Residential Solar + Battery + EV Charger
All-in-One Solution

Brief Analysis on Present Solar+Battery+EV charger Industry

At present, in the mainstream home photovoltaic roof power generation system, the electric load is either supplied by the grid or provided by solar power. When the instantaneous solar power generation exceeds the electricity demand of the household load, the home solar power generation system sells electricity to the grid. When the power generated by the solar power generation system is lower than the demand of the household load, the energy required by the household load must be supplemented by the grid.

In order to give priority to the use of green solar energy to meet the daily load of the household, the household energy storage system stores the surplus electricity generated by the household solar energy in the energy storage battery, so as to meet the energy demand of the household load at night when the solar power is not active.

With the increasing popularity of new energy vehicles, the daily charging of these vehicles has significantly increased the demand for green energy in households. In the case of a fixed capacity of household photovoltaic devices, it is urgent to maximize the efficient use of new energy.

Brief Analysis on Present Solar+Battery+EV charger Industry

At present, the existing technology in the market cannot realize the comprehensive monitoring and reasonable allocation of Solar + storage + charging + load (photovoltaic power generation, energy storage, charging infrastructure, household load). There are the following problems:

In the case of partial solar generation, current technology cannot determine whether the electricity consumed by the household load is from the grid or the photovoltaic system, including the proportion of electricity from the grid or photovoltaic system. Due to the time limit of solar power generation, and most of the electricity consumption occurs at night, there is a lot of waste in photovoltaic power generation, and it is impossible to achieve optimal adjustment and configuration. It is impossible to monitor the detailed relationship data among solar power generation, energy storage, household load, and charging infrastructure in real time. The communication protocols of photovoltaic inverters, energy storage systems, and charging infrastructure are diverse and independent of each other, and it is impossible to integrate different systems such as solar + storage + charging + household loads on one platform.

Currently, the APP control system for photovoltaic inverters, the APP control system for energy storage, and the APP system for charging infrastructure are independent, and it is not feasible for end customers to control multiple APP systems. It is impossible to integrate different systems such as Solar + Energy storage + Charging + Household load on one APP. As a result, the "adjustable and customized" utilization of solar energy production and energy storage systems cannot be realized, and the communication and "controllable" among charging infrastructure, photovoltaic power generation, energy storage, and household load systems cannot be realized.

The Ture All-in-One Solution-1

The technical problem to be solved by the Pheilix invention is that unified control, coordination and communication cannot be realized between the home charging system and other systems such as photovoltaic power generation, energy storage batteries, and home load systems. It is necessary to solve the integration of various systems such as home photovoltaic systems, energy storage systems, charging infrastructure, and home load systems.

In order to solve the above technical problems, the Pheilix invention provides an integrated control device integrating Solar, energy storage, charging and load. The device controls and monitors peripheral equipment such as charging infrastructure, PV (photovoltaic), inverter, energy storage battery, load, etc., and realizes integrated control.

The charging infrastructure can include AC charging stations or low-power DC charging stations, and the inverters can be hybrid photovoltaic energy inverters. Loads may include household loads or other loads. The integrated control unit consists of the following components:

Communication module: Use RS485 or CAN 2.0B (CAN HD) interface to obtain data from peripheral devices. Communicate with photovoltaic inverters and energy storage batteries to obtain data such as photovoltaic power generation, energy storage battery charging and discharging power and remaining capacity, grid-connected or off-grid power of inverters, and fault data. It also communicates with the charging infrastructure through RS485 or Ethernet to obtain data such as the working status, charging power, and fault information of the charging station. It also draws load power.

The communication module is also used to control peripheral devices through commands, including mode switching of inverters, energy storage batteries and charging infrastructure. Algorithm module: built-in AI algorithm, according to peak and valley power consumption policy, charging infrastructure charging demand and other information, control the maximum self-sufficiency rate of home solar, energy storage, charging, and load systems.

The Ture All-in-One Solution-2

The energy state of the battery. The algorithm module also includes a load balancing algorithm, which calculates the available remaining charging power of the charging infrastructure based on the data collected by the communication module, such as the output power of the inverter, household load power, grid power, etc. It can adjust the charging power in real time.

Charging infrastructure control module: Control the charging power of the charging infrastructure through the communication module. It also manages the charging schedule, allowing to set start, pause and stop charging times.

Inverter and energy storage battery management module: switch the working mode of the inverter in real time through the communication module. The battery can be properly charged or not charged during off-peak hours to ensure that the energy storage battery can meet the next day's energy needs of the household load and the charging infrastructure.

According to an embodiment of the present invention, the solar, energy storage, charging, and load integrated control device may further include a fault processing module. The fault processing module receives fault information from various peripheral devices through the communication module, and sends an alarm to the integrated control device, so as to troubleshoot and solve it in time.

According to the embodiment of the present invention, the lighting, energy storage, charging, and load integrated control device may further include a data storage module. The data storage module collects and stores the operating status data of inverters, batteries, charging infrastructure, CT485 and other equipment. It also includes power system status and power transmission data, online control operation records, and fault logs for a small grid system composed of solar + inverters, batteries, charging infrastructure, and household loads. The data is stored in the internal storage unit FLASH of the integrated control device, and uploaded to the cloud platform database at the same time. It can also be transferred via USB or serial port to a local USB drive or PC hard drive for storage and tracking.

The Ture All-in-One Solution-3

According to an embodiment of the present invention, the solar, energy storage, charging, and load integrated control device may further include an HMI (human-machine interface) module. The HMI module includes an LCD touch screen, which is used to display the operating status of the entire home microgrid system, including lighting, energy storage, loads, and the operating status of various peripherals and fault status information received by the fault processing module.

According to the embodiment of the present invention, the HMI module can manually switch the working mode of the inverter or the battery, and can also set the charging power limit of the charging infrastructure or stop charging.

According to the embodiment of the present invention, the integrated control device for solar, energy storage, charging, and load can be connected to the mobile phone through the network.Users can remotely view the running status and all data of the integrated control device through the mobile application, and also remotely control the functions of the integrated control device through the mobile application.

According to the embodiment of the present invention, the solar, energy storage, charging, and load integrated control device may also include a cloud platform service module. The cloud platform service module enables the integrated control device to connect to the Internet through one or more methods such as Wi-Fi, wired network, 4G, etc. It uses one or more protocols such as TCPIP/websocket/OCPP to connect PHEILIX's OCPP cloud server and Pheilix Smart APP. Users can view the running status and system data of the integrated control equipment through the App or Web interface.

According to the embodiment of the present invention, users can remotely access solar, energy storage, charging, and load comprehensive control devices through the cloud server or Pheilix Smart APP. They can upgrade firmware files of integrated control devices, charging infrastructure, inverters or batteries through cloud servers or apps. They can also remotely control the integrated control device to change the working mode of the home microgrid system.

According to an embodiment of the present invention, the charging infrastructure control module can enable the operation of the charging infrastructure when the PV or the energy storage battery has surplus power, and disconnect the power supply to the charging infrastructure when receiving fault data.

According to an embodiment of the present invention, the algorithm module may include a built-in AI algorithm. The algorithm module combines the weekly weather data pushed by the cloud platform to judge and control the charging and discharging of the energy storage battery and the electricity sales operation. For example, batteries can be charged during off-peak hours and discharged during peak hours. The charging infrastructure can discharge at maximum power during operation, and can run electricity sales when the photovoltaic and energy storage batteries have remaining power.

WHY Choose Pheilix Solution ?

Compared with the prior art, the technical solutions provided by the embodiments of the present invention can achieve the following beneficial effects: The "solar + energy storage + charging + load integrated control device" provided by the present invention overcomes the practical technical limitations of the industry, and solves the integration problem among multiple systems such as home photovoltaic systems, energy storage systems, charging stations, and home loads. . Realize the communication, data collection, information analysis, integration, data calculation, adjustment and reasonable distribution among photovoltaic power generation system, energy storage system, home charging station system and home load in the home grid.

WHY Choose Pheilix Solution ?

The integrated control technology of solar, storage, charging and load provided by the invention solves the problems of maximizing the utilization of electricity generated by a photovoltaic system and stored energy and balancing household loads. It maximizes the effective use of clean electricity from photovoltaic systems and energy storage systems.

The integrated control technology of solar, storage, charging and load provided by the invention solves the problems of real-time communication of data among multiple systems and the problems of information data collection, analysis, adjustment and reasonable redistribution. It guarantees maximum return on investment for home users and investors. The solar, storage, charging and load integrated control technology provided by the invention maximizes the self-sufficiency efficiency of household electricity consumption, reduces the dependence and influence on the power grid, and can comply with national policies. Grids are concerned with peak and off-peak power. Significantly reduce dependence on traditional energy sources, ease the pressure on the energy supply of the national grid, and comply with national and global low-carbon environmental protection policies.

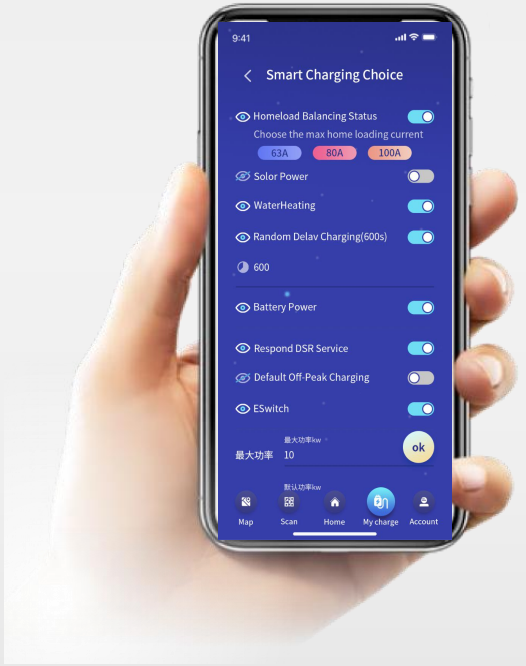
The Pheilix invention solves the problems of real-time data display, remote management and control of photovoltaic power generation system, energy storage system, home charging station system and home load system on mobile phone APP. The real integrated management and control is realized through the cloud platform and mobile APP, which solves the problem of integrating and unifying different communication protocols of photovoltaic power generation system, energy storage system, home charging station system, and home load system on the cloud platform.

PHEILIX™
TECHNOLOGY

Residential EMS Solution

aws

Pheilix Independent R&D
SAAS Cloud Platorm and App System



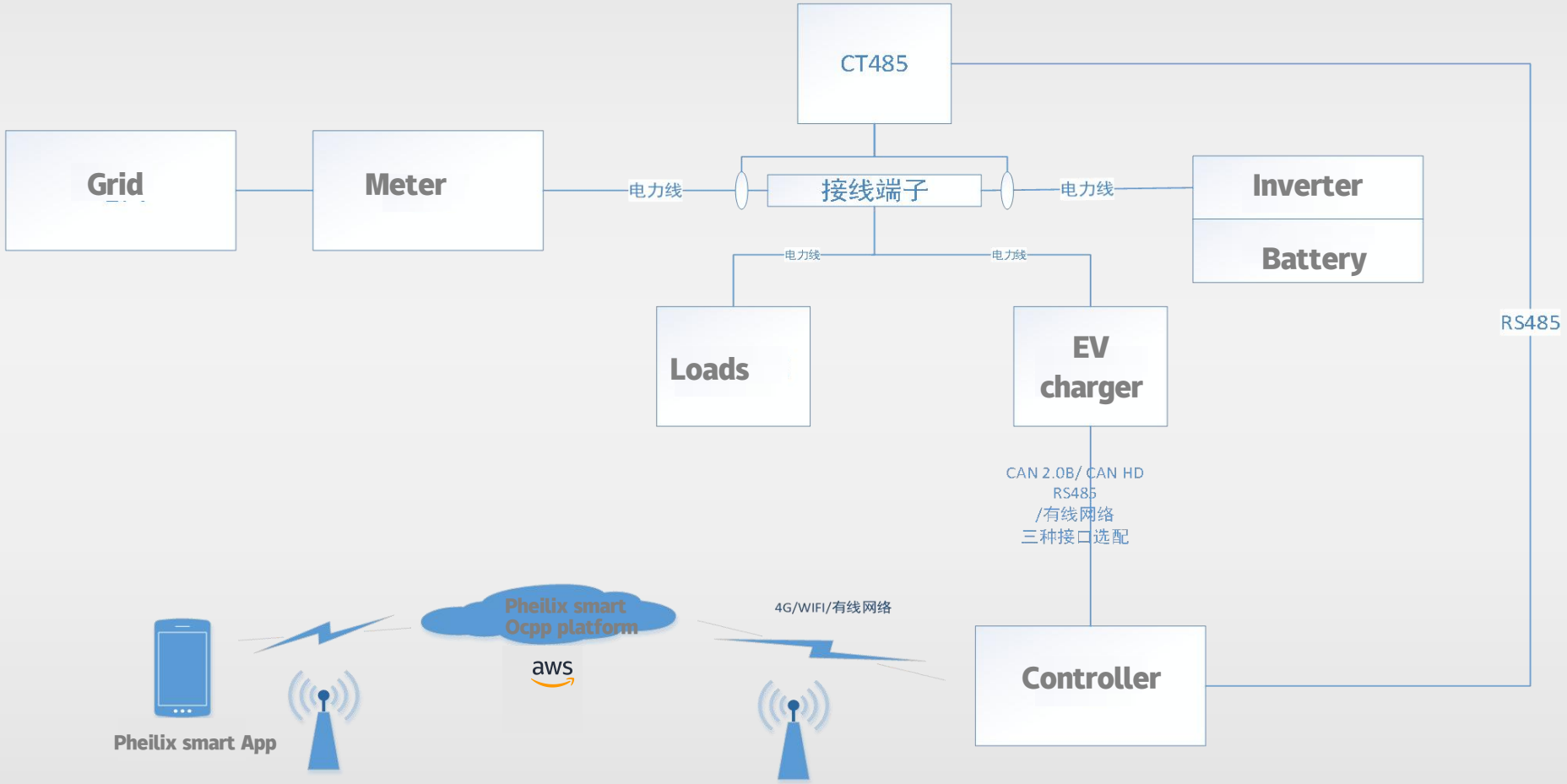
PHEILIX™
TECHNOLOGY

Brief 3D Introduction of Pheilix Solution

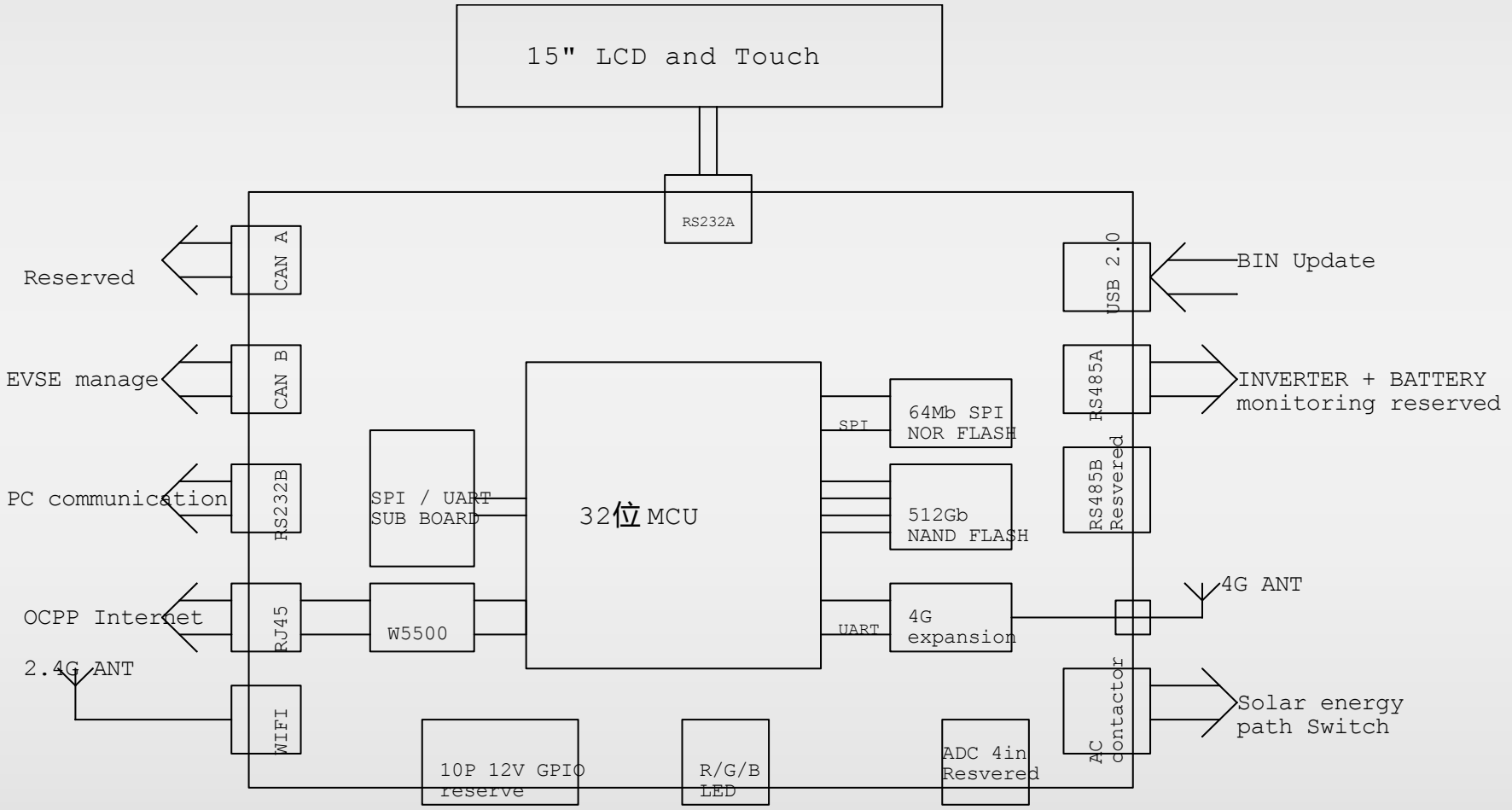
PHEILIX™
TECHNOLOGY

Residential EMS Solution

Brief Schematic of Pheilix Solution



Brief Schematic of Pheilix Solution



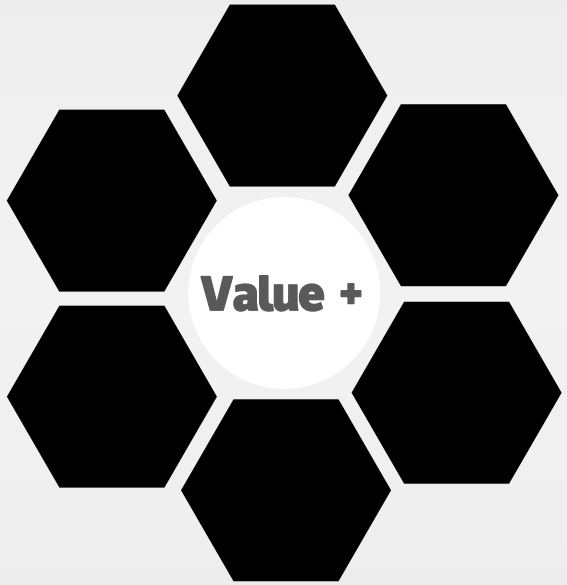
PHEILIX™
TECHNOLOGY

Pheilix Solution Achievement

01 100% use efficiency for New energy produced by residential solar system we refuse waste new energy !

02 100% High use efficiency for New energy produced by residential solar system. We ensure use out in the most valuble way !

03 Support On/Off Grid , Mini-Grid systems condition. Master control for energy balances between entire communicty



04 Expandable to built-in Smart Home appliances monitoring in one system.

05 Expandable to built-in Residential Heating system monitoring in one system.

06 Expandable to built-in Residential Air source system monitoring in one system.

Pheilix Solution Structure List

System Parts	Description	QTY
Solar Panels	3Kw-10Kw solar installation , Each 400w-600w Mono Tie1 25 Years warranty	TBA
Solar bracket	3Kw--10Kw as standard Kits for different roofs design . 20 years Warranty	1
Hybrid Inverters	3Kw-10Kw Single/Tree phase Hybrid 10 years warranty , Low voltage or High voltage solution.	1
Battery	LiFePO4 Cells, 5Kwh/10Kwh/20Kwh, Low/High voltage solution. >6000 circle quality warranty.	1
EV Charging Point	7.2Kw /11Kw/22Kw Homesmart Ocpp/App monitoring with *3 RFID cards,DLB function. 3 years warranty	1
All-in-one control Device	Solar+Battery+EV charger + Loads monitoring all in one	1
Others Accessories	PV boxes / MC4 connectors/ MID meter/ Solar cable/Solar distribution boxes	TBA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