

# Diagnosis services

## Support for smart maintenance decisions



Efficient maintenance requires proper planning, for which the qualitative determination of equipment condition is a key factor. The more critical the equipment and location is in terms of safety, network integrity and operation, the more crucial it is to confirm the condition correctly.

ABB's diagnosis services offer grid owners in-depth inspection and analysis to empower well-founded maintenance decisions.

### Why diagnosis?

Determining the scope of maintenance works or preventive measures following occurrences such as the clearance of a fault or suspicious behavior of primary equipment requires a thorough analysis and understanding of its condition. Diagnosis provides the basis for such decisions through a comprehensive inspection and analysis process employing in-depth investigations.

### What is diagnosis?

Substation diagnosis establishes the condition of equipment or systems by using special test equipment and methods, without the need of dismantling. Diagnosis can be performed on individual equipment or as a package covering a variety of equipment.

### How is diagnosis performed?

After confirming feasibility, ABB performs the agreed inspections and analyses. The results are presented in a detailed report including firm technical evidence, describing:

- Current condition of equipment
- Root causes of problems, malfunctions and breakdowns
- Recommended actions - eg, maintenance, repair, retrofit, replacement, etc.

## Condition monitoring

### – taking control over the risk

The operational and ambient conditions prevailing in substations both contribute to a gradual deterioration of equipment. Other factors influencing its operational reliability and life cycle include the quality of maintenance actions performed, the availability of expertise and spare parts. All of the above aspects have a strong impact on risk levels for failures. Performing adequate maintenance actions at the right time has always been a challenge for grid owners. Increasing demands for productivity and quality of supply enhancements need to be balanced with constraints in budgets and resources. ABB offers monitoring and diagnosis services to address these issues. In-depth condition monitoring is provided for substation equipment and systems. In the ideal case, this is performed regularly in line with a reliability-centered maintenance strategy as it enables trend analysis based on the first test as fingerprint, and determination of the order of priority for further actions.

## Application examples

### Pilot diagnosis

#### – verifying timing and scope of overhaul

ABB offers pilot diagnosis services to define the scope of an overhaul – eg, based on the most worn out switchgear bay prior to a planned midlife overhaul of a complete gas-insulated switchgear installation.

### Post-fault diagnosis of primary equipment

#### – predicting need for accelerated maintenance

Following a primary equipment fault, diagnosis is an excellent way to determine the potential need for accelerated maintenance efforts. It also takes into account – eg, the total number and accumulated current magnitudes of both normal switching operations and fault clearances that influence the condition of a circuit breaker the most.

### End-of-service-life diagnosis

#### – analyzing the possibility for prolonging the use of equipment

Replacement of switchgear components such as instrument transformers is usually recommended after 40 years of service. Customers wishing to retain the equipment can benefit from ABB's diagnosis service offering to ascertain the possibility to safely prolong equipment service life.

### Reliability-centered maintenance

#### – a highly cost-effective maintenance strategy

ABB's condition and risk assessment method is based on reliability-centered maintenance (RCM). It takes into account the actual condition of equipment including age, spare parts availability and previous operational experiences, as well as its importance to factors such as grid stability, power quality and personal safety – making it one of the most cost-effective maintenance strategies available today.



Is it safe to keep these 30 years old surge arresters for another 5 years?

### Why ABB?

ABB's expertise in the substation domain is based on more than 100 years of experience in development, manufacturing and delivery of leading-edge electrical infrastructure to the global power industry – and on the continuous feedback of experiences from customers and users.

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