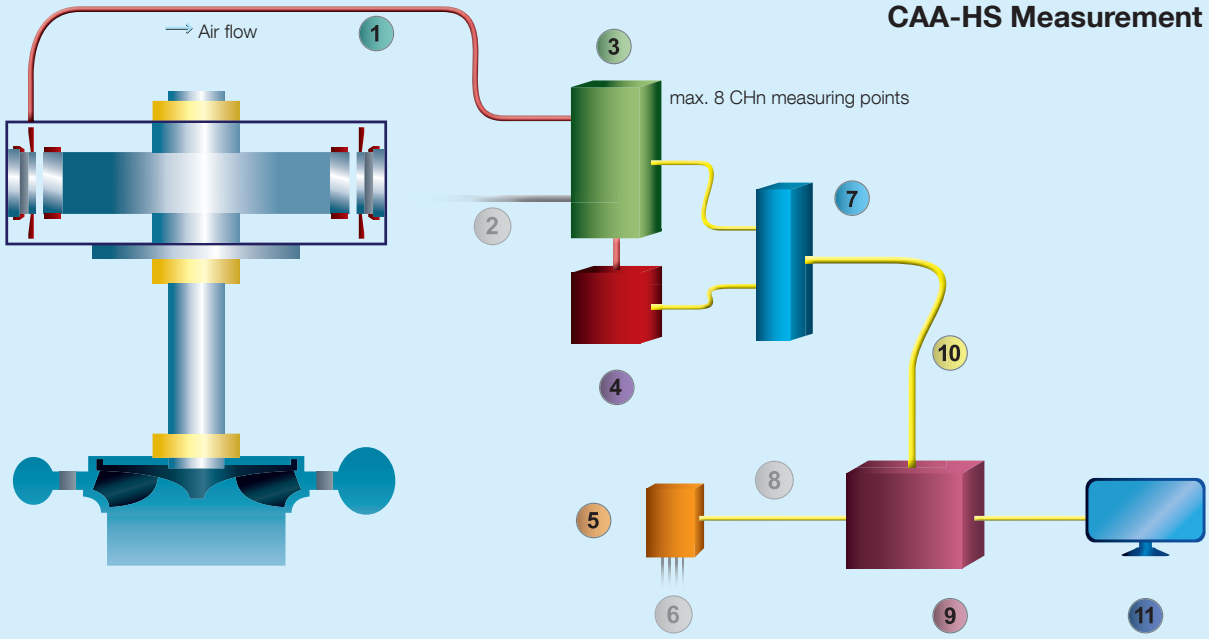
DIA TECH CAA-HS

Cooling Air analysis – Hotspot detection

CAA-HS Measurement Scheme



1	2	3	4	5	6	7	8	9	10	11
Teflon hoses	hose for reference values	ANDRITZ Pneumatic Multiplexer	CHn (Hydro-carbon) Analyzer	SCADA (Supervisory Control and Data Acquisition)	AUXILIARY PARAME-TERS	ANDRITZ Datalogger	LAN	Monitoring Computer	Data transfer on serial link	Graphical User Interface

DIA TECH CAA-HS measures and **analyses** the hydrocarbon-gas concentration, which is evaporated from the insulation material in case of overheating. The effect of bad or broken winding connections, which cause locally extraordinary high temperatures, can be detected in this way. DIA TECH CAA-HS is mainly used to observe soldered connections.

Acquisition of measured values

Air samples are taken from the generator cooling air circuit allowing measurement of the concentration of hydrocarbon-gas (CHn), which is emitted from various insulating materials due to local overheating. The air samples are sucked through Teflon® hoses to a gas-analyzer, where the concentration of the particular gas is determined. The results are transmitted to DIA TECH CAA-HS 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, which is obtained from the existing control system.

Gas concentrations, which are collected from the individual generators, are compared with the reference concentration of the machine hall under consideration of stator current as the essential variable.

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

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Cooling Air analysis – Hotspot detection

Acquisition requirements:

Required hardware:

- Gas analyzer for CHx gases
- ANDRITZ MUX (pneumatic multiplexer)
- ANDRITZ Datalogger (control equipment with control program)
- External pump (if hose length is more than 50 m)

Auxiliary parameters for diagnosis

- Stator current

Main specification:

Processing at analyser:

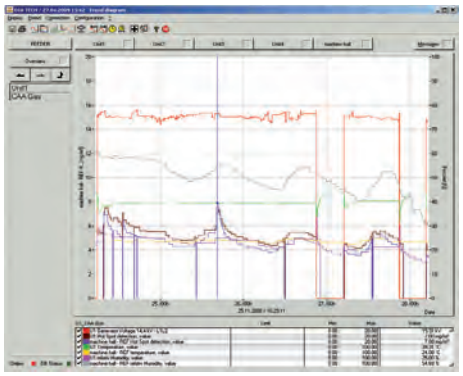
- Measuring technology of gas analyzer is based on: Photo-acoustic infra-red spectroscopy
- The gas analyzer collects air samples from measuring points up to 50 meters away, with additional auxiliary pump up to 200 meters.
- Resolution: about 1mg/cm3
- Measuring cycle: (dependent on hose length): 10 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®

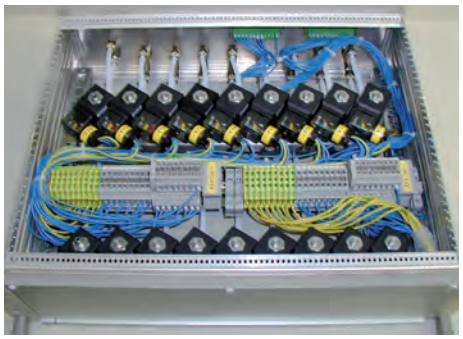
Limit monitoring (pre-warning, warning) upon
Gas concentration (dependent on stator current and ambient gas level)

System requirements:
DIA TECH CAA-HS 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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