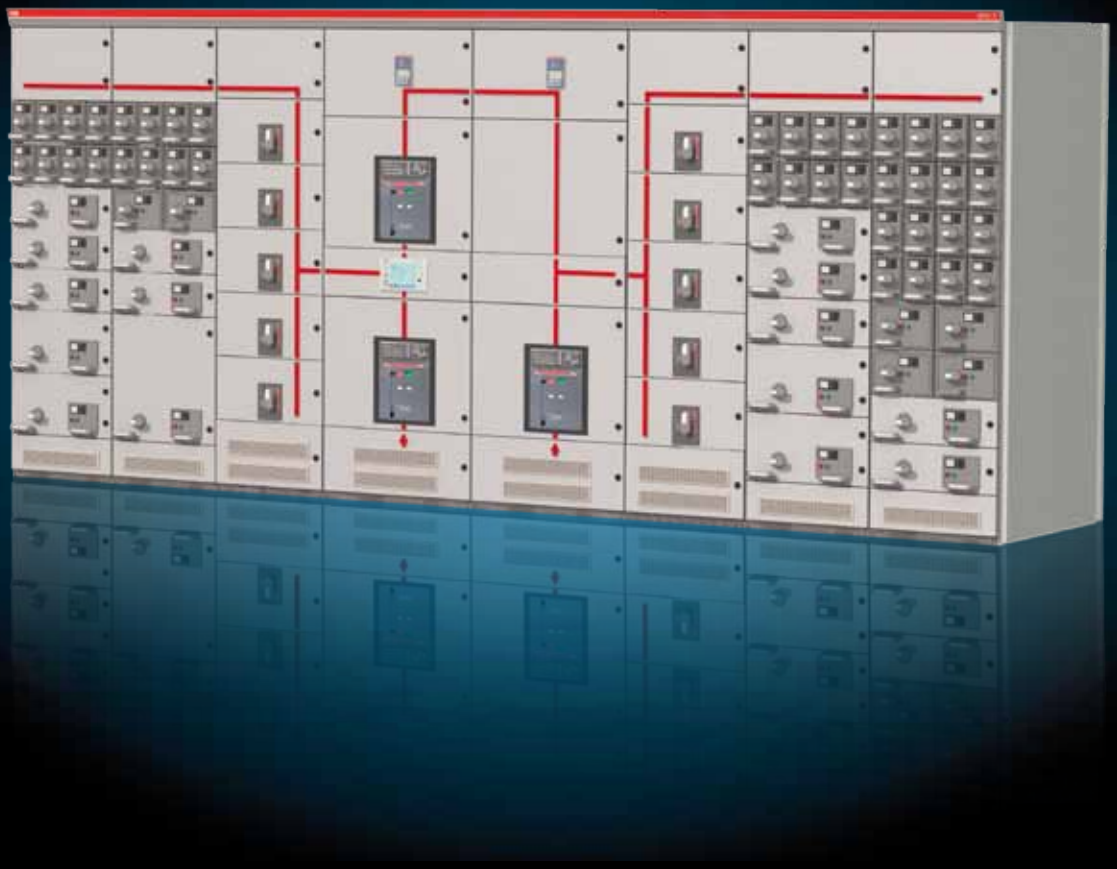


Brochure | September 2014

ABB MNS R
Rear access Power Motor Control Center

Power and productivity
for a better world™

Overview
The MNS Platform – Since 1975

Thirty years ago, ABB engineered MNS - the first modular Low Voltage Switchboard. The separated functional areas combined with the arc containment design received immediate customer recognition. Since then, MNS is the synonym for personnel and operational safety.

Rear Access solution
MNS R is the rear access switchgear of the MNS platform designed to guarantee the highest quality and safety standard for all the plants that require cable connections form the back side. The MNS R main low voltage distribution switchgear with rear access had been studied for installation in large electrical plants, such as petrochemical plants, steel works, rolling mills, power stations, oil rigs, ships, etc.
The service conditions on these plants are often extremely severe: the high currents involved and the effective shortcircuit levels require high performances switchgears. Furthermore, must be guaranteed personnel safety, service continuity, easy inspection, maintenance, erection and installation. Easy extension applications as well as compact overall dimensions are a must. The Power Motor Control Center MNS R switchgear fully complies with all these requirements. In addition to that, due to a perfect integration with all the latest generation of ABB apparatus, it easily meets all market requirements.
With MNS R ABB is delivering "add values" to his clients.

Low Installation cost
Due to the low foot print and easy access for power cables, set up and installation is short and effective. Rear covers of power cable compartments are available in several configurations according to customer specification (hinges, handles, safety locks).

Low meantime to repair and low maintenance cost
Withdrawable MCCB and ACB are available for all applications in order to minimize maintenance time for their replacement. Due to easy access to power and control cables all related work can be done in an effective way; required maintenance time is shorter than usual.

Low foot print and high technical performance
Multilevel Air Circuit-breaker layout reduce switchgear footprint. Air Circuit-breaker up to 6300A without derating show high technical performance. Different busbars locations give maximum flexibility in order to optimize switchgear layout and dimensions.

Type Test
In order to guarantee the highest quality and performances standard MNS R switchgear has been tested according the International Standard IEC. The tests simulate situations which occur very rarely or even never in the installations.

Safety
Modular design, internal segregation and easy access ensuring highest safety for operation, inspection and maintenance. MNS R is internal arc tested according to IEC 61641 and guarantees highest level of personnel safety.

Flexibility in applications
Fully adaptable to customer needs with the wide range of possible configurations: cables or bus duct from top or bottom, degree of protection up to IP54, internal segregation up to form 4b.

Interchangeable modules
Front and rear access MCC panels use exactly the same drawers reducing the plant spare parts



Technical data

Standards and Testing	
Standards	
Verification by testing *	IEC61439-1/-2, CEI 61439-1
Test Certificates	
	ABB SACE, ACAE LOVAG, SINAL, Cesi and Ismes
Electrical Data	
Rated Voltages	
Rated insulation voltage Ui	1000V AC, 1500V DC **
Rated operating voltage Ue	690V AC, 750V DC **
Rated impulse withstand voltage Uimp	Up to 6 / 8 / 12kV **
Overvoltage category	II / III / IV **
Degree of pollution	3
Rated frequency	50 - 60Hz
Rated Currents	
Main busbars:	
Rated current Ie	Up to 8000 A
Rated peak withstand current Ipk	Up to 264 kA
Rated short-time withstand current Icw	Up to 120 kA
Distribution bars:	
Rated current Ie	Up to 4000 A
Rated peak withstand current Ipk	Up to 264 kA
Rated short-time withstand current Icw	Up to 120 kA
Arc Proof	
Test according IEC 61641	75kA, 0,5s at 690V
	100kA, 0,3s at 415V
Mechanical Characteristics	
Dimensions	
Height	2200mm
Width	300, 400, 600, 800, 1000, 1200mm
Depth	1025, 1200, 1400mm
Basic grid size	E = 25mm acc. to DIN 43660
Surface Protection	
Frame	Alu - Zinc coated
Internal subdivision	UNI EN 10130 Zinc coated
Transverse section	UNI ISO 4520 Zinc coated
Enclosure	Power coated RAL7035 (light grey)
Degrees of Protection (IEC 60529, EN 60529)	
With door open	IP20
With door close	IP30 standard up to IP54
Normal Conditions	
Installation	Internal for service
Ambient temperature	min -5 °C, max 40 °C, average 24h 35 °C
Relative umidity	max 50% at 40 °C
Maximum altitude	≤ 2000m
Extras	
Paint finish	
External protection	Special colour on request
Busbar system	
Main and branch busbars	Sheated busbars, treated busbars (Ag/Sn)
Form of separation	
According IEC 61439-2	Up to 4b
According BS 61439-2	Up to 4b type7

* Design verification by testing: where an Assembly has previously been tessted in accordance with IEC 60439-1, and the results fulfil the requirements of the IEC 61439-1/-2, the verification of these tests need not to be repetaed

** Depending on the electrical equipment

MNS R Construction details

Focus on the customer

The experience on the global market tell us that the key to be successful in the business is the capability to satisfy the customers' request without any exceptions; this philosophy applied on the low voltage systems means flexibility of the product.

Switchgear frame

The MNS R frame is based on modular 2mm thick still C sections, pre-drilled at a pitch of 25mm. Each unit is based on modular elements and consists of:
1 circuit-breaker compartments;
2 instruments compartments;
3 busbar compartment;
4 cable compartment.

All compartments are mechanically segregated from the others. The switchgear is pre set for easy extensions on both sides

Segregations and protection

In order to guarantee the maximum safety level and service continuity MNS R can achieve the segregation form type 4b according the IEC standards. It guarantees to operate on the switchgear during the maintenance operation keeping the highest standard level disconnecting only the area interested to the intervention.
Not always the switchgears are installed in a dedicate room with the ideal condition; often they operate in industrial plant with critical condition of humidity, dust or chemical elements. MNS R can be installed in all those plant due to the possibility to be realized with degree of protection up to IP54 according EN 60529



Power Center Component





Circuit-breakers

MNS R is using the reliable and flexible ABB breakers type Emax and Tmax able to cover all the performances range with different configuration according customers' specifications:

- **Air Circuit-breakers.** The Emax family covers a large range in terms of dimensions, rated current and breaking capacity with its circuit-breakers from the smaller new X1 by Emax to the more performing new Emax E6. New Emax are equipped with the new generation of protection trip units, with the latest advances in electronics, offering individual bespoke solutions for control and protection.
- **Moulded Case Circuit Breakers.** The series of Tmax moulded-case circuit-breakers is complying with the IEC 60947-2 Standard and covers an application range up to 1600 A and breaking capacities from 16kA to 200kA. The breakers can equipped with TMF, TMD and TMA thermomagnetic trip units can also be used in direct current plants.

Cable and bus Duct connections

Rear Power cables connection is the main characteristic of MNS R and it guarantee the maximun safety standard together with the possibility to have a switchgear with reduced width.
In case use high rated current often the traditional cables are replace bus Bus Duct.
This is a common application for the power center and MNS R has been designed in order to be connected directly to Power bus duct either from the bottom or from the top. The switchgear busbars are made with copper but can be connected directly also to aluminum Bus duct.

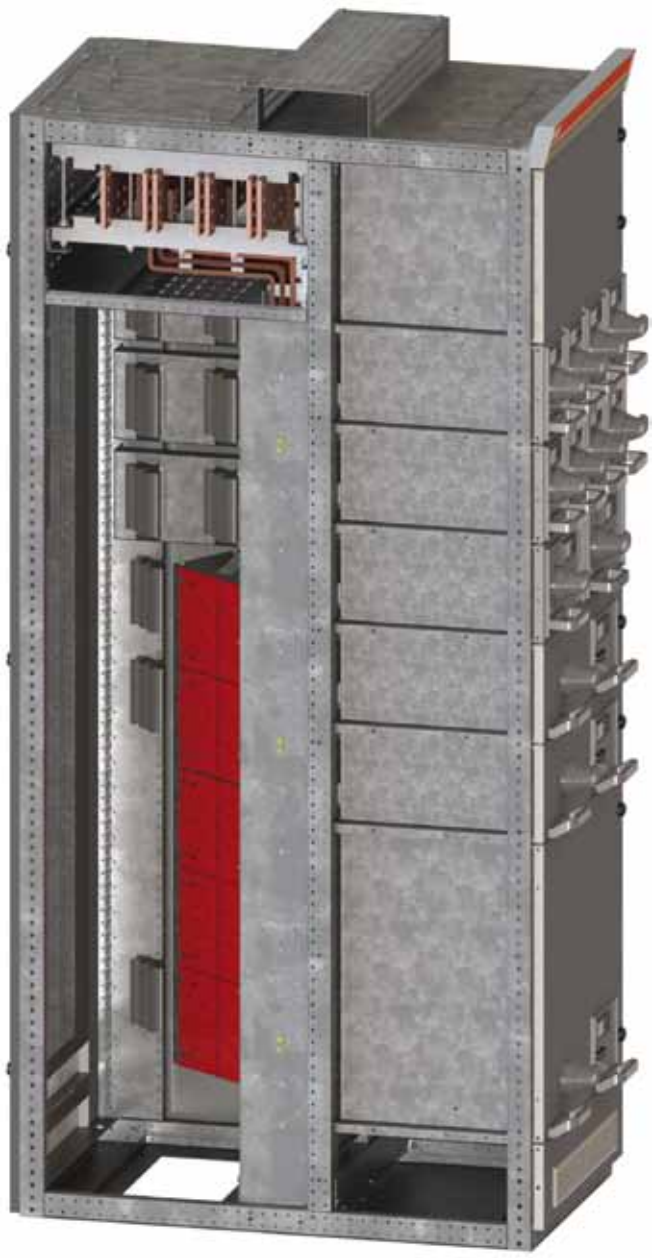
Busbars

MNS R main busbars are available for currents up to 6300A. Main busbars, as well as distribution busbars, can be completely segregated. Each MNS R panel can be fitted with three busbars systems at the same time (top-center- bottom) each segregated from the others.
Distribution busbars are available for currents up to 4000A; branched directly to main busbars, can be located either on the right or on the left in the column. They are feeding outgoing circuit-breakers, and are connected to them by means of rigid or flexible copper busbars, or cables. In any case, all the connections are suitably sized to withstand the thermodynamic stresses of the fault currents.
On request special surface treatment are available so the busbars can be: tinned, silvered or sleeved.

Protection relays

The high level of automation requested by the modern product plant can be satisfy with multifunction units able to perform all the protection functions request together with the measurement ones. Communication is the other successful key point in order to transmit all the requested information to the control systems. One of this Feeder Terminal is the REF542Plus, a compact protection, control, measurement and supervision terminal for power distribution systems. Distinguishing features of the terminal are its flexibility and configurability. The same unit can be used as a feeder, transformer or motor protection terminal, or as a control terminal alone. Another proposal from the ABB portfolio is the Relion® product family offers the widest range of products for the protection, control, measurement and supervision of power systems. To ensure interoperable and future-proof solutions, Relion products have been designed to implement the core values of the IEC 61850 standard.

Motor Control Center Section



Overview

The complete range of MNS R includes also the Motor control center portion with compact cubicles 600mm wide. Each unit is based on modular elements and consists of:

1 **Busbars compartment:** top located to increase the area available for the feeder and optimize the heating dissipation;
2 **Feeders compartments:** depending on the customers requirement are available fully withdrawable units or plug in, both the solutions minimize the downtime for maintenance;
3 **Auxiliary compartment:** located on the top of the cubicles contains all the auxiliary equipment lime miniature circuit breakers;
4 **Cables compartment:** power and control cable in rear part are fully segregated from all the other components.

Withdrawable modules

The withdrawable technique has proved to be the appropriate solution for use in industrial applications where requirements High availability is a must particularly for motor feeders. Modules can be easily exchanged under operational conditions thus assuring maximum flexibility.
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.

Plug-in modules

Plug In modules can be also quickly removed without any disassembling; the module includes the power parts and also the auxiliary instrumentation in order to reduce to the minimum the down time necessary to replace a plug-in module





Multifunction Wall

The multifunction wall (MFW) with the embedded distribution bars is a unique MNS platform 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 specific power contact housings full single phase segregation is assured prior to the connection of the power contacts to the distribution bars.

Variable speed drivers (VSD) modules

According the energy efficiency policy to adapt the speed of the motor according the plant condition is crucial in order to reduce the energy consumption considering the cubic law between motor speed and consumption: with ½ speed, material flow is correspondingly ½, but only ½ of the energy is consumed.
Variable Speed Drive (VSD) is the established technology for efficient operation and control of electric motors. It provides a system by which the voltage and frequency of the power supplied to the motor can be varied and controlled. This helps customers to operate a motor precisely at the process need and to use energy more efficiently and thus lower the environmental impact. MNS R offer VSD type ABB ACS 850 integrated in to withdrawable modules up to 55kW.

Intelligent solution

In the Process Industry modern plant there are hundreds of motors; to run a plant efficiently it becomes important to protect and control motors effectively and safe. To achieve that target the MNS R drawers can be equipped with multifunction protection relay like the M10x. A device able to perform all the control, measuring and protection functions for motor feeders. Through the standard industrial communication protocols like Modbus or Profibus the motor feeders can be integrated in to the supervision systems, like DCS, also with redundant communication.
Locally is possible to perform all the control and monitoring operation using the operator interface type MD; while parameterization and configuration is performed by a setup software user friendly and Microsoft Windows based.
Parameter setting is carried out via a dedicated parameter cable connecting the M10x to the MDx panel mounted on the front of the motor starter module. Software allows for the parameterization of all functions of the different M10x types

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