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# MNS<sup>®</sup> Low-voltage switchgear Exceeding the standards





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# Exceeding the standards with MNS

## 5 essentials of switchgear solutions

Since ABB first introduced the modular low-voltage switchgear platform MNS over forty-five years ago, MNS has always been at the forefront of innovation in the market place.

Safety, flexibility and reliability all stem from the rigorous testing / certification program initialised with our MNS platform introduction. Technical innovation has also been a driver from the beginning and continues to this day.

Not limited to technical innovation, ABB also focuses on the following additional factors valued by customers:

- Ease of doing business: Our customers deal directly with an ABB single point of contact.
- Ease of maintenance: Customers benefit from a tailor made service strategy to meet their demands. This coupled with a standardized design can reduce spares inventory up to 75%.

These 5 essentials, **safety, flexibility, reliability, ease of doing business and ease of maintenance**, establish ABB's basis of solutions for today's challenging business environment.

### Safety

The 'Safety Plus strategy' originated with our first arc fault containment tests in 1979 with characteristics of 500 V 50 kA and 690 V 35 kA. Since then ABB has invested over \$ 60 million in testing and verification of MNS. With this commitment it can be clearly seen that MNS offers the highest standard safety level available in the market today. Notable aspects are:

- The MNS arc free zone comprises the vertical distribution bars and the power contact to the short circuit protection device.
- To ensure the arc is limited to the defined area, gas tight seals are used between the main bus bar system and equipment (incoming and outgoing) compartments.
- Embedded vertical distribution bars guarantee superior phase segregation, creepage distance and increased safety.



Generations of MNS



### Reliability

Since the introduction of MNS in the early 1970s the lifecycle comprises three discrete product generations. The constructional aspects of the MNS platform have remained the same throughout the product evolution. This enables extensions and retrofit throughout the entire installed base. Over 1.5 million MNS sections have been delivered so far, and over 80 percent of these remain in operation, this demonstrates the reliability and quality offered by MNS.

Maintenance-free busbars and mechanical structure help to reduce operational costs. The main power contact is that of a turn-able construction, de-coupling cable stress and eliminating hot spots.

ABB's design guideline defines that the temperature inside the assembly shall not exceed 55°C. This coupled with the diversity factor of 1 applied in verification tests ensures maximum reliability.

### Flexibility

The MNS modular design forms the basis of the system flexibility. This aspect also provides the ability to combine solutions from the entire ABB low voltage product range. These products are integrated in close co-ordination with the associated product development teams which provides increased performance for MNS and ensures the full requirements of the IEC 61439 are met.

- Fixed, Plug-in and Withdrawable motor starters, energy distribution, variable speed drives, soft-starters and power factor correction can be configured in the same vertical section.
- MNS provides solutions for both front and rear access designs for switchroom optimization.
- MNS easily meets harsh / extreme environments.

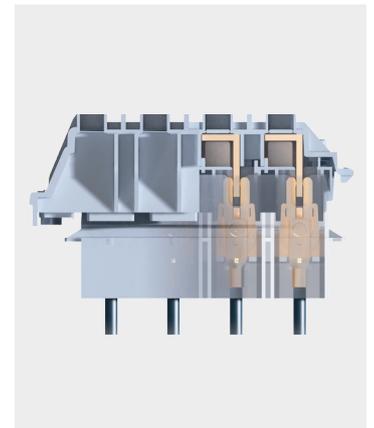
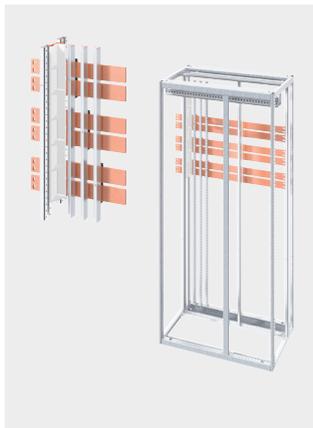
Safety, reliability and flexibility are values proven in our continuous verification programs, these are conducted with our globally recognised partners:

- CESI (IPH-Berlin) testing authority providing ASTA certification
- DEKRA testing authority providing KEMA certification

Internal view of MNS



Main busbars, distribution bars and main contact



# DEKRA statement on low-voltage switchgear assemblies

A low-voltage switchgear assembly is the product of a long supply chain; the road from design to customer applications is not always a straight one.

As a switchgear supplier ABB wants to avoid personal injury of their clients' employees, and prevent loss of energy supply. ABB's clients need to be sure that the switchgear meets their requirements, and those defined by the applicable IEC specifications.

IEC 61439 is the international standard for low-voltage switchgear and control gear assemblies. This standard forms the basis for all DEKRA services in the field of testing and certification of low voltage assemblies. A DEKRA / KEMA Quality Test Certificate means that the product is subjected to a complete sequence of tests prescribed by IEC 61439 and demonstrates full compliance to the standard.

In addition to the Test Certificate DEKRA offers the possibility to obtain a Test Report, this enables the option to test a particular requirement for example:

- During the development phase of a product it may be required to test a single requirement from the specification e.g. Short circuit withstand.
- When a specific requirement is defined e.g. Temperature rise for an increased ambient temperature.

As an 'original manufacturer' ABB requires their customers to be satisfied about their products and ensure they meet with the safety and compliance of the standards. The written evidence of DEKRA testing and certification enables ABB to demonstrate certified switchgear in line with the specifications. This is one of the reasons ABB chooses DEKRA / KEMA Quality Test Certificates to reinforce the quality and reliability of MNS.

Content of this page supplied by courtesy of DEKRA



# IPH / ASTA statement on low-voltage switchgear assemblies

## IPH-Berlin, a subsidiary of CESI

CESI is a world leader in consulting and testing for the energy sector. IPH-Berlin has been successfully operating for more than 50 years. During this period, eleven test bays have been developed, based on the requirements of product design and compliance to international standards. The latest and largest high-current test bay, which makes IPH's facility one of the most recognized and adaptable in the world, comprises a current test laboratory which can provide nominal currents up to 50,000 amperes. Large equipment can be tested with permanent current at any power frequency from 15 Hz to 65 Hz thanks to the large 960 m<sup>3</sup> test bay.

IPH has been a dependable partner for ABB for 45 years. The first short circuit test for ABB was performed in the Berlin laboratory in 1979. Since then, many tests have been performed, with a notable increase in the last ten years. This is due to ABB's policy of continuous development where the MNS product portfolio has been expanded to offer alternative solutions to meet market demands. ABB relies on IPH as the primary laboratory for ASTA certification.

Content of this page supplied by courtesy of IPH / ASTA

## ASTA Recognized Laboratories

Intertek's ASTA Services team delivers leading services for the electrical industry. Their services include schemes truly recognized internationally such as plug and fuse approvals and low/medium/high voltage certification. IPH laboratory is 'ASTA Recognized' which means that in addition to its national accreditation, the laboratory is rigorously audited by Intertek every year to demonstrate technical competence and capability for the scope of work registered. As part of the ASTA certification scheme, tests are witnessed by an 'ASTA Observer' supervised from the ASTA Certification Body in the United Kingdom, on successful completion of which ASTA certificates are issued.

## Benefits of ASTA Certification

The Intertek ASTA deliverable issued is known as an 'ASTA Type Test Certificate', or a variant of this certificate, an 'ASTA Certificate of Verification by Test', in line with latest standard requirements IEC 61439. These certificates provide authoritative objective evidence that ABB equipment is compliant to relevant safety standards and statutory regulatory specifications. Often specified by end users, ASTA Certificates issued have a high level of integrity and global recognition, and are sealed and bound to prevent misuse.



# Exceeding the standards with MNS

ABB's knowledge and experience gained in design, testing and supplying switchgear over the last 50 years, is unrivalled. This coupled with the '5 essentials of switchgear solutions' and our global business model provides a differentiating factor for many decisions in today's challenging business environment.

## Quality management with ABB

The two interrelated processes hereunder illustrate ABB's quality policy covering the complete value chain from global development to local delivery.

ABB's quality process is embedded in the ethics of the entire organisation, each of the locations world-wide operates in accordance with ISO 9001 Quality Management System. ABB's policies include but are not limited to, delivering on-time, with continuous quality to ensure customer satisfaction.

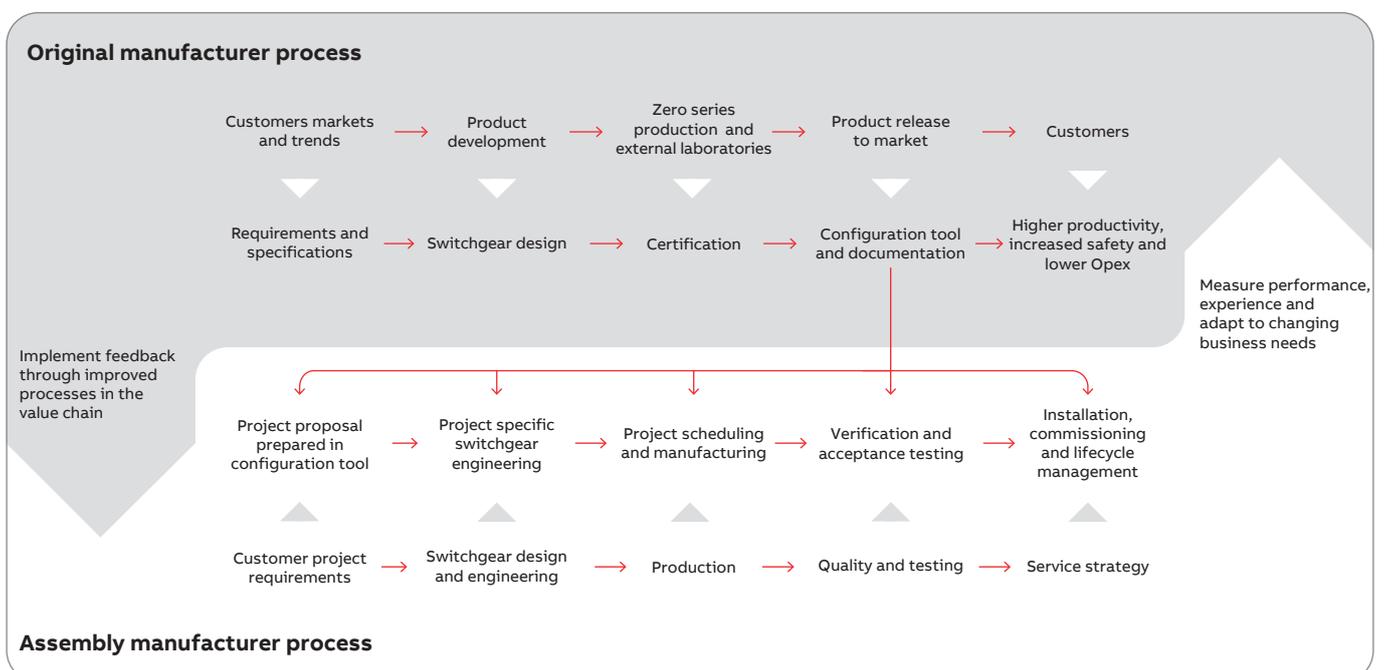
The certified quality and reliability ensured by choosing MNS provides the customer with the best in class asset to achieve higher productivity, increased safety with respect to both plant and personal this in turn lowers the lifecycle cycle costs.

## Original manufacturer and assembly manufacturer

ABB has a unique position with respect to its global presence and the IEC standards definition where ABB is both the 'Original manufacturer' and the 'Assembly manufacturer'.

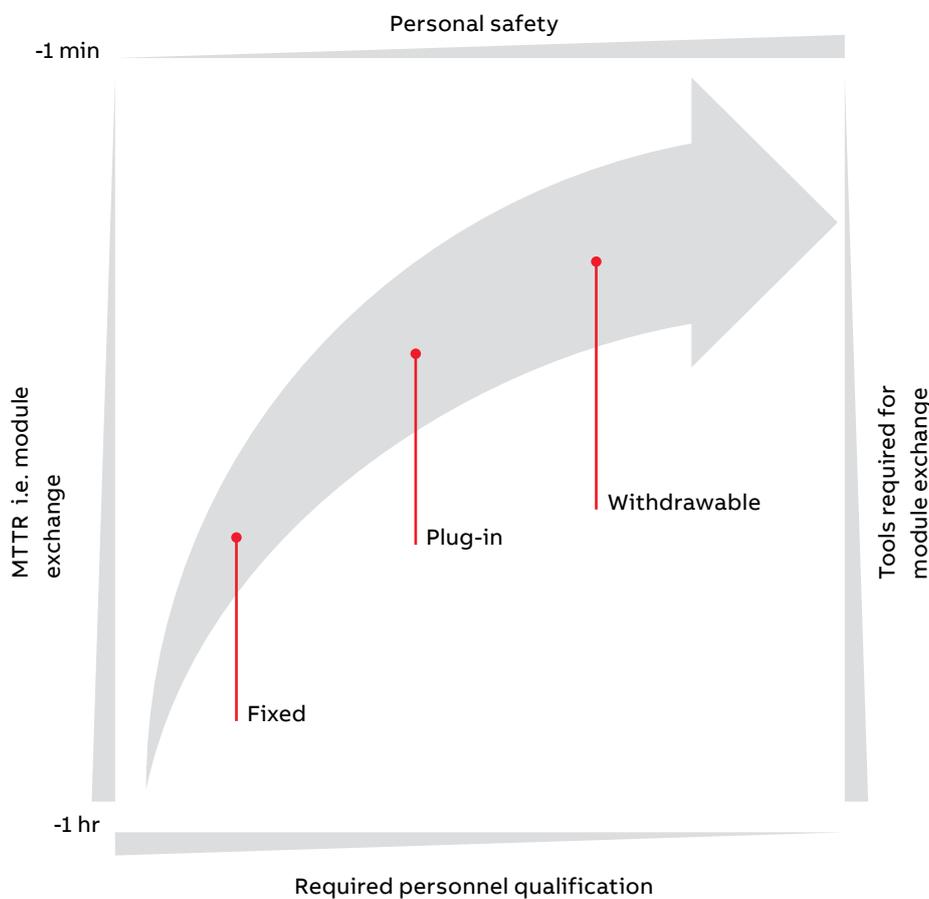
The original manufacturer's responsibility lies with the Global Product Management team, based at strategic locations worldwide. The team manages the complete responsibility for the MNS platform, from project development to lifecycle management, providing the local facilities with the support, documentation and required tools to enable project execution.

The assembly manufacturer's obligation lies with our locally based production facilities, where we employ in excess of 2000 professionals in over 30 locations worldwide. Our local experts are available throughout all stages of the project to meet the expectations of all our customers.



# Scale your solution with MNS

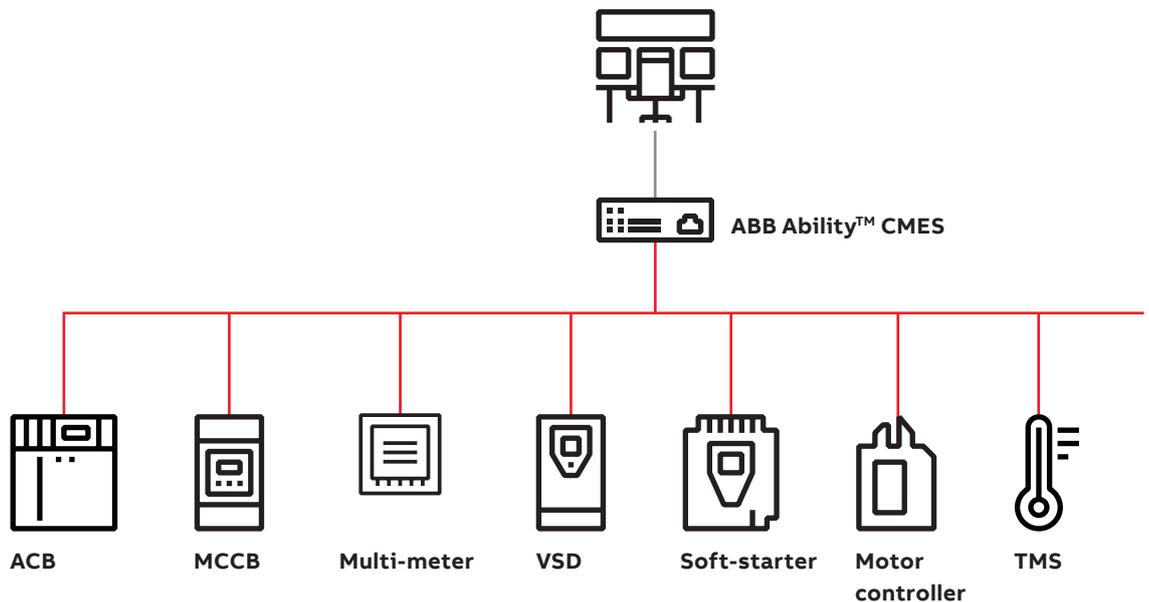
The MNS platform provides complete scalability across the entire portfolio with options for front or rear access designs, this coupled with the portfolio applications that fulfil requirements in all industry segments from final distribution to high end process control and secure power systems ensures MNS is the definitive solution for all applications.



In addition to this a comprehensive range of energy distribution and motor starting portfolios enables our customers to scale their low voltage switchgear dependent upon the CAPEX and OPEX requirements.

Solutions such as the Fixed and Compact design provide the most economical solutions with respect to CAPEX whilst the benefits of Plug-in and Withdrawable system can influence OPEX and reduce downtime in the event of an unwanted outage.

# Higher asset availability with MNS Digital



MNS Digital utilizes latest smart technologies available in the proven MNS system platform and enables complete visibility for all the connected assets providing real time information.

With the utilization of the on-site ABB Ability™ Condition Monitoring for electrical systems (CMES), data is collected and analyzed to ensure continuous operation and maintenance is scheduled only as to when and where it is required. This reduces unwanted shutdown and increases asset availability.

In addition, MNS Digital and the CMES provide energy management data. Combining this data with the high availability and reliability offered by MNS enables optimisation of operational procedures resulting in OPEX cost savings of up to 30%.

ACB: Air circuit breakers Emax2 with Ekip Touch / HiTouch  
 MCCB Molded case circuit breakers Tmax XT  
 Motor controller: UMC100.3 / M10x - M  
 TMS: Temperature Monitoring System  
 VSD: Variable Speed Drives  
 UPS: Uninterrupted Power Supply\*

\* Not shown in graphic.

**Additional information**

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