MNS2.0

Low–voltage Switch Cabinet
(Authorized by ABB)



Application

MNS2.0– low–voltage switch cabinet is a new type low–voltage switch cabinet, introduced by People Ele. Appliance Group Shanghai Co., Ltd. from ABB, as unified low–voltage distribution solution to face needed of customers, with performance of high safety, reliability and flexibility.

ABB through cooperation with local excellent and high level low–voltage switch cabinet manufacturer, make themselves become eligible ABB ” technology partner” , entirely completely bring the multipurpose ABB low–voltage cabinet to your side.

Range of Application

MNS 2.0 compositional low–voltage switch cabinet system, are applied for all the place of generate, distribute and electric power. Such as:

- Main, sub power cabinet and distribution cabinet
- Motor supply power and motor control center
- Open loop or close loop control system electronic cabinet
- Electric system
- Petrochemical industry
- Industrial and mining enterprises
- Public service
- Municipal engineering and commercial building

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System feature

MNS 2.0 compositional low–voltage switch cabinet system, put to use for many years at world market to confirming the value. Whole system is adequately considered development space in yhe future to avoid the risk of eliminate because of technological development.

MNS 2.0 system compared with traditional product with more superiority:

- Compact structure, save the volume of cabinet
- Cabinet can arrange back to back
- Arrangement for distribution loop is economic
- Select norm element, convenient to designed by project planner
- Whole series standardization
- Cabinet can designed corresponding IP grade as different requirements of work and environment
- Can installed different type functional unit by freedom at same cabinet, for example: stationary type unit and draw out type unit
- Equipment replacement and convenient to improve
- Equipment operation have high continuity and reliability
- Operating personnel safe is guaranteed

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Technical standard

MNS 2.0 system compositional low–voltage switch cabinet is through by type tests (TTA), confirmed to IEC60439–1 and GB7251.1–2005 standard. Installing and connecting of system is according to IEC364 and DIN VDE0105 standard to carry out.

Work and environmental conditions

MNS 2.0 low–voltage switch cabinet is applied for indoor installation electrical equipment, IP grade can reach IP54 under other work conditions.

● Environment temperature
○ Highest temperature by short–time: +40℃
○ Highest average temperature by 24h: +35 ℃
○ Lowest temperature: –5 ℃
○ Equipment should reduce volume when the temperature is higher than above environment temperature
○ For measure, metering device, protect relay and other operating conditions, should comply with the regulations by manufacturer.

● Environmental conditions
○ Climatic environment as the 500th part of regulations for IEC60439–1、EN60439、VDE0660 when normal operating. Surrounding environmental relative humidity is 50% at 40 ℃.
○ The condition for switch cabinet indoor installation place should conform to corresponding requirement. The cabinet will adopt ventilate or warm and other measures to prevent condensation at the place which will have condensation happen.
○ If the cabinet is installed the place altitude more than 2000m, device should corresponding volume to operating.

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Technical data

Standard	type test passing assembled switch cabinet (TTA)		GB7251.1–2005 IEC60439–1
Electric parameter			
Rated insulation voltage		UI	690V/AC,3P
Rated working voltage		Ue	400V/AC,3P
Rated impulse withstand voltage		UImp	8kV
Over–voltage grade			Ⅲ
Pollution level			3
Rated frequency			up to 60Hz
Main bus	Rated current	Ie	up to 5500A(6300A)
	Rated peak value withstand current	Ipk	up to 220kA
	Rated short time withstand current	Icw	up to 100kA
Power distribution bus	Rated current	Ie	up to 1200A(2000A)
	Rated peak value withstand current	Ipk	up to 110kA(176kA)
	Rated short time withstand current	Icw	up to 50kA(80kA)
Structure feature			
Size	Frame body and supporting ware part		DIN41488
	Recommended height		2200mm
	Recommended width		400, 600, 800, 1000, 1200mm
	Recommended depth		800, 1000, 1200mm
	Module		E–25mm accords with DIN43660
Internal insolating form			up to Form 4
Protection grade			to IEC529 or DIN41050 IP30 toIP54

TTA accords with one kind of low voltage switch cabinets and control equipment with confirmed type or series, with no difference that may influence the performance, by compared with verified type of complete equipment.

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Structural design

Frame

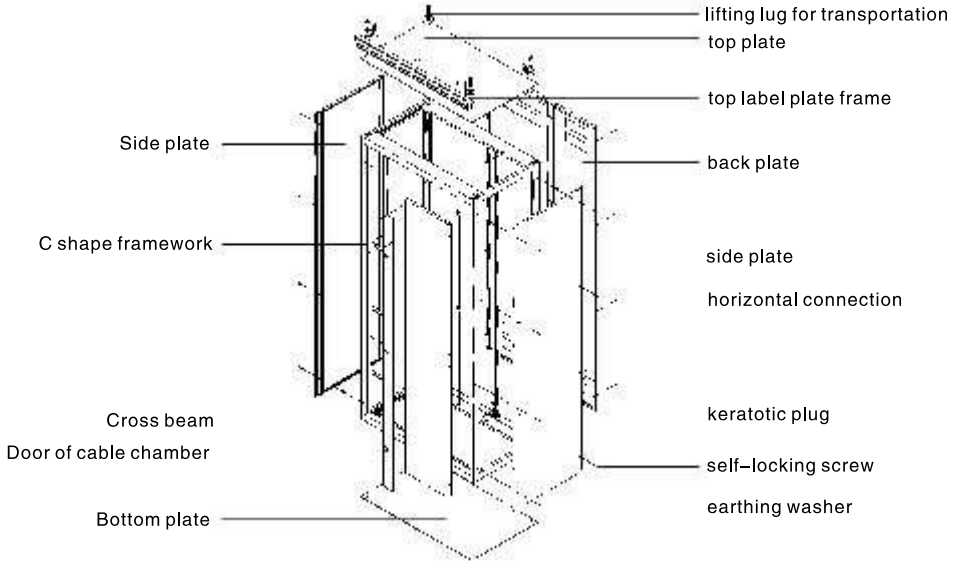
Basic component for MNS 2.0 system frame is a C framework with 25mm distance module hole (DIN43660) . Standard module of MNS system is E=25 mm, because adopt standard module hole system, so frame structure can assemble to various kinds cabinets without special tools, such as the switch cabinet for operation front type and single set or more than one set of back to back type.

Case

MNS 2.0 system as different operating requirements, may design case with different protection grade. Operation at back and unit screen cabinet can choose case which positive protection grade is IP30, protection grade of whole sealing type case is IP40–IP54 (draw out type switch cabinet are all whole sealing structure) . Hinge frame can use for install electron device and dash board and also can be used for device frame. Installation site of hinge frame can with or without the cover plate of observation hole. At the bottom of cabinet provided baseboard, can install cable trough after add flange board. Door plank and sheet may assemble single or multiple ventilation opening and the roof is whole ventilate type(suitable for IP40 and IP41) .

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Frame structure

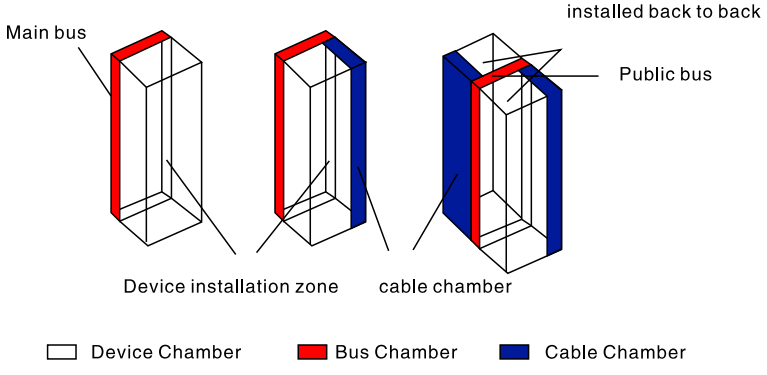
Frame structure for MNS 2.0 system divided into device chamber, bus chamber and cable chamber. Size (height × width × depth): 2200 mm × 400 / 600 / 800 / 1000 / 1200 mm × 600 / 800 / 1000 mm. Such as air circuit breaker is under 2000A and width for cabinet is 400mm, the longest delivery unit is 3000mm, inlet wire / outlet cabinet and bus–couple cabinet are install a switch (fixed type disconnecting switch/ fixed or draw out type moulded case circuit breaker/ air circuit breaker).

After make the parts of same functional group assembled in the MNS 2.0 system, can constitute a simple functional group of machinery and electric, include power element and control element. Chamber into cabinet is divided as different requirement, tank bracket structure can be divided into:

– Into device chamber is functional unit component
– Into bus chamber is bus and distribution bus
– Into cable chamber is inlet and outlet wire cable

Connector line and accessory among the functional unit component, such as cable clamp, cable adapting piece, parallel wire, alignment channel and others.

Among the functional unit and cabinet chamber should make a separate, internal separate can reduce the arc destructive effect to minimum.



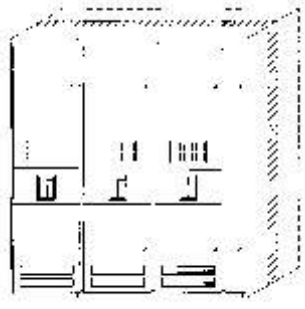
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Main bus

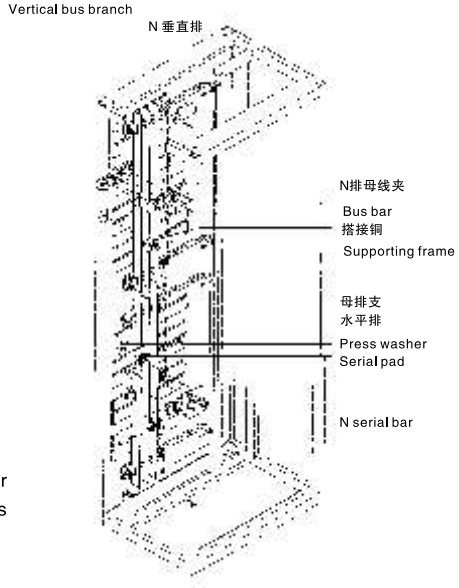
Main bus is fix up the back of switch cabinet (into bus chamber), divided into upper and lower level. Section size of two layer main bus can be different, main bus can be used alone, series connection and parallel connection. Each phase make up two bar or four bar main bus, cabinet with double–sided operation use the design of common bus. Bus for unit screen cabinet as separate of delivery unit, the material of bus is cooper and bus for different section also can connect.

Distribution bus

Distribution bus is used for connecting functional unit element and bus, vertical distribution into the bus chamber. Almost install two three–phase or four phase distribution bus into switch cabinet and can divided into two–stage arrange to appear with whole height, half height or middle. Every phase of distribution bus is simple root right–angle type cooper bar and the material of bus is copper.



Switch cabinet with device chamber equipped with air circuit breaker, bus chamber and bus connection chamber.

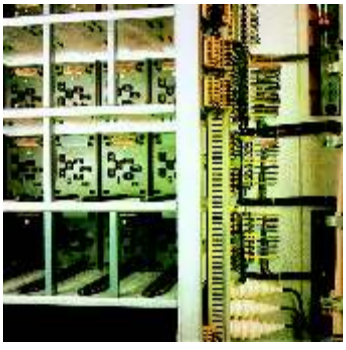


Frame with bus bar and branch bus bar.

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The connection mode of cable and controlling line in switch cabinet

Guard line and neutral line connecting bar

MNS 2.0 system may arrange to TN–C or TN–S bus system. 4 wiring system also include protection neutral line (PEN) , 5 wiring system add protection ground wire and neutral line (PE+N) expect main bus and distribution. Protection neutral line connection bar as system connection is horizontal installation under the device chamber and cable chamber and fixed by insulation terminal, the length of bar as divided by delivery unit. Protection neutral line connection bar for the cabinet is vertical installation into cable chamber, fixed with insulation terminal and the length as same as cabinet height. Have module hole on the PE+N、PEN bar and connection bar, used for connecting of cable.

Alignment channel and cable installation parts

Alignment channel of control wire is installed at the top of cabinet, use for arranging secondary circuit cable alignment of electric installation into cabinet and connecting wire between cabinet. Alignment channel is cut out as the width of cabinet. Can add guide rail in the front of the cabinet to use for install element, such as control power circuit breaker, etc. Control wire alignment channel in the front of the cabinet and PEN bus bar as below have element door or faceplate to protect, with ventilation hole under the panel.

Switching device connect to main bus bar directly

Installed disconnecting switch under 3150A, moulded case circuit breaker under 1250A and air circuit breaker under 5000A(6300A) or below with MNS 2.0 system as normalized form switch cabinet. Draw out type structure with frame of fixation installation belt with isolation contact. Accessories of E circuit breaker can provide: micro programming current electrical release, shunt, under–voltage, closing coil, stored energy motor, auxiliary contact, lock and unlock key, etc.

Machinery accessory of MNS 2.0 system include metering device niche and shock resistance protecting cover. Current measurement, voltage measurement and other electrical meter are installed on door sheet so that convenient to operating. Power protection, current transformer and other electrical element are installed into device chamber and bus chamber so that convenient to inspecting. Disconnecting switch above 1000A or below, moulded case circuit breaker and air circuit breaker above 630A or below can connect with bus bar directly. Bus bar or cable (to 12 cables in parallel) can use for the wiring for inlet or outlet, the inlet into device chamber may connect up and down.

Frame structure

Draw out type switch cabinet is divided into device chamber, bus chamber and cable chamber. Dimensions (Height × Width × Depth): 2200 mm × 1000 mm × 600 / 800 / 1000 / 1200 mm. Draw out type component are made up of component itself and component installation chamber, component for power unit and control unit are draw out type installation, 8E / 4, 8E / 2, 8E, 16E and 24E as standard specifications. Four 8E or four/ two 8E, these element can horizontal install into device chamber which width is 600mm, the height of element is 8E (200mm). Single element of 8E，16E，24E need device chamber which width is 600mm and height of element is the size for element specifications.

When the draw out type element is operated, the main power for switch cabinet need not turn off. Operated the element insertion or extraction in the case of adjoin element without outage, the electric shock will not happen.

Multifunction splitter plate

In the switch cabinet with draw out type or fixed type and draw out type mixed designed, distribution bus (section for right angle L type 50 × 30 × 5 mm) was installed to insulation multifunction splitter plate, with whole bus system together, achieve the requirement of resist the electricity protection level (IP20) and need not add septum. Multifunction splitter plate have the performance of resist malfunction arc and also as the quarantine of device chamber and bus chamber.

8E / 4, 8E / 2 device chamber

8E / 4, 8E / 2 device chambers include: baseboard, guide rail, front rail and plug through connection. Electrical connection for power and control loop with distribution bus, elements and cable chamber, completed by plug through connection. The maximum current of draw out type plug is 125A, can accommodate plug of four 8E/ 4(current up to 45A) or two 8E/ 2(current up to 63A), each 8E / 4 element provide a terminal with 16 (20) core and each 8E / 2 element provide one or two control terminal with 16 (20) core. The connection of inlet or outlet line cable is into the side of draw out type plug element and with protection function of resist malfunction arc.

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Draw out type element，Standard component plan

- Fuse switch or moulded case circuit breaker for power distribution
- Motor starter with fuse
- Motor starter with moulded case circuit breaker
- Motor starter with M101，M102 motor control and protector

Package specification: 8E / 4, 8E / 2, 8E, 16E, 24E



8E / 4 pull out component



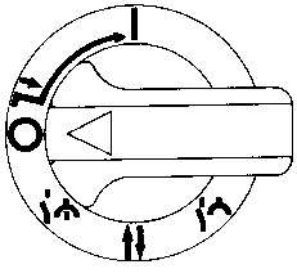
8E / 2 pull out component

8E / 4 and 8E / 2 draw out type component

8E / 4 and 8E / 2 draw out type component structure include: dash board, insulating material side plate backboard with cable connection terminal and one or two 20 core control line terminal installation, as different needed 8E / 2 can match two 20 core terminal. With a hole on the dash board, use for install device of measure, operate and display. Operation of main switch is achieved by hand shank on the dash board, the hand shank have electric and mechanical interlocking function, electric interlock use a micro switch with contact of normally open and normally close.

It will show O to I after operating handle press inward, can add a lock to main switch separating break, test and isolate on the handle as safety protection, almost add three locks.

Instruction of handle position of the switch



Switch handle



I Operation position: main switch closed, control loop connected, components locked



O Off position: main switch break, control loop connected, components locked



Test position: main switch off, control loop connected, components locked



Pull out position: both main switch and control loop break.



Isolation position: pull out 30mm, both main switch and control loop break, finish the isolation.

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8E pull out component



16E pull out component

16E，24E draw out type component

8E to 24E draw out type component include: Dashboard, insulated rear panel, the front cover, metal plates and alignment channel. Hinge assembly for replacement components from the front door provides a convenient (such as replacing fuses), can be realized without draw out components. When the assembly is in work and test position, only use the tools (such as screwdrivers, double lock) to open the front door. When the component is at isolated position, then can be equipped with double lock.

Front cover have the hole for installing dash board, dash board will stay in site when front cover was open or close. Dashboard has knockouts to install metering, operation and indicates device. Operating handle with electrical and mechanical interlock function, electrical interlock using a micro switch with one normally open and normally closed contact to complete.

Instruction of handle position of pull out components



Operation position: main switch closed, control loop connected, components locked

Test position: main switch off, control loop connected, components locked, can be three locks.

Pull out position: both main switch and control loop break.

Isolation position: pull out 30mm, both main switch and control loop break, finish the isolation, with three locks.

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Transport and installation

After switch cabinet assembly is complete and passing inspection then can be packing to transport. Packing is divided into four mode of transportation of single set, two sets, three and four sets, transport units up to 3000 mm, should be avoided whenever possible separate packing, in order to reduce the connection point between the main bus. When the product is reached destination, you should first check the packing is complete or not. If the cabinet is not used immediately, should be stored in a dry and clean place.
Switch cabinet should be in accordance with the dimension to installing, basic channel owned by the user. For cable outlet, you must install the cable channel. Drawings should do first when you install the main bus connection, do surface cleaning treatment on the bus, then fixed by bolt, and overhead cables or wiring work. When the switch cabinet installed in parallel, the site should be parallel with the bolt hole.

Requirement for the space of power distribution chamber

Switch cabinet into power distribution chamber must be installed vertically. If the wall installation, in order to meet the cooling requirements, should ensure

- The minimum distance from the wall for S1≥80 mm
- The minimum distance from the ceiling to S2≥500 mm

Inspect before operation

Switch cabinet after installation or maintenance, before being put into operation must be carried out following inspections and tests (visual inspection overhaul after overhaul its nature)

- Internal electrical equipment and wiring of switch cabinet whether meets the requirements of the drawings? Wire ends are numbered? Wiring is neat firm?
- Contact with electrical equipment installed is good? Itself meets the technical requirements?
- Mechanical and electrical chain reliability?
- Draw out type assembly movement is flexible? Contact is good?
- Test switch cabinet is solid grounding? Without obvious signs? And for the pressure test.
- All test meter and relay correct?