– For a better shipping

Company presentation and technical brochure

Our heart beats to the engine stroke

For a better Shipping - in our globalized world, reliable shipping and freight transport has become more than essential. We have made it our business to support you in this respect.
With a personal and customized approach, minding your needs - we advise you - OUR MISSION - YOUR SUPPORT.

Now in the second generation, we develop and produce innovative in-house products in the field of technical measuring and analysis equipment for the maritime industry. You can benefit from our long-term cooperations with reliable manufacturers in the industry.
Especially marine engines make our heart beat faster.

The many years of worldwide activity of the family in the market of measurement technology and the feedback from customers, flows into every procedure or work step. Therefore, the product range has been steadily expanded to include trade goods. International partnerships for global availability are constantly being expanded. This makes TX Marine Messsysteme GmbH an experienced partner and system provider for complete solutions in the field of on-board measurement technology.
Not the wind, but the sail determines the direction (Chinese proverb).

After all, it makes a big difference which course you set in the operation of a ship. Set the sails in the direction of sustainability and the greatest possible efficiency? With foresight, we advise, train and support and assist you as a measurement technology - service provider in your project!

We all love the sea and do our best every day to keep global shipping moving for the people of the world.
Let us set sail together.

We wish you always a hand's breadth of water under your keel.

Kay Paschen (Founder)
Owner-manager

Nadine Paschen (2nd Generation)
Owner-manager

Our Products & Service

Engine Performance Monitoring

Shaft Power | Thrust | Torque
Cylinder Pressure | Combustion

Emission Measurement

Portable equipment
Certified by class

Performance Software & Hardware

Special software solutions and
data acquisation units

Service

Engine Diagnostics
Installation | Service | Training
Worldwide

Flow Measurement

Fuel | Oil | Water
Volume and Mass
Flow Meter

Condition Monitoring

Crankshaft Deflection | Oil Condition
Cylinder Liner Ovality | Oil Mist
Overspeed Tester | Videoscopes
Oil and Fuel Test kits

Set sail for sustainability and maximum efficiency?

With TX Marine's technology you ensure Target-oriented and reliable solutions.

We advise you with passion as if it were our own lifeblood.

Engine Performance Monitoring

Getting from A to B on time can be a challenge in wind and weather. A well-coordinated team on a reliable ship is the be-all and end-all in seafaring.
Just like the sensory impulses our body sends us, our measured values from the analysis tools serve you.

How fit am I, how high is my load, ...?
The engine is the heart of the ship and requires special care.

If the individual component groups are well coordinated and monitored, you can not only improve performance, but also increase longevity and efficiency and get the last ounce out of your machines.

Reporting and internal reports can be generated at the push of a button, maintenance can be planned at an early stage and considered in the scheduling in good time.
Let's get the best out of your engine together.

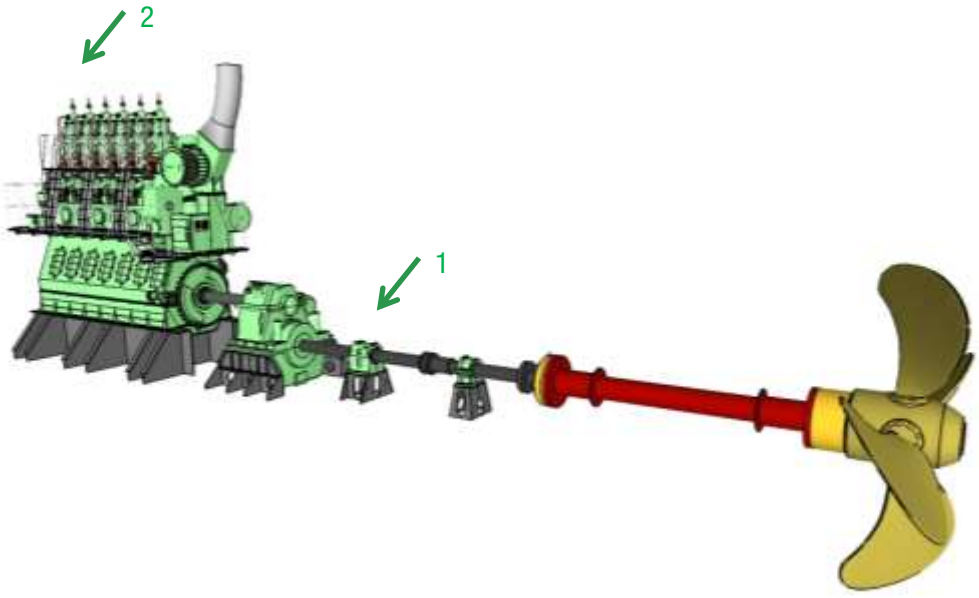
The recording and processing of the following engine measured variables help us to do this:

- Shaft Torque
- Shaft Speed
- Shaft Power

→ our solution for you the TORXmeter® mkII shaft power meter (1)

- Cylinder pressure
- Combustion characteristics

→ our solution for you are electronic and mechanical indicators PMImkII , Type 50 and MSI-3 (2)



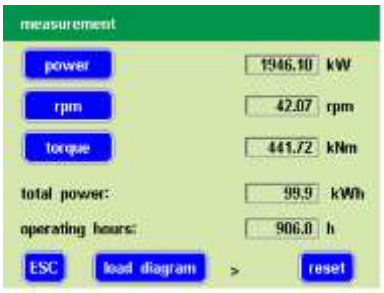
TORXmeter® mkII

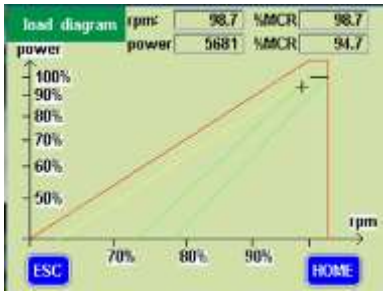
Shaft power meter

Application:
The shaft power measurement system measures the power transmitted through a shaft, enabling the measurement of actual engine power delivered to the propeller.

Shaft power is an essential input (KPI) for Ship Performance Monitoring Systems and ship efficiency. Actual shaft power measurements levels provide an accurate reference point to assist with the assessment of:

- Engine Performance Monitoring
- Hull Condition
- Propeller Condition
- Specific Fuel Oil Consumption
- Operational Efficiency Planning
- Ship Condition Changes



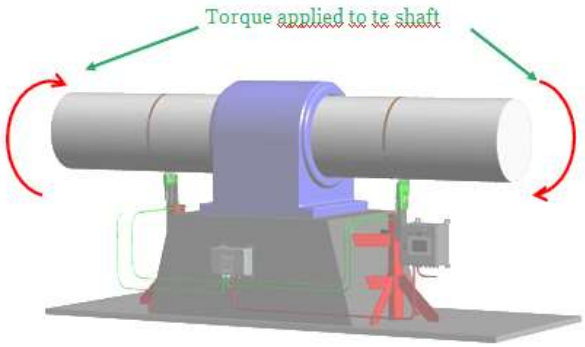


Features:

- Easy to install and operate (training video available)
- No electronic parts on the rotating shaft
- Full contactless
- Maintenance free
- Can be Installed in 1 day
- All Components can be replaced individually
- Easy error diagnosis via email due to fault indicators on the components
- Zeroing (new calibration) can be done by ship's crew

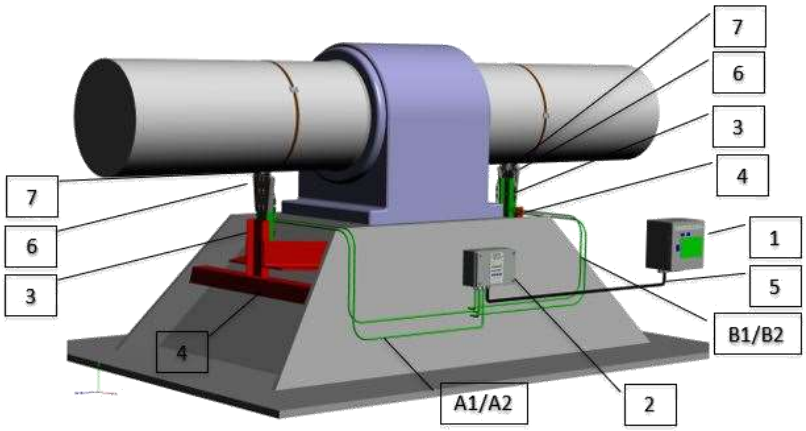
Measuring principle:

Extreme fast response (EXFR) magnetic scanning of the magnetic pattern of the installed belts. The EXFR sensors mkII uses the magnetic pole changing and the zero crossing (change of the magnetic fields) between the two EXFR sensor belts for angle measurement. Due to measurement of torque (twist angle) the system has two EXFR sensors (with two sensor heads) and two EXFR sensor belts installed on the shaft.



Scope of supply:

No. 1	Terminal Box mkII
No. 2	MWE Box mkII
No. A1/A2	Pre-wired cable between MWE Box mkII and EXFR sensors mkII (appr. 7,5 m)
No. B1/B2	Pre-wired cable between MWE Box mkII and EXFR sensors mkII (appr. 7,5 m)
No. 3	2x Welding Brackets (bracket must be welded to ships structure –No.4)
No. 4	2x Support for Sensor holder
No. 5	Cable between Terminal Box mkII and MWE Box mkII (4x2x0,75mm²)
No. 6	2x Sensor holder (screwed on No.3)
No. 7	2 x Sensor holder with pre-mounted 2x2 EXFR sensors mkII (A1/A2) (B1/B2)
No. 8	2 x EXFR sensor belts mkII
Remark:	red items not in the scope off supply



Technical Specification:	
Sensor Accuracy	<0,1% (Shaft Torque, Shaft RPM, Shaft Power) <0,1%+Ke (Shaft Torque) (Ke means total error in shaft modulus constant and shaft diameter)
System Accuracy	<0,1% (Shaft Power, Shaft RPM)
Shaft diameter	150mm up to 3000mm
Speed Range	Up to 1200 rpm
Data Output	4x4-20mA outputs (Torque, shaft power, rpm and bipolar rpm); RS485 NMEA protocol, Alarm output (Overload and system failure)
Data storage	Mini SD card in the Terminal Box mkII control board

PMImkII

Electronic engine indicator

Application:

Precise digital pressure measurement for two and four stroke Diesel engines.

Features:

- No need to install a TDC Sensor
- Easy handling and Plug ‘n’ play installation of the Soft-and hardware results in less user related problems
- Long life components
- Usage of a high-quality sensor
- Integrated rechargeable batteries
- Software for analysis of measurement data, storage and send via email
- Start-up service and assistance for the first measurement via mail

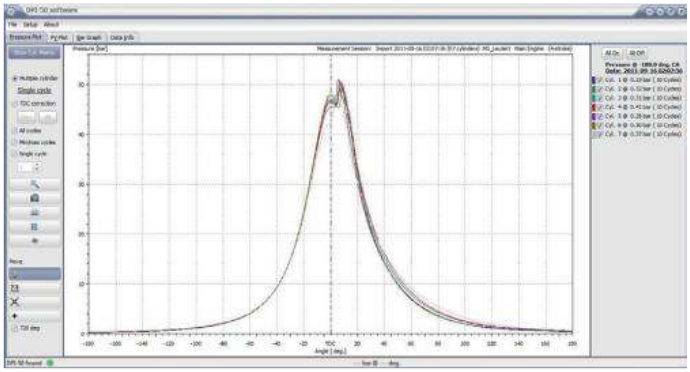
Measuring principle:

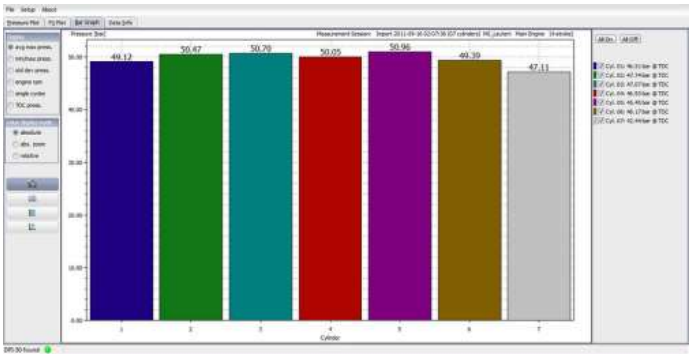
The pressure sensor is temporarily connected to the indicator valve. While the measuring series is being recorded, the data can be read off the LC display of the PMImk2 handheld. After that, the data sets are saved to memory and can be transferred to the PC via the USB interface. The data may be evaluated and administered with the DPI software. In order to connect the pressure sensor, the engine to be analysed must be equipped with standard indication valves (Thompson connection).

Analysing Software:

A high amount of information can be displayed using the PC software.

After measuring the pressure with the PMImkII handheld the measured data can be downloaded to any PC and analysed with our analysing software supplied with the PMImkII on the handheld.





Technical Specification:	
Pressure range:	0 to 250 bar
Engine range:	50 to 5.000 rpm
Accuracy:	< 0.5%
A/D sampling precision:	16 bit (0.0092 bar/sample)
Memory capacity:	50 engines
Battery type:	Standard AA, rechargeable
Battery capacity	> 6 hrs (charging via USB)
Display:	20 x 4 alphanumeric characters, backlight, high Contrast
Standard connection:	W 27 x 1/10''
Operating temperature:	0 to 55°C (Handheld unit); 0 to 350°C (Pressure sensor)
Dimensions:	211 x 100 x 45 mm (Handheld unit) Ø = 60 mm, L = 210mm (Pressure sensor)
Weight:	380g (Handheld unit) ; 830g (Pressure sensor)

Type 50

Mechanical Indicator (System Maihak)

Application:

Precise pressure measurement for two and four stroke Diesel engines.

Features:

- Individually calibrated high accuracy heat treated springs
- Unchanged, rugged and proven reliable Maihak design
- Easy and simple operation by unskilled operator
- Cheapest way to analyse your engine
- Ready-to-use equipment

Measuring principle:

A metal stylus draws a clear pressure-diagram which records the pressure curve within the engine cylinders as influenced by the piston stroke. The recording drum can be moved by means of a string, which is pulled manually or by the engine. If the drum is driven by the engine, the diagram may be planimetered.

Technical Specification:			
Measuring range:	140bar, 160bar, 200bar, 250bar, 300bar		
Engine range:	up to n = 300 rpm or max. dp/dt = 9 x 10^3 bar/sec		
Max. diagram:	50 mm/80 mm (height/length)		
Drum diameter:	50 mm	Weight:	1,5 kg (without wooden box); 4,4 kg (with wooden box)
Paper size:	180 mm x 65 mm		
Dimensions:	165 mm x 130 mm x 90 mm	Standard connection:	W 27 x 1/10''

MSI-3

Peak Pressure Indicator

Application:

Designed for displaying the maximum value of firing pressure of two- or four-stroke engines.

Features:

- Easy handling
- Measuring range up to 300 bar
- High accuracy in all speed ranges
- Extremely robust, low maintenance
- Insensitive to vibration
- Pressure gauge in safety construction
- Light weight

Technical Specification:			
Measuring range:	0 to 160 bar, 0 to 250 bar and 0 to 300 bar		
Engine range:	Up to 2.500 rpm		
Permissible Temperature	Ambient -20 to 60°C		
Error margin	± 1.6 %	Weight	3.0 kg with wooden box
Dimension	210 mm x 155 mm x 60 mm		
Standard connection	W 27 x 1/10''		

Performance Software and Hardware

The ship receives its schedule. The route is planned, the captain is checking the weather conditions and planning his voyage from port to port.

The captain and crew now have a lot of work to do.

Due to the ever-increasing requirements of the international authorities, such as regulations like SOLAS, ISPS or MARPOL, a large number of reports have to be prepared and sent during ongoing operations.
Additionally, shipping companies, ship owners or charterers are required to provide a large number of key performance indicators to document the status of the ship and the sea voyage.

Through comprehensive data recording and visualization on board, important information can be collected and reports and KPIs can be easily generated and displayed. This not only simplifies the work on board, but also saves time and money. Especially when it comes to the constantly more stringent regulations on emissions, solutions are required.

With special monitoring systems, a wide variety of data can be collected on board, either manually or automatically, and a database can be generated. A comprehensive view of the ship is only possible if sufficient data is available, e.g., through permanent recording of measurement data and plausibility checks.

Here, the performance monitoring systems are the key components for all parties involved in ship operation, from the captain to the ship owner.

With our systems, all available data from on board can be collected.

The information can be used for a variety of purposes.

- Plan maintenance intervals and thereby save time and costs.
- To make optimal use of engine and propulsion systems and as a result save fuel.
- To make recommendations to the captain before the start of a voyage to run weather-optimized routes.

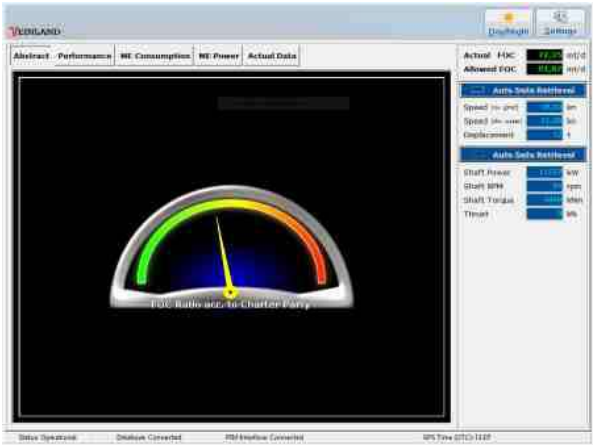
This not only results in fuel and operating cost savings, but also in emission reductions due to the more efficiently operated ship

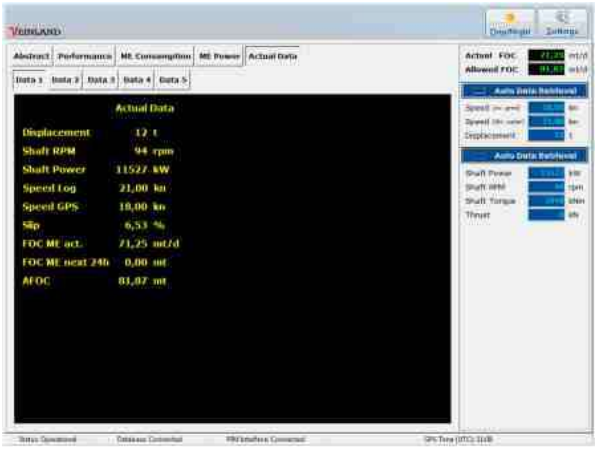
Efficient ship ahead!

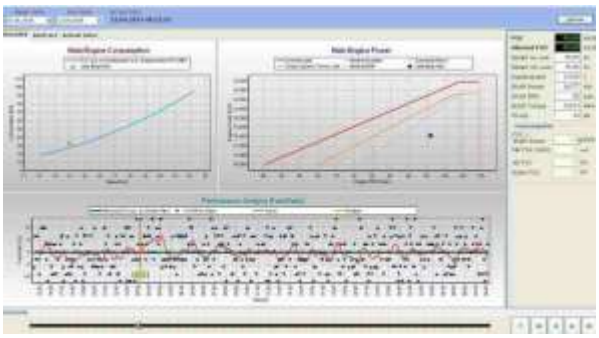
Here we see ourselves as your supporter, to advise you to choose the best possible solution for you.

Performance Software

PIM OBU – Performance Indication Onboard Unit







Application:

Displays nautical data, fuel consumption and engine data in real time.

Features:

- Provides detailed information about actual ships performance
- Compares fuel consumption with the data of the charter party
- Easy transport to owners' office for further analysis and replay
- Data transfer to Cloud software solutions possible, e.g. Storm Geo, Podium

Measuring concept.:

The PIM OBU consist of one data collector unit and one onboard unit (Touchscreen display).

The standard system allows following input:

- Up to 6x Serial Interfaces NMEA (e.g. Draft, Speed log, GPS)
- Up to 6 Flow meter (pulses) (e.g. ME, AE and Boiler)
- Manually Input (displacement, draft, fuel cost)
- Optional inputs are possible

Performance Hardware

Data Control and Logging Unit

Application:

Modular data acquisition system consisting of digital and / or analogue inputs and / or output modules, depending on customer's request.

Features:

- Different modules can detect currents, voltages, temperatures, pulses, potentiometers or resistors
- Detected signals are transmitted, e.g., NMEA telegram via network for further processing

Flow measurement

On board of ships are a lot of flows in different areas which have to be used and monitored.

As medium there are liquids or gases which are measured, these are for example:

- Fresh Water
- Bilge Water
- Refrigerants
- Cylinder oil
- Fuel

Comprehensive and accurate fuel measurement in particular is becoming increasingly important on board.

Fuel costs are one of the biggest operating expenses in ship operation. Due to constantly rising fuel prices and stricter environmental guidelines, it is becoming increasingly important for shipping companies to permanently monitor and document fuel consumption. In this way, deviations can be detected and in advance actions can be taken. There are a variety of measurement methods to measure these consumptions. Not only the actual flow rate can be measured, but also temperatures and densities. Depending on the application and specification of the medium, the measuring devices can be selected.

By checking your on-board fuel systems, we can determine the best solution for you.

A flowmeter consists of two main components, the actual sensor and an evaluation unit, usually known as transmitter or transducer. In addition, a categorization is made between the version's compact devices or separate versions (measuring sensor separated from evaluation unit) and the accuracy class.

We can offer you the following measuring devices for this purpose:

- Coriolis mass flow meter
- Ring piston volume flow meter
- Screw spindle volume flow meter
- Magnetic-inductive flow meter
- Vortex flow meter
- Variable are flow meter
- Ultrasonic flow meter

Investing in the right measurement technology can help you keep an eye on total cost of operation (OPEX)**!**

ROTAMASS TI

YOKOGAWA

Mass flowmeters with the Coriolis measuring principle, for measuring liquids and gases.

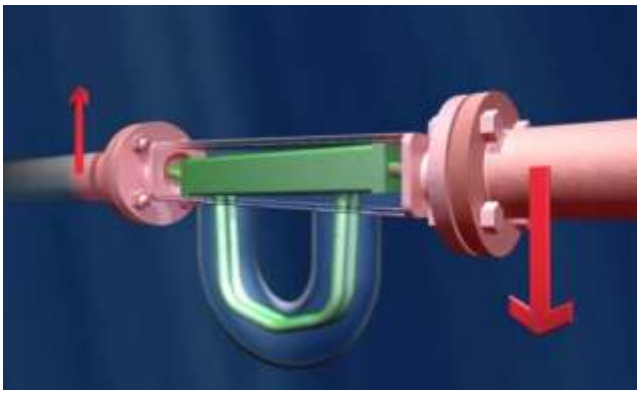
Application:
The ROTAMASS TI series - determine the mass and density of liquids, and gases directly, without by-passes. The devices have a wide range of applications, as appropriate tube materials are available for the different media.

- Line sizes: DN 15 to DN 200
- Flow range: 1,5 t/h to 600 t/h
- Temperature range: –70 °C bis +150 °C

ROTAMASS prime

Features:

- Simplified Selection
  - Selection and sizing with Flow Configurator Software
  - Dedicated products for various applications
- Expert Guide
  - Wizard for easy setup
  - User friendly and multi-lingual operation concept
- Process Guard
  - “Event Management” acc. NAMUR NE107
  - “Data Logging” before, during and after events
- Maintenance Manager
  - In-line verification & reporting WITH Patented "Tube-Health-Check" (Self-monitoring of the entire measuring system during the running process)
- Data Mobility
  - Micro SD card for data transfer and spare management
  - In-depth process analysis
- Advanced Flexibility
  - “Features on Demand” for function upgrade
  - Worldwide approvals
  - Universal power supply
  - Various IO combinations
- Box-in-Box Design (decoupling the measuring sensor from the housing to avoid) malfunctions due to wring installation or vibration)



ROTAMASS nano

Technical data (depends on the Product line):
Medium: Liquids and Gases
Process temperature: -70 to 350 °C
Process pressure: up to 285 bar
Line sizes: DN 15 to DN 200
Accuracy mass flow for liquids: up to ± 0.1 %
Accuracy mass flow for gas: up to ± 0.35 %
Accuracy Density for liquids: up to ± 0.5 g/l / ± 1 g/l
Material of wetted parts: Alloy C-22/2.4602 & 316L/1.4404
Process connections: Flange (EN,ASME; JPI, JIS), Threaded (G or NPT)
Sensor design: Insulation and tracing options
Approvals: Marine application, Functional safety and Hazardous area approvals

ROTAMASS supreme

ROTAMASS giga

CONTOIL®

Volume flowmeters with the Rotary piston measuring principle, for measuring liquids.

AQUAMETRO
OIL & MARINE

Application:

The CONTOIL® series is a wide range volume flow meter for efficient consumption measurement.

- Line sizes: DN 4 to DN 8 and DN 15 to DN 50
- Flow range: 4l/h to 600 l/h and 20 l/h to 30000 l/h
- Temperature range: –40 to 80°C and 130°C or 180°C

Product lines:
CONTOIL® VZF II with electronic display and outputs
CONTOIL® VZO with Roller counter and outputs

Features:

- One hydraulic with multiple read out options
- Electronic display of totalizer, actual flow rate and other flow parameter
- Multiple Output signals
- Integrated temperature sensor (VZFII series)
- No straight inlets or outlets required
- Independent of viscosity and temperature
- High vibration resistance
- Marine approvals
- Pairing if a differential measurement (supply and return) should be installed for higher accuracy

Measuring principle:

CONTOIL® flow meters work on the volumetric principle of rotary piston meters (positive displacement meters).

The main features of this measuring principle are large measuring ranges, high accuracy, suitability for high viscosities and independence from power supply; flow disturbances do not influence proper operation. Rotary piston, guide roller and drive are the only moving parts in contact with the liquid. Their movement is transmitted by a magnetic coupling

through a sealing plate. The hydraulic part is completely separated from the totalising module.

Technical data (depends on the Product line) :

Medium: Liquids and Gases

Process temperature: up to 180°C

Process pressure: up to 40 bar

Line sizes: up to DN 50

Max. permissible error: < ± 1,0 % or ± 0,5 % of actual value

Repeatability ± 0,1 %

Housing Material: Cast Brass, Spheroidal graphite iron GJS 400-15

Measuring chamber Material: Cast Brass, Alu-Bronze, Stainless steel

Process connections: Flange (EN,JIS), Threaded (G)

Outputs: Three freely selectable (2 pulse, frequency, 4…20mA)

Approvals: Marine application, Functional safety and Hazardous area approvals

Emission measurement

Depending on the type of fuel used, ships emit a wide variety of micro-gases such as nitrogen oxides (NO_X), carbon dioxide (CO_2), sulphur dioxide (SO_2), but also soot and particulate matter. This has an impact on the environment, similar to land transport.

Regulations to protect against pollution of the marine environment by shipping were therefore agreed at international level years ago (MARPOL). Due to regulations emission values are limited and therefore need to be monitored.

Is environmental protection also increasingly becoming a focus for your shipping company?

An important factor in complying with the regulations is the maintenance and operation of the ships and thereby the prevention of environmental damage. If the equipment is maintained carefully, there are opportunities to reduce or save costs. The ship' s crew should therefore be provided with measuring equipment that enables emission values to be recorded and documented quickly.

Regular monitoring of the combustion on board can quickly identify problems in the combustion process. For example, by implementing inner-engine modifications on board, combustion can be improved and large investments in costly maintenance operations can be kept to a minimum. The combustion process can consequently be optimized and fuel consumption as well as specific emissions can be reduced.

Furthermore, the measurement and documentation of emission values should make it possible to prove the level of operation of machinery within the permissible limits. This can lead to considerable savings in the procurement of spare parts and possibly also in port charges.

The composition of the ship's exhaust gases identifies problems with the heart - the engine!

Portable analyser's, for measuring exhaust emissions, are easy to use and quickly ready for use without extensive training.

Measured variables that can be determined are:

- Exhaust gas temperature
- O_2
- CO
- NO_X (NO / NO_2 separately)
- SO_2
- CO_2
- CH_4

These measuring devices allow to generate a report of the measured emissions by pressing a button and to document the compliance with the guidelines. As our systems are also certified by classification societies, the operator has an officially approved measurement result and report and can confirm that the maximum prescribed emissions have been complied with.

Invest in an analyser – and notice a return on investment on short time.

350MARITIME

Portable emission measurement on marine diesel engines

Application:
The 350MARITIME is one of a few portable exhaust gas analysis systems for the measurement of exhaust gas emissions acc. To MARPOL Annex VI and NOx Technical Code 2008.

Features:

- Ready to measure in less than 2 minutes
- With DNV and NK certificate acc. To MARPOL Annex VI and NOx Technical Code 2008
- Unrestricted availability thanks to pre-calibrated gas sensors which are exchangeable on site
- Tested gas sensors – as good as reference measurement technology
- Robust protective case with trolley function allows transport by plane

Measuring principle:
Gas sampling takes place with a special, easy-to-install sampling probe. The certified and durable electrochemical gas sensors record the concentrations of the exhaust gas components NOx (NO + NO_2 separately), CO, CO_2, O_2 and SO_2 highly accurately and with long-term stability. CO2 is recorded using the certified IR measurement principle.

In order to withstand the tough conditions at sea, the complete exhaust gas analyzer incl. accessories is stored in a robust protective case.

Technical Specification:	
Operating temperature	+5 to +45 °C
Storage temperature	-20 to +50 °C
Voltage supply	Li ion rechargeable battery AC mains unit 100 V to 240 V (50 to 60 Hz)
Electrical power consumption	max. 40 W
Max. positive pressure at gas input	50 hPa
Max. negative pressure at gas input	-300 hPa
Weight	Approx. 17 kg
Dimensions (case)	56.5 x 45.5 x 26.5 cm

Measuring range:		**Tolerance**
°C, exhaust gas	-40 to + 1000 °C	Max. ±5 K
O_2	0 to 25 Vol. %	According to to MARPOL Annex VI and NOx Technical Code
CO	0 to 3000 ppm	
NO	0 to 3000 ppm	
NO_2	0 to 500 ppm	
SO_2	0 to 3000 ppm	
CO_2 (IR)	0 to 40 Vol. %	
P_{abs}	600 to 1150 hPa	±5 hPa at +22 °C ±10 hPa at -5 to +45 °C

Condition Monitoring and Predictive Maintenance

Planning and performing regular maintenance is better than no maintenance at all. For this purpose, there are many instructions and maintenance programs on board.

Is it enough to rely on these programs? Especially the operating equipment on board of the ship is sensitive to failures and defects. Maintaining them is hard work!

Proactive thinking would reduce the unplanned failures and excessive repair costs by initiating timely actions.

Condition monitoring is based on collecting real-time conditions of machines or equipment. On the other hand, predictive maintenance focuses on early detection of damage.

Permanently installed or periodically used measurement technology can be a very helpful solution.

Both methods of monitoring and maintenance help to increase the reliability of operating equipment and reduce downtime. This not only saves valuable resources, this also saves money.

The variety of information already available on ships is used to evaluate the current condition and to fulfil maintenance schedules.

Through the implementation of additional measurement technology, damage and problems can be detected and maintenance work can be initiated in order to prevent them. Thus, the investment will be amortized in a short time.

We are in this topic well prepared and can offer you the following:

- Crankshaft and Ovality measurement (analogue and digital)
- Metal Thickness gauges (metal and GRP)
- Overspeed tester
- Pressure calibrator
- Temperature calibrator
- Oil sampling tester
- Oil condition sensors
- Oil mist detectors
- Videoscopes

If something is missing in the list which you still need, we will help you to find the right instrument.

We will be glad to advise you about the possibilities of condition monitoring and predictive maintenance.

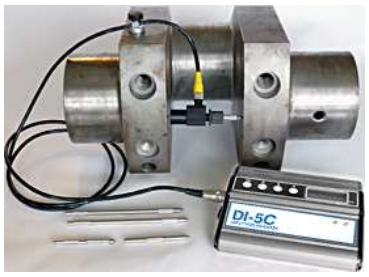
DI-5 / DI-5C

Electronic Deflection Indicator

Application:
Crankshaft alignment check and ovality measurement of the cylinder liner with one measurement equipment.

Features:

- A pleasant and clean operation comparing to use the old dial gauge.
- Download measurements to your computer to store, track, print and compare your engine wear.
- Measure deflections at the extreme precision of 0,001mm
- Rechargeable battery operated for portable use
- Large measuring distance 60 – 574 mm (with different kind of transducers).
- USB connection to PC



Measuring principle:
Four push buttons on the DI5 panel are used to select, change and accept values on the display such as temperature, engine number, number of cylinders, measurement direction and so on. Just push the OK button to store the value.

On completion of the first cylinder, move the transducer to the next cylinder and store measurement values. The generous measurement range allows the transducer to be moved between cylinders without mechanical adjustment. When all cylinders are completed hard copy can be downloaded to a PC for reference and future comparisons (DI-5C).

The ovality kit is designed principally to measure cylinder liner wear and ovality. However, the device can be modified to take measurements from various applications according to your own requirements. The standard kit contains equipment to measure cylinder liners with diameters of 180-600 mm.-

The supplied software with the deflection indicator DI5C

also handles the measurements taken with the ovality kit. By this, you can transfer ovality data to your PC and evaluate and compare, all with graphs and printouts.

Analyze Data at your Computer:

The DI5C will download your measured data to a PC using standard USB interface. The software is compatible with Windows up to version Windows 8, 32/64 bit.

Connecting cable, user information and program disc are supplied with the instrument.

DI SERIES	DI-5	DI-5 Small	DI-5C	DI-5C Small
Memory & transfer to PC	No	No	Yes	Yes
Export as Excel	No	No	Yes	Yes
Measuring distance	89-565 mm	60-536 mm	89-565 mm	60-536 mm
Measuring range	+/- 2.048 mm	+/- 1.000 mm	+/- 2.048 mm	+/- 1.000 mm
Resolution	0,001 mm			
Zero balance range	+/- 2.048 mm	+/- 1.000 mm	+/- 2.048 mm	+/- 1.000 mm
Zero drift	0.001 mm / 5 minutes			
Instrument operating range	0-55°C / 32-130°F			
Transducer	89 mm	60 mm	89 mm	60 mm
Transducer operating range	0-80°C / 32-175°F			
Battery	3.6 V Lithium Ion, rechargeable			
Battery life	10 hours / charge, shelf life 5 years			
Extension bars (invar alloy)	10, 20, 40, 80 and 2x160mm			
Cable length	7 meters			
Gross weight	4 kg			
Dimension: Instrument	190 x 167 x 50 mm			
Transducer:	Ø 31 x 81 mm	Ø 22 x 56 mm	Ø 31 x 81 mm	Ø 22 x 56 mm
Case	300 x 280 x 140 mm			

Analog Deflection Indicator

Crankshaft Gauge TXMKP300/50

Application:
This analog crankshaft gauge enables measuring deflection range in between 60-500mm for testing crankshafts and bearings in the installed state.

Used by Service Engineers, Repairmen, Crankshaft Grinders, Production Supervisors, and Quality Control Inspectors, the Crankshaft Gauges measure the WEB DEFLECTION of crankshafts in:

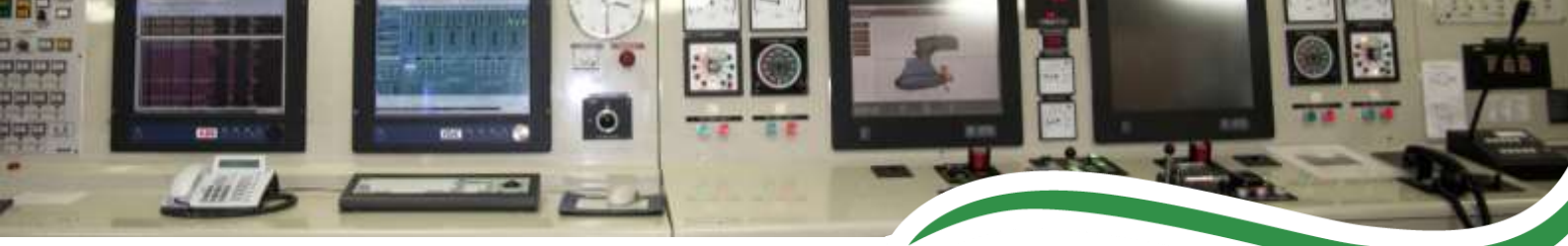
- Ready to operate engines or compressors
- Assembled engines or compressors, with connecting rod in place
- Assembled engines or compressors, with connecting rod removed
- Dismantled crankshafts, between centres

Features:

- sturdy in design and furnished with hardened gauging points.
- Dial grad 0,01mm

Scope of supply:
TXM analog Crankshaft Gauges are supplied in Sets consisting of a dial gauge unit with spring-loaded (live) gauging point and a full set of gauging extensions and fixed gauging points to suit ranges stated. The Sets come in fitted hardwood cases.

Sets TXMKP300 and TXMKP500 use the same box, and their component parts are interchangeable. Extensions to increase the range of Set TXMKP300 to 500mm are available separately.



Thickness Measurement (Metal/GPR)

Ultrasonic Thickness Gauges

Application:
Multiple Echo Ultrasonic Thickness Gauges designed to monitor corrosion Levels and check Metal and GRP Thickness without Removing Coatings.

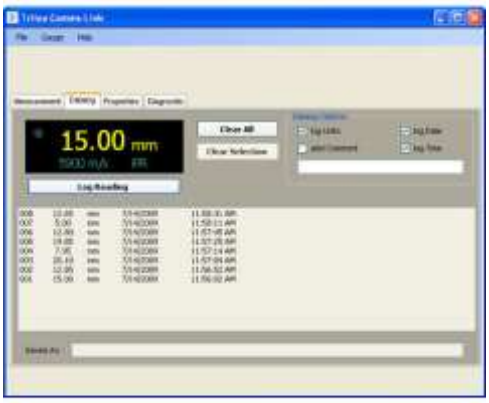
- Constant monitoring of corrosion levels
- Perfect assistance for surveyor
- Underwater measurement possible
- “Flying Thickness Gauge” for high level corrosion without scaffolding or rope access

Features:

- Extremely rugged and robust.
- Protective membranes to prevent probe wear.
- Supplied in heavy duty hard durable carry cases.
- 3-year warranty.
- Intelligent Probe Recognition (IPR) for better performance.
- Automatic Measurement Verification System (AMVS).
- Single crystal probe to avoid ‘V-beam’ error.
- Measures all metal types.
- Free annual calibration. for the life of the gauge.
- All gauges comply with BS EN 15317:2013.
- Ignores 20mm thick coatings.
- No zeroing required.
- Easy to use menus.
- Single probe type for all applications.

Measuring principle:
All Ultrasonic Thickness Gauges should be calibrated to the velocity of sound of the material being measured. Coatings have a different velocity of sound than metal and it is important they are not included in the measurement.
A transmitted ultrasound pulse travels though both the coating and the metal and reflects from the back wall.
The returned echo then reverberates within the metal, with only a small portion of the echo travelling back through the coating each time. The timing between the small echoes gives us the timing of the echoes within

the metal, which relate to the metal thickness. The returned echoes need not be consecutive as the gauge will interpret them automatically and calculate the thickness. A minimum of three echoes are checked each time.
This is referred to as the Automatic Measurement Verification System (AMVS).



Communicator Software:
The software displays live measurement results onto a laptop or PC. It can be used with the Multigauge 5700, 5350 and 5750 even with the Multigauge 3000 and 4000 series. Templates can be pre-set as well data can be stored. It has also the option to store the time, date and an identifying label for each measurement. In addition, various settings within either gauge can be changed from the software to optimise performance.

Technical Specification:	
Sound Velocity Range:	From 1000 m/s to 8000 m/s (0.0394 in/µs to 0.3150 in/µs)
Probes:	Single crystal soft faced - 2.25 MHz, 3.5 MHz & 5 MHz (Metal thickness Measurement) Single crystal hard faced - 1 MHz (GRP or Plastic Thickness Measurement)
Measurement Range:	1 - 250 mm (0.04” - 10”) depending on probe used
Probe Sizes:	6 mm (0.25”), 13 mm (0.5”) & 19 mm (0.75”)
Measurement Mode:	Multiple Echo
Resolution:	0.1 mm (0.005”) or 0.05 mm (0.002”)
Accuracy:	± 0.1 mm (0.005”) or ± 0.05 mm (0.002”)
Display:	Colour LCD (5600 and 5700 Series), Red 4 character 7 segment LED (5500 series)
Storage Capacity:	32 Mb (only with datalogger function)
Data Transmission:	Wireless RF(only with datalogger function)
Coatings Range:	Up to 6mm (Standard Mode)*; up to 20mm (Coating Plus+)*
Batteries:	3 x disposable ‘AA’ alkaline batteries or rechargeable NiMH / NiCD
Battery Life:	Up to 50 hours continuous use using alkaline batteries
Gauge Dimensions:	147 mm x 90 mm x 28 mm (5.75” X 3.5” X 1”)
Gauge Weight:	325 g (11.5 ounces) including batteries
Environmental:	Case rated to IP65, RoHS and WEEE compliant
Operating Temp:	-10°C to +50°C (14°F to 122°F)
Storage Temp:	-10°C to +60°C (14°F to 140°F)

Overspeed Simulator / Tester (OTM)

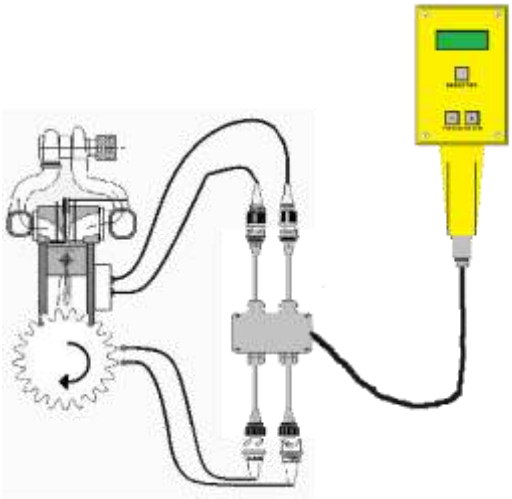
Testing of overspeed safety devises

Application:
Regular simulating and testing of engine shut down/engine over speed safety device to prevent a damage created by overspeed.

Features:

- True check of engine over speed safety device
- True Check of speed pickups & safety electronic
- Fully free programmable
- Ready for plug in (incl. customized adapters)
- Incl. check of output plausibility
- Simulating of over speed on idle incl. concurrent pickup test

Measuring principle:
The OTM receives its supply voltage from the on-board supply system. It permanently measures incoming signals from the speed pickups and shows them on the display. This value is compared with the motor data stored in the OTM (pulses per RPM/overspeed tolerances).
Already here errors in the speed pickups are recognized and alarmed. The OTM can send a freely adjustable speed value (considering the motor data) to the overspeed protection device.
I.e. it does not matter at which speed or at standstill the test is carried out, it is always tested at real switching threshold.
This ensures that the systems operate at the desired speeds.
It goes without saying that the OTM also detects and forwards any overspeed occurring during the test.
Due to the freely adjustable speed values that the OTM sends to the motor electrics / electronics, other speed-dependent switching points can of course be tested in addition to the overspeed test (start speed / load-dependent pump controls etc.).



Marine Calibration Kit (MCK)

Pressure and Temperature calibrator

Application:
This Marine Calibration Kit enables the user to perform temperature and pressure tests, measurements and calibrations for all types of instruments. It contains a complete pressure test set as well as a temperature test including all necessary accessories and certificates according to IMO regulations.

- Pressure range -1/60bar
- Temperature 650°C

Scope of supply:

- Temperature calibrator 230V 50/60Hz
- TP 60 bar pressure test kit
- Analog Test pressure gauge 160 bar*
- Infrared Thermometer
- Test certificate for temperature calibrator
- Test certificate for analogue pressure gauge
- Heavy duty Peli case trolley
- Seals
- Accessories
- Adaptors

Oil sampling tester

Portable oil condition monitoring

Application:
Portable Test Devices and Test Kits for analyse the oil directly on board, independent of a laboratory. This assist the crew with an on-site oil condition monitoring and deciding if maintenance is necessary.

Available Test Kits:

- WIO Check (Water in Oil Measuring device)
- TWIN Check 4.0 (Electronic Water-in-Oil/BN Test)
- Triple Test Kit (Density, Compatibility and Stability Determination)
- SALT Check (Salt Water Determination Test Kit)
- SPOT Check (Quick Insoluble Test)
- Degree of soot contamination
- Fuel dilution
- Remaining detergent-dispersive power of lubricating oils
- Flash Point Check (Closed Cup Flash Point Test / Pensky Martens)
- Visco Dens Plus (Heated Electronic Falling Ball Viscosity Measuring device)
- Visco Cylinder (Electronic Falling Ball Viscosity Measuring Device)
- Jung Check (Falling Ball Viscosity Measuring Device)
- Iron Check E (Digital Test for Chemical Determination of Iron Content)
- MT Cat Fines Check (Cat Fines Determination Test Kit for Al and Si based Cat Fines)

Also available Fuel and Lube Oil Test Cabinets for up to 10 tests.

Oil condition sensor

Humidity sensor Standard & Plus

Application:
Continuous online measurement for the determination of Water Content in Oil

- Relative humidity
- Relative permittivity
- Conductivity

Features:

- Define the relative humidity value
- Efficient tracking of any occurring changes in real time mode
- Additionally, to laboratory analyses
- Fully free programmable
- Immediate measurement after installation
- Calculation in % (0% no water detected and 100% complete saturation/existence of free water)
- Display on a datalogger or connection via outputs directly in your AMS

Measuring principle:
The HUMIDITY SENSOR STANDARD measures constantly the values which is processed to the display unit DATALOGGER. The saturation level is calculated in % ranging from 0 % (no water detected) to 100 % (complete saturation/ existence of free water). The sensor is specifically relevant with regard to unsaturated ester oils due to inability to use portable test devices which measure the degree of water concentration with the help of reagents.
The screw-in HUMIDITY SENSOR PLUS helps to constantly estimate any occurring changes in the saturation degree of oil with water simultaneously measuring relative dielectric number and conductivity of oil at current temperature. The obtained values are transmitted to the special display unit DATALOGGER. Upon completion of the learning phase and creation of the required database, the measured values are also available at reference temperature of 40 °C. The sensor technology provides possibility to determine optimal periods of the engine system maintenance.

Oil sampling tester

Water in Oil sensor

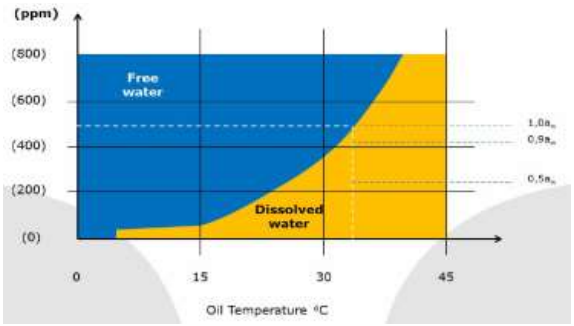
Application:
Continuous measurement of the water activity (a_w) in oil (ppm or a_w) with the WIO standard and WIO Integrated sensor.

Features:

- Applicable Lubrication, Gear box, Turbine, Diesel, Hydraulic and Transformer Oil
- 24/7 monitoring
- Easy installation and operation
- Calibration certificate
- GL approved and MAN Diesel Approved
- Increase lifetime of engine parts, cylinders, bearings, etc.
- Saved damages and downtime cots
- Longer oil lifetime Saved oil sample costs (and administration)
- Potential savings on water filters, separators, etc. (only running when needed)
- Online Measurement
- Higher accuracy than most oil sample
- Analogue outputs

Potential Application:

- Engine or oil systems –for two-stroke vessel engines up to high speed engines
- Gear boxes – repairing or/and reinstalling gear boxes in machines, turbines or vessels is very expensive
- Turbines - e.g. gas turbines in powerplants, hydropower or wind energy
- Hydraulic systems – especially high pressure hydraulic systems are intolerant of water
- Transformers – water in the transformer oil can be very dangerous and critical to its safety
- Cooling/ventilation systems – keeping the cooling or ventilation systems up and running is critical
- Cylinders – adjacent machinery injecting the oil directly into the cylinders
- Pumps – especially large scale water or heat pumps



Oil mist detector (QMI)

Atmospheric Oil Mist Detection System

Application:
The Atmospheric Oil Mist Detection System is used to identify oil mist in confined areas such as:

- Engine rooms
- Pump rooms
- Bow Thrusters
- Purifier rooms
- Hydraulic pack areas
- Test cells

The Atmospheric Sensors are used with Multiplex (12 channel) or Triplex (3 channel) Monitors. The number of Sensor required, will depend on the size of the space being monitored.

Early detection of oil mist helps to safeguard personnel and equipment before a fire occur.

Features:

- Traffic light system to easily identify an issue
- Tamper proof once alarm levels set
- Self-Diagnostic system detects fault or dirty Sensor
- Older models are fully upgradable
- Type approved

Measuring principle:
The equipment uses light scatter (nephelometry) technology. This allows the systems to:

- Deliver rapid response within 500 milliseconds of oil mist being detected
- Measure oil mist particles between 3 and 10 microns
- Quantify oil mist in mg/L
- Activate a relay when oil mist is detected

Oil mist detector (QMI)

Engine Oil Mist Detection System

Application:
The Engine Oil Mist Detection System is used to identify increased levels of oil mist in engine crank spaces. The detectors are mounted on the crankcase and draw oil mist via a common suction rail using an independent fan.

The Engine Detectors are used with Multiplex 12 channel Monitor. The number of Detectors required is dependent on the number of crank spaces within the crankcase.

Monitoring any change in oil mist levels in the running engine's crankcase can help to quickly identify an issue that need to be investigated.

Features:

- Traffic light system to easily identify an issue
- Tamper proof once alarm levels set
- Self-Diagnostic system detects fault or dirty Sensor
- Older models are fully upgradable
- Type approved

Measuring principle:
The equipment uses light scatter (nephelometry) technology.
Proven to:

- Deliver rapid response within 500 milliseconds of oil mist being detected
- Measure oil mist particles between 3 and 10 microns
- Quantify oil mist in mg/L
- Activate a relay when oil mist is detected

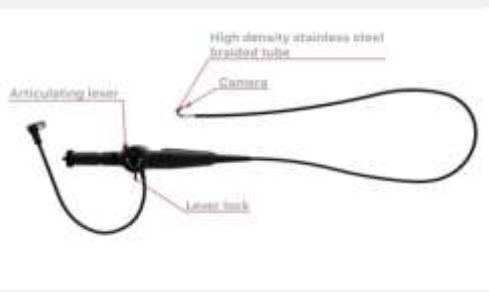
Videoscopes

Professional Video inspection

Application:
Basically, in all technical processes wear, fatigue, aging and corrosion severely limit the availability and efficiency of technical equipment. Particularly in the field of engines and drive technology and its components, a review is mandatory.

Features:

- Record videos and snapshots (JPEG & AVI resolution 640x480)
- Data storage on SD card (delivery 4GB)
- Outputs: mini USB / AV out
- Video output: NTSC & PAL
- Digital zoom
- Light intensity of the camera adjustable
- Field of view 54 ° / 56 °



Standard scope of supply:

- Handheld device TXMFVK900 Videoscope
- 3.5 '' TFT LCD Monitor
- 4 GB SD card
- Charger with adapter
- USB / AV out cable
- Cleaning kit
- Operation manual
- Transport case
- 1 pc 2way camera Ø 6mm 2m cable, flexible (Other cameral lengths available on request 1m or 3m)

Optional:

- 28 mm camera (especially bright light) with a 20-meter push rod on a drum for inspection of pipelines and other hard-to reach areas. Viewing angle approx. 100°

Service

Our goal is to provide you with a full range of support services. OUR MISSION - YOUR SUPPORT

We would like to satisfy you not only in the field of measurement technology and its selection but also with our range of services

As services we can offer you the following:

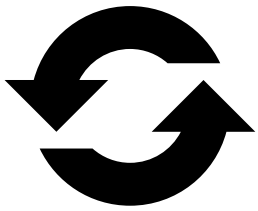
Measurement data evaluation / engine diagnosis

Programs for measurement data evaluation are helpful, but can also be completely useless if the data basis is not correct or the measured values are wrongly interpreted.

Experienced technicians and engineers help to bring light into the darkness and help to analyse your measurement data.

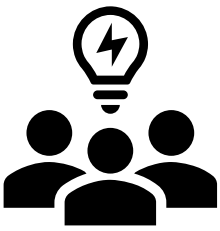
Maintenance and repair

Maintenance and inspection of measurement equipment is important to guarantee a high availability.
If you have a measuring device that is not working properly, we are happy to help!



Rental devices or reconditioned devices

You would like to carry out measurements, but you do not have the right equipment at hand or no budget to purchase it.
We can support you with rental and refurbished equipment.



Training

Training is the key to sustainable personnel development. We can help you bring you or your staff up to date, or refresh basic knowledge

For a better shipping – a steadily growing global network

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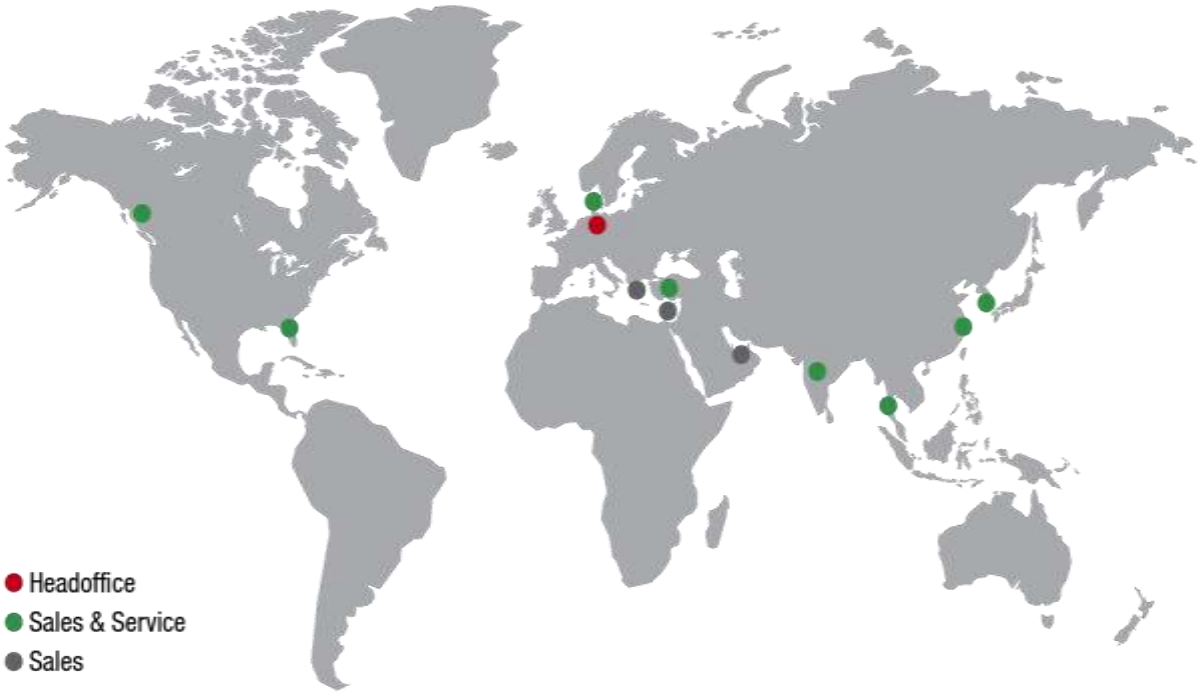

- Headoffice
- Sales & Service
- Sales