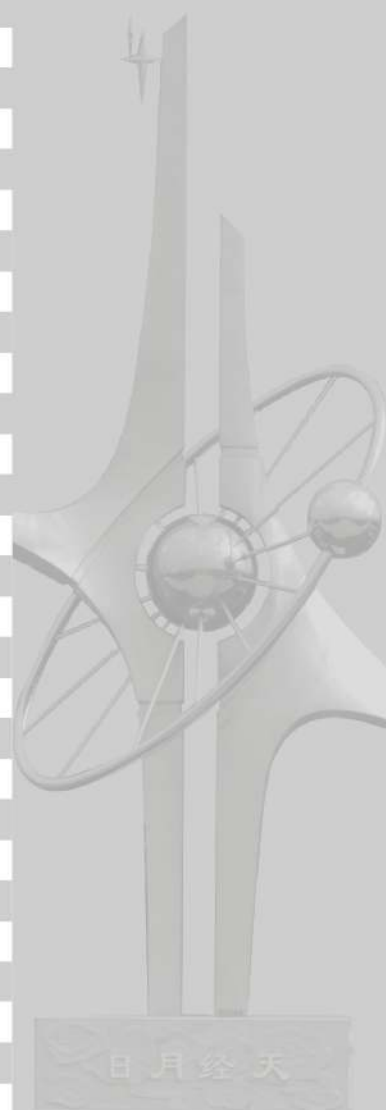




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常熟开关制造有限公司（原常熟开关厂）是专业研发、制造高低压电器元件和成套开关设备的企业。公司坚持“为顾客创造价值，为员工创造机会，为社会创造效益”的发展原则，依托博士后科研工作站的建设为企业发展奠定坚实的技术基础和人才基础；以技术中心和电器产品试验检测站的建立提高新产品开发能力和手段；以先进生产设备改造传统工艺生产模式，实现制造过程柔性自动化；进一步健全营销和服务网络，以全方位服务奉献真诚，创造新业绩。

公司技术中心通过CAD/CAM/CAE系统设计开发了新一代断路器—CM1系列和CW1系列。其中CM1系列具有目前国内同类产品体积小、通断能力最大，抗振动、抗倾斜、短飞弧、隔离功能等特点，能满足1E级核电用要求和船舶使用要求，达到国际九十年代先进水平。产品先后被评为“国家级新产品”、“国家重点新产品”、“江苏省高新技术产品”、“江苏省优秀专利产品”；被国家质量技术监督局列入“121”计划，属国家重点保护的名优产品。现已发展有：CM1系列塑壳式断路器、CM1E系列带剩余电流保护塑壳断路器、CM1E系列电子式塑壳断路器、CM1Z系列智能型可通信塑壳断路器。CW1系列智能型万能式断路器具有结构合理、体积小、短路分断能力高、零飞弧等特点，同时带有通信接口，可与计算机联网，适应了电网容量不断增大、低压配电和控制系统趋向自动化的形势，满足了当前国内配电行业对智能化电器元件的需求，被评为“国家级新产品”和“国家重点新产品”。2003年公司这两大主打产品被授予“中国名牌”称号。

公司新产品还包括CW2系列智能型万能式断路器、CM2系列塑料外壳式断路器、CW1G系列隔离开关、CA1系列自动转换开关、CAPP1系列自动转换开关、CR1系列电动机软起动器、CR2系列智能型电动机软起动器、CD1系列电动机保护器、CV1-12（VS1）户内高压真空断路器、CV1-40.5（ZN85A）户内高压真空断路器、CE1系列智能型电力仪表、与日本富士电机合资生产的SC-E、N系列交流接触器、TK-E、N系列热过载继电器等。同时，公司研制、生产的各类高低压成套开关设备均列入全国城乡电网改造第二批、第三批名单目录，已多次选用于秦山核电站、宝钢、马钢、南京扬子石化、唐山港主变电所、北京国际俱乐部、北京中南海等国家重点工程。本公司主要产品均通过了中国质量认证中心认证，获得“3C”证书，其中CM1系列产品已通过“CE”认证。

公司通过多年发展，已成为拥有总资产6.5亿元，员工1550人，共有中高级职称130多人，占地面积达20多万平方米的中型企业。公司先后被评为“国家重点高新技术企业”、“中国机械工业管理进步示范企业”、“全国机械工业核心竞争力100强企业”、“江苏省知识产权重点保护单位”，“江苏省质量先进单位”。二〇〇五年公司通过了质量/环境/职业健康安全管理体系认证。

日月经天、江河行地，展新气象，再添辉煌。公司本着“诚实、重质、守信”的经营理念真诚欢迎新老朋友惠顾，共同抒写新的华彩篇章。

Changshu Switchgear Mfg. Co., Ltd. (Former Changshu Switchgear Plant) mainly develops and produces high and low voltage electric apparatuses and complete sets of switchgear equipment. The company sticks to the principle of Creating Value for Customer, Creating Opportunity for Staff, Creating Profit for Society. Taking the opportunity of setting up postdoctoral station, the company has accumulated strong power on technology and talent. With setting up of technology centre and test and inspection centre of electric apparatus, new product development is sped up and enhanced. By introducing advanced production equipment, the company has set up flexible manufacturing system to replace the traditional production equipment and techniques. At the same time the company has rebuilt its sales and service network and provided more circumspect and sincere service to customers.

CM1 Series Moulded Case Circuit Breaker and CW1 Series Intelligent Universal Circuit Breaker are the products of new generation and developed by the company taking use of the CAD/CAM/CAE system. The CM1 breaker has the most compact size and the highest breaking capacity comparing with other domestic products of the same kind, collects such advantages such as shock protection, slant protection, short arc-over distance and isolation function. It meets the strict demands put forward in nuclear power industry and also suits for ship mounting. It was ratified the State New Product, the Key State New Product, Jiangsu High-tech. Product, Jiangsu Excellent Patent Product and listed in “121” catalogue, becoming a famous and excellent product enjoying protection from the state government. Now a large product family based on CM1 series breaker has taken shape, which includes CM1 Series Moulded Case Circuit Breaker, CM1E Series MCCB with Residual Current Protection, CM1E Series Electronic MCCB, CM1Z Series Intelligent Communicative MCCB. For CW1 Series Intelligent Universal Circuit Breaker, it features of rational structure, compact size, high short circuit breaking capacity, zero arc-over distance etc. With the communication interface it equipped, communication function will be achieved. So it meets the special demand for the intelligent electric apparatus used in present domestic power distribution industry, can be used in automatic control system and the large current electric system. The breaker was ratified the State New Product, the Key State New Product. In 2003, both CM1 Series MCCB and CW1 Series ACB were awarded China Top Brand product.

Other new products have been launched including CW2 Series Intelligent Universal circuit Breaker, CM2 Series Moulded Case Circuit Breaker, CW1G Series Isolation Switch, CA1 Series Automatic Transfer Switch, CAPP1 Series Automatic Transform Switch, SC-E、N Series A.C. Contactor and TK-E、N Series Thermal Overload Relay are the new products made by the joint venture company with Fuji Electric Co. of Japan. On the other hand, all high and low voltage complete sets of switchgear equipment had been listed in the second and third batches of categories which used in transformation of the urban and suburb electric grids. They have been used in many key national projects for many times such as Qingshan Nuclear Power Plant, Bao Steel Plant, Ma-an-shan Steel Plant, Nanjing Yangtze Petrochemical Co., the main substation of Tangshan Port, Beijing International Club, Beijing Zhong-nan-hai etc. The main products made by the company have obtained “3C” certificates issued by China Quality Centre, for CM1 series products, they have even obtained CE certificates.

Due to many years' progress, the company has become a medium size enterprise having a total assets of 650 million yuan RMB, total staffs of 1550, among whom more than 130 got intermediate and senior technical titles, covering a total area of 200,000 square metres. The company has been awarded many honors successively such as the Key State High-tech. Enterprise, Pilot Enterprise on Management Progress of China Machinery Industry, One of the Top Hundred Competitive Enterprise of the State Machinery Industry, the Major Unit Enjoying Governmental Protection on Intellectual Property in Jiangsu and Jiangsu Model Unit on Quality Control. In 2005 it passed the quality /environment/occupational health and safety management system.

Sun and Moon electric apparatuses are everlasting as the sun and moon. Following the principle of Honesty, Quality and Creditability, the company welcomes all friends to pay a visit.





## 概 述 OUTLINE

GCS型低压成套开关设备(以下简称装置)适用于发电厂、变电所、厂矿企业、高层建筑等低压配电系统的动力、配电和电动机控制中心、电容补偿等的电能转换、分配与控制用。

装置符合GB7251.1《低压成套开关设备和控制设备 第一部分：型式试验和部分型式试验成套设备》和JB/T9661《低压抽出式成套开关设备》的要求。

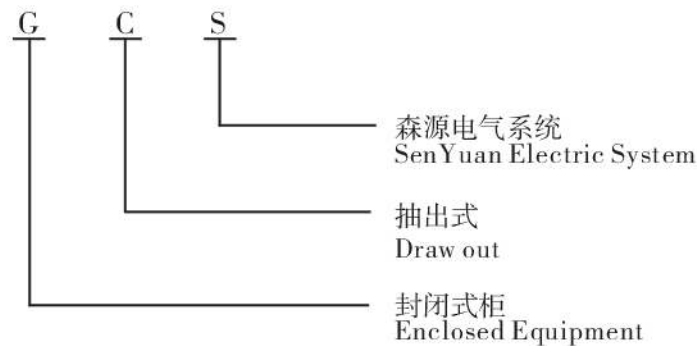
Model GCS Low Voltage Complete Sets of Switchgear Equipment (hereinafter abbreviated as the Equipment) can be used for power transform, distributing and control of power, power distribution, motor control center, and capacity compensation in many places, such as power plant, transformer substation, mining enterprise and high building, and so on.

Comply with the standards of:

GB7251.1 《Low Voltage Complete Sets of Switchgear Equipment and Control Equipment First Part: Complete Sets of Switchgear Equipment of TTA test and part TTA test》、JB/T9661 《Low Voltage Draw out Complete Sets of Switchgear Equipment》.



## 产品型号及含义 TYPE AND ITS MEANING



## 正常使用环境 NORMAL OPERATION CONDITION

●周围空气温度不高于+40℃，不低于-5℃，并且24h内其平均温度不高于+35℃。

●空气清洁，相对湿度在最高温度为+40℃时不超过50%。在较低温度时允许有较高的相对湿度。例如：+20℃时相对湿度为90%，但应考虑到由于温度的变化，有可能会偶然地产生适度的凝露。

- 污染等级3。
- 海拔不超过2000m。

● Ambient temperature: -5℃ ~+40℃ , and the average in 24 hours is below +35℃.

● Air conditions: clear, relative humidity can not exceed 50% at the maximum ambient temperature of +40℃ , but higher relative humidity at the low temperature, for example, 90% at 20℃, occasionally, a few of dews is permitted while temperature changes.

- Pollution protection: 3 grade.
- Elevation ≤2000m.



## 正常使用环境

## NORMAL OPERATION CONDITION

● 周围空气温度不高于+40℃，不低于-5℃，并且24h内其平均温度不高于+35℃。

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## 主要技术参数

## MAIN TECHNICAL PARAMETERS

Table 1

额定工作电压 Rated Working Voltage Ue	V	400
额定绝缘电压 Rated Insulation Voltage Ui	V	690
额定频率 Rated Frequency	Hz	50
额定工作电流 Rated Current In	A	
	水平母线 Horizontal Busbar	1600 ~ 4000
额定短时耐受电流 Rated Short-time Withstand Current Icw(1s)	kA	
	垂直母线 Vertical Busbar	1000
额定短时耐受电流 Rated Short-time Withstand Current Icw(1s)	kA	
	水平母线 Horizontal Busbar	50
额定峰值耐受电流 Rated Peak Withstand Current Ipk	kA	
	垂直母线 Vertical Busbar	50
额定峰值耐受电流 Rated Peak Withstand Current Ipk	kA	
	水平母线 Horizontal Busbar	105
额定峰值耐受电流 Rated Peak Withstand Current Ipk	kA	
	垂直母线 Vertical Busbar	105
外壳防护等级 Protection Grade of Enclosure		IP40



## 结构特点

## STRUCTURE FEATURE

● 装置的框架为组合式结构，基本骨架由E=20的KS型材组装而成。柜架的全部结构件经过镀锌处理，通过自攻锁紧螺钉或8.8级六角螺栓紧固连接成基本柜架。装置内部尺寸、零部件尺寸、隔室尺寸均按模数化(E=20mm)变化。

● 柜体被分隔成三个小室，即水平母线室(在柜后部)、功能单元室(在柜前部)、电缆室(在柜下部)

● The frame of the Equipment is combination-structure, the fundamental framework is assembled by KS-profiled bar with 20mm modulus. All structural components are treated with galvanization, and connecting up to form the fundamental framework by self-lock bolt and 8.8 grade hexagon head tap bolt. The internal size of Equipment and the sizes of components and isolation compartments could be according to the change of modulus (E=20mm).

● The cubicle is divided into three compartments: horizontal busbar compartment (at the rear end of a cubicle), function unit compartment (at the





装置的框架为组合式结构，基本骨架由E=20的KS型材组装而成。柜架的全部结构件经过镀锌处理，通过自攻锁紧螺钉或8.8级六角螺栓紧固连接成基本柜架。装置内部尺寸、零部件尺寸、隔室尺寸均按模数化(E=20mm)变化。

- 柜体被分隔成三个小室，即水平母线室(在柜后部)、功能单元室(在柜前部)、电缆室(在柜下部或柜前右边)。室与室之间用镀锌钢板或高强度阻燃塑料功能板相互隔开，各室作用相对独立；上下抽屉功能单元之间有带通风孔的金属板隔离，有效防止电器元件因故障引起的飞弧与母线或其它线路短路造成的事故。

进出线方式分类：上进上出、上进下出、下进上出、下进下出。电缆隔室的设计使电缆上、

The frame of the Equipment is combination-structure, the fundamental framework is assembled by KS-profiled bar with 20mm modulus. All structural components are treated with galvanization, and connecting up to form the fundamental framework by self-lock bolt and 8.8 grade hexagon head tap bolt. The internal size of Equipment and the sizes of components and isolation compartments could be according to the change of modulus (E=20mm).

The cubicle is divided into three compartments: horizontal busbar compartment (at the rear end of a cubicle), function unit compartment (at the foreside of a cubicle), and cable compartment (at the bottom of a cubicle or the right-hand of fore part of a cubicle). There have galvanized armor plate or high strength flame retardant plastic function boards to part the compartments, and the function of the compartments is independent from each other. There have metal plates with blowholes to insulate the drawers top and bottom, it effectively avoids the electric arc arise from the fault of electric components and the accidents arise from short circuit of busbar or other circuits.

Classified by wire incoming and outgoing: incoming on top and outgoing on top, incoming on top and outgoing at the bottom, incoming at the bottom and outgoing on top, incoming at the bottom and outing at the bottom. The design of cable

Table 2

Units:mm

高 Height	2200					
宽 Width	400	600	800	1000	1200	
深 Depth	800, 1000					

- 为降低功能单元的接插件、电缆头、分隔板的温升，设计了GCS柜专用的转接件，与同类产品比较转接件热容量增大，温升降低。

- 馈电柜和电动机控制柜设有专用的电缆隔室，电缆隔室的宽度为440mm。功能单元室与电缆室的连接通过转接件或转接铜排实现，即提高了电缆的使用可靠性，又极大地方便了用户对电缆的安装与维修。

- For reducing the temperature rise of inserts, cable terminals and clapboards, we have designed special transferrer for GCS switchgear, comparing with the same kind of product, the thermal capacity of this transferrer is increased, and the temperature rise is reduced.

- There have special cable compartment in feeder switchgear and motor control switchgear, the width of it is 440mm. There adopts transferrer or transfer busbar to connect function unit compartment and cable compartment together, it improves the use reliability of cables, and makes the installation and maintenance convenience.



● 抽屉单元高度的模数为160mm，分为  $\frac{1}{2}$  单元、1 单元、 $1\frac{1}{2}$  单元、2单元、3单元五个尺寸系列。各种抽屉单元的持续工作电流选用按表3。

● The height modulus of drawer is 160mm, it has five kinds of dimensions: 1/2unit, 1 unit, 3/2unit, 2unit, 3unit. The continuing working current of all kinds of drawer is shown in table 3.

Table 3

抽屉单元 Drawer Unit	$\frac{1}{2}$ 单元 unit	1 单元 unit	$1\frac{1}{2}$ 单元 unit	2 单元 unit	3 单元 unit
最大持续工作电流(A) Maximal Continuing Working Current	32	225	400	400	400

● 1单元抽屉尺寸为：160(高)× 560(宽) × 410(深)， $\frac{1}{2}$  单元抽屉的宽度为280， $1\frac{1}{2}$  单元、2单元、3单元抽屉仅以1单元抽屉高度作  $1\frac{1}{2}$  倍、2倍、3倍变化。相同功能单元的抽屉具有良好的互换性。

● The dimension of drawer unit is: 160 (height) × 560 (width) × 410 (depth), the width of 1/2 drawer unit is 280, the height of 3/2 unit, 2 unit and 3 unit makes 3/2 times, 2 times, 3 times change as the height of 1 drawer unit. The drawer units of same function have favorable interchange ability.

● 五种抽屉单元在同一个柜体中可作单一组装，也可以混合组装。

● These five types of drawers can be installed in the same form in one cubicle, and mixed installed also.

● 抽屉进出线根据电流大小采用同规格不同片数的接插件，每片接插件≤200A。

● According to the values of current, the wire incoming and outgoing of drawer units use the inserts which have the same specification and different number of lamina, the current value of each piece of insert ≤200A.

●  $\frac{1}{2}$  单元抽屉与电缆室的转接采用背板式结构ZJ-2型转接件，单元抽屉与电缆室的转接按电流分档采用相同尺寸棒式或管式结构ZJ-1型转接件，方便电缆地进出。

● For the convenience of cable's in and out, it uses ZJ-2 backboard-structure transferrer to transfer the wires of 1/2 drawer unit to cable compartment, and it uses the same dimension of ZJ-1 stick/pipe-structure transferrer to transfer the wires of drawer units to cable compartment according to the current value..

● 抽屉单元设有可靠的机械连锁装置，通过操作手柄控制。具有分、合、试验、抽出等位置的明显标志。

● The drawer unit has reliable mechanical interlock device, which is operated by the handle. It has obvious sign to show the positions of connection, separation, test and draw out.

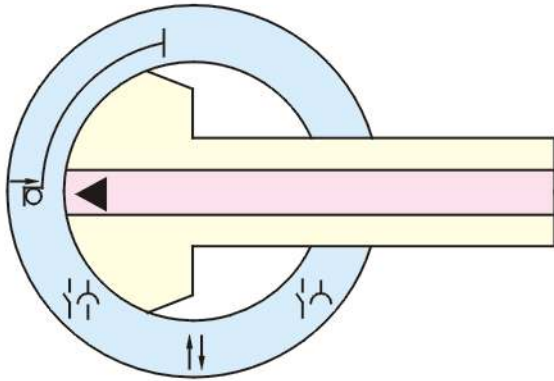
抽屉单元到位后必须严格按照图一、图二所列操作开关功能及其位置动作，否则易损坏结构件，请用户使用时注意。

When the drawer is in position, it must be operating according to the functions and positions of switcher which is shown in Fig.1 and Fig.2, or it will damage the structural components. Please notice when use the equipments.

● 抽屉单元有足够数量的二次接插件(1单元及以上为32对， $\frac{1}{2}$  单元为20对)，能满足自动化用户和与计算机接口的需要。

● The drawer unit has enough secondary inserts (1 unit and above have 32 couples, 1/2 unit has 20 couples), it can satisfy the needs of automatization user and the connection to computer.





图一 1/2 单元抽屉的操作手柄  
Fig.1 Operating handle of 1/2 drawer unit

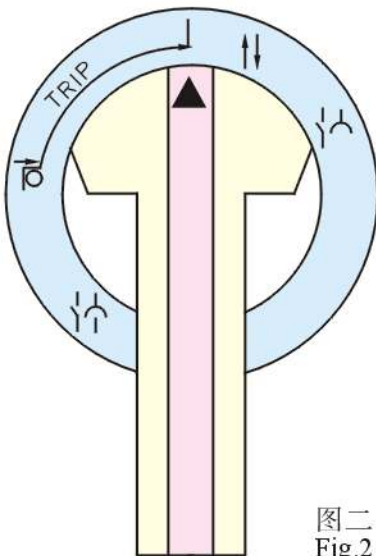
- | Working position: The main switcher is switched on, and the function unit is locked.
- o Main switcher OFF: The main switcher is switched off, and the function unit is locked.
- Y Testing position: The main switcher is switched off, and auxiliary circuit is close, and the function unit is locked.
- Y Insulation position: The drawer is drawn out 30mm, main and auxiliary circuits are open, and the

- | 工作位置：主开关合闸，功能单元锁定。
  - o 主开关分闸：主开关断开，功能单元锁定。
  - Y 试验位置：主开关分闸，辅助回路接通，功能单元锁定。
  - Y 隔离位置：抽屉旋出30mm，主、辅回路均隔离断开，抽屉锁定。
  - ⇕ 抽出位置：主回路和辅助回路均断开，抽屉任意抽出。
- 操作手柄压下6mm后，方能从 o 位置旋向 | 位置，如有必要，操作手柄上可在主开关分闸，试验，隔离三位置加挂锁，作为安全保护。

drawer is locked.

⇕ Drawing out position: Main and auxiliary circuits are open, and the drawer can be pushed in or drawn out.

Only after the handle is pushed down 6mm, could it be rotated from o position to | position. If need, it can put a padlock when the operating handle is in the positions of OFF, test and insulation as safeguard.



图二 1~3单元抽屉的操作手柄  
Fig.2 Operating handle of 1~3 drawer units

- | Working position: The main switcher is switched on, and the function unit is locked.
- o Main switcher OFF: The main switcher is switched off, and the function unit is locked.
- Y Testing position: The main switcher is switched off, and auxiliary circuit is close, and the function unit is locked.
- Y Insulation position: The drawer is drawn out 30mm, main and auxiliary circuits are open, and the

- | 工作位置：主开关合闸，功能单元锁定。
  - o 主开关分闸：主开关断开，功能单元锁定。
  - Y 试验位置：主开关分闸，辅助回路接通，功能单元锁定。
  - Y 隔离位置：抽屉旋出30mm，主、辅回路均隔离断开，抽屉锁定。
  - ⇕ 抽出位置：主回路和辅助回路均断开，抽屉任意抽出。
- 操作手柄压下6mm后，方能从 o 位置旋向 | 位置，如有必要，操作手柄上可在主开关分闸，试验，隔离三位置加挂锁，作为安全保护。

drawer is locked.

⇕ Drawing out position: Main and auxiliary circuits are open, and the drawer can be pushed in or drawn out.

Only after the handle is pushed down 6mm, could it be rotated from o position to | position. If need, it can put a padlock when the operating handle is in the positions of OFF, test and insulation as safeguard.



### ● 水平母线

水平母线采用平置式排列方式，并被置于柜后独立的母线隔室内，用专用母线夹具固定在型钢构件上。装置工作电流大于2500A以上为双组双列平置，2500A及以下为单组双列平置，每相由4条或2条铜排组成，大大提高了母线的短路强度。水平母线和垂直母线之间的电气连接采用专用过渡接头，降低母线过渡搭接温升。

### ● Horizontal Busbar

Horizontal busbars are arrayed flatly, lain in busbar compartment which is at the rear end of a cubicle, and fixed on the profiled bar by special busbar clamp. When working current is more than 2500A, it lays two groups and two tiers, and when it is 2500A and below, it lays single group and two tiers. Every phase is made up of 4 pieces or 2 pieces of copper bars, it improves the anti-short circuit strength of busbar. The electric connection between horizontal busbar and vertical busbar uses the special transitional connector to reduce the temperature rise of busbar.



### ● 垂直母线

用于抽屉柜的垂直母线采用“L”型铜母线，它被嵌装于阻燃型工程塑料制成的隔离板内，既可防止电弧引起的放电，又能防止人体接触，带电部分的防护等级达IP20。

### ● Vertical Busbar

The vertical busbar which is used for drawer adopts "L" copper busbar, it is embedded in isolation board which is made up of flame retardant plastic. It can not only avoid the discharge arise from electric arc, but also prevent the body from contact. The protection grade of the electriferous parts is IP20.







### ●运输

柜体可单台出厂也可联拼组合出厂。如用户不提要求，则按单台包装出厂。如采用组合出厂，柜宽最长不超过3m。

装置吊运过程中，钢丝绳顶角不得大于 $120^\circ$ ，吊运应平稳，避免强烈的振动、摇晃和冲击。

### ●安装

根据用户要求，可提供安装底架，既保障了装置运输过程中不致变形，也方便用户的工程安装。

装置到达收货地点后，首先应检查包装是否完整无损，发现问题应及时通知合同有关方做好商务记录，共同分析原因，作好鉴证和善后处理工作。

不立即安装的装置，应根据正常使用条件和《电气设备暂保管规程》要求置于适当场所保管。

装置安装时应根据系统图核实排列位置，逐一固定，接好母线和进出线。当装置超过10面时，应尽可能从中间向两边安装，以减少积累误差。

装置为离墙安装，安装基础平面要求平整，基础槽钢的水平误差为 $1/1000$ ，总长偏差为 $\pm 3\text{mm}$ 。

装置就位后，首先应检查每组装置与底面是否垂直，然后将整个装置排列好，安装好拼柜螺钉，尔后再与基础槽钢进行焊接，焊点节距和焊长由用户确定。

装置的基础示意图三。电缆沟的宽度和深

### ●Transportation

The cubicle can be delivered in single package or combination. If the user doesn't require, it adopts single package. If it adopts combination, the width of the cubicles isn't more than 3m.

In course of swinging the Equipment, the top angle of steel wire isn't more than  $120^\circ$ , the swing must be steady, and avoid strongly shake, wobble and impulsion.

### ●Installation

The bottom border can be provided according to the requirement of users, it avoids the cubicles out of shape in the course of transportation, and makes the installation convenient.

Check if the package is complete after the Equipment arrived at destination. If there have any problems, please notice all parties of the contract in time and make records, analyze reasons, make verification of a contract and handle the remain problems.

If the Equipments aren't installed at once, it should be stored at the proper place according to the normal operation condition and "Temporary Storage Rules of Electrical Equipment"

It must check the arrangement according to the system scheme before installation first, then, fix one by one, and join the busbars and wires up. When the quantity of the Equipment is over 10, it should be installed from the middle to the sides to reduce the accumulated error.

The Equipment is installed off the wall, the basal plane of installation must be flat, and the level error of basal U-steel is  $1/1000$ , the deviation of the total length is  $\pm 3\text{mm}$ .

While the Equipments took their place, first, check if the Equipments are perpendicularity to the the horizontal plane, then arrange all Equipments properly, link them together by bolts, and weld them with basal U-steel. The distance and length of joints are decided by users.

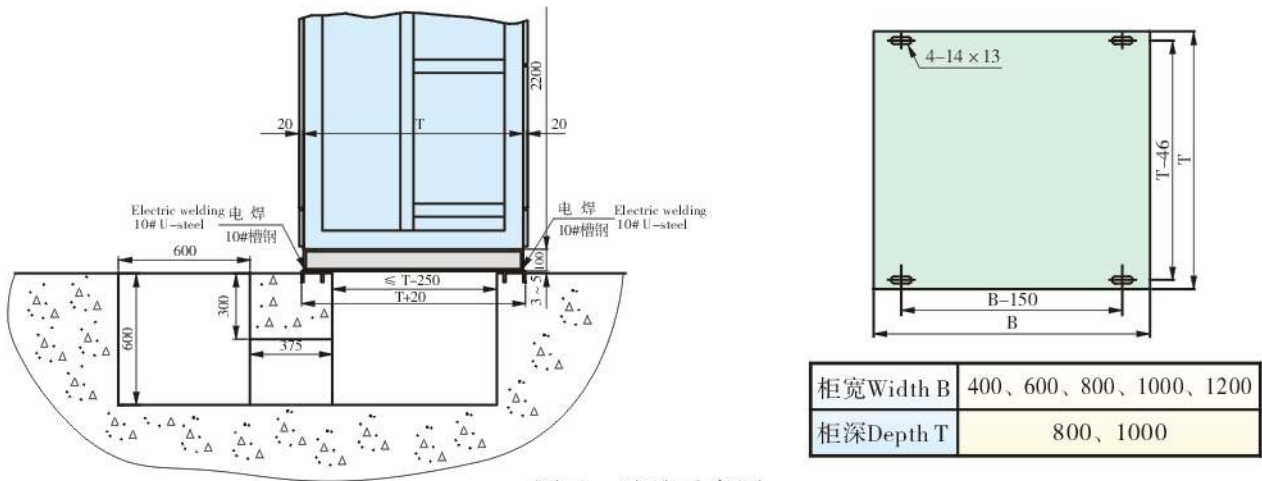


运输

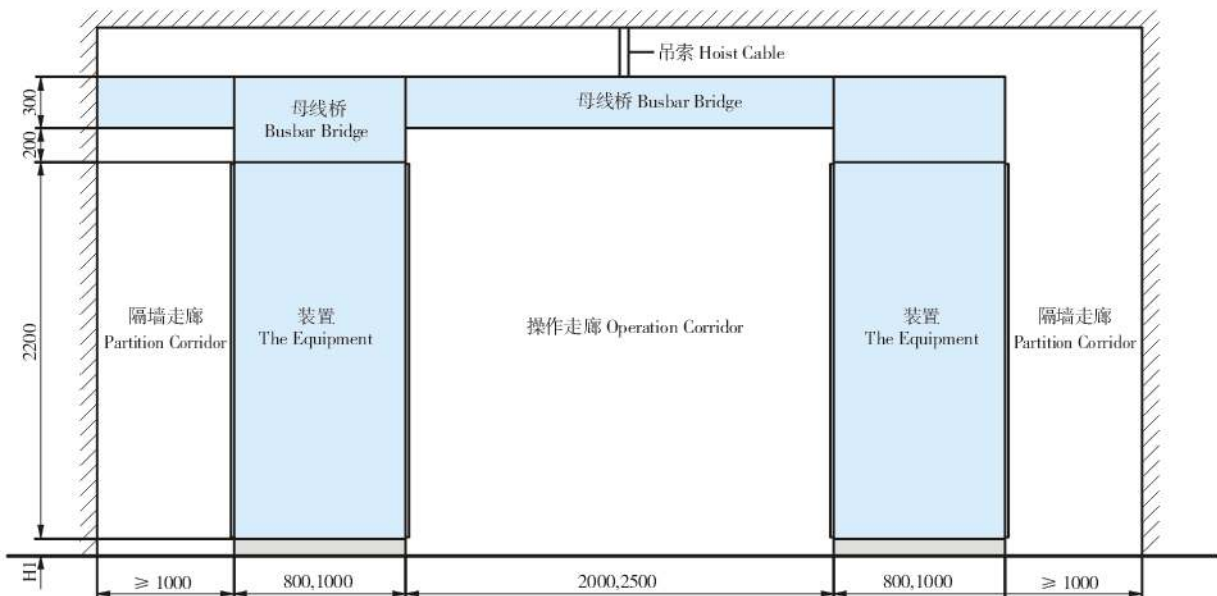
柜体可单台出厂也可联拼组合出厂。如用户不提要求，则按单台包装出厂。如采用组合出厂，柜宽最长不超过3m。

Transportation

The cubicle can be delivered in single package or combination. If the user doesn't require, it adopts single package. If it adopts combination, the width of the cubicles isn't more



图三 基础示意图  
Fig.3 Scheme of Foundation



注：H1为底脚槽钢的高度尺寸，推荐采用10#槽钢。  
Note: H1 is the size of footing U-steel, It is commended the 10# U-steel.

图四  
Fig.4 Scheme of Installation





●当装置运抵目的地后，首先检查包装箱是否完整；若装置不立即安装，应存放在干燥清洁之处。

●接好电缆后，装置底部应封闭，以防止小动物爬入柜内造成短路事故。

●装置在安装或调整后，在投入运行前，需进行下列各种检查和试验：

检查装置内安装的电器设备和控制接线是否符合工厂的图纸要求；

检查所安装的电器设备接触是否良好，是否符合本身的技术条件；

检查机械联锁机构、电气联锁装置的动作是否正确可靠，应符合系统的要求；

检查主回路和控制回路的绝缘电阻是否符合规定要求；

用手动操作各种开关，应操动灵活，无异常和卡轧现象；

检查装置内部有无异物及零部件的安装螺钉是否有松动现象。

●抽出式、插入式断路器通电前的检查：

检查抽出式、插入式部件是否可靠地固定于各自的联接位置上；

凡带有失压脱扣器的断路器，在未接通电源时不能操作，否则将会损坏机构；

为加强安全防范，操作手柄或联锁机构应加上挂锁。

● Check if the package is complete after the Equipment arrived at destination; if the Equipment isn't installed at once, it must be stored in a dry and clean place.

● After joining the cables together, the bottom of the Equipment must be closed to prevent little animal from coming in which can result in short circuit.

● After installation or adjustment and before run, the Equipment need to be examined and tested as below:

Examine if the electric devices and control circuits in the Equipment are satisfied the requirement of the blueprint.

Examine if the electric devices in the Equipment is well connected and up to its technical conditions.

Examine if the action of the mechanical interlock and electric interlock devices is correct and reliable and satisfied the requirement of the system.

Examine if the insulating resistance of the main circuit and control circuit is satisfied the requirement.

Operating all kinds of switchers manually should be flexible and not have the abnormality and getting stuck.

Examine if there have abnormal things in the Equipment and if the installation bolt of the components is loosening.

● Examination before electrification of the draw-out type and insert type breaker:

Examine if the draw-out and insert components is fixed on each connecting position reliably.

Any breakers with under-voltage release can not be operated before switching on, or else damage the machine.

Strengthen the safety, and there should add a lock on the handle or interlock machine.



装置的维护应由专业人员实施，每六个月应做一次例行检查，检查内容：

检查功能单元的一次、二次插接件是否接插良好、到位；

检查单元内部连接导线是否牢靠，应无松动而导致发热现象；

清除断路器相间隔板的灰尘；

The maintenance of the Equipment should be executed by professional, and it should make a routine check every six month. The content of routine examination:

Examine if the primary and secondary inserts are well connected.

Examine if the connecting wires in the unit are reliable and not loosening, or else result in radiating heat.

Clean up the dust on the interphase clapboards of the breaker.



## 维 护 MAINTENANCE

装置的维护应由专业人员实施，每六个月应做一次例行检查，检查内容：

检查功能单元的一次、二次插接件是否接插良好、到位；

检查单元内部连接导线是否牢靠，应无松动

The maintenance of the Equipment should be executed by professional, and it should make a routine check every six month. The content of routine examination:

Examine if the primary and secondary inserts are well connected.

Examine if the connecting wires in the unit are reliable and not loosening, or else result in radiating



## 装置成套性 ENCLOSED PACKAGE

供货时提供下列文件及附件：

- a) 装箱单；
- b) 产品合格证；
- c) 主要元器件使用说明书；
- d) 出厂检验记录；
- e) 有关电气图纸；
- f) 柜门钥匙、操作手柄及合同规定的备品附件。

The following documents and accessories should be handed over with the switchgear:

- a. Container loading list;
- b. Certificate of quality;
- c. Illustrations of main components;
- d. Delivery test report;
- e. Relevant electrical blueprint;
- f. Panel key, operating handle and spare parts and accessories stipulated in the contract.



## 订货须知 ORDERING NOTICE

- a) 主电路方案及单线系统图；
- b) 辅助电路电气原理图；
- c) 装置的排列组合图和配电室的平面布置图；
- d) 水平母线的规格；
- e) 装置内元器件的规格及数量；
- f) 柜体颜色；
- g) 与产品正常使用不符的其它特殊要求。

- a.The scheme of main circuit and single wire systematic diagram;
- b.Assistant circuit electric principle diagram;
- c.Array scheme of equipment and disposal plan of distribution room;
- d.The specifications of horizontal busbar;
- e.The specifications and quantities of the components in the Equipment;
- f.The colour of the cubicle;
- g.Other special requirments that is not up to the normal use of the production.





# 一次方案图 WIRING SCHEME OF THE PRIMARY CIRCUIT

方案编号 Scheme No.		01				02				03		04		
		A	B	C	D	A	B	C	D	A	B			
一次方案 Wiring Scheme of the primary circuit														
		用途 Use		底部受电 Power Supply at bottom				顶部受电 Power Supply on top				顶部受电 Power Supply on top		母线转接 Expanded Switchgear
最大变压器容量 kVA Maximal Transformer Capacity		1000	1600	2000	2500	1000	1250	1600	2000	2000	2500			
断路器额定工作电流 A Rated Working Current of circuit breakers		1600	2500	3200	4000	1600	2000	2500	3200	3200	4000			
主要元件 Main components	断路器壳架等级 Frame Current Grade of circuit breaker	CW2	1600	2500	4000	6300	1600	2000	2500	4000	4000	6300		
		CW1	2000	3200	4000	5000	2000	2000	3200	4000	4000	5000		
	电流互感器 Mutual inductor	BH-0.66	2000/5	3000/5	4000/5	5000/5	2000/5	2500/5	3000/5	4000/5	4000/5	5000/5		
占用高度 Height mm		880	1760			880	1760			1760		1760		
柜宽 Width mm	CW2-3P	600	600	800	1000	600	600		1000	800	1000	400		
	CW2-4P				1200		800							
	CW1-3P		600	800	1000	600	800	800	1000	800	1000			
	CW1-4P	600	800	1000		800	800	1000		1000				
备注 Remarks										与方案4组合 In combination with scheme 4				

方案编号 Scheme No.		05				06		07						
		A	B	C	D	A	B	A	B	C	D	E	F	
一次方案 Wiring Scheme of the primary circuit														
		用途 Use		联络 Junction				联络 Junction		馈电 Feeder				
最大断路器额定工作电流 A Maximal Rated Working Current of circuit breakers		1600	2000	2500	3200	3200	4000	630	1250	1600	2000	2500	3200	
主要元件 Main components	断路器壳架等级 Frame Current Grade of circuit breaker	CW2	1600	2000	2500	4000	4000	6300	1600	1600	1600	2000	2500	4000
		CW1	2000	2000	3200	4000	4000	5000	2000	2000	2000	2000	3200	4000
	电流互感器 Mutual inductor	BH-0.66	2000/5	2500/5	3000/5	4000/5	4000/5	5000/5	750/5	1500/5	2000/5	2500/5	3000/5	4000/5
占用高度 Height mm		880	1760			1800		640	800	880	1760	1760		
柜宽 Width mm	CW2-3P	600	600	800	800	800	1000	1000		600	600	800	800	
	CW2-4P		800		1000		1200							
	CW1-3P	600		800	1000	800	1000				600	600	800	800
	CW1-4P	800	800	1000		1000							800	1000
备注 Remarks						与方案4组合 In combination with scheme 4.		7A方案可装三台主开关, 7B方案可装两台主开关, 7C、7D、7E、7F方案无电缆仓 It could be installed three main switches in scheme 7A, it could be installed two main switches in scheme 7B. There don't have cable room in scheme 7C,7D,7E,7F.						



# 一次方案图 WIRING SCHEME OF THE PRIMARY CIRCUIT

方案编号 Scheme No.	08		09		10	
	A		E	G	A	B
一次方案 Wiring Scheme of the primary circuit						
用途 Use	馈电 Feeder		馈电 Feeder		双电源切换 Switching of double Power Supply	
最大断路器额定工作电流 A Maximal Rated Working Current of circuit breakers	1250		1600	2500	1000	1250
主要元件 Main components	断路器壳架等级 Framework Current Grade of circuit breaker	CW2	1600	2500	1600	
		CW1	2000	3200	2000	2000
	电流互感器BH-0.66 Mutual inductor	1500/5	2000/5	3000/5	1200/5	1500/5
占用高度 Height mm	1760		1760		1760	
柜宽 Width mm	CW2-3P	800	600	600	800	
	CW2-4P			800		
	CW1-3P		600	800	800	
	CW1-4P		800	800	800	
备注 Remarks			无电缆仓 No cable room.		两台断路器可选取不同的规格 Different specifications could be chosen for two pieces of circuit breakers.	

方案编号 Scheme No.	11				
	A	B	C	D	
一次方案 Wiring Scheme of the primary circuit					
用途 Use	双电源切换 Switching of double Power Supply				
最大额定工作电流 A Maximal Rated Working Current of circuit breakers	100	225	630	800	
降容后额定工作电流 A Rated Working Current after capacity reducing	90	202	567	720	
主要元件 Main components	转换开关壳架等级CAI Framework Current Grade of switch	100	225	630	800
	电流互感器BH-0.66 Mutual inductor	150/5	300/5	800/5	1000/5
占用高度 Height mm	480	640	880	880	
柜宽 Width mm	3P	1000		800	
	4P			1000	
备注 Remarks	1.断路器降容系数0.9。2.11C, 11D方案无电缆仓 1.Capacith-reducing Factor of Circuit breaker is 0.9. 2.There don't have cable room in scheme 11C,11D.				

方案编号 Scheme No.	12					
	A	B	C	D	E	
一次方案 Wiring Scheme of the primary circuit						
用途 Use	双电源切换 Switching of double Power Supply					
最大额定工作电流 A Maximal Rated Working Current	63	220	400	600	800	
降容后额定工作电流 A Rated Working Current after capacity reducing	56	202	360	567	720	
主要元件 Main components	断路器壳架等级 Framework Current Grade of circuit breaker	CM1	63	225	400	630
		CM2	125	225	400	630
	接触器SC-□-C Contactor	E3PN5	N10M8	N12M8	N14M8	N16M8
	电流互感器BH-0.66 Mutual inductor	75/5	300/5	500/5	800/5	1000/5
占用高度 Height mm	640	880	1760			
柜宽 Width mm	1000		600	800		
备注 Remarks	1.仅三极方案。2.12C, 12D, 12E方案无电缆仓。 1.Only for three poles.2.There don't have cable room in scheme 12C,12D,12E.					





# 一次方案图 WIRING SCHEME OF THE PRIMARY CIRCUIT

方案编号 Scheme No.		13			14				
		A	B	C	A	B	C		
一次方案 Wiring Scheme of the primary circuit									
		馈电 Feeder			馈电 Feeder				
用途 Use		馈电 Feeder			馈电 Feeder				
最大额定工作电流 A Maximal Rated Working Current		40	225	400	32	225	400		
降容后额定工作电流 A Rated Working Current after capacity reducing		32	202	360	29	202	360		
主要元件 Main components	断路器壳架等级 Framework Current Grade of circuit breaker	CM1	63	225	400	63	225	400	
		CM2	125	225	400	125	225	400	
电流互感器BH-0.66 Mutual inductor		50/5	300/5	500/5	-	-	-		
占用高度 Height mm	3P	1/2抽屉单元 1/2 Drawer Unit	160	320	1/2抽屉单元 1/2 Drawer Unit	160	240		
	4P		240			240	320		
柜宽Width mm		1000			1000				
备注 Remarks		选用CM2断路器仅三极方案。Only for three poles when choose CM2							
方案编号 Scheme No.		15				16			
		A	B	C	D	A	B	C	
一次方案 Wiring Scheme of the primary circuit									
		直接起动 Direct Starting				直接起动 Direct Starting			
最大电机额定功率 kW Maximal Rated Power of Motor		5.5	7.5	37	45	37	75	160	
电机额定电流 Rated Current of Motor		12	16	72	85	72	140	300	
最大断路器额定工作电流 A Rated Working Current of circuit breakers	CM1	16	20	100	125	100	180	400	
	CM2	16	20	100	125	100	180	400	
主要元件 Main components	断路器壳架等级 Framework Current Grade of circuit breaker	CM1	63	63	100	225	100	225	400
		CM2	125	125	125	125	125	225	400
接触器SC-□-C Contactor		E03N5	E04N5	E4PN5	E5PM8	E4PN5	E7PM8	N12M8	
热继电器TK-□-C Thermal Relay		E02W	E02X	E3PHR	E3PHM	E3PHR	E02HJ	E02HJ	
电流互感器BH-0.66 Mutual inductor			20/5	100/5	100/5	100/5	200/5	400/5	
占用高度Height mm		1/2抽屉单元 1/2 Drawer Unit		160	320	160	320	480	
柜宽Width mm		1000				1000			
备注 Remarks		1. 协调配合类型2. 断路器选用电磁(瞬时)脱扣器型, 电动机保护用。 1. Co-ordination and cooperation type 2. The circuit breaker will be equipped with electromagnetic (instantaneous) release, for motor protection.							



# 一次方案图 WIRING SCHEME OF THE PRIMARY CIRCUIT

方案编号 Scheme No.	17					18	
	A	B	C	D	E	A	B
一次方案 Wiring Scheme of the primary circuit							
用途 Use	可逆运行 Reversible Running					可逆运行 Reversible Running	
最大电机额定功率 kW Maximal Rated Power of Motor	5.5	7.5	22	37	45	55	90
电机额定电流 Rated Current of Motor	12	16	43	72	85	105	170
断路器额定电流 A Rated Working Current of circuit breakers	CM1	16	20	63	100	125	140
	CM2	16	20	63	100	125	140
主要元件 Main components	断路器壳架等级 Framework Current Grade of circuit breaker	CM1	63	63	63	100	225
	CM2	125	125	125	125	125	225
接触器 SC-□-C Contactor	E1PN5	E1PN5	E2SPN5	E4PN5	E5PM8	E5PM8	N8M8
热继电器 TK-□-C Thermal Relay	E2PHW	E2PHX	E2PHH	E3PHR	E3PHM	E02HJ	E02HJ
电流互感器 BH-0.66 Mutual inductor	-	20/5	75/5	100/5	100/5	150/5	250/5
占用高度 Height mm	1/2抽屉单元 1/2 Drawer Unit		160	240	320	320	480
柜宽 Width mm	1000					1000	
备注 Remarks	1. 协调配合类型 2. 断路器选用电磁(瞬时)脱扣器型, 电动机保护用。 1. Co-ordination and cooperation type 2. The circuit breaker will be equipped with electromagnetic (instantaneous) release, for motor protection.						

方案编号 Scheme No.	19		20				
	A	B	A	B	C	D	E
一次方案 Wiring Scheme of the primary circuit							
用途 Use	星三角起动 Wye-delta starting		星三角起动 Wye-delta starting				
最大电机额定功率 kW Maximal Rated Power of Motor	37	55	37	75	90	290	315
电机额定电流 A Rated Current of Motor	72	105	72	140	170	520	560
电机相电流 A Phase Current of Motor	41.6	60.7	41.6	80.9	98.2	300.3	323.4
断路器额定电流 A Rated Working Current of circuit breakers	CM1	100	140	100	180	225	630
	CM2	100	140	100	180	225	630
主要元件 Main components	断路器壳架等级 Framework Current Grade of circuit breaker	CM1	100	225	100	225	225
	CM2	125	225	125	225	225	630
接触器 SC-□-C Contactor	E2SPN5	E4PN5	E2SPN5	E5PM8	E6PM8	N12M8	N12M8
热继电器 TK-□-C Thermal Relay	E3PHR	E6PHN	E02HJ	E02HJ	E02HJ	E02HJ	E02HJ
电流互感器 BH-0.66 Mutual inductor	100/5	150/5	100/5	200/5	250/5	750/5	750/5
占用高度 Height mm	480	640	480	640	880	1760	
柜宽 Width mm	100		1000				
备注 Remarks	1. 协调配合类型 2. 断路器选用电磁(瞬时)脱扣器型, 电动机保护用。 1. Co-ordination and cooperation type 2. The circuit breaker will be equipped with electromagnetic (instantaneous) release, for motor protection.						





方案编号 Scheme No.	21		22			
	A	B	A	B		
一次方案 Wiring Scheme of the primary circuit						
用途 Use	软起动, 带旁路 Soft starting, with shunt		变频控制 Frequency conversion control			
最大电机额定功率 kW Maximal Rated Power of Motor	55	250	15	110		
电机额定电流 A Rated Current of Motor	105	420	30	210		
断路器额定电流 A Rated Working Current of circuit breakers	CM1	140	500	40	315	
	CM2	140	500	40	315	
主要元件 Main components	断路器壳架等级 Framework Current Grade of circuit breaker	CM1	225	630	63	400
		CM2	225	630	125	400
	接触器 SC-□-C Contactor	E5PM8		N14M8		
	熔断器 RST Fuse	3-400/300A		11-1500/1500A		
	变频器 ACS800-01-□-3 Transducer			0020	0120	
	软起动器 CR1, CR2 Soft starter	105	450			
	电流互感器 BH-0.66 Mutual inductor	150/5	500/5	50/5	300/5	
占用高度 Height mm	880	1760	880	1760		
柜宽 Width mm	600		600			
备注 Remarks	断路器选用电磁(瞬时)脱扣器型, 电动机保护用。 The circuit breaker will be equipped with electromagnetic (instantaneous) release, for motor protection.					



方案编号 Scheme No.	23												24											
	A	B	C	D	E	F	G	H	I	J	K	L	A	B	C	D	E	F	G	H	I	J	K	L
Wiring Scheme of the primary circuit 一次方案																								
	电容自动补偿 Capacity Automatic Compensation												电容联动补偿 Capacity Gang Compensation											
用途 Use	电容自动补偿 Capacity Automatic Compensation												电容联动补偿 Capacity Gang Compensation											
补偿路数 Number of Compensation Circuits	6	8	10	12	6	8	10	12	6	8	10	12	6	8	10	12	6	8	10	12	6	8	10	12
补偿容量 kvar Compensation capacity	96	128	160	192	120	160	200	240	180	240	300	360	96	128	160	192	120	160	200	240	180	240	300	360
断路器额定电流, A Rated Working Current of circuit breakers	180	225	315	400	225	315	400	500	350	500	630	700	180	225	315	400	225	315	400	500	350	500	630	700
主要元件 Main components	CM1-225	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	CM1-400			1	1	1	1	1	1	1	1	1			1	1	1	1	1	1	1	1	1	
	CM1-630							1	1	1	1	1								1	1	1	1	
	CM1-800											1											1	
	RT16-00/40 3P	6	8	10	12								6	8	10	12								
	RT16-00/50 3P					6	8	10	12								6	8	10	12				
	RT16-00/80 3P									6	8	10	12								6	8	10	12
	XD1-16	6	8	10	12								6	8	10	12								
	XD1-20					6	8	10	12								6	8	10	12				
	XD1-30									6	8	10	12								6	8	10	12
SC-E1PN5-C	6	8	10	12								6	8	10	12									
SC-E2PN5-C					6	8	10	12								6	8	10	12					
SC-E3PN5-C									6	8	10	12								6	8	10	12	
BCM3-0415-16-3	6	8	10	12								6	8	10	12									
BCM3-0415-20-3					6	8	10	12								6	8	10	12					
BCM3-0415-30-3									6	8	10	12								6	8	10	12	
占用高度 Height mm	1760												1760											
柜宽 Width mm	600	800	800	600	600	800	1000	1000	600	800	800	1000	600	800	800	600	600	800	1000	1000	600	800	800	1000
备注 Remarks	1. 断路器选用电磁(瞬时)脱扣器型。 2. CM1断路器可用同规格CM2断路器代替。 3. 断路器配手动操作机构。 4. 加装散热风机。												1. The circuit breaker will be equipped with electromagnetic (instantaneous) release. 2. CM1 Circuit Breaker can be replaced by the same specific CM2 Circuit Breaker. 3. Equipped with hand-driven Operating Mechanism of Circuit Breaker. 4. Added Radiating Fan.											