



Calibration of PAJ Water-In-Oil Sensor (WIO 200) in specific type of mineral or syntectic oil

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Wear in marine engines

The wear and life time of a marine engine depends of many different factors. One of these factors is the degradation of the lubrication oil. One of the big degradation factors is unwanted water in the oil.

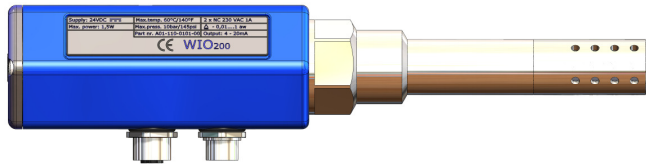
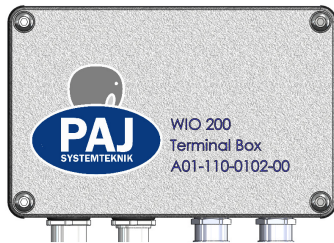
In the context of oil quality PAJ has from specifications' from MAN Diesel developed and manufactured a sensor for marine use, that measures water content in lubrication oil. The water-in-oil sensor can be used to measure the water activity in the lubrication oil and other applications, where it is crucial to measure the water content.



Oil samples with different ages, ranging from a brand new Veritas 800 Marine (right) to a old Veritas 800 Marine oil (left)

WIO200

This product, the **WIO200** sensor system, consists of a WIO200 sensor, terminal box and cables. The **WIO200** sensor is an on line in-situ sensor which measures water content in lubrication oils on ship engine or similar without any used of man power. Datasheet is downloadable from our homepage. This product can be ordered directly from PAJ and our product is CE and GL approved.



The **WIO200** sensor system is produced, tested and calibration at PAJ's production facilities in Sønderborg, Denmark. Each element in the **WIO200** system, from electronically print to mechanical part is rigorously tested before being assembled into a complete **WIO200** system. PAJ collect data out thru the entire assembly and stores all information, ensuring full traceability. After assembly the **WIO200** systems are placed in a 24 hour burn-in test before being calibrated directly in oil. PAJ burn-in test ensures all **WIO200** systems will work under harsh condition.



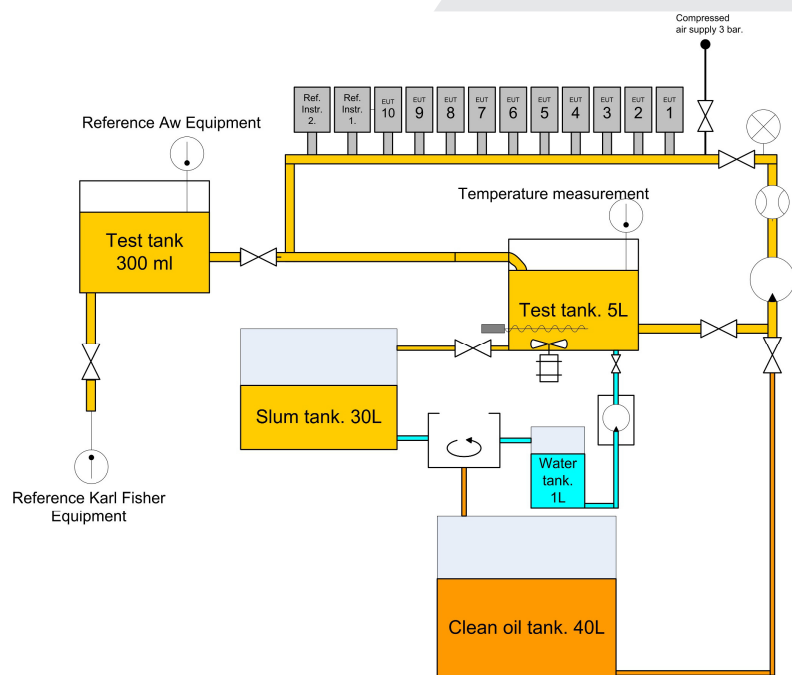
The WIO200 main computer uses energy efficient component and uses only RoHS approved components.

Calibration and testing in oil

PAJ calibrates all sensors directly in oil. On request the buyer can get any oil, new as old, installed into the calibration system. Purchased sensors will then be calibrated and verified in the requested oil.

The default oil is Taro DP30 oil.

The calibration system is seen to the right. Ten sensors are calibrated in oil, using two reference sensors. Reference sensors are calibrated using a 7 point calibration, ensuring high precision.





Out thru the calibration process water is dropped into the oil, in tiny (ppm) amount until the reference sensors reached 1.0 a_w . After calibration the water is automatically removed from the oil and all sensors are tested for incorrect measurements and spikes for 24 hours and all information is stored, ensuring full traceability. All systems must measure the correct water activity level within +/- 0.03 a_w . All sensors are delivered with a calibration certificate.

Below a screen dump from PAJs calibrating software for the **WIO200** – to the left the curves for 10 pcs. WIO200 *before* calibrating. The “ladder” curve appears as water is stepwise dropped into the oil.

To the right the ten curves *after* calibrating of the sensors. The calibrating of the sensor does not require any mechanical adjustments but is done in the internal software of the sensor.

