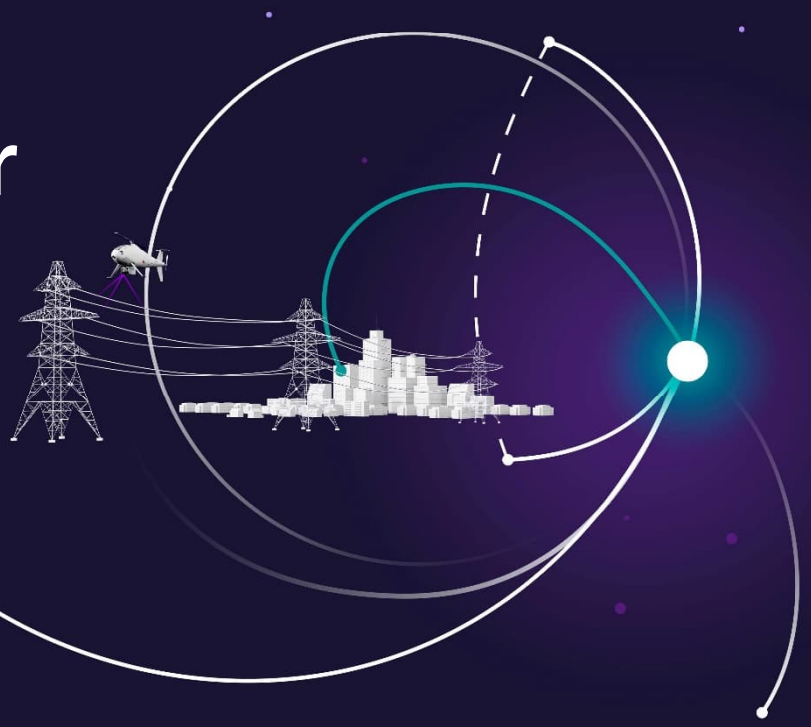
High Voltage Circuit Breaker & Switchgear Monitoring

With Assetguard HVC



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Introduction

The reliability of HV switching devices (circuit breakers, disconnectors, earthing switches) is generally high. However due to lifetime extension and changed maintenance policies, additional care should be taken to maintain an acceptable reliability level.

This is a challenge when the components are exposed to severe environmental condition or in case of increased number of operations.

Moreover, mechanical parts of switching devices not operated continuously may not work properly due to dirt and contaminants.

Assetguard HVC is a condition monitoring system for AIS and GIS switching devices. The system has a distributed structure in which a base unit monitors specific signals and acts as communication master of a riser network. Remote auxiliary units (optional) are available for specific measurement purposes.

The main monitored parameters are interrupted fault currents, switching times, cur-rent waveform of the coils, motor drives adsorbed current, insulation gas density and mechanical movement of poles thanks to a dedicated encoder connected to the pole position indicator.

In this way addition, Siemens Assetguard HVC is able to constantly monitor tripping and closing functionalities and main contact wear.

Features

The main features for Assetguard HVC are:

- Transmission of alarms in case of anomalies, warnings if the switchgear is losing functionalities, information in case maintenance is needed.
- All components integrated in a single housing (power supply, data acquisition, fiber optic communication, data storage and a web server).
- Predefined or customized measuring kits are supplied to be installed in each circuit breaker cabinet.
- Combined hardware and digital filter for better noise immunity performances.
- Available communication protocols for Integration into SCADA are IEC 60870-5-104 and IEC 61850 ed.2.

Benefits

- Supports circuit breakers to overreach their assigned technical life.
- Risk reduction for consequential damages.
- Probability reduction for unexpected outages.
- Avoidance of intensive periodical and manual measurements.
- Safe operation of monitoring system guaranteed thanks to no changes in protection wiring.
- Supports condition-based maintenance.
- Instant diagnosis and data collection for condition assessments.
- Cost effective solution.
- Low installation costs, suitable solutions for retrofit & self-installation.
- We contribute professionals with many years of experience and qualifications in the utility and infrastructure industries.

19" Full rack version

Deliverables

Each Assetguard HVC comprises:

- External sensors (e.g. current transducer, current transducer hall effect).
- Optional external sensors on request (e.g. for measurement of humidity or temperature and for SF6 Gas monitoring, travel curve encoder).
- Turnkey installation and communications services.
- Expert analysis of monitoring data and customer support.
- On-site trainings for operation and maintenance of our systems.
- Design, installation and commissioning of all necessary equipment.

Half rack version

Operating logic

At each incoming switching command, a measurement is started. The measurement ends when the switching operation has been completed. Data are recorded internally in the memory of Assetguard HVC node unit.

Switchgear functionality is assessed by comparing recorded data with preconfigured thresholds. Any alarm is communicated via the integrated webserver, hard-wired contacts and using the integrated protocols.

A Main Data Unit (MDU) with dedicated knowledge modules is used to detect any defects in coils behavior, to suggest maintenance needs in the mechanical drive or to evaluate contact wear (Arcing I2t).

Assetguard HVC also guarantees the monitoring of the auxiliary circuit voltage, the closing coil and the tripping coil currents by means of high-resolution waveforms.

The mail data unit is also able to acquire and assess the motion travel curve of the poles during operations.

It also performs further calculations on opening operations as (current summation interrupted and counter number of operations).The Siemens Energy supervisor has superb experience in preventive and corrective maintenance (including failure analysis and troubleshooting) of FACTS systems.

Acquired data

In details the following measurements are acquired:

- Operating times of individual poles during opening and closing in tenths of a millisecond. (Open / Close single, CO, O - CO)
- Peak fault current during opening in kA tenths.
- SF6 gas density / temperature per switch/pole:
  - Continuous monitoring of the density value or pressure compensated in temperature @20°.
  - Detection of gas leaks with indication of the remaining time at the appearance of the first alarm.
- Current absorbed by charge-spring motors or pumps:
  - Number of daily starts and total hours of operation.
  - Steady state current consumption.
  - Threshold for maximum current absorbed when fully operational.
- Curves of the currents absorbed by the opening and closing coils during operation performed.
- As an option, data from travel curve encoder, disconnectors and earthing switch and additional input channels.

Technical data

Assetguard HVC is designed to withstand the harsh electrical, mechanical and environmental conditions of a substation, while providing the necessary hardware and software for a comprehensive monitoring device.

- Electrical safety according to EN 60529, EN 61010-1 and EN 60255-5.
- Power supply port and each channel has a dielectric withstand capability of 3 kV RMS for 60 s and 5 kV 1.2/50 µs impulse.
- Electromagnetic compatibility (EMC) according to EN61000 and EN 55011:
  - Level 3 electrostatic and electromagnetic immunity.
  - 4 kV surge immunity.
- Environmental strength according to EN 60068:
  - Operating temperature -30°C to 70°C.
  - Humidity 10 - 95%.
- Protection class IP 20.
- Measurement resolution 12 bit at 10 kS/s (16-bit version available upon request).

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Transmission Service
Humboldtstraße 64
90482 Nuremberg, Germany

Customer Support Center
Phone: +49 911 6505 6505
E-Mail: support@siemens-energy.com

For more information, please visit our website:

www.siemens-energy.com/t-service