SPB-0008GHP-D12-SET & SPB-0008GHP-D13-SET

IoT PoE Solar Power Supply System: Full Set of Box + Battery + Solar Panel

8*1000M RJ45 PoE++ BT90W

Overview

This is a next-generation, all-in-one solar-powered smart energy platform, specifically engineered for networked low-voltage systems in digitalized, off-grid, and remote applications. Uniquely positioned in the market, it combines solar power generation, high-efficiency energy storage, multi-voltage DC/PoE output, and intelligent data networking into a compact, modular design.

Powered by a patented MPPT solar charge controller capable of up to 20A charging, the system ensures optimal solar energy harvesting and reliable power delivery. It supports dual-mode energy management (Grid-Priority / Solar-Priority) and features a built-in high-power PoE supply module (IEEE802.3af/at/bt), solving the long-standing challenge of delivering stable 48V power to high-consumption PoE devices such as PTZ cameras, wireless bridges, and edge computing nodes.

With integrated 4G/5G connectivity, the platform enables seamless communication between LAN and cloud systems, allowing remote monitoring, real-time control, and intelligent device integration across various industries. Optional modules further support AC/DC conversion, fiber networking, IoT sensor expansion, and NVR storage, making it ideal for deployment in security monitoring, environmental sensing, smart agriculture, energy infrastructure, and other unattended or power-constrained environments.

Designed with rugged construction, multi-level electrical protection, and flexible mounting options, this platform is the ultimate choice for reliable, scalable, and sustainable off-grid power and networking solutions.

Characteristics

Highly Integrated Architecture

This highly innovative high-tech product integrates MPPT charge and discharge control, multi-voltage simultaneous output with reverse polarity protection, PoE power supply, EPS uninterruptible backup power, local area network data exchange, and cloud platform-based remote centralized management of both data and video streams. Additionally, it supports expansion to grid-powered charging mode.

Versatile Power Supply

Utilizing the world's leading PoE safe power supply standards (IEEE 802.3af/at/bt), the system also features DC ports for simultaneous direct current output, covering a wide voltage range of DC 12V, 24V, 36V, and 48V. An optional built-in conversion module can be added to transform DC power to AC 110V–277V, fully meeting the diverse requirements of devices operating at different voltages simultaneously. Additionally, an integrated dual-switch control module supports automatic switching between grid-priority and solar-priority modes, enabling flexible adaptation to various application scenarios.

In-Depth Analysis of the Intelligent Switching System

The system features an integrated dual-mode automatic switching control module, supporting smart switching between "Grid-Priority" and "Solar-Priority" strategies:

- Grid-Priority Mode: Ideal for environments with a stable power grid, ensuring continuous and efficient device operation.
- Solar-Priority Mode: Tailored for off-grid or renewable energy applications, prioritizing clean energy usage to achieve low-carbon power supply.

This solution combines a dual-path power architecture (DC + AC) with an intelligent energy management system to overcome challenges in voltage compatibility across multiple devices. By enabling automatic switching between energy strategies, it delivers a highly reliable and flexible power solution for smart cities, industrial IoT, off-grid base stations, and more—maximizing energy utilization efficiency while supporting green and low-carbon objectives.

Intelligent Monitoring

Equipped with a built-in OLED display, the system clearly presents real-time charging/discharging current, voltage, load power, daily and cumulative power generation, and fault alerts.

External LED indicators allow users to easily check device status without needing to open or elevate the unit.

For models with an integrated 4G router, operational status is transmitted in real time, solving traditional installation challenges such as excessive components, tangled wiring, and complex debugging—providing a true plug-and-play experience.

Reliable Protection:

The system offers 10 comprehensive safety protection features, covering:

- Overcharge
- Over-discharge
- Deep discharge activation
- Repeated restart at low battery
- Reverse polarity
- Short circuit
- Overcurrent
- Overvoltage

- Overload
- Surge, lightning, and over-temperature protection

These ensure safe and reliable long-term operation under various environmental and electrical conditions.

Flexible Expansion

Designed with a modular hardware architecture, the system can be easily expanded into different model types supporting IoT, AI recognition, HD video storage, and more.

The software platform supports both web-based control and mobile app access, fully meeting power supply and data transmission requirements in standalone or remote environments.

Wide Application

This system is widely applicable across sectors such as:

- Forest fire prevention
- Geological disaster mitigation
- Environmental monitoring
- Security systems
- Agricultural management
- Water conservation
- Oil & gas operations
- Power infrastructure
- Telecommunications

It provides an efficient, stable, and independent power solution tailored to diverse industry needs.

Features

Port Performance

- Provides 8 × 100/1000M 802.3BT PoE ports, each supporting up to 90W independent output
- Provides 1 × 12V 5A DC power output port
- Provides 1 × 24V 5A or 36V 5A DC power output port
- Provides 1 × EPS 12V 3A output for uninterruptible power supply to gateways and 4G routers
- Provides 1 × 35A MC4 solar input port
- Provides 1 × AC 110V–277V input port for the AC power module, converting to DC 36V output (AC module sold separately)

Intelligent PoE Power Supply

- Equipped with 2 × 100/1000Base-TX RJ45 ports supporting BT PoE high-power output up to 90W per port, ideal for powering 3''–9'' IR night vision PTZ cameras, public broadcasting systems, and other high-demand devices.
- Works with PD-end splitters to output 5V, 12V, 24V, and 48V, fully solving outdoor transmission and power challenges.
- Supports PoE transmission over 150 meters, eliminating distance limits between devices and allowing solar panels to be installed in sun-rich locations, while end devices remain in shaded areas.

Charge and Discharge Performance

- Supports up to 300W photovoltaic panel input, with constant current and voltage control to prevent over-power shutdowns. Even when the input exceeds 300W, the system operates safely at 300W.
- Charging current: 20A

- Load output total power: 15A
  12V battery configuration: Max output power 180W / 15A
  24V battery configuration: Max output power 360W / 15A

Fully Automatic Grid Charging (Streetlight Mode, AC module required*)*

- Wide AC input range: 110V–270V
- DC output: 36V 150W constant current/constant voltage
- Supports grid-priority or solar-priority modes

High-Efficiency Smart Charging & Discharging Technology

- Uses true online MPPT charge/discharge technology for 100% solar tracking efficiency, achieving maximum power point tracking (MPP), improving charging performance by up to 25%.
- Current-limiting charging: Prevents overload by regulating excess input current during bright sunlight or multiple high-wattage panels.
- Synchronous discharge: Enables hybrid power from both battery and solar in weak light, prolonging battery life and optimizing energy use.
- Low-light charging: Uses intelligent algorithms to harness energy even in cloudy or rainy conditions, extending battery runtime.
- Auto recharge during discharge: Battery is recharged midday when solar voltage criteria are met, even after partial discharge (e.g., at 97%).
- Auto grid-charging mode: Supports grid module plug-in charging.
- Dual power output channels: 12V + 24V or 12V + 36V

Safety Protections

- Auto identification: Plug-and-play operation without power-on sequence constraints.
- Reverse polarity protection: Prevents damage from incorrect wiring (solar/load).
- Overcharge/Over-discharge protection: Dual-level PCM battery protection circuit.
- Timed charge/discharge: Prevents device restart caused by early morning fluctuations.
- Battery self-activation: 0V low-voltage EMD technology revives deep-discharged batteries.
- Over-temperature protection: Auto shutdown on overheating or panel malfunction.
- Reverse current protection: Prevents nighttime or low-light battery backflow.
- Temperature control monitoring: Adjusts fan speed based on system temperature.
- Optimized MPPT charging: Ensures long battery lifespan.
- Manual system upgrade: Supports local firmware updates via USB

High-Precision OLED Display

- Features a 0.96-inch OLED screen for clear and intuitive data visualization.
- Solar Panel Monitoring: Displays real-time solar panel voltage and charging power.
- Battery Monitoring: Shows current battery voltage and battery capacity as a percentage.
- Load Monitoring: Displays the total power consumption of connected devices.
- Load Fault Alerts: Visual alerts for overcurrent, overvoltage, and short-circuit conditions.
- Solar Input Alerts: Displays warnings for solar overvoltage, NTC temperature sensor failure, and system overheating.
- Real-Time Energy Statistics: Automatically shows daily and cumulative power generation after charging ends.
- Host Temperature Monitoring: Displays real-time temperature of the main unit (requires gateway-integrated model and cloud platform software for PC/mobile viewing).

External LED Status Indicators

- 8 × F8 LED indicators on the enclosure for:
    - Solar panel status
    - Host system health
    - Battery and charge/discharge levels
    - Viewable without opening the enclosure
- 4G status LEDs: Power, 4G signal, LAN data transmission

IoT Cloud Platform – Remote Monitoring & Management *(Gateway model required)*

- Display daily and cumulative solar power generation
- Show operational states: start-up, sync discharge, low power generation, charging, discharging, activation
- Monitor:
    - Solar voltage, charging current/power
    - Battery voltage and percentage
    - Fault diagnostics: overvoltage, overcurrent, short-circuit, NTC failure, over-temp
    - Host and ambient temperatures in real time
- Remote operations: Turn load on/off
- Video stream integration: View remote footage with local PC storage
- Role-based access management: Manage user groups and project-level permissions remotely

Flexible Expansion – Industry-Specific Integration

- Highly integrated PoE solar power platform combining networking, power, and control modules
- Customizable for:
    - NVR + HDD storage
    - LTE wireless networks
    - IoT sensors
    - Agricultural data modules
- Supports integration of multiple sensors: temperature, humidity, elevation, water level, wind speed, vibration, radar, etc.
- Supports real-time video/audio/control data uploading for unified management
- Custom options: multiple battery packs, external solar panels, etc.

Rapid Installation – Distributed Architecture

- New modular/distributed design reduces installation time by 60%
- Cuts labor needs in half
- Simplifies replacements and after-sales maintenance

High-Efficiency Solar Panels

- 36V 300W monocrystalline solar panel
- Cell efficiency up to 21%
- Power tolerance: ±5%
- 93% high-transmittance tempered glass (ultra-clear, low iron)
- Anodized aluminum frame: corrosion-resistant, wear-resistant, high hardness
- Withstands:
    - Wind load: 2400 Pascal
    - Snow load: 5400 Pascal

- 25-year lifespan
    - 90% output at 10 years
    - 80% output at 25 years
- Certified by IEC, TUV, and other international authorities

Advanced Energy Storage System

- Standard: 24V / 2.5kWh automotive-grade ternary lithium battery
    - Volume and weight are 25% of equivalent lead-acid batteries
    - 1200+ cycles with >80% capacity retention
    - 5–7 years lifespan (4× longer than lead-acid)
- Safe thermal design: mitigates risk of overheating or explosion
- Operating temperature: -0°C to 55°C
    - Low-temp models available for cold-weather deployment
- Optional: IP67-rated military-grade stainless steel enclosure, submersible up to 30 days without damage

Customizable Expansion Modules

- Rack-mounted fiber module (4-port terminal box)
- Rack-mounted inverter module: 24V DC in / 110V–240V AC out, 500W
- Rack-mounted AC module: AC110V–277V in / DC36V out, 150W
- PoE-connected audio/visual alarm modules
- PoE-powered loudspeakers

Stable and Reliable Performance

- The main unit features low power consumption and a galvanized steel metal enclosure. For harsher or corrosive environments, optional all-aluminum alloy or stainless-steel enclosures are available to ensure durability.
- Equipped with active heat dissipation, ensuring stable long-term operation.
- The solar panels comply with ISO9001 quality standards and EU CE/TÜV certifications.
- The batteries meet UN38.3 and MDS international maritime shipping standards.
- The complete system fully complies with CE, FCC, and RoHS safety regulations, offering reliable and secure operation.

Application Scenarios

Ideal for a wide range of applications, including:

- Security surveillance
- Forest fire prevention
- Smart agriculture
- Environmental monitoring
- Oil & gas
- Power grid
- Water conservancy
- Geological disaster mitigation
- Campus systems
- Factories
- Scenic areas
- Unattended or remote sites

Industry-Specific Custom Development

Designed with an open IoT architecture, the system supports deep integration with various industry management platforms to build an intelligent and efficient energy management ecosystem.
Through standardized API interfaces and protocol conversion modules, it can seamlessly connect with:

- IoT Integrated Management System
- Intelligent Photovoltaic Management System
- Comprehensive Energy Efficiency Management System
- Smart Lighting Control System
- AI Video Surveillance Platforms
- Water Resource Management Platforms

This enables data interoperability, centralized monitoring, and intelligent control across diverse systems.

Specifications

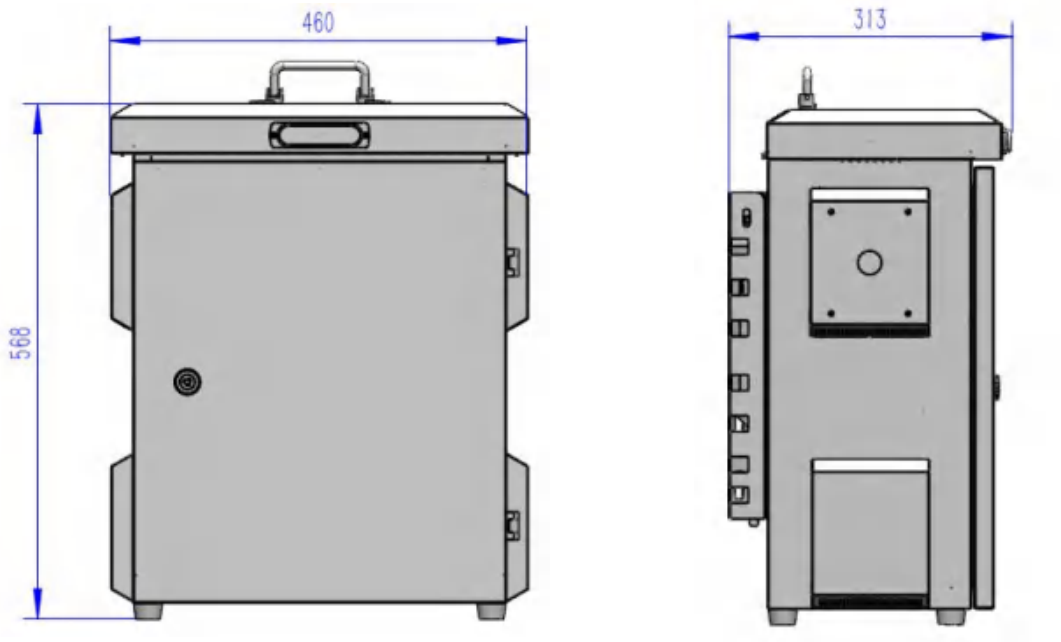
Model	SPB-0008GHP-D12-SET SPB-0008GHP-D13-SET
Charge-Discharge Performance	
Solar Panel Input Power	300W (When input power exceeds the limit, the system restricts input to 300W for continuous operation without downtime)
Input Withstand Voltage	60V
Charging Current	20A
Discharging Power	15A 360W
Charging Power Matching	36V solar panel charges 24V battery
Daily Power Generation (Sunny Day)	PV 300W, daily power generation 1800Wh
Daily Power Generation (Cloudy/Rainy Day)	PV 300W, daily power generation 180Wh
Charging Method	
MPPT	Stage 1 (Battery undercharged state): Trickle charging (slow current rising at a constant speed) Stage 2 (Main stage): Charging at maximum MPPT efficiency within rated charging current Stage 3 (Constant voltage charging): Stop charging when capacity reaches the preset value
PoE Power Supply Ports	
PoE	8*1000M 802.3bt
PoE Performance	Port 1-8 PoE++ BT90W
PoE Distance	150 meters
PoE Protection	High-frequency short circuit/Surge/Overcurrent/Overvoltage/Overload protection
PoE Startup	Ports are powered one by one with 50ms intervals
Standard Power Supply Ports	

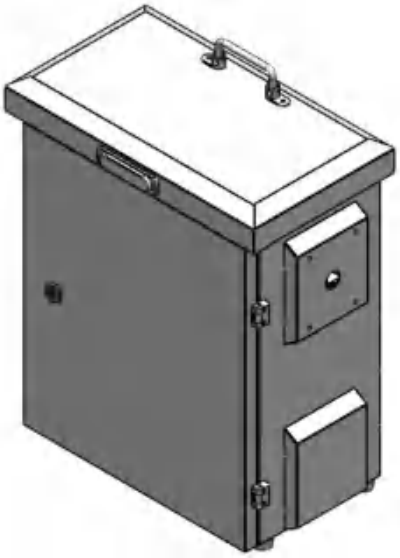
DC12V	2P 7.62 12V 5A	2P 7.62 12V 5A
DC24V	2P 7.62 24V 5A	2P 7.62 36V 5A
EPS Uninterruptible Power Output Port	2P 7.62 terminal, 12V 3A DC output	
Panel Indicators		
Switch Power	Support	
Ethernet Port Data Communication	Support	
Energy Storage Ports		
Solar Input	MC4 35A	
Battery Input	XT60E-M	
Data Ports		
RS485 Communication Port	2P 3.08 Standard Modbus RTU Protocol	
Network Transmission Performance		
Network Protocol	IEEE802.3, IEEE802.3i, IEEE802.3u, IEEE802.3z, IEEE802.3x	
Backplane Bandwidth	56G non-blocking	
Packet Forwarding Rate	40.32Mbps	
MAC Address	8K	
Port Rate	10M/100M/1000M adaptive	
Display Screen		
Material	Industrial-grade 0.96'' OLED	
Status	Activation, startup, low-battery power generation, synchronous discharge, charging, discharging, end of discharge	
Measurements	Charging voltage, charging current, charging power, battery voltage, power percentage, load power consumption	
Statistics	Daily power generation / cumulative power	
Alarms	PV overvoltage / system overheating / load short circuit / load overcurrent / NTC sensor failure	
PV Function DIP		
Power On/Off	Support Button DIP	
Battery Type DIP	Lead-acid/Ternary Lithium/LiFePO4 battery	
Battery Voltage DIP	12V / 24V	
Battery		
Ternary Lithium Battery	24V 117A	
Rated Capacity	2527wh	

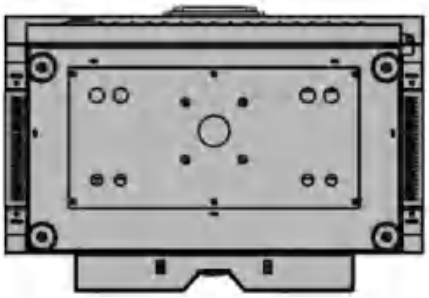
Control Switch	50A
Input Port	XT90E-M
Solar Panel	
Input Voltage	36V 300W
Type	Monocrystalline
Interface	MC4 35A
Accessories	
PV Special Bracket	11 pieces of 30 angle steel, combined type
Hose Clamp	300kg load-bearing tension, diameter 20cm, thickness 1mm
Monitoring Pole	6m combined / 3.6m combined (optional)
Special Application Scenarios	
Mains Charging Mode	Mains module AC110V-270V input, DC36V output, 150W (optional)
Charge-Discharge Protection	
Delayed Charge-Discharge	After discharge ends, when re-entering PV power generation mode, avoid repeated startup and restart of equipment due to low-battery startup, which may damage the equipment
Battery Self-Activation	Supports 0V low-voltage EMD auto-activation technology, enabling deeply discharged batteries to recover and resume normal operation
Synchronous Charge-Discharge	Supports mixed output from PV panel and battery to power load equipment when light is weak
Discharge Recharge	Supports resuming charging mode after battery discharges to 97%
Reverse Current Protection	Prevents battery from back feeding to solar panel on cloudy days or at night when there is no sunlight
PCM	Dual PCM to protect battery from overcharging and over-discharging
Charging Protection	Adopts MPPT high-efficiency charging tracking algorithm to extend battery service life
High-Temperature Protection	Automatically reduces frequency through software balancing or shuts down the system to protect the host when mainboard temperature is too high
High-Temperature Heat Dissipation	Starts ventilation and heat dissipation system to balance internal temperature when internal system temperature exceeds 40°C
Physical Connection Safety	
Load Output Protection	DC output short circuit protection / reverse connection protection; PoE short circuit protection with indicator alarm prompt
Solar Panel Protection	Prevents burnout due to reverse connection of solar panel (excluding battery positive and negative reverse connection protection)

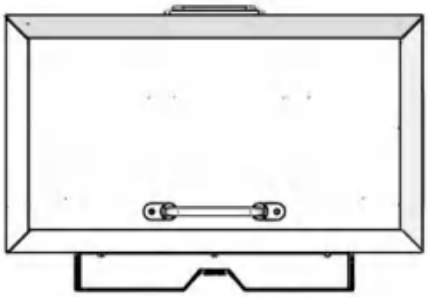
Automatic Identification and Startup	Prioritizes identifying battery voltage and type, automatically matches solar panel voltage bidirectionally
Mechanical Characteristics	
Installation Method	Wall Mount, Pole Mount
Housing Material	Galvanized steel sheet chassis / steel sheet hanger / stainless steel hose clamp
Housing Protection Grade	IP55
Product Dimensions (L*W*H)	460*313*568mm
Packaging Dimensions (L*W*H)	530*383*648mm
Total Weight	Box Weight: 34Kg Packaging Box: 3.4kg (excluding PV panel and PV bracket)
Environment	
Operating Temperature	-15~55°C (-40~+131°F)
Storage Temperature	-30~65°C (-68~+199°F)
Relative Humidity	5%~95% (non-condensing)
Industry Standards	
Certificates	CE/FCC/RoHS

Dimension

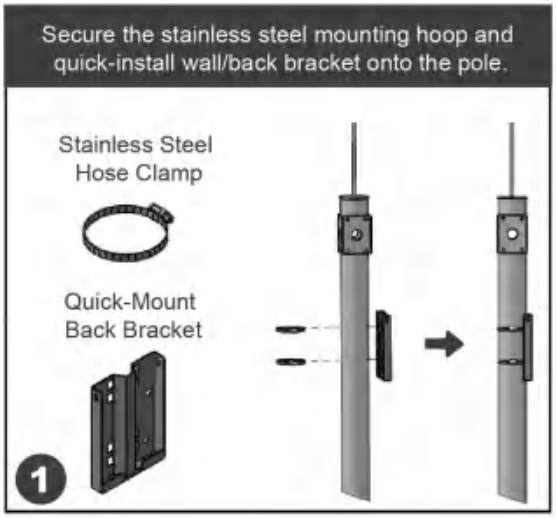


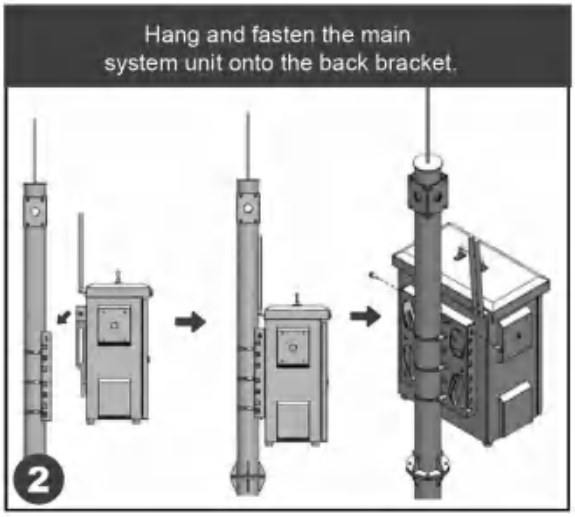


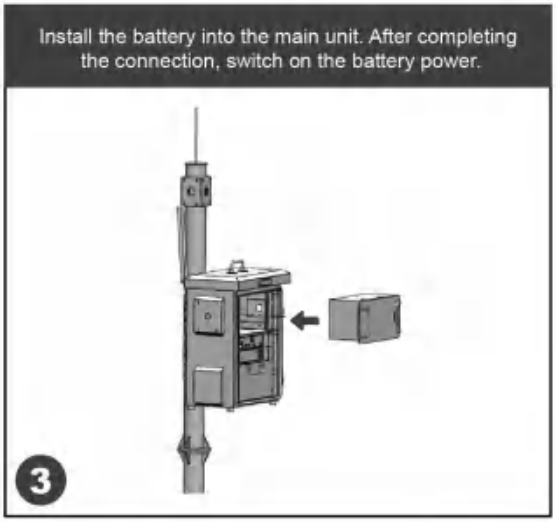


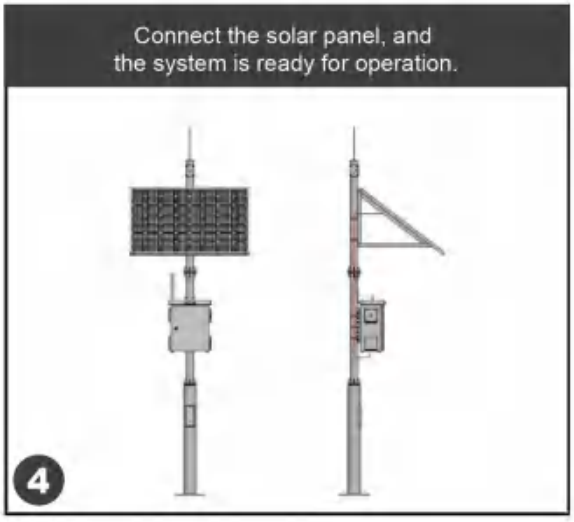


Quick Installation Guide









Ordering Information

P/N	Description
SPB-0008GHP-D12-SET	Full Set of Box + Battery + Solar Panel 8*1000M RJ45 PoE++ BT90w Dual DC Output: 12V 8A/24V 6.25A Ternary Battery: 24V 117Ah PV Panel: 36V 300w
SPB-0008GHP-D13-SET	Full Set of Box + Battery + Solar Panel 8*1000M RJ45 PoE++ BT90w Dual DC Output: 12V 8A/36V 5A Ternary Battery: 24V 117Ah PV Panel: 36V 300w

Optional Expansion Modules

Name	Function	Specification
Grid Power Module	AC to DC Conversion	Total Output Power: 150W Input Voltage Range: 110–277V AC Output Voltage: 36V DC Mode Selection: Supports Grid Priority / Solar Priority
Fiber Expansion Module	Fixed Fiber Interface	Number of Fiber Ports: 4 Port Type: LC / SC (optional) Mounting: DIN rail / Rack-mounted Material: Galvanized steel with electrostatic powder coating
Inverter Expansion Module	DC to AC Conversion	Total Output Power: 500W/1000W Input Voltage: 24V DC Output Voltage: 110V–277V AC Display: LCD AC Output Ports: 2 ports (Available in US/EU/ZA/UK plug standards)
Gateway (RTU)	IoT Remote Control	Input Voltage Range: 6–36V DC Video Stream Access: Compatible with Hikvision, Dahua, Uniview, TVT, Tiandy, TP-Link, Tianshitong Protocol: MODBUS standard communication Cloud Platform: Supports integration with New Energy Aggregation Management Cloud

Industrial High-Power PoE Splitter	PoE Power Output	Max Output Power: 90W Adjustable Output Voltages: 12V/7.5A, 19V/4.75A, 24V/3.74A, 48V/1.9A Port Speed: 100M / 1G / 2.5G Ports: 1 PoE input + 1 data output Standard: Complies with IEEE802.3af/at/bt
Waterproof Isolated PoE Splitter	PoE Power Output	Max Output Power: 15W Adjustable Output Voltage: 12V/1.2A Port Speed: 100M Ports: 1 PoE input + 1 data output Standard: Complies with IEEE802.3af/at