battery on line maintainance system

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Battery condition

The designed service life of the battery is 8 to 15 years, but the actual service life is only about 3 to 5 years, of more than 70% of lead-acid batteries are scrapped due to irreversible sulfation (hereinafter referred to as sulfation). Sulfation storage and transportation, and long-term floating charge lead to the formation of non-decomposable lead sulfate crystals on the plates. Unreasonable charge and discharge management leads plate shedding, collapse, and deformation.

Hidden dangers cannot be predicted

Battery is a living dumb device, deterioration is dynamically changed, and there is no means to predict the point of hidden danger outbreak. The period between two discharge is even more a “black barrier” zone.

Maintenance means are backward

The battery voltage inspection and internal resistance tester cannot measure the state of charge of the battery, and the efficiency of manual discharge

testing is low.

Core idea

Maintenance------Make the battery performance better

Solve the problem of battery sulfation during storage and transportation, solve the problem of battery sulfation in long-term floating charge state, and extend the service life the battery. Let each battery perform best → the best performance of the entire battery pack.

Perspective------Changes are visible

The adjustment and optimization process of each battery is transparent and visible, and the abnormal battery is transparent and visible. The battery performance is no longer in the "black barrier area during the interval period between the two discharge tests.

Test------Most credible data

Online remote test to master the precise charging capacity of the battery. Online remote discharge test does not require maintenance personnel to go to the site, efficient and convenient

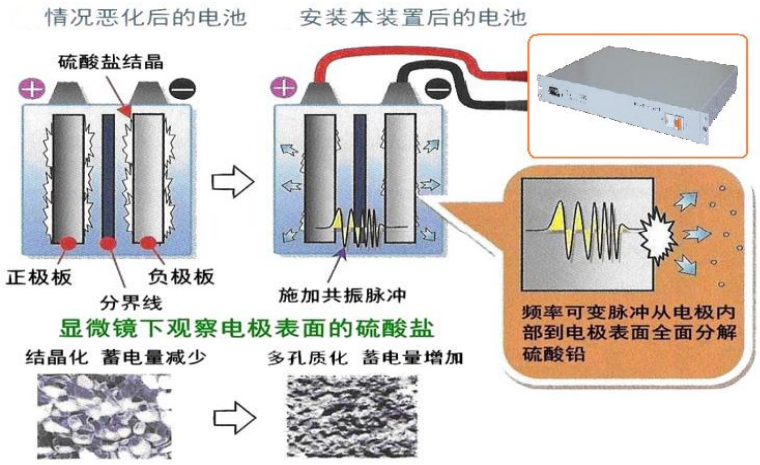
Core technology

1 Change the traditional battery management mode.

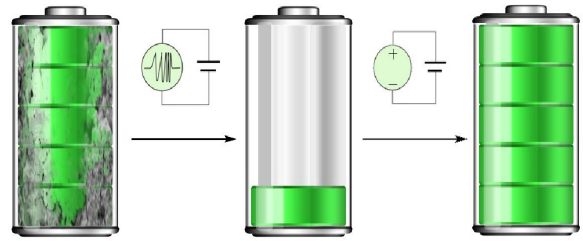
The traditional battery management mode treats the battery pack as a large battery without refinement to the single cell. This case eliminates suppresses sulfation online for each cell, preventing plate shedding, collapse, deformation.。

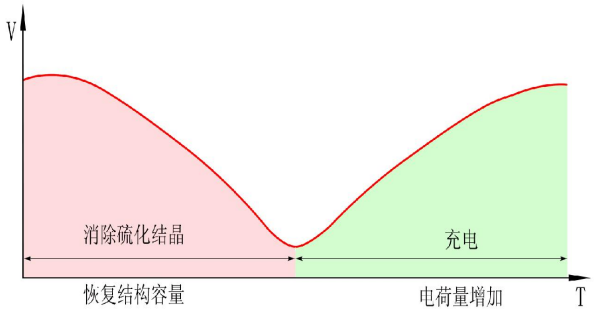
2 Online elimination of sulfide crystallization

Sharp pulse transforms large particles of lead sulfate crystals into small particles, small particles of lead sulfate crystals into lead sulfate, and lead sulfate charging chemical is reduced to active material lead and lead dioxide



3 Eliminate sulfur crystallization → Increase battery structure capacity → Supplementary charging →Increase charge storage





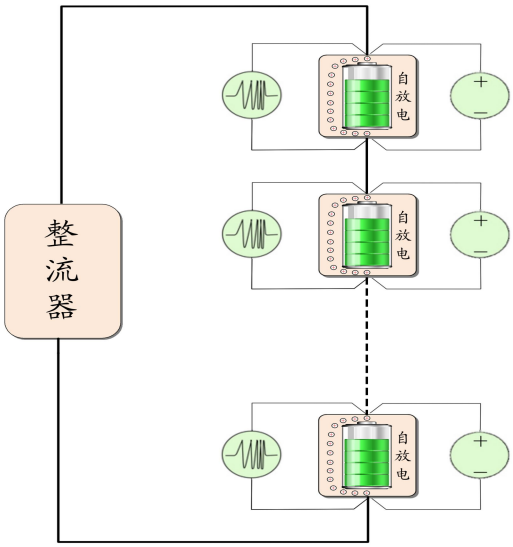
The more serious the sulfation, the larger the area of active material on the plate that is covered by lead sulfate crystals, and this part of the material cannot undergo chemical reactions, and the structural capacity of this part of the plate is gone, and the battery as a whole shows a decrease in capacity; as the lead sulfate gradually disappear, this part of the structural capacity will gradually increase, and the structural capacity will gradually increase, and the voltage will gradually decrease (as if the large battery is not fully); when the battery is charged, this part of the structural capacity will gradually increase with the increase in the amount of electricity, and the voltage will gradually increased

4 Improve battery storage under float charging

It is harmful to the battery to boost the battery charge in a balanced way. This case can effectively boost the battery charge in a floating state.

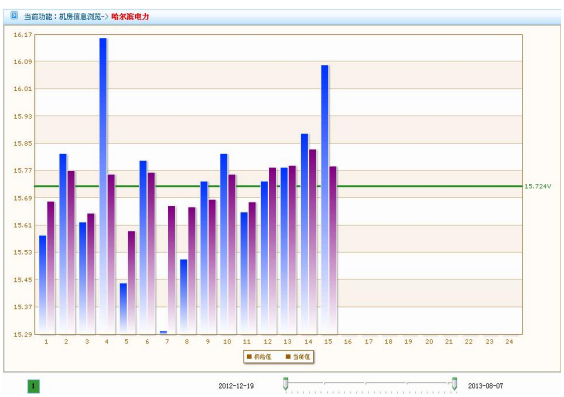
5

Dynamic adaptive balancing improves battery uniformity, with performance changes transparent and visible, highlighting abnormal batteries.



In the state of floating charge, each cell battltage on eachery is in a relatively stable equilibrium state due to long-term sulfation, and the battery is stationary. battery maintenance instrument loads the sharp pulse and charging vo cell battery in turn, resulting in extremely rich changes in the structure capacity and charged capacity of each cell battery. The system tracks and records these changes, and the trend of battery performance changes can be seen from these change curves. Highlight batteries with physical damage (self-discharge, drying up,ive

Differentiated elimination of sulfation crystallization on each battery → improvement of structural capacity → rectifier supplementary charging through the battery pack → online maintenance instrument differentiated charging for each battery → differentiated suppression of sulfation.

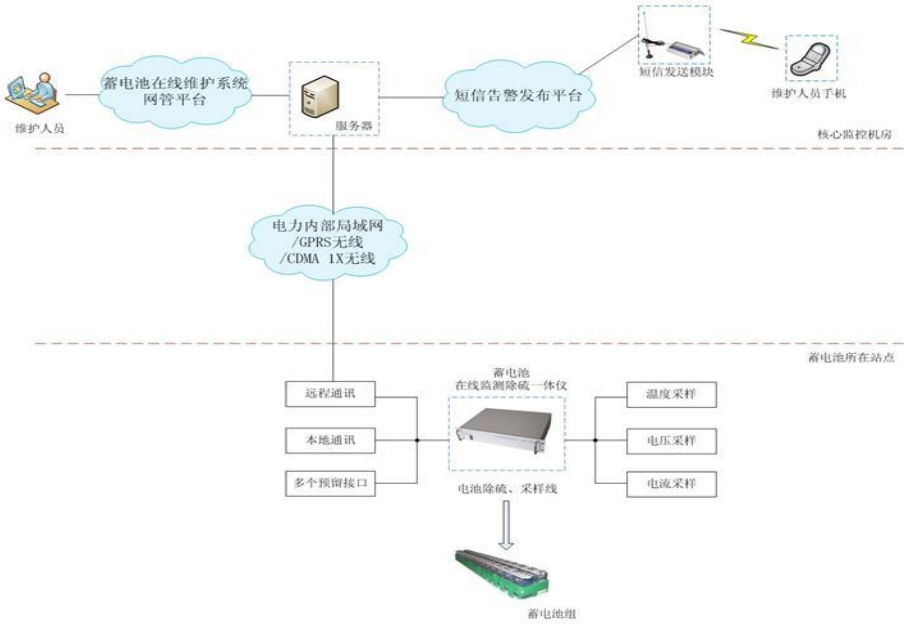


6 remote on line test

- Set parameters through the system network management platform, automatically control the battery for remote discharge test, lock the fault hidden points according to the discharge process data, and accurately the battery capacity. Discharge interval and frequency can be selected according to the trend of battery characteristics.

System composition

The server runs the network management platform, and the network management platform exchanges data with the battery online maintenance instrument installed on the battery side of the machine room through the (local area network, C network, G network). As shown in the figure:



System Features

1 Management Visualization The performance of batteries in operation on the grid is automatically categorized into four types: overall group performance improvement, group performance maintenance, overall group performance difference, and maintenance required, providing a basis for scientific management and control. Maintenance work is limited to battery groups that need to replace outdated batteries reducing the scope of maintenance and improving efficiency.

2 **Safety Visualization** Remote control and testing of batteries no longer require on-site visits, making potential risks transparent visible, and proactive maintenance ensures safety.

3 Savings Visualization Funds are saved in multiple ways, including the evaluation of newly purchased batteries, the of maintenance efficiency, and the extension of battery life.

➢ 48VCommunication power supply battery online maintenance equipment configuration

ambient	model	Power supply	dimension（l×w×h）
48Vsingle battery （2V/24cells500AH ）	TBT02-24S	DC 36-72V	H：44mm(1U) W：482mm D：300mm
48Vtwo battery batch （2V/24cells 500AH	TBT02-24D	DC 36-72V	H：88mm(2U) W：482mm D：300mm

48V Three modes of online test of communication base station battery

1. A contactor is installed on the AC input side of the rectifier to switch the rectifier power supply on and off, controlled by the online maintenance instrument

2. The rectifier output is reduced, and the battery voltage is higher than the rectifier output voltage, forcing the battery to supply power to the load.

3. Equipped a dummy load, the test is completed fully automatically through network management settings.

➢ UPS Battery maintenance equipment configuration online

ambient	model	Power supply	dimension（l×w×h）	remark
UPS (12V/16CELLS 200AH)	TBU12-16	AC180-280V	H：44mm(1U) W：482mm D：300mm	1
UPS (12V/32CELLS200AH)	TBU12-32	AC180-280V	H：88mm(2U) W：482mm P：300mm	1
UPS (12V/40CELL200AH)	TBU12-40	AC180-280V	H：88mm(2U) W：482mm D：300mm	1
UPS (2V/192CELL1000AH)	TBU02-192	AC180-280V	H：44mm×8(8U) W：482mm P：300mm	8module parallel connection

Two ways to test UPS batteries online

1. Keep the UPS in battery mode (test mode) and power the equipment through the inverter with the battery pack. 2. Equipped with a dummy load, the test is completed automatically by setting parameters through the network management.

➢ **220V**Battery maintenance equipment configuration for POWER SWITCH

OUTLOOK

INSTALLMENT

ambient	model	Power supply	dimension（l×w×h)	REMARK
220V SWITCH POWER SUPPLY (12V/18CELL200H)	TBH12-18	AC180-280V	H：44mm(1U) W：482mm D：300mm	1
220V SWITCH POWER SUPPLY (2V/120CELL500H)	TBH02-120	DC180-280V	H：44mm×5(5U) W：482mm D：300mm	5modules parallel connection

➢ Two ways of online testing of 220V Switching battery power supply The 220V closing power supply is used to control the relay action and there is no load at ordinary times. There are two modes for online testing of the battery: The battery is separated from the system, and a false load is connected the two ends of the battery for discharge. Equipped with a false load, the test is completed automatically by setting parameters

through the network management.

Appearance and configuration parameters of capacity test module

The appearance of control module and capacity test module is shown in the following figure. The control module is used control the switching of battery pack between the original power supply system and the capacity test module, and the capacity test module is used to discharge the battery at constant current。

CONTROL MODULE

CAPACITY TEST MODULE

ambient	model	Power supply	dimension（l×w×h）	REMARK
48Vtwo batch of battery (500AH)	TBFT-50	Contact max C：800A (control module) Discharging C：1-50A (capacity test module)	H：440mm (10U) W：482mm D：340mm	CONTROL MODULE 1SET CAPACITY TEST MODUEL 1 SET
220Vswitching power supply 12V 18cells (200AH)	TBFH-20	Contact max C：800A (control module) Discharging C：1-20A (capacity test module)	H：440mm (10U) W：482mm D：340mm	CONTROL MODULE 1SET CAPACITY TEST MODUEL 1 SET
220Vswitch powersupply 2V 104cell-120cell (300AH)	TBFH-30	Contact max C：800A (control module) Discharging C：1-30A (capacity test module)	H：440mm (10U) W：482mm D：340mm	CONTROL MODULE 1SET CAPACITY TEST MODUEL 1 SET

220VSWITCHING POWER SUPPLY 2V 104CELL-120CELL (500AH)	TBFH-50	Contact max C: 800A (control module) Discharging C: 1-50A (capacity test module))	H: 704mm (16U) W: 482mm D: 340mm	CONTROL MODULE 1SET CAPACITY TEST MODUEL 2 SET
UPS 12V 32CELL (200AH)	TBFU-20	Contact max C: 800A (control module) Discharging C: 1-20A (capacity test module)	H: 440mm (10U) W: 482mm D: 340mm	CONTROL MODULE 1SET CAPACITY TEST MODUEL 1 SET