

CLOUD BASED CONDITION MONITORING

SFS H₂O+ RELATIVE HUMIDITY SENSOR



Application:

Stationary screw-in sensor for continuous determination of the oil condition, humidity and temperature in hydraulic and lubricating oils.

Features:

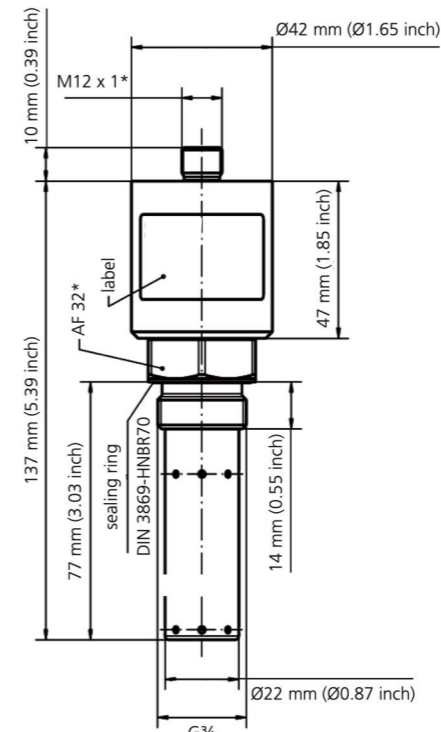
Measurement of changes in hydraulic fluids and lubricants. Data is continuously documented evaluated and stored. In that way deterioration and changes in the oil (e.g. water leakage, oil change, ...) can be indicated. Through this, damage can be recognized or completely avoided at an early stage. This offers the opportunity to prevent machine failures as well as to prolong maintenance and oil change intervals by means of appropriate measures. Furthermore, by monitoring the lubricant, correctly performed maintenance work and the use of the required lubricant quality may be documented.

Measurement Principles:

The sensor records the following physical oil characteristics as well as its periodic change: Temperature, relative oil humidity and water activity resp., relative dielectric number (relative permittivity) and conductivity of the fluid. As especially the conductivity and the relative dielectric number show a strong connection to the temperature, next to the characteristic values at current temperature the sensor also sends the data at reference temperature (40 °C / 104 °F). The sensor is able to evaluate condition changes automatically.

Design Characteristics:

The sensor is provided with a G^{3/4} thread and can be integrated in the tank. The communication with the sensor either takes place over a serial RS 232 interface, two analogue outputs (4 ... 20 mA) or CANopen. In order to also enable a long-term record of data up to half a year, the sensor is provided with an internal data storage unit.

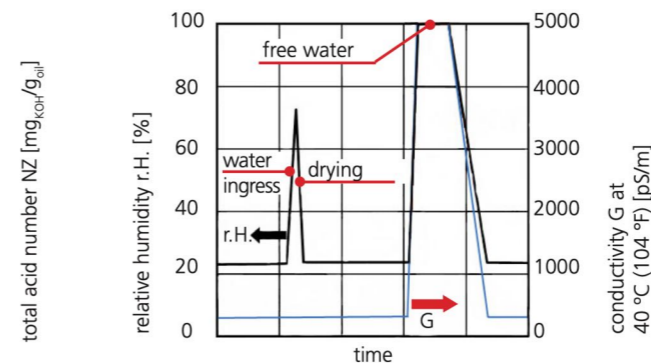
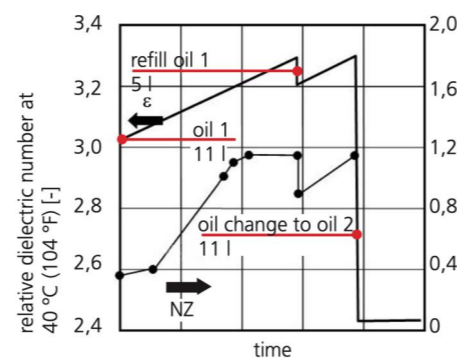


* mm

Dimensions

Application Example:

By using the sensor different changes of the oil condition can be detected. The following example shows a typical course of relative dielectric number, conductivity and relative humidity during various changes of the condition in the system. By means of the characteristics, different oil types may be differed, oil refreshing and oil change can be detected and the relative humidity, free water as well as the deterioration and deterioration rate can be defined respectively.



Technical data

Sensor data	Size	Unit
Max. operating pressure	50 (725)	bar (psi)
<i>Operating conditions</i>		
Temperature ¹	-20 ... +85 (-4 ... +185)	°C °F
Rel. humidity ¹	0 ... 100	% r.H. (non-condensing)

Compatible fluids	mineral oils (H, HL, HLP, HLPD, HVLP), synthetic esters (HETG, HEPG, HEES, HEPR), polyalkylenglycols (PAG), zinc and ash-free oils (ZAF), polyalphaolefins (PAO)
-------------------	--

Wetted materials	aluminum, HNBR, polyurethane resin, epoxy resin, chemical nickel/gold (ENIG), soldering tin (Sn96,5Ag3Cu,0,5NiGe), aluminum oxide, glass (DuPont QQ550) gold, silver-palladium
------------------	--

Protection class ²	IP67
Power supply ³	9 ... 33 V
Power input	max. 0.2 A

Sensor data	Size	Unit
<i>Output</i>		
Power output (2x) ⁴	4 ... 20	mA
Accuracy power output ⁵	± 2	%
Interfaces	RS 232/CANopen	-

<i>Connections</i>		
Threaded connection	G ^{3/4}	inch
Tightening torque of threaded connection	45 ± 4.5	Nm
Electrical connection	M12 x 1, 8-pole	-
Tightening torque M12-connection	0.1	Nm

<i>Measuring range</i>		
Rel. dielectric number	1 ... 7	-
Rel. humidity	0 ... 100	% r.H.
Conductivity	100 ... 800,000	pS/m
Temperature	-20 ... +85 (-4 ... +185)	°C °F

<i>Measuring resolution</i>		
Rel. dielectric number	1*10 ⁻⁴	-
Rel. humidity	0.1	% r.H.
Conductivity	1	pS/m
Temperature	0.1	K

<i>Measuring accuracy⁶</i>		
Rel. dielectric number ⁷	rel. ±0.015	-
Rel. humidity (10 ... 90%) ⁸	±3	% r.H.
Rel. humidity (<10%, >90%) ⁸	±5	% r.H.
Conductivity (100 ... 2000 pS/m)	±200	pS/m
Conductivity (2000 ... 800,000 pS/m)	Typ. < ±10	%
Temperature	±2	K

Response time humidity measurement (0 to 100%)	<10	min
Weight	140	g