GreensunSolar

G500K-E1200

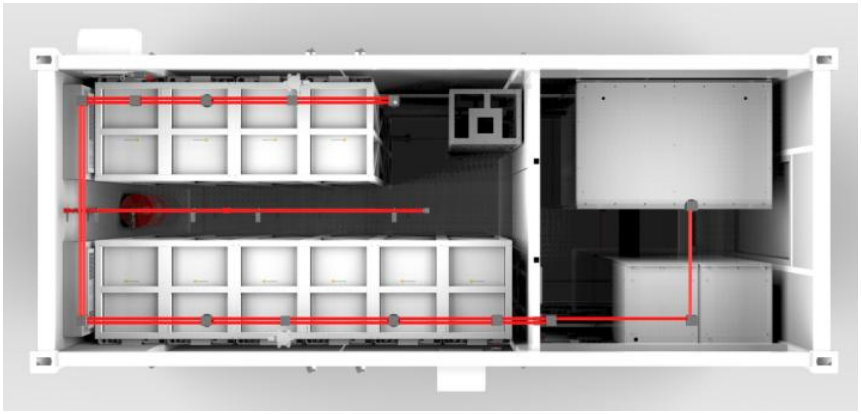
Power: 500kw
Energy: 1205.760kwh

20FT Containerized Battery Energy Storage System LiFePO4 Battery Technology

- **Maximum safety utilizing the safest type of lithium battery chemistry (LiFePO4) combined with an intelligent 3-level Battery Management System**
- **Outstanding performance and long lifespan with over 8000 cycles at 0.5C**
- **Optimized for both on-grid and off-grid applications**
- **20' containerized design complete with battery, Hybrid Inverter, HVAC, Fire Extinguishing System, Lighting.**
- **Designed for easy installation and maintenance**
- **Overall transportation**

APPROVALS

- Cells: UL 1642, Modules: CE
- UN 3536 MSDS certified



SYSTEM INFORMATION

Model	G500K-E1200
AC data	
Rated power (kW)	500KW
Rated voltage (Vac)	400
AC output	3W+N+PE
Rated current (A)	722
Voltage range (Vac)	320V-460Vac
Rated frequency(Hz)	45-55 / 55-65
THDi (on-grid)	＜3%
THDu (off-grid)	≤ 1% linear; ≤ 5% non-linear
Power factor	1leading~1lagging(settable)
Overload capacity	110% long-term
On / off-grid switching	Support
PV data	
Max. PV input voltage (V)	1,000
Max. PV power (kW)	600
MPPT operating voltage range (V)	250-850
Buck-boost mode	Support
Battery data	
Cell type	3.2V 314Ah/LiFePO4
Nominal voltage (V)	768/1P 240S
Nominal energy (kWh)	1205.76
Working voltage range (V)	672~850
Max. charge and discharge rate	0.5C@25℃
Number of battery cycles	≥8,000
System data	
System specification	500kW/1,205.76kWh
Dimensions W *D *H (mm)	6,058×2,438×2,896
Net weight (kg)	21,000
Ingress protection	IP54
Max. operating altitude (m)	5,000(>3,000 derating)
Cooling	Intelligent air cooling
Fire extinguishing system	FM200
EMS communication	RS485, TCP/IP

500KW POWER CONVERSION SYSTEM
(Inverter with Mppt Controller)

- MPS series hybrid inverters integrating PV controllers, energy storage converters
- on/off-grid automatic switching units, greatly improving customer deployment efficiency and reducing installation costs.
- The PV capacity can be flexibly configured, greatly improving the microgrid system availability
- suitable for remote areas and islands where power is relatively weak

AC(grid-connected)	
Apparent power/Rated power	550kw/500kw
Rated voltage	3Phase(3W+N+PE) 400V (320-460V)
Rated current	722A
Rated frequency/Range	50/60Hz(45-55/55-65)
Transformer	Yes
THDI/ PF	<3%/ 0.8lagging-0.8leading
AC(off grid)	
Apparent power/Rated power	550kw/500kw
Rated voltage	3Phase(3W+N+PE) 400V (320-460V)
Rated current	722A
THDU	≤2%
Rated frequency/Range	50/60Hz(45-55/55-65)
Overload capacity	110%-10min120%-1min
PV	
Max PV open-circuit voltage/Max PV power	1000V/600kw
PV mppt voltage range/Mppt number	200-850V/10
Battery	
Battery voltage range	500-850V
Protective degree/Noise emission	IP20/75dB(A)@1m
Environmental temperature	-25℃~+25℃
Max. Altitude	5000m(derate over 3000m)
Cooling	Forced-air

LiFePO4 BATTERY PACK SYSTEM
768V 1570Ah(1205.760kwh)

- Advanced Battery Management System
- Comprehensive monitoring of battery operating status, including voltage, current and temperature
- Passive cell balancing to maximize battery life
- Outstanding performance and long lifespan with over 8000 cycles at 0.5C
- Modular design with high scalability

Battery Pack specification		Battery module specification	
Normal voltage	768V	Normal Voltage	51.2V
Voltage Range	672-852V	Normal capacity	314Ah
Capacity	1570Ah(314Ah*5)	Normal energy	16.078KWH
Normal energy	1205.760KWh	Voltage range	44.8-56.8V
Rack cluster quantity	5clusters	Cycles @ 25 °C	8000Cycle
Cluster capacity	768V 314Ah	BMU	Include
Combiner method	5clusters in parallel	Cell configuration	16S*1P
Max. Continuous Charge	785A	Cell Max. Continuous Charge	0.5C
Max. Continuous Discharge	785A	Cell Max. Continuous Discharge	0.5C
Communication	RS485/CAN	Communication	RS485/CAN
Air cooling	Yes	Air cooling	Yes
IP Level	IP 20	IP Level	IP 20
Cluster combination	15pcs battery module in series	Module Dimension	483*245*792mm
Cluster dimension	1070*800*2330mm	Module weight	125kg
Per Cluster weight	1980kg	Approvals	CE, MSDS,UN38.3

BATTERY MANAGEMENT SYSTEM

- Maximum safety utilizing the safest type of lithium battery chemistry (LiFePO4) combined with an intelligent 3-level Battery Management System which include **BMU, BCU, BAU**.
- The BMS provides all round, real- time monitoring and Protection of the lithium batteries within the ESS. It provides data on cell voltage, cell temperature, cable terminal temperature, battery string voltage, current, SOC and SOH.
- The BMS has been configured with a set value over limit logic, which is integrated with the main control terminal to deliver complete protection and maximum battery life.

BMU Parameter			
Item	Parameter	Item	Parameter
Module supply voltage	DC24V±20%	Battery balancing method	Active balancing
Maximum power supply	2W	Battery balancing current	2A
Battery Cell monitoring number	16	Fan control method	Start-stop; PWM
Voltage detection range	0～5V	Input insulation resistance	≥50MΩ,2500VDC
Voltage detection accuracy	±3mV	Data communication interface	CAN
Number of temperature detections	18	Communication baud rate	250Kbps (default)
Temperature detection range	-40～125℃	Dry contact output	2A@30VDC
Temperature detection accuracy	±1℃	/	/

BCU Parameter			
Item		Parameter	Remark
powered by	Working voltage	16～32Vdc	/
	Working power consumption	≤4W	Excluding contactor operating power
Group terminal voltage acquisition	Collection quantity	2 Circuits	/
	Collection range	0～1500 V	/
	Collection accuracy	±0.2%FS	Full scale
	Collection cycle	≤50 ms	/
Current sampling	Collection quantity	3 Circuits	1-way shunt; 2-way Hall sensors
	Collection range	±400 A	Based on shunt & hall sensor
	Collection accuracy	±0.2%FS	Based on shunt & hall sensor
	Collection cycle	≤20 ms	/

Fault Recording	Recording period	Current recording cycle ≤ 20ms; voltage recording cycle ≤ 50ms			100 faults can be recorded
Temperature collection	Number of channels	4			/
	Collection range	-40～125 ℃			/
	Collection accuracy	±1℃@-25℃～65℃ ±2℃@-40℃～-25℃/ 65℃～125℃			/
	Temperature collection cycle	≤1s			/
DO	Number of channels	8			6 low-side outputs, 2 dry contact outputs
	Output capacity	3A@30VDC			Peak current is not less than 5A/100mS
DI	Number of channels	8			Connect to passive feedback signal input
	Digital input	Passive dry contact			/
Insulation resistance	Scope of collection	0～100 MΩ			/
	Sampling accuracy	100V≤U＜400V	R≤50K	≤15KΩ	/
			R＞50K	≤30%	/
		U≥400V	R≤75K	≤15KΩ	/
			R＞75K	≤20%	/
Ethernet interface	LAN	1			BCU and BAU Communications
	Communication rate	10M/100M adaptive			/
CAN	CAN1	2			BCU and BMU Communications
	CAN2				BCU and BAU or PCS Communications
	baud rate	250 Kpbs			
RS485	RS4851	3			Can communicate with EMS equipment
	RS4852				Can communicate with PCS equipment
	RS4853				Can communicate with RS485 devices (reserved)
	baud rate	9600 bps			

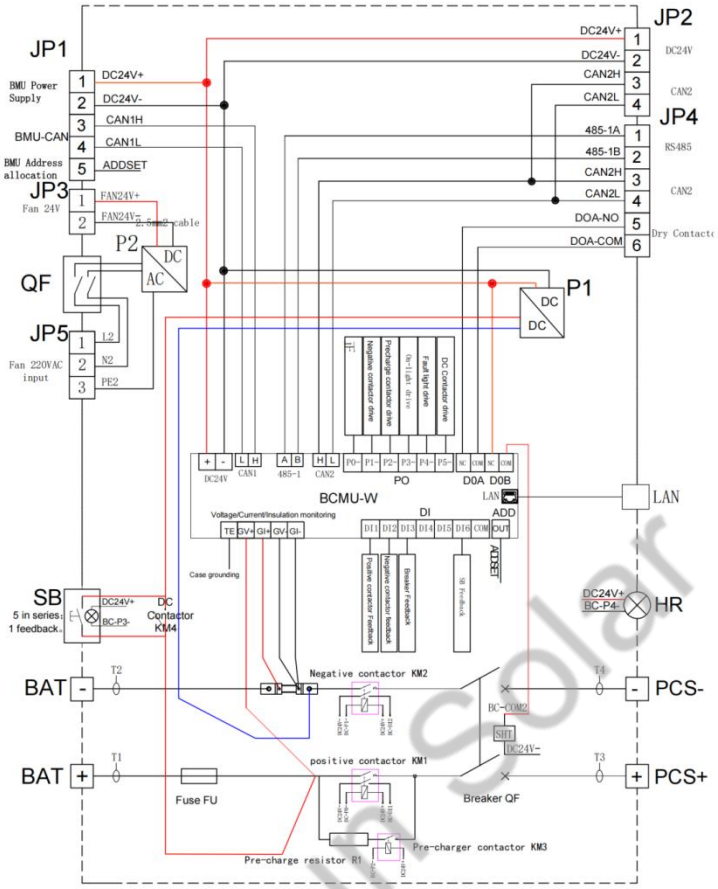
BAU Parameter			
Hardware parameter			
Item	Parameter	Item	Parameter
Display	10.1” 16:9 TFT LCD Screen	Touch screen	4-wire industrial resistive touch screen
Ethernet	2 RJ45 ports, 10/100/1000 Mbps 1 RJ45 port, 10/100 Mbps	USB port	2 USB 3.0 Type A ports

Serial communication port	COM0: RS485 (Individual Isolation 1) COM1: RS485 (Individual Isolation 2) COM2: RS485 (Individual Isolation 3) COM3: RS485 (Individual Isolation 4) COM4: RS485 (Individual Isolation 5)	CAN communication port	CAN0 (isolated 6) with built-in matching resistor CAN1 (isolated 7) with built-in matching resistor
Digital Input DI	8-way, dry node input	Digital output DO	6 channels (1 channel with 1 common terminal, relay type, AC250V/5A)
Electrical specifications			
Rated voltage supply	DC24V, working range 18V~28V	Power protection	Uses isolated power adapter with lightning surge protection
Power consumption	10W	Instantaneous power failure time	＜5ms
Withstand voltage	AC500V (1 minute)	Insulation resistance	DC500V,≥20MΩ
CE & RoHS	Complies with EN 611000-6-2:2005 and EN 61000-6-4:2007 standards; Complies with RoHS;	Lightning surge	±1KV
Group pulse	±2KV	Electrostatic contact	±8KV air ±15KV (panel/power supply/485 communication port) ±6KV air ±8KV (USB/HDMI/network card)
Environmental requirements			
Operating temperature		-20~60℃	
Storage temperature		-30~70℃	
Ambient humidity		10–90% RH (non-condensing)	
Cooling method		Natural air cooling	

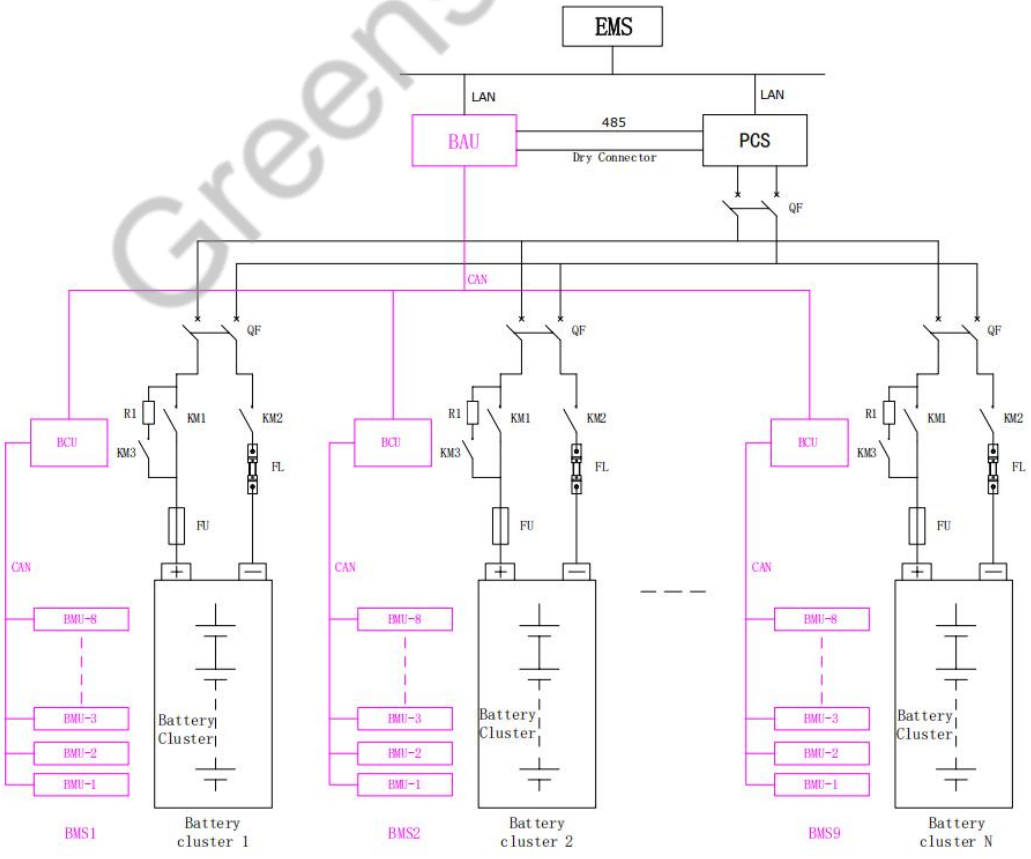
Battery Management System which include BMU, BCU, BAU

The BMS includes a first level system main controller MAU, a second level battery string management module BCU, and a third level battery monitoring unit BMU, wherein the BCU can mount up to 32 BMUs.

Electrical schematic diagram of high pressure box(sketch map)



3Level System group scheme



HVAC SYSTEM

The environmental control system inside the ESS adopts precision heating, ventilation and air conditioning designed to ensure ideal internal temperature whether discharging, charging or on standby.

The operation of the HVAC is fully automatic and responds to the internal temperature of the container. It is a highly reliable system and has a number of easy to use functions.

- **Cooling** - cooling starts when the containers internal temperature exceeds the cooling set point, and it stops when the temperature drops below the cooling set point.
- **Heating** - heating starts when the containers internal temperature is lower than the heating set point, and it stops when the temperature rises above the heating set point.
- **Dehumidification** - dehumidification starts when the containers internal humidity exceeds the dehumidification set point, and it stops when the humidity drops below the dehumidification set point.

HVAC SPECIFICATIONS		
PARAMETER	DEFAULT	SETTING RANGE
Cooling Set Point	29℃	16~38℃
Return Difference	6℃	1~10℃
High temperature alarm	45℃	30~60℃
Low temperature alarm	0℃	-45~10℃
Heating Point	5℃	5~26℃
Return Difference	10℃	1~10℃
Dehumidification Set Point	80%	50~90%
Return Difference	75%	45~95%

Fire Extinguishing System

The fire suppression system is designed according to the container size, and the fire extinguishing gas is discharged from the extinguishing gas cylinders to the main pipeline and then to branch pipelines and sprayed from nozzles. The system includes fire detectors, audible and visual alarm, emergency start/stop button, gas release indicator, gas extinguishing controller, etc., and follows European standards. Main features include.

- Extinguishes electrical, liquid and solid substance fires
- Auto start, manual start and mechanical emergency start
- Effectively prevents accidental discharge caused by chronic leakage
- Configured to prevent accidental start
- Event logging function

Fire protection system technical information	
Item	Remark
Automatic fire alarm system	1. Two smoke detectors and two temperature detectors are installed on top of the battery compartment, and one smoke detector is installed in the electrical compartment. 2. Install an audible and visual alarm, a deflation indicator light, an emergency start/stop button/manual/automatic switch, and a manual fire alarm button outside the electrical compartment. 3. Install an automatic fire alarm host inside the electrical compartment. 4. The fire alarm control device for the energy storage power station can reserve one 485 external communication line and four passive normally open dry contact signals (fault, level 1 fire alarm, sprinkler feedback, and level 2 fire alarm). If fire station-level networking is required, each controller must be equipped with a CAN bus isolator and connected via CAN bus daisy-chaining, ultimately connecting to the station-level fire alarm host for communication.
Gas fire extinguishing system	1. A perfluorohexanone (PFH) fire extinguishing system with internal pressure bottles and piping is used, with a PFH fire extinguishing concentration of 7%. 2. The battery compartment fire protection zone uses the battery compartment as the smallest unit for fire extinguishing. Compartment-level sprinklers are installed, and when a compartment-level fire extinguishing action is initiated, a single compartment-level spray is applied.
Combustible gas system	1. One CO combustible gas detector and one H2 combustible gas detector are installed on top of the battery compartment to monitor combustible gases within the compartment. Information is transmitted to the fire control room via the energy storage power station's fire alarm control device. 2. A combustible gas concentration display (which also serves as a fan start/stop function) is installed outside the compartment to indicate the combustible gas status within the compartment.
Emergency ventilation system	● Inlet fan: Entire unit explosion-proof, explosion-proof marking Ex ec ⅡC T4 Gc, protection level IP65, with motorized mechanism; ● Exhaust fan: Entire unit explosion-proof, explosion-proof marking Ex ec ⅡC T4 Gc, protection level IP65; 1382 m³/h.

Fire protection system layout

Fire linkage logic diagram