

Installation Manual Energy Storage System (ESS) Storion-SMILE 5

Algebra:

V1.5



IMPRINT

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1. Introduction

1.1 System Introduction

AlphaESS SMILE5 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 scheme:

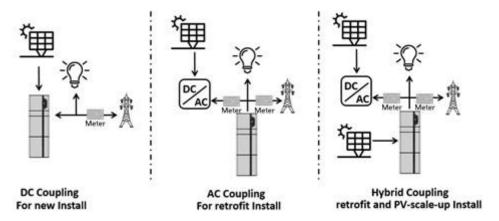


Figure 1. DC/AC/Hybrid Storage System - Scheme

Caution:

For the AC-coupled system, unlike DC, two power meters are to be mounted.

1.2 General Precautions



DANGER

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 $^{\circ}$ 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.



1.3 Parts List

Check the following parts list to ensure it is complete.

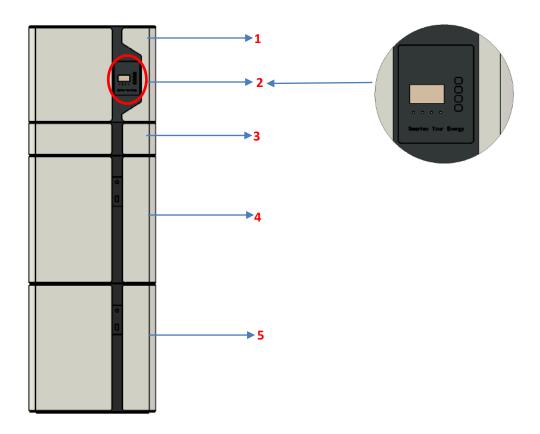
AlphaESS delivers a total system separately on site to client, this consists of:

SMILE5- INV		0				
	M8*60 8pcs	M4 2pcs	M6 4pcs	Mounting panel	Mounting	M6 Gasket
				1pcs	bracket 1pcs	
			0000	1 22 2 20 1 20 2 2 2 2 2 2 2 2 2 2 2 2 2	Agra- Latent State State Space Spa	Settler dear year a managarin
	MC4 2sets	Power Cable	SMA 60A oi	ADL 3000 1pcs	Installation	User manual
		2pcs (1			manual 1pcs	1pcs
		black, 1				
		red)				

SMILE5- BAT				0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	M8*60 6pcs	M5 *10 6pcs	M6 Gasket	Mounting Panel 2pcs
	0	Section desired the section of the s		700
	Power Cable	User manual	M4 *10 6pcs	Battery communication cable
	2pcs (1 black, 1	1pcs		
	red)			



1.4 System Appearance

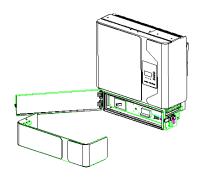


Storion-SMILE5 Delivery Scope

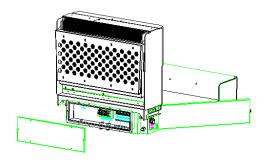
Item	Components
1	Hybrid Inverter
2	Display Screen
3	Cable Box
4	SMILE5-BAT battery 1
5	SMILE5-BAT battery 2



Cable box:







Inverter with cable box - Back View

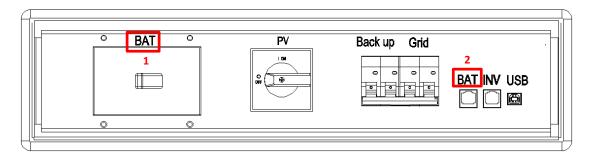


Figure 6. Cable box – Front

BAT(1)	Battery Switch	PV	PV Switch
GRID	GRID Switch	Back up	Backup Switch
INV	Inverter debug communication	BAT(2)	Battery debug communication
USB	USB debug communication		

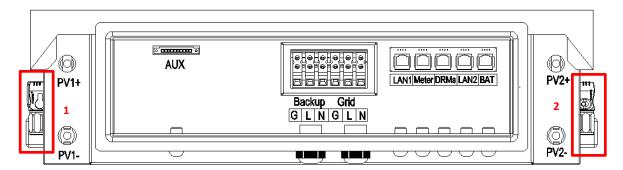


Figure 7 Cable box- back

PV1,PV2	PV Connector	METER	RS485 connection for meter
GRID/BACKUP	Terminal Board AC/Grid	LAN1	Ethernet connection
LAN2	Ethernet for EVEGEN	DRMS	DRED connect for SAA
BAT	Battery communication	AUX	Dry Contact
Terminal 1,2	Battery connect terminal		



1.5 Liability Limitation

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

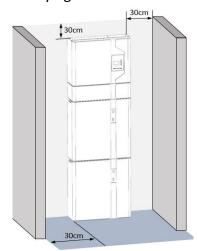
- Product modified, design changed or parts replaced without AlphaESS authorization;
- •Changes, or attempted repairs and erasing of series number or seals by non AlphaESS technician;
- •System design and installation are not in compliance with standards and regulations;
- Failure to comply with the 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. Installation

Observe the specified minimum distances to neighboring objects.

The minimum distances ensure that:

- There is sufficient heat dissipation,
- The storage system door can be opened easily,
- There is sufficient space for carrying out maintenance work.



This manual carefully describes the basic steps on how to install and set up the AlphaESS SMILE5.

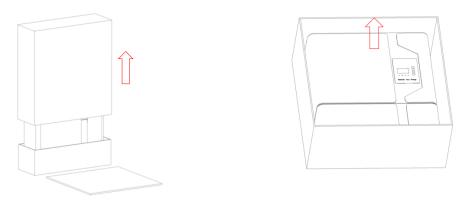


2.1 Installation Site and Environment

The following sites are not allowed for installation:

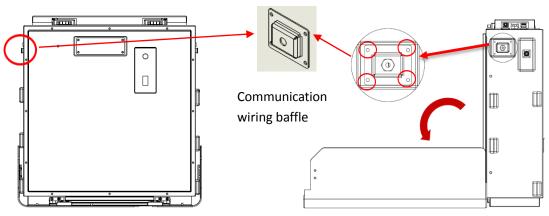
- Sites where the freezing point is reached, like garages, carports or other places.
- Sites with humidity and condensation over 85%.
- Sites which are salty and where humid air can penetrate.
- Flooded areas.
- Earthquake areas –additional security measures are required here.
- Sites that are higher than 2000 meters above the sea level.
- Sites with explosive atmosphere.
- Sites with direct sunlight.
- Sites with extreme change of ambient temperature.
- Wet rooms.
- Sites with highly flammable materials or gases.
- Sites with a potentially explosive atmosphere.
- Installation wall load must be more than 180 kg.

2.2 Installation



Unpacking the inverter and battery

Step1: Remove the battery and inverter from the packaging box.

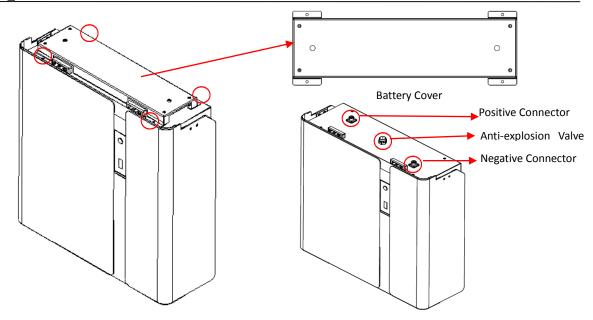


Front of battery with lid off

Side of the battery with lid off

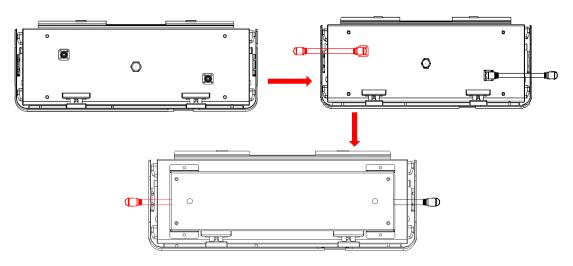
Step2: Open battery housing case and remove communication wiring baffle at the left side.





Disassembly diagram of battery top cover

Step3: Remove the top cover of the battery.

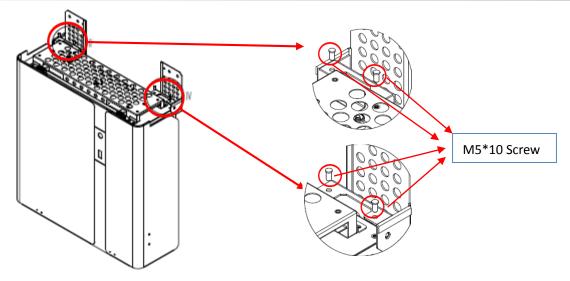


Battery power cable installation diagram

Step4: Close the battery front cover and connect the power cable at the top.

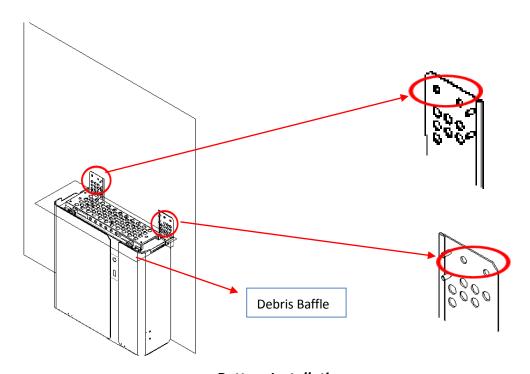
NOTE: if there is an" indoor" sign on the top cover, the battery can only be installed indoor.





Assemble Battery Mounting Panel

Step5: Assemble the battery mounting panel on the battery.

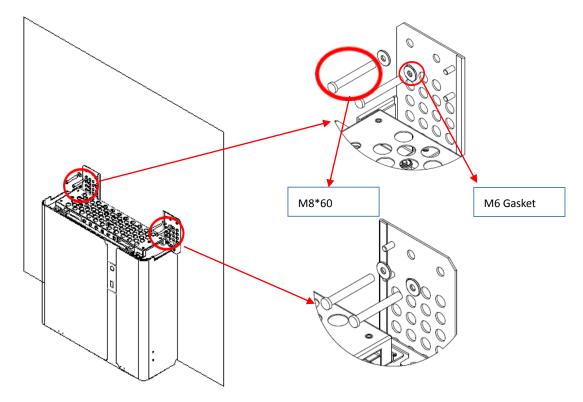


Battery Installation

Step6: Keep the battery against the wall , Drill holes on the wall with an impact drill.

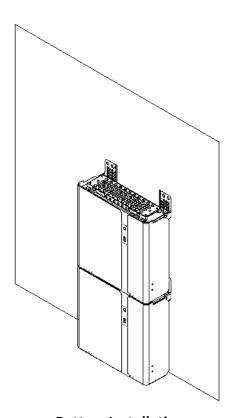
Note: Please make sure a layer of protection must be placed over the battery while drilling, it could be paper, wood board or packaging bubble. (as the picture shows). The ground upon which the battery will be placed on must be less than 3 degree to the horizontal level.





Battery Installation

Step7: Remove the debris baffle and secure the battery to the wall with screws.

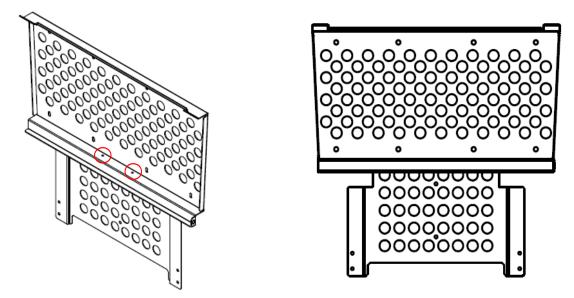


Battery Installation

Step8: Follow Step6 and Step7 to install the second battery.

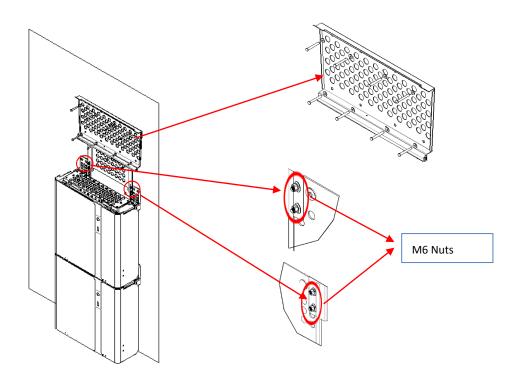
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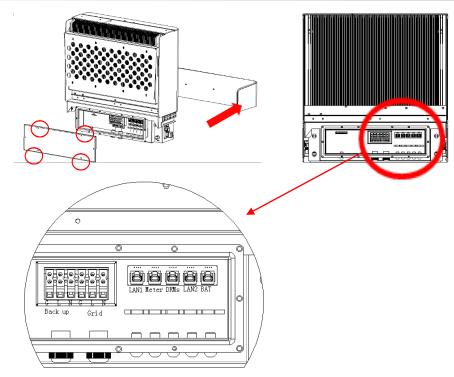
Inverter Mounting panel Installation

Step9: Install the inverter mounting panel and mounting bracket as shown above. (Use M4 nuts).



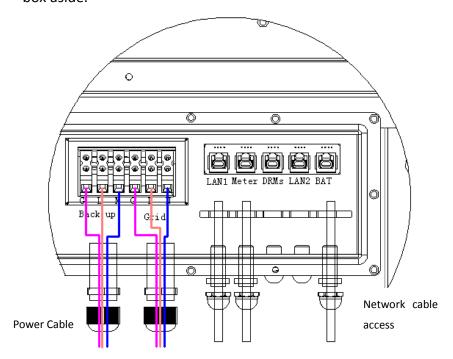
Step10: Drill holes on the wall with impact drill first then install and position inverter mounting panel. Battery intallation is now completed.





Cable box wiring diagram

Step11: Remove the cable box front cover, it can be removed by hand without tools. Remove the screw to take off the back cover. Set the front and back covers of cable box aside.

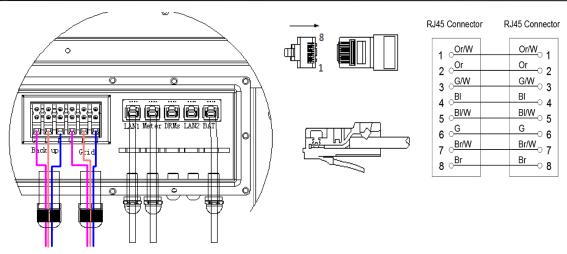


Communication and Power cable access

Step12: Screw off the big and small waterproof terminals and pass the network cable through the terminals, into the switch box. At the same time connect the power cable of output side through waterproof terminal following the diagram. (Here the network cable is not equipped with RJ45 plug).

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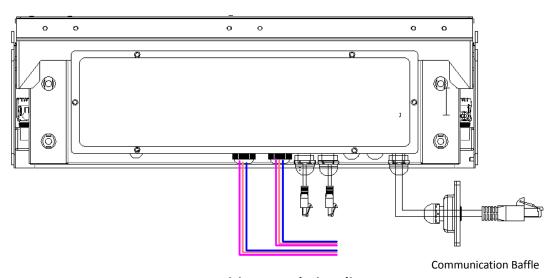




Network cable connection diagram

Step13: Lock waterproof connector, plug in the RJ45 plugs on LAN1 and Meter's ends inside cable box, and then plug in RJ45 and cable on the other side of LAN1 and Meter's ends outside of cable box (leave some length as the other side might need to be connect to router or meter). At the same time, connect RJ45 into BAT end inside of cable box and leave the outside end there for now).

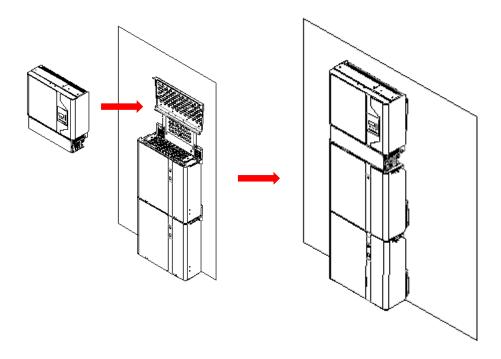
NOTE: the current of the breaker that connects the inverter must be more than 25A and the network cable is type B.



Inverter wiring completion diagram

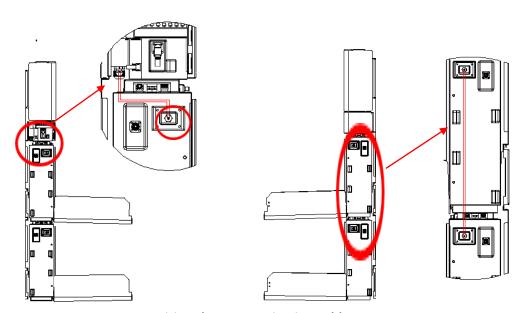
Step14: Lock the cable box back cover, leave the power line and communication line hang on the outside. Follow the diagram, pass the BAT communication line through the battery communication baffle in Step2 and connect the RJ45 plug. Leave the device aside.





Inverter Installation

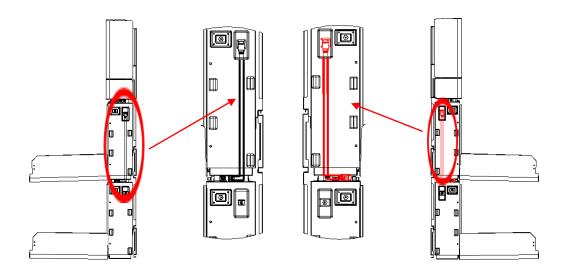
Step15: Hang the inverter onto the mounting panels, adjust the entire system and ensure that the battery and the inverter have been securely hung onto the panels and brackets.



Wiring the communication cable

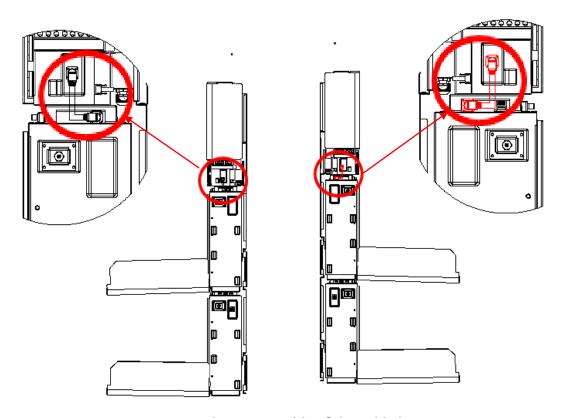
Step16: Connect the communication cable from cable box from step14 to the battery. Use the communication cable from parts list to connect the two batteries at the side. After all above connections done then lock all communication baffles. (If you want to add more the batteries, the new batteries have to been connected first)





Wiring the battry power cable

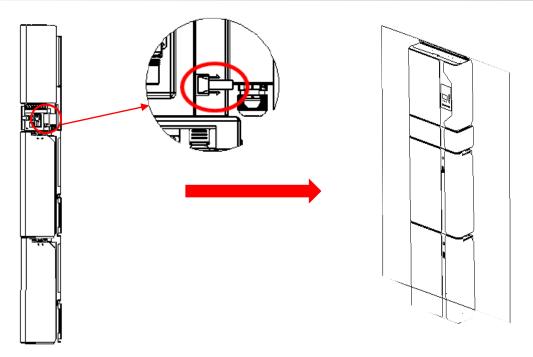
Step17: Connect the batteries from Step4 to the terminals. Make sure that red connects to red and black connects to black.



Wiring the power cable of the cable box

Step18: Connect the power cable from Step4 to the terminals of cable box. Make sure that red connects to red and black connects to black.

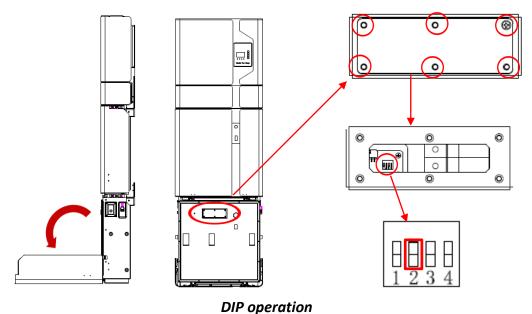




PV Wiring

Step19: Close the battery covers and connect the PV MC4 connectors as shown in the diagram (both sides). At the same time connect all the AC, meter communication cable, ethernet communication cable and then close the cable box cover. The installation is now complete.

Note: The RCD unit must be installed. A 100mA RCD device is recommended.

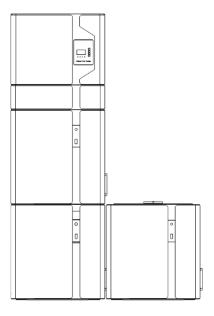


Step20: Open battery housing case and remove DIP baffle, set the DIP switch 2 to "on" mode at the bottom of the module. Then close the DIP baffle and battery housing case.

Note: Only the farthest battery from inverter need to set DIP.



If you want to add more batteries, please install the extra ones by the side as shown below.



Increase the battery modules

Note: When adding on battery modules, please install only by side. You can add up to 6 extra batteries with each two in a string.

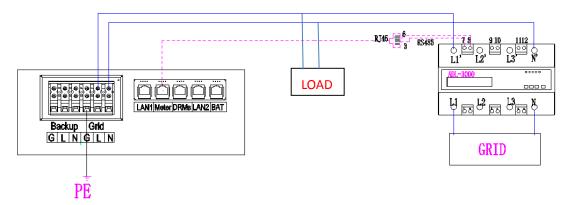
2.4 Power Meter

The power meter should be installed and connected in the distribution box. There are three kinds of power meters, ADL-3000, SM 60A or backup box can be chosen.

- > ADL-3000: three/single phase meter, (with or without CT)
- > SM60A: single phase meter
- backup box: three/single phase meter(Contain off-grid switching and load management)

2.4.1 Meter ADL-3000 (If Applicable)

ADL-3000 connect(without CT, without meter plug)(if applicable):



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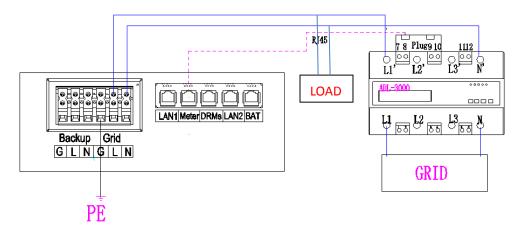


ADL-3000 connect(with CT, without meter plug) (if applicable):

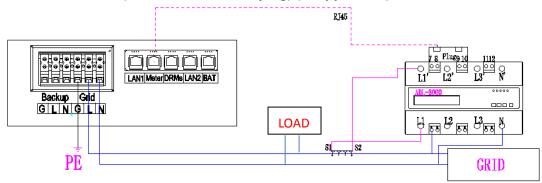
Note:

Meter 7, 8 connect the RJ45 3, 6, then RJ45 connect the cable box/super cable box.

ADL-3000 connect(without CT, with meter plug) (if applicable):



ADL-3000 connect(with CT, with meter plug) (if applicable):



Note:CT connect, Connect S1 to L1, S2 to L1';

For AC/Hybrid system, there are two meter needed:

Two meter connect(with meter plug)

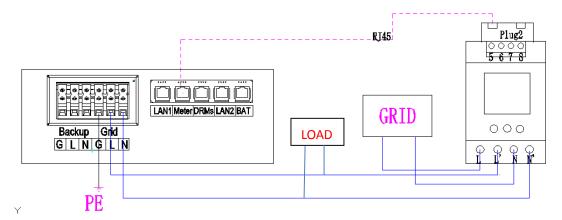
without meter plug



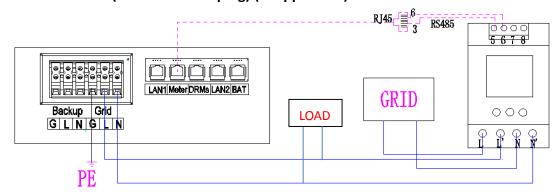
2.4.2 Meter SM 60A (If Applicable)

SM60A connect(with meter plug) (if applicable):





SM60A connect(without meter plug) (if applicable):

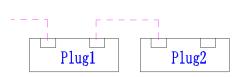


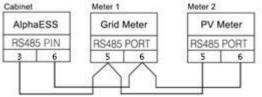
Note:

Meter 5, 6 connect the RJ45 3, 6, then RJ45 connect the cable box/super cable box. For AC/Hybrid system, there are two meter needed:

Two meter connect(with meter plug)

er plug) without meter plug

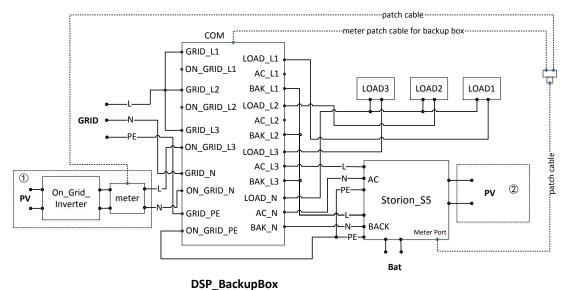




2.4.3 Backup box(If Applicable)

Backup box connect:



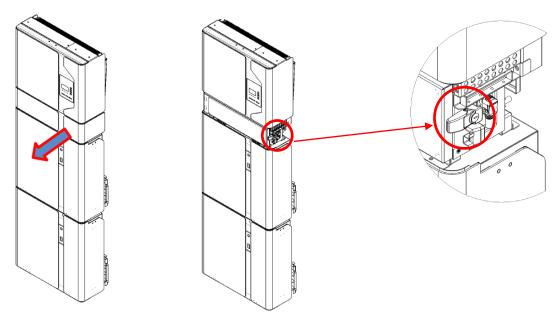


For SMILE5, you must turn on DIP switch 1.

3. Operation the System

3.1 Switch on

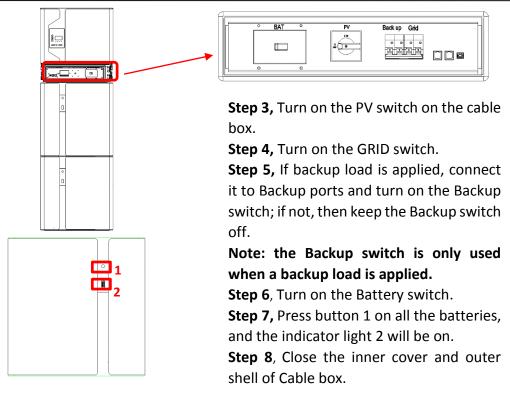
System shall be turned on in the correct sequence to avoid any damage.



Step 1,Open cable box outer shell.

Step 2, Unlock then open Cable box inner cover. Cable box locker can be opened without tools





3.2 Switch off

- Step 1, Open Cable box following the steps in 4.1 step 1, 2.
- Step 2, Press button 1 on all the batteries, till the lights off.
- **Step 3,** Turn off the Battery switch.
- Step 4, Turn off the GRID switch.
- **Step 5,** If backup load is applied, turn off the Backup switch.
- Step 6, Turn off the PV switch on the cable box.
- **Step 7,** Close the inner cover and outer shell of Cable box.

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



4. EMS Introduction /Set up

Storin SMILE5 EMS include the inverter.

4.1 Function description



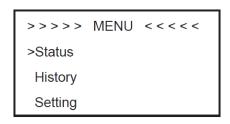
Object	Name	Description
Α	Indicator	Green: The inverter is in normal state.
В	LED	Blue: The battery is in charging or discharging.
С		Yellow: The inverter is in communication.
D		Red: The inverter is in fault.
E	Function	Down button: Move cursor to downside or decrease value.
F	Button	Return button: Escape from current interface or function.
G		ENT button: Confirm the selection.
Н		Up button: Move cursor to upside or increase value.
I	LCD Screen	Display the information of the inverter in this LCD screen.

4.2 Introduction

4.2.1 Main

Power		0W
Today		00.0KWh
Battery		%
	Normal	

Main interface



Main menu

Main displays the inverter working status and information, including:

Power: Real-time output power; Today: Power generation of the day.

Battery: Current remaining battery

power (SOC).

Normal: Current working state of the

equipment, including Standby.

In the Main interface, press ENT key to enter the Menu main interface. Through the up and down key, select the submenu, press the ENT key to enter the select sub-menu, press Return key to return to the previous layer.

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>>>> Status <<<<<
>Sdrid
Solar
Battery

Status menu

>>>>	Grid	<<<<
U		230.2V
1		2.0A
Р		460W

Grid interface

>>>>	Solar	<<<<<
U1		360.0V
l1		1.0A
P1		360W

Solar interface

>>>>	Battery < < < <
U	48.0V
1	10.0A
Р	480W

Battery interface

>>>>	EPS	<<<<<
U		230.2V
1		2.0A
Р		460W

EPS interface

4.2.2 History

>>>>	History	<<<<
>Solar Yield		
Battery Yield		
Error Log	js	

History menu

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

Grid interface displays the real-time information on the city electric side: voltage U, current I, power P, Pgrid, frequency F.

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

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

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

History menu contains four sub-menus : Solar Yield, Battery Yield, Error Log and Bat Error Log.



>>>> Solar Yield <<<<

Today:

1.6Kwh

Solar yield interface

Solar Yield interface displays the related information of power generation of the equipment:

Today: Power generation of today; Yesterday: Power generation of

yesterday;

This month: Power generation of this

month;

Last month: Power generation of last

month;

Total: Total generating capacity;

>>>> Battery Yield < < < <

Today:

1.6Kwh

Battery Yield Display battery displays the related information of the electric quantity discharged from the battery.

Battery yield interface

>>> Inverter Yield < < < <

Today:

1.6Kwh

Inverter Yield interface displays the related information of electric quantity of inverter.

Inverter yield interface

>>>> Error Logs <<<<

1st:

2016-09-08 12:00

SPI Fault

uit ____

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

Error logs interface

>>> Bat Error Logs <<<

1st:

2016-09-08 12:00

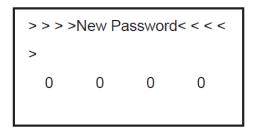
MOS Fault

Bat error logs interface

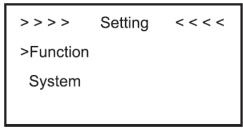
Bat Error Logs interface displays 10 pieces of the latest fault records of device, including the name of the fault and time of error.



4.3 Set up

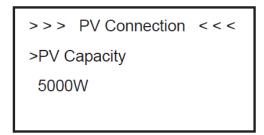


Password interface

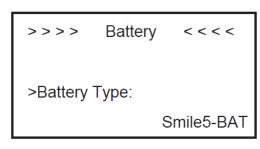


Setting menu

Step2: Click Function to enter function setting.



Step4: Set PV capacity.



Step6: Click the battery function and check Battery type SMILE5-BAT.

Step1: Click setting and enter the password.

The installation's password is four digits password: 6666, after four-digits password is correctly input, you can enter into the main Setting interface (administrator permissions).

```
>>>> Function <<<<
>PV Connection
Battery
Grid
```

Function menu

Step3: Click PV Connection to set PV data.

```
>>> PV Connection <<<
>PV String
Two
```

Step5: Set PV input number (MPPT number).

```
>>>> Battery <<<<
>Battery Ready:
```

Step7: Check the Battery Ready function set No, if you only use inverter without battery,please set it Yes.



Grid >>>> < < < <

>Export Control

Voltage Limit

Frequency Limit

>>> Max. Feed in Rate < < < >User Value 100%

Step8: Click <u>Function-Grid-Export</u> to enter Max.feed in rate setting.

>>> System Mode < < < <

>DC

AC/Hybrid

>>>> Work Mode < < < <

Step9: Set the Max.feed in rate value.

>Mode Select

Self Consume

Step10: Click Function-System Mode to set system mode, DC, AC/Hybrid.

>>>> Work Mode < < < <

>Charge

Start Time 1

00:00

Step11: Click the mode then set up work mode.(self use or force time charge)

>>>> Work Mode < < < <

>UPS Reserve Soc

10%

Step12: Set the charge and discharge time.

>>>> Setting < < < <

>Safety

Reset Energy

Reset Error Logs

Step13: Set the UPS Reserve Soc, it means how much battery energy to keep for UPS function.

<<<< >>>> Safety

>Country

AS4777

Step14: Click the Safty in the setting display.

Step15: Set safty standard.(AS4777 for AU, VDE for DE)

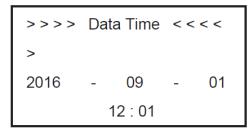


>>>> Setting <><< >Function System >>>> System <><< >Data Time Ethemet New password

Setting menu

Step16: Click System to set up system.

System menu p system. **Step17**: Click Data &Time.



>>>> Ethernet <<<<
>IP Method

Manual

Data time interface

Step18: Set up Data & Time.

Ethernet interface **Step19**: Cilck Ethernet to set IP address.

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

IP Address: IP address;
Subnet Mask: subnet mask;

<u>Default Gateway: default gateway;</u> <u>Automatic display one parameter:</u> <u>MAC Address:display MAC Address.</u>

>>>> Reset Energy < < < < >>Reset

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

System energy interface **Step20**: Click Reset to clear power generation.

>>>> Language <<<< >English Deutsch

Language interface **Step22**: Click Language to set language.

New password interface **Step21**: Click New Password to set new password if you need.

>>>> Information <<<<

>SN:Information Interface
123456781234567

Information interface **Step23**: Make sure all the following number is correct:

Alpha ESS Co., Ltd.



5. Online Monitoring

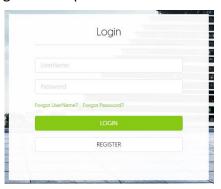
5.1 Register

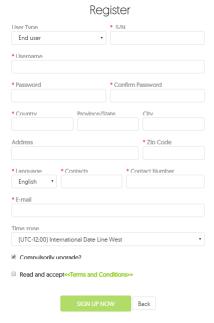
You have to create a new account on our webserver for the normal monitoring. In addition, a part of our warranty is based on this connection to our webserver. The data before the registration would not be retained on the webserver.

So please use the following steps:

Open the portal www.alphaess.com.

Please fill in "Username", "Password" and click "Login", if you have registered. If not, please register following these steps



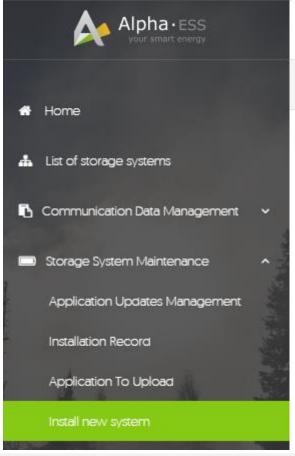


In this form, all blanks marked with an asterisk must be filled out, you can choose End user or installer.

More detailed information can be obtained in <u>Online Monitoring Webserver</u> installation Manual.

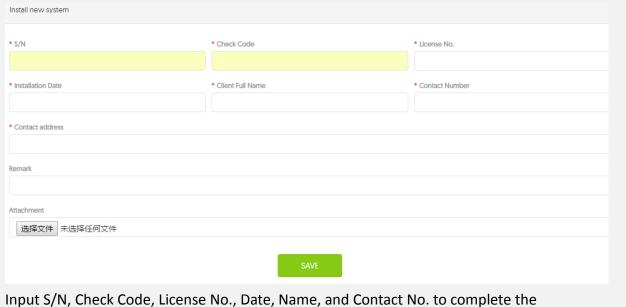


5.2 Registering License



registering process.

Click Install new system to register the license No.





6. Annex

6.1 Datasheet – AlphaESS Storion-SMILE5

System		
Model	Storion-SMILE5	
Battery	SMILE5-BAT	
DOD	90%	
Installed Capacity	5.7/11.5/17.2/22.9/28.7/34.4 kWh	
Usable Capacity	5.2/10.3/15.5/20.6/25.8/30.9 kWh	
Cycle Life	≥6000	
Product Warranty	5 Years	
Performance Warranty	10 Years	
Phase	Single Phase	
Display	LCD	
Communication	Ethernet	
Operating Temperature Range	-10°C To 50°C*	
Humidity	15% - 85%	
Protection Level	IP65	
Dimensions (W x D x H)	600 x 600 x 1100 mm	
Weight	220 kg (With two Batteries)	
Inverter Model	SMILE5-INV	
Nominal Output Power	5000 W / 4600 W (DE)	
Grid Output Voltage Range	180 - 270 Vac	
Grid Frequency	50/60 Hz	
Max. Input PV Power	6600 W	
Max. Input PV Voltage	580 Vdc	
Max. Input PV Current	2*15 A	
Backup	UPS	
Grid Regulation	VDE-AR-N 4105, VDE 0126-1-1, AS 4777.2 2015, CEI 0-21:2014,G59/3	
Safety	IEC 62109-1&-2	

^{*}Only discharge when the temperature is below zero, Battery decrease power output when the temperature is above 40°C