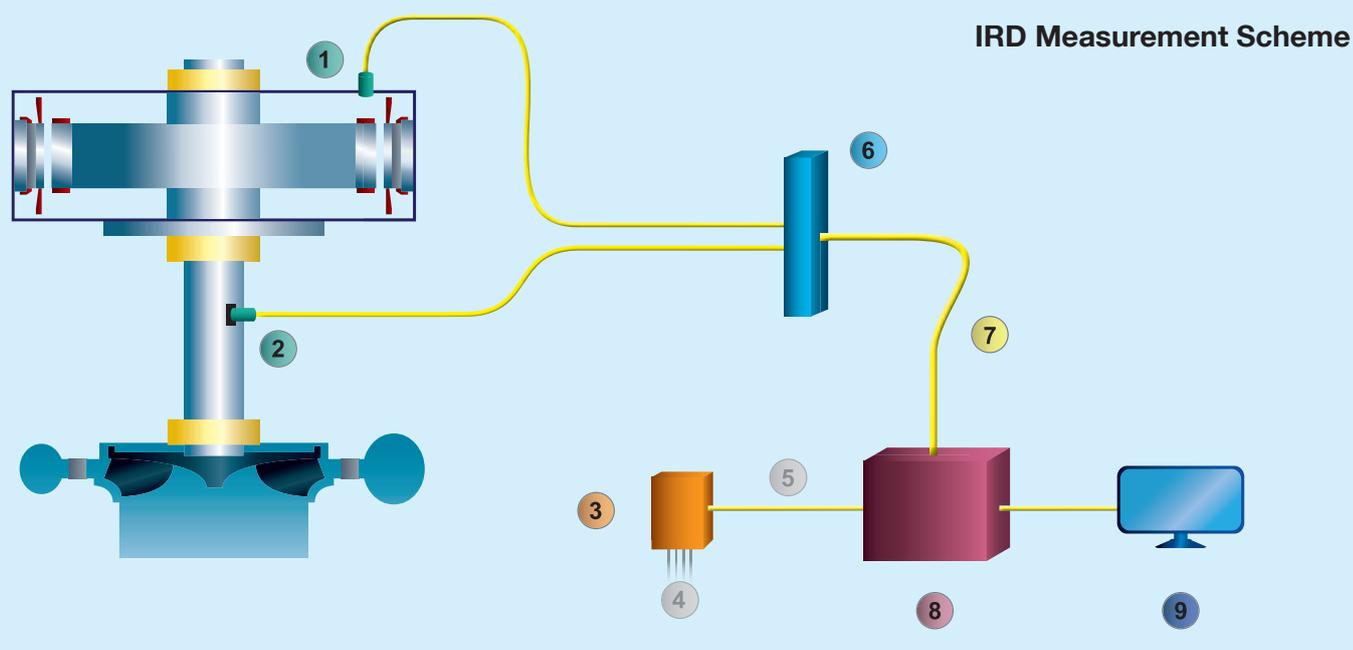


DIA TECH IRD

Rotor Pole Temperature Monitoring



- | | | | | | | | | |
|--|---------------------------|--|----------------------|-----|-----------------------------|--------------------------|---------------------|--------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| IRD Radiation Pyrometer mounted on a bracket close to the rotating poles | Phase Reference (Trigger) | SCADA (Supervisory Control and Data Acquisition) | Auxiliary Parameters | LAN | High-speed acquisition unit | High-speed data transfer | Monitoring Computer | Graphical User Interface |

DIA TECH IRD enables the continuous on-line monitoring of rotor pole temperatures based on Infrared measurement technology. Together with a phase reference signal the related condition monitoring software provides temperature values of each pole separately. This kind of data processing allows a pole specific evaluation of the thermal state of the whole rotor winding. DIA TECH IRD is best suited for the salient rotor pole design. Conventional limit values can be specified on customer's request.

Acquisition of measured values

One rigidly mounted Infrared Radiation Pyrometer per unit provides non-contact measurement at the front side of each

pole during rotation. The Infrared Radiation Pyrometer must have a response time of less than 10 milliseconds (preferably five (5) milliseconds) in order to deliver usable results. The raw temperature signal is transmitted from the sensor to a dedicated processing unit, a high-speed analogue / digital converter (ADC), for acquisition and pre-processing. On a high-speed Ethernet connection the prepared temperature values are transferred to a computer, where a special software performs further signal processing.

Processing of measured values

The DIA TECH IRD software assigns the temperature values to each related pole,

generates Min-, Max- and Average-Temperature and sends them all to the data management package DIA TECH CORE for long-term storage and visualisation. In case of limit violation the DIA TECH IRD module generates a message, which will be indicated by the message system of the DIA TECH GUI (graphical user interface).

DIA TECH IRD

Rotor Pole Temperature Monitoring

Acquisition requirements:

Required hardware:

- Infrared Radiation Pyrometer – response time: 5 ms
- Phase reference sensor (Trigger or Keyphasor)
- High-speed A/D-conversion and processing unit

Auxiliary parameters for diagnosis

- Rotor current

Main specification:

Number of measuring-points:

One (1) package of hardware and software is able to process 48 IRD temperature signals

Pre-processing at front-end ADC

- 6 kHz sampling per sensor
- Low pass filter and average calculation
- Temporary buffering (in case of disconnection between ADC and PC)

Processing at computer:

Providing of characteristic values:

- Min-, Max- and Average-Temperature
- Temperature of each pole

- Standstill temperature
- Pre-warning and Warning of Max-Temperature

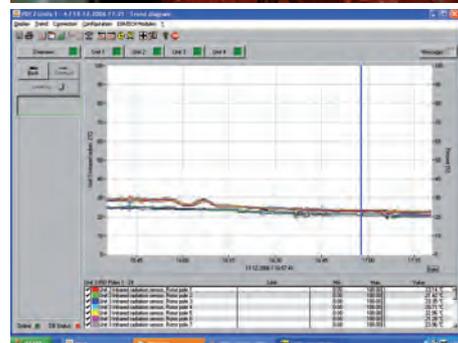
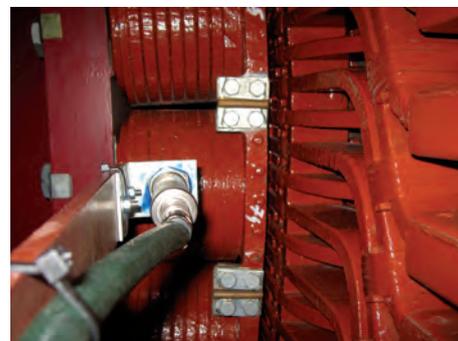
Limit monitoring (pre-warning, warning) upon
Maximum temperature

System requirements:

DIA TECH IRD 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.