ECC®

ECC-MNS

低压抽出式开关柜

Low Voltage Withdrawble Switchgear

中国·上海中科电气集团

SHANGHAI CHINA-SCIENCE ELECTRIC GROUP, CHINA

上海人民电力设备股份有限公司

SHANGHAI RENMIN ELECTRIC POWER EQUIPMENT CO., LTD.

概述

本系列低压抽出式开关柜是一种用标准模件由工厂组装（FBA）的组合式柜型，其技术已达到九十年代末国际水平。

本系列低压抽出式开关柜适用于发电厂、变电站、石油化工、冶金轧钢、交通能源、轻工纺织等厂矿企业和住宅小区、高层建筑等场所、作为交流50~60Hz，额定工作电压交流660V及以下的电力系统的配电设备的电能转换、分配和控制之用。

本装置符合GB7251.1《低压成套开关设备》及JB/T9961《低压抽出式成套开关设备》国家专业标准、并符合IEC439-1、VDE0660第五部分等国际专业标准。

正常使用环境条件

- 周围空气温度不高于+40℃，不低于-5℃，并且24h内气平均温度不高于+35℃。
- 大气条件：空气清洁，相对湿度在最高温度为+40℃时不超过50%，在较低温度是允许有较高的相对湿度，例如+20℃时为90%，但应考虑到温度变化，有可能会偶然的产生凝露。
- 海拔高度不超过2000m。
- 本装置适应于以下温度的运输和储存过程：-25℃至+55℃的范围之间，在短时间内（不超过24h）可达+70℃，在这些极限温度下装置不应遭到任何不可恢复的损伤，而且在以上条件下应能正常工作。
- 如果上述使用条件不能满足时，应由用户和制造厂协商解决。
- 当本装置使用于海上石油钻采平台和核电站时，应另行签订技术协议。

General

ECC-MNS Low Voltage Withdrawout Switchgear (hereinafter referred to as the Cubicle) is a kind of modular low voltage switchgear by factory based assembly (FBA) of standard modular units with a technology of global advance level in end 1990'.

The cubicle is suitably used in power plants, substations, petro-chemicals metallurgy and steel roll, transportation and energy source, light industry and textile enterprises, residential areas and high rises etc. as a kind of distributing device in AC 50 ~ 60Hz, nominal voltage up to 660V electri power systems for electrical transformation, distribution and control.

The Cubicle complies with China national and professional standards such as GB7251.1 "Low Voltage Switchgear" and JB//T9961 "Low Voltage Withdrawout Switchgear", and international professional standards such as IEC439-1 and VDE0660 Part 5 as well.

Working Conditions

- Ambient temperature: Max. +40°C, Min. -5°C, and the average temperature within 24 hours not over +35°C.
- Atmosphere condition: Clean air, relative humidity not over 50% at the maximum temperature of +40°C and higher relative humidity allowed at lower temperature, say, 90% at +20°C, yet accidental condensations due to temperature fluctuation should be taken into consideration.
- Altitude: Not exceeding 2000 meters above sea level.
- Storage and transportation are supposed to be made in a temperature range between -25°C and +55°C with the extreme temperature up to +70°C within a short term not over 24 hours. The Cubicle should not be subjected to incurable damage at extreme temperatures and is supposed to operate normally under the above conditions.
- If the above mentioned conditions can not be available, discussions should be made between customers and the manufacturer to work out a solution.
- Otherwise technical agreement should be signed if the Cubicle is to be used at an offshore petroleum platform or in a nuclear power plant.

基本技术参数
Basic technicaldata

电气性能Electrical parameters	
额定绝缘电压Rated insulating voltage	660 V
额定工作电压Rated working voltage	380V、660V
主母线最大工作电流Maximum working current for main busbar	5000A
主母线额定耐受电流Rated short time withstand current of main busbar	100KA
主母线额定峰值耐受电流Rated peak value withstand current of main busbar	220KA
配电母线（垂直母线）最大工作电流Maximum working current of distributing busbar(vertical)	1000A
配电母线（垂直母线）峰值电流：Peak current of distributing busbar(vertical busbar)	
标准型Standard type (maximum value)	105KA（最大值）
加强型Enforced type (maximum value)	176KA（最大值）
防护等级Class of protection	
符合IEC529、DIN40050标准In compliance with IEC529, DIN40050	
IP30对大于φ2.5mm固体防护Protection against solid objects of greater than φ2.5mm as specified in IP30	
IP40对大于φ1.0mm固体防护Protection against solid objects of greater than φ1.0mm as specified in IP40	
IP54对尘埃和任意方向喷溅作防护Protection against dust and liquid spray at all directions as specified in IP54	
（订购IP54防护等级时应与制造厂协商）(Discussion should be made between customer and manufacturer if apparatus with IP54 is ordered)	

柜体结构

开关柜柜体基本结构是由C型型材装配组成。C型材是以E=25mm为模数安装孔的钢板弯制而成。全部柜架及内层隔板都作镀锌纯化处理。四周门板，侧板则作高压静电喷塑。柜体基本结构见图1所示：柜体基本尺寸见图2、表1、表2。

正常使用环境条件

- **动力配电中心柜（PC）**

可采用Emax、MT、3WN、AH、ME系列等断路器

- **电动机控制中心柜（MCC）**

由大小抽屉组装而成，各回路主开关采用高分断塑壳断路器或旋转式带熔断器的负荷开关。功率因数自动补偿柜（带有手动、自动及运动功率因数补偿装置）

Cubicle frame structure

The basic structure of cubicle body is of Profile C assembly. Profile C is a kind of bent sheet steel with modular E=25mm for fixation holes. All frames and internal partitions are treated with zinc-plating and inactivation. All door plates and side walls of the cubicle is treated with high voltage static plastic spray. Fig. 1 shows the basic structure, Fig. 2 and Tables 1 & 2 show the fundamental dimensions of the Cubicle.

Diversion of cubicles

- Power distribution center cubicle (PC)

Types Emax, MT, 3WN, AH, ME Series of circuit breakers may be applied.

- Motor control center cubicle (MCC)

Formed by different types of drawers, the main switching devices are high breaking capacity MCCB or rotating type load switch with fuses. Automatic compensating cubicle is of manual, automatic and remote power factor one.

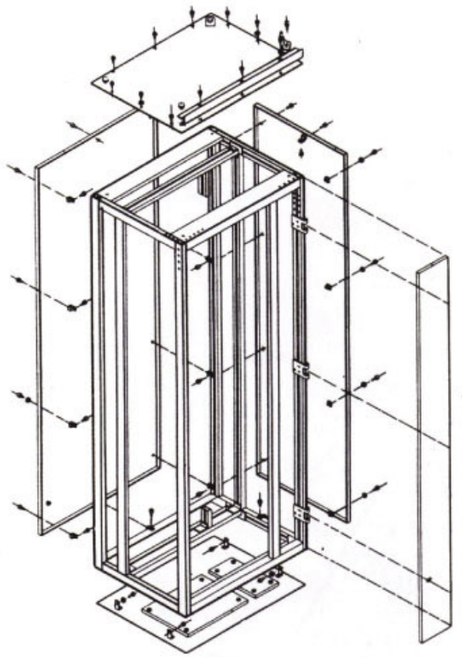

图1　C型型材组成的柜架结构
Fig. 1　Cubicle Frame made of C Profile

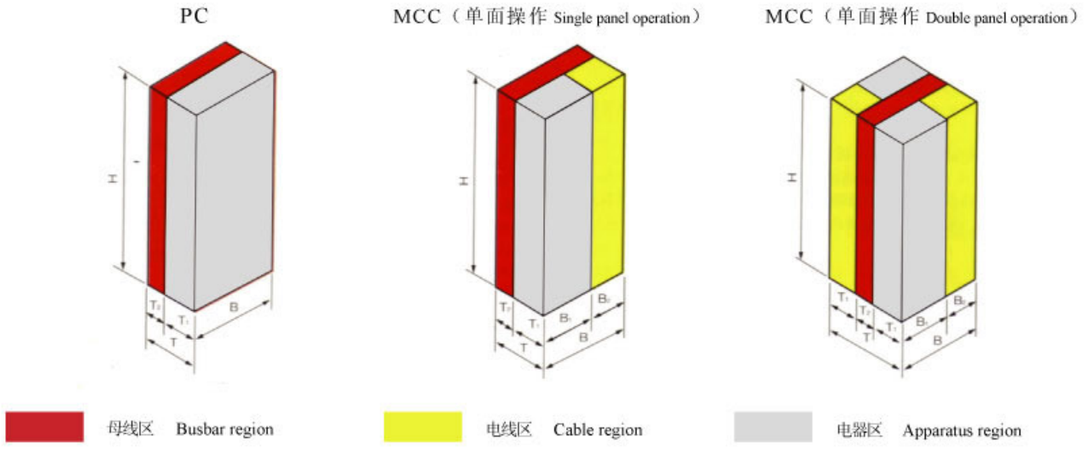

图2 柜体示意图
Fig. 2 Schematic Diagram of the Cubicle Frame

A 动力配电中心（PC）柜

表1 (Table 1) Unit: mm

高 Height	宽 Width	深 Depth T	T_1	T_2	备注 Note
2200	400	1000	800	200	主母线转接
2200	400	1000	800	200	F_1s-1250-2000 ME630-1605
2200	600	1000	800	200	F_2s-2500
2200	800	1000	800	200	F_4s-3200 ME2000-3200
2200	1000	1000	800	200	F_5s-4000 ME3205
2200	1200	1000	800	200	ME4005

B 电动机控制中心（PC）柜

表2 (Table 2) Unit: mm

高 Height	宽 Width B	B_1	B_2	深 Depth T	T_1	T_2	备注 Note
2200	1000	600	400	600	400	200	单面操作 Single panel operation
2200	1000	600	400	1000	400	200	双面操作 Double panel operation

柜体的分区设计

◆ 动力配电中心（PC）

✲ PC柜内分割成四个隔室：

水平母线隔室：在柜的后部；

功能单元隔室：在柜前上部或柜前左边；

电缆隔室：在柜前上部或柜前右边；

控制回路隔室：在柜前上部；

✲ 分隔措施：

水平母线隔室与功能单元隔室、电缆隔室之间用钢板分隔。

控制回路隔室与功能单元隔室之间用阻燃型聚苯醚塑料罩壳分隔。

左边的功能单元隔室与右边的电缆隔室之间用钢板分隔。

✲ 柜内安装的框架式断路器，均能在关门状态下实现柜外手动操作，观察断路器的分合闸状态和根据操作机构与门的位置关系，判断出断路器在试验位置还是在工作位置。

✲ 主电路与辅助电路之间设计成分隔结构，仪表、信号灯和按钮等组成的辅助电器单元，均安装于塑料板上，板后用阻燃型聚胺脂发泡塑料做成的罩壳与主电路分离。

◆ 抽出式电动机控制中心和小电流的动力配电中心(MCC)

抽出式MCC柜内分成三个隔室，即柜后的水平母线隔室，柜前部左边的功能单元隔室，柜前部右边的电缆隔室。水平母线隔室与功能单元隔室之间用阻燃型发泡塑料制造的功能板分隔，电缆隔室与水平母线隔室、功能单元隔室之间用钢板分隔。

MCC（电动机控制中心）的抽屉分为以下五种

8E/4：高200×宽150×深400mm

E/2：高200×宽300×深400mm

8E ： 高200×宽600×深400mm

16E： 高400×宽600×深400mm

24E： 高600×宽600×深400mm;

Compartments in cubicle

◆ **Power distribution center (PC)**

✲ PC may be divided into four compartments, i.e., Horizontal busbar compartment situated at rear of the cubicle, Functional busbar compartment located at upper front or left front, Cable compartment at upper front or right front, Control circuit compartment at upper front.

✲ Separation

Horizontal busbar compartment, functional unit compartment and cable compartment are separated with sheet steel, and Control circuit compartment and functional unit compartment are separated with flame retardant cover made from polyesters, Functional unit compartment in left and cable compartment in right are separated with sheet steel.

✲ The air circuit breaker mounted inside the cubicle can be manually operated and the ON / OFF status of the breaker can be seen visually outside of the cubicle with the cubicle door closed. And still more, according to position of operating mechanism and the door, we can judge whether the circuit breaker is in test position or working position.

✲ Separmed by instruments, signal lamps and pushbuttons are all mounted on plastic plates, and at rear of plates, covers made from retardant polyurethane foam plastics separate the main circuit.

◆ **Withdrawout motor control center and small current power distribution center (MCC)**

There are three compartments in the MCC cubicle, i.e., horizontal busbar compartment situated at rear of the cubicle, functional unit compartment located in left at the front of the cubicle and cable compartment in right at the front of the cubicle. The horizontal busbar compartment and the functional unit compartment are separated with a functional partition made of flame retardant foaming plastics whereas cable compartment, horizontal busbar compartment and functional unit compartment are separated with a partition made of steel sheet.

The drawers in MCC (motor control center) may be divided into 5 kinds, that is,

8E/4 200mm (height) × 150mm (width) × 400mm (depth)

8E/2 200mm (height) × 300mm (width) × 400mm (depth)

8E 200mm (height) × 600mm (width) × 400mm (depth)

16E 400mm (height) × 600mm (width) × 400mm (depth)

24E 600mm (height) × 600mm (width) × 400mm (depth)

◆ 后出线开关柜结构

为减少开关柜排列宽度而设计的后出线，开关柜的主母线水平安装在开关柜的顶部，柜的后半部为电缆室，进出线电缆均在柜后电缆室连接。开关柜的正面为装置小室，安装开关设备的功能单元。该系统设计将开关柜侧面的电缆室转移至后半柜，大大减少了开关柜的排列宽度，以进一步满足变电所空间布置的要求。

馈电柜柜宽600mm，深1000/1200mm，顶部为独立的主母线室，与装置小室隔离。正面装置小室有效安装高度为72E（E=25mm），经多功能板与后部电缆室隔离，充分利用了开关柜的安装空间，结构紧凑，单元配置灵活。背面电缆室带门，安装及维护方便。

进线规的宽度按进线单元的框架电流确定，推荐款宽度为400/600/800/1000mm，柜深1000mm。

◆ Cubicle structure for connection at rear

The scheme of outgoing at rear is designed purposely for reduction of cubicle layout width. The main busbar of the rear outgoing cubicle is horizontally laid out on top in the cubicle. The cable compartment is located at rear part of the cubicle, where incoming and outgoing cables are connected there. In front of the cubicle is situated a device compartment which holds functional units. This kind of the system design features cable compartment located at rear half of cubicle compared with conventional design of cable compartment located on side part of cubicle. Eventually, this will greatly reduces the layout width of cubicle so as to further satisfy the space requirement of the substation layout.
Feeder cubicle has its cubicle width of 600mm, depth of 1000/1200mm, with a separate main busbar compartment at top separated from device compartment in the front. The effective mounting height of the device compartment is 72E (E=25mm) and it is separated from rear cable compartment with a multi functional partition. This makes full use of the assembly space of the cubicle, featuring compact and flexible in unit configuration. By the way, there is a door for rear cable compartment, which is very easy for assembly and maintenance.
The width of the incoming cubicle depends on the frame current of the incoming unit and here we recommend a cubicle width of 400/600/800/1000mm and a cubicle depth of 1000mm.

母线系统

开关柜可配置二组主母线，安装在开关柜的后部母线室。二组母线可分别安装在柜后上部或下部。根据进线需要，上下二组母线可分别采用不同或相同截面的材料。二者既可单独供电，也可并联供电，也可用作后备电源。

配电母线（垂直母线）组装在阻燃型塑料功能板中，既可防止电弧引起的放电，又能防止人体接触，通过特殊联接件与主母线联接。

柜内设有独立的PE接地系统和N中性导体。二者贯穿整个装置，安装在柜前底部及右侧，各回路接地或接零都可就近联接。整个母线系统安装见图3所示。柜架结构间全部采用自攻螺钉联接，具有较高的接地可靠性。

中性母线和中性保护母线平行地安装在功能单元隔室的下部和垂直安装在电缆室中。N线与PE线之间如用绝缘子相隔，则N线与PE线分别使用，若二者之间如用导体短接，即成PE/N线。

保护接地系统

装置的保护电路由单独装设的并贯穿于整个排列长度的PE线（或PEN线）和可导电的结构件二部分组成。

装置中金属构件，除外表的门和封板外，其余都经过镀锌处理，在结构件的连接处，都经过精心设计，使其能通过一定的短路电流。

辅助电路和电缆槽

在功能单元隔室的顶部装有辅助电路和电缆槽，槽内可按放柜间连接线和公用电源线。

电缆和控制线连接

在抽出式组件的一侧，电缆小室中装有接线装置和端子，用于连接出线电缆和控制线和组件之间的接线。进出线电缆和控制线接线装置布置在电缆小室的右侧的道轨上。主回路端子位于后部，控制线端子位于前方45℃方向。控制线端子的接线可用螺丝插入式线鼻子连接或用铜街头来连接。抽出式组件的转接件上主回路端子小于63A的，配有PE端子。

Busbar system

The cubicle may be equipped with two groups of main busbars in the cable compartment at rear. These two groups of busbars may be laid out in up or low parts at rear of the cubicle. According to actual needs, the two groups of busbars may be of same or different cross sectional area used for power supply independently, in parallel and for spare respectively.
Distribution busbar (vertical busbar) is assembled between flame retardant functional plastic plates resulting in prevention of discharge due to arc and of accident access to human body. They are connected to the main busbar through particular connecting parts.
There are independent PE earthing system and N neutral conductor allover through in cubicle. They are mounted at bottom and on the right side of cubicle for circuit earthing and neutral purposes respectively at the nearest points. Fig. 3 shows the whole busbar system arrangement in cubicle. The structural parts of the cubicle frame are connected together with self tapping screws with consequent higher earthing reliability.
Neutral busbar and neutral protective busbar are arranged parallelly on lower part of the functional unit compartment and vertically in the cable compartment. Insulators mounted between N and PE busbars hint that the E and PE busbars are used respectively whereas conductor connecting the two reveals that they are PE/N busbars.

Earthing protective system

The earthing protective system is composed of two parts, i.e., a PE conductor which is mounted respectively arranged along the whole length of the cubicles laid out, and conductively structural parts.
All the metal structural parts except for doors and enclosed plates should be galvanized. The joints between the structural parts are sophisticatedly designed so as to let them carry through a certain amount of short circuit current.

Auxiliary circuits and cable duct

Auxiliary circuits and cable duct are situated on top of the functional unit compartment. In the cable duct, there are connecting wires between cubicles and common power cords.

Connection of cable and control wires

There are connection devices and terminal blocks equipped in the cable compartment for connections of outgoing cables, control wires and assembly parts. The incoming and outgoing cables and control wire devices are located on the guiding rails on right side of the cable compartment. The terminal blocks for main circuit are situated at rear and those for control wires in the front in 45° direction. The connection between control wires and terminal blocks may be made with screws and plug-in pins or copper connectors. For those main circuit blocks rated less than 63A for trans-connection items in withdrawout assembly parts, there PE Terminals.

安全保护系统

每柜设有一块或一组组燃型的塑料功能板，安装在主母线室与电器室之间，其作用为有效防止开关元件因故障引起的飞弧与母线之间短路造成的事故，采取了严密的隔离措施。

上下层抽屉之间有带通风孔的镀锌金属底板相隔离，较小的8E/4，8E/2抽屉其四周均为组燃型工程塑料件，故相邻回路之间有较强的绝缘隔离作用。

柜内采用了多种塑料组件以支撑带电部分，这些组件是无卤素的，并具有CT1300等级以上的防漏电性能。

Safety protection system

As a strict isolating measure, a piece or a group of flame retardant functional plates are placed between main busbar compartment and apparatus compartment in each cubicle for efficient prevention of the accidents caused by short circuit between flashover and busbar.

There is a galvanized metal partition with ventilating holes between up and down layers of the drawer. The smaller 8E/4 and 8E/2 drawers are surrounded with flame retardant engineering plastic so that the there is an intensive insulating isolation between adjacent circuits.

The live parts in cubicle are supported by several kinds of non-halogen plastics with current leakage proof in ratings of more than CT1300.

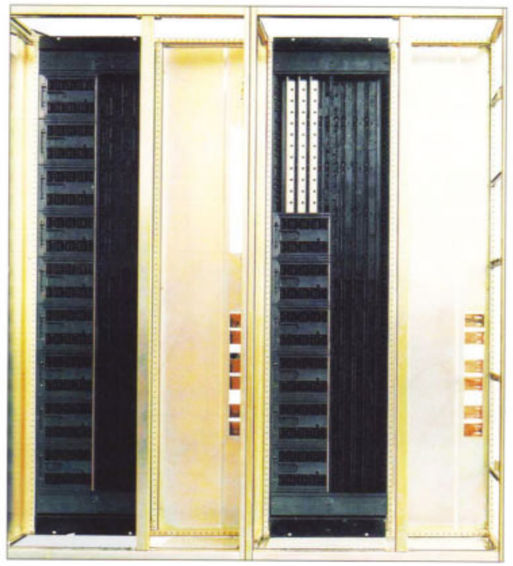

图3　母线系统
Fig. 3　Busbar system

抽屉类型

有五种标准尺寸，都是以8E（200mm）高度为基准：

- 8E/4：在8E高度空间组装4个抽屉单元。
- 8E/2：在8E高度空间组装2个抽屉单元。
- 8E：在8E高度空间组装1个抽屉单元。
- 16E：在16E（400mm）高度空间组装1个抽屉单元。
- 24E：在24E（600mm）高度空间组装1个抽屉单元。

五种抽屉单元可在一个柜体作单一组装，也可用作混合组装。一个柜体中作单一组装时最多容纳抽屉单元数见表3示。

Typical drawers

There are 5 typical drawers with a height of 8E (200mm) as a reference:

- 8E/4　Four such drawers can be hold in a space of 8E in height
- 8E/2　Two such drawers can be hold in a space of 8E in height
- 8E　One such drawer can be hold in a space of 8E in height
- 16E　One such drawer can be hold in a space of 16E (400mm) in height
- 24E　One such drawer can be hold in a space of 24E (600mm) in height

These five different kinds of drawers may be assembled in cubicle both in same or mixed mode. Table 3 shows the maximum content when all the same drawers assembled in one cubicle.

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安全保护系统

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上下层抽屉之间有带通风孔的镀锌金属底板相隔离，较小的8E/4，8E/2抽屉其四周均为阻燃型工程塑料件，故相邻回路之间有较强的绝缘隔离作用。

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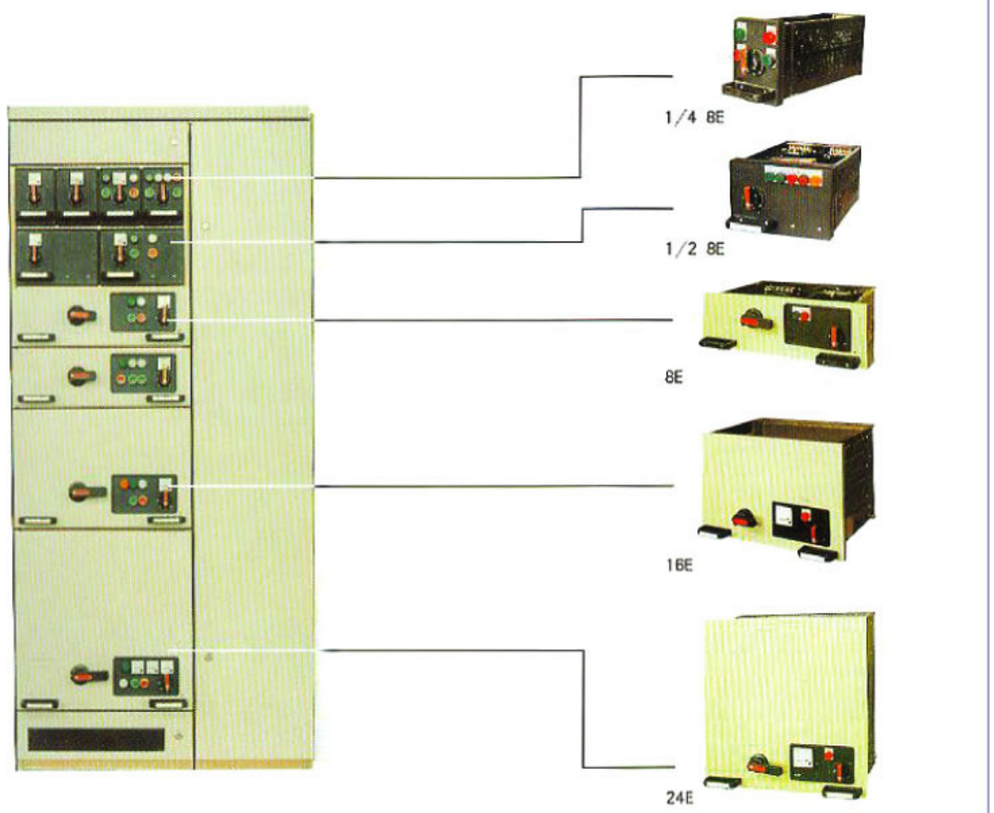
There is a galvanized metal partition with ventilating holes between up and down layers of the drawer. The smaller 8E/4 and 8E/2 drawers are surrounded with flame retardant engineering plastic so that the there is an intensive insulating isolation between adjacent circuits.

The live parts in cubicle are supported by several kinds of non-halogen plastics with current leakage proof in ratings of more than CT1300.

表3　Table 1　Unit: mm

抽屉型式 Drawer	8E/4	8E/2	8E	16E	24E
最多容纳单元数 Max. units	36	18	9	4	3



抽屉的电器和机械连锁

抽屉单元有可靠的机械连锁位置，通过操作手柄的控制，具有明显准确的合闸、试验、抽出和隔离位置。操作机构功能见图4、图5。

为加强安全防范，早作手柄定位后可加上挂锁，最多可加三把锁，见右图。

抽屉单元到位后必须严格按照图4、图5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。

Electrical and mechanical interlocking for drawers

With a reliable mechanical interlocking position set for the drawer unit, there are obvious and accurate closed position, test position and disconnected position controlled by an operating handle. The actual function of the operating mechanism is shown in Figs. 4 and 5.

For purpose of safety prevention, paddle locks may be used after the operating handle is set at a certain position. As shown in the right figure, a maximum of 3 paddle locks may be used for thispurpose.

Caution: After the drawer unit set at a certain position, the operation of the switch must strictly be followed the descriptions in Figs. 4 and 5. Otherwise, the structural parts of the mechanism will be easily damaged.

操作开关功能示意图

Schematic drawings for functional operation of the switch

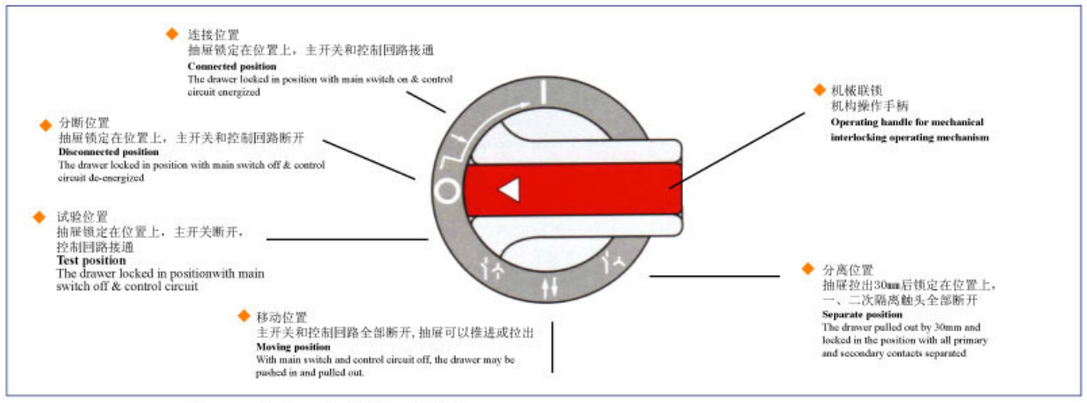


图4　8E/4和8E/2操作开关功能　　Fig. 4 Function of 8E/4 and 8E/2 operating switch

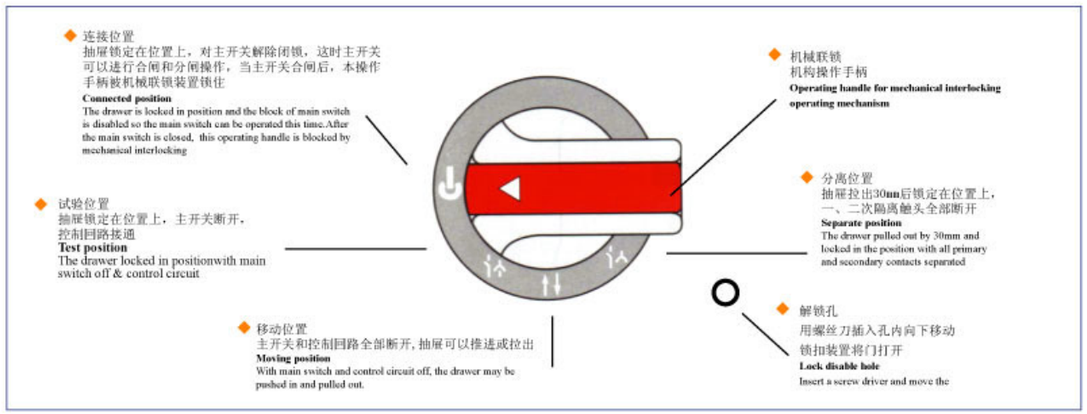


图5　8E、16E、24E、操作开关功能　　Fig. 5 Function of 8E 16E and 24E operating switch

一次方案的排列组合

◆ 功能单元隔室的总高度为72E。

◆ 在同一台装置中，功能单元的一般排列规律是，小功能单元在上、大功能单元在下。

◆ 8E/4抽屉为4个组成一个8E安装单元，8E/2抽屉为2个组成一个8E安装单元，或2个8E/4抽屉和1个8E/2抽屉组成一个8E安装单元。

◆ 方案中所画的电流互感器为本方案中最多安装数量（方案01至19，21至39中，可增加一只电流互感器，用于无用功率补偿回路）在实际使用中，也可按系统需要减少或不装。

◆ 装置的深度有600mm（MCC单面操作柜）和1000mm（PC和MCC双面操作柜）二种，推荐PC和MCC分开排列使用。当使用分断式功能板时，可允许PC和MCC混合装配在同一台柜中。

◆ 当PC与MCC二种装置相邻排列时，则：

①当MCC双面柜（或600深度的MCC单面柜）与PC柜相邻排列时，在二柜之间必须加转接柜（其宽度为400mm）如图6例所示。

②当单面操作的MCC加深到1000mm时，则可以不加转接柜，如图6例2所示。

Arrangement and combination of primary schemes

◆ The total height of the functional unit compartment is 72E.

◆ In the same equipment, the general arranging rule of the functional units is: Small units located at top and large units lower.

◆ Four 8E/4 drawers form an 8E assembly unit, similarly, two 8E/2 drawers form an 8E assembly unit, or, two 8E/4 drawers and one 8E/2 drawer form an 8E assembly unit.

◆ The number of current transformers in the scheme is the maximum mounting quantity of them. In Schemes 19 and 21 to 39, one current transformer may be added for reactive power compensation circuit. In actual situations, the number of current transformers may be reduced or even no current transformer is used as per requirement of the system.

◆ Wherever separated functional plate is used, PC and MCC are allowed to be mounted in mixed way in a same cubicle.

◆ If PC and MCC are arranged adjacently,

a. A trans-connection cubicle with a width of 400mm must be added when an MCC double panel cubicle or an MCC single panel cubicle with a depth of 600mm is arranged adjacently with a PC cubicle, as shown in Example 1 of Fig. 6.

b. When the depth of an MCC increases to 1000mm, there is no need to add a trans-connection cubicle as aboAA shown in Example 2 of Fig. 6.

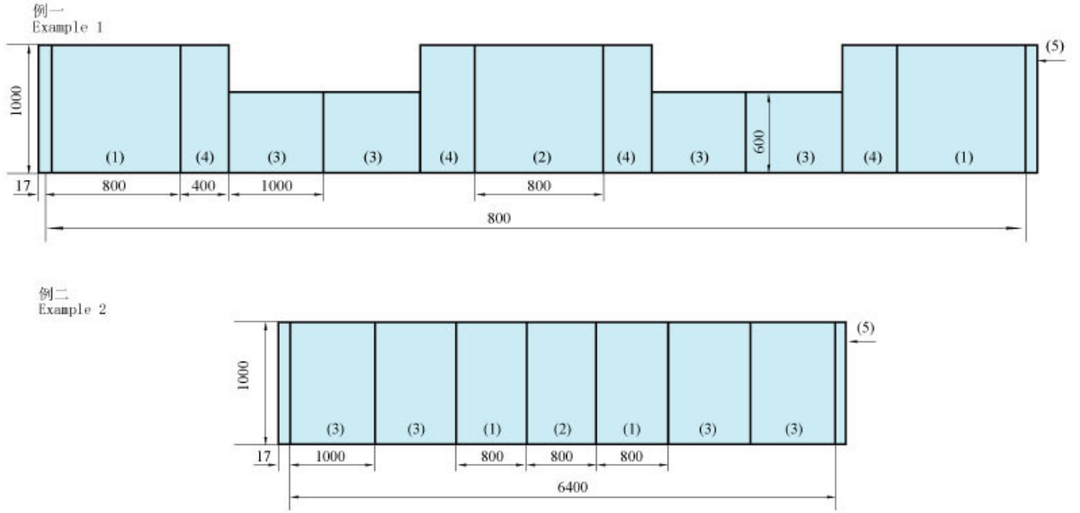


图6　组合方式示意图
Fig. 6 Schematic drawing of combination mode

注：
(1) —— 受电柜（PC柜）
(2) —— 联络轨（PC柜）
(3) —— 电动机控制柜（MCC柜）
(4) —— 主母线转接柜
(5) —— 侧板

Note:
(1) -- Power Acceptance Cubicle (PC Cubicle)
(2) -- Coupling Cubicle (PC Cubicle)
(3) -- Motor Control Center (MCC Cubicle)
(4) -- Main Busbar Trans-connection Cubicle
(5) -- Side Wall

安装、使用、维修

◆ 安装参考图见图7、图8。

◆ 当装置运抵目的地后，首先应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。

◆ 装置推荐为离墙安装式，也可以靠墙安装，安装基础平面要求平整，基础槽钢的水平误差为1/1000，总偏差3mm。

◆ 所有导电部分的螺栓固定方式推荐使用8.8级和张紧垫圈，其旋紧力矩推荐值见下表：

表4 Table 4

螺栓规格 Specification	旋紧力矩 Recommended torque
M6	9.5
M8	25
M10	45
M12	80
M16	200

◆ MCC方案附件供应二种规格的电缆头护套和一定数量的二次回路用的铜接头。（为适应铜接头的冷压加工，二次电缆推荐使用多锌软线）。

◆ 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，需进行下列各项检查和试验：

✲ 检查装置内，安装的电气设备和控制接线是否符合工厂的图纸要求。

✲ 用手动操作各种开关，应操动灵活，无异常和卡轧现象。

✲ 检查机械连锁机构，电气联锁装置的动作是否正确可靠，应符合系统要求。

✲ 检查主电路和控制回路的绝缘电阻是否符合规定要求。

✲ 检查装置内所安装的电气设备接触是否良好，是否符合该电器本身的技术条件。

✲ 检查装置内部有无异物及各部件的安装螺钉是否有松动现象出现。

Installation, operation and maintenance

◆ The overall dimensions are shown in Figs. 7 and 8 and the installation reference drawings are shown in Figs. 9 and 10.

◆ On arrival at the destination, check the completeness of the package first, if it is not to be installed immediately, store it in a dry and clean place.

◆ The cubicle is recommended not to be installed directly against wall, however, it may also be installed directly against wall. The basic installation plane should be smooth and even with the horizontal error f the basic channel steel 1/1000, the total length error 3mm.

◆ The bolt fixation mode of all conductive parts is recommended to apply grade 8.8 and tension washers, the tightening torque being recommended as following table.

◆ As per MCC scheme, two kinds of cable terminal bushings and a certain amount of secondary circuit copper connectors will be supplied. For actual application of the bushing, please refer to Fig. 12. In order to cater for cold pressure machining on copper connectors, stranded flexible wires are recommended for secondary cables.

◆ On completion of cable connection, the bottom of the equipment should be enclosed to prevent rodent animals from intrusion resulting in short circuit accident.

◆ After installation and regulation, following items of inspection tests should be conducted prior to be put into operation.

✲ Check whether the electrical apparatus and control connections are in compliance with requirements specified in drawings of the manufacturer.

✲ Manual operation of various switches with a feeling of flexibility, no abnormal and awkward phenomenon.

✲ Check the mechanical interlocking mechanism and make sure that its operation is correct and reliable as per requirement of the system.

✲ Measure the insulating resistance of the main and control circuits to see that the measured values comply to the requirements specified.

✲ Check whether the contacts of the electrical apparatus installed are in good condition, whether they comply with technical conditions of the apparatus themselves.

✲ Check if there are any foreign objects and if there are loosening in fixation screws for various parts.

◆ 抽出式MCC操作须知：

✲ 抽屉底部应正确进入导体向件后，才能向柜内推动，否则将会发生损坏抽屉或拉不出等不良现象。

✲ 8E/4和8E/2抽屉面板上的符号标志和作用见图4，图中从分断位置“O”到工作位置“|”箭头表示为：先将操作手柄向里推进后再将手柄从“O”旋转到“|”即可，返回时不须推动，只要将手柄“|”旋向“O”，放手后，手柄自动弹出。

✲ 8E～24E抽屉面板上的符号标志和作用见图5，当手柄到达工作位置“ ⏚ ”时，机构对主开关解除机械闭锁，这时主开关可以合闸和分闸操作，但是，当主开关合闸后，联锁机构的手柄就不能操作。

在符合标志的右下角门上有一塑料小盖，这是门的解锁机构，操作过程如下：当抽屉在工作位置时，如果要开门，则先将小盖拔出，然后用螺丝刀插入孔内向下移动锁扣即可开门，开门后务必将塑料小盖盖上，否则将破坏原有的防护等级。

装置的运输和存放

◆ 装置不许倾翻和遭受剧烈震动。

◆ 装置在拆箱后吊装时应使用运输角板，二根钢线丝绳的夹角应≤120°，如用铲车，滚棍或撬棒，均不允许直接在装置的底架上进行。

◆ 装置在安装就位时如要小距离移动位置，则可在底架的四个角上撬动。

◆ 在装置内不许随意拆卸电器产品和零部件。

◆ 应防止雨淋受潮，环境温度按本样本的有关规定。

产品的成套性

开关柜附有装箱单，产品合格证，产品使用说明书，及必要的图纸，随即附件有门钥匙以及根据配套清单所提供的备品备件等。

订货须知

◆ 用户应提供下列资料

◆ 主电路方案单线系统图。

◆ 原理图或原理接线图。

◆ 每柜所装电器设备的详细规格及数量，并填写订货规范书。

◆ 开关柜的排列及组合图，平面布置图。

◆ Attention should be paid to the operation of withdrawout type MCC:

✲ Only when the bottom of the drawer enters correctly into the direction guiding rail can it be pushed in further more in cubicle. Otherwise, the drawer will damage or will be impos
sible to be pulled out etc..

✲ Figure 4 shows the symbol labels on drawer panels for 8E/4 and 8E/2 and their functions. In the figure, we can see a symbol 'O' for open position and a symbol 'I' for working position. Suppose the arrow of the handle points to the symbol 'O'. If we want to close the circuit breaker in the drawer, first we push the handle inside further more and then we turn the handle from 'O' to 'I'.
If we return the handle from I to 'O', simply we turn in counterclockwise from 'I' to 'O' without need to push it inside further more, and the handle will automatically eject out.

✲ Figure 5 shows the symbol labels on drawer panels for 8E ~ 24E and their functions. If the handle reaches the working position, '⏚'the mechanism disables mechanical block on the main switch. At this, the main switch may be ON or OFF operated just at will. However, when the main switch in closed position, the handle of the interlocking mechanism is impossible to be operated. At the right lower corner of the symbol panel, there is a small plastic cover which is a part of block disable mechanism. The operating procedures are as follows: If we want to open the door when the drawer is in working position, pull out the cover, insert a screw driver into the hole and push it downwards to move the latch, then the door may be open. After that, make sure that the small plastic cover should be put in place, otherwise, the class of protection will be de-graded.

Arrangement and combination of primary schemes

◆ No tilted, no upside down, nor subjected to violent shock.

◆ A transportation pallet should be used for lift after unpacking . When lift, the angle formed by two lift steel wires should be equal to or less than 120° as shown in Fig. 11. If forklift, roll bars and prizes are applied, direct contact to the bottom frame of the equipment for lift is totally not allowed.

◆ If slight displacement is needed after the equipment is installed in place, prize the four corners of the bottom frame a little bit.

◆ No dismantle electrical apparatus, components and parts.

◆ No exposed to rain and moisture. The ambient temperature should complies to requirements specified in the instructions.

Completeness of the product

The switchgear should be delivered together with packing list, product certificate, operation instructions, necessary drawings, and accessories such as door keys and spare parts as per detailed list.

Information given for ordering

◆ Single line diagram for circuit schemes

◆ Schematic drawings or wiring drawings

◆ Detailed specification and quantity of the apparatus in each cubicle and filled ordering specifications.

◆ Cubicle arrangement and combination drawings, plane layout etc.

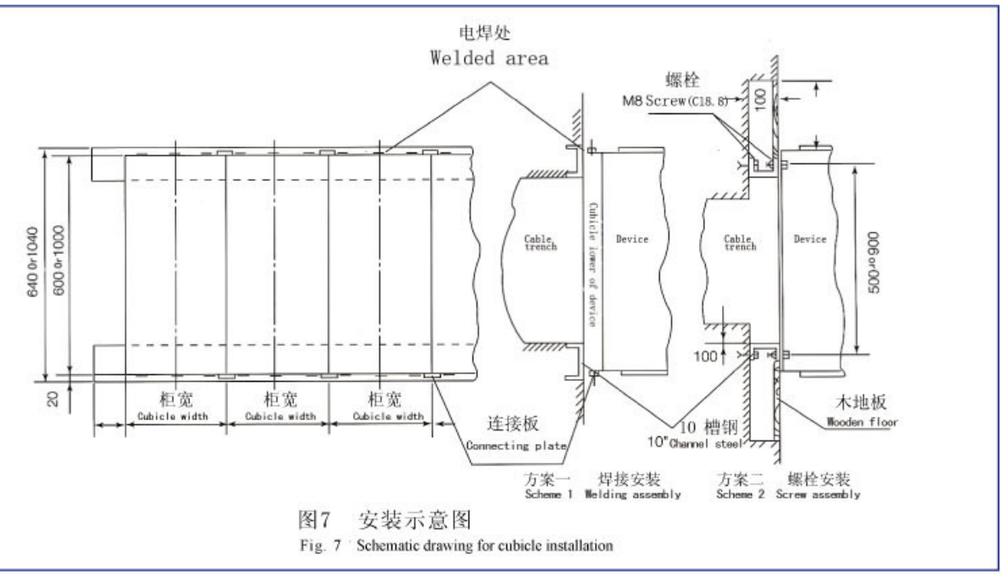


图7 安装示意图

Fig. 7 Schematic drawing for cubicle installation

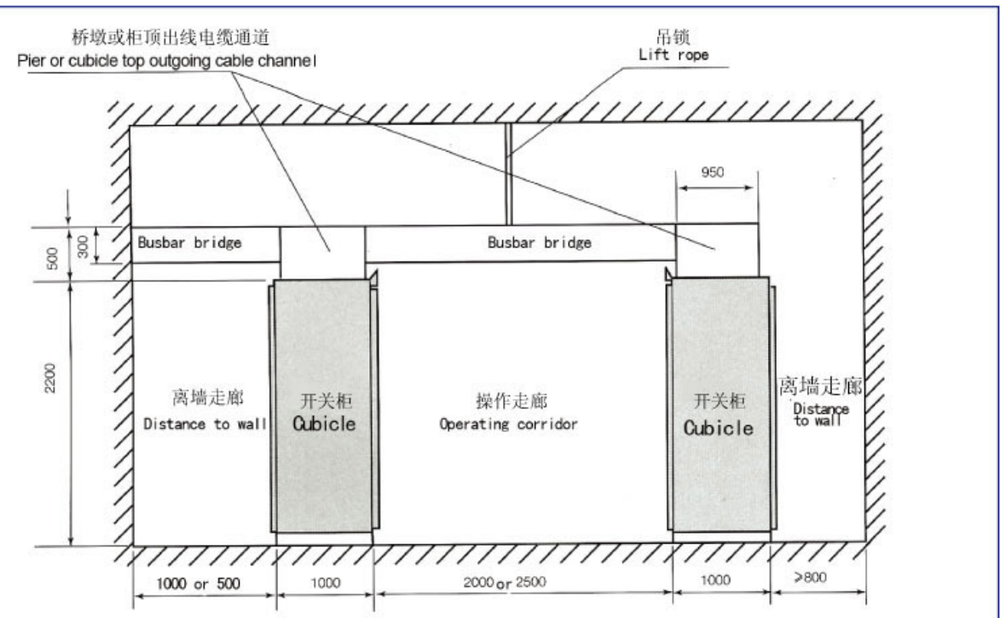


图8 母线桥安装示意图

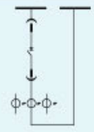
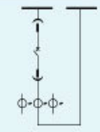
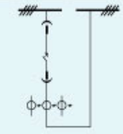
Fig. 8 Schematic drawing for busbar bridge installation

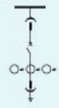
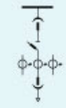
注：制造厂可根据用户要求提供各种形式的母线桥

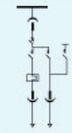
Note: The manufacturer will offer different kinds of busbar bridges according to requirements of our customer.

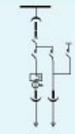
方案编号 Scheme No.		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
一次方案 Primary scheme																					
柜宽（mm） Cubicle width		400	600	800	1000	600	800	1000	600	800	1000	600	800	1000	600	800	1000	600	800	1000	
设备室高 Height of apparatus compartment		72E	72E	72E	72E	72E	72E	72E		72E		72E			72E						
最大工作电流（A） Maximum working current		1500	1500	2300	3150	1500	3200	4000	1600	3200	4000	2000	3200	4000	2000	3000	3600	1500	3200	4000	
主要设备 Main apparatus		MT1605 FI-1600 M16 EHG-60II	MT630~ MT637~ MT1605 EHG-100	MT2000~ MT2505 MT1605 EHG-100	ME3200~ ME2505 ME3205 EHG-120II	AH-63B~ AH-63B EHG-100	AH-20CH~ AH-63B ME1605 EHG-100	AH-40C~ ME1605 EHG-120II	M8~ M16 EHG-100	M20~ M32 EHG-120II	M40 EHG-120II	F1-1250 至 to F1-2000 4级开关 4-pole circuit breaker EHG-100	I2-2000 至 to I4-3200 EHG-100	I5-4000 EHG-120	F1-1250 至 to F1-2000 4级开关 4-pole circuit breaker EHG-100	I2-2000 I2-3000 F3-3200 4级开关 4-pole circuit breaker	F4-3200 F4-3600 F3-3200 4级开关 4-pole circuit breaker	A1363 AH1603 4级开关 4-pole circuit breaker EHG-60II	M08 M32 4级开关 4-pole circuit breaker EHG-100	M40 4级开关 4-pole circuit breaker EHG-120II	
用途 Application		电缆进线或出线 Cable incoming or outgoing																			

方案编号 Scheme No.		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
一次方案 Primary scheme																					
柜宽（mm） Cubicle width		400	800	1000	1000	600	1000	600	800	1000		600	800	1000	600	800	1000	600	800	1000	
设备室高 Height of apparatus compartment		72E				72E			72E			72E				72E					
最大工作电流（A） Maximum working current		1500	1500	2300	1500	3000	4000	1600	3200	4000		2000	3200	4000	2000	3200	3600		3200	4000	
主要设备 Main apparatus		MT630~ MT1605 M16 EHG-60II	MT2000~ MT2505 EHG-100	MT3200~ ~3250 EHG-120	AH-63B~ AH-160B EHG-100	AH-63B~ AH-63B EHG-100	AH-100CH EHG-120II	M08~ M16 EHG-100	M20~ M32 EHG-120II	M40 EHG-120II		F1-1250 至 to F1-2000 EHG-100	I2-2000 至 to I4-3200 EHG-100	I5-4000 EHG-120	F1-1250 至 to F3-3000 4级开关 4-pole circuit breaker EHG-100	I2-2000 至I4F2-3000 F3-3200 4级开关 4-pole circuit breaker EHG-100	F4-3200 F4-3600 F3-3200 4级开关 4-pole circuit breaker		M08 M32 4级开关 4-pole circuit breaker EHG-100	M40 4级开关 4-pole circuit breaker EHG-120II	
用途 Application		柜顶进出线 Incoming and outgoing at cubicle top																			

方案编号 Scheme No.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	40
一次方案 Primary sche																				
柜宽（1uoshuanmm） Cubicle width	600 400	800	1000	600 400	800	1000	600	800	1000		600	800	1000	600	800	1000	600	800	1000	
设备室高 Height of apparatus compartment	72E			72E			72E				72E			72E				72E		
最大工作电流（A） Maximum working current	1500	2300	3150	1600	3200	4000	1600	3200	4000		1600	3200	4000	1600	3200	3600		3200	4000	
主要设备 Main apparatus	ME630~ ME1605 BHG-100	ME2000~ ME2505 BHG-100	ME3200~ ME3250 BHG-1200	AH-6B~ AH-16B BHG-100	AH-20CH 至 to AH-30CH BHG-100	AH-40C BHG-120	M08至 to M16 BHG-100	M20至 to M16 BHG-100	M40 BHG-120H		FI-1250 至 to FI-2000 BHG-100	F2-2000 至 to F4-3200 BHG-120	F5-4000 BHG-120	FI-1250 FI-1600 4级开关 4-pole circuit breaker BHG-100	F2-2000 F2-3000 4级开关 4-pole circuit breaker BHG-120	F4-3200 F4-3600 4级开关 4-pole circuit breaker BHG-120		M08至 to M32 4级开关 4-pole circuit breaker BHG-120	M40 4级开关 4-pole circuit breaker BHG-120	
用途 Application	母联 Busbar coupling										母联 Busbar coupling									

方案编号 Scheme No.	61	62	63	64	65	66	67	68	71	72	73	74	75	76
一次方案 Primary scheme														
柜宽（mm） Cubicle width	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
设备室高 Height of apparatus compartment	8E/4	8E/2	8E	16E	24E	8E/4	8E/2	8E	8E	16E	8E	8E	16E	16E
最大工作电流（A） Maximum working current	30	50	100	300	600	30	50	200	100	300	100	200	300	500
主要设备 Main apparatus	S503-LV10 -40 或or NC100L- BHG-30	S503-LV10 -GV63 或or NC100L- BHG-30	TG30B TG100B BHG-30	TG225B TG400B BHG-40	TG600B BHG-40	NT-00 KG64B 或or HH17 BHG-40	NT-00 KG64B 或orHH17 BHG-30	NT-00-1 SMP60-1 BHG-40	QSA-63 QSA-125 BHG-40	QSA250 QSA-400 BHG-60	DCHR1-00 125A BHG-40	DCHR1-1 250A BHG-40	DCHR1-2 400A BHG-60	DCHR1- 630A BHG-60
用途 Application	馈线 Feeder										馈线 Feeder			

方案编号 Scheme No.	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
一次方案 Primary scheme																		
柜宽（mm） Cubicle width	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
设备室高 Height of apparatus compartment	8E/4	8E/2	8E/4	8E/2	8E/4	8E/2	8E	16E	24E	8E/2	8E	16E	24E	8E/2	8E	16E	24E	
最大工作电流（A） Maximum working current	7.5	15	7.5	15	7.5	15	45	75	160	15	37	65	110	7.5	15	55	110	
主要设备 Main apparatus	S503 B16-B25 BHG-30	S503 B37-B45 BHG-30	NC100L B16-B25 BHG-30	NC100L B37-B45 BHG-30	S503 或orNC100L B16-B25 T25-TSA45 BHG-30	S503 或orNC100L B37-B45 T25-TSA45 BHG-30	TG-100B B65-B105 T105 BHG-40	TG-225B B65-B105 T107-250 BHG-40	TG-400 EH370 BHG-40	S503 B16-45 T16-TSA45 BHG-30	TG100B B65-85 T105 BHG-30	TG225B B105-170 T105-170 BHG-40	TG400B B250 T250 BHG-40	S503 B16 T16 BHG-30	TG-100B B37 TSA45 BHG-30	TG-225B B45-85 T105 BHG-40	TG225B B105-170 T105 BHG-40	
用途 Application	不可逆 Irreversible				不可逆 Irreversible					可逆 Reversible				Y / △				

方案编号 Scheme No.	95	96	97	98	99	100	101	102	103	104	105	106	107
一次方案 Primary scheme													
柜宽（mm） Cubicle width	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
设备室高 Height of apparatus compartment	8E/4	8E/2	16E	24E	24E	8E/2	8E	24E	24E	8E/2	8E	16E	16E
最大工作电流（A） Maximum working current	7.5	22	55	110	160	15	30	65	100	7.5	15	55	90
主要设备 Main apparatus	NT-00 KG64B B16 T16 或orHH17 BHG-30	NT-00 KG64B B25-45 T25-45 或orHH17 BHG-30	QSA-250 B65-170 T105-170 BHG-40	QSA-400 B170-250 T170-250 BHG-40	QSA-400 B250-370 T250-370 BHG-40	NT-00 KG64B B16-45 T16-45 或orHH17 BHG-30	QSA-125 B65-85 T105 BHG-30	QSA-250 B105-170 T105-170 BHG-40	NT-2 B250 T250 BHG-40	NT-00 B16 T16 BHG-30	QSA-125 B25-45 TSA45 BHG-30	QSA-160 B45-B85 T105 BHG-40	QSA-400 B105-170 T105-170 BHG-40
用途 Application	不可逆 Irreversible					可逆 Reversible				Y / △			

方案编号 Scheme No.	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123
一次方案 Primary scheme									MCC方案接线或1AE 任意组合高度为40E							
柜宽（mm） Cubicle width	1000		1000		1000	1000	1000	1000		400	600	400	600	600	800	600
设备室高 Height of apparatus compartment	72E		72E		72E		72E		32E PC	72E	72E	72E	72E	72E	72E	16E
最大工作电流（A） Maximum working current	1600×2	1600×2	1600×2	1600×2	1600×2	630×3	630×3	630×3	630×3	2500	4000A	2000	4000			
主要设备 Main apparatus	ME/630-MEI1605 (3P/4P)	M08-M10 (3P/4P)	$F_1$1250/$F_2$1600 M08-1600 (3P/4P)	$F_1$1250 至$F_2$1600 (3P/4P)	$F_1$1250 M08 (3P/4P)	1HR30 M08	M08	$F_1$1250	按高度BE或1Dance方案选对组合 As per height of scheme for type BE and 1D combination	BHG-100 BHG-100 或用户自备 or prepared by users				DS862-2 DS862-2 DTS62-2 (最多安装8只) 8 sets be mounted in maximum	DS862-2 DS862-2 DTS62-2 (最多安装12只) 12 sets be mounted in maximum	DS862-3 只
用途 Application	电缆进线或出线 Cable incoming or outgoing								馈电 Feeder	计量 Metering		母联 Bustie		计量 Metering		

方案编号 Scheme No.	124	125	126	127	128	129	130	131
一次方案 Primary scheme								
柜宽（mm） Cubicle width	600	800	600	800	600+200	600+400	600+200	600+400
设备室高 Height of apparatus compartment	72E		72E		72E			
最大工作电流（A） Maximum working current	(8×2) 128	(12×16) 192	(8×16) 128	(12×16) 192	(8×16) 128	(16×16) 256		
主要设备 Main apparatus	QSA-400 NT型or RT20 B30C BHG-40 BCMJ3（10-16KVAR）		QSA-400 NT型or RT20 B30C BHG-40 BCMJ3（10-16KVAR）		DCHR1-2 NT型or RT20 B30C BHG-40 BCMJ3（10-16KVAR）	DCHR1-3 NT型or RT20 B30C BHG-40 BCMJ3（10-16） BHG-40		
用途 Application	自动控制补偿柜 Automatic control compensating cubicle				补偿柜 Compensating cubicle			

方案编号 Scheme No.	136	137	138	139	140	141	142	143	144	145	146	143
一次方案 Primary scheme	6-10KV TM 0.4KV				6-10KV TM 0.4KV				6-10KV TM 0.4KV			
用途 Application	电缆下进，下出 Cable incoming down and outgoing down				电缆下进，母线侧出 Cable incoming down and busbar outgoing at side				电缆下进，母排上出 Cable incoming down and busbar outgoing up			
装置容量（KVA） Apparatus capacity	200-500	630-800	1000-1600	2000-2500	200-500	630-800	1000-1600	2000-2500	200-500	630-800	1000-1600	2000-2500
外形尺寸（长×宽×深） Overall dimensions (L×W×D)	2200 X 1800 X 1200	2200 X 2200 X 1400	2400 X 2400 X 1600	2600 X 2600 X 1600	2200 X 1800 X 1200	2200 X 2200 X 1400	2400 X 2400 X 1600	2600 X 2600 X 1600	2200 X 1800 X 1200	2200 X 2200 X 1400	2400 X 2400 X 1600	2600 X 2600 X 1600
主要设备（电力变压器） Main apparatus (power transformer)	SCB-200/10 SCB-250/10 SCB-315/10 SCB-400/10 SCB-500/10	SCB-630/10 SCB-800/10	SCB-1000/10 SCB-1250/10 SCB-1600/10	SCB-2000/10 SCB-2500/10	SCB-200/10 SCB-250/10 SCB-315/10 SCB-400/10 SCB-500/10	SCB-630/10 SCB-800/10	SCB-1000/10 SCB-1250/10 SCB-1600/10	SCB-2000/10 SCB-2500/10	SCB-200/10 SCB-250/10 SCB-315/10 SCB-400/10 SCB-500/10	SCB-630/10 SCB-800/10	SCB-1000/10 SCB-1250/10 SCB-1600/10	SCB-2000/10 SCB-2500/10

方案编号 Scheme No.	148	149	150	151	152	153	154	155	156	157	158	159
一次方案 Primary scheme	6-10KV TM 0.4KV				6-10KV TM 0.4KV				6-10KV TM 0.4KV			
用途 Application	母排侧进，电缆下出 Busbar incoming at side and cable outgoing down				母排侧进侧出 Busbar incoming and outgoing at side				母排侧进，上出 Busbar incoming at side and outgoing up			
装置容量（KVA） Apparatus capacity	200-500	630-800	1000-1600	2000-2500	200-500	630-800	1000-1600	2000-2500	200-500	630-800	1000-1600	2000-2500
外形尺寸（长×宽×深） Overall dimensions (L×W×D)	2200 X 1800 X 1200	2200 X 2200 X 1400	2400 X 2400 X 1600	2600 X 2600 X 1600	2200 X 1800 X 1200	2200 X 2200 X 1400	2400 X 2400 X 1600	2600 X 2600 X 1600	2200 X 1800 X 1200	2200 X 2200 X 1400	2400 X 2400 X 1600	2600 X 2600 X 1600
主要设备（电力变压器） Main apparatus (power transformer)	SCB-200/10 SCB-250/10 SCB-315/10 SCB-400/10 SCB-500/10	SCB-630/10 SCB-800/10	SCB-1000/10 SCB-1250/10 SCB-1600/10	SCB-2000/10 SCB-2500/10	SCB-200/10 SCB-250/10 SCB-315/10 SCB-400/10 SCB-500/10	SCB-630/10 SCB-800/10	SCB-1000/10 SCB-1250/10 SCB-1600/10	SCB-2000/10 SCB-2500/10	SCB-200/10 SCB-250/10 SCB-315/10 SCB-400/10 SCB-500/10	SCB-630/10 SCB-800/10	SCB-1000/10 SCB-1250/10 SCB-1600/10	SCB-2000/10 SCB-2500/10

说明

- 变压器及进出线方式可根据需要另行选择。
- 带有载调压装置时，外形尺寸放宽500mm或加深400mm，具体与制造商协商。
- 产品说明及图例供参考，随着时间的推移，有可能不断修改，不再另行通知，请您与我公司联系。

Note

- Power transformer and incoming outgoing mode will be selected alternatively as per requirement.
- The overall dimensions of a cubicle with on load voltage regulation device inside should be broadened by 500mm in width or deepened by 400mm in depth. Actual particulars will be solved through negotiation with the manufacturer.
- The operation manual and legends are only for reference. With time passing by, they are subjected to modification without notice. If you have any trouble, please contact to our company.

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