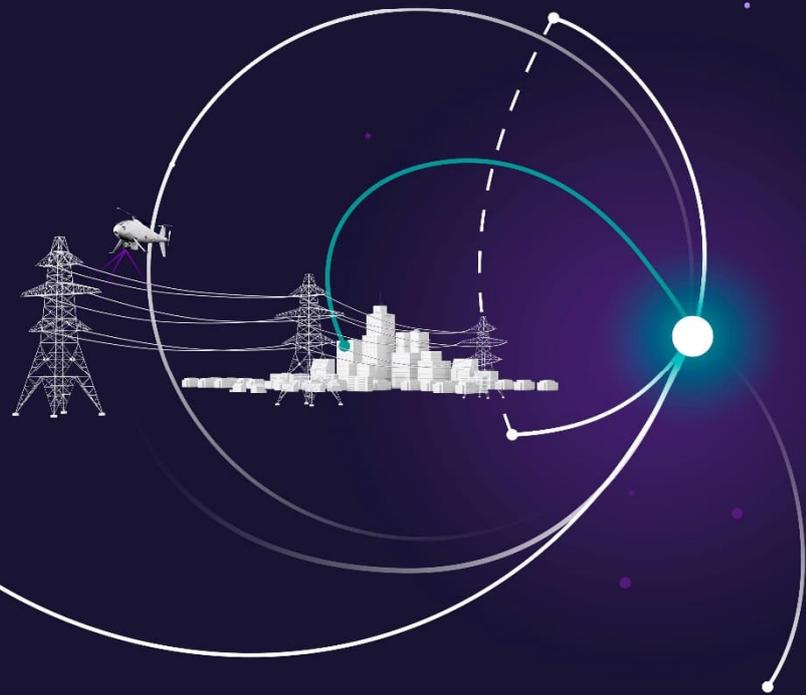


Switchgear Diagnostic Service

Service for Switching Products



[siemens-energy.com/gt-service](https://www.siemens-energy.com/gt-service)

Introduction

Gas and air insulated switchgears (GIS/AIS) are major components in customers' worldwide energy transmission and distribution systems for many decades.

The large installed base of these switchgears does not always run regularly through the recommended maintenance until switchgear components unexpectedly fail.

International maintenance philosophies are demanding a better and condition-based maintenance by the manufacturers of GIS systems.

By 2040, a strong increase in energy demand of 50% is expected. More frequent extreme weather events, cyber-attacks or the energy transition have become increasingly complex topics for the power systems.

Features

Switchgear Diagnostic Service offers a comprehensive on-site Condition Assessment, considering test results, observations and operating history, allowing decisions on future maintenance or replacement. **Switchgear Diagnostic Service** consists of the following steps:

- Execution of on-site investigations at 3 different levels: *Fundamental* (at energized switchgear), *Advanced* (at de-energized switchgear), *Extensive* (with a mobile HV test system)

- Evaluation of historical data by experienced engineers and Siemens Energy's proprietary tool: **Siemens Energy Assessment for Energy (SAFE)**
- Collection and evaluation of data from protection systems and online monitoring systems (e.g., PDM, GDM, CBM)
- Provision of a comprehensive test report with recommended actions for each unit
- Ranking of tested assets in relation to operational risks and priority of recommended actions

Benefits

Condition Assessment will help to prevent unexpected interventions and total failure of switchgear assets. By using one of these appropriate diagnostic methods, we take a snapshot of the condition of the switchgear and derive the appropriate measures to maintain and extend the service life of your switchgear!

- Obtain transparency of the current condition / status of assets
- Detect and evaluate any abnormalities before they cause unnecessary damage
- Optimize maintenance strategy and risk management
- Planned outage time and costs for maintenance activities instead of unscheduled outages with unplanned and high costs for repair

With our diagnostic methods, we develop the best strategy to sustain the value of your switchgears!

Ensure availability and reliability of the switchgear over its lifetime



CAE-SoundCam Ultra© – Location of noise sources

Scope of work / Deliverable

Suggested scope:

- Visit and data collection performance done by Siemens Energy switchgear expert
- Evaluation of event history and maintenance activities
- Assessment of the electrical and thermal stress
- Assessment of the aging and moisture condition
- Comprehensive report including recommendations

Technical Details

Risk mitigation and asset evaluation process:

Switchgear Diagnostic Service FUNDAMENTAL (Level 1):

All modules in the diagnosis Level 1 "FUNDAMENTAL" are to be applied on energized switchgear assets. The most powerful toolbox for this application is the diagnosis with the SAFE-Tool, complemented by thermography and sound analysis. Its analysis is well developed and reliable to detect ageing and severe faults. Standard gas quality tests such as moisture measurement, dew point measurement, SO₂ or other decomposition products will provide reliable detection of the content inside the insulation medium. Additional stand-alone modules are available like the check of different monitoring-systems which apply indications for deficiencies or changes.

Content of Switchgear Diagnostic Service FUNDAMENTAL (Level 1):

- Standard SF₆ quality measurement (acc. IEC60480, IEC62271-303 with 5 parameters + leakage detector)
- Visual inspection with the SAFE-Tool (In extracts to EN13018)
- Thermography (e.g., hot spots)
- Noise measurement / sound spectrum analysis (To be released)

Switchgear Diagnostic Service ADVANCED (Level 2):

Some of the modules in the diagnosis Level 2 "ADVANCED" are to be applied on de-energized and disconnected switchgear assets (very short outage is required). Common methods such as partial discharge (PD) measurements (with energized GIS) and operating timing measurements are part of this module and provide information about the insulation (dielectric) condition as well as the mechanical condition (e.g., displacements) of the active part of a switchgear. **Switchgear Diagnostic Service ADVANCED** can be combined with all modules out of Level 1.

Content of Switchgear Diagnostic Service ADVANCED (Level 2):

- Partial Discharge (PD) measurement (UHF, HF/VHF, TEV, or acoustic method)
- Operating timing measurements
- Analysis of monitoring control & protection devices (Fault recorder, trip analyzer, etc.)
- Specified temperature measurements (Wireless temperature sensors, etc.)

Switchgear Diagnostic Service EXTENSIVE (Level 3):

All modules in the diagnosis Level 3 "EXTENSIVE" are to be applied on de-energized and disconnected switchgear assets (1 to 2 weeks outage is required). Most measurements repeat the measurements as shown in the manufacturers test report and by comparing the results any differences will be highlighted.

High voltage tests on-site are usually required following on-site repairs, refurbishment or relocation and performed to assure the results from the Level 1 and 2 assessments. Our mobile test system provides solutions for all kind of HV tests. **Switchgear Diagnostic Service EXTENSIVE** can be combined with all modules out of Level 1 and 2.

Content of Switchgear Diagnostic Service EXTENSIVE (Level 3):

- Dynamic Contact Resistance of CB
- Motor current and trip coil current (Measurement of CB, DS, ES)
- TanDelta & Capacitance (Measurement of outdoor bushings; grading capacitors)
- CT / VT measurements (Ratio, DC Resistance, Insulation resistance measurement & Frequency Analysis, saturation test)
- High-Voltage Test
- X-Ray

Switchgear Diagnostic Service summary:

The diagnosis and condition monitoring of switchgear required specialist personnel and many years of experience.

If utilities do not have switchgear experts who can decide which parameters to monitor, which technologies to develop and results to interpret, the use of "generalist" engineers shifts the know-how to the switchgear manufacturers and to the manufacturers of condition monitoring devices.

For some operators, the purchase of expert systems that manage the monitoring results and recommend measures is just as much a solution as the outsourcing and management of the condition assessments from their own plant to specialized companies and manufacturers.

The aim is therefore to predict the service life of the systems and the devices installed in them as accurately as possible. This allows the operator to make decisions as to which switchgear must be replaced at what time so that these systems are maintained if they are functional.

We will find the right service for you!

Grid Technologies offers Diagnostic Services	
Fundamental	Visual inspection, Thermography, Historical data evaluation, etc.
Advanced	Partial discharge and Operating time measurements, etc.
Extensive	Extended el. and mech. tests (like FAT). Dynamic tests, X-Ray, etc.

Switchgear Diagnostic Service packages



Visit our High Voltage Product Services

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