DIA TECH
Monitoring and Diagnosis System

Optimal use by:
- Ergonomic graphical user interface
- Powerful hardware and software

Cost reduction by early fault detection:
- Avoidance of secondary damages
- Reduction of repair costs and of repair time
- Maintenance cost reduction
- Planning of repairs at best time

Increase of proceeds by:
- Reduction of outage time
- Optimised energy production
- Lifetime extension

Top right: indication of actual and historic turbine and pump operating hours;
Bottom right: DIA TECH's trend chart; Big chart: intro mimic

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Monitoring and Early Fault Detection

Nowadays all power stations have to maximise production and minimise costs significantly. Even under normal operating conditions all components (turbine, shaft, bearings, generator etc.) are subject to ageing and damages. Advanced monitoring and diagnosis systems have to watch indicators of condition changes, analyse the trend and provide warnings if alarm levels are exceeded. They should support the fast diagnosis of deviation causes such as abnormal ageing and failures, before serious damage occurs. These analytic and diagnostic results can then assist plant operators, technical specialists and plant owners in making decisions. That way, maintenance costs are reduced and generation efficiency can be increased. The early identification of faulty components, the reduction of unscheduled outages and shorter repair times are major objectives for future operational processes. Data is permanently sampled and stored upon every excursion which reduces storage capacity and yields the data available for „life“. This unique feature results in accessing data over longer periods with user friendly graphical displays. To realise these benefits, the DIA TECH System, developed by ANDRITZ HYDRO, incorporating the experiences of international Electric Generating Utilities.
Our Solution

A conventional monitoring system delivers data – our DIA TECH system delivers diagnostic results. DIA TECH is an online monitoring and diagnosis system developed with our know-how as a designer and manufacturer of main power plant equipment. You can use it in generating units for all kinds of power plants. The implemented software and hardware is based on advanced technologies. The modularity of software and hardware makes it possible to add functions and capabilities to the system to meet customer’s specific needs and to add new features. The open system architecture allows easy integration of third party products.

Various diagnosis modules (“Knowledge Modules”) are available for identifying mechanical, dielectrical and thermal problems. The quality of online diagnosis is significantly enhanced due to consideration of different operation modes, such as generator normal operation, turbine normal operation, start up, shut down, etc.

With this intelligent online monitoring system it is possible to detect changing condition of major machine parts earlier and make it easier to judge degrees of strain, thus supporting a preventive, condition-based maintenance strategy. This supports the management of the monitored units and at the same time improves plant availability.

System Architecture

[Diagram showing the system architecture with signal processing, CORE System, Knowledge modules, Sensors / Couplers, Control system, and MMI connections]
Modules

DIA TECH CORE System

Data Management & Visualisation
The DIA TECH CORE System serves as platform for all monitoring and diagnosis modules.

DIA TECH MASTER
Acquisition and distribution of various plant data to data base, GUI and knowledge modules

DIA TECH GUI
Graphical user interface for mimics, trending, warnings and diagnosis messages, supporting tools

DIA TECH Knowledge Modules

DIA TECH CAA-HS
Cooling Air Analysis – Hotspot Detection
- Faulty winding connections – break in worst case

DIA TECH CAA-03
Cooling Air Analysis – Ozone Diagnosis (surface partial discharge)
- Faulty outer corona protection
- Loosening of stator core
- Loosening of stator winding (bars, end winding)
- Loosening of magnetic wedges

DIA TECH SBS
Structure Borne Sound Diagnosis
- Faulty outer corona protection
- Loosening of stator core
- Loosening of stator winding (bars, end winding)
- Loosening of magnetic wedges

DIA TECH MFX
Magnetic Field Monitoring of Rotor Winding
- Changes of magnetic flux caused by disturbances or imbalances
- Interturn faults

DIA TECH IRD
Rotor Pole Temperature Monitoring (based on infrared measurement)
- Overheating of single poles and Rotor winding

DIA TECH MGM
Machine Gap Monitoring
- Deformations of stator & rotor
- Changes of eccentricity & roundness
- Changes of turbine clearance

DIA TECH CAV
Cavitation Monitoring
- Increase of cavitation symptoms
- Reduction of power output caused by cavitation

3rd Party Modules

Vibration Monitoring
Protection – Advanced Condition Monitoring
- Changes of shaft alignment
- Changes of imbalance (mechanical, magnetically, hydraulic)
- Change of bearing clearance & alignment
- Shear pin failure
- Changes of flow characteristics (changed vane positions, clogging of the grid)

Partial Discharge Analysis (PDA)
Measurement – Analysis
- Condition changes inside the stator winding insulation
- Faulty outer corona protection
- Ageing of insulation
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