

## WIT+APX PV-ESS-DG System Solution

**User Manual** 

Shenzhen Growatt New Energy Co., Ltd. 4-13/F, Building A, Sino-German (Europe) Industrial Park, Hangcheng Blvd, Bao'an District, Shenzhen, China Tel: 400-931-3122 Email: usaservice@ginverter.com Web: us.growatt.com

1. Ir	troduction	4
	1.1 Overview	4
	1.2 Target Group	4
	1.3 Symbol Conventions	4
2.	Safety Precautions	6
	2.1 General Safety	6
	2.2 Safety Instructions	6
3. S	ystem Introduction	8
	3.1 System Overview	8
	3.1.1 System Description	8
	3.1.2 System Highlights	9
	3.1.3 System Operating Principles	9
	3.1.4 WIT Inverter Operating Mode	10
	3.1.5 System Application Modes	10
	3.2 Description of components within the scope of delivery	11
	3.3 Reference Documents	12
4. S	ystem Installation	14
	4.1 System Layout	14
	4.2 Cable Connections	18
	4.2.1 Connect the PE Cables	18
	4.2.2 System Wiring Safety Precautions	19
	4.2.3 System Wiring Instructions	20
	4.3 Checklist	27
5. S	ystem Commissioning	29
	5.1 Power on the System	29
	5.2 Configuration and Commissioning	29
	5.2.1 Register an Account	29
	5.2.2 Create a Plant	31
	5.2.3 Network Configuration with ShineTools	33
	5.2.4 Smart Meter Configuration	36
	5.2.5 Online Commissioning	36
	5.2.6 Local Commissioning	48
	5.3 Application Scenario Configuration	50
	5.4 System Operating Modes	54
	5.4.1 Waiting Mode	54
	5.4.2 Operating Mode	54
	5.4.3 Fault Mode	56
	5.4.4 Shutdown Mode	56
6. S	ystem Maintenance	57
	6.1 Routine Maintenance	57
	6.1.1 Clean the Enclosure	57
	6.1.2 Maintain the Fan	57
	6.2 Troubleshooting	59

## **Table of Contents**

6.2.1 WIT Inverter Warnings	
6.2.2 WIT Inverter Errors	64
6.2.3 APX Battery Faults	
7. Decommissioning	77

# 1. Introduction

#### 1.1 Overview

This manual is intended to provide product information and installation instructions for users of WIT+APX PV-ESS-DG System Solution (PV + Energy Storage System + Diesel generator) purchased from Shenzhen Growatt New Energy Co., Ltd. (hereinafter referred to as Growatt). Please read this manual carefully before performing any operations. Store the documents in a convenient place and ensure that they are available at all times for installation, operation and maintenance personnel. For possible changes in this manual, Growatt accepts no responsibilities to inform users.

#### Note:

- 1. The WIT 50-100K-HU-US Series Inverter is hereinafter called WIT.
- 2. The APX 129.0-200.7H-S1-US Battery System is hereinafter called APX.
- 3. This manual is prepared mainly based on the HU model.

## 1.2 Target Group

Only qualified electrical technicians are allowed to install the PV-ESS-DG System. Installers should read through this manual prior to installing, commissioning and troubleshooting the system.

If questions arise during installation, you can visit us.growatt.com to leave a message or contact Growatt customer services at 400-931-3122.

#### **1.3 Symbol Conventions**

The following safety symbols may occur when handling the system. Familiarize yourself with the symbols and their meaning before installing or operating the equipment.

Table 1.1 Safety Symbols

Symbol	Meaning
	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury
WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



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

Information that you must read and know to ensure optimal system operation.

Symbol	Designation	Meaning		
A	High voltage	High voltages are present when the system is in operation. All work on the system must be performed by well-trained electrical technicians.		
	Burn warning	Do not touch the equipment in operation because it generates high temperature on the enclosure.		
	Protective grounding	Connect the ground point of each component of the system to the grounding bar for protective grounding.		
	Delayed discharge	Residual voltage exists after the system is powered off, and it takes 5 minutes for the equipment to discharge to the safe voltage.		
ĺ	Refer to the manual	Reminds the operator to refer to the manual before operating or installing the system.		
	DC	Direct current		
$\sim$	AC	Alternating current		

## Table 1.2 Safety labels

## **2.Safety Precautions**

Before operation, please read the precautions and operating instructions in this manual carefully to avoid accidents. The "DANGER", "WARNING" and "CAUTION" statements in this manual do not represent all safety matters to be observed, and are intended to supplement various operational safety precautions.

## 2.1 General Safety

1) Please read this manual carefully before installation. Damages caused by failure to follow the instructions in the manual are beyond the warranty scope.

2) Only qualified and trained electrical technicians are allowed to perform operations and cable connections on the system.

3) During installation, please do not touch other parts inside the equipment other than the wiring terminals.

4) Ensure that all electrical connections comply with local electrical standards.

5) If maintenance is required, please contact the authorized local system installation and maintenance personnel.

6) Before operating the equipment in the on-grid mode, ensure that you have obtained any permission needed from the local grid operator.

## 2.2 Safety Instructions

Transportation:



• As the equipment of this system is heavy, use extreme caution when moving it to avoid injury due to accidental falls.

Installation:

NOTICE	• Please read this manual carefully before installation. Damages caused by failure to follow instructions specified in the manual are beyond the warranty scope.
	• Ensure that there is no electrical connection on all equipment of the system before installation.
WARNING	<ul> <li>Please observe the installation instructions specified in this manual, including the installation environment and clearance requirements.</li> <li>Install the equipment of the system in a dry and well-ventilated location; otherwise, performance de-rate may be initiated due to excessive heat.</li> <li>Please read the installation instructions and safety precautions carefully before installation.</li> </ul>

Electrical Connection	ons:
	• Before electrical connections, make sure that the DC switches on the inverter and the
	battery are in the "OFF" position.
	• Turn off the AC breaker; otherwise high voltages on the grid side may cause lethal
	injuries.
	• All operations must be performed by trained and professional electricians. Comply
DANGER	with all safety information specified in this manual and local regulations.
	• Do not touch the equipment in operation as high voltages might lead to lethal injuries.
	• Do not place flammable or explosive materials around the system equipment.
	• Each inverter must be equipped with a separate AC circuit breaker. Multiple inverters
	cannot connect to the same AC circuit breaker.
	• If the cable is thick, do not wiggle it after tightening the cable terminals. Otherwise,
	loose connection may cause overheating and device damage. Ensure that the terminals
WARNING	are properly connected before powering on the system.
	• Ensure the correct polarity before connecting the battery to the inverter.
Maintenance and R	eplacement:

	ceptacement.
	• All operations must be performed by trained and professional electricians, and all
	instructions specified in this manual should be observed.
	• Wait at least 5 minutes after turning off the DC switch and AC breaker to avoid
	dangers. Do not perform any operation with power on.
DANGER	• If the inverter reports "PV Isolation low", do not touch the enclosure as a ground fault
	might have occurred.
	• Beware of high voltages which can cause electric shocks.
WARNING	• Do not use air pump to clean the fans as it may damage the fans.
Other:	
	• Upon delivery, check if the package of the inverter is intact. If you notice any damage,

i	<ul> <li>Open centrely, energy and greating of the interfer is indeed in you notice any damage, please contact your supplier.</li> <li>For better heat dissipation, please clean the fan regularly.</li> </ul>
	• The maximum PV input voltage should not exceed 1100V, and the battery input voltage

•	•	The maximum PV input voltage should not exceed 1100V, and the battery input voltage
		should not exceed 1000 V.
WARNING	•	For the equipment that will not be put into operation in the future, you should properly
		dispose of it in accordance with locally applicable regulations.

# 3. System Introduction

### 3.1 System Overview

The Growatt **WIT+APX PV-ESS-DG System** consists of the WIT inverter, the APX commercial battery system, the smart meter and others. This system can be applied to C&I (Commercial & Industrial), micro-grid and other application scenarios. Diverse operating modes are available, including on-grid mode, off-grid mode and on/off-grid transfer. The PV-ESS-DG system comes with a variety of features, such as self-consumption, peak shaving and valley filling, TOU (Time of Use), emergency power backup and power expansion. The system also supports parallel operation of multiple devices, enabling power and battery capacity expansion.

## 3.1.1 System Description



Fig 3.1 On/off-grid PV-ESS-DG system with a single WIT Inverter

## Components:

Icon Component		Description	Responsible party
PV PV panels		Prepared by users	Supplier
PCS	Hybrid inverter	Model: WIT 50/63/75/100K-HU-US (This manual is prepared mainly based on the HU model)	Growatt
BAT	Battery	Model: APX 129.0-200.7H-S1-US	Growatt
ATS	Dual power transfer switch	Prepared by users (Eaton meter is recommended)	Supplier
Meter Smart meter		Model: TPM-CT-E-US	Growatt

Table 3.1	Components of	of the on/off-grid P	V-ESS-DG system
	<u>.</u>	ç	•

GEN	Diesel generator	Prepared by users (requires external dry contact to activate)	Supplier
BREAKER	Circuit breaker	Prepared by users	Supplier

### 3.1.2 System Highlights

- 1. Feature diverse application scenarios, including self-consumption, peak shaving, power backup, and microgrid.
- 2. Equipped with on-grid, off-grid and on/off grid switching capabilities.
- 3. Support multiple systems to be connected in parallel, enabling battery and power expansion.
- 4. The battery is self-contained with integrated optimizer, allowing dynamic voltage adjustment and flexible combination of battery capacity; mixing old and new battery modules is supported to make the most of the battery capacity.
- 5. Support PV+ESS and PV+ESS+DG applications.
- 6. Support local and remote monitoring to facilitate intelligent O&M (operation and maintenance).

#### 3.1.3 System Operating Principles

- 7. The WIT inverter comes with the PV terminals. With connection to the solar modules, the inverter converts the solar power that goes through the MPPT circuits and inverter circuits into AC power, which is then fed to the grid and sent to support loads.
- 8. The WIT inverter comes with the battery terminals. With connection to the batteries, the inverter can charge the battery with both PV and grid power for energy storage, and the battery power can be discharged to export power to the grid and supply power to loads.
- 9. The WIT inverter is integrated with the on/off-grid switch module, supporting automatic transfer between on-grid and off-grid operation and manual transfer with a transfer time less than 16.7 ms.
- 10. The APX battery system can be configured flexibly, allowing connection of 9 to 14 modules.
- 11. The APX battery system features the DC-DC function, which can adjust battery voltage according to the voltage at the grid port and the PV port of the inverter, fulfilling voltage requirements in different application scenarios.
- 12. The APX battery system features the DC-DC function, which enables battery SOC balancing by adjusting voltage and output power.
- 13. The meter can collect the voltage and current at the grid-connection port and measure the charging/discharging power to enable the inverter export limitation.

#### 3.1.4 WIT Inverter Operating Mode

#### Load first:

The solar power and the battery power are prioritized towards powering the loads. If the export limitation is disabled, the surplus solar power will be fed to the grid while the battery power cannot be sold to the grid. If the export limitation is enabled, neither the solar power nor the battery power would be sent to the grid. Priority of power sources supplying to the loads:

1.Solar panels;

2.Bateries;

3.Grid.

NOTE: In Load first mode, a meter is required.

## **Battery first:**

The solar power is directed towards charging the battery first, ensuring that the battery SOC has reached the preset upper threshold. Then the excess solar power will be sent to support the loads. The further surplus solar power can be exported to the grid (with Export Limitation disabled). In case that the solar power is insufficient, it can draw energy from the grid to charge and battery and support the loads.

Priority of power sources charging the battery:

1.Solar panels;

2.Grid.

## Grid first:

The solar power is prioritized towards powering the loads, and the surplus solar power will be fed to the grid. The further surplus solar power (if any) can be sent to charge the battery. If the solar power is insufficient to support the loads, the battery will discharge to power the loads and the excess battery energy can be sold to the grid. Priority of power sources supplying to the loads:

1.Solar panels;

2.Bateries;

3.Grid.

From the "Control" page, select "Mode Selection and Time Setting", where you can configure the six time windows. As shown in the figure, you are allowed to set the operating mode for each period based on power consumption and electricity tariffs. You can set "Enable" or "Disable" to determine whether to run the device in the preset mode during the specific time period. This way, you are allowed to configure different operating modes for different application scenarios.

#### 3.1.5 System Application Modes

**Self-consumption**: Maximize self-consumption, and the surplus power is fed to the grid. The system prioritizes supplying power to loads, and the excess power is fed to the grid to generate revenue.

**Peaking shaving**: Set the power threshold that the WIT+APX PV+ESS+DG system can draw from the grid. When the power drawn from the grid exceeds the threshold, the battery will discharge to reduce the power drawn from the grid until it is below the threshold or until the battery reaches its maximum discharge capability. When the power drawn from the grid is below the threshold, the system will determine whether to charge the battery based on the current operating mode and the battery SOC. **Time-of-use (TOU) Control**: Configure the system to work in the preset mode during different time segments, especially suitable for areas with peak-valley electricity pricing.

**Power expansion**: When the distributed power is insufficient to support the short-term peak loads, the PV-ESS-DG system outputs power and draws power from the grid to support the loads, thus enhancing its power supply capacity.

**Microgrid**: A microgrid is a stand-alone system that consists of distributed energy sources. The PV-ESS-DG system can form a microgrid to ensure power supply to loads, or connect to the utility grid for enhanced energy independence of the user's power supply system.

**Backup power**: When the grid fails, the PV-ESS-DG system can supply power to critical loads to ensure its uninterrupted operation.

Energy quality: The device can output reactive power to regulate the grid power quality.

## 3.2 Description of components within the scope of delivery



Fig 3.2 Components of the on/off-grid PV-ESS-DG system within the scope of delivery Detailed description:

Device	Model	Description
	WIT 50/63/75/100K-A-US	• The -HU Hybrid Inverter models come with
	WIT 50/63/75/100K-H-US	the transfer module, enabling seamless transition between on-grid and off-grid
	WIT 50/63/75/100K-AU-US	operation; equipped with the grid port and the
A. WIT inverter	WIT 50/63/75/100K-HU-US	load port; support connection to the PV and
		battery modules at the same time.
		• The –H Hybrid Inverter models have one AC
		port; support connection to the PV and battery
		modules at the same time.
		• The –AU Storage Inverter models have the
		transfer module, enabling seamless transition

Table	3.2	Equipment	description	of the P	V-ESS-DG	system
-------	-----	-----------	-------------	----------	----------	--------

	r	
		between on-grid and off-grid operation; only
		supports the connection of batteries.
		• The –A Storage Inverter models have one
		AC port, only supporting the connection of
		batteries.
		• 14.33kWh per battery pack; 9-14 unit can be
		connected in series with the minimum capacity
B. Battery	APX 129.0-200.7H-S1-US	of 129.0 kWh and the maximum capacity of
		200.7 kWh
		• Collect grid-side charging/discharging data in
C. Smart meter	TPM-CT-E-US	real time and upload to the inverter, enabling
		export limitation.

## **3.3 Reference Documents**

Device	Model	Access documents
Hybrid Inverter	WIT-HU User Manual	
Hybrid Inverter	WIT-HU Quick Guide	
Battery	APX User Manual	

Table 3.3 Manuals of components of the PV-ESS-DG System

Battery	APX Quick Guide	
TPM-CT-E-US	TPM-CT-E-US Quick Guide	

## 4. System Installation

#### 4.1 System Layout

## 4.1.1 Basic Installation Requirements

A. Ensure that the installation surface is solid enough to support the weight of the system for a long time.

B. Ensure that the installation position comply with the layout clearance requirements, which are specified in this section.

C. Do not install the system in areas with flammable or heat-intolerant materials.

D. Components of the system are protected to IP66 and can be installed indoors or outdoors.

E. Do not expose the system to direct sunlight. Otherwise, the excessive heat may lead to power reduction. You are recommended to install a sun shelter.

F. Keep the humidity at 0% to 95% RH.

G. Keep the ambient temperature at -10°C to +45°C; the recommended ambient temperature for installing the APX battery is below 30°C.

H. Keep dust and dirt in the environment to a minimum level.

I. Do not install the battery in highly humid areas such as bathrooms.

J. Products of the system should only be installed on a flat floor or vertical wall, refer to Figure 4.1 below:



#### Fig 4.1

Reserve enough clearance around each component to ensure the proper operation of the equipment and facilitate ease of operation. Please observe all clearance requirements mentioned in this section. To promote the stable operation of the system, reserve a clearance of at least 11.81 inches between the back of the WIT inverter and the wall, and keep the back of the APX battery system at least 23.62 inches from the wall.



Fig 4.2 (The units in the figure are:mm)

- 1. Keep the system far from strong magnetic signal.
- 2. Ensure that the system is out of the reach children.

#### 4.1.2 System Layout

Set up the PV-ESS-DG system according to the system layout, observing clearance requirements. Do not build or run the system in a narrow space.

Upon delivery and determining the installation position, move the equipment to the installation site with the recommended transportation method provided in the corresponding Quick Guide, then position each component in accordance with the system layout. Observe recommended clearances which are illustrated in the figure below. Install the meter, ATS, WIT and APX in a sequence from left to right. The meter is wall-mounted, with a distance of 47.42 inches above the ground. The horizontal clearance requirements are: 23.63 inches between the meter and ATS; 31.5 inches between ATS and WIT; 31.5~39.37 inches between WIT and APX; 9.84~13.78 inches between two battery clusters. Install the WIT and APX close to the wall, while leaving a clearance of 11.81 inches between the WIT inverter rear side and the wall and 23.62 inches between the APX battery rear side and the wall. If the APX battery is next to the wall on the right side, maintain a clearance of 15.75 inches. Please refer to the figure below:



Fig 4.3 System layout (The units in the figure are:mm)

To extend the service life of the system and avoid power de-rating due to excessive temperature, you are advised to install a sun shelter when the system is installed outdoors to shield it from direct sunlight and rain. As shown in the figure below, please leave a clearance of 39.37 inches on the front side and 59.06 inches on both sides.



Fig 4.4 Front view of the sun shelter (The units in the figure are:mm)



Fig 4.5 Side view of the sun shelter (The units in the figure are:mm)

## 4.1.3 Install System Components

Please refer to the User Manual of each component mentioned in Chapter 3.

4.2 Cable Connections



Fig 4.6 PV+ESS+DG system electrical connections

## 4.2.1 Connect the PE Cables



The ground point of each component is shown in the figure below:



Fig 4.7 System ground point positions

Note:

Connect the PE cable of each component to the grounding bar, using the shortest wiring route whenever possible.

## 4.2.2 System Wiring Safety Precautions

	• Before electrical connections, make sure that the DC switches of all components are
	in the "OFF" position, especially the one of the battery system. Disconnect the AC
	breaker on the grid side. Otherwise high voltages present in the PV-ESS-DG system
	may cause lethal injuries.
	• All operations must be performed by trained and professional electricians. Comply
DANGER	with all safety information specified in this manual and local regulations.
	• Do not touch the equipment in operation unless necessary as high voltages are
	dangerous.
	• Do not place flammable or explosive materials around the system.
	• Each WIT inverter must be equipped with a separate AC circuit breaker. Multiple
	inverters cannot connect to the same AC circuit breaker (not applicable to off-grid
	application).
	• Ensure that the battery terminals are audibly snapped into place.
$\mathbf{\Lambda}$	• If the cable is thick, do not wiggle it after tightening the cable terminals. Ensure that
	the terminals are properly connected; otherwise, loose connection may cause
WARNING	overheating and device damage.
	• The battery wiring terminals are shielded with the protective cover. Upon completion
	of cable connection on the battery side, re-install the protective cover to prevent
	accidental touch.

## 4.2.3 System Wiring Instructions

Upon completion of the after-installation check, verify if all cables required for system wiring are complete and intact, and check if the cables that should be prepared separately meet the recommended specifications.

No.	Cable usage	Connection	Remark
W00/W01	APX-WIT power cable	WIT (BAT+) ~ APX (PCS+) WIT (BAT-) ~ APX (PCS-)	Provided by Growatt
W02	APX-WIT AC power supply cable	WIT (BMS AC) ~ APX (AC INPUT)	Provided by Growatt
W03	APX-WIT communication cable	WIT (BMS COM) ~ APX (PCS)	Provided by Growatt
W16/W17/W18/W19	WIT-Grid power cable	<ul> <li>WIT (GRID R) ~ Distribution cabinet (R)</li> <li>WIT (GRID S) ~ Distribution cabinet (S)</li> <li>WIT (GRID T) ~ Distribution cabinet (T)</li> <li>WIT (GRID N) ~ Distribution cabinet (N)</li> </ul>	Prepared by user (Growatt provides the terminals)
W20W59	WIT-PV power cable	WIT PV1-10 (+) ~ PV panel (+) WIT PV1-10 (-) ~ PV panel (-)	Prepared by user (Growatt provides the terminals)
W60W63	Meter to Grid voltage sampling cable	Distribution cabinet (R) ~ Meter (L1) Distribution cabinet (S) ~ Meter (L2) Distribution cabinet (T) ~ Meter (L3) Distribution cabinet (N) ~ Meter (N)	Prepared by user
W64W66	Meter to Grid current sampling cable	CT1 (SI, S2) Meter (Ia1, Ia2) CT2 (SI, S2) Meter (Ib1, Ib2) CT3 (SI, S2) Meter (Ic1, Ic2)	Prepared by user
W67	Meter to WIT communication cable	WIT COM1 (6, 7/8, 9) Meter (485-1-A, 485-1-B)	Prepared by user

Table 4.1	Cable	list t	forg	vetom	wiring
Table 4.1	Cable	list I	lor s	ystem	wiring

Recommended specifications of cables that should be prepared by users:

1. Inverter's PV-side power cables (W20~W59):

## $Table \ 4.2 \ WIT \ inverter - Max. \ current \ per \ MPPT \& \ Recommended \ cable \ specification$

Inverter model	Max. current per MPPT	Recommended cable specification
WIT 50-100K-H/HU-US	16A*2	12AWG

## 2. Inverter's AC-side power cables (W04~W07, W16~W19):

## Table 4.3 WIT inverter - Recommended AC power cable specification

Inverter model	Recommended cable specification
WIT 50/63K-A/-H-US	1 AWG
WIT 75/100K-A/-H-US	2/0 AWG

## Table 4.4 WIT inverter - Recommended AC power cable specification

Inverter model	Grid-side recommended cable	Load-side recommended cable	
	specification	specification	
WIT 50/63K/-AU/-HU-US	4/0AWG	1AWG	
WIT 75K/-AU/-HU-US	300kcmil	2/0AWG	
WIT 100K/-AU/-HU-US	300kcmil	2/0AWG	

Recommended circuit breaker (CB) specifications:

## For the WIT 50-100K-A-US and WIT 50-100K-H-US models

Inverter model	Rated voltage of CB	Rated current of CB
WIT 50/63K-A/-H-US	480V	150A
WIT 75/100K-A/-H-US	480V	250A

For the WIT 50-100K-AU-US and WIT 50-100K-HU-US models

Inverter model	Rated voltage of	Rated voltage of CB on	Rated voltage of CB on
	СВ	the load side	the grid side
WIT 50/63K-AU/-HU-US	480V	300A	150A
WIT 75/100K /-AU /-HU-US	480V	400A	200A

## 4.2.3.1 Wiring of the Battery System

After positioning all components following the system layout, move the battery modules as specified in the Quick Guide of the battery system, then secure the battery system to the designated location. For detailed battery system wiring instructions, please refer to the Quick Guide.



Fig 4.8 Wiring of the APX battery system

After the cable connection is complete, check the following items	After	the	cable	connection	is	complete,	check	the	follow	ing	items:
---	-------	-----	-------	------------	----	-----------	-------	-----	--------	-----	--------

General item	Position	Checking item
		1. Check the yellow-green PE cable and screws supplied
		with each component.
	Between modules	2. Screws are tightened.
		3. Each module is connected with the PE cable, including
DE ashla		the BM, CM and base.
PE cable		1. Check the yellow-green PE cable and screws supplied
		with the battery package.
	Battery enclosure	2. Screws are tightened.
		3. Connect the PE cable reliably, using the shortest wiring
		route whenever possible
		1. Check the battery terminals.
		2. Cables are securely connected.
Dennessel	Between CM and	3. The power terminal B+ of CM is connected with the
Power cable	BM	power terminal B+ of the first BM; the power terminal B- of
		CM is connected with the power terminal B- of the last BM
		in the second column (the bottommost one).

Table 4.5 Battery system cable connection checklist

		1. Check the battery terminals.			
	Between two BMs in	2. Cables are securely connected.			
	the same column	3. Check the cable connecting two BMs in the same column,			
	the same column	with a black connector on one end and an orange connector			
		on the other end.			
		1. Check the battery terminals.			
		2. Cables are securely connected.			
		3. Connect the B- terminal of the bottommost BM in the first			
	Between two BMIs in	column to the B+ terminal of the uppermost BM in the			
	different columns	second column using the long power cable with a black			
		connector on one end and an orange connector on the other			
		end.			
		1. Check the battery terminals.			
	The last BM to CM	2. Cables are securely connected.			
		3. Connect the B- terminal of the last BM to the B- terminal			
		of CM using the long power cable with one black connector			
		on each end.			
	Ch ( D) (	1. RJ45 connector			
	CM-BM	2. Cables are securely connected.			
		1. RJ45 connector			
	Between two BMs in	2. Cables are securely connected.			
	the same column	3. Cable connecting two BMs in the same column			
		1. RJ45 connector			
		2. Cables are securely connected.			
Communication	Between two BMs in	3. Connect the IN and OUT ports of the bottommost BM in			
cable	different columns	the first column to the IN and OUT ports of the uppermost			
		BM in the second column respectively.			
		1. RJ45 connector			
		2. Cables are securely connected.			
	OUT port of the last	3. For the bottommost BM in the second column, cover the			
	ВМ	IN port of the with a dustproof cap, and install the			
		short-circuit cap onto the OUT port.			

After verifying that all cable connections of the battery system are correct, install the external cover of the fan. **Note:** 

- The recommended battery voltage ranges from 750 V to 1000 V. Users need to determine the number of battery modules considering the actual voltage and power on site.
- The battery column with the CM is defined as the first column, and the other one is the second column.

4.2.3.2 Wiring between the Battery and the Inverter



	may cause lethal injuries.	
	All operations must be performed by trai	ined and professional electricians. Comply
	with all safety information specified in th	is manual and local regulations.
	Do not touch the equipment in operation	on unless necessary as high voltages are
	dangerous.	
	Do not place flammable or explosive mat	terials around the WIT inverter.
	If the cable is thick, do not wiggle it af	ter tightening the cable terminals. Ensure
	that the terminals are properly connected	d; otherwise, loose connection may cause
	overheating and device damage.	
	The battery wiring terminals are shi	elded with the protective cover. Upon
WARNING	completion of cable connection on the ba	ttery side, re-install the protective cover to
	prevent accidental touch.	

## 1. Pipe position

Pipes ① and ② route four cables: W00, W01, W02 and W03, which are supplied with the battery package. 2. Cable connection

W00 and W01: power cables between the battery and the WIT inverter, fed through Pipe ②, connecting the PCS+ and PCS- terminals on the battery to the BAT+ and BAT- terminals on the WIT respectively;

W02: power cable between the battery and WIT, fed through Pipe ②, connecting the AC INPUT port on the battery to the BMS AC port on the WIT;

W03: power cable between the battery and WIT, fed through Pipe ①, connecting the PCS port on the battery to the BMS COM port on the WIT.

Please refer to the figure below for wring between the battery and the WIT:



Fig 4.9 Wiring between the APX battery and the WIT inverter

## 4.2.3.3 Wiring of Power Cables on Inverter's PV Side

<u>注</u> 意	Operations in this section only apply to the WIT 50-100K-H-US and WIT 50-100K-HU-US models.
危险	<ul> <li>Before electrical connections, make sure that the DC switches on the WIT inverter are in the "OFF" position, and disconnect the DC breaker on the battery side and the AC breaker on the grid side. Otherwise high voltages present in the inverter may cause lethal injuries.</li> <li>All operations must be performed by trained and professional electricians. Comply with all safety information specified in this manual and local regulations.</li> <li>Ensure the correct polarity before connecting the PV modules to the inverter.</li> <li>Do not touch the equipment in operation unless necessary as high voltages are dangerous.</li> <li>Do not place flammable or explosive materials around the inverter.</li> </ul>
<b>於</b> 警告	<ul> <li>The maximum open-circuit voltage per PV string should not exceed 1100V.</li> <li>Ensure that all requirements are fulfilled to prevent fire or damage to the WIT inverter, which is beyond the scope of warranty, and Growatt shall not be liable for any consequential damages.</li> </ul>

## 1. Pipe position

Pipe ③ routes forty cables: PV+: W20-W39, PV-: W40-W59, which should be prepared by users separately according to the recommended specifications. The wiring terminals are provided by Growatt.

## 2. Cable connection

W20-W59: power cables between PV panels and the WIT, fed through Pipe ③, connecting the PV panels to the PV(1-10)+ and PV(1-10)- terminals on WIT correspondingly, as shown below:



Fig 4.10 Wiring on the WIT inverter's PV side

Note:

- Hazardous voltages are present on the PV panels connected in series when exposed to solar irradiance, which might cause lethal hazards. Cover the PV panels with dark material prior to connecting the DC input cables and ensure that the DC switch is in the OFF position, otherwise the high voltages of the WIT inverter might lead to lethal hazards.
- 2. The PV modules of the same string connected in series should be of the same model.
- 3. The max. short-circuit current per string must not exceed 40 A under any circumstance.
- 4. For optimal system configuration, it is recommended to connect a same number of PV modules each string.

4.2.3.4 Wiring of Power Cables between the Inverter and the Grid

1. Pipe position and dimensions

Pipe ⑦ routes four cables: W16, W17, W18 and W19, which should be prepared by users separately according to the recommended specifications. The wiring terminals are provided by Growatt.
2. Cable connection

W16, W17, W18 and W19: power cables between WIT and grid, fed through Pipe  $\overline{O}$ , connecting grid port (R/S/T/N) on the WIT to the grid (R/S/T/N) as shown below:



Fig 4.11 Wiring on the WIT inverter's grid side

Select the suitable circuit breaker and cables according to the recommended specifications. Run cables through the pipe, then connect the grid port of the WIT inverter to the grid over the circuit breaker.

4.2.3.8 Wiring of the Smart Meter and the Sampling Cable

1. Pipe position and dimensions Pipe  $\otimes$  routes one cable: W67, prepared by users.

Pipe <sup>(9)</sup> routes four cables: W60, W61, W62 and W63, prepared by users.

Pipe 10 routes three cables: W64, W65 and W66, prepared by users.

2. Cable connection

Meter wiring:

W67: communication cable between the smart meter and WIT, fed through Pipe (8), connecting COM1 (Pin 6, 7) of WIT to RS485-10f the meter (Pin A, B).

W60, W61, W62 and W63: power supply and sampling cables between the smart meter and the grid, fed through Pipe 0, connecting the voltage sampling port (L1/L2/L3/N) on the Meter to the grid-side circuit breaker (R/S/T/N).

W64, W65 and W66: cables between the smart meter and the grid-side current sampling CT, fed through Pipe (10),

connecting the three-phase current sampling port of the smart meter to CT 1/2/3 (S1 and S2), as shown below:



Fig 4.12 Wiring of communication cables between WIT and the Smart Meter



Fig 4.13 Wiring of meter's communication and sampling cables

## 4.3 Checklist

Upon completion of cable connections, please check all cable connections referring to the checklist below:

General item	Specific item	Insp	pection
		1.	Check the yellow-green PE cable and
			cable specifications. Check if the cable
	WIT inverter enclosure PE cable		is securely connected to the nearby
			grounding bar.
		2.	Protect the wiring terminals from rain.
		1.	Check the yellow-green PE cable and
DE ashla			cable specifications. Check if the cable
PE cable	APX battery enclosure PE cable		is securely connected to the nearby
			grounding bar.
		2.	Protect the wiring terminals from rain.
		1.	Check the yellow-green PE cable and
	PE cable of the secondary side of the		cable specifications. Check if the cable
	CT connecting to the meter		is securely connected to the nearby
			grounding bar.

Table 4.16 System electrical connection checklist

		2. Protect the wiring terminals from rain.
		1 The battery terminals (orange and
		healt) are correctly installed
	Power cables between the APX	2 Cables are securally connected
	battery and WIY inverter	2. Cables are securely connected.
		3. Frevent cables from being cut by the
		1 Ensure compation decourse cable
	The AC power supply cable between	1. Ensure correct and secure cable
	the APX battery and the WIT	connection.
	inverter	2. Prevent cables from being cut by the
		edges of the cable sieeve.
		1. Verify that the polarity of the DC
	PV cables between the WIT inverter	connectors is correct and the cables are
	and the PV array	securely connected.
		2. Prevent cables from being cut by the
- ··		edges of the cable sleeve.
Power cable		1. Check the cable specifications and
		check if the cables are securely
		connected.
	Power cables between the WIT	2. Prevent cables from being cut by the
	inverter and the grid	edges of the cable sleeve.
		3. Avoid over-bending in cable routing or
		damaging cables.
		4. Apply fireproof mud to the terminals.
		1. Check the cable specifications and
		check if the cables are securely
		connected.
	Power cables between the WIT	2. Prevent cables from being cut by the
	inverter and the loads	edges of the cable sleeve.
		3. Avoid over-bending in cable routing or
		damaging cables.
		4. Apply fireproof mud to the terminals.
	Communication cable connecting	Ensure no loose connection and no gaps in
	the APX battery to the WIT inverter	sealing rings.
	Communication cable connecting	Ensure no loose connection and no gaps in
	the WIT inverter to the Smart Meter	sealing rings.
Communication	Voltage sampling cable connecting	Ensure no loose connection and no gaps in
cable and	the grid and the Smart Meter	sealing rings.
sampling cable	Current sampling cable connecting	Ensure no loose connection and no gaps in
sampling cable	the grid-side CT to the Smart Meter	sealing rings.
	Dataloggen network (*	Ensure no loose connection and no gaps in
	Datalogger network configuration	sealing rings.
	DDMC	Ensure no loose connection and no gaps in
	DKMS	sealing rings.

# 5. System Commissioning

#### 5.1 Power on the System

1. Turn on all DC-Switches on the right side of the WIT inverter.

Note: If there is no disconnecting device such as a combiner box between the PV array and the WIT, terminals of the PV panel will be energized. In this case, turn on the PV-side switch connector at nighttime without solar irradiance, or cover the panels with opaque material before operations.

2. Turn on the switch disconnector on the APX battery. After the WIT inverter is powered on, the WIT will send a command to wake up the battery when connected to the grid or PV power, so that it will be powered on automatically. In case that the battery system is to be operated in off-grid mode, you need to press the button to power on the battery.

3. Turn on the WIT inverter's grid-side upstream circuit breaker.

Note:

The WIT inverter will power on automatically once the requirements of each connection port are met, then the APX battery will start up automatically. Do not touch the equipment after it is powered on unless necessary.

## 5.2 Configuration and Commissioning



The WIT inverter might display the wrong time and date if it has been stored for over one month. You need to set the correct time and date before connecting the inverter to the grid.

#### 5.2.1 Register an Account

Note: Ensure a consistent connection to the Internet to perform the following operations.

The datalogger can upload data to the server platform, enabling remote monitoring or control via the APP or server webpage. Upon initial usage, you need to configure the datalogger after powering on the system.

1. Register an account with the APP

	8 'Bil Bi 76% English 9	<	Register	14			\$ 'hit hi 76% Egitat V
GROWATT	Demo >>		Current server addressserver growatt.com		GROW	ATT	Demo >>
		* 🕢 Coun	itryorxegion Austria				
hermany		×≜ User	mane Enterspername		Germany		
L Marrier		K 📋 Pasa	nward () Enter password		A	5	
ofar warrane	×	* 🗎 Repe	eat password Report password		Ethar serroom		×
Remark		1 0144	a state of the sta		Ö fannen		
	0	S. 1900	e namer - Louis provident as sources		sto proved		0
Remember password		* 🔤 Emai	IL address Enter enail		Remember pass	iord	
Sign in		* 💷 Veri	fleation code Enter verification code Send	verification code	C	Sign In	
Forgot password	Register	* 🟦 Insta	aller code Input installer code		Forgot password	6	Register
Taulina	1	Register OSS	account at https://ossgrowatt.com/login%arg-en	er cortect		Tanibia.	
*	111		3	_			TH
antiper 801 detailager	Local Debugging		I have read and agree <u>Shine Smart Service</u> Agreement and <u>Shine Smart Services</u> Privat	es User cy Policy	Configure WP) in taking a		Jacob Dollargeting
f 🔽	in		Register		f	9	in
		4					
These read and agree Stine	mart Service They				Ehave rei	dand agree the	Senar & Services User

2. Register an account on the website

Open the browser, then enter <u>http://server-us.growatt.com</u> in the address box to access the login page. Click "Register an Account".

	Shmodesign	Download Mobile En	nd Larguage
	Monitor/Oss	Login	
	Tremes	8	
	Register An Account	Parget Passevierd ?	
	Demo Account includen	ibitly disclosure	
Demo Account			

On the Registration Page, fill in the information as prompted and click to agree to the Privacy Policy. Fields marked with the "·" icon are mandatory. Click next, and it will bring you to the "Add Plant" page. Skip this step during account registration to return to the login page.

	User	Installer	Distributor
	Country		т.
	Username	No More Than 30 Characters	•
	Password ①	Not Less Than 6 Digits	•
	Password Confirm	Not Less Than 6 Digits	•
	Language	English	۰ .
	Phone Number		
	E-Mail		
	Installer Code		
	01	have read and agree to the 🤇	<pre>《Privacy policy》</pre>
		Next	
2.2 Create a Plant			

Note: Ensure a consistent connection to the Internet to perform the following operations.

1. Create a plant with the APP

Tap "Plant" > the "+" icon on the upper right corner > "Add Plant". Fill in the information, then tap "Add Plant".

	Plantlist	2 +	< Add Plant
Q Sea	rch 🗄	Parameters	* Plant name Enter the Plant name
All (3)	Online (0) Offline (3)	Add Plant Abnormal (0)	* Installation date Select the installation date
ant nome	Current Power \$ PV cap	acity≑ Doil	Plant address           O Get from the map         S Automatic         Marual
			* Other × City × City
			Longitude Latitude
			* PV capacity(W) PV capacity 4
			Plant type     Residential plant     Commercial Plant     Ground-mounted plants     (Conversion is based on 1 XWh power generation)
			Fund Revenue DOLLAR 🗸
			PV Plant picture + Uplood Picture
	1		5
Dashboard	Plant Service	A Me	Add Plant

## 2. Create a plant on the website

Click "All Plants" > "Add Plant" on the upper right corner. Fill in the information, then click "Yes".

						/		
*	otal		30 m	/ Capacity		🖌 🔯 Total Revenue		
0.0(kWh)			156.0(kWp)			0(¥)		
All Plants Residential Plant Corre	nercial Plant Ground-Mountes	Plants		• Orley • Abren	mat + Lost Power Station Sergue	nding - Gurrant Power Priority -	Please lease: the total and the second	
- RUSSICERS	- RS							
12.5t/Min foday Conset Print	Over- Totar	Oran Convert	Okwn Toda	Ovw Current Primer				

٩d	d Plant									
,	Installatio	n Information								
	Plant Name	Example: David 6.24Wp Plant	Installation Date		•	PV Capacity(kWp)		Installer		
	Plant Type	Residential Plant 🔹								
	Location Ir	nformation								
	Country	Other 💌 💌	City			Address				
	Time Zone	UTC -12 👻 •	Longitude 🕕			Latitude 🕕		Plant Image	Click Upload	
	Set Revenu	ue Formula(Set 1Kwh As The Co	onversion Standard	)						
	Selling Price	1.2 RMB(¥) •	Standard Coal Saved	0.4		Coz Reduced	0.997	Reducing Deforestation	0.055	
	Electricity price	0.055	Peak Rate	1.3		Standing Rate	1.1	Off-Peak Rate	1.0	

## 5.2.3 Network Configuration with ShineTools

1. Connect the WIT inverter to the Internet on ShineTools

Open ShineTools APP. On the login page, click "End User" and enter the password. The password format is "oss + current date". E.g. oss20230925. Then click "Sign in".

 $\equiv$ 

ShineT	pols		Please select a debugging tool			
End User	O&M User		USB/232-WiFi	>		
a	ø					
			ShineWiFi-S/X			
Automatic Log-in	Forgot password	0	Only supports datalogger with version 3.0.0.2 / 3.1.0.2 or above	>		
Sign i	n					
		3	Direct WiFi (MIN TL-XH-US ,SPH 10K TL-X)	>		
		8	ShineWiFi-X2	>		
			Welink	>		

2. Select "Direct WiFi" > "WIT-A/AU-US" or "WIT-H/HE/HU-US". For the SN (serial number), you can scan the SN barcode on the chassis or enter it manually. Then click "Confirm" and it will start searching for Bluetooth devices.

< Pleas	e select a product		<	Scan		
Please select a pro	oduct type					
MIN TL-XH-US		>				
SPH 10K TL-X		>				
WIT-A/AE/AU-US		>				
WIT-H/HE/HU-US	3	>				
			QR cod	Can not find the number?	serial	
<	Manual		<	Searching for Blu	etooth	
Serial Number Please enter SN	asserate set € Scan			(*)		
	Confirm		Se	arching for bluetoot	h devices	

Click "Connect" after the target Bluetooth device is displayed.

< Searching for Bluetooth	< Searching for Bluetooth
	*
	Bluetooth available nearby(1)
	Please connect the Bluetooth whose name is consistent with the SN from the list below
luetooth available nearby(1)	QWL0DC3005 Connecting
Please connect the Bluetooth whose name is consistent with the SN from the list below	
QWL0DC3005 Not connected	
Search for bluetooth devices	Search for bluetooth devices

After the device is successfully connected, it will display the following page. Make sure that the communication between the WIT inverter and the mobile phone has been established over Bluetooth.

0	Generation (kWh)	<b>430.4</b> Today	4130.4 Total
0	Charged (kWh)	<b>6.1</b> Today	<b>221.7</b> Total
0	Discharged (kWh)	<b>430.4</b> Today	645.5 Total
A	Import from Grid (kWh)	<b>24.2</b> Today	<b>77.5</b>
0	Export to Grid (kWh)	<b>387.9</b> Today	3954.0 Total
0	Consumpti on (kWh)	<b>58.9</b> Today	<b>126.9</b> Total
0	Self Consu mption (kWh)	<b>42.1</b> Today	<b>106.5</b> Total
0	run time (h)		4.9
0	capacity use time (h)		4.9
CL	irrent	Charged	Discharged

"Then connect the WIT inverter to the WiFi network.

Click ""Quick Settings"" > ""Network Type"" > ""WiFi"". Enter the WiFi name and password, click ""Connect to Internet"" to configure the inverter to the server over the network."

< wit	-H/HE/HU-l	JS Refreshing	< (	Quick Setting	Read	<	Configure the n	etwork
O Consumpti	<b>58.9</b> Today	<b>126.9</b> Total	Network Type		>	Netwo	ork configuration m	ethod
Self Consu mption	42.1	106.5 Total	Time		2023-09-21 > 15:16:22 >	O WI Note:F SN cor	FI O 4G Please don't connec de shared from the	C LAN t the WIFI of inverter
(kwn)		4.9	LCD language		English >	([1-	GROWATT	≓
(h)			AFCI		>			
O capacity use time (h)		4.9	Export Limitation	Setting	>			
Current Power	Charged Power	Discharged Power				Server	address	
0278.3W	0.0W	76890.3W				serv	er-us.growatt.com	
nport & Export P	Power reflux 768	Dry contact 🛇				serv	er-us.growatt.com	
🛆 Fault 0	0	Warning <mark>0</mark>					Connect to the la	oternet
= <del>)</del>	C.	8					Connectionness	
uick Setting	System Con figuration	Grid Code						
\$	$\odot$							
EMS	Smart Diagnosis	Device Information						

### 5.2.4 Smart Meter Configuration

Ensure the correct wiring of the Smart Meter, including the grid-side voltage sampling cable, the current sampling cable wiring to the CT, the communication cable and the PE cable as instructed in Chapter 4. Then set parameters following instructions below:

Smart Meter configuration

Connect the voltage sampling cable, the current sampling cable wiring to the CT, the communication cable between the meter and inverter in according to the Quick Guide of the meter mentioned in Section 4. The screen would light up after the system is powered up. Access the configuration page, then set the CT ratio (e.g. set 120 for the CT ratio 600:5), and check if other parameters are correctly configured.

## 5.2.5 Online Commissioning

#### 5.2.5.1 Online Commissioning with the APP

After completing the above steps, wait until the APP network configuration succeeds, then you can add devices to the power plant to check system information and set parameters.

1. Interface description

Sign in with your account and access the page below:
$ \begin{array}{c} L(3) \\ L$	Q Search	Self-consumption 101.6kWh		Exported to grid 169.6kWb	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	) Online (1) Offline (2) Abnormal (0)	Lood cor	nsumption:123.9kWh	19.00	
L         A data da	Ourrent Power≑ PV copocity≑ Doil	Self-consumption 101.6kWh		Imported from Grid 22.3kWh	
Installation able       2023-10-16         W Capacity       0.000         Attice power:0       Total power:0         Distologer:NBMDPADOAS       Total power:0         Distologer:NBMDPADOAS       Total power:0	產 商傭系統应用 → Current Power Os W	My	device list >	*	
Normality Power Generation       Data         Â H Â, K, Ê, Â, A, A, K,       Auxilia         Â H Â, K, Ê, Â, A, A, K,       Auxilia         A Current Power 3005W       Data         Auxilia       Current Power 3005W         Auxilia       Current Power 3005W         Datil Power Generation       Data         Auxilia       Current Power 3005W         Data       Current Power 3005W         Data       Current Power 3005W         Data       Current Power 3005W         Data       Current Power 3005W         Maxilia       Current Power 3005W         Maxilia       Current Power 3005W         Data       Current Power 3005W         Datalogger 1005W       Current Power 3	Installation date 2023-10-16	NBM0D4D0AS_I	Online		
前 格 先 比 点 用 湖 试       Current Power 3005W       Datal asguer MBMDD4D0AS         Market Status in obse       2023-10-16       Power 30046.1W       Today 264.3km         Power 30046.1W       2023-10-16       Power 30046.1W       Today 264.3km         With       Status in obse       2023-10-17       Power 30046.1W       Today 264.3km         With       Status in obse       2023-10-17       Power 30046.1W       Today 264.3km         With Power Generation       2023-10-37       Power 30046.1W       Today 264.3km         Power 30046.1W       Soc 144:       Power 30046.1W       Power 30046.1W         Power Generation       BBWA       Power 30046.1W       Power 30046.1W         Power Soc 143:       Datalogger 1BM00P4D0AS       Power 30046.1W       Power 30046.1W         Power Generation       BBWA       Power 30046.1W       Power 30046.1W       Power 30046.1W         Power Generation       BBWA       Power 30046.1W       Power 30046.1W       Power 30046.1W       Power 30046.1W	Daily Power Generation 0.0kWh	Active power: 0	Total power:	0	
• Correct Power 30254//         Machine is the 523-10-16         PV capacity 1000Wp         Daily Power Generation 2330/0         Mil ch         Machine is the 2023-10-31         Power 30046.1W         Correct Power 30046.1W         Correc	商储系统应用测试	Datalogger:NBM0D4D0/	15		
Installation date 2023-10-16 PV capacity 100kWp Daily Power Generation 23:32Wh Mith Concert Power 0av Installation date 2023-10-31 PV capacity 50000 Daily Power Generation 2023-10-31 PV capacity 50000 Daily 500000 Daily 5000000 Daily 50000 Daily 50000 Daily 50	- Current Power 30.05kW	QWLODCTEST	Running stat		
Duily Power Generation 23 32Wh A Current Power Owl Duils Power Generation 2023-10-37 PV capacity 54WP Duily Power Generation DBWA	Installation date 2023-10-16 PV capacity IO0kWe	Power :30046.1W	Today 264.3	Wh	
#1 st,       Current Flower GMW         Installation aste       2023-10-31         PV capacity       544Wp         Data Power Generation       0.004Mp         Corrent Power Generation       0.004Mp	Daily Power Generation 23.2kWh	Datalogger:NBM0D4D0/	чS		
Current Power Out     Totalistion dots         2023-10-37     PV capacity     Dails Power Generation     Dails     Dever Generation     Data	测试	OHFN00R237LT000D	Online		
Installation obse     2023-0-31       PV capacity     564.Wp       Dails Power Generation     0.0Vxh	- Current Power OkW	50C/94%			
Daily Power Generation DDAA	Installation date 2023-10-31 PV capacity 56kWp	Datalogger:NBM0D4D0/	AS		
(a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	Daily Power Generation D.OkWh		*		
739.7% 94.7% 13		<u></u>	ଟ୍ଟି	Ą	
astrong loang 15		239.7kg	96.2kg	13	
CO2 reduced Coal soved Deferestation reduced		CO <sub>2</sub> reduced	Coal saved	Deforestation reduced	
	1 🗊 🖒 ۹	0 0	$\bigcirc$	8	

Tap "Plant", then select the target plant from the plant list.

Find the WIT inverter from "My device list" for parameter settings, which requires password: Growatt+the current date. For instance, if the date is November 1, 2023, the password is growatt20231101.

< Setting		
Mode Selection and Time Setting	>	
Set Inverter On/Off	>	
Setting time	>	
Mode Selection and On/Off Grid Mode Setting	>	
Ongrid parameters setting	>	
Off-grid Setting	>	
Save The Pf Command?	>	
AC Charging/Discharging Power	>	
Storage Parameter Setting	>	
Set reactive power	>	
ExportLimitation	>	
SingleExport	>	
Set power factor	>	
Max. Charging/Discharging Current	>	
The equalization charging voltage is	>	
The EOD voltage	>	
Customize PF curve	>	

5.2.5.2 Online Commissioning on the Webpage

Web commissioning is the same as the APP commissioning. Sign in with your account and select your target plant to access the page below:

3 🖄 https://servet.growati.com/index			cati Q	
DWATT REFERRE			T Switch theme   O Add Plant   I Add Data Log	er   @ AddColinier   @ MitSESSIENIC
iboard	<b>(</b> ) d	A B 0		7°C 🚓 🔤
Louise Dathoud	Durbland			Daul Witeres Institutes 11. – Witer
System Status: Standby () In Sense: 0.000W ()				
sattery Fist		Photovoltaic Curpu		Dicharged 5
		643.6	836.6	602.2
	ita i			
	Constanting I NEW			0
INC BY		beyond to Gid	Load Concernation	Solar Devenue
		3977 5954 30		0.1tm 484.6.1tm
		337.17 3333.17 34	0.0	
mport: 0.00eW				
Baters Probation 440 2016			1 212-11-15	Kor Day Marth Year
5.76% B3.24%			87.415	205
6-Consumption () Reported to Crid () E.Secolo 297.2001			Self-Consumptio 262.5xV/h	imported from Grid () #2.8kWh
6 Conservation () Executed to Grid () EXECUTE AND			Soft Consumption 262.8xV/m	• O Imported from Grid O #2.8kWh
A Consumption () Exercised to Gold () E 2000 - 1997.7cm			Sef Consumption 282,3000	O     Imported from Grid ()     #7.8W(h)
Economic to cit 2 Jack Alexandre State St			Self-Conumption 28825000	Importations Cell() #7.60%
Conception 0 Learning to Coll 0	<ul> <li>Seren Production</li> <li>Branovlair Organi</li> </ul>	Land (Smannellin) 🔹 Self-Conversion 🔹 Loorend is Gel 🔹 Im	Self-Concuration	Importation Get 3 #2.60%
Conception 0 benefit to cit 0 and 2 form	<ul> <li>Inter Projection</li> <li>Proposition Grant</li> </ul>	Land Dimension 🛛 Self-Conversion 🔍 Langton for Cell 🔹 Im	Lef Convergio	e) ingentel free Gut () gEarch I and ()
Convergine () Exercise to cold () and Zoolo Ina Ina Itazi Exercise Exercis	B Some Production B Promotivel Strated B	Land Communities	Lef Counception	e) impertel free Gut () gEarch I and ()
	B Some Production B Promotical Surgert B	Land Comunities	Left Convergio aski Som	e) impertel free Cut 3 gEarch
	i Sonn Projekti Soport	Load Dimension	Left Convergio	e) imperter fore out 3 grammers grammers
	<ul> <li>Sense Production</li> <li>Provential Strated</li> </ul>	East Ommandes	Let Convertie Bill Solo	<> myetrifice (vi) Itani
	Inne frédoir     Preseste: Over	East Graveetine III Self Computation III East Self Lange and Sockarge into Elitities Charge and Sockarge into Elitities Alliane anno	tel Convertie 28.000	<pre>competition cold Elam </pre>
	Israe Inductor     Presesta: Over	tool (insurantia S GH Computation S Isource) to Del () In the Electricary Charge and Discharge Inter Electricary Aligner James	tel Convertion	estimate from Cold () It Satisfies
Concurrent to Coll (1)     Bart Poll       Res     Bart Poll       Res     Bart Poll       Res     Bart Poll       Bart Poll     Bart Poll       Bart Poll <t< th=""><th>Isree Inductor     Presesta: Over</th><th>tool (insurantian S Gel Comparation S &amp; Boardier to Del 10 mm Electrica (Charge and Coloriange into Electrica Aligner Base Base Base</th><th>tation</th><th>engente free Get () It such as a second s</th></t<>	Isree Inductor     Presesta: Over	tool (insurantian S Gel Comparation S & Boardier to Del 10 mm Electrica (Charge and Coloriange into Electrica Aligner Base Base Base	tation	engente free Get () It such as a second s
Concurrent Dial     Base of the Cold State       International     Base of the Cold State       State of International     Base of the Cold State	Isree Inductor     Presesta: Orget	tead Groundelle S Gel Conventeix D et an Internet Kange and Stachunge refer Biotest Biotest Albert Biotest Bio	end from CHE	engente free Guild Statement of Statement
Image: Constraint of the cold of the	Isram Indicity   Manustati Origi	tood Groundelle	end from CHE	e myerte free det 3 Ramin
Incomparing (I)     Second to cold (I)       State of the cold (I)	Isram Indicity   Manustra Orgen	Load Groundelle S Gill Convertaine S Learned to Cell 4 in the Entropy Charge and Sockwarps with Elizare 40000 0 0.0	ed Convertie 28.500 autor from CH2 • Chargen • Dankerges	estimate from Cold (S) Elization
the Conception of the Cold of		Load Groundeller	Liste Commention Liste Comment Comm	estimate from Cold (S) Elizability 1886
the Concernance of the Cold of	Isona hudeita    Nanostati Over	Load Groundeller	Line Commention State Source	estimate for costs allación
	Isome helderin     Indexesting Opport       Isome helderin     Indexesting Opport       Isome helderin     Indexesting Opport       Isome helderin     Indexesting Opport       Isome helderine     Indexesting Opport       Isome helderine     Indexesting Opport       Isome helderine     Indexesting Opport	Exad Demonstration @ Baryrad is Def @ In Default Charge and Stacharge infor States	Line from Call Internet From Call Call Company & Danharper Line from	<>> myertel fore del 3 Xistin 
the concurrence of a cold	Interm Prediction     Presentation System       Interm Prediction     Presentation System       Interm Prediction     Interm Prediction       Interm Prediction     Interm Prediction	Exed Demonster	exercision and from Coll	• myerti (Fre Gel) Elain
the consequence of a cold		Ever Charge And Sector 10 (1997)	User Provide State	• Insertion (ed.) Elizability (ed.) (ed
		East Semantini  Self Comparison  Terrery Charge And Sectory into  Connection (Main: Weiling  Data Seguer: National California  And Prevention (Main: Chire)  Connection (Main: Chire)  Connection (Main: Chire)	Index Trans. 2023-11-15 14:00.15 Update Trans. 2023-11-15 14:00.15 Control Proceedings 9 Update Trans. 2023-11-15 14:00.15 Control Proceedings 9 Update Trans. 2023-11-07 14:00.15 Control Proceedings 9 Update Trans. 2023-11-07 15:01.06 Update Trans. 2023-11-07 Update Tr	e myerte free de la grande d
	Interm Production     Intermediate State State State       Intermediate     Intermediate State State       Intermediate     Intermediate State	Start (insurantini ) (if Compared in Cel ) in the Entropy Charge and Successor in Cel Entropy Charge and Successor in Cel Entropy Charge and Successor in Cel Entropy (Successor in Cel Entropy - Makedoo Data (Cel Entropy - Makedoo Data (Cel E	146 Converted asset from Cop 140 140 140 140 140 140 140 140	C mystel for Cells I Jacob I Jacob J

Select the target WIT inverter from the device list for parameter settings. You need to enter the password: the current date, e.g. 20231113.

	(	Command					4
○ Time Slot 1	Grid First	• 0	00 00 ~	02 00	Enable	•	
◯ Time Slot 2	Load First	• 0	02 00 ~	04 00	Enable	•	
○ Time Slot 3	Grid First	• 0	03 00 ~	06 00	Enable	T	
○ Time Slot 4	Grid First	• 0	13 00 ~	20 00	Disable	~	
◯ Time Slot 5	Load First	• 0	20 00 ~	23 59	Disable	-	
Time Slot 6	Load First	• 0	00 00 -	09 28	Disable	-	
○ Set Inverter On/Off			Turn On	~			
○ Set Time			2023	3-11-15 13:3	8		
○ Mode Switch			Automati	c , ,	)		
🔿 High Grid Voltage Limit			456.4		(17.3~762V)		4

Set all the above parameters the same as parameter settings with the APP.

#### 5.2.5.3 Parameter Settings

Parameter settings with the ShinePhone APP is the same as that on the website. This section takes settings with APP as an example.

Mode Selection and Time Setting: configure parameters based on actual use. You can set the inverter to operate in three modes: Load First, Grid First or Battery First during different time segments. For detailed operating mode description, please refer to Section 3.1.4. Please note that overlapping time period settings are not allowed. For instance, if the first time segment is set to 02:00~04:00, the other time range can only start from 04:01.

<	Setting	Done	<	Setting	Done	<	Setting	Done
Time Period1	1 00 : 01 ~ 04 : 01		Time Period1	00 : 01 - 04 : 01		Time Period1	00 : 01 - 04 : 01	
	Load First 🔻	)		Load First 🔹			Load First 🔹	
	Disable 🔻	)		Disable 🔹			Disable 💌	
Time Period2	2 04 : 02 ~ 08 : 02		Time Period2	04 : 02 - 08 : 02		Time Period2	04 : 02 - 08 : 02	
	Load First 🔻	)		Time Period1			Load First 🔹	
	Disable <b>v</b>			Load First			Time Period1	
		,			_		Enable	_
Time Period3	3 08 : 03 ~ 12 : 03		Time Per	Bat first		Time Per	Disable	
	Load First 🔻	)		Grid first				
	Disable 🔻	)		Cancel			Uisable	
Time Period	4 12 : 04 ~ 16 : 04		Time Period4	12 : 04 - 16 : 04		Time Period4	12:04-16:04	
	Load First 🔻	)		Load First 🔹			Load First	
	Disable 🔻	)		Disable			Disable	
Time Period	5 16 : 05 ~ 20 : 05		Time Period5	16 : 05 ~ 20 : 05		Time Period5	16 : 05 ~ 20 : 05	
	Load First 🔻	)		Load First			Load First	

Note:

1. You are advised to set the Battery First mode during off-peak hours, and Grid first mode during peak hours, contributing to cost savings.

2. The operating modes mentioned above apply to the on-grid system. For the off-grid system, it will not response to the priority settings, but gives priority to ensuring the AC output voltage.

Set Inverter on/off: you can set to power on/off the WIT inverter.

t Inverter On/Off  Power ON  Complete  Set Inverter On/Off  Complete  Set Inverter On/Off  Power ON  Power Off  Power ON	(	Set Inverter On/Off	Set Inverter On/Off	
Power ON   Power ON  Power ON  Power ON  Power ON  Power ON  Power Off  Power ON  Powe	t Inverter	On/Off	Set Inverter On/Off	
Complete Complete Set Inverter On/Off Power Off Power ON		Power ON	Power ON 🔻	
Set Inverter On/Off Power Off Power ON		Complete	Complete	
Power ON			Set Inverter Op/Off	
Power ON			Power Off	
			Power ON	
Cancel			Cancel	

**Set the Time:** you can set the time of the WIT inverter. With connection to the datalogger, the time will be calibrated automatically.



**Setting On/Off-grid Switching Mode**: includes automatic mode and manual mode; when set to the automatic mode, the WIT inverter will switch between on/off-grid mode automatically based on the output of AC grid port; when set to the manual mode, you need to set the on/off-grid operating mode manually.

Control And Control Mode Control Mode	C Mode Selection and On/Off Grid Mode	Mode Selection and On/Off Grid Mode
Mode Selected	Mode Selected	Mode Selected
Automatic mode	Automatic mode 🔻	Manual mode
Complete	Complete	On gird/Off grid Mode(Only available in Manual Mode.)
		Complete
	Mode Selected	On gird/Off grid Mode(Only available in Manual Mode.)
	Automatic mode	On gird
	Manual mode	Off grid
	Cancel	Cancel

Note:

The -H/-A models do not support the automatic mode.

**Gird Connection Parameter Settings:** set the grid connection thresholds. If the actual voltage/frequency exceeds or falls below the threshold, the inverter cannot be connected to the grid.

Over volta	age		
	527.7	(1-600V)	
Under vol	tage		
	407.8	(1-600V)	
Overfrequ	uency		
	60.1		
Underfree	quency		
	59.5		
Grid-conr within 50 Grid-con within 45	nected high grid frequency: -55Hz(50Hz) or 60-65Hz(60Hz) nected low grid frequency: -49Hz(50Hz) or 55-59Hz(60Hz) Complete		

**Off-grid Parameter Settings**: Set the off-grid parameter range. Off-grid Enable allows you to choose whether to permit the WIT inverter to operate in the off-grid mode. Set the Off-grid Frequency and Voltage in line with the grid power; setting other grid voltage level is prohibited. Growatt shall not be liable for damage caused by failure to follow instructions on setting the voltage level.

<	Off-grid Setting		<	Off-grid Setting		<	Off-grid Setting	
Set EPS On/	Off	C	Set EPS On/Off			Set EPS On	/Off	
	Enable 🔻			Enable	-]		Enable 🔻	
Off-Grid Free	quncy	C	Off-Grid Frequncy			Off-Grid Fre	equncy	
	<b>•</b> 06	Hz		60 •	) Hz		H:	z
Off-Grid Volt	tage	C	Off-Grid Voltage			Off-Grid	Off-Grid Voltage	
	277	V		Off-Grid Frequncy			230	
	Complete			60	-1		240	
				Cancel	-1		277	
				Cancer			127	
							Cancel	

AC Charging & Discharging Power: AC Charging Power is set to limit the maximum power drawn from the grid that charges the battery; AC Discharging Power is set to limit the maximum power of the WIT inverter's AC output terminal. Set the percentage value between 0 and 100.



**Battery Parameter Settings**: you can set the battery charging/discharging cutoff SOC (in percentage, ranging from 0 to 100), and enable/disable the AC charging function.

<	Storage Parameter Set	tting	Storage Parameter Setti
Stop Cl	narging SOC	Stop C	
	100	0~100(%)	100
Stop Di	scharging SOC	Stop E	Discharging SOC
	10	0~100(%)	10
UTI cha	rge	🔲 UTI ch	arge
	Enable	•	LITI charge
When t dischar	he battery energy reaches the p ging SOC, the battery will stop	oreset stop When discharging. discha	th rg Disable
When t chargin WIT Ca	he battery energy reaches the p g SOC, the battery will stop cha n Charge Battery By Ac Power	oreset stop When arging. chargi From Gridd WIT C	th ng Enable an
	Complete		Cancel

**Set Reactive Power**: eight modes are available: PF fixed to 1, Set PF, Default PF Curve, Inductive Reactive Power, Capacitive Reactive Power, QV Mode and Positive & Negative Reactive Power Value Adjustment. For PF fixed to 1, Default PF Curve and QV Mode, reactive power value is not configurable. For the other five modes, you can set the reactive power percentage.

<	Set reactive power		<	Set reactive power		<	Set reactive power	
Set reactive	e power		Set reactive po			Set reactive p	power	
	1	(0-100%)	(	1			[ 1	
	PF fixed 1	•		PF fixed 1			PF fixed 1	
				Please Select				
	No			PF fixed 1			No	
	Complete			Set power factor		_		
	Complete			Default PF Curve			Please Select	
			Indu	stive reactive power ratio	(9/)		No	- 8
			Gar	ductive reactive power ratio			Yes	
			Cor	(%)	atio			
				QV mode			Cancel	
				Positive and negative				
				Cancel				

**Export Limitation**: you can enable or disable this function based on the actual use. Power imported from the grid to the system is forward flow, while power exported from the system to the grid is reverse flow. You can limit the power exported to the grid by setting the export limitation power percentage, ranging from 0 to 100.

<	Export Limitation	<	Export Limitation
Export Lim	litation	Export Limit	ation
	OFF 🔻		ON T
		Export powe	er limit
	Complete		0.0 (0-100%
			Complete

**Per-phase Export Limitation**: enable this function if the local regulations have restrictions on the power exported to the grid per phase. With this function enabled, it can limit the power of each phase that is fed to the grid even with unbalanced loads.



**Max. Charging and Discharging Current**: limit the maximum charging and discharging current of the battery terminals. This configuration only applies when the battery is directly connected to the inverter, and does not apply to the battery with the DC-DC converter.

Maximum charge current	
151.0	(0~200A)
The maximum discharge current is	
151.0	(0~200A)
	151.0 The maximum discharge current is 151.0 Complete

0

**Balancing Charging:** limits the battery maximum charging voltage. The battery will stop charging when the actual voltage is greater than the value. This configuration only applies when the battery is directly connected to the inverter, and does not apply to the battery with the DC-DC converter.

The equalization	n charging voltage is	
	850	(600~1000
Battery stop c	harging voltage	
	Complete	

**EOD Voltage:** battery discharge cutoff voltage. The battery will stop discharging when the actual voltage is lower than the value. This configuration only applies when the battery is directly connected to the inverter, and does not apply to the battery with the DC-DC converter.

<	The EOD voltage	
The EOD ve	bltage	
	750.0	(600~1000V)
Battery st	op discharging voltage.	
	Complete	

**Customized PF Curve**: you can configure 4 points, setting the PF value and the reactive power. The inverter will operate according to the configuration.

<	Customize PF curve		
Point1			
Power percentage	0	(%)	
Power factor point	-1.0		
Point2			
Power percentage	0	(%)	
Power factor point	-1.0		
Point3			
Power percentage	0	(%)	
Power factor point	-1.0		
Point4			
Power percentage	0	(%)	
Power factor point	-1.0		
Power percenta Power factor po	ge(0-100) int(-1-1) Complete		

#### 5.2.6 Local Commissioning

If no WiFi connection is available in the commissioning area, you can connect to the datalogger within a short distance over the ShineTools APP to connect to the server, enabling you to view and set system parameters through the APP without configuring the datalogger.

Operation instructions:

- 1. Download and install ShineTools.
- 2. Enter the login page, select "End user", and enter the password, which is oss+the current data, e.g. "oss20231227".
- 3. ShineTools supports commissioning with various tools, and users need to select the corresponding tool to proceed.



正式环境

Current version 3.4.1.0

- 4. Connect to the datalogger Bluetooth or WIFI hotspot to establish communication between the phone and the datalogger. Select the model to enter the commissioning page.
- 5. Select the setting items below based on your needs:
- A. Quick setting items

Inverter Time: set the time of the WIT inverter. With connection to the datalogger, the time will be calibrated automatically.

Language: set the display language of the WIT inverter.

Export Limitation: set this function complying with the applicable grid standards. Enable export limitation if no power is allowed to be exported to the grid.

AFCI: you can enable the AFCI function and check the current DC arc data.

B. System configuration

Power on/off the Inverter: you can set to power on or off the WIT inverter.

Active Power in Percentage: set the AC port output power of the WIT inverter in percentage, then the WIT inverter will operate within the user-defined limit.

Enable Off-grid Mode: you can enable the off-grid mode when the grid power goes down to support the loads with the PV and battery power.

Enable N-PE Detection: you can enable the function to check the N-PE voltage to ensure safe operation.

Anti-PID working mode (auto/continuous/nighttime): select the Anti-PID working mode according to the on-site situation.

Anti-PID on/off: you can enable/disable the Anti-PID function, which can mitigate the PID effect.

Anti-PID Working Voltage (300~500): select the Anti-PID working voltage level.

On/Off-grid Switching Mode: includes automatic mode and manual mode; when set to the automatic mode, the

WIT inverter will switch between on/off grid mode automatically based on the output of AC grid port; when set to the manual mode, you need to set the on/off grid operating mode manually.

Enable Off-grid Output Soft Start: you can enable the soft start function to increase the voltage output gradually,

thus improving safety during startup.

Off-grid Soft Start Time: set the startup time with the soft start function enabled.

C. Grid Code Settings

Note: Users are not authorized to modify parameters of this section as it might affect the normal operation and protection logic.

D. Charge/Discharge Management

**Set the Charge and Discharge Priority Time Period**: you can set the inverter to operate in the Load First, Grid First or Battery First mode during different time segments according to the actual use. For details, please refer to Section 3.1.1. Please note that overlapping time period settings are not allowed. For instance, if the first time segment is set to 02:00~04:00, the other time range can only start from 04:01.

**Enable AC Charging**: you can enable this function to draw power from the grid to charge the battery, or disable the function if you do not want to charge the battery with grid power.

AC Charging Power (%): you can limit the grid-side power that charges the battery with the AC Charging function enabled.

**Discharge Cutoff SOC**: range from 0~100, the battery will stop charging when the SOC exceeds the preset value. You can set an appropriate value to reserve battery energy as backup power.

**Max Battery Charging Current**: you can limit the battery charging current to not exceed the value you set. This configuration only applies when the battery is directly connected to the inverter, and does not apply to the battery with the DC-DC converter.

**Max Battery Discharging Current**: you can limit the battery discharging current to not exceed the value you set. This configuration only applies when the battery is directly connected to the inverter, and does not apply to the battery with the DC-DC converter.

**Battery Balanced Charging Voltage:** you can limit the battery charging voltage to not exceed the value you set. This configuration only applies when the battery is directly connected to the inverter, and does not apply to the battery with the DC-DC converter.

**Battery EOD Point:** when the battery voltage is less than this value, the battery will raise the under-voltage alarm. This configuration only applies when the battery is directly connected to the inverter, and does not apply to the battery with the DC-DC converter.

E. Device information

PV Voltage and Current: you can check the PV current and voltage of each string;

AC Voltage/Frequency/Current/Power: you can check the voltage, current, frequency and power of the AC port of the WIT inverter;

**Battery Parameters**: you can tap "Battery" to enter the battery details page, checking the battery hardware and software version and other information;

Internal Parameters: you can check key information of the device in operation;

About Device: you can view the hardware and software versions and specifications of the system.

#### **5.3 Application Scenario Configuration**

**Self-consumption:** Maximize self-consumption, and the surplus power is fed to the grid. The system prioritizes supplying power to loads, and the excess power is fed to the grid to generate revenue.

Set to the Load First mode and enable the AC Charging function if you want to charge the battery for backup power.

< Mode Selection and Time Setting	Done	Storage Parameter Setting	
Time Period1 00 : 00 ~ 23 : 00		Stop Charging SOC	
Load First ▼ Enable ▼	]	100	(%)
Time Period2 00:00 ~ 17:20		Stop Discharging SOC	
Battery First	]	10	(%)
Disable <b>V</b>	]	UTI charge	
Time Period3 17:23 ~ 23:00		Enable <b>V</b>	
Grid First ▼ Disable ▼	]	When the battery energy reaches the preset stop discharging SOC, the battery will stop discharging. When the battery energy reaches the preset stop discharging SOC, the battery will stop discharging.	
Time Period4 00:00 ~ 00:00		will can charge battery by Ac Power From Gridd	
Load First	]	Done	
Disable <b>V</b>	]		

**Peaking shaving**: Manage customers' energy usage reasonably and systematically according to their electricity consumption patterns, to shave the peaks and fill up the valleys. Minimize the load peak-valley difference to balance power generation and consumption.

Figure out the peak and valley demand period. During the peak demand period, set Grid First mode and disable the AC Charging function; during the valley demand period, set Battery First mode, enable the AC Charging function and set the charging power threshold.

Time Period1 00 -	23:00	Stop Charging	soc			AC Charing	Power	
Gr	rid First 🔻	otop charging i					100	(%)
E	nable 🔻		100		(%)		No	¥
Time Period2 00 : 00 ~	17 20	Stop Dischargin	ng SOC			AC Dischar	ge Power	
Gr	rid First 🔻		10		(%)		100	(%)
E	inable 🔻	UTI charge					No	¥
Time Period3 17 23 ~	23:00		Enable	•		The AC char	ging power percentage is equ	ual to the actua
Gr	rid First 🔻	When the battery	energy reaches the pre-	let stop		power. WIT i power on the	arging power divided by the nverter will control the percer e AC side not to be higher tha	system rated ntage of chargi in the set value
D	visable 🔻	When the battery discharging SOC,	energy reaches the pre- the battery will stop dis-	iet stop charging.		The AC discl maximum dis	harge power percentage is eq scharge power divided by the	qual to the actu system rated
Time Period4 00 : 00 ~	00:00	WIT Can Charge I	Sattery By Ac Power Fro			power. The l percentage of value.	VIT inverter will control the di on the AC side not to be high	ischarge power er than the set
Lo	ad First 🔻							
D	isable 🔻				2			

**Time-of-use (TOU) Control:** Configure the system to work in the preset mode during different time segments. There are six configurable time windows. For each time window, you can set one of the three working modes: Load First, Battery First, or Grid first.



**Power expansion**: to enhance the power supply capacity.

Set the Load First mode and enable the AC Charging function if you need to charge the battery with the grid power.

Mode Selection and Time Setting	Done	< St	torage Parameter Setting	
Time Period1 00 : 00 ~ 23 : 00 Load First ▼		Stop Charging	SOC	
Enable ▼ Time Period2 00 : 00 ~ 17 : 20		Stop Dischargi	100 ing SOC	(%)
Battery First ▼ Disable ▼		UTI charge	10	(%)
Time Period3 17 : 23 ~ 23 : 00			Enable	¥
Grid First ▼ Disable ▼	]	When the battery discharging SOC When the battery discharging SOC	y energy reaches the preset str b, the battery will stop discharg y energy reaches the preset str c, the battery will stop discharg	op ing, op ing,
Time Period4 00:00 ~ 00:00		wir can charge	Battery by Ac Power From Grid	ad
Load First	]		Done	
Disable <b>V</b>	]			

52 / 77

**Microgrid**: A microgrid is a stand-alone system that consists of distributed energy sources, generally connected to the larger grid with power cables.

The microgrid can function independently or in cooperation with the primary utility grid.

Set on/off-grid switching mode to automatic mode, enable the off-grid mode and select the off-grid frequency and off-grid voltage.

Mode Selecte	d	Ø	Set Backup O	n/Off		
	Manual mode	•		Enable	T	
te gintere gin konstant	nantatia in Maniae Mode (		Off-Grid Freq	uncy	0	
	Normal	T		50	▼ (Hz)	
			Off-Grid Volta	ge		
				230	▼ (V)	

**Backup power**: When the grid fails, the PV-ESS-DG system can supply power to critical loads to ensure its uninterrupted operation.

Set to the Battery First mode, enable the off-grid mode and the AC-charging function

Mode Selection and Time Setting Done	< Off-grid Setting			
Time Period1 00 : 00 ~ 23 : 00	Set Backup On/Off		< Storage Parameter Setting	
Battery First	Enable	•	Stop Charging SOC	
Enable	Off-Grid Frequncy		100	(%)
Time Period2 00:00 ~ 17:20	50	▼ (Hz)		
Battery First	Off-Grid Voltage		Stop Discharging SOC	
Disable <b>V</b>	230	▼ (V)	10	(%)
Time Period3 17:23 ~ 23:00				
Grid First			UTI charge	
Disable <b>V</b>			Enable 🔻	
Time Period4 00:00 ~ 00:00				
Load First			When the battery energy reaches the preset stop discharging SOC, the battery will stop discharging.	
Disable 🔻			discharging SOC, the battery will stop discharging. WIT can Charge Battery By Ac Power From Gridd	
Time Period5 00 : 00 ~ 00 : 00			The out only buttery by her over from oned	
Load First			Done	
Disable 🔻				
Time Period6 00:00 ~ 00:00	Done			

**Energy quality**: The device can operate to output reactive power. Various options are available, including inductive reactive power, capacitive reactive power and customized PF curve to adjust the grid power quality.

<	Set reactive power	
Set react	ive power	
	1	
	PF fixed 1	•
	No	•
Cancel	Select the value	Done
	PF fixed 1	
	Set power factor	

#### 5.4 System Operating Modes

After configuring system parameters, power on the WIT inverter and check if the system is operating properly with the APP or on the website.

The intelligent control system of the WIT inverter and the APX battery constantly monitors and adjusts the operating status of the system. Once the WIT inverter or the APX battery detects an alarm, the corresponding LED indicator will turn red and the OLED screen will display the error message. Once a fault is detected, the system indicator and the corresponding indicator will turn red and the OLED screen will display the error message. The indicators will turn green after the alarm or fault is cleared.

# Caution:

For more information about the alarm/fault description and troubleshooting suggestions, see Section 6.2.

## 5.4.1 Waiting Mode

When the PV voltage is greater than 180 V, the WIT inverter will be powered on and enter the "Waiting" state. In this mode, the inverter will check the system parameters. If no abnormality is detected and the PV voltage is greater than or equal to 195 V, the inverter will start to connect to the grid.

## 5.4.2 Operating Mode

Standby mode: The WIT Inverter enters the standby mode when the operating requirements are not met.

Charging mode: Charge the battery with power drawn from the grid (AC Charging function should be enabled).

This mode should be set manually. You can set the charging period and charging power.

Discharging mode: The battery discharges power to the AC side.

This mode should be set manually. You can set discharging period and discharging power.

When Export Limitation is enabled, the battery only discharges power to support the loads. When Export Limitation is disabled, it can also export power to the grid.

#### Note:

- 1. You are advised to set the charging mode during off-peak hours, and discharging mode during the peak hours, contributing to cost savings.
- 2. The operating modes mentioned above apply to the on-grid system. For the off-grid system, it will only convert the battery power to supply power to the loads.

### Load first:

The solar power and the battery power are prioritized towards powering the loads. If the export limitation is disabled, the surplus solar power will be fed to the grid while the battery power cannot be sold to the grid. If the export limitation is enabled, neither the solar power nor the battery power would be sent to the grid.

Priority of power sources supplying to the loads:

1.Solar panels;

2.Bateries;

3.Grid;

NOTE: In Load first mode, a meter is required.

#### **Battery first:**

The solar power is directed towards charging the battery first, ensuring that the battery SOC has reached the preset upper threshold. Then the excess solar power will be sent to support the loads. The further surplus solar power can be exported to the grid (with Export Limitation disabled). In case that the solar power is insufficient, it can draw energy from the grid to charge and battery and support the loads.

Priority of power sources charging the battery:

1.Solar panels;

2.Grid;

## Grid first:

The solar power is prioritized towards powering the loads, and the surplus solar power will be fed to the grid. The further surplus solar power (if any) can be sent to charge the battery. If the solar power is insufficient to support the loads, the battery will discharge to power the loads and the excess battery energy can be sold to the grid, Priority of power sources supplying to the loads:

1.Solar panels;

2.Bateries;

3.Grid;

From the "Control" page, select "Mode Selection and Time Setting", where you can configure the six time windows. As shown in the figure, you are allowed to set the operating mode for each period based on power consumption and electricity tariffs. You can set "Enable" or "Disable" to determine whether to run the device in the preset mode during the specific time period.

You are allowed to configure different operating modes for different application scenarios.

Mode Selection and Time Setting Done	Mode Selection and Time Setting Done	
Time Period1 00:00 ~ 23:00	Time Period1 00 : 00 ~ 23 : 00 V	K Mode Selection and Time Setting Done
Grid First	Grid Eirst	Time Period1 00 : 00 ~ 23 : 00 ♥
Enable	Enable V	Grid First
Time Period2 00:00 ~ 17:20		Enable
	Time Period2 00 : 00 ~ 17 : 20	Time Period2 00:00 ~ 17:20
	Battery First	Battery First
	Disable	Disable
Time Period3 17: 23 ~ 23: 00	Time Period3 17 : 23 ~ 23 : 00	
Grid First 🔻	Grid First 🔻	1 me Periods 17:23 ~ 23:00
Disable <b>V</b>	Disable V	Grid First V
Time Period4 00:00 ~ 00:00	Time Period4 00; 00 ~ 00; 00	Disable
Load First 🔻		Time Period4 00:00 ~ 00:00
Disable <b>V</b>		Load First 🔻
Time Period5 00 : 00 ~ 00 : 00	Cancel Select the value Done	
		Cancer Select the value Done
		Disable
	Battery First	Enable
Time Period6 00 : 00 ~ 00 : 00	Grid First	

#### Note:

- 1. You are advised to set the Battery First mode during off-peak hours, and Grid first mode during peak hours, contributing to cost savings.
- 2. The operating modes mentioned above apply to the on-grid system. For the off-grid system, it will not response to the priority settings, but gives priority to converting the battery energy to power the loads.

#### 5.4.3 Fault Mode

The intelligent control system of the WIT Inverter monitors and adjusts the system status in real time. When the WIT Inverter detects an alarm, the corresponding status light will turn red and the OLED will display the alarm. When the WIT Inverter detects a fault, the system status indicator and the corresponding status light will turn red and the OLED will display the fault. After the fault or alarm is cleared, the system recovers and all status indicators will be steady green.

NOTE: For detailed description of faults and alarms, please see Section 6.2.

#### 5.4.4 Shutdown Mode

For the on-grid system with Export Limitation enabled and the off-grid system, when the battery SOC is lower than the discharge cutoff SOC and the PV string output does not meet the requirements for grid-tied power generation, the WIT Inverter will automatically shut down. In shutdown mode, the inverter consumes a small amount of energy (PV>Grid>Battery) to wait to start up again when the operating requirements are met.

NOTE: When the DC input voltage is less than or equal to 150Vdc or the battery voltage is lower than 600V, the WIT Inverter enters the shutdown mode automatically.

# 6. System Maintenance

#### **6.1 Routine Maintenance**

# 6.1.1 Clean the Enclosure

$\mathbf{\Lambda}$	•	Wait 5 minutes after disconnecting the AC breaker or the DC	
		upstream breaker/switch until the capacitor is fully discharged.	
DANGER	•	If the product gets dusty, clean its enclosure with a wet cloth 5	
		minutes after the system is powered off.	

1. Check the humidity and dust in the environment around the system and clean the equipment if necessary;

2. Observe whether the air inlet and outlet of the WIT inverter and the APX battery is normal. If necessary, clean the inlet and outlet vents, or clean the fan.

## 6.1.2 Maintain the Fan

	•All operations must be performed by trained and professional electricians,
	and all instructions specified in this manual should be observed.
DANGER	• Wait 5 minutes after disconnecting the AC breaker or the DC upstream
	breaker/switch until the capacitor is fully discharged.
	•Do not use an air pump to clean the fan as it might damage the fan.

When the WIT inverter or the APX battery is operating in high-temperature environment, proper heat dissipation and ventilation is essential to avoid power de-rating. The WIT inverter and the APX battery come with built-in fans. When the internal temperature gets excessively high, the fans will work to lower the temperature. For de-ratings caused by over-high temperature, possible causes and measures are listed below:

- 1. Fan is blocked or the heat sink gathers too much dust. You need to clean the fan, the fan guard or the heat sink.
- 2. Fan is damaged. You need to replace the fan.
- 3. Poor ventilation condition in the installation location of the WIT inverter and the APX battery. You need to select the appropriate installation location according to the basic installation requirements.

Procedure to clean or replace the fan of the WIT inverter or the APX battery:

- 1. Before cleaning or replacing the fan, ensure that the WIT inverter is completely disconnected from all power sources. Power off the battery and wait 5 minutes before performing any work.
- 2. Remove the fan fixing plate on the top of the WIT inverter using a cross-head screwdriver as shown below.
- 3. Loosen the screws securing the fan slide rail. Disconnect the fan wiring cables, then you can remove the fan

from the WIT inverter, as Fig 6.1 shows:

4. Loosen the screws on both sides of the battery fan cover with the Allen key, then remove the fan cover as shown in Fig 6.2.



Fig 6.1 Remove fans from the WIT inverter

5. Disconnect the fan connector, unscrew the fan fixing plate, then remove the fan as shown below:



Fig 6.2 Remove fans from the APX battery

## Note:

- 1 The WIT 50-100K-A-US and the WIT 50-100K-H-US models are equipped with 5 external fans.
- (2) The WIT 50-100K-AU-US and WIT 50-100K-HU-US models are equipped with 7 external fans.
- ③ Each battery module of the APX battery system has one fan.

Procedure to clean the fan, fan guard and heat sink, or replace the fan:

- (1) Clean the heat sink with an air pump; clean the fan and fan guard with a brush or cloth moistened with water.
- 2 If necessary, you can remove all fans and clean each fan separately.

- ③ Remove the fan to be replaced using a cross-head screwdriver, and install the new fan.
- ④ Bind the cables properly and fix them with a cable tie.
- ⑤ Re-install the fan, the fan fixing plate and the WIT inverter.

## 6.2 Troubleshooting



#### 6.2.1 WIT Inverter Warnings

Warnings indicate the current status of the WIT 50-100K inverter, different from the faults and generally has no effect on the normal operation of the WIT inverter. You can clear a warning by restarting the device, resetting or performing self-corrective measures. The warning codes are shown below:

LCD display	Fault Description	English Suggestion
String Fault	PV string fault	1. Check if the PV panels are normal after shutdown.
Sumgraut	r v sung nun	2. If the error message persists, contact Growatt support.
	PV string/PID	1. Check the wiring of the string terminals after
Warning 201	quick-connect terminals	shutdown.
	abnormal	2. If the error message persists, contact Growatt support.
DC SDD woming	DC SPD function	1. Check the DC SPD after shutdown.
DC SPD warning	abnormal	2. If the error message persists, contact Growatt support.
DV Cinquit short	PV1 or PV2 short	1. Check if PV1 or PV2 is short circuited.
PV Circuit short	circuited	2. If the error message persists, contact Growatt support.
Warnin 204	Dry contact function	1. Check the wiring of the dry contact after shutdown.
warning204	abnormal	2. If the error message persists, contact Growatt support.
W : 205	PV Boost driver	1. Restart the inverter.
wannig203	abnormal	2. If the error message persists, contact Growatt support.
	AC SPD function	1. Check the AC SPD after shutdown.
AC SPD warning	abnormal	2. If the error message persists, contact Growatt support.
		1. Unplug the USB flash drive.
USB OCP	USB flash drive	2. Plug in the USB flash drive again after shutdown.
	overload protection	3. If the error message persists, contact Growatt support.
DC Fuse Open	DC fuse blown	1. Check the fuse after shutdown.
201 use open		2. If the error message persists, contact Growatt support.

Table 6.1 WIT inverter warning code list

PV Voltage High	DC input voltage exceeds the upper threshold	<ol> <li>Turn off the DC switch immediately and check the DC voltage.</li> <li>If the DC voltage is within the specified range and the error message persists, contact Growatt support.</li> </ol>
PV Reversed	PV wiring abnormal	<ol> <li>Check the polarity of the PV terminals.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
BDC Abnormal	BDC abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
BDC Bus DisConnect	BDC Bus disconnected	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
PID warning	PID function abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning 220	PV string disconnected	<ol> <li>Check if the PV string is properly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning 221	PV string current unbalanced	<ol> <li>Check if the PV panels of the corresponding string are normal.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
No AC Connection	No utility grid connected or utility grid power failure	<ol> <li>Check if the grid is down.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
AC V Outrange	Grid voltage is beyond the permissible range	<ol> <li>Check if the grid voltage is within the specified range.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
AC F Outrange	Grid frequency is beyond the permissible range	<ol> <li>Check if the grid frequency is within the specified range.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Over Load	Off-grid mode, overload	<ol> <li>Please reduce the load connected to the off-grid output terminal.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
CT Open	CT disconnected	<ol> <li>Check if the CT is properly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
CT Reversed	CT is reversely connected	<ol> <li>Check if the CT is reversely connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
CT COM Fault	The inverter failed to communicate with the CT	<ol> <li>Check if the communication cable is properly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
PairingTimeOut	CT pairing timed out	<ol> <li>Check if the communication cable is properly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>

	-	
Meter Open	Meter disconnected	1. Check if the meter is properly connected.
Meter Reversed	Meter wiring abnormal	<ol> <li>The error message persists, contact Growalt support.</li> <li>Check if the L line and the N line of the meter are reversely connected.</li> </ol>
		<ol> <li>If the error message persists, contact Growatt support.</li> </ol>
NE abnormal N-PE Volt Abnormal	The voltage difference between the N line and the PE cable is abnormal	<ol> <li>Check if the PE cable is reliably connected after shutdown.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Sequence Err	Phase sequence error in three-phase system	No operation is required. The PCS will automatically adjust the phase sequence.
Fan warning XXXX	Fan failure	<ol> <li>Check if the fan is properly connected after shutdown.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning401	Meter abnormal	<ol> <li>Check if the meter is turned on.</li> <li>If the meter is correctly connected to the inverter.</li> </ol>
Warning402	Communication between the optimizer and the inverter is abnormal	<ol> <li>Check if the optimizer is turned on.</li> <li>If the optimizer is correctly connected to the inverter.</li> </ol>
Warning403	PV string communication failure	<ol> <li>Check if the wiring of the PV string after shutdown.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning404	EEPROM abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning405	DSP and COM firmware version mismatch	<ol> <li>Check the firmware version.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning406	Boost circuit malfunction	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning407	Over-temperature	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning408	NTC temperature sensor is broken	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning409	Reactive power scheduling communication failure	<ol> <li>Check if ShineMaster is turned on.</li> <li>If the error message persists, contact Growatt support.</li> </ol>

	-	
Warning410	Abnormal operation of the chip	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning411	Sync signal abnormal	<ol> <li>Check if the sync cable is abnormal.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning412	Startup requirements for grid connection are not met	<ol> <li>Check if the grid voltage is within the specified range and check if the grid-connection startup voltage configuration is correct.</li> <li>Check if the PV voltage is within the specified range.</li> <li>Restart the inverter. If the error message persists, contact Growatt support.</li> </ol>
BMS COM Warning	The inverter failed to communicate with the battery	<ol> <li>Check if the battery is turned on.</li> <li>Check if the battery is correctly and securely connected to the inverter.</li> </ol>
Battery Open	Battery disconnected	<ol> <li>Check if the battery is properly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning: Bat V High	Battery voltage too high	<ol> <li>Check if the battery voltage is within the permissible range.</li> <li>Check if the battery is correctly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Warning: Bat V Low	Battery voltage too low	<ol> <li>Check if the battery voltage is within the permissible range.</li> <li>Check if the battery is correctly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Battery reversed	Battery terminals are reversely connected	<ol> <li>Check if the positive and negative terminals of the battery are reversely connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
BAT NTC Open	Temperature sensor of the lead-acid battery is disconnected	<ol> <li>Check if the temperature sensor of the lead-acid battery is installed or not.</li> <li>Check if the temperature sensor is well-connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Bat temp outrange	Battery temperature is out of range	<ol> <li>Check if the ambient temperature of the battery is within the specified range.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
BMS Error	BMS reported a fault; unable to charge/discharge	<ol> <li>Figure out the cause according to the BMS error code.</li> <li>If the error message persists, contact Growatt support.</li> </ol>

Li-BAT OverloadLithium battery overload protection1. Check if the power of the load exceeds the BAT rated (2. If the error message persists, contact Growatt support, 2. Restart the inverter. If the error message persists, contact Growatt support, 2. Restart the inverter. If the error message persists, contact Growatt support, 2. Restart the inverter. If the error message persists, contact Growatt support, 2. Restart the inverter. If the error message persists, contact Growatt support, 2. Restart the inverter. If the error message persists, contact Growatt support, 2. Restart the inverter. If the error message persists, contact Growatt support, 2. Restart the inverter. If the error message persists, contact Growatt support, 2. Restart the			
BMS Warning :XXXBMS communication abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.BAT SPD warningBAT SPD function abnormal1. Check the BAT SPD after powering off the device. 2. If the error message persists, contact Growatt support.Output High DC1DC component excessively high in output current1. Restart the inverter. 2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output routage1. Restart the inverter. 2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output voltage1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output voltage too high1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. 2.	Li-BAT Overload	Lithium battery overload protection	<ol> <li>Check if the power of the load exceeds the BAT rated discharge power.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
BMS warning :XXBMS communication abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.BAT SPD warning 			
Disk of winning in Hamabnormal2. If the error message persists, contact Growatt support.BAT SPD warningBAT SPD function abnormal1. Check the BAT SPD after powering off the device. 2. If the error message persists, contact Growatt support.Output High DCIDC component excessively high in output current1. Restart the inverter. 2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support.EPS Volt LowOff-grid output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Warni	BMS Warning ·XXX	BMS communication	1. Restart the inverter.
BAT SPD warningBAT SPD function abnormal1. Check the BAT SPD after powering off the device. 2. If the error message persists, contact Growatt support.Output High DCIDC component excessively high in output current1. Restart the inverter. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.RPS Volt LowOff-grid output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support. 2. Restart the inverter. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 603Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support. Contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists		abnormal	2. If the error message persists, contact Growatt support.
BAT SPD warningabnormal2. If the error message persists, contact Growatt support.Output High DCIDC component excessively high in output current1. Restart the inverter. 2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output voltage1. Restart the inverter. 2. If the error message persists, contact Growatt support.PS Volt LowOff-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid output off-grid output overcoaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. 2. Restart the inverter. 2. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 607Manimation with the backup box is ahormal1. Check if the load power exceeds the specification limit. 2. Restart the inverter		BAT SPD function	1. Check the BAT SPD after powering off the device.
Output High DCIDC component excessively high in output current1. Restart the inverter. 2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output voltage1. Restart the inverter. 2. If the error message persists, contact Growatt support.EPS Volt LowOff-grid output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Eommunication with the backup box is abnormal1. Check the communication witing of the backup box after powering off the device. abnormalWarning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan	BAT SPD warning	abnormal	2. If the error message persists, contact Growatt support.
Output High DCIexcessively high in output current1. Restart the inverter. 2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output voltage1. Restart the inverter. 2. If the error message persists, contact Growatt support.EPS Volt LowOff-grid output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Off-grid output overloaded1. Check the communication wiring of the backup box a fier powering off the device. abnormalWarning 607Off-grid output overloaded1. Check the communication wiring off the backup box a fier powering off the device. 2. If the error message persists, contact Growatt support. <t< td=""><td></td><td>DC component</td><td></td></t<>		DC component	
InterferenceInterference2. If the error message persists, contact Growatt support.Output High DCVDC component excessively high in output voltage1. Restart the inverter. 2. If the error message persists, contact Growatt support.EPS Volt LowOff-grid output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output vorcurrent1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 605Off-grid output vorcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output vorcurent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output vorrloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the generator and its wiring after powering	Output High DCI	excessively high in	1. Restart the inverter.
Dutput High DCVDC component excessively high in output voltage1. Restart the inverter.EPS Volt LowOff-grid output voltage too low1. Restart the inverter.Warning 603Off-grid output voltage too high1. Restart the inverter.Warning 604Off-grid output voltage too high1. Restart the inverter.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 605Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 607Communication with the backup box is abnormal1. Check if the load power exceeds the specification limit.Warning 608Balanced circuit abnormal1. Check if the iorer message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support. <td>o uput rigit 2 cr</td> <td>output current</td> <td>2. If the error message persists, contact Growatt support.</td>	o uput rigit 2 cr	output current	2. If the error message persists, contact Growatt support.
Output High DCVexcessively high in output voltage1. Restart the inverter.EPS Volt LowOff-grid output voltage too low1. Restart the inverter.Warning 603Off-grid output voltage too high1. Restart the inverter.Warning 604Off-grid output voltage too recurrent1. Check if the load power exceeds the specification limit.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 605Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. abnormalWarning 609Balanced circuit ahnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to stat1. Check the generator and its wiring after powering off the device. 2. If t		DC component	1 Postart the inverter
output voltage2. If the error message persists, contact Growatt support.EPS Volt LowOff-grid output voltage too low1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the generator and its wiring after powering off tevice. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start <td>Output High DCV</td> <td>excessively high in</td> <td>2. If the arrow measures persists contact Crowett support</td>	Output High DCV	excessively high in	2. If the arrow measures persists contact Crowett support
EPS Volt LowOff-grid output voltage too low1. Restart the inverter.Warning 603Off-grid output voltage too high1. Restart the inverter.Warning 603Off-grid output too high1. Check if the load power exceeds the specification limit.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit.Warning 605Off-grid output overcurent1. Check if the load power exceeds the specification limit.Warning 605Off-grid output overcurent1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. alter powering off the device.Warning 608Backup box is abnormal abnormal1. Restart the inverter. I the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the generator and its wiring after powering off the device. 2. If the error mess		output voltage	2. If the error message persists, contact Growatt support.
too low2. If the error message persists, contact Growatt support.Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Off-grid output overloaded1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the generator and its wiring after powering off the ervice. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start is full the error message pers	EPS Volt Low	Off-grid output voltage	1. Restart the inverter.
Warning 603Off-grid output voltage too high1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start i fully1. Check the generator and its wiring after powering off the device. 2. If the err		too low	2. If the error message persists, contact Growatt support.
Warning 603too high2. If the error message persists, contact Growatt support.Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 607Backup box is abnormal abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	Warning 603	Off-grid output voltage	1. Restart the inverter.
Warning 604Off-grid output overcurrent1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage to low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start i fue device. 2. If the error message persists, contact Growatt support.	warning 005	too high	2. If the error message persists, contact Growatt support.
Warning 604Off-grid output overcurrentlimit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage to lowlimit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloadedlimit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloadedlimit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloadedlimit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormall. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormall. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormall. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faultyl. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to startl. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.			1. Check if the load power exceeds the specification
Warning 604overcurrent2. Restart the inverter. If the error message persists, contact Growatt support.Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	W. : CO4	Off-grid output	limit.
Image: contact Growatt support.Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	warning 604	overcurrent	2. Restart the inverter. If the error message persists,
Warning 605Off-grid bus voltage too low1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.			contact Growatt support.
Warning 605Off-grid bus voltage too lowlimit.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.			1. Check if the load power exceeds the specification
Warning 605low2. Restart the inverter. If the error message persists, contact Growatt support.Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.		Off-grid bus voltage too	limit.
Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 607Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 608Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	Warning 605	low	2. Restart the inverter. If the error message persists,
Warning 606Off-grid output overloaded1. Check if the load power exceeds the specification limit. 2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.			contact Growatt support.
Warning 606Off-grid output overloadedlimit.Varning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.			1. Check if the load power exceeds the specification
Warning 606overloaded2. Restart the inverter. If the error message persists, contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal Backup box is abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start the device. 2. If the error message persists, contact Growatt support.		Off-grid output	limit.
Image: contact Growatt support.Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	Warning 606	overloaded	2. Restart the inverter. If the error message persists,
Warning 607Communication with the backup box is abnormal1. Check the communication wiring of the backup box after powering off the device. 2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.			contact Growatt support.
Warning 607the backup box is abnormalafter powering off the device.Warning 608Backup box is abnormal1. Restart the inverter.Warning 609Balanced circuit abnormal1. Restart the inverter.Warning 700Balanced circuit abnormal1. Restart the inverter.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the backup box is faulty1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the backup box is faulty1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the backup box is faulty1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the device.1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the device.1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the device.1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the device.1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the device.1. Check the generator and its wiring after powering off the device.Warning 701Intervention of the device.1. Intervention off the device.Warning 701		Communication with	1. Check the communication wiring of the backup box
abnormal2. If the error message persists, contact Growatt support.Warning 608Backup box is abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	Warning 607	the backup box is	after powering off the device.
Warning 608Backup box is abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.		abnormal	2. If the error message persists, contact Growatt support.
Warning 608Backup box is abnormal2. If the error message persists, contact Growatt support.Warning 609Balanced circuit abnormal1. Restart the inverter.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.			1. Restart the inverter.
Warning 609Balanced circuit abnormal1. Restart the inverter. 2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	Warning 608	Backup box is abnormal	2. If the error message persists, contact Growatt support.
Warning 609abnormal2. If the error message persists, contact Growatt support.Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.	Warning 609	Balanced circuit	1. Restart the inverter.
Warning 700Fan of the backup box is faulty1. Check the wiring of the fan after powering off the device. 2. If the error message persists, contact Growatt support.Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device. 2. If the error message persists, contact Growatt support.		abnormal	2. If the error message persists, contact Growatt support.
Warning 700Fan of the backup box is faultydevice.2. If the error message persists, contact Growatt support.Warning 701Generator failed to startI. Check the generator and its wiring after powering off the device.2. If the error message persists, contact Growatt support.	Warning 700		1. Check the wiring of the fan after powering off the
1s faulty       2. If the error message persists, contact Growatt support.         Warning 701       Generator failed to start       1. Check the generator and its wiring after powering off the device.         2. If the error message persists, contact Growatt support.       2. If the error message persists, contact Growatt support.		Fan of the backup box	device.
Warning 701Generator failed to start1. Check the generator and its wiring after powering off the device.2. If the error message persists, contact Growatt support.		1s faulty	2. If the error message persists, contact Growatt support.
Warning 701     Generator failed to start     the device.       2. If the error message persists, contact Growatt support.			1. Check the generator and its wiring after powering off
2. If the error message persists, contact Growatt support.	Warning 701	Generator failed to start	the device.
			2. If the error message persists, contact Growatt support.

# 6.2.2 WIT Inverter Errors

Error codes denote a possible equipment failure, fault or incorrect inverter setting or configuration. Any or all attempts to correct or clear a fault must be performed by qualified personnel. The error code would disappear once the fault is cleared. For the irreparable faults, please contact Growatt support.

LCD display	Fault Description	Troubleshooting
AFCI Fault	DC arc fault has been detected	<ol> <li>After shutdown, check the connection of the PV string.</li> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Residual I High	An excessively high leakage current has been detected	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
PV Voltage High	PV input voltage exceeds the upper threshold	<ol> <li>Disconnect the DC switch immediately and check the voltage.</li> <li>If the PV input voltage is within the permissible range and the error message persists, please contact Growatt support.</li> </ol>
PV Isolation Low	PV panels have low insulation resistance	<ol> <li>Check if the PV strings are properly grounded.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
PV Reversed	PV string reversely connected	<ol> <li>After shutdown, check if the PV string is reversely connected to the inverter.</li> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
AC V Outrange	Grid voltage is beyond the permissible range	<ol> <li>Check the grid voltage.</li> <li>If the grid voltage is within the permissible range and the error message persists, please contact Growatt support.</li> </ol>
AC reversed	AC terminals reversed	<ol> <li>Check the connection of the AC output terminals.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
No AC Connection	No utility grid connected or utility grid power failure	<ol> <li>After shutdown, check the AC wiring.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
NE abnormal	The voltage difference between the N line and	1. After shutdown, check if the ground cable is reliably connected.

Table 6.2 WIT inverter error code list

	the PE cable is abnormal	2. If the error message persists, please contact Growatt support.
AC F Outrange	Grid frequency is beyond the permissible range	<ol> <li>Check the grid frequency and restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Over Load	Overload	<ol> <li>Check if the load exceeds the output power upper limit; if so, please reduce the load.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
CT LN Reversed	CT LN Reversed	<ol> <li>Check if the CT is reversely connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
CT COM Fault	CT communication failure	<ol> <li>Check if the communication cable is properly connected.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
CT COM Overtime	CT and inverter pairing timed out	<ol> <li>Re-pair the inverter and the CT.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
ROCOF Fault	ROCOF abnormal	<ol> <li>Check the grid frequency and restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
NE Fault	PV negative grounding, protection for low Neutral-to-Ground (N-G) voltage	<ol> <li>Check whether the N line on the inverter side with PV negative grounding is short-circuited with the ground cable and whether the output side is isolated with a transformer.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
BackflowFail	Export limitation fail-safe	<ol> <li>After shutdown, check the connection of the CT and the meter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 400	DCI bias abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Error 401	High DC component in output voltage	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Output High DCI	High DC component in output current	<ol> <li>Restart the inverter.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Error 403	Output current unbalanced	<ol> <li>Check if the output current is balanced after shutdown.</li> <li>If the error message persists, contact Growatt support.</li> </ol>
Error 404	Bus voltage sampling abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>

Error 405	Relay failed	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt</li> </ol>
Error 406	Initialization mode abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 407	Auto-test failed	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 408	Over-temperature	<ol> <li>After shutdown, check the temperature of the inverter and restart the inverter after the temperature is within the acceptable range.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 409	Bus voltage abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 410	Abnormal voltage across the flying capacitor	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 411	Internal communication failure	<ol> <li>Check the wiring of the communication board after shutdown.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 412	Temperature sensor disconnected	<ol> <li>Check if the temperature sensor module is properly connected.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 413	IGBT drive fault	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 414	EEPROM error	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 415	Auxiliary power supply abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>

Error 416	DC/AC overcurrent protection	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 417	Communication protocol mismatch	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 418	DSP and COM firmware version mismatch	<ol> <li>Check the firmware version.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 419	DSP software and hardware version mismatch	<ol> <li>Check the firmware version.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 420	GFCI module abnormal	<ol> <li>Check the GFCI module after shutdown.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 421	CPLD abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 422	Redundancy sampling inconsistent	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 423	PWM pass-through signal failure	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 424	INV current waveform abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 425	AFCI self-test failed	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 426	PV current sampling abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 427	AC current sampling abnormal	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>

Error 428	BOOST short-circuited	Please contact Growatt support.
		1. Restart the inverter.
Error 429	BUS soft start failed	2. If the error message persists, please contact Growatt
		support.
		1. Restart the inverter.
Error 430	EPO fault	2. If the error message persists, please contact Growatt
		support.
		1 Restart the inverter
Error 431	Monitoring chip BOOT	2 If the error message persists, please contact Growatt
	verification failed	support
	Incompatible battery	1. Replace the battery model.
Error 432	model	2. If the error message persists, please contact Growatt
	moder	support.
		1. Ungrade the battery software
Frror 433	Incompatible battery	2 If the error message persists please contact Growatt
	software	support
		1. Check the connection of the RS485 cable between the
	BMS failed to	inverter and the battery.
BMS COM Fault	communicate with the	2. Check if the battery is in the sleep mode.
	inverter	3. If the error message persists, please contact Growatt
		support.
	BMS reported a fault;	1. Figure out the fault based on the BMS error code.
BMS Error	unable to	2. If the error message persists, please contact Growatt
	charge/discharge	support.
	Battery voltage is below the lower threshold	1. Check the battery voltage.
Bat voltage Low		2. If the error message persists, please contact Growatt
		support.
		1. Check the battery voltage. If it is within the permissible
	Dattamy voltage avagade	range, please restart the inverter. If not, please replace the
Bat voltage High	Battery voltage exceeds	battery.
	the upper threshold	2. If the error message persists, please contact Growatt
		support.
	Battery temperature is	1. Check the temperature of the battery.
Bat Over Temp	beyond the range for	2. If the error message persists, please contact Growatt
	charging/discharging	support.
		1. Check if the battery terminals are reversely connected.
Bat Reversed	Battery terminals	2. If the error message persists, please contact Growatt
	reversed	support.

[	1	Τ
Battery Open	Battery disconnected	<ol> <li>Check the wiring of the battery terminals.</li> <li>If the error message persists, please contact Growatt</li> </ol>
		support.
		1. Check if the power of the load exceeds the battery rated
	Lithium battery overload	discharge power.
BAT Over Load	protection	2. If the error message persists, please contact Growatt
		support.
		1. Restart the inverter.
BUS2 Volt	BUS2 Volt Abnormal	2. If the error message persists, please contact Growatt
Abnormal		support.
		1. Check if the PV voltage is oversized.
Bat Charge OCP	BAT Charge OCP	2. If the error message persists, please contact Growatt
	(Overcurrent Protection)	support.
		1. Check if the battery discharge current configuration is
	BAT Discharge OCP	proper.
Bat Discharge OCP	(Overcurrent Protection)	2. If the error message persists, please contact Growatt
		support.
		1. Restart the inverter.
BatSoftStartFault	BAT soft start failed	2. If the error message persists, please contact Growatt
		support.
		1 Restart the inverter
BatUncontrolledRecti	Battery uncontrolled	2. If the error message persists, please contact Growatt
ficatior	rectification fault	support
	Off-grid output	1. Restart the inverter.
EPS OP Short		2. If the error message persists, please contact Growatt
		support.
		1. Check if the battery is working properly or the battery
Bus voltage abnormal	Off-grid Bus Volt Low	experiences capacity loss.
Dus voltage abilotitia	On-gha bus von Low	2. If the error message persists, please contact Growatt
		support.
AC port volt	Abnormal Volt at the	1. Check if a voltage is present at the AC port.
Abnormal	off-grid terminal	2. If the error message persists, please contact Growatt
Abilotillai	on-grid terminar	support.
		1. Restart the inverter.
Soft Start Fail	Soft start failed	2. If the error message persists, please contact Growatt
		support.
EPS Volt Abnormal	Off-grid output voltage	1. Restart the inverter.
	abnormal	2. If the error message persists, please contact Growatt
	abilormar	support.
Balance Circuit fault	Balanced circuit self-test	1. Restart the inverter.
	failed	2. If the error message persists, please contact Growatt
		support.

Output High DCV	High DC component in output voltage	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
EPS Abnormal	Off-grid output overload	<ol> <li>Restart the inverter.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
OfflineSignError	Off-grid parallel signal abnormal	<ol> <li>Check if the communication cables are properly connected.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 609	Backup box is not detected	<ol> <li>After shutdown, check the signal wiring for identifying the backup box.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Error 610	Off-grid split-phase voltage abnormal	<ol> <li>Power off the system and check if the backup box split-phase transformer and the control relay are abnormal.</li> <li>Restart the system.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Warning 608	Abnormal communication between the backup box and the inverter	<ol> <li>Check if the communication cable between the inverter and the backup box is properly connected.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Warning 608	Backup box grid-side relay failure	<ol> <li>Restart the backup box.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Warning 608	Backup box generator relay connection failure	<ol> <li>Restart the backup box.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Warning 608	Backup box on-grid overload	<ol> <li>Restart the backup box.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Warning 608	Backup box off-grid split-phase overload	<ol> <li>Reduce the load.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>
Warning 608	Overheat inside the backup box	<ol> <li>Restart the backup box.</li> <li>If the error message persists, please contact Growatt support.</li> </ol>

# 6.2.3 APX Battery Faults

Fault codes denote a possible equipment failure or incorrect setting or configuration. Any or all attempts to correct or clear a fault must be performed by qualified personnel. The fault code would disappear once the fault is cleared. For the irreparable faults, please contact Growatt support.

Error code	Description	Troubleshooting
PROTECT 203	Insulation protection	Power off the system, then check whether the power
		cable and the communication cable are loosely
		connected. If not, please contact Growatt technical
		support.
	Insulation alarm	Power off the system, then check whether the power
WARN 219		cable and the communication cable are loosely
		connected. If not, please contact Growatt technical
		support.
FAULT 404	EEPROM calibration	Power off and restart to check whether the fault is
	parameter failure (including	cleared. If the problem persists, please contact Growatt
	BM & CM)	technical support for replacement.
FAULT 404	EEPROM failure protection (including BM & CM)	Power off and restart to check whether the fault is
		cleared. If the problem persists, please contact Growatt
		technical support for replacement.
	Negative side relay stuck	Power off and restart to check whether the fault is
FAULT 405		cleared. If the problem persists, please contact Growatt
		technical support for replacement.
FAULT 405	Positive side relay stuck	Power off and restart to check whether the fault is
		cleared. If the problem persists, please contact Growatt
		technical support for replacement.
FAULT 405	Negative side relay failed to close	Power off and restart to check whether the fault is
		cleared. If the problem persists, please contact Growatt
		technical support for replacement.
FAULT 405	Positive side relay failed to close	Power off and restart to check whether the fault is
		cleared. If the problem persists, please contact Growatt
		technical support for replacement.
FAULT 405	Precharge relay failed to close	Power off and restart to check whether the fault is
		cleared. If the problem persists, please contact Growatt
		technical support for replacement.
WARN 408	Ambient temperature over-temperature alarm	Check if the equipment operating temperature exceeds
		the specified range. If not, please contact Growatt
		technical support.
WARN 408	Copper bar over-temperature warning	Check if the equipment operating temperature exceeds
		the specified range. If not, please contact Growatt
		technical support.
PROTECT 408	Ambient temperature	Check if the equipment operating temperature exceeds

Table 6.3 APX battery system – CM	fault code list 1
-----------------------------------	-------------------

	over-temperature protection	the specified range. If not, please contact Growatt
		technical support.
PROTECT 408	Copper bar	Check if the equipment operating temperature exceeds
	over-temperature protection	the specified range. If not, please contact Growatt
	over temperature protection	technical support.
PROTECT 409	Total voltage over-voltage	Please contact Growatt technical support
	protection	
WARN 410	Main control crystal	Restart the system. If the problem persists, please contact
	oscillator operation alarm	Growatt technical support.
	Communication timeout	Check whether the communication cable between BM
FAULT 411	between CM and BM	and CM is connected normally. If it is properly
	(detected by CM side)	connected, please contact Growatt technical support.
	Communication failure	Destart the system. If the nuckley particle places contact
FAULT 411	between CM_M3 and	Crowett technicel support
	CM_BCU	Growalt technical support.
		Check whether the communication cable between CM
FAULT 411	Communication timeout	and PCS is connected normally. If it is properly
	with PCS	connected, please contact Growatt technical support.
FAULT 426	Current sampling failure	Restart the system. If the problem persists, please contact
		Growatt technical support.
FAULT 506	Busbar open-circuited	Please contact Growatt technical support
FAULT 506	FUSE fault	Please contact Growatt technical support
		Please check if the power cables between CM and
FAULT 603	Precharge overcurrent	inverter are properly connected. If they are properly
		connected, please contact Growatt technical support.
		Please check if the power cables between CM and
FAULT 603	Precharge timeout (failed)	inverter are properly connected. If they are properly
		connected, please contact Growatt technical support.
	Battery cell high	
FAULT 700	temperature failure error	Please contact Growatt technical support
WADN 505	Discharge overcurrent	Check if the load exceeds the system specifications. If
WARN 707	alarm	not, please contact Growatt technical support.
WARN 707	Charging overcurrent alarm	Please contact Growatt technical support
	Discharge overcurrent	Check if the load exceeds the system specifications. If
PROTECT /07	protection	not, please contact Growatt technical support.
PROTECT 707	Charging overcurrent	
	protection	Please contact Growatt technical support
PROTECT 803	Charging current limiting	
	nonresponse	Please contact Growatt technical support
PROTECT 803	Discharge current limiting	
	nonresponse	Please contact Growatt technical support
PROTECT 1009	-	Please check if the number of the connected BMs
	Protection for over-low	matches with the inverter. If so, please contact Growatt
	input voltage	technical support.
FAULT 1030	Cell went offline	Please contact Growatt technical support
--------------	---	---
FAULT 1035	Front-end chip failure	Please contact Growatt technical support
FAULT 1042	Total voltage sampling failure	Please contact Growatt technical support
FAULT 1048	Hardware detected overvoltage protection	Please contact Growatt technical support
FAULT 1049	Hardware detected charging overcurrent protection	Please contact Growatt technical support
FAULT 1053	Hardware discharge overcurrent	Check if the load exceeds the system specifications. If not, please contact Growatt technical support.
PROTECT 1062	Single cell overvoltage rapid protection	Please contact Growatt technical support
PROTECT 1099	Low temperature charging overvoltage protection	Please check if the ambient temperature exceeds the specified range. If not, please contact Growatt technical support.
FAULT 1111	Precharge relay drive failure	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 1112	Positive side relay drive failure	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 1113	Negative side relay drive failure	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 1128	CM BOOT sector flash is damaged	Please contact Growatt technical support
FAULT 1147	BM fault	Please contact Growatt technical support
FAULT 1148	BM serial communication timeout protection	Please contact Growatt technical support
FAULT 1149	System voltage level does not match	Please check if the number of the connected BMs matches with the inverter. If so, please contact Growatt technical support.
FAULT 1150	The isolation switch is abnormally disconnected	Please contact Growatt technical support
FAULT 1151	MCU ADC sampling abnormality	Please contact Growatt technical support

Table 6.4 APX battery system – CM fault code list 2

Error code	Description	Troubleshooting
FAULT 411	Communication with INV is abnormal	Power off the system, then check if the communication cable between CM and PCS is properly connected. If so, please contact Growatt technical support.
FAULT 411	Abnormal serial communication with Main Control Chip 1	Power off the system, then restart to check if the fault is cleared. If the problem persists, please contact Growatt technical support.
FAULT 411	Communication with BM is	Power off the system, then check if the communication

		1
	abnormal	cable between CM and BM is properly connected. If so,
		please contact Growatt technical support.
FAULT 411	Parallel operation with multi-master failed	Power off the system, then restart to check if the fault is
		cleared. If the problem persists, please contact Growatt
		technical support.
	Software and hardware versions are inconsistent	Power off the system, then restart to check if the fault is
FAULT 419		cleared. If the problem persists, please contact Growatt
		technical support.
WARN 410	Crystal oscillator is abnormal	Power off the system, then restart to check if the fault is
		cleared. If the problem persists, please contact Growatt
		technical support.
WARN 410	USB communication is abnormal	Power off the system, then restart to check if the fault is
		cleared. If the problem persists, please contact Growatt
		technical support.
FAULT 417	Version mismatched	Power off the system, then restart to check if the fault is
		cleared. If the problem persists, please contact Growatt
		technical support.
FAULT 431	BOOT abnormal	Power off the system, then restart to check if the fault is
		cleared. If the problem persists, please contact Growatt
		technical support.

## Table 6.5 APX battery system – BM fault code list 1

Code	Description	Troubleshooting
FAULT 416	TZ failure	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 416	Battery transient overcurrent	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 503	Battery transient overvoltage	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 409	BUS transient overvoltage	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 416	Inductor transient overcurrent	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 500	CAN communication abnormal	Check if the communication cable between BM and BM is connected properly. If it is properly connected, please contact Growatt technical support.
FAULT 501	Lithium battery failure	Restart the system. If the problem persists, please contact Growatt technical support.
FAULT 411	Communication with the inverter failed	Check if the communication cable between CM and PCS is connected properly. If it is properly connected, please contact Growatt technical support.
FAULT 707	Overload	Check if the load exceeds the system specifications. If not, please contact Growatt technical support.
FAULT 416	BUS transient overcurrent	Restart the system. If the problem persists, please contact

		Growatt technical support.
FAULT 603	BUS soft start failed	Restart the system. If the problem persists, please contact
	DOS SOIT Start Tailed	Growatt technical support.
		Check whether the communication cable of the system is
FAULT 500	CAN parallel failed	connected properly. If it is properly connected, please
		contact Growatt technical support.
		Restart the system. If the problem persists, please contact
FAULT 417	Hardware sampling failed	Growatt technical support.
	Module current sampling	Restart the system. If the problem persists, please contact
FAULT 416	failed	Growatt technical support
		Undate to the latest software version. If the problem
FAULT 800	Protocol version incorrect	registe place contact Crowatt technical support
		persists, please contact Growart technical support.
FAULI 801	BM bypass failed	Please contact Growatt technical support
FAULT 802	Auxiliary power supply failure	Please contact Growatt technical support
EALU T 410	Crystal oscillator is	Restart the system. If the problem persists, please contact
FAULT 410	abnormal	Growatt technical support.
FAU # 415	Hardware version	Restart the system. If the problem persists, please contact
FAULT 417	inconsistent	Growatt technical support.
		Restart the system. If the problem persists, please contact
FAULT 802	IOBUS failure	Growatt technical support.
	Other module failure	Restart the system. If the problem persists, please contact
FAULT 802		Growatt technical support.
		Please connect to grid power or use PV power to charge
WARNING 702	Forced charge required	the hattery
		Please connect to grid newer or use DV newer to charge
WARNING 701	Battery can only be charged	the bettern
WARNING 703	Fully charged	The system will transfer to bypass/idle mode
		automatically, and no action is required.
WARNING 707	Overload alarm	Check if the load exceeds the system specifications. If
		not, please contact Growatt technical support.
WARNING 404	EEPROM read & write	Restart the system. If the problem persists, please contact
	abnormal	Growatt technical support.
WARNING 412	HVC (high voltage	Restart the system. If the problem persists, please contact
	auxiliary power supply)	Growatt technical support
	detection abnormal	Growatt technical support.
WARNING 412	The IO status of IO Bus is	Restart the system. If the problem persists, please contact
	abnormal	Growatt technical support.
WARNING 410	Crystal oscillator is	Restart the system. If the problem persists, please contact
	abnormal	Growatt technical support.
WARNING 502	Battery voltage is low	Restart the system. If the problem persists, please contact
		Growatt technical support.
WARNING 408	Over-temperature	Check if the equipment operating temperature exceeds
		the specified range. If not please contact Growatt
		and specified range. If not, prease contact Glowatt

		technical support.
WARNING 408	Ambient temperature over-high	Check if the equipment operating temperature exceeds the specified range. If not, please contact Growatt technical support.
WARNING 700	NTC open-circuited	Restart the system. If the problem persists, please contact Growatt technical support.
WARNING 411	Serial communication is abnormal	Restart the system. If the problem persists, please contact Growatt technical support.
WARNING 503	Battery voltage high	Restart the system. If the problem persists, please contact Growatt technical support.

## Table 6.6 APX battery system – BM fault code list 2

Table 6.6 APX battery system – BM fault code list 2		
Code	Description	Troubleshooting
FAULT 411	Abnormal communication	Restart the system. If the fault cannot be eliminated,
	with Main Control Chip 1	please contact Growatt technical support.
FAULT 411	Abnormal communication with PM	Check if the communication cable between CM and INV is connected properly. If it is properly connected, please contact Growatt technical support.
FAULT 411	Parallel failure	Check if the system wiring is normal. If normal, please contact Growatt technical support.
FAULT 411	Multi-master parallel failure	Check if the system wiring is normal. If normal, please contact Growatt technical support.
	The short-circuit connector	Check if the short-circuit connector on the last BM is
FAULT 411	is not installed on the last	properly installed. If so, please contact Growatt technical
	BM	support.
WARN 500	Message from slave device is repetitive	Check if the BM system wiring is normal. If the problem persists after restart, please contact Growatt technical support.
FAULT 419	Software and hardware	Check if the PM matches the system. If so, please contact
-	Crystel oscillator is	Bestert the system. If the problem persists, place contact
WARN 410	abnormal	Growatt technical support.
WARN 410	USB communication is	Restart the system. If the problem persists, please contact
	abnormal	Growatt technical support.
FAULT 431	BOOT is abnormal	Restart the system. If the problem persists, please contact
		Growatt technical support.

## 7. Decommissioning

If the PV-ESS-DG system will not be put into use in the future, handle all components properly.

- 1. Disconnect the external AC circuit breaker and prevent accidental reconnection.
- 2. Set the DC-SWITCH to the "OFF" position.
- 3. Wait at least 5 minutes until the internal capacitor is fully discharged.
- 4. Remove cables on the AC side.
- 5. Remove cables on the DC side.
- 6. Remove the WIT inverter from the installation location.
- 7. Remove cables between the battery clusters.

Shenzhen Growatt New Energy Co., Ltd.

4-13/F, Building A, Sino-German (Europe) Industrial Park,

Hangcheng Ave, Bao'an District, Shenzhen, China

- Т 400-931-3122
- E <u>usaservice@ginverter.com</u>
- W us.growatt.com