

低压开关柜 Low-voltage switchgear

MNS 安装使用说明书
Installation instruction



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目录 (Contents)

产品概述 General description of products	1-2
技术数据 Technical data	3
结构设计 Structural design	4-7
抽出式方案 Withdrawable type program	8-11
操作与安装 Operation and installation	12-13
安装尺寸图 Installation dimensions drawing	14

低压开关柜 — MNS Low-voltage switchgear

产品概述 (General description of products)

应用范围 (Application Range)

MNS 组装式低压开关柜系统，适用于所有发电，配电等电力使用的场所，如：
MNS assembly low-voltage switchgear system, applied to all power sites of generation and distribution, etc.

For example:

- 主，副动力柜，配电柜
- 电动机供电和电动机控制中心
- 开环或闭环控制系统电子柜
- 电力系统
- 石油化工
- 工矿企业
- 公用事业
- 市政工程，商业建筑
- Major-minor power cabinet, power distribution cabinet
- Motor power supply and motor control center
- Open-loop or close-loop control system electronic cabinet
- Power system
- Petrochemical
- Industrial and mining enterprises
- Public utility
- Municipal engineering commercial building

系统特点 (System Features)

MNS 组装式低压开关柜系统，在世界上经过多年使用，证实了它的价值。整个系统充分考虑了将来的发展空间，可避免因为技术发展而被淘汰的风险。

MNS assembly low-voltage switchgear system has proved its value after used for many years in the world market. Giving full consideration to its future development space, the whole system can avoid the risk of being eliminated because of technology development.

MNS 系统采用的柜架结构具有高度灵活性，结构一旦组装完毕就不再需要维修。柜体内可安装不同的标准元件，以满足各种使用要求。由于整个系统包括电气结构均采用了组合式的设计，这种优化的结构设计满足了各种元件的要求，并适用不同工作环境，达到相应的防护等级。

Framework structure adopted in the MNS system features high flexibility and maintenance is no longer needed once assembled. Different standard components can be installed in the cabinet in order to be perfectly adapted to each application. The optimized composite design of the whole system including electrical and mechanical structure satisfies requirements of various components and applies to different working environments, thus reaching corresponding protection level.

MNS 系统与传统产品相比，具有更多的优越性：

MNS system has more superiority compared to the traditional product:

- 结构紧凑，节省柜体的体积
- 柜体能背靠背排列
- 配电回路布置经济
- 全部选用标准元件，方便工程设计人员设计
- 全系列标准化
- 柜体可按工作和环境的不同要求设计出相应的防护等级
- 在一个柜体中可自由安装不同型号的功能组件，如：固定式组件和抽出式组件
- 设备更新改进方便
- 设备运行连续性和可靠性高
- 操作人员人身安全有保障
- Compact, space-saving design
- Cubicles can be arranged back to back
- Economical power distribution circuit
- Standardized components, easy for engineering designer
- Whole series standardization
- Cubicles can be designed with different levels of protection according to different work and environment.
- Different types of function assembly can be freely installed in a cabinet such as fixed and withdrawable ones.
- Equipment with convenient updating and improving
- Equipment with high continuity and reliability
- Operating person has personal safety and security

技术标准 (Technical Standard)

MNS 系统是经过型式试验的组装式低压开关柜(简称TTA)，符合：IEC60439-1和GB7251.1-2005等标准。系统的安装和连接是按IEC364和DIN/VDE0105标准执行。

低压开关柜 — MNS Low-voltage switchgear

产品概述 (General description of products)

MNS system is the assembly low-voltage switchgear which has passed type test and complied to the requirement of the international standard IEC60439-1 and GB7251.1-2005, etc. The installation and connection of the system is in accordance with IEC36 and DIN/VDE0105.

工作和环境条件 (Working And Environment Conditions)

MNS 低压开关柜适用于户内安装的电气设备，其他工作条件下的开关柜防护等级可至IP54。
MNS low-voltage switchgear is the electrical equipment suitable for indoor installation.
For other operating conditions the degree of protection can reach IP54.

环境温度 (Ambient Temperature)

最高温度 (Maximum temperature) : +40°C
24小时内最高平均温度 (Maximum average temperature in 24 hours) : +35°C
最低温度 (Minimum temperature) : -5°C

设备在高于上述环境温度中使用应降容运行。
Capacity of equipment should be reduced if the ambient temperature is over the above

对于测量、计量仪表和保护继电器等的工作条件，应遵照制造厂家的规定。
Working conditions of measurement instruments, metering instruments and protective relay should comply with manufacturer's regulation.

环境条件 (Ambient Conditions)

正常工作气候环境按IEC60439-1, EN60439, VDE0660第500部分的规定，周围环境相对湿度在40°C时为50%。
In normal operating conditions, climate environment should comply with section 500 of VDE0660, EN60439 and IEC60439-1. Relative humidity of ambient environment is 50% at 40°C.

开关柜户内安装地点的条件应符合相应标准的要求。在会产生凝露的场合，开关柜中将采用通风或加热等措施来防止凝露。
Conditions of switchgear indoor installation site should comply with some standard. In some condensation locations, measures such as ventilation or heating will be taken to prevent condensation inside the switchgear.

如开关柜安装在高于海拔2000米以上，设备要相应降容运行。

If the switchgear is installed at an altitude of more than 2,000 meters, the capacity of the equipment should be reduced for running.



标准 / Standard	通过型式试验的组装式开关柜 (TTA) Type-tested assembly switchgear (TTA)		GB7251.1-2005 IEC60439-1
电气参数 / electrical parameter	690 V / AC, 3P 400 V / AC, 3P 8 kV III 3 至 60Hz 至 60Hz		
额定绝缘电压 / rated insulation voltage 额定工作电压 / rated operating voltage 额定冲击耐受电压 过电压等级 / overvoltage level 污染等级 / pollution level 额定频率 / rated frequency	Ui Ue Uimp III 3 至 60Hz 至 60Hz	至 5500A (6300A) 至 5500A (6300A) 至 220kA 至 220kA 至 100kA 至 100kA	
主母线 / main busbar 额定电流 / rated current 额定峰值耐受电流 额定短时耐受电流	Ie Ipk low	至 1200A (2000A) 至 1200A (2000A) 至 110kA (176kA) 至 110kA (176kA) 至 100kA (80kA) 至 100kA (80kA)	
配电母线 / distribution busbar 额定电流 / rated current 额定峰值耐受电流 额定短时耐受电流	Ie Ipk low		
结构特性 / structural characteristics	尺寸 / dimensions 柜体和支件构件 / cabinet and components 推荐高度 / recommended height 推荐深度 / recommended depth 模数 / modulus E=25mm 内部隔离形式 / internal forms of segregation 防护等级 / Protection level		
	DIN41488 400, 600, 800, 1000, 1200 mm 800, 1000, 1200 mm 符合 DIN43660 / complied with DIN43660 至 Form4 至 Form4 按 IEC529 或 DIN41050 按 IEC529 或 DIN41050 IP30 至 IP54 IP30 to IP54		

* TTA 符合一种确认型号或系列的低压成套开关设备和控制设备，它与通过验证认为符合标准的定型成套设备相比，不存在可能影响性能的差异。
TTA complies with the requirement of a kind of confirmed model or series low-voltage complete set switch equipment and control equipment.
No difference that may affect the performance exists, by contrast with the shaped complete set of equipment that has passed the test and complied with standards.

框架 (Framework)

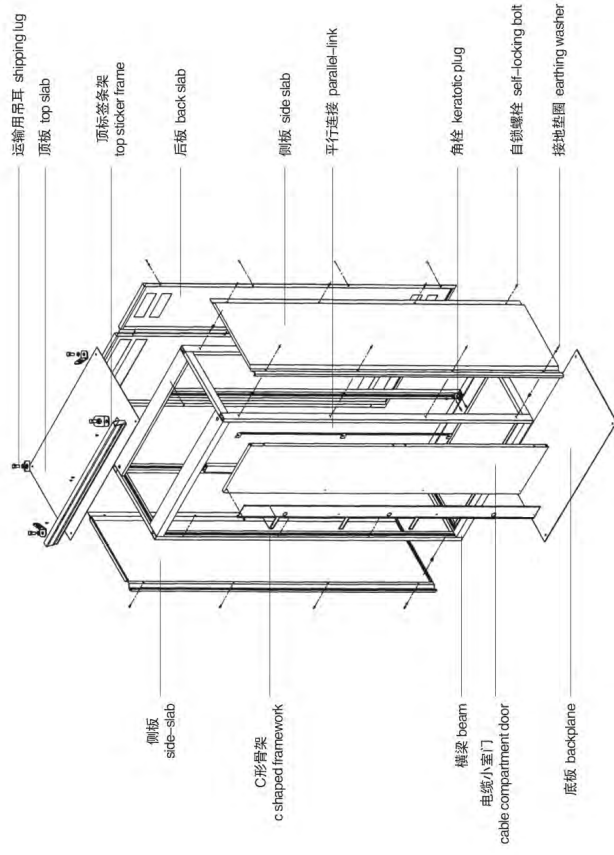
MNS 系统框架的基本零件为带有 25mm 间隔模数孔的 C 形骨架 (DIN43660)。
MNS 系统的标准模数 E=25mm，由于采用了标准模数孔系统，框架结构无需专用工具即能组装成各种型式的柜体，如前操作式和背靠背式单台或多台组合的开关柜。

Basic parts of MNS system framework are C shaped framework (DIN43660) with 25mm interval modulus hole.
MNS system standard module E=25mm, due to the application of standard modulus hole system, the framework can make up all kinds of cabinets like one or more pre-operation-model and back to back model composite switchgear, without any special tools.

外壳 (Casing)

MNS 系统按不同的使用要求，可设计出不同防护等级的外壳。后操作和联屏柜可选用正面防护等级为 IP30 的外壳，全封闭外壳防护等级为 IP40-IP54 (抽出式开关柜均为全封闭结构)。较链框架可作安装电子器件和仪表板用，也可作装置柜架用。较链框架的安装位置上可加带不带观察孔的盖板。柜底部可提供底板，加装法兰板后可安装电缆槽。门板和外壳可装配单个/多个通风口，顶板可为全通风型 (适合于 IP40 和 IP41)。

MNS system can be designed for different protection level casing as per different operating requirement. For post-operation and united screen cabinet, casing should be one with frontal protection level of IP30. Totally-enclosed protection level for the casing is IP40-IP54 (withdrawable type switchgear is all totally-enclosed). Hinge framework can be used for electrical equipment and dashboard installation, which can be also used as device framework. Hinge framework installation location can be with or not with peep hole cover. Cabinet base can provide backplane and install cable trough after mounting flange. Door slab and casing can mount one or more vents and top slab can be totally ventilated type (suitable for IP40 and IP41).



低压开关柜 — MNS Low-voltage switchgear

结构设计 (Structural design)

框架结构 (Frame Structure)

MNS 系统的框架结构可分为：装置小室、母线小室和电缆小室。
尺寸 (高X宽X深)：2200mm x 400/600/800/1000/1200mm x 600/800/1000mm。
如空气断路器为2000A以下，则开关柜柜宽可为400mm。运输单元最长为3000mm。
进出线柜和母联柜均安装有一个开关 (固定式隔离开关/固定式或抽出式塑壳断路器/空气断路器)。
在 MNS 系统中将同一功能组的零部件组装后，可构成一个简便的机械和电气功能组件，包括动力组件和控制组件。
MNS system framework can be divided into device compartment, busbar compartment and cable compartment.
Dimension (height x width x depth) 2200mm x 400/600/800/1000/1200mm x 600/800/1000mm.)

If air circuit-breaker is below 2000A, switchgear width can be 400mm and max length of shipping unit will be 3000mm.
Incoming/outgoing cabinet and bus coupler cabinet are both mounted with one switch (fixed disconnector/ fixed or withdrawable molded case circuit breaker/air circuit breaker)

In MNS system, the parts of the same functional group mounted can form one simple mechanical and electrical functional assembly, including power and control assembly.

柜内部分隔 (Cabinet Compartment Isolating)

按不同要求，框架结构可分为：

- 装置小室中为功能单元组件
 - 母线小室中为母线和配电母线
 - 电缆小室中为进出线电缆 (上、下进出线均可)
 - 功能单元组件之间的连接以及附件，如电缆夹，电缆连接线，并联线，走线槽等。
- 功能单元之间及柜内小室之间均可作分隔，内部分隔可将电弧破坏性降低到最小程度。
According to different requirement, framework structure can be divided into:

- Inside the device compartment is functional unit group components For device compartment, it is functional unit assembly.
- In the busbar compartment, there are busbar and (power) distribution busbar.
- In the cable compartment, there is incoming/outgoing cable (upper and lower ones both are ok).

Connection lines and accessories between functional unit assembly, like cable clamp, cable wire, parallel line and trunking, etc.
It can be separated among functional units and compartments. Internal separating can reduce arc destructiveness to the minimum.

主母线 (Main Busbar)

主母线布置在开关柜的背部 (母线小室内)，可分为上、下两层。双层主母线系统分别布置在上、下两层，单层主母线系统布置在上层或下层。高层主母线的截面大小可以不相同。主母线单独，串联，并联均可。视母线电流大小，每相可由2条或4条主母线组成。双面操作的柜体采用共同母线的形式。联屏柜的母线按其运输单元作分隔。母线材料为铜，不同截面的母线也能相接。

Main busbar is distributed on the back of switchgear (inside the busbar compartment), including upper layer and lower layer. Main busbar is separately distributed on the upper layer and lower layer in double layers main busbar system but laid on the upper or lower layer in single layer main busbar system. Cross-section size of two layers main busbar can be different. Main busbar can be separate, series or parallel distributed. According to busbar current, each phase can be made up of two or four main busbars. Two-sides operating cabinet uses same busbar. United screen cabinet busbar can be divided as per its shipping unit. Busbar material is copper and busbars with different cross-sections can also be connected.

配电母线 (Power Distribution Busbar)

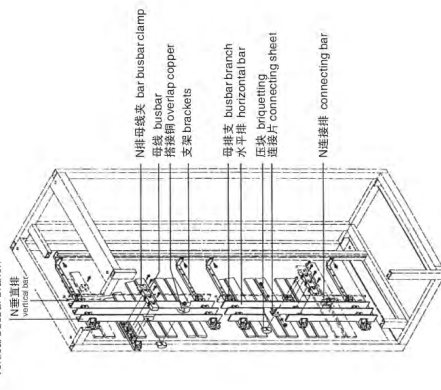
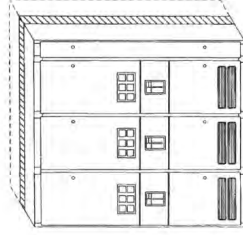
配电母线用于功能单元组件和母线之间的连接，垂直分布在母线小室内。一个开关柜中最多能安装两个3相或4相配电母线，可以全高度，非高度或中间分开呈两段布置。配电母线每相为单根直角型铜排，母线材料为铜。

低压开关柜 — MNS Low-voltage switchgear

结构设计 (Structural design)

Power distribution busbar is used to connect functional unit component with busbar, vertically distributed in the busbar compartment. One switchgear can mount max two 3 phases or 4 phases power distribution busbar, which can be mounted on full height, semi-height, or half separated into two parts. Each phase of power distribution busbar is single right angle copper bar. Busbar material is copper.

垂直母排分支
Vertical busbar branch



带母排，分支母线柜架
Cabinet framework with busbar and branch busbar

带有空气断路器的装置小室，母线小室，母线连接小室的开关柜

The switchgear with busbar compartment, busbar connection compartment and device compartment with air circuit breaker.

保护线和中性线连接排 (Protection Line And Neutral Line Connect Bar)

MNS 系统可布置成TN-C或TN-S的母线系统。除主母线和配电母线外，4线制系统还包括保护中性线 (PEN)，5线制系统则加上保护接地线及中性线 (PE+N)。

系统连接用的保护/中性线连接排垂直安装在电缆小室内，用绝缘端子固定，排的长度按运输单元元分隔。供本柜连接用的保护/中性线连接排垂直安装在电缆小室内，用绝缘端子固定，长度与柜高度相同。

PE+N, PEN排及连接排上均开有槽穿孔，用于电缆的连接。

MNS system can be distributed into the busbar system of TN-C or TN-S. Besides main busbar and distribution line, 4-line system also includes protection neutral line and 5-line system includes extra protection earth line and neutral line (PE+N).

Protection/neutral line connection bar for system connection will be horizontally installed in the device compartment and under the cable compartment, fixed with insulated terminals. The length of bar is separated as per shipping unit. Protection/neutral line connection bar for this cabinet connection is vertically installed in cable compartment, fixed with insulated terminals and the length same as cabinet width.

All PE+N, PEN bar and connection bar have modulus holes used for cable connection.

低压开关柜 — MNS Low-voltage switchgear

结构设计 (Structural design)

走线槽, 电缆安装件 (Trunking, Cable Mounting Fittings)

控制线走线槽安装在柜的上方, 用于布置柜内电气装置的二次回路电缆走线及柜与柜之间的连接线。走线槽按柜的宽度截取。柜前方可装有导轨, 用于元件的安装, 如控制电源断路器等等。

柜体上方的控制线走线槽及下方的PEN母排均有组件门或面板作保护, 面板的下部带有通风孔。

Control line trunking is installed above the cabinet, used for distributing auxiliary circuit cable running and connection lines among cabinets of electrical device in the cabinet. Trunking is intercepted as per the cabinet width.

In front of cabinet guide rail can be installed to install components, like control power circuit breaker.

Both the upper control line trunking and the lower PEN busbar in the cabinet have a component door or slab for protection, under which is with a vent.

直接连接到主母排的安装 (Switchgear Directly Connected With Main Busbar.)

MNS 系统中安装3150A以下隔离开关, 1250A以下塑壳断路器和5000A (6300A) 及以下空气断路器均作为标准型开关柜。抽出式结构设有固定安装带分离触头的框架。

断路器可提供的附件: 微处理过电流电子脱扣器, 分励, 欠电压, 合闸线圈, 储能电动机, 辅助触点, 锁及钥匙锁等。

MNS 系统的机械附件包括有计量仪器罩盖和抗冲击防护盖。电流计量和电压测量等电气仪表都安装在门板上以方便操作, 电源保护和电流互感器等电气元件都安装在装置小室及母线小室以上隔离开关, 630A及以上塑壳断路器和空气断路器可直接与母排相连接。母排或电缆 (至12根并联电缆) 可用作进/出线的接线。在装置小室内进线可上下连接。

In MNS system installs with less than 3150A disconnector, less than 1250A molded-case circuit breaker and no more than 5000A (6300A) air circuit breaker to be standard switchgear.

Withdrawable structure has no fixed framework with separating contact.

Accessories provided by E circuit breaker: microprocessor's current electronic release, shunt, under voltage, closing coil, energy-storage electromotor, auxiliary contact, lock and key lock, etc.

MNS system mechanical accessories include metering instrument niche and anti-impulse cover. Electric instruments like current and voltage metering instruments are all installed on the gate slab, easy for operation, electrical components like power protection and current transformer are all installed in device and busbar compartment, convenient for check.

Disconnector of no less than 1000A, molded-case circuit breaker of no less than 630A and air circuit breaker can connect with busbar directly. Busbar and cable (to 12 parallel cables) can be used for incoming/outgoing line connection.

Incoming cables in device compartment can be connected up/down.



Emax E系列空气断路器



Isomax S系列塑壳断路器



Tmax T系列塑壳断路器

低压开关柜 — MNS Low-voltage switchgear

抽出式方案 (Withdrawable type program)

框架结构 (Framework Structure)

抽出式开关柜可分为: 装置小室, 母线小室和电缆小室。

尺寸 (高x宽x深) 2200mm x 1000mm x 600/800/1000/1200mm。

抽出式组件由组件本身和组件安装小室两部分组成, 动力单元和控制单元的组件为抽出式安装, 标准规格为8E/4, 8E/2, 8E, 16E, 24E。4个8E/4或2个8E/2组件可以水平安装在600mm宽的装置小室内, 组件高度为8E (200mm)。8E, 16E, 24E的单个组件就需要600mm宽的装置小室, 组件的高度就是组件规格所指的尺寸。

抽出式组件作抽出操作时, 开关柜的主电源不必切断。在相邻组件不间断的情况下操作组件插入/抽出, 不会发生触电的危险。

Withdrawable switchgear includes: device compartment, busbar compartment, and cable compartment.

Dimension (height x width x depth) 2200mm x 1000mm x 600/800/1000/1200mm.

Withdrawable component is made up of component itself and installation compartment. Power unit and control unit components are withdrawable type installation. Standard specification is 8E/4, 8E/2, 8E, 16E, 24E. Four 8E/4 or two 8E/2 components with height of 8E (200mm) can install horizontally in 600mm width device compartment 8E.

16E and 24E single component needs 600mm width device compartment. Component height means the dimension of component specification.

There is no need to cut off the main power of switchgear when the withdrawable type component is withdrawn.

Shock will not happen when the components are inserted or withdrawn without power cut off among adjacent components.

多功能分隔板 (Multi-function Partition)

在抽出式或固定式混合设计的开关柜中, 配电母线 (直角L型截面50x30x5mm) 安装在绝缘多功能分隔板中, 同整个母线系统一起, 无需另加隔板即可达到抗电击防护等级 (IP20) 的要求。

多功能分隔板有抗故障电弧性能, 也作为装置小室和母线小室之间的隔离。

In the switchgear designed with withdrawable type or withdrawable mixed with fixed type, power distribution busbar (right angle L model cross-section 50x30x5mm) is installed in multi-function partition, which together with the whole busbar system can meet the demands of anti-shock protection level (IP20) without any other separator.

Multi-function partition has the anti-fault arc performance, which can also serve as the partition between device compartment and busbar compartment.

8E/4, 8E/2装置小室 (Device Compartment)

8E/4, 8E/2装置小室包括: 底板, 导轨, 前挡和插头转接组件。动力和控制回路与配电母线, 组件与电缆小室之间的电气连接由插头转接件来完成。

抽出式插头组件电流最大至125A, 它可容纳四个8E/4 (电流至45A) 或两个8E/2 (电流至63A) 的插头, 每个8E/4组件配备一个或两个16 (20) 芯的控制端子。

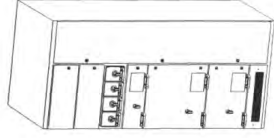
进/出线电缆的连接侧位于抽出式插头组件内, 并有抗故障电弧保护功能。

8E/4, 8E/2 device compartment includes: backplane, guide rail, forelegs and plug-adaptor components.

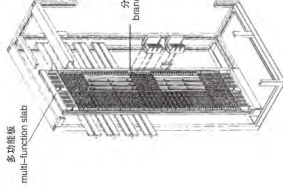
Plug-adaptor is used to connect power and control circuit to power distribution busbar as well as components to cable compartment.

Withdrawable plug component max current is 125A, so it can contain four 8E/4 (current to 45A) or two 8E/2 (current to 63A) plugs. Each 8E/4 component equips with one or two 16 (20) core control terminal.

Incoming/outgoing cable connection side is laid inside of plug component and has anti-fault arc protection function.



抽出式开关柜
Withdrawable switchgear
(带装置、母线、母排小室)
(With device, busbar compartment)



多功能分隔板
multi-function slab
分支母线
branch busbar



8E/4和8E/2抽出式组件小室
8E/4 and 8E/2 withdrawable type
component compartment

低电压开关柜 — MNS Low-voltage switchgear

抽出式方案 (Withdrawable type program)

8E...24E装置小室 (Device Compartment)

8E...24E装置小室包括底板、导轨、金属侧板 (带控制出线端子)。抽出式组件的进线与多功能分隔板中的配母线通过分列触头连接, 出线电缆连接采用电缆接头 (主回路), 控制电缆连接用由20芯或16芯控制接线接头组成的高度为4E的16芯或32芯控制接线端子 (二次回路) 来实现。主回路电缆接头安装在多功能分隔板上。

8E...24E device compartment includes backplane, guide rail and metal side slab, (with control outlet terminal). Withdrawable type component incoming lines are connected to power distribution busbar of multi-function partition through separate contact. Outgoing cable is connected by cable joint (main circuit) and control cable is connected by height 4E 16 core or 32 core control terminals (auxiliary circuit) made up of 20 or 16 core control joint. Main circuit cable joint is installed on multi-function partition.

电缆及接线 (Cable And Wiring)

在电缆小室中, 抽出式组件的一侧安装有接线装置和端子, 用于出线电缆, 控制和组件之间的接线。
In cable compartment, one side of withdrawable type component is installed with junction device and terminal for wiring among outgoing cable, control and component.

进出线电缆和控制线接线端子位于电缆小室右侧的电缆安装导轨上, 主回路端子位于其前方45°方向上。

控制线端子的接线可用螺钉或插入式线鼻子连接, 或用端子连接, 主回路端子小于63A的抽出式组件, 转接件上配有PE端子。
The position of incoming/outgoing cable and control line wiring is laid on cable installation guide rail that is on the right of cable compartment. Main circuit terminals are laid at the back of that position and control line terminal 45° in the front. Control terminal wiring can be connected by screw, plug-in line nose or terminals. For withdrawable components with the main circuit terminal less than 63A, adaptor is equipped with PE terminal.

低电压开关柜 — MNS Low-voltage switchgear

抽出式方案 (Withdrawable type program)

抽出式组件 (Withdrawable Type Components)

标准组件方案 standard component program

- 配电用熔断器开关或塑壳断路器
- 带熔断器的电动机起动器
- 带塑壳断路器的电动机起动器
- 带M101, M102电动机控制与保护装置电动机起动器
- 组件规格: 8E/4, 8E/2, 8E, 16E, 24E
- Power distribution fuse switch or molded-case circuit breaker.
- Electromotor starter with fuse
- Electromotor starter with molded-case circuit breaker
- Electromotor starter with M101, M102 electric control and protection device
- Component specification 8E/4, 8E/2, 8E, 16E, 24E



8E/4抽出式组件
8E/4 withdrawable components

8E/4和8E/2抽出式组件 (Withdrawable Type Component)

8E/4和8E/2抽出式组件结构包括: 仪表板, 绝缘材料侧板, 带电缆接线端子的后板和一个或两个20芯控制端子安装件, 按不同要求8E/2可配两个20芯的端子。
仪表板上没有敲落孔, 用于安装计量、操作、显示器件。主开关的操作由安装在仪表板的手柄来实现, 该手柄具有电气及机械联锁功能, 电气联锁采用带一个常开和一个常闭触点的微动开关来完成。

操作手柄向里扳动后, 方能从O位置向位置, 操作手柄上可给主开关分闸, 试验, 隔离三个位置加挂锁以作为安全保护, 最多可加3把锁。

8E/4 and 8E/2 withdrawable type component structure include: instrument slab, insulating materials side-slab, back slab with cable terminal and one or two 20 core control terminal mounts. The 8E/2 can equip with two 20 core terminal according to different requirement.

No knock-off hole is on instrument slab, used for mounting metering, operating and display devices.

Main switch is operated by the handle with electrical and mechanical interlocking function, mounted on instrument slab. Electrical interlocking is controlled by one normal open or normal closed contact position switch. Press handle in and convert the position from O to I. Handle can add padlocks to main switch opening, test and isolation positions for safety protection (with max 3 ones).

开关手柄位置说明 (Switch Handle Position Illustration):

- I 工作位置: 主开关合闸, 控制回路接通, 组件锁定
- O 分闸位置: 主开关断开, 控制回路接通, 组件锁定
- ⏏ 试验位置: 主开关断开, 控制回路接通, 组件锁定
- ⏏ 抽出位置: 主回路和控制回路均断开
- ⏏ 隔离位置: 抽出30mm距离, 主回路及控制回路均断开, 完成隔离

Operating position: main switch closed, control circuit connected and component locked.

Opening position: main switch off, control circuit connected and component locked.

Testing position: main switch off, control circuit connected and component locked.

Withdrawable position: both main circuit and control circuit break off.

Isolating position: Withdraw 30mm distance, both main circuit and control circuit break off to be isolated.



电缆和控制线在开关柜中的接线方式
Cable and control lines connection method in switchgear



8E装置小室
8E device compartment

16E, 24E抽出式组件 (Withdrawable Type Component)

8E至24E抽出式组件包括：仪表板，绝缘后板，前盖板，金属侧板和走线槽。铰链组件门为从前方便更换元件提供了方便（如更换熔断器），无需抽出组件即可实现。当组件处于工作位置时，可以配双锁。

前盖板上安装有仪表板的开孔，仪表板在前盖板开启，关闭时留在原位不动。仪表板设有敲落孔以安装计量，操作和指示器。操作手柄具有电气及机械联锁功能，电气联锁采用带一个常开一个常闭触点的微动开关来完成。

8E至24E withdrawable type component includes: instrument slab, insulation back slab, front cover slab, metal side slab, and trunking.

Hinge component gate is convenient for changing component in front (like changing fuse), no need to withdraw component.

Only tools (like screw driver, double lock) can open front gate when component is in operating and testing position.

When component is in isolated position, double locks can be used.

Front slab has open bore for mounting instrument slab, so that instrument slab could stay in the same place when opening or closing front slab. Instrument slab is designed with knock-off hole to mount metering, operation and display instruments. Operating handle is available of electrical and mechanical interlocking function. Electrical interlocking is operated by a switch with one normal open contact and one normal close contact.

抽出式组件操作手柄位置说明

Withdrawable type operating handle position illustration:

- 🔧 工作位置：主开关合闸，控制回路接通，组件锁定
- 🔧 试验位置：主开关分闸，控制回路接通，组件锁定，可加三把锁
- 🔧 抽出位置：主回路和控制回路均断开
- 🔧 隔离位置：抽出30mm距离，主回路及控制回路均断开，完成隔离，可加三把锁

Operating position: main switch closed, control circuit connected and component locked.

Testing position: main switch off, control circuit connected and component locked. Three locks could be added.

Withdrawable type position: both main circuit and control circuit break off

Isolating position, withdraw 30mm distance, both main circuit and control circuit break off to be isolated.

Three locks could be added.



8E抽出式组件
withdrawable components



开关手柄 Switch handle



16E抽出式组件
withdrawable components



16E抽出式组件
withdrawable components

运输与安装 (Shipping And Installation)

开关柜在全部装配齐全，并经检验合格后，方可装箱运输。装箱分单台，二台，三台，四台4种运输方式，运输单元最长为3000mm，应尽可能避免单独装箱，以减少主母线之间的连接点。当产品运抵目的地后，应先检查装箱是否完整。若开关柜不是立即使用，应存放于干燥和清洁处。

开关柜应按图例尺寸图安装，基础槽钢由用户自备。如需电缆出线，还须开安装电缆沟。安装时应按图纸先做主母线连接，对母线表面做好清洁处理，然后用螺栓紧固，并进行电缆或架空布线工作。开关柜并联安装时，应在并联孔部位用螺栓紧固。

Switchgear can only be shipped after all mounted well and qualified. Packing includes single, two, three, four sets 4 kinds of shipping way. Shipping unit max length 3000mm, should try to avoid separate packing in order to reduce connection points among main busbars. Check packing integrity after product reaches destination. Put in dry and clean place if switchgear is not used immediately.

Switchgear should be mounted according to framework dimension, basic channel steel prepared by the user himself. Installation cable tunnel should be opened if cable outlet is needed. Firstly connect main busbar as per drawing, clean well the busbar outside, then fasten with screw bolt and do cable or aerial distribution. During the parallel installation for the switchgear, screw parallel holes tightly.

配电室空间要求 (Power Distribution Room Space Requirement)

开关柜在配电室内必须垂直安装。若靠墙安装时，为满足散热要求，应确保：

Switchgear should be installed vertically in distribution room. In order to meet cooling

requirements when installed against the wall, we should assure:

- 与墙壁的最小距离为 (Minimum distance away from wall) $S_1 \geq 800\text{mm}$
- 与天花板的最小距离为 (Minimum distance away from ceiling) $S_2 \geq 500\text{mm}$

运行前检验 (Check Before Running)

开关柜在安装后或检修后，在投入运行前必须进行下列检查和试验（检修后的检查可视其检修性质而定）。

- 开关柜内部电器设备和接线是否符合图统要求？线路是否有编号？接线是否整齐牢固？
- 所安装的电器设备接触是否良好？是否符合本身技术要求？
- 机械联锁和电气连锁的可靠性？
- 抽出式组件动作是否灵活？接触是否良好？
- 试验开关柜的接地装置是否牢固？有无明显标志？并作耐压试验
- 试验所有表计及继电器动作是否正确？

Do check and test the following before running after switchgear mounted and overhauled (the check after overhaul depends on overhaul situation).

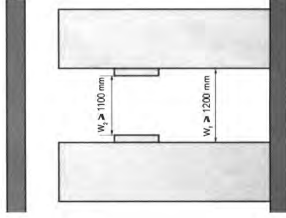
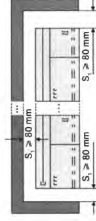
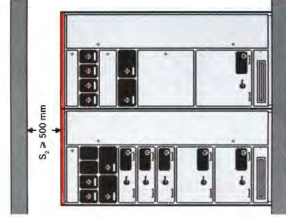
- Whether switchgear inner cable equipment and wiring meet drawing requirement? Line terminal with number or not? Wiring complete and firm or not?
- Mounted electrical equipment contact well or not? Suitable for its own technical requirement or not?
- Mechanical interlocking and electrical interlocking reliable or not?
- Withdrawable type component flexible or not? Contact well or not?
- Test switchgear earthing device solid or not? Have obvious mark? Do voltage withstand test
- Test all instrument and relay correct or not?

低电压开关柜 — MNS Low-voltage switchgear

操作与安装 (Operation and installation)

产品的成套性 (Product Set)

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，随机附件有门钥匙以及根据配套清单所提供的备品备件。Switchgear is with packing list, qualification certificate, product use instructions and necessary drawings. Accessories along with the switchgear include door key and spare parts as per provided complete set list. Power distribution room mounting dimensions and operation channel requirement.



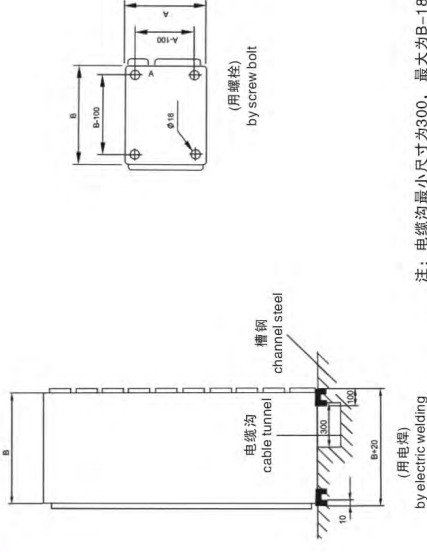
配电室安装尺寸及操作通道要求
Power distribution installation dimensions and operation channel requirements

低电压开关柜 — MNS Low-voltage switchgear

安装尺寸图 (Installation dimensions drawing)

应用范围 (Applied Range)

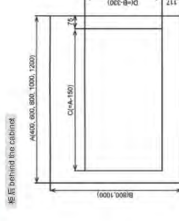
- A: 柜宽 / cabinet width
- B: 柜深 / cabinet depth



注：电缆沟最小尺寸为300，最大为B-180。
Remark: cable tunnel (minimum dimension is 300, max is B-180.

底柜开孔图 (Base Cabinet Open Hole Pattern)

- A: 柜宽 / cabinet width
- B: 柜深 / cabinet depth
- C = A-150
- C = B-350



进线柜 (后出线)
incoming line cabinet (side sense wire)



馈线柜 (后出线)
feed cabinet (back sense wire)

注：上进线实际情况而定
(Note: the upper incoming line depends on actual conditions)