

DISTRIBUTION SOLUTIONS

UniSec

Maintenance solutions



- ABB supports you to improve the reliability, safety and efficiency of your electrical equipment

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UniSec maintenance solutions

The ABB Medium Voltage Service offers long-term systematic and organized maintenance and support for your production, including recommendations for preventive maintenance and spare part programs. Our preventive approach helps to eliminate many of the potential problems while reducing the risk of equipment failures and

unscheduled repairs. ABB maintenance services always include repairs authorized by the manufacturer and refurbishment of equipment so that it corresponds to the original product.

ABB proposes risk and condition-based maintenance strategies to ensure maximum plant reliability.

Corrective maintenance →

Maintenance performed after a fault has been detected for the purpose of restoring the normal operating conditions.

This approach is based on the firm belief that the costs sustained for downtime and repairing faults are lower than the investment required for a maintenance program.

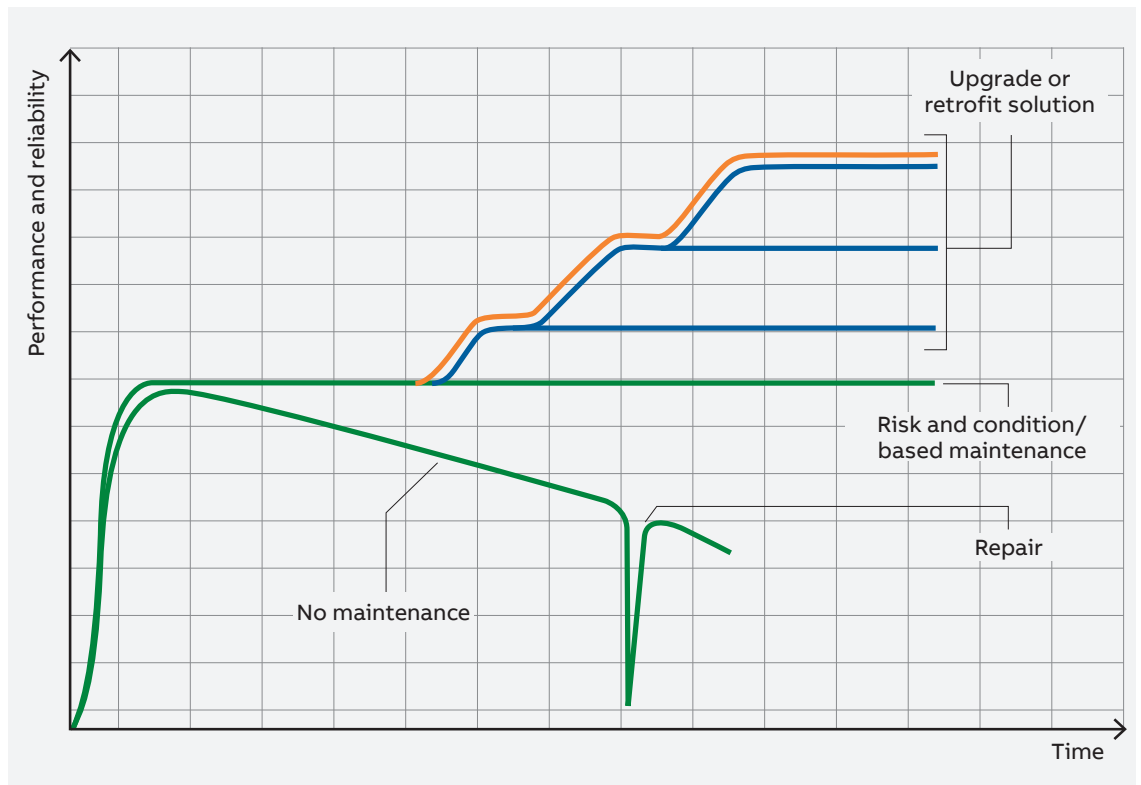
This strategy may be cost-effective until catastrophic faults occur.

Preventive maintenance →

Maintenance performed at predetermined intervals or according to prescribed criteria for the purpose of reducing the risk of failure or impaired performance of the equipment.

This method is based on scheduled maintenance activities to which the out-of-service apparatus is subjected, including: visual inspections, cleaning, lubrication of mechanical components, replacement of worn parts and routine tests.

The maintenance cycles are planned for when the apparatus must be taken out of service. This method reduces the incidence of operating faults.



Switchgear operating trend over time based on the adopted maintenance strategy.

Risk-based maintenance →

Method which includes analysis, measurement and periodic tests in addition to standard preventive maintenance.

The acquired information is evaluated on the basis of the environmental, operating and process conditions of the equipment in the system. The aim is to perform asset condition and risk assessment enabling the appropriate maintenance program to be defined.

All equipment with abnormal values is refurbished or replaced. This allows the useful life of the plant to be extended and guarantees high levels of reliability, safety and efficiency over time.

Condition-based maintenance

Maintenance based on monitoring the performance of the apparatus and controlling the corrective measures adopted as a result.

The effective condition of the equipment is assessed by online monitoring of significant operating parameters and their automatic comparison with average values and performance. Maintenance is performed when certain indicators signal that the equipment is deteriorating and the likelihood of failure is increasing.

In the long-term, this strategy allows maintenance costs to be drastically reduced, thereby minimizing the occurrence of serious faults and optimizing the way the available economic resources are used.

Condition-based maintenance using MySiteCare

MySiteCare

The MySiteCare monitoring and diagnostics unit employs various sensors to acquire circuit breaker and switchgear data, after which it converts these data into diagnostic information so as to assess the conditions of the apparatus and allow maintenance work to be planned.

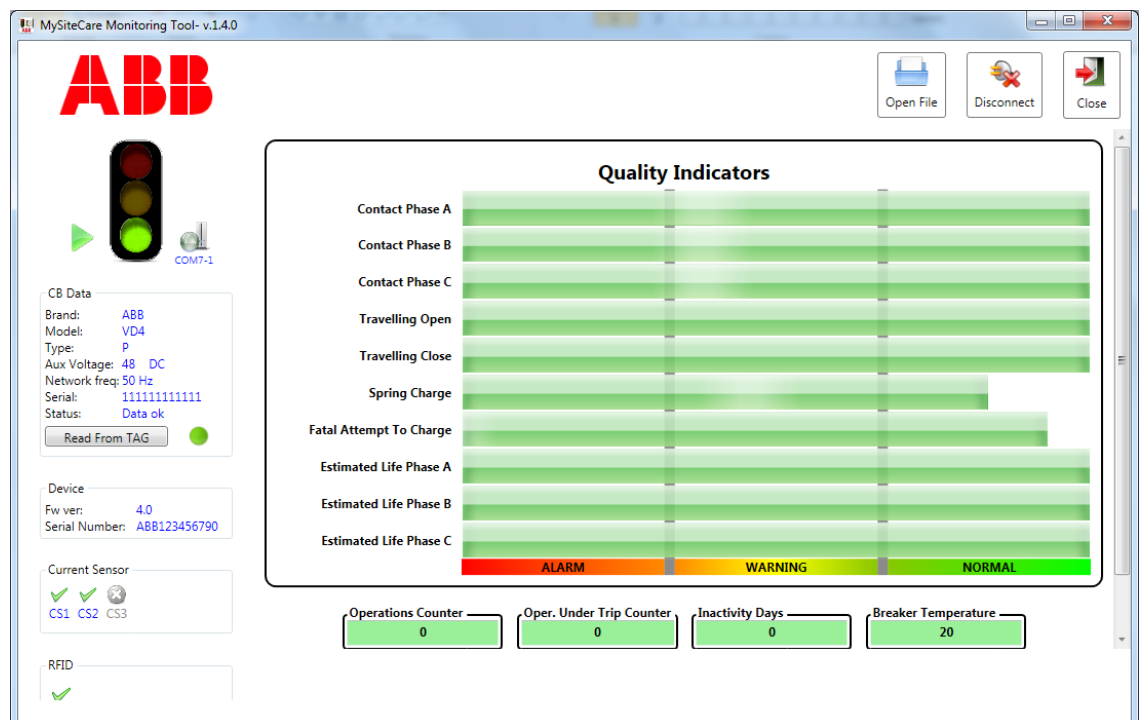
One MySiteCare unit must be installed for each circuit breaker or switchgear panel.

MySiteCare monitors the following variables:

- Operation of the mechanical part: opening and closing times, spring loading time, slipping and failed spring loading attempts, number of operations, idle time

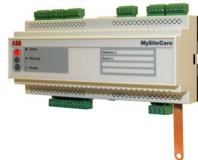
- Contact wear and remaining life estimation
- SF₆ circuit breaker pressure, protection relay watchdog and control coil continuity state can also be monitored by MySiteCare.

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 information 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.



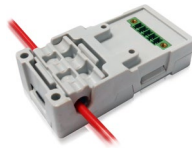
A - Central unit

This is the monitoring and diagnostic part. It provides a set of binary inputs which monitor circuit breaker operation and timing, including trip and closing coil activation, auxiliary contact, springs loaded signal. It can also monitor other parameters, such as SF₆ circuit breaker pressure, protection relay watchdog and control coil continuity state.



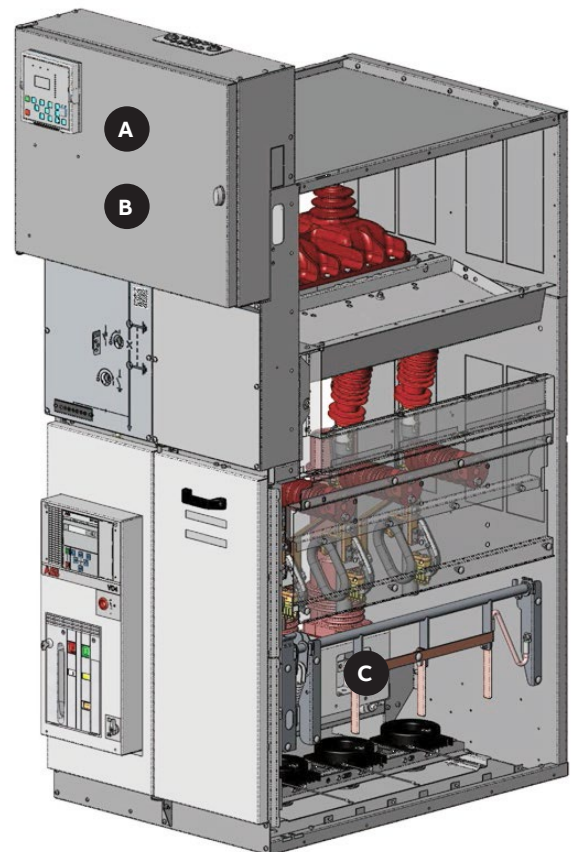
B - Current sensors for contact wear estimation

Hall-effect current sensors clipped onto the secondary circuits of the current transformer inside the auxiliary compartment. They measure the three-phase currents to estimate circuit breaker pole contact wear and the mechanical and/or electrical wear-out of the spring-loading gear motor.



C - RFID identification sensor

Based on RFID wireless technology, this sensor identifies and traces breaker replacement in the switchgear or breakers swapped between panels. It also measures the temperature in the breaker compartment.



Traditional preventive maintenance

Alternatively, regular check-ups are required to maintain the original performance level of the equipment.

To ensure it is performed correctly, maintenance must be carried out by skilled personnel, familiar with the characteristics of the switchgear and with in-depth knowledge of the apparatus.

Maintenance activities must be performed in compliance with all the relevant IEC safety regulations, with those of other technical authorities and with the regulations in force in the country where the switchgear is installed.

Compliance with any additional instructions of primary importance is also mandatory.

We advise you to call in the ABB Service personnel when maintenance and repair work are required.

The switchgear is designed for use in normal service conditions, as defined by standard IEC 62271-1 (Table 1).

The effects of the reduced dielectric strength of the insulating air must be taken into account at site altitudes above 1000 m (please refer to standard IEC 61271-1). Compensate for increased ambient temperatures when busbars, branch conductors and other components are designed, otherwise the current carrying capacity will be limited. Condensation may form when the switchgear operates in areas with a high degree of humidity and/or major temperature fluctuations and must remain an exception in normal service conditions for indoor switchgear. Preventive measures (e.g. installation of electric heaters) must be discussed with the manufacturer so as to avoid the phenomenon and any resulting corrosion or other adverse effects.

Consult the dedicated product manuals as indicated in table 2 for detailed information and specific maintenance procedures ensuring that the tasks are performed in safe conditions.

Table 1

Ambient air temperature	°C
Maximum	+ 40
Maximum 24 h average	+ 35
Minimum 24 h average	- 5 (*)
Minimum recommended	+ 5
Altitude above sea level	m
Maximum	1000
Humidity conditions	%
Average value of relative humidity (24 h)	≤ 95
Average value of relative humidity (1 month)	≤ 90
Pollution	

The ambient air must not be significantly polluted by dust, smoke corrosive and/or flammable gases, vapours or salt.

(*) Contact ABB for - 25 °C operating temperatures and - 40 °C storage temperatures

Table 2

Vacuum circuit breaker: VD4/R type	1VDCD600565 (VD4/R-VD4/L – VD4/UniAir – VD4/UniMix – 12...24kV – 630...1250A – 12...25kA Installation and maintenance manual)
Vacuum circuit breaker: Vmax type	1VCD600189 (Vmax – 12...17.5kV – 630...1250 A – 16...31.5kA Installation manual)
Vacuum circuit breaker: VD4 type	647654 (VD4 – 12...24kV – 630...3150A A – 16...50kA Installation and maintenance manual)
SF ₆ circuit breaker: HD4/R type	647021 (HD4 – 12-40.5 kV – 630-3600 A – 16-50 kA Installation and maintenance manual)
Vacuum contactor: VSC type	600192 (VSC – VSC/F – VSC/P – VSC/PN – VSC/PNG – 7.2/12 kV – 400 A Installation and maintenance manual)
UniSec switchgear	1VFM200005 Operation and maintenance manual
SF ₆ switch disconnecter: GSec type	1VCD601151 Instruction for installation, generation and maintenance

Maintenance instructions

Maintenance includes the following activities:

- Inspection: evaluation of the effective conditions
- Overhauling: actions to preserve the specified conditions
- Repairs: actions to restore the specified conditions

The frequency with which some apparatus/ components (e.g. parts subject to wear) must be inspected and serviced is determined by fixed criteria, such as switching frequency, length of service and number of short-circuit breaking operations (consult the specific maintenance manuals in table 2 for detailed information). For other parts, the frequency may depend on: different ways of operating in specific cases, work load, environmental factors (including pollution and aggressive air), etc.

The frequency with which maintenance work must be performed always depends on the operating conditions of the switchgear, e.g. the way of operating, the number of rated and short-circuit current switching operations, the ambient temperature, degree of pollution, etc.

The maintenance intervals and actions to be taken are described in Table 3 below and are recommended for UniSec switchgear under normal service conditions.

Shorter intervals are recommended for all maintenance activities in more demanding conditions (such as areas with high pollution levels). Please contact ABB for more details.

Table 3

Maintenance intervals and activities in normal service conditions.

Classification	Recommended activities	"Time interval in Years (normal conditions)"	According to number of operations
	Switchgear		
Inspection	Visual check for dirt, corrosion or moisture	5	
	Check for effects of high temperature on the main circuits	5	
	Check for traces of partial discharge and current leakage on insulating material parts	5	
	Visually check the surface of the contacts (signs of overheating)	5	
	Check the general condition and lubricate the earthing switch contacts	5	
	Check the correct mechanical/electrical operation of accessories, interlocking, auxiliary and signalling devices of switchgear	5	
Overhauling	Tighten all electrical connections (main busbars, switches, measuring devices, cables, etc.) to the correct torque as specified in the installaton and tightening torque instructions	5	
	Clean all parts (disconnectors, circuit breakers, tripping mechanisms, motors, etc.) with a vacuum cleaner and visually inspect them	5	
	Perform a closing/opening operation on all disconnectors and circuit breakers, including the earthing switches	5	
	Perform one electrical operation sequence on all motor-operated devices and tripping mechanisms	5	
	Clean the busbars, cable compartment, GSec switch-disconnector both insulated and metal parts, instrument transformers, circuit breaker, etc.	5	
	Grease the contacts, blades and operating mechanism (Earthing Switch)	5	According to product manual
	When required, replace the parts subjected to mechanical stress (Earthing switch and operatinf mechanism)	5	According to product manual
Repairs	Carry out repair work immediately after a defect has been discovered	As required	
	Completely remove all rust from damaged paintwork areas on steel sheet and other steel parts	As required	
	Lightly roughen the surrounding paint and carefully degrease the entire surface.	As required	
	Then immediately apply an anti-rust primer and apply the top coat		
	Carefully remove any oxidation from galvanized surfaces	As required	

Traditional preventive maintenance

Table 3

Apparatus (Circuit Breaker and Switch Disconnecter)		
Inspection	Visual inspection to check for any contaminations, traces of corrosion or electrical discharge phenomena	According to product manual
	Visual inspection of the poles or cover (resin parts)	
	Visual inspection of the isolating contacts. The contact system should be turned alternately in order to keep the interval surface of the contact area clean. The contact areas must be cleaned when there are signs of overheating	According to product manual
	Visual inspection of the components, especially those which may be damaged by incorrect operations. Carry out functional tests of the locks, checking their correct operation and activation without abnormal force (If withdrawable assembly)	According to product manual
	Check the operating pressure of the gas-insulated devices (if with SF ₆)	According to product manual
	Measure of the insulating resistance	According to product manual
Operating mechanism		
Inspection & Overhauling	Visual inspection to check the operating mechanism, the lubrication conditions of the jaw isolating contacts, the sliding surfaces, etc.	According to product manual
	Carry out a few opening and closing operations	According to product manual
	Make sure that the electrical and mechanical operations of the various devices are correct, with particular attention to the interlocks	According to product manual
Overhauling	Clean the surfaces, the insulating surfaces and the conductive parts	According to product manual
	When required, replace the parts subjected to mechanical stress	According to product manual
Repairs	When required, replace the parts subjected to mechanical stress	As required
ITs and Sensors		
Inspection & Overhauling	Visible surface pollution shall be cleaned off the transformer	5
Repairs	In case of surface contamination please contact ABB	As required
Protection Devices		
Inspection & Overhauling	Check the correct mechanical/electrical operations of the protection devices	5
Repairs	When required, please contact ABB	As required

Spare parts

ABB offers a broad range of spare parts for your switchgear, thereby allowing you to address the important requirements of the future. ABB possesses extensive experience with medium voltage switchgears and can provide you with a detailed list of recommended spare parts based on the lifecycle of your switchgear.

Unexpected situations able to cause delays in your start-up plan may occur during the installation and commissioning process of a switchgear if you do not have the required spare parts in stock. ABB can provide a recommended list of spare parts, including the most frequently replaced components for:

- Easy availability during commissioning activities
- Rapid replacement or repairs
- Preventing start-up delays due to unexpected failures in the most common components
- Ensuring you have a minimum number of replacement parts in stock for your switchgear

Spare parts classification

Skilled technicians are required to replace parts, which are classified according to the following levels:

- L1: parts that can be replaced directly by customers by following the instructions in the user manual or, better still, after having attended an L1 training course (introductory training for apparatus operators)
- L2: parts that can be replaced directly by customers by following the user manual instructions of the apparatus or, better still, after having attended an L2 training course (advanced training for maintenance technicians and site operators)
- L3: parts which can only be provided when needed for qualified ABB maintenance or repairs. These parts require dedicated tools and specific in-depth skills in order to be replaced

Additional information and details are available in the dedicated publication below:

1VCP000691 - UniSec - Spare parts for improving switchgear availability.

For further details please contact:



More product information:

abb.com/mediumvoltage

Your contact center:

abb.com/contactcenters

More service information:

abb.com/service