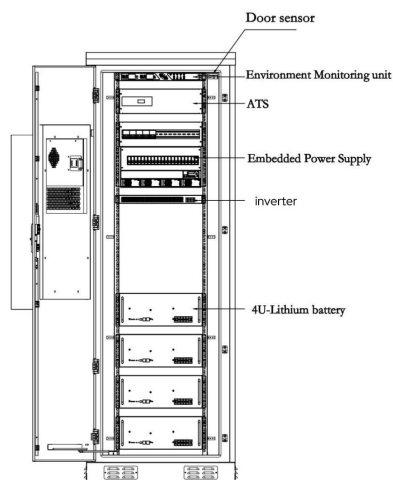




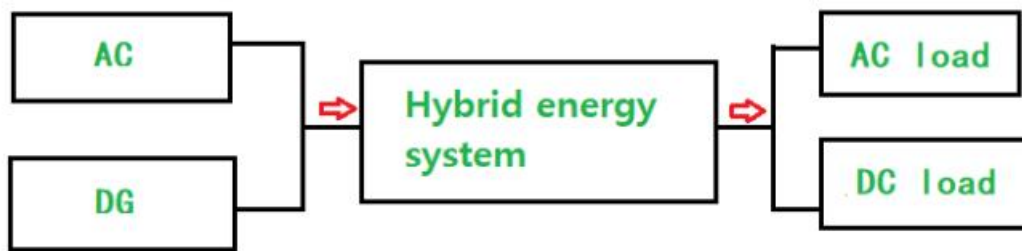
Hybrid power cabinet



Hybrid power cabinet
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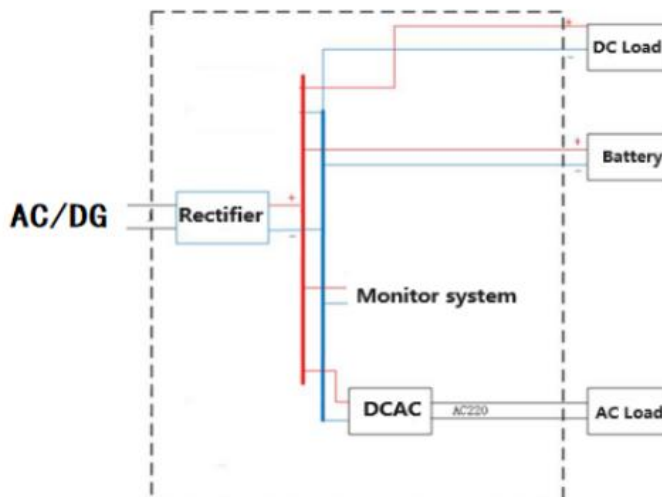
1、 Overview

Many stations, such as communication base stations, are mostly located in suburban and remote areas, facing problems such as unstable electricity supply, long distances from electricity supply, and huge installation costs. The use of mains power, diesel generators, and energy storage for power generation has become the fastest and most effective way to solve the power supply problem at the aforementioned stations. The hybrid energy supply system does not require the installation of power lines and requires a one-time investment. Easy to operate, economical, energy-saving, and environmentally friendly. And it has a long service life, stable performance, and low maintenance costs. At the same time, it can also utilize urban electricity to improve the safety, stability, and reliability of the station power supply system. In order to reduce the use of electricity in the power grid, the base station can use diesel generators and energy storage for power supply. The hybrid energy system is directly applied as a backup energy source in stations with mains or diesel generators. When the mains is normal, the mains supplies power to the station load. When the mains is unstable or power is cut off, the load is powered by energy storage batteries. When the battery level is too low, the diesel generator starts to supply power to the load and charges the battery. This solution will ensure the stable operation of the station load without dropping the station.

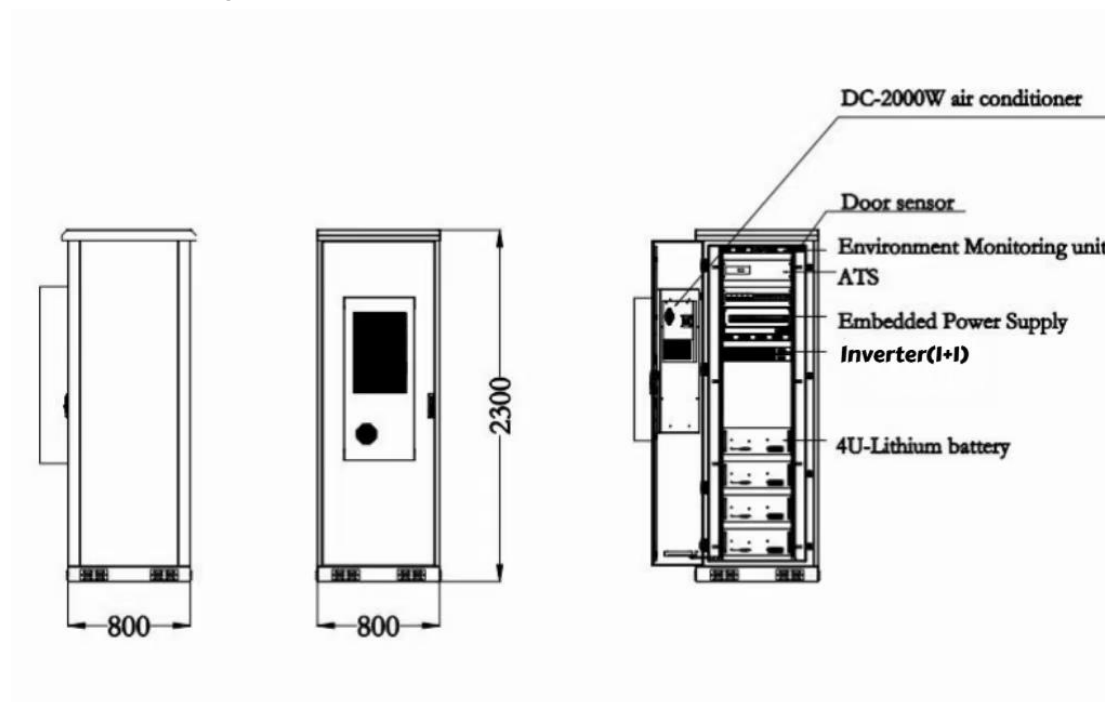


2、 System composition and working principle

This system consists of photovoltaic modules, combiner boxes, rectifier modules, photovoltaic modules, lithium battery packs, inverters, battery cabinets, distribution cabinet systems, and dynamic environmental monitoring units. The schematic diagram of the system framework is as follows.



3. Product Drawing Introduction



4. Technical Parameter

Hybrid Outdoor Cabinet Specifications	
Physical Specification	Details
Dimensions	Recommended HxWxD in mm = 2100x750x750 19"inch internal width
Weight	Approx 110Kg
Installation mode	Ground/Rooftop
Cabling mode	Bottom of the cabinet 2 entries FL21 cable gland
Maintenance mode	In Front
Security Standard	IEC60950
Protection level	IP55
Noise Level	≤ 65dBA @1.5m
Frame Material	Galvanized Steel

Skin Material	Single layer with thermal insulation
Paint	Powder Coat paint RAL 7035 Gray
Battery Space	Battery space of 4 strings
Operating Temp range	from -40 to +60
Bolts	The cabinet should be fixed by bolts to existing concrete foundation with minimum of 4 bolts (Bolts to be provided)
Door	Door should be latched to a stopper at the bottom to prevent the door from sawing during windy weather
External Lock	External rings for external lock with dimension (11mm diameter) of shackle smart lock

<u>Hybrid</u>	
Hybrid System Rectifier Capacity	24kW fully equipped
Rectifier Model capacity	3000W or 4000W minimum of 96% efficiency (Preferred to be 3000W)
Hybrid Controller	To be included or part of the rectifier controller
Hybrid Mode	CDC
Remote Monitoring solution	The rectifier system should be open to provide all power related information to XXXRMS solution

System specification	1- The cabinet should control the DG Turn on and off without the need of af any Aux card or depending on any other out of the cabinet modules (ATS or MDB). 2- The System should provide power on priory basis A-Grid, B-Battery 3-DG. 3- The system should be open to be integrated fully with any 3rd party RMS on both Rectifier and battery. 4- The system should be able to cut of the inverter power in case Grid is available or when the Battery capacity reaches the limit and that the DG didn't start for any reason. 5- The system should support dynamic battery charging current depending on the AC input source, for instance on grid it can be higher than DG. 6- The system should have the ability to limit the power consumption from grid or generator power source. 7- Connections between the cabinet and other equipment (generator, fuel tank, ATS, MDB, etc..) to be by wire connection. 8- The System should have the ability to dynamically change the battery charging current when DG is on and utilize as much power from the DG until 80% of the DG capacity to lower the time of charging. 9- The system should not be connected to any external DC voltage to power on any cabinet Aux card and the cabinet should be self dependent to power any Aux card that is part of the solution. 10- The rectifier controller should be accessed by mean of SW application or web portal over ETH connection with a PC and able to alter and configuration 11- The system should log all the activities of the rectifier and hybrid system and stored for at least 1 month and be able to extract the log in a readable format. 12- The charging current rate (C) need to be variable during the charging mode with set values and periods (start charging value with set period and stable charging value with period).
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<u>Cooling Specification</u>	
Model	Cytech
Cooling type	DC
Cooling capacity	2000 Watt
working condition	Auto switch off when cabinet door is open
Passive Cooling	HEX DC FAN 120W/K (Optional)
<u>AC input Specification</u>	
Input mode	Three phase compatibles with single phase
Input frequency	45Hz - 65Hz, rated value: 50Hz/60Hz
Input capacity	1 × 63A/3P MCB
Surge Protection Device	Type 2 Surge Arrestor discharge current 40kA 8/20us
Output Voltage	43VDC to 58VDC
Capacity	24kW, loaded capacity 24kW
Battery MCB	4x125A
LLVD Programmable	4x125A, 4x63A,
BVLD Programmable	4x63A, 2x32A, 2x16A
Efficiency	> 96%
Power factor	0.99
Battery cabling	battery cable no less than 35mm
Input voltage	85VAC - 300VAC, rated 220VAC
<u>Controller</u>	
Signal input	Battery temp (number of sensors should match the installed batteries) and Ambient temp
I/O	8 Digital Inputs (the initial state for all the digital outputs should be closed (NC), 6 Dry contacts.
Alarms	load fuse alarm, door sensor, low battery voltage, high battery voltage, temperature alarm, mains detect alarm, smoke alarm, water alarm, Gen. abnormal work (manual run, fail to start, fail to stop).
storage capacity	Up to 1000 historical records
Communication port	RS232, RS485, CAN , FE
Networking mode	IP, SNMP traps

Hybrid	The controller should provide hybrid functionality
Power limitation	system should have a limitation on the power consumed
<u>Others</u>	
DC Service light	To be included
Smoke Sensor	To be included
Door Sensor	To be included
Water Sensor	To be included
Alarm box	1- one unit alarm box to connect all the external alarms and signals 2- The cabinet Alarm box should be isolated and not to be impacted by any external volage coming from the telecom equipment
<u>Battery</u>	
Battery Type	Lithium Ion (LFP) type 600Ah total capacity with minimum of 150Ah per battery
Cycles	6000 Cycle
DC Load AC Load	8kW
	2kW for Owner
Battery backup time	4 hours
<u>Inverter</u>	
Inverter	DC-AC inverter 220V (n+1), 3KVA module with smart circuit breaker to be adjusted, can be managed remotely through the RMS
current Limiter	Automatic changeover and current limiter (ACCL) to be installed and set to (8 Amp.) to limit the inverter output
By-pass Mode	Inverter should have 2 input sources (A/C, By-pass) and (DC, from batteries)
Inverter Protection	Overload protection (Inverter to shutdown in case of over load and back to service after set period of time), reverse voltage protection (inverter to protected from any reverse signals may back from the landlord line).
Inverter Output ports	minimum 2 output ports remotely controlled through smart C.B

5. Configuration List

Hybrid power cabinet list				
No	Name	Specification parameter	Qty	Remark
1	Hybrid power cabinet	H*W*D=2300*800*800mm	1	With DC2000 air conditioner
2	Power Supply System	Equipped with monitoring and frame insertion	1	
3	Environmental monitoring unit	LAN/4G	1	SNMP
4	Lithium battery	51.2V/150Ah	4	
5	Rectifier module	3000W	8	96% efficiency
6	Inverter	3KW	2	
7	ATS	Switching switch between mains power and diesel generator, diesel generator dry node automatically starts and closes when connected to the switching power supply	1	
8	AC&DC input and output	Primary power off, secondary power off, lightning protection, STS, etc	1 set	

Note:

Remote monitoring comes with a built-in platform and can also be connected to customer platforms. If the built-in platform is needed, platform service fees and data server fees will be incurred, which will not be included temporarily.

Engineers can be dispatched abroad for debugging, but a separate fee will be charged.