Powerfree Cube User Manual

SHENZHEN PANDPOWER CO., LTD.

IMPORTANT NOTE:

Read this manual carefully before installing or operating this Product. Make sure to save this manual for future reference.

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Preface

Dear customer,

Thank you for purchasing the product Powerfree Cube manufactured by SHENZHEN PANDPOWER CO., LTD. We sincerely hope that our product can meet your needs, and also you can make suggestions on the performance, function, appearance and other aspects of the product, and we will continuously improve the quality of the product based on your suggestions.

Manual Application

This manual applies to transportation, assembling, installation and commissioning for Pand Powerfree Cube series product.

Target Readership

This manual is intended to be used by the operator appointed.

Manual Key Terms and Definition

ESS: Energy Storage System

BMS: Battery Management System

1. Safety

1.1 Operator Qualification and Responsibility

A qualified operator is someone who has the necessary knowledge, professional training and experience, such as:

- The operator must have obtained the certificates that comply with local regulations for related operations.
- Equipment protection and standard maintenance in accordance with established safety standards.
- Give assistance to the injured party for the first time.
- Obey local regulations, standards and management.

The operator must ensure that:

- Before commissioning and closing the isolation circuit breaker, must understand all the basic information and step instructions, especially the safety instructions for assembly and installation that must be followed strictly.
- Must use appropriate measuring device and follow appropriate standards and directives. Must understand the operating manual of the measuring device before any measurement.
- The operator wear the overalls and protective devices and be provided with the special tools in accordance with local laws and regulations.
- The installation work must be assigned to the dedicated full-time operator;
- During the wiring process, do not allow two or more operator to connect one wire at the same time;
- During the installation process, each completed item must be inspected once and the cross-inspecting must also be required;
- The device must be installed in order, and any step can't be skipped;
- The separation belts must be established during installation to prevent any irrelevant person from entering the site.
- Do not remove or alter the nameplate;
- The software, enclosure and components of the equipment cannot be changed without authorization of the manufacturer. If the software, enclosure and components of the equipment are changed, the corresponding responsibilities and warranty will become invalid;
- All operations of the energy storage system must obey the instructions in the User Manual, the Installation Manual and the Warranty Letter. Any equipment damage due to violation against such instructions will result in invalidity of relevant responsibilities and warranties.

1.2 Warning

➢ Package：

The Powerfree Cube is packaged as a whole unit to ensure that the product is free from any harmful gas, chemical pollution, static electricity, humidity and mechanical damage during handling, transportation, and storage.

➢ Transportation：

Don’t invert, roll over, throw or bump the product to avoid any damage;

Don’t expose the product to sun, don’t put the product under water and rain.

Don’t unpack the product without PAND authorization.

➢ Storage：

Place the positive pole and negative pole with insulation cover or tap;

Store the product under the environment which is described in chapter 2.2.

2. Product Overview

2.1 Brief Introduction

Energy storage technology has been recognized as an important part of power system operation process of six links in the acquisition-electricity generation – transmission - distribution - application - energy storage. Involving the energy storage into grid system can be effectively to manage the demand side, to eliminate the grid peak, to smooth the load curve, to regulate the frequency and voltage. It also can promote the application of renewable energy by improving the stability of renewable system generation. Energy storage is of great strategic application in the future energy structure.

The Powerfree Cube is an automotive grade LFP battery system designed and manufactured by Shenzhen Pandpower Co., Ltd. It is composed of 2P16S battery pack, shell and BMS. The product has the characteristics of high energy density, long life, safety and reliability, light weight, and wide temperature range. The BMS has sufficient data storage space to record battery status information, statistical information and alarm information for historical record query and troubleshooting.

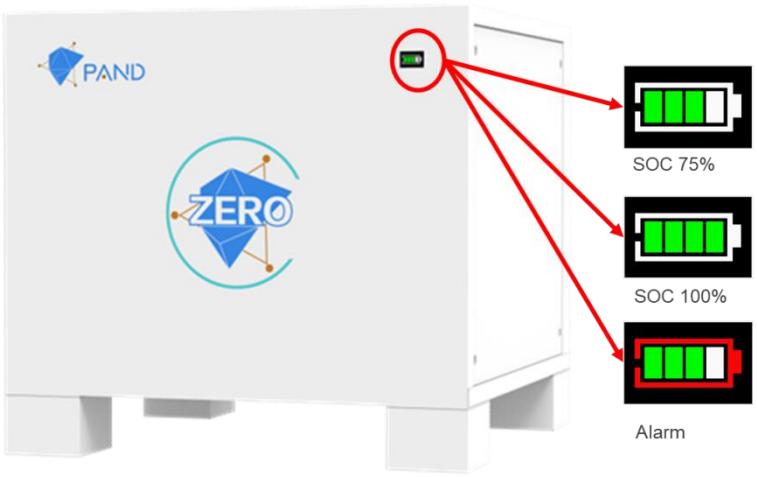


Fig.2-1 Product appearance

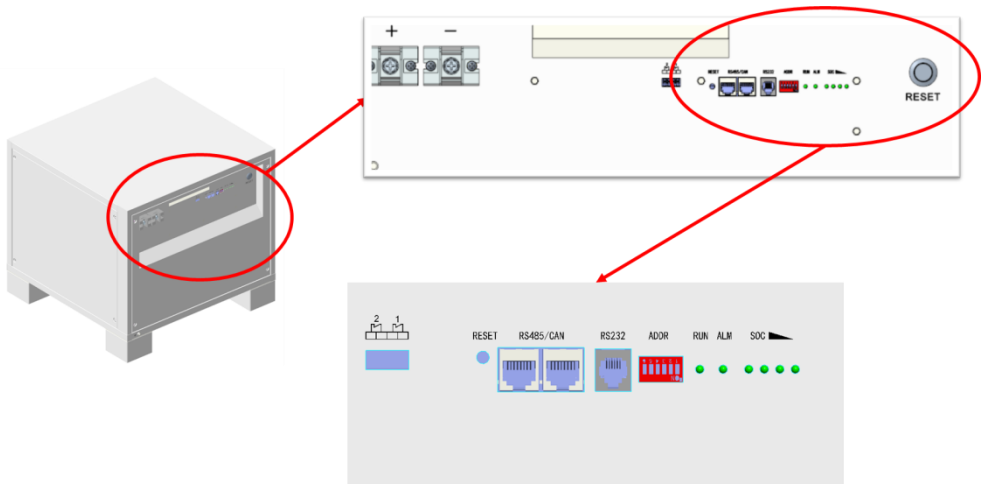


Fig.2-2 Product back panel

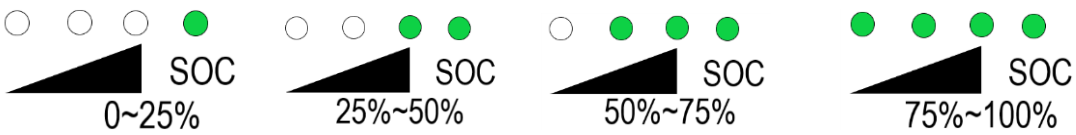
Sign	Function description
SOC	Display capacity level
ALM	Display alarm status
RUN	Display running status
ADDR	DIP switch
RS232	RJ11
RS485/CAN	RJ45-1
RS485/CAN	RJ45-2
RESET	BMS switch
1/2	Dry contact
P+	Battery positive terminal
P-	Battery negative terminal

2.2 LED indicator instruction

Product status		RUN	ALM	SOC
Shutdown		OFF	OFF	All OFF
Standby	Normal	quick flashing	OFF	Display status depend on SOC level
	Alarm	quick flashing	Slow flashing	
Charging	Normal	ON	OFF	Display status depend on SOC level
	Alarm	ON	Slow flashing	
	Fully charged	ON	OFF	All ON
Discharging	Normal	Slow flashing	OFF	Display status depend on SOC level
	Alarm	Slow flashing	Slow flashing	
	Fully discharged	Slow flashing	OFF	All OFF
Fault		OFF	ON	All OFF

Note: quick flashing: flash every 0.25S slow flashing: flash every 0.5S

SOC level:



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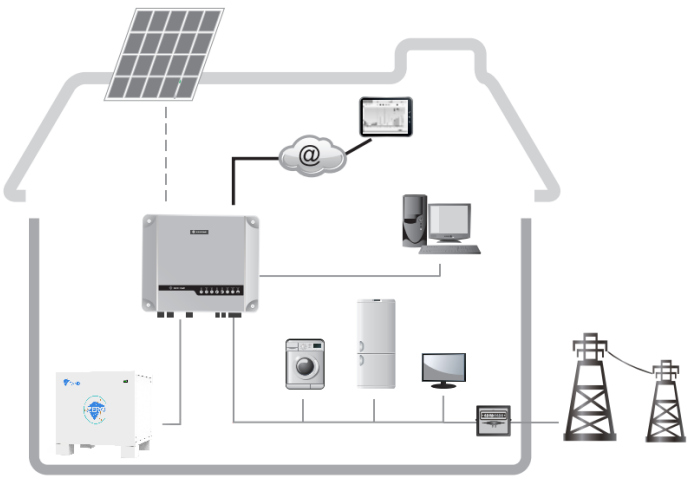
2.3 Product Specification

Energy(KWh)	10
Capacity(Ah)	200
DOD	90%
Max extensible energy(KWh)	80 (max 8 units in parallel)
Rated voltage(V)	51.2V
Working voltage range(V)	40-58.4
Charging temperature Range	0℃~+50℃
Discharge temperature Range	-20℃~+55℃
Rated power (KW)	5
Max charge current	100
Max discharge current	100
Efficiency	≥94%
Self-discharge rate	≤2%/Month
Dimension (W×H×D, mm)	650*630*600
Weight(Kg)	140±10.0
Enclosure Protection Rating	IP30
Installation method	Floor-mounted
Storage requirement	SOC ≥30%　1）≤12 Month @25℃ 2）≤6 Month @35℃ 3）≤3 Month @45℃
Communication	RS485/CAN
Compatible inverter	Goodwe/Growatt/Voltronic/Megarevo/SRNE/Solis/Deye
Design life	10years/4000 cycles
Certification	IEC62619/IEC60730/UN38.3

2.4 Product Application

The product can store surplus energy generated from rooftop photovoltaic panels for use when needed. When the sun has set, energy demand is high, or there is a black-out, you can use the energy stored in the product to meet the energy needs at no extra cost. In addition, the product helps you pursue the global of energy self-consumption and ultimately energy-independence.



Electricity Bill Saving

Charge during off-peak times

Discharge during peak times

Self-consumption

Store solar energy generated from photovoltaic panels for further use

Emergency Power Backup

Discharge during a black-out, functioning as backup power.

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3. Installation

Please refer to quick installation instruction for the installation method.

4. Working mode

4.1 Charging mode

When the BMS detects the external charging voltage ≥48V, and all cell voltage and temperature are normal, the product will enter charging mode.

4.2 Discharging mode

When the BMS detects that there is load, and all cell voltage and temperature are normal, the product will enter discharging mode.

4.3 Standby mode

The product will enter standby mode when both charging and discharging conditions are not met.

4.4 Sleep mode

When the cell volt is lower than cut-off volt or the reset button is press down, the product will shut down to enter sleep mode.

5. Product startup/shutdown

Product startup process

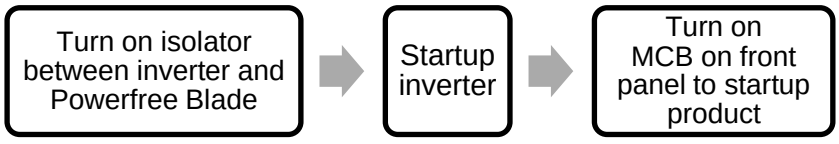

Fig.4-1 Product startup process

Note:

- Keep MCB on “OFF” position before product energized.
- When the product is energized, the SOC indicators will be lighted 0.5S in turn.

Product shutdown process

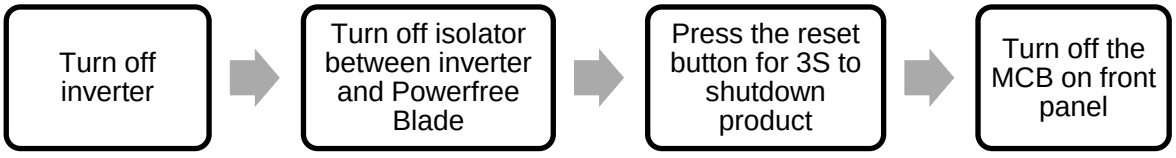

Fig.4-2 Product shutdown process

6. Compatible Inverter List

Please refer to appendix 1 to check compatible inverter.

7. Common Issues & Solution

- The product could be in fault after long time (⩾30 days) shutdown because of battery self-discharge to empty. The SOC level is required to keep above 30% before long time shutdown, and power on product to check SOC level monthly during product shutdown.
- Avoid product is over discharged to empty without charging back long time, otherwise the product could be in fault.

The Powerfree Cube adopt maintenance-free design, if any fault can't be clear after product reset, please contact Pand or Pand authorized service provider.

8. Contact

For any assistance about Product, please contact Pand by:

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Appendix 1

Compatible inverter list

Goodwe	S-BP series	GW3600S-BP
	EM Series	GW5048-EM
	ES Series	GW5048D-ES
Growatt	SPF series	SPF 5000 ES
	SPH series	SPH 5000 ES
Voltronic	InfiniSolar series	InfiniSolar series
	Axpert series	Axpert series
Megarevo	RKL1 Series	R5KL1-A
SRNE	/	HFP4850S80-145
Solis	RAI	RAI-3K-48ES-5G
	RHI	RHI-(3-6)K-48ES-5G
Deye	SUN/SG01 series	SUN-5-8K-SG01LP1-USEU