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OPERATION & MAINTENANCE MANUAL OF ENERGY STORAGE SYSTEM (ESS)

STORION-T50/T100 (INDOOR, WITH M48112-S)



Copyright Statement

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01 Introduction

1.1 Brief Introduction

This manual applies for Storion-T50/T100 Li-ion battery energy storage system, mainly includes:

(1) Safety introduction

Introduces the product use, operating notes and qualification of operators of T50/T100 Li-ion battery energy storage system.

(2) Product description

Describes product appearance, product characteristics, system composition and major functions of T50/T100 Li-ion battery energy storage system.

(3) System installation

Introduces the installation of T50/T100, including precautions.

(4) Routine maintenance

Introduces items in maintenance of T50/T100 Li-ion battery energy storage system, including attentions.

(5) Troubleshooting

Introduces the faults of T50/T100 Li-ion battery energy storage system, causes to faults, and processing method.

1.2 Explanation of Terms

(1) Lithium iron phosphate cell (LiFePO₄)

Basic unit constituted by electric poles and electrolytes; each cell is independent and closed.



NOTE: Paralleled cell cannot be regarded as an independent cell, even repacked as one whole battery pack.

(2) Lithium iron phosphate pack

The pack is made up of battery monitoring circuit, battery equalization circuit, electrical connectors, communication interfaces, thermal management devices and multiple Lithium iron phosphate cells.



NOTE: For packs from same company, all the details such as physical size, working performance and interface specification should be consistent so that all the packs are compatible and interchangeable.

(3) Battery management system

Electronic equipment collection for monitoring the operating information of cells, packs and system units (such as voltage, current, temperature, protective parameter of batteries), evaluating the state of charge (SOC), the state of health (SOH) and cumulative processed energy and protecting batteries for safety, etc.

(4) Battery system unit

Batteries connected in series/parallel in the pack with a battery management system (BMS) in which accesses to DC side of a bidirectional converter .

(5) Storage unit

A combination of a bidirectional converter and a battery system unit, which can be used as an independent load or be controlled directly by monitoring system.

2.1 Keep the Manual

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

The PCS should be operated in strict accordance with the description in the manual, in case of the damage or loss to equipment, personnel and property.

This manual should be kept carefully for maintenance and repair.



NOTE: To ensure optimal reliability and to meet warranty requirements, the Energy Storage System must be installed according to the instructions in this manual.

2.2 Operator Requirements

The operators should get a professional qualification, or be trained by qualified person.

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 carrying out maintenance work it has to be at least two operators in the field all the time. They can't operate on any equipment until they are all powered off and fully discharged.

It is strictly prohibited for any maintenance operation when equipment is on or charged.

**NOTE:**

- (1) If the installer leaves the site, but the system during debugging should be shut down in time, including batteries and PCS.
- (2) When the system fails, please refer to the troubleshooting table to solve the problem first. If the problem cannot be solved, please contact AlphaESS engineers. If you cannot contact the engineers in time, please shut down the system.

If the equipment is damaged due to unauthorized operation or without following the above precautions, it will not be covered by the warranty.

2.3 Protection of Warning Sign

The warning sign contains important information for the system to operate safely and it is strictly prohibited to be torn or damaged.

Ensure that the warning sign is always clear.

The signs should be replaced immediately if damaged.

2.4 Setting of Warning Sign for Safety

To prevent erroneous operations and accidents caused by unrelated personnel nearby, the suggestions below should be followed during the instruction, maintenance and repairing:

Obvious signs should be set at the front and rear-level switch in case of accidents caused by false switching.

Warning signs or tapes should be set near the operation areas.

Keys of the system must be pulled out after maintenance or operation.

2.5 Live Line Measurement

High voltage in the container. Touching by accident may cause vital electric shock.

Equipment protection must be taken when do live line measurements (e.g. insulation gloves).

The measuring equipment should be connected and used correctly to ensure personnel safety.

When measuring, at least two workers are needed.

2.6 Measuring Equipment

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

Ensure the connection and operation to match the specification in case of electric arc or shock.

2.7 Electrostatic Prevention

Contact or improper operation of the printed circuit board or other ESD sensitive components may result in damage to the device. Unnecessary contact should be avoided.

2.8 Moisture Prevention

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

Do not open the container door if the humidity is higher than 95%.

Repairing or maintaining activities in wet conditions should be avoided or limited.

2.9 Operation after Power Failure

The battery system belongs to energy storage system, which maintains fatal high voltage even when the DC side is disconnected. Therefore, touching of the battery output is strictly prohibited.

The PCS maintains fatal voltage even when both the DC or AC side are disconnected, so it must be tested by the multimeter for safety before operation.

2.10 Minimum Personal Protective Equipment

For the safety of operators to the system, personal protective equipment are required. During the operation, following protective equipment are required:

No.	Item	Notes
1	Work clothes	
2	Protective shoes	
3	Protective glasses	

When doing maintenance works such as checking cables or wires, measuring voltage, replacing small electrical parts or cleaning modules and brackets, as minimum the following protective equipment are required:

No.	Item	Notes
1	Work clothes	
2	Protective shoes	
3	Protective glasses	
4	Insulated gloves	For touching live parts



NOTE: All metal tools during maintenance should be insulated.

When replacing modules, the following protective equipment are required:

No.	Item	Notes
1	Work clothes	
2	Protective shoes	
3	Protective glasses	
4	Insulated gloves	For touching live parts



NOTE: When replacing modules, the hydraulic lift should be used carefully in case that the modules may fall down. All workmen are suggested to wear high-safety and high strength protective shoes to protect their feet.

3.1 Function Description

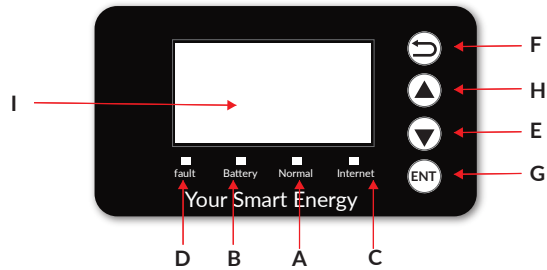


Figure 3-1 EMS Interface

Table 1 Function Description

Object	Name	Description
A	Indicator LED	Green: The system is operating normally
B		Green: Allow the battery to charge or discharge Flash: Don't allow the battery to charge or discharge
C		Green: Server Connected
D		Red: Fault
E	Button Function	Down Button: Move cursor to downside or decrease value
F		Return Button: Exit the current interface or function
G		ENT Button: Confirm the selection
H		Up button: Move cursor to upside or increase value
I	LCD Screen	Display the information of the inverter in this LCD screen

3.2 Introduction

If you find the manual content is inconsistent with the software version, please contact AlphaESS in time.

Power	0W
Pload	00.0kWh
Battery	%
offGridMode	

Main Interface

Main Interface displays the system working status and information, including:

- Power: Total AC output power
- Pload: Total load power.
- Battery: State of charge (SOC).
- offGridMode: Current working state of the equipment, including alarm type.

In the Main interface, press ENT key to enter the Menu.

3.2.1. Main menu

Main menu	Status	System status data
	History	System historical data
	Setting	System settings
	Information	System message

3.2.2. Status

Status	Grid	Uab/Ubc/Uca	The line voltage on the AC side of PCS
		Ia/Ib/Ic	Phase current on the AC side of PCS
		F	Frequency on the AC side of PCS
		PInv	Output power on the AC side of PCS
		PmAC	Total power read by meter on grid side
		PmDC	Power read by meter on PV inverter side
	Solar	U1	PV1 voltage
		I1	PV1 current
		P1	PV1 power
		U2	PV2 voltage
		I2	PV2 current
		P2	PV2 power
		Pm_dc	PV inverter output
	Battery	U	Battery voltage
		I	Battery current
		P	Battery power
SOC		Battery SOC	
RelayL		Relay status	

Status	UPS	-	
	Communication	BMS	BMS communication status
		Net	Network communication status
		Meter1	Grid meter communication status
		Meter2	Meter of PV inverter communication status
		PCS	PCS communication status
		AndroidLCD	No used
		Pvcb	PV combiner box / PV inverter communication status
		Air_Con	Air conditioner communication status
		Dispatch	Dispatch communication status
		InEmuCom	No used
		PHY_Conn	No used
		STSCom	No used

3.2.3. History

History	Einput	Total energy purchased from the grid log
	Eoutput	Total energy of feedin
	Edischarge	Total energy discharged from battery
	Epvtotal	Total energy of PV generation
	Egridcharge	Total energy charged by the grid to the battery
	Echarge	Total battery charging energy
	Error Logs	Alarm details

3.2.4. Setting

Setting	Function	Solar	Storage Cap	Set the installed PV capacity of the energy storage machine
			On Grid Cap	Set the installed PV capacity of the grid-connected inverter (if the PV inverter is controllable, it is the total rated power of the PV inverter)
			On Grid InvNum	Set the number of PV inverters
		Battery	Bat Model	View battery model
			SOC Calibration	Set whether to calibrate SOC

Setting	Function	Battery	Battery Ready	Reserved		
			CloseRelay	Set whether to forcibly close the relay		
			Soc50Flag	No used		
			Set ID	Set battery cluster ID (Only for M48112-S)		
		Grid	Export Control	Set the percentage of the maximum feed in limit		
			Pmeteroffset	Enable	Enable	
				Offset	Setting value>0 means buying electricity from the grid, setting value<0 means selling electricity to the grid	
				Start Time 1	Start time 1	
				End Time 1	End time 1	
				Start Time 2	Start time 2	
				End Time 2	End time 2	
			PmeterMax	Set the upper limit of the power meter		
			Peak Shave	Peak ShaveEN	Function enable	
				UpperLimit	UpperLimit	Set peak power
					Start Time 1	Start time 1
					End Time 1	End time 1
					Start Time 2	Start time 2
				End Time 2	End time 2	
				LowerLimit	LowerLimit	Set power of valley period
		Start Time 1	Start time 1			
		End Time 1	End time 1			
		Delta	Allowable error value			
		UPS System	No used			
System Mode	System Mode	System mode selection, optional DC/AC/Hybrid				

Setting	Function	System Mode	Work Mode	Force Charge	Set whether to turn on the force charge function	
				Allow Discharge	Set whether to turn on the discharge time period function (Spontaneous use within the time period, discharge is prohibited outside the time period)	
				Charge Start Time 1	Set the charging start time of the first stage	
				Charge End Time 1	Set the charging end time of the first stage	
				Charge Start Time 2	Set the charging start time of the second stage	
				Charge Start Time 2	Set the charging start time of the second stage	
				Charge cut SOC	Set the upper limit of charging SOC	
				DisCharge Start Time 1	Set the discharge time of the first stage	
				DisCharge End Time 1	Set the first stage to stop the discharge time	
				DisCharge Start Time 2	Set the discharge time of the second stage	
				DisCharge End Time 2	Set the second stage to stop the discharge time	
				Discharge Cut SOC	Set the lower limit of discharge SOC in gridconnected mode	
				ChargePower	Power	Set the upper limit of force charging power
				BackUp	LoadCutSoc	Set the off-grid mode to cut off the load SOC, LoadCutSoc < LoadTiedSoc
		LoadTiedSoc	Set the off-grid mode to cut off the load and then connect to the SOC of the load again, LoadCutSoc < LoadTiedSoc			
		AirSelect	Choose an air conditioner brand			
		BackupBox	YES			
		CT Meter	CT Enable	Enable		
			CT Ratio	CT Ratio		

Setting	Function	Generator	GeneratorEN	Set whether the DG function is turned on	
			Generator-Mode	SOC	Set DG working mode to SOC mode
				TOU	Set DG working mode to time period mode
				Manual	Set DG working mode to manual mode
			GCSOCStart	Set the SOC for starting charging by DG in SOC mode	
			GCSOCEnd	Set the SOC for ending charging by DG in SOC mode	
			GCTimeStart	Set the time to start charging by DG in TOU mode	
			GCTimeEnd	Set the time to end the charging by DG in TOU mode	
			GCOOutput-Mode	GCRated	Set DG power control mode to rated power mode
				GCCharge	Set DG power control mode to battery charging power mode
			GCCharge-Power	Set PCS charging power in GCCharge mode	
			GCRated-Power	Set DG rated power	
			GCRated-percent	Set DG rated output ratio	
			PCS	ModeOn	Boot the PCS
		ModeOff		Shutdown the PCS	
		ClearFault		Clear PCS errors	
		OnGridCmd		Set to grid-connected mode	
		OffGridCmd		Set to off-grid mode	
		MaxCharge-Curr		PCS maximum charging current	
		MaxDis-ChargeCur		PCS maximum discharge current	
		Energydis-patch	Dispatch mode, fixed as AC_Dispatch		

Setting	Function	PCS	AC_Tied	AC_Grid	Set the AC power supply to the grid
				AC_Generator	Set the AC power supply to DG
			Minv	Select inverter model, optional T30/T50/T100/T150/TB250/TB500/TB100	
			MinLowVbat	PCS battery voltage lower limit	
			MaxHighVbat	PCS battery voltage upper limit	
			MaxHighVbat	PCS battery voltage upper limit	
			EquaChgVbat	PCS battery equalization voltage	
			GridType	PCS AC wiring mode, three-phase four-wire system	
		Dispatch	CtrlMode	Local	Set the control mode to local
				Remote	Set the control mode to remote
			Protocol	Scheduling protocol selection, Alpha/Nio	
			Dev_addr	Scheduling device address	
			EMS_timeout	Scheduling timeout 0 means unlimited time for EMS connection. If the timeout is not set as 0, EMS will not be connected when the time is out	
			ComMode	Set the dispatching communication method, RS485 is used by default, CAN/LAN is to be developed	
	ModbusRTU		Modbus baud rate selection, can be set to 19200 or 9600 (need to re-power after setting)		
	ModbusTCP		Server IP	No used	
		Server Port	No used		
		Client IP	No used		
	MSID	No used			
	NioCtrl	Customized use for customers Nio			
	Safety	No used			
Restart	Restart EMS				
System	Date Time	Set time and date			
	Ethernet	IP method	Set the IP allocation method to manual		
		Set the IP allocation method to automatic			
	IP Address	Set IP address			

Setting	System	Ethernet	Subnet Mask	Set the subnet mask	
			Default Gateway	Set the default gateway	
			MAC Address	Set the MAC address, here is a fixed MAC address	
		New password	No used		
		Language	English	Set language to English	
			Deutsch	No used	
		Reset Energy	Clear inverter power statistics		
		Reset Meter	Clear the energy statistics of the meter		
		Factory Reset	Factory Reset		
		Factory Mode	No used		

3.2.5. Information

Information	SN	System serial number	
	Model NO.	System Model	
	Meter Model	No used	
	TOP_BMU	TOP BMU software version	
	BMU Ver	BMU software version	
	LMU Ver	LMU software version	
	ISO Ver	ISO software version	
	BMSCommVer	No used	
	EMS Ver	H_Ver	EMS hardware version
		S_ver	EMS software version

04 Operation

4.1 Check before Operation

Before operation, please check the equipment according to following procedures: If no sign of damage is inspected visually outside the system module and all the battery and Grid switches are in the "OFF" position, you will

- A. Check whether the DC input wiring of the energy storage system and the AC output wiring are normal and whether the grounding is good;
- B. Check whether the polarity of the wiring is correct;
- C. Check whether the EPO button in reset state of PCS

4.2 Power-on Procedures

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

- A. Turn on the molded case circuit breakers of HV900112 in each cluster respectively. From left to right: OFF- triggered position-ON;



NOTE: Time two clusters switching on should be more than 5s.

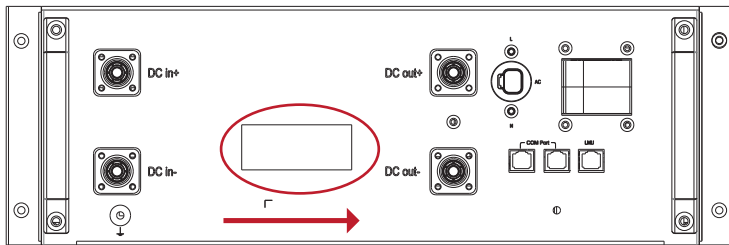


Figure 4-1 Turn on the molded case circuit breaker

- B. Turn on the AC air switch of HV900112 in each cluster respectively. If there is an AC main switch, turn it on.

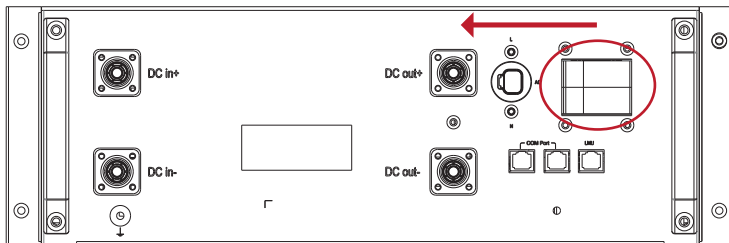


Figure 4-2 Turn on the AC switch

- C. After the power is on, the LED on the batteries and HV900112 starts flashing.
- D. After waiting for about 2 minutes, check the status of each HV900112 on the EMS display. You can check it according to the following table. If the value displayed on the EMS and the use in the table below, the battery output is normal.



NOTE: Inspection steps : EMS->Status-> Battery->RelayL;

Table 2 Battery status comparison table

ID	RelayL	ID	RelayL	ID	RelayL	ID	RelayL
1	1	6	32	11	1024	16	32768
2	2	7	64	12	2048	17	65536
3	4	8	128	13	4096	18	131072
4	8	9	256	14	8192	19	262144
5	16	10	512	15	16384	20	524288

Example: ID1+ID5=1+16=17; ID2+ID6+ID8=2+32+128=162

- E. If the battery status is correct, turn on the battery and PV switches of the system by pushing up the switch handles. The green indicator of the system starts flashing. After 10 seconds, the red indicator is on.

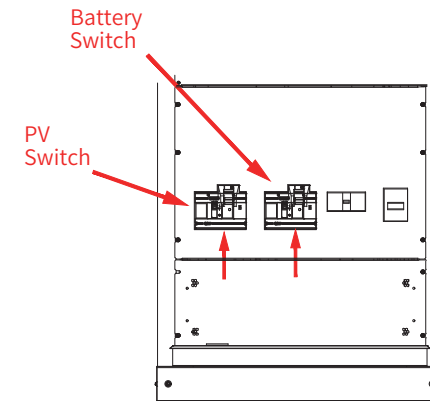


Figure 4-3 Turn on the PV Switch and Battery Switch

- F. Turn on the load switch and grid switch by pushing up switch handles.

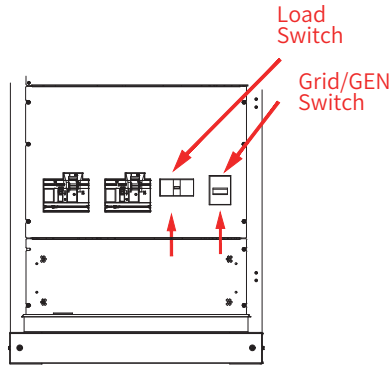


Figure 4-4 Turn on the Load Switch and GEN/Grid Switch

G. Normal system operation

After the system is powered on, it will be switched on automatically if there are no errors and warnings.

4.3 Power-off Procedures

The system shall be powered off according to following steps:

- A. Turn off all of the loads.
- B. Turn off two AC switches of the PCS.
- C. Turn off two DC breakers of the PCS.
- D. Turn off the AC air switch of HV900112 in each cluster.
- E. Turn off the MCCB of HV900112 in each cluster.

05 EMS operation

5.1 Off-Grid Mode

Check the settings on the TOP BMU box:

- A. Check the relay status of HV900112 : EMS->Status-> Battery->RelayL;
- B. Check the battery type : EMS->Setting->Function->Battery->M48112-S;
- C. Check the running mode is AC_Generator: EMS->Setting->Function->Pcs-> AC_Tied ->AC_Generator (Password : 1111)
- D. Check the system software type : EMS->Setting->Function->Pcs->Minv->T50/T100;
- E. Check the STS status is enable : EMS->Setting-> Function->Backup-> BackupBox -> Backup_EN->YES;
- F. Check the meter status is disable : EMS->Setting-> Function->CT Meter-> Enable->NO;
- G. Check the system mode is DC : EMS->Setting-> Function->System Mode-> DC;
- H. Check the maximum charge power of system : EMS->Setting-> Function->System Mode-> ChargePower->Power->50kW/100kW;
- I. Set up the PV storage capacity : EMS->Setting-> Function->Solar-> Enable->Storage Cap;
- J. Set up the generator parameters
 - a. Open the generator : EMS->Setting-> Function->Generator-> Enable->YES;
 - b. Check the generator mode is SOC Mode: EMS->Setting-> Function->Generator-> GeneratorMode->SOC Mode;
 - c. Check the SOC start is 30%: EMS->Setting-> Function->Generator-> GCSOCStart ->30%;
 - d. Check the SOC end is 55%: EMS->Setting-> Function->Generator-> GCSOCEnd ->55%;
 - e. Check the generator output mode is GCRate: EMS->Setting-> Function ->Generator -> GCOOutputMode->GCRate;
 - f. Set up the rate power of generator : EMS->Setting-> Function->Generator-> GCRatePower;
 - g. Check the coefficient : EMS->Setting-> Function->Generator-> GCRatedPercent ->80%;

5.2 On-Grid Mode

5.2.1. Self-Consumption

- A. Check the relay status of HV900112 : EMS->Status-> Battery->RelayL;
- B. Check the battery type is M48112-S : EMS->Setting->Function->Battery-> M48112-S;

- C. Check the running mode is AC_Grid: EMS->Setting->Function->PCS-> AC_Tied ->AC_Grid (Password : 1111);
- D. Check the system software type : EMS->Setting->Function->Pcs->Minv->T50/T100;
- E. Check the STS status is enable : EMS->Setting-> Function->Backup-> BackupBox -> Backup_EN->YES;
- F. Check the meter status is enable : EMS->Setting-> Function->CT Meter-> Enable-YES;
- G. Check the meter ratio is correct : EMS->Setting-> Function->CT Meter->Ratio->80;
- H. Check the system mode : EMS->Setting->Function->System Mode->DC / AC / Hybrid;
- I. Check the maximum charge power of system : EMS->Setting-> Function->System Mode-> ChargePower->Power->50kW/100kW;
- J. Set up the discharge cut SOC of the system: EMS->Setting-> Function->System Mode-> DischargeCutSOC->11%;
- K. Set up the PV storage capacity : EMS->Setting-> Function->Solar->Storage Cap;
- L. Set up the On Grid capacity : EMS->Setting-> Function->Solar->On Grid Cap;

5.2.2. Pmeteroffset Mode



NOTE: The default PmeterOffset of the system is 0, that means the Pmeteroffset function is off. If this function is on, the EMS would adjust the PCS output power so that the total grid power could meet the set value.

For example if the value of PmeterOffset is set to 20kW, the maximum power absorbed from utility grid is 20 kW.

- (1) If now the load power is <20kW, such as 10kW, and the batteries are not fully charged, the grid will charge the batteries with 10kW and provide power to load with 10kW at the same time.
- (2) If now the batteries are full and the load power is 10kW, the grid power will supply load with 10kW.
- (3) If now the load power is >20kW, such as 30kW, the grid will supply load with 20kW, the rest 10kW will be supplied by T50/T100.
- (4) If the load power is > (Pmeter_offset + Nominal output power of PCS), the setup is invalid. For example:
 - a) For T50: the load power is 75kW, then the grid will supply load with 25kW and T50 will supply 50kW.
 - b) For T100: the load power is 125kW, then the grid will supply load with 25 kW and T100 will supply 100kW.

5.2.2.1 Setting

- A. Turn on the function of Pmeteroffset: EMS->Setting-> Function->Grid-> Pmeteroffset ->Enable->Yes;
- B. Set up the offset power: EMS->Setting-> Function->Grid-> Pmeteroffset->Offset
- C. Set up the first offset start time: EMS->Setting-> Function->Grid-> Pmeteroffset-> Start Time 1;
- D. Set up the first offset end time: EMS->Setting-> Function->Grid-> Pmeteroffset-> End Time 1;
- E. Set up the second offset start time: EMS->Setting-> Function->Grid-> Pmeteroffset-> Start Time 2;
- F. Set up the second offset end time: EMS->Setting-> Function->Grid-> Pmeteroffset-> End Time 2;

5.2.3. Peakshaving

- A. Turn on the function of peak shave : EMS -> Setting -> Function -> Grid -> peakshave -> PeakshaveEN -> Yes;
- B. Set up the peak power: EMS -> Setting -> Function -> Grid -> peakshave -> Upperlimit;
- C. Set up the valley power: EMS -> Setting -> Function -> Grid -> peakshave -> Lowerlimit;
- D. Set up the Delta power: EMS -> Setting -> Function -> Grid -> peakshave -> Delta;
- E. Set up the first peak shaving start time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> PEAK_T1-START;
- F. Set up the first peak shaving end time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> PEAK_T1-END;
- G. Set up the first valley filling start time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> FILL_T1-START;
- H. Set up the first valley filling end time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> FILL_T1-END;
- I. Set up the second peak shaving start time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> PEAK_T2-START;
- J. Set up the second peak shaving end time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> PEAK_T2-END;
- K. Set up the second valley filling start time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> FILL_T2-START;
- L. Set up the second valley filling start time: EMS -> Setting -> Function -> Grid -> peakshave -> peakttime -> FILL_T2-END;

5.2.4. Time Period Charge and Discharge Mode

- A. Turn on the function of force charge: EMS->Setting-> Function->System Mode-> Force Charge->Enable;
- B. Set up the first charge start time: EMS->Setting-> Function->System Mode-> Charge Start Time 1;
- C. Set up the first charge end time: EMS->Setting-> Function->System Mode-> Charge End Time 1;
- D. Set up the second charge start time: EMS->Setting-> Function->System Mode-> Charge Start Time 2;
- E. Set up the second charge end time: EMS->Setting-> Function->System Mode-> Charge End Time 2;
- F. Set up the charge cut SOC of the system: EMS->Setting-> Function->System Mode-> Charge Cut SOC;
- G. Turn on the function of allow discharge: EMS->Setting-> Function->System Mode-> Allow Discharge->Enable;
- H. Set up the first discharge start time: EMS->Setting-> Function->System Mode-> Discharge Start Time 1;
- I. Set up the first discharge end time: EMS->Setting-> Function->System Mode-> Discharge End Time 1;
- J. Set up the second discharge start time: EMS->Setting-> Function->System Mode-> Discharge Start Time 2;
- K. Set up the second discharge end time: EMS->Setting-> Function->System Mode-> Discharge End Time 2;
- L. Set up the discharge cut SOC of the system: EMS->Setting-> Function->System Mode-> DischargeCutSOC->11%;

06 Meter Instruction

6.1 Function Description

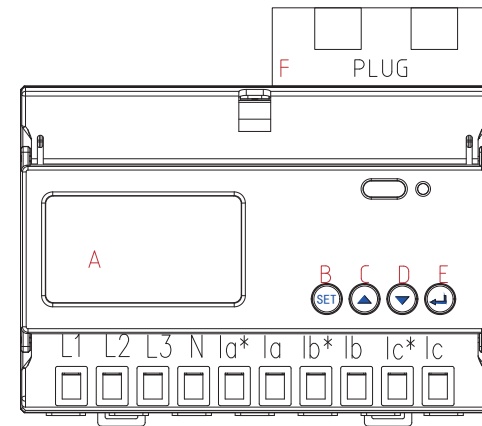






Figure 6-1 Schematic diagram of the appearance of the meter

Table 3 Function Description






Object	Name	Description
A	Display Screen	Data display and setting display
B		Menu button: Enter / Exit menu.
C		Up button: View the voltage and current in the viewing interface, move left in the programming interface and modify the flashing shift.
D		Down button: View the power in the viewing interface, move right in the programming interface and modify the flashing shift.
E		Enter button: Check the power in the viewing interface and save the settings in the programming interface.
F	Plug	Connect to EMS or other meters through network cable to realize communication between devices.

6.2 Introduction

6.2.1. Introduction to the display interface

Examples of display interface:

Table 4 Partial display interface diagram

 <p>Current forward active energy 12.34kWh</p>	 <p>Current reversing active energy 12.34kWh</p>
 <p>Current total power 1.234kW</p>	 <p>Current positive active power demand 1.234kW</p>
 <p>Phase A voltage 123.4V</p>	 <p>Phase A current 12.34A</p>

NOTE: The above is just a part of the display interface. The display mode of other interfaces is similar to the above figure. You can determine the display meaning according to the information displayed on the interface.

6.2.2. Introduction to programming interface

- 1.Press “SET” and the screen shows “PASS”
- 2.Press “ENT” and the screen shows “0000”
- 3.Input “0001” as the password and press “ENT”
- 4.Set the parameters
- 5.After settings, press “SET” and the screen shows “SAVE”
- 6.Select “YES” and press “ENT” to save the settings

NOTE: The above list is the key sequence interface when the ADL3000 is equipped with all functions. If there is no customized function, there is no relevant display interface. The displayed values are all primary data. Please Make sure that the set ratio is consistent with the actual ratio.

6.3 Meter setting

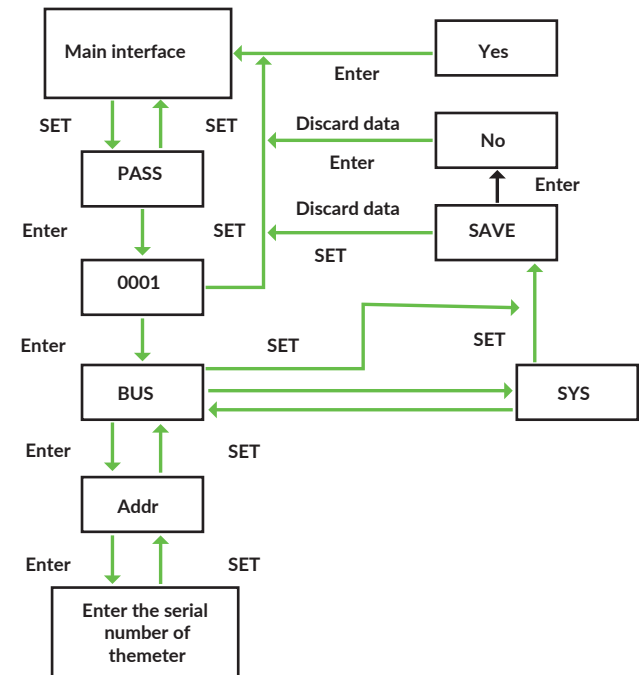


Figure 6-2 Flow chart of meter setting

6.3.1. Setup in on-grid mode

- A. Press "SET" to enter the programming interface;
- B. Enter the password 0001 and press "Enter";
- C. See "BUS1" and press "Enter";
- D. See "Addr" and press "Enter" ;
- E. Use the up and down buttons to set the meter address.If the system is in the AC mode or Hybrid mode, the grid side meter is "001" and the PV inverter side meter is "002";If the system is in the DC mode,only need set the grid side meter as "001" ,the interface is shown below:

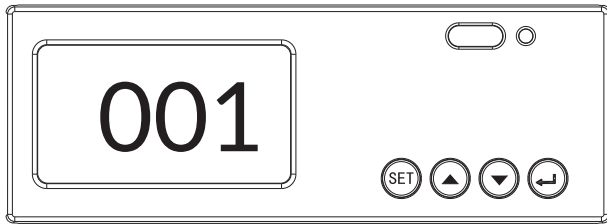


Figure 6-3 Address setting interface

- F. Press "SET" to enter the "SYS" interface;
- G. Press "SET" to enter "SAVE", press "Enter" to select "Yes" to save;
- H. The setting is over;

07 Emergency Stop

When the energy storage system is abnormal, you can press the emergency stop button "EPO" on the cabinet door, and then follow the step A to E in 4.3 to power it off. In order to prevent personal casualty, if you want to repair or open the machine after power-off, please measure the voltage at the input port with the multimeter first. Before any relevant operation, please confirm that there is no grid electric supply! The upper cover plate cannot be opened until the DClink capacitance inside the module discharging completely for about 15 minutes (see warning label on the surface of module for details).

8.1 Register

You have to create a new account on our web server for the normal monitoring. So please use the following steps:

Open the portal: www.alphaess.com.

Enter the username and password, then click “Login” to jump to the home page. There will be a prompt after a failed login.

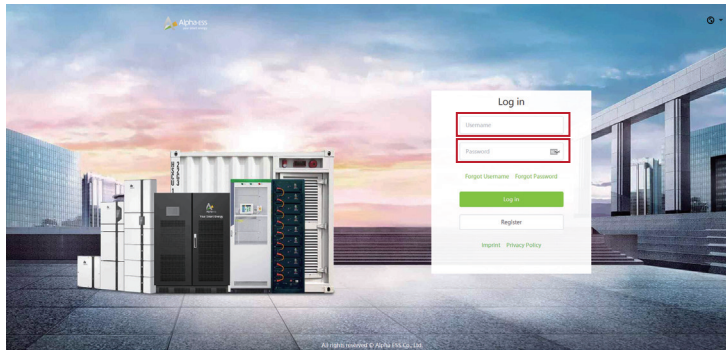


Figure 8-1 Monitoring login interface

Users who haven't yet registered need to click “Register” to visit the registration page: (as shown below)

Register

User Type * S/N

* Username

* Password * Confirm Password

* Country / Region Province/State City/Town

Address * Zip Code

* Language * Contact Person * Contact Number

* E-mail

* Time Zone

Whether to allow automatic update (the automatic upgrade function is to actively update the latest push program to improve the use of the device when the system is online.)

Agree to the above terms ([Terms and Conditions](#))

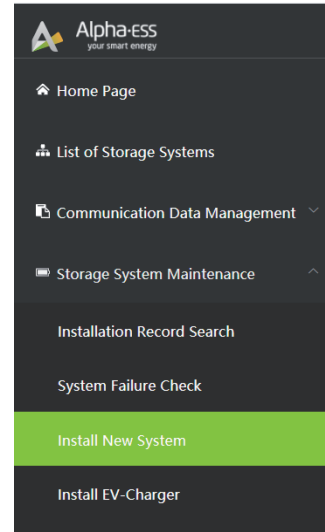
[Imprint](#) [Privacy Policy](#)

Boxes followed by a “*” mark must be filled, and the contents you fill must consist with the facts. Registered users come in 2 types: end users and installers. Please choose between them according to the actual situation. Then you can check whether you need auto upgrade or not according to your own situation. Then Click “SIGN UP NOW” to go to the login page.

More detailed information can be obtained in Online Monitoring Web server installation Manual.

Figure 8-2 Register interface

8.2 Registering License



Click Install new system to register the license No.

Figure 8-3 Menu for installer

Install New System

* S/N * Check Code * License

* Create Time * Customer Full Name * Contact Number

* Address

* Remark

Figure 8-4 System registering interface

Input S/N, Check Code, License No., Date, Name, and Contact No. to complete the registering process.

09 Routine maintenance

9.1 Tool and Consumable Requirements List

9.1.1. Tools and equipment requirements

No.	Name	Model specification (precision)	Unit	Quantity	Remarks
1	Slotted screwdriver	2、4、6、8 "	.....	1	
2	Phillips screwdriver	2、4、6、8 "	.....	1	
3	Wrench		.....	1	
4	Multimeter		.....	1	
5	Clamp Meter		.....	1	
6	Insulation tester		.....	1	
7	Ethernet cable	CAT5E	.....	1	
8	USB-485 data cable	/	.....	1	
9	Digital storage oscilloscope	(If any)	.....	1	
10	Power quality analyzer	(If any)	.....	1	

9.1.2. Consumables list

No.	Name	Model specification (precision)	Unit	Quantity	Remarks
1	Electrical tape	.....	.....	Several disks	.....
2	Plastic cable ties			Several	

9.2 Maintenance list

- A. Check whether the cable connection is loose;
- B. Check whether the cable is aging or damaged;
- C. Check whether the cable insulation tape is dropped;
- D. Check whether the cable terminal screws are loose and whether there are signs of overheating;
- E. Check whether the grounding is normal;

9.2.1. Routine inspection

9.2.1.1 Power on inspection

Operators need to conduct daily inspections of the equipment, and maintain the equipment by observing the status of the equipment indicator lights and software monitoring information.

Check items	Check content	Inspection requirements	Time	Notes
1.Battery				
Indicator light	Check all battery and highvoltage control box indicators when the system is running normally	Flashing green light	Once 6 months	
EMS display	There is nothing wrong with the EMS display when the system is operating normally	The fault light goes out and the interface displays On-Grid Mode	Once 6 months	
Battery cluster flags	Check whether all battery cluster flags on the BMS display of each container are normal	Interface entry: Status Battery Relay to view	Once 6 months	
LMU sampling line	Use the host computer to monitor the voltage, temperature and event conditions of the module, and check whether the sampling line connection terminal and terminal block of the LMU, and the communication line connection terminal block are loose or damaged	The data is normal, there is no looseness or damage	Once 6 months	
System running	Check if there is any abnormal noise when the system is running	No abnormal noise	Once 6 months	
2.PCS				
PCS display	Check the PCS screen	All voltage, power and current data on the PCS should be normal	Once 6 months	

PCS communication	Check if communication is normal	The monitoring software can communicate with the PCS, and the status of the PCS can be displayed normally in the monitoring software	Once 6 months	
PCS internal temperature	Check the internal temperature of the PCS, including battery temperature and module temperature	PCS has no abnormal conditions	Once 6 months	
PCS working status	Work status, view history	Each PCS in the monitoring software is in a normal working state, no fault state	Once 6 months	
PCS fault record	Read error messages and warnings, export failure records	The PCS changes from a normal working state to a fault state, and the records are exported in the monitoring screen	Once 6 months	
PCS AC switch	Visually check the AC switch	AC switch is normal	Once 6 months	
PCS fan	Visually check the fan	The fan is operating normally	Once 6 months	
Function test	Check the PCS startstop, switch control and other functions, the control function should be normal.	Functioning normally	Once 2 years	
Protective function	Check DC side over/under voltage, over current, short circuit, grounding protection, and AC side over/under voltage, over current, overload, over temperature, three-phase unbalance and other protection functions	The protection function should operate normally	Once 2 years	

9.2.1.2 Power off inspection

When the equipment has been running for a certain period of time, it is necessary to perform power outage maintenance on the equipment. Power outage maintenance includes: power outage inspection, maintenance work, etc.

Check items	Check content	Inspection requirements	Time	Notes
1.Battery				
Connection between batteries	Check whether the wiring harness between batteries is tightly locked	All locked, not loose	Once 6 months	
Connection between the battery and highvoltage control box	Check whether the wiring harness between the Battery and the highvoltage control box is locked	All locked, not loose	Once 6 months	
Connection between highvoltage control box and junction box	Check whether the wiring harness between the highvoltage control box and the junction box is locked	All locked, not loose	Once 6 months	
Connection between junction box and PCS	Check whether the wiring harness between the combiner cabinet and the PCS is locked and whether the temperature is within the standard range	All are locked, no looseness. The marks on all the power connection screws are not misaligned	Once 6 months	
Battery connection	Check whether the connection terminal of the battery power cable is damaged, deformed, or has overheating traces; whether the battery terminal is insulated and protected	The connection terminal and the base are normal, without damage or deformation, and no traces of overheating; All red and black terminal Amphenol connectors are complete	Once 6 months	
High voltage control box connection	Check whether the connecting terminal of the power line of the highvoltage control box is damaged, deformed, and whether there are traces of overheating; whether the terminal of the high-voltage control box is insulated and protected	The connection terminal and the base are normal, without damage or deformation, and no traces of overheating; All red and black terminal Amphenol connectors are complete	Once 6 months	

Battery fixed	Check the fixation between the battery and the battery rack	All battery fixing bolts are tightened	Once 6 months	
Battery grounding	Check whether the battery is well grounded	The rear surface of the front cover of the battery box should be in good electrical connection with the surface of the battery rack and the grounding point (use a multimeter to test the conduction state)	Once 6 months	
Battery rack grounding	Check whether the ground wire of the battery rack is well connected	The battery rack ground wire is well connected to the container, and the ground screw is fixed properly	Once 6 months	
Exterior	Check whether the appearance of all batteries and high-voltage control boxes in the system is normal	No rust or damage	Once 6 months	
Battery rack fixed	Check whether the fixing points at the bottom of the battery rack are good	The battery rack is well fixed	Once 6 months	
Battery rack appearance	Check if the battery rack is rusty or damaged	No rust or damage on the surface	Once 6 months	
Cable lug contact internal resistance	Check the contact internal resistance of the junction box and the cable lug of the PCS wiring harness	There is no dust or other impurities on the surface, and the contact surface cannot be pressed against the heat shrinkable sleeve or wax tube	Once 6 months	
Harness fixed	Check the wiring of the wiring harness	There should be enough cable tie positions for the wiring, and there should be no excessive stress in the fixed position of the root of the wire harness	Once 6 months	

Cable aging	Check whether the cable is aging or damaged	No aging or damage	Once 6 months	
High-voltage control box fixed	Check that the high-voltage control box is well fixed, and the front panel is close to the battery rack to ensure that it is completely grounded	All fixing screws are locked	Once 6 months	
Molded case circuit breaker for high-voltage control box	Check whether the plastic case circuit breaker of the high-voltage control box is closed normally	The high-voltage control box molded case of circuit breaker is closed normally	Once 6 months	
Junction box fixed	Check whether the fixing points at the bottom of the junction box are good	The junction box is well fixed	Once 6 months	
2.PCS				
PCS cable	Check the PCS cable terminal for signs of overheating	No signs of overheating and burning	Once 6 months	
PCS ground	Check if the PCS is properly grounded	No rust and damage	Once 6 months	
PCS fixed	Check the PCS fixation	All fixing bolts have been tightened, and the marks on the screws are not misaligned	Once 6 months	
PCS inlet and outlet	Check the PCS air inlet and outlet for debris	No clutter	Once 3 months	
Primary circuit	Check the power line connection of the primary circuit, test the insulation resistance of the primary circuit to ground	The cable of the primary circuit should be firmly connected, without deformation, broken skin, oxidation, and the insulation resistance should be greater than 10MΩ	Once 12 months	

Switches, circuit breakers, contactors	Test PCS switch, contactor, circuit breaker, protection function	PCS switches, contactors, circuit breakers, and protection functions are normal	Once 12 months	
Lightning protection device	Check lightning protection device, DC fuse	The connection should be firm, the interface should not be oxidized, and the protection action should not be triggered under normal working conditions	Once 12 months	

9.2.2. Routine maintenance

9.2.2.1 Power on maintenance

Maintenance items	Maintenance requirements	Time
1.Battery		
Battery capacity calibration	Complete discharge-charge-discharge cycle	Once 6 months
Battery data analysis	Analyze the recorded BMS data (completed by Alpha employees)	Once 6 months
Check the switch function and trip function of the high-voltage control box circuit breaker	1. The function of the circuit breaker is normal; There should be no voltage when the circuit breaker is disconnected. Use a multimeter to detect the DC voltage gear. 2. Tripping function detection: When the circuit breaker is closed, use the host computer to send a command, and the circuit breaker normally trips.	Once 6 months
Whether the insulation resistance of the DC side of the system is within a reasonable range	When the system is in normal operation, confirm whether the BMS has reported insulation failure. If there is no fault, the insulation resistance is within the reasonable range.	Once 6 months
2.System		
Circuit breaker maintenance	Check the contactors (auxiliary switches or micro switches) in turn every year and ensure their normal operation; Check operating parameters (pay special attention to voltage and insulation)	Once 6 months

Security	Check the LCD screen; Simulate the power off and check whether the communication signal is available during the power off	Once 6 months
3.PCS		
Exterior	Check if the inverter is damaged or deformed	Once 6 months
Operating status	Check whether the inverter makes abnormal noises during operation; Check whether all components are normal during the operation of the inverter; Check the temperature of the inverter shell and use a thermal imager to monitor the temperature of the system	Once 6 months
Environment	Check whether the air inlet/outlet is normal; Check the humidity and dust around the inverter, and ensure that the filter device at the air inlet is working properly	Once 6 months

9.2.2.2 Power off maintenance

Maintenance items	Maintenance requirements	Time
1.Battery		
Fixing the battery rack	The bracket is fastened to the bottom fixing place	Once 6 months
Battery rack grounding	Use a multimeter for grounding test	Once 6 months
Battery fixed	The battery is fastened to the battery holder	Once 6 months
Copper row fixed	Check that the copper bar is well fixed. Please use the same type of copper bar If you need to replace it.	Once 6 months
Insulation protection	Protective cover on battery rack	Once 3 months
Battery label	Replace with the same label	Once 3 months
Battery grounding	Use a multimeter for grounding test	Once 3 months
High control box grounding	Use a multimeter for grounding test	Once 3 months
Junction box grounding	Use a multimeter for grounding test	Once 3 months

Whether the insulation resistance at the DC side of the system is within a reasonable range	Shut down the system, and disconnected all the high-voltage control box voltage control box plastic cases. And use the insulation resistance tester and the DC 1000V gear to test. Both the insulation resistance between the total positive and the ground, and the total negative and the ground of the junction cabinet should be $\geq 5M\Omega$	Once 6 months
Whether the grounding resistance of the battery, high-voltage box, and cabinet is within a reasonable range	Use the multimeter to test separately when the machine is stopped. The test value should be less than 10Ω .	Once 6 months
2.PCS		
PCS live part screws, collection wiring harness, communication wiring harness inspection	The live parts of the PCS screws, collection wiring harness, and communication wiring harness should be normal, without jamming or looseness, and no looseness or looseness of the connectors	Once 6 months
PCS cleaning, antirust inspection	Clean the PCS and check the wiring harness connector for rust	Once 6 months
System cleaning	Clean circuit boards and components; Check the temperature and dust of the PCS. If necessary, use the compressed air of the fan to clean the interior and replace the air filter	Once 6 months
Power circuit connection	Check whether the power cord is loose and fastened; Check whether the power cord and control cable are damaged; pay special attention to the contact surface between the cable insulation and metal! Check whether the insulation tie is off the cable terminal	Once 6 months
Module check	Check or replace the power module to ensure that the power module works normally	Once 6 months
Clean the ventilation baffle or air duct	Paint or use vacuum cleaner to remove the attached dust	Once 6 months
Check SPD	Check SPD (Surge Protection Device)	Once 6 months
PCB	Check and clean the PCB inside the equipment: (1)Whether there is dust accumulation on the circuit board; (2)whether there are burn marks, (3)whether there are loose marks on the wiring terminals, and observe the pins of the terminals to see whether there are pin deformations or oxidation.	Once 6 months
Security	Check the warning labels and replace them if necessary	Once 6 months

Fan repair	Perform routine maintenance on the fan to ensure that the fan operates normally, and dust the module cooling fan.	Once 6 months
Connection of interface and cable	Check whether the screws of the control terminal are loose. If there is any looseness, please use a screwdriver to tighten; Check whether the main circuit terminal is loose; Observe the connection between the inverter and the cable	Once 6 months

9.3 Notes

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

- A. Related safety standards and specifications should be followed in operation and maintenance.
- B. Disconnect all the electrical connections so that the equipment would not be powered on.
- C. Wait for at least 15 minutes after disconnection in case that the residual voltage of capacitors is not decrease to safe voltage. Use a multimeter to ensure the equipment is completely uncharged.
- D. The amount of maintenance staff should be not less than two while maintaining.
- E. The equipment should be repaired by professional staffs and it is strictly forbidden for maintenance staff to open equipment on their own.
- F. Appropriate protective measures should be taken while maintaining, such as insulated gloves, shoes, and anti-noise ear plugs.
- G. Usually the location of the storage system is far away from urban areas. Related emergency rescue measures should be prepared in order to be implemented when necessary.
- H. Life is priceless. Make sure no one would get hurt first.
- I. When the fire is outside the containers, please make sure all doors are closed in case of smoke. Smoke may cause warnings of sensor, but it will not trigger anti-fire system. If the fire spreads into the container, the temperature sensor would work and the whole system would stop.
- J. For single cell, it is better to be sank into water to block burning.
- K. The batteries SOC need to be charged to 30%~50% when the whole system is static for a long time (that is, the batteries has not been charged for two weeks or longer), in case of over discharge.
- L. Please contact us in time if there are any conditions that could not be explained in the manual.

Fault Category	LCD Fault Display	Fault Name	Troubleshooting
BMS	Cell-Temp-Diff	Cell temperature different fault	Shut down the system for about 2 hours, then restart the system to check if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
	Chrg-Ov-Curr	Module charge over current fault	Restart the system to check if the fault is eliminated. If the problem is not resolved, stop any operation on the system and contact AlphaESS customer service.
	Disch-Ov-Curr	Module discharge over current fault	Restart the system, turn off some of the loads to check if the fault is eliminated. If the problem is not resolved, stop any operation on the system and contact AlphaESS customer service.
	Pole-Ov-Temp	Pole over temperature fault	Shut down the system for about 2 hours, then restart the system to see if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
	Cell-Ov-Volt	Cell over volt fault	Restart the system, switch the system to the discharging state, If the error is not eliminated, stop any operation on the system and contact AlphaESS customer service.
	Cell-Volt-Diff	Cell volt different fault	Restart the system to see if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.

Fault Category	LCD Fault Display	Fault Name	Troubleshooting
BMS	Disch-Low-Temp	Cell discharge under temperature fault	Confirm that the ambient temperature is higher than -10°C.. If it is lower than it, please turn on the heating equipment such as heater. If the ambient temperature is higher than -10°C., restart the system. If the problem is not resolved, please contact AlphaESS customer service
	Cell-Low-Volt	Cell under volt fault	Restart the system to see if the fault is eliminated. If the problem is not solved, please contact AlphaESS customer service
	IR_Fail	Insulation resistance fault	Switch off the battery MCCB and measure the impedance of the positive and negative poles of the battery to the ground to see if it is greater than 270KΩ and restart the system. If the problem is not solved. stop any operation on the system and contact AlphaESS customer service.
	Commu_fail_LMU	LMU Communication fault	Check if the communication cable connector between the HV-control box and the battery is not plugged in. If the problem is not resolved, please contact AlphaESS customer service.
	Cell-Ov-Temp	Cell over temperature fault	Stop charging and discharging and then run the system after the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
	Commu_fail_BMU	BMU Communication fault	Check if the communication cable connector between the HV-control box and the TOP BMU is not plugged in. If the problem is not resolved, please contact AlphaESS customer service.

Fault Category	LCD Fault Display	Fault Name	Troubleshooting
BMS	Chrg-Low-Temp	Cell charge under temperature fault	Confirm that the ambient temperature is higher than 0°. If it is lower than below, please turn on the heating equipment such as heater. If the ambient temperature is higher than 0°, restart the system. If the problem is not resolved, please contact AlphaESS customer service.
	Wire-Harness-Err	Wire beam fault	Restart the system to see if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
	Relay Err	Relay fault	Restart the system to see if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
	Temp-Sen-Err	Temperature sensor fault	Restart the system to see if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
EMS	PCS Lost	PCS Lost	Check if the communication cable connector between PCS (Storion-T50/T100-INV: port 9, 10) and TOP BMU (EMS) is connected and restart the system. If the problem is not resolved, please contact AlphaESS customer service.
	Meter1 Lost	Meter1 Lost	Check the communication line between the GRID meter and the TOP BMU (Meter COM port), and restart the system. If the problem is not resolved, please contact AlphaESS customer service.

Fault Category	LCD Fault Display	Fault Name	Troubleshooting
EMS	BMS Lost	BMS Lost	Check if the battery and TOP BMU (BMU) communication cable connector are not plugged in and restart the system. If the problem is not resolved, please contact AlphaESS customer service.
	PV Meter Lost	PV Meter Lost	Check if the communication cable between the PV side meter and the GRID meter is connected. If the problem is not resolved, please contact AlphaESS customer service.
	SD Lost	SD Lost	Restart the system to check if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
	RTC error	RTC error	Restart the system to check if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.
	Fire_Fault	Fire_Fault	Check the system for fire failure. If there is a fire, please extinguish the fire in safe condition. If there is no fire, please check if the DI1 (TOP BMU) interface terminal is connected tightly and restart the system. If the problem is not resolved, please contact AlphaESS customer service.
	Fire Controller Err	Fire Controller Err	Check whether the AC and DC switches on the fire controller are all turned on, and check whether the fire communication is connected to DI2 (TOP BMU). If the problem is not resolved, please contact AlphaESS customer service.

Fault Category	LCD Fault Display	Fault Name	Troubleshooting
EMS	GC_Fault	GC_Fault	Check if DO2 (TOP BMU) is connected properly, and after setting the diesel GENSET to start, measure whether DO2 (TOP BMU)1, 2 is on. If the problem is not resolved, please contact AlphaESS customer service.
	Over_Load	Over_Load	Reduce the number of loads, so that the load required power is less than the rated power of the system. If the problem is not resolved, please contact AlphaESS customer service.
	Over_Curr	Over_Curr	Reduce the number of loads, so that the load required power is less than the rated power of the system. After the load reduction, select fun-PCS-ClearFault on the EMS menu to clear the fault, otherwise the PCS will not operate normally. If the problem is not resolved, please contact AlphaESS customer service.
	PCSMoDeFault	PCSMoDeFault	Check whether the inverter is in the remote control mode. If it is not the remote control mode, please set it to the remote control mode. If the problem is not resolved, please contact AlphaESS customer service.
PCS	AC_Out_volt_F	DC-AC subsystem AC output voltage Fault	Restart the system to check if the fault is eliminated. If the problem is not resolved, please contact AlphaESS customer service.

Fault Category	LCD Fault Display	Fault Name	Troubleshooting
PCS	AC_phase_lost	DC-AC subsystem AC phase lost Fault	Check if there is phase loss in the AC input of the inverter. If there is a phase loss, please power off and reconnect the cable. If the problem is not resolved, please contact AlphaESS customer service.
	off_grid_UPLF	DC-AC subsystem off-grid voltage phase lost Fault	Check if there is phase loss in the AC input of the inverter. If there is a phase loss, please power off and reconnect the cable. If the problem is not resolved, please contact AlphaESS customer service.
	EG_SF	DC-AC subsystem emergency stopped Fault	Check if the emergency stop button is operated manually. If yes, please release the emergency stop button according to the manual. If the problem has not been solved, please contact AlphaESS customer service.
	bat_overload	DC-DC subsystem battery overload Fault	Reduce the load on the grid side, check if the fault is eliminated, If the problem has not been solved, please contact AlphaESS customer service.
	emergent_stopped	DC-DC subsystem emergent stopped Fault	Check if the emergency stop button is operated manually. If yes, please release the emergency stop button according to the manual. If the problem has not been solved, please contact AlphaESS customer service.
	grid_N_line_lost	STS subsystem grid N-line lost Fault	Check if the connection of N phase of the grid, If the problem has not been solved, please contact AlphaESS customer service.
	off_grid_AC_phase_lost	STS subsystem off-grid AC voltage phase lost Fault	Check if the off-grid phase is insufficient, If the problem has not been solved, please contact AlphaESS customer service.