

AT THE OPTIMUM. ANYTIME. ANYWHERE.

WIO200

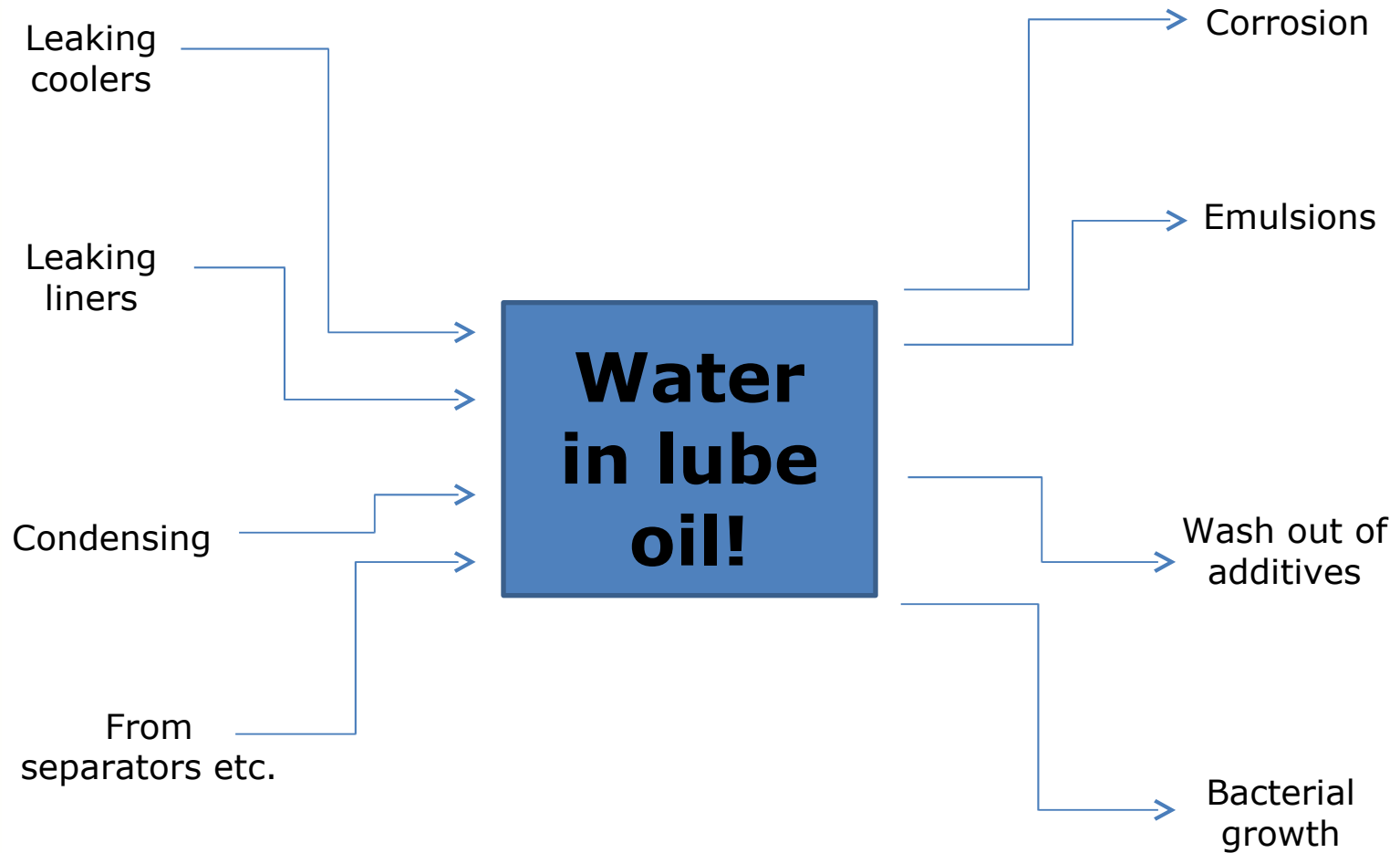
Water-in-Oil Sensor

"Less than 1% of bearing problems are found during open-up inspection, but more than 2% of bearing problems are caused by open-up inspections."

MAN Diesel & Turbo *)

**) Please also see MAN Service Letter SL05-460/NHN – November 2005*

Where is the water coming from?



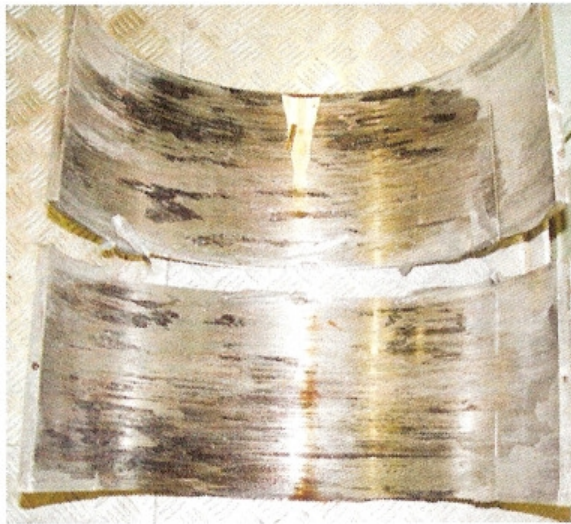
- Corrosion of steel/metal
- Cavitation
- Lower load carrying capacity
- Degregation of oil
- Excessive wear on parts
- Shorter oil life time
- Shorter parts life time
- Break downs and use of spare parts

MAN B&W Diesel



Enclosure 2 for
SL05-460/NHN

Cases of Crosshead Bearing Overlayer Corrosion



Steel to steel contact, severe damage to XH pin and conrod. **Not acceptable.**



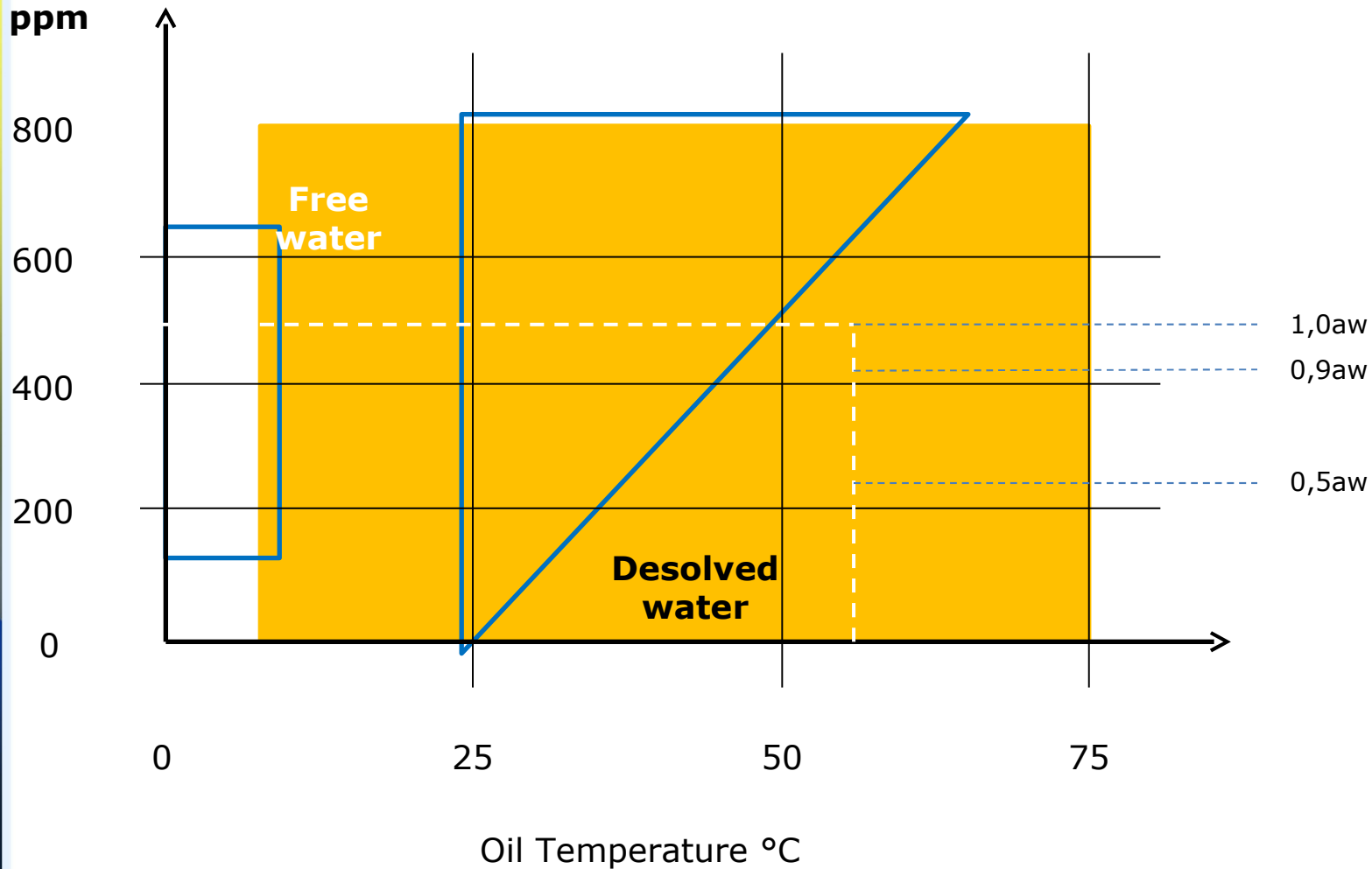
Overlayer completely corroded away, partly scuffing between Ni-layer and pin, partly steel-to-steel contact. **Not acceptable.**

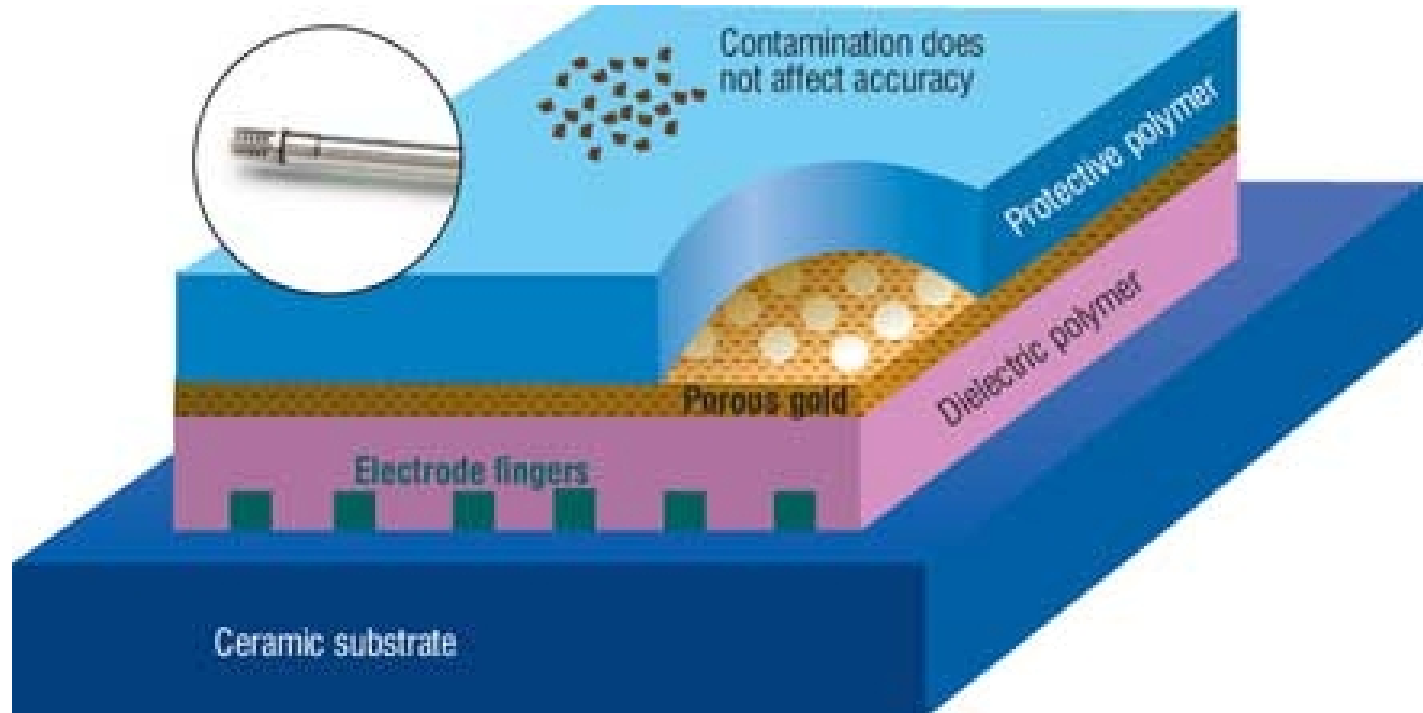
engine make and model. However, based on the Club's experience, general recommendations include:

1. Maintain the engine room crew intact as much as possible. A crew well-trained and familiar with the engine is a key factor in respect of safety.
2. Implement a planned maintenance system and ensure that this is continuously kept up-to-date.
3. Use only spare parts from reliable suppliers.
4. Ensure that filters and purifiers for lubricating oil are in sound condition. Take samples of the lubricating oil. The quality of the oil should be carefully monitored and tested enabling change of oil before damage occurs.
5. The above is valid also for fuel oil. Ensure that the

The Swedish Club Highlights – July 1998 and September 2005

Measuring aw (Water Activity)

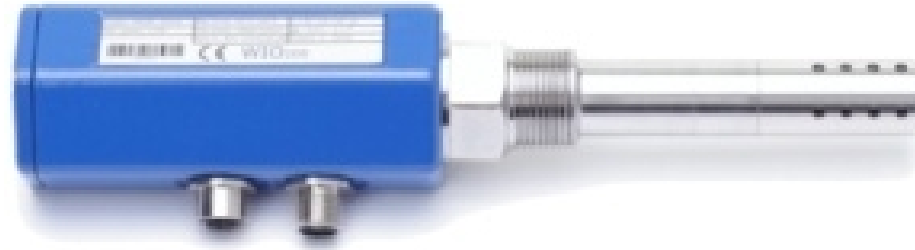




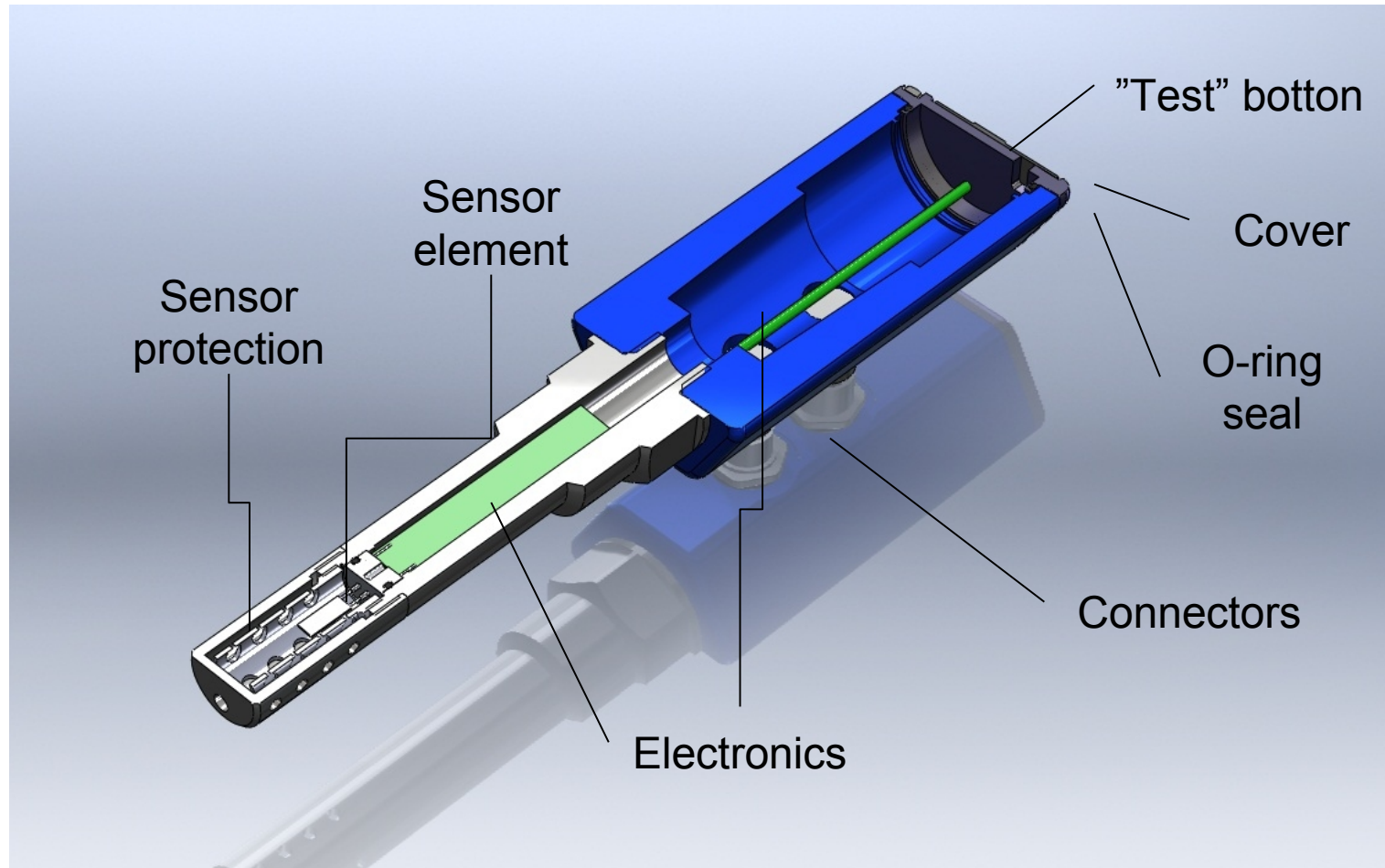
Sensor element - details



- Continuous in-situ on-line measuring
- No human error possible
- No work for engine room crew
- No waiting for lab results
- Direct connection to Engine Management System (4-20mA)



- Rigid design for marine use
- Tested for vibrations etc. (GL Type Appr.)
- Stainless steel and cast iron
- Extra protection for sensor element
- Seperate connectors for power and signal

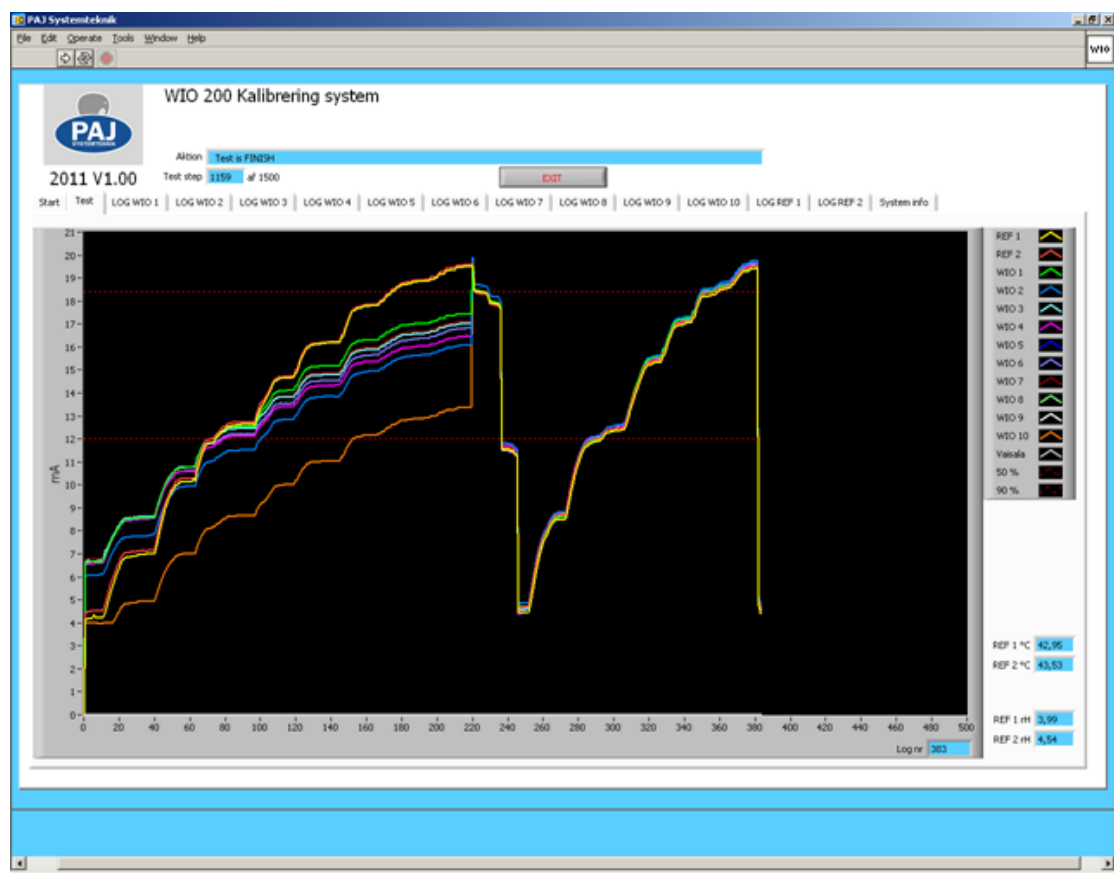


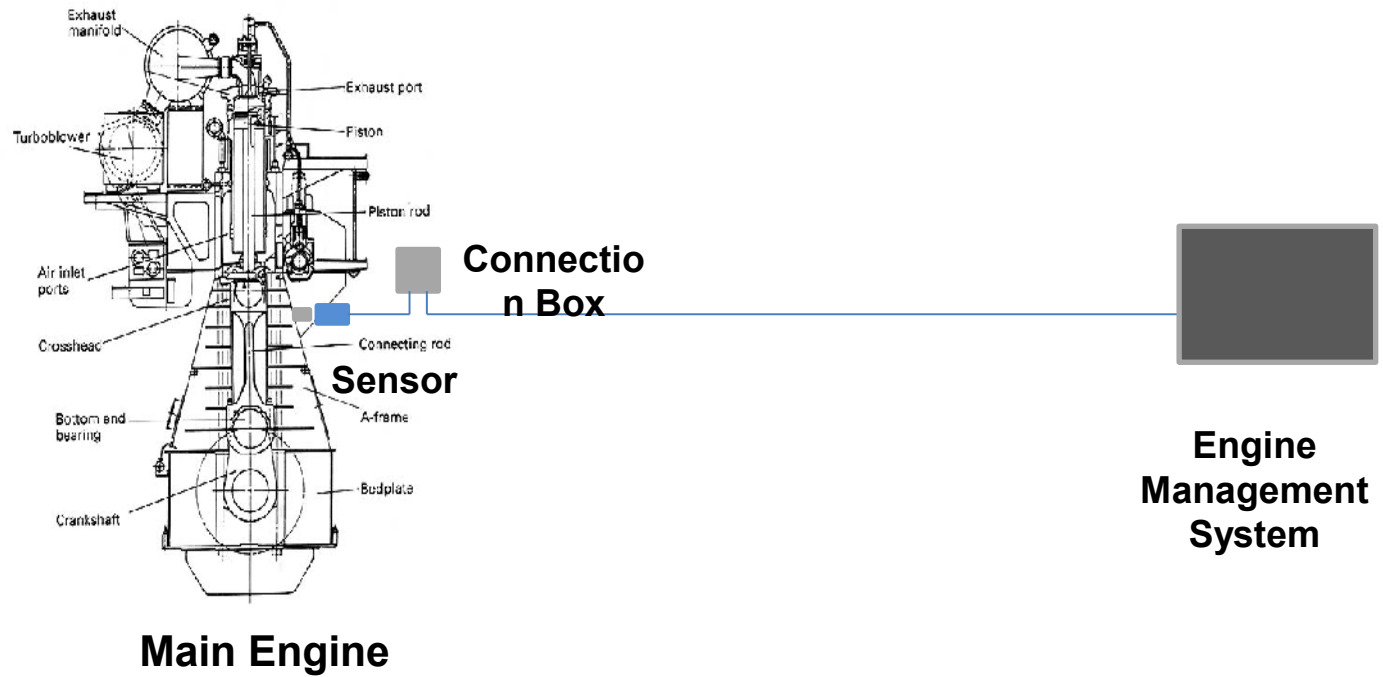
WIO200 Sensor w. display

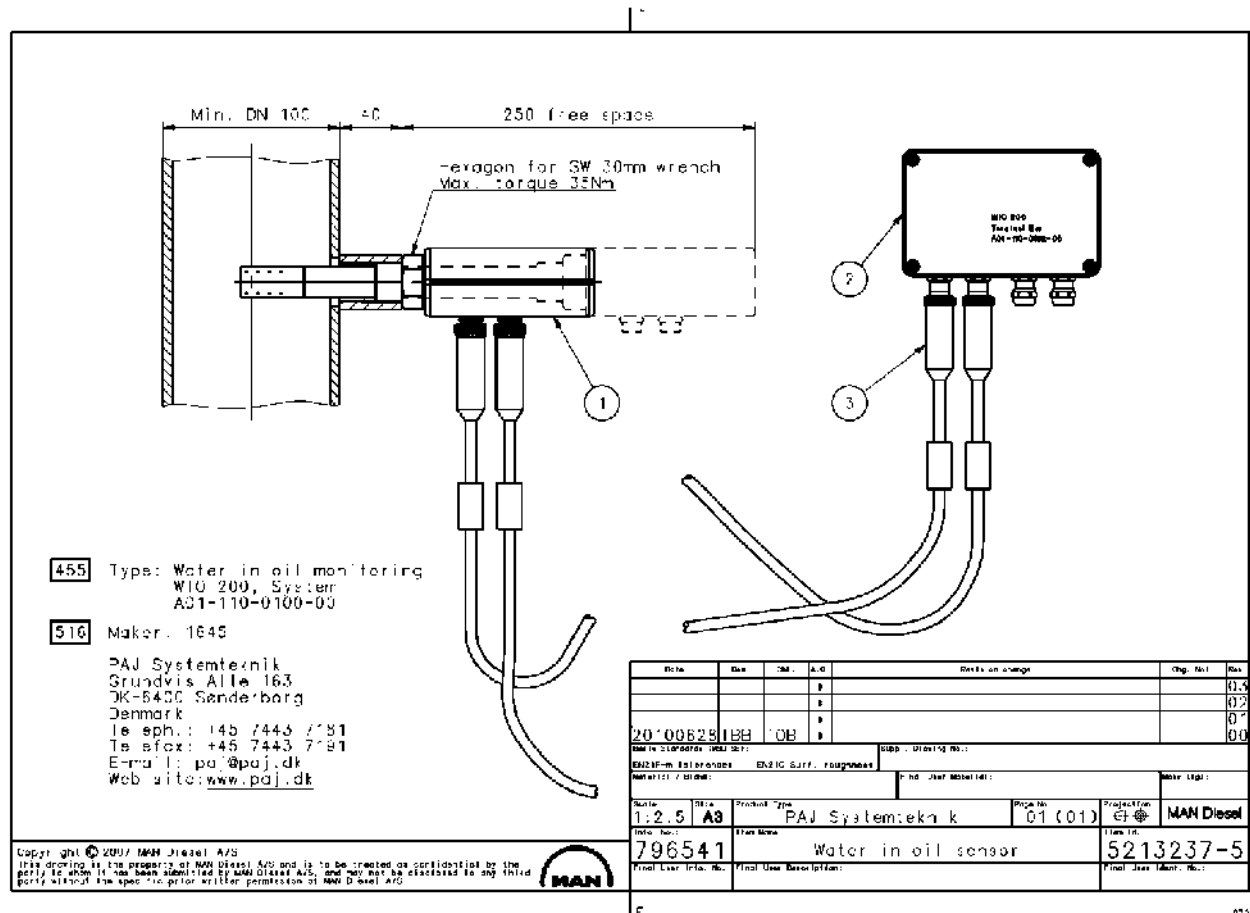


The **WIO200** is calibrated in oil (not in air!) giving the best possible result.

The curves to the left is BEFORE calibrating of 10 sensors – to the right the curves AFTER calibrating in M.E. Lube Oil.











Type Approval Certificate Germanischer Lloyd

This is to certify that the undemoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No.	7595609 HH
Company	PAJ Systemteknik Grundtvigs Allé 163 6400 Sønderborg, DENMARK
Product Description	Water in Oil Monitor
Type	WIO200
Environmental Category	D, EMC 2
Technical Data / Range of Application	Sensor which measures water content in lubrication oils on ship engine Condition Monitoring Component (according to GL I-1-17, Section 2, D.2.) WIO Sensor system nr: A01-110-0100-00 Consists of: - WIO Sensor nr: A01-110-0101-00 - Terminal Box nr: A01-110-0102-00 - Sensor cables 2 pcs. Order nr: A01-110-0103-00 The technical specification is shown on page 2. Software Version 111197-810 Rev 1.00
Test Standard	Guidelines for the Performance of Type Approvals Chapter 2, Edition 2003
Documents	Test report : 2009-02280 EMC, 2009-01458, 2009-01458R2LM, 2009-02373 111197-900 WIO Sensor Specifications Rev.1.00, Datasheet 111197-902 Rev.1.00 Software Questionnaire according to requirement class 3, dated 28.09.2009
Remarks	Rules GL I-1-17 to be observed for Condition Monitoring (CM). Alarm settings have to be specified by engine manufacturer if sensor is used for CM.
Valid until	2014-11-29
Page	1 of 2
File No.	IA.10
Hamburg, 2009-11-30	

Type Approval Symbol  

Germanischer Lloyd Jürgen Wittburg Marco Rinkel

This certificate is issued on the basis of "Regulations for the Performance of Type Tests, Part 0, Procedure".

Internet Publication: GL-Approvals

MAN Diesel



Certificate of Approval

This is to certify that PAJ Systemteknik Water-in-Oil monitoring equipment W/O 200, consisting of W/O sensors, terminal boxes and cables, has been approved for installation with all MAN B&W two-stroke diesel engines.

Copenhagen, 16 December 2009

MAN Diesel



- Est. 1996 in Sønderborg, Denmark
- Currently 20 employees
- Development, design, production and testing...for customers with high requirements.
- **Medico** – hospitals, labs etc.
- **Traffic** – railways, wind turbines etc.
- **WIO200** first own product
- Sold to: MAN, Clipper FM, Rovsing Dynamics, Hapag-Lloyd, Reederei F. Laeisz GmbH, Nabtesco, YMD (Shanghai)...
- More sensor types in the "pipe-line"