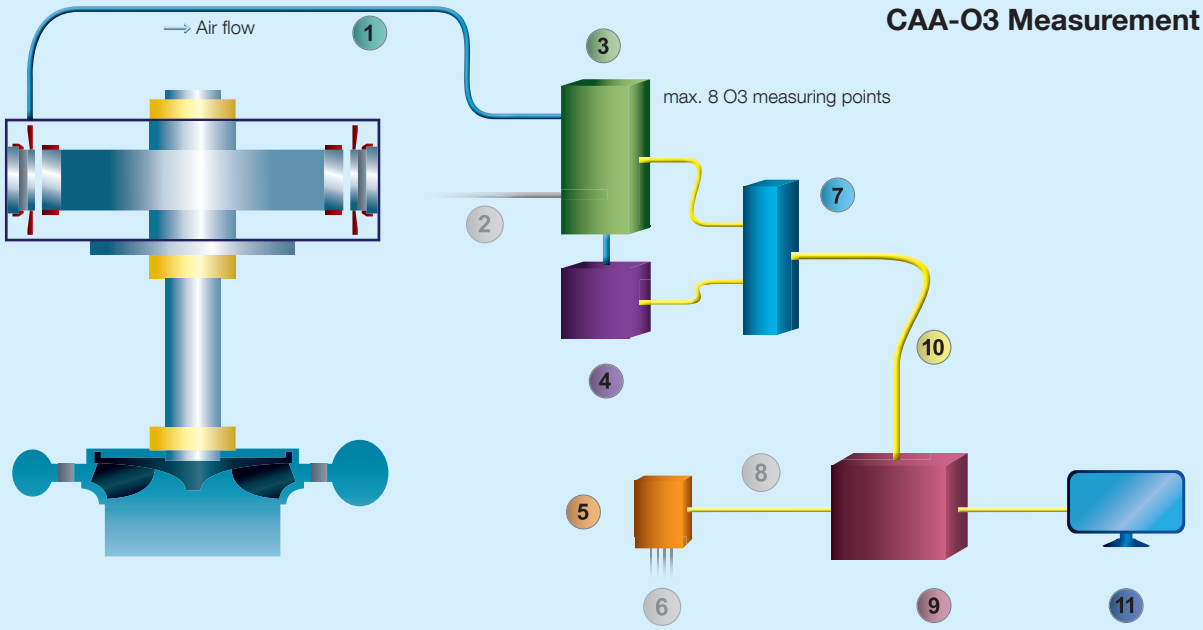
DIA TECH CAA-O3

Cooling Air analysis – Ozone diagnosis



DIA TECH CAA-O3 makes assessment of insulation condition by analyzing its surface partial discharge (PD) activity. Surface PD informs about dirt, changes of potential gradients and insulation damage in the stator winding area. PD produces ozone and its concentration can be measured by taking air samples from the generator cooling air circuit.

Acquisition of measured values

Air samples are taken from the generator cooling air circuit allowing measurement of the concentration of ozone-gas (O3), which derives from winding insulating material due to surface partial discharge activity. The air samples are sucked through Teflon® hoses to a ozone-analyzer, where the concentration of ozone is determined.

The results are transmitted to DIA TECH CAA-O3 software for further diagnostic processing. One single hose per generator (designed with a closed cooling circuit) is sufficient. At least one more hose is necessary to measure the ambient conditions in the power house for reference.

Processing of measured values

The maximum of measuring points of one monitoring package is eight – six for the units and two references in the machine hall. A pneumatic multiplexer – the "ANDRITZ MUX" –, which is controlled by the "ANDRITZ Datalogger", manages sequence of measuring cycles and assignment of measured concentration values. The ANDRITZ Datalogger transmits the pre-processed data to the computer, where the diagnosis software evaluates the concentration results considering load and ambient conditions. The load condition is represented by stator current respectively stator voltage, which is obtained from the existing control system.

Ozone concentrations, which are collected from the individual generators, are compared with the reference concentration of the machine hall under consideration of stator voltage and air humidity. Air humidity influences the PD activity immensely and is therefore a main parameter for assessment of insulation condition.

In case of failure detection DIA TECH CAA-O3 can so generate diagnosis messages, which are displayed in the message window of the DIA TECH GUI.

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Acquisition requirements:

Required hardware:

- Ozone analyzer
- ANDRITZ MUX (pneumatic multiplexer)
- ANDRITZ Datalogger (control equipment with control program)
- Humidity sensor

Auxiliary parameters for diagnosis

- Stator voltage
- Air humidity

Main specification:

Processing at analyser:

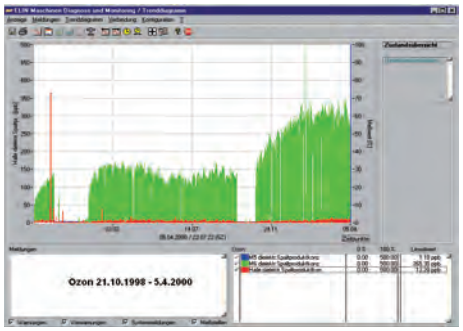
- Measuring technology of gas analyzeris based on: Photo-acoustic infra-red spectroscopy
- Measuring technology of ozone analyzer is based on Ultraviolet absorption
- The ozone analyzer collects air samples from measuring points up to 200 meters away.
- Resolution: about 0.5 ppb
- Measuring cycle: (dependent on hose length): 10 to 15 minutes
- The system is limited to 8 measuring points: 6 units and 2 references
- Hose dimension: outer/inner Ø: 6/4 mm
- Hose material: Teflon®

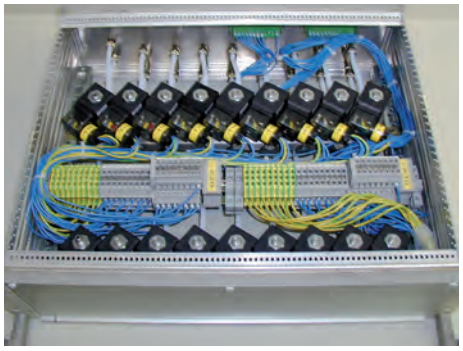
Limit monitoring (pre-warning, warning) upon
Ozone concentration (dependent on stator voltage, humidity and ambient ozone level)

System requirements:
DIA TECH CAA-O3 requires the data management software package DIA TECH CORE. All DIA TECH Modules are running on standard personal computers and a Windows®-based platform.

Available DIA TECH Knowledge Modules:

DIA TECH CAA-HS	(Cooling air analysis – hotspot detection)
DIA TECH CAA-O3	(Cooling air analysis – ozone diagnosis for surface partial discharge)
DIA TECH CAV	(Cavitation monitoring)
DIA TECH IRD	(Rotor pole temperature module based on infrared measurement)
DIA TECH MFX	(Magnetic flux monitoring)
DIA TECH MGM	(Machine gap monitoring module for air gap and turbine clearance)
DIA TECH RTMP	(Rotor winding temperature module based on calculation)
DIA TECH SBS	(Structure borne sound diagnosis for stator core vibration
DIA TECH ThM	(Thermal diagnosis for stator core & winding and cooling circuit)
DIA TECH CORE	(Data management package with graphical user interface)
DIA TECH TPOT	(Turbine / pump operation time counter)





DIA TECH is part of NEPTUN, the integrated common solution for secondary technology.

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