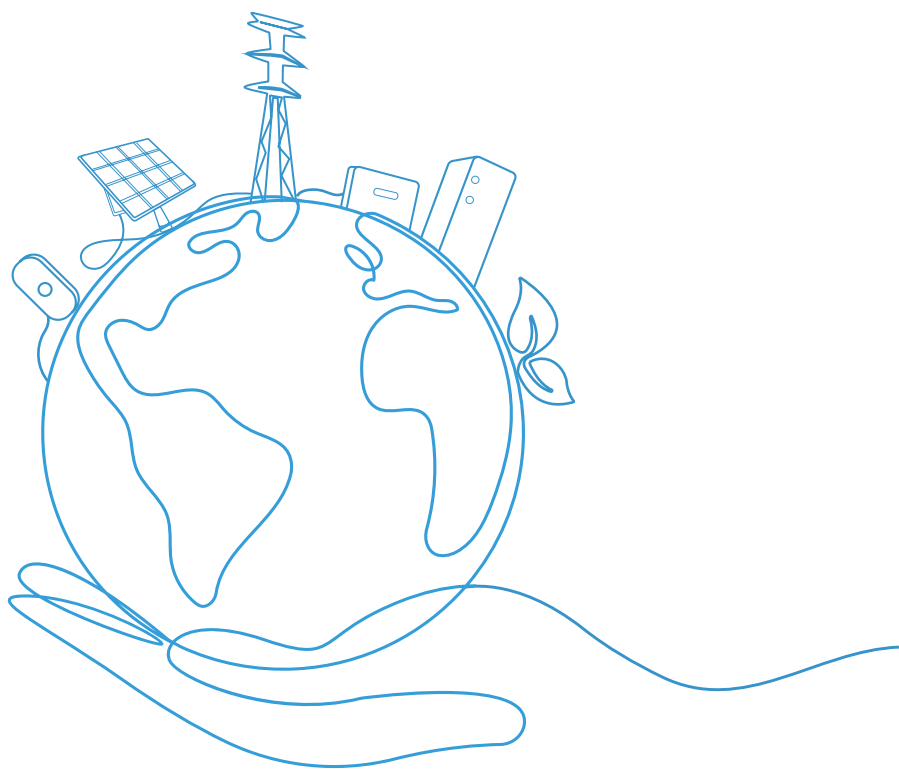


# User Manual

## HP1-7.5~12KS2 Inverter

v1.2

2025-10



**LIVOLTEK**

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# About this Manual

## Validity

This manual is valid for the following products:

- HPI-7K5S2M
- HPI-8KS2M
- HPI-10KS2
- HPI-12KS2

## Model Description

# HPI-7K5S2M

1

2

3

4

5

|   |                     |                                                                                      |
|---|---------------------|--------------------------------------------------------------------------------------|
| 1 | Product Name        | HPI: single-phase hybrid inverter                                                    |
| 2 | Power               | 7K5: rated power of the inverter is 7.5kW                                            |
| 3 | Rated grid voltage  | S: rated grid voltage is 220/ 230/ 240V                                              |
| 4 | Version             | 2: second generation of this series of inverter                                      |
| 5 | Inverter difference | M: distinguishing between inverters of the same model name with different structures |

## Target Group

This document is intended for qualified persons and operators. Only qualified persons are allowed to perform the activities marked in this document with a warning symbol and the caption "Qualified person". Tasks that do not require any particular qualification are not marked and can also be performed by operators. Qualified persons must have the following skills:

- Have basic knowledge and installation skills of inverter.
- Training to deal with risks associated with installing, repairing, and using electrical devices, inverters, and batteries.
- Training in the installation and commissioning of electrical devices and installations.
- Knowledge of all applicable laws, regulations, standards, and directives.
- Knowledge of and compliance with this document and all safety information.
- Successful participation in a training course on commissioning the inverter with the Livoltek manufacturer.



# Levels of Warning Messages

The following levels of warning messages may occur when handling the product.

 **DANGER**  
Indicates risk of electric shock which will result in death or serious injury if not avoided.

 **WARNING**  
Indicates a situation of moderate potential hazard that could result in death or serious injury if not avoided.

 **CAUTION**  
Indicates a low level of potential hazard that, if not avoided, could result in moderate or minor injury to personnel.

 **NOTE**  
Emphasis and additions to the content may also provide tips for optimizing the use of the product.

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# 1 Safety

## 1.1 General Safety

Before transporting, storing, installing, operating, using, and/or maintaining the equipment, please read this manual carefully, strictly follow the instructions, and comply with all safety precautions indicated on the device and in the manual.

The safety alerts in this manual – **DANGER, WARNING, CAUTION** and **NOTE** – are not exhaustive. Installers must also comply with all applicable international, national and regional regulations, as well as industry best practices. Livoltek shall not be liable for any consequences resulting from violation of safety operation requirements, non-compliance with safety standards in equipment design, manufacture or use, equipment failures or malfunctions caused by use outside specified environmental conditions and any personal injuries, property damage or other losses arising from improper use.

The equipment must only be used in environments that meet all design specifications. Any malfunctions, performance issues or component damage resulting from non-compliant usage will not be covered under the product warranty.

Transportation, storage, installation, operation, use and maintenance must strictly follow applicable laws, regulations, standards and specifications.

Any of the following actions are strictly prohibited:

- Reverse engineering, decompiling or disassembling the device software.
- Modifying, adapting or other operations on the software.
- Attempting to analyze the device's internal logic or obtain source code.
- Disclosing any software performance test results.
- Any other actions that may infringe intellectual property rights.
- Obtain communication protocols from illegal channels.
- Build monitoring, control system without authority from Livoltek.

**Livoltek shall not be liable for any of the following circumstances or their consequences:**

- **Force Majeure Events**

Earthquake, flood, volcanic eruption, landslide, lightning strike, fire, war, armed conflict, typhoon, hurricane, tornado, extreme weather and other force majeure events.

- **Improper Usage**

Operating the device under conditions not described in this manual.

Non-compliant installation/usage environments that violate related international, national, or regional standards.

Installing, refitting, operating the device in improper ways, under improper environment or electrical connection mentioned in this user manual without authority from Livoltek.

Failure to follow instructions and safety warnings in the manual.

Unauthorized disassembly, hardware modification, or software code alteration.

- **Third-Party Causes**

Damage caused during transportation by you or your authorized third parties.

Storage conditions not meeting the product requirements.

Use of materials/tools that fail to comply with local laws and standards.

- **Human Factors**

Damage resulting from negligence, intentional acts, misconduct, improper operation by you or third parties.

Installation or operation by unqualified personnel.

## 1.2 Personal Safety



### **DANGER**

- Live work is strictly prohibited during installation.
- Never install or remove cables while equipment is energized.
- Improper or incorrect operations may result in fire hazards, electric shock risks or potential explosions and thus cause serious personal injury or fatality and significant property damage.
- Before any operation, installers must wear insulated protective equipment to ensure personal safety.
- During operation, installers must use specialized insulated tools that comply with related local laws, regulations, standards, and technical codes.



### **WARNING**

- Do not disable any protective devices of the equipment. And never ignore warnings, cautions, or preventive measures stated in the manual or labeled on the inverter.
- If any malfunction is detected that may cause personal injuries or equipment damage during operation, stop operation immediately and implement approved protective measures.
- Do not energize the equipment if installation is incomplete or the equipment is not verified by qualified personnel.
- The installation site of the equipment should be away from children.

## 1.3 Mechanical Safety



### CAUTION

- Check whether the inverter and its accessories are damaged once you receive the inverter. If yes, contact your dealer immediately.
- The inverter must be installed in a place with adequate ventilation. Mount the inverter in vertical direction, and ensure that no objects block the heat dissipation.
- The safety instructions in this manual cannot cover all the precautions that should be followed.
- LIVOLTEK shall not be held liable for any damage caused by violation of the safety instructions in this manual.

## 1.4 Electrical Safety



### DANGER

- During operation, prevent foreign objects from entering the equipment. Failure to do so may result in equipment damage (short circuit or mechanical failure), power abnormalities (load power reduction or outage) and personal injury hazards.
- Improper or incorrect operation may cause fire, electric shock, or other accidents.
- Before connecting or disassembling power cables, power off the device and the breakers between the inverter and other power supply devices.
- Before connecting assembled power cables, ensure that the labels on the cables are correct and terminals assembled on the cables are well insulated.
- The equipment must be kept away from flammable/ explosive materials, heat sources, and open flames and avoid exposure to direct sunlight, dust accumulation, volatile/ corrosive gases, radioactive substances, organic solvents and high-salt environments.
- Ensure that the equipment is placed in an environment with an ambient temperature, no direct sunlight exposure, clean, dry, and well-ventilated conditions
- Check and confirm that the positive and negative polarity of PV strings are correctly connected to the corresponding positive and negative terminals of the inverter.
- During the installation and electrical connection process, ensure that the positive and negative poles of PV strings do not short-circuit to the ground. Otherwise, an AC/ DC short-circuit may occur, and thus resulting in equipment damage. The damage caused by this is not covered by the warranty.



## **DANGER**

- Check and confirm that input cables of PV strings are connected to the PV input terminals of the inverter and do not connect to any other DC source to the PV input terminal to the inverter.
- Before connecting PV arrays, ensure that their voltage is within a safe range.
- Before touching DC cables, use measuring devices to ensure that the cable is voltage-free and current-free.
- The installers and operators must follow all warnings on the PV strings and in its manual.
- Comply with the safety instructions related to PV strings and the regulations related to the local grid.



## **WARNING**

- For grounded equipment: during installation, the protective grounding cable must be connected first. And during removal, the protective grounding cable must be disconnected last.
- The sequence of installation, operation and maintenance should be operated in accordance with the manual.
- The equipment grounding impedance shall comply with applicable local electrical standards.
- The equipment shall be permanently connected to the protective earth (PE).
- Before operating the equipment, verify that all electrical connections and ensure reliable grounding is established.



## **CAUTION**

- Cable selection, routing, and connection must strictly comply with local laws, regulations, and technical codes.
- All cables must be securely connected, with intact insulation and proper specifications.
- Cable trays and conduit entry points shall be free of sharp edges. All penetration points (e.g., knockouts, bushings) must have protective fittings installed.
- Implement safeguards to prevent cable damage from burrs, abrasive surfaces and other mechanical hazards.

### 1.4.1 Inverter Safety



#### **DANGER**

**Danger: Fatal electric shock hazard if opened. Live components inside.**

- High voltages are present in the live parts and cables inside the product during operation. Touching live parts and cables results in death or lethal injuries due to electric shock.
- Do not open the inverter cover or change any components without manufacturer's authorization. Otherwise, the warranty for the inverter will be invalid.



#### **WARNING**

**Danger to life due to fire or explosion.**

- In rare cases, an explosive gas mixture can be generated inside the product under fault conditions. In this state, switching operations can cause a fire inside the product. Death or lethal injuries due to hot or flying debris can occur.
- In the event of a fault, do not perform any direct operations on the product.
- Ensure that unauthorized personnel have no access to the product.
- Only perform operation on the product when you wear personal protective equipment for handling of hazardous substances.
- Wait at least 5 minutes for the internal capacitors to discharge after the battery, the PV and the grid are powered off.



#### **CAUTION**

**Danger to life due to fire or explosion.**

- Do not touch any hot parts (such as the heat sink) during operation. Only the DC switch can safely be touched at any time.



### 1.4.2 Battery Safety



#### **DANGER**

**Danger to life due to live DC cables of the battery.**

- The DC cables connected to a battery may be live. Touching the DC conductors or the live components leads to lethal electric shock.
- Do not touch non-insulated cable ends.
- Do not touch any live components.
- Observe all safety information from the battery manufacturer.
- Prior to performing any work on the inverter or the battery, disconnect the inverter from power as described in this document.
- If an error occurs, have it rectified by qualified personnel only.



#### **WARNING**

**Risk of burns due to electric arcs.**

- Short-circuit currents in the battery can cause heat build-up and electric arcs.
- Disconnect the battery from power prior to performing any operation on the battery.

## 2 Product Overview

The inverter is a single-phase hybrid inverter which can convert the DC power from the PV array or the battery to the AC power, in conformity with the grid requirements. It also transmits the DC power from the PV panel to the battery. With the bidirectional converter integrated inside, the inverter can charge or discharge the battery.

### 2.1 Application Scenarios

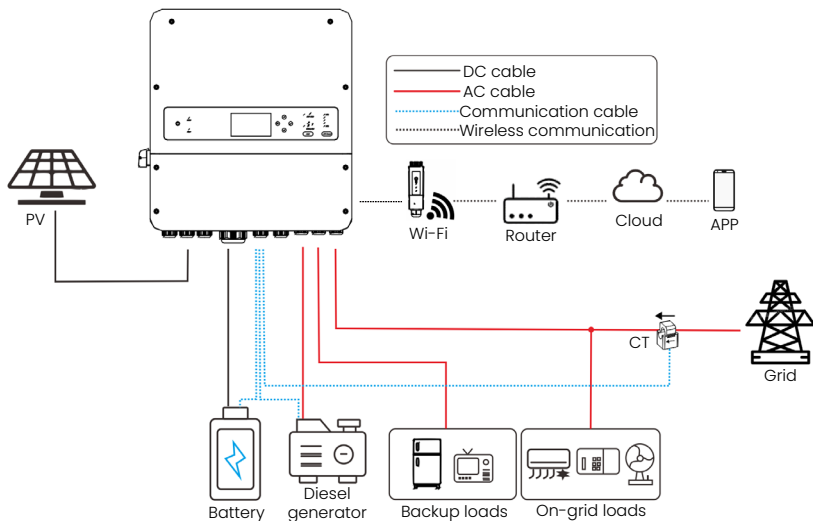


Figure 2-1 Application scenario (diesel generator)

#### **i** NOTE

- The number of PV strings in the figure above are taken for example.
- The GEN port is connected with either a generator or smart loads. In this application scenario, a generator is connected to the GEN port for an example.
- A CT is connected to the electrical diagram for an example.

Table 2-1 Devices in the system

| Device Type      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inverter         | HPI series energy storage inverter supports a grid connection of a photovoltaic system.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| PV module        | PV string is composed of multiple PV modules in series.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Battery          | This series inverter should be coupled with Livoltek low-voltage batteries. One pair of battery terminals can be connected with one string of battery. It communicates with the inverter via the BMS port.                                                                                                                                                                                                                                                                                                |
| Backup loads     | Emergency and critical loads requiring uninterruptible power supply, are connected to the BACK-UP port.                                                                                                                                                                                                                                                                                                                                                                                                   |
| On-grid loads    | Normal loads connected to GRID port of the inverter shall black out when the grid is off.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Smart loads      | <p>Smart loads with low-frequency of use are connected to the GEN port. When there is grid input, smart loads are powered by the grid.</p> <p>When there is grid outage, the on and off of smart loads are automatically controlled by the <b>EPS Secure</b> value on the inverter LCD or by the <b>ON</b> or <b>OFF</b> SoC on <b>My Livoltek APP</b>.</p> <p>When the actual battery SoC is lower than the <b>EPS Secure</b> value or the <b>OFF</b> SoC, smart loads are automatically turned off.</p> |
| Diesel generator | A diesel generator is connected to the GEN port of the inverter.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CT               | A CT can be used to measure current, calculate power and energy consumption and monitor current in real time.                                                                                                                                                                                                                                                                                                                                                                                             |

## 2.2 Appearance and Ports

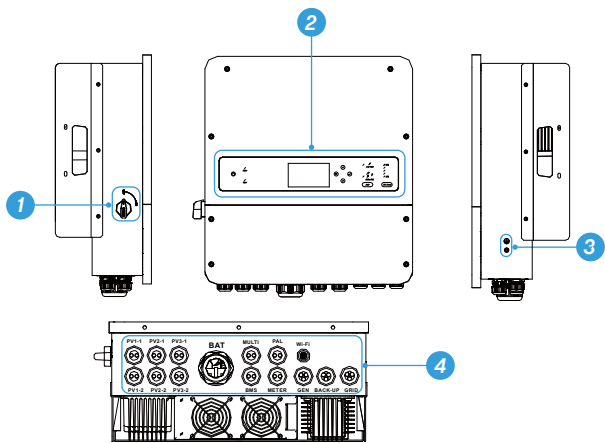


Figure 2-1 Appearance and ports  
Table 2-2 Introduction to inverter ports

| No. | Item                       | Description                                                                                                         |
|-----|----------------------------|---------------------------------------------------------------------------------------------------------------------|
| 1   | DC switch                  | Disconnect the DC circuit if needed.                                                                                |
| 2   | LCD display                | Includes the display, indicators and keys.                                                                          |
| 3   | Grounding terminal         | Connect the housing of an inverter to the earth.                                                                    |
| 4   | Electrical connection area | Includes PV terminals, battery terminal, GEN terminal, BACK-UP and GRID terminals, communication terminals and etc. |

## 2.3 Dimensions

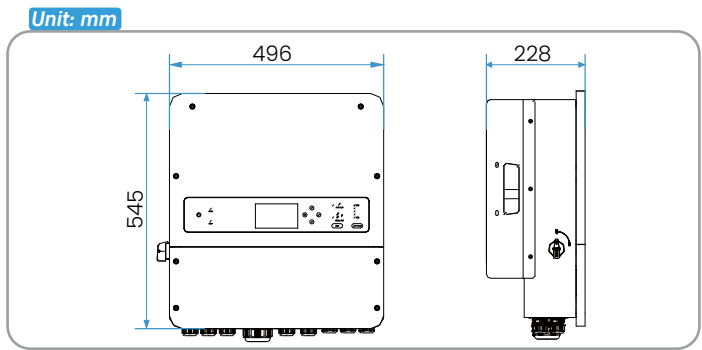


Figure 2-2 Inverter dimensions

## 2.4 Certification and Safety Symbols on the Inverter

### NOTE

- Certification is subject to the actual product.

Table 2-3 Symbols on the inverter

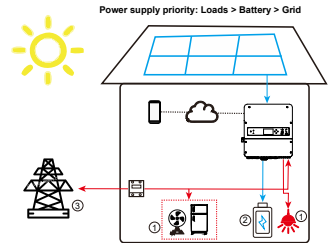
| Symbol                                                                              | Description                                                                                                                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | CE Mark: The inverter complies with the requirements of the applicable CE guideline.                                                                                                      |
|     | RCM mark of conformity.                                                                                                                                                                   |
|     | The inverter complies with the requirements of the applicable UKCA guideline.                                                                                                             |
|     | The inverter complies with the requirements of the applicable UKNI guideline.                                                                                                             |
|     | The inverter complies with the requirements of the applicable INMETRO guideline. The INMETRO certification is one of the key market access credentials for entering the Brazilian market. |
|    | Caution: risk of electric shock                                                                                                                                                           |
|    | Caution: risk of danger                                                                                                                                                                   |
|  | Caution: hot surface                                                                                                                                                                      |
|  | RoHS mark                                                                                                                                                                                 |
|   | Danger to life due to high voltage. Disconnect all power supplies before performing any operations on the inverter.                                                                       |
|   | Refer to the corresponding instructions.                                                                                                                                                  |
|  | WEEE Mark: Do not dispose of the inverter together with household waste.                                                                                                                  |

## 2.5 Work Mode

This series inverter supports four work modes: **ECO Mode** (Self-use), **TOU** (Self-define), **Battery First** (Back-up) and **Off-grid** mode. You can select and configure the first three work modes via **My Livoitek APP**. The inverter shall automatically switch to **Off-grid** mode during grid outage.

### 2.5.1 ECO Mode

The **ECO** (self-use) mode is ideal for regions with low grid import rates and high electricity costs, maximizing solar energy consumption and minimizing grid dependency.



#### During daytime and sufficient solar power is available,

- The PV generation prioritizes powering loads first. Any surplus PV generation charges the battery, and the remaining excess is exported to the grid (if permitted) \*1.
- When the battery is fully charged, the PV generation powers loads first and any surplus PV generation is exported to the grid\*1.

#### During nighttime and solar power is insufficient or unavailable,

- The battery discharges to powers loads until reaching its capacity limit, with any additional power demand drawn from the grid.
- The battery shall cease discharging when its actual SoC falls below the configurable discharge cut-off threshold, at which point local loads will automatically switch to the grid for power supply.
- The system automatically and seamlessly transitions among battery, PV, and grid power sources.

#### When grid fails,

In case of grid failure or mains outage, the hybrid inverter automatically transitions to off-grid mode. This mode establishes a battery-backed microgrid, utilizing both PV generation and battery storage to supply power for critical loads.

**NOTE**

\*1: The inverter can be set 0 feed-in to the grid. But a small amount of energy will still inevitably be fed into grid due to unpredictable PV power changes and load fluctuations.

\*2: The battery power supply can be restored when the battery is charged to the "set value +10%" by PV generation.

### 2.5.2 TOU Mode

The **TOU** (self-define) mode is designed for regions implementing time-of-use tariffs, where electricity price fluctuates between peak and off-peak periods.

This mode enables customers to maximize solar power usage during optimal times, minimizing grid electricity usage during peak tariff hours and reduce costs.

When operating in this mode, the charging and discharging time can be set flexibly as required. This mode is ideal for those who want to charge the battery when the electricity price is at an off-peak rate and use the PV and battery power during peak rate time or save the energy for grid outages.

- During the scheduled time periods, the battery charges or discharges with preset commands. During unscheduled periods or when feed-in conditions are not met, the system shall automatically switch to **ECO** (self-use) mode.
- During charging time periods, the PV and the grid will charge the battery as first priority at the same time, any excess PV generation powers loads and then the remaining excess is fed into the grid\*1.
- During discharging time periods, the PV generation power loads first, then excess PV generation and battery power is fed into the grid\*1.

**NOTE**

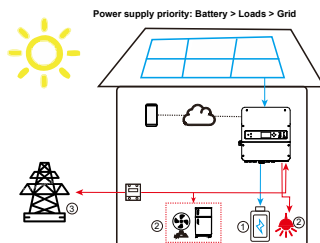
\*1: The inverter can be set 0 feed-in to the grid. But a small amount of energy will still inevitably be fed into grid due to unpredictable PV power changes and load fluctuations.

\*2: The battery power supply can be restored when the battery is charged to the "set value +10%" by PV generation.

### 2.5.3 Battery First Mode

The **Battery First** (Back-up) mode is designed for regions with grid instability, enhancing system autonomy during outages while minimizing the frequency of battery charging and discharging to extend battery life.

- Under this work mode, the actual battery SoC is required to be kept at a high level (default 50%) (set via APP) in case of grid outage.
- When the system is connected to the grid, the battery is only allowed to discharge power when the actual battery SoC is above the set value.
- When the actual battery SoC is lower than the set value, the battery shall never discharge and the PV and grid will charge the battery to the set value as first priority. If the PV generation is sufficient, it will fully charge the battery and the excess PV generation will be fed to the grid\*1.
- The loads will be supplied power by the surplus PV generation, or by the grid if necessary.



**NOTE**

\*1: The inverter can be set 0 feed-in to the grid. But a small amount of energy will still inevitably be fed into grid due to unpredictable PV power changes and load fluctuations.

\*2: The battery power supply can be restored when the battery is charged to the "set value +10%" by PV generation.

### 2.5.4 Off-grid Mode

The **Off-grid** mode is suitable for non-grid areas, and the inverter will automatically activate this mode in the event of grid failure.

When the inverter works in this work mode, the PV and the battery make a pure off-grid system, the critical loads (backup loads) will be powered by PV generation. If the PV generation is insufficient, the battery will discharge power to the loads at the same time. (Batteries are necessary in this work mode.)

**NOTE**

- When battery is discharged to the discharge cut-off value (@EPS), the inverter will stop working and wait for the grid to recover or until there is sufficient power from the PV to charge the battery.
- If grid failure is a common occurrence in your area, it is recommended to set the discharge cut-off value (@Grid) higher to ensure that there is more battery power available during grid outage.



## 3 Transportation and Storage

If the inverter is not put into use immediately, the following transportation and storage requirements need to be met.

### Transportation

- Prior to transportation, all warning labels and handling instructions on the inverter packaging must be strictly observed.
- Pay attention to the weight of inverter. Be cautious to avoid injury when carrying this series inverter. Transport it with appropriate number of personnel required by local regulations.
- Wear protective gloves when carrying the equipment by hand to prevent injuries.
- When lifting up the inverter, hold the handles and the bottom of the inverter. Keep the inverter horizontal in case of falling down.

### Storage

- The inverter must be stored indoors.
- Do not remove the original packaging materials and check the outer packaging material regularly.
- Stack the inverter in accordance with the caution signs on the inverter carton to prevent their falling down and device damage. Do not place it upside down.
- The inverter should be stored in a clean and dry place and be protected from dust and water vapor corrosion.
- Do not store the inverter in places susceptible to direct sunlight, rain, and strong electric field.
- Do not store the inverter in places with corrosive substances or susceptible to rodents and insects. If any insect or rodent bites are found, replace the packaging materials in time.
- Carry out periodic inspections. Inspection shall be conducted at least once every six months.
- If the inverter has been stored for more than one year, inspection and testing by professionals are required before it can be put into operation.
- If the inverter needs to be transported again, pack it strictly before transporting it.

#### NOTE

- Please store the inverter according to the storage requirements. Product damage caused by failure to meet the storage requirements is not covered by the warranty.

# 4 Preparation before Installation

## 4.1 Installation Site Selection

### 4.1.1 Environment Requirement

Install the device in a well-ventilated environment to ensure good heat dissipation. In the case of poor ventilation, the system performance may compromise. Ensure that the installation site meets the following (but not limited to) conditions:

- Not in areas where highly flammable materials are stored.
- Not in potential explosive areas.
- Not in the cool air directly.
- Not near the television antenna or antenna cables.
- Not higher than the altitude of 2000m above sea level.
- Not in environment of precipitation or humidity ( > 95%).
- The slope of the wall should be within  $\pm 5^\circ$ .
- The wall must be solid enough to bear the weight of the inverter.
- Do not install the inverter on a wall made of gypsum boards or similar materials with weak sound insulation to avoid noise disturbance in a residential area.
- The ambient temperature in the range of  $-25^\circ\text{C}$  to  $+60^\circ\text{C}$ .
- Not in areas with direct sunlight, rain exposure, snow laying up.
- Do not install the inverter where people can easily touch its enclosure and heat sinks.
- DO NOT install the inverter in a place where personnel are likely to come into contact with its enclosure and heat sinks because these parts are extremely hot during operation.



Figure 4-3 Environment requirement

## 4.1.2 Angle and Space Requirement

Neither install the inverter horizontally nor install it with a forward or backward tilt or even with it upside down. The horizontal installation can result in damage to the inverter. Install the inverter upright to facilitate heat dissipation.

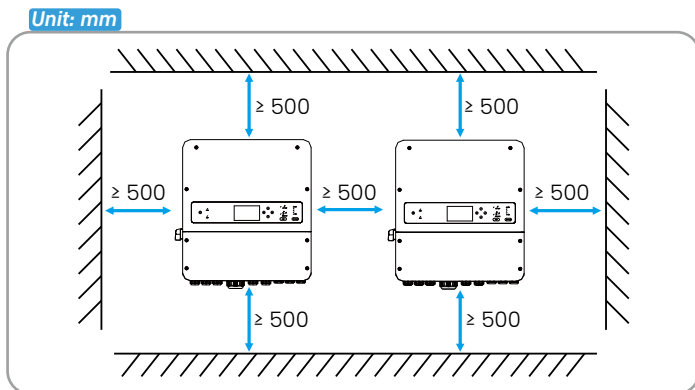


Figure 4-4 Space requirement

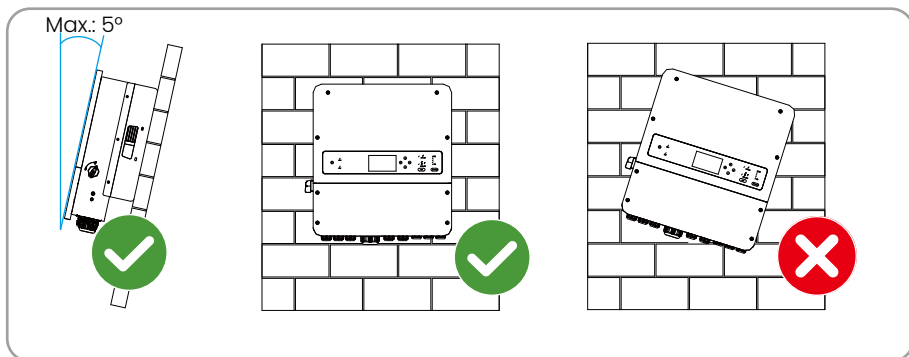


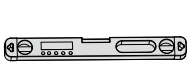
Figure 4-5 Angle requirement

## 4.2 Materials Preparation

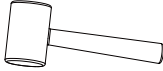
### 4.2.1 Tools Preparation

The following tools are recommended for installation

Table 4-4 Tools preparation



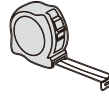
Spiritual level



Rubber hammer



Drill



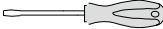
Measuring tape



Utility knife



Marker



Flat screwdriver



Phillips  
screwdriver



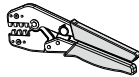
Socket spanner



Wire stripper



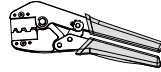
Crimping tool for  
RJ45 connectors



MC4 crimping  
tool



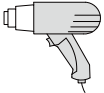
Hydraulic clamp



Crimping tool



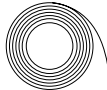
Crimping tool  
for pin terminals



Heat gun



Heat shrink  
tubing



Insulating tape



Clamp current  
meter



Multimeter



Zip tie



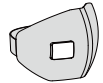
Safety gloves



Safety boots



Safety goggles



Anti-dust mask

### 4.2.2 Additionally Required Materials

Table 4-5 Self-prepared cables

| No | Item                       | Recommended Specifications                                                                                                 |
|----|----------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 1  | PE cable                   | 6 AWG/ 16 mm <sup>2</sup> outdoor one-core copper cable                                                                    |
| 2  | GRID/ BACK-UP/ GEN cable   | 6 AWG/ 16 mm <sup>2</sup> outdoor one-core/ three-core copper cable                                                        |
| 3  | PV cable                   | 4/6 mm <sup>2</sup> outdoor copper cable                                                                                   |
| 4  | Battery cable <sup>1</sup> | 1/0 AWG/ 50 mm <sup>2</sup> outdoor copper cable                                                                           |
| 5  | Network cable              | CAT5E                                                                                                                      |
| 6  | Signal cable               | Two-core or multi-core cable with a cross-sectional area of 0.2 mm <sup>2</sup> to 1.5 mm <sup>2</sup> or 24 AWG to 16 AWG |

Table 4-6 Self-prepared circuit breakers

| No. | Item                                             | Recommended Specifications                                                                   |
|-----|--------------------------------------------------|----------------------------------------------------------------------------------------------|
| 1   | AC (GRID/ BACK-UP/ GEN) circuit breaker          | Rated current: 60A a.c.                                                                      |
| 2   | DC (BAT) circuit breaker (optional) <sup>2</sup> | Rated current: 250A d.c. for 7.5 kW and 8kW inverter; 290A d.c. for 10kW; 325A d.c. for 12kW |

#### NOTE

- Other sizes of grounding cable that meet local standards and safety regulations can be used for grounding connections. But Livoltek shall not be held liable for any damage caused.

1. Battery power cables and BMS communication cable are provided in the Livoltek battery accessory. battery cables recommended are for maintenance.  
 2. For Livoltek batteries connected, install a DC breaker between the inverter and the battery if no internal breaker is inside the battery. For other brand battery, a DC breaker is recommended to be installed for safety.

# 5 Unpacking and Inspection

## 5.1 Package Unpacking and Inspection

Our product has been thoroughly tested and strictly inspected before delivery. Nonetheless, damage may still occur during transportation. For this reason, please conduct a thorough inspection after receiving the product.

- Check the outer package for any visible damage.
- Check the scope of delivery for completeness according to the packing list.
- Check the inner contents for damage after unpacking.

Contact Livoltek or the transport company in case of any damage or incompleteness, and provide clear photos to facilitate services.

Do not dispose of the original outer package. It is recommended to store the device in the original package when the product is decommissioned.

### **NOTE**

- After receiving the product, check whether the appearance and structural components of the device are damaged, and check the packing list is consistent with the actual received accessories. If there are problems with above inspection items, do not install the device and contact your distributor first. If the problem persists, contact our dealer or Livoltek after-sales team for support in time.
- If any tool is used for unpacking, be careful not to damage the product.

## 5.2 Scope of Delivery

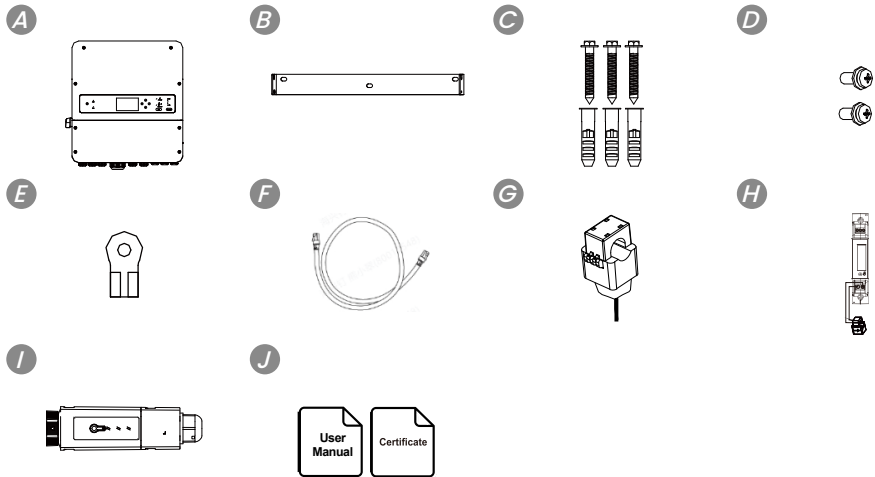


Figure 5-6 Scope of delivery  
Table 5-7 List of inverter accessories

| Item | QTY     | Description                           | Remark                                                                                            |
|------|---------|---------------------------------------|---------------------------------------------------------------------------------------------------|
| A    | 1 pcs   | Inverter                              | /                                                                                                 |
| B    | 1 pcs   | Bracket                               | For hanging the inverter                                                                          |
| C    | 3 pairs | Expansion tubes & self-tapping screws | For securing the inverter bracket                                                                 |
| D    | 2 pcs   | M5*12 screws                          | For fixing the inverter with the bracket                                                          |
| E    | 1 pcs   | Grounding terminal                    | For PE cable wiring                                                                               |
| F    | 1 pcs   | Parallel communication cable          | For parallel communication connection among inverters                                             |
| G    | 1 pcs   | CT                                    | For real-time current measuring and monitoring, power and energy consumption calculating and etc. |
| H    | 1 pcs   | Smart meter                           | Optional, additionally purchased from Livoltek                                                    |
| I    | 1 pcs   | Stick logger                          | For providing wireless data transmission among devices                                            |
| J    | 2 pcs   | Documents                             | User manual & Certificate                                                                         |



### NOTE

- Contact the local distributor if any accessories miss.

## 5.3 Inverter Handling Requirement

Before installation, move the package to the installation site, remove the outer package and take the inverter out of the carton with appropriate personnel.



### CAUTION

**Improper handling may cause personal injury!**

- Arrange an appropriate number of personnel to carry the inverter according to its weight, and installation personnel should wear protective equipment such as anti-impact shoes and gloves.
- Pay attention to the center of gravity of the inverter to avoid tilting during handling.
- DO NOT place the inverter directly on a hard ground in case of any damage to the enclosure of the inverter. Protective materials such as sponge pad or foam cushion should be placed underneath the inverter.
- Carry and move the inverter by holding the corners of the inverter. Do not move the inverter by holding its terminals.



## 6 Mechanical Installation



### WARNING

- Ensure that there is no electrical connection before installation.
- Before drilling, ensure that the wall is free from any electrical wiring or plumbing to avoid electrical hazards or pipe damage.
- Check and confirm that the wall is solid enough to bear the weight of the inverter.



### CAUTION

- Before installation, personal protective equipment must be worn.
- The inverter is heavy, please handle it with care during transport and installation to avoid injury.



### NOTE

- Install the inverter in a correct angle and direction.
- Notice that the dimensions of the inverter to ensure that the inverter installation meets the requirements.
- Take the inverter dimensions and the bracket into consideration to select a good installation location

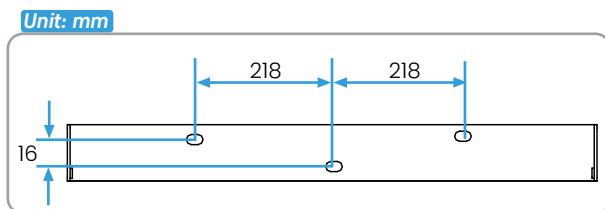


Figure 6-7 Inverter bracket dimensions

## Mounting Procedure

**Step 1:** Take out the inverter, inverter bracket, expansion tubes, self-tapping screws, and M5\*12 screws from the inverter accessories.

**Step 2:** Locate the bracket.

- Put the bracket on the wall with a spirit level on its top to ensure that the bracket is level. Mark the drilling holes through the bracket with a marker.

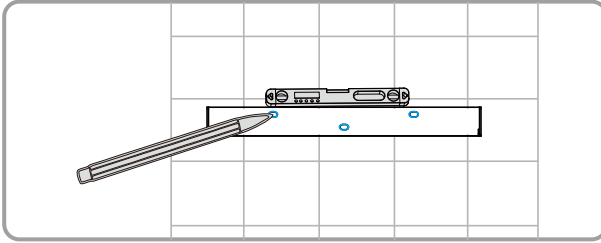


Figure 6-8 Locate the inverter bracket

**Step 3:** Remove the bracket and drill marked holes at the depth of at least 50mm.

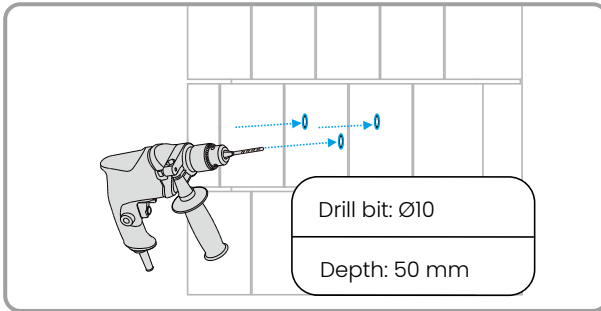


Figure 6-9 Drill holes

**Step 4:** Install the inverter bracket.

- Knock expansion tubes into the holes and align the holes of the bracket with the holes on the wall.
- Insert self-tapping screws through the bracket into the wall.

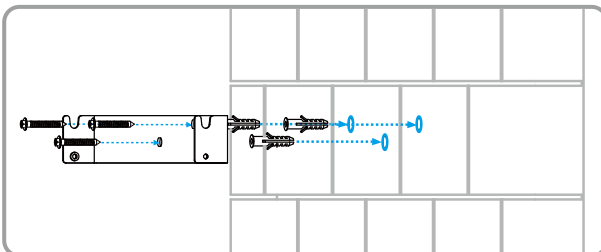


Figure 6-10 Install the inverter bracket

**Step 5:** Secure self-tapping screws with a socket spanner.

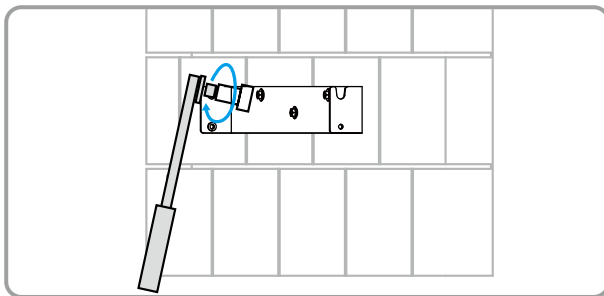


Figure 6-11 Secure the inverter bracket

**Step 6:** Install and secure the inverter.

- Hang the inverter onto the bracket.
- Install the two M5\*12 screws on both sides of the inverter to secure the inverter and the bracket with a phillips screwdriver. (Torque: 3.0 N.m)

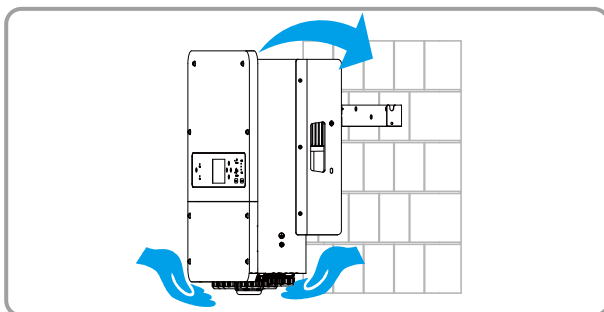


Figure 6-12 Hang the inverter on the bracket

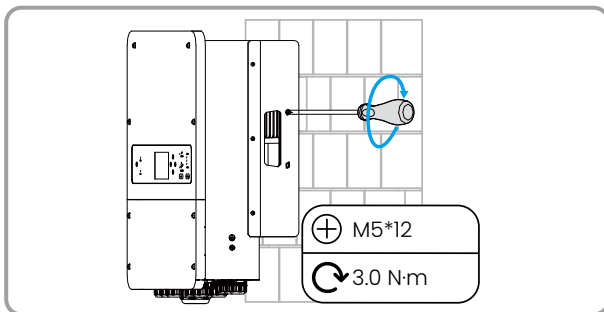


Figure 6-13 Secure the inverter with the bracket

# 7 Electrical Connection



## DANGER

### **Danger to life due to a high voltage inside the inverter!**

- The PV string will generate lethal high voltage when exposed to sunlight. Before starting electrical connections, disconnect the DC and AC circuit breakers and prevent them from inadvertent reconnection.
- All operations, cables and parts specification shall be in compliance with local laws and regulations in the process of electrical connection.
- Confirm that the DC switch of the inverter is in OFF position before any electrical connections.
- Ensure that all cables are free from voltage and current before performing cable connection.



## WARNING

- Any improper operations during cable connection can cause device damage or personal injury. Damage to the product caused by incorrect wiring is not covered by the warranty.
- Wear personal protective equipment like safety shoes, safety gloves, and insulating gloves during electrical connections.
- All cables must be firmly attached, undamaged, properly insulated and adequately dimensioned.
- All cable wiring must be performed by qualified personnel.



## NOTE

- Comply with the safety instructions related to the PV strings and the regulations related to the utility grid.
- All electrical connections must be in accordance with local and national standards.
- Only with the permission of the utility grid, the inverter can be connected to the utility grid.
- The cable colors in figures in this manual are for reference only. Please select cables according to local cable standards.
- Install the external protective grounding cable first when performing electrical connection and remove the external protective grounding cable last when removing the inverter.
- When the inverter is powered on, the BACK-UP port is charged. Power off the inverter first if maintenance is required for the loads connected with BACK-UP port. Otherwise, it may cause electric shock.

## 7.1 Electrical Connection Diagram

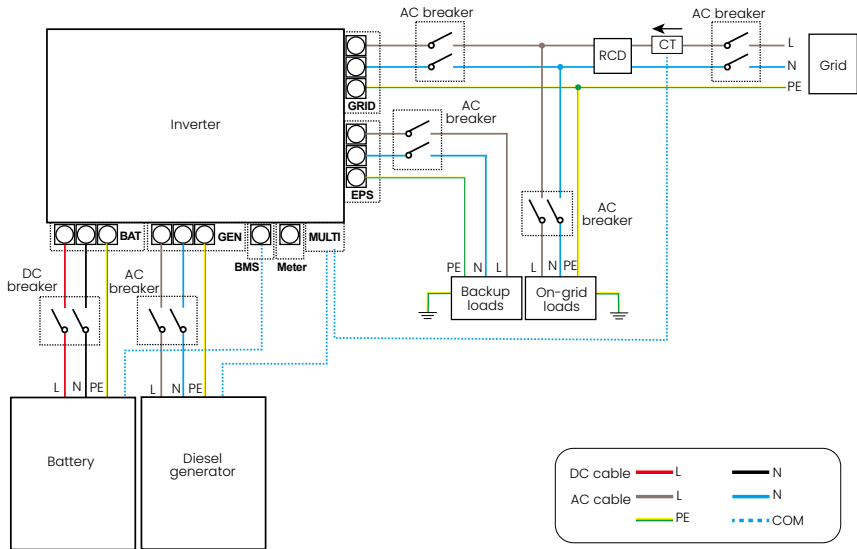


Figure 7-14 Electrical connection diagram

**NOTE**

- Here a diesel generator is connected to the GEN port of the inverter. You can choose to connect smart loads to the GEN port.
- A CT is connected for an example in the system diagram.

7.2 Overview of Inverter Connection Area

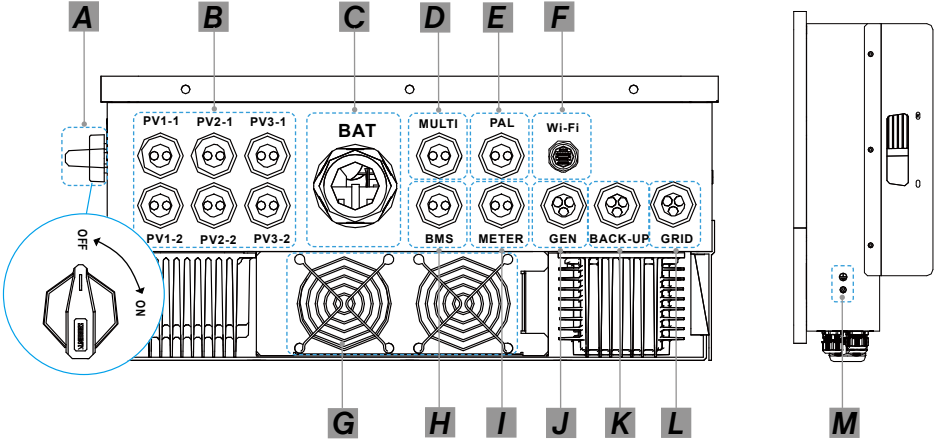


Figure 7-15 Overview of inverter connection area  
Table 7-8 Introduction to inverter connection area

| No. | Description                                                                                                                                                                                                            |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A   | DC switch                                                                                                                                                                                                              |
| B   | PV input terminals for PV cable connection. For 7.5kW and 8kW inverters, connect to PVI-1, PVI-2, PV2-1 and PV2-2 PV ports. For 10kW and 12kW inverters, connect to PVI-1, PVI-2, PV2-1, PV2-2, PV3-1 and PV3-2 ports. |
| C   | BAT terminal for battery power cable connection                                                                                                                                                                        |
| D   | MULTI terminal for diesel generator control, CT communication connection and etc.                                                                                                                                      |
| E   | PAL terminal for parallel communication cable connection                                                                                                                                                               |
| F   | Wi-Fi terminal for a stick logger connection                                                                                                                                                                           |
| G   | External fans for heat dissipation                                                                                                                                                                                     |
| H   | BMS terminal for lithium battery communication cable connection                                                                                                                                                        |
| I   | METER terminal for a meter connection                                                                                                                                                                                  |
| J   | GEN terminal for either a diesel generator or smart loads connection as needed                                                                                                                                         |
| K   | BACK-UP terminal for backup loads connection                                                                                                                                                                           |
| L   | GRID terminal for connecting to the grid                                                                                                                                                                               |
| M   | Additional grounding terminal                                                                                                                                                                                          |

### 7.3 PE Connection

Good grounding for the inverter helps resist the impact of surge voltage and improve the EMI performance. Connect the PGND cable before connecting the AC power cables, DC power cables, and communication cables.

 **DANGER**

- There are large currents during the inverter’s operation. If the inverter is powered on and put into operation without being grounded, it may lead to electric shock hazards or failures of major protective functions such as surge protection. Therefore, before powering on the inverter, make sure it has been reliably grounded; otherwise, damages caused therefrom will not be covered by warranty.
- Before any electrical connection, ensure that the grounding cable is reliably connected.

 **WARNING**

- It is recommended that both the external protective grounding terminal and the AC side grounding terminal be reliably grounded.
- All non-current carrying metal parts and device enclosures in the PV power system should be grounded such as the inverter enclosure, subconstruction of PV modules and etc.
- Ensure that the PE cable is securely connected. Otherwise, electric shocks may occur.
- Do not connect the neutral wire to the enclosure as a PE cable. Otherwise, electric shocks may occur.

 **NOTE**

- The PE point at the AC output port is used only as a PE equipotential point, and cannot substitute for the PE point on the enclosure. Make sure the two terminals are both grounded reliably.
- It is recommended that silicagel or paint be used around the grounding terminal after the PE cable is connected.

Table 7-9 Materials for PE connection

| Materials                           | Source         |
|-------------------------------------|----------------|
| 6 AWG/ 16 mm² one-core copper cable | Self-prepared  |
| Grounding terminal                  | Delivery scope |

## Wiring Procedure

**Step 1:** Strip 5~7 mm insulation off the PE cable as below.

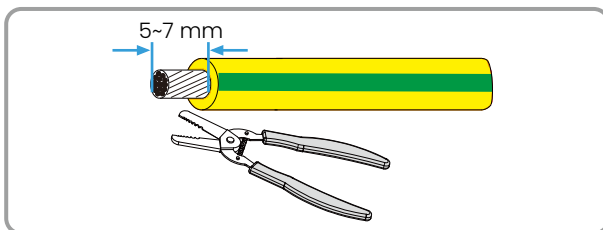


Figure 7-16 Strip PE cable

**Step 2:** Thread the cable through materials.

- Cut 28~29 mm heat shrink tubing and thread the stripped end through the tubing.
- Insert the stripped end into the grounding terminal.

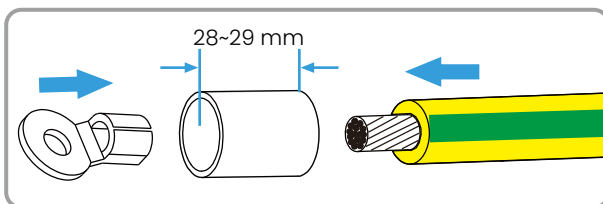


Figure 7-17 Assemble the cable

**Step 3:** Crimp the grounding terminal with a crimping tool

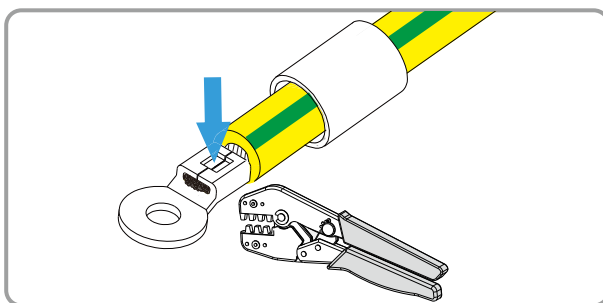


Figure 7-18 Crimp the grounding terminal



**Step 4:** Pull the tubing backward to cover the connection section and blow it with a heat gun to ensure that no conductor is exposed.

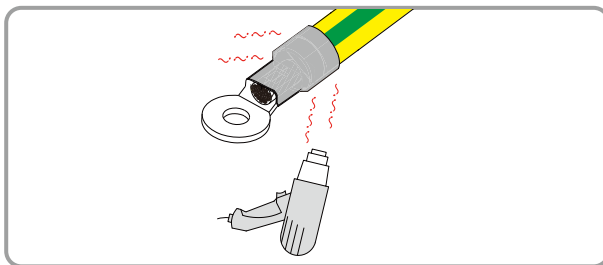


Figure 7-19 Insulate the connection section

**Step 5:** Connect the assembled PE to the inverter.

- Loosen the screw on the grounding port on the inverter.
- Connect the assembled PE cable to the grounding port.
- Secure the cable with the screw. (Torque: 1.2 N·m)

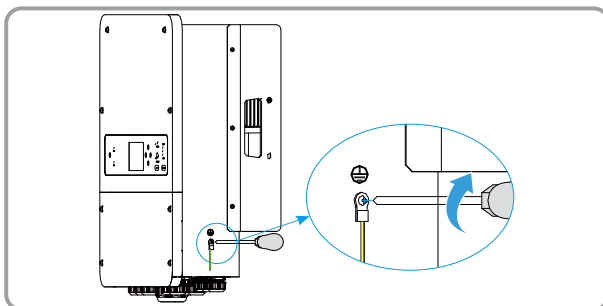


Figure 7-20 Connect the PE cable

**i NOTE**

- Before any other electrical connection operation inside the inverter, please disassemble the upper lid of the inverter.

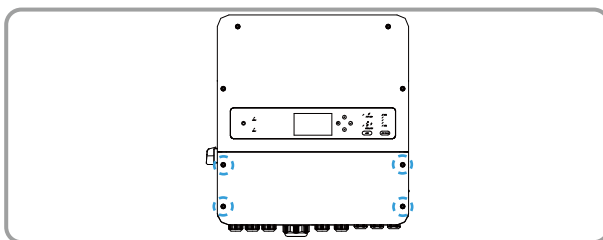


Figure 7-21 Remove screws on the upper lid

## 7.4 GRID Connection



### WARNING

- Ensure that the inverter is totally isolated from any DC or AC power before connecting AC cables.
- Only with the permission of the local grid department, the inverter can be connected to the grid.
- Before commencing AC wiring, please ensure all AC circuit breakers are switched off.
- DO NOT connect the AC (GRID) cable and AC (BACK-UP) cable together.
- If you want to use power from the grid and backup power, please connect both with GRID output and BACK-UP output. When you want to use on grid only, please connect with GRID output and float BACK-UP output.
- Determine whether an AC circuit breaker with greater overcurrent capacity is required based on actual conditions.
- The grid and off-grid voltage and frequency must be in the permissible range.
- Never connect a load between the inverter and the circuit breaker.
- DO NOT connect grid power cable to the BACK-UP or GEN port, otherwise it may cause inverter damage or fire hazards.



### WARNING

- Risk of inverter damage due to incorrect cable connection. Do not connect the grid power cables to BACK-UP port or connect the backup cable to the grid.
- An independent circuit breaker must be installed on the BACK-UP side to cut off the inverter from backup loads when necessary.
- Decide which household appliances should be included in the backup circuit and carry out any required re-wiring.
- An external AC circuit breaker should be installed on the output side of the inverter and the grid side (between inverter and the grid) to ensure safe disconnection from the grid. Another external backup (BACK-UP) circuit breaker should be installed at the output side of the inverter (between inverter and loads) to ensure safe disconnection.
- With an integrated universal current-sensitive residual current monitoring unit included, the inverter will disconnect immediately from the mains power once a fault current with a value exceeding the limit is detected. However, if an external residual current device (RCD) (type A is recommended) is mandatory, the switch must be triggered at a residual current of 300 mA (recommended).

Table 7-10 Materials for GRID connection

| Materials                                                           | Source        |
|---------------------------------------------------------------------|---------------|
| 6 AWG/ 16 mm <sup>2</sup> outdoor one-core/ three-core copper cable | Self-prepared |
| AC circuit breakers                                                 | Self-prepared |

Wiring Procedure

**Step 1:** Strip the Grid cable.

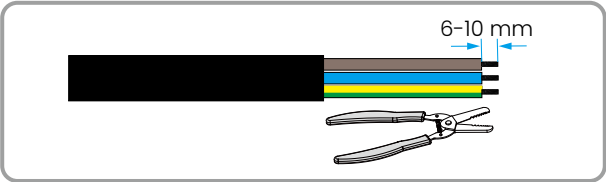


Figure 7-22 Strip Grid cables

**Step 2:** Loosen and remove the swivel nut from the GRID port, thread the Grid cable through the nut and into the inverter.

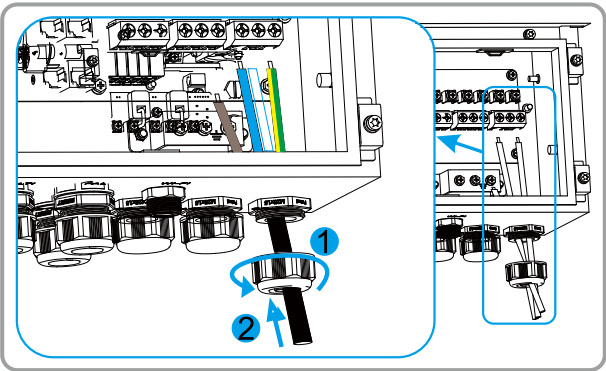


Figure 7-23 Thread Grid cable into the inverter

**Step 3:** Connect the L, N and PE cable to GRID\_L, GRID\_N and PE terminal respectively inside the inverter and tighten the screws on the top of the GRID terminal block to secure Grid cables.

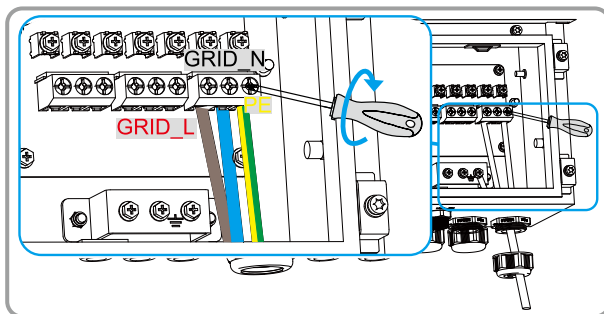


Figure 7-24 Connect Grid cables

**Step 4:** Tighten the swivel nut.

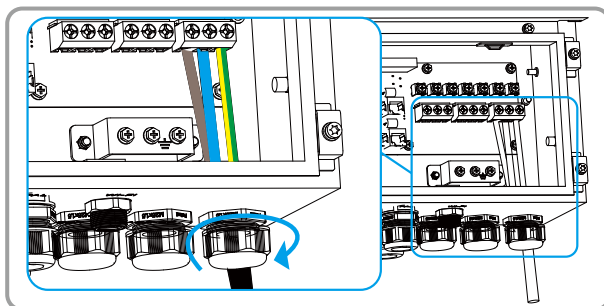


Figure 7-25 Tighten the GRID swivel nut

# 7.5 BACK-UP Connection

Table 7-11 Materials for BACK-UP connection

| Materials                                                           | Source        |
|---------------------------------------------------------------------|---------------|
| 6 AWG/ 16 mm <sup>2</sup> outdoor one-core/ three-core copper cable | Self-prepared |
| AC circuit breakers                                                 | Self-prepared |

## Wiring Procedure

**Step 1:** Strip the backup cable.

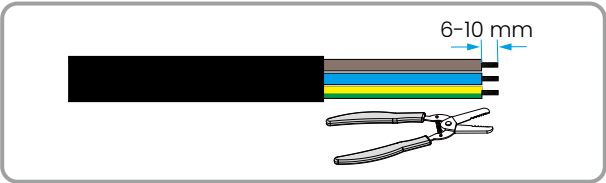


Figure 7-26 Strip a backup cable

**Step 2:** Loosen and remove the swivel nut from the BACK-UP port, thread the backup cable through the nut and into the inverter.

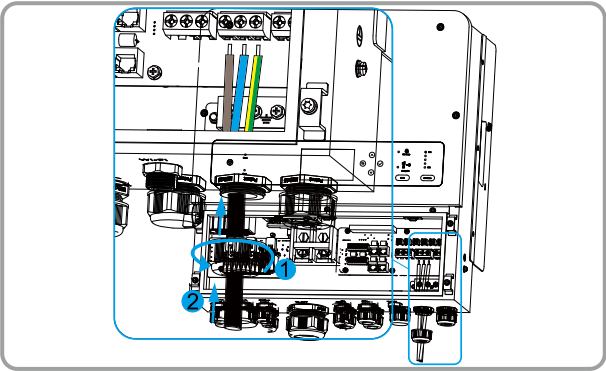


Figure 7-27 Thread backup cables into the inverter

**Step 3:** Connect the L, N and PE cable to EPS\_L, EPS\_N and PE terminal respectively inside the inverter and tighten the screws on the top of the BACK-UP terminal block to secure backup cables.

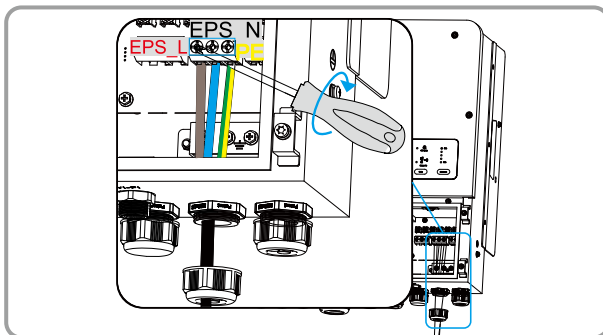


Figure 7-28 Connect backup cables

**Step 4:** Tighten the swivel nut.

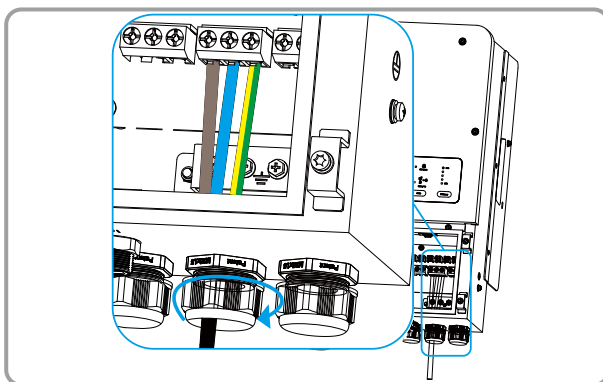


Figure 7-29 Connect to the BACK-UP swivel nut

## 7.6 PV Connection

### DANGER

#### Danger of electric shock!

- The PV array will generate lethal high voltage once exposed to sunlight. Ensure that all cables are voltage-free before performing electrical operations.
- DO NOT connect the AC circuit breaker before completing electrical connection.

### WARNING

- Ensure that the PV arrays are well insulated to the ground before connecting it to the inverter.
- Arc or contactor over-temperature may occur if PV cables are not firmly connected in place.
- Ensure that the voltage, current and power ratings of the PV arrays are within the permissible range.
- Ensure that polarity is correct. The inverter will not run properly if any PV polarity is reversed.
- The 7.5-12kW inverter is designed with 2 or 3 MPPT trackers, if the inputs of the PV panels are paralleled, please consult with your local distributor for technical support.
- To avoid any malfunction, do not connect any PV Arrays with possible current leakage to the inverter. For example, grounding PV Arrays will cause current leakage to the inverter.
- Ensure that DC switch is in OFF position. Otherwise please use an external DC switch to cut off the PV connection during wiring and when necessary.

Table 7-12 Materials for PV connection

| Materials                     | Source        |
|-------------------------------|---------------|
| 4/6 mm <sup>2</sup> PV cables | Self-prepared |
| DC circuit breaker (optional) | Self-prepared |

### Wiring Procedure

**Step 1:** Strip 6~10 mm insulation off PV cables.

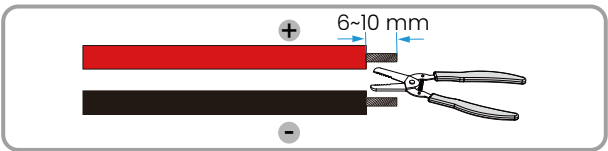


Figure 7-30 Strip PV cables

**Step 2:** Loosen the PV swivel nuts, thread stripped PV cables through the swivel nuts into the inverter.

Table 7-13 PV ports connected of different inverters

| Inverter                | PV ports to be connected                 |
|-------------------------|------------------------------------------|
| HPI-7K5S2 and HPI-8KS2  | PV1-1, PV1-2, PV2-1, PV2-2               |
| HPI-10KS2 and HPI-12KS2 | PV1-1, PV1-2, PV2-1, PV2-2, PV3-1, PV3-2 |

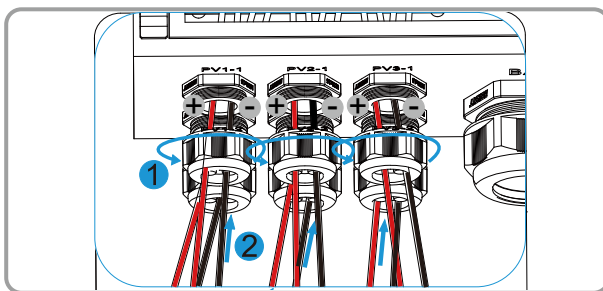
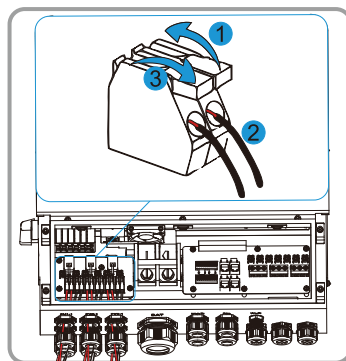


Figure 7-31 Thread PV cables into the inverter

**Step 3:** Connect PV cables into PV ports. Check the polarity of the PV module inside the inverter.

- Open the switch. Connect the positive pole (+) of the PV cable to the positive pole (+) of the PV module and the negative pole (-) of the PV cable to the negative pole (-) of the PV module.
- For 7.5kW and 8kW inverter, connect to PV1+, PV1-, PV2+ and PV2- terminals. For 10kW and 12kW inverter, connect to PV1+, PV1-, PV2+, PV2-, PV3+ and PV3- terminals inside the inverter.
- Close the switch and slightly pull PV cables to ensure PV cables are firmly fixed.



**Step 4:** Tighten the swivel nuts.

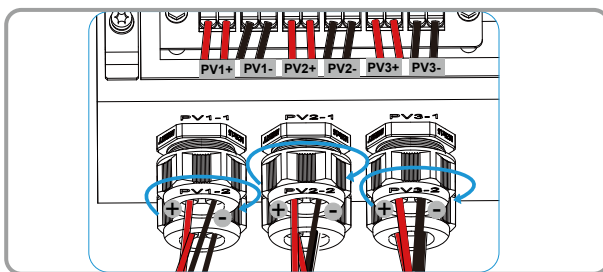


Figure 7-32 Tighten the PV swivel nuts



## 7.7 Battery Connection (BAT&BMS)

This section mainly describes the cable connections on the inverter side. Refer to the instructions supplied by the battery manufacturer for the connections on the battery side and configuration.



### **DANGER**

- Be careful about any electric shock or chemical hazard.
- A short circuit in the battery may cause personal injury. The instantaneous high current caused by a short circuit can release a large amount of energy and may cause a fire.
- Ensure that the open circuit voltage of the battery is within the permissible range of the inverter.
- Only use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, use electrical tape to cover the entire exposed metal surfaces of the available tools except their tips.
- Before connecting the battery cable, ensure that the switches of inverter and the battery are all disconnected.
- Connect battery cables with correct polarity. If battery cables are reversely connected, the solar inverter may be damaged.
- It is forbidden to connect and disconnect the battery cables when the inverter is running, otherwise it may cause electric shock.
- Do not connect one battery pack to more than one inverter at the same time. Otherwise, it may cause damage to the inverter.
- It is forbidden to connect loads between the inverter and batteries.
- During installation and operation of the inverter, ensure that the batteries are not short-circuited to the ground. Failure to do so may result in damage to the unit. The resulting damage is not covered by the warranty.



### **NOTE**

- For safe operation and compliance, a two-pole DC circuit breaker with overcurrent protection should be installed between the inverter and the battery without a built-in DC breaker, ensure that an external DC breaker is connected.
- This inverter can only be connected with Livoltek low-voltage lithium batteries with nominal voltage now. If you choose other lithium batteries, please consult Livoltek for compatibility. Otherwise, the inverter will not work normally.
- If you do not have any battery now, you can float BAT terminal, and this hybrid inverter will only work as a PV inverter.

Battery Power Cable Wiring Procedure

Table 7-14 Materials for battery connection

| Materials           | Source               |
|---------------------|----------------------|
| Battery power cable | In battery accessory |
| DC circuit breaker  | Self-prepared        |

Table 7-15 Compatible Livoltek battery models

| Compatible battery model |             |                    |
|--------------------------|-------------|--------------------|
| BLF-B51150               | BLF-B51100  | Homcellar-10kWh-B1 |
| BLF51-5                  | AES-5kWh-G1 | Homcellar-15kWh-B1 |

**Step 1:** Strip 10-15mm insulation off the battery cables.

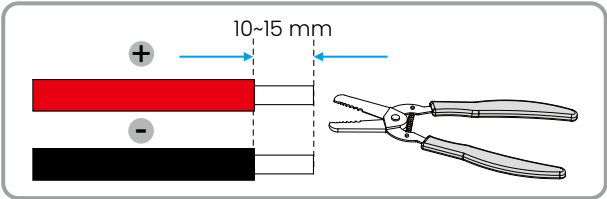


Figure 7-33 Strip battery cables

**Step 2:** Connect battery terminals to positive and negative battery cable and crimp terminals with a hydraulic clamp.

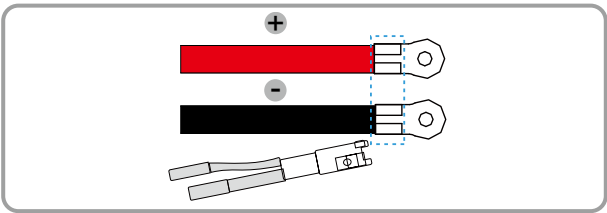


Figure 7-34 Assemble battery cables

**Step 3:** Loosen and remove the BAT swivel nut. Thread assembled battery cables into the BAT port into the inverter.

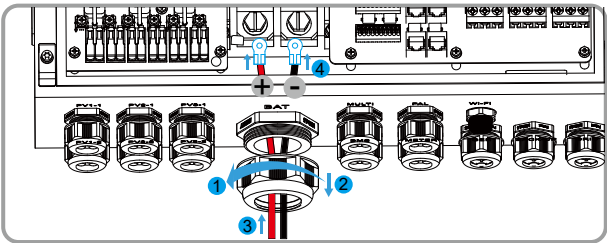


Figure 7-35 Thread battery cables

**Step 4:** Connect assembled battery cables.

- Connect assembled positive and negative battery cable to the corresponding BAT\_L and BAT\_N terminal respectively, tighten the screws on the top of the battery terminal block with a flat screwdriver to secure battery cables. Slightly pull cables backwards to ensure that cables are firmly connected.
- Tighten the swivel nut.

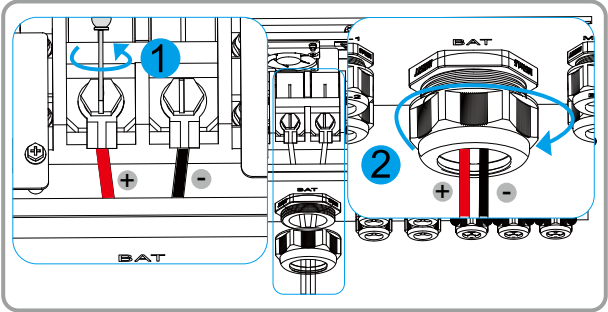


Figure 7-36 Connect battery cables

**BMS Wiring Procedure (with Lithium Battery)**

Table 7-16 Materials for BMS connection

| Materials      | Source        |
|----------------|---------------|
| Network cable  | Self-prepared |
| RJ45 connector | Self-prepared |

**Step 1:** Strip and crimp the network cable with a RJ45 connector in accordance with the BMS pin definition as below.

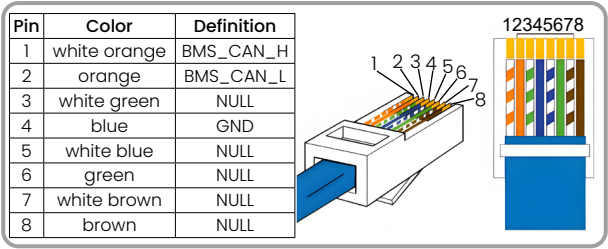


Figure 7-37 Crimp BMS network cable

**Step 2:** Loosen and remove the swivel nut from the BMS port, thread assembled BMS network cable into the BMS port and connect it to the BMS terminal inside the inverter.

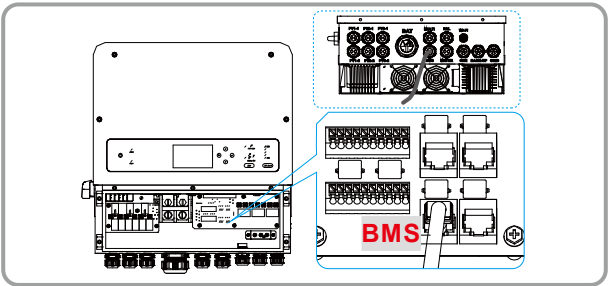


Figure 7-38 Connect BMS network cable to BMS terminal

7.8 Diesel Generator or Smart Loads Connection (GEN)

Either a diesel generator or smart loads can be connected to the GEN port of the inverter.

Table 7-17 Materials for a diesel generator or smart loads connection

| Materials                                                           | Source        |
|---------------------------------------------------------------------|---------------|
| 6 AWG/ 16 mm <sup>2</sup> outdoor one-core/ three-core copper cable | Self-prepared |
| AC circuit breaker                                                  | Self-prepared |

Wiring Procedure

**Step 1:** Strip the cable as below.

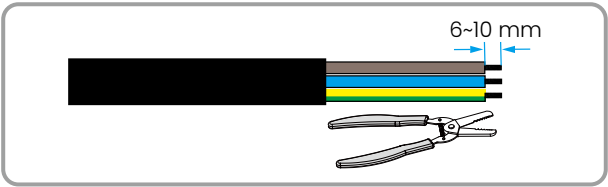


Figure 7-39 Strip a cable

**Step 2:** Loosen the remove the swivel nut from the GEN port. Thread the stripped end into the GEN port and inside the inverter.

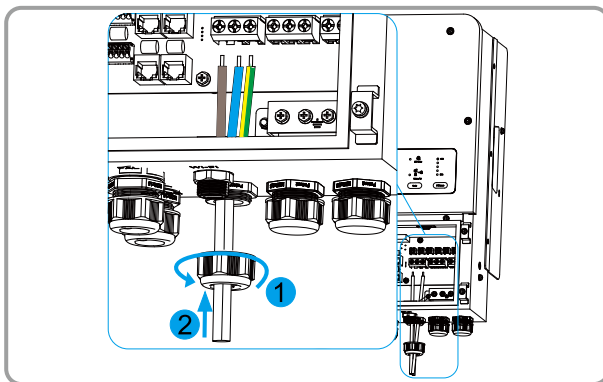


Figure 7-40 Thread generator cables

**Step 3:** Connect stripped L, N and PE cable to GEN\_L, GEN\_N and PE terminal respectively. Tighten the screws on the top of the generator terminal block inside the inverter.

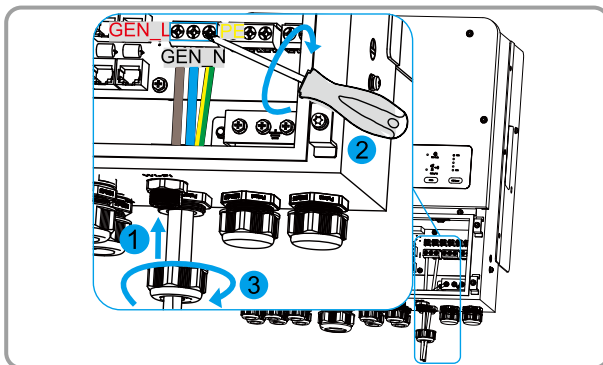


Figure 7-41 Connect generator power cables to GEN port

Dry Contact Wiring Procedure (for a diesel generator)

**i** NOTE

- If you choose to connect a diesel generator to the GEN port of the inverter, you should connect signal cables to the corresponding dry contact terminals of the MULTI port.

Table 7-18 Materials for dry contact connection

| Materials    | Source        |
|--------------|---------------|
| Signal cable | Self-prepared |

- Step 1:** Strip 5~7mm insulation off the signal cable.
- Step 2:** Loosen the MULTI swivel nut, thread stripped cables through the swivel nut into the inverter. Connect the two stripped cables to the pin 3 and pin 4 (in CON14 terminal block). Press the grey button on the top to secure the cables with the terminal block.
- Step 3:** Connect the swivel nut to the MULTI port and tighten it.

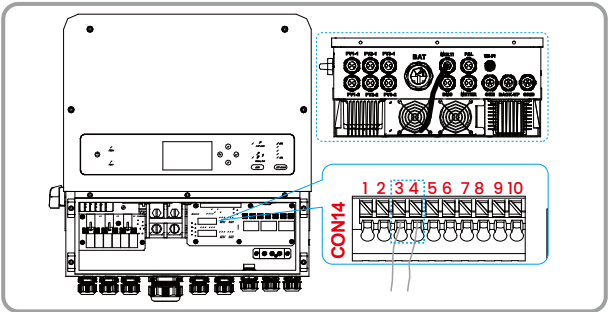


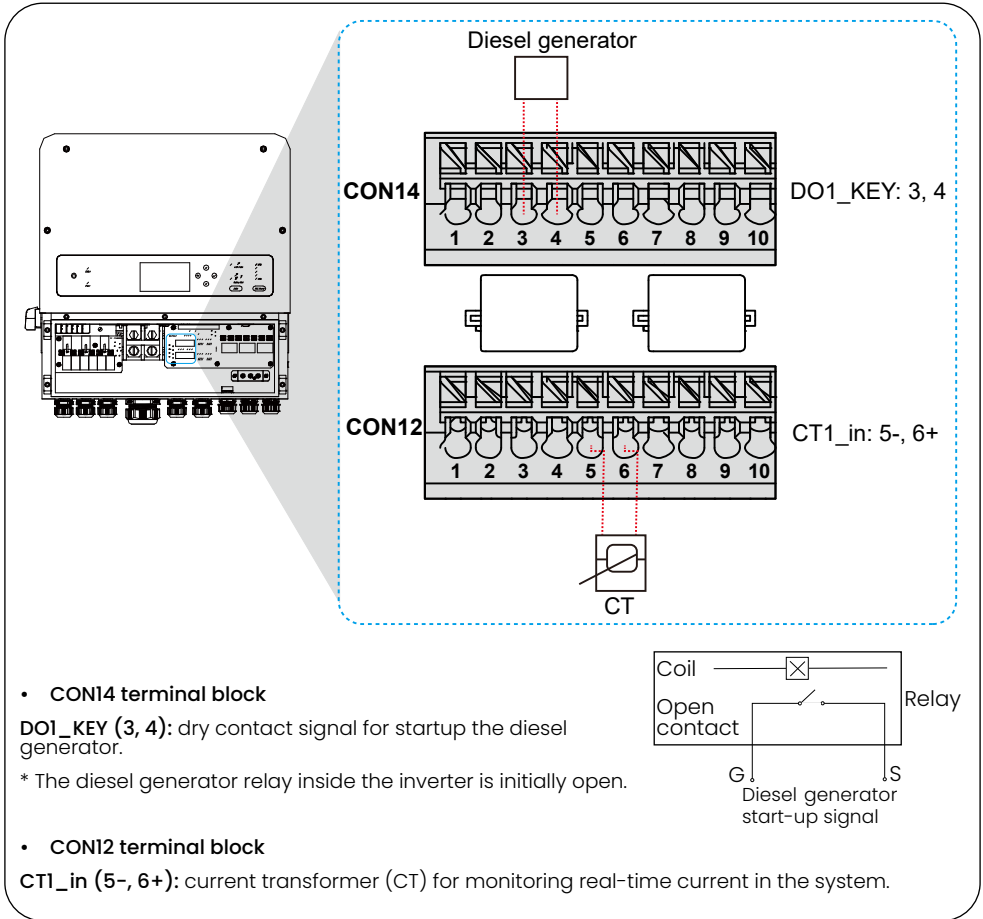
Figure 7-42 Connect signal cables to generator dry contacts

**i** NOTE

- Please refer to the specific user manual of a diesel generator to complete the generator connection.

## 7.9 Function Port Connection (MULTI & METER & PAL)

### 7.9.1 Function Port (MULTI) Introduction



#### Wiring procedure

**Step 1:** Strip 5~7 mm insulation off.

**Step 2:** Loosen and remove the swivel nut from the MULTI port, thread the signal cables through the swivel nut and into the inverter.

**Step 3:** Connect the cables into the corresponding terminal block in accordance with the function to be achieved, and press the grey block on the top of the terminal block

to secure cables.

**Step 4:** Slightly pull backward to confirm the cables are firmly connected, adjust the cable length inside the inverter and tighten the MULTI swivel nut.

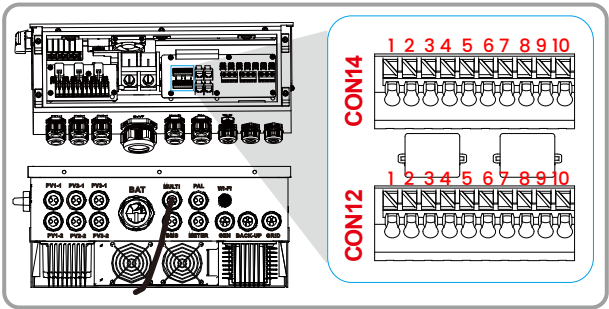


Figure 7-43 Signal cable connection

7.9.2 CT Connection (MULTI)

This series of inverters features a grid feed-in limitation function to comply with local regulations and grid codes. The function is implemented by installing an Current Transformer (CT).

**i** NOTE

- That no meter or CT is connected to an inverter will cause fault.
- If a CT is connected to a parallel system, set **Control mode** of the master inverter as CT and that of the slave inverters in the system as **No meter**.
- DO NOT install a CT on a N wire or an grounding cable.
- DO NOT install a CT on N and L cable simultaneously.
- DO NOT install a CT on non-insulated cables.
- The arrow on the CT installed in the system should point to the inverter side.

Wiring Procedure

Table 7-19 Materials for a CT connection

| Materials | Source         |
|-----------|----------------|
| CT        | Delivery scope |

**Step 1:** Strip the signal cables originally installed on the CT.

**Step 2:** Loosen and remove the swivel nut from the MULTI port. Thread signal cables through the swivel nut and into the inverter.



- Step 3:** Connect stripped signal cables to **CON12** terminal block: red cable to pin 6 terminal and white cable to pin 5 terminal.
- Step 4:** Slightly pull backward to ensure that cables are tightly secured and then tighten the swivel nut to the MULTI port.

Table 7-20 CT pin definition (MULTI port)

| Pin            | 5           | 6         |
|----------------|-------------|-----------|
| Pin definition | CT- (white) | CT+ (red) |

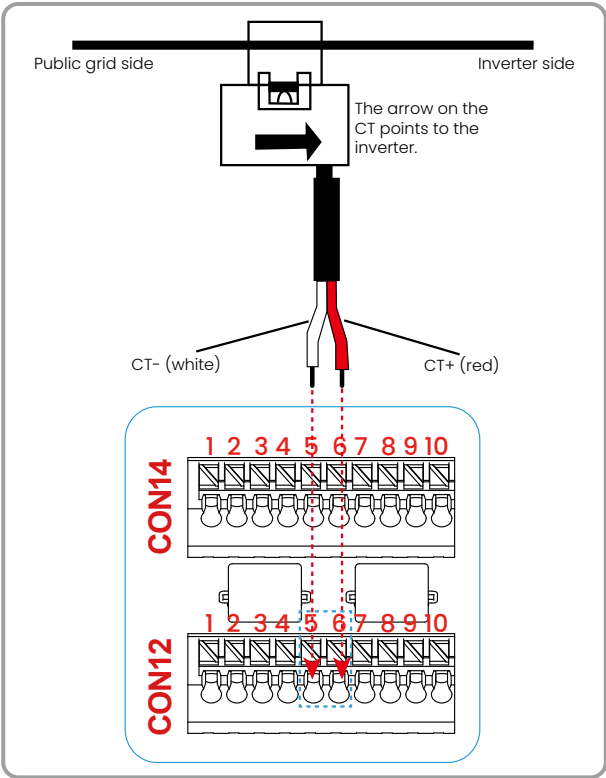


Figure 7-44 CT connection

### 7.9.3 Smart Meter Connection (METER) (Optional)

#### **i** NOTE

- If you want to connect a smart meter, contact Livoltek after-sales team to additionally purchase one.
- The smart meter must be authorized by Livoltek, any third party or unauthorized meter may not match the inverter.
- Any damage caused by connecting an unauthorized meter to the system is not covered by warranty.
- Ensure that AC cables are totally isolated from AC power before connecting a smart meter.
- One smart meter can only be used for one hybrid inverter.
- Generally, the smart meter should be installed in or near the grid distribution box right after the billing meter.

#### Smart meter connection diagram

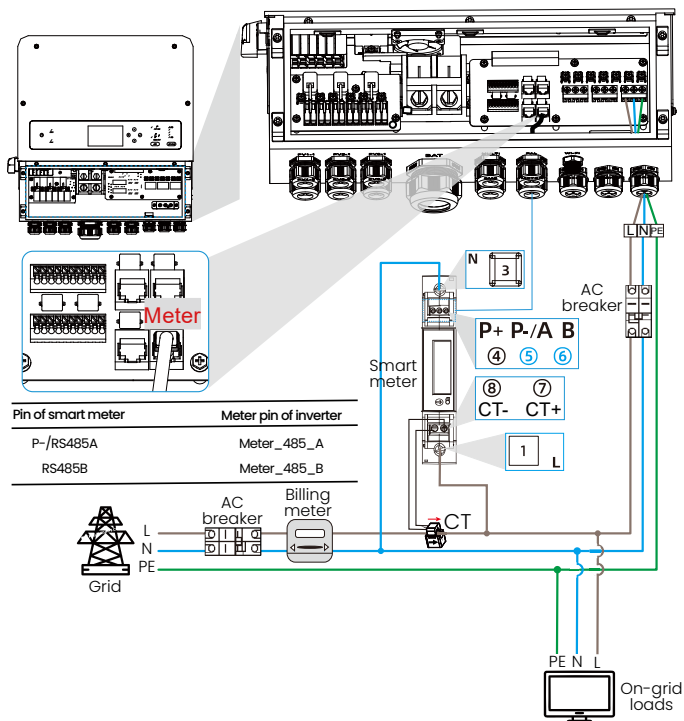


Figure 7-45 Smart meter connection diagram

## Wiring Procedure

Table 7-21 Materials for smart meter connection

| Materials            | Source                 |
|----------------------|------------------------|
| Network cable        | Self-prepared          |
| RJ45 connector       | Self-prepared          |
| One-core power cable | Self-prepared          |
| Smart meter          | Purchased from Livotek |

**Step 1:** Smart meter power cable connection.

- Prepare two one-core copper power cables.
- Strip both ends of power cables.
- Connect pin 1 terminal to phase line L and pin 3 terminal to phase line N with power cables.

**Step 2:** Smart meter communication cable connection.

- Strip the network cable, crimp the stripped end with a RJ45 connector in accordance with the meter pin definition below. And connect the assembled network cable to the METER port.

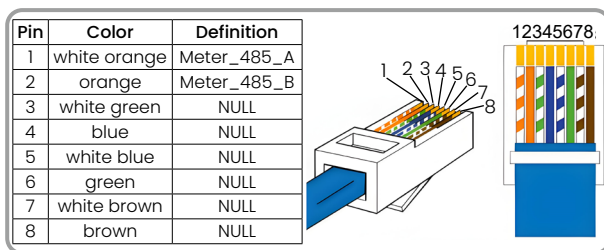


Figure 7-46 Crimp a meter communication cable

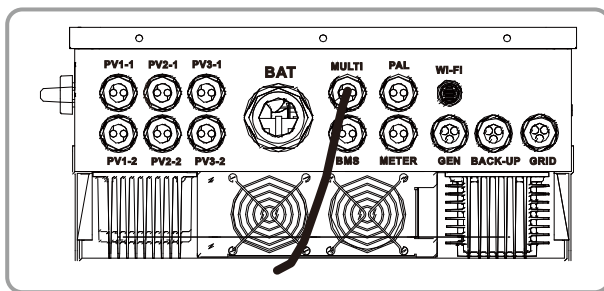


Figure 7-47 Connect to the METER port

- Strip the other end of a network cable and connect the stripped end to the smart meter: white orange wire to P-/A terminal and orange wire to B terminal.

7.9.4 Parallel Connection (PAL)

Parallel function shall be available in Q4 of 2025.

Parallel Connection Diagram

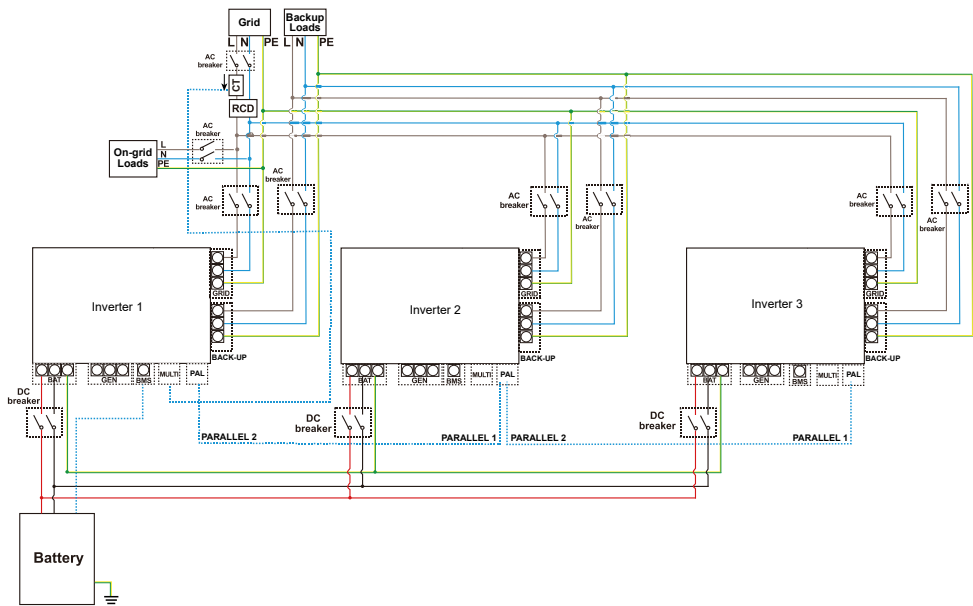


Figure 7-48 Three inverters in parallel

Wiring Procedure

Table 7-22 Materials for parallel communication connection

| Materials      | Source         |
|----------------|----------------|
| Parallel cable | Delivery scope |

**NOTE**

- Please refer to the previous sections to complete PV, battery, grid, backup and CT/ smart meter connection. Refer to the following steps to complete parallel communication connection.

- Step 1:** Remove all PAL swivel nuts from inverters in the parallel system.
- Step 2:** Connect one end of a pre-assembled parallel cable to PARALLEL2 terminal (PAL port) of the inverter 1 and the other end to PARALLEL1 terminal (PAL port) of the inverter 2. Connect one end of another pre-assembled parallel cable to PARALLEL2 terminal (PAL port) of the inverter 2 and the other end to PARALLEL1 terminal (PAL

port) of the inverter 3.

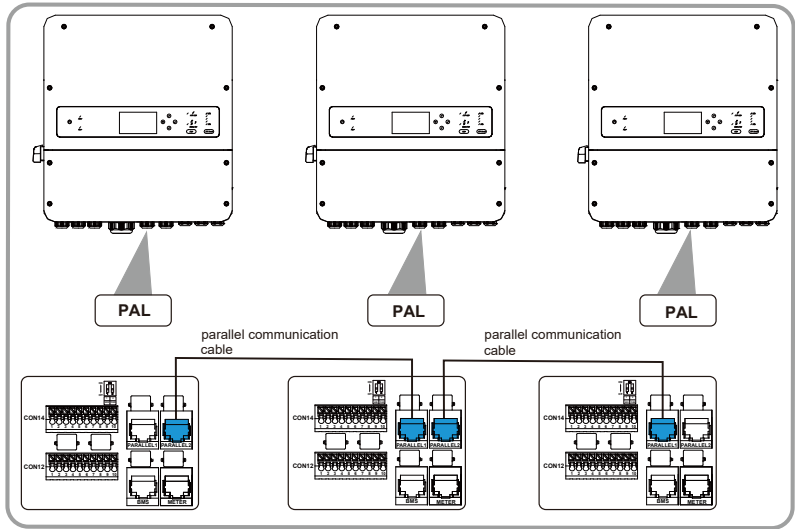


Figure 7-49 Parallel communication cable connection

**Step 3:** Turn on DIP switches of the first and last inverter in a parallel system.

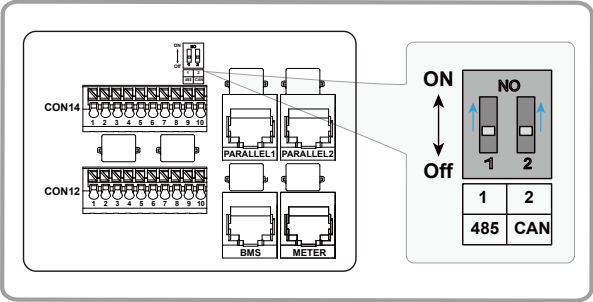


Figure 7-50 Turn on DIP switches

**Step 4:** Connect swivel nuts to the PAL port of inverters in a parallel system and tighten them respectively.

## 7.10 Stick Logger Connection

The inverter provides a communication port, which can collect data and transmit data of the inverter to the monitoring website via a stick logger.

### Wiring Procedure

**Step 1:** Remove the waterproof lid from Wi-Fi port of the inverter.

**Step 2:** Insert the stick logger from the inverter accessory into the Wi-Fi port.

**Step 3:** Tighten the swivel nut clockwise to secure the logger on the inverter.

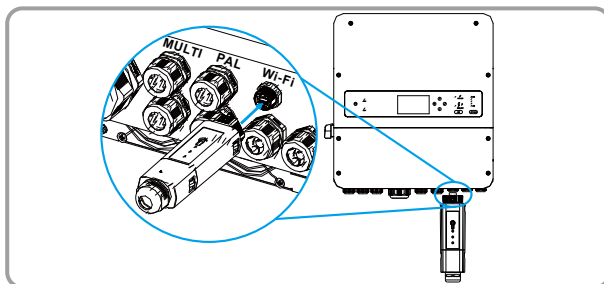


Figure 7-51 Stick logger connection

## 7.11 Installation and Electrical Connection Verification

Check the following items before turning on an inverter:

- No foreign objects are inside or on the inverter.
- All screws especially the screws used for electrical connections are tightened.
- The inverter is installed correctly and securely.
- All cables are connected according to *7 Electrical Connection*.
- Check there is no open circuit or short circuits at AC and DC terminals with a multi-meter.
- Idle terminals are sealed.
- All safety warning symbols are intact and complete on the inverter.
- The country marked on the packing box is in accordance with the installation site.
- The inverter is correctly and firmly fastened to the mounting bracket on the wall.
- An AC circuit breaker is correctly connected between inverter GRID port and the grid and ensure the circuit breaker is disconnected.
- An AC circuit breaker is correctly connected between inverter BACK-UP port and critical loads and ensure that the circuit breaker is disconnected.
- For Li-Ion battery, ensure that the BMS communication cable has been correctly connected.

### **i** NOTE

- After you complete all electrical connection, install the upper lid back to the inverter and secure it with four screws. (Torque: 5 N·m)

# 8 System Operation

## 8.1 Inverter LCD Display

Observe inverter indicators to obtain the inverter operation status.

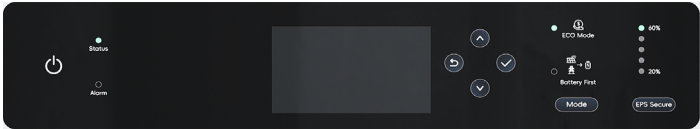


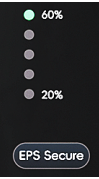
Figure 8-52 Inverter LCD Display

Table 8-23 Indicators introduction

| Indicator                                                                        | Color | Status     | Description                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------|-------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Green | Steady on  | The inverter is running normally. Or the inverter is upgrading software (with Alarm indicator steady on at the same time).                                                                                                                                       |
|                                                                                  |       | Slow Flash | The inverter is in standby or off status.                                                                                                                                                                                                                        |
|                                                                                  |       | Flash      | The inverter is starting and in self-checking status.                                                                                                                                                                                                            |
|  | Red   | Steady on  | The inverter is in fault status. Or the inverter is upgrading software (with Status indicator steady on at the same time). In the event of a fault condition while grid power is energized, the inverter shall supply power to backup loads via the bypass path. |
|                                                                                  |       | Off        | The inverter is running normally.                                                                                                                                                                                                                                |

Table 8-24 Inverter keys introduction

| Indicator                                                                           | Function           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | System on/ off key | <p>System on/off key is to start or stop the energy conversion of the inverter.</p> <ul style="list-style-type: none"><li>When the inverter is in off status, press the System on/ off key, and then the inverter starts, begins system self-checking and runs normally when the PV voltage exceeds the startup voltage.</li><li>When the inverter is running normally, press the System on/ off key and then the inverter stops energy conversion. If the voltage still remains on the AC side, the BACK-UP port will maintain load power supply via the bypass path.</li></ul> |
|  | Up key             | Move the cursor to the upper part or increase the value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | Down key           | Move the cursor to the lower part or decrease the value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | ESC key            | Exit from the current interface or function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|  | Enter key          | Confirm the selection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Indicator                                                                        | Function           | Description                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Work mode setting  | <p><b>ECO Mode</b> (self-use mode) is to maximize the solar energy usage and minimize the grid import. It is the default work mode.</p> <p><b>Battery First mode</b> (backup mode) is to maximize battery reserve SoC for improving the stability of power supply.</p> <p><b>Method:</b> press the <b>Mode</b> key to set one of the two work modes. The work mode with green light on is the current work mode.</p>          |
|  | EPS Secure setting | <p>EPS Secure is set for battery reserved SoC for automatically turning on or turning off smart loads if connected.</p> <ul style="list-style-type: none"> <li>When the actual battery SoC exceeds the <b>EPS Secure</b> value set, smart loads will be turned on automatically.</li> <li>When the actual battery SoC is lower than the <b>EPS Secure</b> value set, smart loads will be turned off automatically.</li> </ul> |

## 8.2 Start-up Procedure

### QUALIFIED PERSON

#### Step 1: Power on the battery.

- Press the button to power on the battery.
- Turn on the DC breaker between the inverter and the battery connected.
- The inverter LCD display lights on and the real-time battery parameters can be checked on the display.

#### Step 2: Turn on the PV.

- Turn on the DC breaker between PV panels and the inverter (if connected) and rotate the DC switch to **ON** position. And then the inverter LCD display lights on, the **Status** indicator flashes and the real-time PV parameters can be checked on the display.

#### Step 3: Switch on loads.

- Turn on the circuit breaker(s) between the inverter and backup loads/ on-grid loads/ smart loads (if connected) between the inverter and loads. The real-time loads parameters can be checked on the display.

#### Step 4: Power on the grid.

- Turn on the circuit breaker between the inverter and the grid. The inverter LCD display lights on and the **Status** indicator flashes. The real-time grid parameters can be checked on the display.

#### Step 5: Turn on a diesel generator (if connected).

- Turn on the generator (if a generator connected needs turning on manually) and the circuit breaker between the inverter and the generator.

#### Step 6: Configure the stick logger.

- Refer to *9.2 APP Setting* and scan the QR code to complete network configuration,



register an account, build a site, add the inverter into your site via **My Livoltek APP** on the installation site.

### **Step 7: Switch on the inverter.**

- Press the **System on/off** key to turn on the inverter, the LCD display lights on, the **Status** indicator flashes, the inverter is self-checking. The inverter enters normal status and the **Status** indicator turns steady on.

### **Step 8: Observe the indicator.**

- Observe the inverter indicators. Confirm the **Alarm** indicator is off and there is no fault reported on the display.

# 9 Setting

## 9.1 Setting on the Inverter Display

### 9.1.1 Setting Menu

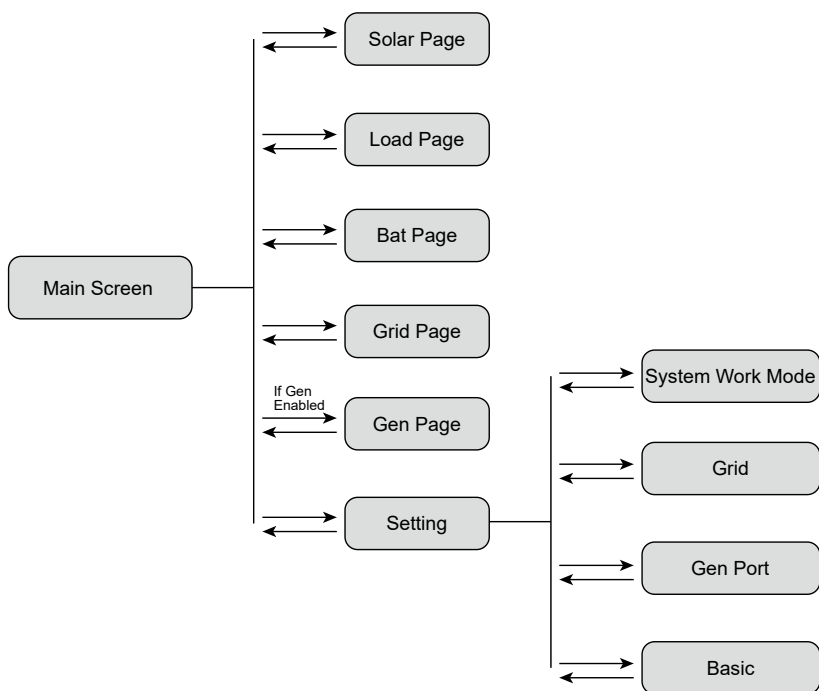


Figure 9-53 Setting menu

#### **i** NOTE

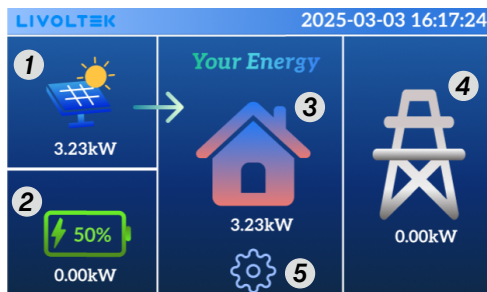
- Please refer to the actual settings interface of the inverter.

## 9.1.2 Setting Items on the Display

You can touch anywhere on the inverter display or press any key to turn on the display.

### Main interface

You can touch the icons below on the display to enter different interfaces to get PV, battery, loads and grid information and etc. or to perform settings as needed.



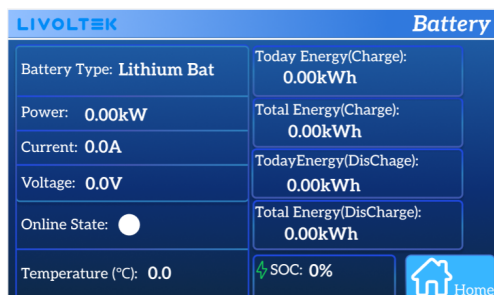
- 1 Solar page
- 2 Battery page
- 3 Load page
- 4 Grid page
- 5 Setting page

### Solar page



Touch the icon **1** to enter the **Solar** page, you can view the real-time PV power, voltage and current of each PV string, today's PV energy and total PV energy in this interface.

### Battery page



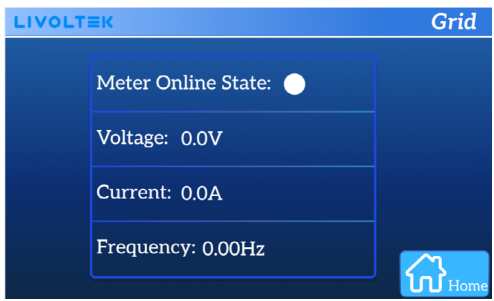
Touch the icon **2** to enter the **Battery** page, you can view the battery type connected, the real-time power, current, voltage, online state and temperature of the battery, today's charging and discharging energy and total charging and discharging energy of the battery and the real-time battery SoC.

### Load page



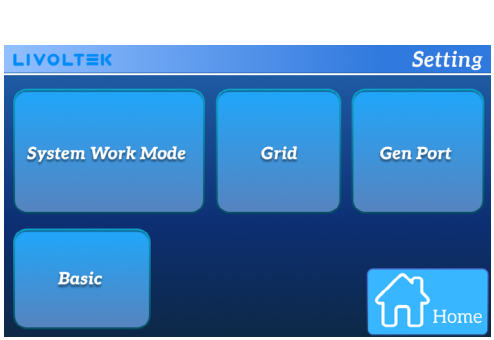
Touch the icon **3** to enter the Load page, you can view the power, today's energy and total energy of loads connected.

### Grid page



Touch the icon **4** to enter the Grid page, you can view the meter online state, the real-time voltage, current and frequency of the grid.

### Setting page



Touch the icon **5** to enter the Setting page, you can perform settings via items displayed in this interface.

- Set a work mode in System Work Mode interface.
- Set the control method and power limit fed into the grid in Grid interface.
- Set generator or smart loads parameters in Gen Port interface as needed.
- Turn on/ shutdown/ restart the inverter and set the date & time at the installation site in Basic interface.



## NOTE

- Here below are interfaces you can perform settings.

### Settings in Basic interface



Path: touch **Basic** in **Setting** interface to enter another interface.

You can turn on, shutdown or restart the inverter in this interface.

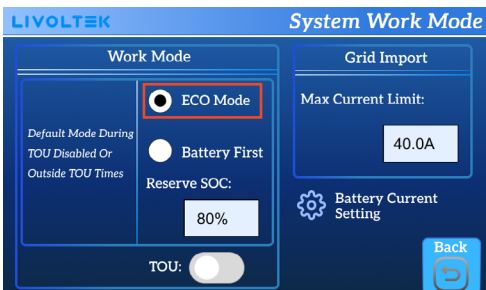


Path: touch the setting icon at the top right corner of the **Inverter Control** interface to enter **Date & Time** interface.

You can set the **Year**, **Month**, **Day**, **Hour** and **Minute** in accordance with the time of the installation site.

### Settings in System Work Mode interface

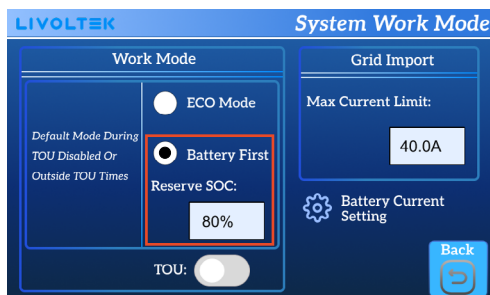
#### Work Mode setting



#### ECO Mode

**ECO Mode** (self-use) is to maximize the solar energy usage and minimize energy imported from the grid. Refer to *2.5 Work Mode* to acquire more detailed information.

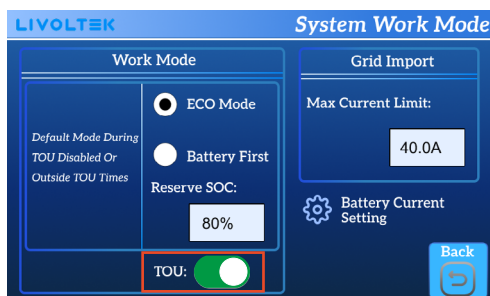
Path: click **ECO Mode** to confirm the work mode of the inverter.



### Battery First

**Battery First (backup)** work mode is to ensure that the battery reserves a minimum capacity fully charged when there is a grid outage. The battery shall never discharge when the actual battery SoC decreases to the set **Reserve SOC** and when there is grid input, the PV and grid will prioritize charging the battery.

**Path:** click **Battery First** to confirm the work mode of the inverter and set **Reserve SOC** to limit the battery discharging in this work mode.



### TOU

**TOU (self-define)** work mode is for charging or discharging the battery with a certain power under different time periods. When any of the other two work modes is set with **TOU** mode,

- The **TOU** mode prioritizes the other two work modes within the time periods set in **TOU** mode.
- The inverter works in any of the other two work mode set when it is out of the time periods in **TOU** mode.

### Settings in TOU mode

**Step 1:** Enable **TOU** function and enter **TOU** setting interface.

**Step 2:** Set battery charging or discharging mode in a time period.

- **Command:** set **Charge**, **Discharge** or **Stop** to define the battery charging or discharging status. **Stop** is set to release control over battery charging or discharging during this time period.
- **Time:** set the start and end time of a time slot within a natural day to control the battery's charging or discharging mode during that period.
- **Power:** set the parameter to limit the battery's charging or discharging power in a time period.
- **SOC:** set the parameter and the battery stops charging or discharging when the actual battery SoC reaches this value.



### NOTE

- If you choose to disable or release some time period, set **Charge** or **Discharge** as **Stop**. And the inverter will run in any of the other two work modes already set in this time period.

**Example 1:** in time period 1 below, the battery charges from 2:00 to 5:00 at the power of 2 kW and the battery stops charging when the actual battery SoC reaches 10%.

**Example 2:** in time period 2 below, the battery discharges from 6:00 to 7:00 at the power of 3kW and the battery stops discharging when the actual battery SoC reaches 58%.

**Example 3:** in time period 4 below, the battery charges or discharges in accordance with any of the other two work modes already set.

**Step 3:** Touch  to enter TOU SET2 interface set the day within a week to repeat different charging or discharging time periods within a week.

**Example:** in Time 1, the battery charges from 2:00 to 5:00 at the power of 2 kW and the battery stops charging when the actual battery SoC reaches 10% every Thursday and Sunday.

| LIVOLTEK  |        | System Work Mode |        |     |               |
|-----------|--------|------------------|--------|-----|---------------|
| Command   | Time   |                  | Power  | SOC |               |
| Charge    | 2 : 0  | 5 : 0            | 2.00kW | 10% | ↑<br>TOU SET1 |
| Discharge | 6 : 0  | 7 : 0            | 3.00kW | 58% |               |
| Discharge | 8 : 0  | 9 : 0            | 5.00kW | 10% | ↓             |
| Stop      | 10 : 0 | 11 : 0           | 0.00kW | 10% |               |
| Stop      | 11 : 1 | 12 : 0           | 0.00kW | 10% | Back          |
| Discharge | 18 : 0 | 23 : 0           | 6.00kW | 10% |               |

LIVOLTEK

System Work Mode

|       | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|-------|-----|-----|-----|-----|-----|-----|-----|
| Time1 |     |     |     |     |     |     |     |
| Time2 |     |     |     |     |     |     |     |
| Time3 |     |     |     |     |     |     |     |
| Time4 |     |     |     |     |     |     |     |
| Time5 |     |     |     |     |     |     |     |
| Time6 |     |     |     |     |     |     |     |

↑

TOU SET2

↓

Back

### Grid Import limitation setting

| LIVOLTEK                                                                                                                                                                                                                                                                                              |  | System Work Mode                                                                              |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------|--|
| <div>Work Mode</div> <div> <input checked="" type="radio"/> ECO Mode<br/>           Default Mode During TOU Disabled Or Outside TOU Times         </div> <div> <input type="radio"/> Battery First<br/>           Reserve SOC: 80%         </div> <div>TOU: <input checked="" type="checkbox"/></div> |  | <div>Grid Import</div> <div>Max Current Limit: 40.0A</div> <div>Battery Current Setting</div> |  |

To avoid an inverter damage due to excessive current imported from the grid, set Max. Current Limit on the inverter display immediately when the device is powered on.

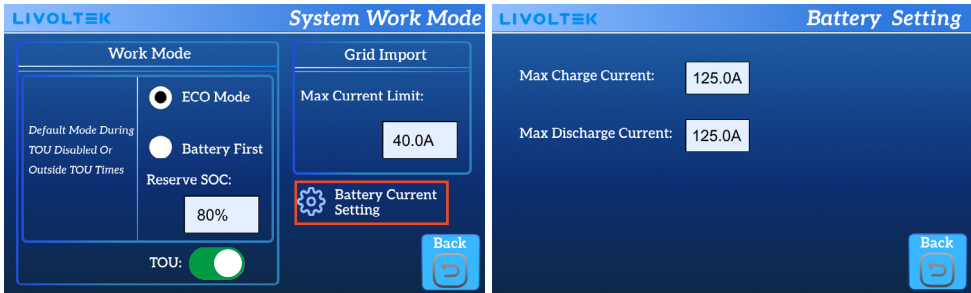
Max. Current Limit: 0-60A for 7.5kW/ 8kW/ 10kW/ 12kW inverter.

Battery Current setting

To limit the maximum charging current can prevent the battery from be overcharged by the grid or photovoltaic power, and avoid overheating or capacity degradation due to overload.

If overloading occurs due to simultaneous startup of high-power loads, to limit the discharging current can prevent the inverter from tripping.

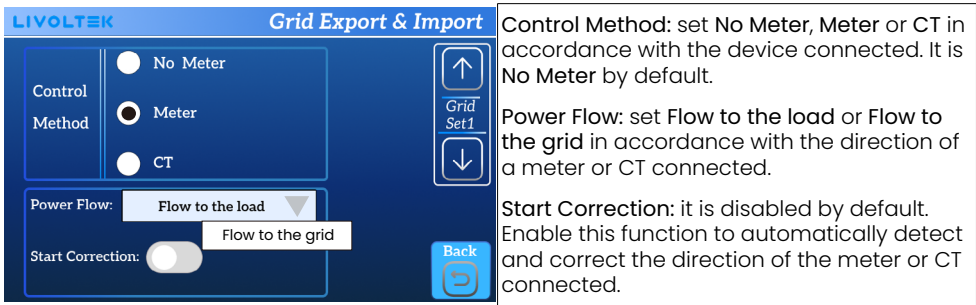
- **Max Charge Current:** 0-190A for 7.5kW/ 8kW inverter; 0-220A for 10kW inverter; 0-250A for 12kW inverter.
- **Max Discharge Current:** 0-190A for 7.5kW/ 8kW inverter; 0-220A for 10kW inverter; 0-250A for 12kW inverter.



Grid Export & Import setting

Touch Grid in the Setting interface to enter the Grid Export & Import interface.

Meter/ CT setting in Grid Export & Import interface





## Feed-in power limitation interface

Touch  to enter **Grid Set2** interface to set power limitation fed into the grid.

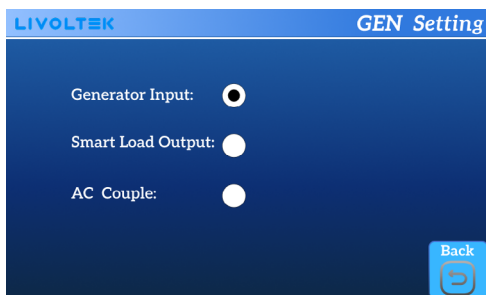


**Export to grid limit:** it is disabled by default. You can enable this function if there is a requirement of feed-in power limitation from a local grid company.

**Value:** set this value when this function is enabled.

If no power is allowed to be fed into the grid, enable this function and set **Value** as 0.

## Gen Port setting



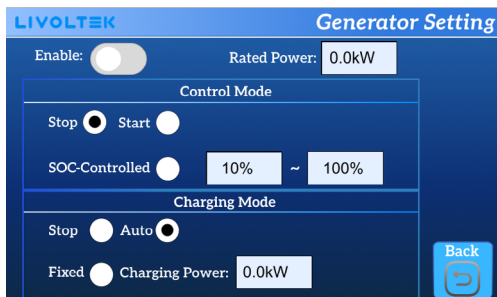
Touch **Gen Port** in the **Setting** interface and select to set parameters of a generator or smart loads actually connected.



### NOTE

- AC Couple function is reserved for now.

## Generator setting



When a generator is connected to the **GEN** port of the inverter, touch **Generator Input** to enter **Generator Setting** interface.

**Step 1:** Enable this function.

**Step 2:** Set **Rated Power** (recommended 75% rated power of the generator connected).

**Step 3:** Set **Control Mode** to confirm a generator start-stop mode: **Stop**, **Start** or **SOC-Controlled**.

Table 9-25 Control mode setting

| Control Mode   | Description                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stop           | Set <b>Stop</b> and you can manually stop the generator connected.                                                                                                                                                                                                                                                                                                                    |
| Start          | Set <b>Start</b> and you can manually start the generator connected.                                                                                                                                                                                                                                                                                                                  |
| SOC-Controlled | Set <b>SOC-Controlled</b> and battery SoC range. The on and off of the generator is controlled by the actual battery SoC.<br>For example,<br><ul style="list-style-type: none"> <li>When the actual battery SoC exceeds 10%, the generator is automatically turned on.</li> <li>When the actual battery SoC is lower than 100%, the generator is automatically turned off.</li> </ul> |

**Step 4:** Set **Charging Mode** to confirm inverter's charging power control for the generator: **Stop**, **Auto** or **Fixed**.

Table 9-26 Charging mode setting

| Charging Mode | Description                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------------------|
| Stop          | Set <b>Stop</b> and the generator stops charging batteries.                                                     |
| Auto          | Set <b>Auto</b> and the generator charges batteries in accordance with the surplus energy of the system.        |
| Fixed         | Set <b>Fixed</b> and <b>Charging Power</b> , the generator charges batteries at the set <b>Charging Power</b> . |

## Smart Load setting

When smart loads are connected to the **GEN** port of the inverter, touch **Smart Load Output** to enter **Smart Load Mode** interface.

You can perform settings in Smart Load Mode interface to control the on and off of smart loads via the inverter.

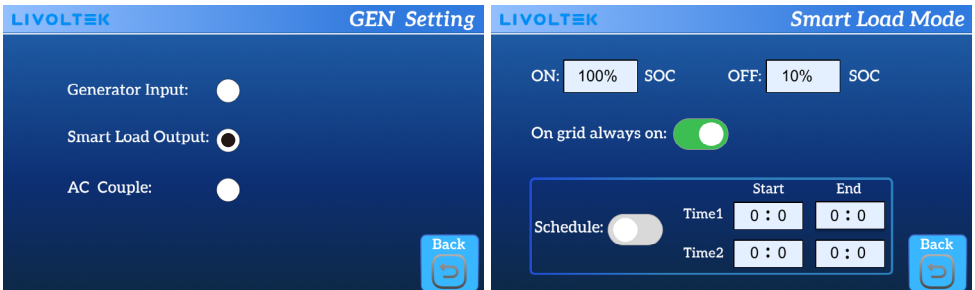


Table 9-27 On or off conditions of smart loads

| On grid<br>always on | Grid input | Schedule                           | ON/ OFF SOC                        | Status of Smart<br>Loads |
|----------------------|------------|------------------------------------|------------------------------------|--------------------------|
| Enabled              | Yes        | /                                  | /                                  | Turn on                  |
|                      | No         | Enabled but out of<br>time periods | /                                  | Turn off                 |
|                      |            | Enabled and within<br>time periods | actual battery SoC $\geq$ ON value | Turn on                  |
|                      |            |                                    | actual battery SoC $<$ OFF value   | Turn off                 |
|                      |            | Disabled                           | actual battery SoC $\geq$ ON value | Turn on                  |
|                      |            |                                    | actual battery SoC $<$ OFF value   | Turn off                 |
| Disabled             | /          | Enabled but out of<br>time periods | /                                  | Turn off                 |
|                      | /          | Enabled and within<br>time periods | actual battery SoC $\geq$ ON value | Turn on                  |
|                      | /          |                                    | actual battery SoC $<$ OFF value   | Turn off                 |
|                      | /          | Disabled                           | actual battery SoC $\geq$ ON value | Turn on                  |
|                      | /          |                                    | actual battery SoC $<$ OFF value   | Turn off                 |

## 9.2 APP Setting

You can login on our web (link as below) on your computer, also you can scan the QR code to download the APP on your phone.

| Area                                       | Web link                                                                        |
|--------------------------------------------|---------------------------------------------------------------------------------|
| Asia, Latin American, Australia and others | <a href="https://www.livoltek-portal.com/">https://www.livoltek-portal.com/</a> |
| Europe, Middle East Regions, Africa        | <a href="https://evs.livoltek-portal.com/">https://evs.livoltek-portal.com/</a> |

APP:  
Search for **My Livoltek**  
on Apple App Store,  
Google Play.



Mobile  
Explorer



Google Play



Download on the  
App Store

### *i* NOTE

- For the initial power-on of an inverter, installers should set the work mode, the country, the grid code, feed-in limitation and etc. as needed.
- You **must** scan QR code to obtain an APP setting guide for end-users in accordance with the logger connected. Follow the guide to complete account registration, site creation, device (inverter) addition on the installation site so that you can perform/ modify settings in your account remotely.



# 10 Troubleshooting and Maintenance

## 10.1 Troubleshooting

Once the inverter fails, the fault information is displayed on the APP interface.

The fault codes and troubleshooting methods of this series inverter are detailed in the table below. When a fault occurs, you can check the fault information according to the fault code on the mobile APP.

 **NOTE**

- The troubleshooting list shall be updated without any notice. Please contact Livoitek after-sales team for solutions to new faults.
- In the event of a fault condition while grid power is energized, the inverter will supply power to backup loads via a bypass path.

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Table 10-1 Troubleshooting List

| Fault Code | Fault/ Alarm Name | Possible Cause                                                                    | Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------|-------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1, 2, 13   | Grid Overvoltage  | Grid voltage is higher than the set voltage protection value;                     | <div>Generally, the inverter will be reconnected to the grid after the grid returns to normal.<br/>If the fault occurs repeatedly:<br/><b>1</b> Measure the actual grid voltage, and contact the local electric power company for solutions if the grid voltage is higher than the set value.<br/><b>2</b> Check whether the protection parameters are appropriately set via the App. Modify the overvoltage protection values with the consent of the local electric power operator.<br/><b>3</b> Contact Livoitek after-sales team if the preceding causes are ruled out and the fault persists.</div> |
|            |                   | Or the high voltage duration exceeds the set value for high voltage ride-through. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Fault Code | Fault/ Alarm Name    | Possible Cause                                            | Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------|----------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3          | Grid Undervolt       | Grid voltage lower than the set voltage protection value. | <p>Generally, the inverter will be reconnected to the grid after the grid returns to normal.</p> <p>If the fault occurs repeatedly:</p> <ol style="list-style-type: none"> <li>1 Measure the actual grid voltage, and contact the local electric power company for solutions if the grid voltage is lower than the set value.</li> <li>2 Check whether the protection parameters are appropriately set via the App.</li> <li>3 Check whether the AC cable is firmly in place.</li> <li>4 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol> |
| 7          | Grid Over-frequency  | Grid frequency is higher than the set protection value    | <p>Generally, the inverter will be reconnected to the grid after the grid returns to normal.</p> <p>If the fault occurs repeatedly:</p> <ol style="list-style-type: none"> <li>1 Measure the actual grid frequency, and contact the local electric power company for solutions if the grid frequency is beyond the set range.</li> <li>2 Check whether the protection parameters are appropriately set via the App.</li> <li>3 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                           |
| 8          | Grid Under-frequency | Grid frequency is lower than the set protection value     | <p>Generally, the inverter will be reconnected to the grid after the grid returns to normal.</p> <p>If the fault occurs repeatedly:</p> <ol style="list-style-type: none"> <li>1 Measure the actual grid frequency, and contact the local electric power company for solutions if the grid frequency is beyond the set range.</li> <li>2 Check whether the protection parameters are appropriately set via the App.</li> <li>3 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                           |

| Fault Code                                                                                                | Fault/ Alarm Name                | Possible Cause                                                                                                                                                                 | Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9                                                                                                         | Grid Power Loss                  | <ol style="list-style-type: none"> <li>1 There is a grid outage;</li> <li>2 Grid cables are not firmly or correctly connected or circuit breakers are disconnected.</li> </ol> | <p>Generally, the inverter will be reconnected to the grid after the grid returns to normal.</p> <p>If the fault occurs repeatedly:</p> <ol style="list-style-type: none"> <li>1 Check whether the grid supplies power reliably.</li> <li>2 Check whether the AC cable is firmly in place.</li> <li>3 Check whether the AC cable is connected to the correct terminal (whether the live wire and the N wire are correctly in place).</li> <li>4 Check whether the AC circuit breaker is connected.</li> <li>5 Contact Livoitek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol> |
| 10, 17, 22, 33, 34, 35, 36, 49, 51, 56, 71, 74, 77, 80, 81, 89, 97, 99, 102, 105, 109, 129, 130, 131, 132 | System Failure                   | <ol style="list-style-type: none"> <li>1 System internal module abnormality</li> <li>2 System-related wiring or terminal abnormality</li> </ol>                                | <p>Wait for the system to return to normal.</p> <p>Disconnect the AC side switch and the DC switch, and if there is a battery, disconnect the battery side switch as well. Wait for 15 minutes, then sequentially close the AC and DC switches to restart the system.</p> <p>Contact Livoitek after-sales team if the preceding causes are ruled out and the fault persists.</p>                                                                                                                                                                                                                                         |
| 11                                                                                                        | Leakage Current Exceeds Standard | Inverter operation leakage current exceeds the standard requirement.                                                                                                           | <ol style="list-style-type: none"> <li>1 The inverter can continue to operate.</li> <li>2 Check for any abnormalities in the wiring and terminals related to the alarm, inspect for environmental foreign objects or other anomalies, and carry out corresponding repairs.</li> <li>3 Contact Livoitek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                                                                         |
| 12                                                                                                        | Grid Abnormal                    | Inverter grid-tied pre-self-check triggers if grid abnormalities are detected.                                                                                                 | <p>Generally, the inverter will be reconnected to the grid after the grid returns to normal.</p> <p>If the fault occurs repeatedly:</p> <ol style="list-style-type: none"> <li>1 Measure the actual grid, and contact the local electric power company for solutions if the grid parameter exceeds the set range.</li> <li>2 Contact Livoitek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                                  |

| Fault Code                                    | Fault/ Alarm Name                | Possible Cause                                                                                                                                          | Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23                                            | PE Abnormal                      | <ol style="list-style-type: none"> <li>1 Inverter PE cable is in poor contact.</li> <li>2 Inverter PE cable connection is abnormal.</li> </ol>          | <ol style="list-style-type: none"> <li>1 Check if the grounding cable is connected properly.</li> <li>2 Check if the insulation between the grounding cable and the live cable is normal.</li> <li>3 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                                                                                                      |
| 42, 43, 57, 449, 450, 451, 452, 453, 454, 455 | PV Reverse Connection            | Incorrect polarity of string connection: positive and negative terminals are reversely connected.                                                       | <ol style="list-style-type: none"> <li>1 Check if the positive and negative PV ports on the inverter are reversely connected. If so, wait until the PV string current drops below 0.5A, then disconnect the DC switch and adjust the corresponding PV polarity.</li> <li>2 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                                |
| 98                                            | Environmental Temp Too High      | <ol style="list-style-type: none"> <li>1 Over high temperature inside the enclosure</li> <li>2 Excessive operating environmental temperature</li> </ol> | <ol style="list-style-type: none"> <li>1 The inverter can continue to operate.</li> <li>2 Check for any abnormalities in the wiring and terminals related to the alarm, inspect for environmental foreign objects or other anomalies, and carry out corresponding repairs.</li> <li>3 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                     |
| 100                                           | System Insulation Resistance Low | Photovoltaic panel insulation resistance to the ground is below the standard value.                                                                     | <ol style="list-style-type: none"> <li>1 Check through the APP or WEB if the ISO impedance protection value is too high, ensuring it complies with local regulations.</li> <li>2 Inspect the PV and DC cable ground impedance. If there is any short circuit or damage to the cable insulation, take corrective measures.</li> <li>3 If the cables are normal and the fault occurs on rainy days, wait for better weather before reconfirming.</li> <li>4 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol> |

| Fault Code                   | Fault/ Alarm Name          | Possible Cause                                                                                                                                  | Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 104                          | Environmental Temp Too Low | Detected that environmental temperature is below the protection value.                                                                          | <ol style="list-style-type: none"> <li>1 The inverter can continue to operate.</li> <li>2 Check for any abnormalities in the wiring and terminals related to the alarm, inspect for environmental foreign objects or other anomalies, and carry out corresponding repairs.</li> <li>3 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                        |
| 161, 163, 180, 181, 182, 183 | System Alarm               | <ol style="list-style-type: none"> <li>1 System internal module abnormality</li> <li>2 System-related wiring or terminal abnormality</li> </ol> | <ol style="list-style-type: none"> <li>1 The inverter can continue to operate.</li> <li>2 Check for any abnormalities in the wiring and terminals related to the alarm, inspect for environmental foreign objects or other anomalies, and carry out corresponding repairs.</li> <li>3 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                        |
| 516                          | AFCI Fault                 | Inverter experiences an AFCI fault on the DC side.                                                                                              | <ol style="list-style-type: none"> <li>1 Disconnect the DC power and check the DC side for any cable damage, loose or poorly contacted connection terminals or fuses, or signs of burning on components. If any are found, replace the damaged cables, tighten loose terminals or fuses, and replace any components with burn marks.</li> <li>2 After completing the inspection and remedial repairs of the DC side in step 1, reconnect the DC power, clear the AFCI fault through the APP or WEB, and the inverter will resume normal operation. Check whether battery communication cable is correctly and firmly connected with the terminal.</li> <li>3 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol> |



| Fault Code | Fault/ Alarm Name               | Possible Cause                                                                                                                                                                                                                                                           | Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 518        | Smart Meter Connection Abnormal | <ol style="list-style-type: none"> <li>1 Communication cable between the smart meter and the inverter is disconnected;</li> <li>2 Poor contact at the communication terminals of the electricity meter or inverter.</li> <li>3 No power supply from the grid.</li> </ol> | <ol style="list-style-type: none"> <li>1 Check if the grid is supplying power.</li> <li>2 Check for any abnormalities in the communication line and its connection terminals. If there are any, ensure reliable connection.</li> <li>3 Reinstall the smart meter communication cable.</li> <li>4 Contact Livoltek after-sales team if the preceding causes are ruled out and the fault persists.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                        |
| 645-551    | Battery Alarm                   | An alarm is issued due to minor anomalies in the battery itself, its operating environment, or operations performed on the battery.                                                                                                                                      | <p>Generally, the battery can automatically return to normal. If the alarm persists repeatedly.</p> <ol style="list-style-type: none"> <li>1 If an overtemperature or low temperature alarm occurs, which are alarms related to environmental temperature, take measures such as improving cooling conditions to reduce the temperature.</li> <li>2 If the alarm persists and is not due to the above reasons, please contact the battery manufacturer.</li> </ol>                                                                                                                                                                                                                                                                                                                 |
| 577-587    | Battery Fault                   | A fault is reported due to abnormalities in the battery itself, its operating environment, or operations performed on the battery.                                                                                                                                       | <ol style="list-style-type: none"> <li>1 For battery voltage faults, please check if there are any abnormalities in the connection of the battery power cables (reverse connections, looseness, etc.). If so, properly reconnect the battery power cable.</li> <li>2 Once the battery power cables are confirmed to be correctly connected, check if there is any anomaly in the real-time voltage of the battery. If there is, contact the battery manufacturer. If not, please contact Livoltek Customer Service Center.</li> <li>3 For battery temperature faults, take measures such as improving cooling conditions to lower the temperature.</li> <li>4 If the fault still persists and is not due to the above reasons, please contact the battery manufacturer.</li> </ol> |



## NOTE

- Contact the dealer if the measures listed in the troubleshooting columns have been taken but the problem persists. Contact your dealer or Livoltek after-sales team for support.

## 10.2 Routine Maintenance

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### 10.2.1 Safety Precautions



#### **DANGER**

- High voltage generated by the equipment during operation may cause an electric shock, which could result in death, serious injury, or serious property damage. Prior to maintenance, power off the equipment and strictly comply with the safety precautions in this document and relevant documents.
- Maintain the equipment with sufficient knowledge of this document and using proper tools and testing equipment.
- Before maintaining the equipment, power it off and follow the instructions on the delayed discharge label to ensure that the equipment is powered off.
- Turn off the AC and DC switches of the inverter when maintaining the electric equipment or power distribution equipment connected the inverter.
- For personal safety maintenance personnel must wear appropriate personal protective equipment (like insulation gloves and protective shoes) for the inverter maintenance.
- Place temporary warning signs or erect fences to prevent unauthorized access to the maintenance site.
- Follow the procedures of maintenance stipulated in the manual strictly.
- Check the relevant safety and performance of the inverter rectify any faults that may compromise the inverter security performance before restarting the inverter.
- To avoid any other unforeseeable risk, contact immediately your dealer, if there is any issue found during operation.
- The equipment can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the equipment.



#### **WARNING**

- Before maintaining and commissioning inverter and its peripheral distribution unit switch off all the charged terminals of the inverter, and wait at least 5 minutes after the inverter is powered off.



#### **CAUTION**

- Risk of inverter damage or personal injury due to incorrect service!
- Always keep in mind that the inverter is powered by dual sources: PV strings and utility grid.
- Before maintaining and commissioning inverter and its peripheral distribution unit switch off all the charged terminals of the inverter, and wait at least 5 minutes after the inverter is powered off.

### 10.2.2 Shutdown the Inverter

- Step 1:** Press the **System on/ off** key on the inverter display to turn off the inverter.
- Step 2:** Turn off the circuit breaker between the inverter and backup loads.
- Step 3:** Turn off the circuit breaker between the inverter and PV panels and the DC switch on the inverter.
- Step 4:** Turn off the circuit breaker between the inverter and the battery, press the button on the battery to turn it off.
- Step 5:** Turn off the circuit breaker between the inverter and the grid. Turn off the circuit breaker between the inverter and the generator (if connected).
- Step 6:** Wait at least 5 minutes after the inverter display and indicators black out for discharging energy from the internal circuits of the inverter.

### 10.2.3 Equipment Maintenance

Table 10-2 Routine maintenance

| Check Item            | Method                                                                                                                                                                                 | Period                                                       |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Device clean          | Check whether the air outlet and heat sink are blocked by dust and other objects.<br>Check if the air inlet and outlet are normal. Clean the air inlet and outlet, if necessary.       | Six months to a year<br>(depend on the dust contents in air) |
| System running status | Check whether the inverter is not damaged or deformed or can be operated with no abnormal sound.                                                                                       | Once every 6 to 12 months                                    |
| Fans                  | Check whether there is a fan alarm on the APP.<br>Check whether there is any abnormal noise when the fan is rotating.<br>Clean or replace the fans and contact our dealer for support. | Once every 6 to 12 months                                    |
| Cable entry           | Check whether the cable entry is insufficiently sealed, or the gap is excessively large, and reseal the entry when necessary.                                                          | Once every 6 to 12 months                                    |
| Electrical connection | Check whether all cables are firmly in place. Check whether a cable is damaged, especially the part contacting the metal enclosure.                                                    | Once every 6 to 12 months                                    |

# 11 Decommissioning

## 11.1 Disassembling the Device

 **QUALIFIED PERSON**

### 11.1.1 Shut Down the Inverter



#### CAUTION

**Danger of burns!**

- Even if the inverter is turned off, it may still be hot and cause burns. Wear protective gloves before operating the inverter after it cools down.

For dismantling the inverter, the inverter must be switched off. Proceed as follows to disconnect the inverter. Lethal voltages or damage to the inverter will follow if otherwise.

**Step 1:** Refer to *10.2.2 Shutdown the Inverter* to power off the inverter or inverters in parallel.

**Step 2:** Ensure that the DC cable is free from voltage and current with measuring equipment.

### 11.1.2 Dismantling the inverter



#### CAUTION

- Risk of burns and electric shock!
- After the inverter is turned off for 5 minutes, measure the voltage and current with professional instrument. Only when there is no voltage nor current can operators who wear protective equipment operate and maintain the inverter.



#### NOTE

- Before dismantling the inverter, disconnect the inverter from both AC and DC power.

**Step 1:** Please refer to *7 Electrical Connection* to disconnect all cables from the inverter.

**Step 2:** Refer to *6 Mechanical Installation* to disassemble the inverter from the wall.

**Step 3:** If necessary, remove the inverter bracket from the wall.

**Step 4:** If you will reuse the inverter, refer to *3 Transportation and Storage* to restore it.

## 11.2 Packing

### **QUALIFIED PERSON**

If the original package materials are kept, put the inverter inside the original package. If the original packages are not available, put the inverter inside a cardboard box suitable for the weight and size of the inverter and seal it properly.

## 11.3 Disposing of the Device

The product must be disposed of in accordance with the locally applicable disposal regulations for waste electrical and electronic equipment.



### **CAUTION**

- Some components of the inverter may cause environmental pollution. Please dispose of them in accordance with the disposal regulations for electronic waste applicable at the installation site.
- Do NOT dispose of it with household waste.

# 12 Technical Specifications

## NOTE

- Backup output power depends on the battery.
- Specifications are subject to change without further notice.

### • DC Input Data

| Model                                   | HPI-7K5S2M | HPI-8KS2M | HPI-10KS2 | HPI-12KS2 |
|-----------------------------------------|------------|-----------|-----------|-----------|
| Max. PV input power (W)                 | 15000      | 16000     | 20000     | 24000     |
| Max. PV input voltage (V)               | 500        |           |           |           |
| Minimum PV input voltage (V)            | 60         |           |           |           |
| Start-up voltage (V)                    | 70         |           |           |           |
| Nominal PV input voltage (V)            | 370        |           |           |           |
| MPPT voltage range (V)                  | 60 to 500  |           |           |           |
| No. of MPPTs                            | 2          |           | 3         |           |
| Max. input current per MPPT (A)         | 32/32      |           | 32/32/32  |           |
| Max. short circuit current per MPPT (A) | 40/40      |           | 40/40/40  |           |
| Strings per MPPT                        | 2/2        |           | 2/2/2     |           |

### • AC (Grid) Input/ Output Data

| Model                                  | HPI-7K5S2M                                                     | HPI-8KS2M | HPI-10KS2 | HPI-12KS2 |
|----------------------------------------|----------------------------------------------------------------|-----------|-----------|-----------|
| Nominal output/ apparent power (W/ VA) | 7500                                                           | 8000      | 10000     | 12000     |
| Max. output apparent power (VA)        | 7500                                                           | 8800      | 11000     | 13200     |
| Max. AC input apparent power (W)       | 13800                                                          |           |           |           |
| Nominal grid voltage (V)               | L/N/PE, 220/ 230/ 240                                          |           |           |           |
| Nominal grid voltage range (V)         | 0.85 to 1.1 Un                                                 |           |           |           |
| Nominal grid frequency (Hz)            | 50/60                                                          |           |           |           |
| Nominal grid frequency range (Hz)      | 45 to 55/ 55 to 65                                             |           |           |           |
| Nominal output current (A)             | 34.1                                                           | 36.4      | 45.5      | 54.6      |
| Max. output current (A)                | 34.1                                                           | 40        | 50        | 60        |
| Max. input current (A)                 | 60                                                             |           |           |           |
| Power factor                           | > 0.99 at rated power (adjustable 0.8 leading to -0.8 lagging) |           |           |           |
| Total harmonic distortion rate (%)     | <3                                                             |           |           |           |

### • EPS (Off-grid) Output Data

| Model                               | HPI-7K5S2M                  | HPI-8KS2M | HPI-10KS2 | HPI-12KS2 |
|-------------------------------------|-----------------------------|-----------|-----------|-----------|
| Nominal output/ apparent power (VA) | 7500                        | 8000      | 10000     | 12000     |
| Peak output/ apparent power (W/ VA) | 2 times of rated power, 10s |           |           |           |
| Nominal output voltage (V)          | L/N/PE, 220/ 230            |           |           |           |
| Nominal output frequency (Hz)       | 50/60                       |           |           |           |
| Nominal output current (A)          | 34.1                        | 36.4      | 45.5      | 54.6      |
| Total harmonic distortion rate (%)  | <3                          |           |           |           |

## Battery Data

| Model                                         | HPI-7K5S2M           | HPI-8KS2M | HPI-10KS2 | HPI-12KS2 |
|-----------------------------------------------|----------------------|-----------|-----------|-----------|
| Battery type                                  | Li-ion               |           |           |           |
| Battery voltage range (V)                     | 40 to 60             |           |           |           |
| Max. charge/ discharge current (A)            | 190                  | 190       | 220       | 250       |
| Communication with BMS                        | CAN/RS485            |           |           |           |
| Charge/ discharge strategy for li-ion battery | Self-adaption to BMS |           |           |           |

## Generator Data

| Model                        | HPI-7K5S2M | HPI-8KS2M | HPI-10KS2 | HPI-12KS2 |
|------------------------------|------------|-----------|-----------|-----------|
| Max. input power (W)         | 7500       | 8000      | 10000     | 12000     |
| Max. input current (A)       | 34.1       | 36.4      | 45.5      | 54.6      |
| Nominal input frequency (Hz) | 50/60      |           |           |           |

## Efficiency

| Model               | HPI-7K5S2M | HPI-8KS2M | HPI-10KS2 | HPI-12KS2 |
|---------------------|------------|-----------|-----------|-----------|
| Max. Efficiency (%) | 97.6       |           |           |           |
| Euro Efficiency (%) | 96.8       |           |           |           |
| MPPT Efficiency (%) | > 99.9     |           |           |           |

## General Data

| Model                             | HPI-7K5S2M                    | HPI-8KS2M | HPI-10KS2 | HPI-12KS2 |
|-----------------------------------|-------------------------------|-----------|-----------|-----------|
| Dimensions (W*H*D) (mm)           | 496 * 545 * 228               |           |           |           |
| Weight (kg)                       | 34                            |           |           |           |
| Mounting method                   | Wall-mounted                  |           |           |           |
| Ingress protection                | IP66                          |           |           |           |
| Cooling                           | Forced air cooling            |           |           |           |
| Operating temperature range (°C ) | -25 to +60                    |           |           |           |
| Permissible ambient humidity (%)  | 0 to 95                       |           |           |           |
| Max. altitude (m)                 | 2000                          |           |           |           |
| Noise (dB)                        | 45                            |           |           |           |
| Display                           | LCD+APP                       |           |           |           |
| Topology (solar to battery)       | High-frequency isolation      |           |           |           |
| Warranty                          | Five-year (ten-year optional) |           |           |           |

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# Warranty Card Registration

# LIVOLTEK

Dear customer, thank you for choosing LIVOLTEK product.

For registering product warranty, please prepare everything ready and register on

<https://www.livoltex.com/warranty-center/>

| Product Information  |  |
|----------------------|--|
| Product Type         |  |
| Product SN           |  |
| Installation date    |  |
| Installation Company |  |
| Personal Information |  |
| Your name            |  |
| Your contact number  |  |
| Your Email address   |  |
| Your home address    |  |

\* Warranties should be registered in time. It is recommended that they are registered no more than 6 weeks following the successful installation and commissioning of the product where possible, thanks for your cooperation.





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Power Your Life with Green Energy



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