TECHNICAL INFO

MNS 3.0 Low Voltage Switchgear

- Safer, more reliable, more intelligent, more value to customers

ABB is the global leader for low voltage switchgear with over 1.5 million MNS® switchgears delivered worldwide since the inception of this system in 1973.

MNS® is the registered trademark of the ABB low voltage switchgear system, registered in China since 1996.

ABB Xiamen Low Voltage Equipment Co., Ltd. is one and only MNS® low voltage switchgear production base set up by ABB Group in China.

Our advantages:

- MNS® is the world's leading technology product platform, which provides highly safe and reliable low-voltage switchgear for customers in the utilities, industry, rail transit, data center and other infrastructures.

- Diverse market and customer needs are met by the global R&D system. Our R&D teams are all over Germany, Sweden, Finland, India, China, the United States and Mexico.

- We have more than 30 MNS® manufacturing bases all over the world to provide globalized service and technical support following the same quality standards.

- MNS digital solution adopts the concept of system and integrates digital intelligent technology, so that the traditional switchgear keeps up-to-date and becomes an intelligent member of the Internet of Things.

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MNS® Switchgear Overview

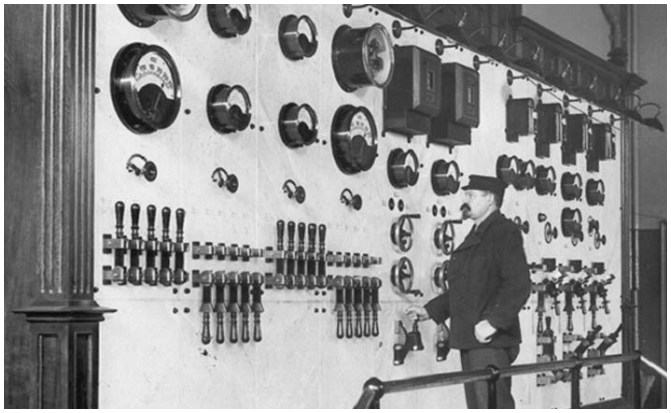
Up-to-date low-voltage switchgear
ABB is an enterprise mastering advanced low-voltage switchgear technology, which leads the development trend of low-voltage switchgear. As early as the1890s, ABB took the lead in manufacturing switchgear systems in Sweden. Since the invention of MNS® system in 1973, ABB has continuously improved the distribution technology of low-voltage switchgear with the responsibility of safe and reliable power consumption by users. Up to now, more than 1.5 million sets of MNS® switchgear have been put into use worldwide.

Nowadays, the automation process of industrial users is becoming more and more complex, the social cost of unexpected power outage in infrastructure is getting higher and higher, the labor cost is increasing gradually, and the digital information technology rapidly develops, which puts forward higher requirements for low-voltage switchgear.

How to minimize failure rate, reduce downtime, ensure reliable power supply and reduce the daily operating costs of customers as far as possible?

A new generation of MNS digital low-voltage switchgear solution adopts the concept of system and integrates digital intelligent technology, so that the traditional switchgear keeps up-to-date and becomes an intelligent member of the Internet of Things.

ABB Group has set up more than 30 MNS® production bases all over the world. The global service and support network jointly established under the same standard convince customers that choosing MNS® switchgear is the right decision.



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Hofors power station & rolling mills, Sweden, 1890

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Zoetermeer hospital, Netherlands

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MNS Digital Low Voltage Switchgear in ABB Xiamen Hub

Features & Applications
ABB Xiamen Low Voltage Equipment Co., Ltd. is the one and only MNS® low voltage switchgear in China owned by ABB Group, and introduced MNS® modular low voltage system which with the advanced technologies of the world from ABB Germany. The ABB MNS® system is a low voltage switchgear assembly. Its design is verified in accordance with GB/T 7251.1/12-2013, IEC 61439-1/2.

Comprehensive application solutions and services
- Full range of low-voltage switchgear solutions can meet the application needs of customers in different industries
- Products and services around the world can help customers develop overseas market
- All-round services can prolong the service life of equipment and shorten the time of field modification

Safe and reliable low-voltage switchgear
- Anti-arc design and complete type test can ensure the safety of operators
- Effective prevention from temperature rise, overvoltage and earthquake can ensure the continuous operation of equipment
- Maintenance-free busbar and reliable electrical and mechanical components can effectively prolong the service life of switchgear

Flexible, compact and highly available
- Flexible combination of side outgoing, rear outgoing, back-to-back and other solutions adapts to various spaces
- Modular design provides compact structure, saves space, facilitates upgrading and transformation, and reduces design time.
- The withdrawable design provides the better usability and interchangeability to reduce the loss caused by downtime and maintenance.

Digital intelligent solutions
- Multiple digital and intelligent solutions are used to help customers reduce operating costs
- Intelligent temperature measurement technology is used for real-time monitoring of key components temperature, to reduce the risk of power failure
- Various monitoring and diagnostic data are provided for customers to make maintenance plans and conduct data analysis

Thus MNS® proves to have the approved solution for the following industries:
- oil & Gas, on and off shore
- petrochemical/coal chemical
- metal mining
- cement/glass
- semiconductor/photoelectricity
- automobile making
- paper
- food
- pharmaceutical
- Marine
- water

As well as for infrastructure requirements:
- power stations
- rail
- airports
- data centers
- hospitals
- commercial buildings
- residence community

— Typical Layout

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Technical Data

Standards	Design verified and Type-tested switchgear assemblies			GB/T 7251.1/12-2013, IEC 61439-1/2, EN 61439-1/2, DIN_VDE 0660, Part 500 BS 5486, UTE 63-412
Test certificates	(CCC) China Compulsory Product Certification			China Quality Certification Centre
	Type test			ASTA, Shanghai Testing & Inspection Institute For Electrical Equipment Co. Ltd
	Short-circuit withstand strength test			ASTA, Shanghai Testing & Inspection Institute For Electrical Equipment Co. Ltd
	Resist to accidental arcs acc. to IEC 61641 and part 508 of VDE0660			ASTA, Great-Britain
	Classification Society Certification (shipping)			Gemanischer Lloyd
	Earthquake Test for Security Areas in Nuclear Power Stations			China National Center of Quality Supervision and Test for Electrical Apparatus Products/DRL German Research
Electrical data	Rated voltages	Rated insulation voltage Ui		up to 1000V AC, 3 P, 1500V DC*
		Rated operating voltage Ue		up to 690V AC, 3 P, 750V DC*
		Rated impulse withstand voltage Uimp		6/8/12 kV*
		Overvoltage category		II/III/IV*
		Degree of pollution		3
		Rated frequency		up to 60 Hz
	Rated currents	Copper Busbars	Rated current Ie	up to 6300 A
			Rated peak withstand current Ipk	up to 220 kA
			Rated short-time withstand current Icw	up to 100 kA
		Distribution bars	Rated current Ie	up to 2000 A
			Rated peak withstand current Ipk	up to 220 kA
			Rated short-time withstand current Icw	up to 100 kA
		Arc proof	Rated operating current	up to 690 V
			Prospective short-circuit current	up to 100 kA
			Duration of short-circuit	300 ms
			Criterion (IEC 61641)	1 to 7
Mechanical characteristics	Dimensions	Sections and frames		DIN41488
		Standard height		2200 mm
		Standard width		400, 600, 800, 1000, 1200 mm
		Standard depth		800, 1000, 1200 mm
		Basic grid size		E=25 mm acc. to DIN 43660
	Surface protection	Frame		Alu-zinc coated
		Internal partitions and mounting plate		Alu-zinc coated/Zinc coated/Non-metal
		Transverse section		Alu-zinc coated/Zinc coated
		Enclosure		Alu-zinc coated and Powder coated RAL 7035, light
	Degrees of protection of plastic components	IEC 529		up to IP54
		Halogen-free, self-extinguishing		DIN VDE0304 Part 3
		flame retardant, CFC-free		IEC707
		Internal subdivision		up to Form 4

* Depending on the electrical equipment.

Operational safety and availability

The fulfillment of all instructions of GB/T 7251.1/12-2013 and IEC 61439-1/2 standard for Low Voltage switchgear assemblies assures a basic level for personal and system protection. But ABB's pursuit for safety and reliability goes beyond that.

In order to reach the highest level of safety, the MNS 3.0 low-voltage switchgear system continues to withstand some tests subject to strict application requirements, such as seismic test, on the basis of passing the type test. Applicable standards: GB/T 7251.1/12-2013, IEC 61439-1/2, EN 61439-1/2 VDE 0660 Part 500, BS 5486 Part 1, UTE 63-412 and other standards.

In addition, ABB also conducts an internal fault arc test according to IEC 61641 standard. This test chooses the ignition point as the fault point which can cause the maximum impact force inside the low-voltage switchgear working properly under power-on state, and such points are verified one by one according to the criterion specified in IEC61641.

The MNS 3.0 low-voltage switchgear not only meets the personal protection requirements of Criterion 1 to 5, but also passes the verification according to Criterion 6 and 7 to achieve maximum safety protection for equipment and persons.

For more information on arc fault containment the “MNS® Safety Aspects” brochure delivers essential considerations concerning plant and personal safety assured by MNS, such as:

- Basic safety philosophy
- Switchgear assembly verified by testing
- Arc fault protection
- Degrees of protection (IP code)
- Internal separation
- Earthquake, vibration and shock
- Neutral conductor dimensioning

Operation and Environment Condition
MNS 3.0 low voltage switchgear assembly is an electrical device suitable for indoor installation, the protection degree of the assembliescan be as high as IP54 under normal operation environments

Environment Temperature under normal operation environments

Highest temperature in short-term	+40°C
The highest average temperature in 24 hours	+35°C
The lowest temperature	-5°C

Equipment shall run with less load under environment temperature higher than those specified above.

The operation conditions for measuring and metering instrument as well as protection relay shall follow the vendor's instructions.

Environment Condition
Climatic environment under normal operation shall follow the specifications of GB/T 7251.1/12-2013, IEC 61439-1/2, EN 61439-1/2 and Part 500 of VDE 0660. The ambient relative humidity is 50% at 40°C.

The condition of the place of indoor installation of the switchgear assemblies shall be as per the requirements specified in the corresponding standards. Anti-condensation measures such as ventilation and heating shall be taken in the places where condensation may occur.

In case that the switchgear is installed at elevation higher than 2,000 m, derating use of the equipment is needed.

The surface of the tropical type switchgear has to be coated with special paint.

With accessories and enhanced parts, MNS 3.0 system can meet the safety requirements for switches in earth quake zones.

When the shock resistant separators are added, the switchgear with air circuit breakers or fuse disconnectors can meet the requirement of the federal civil defense equipment for civil military defense bunkers, shock resistance value is 0.63/6.3.

Standard type MNS 3.0 low voltage switchgear has passed the test for marine standards of German Lloyd's Register of Shipping with resistance against shock of 5-100 Hz.

Special Operating Environment Design
- Tropical
- The earthquake zone
- Shelter
- Ship
- Offshore marine use

Switchgear structure

Functional Compartments and Segregation
The assembly is divided into compartments thus separating different functional areas.

Structure of circuit breaker cabinet

❶ Equipment compartment
The equipment compartment is divided into 3 sub sections, each sub section having its own door.

The center sub section accommodates the circuit breaker and associated equipment in fixed or withdrawable design.

The incoming and outgoing direction of the cable may affect the mounting position of the secondary component chamber. For example, under the condition of top incoming, the secondary component chamber can also be placed in the partition space under the switchgear.

❷ Busbar compartment
Contains the MNS® main busbar system.

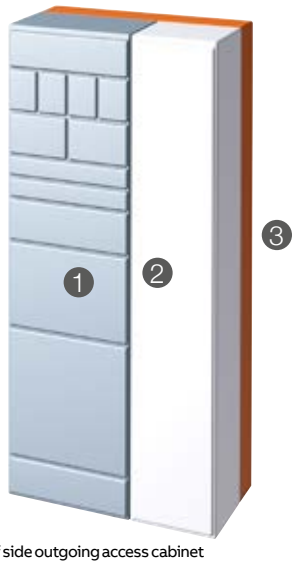
Outgoing cabinet structure

❶ Equipment compartment
It is used to place the withdrawable/fixed plug type outgoing circuit, such as the withdrawable motor start circuit.

❷ Cable compartment
Contains control cables and terminals, as well as power cables and connection units. Cable entry may be top or bottom.

❸ Busbar compartment
Contains the MNS® main busbar system.
The distribution bars are embedded in the multifunction wall (MFW) which is located between the equipment compartment and the busbar compartment.

Structure of side access circuit breaker cabinet



Structure of side outgoing access cabinet

Switchboard Arrangements
MNS 3.0 side access switchgear can be arranged as follows: free standing, back-to-back or duplex.

—
Free standing

—
Back-to-back (no common bus for mounting)

—
Duplex (common bus for mounting)

Switchboard Dimensions
Dimensions of MNS 3.0 side access switchgear:

Mechanical Design

Frame construction
The frame construction of MNS 3.0 switchboard are “C” shaped steel profiles with a 25 (1E) mm hole pitch according to DIN 43660.

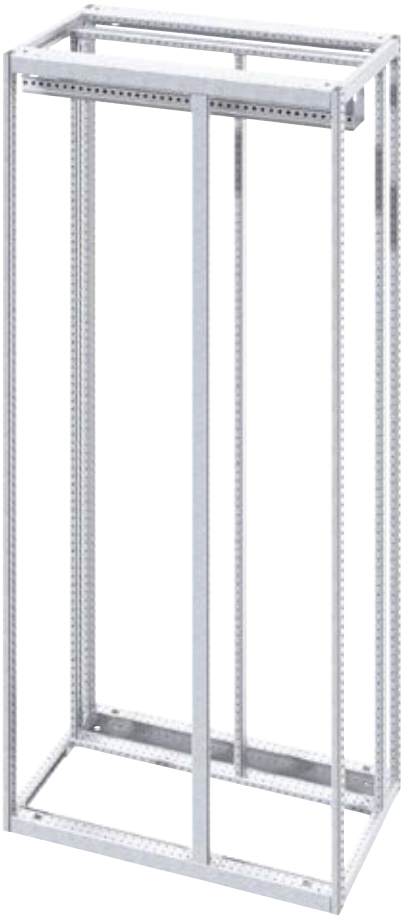
Each switchgear adopts ESLOK screws or tapping screws to horizontally and longitudinally connect the framework in order to build a stable and maintenance-free modular structure.

The framework adopts hot-dipped-aluminum-zinc-coated or hot-dipped-zinc-coated clad sheets which are corrosion-resistant.

Enclosure
MNS 3.0 switchboard enclosure is made of sheet steel protected by galvanic coating and powder coating for maximum durability.

The fixing of the enclosure with respect to doors, roof plates, rear and side walls is achieved with thread forming screws. Final construction varies depending upon the required degree of protection.

In accordance with the general safety philosophy followed with MNS®, each compartment and sub-compartment which requires access for commissioning, operation or maintenance, has its own door.



— Frame construction

— Enclosure

Busbar System

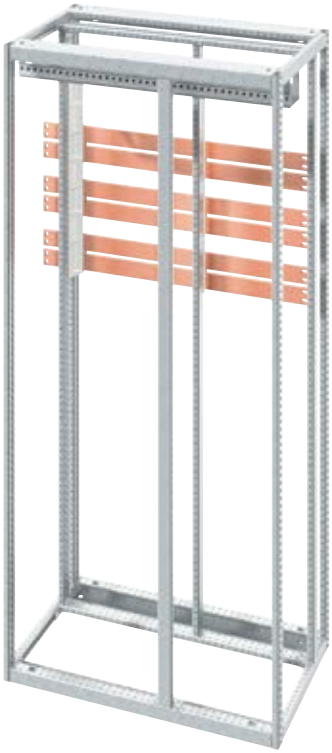
Main Busbars

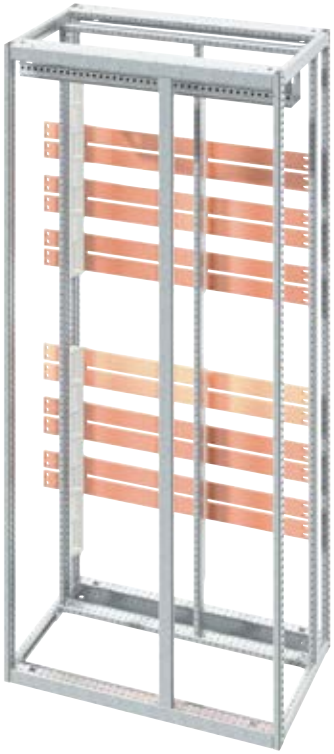
The main busbar system of MNS 3.0 switchgear is arranged in the rear of the switchgear. This assures a maximum distance between the busbars and the operator and maintenance staff. The main busbar system is fully separated from the equipment compartment as well as from the cable compartment.

The busbar system is a maintenance free construction as a result of utilizing thread locking ESLOK screws together with conical spring washers. This technology remains relatively unchanged since the introduction of MNS® switchgear, and has been extensively supplied into the most demanding industries.

Copper for main busbars and other related connectors conforms to DIN 40500. The standard configuration of main busbar adopts the bare copper scheme, but tin plating, silver plating or heat shrinkable bushing can also be adopted according to customer requirements.

The busbar is separated by transport units. The cross-section area is 20x10 mm, 30x10 mm, 40x10 mm and 60x10 mm.





Protective Earth and Neutral Bars
As per a standard, PE bar and neutral bars run horizontally within the front of the switchboard just above the base. The PE bar is fastened to the frame to assure electrical continuity. In the cable compartment, PE bars and neutral bars are longitudinally mounted on the front right hand side of the compartment.

Because of phase unbalance or harmonic problems, some applications need four-pole main busbars. At this time, 50% or 100% neutral bars can be mounted in the busbar comparment in parallel with the main busbars.

Distribution bars
Distribution bars (3 poles or 4 poles) run through the whole outgoing cabinet from top to bottom and adopts complete interphase isolation. The standard configuration of distribution busbar is tin plating. Silver plating can be selected as required by customers.

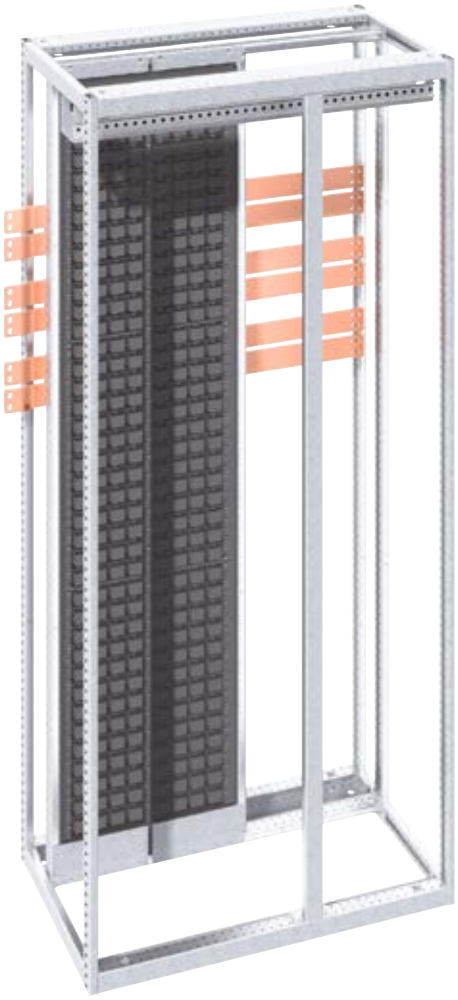
Multifunction Separator
The multifunction separator (MFS) with the embedded distribution bars is a unique MNS 3.0 design. It constitutes a complete barrier between the main busbars and the equipment compartment.

The distribution bars are fully phase segregated and insulated. This design makes it virtually impossible for an arc to pass between distribution bar phases or between main busbars and equipment compartment. The insulation material is CFC and halogen free, it is also flame-retardant and self-extinguishing.

Contact openings are finger proof (IP 2X) so that personal safety is guaranteed even when modules are removed.

With the use of MNS 3.0 specific power contact housings full single phase segregation is assured prior to the connection of the power contacts to the distribution bars.

System Highlights:
- Maintenance free bus bar construction
- Easy switchgear extension
- Main busbar arrangement at the rear thus assuring
  - maximum safety to personnel
  - effective withstand against highest stresses in c ase of short circuit
  - optimum heat dissipation
- Gas tight seals for connection from the equipment compartment to the main busbar system
- Option for Form 4 separation for both incoming and outgoing assemblies
- Active and passive arc fault prevention tested according to IEC 61641
- Isolating materials are free of CFC and halogens



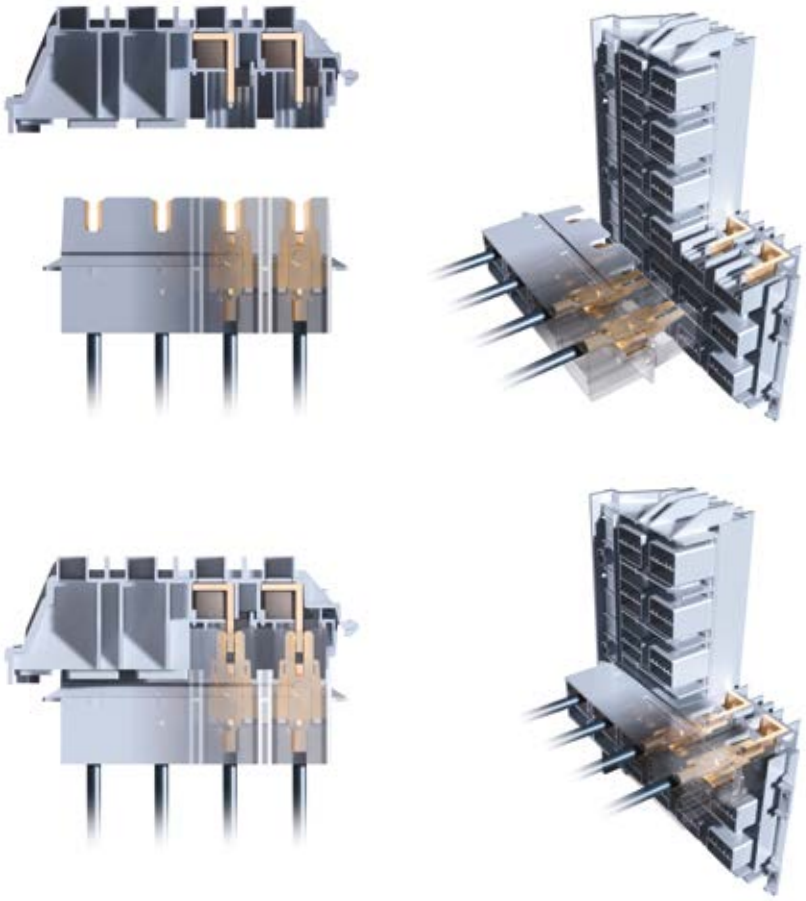
Primary connector
The primary connector can be directly connected to the distribution bars. MNS® power contact is characterized by a turnable bearing, thus decoupling cable stress and electrical contact. Consequently any cable bending forces cannot affect the stability of the power contact.

The mechanical stabilisation is achieved by the supporting plate and the contact spring where the contact fingers ensure positive electrical contact. Contact fingers are silver plated or tin plated as standard.

The contact has been subjected to several tests in order to prove the sophisticated design and the high quality, which provides a life cycle up to 1000 insertions.

Tests
- Type test GB/T 7251.1/12-2013, IEC 61439-1/2
- Corrosion test acc. DIN 50017, IEC 60068-2- 60
- Crimping quality check acc. IEC 61238-1
- Vibration and shock test acc. IEC 60068-2-6, IEC 60068-2-27

System Highlights:
- Operational life cycle up to 1000 insertions (independently certified)
- Bearing construction eliminating cable stress
- Full single phase segregation assured prior to the connection of the power contacts to the distributi



Design of MNS® rear access switchgear

Highlights

- The rated current of main busbar can be up to 6,300 A and the depth of the cubicle needs only to be 1,200 mm.
- The structure of the main busbar array system are compatible for hard copper bar and facilitates field expansion.
- The separation inside the cubicle can reach Form 4.
- Design of the cubicle satisfy the requirement for arc fault protection.
- With modularization design, the multi-function wall can form in different heights and separate the phases of branch busbars.
- Multi-cubicle structure, cubicle (≥600) is available for single package.

The MNS® rear access switchgear is designed to reduce the array width of switchgears, It adopts the framework which is the same as that of the side access switchgear in the materials and functions, door sheet, multifunction separators, primary connector and outgoing unit.

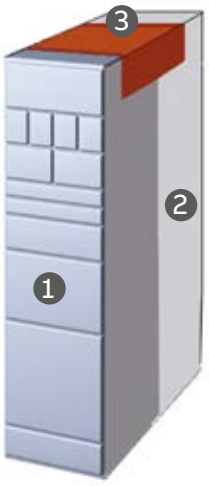
The main busbar of the rear access switchgear is horizontally installed at the top of the switchgear.

The rear part of the switchgear is cable compartment, where incoming and outgoing cables are connected here. The device compartment is at the front, where switches and other devices are installed as the function unit. The rear access solution dramatically reduces the array width of switchgears, so as to fit the substation layout demands in a better way.

The feeder switchgear features width of 600 mm . Independent main busbar compartment is on the top part which is separated from the device compartment. The available installation height of 72 E (E=25 mm) is designed for the front device compartment which is separated from the rear cable compartment via the multi-function separator. Thus the installation space of the switchgear is fully utilized for a compact structure and flexible unit arrangement. The rear cable compartment is with a door for easy installation and maintenance.

The width of the incoming switchgear depends on the frame current.

— Structure of rear access circuit breaker cabinet



— Structure of rear access circuit breaker

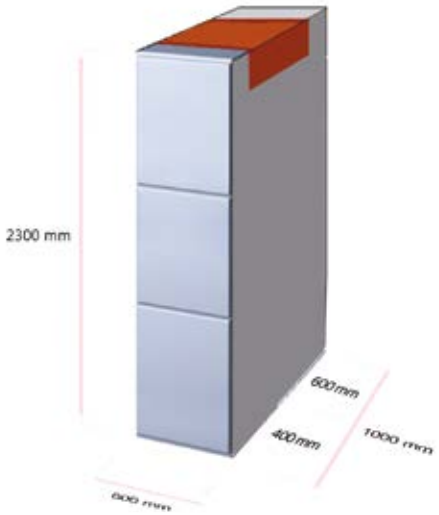
1 **Device compartment**

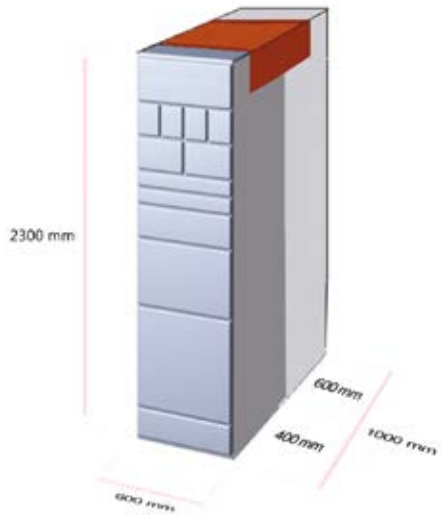
2 **Cable compartment**

3 **Busbar compartment**

Switchboard Dimensions

MNS® rear access switchgear shall be arranged on one side, with the following dimensions:





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Dimensions and Main Busbar systems Configuration

Main busbar Rated current	≤ 3200 A	4000-5000 A	6300 A
Cubicle- top main busbar	Sigle busbar	Sigle busbar	Upper and lower dual busbar
Depth of Cubicle	1000 mm	1200 mm	1200 mm
Height of Equipment compartment	72E(1800 mm)	72E(1800 mm)	64E(1600 mm)

Busbar System

The main busbar is installed horizontally in the busbar compartment on the top part of the switchgears. Each phase comprises busbar in the quantity of times of 2.

Special structural design is adopted for the main busbar system which optimizes the heat dissipation channel of the switchgears, meantime, no drilling is needed for the connection of the switchgear and feeder switchgears thus to facilitate the installation and field maintenance.

The main busbar system is divided into single and dual busbar with a maximum rated current of 5,000 A for the single busbar and rated current of 6,300 A for dual busbar.

Single package and transportation for the main busbar system is available for the maximum flexibility of field installation.

Vertical copper busbar installed in the multi-function constitutes the distribution busbar system with a maximum rated current of 2000 A.

The vertical copper busbars are separated by the multifunction separator thus to minimize the occurrence of short circuit to the maximum extent. Protective grounding bus bar is installed in the bottom of the cable compartment on the rear side of the switchgears.

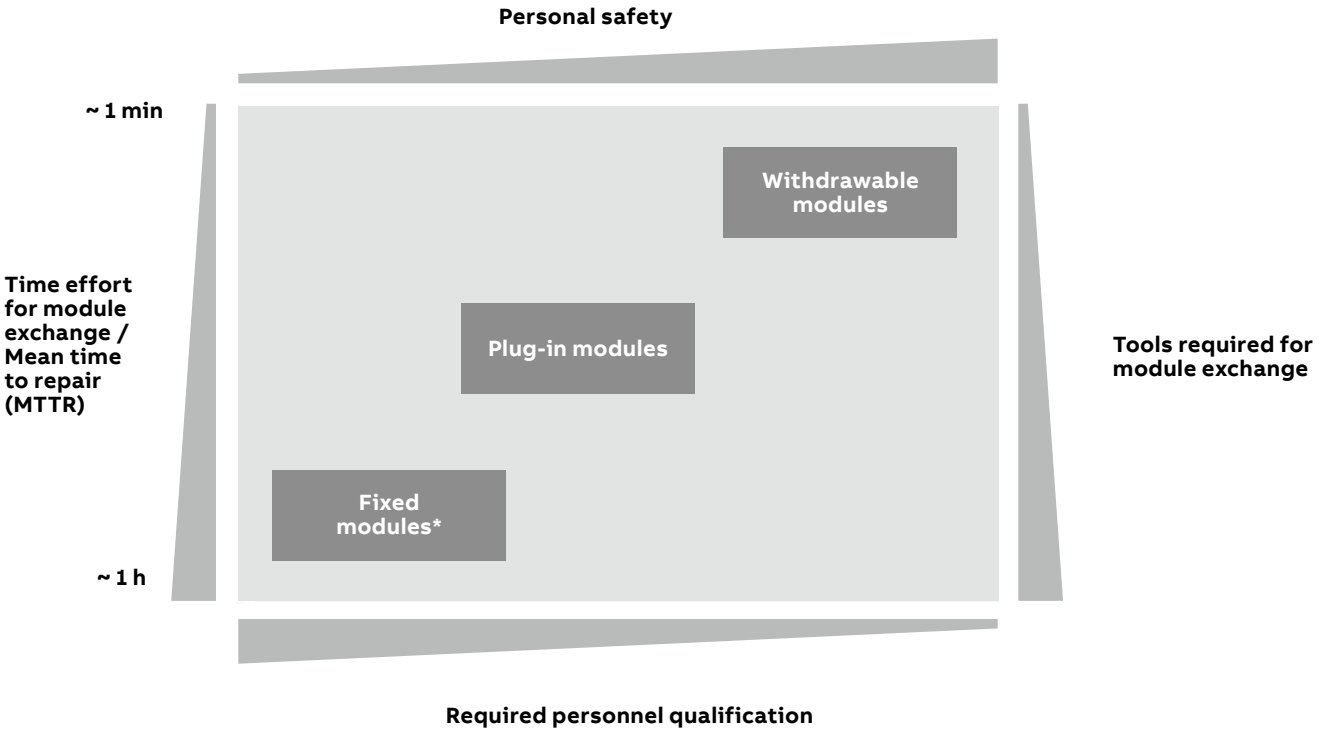
The neutral busbar can be installed in the busbar compartment on the top part of the switchgears or together with the grounding busbar based on the requirements.

The PE/N busbar in the bottom of the cable compartment on the rear side of the switchgears are all with modulus holes for the connection of cables.

Outgoing solutions

The available module types have typical characteristics as shown in the graphic above. Where high process availability is essential and minimal time is required for module exchange the with drawable solution has proved to be the definitive choice.

In installations where internal access to the switchgear does not present an obstacle the plug-in option may be the practical solution. Depending upon the choice of outgoing modules selected, the skill set of the personnel required to operate and maintain the switchgear may also differ. Switchgear requirements differ from project to project. MNS 3.0 switchgear easily allows the assembly to be configured to suit all plant operational requirements.



Plug-in Unit
MNS 3.0 switchgear offer numerous alternatives for plug-in modules. When utilizing the multifunction wall, all modules have the ability to be exchanged without de-energizing the switchgear, should maintenance procedures allow.

The flexibility of the system allows power distribution and motor control to be offered in the most economical Form 2 solution. On this basis, door opening/closing operation can be selected.

Variable frequency Drives/soft starter
Due to its inherent modular design MNS 3.0 switchgear can easily be adapted to house the ABB range of AC Industrial Drives/soft starter. The switchgear can accommodate multiple drives/soft starter in a single section. Each drive compartment has an individual isolator.

Drive Solution is available for filters to be installed and for the drive control panel to be door mounted to enable interrogation and parameterization without the need to open the door.

Reactive Power Compensation Solution
MNS 3.0 can provide various compensation solutions for AC system with a maximum compensation capacity of 450 kvar. Compensation with different reactance rates are available. For cubical size of 600 mm to 1,200 mm, centralized are adopted.

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Frequency conversion cabinet

—
Soft start cabinet

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Capacitor cabinet

Design of Withdrawable Modules

The withdrawable technique of MNS 3.0 system has proved to be the appropriate solution for use in industrial applications where requirements for high availability are a must particularly in Motor Control Centers (MCC).

Modules can be easily exchanged under operational conditions thus assuring maximum flexibility.

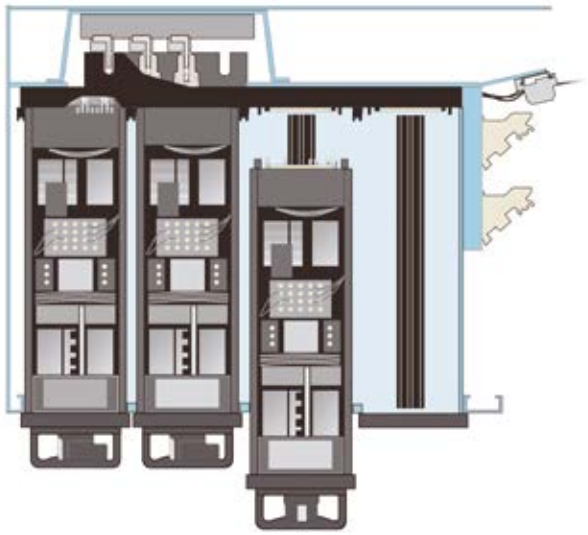
Small modules
Withdrawable technique is distinguished by its compact design where, with the smallest 8E/4 module it is possible to physically define a maximum of 36 modules in the equipment compartment. This modularity enables the assembly to maximize the usage of the available space, which in turn reduces the overall footprint of the switchgear.

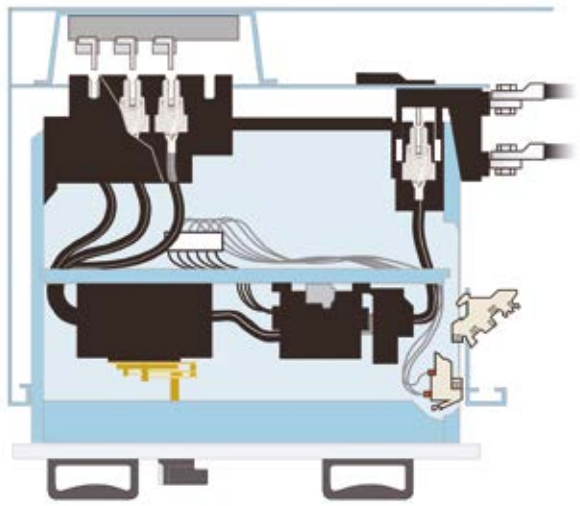
The adapter unit enables the horizontal distribution of power from the vertical distribution bars, this allows 2 modules (8E/2) or 4 modules (8E/4) to be located adjacently within the same horizontal position in the switchgears. Adapter are available in 3 or 4 pole options. Cable connections for main and auxiliary circuits are integrated into the adapter and are accessible from the cable compartment.

Full width module
These modules are available ranging from 4E to 24E in physical sizes. The construction of the full modules differs slightly from that of the small modules in utilizing a full width hinged door which is mechanically interlocked to the isolator.

All operational procedures for the modules are possible without the need to open the door of the module.

Full width modules connect directly to the distribution bars through the multifunction wall. The design of the module enables auxiliary components to be located on both the vertical and horizontal mounting plates within the module, thus optimizing the available space usage within the module. Cable connections for main and auxiliary circuits are accessible from the cable compartment.





Module operation
MNS® modules are operated with the multifunction operating handle. This handle also activates the electrical and mechanical interlocking of the module and the module door. No further tools or unlocking devices are necessary to withdraw a module, thus replacing a module takes less than a minute. Replacement as well as retrofitting of modules can be performed under live conditions, should plant operating procedures allow.

System Highlights
- High stacking density, resulting in a reduced footprint
- Complete phase isolation of main power contact prior to connection to the distribution bars
- Full module functionality with external operation
- Module replacement possible in less than 1 minute, no tools required

Operating position of drawer module
All positions are clearly identified at the fixed position of the operating handle. All identifiers conform to GB/T 7251.1/12-2013 and IEC 61439-1/2.

All primary and secondary connections can be self-positioned without additional tools.

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8E/4 Withdrawable Module

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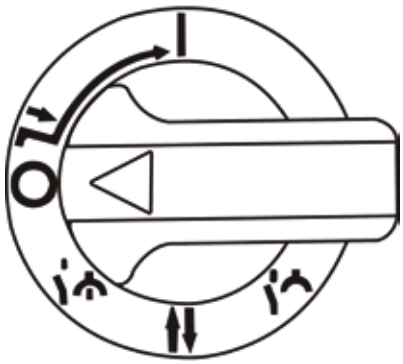
8E/2 Withdrawable Module



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Module Operating Handle

The standard of Withdrawable Module

Standard Module Solution
- Fuse switch and molded case circuit breaker
- Distribution Circuit with FC61x or FC710 feed management module
- The motor starter with fuse
- The motor starter with molded case circuit breaker
- The motor starter with M10x or MC510 motor control and protection device

Size of the modules:
8E/4, 8E/2, 4E, 6E, 8E, 12E, 16E, 20E, 24E

8E/4 and 8E/2 Withdrawable Module
The structure of 8E/4 and 8E/2 withdrawable module includes instrument panel, side plate of the insulation material, back plate with cable terminal, one or two installation parts with 20 core control wire terminal. And 8E/2 module can provide with 2 optional 20-core terminals according to different requirement.

Drilled holes are furnished on the panel for the installation of components of meters, operation device and indications. The operation of the main switch is achieved by the handle installed on the panel which is furnished with the function of electrical and mechanical interlocking. The interlocking is realized by a micro switch with one normally on and normally off for the other.

Position to Position 1 can be achieved by pushing the operating handle inward. Padlocks are available in three positions of the operation handle in terms of opening, testing and isolation of the main switch for safety protection. Three padlocks are available to the maximum extent.

Instruction on Positions of the Module Operating Handle of 8E/4 and 8E/2

		ON position-Main and control circuits are closed. Module is locked.
		OFF position- Main circuit are disconnected, the control circuits are closed. Module is locked.
		TEST position-Main circuit are disconnected, the control circuits are closed. Module is locked.
		MOVE position-Main and control circuits are disconnected.
		ISOLATED position-The module is 30 mm drawn out of the section. Main and control circuits are disconnected and the isolating distance is fulfilled.

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4E Withdrawable Module

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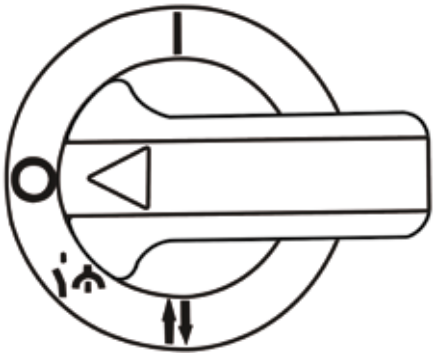
8E Withdrawable Module



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Module Operating Handle

Withdrawable Module of 4E, 6E, 8E, 12E, 16E, 20E, 24E

The withdrawable module of 4E to 24E include panel, rear insulation plate, front cover plant, metal side plate and wiring duct.

Module door facilitates the replacement of components from the front side (e.g. replacing the fuse) without drawing out the module. In case the module is in On or test position, the front door could only be opened with tools (such as screwdrivers. Double locks are available when the module is in isolation position.

There are openings in the front cover plate for the installation of the instrument panel. The instrument panel stay at the original place when the front cover open or close. Drilled holes are furnished on the panel for the installation of components of meters, operation device and indications.

The operating handle is furnished with the function of electrical and mechanical interlocking. The interlocking is realized by two contactor micro switches with one normally on and normally off for the other.

Instruction on Positions of the Module Operating Handle

	I	ON position-Main and control circuits are closed. Module is locked.
	O	OFF position- Main circuit are disconnected, the control circuits are closed. Module is locked.
		TEST position-Main circuit are disconnected, the control circuits are closed. Module is locked. Can be locked with 3 padlocks.
		MOVE position-Main and control circuits are disconnected.
	O	ISOLATED position-The module is 30 mm drawn out of the section. Main and control circuits are disconnected and the isolating distance is fulfilled. Can be locked with 3 padlocks.

Incoming solutions

All incoming solutions of the MNS 3.0 system are verified in accordance with GB/T 7251.1/12-2013, IEC 61439-1/2, in addition to IEC 60947-1 required for the individual apparatus, and engineered to meet the requirements of IEC 61641. This ensures ABB's offering of 'Proven Safety Plus' for operators and plant.

Incoming options
All Emax2 have as a minimum the following features:
• Optional S, L, I, G functions
• Manual charging lever and 'Charged' indication
• Manual Open/Close push buttons
• 4 auxiliary contacts

Extraction operation of Emax 2
Emax 2 combination consists of two parts, namely the fixed part (base) and the moving part (circuit breaker). Thus, Emax2 can have three locations:

Connection: The moving part is inserted into the fixed part, and both the main contact and the auxiliary contact are connected. The circuit breaker is operable and the mechanical indication shows "connected".

Test/isolation: The moving part is inserted into the fixed part, the main contact is not connected but the auxiliary contact is connected, the power terminal of the cabinet is not connected but the auxiliary contact is connected. The circuit breaker can be used for off-line test, and the mechanical indication shows "test isolation".

Disconnection: The moving part is inserted into the fixed part, and neither the main contact nor the auxiliary contact is connected. In this position, all electrical operations of circuit breaker are not allowed. Mechanical indication shows "disconnected". The door of the switch chamber can be kept closed, so the IP class of the switchgear is not affected.

Emax 2 base (fixed part) is fitted with shutters, which can be automatically closed during the racking out process of the circuit breaker to prevent possible contact on the live part.

System Integration
Emax 2 series circuit breakers can be perfectly integrated with all automation and electric energy management systems in order for efficiency improvement, energy consumption reduction and the implementation of remote monitoring.

All circuit breaker can be configured with communication unit compatible with protocols of Modbus, Profibus and Devicenet as well as protocols of modernized Modbus TCP, Profinet and Ethernet IP.

— Emax2 series circuit breakers

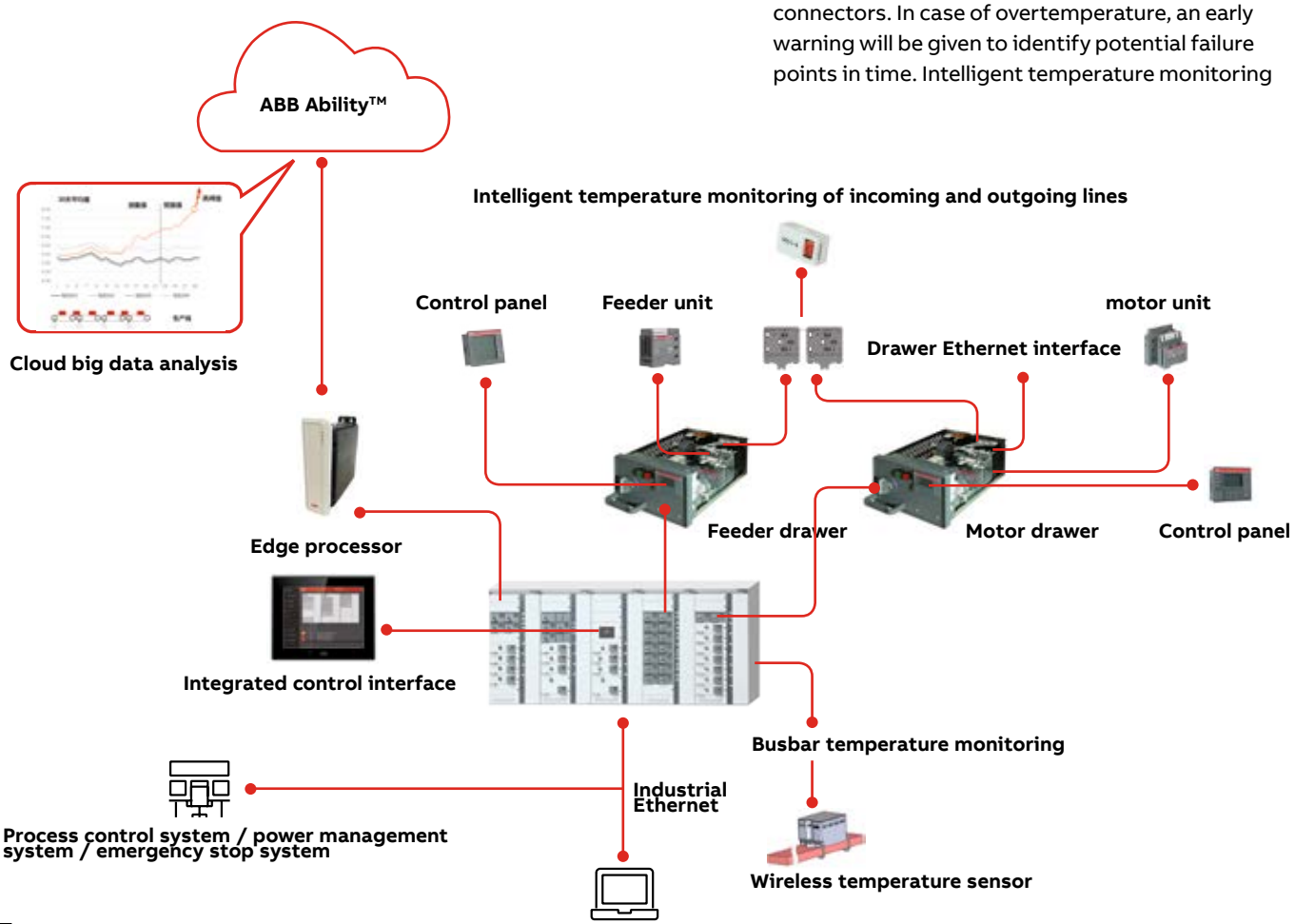
— Outgoing cabinet

Digital solutions

A new generation of MNS Digital solution, which inherits the excellent quality standards and manufacturing technology of MNS® system and integrates Internet technology and smart sensors, can realize remote monitoring, control and setting, and provide detailed fault diagnosis and event log to help users to carry out large data analysis; it can provide early warning of equipment faults, and achieve proactive maintenance to ensure safe, reliable and continuous electricity demand. Safe and continuous production for 7X24h is critical to process industry users. MNS Digital solution has continued and developed the safety and reliability of MNS®, which can provide more reliable continuous power supply for customers and ensure the higher personal safety of operating personnel.

Powerful Ethernet communication
It adopts industrial standard communication interfaces and its communication rate is hundreds of times that of traditional communication network, so that the information can be transmitted to the required departments (such as operation, maintenance, and management personnel) in an all-round way. It adopts reliable Ethernet connection technologies to meet the operating requirements for industrial environment; it adopts a loop structure to establish a redundant system for the safer communication; it has passed network security certification to avoid network attack.

Advanced temperature measurement
Infrared technology is used for real-time on-line monitoring of incoming and outgoing primary connectors. In case of overtemperature, an early warning will be given to identify potential failure points in time. Intelligent temperature monitoring



System diagram

sensor is of non-contact, without considering additional insulation measures; it adopts embedded plug-type structure, which is easy to maintain and safer.

Flexibly configurable control module
It is scalable and suitable for simple and complex motor startup type (14 startup modes for selection), and meets the requirements for protection functions (16 protection functions for selection), feed management (monitoring and diagnosis) and field input/output signal.

System access based on "off-the-shelf" universal web browser. With authorization and through the built-in network server, users can choose any device with its own network browser to access the system. Users can quickly obtain information through authorization by friendly operating interface and simple click.

Ethernet communication connection

Industrial Ethernet has been widely used for high-speed communication between the same industrial network backbones and for data collection and long-term preventive maintenance. Ethernet is also being used gradually at the device layer. This means that Ethernet provides an ideal environment for interoperability between control layers of the plant.

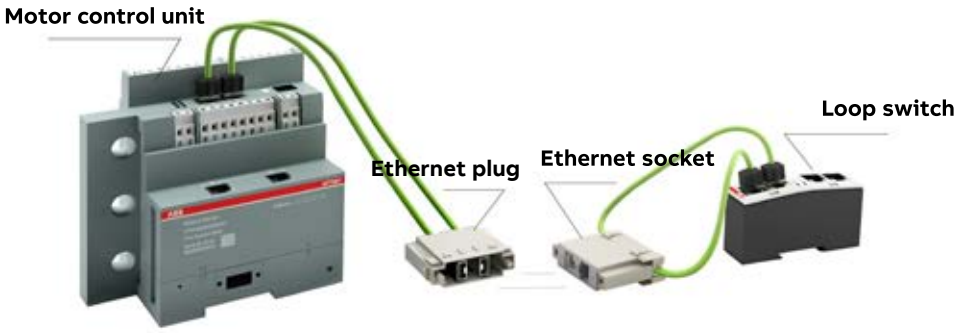
As a unified communication environment in the plant, its operation is more transparent, more reliable and more cost-effective, and also reduces labor costs.

Features and advantages:
• Support multiple topologies
• Support ring redundancy
• Support MRP (Medium Redundancy Protocol)
• Support removable drawers with loop switch

In the MNS Digital solution, the integrated design of the Ethernet communication connection and the switchgear can meet the strict requirements of Ethernet high-speed communication for connectors and wiring. Especially for with drawable drawers, Ethernet connection systems shall meet high-speed communication requirements, and also must meet the requirements of mechanical shock for communication connection reliability. The Ethernet interface consists of two parts, namely the plug and the socket.

For 8E/2 drawers, the Ethernet plug is embedded in the rear panel of the drawer and the Ethernet socket is integrated into the adapter.

For 4-24E drawer, the Ethernet plug is mounted on the right side of the drawer and the Ethernet socket is mounted in the cable chamber.



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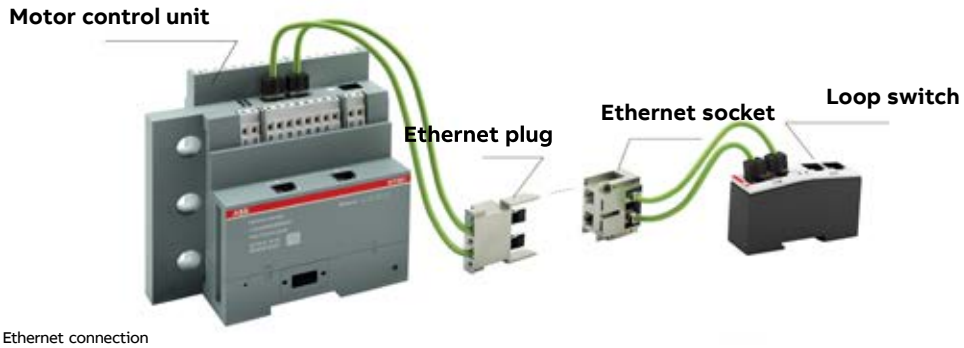
8E/2 Ethernet connection



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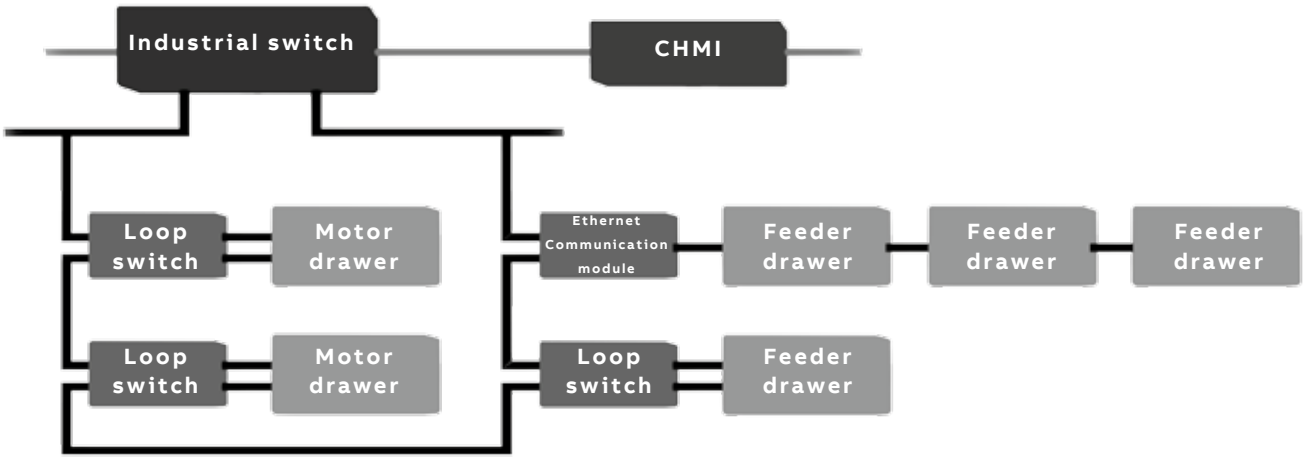
4E-24E Ethernet connection

Ethernet ring-type communication

The process operation needs to be highly reliable. The MNS Digital solution can be configured for ring-type communication. MNS Digital solution adopts a managed switch to connect the switchgear with the human-machine interface, background system and other Internet devices so as to build a system.

Features and advantages:
• Preventing cable fall-off from causing communication failure

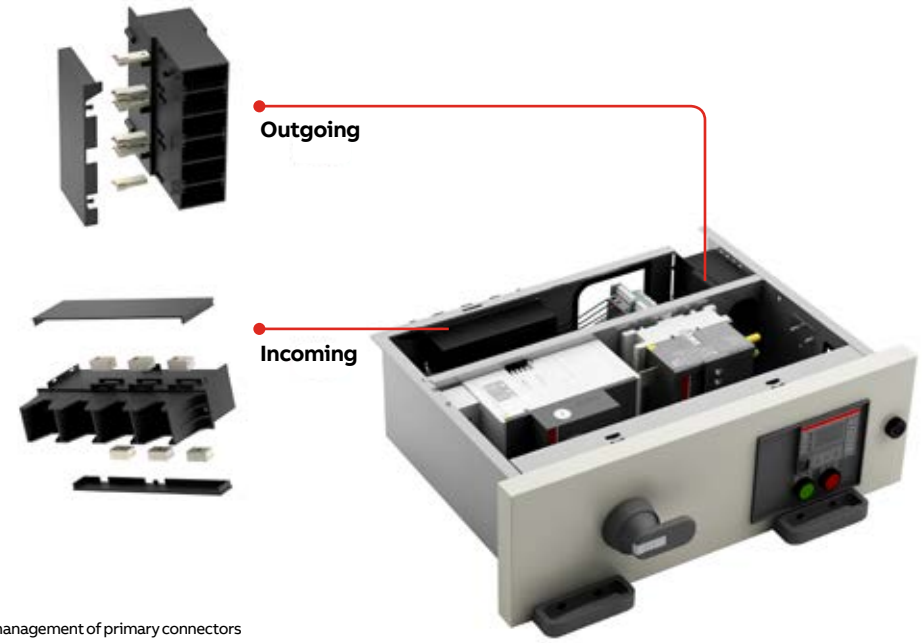


Integrated temperature measurement management
The MNS Digital solution monitors the temperature of critical parts in the drawer and switchgear and the environment, such as primary connectors of the drawer. Real-time monitoring data and maintenance & diagnosis information can help detect faults and deal with them as early as possible, so as to prevent or reduce fault expansion, reduce downtime and improve equipment utilization.

Temperature management of primary connectors
MNS Digital solution adopts infrared sensor technology to measure the temperature of connectors on the incoming/outgoing side of the drawer in a non-contact manner, and judge the measured temperature.

When the temperature exceeds the set alarm value or the trip value, an appropriate alarm signal or trip command will be issued.

Busbar temperature management
MNS Digital solution adopts Zigbee wireless temperature sensor technology to directly measure busbar temperature without additional power supply, and judges the measured temperature. When the temperature exceeds the set alarm value or the trip value, an appropriate alarm signal or trip command will be issued.



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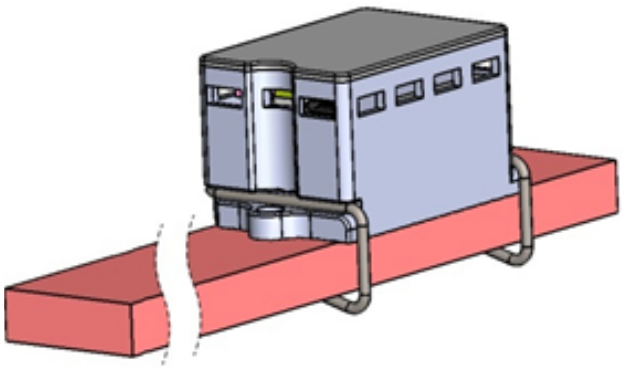
Temperature management of primary connectors



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Busbar temperature management

Motor management

Motor management module MC510

MC510 is a scalable controller used for motor protection and distribution circuits, which can help users control, protect and monitor low-voltage motors more professionally. It can perform all the required tasks, and its advantages include:

- Modular design concept
- Operation performance and safety
- Supporting various startup types
- Perfect motor protection
- Rich measurement and diagnosis
- Proactive maintenance possibility
- Flexible programming logic application

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Motor management module MC510

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Operation panel MP51

Feeder management

Feeder management module FC61x

FC61x is an intelligent feeder controller based on current and voltage measurement and maintenance data monitoring, and it is capable of temperature measurement. FC61x provides proper monitoring and protection for all incoming/connection/feeder circuits. FC61x adopts Modbus RTU communication mode.

Its features include:
- Temperature monitoring
- Logic programming
- Modular design
- System integration communication
- Diagnosis and event recording
- Comprehensive parameter measurement and management

Feeder protection module FC710

FC710 is an intelligent controller based on current and voltage measurement and maintenance data monitoring, and it is capable of temperature measurement. FC710 provides proper monitoring, protection and alarming for all incoming/ connection/feeder circuits. FC710 adopts Modbus RTU communication mode.

Its features include:
- Feeder protection
- Temperature monitoring
- Logic programming
- Modular design
- System integration communication
- Diagnosis and event recording
- Comprehensive parameter measurement

Extension module

MC510/FC61x/FC710 provides an expansion interface for complex applications to meet various customer needs. It can be connected to the following expansion modules:
- Digital input/output
- Analog input/output
- Hotspot monitoring module
- Wireless temperature measurement module
- Residual current monitor module
- Ethernet extension module
- Loop switch

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Operation panel MP53

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Feeder management unit FC61x/FC710

In-situ monitoring scheme

Human-machine interface MV570
MNS Digital solution provides a human-machine interface MV570 for displaying the operating condition of connected devices. In addition, MV570 is also a web interface enabling the access via any standard personal computer web browser, such as Microsoft's Internet Explorer. MV570 is a touch tablet computer conforming to industry standard, which is mounted directly on the switchgear. ABB's “plant-wide information” concept is fully reflected here.

MV570 provides users with the following function options based on access rights:

1. Monitoring:
- Real-time data for circuit operation (current, voltage, power, power factor, connector temperature, etc.)
- Circuit status: run/stop
- Alarm and trip information

2. Parameterization
- Access control and protection parameters
- Download control and protection parameters

3. Control:
- Start/stop/trip reset

4. Maintenance:
- SOE
- Motor start/stop time
- Number of starts
- Number of trips
- MC510 firmware upgrading

5. Project management:
- Add new project, copy and deletion
- Cabinet layout interface editing

6. User management:
- Add and delete different types of users
- Password management

Monitoring system integrated into plant area

MNS Digital solution is a low-voltage switchgear integrated control system really based on Internet technology. It has taken into account electrical and safety as well as reliability and convenience of information transmission. MNS Digital solution provides process operators, electrical engineers, maintenance teams and plant management personnel with required engineering information.

Plant control system
The application of industrial process control system needs the support of multiple systems that are connected to the switchgear and motor control center via an Ethernet communication interface.

This is because specific users propose different control operational requirements and need different information at different operating locations.

MNS Digital solution strives to meet user needs and effectively support multiple industrial Ethernet communication interfaces and applications.

Grid monitoring / SCADA
As the demand for plant use increases, so does the demand for electrical statistics and site conditions.

Being able to provide the right information at the right time is an important criterion to determine whether a plant is profitable.

This function is an important part of MNS Digital solution.

Access to electrical data can be done using the industry standard Ethernet interface, making it easy to get all of the following data:

- Measured value, equipment status and failure analysis
- Time record of alarms and events

Engineering operation and maintenance
When the user rights are recognized, the users can access all system parameters and related settings via the Ethernet interface.

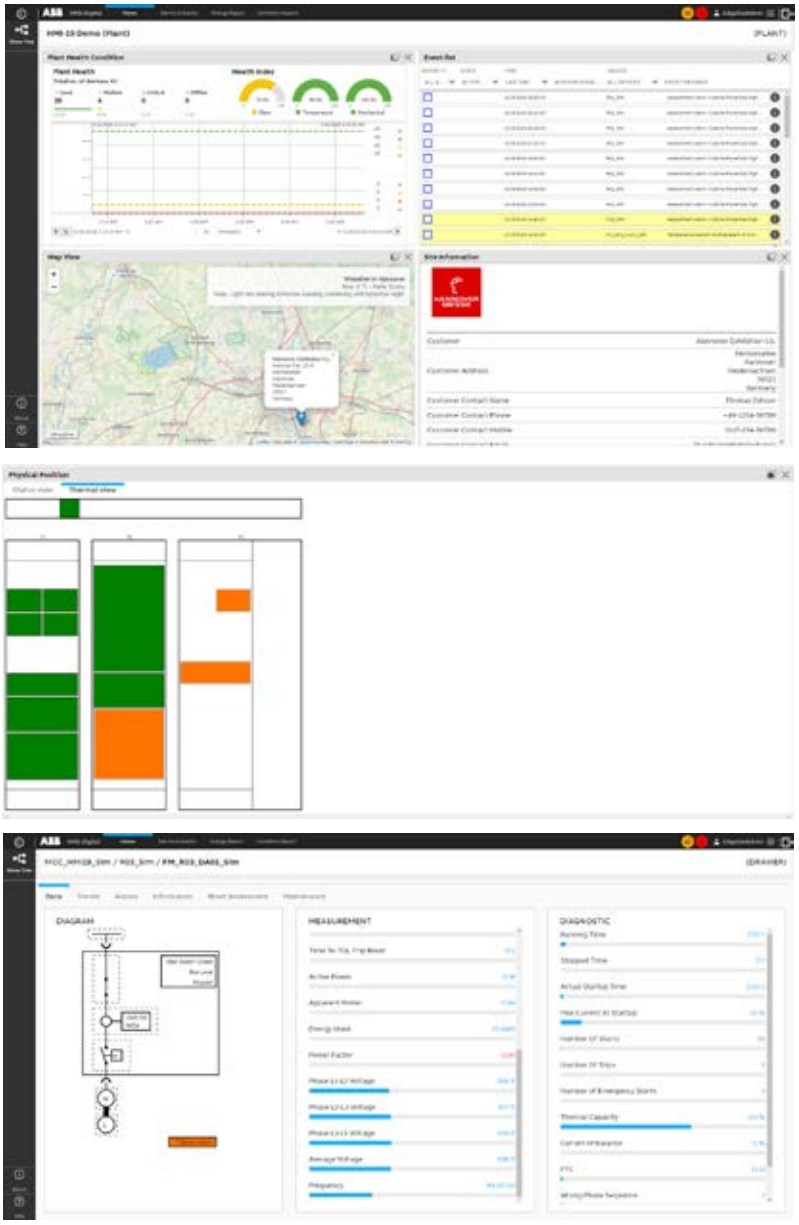
MNS Digital solution provides engineers with an Internet-based optimized engineering tool to design all system parameters through network connection.

Condition monitoring of MNS Digital solution
Maintenance costs are one of the biggest expenses for plant operations.

MNS Digital solution provides a structured approach to organize repairs and work with predictive maintenance procedures to reduce maintenance costs.

Condition monitoring system of MNS Digital solution continuously monitors the real-time information of switchgear operation.

Any change in state will be monitored and analyzed, and the received data will be converted into valuable system information.



Primary circuit solutions

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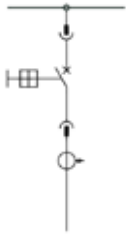
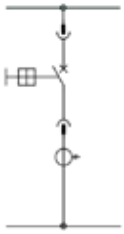
MNS 3.0 side access, ACB-Emax2 incoming, feeder, bus tie

Solution No.							**01**			**02**	
Singleline											
Application							Incomer, feeder			Bus tie	
Switchgear type							MNS 3.0				
Circuit breaker	Icu kA (400 V)	Icu kA (690 V)	Current transformer	Functional instrument	Current carrying capacity (A)	Width (mm)	Depth (mm)	Height	Width (mm)	Depth (mm)	Height
E1.2C 800 3P	50	42	LN4C 800/5	FC61x	800	400	1000	85E	400	1000	85E
E1.2C 800 4P	50	42	LN4C 800/5	FC61x	800	600	1000	85E	600	1000	85E
E1.2C 1000 3P	50	42	LN4C 1000/5	FC61x	1000	400	1000	85E	400	1000	85E
E1.2C 1000 4P	50	42	LN4C 1000/5	FC61x	1000	600	1000	85E	600	1000	85E
E2.2N 1250 3P	66	66	LN5C 1250/5	FC61x	1250	400	1000	85E	400	1000	85E
E2.2N 1250 4P	66	66	LN5C 1250/5	FC61x	1250	600	1000	85E	600	1000	85E
E2.2N 1600 3P	66	66	LN5C 1600/5	FC61x	1600	400	1000	85E	400	1000	85E
E2.2N 1600 4P	66	66	LN5C 1600/5	FC61x	1600	600	1000	85E	600	1000	85E
E2.2N 2000 3P	66	66	LN5C 2000/5	FC61x	2000	400	1000	85E	400	1000	85E
E2.2N 2000 4P	66	66	LN5C 2000/5	FC61x	2000	600	1000	85E	600	1000	85E
E2.2N 2500 3P	66	66	MCT105.38 2500/5	FC61x	2500	600	1000	85E	600	1000	85E
E2.2N 2500 4P	66	66	MCT105.38 2500/5	FC61x	2500	800	1000	85E	800	1000	85E
E4.2N 3200 3P	66	66	MCT127.10A 3000/5	FC61x	3200	800	1000	85E	800	1000	85E
E4.2N 3200 4P	66	66	MCT127.10A 3000/5	FC61x	3200	1000	1000	85E	1000	1000	85E
E4.2N 4000 3P	66	66	MCT127.10A 4000/5	FC61x	4000	800	1200	85E	800	1200	85E
E4.2N 4000 4P	66	66	MCT127.10A 4000/5	FC61x	4000	1000	1200	85E	1000	1200	85E
E6.2H 5000 3P	100	100	MCTE6 5000/5	FC61x	5000	1000	1200	85E	1000	1200	85E
E6.2H 5000 4P	100	100	MCTE6 5000/5	FC61x	5000	1200	1200	85E	1200	1200	85E
E6.2H 6300 3P	100	100	MCT4X160 6000/5	FC61x	6300	1200	1200	85E	1200	1200	85E
E6.2H 6300 4P	100	100	MCT4X160 6000/5	FC61x	6300	1200	1200	85E	1200	1200	85E

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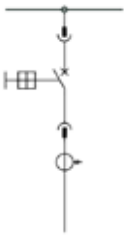
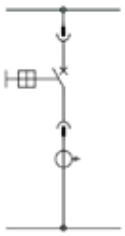
MNS rear access ACB-Emax2 - Incomer, feeder, bus tie

Solution No.							**03**			**04**	
Singleline											
Application							Incomer, feeder			Bus tie	
Switchgear type							MNS rear access				
Circuit breaker	Icu kA (400 V)	Icu kA (690 V)	Current transformer	Functional instrument	Current carrying capacity (A)	Width (mm)	Depth (mm)	Height	Width (mm)	Depth (mm)	Height
E1.2C 800 3P	50	42	LN5C 800/5	FC61x	800	400	1000	89E	600	1000	89E
E1.2C 800 4P	50	42	LN5C 800/5	FC61x	800	600	1000	89E	600	1000	89E
E1.2C 1000 3P	50	42	LN5C 1000/5	FC61x	1000	400	1000	89E	600	1000	89E
E1.2C 1000 4P	50	42	LN5C 1000/5	FC61x	1000	600	1000	89E	600	1000	89E
E2.2N 1250 3P	66	66	LN5C 1250/5	FC61x	1250	400	1000	89E	600	1000	89E
E2.2N 1250 4P	66	66	LN5C 1250/5	FC61x	1250	600	1000	89E	600	1000	89E
E2.2N 1600 3P	66	66	LN5C 1600/5	FC61x	1600	400	1000	89E	600	1000	89E
E2.2N 1600 4P	66	66	LN5C 1600/5	FC61x	1600	600	1000	89E	600	1000	89E
E2.2N 2000 3P	66	66	LN5C 2000/5	FC61x	2000	400	1000	89E	600	1000	89E
E2.2N 2000 4P	66	66	LN5C 2000/5	FC61x	2000	600	1000	89E	600	1000	89E
E2.2N 2500 3P	66	66	LN7A 2500/5	FC61x	2500	600	1000	89E	600	1000	89E
E2.2N 2500 4P	66	66	LN7A 2500/5	FC61x	2500	600	1000	89E	600	1000	89E
E4.2N 3200 3P	66	66	MCT105.10 3000/5	FC61x	3200	800	1000	89E	800	1000	89E
E4.2N 3200 4P	66	66	MCT105.10 3000/5	FC61x	3200	1000	1000	89E	1000	1000	89E
E4.2N 4000 3P	66	66	MCT127.10 4000/5	FC61x	4000	800	1200	89E	1000	1200	89E
E4.2N 4000 4P	66	66	MCT127.10 4000/5	FC61x	4000	1000	1200	89E	1000	1200	89E
E6.2H 5000 3P	100	100	MCT129.10 5000/5	FC61x	5000	1000	1200	89E	1200	1200	89E
E6.2H 5000 4P	100	100	MCT129.10 5000/5	FC61x	5000	1200	1200	89E	1200	1200	89E
E6.2H 6300 3P	100	100	MCT129.10 6000/5	FC61x	6300	1200	1200	89E	1200	1200	89E
E6.2H 6300 4P	100	100	MCT129.10 6000/5	FC61x	6300	1200	1200	89E	1200	1200	89E

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Feeder, lighting XTmax - Withdrawable / fixed module

Solution No.				**05**	**06**
Singleline					
Application				Feeder	
Width (mm)				1000 (600[1])	
Module type				Withdrawable	Fixed
Circuit breaker	Adjustable thermal threshold	Current transformer	Functional instrument	Height	
XT2S160TMD20,3P	14-20	LNC2A	FC61x	8E/2,8E	6E
XT2S160TMD32,3P	22.5-32	LNC2A	FC61x	8E/2,8E	6E
XT2S160TMA63,3P	44-63	LNC2A	FC61x	8E/2,8E	6E
XT2S160TMA80,3P	56-80	LNC2A	FC61x	8E	6E
XT2S160TMA100,3P	70-100	LNC2A	FC61x	8E	6E
XT2S160TMA125,3P	88-125	LNC2A	FC61x	8E	6E
XT2S160TMA160,3P	112-160	LNC2A	FC61x	8E	6E
XT4S250TMA200,3P	140-200	LNC2	FC61x	8E	8E
XT4S250TMA250,3P	175-250	LNC2	FC61x	8E	8E
T5S400ln320,3P	128-320	LNC3	FC61x	12E	12E
T5S400ln400,3P	160-400	LNC3	FC61x	12E	12E
T6S630ln630,3P	252-630	LN4A	FC61x	16E	16E
XT2S160TMD20,4P	14-20	LNC2A	FC61x	8E/2,8E	8E
XT2S160TMD32,4P	22.5-32	LNC2A	FC61x	8E/2,8E	8E
XT2S160TMA63,4P	44-63	LNC2A	FC61x	8E/2,8E	8E
XT2S160TMA80,4P	56-80	LNC2A	FC61x	8E	8E
XT2S160TMA100,4P	70-100	LNC2A	FC61x	8E	8E
XT2S160TMA125,4P	88-125	LNC2A	FC61x	8E	8E
XT2S160TMA160,4P	112-160	LNC2A	FC61x	8E	8E
XT4S250TMA200,4P	140-200	LNC2	FC61x	8E	8E
XT4S250TMA250,4P	175-250	LNC2	FC61x	8E	8E
T5S400ln320,4P	128-320	LNC3	FC61x	16E	16E
T5S400ln400,4P	160-400	LNC3	FC61x	16E	16E
T6S630ln630,4P	252-630	LN4A	FC61x	24E	24E

Remark:dimension [1] is for MNS rear access.

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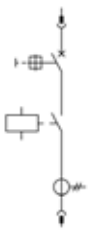
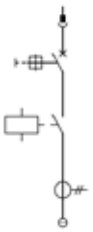
Contactor Feeder Withdrawable / fixed module

Solution No.					**07**	**08**
Singleline						
Application					Feeder	
Width (mm)					1000 (600[1])	
Module type					Withdrawable	Fixed
Circuit breaker	Adjustable thermal threshold	Contactor	Current transformer	Functional instrument	Height	
XT2S 160 TMD 10	7-10	AF38	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMD 16	11.2-16	AF38	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMD 20	14-20	AF38	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMD 25	17.5-25	AF38	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMD 32	22.5-32	AF40	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMA 40	28-40	AF40	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMA 50	35-50	AF52	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMA 63	44-63	AF65	LNC2A	FC61x	8E/2	TBD
XT2S 160 TMA 80	56-80	AF80	LNC2A	FC61x	8E	TBD
XT2S 160 TMA 100	70-100	AF116	LNC2A	FC61x	8E	TBD
XT2S 160 TMA 125	88-125	AF116	LNC2A	FC61x	8E	TBD
XT2S 160 TMA 160	112-160	AF140	LNC2A	FC61x	16E	TBD
XT4S 250 TMA 200	140-200	AF190	LNC2	FC61x	16E	TBD
XT4S 250 TMA 250	175-250	AF205	LNC2	FC61x	16E	TBD

Remark:dimension [1] is for MNS rear access.

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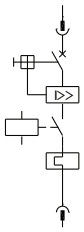
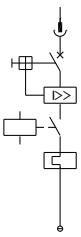
Motor Starter, Direct-on-line Starter, Withdrawable/ Fixed Module (MO+AF)

Solution No.						**09**	**10**
Singleline							
Application						Motor Starter (Direct-on-line)	
Width (mm)						1000 (600[1])	
Module type						Withdrawable	Fixed
Power (kW)	Rating (A)	Circuit breaker	Contactor	Overload relay	Threshold	Height	Height
0.06	0.2	MO132-0.25	AF09	TF42-0.23	0.17-0.23	8E/2	8E
0.09	0.3	MO132-0.4	AF09	TF42-0.31	0.23-0.31	8E/2	8E
0.12	0.44	MO132-0.63	AF09	TF42-0.55	0.41-0.55	8E/2	8E
0.18	0.6	MO132-0.63	AF09	TF42-0.74	0.55-0.74	8E/2	8E
0.25	0.85	MO132-1.0	AF09	TF42-1.0	0.74-1.0	8E/2	8E
0.37	1.1	MO132-1.6	AF09	TF42-1.3	1.0-1.3	8E/2	8E
0.55	1.5	MO132-1.6	AF09	TF42-1.7	1.3-1.7	8E/2	8E
0.75	1.9	MO132-2.5	AF09	TF42-2.3	1.7-2.3	8E/2	8E
1.1	2.7	MO132-4.0	AF26	TF42-3.1	2.3-3.1	8E/2	8E
1.5	3.6	MO132-4.0	AF26	TF42-4.2	3.1-4.2	8E/2	8E
2.2	4.9	MO132-6.3	AF26	TF42-5.7	4.2-5.7	8E/2	8E
3	6.5	MO132-10	AF26	TF42-7.6	5.7-7.6	8E/2	8E
4	8.5	MO132-10	AF26	TF42-10	7.6-10	8E/2	8E
5.5	11.5	MO132-12	AF26	TF42-13	10-13	8E/2	8E
7.5	15.5	MO132-16	AF26	TF42-16	13-16	8E/2	8E
11	22	MO132-25	AF26	TF42-24	20-24	8E/2	8E

Remark:dimension [1] is for MNS rear access.

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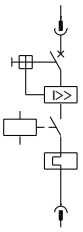
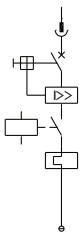
Motor Starter, Direct on Line, Withdrawable/ Fixed Module (XTmax+EOL)

Solution No.						**11**	**12**
Singleline							
Application						Motor Starter (DOL)	
Width (mm)						1000 (600[1])	
Module type						Withdrawable	Fixed
Power (kW)	Rating (A)	Circuit breaker	Contactor	Overload relay	Threshold	Height	
0.37	1.1	XT2S160 MF2	AF09	EF19-2.7	0.8 ... 2.7	8E/2,8E	TBD
0.55	1.5	XT2S160 MF2	AF09	EF19-2.7	0.8 ... 2.7	8E/2,8E	TBD
0.75	1.9	XT2S160 MF2	AF09	EF19-2.7	0.8 ... 2.7	8E/2,8E	TBD
1.1	2.7	XT2S160 MF4	AF26	EF19-6.3	1.9 ... 6.3	8E/2,8E	TBD
1.5	3.6	XT2S160 MF4	AF26	EF19-6.3	1.9 ... 6.3	8E/2,8E	TBD
2.2	4.9	XT2S160 MF8.5	AF38	EF19-6.3	1.9 ... 6.3	8E/2,8E	TBD
3	6.5	XT2S160 MF8.5	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
4	8.5	XT2S160 MF12.5	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
5.5	11.5	XT2S160 MF12.5	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
7.5	15.5	XT2S160 MA20	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
11	22	XT2S160 MA32	AF40	EF65-56	20 ... 56	8E/2,8E	TBD
15	29	XT2S160 MA32	AF40	EF65-70	25 ... 70	8E/2,8E	TBD
18.5	35	XT2S160 MA52	AF40	EF65-70	25 ... 70	8E/2,8E	TBD
22	41	XT2S160 MA52	AF52	EF65-70	25 ... 70	8E/2,8E	TBD
30	55	XT2S160 MA80	AF65	EF65-70	25 ... 70	8E	TBD
37	66	XT2S160 MA160	AF116	EF146-150	54 ... 150	8E	TBD
45	80	XT2S160 MA160	AF116	EF146-150	54 ... 150	8E	TBD
55	97	XT2S160 MA160	AF116	EF146-150	54 ... 150	8E	TBD
75	132	XT2S160 MA160	AF140	EF146-150	54 ... 150	8E	TBD
90	160	XT4S250 Ekip I In 250	AF190	EF205-210	63 ... 210	12E	TBD
110	195	T5S 400 PR221DS-I In 400	AF265	EF370-380	115 ... 380	16E	TBD
132	230	T5S 400 PR221DS-I In 400	AF265	EF370-380	115 ... 380	16E	TBD
160	280	T5S 400 PR221DS-I In 400	AF305	EF370-380	115 ... 380	24E	TBD
200	350	T6S 630 PR221DS-I In 630	AF460	EF460-500	150 ... 500	24E	TBD
250	430	T6S 630 PR221DS-I In 630	AF460	EF460-500	150 ... 500	24E	TBD

Remark:dimension [1] is for MNS rear access.

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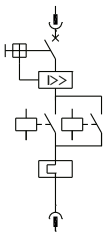
Motor Starter, Reversing Starter, Withdrawable/ Fixed Module (XTmax+EOL)

Solution No.						**13**	**14**
Singleline							
Application						Motor Starter (Reversing)	
Width (mm)						1000 (600[1])	
Module type						Withdrawable	Fixed
Power (kW)	Rating (A)	Circuit breaker	Contactorx2	Overload relay	Threshold	Height	
0.37	1.1	XT2S160 MF2	AF09	EF19-2.7	0.8 ... 2.7	8E/2,8E	TBD
0.55	1.5	XT2S160 MF2	AF09	EF19-2.7	0.8 ... 2.7	8E/2,8E	TBD
0.75	1.9	XT2S160 MF2	AF09	EF19-2.7	0.8 ... 2.7	8E/2,8E	TBD
1.1	2.7	XT2S160 MF4	AF26	EF19-6.3	1.9 ... 6.3	8E/2,8E	TBD
1.5	3.6	XT2S160 MF4	AF26	EF19-6.3	1.9 ... 6.3	8E/2,8E	TBD
2.2	4.9	XT2S160 MF8.5	AF38	EF19-6.3	1.9 ... 6.3	8E/2,8E	TBD
3	6.5	XT2S160 MF8.5	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
4	8.5	XT2S160 MF12.5	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
5.5	11.5	XT2S160 MF12.5	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
7.5	15.5	XT2S160 MA20	AF38	EF19-18.9	5.7 ... 18.9	8E/2,8E	TBD
11	22	XT2S160 MA32	AF40	EF65-56	20 ... 56	8E/2,8E	TBD
15	29	XT2S160 MA32	AF40	EF65-70	25 ... 70	8E/2,8E	TBD
18.5	35	XT2S160 MA52	AF40	EF65-70	25 ... 70	8E/2,8E	TBD
22	41	XT2S160 MA52	AF52	EF65-70	25 ... 70	8E/2,8E	TBD
30	55	XT2S160 MA80	AF65	EF65-70	25 ... 70	8E	TBD
37	66	XT2S160 MA160	AF116	EF146-150	54 ... 150	16E	TBD
45	80	XT2S160 MA160	AF116	EF146-150	54 ... 150	16E	TBD
55	97	XT2S160 MA160	AF116	EF146-150	54 ... 150	16E	TBD
75	132	XT2S160 MA160	AF140	EF146-150	54 ... 150	16E	TBD
90	160	XT4S250 Ekip I In 250	AF190	EF205-210	63 ... 210	16E	TBD
110	195	T5S 400 PR221DS-I In 400	AF265	EF370-380	115 ... 380	24E	TBD
132	230	T5S 400 PR221DS-I In 400	AF265	EF370-380	115 ... 380	24E	TBD
160	280	T5S 400 PR221DS-I In 400	AF305	EF370-380	115 ... 380	24E	TBD

Remark:dimension [1] is for MNS rear access.

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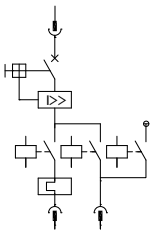
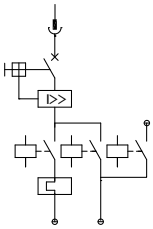
Motor Starter, Star-delta Starter, Withdrawable/ Fixed Module(XTmax+EOL)

Solution No.						**15**	**16**
Singleline							
Application						Motor Starter (Star-delta)	
Width (mm)						1000 (600[1])	
Module type						Withdrawable	Fixed
Power (kW)	Rating (A)	Circuit breaker	Contactor	Overload relay	Threshold	Height	
0.37	1.1	XT2S160 MF2	2*AF09+AF09	EF19-1.0	0.3 ... 1.0	8E	16E
0.55	1.5	XT2S160 MF2	2*AF09+AF09	EF19-2.7	0.8 ... 2.7	8E	16E
0.75	1.9	XT2S160 MF2	2*AF09+AF09	EF19-2.7	0.8 ... 2.7	8E	16E
1.1	2.7	XT2S160 MF4	2*AF26+AF26	EF19-2.7	0.8 ... 2.7	8E	16E
1.5	3.6	XT2S160 MF4	2*AF26+AF26	EF19-6.3	1.9 ... 6.3	8E	16E
2.2	4.9	XT2S160 MF8.5	2*AF38+AF26	EF19-6.3	1.9 ... 6.3	8E	16E
3	6.5	XT2S160 MF8.5	2*AF38+AF26	EF19-6.3	1.9 ... 6.3	8E	16E
4	8.5	XT2S160 MF12.5	2*AF38+AF26	EF19-6.3	1.9 ... 6.3	8E	16E
5.5	11.5	XT2S160 MF12.5	2*AF38+AF26	EF19-18.9	5.7 ... 18.9	8E	16E
7.5	15.5	XT2S160 MA20	2*AF38+AF26	EF19-18.9	5.7 ... 18.9	8E	16E
11	22	XT2S160 MA32	2*AF40+AF40	E45DU-30	9 ... 30	8E	16E
15	29	XT2S160 MA32	2*AF40+AF40	E45DU-30	9 ... 30	8E	16E
18.5	35	XT2S160 MA52	2*AF40+AF40	EF65-56	20 ... 56	8E	16E
22	41	XT2S160 MA52	2*AF52+AF40	EF65-56	20 ... 56	8E	16E
30	55	XT2S160 MA80	2*AF65+AF40	EF65-70	25 ... 70	8E	16E
37	66	XT2S160 MA100	2*AF96+AF40	EF96-100	36 ... 100	16E	24E
45	80	XT2S160 MA100	2*AF96+AF40	EF96-100	36 ... 100	16E	24E
55	97	XT2S160 MA160	2*AF116+AF116	EF146-150	54 ... 150	16E	24E
75	132	XT2S160 MA160	2*AF116+AF116	EF146-150	54 ... 150	16E	24E
90	160	XT4S 250 Ekip I In 250	2*AF116+AF116	EF146-150	54 ... 150	16E	24E
110	195	T5S 400 PR221DS-I In 400	2*AF190+AF116	EF205-210	63 ... 210	24E	28E
132	230	T5S 400 PR221DS-I In 400	2*AF190+AF116	EF205-210	63 ... 210	24E	28E
160	280	T6S 630 PR221DS-I In 630	2*AF265+AF190	EF370-380	115 ... 380	24E	40E
200	350	T6S 630 PR221DS-I In 630	2*AF265+AF190	EF370-380	115 ... 380	24E	40E

Remark:dimension [1] is for MNS rear access.

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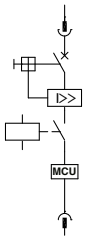
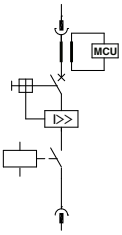
Motor Starter, Direct on line Starter with XTmax+M102

Solution No.						**17**	**18**
Singleline							
Application						Motor Starter (M102 Direct on line)	
Width (mm)						1000 (600[1])	
Module type						Withdrawable	
Power (kW)	Rating (A)	Circuit breaker	Contactor	Motor protector	Protective transformer	Height	
0.37	1.1	XT2S160 MF2	AF09	M102/MC510		8E/2,8E	
0.55	1.5	XT2S160 MF2	AF09	M102/MC510		8E/2,8E	
0.75	1.9	XT2S160 MF2	AF09	M102/MC510		8E/2,8E	
1.1	2.7	XT2S160 MF4	AF26	M102/MC510		8E/2,8E	
1.5	3.6	XT2S160 MF4	AF26	M102/MC510		8E/2,8E	
2.2	4.9	XT2S160 MF8.5	AF38	M102/MC510		8E/2,8E	
3	6.5	XT2S160 MF8.5	AF38	M102/MC510		8E/2,8E	
4	8.5	XT2S160 MF12.5	AF38	M102/MC510		8E/2,8E	
5.5	11.5	XT2S160 MF12.5	AF38	M102/MC510		8E/2,8E	
7.5	15.5	XT2S160 MA20	AF38	M102/MC510		8E/2,8E	
11	22	XT2S160 MA32	AF40	M102/MC510		8E/2,8E	
15	29	XT2S160 MA32	AF40	M102/MC510		8E/2,8E	
18.5	35	XT2S160 MA52	AF40	M102/MC510		8E/2,8E	
22	41	XT2S160 MA52	AF52	M102/MC510		8E/2,8E	
30	55	XT2S160 MA80	AF65	M102/MC510		8E	
37	66	XT2H160 MA160	AF116	M102/MC510	PCT 3L 200/5R		8E
45	80	XT2H160 MA160	AF116	M102/MC510	PCT 3L 200/5R		8E
55	97	XT2S160 MA160	AF116	M102/MC510	PCT 3L 200/5R		8E
75	132	XT2S160 MA160	AF140	M102/MC510	PCT 3L 200/5R		8E
90	160	XT4S250 Ekip I In 250	AF190	M102/MC510	PCT 3L 200/5R		12E
110	195	T5S 400 PR221DS-I In 400	AF265	M102/MC510	PCT 4L 300/5R		16E
132	230	T5S 400 PR221DS-I In 400	AF265	M102/MC510	PCT 4L 300/5R		16E
160	280	T5S 400 PR221DS-I In 400	AF305	M102/MC510	PCT 4L 300/5R		24E
200	350	T6S 630 PR221DS-I In 630	AF460	M102/MC510	PCT 5L 500/5R		24E
250	430	T6S 630 PR221DS-I In 630	AF460	M102/MC510	PCT 5L 500/5R		24E

Remark:dimension [1] is for MNS rear access.

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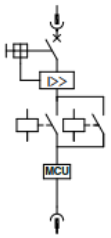
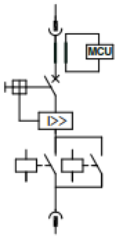
Motor Starter, Reversing Starter with XTmax+M102

Solution No.						**19**	**20**
Singleline							
Application						Motor Starter (M102 Reversing)	
Width (mm)						1000 (600[1])	
Module type						Withdrawable	
Power (kW)	Rating (A)	Circuit breaker	Contactor2x	Motor protector	Protective transformer	Height	
0.37	1.1	XT2S160 MF2	AF09	M102/MC510		8E/2,8E	
0.55	1.5	XT2S160 MF2	AF09	M102/MC510		8E/2,8E	
0.75	1.9	XT2S160 MF2	AF09	M102/MC510		8E/2,8E	
1.1	2.7	XT2S160 MF4	AF26	M102/MC510		8E/2,8E	
1.5	3.6	XT2S160 MF4	AF26	M102/MC510		8E/2,8E	
2.2	4.9	XT2S160 MF8.5	AF38	M102/MC510		8E/2,8E	
3	6.5	XT2S160 MF8.5	AF38	M102/MC510		8E/2,8E	
4	8.5	XT2S160 MF12.5	AF38	M102/MC510		8E/2,8E	
5.5	11.5	XT2S160 MF12.5	AF38	M102/MC510		8E/2,8E	
7.5	15.5	XT2S160 MA20	AF38	M102/MC510		8E/2,8E	
11	22	XT2S160 MA32	AF40	M102/MC510		8E/2,8E	
15	29	XT2S160 MA32	AF40	M102/MC510		8E/2,8E	
18.5	35	XT2S160 MA52	AF40	M102/MC510		8E/2,8E	
22	41	XT2S160 MA52	AF52	M102/MC510		8E/2,8E	
30	55	XT2S160 MA80	AF65	M102/MC510		8E	
37	66	XT2S160 MA160	AF116	M102/MC510	PCT 3L 200/5R		16E
45	80	XT2S160 MA160	AF116	M102/MC510	PCT 3L 200/5R		16E
55	97	XT2S160 MA160	AF116	M102/MC510	PCT 3L 200/5R		16E
75	132	XT2S160 MA160	AF140	M102/MC510	PCT 3L 200/5R		16E
90	160	XT4S250 Ekip I In 250	AF190	M102/MC510	PCT 3L 200/5R		16E
110	195	T5S 400 PR221DS-I In 400	AF265	M102/MC510	PCT 4L 300/5R		24E
132	230	T5S 400 PR221DS-I In 400	AF265	M102/MC510	PCT 4L 300/5R		24E
160	280	T5S 400 PR221DS-I In 400	AF305	M102/MC510	PCT 4L 300/5R		24E

Remark:dimension [1] is for MNS rear access.

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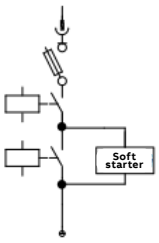
Motor Starter,PSTX Soft Starter

Solution No.							**21**
Singleline							
Application							Motor Starter (soft starter)
Module type							Fixed
Power (kW)	Rating (A)	Circuit breaker	Fuse (aR)	Main contactor	Pass-by contactor	Soft starter	Height
15	30	OS32GD12	100	AF30	Built-in	PSTX30	24E
18.5	37	OS63GD12	125	AF38	Built-in	PSTX37	24E
22	45	OS63GD12	160	AF52	Built-in	PSTX45	24E
30	60	OS63GD12	160	AF65	Built-in	PSTX60	24E
37	72	OS125GD12	250	AF80	Built-in	PSTX72	24E
45	85	OS125GD12	315	AF96	Built-in	PSTX85	24E
55	106	OS250D12	400	AF116	Built-in	PSTX105	32E/400x2200(2300[1])
75	143	OS400D12	500	AF140	Built-in	PSTX142	400x2200(2300[1])
90	171	OS400D12	630	AF190	Built-in	PSTX170	400x2200(2300[1])
110	210	OS400D12	630	AF205	Built-in	PSTX210	400x2200(2300[1])
132	250	OS400D12	700	AF265	Built-in	PSTX250	400x2200(2300[1])
160	300	OS630D12	800	AF305	Built-in	PSTX300	600x2200(2300[1])
200	370	OS630D12	900	AF370	Built-in	PSTX370	600x2200(2300[1])
250	470	OS630D12	900	AF460	Built-in	PSTX470	600x2200(2300[1])
315	570	OS630D12	1000	AF580	Built-in	PSTX570	600x2200(2300[1])
400	720	OT800D12	1250	AF750	Built-in	PSTX720	800x2200(2300[1])
450	840	E2.2N1600	1,500	AF1350	Built-in	PSTX840	1000x2200(2300[1])
560	1050	E2.2N2000	1,800	AF1650	Built-in	PSTX1050	1000x2200(2300[1])
710	1250	E2.2N2000	2,000	-	Built-in	PSTX1250	1000x2200(2300[1])

Remark:dimension [1] is for MNS rear access.

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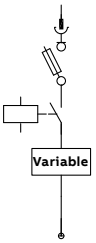
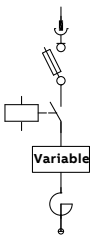
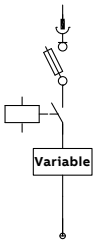
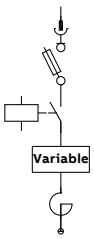
Motor Starter, Variable Frequency Driver ACS880

Solution No.							**22**	**23**	**24**	**25**
Singleline										
Application							Motor Starter (Variable Frequency Driver)		Motor Starter (Variable Frequency Driver)	
Cubicle type							MNS 3.0		MNS rear access	
Module type							Fixed		Fixed	
Power (kW)	Rating (A)	Circuit breaker	Fuse （aR）	Contactor	Variable Frequency Driver	Output Filter (optional)	Height	Height (with output filter)	Height	Height (with output filter)
0.75	2.4	OS32GD12	25	AF09	ACS880-01-02A4-3		24E	24E	24E	24E
1.1	3.3	OS32GD12	25	AF09	ACS880-01-03A3-3		24E	24E	24E	24E
1.5	4	OS32GD12	25	AF09	ACS880-01-04A0-3		24E	24E	24E	24E
2.2	5.6	OS32GD12	25	AF09	ACS880-01-05A6-3		24E	24E	24E	24E
3	7.2	OS32GD12	25	AF09	ACS880-01-07A2-3		24E	24E	24E	24E
4	9.4	OS32GD12	25	AF09	ACS880-01-09A4-3		24E	24E	24E	24E
5.5	12.6	OS32GD12	25	AF09	ACS880-01-12A6-3	NOCH0016-6x	24E	24E	24E	24E
7.5	17	OS32GD12	40	AF30	ACS880-01-017A-3		24E	24E	24E	24E
11	25	OS32GD12	40	AF30	ACS880-01-025A-3	NOCH0030-6x	24E	24E	24E	24E
15	32	OS63GD12	63	AF40	ACS880-01-032A-3		32E	32E	32E	32E
18.5	38	OS63GD12	63	AF40	ACS880-01-038A-3		32E	32E	32E	32E
22	45	OS125GD12	80	AF52	ACS880-01-045A-3		36E	36E	36E	36E
30	61	OS125GD12	100	AF52	ACS880-01-061A-3	NOCH0070-6x	36E	36E	36E	36E
37	72	OS125GD12	125	AF80	ACS880-01-072A-3		400*2200	400*2200	400*2300	400*2300
45	87	OS125GD12	160	AF80	ACS880-01-087A-3		400*2200	400*2200	400*2300	400*2300
55	105	OS250D12	200	AF116	ACS880-01-105A-3	NOCH0120-6x	400*2200	400*2200	400*2300	400*2300
75	145	OS250D12	250	AF146	ACS880-01-145A-3		400*2200	400*2200	400*2300	400*2300
90	169	OS250D12	315	AF146	ACS880-01-169A-3		400*2200	600*2200	400*2300	400*2300
110	206	OS250D12	350	AF190	ACS880-01-206A-3		400*2200	600*2200	400*2300	400*2300
132	246	OS400D12	450	AF205	ACS880-01-246A-3		400*2200	800*2200	400*2300	400*2300
160	293	OS400D12	500	AF265	ACS880-01-293A-3	FOCH0260-70	400*2200	800*2200	400*2300	400*2300
200	363	OS400D12	630	AF305	ACS880-01-363A-3		600*2200	800*2200	600*2300	600*2300
250	430	OS630D12	700	AF400	ACS880-01-430A-3	FOCH0320-50	1000*2200	1000*2200	800*2300	800*2300
250	505	OS630D12	800	AF460	ACS880-04-505A-3		1000*2200	1000*2200	1000*2300	1000*2300
315	585	OS800D12	1000	AF580	ACS880-04-585A-3		1000*2200	1000*2200	1000*2300	1000*2300
355	650	OS800D12	1000	AF580	ACS880-04-650A-3		1000*2200	1000*2200	1000*2300	1000*2300
400	725	OT1000E12P	1250	AF750	ACS880-04-725A-3	FOCH0610-70	1000*2200	1000*2200	1000*2300	1000*2300
450	820	OT1000E12P	1600	AF750	ACS880-04-820A-3		1000*2200	1000*2200	1000*2300	1000*2300
500	880	OT1000E12P	1600	AF750	ACS880-04-880A-3	FOCH0875-70	1000*2200	1000*2200	1000*2300	1000*2300

Remark:dimension [1] is for MNS rear access.

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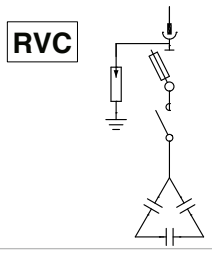
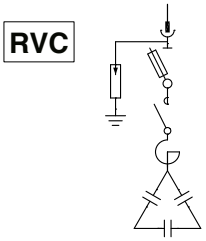
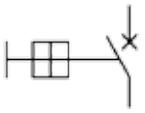
Reactive Power Compensation

Solution No.			**26**	**27**	
Singleline					
Application			Reactive	Reactive Power Compensation (with reactor)	Controller
Cubicle Width (mm)				600 (800、1000)	
Module type				Fixed	
Compensation capacity	Circuit breaker	Contactor	Capacitor	Reactor	Controller
15kVAR	XLP00	UA30-R	CLMD33 430-17.3		RVC/RVT
30kVAR	XLP00	2*UA30-R	2*CLMD33 430-17.3		RVC/RVT
45kVAR	XLP00	2*UA50-R	2*CLMD33 430-26.8		RVC/RVT
60kVAR	2*XLP00	4*UA30-R	4*CLMD33 430-17.3		RVC/RVT
90kVAR	2*XLP00	4*UA50-R	4*CLMD33 430-26.8		RVC/RVT
105kVAR	3*XLP00	4*UA30-R+2*UA50-R	4*CLMD33 430-17.3+2*CLMD33 430-26.8		RVC/RVT
120kVAR	4*XLP00	8*UA30-R	8*CLMD33 430-17.3		RVC/RVT
150kVAR	4*XLP00	4*UA30-R+4*UA50-R	4*CLMD33 430-17.3+4*CLMD33 430-26.8		RVC/RVT
180kVAR	4*XLP00	8*UA50-R	8*CLMD33 430-26.8		RVC/RVT
200kVAR	5*XLP00	4*UA30-R+6*UA50-R	4*CLMD33 430-17.3+6*CLMD33 430-26.8		RVC/RVT
225kVAR	5*XLP00	10*UA50-R	10*CLMD33 430-26.8		RVC/RVT
240kVAR	6*XLP00	4*UA30-R+8*UA50-R	4*CLMD33 430-17.3+8*CLMD33 430-26.8		RVC/RVT
270kVAR	6*XLP00	12*UA50-R	12*CLMD33 430-26.8		RVC/RVT
315kVAR	7*XLP00	14*UA50-R	14*CLMD33 430-26.8		RVC/RVT
360kVAR	8*XLP00	16*UA50-R	16*CLMD33 430-26.8		RVC/RVT
400kVAR	9*XLP00	18*UA50-R	18*CLMD33 430-26.8		RVC/RVT
275kVAR	6*XLP00	1*UA50+5*UA95	2*CLMD33/16.7kVAR 480V+15*CLMD33/22.5kVAR 480V	1*7%,25kVAR,400V+5*7%,50kVAR, 400V	RVC/RVT
300kVAR	6*XLP00	6*UA95	18*CLMD33/22.5kVAR 480V	6*7%,50kVAR,400V	RVC/RVT

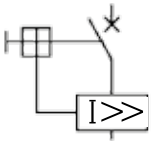
Legends



Circuit breaker

Current transformer

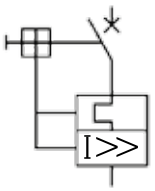
Fuse switch disconnector (strip type, single breakpoint)



Circuit breaker (without thermal over load protection)

Current transformer

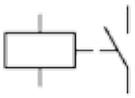
Fuse switch disconnector (single breakpoint)



Circuit breaker (with thermal overload protection)

Cable plug

Capacitor



Contactor

Fixed connection

Arrester

Thermal relay

Fuse switch disconnector (square)

Reactor

After sales and service

ABB's goal is to ensure the assets maximum performance and availability. ABB has supplied over 1.5 million MNS® switchgears from its world wide manufacturing locations. Each of these locations operates with an After Sales and Service department, offering unparalleled global support.

On completion of commissioning, the switchgear is at the peak of its performance. To maintain this condition it is essential to adopt a service and maintenance plan for this asset. If the switchgear does not receive maintenance, this could result in downtime. In production the availability of the switchgear ensures productivity, and any down time is a lost opportunity for profit. Down time can be attributed to the following maintenance practices.

- Reactive maintenance is costly for both production and unplanned downtime.
- Preventive or Continuous maintenance is usually performed on an annual basis, during a scheduled shutdown.
- By evaluating information from the intelligent switchgear it is possible to adopt a Predictive maintenance schedule.

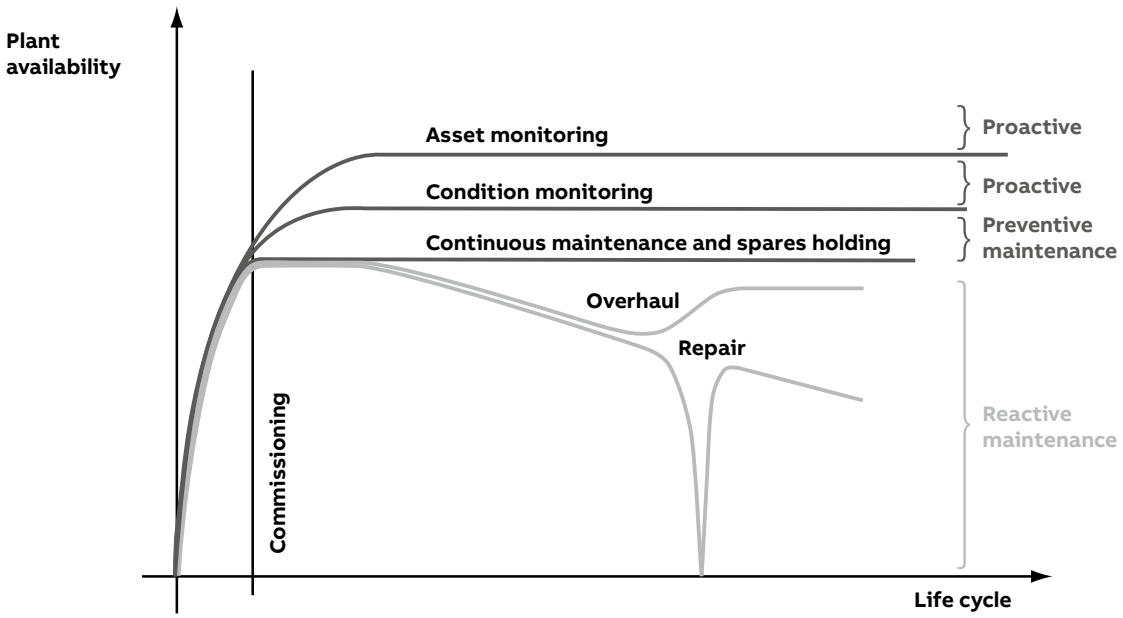
Utilizing an ABB expertise can help to increase the life cycle of the switchgear

Regular Services
ABB offers comprehensive service and support during the whole life time of the switchgear:

- Engineering assistance
- roduct training
- Spares holding
- Installation and commissioning
- Service planning
- Hardware and software support
- Upgrades, expansions and modification

Contract Services
ABB can offer comprehensive maintenance contracts designed specifically for each particular process. Through preventive maintenance programs unscheduled outages can be reduced and maintenance workflows are streamlined.

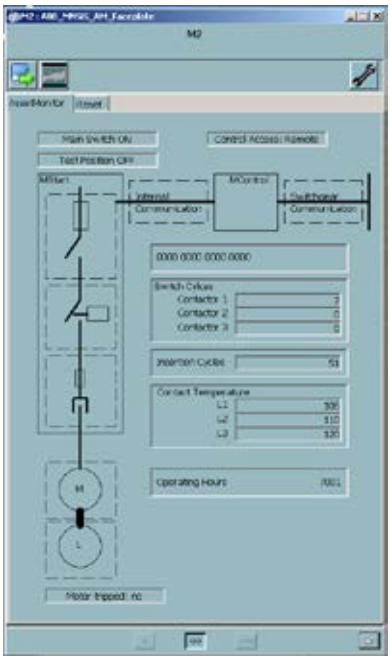
Utilization of integrated switchgear enables the maintenance to be taken into an even predictive maintenance practice, where information available from the switchgear can further assist with maintenance workflow.



Asset Monitoring
In a further step of improving maintenance practices ABB's service technology is a fully self supervising switchgear that can eliminate costs for assets that do not require attention.

The asset monitor system evaluates all events, alarms and trips for predictive maintenance planning and essential working issues. The conditions are monitored and entered into groups; electrical, mechanical and plant associated. Each condition has a cause and suggested action for problem resolution.

Asset monitoring sets the next standard for integrated main-tenance procedures enabling higher switchgear availability through Proactive maintenance.



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Asset Monitoring

Technical descriptions relate to MNS 3.0.

MNS 3.0 Low Voltage Switchgear Technical Info

The brochure is associated with other MNS® Low Voltage Switchgear publications, such as:
MNS® Low Voltage Switchgear Service Manual-Installation, operation and Commissioning
MNS® iPDU (Intelligent Power Distribution Unit) Technical Info
MNS® Low Voltage Distribution Board and Power Cabinet Technical Info
MNS® & MNS *i*S Low Voltage Switchgear Safety Solution

About Intelligent Low Voltage Switchgear more information:
MNS Digital Switchgear
MNS *i*S Motor Control Center System Guide
MNS *i*S Condition Monitoring-Enhanced availability through innovative design
MNS *i*S Switchgear System - Your Platform to success Values for End Users
MNS *i*S Switchgear System - Your Platform to success Values for EPCs
MNS with M10x Intelligent motor management

Note

ABB Connect

The digital assistant for all your electrification needs

ABB Connect helps you to find product information and stay connected to the latest news and tools. It's a digital assistant that enables customers to connect to the broadest range of electrification solutions in one place.

- Easy to find what you need by search
- Get all information about our products, applications, selection guides, installation manuals, service, certificates, and engineering tools, etc.
- Saving documents locally, updating automatically.
- Receive your expected massages
- Online customer service

You can use ABB Connect on iOS, Android and Windows 10 device

Scanning QR code
to enter ABB Connect

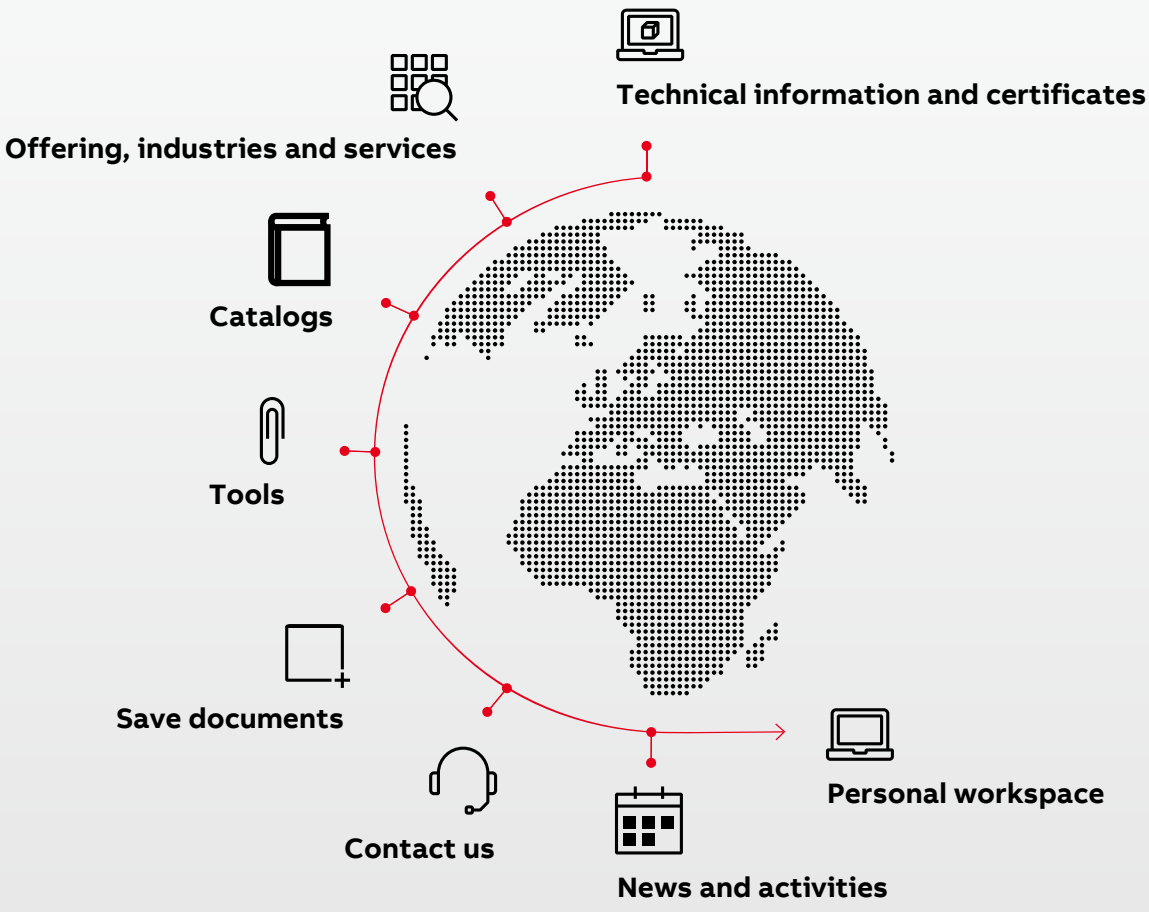

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ABB China Customer Contact Center

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