Australian Energy Storage

CN Series
User manual

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1 Introduction

CN Series lithium iron phosphate battery is composed of lithium iron phosphate cell, battery management system (BMS), housing and related components. The high-performance battery management system (BMS) can protect batteries from overcharge, over discharge, over current, short circuit, and temperature anomalies. It can communicate with intelligent devices such as computers, realise remote centralised monitoring, and monitor various operating parameters and status of single batteries in real time.

The product by its integration, miniaturisation, light-duty, intelligent centralised monitoring, battery maintenance and management, unattended, safe and convenient to use, energy conservation, environmental protection and other characteristics are widely used in network equipment, remote switches, mobile communication equipment, transmission equipment, such as communications satellite ground station, microwave communications equipment as a backup power supply.

Installation, operation and maintenance of the CN series lithium iron phosphate battery system should only be performed by trained and qualified professionals. Before installing and using the product, read the safety precautions and related operation instructions carefully; otherwise, personal injury or product damage may occur. The precautions mentioned in this manual are common. If you find special operating conditions or conditions, contact the technical personnel of the battery manufacturer.

2 Product Features

- Using the high performance lithium iron phosphate (LiFePO4) as positive materials, the cycle life is more than 4000 times, floating life up to 10 years, prolongs the service life of backup power supply system. (10 Year Warranty)
- Using the intelligent management system, realise the monitoring and control of battery system under charge, discharge, floating and standby, make sure the system is always in under ideal state of health.
- Built with comprehensive monitoring system, the battery voltage, current, temperature, volume, state of health is under monitoring. ESD Monitoring is achieved via inverter communications
- The built-in intelligent balance module, to ensure that the consistency of battery capacity, to extend the service life.

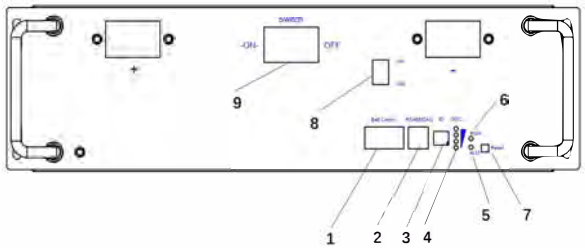
- Intelligence-design, meet the national standard requirements, remote-measurement, remote-communication, remote-control and remote-adjustment.
- Working state and alarm display directly on control panel.
- System with intelligent thermal management devices, which insure the system work in a wide range of temperature, -20 ℃~+60 ℃.
- With good electromagnetic compatibility and can be matched with standard communication equipment compatibility.
- Standard and universal size.

3 Product parameters

3.1 Model Type

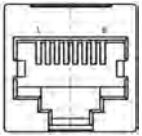
Model Type	Voltage(V)	Capacity(Ah)	Size			Weight/kg
			Width/mm	Depth/mm	Height/mm	
CN51.2-100	51.2	100	442	420	130	42.5
CN51.2-200	51.2	200	442	550	226	84

3.2 Product appearance



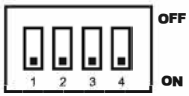
No	Name	Function	Remarks
1	RS485	RS485 communication ports	communication between batteries, See Table 3.1
2	RS485/CAN	RS485/CAN communication ports	communication between inverters, See Table 3.1
3	ID	Assign address of every model	See Table 3.2
4	SOC	The state of charge	Four small green LED
5	ALM	Alarming indicates LED	
6	RUN	Operating indicates LED	Always brightly when operating
7	Reset	Reset the battery system	
8	ON/OFF	The switch of the BMS	
9	ON/OFF	The switch of the battery	

Table 3.1 RS485 Pins and definitions



RS485			
RJ45 Pins	Definitions	RJ45 Pins	Definitions
1	NC	5	CAN-L
2	NC	6	NC
3	GND	7	RS485-A
4	CAN-H	8	RS485-B

Table 3.2 Assignments of ID address



Code				Address	Assign	Remarks
ON	ON	ON	ON	16	Model 16	
ON	ON	ON	OFF	1	Model 1	
ON	ON	OFF	ON	2	Model 2	
ON	ON	OFF	OFF	3	Model 3	
ON	OFF	ON	ON	4	Model 4	
ON	OFF	ON	OFF	5	Model 5	
ON	OFF	OFF	ON	6	Model 6	
ON	OFF	OFF	OFF	7	Model 7	
OFF	ON	ON	ON	8	Model 8	
OFF	ON	ON	OFF	9	Model 9	
OFF	ON	OFF	ON	10	Model 10	
OFF	ON	OFF	OFF	11	Model 11	
OFF	ON	OFF	ON	12	Model 12	
OFF	OFF	ON	OFF	13	Model 13	
OFF	OFF	OFF	ON	14	Model 14	
OFF	OFF	OFF	OFF	15	Model 15	

Note: In the table 3.2, code bits are in accordance with the control panel ID code corresponding to the binary digit, dial up stands for "OFF ", dial down stand for " ON ", the right dial is low digit, the left dial is high digit, encoding in the range of 0~15, which can support up to 16 modules cascade. All coded according to the table, followed by analogy. If you need more modules in parallel, please tell us, we will design it to meet your requirement.

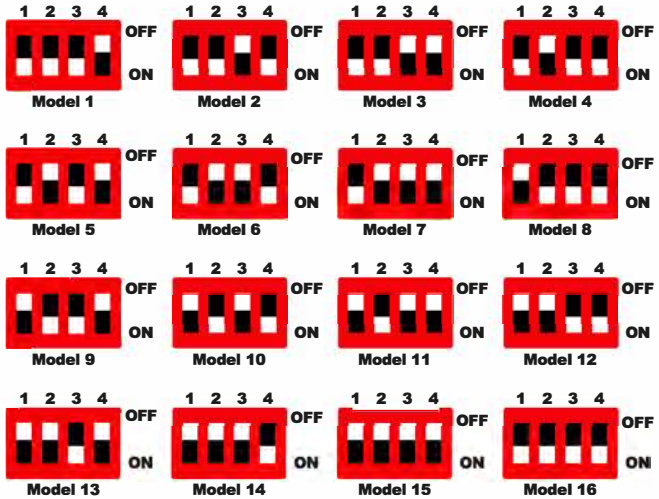


Table 3.2 LED indicator description

State	Normal	RUN	ALM	SOC LED				Definition
				25%	50%	75%	100%	
Shutdown		OFF	OFF	OFF	OFF	OFF	OFF	
Standby	Normal	ON	OFF	Indicator as the battery capacity				
	Protection	OFF	ON					
Charge	Normal	Flash1	OFF					
	Protection	OFF	ON					
Discharge	Normal	Flash2	OFF					
	Protection	OFF	ON					
Battery Full	Normal	ON	OFF					

Note: The SOC means "state of charge", there are 4 LED for SOC, From bottom to top, each light indicates increment of 25% SOC. When the battery is shut down, all the lights go out, when the battery start to work, the green "RUN" LED is always bright. When the battery is protected, the red LED"ALM" is always bright.

Note: Flash 1——0.5s ON and 0.5s OFF; Flash 2——1.0s ON and 1.0s OFF.

4 Installation and Testing

4.1 Prepare to install

The installation, operation and maintenance of CN Series lithium iron phosphate battery must be performed by trained and qualified professional personnel. Before installation and use, please carefully read the product safety precautions and related operating rules. Strictly abide by the following safety rules and local safety regulations, otherwise may cause personal injury or damage to the product.

- Make sure that the telecom equipment to be connected with the battery system is in good condition and free from defects;
- Before installation, make sure that the power supply system is under shut down state, while the battery system is also under shut down state;
- All the electricity cables must have corresponding grade of insulation, Please ensure that no exposed cables;
- Make sure that the battery and power system are reliable grounding.
- An external isolator must be fitted to interrupt all live conductors, in a floating system this means a 2 Pole isolator operating in both positive and negative conductors. Isolator must be rated greater that total system current. After installation the isolator must prevent access to any live parts by form of insulated barrier. An example would be a circuit breaker fitted in a non conductive enclosure or a circuit breaker with terminal shields.
- Additionally the battery has insulated terminal covers. These must be fitted upon completion of installation however prior energising
- The terminal covers are transparent and must be fitted upon completion on installation, to prevent access to the live terminals. These can be seen below.
- They are to be removed and fitted using pliers
- The maximum cable size is 25mm2 or a fitted bus bar. Do not modify the terminal cover as these are designed to prevent contact with the live terminal
- Please note in a floating DC system, e.g neither side is grounded. Both the positive and negative are considered live conductors.

Positive and Negative Terminal covers

4.1.1 Requirement Of Installation Environment

Type	Requirement
Working Temperature	Working Range: -10℃ ～ +60℃
Storage Temperature	- 10℃～ +60℃
Relative Humidity	＜95%
Atmospheric Pressure	86kPa ～ 106kPa
Site Requirements	No conductive dust and corrosive gas, no vibration. Keep away from heat and flame

4.1.2 Tools and Materials

Name	Name
User manual	Oblique mouth clamp
Screw driver	multimeter
Wrench	Ammeter
Pincers	Insulating tape
Wire stripping pliers	Electrostatic prevention Bracelet
Wristband	Clamp band

4.1.3 Site Survey

4.1.3.1 Equipment Inspection

- Check that the equipment connected with batteries are right and in good conditions.
- Check the DC interface position of the equipment. Check and confirm the output voltage is in the range.
- Check DC device interface, make sure the maximum output current is matched with the selected battery.
- Check the maximal working current of devices backed by the battery , make sure that the current is less than the maximum discharge current of the products.

4.1.3.2 Ground Check

Check and confirm the electrical grounding position of power system room.

4.1.4 Battery Check

- On the installation site, check the battery packaging to make sure it's intact;
- Check battery box according to the packing list, make sure all the material is complete, if any damaged, please fill in the receipt;
- Please be careful while handling batteries, avoid any damage.

4.2 Installation

4.2.1 Cautions

- When begin to install the battery system, you should pay attention to the following matters; firstly this battery is to be installed indoors or in and outdoor rated cabinet
- Installation space and load bearing. Make sure that there are sufficient fixed components to install the battery system, and to ensure that the battery mounting bracket or the cabinet be strong enough to bear the weight.
- Cable specifications. To ensure that the use of the connection of the power supply line can meet the maximum current requirements of equipment operation.
- Project layout. Ensure the whole construction process of power equipment, batteries and other reasonable layout.
- Wiring layout. Ensure that the wiring reasonable, orderly; and consider the moisture-proof, corrosion prevention. A distance of 15mm is suggested between heat sources and the battery. Please contact the manufacturer.
- The whole installation process should wear anti-static wristband.
- The installation site should be at least two or more peoples to operate.

⚠ **Caution: Please ensure the installation site safe before installation.**

4.2.2 Installation step

Step NO.	Name	Definition
1	OFFTurn off power supply	The system should be powered off, to ensure that there is no electric in installation process
2	Mechanical installation	1.Mounting lugs installation
		2.Battery fixed installation
3	Electrical installation	1.Grounding cable
		2.Power cable installation
		3.Connecting equipment installation
		4.Communication cable installation
4	Electrical commissioning	Power system commissioning

Step 1. Interruption Of Power Supply

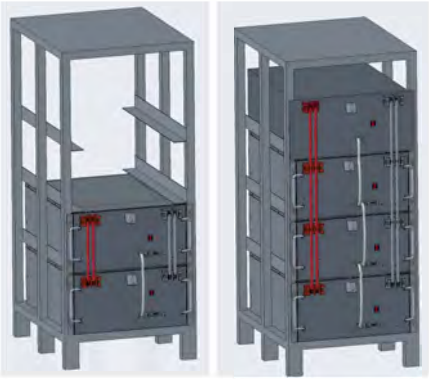
Before installation, please ensure the battery is powered off, at the same time, shutdown the equipment which need to connect to the battery.

Step 2. Machinery Installation

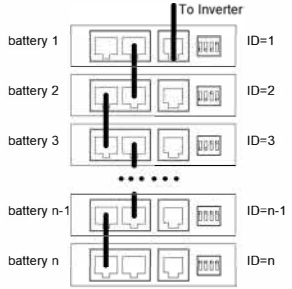
- Mounting lugs installation. Equipment packaging with the chassis mounting lugs, before the installation of equipment, fix the mounting lugs on both sides of the battery box, ensure that the installation strong.
- Battery installation. Battery module preference mounted in the rack 19 inch (or cabinet), when installed, portable handle arranged in parallel on the frame (or cabinet) supporting plate, push rack (or cabinet), ensure the mounting lugs and frame (or cabinet) edge fixing hole tightly, and then using a screwdriver with screw for fixation screwed into the rack to the mounting holes, to ensure that the battery pack mounted solid. Please allow 15mm clearance from walls for ventilation.

Step 3. Electrical Installation

- Grounding cable. The grounding cable end with screw press-fit fixation in the chassis rear grounding hole, the other end is connected to the frame (or cabinet) grounding copper bar. To ensure the stable connection.
- Power line installation. When using a single battery, battery terminals directly connected to the device or switch power supply terminal, if there are multiple batteries in parallel when in use,please connect all batteries in parallel with the power line at first.
- Connect device installation. When installing the connecting equipment, make clear the position of the positive and negative terminal posts of the system, connect the positive terminal with red wire, and connect the negative terminal with black wire to ensure that there is no wrong connection.
- Cabling shall be as per **AS3008**



- Communication cable installation. When the battery is used in a single, please skip this step. When a plurality of batteries used in parallel according to table 3.4, please dial settings for each cell address code (to ensure that no duplicate address code), and then connect the communication interface of RJ45-RS485 one by one. Connect the first or last battery module RS485 interface to the PC monitor or SMPS or UPS controller.



Caution: If there is any problem during installation, please contact the factory technicians in time to avoid damaging the equipment or causing safety accidents.

Step 4. Startup/Shutdown Procedure and Commissioning

Single Battery: After completing installation to start, switch on isolator, then simply switch the on/off switch to the on position to start the battery, this will energise the system. To shutdown simply move the on/off switch to the off position, then move the system isolator to the off position.

Multiple Batteries: After completing installation to start, switch on isolator, then simply switch the on/off switch to the on position on all batteries, in no particular order to start the battery, this will energise the system. To shutdown simply move the on/off switch to the off position on all batteries, in no particular order, then move the system isolator to the off position.

Caution: If the battery does not start , please disconnect the power line inspection and reinstall the start, if still cannot solve please the technical staff of the battery manufacturer, avoid damage to equipment or cause accidents.

NOTE: Periodic maintenance is not required for this battery

5 Transportation, storage, use and maintenance

5.1 Transportation and Storage

5.1.1 According to the provisions of the product can be used in general means of conveyance, but should avoid throwing, rain fall, strong radiation and corrosion erosion during transportation, please prevent the collision and strong vibration.

5.1.2 Storage device in the indoor storage, the ambient air temperature is 0 ℃ to +30℃, the average monthly relative humidity of not more than 90%, the ambient air without corrosive and flammable and explosive gas; storage warehouse should be ventilated, free of alkaline, acidic substances and other corrosive gases, without a strong mechanical vibration, shock, and without strong electromagnetic field and direct sunlight. Capacity was maintained at 50% to 60% stores, and charging the battery every 3 months.

5.2 Common faults and Solutions

NO.	Fault phenomenon	Analysis	Solution
1	No DC output	Low voltage protection	Charge the battery and try again
2	Power supply time is too short	Battery capacity lack or not full power	Re-discharge after being fully charged or replace the battery
3	Battery can not be charged to full	Power system DC output voltage falls below the minimum charge voltage	Regulating DC output voltage power supply to battery suitable charging voltage
4	There is a spark in the wiringafter the powe is switched on	Short circuit of power cable connection	Disconnect the power supply, check the circuit and troubleshoot the fault

Caution:If you have some special technical problems which not mentioned above, please contact the technical staff of the battery manufacturer.

5.3 Safety instructions

Please read and comply with the following conditions of installation and use of the battery, incorrect installation using the battery may cause personal injury or damage to the product.

- DO NOT throw the battery into water. Store batteries in a cool and dry environment when not in use.
- DO NOT put the battery into fire or heat the battery, so as to avoid explosion or other dangerous events.
- When charge the battery,please choose specialised charging equipment,and follow the correct procedures,do not use unqualified chargers.
- DO NOT reverse positive and negative terminals,do not connect the battery directly to AC power, avoid battery short circuit.
- DO NOT using batteries from different manufacturers or different kinds, types together ,and do not mixed use old batteries and new batteries.
- DO NOT use the battery when there are hot bulges, deforms or leaks.
- DO NOT puncture the battery by nail or other sharp objects; Do not throw, stamp on, impact or hit the battery.
- DO NOT open or try to repair the battery when it is defective. Warranty invalid if the battery repaired or disassembled.
- Batteries are half charged before shipment, Don't use the battery if there is a hot bulge, or it smells abnormal. Contact the battery manufacturer immediately if this happens.
- If you need storage the battery for a long time, please charge and discharge the battery every three months to ensure the best performance,and the best state of charge for storage is between 50% ～ 60%.
- Please use the battery in the temperature range which defined in the manual.
- The state of charge of batteries is 50% before shipment, please charge the battery before use or test.