

MODA 4-15KTL3-HU

&

User Manual

rict, Shenzhen, Guangdong, China

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Preface

Overview

This document mainly describes the safety precautions, product information, installation, electrical connection, commissioning and maintenance methods of the MODA 4-15KTL3-HU three-phase photovoltaic energy storage all-in-one machine (hereinafter referred to as the "all-in-one machine"). Before operating this product, please carefully read the relevant content in this document and keep it properly for future reference at any time.

Intended Readers

- Photovoltaic power plant operation and maintenance personnel
- Qualified electricians

Intended Readers

- MODA 4000-HU
- MODA 5000-HU
- MODA 6000-HU
- MODA 8000-HU
- MODA 10K-HU
- MODA 12K-HU
- MODA 15K-HU

Symbols in this manual

The following safety symbols are used throughout this document to denote important safety information. Familiarize yourself with the symbols and their meaning before installing or operating this instrument.

Symbol	Meaning
 DANGER	**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
 NOTICE	**NOTICE** is used to address practices which are not safety relevant.
 Information	**Information** that you must read and know to ensure optimal system operation.

Definition and interpretation

Term/Abbreviation	Description
AC	Alternating Current
DC	Direct Current
PV	Photovoltaic
GFCI	Ground Fault Circuit Interrupter, a ground fault circuit breaker, a safety device used to protect against line-to-ground faults
MPPT	Maximum Power Point Tracking
AFCI	Arc-Fault Circuit Interrupter
PID	Potential-Induced Degradation
TOU	Time of Use, Time-of-Use Electricity Price
SOC	State of Charge
BSS	Battery Storage System
EMS	EMS control system
PACK	PACK Battery Cluster
BMS	Battery Management System
Hybrid Inverter	Energy Storage Converter
EM	Environmental Control Unit
MODA	MODA 4-15KTL3-HU

Change history

Version 00

First release

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1 Safety Precaution

Before installing, operating and maintaining this product, please read this section carefully and strictly observe all safety precautions during operation. For equipment damage caused by installation not in accordance with the instructions in this manual, and for any liability arising from violation of general safety operation requirements or violation of safety standards for equipment design, production and use, Growatt New Energy reserves the right to refuse to provide Quality Assurance.

1. All operations, wiring work and maintenance must be performed by trained professional electrical technicians in compliance with the procedures specified in the documentation.
2. Do not operate this product under the operating conditions not specified in this manual.
3. Do not disassemble, modify the product or alter the software code without authorization.

1.1 Personal Safety

- Only qualified technicians who have received professional training are permitted to install and operate the inverter. Installation personnel should read through this manual prior to installing the instrument.
- Non-professionals are not allowed to operate the equipment. Do not attempt to repair, modify or disassemble the inverter by yourself.

 **DANGER**	• Do not work with power on; otherwise, it might lead to personal injury. • Do not wear conductive objects such as watches, bracelets, bangles, or rings during operation to avoid an electric shock. • Do not connect or disconnect power cables when the system is in operation as it may generate electric arcs and cause damage to the device. • Before performing routine maintenance, power off the system and wait 5 minutes for the capacitor to discharge to a safe level and to avoid body burns caused by the remaining heat.
 **WARNING**	• Insulated tools must be used for all work on the system to avoid electric shocks. The dielectric withstanding voltage level must comply with local laws, regulations, standards and specifications. • Wear helmets, goggles, insulated gloves, reflective clothes and safety shoes during operation. • If a fault persists after restarting the system, please contact Growatt support. Tampering with or opening the inverter without authorization will void the warranty.

1.2 Electrical Safety

 Information	• Check the equipment for damage before starting installation.
 DANGER	• During installation, do not open the inverter without permission to prevent foreign objects from entering the device, which might cause short circuits. • The inverter must be properly grounded. • The air inlet and outlet of the fan must not be obstructed.

1.3 Mechanical Safety

Handling Safety

 WARNING	• Be careful when moving the inverter with consideration of its weight. Carry the equipment with your palms, rather than your fingers. Be aware of personal injury caused by a falling inverter. • If multiple persons are required to move the heavy equipment, consider factors like height when determining the manpower and work division. Ensure that the weight is evenly distributed to maintain balance. • When moving the equipment manually, wear protective gears such as gloves, safety shoes and helmets to prevent injuries.
 NOTICE	• When moving the inverter, avoid applying forces to DC switches, PV terminals, BAT terminals, or AC terminals. The consequential damage to terminals or switches will not be covered by any warranty. • When moving the inverter with a forklift, it is important to ensure that the inverter is centered on the forks and is secured with appropriate straps to prevent tip-overs.
 WARNING	• The MODA inverter weighs about 32 kg and two people are required for moving it to the installation site.

Safety for Ladder Use

 NOTICE	• When you need to perform live working at heights, use a wooden or insulated ladder. Check whether the ladder is as per the standards before using it. Do not use a ladder with potential safety hazards. • When working at heights, use a platform ladder with guard rails rather than a straight ladder.

 WARNING	• Any work which is performed 2 meters or more is known as work at heights. Use a ladder when working at heights. If on-site conditions permit, use a double-hook safety belt when climbing the ladder to prevent falls. Do not attach the hooks to the ladder rung; instead, attach them to a solid structure that the ladder leans against. If the safety belt is not available, you are supposed to use a safety rope for fall protection. • The ladder base should be in good condition. Place the ladder on a level and solid working surface to prevent slipping and tilting.

Lifting Safety

 WARNING	• When hoisting the equipment, observe local hoisting standards closely.

Drilling Safety

 NOTICE	• When drilling holes, wear protective gears, such as goggles, masks, and protective gloves. • Avoid drilling holes into the water pipes and power cables to prevent short circuits or other hazards. • When drilling holes, protect the equipment from shavings. Remove shavings from holes in time. • After drilling, clean up any dust inside the hole.

Connecting cables

 DANGER	• When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Ensure that the DC SWITCH on the inverter is set to OFF before connecting cables. • You are recommended to prepare firefighting equipment on site, such as fire sand and fire extinguishers. • Wear insulated gloves and use insulated tools to prevent electric shock injuries.
 NOTICE	• When assembling cables, please keep a distance from the inverter to prevent cable debris from falling into the inverter, which might cause short circuits. • Damage caused by dust or moisture penetration due to improper installation of waterproof connectors is beyond the scope of warranty.

 WARNING	• Follow the wiring instructions specified in the user manual; otherwise, any device damage caused by improper wiring will not be covered under any warranty. • Unqualified persons shall not perform any electrical connections. • Wear insulated gloves to prevent static electricity from damaging the components of the inverter. • Do not use single-strand wire as the output wire for the inverter. • Do not use aluminum wire as the output cable. • Avoid overstress on the cable, which could lead to poor contact.

1.4 Identification description

Symbol	Explanation
	Risk of high voltages which might lead to electric shocks
	Risk of fire
	Risk of burns due to hot surface
	Delayed discharge: High voltage exists after the battery is powered off. It takes 5 minutes to discharge to the safe voltage
	Grounding: indicates the position for connecting the PE cable
	Direct Current (DC)
	Alternating Current (AC)
	Refer to the manual
	CE marking The inverter complies with the requirements of the applicable EU directives
	Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site

2 Product overview

2.1 Introduction

Features

The MODA TL3-HU is a high-quality Hybrid Inverter designed to convert solar energy into AC energy or store energy in the battery. Energy output from the inverter can be used to optimize self-consumption, store in the battery for future use or feed into the public grid. Users are allowed to configure different operating modes based on the PV generation and their needs. During a power outage, it can discharge the battery and work in the off-grid mode to supply power.

Model description

MODA 15K TL3-HU
① ② ③④ ⑤

Table 2.1 Model description

Designation	Meaning	Description
①	Product series	MODA: Product series name
②	Power class	• 15K: the rated power is 15kW • 12K: the rated power is 12kW • 10K: the rated power is 10kW • 8000: the rated power is 8000W • 6000: the rated power is 6000W • 5000: the rated power is 5000W • 4000: the rated power is 4000W
③	Electronic architecture	TL: transformerless inverter
④	AC output	• /: single-phase • 3: three-phase
⑤	Feature	• X: PV Inverter • XH: Hybrid Inverter • XA: Storage Inverter • HU: Hybrid UPS Inverter

2.2 Product appearance

2.2.1 Inverter module

Appearance and Interfaces

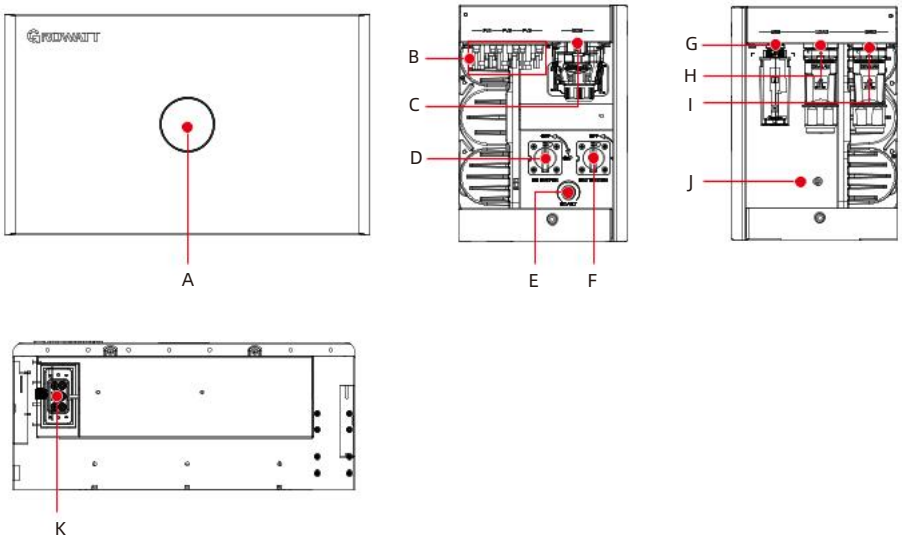


Figure 2.1 Appearance and Interfaces

No.	Descriptions	No.	Descriptions
A	LED Indicator	G	USB Port
B	PV connector	H	Load AC connector
C	Communication connector	I	Grid AC connector
D	DC switch	J	Battery port
E	Black start button	K	Safety grounding
F	BAT swith		

Indicator

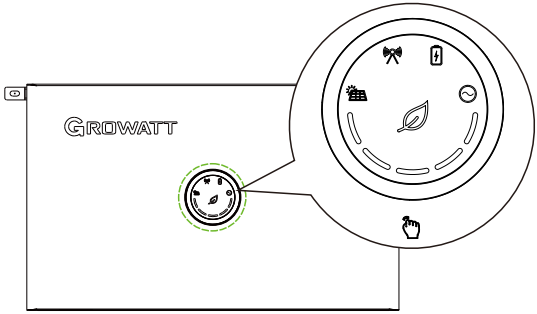
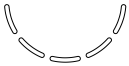
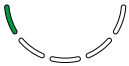


Figure 2.2 Display Panel Diagram

Table 2.2 Explanation of Display Screen Symbols

Indicator	Color	Status	Description
		Off	PV disconnected
		On	PV normal operation
		Flash	PV reverse polarity
		On	PV side fault
		On	Communication normal
		On	Cloud platform disconnected
		Off	Datalogger disconnected
		On	Battery normal
		On	Battery hibernation
		Flash	Partial battery fault
		On	All battery fault
		Off	Grid disconnected
		On	Grid connected standby
		On	Grid connected running
		On	Off-grid running
		Flash	Off-grid overload

Indicator	Color	Status	Description
		Flash	Grid abnormality
		On	Inverter AC side fault
		Off	Battery has no power
		ON or Flash	• 0% <SOC≤ 20% • Battery neither charging nor discharging is ON/Battery charging and discharging is flashing
		ON or Flash	• 20% <SOC≤ 40% • Battery neither charging nor discharging is ON/Battery charging and discharging is flashing
		ON or Flash	• 40% <SOC≤ 60% • Battery neither charging nor discharging is ON/Battery charging and discharging is flashing
		ON or Flash	• 60% <SOC≤ 80% • Battery neither charging nor discharging is ON/Battery charging and discharging is flashing
		ON or Flash	• 80% <SOC≤ 100% • Battery neither charging nor discharging is ON/Battery charging and discharging is flashing
		On	System normal
	/	/	/
		Light up clockwise	System upgrade
		On	System failure
	/	Color rotation	Power on init
	/	/	Wake indicator

2.2.2 Battery module

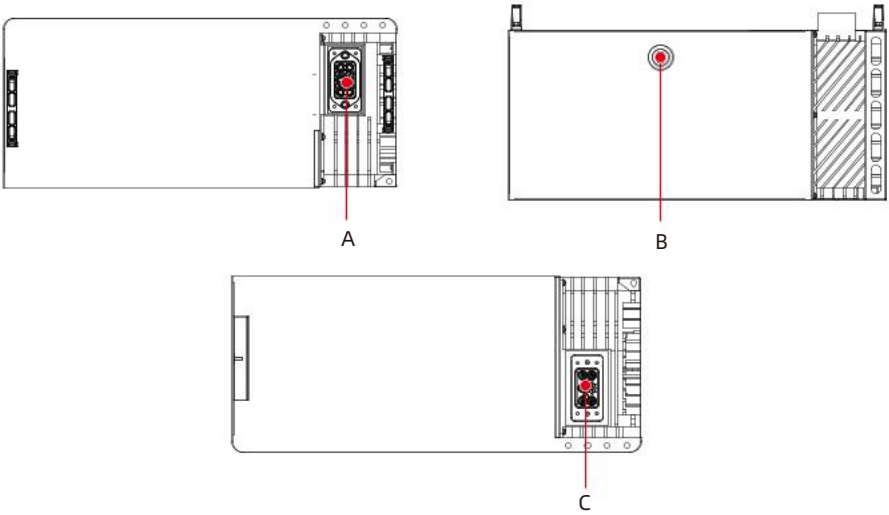


Figure 2.3 Appearance and Interfaces

No.	Descriptions	No.	Descriptions
A	Inverter port	C	BAT port
B	Breather valve		

Indicator

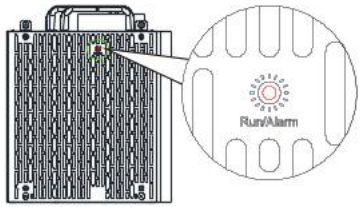


Figure 2.4 Battery indicator

Table 2.3 Battery Indicator Status Description Table

Indicator	Color	Status	Description
Run/Alarm		On	Normal
		Flash	Upgrade
		On	Fault
		Off	Hibernation

2.3 Operating status

There are four operating statuses of the MODA TL3-HU inverter: Standby, Normal, Fault and Update.

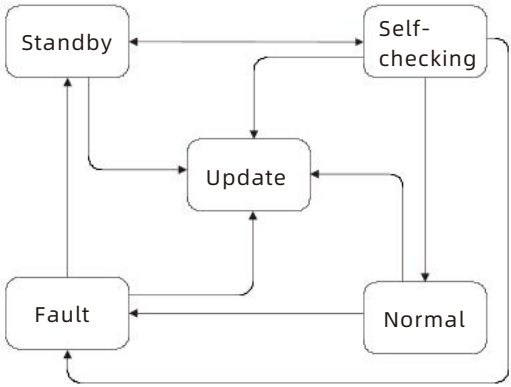


Figure 2.5 Operating mode

Table 2.4 Operating mode description

Operating status	Description
Standby	Receive a shutdown command or the PV voltage does not meet the requirement for grid connection
Self-checking	Conduct self-check to check if the grid connection requirements are met
Normal	Successfully connected to the grid or the inverter is working in the off-grid mode normally
Fault	A fault has occurred. When the inverter is in grid-connected state, cut to bypass state or exit grid-connected state; when the inverter is in off-grid state, exit off-grid state.
Update	Updating the firmware

2.4 Product Nameplate

The figure below illustrates the nameplate using the MODA 15KTL3-HU as an example. This nameplate diagram is for reference only; the actual nameplate content shall prevail. For detailed specifications, please refer to "9 Technical Parameters".

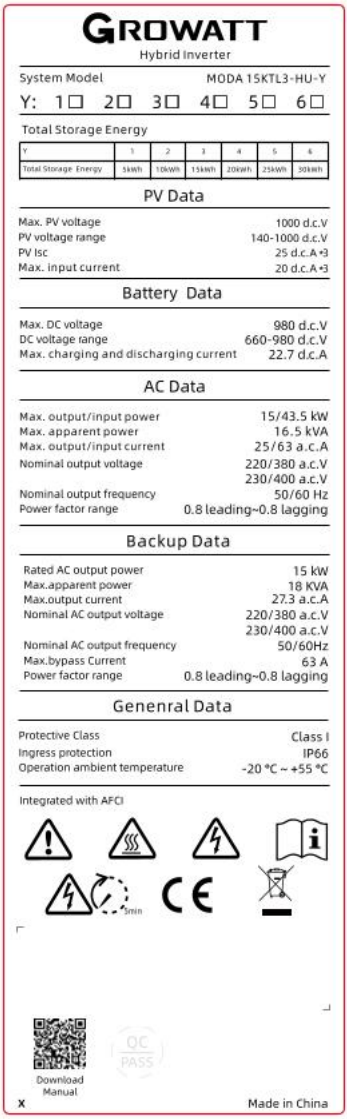


Figure 2.6 Nameplate

2.5 Application scenarios

2.5.1 Grid-tied PV & ESS (Energy Storage System)

NOTICE	• The MODA TL3-HU inverter, when paired with batteries, offers the grid-tied "PV+ Energy Storage" solution. • In this application scenario, an external energy meter is required. The meter should be installed between the grid and the load. Failure to do so will render the configuration of different operating modes for the system ineffective.

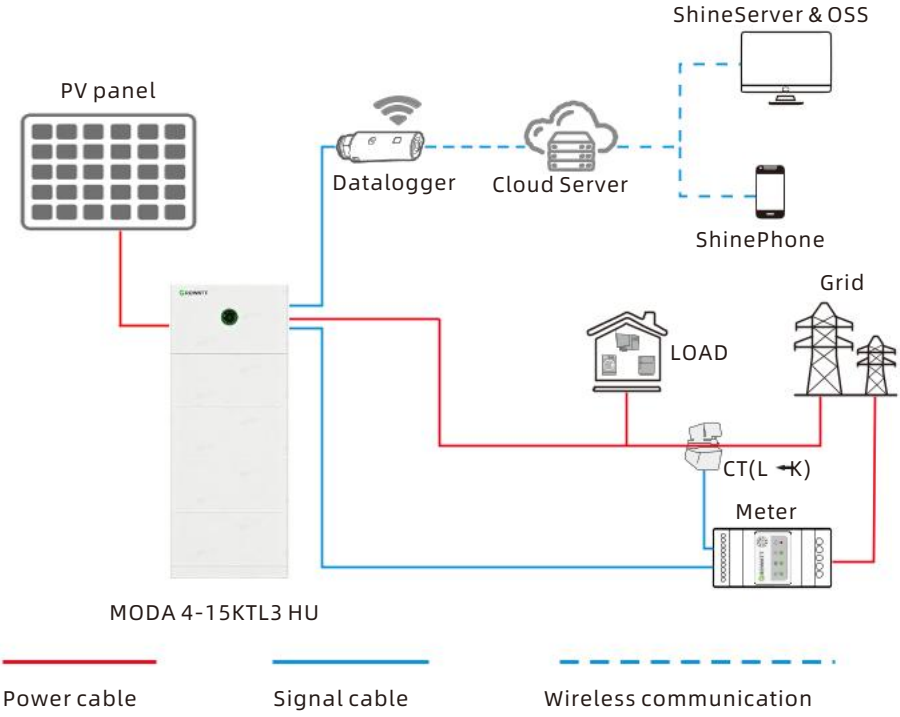


Figure 2.7 PV + Energy Storage System

2.5.2 Grid-tied inverters connected in parallel

NOTICE	• The MODA TL3-HU inverters can be connected in parallel, but MODA TL3-HU does support parallel connection with other models. • Need to be used with a GroHome Manager-X monitoring parallel system. • With GroHomeManager-X, a maximum of 5 units can be connected in parallel. • To enable the parallel operation, the system should be upgraded. • It is recommended to connect a bypass breaker between each backup load and the grid. Refer to Figure 2.9 for wiring.

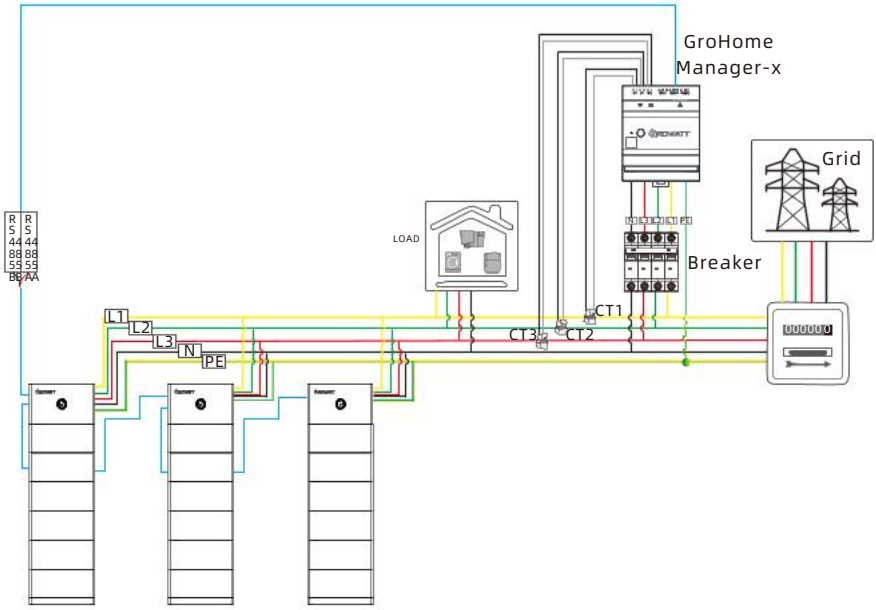


Figure 2.8 Parallel system

2.5.3 Partial backup

NOTICE	• Due to the power limitations of the battery and the inverter, not all the electrical appliances can be powered when the system goes off-grid. You can configure the partial back-up function with the essential loads connected to the LOAD port on the inverter and other loads to the grid. • It is recommended that an external manual bypass breaker be added, as shown in Figure 2.9, to avoid disconnecting the load in the event of a machine bypass operation failure.

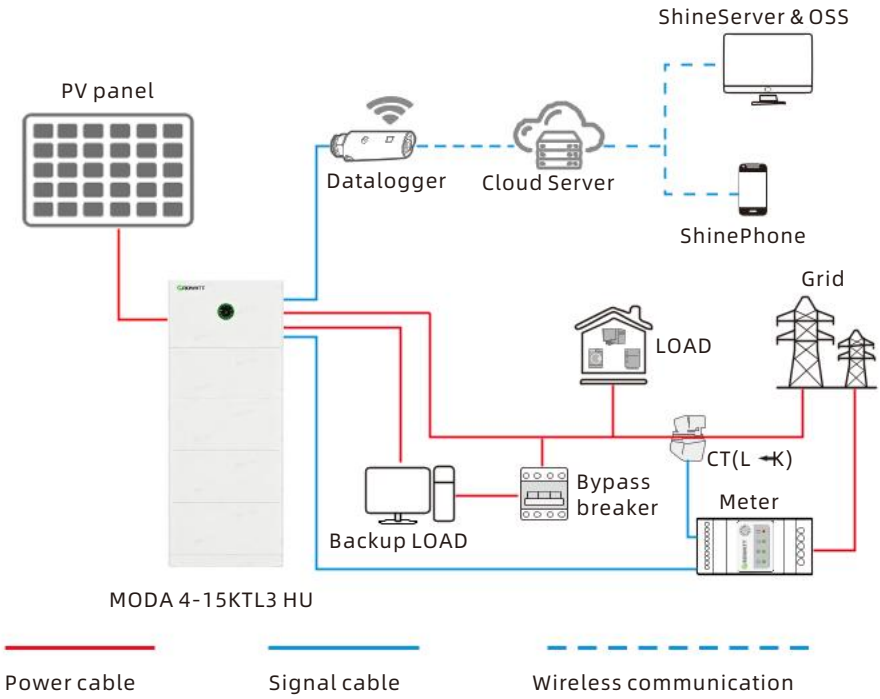


Figure 2.9 Partial backup system

2.5.4 Whole-home backup

NOTICE	• When the maximum power output capacity of the system in the off-grid state surpasses the total power demand of the electrical appliances, you can configure the system for a whole-home backup setup. In this case, you can connect all loads to the LOAD port of the inverter. • It is not recommended to connect a load greater than the rated power of the inverter.

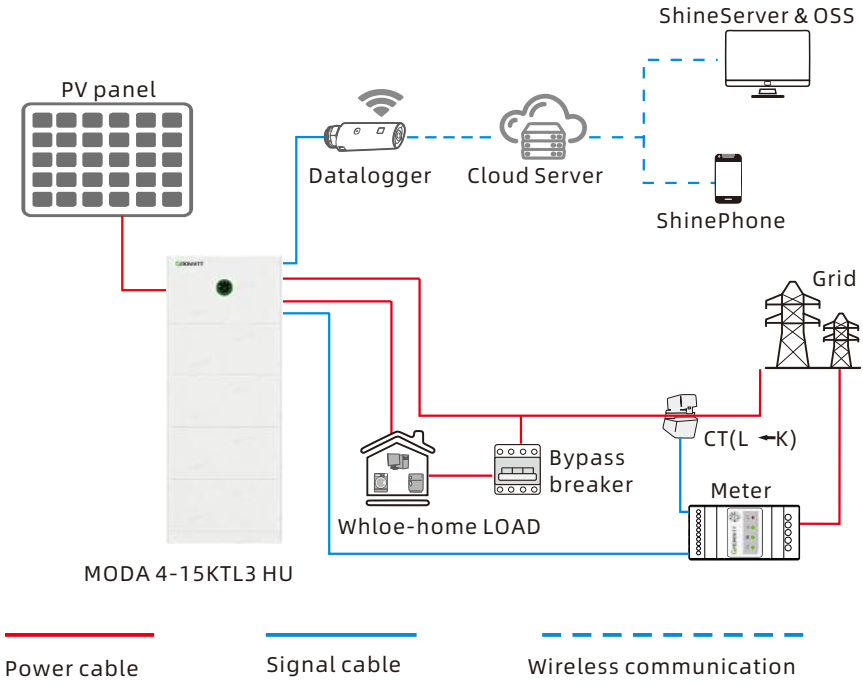


Figure 2.10 Whole-home backup system

2.6 Operating mode

NOTICE	• The MODA TL3-HU inverter offers three operating modes and 9 configurable time segments, enabling to operate the inverter in a specific mode during different periods. For details, please refer to Section 6.4 Setting the operating modes. • In areas with high electricity prices or areas where no grid subsidies are available, it is recommended to set the Load First mode. • In areas with time-of-use electricity rates (peak/off-peak rates), it is recommended to configure a combination of modes. During peak-rate periods, set the inverter to the Grid First mode, and during off-peak-rate periods, set it to the Battery First mode. • If the local power grid is unstable or fails, the inverter can automatically switch to off-grid mode to ensure that critical loads are powered on continuously.

2.6.1 Load First mode

Priority: Load > Battery > Grid. When the solar power is sufficient, it is prioritized towards supplying the loads. The surplus energy is used to charge the battery and then export to the grid.
When the solar power is insufficient or the PV panels are not generating power, the battery will discharge to support the loads. If the battery discharges to the user-defined discharge cutoff SOC, it will stop discharging and the system will draw power from the grid to support the loads.
If the "charge from grid" function is enabled in compliance with local regulations, the battery charges at the maximum power (unless limited by the user-defined battery charging power). If the PV energy is insufficient, it will draw energy from the grid.

2.6.2 Battery First mode

Priority: Battery > Load > Grid. When the solar power is sufficient, it is prioritized towards charging the battery. The surplus energy goes to supply the loads and then export to the grid.
When the solar power is insufficient or the PV panels are not generating power, all solar power is used to charge the battery and energy drawn from the grid will support the loads.
If the "charge from grid" function is enabled in compliance with local regulations, the battery charges at the maximum power (unless limited by the user-defined battery charging power). If the PV energy is insufficient, it will draw energy from the grid.

2.6.3 Gird First mode

Priority: Load > Grid > Battery. When the solar power is sufficient, the inverter operates at its maximum output power to support the loads and export to the grid. The surplus solar power will charge the battery. If the solar power is insufficient, the battery will discharge.

2.6.4 Backup mode

NOTICE	• The MODA TL3-HU inverters support off-grid operation. To enable this feature, you need to purchase a compatible battery system (APX 5.0P-B3).

The Backup mode is mainly designed for scenarios with an unstable grid and critical loads. In the event of a grid anomaly or outage, the inverter switches to the off-grid mode (default values: 230/400V, 50Hz) to supply power to critical loads. When the grid power is restored, the inverter switches back to the grid-tied mode.

2.6.4.1 The maximum off-grid power and recommended battery configuration

Information	• The BMS (battery management system) supports up to 6 battery modules (APX 5.0P-B3). • The maximum off-grid output power is determined by several factors, including the power of the battery system and the inverter's power rating. The power of each battery module is 2.5kW. Please choose the appropriate battery configuration to meet your power needs.

The table below illustrates the relationship between the maximum off-grid output power, the number of battery modules (BM) and the inverter power rating.

Table 2.4 Relationship between the Max. off-grid output power, the number of BM and the inverter rating power (without PV)

No.of BM / Model / Output power	APX 5.0P-B3					
	1	2	3	4	5	6
MODA 4000TL3-HU	2.5kW	4kW	4kW	4kW	4kW	4kW
MODA 5000TL3-HU	2.5kW	5kW	5kW	5kW	5kW	5kW
MODA 6000TL3-HU	2.5kW	5kW	5kW	6kW	6kW	6kW
MODA 8000TL3-HU	2.5kW	5kW	7.5kW	8kW	8kW	8kW
MODA 10KTL3-HU	2.5kW	5kW	7.5kW	10kW	10kW	10kW
MODA 12KTL3-HU	2.5kW	5kW	7.5kW	10kW	12kW	12kW
MODA 15KTL3-HU	2.5kW	5kW	7.5kW	10kW	12.5kW	15kW

2.7 Function

2.7.1 Export limitation

When the MODA TL3-HU inverter is connected to an energy meter and the communication between the inverter and the meter is established, the export limitation function can be activated.

Standard export limitation

- When the "Phase levels" is disabled and the export limitation value is set to a positive value, it indicates the power allowed to be exported to the grid as a percentage. For example, if the inverter's rated power is 10 kW, and the export limitation is set to 30%, the power allowed to be fed to the grid is 10 kW * 30% = 3 kW. If Phase L1 carries a 1 kW load, Phase L2 and Phase L3 do not carry a load, the output of the inverter would be: L1: 1.33 kW, L2: 1.33 kW, L3: 1.33 kW and the power fed to the grid would be: L1: 0.33 kW, L2: 1.33 kW, L3: 1.33 kW.
- When the export limitation value is set to a negative value, it indicates the power allowed to be drawn from the grid as a percentage. For example, if the inverter's rated power is 10 kW, and the export limitation is set to -30%, the power allowed to be drawn from the grid is 10 kW * 30% = 3 kW. If the load power is greater than 3 kW (e.g. load power is 4 kW), the power grid provides 3 kW, and other energy needed will be supplied by the inverter output. When the combined PV and Battery energy is insufficient (e.g. PV power + Battery power = 0.5 kW), the inverter will output at its maximum power while drawing energy from the grid to power the loads.

Phase level export limitation

- When the "Phase levels" is enabled and the export limitation value is set to a positive value, it indicates the power allowed to be exported to the grid as a percentage. For example, if the inverter's rated power is 10 kW, and the export limitation is set to 30%, the power allowed to be fed to the grid is 10 kW * 30% = 3 kW. If Phase L1 carries a 1kW load, Phase L2 and Phase L3 do not carry a load, the output of the inverter would be: L1: 2 kW, L2: 1 kW, L3: 1 kW and the power fed to the grid would be: L1: 1 kW, L2: 1 kW, L3: 1 kW.
- When the export limitation value is set to a negative value, it indicates the power allowed to be drawn from the grid as a percentage. For example, if the inverter's rated power is 10 kW, and the export limitation is set to -30%, the power allowed to be drawn from the grid is 10 kW * 30% = 3 kW. If the load power is greater than 3 kW (e.g. load power is 4 kW), the power grid provides 3 kW, and other energy needed will be supplied by the inverter output. When the combined PV and Battery energy is insufficient (e.g. PV power + Battery power = 0.5 kW), the inverter will output at its maximum power while drawing energy from the grid to power the loads.

2. 7.2 Demand Response Modes (DRMS) & Radio Ripple Control Receiver (RRCR)

- The MODA TL3-HU inverter is DRM compliant and can connect to a Radio Ripple Control Receiver (RRCR). A 10-pin connector is used as the input port for DRMS and RRCR. For the port definitions, you can refer to Section 4.7.1 COM port definition. The DRMS is set to disabled by default. To enable it, please contact Growatt customer support. For details, please refer to Section 6.2 DRMS & Remote logic control.
- According to European standards, the MODA inverter can be connected to a RRCR , which is enabled by default. For details, please refer to Section 6.2 DRMS & Remote logic control.

2.7.3 Dry contact

The MODA TL3-HU inverter features the dry contact function. Once it is enabled, the COM port on the inverter will output a 12V signal when the inverter's output power reaches the preset activation power level. This signal can be used as an activation or deactivation signal for other devices. Conversely, when the inverter's output power reaches the specified deactivation power level, the voltage output from the inverter's COM port changes from 12V to 0V, providing another signal that can be used as an activation or deactivation signal for other devices. To configure this function, you can refer to section 6.3 Dry contact.

2.7.4 AFCI (Arc Fault Circuit Interrupter)

When the PV modules or the cables are in poor contact or damaged, an electrical arc may occur on the DC side, which might lead to a fire hazard. Growatt inverters are integrated with an arc-fault detection function in compliance with UL1699B-2018 standards. This feature is designed to ensure the safety of users' lives and property.
The AFCI function is disabled by default. You can enable this function on a couple of platforms, including the OSS, ShineServer, ShinePhone and ShineTools. For details, please see Section 6.5 AFCI. Alternatively, you can contact Growatt support for assistance.

2.7.5 GFCI (Ground Fault Circuit Interrupter)

The MODA TL3-HU inverter is integrated with a leakage protection function. When the leakage current exceeds 300mA and continues for more than 300ms, the inverter will disconnect from the grid while reporting "Fault 201" and displaying "Residual I High". This feature is designed to ensure the safety of users' lives and property. The GFCI function is enabled by default.

2.7.6 Monitoring

The MODA TL3-HU inverter has a reserved port for connecting to the datalogger. After installing and registering the Growatt datalogger, you can monitor the system's operation status and configure its functions on ShinePhone (APP), ShineServer (https://server.growatt.com), and the OSS (https://oss.growatt.com).

Inspection upon delivery 3

3.1 Checking the packing list

Before unpacking the inverter, check the outer packing materials for any externally visible damage. After unpacking the inverter, check the scope of delivery for completeness. If the scope of delivery is incomplete or damaged, contact your dealer.

3.2 Packing list

Inverter module

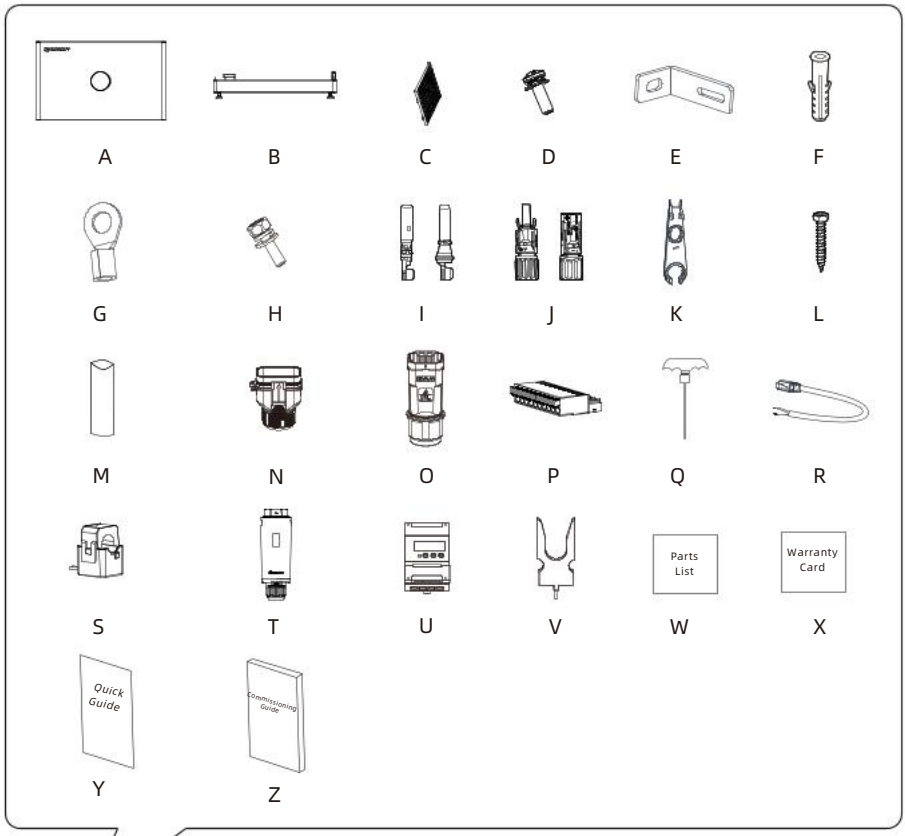


Figure 3.1 Scope of delivery

Table 3.1 Packing List

No.	Description	Quantity	No.	Description	Quantity
A	Inverter	1	N	COM waterproof cover	1
B	Base	1	O	AC waterproof cover	2
C	Decorative cover	2	P	10-pinterminal	1
D	M4×16 screw	2	Q	Allen wrench	1
E	Anti-tipping plate	2	R	Network cable	1
F	Plastic tube	2	S	CT	6
G	OT terminal	1	T	Datalogger	1
H	M6×16 screw	1	U	Meter	1
I	PV terminal core (+/-)	3	V	AC unlocking tool	1
J	PV terminal (+/-)	3	W	Parts list	1
K	Connector wrench	1	X	Warranty card	1
L	Self-tapping screw	2	Y	Quick guide	1
M	Tubular terminal	10	Z	Commissioning guide	1

Inverter module



Figure 3.2 Packing list

3.3 Structure size

3.3.1 Packaging dimensions

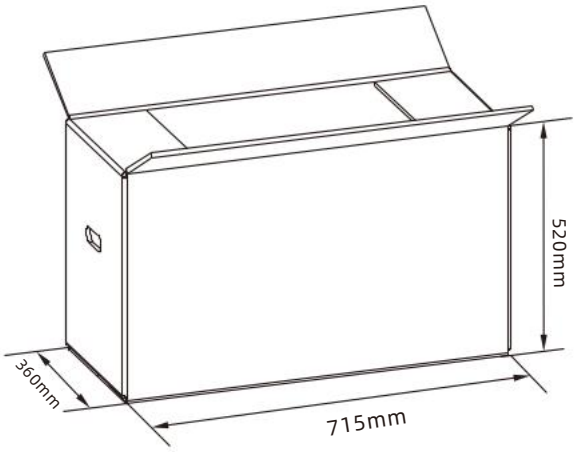


Figure 3.3 Packaging box dimensions

3.3.2 Product dimensions

Inverter module

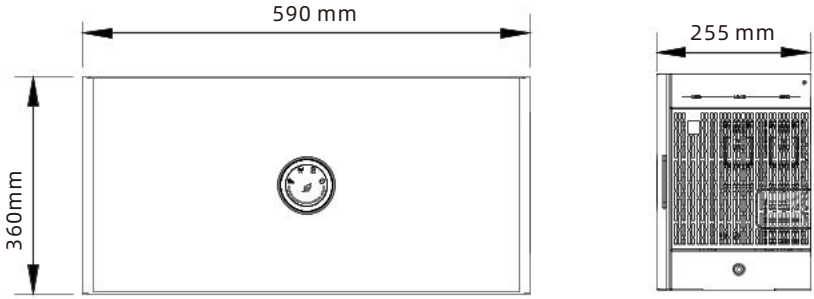


Figure 3.4 Inverter Dimensions

Table 3.2 Inverter Dimensions and Weight

Model	Height (H)	Width (W)	Depth (D)	Weight
MODA 4-15KTL3-HU	360 mm	590 mm	255 mm	32 kg

Battery module

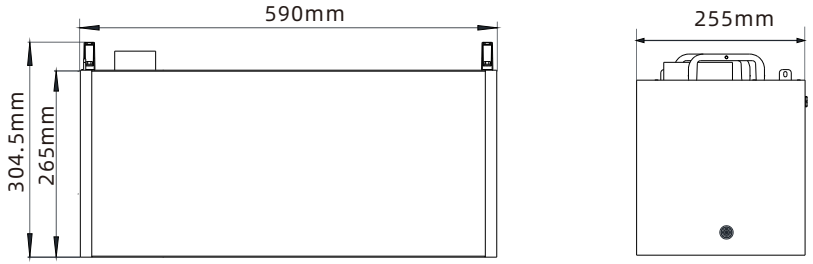


Figure 3.5 Battery Dimensions

Table 3.3 Battery Dimensions and Weight

Model	Height (H)	Width (W)	Depth (D)	Weight
APX 5.0P-B3	304.5 mm	590 mm	255 mm	45 kg

3.4 Moving the inverter

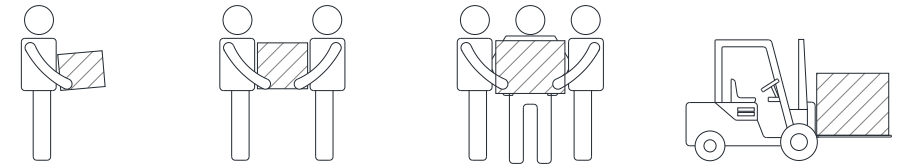


Figure 3.6 Manpower Allocation for Material Handling

DANGER	• The battery module has been certified in accordance with UN 38.3 (Section 38.3 of the Sixth Revised Edition of the UN Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and SN/T 0370.2-2009 (Rules for the Inspection of Packaging for Export Dangerous Goods, Part 2: Performance Inspection), and is classified as Class 9 dangerous goods. • The product must not be transported together with any flammable, explosive, or toxic substances.

 **WARNING**	• Before transportation, ensure that the original packaging is intact and that the transport conditions meet the transport requirements specified on the packaging. • During transportation, adequate sealing protection and cushioning/reinforcement must be provided to prevent exposure to direct sunlight, rain, condensate immersion, and mechanical damage. • The product must be transported within a temperature range of -20 °C to 40 °C and a relative humidity range of 5 % RH to 95 % RH. • When the product is transported under the specified temperature, humidity, and ventilation conditions, a slight decrease in the battery module capacity is a normal phenomenon.
 **NOTICE**	• When handling the equipment, do not use switches, wiring terminals, or other components as gripping points. • When handling the equipment, assign an appropriate number of personnel based on the actual weight of the equipment to avoid mechanical injury. • When placing the product on the ground, lay foam or cardboard underneath it to prevent damage to the product.

3.5 Product Storage

Never store the product without its packaging. Never store flammable or explosive materials in the vicinity of the product, and never expose the product to corrosive environments.

- Place the product strictly in accordance with the markings on the packing case. Never store the product upside down or on its side.
- Store the product within a temperature range of -25 °C to 60 °C and a relative humidity range of 5 % RH to 95 % RH.
- CAUTION Stack products strictly in accordance with the following requirements. Never stack them excessively high, to prevent equipment damage or personal injury caused by falling products.
- A maximum of 4 packaged inverter modules may be stacked.
- A maximum of 3 packaged main battery modules may be stacked.
- A maximum of 5 packaged expansion battery modules may be stacked.
- Store the batteries in a dry, clean, and well-ventilated location, and avoid exposure to strong infrared radiation.
- Damaged battery modules must be isolated and stored separately, and must never be stored together with intact battery modules.
- Keep a distance of at least 2 m between the batteries and any heat source (e.g., radiators).
- After long-term storage, the product must be inspected and functionally tested by qualified professionals before it is put into operation.

NOTICE	• To guarantee product performance and service life, strictly comply with all storage instructions described above.

Battery measurement

Table 3.4 Battery Storage period and charging cycle

Temperature	Relativehumidity	Storage period	Charging cycle
< -20℃	Not allowed		
-20℃~10℃	5%~95%	<12 months	<12 months
10℃~30℃	5%~95%	<9 months	<9 months
30℃~50℃	5%~95%	<6 months	<6 months
> 50℃	Not allowed		

NOTICE	• If the battery is discharged to a SOC below 10 %, charge it to 40 % SOC within 7 days. • It is recommended to store the battery module within a temperature range of -20 ℃ to 30 ℃ and to charge it periodically as required in the table above. • WARNING If the battery module is stored beyond the permitted storage period specified above without being charged, it may be damaged.

NOTE: Currently, the battery module can only be charged via the inverter module.

3.6 Installation requirements

Environmental Requirements

- The all-in-one machine has an ingress protection rating of IP66 and supports both indoor and outdoor installation.
- Ensure that the installation environment is dry, well-ventilated, and has appropriate temperature and humidity.
- Never install the all-in-one machine in flammable, explosive, or corrosive environments.
- The enclosure surface reaches high temperatures during operation. Never install the all-in-one machine within the reach of children.
- If the all-in-one machine is installed in an area with dense vegetation, mow the vegetation regularly and harden the ground beneath it (recommended hardened area: 3 m × 2.5 m, using concrete, gravel, or similar materials).

- The all-in-one machine with an external fan generates noise during operation. Do not install it in residential areas. If this cannot be avoided, the installation site must be located at least 25 m away from residential areas, or effective noise reduction measures must be taken.
- For outdoor installation, give priority to a sheltered location. If this is not possible, a sunshade must be installed to protect the machine from direct sunlight and adverse weather conditions such as rain, snow, and lightning.



Figure 3.7 Environmental requirement

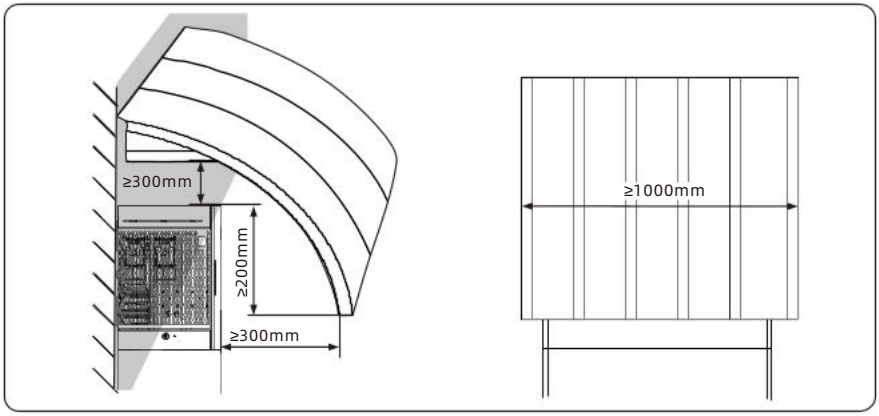


Figure 3.8 Sunshade installation and gap requirements

Mounting Surface Requirements

- The mounting surface must be capable of bearing the weight of the all-in-one machine.
- The mounting surface must be fire-resistant and heat-resistant.
- In residential areas, never install the all-in-one machine with an external fan on walls with poor sound insulation, to prevent noise from disturbing nearby residents.

Space requirements

- Sufficient clearance must be reserved around the all-in-one machine to meet heat dissipation and maintenance requirements.

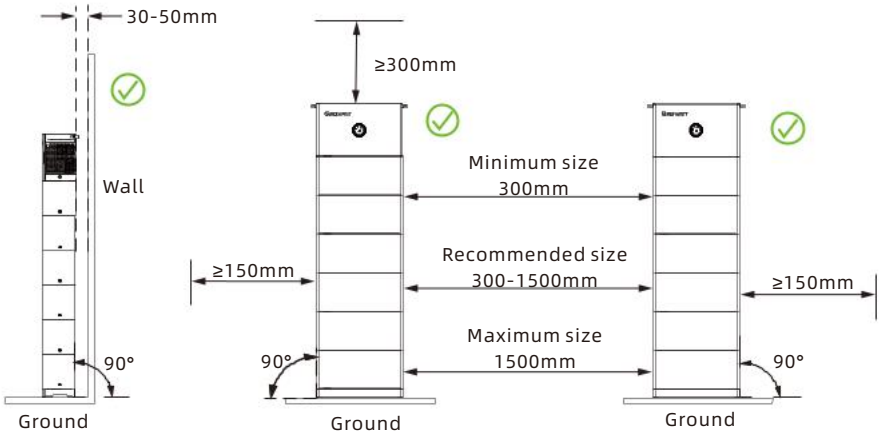


Figure 3.9 Installation and gap requirements

3.7 Required tools

Please bring your own installation tools, including but not limited to those listed below. The tools used must comply with electrical safety standards.

Table 3.5 Installation tools

Tools				
 Hammer drill	Drilling bit (Φ=8 mm)	 Hammer	 Level	 Cross-head screwdriver
 Vacuum	 Marker	 Measuring tape	 Heat gun	 Multimeter
 Wire stripper	 Slanted mouth plier	  Crimping plier		
 Safety gloves	 Goggles	 Mask	 Safety shoes	 Helmet

3.8 Install

3.8.1 Preparation work before installation

Before shipment, the inverter and base are pre-installed together. The base must first be removed. Follow these steps:

1. Open the package, hold both sides of the inverter with both hands, and lift it vertically upward.
2. Continue lifting the inverter until it is completely removed from the carton, then place it gently on a clean, flat soft pad or work surface to protect the enclosure from scratches or impact damage.
3. Use a screwdriver of an appropriate size to loosen the screws that secure the wall-mount bracket on the left and right sides of the inverter.
4. Once the screws are loosened, lift the wall-mount bracket vertically upward to detach it from the back of the inverter.
5. Remove the wall-mount bracket and store it safely for later use (the bracket must first be secured to the installation wall; the inverter is then aligned with the bracket and hung vertically downward into position).

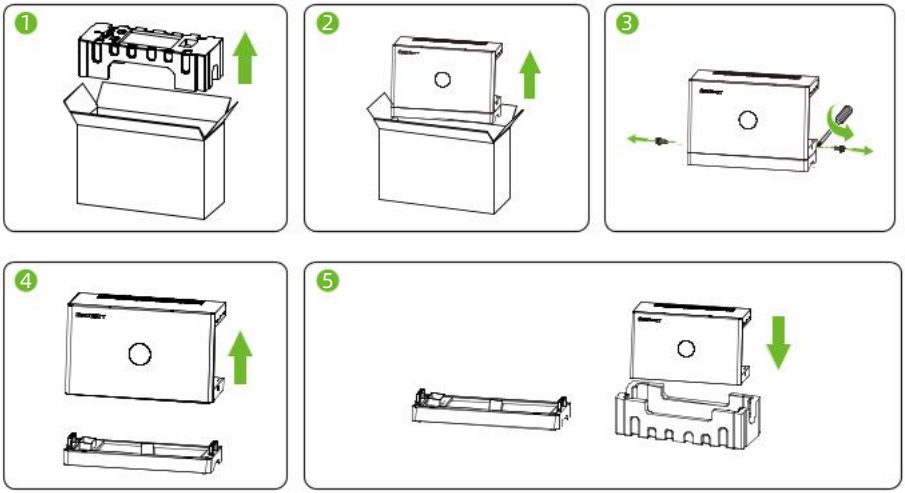


Figure 3.10 Preparation work before installation

3.8.2 Floor-mounted installation

1. Mounting the Base

1. Move the base to the designated installation position and place it against the wall, leaving a clearance of 30-50 mm between the base and the wall.
2. Level the base. According to the floor flatness, use the supplied 1 mm shims (x4) and 2 mm shims (x4) to level and stabilize the base, ensuring it is horizontal and free of wobble.

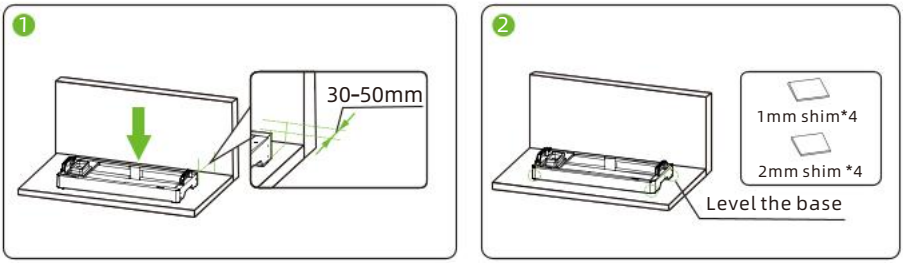


Figure 3.11 Mounting the Base

2. Mounting the Battery

1. Align the first battery module with the base and lower it vertically into position.
2. Secure the battery module using M4 screws with a tightening torque of 1.2 N·m.
3. Stack the remaining battery modules one by one from bottom to top. Secure each layer with M4 screws tightened to 1.2 N·m, ensuring all modules are firmly connected and properly aligned.

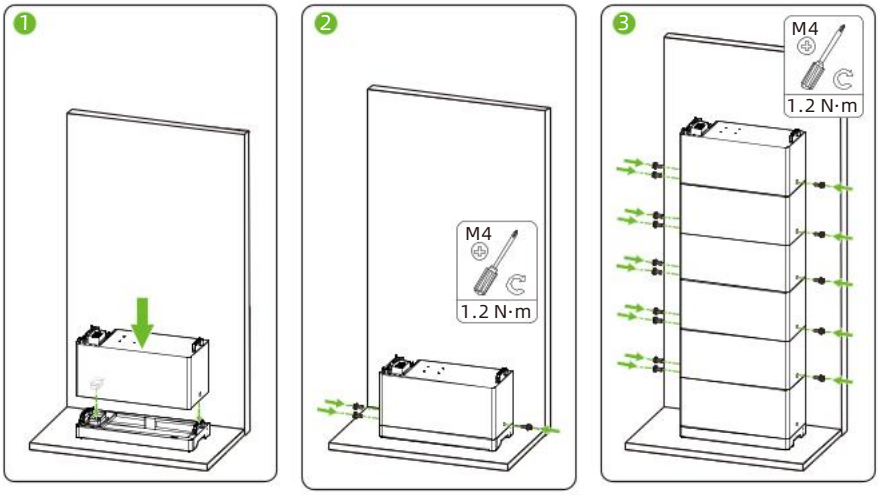


Figure 3.12 Mounting the Battery

3. Mounting the Inverter

1. Align the inverter with the top battery module and lower it vertically into position.
2. Secure the inverter from the side using M4 screws with a tightening torque of 1.2 N·m, and verify that the entire unit is mounted securely.

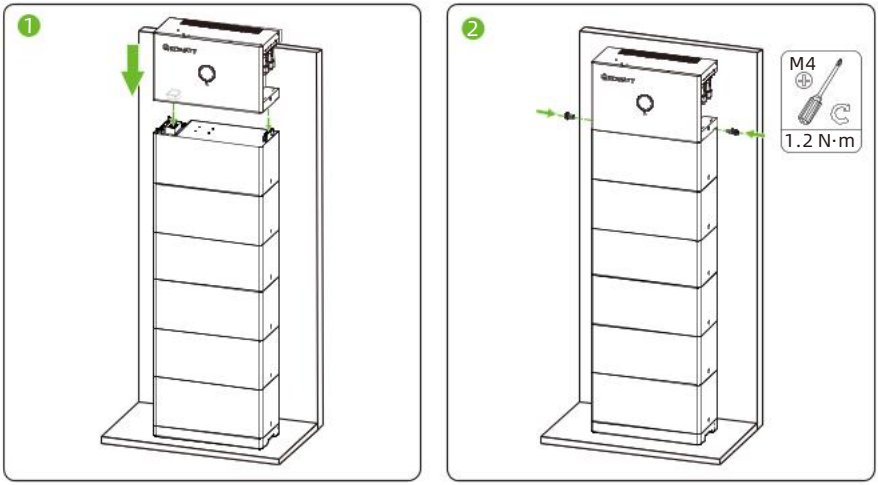


Figure 3.13 Mounting the Inverter

4. Mounting Anti-tipping plates

1. Locate mounting positions for the anti-tipping plates. Mark hole positions on the wall per dimensions shown: one side 19 mm from the edge at 15 mm height; the other side 7 mm from the edge at 15 mm height.
2. Drill wall holes: Use a Φ8 mm drill bit, keep the drill at 90° perpendicular to the wall. Drill depth shall be 45-50 mm, then insert wall expansion anchors.
3. Tighten fasteners:
   - Fasten anti-tipping plates to the energy-storage unit with M4 cross-head screws at torque 1.2 N·m.
   - Secure the plates onto wall anchors with M6 bolt-and-nut assemblies at torque 5 N·m. The anti-tipping plates installation is completed.

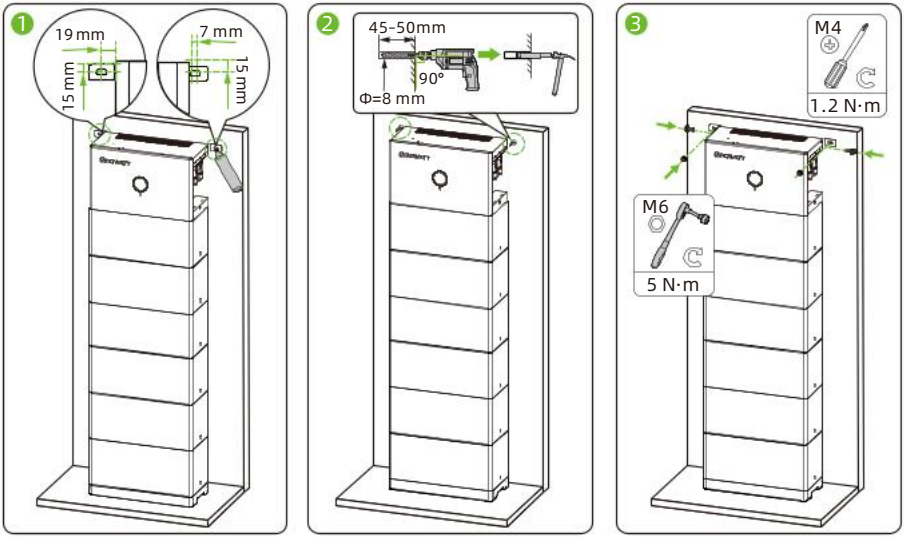


Figure 3.14 Mounting Anti-tipping plates

3.8.3 Wall-mounted installation

For wall-mounted installation, the wall bracket must first be securely fixed to the wall before the all-in-one machine is hung onto it. The installation procedure of the wall bracket is shown in Figure 3.15.

1. Installing the Wall Bracket

1. Assemble the supporting parts of the wall bracket using M6 screws with a tightening torque of 5 N·m. Make sure the entire bracket structure is firmly connected and free of looseness.
2. Hold the assembled wall bracket against the wall at the designated installation position. According to the mounting hole dimensions on the bracket (overall length 496 mm, end hole offset 80 mm, spacing between adjacent holes 93 mm), accurately mark each drilling position on the wall.
3. Use a hammer drill to drill holes at the marked positions perpendicular (90°) to the wall. The hole diameter shall be 10 mm and the hole depth shall be 55 mm. After drilling, remove dust from the holes and insert the matching expansion anchors into the holes.
4. Align the mounting holes of the wall bracket with the expansion bolts on the wall, and tighten with M10 nuts at a tightening torque of 13 N·m. After tightening, check the levelness and load-bearing stability of the bracket. Only when the bracket is confirmed secure and free of looseness can the subsequent mounting of the all-in-one machine proceed.

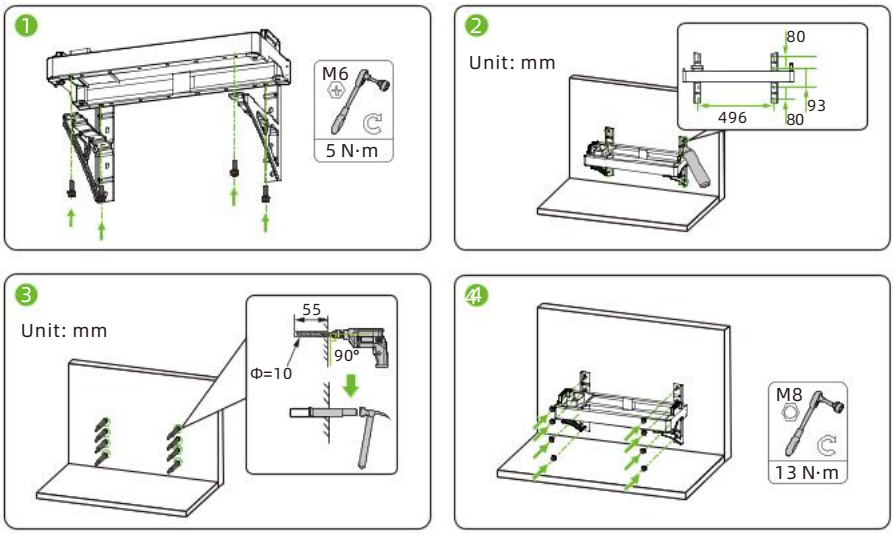


Figure 3.15 Installing the Wall Bracket

2. Mounting the Battery

1. Align the first battery module with the base and lower it vertically into position.
2. Secure the battery module using M4 screws with a tightening torque of 1.2 N·m.
3. Stack the remaining battery modules one by one from bottom to top. Secure each layer with M4 screws tightened to 1.2 N·m, ensuring all modules are firmly connected and properly aligned.

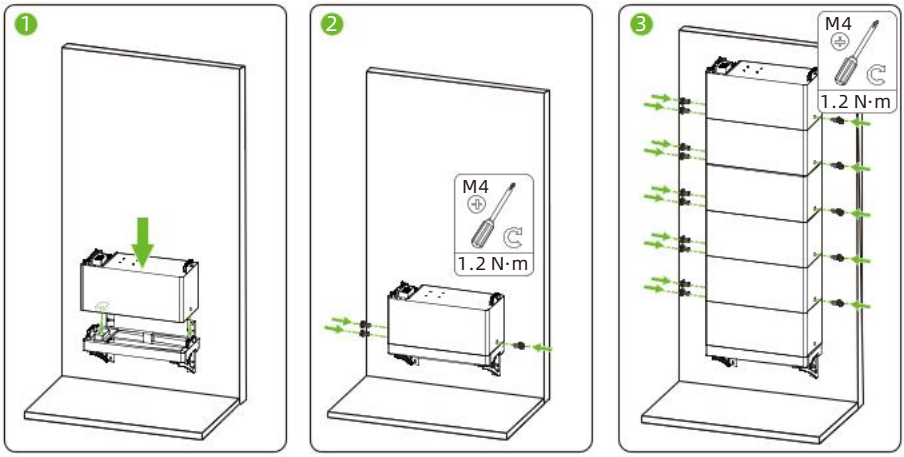


Figure 3.16 Mounting the Battery

3. Mounting the Inverter

1. Mark wall drilling positions: Mark hole locations on the wall per drawing dimensions. One hole is 19 mm from the edge at 15 mm height; the other hole is 7 mm from the edge at 15 mm height.
2. Drill wall holes and fit expansion anchors: Use a Φ8mm drill bit, keep the drill bit perpendicular (90°) to the wall. Drill depth: 45-50mm. Insert wall expansion anchors after drilling.

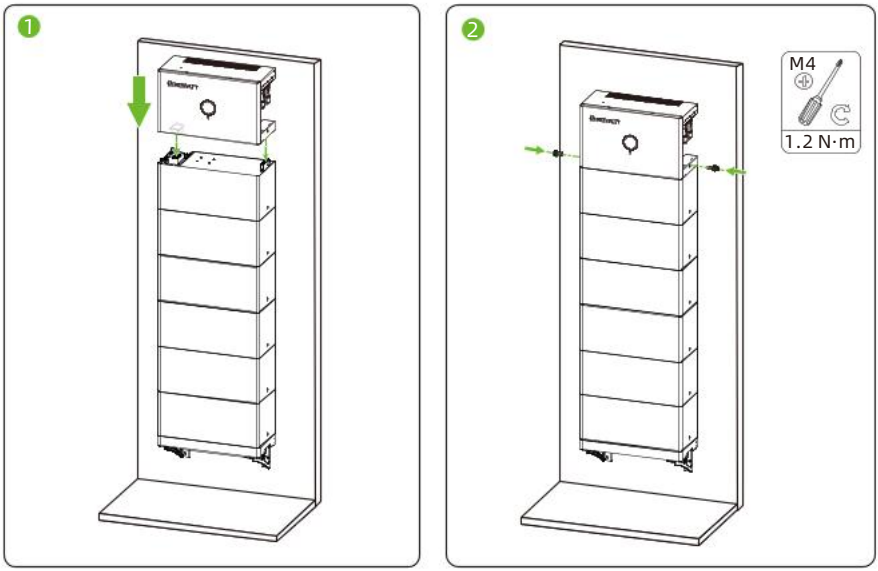


Figure 3.17 Mounting the Inverter

4. Mounting Anti-tipping plates

1. Locate mounting positions for the anti-tipping plates. Mark hole positions on the wall per dimensions shown: one side 19 mm from the edge at 15 mm height; the other side 7 mm from the edge at 15 mm height.
2. Drill wall holes: Use a Φ8 mm drill bit, keep the drill at 90° perpendicular to the wall. Drill depth shall be 45-50 mm, then insert wall expansion anchors.
3. Tighten fasteners:
   - Fasten anti-tipping plates to the energy-storage unit with M4 cross-head screws at torque 1.2 N·m.
   - Secure the plates onto wall anchors with M6 bolt-and-nut assemblies at torque 5 N·m. The anti-tipping plates installation is completed.

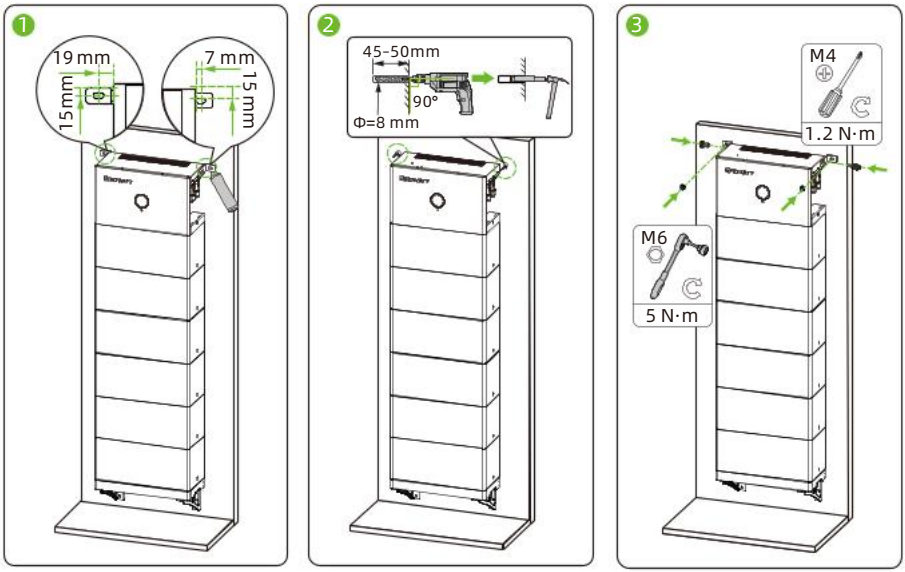


Figure 3.18 Mounting Anti-tipping plates

3.8.4 Protective cover installation

After the all-in-one machine is hung and secured in place, the left and right protective covers must be installed to protect the internal wiring terminals and improve the overall ingress protection of the unit. The installation procedure is shown in Figure 3.19.

Step 1: Align the left and right protective covers with the guide slots on the corresponding sides of the all-in-one machine, and insert them vertically downward along the slots until the cover snaps initially engage with the guide rails of the enclosure (see the enlarged detail views).

Step 2: Once both protective covers are in position, push them evenly and horizontally inward toward the enclosure until the snaps are fully engaged. After installation, check that the covers fit tightly against the enclosure with no looseness or visible gaps before proceeding to the subsequent electrical connection procedure.

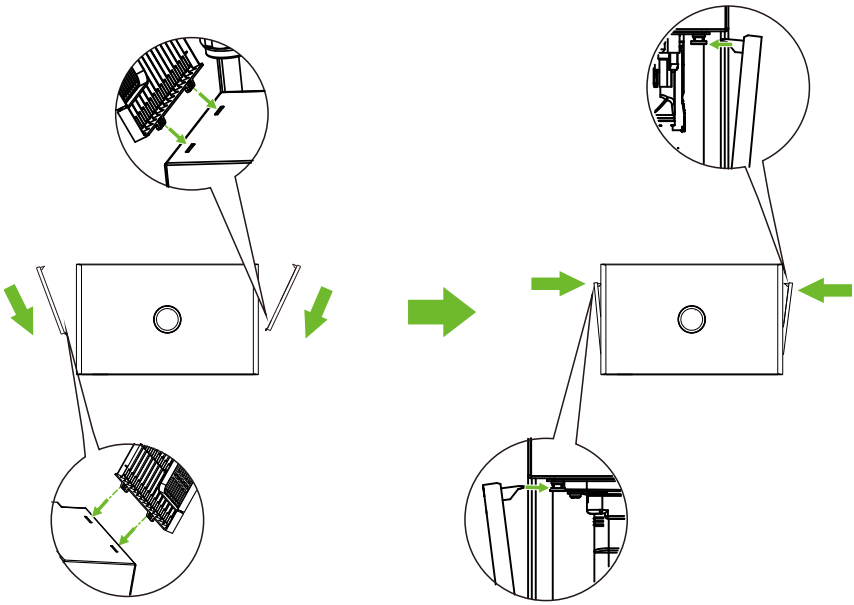


Figure 3.19 Protective cover installation

Electrical connection 4

4.1 Safety precautions

 DANGER	• When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Ensure that the DC SWITCH on the inverter is set to OFF before connecting cables. • You are recommended to prepare firefighting equipment on site, such as fire sand and fire extinguishers. • Wear insulated gloves and use insulated tools to prevent electric shock injuries.
 WARNING	• Follow the wiring instructions specified in the user manual. otherwise, any device damage caused by improper wiring will not be covered under any warranty. • Unqualified persons shall not perform any electrical connections. • Wear insulated gloves to prevent static electricity from damaging the components of the inverter. • Do not use single-strand wire as the output wire for the inverter. • Do not use aluminum wire as the output cable. • Avoid overstress on the cable, which could lead to poor contact.
 NOTICE	• When assembling cables, please keep a distance from the inverter to prevent cable debris from falling into the inverter, which might cause short circuits. • Damage caused by dust or moisture penetration due to improper installation of waterproof connectors is beyond the scope of warranty

4.2 Preparing cables

Note:
The cable specifications must comply with local regulations.

Table 4.1 Cable specifications

No.	Cable	Recommended Specifications	
		MODA 4-8KTL3-HU	MODA 10-15KTL3-HU
1	Ground cable	12-16mm²	
2	AC output cable		
3	PV input cable	4-6 mm²	6-8 mm²
4	Communication cable	0.32-0.52 mm²	

4.3 Preparing the AC (GRID & LOAD) breaker

- An external AC circuit breaker should be installed on the AC side of the inverter to ensure a safe disconnection of the inverter from the grid and loads (The load port is for connecting back-up loads).
- The AC breaker is not required to offer residual current protection as the inverter is equipped with a sensitive residual current detection device (RCD). If local regulations require the use of an AC breaker that incorporates residual current protection, it is advised to install a type A or a type B RCD between the inverter and the grid. The rated residual current must be greater than or equal to 300 mA.

 **DANGER**	• If an AC breaker with a rating greater than the recommended specification or the value outlined in local regulations is used, the inverter might fail to disconnect from the grid or backup load when an exception occurs, which might lead to severe damage. Growatt shall not be liable for the consequences.
 **WARNING**	• Each inverter must be equipped with an AC output breaker, and multiple inverters cannot share the same AC breaker.
 **NOTICE**	• Users are responsible for preparing the terminals for connecting the AC breaker.

Table 4.2 AC (Grid & Load) breaker specifications

Inverter Model	Recommended AC breaker specification
MODA 4000TL3-HU	25A/230V
MODA 5000TL3-HU	25A/230V
MODA 6000TL3-HU	25A/230V
MODA 8000TL3-HU	32A/230V
MODA 10KTL3-HU	40A/230V
MODA 12KTL3-HU	50A/230V
MODA15KTL3-HU	63A/230V

4.4 Connecting the grounding cable

 DANGER	• Please ensure that the grounding cable is securely connected; failure to do so may lead to an electric shock. • It is strictly prohibited to utilize the N-line as a grounding cable and connect it to the inverter's enclosure, as this can cause an electric shock.
 WARNING	• The PE point at the AC output terminal serves only as an equipotential connection point and should not substitute for the protective grounding point on the enclosure. • It is recommended to apply silicone gel or paint around the grounding terminal as a protective coating after installation to prevent corrosion. • Lightning protection for the PV system should comply with international standards or IEC standards. Failure to do so may result in damage to PV components, accessories, inverters, and distribution facilities. In such cases, the company shall not be liable for the consequences.
 NOTICE	• Be careful not to damage the wire core while stripping wires. • The cavity formed after crimping the conductor in OT terminals should fully encapsulate the wire core, ensuring a tight and secure connection. • You can use heat shrink tubing or insulating tape to cover the crimped area. The use of heat shrink tubing is described as an example. • When using a heat gun, please take precautions to avoid equipment burns.

Preparing the Cable At the electrical connection stage, the power cables must first be prepared at their ends by stripping the insulation and crimping OT terminals.

Step 1: According to the conductor size of each L1/L2/L3 cable and the specification of the matching OT terminal, strip the insulation at the cable end to the required length of "L1/L2/L3 + 3 mm" to expose the core wire. Do not nick or cut the conductors during stripping.

Step 2: Insert the exposed core wire fully into the crimp barrel of the OT terminal (ring-type lug) along the terminal axis, ensuring the wire is seated to the end.

Step 3: Crimp the crimp barrel with a crimping tool matching the OT terminal size. After crimping, the terminal shall be firmly bonded to the core wire with no looseness, and the conductors shall not be frayed or exposed.

Step 4: Align the cable with the crimped OT terminal to the corresponding terminal position inside the unit, and secure it with an M6 screw at a tightening torque of 3.5 N·m. Gently pull the cable after tightening to confirm the connection is reliable and free of loosening.

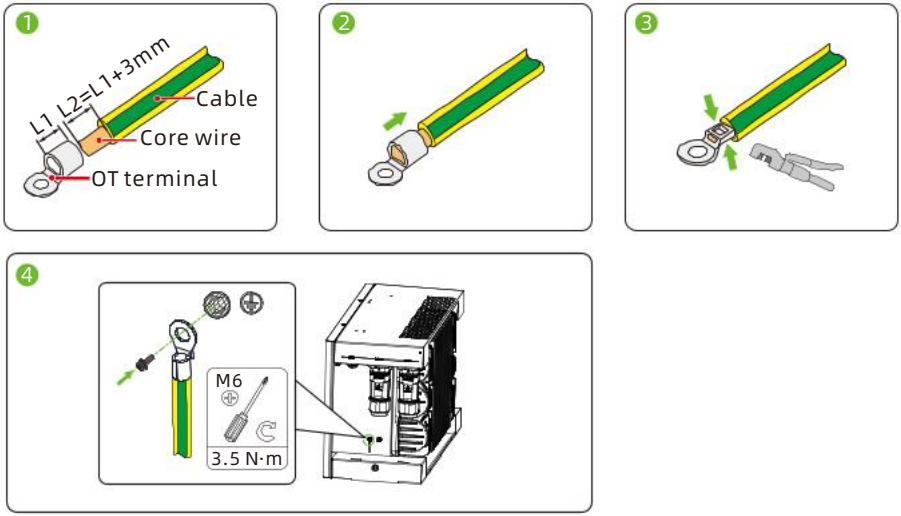
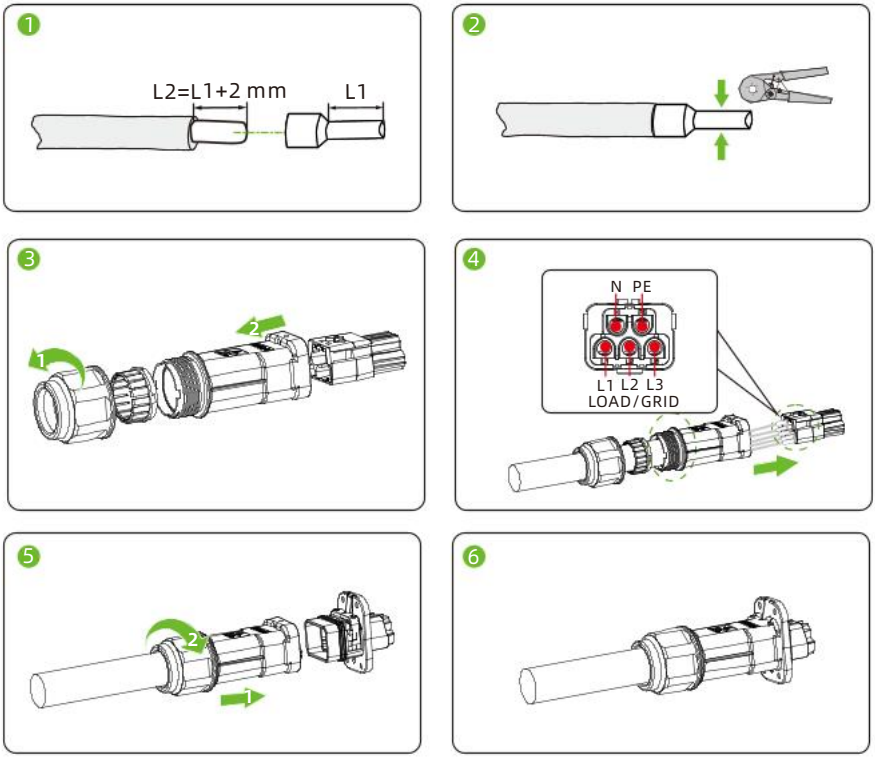


Figure 4.1 Preparing the cable

4.5 Connecting the AC (GRID & LOAD) output cable

DANGER	• An external AC circuit breaker is required on the AC side to ensure that the inverter can be safely disconnected from the grid and backup- load (Load port is used to connect to backup-load). • If an AC breaker with a rating greater than the recommended specification or the value outlined in local regulations is used, the inverter might fail to disconnect from the grid when an exception occurs, which might lead to severe damage. Growatt shall not be liable for the consequences.
WARNING	• Each inverter must be equipped with an AC output breaker, and multiple inverters cannot share the same AC breaker.
NOTICE	• Be careful not to damage the wire core while stripping wires. • The cavity formed after crimping the conductor in OT terminals should fully encapsulate the wire core, ensuring a tight and secure connection. • You can use heat shrink tubing or insulating tape to cover the crimped area. The use of heat shrink tubing is described as an example. • When using a heat gun, please take precautions to avoid equipment burns.

Install



Remove

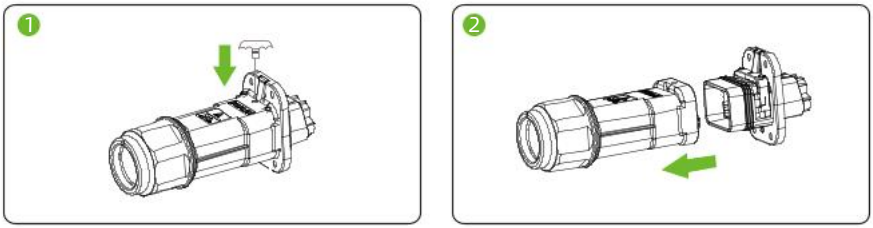


Figure 4.2 Assembling the AC connector

The inverter's GRID and LOAD ports share the same wiring method, but the GRID and LOAD connectors (cable end equipment end) are keyed so that they cannot be mated incorrectly.

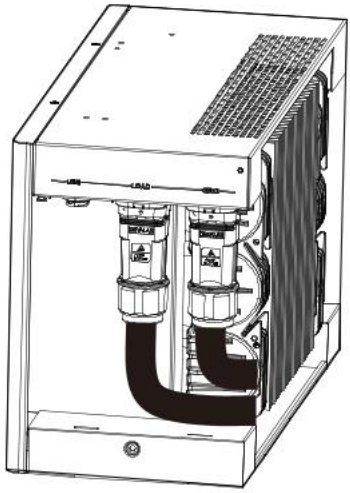


Figure 4.3 Finish the AC connection

4.6 Connecting the DC input cable

WARNING	Please ensure that the following conditions are met, as failure to do so may damage the inverter or pose a fire hazard. In such cases, the company shall not be liable for any consequences: • The maximum open-circuit voltage of each PV string must not exceed 1100Vdc under any conditions. • When the voltage of each PV string exceeds 1000V, the inverter will stop power output. • PV modules in each string should be of the same specification and type. • The maximum short-circuit current for each MPPT must not exceed 25A under any circumstances. • In cases where the inverter has no isolated transformer for its output, the negative pole of the PV panel is energized and grounding PV- is prohibited. • Pay attention to the correct polarity when connecting the DC cables. Connect the positive and negative terminals of the PV string to the positive and negative PV terminals on the inverter correspondingly.

 **DANGER**	• Before connecting the DC input cables, verify that the DC voltage is within the permissible range (< 36V DC) and ensure that the DC SWITCH on the inverter is set to the OFF position. Otherwise, high voltages may lead to electric shocks. • Do not perform maintenance operations on the DC input cables when the inverter is in operation, such as connecting or removing a PV string or its component. Failure to do so may cause electric shocks. • If the DC input terminals of the inverter are not connected to the PV strings, do not remove the waterproof cover from the DC input terminals, as this could compromise the equipment's protection rating.
 **WARNING**	• In case that the DC cables are reversely connected, do not operate the DC switch and the positive and negative connectors immediately. Wait until the solar irradiance declines in the evening and the PV string current drops below 0.5A. Then turn the DC SWITCH to the OFF position and remove the positive and negative connectors to correct the polarity of the DC input cables.
 **NOTICE**	Device damage resulting from the following circumstances during the installation of PV strings and the inverter is beyond the scope of warranty: • Improper installation of distribution cables or incorrect wiring that leads to a short circuit between the positive or negative terminal of the PV string and ground, which may cause an AC/DC short circuit during inverter operation. • Moisture or dust penetration due to inappropriate sealing on the PV side.

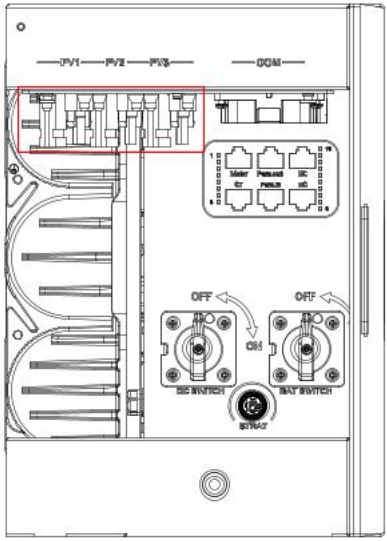
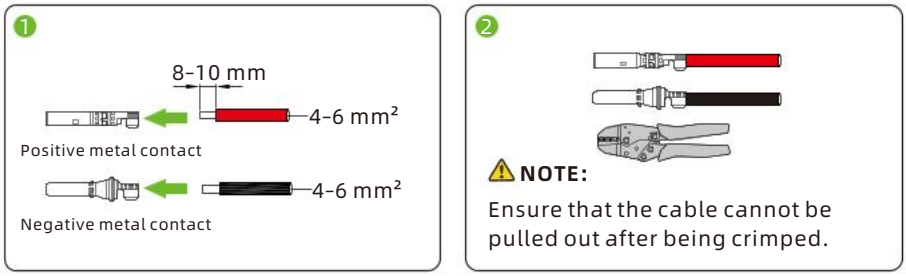


Figure 4.4 PV inputs

4.6.1 Connecting the PV terminal

WARNING	• Please use the positive and negative metal contacts and the DC connectors delivered with the inverter package. Using other incompatible models may result in severe consequences, which will void the warranty. • Crimp the PV metal contact with a dedicated crimper. Using an inappropriate crimping tool may lead to severe consequences, and any device damage caused by this is not covered by the warranty. • Cables with high rigidity are not recommended for the DC input as bending of cables may lead to poor contact of terminals. • When assembling the DC connectors, pay attention to the • correct polarity and label the positive and negative cables. • After snapping the positive and negative connectors into place, pull the cables slightly to ensure that they are securely in place. • When wiring the DC input cables at the installation site, leave at least 50 mm of them slack. The axial tension on the PV connector should not exceed 80N and do not apply radial stress or torque on the PV connectors.

Install



Remove

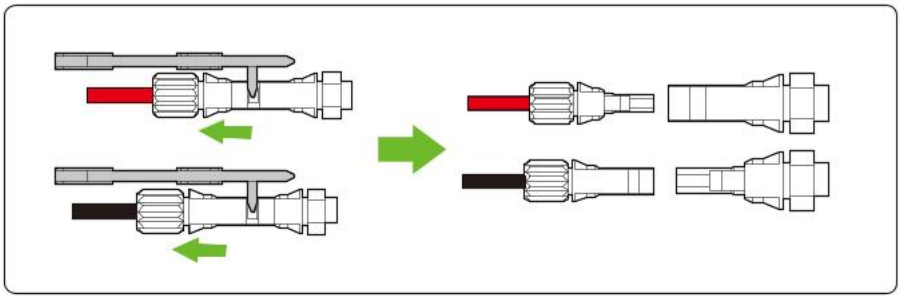


Figure 4.5 Preparing the PV input cables

4.7 Connecting the communication cable

WARNING	• When arranging the signal cables, separate them from power cables and keep them away from strong interference sources to avoid communication interruption. • If a signal cable is not required to be connected, please do not remove the COM terminal dustproof cover preinstalled on the inverter.

4.7.1 COM port definition

COM Port shows the terminal definition of the COM communication port. This port adopts a dual-terminal-block design consisting of a 10-pin block and an 8-pin block, with the pin numbers and arrangement as shown. Among the terminals, Para.in and Para.out are the parallel communication terminals, used for parallel input and parallel output respectively when multiple units operate in parallel; Meter is the terminal for connecting the smart meter, and CT is the terminal for connecting the current transformer. Pins marked NC are not internally connected and shall be left unwired. Before wiring, confirm the function of each terminal against this figure and connect the wires strictly according to the pin numbers.

Terminal Definition

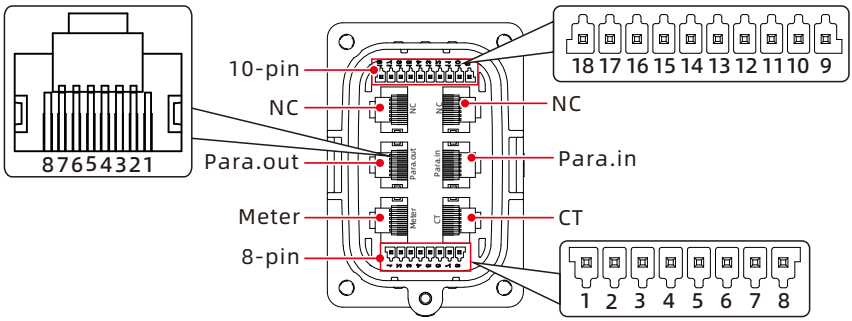


Figure 4.6 COM port

Table 4.3 Pin definition of the COM port

Port	Pin	Signal	Function
Para.out	1	485-1_B	External communication
	5	485-1_A	
	2	Sc_A/H	Inverter parallel
	3	PL CANH（DSP_2）	
	4	Sc_B/L	
	6	PL CANL（DSP_2）	
	7	BAT1 CAN H（M3_2）	
	8	BAT1 CAN L（M3_2）	
Para.in	1	485-1_B	External communication
	5	485-1_A	
	2	Sc_A/H	Inverter parallel
	3	PL CANH（DSP_2）	
	4	Sc_B/L	
	6	PL CANL（DSP_2）	
	7	BAT1 CAN H（M3_2）	
	8	BAT1 CAN L（M3_2）	
Meter	4	NC	/
	1	485-2_B	Meter communication
	2	GND.S	
	3	5V.S	
	5	485-2_A	
	6	GND.S	
	7	RS485_3B	
	8	RS485_3A	
CT	1	I_Load.P3	AC current sampling
	2	I_Load.N3	
	3	I_Load.P2	
	4	I_Load.P1	
	5	I_Load.N1	
	6	I_Load.N2	

Port	Pin	Signal	Function
CT	7/8	NC	/
10-pin terminal	11	12V.S	Dry contact: the power supply should not be greater than 2 W
	12	DRY.G	
	13	DRM1/5	DRMS connection
	14	DRM2/6	
	15	DRM3/7	
	16	DRM4/8	
	17	REF	
	18	COM	

4.8 Connecting the meter (optional)

NOTICE	• The MODA inverter supports export limitation, setting different operating modes, and monitoring self-consumption. To enable these functions, an external smart meter is required. Please purchase the meter from Growatt . • After connecting the meter, you need to enable the meter communication on the inverter.

Recommended meter models:

Table 4.4 Meter specification

No.	Brand	Recommended model	Applicable system	Source
1	Eastron	• SDM630-Modbus V3	System with a single inverter	Purchase from Growatt
2	Eastron	• SDM630MCT 40mA	System with a single inverter / multiple inverters connected in parallel	Purchase from Growatt
3	CHINT	• DTSU666/3*220/ 5(80)A	System with a single inverter	Purchase from Growatt
4	CHINT	• DTSU666/3*220/ 1.5(6)A	System with a single inverter / multiple inverters connected in parallel	Purchase from Growatt
5	CHINT	• DTSU666/3*220/ 6CT	Recommended for use in AC Coupled systems	Purchase from Growatt

WARNING	• The phase sequence of the inverter must correspond with that of the meter; otherwise, it will not support export limitation and operating the inverter in different modes. • A smart meter is required for the energy storage system; otherwise, certain functions will be unavailable.

4.8.1 Connecting Eastron smart meter

Table 4.5 Eastron smart meter specific parameters

Manufacturer	Eastron
Type	SDM630CT-Modbus V3
General Specifications	
Voltage AC (Un)	3*230V
Voltage Range	184~299V AC
Basic Current	10A
Power consumption	≤2W
Frequency	50/ 60Hz(±10%)
AC voltage withstand	4kV for 1 minute
Impulse voltage withstand	6kV-1.2uS waveform
Over current withstand	20Imax for 0.5s
Pulse output 1	1000imp/kWh (default)
Pulse output 2	400imp/kWh
Display Max. Reading	LCD with white backlit 999999kWh
Environment	
Operating temperature	-25℃~55℃
Storage and transportation temperature	-40~70℃
Reference temperature	23±2℃
Relative humidity	0 to 95%, non-condensing
Altitude	up to 2000m
Warm up time	3s
Installation category	CAT II
Mechanical Environment	M1
Electromagnetic environment	E2

Manufacturer	Eastron
Degree of pollution	2
Mechanics	
Din rail dimensions	72x66x100 mm (WxHxD) DIN 43880
Mechanics	
Mounting	DIN rail 35mm
Ingress protection	IP51 (indoor)
Material	Self-extinguishing UL94V-0
Communication port	PIN A, RS485A/PIN B, RS485B

Information	• Pin 1/2/3/4 of the meter are connected to the grid and Pin 5/6/7/8 to the inverter. • The communication address of Eastron meter is 2.

4.8.1.1 3P3W wiring

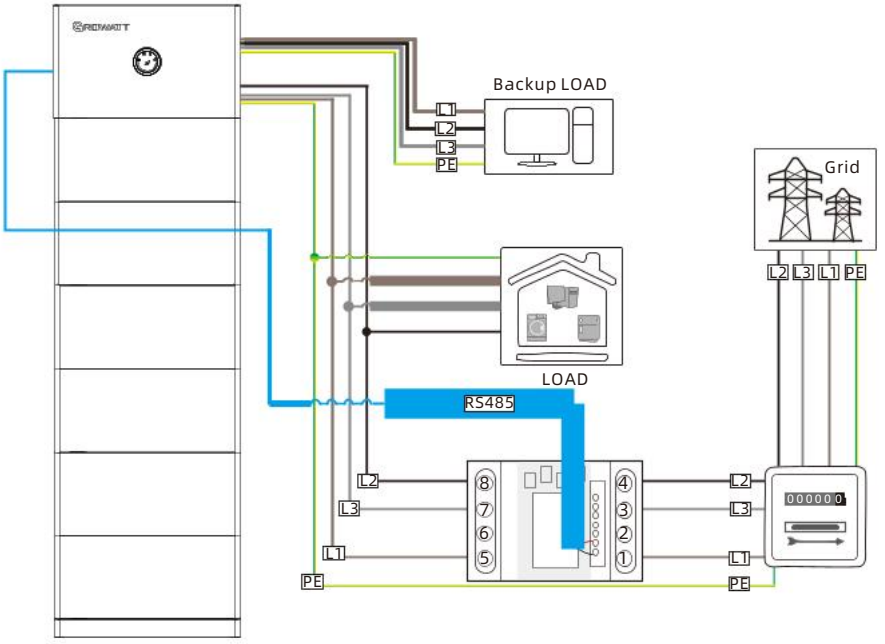


Figure 4.7 3P3W System (with an Eastron smart meter)

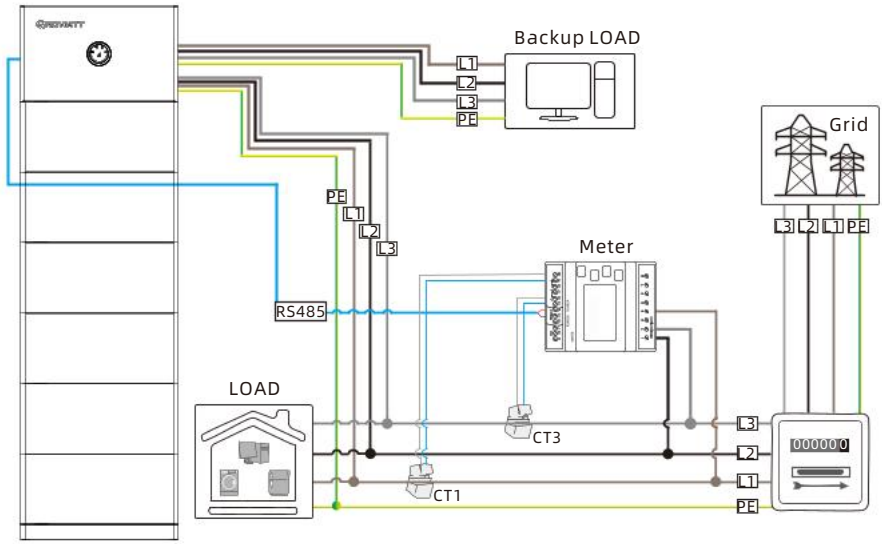


Figure 4.8 3P3W System (with an Eastron 3CT smart meter)

4.8.1.2 3P4W wiring

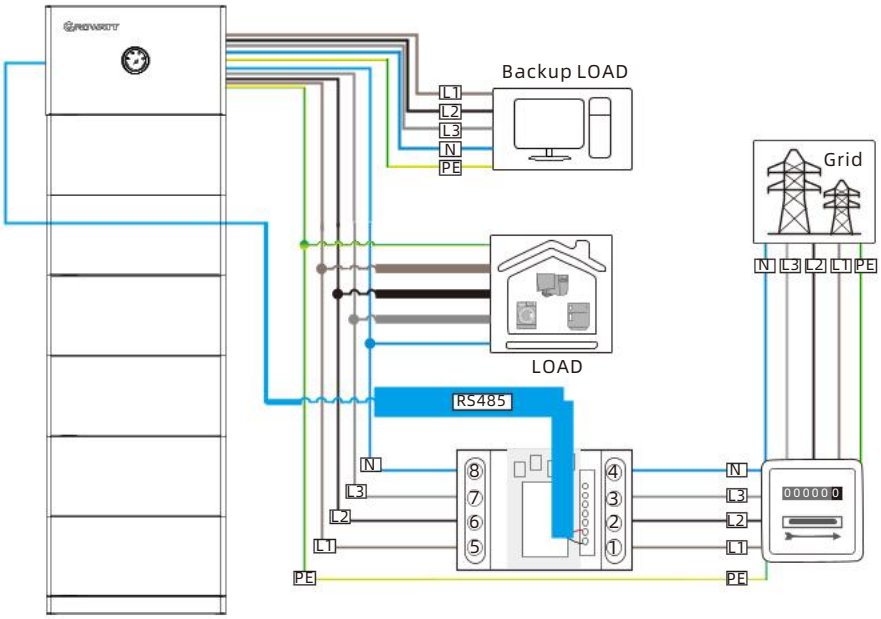


Figure 4.9 3P4W System (with an Eastron smart meter)

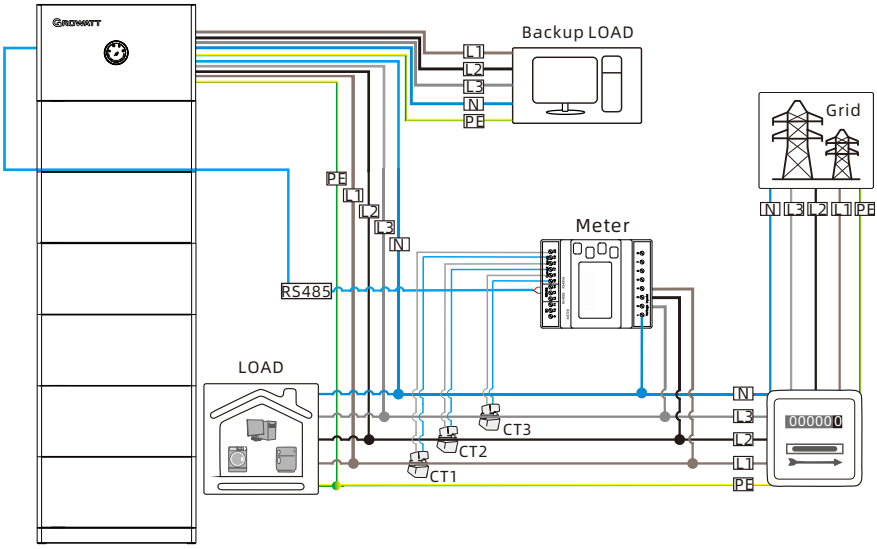


Figure 4.10 3P4W System (with an Eastron 3CT smart meter)

4.8.2 Connecting CHINT smart meter

Table 4.6 CHINT smart meter specific parameters

General specifications	
Rate voltage	3×230/400Vac
Reference frequency	50Hz/60Hz
Specified operating voltage range	0.9Un~1.1Un
Extended operating voltage range	0.8Un~-1.15Un
Voltage line power consumption	<1.5W/6VA
Input current	0.25-5(80)A
Starting current	0.004lb
AC voltage withstand	2kV /5mA for 1 minute
Impulse voltage withstand	4kV-1.2/50uS waveform
Max. Reading	9999999kWh
Accuracy	
Active power	1% of range maximum

Reactive power	2% of range maximum
Environment	
Rated temperature	-10℃~45℃
Limit temperature	-25℃~70℃
Relative humidity (average annual)	<75%
Atmosphere	63.0~106.0kPa
Installation category	CAT III
Degree of pollution	Conform to RoHS
Communication	
Communication	RS485 output for Modbus RTU
Baud rate	9600
Pulse	400imp/kWh
Communication port	PIN 24, RS485A/PIN 25, RS485B
Mechanics	
Din rail dimensions	100×72×65mm (LxW×H)
Mounting	DIN rail 35mm
Sealing	IP61 (indoor)

Information	• Pin 1/4/7/10 of the meter are connected to the grid and Pin 3/6/9/10 to the inverter. • The communication address of CHINT meter is 4.

4.8.2.1 3P3W wiring

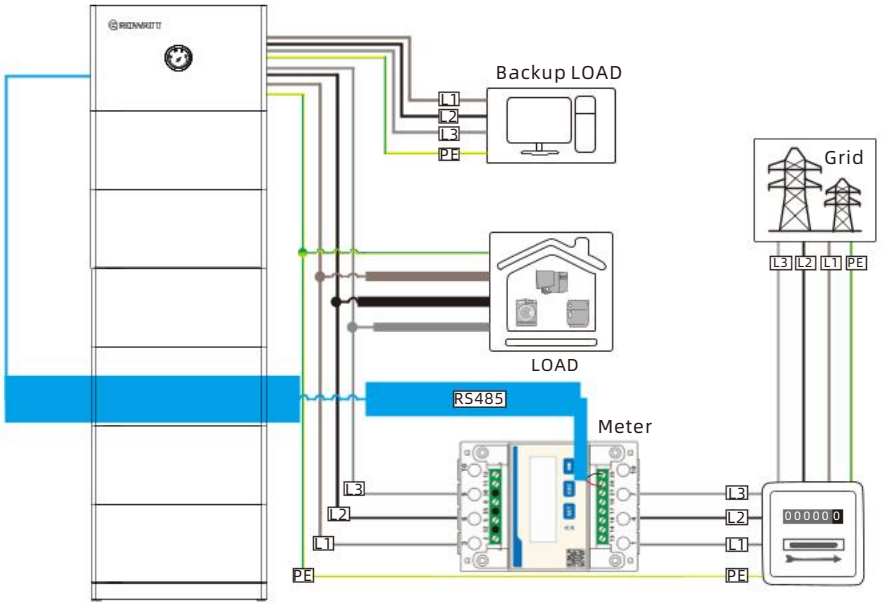


Figure 4.11 3P3W system (with a CHNT meter)

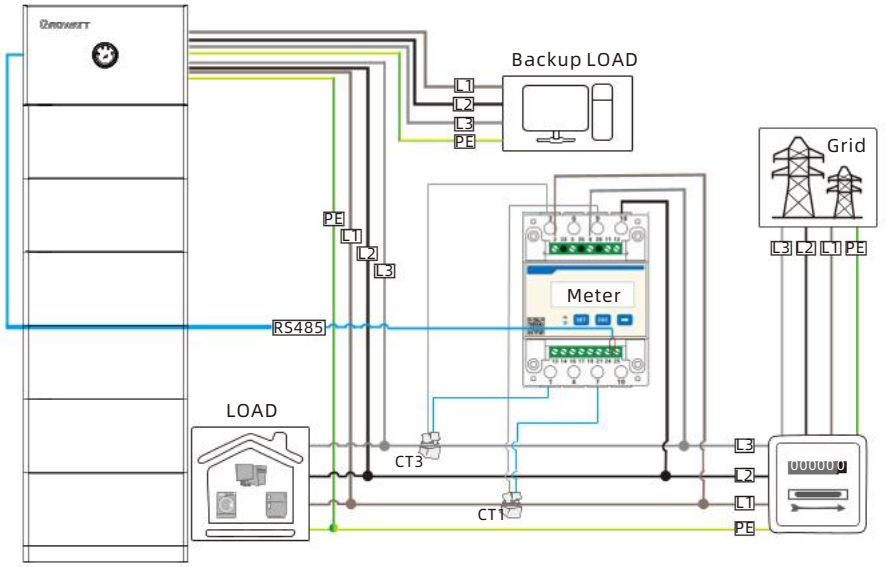


Figure 4.12 3P3W system (with a 3CT CHNT meter)

4.8.2.2 3P4W wiring

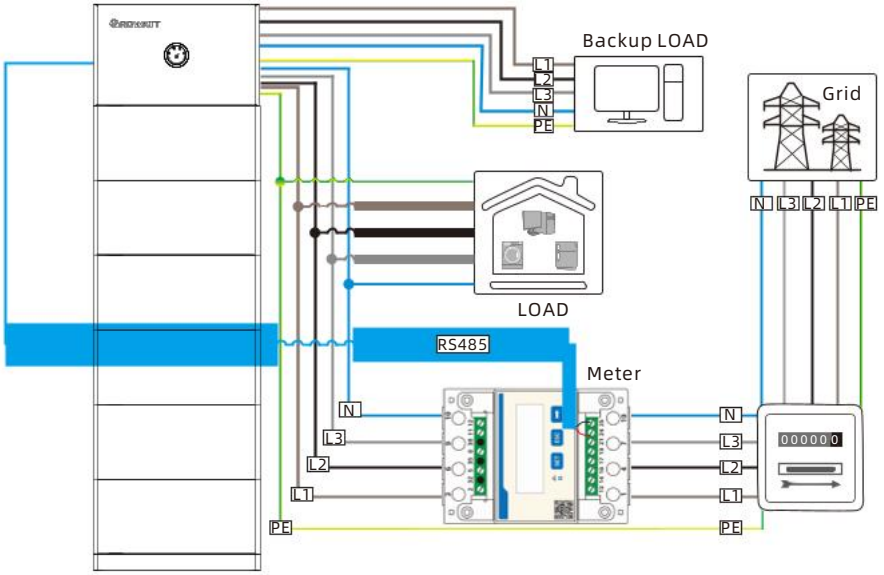


Figure 4.13 3P4W system (with a CHNT meter)

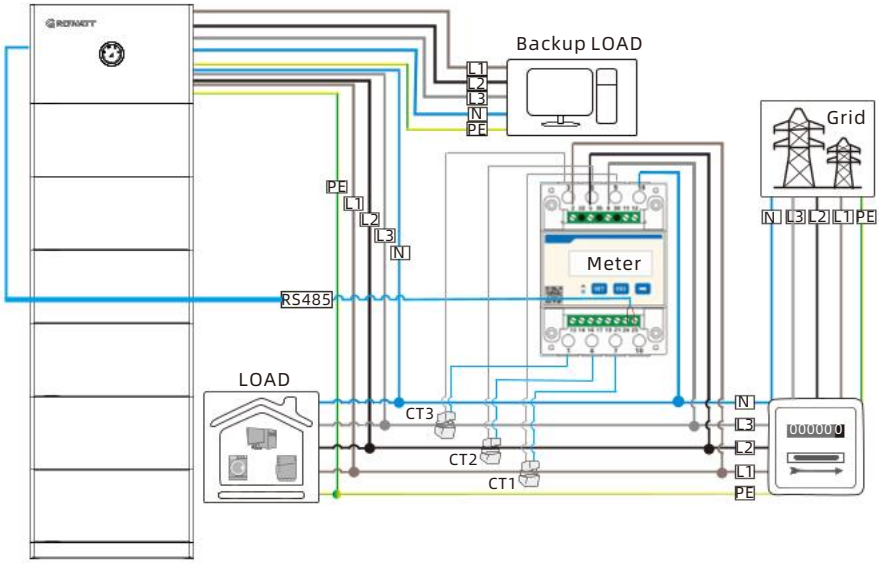


Figure 4.14 3P4W system (with a 3CT CHNT meter)

4.9 Connecting inverters in parallel

NOTICE	• The following inverter models support the parallel operation for energy scheduling in on-grid mode: MODA TL3-X/X2, MID TL3-X/X2, MAX TL3-X LV, MODA TL3-XH, MID TL3-XH, MODA TL3-HU. • MODA TL3-HU does support parallel connection with other models. • Need to be used with a datalogger, ShineMaster-X, SEM-XA-R or GroHomeManager-X to monitor the parallel system. • ShineMaster-X needs to be used with a separate meter.If need to use a parallel system, please contact GROWATT. • To use GroHomeManager-X, you need to upgrade the system first.

4.9.1 System wiring

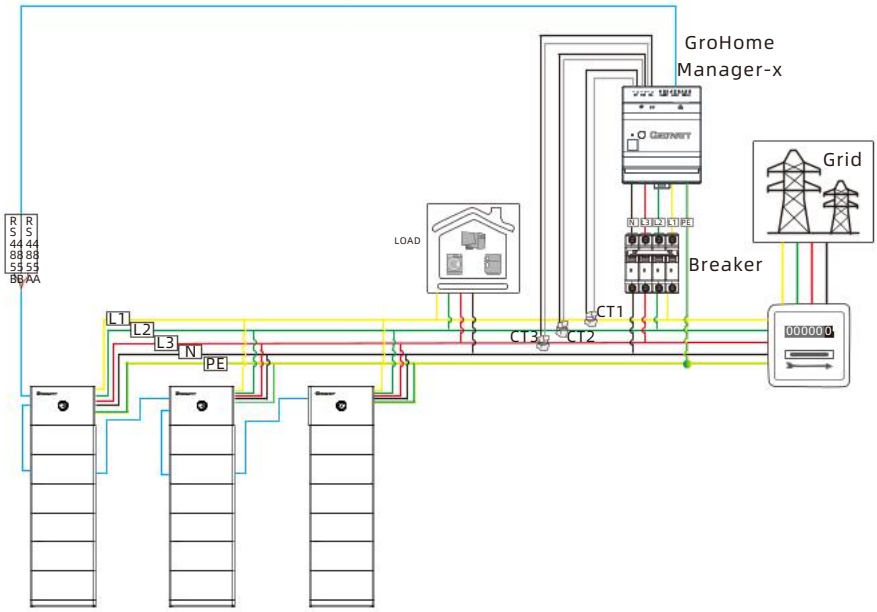


Figure 4.15 Parallel system wiring diagram

4.10 Connecting the monitoring module

NOTICE	• The datalogger/GroHomeManager-X/SEM-XA- R/ShineMaster-X/WiLan-X2 is an optional accessory and should be purchased by the users separately.

4.10.1 The monitoring module model

With a monitoring module connected, the MODA TL3-HU inverter can be monitored via the cloud server and the APP.

Recommended datalogger model:

Table 4.7 Datalogger specifications

No.	Brand	Recommended model	Applicable system
1	GROWATT	• ShineWiLan-X2	A single inverter
2	GROWATT	• ShineMaster-X	A single inverter or parallel
3	GROWATT	• GroHomeManager-X	A single inverter or parallel

4.10.2 Configuring the SEM-XA-R/ShineMaster-X

Step 1: Setting the communication address of the inverter.

Information	• The communication address ranges from 1 to 254.

Step 2:

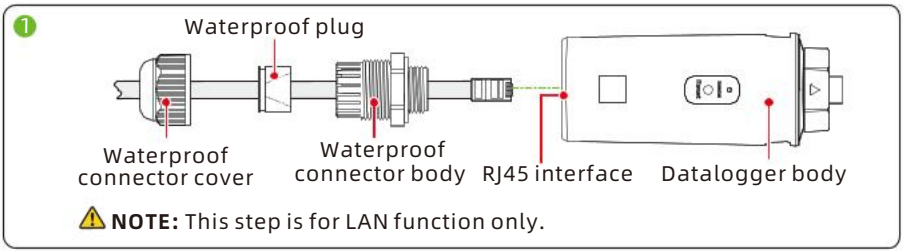
1. Scan the QR code right to download ShinePhone, or you can search for ShinePhone in Apple Store or Google Play.
2. Once the APP is installed, you can configure the datalogger and add the PV plant as prompted. For details about configuring the datalogger,refer to GroHomeManager-X Configuration Guide.

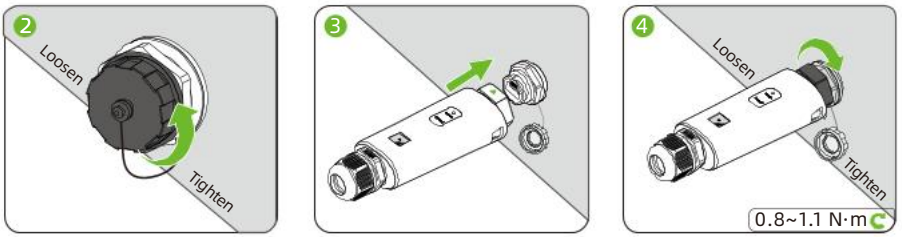
【ShinePhone APP】

【GroHomeManager-X Configuration Guide】

4.10.3 Installing and removing the datalogger

Install





Remove

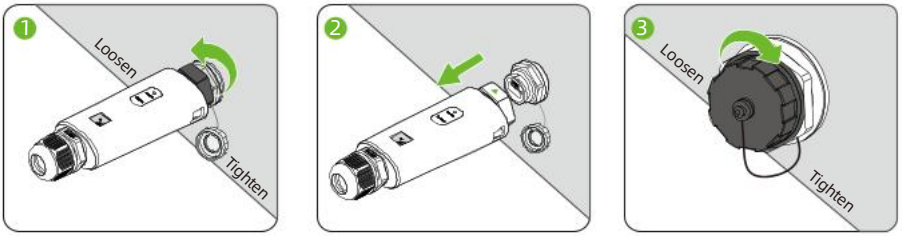


Figure 4.16 Installing and removing the datalogger

4.10.4 Configuring the datalogger

You can access the configuration guide of the following datalogger models by scan the corresponding QR code.

Table 4.8 Datalogger configuration guide

Datalogger	
ShineWiLan-X2 Configuration Guide	

Commissioning 5

5.1 Checking before powering on the system

Table 5.1 Checking items

No.	Checking items	Criteria
1	Installation of the inverter	The inverter is securely installed
2	Cable layout	The communication cables and the power cables are separated
3	Grounding	The grounding cable is correctly and properly connected
4	Switch	The DC SWITCH and all other breakers connected to the inverter are OFF
5	Cable connection	The cables on the AC/PV/battery side are correctly and securely connected
6	Unused terminals & ports	All unused terminals and ports are sealed with waterproof caps
7	Installation environment	The installation environment meets all the requirements specified in this manual and ensure that the ventilation valve is not obstructed

5.2 Powering on the system

 DANGER	• Wear insulated gloves and use insulated tools to avoid electric shocks or short-circuit accidents.
 NOTICE	• Before turning on the AC breaker, check if the AC voltage is within the permissible range using a multimeter.

Step 1. If the inverter is connected to a battery, turn the DC SWITCH on the battery to ON.
Step 2. Set the DC SWITCH on the left side of the inverter to ON.
Step 3. Turn on the AC breaker between the inverter and the grid.
Step 4. Check the running status of the inverter by observing the OLED screen.
Step 5. Tap the touch button to view information concerning the inverter on the OLED screen.

5.3 Setting the country/region

For all-in-one (hybrid) inverters, the country/area setting determines the grid code parameters applied to the device, including voltage and frequency thresholds, protection settings, active/reactive power control, and other grid-compliance parameters. Selecting the correct country/area ensures that the inverter operates in accordance with the local grid regulations at the installation site.

Note:

The OLED display on all-in-one inverters does not support country/area configuration. The country/area must be set via the Server webpage or the ShinePhone APP. If a wrong country/area has been selected, you can reconfigure it using the same methods.

5.3.1 Prerequisites

- The inverter is powered on and connected to the Server via a datalogger (ShineWiLan-X2).
- You have a Server account with the necessary permissions.
- The inverter is in Standby state before modifying the country/area.

NOTICE	• Setting parameters on the ShinePhone APP or the Server webpage requires a password. To obtain the password, please contact Growatt service personnel.

5.3.2 Setting the Country/Area on the Server Webpage

Step 1. Log in to the Server platform

- Open a web browser and navigate to https://server.growatt.com.
- Enter your account credentials and click Log in.

Step 2. Access the inverter settings

- From the Plant page, select the target plant.
- Go to Device Management > Datalogger / Inverter list.
- Locate the target inverter and click the Settings button to enter the parameter configuration interface.

Step 3. Select the country/area

- In the inverter settings interface, locate the Country/Area dropdown menu.
- Select the appropriate country or grid code from the list (e.g., Germany, France, Italy, United Kingdom, etc.).
- The system will automatically load the corresponding grid code parameters for the selected country/area.

Step 4. Save and apply the settings

- Verify that the selected country/area is correct.
- Click Save to write the parameters to the inverter.
- The inverter will remain in Standby state during the parameter-writing process.

- After the settings are saved, restart the inverter for the new grid code parameters to take effect.

5.3.3 Setting the Country/Area on the ShinePhone APP

Step 1. Open the ShinePhone APP and log in with your account.
Step 2. Go to the Plant detail page and select the target inverter from My device list.
Step 3. Tap the Control or Settings icon at the bottom of the inverter detail page.
Step 4. Locate the Country/Area setting option.
Step 5. Select the desired country/area from the list and confirm.
Step 6. Restart the inverter to apply the new settings.

NOTICE	• The availability of the Country/Area setting on the ShinePhone APP may vary by inverter model and firmware version. If the option is not available, please use the Server webpage or contact Growatt service personnel.

5.3.4 Important Notes

NOTICE	• Excessively high voltage can damage the inverter! Ensure that the AC voltage is within the permissible range before powering on the system.

- Standby state required: Ensure the inverter is in Standby state before changing the country/area. Do not modify grid code parameters while the inverter is connected to the grid and in normal operation.
- Password protection: Country/area settings on the Server webpage and ShinePhone APP require a password. Please contact Growatt service personnel to obtain the password.
- Restart required: After changing the country/area, the inverter must be restarted for the new grid code parameters to take effect.
- Smart Mode conflict: If the Smart Mode (intelligent scheduling) function is enabled, disable it before changing the country/area setting. The country/area cannot be modified while Smart Mode is active.
- Data retention: Modifying the country/area does not erase historical generation data or user configurations.
- Grid compliance: Select the country/area that matches the actual installation location. Using an incorrect grid code may result in non-compliance with local grid regulations and can cause operational issues such as failure to connect to the grid or abnormal battery charging.
- Firmware version: If the Country/Area option is not displayed or the desired country is not available, check that the inverter firmware is up to date. Contact Growatt service personnel for firmware upgrade assistance.

6 Functions

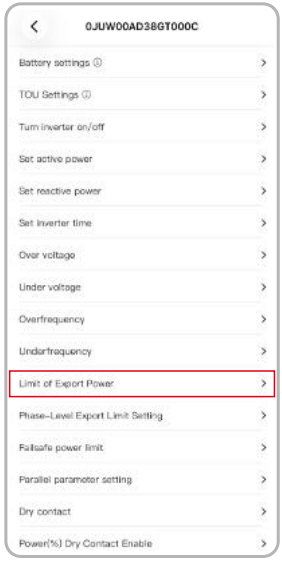
Information	**Note:** Setting the following parameters on the ShinePhone APP or the Server webpage requires the password. To access the password, please contact Growatt service personnel.

6.1 Setting the export limitation

WARNING	• To enable export limitation, a smart meter is required. Please select the meter recommended above; otherwise, the communication protocol may be mismatched. • Please ensure that all cables are correctly connected and the Export Limitation is enabled.

6.1.1 On the ShinePhone APP





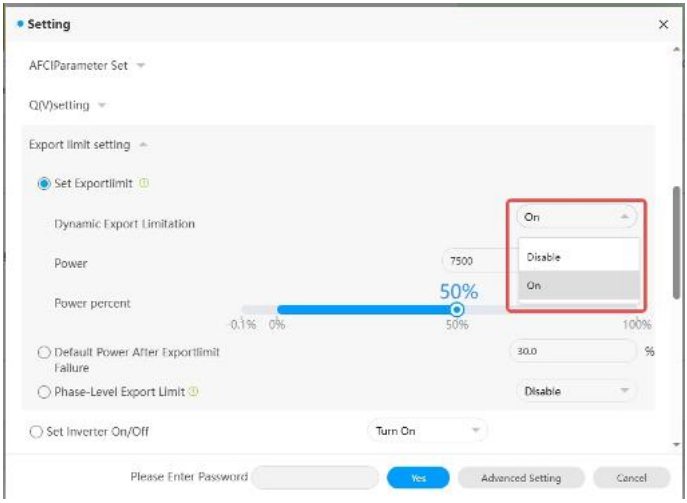


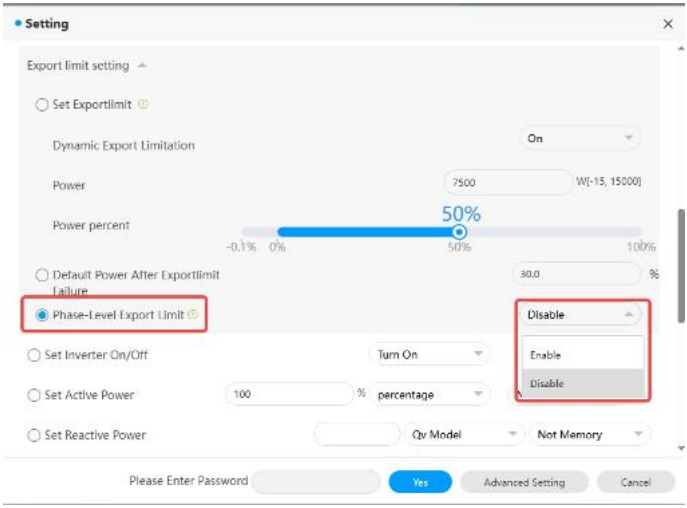
6.1.2 On the Server webpage

Step 1. Log in with your Server account.



Step 2. Setting > Export limit setting > On > Set the Phase level.





6.2 DRMS & Remote logic control

WARNING	• Excessively high voltage can damage the inverter! • External voltage supplying to the DRM PORT should not exceed +5V.

6.2.1 Method of asserting demand response modes

Step 1: Turn the waterproof sealing nut at the rear of the communication connector counterclockwise to loosen it, so that all connector parts are ready for assembly.

Step 2: Separate the connector body from the panel-mount base along the assembly direction to prepare for cable threading.

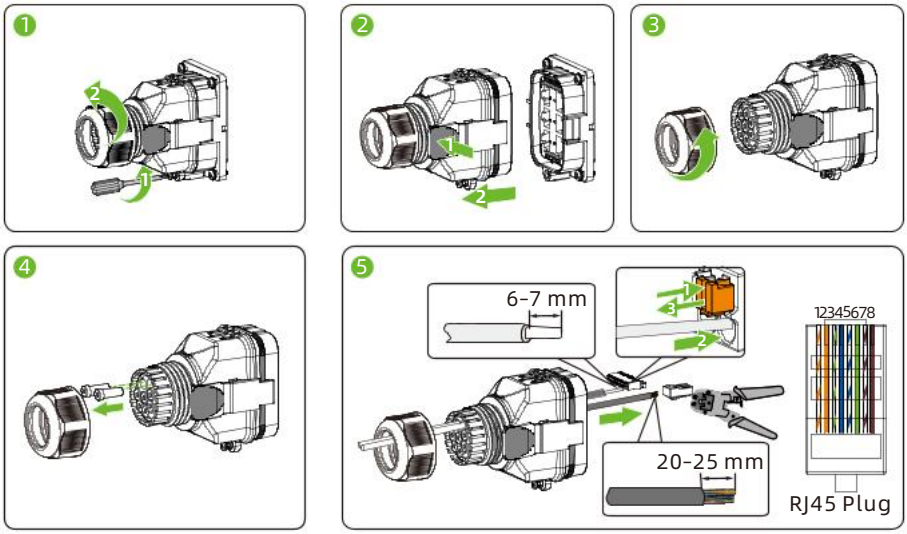
Step 3: Thread the communication network cable through the rear waterproof sealing nut first. Step 4: Thread the cable through the sealing ring and other sealing components in sequence, and then into the connector body. Keep the correct order and orientation of each part; do not reverse them.

Step 5: Terminate the network cable: strip 20-25 mm of the outer jacket, then strip 6-7 mm of insulation from the end of each conductor. Insert the eight conductors into the corresponding positions according to the pin 1-8 wire sequence of the RJ45 plug, and crimp them firmly with a crimping tool.

Step 6: Insert the crimped RJ45 plug fully into the connector body, then align the connector body with the panel-mount base and push them together along the arrow direction until they latch.

Step 7: Tighten the rear waterproof sealing nut, and use a hex key to tighten the fixing screw on the side of the connector. Confirm that the connector is well sealed and securely connected; the COM cable connection is then complete.

Install



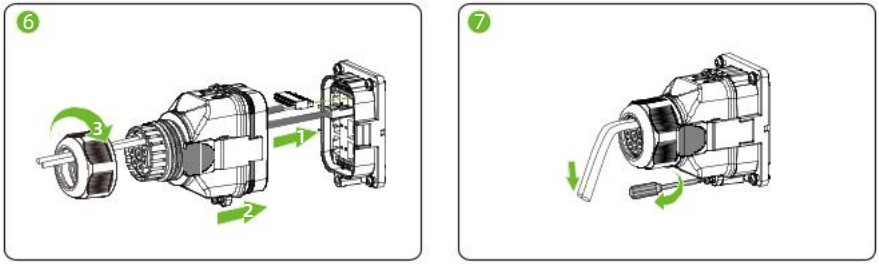


Figure 6.1 DRMS wiring diagram

Table 6.1 DRMS function description

Mode	Switches on DRE		Function
DRM 0	S0	S9	• When switches S0 and S9 are turned on, the inverter will shut down • When switch S0 is turned off and S9 is turned on, the inverter will be grid-tied
DRM 1	S1	S9	Do not consume power
DRM 2	S2	S9	Do not consume at more than 48% of rated power
DRM 3	S3	S9	Do not consume at more than 73% of rated power. Generates maximum inductive reactive power.
DRM 4	S4	S9	Increase power consumption
DRM 5	S5	S9	Do not generate power
DRM 6	S6	S9	Do not generate at more than 48% of rated power
DRM 7	S7	S9	Do not generate at more than 73% of rated power. Generates maximum capacitive reactive power
DRM 8	S8	S9	Increase power generation (subject to constraints from other active DRMS)

Note:
14A: Under Germany safety regulations, when the S4 interface is closed, the forward active power on the AC side of the inverter shall be limited to no more than 4.2KW. To avoid Due to over-limit caused by power fluctuation, the inverter program limits the power to 90% * 4.2kW = 3.78kW.

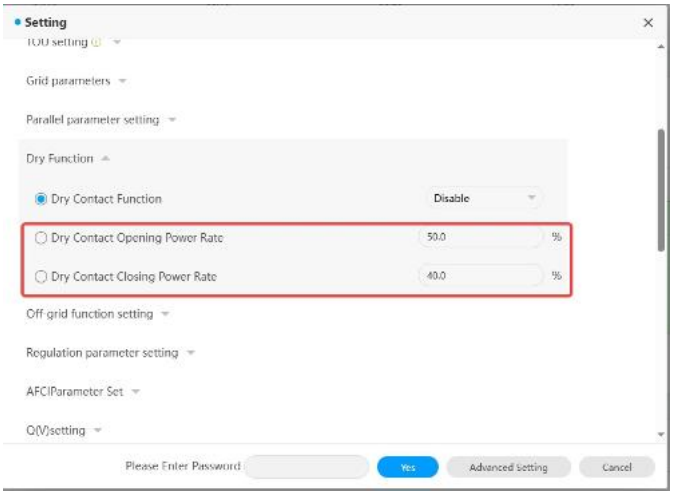
6.3 Setting the dry contact

6.3.1 On the Server webpage

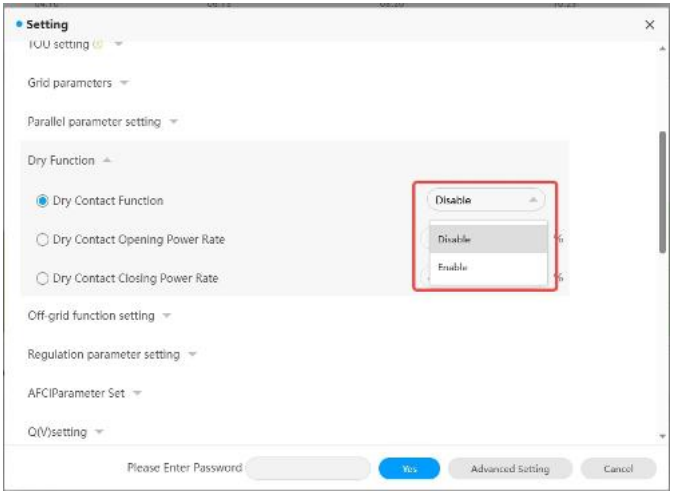
Step 1. Log in with your Server account.



Step 2. Setting > Dry Function > Dry Contact Function > Disable>Enable.

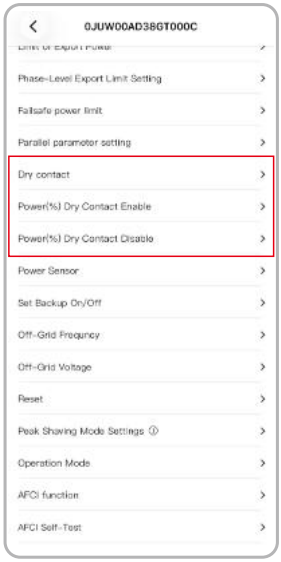


Step 3. Set the dry contact opening/closing power.



6.3.2 On the ShinePhone APP





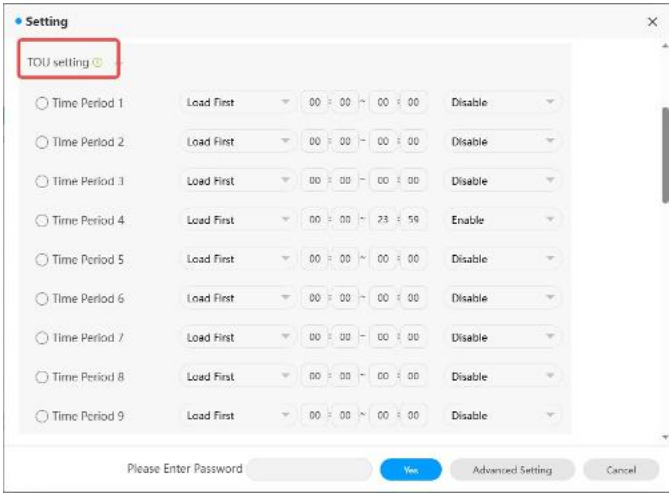
6.4 Setting the operating modes

WARNING	• The time periods should not overlap; otherwise, the configuration would fail. • After setting the parameters, please verify that the parameter changes have been successfully adopted.

6.4.1 On the Server webpage

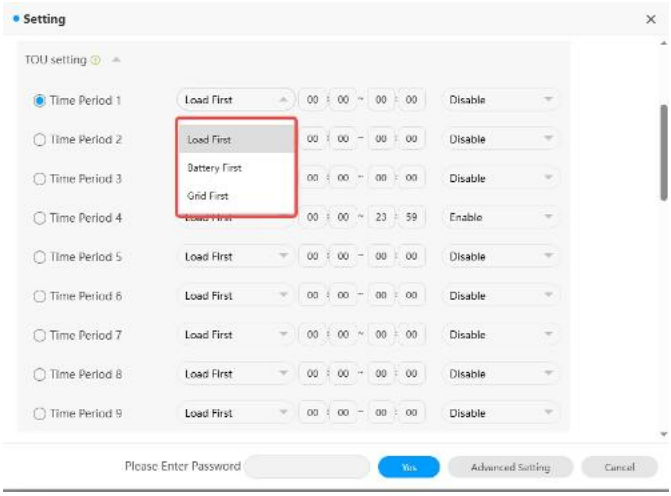
Step 1. Log in with your Server account.

Step 2. The time segments are illustrated below, which will only be displayed if a battery is connected.



Step 3. Set the operating mode for a specific time segment

Select the specific time segment > select the operating mode > set the start & end time > select “On”.



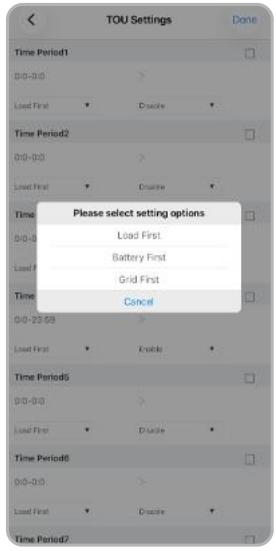
Step 4. Setting other time segments

Follow the operations described above to configure other time segments.

6.4.2 On the Server webpage



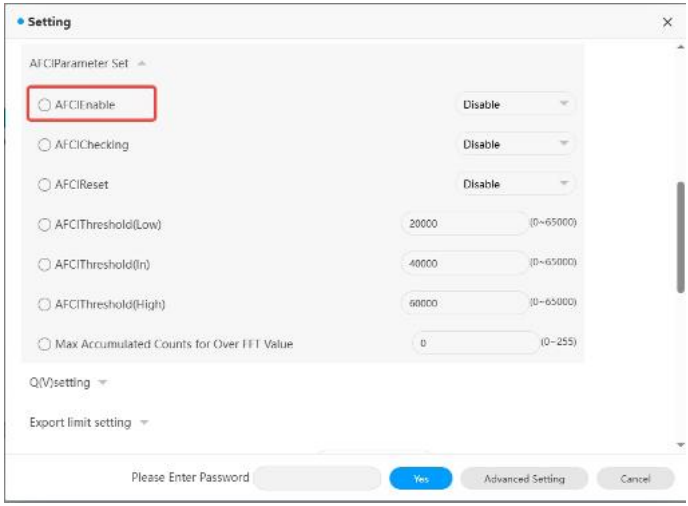


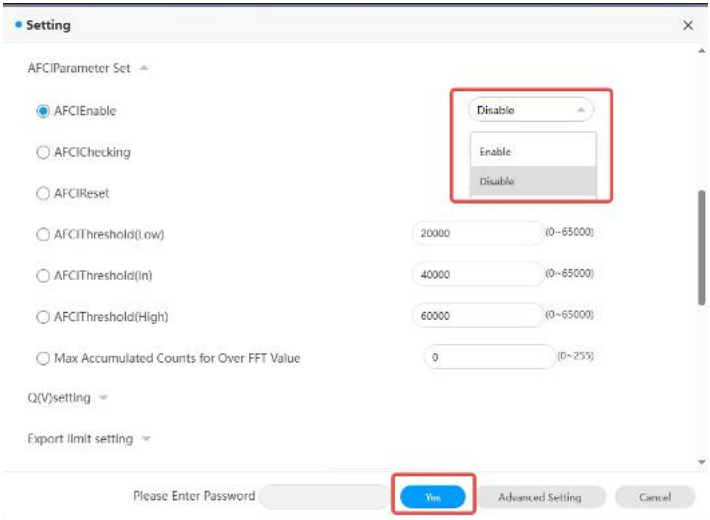


6.5 AFCI

6.5.1 On the Server webpage

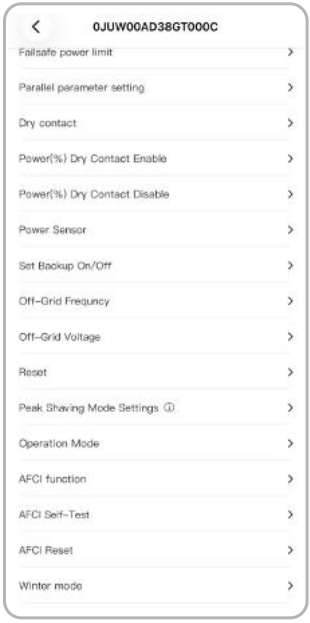
Step 1. Log in with your Server account, then click “Setting”.
Step 2. Select Regulation parameter setting > AFCI On > On > Yes.





6.5.2 On the ShinePhone AP





6.5.3 Clearing the fault

If "Error 200" is displayed, it indicates that an arc fault has been detected in the PV system. The AFCI will be triggered, and the inverter will be powered off. The inverter has large electrical potential differences between its conductors. Arc flashes can occur through air when high-voltage current flows. Do not work on the product during operation. When the inverter reports Error 200, please proceed as follows:

Step 1. Shut down the system
Disconnect the DC SWITCH on the inverter, the AC breaker and the DC SWITCH on the battery.
Step 2. Check the PV system
- Check if the PV voltage is within the permissible range.
- Check if the PV terminals are securely in place.
- Check if any cable is damaged.

Step 3. Restart the system
Check the system to ensure that no error is found, then proceed to restart the system.

6.6 Power de-rating for voltage variation (Volt-Watt mode)

The inverter regulates the output power based on the AC grid voltage. This feature is enabled by default and is considered an advanced function. If you need to modify this setting, please contact the after-sales O&M team for assistance.

6.7 Reactive power regulation for voltage variation (Volt-VAR mode)

The inverter adjusts the input/output power in response to changes of the AC grid voltage. This feature is disabled by default and is considered an advanced function. If you need to modify this setting, please contact the after-sales O&M team for assistance.

6.8 Peak shaving

For most electricity consumers, load demand varies throughout the day, with distinct peaks and troughs. In many regions, grid operators impose additional charges during peak load periods. Peak shaving adjusts battery charging and discharging based on load fluctuations.This reduces reliance on grid power during peak hours and lowers overall electricity costs.
Growatt system ensures that the power drawn from the grid does not exceed the set limit. It charges during off-peak hours and discharges during peak hours to maintain this balance.Additionally, combining peak shaving with modes like self-consumption and TOU (Time of Use)enhances customization and offers tailored solutions to lower electricity costs.

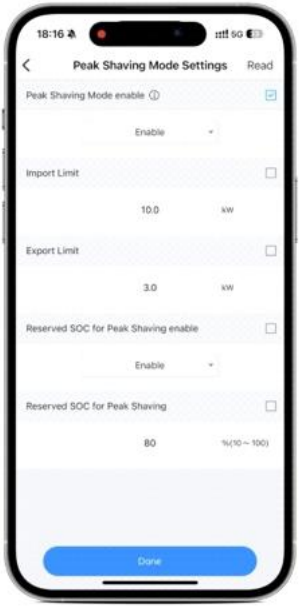
Setup Steps

After upgrading the device firmware, you can set the parameters via ShinePhone, ShineServer,and ShineTools. For the settings for self-consumption and TOU mode, this section provides a step-by-step guide specifically for peak shaving settings.

6.8.1 ShinePhone APP

Steps

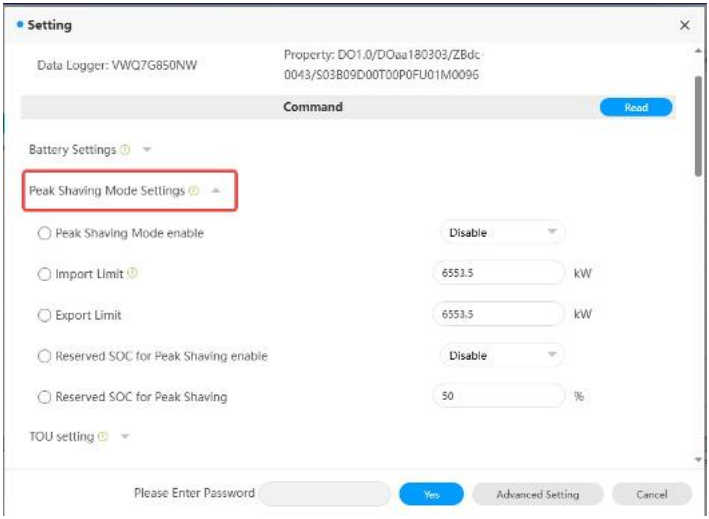
1. Download the latest ShinePhone APP and log in with your account.
2. Plant → My device list → Select inverter and view details → Control → Peak shaving mode settings
3. Set the peak shaving parameters according to your load demands.



6.8.2 ShineSever System

Steps

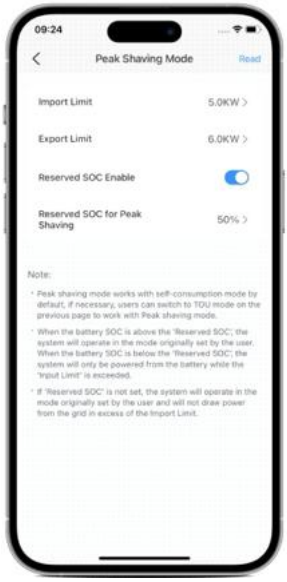
1. Log in with your account.
2. Device → Setting → Peak Shaving Mode Settings.
3. Set the peak shaving parameters according to your load demands.



6.8.3 ShineTools APP （Local Configuration）

Steps

1. Download the latest ShineTools APP and connect with your device.
2. EMS → Work Mode → Peak Shaving Mode → Mode Setting
3. Set the peak shaving parameters according to your load demands.



6.9 System renovation mode

The detection system checks whether there is any excess energy in the power grid. If there is excess energy, it uses the output power of a third-party inverter to charge the battery. When the third-party inverter fails to meet the load demand, the battery discharges to supply power to the load.The following functions can be achieved:

1. Self-consumption, the system will prioritize meeting the load demand and then feed the excess energy back to the grid.
2. Anti-reverse current function.
3. EMS energy management, setting priority modes by time period.
4. Off-grid mode, the system can operate independently (with three-phase imbalance).
5. Load power monitoring, monitoring the real-time power of the load. Cloud monitoring can be realized through the collector.

System maintenance 7

To ensure the long-term and reliable operation of the system, it is recommended to perform maintenance on a regular basis as instructed in this section.

 DANGER	• If the inverter is connected to a DC/DC high-voltage controller and the off-grid mode is enabled, disconnect the AC circuit breaker between the inverter and the grid, the inverter will output 230/240V voltage in the off-grid mode. Before maintaining the system, ensure that the DC SWITCH on the DC/DC high voltage controller is set to OFF.
	• After the system is powered off, there may still be residual electricity and heat in the inverter, which could lead to electric shock or burns. Wait 5 minutes after turning off the system and wear protective gloves before performing any operations on the inverter.

7.1 Powering off the system

Follow these steps to power off the system:
Step 1. Turn off the AC breaker between the inverter and the grid.
Step 2. Set the DC SWITCH on the inverter to OFF.
Step 3. If there is a DC breaker between the inverter and the PV string, disconnect the DC breaker.

7.2 Checking items and Maintenance frequency

Table 7.1 Maintenance Items and Intervals

Checking item	Checking content	Interval
Cleaning	• Check if the heat sink and the fan are obstructed or blocked by dust periodically.	Once a year
Operation status	• Check if the inverter's exterior is damaged or deformed. • Check for any abnormal sounds during operation.	Every six months
	• Check the operating status of the system on the APP.	Regularly
Cable connection	• Check if any cable is in poor contact or loose connection. • Examine cables for any damage. • Check for melting at terminal connections.	Every six months
Grounding	• Verify if the grounding cable is securely connected.	Every six months
Sealing	• Inspect the sealing of all terminals and interfaces.	Every six months
Environment	• Inspect and clear any weeds around the inverter before they wither.	Once a year

7.3 Troubleshooting

An error message will be displayed on the OLED screen and the LED indicator will turn red when a fault occurs, indicating that a system fault or an inverter fault has occurred. In some cases, you may need to contact Growatt for technical assistance.

7.3.1 System alarm

Inverter alarm

Table 7.2 Inverter Module Protection Codes

Protect Code	Description	Troubleshooting
Protect 200	PV string fault	1. Check if the PV panels are normal after shutdown. 2. If the error message persists, contact Growatt support.
Protect 201	PV string/PID quick-connect terminals abnormal	1. Check the wiring of the string terminals after shutdown. 2. If the error message persists, contact Growatt support.
Protect 202	DC SPD function abnormal	1. Check the DC SPD after shutdown. 2. If the error message persists, please contact Growatt support.
Protect 203	Pv1 or PV2 short circuited	1. Check if PV1 or PV2 is short circuited. 2. If the error message persists, contact Growatt support.
Protect 204	Dry contact function abnormal	1. Check the wiring of the dry contact after shutdown. 2. If the error message persists, contact Growatt support.
Protect 205	PV boost driver abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 206	AC SPD function abnormal	1. Check the AC SPD after shutdown. 2. If the error message persists, contact Growatt support.
Protect 207	USB flash drive overcurrent protection	1. Unplug the USB flash drive. 2. Plug in the USB flash drive again after shutdown. 3. If the error message persists, contact Growatt support.

Protect Code	Description	Troubleshooting
Protect 208	DC fuse blown	1. Check the fuse after shutdown. 2. If the error message persists, contact Growatt support.
Protect 209	DC input voltage exceeds the upper threshold	1. Turn off the DC switch immediately and check the DC voltage. 2. If the DC voltage is within the specified range and the error message persists, contact Growatt support.
Protect 210	PV wiring abnormal	1. Check the polarity of the PV terminals. 2. If the error message persists, contact Growatt support.
Protect 217	BDC abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 218	BDC Bus disconnected	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 219	PID function abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 220	PV string disconnected	1. Check if the PV string is properly connected. 2. If the error message persists, contact Growatt support.
Protect 221	PV string current unbalanced	1. Check if the PV panels of the corresponding string are normal. 2. If the error message persists, contact Growatt support.
Protect 300	No utility grid connected or utility grid power failure	1. Check if the grid is down. 2. If the error message persists, contact Growatt support.
Protect 301	Grid voltage is beyond the permissible range	1. Check if the grid voltage is within the specified range. 2. If the error message persists, contact Growatt support.

Protect Code	Description	Troubleshooting
Protect 302	Grid frequency is beyond the permissible range	1. Check if the grid frequency is within the specified range. 2. If the error message persists, contact Growatt support.
Protect 303	Off-grid mode, overload	1. Please reduce the load connected to the off-grid output terminal. 2. If the error message persists, contact Growatt support.
Protect 400	Fan failure	1. Check if the fan is properly connected after shutdown. 2. If the error message persists, contact Growatt support.
Protect 401	Meter abnormal	1. Check if the meter is turned on. 2. If the meter is correctly connected to the inverter.
Protect 406	Boost circuit malfunction	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 407	Over-temperature	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 408	NTC temperature sensor is broken	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 409	Reactive power scheduling communication failure	1. Check if ShineMaster is turned on. 2. If the error message persists, contact Growatt support.
Protect 411	Sync signal abnormal	1. Check if the sync cable is abnormal. 2. If the error message persists, contact Growatt support.
Protect 421	AC power overdemandlimit	1. Detect load power 2. If the error message persists, contact Growatt support.

Protect Code	Description	Troubleshooting
Protect 600	DC component excessively high in output current	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 601	DC component excessively high in output voltage	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 602	Off-grid output voltage too low	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 603	Off-grid output voltage too high	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 604	Off-grid output overcurrent	1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.
Protect 605	Off-grid bus voltage too low	1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.
Protect 606	Off-grid output overloaded	1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.
Protect 607	Communication with the backup box is abnormal	1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.
Protect 608	Backup box is abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 609	Balanced circuit abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.

Battery alarm

Table 7.3 Battery Module Protection Codes

Code	Description	Troubleshooting
Battery Warning 404 (0)	Abnormal EEPROM	Please contact Growatt support.
Battery Warning 410 (0)	External oscillation abnormal	1. Restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 410 (1)	Oscillation abnormal	1. Restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 410 (2)	USB communication abnormal	1. Restart the machine, and replace the USB flash drive. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 411 (6)	Parallel communication failed	1. Power off the machine and check the communication cables between PM and PM, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 431 (0)	BOOT abnormal	1. Restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 500 (0)	Abnormal CAN communication during parallel operation	1. Power off the machine and check the communication cables between PM and PM, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 500 (7)	BM went offline	1. Power off the machine and check the communication cables between BM and BM, then restart the machine. 2. If the fault message still exists, contact the manufacturer.

Code	Description	Troubleshooting
Battery Warning 500 (9)	Abnormal communication with PM	1. Power off the machine and check the communication cables between BM and BM, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 701 (0)	Battery not discharging alarm	The battery SOC reaches the preset discharge cutoff SOC. Therefore, the battery is not allowed to discharge.
Battery Warning 702 (0)	Forced charge is required	The battery SOC is lower than the preset discharge cutoff SOC. Therefore, forced charge is required.
Battery Warning 703 (0)	Battery is fully charged	The battery SOC reaches the preset charge cutoff SOC. Therefore, the battery is not allowed to be charged.
Battery Warning 704 (0)	PM to INV overvoltage	1. Power off the machine and check the power cables between PM and INV, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 705 (0)	PM to INV overvoltage	1. Power off the machine and check the power cables between PM and INV, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 707 (0)	Overload protection	1. Reduce the load power, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Warning 708 (0)	Discharge Overload Anomaly	1. Reduce the load power, then restart the machine. 2. If the fault message still exists, contact the manufacturer.

7.3.2 System fault

Inverter fault

Table 7.4 Inverter Module Fault Codes

Error code	Description	Troubleshooting
Error 200	DC arc fault has been detected	1. After shutdown, check the connection of the PV string. 2. Restart the inverter. 3. If the error message persists, please contact Growatt support.
Error 201	An excessively high leakage current has been detected	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 202	PV input voltage exceeds the upper threshold	1. Disconnect the DC switch immediately and check the voltage. 2. If the PV input voltage is within the permissible range and the error message persists, please contact Growatt support.
Error 203	PV panels have low insulation resistance	1. Check if the PV strings are properly grounded. 2. If the error message persists, please contact Growatt support.
Error 300	Grid voltage is beyond the permissible range	1. Check the grid voltage. 2. If the grid voltage is within the permissible range and the error message persists, please contact Growatt support.
Error 301	AC terminals reversed	1. Check the connection of the AC output terminals. 2.If the error message persists, please contact Growatt support.
Error 302	No utility grid connected or utility grid power failure	1. After shutdown, check the AC wiring. 2. If the error message persists, please contact Growatt support.
Error 304	Grid frequency is beyond the permissible range	1. Check the grid frequency and restart the inverter. 2. If the error message persists, please contact Growatt support.

Error code	Description	Troubleshooting
Error 305	Overload	1. Check if the load exceeds the output power upper limit; if so, please reduce the load. 2. If the error message persists, please contact Growatt support.
Error 309	ROCOF Fault	1. Check the grid frequency and restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 311	Export limitation fail-safe	1. After shutdown, check the connection of the CT and the meter. 2. If the error message persists, please contact Growatt support.
Error 401	High DC component in output voltage	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Error 402	High DC component in output current	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Error 403	Output current unbalanced	1. Check if the output current is balanced after shutdown. 2. If the error message persists, contact Growatt support.
Error 404	Bus voltage sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 405	Relay failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 407	Auto-test failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 408	Over-temperature	1. After shutdown, check the temperature of the inverter and restart the inverter after the temperature is within the acceptable range. 2. If the error message persists, please contact Growatt support.

Error code	Description	Troubleshooting
Error 409	Bus voltage abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 411	Internal communication failure	1. Check the wiring of the communication board after shutdown. 2. If the error message persists, please contact Growatt support.
Error 412	Temperature sensor disconnected	1. Check if the temperature sensor module is properly connected. 2. If the error message persists, please contact Growatt support.
Error 416	DC/AC overcurrent protection	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 420	GFCI module abnormal	1. Check the GFCI module after shutdown. 2. If the error message persists, please contact Growatt support.
Error 424	INV current waveform abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 425	AFCI self-test failure	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 426	PV current sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 427	AC current sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 428	BOOST short-circuited	Please contact Growatt support.

Error code	Description	Troubleshooting
Error 429	BUS soft start failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 600	Off-grid output short-circuited	1. Restart the inverter. 2. If the error message persists, please contact
Error 601	Off-grid Bus Volt Low	1. Check if the battery is working properly or the battery experiences capacity loss. 2. If the error message persists, please contact Growatt support.
Error 602	Abnormal Volt at the off-grid terminal	1. Check if the battery is working properly or the battery experiences capacity loss. 2. If the error message persists, please contact Growatt support.
Error 603	Soft start failed	1. Restart the machine. 2. If the fault message still exists, contact the manufacturer.
Error 604	Off-grid output voltage abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 605	Balanced circuit self-test failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 606	High DC component in output voltage	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 607	Off-grid output overload	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 608	Off-grid parallel signal abnormal	1. Check if the communication cables are properly connected. 2. If the error message persists, please contact Growatt support.

Error code	Description	Troubleshooting
Error 609	Backup box is not detected	1. After shutdown, check the signal wiring for identifying the backup box. 2. If the error message persists, please contact Growatt support.
Error 610	Off-grid split-phase voltage abnormal	1. Power off the system and check if the backup box split-phase transformer and the control relay are abnormal. 2. Restart the system. 3. If the error message persists, please contact Growatt support.
Error 700	Abnormal communication between the backup box and the inverter	1. Power off the system and check if the backup box split-phase transformer and the control relay are abnormal. 2. Restart the system. 3. If the error message persists, please contact Growatt support.
Error 701	Backup box grid-side relay failure	1. Check if the communication cable between the inverter and the backup box is properly connected. 2. If the error message persists, please contact Growatt support.
Error 703	Backup box on-grid overload	1. Restart the backup box. 2. If the error message persists, please contact Growatt support.
Error 705	Overheat inside the backup box	1. Reduce the load. 2. If the error message persists, please contact Growatt support.

Battery fault

Table 7.5 Battery Module Fault Codes

Error code	Description	Troubleshooting
Battery Error 407 (0)	BM output power cable connection is abnormal	1. Power off the machine and check the power cables, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 411 (0)	Communication between the PM and Inverter is abnormal	1. Power off the machine and check the communication cables between PM and INV, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 411 (1)	Communication between the PM's monitoring and main control chip is abnormal control chip	1. Power off the machine and check the communication cables between PM and PM, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 411 (5)	Abnormal communication with BM	1. Power off the machine and check the communication cables between PM and PM, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 411 (7)	Multiple Masters parallel communication failure	1. Power off the machine and check the communication cables between PM and INV, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 416 (1)	Hardware malfunction	1. Power off the machine and check the power cables, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 417 (1)	When a mismatch between software and hardware MODEL is detected, it is set immediately.	1. Power off the machine and check the power cables, then restart the machine. 2. If the fault message still exists, contact the manufacturer.

Error code	Description	Troubleshooting
Battery Error 417 (3)	When the detection main board and control board do not match, it is immediately set. Note: Currently only applicable to Japanese models.	1. Power off the machine and check the communication cables between PM and INV, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 419 (5)	PM's software and hardware versions are inconsistent	Please contact Growatt support.
Battery Error 502 (0)	Battery voltage is low	Check if the battery-side voltage is within normal range (single pack > 32V or so) through web monitoring data. If the battery voltage is lower than 32V, please contact the manufacturer to replace BM.
Battery Error 506 (2)	PM fuse blown	1.Power off the machine and check the power cables between PM and INV, then restart the machine. 2. If the fault message still exists, contact the manufacturer.
Battery Error 506 (3)	PM output short-circuited	1. Power off the machine and check the insulation breaker, then restart the machine. 2. If the error message persists, please contact Growatt support.
Battery Error 700 (0)	Internal temperature sampling resistor is open-circuited	1.When the temperature of the machine is close to - 40°C (-40°F), it will raise this alarm. 2.If the temperature is higher than -40°C(-40°F) when this alarm is reported, please contact Growatt support.

Decommissioning 8

8.1 Removing the inverter

- Disconnect all electrical connections from the inverter, including the RS485 communication cable, DC input cables, AC output cables, battery cables, and the grounding cable.
- Remove the inverter from the mounting bracket.
- Take away the mounting bracket.

8.2 Packing the inverter

- If the original package is available, please place the inverter in the original box and tie it with tapes.
- If the original package is not available, please put the inverter in a carton box that is suitable for its dimensions and weight.

8.3 Storing the inverter

Store the inverter in a dry place and keep the temperature between -25℃ and 60℃.

8.4 Disposing of the inverter

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

9 Specification

Table 9.1 MODA 4/5/6/8K-HU Specifications

Model / Specifications	MODA 4000TL3-HU	MODA 5000TL3-HU	MODA 6000TL3-HU	MODA 8000TL3-HU
Input data (DC)				
Recommended Max. PV power (for module STC)	8000W	10000W	12000W	16000W
Max. DC voltage	1000V			
Start voltage	160V			
Full power voltage range	400V~800V			
Nominal voltage	600V			
MPPT voltage range	140V-1000V			
No. of MPPT trackers	3			
No. of PV strings per MPPT tracker	1/1/1	1/1/1	1/1/1	1/1/1
Max. input current per MPPT tracker	20A/20A/20A	20A/20A/20A	20A/20A/20A	20A/20A/20A
Max. short-circuit current per MPPT tracker	25A/25A/25A			
Backfeed current to PV array	0A			
DC Battery				
Compatible battery (only)	APX 5.0P-B3			
Operating voltage range	660 V ~ 980V			
Max. operating current	22.7A	22.7A	22.7A	22.7A
Max. discharge power	4000W	5000W	6000W	8000W
Max. charge power	12000W	15000W	15000W	15000W
Output data (On-gird)				
Nominal AC power	4000W	5000W	6000W	8000W
Max. AC apparent power	4800VA	6000VA	7200VA	9600VA
Nominal AC voltage /range	220/380V 230/400V			

Model / Specifications	MODA 4000TL3-HU	MODA 5000TL3-HU	MODA 6000TL3-HU	MODA 8000TL3-HU
AC grid frequency/ range	50/60 Hz 45~55Hz/55-65 Hz			
Maximum Input /Output Current	63A/6.7A	63A/8.3A	63A/10A	63A/13.3A
Power facto (@nominal power)	>0.99			
THD	<3%			
AC grid connection type	3W+N+PE/3W+PE			
Efficiency				
Max. efficiency	98.3%			
Euro-eta	97.50%			
Output data (Backup)				
Nominal output power	4000W	5000W	6000W	8000W
Max. apparent power	4800VA	6000VA	7200VA	9600VA
Max. output power of single phase	1600W	2000W	2400W	3200W
Nominal AC output voltage	220V/380V 230V/400V			
Nominal AC output frequency	50Hz/60Hz			
Max. output current	7.3A On-Grid& Bypass: 63A	9.1A On-Grid& Bypass: 63A	10.9A On-Grid& Bypass: 63A	14.5A On-Grid& Bypass: 63A
Power factor	0.8 leading to 0.8 lagging			
THDv	<3%			
DCV	≤300mV AVG			
Switch time	<20ms			
Protection devices				
DC reverse-polarity protection	YES			
DC switch	YES			
DC surge protection	Type II			
Insulation resistance monitoring	YES			

Specifications \ Model	MOD 4000TL3-HU	MOD 5000TL3-HU	MOD 6000TL3-HU	MOD 8000TL3-HU
AC surge protection	Type II			
AC short-circuit protection	YES			
Grid monitoring	YES			
Anti-islanding protection	YES			
Residual-current monitoring unit	YES			
String fuse protection	NO			
String monitoring	YES			
AFCI protection	Configurable			
General data				
Dimensions (W / H / D) in mm	740*255*360mm			
Weight	32kg			
Operating temperature range	-25°C ... +60°C (>45°C Derating)			
Noise emission (typical)	≤29dB(A)			
Altitude	4000m			
Internal consumption at night	<20W			
Topology	Transformerless			
Cooling	Natural heat dissipation			
IP rating	IP66			
Relative humidity	0~100%			
DC connection	H4/MC4 (OPT)			
AC connection	waterproof cover + Five-core quick connector (Grid and Load integration)			
Interfaces				
Display	LED+WIFI+APP			
USB/RS485/CAN	YES			
WiLan-X2/ GroHomeManager-X/ShineMaster-X	Configurable			

Table 9.2 MODA 10/12/15K-HU Specifications

Model / Specifications	MODA 10KTL3-HU	MODA 12KTL3-HU	MODA 15KTL3-HU
Input data (DC)			
Recommended Max. PV power (for module STC)	20000W	24000W	30000W
Max. DC voltage	1000V		
Start voltage	160V		
Full power voltage range	400V~800V		
Nominal voltage	600V		
MPPT voltage range	140V-1000V		
No. of MPPT trackers	3		
No. of PV strings per MPPT tracker	1/1/1	1/1/1	1/1/1
Max. input current per MPPT tracker	20A/20A/20A	20A/20A/20A	20A/20A/20A
Max. short-circuit current per MPPT tracker	25A/25A/25A	25A/25A/25A	25A/25A/25A
Backfeed current to PV array	0A		
DC Battery			
Compatible battery (only)	APX 5.0P-B3 (7~49kWh)		
Operating voltage range	660 V ~ 980 V		
Max. operating current	22.7A		
Max. discharge power	10kW	12kW	15kW
Max. charge power	15kW		
Output data (on-grid)			
Nominal AC power	10kW	12kW	15kW
Max. AC apparent power	10kVA	12kVA	15kVA
Nominal AC voltage/range	220/380V 230/400V		
AC grid frequency/range	50/60 Hz 45~55Hz/55-65 Hz		
Maximum Input/Output Current	63A/15.2A	63A/18.2A	63A/22.7A

Specifications \ Model	MODA 10KTL3-HU	MODA 12KTL3-HU	MODA 15KTL3-HU
Power facto (@nominal power)	>0.99		
THD	<3%		
AC grid connection type	3W+N+PE/3W+PE		
Efficiency			
Max. efficiency	98.6%		
Euro-eta	98.10%		
Output data (Backup)			
Nominal output power	10kW	12kW	15kW
Max. apparent power	12kVA	14.4kVA	18kVA
Max. output power of single phase	4000W	3800W	6000W
Nominal AC output voltage	220V/380V 230V/400V		
Nominal AC output frequency	50Hz/60Hz		
Max. output current	18.2A On-Grid& Bypass: 63A	21.8A On-Grid& Bypass: 63A	22.7A On-Grid& Bypass: 63A
Power factor	0.8 leading to 0.8 lagging		
THDv	<3%		
DCV	≤300mV AVG		
Switch time	<20ms		
Protection devices			
DC reverse-polarity protection	YES		
DC switch	YES		
DC surge protection	Type II		
Insulation resistance monitoring	YES		
AC surge protection	Type II		
AC short-circuit protection	YES		

Model / Specifications	MODA 10KTL3-HU	MODA 12KTL3-HU	MODA 15KTL3-HU
Grid monitoring	YES		
Anti-islanding protection	YES		
Residual-current monitoring unit	YES		
String fuse protection	NO		
String monitoring	YES		
AFCI protection	Configurable		
General data			
Dimensions (W / H / D) in mm	740*255*360mm		
Weight	32kg		
Operating temperature range	-25~60°C (>45°C Derating)		
Noise emission (typical)	≤29dB(A)		
Altitude	4000m		
Internal consumption at night	<20W		
Topology	Transformerless		
Cooling	Natural heat dissipation		
IP rating	IP66		
Relative humidity	0~100%		
DC connection	H4/MC4 (OPT)		
AC connection	waterproof cover + Five-core quick connector (Grid and Load integration)		
Interfaces			
Display	LED+WIFI+APP		
USB/RS485/CAN	YES		
WiLan-X2/ GroHomeManager-X /ShineMaster-X	Configurable		

10 EU Declaration of conformity

Within the scope of EU directives:
- 2014/35/EU Low Voltage Directive (LVD)
- 2014/30/EU Electromagnetic Compatibility Directive (EMC)
- 2011/65/EU RoHS Directive and its amendment (EU)2015/863

Shenzhen Growatt New Energy Co. Ltd confirms that the Growatt inverters and accessories described in this document are in compliance with the above-mentioned EU directives. The entire EU Declaration of Conformity can be found at en.growatt.com.

11 Certificate of Compliance

Growatt confirms herewith that the products, when correctly configured, are in compliance with the requirements specified in the following standards and directives (dated: Aug./2026):

Model	Certificates
MODA 4-15KTL3-HU	CE, IEC 62109, INMETRO, AS4777.2, EN50549, N4105, C10/11

Contact us 13

To provide you with the necessary support, please have the following information ready:

Serial Number	Format: LSLxxxxxx
Model	SxxBxxDxxTxxPxxUxxMxxxx
Error message	Error xxx
Grid voltage	xxx V
DC input voltage	xxx V
Can you reproduce the problem?	Yes or No
Has it occurred before?	Yes or No
What were the environmental conditions like when the problem occurred?	

Information about the PV panels

Manufacturer name and model number of the PV panel	xxx
Output power of the panel	xx kW
Voc of the panel	xxx V
Vmp of the panel	xxx V
Imp of the panel	xx A
The number of panels in each string	xx pcs.

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