

GWESTS125-225kWh-400-A

125kW/225kW optical storage and off-grid integrated
machine product specification

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catalogue

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1. The composition and working principle of off-grid energy storage systems

The off-grid solar energy storage system includes: PV modules, PV mounting brackets, cables, MPPT controller, and the off-grid all-in-one unit. As shown in the figure below, the MPPT controller is an outdoor product, directly installed on the PV module mounting brackets. The positive and negative DC output wires of the MPPT controller, along with the RS485 communication cables, are connected to the off-grid all-in-one unit. The RS485 cables are used to monitor the voltage, current, power, fault information of the PV branches, and to regulate the power limit.

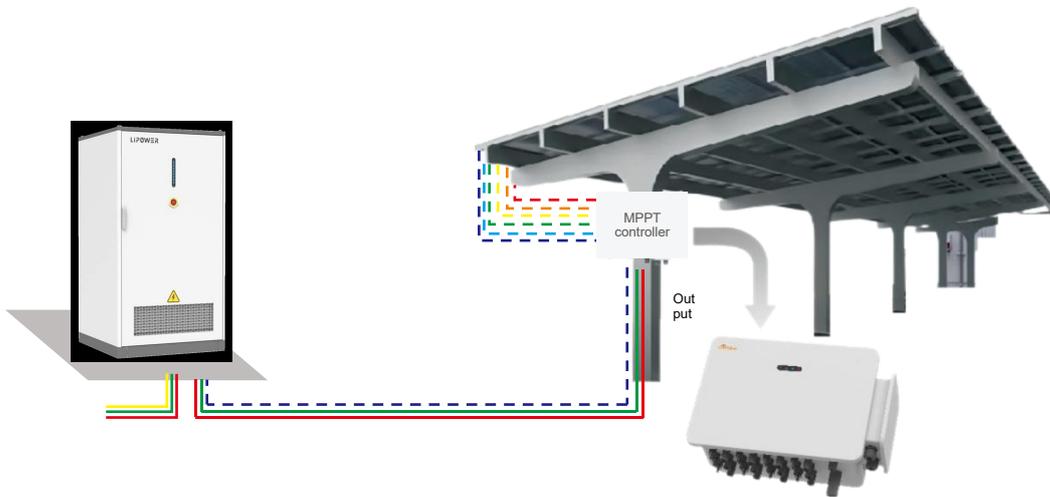


Figure 1.1 Schematic diagram of the optical storage and off-grid system

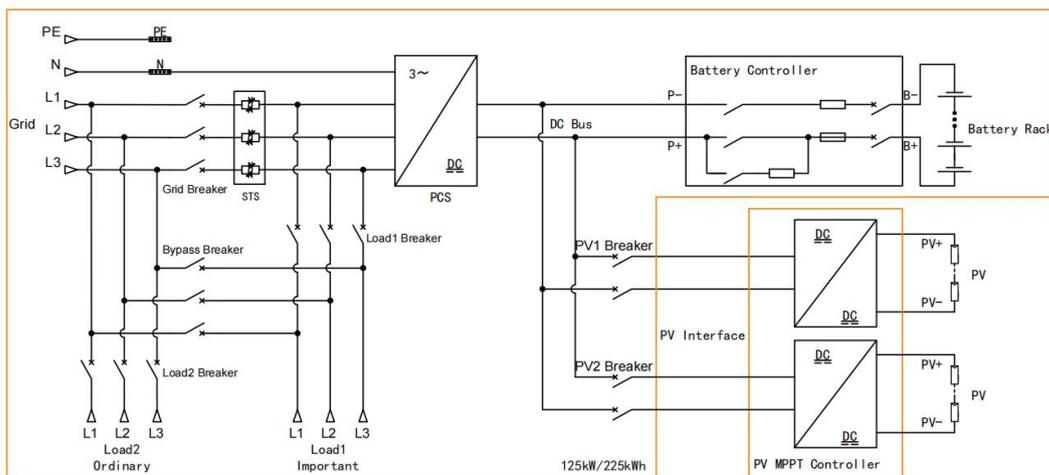


Figure 1.2 Electrical Schematic of the Off-Grid Solar Energy Storage System

1.1. Basic Composition of the Off-Grid Solar Energy Storage

All-in-One Unit

The basic components of the off-grid all-in-one unit include: PCS (Power Conversion System), high-voltage box, battery cluster, STS transfer switch, BMS (Battery Management System), EMS (Energy Management System), cooling system, fire protection system, auxiliary power supply system, and communication system.



Figure 1.3 Physical Image of the Off-Grid All-in-One Unit

1.2. Working Principle of the Off-Grid Solar Energy Storage

All-in-One Unit

The energy storage system is a multifunctional energy management system that plays an important role in balancing grid load, improving renewable energy utilization, responding to sudden grid failures, improving energy supply stability, and providing power support during emergencies.

PCS (Power Conversion System): The system connects to the grid and performs the AC-DC conversion, i.e., charging and discharging functions of the battery cluster.

High-voltage Box: It connects the PCS to the battery cluster and provides functions such as soft start, battery current and voltage detection, short-circuit protection, and remote on/off control.

STS Automatic Transfer Switch: By quickly and seamlessly switching between power sources, the STS significantly enhances the stability and reliability of the power system.

Battery Cluster: The battery system consists of 7 or 8 battery packs connected in series, with each pack made up of 16 cells of 314Ah each connected in series.

BMS (Battery Management System): The system is composed of a primary BMU (Battery Management Unit, with balancing control functions) and a secondary BCMU (Battery Cluster Management Unit).

EMS (Energy Management System): Responsible for managing the automatic operation of the entire system, remote control, and interface display via mobile phone and PC.

Cooling System: Ensures the battery cluster operates within the optimal temperature range, improving battery efficiency and lifespan.

Fire Protection System: Composed of a detection system, control unit, and fire suppression unit. The fire suppression unit typically uses lithium-ion battery-specific fire suppression agents, such as aerosols.

Auxiliary Power Supply System: Provides 220VAC and 24VDC to power the air conditioning, fire protection, and control systems, ensuring the safe and reliable operation of the entire system.

Communication System: Composed of a switch, Wi-Fi/4G communication modules, enabling local debugging and remote monitoring of the entire system.

The off-grid solar energy storage all-in-one unit integrates a photovoltaic input interface based on the energy storage system and adds an off-grid interface for grid-islanding control and load distribution.

2. Off-Grid Solar Energy Storage All-in-One Unit

Product Specifications

2.1. Product Specifications

product model		GWESTS125-225kWh-400-A
DC pool parameters	Cell type	LFP 314 Ah
	Battery Pack capacity and configuration	16.077kWh/1P16S

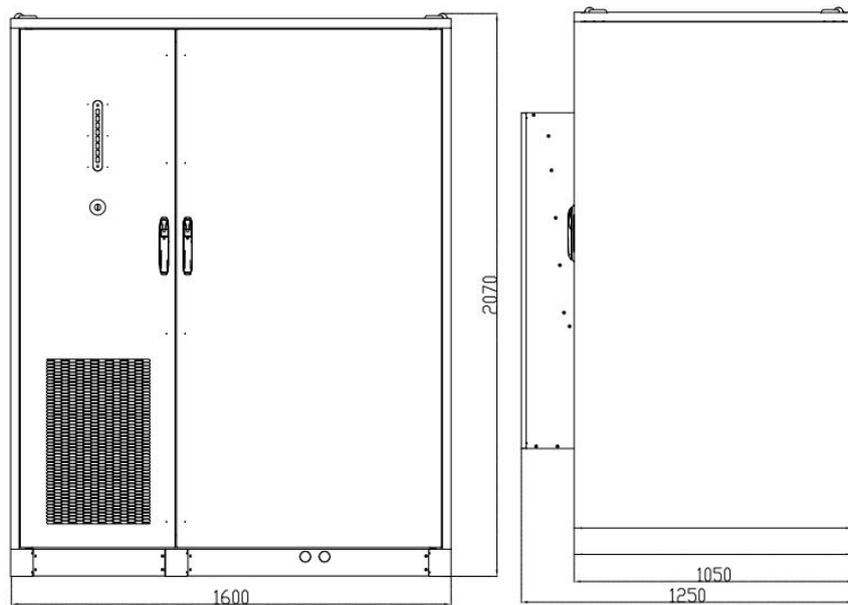
specification

	Battery Capacity/Pack Quantity:	225kWh/ 14
	Battery voltage range	627V ~ 806V
	Rated charge and discharge rate and current	0.5C, 157A
	Maximum charge and discharge current	280A
	Cycle Life	>8000
	Number of Temperature Sensors	112
The PV parameters on the DC side	Maximum Input Power	200 kW
	Maximum Input Power	320A
	Voltage Range/System Bus Voltage	650V ~ 800V
	Input Switch	2 with 250A / 1000 Vdc / 2P
AC side parameters (synchronize and close)	AC Rated Power	125 kW
	AC Maximum Power	137.5 kW
	Rated Current	187.5A
	Current Distortion Rate	<3%
	DC Component	<0.5%I _{pn}
	System Voltage Configuration	3W+N+PE
	Voltage Range	360VAC~440VAC
	Frequency Range	45~55Hz/55~65 Hz
	Frequency Range	-1~1
AC side parameters (Off-grid)	Rated Output Power	125kW
	Maximum single-phase output power	42kW
	Rated Output Voltage	400V
	Rated Output Frequency	50/60 Hz
	Voltage Distortion Rate THDu	<3%
	Overload Capability	110% overload for 10 min
Off-grid switching and switch configuration	Bypass Maintenance Switch	250A/400Vac
	Load Switch	250A/400Vac
	Grid Switch	400A/400Vac
	STS Switch	400A/250kW
	Switching Time	STS<20ms

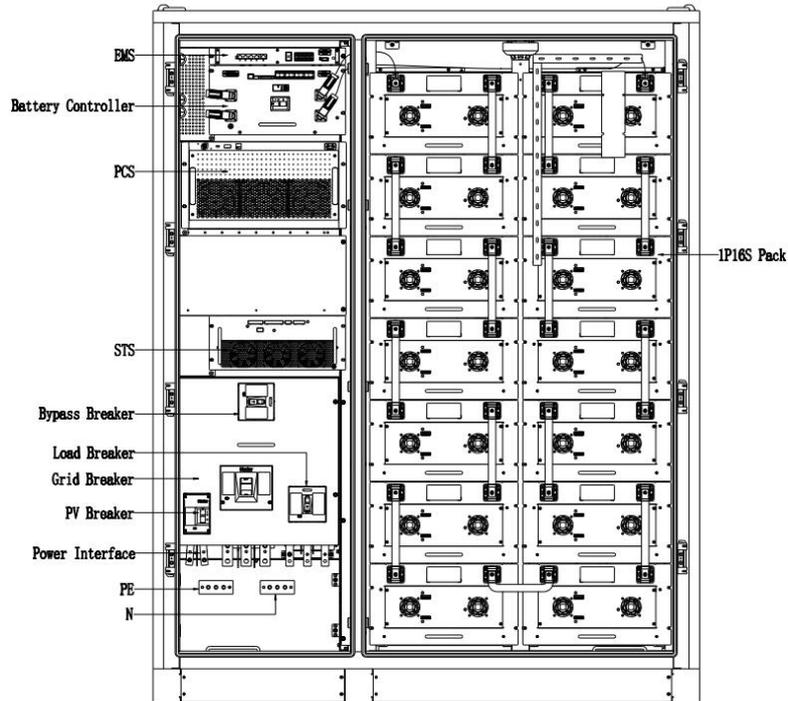
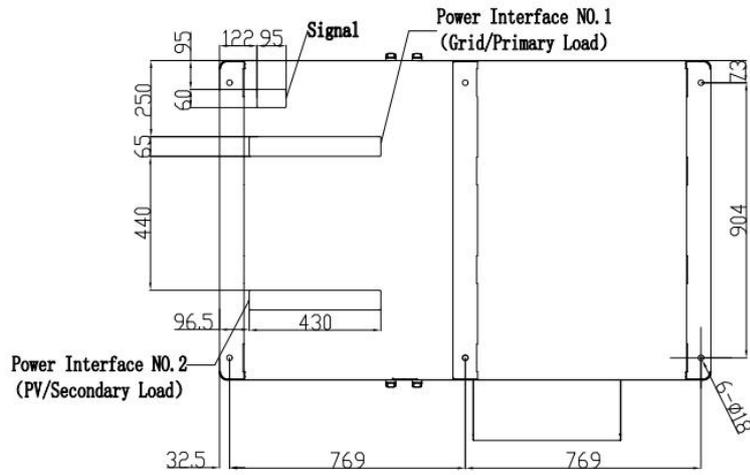
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system parameter	Maximum System Efficiency	≥90%
	Operating Temperature	-30~55°C (use over 40 degrees)
	Relative Humidity	0 ~ 95% RH, with no condensation
	Dimensions (L×W×H)	1600×1050×2050mm
	weight	2600kG
	Protection Level	Complete machine IP54
	Noise	<70dB
	Networking Methods	4G / Wifi / Ethernet
	Fire Protection	Aerosol
	Display Screen	LCD Touch Screen

2.2. Appearance and Dimensions of the Photovoltaic Energy Storage Off-Grid Integrated System.

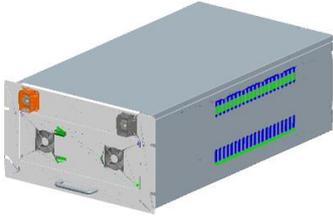


specification



3. System Configuration of the Photovoltaic Energy Storage Off-Grid Integrated System.

3.1. system composition

project name	diagrammatic sketch	remarks
The cell		Li-Cell-EES-3.2V-502.4W-502.4W-1004.8W.h-1004.8W.h
PACK/ battery box		Li-Module-EES51.2V-8.038kW-8.038kW- 16.077kW.h- 16.077kW.h BMU
high-voltage compartment		BCMU
PCS		125kW three-phase, single-phase 42kW
STS change-over switch		200kW-thyristor type automatic transfer switch, Automatic switch between multiple power sources within 20ms

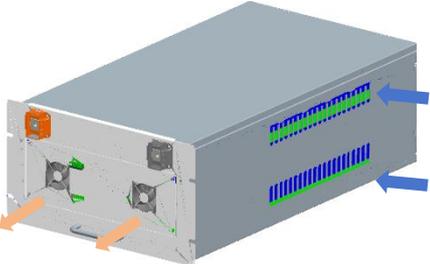
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fire extinguisher system		Standard equipped with aerosol fire extinguishing device, integrating detection and fire control (Perfluorhexone / water fire protection can be selected according to actual requirements)
EMS		Configure as per the site requirements
one-level BMU		Integrated in the battery Pack box
air conditioning system		Rated cooling capacity is 3kW, adding heat is 1kW

3.2. PACK / battery case parameters

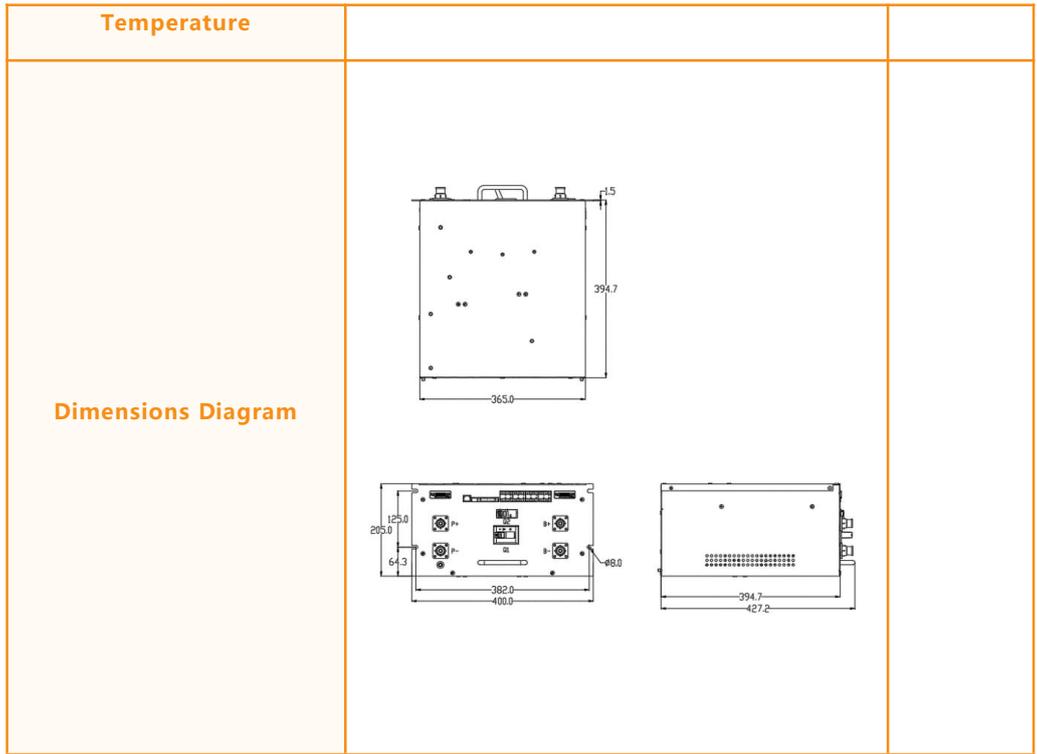
project name	Specification parameters	remarks
Standard capacity of cell	314 Ah	
burst mode	1P16 S	
rated voltage	DC51.2 V	
Operating voltage range	DC40 ~ 58.4 V	
rated energy	16.077 kWh	
Rated charge and discharge power	8.038kW	
energy density	≥120 Wh/ kg	
Standard charging method	0.5 CP charging, cut-off voltage battery pack 58.4V or monomer 3.65V	
Standard discharge mode	0.5 CP discharge, cut-off voltage 40V or 2.5V	
Rated charge / discharge current	157 A	

specification

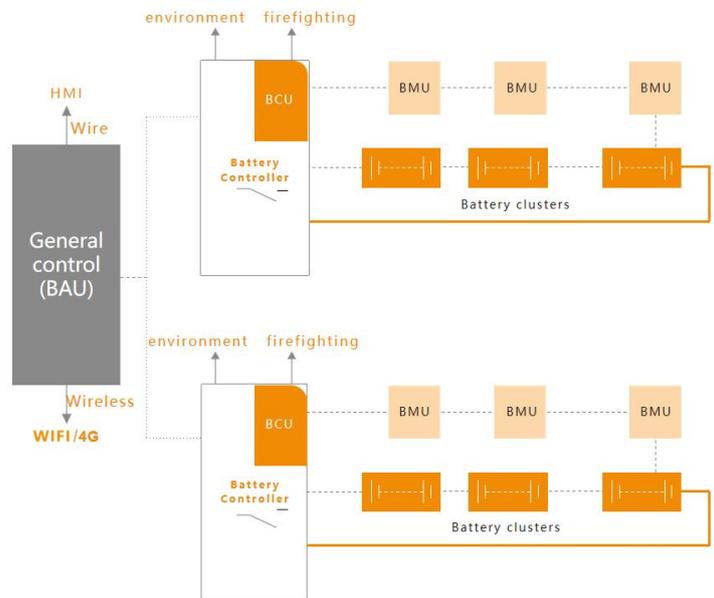
Maximum sustainable charge and discharge current	280 A	
protocol	BMU: daisy chain; auxiliary control (fan): CAN	
Insulation resistance value	>100MΩ	
Charge and discharge ambient temperature	25±5°C	Guaranteed cycle life conditions
standard weights	105 kg	
Overall dimensions (width, depth and height)	415*759*240 mm	
Heat dissipation way		

3.3. High pressure box parameters

project name	Specification parameters	remarks
Maximum Operating Voltage	1000 Vdc	
Rated Current	157 A	
Maximum Continuous Operating Current	166 A	
Control System Rated Voltage	24 Vdc	
Control System Power Supply Method	220 Vac to 24 Vdc and 1000 Vdc to 24 Vdc	Dual power supply
Shell Material	Aluminium zinc plate	
Dimensions (W×D×H)	400*395*205 mm	
weight	≈20kg	
Cooling Method	natural cooling	
High Voltage DC Terminal	Plug-in connector	
Control Power Supply Terminal	Plug-in connector	
Operating Ambient Temperature	-20°C ~ 45°C	
Storage Ambient	-20°C ~ 60°C	



3.4. BAU Connection and Control Method

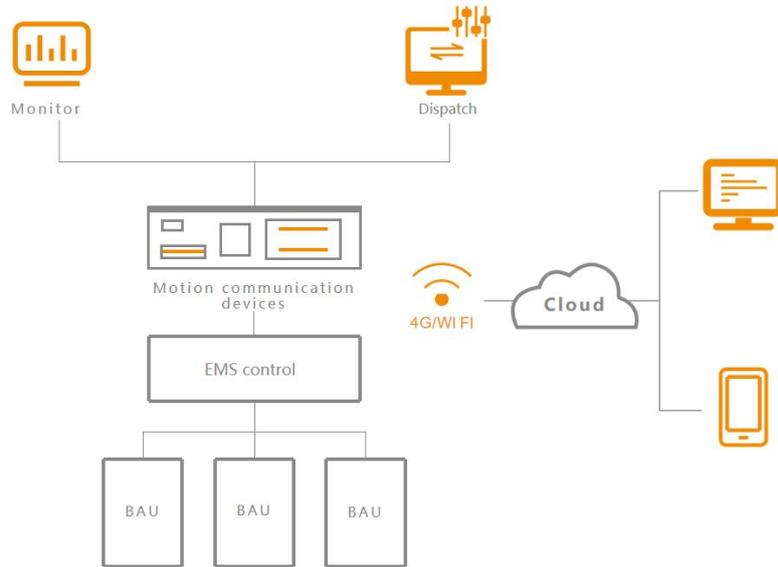


BMS Three-Level Fault Protection Strategy:

1. Level 1 Fault Alarm, Illuminate the fault indicator light and notify the PCS (Power Conversion System) to reduce load operation if necessary.
2. Level 2 Fault, Notify the PCS to stop charging and discharging (standby mode).

3. Level 3 Fault, Notify the PCS to shut down (disconnect internal switches) and control the high-voltage box to disconnect the DC side switch.

3.5. EMS Connection and Control Method



BMS/EMS/PCS Coordinated Control Strategy:

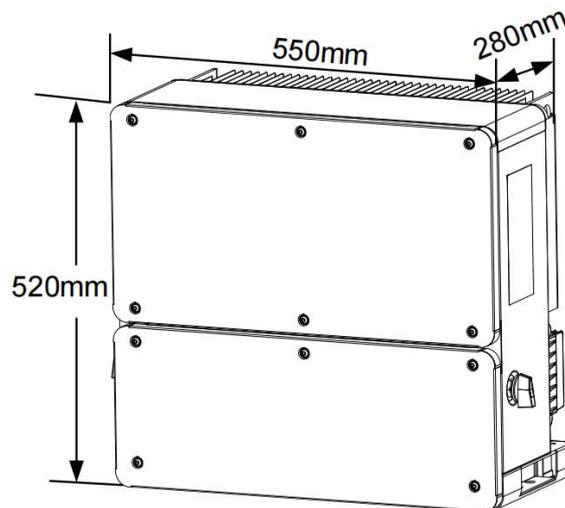
1. The cluster-level BCU (Battery Control Unit) and PCS (Power Conversion System) are connected via both CAN and dry node dual channels to ensure that the PCS implements the protection requirements set by the BCU.
2. Under normal conditions, the PCS exchanges information with the EMS (Energy Management System) through RS485, completing the control of system charging and discharging power.

4. PV MPPT controller

4.1. Schematic Diagram

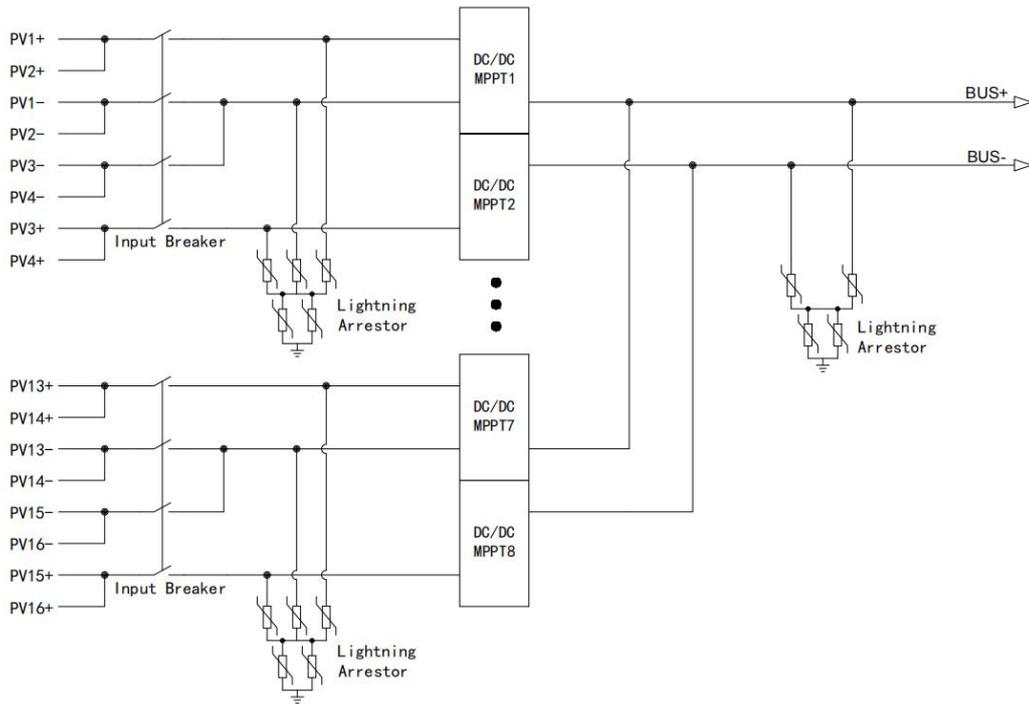


Pic4.1 84kW-MPPT Physical Picture



Pic 4.2 84kW-MPPT Product Dimensions

specification



pic4.3 Photovoltaic System Diagram

4.2. System parameters

product model		GWMPPT-2	GWMPPT-8
input parameter	Maximum PV array voltage	900V	
	MPPT voltage range	200V~820V	
	Full-load MPPT voltage range	530V~820V	
	Maximum branch current	20A	
	Enter the number of PV branches	Two	Eight
	MPPT quantity	One	Four
	MPPT current per circuit	40A	40A/40A/40A/40A
Output parameter is rated for output	Full-load output voltage range	600~820V (communicable and modifiable)	
	Lower power output voltage range	820-860 V (communicable and modifiable)	
	The Best unit stops working	> 860V (communicable)	
	rated output current	35A	140A
	output rating	21kW	84kW
	maximum output current	38A	154A

specification

system parameter	European efficiency	99.4%	99.4%
	levels of protection	IP65	IP65
	cooling-down method	forced air cooling	forced air cooling
	Dimensions (width x depth x height)	200*400*120mm	280*460*180mm
	weight	13kg	23kg
	working temperature	-30~55°C	
	power supply mode	Self-powered (no night power consumption)	
	communication interface	RS485	4G/RS485
Notes: It is recommended that the maximum open-circuit voltage of the PV string selected during design should not exceed the highest voltage that the back-end photovoltaic energy storage integrated system port can withstand.			