

ABB® Life Expectancy Analysis Program (LEAP)

Expected life and condition assessment for AC stator windings

NORTH AMERICAN COVERAGE



UNITED STATES	www.ips.us
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Birmingham, AL	800-978-2212
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BOLD = ABB Authorized Value Provider



The ABB LEAP analysis documents the actual condition of your AC stator winding insulation and estimates its remaining life. This allows you to better forecast and optimize maintenance & service plans that extend machine life, while reducing costly, unplanned downtime.

When will the stator winding fail?

If you knew the answer to this question, you would be able to optimize maintenance budgets and plans, while also minimizing costly, unplanned down time. ABB LEAP is a unique assessment tool that provides an answer to the question.

ABB LEAP is not a test, instead it is a comprehensive, in-depth analysis by ABB engineering regarding the condition of your stator winding insulation. Data collected from your motor or generator is also compared to similar machines within a growing worldwide LEAP database of 10,000+ entries. This comparison allows ABB engineers to estimate, with a statistical confidence level up to 80%, the expected life of your stator winding insulation.

A final report is issued 3 – 4 weeks after data collection is complete. The report includes a stator winding insulation condition and expected life assessment, while also providing maintenance recommendations from both ABB and IPS, MB extending the remaining life of your machine. LEAP allows you to optimize maintenance plans while minimizing costly, unplanned downtime caused by stator winding failures due to insulation aging and operational stresses.

- Available on AC motors & generators
 - » Voltage ratings 4 kV to 20 kV
 - » All manufacturer brands
 - » Non-VFD applications only
- LEAP deliverables:
 - » Non-destructive winding analysis
 - » Expected life of stator winding
 - » ABB & IPS engineering and maintenance recommendations
 - » Comprehensive report per machine
- LEAP benefits:
 - » Reduce costly unplanned downtime
 - » Optimize maintenance plans for extending machine life
 - » Forecast service & replacement needs
- LEAP data collection:
 - » Available on-site or in-shop
 - » Factory trained technicians
 - » 6 to 8 hours per machine
 - » Non-intrusive—only requires access to terminal box
 - » Non-intrusive – only requires access to terminal box



ABB LEAP equipment is portable and weighs a total of 4,000 lbs. LEAP data collection can be performed on-site or in-shop.

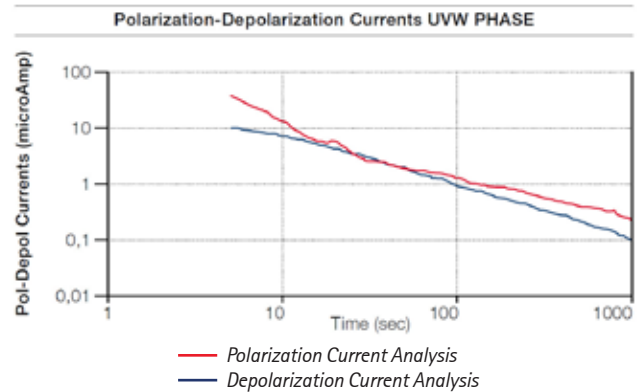
ABB LEAP Analysis—Measurements and Reporting

All AC motor and generator stator windings are exposed to thermal, electrical, mechanical and environmental stresses during normal operation, including abnormal events such as voltage transients. Over time, these stresses cause aging of the stator winding resulting in a decrease of insulating material strength. ABB LEAP includes the following DC and AC measurements to assess the condition of your stator winding insulation. The DC inspection is sensitive to the stator winding surface condition, while the AC inspection provides more information on the insulation volume.

DC measurements:

Consists of a 17-minute Polarization - Depolarization Current Analysis (PDCA) for each phase and as a whole. Besides leakage and absorption current, the PDCA also provides:

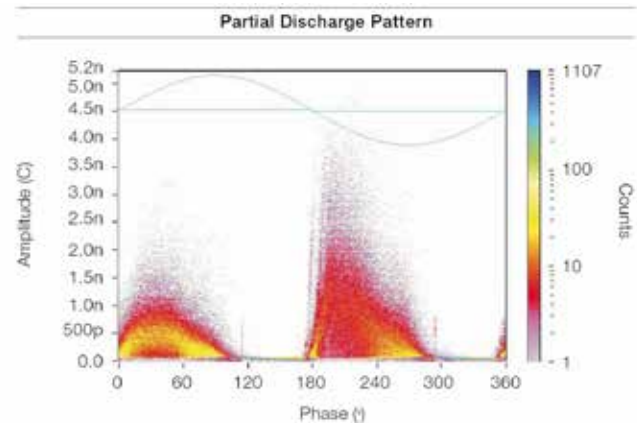
- Quantity and location of charge storage within the machine
- Identifies contamination even when Insulation Resistance (IR) and Polarization Index (PI) values are "acceptable"
- Determines the state of the winding insulation (e.g. aging, looseness)



AC measurements:

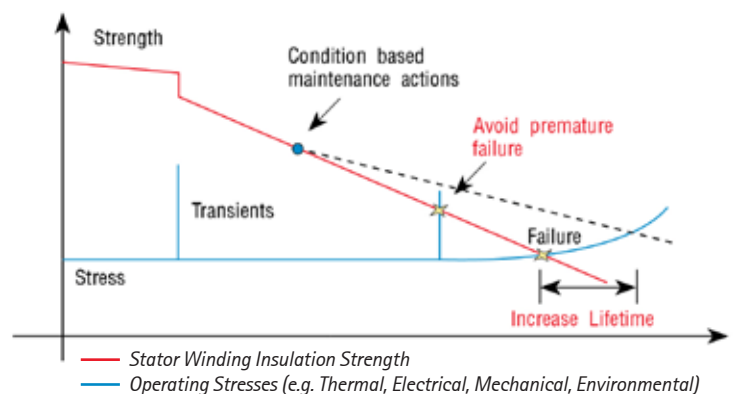
Consists of Non Linear Insulation Behavior Analysis (NLIBA), Tan Delta and Capacitance Analysis, and Partial Discharge (PD) Analysis and provides the following:

- 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



Final Report: Includes assessment from ABB and IPS engineering, and 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



Insulation aging is represented by the red curve, and shows a decline in insulation strength over time. When the blue, operational stress (e.g. thermal, electric, mechanical, environmental) and red insulation strength curves cross, an insulation failure will occur leading to expensive unplanned downtime.