

HWR-380M Impedance Spectrum Oil Condition Sensor

Out lined

The HWR-380M Oil Condition Sensor uses EIS (Electrochemical Impedance Spectroscopy) technology to continuously monitor, measure and report actual oil conditions. EIS impedance spectroscopy provides two orders of magnitude improvement in data detection accuracy over traditional commercially available dielectric constant measurement techniques.

Easy to install, with a simple plug-and-play data interface to a field display and monitoring system, the HWR-380M is suitable for use with any type of refined, mineral or synthetic oil and can be installed in any engine, transmission, hydraulic or power transformer system.



The HWR-380M oil condition monitoring technology ensures that any wear or contamination is detected, measured and reported in real time, with a real-time condition analysis accuracy of 0.001%. Through simple installation and use, the HWR-380M provides real-time insight into the condition of your equipment, helping to avoid potential breakdowns, eliminate unnecessary maintenance and reduce your operating costs.

Specificities

- **EIS impedance spectrometry techniques**

Captures all changes in oil conditions - wear and contaminants (including water ingress, oxidant failure, acid value changes, viscosity changes, oil mixing, carbon and particles, etc.)

- **Upgraded Accuracy and Sensitivity Guarantee**

10⁻¹⁵ Resolution, 0.001% subtle changes reliably identified, 100 times more accurate than common dielectric constant sensors

- **Reliable and robust**

New grounding technology for use in the most extreme industrial environments

- **Global Business and Technology Standards Certification**

EN61326-1, EN61000-6-4 EMC certification

Benefit

- 7×24h monitoring of oil conditions provides insight into the true state of equipment
- Enables effective equipment management, improving reliability, efficiency and profitability
- Reduce maintenance costs by accurately identifying oil service life
- Reliably predict optimal maintenance schedules, eliminating unnecessary maintenance and downtime
- Ensure optimal oil condition and early warning of wear particles and damage before they occur, reducing breakdowns and damage, improving efficiency and extending equipment life
- Reduce oil sampling and consumption, reducing laboratory analyses
- Reduce carbon emissions and help protect the environment



Appliance

Power, Energy
Mining, steel, metallurgy
Shipbuilding, railway
Manufacturing industry hydraulic,
lubrication equipment
Petroleum, chemical industry

Applicable oils:

Lubricants, Hydraulic Fluids
Gearbox oil
Engine oils, fuels
Turbine oil
Transformer oil

Theory

HWR-380M characterises the change of oil condition by measuring the medium loss $\tan\delta$, and reacts to the degree of deterioration of oil condition and analysis of deterioration trend by outputting a TND 0...1000 oil condition indicator.

The TND 800...1000 interval indicates new oil;

The interval TND 400...800 indicates normal usable old oil;

The TND 200...400 interval indicates that the oil has been seriously deteriorated or contaminated, and needs to be replaced or filtered immediately.

HWR-380M can simultaneously monitor the real part of the dielectric constant (capacitance change) and the imaginary part of the dielectric constant (dielectric loss), and obtain the dielectric loss $\tan\delta$ by calculating the imaginary/real part, thus obtaining a higher sensitivity than the conventional monitoring of the real part only. The sensitivity is verified to be 2 orders of magnitude (about 100 times) higher. For example, when the laboratory analyses a new mineral

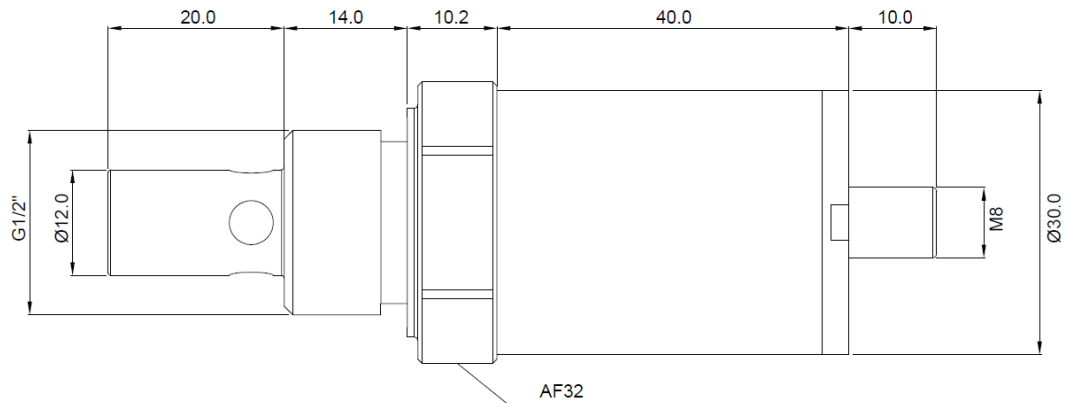
oil, the dielectric loss $\tan\delta$ is 0.001, while the dielectric loss $\tan\delta$ of an old oil sample with a large number of impurities added artificially becomes 0.1 (a change of 100 times); while the corresponding dielectric constant sensor (the real part), which is commonly used in the market, only changes from 2.25 to 2.45 (a change of 1.09 times);

The HWR-380M probe is a coaxial capacitor with inner and outer electrodes, which is embedded in oil and measures the change in dielectric loss $\tan\delta$ of the oil between the electrodes. Through the high precision and stability of the oscillation circuit, the inductor and the sensor probe form an LC resonant circuit, and measure the feedback voltage output in the circuit. After temperature compensation, the feedback voltage has a specific correspondence with the dielectric loss $\tan\delta$, so as to judge the oil condition and online monitoring. And through RS485, 4-20mA, 4G and other signal transmission methods, the oil condition analysis is sent in real time. When the oil condition changes suddenly, it will warn to the platform monitoring system in time, which saves valuable repair time for customers, improves the life of the equipment, enhances the production efficiency, and reduces the chance of failure.

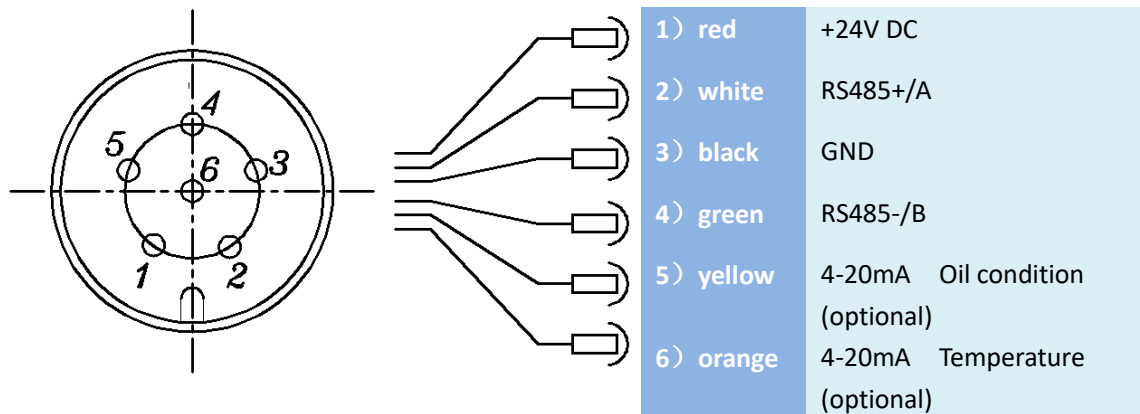
Parametric

Measurement range:	
TND oil condition	0...1000
temp	-40...100 °C
Measurement accuracy:	
TND oil condition	± 1% FS max.
temp	± 1 °C
Other parameters	
Applicable oils	Suitable for most mineral, synthetic and semi-synthetic oils
Test content	Oxidants, water, impurities, acid value, alkali value, wear particles, viscosity change, oil temperature
exports	RS485 digital output, optional (4-20mA analogue output, 4G cloud)
Operating power	DC9V-30V(Minimum DC20V if 4-20mA output is selected)
Operating current	<20mA+ Load current
Allowance for work stress	<10bar(Please enquire for more pressure)
operating temperature	-40...85°C
Probe oil temperature	-40...120°C
mechanical interface	G1/2" BSP
sealing material	ED fluoroelastomer sealing ring 23.9*18.5*1.5mm
torsion	25...30N·m
electrical interface	M8*1 6-pole
connection cable	6 pole 2m UL20866 6*22AWG (elbow, straight optional)
Shell material	316 stainless steels
protection class	IP65
weight	Approx. 260 g
电磁兼容标准	EN 61000-6-4 EN 61000-6-2

Overall dimensions (mm)



Wiring (M8 male)



Note: The sensor default signal interface RS485, optional 4-20mA three-wire output + RS485 interface (analogue + digital output at the same time).

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