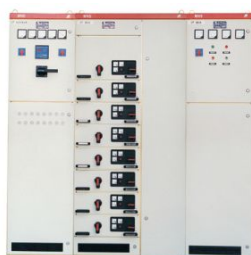


MNS

Integrated Low Voltage Switch
Equipment



概述

MNS型低压成套开关设备（以下简称低压开关柜）是我公司结合我国低压成套开关设备的发展趋势，在其电器元件的选用与柜体结构方面进行改进，并重新注册的产品。该产品的电气性能和机械性能完全满足原MNS产品技术要求。

本低压开关柜适用于交流 50 ~ 60Hz, 额定工作电压 660V 及以下的电力系统，作为发电、输电、配电、电能转换和电能消耗的设备控制。

本低压开关柜除一般陆地使用外，经过特殊处理后还可用于海上石油钻采平台和核电站中。

本低压开关柜符合 IEC439、VDE0660 第 5 部分，GB7251-87《低压成套开关设备》标准和 JB/T9661《低压抽出式成套开关设备》行业标准。

General

MNS Integrated Low Voltage Switch Equipment(Named as Low Voltage Switchboard for Short in the following text) is a registered product of our company. RMNS low voltage switchboard is improved both in electric part choosing and in structure designing according to the trend of integrated low voltage switch equipment. The electric and mechanical performance of this product can meet the technical level of the original MNS product.

This low voltage Switchboard can serve as control equipment for generating, transmitting, distributing electricity and transducing or consuming power in AC 50-60Hz electric systems which rated operating voltage should not above 660V.

This low voltage Switchboard can operating in general overland cases and can operating in maritime petroleum mining platform and nuclear power plant after special treatment.

This low voltage Switchboard is compliant with IEC439 , the 5th section of VDE0660, the GB7251 integrated low voltage switch equipment standard and JB/T9661 integrated low voltage draw-out switch equipment standard.

使用环境条件

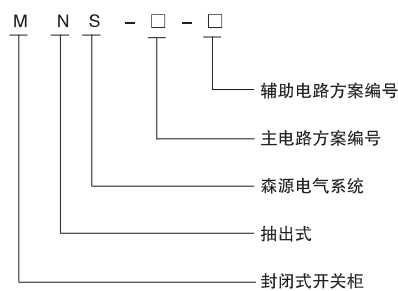
- 2.1 周围环境温度不高于+40℃，并在24h内平均温度不高于+35℃，最低环境温度不低于-5℃。
- 2.2 相对湿度在最高温度为+40℃时不超过50%，在较低温度时，允许有较高的相对湿度（例：+20℃时为90%）；
- 2.3 海拔高度不超过2000m；
- 2.4 允许在-25℃ ~ +50℃温度条件下运输和储存，并允许在24h内温度不超过+70℃；
- 2.5 地震烈度低于9度。

Service Environmental Condition

- 2.1 The ambient temperature is between -5℃ and +40℃, and the mean temperature of 24 hours is not above +35℃.
- 2.2 Relative humidity is not above 50% when the ambient temperature is not above +40℃. when the temperature is relatively low, higher relative humidity is allowed (For example, the allowed relative humidity is 90% when the ambient temperature is +20℃).
- 2.3 Altitude is not above 2000m.
- 2.4 The temperature for transportation and storage is between-25℃ and +50℃, and a temperature below +70℃ is allowed within 24 hours.
- 2.5 Seismic intensity is below 9 degree.

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型低压成套开关设备

产品型号及含义



技术参数 Technical Parameters

3.1 MNS 型低压开关柜的主要技术参数见表

额定工作电压 (V)		380、660
额定绝缘电压 (V)		660
额定工作电流 (A)	水平母线	630 ~ 5000
	垂直母线	800 ~ 2000*
额定短时耐受电流 有效值 (1s)/ 峰值 (kA)	水平母线	50 ~ 100/105 ~ 250
	垂直母线	60/130 ~ 150
外壳防护等级		IP30、IP40、IP54**
外形尺寸 (宽 × 深 × 高, mm)		600 × 800、1000 × 600、(1000) × 2200

* 垂直母线额定工作电流：单面或双面操作的抽出式 MCC 为 800A，可移式为 1000A；柜深 1000mm 单面操作的 MCC 为 800 ~ 2000A。

** 防护等级 IP54 由于降容情况严重，故不推荐使用。

*The rated operational current of the vertical bus bars:

The rated operational current of the single-sided or dual-sided draw-out MCC is 800A, and that of movable type MCC is 1000A. The rated operational current of the single-sided 1000mm MCC is 800–2000A.

**Due to the severe reduction of capacity, the IP54 protection degree is not recommended.

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3.2 本产品柜内主要电器技术数据见表

名 称	型 号	主要技术数据	名 称	型 号	主要技术数据
低压断路器	DW914(AH)	600 ~ 4000A	熔断器式隔离器	DCHR1	125 ~ 630A
低压断路器	RDW17	600 ~ 3900A	熔断器式隔离开关	HH15	125 ~ 800A
低压断路器	RDM1系列 RDM2 系列	15 ~ 630A	交流接触器	CJX2-F(RDC6) 系列 CJX2(RDC6) 系列 CJX8 系列	4.7 ~ 630A
低压断路器	DZ47-63 S503	10 ~ 63A	熔断器	NGT 系列 RT20/NT	4 ~ 630A
低压断路器	RDM8 系列 LNA	6 ~ 100A	热过载继电器	JRS2 系列 JRS8/NT	16 ~ 370A
熔断器式 负荷开关	SMP	125 ~ 630A	电流互感器	LMK1 LN LMZ2	15 ~ 5000/5A
熔断器式 负荷开关	OESA	63A	电容器	BSMJ CLMB	~ 400v(内部△)
低压断路器	RDSW6(RDW1)	600 ~ 3200A	低压断路器	M	600 ~ 6300A

结构简介

低压开关柜的基本框架为组合装配式结构，框架的全部结构件都经过镀锌处理，通过自攻锁紧螺钉或 8.8 级六角螺钉坚固互相连接成基本框架，再按方案变化需要，加上相应的门、封板、隔板、安装支架以及母线、功能单元等零部件，组装成一台完整的低压开关柜，开关柜内零部件尺寸、隔室尺寸实行模数化（模数单位 E=25mm，下同）。

4.1 动力配电中心（以下简称 PC）

4.1.1 PC 柜内划分成四个隔室，即水平母线隔室，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，在柜前下部或柜前右边；控制回路隔室，在柜前上部。其分隔措施：水平母线隔室与功能单元隔室、电缆隔室之间用三聚氰胺酚醛夹心板或钢板分隔。控制回路隔室与功能单元隔室之间用阻燃型聚胺脂发泡塑料模制罩壳分隔。左边的功能单元隔室与右边的电缆隔室之间用钢板分隔。

4.1.2 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，视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。

4.1.3 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路单元，均安装于塑料板上，板后有一个用阻燃型聚胺脂发泡塑料做成的罩壳与主电路分离。

4.2 抽出式电动机控制中心和小电流的动力配电中心（以下简称抽出式 MCC）

4.2.1 抽出式 MCC 柜内分成三个隔离室，即柜后部的水平母线隔室，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发泡塑料制成的功能壁分隔。电缆隔室与水平母线隔室、功能单元隔室之间用钢板分隔。

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4.2.2 抽出式 MCC 有单面操作和双面操作两种结构。

4.2.3 抽出式 MCC 有五种标准尺寸的抽屉，它们分别是 8E/4、8E/2、8E、16E 和 24E。其中 8E/4 和 8E/2 两种抽屉的结构是用模制的阻燃型塑料件和铝合金型材组成（4 个 8E/4 或 2 个 8E/2 组成一个 8E 高度的间隔）。功能单元隔室的总高度为 72E。

4.2.4 五种标准尺寸的抽屉，一般有 16 个二次隔离触头引出。如果需要，除 8E/4 抽屉外，其它四种抽屉可增加到 32 个。每个静触头的接线端同时可接 3 根导线。上述端头由制造厂随产品提供适量的附件和冷轧钢。

4.2.5 通过机械连锁装置的操作程序，只有当主回路和辅助回路全部断开的状态下才能移动抽屉，机械连锁装置使抽屉具有移动位置、分断位置和分离位置，并用相应的符号标志出来。

机械连锁装置上的操作手柄和主断路器的操作手柄能同时被三把挂锁锁住。

4.3 可移式电动机控制中心和小电流动力配电中心（以下简称可移式 MCC）

4.3.1 可移式 MCC 的柜体结构特征同 4.2 条款中 (a) 和 (b)。

4.3.2 功能单元设计成可移式结构，功能单元与垂直母线的连接采用一次隔离触头，即使与其连接的电路是带电的，也可以从设备中完整地取出和放回该功能单元。另一端为固定式结构。

4.3.3 可移式 MCC 的功能单元分为 3E、6E、8E、16E、24E、32E 和 40E 功能单元隔室，总高度也是 72E。

4.4 母线系统

4.4.1 水平母线（L 1、L 2、L 3）。水平母线安装于柜后独立的母线隔室中，它有两个可选择的安装位置，即柜高 1/3 或 2/3 处。母线可按需要装于上部或下部，也可以上下两组同时安装，两组母线可以单独使用，也可以并联使用。

每相母线由 2 根、4 根或 8 根母排并联，母排截面有 $10 \times 30 \times 2$ ， $10 \times 60 \times 2$ ， $10 \times 80 \times 2$ ， $10 \times 60 \times 4$ ， $10 \times 80 \times 2 \times 2$ 和 $10 \times 60 \times 4 \times 2$ 六种。

4.4.2 垂直母线为 $50 \times 30 \times 5$ 的 L 型铜母线，它被嵌装于用阻燃型塑料制造的功能壁中，带电部分的防护等级达 IP20。

4.4.3 中性线（N 线）和保护接地线（PE 线）。中性线母线和保护接地线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 线和 PE 线之间如用绝缘子相隔，则 N 线与 PE 线分别使用，两者之间如用导体短接，即成 PEN 线。

4.5 保护接地系统

本开关柜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）和可导电的金属结构件两部分组成。金属结构件除外表的门和封板外，其余都经过镀锌处理。在结构的连处都经过精心设计，使其能通过一定的短路电流。

4.6 辅助电路电缆槽

在功能单元隔室的顶部装有辅助电路电缆槽，槽内可安放柜间连接线和公用电源线。

4.7 辅助电路的隔离措施

在抽出式 MCC 方案的每一回路中，按系统需要可装设一只隔离变压器，变压器容量较交流接触器，规格确定。

Structural introduction

The base frame of the low voltage switchboard is assembled structure. All the parts of the base frame are zincified and assembled by self-locking bolts or 8.8 grade bolts. Then according to the requirement of scheme, other corresponding parts such as door, cover board, clapboard, installation support and bus bars, function units are added to the frame to form a complete LOW VOLTAGE switchboard. The dimension of the parts in the switchboard and the room is modular (modular unit=25mm, the same below)

4.1 Power distribution center (PC for short) a. PC board is divided into 4 rooms. The horizontal busbars room is at the back of the PC board; the function unit room at the front-top or on the front-left; the cable room at the front-bottom or on the front-right; the control circuit room at the front-top. Isolating measures are as follows: the horizontal bus bars room, the function unit room and the

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cable room are isolated by melamine phenolic board or steel board. The control circuit room and function unit room are isolated by flame retardant melamine expanded plastic molding case. The left function unit room and the right cable room are isolated by steel board.

b. The frame type breaker in the board can be manually operated without opening the door. Operators can determine whether the breaker is in the testing position or in the operating position by observing the state of the breaker.

c. The main circuit and the auxiliary circuit are separated. The meters, signal lights and buttons of the auxiliary circuit are installed on a plastic board. There is a flame retardant melamine expanded plastic case behind the board to separating the auxiliary circuit from the main circuit.

4.2 Draw-out motor control center and small current power distribution center (Draw-out MCC for short below)

a. Draw-out MCC cabinet is divided into 3 room i.e. the horizontal bus bars room at the back, the function unit room on the front-left, and the cable room on the front-right. The horizontal bus bars room and function unit room are isolated by flame retardant expanded plastic board. The cable room and the horizontal bus bars room or the function unit room are isolated by steel board.

b. Draw-out MCC has single operating side version and dual operating side version.

c. Draw-out MCC has 5 types of standard drawers. They are 8E/4, 8E/2, 8E, 16E and 24E. The 8E/4 and 8E/2 drawers are made up of molding flame retardant plastic and aluminium alloy (4 8E/4 drawers or 2 8E/2 drawers make a space of 8E height). The total height of the function unit room is 72E.

d. The 5 types of drawers usually have 16 quadric isolating contacts. The contacts of all types of drawers except for 8E/4 can be added up to 32. The terminal of each contact can be connected with 3 wires. Accessories and cold rolling grips for the terminals are applied by the manufacturer.

e. According to the operating procedure of the mechanical interlocking device, the drawers can only be moved when the main circuit and the auxiliary are both disconnected. The draws have 3 positions: moving position, switching position and isolating position. They are denoted by corresponding denotations.

The handle of the mechanical interlocking device and the handle of the main breaker can be locked by three locks.

4.3 Movable motor control center and small current power distribution center (Movable MCC for short below)

a. The structural features of the Movable MCC board are the same as the items of a. and b. in section 4.2.

b. The function unit is movable, and it is connected with the vertical bus bars by primary isolating contacts. Even though the corresponding circuit is not disconnected, the function unit can be fetched out and in. The other side of the function unit is fixable.

c. The types of the function unit room of Movable MCC are 3E, 6E, 8E, 16E, 24E, 32E and 40E. The total height of the function unit is 72E.

4.4 Bus bars system

a. Horizontal bus bars (L1, L2, L3): The horizontal bus bars are installed in the isolating bus bars room at the back of the board. They have 2 options of installing positions i.e. the first third of the board height and the second third of the board height. The bus bars can be installed at either top or bottom in the board or in both positions. The 2 bus bars can operate individually or parallelly.

Each bus bars is composed of 2 or 4 parallel buses. The sizes of the bus sections are 10 × 30 × 2, 10 × 60 × 2, 10 × 80 × 2, 10 × 60 × 4, 10 × 80 × 2 × 2 or 10 × 60 × 4 × 2.

b. The vertical bus bars are L type copper bus bars which size are 50 × 30 × 5. They are embedded in the flame retardant plastic function walls, and the protection degree of the electriferous part of them is IP20.

c. The neutral bus bar (N bus bar) and the protecting earth bus bar (PE bus bar): The N bus bar and the PE bus bar are parallelly installed at the bottom of the function unit cabinet and vertically installed in the cable cabinet. The N bus bar and the PE bus bar operate individually if they are insulated, and they form PEN bus bars if they are connected.

4.5 Protecting earth system The protecting circuit of the switchboard is composed of PE bus bar (or PEN bus bar) and conductive metal component. The PE bus bar (or PEN bus bar) is individually installed and runs through all the length of the bus bars. All parts of the metal component except for the door and cover board are zincified. The elaborate designed connections of the component can endure a short-circuit current of certain value.

4.6 Cable groove of the auxiliary circuit The cable groove of the auxiliary circuit is installed at the top of the function unit room. Inter-board cable and common power cable can be installed in the groove.

4.7 Isolating measures of the auxiliary circuit In each circuit of the draw-out MCC scheme, an isolating transformer can be installed according to the requirement of the system. The capacity of the transformer is in accordance with the AC contactor and the specification.

一次方案的排列组合

- 5.1 功能单元隔的总高度为 72E。
- 5.2 在同一台开关柜中，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。
- 5.3 8E/4 抽屉为 4 个组成一个 8 E 安装单元，8 E/2 抽屉为 2 个组成一个 8E 安装单元。
- 5.4 方案中所画的电流互感器为本方案中最多安装数量（方案 03-06、12 ~ 17 中可增加一只电流互感器，用于无功功率补偿回路）。在实际使用中可按系统需要而减少或不装。
- 5.5 本开关柜的深度有 600mm（MCC 单面操作柜）和 1000mm（PC 和 MCC 双面操作柜）两种，推荐 PC 和 MCC 柜分开排列使用。
- 5.6 当 PC 和 MCC 二种柜并排排列时，则将单面操作的 MCC 柜加深到 1000mm，或把与 PC 相邻的双面操作柜改为单面操作柜。
- 5.7 母线桥选用时应注意母线桥宽度与开关柜一样宽，所以母线桥只能架，设于两边相同宽度的开关柜上；在标准的 MCC 柜上不能架设母线桥，如要架设应按 6.6 条处理；在 600mm 宽的柜体上架设母线桥，其最大额定电流不大于 1500A。
- 5.8 DCHR1 型熔断器式隔离器与其它 MCC 方案组合时，最小应留有 1E 的空隙。
- 5.9 在每台 MCC 柜中需留有适当的备用功能单元，不能为长期运行的功能单元或不装功能单元的空格。

The arrangement of the primary scheme

- 5.1 The total height of the function unit room is 72E.
- 5.2 The general arrangement principle of the function unit is that the small units is above the big ones in the same switchboard.
- 5.3 The 8E assembled unit is composed of 4 8E/4 drawers or 2 8E/2 drawers.
- 5.4 The number of the current transformers in the scheme is the maximum value (In scheme 03-06, 12-17, a current transformer can be added to serve in the reactive power compensation circuit). In actual application, you can install no or fewer current transformer according to the requirement of the system.
- 5.5 The depth of the switchboard can be 600mm (for mono-side MCC) or 1000mm(PC or dual-side MCC). Arranging PC boards and MCC boards respectively are recommendable.
- 5.6 When arranging PC and MCC together, the depth of the mono-side MCC should be added up to 1000mm, or the dual-side MCC near the PC should be changed into mono-side operating mode.
- 5.7 When choosing the bus bars bridge, the width of the bus bars bridge should be equal to that of the switchboard. Therefore, the bus bars bridge should be spanned on switchboards of the same width. The bus bars bridge should not be spanned on the standard MCC. If necessary, spans it according to paragraph 6.6. If the bus bars bridge is spanned on switchboard of a 600mm width, the maximum rated current should not be above 1500A.
- 5.8 When combining the DCHR1 fuse type isolator with other MCC scheme, a 1E space should be kept.
- 5.9 Between each MCC, spare function unit should be installed. Long-term running function unit or space without function unit is not allowed.

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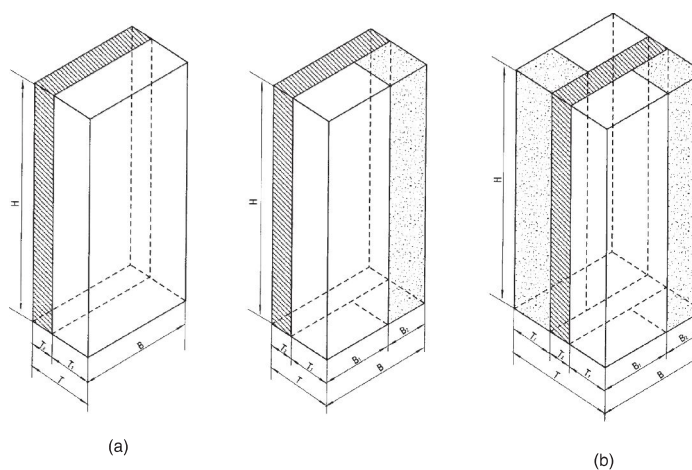
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外形及安装尺寸

本开关柜架的外形尺寸见图1。MNS型抽出式MCC、(PC柜)的外形尺寸见图2~图5, 安装尺寸图见图6。

The figure and installation dimension

The general dimension of the cabinet is showed in fig.1. The general dimension of MNS draw-out MCC(or PC) is showed in fig.2-5. The installation dimension is showed in fig.6.



外形尺寸 (mm)						
H	B	B ¹	B ²	T	T ¹	T ²
2200	600			1000		
2200	800			1000	750	250
2200	1000			1000	750	250
2200	1000	600	400	600	400	200
2200	1000	600	400	1000	750	250
2200	1000	600	400	1000	400	600
2200	1000	600	400	1000	400	200

□ 功能单元室 □ 电缆隔室 ▨ 水平母线隔室

a. 单面操作柜 b. 双面操作柜

图1 MNS型低压开关柜架的外形尺寸

fig.1 The general dimension of MNS low voltage switchboard's frame

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型低压成套开关设备

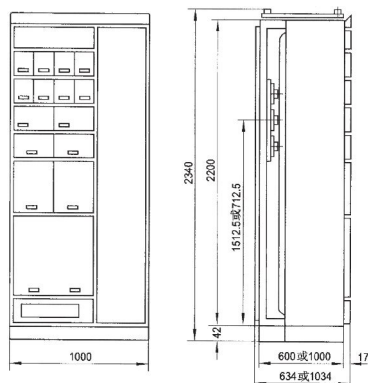


图2 抽出式MCC柜 (单面操作)

fig.2 Draw-out MCC
(Cabinet operated on mono-side)

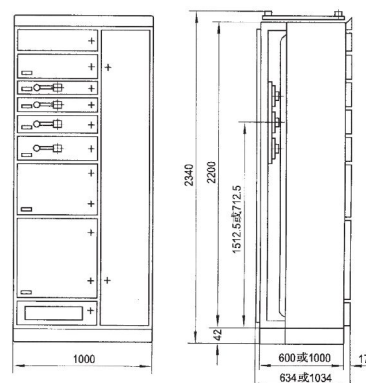


图3 可移式 MCC (单面操作)

fig.3 Movable MCC
(Cabinet operated on mono-side)

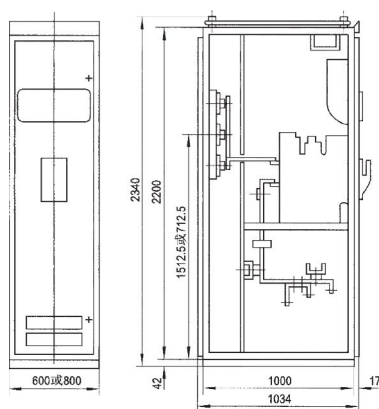


图4 PC 柜 (DW914)

fig.4 PC (DW914)

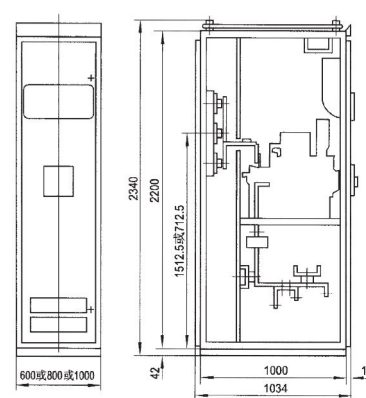
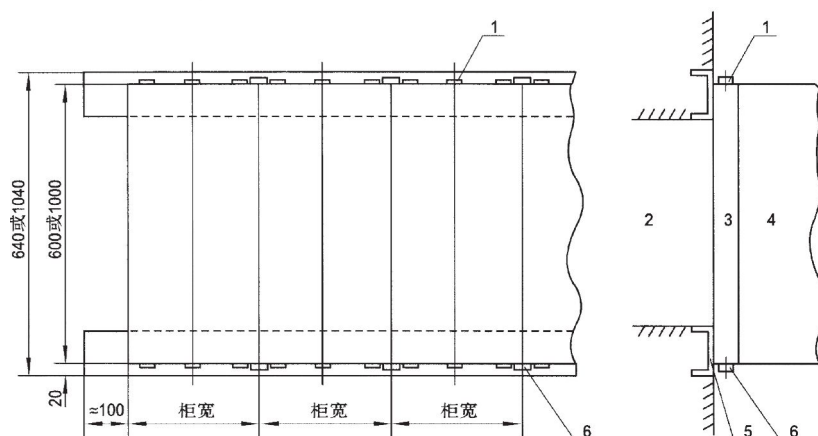


图5 PC 柜 (RDW17-630 ~ 3205)

fig.5 PC (RDW17-630-3205)

MNSIntegrated Low Voltage Switch
Equipment

1、电焊处 2、电缆沟 3、开关柜底 4、开关柜 5、10# 槽钢 6、连接板

1.Welding position 2. Cable groove 3. The bottom of the cabinet 4.Switchboard

5.10# channel steel 6.Connection board

图 6 MNS 型低压开关柜安装尺寸图

fig.6 The installation dimension of MNS low voltage switchboard.

抽屉式 MCC 柜操作须知

7.1 抽屉底部应正确插入导向件后，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。

7.2 8E/4 和 8E/2 抽屉面板上的符号标志和作用（见图 7）。图中从分断位置“O”到工作位置“|”的箭头表示为，先将操作手柄向里推进后将手柄从“O”旋转到“|”即可，返回时不须推动，只要将手柄“|”旋向“O”，放手后，手柄将自动弹出。

7.3 8E ~ 24E 抽屉面板上的符号标志和作用（见图 8）。当手柄到达工作位置时，机构对开关解除机械闭锁，这时主开关方可进行合闸和分闸操作。但是，当主开关合闸后，联锁机构的手柄就不能操作。

7.4 在符号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，关闭后务必将塑料小盖盖上，否则将破坏原有的防护等级。

MNS

型低压成套开关设备

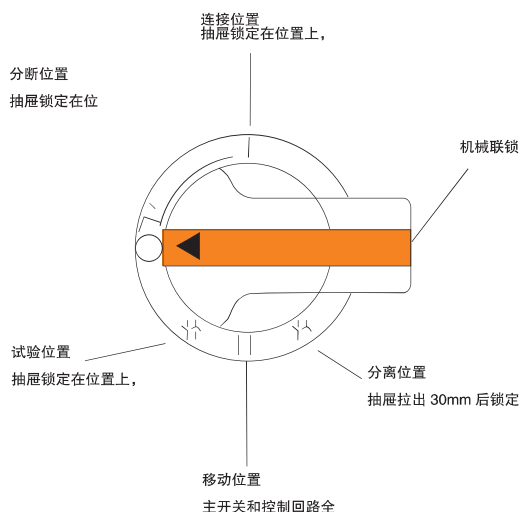


图7 8E/4和8E/2抽屉操作手柄位置图
-fig.7 The position of 8E-24E drawers' handle

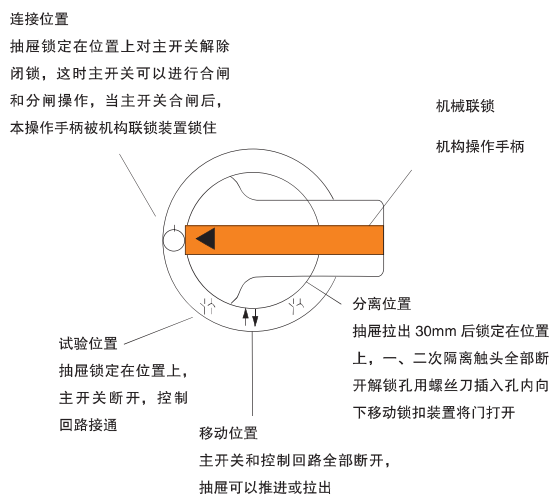


图 7 8E ~ 24E 抽屉操作手柄位置图
-fig.7 The position of 8E-24E drawers' handle

MNS

Integrated Low Voltage Switch
Equipment

Operating specification of draw-out MCC

7.1 The drawers should be pushed into the switchboard after inserting oriented part below its bottom. Or the drawers will be damaged or cannot be pulled out.

7.2 The signature on the panel of 8E/4 and 8E/2 drawers and its function is showed in fig.7. The arrow from the switching position “O” to the operating position “I” in the diagram represents that: Push the handle and rotate it from the position “O” to “I”. The reverse procedure need not to push the handle and only need to rotate it from the position “I” to “O”. When the handle reach the position “O”, release it and it will rebound.

7.3 The signature on the panel of 8E-24E drawers and its function is showed in fig.8. When the handle reaching the operating position, the machine relieve the lock of the switch and the main switch can be switched on or switched off. However, if the main switch is switched on, the handle of the interlock machine is disabled.

7.4 At the right-bottom corner of the signature there is a small plastic cover. It is the unlocking machine of the door. The unlocking procedure is as follows: when the drawer is in the operating position, pull out the cover, insert a screwdriver into the hole and move the lock down. Thus the door is unlocked. Make sure to cover the small plastic cover after closing the door, or the original protecting degree will be damaged.

订货须知

订货时，用户应提供下列资料数据：

8.1 一次回路方案及单线系统图。

8.2 二次回路原理图或接线图。

8.3 关柜的排列图和配电室的平面布置图。

8.4 每台开关柜所装各种电器设备的平面布置图。

8.5 提供水平母线的工作电流和短路电流，并按工厂标准选取母线规格，工厂标准母线规格是 10×30×2、10×60×2、10×80×2、10×60×4、10×80×2×2、10×60×4×2，如不注明母线规格，则由工厂选定。

8.6 提供每个回路的使用名称，字数限制在 10 个字以内，如不提供，制造厂仅提供空白符号牌。

8.7 如需对辅助电路中的控制开关或转换开关、按钮等标志功能名称，则需提供内容。

8.8 抽屉的试验位置是用位置开关来实现的，如需要此试验位置，则需在系统中串入该触点。

Information for order

Please offer the following information when ordering the equipment:

8.1 The primary circuit scheme and the mono-wiring diagram of the system.

8.2 The secondary circuit scheme or the wiring diagram.

8.3 The arrangement diagram of the switchboard and the planar arrangement diagram of the distribution room

8.4 The planar arrangement diagram of the electrical equipment in each switchboard

8.5 Offer the operating current and the short-time current of the horizontal bus bars and choose the size of the bus bars. The sizes of the standard bus bars of the manufacturer are 10×30×2, 10×60×2, 10×80×2, 10×60×4, 10×80×2×2, 10×60×2×4. If not specified, the size of the bus bars is chose by the manufacturer.

8.6 Offer the name of each circuit, and the names of the circuits are limited to 10 letters. If the names are not given, the manufacturer will offer blank plate.

8.7 If you want to give name to the control switches, transfer switches and buttons of the auxiliary circuit, you should offer the corresponding information.

8.8 The testing position of the drawers is formed by position switch. If you want to posses the testing position, please add this contact to the system.

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