ATESS HPS 30/50/100/120/150

混合储能系统用户手册

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ATESS HPS 30/50/100/120/150

Hybrid energy system user manual

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1 简介

1.1 内容介绍

本手册将为使用深圳时代能创能源科技有限公司（以下简称时代能创能源科技）ATESS HPS系列光储一体机（以下简称储能控制器）的用户提供详细的产品信息和安装使用说明。
请在使用本产品前仔细阅读本手册，并将本手册妥善存放在便于安装、操作、维护人员获取的地方。
时代能创能源科技对本手册的任何修改，将不会通知用户。手册内容将不断更新、修正，难免存在与实物稍有不符或者错误的情况。用户请以所购买产品的实物为准，联系当地经销商或登录本公司网站: www.atesspower.com下载索取最新版本的手册资料。

1.2 适用人员

适用人员需具备以下几点：
- 储能控制器必须由获相关部门认证资格的专业电气人员安装；
- 操作人员应充分熟悉整个储能系统的构成及工作原理；
- 操作人员应详细阅读本手册；
- 操作人员应充分熟悉项目所在国家/地区的相关标准。

若在安装过程中有任何问题，安装人员可以联系时代能创能源科技公司。

1.3. 标志

为了确保用户在安装本产品时的人身及财产安全，或高效优化地使用本产品，手册中提供了相关的信息，并使用适当的符号加以突出强调。以下列举了本手册中可能使用到的符号，请认真阅读，以便更好地使用本手册。

	危险 “危险”表示有高度潜在危险，如果未能避免将会导致人员死亡或者严重伤害的情况。
	注意 “注意”表示有潜在风险，如果未能避免可能导致设备无法正常运行和造成财产损失的情况。
	警告！电击危险 设备内含有交流和直流电源终端，必须单独断开每路电源后，至少等待5分钟，使用仪器测量确认安全后才可以进行维修。
	警告，火灾危险 仅适用于安装在混凝土或其他不可燃物上。
	PE端 此处为保护接地(PE)端，安装接地时需要牢固接地以保证人员的安全。
	电击危险 电容存在电击危险，断开所有电源等待5分钟确认安全以后，才可以移动盖板。

安全 2

2.1 使用须知

所有储能控制器安装和服务人员都必须经过培训，并且熟悉在电气设备上工作时要遵守的一般安全规定。安装和服务人员还应熟悉地方规定和安全要求。
- 使用前请仔细阅读本手册，若未按本手册中的说明进行操作而出现设备损坏，本公司有权不进行质量保证；
- 只有合格的电气工程师才能对储能控制器进行操作；
- 设备运行时，除了通过触摸显示屏查看设备运行信息，请不要触碰其它电气部分；
- 所有的电气操作必须符合当地电气操作标准；
- 使用储能控制器并网充放电，需要征得当地供电部门允许，并由专业人员进行相关操作。

1 Introduction

1.1 Contents

This manual will provide detailed product information and installation instructions for users of the ATESS HPS series energy storage integrated inverter (hereinafter referred to as inverter) of Shenzhen ATESS power Technology Co., Ltd. (hereinafter referred to as ATESS). Please read this manual carefully before using the product and store it in a place convenient for installation, operation and maintenance. Users will not be informed of any modification of this manual by ATESS. The contents of the manual will be updated and revised constantly, and it is inevitable that there is a slight discrepancy or error between the manual and the real product, Please refer to the actual products that you have purchased. Users should contact their local distributors or log in to our website: www.atesspower.com to download and obtain the latest version of the manual.

1.2 Target readers

Qualification:

- Only professional electricians certified by relevant departments can install this product.
- The operator should be fully familiar with the structure and working principle of the entire energy storage system;
- The operator should be fully familiar with this manual;
- The operator should be fully familiar with the local standards of the project.

1.3 Symbols

In order to ensure the personal and property safety of the user during installation, or optimally efficient use of this product, symbols are used highlight the information. The following symbols may be used in this manual, please read carefully, in order to make better use of this manual.

	DANGER DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	CAUTION CAUTION indicates there is potential risk, if not avoided, could result in equipment malfunction and property damage.
	Caution,risk of electric shock When battery bank connecting point are exposed, there will be DC voltage in the equipment DC side; and when output breaker is on, there is a potential risk of electric shock.
	Caution, risk of fire hazard Suitable for mounting on concrete or other non-combustible surface only.
	Protective conductor terminal The inverter has to be firmly grounded to ensure the safety of personnel.
	Risk of electric shock, Energy storage timed discharge Electrical shock danger exists in the capacitor; the cover shall be moved at least 5 minutes later after all powers are disconnected.

Safety instructions 2

2.1 Notice for use

Inverter installation and service personnel must be trained and familiar with the general safety requirement when working on electrical equipment. Installation and service personnel should also be familiar with the local laws and regulations and safety requirements.

- Read this manual carefully before operation. The equipment will not be under warranty if failing to operate according to this manual.
- Operation on the inverter must be for qualified electrical technician only.
- When inverter operating, don't touch any electrical parts except for the touch-screen.
- All electrical operation must comply with local electrical operation standards.
- Permission from the local utility company is required before installing the energy storage system and only professional personnel are qualified for the operation.

2.2 正确安装方法

正确安装储能控制器意味着遵循用户手册中的全部说明，涉及设备的运输、安装、电气连接和运行。时代能创能源科技公司对于因未正确使用设备而造成的任何损坏不承担责任。

储能控制器具有IP20的保护等级，是为室内安装设计的。当安装储能控制器时，必须注意用户手册所包含的信息，特别是第5章“产品安装”。
正确使用设备还需要注意以下几点：

- 注意此处及以下部分列出的安全说明；
- 注意储能控制器用户手册说明；
- 考虑与设备相关的技术数据。

2.3 重要的注意事项

注意1：静电可能导致储能控制器损坏
储能控制器可能由于静电放电而造成内部元器件的不可恢复的损坏！
当操作储能控制器时，必须遵守防静电防护规范！

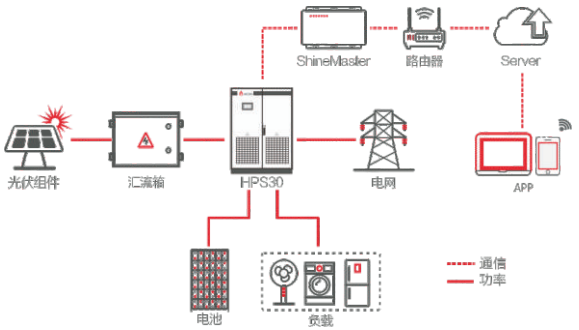
注意2：使用限制
储能控制器不可直接用于连接生命辅助设备和医疗设备！

注意3：工具注意事项
在储能控制器开机前应检查所有安装工具或其他不必要的物品遗留在储能控制器内部！

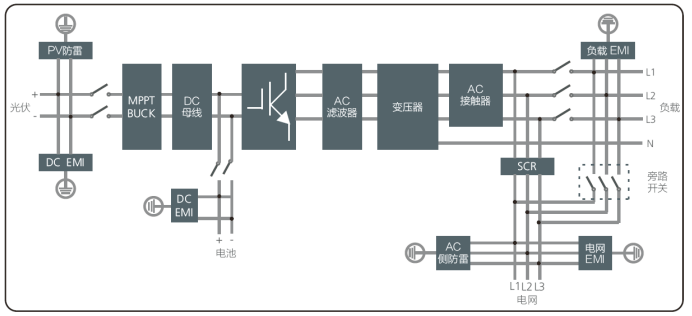
注意4：维护注意事项
维护时，必须保证该储能控制器已安全断电且机器所有带电器件放电完毕，方可操作！

3.1 光储一体并离网储能系统

时代能创能源科技生产的HPS系列是集中型混合储能系统，主要功能是将光伏直流电分配到储能电池或逆变输出，并可实现并离网快速切换，保证不间断供应负载。



3.2 储能控制器电气原理



3.3 主要零部件布局

3.3.1 外部零部件

储能控制器的外部主要部件包括：LED指示灯、LCD触摸屏和启停旋钮、紧急停机按钮等部分。

2.2 Installation

Proper installation requires following all the instructions in the user manual involving transportation, mounting, wiring and commissioning. ATESS does not cover warranty for the inverter damage due to failing to use it properly.

The protection level of the inverter is IP20, which is designed for indoor installation. Please refer to chapter 5 for installation instruction.

Other notice for using the inverter:

- Pay attention to the safety instructions listed here and below;
- Pay attention to the user manual of energy storage controller;
- Technical data related to equipment shall be considered.

2.3 Important note

Item 1: Static electricity can cause damage to the inverter
electrostatic discharge may cause unrecoverable damage to inverter internal components!
When operating the inverter, operator must comply with anti-static protection norms!

Item 2: Restriction
The inverter cannot be directly used to connect the life support equipment and medical equipment!

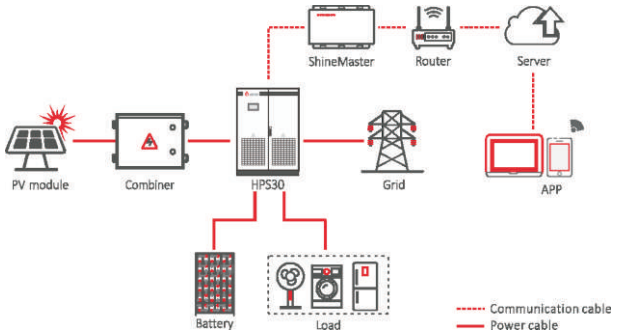
Item 3: Precautions
Make sure installation tools or other unnecessary items are not left inside the inverter before starting up.

Item 4: Maintenance notice
Maintenance can only be carried out after the inverter totally discharged.

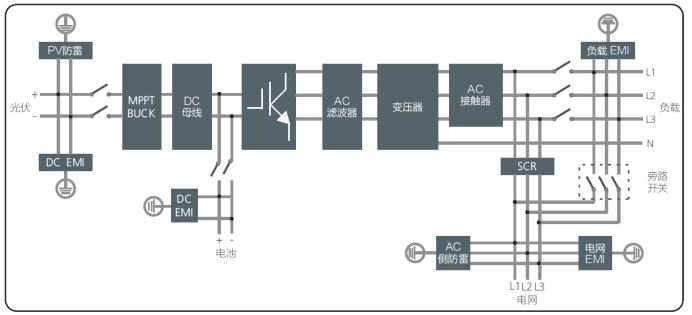
Product description 3

3.1 Energy Storage system

ATESS HPS bidirectional battery inverter is designed for energy storage system, it converts DC current generated by battery bank into AC current and feed it into the load/grid, also it can take power from solar inverter or grid to charge battery to ensure uninterrupted power supply to the load.



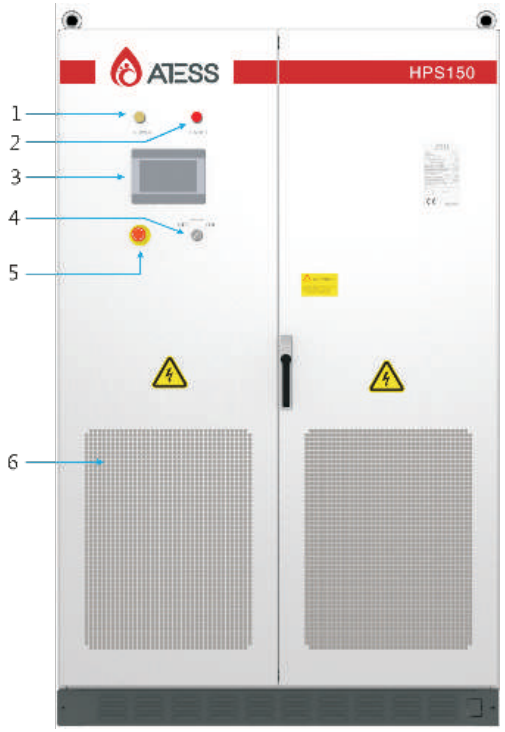
3.2 Circuit diagram of the inverter



3.3 The layout of the main components

3.3.1 External components

The main external components of the energy storage controller include: LED indicator, LCD touch screen, off-on knob, emergency stop button and other parts.



储能控制器的外观说明

序号	部件名称	说明
1	电源指示灯(POWER)	储能控制器系统正常供电时，该指示灯运行，亮黄色
2	储能控制器故障指示灯(FAULT)	储能控制器工作出现故障或未开机运行时，该指示灯运行，亮红色
3	触摸屏（touch Screen LCD）	显示储能控制器运行信息，执行控制命令以及参数设置等
4	启停旋钮(OFF/ON)	储能控制器开关机旋钮
5	紧急停机开关(EMERGENCY STOP)	用于储能控制器紧急停机，切断与外部联系
6	防尘网	防止灰尘进入储能控制器内部

部件说明

➢ 指示灯

本储能控制器采用智能化设计。在逆变电源的最上端为2个显示机器运行状态的LED灯，通过LED指示灯可查看当前储能控制器的工作状态。

LED	含义
POWER	储能控制器系统正常供电时，该指示灯常亮
FAULT	储能控制器工作出现故障或未开机运行时，该指示灯常亮

➢ 紧急停机按钮

注意！
紧急停机按钮仅在紧急情况下使用，例如：系统出现比较严重的故障、发生火灾、发生漏电、操作严重失误等需要立刻停机的现象情况！

紧急停机按钮

紧急停机按钮可立即断开储能控制器与外部所有连接，从而将储能控制器置于安全状态。通过按下紧急停机按钮，设备将被锁定在“关闭” 位置。只有排除所有故障，再顺时针旋转松开紧急停机按钮，然后合上交直流空开，才能恢复机器正常运行。

➢ 启停旋钮

启停旋钮用于控制开启和关停储能控制器。

启停旋钮

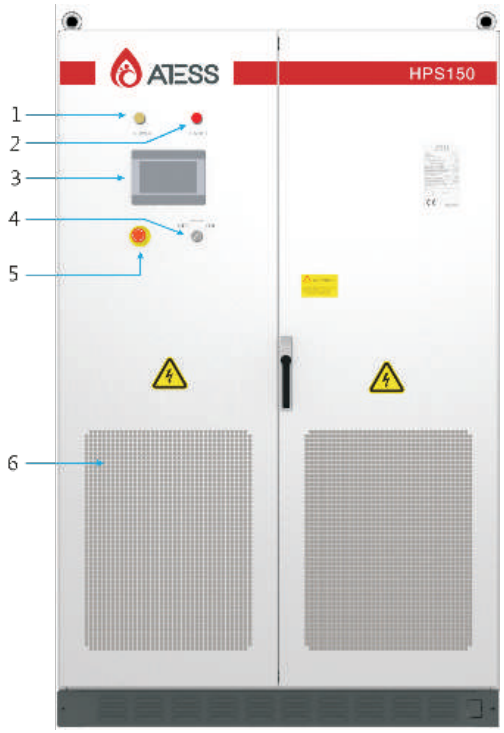
详细开关机流程请阅读第8章“运行”章节。

➢ 触摸屏

显示储能控制器实时运行数据、故障信息记录等信息，详细内容请见第7章节。

3.3.2 内部零部件

储能控制器的内部零部件包括：光伏断路器、电池断路器、电网断路器、维修开关、负载断路器、供电微断、交流防雷开关、PCB板件等。



Appearance description of energy storage inverter

NO	Name	Description
1	Power indicator	When power supply is normal, the indicator displays yellow.
2	FAULT	When inverter is faulty, the indicator displays red.
3	Touch Screen LCD	Operation information display, receive control command and parameters setting
4	OFF/ON knob	Only control the grid-side switch, and does not control the DC-side switch
5	EMERGENCY STOP	Shut down the inverter when pressed down
6	Dust screen	Prevent dust from entering into the inverter

Part description

> Indicator

The energy storage controller adopts intelligent design. There are two LED indicators on the inverter which is used to display the current status of the inverter.

LED	Description
POWER	The indicator lights when power supply to the inverter is normal.
FAULT	The indicator lights when there is failure in circuit system.

> Emergency STOP

The emergency stop button is only used in case of emergency,
such as: serious failure in the grid, fire, etc.

Emergency STOP

The emergency stop button immediately disconnects the inverter from both grid and battery, which ensure the safety of the inverter. By pressing the emergency stop button, the device will be locked in the "off" position. Only release the emergency
stop button by rotating it clockwise and closing AC, DC breaker, can the inverter resume working normally.

> Off-on knob

It is used to start or stop the inverter.

Off-on knob

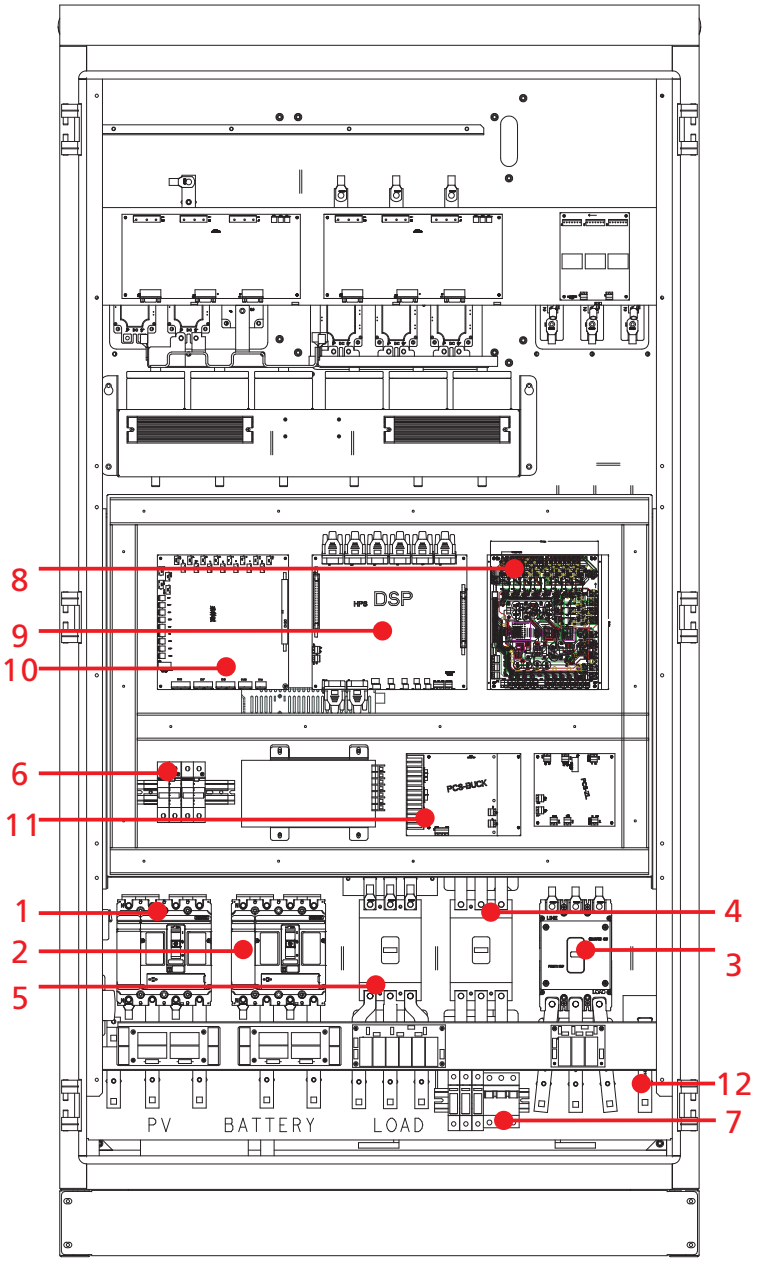
Please read Section 8 "operation" for detailed switch on / off process.

> Touch screen

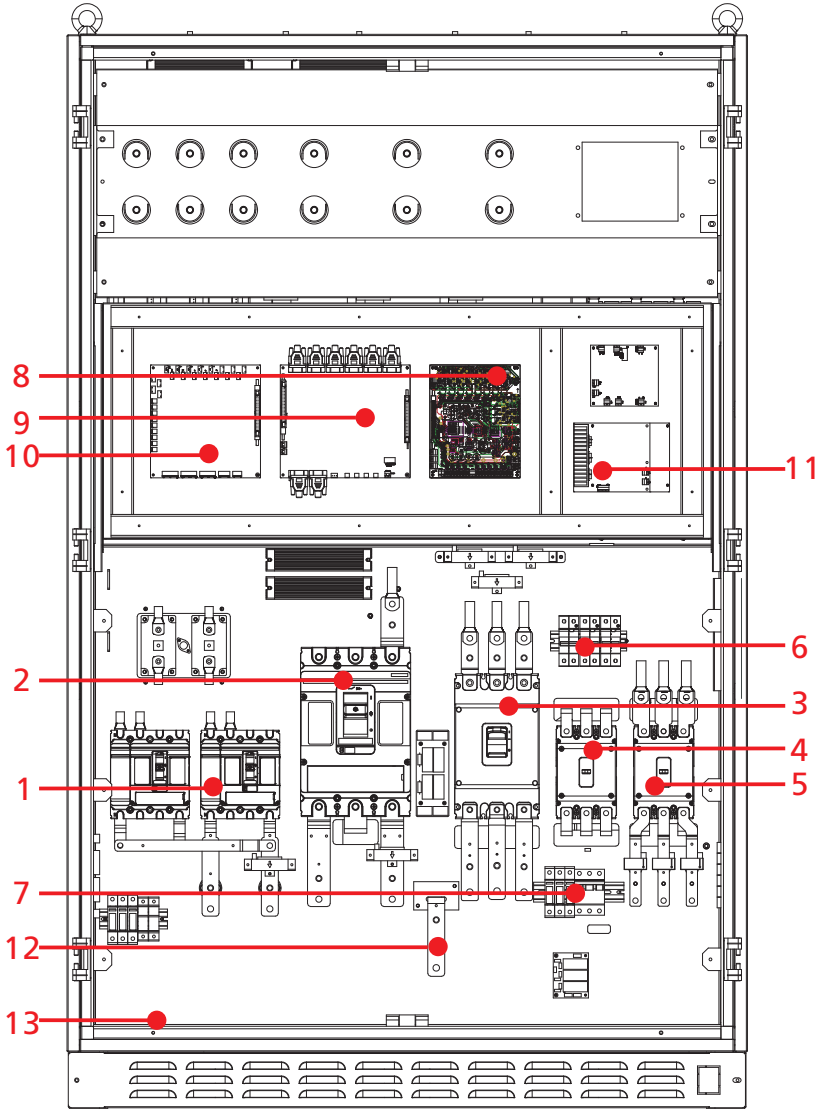
It displays the inverter's operating parameters, power generation, and faulty information record. Please refer to Section 7 for details.

3.3.2 internal component

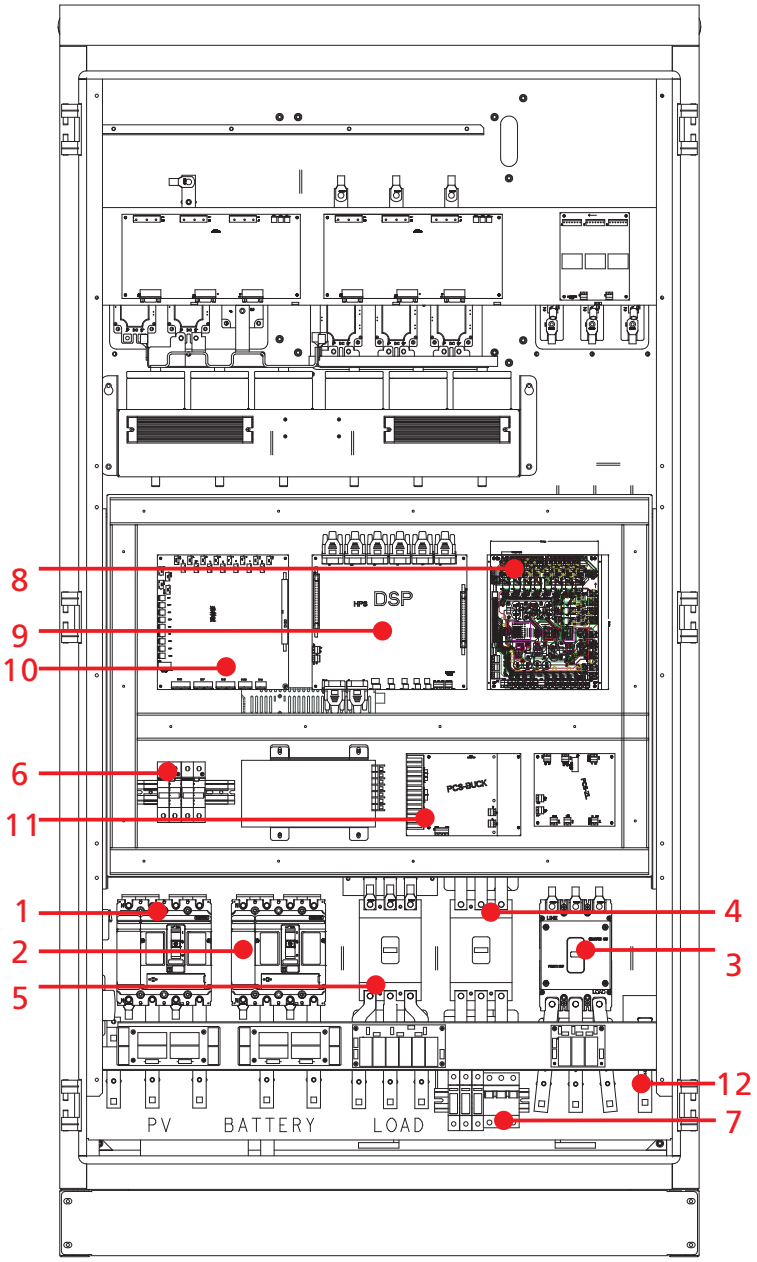
The internal components of the energy storage inverrter include:PV circuit breaker, battery circuit breaker, power grid circuit breaker, maintenance switch, load circuit breaker, power supply micro break, AC lightning protection switch, PCB, etc.



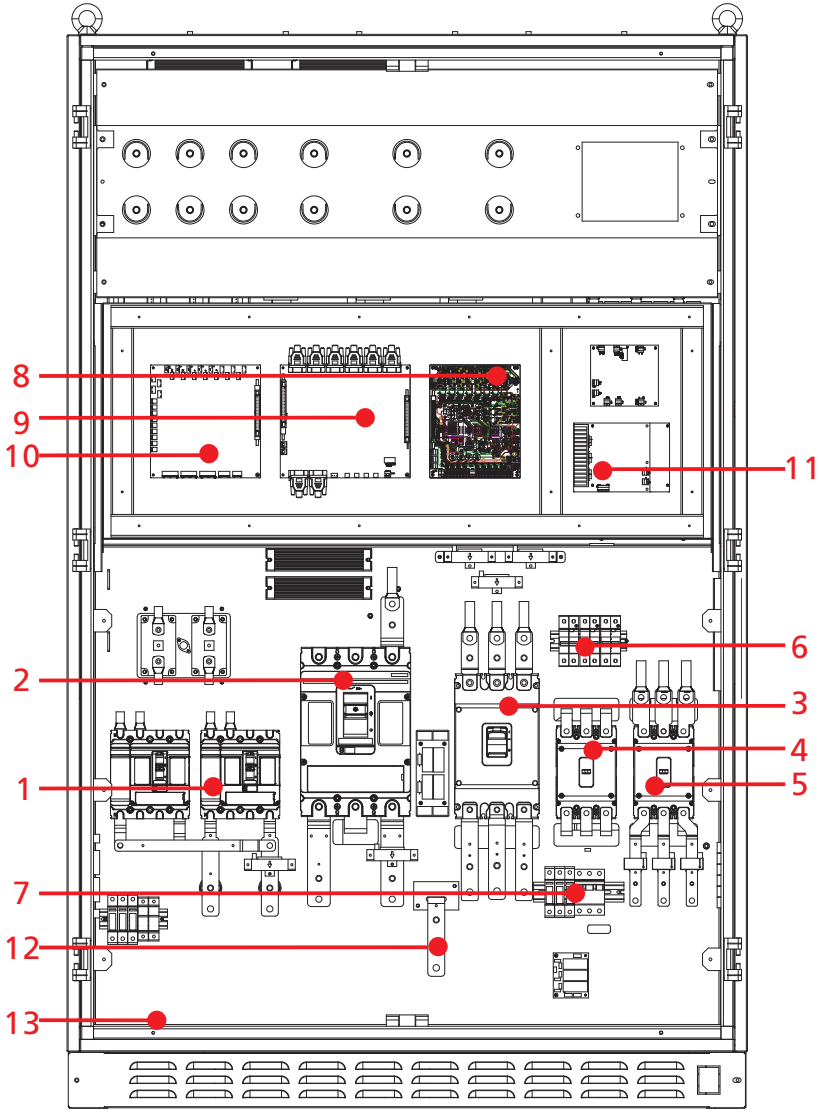
HPS50正面结构图，HPS30基本相同，外观略有差异，请注意实际机器丝印



HPS100/120/150结构布局基本一致，请注意机柜丝印



The front structural drawing of hps50 is basically the same as that of HPS30, with slight difference in appearance. Please pay attention to the printing on machine.



The structural layout of HPS100/120/150 is basically the same, please pay attention to the printing on machine.

序号	部件名称	说明
1	光伏断路器（PV input）	控制光伏与机器的连接与断开
2	电池断路器（Battery input）	控制电池与机器的连接与断开
3	电网断路器（AC input）	控制电网与机器的连接与断开
4	维修开关（BYPASS）	维修开关，详情见9.1.1
5	负载断路器（AC output）	控制负载与机器的连接与断开
6	供电微断*3	机器电源板、风扇供电开关
7	交流防雷开关	交流防雷的开关
8	接口板	储能控制器供电转换PCB板
9	控制板	储能控制器主控板，存在通讯接口
10	采样板	储能控制器采样电压电流温度的PCB板
11	BUCK板	直流供电PCB
12	N排	负载和电网N排接线端子
13	地排	机器接地铜牌

3.4 运行模式及状态

运行模式设置方法请阅读7.2.4章节。

注意！
机器存在多种运行模式，对储能控制器不熟悉的人员请勿擅自修改，需要修改请联系时代能创能源科技售后人员。

3.4.1 并网模式

并网模式下可选功能：

防逆流使能

防逆流使能
1、使能设置为1时，禁止向电网馈电；
2、使能为设置0时，可向电网馈电。

电网和PV同时充电使能

1.使能设置为1时，电网和PV可以同时充电池；
2.使能设置为0时，电网和PV不可以同时充电池。
运行模式及各使能位设置方法请阅读7.2.4章节。

3.4.1.1 负载优先（防逆流功能可选）

1. PV能量充足时，PV优先供应负载，余电充电池。
2. Pv功率不满足负载时，电池自动放电。电池如果放电到放电截止电压或放电截止SOC（取决于电池类型），电池将停止放电，PV和电网一起给负载供电，为保护电池，会用小功率给电池涓流充电，电池充电到电池充电饱和度设定值可恢复供电.
放电截止电压、放电截止SOC、电池充电饱和度详情见7.2章节

3.4.1.2 电池优先（防逆流功能可选）

1. PV能量充足时，优先充电池，余电供负载;
2. PV能量不足时，PV优先给电池充电，电网只供应全部负载不充电池，可选同时对电池充电（PV和电网同时充电使能,此使能出厂时默认打开）;
3. 如果电池优先模式下电池没有放电或者切换到其他模式，为保持电池电化学活性，限流充电一周后，进入电池放电状态，电池放电功率依据电池规格计算。（防逆流时不会放电到电网）;

3.4.1.3 经济模式（防逆流功能可选）

经济模式时间段分为：峰期、平期、谷期，时间段设置方法请看7.2.4章节。
1. 谷期时：工作逻辑与电池优先模式一致。
2. 平期时：
a) 电池不放电带负载，电网不对电池充电；
b) PV能量充足时，PV优先供负载，余电充电池；
c) PV能量不足时，PV与电网联合供负载，PV不对电池充电。
3. 峰期时：
a) 电网不对电池充电；
b) PV能量充足时，PV优先供负载，余电充电池。
c) Pv能量不足时，分两种情况：
（1）电池电压大于放电截止电压或放电截止SOC（取决于电池类型）时，PV和电池输出供负载。
（2）电池电压小于等于放电截止电压或放电截止SOC（取决于电池类型）时，电池不放电，PV和电网联合供负载，不对电池充电。

3.4.1.4 削峰填谷（电网）

说明：该模式需要设置电网上限功率，该值只限制电网取电功率，不限制电网馈电功率。
1. PV功率大于负载和充电功率时，不从电网取电，PV带负载并对电池充电；
2. （PV功率+电网上限功率）大于（负载功率+充电功率时）时，电网和PV同时供电负载并对电池充电。
3. （PV功率+电网上限功率）大于负载功率时，电网和PV优先供负载，余电充电池。
4. （PV功率+电网上限功率）小于负载功率时，电网、PV和电池同时供负载。

NO	Name	Description
1	PV input	Control the connection of battery and HPS
2	Battery input	Control the connection of battery and HPS
3	AC input	Control the connection of grid and HPS
4	BYPASS	Maintenance switch, see 9.1.1 for details
5	AC output	Control the connection of load and HPS
6	Power supply micro break*3	power board, fan power switch
7	AC lightning protection switch	Switch for AC lightning protection
8	Interface board	inverter power supply conversion PCB
9	Controal board	inverter main control board, with communication interface
10	Sampling board	voltage current temperature sampling PCB
11	BUCK board	DC power supply PCB
12	N terminals	Load and grid N terminals
13	Earth terminals	Grounding bronze terminals

3.4 Operation mode and status

Please refer to Section 7.2.4 for details on operation mode setup procedure.

Caution!

Before the machine leaves the factory, the operation mode will be set according to the technical agreement. ATESS will not be responsible for the consequences caused by modifying the operation mode without the consent of ATESS. Please contact ATESS personnel for modification if needed.

3.4.1 On grid mode

Optional functions in grid connection mode:

Anti-backflow enable

1.When anti-backflow enable is set to 1, feeding power to utility gird is restricted.

2.When anti-backflow enable is set to 0, HPS can feed power to utility grid.

Grid&PV charge together enable

1.When simultaneous charging function enable is set to 1, grid and PV can charge battery simultaneously.

2.When simultaneous charging function enable is set to 0, grid and PV can not charge battery at the same time.

Please refer to Section 7.2.4 for setup procedure.

3.4.1.1 Load first mode (anti-backflow function optional)

1. When PV energy is sufficient, PV supply priority to load, the remaining to battery.

2. When PV power is lower than load power, battery discharge automatically. if battery discharged cutoff voltage or cut-off SOC (depending on battery type), it will stop discharging, PV and grid supply power to the load together. The power supply can be restored when the battery is charged to the set value of battery saturation.

See Chapter 7.2 for details of discharge cut-off voltage, SOC and BAT_charged_ saturation

3.4.1.2 Battery first mode (anti-backflow function optional)

1. When the PV energy is sufficient, PV supply priority to battery charge, the remaining to load;

2. When PV energy is insufficient, the PV charge the battery first. The power grid only supplies all loads without charging the battery. It is optional to charge the battery at the same time (PV&grid charge together enable, which is set to 1 by default when leaving factory);

3. If the grid connected backup mode is not discharged or switched to other modes, To maintain electrochemical activity, the battery will enter the discharge state after one week of current limiting charging, and the discharge power will be calculated according to battery specifications.

3.4.1.3 Time shifting mode(anti-backflow function optional)

The period of economic mode is divided into peak period, fair period and valley period. Please refer to section 7.2.4 for the setting details.

1. Valley price: working logic is the same to the backup priority mode's.

2. Fair price:

A. Battery can neither discharge nor be charged by grid.

B. PV power supply priority to load, the remaining to battery when PV power is higher than load.

C. When PV power is lower than load power, PV and grid supply load, PV doesn't charge battery.

3. Peak price:

A. Grid will not charge battery.

B. When PV power is higher than load, PV supplies to load , the remaining to

battery.

C. When PV power is lower than load power, there are two conditions:

(1) When battery voltage is higher than the discharge cut-off voltage or the discharge cut-off SOC (depending on the battery type), PV and battery supply the load.

(2) When battery voltage is less than or equal to the discharge cut-off voltage or the discharge cut-off SOC (depending on the battery type), the battery does not discharge, and the PV and the grid jointly supply the load and do not charge the battery.

3.4.1.4 Peak-shaving(Grid)

Note: in this mode, the upper limit power of power grid should be set. This value only limits the power taken from grid, not the power fed to grid.

1. When PV power is greater than the load and charging power, do not take power from the grid, PV supplies load and charge the battery;

2. (When PV power + upper limit power of grid) is greater than (load power + charging power), grid and PV supply load and charge battery at the same time.

3. When (PV power + upper limit power of power grid) is greater than the load power, grid and PV supply priority to the load and the remaining charge batteries.

4. When (PV power + grid upper limit power) is less than the load power, the grid, PV and battery supply the load at the same time.

3.4.1.5 EMS模式

说明：

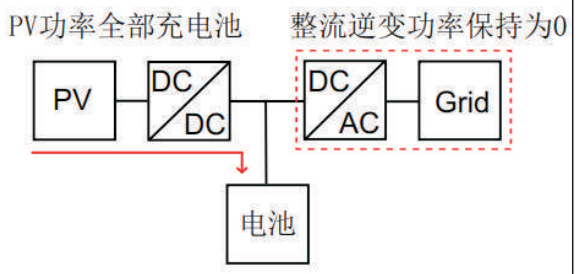
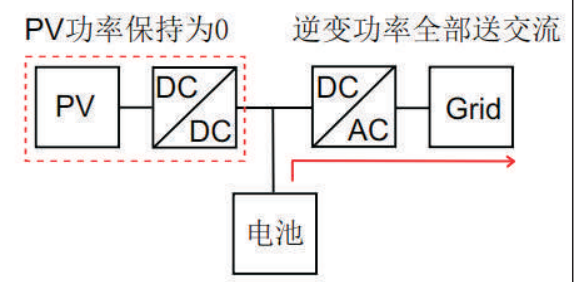
1.EMS模式下，储能控制器受远端EMS管理系统控制，自身无运行逻辑，功率受EMS指令控制。

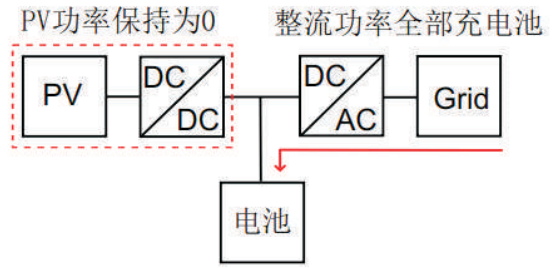
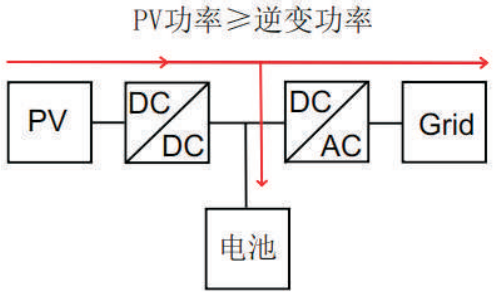
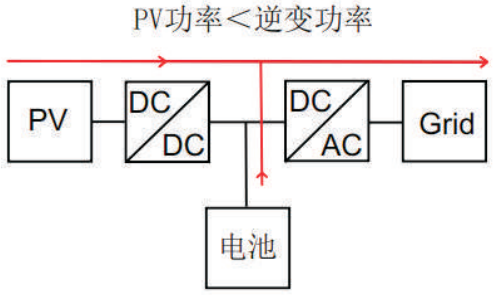
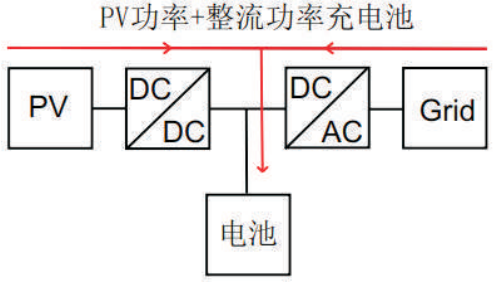
2.EMS模式下无充电曲线，只有过欠压保护值。

3.受控功率有PV功率、逆变整流功率(当没有接入电网时，只能控制PV功率，逆变功率根据负载情况自动调节)。当设置为逆变时，直流输出至交流，当设置为整流时，交流给电池充电。

4.EMS模式不支持手动操作，仅支持远端EMS发送指令操作。

控制说明：

序号	图例	说明
1		保持逆变整流功率为0，只修改PV功率，此时PV完全充电池，交流无功率
2		保持PV功率为0，只修改逆变功率，此时电池逆变送交流

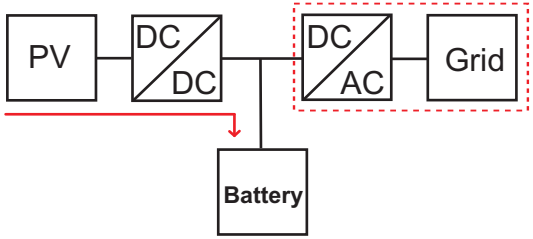
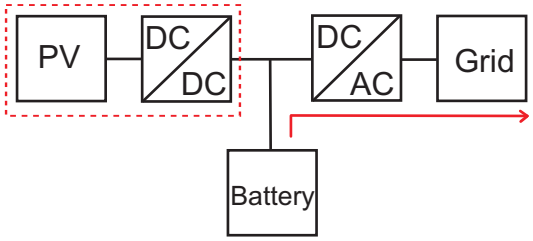
序号	图例	说明
3		保持PV功率为0，只修改整流功率，此时交流充电池
4		PV功率大于等于逆变功率，PV优先逆变至交流，余电充电池
5		PV功率小于逆变功率，PV和电池联合输出至交流
6		PV和交流联合充电池，当PV功率加交流功率超过最大充电允许值，优先用PV充电池

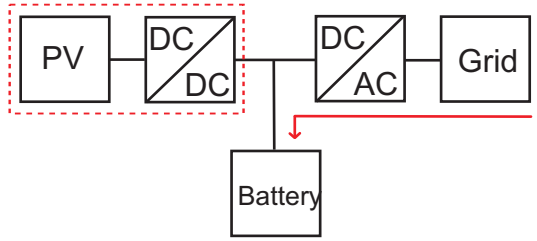
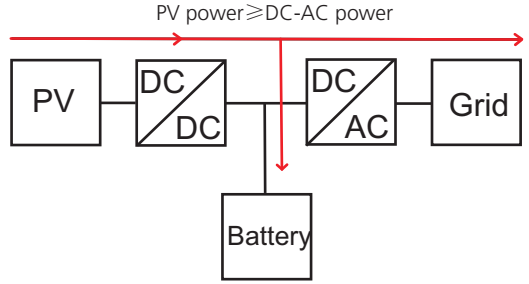
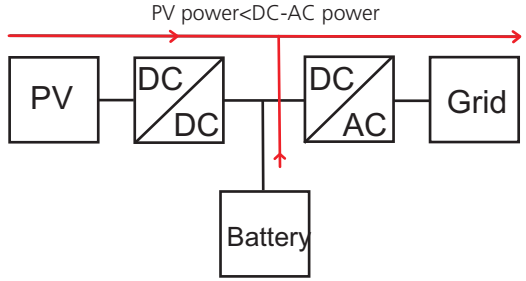
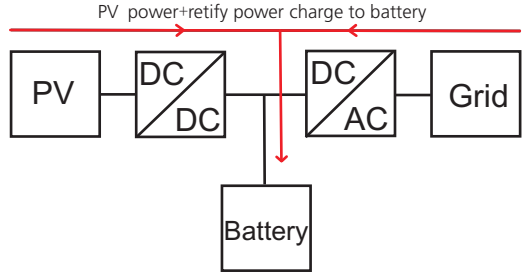
3.4.1.5 EMS MODE

Description:

1. In EMS mode, the inverter is controlled by the remote EMS management system, doesn't have its own operation logic, and power is controlled by EMS command.
2. In EMS mode, there is no charging curve, only over and under voltage protection value.
3. The power under control includes PV power and DC-AC rectifier power (when not connected to grid, only PV power can be controlled, and inverter power can be adjusted automatically according to load). When it is set to inverter, DC output to AC. when it is set to rectifier, AC will charge the battery.
4. EMS mode does not support manual operation, only remote EMS sending instructions.

Control Description:

No.	Diagram	Description
1	All PV power charge to battery, DC-AC rectifier power remains 0 	Keep the DC-AC rectifier power at 0, only modify PV power, at this time, PV is fully charged and AC has no power
2	PV power remains 0, all the DC-AC power send to AC 	Keep PV power at 0, only modify the DC-AC power, at this time, the battery inverts to AC

No.	Diagram	Description
3	PV power remains 0, all retifier power charge to battery 	Keep PV power at 0, and only modify the rectifier power. At this time, the AC charge battery
4	PV power≥DC-AC power 	PV power higher than or equal to inverter power, PV convert to AC in priority, remaining charge to battery
5	PV power<DC-AC power 	PV power lower than DC-AC power, PV and battery output to AC together
6	PV power+retify power charge to battery 	PV and AC power charge battery together, when PV+AC power exceeds the max. charging value, use PV power to charge battery in priority

3.4.2 离网模式

1. PV能量充足时，PV优先给负载供电，余电充电池。
2. PV能量不足时，电池自动放电。如果电池放电到放电截止电压，会有下面两种情况：

a) 默认设置下停止逆变输出，转入仅PV充电模式。此时交流无输出。

b) 如启用了油机接入功能，则储能控制器发继电器信号启动油机，由油机供应负载或者给电池充电。

3.4.3 油机模式

I. 油机接入功能（干节点控制）

离网模式下，当电池放电到“放电截止电压”或“SOC下限”（取决于电池类型）时，储能控制器发继电器信号启动油机，进入油机模式，此时由油机来给负载供电；同时PV停止给负载供电，只对电池充电。

1. PV功率大于充电功率时，PV功率仅用于给电池充电；油机只供应负载。
2. PV功率小于充电功率时，优先充电池；油机给负载供电，并可选对电池充电（PV和电网同时充电使能）。
3. 电池充到“SOC上限”或“浮充限流点设置”（取决于电池类型）时，储能控制器发信号停止油机并转入离网模式。
4. 储能系统中无电网时，油机可直接接在储能控制器电网端；同时存在电网和油机时需要搭配ATS使用。

SOC上限、浮充限流点设置详情见7.2.4章节。

3.4.4 单PV模式

1. 无电网时，将启停旋钮转至ON,不点LCD开机键，储能控制器将开机进入单PV模式，此时PV只对电池充电（最大30A），不会逆变输出到交流侧。
2. 无电网时，在单PV模式时手动在LCD屏上开机，储能控制器进入离网模式。
3. 离网模式放电至电池欠压告警点时，储能控制器关闭逆变，自动切换到单PV模式，待电池充到设定电压(单PV转离网)时自动转入离网。
4. 单PV模式检测到电网恢复正常，储能控制器自动进入并网模式。

单PV转离网，详情见7.2.4章节

3.4.5 并离网自动切换

工作逻辑：检测到电网正常，自动切并网，检测到电网异常，自动切离网。

3.4.6 故障模式

当储能控制器出现故障时，逆变电源会将交直流侧的接触器立即断开并停机进入故障状态，从而保证系统安全。储能控制器此时会持续监测故障是否消除，如果故障未消除，则保持故障状态；故障消除后则会自动重启。

3.4.7 永久故障模式

当储能控制器出现比较严重的故障时，储能控制器电源会将交直流侧的接触器立即断开并进入永久故障状态，以保证系统的安全。当连续三次检测到永久故障信息，将断开所有开关。例如：储能控制器的IGBT模块出现永久故障等信息。一般储能控制器进入这种永久故障模式时，请不要私自对储能控制器进行维修，应该与当地经销商的人员取得联系，也可以致电深圳时代能创能源科技有限公司寻求帮助。

当环境温度过高时，储能储能控制器的输出功率就会正常降低。但是，如果经常发生这种情况，检查一下储能控制器的冷却面，或者把储能控制器放在通风条件较好的地方。如果储能控制器风扇脏了，请清理风扇灰尘，如果储能控制器内部有问题，请向专业服务部门寻求帮助。

3.5 尺寸

型号	HPS30	HPS50	HPS100	HPS120	HPS150
尺寸（宽*高*厚 mm）	950/18660/750mm		1200/1900/800mm		
重量(KG)	440	620	900	1024	1250

表一储能控制器的尺寸重量

3.6 包装信息

序号	名称	单位	数量	说明
1	储能控制器整机	台	1	包含机柜钥匙
2	用户手册	本	1	
3	合格证	份	1	
4	出厂测试报告	份	1	

表一产品包装信息

产品运输及储存 4

4.1 产品的运输

用户在运输储能控制器时，只允许使用用户手册中描述的运输方法，运输时请考虑储能控制器的重量和其非居中的重心。重心已在包装箱上标出。

危险!

储能控制器很重，在运输储能控制器时，必须要有合格的起重设备和人员，储能控制器必须按照重心标识垂直于水平面直立运输，运输时储能控制器相对于直立放置的倾斜度不能超过10度，不允许将设备倒置或以水平位置运输，如果不能正确地吊运和运输储能控制器，可能导致严重的人生安全、财产损失和储能控制器损坏。

3.4.2 Off-grid mode

1. When PV power is higher than load power, PV supply priority to load power, the remaining to the battery charge.

2. Battery discharge automatically when PV power is lower than load power. when the battery is discharged to the undervoltage alarm point, there are two situations:

a) By default, the inverter stop output and switch to PV charging mode, there is no AC output.

b) If the DG access function is enabled, the inverter sends a relay signal to start the DG, which supplies the load or charges the battery.

3.4.3 Generator mode

I. Generator access function (dry contact control)

In the off grid mode, when the battery is discharged to the under voltage alarm point, HPS sends a relay signal to start the DG and enter DG mode. The generator will supply power to load; at the same time, HPS stops supplying power to the load and only charges the battery.

1. When PV power is greater than the charging power, PV power is only used to charge the battery; the DG only supplies the load.

2. When PV power is less than the charging power, PV supplies priority to battery; DG supplies power to the load and optionally charges the battery.

3. When the battery is charged to "SOC upper limit" or "floating charge current limiting point" (depending on the battery type), the inverter sends a signal to stop the DG and switch to off grid mode.

4. When there is no power grid, the DG can be directly connected to the power grid end of the inverter; when there is power grid and DG neither, it needs to be used with ATS.

See Chapter 7.2.4 for details of setting SOC upper limit and floating charge current limiting point.

3.4.4 PV mode

1. When utility is unavailable, turn on the knob without clicking the LCD power-on key, HPS will start to enter PV mode, then PV only charges the battery and will not invert AC output.

2. When utility is unavailable, manually start the LCD screen in PV mode, then inverter enters off grid mode.

3. In the off grid mode when discharged to the battery low voltage alarm point, inverter will stop DC/AC converting and automatically switch to PV mode. When battery is charged to the set voltage(single PV to off-grid), it automatically switches to off grid mode.

4. When the power grid returns normal, inverter automatically switch to grid tie mode.

See Chapter 7.2.4 for details on charge change to offline.

3.4.5 Automatic on/off grid switch

Operate logic: when the power grid is normal, cut the grid automatically, otherwise when the power grid is abnormal, cut off the grid automatically.

3.4.6 Fault mode

When the inverter fails, the contactor on AC and DC sides will immediately disconnect andshut down the inverter, so as to ensure the system safety. At this time, the inverter will continuously monitor whether the fault is eliminated, If not, it will maintain the fault state; after eliminated, it will restart automatically.

3.4.7 Permanent failure mode

When the invertrer has a serious fault, the contactor on AC and DC sides will immediately disconnect and enter a permanent fault state to ensure safety of the system. When permanent fault is detected three times in a row, all switches will be disconnected. For example, the IGBT module of the inverter is faulty. When inverter enters this permanent failure mode, please do not repair it without permission. You should contact the personnel of the local dealer or call Shenzhen Atess Power Technology Co., Ltd. for help.

When temperature gets too high, output power of the inverter will decrease, which is normal. However, if this happens frequently, check the cooling surface of the inverter or place it in a place with good ventilation condition. If the fan gets dirty, please clean the dust on it. If there is any problem inside the inverter, please contact the professional service department for help.

3.6 Dimension

Model	HPS30	HPS50	HPS100	HPS120	HPS150
Dimension (W*H*Dmm)	950/18660/750mm		1200/1900/800mm		
Weight(KG)	440	620	900	1024	1250

Figure--Demension and weight of HPS

3.7 Packing information

NO	Name	Unit	Qty.	Note
1	HPS	unit	1	Key included
2	User manual	pcs	1	
3	Certificate	pcs	1	
4	Factory test report	pcs	1	

Figure—Packing information

Transportation and storage 4

4.1 Transportation

Transportation should follow the transportation methods described in the user manual. The inverter's weight and center of gravity should be taken into account during transportation. The center of gravity is marked on the box.

Caution, risk of danger

During transportation, lifting equipment and personnel must be qualified. The inverter should be placed vertically and the inclination cannot be more than 10 degrees. It is not allowed to place the inverter upside down or transport in a horizontal position.Incorrect lifting and transportation can lead to serious injury, property loss and damage to the inverter.

4.2 产品的检查和储存

用户在签收运输公司送来的储能控制器前，应仔细地进行检查。将收到的物品与交货通知单中列出的项目进行验收，如发现任何缺陷或损坏，应立即通知运输公司并要求其对设备进行鉴定。如果有需要，您可向深圳时代能创能源科技有限公司寻求帮助。

注意！
该设备只能封装贮存，因此要确保对其内部的防尘和防潮，如果贮存的时间较长，储能控制器必须存放在干燥的环境中以防水进入储能控制器。

5 产品安装

5.1 安装条件要求

为了确保机器能够正常工作，安装的环境和要求如下：

> 本储能控制器的防护等级为IP20，同时该产品为电子设备，故不要放置在潮湿的地方；
> 安装在室内，避免阳光照射和雨淋；
> 机器周围通风较好；
> 安装环境清洁；
> 设备在运行过程中会产生一些噪声，尽量安装在远离居民生活的地方；
> 安装地面确保不会晃动，支撑面应满足储能控制器的承重要求；
> 安装位置应确保便于维护；
> 环境温度在-25℃~55℃之间；
> 机器应预留足够的空间保证通风散热

储能控制器建议安装在配电室内，配电室的地面、空间、线缆沟、风道、通风设备及各项防护措施都需要经过严格的设计，并满足以下各项要求

> 地基要求

本储能控制器需要安装在表面为阻燃材料的平整地面或槽钢支撑结构上，地面禁止出现凹陷或倾斜的情况。必须保证地基坚实、安全可靠。地基必须具备承受储能控制器重量的承重能力。

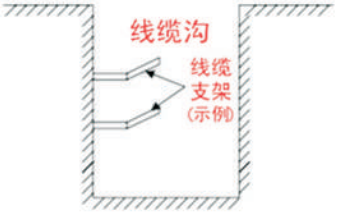
> 空间要求

在安装储能控制器时，与墙壁或其他设备之间必须保留适当的距离，以便满足最窄维护通道、逃逸路线和通风的要求。

储能控制器安装位置的前方应当保证大于1.5m的空间，背部应当保证大于0.8m的空间，顶部应当保证大于0.8m 的空间以方便安装，散热与维护。

> 线缆沟设计

储能控制器的电缆连接采用下进线下出线方式，建议储能控制器与外部连接的线缆均从线缆沟走线，便于安装、维护。



线缆沟通常由施工方按照相关标准进行设计施工，需考虑设备的重量及尺寸。线缆沟之间以及线缆沟和接地电极之间都需要良好的电气连接。

> 布线规范

系统使用的电缆一般可分为电力电缆及通讯线缆线。在铺设通讯线缆时，需要远离电力电缆，电缆在交叉处需保持直角。铺设时尽量使电缆长度最短，且要与电力电缆保持距离。建议直流端BT+及BT-对地绝缘阻抗大于1M欧。

4.2 Inspection and storage

The inverter should be carefully checked before signing the document from the transportation company. Check the received items against delivery note, and if there is any defect or damage, immediately notify the transportation company. If necessary, you can seek help from Atess Customer Service department.

Caution

ATESS HPS50 can only be stored when it is stopped and all the doors are closed in a dry room to protect the internal circuits against dust and moisture.

5 Installation

5.1 Installation condition requirements

To ensure normal operation of the machine, the installation environment is required as follows:

> The ingress protection of inverter is IP20. Moreover, as this product is an electronic equipment, it shall not be placed in humid environment;
> Install indoors and avoid sunlight and rain;
> Ventilation of the room shall be good;
> The installation environment shall be clean;
> As some noise will be produced in operation, this equipment shall be installed far from residential quarters;
> The installation ground shall be even enough, and firm enough to support the weight of inverter;
> The installation position shall be convenient for maintenance;
> Ambient temperature range: –25°C~55°C;
> Appropriate space shall be reserved for the machine to ensure ventilation and cooling.

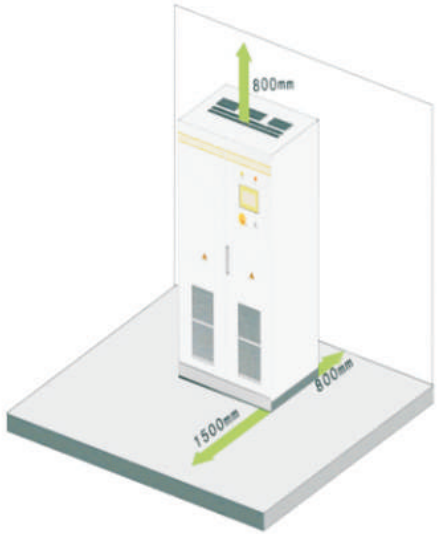
We suggest inverter is installed in the distribution room. The floor, wall clearance, Ventilation equipment and precaution should be designed by professional personnel and satisfy the following requirements.

> Foundation requirement

Inverter is required to install on even ground with fire-retardant material as the surface or channel steel support structure, and sag or tilt ground is prohibited. The foundation shall be solid, safe and reliable. The foundation shall be capable of bearing the load of the inverter. Its load bearing ability shall be concerned throughout the installation place selection.

> Clearance space

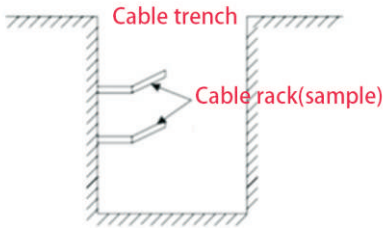
During installation of the inverter, appropriate space shall be left to the wall or other equipment, in order to satisfy the requirements on narrowest maintenance channel, emergency access and ventilation.



In front of the installation place of inverter, a space of 1.5m or more shall be ensured, the back 0.8m or more, the top 0.8m or more to ensure easy installation, cooling and maintenance.

> Cable trench

The cable connection of inverter adopts bottom inlet and bottom outlet. Cable trenches are recommended to ensure easy installation and maintenance.



The cable trenches are often designed and constructed by the construction side based on relevant standards, with the equipment weight and dimensions required to be considered. Good electrical connection is needed between different cable trenches and GND terminals.

> Wiring specification

Cables in the inverter can be classified into either power cables or data cables. In cabling, the power cable shall be kept far away from, and the cable shall be kept in right angle at cross. The cable shall be as short as possible, and an appropriate distance shall be kept to the power cable. It is recommended that the insulation impedance of BT + and BT - at DC end to ground to be higher than 1m Ω

电力电缆及通讯线缆线应分别放在不同的线缆沟中，以避免电力电缆和通讯线缆长距离并行走线，以减少输出电压瞬变产生电磁干扰。电力电缆及通讯线缆线之间的距离应大于0.2m。当导线交叉分布时，应使交叉角度为90度，而距离可适当减少。

> 通风要求

储能控制器运行时会产生大量的热量，当环境的温度过高时会影响设备的电气性能，甚至会损坏设备，所以在设计操控室时需要充分考虑这些热量的释放，以确保设备正常高效的运行。

> 通风环境

为满足储能控制器的通风要求，安装环境需满足以下条件：

1. 储能控制器应避免安装在通风条件差、气流量低的场所；
2. 进风口应有充足的空气补充。

> 通风设备

为了保证设备安全可靠高效运行，设备运行的环境温度必须在-25℃～55℃范围内，因此须配有适当的通风装置，将设备产生的热量散发出去，建议储能控制器安装空间的通风量至少在3665m³/h以上；

1. 配电室内必须有通风设施，确保储能控制器产生的废热能排离设备，以符合允许的最大环境温度。可通过安装排气装置（例如风机、通风管道等）来实现；
2. 为保证压力均衡，可在出风管道出口处另加向外排风的风扇；
3. 出风口的朝向应根据当地风向的实际情况选择朝向；
4. 注意进风口、出风口的防尘措施及防淋雨设计；
5. 若需要加通风管道，则通风管道的尺寸应根据出风量的大小且应由专业人士设计。

> 其他防护

储能控制器的防护等级为IP20，适合安装在干燥、清洁的电站环境中。同时需要注意避免房屋漏水损坏储能控制器。根据EMC要求和噪音级别，储能控制器应安装在工业环境中。

5.2 整机安装所需工具及零配件

安装需要使用的工具以及零件如下：

- > 起重吊车、铲车或叉式自动装卸车（具备承载储能控制器重量能力）；
- > 扭矩扳手；
- > 螺丝刀；
- > 剥线钳；
- > 端子压着机；
- > 热吹风机；
- > 兆欧表以及万用表。

5.3 机械安装

5.3.1 带包装的整机运输

> 相关注意事项

储能控制器采用整体运输方式，用户可以通过叉车从底部抬起，或是通过起重机、吊车移动。

注意1：储能控制器为一个整体，无论运输或安装时都不得将其分解。未经时代能创能源科技授权的改装造成的故障不在质保范围内。

注意2：在移动过程中不能使储能控制器倾斜、激烈晃动或突然受力，如突然放下抬起。

注意3：仔细阅读所标的参数以选择合适的运输工具及存放地点。

建议用户尽量使用叉车移动储能控制器。

在将储能控制器机柜移动到预定位置之前，建议先将电源电缆铺设好，由于这些电缆都比较粗，一旦安装了储能控制器机柜，将很难进行电缆布线操作。

运输过程中为了确保储能控制器处于较好的防护状态，尽可能带包装运输，并按照包装上各种标识的示意进行运输，包装标识图示说明如下：

图标	示意
	重心标识
	起吊标识
	正面朝上，禁止储能控制器横放、倾斜或者倒置
	小心轻放，避免运输环境中过于激烈的碰撞摩擦对储能控制器造成损坏
	注意防潮，避免储能控制器遭受雨淋或受潮

未拆卸包装的储能控制器可以使用叉车、起重机货叉或者吊车进行移动。移动时，需要注意包装上所标的重量，确保叉车、起重机货叉或者吊车具备足够的承载能力。储能控制器的重心在前后、左右对称，偏下部的位置，运输时应合理排布支撑或起吊点。

叉车运输方式是标准运输方法。运输时箱体的重心应落在叉车的两根货叉之间。储能控制器的尺寸较大可能会挡住驾驶员的视线，应由辅助人员配合。

The power cable and data access shall be placed in different cable trenches respectively to avoid lengthy routing between the power cable and other cables, so as to reduce the electromagnetic interruption caused by sudden change of the output voltage. The distance among the power cable and data access shall be more than 0.2m. When the cables are crossed, the cross angle shall be 90 degrees, while the distance can be reduced appropriately.

> Ventilation requirement

In operation, inverter will produce a lot of heat. When ambient temperature is too high, the electrical property of the equipment may be affected, the equipment may even be damaged. Therefore, the heat release shall be fully considered in designing the control room to ensure operation of the equipment in high efficiency.

> Ventilation environment

To satisfy the ventilation requirement of inverter, its installation environment shall meet the following conditions:

※ Inverter shall be prevented from being installed in the place of poor ventilation

condition and insufficient air flow;

※ The air inlet shall have enough air supplementation.

> Ventilation equipment

To ensure safe and reliable operation of the equipment, the ambient temperature must be within the permission range –25°C~ 55°C, therefore, appropriate ventilation devices must be equipped with to release the heat generated by the equipment. We suggest the ventilation rate is more than 3665m³/h.

1. There must be ventilation equipment inside the distribution room to ensure release of the waste heat generated by the inverter from the equipment, and allow for maximum ambient environment temperature. This can be realized from installation of exhaust devices;

2. Another fan can be added at the air duct outlet to exhaust the air out and ensure balanced pressure;

3. The direction of the air outlet shall be selected according to the local actual wind direction;

4. Pay attention to the dustproof measures and waterproof design at the air inlet and outlet;

5. If more air ducts are required, its dimensions shall be designed by the professionals according to the air output amount.

> Other protections

With IP20 of protection level, inverter is appropriate to be installed in dry and clean environment. Meanwhile, water leakage of the house shall be prevented, as it may damage the inverter. According to EMC requirement and noise level, the inverter shall be installed in industrial environment.

5.2 Tools and spare parts required for whole machine installation

Tools and spare parts required for installation is as follows:

> Hoisting crane, forklift or fork lift truck (with the capacity for bearing the weight of the inverter)

> Torque wrench

> Screwdriver

> Wire stripper

> Terminal crimping machine

> Heat dryer

> Megger and multimeter

5.3 Mechanical installation

5.3.1 Transportation of packaged whole machine

This inverter is transported as an integrated unit, and the user can hoist it from the bottom with a forklift, or move it with a hoisting crane or crane.

Note 1: The inverter is integrated and cannot be dissembled either in transportation or installation. Any fault attributed to modification unauthorized by the ATESS is beyond the quality assurance.

Note 2: In movement, tilt, violent shake or sudden force upon the inverter shall be prevented, such as sudden down of lifting.

Note 3: Please read carefully the labeled parameters to select an appropriate transportation means and storage place.

We suggest the user make use of forklift to move the inverter if possible.

Before the inverter is moved to the designated place, we suggest to lay the DC input cable and AC main power supply cable. As these cables are relatively thick, they are hard to be cabled after the inverter is installed.

To keep the equipment in a better protective status, please adopt transportation with package as much as possible, and comply with the labels printed on the package in transportation:

Sign	Indication
	The gravity centre
	Lifting logo
	Face up to prohibit the inverter horizontally, tilted or upside down
	Handle with care, to avoid the transport environment too intense collision friction damage to the inverter
	Keep away from moisture

Inverters whose packages are not demolished can be moved with forklift, hoisting crane or crane. In moving, attention shall be paid to the weight painted on the package to ensure enough load capacity of the devices. As the gravity center of the equipment locates at the lower place symmetrical in front and back and left and right, the support point or hoisting point shall be arranged reasonably in transportation.

The forklift transportation is the standard one. The gravity center of the cabinet in transportation should locate between two forks of the forklift. The big-size inverter may block driver's sight, and it shall be treated with cooperation of the aid personnel.

5.3.2 不带包装的储能控制器运输

> 拆除储能控制器包装

请按照以下步骤拆卸设备运输包装箱。
步骤1: 拆卸包装箱的木质侧边与顶板;
步骤2: 拆除机器上的外设包装材料;
步骤3: 拆除机器与栈板间的紧固螺丝。
1）拆除底座前后盖板;
2）旋下储能控制器与木托盘底部连接的紧固螺母;
3）取出螺丝即可将储能控制器与运输木托盘分离。

> 裸机的移动安装

已经拆卸包装的储能控制器可使用叉车、起重机、滑轨或者吊车进行移动。如果拆卸包装的地点离最终安装位置稍远，可以先带底部木托盘运输。
若储能控制器底部木托盘已经移除，则在使用叉车移动储能控制器时，需要先将底座的前后盖板拆除，并使重心位置落在两叉车中间，再进行起重搬运，见下图:

危险!
在用叉车移动储能控制器时，动作一定要慢且轻，避免使储能控制器震动过大，或与其他物体撞击，以免造成对人身安全及储能控制器的损坏。

如果使用起吊方式进行移动，请注意起吊位置，需要保证起吊的角度 70° ，并注意储能控制器的重心位置。

注意:

> 必须时刻要注意储能控制器的重心位置;
> 采取必要的辅助措施确保运输人员安全;
> 采取必要的辅助措施确保设备完好运送至最终安装地点。

5.4 电气安装

5.4.1 输入输出要求

危险!

> 储能控制器工作时存在高压电击危险，只有具备专业技能的电工才可以对储能控制器进行操作。
> 所有与设备连接的操作都必须在无电压状态下进行。
> 如果接错了输入、输出端子，将会损坏储能控制器!

如果不按照本警告信息去做，可能导致严重的人身伤害或重大的财产损失，甚至死亡。

> 蓄电池组件

蓄电池工作电压为352V-600V。则电池最低电压不低于352V，最高电压不超过600V。

> 光伏组件

光伏组件MPPT工作电压最高不超过800V，开路电压不超过1000V，则会使设备处于过压保护状态而无法正常工作。光伏MPPT电压范围480V-800V，则光伏最低工作电压不低于480V，最高工作电压不超过800V。

> 光伏和电池电压搭配

光伏电压MPPT电压应大于电池最高电压，否则会造成光伏无法将电池充满的情况。但是建议压差不要过大，压差过大机器损耗将增大，效率会变低，光伏MPPT电压大于电池最高电压100V为最佳配置。

> 三相电网

储能控制器会不断检测电网是否满足并网条件，以下为满足金太阳（中国）并网条件的电网限制（各个国家的并网要求可能不一样，储能控制器的保护参数可以设置，详细信息请参照当地的并网法规），电网为三相电网。同时在安装并网储能控制器前应得到当地的电力部门的允许。

型号	HPS30/50/100/120/150
电网电压限制	360V-440V
电网频率限制	45Hz-55Hz/55Hz-65Hz

> 线缆要求

1.请根据电压等级选择相应的耐压电缆。

2.由于不同的电压值会导致电流大小发生变化，请根据实际电压范围计算相应的电缆线径。以下表格仅提供最低工作电压额定功率的线缆要求，实际运用中应根据实际电压计算，可向时代能创能源科技售后人员询问。

5.3.2 Movement and installation of bare machine

➢ Demolish the package of inverter

Please demolish the packaged cabinet of the equipment according to the following procedures:
Procedure 1: Demolish the wood side and roof of the packaged cabinet
Procedure 2: Demolish the out-set package material on the machine
Procedure 3: Demolish the fastening screws between the machine and the pallet

① Demolish the front and back cover lids of the pedestal;

② Screw off the hold-down nuts at the bottom of the wood pallet;

③ Remove the screws, and the inverter will depart from the wood pallet.

➢ Movement and installation of bear machine

The inverter with demolished package can be moved with forklift, hoisting crane, slide rail or crane. If the package demolished place is far from the final installation place, it can be transported with forklift containing wood pallet.
If the wooden pallet at the bottom of the machine has been removed, when using the forklift, the front and rear cover plates of the base need to be removed first, and the center of gravity should be placed in the middle of the two forklifts, and then start lifting and transporting, as shown in the following figure:

Caution, risk of danger
We must act slowly and gently when transporting the inverter with forklift to avoid violent vibration of the inverter or collision with other objects.

If lifting method is used for moving, please pay attention to the lifting position, ensure that the lifting angle is 70 °, and be cautious of the center of gravity position of the inverter.

NOTE:

➢ It is necessary to always pay attention to the position of the center of gravity of inverter.

➢ Take necessary auxiliary measures to ensure the safety of transportation personnel;

➢ Take necessary auxiliary measures to ensure that the equipment is delivered to the final installation site.

5.4 Electrical installation

5.4.1 Input and output requirements

Caution, risk of danger

➢ There is a danger of electrical shock of high voltage in inverter's operation; only electricians of professional skills can operate.

➢ All connections with this equipment shall be done under non-voltage state.

➢ The inverter may be damaged if input or output terminal is incorrectly plugged.

Failure of acting upon this information may cause serious personnel injury or significant property loss even to death.

➢ Battery

The battery operating voltage is 352V-600V. The battery voltage sould be not lower than 352V and not higher than 600V.

➢ PV module

The maximum MPPT working voltage of PV module should not be more than 820v and the open circuit voltage should not exceed 1000V, otherwise the equipment will be in over-voltage protection state and cannot work normally. The MPPT voltage range of should be within 480v-820v, which means the minimum working voltage of photovoltaic shall not be lower than 480v and the maximum working voltage shall not be higher than 820v.

➢ PV and battery configuration

The MPPT voltage shall be greater than the maximum voltage of the battery, otherwise, the battery cannot be fully charged by PV power. However, it is suggested that the voltage difference not be too large, or it will speed up the machine wearing and the reduce efficiency. The best configuration is that the voltage of MPPT is 100V higher than the maximum battery voltage.

➢ Three phase grid connection

The inverter will constantly detect whether the grid meets the grid connection conditions constantly. The following are the grid restrictions according to golden sun (China) (the grid connection requirements would vary from countries, and the protection parameters of the inverter can be set referring to the local grid connection regulations). The grid is three-phase. At the same time, the permission of the local power department shall be obtained before installing the grid connected system.

Model	HPS30/50/100/120/150
Grid voltage limit	360V-440V
Grid frequency limit	45Hz-55Hz/55Hz-65Hz

➢ Cable requirements

1. Please select the corresponding withstand voltage cable according to the voltage level.

2. Because different voltage will lead to change of current, please calculate the corresponding cable diameter according to the actual voltage range. The following table only provides the cable requirements of the lowest working voltage and rated power. In actual application, it should be calculated according to the actual voltage, please inquire the after-sales staff of ATESS if you need more details.

线缆	线径大小要求（mm²）MAX					安装孔径		
机型	HPS30	HPS50	HPS100	HPS120	HPS150	HPS30	HPS50	HPS100/120/150
	以下数据为总线径							
光伏	35mm²	50mm²	70mm²	95mm²	120mm²	Φ8	Φ8	Φ10
电池	35mm²	50mm²	120mm²	120mm²	150mm²	Φ8	Φ8	Φ10
电网	35mm²	70mm²	120mm²	120mm²	150mm²	Φ8	Φ8	Φ10
负载	16mm²	35mm²	70mm²	70mm²	95mm²	Φ8	Φ8	Φ10
N线	35mm²	70mm²	120mm²	120mm²	150mm²	Φ8	Φ8	Φ10
地线	负载电缆线径的一半，不低于16mm²，请使用专用的黄绿线					Φ8	Φ8	Φ8
通讯线	0.75mm²，请使用专用的双绞屏蔽通信线					/		

5.4.2 直流侧接线

危险！
蓄电池组件输出正负极不可接反，应该用万用表测量确定极性之后，在对应接入储能控制器的正负极输入端。

直流侧接线方法如下：

步骤1：断开上级直流侧配电断路器，保证直流侧接线不带电。
步骤2：用万用表测量蓄电池组件的开路电压保证在允许范围内。
步骤3：用万用表确认正负极。
步骤4：剥掉电缆末端的绝缘皮。
步骤5：压接接线铜鼻。
1. 将剥好的铜芯部分放到接线铜鼻的压线孔内。
2. 使用端子压着机将接线铜鼻压紧。压接数量应在两道以上。
步骤6：安装热缩套管。
1.选择与电缆尺寸较符合的热缩套管，长度选择约5cm。
2.将热缩套管套在接线铜鼻上，以完全覆盖接线铜鼻的压线孔为适。
3.用热吹风机使热缩套管缩紧。
步骤7：用电缆连接储能控制器的“Battery-input +”端到蓄电池组件的正极。
1.选用和接线铜鼻符合的螺栓。
2.把接线两端的铜鼻分别牢固接在储能控制器的“Battery-input +”端和蓄电池组件的正极。
3.用螺丝刀或扳手紧固螺栓。
步骤8：按照步骤7的方法用电缆连接储能控制器的“Battery-input-”端到蓄电池组件的负极。
步骤9：按照步骤7的方法用电缆连接储能控制器的“PV-input +”端到光伏组件的正极。
步骤10：按照步骤7的方法用电缆连接储能控制器的“PV-input -”端到光伏组件负极。
步骤11：确认接线已经牢固。

5.4.3 交流侧接线

危险！
连接交流电网时，将交流配电柜断路器断开，保证接到端子的交流线不带电。

储能控制器的交流侧输出电压为 400V，经变压器连接至电网。储能控制器交流侧与电网侧的接线方法如下：
步骤1：断开电网侧断路开关，断开储能控制器交流侧断路器，用万用表测量确认接线端子已经断电。
步骤2：确定交流连接电缆的相序。
步骤3：剥掉电缆末端的绝缘皮。
步骤4：压接接线铜鼻。
1.将剥好的线头裸露的铜芯部分放到接线铜鼻的压线孔内。
2.使用端子压着机将接线铜鼻压紧，压接数量应在两道以上。
步骤5：安装热缩套管。
1.选择与电缆尺寸较符合的热缩套管，长度选择约 5cm 。
2.将热缩套管套在接线铜鼻上，以完全覆盖接线铜鼻的压线孔为适。
3.用热吹风机使热缩套管缩紧。
步骤6：连接“L1”线缆到交流配电柜的“L1”即 A（U）相。 选用和接线铜鼻符合的螺栓。
步骤7：按照步骤 6 的方法连接交流输出的“L2”连到交流配电柜的“L2”，即 B（V）相；连接交流输出的“L3”连到交流配电柜的“L3”即 C（W）相；连接N线，连接到机器N排。

5.4.4 连接地线

为了保证安全，需要将所有的储能控制器都通过PE导体接地。 储能控制器柜内的PE铜排已经在柜内与储能控制器的外壳可靠连接，进行 PE连接时需要将PE接地铜排与安装场地或电气操控室的等电位连接装置可靠连接。接地线缆线径不小于负载线缆线径的一半，接地电阻不得高于4Ω。
接线进出口置于储能控制器底部，待所有的接线完毕后，接线进出口必须用防火泥密封，防止灰尘和小动物进入储能控制器内部。

在PE铜排上接几根连接线，那是储能控制器内部个别器件需要接地，请不要私自更改，以免造成触电危险！

Cable	Cable Diameter Requirements (mm²)					Aperture		
Model	HPS30	HPS50	HPS100	HPS120	HPS150	HPS30	HPS50	HPS100/120/150
	Bellow are total line diameter							
PV	35mm²	50mm²	70mm²	95mm²	120mm²	Φ8	Φ8	Φ10
Battery	35mm²	50mm²	120mm²	120mm²	150mm²	Φ8	Φ8	Φ10
Utility	35mm²	70mm²	120mm²	120mm²	150mm²	Φ8	Φ8	Φ10
Load	16mm²	35mm²	70mm²	70mm²	95mm²	Φ8	Φ8	Φ10
N wire	35mm²	70mm²	120mm²	120mm²	150mm²	Φ8	Φ8	Φ10
Earth wire	More than 16 mm².Green and yellow is recommended					Φ8	Φ8	Φ8
Communication Wire	0.75mm², shielded Twisted pair is recommended					/		

5.4.2 DC side wiring

Caution, risk of danger

The positive and negative of the battery shall not be connected in reverse. A multimeter shall be used to determine the polarity first, and then connect into the corresponding input ends of the battery.

Specific procedures are as follows:

1) Cut off the distribution circuit breaker at the DC side, and ensure that no voltage on the wire at DC side.

2) Use a multimeter to measure the open circuit voltage of the battery to ensure that it is within the allowed range.

3) Determine the positive and negative pole of the battery with a multimeter.

4) Strip off the insulation skin at the end of the cable.

5) Crimp the wiring copper nose.

1. Put the stripped copper core into the crimping hole of the copper nose.

2. Use the terminal pressing machine to press the copper nose tightly. The number of crimping shall be more than two.

6) install the shrink fit sleeve.

1. Select the heat shrinkable sleeve which is more consistent with the cable size, length is about 5cm.

2. The heat shrinkable sleeve shall be sleeved on the copper nose of the wiring to completely cover the wire pressing hole of the copper nose.

3. Use a heat blower to tighten the heat shrink sleeve.

7)Connect the positive of the battery to the “Battery-input +" of DC input

1. Select the bolts that match the copper nose.

2. Connect the copper nose at both ends of the wiring firmly to the "battery input +" end of the inverter and the positive pole of the battery.

3. Tighten the bolts with a screwdriver or wrench.

8)Connect the "battery input -" end of the inverter to the negative pole of the battery by cable according to the method of step 7.

9)cable the "PV input +" end of the inverter to the positive pole of the PV module according to step 7.

10)cable the "PV input -" end of the invereter to the negative pole of the PV module according to step 7.

11) Please be sure that all wirings are fastened.

5.4.3 AC side wiring

Caution, risk of danger

When connecting the AC grid, cut off the circuit breaker at the AC side to ensure that the AC wire connecting to terminals has no electricity.

The output voltage of the AC side of the inverter is 400V, which is connected to the power grid through a transformer. The wiring method of AC side and grid side is as follows:

1) Cut off the circuit breaker at AC side, to ensure that the AC wire connecting to terminals has no electricity. Confirm it with a multimeter.

2)Ensure that the wiring phase sequence at AC side is in consistent with the phase sequence at grid side.

3)Strip the insulation skin off at the end of the cable

4)Crimping copper nose

1. Put the exposed copper core of the stripped wire head into the crimping hole of the copper nose.

2. Use the terminal crimper to compress the copper nose of the wiring, and the number of crimping shall be more than two.

5)install the shrink fit sleeve.

1. Select the heat shrinkable sleeve which is more consistent with the cable size, length is about 5cm.

2. The heat shrinkable sleeve shall be sleeved on the copper nose of the wiring to completely cover the wire pressing hole of the copper nose.

3. Use a heat blower to tighten the heat shrink sleeve.

6)Connect "L1" cable to "L1" of AC distribution cabinet, i.e. phase a (U). Select the bolts that match the copper nose.

7) connect "L2" of AC output to "L2" of AC distribution cabinet, i.e. phase B (V); connect "L3" of AC output to "L3" of AC distribution cabinet, i.e. phase C (W); connect n-line to n wire on the inverter.

5.4.4 Earthing

Inverter must be earthing well for safety; Please make sure of the connection between PE in power distribution cabinet and PE copper in the inverter good; and make sure the earthing cable more than half of load cable, and earthing resistance is not lower than 4Ω.

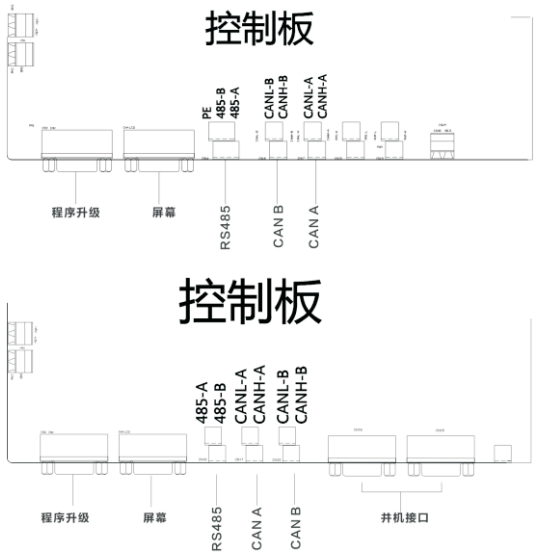
All wiring into the channel at the bottom of the inverter to be all the wiring is completed, the connection port must be sealed with dust cotton, to prevent dust from entering the inside of the inverter.

Connect several connecting wires on the PE copper bar as some parts inside the energy storage controller need to be grounded, please do not change them without permission, so as to avoid electric shock

5.5 通讯

ATESS HPS系列储能控制器采用多种通讯方式。下图为控制板接口示意图.

注意：存在不同版本的控制板，请根据实际控制板对照寻找通讯接口。



1.RS485监控通讯

储能控制器与储能控制器之间通过RS485线通讯，最后连接至我们公司的ShineMaster经过网络上传至服务器，可远程实时监控单台/多台储能控制器的运行状态。RS485通讯线两端采用接线端子，两端接线端子平行接线制作RS485通讯线，其长度不要超过1000米，为保证传输质量，请采用采用专用双绞屏蔽通讯线。储能控制器的485接口位于机器内部控制板,请区分“A”、“B”。

如果不采用ShineMaster进行监控，用户自己的监控设备需要兼容ATESS的485通讯协议。

2. BMS-CAN通讯

➢ 储能控制器搭配带BMS管理系统的储能电池时，需要用到CAN通讯。储能控制器CAN-A连接至BMS的CAN通讯接口，对接通讯协议后可实现通讯。

➢ CAN通讯线两端采用接线端子，两端接线端子平行接线制作CAN通讯线，建议采用专用屏蔽通讯线。

➢ 储能控制器的CAN-A接口位于机器内部控制板，请区分“L”、“H”。

➢ 如果用户未使用ATESS生产的BMS电池系统，则用户自己的BMS电池系统需要兼容ATESS的BMS通讯协议。

3. ATS-CAN通讯

➢ 储能控制器搭配ATS使用时，需要与ATS通讯，储能控制器Can-B连接至ATS的Can接口。注：只有时代能创能源科技生产的ATS才能与储能控制器进行通讯。

➢ 时代能创能源科技生产的ATS自带与储能控制器通讯的专用通讯线。

➢ 储能控制器的CAN-B接口位于机器内部控制板，请区分“L”、“H”。

4. 并机通讯(并机定制专用)

➢ 当两台同型号储能控制器并联使用时，需要用到并机通讯。

➢ 并机通讯采用DB9通讯线接线，为并机系统时随机附件，并机方案有专用的并机接口。

➢ 并机使用时，使用DB9通讯线将两台储能控制器的并机接口相连，控制板上的两个并机接口任选一个即可，为预留接口。

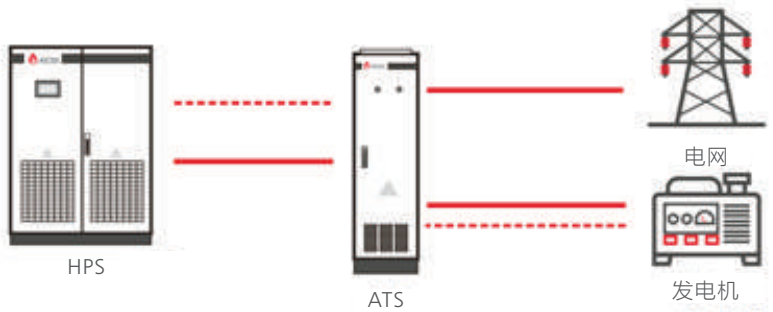
并机功能为特殊定制功能，用户不可自行并机使用。
并机设备也不可擅自修改为单机运行。
不按要求操作造成后果时代能创能源科技公司概不负责。

5.6 ATS接线

1. 当系统需要同时接入电网和油机时，需要ATS和HPS搭配使用，ATS主要作用就是切换电网和油机。

2. ATS和HPS主要接线为ATS内部板件电源线、can通讯线、交流动力线。

接线图：

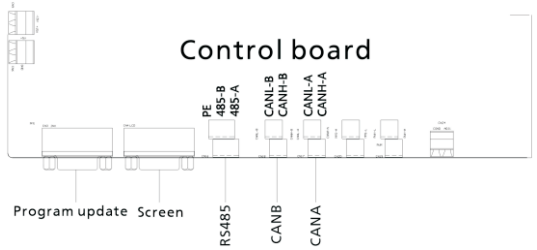


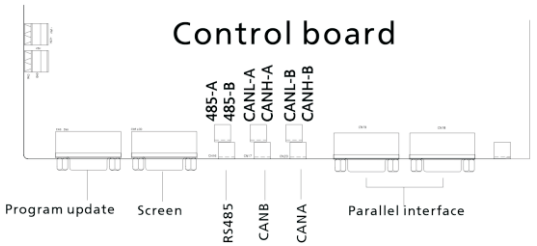
3.ATS内部有三个断路器，中间的断路器接到HPS的电网开关（AC input），其它两个为电网开关（GRID）和发电机（GEN）开关，注意机柜丝印区分，不可接错位置，三相相序也不能接错，否则系统无法正常运行。

5.5 Communication

The atess HPS series energy storage controller adopts a variety of communication modes. The following figure is the schematic diagram of the control board interface.

Note: there are different versions of the control board. Please look for the communication interface according to the actual control board.





1. RS485 communication

The inverters communicates with each other through RS485 line, and finally connects to our Shinemaster, which uploads the inverter data to the server through network. It can remotely and real-time monitor the operation status of single / multiple inverter(s). Terminal blocks are used at both ends of RS485 communication line, by paralleling the two blocks it will make RS485 line, which shall not exceed 1000m. In order to ensure transmission quality, special twisted pair shielded communication line shall be applied. The 485 interface is located in the internal control board, please distinguish "A"and "B".

If Shinemaster is not used for monitoring, the user's own monitoring equipment needs to be compatible with 485 communication protocol of ATESS.

2. BMS-CAN communication

- CAN communication is required when inverter is equipped with battery with BMS. Connect CAN A of inverter to the CAN port of battery, and communication can be realized after docking the communication protocol.
- Terminal blocks are used at both ends of communication line, by paralleling the two blocks it will make a CAN line. Special shielded communication line is recommended
- The CAN A interface is located in the internal control panel. Please distinguish "L" and "H".
- If the user does not use the BMS battery system produced from ATESS, the user's own system needs to be compatible with the BMS communication protocol of ATESS.

3. ATS-CAN communication

- When the inverter is used with ATS, it needs to communicate with ATS. The inverter CAN-B is connected to the CAN interface of ATS. Note: only ATS produced by ATESS can communicate with the inverter.
- ATS produced by ATESS has its own special communication line for communication with inverter.
- The CAN-B interface of the inverter is located in the internal control panel of the machine. Please distinguish "L" and "H".

3. Parallel communication (special for customized parallel function)

- Parallel communication is required when two same HPS models are used in parallel.
- DB9 communication line is used for parallel communication, which goes with the shipment in parallel scheme, also there will be special parallel communication interface.
- When paralleling two HPS models, DB9 communication line is used to connect the parallel interfaces of two models. One of the two parallel interfaces on the control board can be selected as the reserved interface.

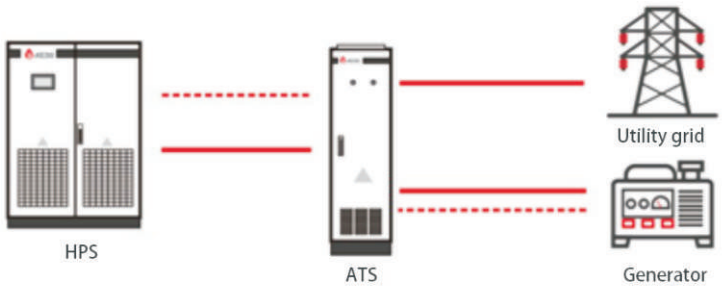
As Parallel function is a special customized function, users cannot parallel the models on their own. The parallel equipment shall not be changed to stand-alone without authorization. ATESS is not responsible for the consequences caused by not operating as required.

5.6 ATS wiring

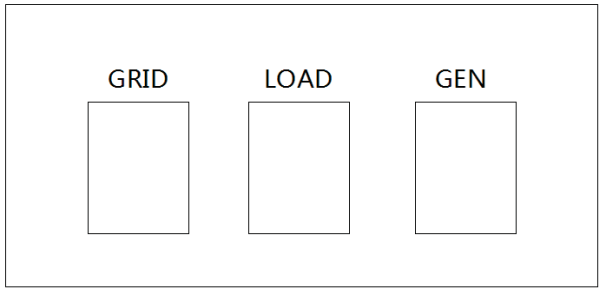
When the system needs to be connected to utility grid and gemerator at the same time, an ATS is required to be used together with HPS, which is mainly used to switch between the utility and generator.

2. The main wiring of ATS and HPS is ATS internal panel power line, CAN communication line and AC power line.

Wiring diagram is shown as below:

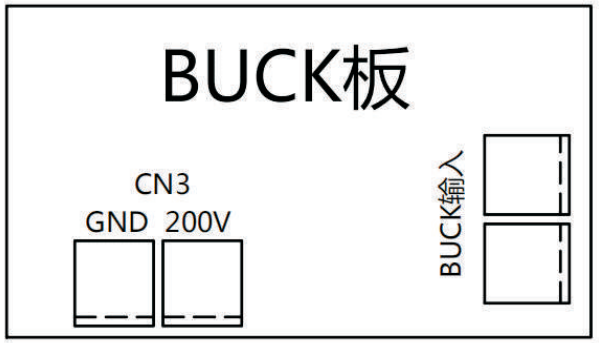


3. There are three circuit breakers in ATS. The middle circuit breaker is connected to the power grid switch (AC input) of HPS. The other two are grid switch (grid) and generator (Gen) switch. Pay attention to the printing on cabinet. It is not allowed to connect incorrectly, neither is it for the three phase sequence, otherwise the system cannot operate normally.



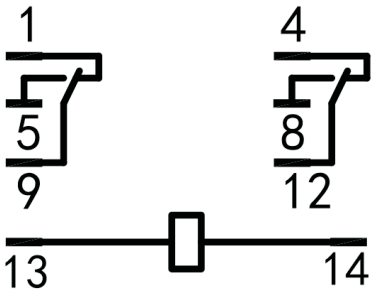
4. ATS需要与储能控制器进行通信连接，连接在储能控制器的CAN-B.注意顺序，区分“L”“H”。

5. ATS需要从储能控制器取电，连接至储能控制器的BUCK板的CN3.注意正负，红色为正，黑色为负。



5.7 油机干接点接线

储能控制器内部有控制油机的无源干接点接触器，下面为干接点结构图（初始状态）。



接线说明：

1. 13”“14”为干接点接触器电源，无需客户接线。

2. 干接点共有两组接线触点，“1”“5”“9”为一组，“4”“8”“12”为一组，两组会同时动作。

3. 初始状态即储能控制器未发送开启油机指令时，“1”“9”之间为常闭状态，“5”“9”之间为常开状态，当储能控制器发送开启油机命令时，“1”“9”从常闭转换为常开，“5”“9”从常开转换为常闭。“4”“8”“12”相同。

4. 需要从干接点中通过电流时，交流电压不超过240V，直流电压不超过28V，电流不超过5A。

5.8 并机系统接线

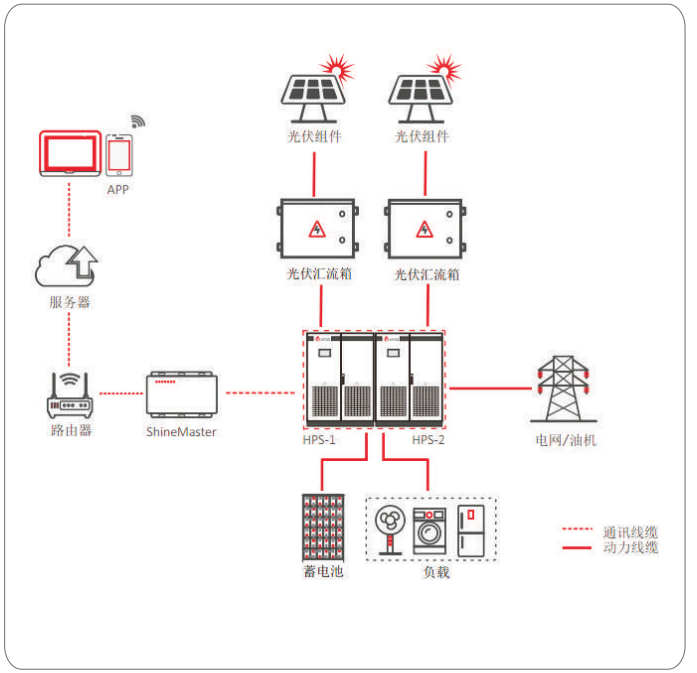
> 并机系统：

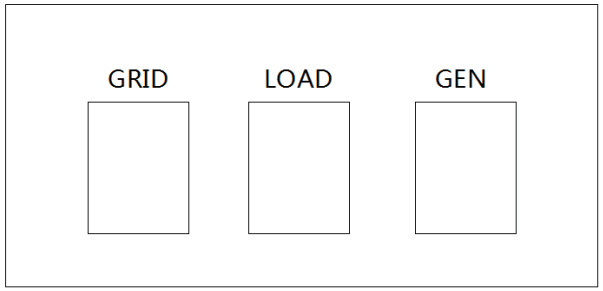
1. 两台同型号储能控制器交流输出并联，同时输出供应负载，运行相同的模式。

> 系统要求：

1. 必须为同型号储能控制器。
2. 程序为定制并机程序，普通单机运行程序不支持并机。
3. 为保证系统稳定运行，每台机配置尽量一致。

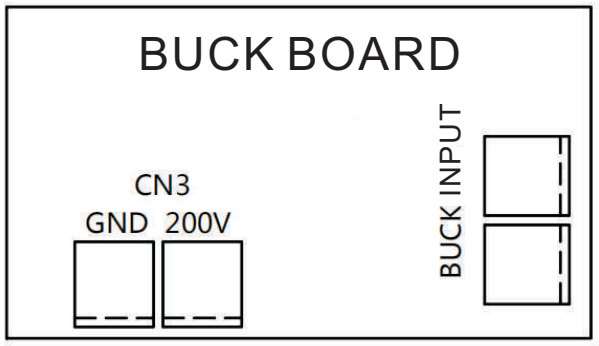
> 系统接线图





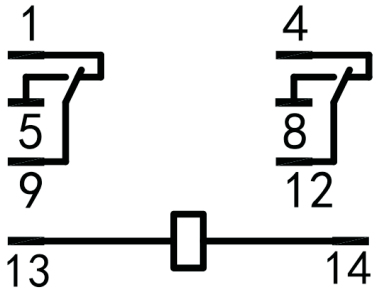
4. ATS needs to communicate with HPS, which is connected on CAN-B of HPS. Pay attention to the sequence and distinguish "L" and "H".

5. ATS needs to be powered by HPS and connected to CN3 of the BUCK board of HPS. Pay attention to positive and negative, red is positive and black is negative.



5.7 Diesel generator dry contact wiring

The inverter has a passive dry contact contactor to control the diesel generator, and the following is the dry contact structure diagram (initial state).



Wiring instructions:

1. "13" and "14" are the power supply of dry contact contactor, no need for wiring.

2. There are two groups of connection contacts in the dry contact, "1", "5" and "9" are a group, "4", "8" and "12" are a group, and the two groups will act at the same time.

3. The initial state is that when the inverter does not send the command to start the diesel generator, the state between "1" and "9" means stay closed, and the state between "5" and "9" means stay opened. When the inverter sends the command to start the diesel generator, "1" and "9" are switched to stay opened from stayed closed, and "5" and "9" are switched to stay opened from stayed closed. "4", "8" and "12" are the same.

4. When the current needs to pass through the dry contact, the AC voltage shall not exceed 240V, the DC voltage shall not exceed 28V, and the current shall not exceed 5A.

5.8 Parallel wiring

> Parallel operation system:

1. Two same HPS models are used in parallel, output and supply load at the same time operating in the same mode.

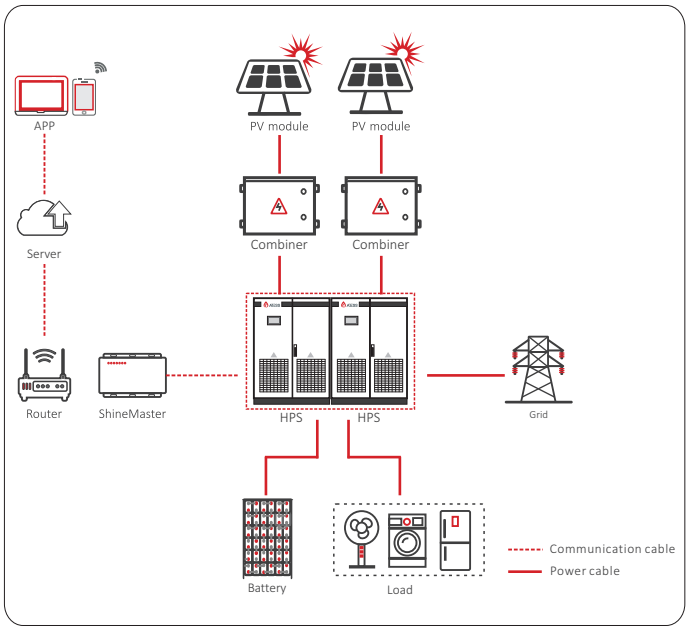
> System requirements:

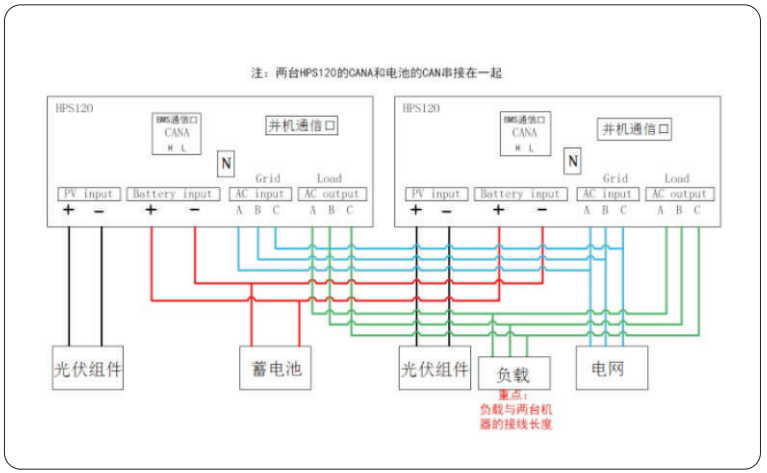
1. It must be the same HPS model.

2. The program has to be customized parallel program, default single model running programs is not applicable in parallel case.

3. At present, it supports at most two HPS in parallel.

> System wiring diagram shown as follow:





> 接线说明：

1. 光伏组件可以分开也可以共用，分开时注意两台机的光伏配置尽量相同。

2. 为减小环流损耗建议共用电池，当电池是带有BMS的锂电池时，两台机都需要和BMS进行通讯。

3. 两台机共同供应负载，负载端汇流后接入负载。要求汇流点到两台机线缆的长度相同，否则会造成负载分配不均衡。

4. 两台机共用电网或者油机。当需要电网油机切换时，需搭配ATS使用，安装方法同单机安装ATS。

5. 并机系统有专用的并机通讯线，直接将两台机的并机口相连，通讯线由时代能创能源科技提供；注意干扰，走线请避开强电。

6. 为保证通讯质量，两台机请安装在同一位置，减小通讯传输距离，且随机赠送的并机通讯线只有5米。

> 工作模式：

并机工作模式和单机相同，运行相同的模式。

系统可选并机后备功能。

不后备：

1.离网环境下，并机的储能控制器必须同时启动，同时关闭。开机时，需两台机一同开启，只开启1号机，1号机只能进入并机转离网模式（交流无输出），待2号机启动后才能一同进入离网模式；1号机进入故障状态后，2号机会进入并机转离网模式（交流无输出），1号机开机后，再一同进入离网模式。

2. 离网运行的储能控制器需要切入并网模式时，需要所有储能控制器都准备好进入并网模式，再同时进入并网模式，不允许一台机运行并网模式，另一台机运行离网模式。

后备：

1.离网环境下，并机的储能控制器不需要同时启动，同时关闭。可以单机离网模式运行，随时从并机中脱离和接入。

2.离网运行的储能控制器需要切入并网时，不需要所有的储能控制器都准备好进入并网模式，只需要本身满足并网条件即可并网。

3.不允许一台机运行并网模式，一台机运行离网模式。

后备使能选择说明：

当负载功率超过储能控制器单机最大负载功率，不建议使用后备功能，否则会经常造成储能控制器过载导致停机，负载会全部断电。

首次上电 6

6.1 运行前检查

在储能控制器投入运行之前，要对其安装进行检查，至少两名工作人员按照下表所列的项目注意检查以确保各项安装的正确性。

机械安装项目检查

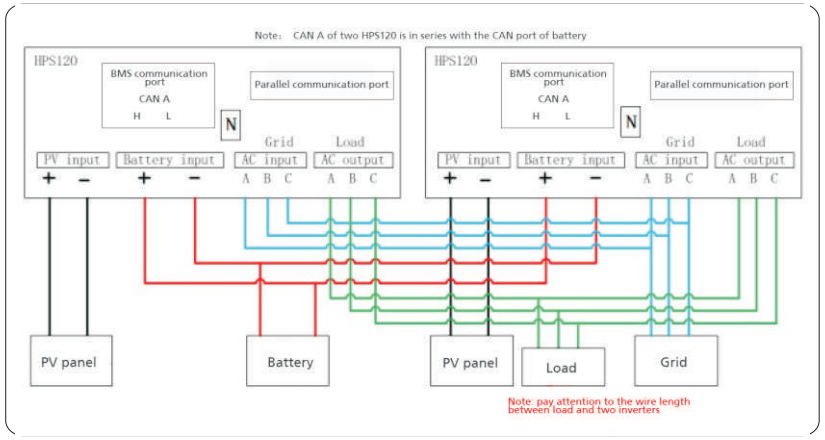
> 储能控制器无变形、损坏情况
> 储能控制器底部固定、支撑稳定可靠
> 储能控制器周围是由足够的空间
> 储能控制器所处环境的温度、湿度、通风状况符合要求
> 冷却空气流通顺畅
> 柜体密封防护完整可靠

电气安装检查

> 储能控制器接地完整牢固
> 电网电压与储能控制器额定输出电压相匹配
> 电网连接相序正确，紧固力矩符合要求
> 直流输入连接正负极正确，紧固力矩符合要求
> 通讯接线正确，并与其他电缆保持一定的距离
> 电缆线号标记正确，清晰
> 绝缘防护罩完整可靠，危险警告标签清晰牢固

其他检查

> 所有无用的导电部分用绝缘扎带扎紧
> 柜体内部没有遗留工具、零件、钻孔产生的导电灰尘或其他异物
> 柜体内部无凝结的潮气或结冰现象



➢ Wiring instructions:

1. PV modules can be separated or shared. When separating, PV configuration of the two units should be same as much as possible.

2. In order to reduce the circulation loss, it is recommended to share the battery. When it is a lithium battery with BMS, both computers need to communicate with BMS.

3. The two HPS supply load together, The load terminals of the two paralleled units are connected before connecting to load, and the length from combination point of the two HPS to the load terminals must be the same.

4. The two HPS share the utility grid or generator. When require to switch between these two power source, it shall be used with ATS. The installation method is the same as that of single unit installation.

5. The parallel system has a special parallel communication line, which directly connects the parallel ports of the two machines, and the line is provided by ATESS; Pay attention to interference, and avoid strong electricity when routing.

6. In order to ensure the communication quality, please install the two computers at the same location to reduce the communication transmission distance, and the complimentary line of parallel communication is only 5 meters long.

➢ Operation mode:

The paralleled HPS operation mode is the same as when it works in single unit.

The system can select parallel backup function.

No backup:

1. When off-grid, the paralleled inverter must be started and shut down at the same time. When starting up, two units shall be started together, Start unit 1, it can only enter the parallel to off-grid mode (no AC output), and then can enter the off-grid mode together after unit 2 is started; after unit 1 enters the fault state, unit 2 shall enter the parallel to off-grid mode (no AC output), and then enter the off-grid mode together after unit 1 is started.

2. When the inverter in off-grid operation needs to switch into on-grid mode, all inverters need to be ready, and then enter on-grid mode at the same time. It is not allowed that one machine running in on-grid mode, and the other in off grid mode.

Backup:

1. When off-grid, the paralleled inverter does not need to be started and closed at the same time. It can operate in the single off network mode, and disconnect and access from the parallel at any time.

2. When the energy storage controller in off grid operation needs to be connected to the grid, it does not need all the energy storage controllers to be ready to enter into the grid connection mode, but only needs to meet the grid connection conditions to be connected to the grid.

3. One machine is not allowed to operate in grid connected mode and one machine operates in off grid mode.

Description of backup enable selection:

When the load power exceeds the maximum load power of the single energy storage controller, it is not recommended to use the backup function, otherwise the overload of the energy storage controller will often lead to shutdown, and the load will be completely powered off.

Commissioning 6

6.1 Inspection before operation

Before the inverter is put into operation, its installation shall be inspected. At least two staff do the inspection according to the items listed below to ensure the correctness of the installation.

Inspection items for installation

➢ There is no deformation or damage to the inverter.
➢ Bottom of the inverter is fixed securely, the foundation support is stable and reliable.
➢ There is enough space around the inverter.
➢ The temperature, humidity and ventilation conditions of the environment where the inverter is located meet the requirements.
➢ There is enough cooling air for ventilation.
➢ Cabinet sealing protection is complete and reliable

Electrical inspection

➢ Inverter is grounded completely and firmly.
➢ The grid voltage matches the rated output voltage of the inverter.
➢ The phase sequence of grid connection is correct, and the tightening torque meets the requirements.
➢ The positive and negative poles of DC input connection are correct, and the tightening torque meets the requirements.
➢ Communication wiring shall be correct and keep a certain distance from other cables.
➢ Cable number is marked correctly and clearly.
➢ The insulation protection cover is complete and reliable, and the danger warning label is clear and firm.

Other inspection

➢ All useless conductive parts shall be tied with insulating ties.
➢ There are no tools, parts, conductive dust or other foreign matters left inside the cabinet.
➢ There is no condensation of moisture or ice in the cabinet.

6.2 上电

HPS采用交直流一体供电方式，单独有交流或者直流都可以点亮LCD。

> 电池供电

初次上电可使用电池供电，合上电池断路器，LCD应点亮。

> 交流供电

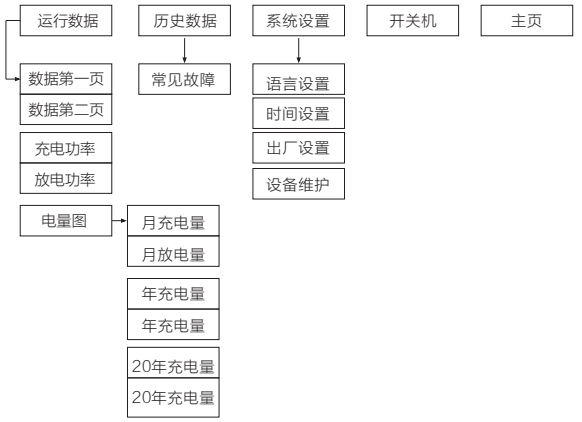
初次上电可使用交流供电，合上AC input开关、Bypass开关和AC output开关，以及供电的三个微断开关，LCD应点亮。储能控制器由交流供电时，当超过10分钟未检测到电池电压正常，将跳脱除Bypass外所有断路器，且单独交流供电时无法开机运行。

建议使用电池点亮屏幕。上电后请不要立即旋转开机旋钮，应查看故障信息页面以及查看运行设置是否符合实际情况，具体方法请查看第7章。

7 人机界面

7.1 触摸屏简介

用户可以在LCD触摸屏上查看储能控制器的运行信息，以及进行储能控制器运行参数的设置。为了方便操作， 以下提供LCD菜单逻辑结构分布图。



HPS LCD菜单逻辑结构分布

LCD上电后，进入开机界面，约15S进入界面主页。这时可以开始操作相关按键进行信息查阅和参数设置。

每个页面的右上方显示了LCD与储能控制器控制板的通讯状态（为√时通讯正常，为×时通讯故障）、储能控制器所在通讯端的站号、系统时间等。

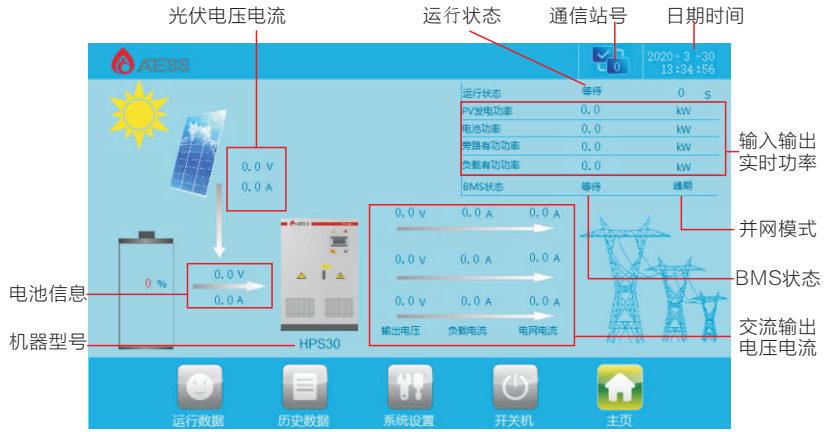
每个页面的下方都有五个常用功能按键：“运行数据”“历史数据”“系统设置”“开关机”“主页”。通过这五个常用键，用户可以方便快速的操作。在界面的左侧显示上述五个常用键对应下的子菜单按钮，选中后的按钮以绿色标示。

7.2 触摸屏操作

7.2.1 主页面

在其他任意界面下方点击【主页面】按钮就可以进入该页面。

在该页面中主要有：设备的型号、运行状态，输入输出电压、电流等信息。通过LCD下方常用功能键可切换至其他页面。



6.2 Power on steps

HPS adopts the integrated AC and DC power supply method, and LCD can be lit when there is AC or DC alone.

> Battery power supply

The battery can be used for the first time power-on. When the battery breaker is closed, the LCD should be on.

> AC power supply

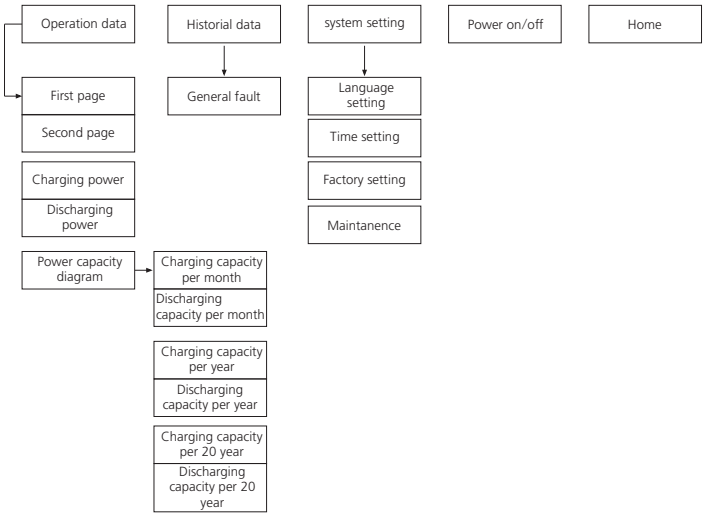
AC power supply can be used for the first time power-on. Turn on AC input switch, bypass switch, AC output switch and the three micro breaks, LCD should be on. When the HPS is powered by AC, as long as the battery voltage is detected to be abnormal for more than 10 minutes, all circuit breakers except bypass will be switched off, and inverter won't be able to start and operate when powered by AC source alone.

It is recommended to use batteries to light up the screen. After power on, please do not switch the power-on knob immediately. Please check the historical information page and check whether the operation setting is in line with the actual situation. Please refer to Chapter 7 for details.

7 GUI instruction

7. 1 LCD display screen introduction

User can view the information of the inverter operation on the LCD touch screen, as well as setting the operating parameters. In order to facilitate the operation, a menu is provided below.



HPS LCD Menu logical structure

After powering on the LCD,it will enter the home page after about 15s. Then you can begin to read the information and set the parameters.

Inverter communication state(√means normal and × means communication fault), station number and system time is displayed at the right top of each page of the LCD.

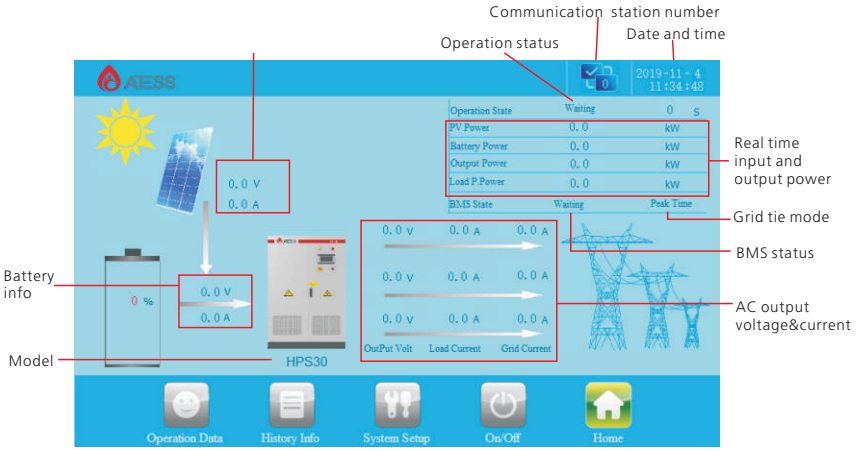
Each page has five commonly used function keys: "run data" "historical information" "system settings" "Power on/off" "Home" at the below of the page. Through these keys users can easily operate. On the left of the page it shows the corresponding sub-menu of the five keys, and it will be marked green after selected.

7.2 LCD operation

7.2.1 Home page

When powered or clicking "Home" button in any interface will enter into the Home page.

The operating status of the inverter output power, safety standard, model, input and output voltage,current information can be viewed in the page. Pressing the following key can switch to other pages.



运行状态显示内容	说明
故障	未开机或者存在故障无法开机
等待	启动初始化
检查	系统自检中
永久故障	发生严重故障
离网模式	离网带载模式
并网模式	成功连接到电网
单PV模式	PV仅充电模式
并机转离网	并机系统等待进入离网模式
并机转并网	并机系统等待进入并网模式

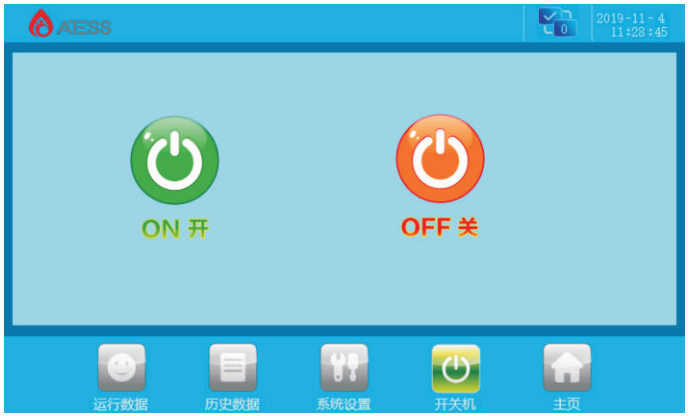
通信站号：数字代表当前站号，为485通信站号。数字上方的“√”表示LCD与控制板通信正常，当显示为“×”时表示失去通信。

并网模式：当储能控制器运行状态为并网时，将显示当前并网模式：负载优先、电池优先、经济模式、削峰填谷、EMS模式、油机模式。

BMS状态：当电池为带有BMS的锂电时，此处显示当前BMS状态。无BMS通信时显示“等待”。

7.2.2 开关机页面

在其他任意界面下点击【开关机】按钮就可以进入该页面。
在该页面中主要有：开机按钮，关机按钮。用于选择开机或者关机操作。
开机：必须将启动旋钮转至ON后点击“ON”方可成功开机。
关机：关机可点击“OFF”关机，也可以直接将启停旋钮转至OFF关机。



7.2.3 运行数据

在其他任意界面下方点击【运行数据】按钮就可以进入“运行数据”的子菜单。
子菜单有：运行数据、功率曲线、充放电量。通过左侧按钮可进入对应子菜单界面。
默认进入“运行数据”界面。
该界面下多项数据通过在LCD显示屏背面的“USB”接口插入U盘，储能控制器实时运行数据将会每隔一分钟自动存入U盘，储能控制器将会在U盘中每月自动创建一个文件进行数据存储，可查看历史记录信息。

Operation status	Description
Error	Not started or failed to start
Wait	Start initialization
Check	System self checking
Permanent fault	Serious failure occurred
Off grid mode	Off grid mode with load
On grid mode	Successfully connected to grid
PV mode	PV only charging mode
Parallel to off-grid	Parallel system waiting to enter off-grid mode
Parallel to on-grid	Parallel system waiting to enter on-grid mode

Communication station number: the number represents the current station number, which is 485 communication station number. The "√" above the number indicates that the LCD and the control board communicate normally, and when the display is "×", it indicates that the communication is lost.

Grid connected mode: when the operation state of the inverter is grid connected, the current grid connection mode will be displayed: load priority, battery priority, economic mode, peak shifting, EMS mode and diesel generator mode.

BMS status: when it works with lithium battery with BMS, the current BMS status is displayed here. "Wait" is displayed when there is no BMS communication.

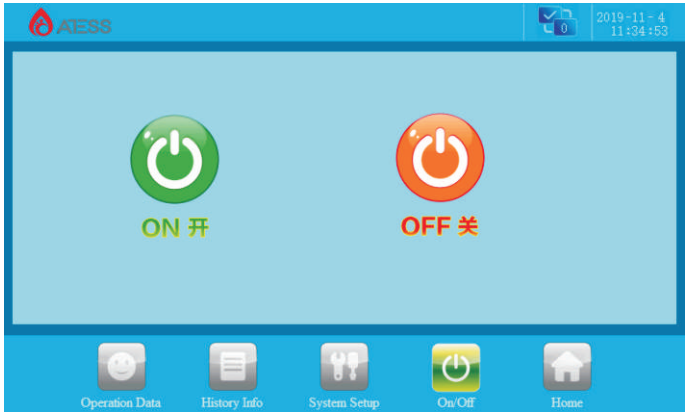
7.2.2 ON/OFF interface

Clicking "ON/OFF" button in any interface will enter into this interface.

There are "ON" and"OFF" button which is used to turn on and turn off the inverter.

Start up: turn the start knob to on and click "on" to start up successfully.

Shut down: shut down by clicking "off", or turn the start / stop knob to off directly.



7.2.3 Operation data

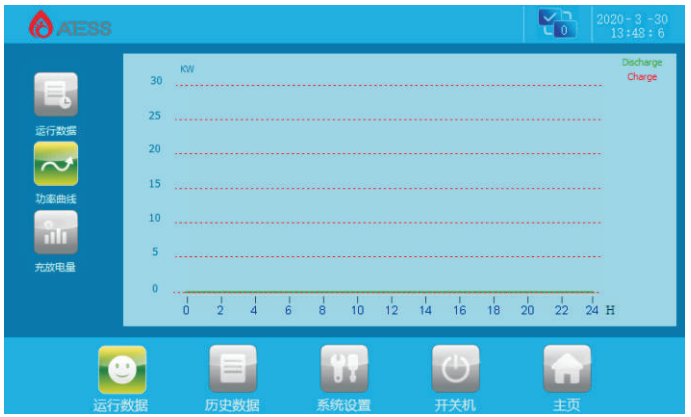
Click [operation data] at the bottom of any other interface to enter the submenu of "operation data".

The submenu includes: operation data, power curve, charge and discharge capacity. The corresponding submenu interface can be accessed through the left button. The default one is"operation data" interface.

A number of data under the interface are inserted through the "USB" interface on the back of the LCD screen. The real-time running data of the inverter will be automatically stored in the USB every other minute. The inverter will automatically create a file in the USB every month for data storage, through which can view the historical record information.

运行数据： 显示当前储能发电参数以及实时数据包括电网电压、电网频率、电网电流、直流输入电压、直流输入电流、机箱内温度以及总发电时间等信息(实时更新)。

功率曲线： 显示当天电池充放电曲线，点击屏幕刷新。



充放电量： 记录电池充放电量，记录有月、年、20年电量，点击屏幕刷新。

7.2.4 系统设置

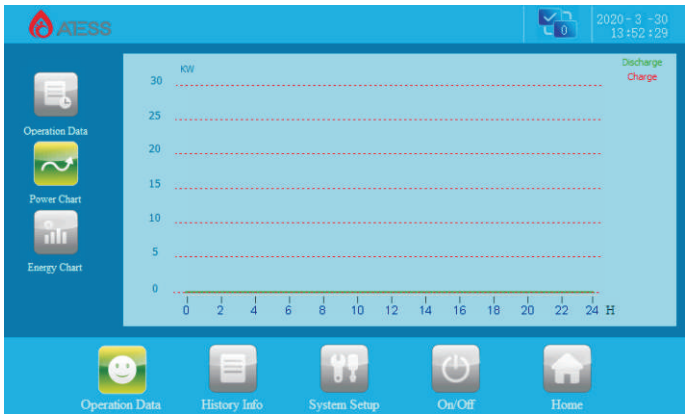
在其他任意界面下点击【系统设置】按钮就可以进入“系统设置”的子菜单。

子菜单有：语言设置，时间设置，设备信息，设备维护。通过左侧按钮可进入对应子菜单界面。默认进入“语言设置”界面。

语言设置： 在该页面下选择界面语言，目前仅支持中文，英文。

Operation data: display the current parameters and real-time data of energy storage power generation, including grid voltage, grid frequency, grid current, DC input voltage, DC input current, temperature in the case and total generation time (real-time update).

Power curve: display the battery charge and discharge curve of the day, click the screen to refresh.



Charge and discharge capacity: record the charge and discharge capacity of the battery by month, year and 20 year. Click the screen to refresh.

7.2.4 System setting

Clicking "System setting" button in any interface will enter into this interface.

Submenu: language settings, time settings, inverter information, maintenance.Pressing the left button can enter into the corresponding submenu interface. The default one is language setting interface.

Language Settings: Select language, currently it only supports Chinese, English.

时间设置：在该页面下设置系统时间(当LCD显示的时间、日期与当地实际时间日期不一致时，可以在这里进行修改)。

设备信息：该页面下显示了制造商、整机的序列号、软硬件版本信息与出厂日期信息，仅显示无法修改。

设备维护：该界面需要密码才能登入，密码由技术支持提供，只有充分熟悉整个设备系统构成及工作原理的电工或者维修人员才能够对此项进行操作，以免对人身安全和储能控制器性能造成损坏，请谨慎操作。

- 输入密码正确后可进入“设备维护”的子菜单。子菜单有：保护参数，校准参数，电网管理，出厂设置。默认进入“保护参数”界面。
- 参数修改方法，修改设定值，点击保存按钮，当前值会变成设定值相同数值；无法变成设定值时，一般有几个原因：
  - ■LCD反应慢，可通过切换页面加快刷新速度。
  - ■该数值超过上限值，无法保存
  - ■该页面其它数据存在错误，无法保存

1.保护参数：

电网电压上限：电网电压上限，超过上限会切入离网模式，默认设置额定的110%。
电网电压下限：电网电压下限，低于下限会切入离网模式，默认设置额定85%。
电网频率上限：电网频率上限，超过上限会切入离网模式，默认设置额定+2。
电网频率下限：电网频率下限，低于下限会切入离网模式，默认设置额定-2。
检测时间：开机检测时间，默认预设60秒，最低10秒，最高300秒。
输出功率限幅：交流输出功率百分比。可设为1%-120%，默认设置100%，建议不超过110%。
输出电压设置：设置离网输出电压，可设置380或者400，可根据实际需要更改，更改后需要断电重启才能生效。
输出频率设置：设置交流输出频率，可设置50或者60，可根据实际需要更改，更改后需要断电重启才能生效。
电池充电电流：该数值可修改电池充电电流，建议不超过保护电池充电电流保护值，请根据电池实际参数设置，避免对电池过充造成重大损失。

Time settings: system time setting (if the date and time displayed on LCD is not inconsistent with the actual date and time, they can be modified here).

Device Information: This page shows the manufacturer, inverter serial number, hardware and software version information, and the date of manufacturing.

Maintenance: the interface requires a password to login. It is for electrician and maintenance personnel who are fully familiar with the structure and working principle of the DC grid system only, in order to avoid damage to personal safety and the inverter.

- Enter the correct password to enter the submenu of "equipment maintenance". The submenu includes: protection parameters, calibration parameters, power grid management, factory settings. The default one is "protection parameters".
- Parameter modification method: modify the set value. Click Save to change the current value to the same value as the set value. There are several reasons why the current value cannot be changed to the set value:

- LCD response is slow, you can switch pages to speed up the update.
- The value exceeds the limit and cannot be saved.
- Other data on this page has errors and cannot be saved.

1. Protection parameters:

Grid Max. voltage: If it exceeds Max. power grid voltage, it will switch to off grid mode. The default setting is 110% of rated voltage.

Grid Min. voltage: If it gets lower than Min. power grid voltage, it will switch to off grid mode. The default setting is 85% of rated voltage.

Grid Max. frequency(Hz): If it exceeds Max. power grid frequency, it will switch to off grid mode. The default setting is rated + 2.

Grid Min. frequency: If it gets lower than Min. power grid frequency, it will switch to off grid mode. The default setting is rated-2.

Check time(s): startup detection time, default 60 seconds, minimum 10 seconds, maximum 300 seconds.

Output power limit: AC output power percentage. It can be set to 1% - 120%, the default setting is 100%, and it is recommended not to exceed 110%.

Output voltage setting: the off-grid output voltage can be set to 380 or 400, and can be changed according to the actual needs. After the change, power off and restart to take effect.

Output frequency setting: the AC output frequency can be set to 50 or 60, and can be changed according to the actual needs. After the change, power off and restart to take effect.

Charge_curr: can modify the battery charging current. It is recommended not to exceed the protection value of the charging current. Please set according to the actual parameters of the battery to avoid heavy losses caused by overcharge to battery.

电网功率上限：仅“削峰填谷”模式生效，为电网取电功率上限，默认最大设置为额定功率的两倍（HPS150最大为240）。

SOC上限、SOC下限：仅在油机模式下且电池有BMS时生效，离网模式下当前SOC低于SOC下限值，储能控制器发送油机开启命令；油机模式下当前SOC大于SOC上限值，储能控制器发送油机关闭指令。

电池充电饱和度：仅在并网负载优先模式生效，当电池电压因欠压停止放电转入充电后，需要电池单元达到设定值时才能恢复放电。

$$\text{电池恢复放电单元电压}=\text{浮充单元电压}-\frac{\text{电池饱和度}}{10}$$

浮充限流点设置：设置限流充电，当前单元电压大于（浮充单元电压-浮充限流点）时，进入限流充电状态。

$$\text{目标充电电流}=\frac{\text{浮充单元电压设定值-电池 当前单元电压}}{\text{浮充限流点设置值}}\ \text{*电池充电电流设定值}$$

电池启动电压：当储能控制器电池单元电压达到启动电压时，储能控制器才能启动运行。

单PV转离网：单PV模式下，电池单元电压达到设定值则自动转入离网模式；

放电截止电压：当电池单体电压达到放电截止电压时，电池停止放电（离网下转入单PV模式或者启动油机），电池无BMS时生效。

电网取电功率补偿：强行减小从电网取电功率，最大为10kw。

该页面出厂前将按照技术协议设置

该页面为电池参数设置页面，电池是储能控制系统的重要组成部分，电池参数需要仔细确认是否和实际情况一致。

电池组数：电池组件的并联数量。如2V/200Ah，240串2并，则组数为2。

电池单元数：电池组件每一串的电池数量。如2V/200Ah，240串2并，则单元数为240。

电池容量：电池单组容量，单位Ah。如2V/200Ah，240串2并，则容量200Ah。

电池充电过流保护：电池总充电电流的保护值。

电池放电过流保护：电池总放电电流的保护值。

浮充电压设置：电池的浮充单元电压值。电池单元电压到达此设定值时，充电电流趋近0A。

电池欠压告警：电池欠压告警时的单元电压值。

电池欠压保护：电池欠压保护时的单元电压值，电池电压因放电到达此设定值时，储能控制器将停机。

电池过压保护：电池的过压单元电压值，电池电压到达此设定值时，储能控制器将停机。

油机功率上限：仅“油机模式”模式生效，为油机功率上限，默认最大设置为额定功率的两倍（HPS150最大为240）。

放电截止SOC：当电池为带有BMS的电池时，实际SOC低于设置值,储能控制器将停止电池放电（仅并网状态生效）。并网模式下和“放电截止电压”功能相同，根据电池有无BMS来选择，无BMS时设置放电截止电压，有BMS时设置放电截止SOC。

Grid power limit value: the upper limit of power that can be taken from grid, which only takes effect under peak shaving mode, and the default maximum setting is twice of the rated power(maximum for HPS150 is 240).

SOC up limit and SOC down limit: only valid in diesel generator mode and when the battery has BMS. When off grid and the current SOC is lower than the Min. SOC, the inverter sends the diesel generator starting command; in diesel generator mode, the current SOC is higher than the upper SOC limit, and the inverter sends the diesel generator closing command.

BAT_charging_saturation: only valid in the on-grid load priority mode, when the battery voltage switches to charging from discharging due to undervoltage , the battery unit can resume discharging only when it reaches the set value.

$$\text{Recovery discharge unit voltage} = \text{floating charge unit voltage} - \frac{\text{battery saturation set value}}{10}$$

Float current limit setting: set current limiting charging, when the current unit voltage is greater than (floating cell voltage - floating charge current limiting point), enter the current limiting charging state.

$$\text{Target charging current} = \frac{\text{floating cell voltage - current unit voltage}}{\text{floating charge current limiting point value}} * \text{battery charging current set value}$$

Start volt: when the battery cell voltage of inverter reaches the starting voltage, inverter can start to operate.

Charge change to offline: in single PV mode, when the cell voltage reaches the set value, it will automatically switch to off-grid mode;

Discharge cutoff voltage: When the unit battery voltage reaches the discharge cut-off voltage, the battery stops discharging(or switch to single PV mode or start DG when off grid), and the battery takes effect when there is no BMS.

Power compensation of grid: forcibly reduce the power taken from grid to maximum of 10kW.

This page will be set according to the technical agreement before delivery

> This page is the battery parameter setting page. As battery is an important part of the energy storage system, the battery parameters need to be carefully confirmed whether they are consistent with the actual situation.

Batteries: the number of battery in parallel. E.g. 2V / 200ah battery, 240 in series and 2 in parallel, the number of groups should be 2.

Battery cells: the number of batteries in each string. E.g. 2V / 200ah battery, 240 in series and 2 in parallel, the number in each string should be 240.

Battery capacity: single unit battery capacity, unit: ah. If 2V / 200ah, 240 in series and 2 in parallel, the capacity is 200ah.

Max current charge: Protection value of total charging current of battery.

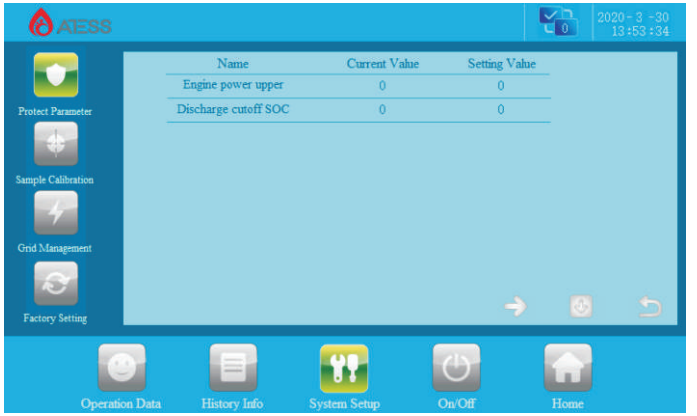
Max current discharge: Protection value of total discharge current of battery.

Floating charge_volt: the floating charge cell voltage of the battery. When the cell voltage reaches this set value, the charging current approaches 0A.

Undervolt_warning: the cell voltage value when battery undervoltage alarm activates.

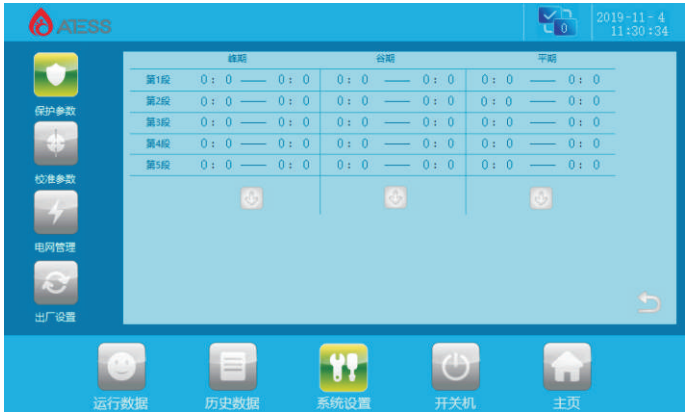
Undervolt_fault: the cell voltage value of battery undervoltage protection. When the battery voltage reaches this set value due to discharge, HPS will stop for protection.

Overvolt_fault: the over-voltage cell voltage value of the battery. When the battery voltage reaches this set value, HPS will protect and shut down.



Engine power upper: only takes effect under diesel generator mode , which is the upper limit of generator power. The default maximum setting is twice the rated power(maximum for HPS150 is 240).

Discharge cutoff SOC: when the battery is a lithium battery with BMS, the actual SOC is lower than the set value, and the inverter will stop the battery discharge (only valid in on-grid mode). In grid connection mode, it's the same with the function of "discharge cut-off voltage". It is selected according to whether the battery has BMS. When there is no BMS, the discharge cut-off voltage is set, and when there is BMS, the discharge cut-off SOC is set.



该页面为设置经济模式时间段设置页面，仅在经济模式下生效。过24点的时间段必须分为两段设置。例：20:00-6：00为谷期，需要设置谷期时间为20:00-24:00,00:00-6:00。

未做说明的页面为出厂预设参数，请勿修改。
若后续方案变动，请在ATESS工作人员指导下修改参数。

2.校准参数：

校准参数修改：修改为0时表示功能未打开，修改为1时表示功能已打开，修改使能不需要手动保存，参数自动保存。当修改后未能自动保存表示无法打开此功能，请联系时代能创能源科技公司。

孤岛保护使能：防止储能控制器在电网异常下未正确切入离网模式的保护使能。

手动调节使能：仅作为修改重要参数时使用，平时请勿打开。

旁路柜使能：当储能控制器搭配时代能创能源科技生产的ATS使用时，需要将旁路柜使能修改为1；否则，设为0。

BMS通信使能：储控制器与电池进行BMS通信时，设置为1；否则，设为0。

防逆流使能：设为1时，储能控制器将不会向电网馈电；设为0时，储能控制器将会向电网馈电。

油机使能：当储能控制器的电网输入端接入为油机时，需要将油机使能设为1，否则设为0。

电网和PV同时充电使能：设为1时，电网和PV可以同时给电池充电；油机模式下，油机和PV可以同时给电池充电。优先由PV供应，不足时由电网或者油机补充；设为0时，电网和PV不可以同时给电池充电。油机模式下，油机和PV不可以同时给电池充电。优先由PV 供应，PV完全没有功率时油机或电网才会充电池。

并机后备使能：设为1时，并机系统进入后备功能；设为0时，关闭后备功能。

监控并机判断标志：当系统为并机系统且带有Shinemaster监控时，同一并机系统的储能控制器设置同一数值，将在监控页面自动统计并机系统数据，否则记录单机数据。

并机台数：并机系统储能控制器数量设置。并机系统为2台并联，设为2；三台设为3.

> 并网模式选择页面

设为0，并网时运行负载优先模式

设为1，并网时运行电池优先模式

设为2，并网时运行经济模式

设为3，并网时运行电网需量管理模式

> 油机使能为0时生效，油机使能为1时，并网下默认进入油机模式。搭配ATS且打开旁路柜使能，系统同时存在两种模式（以上四种模式之一和油机模式）。

若客户为特殊定制运行模式，请不要自行修改运行模式，。
未做说明的页面为出厂预设参数，请勿修改。
若后续方案变动，请在ATESS工作人员指导下修改参数。

This page will be set according to the technical agreement before delivery

This page is the economic mode time period setting page, which only takes effect in economic mode. The time period after 24 o'clock must be divided into two settings. For example, 20:00-6:00 is the valley period, which needs to be set as 20:00-24:00, 00:00-6:00.

The page without instructions is factory preset parameter, please do not modify.

If the subsequent scheme changes, please modify the parameters under the guidance of ATESS.

2. Calibration parameters:

Modification of calibration parameters: when it is modified to 0, it means that the function is not valid; when modified to 1, it means that the function is valid; the modification enabling does not need to be saved manually, parameters are saved automatically. If the modification fails to save automatically and the function cannot take effect, please contact ATESS.

Islanding protection enable: it is a protection to prevent the inverter from not correctly switching into off grid mode in case of grid abnormality.

Manual adjustment enable: only used to modify important parameters, do not open it at ordinary times.

Bypass_cabinet enable: when inverter is used with ATS produced by ATESS, the bypass cabinet enabling needs to be modified to 1; otherwise, set to 0.

BMS communication enable: when inverter communicates with the battery in BMS, set it to 1; otherwise, set to 0.

Anti_backflow enable: when set to 1, inverter will not feed power to grid; when set to 0, inverter will feed power to grid.

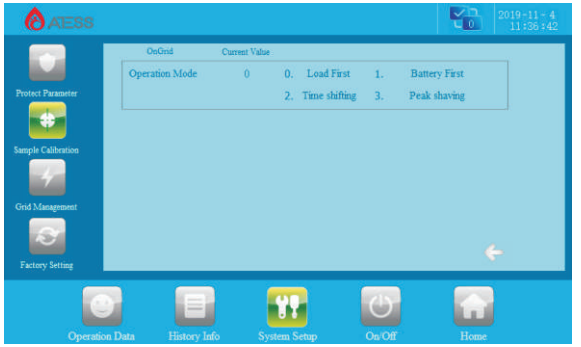
Generator enable: when the input end of the power grid of the inverter is connected to diesel generator, the generator enable should be set to 1, otherwise it should be set to 0.

Grid&PV charge together enable: when set to 1, power grid and PV can charge the battery at the same time; in diesel generator mode, generator and PV can charge the battery at the same time. PV supply as priority, when it is insufficient, it is supplemented by power grid or generator; when it is set to 0, power grid and PV can not charge battery at the same time. In generator mode, the generator and PV can not charge battery at the same time. It is preferentially supplied by PV. Only when PV has no power can the generator or power grid charge the battery.

Parallel backup enable: when it is set to 1, the parallel system enters backup mode; when it is set to 0, backup function is disable.

Monitoring parallel judgment mark: when the system is parallel system with Shinemaster monitoring, the same value will be set for the energy storage controller of the same system, and the parallel system data will be automatically counted on the monitoring page, otherwise the single machine data will be recorded.

Number of parallel machine: number setting of parallel system. When 2 inverters in parallel, set as 2; when three units set as 3.



> Grid connection mode selection page

Set to 0, run load priority mode when grid connected

Set to 1, run battery priority mode when connected to grid

Set to 2, run economic mode when connected to grid

Set to 3, run demand management mode when connected to grid.

> This takes effect when generator enable set to 0. When generator enable is set to 1, it will enter generator mode by default under grid connection. When using with ATS and enable the bypass cabinet, the system runs at two modes at the same time(one of the above four modes and DG mode).

If user has customized the operation mode, please do not modify it.

The page without instructions is the factory preset parameter, please do not modif.

If the subsequent scheme changes, please modify the parameters under the guidance of ATESS.

3.电网管理：

该页面参数为重要参数，为出厂预设参数，未得到ATESS人员同意，请不要修改。造成后果ATESS概不负责。

未做说明的页面为出厂预设参数，请勿修改。
若后续方案变动，请在ATESS工作人员指导下修改参数。

4.出厂设置：

该页面参数为重要参数，为出厂预设参数，未得到ATESS人员同意，请不要修改。

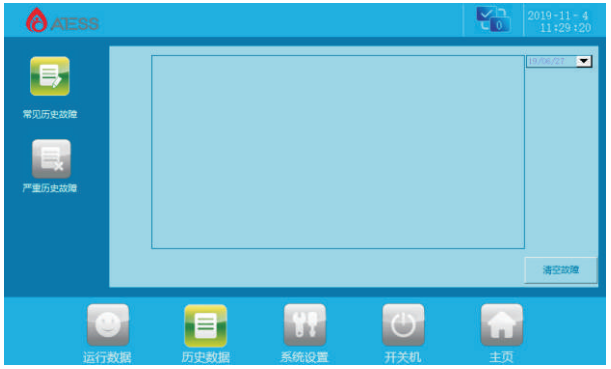
未做说明的页面为出厂预设参数，请勿修改。
若后续方案变动，请在ATESS工作人员指导下修改参数。

7.2.5 历史数据

在其他任意界面下方点击【历史信息】按钮就可以进入“历史数据”的子菜单。

子菜单有：常见历史故障，严重历史故障。通过左侧按钮可

进入对应子菜单界面。默认进入“常见历史故障”界面。



常见历史故障：通过上下滑动进度条可查阅所有常见历史故障详情，通过删除可将表格清空。

更多的常见故障信息见附表7.3。

7.3 LCD显示信息附表

一般历史故障表

序号	信息内容	
	英文	中文
1	PV_Inverse_Failure	PV接反永久故障
2	IGBT_Failure	IGBT永久故障
3	EEPROM_Write_Failure	EEPROM写永久故障
4	EEPROM_Read_Failure	EEPROM读永久故障
5	AC_MainContactor_Failure	主接触器永久故障
6	AC_SlaveContactor_Failure	辅接触器永久故障
7	GFDI_Failure	GFDI永久故障
8	GFCI_Failure	GFCI永久故障
9	RISO_Failure	绝缘阻抗永久故障
10	PV_VoltHigh_Fault	PV电压高故障
11	Bypass_Communication_Fault	旁路柜通信故障
12	PV_CurrHigh_Fault	PV电流过流故障
13	BMS_Communication_Fault	BMS通信故障
14	PV_Insulation_Fault	PV对地绝缘阻抗故障
15	BMS_Fault	BMS故障
16	DC_OCP_Fault	直流过流故障（Trip）
17	Smoke_alarm_Fault	烟雾报警故障
18	INT_PV_OverVolt_Fault	PV过压故障（INT）
19	INT_PV_OverCurr_Fault	PV过流故障（INT）
20	IGBT_Converter_Fault	控制器IGBT故障
21	IGBT_Buck_Fault	Buck IGBT故障
22	Converter_L_OCP_Fault	控制器电感过流故障（Trip）
23	Buck_L_OCP_Fault	Buck电感过流故障（Trip）
24	AC_NoUtility_Fault	交流无市电故障
25	AC_GridPhaseSeque_Fault	交流电网相序反故障
26	AC_PLL_Fault	交流锁相故障
27	AC_Volt_Unbalance_Fault	交流电压不平衡故障
28	AC_Curr_Unbalance_Fault	交流电流不平衡故障
29	AC_WU_OverVolt_Fault	交流WU过压故障

3. Power grid management

The value on this page are important factory preset parameters. Please do not modify them without the consent of ATESS. ATESS won't be responsible for the consequences caused by changing the value.

If the subsequent scheme changes, please modify the parameters under the guidance of ATESS.

4. Factory settings

The value on this page are important factory preset parameters. Please do not modify them without consent of ATESS.

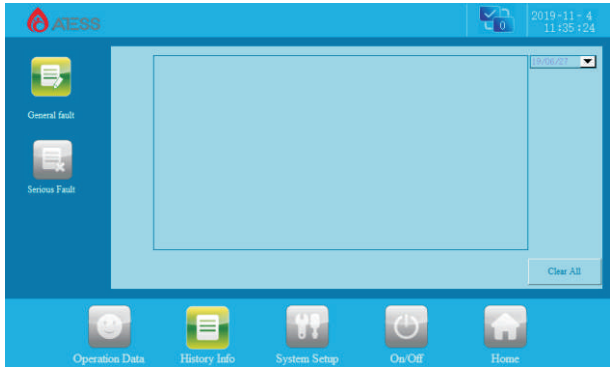
The page without instructions is the factory preset parameter, please do not modif.

If the subsequent scheme changes, please modify the parameters under the guidance of ATESS.

7. 2. 5 Historical information

Clicking "historical information" can enter into the sub-menu of the "historical information".

The submenu includes: Common historical failure, serious historical failure. Via the left button you can enter the corresponding submenu interface. The "common historical faults"is the default interface.



History of failure: all the common history of failure details can be found by flipping the page up and down.

The common fault information, see table 7.3.

7.2 LCD display information schedule

General history failure table

NO	Information	
	English	Chinese
1	PV_Inverse_Failure	PV接反永久故障
2	IGBT_Failure	IGBT永久故障
3	EEPROM_Write_Failure	EEPROM写永久故障
4	EEPROM_Read_Failure	EEPROM读永久故障
5	AC_MainContactor_Failure	主接触器永久故障
6	AC_SlaveContactor_Failure	辅接触器永久故障
7	GFDI_Failure	GFDI永久故障
8	GFCI_Failure	GFCI永久故障
9	RISO_Failure	绝缘阻抗永久故障
10	PV_VoltHigh_Fault	PV电压高故障
11	Bypass_Communication_Fault	旁路柜通信故障
12	PV_CurrHigh_Fault	PV电流过流故障
13	BMS_Communication_Fault	BMS通信故障
14	PV_Insulation_Fault	PV对地绝缘阻抗故障
15	BMS_Fault	BMS故障
16	DC_OCP_Fault	直流过流故障（Trip）
17	Smoke_alarm_Fault	烟雾报警故障
18	INT_PV_OverVolt_Fault	PV过压故障（INT）
19	INT_PV_OverCurr_Fault	PV过流故障（INT）
20	IGBT_Converter_Fault	控制器IGBT故障
21	IGBT_Buck_Fault	Buck IGBT故障
22	Converter_L_OCP_Fault	控制器电感过流故障（Trip）
23	Buck_L_OCP_Fault	Buck电感过流故障（Trip）
24	AC_NoUtility_Fault	交流无市电故障
25	AC_GridPhaseSeque_Fault	交流电网相序反故障
26	AC_PLL_Fault	交流锁相故障
27	AC_Volt_Unbalance_Fault	交流电压不平衡故障
28	AC_Curr_Unbalance_Fault	交流电流不平衡故障
29	AC_WU_OverVolt_Fault	交流WU过压故障

序号	信息内容	
	英文	中文
30	AC_WU_UnderVolt_Fault	交流WU欠压故障
31	AC_VW_OverVolt_Fault	交流VW过压故障
32	AC_VW_UnderVolt_Fault	交流VW欠压故障
33	AC_UV_OverVolt_Fault	交流UV过压故障
34	AC_UV_UnderVolt_Fault	交流UV欠压故障
35	AC_OverFreq_Fault	交流过频故障
36	AC_UnderFreq_Fault	交流欠频故障
37	AC_GridCurr_DcHigh_Fault	电网直流量高故障
38	Converter_LCurr_DcHigh_Fault	控制器电感直流量高故障
39	Buck_LCurr_DcHigh_Fault	Buck电感直流量高故障
40	GridCurr_High_Fault	电网电流高故障

8 运行

8.1 开机运行步骤

安装及系统设置检查完毕后可开机运行。

> 首次运行

首次运行操作步骤如下：1. 将储能控制器PV、电池、AC input、供电微断开关合上，AC output开关在系统运行正常前请不要打开，避免对负载有影响；

2. Bypass开关正常运行时应关闭；
3. 检查屏幕采样数据是否有异常，是否和实际一致；
4. 检查电池参数设定是否和实际电池一致，若不一致请修改；
5. 若电池带有BMS则检查BMS使能是否打开，BMS通讯是否正常；
6. 若电网端口接入为油机，则检查油机使能有没有打开；
7. 若带有时代能创能源科技生产的ATS，则检查旁路柜使能是否打开，通讯及电源线是否正确连接；
8. 查看屏幕历史信息页面，对照8.3章节的一般故障，查看是否有严重故障。
9. 检查无误后，将旋钮开关旋至”ON”，在LCD“开关机”页面点击“ON开”，等待机器进入“并网”； 如果现场为离网环境，开机后将会入“离网模式”；
10. 运行时观察屏幕显示数据是否正常，有没有报故障信息，机器是否有异响、异味；如果有异常情况请立即停机检查。

警告!
Bypass开关仅在维护时使用，请在正常运行中不要打开。

手动关机

在储能控制器工作过程中，可点击LCD上关机按键，或者直接将旋钮开关旋至“OFF”，储能控制器停止工作。

1.点击LCD关机按键手动关机后，必须通过LCD上的开机键（ON）手动开机；通过旋钮开关旋至“OFF”关机的，先将HPS旋钮开关旋至“ON”，在LCD“开关机”页面点击“ON开”按键才能开机，否则储能控制器不能自动开机。

2.手动关机后储能控制器仍然带电。

8.2 完成试运行

储能控制器运行后进行如下测试步骤：

步骤1：检查储能控制器是否存在异常，如，噪声过大、发热量过大、出现异常气味或冒烟；

步骤2：测量储能控制器输出电压、电流情况是否稳定；

步骤3：操作LCD，检查其工作显示是否正常、准确。

步骤4：测试是否符合预设的运行逻辑。

至此，储能控制器试运行过程全部完成，可进入日常运行维护过程。

8.3 一般故障处理

机器运行中出现故障，请点击LCD“历史信息”页面查看当前故障。以下为HPS常见故障分析及处理步骤：

1.手动关机：HPS面板旋钮开关旋至“OFF”

处理步骤:旋钮关机正常故障，不用处理。

2.LCD关机：HPS屏幕开关机点击“OFF”

处理步骤：屏幕关机正常故障，不用处理。

3.EPO故障：紧急停机按钮被按下

处理步骤：确定无其它异常情况下，释放紧急停机按钮。

4.电池欠压故障：电池单元电压低于电池欠压保护值

处理步骤：

a.检查屏幕主页电池电压，是否电池断开没有电压。若没有电压，则检查HPS电池空开是否跳开，电池自身是否断开输出

b.检查电池单元数和电池欠压保护值是否设置正确，若不正确请将参数设置正确。如果参数正确的情况下由于电池本身低压造成，请联系能源科技人员协助处理。

NO	Information	
	English	Chinese
30	AC_WU_UnderVolt_Fault	交流WU欠压故障
31	AC_VW_OverVolt_Fault	交流VW过压故障
32	AC_VW_UnderVolt_Fault	交流VW欠压故障
33	AC_UV_OverVolt_Fault	交流UV过压故障
34	AC_UV_UnderVolt_Fault	交流UV欠压故障
35	AC_OverFreq_Fault	交流过频故障
36	AC_UnderFreq_Fault	交流欠频故障
37	AC_GridCurr_DcHigh_Fault	电网直流量高故障
38	Converter_LCurr_DcHigh_Fault	控制器电感直流量高故障
39	Buck_LCurr_DcHigh_Fault	Buck电感直流量高故障
40	GridCurr_High_Fault	电网电流高故障

8 Operation

8.1 Power on steps

After installation and system settings are inspected, inverter can be started for operation.

> First run

The first operation steps are as follows:

1. Turn on the PV, battery, AC input and power supply micro breaks, and do not turn on the AC output switch before the system operates normally to avoid any impact on the load;

2. Bypass switch shall be closed when it is in normal operation;

3. Check whether the screen sampling data is abnormal and consistent with the actual situation;

4. Check whether the battery parameter setting is consistent with the actual battery, if not please modify.

5. If the battery has BMS, check whether the BMS is enabled and normal.

6. If the grid input end is connected to generator, check whether generator is enabled.

7. If it is equipped with ATS manufactured by ATESS, check whether the bypass cabinet is enabled.

8. Check the history information page of the screen, and check whether there are serious faults according to the general faults in Chapter 8.3.

9. After checking, turn the knob to "on", click "on" on the LCD" on / off "page, and wait for the machine to enter" grid connection "; if the site is off grid, it will enter" off grid mode "after starting;

10. During operation, observe whether the data displayed on the screen is normal and whether there is fault information reported, and whether the machine has abnormal noise and smell; if any abnormal situation occurs, please stop the machine immediately for inspection.

Warning!

The bypass switch is only used for maintenance. Please do not turn it on during normal operation.

Warning!

1. After clicking the LCD shutdown button to shut down the machine manually, it must be turned on manually through the start button (on) on the LCD; if the machine is turned off by turning the knob to "off", turn the HPS knob to "on" first, and then click the "on" button on the LCD "switch on" page to start the machine, otherwise inverter cannot start automatically.

2. The inverter is still electrified after manual shutdown.

8.2 Pilot operation completion

The following procedures shall be carried out after the inverter is normally in operation.

Procedure 1: Inspect whether abnormity exists in the inverter, such as excessive noise, excessive heat, abnormal smell or smoke.

Procedure 2: Measure whether inverter voltage, current and THD are stable.

Procedure 3: Operate LCD control panel and inspect whether it displays normally and accurately.

Procedure 4: Test whether it conforms to the preset operation logic.

By now, the pilot operation of inverter is fully completed, and we can enter the daily operational maintenance.

8.3 General troubleshooting

If there is a fault during the operation, please click the LCD "history information" page to view the fault information. The following are the common fault analysis and handling steps of HPS:

1. Key emergency stop: turn HPS panel knob to "off"

Handling steps: the knob is shut down normally, no need to handle.

2. LCD emergency stop: click "off"on HPS screen

Processing steps: the screen is shut down normally, no need to handle.

3. EPO fault: emergency stop button pressed.

Handling steps: release the emergency stop button in case of no other abnormalities.

4. Batt_UnderVolt_Fault: the battery cell voltage is lower than the battery undervoltage protection value.

Processing steps:

A. check the battery voltage to see if there is no voltage when the battery is disconnected. If there is no voltage, check whether the air switch of HPS battery jumps off and whether the battery itself disconnects the output.

B. check whether the number of battery cells and undervoltage protection value are set correctly. If not, please set the parameters correctly. If the parameters are correct and it's caused by the low voltage of the battery itself, please contact ATESS for assistance.

5.电池过压故障：电池单元电压高于电池过压保护设定值

处理步骤：检查电池单元数和过压保护值是否设置正确，若不正确请将参数设置正确。如果参数正确的情况下由于电池本身过压造成，请联系能源科技人员协助处理。

6.电池过充故障：电池充电电流高于最大充电电流值

处理步骤：检查电池充电电流设定值和电池最大充电电流值是否合理，电池最大充电电流值按照电池厂家给出的建议设置，电池充电电流设定值应小于最大充电电流保护值。

7.电池过流故障：电池放电电流高于最大放电电流值

处理步骤：检查电池最大放电电流值是否合理，用电池电压乘以最大放电电流，计算出电池最大放电功率，看看是否小于负载功率，若是，则减小负载功率。

8.BMS故障：电池出现二级或者三级故障

处理步骤：a.检查BMS具体报出的故障

b.联系电池厂家解决故障

c.故障解决后，重新开机

9.BMS通信故障：HPS没有接收到电池BMS发送的CAN数据

处理步骤：a.检查电池CAN线是否接在HPS控制板的CAN-A端口上

b.检查CAN线高低有没有接反

c.用CAN盒子检查总线上是否有BMS发出的数据

d．检查CAN线是否用的屏蔽线

e．若还是通讯不上，请联系能源科技人员协助处理。

10.旁路柜通信故障：HPS没有接收到旁路柜发送的CAN数据

处理步骤：a.检查ATS的CAN线是否接在HPS控制板的CAN-B端口上

b.检查CAN线高低有没有接反

c.用CAN盒子检查总线上是否有旁路柜发出的数据

d．检查CAN线是否用的屏蔽线

e.若还是通讯不上，则联系相关专业人员

11.交流无市电故障：交流无电压输出

处理步骤：一般不会出现这个故障，是因为其它原因导致故障无输出。

12.交流过频故障：电网频率超出电网频率上限，储能控制器进入离网状态

处理步骤：检查电网频率上限是否合理，若合理，则等待电网频率恢复正常后储能控制器将自动进入并网。

13.交流低频故障：电网频率低于电网频率下限，储能控制器进入离网状态

处理步骤：检查电网频率下限是否合理，若合理，则等待电网频率恢复正常后储能控制器将自动进入并网

14.交流电压UV高告警：电网电压高于电网电压上限，储能控制器进入离网

处理步骤：检查电网电压上限设置是否合理，若合理，则等待电网电压恢复正常后，储能控制器自动进入并网

15.交流电压VW高告警：电网电压高于电网电压上限，储能控制器进入离网

处理步骤：检查电网电压上限设置是否合理，若合理，则等待电网电压恢复正常后储能控制器自动进入并网

16.交流电压WU高告警：电网电压高于电网电压上限，储能控制器进入离网

处理步骤：检查电网电压上限设置是否合理，若合理，则等待电网电压恢复正常后，储能控制器自动进入并网

17.交流电压UV低告警：电网电压低于电网电压下限，储能控制器进入离网

处理步骤：检查电网电压下限设置是否合理，若合理，则等待电网电压恢复正常后储能控制器自动进入并网

18.交流电压VW低告警：电网电压低于电网电压上限，储能控制器进入离网

处理步骤：检查电网电压下限设置是否合理，若合理，则等待电网电压恢复正常后储能控制器自动进入并网

19.交流电压WU低告警：电网电压低于电网电压上限，储能控制器进入离网

处理步骤：检查电网电压下限设置是否合理，若合理，则等待电网电压恢复正常后储能控制器自动进入并网

20.交流电网相序反故障：电网三相相序接反

处理步骤：检查电网三根线的相序U V W，对应接到我们机器AC-input端的A B C

21.过温故障：机器内部器件温度过高

处理步骤：a.检查机器供电微断开关是否打开，若没打开，则打开开关

b.检查HPS进风口和出风口是否被堵住，定期清理灰尘。

c.等待机器冷却，故障消除，正常开机，观察温度达到60度时风扇会不会工作。若不工作，请联系能源科技有限公司人员解决。

其他故障，请联系时代能创能源科技相关专业人员处理

8.4 关机下电步骤

警告!

储能控制器完全下电以后，储能控制器仍然带电，如需操作，请务必彻底断开所有外部连接，并至少等待5分钟，使用仪器测量保证安全后可进行其它操作。

1. 将旋钮开关旋至 “OFF”关机；
2. 断开直流总输入开关PV input和Battery input；
3. 断开交流输出开关AC input和AC output；

警告!

下电过程储能控制器发出告警为正常的现象，可继续执行下电步骤。

5. Batt__OverVolt__Fault: the battery cell voltage is higher than the set value of battery over-voltage protection.

Processing steps: check whether the number of battery cells and overvoltage protection value are set correctly. If not, please set the parameters correctly. If the parameters are correct due to the over-voltage of the battery itself, please contact the energy technology personnel for assistance.

6. Batt__OverCharge__Fault: the battery charging current is higher than the maximum charging current.

Processing steps: check whether the battery charging current setting value and the maximum charging current value are reasonable. The maximum charging current value of the battery shall be set according to the recommendations given by the battery manufacturer. The setting value of the battery charging current shall be less than the maximum charging current protection value.

7. Batt__OverCurr__Fault: the battery discharge current is higher than the maximum discharge current

Processing steps: check whether the maximum discharge current value of the battery is reasonable, multiply the maximum discharge current by the battery voltage, calculate the maximum discharge power of the battery, see whether it is less than the load power, if yes, reduce the load power.

8. BMS__Fault: secondary or tertiary battery failure

Processing steps:

A. check the specific faults reported by BMS

B. contact the battery manufacturer to solve the problem

C. restart after troubleshooting

9. BMS__Communication__Fault: HPS does not receive CAN data sent by BMS

Processing steps:

A. check whether the battery CAN cable is connected to the CAN-A port of HPS control board.

B. check whether the CAN line is connected reversely

C. check whether there is data sent by BMS on the bus with CAN box

10. Bypass__Communication__Fault: HPS did not receive can data sent by bypass cabinet

Processing steps:

A. check whether the CAN line of ATS is connected to the CAN-B port of HPS control board.

B. check whether the CAN line is connected reversely

C. use CAN box to check whether there is data from bypass cabinet on the bus

D. check whether the CAN line is shielded wire

E. if the communication still fails, contact relevant professionals

11. AC__NoUtility__Fault

Processing steps: generally, this fault will not fade out because there is no output due to other reasons.

12. AC__OverFreq__Fault: the power grid frequency exceeds the upper limit, and HPS enters off grid state.

Processing steps: check whether the upper limit of power grid frequency is reasonable. If yes, wait until the power grid frequency returns to normal, HPS will automatically enter into grid connection state.

13. AC__UnderFreq__Fault: the power grid frequency is lower than the lower limit, and HPS enters the off grid state.

Processing steps: check whether the lower limit of power grid frequency is reasonable. If yes, wait until the power grid frequency returns to normal, HPS will automatically enter into grid connection state.

14. AC__UV__OverVolt__Rmt__Warning: when the utility grid voltage is higher than the upper limit, HPS enters off grid state.

Processing steps: check whether the upper limit setting of power grid voltage is reasonable. If yes, wait until the power grid voltage returns to normal, and HPS will automatically enter into grid connection state.

15. AC__VW__OverVolt__Rmt__Warning: when the grid voltage is higher than the upper limit, HPS enters off grid state.

Processing steps: check whether the upper limit setting of power grid voltage is reasonable. If yes, wait until the power grid voltage returns to normal, and HPS will automatically enter into grid connection state.

16. AC__WU__OverVolt__Rmt__Warnin: when the grid voltage is higher than the upper limit, HPS enters off grid state.

Processing steps: check whether the upper limit setting of power grid voltage is reasonable. If yes, wait until the power grid voltage returns to normal, and HPS will automatically enter into grid connection state.

17. AC__UV__UnderVolt__Rmt__Warning: when the grid voltage is lower than the lower limit, HPS enters off grid state.

Processing steps: check whether the lower limit setting of power grid voltage is reasonable. If yes, wait for the power grid voltage to return to normal, and HPS will automatically enter into grid connection state.

18. AC__VW__UnderVolt__Rmt__Warning: when the grid voltage is lower than the upper limit voltage, HPS enters off grid mode.

Processing steps: check whether the lower limit setting of power grid voltage is reasonable. If yes, wait for the power grid voltage to return to normal, and HPS will automatically enter into grid connection state.

19. AC__WU__UnderVolt__Rmt__Warning: when the grid voltage is lower than the upper limit voltage, HPS enters off grid state.

Processing steps: check whether the lower limit setting of power grid voltage is reasonable. If yes, wait for the power grid voltage to return to normal, and HPS will automatically enter into grid connection state.

20. AC__GridPhaseSeque__Fault: reverse phase sequence connection of power grid

Processing steps: check the three lines of phase sequence U V W of the utility grid, which are corresponding to A B C connected to the AC input terminal of inverter.

21. OverTemp__Fault: the temperature inside of the machine is too high.

Processing steps:

A. check whether the power supply micro break of the inverter is turned on. If not, turn on the break.

B. check whether HPS air inlet and outlet are blocked, and clean dust regularly.

C. wait for the machine to cool down, the fault is eliminated and inverter restart normally, and observe whether the fan works when the temperature reaches 60 ℃. If not, please contact ATESS.

Regarding other faults, please contact relevant professionals of ATESS.

8.4 Power off steps

CAUTION!

After the inverter is completely powered off, the general DC switch at battery side and the Grid switch at grid side still maintain voltage. If operations are needed, please be sure to cut off the outer power completely, and wait for not less than 5 minutes.

1. Click the OFF button on LCD or turn the off-on knob from ON to OFF;
2. Cut off DC SWITCH PV input and Battery input;
3. Cut off AC SWITCH AC input and AC output;

CAUTION!

It is normal for the inverter to give alarm during power off. The power down steps can be continued.

9 产品维护

9.1 日常维护

9.1.1 维护和维修

只有当储能控制器安全断开与外部所有连接时，当确认这些电源不会再接通且至少等待5分钟以上时，才能对储能控制器执行所有维护和维修操作。

只有熟悉系统操作的专业技术人员才能执行此类操作。

> 断开断路器

操作PV input 和 Battery input直流开关，断开储能控制器与光伏组件、蓄电池组件的连接，并且操作AC input 和AC output交流开关，断开储能控制器与交流的连接。确保储能控制器不会意外重新接通。使用万用表测试，确保设备已经断开并且无电压。即使储能控制器已同电网/主电源和蓄电池和光伏组件断开，储能控制器内部一些元器件（如电容）还存在残余电压，放电比较慢，因此在断路器断开后，请至少等待5分钟并使用万用表测量确认安全后再继续操作。

> 维护和修改

只有获得时代能创能源科技授权的人员才能维护和修改储能控制器，为确保人身安全，请仅使用制造商提供的原厂配件。如果使用非原厂配件，则在电气安全、EMC等方面将无法保证和相关认证准则相符合。

> 功能和安全参数

未经当地电力供应公司授权以及未获得时代能创能源科技的指示，切勿更改储能控制器的参数。在未经授权的情况下更改功能安全参数，可能对人身或储能控制器造成伤害和损坏，此种情况下，时代能创能源科技将不提供质保服务。

> Bypass开关使用方法

如果HPS发生故障无法继续开机运行，需要停机维修，而接在HPS上的负载需要继续工作时，可使用Bypass开关让负载由电网或者发电机供电不间断工作，维修人员可安全的维修机器。

步骤1：在机器故障状态下，打开Bypass开关。

步骤2：关断“AC input”、“AC output”、“PV input”和“Battery input”开关。

此时，交直流电均与储能控制器断开连接，负载全部由电网供应，待余电放电完毕后可展开维修工作。

注意!

1. 下电后，等待5分钟确认安全后再进行维修工作。
2. 使用万用表测量后确保安全再进行拆装等工作。

9.1.2 更换防尘网

在储能控制器使用过程中应定期清扫顶部积尘，清洗或更换进风口防尘网，更换防尘网过程中，储能控制器需要断电。

防尘网更换方式：

门板上的防尘过滤棉可直接向上抽出清洗和更换。

为了保证储能控制器工作正常，需要定期对防尘网进行清洗。

9.1.3 定期维护

储能控制器必须进行定期的维护工作，以保证其正常运转与使用寿命。

推荐的例行维护周期及工作内容如表7-2所示.

维护项目	周期
读取数据采集器的数据	每月
清洁功率模块散热器	每月
检查柜体内部是否有灰尘、潮气或者凝结水汽等	每月
检查电缆连接是否有松动的情况，如果有必要需将螺丝固紧	每月
检查警告标签，如果有必要及时增加或更换	每月
人工检查交直流断路器	每月
检查紧急停机按钮以及LCD的停止功能	每月
检查机器运行过程中是否有异常响声	每周
检查蓄电池组件有无异常，鼓包，冒烟	每天

所有的维护操作都必须保证在储能控制器的直流侧、交流侧、蓄电池组件与交流配电柜相应的开关全部断开的情况下进行。

储能控制器交直流开关断开后，储能控制器上某些元器件还带有残余电压，请至少等待5分钟后，确认安全后才能对储能控制器进行维护操作，以防触电!

9.2 废旧处理

储能控制器不会对环境造成污染，产品的组成材料和部件均满足环保要求，时代能创能源科技依据环境保护要求，用户在储能控制器使用期终结时，应按当地相应法规进行处理。

9 Routine maintenance

9.1 Regular maintenance

9.1.1 Maintenance and repair

CAUTION!

All maintenance operations must be carried out in the condition that DC side and AC side of the inverter, PV module and AC distribution cabinet switch are all disconnected.Maintenance must be proceeded only after AC and DC disconnected for at least 5 minutes, in order to avoid electric shock!

Only professional technicians familiar with the system operation can perform such operation.

> Disconnect the circuit breaker

Turn off the PV input and battery input switches to disconnect inverter with PV module and battery, and turn off the AC input and AC output AC switches to disconnect inverter and AC source. Make sure that the inverter is not switched on accidentally. Using a multimeter to test and make sure the device is disconnected and voltage-free.

Even if the inverter has been disconnected with the power grid or main power supply, battery and PV module, some components (such as capacitors) inside the inverter still have residual voltage is discharging slowly. Therefore, after the circuit breaker is disconnected, please wait at least 5 minutes and use the multimeter to measure and confirm the safety before continuing the operation.

> Maintenance and modification

Only personnel authorized by ATESS can maintain and modify the inverter. To ensure personal safety, please use only the original components provided by the manufacturer. Otherwise there will be no guarantee on compliance with relevant certification standards in terms of electrical safety, EMC, etc.

> Function and safety parameters

Do not change the parameters of inverter without the authorization of the local power supply company or without the instruction of ATESS. Unauthorized change of functional safety parameters may cause injury and damage to personnel or inverter, in which case, ATESS will not provide warranty services.

> How to use bypass switch

If HPS fails and can not continue to operate, it needs to be shut down for maintenance. When the load connected to HPS needs to continue to work, the bypass switch can be used to power the load continuously by grid or generator, and the maintenance personnel can safely repair the machine.

Step 1: turn on the bypass switch in case of machine failure.

Step 2: turn off the "AC input", "AC output", "PV input" and "battery input" switches.

At this time, the AC and DC power are disconnected with inverter, and the load is supplied by grid. The maintenance work can be started after the residual power is discharged.

CAUTION!

1. After power on, wait for 5 minutes to confirm safety before carrying out maintenance work.
2. Use multimeter to measure, ensure the safety before disassembling.

9.1.2 Replace the dust screen

During the use of inverter, the dust on the top shall be cleaned regularly, and the dust screen at the air inlet shall be cleaned or replaced. During the replacement of the dust screen, the inverter shall be powered off.

Replacement method of dust screen:The dust-proof filter cotton on the door panel can be directly pulled up for cleaning and replacement.

In order to ensure the normal operation of inverter, it is necessary to clean the dust screen regularly.

9.1.3 Regular maintenance

In order to ensure the normal operation of the inverter, regular maintenance work is required.

Recommended routine maintenance cycle and work, as shown in Table 7-2.

Maintenance item	Cycle
Read data from data logger	every month
clean heat sink of the power module	every month
Check the dust, moisture or condensation inside the cabinet	every month
Check the cable connections, and fix the screw if necessary	every month
Check the warning label, add or replace some if necessary	every month
Manual checks AC and DC circuit breakers	every month
Check that the emergency stop button, and the LCD stop function	every month
Check if there is abnormal sound when inverter is operating	every week
Check if the battery is abnormal, bulging or smoking	every day

CAUTION!

All maintenance operations must be carried out in the condition that DC side and AC side of the inverter, PV module and AC distribution cabinet switch are all disconnected. Maintenance must be proceeded only after AC and DC disconnected for at least 5 minutes, in order to avoid electric shock!

9.2 Waste disposal

The inverter will not cause environmental pollution, since the all the components meet the requirements of environmental protection. According to environmental protection requirements, user shall dispose the inverter in accordance with the relevant laws and regulations.

10 附件

10.1 产品规格

型号	HPS30	HPS50	HPS100	HPS120	HPS150
光伏参数					
光伏额定功率	33KWp	55KWp	110KWp	132KWp	165KWp
光伏最大功率	45KWp	75KWp	150KWp	180KWp	225KWp
光伏最大开路电压	1000V	1000V	1000V	1000V	1000V
光伏额定功率 MPPT电压范围	480Vdc-800Vdc				
电池参数					
电池工作电压范围	352V-600V				
电池最大充电电流	100A	160A	300A	350A	450A
电池最大充电功率	45KW	75KW	150KW	180KW	225KW
电池最大放电功率	33kw	55kw	110kw	132kw	165kw
交流输出参数					
额定电压	400Vac				
额定电流	43A	72A	144A	173A	217A
额定功率	30KW	50KW	100KW	120KW	150KW
频率范围	45-55Hz/55-65Hz				
额定频率	50/60Hz				
最大交流输出功率	33KVA	55KVA	110KVA	132KVA	165KVA
最大交流输入功率	60KVA	100KVA	200KVA	240KVA	240KVA
功率因数	0.8lagging—0.8leading				
电流谐波THDI	<3%(满载)				
电压谐波THDU	≤2%				
过载能力	110%——10分钟，120%——1分钟				
其它参数					
防护等级	IP20(室内)				
噪音	<65dB（A）@1m				
散热方式	智能风冷				
湿度	0%-95%无凝结				
最高海拔	6000（3000m以上降额）				
内置隔离变压器	具有				
运行温度范围	-25℃—+55℃				
通讯					
LCD显示	触摸LCD				
通讯接口	RS485/CAN				

光伏1.5倍额定输出： HPS最大支持1.5倍额定光伏输出，但是需要满足以下两个条件:

型号	电池电压 （当前实际电压）	光伏MPPT电压	浪涌电流	最大故障电流
HPS30	450V以上	超过电池最高电压 且500V以上	47.6A	52A
HPS50	500V以上	超过电池最高电压 且550V以上	79.3A	86.6A
HPS100	500V以上	超过电池最高电压 且600V以上	158.7A	173.2A
HPS120	520V以上	超过电池最高电压 且550V以上	190.5A	207.8A
HPS150	500V以上	超过电池最高电压 且550V以上	238.1A	259.8A

10.2 ATESS工厂保修

> 质保期

本产品质保期为一年，如果合同另有规定，以合同为准。
时代能创能源科技产品在质保期内，维修时客户应主动向时代能创能源科技公司服务人员出示购买产品的发票和日期。同时产品上的铭牌标识应清晰可见，否则有权不予维修。

> 质保条件

质保期间出现故障的产品，时代能创能源科技公司将免费维修或者更换产品；客户应给时代能创能源科技公司预留一定的时间去维修故障机器。

> 责任豁免

以下情况出现，本公司有权不进行质量保证：
1. 无时代能创能源科技标识的产品；
2. 产品或部件已经超过时代能创能源科技保修期；
3. 未按说明书要求，非产品所规定的工作环境或错误安装、保管及使用等造成的故障或损坏（例如温度过高、过低，过于潮湿或干燥，海拔过高，电压或电流不稳定等）；
4. 由非时代能创能源科技各售后服务人员安装、修理、更改或拆卸而造成的故障或损坏,由时代能创能源科技售后委托的除外；
5. 因使用非时代能创能源科技部件导致的故障或损坏；
6. 因意外或人为原因（操作失误、划伤、搬运、磕碰、接入不合适的电压等）导致的故障或损坏,运输损坏；
7. 因自然灾害等不可抗力（如地震、雷击、火灾等）原因造成的故障或损坏；
8. 其他并非时代能创能源科技机器（包括部件）本身质量问题而导致的故障或损坏。

10 Appendix

10.1 Specification

Model	HPS30	HPS50	HPS100	HPS120	HPS150
PV parameter					
PV rated power	33KWp	55KWp	110KWp	132KWp	185KWp
Max. PV power	45KWp	75KWp	150KWp	180KWp	225KWp
Max. PV open circuit voltage	1000V	1000V	1000V	1000V	1000V
PV MPPT voltage range	480Vdc-800Vdc				
Battery parameter					
Battery operating voltage range	352V-600V				
Max battery charge current	100A	160A	300A	350A	450A
Max battery charge power	45KW	75KW	150KW	180KW	225KW
Max battery discharge power	33kw	55kw	110kw	132kw	165kw
AC output parameter					
Rated voltage	400Vac				
Rated current	43A	72A	144A	173A	217A
Rated power	30KW	50KW	100KW	120KW	150KW
Rated frequency	50/60Hz				
Frequency Range	45-55Hz/55-65Hz				
Max. AC output power	33KVA	55KVA	110KVA	132KVA	165KVA
Max. AC input power	60KVA	100KVA	200KVA	240KVA	240KVA
Power factor	0.8lagging—0.8leading				
THDI	<3%(Full load)				
THDU	≤2%				
Overload capacity	110%——10 mins,120%——1 min				
Other parameter					
Ingress Protection	IP20(Outdoors)				
Noise emission	<65dB（A）@1m				
Cooling	Intelligent air cooling				
Humidity	0%-95% non-condensing				
Maximum altitude	6000（derate over 3000m）				
Build-in transformer	yes				
Operating temperature	-25℃—+55℃				
Communication					
LCD display	Touch screen LCD				
Communication interface	RS485/CAN				

1.5 times rated PV output: HPS supports 1.5 times rated PV output at most, but the following two conditions need to be met.

Model	Battery voltage (current actual voltage)	PV MPPT voltage	Inrush current	Max. fault current
HPS30	Above 450V	Exceed the max. battery voltage and above 500V	47.6A	52A
HPS50	Above 500V	Exceed the max. battery voltage and above 550V	79.3A	86.6A
HPS100	Above 500V	Exceed the max. battery voltage and above 600V	158.7A	173.2A
HPS120	Above 520V	Exceed the max. battery voltage and above 550V	190.5A	207.8A
HPS150	Above 500V	Exceed the max. battery voltage and above 550V	238.1A	259.8A

10.2 Atess Factory warranty

➢ Warranty period

The warranty period of this product is one year. If otherwise specified in the contract, the contract shall prevail.

During the warranty period, the customer shall show the invoice and date of purchase to the service personnel of ATESS. At the same time, the nameplate mark on the product shall be clear and visible, otherwise, ATESS has the right not to provide warranty service.

➢ Warranty conditions

In the event of failure during the warranty period, ATESS will repair or replace the product free of charge; The customer shall Set aside some time to repair the faulty machine.

➢ Liability exemption

In case of the following circumstances, ATESS has the right not to conduct warranty:

1. Products without logo of ATESS Power Technology logo;
2. The product or component that has exceeded the valid warranty period of ATESS;
3. Failure or damage (such as high temperature, low temperature, too wet or dry, high altitude, unstable voltage or current, etc.) caused by working in beyond-specified environment or wrong installation, storage or use that violates the instructions;
4. Failure or damage caused by unauthorized installation, repair, modification or disassembly. except for those authorized by ATESS;
5. Failure or damage caused by using components that not supplied by ATESS;
6. Failure, damage or transportation damage caused by accident or human factors (operation error, scratching, carrying, bumping, improper voltage connection etc.), ;
7. Failure or damage caused by force majeure (such as earthquake, lightning, fire etc.);
8. Failures or damages caused by other factors rather than quality problems of the supplied product itself(including components).