

USER MANUAL



HP1-7.5~16kW

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Legal Disclaimer

About This Manual

- This manual describes the basic information, installation, electrical connection, commission and troubleshooting of the product. Read the manual and other related documents before performing any operation on the product.
- As a result of product upgrading or other reasons, this manual may be upgraded without prior notice. For the latest updates, please visit www.livoltek.com.
- Keep this manual well for future references.

Applicable Model

This manual applies to the following LIVOTEK low voltage solar hybrid inverters:

- HP1-7K5S2M
- HP1-8KS2M
- HP1-10KS2
- HP1-12KS2
- HP1-14KS2
- HP1-16KS2

Legal Information

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The Hyper series inverters are transported, used and operated under limited condition. **LIVOLTEK** shall not be liable to provide the service, technical support or compensation under conditions listed below, including but not limited to:

- Inverter is damaged or broken by force majeure (such as earthquake, flooding, thunderstorm, lighting, fire hazard, volcanic eruption etc.).
- Inverter's warranty is expired and not extended.
- Can't provide the inverter's SN, warranty card or invoice.
- Inverter is damaged by man-made cause.

- Inverter is used or operated against local policy and regulation.
- Inverter is installed, configured, operated and commissioned against requirements mentioned in this manual.
- Inverter is installed, changed, disassembled and operated under improper environments or electrical condition mentioned in this manual.
- Inverter is changed, updated or disassembled on hardware or software without authority from LIVOLTEK.
- Obtain the communication protocol from other illegal channels.
- Build monitoring, control system without authority from LIVOLTEK.

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EU Declaration of Conformity

Hangzhou Livoltek Power Co., Ltd. hereby declares that the inverter with wireless communication module sold in the European market meets the requirements of the following directives:

- Radio Equipment Directive 2014/53/EU (RED)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS).
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006

(REACH).

Download the EU Declaration of Conformity on <https://livoltek.com>.

Safety Precaution

Symbols Description

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazard with a medium level of risk that, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a situation that, if not avoided, could result in equipment or property damage.

Safety Instructions

The device has been designed and tested strictly in accordance with international safety regulations. However, as with all electronic devices, potential risks are likely to happen in case of improper operations. Carefully read and follow the safety instructions prior to any operations on or with the device to prevent personal injury and property damage.

LIVOLTEK shall not be held liable for any damage caused by violation of the safety instructions in this manual.

General Safety

- Conduct any operations on or with this device by only qualified technicians wearing appropriate protective equipment and ensure no other unauthorized persons can access the device.
- Conduct any operations on or with this device according to local laws and regulations.
- Install, operate and maintain this device in environments that meet its design specifications.
- Do not touch any live parts or cables inside the product when it is operating, as they carry high voltage and can cause fatal electric shock.
- Do not disassemble or change any components of this device without manufacturer's authorization.
- Do not perform any direct actions on the product in the event of a fault, as, in rare cases, an explosive gas mixture may form inside, potentially leading to fire or explosion, causing severe injury or death.
- Wait at least 10 minutes after powering off the battery to allow internal capacitors to discharge

before performing any operation on the device.

- Do not touch any hot parts of the device (such as the heat sink) during when it is operating.

Battery Safety

- Disconnect the inverter from all voltage sources before any operations on the battery.
- Do not touch the DC conductors, as they may carry high voltage, leading to fatal electric shock.
- Do not touch non-insulated cable ends.
- Follow strictly other safety instructions provided by the battery.

Wiring Safety

- Conduct wiring by qualified technicians.
- Ensure all electrical terminals are intact before wiring.
- Ensure all DC cables are voltage-free before wiring.
- Install the external protective grounding cable before relocate the device.
- Ensure all cables are connected to right terminals and polarities.
- Ensure that the positive or negative poles of the PV strings do not short-circuit to the ground before wiring.
- Connect only PV cables to input terminals of device. Do not connect DC cables to the input terminals.
- Before connecting PV arrays, verify that their voltage is within the safe range.
- Ensure that all electrical connections comply with local and national standards.

Maintenance Safety

- Power off the device before maintenance. Refer to the delayed discharge label to ensure that the equipment is completed powered off.
- Ensure all faults are rectified before powering on the device.

PE Connection and Leakage Current

- All inverter is incorporate a certified internal Residual Current Monitoring (RCM) in malfunction in the PV array, cables or inverter.

- There are 2 trip thresholds for the REMA as required for certification (IEC 62109-2:2011). The default value for electrocution protection is 30mA, and for slow rising current is 300mA.
- The inverter, with built-in RCM, will exclude possibility of DC residual current to 6mA, thus in the system an external RCD (type A) can be used ($\geq 30\text{mA}$).
- A faulty ground connection can result in equipment failure, personal and death injuries, and electromagnetic interference.
- Ensure correct according to grounding to IEC62109 and conductor diameter according to STANDARD specification.
- Do not connect the grounding end of the equipment in series to prevent multi-point grounding.
- Electrical appliances must be installed in accordance with the wiring rules of each country.

For the United Kingdom

- The installation that connects the equipment to the supply terminals shall comply with the requirements of BS 7671.
- Electrical installation of PV system shall comply with requirements of BS 7671 and IEC 60364-7-712.
- All protective devices cannot be changed.
- User shall ensure that equipment is so installed, designed and operated to maintain at all times compliance with the requirements of ESQCR22(1)(a).

Content

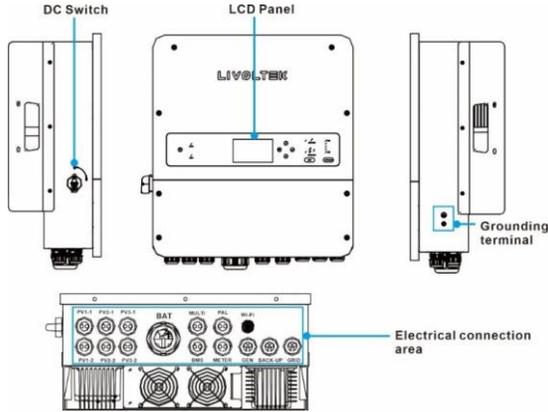
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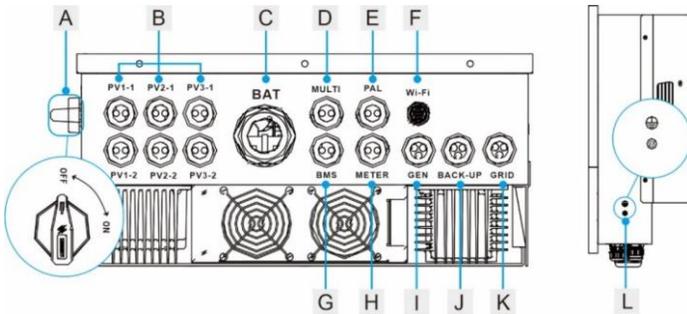
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1. Product Overview

1.1 Appearance

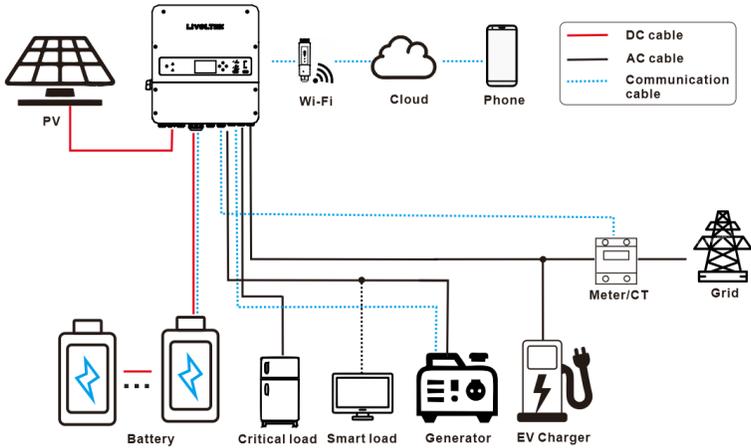


1.2 Terminal Description

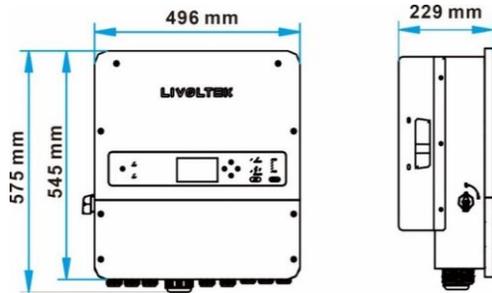


No.	Description	No.	Description
A	DC switch	G	BMS communication terminal
B	PV input terminal	H	METER terminal
C	Battery input terminal (BAT+/- BAT-)	I	GEN terminal
D	MULTI communication terminal	J	BACK-UP terminal
E	Parallel communication terminal	K	GRID terminal
F	Wi-Fi terminal	L	Additional grounding terminal

1.3 Typical Application



1.4 Dimensions



2. Installation

2.1 Unpacking

Steps:

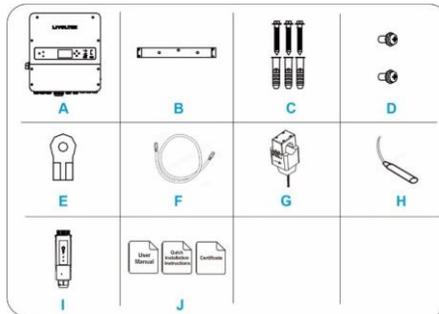
Step1. Carefully remove the sealing tape. Avoid using excessively sharp tools to prevent damaging the contents.

Step2. Gently open the packaging and choose an appropriate way to lift the device based on its size and weight to avoid any accidental damage.

Step3. After removing the device, check its casing and connection terminals for any scratches, cracks, or deformation.

Step4. Ensure that all connection terminals are free from visible damage or foreign objects.

Step5. Refer to the product manual or the included checklist to confirm that all accessories are present. Check the following figure and table for all components.



Item	Description	Item	Description
A	Inverter*1	F	Parallel communication cable*1
B	Inverter bracket*1	G	CT (with a cable) *1
C	Expansion tube& self-tapping screw*3 pairs	H	Battery temperature sensor*1
D	M5*12 screws*2	I	Wi-Fi logger*1
E	OT terminal*1	J	User Manual & Quick Installation Guide & Certificates

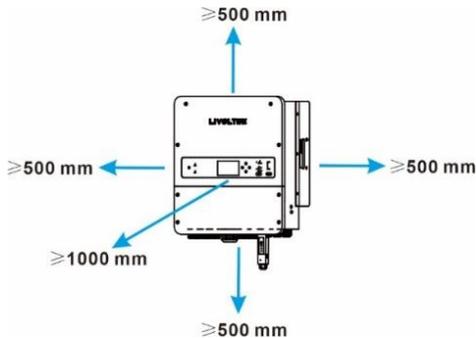
NOTICE

- Inspect the Packaging to check if the outer packaging is intact and undamaged, contact the supplier or shipping company in case of damaged packaging or missing components.
- Keep the original box and protective materials for future storage or transportation.

2.2 Selecting a proper installation location

Selecting an appropriate installation location is crucial to ensuring the safe and reliable operation of the device. Please carefully review the following guidelines before proceeding with the installation. To find a proper location, the device should:

- Be away from flammable and explosive materials.
- Be away from television antenna or other antenna cables.
- Be away from environment with precipitation or humidity exceeding 95%.
- Have an ambient temperature ranging from -20°C to 60°C .
- Be at an altitude no higher than 2,000 meters above sea level.
- Be not be directly exposed to cool air.
- Be not accessible to untrained personnel.
- Have enough clearances around it as shown below:

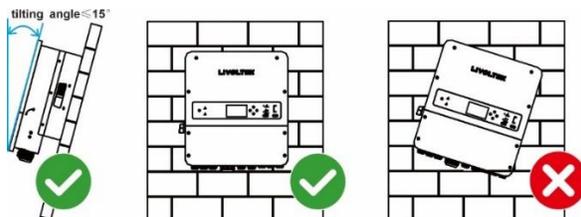


- Be protected from direct sunlight, rain exposure, and snow accumulation.



The wall on which the device is installed should:

- Be solid enough to bear the weight of the device.
- Have no electricity cables or plumbing inside.
- Be not made of gypsum boards or similar materials with weak sound insulation.
- Have a slope within $\pm 15^\circ$.



2.3 Mounting

⚠ DANGER

- Mount the device by only qualified technicians.
- Ensure to wear protective equipment before mounting.

Before you start:

- Select a proper installation location for your device.
- Ensure to wear protective equipment.
- Prepare the necessary tools, including a spirit level, marker, a hammer, a drill, a spirit level, a flat head screwdriver and a Phillips head screwdriver

Steps:

Step1. Align the mounting bracket horizontally against the wall using the spirit level and mark drilling positions using the marker.

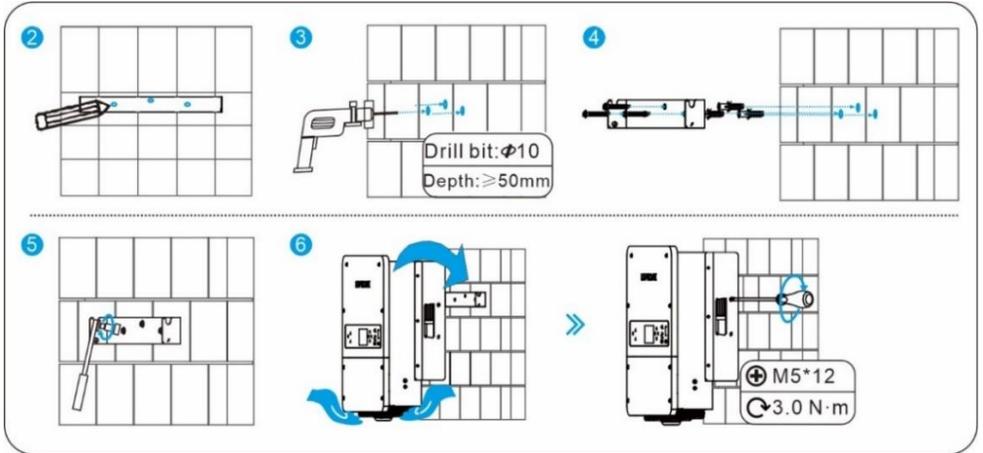
Step2. Drill holes at the marked positions using the drill, ensuring a depth of at least 50mm.

Step3. Hammer the expansion tubes into the freshly drilled holes, then insert the self-tapping screws through the mounting holes on the bracket into the expansion tubes.

Step4. Secure the bracket to the wall by driving the screws using the flat-head screwdriver.

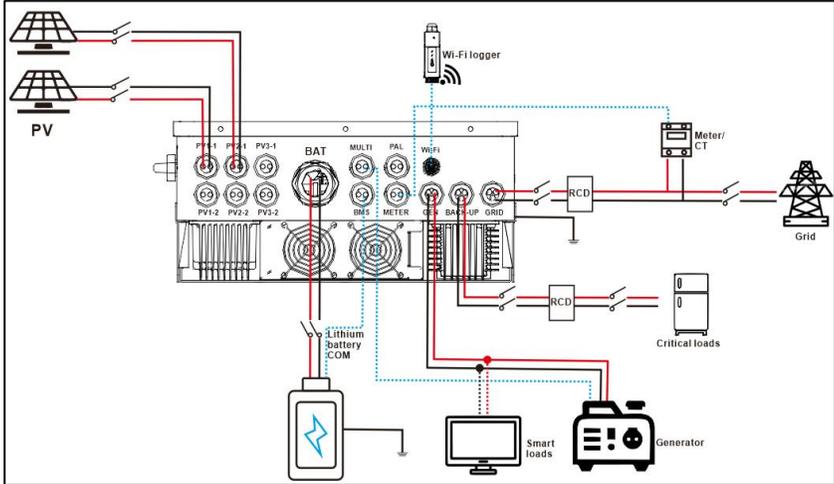
Step5. Align the device with the mounting bracket, ensuring a secure fit.

Step6. Secure the device to the bracket by tightening the M5*12 screws into the overlapping holes at both side of the device using the Phillip head screw driver.



3. Electrical Connection

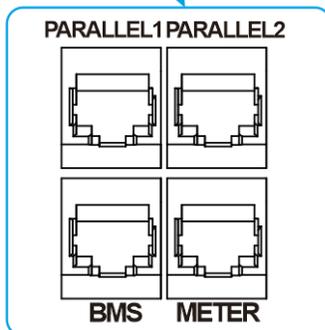
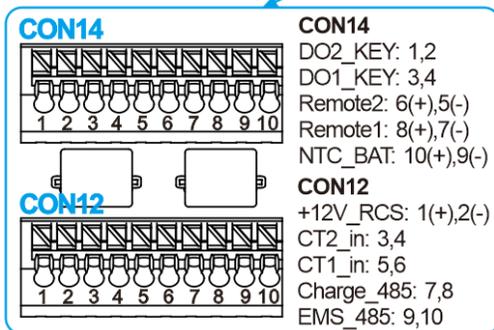
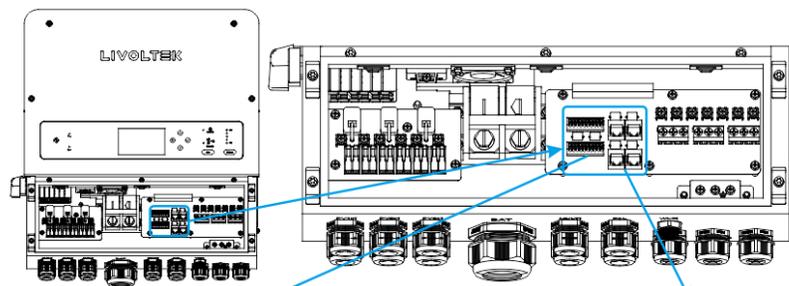
Power Cable Connection Diagram



NOTICE

The inverter support both lithium battery and lead-acid battery. Adopt different wiring methods based on battery types as the lithium battery above is only an example.

Communication Cable Connection Diagram



Definition	Function
DO2_KEY	Reserved
DO1_KEY	dry contact signal for startup the diesel generator
Remote2	Reserved
Remote1	Reserved
NTC_BAT	battery temperature sensor for Livoltek lead-acid battery
+12V_RCS	relay signal for cutting off the PV input
CT2_in	current transformer (CT1) for “zero export to CT” mode clamps on L1 when in split phase system
CT1_in	current transformer (CT2) for “zero export to CT” mode clamps on L2 when in split phase system
Charge_485	communication connection with a Livoltek EV charger
EMS_485	connected and receiving directives from the local grid.
PARALLEL1	parallel communication port 1
PARALLEL2	parallel communication port 2

BMS	BMS port for Livoltek lithium battery communication
Meter	Meter port for Meter communication

Prepare the following tools in advance before wiring operations.

 Hammer drill Bit $\phi 10$	 Hammer	 Tape ruler	 Flat-head screwdriver Phillips head screwdriver
 Diagonal plier	 OT terminals press clamp	 Wire stripper	 Hydraulic tensioner
 Euro terminal crimping tool	 DC Voltage (Range $\geq 1100V$ DC) Multimeter	 Spirit level Marker	 Protective glasses

3.1 PE Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Prepare a heat-shrink tube and a PE cable (not included with the product). Check the table below for details.

Model	PE cable	Heat-shrink Tube
7.5-12kW	6AWG (16mm ²)	28-29mm
14-16kW	5AWG (16mm ²)	

Steps:

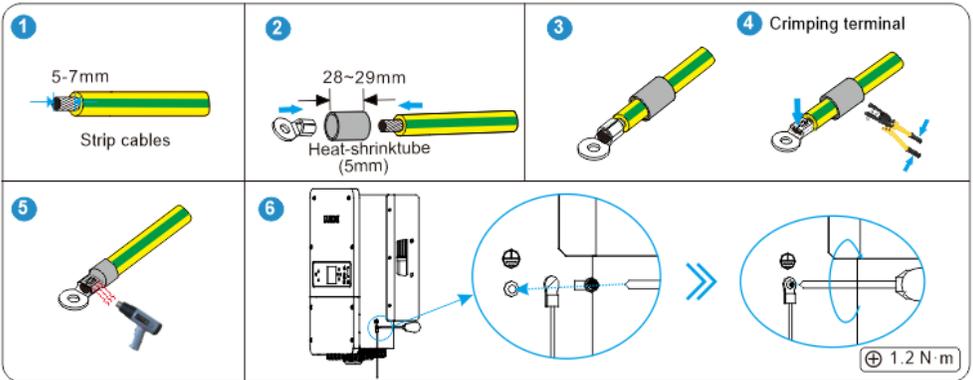
Step1. Strip approximately 5-7mm of insulation from one end of the PE cable.

Step2. Thread the stripped end of the PE cable through the heat-shrink tube and into the OT terminal.

Step3. Secure the PE cable to the OT terminal using the crimping tool.

Step4. Pull the heat shrink tube to OT terminal's crimped area and fix it using the heat gun.

Step5. Secure the assembled PE cable to the ground plate on the bottom right corner of the inverter using a Phillips head screwdriver.



NOTICE

- Ensure the PE cable is firmly connected to prevent electrical shocks.
- 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 to apply silica gel or paint around the ground terminal after PE wiring.

3.2 PV Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure all cables are voltage-free before performing electrical operations.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections

⚠ WARNING

- Make sure the PV arrays are well insulated to the ground before connecting it to the inverter.
- Make sure the voltage, current and power ratings of the PV arrays are within the permissible range.
- The 7.5-16kW 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, grounded PV Arrays will cause current leakage to the inverter.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.

- Open the Inverter cover using the Phillips head screwdriver.
- Prepare and PE cables (not included with the product). Check the table below for details.

Model	PE cable	PV breaker
7.5-12kW	/	/
14-16kW	/	/

Steps:

Step1. Thread PV cables into the inverter.

- Turn the swivel nuts counterclockwise to remove it.
- Remove the cylindrical waterproof plugs
- Thread the PV cables through the cable inlets into the inverter.

Step2. Strip 6-10mm insulation from the end of PV cables inside the inverter.

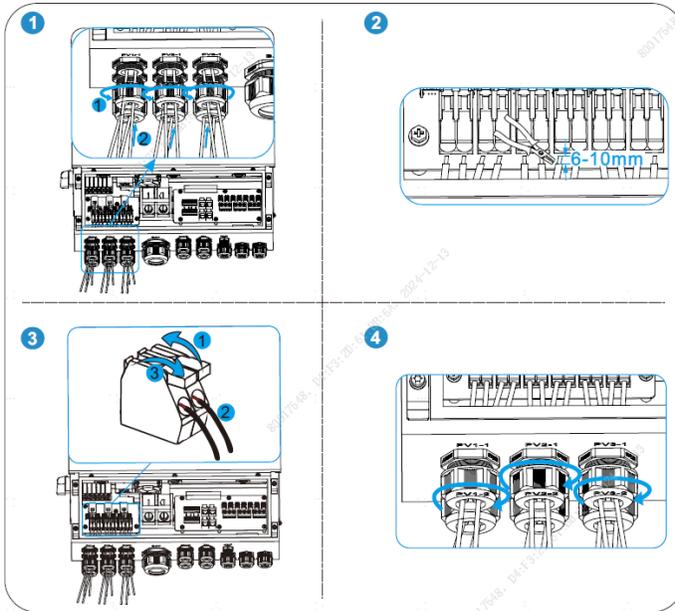
Step3. Connect the PV cables to PV terminals.

- Upper the switch.
- Insert the PE cables into PV terminals.
- Lower the switch.

⚠ WARNING

- Ensure the positive and negative of PV cables are not reversed.
- Ensure the PE cable connection is firm and stable.

Step4. Secure the swivel nuts back.



3.3 GRID Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

⚠ WARNING

- Connect the inverter to grid only with the permission of the local grid department.
- DO NOT connect the AC cable and AC Backup (EPS) cable together.
- DO NOT connect the Backup (EPS) cable to grid.
- Determine whether an AC circuit breaker with greater overcurrent capacity is required based on actual conditions.
- The grid voltage and frequency must be in the permissible range.
- Do not connect a load between the inverter and the circuit breaker.
- Install an exclusive AC circuit breaker for GRID to cut off the electricity flow from GRID.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the inverter cover using the Phillips head screwdriver.

- Prepare an AC circuit breaker and AC cables (not included with the product). Check the table below for details.

Model	7.5-12kW	14-16kW
AC cable	6AWG (16 mm ²)	4AWG (25 mm ²)
AC breaker	60A	80A

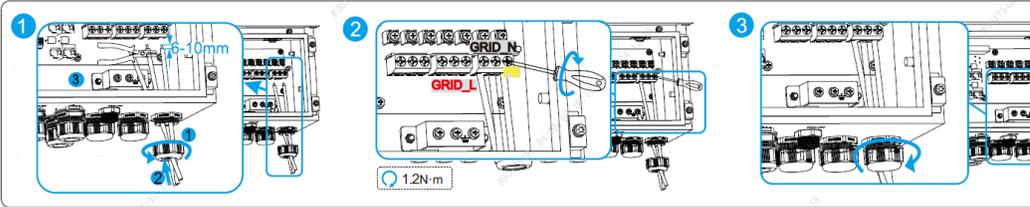
Steps:

Step1. Thread AC cables into the inverter and prepare them for wiring.

- Turn the swivel nuts counterclockwise to remove it.
- Remove the cylindrical waterproof plugs
- Thread the PV cables through the cable inlets into the inverter.
- Strip 6-10mm insulation from the end of AC cables inside the inverter.

Step2. Secure the grid cables to GRID_L, GRID_N and GRID_PE terminals respectively using the Phillip head screwdriver.

Step3. Secure the swivel nuts back.



3.4 BACK-UP (EPS) Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

⚠ WARNING

- Use EPS for only critical loads.
- The off-grid voltage and frequency must be in the permissible range.
- Do not connect the grid power wires to BACK-UP port.
- Install an exclusive AC circuit breaker for EPA to cut off the electricity flows from EPS loads.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the inverter cover using the Phillips head screwdriver.
- Prepare an EPS cable and an EPS circuit breaker (not included with the product). Check the table below for details.

Model	7.5-12kW	14-16kW
Wire	6AWG (16 mm ²)	4AWG (25 mm ²)
AC breaker	60A	80A

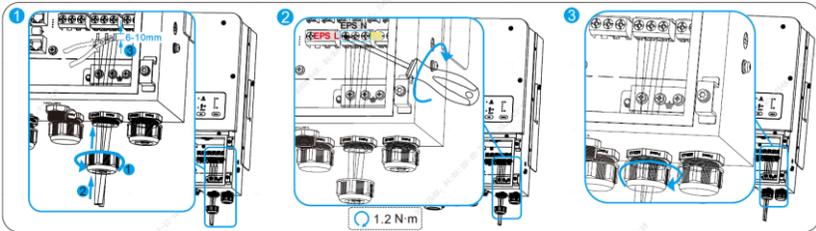
Steps:

Step1. Thread AC cables into the inverter and prepare them for wiring.

- Turn the swivel nuts counterclockwise to remove it.
- Remove the cylindrical waterproof plugs
- Thread the EPS cables through the cable inlets into the inverter.
- Strip 6-10mm insulation from the end of EPS cables inside the inverter.

Step2. Secure the grid cables to EPS_L, EPS_N and EPS_PE terminals respectively using the Phillip head screwdriver.

Step3. Secure the swivel nuts back.



3.5 Battery Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

⚠ WARNING

- Ensure that the open circuit voltage of the battery is within the permissible range of the inverter.
- Ensure to turn off the DC switch of inverter and the battery before wiring.

- Connect battery cables with correct polarity.
- Do not connect one battery pack to more than one inverter at the same time.
- Do not connect loads between the inverter and batteries.
- Install an exclusive AC circuit breaker for battery to cut off the battery electricity flows.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the inverter cover using the Phillips head screwdriver.
- Prepare a battery cable and an AC circuit breaker (not included with the product). Check the table below for details.

Model	7.5-12kW	14-16kW
Wire	1/0AWG (50 mm ²)	1/0AWG (50 mm ²)
AC breaker	250A	290A

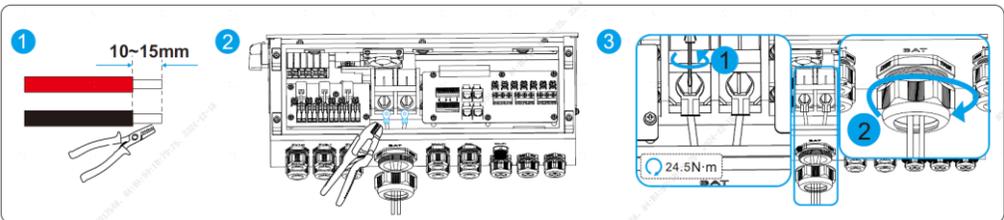
Steps:

Step1. Thread the battery cables into the inverter and prepare them for wiring.

- Turn the swivel nuts counterclockwise to remove it.
- Remove the cylindrical waterproof plugs
- Thread the battery cables through the cable inlets into the inverter.
- Strip 10-15mm insulation from the end of battery cables inside the inverter.

Step2. Secure the battery cables to BAT _L and BAT _N terminals respectively using the flat head screwdriver.

Step3. Secure the swivel nuts back.



3.6 Battery Communication Connection

⚠ DANGER

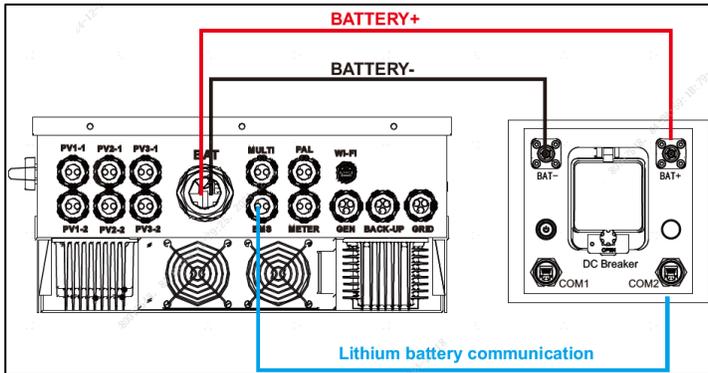
- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical

connections

- Ensure all cables are voltage-free before performing electrical operations.

3.6.1 Lithium Battery Communication Connection

Connection diagram:



NOTICE

The lithium battery displayed in this diagram is only for an example. Please refer to the specific battery user manual or installation guide for specifics.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the inverter cover using the Phillips head screwdriver.
- Prepare the RJ45 terminal and a communication cable.

Steps:

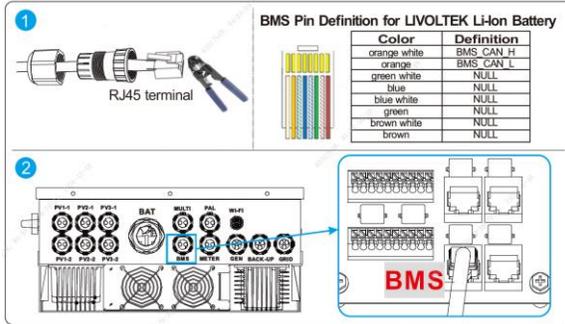
Step1. Thread the communication cable into the inverter.

- d) Turn the swivel nuts counterclockwise to remove it.
- e) Remove the cylindrical waterproof plugs
- f) Thread the communication cable through into the inverter.

Step2. Thread and secure the communication cable into the RJ45 terminal by crimping.

Step3. Connect the RJ45 terminal into the BMS terminal.

Step4. Secure the swivel nuts back.

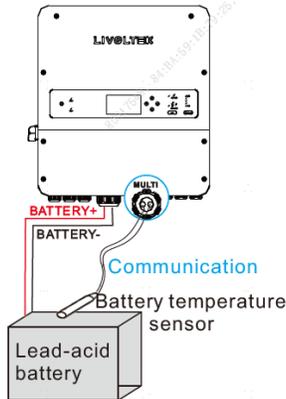


3.6.2 Lead-acid Battery Communication

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

Communication diagram



NOTICE

The lead-acid battery displayed in this diagram is for an example. Please refer to the specific battery user manual or installation guide for specifics.

Steps:

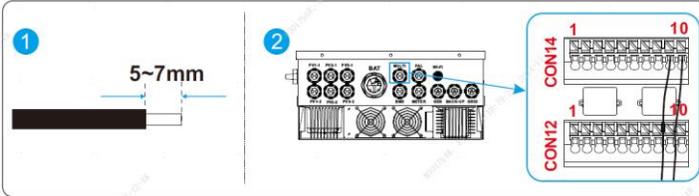
Step1. Strip 5~7mm insulation off the temperature sensor cable.

Step2. Remove the MULTI swivel nut and the waterproof plug.

Step3. Thread striped cables through the MULTI inlets into the inverter.

Step4. Connect the two cables to the pin 10 and pin 9 of CON14 terminals.

Step5. Press the grey button on the top to fix the cable.



3.7 Generator Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.
- Install an exclusive AC circuit breaker for generator to cut off the electricity flow.

⚠ WARNING

A generator and smart loads cannot be connected at the same time.

Before you start:

- Prepare wiring tools
- Open the inverter cover using the Phillips head screwdriver.
- Prepare and GEN cables and a generator breaker (not included with the product). Check the table below for details.

Model	7.5-12kW	14-16kW
GEN Cable	6AWG (16 mm ²)	4AWG (25 mm ²)
AC breaker	60A	80A

Steps:

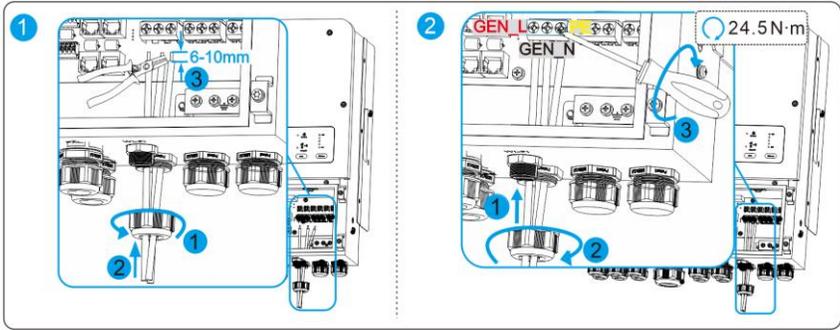
Step1. Thread GEN cables into the inverter and prepare them for wiring.

- a) Turn the swivel nuts counterclockwise to remove it.
- b) Remove the cylindrical waterproof plugs
- c) Thread the GEN cables through the cable inlets into the inverter.
- d) Strip 6-10mm insulation from the end of GEN cables inside the inverter.

Step2. Secure the GEN cables to GEN _L, GEN _N and GEN_PE terminals respectively using the

Phillip head screwdriver.

Step3. Secure the swivel nuts back.



3.8 GEN communication connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the Inverter cover using the Phillips head screwdriver.
- Ensure a generator is connected to the inverter.
- Prepare a communication cable.

Steps:

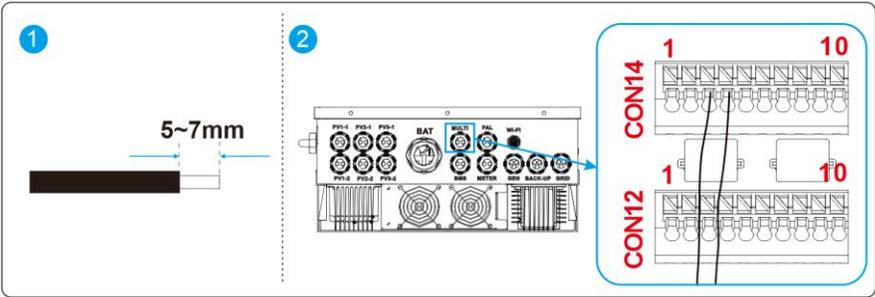
Step1. Strip 5~7mm insulation off the communication cable.

Step2. Remove the MULTI swivel nut and the waterproof plug.

Step3. Thread striped cables through the MULTI inlets into the inverter.

Step4. Connect the two cables to the pin 3 and pin 4 of CON14 terminals.

Step5. Press the grey button on the top to fix the cable.

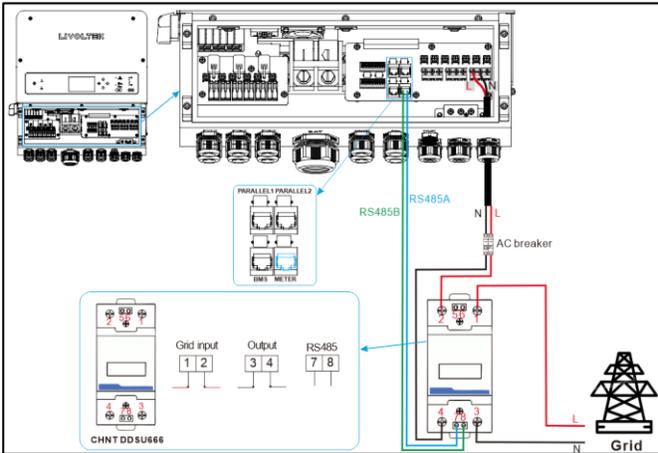


3.9 Meter Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

Wiring Diagram



Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the Inverter cover using the Phillips head screwdriver.
- Prepare a communication cable, a smart single-phase meter and a RJ45 terminal.

Steps:

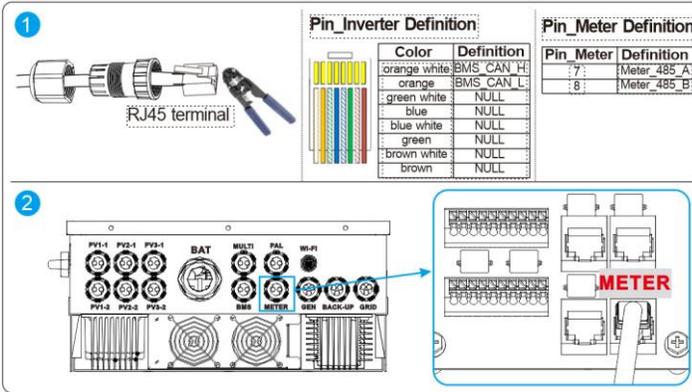
Step1. Remove the Meter swivel nut and the waterproof plug.

Step2. Thread the communication cable through the Meter inlets into the inverter.

Step3. Strip the communication cable properly.

Step4. Insert and secure the stripped communication cable to the Meter terminal.

Step5. Secure the Meter swivel nut back.



3.10 CT Connection

⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.
- Ensure the cable polarities of the CT are not reversed.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the Inverter cover using the Phillips head screwdriver.
- Prepare a CT.

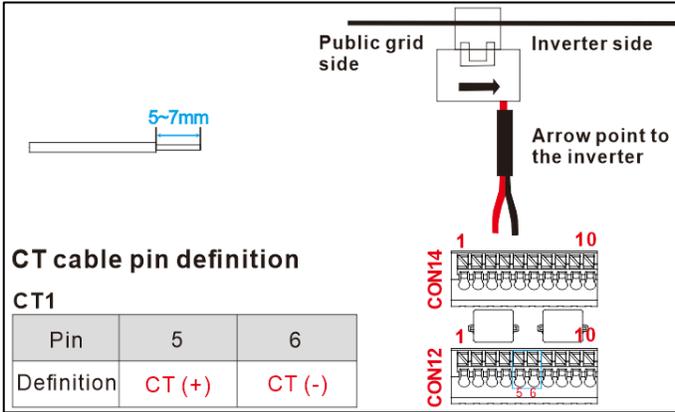
Steps:

Step1. Secure the CT on the cable. Make sure the arrow head points to the inverter side.

Step2. Strip the CT cable properly.

Step3. Connect the positive cable to terminal 5 of CON12 terminals.

Step4. Connect the negative cable to terminal 6 of CON12 terminals.



NOTICE

- The CT must be authorized by LIVOLTEK as the third party or other non-authorized CT may not match with the inverter.

DANGER

- Do not connect the CT to the N wire or the earth wire.
- Do not connect the CT to the N and L wire simultaneously.
- Do not connect the CT to non-insulated wires.

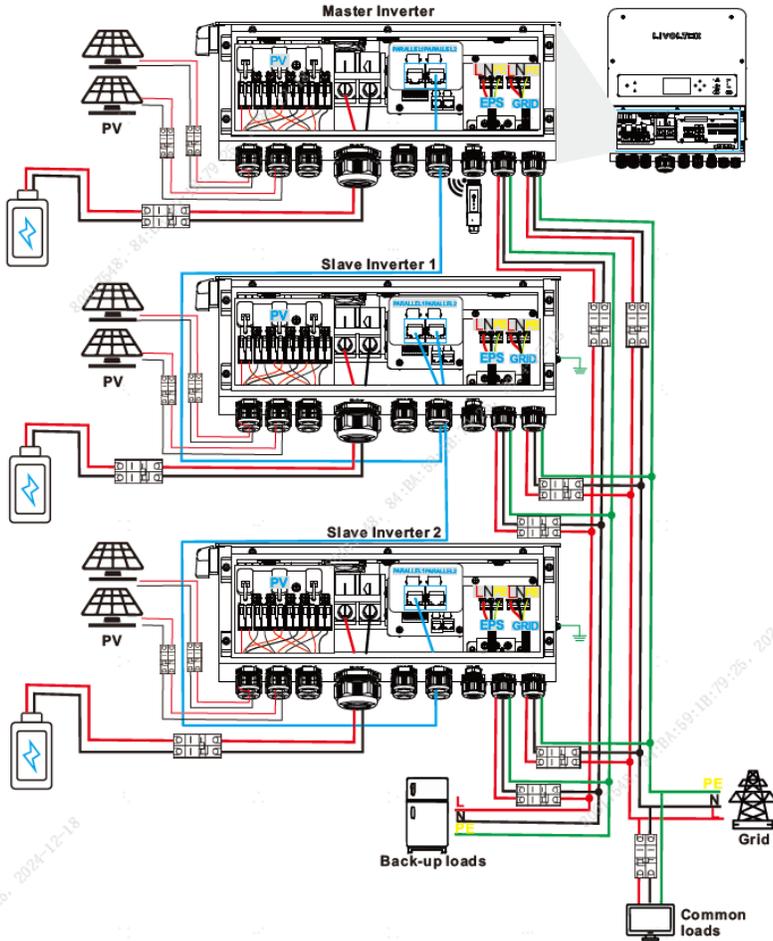
3.11 Parallel Connection

DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Ensure all cables are voltage-free before performing electrical operations.

This device supports connecting with up to 6 HP1-7.5~16kW series inverters in parallel.

Wiring diagram



NOTICE

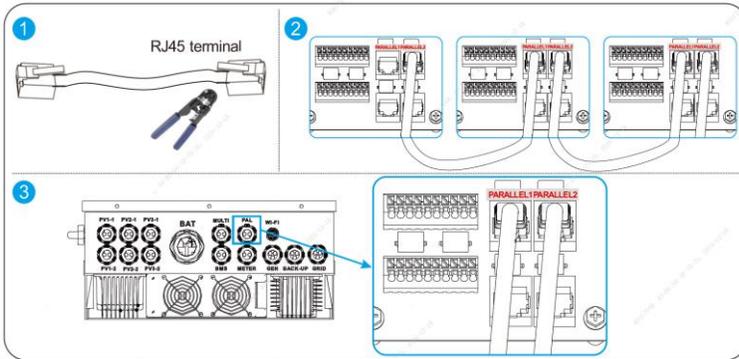
Only one parallel communication cable is provided with the product. To connect more than 2 inverters in parallel, each inverter needs additional two RJ45 terminals and a communication.

Before you start:

- Prepare wiring tools mentioned before chapter 3.1.
- Open the Inverter cover using the Phillips head screwdriver.

Steps:

- Step1.** Strip both ends of the communication cable properly.
- Step2.** Thread the assembled communication cable through the PAL terminal inlets into the inverter.
- Step3.** Insert and secure the stripped cable ends into the two RJ45 terminals.
- Step4.** Insert one end of the assembled communication cable into PARALLEL2 terminal of the master inverter and the other into the PARALLEL1 terminal of the slave inverter.
- Step5.** Insert one end of the other assembled communication cable into PARALLEL2 terminal of the slave inverter 1 and the other into the PARALLEL1 terminal of the slave inverter 2.
- Step6.** Secure the PAL swivel nut Back.



3.12 Wi-Fi Connection

This device uses a WIFI Dongle (provided with the product) to achieve Wi-Fi & Bluetooth functions.

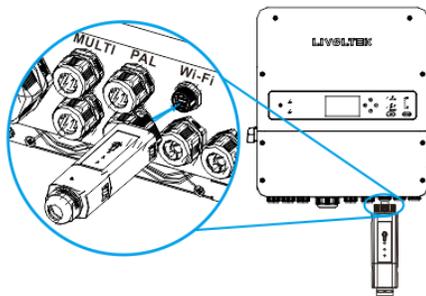
⚠ DANGER

- Conduct electrical connection by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections

Steps:

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

Step 2: Insert the Wi-Fi logger into the Wi-Fi port. Slightly shake it by hand to ensure the connection is stable.



4. Device Power on & off

4.1 Powering on the Inverter

⚠ DANGER

- Conduct operations on or with this device by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before operations.
- Ensure all necessary cables and AC circuit breakers are correctly connected.
- Ensure all AC circuit breakers are open to cut off the electricity flow.
- Ensure necessary cables are connected correctly.

Before you start:

- Ensure the inverter is correctly and firmly installed.
- Ensure all unused terminals are properly sealed.

Steps:

Step1. Close the Grid AC circuit breakers to power on the Grid

Step2. Close Battery DC circuit breaker to power on the battery (if any).

Step3. Power on the PV by rotating the DC switch to “ON”. Wait for a moment and the inverter will start a self-test procedure.

Step4. Close the loads AC circuit to power the loads

Step5. Check the LED indicators. Refer to pictures below for more information.



Key	Description
	Press for 3 seconds to turn on/off the device

	Move cursor upward/increase value	
	Move cursor downward/decrease value	
	Return to previous level	
	Confirm	
Indicator	Status	Description
 Status	Steady on	The inverter is running normally or upgrading software (when Alarm light is steady on at the same time).
	Flash	The inverter is in standby or startup status.
	Steady off	The inverter is off.
 Alarm	Steady on	The inverter is in fault status. Or the inverter is upgrading software (with Status light always on at the same time).
	Steady off	The inverter is running normally.
  ECO Mode   Battery Fist  Mode	Steady on	The inverter is working in this working mode.
	Flash	<p>The working mode is to be confirmed.</p> <ul style="list-style-type: none"> ● Press Enter key to confirm the working mode. ● Press Mode key to select the other working mode and press Enter key to confirm the working mode selected. <p>ECO mode is the default working mode of the inverter. If the other working mode is selected but not confirmed, the working mode selection will turn back to be ECO mode after 3 seconds.</p>

	Steady on	<p>The battery discharges power to EPS loads only.</p> <ul style="list-style-type: none"> ● When the actual battery SOC > the battery SOC set, the battery discharges power to the EPS loads first and then to the smart loads. ● When the actual battery SOC ≤ the battery SOC set, the battery discharge power to EPS loads only.
	Flash	<p>The battery SOC to secure EPS loads only is to be confirmed.</p> <ul style="list-style-type: none"> ● Press Enter key to confirm the SOC. ● Press EPS Secure key to select battery SOC and press Enter key to confirm the SOC selected. <p>If the SOC is selected but not confirmed, the SOC selection will turn back the default SOC after 3 seconds.</p>

4.2 Powering off the Inverter

Steps:

Step1. Open the load AC circuit breaker to power off the load

Step2. Open the Grid AC circuit breaker to power off the Grid

Step3. Open Battery DC circuit breaker to power on the battery (if any).

Step4. Power off the PV by rotating the DC switch to “off”. Wait at least 5 minutes after the LED indicators have turned off to allow the internal circuits to discharge.

5. Managing the Inverter on LIVOLTEK APP

5.1 Configuring Device Wireless Network

Before you start:

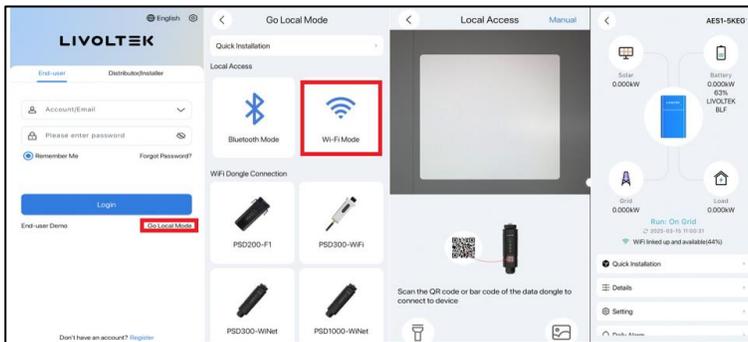
- Ensure the inverter is powered on.
- Ensure the Wi-Fi logger is connected to the inverter.
- Install the LIVOLTEK APP: Select a method from below to install the LIVOLTEK APP:
 - Search and download it from Apple App Store, Google Play, or Android APK.
 - Scan the QR code below to download it



Steps:

Step1. Open the LIVOLTEK APP:

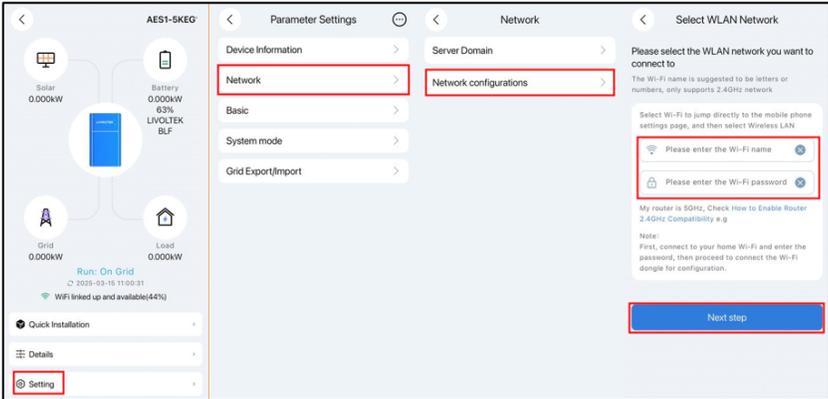
Step2. Connect to the Wi-Fi logger to go to device local page by clicking **Go Local Mode**→**Wi-Fi Mode** and scan the QR code on the Wi-Fi logger.



NOTICE

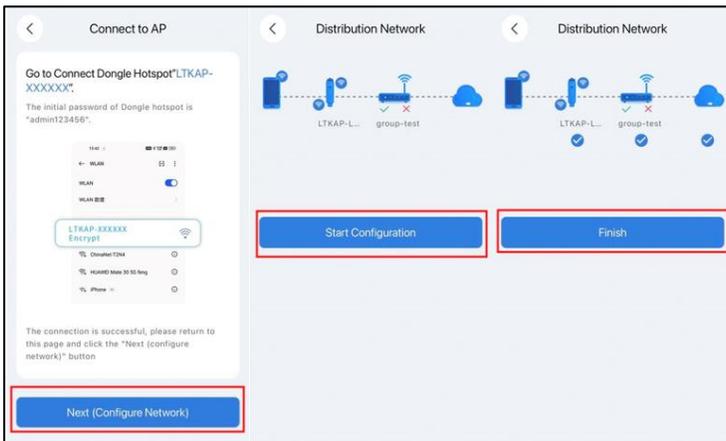
Instead of scanning QR code, user can also connect to the Wi-Fi logger manually by clicking **Manual**→**Next step** and entering the password of the logger.

Step3. On the device local page, click **Setting Network**→**Network configurations**.



Step4. Enter the Wi-Fi name and password and click **Next step**.

Step5. Click **Next(Configure Network)**→**Start Configuration**, and wait for a while.



Step6. Click **Finish**.

5.2 Creating a Site

Creating a site improve the device management experience.

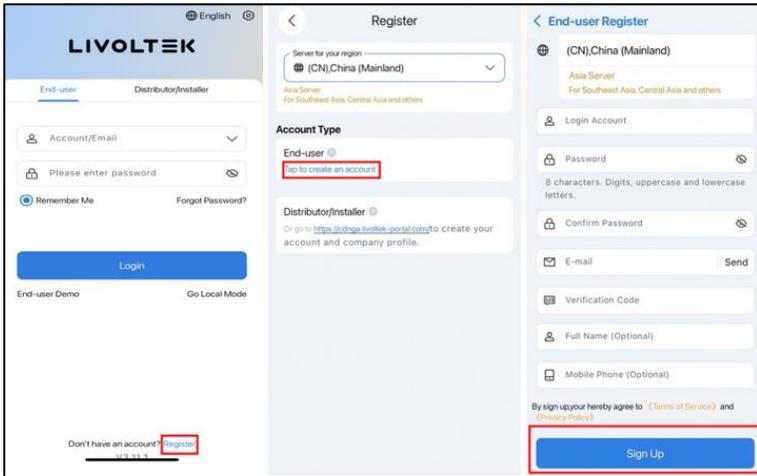
Before you start:

- Install the LIVOLTEK APP

Steps:

Step1. Register a LIVOLTEK APP account. (Skip this step when you already have an account)

- a) Click **Register**.
- b) Select your region server.
- c) Click **Tap to create an account**.
- d) Set the required information and click **Sign Up**.



NOTICE

To create a Distributor/Installer account, go to the website.

Step2. Log in by entering your account and password.

Step3. Click **Creat A Site Now**

Step4. Set a name, address and the installer information for your site and click **Next step**.

NOTICE

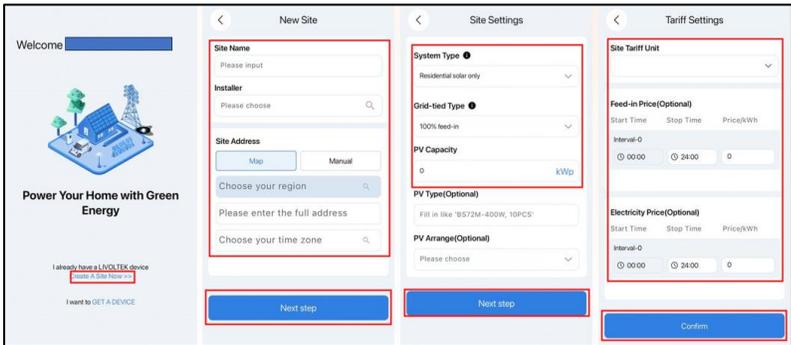
Enter "**Livoltek**" for **Installer** in case of no installers or self-builders.

Step5. Select a System Type for your site. Refer to the table below for details.

System Type	Description
Residential solar only	For on-grid inverter
ESS	For off-grid & hyper inverter
Residential EV Charger	For EV charger
Residential EV Charger with ESS	For integrated PV storage and charging machine

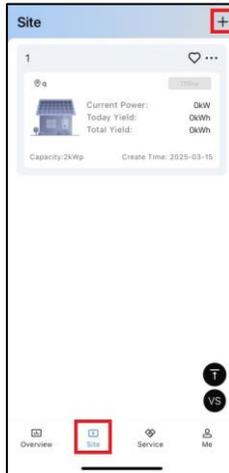
Step6. Set Grid-tied Type and PV Capacity for your site and click **Next step**.

Step7. Set Site Tariff Unit and click **Confirm**.



NOTICE

Click **Site** → **+** after logging in to create a site when you already have a site.



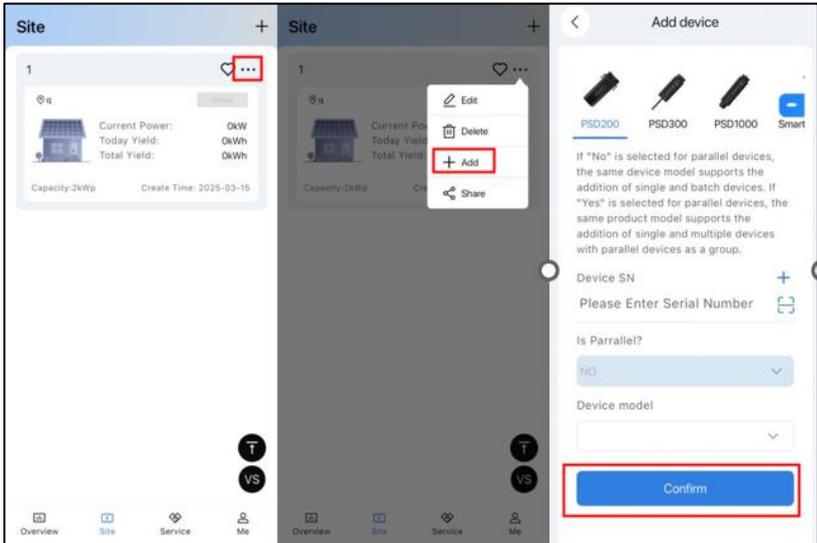
5.3 Adding Your Device to a Site

Steps:

Step1. On the site page select the site to which the device is added.

Step2. Click the icon on the right top corner of this site →**Add**.

Step3. Set the required information and click **Confirm**.



The device added will show below the site upon successful adding as showed in the picture below.



5.4 Configuring Device Settings

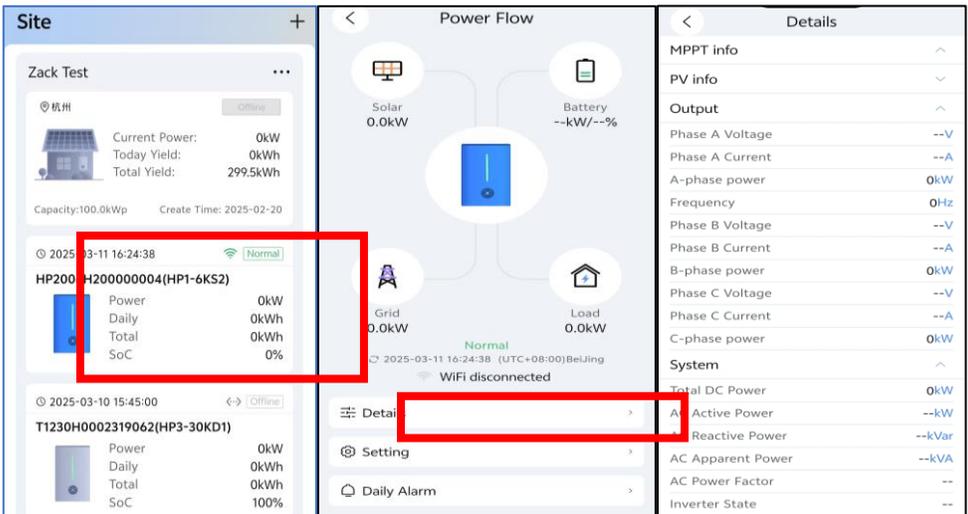
You can view device status configure its settings by click a device added.

5.4.1 Viewing device status

Steps:

Step1. On the site page, click the device to be viewed.

Step2. Click Details to view device details.



NOTICE

Please refer to actual devices as the device in pictures above is only an example.

5.4.2 Configuring Basic Settings

You can set basic settings for this device, including **Reboot, Reboot BMS, Turn on, Shutdown and Manually emergency charge.**

Steps:

Step1. Select the device to be configured.

Step2. Click **Settings**→**Basic**.

Step3. Configure basic settings at your request. Refer to the table below for details.

Setting	Description
Reboot	Restart inverter remotely
Reboot BMS	Restart BMS software
Turn on	Starting inverter
Shutdown	Put the inverter in standby status
Manually emergency charge	Forced use of grid power for batteries

5.4.3 Configuring other settings

System mode

System Mode contains two working modes, including Self-Use and Backup Refer to table below for modes details.

Mode	Description
Self-Use	Use the PV and battery power to supply the loads.
Backup	The PV power supplies the battery first until the battery reaches the SOC. When PV power fails to charge the battery to the set SOC, the grid power will be applied to continue charge the battery.

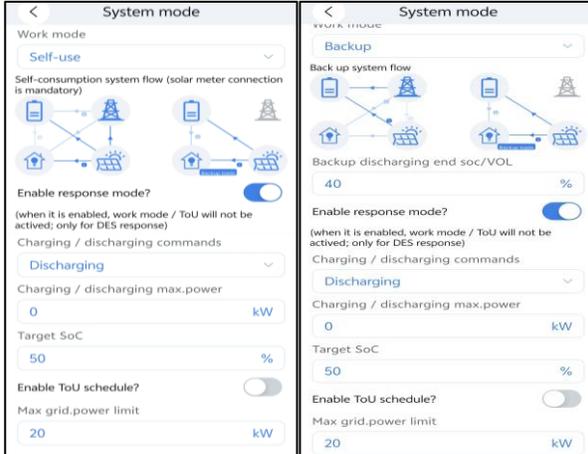
Steps:

Step1. Select the device to be configured.

Step2. Click **Settings**→**System mode**.

Step3. Select the system mode at your request.

Step4. Set other settings.



Grid Export/Import

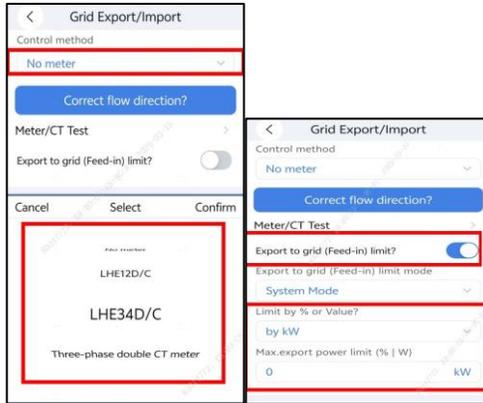
Grid Export/Import controls how much power the device can send to the grid.

Before you start:

Ensure a meter has been connected.

Steps:

- Step1.** Select the device to be configured.
- Step2.** Click **Settings**→**Grid Export/Import**.
- Step3.** Select meter model for the control method.
- Step4.** Enable Export to grid (Feed-in) limit.
- Step5.** Set Enable Export to grid (Feed-in) limit mode.
- Step6.** Set limit of export to grid (Feed-in).



Diesel Generator

Diesel Generator controls how much power the grid can send to the battery by setting values of **Start-up SOC** and **End-up SOC**.

Steps:

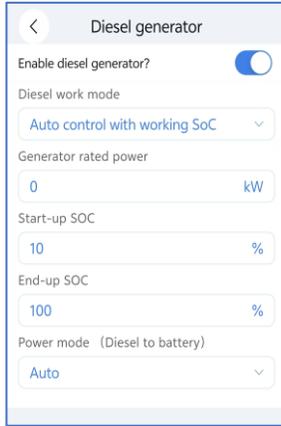
Step1. Select the device to be configured.

Step2. Click **Settings**→**Diesel Generator**.

Step3. Set **Diesel work mode** and **Generator rated power**.

Step4. Set **Start-up SOC** (when to start) and **End-up SOC** (when to end).

Step5. Set **Power mode**.



Smart Load (External Relay)

The device supports connect some loads to the Gen port when no generator is connected.

Steps:

Step1. Select the device to be configured.

Step2. Click **Settings**→**Smart Load (External Relay)**.

Step3. Set **Smart load using mode** and configure. Refer to the table below for details.

Auto start	Enable this function based on SOC
ToU schedule	Enable this function on schedule.

6 Troubleshooting and Maintenance

WARNING

Before maintaining and commissioning switch off all the charged terminals of the inverter, and wait at least 10 minutes after the inverter is powered off.

6.1 Troubleshooting

Check the table below for common problems and treatments.

Alarm Code	Alarm Name	Possible Cause	Suggestion
1,2,13,14	Grid Overvoltage	Grid voltage higher than the set protection value	Checking the voltage value of the grid. The inverter will be reconnected to the grid after the grid returns to normal.
3,4	Grid Undervoltage	Grid voltage lower than the set protection value	
7,18	Grid Over-frequency	Grid frequency higher than the set protection value	Checking the frequency of the grid. The inverter will be reconnected to the grid after the grid returns to normal.
8	Grid Under-frequency	Grid frequency lower than the set protection value	
9	Grid Down	1. No power from the grid 2. Grid lines or breakers are disconnected	Checking grid power, circuit wiring, and circuit breaker status.
10	Excess DC component	1. Internal System module abnormality 2. Abnormal system wiring or terminals	Disconnect the AC test switch and DC side switch, if there is a battery, you need to disconnect the battery side switch. Wait for 15 minutes, then close the AC and DC switches and restart the system.
11	Leakage current fault	The leakage current is higher than the set protection value	This is usually due to cloudy and rainy days, when the weather becomes better, the fault will disappear; if the weather is normal, you need to check that the AC and DC cables have good impedance to ground;
12	Grid anomalies	Inverter self-test before grid-connection, triggered if the grid is abnormal	When the grid returns to normal, the inverter will go into grid connection; if the fault occurs repeatedly, please contact the local power company or Livoltek customer service Centre.
16	Grid voltage imbalanced	Imbalance of voltage in each phase of the grid	Check the voltage difference between the voltages of the phases of the grid.
23	Ground fault	Poor inverter grounding	Check whether the chassis is reliably grounded and whether the insulation of the fire wire to ground is good.

98	High ambient temperature	High internal temperature of the inverter	Check that the temperature around the machine is not too high, that it is not in a ventilated position, that it is not exposed to direct sunlight and that the fan is working properly.
100	Low Insulation Impedance	The insulation impedance of the photovoltaic panel to ground is below the required level	Check the ISO protection value; Inspect the PV cables for ground insulation impedance. If the cables are normal and the fault occurs during rainy weather, wait until the weather is clear and check again. If there is a battery, check the battery cables for ground insulation impedance
112	EPS Overload	Load power exceeds inverter power	Remove some loads from the off-grid port or reduce their power;
335	Battery communication	Inverter cannot detect battery communication.	Check if the battery communication line and connections are normal to ensure a reliable connection. Reinstall the battery communication line.
42,43,57,449, 450,451	PV reverse polarity	PV reverse polarity	Check whether the positive and negative polarity of the 65 corresponding PV string is incorrect.
545-551	Battery Alarm		It may be related to environmental temperature, such as overheating or low temperature, in which case, improving the battery's operating environment is necessary.
577-587	Battery Fault		Related to voltage anomalies, check if the battery cables are connected properly, if there is any reverse connection, loose wire ends, etc.
135, 161, 163, 165, 167, 169-174, 180-190, 192, 197, 198, 353, 354, 419, 424-	System Alarm		The inverter can continue to operate. Investigate if there are any abnormalities in the wiring, terminals, or environmental factors corresponding to the alarm, and carry out the necessary repairs.

429,			
6, 10, 15, 17, 18, 21, 22, 24- 30, 33-56, 58-143, 257, 258, 262, 265, 269, 273, 277, 281, 517, 519	System Fault		Wait for the inverter to restart operation. Disconnect the DC and AC switches, battery switch, wait for 15 minutes, then reconnect the power to restart the inverter.

⚠ CAUTION

Contact your professionals or the LIVOTEK Customer Service Centre for help if necessary.

6.2 Routine Maintenance

To ensure that the inverter can operate properly for a long term, you are advised to perform routine maintenance on it as described in this chapter.

⚠ DANGER

- Conduct operations by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Wait at least 10 minutes until the inverter is completed powered off.

Routine Maintenance

Check Item	Method	Period
System clean	Check the temperature and dust of the inverter. Clean the inverter enclosure if necessary.	every 6 to 12 months
System running status	Check whether the inverter is not damaged or deformed or can be operated with no abnormal sound.	
Cable entry	Check whether the cable entry is insufficiently sealed, or the gap is excessively large, and reseal the entry when necessary.	
Electrical connection	Check whether all cables are firmly in place. Check whether a cable is damaged, especially the part contacting the metal enclosure.	

6.3 Decommissioning

⚠ DANGER

- Conduct operations by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.

- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Wait at least 10 minutes until the inverter is completely powered off.

Steps:

Step1. Disconnect all cables from the inverter including communications cables, DC input power cables, AC output power cables, and PGND cables.

Step2. Remove the Wi-Fi logger.

Step3. Remove the inverter and the installation bracket from the wall.

Step4. Pack the inverter with the original packaging and keep it properly.

6.4 Disposal



- Conduct operations by only qualified personnel wearing protective equipment.
- Ensure to turn off the DC switch before any electrical connections.
- Ensure the DC and AC circuit breakers are open to cut off electricity flows before any electrical connections
- Wait at least 10 minutes until the inverter is completely powered off.

The inverter and its packaging are made from environmentally friendly materials. Do not discard them with household waste; instead, dispose of the inverter in accordance with local environmental laws and regulations.

7. Device Specification

	Model	HP1-7KS2M	HP1-8KS2M	HP1-10KS2	HP1-12KS2	HP1-14KS2	HP1-16KS2
DC Input	Max. input power	15000W	16000W	20000W	24000W	28000W	32000W
	Max. DC input voltage	500V					
	Minimum DC input voltage	90V					
	Starting voltage	100V					
	Nominal input voltage	370V					
	MPPT voltage range	90-500V					
	MPPT (full load) range	125-425V	130-425	110-425	130-425	150-425	175-425
	Max. MPP trackers per MPP tracker	2		3			
	Max. input current per MPPT	32/32A		32/32/32A			
	Max. short circuit current per MPPT	40/40A		40/40/40A			
	Max. Strings per MPP tracker	2/2		2/2/2			
AC Input/ Output (GRID)	Nominal output/apparent power	7500 W/VA	8000 W/VA	10000 W/VA	12000 W/VA	14000 W/VA	16000 W/VA
	Max. output apparent power	7500 VA	8800 VA	11000 VA	13200 VA	15400 VA	17600 VA
	Max. input apparent power	14400 VA				24000 VA	
	Nominal grid voltage	L/N/PE, 220/230/240 V					
	Nominal grid	0.85~1.1Un V					

	voltage range						
	Nominal grid frequency	50/60Hz					
	Grid frequency range	45-55/ 55-65 Hz					
	Nominal output current	34.1A	36.4A	45.5A	54.6A	63.6A	72.7A
	Max. output current	34.1A	40A	50A	60A	70A	80A
	Max. input current	60A			90A		
	Power factor (cos θ)	> 0.99 at Rated Power (Adjustable 0.8 Leading - 0.8Lagging)					
	Total harmonic distortion	<3%					
AC Output (BACK-UP/EPS)	Nominal output/ apparent power	7500 W/VA	8000 W/VA	10000 W/VA	12000 W/VA	14000 W/VA	16000 W/VA
	Peak output/ apparent power	2 times of rated power, 10S					
AC Output (BACK-UP/EPS)	Nominal output voltage	L/N/PE, 220/230					
	Nominal output frequency	50/60Hz					
	Nominal output current	34.1A	36.4A	45.5A	54.5A	63.6A	72.7A
	Total harmonic Distortion	<3%					
	Grid and off-grid switching time	<10ms					
Battery	Battery type	Li-ion/Lead-acid					
	Battery voltage range	40~60V					
	Max. charge/disch arge power	7500W	8000W	10000W	12000W	14000W	16000W

	Max. charge/discharge current	190A	220A	250A	290A	290A	
	Communication	CAN/RS485					
	Charging & discharging strategy for lithium battery	Self-adaption to BMS					
Generator	Max. input power	7500W	8000W	10000W	12000W	14000W	16000W
	Max. input current	34.1	36.4	45.5	54.5	63.6	72.7
	Nominal input frequency	50/60 (Hz)					
Efficiency	Max. efficiency	97.6%					
	Euro efficiency	96.8%					
	MPPT efficiency	> 99.9%					
General	Dimensions	(W*H*D) 496*505*225 mm					
	Weight	34kg					
	Installation	Wall Mounting					
	Ingress protection	IP65					
	Heat dissipation method	Forced air cooling					
	Working temperature	-25°-60°C (derating at 45°C)					
	Humidity	0-95%					
	Max. altitude	2000m					
	Noise	45dB				55 dB	
	Interface	LCD+APP					
	Topology (solar to battery)	High-Frequency Isolation					
Warranty	3 years (10 years optional)						

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.livoltek.com/registration.html>.

Product Information	
Product Type	
Product S/N	
Installation date	
Installation Company	
Personal Information	
Your name	
Your contact number	
Your Email address	
Your home address	

*Warranties should be registered within 36 months of installation; however, 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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