

Medium voltage service

MySiteCare and MyRemoteCare

Reliable asset condition monitoring

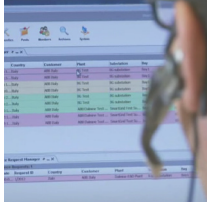
Power and productivity
for a better world™



Maintenance strategies

What is the best approach?

Performance and reliability improvement



Condition-based maintenance

Maintenance based on monitoring equipment performance and operating parameters plus control of the corrective actions taken.



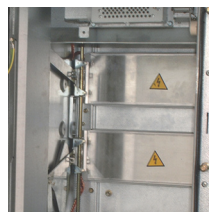
Risk-based maintenance

Maintenance performed by integrating analysis, measurement and periodic on-site test activities with standard preventive maintenance.



Preventive maintenance

Maintenance performed after set periods of time or according to prescribed criteria for the purpose of reducing the risk of faults or impaired performance of the equipment.



Corrective maintenance

Maintenance performed after failure detection for the purpose of restoring normal operating conditions.

Increased risk of failure and induced effects

Condition-based maintenance

MyRemoteCare

Condition-based maintenance is the best approach for electrification system management.

MyRemoteCare is the ABB solution developed for this purpose based on remote diagnosis and monitoring the conditions of switchgear, circuit breakers, and contactors. It enables users and maintenance teams to continuously supervise equipment conditions and performance trends, and to constantly manage the related warnings and faults. ABB service engineers suggest the right sort of maintenance

at the best time for each asset by analyzing the acquired data. This allows failures to be prevented as well as accurate planning of maintenance, not only according to purely schedule-based servicing activities.

MyRemoteCare acquires diagnostic information from MySiteCare, a universal switchgear monitoring and diagnosis device.

The remote services implemented with MyRemoteCare are included in PowerCare customer support agreements.

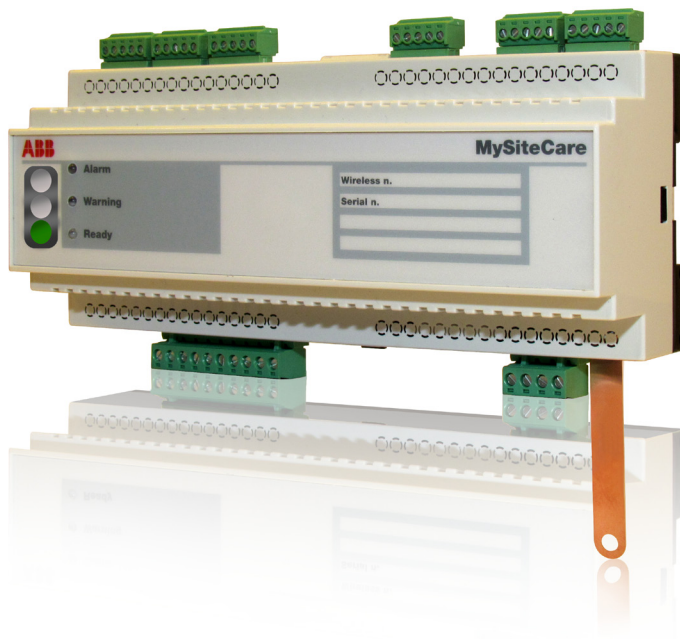


MySiteCare

MySiteCare monitoring and diagnostic unit uses various sensors to acquire circuit breaker and switchgear data and converts them into diagnostic information so as to assess the conditions and allow maintenance work to be planned. One MySiteCare unit must be installed for each circuit-breaker or switchgear panel.

MySiteCare monitors the following variables:

- Operation of the mechanical part: opening and closing times, spring charging time, slipping and failed spring charging attempt, number of operations, idle time
- Remaining life estimation and contact wear
- Environmental temperature of the circuit breaker compartment
- Monitoring of temperatures in critical points on primary circuit.
- SF6 circuit breakers pressure, protection relay watch-dog and control coil continuity status can be also connected to MySiteCare.



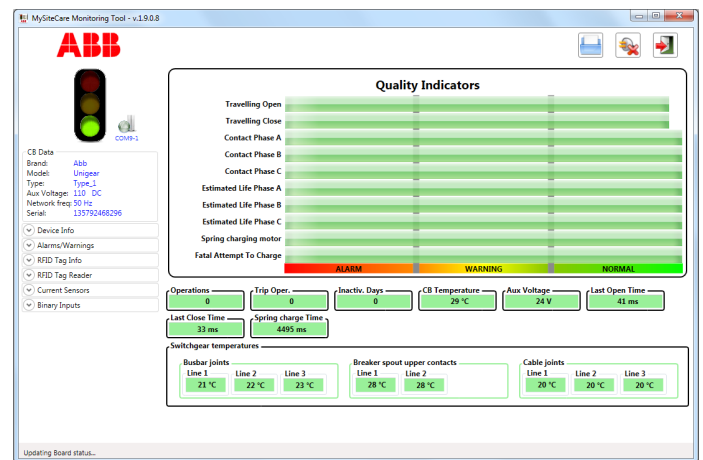
MySiteCare central unit

MySiteCare implements predictive diagnostic algorithms and provides indications concerning the mechanical, electrical and operating conditions of the circuit-breaker or panel.

MySiteCare has a user-friendly interface that displays issues by means of a traffic light: red, yellow and green. This signal indicates how serious the problem is, thus the probability of failure or impaired reliability and safety of the monitored equipment.

MySiteCare can be installed on new equipment as well as on existing one, and in this case, it is suggested to inspect and test it in order to:

- check its health condition
- maintain or replace worn components if required
- assess the real conditions of the equipment so as to properly configure MySiteCare.



Main page of the monitoring tool (USB connection)

MySiteCare

Circuit breaker monitoring and diagnostic

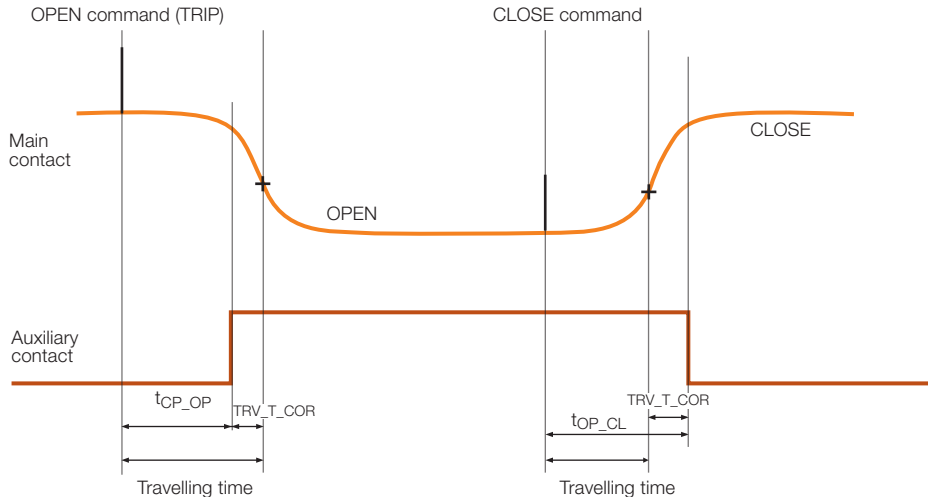
Installation of MySiteCare on each panel does not involve any changes to the circuit-breaker, the protection relay or switchboard.

The predictive diagnostic algorithms are configured by ABB's qualified technicians when the monitoring system is commissioned: the parameters concern the relevant circuit-breaker, contactor and switchgear status.



Central unit:

is the monitoring and diagnostic unit providing a set of binary inputs to monitor the circuit-breaker operations and timings, like: trip and close coil activation, auxiliary contact (open/closed circuit-breaker status), springs charged signal. Moreover it can monitor other warnings like: SF6 circuit breakers pressure, protection relay watch-dog and control coil continuity status. These signals are easily derived from the existing terminal blocks in the low voltage compartment. Auxiliary voltage is monitored since it might affect the performance of the coils and spring-charging gear-motor.

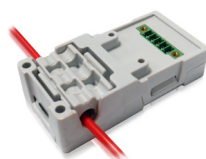
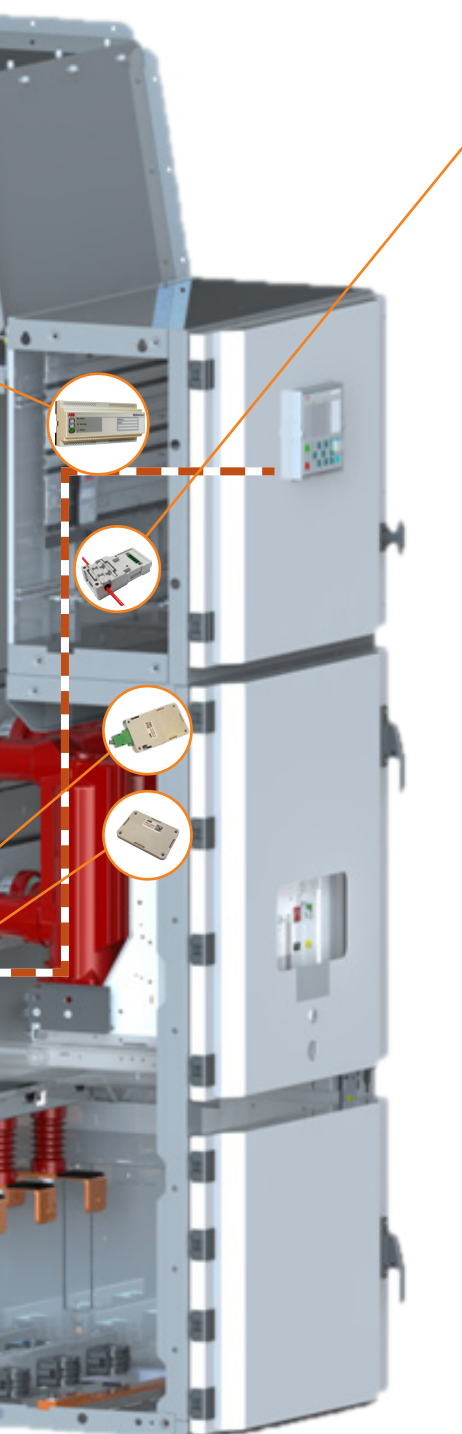


RFID identification sensor:

able to identify and trace the replacement of breaker in the switchgear or the breakers swap between panels. The sensor is based on RFID wireless technology and comprises:

- TAG RFID (passive) to store identification data of the circuit-breaker and its current health condition
- RFID transmitter installed in the circuit-breaker compartment, to let MySiteCare read and write the TAG. Moreover it measures the temperature inside the breaker compartment

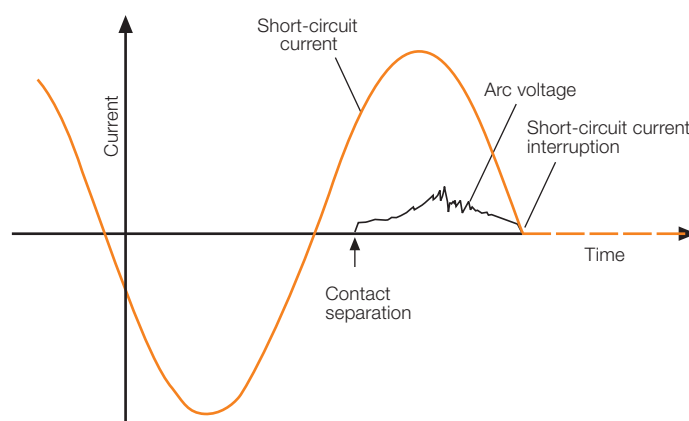
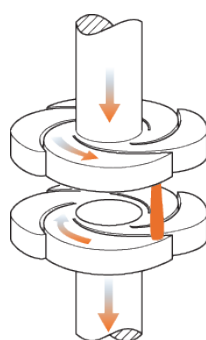




Current sensors for contact wear estimation:

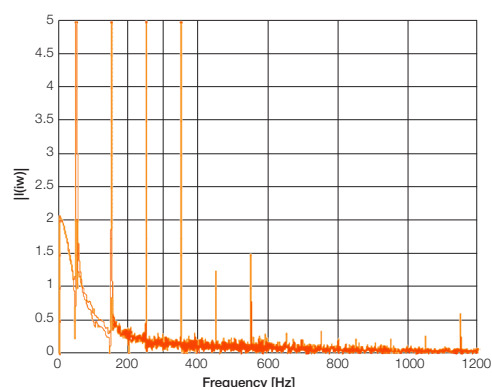
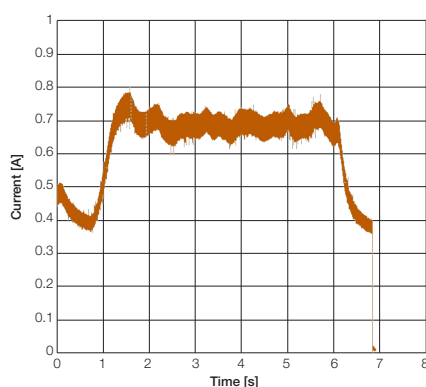
hall-effect current sensors clipped onto the secondary circuits of the current transformer inside the auxiliary compartment, enabling trip current to be measured.

MySiteCare analyzes the three-phase currents calculating the accumulated energy by the poles during a trip, which is then used to estimate the contacts wear and the remaining life of the breaker.



Current sensor for spring charging gear motor analysis:

hall-effect current sensor analyzes current waveform absorbed by the spring charging motor during operation. MySiteCare performs time and frequency spectrum analysis of the waveform in order to detect mechanical and/or electrical wear out.



MySiteCare

Switchgear hot spot detection

While circuit breaker moving parts and auxiliaries provide number of various data for analysis, the rest of the switchgear is static and the number of condition variables for monitoring is quite limited.

One of the most meaningful data for analysis on the panel are temperatures of the primary circuit on or near the critical points of the current path-joints.

The temperature of the primary circuits has a dominant influence on the switchgear insulation life. If a loose joint within the switchgear creates a hot spot on the primary circuit, the insulation close to the hot spot can suffer serious deterioration due to excessive heating. The lifetime of the insulation decreases rapidly resulting in weak areas sensitive to dielectric stressing during subsequent operation.

An aged insulator increases dramatically the switchgear probability of failure in form of an internal arc fault, which can result in long-term power supply outage and huge consequential damages.

MySiteCare unit includes an effective algorithm for hot spot detection.

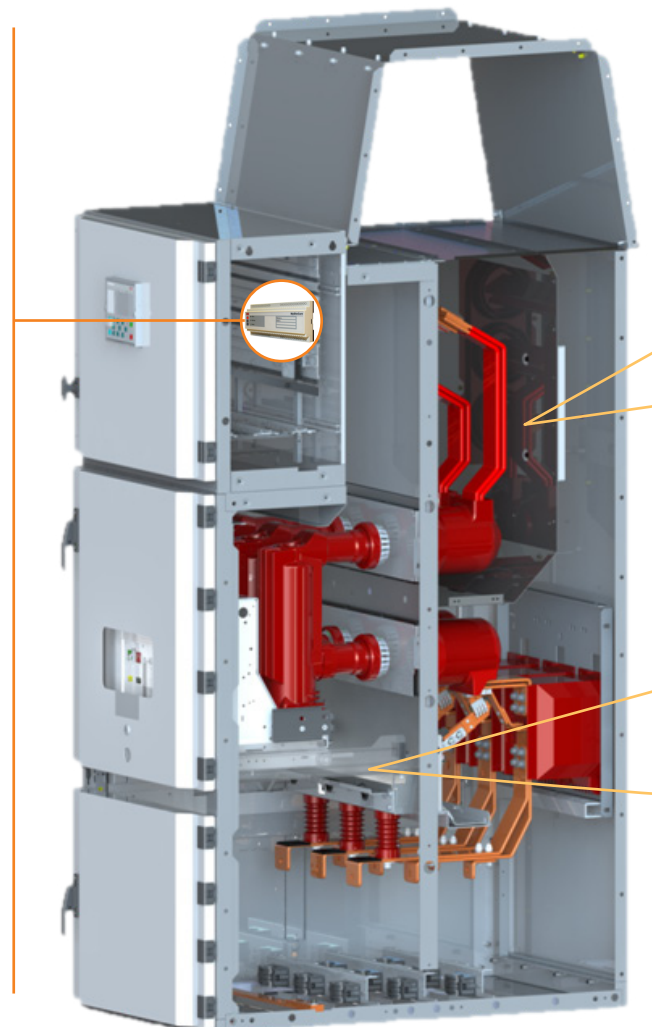
MySiteCare generates alerts whenever it detects an abnormal overheating, several hours before a critical and unsafe condition is reached. This predictive diagnostic supports the condition based maintenance, in order to maximize the asset lifetime, as well as asset availability and reliability.



Central unit:

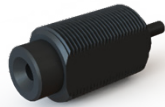
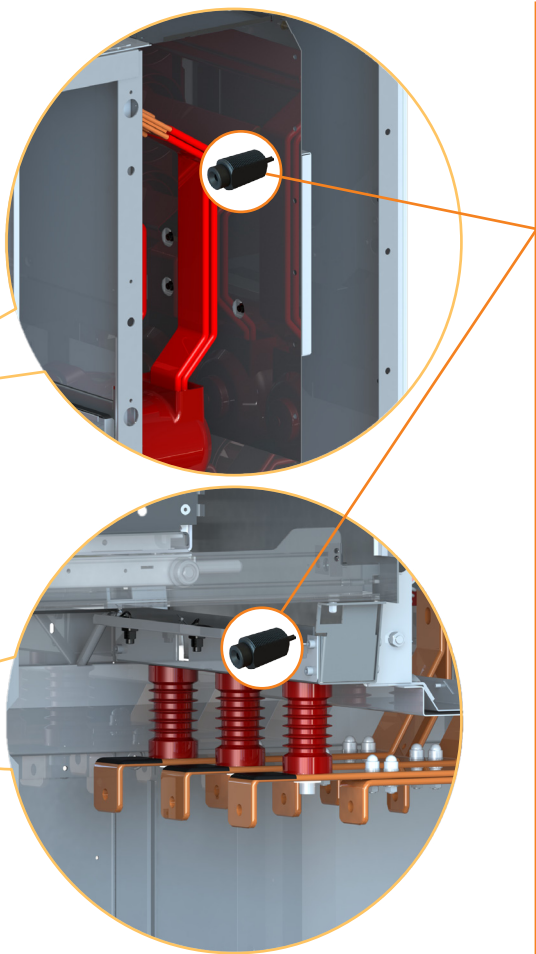
The algorithm does not require information about the current flowing through primary circuit as it works on comparative principle.

It is based on the fact the currents in 3-phase system are usually balanced and thus the temperatures in all 3 phases should be similar at the same spot of the primary circuit. If one or two of the temperatures rises significantly above the other, the algorithm evaluates the situation as loose joint signaling the alarm to the operator.



Several reasons can create hot spot critical condition, like for instance:

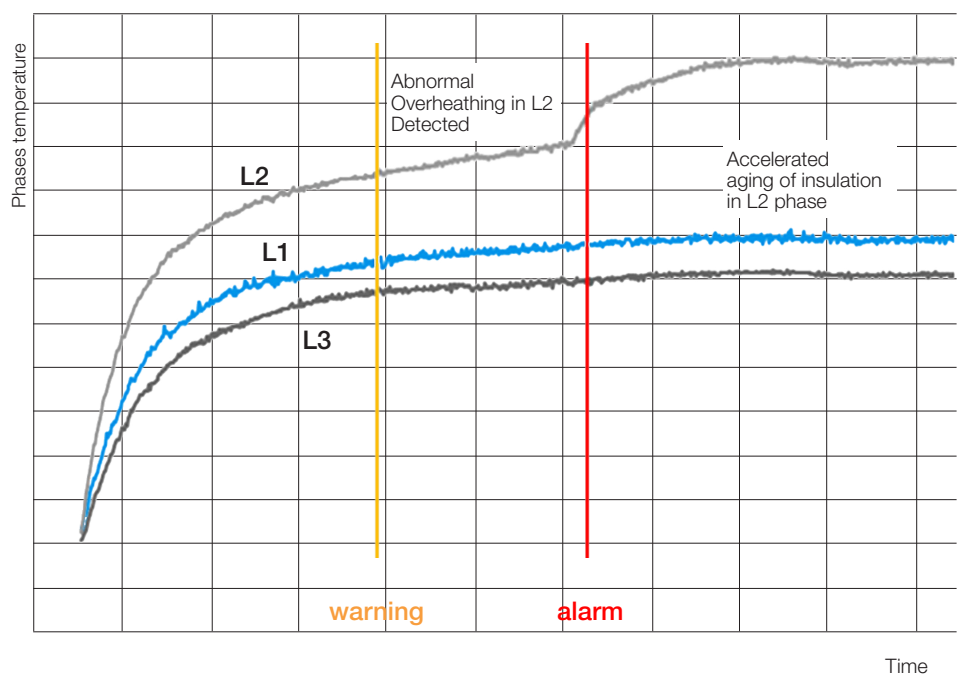
- Loose joints due to vibrations or unusual operating shocks
- Power cable loose connections as result of severe short circuits and aged clamping arrangement
- Mechanical damage of sliding power contacts during equipment handling outside the panels
- Ablation of contact surface of sliding power contacts due to excess of racking operations above the prescribed limits
- Contacts resistance increase caused by oxidation or corrosion due to unfavorable environmental conditions (humidity, marine ambient, chemical pollution, etc.).
- Long maintenance intervals due to equipment utilization in continuous process plants.



Infrared hot spot sensors:

Up to 8 infrared hot spot temperature sensors measuring critical busbar and cable joints.

In the example below, a loose cable termination in phase 2 is detected and signaled several hours before becoming potentially critical.



MyRemoteCare

Remote monitoring of the switchgear

ABB offers a simple service for remote display and analysis of the conditions of the equipment installed able to facilitate technical support and optimal maintenance planning. MyRemoteCare stores diagnostic information about the individual apparatus and uses it to generate reports and warning messages. In addition, it allows historical data to be analyzed, thereby making it easier to detect typical deviations from standard behavior over the years.

ABB service engineers analyze the diagnostic in the remote service center and ensure that events are signalled. They also assess the causes and whether or not to take action in the short- or long-term. Maintenance personnel can consult the decisions and/or actions planned by ABB experts via the MyRemoteCare portal. The predictive maintenance tasks will be performed by qualified ABB technicians.



Remote support by ABB specialists

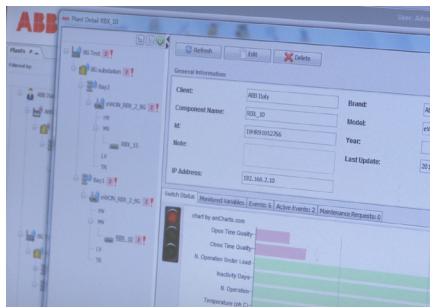
The information processed by each MySiteCare diagnostic unit is transmitted via RS485 link to a concentrator (Gateway). The concentrator has a SIM card allowing the data to be transmitted to the ABB Data Center via a cell phone network (2G/3G), through a secure private channel that is dedicated to the MyRemoteCare system only.

The frequency with which information is transmitted depends on the event and the concentrator sends an update to the system whenever an important change occurs. Only equipment diagnostic information is available to the ABB specialists; no operational data is gathered nor transferred to ABB service center, respecting customer privacy.

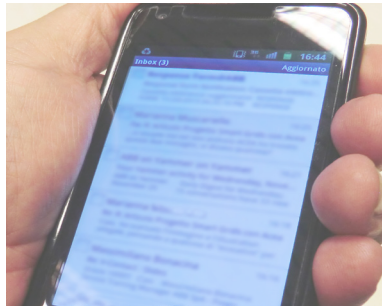
In the absence of important changes or events, the status of the installation is updated every 24 hours. In addition, MyRemoteCare has a system for frequently checking the connection to the installation, thereby ensuring a high degree of reliability and data quality.

ABB service specialists and maintenance officers can access MyRemoteCare secure web portal so as to consult diagnostic information.

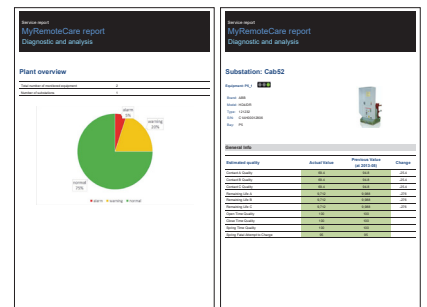
Only authorized personnel are allowed accessing the portal. Access credentials are supplied when the service is activated.



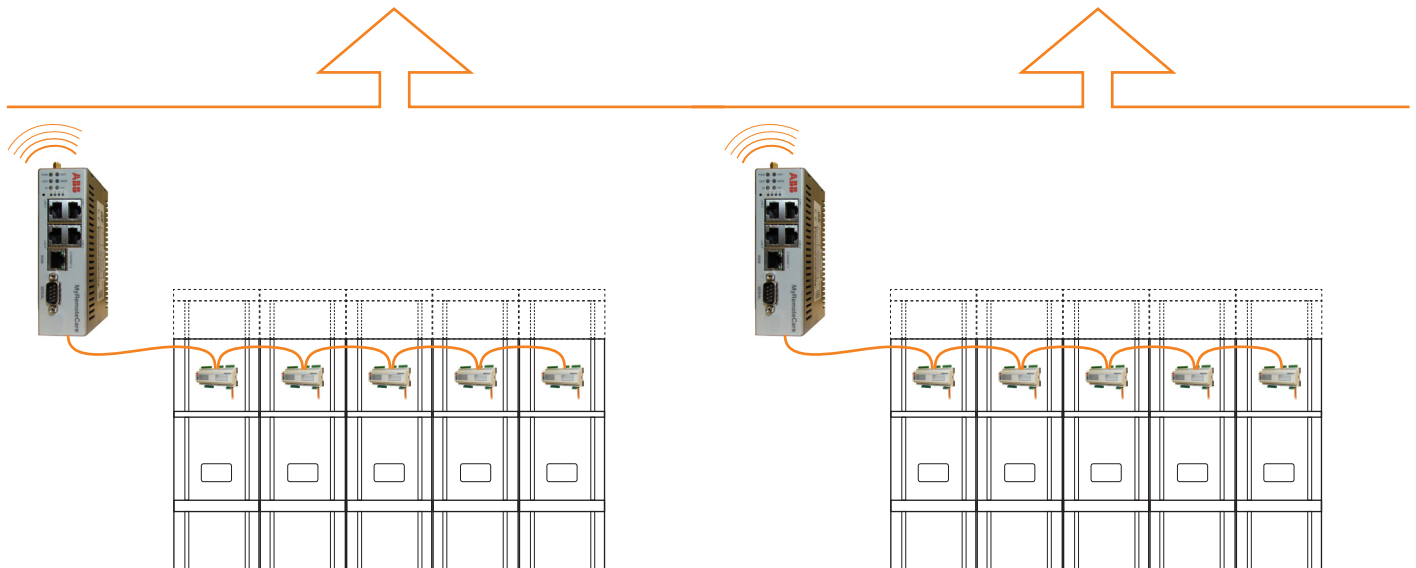
Asset information on web portal



Alerts by mail

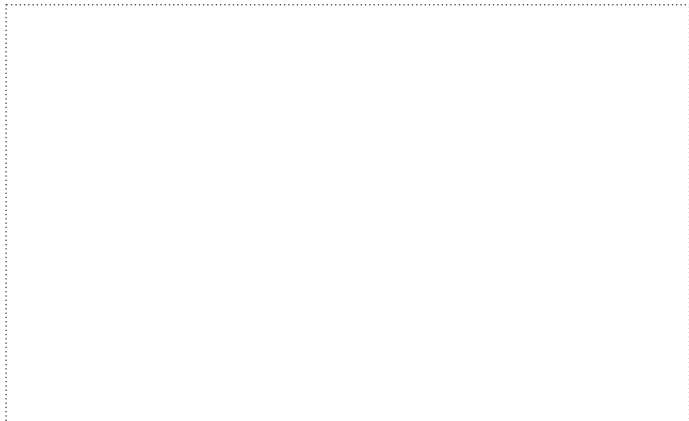


Periodic summary report



Transmission path of diagnostic information from the installation to MyRemoteCare

Contact us



Your Service sales contact: www.abb.com/contacts

More Service information: www.abb.com/productguide

MyRemoteCare webpage:



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