

# - For a better shipping

Company presentation and technical brochure Version 02.2024



## Our heart beats in 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 and our dedicated staff 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 increased 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**



#### 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 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 power meter and ShaPoLi solution

#### **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 and Propeller condition
- Specific fuel oil consumption
- Operational efficiency planning
- Ship condition changes

#### Features:

- Easy to install via ship's crew (training video available)
- Easy operation
- PC software for displaying measuring data
- 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 and NMEA protocol
- Zeroing (new calibration) can be done by ship's crew

#### **Measurement principle:**

For the measurement of torque (twist angle) the system has two EXFR sensors (each with two sensor heads) and two EXFR sensor belts installed on the shaft. The two sensors detect the twisting of the shaft during operation of the engine through extremely fast response (EXFR) magnetic scanning of the magnetic pattern of the 2 installed belts. The sensors use the magnetic pole changing and the zero crossing (change of the magnetic fields) between the two EXFR sensor belts for angle measurement.













## **TORXmeter**<sup>®</sup> digi

### Scope of supply

- No. 1 Control unit with small display inside
- No. A1/A2 Pre-wired cable between Control Unit and EXFR sensors mkll (appr. 7.5 m)
- No. B1/B2 Pre-wired cable between Control Unit and EXFR sensors mkll (appr. 7,5 m)
- No. 2 2 x Welding brackets (bracket must be welded to ships structure -No.4)
- No. 3 2x Sensor holder with pre-mounted 2x 2 EXFR sensors mkll (A1/A2) (B1/B2)
  - 2 x EXFR sensor belts mkll



- No. 4
- No. 5 PC Software for setup parameter, display of measurement data and calibration (no picture)
- No. 6 "Torsional vibration" viewer of raw data and twist (no picture)

Technical Specificat	tion:
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:	150 mm up to 3000 mm
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 mkll control board
Communication:	Setup via Laptop of all parameters via software and USB connection
	Small coloured display for setup and displaying measurement data
Performance	Output via RS485 (NMEA183) protocol 1/s; Baud rate 4800 up to 38400
outputs:	Output for °twist/°crankshaft; resolution <2°; binary 14 bytes
Update:	via USB connection
Option:	Repeater Display, ShaPoLi Display, Fuel Display

#### **Optional available:**

Display WH with Shaft Power Limitation (ShaPoLi) solution as optional equipment for the TORXmeter® shaft power meter. The system is a high-accurate and cost-effective measurement system in comparison with other power limitation solution, e.g. engine power limitation (EPL). The system is developed according with the latest EEXI Implementation Guidelines, published by the International Association of Classification Societies (IACS) in Rec. No. 172 with refers to the MEPC.335 (76). Our system is the reduced solution with alarm on the bridge and afterwards manual power limitation by the nautical personnel.







### **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
- The Crew is capable to carry out a static pressure check of the pressure sensor on board!

#### **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 PMImkII 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 larger amount of information as shown on the screen of the device can be displayed on a PC or laptop 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.







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	P-Low (hir)	4.11	10.28	10.17	4.51	30.84	48.75	4.78	48.37	-
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Technical Specification:	
Pressure range:	0 to 300 bar
Engine range:	50 to 5.000 rpm
Accuracy:	< 0.5 %
A/D sampling precision:	16 bits (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 27x1/10"
Operating temperature:	0 to 55 °C (Handheld unit); 0 to 350 °C (Pressure sensor)
Dimensions:	$211 \times 100 \times 45$ mm (Handheld unit) Ø = 60 mm, L = 210 mm (Pressure sensor)
Weight:	380 g (Handheld unit); 830 g (Pressure sensor)

## **TXM PMI Online System**

Our TXM PMI Online system is an advanced system designed for real-time cylinder pressure data acquisition. Data can be recorded from up to 20 cylinders for closed loop control applications and to diagnose malfunctions or to assist in the setting and optimising of engine parameters e.g. balancing cylinder.

#### **Benefits and Key Features:**

- 1. **Real-Time Monitoring:** Our system provides instantaneous data acquisition of cylinder pressure, enabling you to monitor engine performance in real-time.
- 2. **Minimise fuel consumption:** At the centre of the efforts is cylinder balancing the equalisation of output across all cylinders. Well balanced engines minimise fuel consumption between 2 % and 3 %.
- 3. **Reduce emissions:** Emissions of the greenhouse gas carbon dioxide can be reduced by some 2%. The smoother engine running will decrease wear and tear in the engine.
- 4. **Accuracy and Precision:** Utilizing state-of-the-art sensors, our system ensures accurate and precise measurement of cylinder pressure, offering a comprehensive understanding of engine dynamics.
- 5. **Data Logging and Analysis:** The acquired data is logged and can be analyzed comprehensively. This feature allows for in-depth insights into engine behavior, facilitating proactive maintenance and optimization.
- 6. **Compatibility:** Our system is designed for seamless integration with a variety of engines, ensuring versatility and adaptability to different setups.
- 7. **User-Friendly Interface:** The user interface is intuitive, making it easy for operators to navigate and interpret the data effectively.





## Type 50

## **Mechanical Indicator (System Maihak)**

#### **Application:**

Precise pressure measurement for two and four stroke Diesel engines.

#### **Measuring principle:**

A metal stylus draws a clear pressure-diagram whicht 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:	140 bar, 160 bar, 200 bar, 250 bar, 300 bar				
Engine range:	up to n = 300 rpm or max. dp/dt = $9 \times 10^3$ bar/sec				
Max. diagram:	50 mm/80 mm (height/length)				
Drum diameter:	50 mm	Weight:	1,5 kg (without wooden box);		
Paper size:	180 mm x 65 mm		4,4 kg (with wooden box)		
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
- High accuracy in all speed ranges
- Insensitive to vibration
- Light weight

- Measuring range up to 300 bar
- Extremely robust, low maintenance
- Pressure gauge in safety construction





## **Performance Software and Hardware**

The ship must follow a time table. 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 the Key Performance Indicators (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.
- Ensure your vessel complies with the new CII rules

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**

#### **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. example:

It consist of one data collector unit and one 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 recognize 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 in time 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 the different purposes of use:

- Coriolis mass flow meter
- Ring piston volume flow meter
- Screw spindle volume flow meter
- Magnetic-inductive flow meter
- Ultrasonic flow meter
- Other types on request

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





## **Coriolis mass flow meter**

## Simulaneos measurement of mass flow, density and temperature for liquids and gases

#### Application:

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 and pipe diameters are available for the different media.

- Line sizes: DN 4-DN 400
- Flow range: 0 t/h 4100 t/h
- Pressure Rating: up to 345 bars

#### Features:

- Direct mass measurement without pressure and temperature compensation
- · Provides highly accurate measurement results
- Independent of the medium, which means that no conversion is necessary if the device is used for other liquids
- · Wide range of housing options for hazardous areas

#### **Measuring principle:**

Coriolis flow meter is a perfect choice of fuel oil flow measurement. The Coriolis mass flow meter typically consists of a flow tube and two sensors that measure the Coriolis forces generated by the fluid as it flows through the tube. The Coriolis forces are directly proportional to the mass flow rate of the fuel oil, allowing for highly accurate and reliable measurements.

Fuel oil mass flow meters are capable of measuring a wide range of flow rates, from very low to very high, and can handle a variety of fuel oil grades and viscosities. They are also designed to withstand the harsh conditions typically found in industrial environments, such as high temperatures, pressure fluctuations, and corrosive fluids, high pressure fuel oil measurement, high viscosity fuel oil measurement.



## **Tricor from KEM Küppers**

## Simple operation for measuring the flow of your fuel.

#### Features:

- Exceptional ease of use and fast setup time: we will pre-program your process parameters
- Easy to install: no straight run of pipe required and multiple mounting options available
- Mechanically balanced tubes and superior mechanical design for best-in-class density measurement
- Exceptional mechanical design resists external interference
- API gravity reading in software
- Frequency output up to 10,000 Hz resolution
- Easily accessible, integrated meter diagnostics to verify meter health & performance
- Customized process connections available
- Various certifications available (Hazardous area, marine class)
- Compact and remote version available

#### Technical data (depends on the Product line):

Medium: Liquids and Gases

Process temperature: -60 to 200 °C (remote version)

Process pressure: up to 200 bar (option up to 345bat (not for ASME)

Line sizes: DN 4 to DN 80

Accuracy mass flow for liquids: up to  $\pm$  0.3 % (option up to 0,1% of flow rate)

Accuracy mass flow for gas: up to  $\pm$  1% (option up to  $\pm$  0,5% of flow rate)

Accuracy Density for liquids: up to ±1.0 kg/m<sup>3</sup>

Process connections: Flange (EN, ANSI), Threaded (G or NPT) DN10 up to DN150  $\,$ 

Approvals: Marine application and Hazardous area approvals

Communication interfaces: Analog Outputs, Pulse Output, Status In - and Output, RS485 and USB











## **RRO LINE PROMASS**

X300 series Highest capacity four-tube flowmeter with a compact, easily accessible transmitter. For highest flow rates and outstanding performance in on/offshore oil and gas applications.

#### **Benefits:**

- Increased profit single installation point providing premium accuracy for large quantities
- Fewer process measuring points multivariable measurement (flow, density, temperature)
- Space-saving installation no in/outlet run needs
- Full access to process and diagnostic information numerous, freely combinable communication interfaces
- Integrated verification Heartbeat Technology

#### **Device properties**

- Nominal diameter: DN 300 to 400 (12 to 16")<sup>1</sup>
- Four-tube system with low pressure drop
- Max. measurement error
  - Mass flow (liquid): ±0.10 % (standard), 0.05 % (option)
  - Volume flow (liquid): ±0.10 %
  - Mass flow (gas): ±0.35 %
  - Density (liquid): ±0.0005 g/cm<sup>3</sup>
- Measuring range: 0 to 4100 t/h
- Complete exterior design made of 1.4435 (316L)
- · Backlit display with touch control and WLAN access
- Remote display available
- Approvals: Marine application (LR, DNV, ABS, BV, CCS), Functional safety and Hazardous area approvals









<sup>1</sup> Devices for smaller diameter and flow ranges also available

## **DFM Marine fuel flow meter**

DFM Marine measures engine fuel consumption and operating time of engines, boilers / burners, defining fuel consumption in different operation modes.

#### **Operating parameters:**

- · Hourly fuel consumption of engines, diesel generators, boilers
- Operating time of each fuel consumer in "Idle", "Loadind," and "Overload" modes
- RPM, temperature of technical fluids, and other data from standard and additional sensors
- Bunkering duration and volume of received fuel

#### **Events:**

- On/off status of engine, generator and boiler
- Fuel flow meter cheating, engine overspeed, boiler overheating.

#### Features:

- Data transfer protocols: SAE J1939 and NMEA 2000
- MAX pressure:
  - flange connection: 25 bar
  - connection thread:16 bar
- Viscosity of working fluid: 1,5-6,0 mm2/s (cSt)
- Operating temperature: 40 .. +60/150 °C'
- Measuring chamber material: brass
- Inaccuracy rate \*\*: ± 0,5 %

#### \*Special model on request

 $^{**}$  For fuel consumption up 50 L/h inaccuracy rate is possible up to  $\pm$  1 %













## **CONTOIL**®

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

#### **Application:**

The CONTOIL  $^{\ensuremath{\mathbb{B}}}$  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: 41/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  $^{\circledast}$  VZF II with electronic display and outputs CONTOIL  $^{\circledast}$  VZO with roller counter and outputs

#### Features:

• Marine approvals (CCS, DNV GL, LR, RMRS, RRR)

#### **Measuring principle:**

CONTOIL<sup>®</sup> 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.











## deltawaveC

## Contactless flow measurement for liquids and gases with clamp-on ultrasonic technology

#### **Application:**

Mobile sample measurements and measurement tasks over a longer period of time or continuous measurement in fixed installation. Both devices use the proven, highly precise ultrasonic transit time difference method with latest digital signal Processors.

#### Features:

- Saves Installation costs due to clap-on technology
- Wear and maintenance free, therefore save operating costs
- Automatic signal generation and evaluation
- Automatic signal optimization facilitated "impossible" clamp-on measurements
- Adjusted signal frequency and special damping for
- optimal signal quality
- Stable and reliable measurement under extremely difficult conditions
- Verified signal quality ensures reliable measurement
- Modern cross-correlation process tackles the toughest measurement tasks
- Automatic Fluid Control (AFC) technology for high accuracy under changing process conditions

#### Technical data (depends on the Product line):

Medium: Liquids and Gases

Medium Temperature: -40...150°C (HT 55...380°C)

Inside Diameter: DN10-DN6000

Flow velocity: 0.01...35 m/s, depending on the pipe diameter

Accuracy (volume flow):  $\pm$  1...3 % v. MW  $\pm 0.01$  m/s application dependent

Reproducibility: 0.15 % v. MW ±0.01 m/s

Outputs: current, pulses, RS232/RS485, Modbus

Certification: Ex-Version

Marine







Mounting in V mode, standard mode



Mounting in Z mode, typical for large pipes



Mounting in W mode, typical for small pipes





## **Condition Monitoring and Predictive Maintenance**

Planning and performing regular maintenance is one, however, not the best way of performing maintenance. 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, monitoring and condition-based maintenance can prevent unplanned problems and failure.

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 very helpful solutions and can avoid expensive repair costs and costly failures of the propulsion system or other systems.

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 in time 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:

- Vibration Diagnostics
- Crankshaft and ovality measurement (analogue and digital)
- Metal Thickness gauges (metal and glass reinforced plastics)
- 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.





## **Type 9080**

## Intelligent Trending Vibration & Bearing Condition Analyser with various kit options available. Analyses, Interprets and TRENDS Machine Condition

- Identify the vibration problem: 2/10Hz to 1kHz for a clearer understanding of unbalance, misalignment or looseness
- Vibration values are displayed with color coded alarm levels for ISO values
- User settable Alarm Levels for easy identification of the bearing condition displayed as a BDU (Bearing Damage Unit) value
- 1kHz to 10kHz covers the Bearing Condition to identify bearing wear, damage, lubrication issues etc.
- · Identify complex issues: 800-line spectrum with zoom and cursor
- Load up routes for operatives to follow and trend lines show problems before they happen when using the accompanying VibTrend PC Software

#### **VibTrend PC Software**

Supplied as Standard with 9080 Kits with NO ongoing subsription fees. Store, analyse and report on all your vibration parameters in one place. Create Routes for operatives to follow for easy vibration point and machine identification then send out e-mail notifications automatically once docked

#### 9080-Standard Includes:

A9018 accelerometer, curly cable and magnet & A9081A USB docking cradle in the A9087 carrying case with VibTrend Standard PC software (up to ten assets with ten measurement points per asset) WITHOUT any ongoing subscription fees.

#### 9080-Pro:

As 9080-Standard PLUS A9084 VibTrend Pro Unlimited PC software (up to 1,000 assets with ten measurement points per asset) WITHOUT any ongoing subscription fees













#### 9080-Plus:

As 9080-Pro PLUS

A9086 protective boot, A9082 tacho strobe, and A9072 100mm extended stinger A9084 VibTrend Pro Unlimited PC software (up to 1,000 assets with ten measurement points per asset) WITHOUT any ongoing subscription fees

## If you have Pumps, Fans and Motors you need TPI Vibration Analysers!

- Traditionally, vibration analysis has been a specialist field and typically performed by vibration consultants using very expensive equipment
- Vibration analysers from TPI allow anyone to perform meaningful vibration analysis at an unexpectedly low cost
- Easily and affordably detect worn bearings, faulty gearboxes, unbalance, misalignment and looseness
- Identify the vibration problem: 2/10Hz to 1kHz for a clearer understanding of unbalance, misalignment or looseness
- 1kHz to 10kHz covers the Bearing Condition to identify bearing wear, damage, lubrication issues etc.
- · Identify complex issues: 800-line spectrum with zoom and cursor
- By detecting early signs of machine failure, machinery can be repaired or replaced before an expensive breakdown occurs

#### Pumps

This style pump can have bearing problems or balancing issues. The motor is bolted directly to the pump and does not normally have alignment issues.

#### Motors

The motor and pump are bolted to the frame and attached with a coupling. This can present bearing problems in the motor and pump, balancing issues due to damaged impellers, and also shaft misalignment between the two.

#### Fans

Fans can also have bearing and balancing problems. A fan can be out of balance due to damage, dirt, or thrown weight. A bent shaft will also create a balance issue.





sdun



Motors



ans



## DIBOX SERIES ONLINE VIBRATION MONITORING

#### Advantages:

- Early detection of deviations and potential problems in the machinery
- Extending the service life of systems
- Improving safety
- Optimizing maintenance processes
- · Cost savings, higher productivity and safer operating conditions



Online vibration monitoring is a continuous process for monitoring the vibrations of machines and systems in real time. Sensors are attached to critical points on the machines to record vibrations and oscillations. This data is then transmitted to a central monitoring system, which analyses and evaluates it.

#### Features:

- · Vibration level and process parameter monitoring
- Up to 12 inputs for sensors for vibration, temperature, speed and process parameters
- · Calculation of vibration acceleration, velocity and displacement
- · Monitoring of effective and peak values of the parameters
- 3 parameterizable alarm thresholds with alarm delays
- Determination of the vibration spectrum
- Graphic OLED display
- Built-in 8 GB memory card (recording of levels and time histories, 25.6 kHz bandwidth)
- Ethernet, WiFi and GSM interface
- Industrial interfaces
- Relay and analog 4-20 mA outputs
- · Configuration via web page and free software
- 36-month warranty









## DI-5 / DI-5C

## **Electronic Deflection Indicator**

#### Application:

Crankshaft alignment check and ovality measurement of the cylinder liner with just 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

#### Working principle:

Four push buttons on the DI-5 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 DI-5C 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 DI-5C will download your measured data to a PC using standard USB interface. The software is compatible with Windows up to version Windows 10, 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 n	ım	
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, s	helf life 5 years	
Extension bars (invar alloy)		10, 20, 40, 80 an	d 2x160mm	
Cable length		7 mete	rs	
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	1







## **Analogue Deflection Indicator**

## Crankshaft Gauge TXMKP300/50

#### **Application:**

This analogue 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 analogue 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
- All gauges comply with BS EN 15317:2013
- Ignores up to 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.



Sound Velocity Range:	From 1000 m/s to 8000 m/s (0.0394 in/µs to 0.3150 in/µs)
	Single crystal soft faced - 2.25 MHz, 3.5 MHz & 5 MHz (Metal thickness Measurement)
Probes:	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.

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 (Maker Sika and IKM)

#### **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 -1/60 bar
- Temperature 650 °C

#### Scope of supply sample

- 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 case trolley
- Seals
- Accessories
- Adaptors









## Fuel, Lube and Hydraulic Oil Testing Equipment

## Portable Testing Equipment for Regular Oil Condition Monitoring

#### **Application:**

Portable Test Devices and Test Kits for regular measurement and trend analysis of crucial parameters of fuel, lube and hydraulic oil directly on board a vessel, independent of a standard laboratory testing. Routine on-site oil conditon monitoring or in-service oil testing allows engineers and users to determine any off-specification issues (e.g., degradation of the oil quality or abnormal wear) or changes in the oil condition (e.g., contamination) promptly. So efficient condition-based maintenance measures can be proactively planed and scheduled well before an engine failure occurs.

#### **Available Test Kits:**

- WIO CHECK (Water-in-Oil Measuring Device)
- **TWIN CHECK 4.0** (Electronic Water-in-Oil / BN Test)
- COMPA DENS CHECK (Density, Compatibility and Stability Determination – Triple Test Kit)
- SALT CHECK (Salt Water Determination Test to determine the nature of water in oil (fresh or salt))
- **SPOT CHECK** (Quick Insoluble Test to determine: 1. degree of soot contamination; 2. fuel dilution; 3. 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)
- JUNG CHECK (Falling Ball Viscosity Measuring Device)
- VISCOSITY COMPARATOR (Go / No Go Viscosity Determination)
- **TOTAL IRON CHECK** (Digital Test for Chemical Determination of Total Iron Content, but also Determination of Corroded Iron and Distinction of Abrasive Iron, Patent Number: 2982974)
- MT CAT FINES CHECK (Cat Fines Determination Test Kit for Al and Si based Cat Fines)
- POUR POINT CHECK (Pour Point Determination)
- INSOLUBLES CHECK (Visual Particle Determination)
- MT AN CHECK (Acid Number Titration Test)

#### Also available:

FUEL AND LUBE OIL TEST CABINET for up to 10 tests.



Test Device TWIN CHECK 4.0: Electronic Water-in-Oil / BN Test



Test Device TOTAL IRON CHECK: Chemical Determination of Total Iron Content, Patent Number: 2982974



Test Kit MT CAT FINES CHECK: Cat Fines Determination Test Kit for AI and Si based Cat Fines



FUEL AND LUBE OIL TEST CABINET Option II: MT CAT FINES CHECK + TOTAL IRON CHECK incl. Reagents and Accessories







## **Oil Condition Monitoring Sensors**

#### **Application:**

Oil analysis with intelligent inline and / or online sensor technology enables continuous condition monitoring and real-time data on specific parameters of fuel, lube and hydraulic oil. Automatic earlywarning system of the sensors provides for immediate identification of any occurring changes in the oil conditon, be that contamination, oil degradation over time or signs of wear. So relatively small issues (i.e., impending problems) can be efficiently tackled at the pre-alarm level during the uninterrupted operation process of machinery. The sensors can be installed individually in accordance with customer-specifc fied of application (M/E, generators, gearboxes, hydraulic systems etc.) or combined into Modular Monitoring System. Through the connection with the special data processing and display unit, the data from sensors can be continuously recorded and assessed. The installation of sensor technology can help to optimize condition-based maintenance intervals, to minimize downtime, to increase productivity, to provide real-time statistics/ trendline and to reduce oil sampling.

#### **Available Sensors:**

- VISCOSITY & DENSITY SENSOR (Continuous Monitoring of Viscosity, Density and Temperature)
- PARTICLE SENSOR (Continuous Monitoring of Particles Concentration with Particle Size Display in accordance with ISO 4406:99 and SAE AS 4059)
- HUMIDITY SENSOR STANDARD (Continuous Water-in-Oil Monitoring)
- HUMIDITY SENSOR PLUS (Continuous Determination of Water Content in Oil and Oil Aging by means of Measuring Conductivity and Relative Permittivity)
- FE SENSOR (Continuous Monitoring of Ferromagnetic Particles)
- AHHOI IR (IR Water In-Line Sensor, Patent No. 2009439)
- DATALOGGER (Sensor Data Storage Device)





VISCOSITY & DENSITY SENSOR



PARTICLE SENSOR



HUMIDITY SENSOR PLUS



FE SENSOR



DATALOGGER: SENSOR DATA STORAGE DEVICE



## **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
- By detecting water in oil in advance and taking preventive actions, the lifetime of engine parts, e.g. cylinders, bearings, etc. can be increased
- Saved damages and downtime costs
- Longer oil lifetime
   Saved oil sample costs (and administration)
- Potential savings on water filters, separators, etc. (only running when needed)
- Online Measurement
- Analogue outputs

#### **Potential Application:**

- Engine or oil systems –for two-stroke Diesel engines up to high speed engines
- Gear boxes
- 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
- Pumps especially large-scale water or heat pumps















## **Oil mist detector**

## **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 or even an explosion occurs.

#### 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 to actual models
- Type approved

#### **Measuring principle:**

The equipment uses light scatter (nephelometry) technology. Light scatter has the advantage of being linear in output and has a true zero. This means it is possible to quantify the oil mist as a measurement in mg/l.

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:**

Hi la

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. Light scatter has the advantage of being linear in output and has a true zero. This means it is possible to quantify the oil mist as a measurement in mg/l.

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













## 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 20meter push rod on a drum for inspection of pipelines and other hard-to reach areas. Viewing angle approx. 100°







## **Emission measurement**

Depending on the type of fuel used, ships emit a wide variety of exhaust-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 and the climate

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

#### The environmental protection therefore 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. There are also regulations for exhaust gas cleaning systems (e.g. Catalyzers), which require a regular NOx Spot Check Test.

Furthermore, the measurement and documentation of emission values should make it possible to prove the level of operation of machinery within the permissible limits.

#### 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<sub>2</sub>
- CO
- NO<sub>x</sub> (NO / NO<sub>2</sub> separately)
- SO<sub>2</sub>
- CO<sub>2</sub>
- CH<sub>4</sub>

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 your emission footprint.





## **350MARITIME**

## Portable emission measurement for 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
- 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<sub>2</sub> separately), CO, CO<sub>2</sub>, O<sub>2</sub> and SO<sub>2</sub> 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
02	0 to 25 Vol. %	
CO	0 to 3000 ppm	
NO	0 to 3000 ppm	According to MARPOL Annex VI and NOx Technical
NO <sub>2</sub>	0 to 500 ppm	
<b>SO</b> <sub>2</sub>	0 to 3000 ppm	
CO <sub>2</sub> (IR)	0 to 40 Vol. %	
P <sub>abs</sub>	600 to 1150 hPa	±5 hPa at +22 °C ±10 hPa at -5 to +45 °C





## MCA 10 maritime

### Continuous emission monitoring system on ships

#### Application:

Continuous measurement of sulphur dioxide (SO<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) approved by DNV SO<sub>2</sub> and CO<sub>2</sub>, other components such as NO, NO<sub>2</sub> and NH<sub>3</sub> can be measured

#### Advantages:

- · Delivers continuously precise measurement data
- Digital remote access (optional) via Ethernet or UMTS router enables worldwide support
- Compact device design and operator-friendly
- The hot-wet photometer that does not require any maintenance-intensive gas conditioning
- · Maintenance activities are reduced to a minimum



Technical Specifications:	
Analyser system:	steel sheet housing (IP54) with additional wall fixation and vibration dampers;
	600 mm x 1510 mm x 500 mm (w x h x d), approx. 120 kg
Measuring methods:	• bi-frequency measuring method (NO <sub>2</sub> , SO <sub>2</sub> <sup>[1]</sup> , H <sub>2</sub> O, CO <sub>2</sub> <sup>[1]</sup> )
	• gas filter correlation (CO, NO, $NH_3$ , $CH_4$ )
	<ul> <li>zirconium dioxide sensor (0<sub>2</sub>)</li> </ul>
Display / Operating:	15" touch panel, 1024 x 768 Pixel
Tested interfaces:	<ul> <li>inputs for analogue and digital signals</li> </ul>
	• analogue outputs 420 mA
	<ul> <li>digital outputs (e.g. failure, maintenance, maintenance requirement,</li> </ul>
	measuring range switch-over)
	<ul> <li>Modbus RTU, Modbus TCP/IP, Profibus DP, Profinet</li> </ul>
Compressed-air connection:	pressure: 46 bar, consumption: ca. 1 m <sup>3</sup> /h
Gas conveyance:	via ejector; gas path continuously heated (standard 185 °C)
Standardisation:	dry, wet
Sensitivity correction:	with test gas, once in 12 months (when using automatic calibration)
Calibration:	<ul> <li>zero point: automatically with instrument air;</li> </ul>
	<ul> <li>span point: with test gas, automatically by adjusting filter (optional)</li> </ul>
Power supply:	230 V or 400 V / 50 Hz, 4000 W (analyser cabinet, fan, probe) + 125 W/m
	measuring gas pipe; further options on request
Ambient conditions:	• acc. to DNVGL-CG-0339
	<ul> <li>relative humidity: max. 95% (non-condensing) (class B)</li> </ul>
	electromagnetic compatibility: class A
	enclosure: class B
Available system components	DNV certified probe, measuring gas pipe, switch-over between two measuring points
(optional):	(certified; response time for each measuring point: $T90 < 140 s$ )

## 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:



#### **Data collection**

Data collection is crucial because it provides the foundation for informed decision-making and enables the generation of insights and analysis.

We can assist with our portable equipment in the area of vibration, temperature, cylinder pressure, NDT and emission.



#### Data evaluation / engine diagnosis

Discover the full potential of your data with our data evaluation expertise! By carefully analysing and evaluating your data, we provide you with valuable insights. Examples of these include vibration analysis after machine overhauls or the evaluation of engine performance data.



#### Static Emission check und Re-calibration:

Our service includes emissions testing and calibration for accurate and environmentally friendly performance of your devices. With state-of-the-art technology and experienced professionals, we offer fast and reliable testing to ensure that your systems comply with applicable emission standards. This is used for scrubber installations, for example.



#### Ultrasonic thickness measurement (UTM) service

Using state-of-the-art methods, we carry out comprehensive ultrasonic testing to ensure the structural integrity of your vessels or specific annual maintenance work, such as scrubber tailpipe testing to comply with regulations. From hull to deck, we carefully inspect every area to identify potential weaknesses early and plan repairs.



#### Speed/power trial

Speed/power trials play a vital role in ensuring the safety, efficiency, and compliance of ships, as well as facilitating informed decision-making. We can support with experienced engineers and calibrated measurement equipment to support you in the best way.







#### **Underwater Drone Inspection**

The predictive hull monitoring approach reduces fuel consumption due to decreased unnoticed marine fouling. We can support with micro-ROV systems, for unmanned hull monitoring, in combination with Al-based marine fouling recognition.



#### **3D Ship Modelling**

We can digitalize your fleet with state-of-the-art virtual tours and digital twins. Useful, for example, in the engine room to prepare for service work or shipyard times.



#### Maintenance / Calibration

Maintenance and calibration 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!



#### Ship efficiency increase assistance

Acc. to international regulation ships must calculate their Energy Efficiency Existing Ship Index (EEXI).

We can assist you with the calculation and assessment on improvement options.



#### **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



