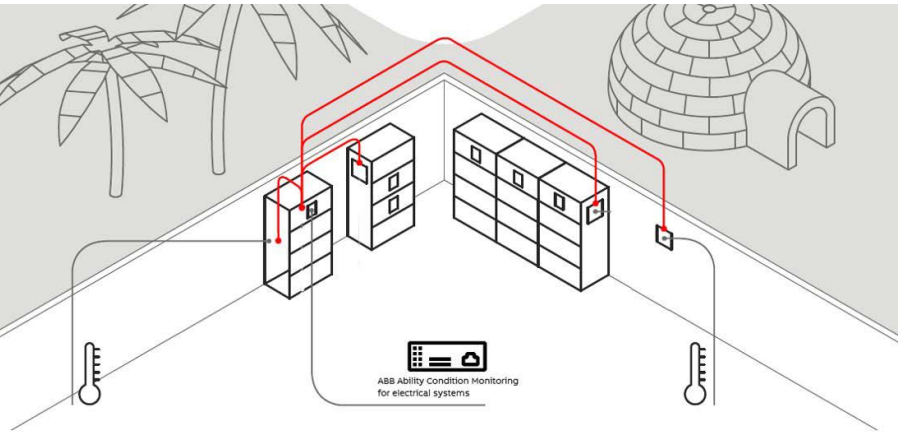
LOW VOLTAGE SYSTEMS

MNS® Temperature Monitoring System

Monitoring critical connections

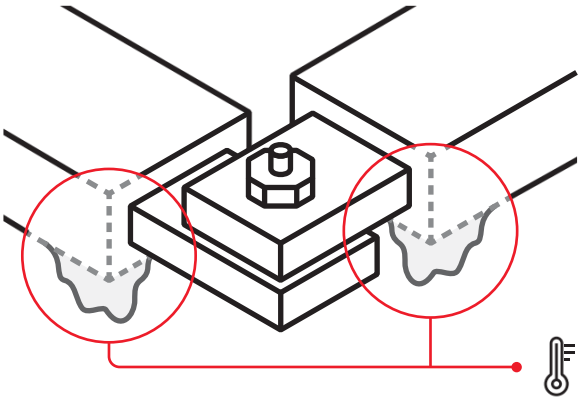


MNS Temperature Monitoring System and ABB Ability™ condition monitoring solutions ensure continuous switchgear operation with early detection of potential risks, reducing switchgear maintenance costs through 24/7 monitoring and analytics based on actual loads.

ABB's MNS platform for low-voltage switchgear has been evolving for over 45 years. Since its inception, the MNS design has focused on the fundamental principles of safety, reliability, modularity, and scalability. While the MNS bus bar joints are proven maintenance free, certain connections that are made during installation or maintenance can now be monitored with MNS Temperature Monitoring System (TMS).

Most common failure in electrical equipment and assemblies are caused by bad joints. But how to detect bad joints early?

Current measurement	✗
Power measurement	✗
Temperature measurement	✓



— Monitoring electrical connection

Factors that underline the need for continuous temperature monitoring:

- Disturbance free electrical operation.
- Insurance companies require temperature monitoring as part of electrical maintenance.
- Areas of switchgear installation that are not always under control of the OEM e.g. ACB incoming cable or bus duct connection, busbar connections at shipping splits.
- Mounting and maintenance of power connectors in functional units is not performed as per OEM guidelines.
- Service and maintenance are done by a third party (i.e. not certified by OEM).

MNS TMS is connected to ABB Ability™ Condition Monitoring for electrical systems (CMES), where the temperature values are analyzed together with load data from the switchgear assembly – providing a more precise data to ensure the right decisions are taken.

Sensor in MNS module
- Monitoring incoming and outgoing connections such as power contacts

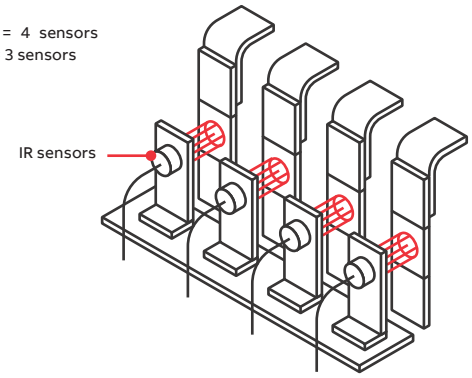
Sensor at ACB connection
- Monitoring incoming / outgoing cable or bus duct connection

Sensor at MNS shipping splits
- Monitoring busbar joints between shipping splits

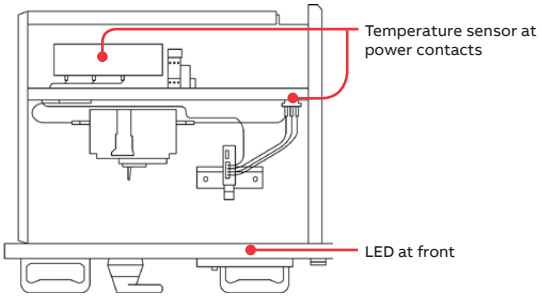
ACB and busbar temperature monitoring
MNS busbars are maintenance-free when assembled in ABB factories with full quality control, while air circuit breaker incoming termination and shipping splits are finalized during installation on-site.

Infrared sensors provide highest safety due to contact- less monitoring in high current areas of the switchgear assembly. Temperature data is safely transferred to a data card for further assessment to the monitoring system.

4P breakers = 4 sensors
3P breakers = 3 sensors



Module power contact temperature monitoring
Power contact temperature is monitored by adding temperature sensors to incoming and outgoing power contact cables in MNS modules. Data is safely transferred for further assessment to the monitoring system. LED status indication is available for the front of the module.



Benefits gained with 24/7 online temperature monitoring:

- **Reduced operational cost:** No need to go to switch room for regular temperature monitoring.
- **Increased safety:** operators can monitor the internal temperatures from a safe and remote location. All critical areas are monitored without the requirement of work permits.
- **Increased availability:** no need to shut downloads for safe temperature checks.
- **Predictability:** electrical connection issues detected before a fault develops. The detailed location of temperature increases, and the severity (temperature alarm) is available in the ABB Ability™ CMES system on-site.
- **No manual data assessment:** online monitoring considers the correlation between actual temperature and actual load condition.

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