

Robotic Air Gap Inspection



Comprehensive generator inspection with rotor in-situ

Are you looking to minimise your generator downtime caused by a major outage?

Do you need to extend intervals between lengthy generator major overhauls?

Would you consider a more comprehensive minor inspection to establish generator condition?

Utilising a robot of **only 15mm thick** for visual inspections, EL-CID and wedge tightness tests, we can provide an immediate condition assessment of the generator with no need to remove the rotor; accurately presenting the machine status and which is a proven alternative to traditional 'rotor-out' inspections.

Robotic air gap inspection can easily and reliably determine the status of the stator core, stator wedging system and insulation, as well as the rotor surface condition, and any visible problems within the cooling ducts – helping with the early detection of issues that might otherwise cause a critical failure or only present during a major planned outage, increasing the schedule and cost. Importantly, carrying out such enhanced inspections can prove instrumental in decision making for future planned maintenance.

Key Benefits

- Minimised lost productivity
- Replaces need to remove generator rotor
- Reduced schedule and outage costs
- Rapid identification of significant faults
- Extended time between or replacement of major overhaul
- Data recorded and presented quickly

ACCURATE RESULTS IN-SITU

Without the need to remove the generator rotor, the robotic vehicle can be accurately positioned in tight air-gaps and access otherwise unseen areas to study the generator condition through the following three key inspections:

Visual Inspection

For an ultimate 360° internal view, 4 camera modules focus on; a forward view for general inspection of stator teeth and wedges, the rotor body/cooling slots and the stator cooling slots left and right.

Visual inspection here can prove key in determining any movement, e.g. in the bar or rotor winding insulation as well as identifying any contamination that will need to be investigated and removed. It is also an opportunity to look for evidence of heating/electrical discharge.

Necessary corrective actions can then be efficiently planned with results indicating whether an immediate response is required or to be scheduled for next outage.

Stator Wedge Tightness Assessment

A fully automated tap test (positioning, tapping, analysis) utilises a stator wedge tap tester which is capable of accurately determining the wedge tightness based upon analysis of the acoustic signature. The associated colour coded wedge tightness map clearly identifies whether wedge tightening, or replacement is required.

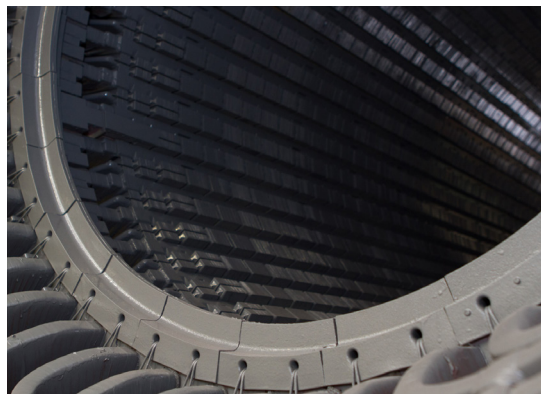
EL CID

Electro-Magnetic Core Imperfection Detection (EL CID) is a recognised solution for establishing stator core lamination insulation condition and detecting faults that will eventually lead to over-heating and potential catastrophic damage.

An automated fixed-speed approach to EL CID testing provides more consistent results than a test performed manually, with regular testing allowing comparison of results for evaluating and verifying stator condition.

Additional Testing - Retaining Rings

Another critical component and major opportunity to take while the generator is opened and frequently used in conjunction with the robotic inspection is – NDT inspection of the critical interface surfaces of the rotor end-winding retaining rings. Read more about this in our Service Sheet 'KIRR inspection of retaining rings'.



Quartzelec chooses to use the DEKRA ARGIS system for robotic air gap inspections



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