TBB POWER

Version: V1.0

USER MANUAL

Hybrid Inverter

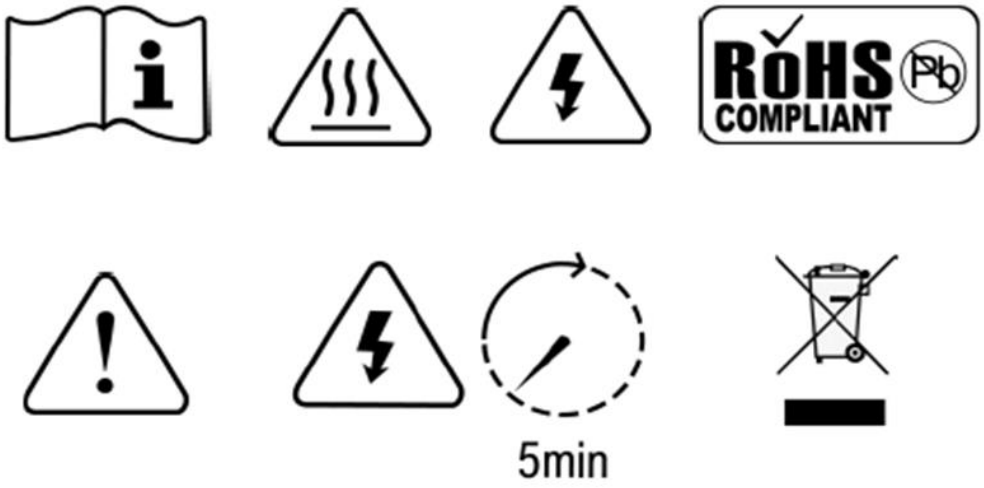
INGE Three Phase



www.tbbpower.com

Revision History

Version	Description
A1.0	Initial Version



WARNING: HIGH VOLTAGE INSIDE

CAUTION: THE DC FUSE MUST HAVE BEENTURNED OFF BEFORE SERVICING

MADE IN CHINA

Disclaimer

Unless specially agreed in writing, TBB POWER (XIAMEN) CO., LTD.

- Takes no warranty as to the accuracy, sufficiency of suitability of any technical or other information provided in this manual or other documentation.
- Assumes no responsibility or liability for loss or damage, whether direct, indirect, consequential or incidental, which might arise out of the use of such information.
- Offers standard warranty with its products, taking no responsibility for direct or indirect loss due to equipment failure.

About This Manual

This manual describes our product features and provides procedure of installations. This manual is for anyone intending to install our equipment.

General Instruction

Thanks for choosing our products and this manual is suitable for INGE. This chapter contains important safety and operation instructions. Read and keep this User Guide well for later reference.

INGE needs to be installed by professionals and please pay attention to the following points prior to installation:

Please make sure the input voltage or voltage of battery is equal to the nominal input voltage of this inverter.

- Please connect the positive terminal "+" of the battery to the "+" input of the inverter.
- Please connect the negative terminal "-" of the battery to the "-" input of the inverter.
- Please use the shortest cable for connection and ensure a secure connection.
- While connecting, please secure the connection and avoid the short circuit between the positiveterminal and the negative terminal of the battery, to protect the battery from damage.
- The inverter has high voltage inside. Only the authorized electrician can open the case.
- The inverter is NOT designed to be used in any life-sustaining equipment.

Contents

1. General Safety Instruction 1
1.1 Safety Instruction 1
1.2 General Precaution 1
1.3 Precaution regarding Battery Operation 1
2. Instruction 2
2.1 Brief Instruction 2
2.1.1 General Description 2
2.1.2 Naming Rules 3
2.2 Structure 3
2.2.1 Front 3
2.2.2 Product Overview 4
2.2.3 Dimension 6
2.3 Function 7
2.3.1 Parallel 7
2.3.2 Power Control and Power Assist 7
2.3.3 Auto Restart While AC is Recovering 8
2.3.4 Auto Restart While PV is Recovering 8
2.3.5 Powerful and Reliable Inverter 8
2.3.6 Professional Battery Charger 8
2.3.7 Transfer 9
2.3.8 Protection Function 9
3. Installation and Wiring 10
3.1 Pre-installation Inspection 10
3.1.1 Check Outer Packing 10
3.2 Select Installation Location 11
3.2.1 Requirement 11
3.2.2 Installations Tools 11
3.2.3 Installation Space Requirements 12
3.3 Installation 12
3.4 Preparation Before Wiring 14
3.4.1 Breaker Preparation 14
3.4.2 Cable Preparation 14
3.5 Wiring 15
3.5.1 Earth Connection(mandatory) 15
3.5.2 Signal port connect 15
3.5.3 Batteryconnect 18
3.5.4 AC cables Connect 19
3.5.5 PV cables Connect 19
3.5.6 Wiring System for Inverter 22
3.5.7 Typical application diagram of diesel generator 24
3.5.8 parallel connection diagram 25
4. Operation 27
4.1 Check Before Operation 27
4.2 Power ON Test 27
4.3 Power OFF 28

4.4 LEDIndicator 28
4.5 LCD touch screen 29
4.5.1 LCD operation flow chart 29
4.5.2 Home Screen information 30
4.5.3 Operation details page 31
4.5.4 Setting Menu 34
4.5.5 Alarm Information 44
4.6 ConfigureINGEThroughUpper computer& NOVA Monitoring Platform 45
5. Mode 46
Mode Ⅰ:Zero export to Load 46
Mode Ⅱ:Off-Grid 47
ModeⅢ: Off-Grid with Generator 47
6. FAQ 48
6.1 Fault Event 48
6.2 WarningEvent 50
7. Specification 54

1. General Safety Instruction

1.1 Safety Instruction

As dangerous voltage and high temperature exist within the INGEserieshybrid inverter, only qualified and authorized maintenance personnel are permitted to open and repair it.

This manual contains information concerning the installation and operation of the INGEhybrid inverter. All relevant parts of the manual should be read prior to commencing the installation. Please follow the local regulations meantime.

Any operation against safety requirement or against design, manufacture, safety standardare out of the manufacturer warranty.

1.2 General Precaution

- This inverter is designed for outdoor use(IP65).
- To avoid fire and electric shock, make sure all cables are selected with right gauge and connected well. Cables with smalleror broken cables are not allowed to use.
- Please do not put any inflammable goods next to the INGE series.
- Never place the INGE series directly above batteries.
- Do not place battery over the INGE series.

1.3 Precaution regarding Battery Operation

- Do not put the metal tool on the battery. Spark and short circuit might lead to explosion
- Remove all personal metal items such as rings, bracelets, necklaces, and watches while working with batteries. Batteries can cause short-circuit current high enough to melt metal, and could cause severe burns.

2. Instruction

2.1 Brief Instruction

2.1.1 General Description

INGEserieshybrid inverter (**hereinafter referred to as INGE**) is an inverter integrated with multiple functions like battery inverter, AC charger,suitable for backup power and off-grid applications.

INGE series has the following features:

1. Strong surge capability to carry various inductive loads, such as air conditioners, refrigerators, water pumps, etc.

2. Flexible configuration on energy priority to charge the battery or power the loads with grid or solar energy, meeting the needs of different application scenarios.

3. Two AC outputs: one usual uninterruptible output(LOAD port), one programmable port for load management or generator (GEN port).

4. Support system wake-up when the source of the GRID port or PVis regained, to effectively prevent the system from becoming deadlock due to low battery voltage/SOC, to realize unattended function.

5. Equipped with Power Assist function to relieve power supply pressure of AC side under short-term overload condition.

6. Equipped with Bypass Assist function to relieve power supply pressure of battery side under short-term overload condition and limit the battery's discharge power, effectively limiting the discharge current of the lithium battery BMS, thus to avoid overcurrent protection of the BMS.

7. Intelligent fan control to minimize noise.

8. Flexible in system expansion, two or more units can be connected in parallel to compose a three-phase parallel system.

9. Remote monitoring and control via NOVA APP or Web.

10. Higher PV open circuit voltage and multiple MPPT trackers.

11. Minimize the impact of loads on batteries when the grid is available.

12. Built-in programmable relays, supporting automatic generator start and stop (AGS).

2.1.2 Naming Rules

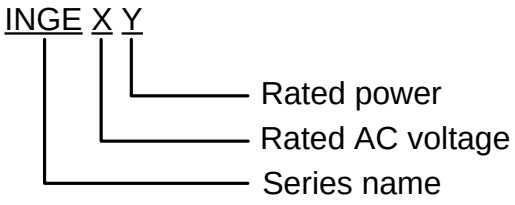


Figure	Explanation	
INGE	Series name	
T	Indication of rated AC voltage	230VAC/400VAC, Three phase
20	Indication of rated power	20kW

2.2 Structure

2.2.1 Front



Figure 2-1 INGE structure in front view

2.2.2 Product Overview

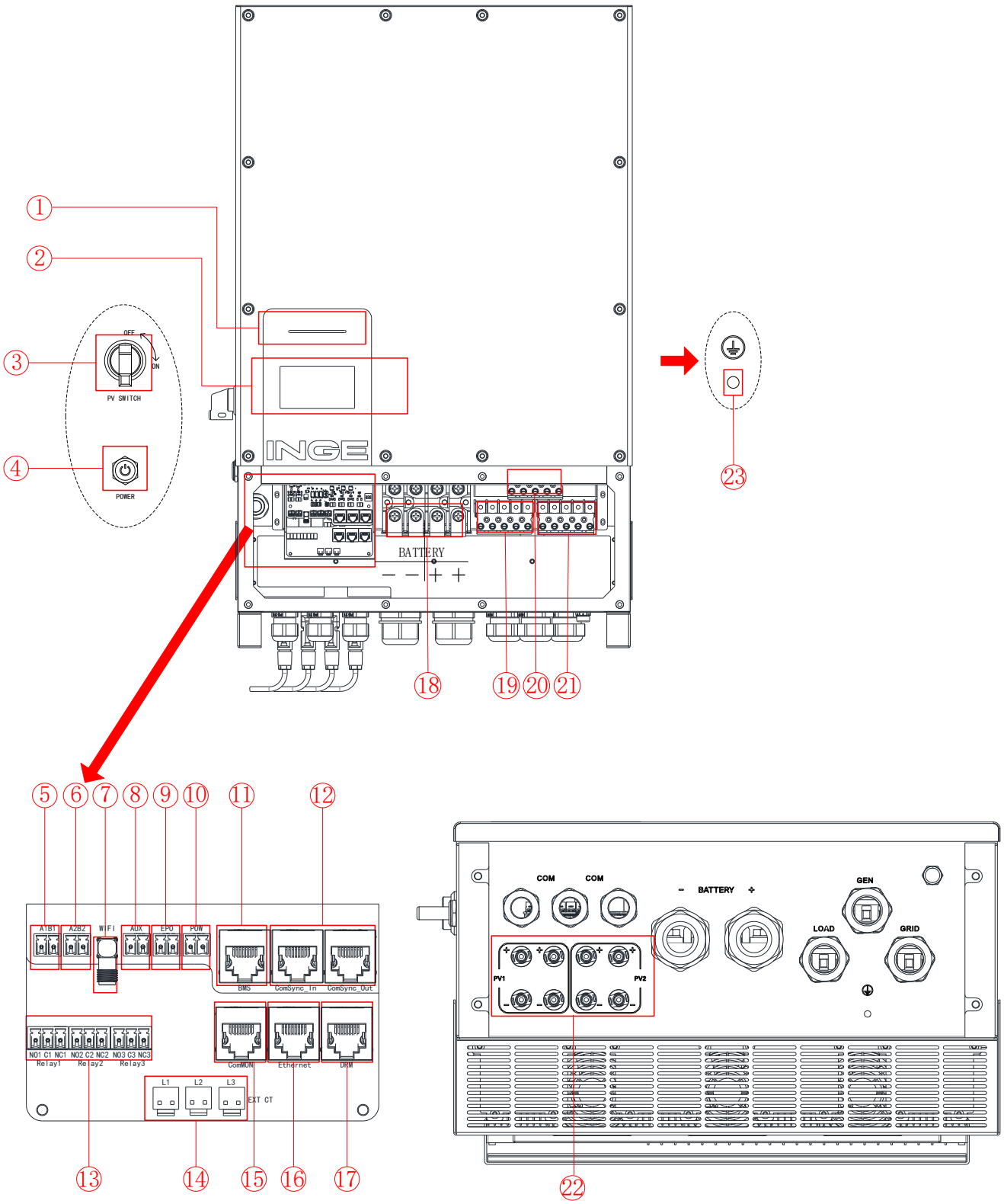


Figure 2-2

Table 2-1

No.	TYPE	Name	Description	Note
1	Display	LED	LED Indicator	
2		LCD	LCD touch screen	
3	Switch	PV Switch	Solar input switch	
4		ON/OFF	Power button	
5	Signal Port	A1B1	Connect to the SP Series, etc	RS485
6		A2B2	Reserved	RS485
7		WiFi	Connect to the antenna	
8		AUX IN	Programmable input dry contact	
9		EPO	Emergency power off	
10		POW	Remote ON/OFF control	
11		BMS	For connecting lithium battery BMS communication	CAN Bus ⚠Connecting to undefined port is prohibited for it could lead to inverter damage.
12		ComSyncIn	For multiple inverters running in parallel system	CAN Bus ⚠Connecting to undefined port is prohibited for it could lead to inverter damage.
		ComSyncout	For multiple inverters running in parallel system	CAN Bus ⚠Connecting to undefined port is prohibited for it could lead to inverter damage.
13		Relay1	Dry output contact. Its control logic can be selected through the upper computer	Built-in 30Vdc/3A or 250Vac/3A relay.
		Relay2	Dry output contact. Its control logic can be selected through the upper computer	Built-in 30Vdc/3A or 250Vac/3A relay.
		Relay3	Dry output contact. Its control logic can be selected through the upper computer	Built-in 30Vdc/3A or 250Vac/3A relay.
14		EXT CT	External current sensor interface for external grid current sampling	ConnectEXTCT L1/L2/L3
15		ComMON	Monitoring communication port for connecting to theUpper computer	RS485 ⚠Connecting to undefined port is prohibited for it could

				lead to inverter damage.
16		Ethernet	Connect to the Ethernet through network cables	
17		DRM	Can be configured as DRM0-DRM8 for AS 4777.2 (Australia/New Zealand)	
18	Power Port	BAT+	Battery Positive Input	M8 bolt
		BAT-	Battery Negative Input	
19		LOAD	Critical load	DRTB16-QC
20		GEN	Generator AC Input or Normal load	
21		GRID	AC InputCanbeconnectedtothegridorgenerator	
22		PV 1/2	PV Input	MC4
23		Grounding	Protective grounding position	M6 bolt

2.2.3 Dimension

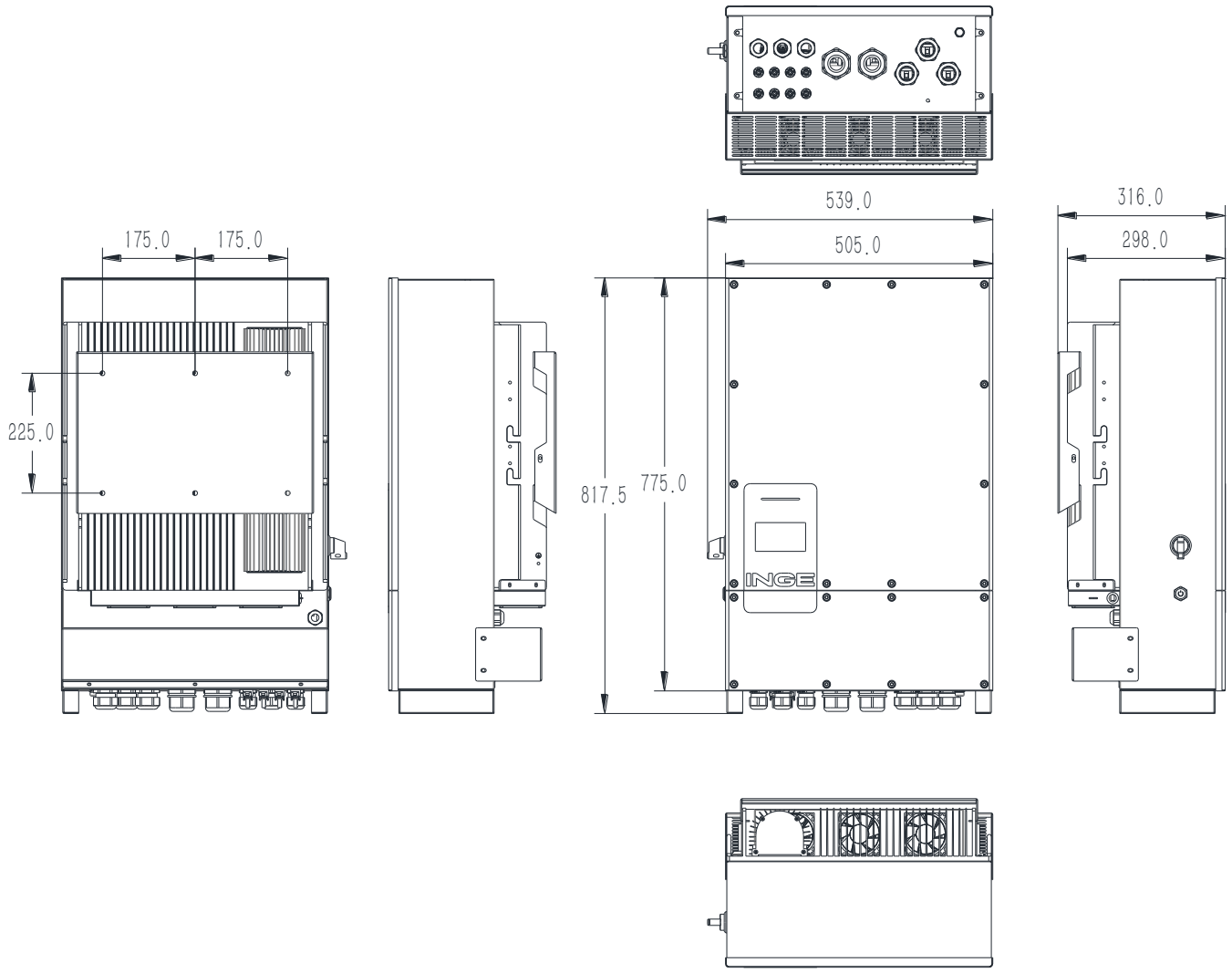


Figure 2-3 Dimension of INGE

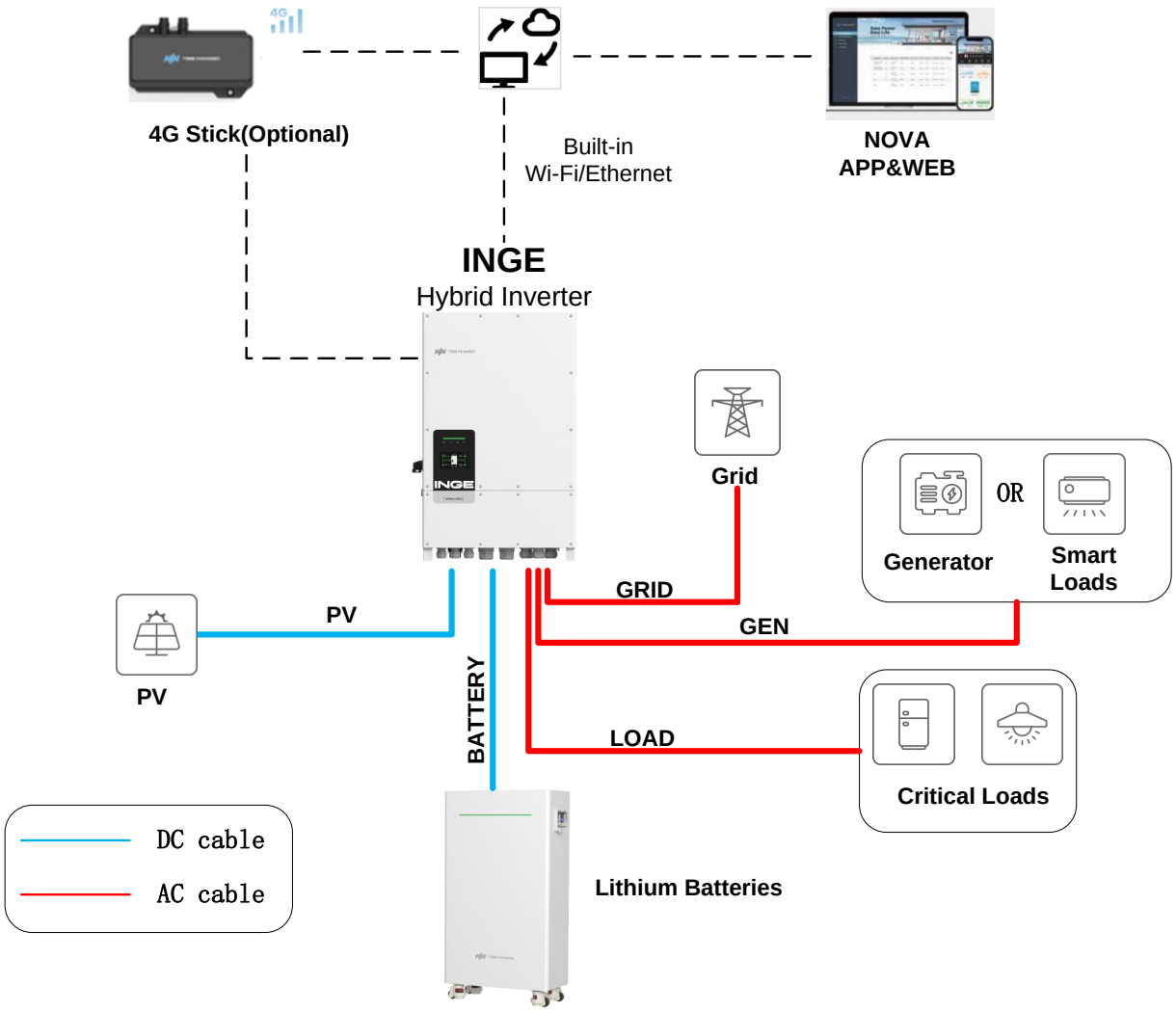


Figure 2-4

2.3 Function

2.3.1 Parallel

Up to three units can be connected in parallel to compose a parallel system, which is convenient for system expansion or to construct a micro-grid system.

2.3.2 Power Control and Power Assist

INGEoffers a unique feature of power control & power assist, which is very useful when you have a limited grid supply or work with a generator. INGEwill take control of energy flow automatically, using extra power to charge the battery or discharge the batteryto compensate the insufficient part of the grid or generator. With this feature, the user can avoid air switch trip and does not have to use oversized generators.

2.3.3 Auto Restart While AC is Recovering

INGE can automatically restart when the source of the GRID port is recovering. Full explanations are as follows:

While the lithium battery is under low-voltage protection, and once the source of the GRID port is recovering, INGE can be woken up to recharge the lithium battery, and meantime the lithium battery can also be woken up to return to the normal state of charge and discharge.

2.3.4 Auto Restart While PV is Recovering

INGE can automatically restart when the PV input is recovering. Full explanations are as follows:

While the lithium battery is under low-voltage protection, and once the PV input is recovering, the lithium battery can be charged by the MPPT module, so the lithium battery can be woken up to return to the normal state of charge and discharge, and meantime INGE can also be woken up.

2.3.5 Powerful and Reliable Inverter

High Performance Pure Sine Wave

INGE is a pure sine wave inverter generating a near perfect sine AC wave power output that is very similar to or even better than what the user can get from the utility grid. Pure sine wave can guarantee the normal function of the sensitive equipment (computer, laser printer, TV, etc.). Also, your home appliances such as fridge, microwave and power toolswill work more efficiently.

High Surge Power Capability

Provided with outstanding surge power capability and transformer, INGE is suitable for heavy inductive loads like fridge, coffee maker, microwave, power tools, air conditioner, etc.

2.3.6 Professional Battery Charger

Battery Type Settings

INGE supports working with lithium batteries.

Compatible with Lithium Battery

INGE supports working with TBB’s lithium battery for residential energy storage. Connect the 'BMS' port of INGEto the CAN port of the lithium battery to set up the communication between the lithium battery and INGE.

When the connection with the lithium battery is set up, INGE can automatically respond to the charging request of the lithium battery BMS, and meantime read the information sent by the lithium battery BMS for monitoring. When a communication error occurs after working with the lithium battery for a period of time, INGE can automatically detect the error and raise an alarm.

2.3.7 Transfer

Uninterrupted AC Power Supply

In case of voltage/frequency/waveform of GRID port or GEN portmatch the minimum quality,the voltage of the LOAD port will switch to that of the GRID port or GEN port. INGE will work as a battery charger and the loads will be powered by the grid or generator.

In case of the load failure or excessive the grid or generator current, INGE will initiate a fast take-over of power supply, which will guarantee an uninterrupted power supply. Once the grid or generator resumes or matches the quality, the power supply will be switched back to the grid or generator again. Due to its ultra fast transfer design, as fast as 4ms, INGE could be used as an UPS.

2.3.8 Protection Function

INGE is equipped with a series of complete hardware and software protection functions to ensure its stable and reliable operation.

Overload Protection

When overload protection is triggered, it will restart automatically after 60s. And after three consecutive overload shutdown protections, INGE will not restart automatically. In this case, the user needs to manually restart it.

Over Temperature Protection

When the internal temperature is too high, INGE will enter the over-temperature protection. After the internal temperature returns to normal, it can automatically resume normal operation.

Short Circuit Protection

INGE will automatically shut down when the load is short-circuited and needs to be manually activated.

Battery Low Voltage/SoC Protection

To prevent the permanent battery damage caused by the over discharge of battery, INGE will automatically cut off the output according to the low voltage/SOC protection threshold set by the user.

PV Array Insulation Resistance Detection

INGET20 is designed with built-in PV array insulation resistance detection (earth fault detection) function. In the event of the insulation resistance value lower than the safety threshold, INGE’s MPPT solar charger module will stop working and stay in a standby state.

3. Installation and Wiring

3.1 Pre-installation Inspection

3.1.1 Check Outer Packing

- Check the outer packaging for damage before unpacking, and check if this is the correct model. If there is something wrong, please don't open it and contact your dealer.
- Check the internal contents for any visible damage after unpacking.
- If any item is missing or there is any damage, please contact your dealer.

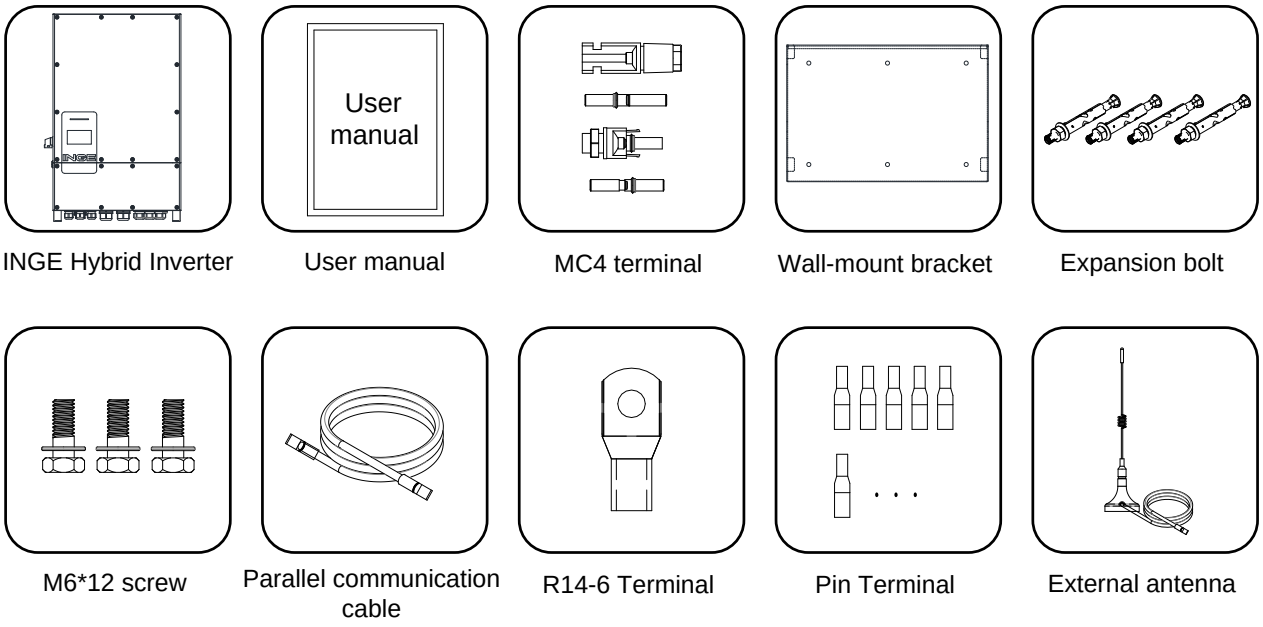


Figure 3-1

Table 3-1 Packing list

Packing list	
Description	Quantity
INGE Hybrid Inverter	1
User manual	1
MC4terminal (PV input)	8
Wall-mount bracket	1
Expansion bolt (For fixing the wall-mount bracket on the wall)	7
M6*12 screw (For fixingtheINGE on the wall-mount bracket and to ground the INGE housing)	4
Parallel communicationcable	2
R14-6 Terminal	2

Pin Terminal	22
External antenna	1

3.2 Select Installation Location

3.2.1 Requirement

- During the operation of the heatsink, the temperature of the case and heatsink will be relatively high. Please do not install it in the place where it is easy to reach.
- Do not install it in the place where inflammable and explosive articles are stored.
- Do not install it in the place where children can touch it.
- Do not install it on flammable building materials.
- Please make sure that the support surface is solid enough to bear the weight of INGE.
- After wiring is completed, adhesive sealing shall be applied to the PG connector to meet the IP 65 protection rating.

Do not install INGE in a sealed compartment containing batteries.

3.2.2 Installations Tools

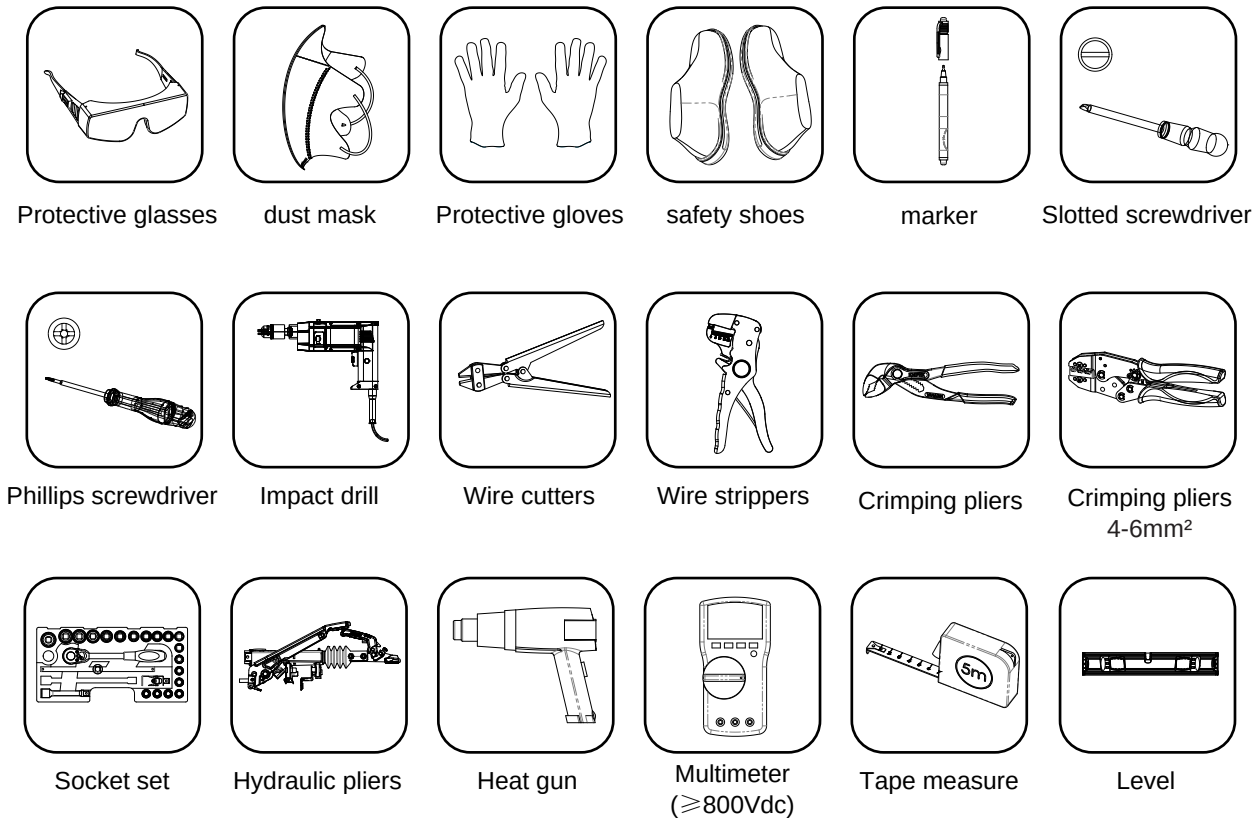


Figure 3-2

3.2.3 Installation Space Requirements

A good ventilation can guarantee the normal operation of equipment. Please always guarantee there is enough space around INGE upon installation.

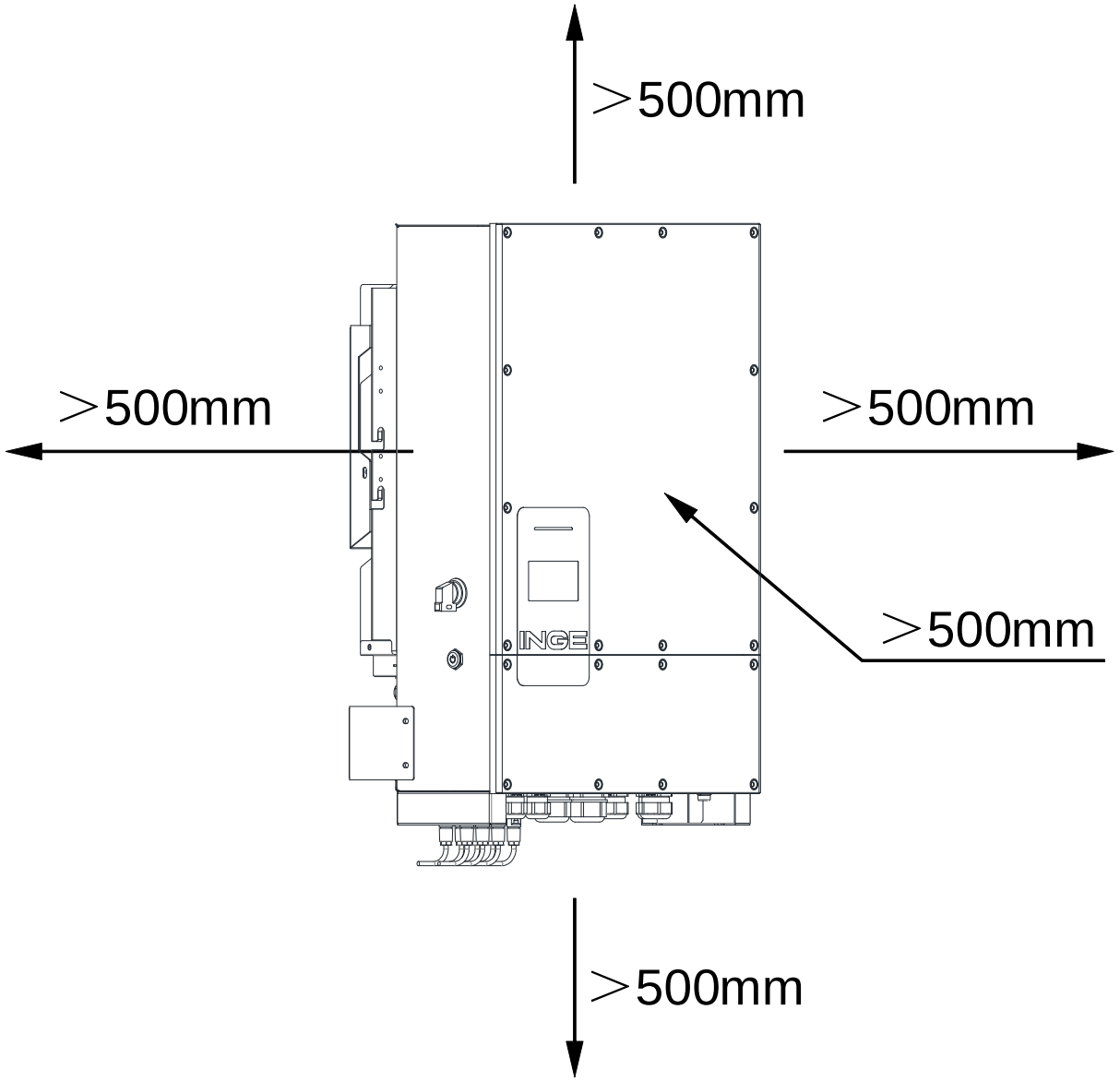


Figure 3-3 Installation space requirements

3.3 Installation

1. Locate a flat and sturdy wall surface, use the mounting bracket as a template to mark the exact installation position of the inverter, and mark the drilling points with a marker pen.
2. Drill 6 holes of 70-75mm depth at the marked position using a 10mm drill bit.Clean out the dust inside the hole to ensure no residue remains.
3. Tap the expansion sleeve (the tube included with the screw set) into the drilled hole until it is flush with the wall surface.

4. Align the wall-mount bracket with the expansion sleeves, pass the M8 bolts through the bracket holes, and screw them into the expansion sleeves. Tighten the bolts evenly with a socket wrench (do not over-torque) — the expansion sleeves will expand and grip the hole walls securely. Verify that the bracket is firmly fixed (it should not wobble when gently shaken).
5. Place the inverter horizontally into the wall-mount bracket, then lower it until the radiator notch fully engages and secures with the wall mount.
6. Fix the INGE on the wall-mount bracket with M6 screws.

Please double check to make sure INGE is securely installed.

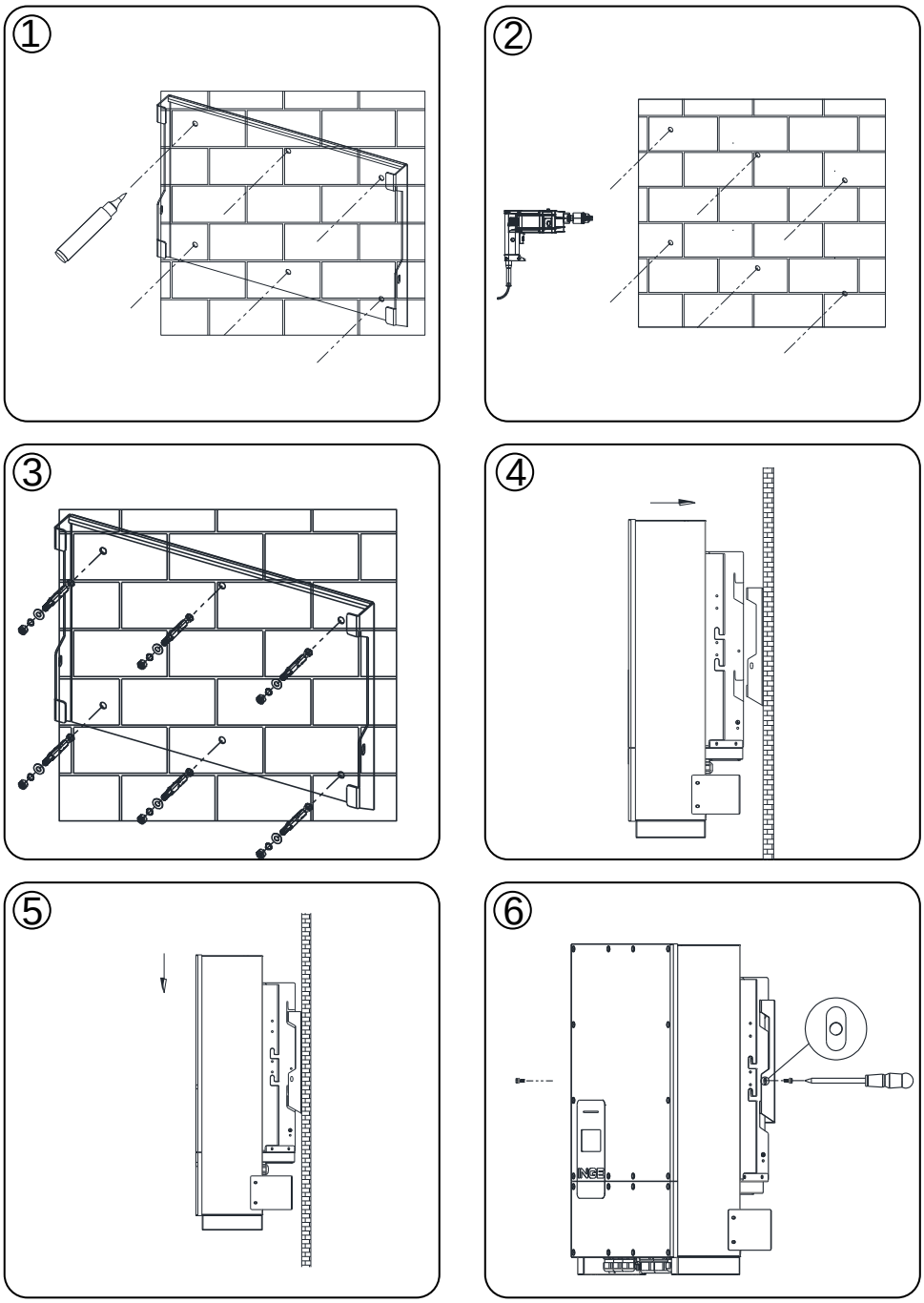


Figure 3-4

3.4 Preparation Before Wiring

3.4.1 Breaker Preparation

- An over current protection device such as DC fuse or DC circuit breaker needs to be installed on positive cable rated at 125% of the nominal rating.
- The withstand voltage of the DC circuit breaker on the battery side should be greater than 63V.
- Circuit breaker requirements are shown in the Table 3-2.

Table 3-2 Breaker Requirement

Parts	Model	Requirement
Battery breaker	T20	(1) The voltage requirement should be greater than 63Vdc. (2) The current requirement should be greater than 500A.
AC breaker for Grid, Load, GEN	T20	(1) The voltage requirement should be greater than 275Vac. (2) The current requirement should be greater than 70A.

Note: The selection of the above circuit breakers or fuses must comply with the requirements of local laws and regulations.

3.4.2 Cable Preparation

- It is recommended to install INGE with cables with insulation rating of at least Class Y (90℃).
- Minimum requirements on the cross-sectional area for the cables are shown in the Table 3-3, Table 3-4, Table 3-5.

Table 3-3 Battery Cable Requirement

Model	Recommended Cable Size	
	Length (The total length of the positive and negative cable of the battery)	4m
T20	Cross-sectional area	50 mm²*2 OR 70 mm²*1
	Voltage drop	0.4V

Table 3-4 AC Cable Requirement

Model	Recommended Cable Size				
		Ground	Grid	Load	GEN
T20	Cross-sectional area	16 mm²	16 mm²	16 mm²	16 mm²

Table 3-5 PV Cable Requirement

Model	Recommended Cable Size		
		PV1	PV2
T20	Cross-sectional area	6 mm²	6 mm²

3.5 Wiring

3.5.1 Earth Connection(mandatory)

To ensure safety, grounding cable must be connected to the earth at the nearest accessible point., and the length of the grounding cable shall not exceed 1.5 meters, this prevents electric shock if the original protective conductor fails.

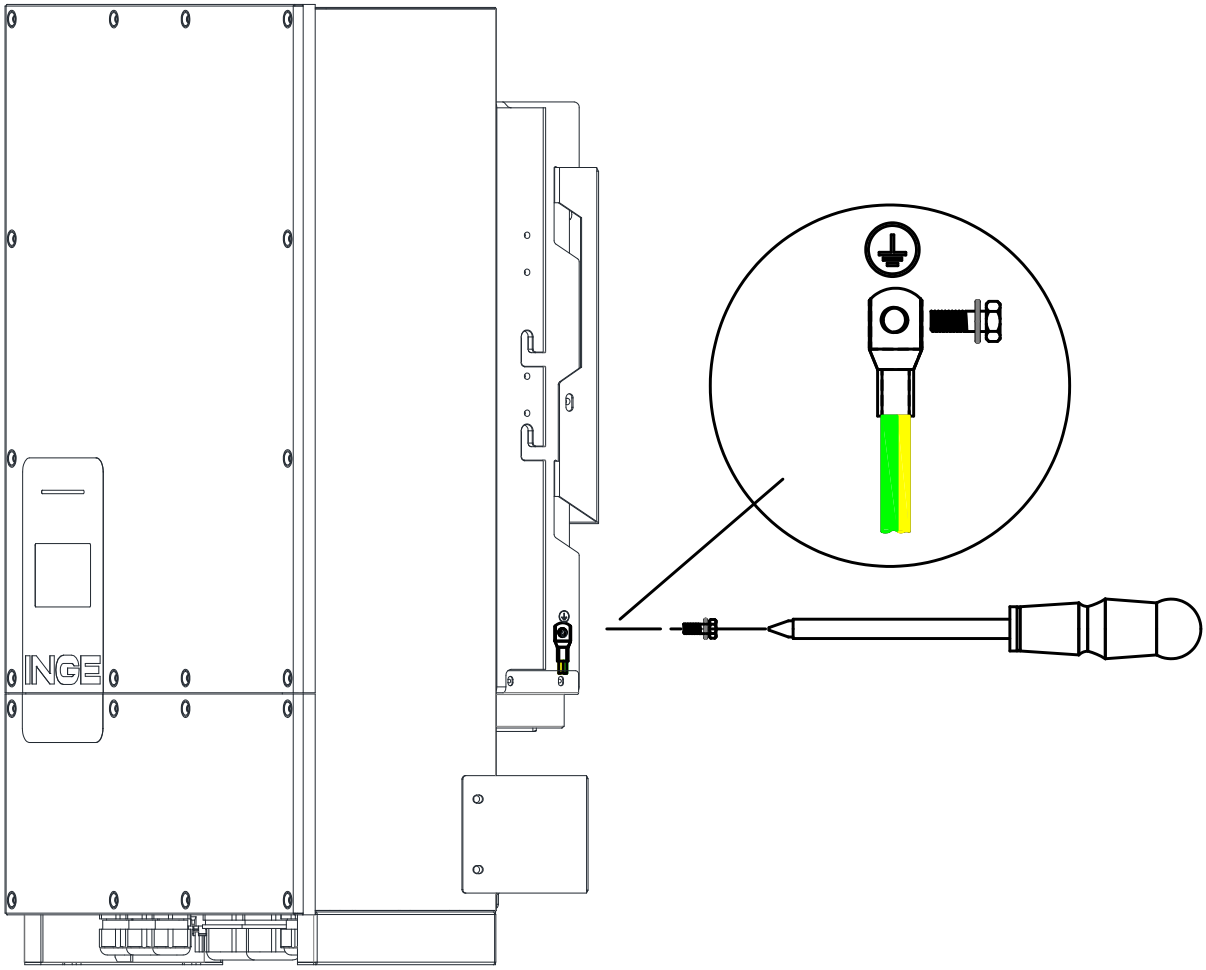
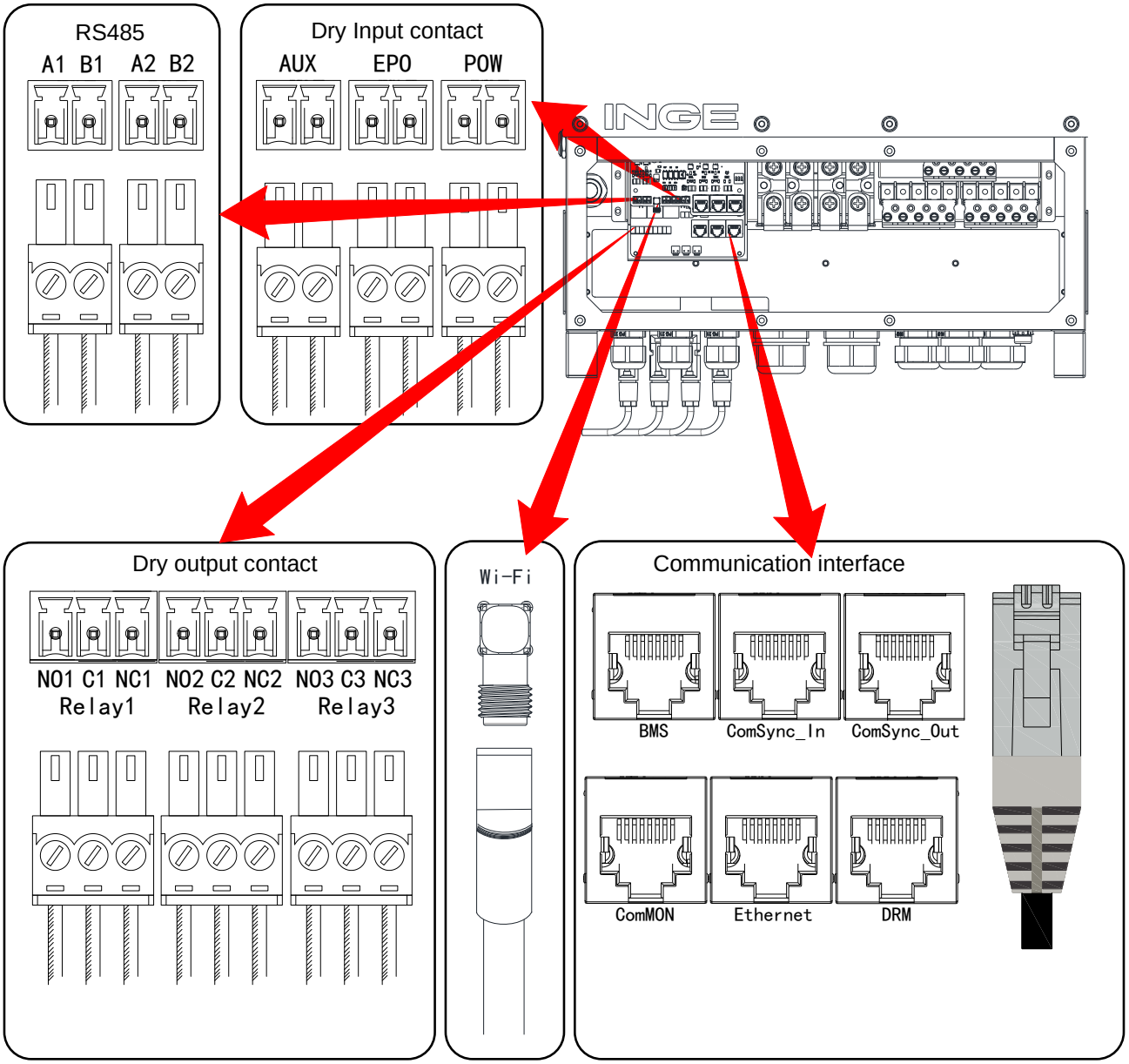


Figure 3-5

3.5.2 Signal port connect

Connect the corresponding communication cable.

If the inverter is installed outdoors, ensure that its connectors are rotated clockwise to the waterproof position and that the connector covers are fully closed.


RS485
A1 B1 A2 B2
Dry Input contact
AUX EPO POW
INGE
Dry output contact
NO1 C1 NC1 NO2 C2 NC2 NO3 C3 NC3
Relay1 Relay2 Relay3
Wi-Fi
Communication interface
BMS
ComSync_In
ComSync_Out
ComMON
Ethernet
DRM

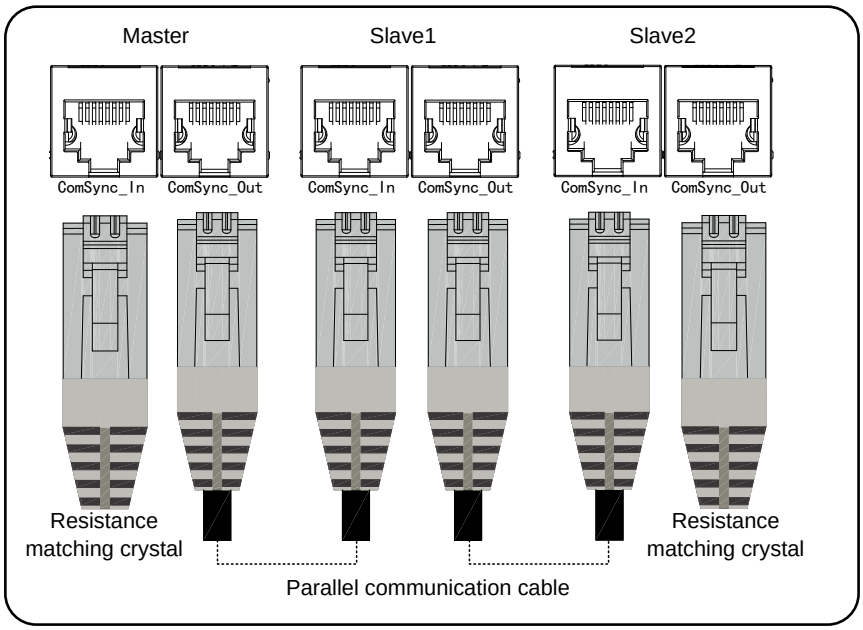

Master
Slave1
Slave2
ComSync_In
ComSync_Out
ComSync_In
ComSync_Out
ComSync_In
ComSync_Out
Resistance matching crystal
Resistance matching crystal
Parallel communication cable

Figure 3-6

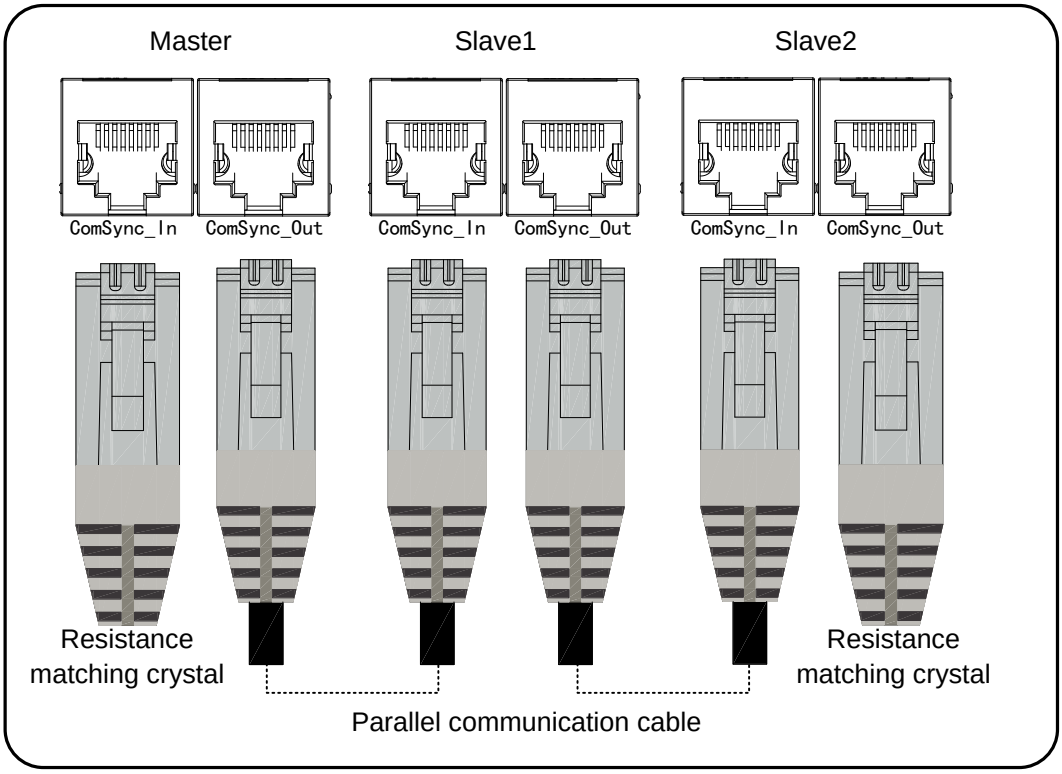


Figure 3-7

RS485: Connect to the SP Series, etc

AUX: Programmable input dry contact.

EPO: Emergency power off.

POW: Remote ON/OFF control.

Dry output contact: Its control logic can be selected through the LCD and the upper computer.

Only Relay 1 can be configured with the AGS(Automatic Generator Start) function. Please connect the dry contact signal for starting the diesel generator to Relay 1.

Wi-Fi: Connect to the external antenna.

BMS: For connecting lithium battery BMS communication.

ComSync_In: For multiple inverters running in parallel system.

ComSync_Out: For multiple inverters running in parallel system.

For the communication wiring of the parallel system, refer to Figure 3-7.

ComMon: Monitoring communication port for connecting to the Upper computer.

Ethernet: Connect to the Ethernet through network cables.

DRM: Can be configured as DRM0-DRM8 for AS 4777.2 (Australia/New Zealand).

3.5.3 Batteryconnect

Connect the positive and negative cables of the battery.

Pay attention to the positive and negative polarity of the battery. Make sure that a battery circuit breakerhas been installed between INGE and the battery before performing the connection, and that the circuit breaker has been turned off.

Use an suitable M8 hexagon socket bit to unscrew the bolts and fit the battery connectors in, then fasten the bolt by the hexagon socket bit, make sure the bolts are tightened with torque of 12N.m in clockwise direction.

Make sure polarity at both the battery and INGE is correctly connected.

If the inverter is installed outdoors, ensure that its connectors are rotated clockwise to the waterproof position and that the connector covers are fully closed.

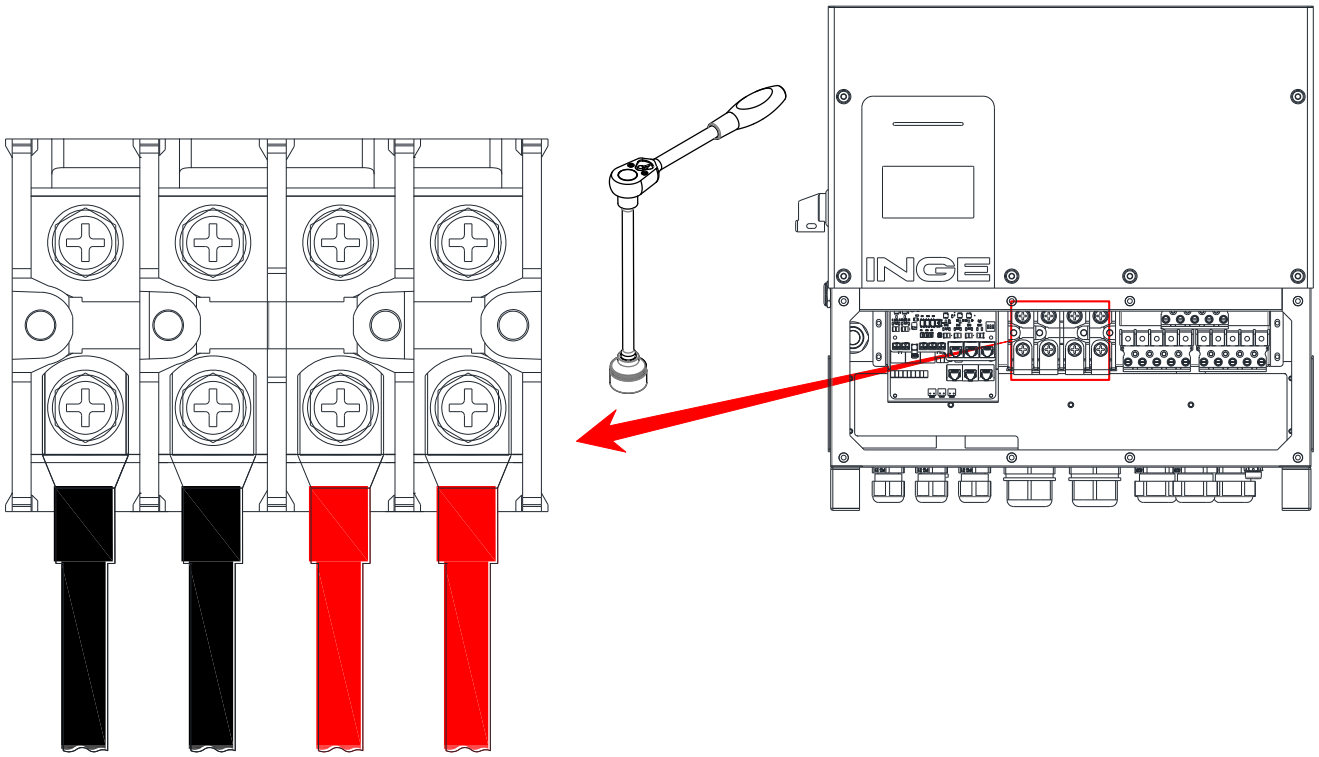


Figure 3-8

3.5.4 AC cables Connect

1、Pay attention to the wiring sequence of the cables.

2、Before connecting to AC cables, a separate AC breaker must be installed between the INGE and the grid, and also between the INGE and the loads.The circuit breaker has been turned off.For the INGE T20, the recommended AC breaker for the load is70A，and the recommended AC breaker for grid is 70A.

3、Strip 10 mm of insulation from the cable, use a suitable screwdriver to loosen the screws of the AC terminals, insert the wire into the specified position of the AC terminal according to the required polarity, then tighten the terminal screws. Ensure the connection is securely completed.

If the inverter is installed outdoors, ensure that its connectors are rotated clockwise to the waterproof position and that the connector covers are fully closed.

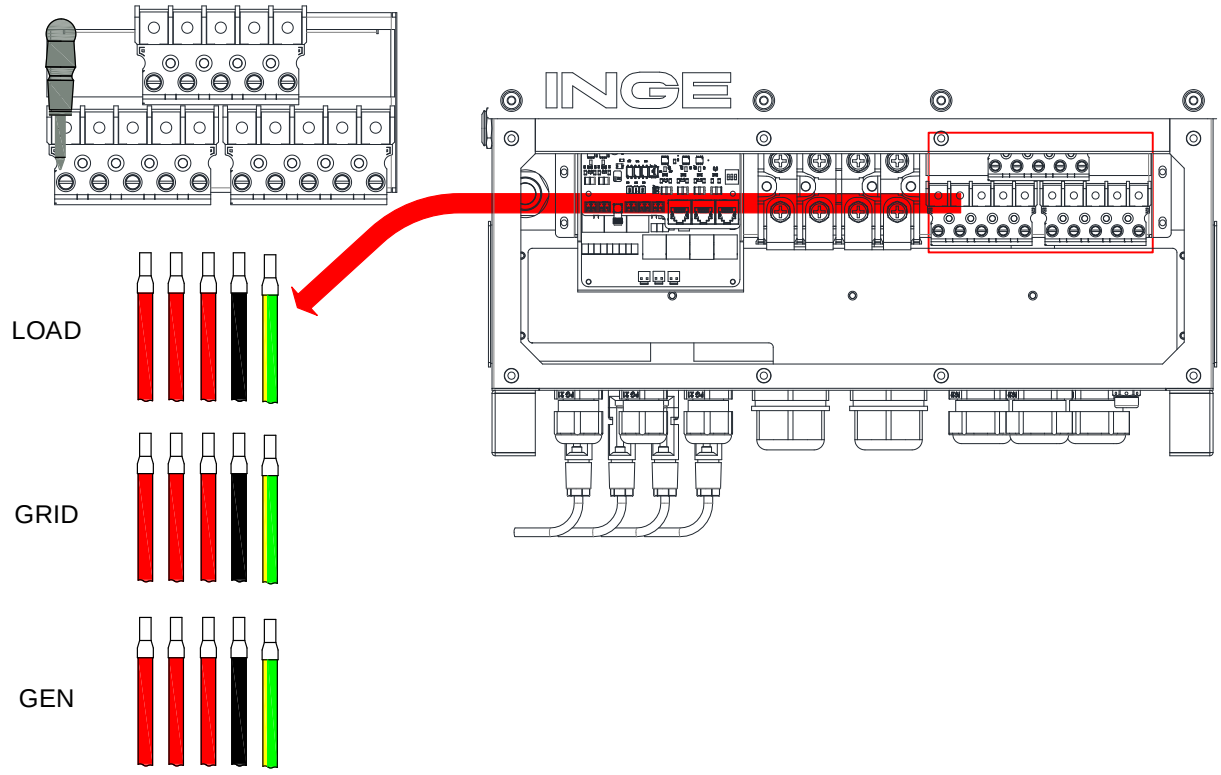


Figure 3-9

3.5.5 PV cables Connect

When selecting proper PV modules, please be sure to consider below parameters:

1) Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.

2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.

3) The PV modules used to connected to this inverter shall be Class A rating certified according to IEC 61730.

Table 3-6

Max. PV Input Power (W)	15000+15000
Max. PV Input Voltage (V)	800
MPPT Voltage Range / Start-up Voltage (V)	120~750 / 130
Max. PV Input Current / Max. Short Current (A)	36+36 / 45+45
MPPT Number / No. Strings Per MPPT Tracker	2 /2+2

PV Module Wire Connection:

1. Switch the Grid Supply Main Switch(AC)OFF.

2. Switch the PVSwitch OFF.

3. Assemble PV input connector to the inverter. Pay attention to the positive and negative polarity of the PV panels.

The steps to assemble the DC connectors are listed as follows:
a) Strip off the DC wire about 7mm, disassemble the connector cap nut (see picture 3-10).

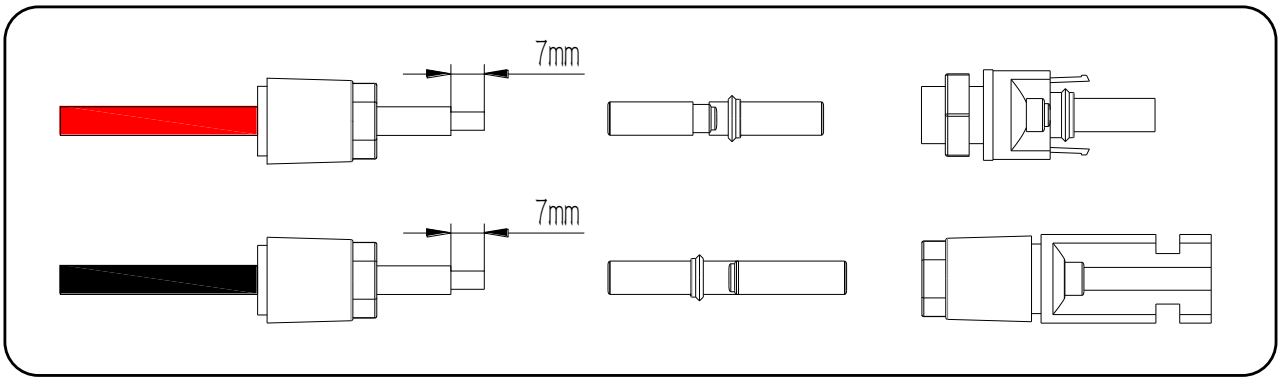


Figure 3-10

b) Crimping metal terminals with crimping pliers as shown in picture 3-11.

c) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector.

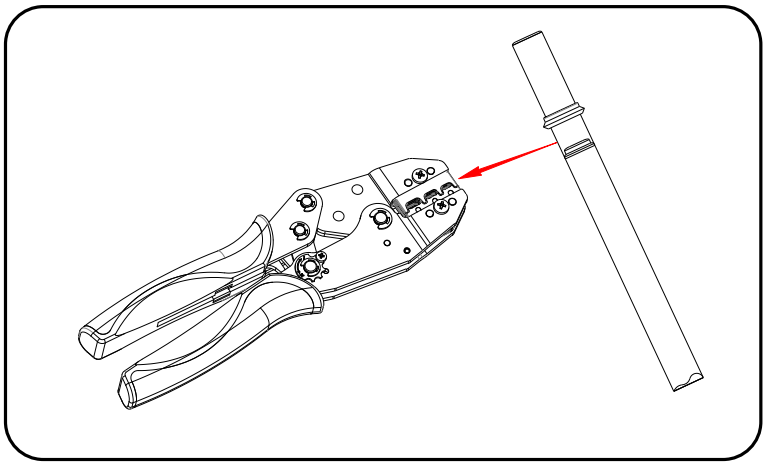


Figure 3-11

d) Finally insert the DC connector into the positive and negative input of the inverter, shown as picture 3-12.

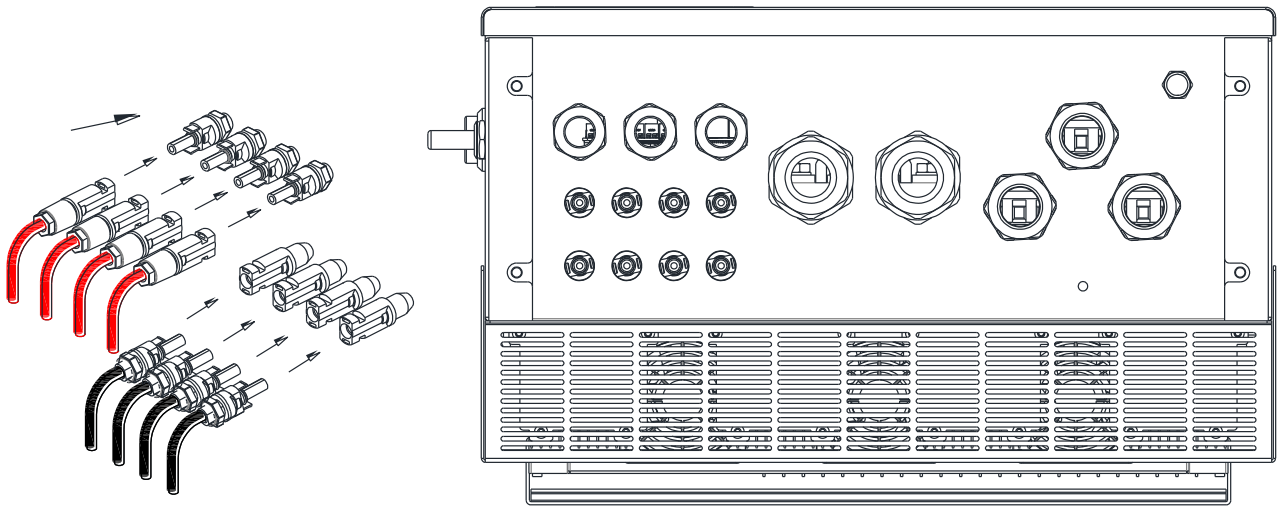
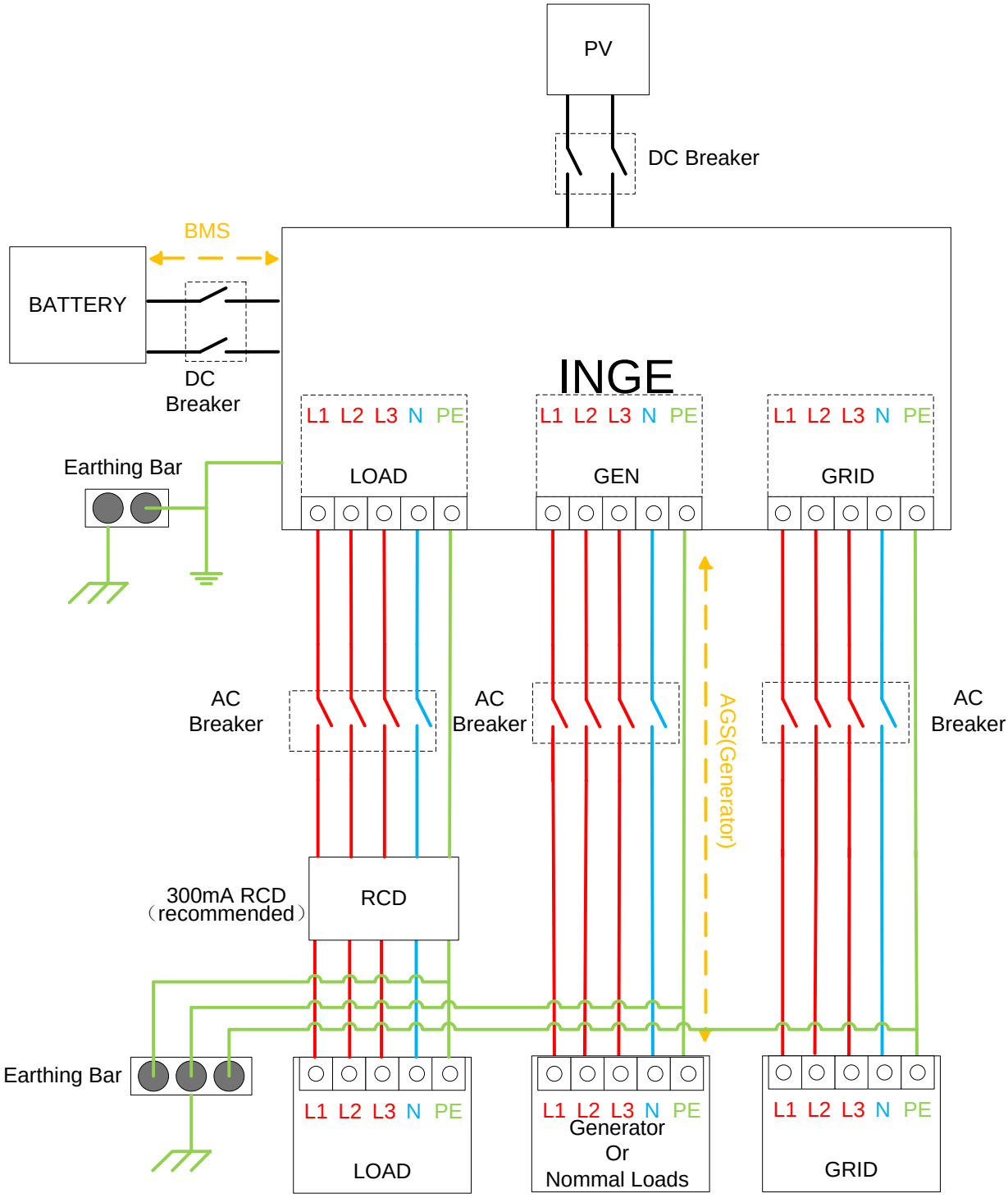


Figure 3-12

After all wiring is completed, please fix the bottom cover back to INGE with the screws.

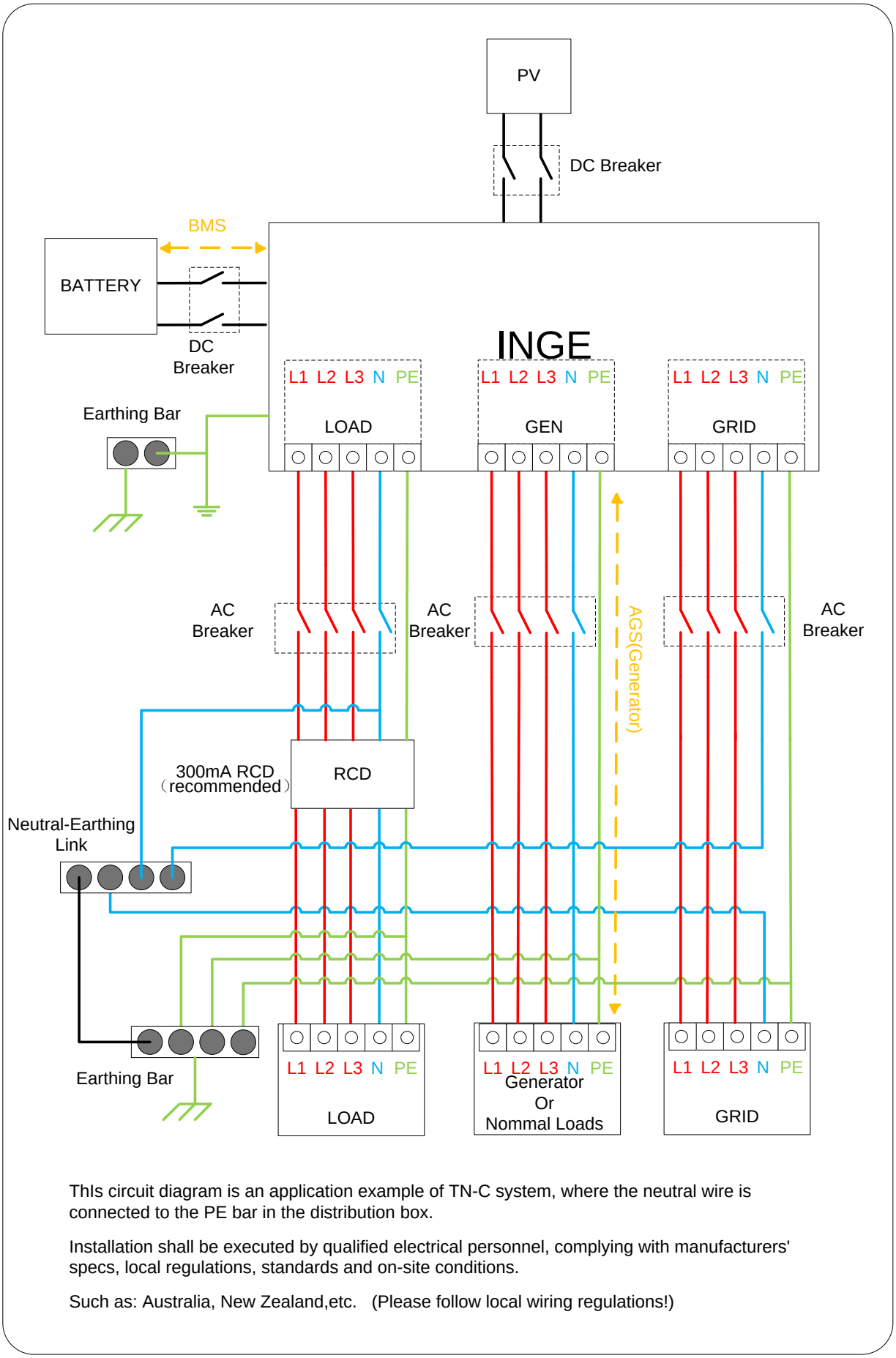
3.5.6 Wiring System for Inverter



This circuit diagram is for reference only and is applicable solely to grid systems without special technical requirements for electrical wiring.

Installation shall be executed by qualified electrical personnel, complying with manufacturers' specs, local regulations, standards and on-site conditions.

Note: The load PE line and earthing bar must be reliably grounded; Otherwise the back-up function may be abnormal when the grid fails.



ThIs circuit diagram is an application example of TN-C system, where the neutral wire is connected to the PE bar in the distribution box.

Installation shall be executed by qualified electrical personnel, complying with manufacturers' specs, local regulations, standards and on-site conditions.

Such as: Australia, New Zealand,etc. (Please follow local wiring regulations!)

Figure 3-13

3.5.7 Typical application diagram of diesel generator

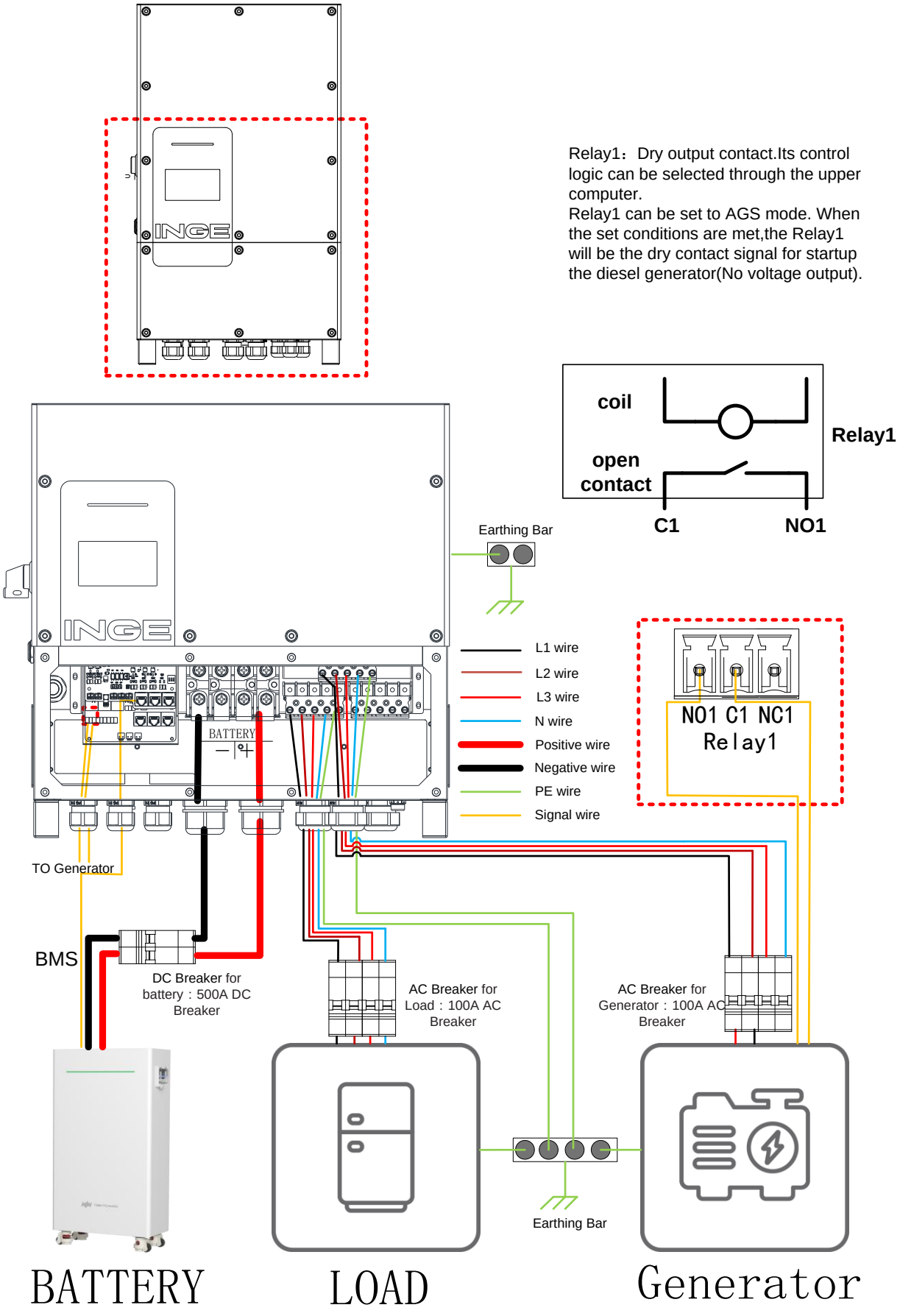


Figure 3-14

3.5.8 parallel connection diagram

Independent Battery

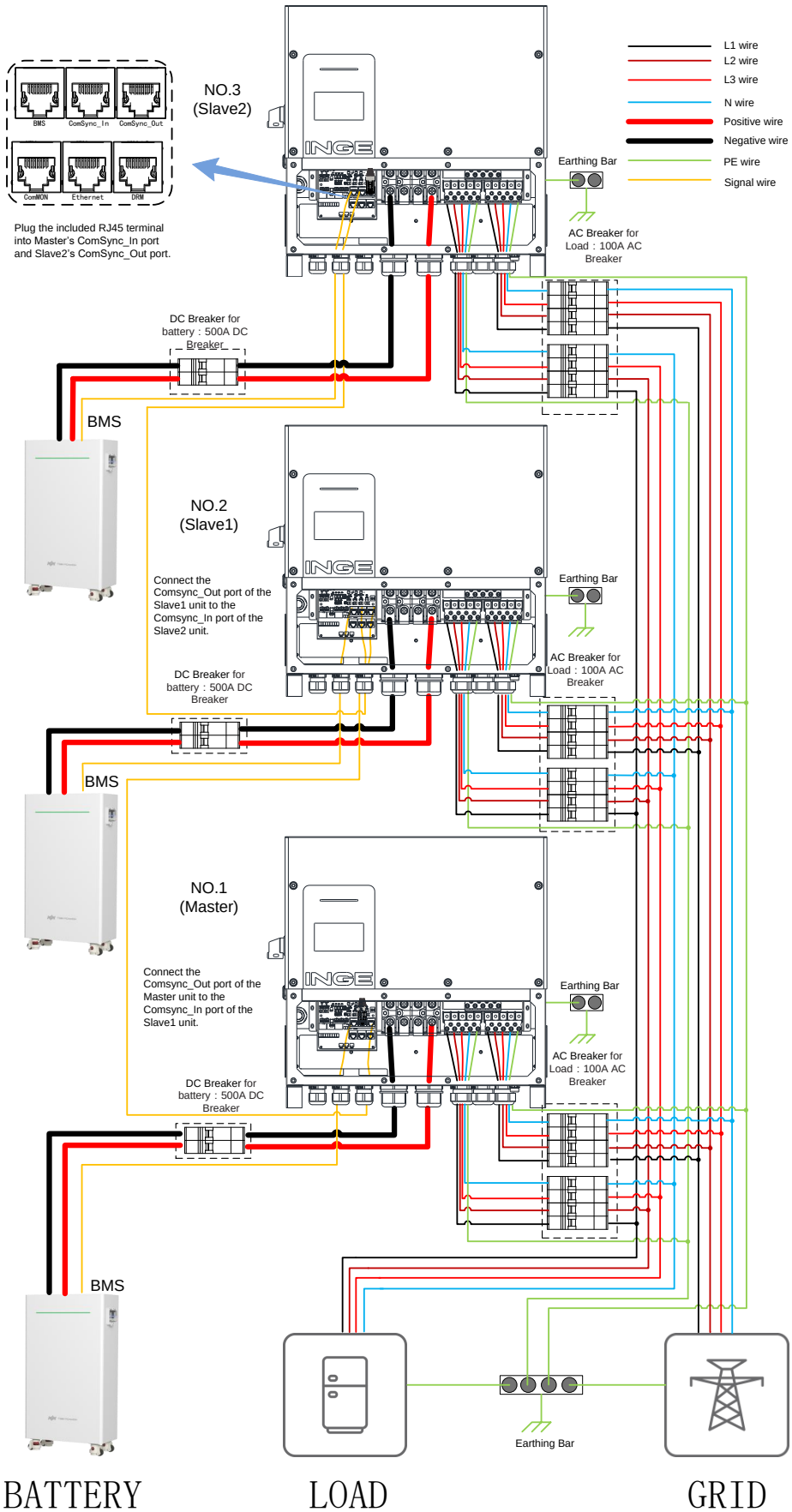


Figure 3-15

Shared Battery Bank

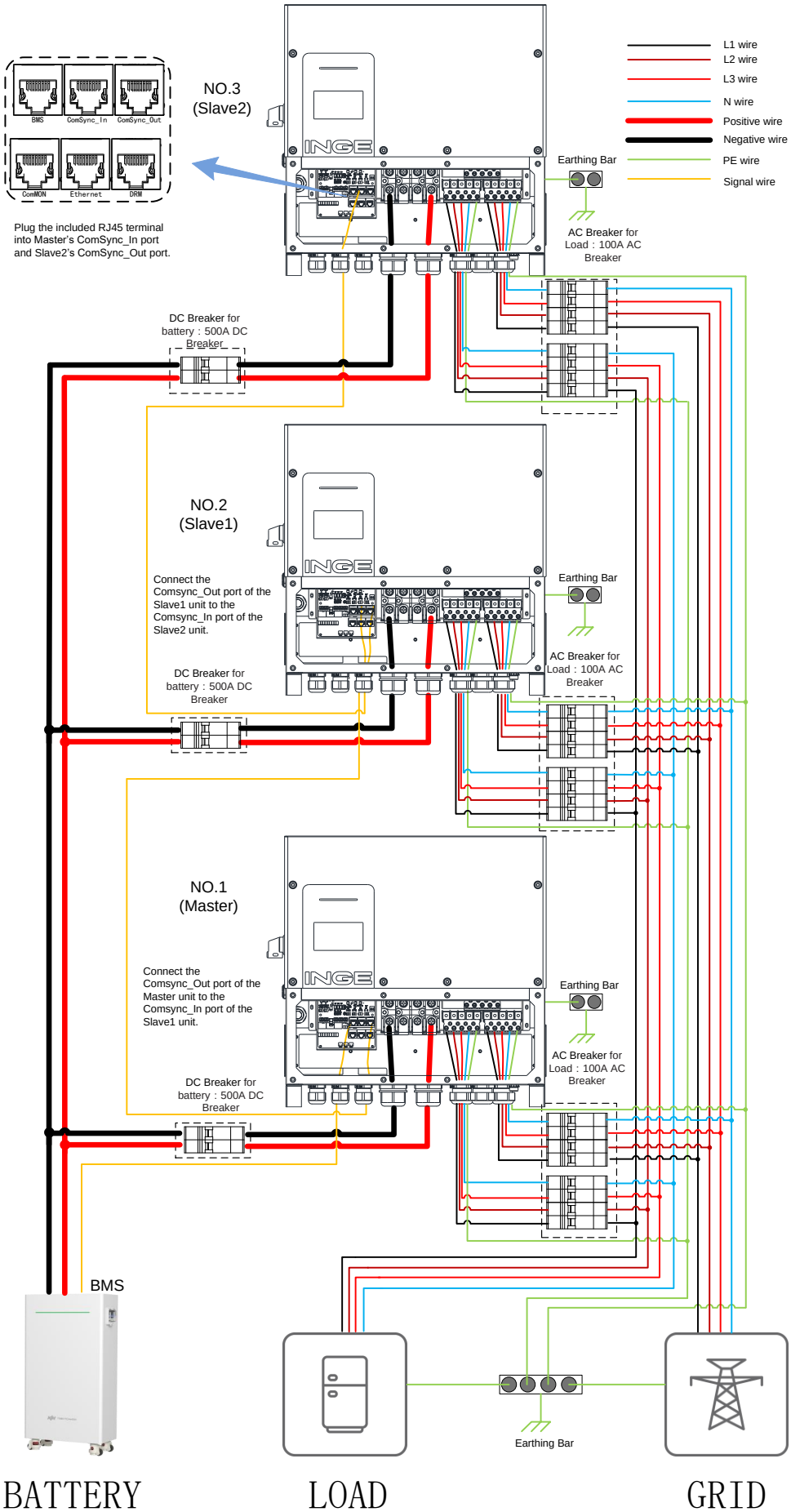


Figure 3-16

4. Operation

4.1 Check Before Operation

Please check before operation according to the following.

- INGE is installed correctly and firmly.
- Reasonable cable layout to meet customer requirements.
- Make sure the ground wire is properly, firmly and reliably connected.
- Double check to make sure the BATTERY breaker, AC breaker, PV breaker is OFF.
- Make sure the cables are properly, firmly and reliably connected.
- Reasonable installation space, clean and tidy environment, no construction residue.

4.2 Power ON Test

Make sure the battery voltage is within the permissible range before the breaker is turned ON.

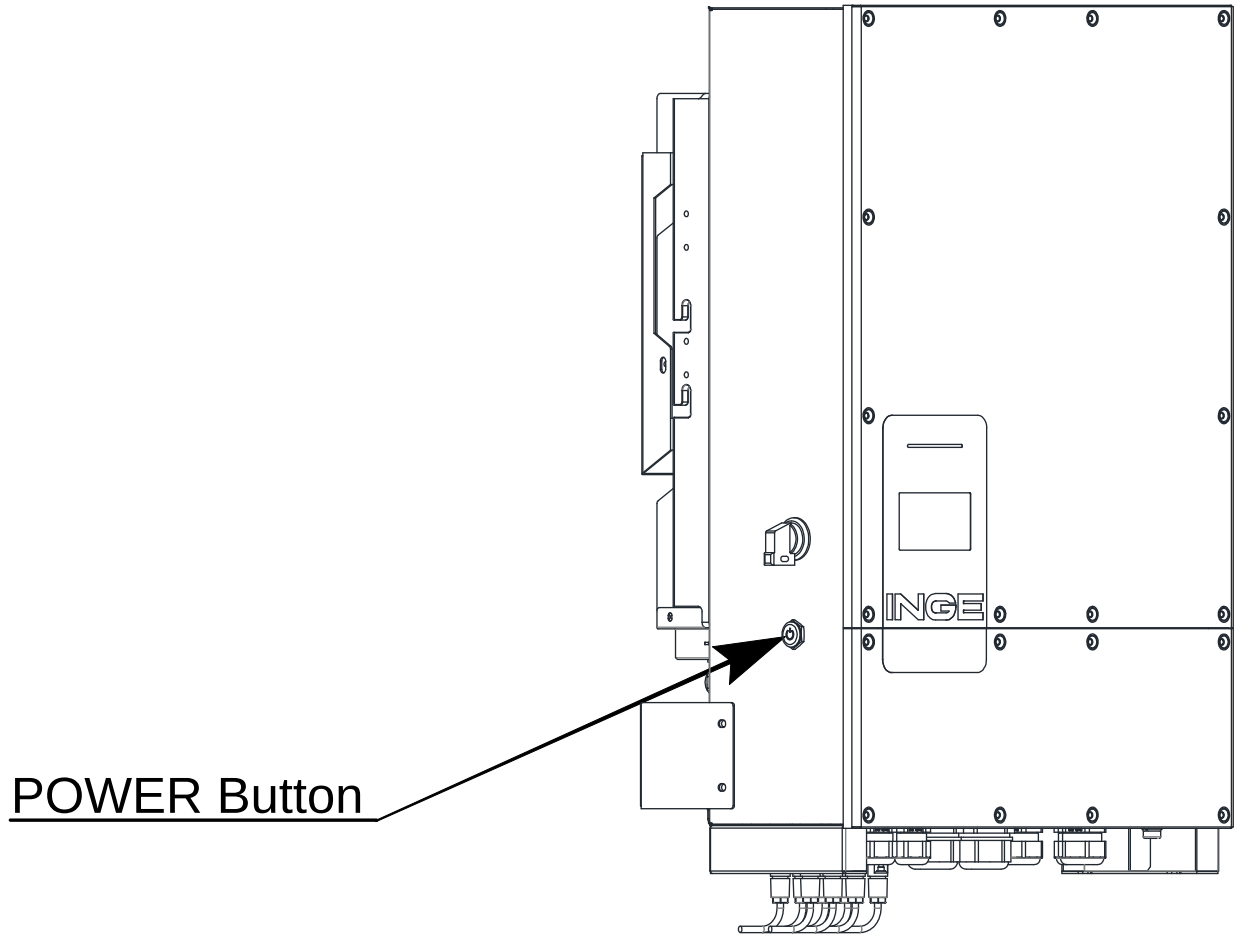


Figure 4-1

1.Once the unit has been properly installed and the batteries are connected well, please follow the instructionsstep by step.

- Step 1: Turn on the batterybreakerand wait for a moment.Observe the LEDindicatorto make sure the inverter is in standby mode.
- Step 2: Press the POWERButtonto ON state to set the inverter to the inverting mode and wait for the inversion startup.Observe the LEDindicatorto make sure the inverter is running normally.

2.When system without battery connected,but connect with either PV or grid,the INGE can also enter standby mode.When both PV and grid are within their normal operating rangesand the INGE is set to NO Battery mode,press the POWER Button to ON and the INGE will output power normally with a waveform consistent with that of the mains supply.

4.3 Power OFF



After INGE is powered OFF, there is still residual power and heat on the case, which may lead to electric shock or burns. Therefore, 5 minutes after INGE is powered off, you should wear protective gloves before removingINGE.

Please follow the instructions step by step.

- Step 1: Press the POWER button to OFF state to set the inverter to the standby mode.
- Step 2: Turn off the battery breaker.

4.4 LEDIndicator

The LEDIndicatorcan display the current operating status of the INGE, with the display logic as follows:

Table 4-1 LED Indicator

Color	display	the current operating status
White	Flashing	Standby mode.
light blue	Flashing	Inverter soft-start in progress
Green	Solid On	The battery is charging.
	Flashing	The battery is fully charged.
Blue	Solid On	Inverting mode.
	Flashing	Bypass modeor Power Assist modeor NO Battery mode.
Yellow	Solid On	Warning occurs.
Red	Solid On	Fault occurs.

4.5 LCD touch screen

4.5.1 LCD operation flow chart

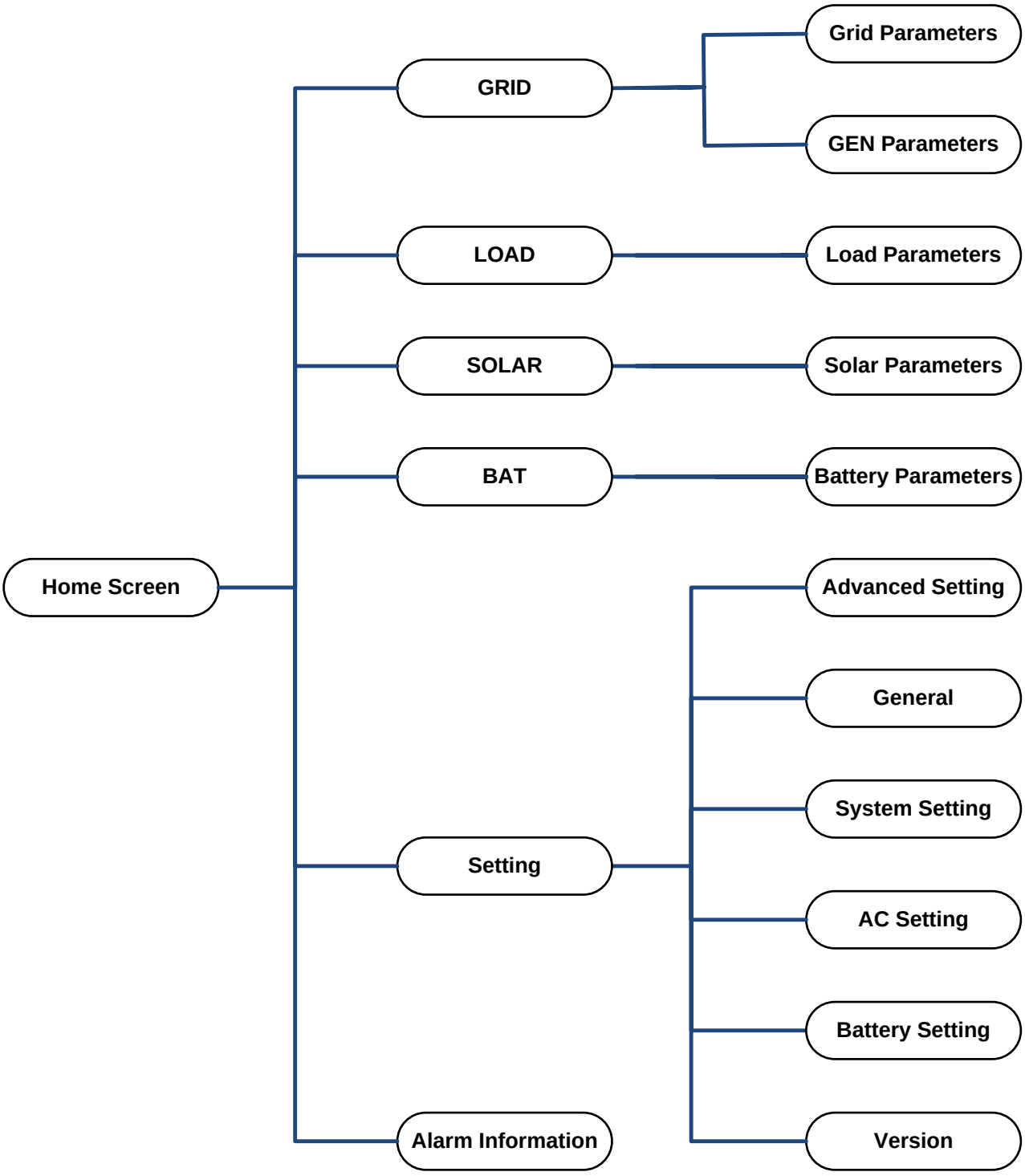


Figure 4-2

4.5.2 Home Screen information

The LCD is a touch screen, below screen shows the operatingl information of the inverter.

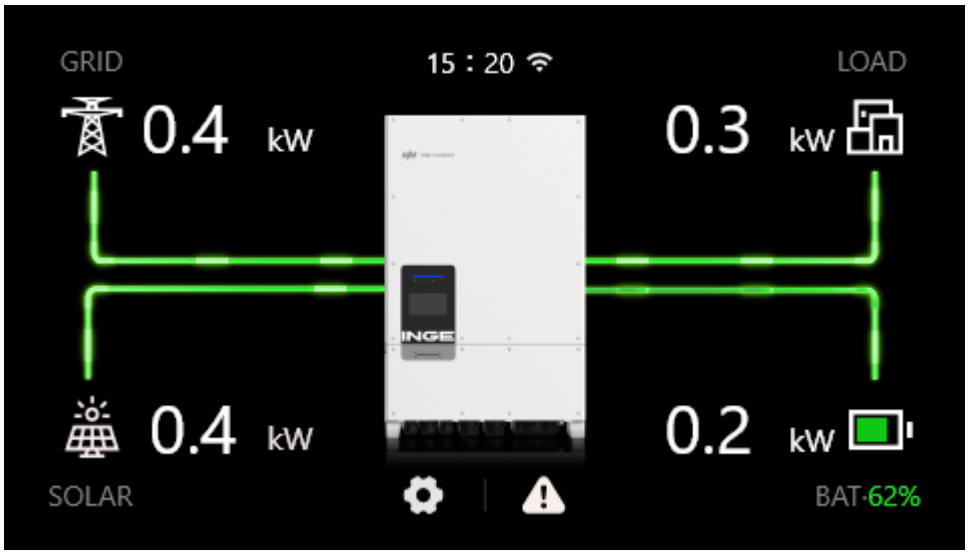
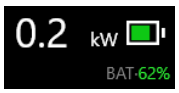
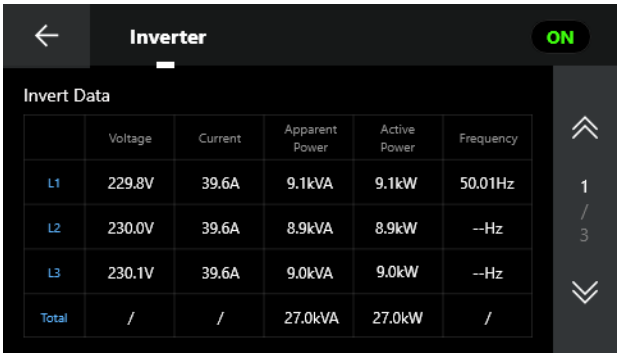


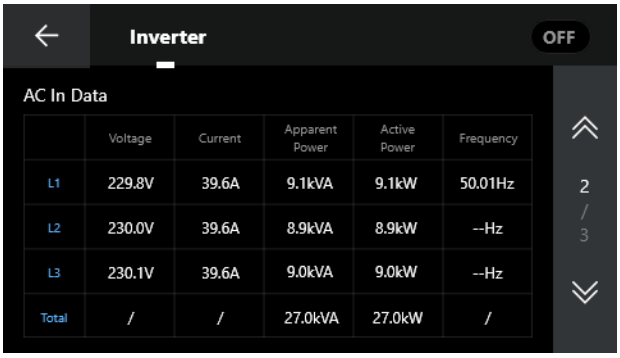
Table 4-2

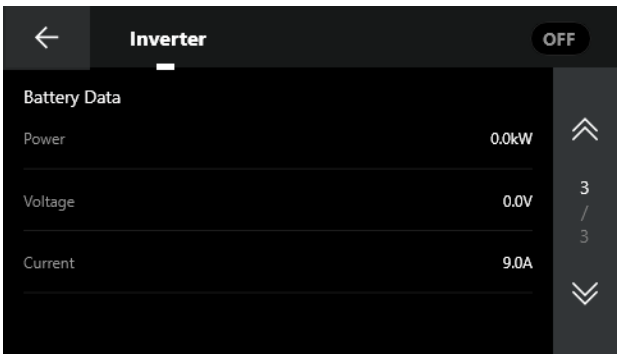
Icon	Function	Note
	This icon displays the system power status: the color of the LED strip in the screen area changes with the system status, e.g., steady white for standby mode and steady blue for inverter mode.	
	This icondisplays the time that must be set during commissioning and the current Wi-Fi connection status. The Wi-Fi icon is green when the connection is normal, and gray if otherwise.	
 	This icon displays the real-time power of the grid. It will be switched to display the real-time power of the generator once the generator is connected at the GEN port. Click this icon to access the current operation details page.	The direction of energy flow between these four components is indicated by the movement of the white slider.
	This icon displays the real-time power of the load. Click this icon to access the current operation details page.	
	This icon displays the real-time power of solar. Click this icon to access the current operation details page.	
	This icon displays the real-time power and state of charge (SOC) of the battery. Click this icon to access the current operation details page. Negative battery power means charge, positivebattery power means discharge.	

	This icon displays whether the inverter has any active alarms or faults. The icon will be white if the inverter is operating normally, yellow if there is an alarm present, and red if a fault has occurred. Click this icon to view the current fault information.	
	Click this icon to access the Settings menu。	

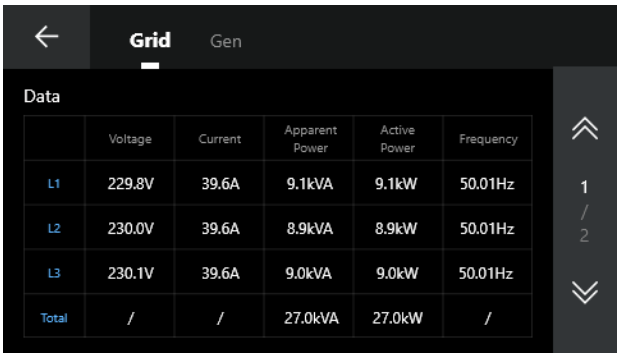
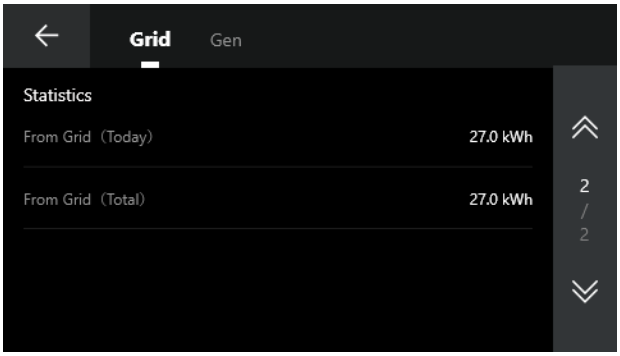
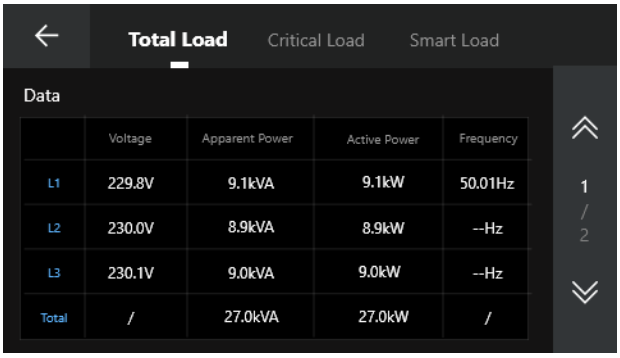
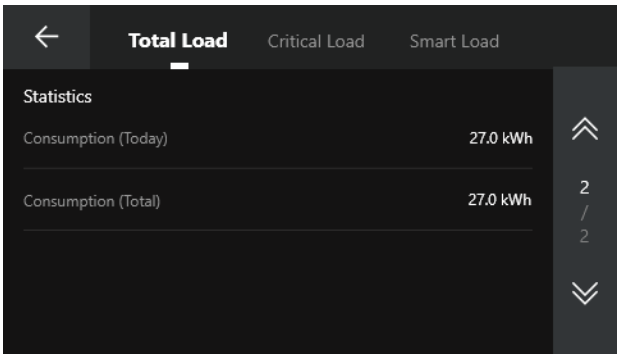
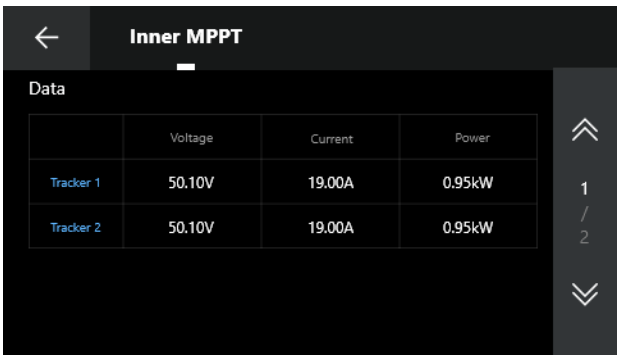
4.5.3 Operation details page

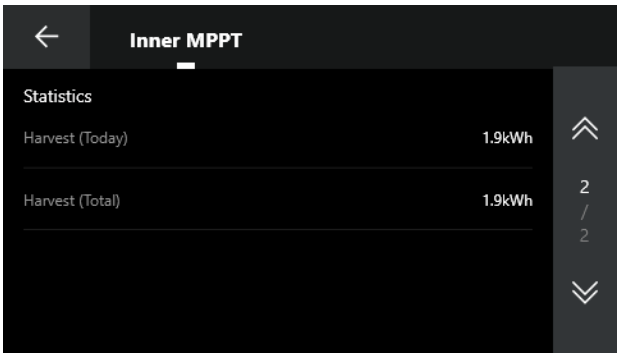
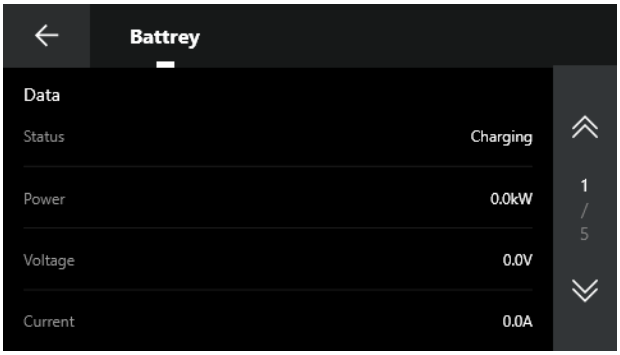
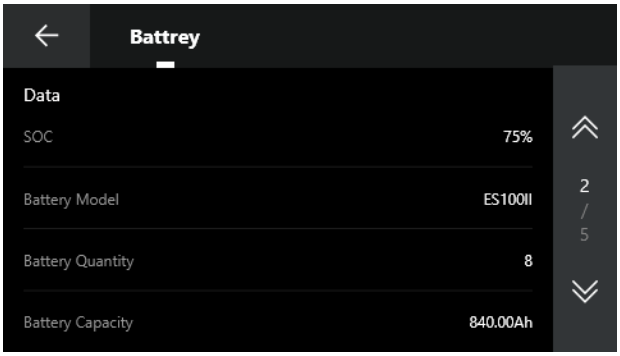
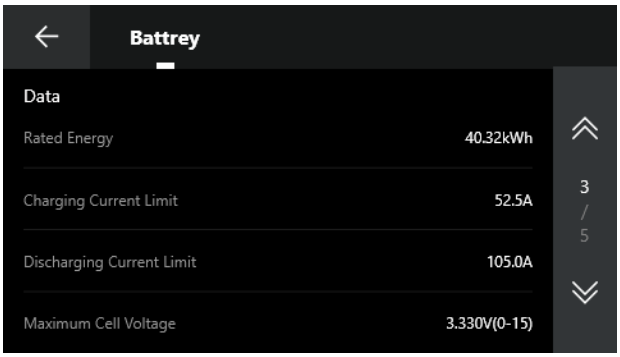


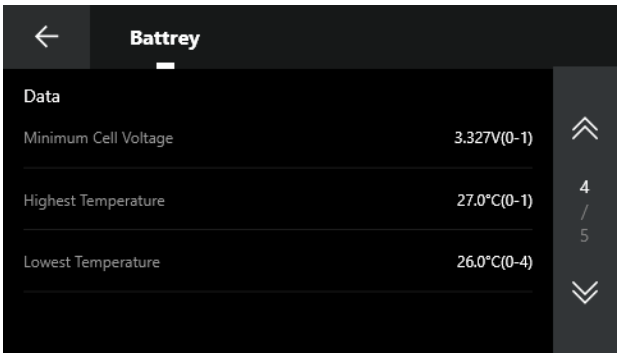
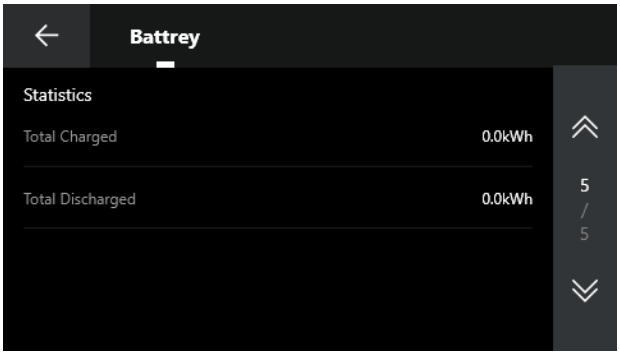
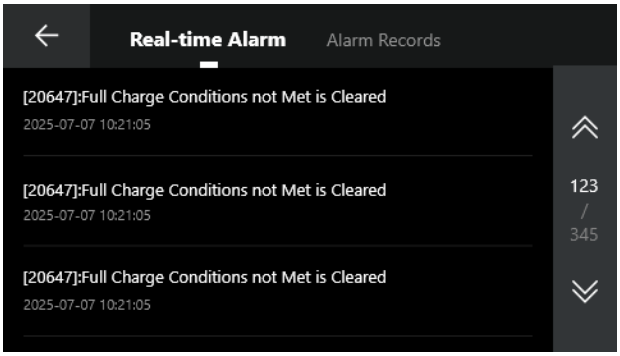




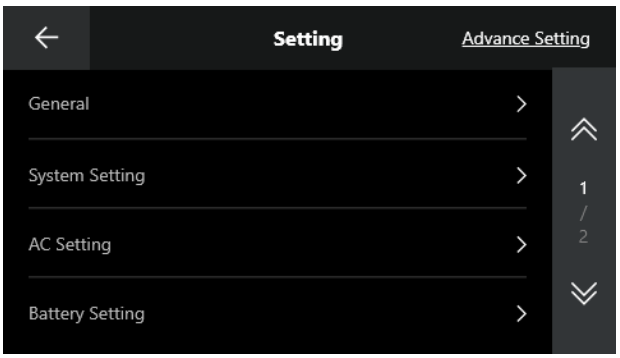
PCS System Detailed Info: 3 pages in total
The upper right corner displays the current operating status of the system:
ON indicates that the system is in normal operating status.
OFF indicates that the system is in standby status.
Invert Data: Real-time ACoutput Voltage, Current, Apparent Power, Active Power,Frequency at theLOAD port.
AC inData: Real-time ACin Voltage, Current, Apparent Power, Active Power,Frequencyat theGRID/GEN port.
Battery Data: Real-time the Power, Voltage, Currentat thebattery port.

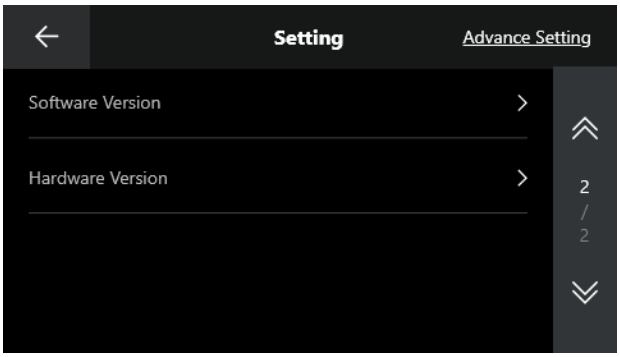
	AC input Detailed Info: Page 1/2 Real-time AC input Voltage,Current,Apparent Power, ActivePower, Frequency at the GRID/GEN port. **Grid:**GRID port input **Gen:** AC input of GEN port configured as generator.
	AC input Detailed Info: Page 2/2 The power consumption of the current day and the cumulative historical power consumption at the GRID/GEN port. **Grid:**GRID port input **Gen:** AC input of GEN port configured as generator.
	AC output Detailed Info: Page 1/2 Real-time AC Output Voltage,current,Apparent Power, Active Power, AC frequency at theLOAD/GEN port. **Total Load:**totaloutput load **Critical Load:**LOADportoutput Load **Smart Load:**Outputload of GEN port configured as Smart Load.
	AC output Detailed Info: Page 2/2 The power consumption of the current day and the cumulative historical power consumption at the LOAD/GENport. **Total Load:**totaloutput load **Critical Load:**LOAD Circuit output Load **Smart Load:** Output load of GEN circuit configured as Smart Load.
	Solar Panel Detailed Info：Page 1/2 Real-time voltage, current and power of each MPPT.

	Solar Panel Detailed Info：Page 2/2 The power consumption of the current day and the cumulative historical power consumption of the solar panel.
	Battery Detailed Info：Page 1/5 **Status:** The operating state of the Battery. **Power:** The real-time charging or discharging power of the battery pack at the current moment. **Voltage, Current:** The real-time terminal voltage and current of the battery pack.
	Battery Detailed Info：Page 2/5 **SOC:**Representing the percentage of the remaining capacity of the battery pack relative to its rated capacity. **Battery Model:** Currently used battery model **Battery Quantity:** The number of currently paralleled batteries **Battery Capacity:**The rated capacity of the battery pack.
	Battery Detailed Info：Page 3/5 **Rated Energy:**The rated energy of the battery pack. **Charging Current Limit:**The maximum allowable charging current of the battery pack. **Discharging Current Limit:**The maximum allowable discharging current of the battery pack. **Maximum Cell Voltage:**The highest real-time voltage among all the battery cells in the battery pack.

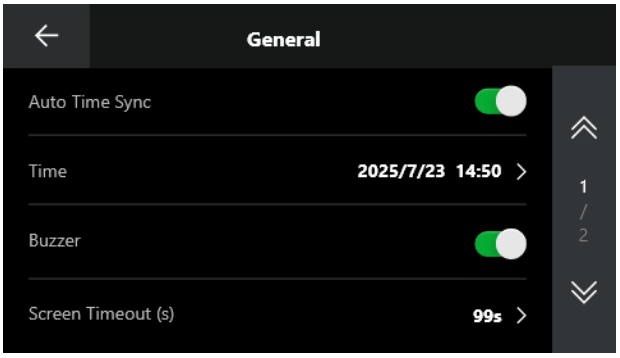
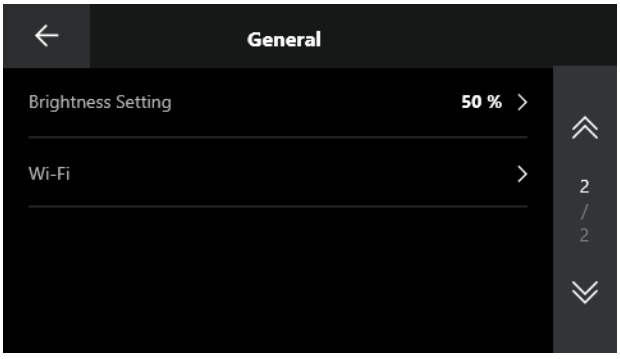
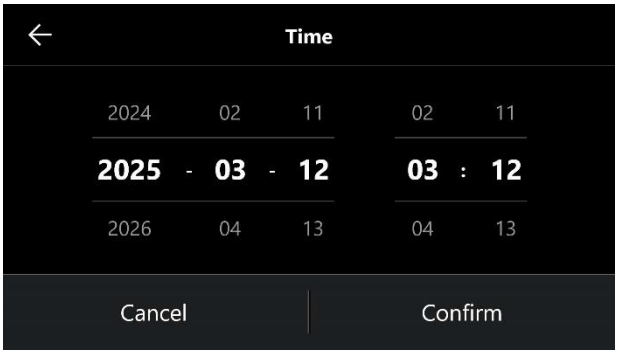
	Battery Detailed Info：Page 4/5 **Minimum Cell Voltage:**The lowest real-time voltage among all the battery cells in the battery pack. **Highest Temperature:**The highest real-time temperature detected at the battery pack. **Lowest Temperature:** The lowest real-time temperature detected at the battery pack.
	Battery Detailed Info：Page 5/5 **Total Charged:** The total amount of electrical energy that has been charged into the battery pack. **Total Discharged:**The total amount of electrical energy that has been discharged from the battery pack.
	Click the options above to switch between Real-time Alarm and Alarm Records.

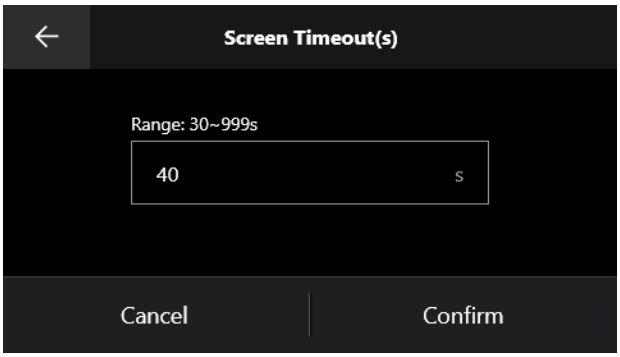
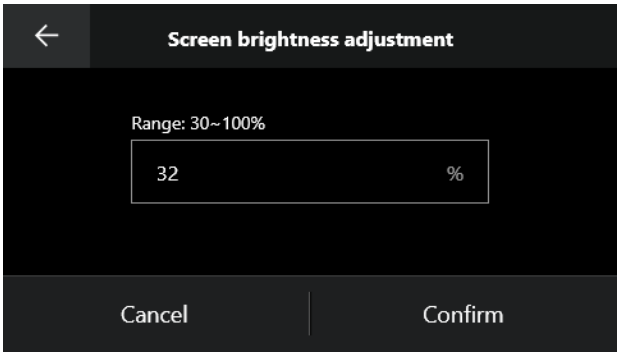
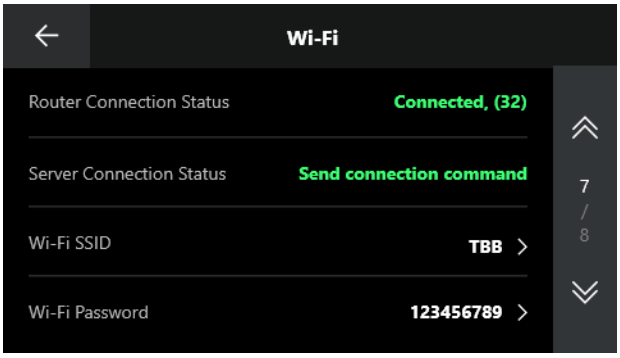
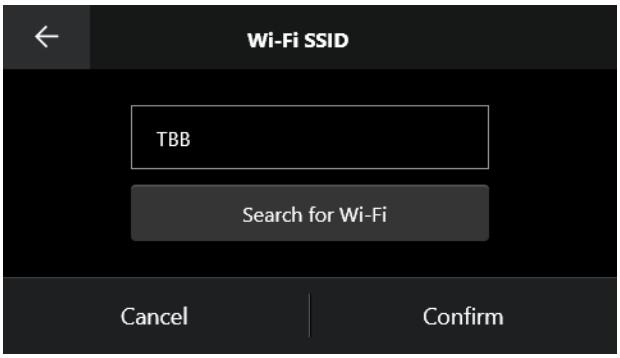
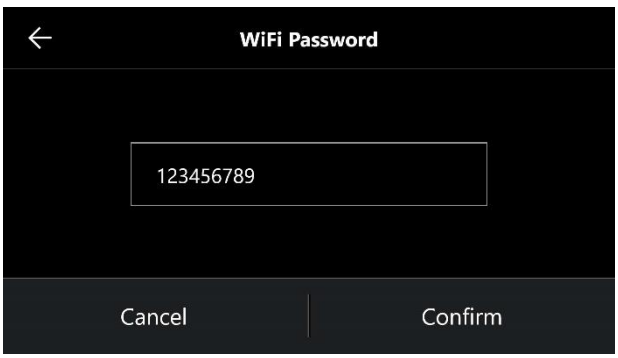
4.5.4 Setting Menu

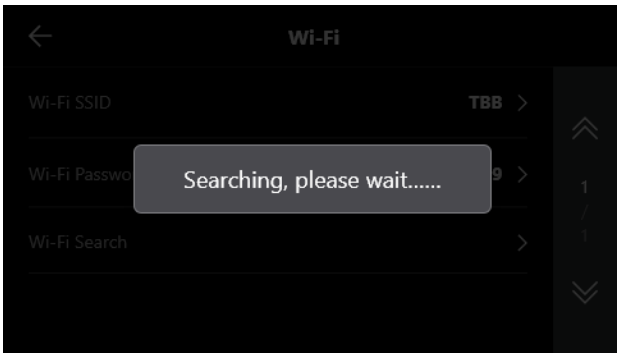
	This is Setting Menu, including six items: General Setting,SystemSetting,AC Setting, Battery Setting, Version, Advanced Setting.

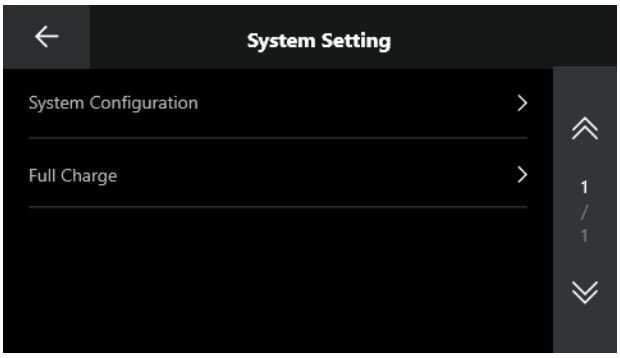
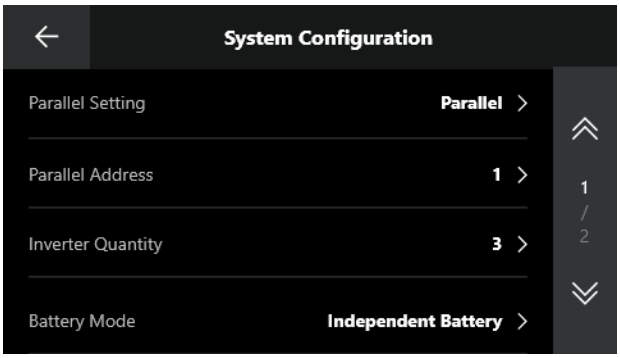
4.5.4.1 General Setting

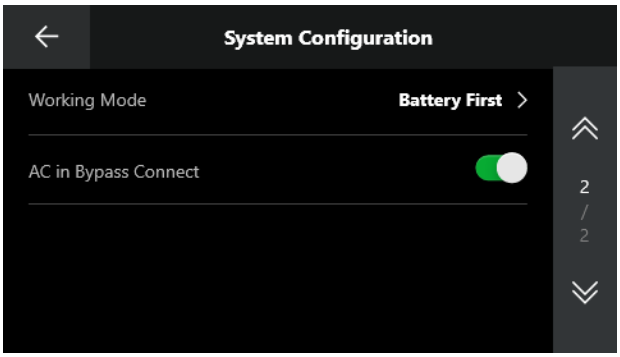
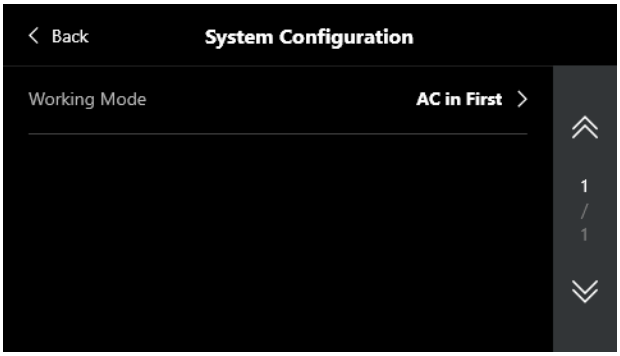
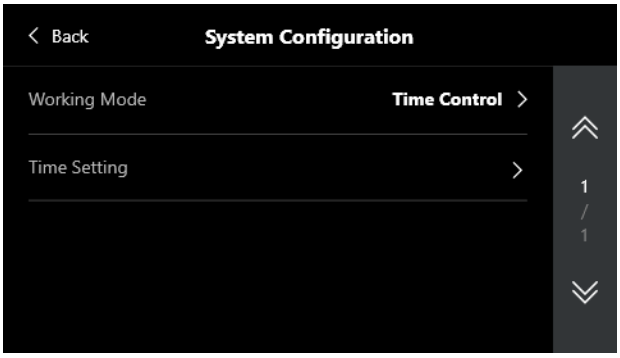
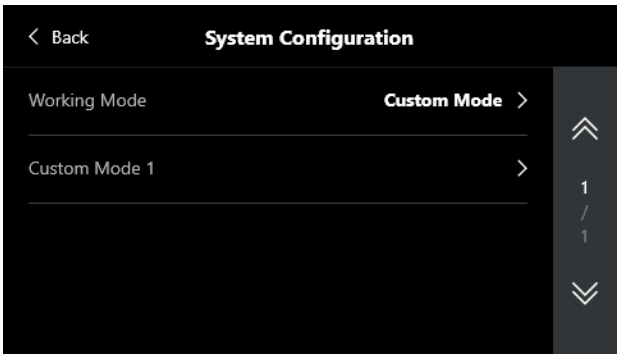
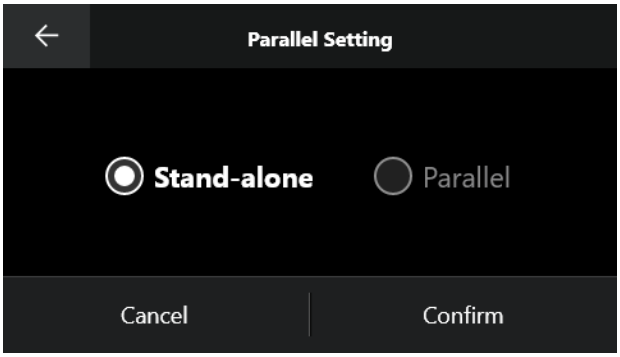
	This is General Setting page 1/2. **Auto Time Sync:** When this function is enabled, the inverter will perform an automatic time calibration with the NOVA Monitoring Platform once per day. **Time:** To set the local day and time for the inverter. **Buzzer:** Whether or not enable the buzzer to sound during the faulty occurring. **Screen Timeout(s):**If no operation is detected on the LCD screen, it will automatically dim aft er the configured time.
	This is General Setting page 2/2. **Brightness Setting:** Set screen brightness as a percentage. **Wi-Fi:** Used to configure the Wi-Fi network connection of the device, enabling wireless co mmunication between the device and mobile te rminals or monitoring platforms.
	Swiping up and down on the screen can chang e the selected number to set the current time a nd date. Then click Confirm to finalize and apply the changes.

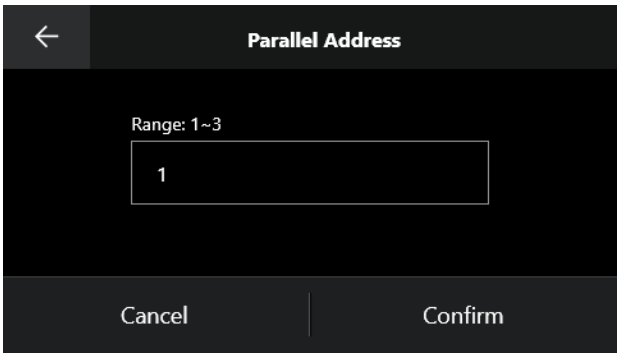
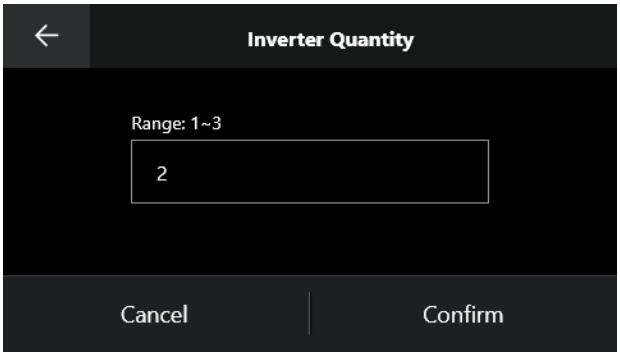
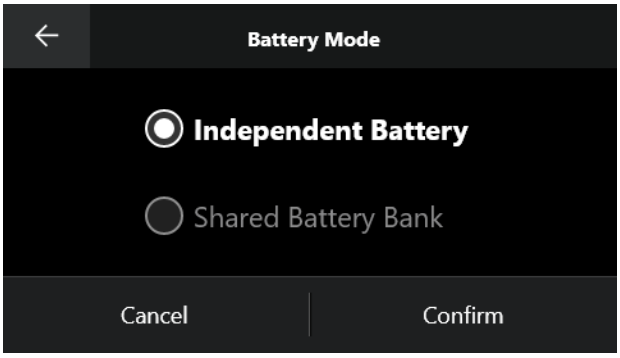
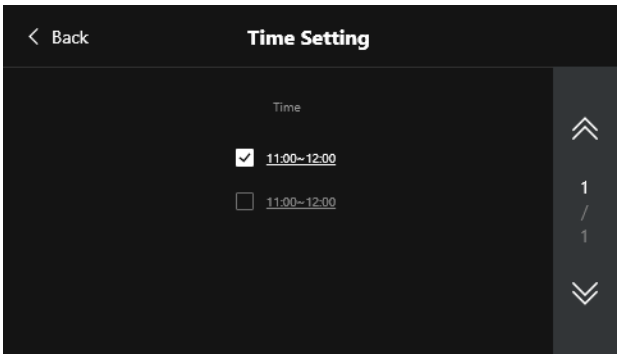
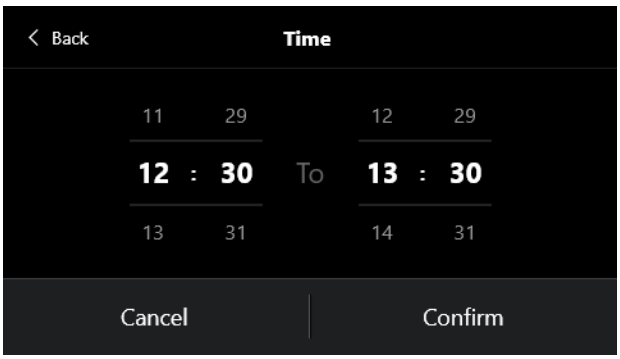
	Adjust the time values numerically. Then click Confirm to finalize and apply the changes.
	Set screen brightness as a percentage.
	This is Wi-Fi Setting page. **Wi-Fi SSID:** Customize the local Wi-Fi network name. **Wi-Fi Password:** Customize the local Wi-Fi networkpassword.
	Tap the preset Wi-Fi name to edit. Search for Wi-Fi: Tap to scan and list available nearby Wi-Fi networks. Then click Confirm to finalize and apply the changes.
	Adjust the password values numerically. Then click Confirm to finalize and apply the changes.

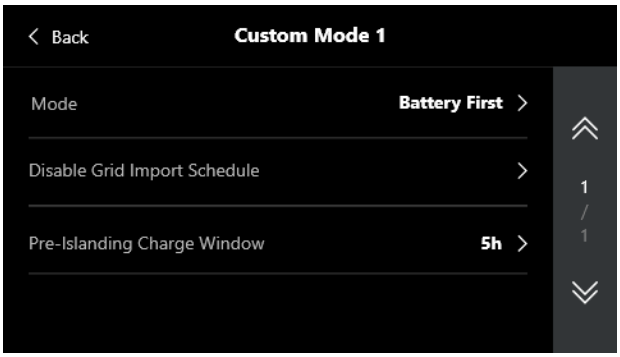
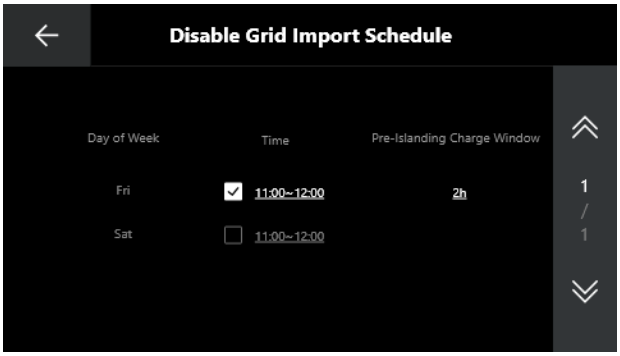
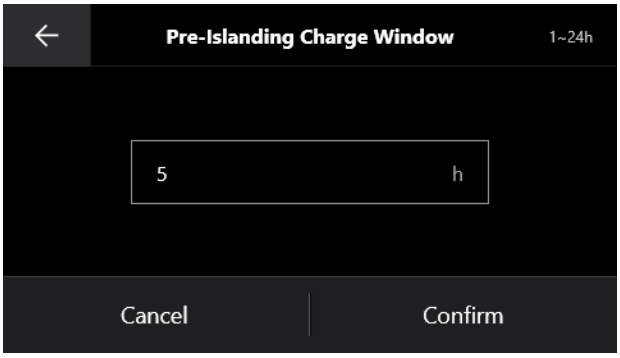
	Searching for Wi-Fi networks, please wait...
	Click to select and confirm the Wi-Fi network for connection.

4.5.4.2 System Setting

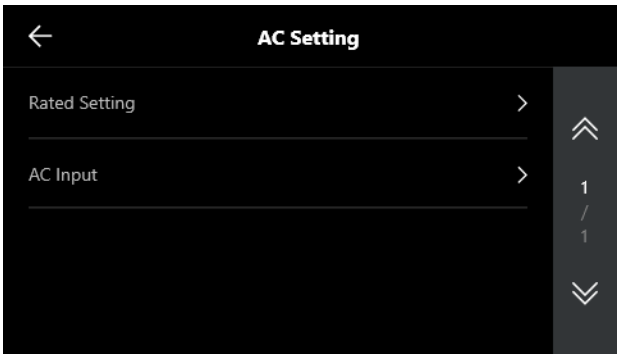
	This is System Setting page.
	This is System Configuration page 1/ 2. **Parallel Setting:**Configure the system to operate in Stand-alone mode or Parallel mode. **Parallel Address:**Set the Parallel Address of the current inverter. **Inverter Quantity:**Set the number of inverters in the system. **Battery Mode:**Configure whether eachinverter in the current parallel system is equipped with an independent battery pack.

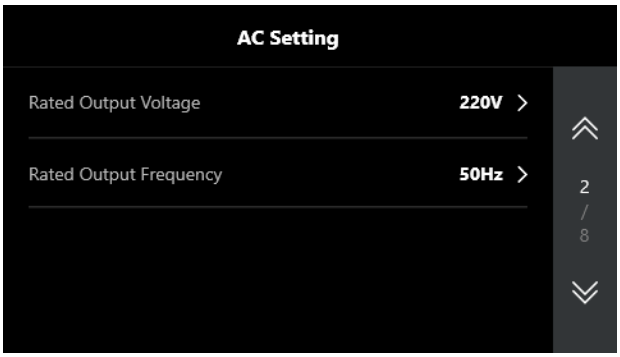
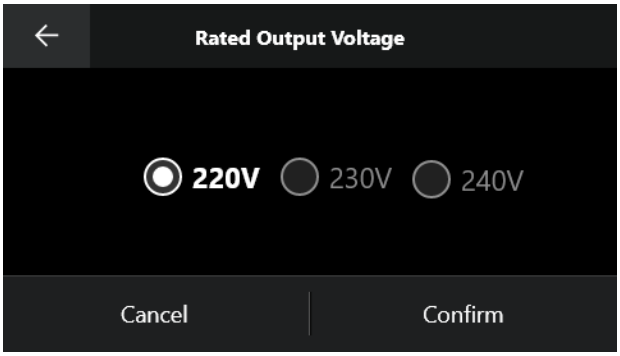
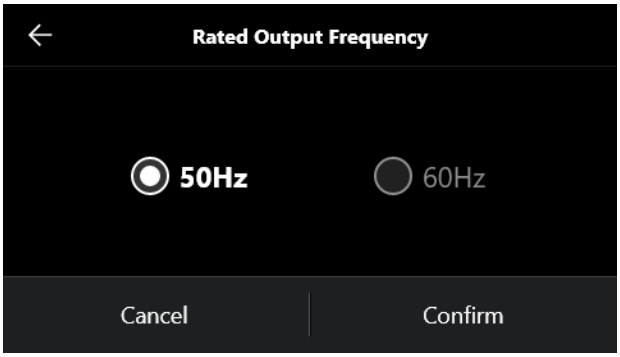
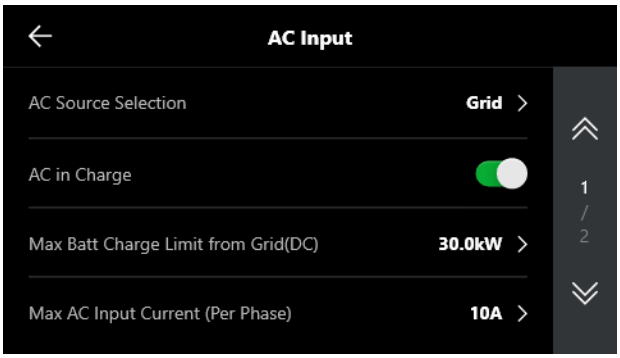
	**Working Mode:**Set the inverter's WorkingModetoBattery First, AC in First, Time Control or Custom Mode. **Battery First:**The load prioritizes power supply from the battery. **AC in Bypass Connect:**Set whether the grid is in bypass connection status when the Working Mode is set to Battery First and the grid is normal.
	**AC inFirst:**The load prioritizes power supply from the Grid.
	**Time Control:**Set the time period for the AC In First mode, with the Battery First mode applied during all other time periods. **Time Setting:**Set the time period for the AC In First mode.
	**Custom Mode1:**Click to enter detailed settings.
	**Stand-alone:** Enable this function whenrunning as astand-alone application. **Parallel:**Enable this function whenseveral samemodelhybrid inverters areconnectingin pa rallel. Then click Confirm to finalize and apply the changes.

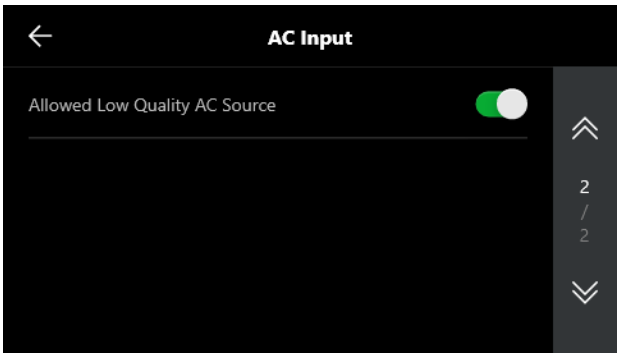
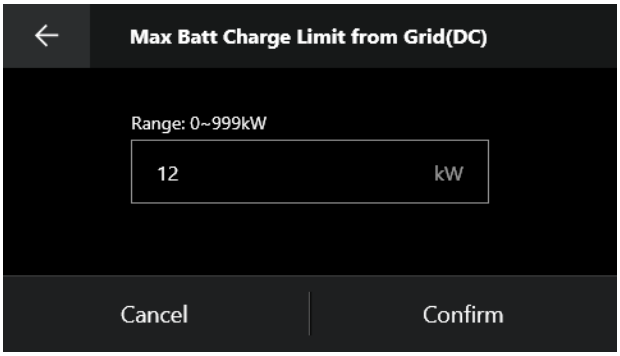
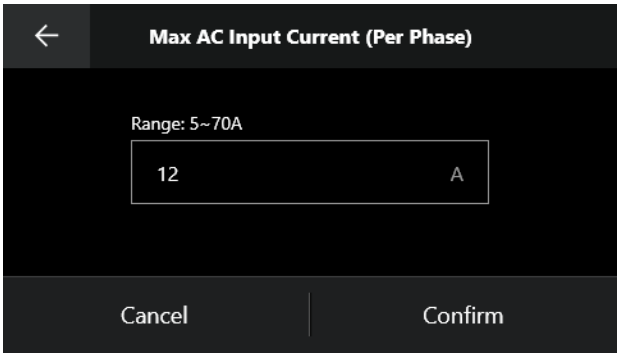
	Adjust the address values numerically.Set the master device address to 1. Assign sequential and unique numerical IDs (e.g., 2, 3) to all slave devices. Then click Confirm to finalize and apply the changes.
	Adjust the quantity values numericallyaccordin g to the total number of actually installed devices. Then click Confirm to finalize and apply the changes.
	**Independent Battery:**In the parallel operation system, the battery pack of each inverter is configured as an independent unit. **Shared Battery Bank:**In the parallel operation system, all inverters are connected to and share a single battery pack.
	Click the time to access the time period settings. Click the checkbox to tick it and activate the settings.
	Swiping up and down on the screen can chang e the selected number to set the current time a nd date. Then click Confirm to finalize and apply the changes.

	**Mode:** Set the inverter's WorkingModetoBattery First, AC in First. **Disable Grid Import Schedule:**Set the time period for grid absence. **Pre-Islanding Charge Window:**Set the pre-charging time for AC charging (charging the battery to 100% SOC) prior to grid absence.
	Click the time to access the time period settings. Click the checkbox to tick it and activate the settings.
	Adjust the time values numerically. Then click Confirm to finalize and apply the changes.

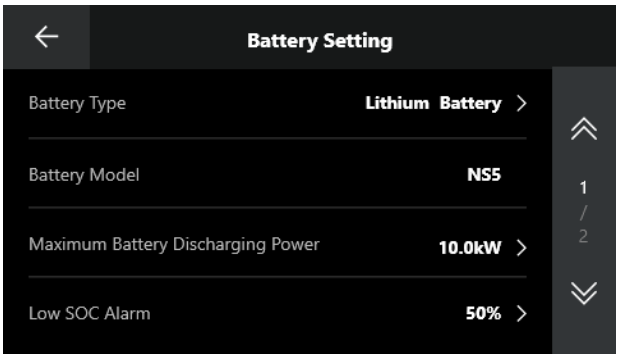
4.5.4.3 AC Setting

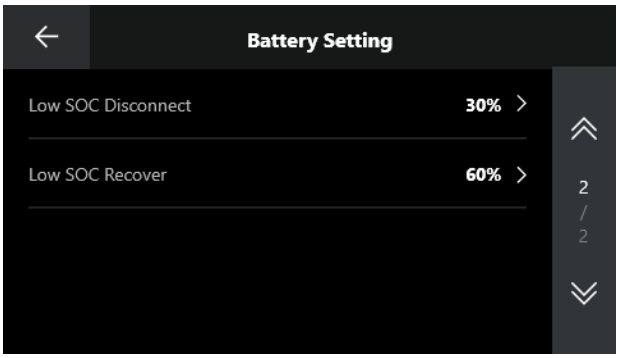
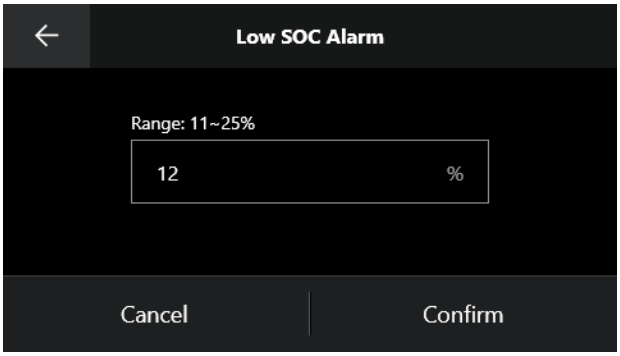
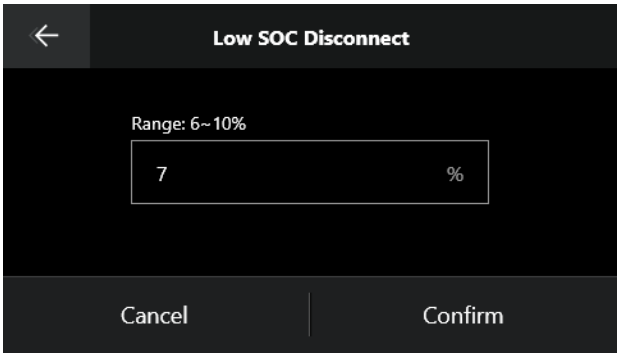
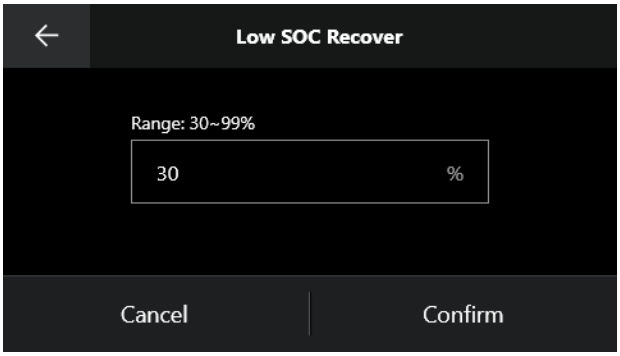
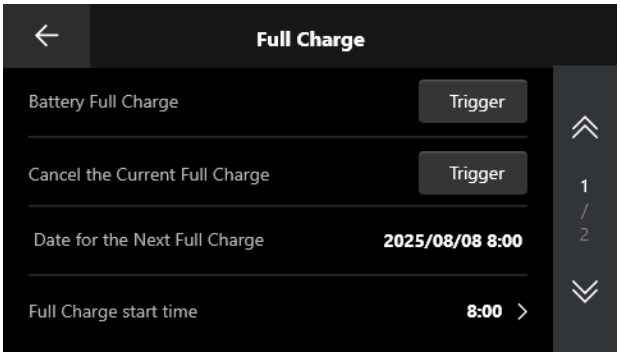
	This is AC Setting page.

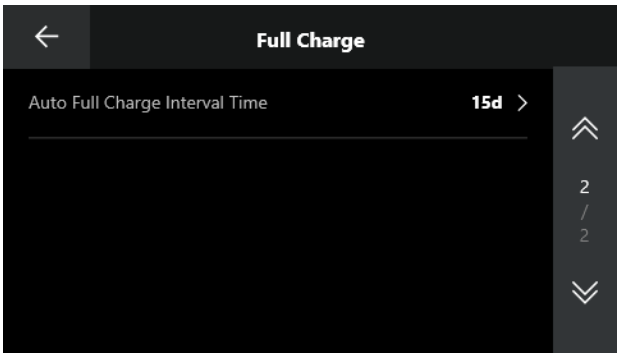
	This is AC Rated Setting page.
	Rated Output Voltage:To set the rated output voltage of the inverter. Availableoptions are 220V, 230V or 240V.
	Set according to the grid frequency in on-grid mode or frequency required by load in off-grid mode. Availableoptions are 50Hz/60Hz.
	This is AC Input Setting page 1/ 2. **AC Source Selection:**Set the GRID port to Grid or generator. **AC in Charge:**When this function is enabled, battery charging via the grid is allowed; otherwise, charging is only permitted via solar energy. **Max Batt Charge Limit from Grid (DC):** Set the maximum power for charging the battery from the grid. **Max AC Input Current (Per Phase):**Set the maximum input current of the grid.

	This is AC Input Setting page 2/ 2. **Allowed Low Quality AC Source:**Enabling this function allows for an ap propriateexpansion of the threshold value relat ed to the quality of the connected AC wavefor m.
	Adjust the grid charging power limit numerically. Then click Confirm to finalize and apply the changes.
	Adjust the grid input Current limitnumerically. Then click Confirm to finalize and apply the changes.

4.5.4.4 BatterySetting

	This is Battery Setting page. **Battery Type:** Set the battery type to Lithium Battery or NO Battery Mode. When NO Battery Mode is selected, the device will operate normally only if the AC input of the GRID port is functioning properly. **Battery Model:**This parameter is non-modifiable and will be automatically detected by the system once the battery communication cable is connected. **Maximum Battery Discharging Power:** Set the maximum discharge power of the battery. **Low SOC Alarm:** Set the low SOC Alarm value of the battery.

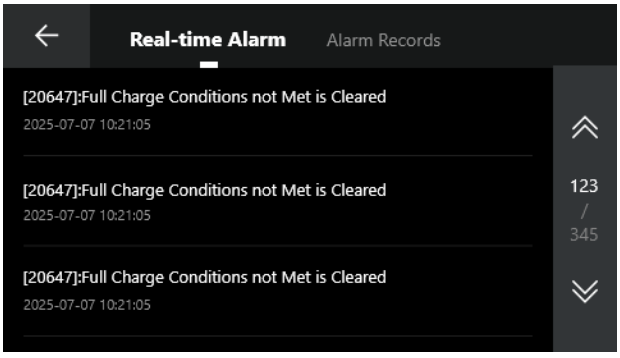
	**Low SOC Disconnect:** Set the low SOC protection value of the battery. **Low SOC Recover:**Set the SOC at which battery charging stops.
	The inverter will trigger an alarm when its associated battery's SOCfalls below the preset threshold. With Working Mode set to Battery First and the grid operating within normal parameters, the battery will cease output, and the inverter will initiate grid-supplied charging once the battery's SOCfalls below the preset threshold. Then click Confirm to finalize and apply the changes.
	The battery will cease output once its SOCfalls below the preset value. Then click Confirm to finalize and apply the changes.
	Once the battery's SOCreaches the preset threshold, the inverter will deactivate the low battery voltage alarm. With Working Mode configured as Battery First, the grid will cease charging the battery automatically when the SOC reaches the preset threshold.
	**Battery Full Charge:** With Working Mode configured as Battery First,after clicking the "Trigger" button, if the grid is operating within normal parameters, the grid will immediately start charging the battery. This process will continue until the battery's SOC reaches 100% or the charging process is manually cancelled. **Cancel the Current Full Charge:** Upon clicking the "Trigger" button, the current Full

	Charge will be cancelled immediately. **Date for the Next Full Charge:**The start date of the next Full Charge.Upon clicking the "Battery Full Charge" button, the target date will be updated to the sum of the current charging cycle's end time and the preset Auto Full Charge Interval Time. **Full Charge start time:**Specific start time for the Next Full Charge. **For example:** "Date for the Next Full Charge"is set to 2025/08/08 00:00 and "Full Charge Start time" is set to 8H, the exact start time of the next Full Chargewill be 2025/08/08 08:00. **Auto Full Charge Interval Time:**With Working Mode configured as Battery First,intervalbetween automatic activationsof the "Battery Full Charge" Function.

4.5.4.5 Version

	This is Version page. Display the device's software version, hardwar e version, and serial number (SN)/

4.5.5 Alarm Information

	This is Alarm Information page. Click the toggle button above to switch between Real-time Alarm and Alarm Records.

4.6 ConfigureINGEThroughUpper computer& NOVA Monitoring Platform

Connect the INGE to a computer via the TBB Interface module, DTU-4G,and

configure INGE’s parameters on the TBBLinking II.

The NOVA Monitoring Platform, which includes both an APP and a WEB, comes with the following functions:

1、Monitor the complete operating information of the system and its components (including inverters, batteries, MPPT controllers, PV inverters, generators, loads, etc.), and implement data statistics as well as comprehensive fault logging functions.

2、Remotely adjust all system settings, including all inverter parameters and customized battery configurations (such as LED indicator on/off settings).

For details, please refer to the relevant application manual.

5. Mode

Mode Ⅰ:Zero export to Load

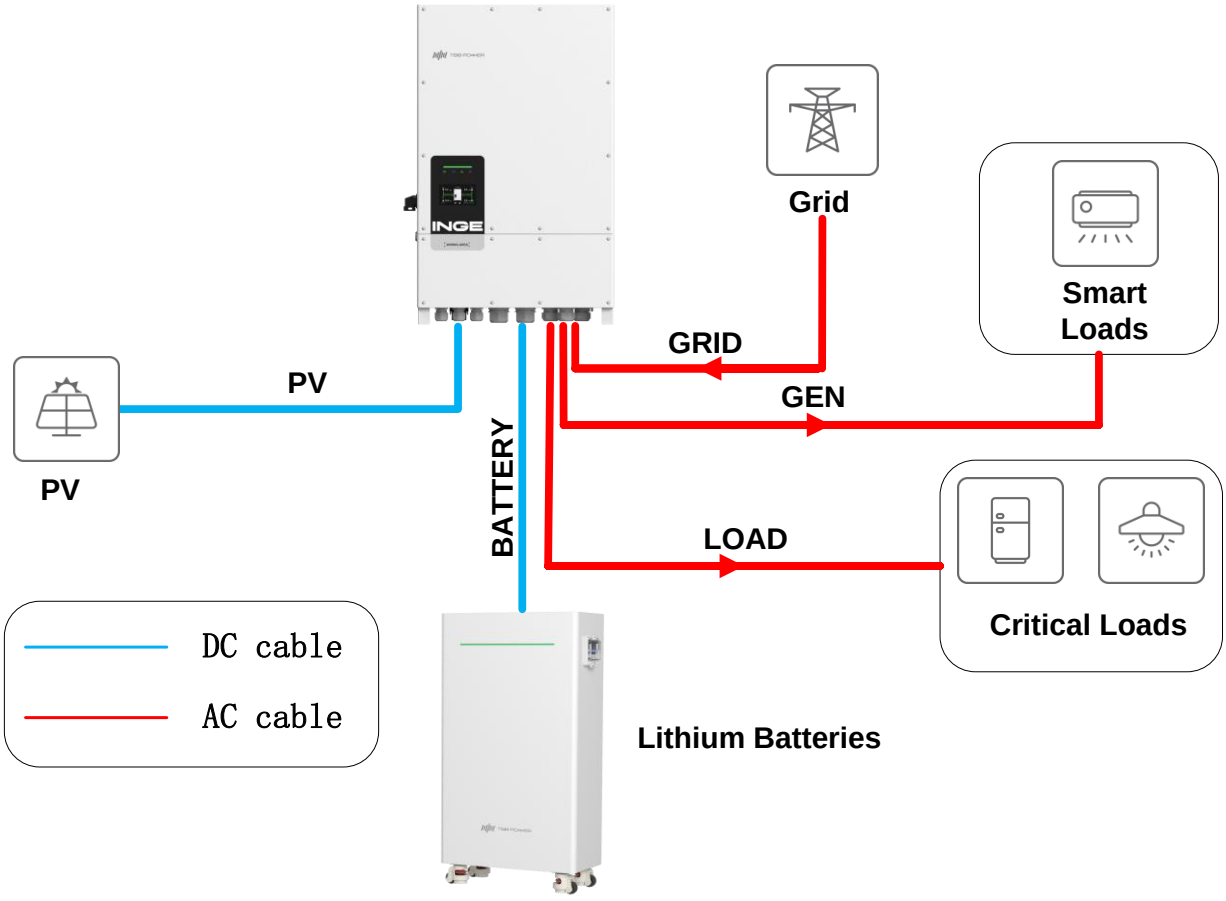


Figure 5-1

Mode Ⅱ:Off-Grid

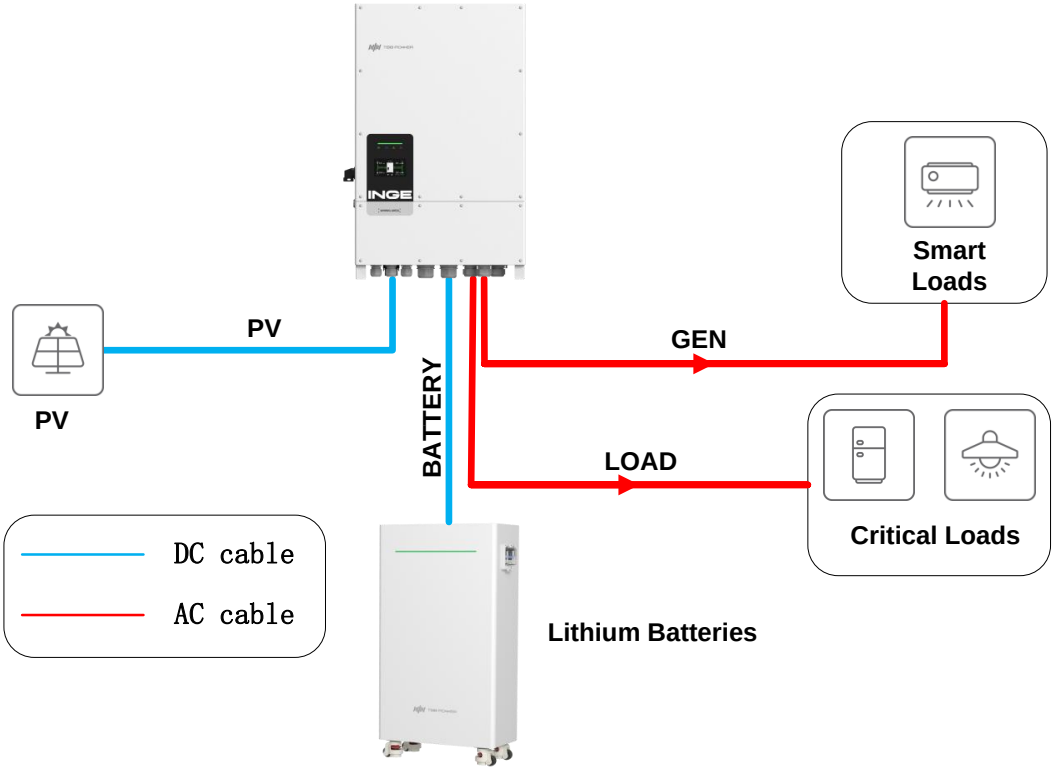


Figure 5-2

Mode Ⅲ: Off-Grid with Generator

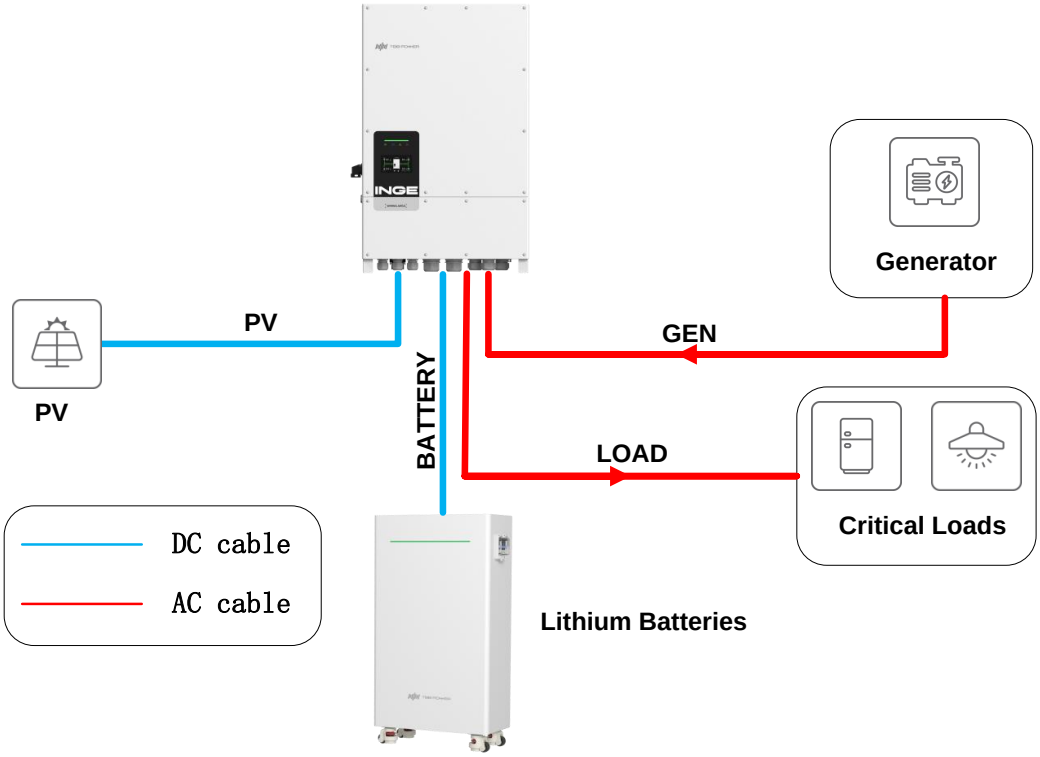


Figure 5-3

6. FAQ

Fault and alarm information is available on the LCD screen, TBBLink-II, NOVA Web and APP.

6.1 Fault Event

Serial No.	Fault Event	Solutions
1	Bus Over Voltage Protection	1.Please wait for a while and check whether it is normal; 2.When the loads of the positive and negative half - waves of the GRID port or GEN portdiffer significantly, this protection may be triggered; 3.Restart the system 2~3 times. 4. If the problem persists, please contact the after-sales service.
2	Bus Under Voltage Protection	
3	Bus Unbalance Protection	
4	Balancer Overcurrent Protection	
5	Battery Over Voltage Protection	Check whether battery is well connected and whether there is any other connected charger that causes the battery overvoltage.
6	Battery Low Voltage Protection	Check whether battery is well connected or the Mode setting is correct.
7	PV Over Voltage Protection	Check PV input voltage and wiringconnection.
8	Output Shortcut Protection	1.Check whether the connected load is short circuited at the LOAD port or GEN port. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
9	Output Overload Protection	1.Check whether the total connected load of the LOAD port and GEN port is overloaded and reduce the connected load. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
10	Inverter Low Voltage Protection	1.Check whether the connected load is short circuited at the LOAD port. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
11	Inverter Software Overcurrent Protection	1.Check whether the connected load is short circuited or overloaded at the LOAD port or GEN port. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.

12	PV Input Over Current Protection	1.Check whether PV modules configuration exceeds the limit. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
13	PV Reverse Polarity Protection	1.Check the wiring of the PV input port. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
14	LLC Over Current Protection	1.Check whether the connected load is short circuited or overloaded at the LOAD port or GEN port. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
15	Heatsink Over Temperature Protection	Check whether the air vent of the inverter is clear and unobstructed; check whether the ambient temperature exceeds 45℃.
16	Internal Over Temperature Protection	
17	Transfer Relay Fail	1. Restart the system 2~3 times. 2. If the problem persists, please contact the after-sales service.
18	Inverter Leakage Current Abnormal	1.Check whether the cable connections of the PV modules are correct or if there is any damage, and clear the fault. 2. If the problem persists, please contact the after-sales service.
19	EEPROM Abnormal	1. Restart the system 2~3 times. 2. If the problem persists, please contact the after-sales service.
20	Hardware Sampling Abnormal	
21	Hardware PSU Fault	
22	Insulation Impedance Abnormal Protection	
23	Software Operation Timeout Protection	
24	LLC Soft-Start Error	
25	Cell or Module Over Voltage Protection	1.Check whether there is any other connected charger that causes the battery overvoltage. 2.Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
26	Cell or Module Under Voltage Protection	1.Check whether the fault is cleared after charging the battery via grid connection or PV input. 2. Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.

27	Low SOC Protection	Check whether the fault is cleared after charging the battery via grid connection or PV input.
28	Cell or Module Over Temperature Protection	1.Check whether the ambient temperature exceeds the operating temperature range of the lithium battery. 2. Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
29	Cell or Module Under Temperature Protection	
30	BMS Discharging Over Current Protection	Check whether the battery current of the inverter system exceeds the maximum discharge current of the lithium battery.
31	BMS Charging Over Current Protection	Check whether there are any other chargers charging the battery (which could lead to over current) besides the system connected to the lithium battery BMS.
32	BMS Internal Abnormal	1. Restart the system 2~3 times. 2. If the problem persists, please contact the after-sales service.
33	BMS External Over Voltage Protection	Check whether battery is well connected and whether there is any other connected charger that causes the battery overvoltage.
34	BMS Over Temperature Protection	1.Check whether the ambient temperature exceeds the operating temperature range of the lithium battery. 2. Restart the system 2~3 times. 3. If the problem persists, please contact the after-sales service.
35	BMS Communication Fail	Check whether the communication cable between the inverter and the battery is securely connected.

6.2 WarningEvent

1	Battery Low Voltage Alarm	Check the battery voltage.
2	Output Overload Alarm	Reduce the connected load at the LOAD port and the GEN port.
3	Parallel Communication Abnormal	1.Check the connection of the parallel communication cable. 2.Check the parallel parameter settings
4	Parallel Address Conflict Alarm	Check the parallel parameter settings or trigger the Parameter Sync on the slave unit.

5	Parameter Mismatch Alarm	
6	Synchronization Timeout Alarm	
7	Incorrect Mode Setting	1.Check the mode settings related to the GEN port. 2.Check the mode settings related to the battery. 3. Restart the system. 4. If the problem persists, please contact the after-sales service.
8	parallel output circuit abnormal	Check whether the LOAD port of each inverter is well connected in parallel.
9	Outward Fan Abnormal Alarm	1.Check whether the connection points of the inverter's external fans are functioning properly. 2. Restart the system. 3. If the problem persists, please contact the after-sales service.
10	Communication with iEMS Abnormal	1. Restart the system 2~3 times. 2. If the problem persists, please contact the after-sales service.
11	Heatsink Over Temperature Alarm	1.Check whether the air vent of the inverter is clear and unobstructed; check whether the ambient temperature exceeds 45℃. 2.Reduce the connected load at the LOAD port and the GEN port.
12	Heatsink Temperature Sensor Fail Alarm	1. Restart the system 2~3 times. 2. If the problem persists, please contact the after-sales service.
13	Controller Board Temperature Sensor Fail Alarm	1. Restart the system 2~3 times. 2. If the problem persists, please contact the after-sales service.
14	EEPROM Repeated Write Abnormal	1. Restart the system 2~3 times. 2. If the problem persists, please contact the after-sales service.
15	AC Precharge Abnormal	1.Check the input source of the GRIDport and the wiring connection. 2. Reconnect the grid. 3.If the problem persists, please contact the after-sales service.
16	Grid High Voltage Alarm	Check the input source of the GRIDport and the wiringconnection.

17	Grid Low Voltage Alarm	
18	Grid High Frequency Alarm	
19	Grid Low Frequency Alarm	
20	Grid Phase Rotation	
21	GENHigh Voltage Alarm	Check the input source of the GRIDport and the wiringconnection.
22	GENLow Voltage Alarm	
23	GENHigh Frequency Alarm	
24	GEN Low Frequency Alarm	
25	GEN Phase Rotation	
26	Cell or Module High Voltage Alarm	1.Check whether there is any other connected charger that causes the battery overvoltage. 2. Check whether the battery configuration is normal. 3. If the problem persists, please contact the after-sales service.
27	Cell or Module Low Voltage Alarm	1.Check whether the fault is cleared after charging the battery via grid connection or PV input. 2. Check whether the battery configuration is normal. 3. If the problem persists, please contact the after-sales service.
28	Cell or Module High Temperature Alarm	1.Check whether the ambient temperature exceeds the operating temperature range of the lithium battery. 2.Reduce the charging anddischarging currents of the inverter system. 3. If the problem persists, please contact the after-sales service.
29	Cell or Module Low Temperature Alarm	1.Check whether the ambient temperature exceeds the operating temperature range of the lithium battery.

		2. If the problem persists, please contact the after-sales service.
30	BMS Discharging High Current Alarm	Check whether the battery current of the inverter system exceeds the maximum discharge current of the lithium battery.
31	BMS Charging High Current Alarm	Check whether there are any other chargers charging the battery (which could lead to over current) besides the system connected to the lithium battery BMS.
32	BMS Internal Communication Fail	1.Restart the lithium battery 2~3 times. 2. If the problem persists, please contact the after-sales service.
33	Low SOC Alarm	Check whether the fault is cleared after charging the battery via grid connection or PV input.
34	High Temperature Alarm	1.Check whether the ambient temperature exceeds the operating temperature range of the lithium battery. 2.Reduce the charging and discharging currents of the inverter system. 3. If the problem persists, please contact the after-sales service.

7. Specification

Model	INGE T20
Grid Input	
Power Assist	Yes
Nominal AC Voltage and Frequency	3L+N+PE,Three phase,220/380Vac,230/400Vac,240/415Vac,50/60Hz
AC Voltage and Frequency Range	-20%~+20% or according to grid code standard, 50Hz+/-5Hz:60Hz:+/-5Hz
Nominal AC Current	70A
GEN	
Power Assist	Yes
Nominal AC Voltage and Frequency	3L+N+PE,Three phase,220/380Vac,230/400Vac,240/415Vac,50/60Hz
AC Voltage and Frequency Range	-20%~+20%, 40Hz~70Hz
Nominal AC Current	70A
Inverter	
Nominal AC Voltage and Frequency	3L+N+PE,Three phase,230/400Vac+1-2%;50/60Hz+/-0.1%
Harmonic Distortion	Linear load<2%, Non-linear load <5%
Nominal Output Power	20000W
Max. AC Output Power	22000VA
Peak Power (off-grid)	2 times of rated power
Nominal AC Output Current	30.3A
Power Factor Adjustment Range	0.8 leading to 0.8 lagging
Maximum Efficiency	97.6%
Battery	
DC Voltage Range	42V~60V
Battery Modules Types	Lithium battery (Self adaption to BMS)
Max. Charging / Discharging Current	400A / 400A
Solar	
Max. PV Input Power	30000W
Max. PV Input Voltage	800V
MPPT Voltage Range / Start-up Voltage	120V~750V / 130V
Max. PV Input Current / Max. Short Current	36A+36A / 45A+45A
MPPT Number / No. Strings Per MPPT Tracker	2 /2+2
General	
Backup	UPS
Transfer Time	4ms
Protection	a) output short circuit, b) overload, c) battery voltage too high, d) DC Type II Surge Protection, e) AC Type II Surge Protection
CAN Bus Communication Port	For parallel operation
General Purpose Communication Port	RS485, CAN
Monitor Mode	BLE, Wi-Fi,4G(optional)
Display	LED+ touch LCD screen
Operating Temperature Range &Relative Humidity	-40℃~+65℃, >45℃ de-rating; 95% without condensation
Altitude	4000m
Dimension (W*H*D)	505mm*775mm*298mm (Excluding connectors and brackets)
Weight	70kg
Cooling	Smart Cooling
IP Protection	IP65 (Outdoor)
Safety & EMC	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2 EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12

TBB POWER

TBB POWER (XIAMEN) CO., LTD

sales@tbbpower.com
+86-592-5796068
www.tbbpower.com

Visit official website for more information.