

# Advanced Robotic Generator Inspection System (ARGIS)



## Independent in-situ generator inspections

Generators are crucial components in an industrial power plant and are designed to operate reliably for many years. One of the most expensive parts of a 3-phase generator is the stator, which is where the energy from the magnetic field is converted into electrical energy. The condition of the generator and its core deteriorates over time, increasing the likelihood of failures. Quantitative testing and periodic inspections of the generator core are necessary to avoid unplanned outages. ARGIS enables inspections to be carried out not only when the rotor has been removed, but also with the rotor still in place, thus saving you time, effort and money.

Condition testing normally requires the rotor to be removed from the generator. Not only could this possibly damage the generator, but it is also time-consuming work that can only be performed during a major shutdown. However, thanks to the Advanced Robotic Generator Inspection System (ARGIS) developed by DEKRA, removal of the rotor can be avoided. The ARGIS system is a proven concept for in-situ mechanical inspections which can be performed on many brands of generators.

### How ARGIS works

A chain containing motor drives and a docking station for the Generator Inspection Vehicle (GIV) is mounted around one of the retaining rings of the generator. The chain is positioned accurately in front of each slot so that the GIV can be inserted into a gap as small as 17 mm (0,67 inch) and up. The GIV then moves to the other end of the stator core and back in order to perform the ELCID, wedge test and visual inspections all in the same run to save time.

### Which tests can ARGIS perform?

- > **Low flux leakage test**  
Electromagnetic core flux leakage testing (ELCID or equivalent) is a standard feature. The step irons are measured with a separate module.
- > **Wedge tightness testing**  
The GIV is provided with a stator wedge tap tester that determines the wedge tightness based on spectral analysis of the sound response.
- > **Visual testing**  
The GIV is equipped with 4 camera modules: a forward-viewing camera is used for general inspection of the stator teeth and wedges, another camera inspects the rotor body and cooling slots, and 2 further cameras inspect the stator cooling slots.



Regular testing increases reliable operation and prevents potentially costly downtime and repairs. Our experts can provide you with information and recommendations regarding:

- > Condition of the generator
- > Routine maintenance/overhaul
- > Long-term condition

### Key Benefits of ARGIS (with in-situ rotor)

- > Less manpower is required to prepare the generator for inspection (0,5-3 shifts instead of up to several weeks)
- > Reduction of outage costs up to EUR300.000,-
- > Reduction of lost productivity due to outage time (which can amount to millions of euros)
- > Fewer risks of damage to the generator
- > A generator inspection can stay out of the critical path of an outage
- > High reproducibility
- > All data is stored for future comparison and data trending
- > Low flux leakage testing with excitation through rotor forging reduces dismantling of the generator
- > Better anticipation and planning possible for next major outage (plan repair work or postpone)
- > ARGIS can be combined with in-situ retaining ring testing (KIRR)

### Why DEKRA?

- > The ARGIS equipment is designed by DEKRA and can be customized to requirement
- > Extensive knowledge of condition assessment, failure analysis/RCA
- > Expertise in both electrical and mechanical testing
- > Independent inspection and testing

### About DEKRA

DEKRA has been active in the field of safety for 90 years. Founded in 1925 in Berlin as Deutscher Kraftfahrzeug-Überwachungs-Verein e.V., it is today one of the world's leading expert organizations. The company currently employs more than 37,000 people in more than 50 countries on all five continents. With qualified and independent expert services, they work for safety on the road, at work and at home. These services range from vehicle inspection and expert appraisals to claims services, industrial and building inspections, safety consultancy, testing and certification of products and systems, as well as training courses and temporary work. The vision for the company's 100th birthday in 2025 is that DEKRA will be the global partner for a safe world.

### About DEKRA Material Testing & Inspections

Material Testing & Inspection (MTI) inspects and tests business-critical installations, systems, and materials for businesses operating in petro chemistry, the processing industry, and the energy sector. The tests and inspections are primarily focused on ensuring the safety of structures and installations, such as storage tanks, pipelines, gas turbines, and pressure vessels. MTI's specialists use highly advanced methods, technologies, and testing equipment, on location and in their own testing laboratories.

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