SERVICE NOTE

ABB Ability™ LEAP

Peace of mind for high voltage motors and generators

You have your roof inspected for damage and life expectancy - Why wouldn't you protect your motors the same way?

ABB Ability LEAP (Life Expectancy Analysis Program) makes it easy to know how your motor is doing.

What is LEAP?
ABB Ability LEAP is an advanced solution for analyzing the condition and expected lifetime of the stator winding insulation - the most critical uptime component in high voltage motors and generators.

ABB LEAP goes further than conventional health monitoring programs for rotating electrical machines. LEAP algorithms estimate the strength of materials in installation and then compare with models to determine forces acting on the system to calculate remaining life and current condition.

ABB LEAP analysis provides precise information on the remaining lifetime of the stator winding. Based on this, specific service actions can be planned well ahead. This method drastically reduces unplanned shutdowns caused by the failures (due to factors such as thermal, electrical, ambient, or mechanical aging), which could have been foreseen.

Lasting benefits
The ABB Ability LEAP analysis allows:

- **Maintenance recommendations to reduce insulation system stress** – Extend lifetime and assure long term operation
- **Data-based repair and upgrade decision**s – Make accurate run/repair/replace choices based on insight into the stator insulation condition
- **Expected remaining lifetime calculations of the stator winding insulation** – Optimize the mitigation strategy and overall cost of ownership (COO)

Where can you use LEAP?
A LEAP analysis can be performed on any AC high voltage (4100 V and higher) motor or generator.

ABB Ability LEAP process

Mapping of the installed base
Review your installed base with a local ABB technician and decide which motors and generators to analyze.

On-site measurements
A local ABB technician brings all the equipment needed for the tests and performs the measurements during a normal maintenance break. The data is uploaded to a portal.

Data analysis
An ABB expert analyzes the data using an advanced empirical model that is based on the results of more than 25,000 tests.

ABB expert report
You receive an expert report on the condition and expected lifetime of the motors and generators. The report also includes ABB's short and long term operation and maintenance recommendations.

Making the right decisions
Accurate and up-to-date information on the status of the motors and generators enables you to make informed decisions about the maintenance and management of your equipment.

Planning maintenance activities
Prioritize and optimize the maintenance plan and secure high reliability for your motors and generators.

Optional service activities
Additional service solutions available from ABB provide condition information on other major items of equipment, paving the way for more comprehensive preventive maintenance planning.

ABB Ability LEAP process

Always one step ahead
ABB Ability LEAP detects potential problems in the stator winding insulation well before they become critical and cause extended downtime.

Accurate information from a single site visit
Testing and analysis are performed on a single occasion and can be combined with normal maintenance. This is an advantage versus conventional methods that require trending data from a whole series of measurements before they can provide useful output.

Extended lifetime
The results are used to predict when the condition of the system will become vulnerable or critical. Based on this, specific operation and service actions can be planned well ahead to avoid premature failure and increase the lifetime of your motors and generators.

ABB LEAP methodology
Data collection
- A set of measurements is performed to collect operating data, test results and machine information.

Data analysis
- Data collected is analyzed to identify the process of insulation degradation.

Stress calculation
- ABB Life Expectancy Analysis is performed and factors and conditions that affect lifetime are identified.
- Clear plans are drawn up for possible further inspections, maintenance, replacements or upgrades.

ABB Ability LEAP

Accurate analysis of the stator winding insulation

ABB has developed unique analytical tools to identify, characterize and quantify defects that could be present within the insulation system. Testing and analysis are performed on a single occasion and can be combined with normal preventive maintenance (such as L1 to L4 maintenance of ABB machines). A LEAP analysis optimizes maintenance planning for electrical machines by moving from time based to condition based maintenance.

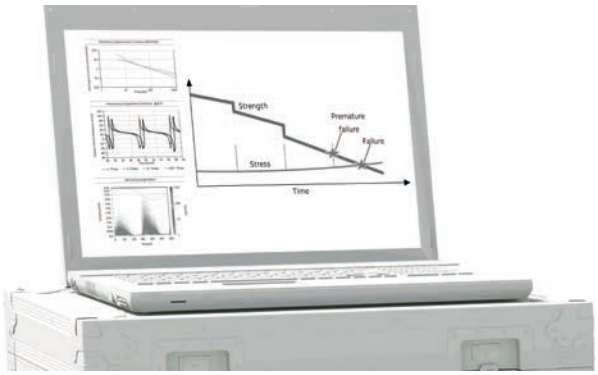
Measurements on site
ABB LEAP Standard for stator windings consists of the following measurements:

DC measurements
- Polarization - Depolarization Current Analysis (PDCA)
- Besides leakage and absorption current, the PDCA test:
  - Provides an indication of the quantity and location of charge storage within the machine
  - Identifies contamination even when IR and PI values are “acceptable”
  - Determines the state of the winding insulation (e.g. aging, looseness)

AC measurements
- Non Linear Behavior Analysis, Tan and Capacitance Analysis, and Partial Discharge Analysis confirm the results of the DC measurements:
- Assessment of the condition of the corona protection shield
- Determination of the extent of de-lamination or void content in terms of the percentage of discharging air volume to insulation volume
- Assessment of the condition of the stress grading system at the slot ends
- Trend of aging effects

DC tests are sensitive to the surface condition, while AC tests provide more information on the insulation volume.

Report
The report provides the customer with information on:
- Contamination of the stator winding (increases stresses and reduces the lifetime)
- Aging of the insulation system, aging of resin, de-lamination
- Status of the stress grading system
- Status of the corona protection system in the stator slot area
- PD activity in other parts of the stator (e.g. winding overhang)
- Remaining lifetime based on information provided by the customer in combination with the measurements conducted
- Recommendations for maintenance or other action like rewinding/replacement
- Recommended time for next inspection based on operating information provided



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9AKK108318 05.2021 Printshop 500