzhen, Guangdong.





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Android



# Three phase string inverters





# **User Manual**

TCL-GT12K-G1/TCL-GT15K-G1
TCL-GT17K-G1/TCL-GT20K-G1

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## 1 Notes on this Manual

## 1.1 General Notes

TCL-GT-G1 series inverter is a three-phase transformerless string inverter with two independent MPPTs. It converts the direct current (DC) generated by the photovoltaic (PV) module into a three-phase alternating current (AC) and feeds it into the utility grid.

## 1.2 Area of Validity

This manual describes the mounting, installation, commissioning and maintenance of the following inverters:

TCL-GT12K-G1

TCL-GT15K-G1

TCL-GT17K-G1

TCL-GT20K-G1

Please read this manual carefully before using this product, keep it in a convenient place and make it available at all times.

# 1.3 Target group

This document is for qualified electricians only, who must perform the tasks exactly as described.

All persons installing inverters must be trained and experienced in general safety which must be observed when working on electrical equipment.

Installation personnel should also be familiar with local requirements, rules and regulations.

Qualified persons must have the following skills:

- Knowledge of how an inverter works and is operated
- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of the applicable laws, standards and directives
- Knowledge of and compliance with this document and all safety information.

## 1.4 Symbols used in this manual

Safety instructions will be highlighted with the following symbols:



DANGER indicates a hazardous situation which, if not be avoided, will result in death or serious injury.

# **A** WARNING

WARNING indicates a hazardous situation which, if not be avoided, can result in death or serious injury.

# **A** CAUTION

CAUTION indicates a hazardous situation which, if not be avoided, can result in minor or moderate injury.

## **NOTICE**

NOTICE indicates a situation which, if not be avoided, can result in property damage.



INFORMATION that is important for a specific topic or goal, but is not safety-relevant.

# 2 Safety

## 2.1 Intended use

- 1. TCL-GT-G1 series inverter converts the direct current from the PV arrays into grid-compliant alternating current.
- 2. TCL-GT-G1 series inverter is suitable for indoor and outdoor use.
- 3. TCL-GT-G1 series inverter must only be operated with PV arrays (PV modules and cabling) of protection class II in accordance with IEC 61730, application class A. Do not connect any sources of energy other than PV modules to TCL-GT-G1 series inverter.
- 4. PV modules with a high capacity to ground must only be used if their coupling capacity does not exceed 5.0µF.
- 5. When the PV modules are exposed to light, a DC voltage is supplied to this inverter.
- 6. When designing the PV power plants, ensure that the values comply with the permitted operating range of all components at all time.
- 7. The product must only be used in countries for which it is approved or released by TCL and the grid operator.
- 8. Use this product only in accordance with the information provided in this documentation and with the locally applicable standards and directives. Any other application may cause personal injury or property damage.
- 9. The type label must remain permanently attached to the product.

## 2.2 Important safety information

# **A** DANGER

Danger to life due to electric shock when live components or cables are touched

- All work on the inverter must only be carried out by qualified personnel who have read and fully understood all safety information contained in this manual.
- Do not open the inverter.
- Children must be supervised to ensure that they do not play with the inverter.

# **▲** DANGER

Danger to life due to high voltages of the PV array When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the inverter under load, an electric arc may occur leading to electric shock and burns.

- Do not touch non-insulated cable ends.
- Do not touch the DC conductors.
- Do not touch any live components of the inverter.
- Have the inverter mounted, installed and commissioned only by qualified persons with the appropriate skills.
- •If an error occurs, have it rectified by qualified persons only.
- •Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this document (see Section 9 "Disconnecting the Inverter from Voltage Sources").

# **WARNING**

Risk of injury due to electric shock

Touching an ungrounded PV module or array frame can cause a lethal electric shock.

• connect and ground the PV modules, array frame and electrically conductive surfaces so that there is continuous conduction.

# **A** CAUTION

Risk of burns due to hot enclosure parts Some parts of the enclosure can get hot during operation.

• During operation, do not touch any parts other than the enclosure lid of the inverter.

## **NOTICE**

Damage to the inverter due to electrostatic discharge Internal components of the inverter can be irreparably damaged by electrostatic discharge.

· Ground yourself before touching any component.

## 2.3 Symbols on the label

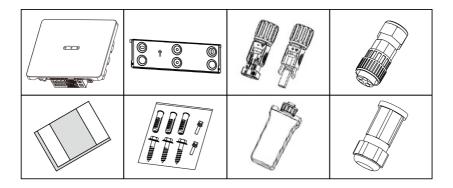
Symbol	Explanation
	Beware of a danger zone
	This symbol indicates that the inverter must be additionally
	grounded if additional grounding or equipotential bonding is
	required at the installation site.

	Beware of high voltage and operating current
	The inverter operates at high voltage and current. Work on the
[7]	inverter must only be carried out by skilled and authorized
	electricians.
^	Beware of hot surfaces
(((	The inverter can get hot during operation. Avoid contact during
<u></u>	operation.
	WEEE designation
	Do not dispose of the inverter together with the household
	waste but in accordance with the disposal regulations for
	electronic waste applicable at the installation site.
	CE marking
$C \in$	The product complies with the requirements of the applicable
	EU directives.
\$ 17k	Certification mark
TÜV	The product has been tested by TUV and got the quality
SUD SUD	certification mark.
	RCM Mark
	The product complies with the requirements of the applicable
تعا	Australian standards.
	Capacitors discharge
A 7-:	Before opening the covers, the inverter must be disconnected
	from the grid and PV array. Wait at least 5 minutes to allow the
	energy storage capacitors to fully discharge.
	Observe the documentation
	Observe all documentation supplied with the product
<b>~~</b>	Section an accumentation supplied with the product

# 3 Unpacking

## 3.1 Scope of delivery

Obje	Description	Quantity
Α	Inverter	1 piece
В	Wall bracket	1 piece
С	DC connector	3 pairs(12-15K)
C	DC connector	4 pairs(17-20K)
D	AC connector	1 piece
E	Documentation	1 piece
F	Screw accessory	1 piece
G	4G/ WiFi Stick	1 piece
Н	Communication Cover	2 pieces



Please carefully check all the components in the carton. If anything is missing, contact your dealer at once.

## 3.2 Check for transport damage

Thoroughly inspect the packaging upon delivery. If you detect any damage to the packaging which indicates the inverter may have been damaged, inform the responsible shipping company immediately. We will be glad to assist you if required.

# 4 Mounting

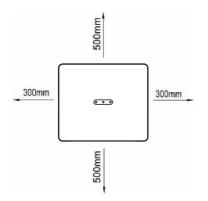
## 4.1 Requirements for mounting



Danger to life due to fire or explosion

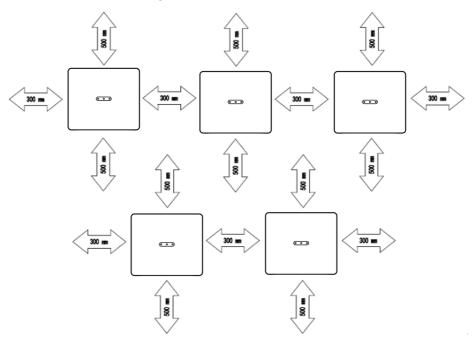
Despite careful construction, electrical devices can cause fires.

- Do not mount the inverter on flammable construction materials.
- Do not mount the inverter in areas where flammable materials are stored.
  - Do not mount the inverter in areas where there is a risk of explosion.
- 1. Be sure that the inverter is mounted out of the reach of children.
- 2. Mount the inverter in areas where it cannot be touched inadvertently.
- 3. Ensure good access to the inverter for installation and possible service.
- 4. The ambient temperature should be below 40°C to ensure optimal operation.
- 5. Observe the minimum clearances to walls, other inverters, or objects as follows to ensure sufficient heat dissipation.



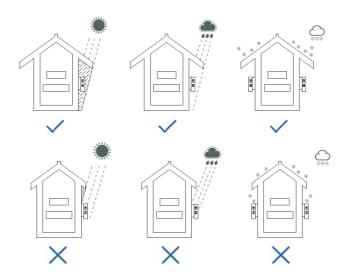
Direction	Min. clearance (mm)
above	500
below	500
sides	300

## Clearances for one inverter

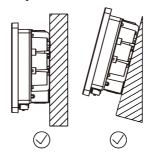


Clearances for multiple inverters

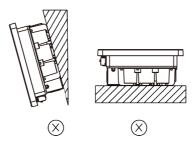
- In order to avoid power reduction caused by overheating, do not mount the inverter in a location that allows long-term exposure to direct sunlight.
- 7. Ensure optimum operation and extend service life, avoid exposing the inverter to direct sunlight, rain and snow.



- 8. The mounting method, location and surface must be suitable for the inverter's weight and dimensions.
- If mounted in a residential area, we recommend mounting the inverter on a solid surface. Plasterboard and similar materials are not recommended due to audible vibrations when in use.
- 10. Don't put any objects on the inverter. Do not cover the inverter.
- 11. Mount the inverter vertically or tilted backward by max.15°.



12. Never install the inverter horizontally, or with a forward tilt or with a backward tilt or even with upside down. The horizontal installation can result in damage to the inverter.



13. Mount the inverter at eye level for easy inspection.

## 4.2 Mounting the inverter



Risk of injury when lifting the inverter, or if it is dropped The weight of TCL inverter is max. 18.6 kg. There is risk of injury if the inverter is lifted incorrectly or dropped while being transported or when attaching it to or removing it from the wall bracket.

• Transport and lift the inverter carefully.

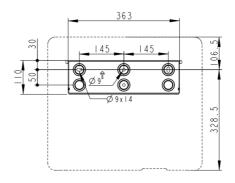
## Mounting procedure:

# **A** CAUTION

Risk of injury due to damaged cables

There may be power cables or other supply lines (e.g. gas or water) routed in the wall.

- Ensure that no lines are laid in the wall which could be damaged when drilling holes.
- 1. Use the wall bracket as a drilling template and mark the positions of the drill holes, then drill 3 holes (Φ10) to a depth about 70mm. During operation, keep the drill vertical to the wall, and hold the drill steady to avoid tilted holes.

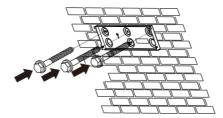


# **A** CAUTION

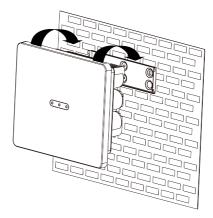
Risk of injury due to the product falls down

If the depth and distance of the holes is not correct, the product maybe fall down from the wall.

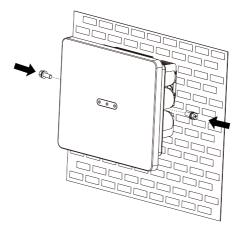
- •Before inserting the wall anchors, measure the depth and distance of the holes.
- 2. After cleaning the dust and other objects from the holes, place 3 wall anchors into the holes, then attach the wall bracket to the wall using the hexagon head screw delivered with the inverter.



3. Hold the inverter using the handles at the corners, attach the inverter onto the wall bracket tilted slightly downwards.



- 4. Check both sides of the outer fin of the inverter to ensure that it is securely in place.
- 5. Attach the outer fins of heat sink to both sides of the wall bracket using M4 screws. (screw driver type: PH2, torque: 1.6 Nm).



Dismante the inverter in reverse order.

## 5 Electrical connection

## 5.1 Safety



Danger to life due to high voltages of the PV array

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the inverter under load, an electric arc may occur leading to electric shock and burns.

- Do not touch non-insulated cable ends.
- Do not touch the DC conductors.
- Do not touch any live components of the inverter.
- Have the inverter mounted, installed and commissioned only by qualified persons with the appropriate skills.
- If an error occurs, have it rectified by qualified persons only.
- Prior to performing any work on the inverter, disconnect it from all voltage sources as described in chapter 9.

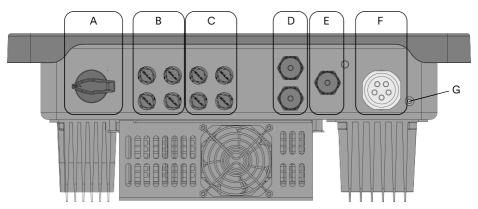
# **A** WARNING

Risk of injury due to electric shock

Touching an ungrounded PV module or array frame can cause a lethal electric shock.

• connect and ground the PV modules, array frame and electrically conductive surfaces so that there is continuous conduction.

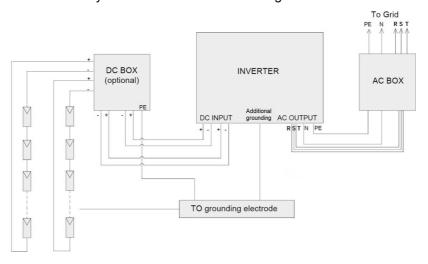
# 5.2 Electrical Connection Panel



Object	Description	
Α	DC-switch	
В	MPP1 connector	
	(12K-20K has 2 pairs of terminals)	
С	MPP2 connector	
	(12K-15K has 1 pair of terminals, 17K-20K has 2 pairs of	
	terminals)	
D	RS485 Communication interface COM1/2	
Е	Communication Stick interface COM3	
F	AC connector	
G	Additional grounding screw	

## 5.3 Electrical connection diagram with a separate DC isolator

Local standards or codes may require that a separate DC isolator should be installed next to the inverter. The separate DC isolator must disconnect each PV string of the inverter so that the entire inverter can be removed if the inverter is faulty. We recommend the following electrical connection:

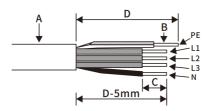


## 5.4 AC Connection

## 5.4.1 Conditions for the AC connection

## **Cable Requirements**

The grid connection is made using 5 conductors (L1, L2, L3, N, and PE). We recommend the following requirements for stranded copper conductor.



Object	Description	Value
Α	External diameter	1016 mm
В	Conductor cross-section	2.56 mm <sup>2</sup>
С	Stripping length of the insulated conductors	Approx. 13 mm
D Stripping length of the AC cable's outer sheath Approx.53 mm		Approx.53 mm
The PE insulated conductor must be 2 mm longer than the L and M		

The PE insulated conductor must be 2 mm longer than the L and N conductors

Larger cross-sections should be used for longer leads.

## Cable Design

The conductor cross-section should be dimensioned to avoid power loss in cables exceeding 1% of rated output power.

The required conductor cross-section depends on the inverter rating, ambient temperature, routing method, cable type, cable losses, valid installation requirements of installation side.

## **Residual current protection**

The product is equipped with an integrated universal current-sensitive residual current monitoring unit inside. The inverter will disconnect immediately from the mains power as soon as fault current with a value exceeding the limit.

If an external residual-current protection device is required, please install a type B residual-current protection device with a protection limit of not less than 100mA.

## Overvoltage category

The inverter can be used in grids of overvoltage category III or lower in accordance with IEC 60664-1. This means that it can be permanently

connected at the grid-connection point in a building. In installations involving long outdoor cable routing, additional measures to reduce overvoltage category IV to overvoltage category III are required.

#### AC circuit breaker

In PV systems with multiple inverters, protect each inverter with a separate circuit breaker. This will prevent residual voltage being present at the corresponding cable after disconnection.

No consumer load should be applied between AC circuit breaker and the inverter.

The selection of the AC circuit breaker rating depends on the wiring design (wire cross-section area), cable type, wiring method, ambient temperature, inverter current rating, etc. Derating of the AC circuit breaker rating may be necessary due to self-heating or if exposed to heat.

The maximum output current and the maximum output overcurrent protection of the inverters can be found in section 10 "Technical data".

## **Grounding conductor monitoring**

The inverter is equipped with a grounding conductor monitoring device. This grounding conductor monitoring device detects when there is no grounding conductor connected and disconnects the inverter from the utility grid if this is the case. Depending on the installation site and grid configuration, it may be advisable to deactivate the grounding conductor monitoring. This is necessary, for example, in an IT system if there is no neutral conductor present and you intend to install the inverter between two line conductors. If you are uncertain about this, contact your grid operator or TCL.

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Safety in accordance with IEC 62109 when the grounding

conductor monitoring is deactivated.

In order to guarantee safety in accordance with IEC 62109 when the grounding conductor monitoring is deactivated, carry out one of the following measures:

- Connect a copper-wire grounding conductor with a cross-section of at least 10 mm² to the AC connector bush insert.
- Connect an additional grounding that has at least the same cross-section as the connected grounding conductor to the AC connector bush insert.
   This prevents touch current in the event of the grounding conductor on the AC connector bush insert failing.

#### 5 4 2 Grid connection

#### Procedure:



Danger to life due to high voltages in the inverter

Touching the live components can lead to lethal electric shocks.

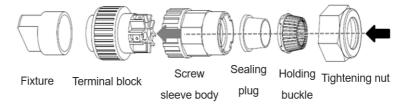
- Before performing the electrical connection, ensure that the AC circuitbreaker is switched off and cannot be reactivated.
- 1. Switch off the AC circuit breaker and secure it against reconnection.
- Insert the copper wire into a suitable European style tube connector (according to DIN 46228-4) and crimp it.

## **NOTICE**

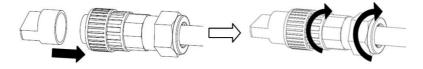
Damage to the inverter due to wrong wiring

If the phase line was connected to PE terminal, the inverter will not function properly.

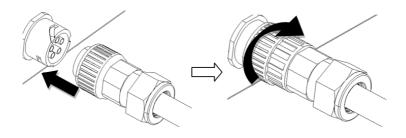
- Please ensure that the type of the conductors matches the signs of the terminals on the socket element.
- 3. Insert the grounding wire (PE), neutral wire (N) and live wire (L1, L2 and L3) of the crimped European connector into the corresponding holes of the terminal block as indicated by the arrows below, and tighten the screws with a 3mm wide Allen wrench. The torque is 2.0 Nm.



4. Push the holding buckle and the sealing plug into the screw sleeve body, and then assemble the terminal block, the screw sleeve body and the tightening nut together. First clamp the terminal block with a plastic clamp, then screw the screw sleeve body onto the terminal block, and finally tighten the tightening nut.



Insert the wired AC connector into the corresponding AC output port of the inverter and tighten it clockwise..

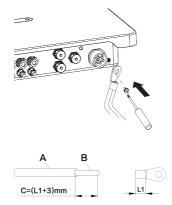


## 5.4.3 Additional grounding connection

If additional grounding or equipotential bonding is required locally, you can connect additional grounding to the inverter. This prevents touch current if the grounding conductor on the AC connector fails.

## Procedure:

- 1. Align the terminal lug with protective conductor.
- 2. Insert the screw through the hole located at the housing and tighten it firmly (screw driver type: PH2, torque: 2.5Nm).



## Grounding parts information:

Object	Explanation
1	M5 screw
2	M5 OT terminal
3	Yellow-green grounding wire

## 5.5 DC connection

# **⚠** DANGER

Danger to life due to high voltages in the inverter

Touching the live components can lead to lethal electric shocks.

- Before connecting the PV generator, ensure that the DC-switch is switched off and that it cannot be reactivated.
- Do not disconnect the DC connectors under load.

## 5.5.1 Requirements for the DC connetion

Requirements for the PV modules of a string:

- •PV modules of the connected string must be the same type, Identical alignment and Identical tilt.
- The thresholds for the input voltage and the input current of the inverter must be adhered to (see Section 10.1 "Technical DC input data").
- On the coldest day based on statistical records, the open-circuit voltage of the PV array must never exceed the maximum input voltage of the inverter.
- The connection cables of the PV modules must be provided with the connectors
- The positive connection cables of the PV modules must be fitted with the positive DC connectors. The negative connection cables of the PV modules must be provided with the negative DC connectors.

## 5.5.2 Assembling the DC connectors

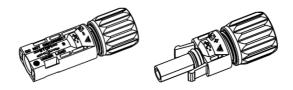
# **A** DANGER

Danger to life due to high voltages on DC conductors

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC conductors can lead to lethal electric shocks.

- Cover the PV modules.
- Do not touch the DC conductors.

Assemble the DC connectors as described below. Be sure to observe the correct polarity. The DC connectors are marked with the symbols "+" and " - ".



## Cable requirements:

The cable must be of type PV1-F, UL-ZKLA or USE2 and comply with the following properties:

External diameter: 5-8mm

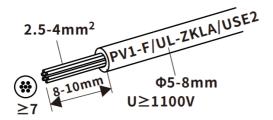
Conductor cross-section: 2.5-4mm²

Qty single wires: minimum 7

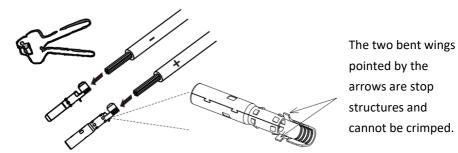
Nominal voltage: minimum 1100V

#### Procedure:

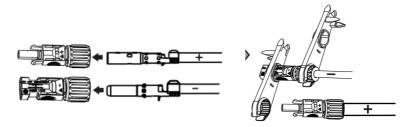
1. Strip the cable sheath as shown below.



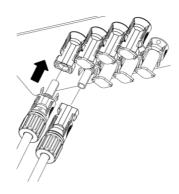
Put the positive and negative metal terminals onto the stripped cables respectively and press them tightly with a crimping pliers (H4TC0002, AMPHENOL).



 Insert the positive and negative cables with crimped metal terminals into the corresponding positive and negative connectors and snap them into place. Pull back to check if they are in place, and then tighten the locking nut at the end of the DC connector.



 Remove the sealing plug from the DC connector input of the inverter, and insert the wired DC connector into the corresponding DC connector input of the inverter. Please keep the sealing plug on the unused DC connector input port.



## 5.5.3 Disassembling the DC connectors

# **A** DANGER

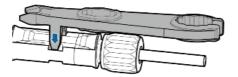
Danger to life due to high voltages on DC conductors When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC conductors can lead to lethal electric shocks.

- Cover the PV modules.
- Do not touch the DC conductors.

#### Procedure:

- 1. Disconnect the AC circuit breaker and prevent it from being reconnected.
- 2. Disconnect the DC switch and prevent it from being reconnected.
- Use a current clamp to check the DC cable to make sure there is no current.
- 4. Wait until all LED indicators go out.
- DC connector removal: Use a disassembly wrench to insert the fixed bayonet shown in the figure below and press it down hard to gently unplug the DC connector. Before operation, make sure that the DC switch

is in the "OFF" position.



- Disassembly of AC connector: Unscrew the screw sleeve of the AC connector head counterclockwise, and then pull out the AC connector.
- Disassembly of communication connector: Unscrew the screw sleeve of the data acquisition stick or communication connector head counterclockwise, and then pull out the data acquisition stick or communication connector.

## 5.5.4 Connecting the PV Array

# **NOTICE**

Destruction of the inverter due to overvoltage

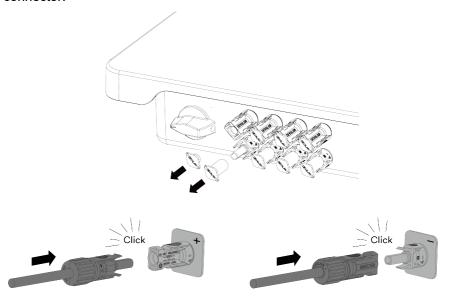
If the voltage of the strings exceeds the maximum DC input voltage of the inverter, it can be destroyed due to overvoltage. All warranty claims become void.

- Do not connect strings with an open-circuit voltage greater than the maximum DC input voltage of the inverter.
- Check the design of the PV system

#### Procedure:

- Ensure that the individual AC circuit breaker is switched off and secure it against reconnection.
- Ensure that the DC-switch is switched off and secure it against reconnection.
- 3. Ensure that there is no ground fault in the PV strings.
- 4. Check whether the DC connector has the correct polarity. If the DC connector fits with a DC cable having the wrong polarity, the DC connector

- must be reassembled again. The DC cable must always have the same polarity as the DC connector.
- 5. Ensure that the open-circuit voltage of the PV strings does not exceed the maximum DC input voltage of the inverter.
- Unplug the sealing plug on the input end of the DC connector and connect
  the assembled DC connectors to the inverter until they audibly snap into
  place. Do not unplug the sealing plug from the input end of unused DC
  connector.



#### **NOTICE**

Damage to the inverter due to moisture and dust penetration Seal the unused DC inputs with sealing plugs so that moisture and dust cannot penetrate the Inverter.

• Make sure all DC connectors are securely sealed.

#### 5.6 Conmunication equipment connection

#### 5.6.1 Mounting the WiFi or 4G Stick

#### **NOTICE**

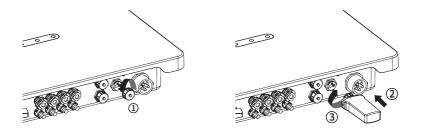
Damage to the inverter due to electrostatic discharge Internal components of the inverter can be irreparably damaged by electrostatic discharge.

• Ground yourself before touching any component.

When the system uses WiFi Stick or 4G Stick monitoring, WiFi Stick or 4G Stick should be connected to COM3 connection in section 5.2.

#### Procedure:

- 1. Take out the WiFi Stick included in the scope of delivery.
- 2. Attach the WiFi Stick to the connection port in place and tighten it into the port by hand with the nut in the stick. Make sure the stick is securely connected and the label on the modular can be seen.





The communication stick interface COM3 is only applicable to TCL products and can not be connected to any other USB devices.

#### **NOTICE**

The inverter can be destroyed by wrong communication wiring

- Internal components of the inverter can be irreparably damaged due to incorrect wiring between the power wire and signal wire. All the warranty claim will be invalid.
- Please check the wiring of the RJ45 connector before crimping the contact.

Pinout detail of the RJ45 interface on the inverter as follows:

This inverter is equipped with RJ45 interfaces for RS485 communication. The network cable should be connected to COM1/2 connection in section 5.2.

Pin 1 Pin 8

Pin 1=TX\_RS485A

Pin 2=TX\_RS485B

Pin 3=NC

Pin 4=GND

Pin 5=NC

Pin 6=NC

Pin 6=NC

Pin 7=NC

Pin 8=NC

The network cable meeting the EIA/TIA 568A or 568B standard must be UV resistant if it is to be used outdoors.

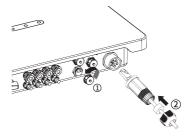
#### Cable requirement:

- Shielding wire
- CAT-5E or higher
- UV-resistant for outdoor use
- RS485 cable maximum length 1000m

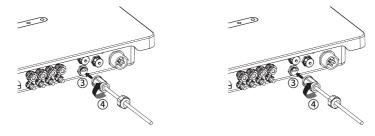
#### Procedure:

- 1. Take out the communication cover from the package.
- 2. Screw on the cover cap of the signal terminal according to the sequence of

the following arrows and plug the correctly connected wire into the waterproof RS485 communication client in the optional accessories.



Insert the cable into the corresponding communication connector in the order of the arrow, tighten the sleeve and the forcing head screw at the tail.



#### **NOTICE**

Damage to the inverter due to moisture and dust penetration

- If the cable gland are not mounted properly, the inverter can be destroyed due to moisture and dust penetration. All the warranty claim will be invalid.
- Make sure the cable gland has been tightened firmly.

Disassemble the network cable in reverse order.

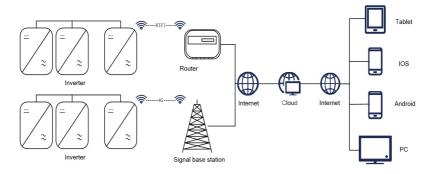
#### 5.6.3 Connect the smart meter cable

If smart meter needs to be connected. Cable requirements and connecting procedure are the same as chapter 5.6.2.

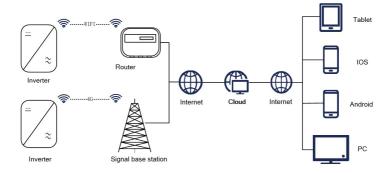
#### 6 Communication

#### 6.1 System monitoring via WLAN

User can monitor the inverter through the external 4G/WiFi stick module. The connection diagram between the inverter and internet is shown as following two pictures, both two methods are available. Please note that each 4G/WiFi stick can only connect to 5 inverters in method1.



Method 1 only one inverter with the 4G/WiFi Stick, the other inverter be connected through the RS 485 cable.

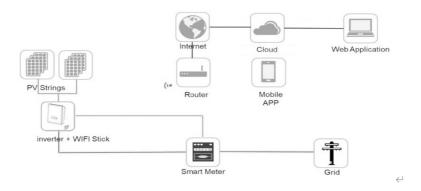


Mehod 2 every inverter with 4G/WiFi Stick, every inverter can connect to internet.

As shown above, we offer a remote monitoring platform called "TCL cloud". You can also install the "TCL APP" on a smart phone using Android or an iOS operating system. You can visit the website (https://www.tcl.com/global/en/photovoltaic) for system information. And download the user manual for the TCL Cloud Web or TCL APP.

#### 6.2 Active power control with Smart meter

The inverter can control active power output via connecting smart meter, following picture is the system connection mode through WiFi stick.



The smart meter should support the MODBUS protocol with a baud rate of 9600 and address set 1. Smart meter as above SDM630-Modbus connecting method and seting baud rate method for modbus please refer to it's user manual.

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Possible reason of communication failure due to incorrect

#### connection

- WiFi stick only support single inverter to do active power control.
- The overall length of the cable from inverter to smart meter is 100m.

The active power limit can be set on "TCL APP" application, the details can be found in the user manual for the TCL APP.

#### 6.3 Remote firmware update

TCL-GT-G1 series inverters can update the firmware through 4G/WIFI stick, no need to open the cover for maintenance. For more information, please contact the Service.

# 6.4 Active power control via demand response enabling device (DRED)



DRMs application description

- Only applicable to AS/NZS4777.2:2020.
- DRM0, DRM5, DRM6, DRM7, DRM8 are available.

The inverter shall detect and initiate a response to all supported demand response commands, demand response modes are described as follows:

Mode	Requirement
DRM 0	Operate the disconnection device

DRM 1	Do not consume power
DRM 2	Do not consume at more than 50% of rated power
DRM 3	Do not consume at more than 75% of rated power AND Source
	reactive power if capable
DRM 4	Increase power consumption (subject to constraints from other
	active DRMs)
DRM 5	Do not generate power
DRM 6	Do not generate at more than 50% of rated power
DRM 7	Do not generate at more than 75% of rated power AND Sink
	reactive power if capable
DRM 8	Increase power generation (subject to constraints from other
	active DRMs)

If DRMs support is required, the inverter should be used in conjunction with AiCom. the Demand Response Enabling Device (DRED) can be conneted to the DRED port on AiCom via RS485 cable. You can vist the website https://www.tcl.com/global/en/photovoltaic for more information and download the user manual for the AiCom.

#### 6.5 Communication with the third party device

TCL inverters can also connect with one third party device instead of RS485 or WiFi stick, the communication protocol is modbus. For more information, please contact the Service.

#### 6.6 Earth fault alarm

This inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring. If an Earth Fault Alarm occurs, the red color LED indicator will light up. At the same time, the error code 38 will be sent to the TCL Cloud. (This function is only available in Australia and New Zealand)

#### 7 Commissioning

#### 7.1 Electrical check

Carry out the main electrical checks as follows:

① Check the PE connection with a multimeter: check that the inverter's exposed metal surface has a grounding connection.

## **A** WARNING

Danger to life due to the presence of DC-Voltage

Touching the live conductors can lead to lethal electric shocks.

- Only touch the insulation of the PV array cables.
- Do not touch parts of the sub-structure and frame of the PV array which isn't grouned.
  - Wear personal protective equipment such as insulating gloves.
- ② Check the DC voltage values: make sure that the DC voltage of the strings does not exceed the permitted limits.
- ③ Check the polarity of the DC voltage: make sure the DC voltage has the correct polarity.
- ④ Check the PV generator's insulation to ground with a multimeter: make sure that insulation resistance to ground is greater than 1MOhm.



Danger to life due to the presence of AC-Voltage

Touching the live conductors can lead to lethal electric shocks.

- Only touch the insulation of the AC cables.
- Wear personal protective equipment such as insulating gloves.
- ⑤ Check the grid voltage: check that the grid voltage at the point of connection of the inverter is within the permitted range.

#### 7.2 Mechanical check

Carry out the main mechanical checks to ensure the inverter is waterproof as follows:

- ① Make sure the inverter has been correctly mounted with wall bracket.
- ② Make sure the cover has been correctly mounted.
- 3 Make sure the communication cable and AC connector have been correctly wired and tightened.

#### 7.3 Safety code check

Choose suitable safety code according to the location of installation. please visit website (https://www.tcl.com/global/en/photovoltaic) and download the TCL Cloud APP manual for detailed information, you can find "Grid code settings" in the TCL Cloud APP manual where an installer needs ...



The TCL's inverters comply with local safety code when leaving the factory.

#### 7.4 Start-up

After finishing the electrical and mechanical checks, switch on the miniature circuit-breaker and DC-switch in turn. Once the DC input voltage is sufficiently high and the grid-connection conditions are met, the inverter will start operation automatically. Usually, there are three states during operation:

- 1) Waiting: When the initial voltage of the strings is greater than the minimum DC input voltage but lower than the start-up DC input voltage, the inverter is waiting for sufficient DC input voltage and cannot feed power into the grid.
- 2) Checking: When the initial voltage of the strings exceeds the start-up DC input voltage, the inverter will check feeding conditions at once. If there is anything wrong during checking, the inverter will switch to the "Fault" mode.
- 3) Normal: After checking, the inverter will switch to "Normal" state and feed power into the grid.

During periods of low radiation, the inverter may continuously start up and shut down. This is due to insufficient power generated by the PV array.

If this fault occurs often, please call service.

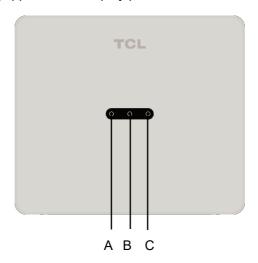


If the inverter is in "Fault" mode, refer to chapter 11 "Troubleshooting".

### 8 Display

#### 8.1 Overview of the control panel

The inverter is equipped with a display panel, which has 3 LED indicators.



Object	Description
Α	Normal (White LED)
В	Communication (White LED)
С	Fault (Red LED)

#### 8.2 LED indicators

The three LED indicators from top to bottom are:

1. SOLAR power indicator

When the inverter is in the standby self-checking state, the white light flashes. Under normal grid-connected working state, the light is always on. In "Fault" mode, the light is off.

2. COM communication indicator

When the inverter communicates with other devices normally, the white light flashes. If communication is abnormal or not connected, the light is off.

#### Fault indicator

The light is on when the invert is faulty or when external conditions cannot be grid-connected or when it is working improperly. When there is no fault, the light is off.

#### 9 Disconnecting the inverter from voltage sources

Before performing any work on the inverter, disconnect it from all voltage sources as described in this section. Always adhere strictly to the given sequence.

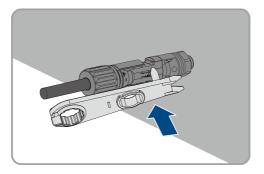
- 1. Disconnect AC circuit breaker and secure against reconnection.
- 2. Disconnect the DC-switch and secure against reconnection.
- 3. Use a current probe to ensure that no current is present in the DC cables.

## **A** DANGER

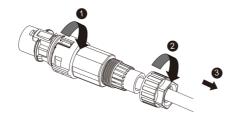
Danger to life due to electric shock when touching exposed DC conductors or DC plug contacts if the DC connectors are damaged or loose

The DC connectors can break or become damaged, become free of the DC cables, or no longer be connected correctly if the DC connectors are released and disconnected incorrectly. This can result in the DC conductors or DC plug contacts being exposed. Touching live DC conductors or DC plug connectors will result in death or serious injury due to electric shock.

- Wear insulated gloves and use insulated tools when working on the DC connectors.
- Ensure that the DC connectors are in perfect condition and that none of the DC conductors or DC plug contacts are exposed.
- Carefully release and remove the DC connectors as described in the following.
- 4. Wait until the LEDs are OFF. To remove DC plug connectors, insert the appropriate tool into the slots and press the tool with an appropriate force.



5. Release and disconnect the AC connector. Rotate the socket element counterclockwise to open.



6. Wait until all LEDs and the display have gone out.

#### 10 Technical data

#### 10.1 DC input data

Туре	TCL- GT12K- G1	TCL- GT15K- G1	TCL- GT17K- G1	TCL- GT20K- G1
Max. PV modules Power (STC)	18000W	22500W	25500W	30000W
Max. input voltage/ Rated input voltage		1100V	//630V	
MPP voltage range		150~	1000 V	
Full load MPP voltage range	400~850V			
Intitial feed-in voltage	180V			
Min input voltage	125V			
Max. DC input current	32A/20A 2*32A		*32A	
I <sub>sc</sub> PV, absolute max.	48A/30A 2*48A		*48A	
Maximum reverse current from the inverter in the system for max. 1 ms	0A			
Number of MPP trackers	ber of MPP trackers 2			
Strings per MPP tracker	2/1 2/2		/2	
Overvoltage category in accordance with II IEC60664-1		I		

- (1) When the DC input voltage is greater than 1000V, the inverter will alarm an error.
- (2) When the DC input voltage is lower than 995V, the inverter starts self-checking.

(3) The full-load MPP voltage range of the inverter is the value measured under the rated AC voltage. If you have any questions, please consult local service personnel.

#### 10.2 AC output data

Туре	TCL- GT12K- G1	TCL- GT15K-G1	TCL- GT17K-G1	TCL- GT20K-G1
Rated output power	12000 W	15000 W	17000 W	20000 W
Max. output active power	13200 W	16500 W	18700 W	22000W
Max. output apparent power	13200VA	16500VA	18700VA	22000VA
Rated AC Voltage	3/N/PE, 220/380 V, 230/400 V,240/415 V			
AC voltage range		160 \	/~300 V	
Rated AC Frequency (2)	50 Hz/ 60 Hz			
Operating range at AC power frequency 50 Hz	45 Hz to 55Hz			
Operating range at AC power frequency 60 Hz	55 Hz to 65Hz			
Max. continuous output current	3×19.1A	3×24A	3×27.1 A	3×31.9 A
Maximum output current under fault conditions	3×33A		3×46A	
Maximum output overcurrent protection	3×40A		3×60A	

Adjustable		
displacement	0.80 ind - 0.80 cap	
power factor		
Inrush current	<10A @250up	
(peak and duration)	<10A @250us	
Harmonic distortion		
(THD) at the rated	< 3%	
power		
Night-time power	<1 W	
loss	~ 1 VV	
Standby power loss	<12 W	
Overvoltage		
category in	Ш	
accordance with	III	
IEC60664-1		

<sup>(1)</sup> The AC voltage range depends on the local safety standards and rules.

<sup>(2)</sup> The AC frequency range depends on the local safety standards and rules.

#### 10.3 General data

Туре	TCL-GT12-15K-G1	TCL-GT17-20K-G1
Net weight	17.3 KG	18.6KG
Dimensions(L×W×D)	503×435×	<183 mm
Mounting environment	Indoor and	d Outdoor
Mounting recommendation	Wall br	racket
Operating temperature range	-25+	-60°C
Max. permissible value for relative humidity ( non-condensing )	100%	
Max. operating altitude above mean sea level	3000m	
Ingress protection	IP65 according to IEC60529	
Climatic category	4K4H	
Protection class	I according to IEC 62103	
Topology	Transfor	merless
Feed-in phases	3	
Cooling concept	Active cooling	
Display	LED	
Communication interfaces	WiFi/4G/RS485(optional)	
Radio technology	y WLAN 802.11 b / g / n	
Radio spectrum	WLAN 2.4 GHz with 2412MHz – 2472MHz band	
Antenna gain	2d	В

## 10.4 Safety regulations

Туре	TCL-GT-G1 Series inverter	
Internal overvoltage protection	Integrated	
DC insulation monitoring	Integrated	
DC injection monitoring	Integrated	
Grid monitoring	Integrated	
Residual current monitoring	Integrated	
Islanding protection	Integrated (Three-phase monitoring)	
EMC immunity	EN61000-6-1 EN61000-6-2	
EMC emission	EN61000-6-3	
LIVIO CITIISSIOIT	EN61000-6-4	
Utility interference	EN61000-3-2, EN61000-3-3	
Ounty interiorerioe	EN61000-3-11, EN61000-3-12	

## 10.5 Tools and torque

Tools and torque required for installation and electrical connections.

Tools, model		Object	Torque
Torque screwdriver,		Screws for the cover	3.0 Nm
T25			
Torque	screwdriver,	Screws for wall bracket	1.6Nm
T20		Screw for second	
		grounding	
Flat-hea	d screwdriver,	Sunclix DC connector	1
blade wi	th 3.5mm		
Torque	screwdriver,	Screw for second protective	1.6Nm
PH2		grounding connection	
Cross he	ead		
Flat-hea	d screwdriver,	Smart meter connector	1
blade 0.	4×2.5		
1		Stick	Hand-tight
Socke	Open end of	Swivel nut of M25 cable	Hand-tight
t	33	gland	
wrenc	Open end of	Swivel nut of sunclix	2.0Nm
h	15	connector	
Wire stri	pper	Peel cable jackets	1
Crimping	g tools	Crimp power cables	1
Hamme	r drill,	Drill holes on the wall	1
drill bit o	f Ø10		
Rubber	mallet	Hammer wall plugs into	1
		holes	
Cable cutter		Cut power cables	/
Multimeter		Check electrical connection	1
Marker		Mark the positions of drill	1
		holes	

ESD glove	Wear ESD glove when	1
LOD GIOVE		1
	opening the inverter	
Safety goggle	Wear safety goggle during	1
	drilling holes.	
Anti-dust respirator	Wear anti-dust respirator	1
	during drilling holes.	

#### 11 Troubleshooting

When the PV system does not operate normally, we recommend the following solutions for quick troubleshooting. If an error occurs, the red LED will light up. There will have "Event Messages" display in the monitor tools. The corresponding corrective measures are as follows:

Object	Error	Corrective measures
	code	
		Check the grid frequency and observe how often
		major fluctuations occur.
	E33	If this fault is caused by frequent fluctuations, try to
		modify the operating parameters after informing the
		grid operator first.
		Check the grid voltage and grid connection on
		inverter.
		Check the grid voltage at the point of connection of
		inverter.
Presumable	E34	If the grid voltage is outside the permissible range
Fault		due to local grid conditions, try to modify the values
		of the monitored operational limits after informing the
		electric utility company first.
		If the grid voltage lies within the permitted range and
		this fault still occurs, please call service.
		Check the fuse and the triggering of the circuit
	E35	breaker in the distribution box.
		Check the grid voltage, grid usability.
		Check the AC cable, grid connection on the
		inverter.
		If this fault is still being shown, contact the service.
		Make sure the grounding connection of the inverter
	E36	is reliable.
		Make a visual inspection of all PV cables and
		a.t. a. t. caai in operation of all 1 7 cables and

		modules.
		If this fault is still shown, contact the service.
		Check the open-circuit voltages of the strings and
		make sure it is below the maximum DC input voltage
	E37	of the inverter.
		If the input voltage lies within the permitted range
		and the fault still occurs, please call service.
Presumable		Check the PV array's insulation to ground and
Fault		make sure that the insulation resistance to ground is
		greater than 1 MOhm. Otherwise, make a visual
	E38	inspection of all PV cables and modules.
		Make sure the grounding connection of the inverter
		is reliable.
		If this fault occurs often, contact the service.
		Check whether the airflow to the heat sink is
	E40	obstructed.
		Check whether the ambient temperature around the
		inverter is too high.
	E46	Check whether the open circuit voltage of each
		photovoltaic group is ≥1020V.
		If the open circuit voltage of each pv group is less
		than 995V and this fault still exists, please contact
		the service personnel.
		Check whether the electric supply is abnormal.
	E48	If the electric supply is normal and this fault still
		exists, please contact the service personnel.
	E56	Disconnect the inverter from the grid and the PV
	E57	array and reconnect after 3 minutes.
	E58	If this fault is still being shown, contact the service.
	E61	Check the DRED device communication or
	E62	operation.
	E65	Make sure the grounding connection of the inverter

		is reliable.
		If this fault occurs often, contact the service.
	E01	Disconnect the inverter from the utility grid and the
Permanent	E03	PV array and reconnect it after LED turn off.
Fault	E05	If this fault is still being displayed, contact the
	E07	service.
Permanent	E08	
Fault	E10	

Warning code	Warning message	
31	PV1 input over voltage	
32	PV2 input over voltage	
34	PV1 input over current-software	
35	PV1 input over current-hardware	
36	PV2 input over current-software	
37	PV2 input over current-hardware	
40	BUS over voltage-software	
42	BUS voltage unbalance (for three phase inverter)	
44	Grid voltage over instant	
45	Output over current-software	
46	Output over current-hardware	
47	Anti-islanding	
150	PV1-SPD Fault	
156	Inter Fan abnormal	
157	External Fan abnormal	
163	GFCI Redundancy check	
166	CPU self-testregister abnormal	
167	CPU self-testRAM abnormal	
174	Low Air Temperature	

#### 12 Maintenance

Normally, the inverter needs no maintenance or calibration. Regularly inspect the inverter and the cables for visible damage. Disconnect the inverter from all power sources before cleaning. Clean the housing, cover and display with a soft cloth. Ensure the heatsink at the rear of the inverter cover is not covered.

#### 12.1 Cleaning the contacts of the DC-switch

Clean the contacts of the DC-switch once per year. Perform cleaning by cycling the switch to ON/OFF positions 5 times. The DC-switch is located at the lower left of the housing.

#### 12.2 Cleaning the heat sink



Risk injury due to hot heat sink

The heat sink may exceed 70°C during operation.

- Do not touch the heatsink during operation.
- Wait approx. 30 minutes before cleaning until the heatsink has cooled

An external fan is installed at the bottom of the inverter. When the fan fails to work normally, the inverter cannot effectively dissipate heat, and the load drops or the machine may even shut down. At this time, the fan needs to be cleaned or replaced.

Clean the heat sink with pressurized air or a soft brush. Do not use aggressive chemicals, cleaning solvents or strong detergents.

For proper function and long service life, ensure free air circulation around the heatsink.

#### 13 Recycling and disposal

Dispose of the packaging and replaced parts according to the rules at the installation site where the device is installed.





Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.

### 14 EU Declaration of Conformity

within the scope of the EU directives

 Electromagnetic compatibility 2014/30/EU (L 96/79-106, March 29,2014) (EMC).



- Low Voltage Directive 2014/35/EU.(L 96/357-374, March 29, 2014)(LVD).
- Radio Equipment Directive 2014/53/EU (L 153/62-106. May 22. 2014) (RED)
   TCL PV Tech (Shenzhen) Co., Ltd. confirms herewith that the inverters described in this document are in compliance with the fundamental requirements and other relevant provisions of the above mentioned directives.
   The entire EU Declaration of Conformity can be found at https://www.tcl.com/global/en/photovoltaic

#### 15 Warranty

The factory warranty card is enclosed with the package, please keep well the factory warranty card. Warranty terms and conditions can be downloaded at https://www.tcl.com/global/en/photovoltaic, if required.

When the customer needs warranty service during the warranty period, the customer must provide a copy of the invoice, factory warranty card, and ensure the type label of the inverter is legible. If these conditions are not met, TCL has the right to refuse to provide with the relevant warranty service.

#### 16 Contact

If you have any technical problems concerning our products, please contact TCL service. We require the following information in order to provide you with the necessary assistance:

- Inverter device type
- · Inverter serial number
- Type and number of connected PV modules
- Error code
- · Mounting location
- Warranty card

TCL PV Tech (Shenzhen) Co., Ltd.

Add.:No. Room D301, Building A3, No. 2533, Guanguang Avenue, Fenghuang Community, Fenghuang Street, Guangming District, Shenzhen, Guangdong.

https://www.tcl.com/global/en/photovoltaic





ios

Android



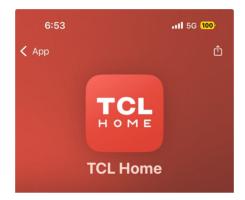
TCL PV Tech (Shenzhen) Co., Ltd.
Web:www.tcl.com/global/en/photovoltaic
Add.:Room D301, Building A3, No. 2533, Guanguang Avenue,
Fenghuang Community, Fenghuang Street, Guangming District,
Shenzhen, Guangdong.

# TCL Home User Manual 1.0

## 1、App Install

Method 1: Download and install the app from the app store

- iPhone users: Search for "TCL Home" in the App Store.
- Other mobile phone users: Search for "TCL Home" in the Google Play.



Method 2: Scan the QR code to download and install the app.



## 2、Sign Up and Log In

#### 2.1 Create account

## **Step 1** Open the App

Launch the TCL Home app and enter the main login interface.

You can choose the following actions:

- Log In: Enter your email or phone number and password, then click Login.
- Create Account: Click Create account.

#### Step 2 Create account.

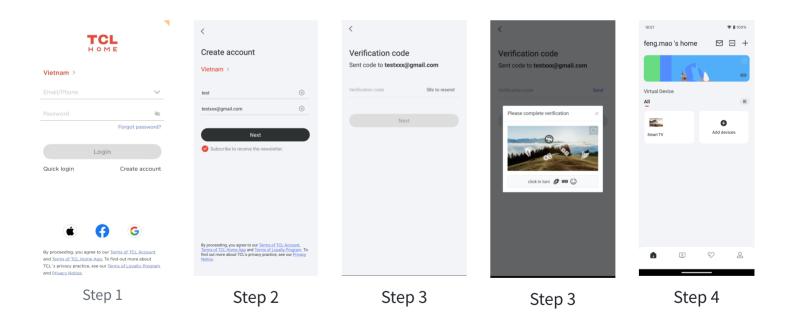
- Enter your name and email address.
- Optionally, you can choose to subscribe to the newsletter.
- Click Next to proceed.

## Step 3 Verify Your Identity

- The system will send a verification code to the email or phone number you entered.
- On the Verification code screen, enter the code you received.
- If required, complete the image verification (e.g., clicking specific elements in the image).
- Click **Next** to complete the verification.

## Step 4 Complete Registration or Login

- After successful verification, unregistered email addresses or phone numbers will be automatically registered.
- You can now access all features of the TCL Home app.



## 2.2 Quick login

## Step 1 Open the App

Launch the TCL Home app and enter the main login interface.

You can choose the following actions:

- Log In: Enter your email or phone number and password, then click Login.
- Quick Login: Click Quick login.

#### Step 2 Click Quick login.

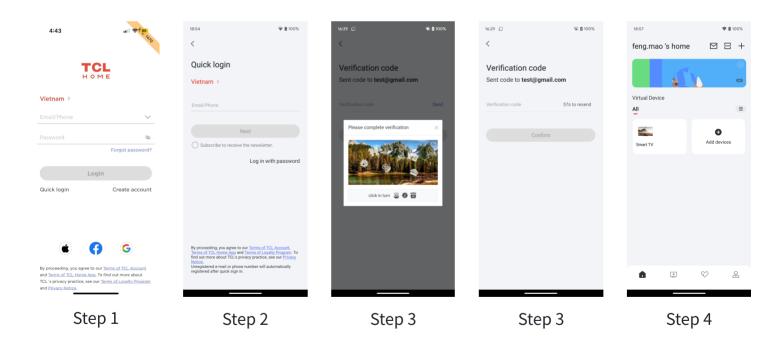
- Click Quick login.
- Enter your email or phone number.
- Optionally, you can choose to subscribe to the newsletter.
- Click Next.

## **Step 3 Verify Your Identity**

- The system will send a verification code to the email or phone number you entered.
- On the **Verification code** screen, enter the code you received.
- If required, complete the image verification (e.g., clicking specific elements in the image).
- Click **Next** to complete the verification.

#### **Step 4 Complete Registration or Login**

- After successful verification, unregistered email addresses or phone numbers will be automatically registered.
- You can now access all features of the TCL Home app.



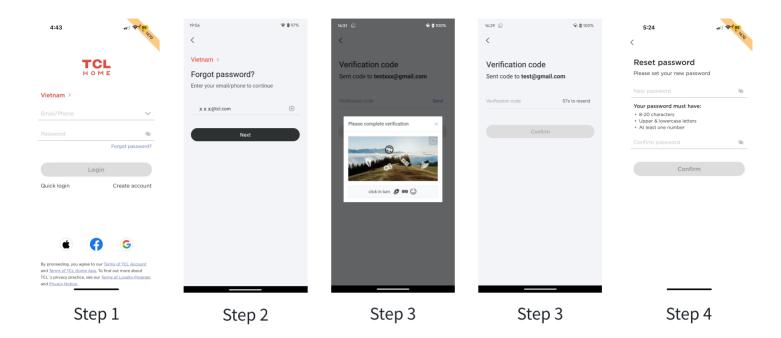
## 2.4 Forgot password

Step 1 If you forget your password, click Forgot password?.

Step 2 Follow the prompts to enter your email or phone number.

Step 3 Enter the verification code you receive.

## Step 4 Enter a new password and click Confirm to log in again.



# 3. Network Configuration and Binding

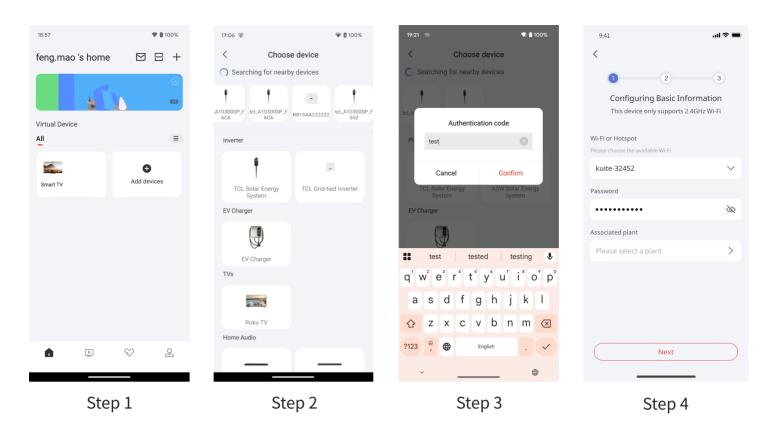
## 3.1 Add the Device

Step 1 In the app, click "Add Device" or the "+" button, and select the device type.

Step 2 The app will automatically search for nearby devices. Once found, click to connect.

Step 3 The installer code is admin.

Step 4 Enter the name and password of your home Wi-Fi network ( supports only 2.4GHz Wi-Fi).

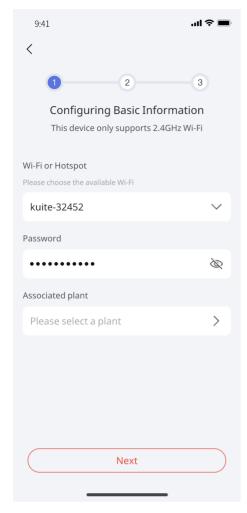


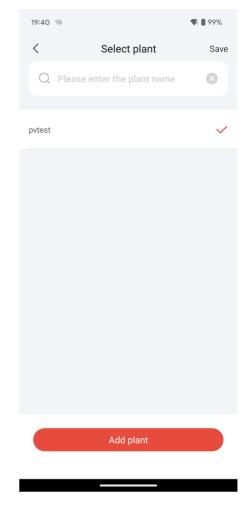
S

Step 5 Select the **Plant** to associate in the "Associated plant" field.

Step 6 Click the arrow icon on the right to enter the selection page and complete the association.

• If no plant is available for association, you can click **Add plant** to add one.





Step 5

Step 6

#### 3.1.1 Add Plant

## Step 1 Fill in the plant information

#### 1. Enter Plant Name (Step 1)

• Input the name of the plant in the "Plant name" field (required).

## 2. Select Country/Region (Step 1)

 Click the "Country/Region" field and select the country or region where the plant is located (required).

## 3. Enter Plant Address (Step 1)

- Input the detailed address of the plant in the "Plant address" field.
- Click the location icon on the right to select the address via the map.

## 4. Enter Total String Capacity (Step 1)

• Input the total string capacity of the plant in the "Total string capacity (kWp)" field (required).

## 5. Select Plant Type (Step2)

- Click the "Plant type" field and select the type of plant (PV+Battery,
   PV+Grid+Consumption,
   PV+Grid+Consumption+Battery) (required).
- Click the question mark icon on the right to view the type description.

#### 6. Select System Type (Step 1)

- Click the "System type" field and select the system type of the plant (e.g., grid-connected, off-grid, etc.) (required).
- Click the question mark icon on the right to view the type description.

#### 7. Enter Creation Date (Step 3)

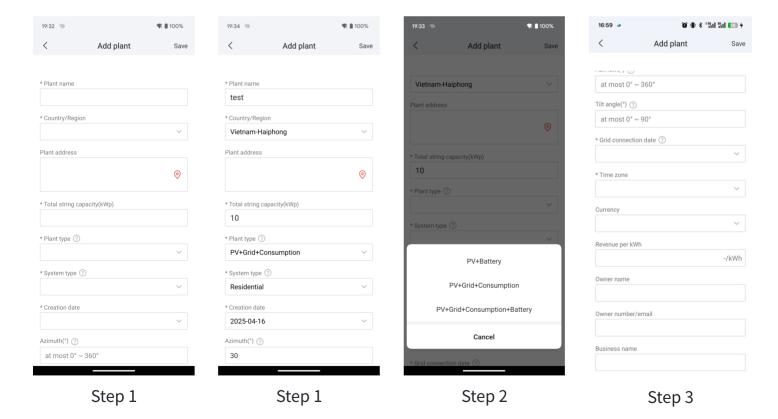
Input the creation date of the plant in the "Creation date" field (required).

#### 8. Set Azimuth (Step 3)

- Input the azimuth of the plant in the "Azimuth (°)" field, with a range of 0° to 360°.
- Click the question mark icon on the right to view the definition of azimuth.

#### 9. Save Information (Step 3)

 After completing the above fields, click the "Save" button in the top-right corner of the page to save the plant information.



## 3.2 Connect to the Dongle AP hotspot

## **Step 1 Confirm and Proceed to the Next Step**

 Click the "Next" button at the bottom of the page to save the configuration and proceed to the next step.

#### **Step 2 Connect to the Device**

#### a. Connect to the Device Hotspot

- Follow the prompt to connect your mobile phone to the device's temporary WLAN hotspot to complete the connection.
- Example hotspot name: eg (B815AA222222)

#### **b.** Confirm Connection

- Click the "Connect" button to connect to the device hotspot.
- If you need to cancel the operation, click the "Cancel" button.

#### **Step 3 Connect to the Device**

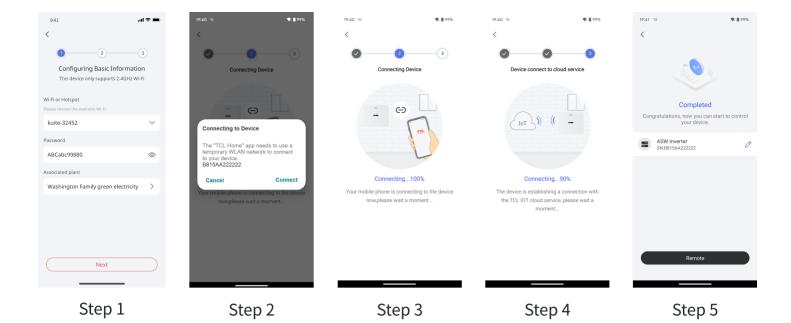
- Your mobile phone is establishing a connection with the device, and the progress is displayed on the screen.
- Please wait patiently until the connection is completed (100%).

## **Step 4 Device Connecting to Cloud Service**

- The device is establishing a connection with the TCL IoT cloud service, and the progress is displayed on the screen.
- Please wait patiently until the connection is completed (100%).

## **Step 5 Binding Completed**

- The screen displays "Completed," indicating that the device has been successfully registered and bound to the cloud service.
- You can see the device name and serial number (e.g., ASW Inverter, SN: B815AA222222).
- Click the "Remote" button at the bottom of the screen to start remotely controlling the device.



## 4. Transfer plant

Step 1 Open the app, log in to your account, and navigate to the device homepage to view the corresponding list of power station cards. Click on a power station card to enter the power station details page.

Step 2 The power station details page displays the power station status, real-time power monitoring, and energy flow diagram. Click the settings icon in the top right corner.

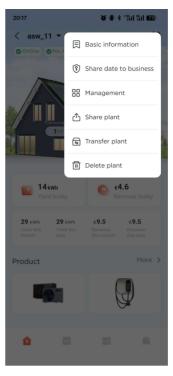
Step 3 Select "Transfer Plant".

Step 4 Scan the code to transfer Plant.

- Scan the code to download and register as a TCLhomeAPP user
- Use TCLhome APP to scan this QR code
- After the transfer, the power station will be under the Use TCLhome account.









Step 1 Step 2 Step 3 Step 4

## 5. The introduction of Plant functions

# Step 1 The Plant page :power plant name, energy flow diagram, data overview, product introduction and functional areas

- 1. **Power plant name:** show the powerplant name and switch to view the user's other power plants.
- 2. **Energy flow diagram:** real-time display of the PV power generation, battery storage power, load consumption power and real-time power of the grid according to the current operation of the plant.
- 3. **Data Overview:** This is to show the important data related to the power plant, including yield today, yield this month, yield this year, revenue today, revenue this month, revenue this year.
- 4. **Product Introduction:** Here will show the power plant related supporting products, including pv panels ,heat pumps ,inverter ,battery,and EV charger. Click on it to view the specific introduction of the product.

## **Step 2 More Functions:**

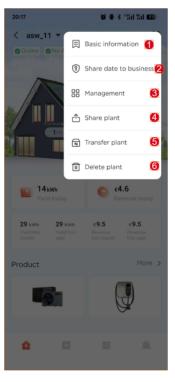
- 1. **Basic information:** click to view the basic information of the power station, such as: grid connection date.
- 2. **Share data to bussiness:** you can share the data of the power station to the maintenance provider.

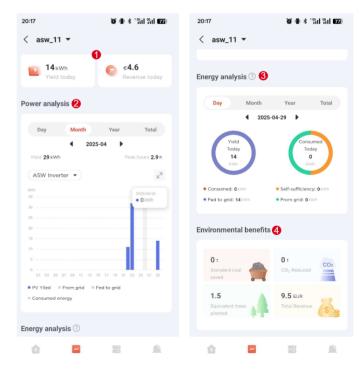
- 3. **Management:** You can add your TCL heat pump or EV charger to the power station for unified management.
- 4. **Share plant:** share the power station to your family or friends.
- 5. **Transfer plant:** Installer can share the power station to user.
- 6. **Delete plant:** only the owner of the power station owns this function.

# Step 3 The data page including: power generation data, power analysis, energy analysis, environmental benefits

- 1. Power generation data: show the daily yield and daily revenue.
- 2. **Power analysis:** show the relevant parameters of different years, months, days and the total life cycle content, such as: power generation, power consumption, etc.
- 3. **Energy analysis:** show specific details of different periods (day/month/year/life cycle) from the perspective of both power generation and power consumption. For example, it introduces how much of the total power generation is self-generated and how much electricity is sold to the grid
- 4. **Environmental Benefits:** 4 environment-related indicators are shown here, saving standard coal, reducing carbon emissions, equivalent tree planting and power generation benefits, through which users can learn about the contribution of installing PV power generation to global environmental protection.







Step 1 Step 2 Step 3

**Step 4 Devices Management page: Devices status** 

- 1. **Device type:** here the device is categorized according to different communication status and operation status of the device, users can quickly filter and locate the device they need to view according to different categories.
- 2. **Device Card:** Each inverter under the current power plant will be displayed here as a card, which mainly contains device name, device SN, device operation status (normal/alarm), real-time power and today's power generation.

### Step 5 The alarm page :alarm type,alarm card

- 1. **Alarm type:** here according to different types of alarms are categorized, users can quickly filter and locate the alarms they need to view according to different alarm types (e.g., all alarms, alarms in progress, and alarms that have been shut down).
- 2. **Alarm card:** each alarm triggered by each device under the current power station will be displayed here in the form of a card, the card contains: alarm level, alarm title, belongs to the inverter, alarm trigger time, alarm status and other information.
- 3. **Click on the view:** you can enter the alarm details inside the alarm to view the alarm content of the current content contains more detailed content.

