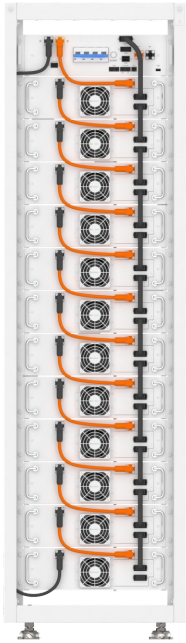


WIT 29.9-50K-XHU+AXE 30.0-60.0kWh Energy Storage System User Manual (Single System)

Contents

1 Introduction

1.1 Overview

This manual provides reference instructions for the configuration and use of the system composed of Shenzhen Growatt New Energy Co., Ltd. (hereinafter referred to as Growatt) WIT 29.9-50K-XHU+AXE 30.0~60.0H-1HR-E1 and WIT 29.9-50K-XHU+AXE 50.0~60.0H-1HT-S1. Please read this manual carefully before using, and store it properly in a place easily accessible to installation, operation, and maintenance personnel. This manual may be updated based on user feedback or product upgrade requirements, and Growatt New Energy is not responsible for notifying users.

Note:

(1) This article abbreviates the WIT 29.9-50K-XHU All in One Photovoltaic Energy Storage System as WIT.

(2) This article abbreviates both the indoor battery rack AXE 30.0~60.0H-1HR-E1 and the outdoor battery AXE 50.0~60.0H-1HT-S1 as AXE.

1.2 Applicable Personnel

By carefully reading this manual, users can quickly and correctly understand the system status of WIT 29.9-50K-XHU+AXE 30.0~60.0H-1HR-E1 and WIT 29.9-50K-XHU+AXE 50.0~60.0H-1HT-S1, and are able to perform simple troubleshooting and daily maintenance.

If any issues arise during use, the installer can try:

Log in to the official website for the Chinese region en.growatt.com, or the official website for global regions en.growatt.com to query device information or contact customer service.

1.3 Symbol Conventions

Symbol	Description
 DANGER	Used to warn of an immediate hazardous situation that, if not avoided, will result in death or serious personal injury.
 WARNING	Used to alert potential dangerous situations that, if not avoided, may lead to death or serious personal injury.
 CAUTION	Used to alert potential dangerous situations that, if not avoided, may lead to moderate or minor personal injury.

Symbol	Description
 NOTICE	Used to indicate that in a specific situation, if not operated correctly as required, it may result in property damage.
	Used to remind operators to check the instruction manual before operating or installing WIT.

1.4 Explanation of Safety Symbols

Symbol	Name	Meaning
	High voltage	High voltages exist after the WIT Inverter is powered on. Only qualified and trained electrical technicians are allowed to perform operations.
	Burn warning	Do not touch a running inverter because it generates high temperatures on the shell.
	Grounding	Indicates the position for connecting the PE cable.
	Delay discharge mark	Residual voltage exists after the WIT Inverter is powered off. It takes 5 minutes to discharge to the safe voltage.
	Refer to the manual	Remind operators to refer to the manual before installing and operating the WIT Inverter.
	DC	Direct Current.
	AC	Alternating Current.

1.5 Safety Specifications

Before starting operation, please carefully read the precautions and operating instructions in this manual to avoid accidents. The "Danger", "Warning", and "Caution" items in this manual do not represent all safety items that should be observed, but only serve as a supplement to safety precautions in various operations.

(1) Before installation, please carefully read this manual, the WIT 29.9~50K-XHU User Manual, the AXE 30.0~60.0H-1HR-E1 User Manual, and the AXE 50.0~60.0H-1HT-S1 User Manual. If equipment damage occurs due to installation not being carried out in accordance with the instructions in this manual, Growatt New Energy reserves the right not to provide Quality Assurance.

(2) All operations and wiring must be carried out by trained professional electrical technicians.

(3) During installation, please do not touch any other parts inside the chassis except for the terminal blocks.

(4) All electrical connections must comply with local electrical safety standards.

(5) If the system requires maintenance, please contact the locally designated system installation and maintenance personnel.

(6) Permission from the local power supply department is required to operate this equipment in on-grid mode.

Handling:

 **WARNING**	• Risk of injury when lifting the WIT Inverter, or injury caused by a falling inverter as it is heavy. Please transport and lift the inverter carefully.

Installation:

 **NOTICE**	• Please read this manual carefully before installation. Damages caused by failure to observe instructions specified in this manual are not covered under any warranty.
 **DANGER**	• Do not connect any cables before installation.
 **WARNING**	• Please observe the installation instructions specified in this manual, including the installation environment and clearance requirements. • Install the WIT Inverter in a dry and well-ventilated location; otherwise, performance de-rate may be initiated due to excessive temperature. • Please read the installation instructions and safety precautions carefully before installation.

Electrical Connections:

 **DANGER**	• Before connecting cables, ensure that the PV SWITCH of the WIT Inverter are OFF, and turn off the switch and breaker on the AC side and the battery side. Otherwise, high voltages may cause severe injuries. • It must be operated by qualified and trained electrical technicians. Technicians should observe instructions in this manual and local regulations. • High voltages may cause electric shocks and serious injury. Please do not touch the WIT Inverter in operation. • Do not install the inverter in potentially explosive and flammable atmospheres.
 **WARNING**	• Each WIT Inverter must be equipped with an AC circuit breaker. Multiple WIT Inverters cannot connect to the same AC circuit breaker. • Do not connect the load between the WIT Inverter and the circuit breaker. • If the cable is thick, do not shake the cable terminals after tightening them. Otherwise, the loose connection may cause overheating and device damage. Ensure that the terminals are properly connected before starting the WIT Inverter. • Ensure the correct polarity of the terminals before connecting the PV array to the WIT Inverter.

Maintenance and replacement:

 **DANGER**	• It must be operated by qualified and trained electrical technicians. Technicians should observe instructions in this manual and local regulations. • After turning off the DC switches and the AC breakers, wait for at least five minutes before performing any operations to avoid risks. • When the OLED screen indicates “PV Isolation low” , do not touch the chassis as a ground fault may have been detected. • Beware of high voltages which may cause electric shocks.
 **WARNING**	• To ensure good dissipation, clean the fan regularly. • Do not use the air pump to clean the fan. Otherwise, the fan may be damaged.

Others:

	• Upon receiving the product, check if the contents are intact and complete. If any damage is found or any component is missing, please contact your distributor.
 **WARNING**	• The maximum PV input voltage cannot exceed 1100V. The battery input voltage cannot exceed 900V. • For the WIT Inverter that will not be put into operation in the future, you should properly dispose of them by yourself.

Introduction to the Overall 2 System Solution

2.1 System Composition

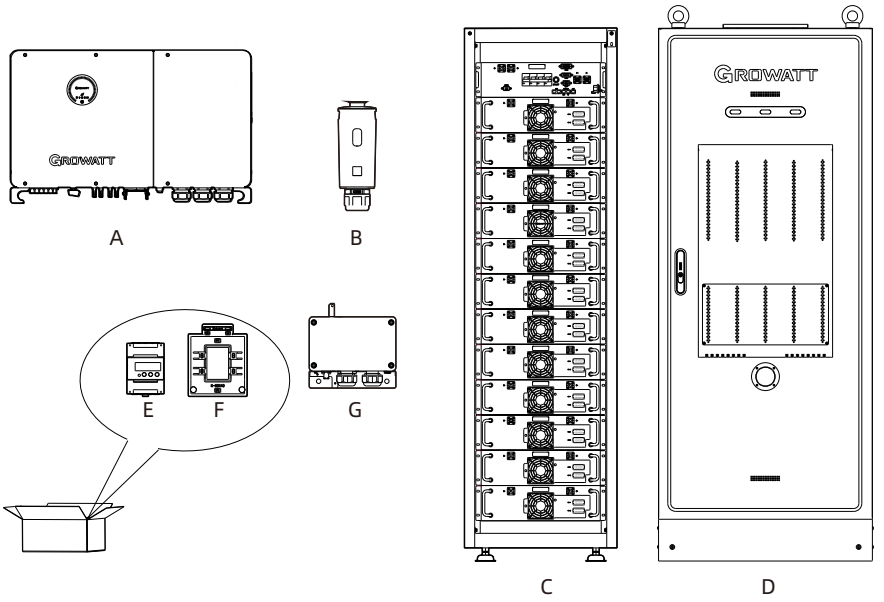


Figure 2-1 System Components

Table - Basic Components and Optional Equipment for Single System

No.	Device	Remarks	Service Responsible
A	WIT	WIT 29.9-50K-XHU hybrid inverter, has five optional power specifications (29.9KW, 30KW, 36KW, 40KW, 50KW)	Growatt
B	Datalogger	ShineWiLan-X2	Growatt
C	AXE Batter Rack	AXE battery system unit, with the number of units selectable from 1 to 3 and the number of battery packs selectable	Growatt
D	AXE Battery Cabinet		Growatt
E	Smart Meter	TPM-CT-E-EU/TPM-CT-C-EU Meter Assembly (available in three specifications: 1200A, 600A, and 250A)	Growatt
F	CT		Growatt
G	Battery Junction Box	Optional Accessories	Growatt

NOTICE	1. If the system involves on-grid applications, the smart meter kit TPM-CT-E/C-EU provided by our company must be used. 2. If the WIT is only connected with one cluster of AXE battery system, it is recommended to use it in conjunction with the battery junction box or perform shunt treatment on the battery cluster.

2.2 System Application Introduction

2.2.1 Common Application

Figure 2-2 shows a common solution for the single WIT commercial and industrial energy storage system.

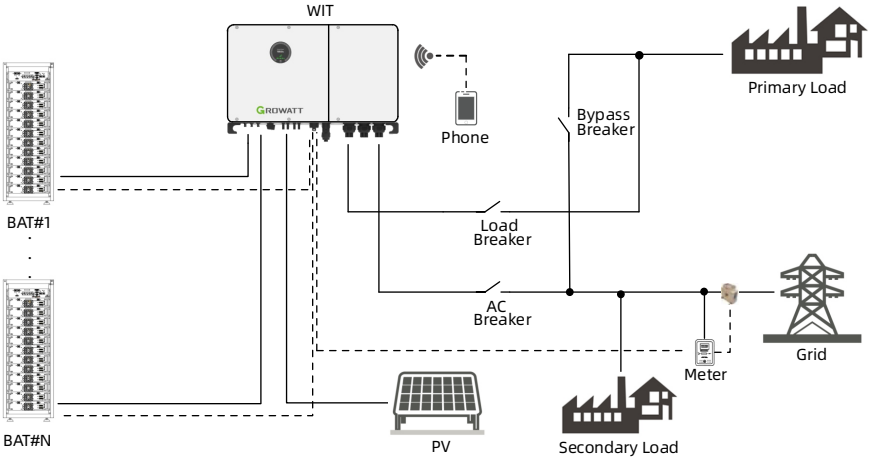


Figure2-2 Single WIT+AXE System

NOTICE	1. It supports up to 3 battery systems connected to the WIT. (N≤3) 2.The bypass breaker is mainly used during the maintenance of the WIT system and needs to be interlocked with both the AC Breaker and the Load Breaker.

2.2.2 GEN Port Application

The GEN port supports three kinds of devices connection to feature different application: diesel generator, smart load, and PV inverter.

1. When integrated with generator, the system supports the start-stop control of the generator, as well as the charging and load-bearing functions of the generator;
2. When integrated with smart load, the system can control the connection and disconnection of the smart load by setting the battery SOC.
3. When integrated with PV inverter, AC-couple application is available. The PV inverter can power the load, charge the battery and export power to the grid. It is available both in on-grid system mode and off-grid mode.

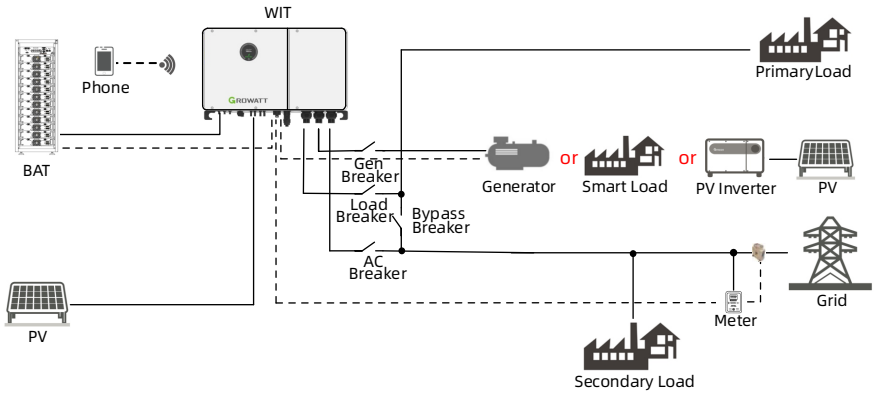


Figure 2-3 Multiple applications of GEN port

NOTICE	1.The power of the PV inverter should be less than the rated charge/discharge power of the WIT system. 2. For details on the introduction and setup method of the GEN port's multiple application, please refer to Appendix 1.2 GEN Port Application Introduction.e refer to Appendix 1.2 GEN Port Application Introduction.

3 Installation and Wiring Instructions

3.1 Installation Environment Requirements

A. The installation space must meet the dimensional requirements of the system layout diagram in Section 3.2.
B. The protection rating of WIT 29.9-50K-XHU is IP66 and supports outdoor installation.
C. The protection rating of AXE 30.0-60.0H-1HR-E1 is IP20 and supports indoor installation.
D. The protection rating of AXE 30.0-60.0H-1HT-S1 is IP55 and supports indoor installation.
E. Smart meter and CTs only supports indoor installation.
F. The humidity of the installation environment should be between 5% and 95%.
G. The installation environment temperature should be between -10°C and 50°C.
H. To extend the lifespan of system equipment and reduce system derating caused by overheating from direct sunlight, please do not expose the system equipment directly to sunlight when the equipment are installed outdoors. It is recommended to install a sunshade to avoid direct sunlight and rain erosion.
I. System equipment can only be installed on a flat floor or vertical wall. The floor and wall must be sturdy and able to withstand the weight of the system equipment for an extended period of time.
J. Please do not install the system in dusty environment, otherwise the particulate matter in the environment may accumulate at the inlet and outlet trends of the equipment, affecting heat dissipation, and may cause damage in severe cases.
K. Do not install system equipment on buildings constructed of flammable or heat-intolerant materials.
L. Do not install system equipment near strong electromagnetic signals.
M. Do not install system equipment in places accessible to children.

3.2 System Layout

After receiving the complete set of equipment, the user should select a suitable installation environment, then transport the equipment to the site according to the recommended handling methods in the quick installation manual for each device, and arrange it in place according to the recommended layout method in this chapter.
Regarding the installation distance of the entire system equipment, please complete the corresponding system setup according to the recommended layout dimensions of the indoor rack in Figures 3-1 and 3-2 and the recommended layout dimensions of the outdoor cabinet in Figures 3-3 and 3-4. Please do not set up the system equipment to operate in a confined space, otherwise the system may experience load reduction or shutdown due to temperature issues.

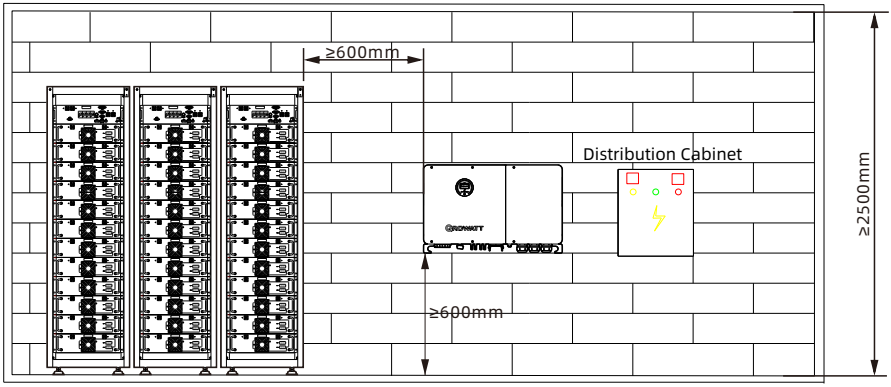


Figure 3-1 Front View of Indoor Rack System Layout

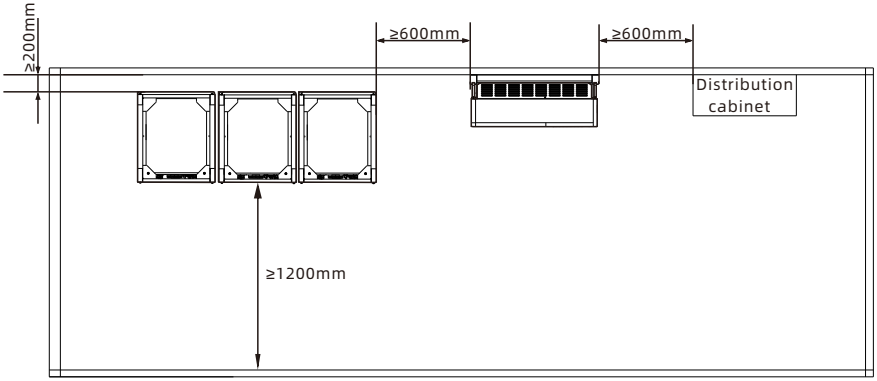


Figure 3-2 Top View of Indoor Rack System Layout

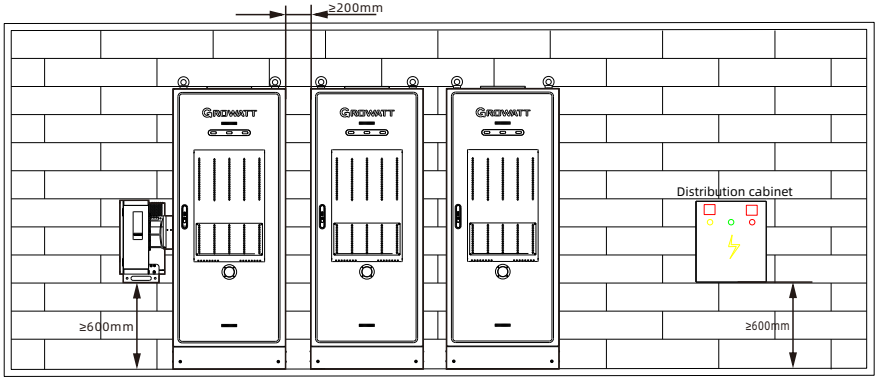


Figure 3-3 Front View of the Outdoor Cabinet System Layout

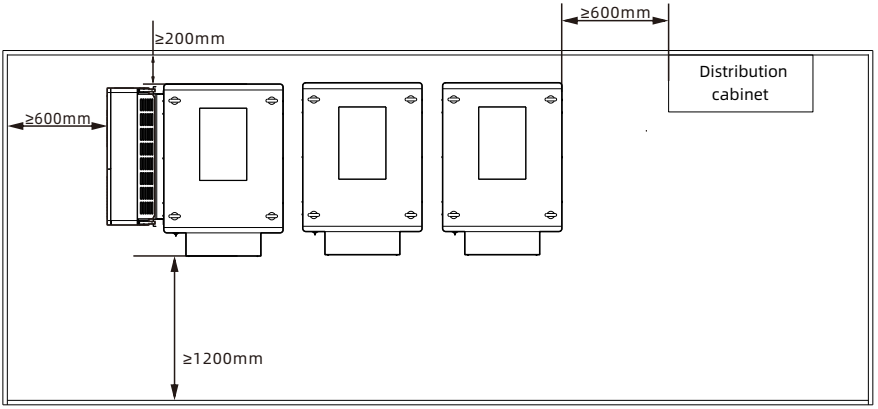


Figure 3-4 Top View of Outdoor Cabinet System Layout

3.3 System Cable Connection

NOTICE	System communication cables, power cables, and power supply cables shall not use the same conduit and shall maintain sufficient distance to avoid signal interference.

3.3.1 Grounding Cable Connection

In the system, the AXE and WIT enclosures need to be connected to the same ground busbar, and the connection must be reliable. Grounding can be carried out by referring to the schematic diagram in Figure 3-5.

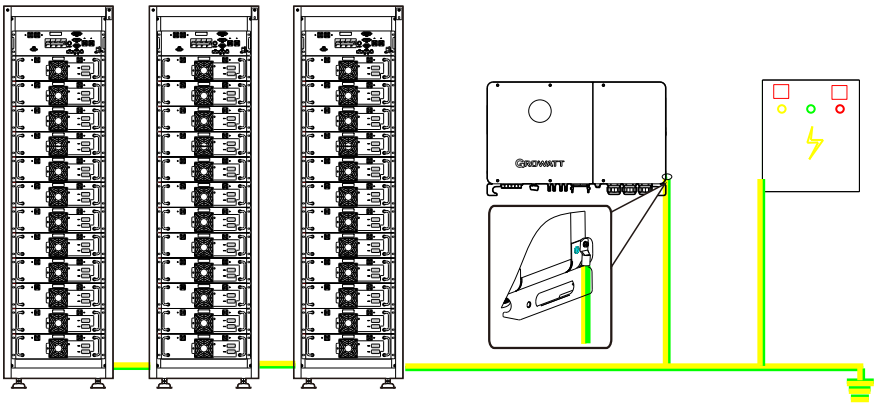


Figure 3-5 System Chassis Grounding

3.3.2 Connection of WIT and AXE related cables

3.3.2.1 Power cable connection between WIT and AXE

For the power cable connection between the BMs (battery modules) of AXE, please refer to the AXE user manual.
Connect one end of the power cable to the P+/P- terminals on the CM (control module) of AXE and connect another end to the battery terminals of WIT. When connecting single cluster of AXE to WIT, a battery junction box needs to be equipped, and the connection is shown in Figure 3-6.

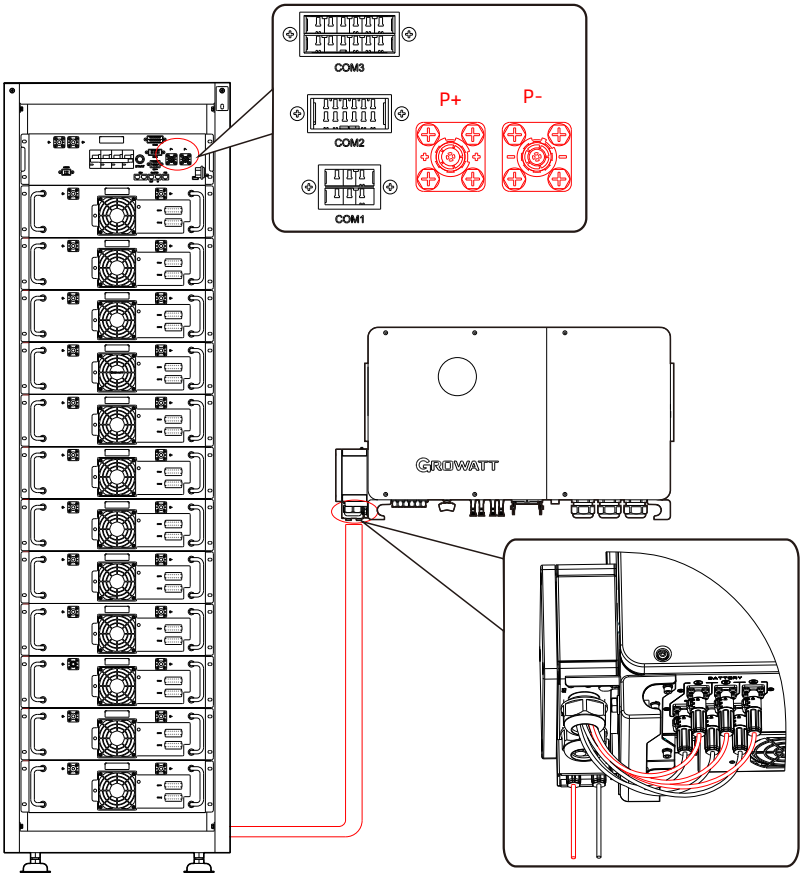


Figure 3-6 Single Cluster AXE Power Cable Connection

The power cable connection for the three clusters of AXE is shown in Figure 3-7.

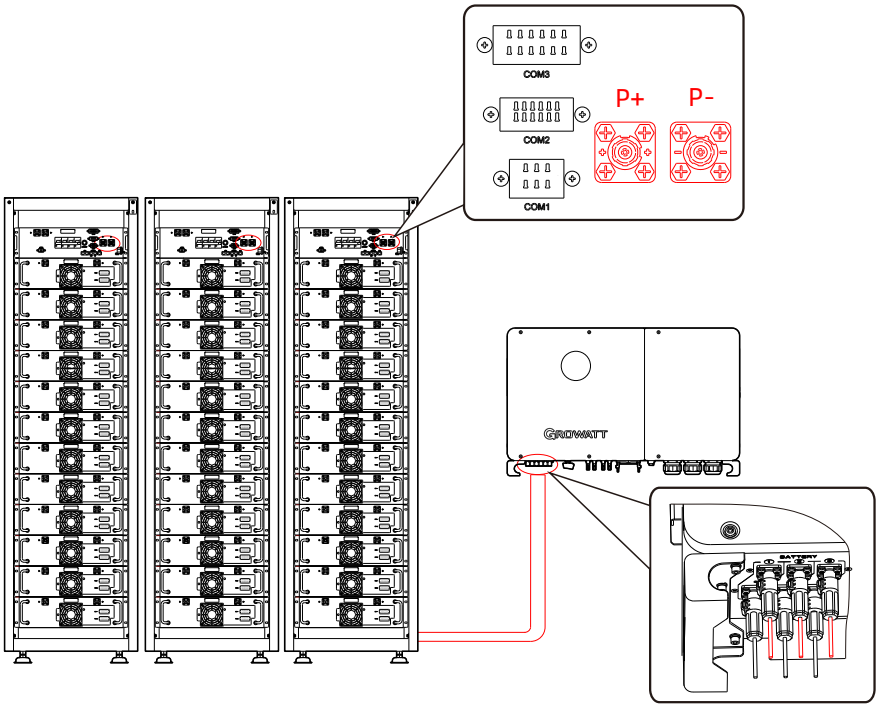


Figure 3-7 Three Clusters of AXE Power Cable Wiring

3.3.2.2 BMS-AC Cable Connection for Battery Rack

Connect one end of the BMS-AC cable to the AC 220V port on the CM (control module) of AXE and connect another end to the BMS-AC ports CN4, CN5, CN6, and CN7 below the WIT LOAD port via green Phoenix terminal. The connection method is shown in Figure 3-8.

NOTICE	BMS-AC cable is included in the AXE control module shipment. The green Phoenix terminal is included in the WIT shipment.

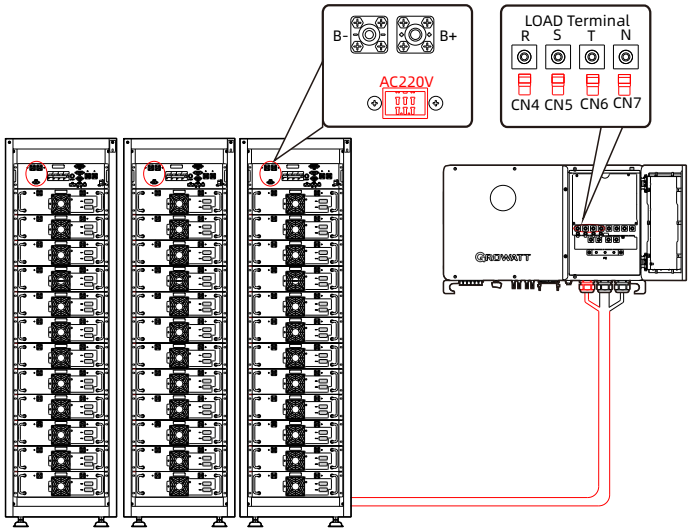


Figure 3-8 BMS-AC Cable Connection for AXE Indoor Rack

3.3.2.3 Power Supply Cable Connection for Battery Cabinet

Connect one end of the cable to the XT1 AC 220V port on the side of the battery cabinet and connect another end to the BMS-AC ports CN4, CN5, CN6, and CN7 below the WIT LOAD port via green Phonix terminal. The connection method is shown in Figure 3-9.

NOTICE	1. AXE battery cabinet air conditioners and fans use phase voltage. 2. The input voltage range of the air conditioner is 220±15%V. Please notice to the local grid voltage range to avoid exceeding.

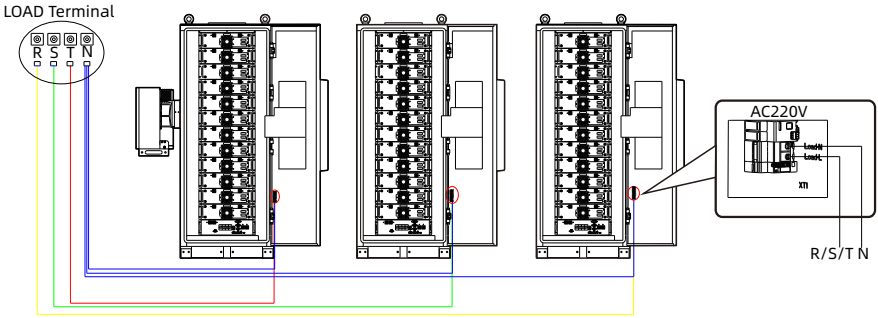


Figure 3-9 Power Supply Cable Connection for AXE Battery Cabinet

3.3.2.4 BMS Communication Connection

NOTICE	1. The communication cable between WIT and AXE is included in the shipping accessories of AXE. 2. The battery communication cable must be connected to BMS1 when only one cluster of AXE is connected to the WIT. 3. The communication connection between WIT and AXE shall be consistent with the power connection. For example, if the battery is connected to BAT1 and BAT2, the communication ports BMS1 and BMS2 shall be used.

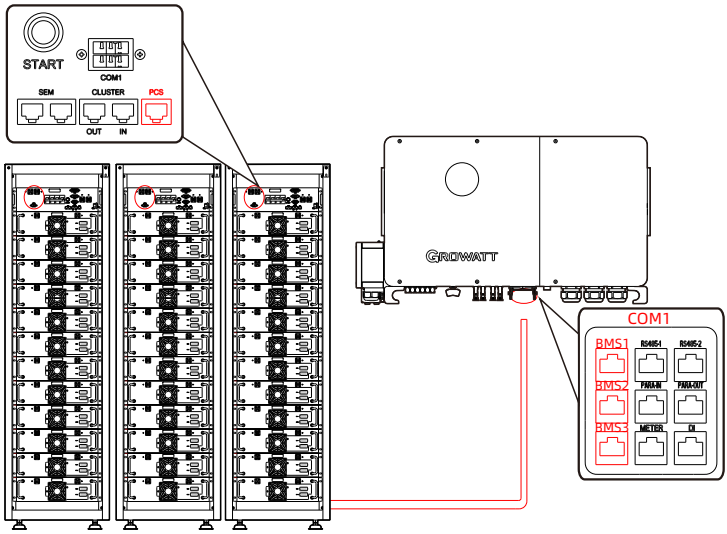


Figure 3-10 AXE Communication Cable Connection

3.3.3 PV Cable Connection

The PV terminal location of WIT is shown in Figure 3-11.
Connect one end to the PV terminal of WIT and connect another end to the PV panel. The PV terminal block is included in the shipping accessories of WIT. Plugged in the terminals according to the legend on the WIT.

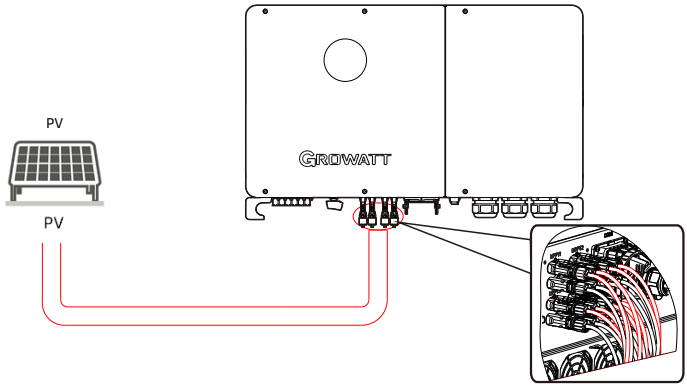


Figure 3-11 PV Power Cable Connection

3.3.4 AC Power Cable Connection

The AC port location on the WIT is shown in Figure 3-12.
WIT has three sets of AC ports: the Grid port is connected to the grid; the Load port is connected to the primary load; the GEN port has three forms of application; the terminals are included in the WIT shipping accessories. Before connecting, please ensure that the ground cable corresponding to these sets of power cables has been connected to the ground busbar.

NOTICE	The phase sequence of all cables on the WIT Grid side, Load side, and GEN side shall remain consistent.

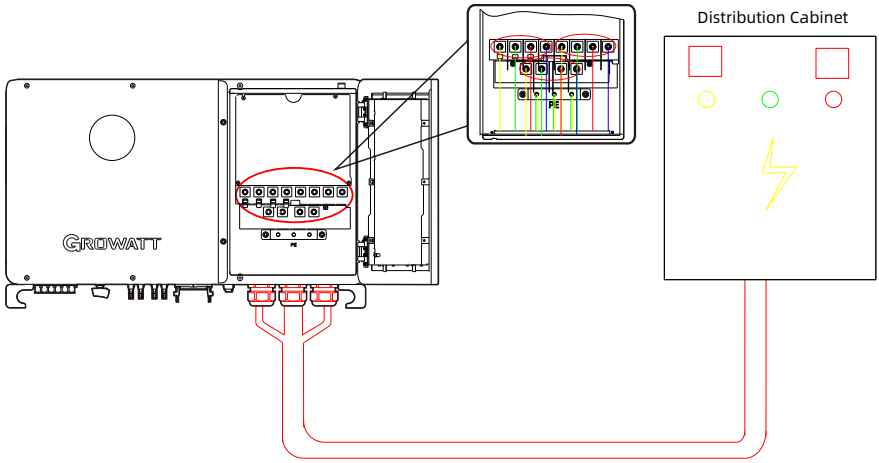


Figure 3-12 AC Power Cable Connection

3.3.5 CT and Meter Cable Connection

NOTICE	Growatt shall not be responsible for any application issues arising from the use of meter and CTs not recommended by Growatt.

3.3.5.1 Eastron Meter Wiring

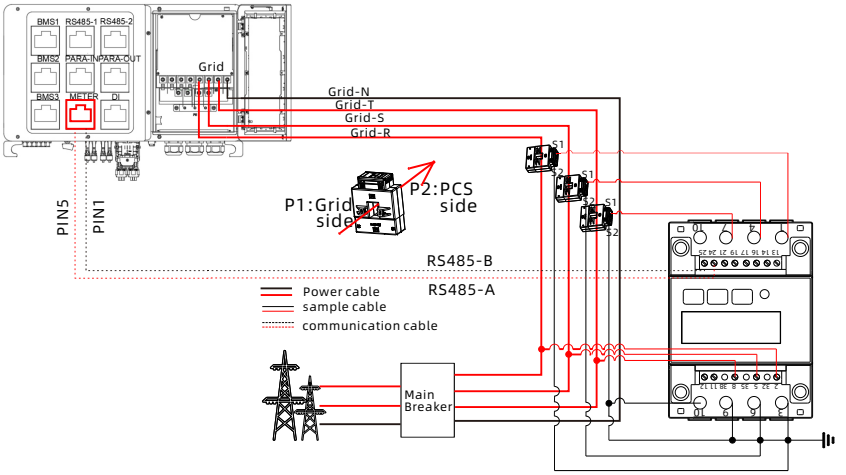


Figure 3-13 Eastron Electric Meter Wiring

3.3.5.2 CHINT Meter Wiring

Please refer to the schematic diagram of the smart meter wiring in Figure 3-14.

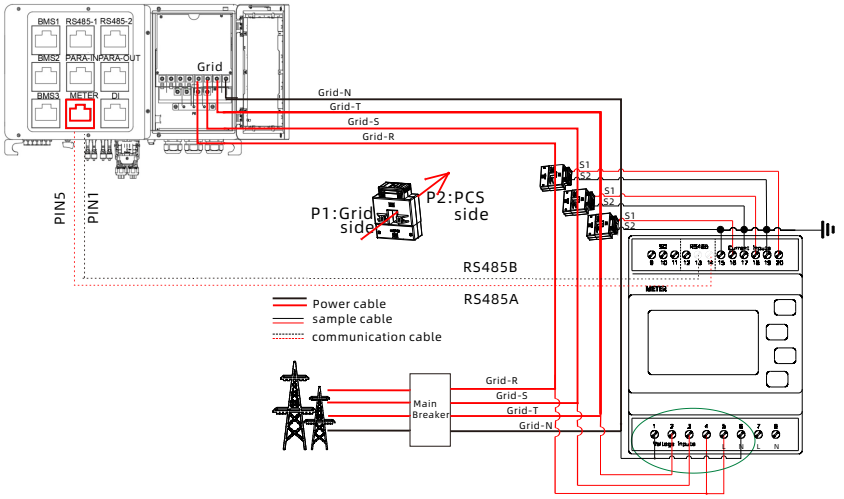


Figure 3-14 CHINT Smart Meter Wiring

3.3.6 Generator Communication Wiring

NOTICE	1. The system supports control generator's start and stop via dry contact communication. 2. The dry contact is normally closed status by default. 3. Please ensure that the communication cable is corresponding to the PIN description of COM2 port on the WIT.

Connect the the dry contact cable for starting and stopping the generator to PIN3 & PIN4 of the COM2 port.

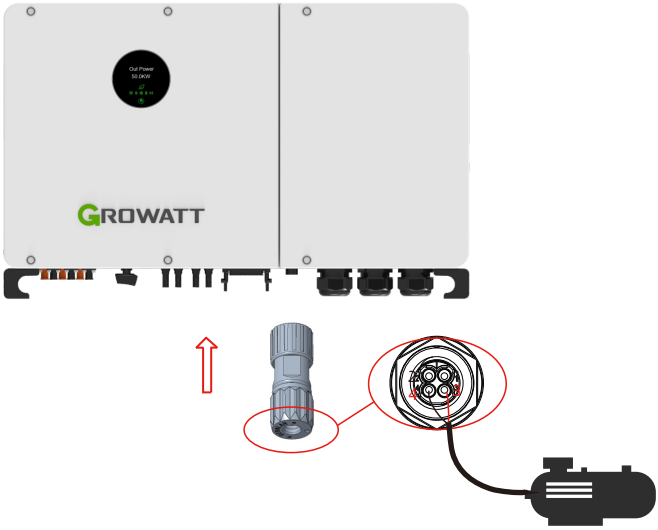


Figure 3-15 Generator Communication Connection

3.3.7 System Communication Cable Wiring Overview

3.3.7.1 System Communication and Sampling Wiring

Figure 3-16 shows a overview of communication cable connection. Including power supply cable and CT sampling cable.
In the figure, the blue dashed lines are system communication cables, and the solid lines are sampling/power supply cables. The battery communication line can use network cables for plugging. The pins and color definitions of the ethernet cable are shown in the following table:

Table3-1 Common Ethernet Cable PINs

PIN	PIN1	PIN2	PIN3	PIN4	PIN5	PIN6	PIN7	PIN7
Color	White Orange	Orange	White Green	Blue	White and Blue	Green	White-Brown	Brown

NOTICE

1. The battery communication cable must be connected to BMS1 when only one cluster of AXE is connected to the WIT.
2. The communication connection between WIT and AXE shall be consistent with the power connection. For example, if the battery is connected to BAT1 and BAT2, the communication ports BMS1 and BMS2 shall be used.

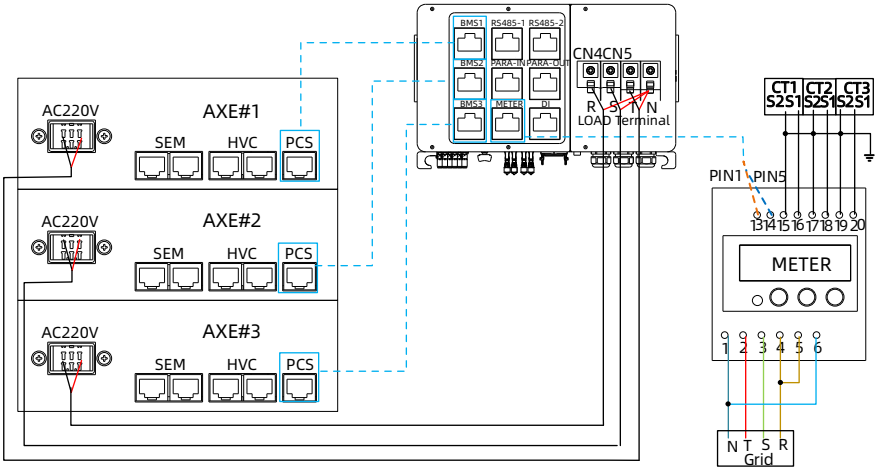


Figure 3-16 System Communication Cable Overiew

3.3.7.2 System Wiring Overview

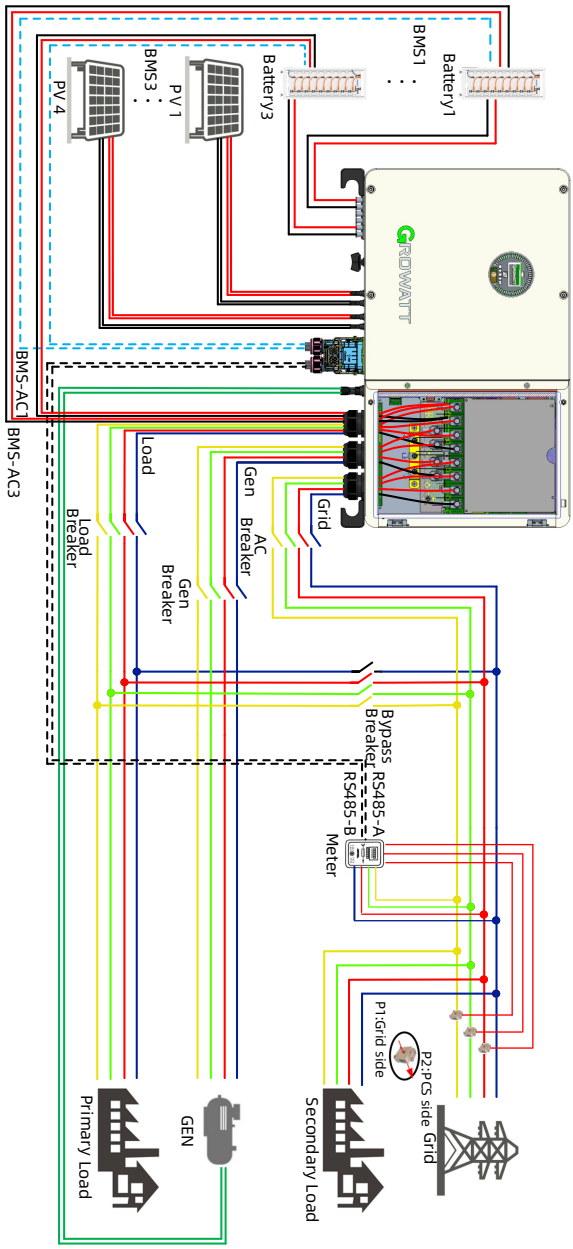


Figure 3-17 System Overview

NOTICE	The on-grid and off-grid system connection type must be consistent.

3.4 System Power-On Instruction

NOTICE	Before powering on the system, please ensure that all connections within the system are firm and reliable.

3.4.1 Recommended Power Supply for Commisioning

	AC	PV	AXE
WIT Upgrade	√	○	√
AXE Upgrade	√	○	○
Parameter Settings	√	√	√
Quick Site Setup	√	√	√

NOTICE	1. "√" indicates recommended power supply; 2. "○" indicates unstable factors may exist, not recommended; 3. Other power supply solutions can also be adopted at the customer site, and will not be elaborated further. 4. When upgrading battery system in off-grid scenario, installation and commissioning personnel must be on-site.

3.4.2 System Power-On Instruction

Ensure that the voltage and current limits of all sources are within the allowable scope of work for WIT and AXE. Follow the steps below to power on:

1. Turn on the PV switch on the WIT machine side;
2. Close the circuit breaker on the grid side and load side;
3. Close the AXE high-voltage box circuit breaker, long-press the button to switch it on.

After meeting the power-on conditions, the system will automatically power on.

NOTICE	To shut down the system, a shutdown command need to be issued on the monitoring platform.

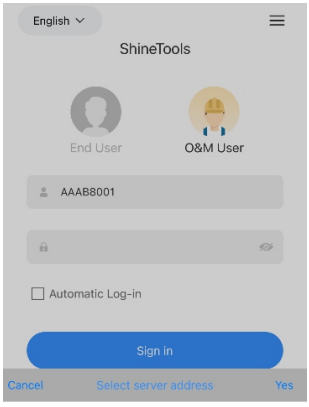
Single System Commissioning Guide 4

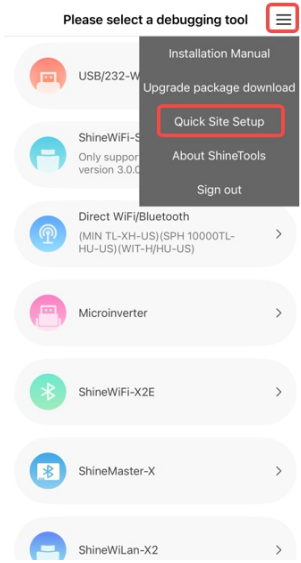
NOTICE	1. Customers can create new power plant and add devices to the Growatt Server using Server network configuration, ShinePhone network configuration, or ShineTools quick site setup. This chapter uses ShineTools quick site setup for illustration; for the use of other platforms, please refer to the attachment instructions. 2. Please register an account before using ShineTools.

4.1 ShineTools Quick Site Setup

ShineTools (V3.5.3.5 and later versions) supports the "Quick Site Setup" feature. Quick Site Setup includes functions such as creating power plant, adding datalogger to the power plant, network configuration, firmware upgrade, and partial parameter settings. Sign in to the O&M user account, select the correct server address; click the horizontal bar in the upper right corner, and select Quick Site Setup:

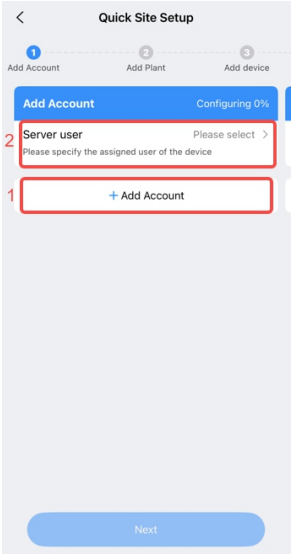
NOTICE	Please contact Growatt customer service to activate the O&M account.

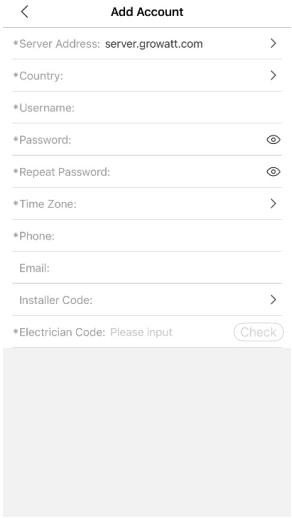




4.1.1 Add Account

When adding account (plant administrator) for the initial time, click on red box 1, fill in the relevant information to apply for an account. This account and password can be used to sign in Growatt Server for monitoring your plant and devices.
If you want to add power plant to existing account, click on red box 2 to select the account.

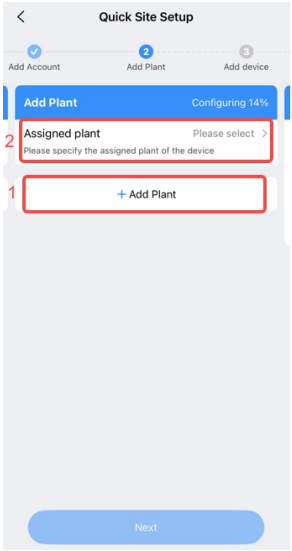


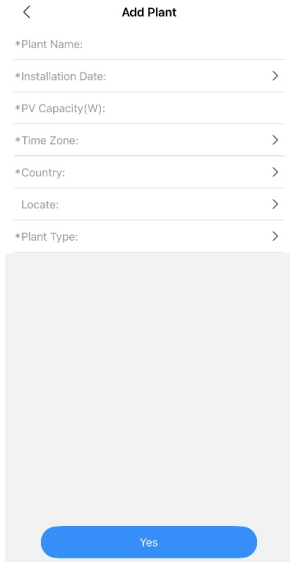


4.1.2 Add Plant

Click on red box 1 to fill in relevant information and add new plant under the account selected in Section 4.1.1.

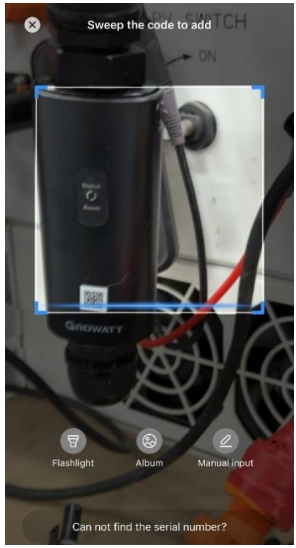
Clicking on red box 2 allows you to find the plant managed by the user selected in section 4.1.1.



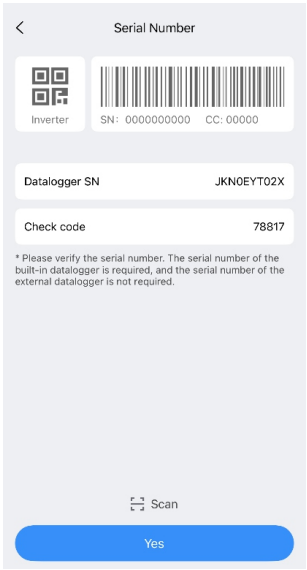


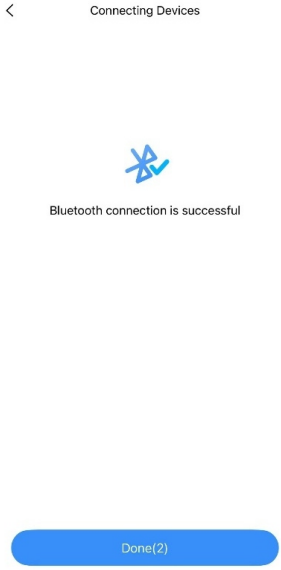
4.1.3 Add Datalogger

Click "Datalogger SN" to scan the QR code on the Datalogger or the barcode on its back to connect. Ensure that the indicator light on the Datalogger remains constantly blue; if it is blinking, press it briefly once to make it stay constantly on.



After clicking "Confirm", it will automatically remind that the power plant has been successfully bound in about 5 seconds. After success, you can jump to the next step firmware upgrade.

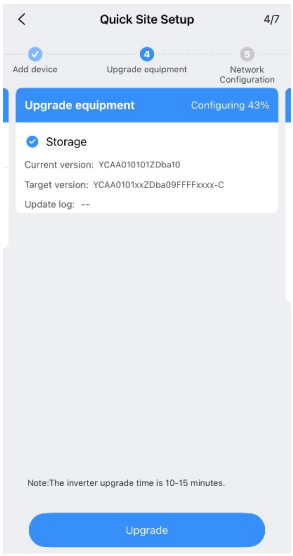


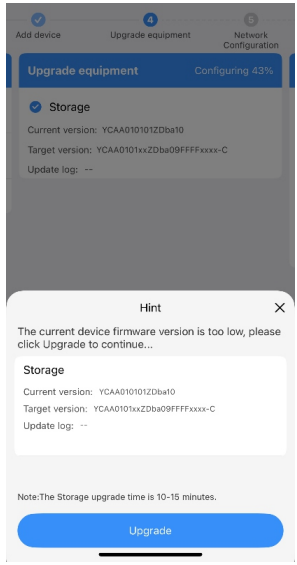


4.1.4 Upgrade equipment

"Upgrade equipment" can automatically detect the current device firmware version and the latest upgradable firmware version of WIT and AXE batteries and perform one-click upgrade.

NOTICE	1. The latest firmware version of current device is available on the OSS platform. 2. If there is not network on site, please contact Growatt customer service to obtain the latest firmware version for the device and then perform upgrade locally using USB drive.

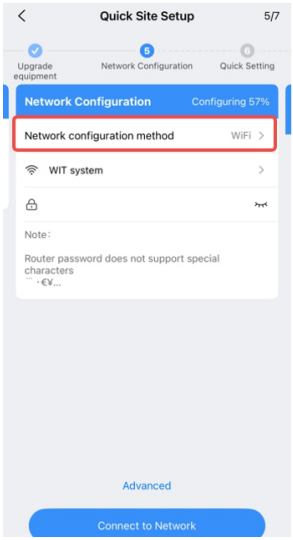


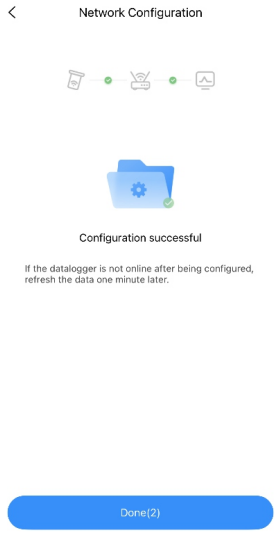


4.1.5 Upgrade equipment

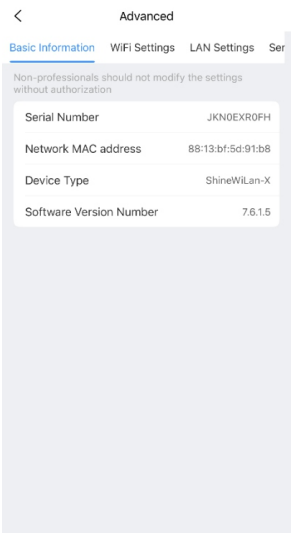
Connect to 2.4G WiFI or plug in Ethernet cable at the rear of the Datalogger to connect to network.

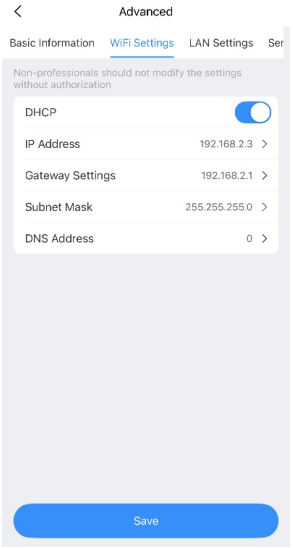
After network configuration, the system will upload device data to the cloud platform. Remote monitoring and parameter setting through OSS/Server will be available to perform.

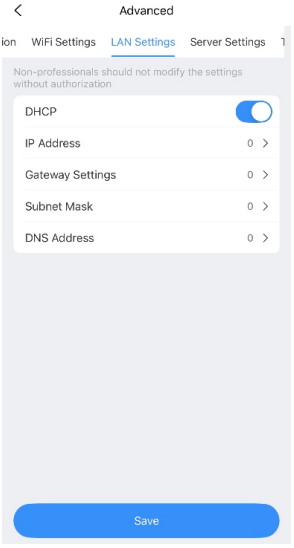


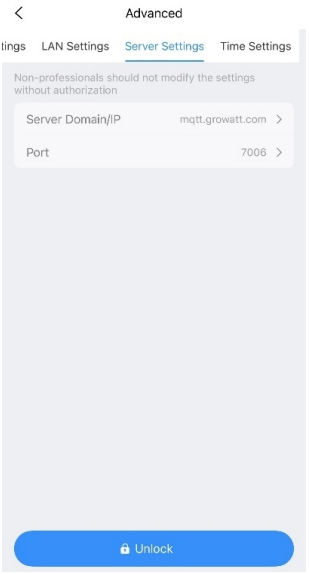


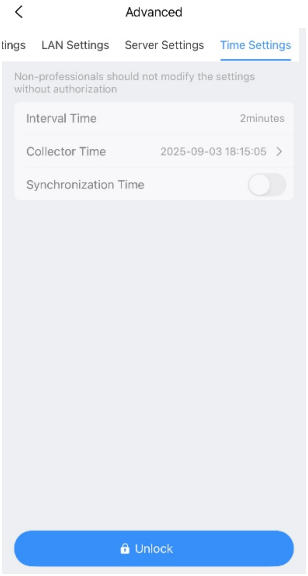
The "Advanced Settings" at the bottom of the network configuration page can be used to set and change time, network, server, etc.
To modify the advanced network settings, a password needs to be enter (growatt + current year, month, and day; e.g., growatt20250610).









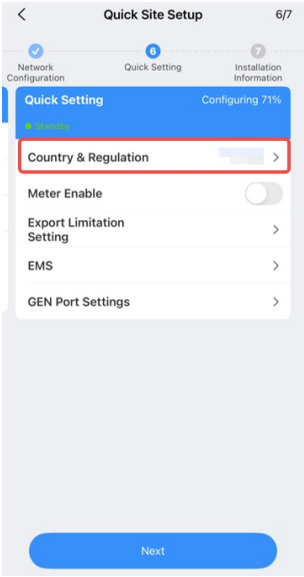


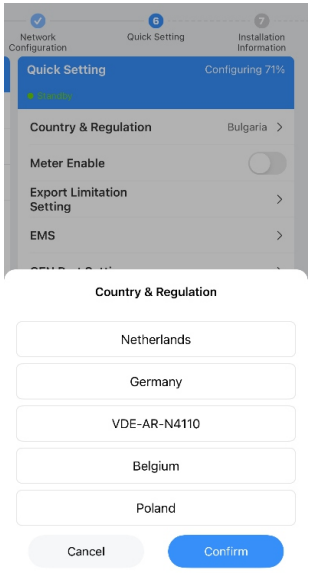
4.1.6 Quick Setting

NOTICE	After the customer completes the "4.1.6 Quick Setting" step, the device can be quickly put into operation; if there are other parameter settings, please refer to "4.2 ShineTools Operation Guide" and the appendix for configuration.

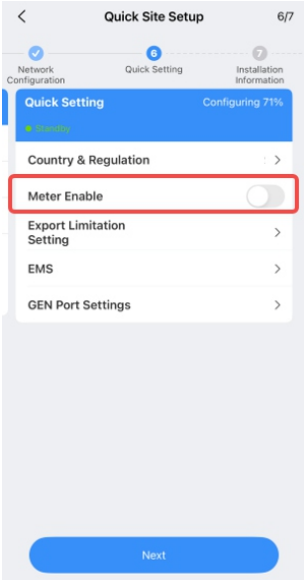
Step1: Country&Regulation Settings

This step allows you to select the required national regulations. Please make settings according to the requirements as shown in the figure below.





Step2 Meter Enable



The meter enable function needs to be turned on when an external smart meter exists. The meter installation point is shown in Figure 4-1:

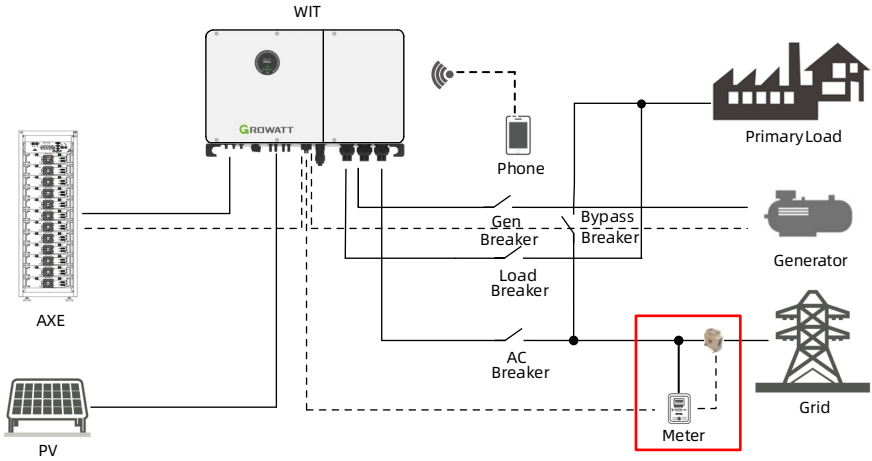
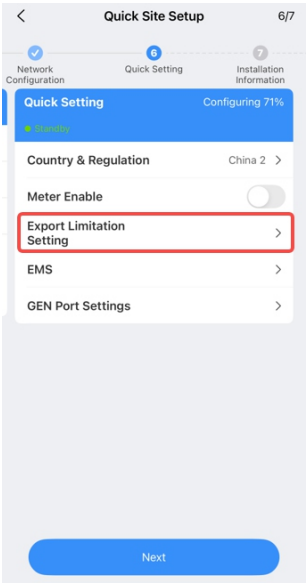


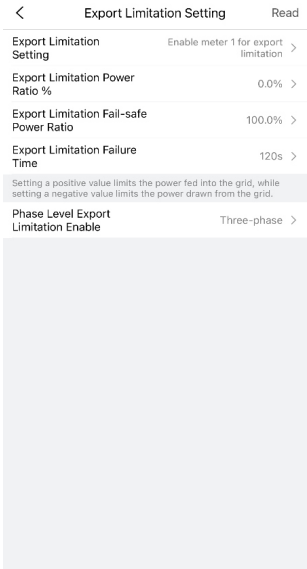
Figure 4-1 Smart Meter and CTs Installation Point (Meter 1)

Step3 Export Limitation Setting

Modify export limitation related settings as required.

NOTICE	1. Only "Enable meter 1 for export limitation" can be selected here if the meter is enabled in the Step2 above. 2. "Enable (internal) CT for export limitation" must be selected here if there is no external smart meter. 3. External smart meter export limitation is recommended for higher accuracy.

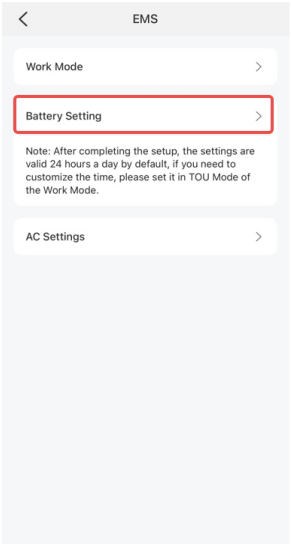


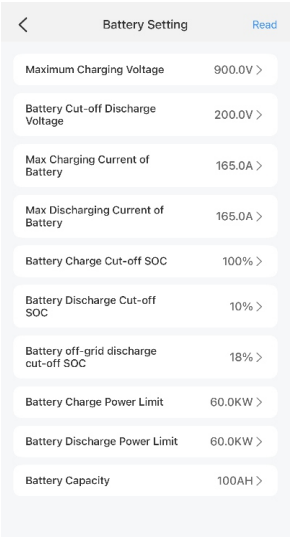


Step4 EMS Settings

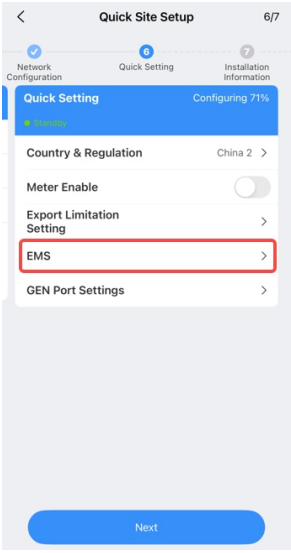
The EMS parameters include TOU settings, battery parameter settings, and AC settings for grid charging of batteries, etc.

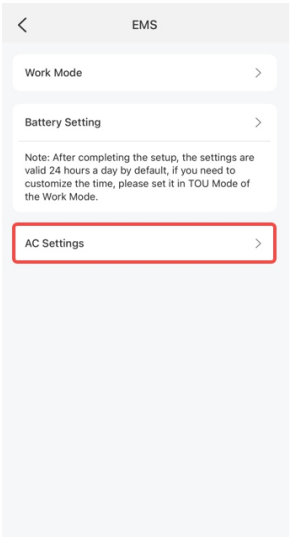
The battery parameters includes battery connection mode, battery charge/discharge power, current and cut-off stop SOC, etc.

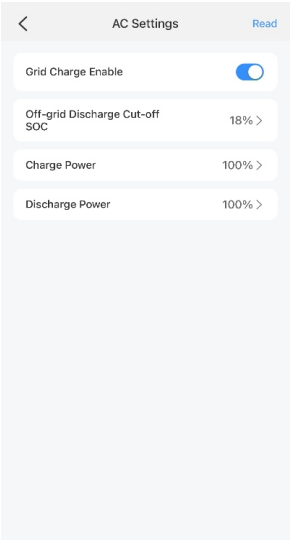




AC parameters related to grid power, such as off-grid discharge cut-off SOC, battery charging/discharging power from grid power, can also be set in this step.



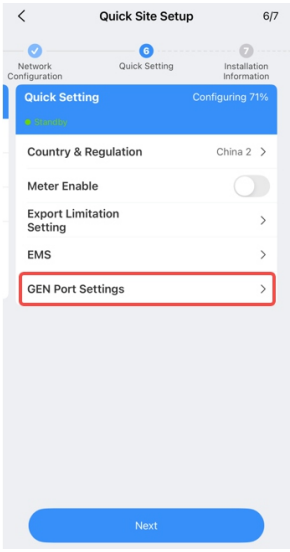


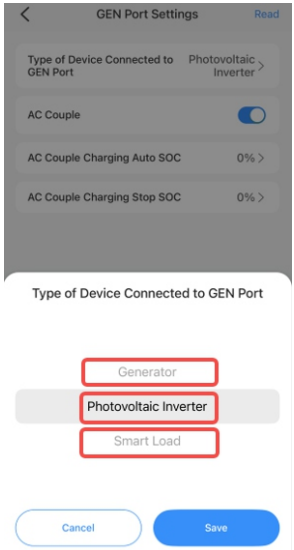


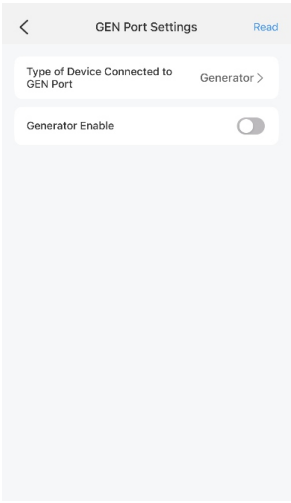
Step5 Generator Port Settings

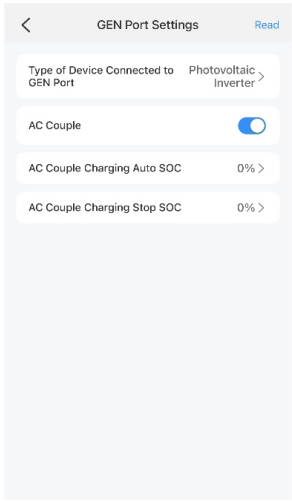
The GEN port supports connect to generator, PV inverter, or smart load. Please make selections and set corresponding device type as actual.

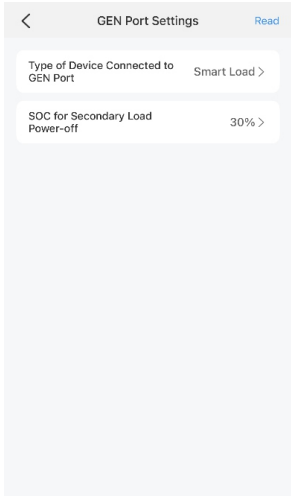
NOTICE	For details on the introduction and setup method of the GEN port's multiple application, please refer to Appendix 1.2 GEN Port Application Introduction.





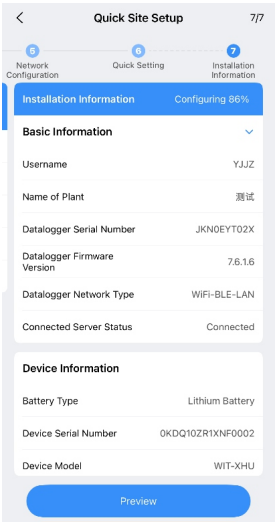


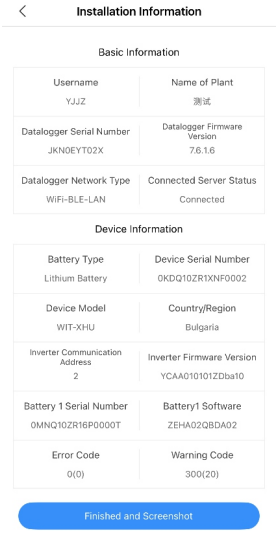




4.1.7 Installation Information Preview

After completing all the above steps, you can check device and battery information. After completing Quick Site Setup, you can enter the ShineTools main interface to browse device information and set parameters.

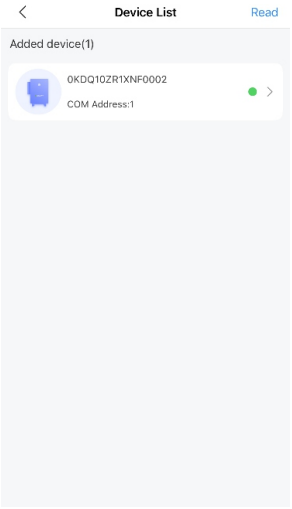


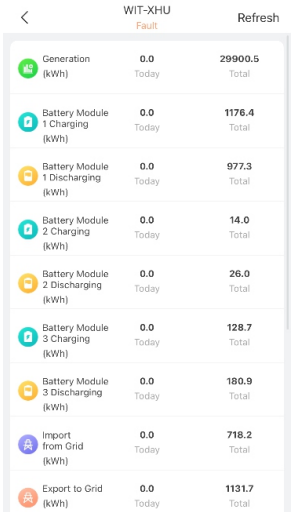


4.2 ShineTools Operation Guide

4.2.1 ShineTools connect WIT

After completing " Quick Site Setup ", the page will automatically jump to the device list. Select WIT device will directly enter the ShineTools main interface.



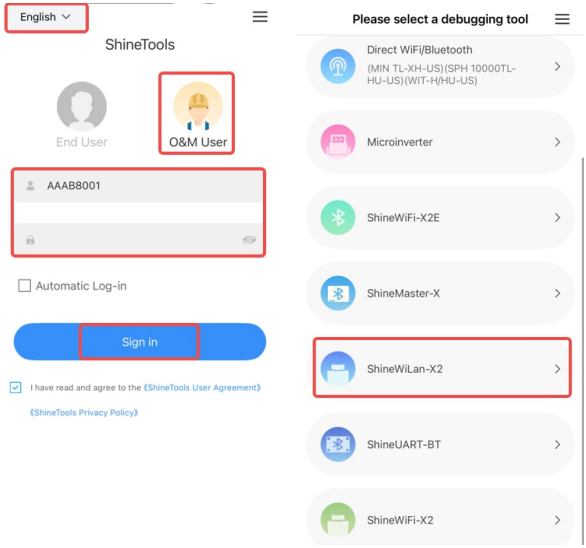


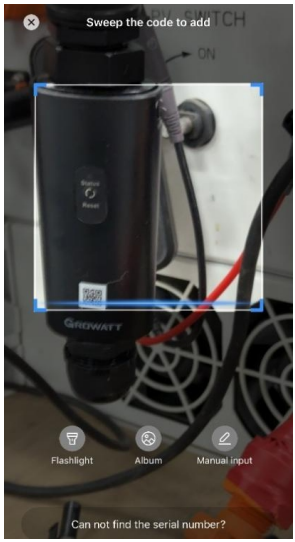
If "Quick Site Setup" is not used, please follow the steps below to enter the ShineTools main interface.

Step1 Select the language and account type, fill in the account number and password, then sign in;

Step2 Select 'ShineWiLan-X2';

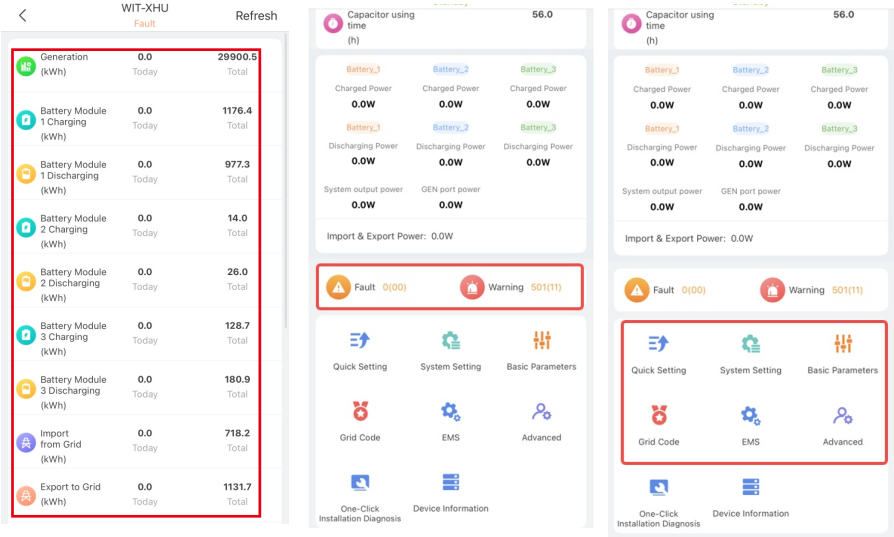
Step3 Scan the QR code on the datalogger.





4.2.2 ShineTools Interface Demonstration

After signing in to ShineTools, you can view the system power generation and consumption. Device fault and warning information can be checked. System parameters can be read and set at the bottom of the interface.



4.2.3 Common Settings

Here lists some common settings. Please verify whether the default values meet the actual requirements and modify them as needed.

Table 4-1 ShineTools Common Setting Table

Setting Category	Setting Location	Setting Name	Default value
Country& Regulation	Quick Setting	Country& Regulation	There are differences according to different regions
Battery Parameters	EMS–Battery Setting	BMS Enable	Enable
		Battery Discharge Cut-off Voltage	200V
		Maximum Charging Voltage	900V
		Battery Charge Cut-off SOC	100
		Battery Discharge Cut-off SOC	10
		Battery off-grid discharge cut-off SOC	10

Setting Category	Setting Location	Setting Name	Default value
Export Limitation Setting	Quick Setting–Export Limitation Setting	Export Limitation Setting	Disable
		Export Limitation Power Ratio%	0
		Phase Level Export Limitation Enable	Three-phase
Operation Mode	EMS–Work Mode–TOU Mode	TOU Mode	Disable
	System Setting	System PV Energy Storage Mode	Grid First
Parameters related to mains power	EMS–AC Settings	Grid Charge Enable	Enable
		Charge Power	100%
		Discharge Power	100%
Smart Meter Settings	System Setting	Whether the Load is Connected to the Electric Meter	Disable
N Line Settings	System Setting	Neutral line Enable	Enable
Generator Settings	System Setting	GEN Port Settings	Generator
Off-Grid Settings	System Setting	Off-Grid Enable	Enable
		Off-Grid Voltage	230V
		Off-Grid Frequncy	50Hz

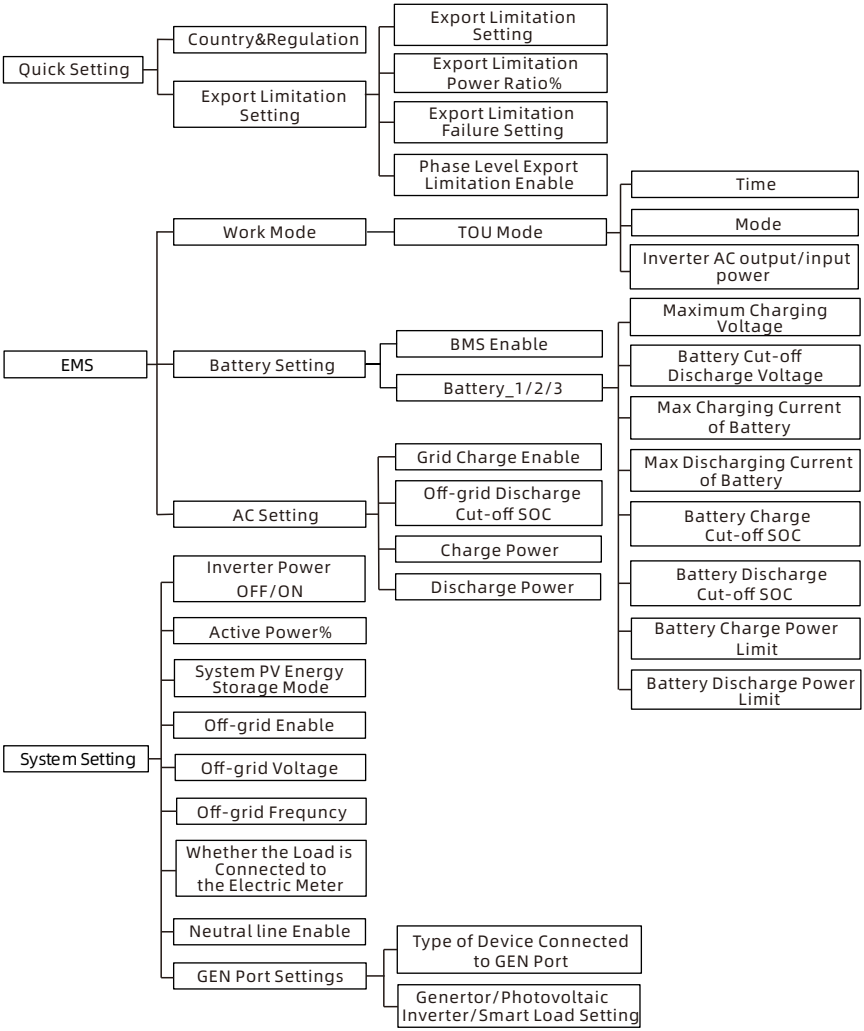


Figure 4-2 ShineTools Common Settings Tree Diagram

4.3 System Application Settings Guide

NOTICE	1. All settings in this chapter are configured based on ShineTools. 2. Please refer to the appendix for the introduction to system application mode and GEN port application.

4.3.1 Operation Mode

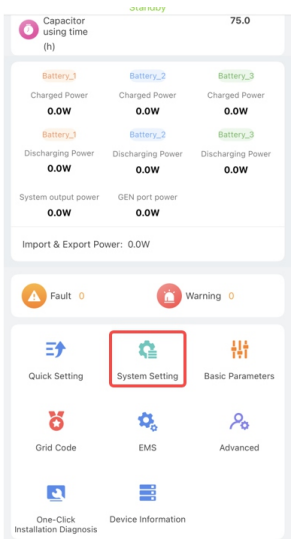
There are two methods to set the system operation mode.

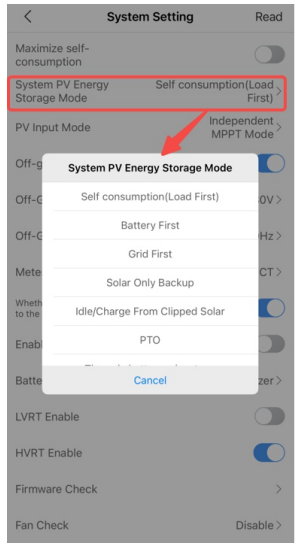
1) Default Operation Mode

The default operation mode can be configured through the following steps, allowing the system to operate continuously in a specific mode.

Step1 Click to enter "System Setting" on the main interface;

Step2 Locate the system operation mode setting and modify according to actual needs.



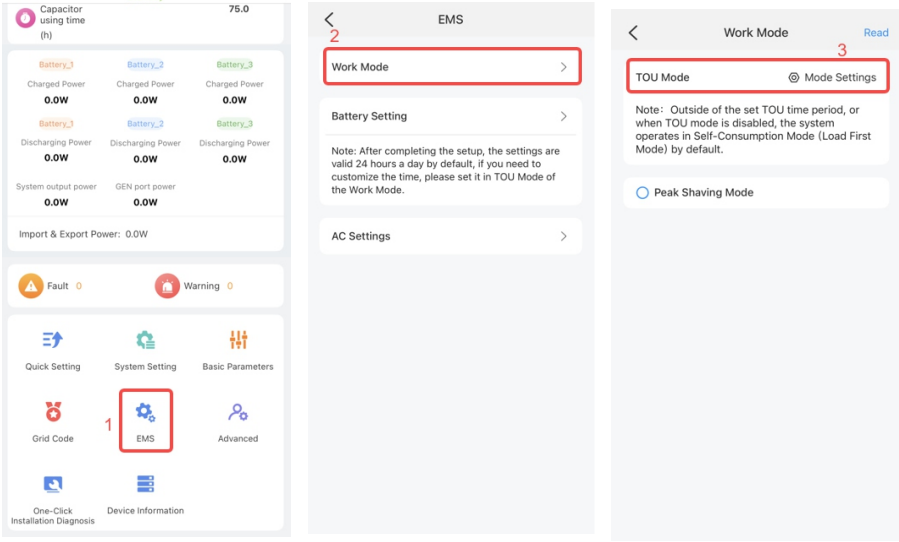


2) Time of Use

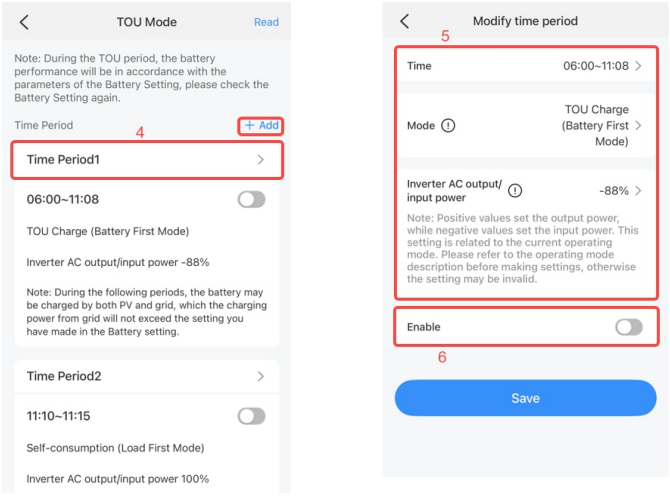
TOU settings allow the system to operate in different modes during various time periods, with a daily cycle of execution.

NOTICE	1. Up to 6 time periods can be set. 2. The start and end times in time periods do not allow any kind of overlap. 3. The TOU settings override the default operation mode. The system will operate in default mode during time periods when TOU is not enabled.

Step1 Click to enter "EMS" on the main interface;
Step2 Click to enter "Work Mode";
Step3 Enter the settings of "TOU Mode";

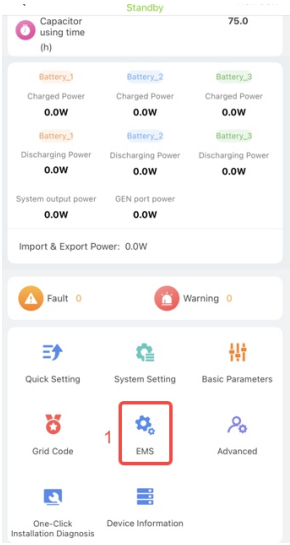


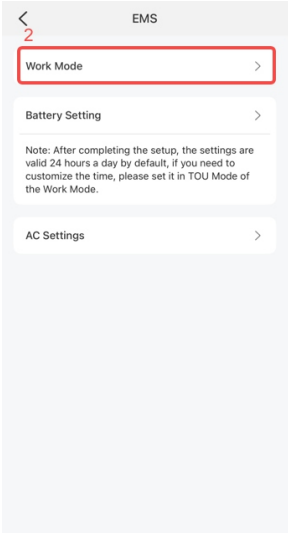
Step4 Enter any time period to make settings. Click the top right corner '+ADD' to add time period;
Step5 Set parameters as the duration of the time period, the working mode during this period, AC power;
Step6 Enable and save the settings.



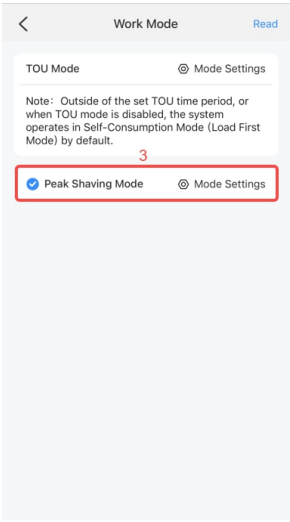
4.3.2 Peak Shaving

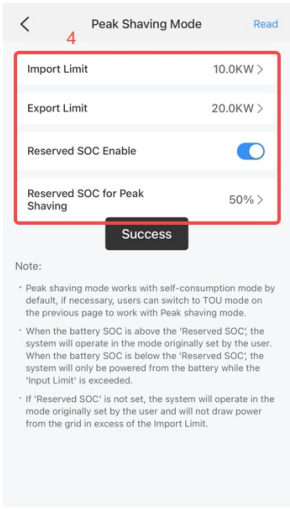
If peak shaving function is required, please refer to the following steps:
Step1 Click to enter "EMS" on the main interface of ShineTools;
Step2 Click to enter the settings of "Work Mode";





Step3 Enter the settings interface for Peak Shaving mode;
Step4 Set relevant parameters for Peak Shaving such as import Limit, export Limit, reserved SOC, etc.

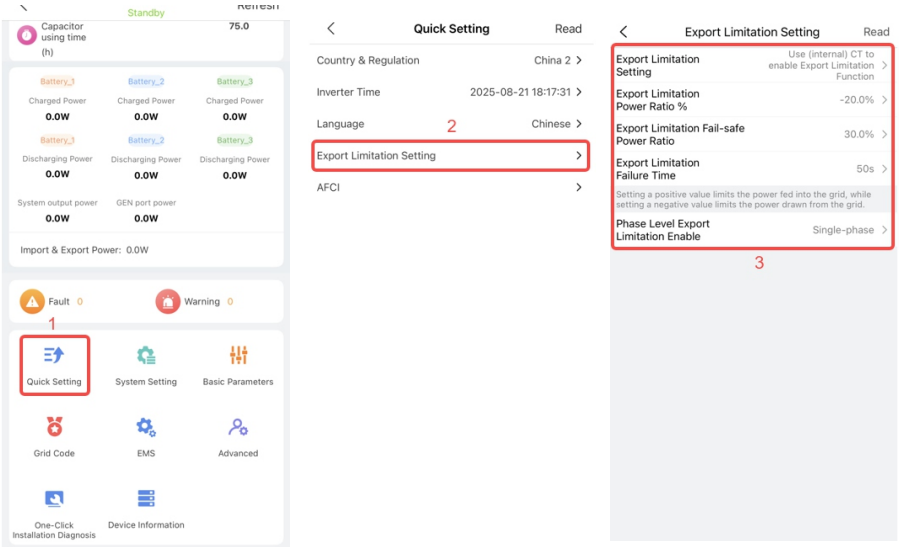




4.3.3 Export Limitation

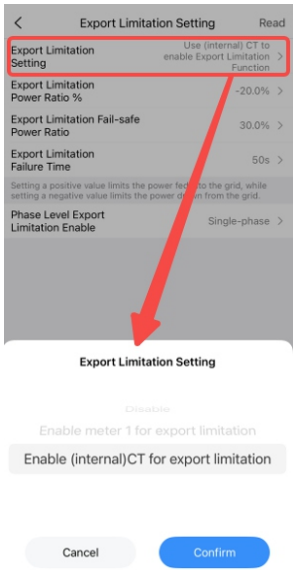
NOTICE	1. Only "Enable meter 1 for export limitation" can be selected here if the meter is enabled in the Step2 above. 2. "Enable (internal) CT for export limitation" must be selected here if there is no external smart meter. 3. External smart meter export limitation is recommended for higher accuracy.

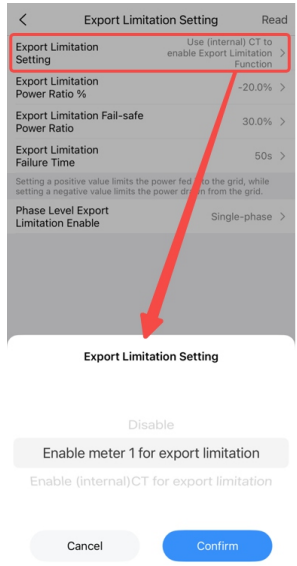
The Export Limitation can precisely regulate the export power from the system to the grid to meet local safety regulations.
The setting method for the Export Limitation is as follows:
Step1 Click to enter "Quick Setting" on the main nterface of ShineTools;
Step2 Click to enter " Export Limitation Settings ";
Step3 Set relevant parameters as required.



1）Meter for export limitation / CT for export limitation
The internal CT export limitation can be selected when the system has no external smart meter and Cts.

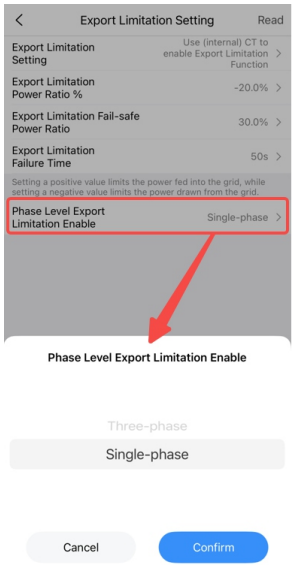
NOTICE	When internal CT export limitation is enabled, no load is supported to connect to the grid side of WIT.

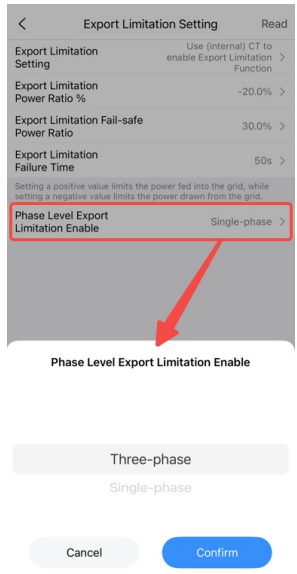




2) Single-phase/Three-phase export limitation

Three-phase limits the total three-phase export power to the grid within the required value; single-phase limits the export power to the grid for each phase. Please confirm whether to enable phase-level export limitation according to actual needs. For specific setting methods, please refer to the figure below.





5 System Status Viewing and Maintenance

5.1 Introduction to System Indicator Light Status

5.1.1 WIT Display Screen Status

An LCD display screen is in front of WIT, which includes indicator lights for each input and output terminal. This screen will display current operating state of the system.

(1) Indicator Light Description

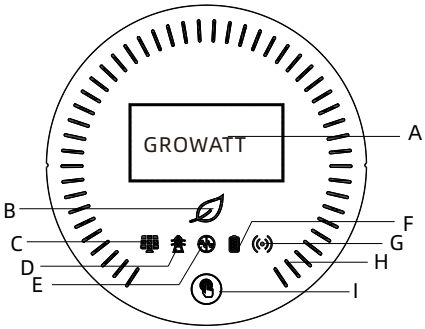


Fig 5.1 Display panel

Table 5.1 Symbol Description

Position	Description	Note
A	OLED screen	Displays the main system information
B	System indicator	Displays the system status
C	PV indicator	Indicates the operation status on the PV side
D	Grid/GEN indicator	indicates the operation status on the grid side and the GEN port status
E	Off-grid indicator	Off-grid status display
F	Battery indicator	Indicates the status of the battery
G	Communication	Indicates the communication status and other system faults
H	Running light	Indicates the charging and discharging mode of the battery and some other statuses
I	Button	You can switch the information displayed on the OLED by pressing the button

(2) Indicator Status and Meaning

Table 5.2 Indicator description

	Status	Meaning
	Off	The system initialization at power-on
	Steady green	The system is operating properly
	Blinking green	System in standby or firmware upgrade
	Steady red	System failure
	Off	The PV voltage dose not reach the operating voltage
	Steady green	The PV voltage reaches the operating voltage and there are no error or warning
	Steady red	A fault or alarm is reported on the PV side
	Off	No grid
	Steady green	Successfully connected to the grid
	Steady red	A fault or alarm is reported on the grid side
	Off	The system operates in grid-connected mode
	Steady green	The system operates in off-grid mode with no faults or alarms on the inverter side
	Steady red	The system operates in off-grid mode with faults or alarms on the inverter side
	Off	The system is not connected to any battery
	Steady green	No faults and alarms for any of the batteries connected to the system（When multiple clusters of batteries are connected to the system, the battery indicator turns green when the page is turned to the page corresponding to normal battery; the light turns red when the page is turned to the page corresponding to abnormal battery; and the light goes out when the page is turned to the page corresponding to battery not connected to the system）
	Steady red	All batteries are faulty or alarmed

<table>
<tr><th></th><th>Status</th><th>Meaning</th></tr>
<tr><td rowspan="4">  </td><td>Off</td><td>No host computer communication or USB flash drive read/write</td></tr>
<tr><td>Steady green</td><td>Host computer communication is normal or the USB flash drive reads and writes normally</td></tr>
<tr><td>Blinking green</td><td>The WIT Inverter is upgrading or the USB interface is reading and writing data</td></tr>
<tr><td>Steady red</td><td>External communication fails, or a system fault occurs</td></tr>
<tr><td rowspan="3">  </td><td>Steady white</td><td>Battery is in standby mode</td></tr>
<tr><td>Rotates clockwise</td><td>Charging mode</td></tr>
<tr><td>Rotates anticlockwise</td><td>Discharging mode</td></tr>
<tr><td>  </td><td colspan="2">Displays critical system information. Users can call up and switch the interface by tapping the button.
When a fault or alarm occurs in the system, the fault or alarm will be displayed</td></tr>
<tr><td>  </td><td colspan="2">The OLED will be activated when the button is pressed. The OLED will turn off if there is no operation for 5 minutes.</td></tr>
<tr><td rowspan="3">  </td><td colspan="2">Progress less than 50%: system is functioning normally, system, PV, grid, off-grid, battery and communication indicators show real-time status of system</td></tr>
<tr><td colspan="2">Progress greater than 50%: PV, grid, off-grid, battery are steady green, system indicator and communication indicator blinking green</td></tr>
<tr><td colspan="2">After the system firmware update is completed, the system, PV, grid, off-grid, battery and communication indicators are steady green for 8s</td></tr>
<tr><td colspan="3">In the first 3s after power-on, the OLED display shows the company LOGO, the running lights are steady green, and the system, PV, grid, off-grid, battery and communication indicators lights are all off.;
After 3s, the system, PV, grid, off-grid, battery and communication indicators are steady green for 8s.</td></tr>
</table>

5.1.2 AXE Indicator Status

Table 5-3 AXE Lamp Display Logic Description Table

Current System Status	Battery cabinet light display status (operating light green, warning light yellow, fault light red)	CM/High Voltage Box Lamp Display Status
Initialize	Running light is always on	Green light is always on
Standby	Running light is always on	Green light is always on
Charge	Running light flashes (on for 500ms /off for 500ms)	Green light is always on
Discharge	Running light flashes (on for 100ms /off for 100ms)	Green light is always on
Shutdown	Running light, warning light, and fault light are off	Green light goes out
Warning	Warning light stays on	Green light flashes (on for 1000ms/off for 1000ms)
Fault	Malfunction indicator light stays on	Red light flashes (on for 1000ms/off for 1000ms) /Red light stays on
Upgrade	Running light and warning light flash (on for 500ms/off for 500ms)	Green light flashes (on for 200ms/off for 200ms)
Upgrade successful	Running light, warning light, and fault light are off	/
Upgrade failed	Warning light flashes (on for 500ms /off for 500ms/on for 500ms /off for 2000ms)	/
Fault Waveform Recording Reading	Running light and warning light flash (on for 500ms/off for 500ms)	Green light flashes (on for 200ms/off for 200ms)
Cabinet door open	Running light, warning, and fault light flash (on for 500ms/off for 500ms)	Green light is always on

Note: Only the high-voltage box indicator light is retained for indoor racks.

5.2 System Fault Code Interpretation

5.2.1 Warning Code

The appearance of the following warning codes indicates that the system has encountered an abnormal situation, which may lead to input/output power decrease. After troubleshooting by restarting the inverter or reconfiguring the system, the warning signs will disappear. The warning codes are shown in Table 5-4:

Table 5.4 Warning codes

Warning	Subcode	Description	Suggestion
Warning 200		Multi-channel string mismatch	1. Check if the panel is normal after shutting down; 2. If the fault information still exists, contact the manufacturer.
Warning 201		Abnormal wiring of string terminals	1. Check the wiring of the string terminals after shutdown. 2. If the fault information still exists, contact the manufacturer.
DC SPD Warning		DC SPD function DC lightning arrested alarm	1. Check the DC lightning arrested after shutdown. 2. If the fault information still exists, contact the manufacturer.
Warning 203		Is the first or second panel or circuit short-circuited?	1. Check whether the first, second, third, and fourth circuit panels or lines are short-circuited. 2. If the fault information still exists, contact the manufacturer.
DC/DC Warning		Boost boost drive anomaly	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
AC SPD Warning		AC lightning arrested alarm	1. Check the DC lightning arrested after shutdown. 2. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 208		DC fuse disconnected	1. Check the fuse after shutting down. 2. If the fault message still persists, contact the manufacturer.
Warning 209		Panel PV voltage is too high	1. Immediately disconnect the DC switch and confirm the voltage. 2. If the fault information still exists after the normal voltage is restored, contact the manufacturer.
PV Reversed		The positive and negative poles of the PV panel are reversed	1. Check the input end of the panel 2.If the fault information still exists, contact the manufacturer
Warning 219	1. PID Overvoltage Fault 2.PID Insulation Fault 3. PID Bus Voltage Fault	PID Alarm	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Warning 220		String not connected	1. Check if the connection of the corresponding string is normal. 2. If the fault information still exists, contact the manufacturer.
Warning 221		String current imbalance	1. Check if the corresponding string panel is normal. 2. If the fault information still exists, contact the manufacturer.
Warning 300	0. No mains power connection	Mains power is not connected, or the wiring is not properly connected	1. Please confirm whether the power grid is lost. 2. If the fault information still exists, contact the manufacturer.
Warning 301		Mains voltage out of range	1. Check whether the AC voltage is within the specification range of the standard voltage. 2. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 302		Mains frequency out of range	1. Check if the frequency is within the range. 2. If the fault information still exists, contact the manufacturer.
Warning 303		Output power out of range	1. Reduce output power 2. If the fault information still exists, contact the manufacturer
Warning 308		The electricity meter is not connected, or the wiring is not properly connected	1. Check if the electricity meter is properly connected. 2. If the fault information still exists, contact the manufacturer.
Warning 309	0: Electric meter reverse connection 1: CT1 reverse connection, CT2 normal connection; 2: CT1 normal connection, CT2 reverse connection; 3: CT1 reverse connection, CT2 reverse connection; 4: CT1 not connected, CT2 normal connection; 6: CT1 not connected, CT2 reverse connection; 8: CT1 normal connection, CT2 not connected;	Abnormal meter wiring	1. Check if the electricity meter is connected in reverse. 2. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 309	9: CT1 reverse connection, CT2 not connected; 12: CT1 not connected, CT2 not connected;	Abnormal meter wiring	1. Check if the electricity meter is connected in reverse. 2. If the fault information still exists, contact the manufacturer.
Warning 310		Abnormal voltage difference between N line and PE cable	1. Check the ground wire after shutting down to ensure it is securely connected. 2. If the fault information still persists, contact the manufacturer.
Warning 311	0: Grid phase sequence error	Three-phase phase sequence error alarm	No operation required, PCS automatically adjusts the wave emission phase sequence. It is recommended that the customer change the phase sequence.
Warning 400	BIT0: Fan 1 abnormal BIT1: Fan 2 abnormal BIT2: Fan 3 abnormal BIT3: Fan 4 abnormal	XXXX corresponds to four fans respectively, with normal operation being 0000. An error in a particular fan is represented as 1, for example, 0010 indicates an error in the second fan.	1. Check the fan wiring after shutting down. 2. Replace the fan. 3. If the fault message still persists contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 401	0: When the system is in dual-meter mode after transformation, an alarm is triggered for abnormal communication of Meter 1, or when in the single-meter mode, an alarm is triggered for abnormal communication of the meter. 1: When the system is in dual-meter mode after transformation, an alarm is triggered for abnormal communication of Meter 2.	The communication connection between the meter and the machine is abnormal	1. Check if the electricity meter is turned on. 2. Check if the connection between the machine and the electricity meter is normal.
Warning 402		Communication anomaly between optimizer and inverter	1. Check if the optimizer is turned on. 2. Check if the connection between the optimizer and the inverter is normal.
Warning 407	0. Over-temperature alarm 20. ATS over-temperature alarm	Over Temperature Alarm	1. Restart the inverter. 2. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 408	0. NTC damage alarm 1. Inverter or BOOST NTC damage alarm 20. ATS NTC fault	NTC broken	1. Restart the inverter. 2. If the fault information still exists, contact the manufacturer.
Warning 411	1. Low-frequency synchronization alarm 2. High-frequency synchronization alarm 3. Low-frequency synchronization reverse connection 4. Inverter internal CAN communication anomaly 5. Parallel unit CAN communication anomaly 22. ATSCAN communication failure	Synchronization signal is abnormal	1. Check if the hardware synchronization cable is abnormal. 2. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 412	1. Phase locking failure 2. Grid voltage exceeds the grid-connected startup voltage range 3. Grid frequency exceeds the grid-connected startup frequency range 4. PV voltage is too low or too high 5. Bus soft start failure or BUS voltage is too low 6. Battery voltage is lower than the set EOD point 7. BUS voltage is not calibrated 8. BMS status is in initialization, shutdown, fault, or upgrade state 9. Off-grid parameter settings are abnormal 10. M3-DSP serial protocol version mismatch 11. Phase sequence check is not completed 12. Frequency range check is not completed 13. DSP receives incomplete M3 data frames 14. Inverter voltage is abnormal 21. ATS wave blocking alarm	The grid-connected startup conditions of the inverter are not met	1. Check whether the grid voltage is out of range or whether the grid-connected voltage setting of the inverter is correct; 2. Check whether the PV voltage is too high or too low; 3. Check the battery voltage and the BMS low voltage set point; 4. Check whether the battery BMS status is ready; 5. Check the off-grid parameter settings; 6. Check whether the M3 and DSP versions are correct; 7. Restart the inverter. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 500		Machine-battery communication failure	1. Check if the lithium battery is turned on. 2. Check if the connection between the lithium battery and the inverter is normal.
Warning 501		Battery wiring is not properly connected	1. Check if the battery is connected 2. If the fault message still persists contact the manufacturer
Warning 502		Battery voltage is too high	1. Check if the battery voltage is within the specification range. 2. Check if the battery is properly connected. 3. If the fault information still exists, contact the manufacturer.
Warning 503		Battery voltage is too low	1. Check if the battery voltage is within the specification range. 2. Check if the battery is properly connected. 3. If the fault information still exists, contact the manufacturer.
Warning 504		Battery Reverse Connection	1.Check if the battery is installed backwards 2. If the fault message still persists contact the manufacturer
Warning 505		Battery temperature detection is not properly connected	1. Check if the battery temperature sensor is installed. 2. Check if the battery temperature sensor is properly connected. 3. If the fault message still persists contact the manufacturer.
Warning 506		Battery temperature exceeds the allowable range	1. Check if the battery ambient temperature is within the specification range. 2. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 507		The battery reports an error and cannot be charged or discharged. Determine the cause of the error based on the battery error code.	1. The battery reports an error and cannot be charged or discharged. Determine the cause of the error based on the battery error code. 2. If the fault information still exists, contact the manufacturer.
Warning 508		Load power is greater than the rated discharge power of the lithium battery	1. Check if the load is greater than the battery discharge rated power 2. If the fault information still exists, contact the manufacturer.
Warning 509		Battery Management System Information Abnormal	1. Restart the inverter. 2. If the fault information still exists, contact the manufacturer.
Warning 510		Battery lightning arrester is abnormal	1. Check the DC lightning arrested after shutdown. 2. If the fault information still exists, contact the manufacturer.
Warning 600		Output current DC component is too high	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Warning 601		The DC component of the output voltage is too high	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer

Warning	Subcode	Description	Suggestion
Warning 602	1: R-phase first order off-grid voltage is low 2: R-phase second order off-grid voltage is low 3: R-phase third order off-grid voltage is low 4: S-phase first order off-grid voltage is low 5: S-phase second-order off-grid voltage is low 6: S-phase third order off-grid voltage is low 7: T-phase first order off-grid voltage is low 8: T-phase second order off-grid voltage is low 9: T-phase third order off-grid voltage is low	Off-grid output voltage is too low	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Warning 603	1: High first-order off-grid voltage of Phase R 2: High second-order off-grid voltage of Phase R 3: High first-order off-grid voltage of Phase S 4: High second-order off-grid voltage of Phase S 5: High first-order off-grid voltage of Phase T 6: High second-order off-grid voltage of Phase T	Off-grid output voltage is too high	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer

Warning	Subcode	Description	Suggestion
Warning 604	1: R-phase first-order overcurrent 2: R-phase second-order overcurrent 3: R-phase third-order overcurrent 4: S-phase first-order overcurrent 5: S-phase second-order overcurrent 6: S-phase third-order overcurrent 7: T-phase first-order overcurrent 8: T-phase second-order overcurrent 9: T-phase third-order overcurrent 10: N-line first-order overcurrent 11: N-line second-order overcurrent 12: N-line third-order overcurrent	Off-grid output current overcurrent	1. Check if the load exceeds the specification. 2. Restart the inverter. If the fault information still exists, contact the manufacturer.
Warning 605	1: First-order Bus voltage is low 2: Second-order Bus voltage is low	Off-grid Bus voltage is too low	1. Check if the load exceeds the specification. 2. Restart the inverter. If the fault information still exists, contact the manufacturer.
Warning 609	1. Balanced circuit overload 2. Balanced circuit abnormal alarm	Balanced Circuit Alarm	1. Restart the inverter; 2. If the fault information still exists, contact the manufacturer.

Warning	Subcode	Description	Suggestion
Warning 606	1: R-phase first-order overload 2: R-phase second-order overload 3: R-phase third-order overload 4: S-phase first-order overload 5:S-phase second-order overload 6: S-phase third-order overload 7: T-phase first-order overload 8: T-phase second-order overload 9: T-phase third-order overload	Off-grid output overload	1. Check if the load exceeds the specification. 2. Restart the inverter. If the fault information still exists, contact the manufacturer.

5.2.2 Fault Code

The appearance of a fault code indicates that the device is damaged, or the settings are abnormal. Please have any operations performed by a professional. Normally, after the fault is cleared, the machine will stop reporting errors. Some faults are irreparable errors. Please contact Growatt New Energy for relevant support.

Table 5.4 Warning codes

Fault Code	Fault Subcode	Description	Suggestion
AFCI Fault		DC Arc Fault	1. Check the wiring at the panel end after shutting down. 2. Restart the inverter. 3. If the fault information still exists, contact the manufacturer.
GFCI High		Leakage current GFCI is too high	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
PV Voltage High		Input PV voltage is too high	1. Immediately disconnect the DC switch and confirm the voltage. 2. If the fault information still exists after the normal voltage is restored, contact the manufacturer.
PV Isolation Low		Panel insulation impedance ISO is too low	1. Check whether the panel enclosure is reliably grounded after shutdown. 2. If the fault information still exists, contact the manufacturer.
PV Reversed		PV Reverse Connection	1. Check the inverter wiring after shutting down. 2. Restart the inverter. 3. If the fault message still exists, contact the manufacturer.
AC V Outrange		Mains voltage exceeds the allowable range	1. Check the grid voltage 2. If the grid voltage has returned to the allowable range but the fault information still exists, contact the manufacturer

Fault Code	Fault Subcode	Description	Suggestion
No AC		The output is not connected to the mains	1. Check the AC side circuit connections after shutting down. 2. If the fault information still exists, contact the manufacturer.
PE Abnormal		Zero-earth detection anomaly	1. Check the ground wire after shutting down to ensure it is securely connected. 2. If the fault information still persists, contact the manufacturer.
AC F Outrange		Mains frequency out of range	1. Check the grid frequency and restart. 2. If the fault information still exists, contact the manufacturer.
Error 309		Abnormal rate of change of grid frequency	1. Check the grid frequency and restart. 2. If the fault information still exists, contact the manufacturer.
Grounding Fault		Neutral point voltage to ground is low	1. Check whether the N line on the inverter side of the PV negative grounding is short-circuited to the ground wire, and whether the output side is connected to a transformer for isolation. 2. If the fault information still exists, contact the manufacturer.
Error 311	1. Over-range timeout protection for reverse power control of electricity meter 2. Abnormality of anti-reverse electricity meter	Anti-reverse flow failure protection	1. Check if the error quickly recovers. If it does and the system restarts quickly, it is due to the over-range timeout protection of the meter's reverse power control. This occurs after a rapid load disconnection, as the inverter shuts down for protection to prevent reverse power flow as required by safety regulations. 2. Confirm if the fault persists. After shutting down, check if the current transformer is correctly connected and communicating. 3. If the fault information still exists, contact the manufacturer.

Fault Code	Fault Subcode	Description	Suggestion
Error 400		Output DC component bias voltage is abnormal	1. Restart the inverter. 2. If the fault information still exists, contact the manufacturer.
Error 401		The DC component of the output voltage is too high	1: Restart the inverter 2: If the fault information still exists, contact the manufacturer
Error 402	1: R-phase DCI too high 2: S-phase DCI too high 3: T-phase DCI too high	The DC component of the output current is too high	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 404		Bus voltage sampling anomaly	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 405		Relay abnormality	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 408	0. PCS Over Temperature	Overheating	1. Check the temperature after shutting down and restart the inverter after it is normal. 2. If the fault information still exists, contact the manufacturer.
Error 409	1. Bus undervoltage 2. Bus overvoltage 3. Positive Bus undervoltage 4. Positive Bus overvoltage 5. Negative Bus undervoltage 6. Negative Bus overvoltage 7. Bus voltage imbalance	Bus voltage anomaly	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer

Fault Code	Fault Subcode	Description	Suggestion
Error 411	0. M3 fails to read DSP communication 1. Communication failure between M0 and DSP 2. Main chip DSP fails to read M3 communication 3. Communication failure between AFCI and DSP 4. Sub-chip DSP fails to read M3 communication 5. Main chip DSP fails to read sub-chip DSP communication 6. Sub-chip DSP fails to read main chip DSP communication 7. CAN communication failure between parallel DSPs 8. CAN communication failure between DSP and off-grid box SYN 9. The number of communication frames received by the main chip DSP from M3 is incomplete	Internal communication error	1. Check the wiring of the communication board after shutting down. 2. If the fault information still exists, contact the manufacturer.

Fault Code	Fault Subcode	Description	Suggestion
Error 411	10. The number of communication frames received by the sub-chip DSP from M3 is incomplete 11. M3 fails to read sub-chip DSP communication 20. Abnormal communication between ATS and DSP 21. Abnormal communication between ATS and M3 23. DSP receives abnormal M3 communication 24. M3 receives abnormal DSP communication 25. Alarm for incomplete reception of ATS DSP communication frames	Internal communication error	1. Check the wiring of the communication board after shutting down. 2. If the fault information still exists, contact the manufacturer.
Error 412		NTC OPEN Abnormal connection of temperature sensor	1. Check if the temperature sampling module is properly connected after shutting down. 2. If the fault information still exists, contact the manufacturer.
Error 413		IGBT Driver Abnormality	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 414		EEPROM Memory Read/Write Error	1. Restart the inverter. 2. If the fault information still exists, contact the manufacturer.

Fault Code	Fault Subcode	Description	Suggestion
Error 415	0. SPS Abnormality	Auxiliary power supply is abnormal	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 416	1. DC overcurrent protection 2. AC overcurrent protection 3. Long-term wave-by-wave current limiting protection for phase R 4. Long-term wave-by-wave current limiting protection for phase S 5. Long-term wave-by-wave current limiting protection for phase T 20. ATS overcurrent protection	DC/AC Overcurrent Protection	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 417	1. The Communication Protocol between M3 and BDC does not match. 2. The Communication Protocol between M3 and inverter DSP does not match. 3. The Communication Protocol between DSP and M0 does not match.	System Communication Protocol Mismatch	1. Restart the machine 2. If the fault message still exists, contact the manufacturer

Fault Code	Fault Subcode	Description	Suggestion
Error 418		The firmware versions of the control board and communication board do not match	1. Check the firmware version 2. If the fault information still exists, contact the manufacturer
Error 419		Control software and hardware version mismatch	1. Check the firmware version 2. If the fault information still exists, contact the manufacturer
Error 421		CPLD module is abnormal	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 422	1. Inconsistent AC voltage sampling 2. Inconsistent GFCI sampling 3. Inconsistent ISO sampling	Redundant sampling inconsistency	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 423	0. PWM signal direct pass 1. Self-check: R-phase inverter voltage abnormal 2. Self-check: S-phase inverter voltage abnormal 3. Self-check: R/S-phase inverter voltage abnormal 4. Self-check: T-phase inverter voltage abnormal 5. Self-check: R/T-phase inverter voltage abnormal	Inverter PWM or bus direct-through protection fault	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer

Fault Code	Fault Subcode	Description	Suggestion
Error 423	6. Self-check: S/T-phase inverter voltage abnormal 7. Self-check: R/S/T-phase inverter voltage abnormal 8. Self-check: Total bus voltage abnormal 9. Self-check: Positive bus voltage abnormal 10. Self-check: Negative bus voltage abnormal	Inverter PWM or bus direct-through protection fault	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 425		AFCI self-test error	1. Restart the machine 2. If the fault message still exists, contact the manufacturer
Error 426	0. Abnormal PV current sampling 1. Abnormal battery current sampling	PV current sampling anomaly	1. Restart the machine 2. If the fault message still exists, contact the manufacturer
Error 427	0. Abnormal AC current sampling 1. Abnormal CT current sampling	Abnormal AC current sampling	1. Restart the machine 2. If the fault message still exists, contact the manufacturer
Error 429	1. BUS1 soft start failed 2. BUS2 soft start failed	BUS Soft Start Failed	1. Restart the machine 2. If the fault message still exists, contact the manufacturer
Error 430		EPO Fault	1. Check if the machine is operating normally
Error 431		Monitoring chip BOOT verification failed	1. Restart the machine 2. If the fault message still exists, contact the manufacturer

Fault Code	Fault Subcode	Description	Suggestion
Error 500		Machine-battery communication failure	1. Restart the entire system 2. If the fault information still exists, contact the manufacturer
BAT Voltage Low		Low battery voltage	1. Check the battery voltage 2. If the fault message still exists, contact the manufacturer
Error 503		Battery voltage is too high	1. Check if the battery voltage is normal. If not, please replace the battery. 2. If the fault information still exists, contact the manufacturer.
Error 504		Battery temperature out of range	1. Battery temperature exceeds the charge-discharge temperature range (configurable), check the battery temperature. 2. If the fault information still exists, contact the manufacturer.
BAT Reversed		Reverse connection of battery positive and negative electrodes	1. Check the battery terminal 2. If the fault message still persists contact the manufacturer
Error 506		Battery not connected or wiring not properly connected	1. Check the battery terminal 2. If the fault message still persists contact the manufacturer
Error 507		Load power is greater than the rated discharge power of the lithium battery	1. Check if the load is greater than the battery discharge rated power 2. If the fault information still exists, contact the manufacturer.
Error 508		BUS2 voltage anomaly	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer

Fault Code	Fault Subcode	Description	Suggestion
Error 509		Battery charging overcurrent fault	1. Check if the photovoltaic voltage is overrated. 2. If the fault information still exists, contact the manufacturer.
Error 510		Battery discharge overcurrent fault	1. Check whether the battery discharge current setting parameters are reasonable. 2. If the fault information still exists, contact the manufacturer.
Error 511		Battery Soft Start Fault	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Output Short		Off-grid output short circuit	1. Restart the inverter. 2. If the fault information still exists, contact the manufacturer.
Error 601	1. Bus voltage is low 2. Bus voltage is high	Off-grid bus voltage is low	1. Check if the battery is working properly or is undercharged. 2. If the fault information still exists, contact the manufacturer.
Error 602	1. Output port voltage is abnormal when the single unit is not powered on. 2. Output port voltage is abnormal when the parallel units are not powered on. 3. There are powered-on PCSs in the parallel units, but there is no voltage abnormality at the output ports of the unpowered PCSs.	Off-grid port voltage anomaly	1. Check if there is voltage at the AC port of the device. 2. If the fault information still exists, contact the manufacturer.

Fault Code	Fault Subcode	Description	Suggestion
Error 603		Soft start failed	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 604	1. Off-grid output voltage is too low 2. Off-grid output voltage is too high	Off-grid output voltage is abnormal	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 605		Self-check fault of balancing circuit	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 606		The DC component of the output voltage is too high	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
OverLoad		Off-grid output overload	1. Restart the inverter 2. If the fault information still exists, contact the manufacturer
Error 608	1. Abnormal CAN communication between parallel devices 2. Abnormal low-frequency synchronous communication	Off-grid parallel signal is abnormal	1. Check if the communication line is properly connected; 2. If the fault information still exists, contact the manufacturer

5.3 Daily Maintenance

5.3.1 WIT Enclosure Cleaning

DANGER	• Please disconnect the AC and DC side front-stage circuit breaker or switch, wait 5 minutes until the capacitor is fully discharged, and then proceed with the operation. • If dust accumulates, wipe the corresponding machine housing with damp cloth.

(1) Regularly check the humidity and dust in the environment around the system, and clean the system equipment if necessary;
(2) Regularly check the ventilation and heat dissipation of the equipment, details are provided in Section 5.3.2.

5.3.2 WIT Fan Maintenance

DANGER	• Must be operated by trained professional electrical technicians and comply with the manual instructions. • Please disconnect the AC and DC side front-stage circuit breaker or switch, wait 5 minutes until the capacitor is fully discharged, and then proceed with the operation.
WARNING	• Do not use an air pump to clean the fan, as it may cause damage to the fan.

Ventilation and heat dissipation are crucial for protecting the WIT from performance degradation caused by excessive heat. The WIT is internally equipped with cooling fan, which starts working when the internal temperature is too high. If the output power of the WIT decreases due to excessive internal temperature, the possible causes and countermeasures are as follows:
(1) The fan is blocked or there is excessive dust on the heat sink, the fan, fan guard, or heat sink needs to be cleaned;
(2) The fan is damaged and needs to be replaced;
(3) The ventilation at the WIT installation location is poor, and a suitable installation location needs to be selected according to the basic installation requirements.

Fan cleaning and replacement:
Step 1: Before cleaning or replacing the fan, please ensure that the DC side and AC side of WIT are completely disconnected for at least 5 minutes before proceeding with the operation;
Step 2: Remove the fan fixing plate with a Phillips screwdriver, as shown in Figure 5-2:

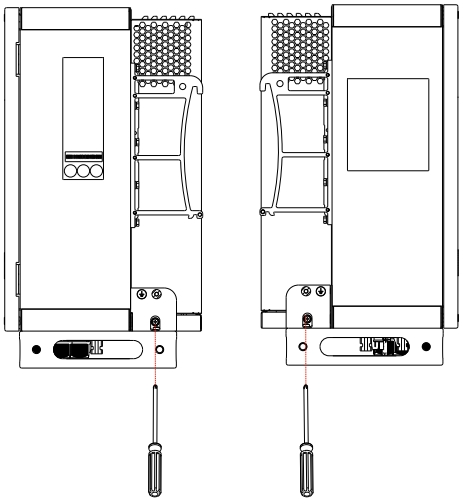


Figure 5-2 WIT Side View

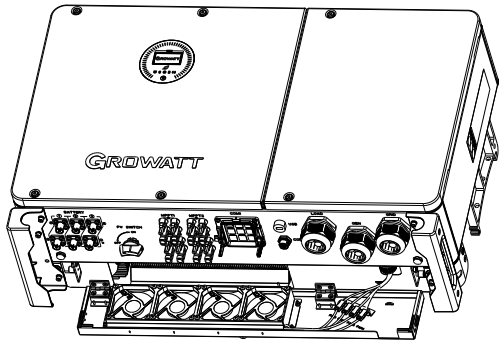


Figure 5-3 Position of the Fan Fixing Plate

Step3: Disconnect the fan connector, remove the fan fixing plate with a screwdriver, and then remove the fan;

Step 4: Clean the fan, fan guard and heat sink or replace the fan:

① Clean the heat sink with an air pump, and clean the fan and fan guard with a brush or a damp cloth;

② If necessary, each fan can be removed for individual cleaning;

③ Use a Phillips screwdriver to remove the fan that needs to be replaced, and then replace it with a new one;

④ Organize the wiring harness and secure it with cable ties;

⑤ Reinstall the fan, fan fixing plate, and WIT.

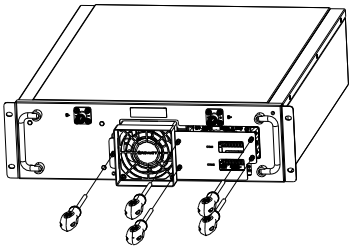
5.3.3 AXE Fan Maintenance

Ventilation and heat dissipation are crucial for protecting the BM module from cell performance degradation caused by excessive heat. The front end of the BM module is equipped with a cooling fan, which starts working when the internal temperature of the BM module is too high. The fan needs to be regularly cleaned. If the fan is damaged, Please replace promptly.

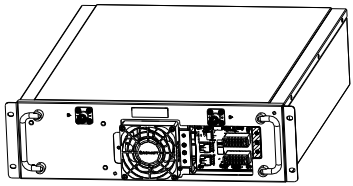
Before cleaning or replacing the fan, please complete the system power-down, disconnect the power and communication cable between BM modules or between BM module and CM module. Then proceed with the operation;

Fan cleaning and replacement:

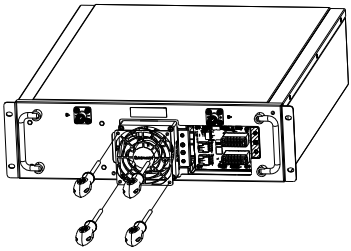
Step 1: Use a Phillips screwdriver to remove the fixing screws of the fan cover plate and the fan guard. Then remove them and pull out the fan. Disconnect the fan connector and remove the fan as needed;



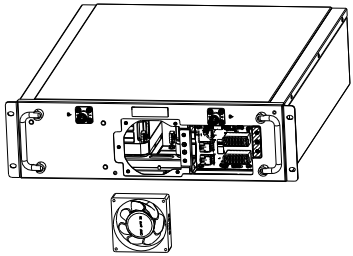
Remove the screws from the fan cover plate



Remove the fan cover plate



Remove the fan guard screws



Pull out or remove the fan

Step 2: Clean the fan and fan guard with a brush or damp cloth. Do not clean by rinsing with water directly. If necessary, the fan can be removed and cleaned separately;

Step 3: If the fan is damaged, the damaged fan needs to be removed separately and replaced with a new fan of a matching model;

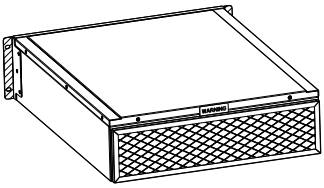
Step 4: cleaning is completed, organize and connect the wiring harness; after confirming that the fan connector is securely connected, install the fan, fan guard, and fan cover guard in sequence. Connect the power and communication cables between BM modules or between BM module and CM module. After confirming that everything is correct, power on the system.

5.3.4 AXE Dust-Proof Net Maintenance

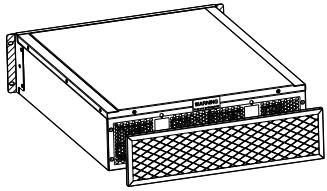
NOTICE	Only indoors battery rack has the dust-proof net. For the battery cabinet, please refer to 5.3.5 Battery Cabinet Maintenance.

A dust-proof net is installed at the back end of the BM module to prevent dust and debris from entering the interior of the BM module and contaminating components. If the dust-proof foam or its protective mesh has excessive dust or is blocked, the dust-proof foam needs to be cleaned or replaced.
Before cleaning or replacing the dust-proof net, please disconnect the power and communication cables between BM modules or between BM module and CM module after the system is powered off, and then proceed with the operation.

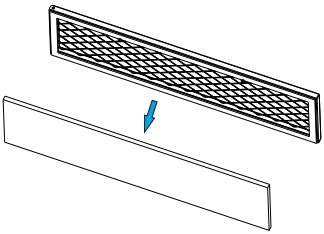
Dustproof foam cleaning and replacement;
Step1 Slightly lift the dust filter upward with both hands, then move it backward to remove the dust-proof net;



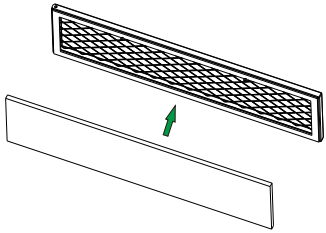
BM module rear



Remove the dust-proof net



Remove the old dust-proof foam



Install new dust-proof foam

Step 2: If the dust on the dustproof foam and foam mesh is less or easy to blow off, use an air pump and brush to blow and clean the dustproof foam and foam mesh;
Step 3: If the dustproof foam has a large amount of dust or is blocked and cannot be cleaned, or if the dustproof foam is damaged, a new dustproof foam needs to be replaced;

Step 4: After cleaning or replacement is completed, smooth out the dustproof foam. Install the dustproof foam back into the foam protective mesh and then reinstall the dustproof net. Connect the power and communication cables between BM modules or from BM modules to CM modules. After confirming that everything is correct, power on the system.

5.3.5 Battery Cabinet Maintenance

 **DANGER**	• Only personnel with professional qualifications and authorization are allowed to perform maintenance on the battery cabinet. • Must comply with the relevant electrical operating procedures of the country or region where one is located. • Both the input and output of the battery cabinet are high-voltage electricity, and necessary safety precautions must be taken before starting maintenance. • Before performing maintenance, the correct operating procedures must be strictly followed. • The inverter has a bus capacitor, and the entire energy storage system must have all main power and control power switches (AC and DC switches) fully disconnected for 5 minutes before it can be completely discharged, ensuring that all wiring harnesses and the interior of the entire energy storage system are in a de-energized state. • After disconnecting the power supply, a warning sign must be hung at the disconnection point to prevent someone from powering on during maintenance. • To avoid accidental danger, maintenance personnel should wear insulating protective equipment during maintenance.

5.3.5.1 Battery Cabinet Inspection and Maintenance Items

Table 5-6 List of Daily Maintenance Items for Battery Cabinets

No.	Maintenance Project
1	Check for abnormal noises inside the battery cabinet
2	Check for any unusual odors inside the battery cabinet
3	Check the input and output voltage, current, temperature, and operating status of the energy storage system, conduct real-time monitoring, and promptly perform maintenance if any abnormal operation or abnormal voltage, current, or temperature is detected.
4	Check that the exterior surface of the cabinet is undamaged, and clean any dirty areas on the surface with water or alcohol .

Table 5-7 List of Regular Maintenance Items for AXE Battery Cabinets

Maintenance Project	Maintenance Method	Maintenance Cycle
Device Inspection and Maintenance	a. Check conduct routine inspections on all metal devices b. Check the operating parameters of the equipment	half a year
Internal component inspection	a. Check for dust on circuit boards and components. If there is excessive dust, use tools to clean it. b. Check for dust on the air intake filter of the air conditioner. If there is excessive dust, use tools to clean it. c. Check for overall dust on the fan. If there is excessive dust, use tools to clean it.	half a year
Security Features	a. Check the safety warning signs on the integrated energy storage cabinet. If any damage or blurring is found, please replace them promptly. b. Check whether the emergency stop function of the equipment is normal.	half a year
Air Conditioner	Check the cleanliness of the condenser and clean it with compressed air.	half a year
External of the device	a. Check whether the device housing has any damage, paint peeling, rust, etc. b. Check whether the equipment is installed securely and whether there are potential hazards of tilting and collapse c. Check if the cabinet door can open and close normally d. Check whether there are any potential safety hazards in the working environment around the equipment	One year
Inside the device	Check for contamination, foreign objects, and dust inside the equipment and clean them up	One year

Maintenance Project	Maintenance Method	Maintenance Cycle
Device Wiring Harness	Check the following items and perform maintenance a. Check whether the connection of the device wiring harness is correct and whether the layout complies with the specifications	One year
Fan	a. Check if the fan can operate. b. Check if the fan is laggy during operation. c. Check if the noise during the fan's operation is too loud.	One year
Ground Wire	a. Check if the ground wire is connected b. Check whether the resistance value of the ground wire meets the specifications	One year
System Status	a. Check whether there are abnormal phenomena such as excessive noise, jitter, etc. during the operation of the equipment. b. Check whether the temperature and humidity during the operation of the equipment are within the normal range. c. Check whether the equipment shows signs of damage, component failure, rust, etc. d. Check whether the equipment's trend outlet is blocked	Two years
Lightning protection equipment and fuses	Check whether the lightning protection equipment and fuses are tightened	Two years

5.3.5.2 Battery Cabinet Cleaning

Since battery cabinets operate outdoors for extended periods, pollutants accumulate on the surface of the equipment, and dust accumulates inside. Regular cleaning is an essential task. Regular cleaning can improve the appearance of the equipment, reduce shell corrosion, enhance the heat dissipation efficiency of the equipment, reduce energy consumption, reduce safety accidents, thereby extending the service life of the equipment and improving operational efficiency.

(1) External cleaning of the system

Clean the contaminants on the outside of the battery cabinet with a damp cloth or 97% alcohol. When cleaning, ensure that water stains do not flow into the equipment through the trend.

(2) Internal cleaning of the system

It is not recommended to directly sweep the dust inside the battery cabinet with a broom, as this may easily cause dust to fly up. Instead, it is recommended to use a vacuum cleaner to absorb the dust. Well-maintained sealing strips are an important guarantee for effectively preventing water seepage inside the integrated cabinet and should be carefully inspected. If any damage is found, please replace it immediately.

(3) Door lock and hinge inspection

(4) Seal strip inspection

After the cleaning work is completed, the door lock of the integrated energy storage cabinet should be checked to ensure it can be used normally and is in good condition. If necessary, the lock hole of the door lock should be properly lubricated.

5.3.5.3 Hydrogen Exhaust Fan Maintenance

 **NOTICE**	For the maintenance of BM fans in battery cabinets, please refer to Section 5.3.3.

Step 1: Before replacing the fan, please power off the system and then proceed with the operation;

Step 2: Use a Phillips screwdriver to remove the fixing screws of the fan cover plate and the fan guard then remove them;

Step 3: Remove the cover plate of the wire harness card slot for the fan connection;

Step 4: Pull out the fan or disconnect the fan connector to remove the fan;

Step 5: Clean the fan, fan guard, or replace the fan;

Step 6: Reverse steps 5 to 1 in the above sequence to restore the assembly of the hydrogen exhaust fan.

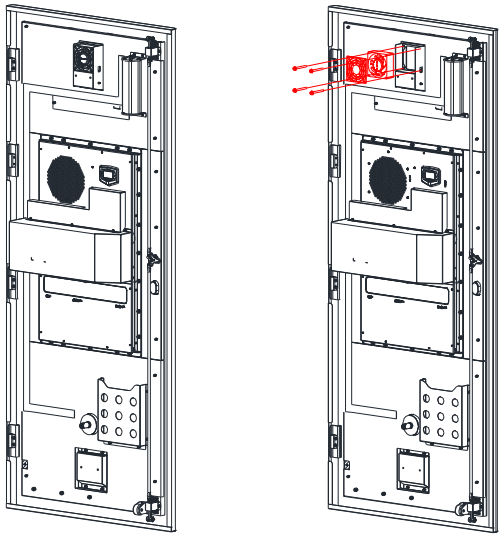


Figure 5-4 Hydrogen Exhaust Fan Disassembly Instruction Diagram

5.3.5.4 Maintenance of Air Conditioning Inlet/Outlet Trend Filters

Step 1: Before replacing the filter screen of the air conditioner's inlet and outlet trends, please power off the system and then proceed with the operation;
Step 2: Use a Phillips screwdriver to remove the large gasket screws on the rear door panel, then remove the rear door air conditioner filter;
Step 3: Check whether the air inlet and outlet trend screens of the air conditioner are blocked. If there is a blockage, please handle it promptly;
Step 4: Replace/Clean the rear door air conditioner filter;
Step 5: Restore the air conditioner filter of the cabinet.

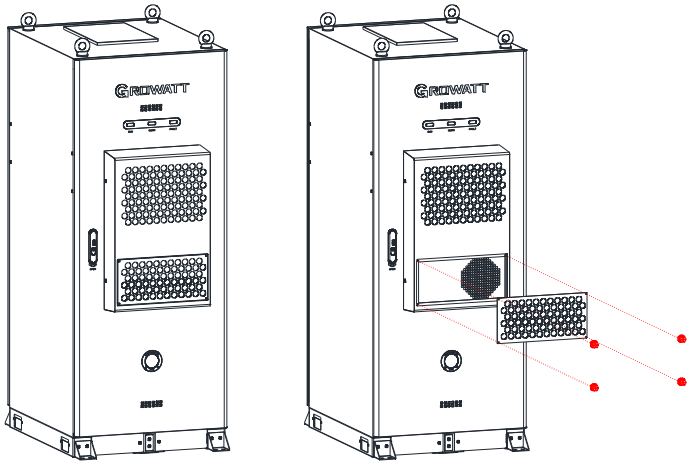


Figure 5-5 Air Conditioner Filter Removal Instruction Diagram

6 System Scrap Disposal Instructions

If the system will no longer operate in the future, it needs to be properly handled. The steps are as follows:

WIT Processing:

(1) Disconnect the external AC circuit breaker to prevent reconnection due to misoperation.
(2) Turn the PV Switch to the "OFF" position.
(3) Disconnect the battery's upstream circuit breaker.
(4) Wait at least 5 minutes until the internal capacitor has finished discharging.
(5) Remove the AC connection cable.
(6) Remove the DC connection cable.
(7) Remove the grounding wire.
(8) Remove the WIT from the installation location.
(9) Dispose of WIT in accordance with local disposal regulations.

Battery Handling:

(1) Disconnect all switches of AXE.
(2) Disconnect all the upstream circuit breakers of AXE.
(3) Wait at least 10 minutes after shutting down before opening the battery cabinet door.
(4) Disconnect the internal power connection cable and the power supply/communication connection cable of AXE.
(5) Remove the BM module of AXE and dispose of it in accordance with local disposal regulations.

Contact Us 7

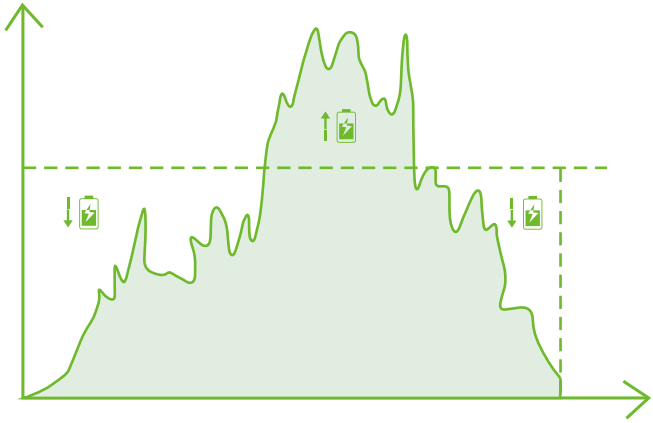
If you encounter technical issues while using our products, please contact Growatt for technical support. To provide you with the necessary assistance, please prepare the following information:
(1) Model of WIT and AXE battery system;
(2) Serial numbers of WIT and AXE batteries;
(3) System configuration and wiring diagram;
(4) Actual load power;
(5) Application mode and displayed error message code during WIT failure;
(6) OLED screen display status of WIT;
(6) Indicator status of AXE battery cabinet;
(7) Indicator status of the AXE high-voltage box.

Appendix 1 System Application Introduction

1.1 System Application Modes Introduction

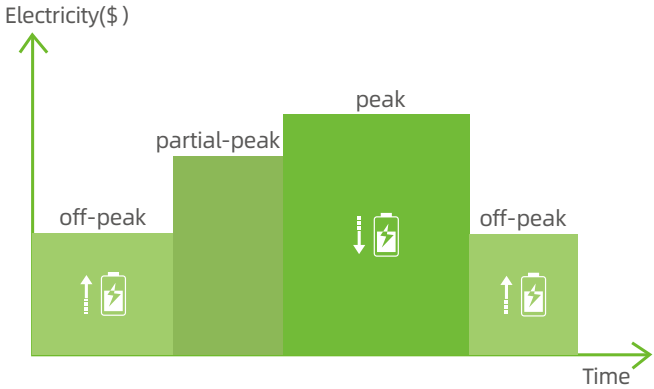
1.1.1 Self-consumption

Store excess PV energy in the battery and discharge to output energy when PV energy is insufficient or power consumption is high, thereby increasing the self-consumption rate.



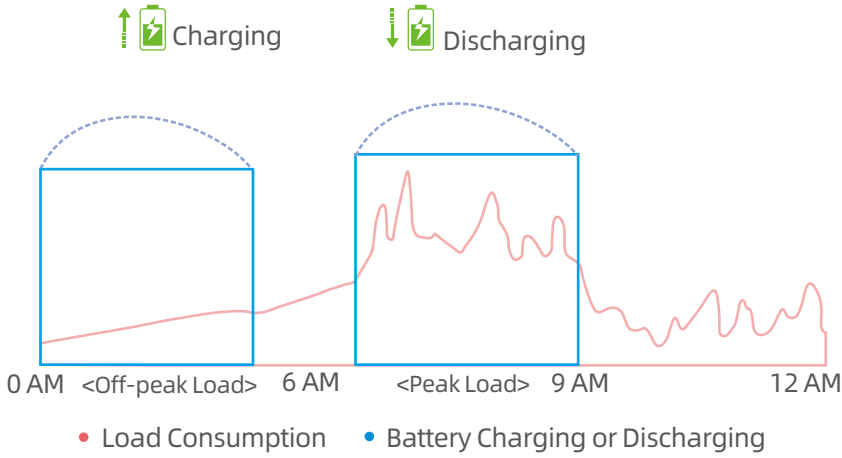
1.1.2 Time of Use

Allow the energy storage system to operate with different working logics and charge-discharge states during different time periods.
For example, based on the electricity price differences during different time periods of time-of-use electricity pricing, charge the battery during off-peak electricity price periods and discharge it during peak electricity price periods to reduce electricity bills and save costs.



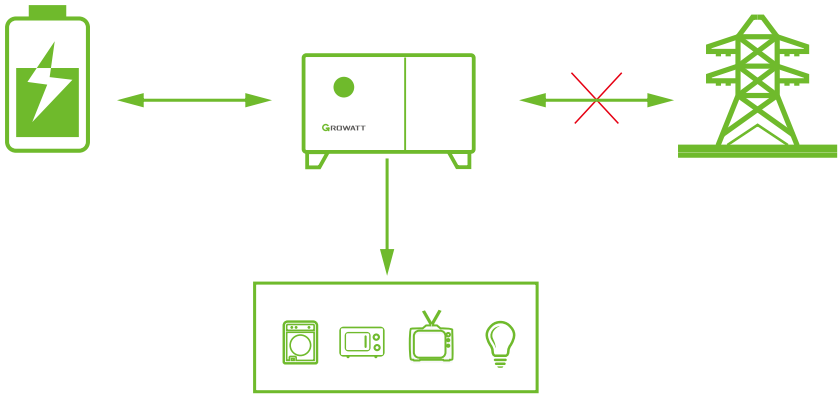
1.1.3 Peak shaving

Energy storage systems can detect real-time load power consumption, charge when the power load is low, and discharge when the power load is high, thereby controlling the energy drawn from the grid to manage electricity costs and increase revenue.



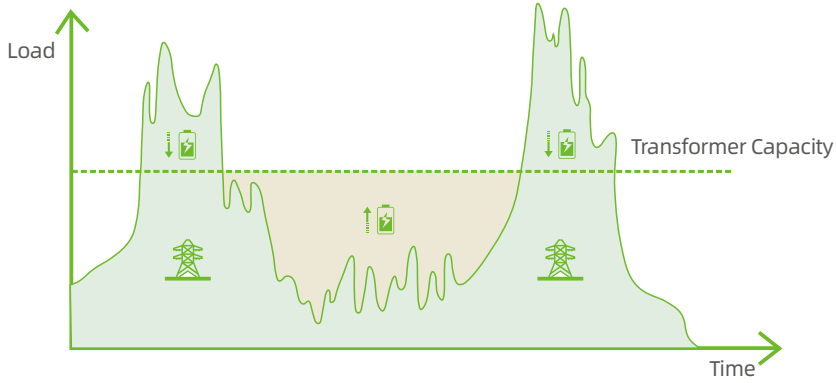
1.1.4 Back-up Power Supply

By leveraging off-grid operation ablility and on/off-grid switching functions, the energy storage system can serve as a back-up power source to ensure power supply to the load during grid failures.



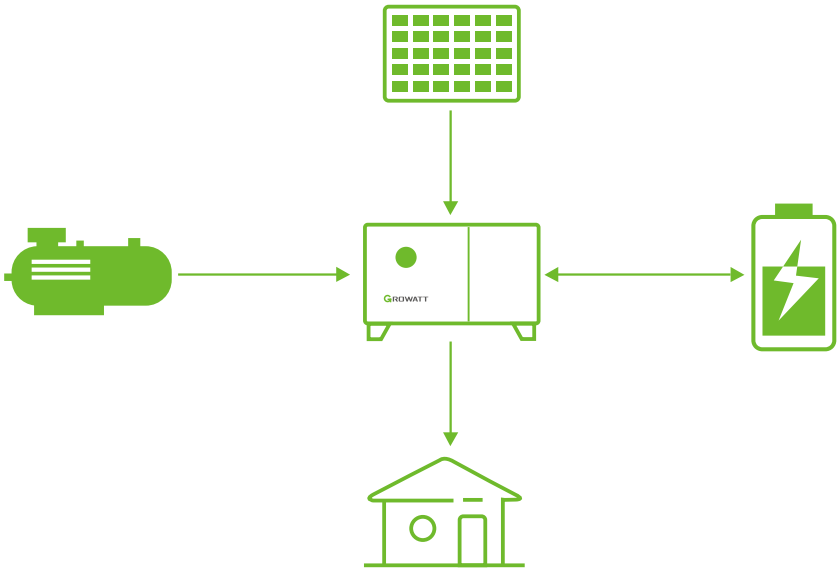
1.1.5 Power Expansion

When the load power is high and the transformer capacity limits the power it can draw from the grid, the system can discharge the battery to meet this part of the electricity demand. When the electrical load is low, the system can charge the battery in preparation.



1.1.6 Micro-grid Application

Energy storage systems can operate independently of the grid, ensuring 24/7 power supply to loads through PV energy, battery energy storage, and diesel generators, thereby enabling micro-grid system applications.



1.2 GEN Port Application

The GEN port supports three kinds of devices connection to feature different application: diesel generator, smart load, and PV inverter.

Device Type	Application Mode	Introduction
Diesel Generator	Generator	The generator can be start via dry contact control when the grid is abnormal and the SOC of the battery is lower than the set value, replacing the grid to supply power to the load and charge the battery.
PV Inverter	AC couple	When the grid is normal, it executes the normal operating logic of the PV inverter; when the grid is abnormal and the system operates off-grid, the PV inverter can carry loads or charge the battery.
Smart Load	Smart Load	When operating in on-grid mode, the WIT and the grid simultaneously supply power to smart loads and primary loads, with a maximum supportable smart load power of 132kW When operating in off-grid mode, the WIT supplies power to smart loads and primary loads. If the total load power exceeds the rated load rate (overload is not considered in the system) or the battery SOC ≤ 50%, the power supply to smart loads will cut- off.
NA	No external device	/

NOTICE	The power of the PV inverter should be less than the rated charge/ discharge power of the WIT system.

The setting of GEN ports applications are as follows:

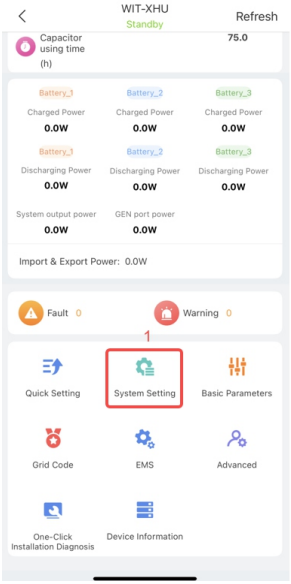
1) Generator

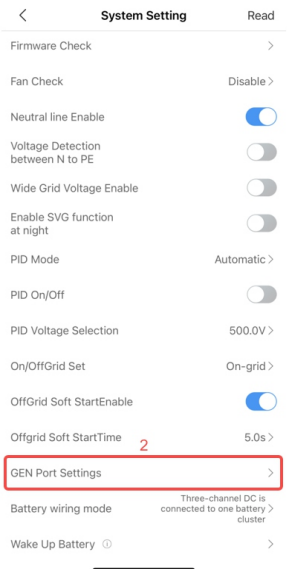
Enabling the generator function requires the following settings:

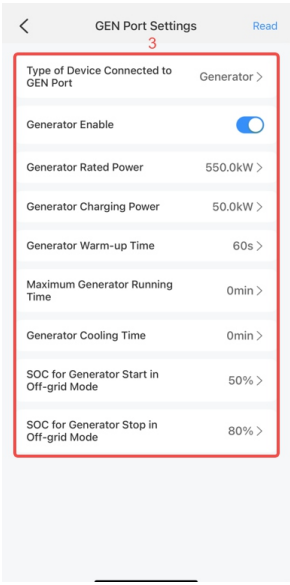
Step 1: Click to enter "System Settings" on the main interface of ShineTools;

Step 2: Click to enter "GEN Port Settings";

Step 3: Set parameters as required.

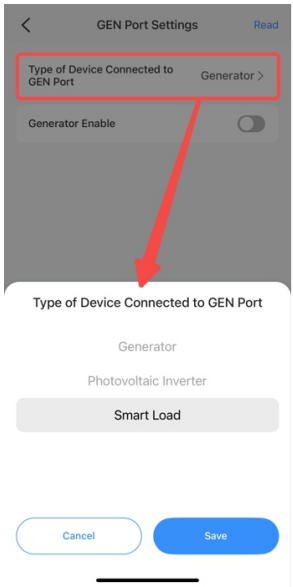


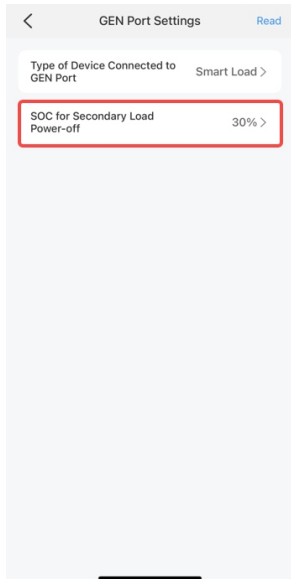




2) Smart Load

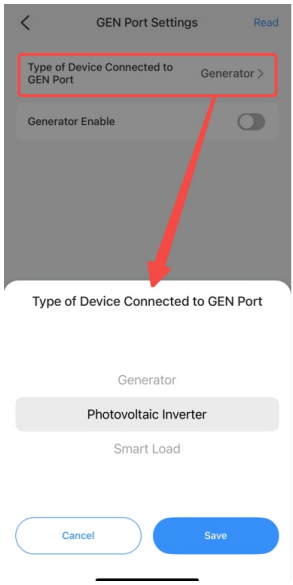
Please change the connected device type of the GEN port to "Smart Load" to perform relevant settings for the smart load.

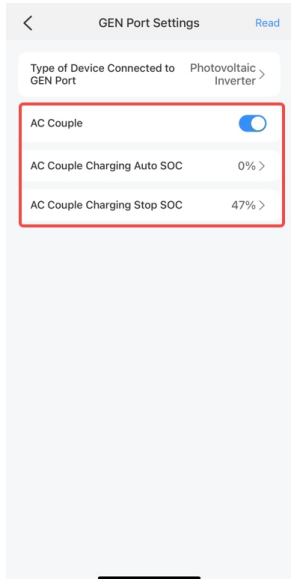




3) AC-Couple

Please change the connected device type of the GEN port to " Photovoltaic inverter" to set the relevant parameters.





1.3 System Operation Mode

WIT has seven operation modes as followed.

Mode Type	Introduction
Load First	The system always prioritizes the supply of power to the load. If there is excess energy, it is stored or exported according to priority; if there is insufficient energy, it is taken from other sources to ensure power to the load. Power supply priorty: PV>Battery>Grid Power consume priorty: Load>Battery>Grid
Battery First	The system provides energy to charge the battery with high priority and decreases the priority of battery discharge to keep the battery full charged. At the same time, the system will ensure that power is supplied to the load. Power supply priorty: PV>Grid>Battery Power consume priorty: Battery>Load>Grid
Grid First	The system will export as much excess energy as possible to the grid to meet the needs of various applications, provided that the loads are powered. The batteries may also be discharged and export power to the grid to meet demand. Power supply priorty: PV>Battery>Grid Power consume priorty: Load>Grid>Battery
Solar Back-up Only	The operation logic of Solar Back-up Only Mode is similar to Battery First Mode. The difference is that the system will prohibit charging battery with power from the grid. The battery is only charged by PV power and does not export power to the grid. Power supply priorty: PV>Grid>Battery Power consume priorty: Battery>Load>Grid
IDLE	Since the battery is idle, the battery will not participate in the energy interaction of the system. The battery neither charges nor discharges. The system will keep the loads powered and export the excess energy to the grid. Power supply priorty: PV>Grid Power consume priorty: Load>Grid
PTO	In PTO mode, the WIT will remain disconnected from the grid and there will be no energy interaction between the WIT and the grid. The energy storage system will only use the PV energy to charge the battery, and the load will be completely driven by the grid.
Grid First (ECO)	The operation logic of Grid First Mode (ECO) is similar to Grid First Mode. The difference is that there is no energy interaction between the battery and the grid. The battery is only charged by PV power and does not export power to the grid. Power supply priorty: PV>Battery>Grid Power consume priorty: Load>Grid>Battery

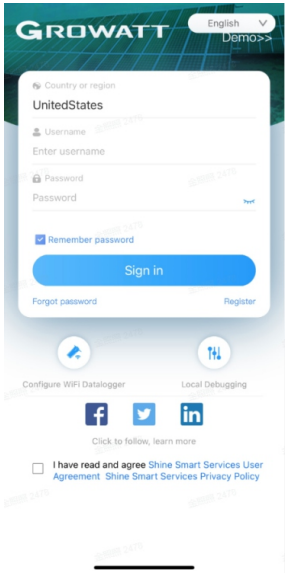
Monitoring&Setting Appendix 2 Platform Introduction

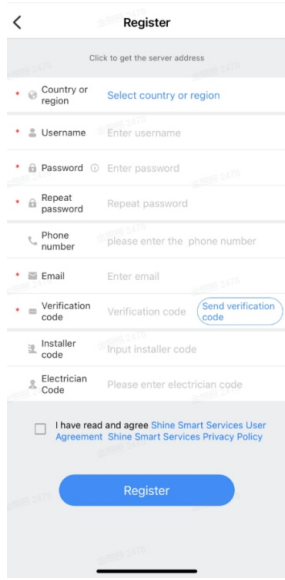
2.1 ShinePhone Introduction

2.1.1 Sign In and Network Configuration

(1) ShinePhone APP Download
Scan the following QR code or search for "ShinePhone" in the Google/Apple Store to download and install the mobile app.

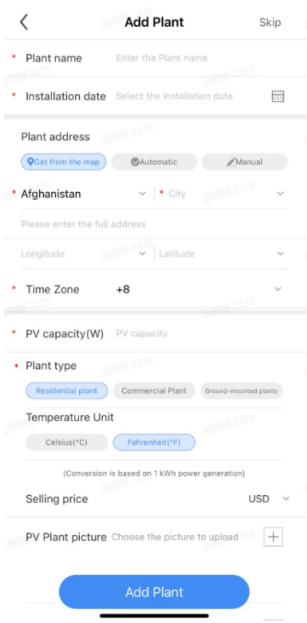
(2) Register an Account
Run the APP, click "Register" on the login page. Please fill in the relevant information as needed. Fields marked with * are required. Check the checkbox to indicate agreement with the Privacy Policy. After successful account registration, you can log in to the main interface. The registration page is shown below:





(3) Add plant

After the account is successfully registered, fill in the following form to add a plant. Fields marked with * are required.



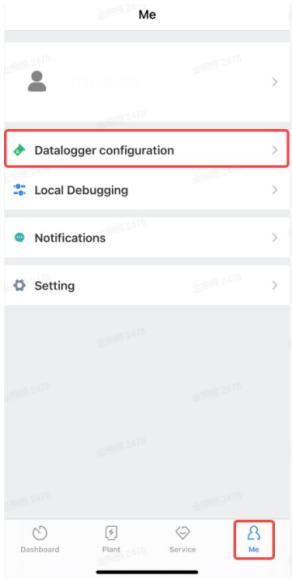
(4) Add datalogger

① After correctly connecting the datalogger to WIT, briefly press the button on it, and configuration can begin when the blue light stays on constantly;

② On the main interface, select the "Me" page and click "Datalogger Configuration";

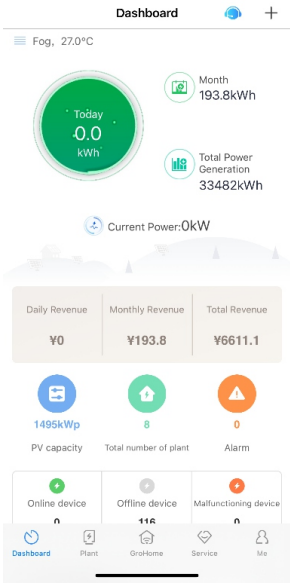
③ Scan the QR code on the datalogger housing or manually enter the SN code;

④ After clicking "WiFi Connection", it will automatically connect to the Bluetooth device with the same name as the datalogger's SN code, then connect to a 2.4G WiFi without firewall to ensure that data can be uploaded to the server normally. After a successful connection, return and click Next;

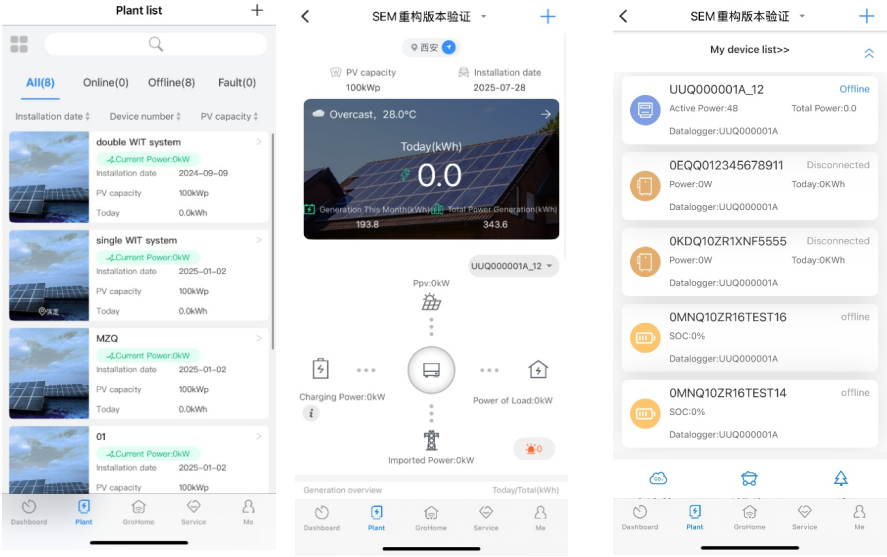


2.1.2 Interface Introduction

After logging in to Shinephone, system information such as power generation and bar charts, device status, and alarm information can be seen in the "Dashboard" section of the home page.

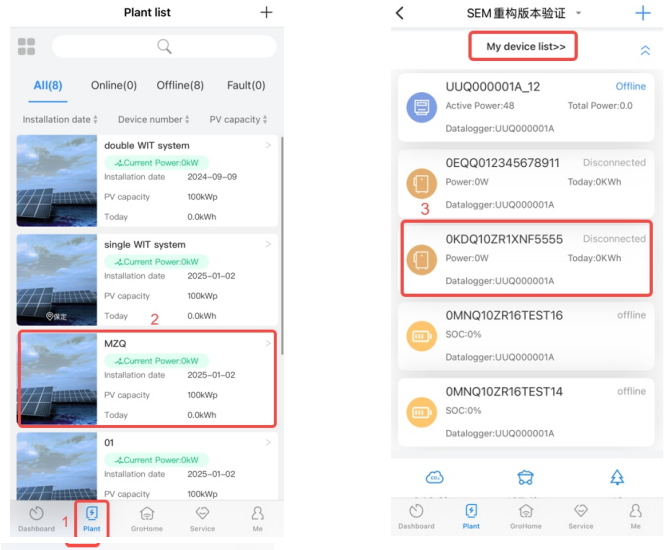


After jumping to the "Plant" page, you can view the list of plants under your account. After entering a specific plant, you can view detailed information such as the power generation, power status, energy graph, device list, etc.

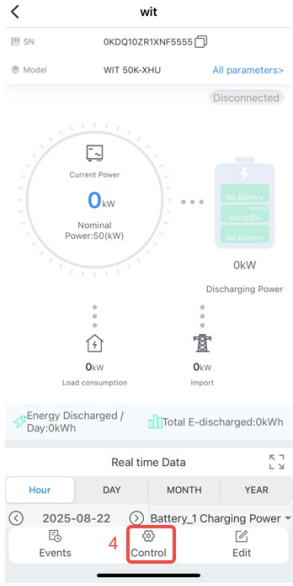


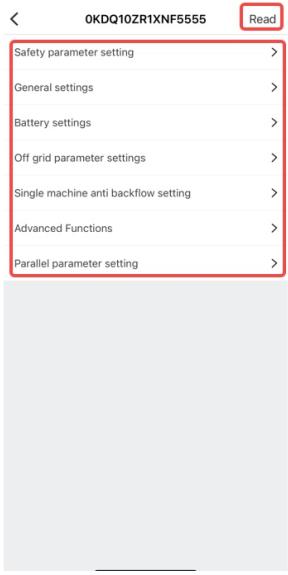
2.1.3 ShinePhone Parameter Settings

After entering the plant list, find and enter the plant where the device to be configured is located. In the device list at the bottom of the page, find the corresponding WIT device.



After entering the device list, click the "Control" icon in the middle of the bottom of the page and enter the password (growatt + current year, month, and day, e.g.growatt20250904), you can read and set the parameters of this device.



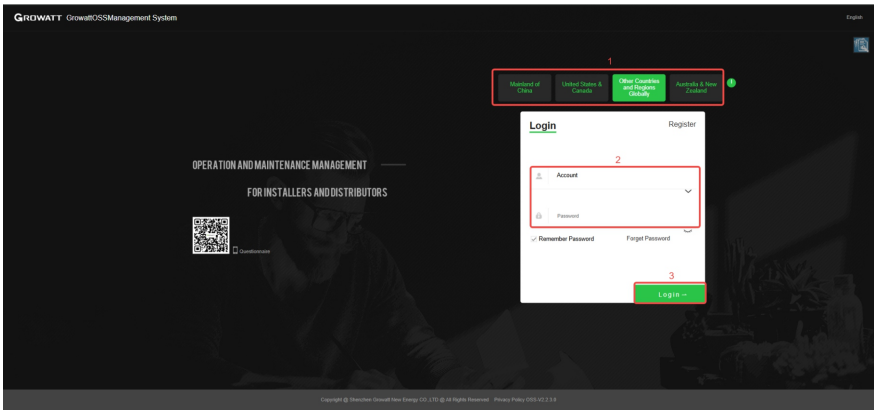


2.2 OSS Introduction

2.2.1 Sign In and Network Configuration

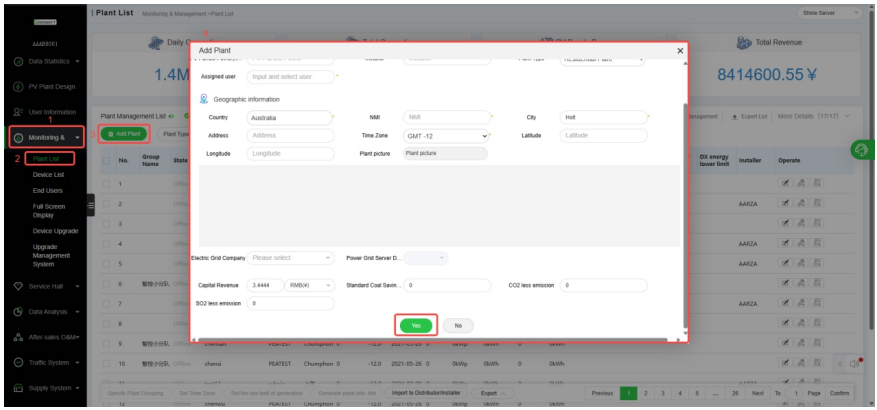
(1) Log in to the account

After selecting the corresponding server, log in to the OSS webpage using the installer/distributor account and password.



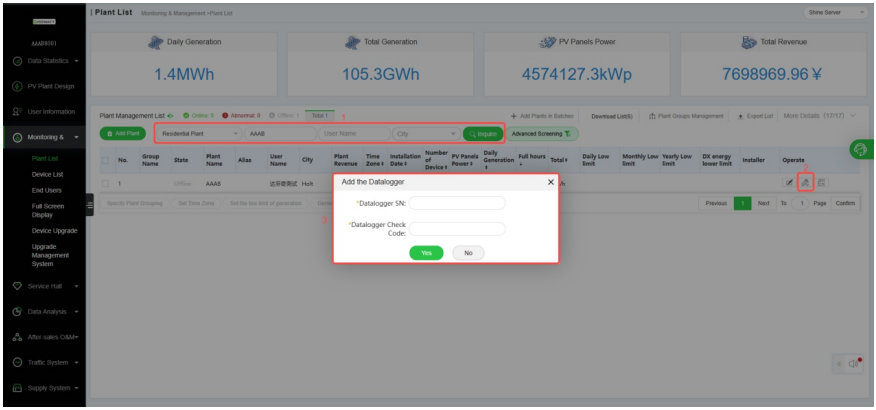
(2) Add Plant

In "Monitoring&Maintenance", find the "Plant List" page, click "Add Plant", fill in the relevant information, and then submit. Note that the username must be the sever user of the corresponding server.



(3) Adddatalogger

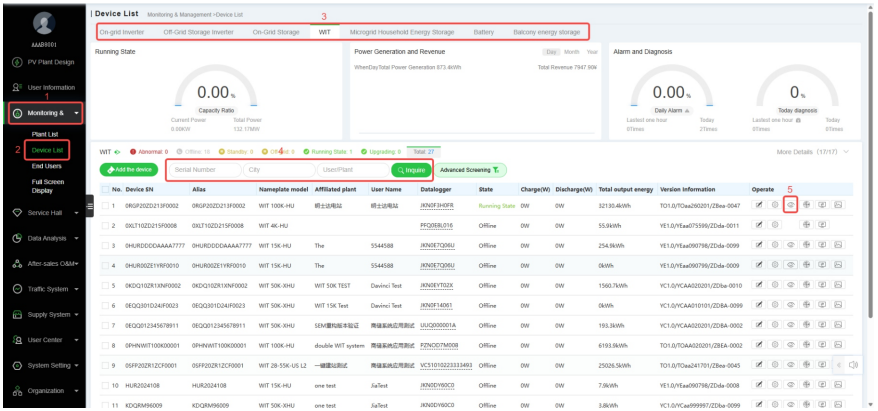
Search for the newly established plant based on the established plant information, click on the datalogger icon on the right side of the plant, and enter the SN code on the datalogger.



2.2.2 OSS View Device Information

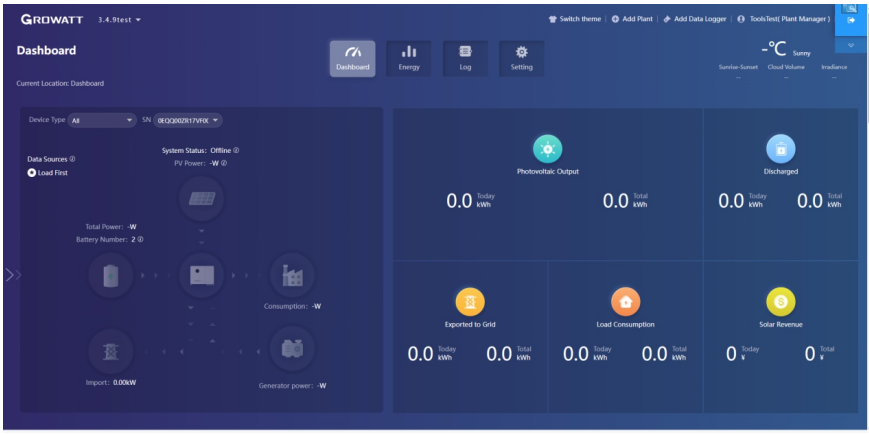
(1) Dashboard Entry

After logging in to your account, find the "Plant List" page in "Monitoring&Maintenance". At Step 3 directly above, select the device type you need to read/set. At Step 4, fill in the device-related information to search. After finding the target device, click the eye icon on the right to jump to the device dashboard and view the device information.



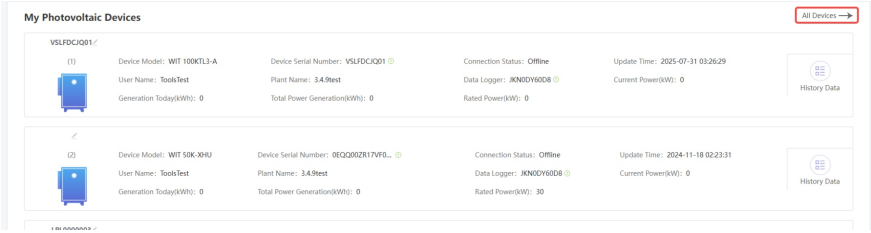
(2) Device Information Viewing

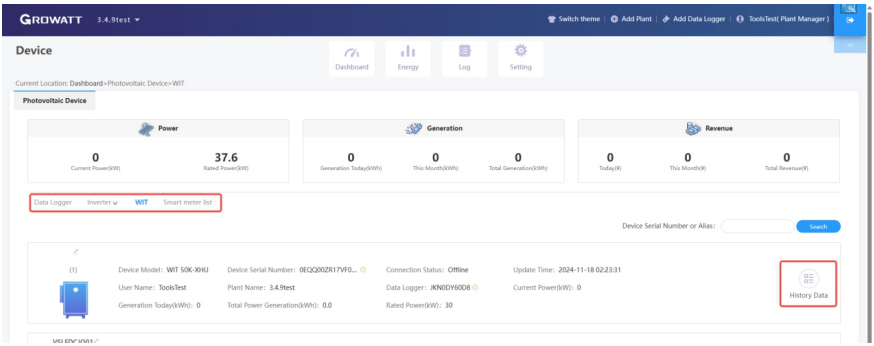
After jumping to the dashboard, system power information, power generation status, alarm information, etc. can all be viewed.



(3) History data of other devices

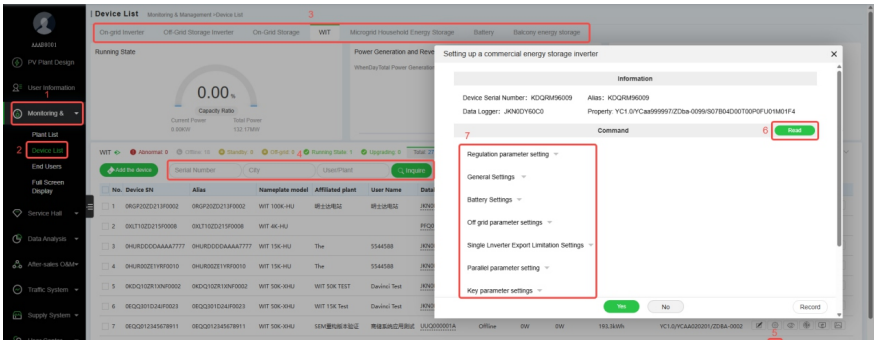
Clicking ‘All Device’ bottom to jump to a list of devices including dataloggers, WITs, AXEs, smart meters, etc. Clicking the "History Data" button on the right side of a device allows you to view and export the device's history data.





2.2.3 OSS Setting

In the "Monitoring&Maintenance", find the "Plant List" page, select the device type to be read/set at Step 3 directly above, fill in the device-related information at Step 4 to search, and after finding the target device, click the "Settings" icon on the right to read and set parameters in the pop-up window.



System Specification Appendix 3

3.1 WIT 29.9~50K-XHU+AXE 30.0~60.0H-1HR-E1

Hybrid Energy Storage System Parameter					
Battery System Data					
Model	**AXE 30.0H -1HR-E1**	**AXE 35.0H -1HR-E1**	**AXE 40.0H -1HR-E1**	**AXE 50.0H -1HR-E1**	**AXE 60.0H -1HR-E1**
Number of battery modules	6	7	8	10	12
Nominal energy	30kWh	35kWh	40kWh	50kWh	60kWh
Rated energy	30kWh	35kWh	40kWh	50kWh	60kWh
Dimension(W/H/D)	570/1560/660mm			570/1964/660mm	
Nominal voltage	307.2V	358.4V	409.6V	512V	614.4V
Operating voltage range	278.4~ 345.6V	324.8~ 403.2V	371.2~ 460.8V	464~576V	556.8~ 691.2V
Nominal capacity	100Ah(@25℃)				
Rated capacity	100Ah(@25℃)				
Battery type	Cobalt Free Lithium Iron Phosphate (LFP)				
Communication port	CAN/RS485/USB				
Control module	AXE 1000100-C1				
Installation method	Floor installation				
Hybrid Inverter Data					
Hybrid Inverter Model	**WIT 29.9K -XHU**	**WIT 30K -XHU**	**WIT 36K -XHU**	**WIT 40K -XHU**	**WIT 50K-XHU**
PV Input Data					
Max.recommended PV power(for module STC)	59.8kW	60kW	72kW	80kW	100kW
Maximum PV open-circuit voltage	1100V				
MPP voltage range	180~1000V				
Max.input current per MPP tracker	40A				

Hybrid Inverter Data					
Hybrid Inverter Model	**WIT 29.9K -XHU**	**WIT 30K -XHU**	**WIT 36K -XHU**	**WIT 40K -XHU**	**WIT 50K-XHU**
Max.short-circuit current per MPP tracker	50A				
No.of MPP trackers	4				
AC Side Data (On-grid)					
Output Date					
AC nominal power	29.9kW	30kW	36kW	40kW	50kW
MAX. AC apparent power	29.9kVA	33kVA	39.6kVA	44kVA	55kVA
Nominal AC voltage/range	380V/400V -15%~+10%				
Nominal AC grid frequency frequency/range	50/60Hz,45-55Hz/55-65Hz				
Max. output current	45.3A	50A	60A	66.7A	83.3A
Adjustable power factor	-1...+1				
THDi	<3%				
AC grid connection type	3P3W+PE/3P4W+PE				
Input Date					
AC nominal power	59.8kW	60kW	72kW	80kW	100kW
MAX. AC apparent power	59.8kVA	66kVA	79.2kVA	88kVA	110kVA
Nominal AC voltage/range	380V/400V -15%~+10%				
Nominal AC grid frequency/range	50/60Hz,45-55Hz/55-65Hz				
Max. input current (GEN/AC couple)	90.6A/ 45.3A	100A/50A	120A/60A	133.3A/ 66.7A	166.7A/ 83.3A
AC Side Data (Off-grid)					
AC nominal power	29.9kW	30kW	36kW	40KW	50kW
Max. AC apparent power	29.9kVA	45kVA	54kVA	60kVA	75kVA

Hybrid Inverter Data					
Hybrid Inverter Model	**WIT 29.9K -XHU**	**WIT 30K -XHU**	**WIT 36K -XHU**	**WIT 40K -XHU**	**WIT 50K-XHU**
Max. output current	68.0A	68.2A	81.8A	91A	113.6A
Nominal AC voltage	220V/230V(L-N), 380V/400V(L-L)				
Nominal grid frequency	50/60Hz				
THDv	<3%(@Linear full load)				
Overload capacity	≥1.5 times of rated power,10s				
On/off grid switching time	≤10ms				
System Data					
Ingress Protection	IP66（for WIT），IP20（for AXE）				
Communication port	RS485/CAN/USB				
Datalogger	ShineWiLan-X2				
Cooling mode	Smart air cooling				
Operating temperature	-30℃~60℃（for WIT），-10℃~50℃（for AXE）				
Relative humidity	5%~95%				
Altitude	≤4000m（for WIT）,≤2000m（for AXE）				
Topology	Transformerless				
Warranty (5/10 years)	Yes/Opt				
Certification & Licensing	**Battery System:** UN 38.3, IEC 62619, IEC 60730, IEC 62477, CE, RoHS, UKCA				
	Hybrid Inverter: CE/CB, ROHS,IEC 62109-1,IEC 62109-2,IEC 62477-1,EN 62920,IEC 6100-6-4,IEC 61000-6-2,IEC 61000-3-12,IEC 61000-3-11,EN 55011,IEC 62116,IEC 61727,IEC 61683,IEC 60068-2-1,NRS097-2-1				
*The battery system in this table is indoors battery rack model.					

3.2 WIT 29.9~50K-XHU+AXE 50.0~60.0H-1HT-S1

Hybrid Energy Storage System Parameter					
Battery System Data					
Model	**AXE 30.0H-1HR-E1**		**AXE 40.0H-1HR-E1**		**AXE 60.0H-1HR-E1**
Number of battery modules	10		11		12
Nominal energy	50kWh		55kWh		60kWh
Rated energy	50kWh		55kWh		60kWh
Dimension(W/H/D)	800/2000/1000mm				
Nominal voltage	512V		563.2V		614.4V
Operating voltage range	464~576V		510.4~633.6V		556.8~691.2V
Nominal capacity	100Ah(@25℃)				
Rated capacity	100Ah(@25℃)				
Battery type	Cobalt Free Lithium Iron Phosphate (LFP)				
Communication port	CAN/RS485/USB				
Control module	AXE 1000100-C1 EU				
Installation method	Floor installation				
Hybrid Inverter Data					
Hybrid Inverter Model	**WIT 29.9K -XHU**	**WIT 30K -XHU**	**WIT 36K -XHU**	**WIT 40K -XHU**	**WIT 50K-XHU**
PV Input Data					
Max.recommended PV power(for module STC)	59.8kW	60kW	72kW	80kW	100kW
Maximum PV open-circuit voltage	1100V				
MPP voltage range	180~1000V				
Max.input current per MPP tracker	40A				
Max.short-circuit current per MPP tracker	50A				

Hybrid Inverter Data					
Hybrid Inverter Model	**WIT 29.9K -XHU**	**WIT 30K -XHU**	**WIT 36K -XHU**	**WIT 40K -XHU**	**WIT 50K-XHU**
No.of MPP trackers	4				
AC Side Data (On-grid)					
Output Date					
AC nominal power	29.9kW	30kW	36kW	40kW	50kW
MAX. AC apparent power	29.9kVA	33kVA	39.6kVA	44kVA	55kVA
Nominal AC voltage/range	380V/400V -15%~+10%				
Nominal AC grid frequency frequency/range	50/60Hz,45-55Hz/55-65Hz				
Max. output current	45.3A	50A	60A	66.7A	83.3A
Adjustable power factor	-1...+1				
THDi	<3%				
AC grid connection type	3P3W+PE/3P4W+PE				
Input Date					
AC nominal power	59.8kW	60kW	72kW	80kW	100kW
MAX. AC apparent power	59.8kVA	66kVA	79.2kVA	88kVA	110kVA
Nominal AC voltage/range	380V/400V -15%~+10%				
Nominal AC grid frequency/range	50/60Hz,45-55Hz/55-65Hz				
Max. input current (GEN/AC couple)	90.6A/ 45.3A	100A/ 45.5A	120A/ 54.5A	133.3A/ 60.7A	166.7A/ 75.7A
AC Side Data (Off-grid)					
AC nominal power	29.9kW	30kW	36kW	40KW	50kW
Max. AC apparent power	29.9kVA	45kVA	54kVA	60kVA	75kVA
Max. output current	68.0A	68.2A	81.8A	91A	113.6A

Hybrid Inverter Data					
Hybrid Inverter Model	**WIT 29.9K -XHU**	**WIT 30K -XHU**	**WIT 36K -XHU**	**WIT 40K -XHU**	**WIT 50K-XHU**
Nominal AC voltage	220V/230V(L-N)，380V/400V(L-L)				
Nominal grid frequency	50/60Hz				
THDv	<3%(@Linear full load)				
Overload capacity	≥1.5 times of rated power,10s				
On/off grid switching time	≤10ms				
System Data					
Ingress Protection	IP66（for WIT），IP20（for AXE）				
Communication port	RS485/CAN/USB				
Datalogger	ShineWiLan-X2				
Cooling mode	Air cooling				
Operating temperature	-30℃~60℃（for WIT），-25℃~55℃（for AXE）				
Relative humidity	5%~95%				
Altitude	≤4000m（for WIT），≤2000m（for AXE）				
Topology	Transformerless				
Warranty (5/10 years)	Yes/Opt				
Certification & Licensing	**Battery System:** UN 38.3, IEC 62619, IEC 60730, IEC 62477, CE, RoHS, UKCA				
	Hybrid Inverter: CE/CB，ROHS,IEC 62109-1,IEC 62109-2,IEC 62477-1,EN 62920,IEC 6100-6-4,IEC 61000-6-2,IEC 61000-3-12,IEC 61000-3-11,EN 55011,IEC 62116,IEC 61727,IEC 61683,IEC 60068-2-1,NRS097-2-1				
*The battery system in this table is indoors battery rack model.					

Download Manual

Growatt New Energy

Shenzhen Growatt New Energy Co., Ltd.

4-13/F, Building A, Sino-German (Europe) Industrial Park,
Hangcheng Blvd, Bao'an District, Shenzhen, China

E service@growatt.com

W en.growatt.com

For local customer support, please visit https://en.growatt.com/support/contact

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