WATER IN OIL

GfS Develops Solutions

Monitoring System

NP330-F

Hydraulics and lubrication oil monitoring

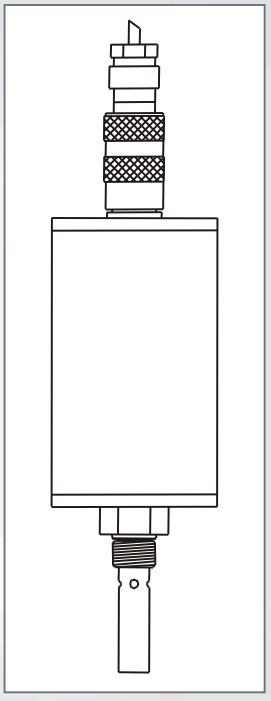
... for absolute water content

- The oil monitoring system NP330-F is designed for inline measurement of the absolute water content in silicone and mineral oils for electrical insulation.
- The system includes a sensor for detecting water in oil and a display unit.
- The standard table display shows the actual water content as ppm.
- Optionally a remote monitor can be connected to the sensor and realize a wireless connection to the customer's file server.

Features / Benefits

- continuous monitoring (inline measurement)
- displaying absolute water content in ppm
- for silicone, ester, biodegrading and mineral oils in hydraulic and lubrication systems
- System calibrated according to Karl-Fischer Reaction method (ASTM D1533)
- easy installation

NP330-F Monitoring System



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Monitoring System

NP330-F

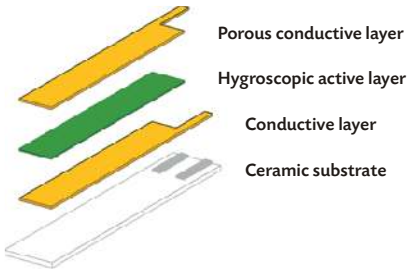
... for absolute water content

NP330-F water-in-oil monitoring system provides a direct measurement of the moisture in oils.

The system includes a sensor for measuring water content and a display unit. Standard table display for ppm or an optional remote monitor with wireless connection are available.

The water content of transformer fluids is determined through free water molecules that are solved in fluid. Water molecules in the oil are registered by an absolute humidity sensitive element, based on 2 conductive layers and 1 hygroscopic active layer.

The electrical capacity of the absolute humidity sensor is correspondent to the water content. Only water enters the sensitive element and increases the capacity. The characteristics of the capacity are captured during calibration and stored by the sensor individually.



Reference method for sensor calibration is the Karl-Fischer reaction that method forms the basis for standard ASTM D2224 for testing fluids for electrical insulation.

Additionally, the temperature of the fluid is registred by the sensor.

A micro-controller inside the sensor evaluates the absolute water content of the oil and gives this out linearly in ppm by means of an analogue 4-20 mA signal and via the serial interface.

The sensor NP330-F is also equipped with a programmable switching output for alarming. The user can program freely.

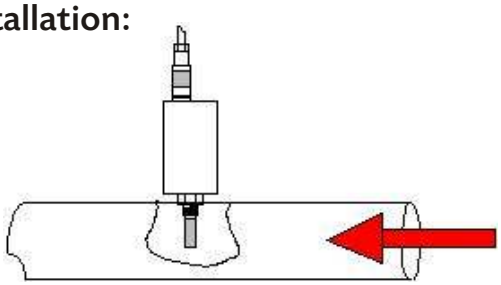
Output signals:

- **analogue current 4-20 mA**
- **serial digital interface (RS232)**
- **switching output (24 V DC)**

Technical data sensor:

- **Typical Measurement range:**
  10 .... 20 000 ppm (upper range limited to saturation of oil)
- **Fluid temperature:**
  -20° C to +60° C
- **Fluid pressure:**
  0 .. 300 bar
- **Mounting deapth:**
  50 mm with ½-inch Thread
- **Protection Type:**
  IP65

Installation:



- **Easy installation of sensor direct into pipe line or tanks.**
- **An Oil flow is recommended at installation point.**

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Monitoring System

NP330-F

Standard table display

The standard display instrument is especially designed for sensor NP330 and conceived for ‚stand-alone' use of the sensor. It serves to visualize the 4-20 mA signal of the sensor and provides access to all interfaces of the sensor.

Externally accessible plug connections are:

- connection cable to sensor NP330
- RS232 of sensor NP330 for communication with PC
- 4-20 mA current loop of sensor NP330 for an external recording instrument
- switching output of sensor NP330

Power supply for both table display and sensor is realized via the plug-in power supply unit.

Data are displayed via a 3½-digit 7-segment indication (13 mm hight).

The state of the switching output of the sensor NP330.04 is indicated by an LED in the front panel.

Technical data display:

- **Display range:**
  0 .. 1999 ppm
- **Operating temperature:**
  0 .. +50° C
- **Input voltage Plug-in supply:**
  230 V / 50-60 Hz
- **Protection type:**
  IP50
- **Dimensions:**
  150 x 65 x 210 mm³ (w x h x l)

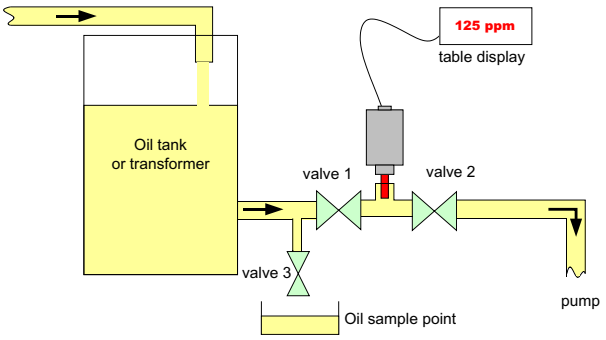
Where should the sensor be installed in your System ?

The sensor should be installed at a place where the water content of the oil is most telling with regard to the respective issue.

- If, for instance, a cooler leakage is suspected as source of malfunction, the measurement site is to be located in the oil pipe closely behind the cooler outlet.
- If the quality of oil introduced into a system is to be monitored, the measurement site is to be located in the suction line of the pump.

The sensor has to be installed at a threaded hole positioned in a way that the sensor element will be continuously bathed in the oil to be monitored, that no sedimentation can take place.

Typical application:



System Package listing:

Standard monitoring system :

1 Sensor transmitter NP330-F with calibration
1 Table display for ppm water content
1 Thread adapter for ½-inch (stainless steel)
1 Serial cable RS232 (2 m)
1 Transmitter cable 7 (3 m)
1 Plug-in power supply 230 V / 50-60 Hz
1 Calibration certificate/documentation

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Monitoring System

NP330-F

.... for absolute water content & wireless remote monitoring

Remote Monitoring System

The remote monitor unit serves to visualize the signal of the sensor and provides access to all data of the sensor via wireless GSM/GPRS connection.

All measuring data are logged internally on CF card memory (512 MB) and will be transferred over IP connection direct to FTP-server at the customer office. Every remote monitor is sending a separate data file to the server.

Wireless transfer is done by GPRS protocol.

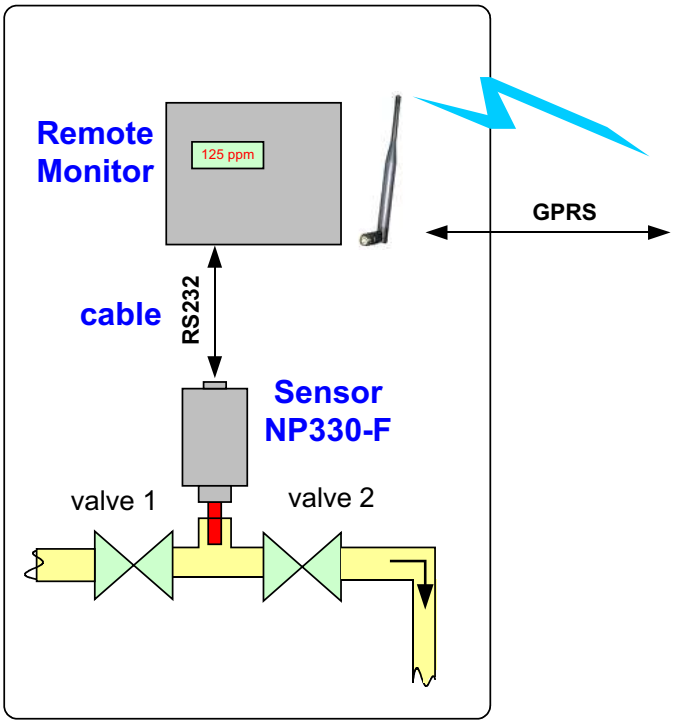
Externally accessible plug connections are:

- connection cable to sensor NP330
- GSM antenna with cable
- Ethernet port 10/100 Mbit

Data are displayed via a 4-line LC display with 20 characters each line.

Measured water content, temperature and remote parameters and status are displayed.

Power supply for both table display and sensor is realized via the plug-in power supply unit.



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