Bearing Condition Monitor

XTS-W
Bearing Condition Monitor
Avoid open-up inspections & protect the heart of your engine with the XTS-W

AMOT has pioneered the development of bearing wear monitoring since 2000, when the company produced its first concepts of the XTS-W in collaboration with MAN Diesel & Turbo. From its initial sea trials through to class, licensee and ship owner adoption, the XTS-W has evolved to become the leading bearing condition monitor on the market today.

A manufacturer of quality components for marine rotating machinery since 1948, AMOT currently has three manufacturing sites and seven sales offices positioned strategically around the world to support new build, ship owners and operators globally. Our manufacturing plants are ISO 9001 accredited and many of our products have industry standard certification such as LR, GL, ABS, DNV and BV.

AMOT recognises the key to your business is keeping your equipment operational and minimising downtime. We continue to work closely alongside the technical teams of our customers to ensure our solutions meet their ever-changing needs.

We look forward to working with you.

www.amot.com
a proven solution to maximise revenue and reduce costs

The XTS-W is a unique, cost-effective and relevant solution that breaks new ground in marine condition monitoring systems.

Avoid Open-Up Inspections

MAN Diesel & Turbo has stated that if a system such as the XTS-W is installed, open-up inspections of all crank train bearings are no longer required, providing **operational cost savings** and **removing the high risk of bearing damage** during such inspections. Exposure of key personnel to potentially hazardous situations is also removed, offering a **safer working environment**.

Cost-effective, planned maintenance

The XTS-W Bearing Condition Monitor provides ‘real-time’ data on crank train bearing condition. It displays the rate of degradation, bearing wear and the water-in-oil content to fully protect the crank train bearings. The XTS-W provides ‘real time’ information allowing the user to take appropriate corrective action, thus avoiding consequential damage, costly unplanned repairs and loss of revenue.

The XTS-W has many benefits.

- Avoids open-up inspections providing:
  - operational cost savings
  - removing high risk of damage during such inspections
  - minimising crew exposure to potentially hazardous situations
- Provides real-time information on bearing condition allowing effective operating decisions to be made - maximum uptime, minimum cost
- Protects your engine 24 hours a day, 7 days a week
- Simple to install on both new build and existing vessels
- Easy to use and comprehensive reporting
- User-friendly home screen indicating both system and alarm status real-time
- MAN Diesel & Turbo has reduced the frequency of external inspections if BWM is applied.

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**Maximum Availability**

The XTS-W continually measures the condition of the bearing, offering an intuitive and reliable **definitive measuring device**. The full life potential of the bearing can be assessed and in-service time maximised. Easily installed, the XTS-W is suitable for both new build installations and retrofitting to existing engines.

**Proven Product**

The XTS-W is Type Approved by Germanischer Lloyd, Lloyd’s Register, American Bureau of Shipping and Bureau Veritas. The technology developed by AMOT is a valuable component of the condition based maintenance programmes provided by Classification Societies.
The XTS-W has been developed by AMOT as a bearing condition monitor for 2-stroke low speed engines. It indicates wear in the crank train: main; crankpin; and crosshead bearings. In addition it can monitor main bearing temperature, water in oil content and electrical potential between the propeller shaft and hull, all of which may have an adverse effect on bearing life.

The XTS-W can be accessed in a variety of ways to suit the preferences of the ship owner:

- Locally, in the engine control room using a standard monitor keyboard and mouse
- Ethernet connection using a PC on the ship’s network
- A dedicated off the shelf PC
- Integrated into a suitable AMS system

The system comprises …

- 2 custom analogue inductive sensors per cylinder mounted on a bracket located on the engine frame
- an interface unit mounted in the engine control room for connection to the AMS system and local system access
- a signal processing unit (SPU) mounted onto the outside of the engine
- a water-in-oil sensor mounted in the main lube oil feed pipe (optional)
- a shaft earth line monitor to measure the electrical potential between propeller shaft and hull (optional)
- temperature probes measuring main bearing temperatures (optional)

How it works

The XTS-W maps the characteristics of your individual engine, ensuring accurate real time measurement of bearing thickness.

The sensors convert any physical displacement due to bearing wear into a pulsed electrical signal, which is sent to the signal processing unit. Each microprocessor based SPU generates continuous signals proportional to the wear detected, compensating for environmental and engine load conditions.

The calibrated SPU communicates wear data to the HMI which provides a clear graphic display of bearing wear. Each sensor can be calibrated individually or simultaneously.

The SPU calibration is fully automatic with engine protection only 30 minutes from start-up.
The XTS-W uses custom proximity sensors to measure the relative position of each guide shoe, at Bottom Dead Centre (BDC), with respect to the crankcase. Any significant wear in the bearing surfaces results in a shift in this measurement, thus facilitating early detection of a failure. This measurement technique is used to detect wear in the main, crank-pin and crosshead bearings.

Typical display screens
The XTS-W displays include:

- Bar chart showing 'real time' wear, 3 alarm conditions: green = good, yellow = warning red = alarm, flashing red = engine slow down

- Trend chart showing long-term wear trends

- Water-in-oil displaying water activity (aW), parts per million (ppm) and lubrication oil temperature

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Experience

With over 400 vessels specified by 50 different ship owners worldwide, combined operation time exceeds 100 years - making the XTS-W the most proven bearing condition monitor!

Total bearing care

The AMOT XTS-W constantly monitors the condition of the crank train bearings. Premature bearing failure can be the result of: ingress of dirt, misalignment, water in oil contamination causing weakening of the bearing material, or poor earthing of the propeller shaft to the hull, causing damaging spark erosion within the crank train bearings.

The XTS-W not only monitors bearing wear, but also water in oil content and shaft earthing efficiency. If the MAN Diesel & Turbo recommended alarm criteria are exceeded, alarms will be initiated before levels become critical, allowing the user to take the necessary actions to prevent increased risk of failure.
protection
you cannot afford to be without

Open-up inspections and bearing failure

There is an increased risk of damage to a healthy bearing after a regular unnecessary open-up inspection – as statistics prove! Experience shows that main bearings are particularly vulnerable to mis-assembly, dirt and scratches during such inspections. All this increases operational costs and exposes key staff to potential hazards. Importantly, MAN Diesel & Turbo does not recommend unnecessary opening up of the crank train bearings on its 2-stroke low speed engines.

Better to eliminate the risk of bearing failure.

Better to fit an XTS-W.

- MAN Diesel & Turbo does not recommend unnecessary open up inspections of the crank train bearings in its 2 stroke engines: “We consider scheduled open-up inspections as obsolete.”

- MAN Diesel & Turbo Checking & Maintenance Schedule states: “Bearings should only be opened if bearing material fragments fall out or top clearance is outside limits.”

- MAN Diesel & Turbo has now omitted scheduled open-up inspections of all bearings in its instruction material. Additionally, the company will reduce the frequency of external inspections (crank shaft deflection, bearing clearance measurements, bearing edge check and inspection of crank case for bearing material) if BWM is applied.

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

- More than 7,000 ships have open-up inspections every year.

- Germanischer Lloyd says that open-up inspections can be omitted if the following MAN Diesel & Turbo approved equipment is fitted:
  - Bearing Wear Monitor (BWM)
  - Water in Oil Monitor (WIO)
  - Shaft Earth Line Monitor (SELM)

Once an engine has the above monitoring systems installed, and provided the vessel has a computerised Planned Maintenance System (PMS), the owner may apply for Survey Arrangement Condition Monitoring (SACM).

* Source: MAN Diesel & Turbo
XTS-W

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