



奇凯电气

**上海奇凯电气成套设备有限公司**  
**SHANGHAI QI-KAI ELECTRIC EQUIPMENT CO., LTD.**

厂址：上海市沪松公路 1620 弄九里亭工业园区 25 号  
 (Add.): 25 Jiuliting Industrial Park, Lane 1620, Husong Road, Shanghai, China

电话(Tel): 86-21-57636999

传真(Fax): 86-21-57636888

邮编(P.C.): 201615

网址(URL): <http://www.qkelect.com.cn>

邮箱(E-mail): [qkelect@qkelect.com.cn](mailto:qkelect@qkelect.com.cn)

**QI-KAI**



# GZDW-M

## 系列直流电源屏

Manual for GZDW-M serial Panel of  
high-frequency switch DC source



上海奇凯电气成套设备有限公司  
SHANGHAI QI-KAI ELECTRIC EQUIPMENT CO., LTD.



## 公司简介



### Brief Introduction

上海奇凯电气成套设备有限公司座落在上海西南距七宝镇 4.5 公里的松江区九亭镇九里亭工业园区内, 占地 12 亩, 标准厂房二层, 总面积 2000m<sup>2</sup>, 办公楼三层, 总面积 1000m<sup>2</sup>, 其中绿化面积 4500m<sup>2</sup>。

奇凯电气公司主要生产直流屏、模拟屏、交流屏、信号屏、继电保护屏、充电浮充电装置和各类蓄电池的组装。

奇凯电气公司是国家经贸委发布的《全国城乡电网建设与改造所需主要设备及生产企业推荐目录》的生产厂家, 通过了德国 TUV 公司的 ISO9001 质量保证体系的国际认证。

奇凯电气公司 GZDW-M 直流屏是 2005 年度国家级重点新产品、2004 年度上海市重点新产品、上海市成果转化项目。公司技术力量雄厚, 大专以上的技术人员占公司员工的 60% 以上, 其中有原在航天部立一等功、二等功和国外学有所成的高级技术人员, 技术工人有上海劳动局颁发的高级证书, 最高为八级电工。

奇凯电气公司检测系统齐全, 全部实行智能化, 产品外形新颖, 具有独特之处。产品有分低、中、高档的各种形式, 供客户根据需要进行选择。本公司特别擅长各种蓄电池的筛选、匹配, 使之与整机能处于优良的匹配工作状态, 整机保用一年, 终身保修。售后服务响应时间承诺外地用户 24 小时, 本市用户 12 小时。

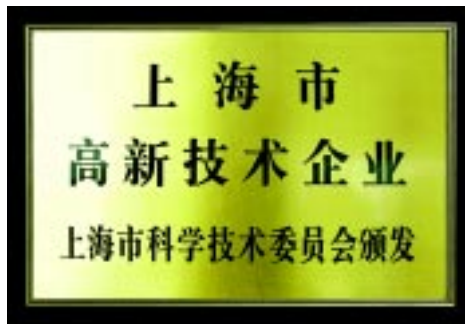
Shanghai Qi-kai Electric Equipment Co., Ltd. is located at Jiu-Li-Ting industrial zone, Jiu-Ting Town, Song-Jiang district. It occupies area of 12 mou, 4.5Km from Qi-Bao Town, southwest in Shanghai. We possess standard two-floor factory, occupying total areas 2000m<sup>2</sup>, and three-floor office, 1000 m<sup>2</sup>, including greenery areas 4500 m<sup>2</sup>.

Qi-kai Electric Company's main products are direct current panels, mimic diagrams, AC panels, signal panels, relay protecting panels and charge-bypass chargers, moreover, we provide services for battery assembly.

Qi-kai Electric Company is a manufacturer listed in endorsed contents of main facilities and products for the construction and reconstruction of electricity net in towns and villages all over the country by China Trade and Economy Ministry. We have got the international quality certificate of ISO9001 from TUV, Germany.

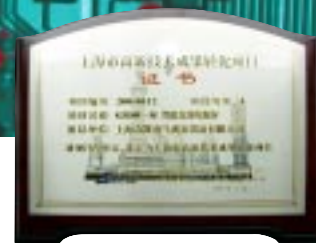
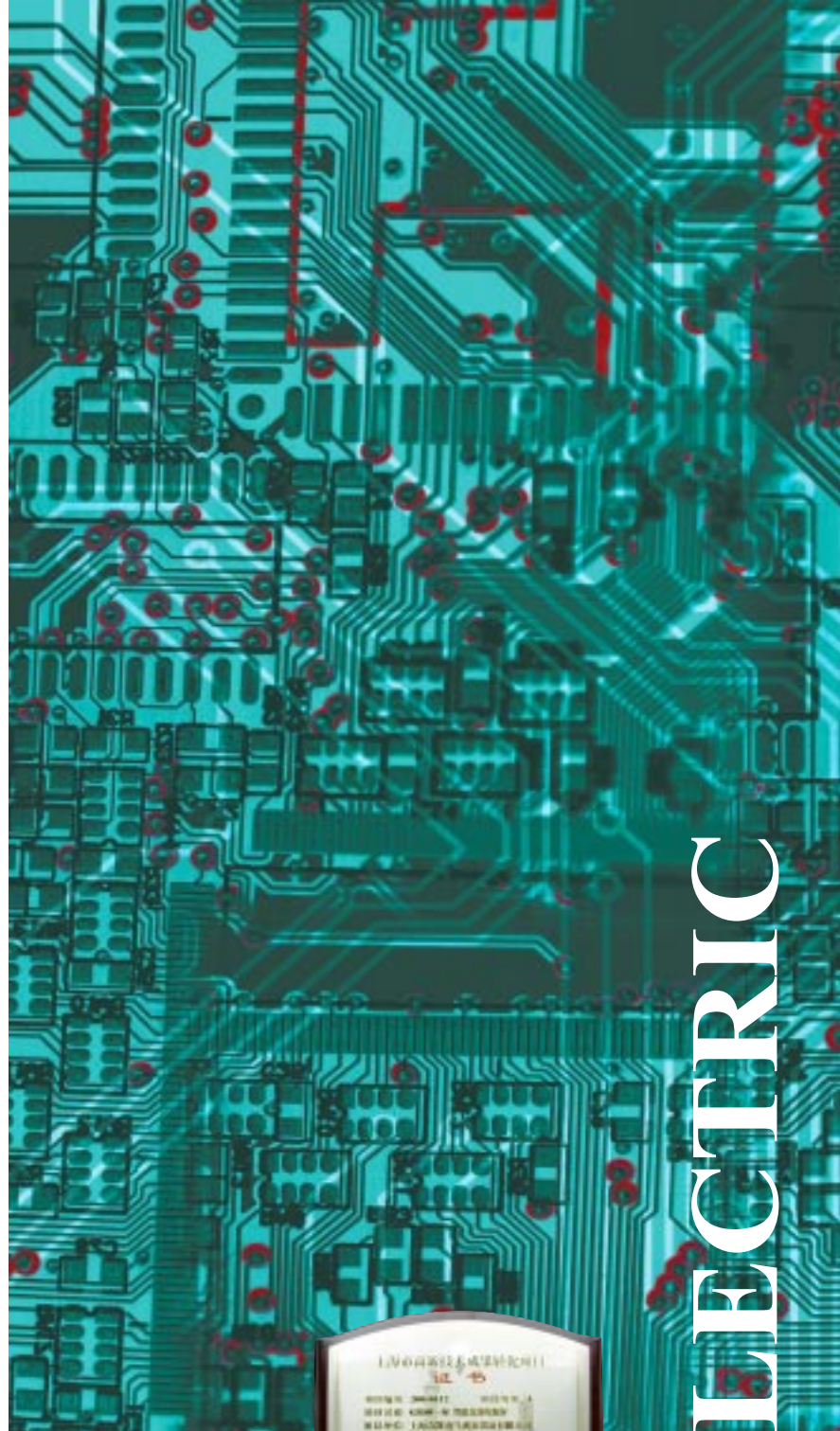
GZDW-M DC Panel of Qi-kai Electric Company is national grade important new product of 2005, Shanghai important new product of 2004, Shanghai accomplishment switch item. Qi-kai Electric Company has abundant technical source, the technique person possess junior college and higher educational qualifications occupy 60% of the company staff. Some of them worked previously in the Ministry of spaceflight, won the first or second prize for their contribution toward development of





spaceflight. Some of them returned from overseas and have rich experience in this field. Technical workers all have the advanced certificate issued by laboring bureau of Shanghai, the highest level of them is grade 8.

Qi-kai Electric Company has complete supervising system and all operations are intellectualized and provides novel products with specific features, which are divided into low, medium and high level for customers selection particularly. We can ensure whole machine working in the most optimum status through our distinctive features of the selection and match of batteries. The whole machine is guaranteed one year and lifelong maintenance. We promise that responding time of after-sales service is within 12 hours in Shanghai, 24 hours outside.



QI-KAI ELECTRIC



# GZDW-M

## 系列直流电源屏

### Manual for GZDW-M serial Panel of high-frequency switch DC source

#### 1. 概述

GZDW-M系列直流电源屏综合国内外同类产品之特点,结合国内外目前电站实际运行情况,选用目前国内最合适,高可靠的元器件和本公司自行研制的核心控制部件而自行研制成功的典型产品。

GZDW-M系列直流电源屏具有一项发明专利(已通过初审、实施保护),申请号:200410053176X(直流电源屏智能监控器及控制方法)、一项实用新型专利,专利号:ZL 2004 2 0081153.5(直流电源屏智能监控器)、一项外观专利,专利号:ZL 02 3 66536.X(电气柜玻璃门)。

同传统直流屏相比,该系列直流屏采用西门子PLC加触摸屏作为中央监控,实现高可靠性能的智能化管理,实现人机对话,结构简单,维护方便,具有“四遥”功能,可以实现无人值班的自动管理。

本产品是一种理想的直流操作电源,能满足500KV以下的变电站和600MW以下发电厂的直流操作电源需求。

#### 2. 特点

2.1 框架拼装结构,独特新颖的外形,便于观察和操作。

2.2 PLC可编程控制器实现全自动控制,适合无人值守的场所。

2.3 高可靠性整机,电源模块热备份、调压、交流输入等关键部分双套保护。

2.4 采用RS485通讯接口,MODBUS通讯协议,具备“四遥”功能。

2.5 大屏幕液晶触摸屏,汉化显示,故障自动显示报警。

2.6 蓄电池组的严格筛选,匹配,采用严密独特的每个单体电池的整体性筛选,匹配,实现整组电池的一致性。配备温度自动补偿装置,延长电池寿命,使之完全融合于整机中。

2.7 维护简便,单个模块电源可带电插拔,不影响正常供电。

#### 3. 形式

##### 3.1 N+1形式

单组N+1电源模块,对电池组充电,同时通过调压装置向控制母线供电。

##### 3.2 N+2形式

采用二组电源模块独立工作,一组向控制母线供电,另一组向电池充电,智能化管理二组电源模块,互为独立,每组电源模块都采用N+1形式,即N+2形式。

#### 4. 使用环境

4.1 海拔高度不超过2000米。

4.2 环境温度 $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$ 。

4.3 日平均相对湿度不大于95%,月平均相对湿度不大于90%。

4.4 无强烈振动和冲击,无强烈电磁场干扰。

4.5 周围无严重粉尘、爆炸粉尘、爆炸危险介质、腐蚀金属和破坏绝缘的有害气体、导电微粒和严重的霉菌。

4.6 垂直倾斜度不大于5度。

#### 5. 基本参数

##### 5.1 三相交流输入电压

$380 \pm 15\%$ 、频率  $50 \text{ Hz} \pm 10\%$ 。

##### 5.2 控制母线直流输出电压等级

48、110、220V。

##### 5.3 控制母线直流输出电流额定值

5、8、10、15、20、30、40、50、60、80、100、150、200、300、500A。

##### 5.4 蓄电池额定容量等级

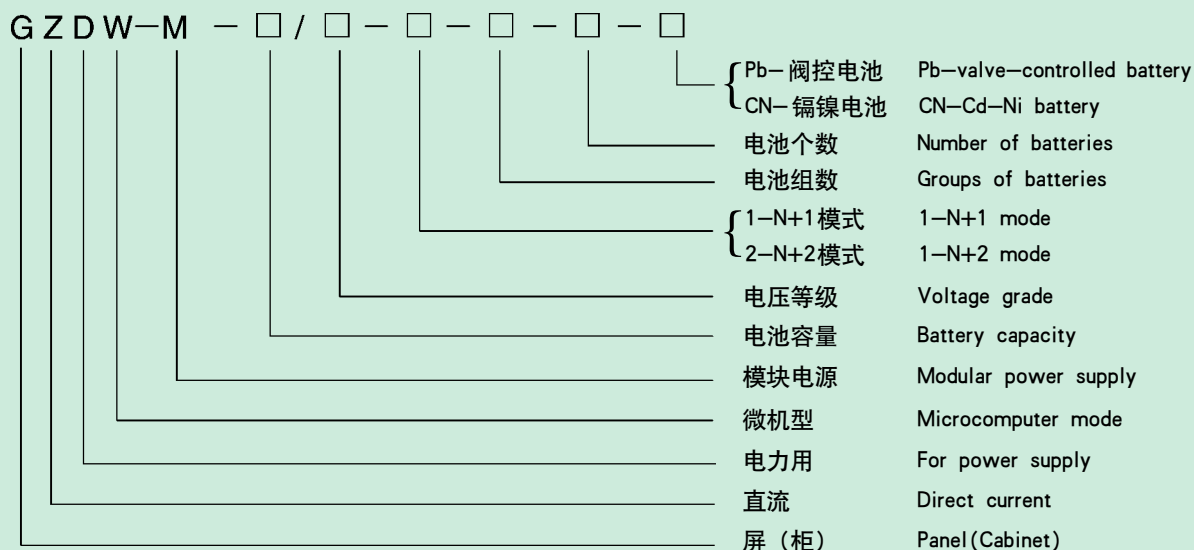
10、20、40、65、80、100、150、200、250、300、500、800、1000、2000、3000Ah。

#### 6. 主要技术指标

##### 6.1 主要技术数据



- 6.1.1 控制母线电压稳定度  $\leq \pm 0.5\%$
- 6.1.2 控制母线电压纹波系数  $\leq \pm 0.5\%$
- 6.1.3 恒流精度  $\leq \pm 0.5\%$
- 6.1.4 合闸母线电压  $-10\% \sim +15\%$
- 6.1.5 最大限制输出电流(A)  $1.2I_N$
- 6.1.6 效率  $\geq 92\%$
- 6.1.7 功率因数  $> 0.90$
- 6.1.8 响应速度  $0.2ms$
- 6.1.9 整机噪声  $\leq 50dB$
- 6.1.10 均流方式 自动均流
- 6.1.11 谐波 无干扰
- 6.1.12 输入端高电压冲击 四级防雷保护
- 6.2 整机配置见表(一)~表(三)
- 6.3 整机原理框图见图(一)~图(七)
- 7. 产品型号



如: GZDW-M-100 / 220-1-1-18-Pb

表示电池容量 100Ah, 电压等级 220V, N+1 形式, 由 1 组 18 块阀控电池组成的高频开关直流电源屏。

## 8. 组成

### 8.1 两大类电池的选择

#### 8.1.1 镉镍电池

#### 8.1.2 两种阀控式铅酸电池

- a. 进口原装的阀控电池
- b. 国产的阀控电池

### 8.2 电源模块选择

#### 8.2.1 N+2 形式。

#### 8.2.2 N+1 形式。

## 9. 产品的功能

### 9.1 系统功能

#### 9.1.1 控制和保护功能

- (1) 两路交流输入过电压、欠电压、缺相自动控制保护
- (2) 对充电模块模拟量接口进行软启动控制
- (3) 精确控制充电模块、控制模块输出电压、电流，可控电压范围 0~500V，可控电流范围 0~500A，控制精度 12 位。
- (4) 自动控制电池强充、均充、浮充电全过程
- (5) 按电池强充、浮充两条 V-T 曲线进行电池温度自动补偿充电参数
- (6) 按电池均充电流下降值加时间控制自动补偿均充电参数
- (7) 充电模块输出及电池组充电限流
- (8) 控制模块输出的电流限流
- (9) 控制母线自动调压
- (10) 电池活化时间控制
- (11) 充电模块、控制模块故障保护
- (12) 母线自动调压装置故障保护
- (13) 漏电保护
- (14) 历史资料储存和打印

#### 9.1.2 检测功能

- (1) 三相交流电压值及缺相自动检测
- (2) 充电模块输出电压、电流自动检测
- (3) 控制模块输出电压、电流自动检测
- (4) 控制母线电压、电流自动检测
- (5) 电池组电压、电流自动检测
- (6) 单体电池电压自动检测
- (7) 控制母线、合闸母线、负母线对地漏电流自动检测
- (8) 馈出回路绝缘自动检测
- (9) 电池温度自动检测
- (10) 闪光装置检测

#### 9.1.3 显示功能

触摸屏通过大液晶屏幕多画面转换，采用按钮、指示灯、仪表、文字、数据、方块图、条状图、状态图、曲线等多种模拟图形显示直流屏运行的动态过程和静态资料。

- (1) 开机显示直流屏型号、规格、铭牌、厂名、地址、电话及操作方法。
- (2) 模拟显示系统原理图以及触点通断后线路动态变化。
- (3) 模拟显示充放电过程各部分状态变化。
- (4) 计量项目的显示：三相交流电压；充电模块输出电压、电流；蓄电池电压、电流；单体电池电压；控制母线电压、电流；合闸母线电压；正负母线绝缘电阻值；各馈出支路绝缘电阻值；电池温度；模块

温度；放电容量和设置时间。

- (5) 交流缺相、交流失电以及电压、电流超限报警显示。
- (6) 显示单体电池充放电曲线。
- (7) 闪光装置显示。
- (8) 故障处置指导。
- (9) 历史资料查阅。
- (10) 万年历。

#### 9.1.4报警功能

画面和声音同时报警

- (1) 正负母线绝缘不良报警
- (2) 馈出回路绝缘不良报警
- (3) 单体电池异常报警
- (4) 控制母线电压、电流超限报警
- (5) 合闸母线电压超限报警
- (6) 电源模块输出电压、电流超限报警
- (7) 三相电欠电压、过电压报警
- (8) 充电模块故障报警
- (9) 控制模块故障报警
- (10) 闪光报警

#### 9.1.5通讯功能

系统通讯接口定义：可选 RS485 标准通讯口，能直接与外部数据终端设备通讯；能直接进入综合自动化通讯系统；能进行近距离（1000 米以内）或通过 MODBUS 远端“遥信、遥测、遥控、遥调”智能控制，真正做到无人值守。

#### 9.1.6储存和打印功能

画面容量 256 幅，历史资料储量 3712K，置有万年历，配有打印机硬件接口。

### 9.2 电源模块

#### 9.2.1 N+2电源模块形式

本系列产品装配二组独立的电源模块，一组电源模块独立向电池实现强充、均充、浮充，并严格按照充电曲线智能化地进行充电，另一组电源模块独立向控母供电，每组模块电源都采用 N+1 形式，提高运行可靠性。

#### 9.2.2 N+1电源模块形式

本系列产品也可装配单组电源模块，既向电池充电，又可通过硅链和电子降压装置向控母供电，采用 N+1 形式，提高运行可靠性。

#### 9.2.3 中央监控器

由 PLC 可编程控制器、电池巡检扩展 (BTS<sub>1</sub>)、分回路绝缘监测扩展 (BTS<sub>2</sub>)、模拟量扩展 (BTS<sub>3</sub>)、数字量扩展 (BTS<sub>4</sub>) 和测量传感器组成中央监控器，对整机进行控



制、保护、报警并通过大屏幕触摸屏对整机运行的状态、数据进行显示、打印。

#### 9.2.4 温度补偿控制器

温度补偿控制器也称V-T曲线控制器,可依据电池的种类,充电的三种状态,环境工作温度的不同来选择最佳的充电切换点和确定充电的具体数值,使电池工作在最佳工作状态,保证电池工作寿命。

#### 9.2.5 自动化

本系列产品关键部位都有备份,无论在何种工作状态下、何种故障,都能无间隙地保证电池自动向母线供电,并具有自诊断全自动操作,无需人工干预。

#### 9.2.6 数据传输

本系列产品可通过RS485向中央监控传送数据。

#### 9.2.7 输出馈路

本系列产品可根据用户选择控制、合闸、信号、事故照明等各种功能的输出馈路,并选择具体路数。

#### 9.2.8 电池的安装

电池根据种类、分阶梯排列或平面排列装于电池屏内,并装于用聚氯乙烯板组成的电池槽内,使之能与机柜绝缘,便于清洁维护工作。

#### 9.2.9 活化

本系列产品均装有电池活化装置,具有自动检测放电电流、放电时间并自动计算放电容量的功能。

### 10. 备品备件

#### 10.1 备品备件

本系列产品出厂,均随整机提供全套图纸、使用说明书、出厂试验报告、合格证、可带插拔的备件、专用工具、易损器件。

### 11. 屏体的外形尺寸、安装尺寸、颜色

#### 11.1 外形尺寸

2260(高)×800(宽)×600(深)

#### 11.2 安装尺寸

680(宽)×480(深)

#### 11.3 颜色

本系列产品颜色按国际RAL标准,常用色标编号如下:  
RAL7035 淡灰色 RAL7032 浅驼色。

用户也可根据要求提供其它色标编号或色板。

### 12. 订货

用户订货需提供如下参数:

- 交流输入的路数
- 控制母线、合闸母线、事故照明的路数和极数
- 控制母线的输出电流等级

d. 电池的种类、容量和组数

e. 屏体的形式、外形尺寸、颜色

f. 交货地点、运输方式、包装要求

g. 如有特殊要求,本公司可另行设计,满足要求。

### 13. 包装、运输、现场服务

#### 13.1 包装

本系列产品包装分简易包装和木箱包装。

##### 13.1.1 简易包装

屏体内套塑料袋,外加毛毯套,电源模块、电池单独包装,其中毛毯套要回收,此包装适合于市内用户,包装全部免费。

##### 13.1.2 木箱包装

屏体内套塑料袋,木箱内壁有防雨油毛毡。屏体与木箱之间衬发泡塑料板,屏体与木箱底板用螺丝固定,木箱采用满板形式,电源模块、电池全部采用木箱包装。此包装适用于外地用户,所有包装材料不予回收,包装费用由用户承担。

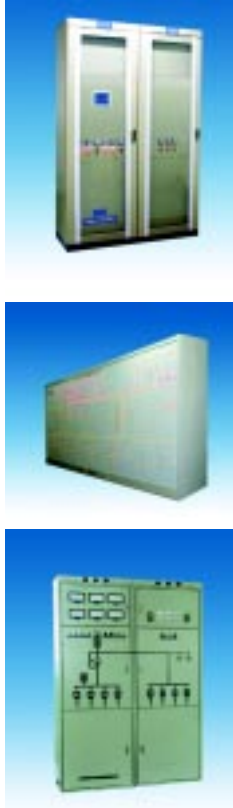
#### 13.2 运输

a. 产品运输,每一屏的电源模块、电池全部拆卸之后运输到现场,然后由本公司调试人员安装。

b. 本市用户免费送货到现场,外地用户由本公司代办运输。

#### 13.3 现场服务

本公司负责现场免费调试开通,现场培训。



QI-KAI ELECTRIC



# GZDW-M

系列直流电源屏

## Manual for GZDW-M serial Panel of high-frequency switch DC source

### 1. General description

GZDW-M serial panel of DC source integrates domestic and overseas features of the same serial products. We develop this typical product originally in terms of the practical running situation of current substations. All components are of high reliability, including some important controlling parts developed by us independently.

GZDW-M serial panel of DC source panel possesses one invent patent (has passed first audit and execute protection), apply: 200410053176X(DC source panel intelligent monitor and controlling method), one practically new patent, patent: ZL 2004 2 0081153.5 (DC source panel intelligent monitor), one outlook patent, patent: ZL 02 3 66536.X(Electric panel glass door).

Compared with traditional DC Panel, this serial DC Panel adopts SIEMENS PLC plus touch screen as central monitor to realize high reliability intelligent manage and human-machine dialogue, structure is simple, and maintenance is convenient, with four remote function can realize automatic manage without man on duty.

Our product is an ideal DC operation power supply which can meet requirements of substations below 500KV and power generation plant below 600 MW.

### 2. Features

- 2.1 Frames combined structure, unique and novel appearance, convenient to observation and operation.
- 2.2 PLC realizes complete automatic control without man on duty.
- 2.3 High-reliability whole machine. Module has backup, voltage adjustment, AC input and other key parts have double protection.
- 2.4 Remote bus communication for "four remote" through RS485 serial interface and MODBUS communication protocol.
- 2.5 Chinese display on large LCD touch screen, and automatic display and alarm for fault.
- 2.6 Strict selection and match for consistency of a whole set of batteries, adopts strict and peculiar whole select and match of each single battery to realize consistency of whole group of batteries. Equipped with automatic device for temperature compensation to extend battery life and completel conflued in the whole machine.
- 2.7 Convenient to maintain and simple module power supply can be plugged and pulled out with electric that would not interfere normal power supply.

### 3. Mode

#### 3.1 N+1 mode

Single modular power supply charges battery group, and meanwhile, supplies electricity to controlling bus through voltage adjustment.

#### 3.2 N+2 mode

Two groups of modular power supplies operate independently. One supplies electricity to controlling bus, another charges batteries. They are both managed intellectually and independently. Each module adopts N+1 mode, that is to say, the whole machine adopts N+2 mode.

### 4. Working environment

- 4.1 Not higher than 2,000 meters above sea level.
- 4.2 Circumstance temperature:  $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- 4.3 Mean daily relative humidity not higher than 95%, mean monthly relative humidity not higher than 90%.
- 4.4 No hard shock or beat, no strong electromagnetic field interference.
- 4.5 No heavy dirt, no explosive dirt, no dangerous medium causing explosion around, no harmful gas which can corrode metal or destroy insulation, no conductive particles or serious moulds.
- 4.6 Vertical gradients not higher than 5 degree.

### 5. Basic parameters

- 5.1 Three phase alternating current input voltage:  $380\text{V} \pm 15\%$ , frequency:  $50\text{Hz} \pm 10\%$ .
- 5.2 Grades of direct current output voltage for controlling bus: 48V, 110V, 220V.
- 5.3 Grades of direct current output rated current for controlling bus: 5, 8, 10, 15, 20, 30, 40, 50, 60, 80, 100, 150, 200, 300, 500A.
- 5.4 Rated capacity for battery: 10, 20, 40, 65, 80, 100, 150, 200, 250, 300, 500, 800, 1000, 2000, 3000Ah.

### 6. Main technical index

- |   |   |
|---|---|
| 6.1 Main technical data                     |   |
| 6.1.1 Controlling bus voltage stability     | $\leq \pm 0.5\%$                            |
| 6.1.2 Controlling bus voltage ripple factor | $\leq \pm 0.5\%$                            |
| 6.1.3 Constant current stability            | $\leq \pm 0.5\%$                            |
| 6.1.4 Closing bus voltage                   | $-10\% \sim +15\%$                          |
| 6.1.5 Max. limited output current(A)        | $1.2 I_N$                                   |
| 6.1.6 Efficiency                            | $\geq 92\%$                                 |
| 6.1.7 Power factor                          | $> 0.90$                                    |
| 6.1.8 Responding speed                      | 0.2ms                                       |
| 6.1.9 Noise of the whole machine            | $\leq 50\text{dB}$                          |
| 6.1.10 Means of balancing current:          | automatically                               |
| 6.1.11 Harmonics :                          | no interference                             |
| 6.1.12 High voltage shock of input:         | the fourth level thunder- proof protection. |

6.2 Configuration of the whole machine is showed in figure 1 to figure 3.

6.3 Principle drawing of the whole machine is showed by diagram 1 to diagram 7.

### 7. Product type

For example: GZDW - M-100/220 -1-1-18 - Pb

Represents panel of high-frequency switch DC source whose voltage grade is 220V, the battery capacity is 100Ah. It consists a set of 18 pieces of valve-controlled batteries, and adopts N+1 mode.

### 8. Components

- 8.1 Two categories of batteries to be selected
  - 8.1.1 Cd-Ni batteries
  - 8.1.2 Two categories of valve-controlled sealed lead-acid batteries
    - a. Imported original valve-controlled batteries
    - b. Domestic valve-controlled batteries
- 8.2 Selection of modular power supply
  - 8.2.1 N+2 mode
  - 8.2.2 N+1 mode

### 9. Product functions

#### 9.1 Systematic function

##### 9.1.1 Function of control and protection

- (1) Automatic controlling protection for over voltage, lower voltage and phase lack of two AC inputs
- (2) Softly starting control for analogue interface of charging module
- (3) Accurate control of charging module and controlling module of output voltage and current, the voltage range controlled is between 0 and 500V, the current range controlled is between 0 and 500A, controlling accuracy is 12 digital
- (4) Automatic control for the whole process of battery's forceful charge, balancing charge and floating charge
- (5) Automatic compensation for charging parameter in terms of two V-T curves of battery's forceful charge and floating charge
- (6) Automatic compensation for balancing charge parameter in terms of drop value of battery's balancing charge current plus time
- (7) Current limitation for output of charging module and charging the battery set
- (8) Current limitation for output of controlling module
- (9) Automatic adjustment of controlling bus voltage
- (10) Time control of battery activation



- (11) Breakdown protection of charging and controlling module
- (12) Breakdown protection for automatic voltage adjustment instrument of bus
- (13) Protection for electricity leak
- (14) Storage and printing for historical data

#### 9.1.2 Inspective function

- (1) Automatic inspection for three-phase AC voltage and lacked phase
- (2) Automatic inspection for output current and voltage of charging module
- (3) Automatic inspection for output current and voltage of controlling module
- (4) Automatic inspection for current and voltage of controlling bus
- (5) Automatic inspection for current and voltage of battery set
- (6) Automatic inspection for single batteries voltage
- (7) Automatic inspection for leak current between earth and controlling bus , closing circuit bus and negative bus
- (8) Automatic inspection for insulation of feed out circuits
- (9) Automatic inspection for battery temperature
- (10) Automatic inspection for flash devices

#### 9.1.3 Display function

Touch screen displays dynamic process and static data for the running of the DC panel using push button, indicator, meter, word, data, and several type of simulative diagram such as diamond figure, bar figure, status figure and curve by multi-picture switchover on large scale of screen.

- (1) Display type of DC panel, specification, nameplate, manufacturer, address, telephone and operation
- (2) Simulative display of systematic principal drawing and circuit's dynamic change after contactor's on/off
- (3) Simulative display of status change of charging and discharging process
- (4) Measure item displayed: three-phase AC voltage, output voltage and current of charging module, battery voltage and current, single battery voltage, voltage and current of controlling bus, closed bus voltage, insulative resistance value of positive and negative bus, insulative resistance value of each feed out branch, battery temperature, module temperature, discharging capacity and setting time
- (5) Alarm display for AC phase lack, AC failure and over limit of voltage and current
- (6) Display of charging and discharging curves of single battery
- (7) Display of flashing devices
- (8) Instructions for faults
- (9) Inquiry of historical data
- (10) Calendar

#### 9.1.4 Alarm function

Picture and sound alarm at the same time

- (1) Alarm for poor insulation of positive and negative bus
- (2) Alarm for poor insulation of feed out circuits
- (3) Alarm for abnormal single battery
- (4) Over limit alarm for voltage and current of controlling bus
- (5) Over limit alarm for voltage of closing bus
- (6) Over limit alarm for output voltage and current of module
- (7) Alarm for over voltage and lower voltage of three phases
- (8) Breakdown alarm of charging module
- (9) Breakdown alarm of controlling module
- (10) Alarm for flash

#### 9.1.5 Communication function

Definition of systematic communication interface: allowance for RS232 or RS485 standard communication interface; directly communicate with external data terminal; linked into generally automotive communication system; intellectual control within 1000 meters or remote signal, remote measurement, remote control and remote adjustment through MODBUS; keep watch without any person.

#### 9.1.6 Function of storage and printing

Picture capacity is 256; storage of historical data is 3712K, with calendar and printing interface.

#### 9.2 Modular power supply

##### 9.2.1 N+2 mode

This serial product is equipped with two groups of independent modular power supplies. One is in charge of forceful charge, balancing charge, and floating charge to batteries independently in terms of intellectualized charging curve strictly. Another independently supplies electricity to controlling bus. Each group of modular power supply adopts N+1 mode to improve operating reliability.

##### 9.2.2 N+1 mode

This serial product can also be equipped with single group of modular power supply. It can both charge battery, and supply electricity to controlling bus through electronic voltage-drop device and silicon voltage-drop unit. The N+1 mode can improve operating reliability.

##### 9.2.3 Central monitor

PLC, battery test expand (BTS1), branch circuit insulation test expand (BTS2), simulated expand (BTS3), digital expand (BTS4) and measure sensor constitute central monitor to control ,protect and alarm the whole machine, meanwhile, display and print state, data of the whole machine running through big touch screen.

#### 9.2.4 Temperature compensation controller

Temperature compensation controller is also named as V-T curve controller, which can select optimum charge switch point and ensure exact value according to type of battery ,the three states of battery charge mode, the different of circumstance temperature to keep batteries running at optimum situation and guarantee batteries working life.

#### 9.2.5 Automation

The key parts of the serial products possesses backup, in whatever state and fault can ensure battery automatic supply power to bus uninterruptedly and with self-test automatically operation without any person.

#### 9.2.6 Data transfer

This serial product can transfer data to central monitor through RS232 or RS485.

#### 9.2.7 Feed out circuit

Customers can choose the number of feed out circuit and the functions of control, closing, signal and accident lighting.

#### 9.2.8 Battery fixing

Batteries are arranged in the form of ladder or level by level in the PVC battery duct, which can be insulated from the cabinet and which is convenient to clean and maintenance.

#### 9.2.9 Activation

This serial product installed battery activity set and possesses automatic test discharge current; discharge time and automatic calculate discharge capacity function.

### 10. Accessories and fittings

#### 10.1 Accessories and fittings

This serial product leave factory with the whole set of drawing, user guide, test report, eligibility certificate, spare parts of controller replaced with electricity on, specific tools and destructible device

### 11. External size, installing size and colors of the cabinet

#### 11.1 External size (unit, mm)

Height	Width	Depth
2260	800	600

#### 11.2 Installing size: 680(width)x480(depth)

#### 11.3 Colors

The colors of this serial product comply with RAL of International Standard Usual colors are numbered as follows:

Light gray: RAL7035      Light camel gray: RAL7032

Customers can provide other number of colors or color board in terms of special requirements.

### 12. Ordering

Ordering parameters provided by customers:

- a. Number of tracks of alternating current
- b. Number of tracks and poles of controlling bus, closing bus and accident light
- c. Grade of output current of controlling bus
- d. Battery category, capacity and number of set
- e. Cabinet form, external size and color
- f. Delivery place, means of transportation, packing requirements
- g. Our company can customize products to meet special requirements

### 13. Packing, transportation, and on-the-spot service

#### 13.1 Packing

This serial product is categorized into simple packing and wooden packing.

##### 13.1.1 Simple packing

The panel is covered by plastic pocket, and then covered by blankety. Power supply module and batteries are separated packing. The blankety should be return to manufacturer. This kind of packing is adaptive to customers within Shanghai. All packing are free of charge.

##### 13.1.2 Wooden packing

The panel is covered by plastic pocket. There is waterproof cloth inside wooden box, and foamed plastic board between panel and wooden box. The panel is fixed by screws on the bottom board of fully-sealed wooden box. Power supply module and batteries adopt wooden packing. This kind of packing is adaptive to customers outside Shanghai. All packing will not be returned to manufacturer. Customers should pay the fee of packing.

#### 13.2 Transportation

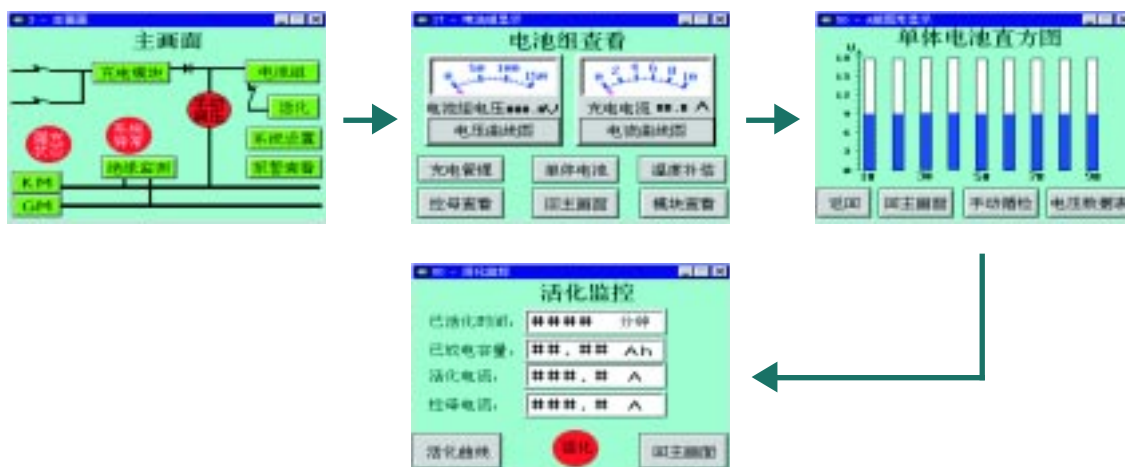
- a) Panel, power supply module and batteries are all dissembled, and then transported to working spot independently. Installation is the duty of our company.
- b) Sending products to working spot for customers within Shanghai is for free. We can offer products delivery for customers outside Shanghai with charge.

#### 13.3 On-the-spot service

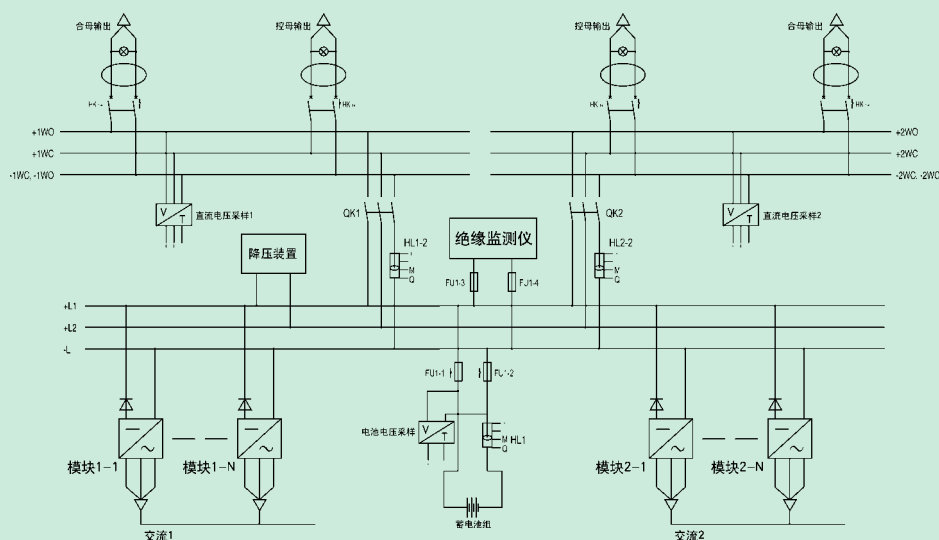
Our company starts up the machine on the spot, provides favorable testing service and training on the spot for free.



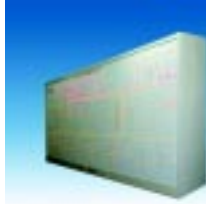
# GZDW-M 触摸屏画面



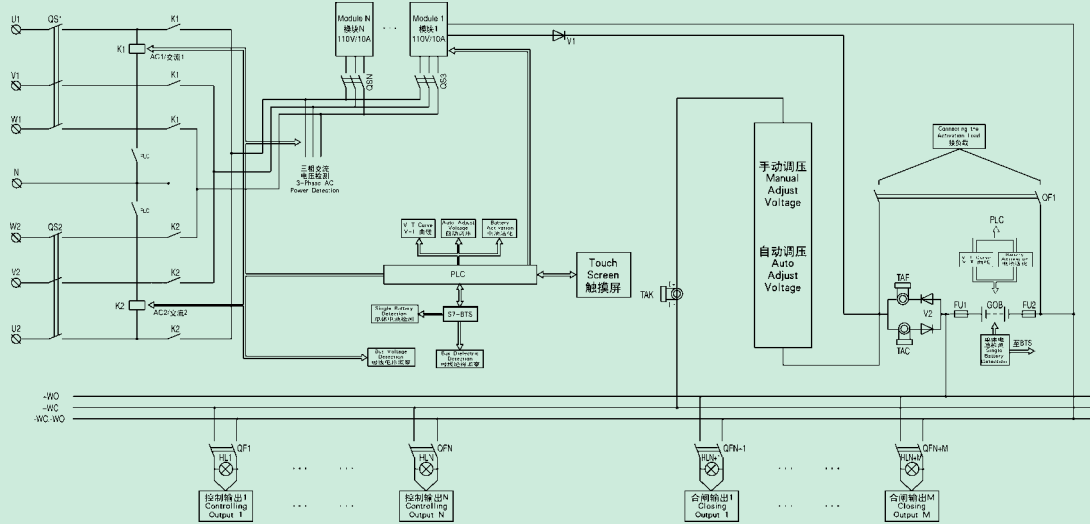
单电双充，双母线系统图（一）



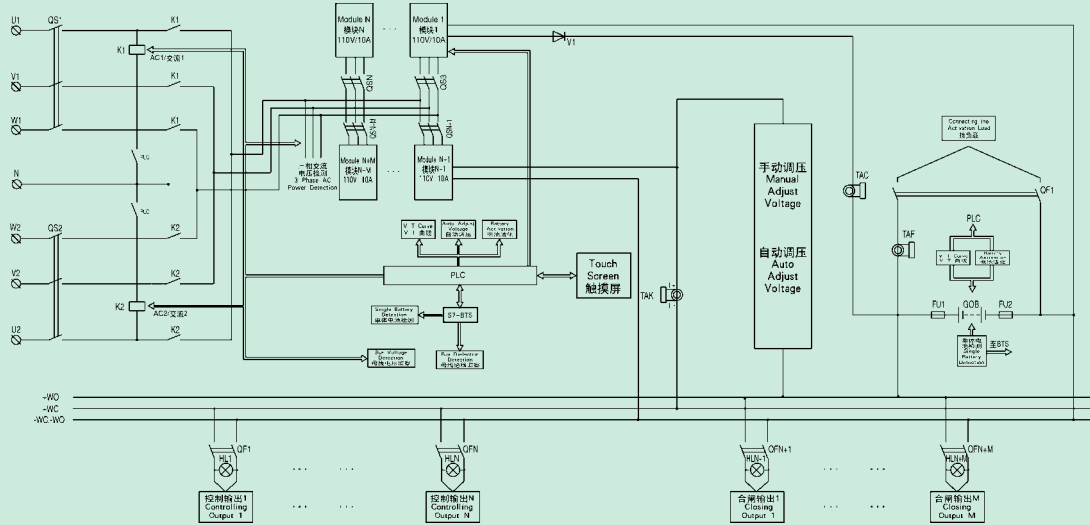




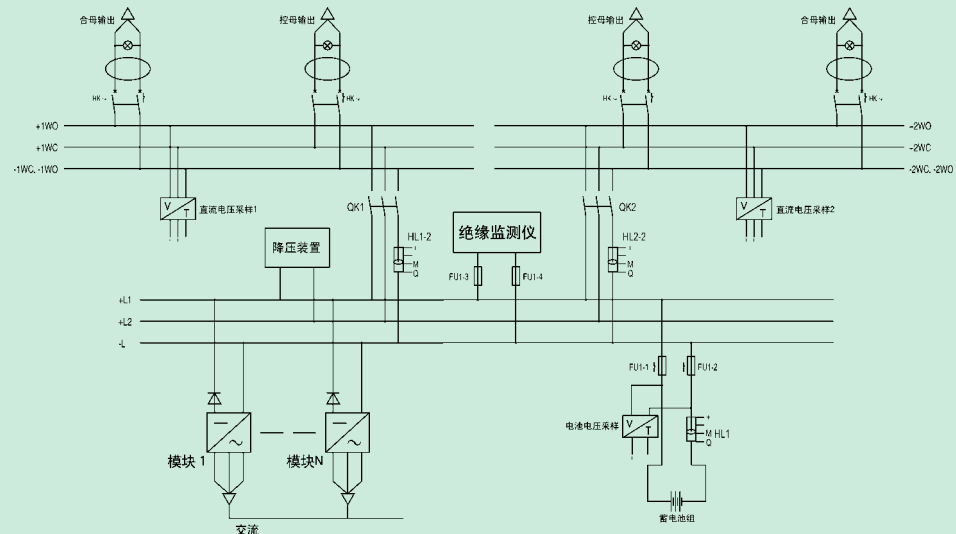
N+1 电气原理图（二）



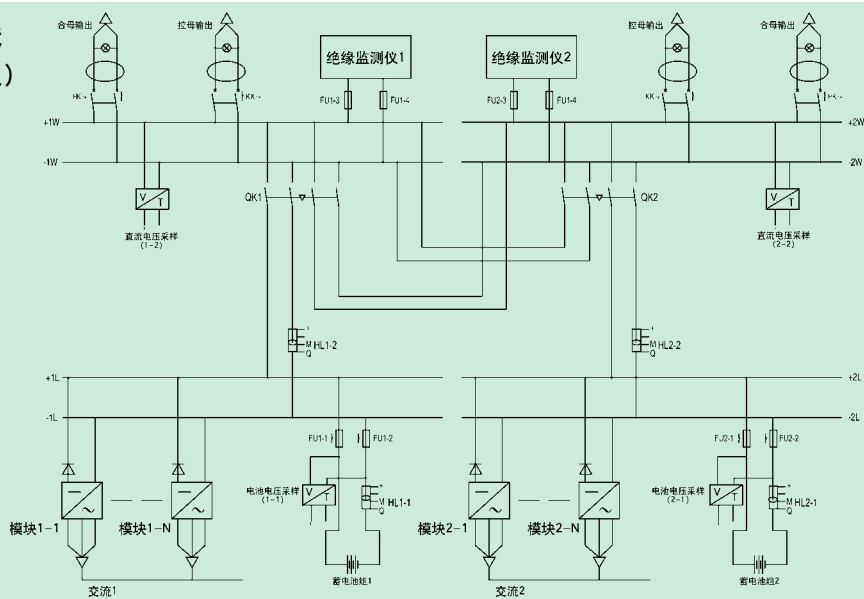
N+2 电气原理图（三）



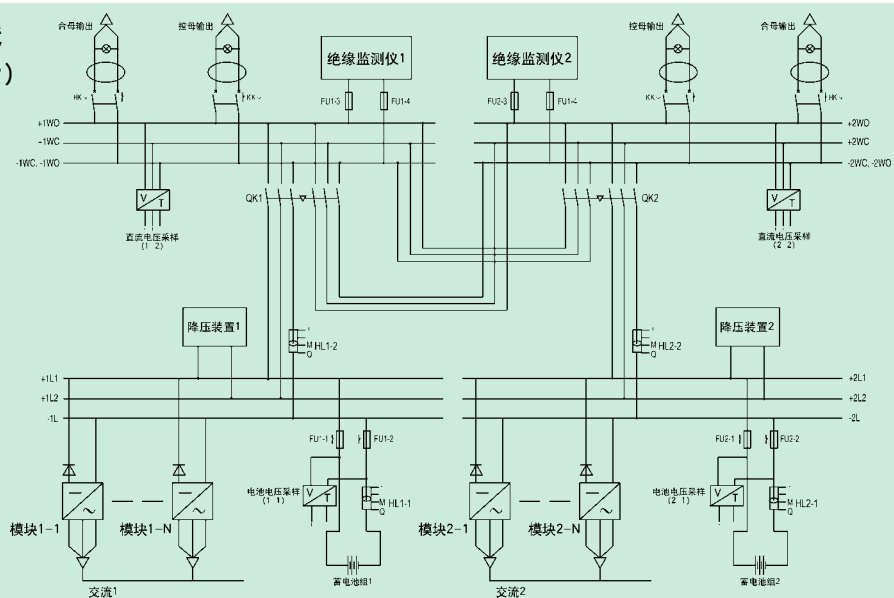
单电单充，双母线系统图（四）



### 双电双充，单母线 带联络系统图（五）



### 双电双充，双母线 带联络系统图（六



### 220V/110V 双电双充双母线带联络图 (七)

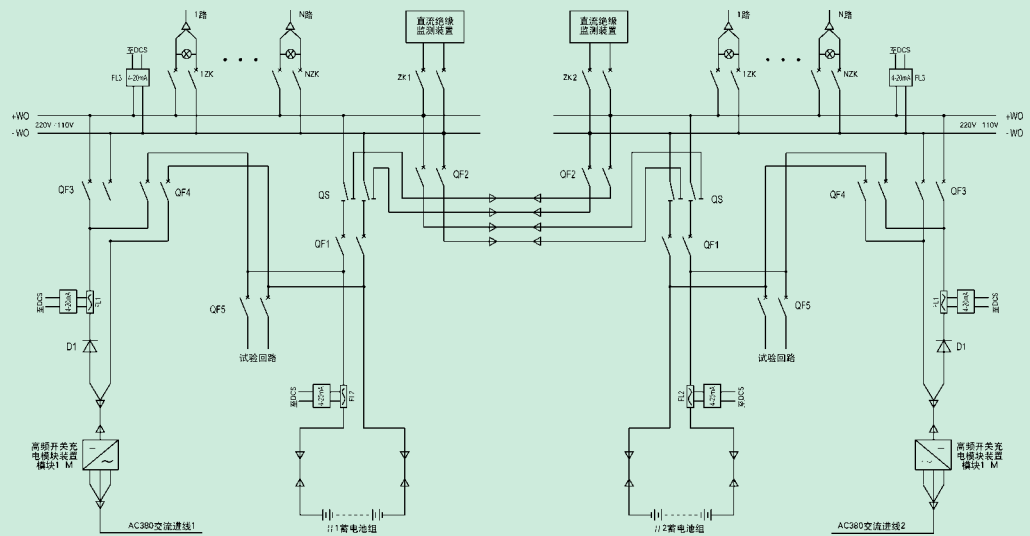


表 (一) Table

项目 Items 基本参数 Basic parameters 型号规格 Models	交流输入 Alternating current input		控制母线 Controlling bus				合闸母线 Closing bus			直流电动机 启动负荷 Starting pulse loading for direct current motor		选用不同电池所需屏数 Number of case needed for different type of battery	
	电压 Voltage (V)	容量 Capacity (KW)	最大经常性负荷电流 Max current under running load (A)	事故时负荷 Loading in accident	馈路出数 Number of feed out circuit	脉冲负荷 Switching on pulse load	时间 Time (S)	电流 Current (A)	馈路出数 Number of feed out circuit	时间 Time (S)	电流 Current (A)	高倍率镉镍电池 单组电池 / 双组电池 Fully-sintered Cd-Ni battery single/double	阀控密封铅酸电池 单组电池 / 双组电池 Valve-controlled sealed lead-acid battery single/double
GZDW -20/220		2.5	5					<40	6			2/3	2
GZDW -40/220		4.0	8		6			<80			40 ~ 100	3/4	2
GZDW -50/220		5.0	10					<100	4			2	2
GZDW -65/220		7.0	15					<130	6			3/4	2/3
GZDW -80/220		8.0	20					<160	6 ~ 10		100 ~ 300	3/5	2/3
GZDW -100/220		10.0	25		6 ~ 10			<200				3/5	2/3
GZDW -150/220	+15% 380	13.0	30	1	8 ~ 18	0.1 ~ 0.5		<300	8 ~ 18	5 ~ 10			3/5
GZDW -200/220	-15%	16.0	40					<400					4/7
GZDW -250/220		20.0	50					<500			200 ~ 700		5/8
GZDW -300/220		24.0	60		12 ~ 30			<600	12 ~ 30				5/9
GZDW -500/220		35.0	80		40			<1000	40				7/12
GZDW -800/220		50.0	100					<1500					12/21
GZDW -1000/220		65.0	150		36 ~ 70			<2000	36 ~ 70		400 ~ 3000		12/21
GZDW -2000/220		123.0	300					<4000					
GZDW -3000/220		196.0	500					<6000					

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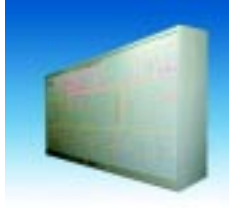




表 (二) Table

项目 Items  基本参数 Basic parameters  型号规格 Models		交流输入 Alternating current input		控制母线 Controlling bus				合闸母线 Closing bus			直流电动机 启动负荷 Starting pulse loading for direct current motor		选用不同电池所需屏数 Number of case needed for different type of battery	
		电压 Voltage (V)	容量 Capacity (KW)	最大经常性负荷电流 Max current under running load (A)	事故时负荷 Loading in accident		馈路出数 Number of feed out circuit	脉冲负荷 Switching on pulse load		馈路出数 Number of feed out circuit	时间 Time (S)	电流 Current (A)	高倍率镉镍电池 单组电池 / 双组电池 Fully-sintered Cd-Ni battery single/double	阀控密封铅酸电池 单组电池 / 双组电池 Valve-controlled sealed lead-acid battery single/double
GZDW -M-20/110			1.2	5		<14							2	1
GZDW -M-40/110			2.0	8		<28				6		40 ~ 100	2/3	1/2
GZDW -M-50/110			2.5	10		<35				4			2	2
GZDW -M-65/110			3.5	15		<45							2/3	2
GZDW -M-80/110			4.0	20		<56				6	5~10	100 ~ 300	2/3	2
GZDW -M-100/110			5.0	25		<70							2/3	2
GZDW -M-150/110		+15% 380	6.5	30	1	<100								2
GZDW -M-200/110		-15%	8.0	40		<120		0.1 ~ 0.5	6 ~ 18					2/3
GZDW -M-250/110			10.0	50		<150						200 ~ 700		2/3
GZDW -M-300/110			12.0	60		<180			12	12				3/4
GZDW -M-500/110			17.5	80		<300			18	18				6
GZDW -M-800/110			25.0	100		<480								6/10
GZDW -M-1000/110			33.0	150		<600			18 ~ 30	18 ~ 30		400 ~ 3000		6/10
GZDW -M-2000/110			62.0	300		<1000								
GZDW -M-3000/110			98.0	500		<1500								

表 (三) Table

项目 Items 基本参数 Basic parameters 型号规格 Models	交流输入 Alternating current input		控制母线 Controlling bus				合闸母线 Closing bus			直流电动机 启动负荷 Starting pulse loading for direct current motor		选用不同电池所需屏数 Number of case needed for different type of battery	
	电压 Voltage (V)	容量 Capacity (KW)	最大经常性负荷电流 Max current under running load (A)	事故时负荷 Loading in accident	馈路出数 Number of feed out circuit	脉冲负荷 Switching on pulse load	时间 Time (S)	电流 Current (A)	馈路出数 Number of feed out circuit	时间 Time (S)	电流 Current (A)	高倍率镉镍电池 单组电池 / 双组电池 Fully-sintered Cd-Ni battery single/double	阀控密封铅酸电池 单组电池 / 双组电池 Valve-controlled sealed lead-acid battery single/double
GZDW -M-10/48		0.6	8	<7				<20				2	1
GZDW -M-20/48		1.0	10	<14	6			<40	6		20 ~ 80	2	1
GZDW -M-40/48		1.2	15	<28				<80				2	1/2
GZDW -M-65/48		1.8	20	<45				<130				2	1/2
GZDW -M-80/48		2.5	30	<56				<160			100 ~ 300	2/3	2
GZDW -M-100/48		3.2	40	<70	12 ~ 18			<200	12 ~ 18			2/3	2
GZDW -M-150/48	+15% 380	4.1	50	<100		0.1		<300					2
GZDW -M-200/48	-15%	5.0	60	<120		~ 0.5		<400		5~10			2
GZDW -M-250/48		6.0	70	<150				<500			200 ~ 700		3
GZDW -M-300/48		7.0	80	<180	18			<600	18				3
GZDW -M-500/48		9.5	100	<300				<1000					3/4
GZDW -M-800/48		15.0	150	<480				<1500					3/4
GZDW -M-1000/48		20.0	200	<600	18 ~ 24			<2000	18 ~ 24		400 ~ 3000		3/4
GZDW -M-2000/48		32.0	300	<1000				<4000					
GZDW -M-3000/48		50.0	500	<1500				<6000					

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