



Alpha·ESS
your smart energy

User Manual

Energy Storage System (ESS)

SMILE5 (AU)



V03

IMPRINT

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Step. 25th 2019

Copyright Statement

This manual is under the copyright of Alpha ESS Co., Ltd. with all rights reserved. Please keep the manual properly and operate in strict accordance with all safety and operating instructions in this manual. Please do not operate the system before reading through the manual.

Version Information

Version	Date	Content
V1.6	02022018	Notes are added for better overview purposes. RJ45 connecting diagram was updated.
V1.7	06032018	Figures changed after firmware version update. Figures and installation steps changed after new pre-wired cable configuration in CB.
V1.72	14052018	Package parts list modified. Power definition modified. ADL3000 3-phase connection added.
V1.74	22092018	Daily maintenance content added, installation environment requirements and parameters in DS. EMS display indication modified.
V1.76	05112018	Differentiation of outdoor and indoor versions.
V02	25092019	Off-grid application removed; two wirings in the inverter reduced; ACR meter connection added; color of the inverter display light modified; new version of the cover drawing added; Australian standard split machine wiring modified
V03	05062020	Added WiFi Instruction Meter connection diagram modified Added earthing requirements for battery in Australia Added datasheet and safty- region table

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1. Introduction

1.1 System Introduction

AlphaESS Storion-SMILE5 (incl. SMILE5-BAT and SMILE-INV) can be applied in DC-coupled systems (mostly new installation), AC-coupled systems (mostly retrofit) and Hybrid-coupled systems (mostly retrofit, and PV capacity-increase), as the following schemes show:

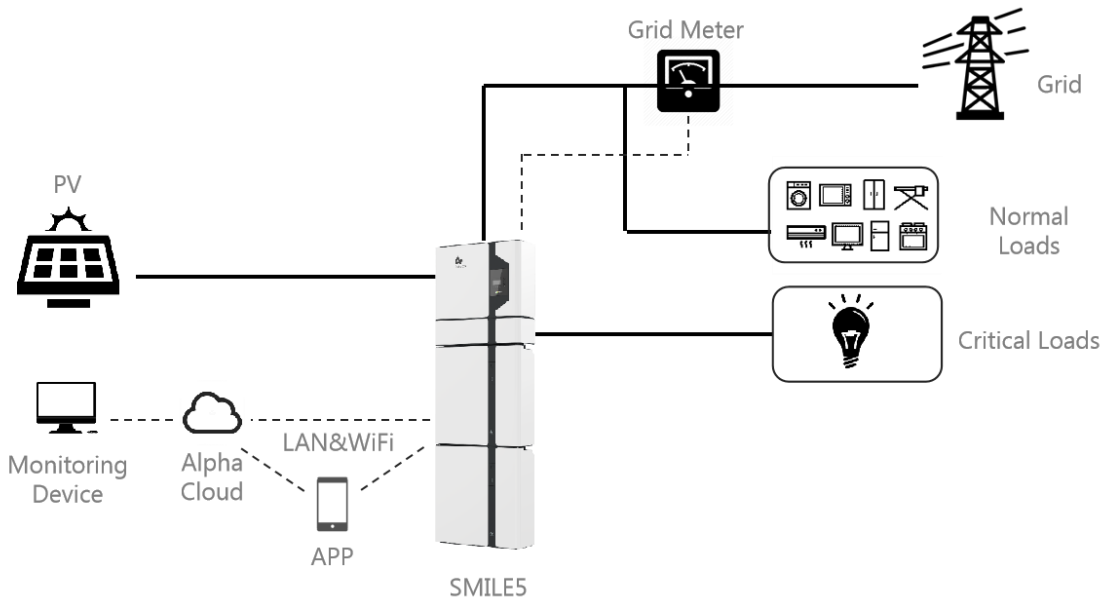


Figure 1 DC - Coupled Storage System – Scheme

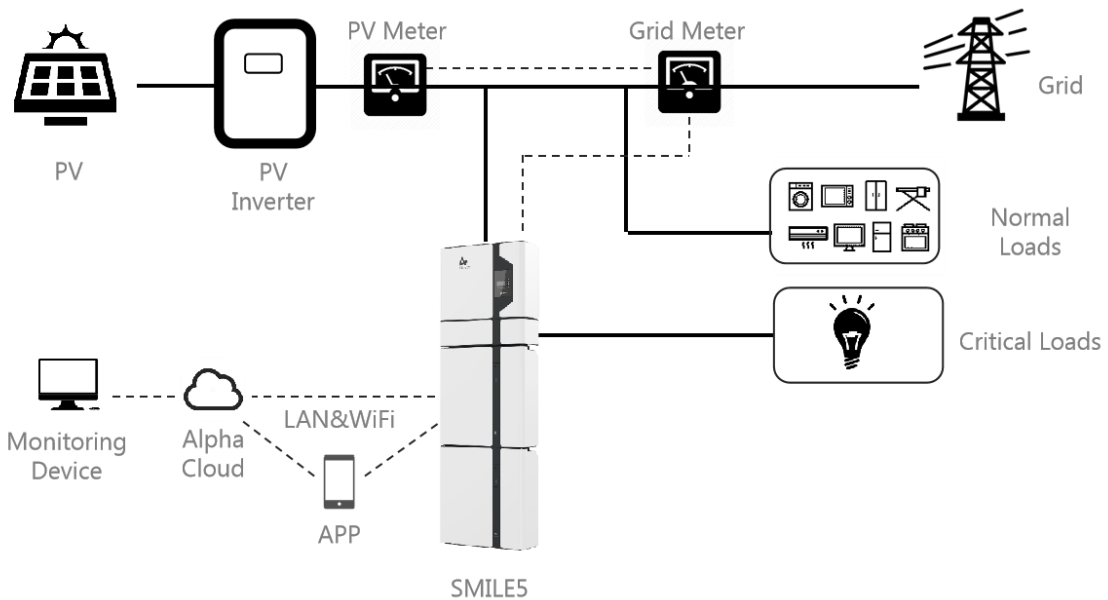


Figure 2 AC - Coupled Storage System – Scheme

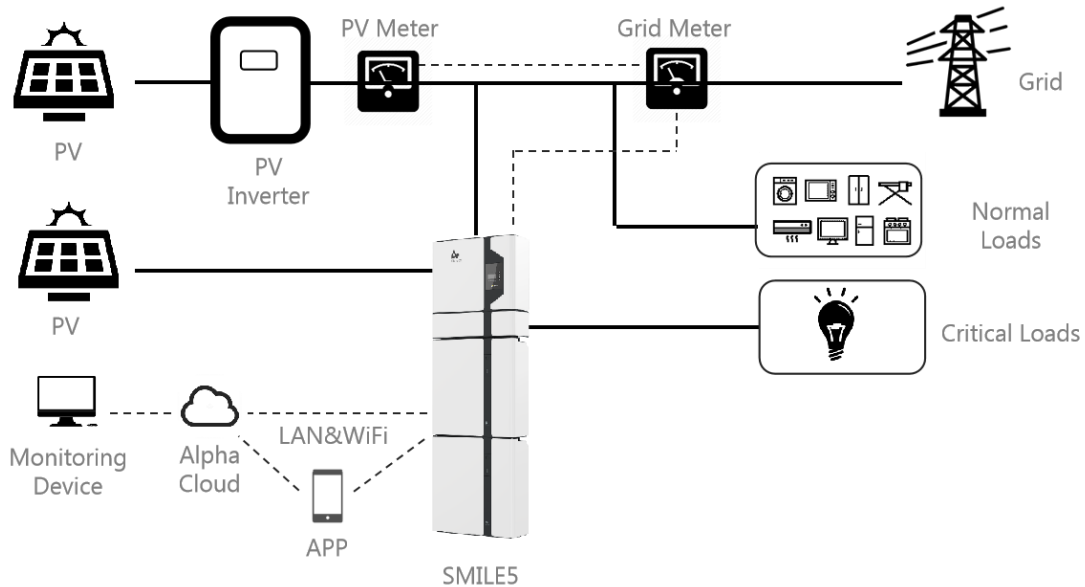


Figure 3 Hybrid - Coupled Storage System – Scheme

CAUTION:

For the AC-/ Hybrid-coupled system, unlike DC, two power meters are to be mounted.
SMILE5 cannot be used in pure off-grid systems!

1.2 Safety Introduction

1.2.1 Manual keeping

This manual contains important information about operating the system. Before operating, please read it very carefully.

The system should be operated in strict accordance with the description in the manual, otherwise it can cause damages or loss to equipment, personnel and property.

This manual should be kept carefully for maintenance and reparation.

1.2.2 Operator Requirements

The operators should get a professional qualification, or trained.






The operators should be familiar with the whole storage system, including compositions and working principles of the system.

The operators should be familiar with the Product Instruction.

While maintaining, the maintainer is not allowed to operate any equipment until all the equipment has been turned off and fully discharged.

1.2.3 Protection of Warning Sign

The warning signs contain important information for the system to operate safely, and it is strictly prohibited to torn or damage them. Ensure that the warning signs are always read-able and correct placed. The signs must be replaced immediately when damaged.

	This sign indicates a hazardous situation which, if not avoided, could result in death or serious injury!
	This sign shows danger of high voltage and electric shock!
	The Storion-SMILE5 must not be touched or put into service until 5 minutes after it has been switched off or disconnected to prevent an electric shock or injury.
	This sign shows danger of hot surface!
	Refer to the operating instructions.

1.2.4 Setting of Warning Sign for Safety

During instruction, maintenance and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident:

- Obvious signs should be placed at front switch and rear-level switch to prevent accidents caused by false switching.
- Warning signs or tapes should be set near operating areas.
- The system must be reinstalled after maintenance or operation.

1.2.5 Measuring Equipment

For ensuring the electrical parameters to match requirements, related measuring equipment are required when the system is being connected or tested.

Ensure that the connection and use matched specification to prevent electric arcs or shocks.

1.2.6 Moisture Protection

It is very likely that moisture may cause damages to the system.

Repair or maintaining activities in wet weather should be avoided or limited.

1.2.7 Operation After Power Failure

The battery system is part of the energy storage system and stores life-threatening high voltage even when the DC side is switched off. Touching the battery outlets is strictly prohibited. The inverter can keep a life-threatening voltage even after disconnecting it from the DC and / or AC side. Therefore, for safety reasons, it must be tested with a properly calibrated voltage tester before an installer works on the equipment.

1.3 Battery Safety Datasheet

1.3.1 Hazard Information

Classification of the hazardous chemical

Exempt from classification according to Australian WHS regulations.

Other hazards

This product is a Lithium Iron Phosphate Battery with certified compliance under the UN Recommendations on Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, sub-section 38.3. For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by misuse, the gas release vent will be operated. The battery cell case will be breached at the extreme. Hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

1.3.2 Safety Datasheet

For detailed information please refer to the provided battery safety datasheet.

1.4 General Precautions



Danger to life due to high voltages of the PV array, battery and electric shock.

When exposed to sunlight, the PV array generates dangerous DC voltage which will be present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the system under load, an electric arc may occur leading to electric shock and burns.

- Do not touch uninsulated cable ends.
- Do not touch the DC conductors.
- Do not open the inverter and battery.
- Do not wipe the system with damp cloth.
- Have the system installed and commissioned by qualified people with the appropriate skills only.
- Prior to performing any work on the inverter or the battery pack, disconnect the inverter from all voltage sources as described in this document.

 **WARNING**

Risk of chemical burns from electrolyte or toxic gases.

During standard operation, no electrolyte shall leak from the battery pack and no toxic gases shall form. Despite careful construction, if the Battery Pack is damaged or a fault occurs, it is possible that electrolyte may be leaked or toxic gases formed.

- Do not install the system in any environment of temperature below -10°C or over 50°C and in which humidity is over 85%.
- Do not touch the system with wet hands.
- Do not put any heavy objects on top of the system.
- Do not damage the system with sharp objects.
- Do not install or operate the system in potentially explosive atmospheres or areas of high humidity.
- Do not mount the inverter and the battery pack in areas containing highly flammable materials or gases.
- If moisture has penetrated the system (e.g. due to a damaged enclosure), do not install or operate the system.
- Do not move the system when it is already connected with battery modules.
- Secure the system to prevent tipping with restraining straps in your vehicle.
- The transportation of AlphaESS Storion-SMILE5 must be made by the manufacturer or an instructed personal. These instructions shall be recorded and repeated.
- A certified ABC fire extinguisher with minimum capacity of 2kg must be carried along when transporting.
- It is totally prohibited to smoke in the vehicle as well as close to the vehicle when loading and unloading.
- For the exchange of a battery module, please request for new hazardous goods packaging if needed, pack it and let it be picked up by the suppliers.
- In case of contact with electrolyte, rinse the affected areas immediately with water and consult a doctor without delay.

 **CAUTION:**

Risk of injury through lifting or dropping the system.

The inverter and battery are heavy. There is risk of injury if the inverter or battery is lifted incorrectly or dropped during transport or when attaching to or removing from the wall.

- Lifting and transporting the inverter and battery must be carried out by more than 2 people.

1.5 System Appearance

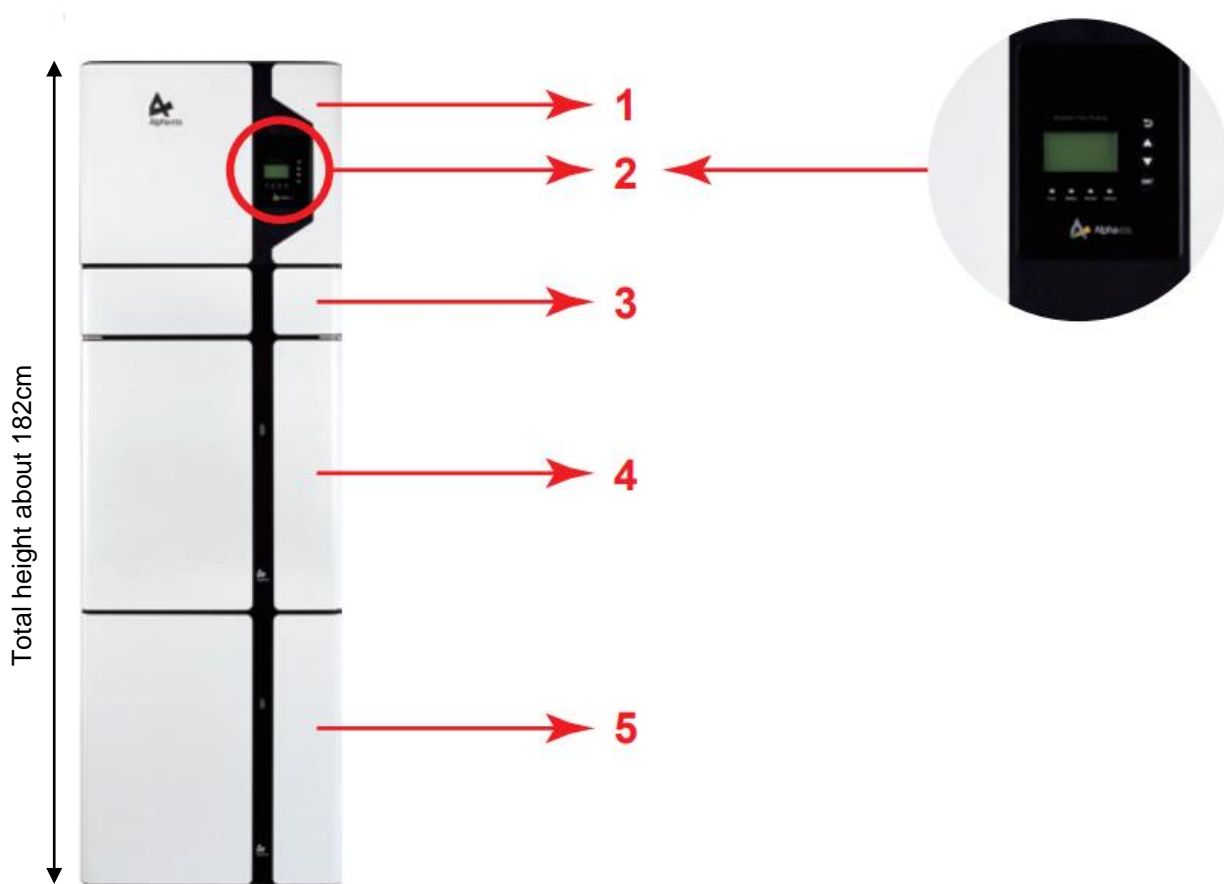


Figure 4 Storion-SMILE5 Delivery Scope

Object	Description
1	Hybrid Inverter
2	EMS Display Screen
3	Cable Box (connected to Inverter)
4	SMILE5-BAT (Battery 1)
5	SMILE5-BAT (Battery 2)

1.5.1 Cable Box Part

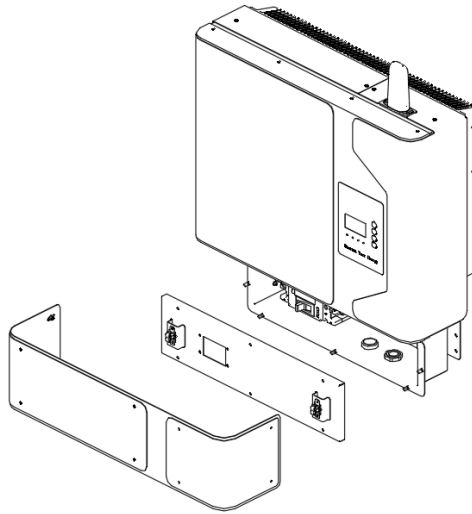


Figure 5 Inverter without Cable Box Covers– Front View

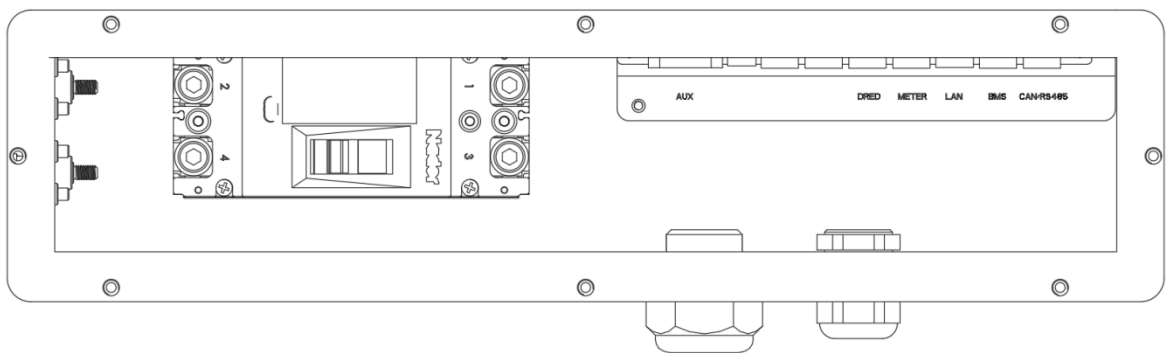


Figure 6 Cable Box Part without Covers – Front View

Item	Description	Item	Description
Dry Contact Relay	External Device Control Interface	USB	USB Debug Communication Port
INV	Inverter Debug Communication	DRMS	Power Dispatching Port
Meter	Meter Communication Port	LAN	Net Wire Connection Port
BMS	Battery Communication Port	CAN/RS485	External Expansion Port Or External Dispatching Port

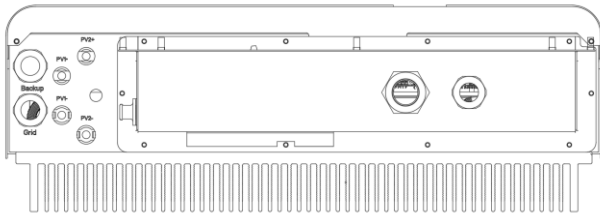


Figure 7 Cable Box Part without Covers - Bottom View

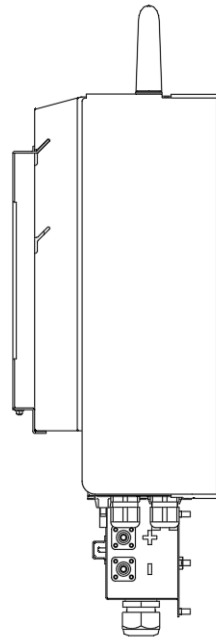


Figure 8 Cable Box Part without Covers - left View

Object	Description	Item	Description
PV1, PV2	PV Connector	GRID	Terminal Board Grid
BAT +, BAT -	Battery Connector	BACKUP	Terminal Board Backup Load

1.6 Liability Limitation

Any product damage or property loss caused by the following conditions AlphaESS does not assume any direct or indirect liability.

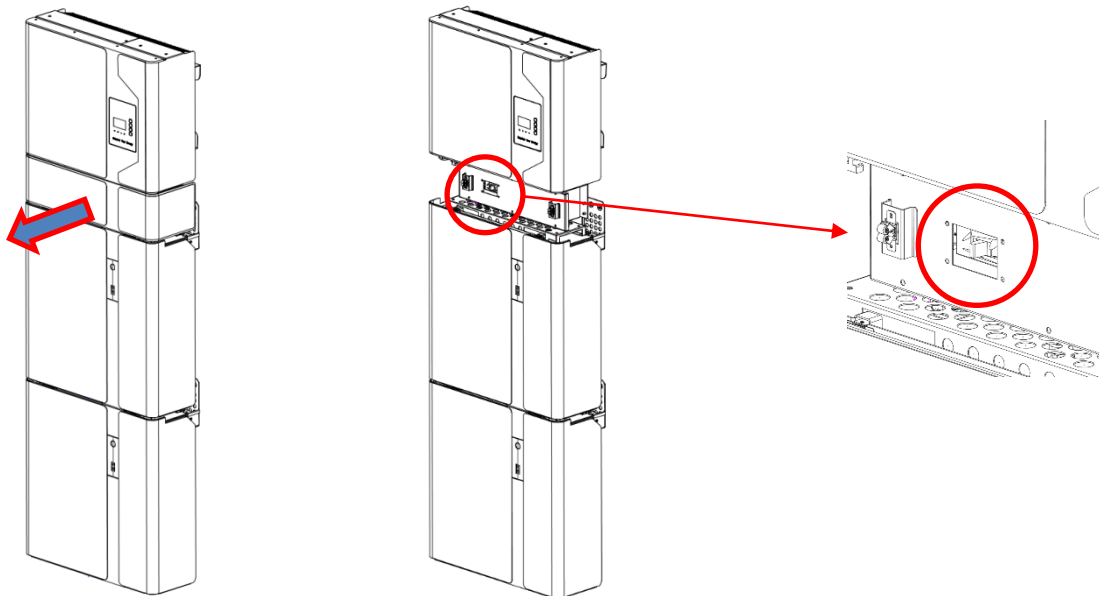
- Product modified, design changed or parts replaced without AlphaESS authorization;
- Changes, or attempted repairs and erasing of series number or seals by non AlphaESS technician;
- System design and installation are not in compliance with standards and regulations;
- Failure to comply with the local safety regulations (VDE for DE, SAA for AU);
- Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/packaging is unloaded and such damage is identified;
- Failure to follow any/all of the user manual, the installation guide and the maintenance regulations;
- Improper use or misuse of the device;
- Insufficient ventilation of the device;
- The maintenance procedures relating to the product have not been followed to an acceptable standard;
- Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.);
- Damages caused by any external factors.

2. System Operation

2.1 Switch on

When turning on the system, it is very important to follow the order of the following steps to prevent damage to the system.

WARNING: Please check the installation again before turning on the system.



Step 1: Turn on the external PV switch

Step 2: Turn on the external grid switch.

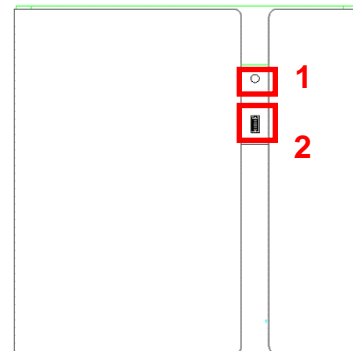
Step 3: If backup load is applied, turn on the external Backup switch.

NOTE: the Backup switch is only used when a backup load is applied.

Step 4: Open the outer shell of the cable box. Open the battery switch cover and turn on the battery switch on the cable box.

Step 5: Press power button on all the batteries until the indicator lights turn on.

Step 6: Close the battery switch cover and the outer shell of the cable box.



2.2 Switch off

Step 1: Press the power button on all the batteries, till the lights turn off.

Step 2: Open cable box outer shell, open the battery switch cover and turn off the battery switch.

Step 3: Turn off the external grid switch.

- Step 4:** If backup load is applied, turn off the external backup switch.
- Step 5:** Turn off the external PV switch on the cable box.
- Step 6:** Close the battery switch cover and the outer shell of cable box.

More information can be found in SMILE5-BAT user manual.

2.3 Emergency Procedure

When the SMILE5 energy storage system appears to be running abnormally you can turn off the grid connected main switch directly feeding the BESS and turn off all load switches within the BESS, turn off the battery switch at the same time. To prevent a potentially fatal personal injury, if you want to repair or open the machine after the power is switched off please measure the voltage at the input terminals with a suitably calibrated voltage tester.

Before working on this equipment, please confirm that there is no grid electric supply to the BESS!

The upper cover plate cannot be opened until the DC-link capacitance inside the battery modules discharges completely about 15 minutes later.

2.3.1 Emergency Handling Plan

1. Disconnect the AC breaker.
2. Check the control power supply. If it is OK, return the power supply to find out the reason.
3. Please record every detail related to the fault, so AlphaESS can analyze and solve the fault. Any operation of equipment during a fault is strictly forbidden, please contact Alpha as soon as possible.
4. As battery cells contains a little Oxygen inside and all cells have got explosion-proof valves, explosion hardly happens.
5. When the indicator light on the battery shows a red fault, check the fault type through the communication protocol, and contact our after-sales service personnel for advice.

2.3.2 Hazards

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below:

Inhalation: Evacuate the contaminated area, and seek medical attention.

Eye contact: Rinse eyes with running water for 5 minutes, and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.

Ingestion: Induce vomiting and seek medical attention.

2.3.3 Fire


If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

Fire extinguishing media

During normal operation no respirator is required. Burning batteries cannot be extinguished with a regular fire extinguisher, this requires special fire extinguishers such as the Novec 1230, the FM-200 or a dioxin extinguisher. If the fire is not from a battery, normal ABC fire extinguishers can be used for extinguishing.

Fire-fighting instructions

1. If fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the power to charge.
2. If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.
3. If the battery pack is on fire, do not try to extinguish but evacuate people immediately.

 There may be a possible explosion when batteries are heated above 150° C. When the battery pack is burning, it leaks poisonous gases. Do not approach.

Effective ways to deal with accidents

Battery in dry environment: Place damaged battery into a segregated place and call local fire department or service engineer.

Battery in wet environment: Stay out of the water and don't touch anything if any part of the battery, inverter, or wiring is submerged.

Do not use a submerged battery again and contact the service engineer.

3. EMS Introduction and Set up

3.1 Function Description



Figure 9 SMILE5 EMS Interface

Object	Name	Description
A	Indicator LED	Red: The inverter is in fault.
B		Green: The battery is in charging or discharging.
C		Green: The inverter is in normal state.
D		Green: The inverter is in communication.
E	Button Function	Return Button: Escape from current interface or function.
F		Up button: Move cursor to upside or increase value.

G		Down Button: Move cursor to downside or decrease value.
H		ENT Button: Confirm the selection.
I	LCD Screen	Display the information of the inverter in this LCD screen.

3.2 Introduction

This part is suitable for EMS firmware-version 1.01.67 and above.

3.2.1 Main

Power	0W
Total	00.0kWh
Battery	%
Normal	

Main displays the inverter working status and information, including:

- Power: Current PV power
- Total: Total power generation.
- Battery: Current remaining battery power (SOC).
- Normal: Current working state of the equipment, including Standby.

>>>> MENU <<<<<
>Status
History
Setting

In the Main interface, press ENT key to enter the menu's main interface.

Use the up and down key to select a sub-menu, press the ENT key to enter the selected sub-menu, press Return key to return to the previous layer.

3.2.2 Status

>>>> Status <<<<<
>Grid
Solar
Battery

Status menu contains five sub-menus: Solar, Battery, Grid, UPS and Comm .These display the relevant information about the current physical or communication interface respectively.

>>>> Grid <<<<<	
> U	230.2V
I	2.0A
F	49.99Hz

Grid interface displays the real-time information on the utility grid side:

voltage U, current I, frequency F, P_{Inv} , $P_{MeterAC}$, $P_{MeterDC}$.

```

>>>>> Solar <<<<<<
> U1          360.0V
  I1          1.0A
  P1          360W
    
```

Solar interface displays the real-time information of PV side: voltage U1, current I1, power P1, voltage U2, current I2 and power P2.

```

>>> Battery <<<
> U          48.0V
  I          10.0A
  P          480W
    
```

Battery interface displays the real-time information of battery side: voltage U, current I, power P, residual capacity of Battery (SOC), the internal environmental temperature Temp

```

>>>>> UPS <<<<<<
> U          230.2V
  I          2.0A
  P          460W
    
```

UPS interface displays the real-time information in this mode: voltage U, current I, power P, frequency F

```

>>>>> Comm <<<<<<
> BMS          Yes
  Net          Yes
  MeterGrid    Yes
    
```

Communication interface displays the real-time communication situation of BMS, Net, MeterGrid and MeterDC.

3.2.3 History

```

>>>> History <<<
> Grid Consump
  INV Gen.
  BAT Gen.
    
```

History menu contains seven sub-menus: Grid Consumption, INV Gen., BAT Gen., PV Gen., Grid Charge, PV Charge, Error Logs

```

> Grid CONSUMP <
> Total:
                                0.0kWh
    
```

Grid Consumption interface displays today's or total load consumption from grid

```
>>> INV Gen. <<<
> Today:
29.1kWh
```

INV Gen. interface displays today's or total electricity quantity generated from SMILE5-INV.

```
>>> Bat Gen. <<<
> Today:
13.8kWh
```

Bat Gen. interface displays today's or total electricity quantity discharged from the battery.

```
>>> PV Gen. <<<
> Today:
19.0kWh
```

PV Gen. interface displays today's or total electricity quantity generated from the PV-panels.

```
>>> Grid Charge <<
> Today:
1.9kWh
```

Grid Charge interface displays today's or total electricity quantity battery charging from the grid.

```
>>> PV Charge <<
> Today:
13.1kWh
```

PV Charge interface displays today's or total electricity quantity battery charging from the PV-panels.

```
>>> Error Logs <<<
1:
2018-02-02 16:48
Chg SPI Fault
```

Error Logs interface displays the 10 latest fault records of this device, including the name of the fault and time of error.

```

> >      Information      <
> SN:
          AL20020YYMMXXXX
    
```

Make sure all numbers in the information menu are correct.

3.2.4 Setting

4.2.4.1 General Setting

```

>      New Password      <
>
          0 0 0 0
    
```

Step 1: Click setting and enter the password.

The installation's password is a four-digit password: 1111, after four-digits password was correctly input, you can enter into the main Setting interface (administrator permissions).

```

>>>      Setting      <<<
> Function
          Safety
    
```

```

>>>      Function      <<<
> Solar
          Battery
          Grid
    
```

Step 2: Click Function to enter function setting.

Step 3: Click Solar to set the Solar relevant information.

```

>>>      Solar      <<<
> On Grid Cap.
          000000W
    
```

```

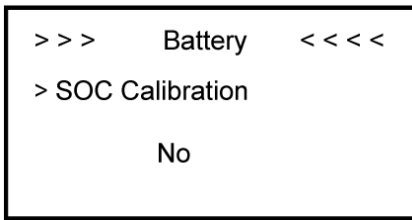
>>>      Battery      <<<<
> Bat Model
          Smile5-BAT
    
```

Step 4: Set on-grid capacity, storage capacity and number of PV strings (MPPT number).

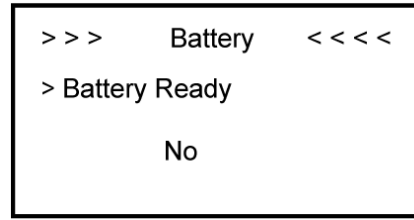
Step 5: Click the Battery Function and check battery type SMILE5-BAT.

On-grid capacity: Existing PV capacity

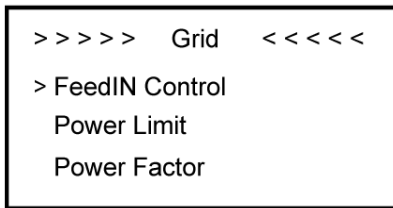
Storage capacity: PV capacity on SMILE5



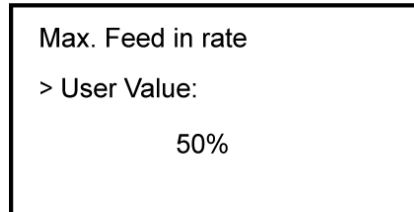
Step 6: Check SOC Calibration function set No.



Step 7: Check the Battery Ready function set No. If you only use the inverter without battery, please set it Yes.

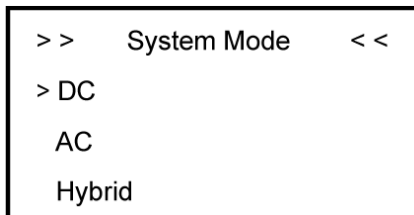


Step 8: Click the Grid Function to set up relevant parameters about the grid

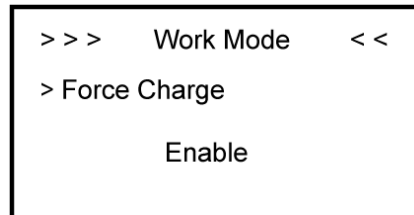


Step 9: Set the Max. Feed in rate value.

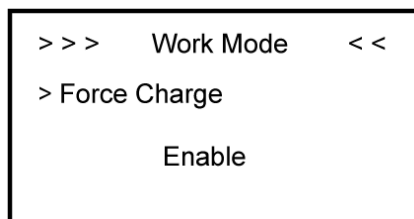
For example, the storage capacity is 6.6kW, the on grid capacity is 3kW, feed-in power is limited within 5kW, then the max. feed in rate = $5 / (6.6+3) \approx 52\%$



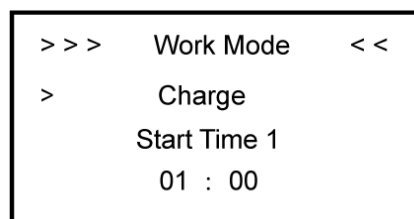
Step 10: Click Function-System Mode to set system mode: DC, AC, Hybrid.



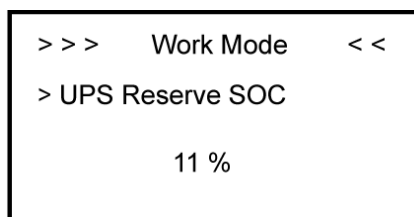
Step 11: Click the mode then set up work mode.(self-use or force time charge)



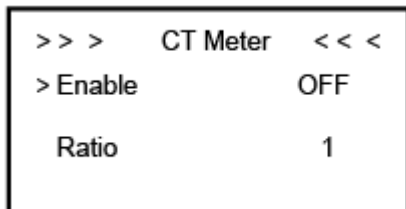
Step 12: If you want to use force charge, set Enable here.



Step 13: Set the charge and discharge time.



Step 14: Set the UPS Reserve SOC, it means how much battery energy to keep for UPS function.

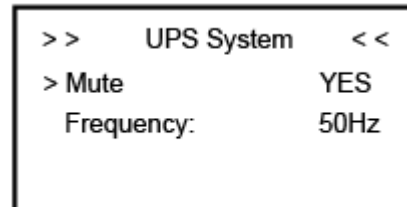


Step 16: If you use CT meter, please set CT meter enable and the relevant ration

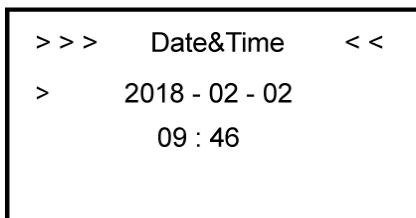
Step 15: Click Safety in the setting menu. Set safety standard.

AS4777.2 for Australia, VDE4105/11.18 for Germany, CEI0-21 for Italy, G98/G99 for Britain, NRS097-2-1 for South Africa, RD1699 for Spain. For other details please find in Section 9.2.

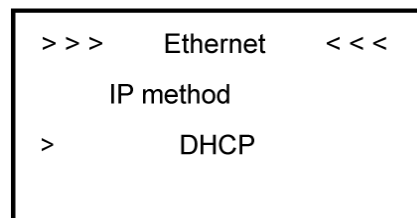
For Volt-var/watt function in South Australia please choose AS4777-SA.



Step 17: If you use UPS function, please set the mute as YES in UPS System interface and the relevant Frequency.



Step 18: Click System in the setting menu. Click Date &Time and set up the date and time.



Step19: Click Ethernet to set the IP address. DHCP mode means that setup IP address is set up automatically.

If you want to set up the IP address manually, please choose manual mode.

NOTE: It is needed to set the following 3 parameters for manual mode:

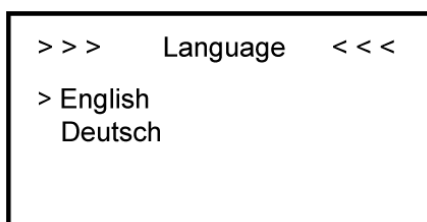
IP Address: IP address;

Subnet Mask: Subnet mask;

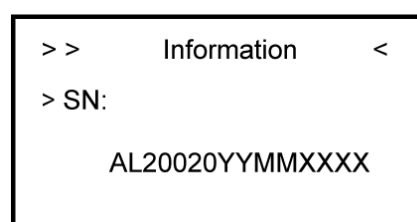
Default Gateway: Default gateway;

Automatic display one parameter:

MAC Address: display MAC Address.



Step 20: Click Language to set language



Step 21: Make sure all the following number is correct.

4.2.4.2 Additional Function Setting

A. If you use Backup box, please set as below:

```
>> Backupbox <<<
> Enable
  No
```

Step 1: Click Enable to set yes.

```
>> Backupbox <<<
> L1      1 SOC    10
  L2      2 SOC    10
  L3      3 SOC    10
```

Step 2: Set the priority of the load,

L1 > L2 > L3

B. If external device will dispatch the system, please set as following steps:

```
>>> Function <<<<
> Parallel
  ModBus
```

Step 1: Please go to the function menu, choose "ModBus" and press enter.

```
>>>> ModBus <<<<<
> Enable      OFF
  Mode        Slave
```

Step 2: Please set Modbus enable as yes.

C. If you use cascading function please set as following steps:

```
>>> Function <<<<
> Parallel
  ModBus
```

Step 1: Please go to the function menu, choose "Parallel" and press enter.

```
>> Parallel <<<
> Select
  Yes
```

Step 2: Please choose "Select" as "Yes" and press enter.

```
>> Parallel <<<
> Phase
  L1
```

Step 3: Please choose "Phase" as L1 (master) and press enter.

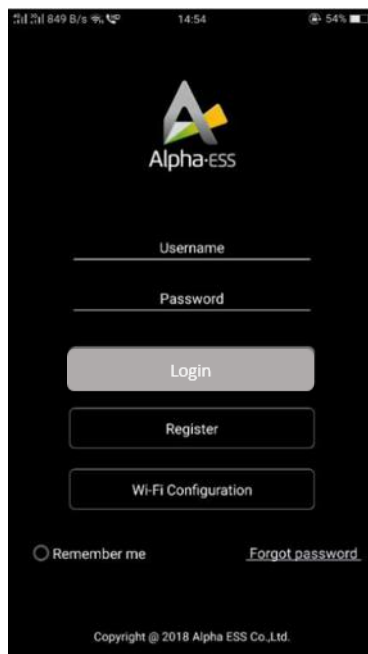
```
>> Parallel <<<
> Mode
  Parallel Mode
```

Step 4: Please choose "Mode" as "Parallel mode" and press enter.

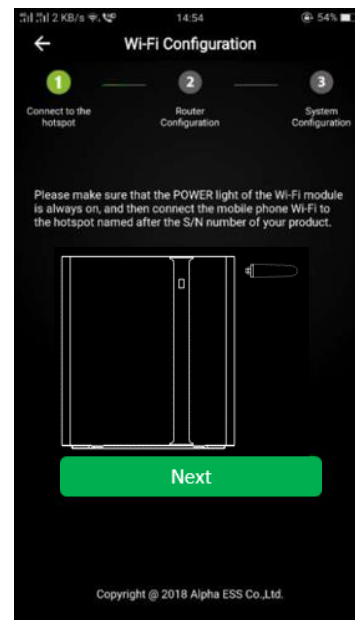
Step 5: please repeat Step 1 to 4 to set the other device as L2 (slave) L3 (slave).

4. Configuration Network (WiFi optional)

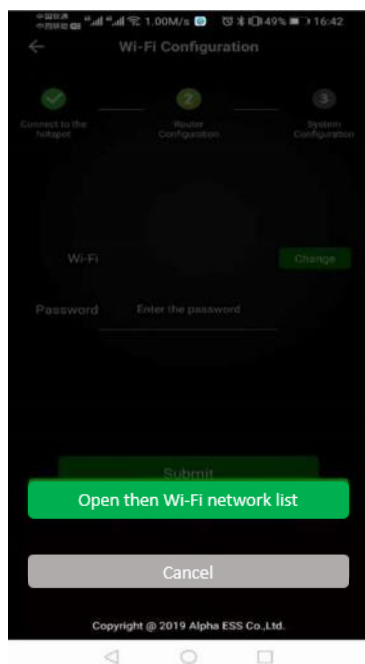
Please install the WiFi module. Download and install the APP by scanning the QR code below, and directly connect to this device by WiFi module.



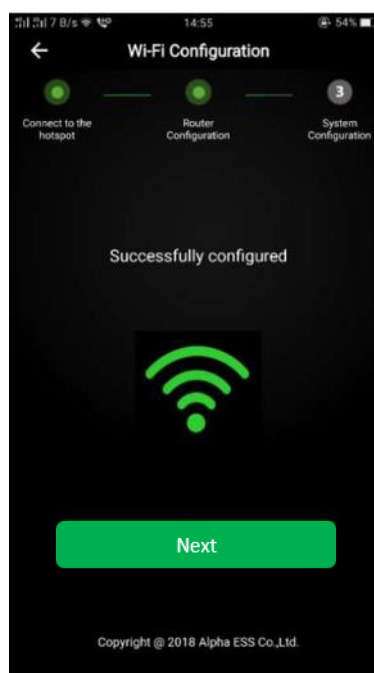
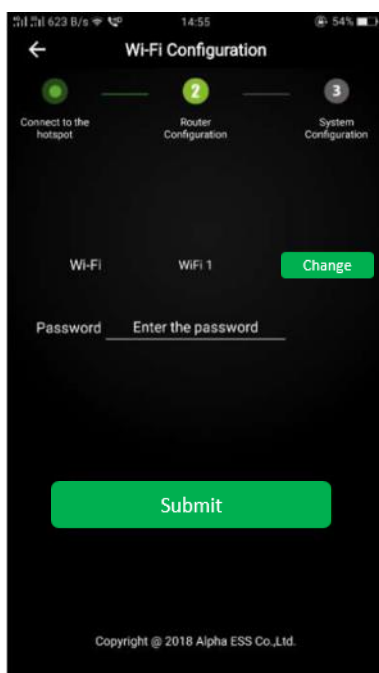
Step 1: Open AlphaESS APP, click the “Wi-Fi Configuration” button and enter the WiFi configuration interface



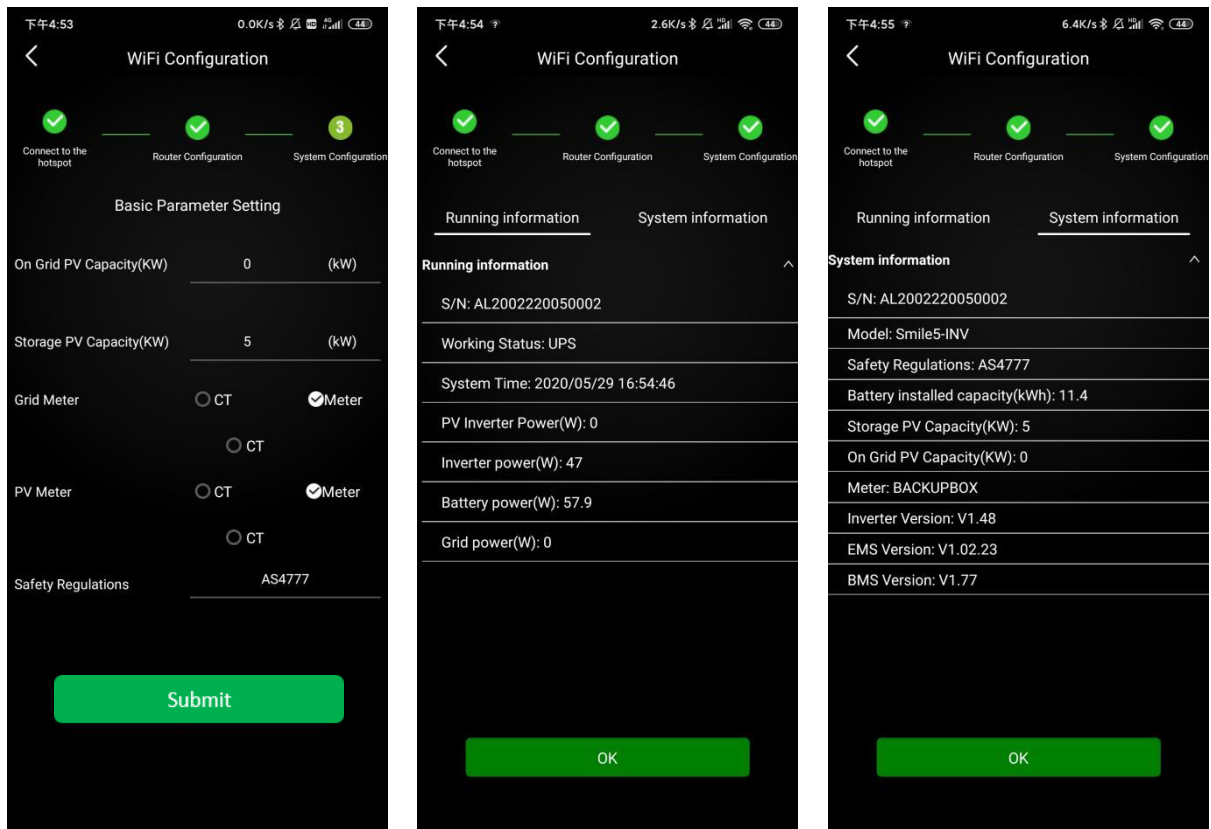
Step 2: After that please check whether your mobile phone has connected to the system hotspot



Step 3: If your mobile phone hasn't connected to the system hotspot, please open the Wi-Fi network list. Please find the hotspot named after the product SN in WLAN list then enter the password 12345678 and connect to it. After successfully setting it, please go back to APP and click "Next".



Step 4: Enter the WiFi account and password and then save it, the configuration is successful, click "Next",



Step 5: Set the basic parameters, and you can see the device details , click “Submit” button.

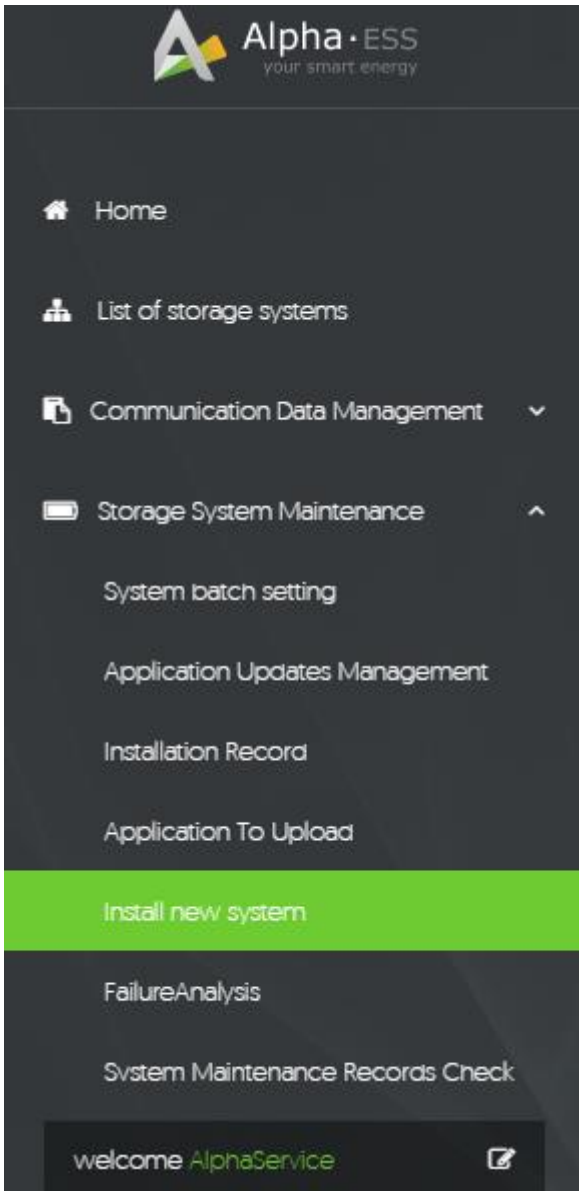
Safety Regulation Setting: AS4777.2 for Australia, VDE4105/11.18 for Germany, CEI0-21 for Italy, G98/G99 for Britain, NRS097-2-1 for South Africa, RD1699 for Spain. For other details please find in Section 8.2.





Note: If not registered, please register account according to the hint after downloading and installing App.

5. Online Monitoring

Installers who haven't registered yet need to click “Register” to visit the registration page. Please refer to “AlphaCloud Online Monitoring Webserver Installers User Manual”, which you can get from AlphaESS sales and get your personal license number from relevant AlphaESS sales.



Log in to your installer account and choose Storage System Maintenance> "Install new system" to register a new system at Alpha ESS.

Storage System Maintenance English   Logout

Install new system

* S/N

* Check Code

* License No.

* Installation Date

* Client Full Name

* Contact Number

* Contact address

Remark

Attachment 未选择任何文件

Enter the system S/N, check code, license, installation date, client name, contact number, contact address, and click the save button. The red * marks required information for this process. Click the Browse button to select an attachment you want to add.

5.1 System Setup in Monitoring

Some of the system settings must be carried in the installer monitoring. To do this, follow the steps below:

Step 1: Please login in the installer account, click the list of storage systems and enter the SN.

5.1.1 Basic Information

Step 2: After selecting the correct system, enter System Setup interface. Enter in the "Basic Information" and input below information:

- Address,
- Zip code,
- Contact name,
- E-Mail address,
- Currencies and
- Telephone number.



NOTE: Do not forget to click "Save" button!

5.1.1 Other Information

Step 3: select the "Other Information" submenu and set the following parameter:

- Time zone
- Data upload frequency: SMILE5 has second level data, you can choose it as 10s data if you wish.

6. Routine Maintenance

6.1 Maintenance Plan

- Check if wire connections are loose.
- Check if cables are aged/damaged.
- Check if cable insulating ribbon drops.
- Check if cable terminal screw loose, any overheat sign.
- Check if ground connection is well.

6.1.1 Operating Environment

(Every half year)

Carefully observe whether the battery system equipment is ineffective or damaged;

When the system is running, listen to any part of the system for abnormal noise;

Check whether the voltage, temperature and other parameters of the battery and other equipment parameters are normal during system operation;

6.1.2 Equipment Cleaning

(Every six months to one year, depending on the site environment and dust content, etc.)

Ensure that the ground is clean and tidy, keep the maintenance access route unblocked, and ensure that the warning and guiding signs are clear and intact.

Monitor the temperature of the battery module and clean the battery module if necessary.

6.1.3 Cable, Terminal and Equipment Inspection

(Every six months to one year)

- Check if the cable connections are loose.
- Check whether the cables are aged / damaged.
- Check whether the cable tie of the cable has fallen off.
- Check if the cable terminal screws are loose and the terminal position has any signs of overheating.
- Check whether the management system of the system equipment, monitoring system and other related equipment are invalid or damaged.
- Check that the grounding of the equipment is good and the grounding resistance is less than 10 ohms.

6.2 Notes

After the equipment are out of operation, the following notes should be paid attention to while maintaining:

- Related safety standards and specifications should be followed in operation and maintenance.
- Disconnect all the electrical connections so that the equipment would not be powered on.
- Wait at least 5 minutes after disconnection, so that the residual voltage of the capacitors drops to a safe voltage. Use a multimeter to make sure that the equipment is completely discharged.

- The equipment should be repaired by professional staff only and it is strictly for-bidden for maintenance staff to open equipment modules on their own.
- Appropriate protective measures should be taken while maintaining, such as insulated gloves, shoes, and anti-noise ear plugs.
- Life is priceless. Make sure no one would get hurt first.
- In case of a deep discharge, the battery must be charged to a SOC rate of 30% to 50% if the entire system is static (e.g. the battery has not been charged for two weeks or more).

Please contact us in time if there are any conditions that could not be explained in the manual.

7. Trouble Shooting

Error Category	Server Error Code	Error Analysis	Trouble Shooting
EMS	1	Network Card_Fault	Please contact AlphaESS service center.
	2	Rtc_Fault	Please contact AlphaESS service center.
	4	E2prom_Fault	Please contact AlphaESS service center.
	8	INV_Comms_Error	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	16	Grid_Meter_Lost	Please check the communication order and connectivity between the grid meter and EMS.
	32	PV_Meter_Lost	Please check the communication order and connectivity between PV meter and EMS.
	64	BMS_Lost	Please check the communication order and connectivity between BMS and EMS.
	128	UPS_Battery_Volt_Low	Please charge the battery.
	256	Backup_Overload	Please check whether the critical load of the inverter exceeds the loading capacity of the inverter.
	512	INV_Slave_Lost	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	1024	INV_Master_Lost	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.

	2048	Parallel_Comm_Error	Please turn off the parallel connection mode and check if the configuration is correct and the communication cables are normal.
	4096	Parallel_Mode_Differ	Please turn off the parallel connection mode and check if the configuration is correct
BMS	1	Over Temperature	Please wait for the battery temperature to decrease.
	16	Charge Over-current	Please wait for battery to recover from over-current.
	64	Discharge Over-current	Please wait for battery to recover from over-current.
	128	Multi Master error	Please turn on all batteries in 30 seconds after power-off.
	256	Cell Over-voltage	It is forbidden to charge the battery and wait for the battery to recover from over-voltage.
	512	Mos High Temperature	Please shut down the system and wait for 2 hours before restart.
	1024	Discharge Low Temperature	It is forbidden to charge or discharge the battery and wait for the battery temperature to rise.
	2048	Mos DriverFeedback Error	Please contact AlphaESS service center.
	4096	Cell Under-voltage	It is forbidden to discharge the battery and wait for the battery to recover from under-voltage.
	8192	Firmware Versions Inconsistence	Upgrade batteries with inconsistent firmware versions to the same.
	16384	Current error	Check whether the wiring and check whether inverter load exceed the maximum discharge power of the battery.
	32768	Mos error	Please restart the battery system. If there is still a problem, please contact the service center.


	1048576	The Slave Battery Communication Lost	Please check if the communication cable between the slave battery and BMS is not connected or restart the battery.
	2097152	Charge Low Temperature	Please confirm that the ambient temperature is higher than 0°C.
	4194304	Dial switching mode in Parallel modules Inconsistence	Please check whether the dial switching mode of parallel battery modules are consistent.
	8388608	Master Battery Communication Lost	Please check if the communication cable between the master battery and BMS is not connected or restart the battery.
	134217728	No SOC calibration For 4 weeks	Please calibrate the SOC of battery.
	268435456	Circuit Breaker Turned off	Please power off the battery system and check the circuit breaker sampling line.
	536870912	SN Missing	Please contact AlphaESS service center.
	1073741824	Two Temperature Sensor Error	Please restart the battery system. If there is still a problem, please contact the service center.
INV	1	TzProtectFault	Please check the inverter wiring and restart the inverter.
	2	MainsLostFault	Please contact AlphaESS service center.
	4	GridVoltFault	Please confirm whether the grid parameters conform to the system grid regulations.
	8	GridFreqFault	Please confirm whether the grid parameters conform to the system grid regulations.
	16	PLLLostFault	Please confirm whether the grid parameters conform to the system grid regulations.
	32	BusVoltFault	Please confirm whether the PV wiring voltage exceeds the maximum range of the system.
	64	Ac5Mins_Voltage_Fault	Please confirm whether the grid parameters conform to the system grid regulations.
	128	Inv_OCP_Fault	Please restart the inverter.

	256	Dci_OCP_Fault	Please restart the inverter.
	512	ResidualCurrentFault	Please confirm that the case is grounded and the neutral wire is not reversed.
	1024	PvVoltFault	Please confirm that PV has voltage access and reduce PV voltage.
	2048	Ac10Mins_Voltage_Fault	Please confirm whether the grid parameters conform to the system grid regulations.
	4096	IsolationFault	Please restart the inverter. If the problem has not been solved, please contact AlphaESS service center.
	8192	TemperatureOverFault	Please confirm the inverter temperature and let the inverter standby to cool down.
	65536	SpiCommsFault	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	131072	SciCommsFault	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	262144	CanCmmsFault	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	524288	InputConfigFault	Confirm whether the number of PV access consistent with MPPT number settings.
	1048576	EepromFault	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	2097152	RelayFault	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	4194304	SampleConsistenceFault	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	8388608	ResidualCurrent_DeviceFault	Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
	33554432	Wiring_Fault	Check if the wirings between inverter and

			grid and backup are correct.
67108864	HCT_AC_DeviceFault		Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.
134217728	OverLoadFault		Please check whether the critical loads of the inverter exceeds the load capacity of it.
268435456	UPS_OCP_Fault		Check whether the emergency load exceeds the maximum current of the inverter.
536870912	DCI_DeviceFault		Please restart the inverter. If the problem has not been solved, please contact AlphaESS service center.
1073741824	Other_DeviceFault		Please restart the inverter. If the problem has not been solved, please contact AlphaESS service center.
2147483648	UpsRelayFault		Please update the inverter firmware. If the problem has not been solved, please contact AlphaESS service center.

8. Annex

8.1 Datasheet

Model		SMILE5	
System Specification			
Nominal Output Power	5000 W / 4600 W (DE)		
Capacity Range	2.9 ~ 17.2 kWh (96% DoD)	5.7 ~ 34.4 kWh (96% DoD)	10.1 ~ 60.6 kWh (90% DoD)
Usable Capacity Range	2.8 ~ 16.5 kWh	5.5 ~ 33.0 kWh	9.1 ~ 54.4 kWh
Battery Chemistry	LFP (LiFePO ₄)		
IP Protection	IP21 (Indoor) / IP65 (Outdoor)		
Warranty	5 Year Product Warranty, 10 Year Battery Warranty		
Inverter Technical Specification			
Model	SMILE5-INV	Rated Frequency	50 / 60 Hz
Max. PV Input Power	2 x 3300 W	Phase	Single-Phase
Max. PV Input Current	2 x 12 A	Backup	UPS
Max. PV Input Voltage	580 V	Display	LCD
MPPT Number	2	Communication	Ethernet
MPPT Voltage Range	125 ~ 550 V	Start Up DC Voltage	125 V
Max. PV Short-circuit Current	2 x 15 A	Humidity	15% ~ 85% (No Condensing)
Max. Charging/Discharging Current	100 A	Dimension (W x D x H)	610 x 236 x 615 mm
Max. Charging/Discharging Power	5000 W	Weight	60 kg
Rated Voltage	230 V	Safety	IEC 62109-1&-2, IEC 62477-1, IEC 62040.1.1, IEC 62116
Grid Voltage Range	180 ~ 270 V	EMC	EN 61000-6-1/2/3/4
Grid Regulation	VDE-AR-N 4105, VDE 0126-1-1, AS 4777.2/3, CEI 0-21, G99-1, G100, RD 1699, NRS 097-2-1, TOR D4		
Battery Technical Specification			
Module Model	M4856-P	SMILE5-BAT	SMILE-BAT-10.1P
Module Capacity	2.9 kWh	5.7 kWh	10.1 kWh
Module Nominal Voltage	51.2 V	51.2 V	48 V
Operating Temperature Range	-10 °C ~ 50 °C*	-10 °C ~ 50 °C*	-10 °C ~ 50 °C*
Max. Modules in Parallel	6	6	6
Max. Charging/Discharging Current	56 A (1C)	56 A (0.5C)	100 A (0.5C)
Cycle Life	10 000**	10 000**	8000
* When the temperature is below 0 °C or above 40 °C, the performance will be limited.			
** Under specific test conditions			

8.2 Grid Regulation - Region/Country

Grid Regulation	Region/Country
CEI-021	Italy
VDE4105/11.18	Germany
	Switzerland
	Lebanon
AS4777.2	Australia
	New Zealand
	Lebanon
AS4777.2-SA	South Australia
G98/G99	Britain
TOR D4	Austria
NRS097-2-1	South Africa
RD1699	Spain
EN50549	Czech
	Greece
	Denmark
	Belgium
	Poland
	Netherlands
	Ireland
	Sweden
	Finland
	Luxembourg
	Bulgaria
	Slovakia
	Hungary
	Lebanon
C10/C11	Belgium
VDE0126	France
PEA	Thailand
MEA	Thailand
IEC61727	India
BISI	Chile
60Hz default	Default
50Hz default	Default
JET-GR Series	Japan