MNS – modular low voltage switchgear system
The solution for electrical distribution in industry, power plants and marine applications
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High quality electrification with ABB products

ABB is a leading world-class supplier of a wide range of electrical systems and products for industrial use. Combining high quality and specialized engineering for composite plant projects, ABB products will maximize the productivity of customer processes over the total life cycle. ABB can supply nearly all components required for the implementation of total electrification projects, including power distribution, process electrification and automation systems. The cooperation with customers does not necessarily end at the investment stage because ABB is also able to take care of the life cycle maintenance of the plant.

ABB has a long traditions and experience in design and manufacture of a wide range of products for power distribution and low voltage motor starters. Following the long traditions, ABB continues its innovative work and offers all the know-how and knowledge with the latest technology.

Tomorrow’s competitive advantages will include the requirement for the decreasing use of maintenance resources and the operational reliability of the equipment. With the reduction in maintenance resources, the reliability of the products and their maintenance is an area requiring substantial development. ABB’s newest products includes features which allow even broader condition monitoring, which in turn allows for better allocation of maintenance resources.
The product development of MNS is based on decades long traditions which ensures the manufacture of safe and reliable assemblies. MNS is designed to serve as the main switchgear for modern automation in motor control and power distribution systems.

Low voltage switchgear MNS is based on a modular design of well tested technology using high quality ABB equipment and components, with ensured availability all over the world. It is manufactured in several factories all over the world and can provide life cycle long support near to its end users.
MDY busduct system
Phase-isolated, halogen-free MDY busduct is a reliable junction from a distribution transformer to the MNS switchgear and, if required, between different switchgear parts. The MDY busduct can be equipped with a load-break switch. If needed, the over current relay can be located close to the terminals of the low voltage side of the supplying transformer.

MNS iS – innovative switchgear design
MNS iS is a newcomer in the MNS switchgear family with modern connection possibilities for the control and condition monitoring systems of processes and equipment. Its construction represents a new design which, in addition to operational and personnel safety, enables configurations and updates during the whole life cycle of the assembly. Thanks to high standardization, service and component additions are easy to carry out.

Frequency converters
In certain drives, frequency converters may achieve remarkable energy savings in comparison to standard speed drives. The use of frequency converters in the MNS switchgears enables the auxiliary devices required by the system to be installed and tested at the factory, which speeds up commissioning at the installation site. The filtering of harmonics and possible interference can be performed in a centralized way for frequency converters installed in switchgears. All motor outlets needed in the process can be located in the same MNS switchgear, including both the speed controlled and standard speed drives.
Reactive power compensation
A user with a power tariff has two options, either to pay for the used reactive power (Q/kvar) or to produce it with a capacitor bank. The MCR blocking reactor bank’s regulator measures the reactive power taken from the switchboard supply and, when necessary, switches on capacitor banks to keep the reactive power from the network in set limits.

MNS PDUpro – intelligent electricity distribution center
The structure of PDUpro enables the controlled handling of a unit’s critical elements during use without risking the safety of personnel. PDUpro brings flexibility to critical electricity distribution targets. Due to the modular structure, the unit can be extended or altered according to the user’s changing needs while other circuits are in use. MNS PDUpro can be equipped with real-time energy and loading measurement for each output and phase, and separate alarm for each output cubicle. The system can be fully integrated to most energy and real estate management systems.
Reliable, flexible, versatile

The versatile MNS switchgear system enables our customers to find solutions for demanding processes and operational conditions. It is an extensively tested technology and modular design, which make MNS the most flexible and reliable switchgear system on the market.

Wide scope of applications
MNS is tailored according to the specific needs of our customers. Its application areas are metal, petrochemical and pulp and paper industry, power plants, marine and offshore applications, as well as demanding building infrastructure requirements.

Expertise
The switchgear can be delivered as a stand-alone product or a part of a total project. ABB expertise is at your service for both the engineering of low voltage switchgear, or for the electrification of large plants. By contacting ABB already in the pre-engineering phase, we will help you to find the most cost efficient technical solutions.

Reliability
Reliability of power distribution is the keyword in all process control. For example, in marine applications operational reliability is extremely important, when the processes run in severe conditions and a power failure means high economical losses, or could even lead to dangerous outages. The ABB worldwide service network provides assistance wherever you are.

Minimal life cycle costs
As a leading manufacturer of electro-technical equipment, ABB invests in customer-focused product development and long-term customer service. A comprehensive maintenance network and fast spare part service keep the wheels turning.
Safety for the operating and maintenance personnel is the key issue in our development efforts. New designs emphasise safety, and diversified testing and verification procedures are brought into focus when we supply our customers with the safest possible switchgear system.

**Safe design**
The MNS switchgear is divided into separate equipment, busbar and cable compartments (Internal separation form 4). The design solutions used (Arc Free Zones) clearly decrease the possibility of damages occurring. In the unlikely event of arcing, damage is localized in the compartment where the arc occurred. This allows fast repair and re-commissioning of the switchgear.

**Extensive tests**
The safety of the MNS switchgear has been verified by extensive type and arc tests according to the IEC standards. Additional tests confirm the suitability of MNS for seismic areas, shelters and marine applications.

**High-quality materials**
In the selection of materials for MNS special attention has been paid to environmentally friendliness and recycling. The frame parts are made of zinc galvanized sheet steel. The busbar material is aluminium or copper depending on the rated current. All plastic materials are halogen-free and recyclable.

**High-quality of end product**
The whole manufacturing process of MNS is certified according to an authorized quality system, based on the international quality standard ISO 9001. The quality system in the manufacturing process was introduced as early as in 1991. Annual quality audits are performed by an independent inspection organization.
The MNS switchgear system offers a wide range of solutions for space saving and serviceability. The selection of switchgear according to its function helps you to achieve significant savings in the switchgear room and switchgear life cycle costs, as well as in the total investments.

**Ready modular solutions**
The two most common main switching devices used in MNS switchgear are a load switch breaker or an air insulated circuit breaker. Earthing switches located outside the cover are used for earthing the switchgear. Auxiliary devices are located in separate compartments close to the feeder cubicle.

**Fixed outgoing units (F)**
The MNS switchgear with fixed outgoing units and screw and bolt connections has proved to be a reliable and maintenance-free solution. The front door is locked, when the circuit breaker is in the I-position. The door can be opened for visual inspection of the equipment without interrupting the supply by using a specially designed method.

**Withdrawable outgoing units (W)**
In the MNS switchgear with withdrawable outgoing units, all electric connections are made using slidecontacts, which make fast changing or adding of units possible. This solution undoubtedly saves more space than other solutions. ABB has a long experience in the use of the withdrawable units and the special slide contacts have proved their reliability.
Optimal life cycle costs

The initial investment is only one part of the total switchgear life cycle costs. In the design and development of MNS, special attention has been paid to low service, maintenance and disposal costs.

Optimal current-carrying conductors
The current-carrying conductors of MNS are made of copper or aluminium bars. The choice of material depends on the load of conductors, and most of all, the environmental conditions. Aluminium has many advantages compared with copper:
- lightness
- corrosion resistance without special coating
- environmentally friendliness
- lower price

Busbars with slide contacts are made of tinned copper. This achieves:
- good corrosion resistance
- good sliding properties

Thanks to the special touch proof compartmentized construction of the enclosure the vertical feeder busbar in the cubicle using withdrawable units is arc-free.

High quality components
MNS solutions are based on high quality ABB components, with ensured availability all over the world. The components have passed extensive testing and attention has been paid to the continuity of their use, as well as their replacement in new generations of products.

Environmentally friendliness
A Life Cycle Analysis has been made on MNS switchgear in order to ensure that it can be safely removed from service and the materials recycled as much as possible. None of the materials used creates a problem for the environment.
## MNS technical data

### Standards and tests
- IEC 61439-1: 2011, EN 61439-1
- BS EN 60439-1
- DIN VDE 0660, part 500
- SFS-EN 60439-1: 2000
- IEC 60529, EN 60529
- IEC 61641 (Technical report)
- PSK 1801: 2001
- Certificate FI 19335, SGS Fimko Oy

### Rated insulation voltage $U_i$
- 1000 VAC

### Rated operation voltage $U_e$
- 690 VAC

### Rated impulse withstand voltage $U_{imp}$
- 8 kV

### Overvoltage category
- III

### Degree of pollution
- 3

### Rated frequency
- 0/50/60 Hz

### Rated currents $I_i$
- **Main busbars**
  - Max. 6300 A
- **Distribution bars**
  - Max. 2000 A

### Rated short-time withstand current $I_{sw}$
- **Main busbars**
  - Max. 100 kA
- **Distribution bars**
  - Max. 86 kA

### Rated peak withstand current $I_{pk}$
- **Main busbars**
  - Max. 250 kA
- **Distribution bars**
  - Max. 165 kA

### Arcing withstand
- 50 kA, 300 ms, 760 V

### EMC environment
- 2

### Insulation resistance
- $>10$ MΩ

### Degree of protection
- IP 31...IP 54 (IEC 60529)

### Dimensions
- **Height**
  - 2200 mm
- **Cubicle widths**
  - 400, 600, 800, 1000, 1400 mm
- ** Depths**
  - 400, 600, 800, 1000, 1200 mm
- **Module size**
  - E = 25 mm

### Surface treatment
- **Pre treatment**
  - Zinkphosphating 1-2 g/m²
- **Housing**
  - Hot galvanized sheet steel
- **Inside parts**
  - Hot galvanized sheet steel
- **Roof and rear plates**
  - Hot galvanized sheet steel
- **Doors and side walls**
  - Painted RAL 7035, light grey
  - Electrostatic polyester powder, thickness 60 μm

### Internal compartments
- Internal separation form 4, IEC 61439-1

### Assembly
- F or W
- Standing on floor