



Integrated Substation Condition Monitoring

Innovative monitoring solutions for maximum network reliability

Answers for energy.

SIEMENS



The key to reliable energy supply: Integrated Substation Condition Monitoring

Getting a grip on the challenges in network optimization

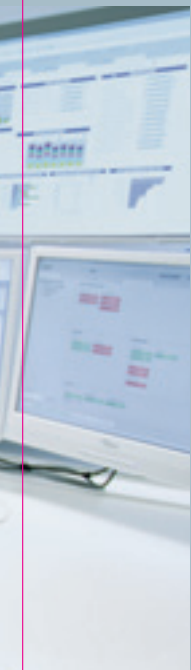
Utilities today face a number of unique challenges: in view of the steadily growing demand for energy, network capacities need to be expanded, availability improved, and congestions and outages avoided. All this needs to be performed in the most cost-efficient way possible, because at the same time expenditures are being cut and great efforts are being made to extend average life cycles and minimize maintenance costs.

Condition monitoring provides the answer to these complex challenges. It provides all the technical information required to maintain utmost availability and at the same time maximize performance, including loading and lifetime benefits. This advanced monitoring solution surveys every link in the energy supply chain. Accurate monitoring of all primary components of a substation makes possible optimized loading and performance, and it helps increase the lifetime of the line.

ISCM is an extremely flexible solution that can be implemented in every existing substation infrastructure. Siemens offers both fully integrated condition monitoring and single-asset embedded monitors – the choice is up to you.

Siemens' innovative monitoring system contributes to the network optimization down to each element in terms of efficiency and reliability. It provides valuable information and reliable diagnostics. Failures can be predicted, unscheduled downtime is thus reduced, and equipment life is extended to a significant degree. That is condition-based maintenance.

In addition, capacity data analysis provides recommendations for how to maximize asset performance and levers existing overloading capabilities, especially of transformers and overhead lines. This optimizes grid operation and grid asset management.



Your benefits at a glance

Condition-based maintenance becomes a reality

- Precise and actionable information for fast and targeted reaction
- Reduction of unscheduled downtime through proactive repair planning made possible
- Effective prediction and prevention of equipment failure
- Intelligent consideration of a given normal range of operating characteristics instead of mere "hard limits"
- Complete condition information available in a consistent format
- Functionality customizable to integrate and deliver the right data to the right personnel
- Clear rules for all safety-critical and security-relevant situations
- Common communication, user interface and diagnostic software ensure seamless integration
- Easy implementation in any given substation automation infrastructure



ISCM, a set of modules, each tailored to a specific monitoring task

The modules of Integrated Substation Condition Monitoring, ISCM

Transformer Monitoring

Improved transformer operation and maintenance through comprehensive status data.

GIS Monitoring

Innovative analysis algorithms make possible the precise insight into equipment which is difficult to inspect.

Circuit Breaker Monitoring

Preventive fault detection within one of the core elements of a network system.

Isolator- and Earthing-Switch Monitoring

Performance monitoring for safe operation.

Overhead Line Monitoring

Increased transmission capability through optimized rating.

Cable Monitoring

Sophisticated diagnostics for prolonged service life to prevent expensive repairs.

Surge Arrester Monitoring

Assessing the condition of usually underestimated devices to prevent expensive maintenance.

Current Transformer and Voltage Transformer Monitoring

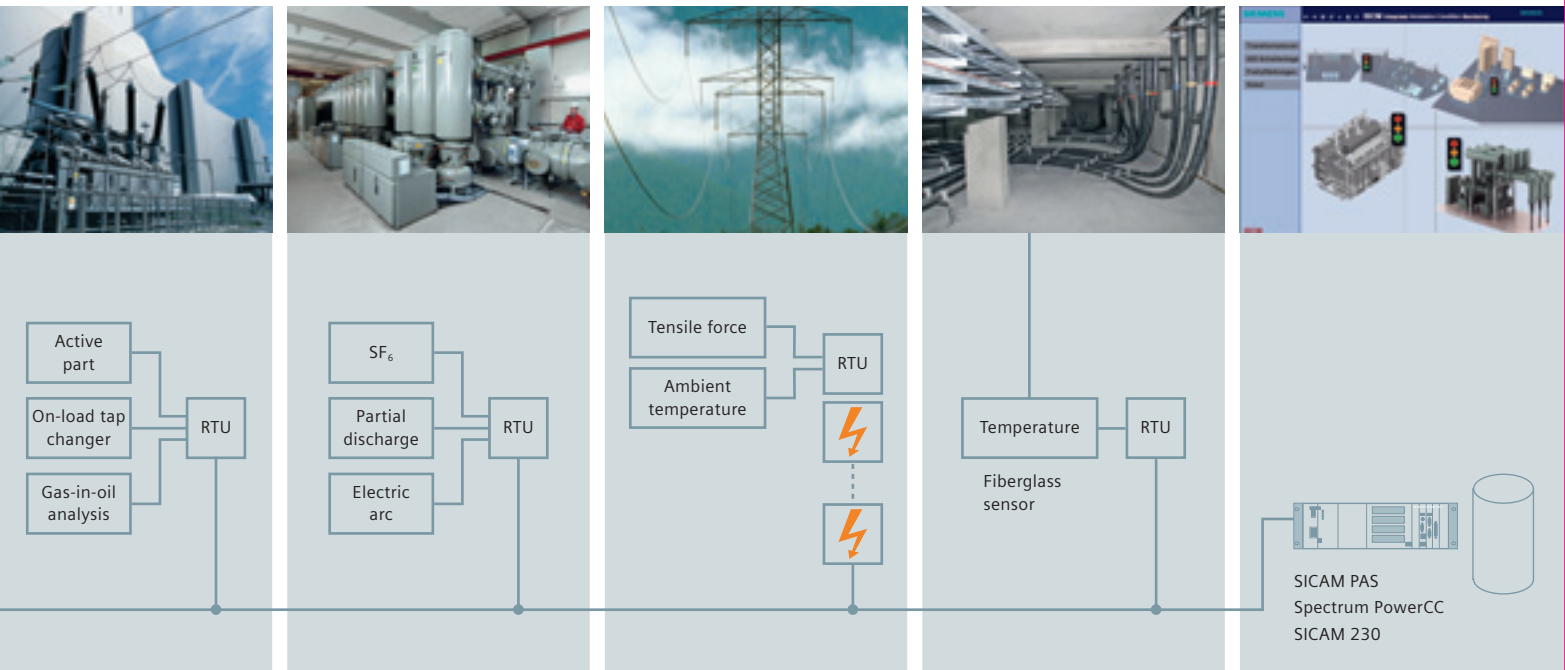
Online-monitoring of sensitive current and voltage transformers in order to prevent costly repairs.

Balance of Plant Monitoring

Reasonable added value through monitoring of supplementary BoP equipment, especially batteries and diesel engines.

Secondary Equipment Monitoring

Monitoring of Control and Protection relays is easy to implement and complements ISCM to an all-in-one solution.



Precise diagnosis and excellent visualization through innovative knowledge modules

The predictive diagnoses and prognoses provided by the Siemens Integrated Substation Condition Monitoring meet the demands to optimize equipment performance, to reduce costs, and to minimize unscheduled downtime. Such diagnosis is a difficult task. It requires experience-based or even standard-based calculation models to allow the prediction of future equipment health states.

This capability with the related algorithms is the centerpiece of the multiple knowledge modules of which the Siemens Integrated Substation Condition Monitoring consists.

Unlike “islanded”, individual condition monitoring systems for each asset, which have already been available in the market for some time, the Siemens Integrated Substation Condition Monitoring makes possible a combination of individual

modules on a common communication platform. Hence, taken together, the modules form an overall analysis system for all major assets of a substation. Thanks to their common IT platform, all relevant data is collected, analyzed, and presented in a suitable manner through the SCADA system. Siemens’ user interface provides clear, well-structured displays, the visualization of values, either numeric or in the form of bar graphs, curves, and charts, logging of reports, convenient query functions on reports, and even the visualization of external information.

Reliable data transmission and effective monitoring through SCADA

A dedicated software frame hosts the different knowledge modules for all primary assets. This software frame is designed to communicate system-internally either within a substation or up to the control center level of the SCADA system. Hence, knowledge modules and the entire Siemens

Integrated Substation Condition Monitoring can be implemented within compatible SCADA Systems. Measured data from external systems is distributed to the corresponding knowledge module of the primary assets. Once data is received by the SCADA/EMS system, the knowledge modules process all transmitted information for visualization and actionable recommendations.

Thanks to its flexibility, the knowledge modules are independent from existing hardware platforms and can be implemented at all different CM levels from substation control up to central data acquisition in the control center.

Published by and copyright © 2009:
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Power Distribution Division
Order No. E50001-G730-A133-X-7600
Printed in Germany
Dispo 19210, c4bs No. 7824
fb 1770 61/20161 480483 WS 04093.

Printed on elementary chlorine-free
bleached paper.

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