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Partner brands

GOLD ENGINEERING GMBH
Consulting and Technical Solution Platform

RHEONIK
VAGON®
FUCHS
GD
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PAJ SENSOR
KRACHT®
KRAL

"We offer you preventive and predictive maintenance solutions for all diesel engines in the Marine, Offshore and Power Generation Industries."

DIMAR - TEC Pte. Ltd.
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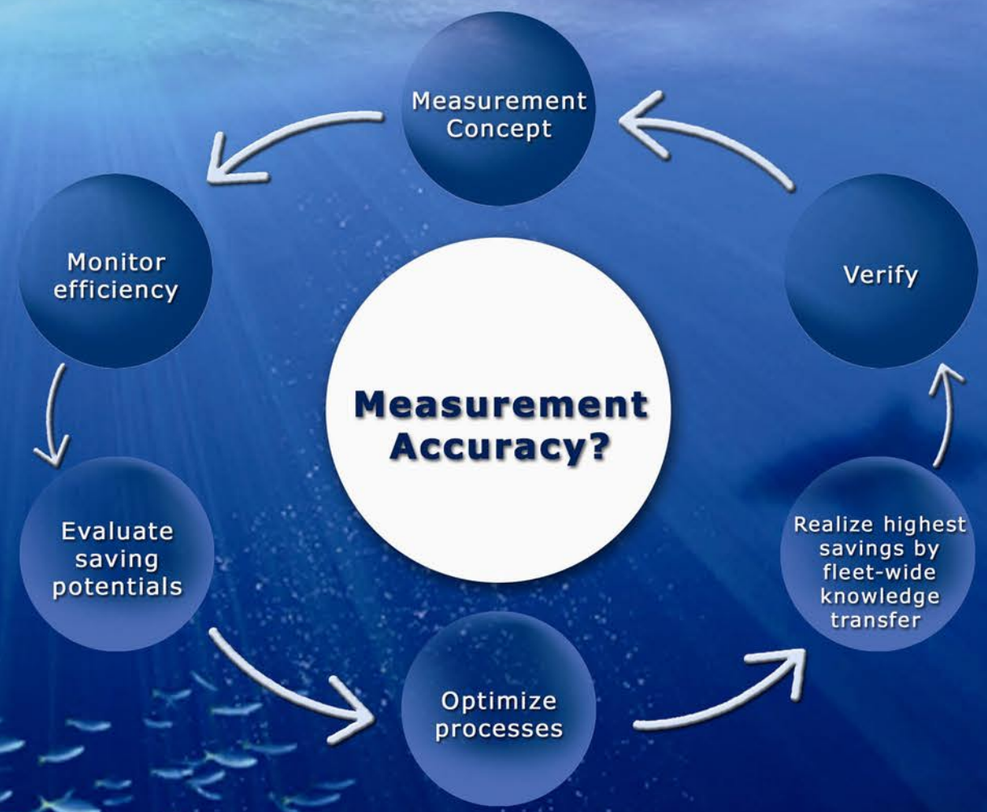
Alpha Industrial Building
Singapore 608599
Tel +65 6565 0922
info@dimar-tec.com www.DIMAR-TEC.com

DIMAR-TEC

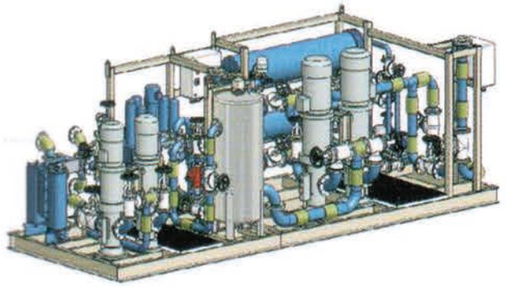
AT THE OPTIMUM. ANYTIME. ANYWHERE.

You can not control what you don't measure.

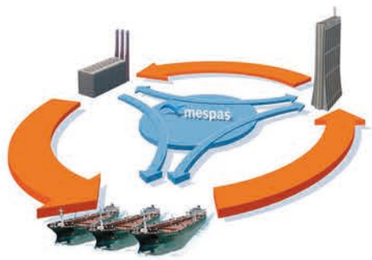
Fuel Monitoring results in Fuel Management.



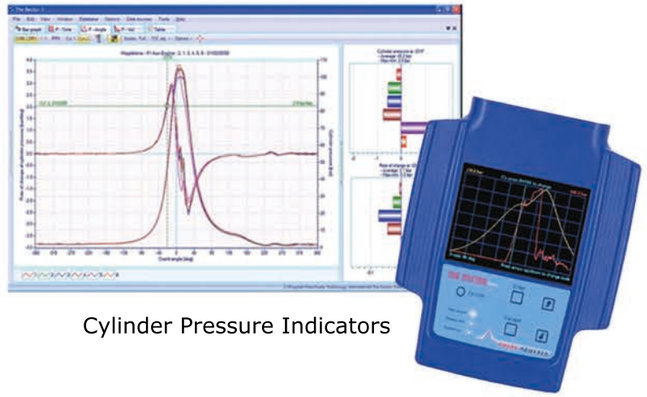
AT THE OPTIMUM. ANYTIME. ANYWHERE. AT THE OPTIMUM. ANYTIME. ANYWHERE.



Fuel Oil and Lube Oil Module



Technical Fleet Management Software



Cylinder Pressure Indicators

Shaft Power Meter on the GO!

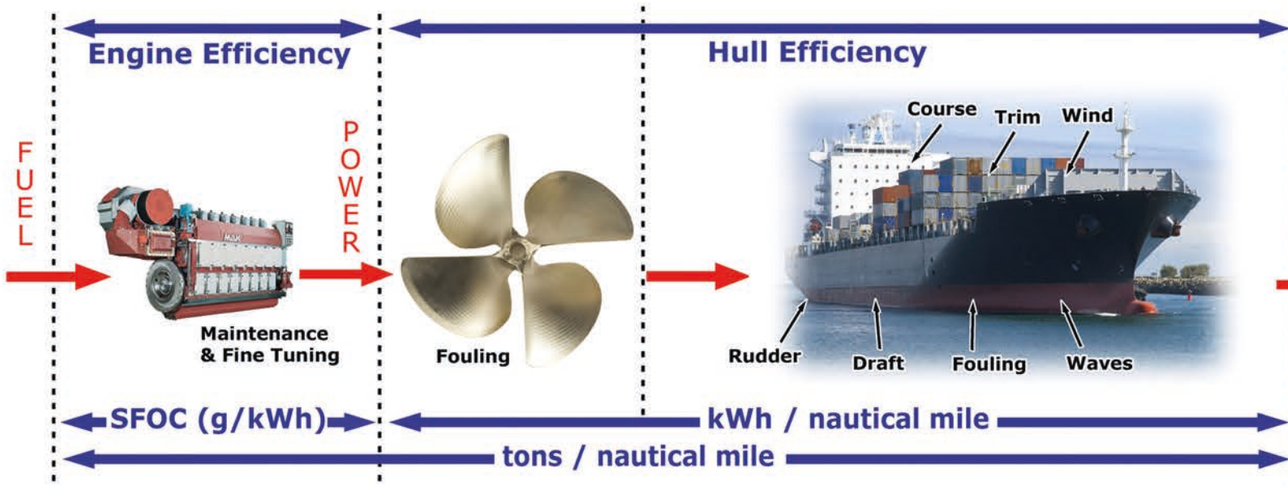
Fuel Efficiency Controller FEC

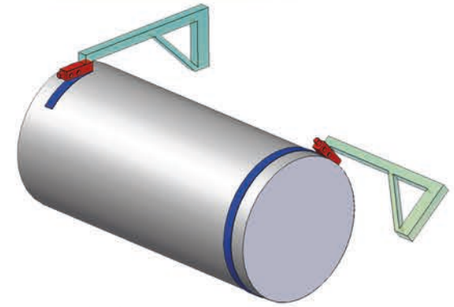
Mass Flowmeter

Viscosity

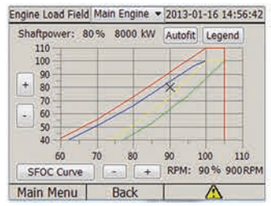
Flowmeter

Vane type flowmeter





Shaft Power Meter



Engine Load Field Visualization

Spares & Technical Support for European Diesel Brands

Water-in-Oil Sensor

Crank Web Deflection Indicator

Ultrasonic Thickness Gauge

Frequency Inverter

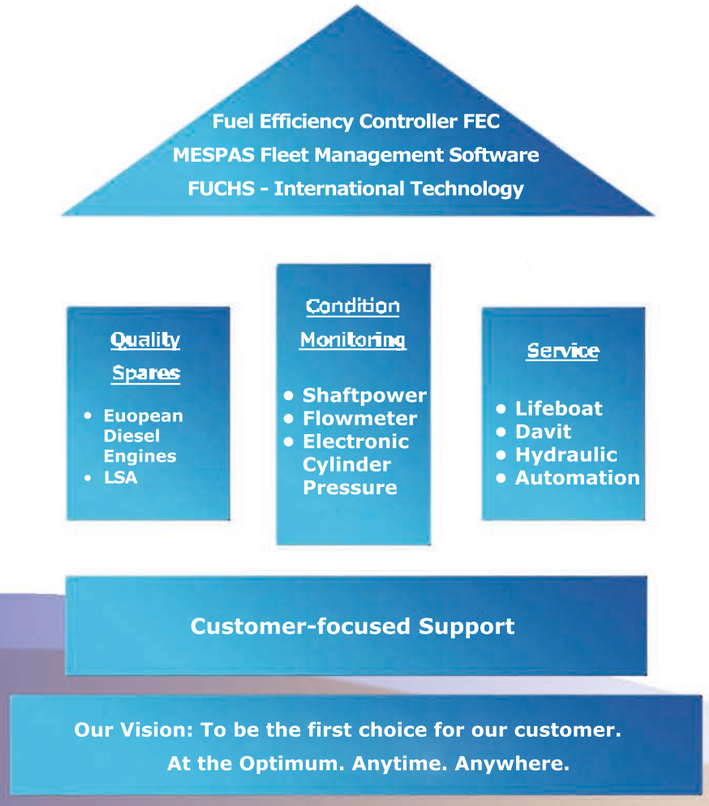
DIMAR-TEC

COMPANY PROFILE

DIMAR-TEC provides a one-stop solution to optimize vessel and fleet performance. We are specialized in technical services and products to monitor and evaluate the core operation of the vessel.

Starting with basic measurement devices- for preventive and predictive maintenance - up to system concepts for vessel performance monitoring, we customize the most effective solution for your fleet.

With our head office in Singapore and a global service network through China and Germany, we are well positioned in the marine industry.



Embracing the words of the great Greek philosopher Aristotle -
"The whole is more than the sum of its parts"
DIMAR-TEC's open work culture and continous training ensure performance progression and team spirit.

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1. FEC System Solutions

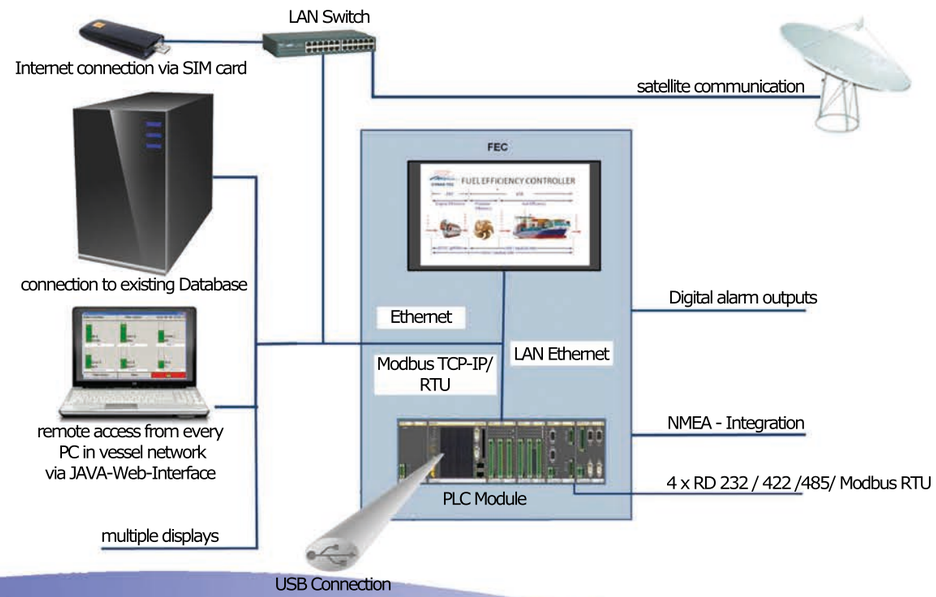
DIMAR-TEC's unique Concept

While supplying measurement devices for vessel performance optimization to the marine industry our team experienced difficulties to interface the information of existing sensors on board and combine the data to relevant KPI values.

Therefore we developed our own system solution, the Fuel Efficiency Controller FEC.

DIMAR-TEC's Fuel Efficiency Controller is designed to integrate with standard Fleet Management software solutions to handle the data storage, long term history views, communication with shore office and integration with other electronic data as vessel noon report etc.

For this task the FEC creates regular data files in CSV format with accurately averaged data to minimize data volume, but ensure the quality of the esential information. The files can be sent directly onshore or collected by the vessel's document management system.



FEC performance short description:

- Provides reliable and timely data (accuracy will be determined based on sensor quality in use)
- Calculates KPI's to identify saving potentials on vessel & fleet level
- Indicates mal-functions on vessel level enabling immediate action
- Provides analysis tool for optimization on vessel level
- **Interoperability** of our systems ensures flexibility and synergies
- **Tailor-made engineering** for every vessel ensures the highest quality of data

Savings point of view:

- Saving by Fleet comparison: difference between similar vessels **potential 5~10 %**
- Saving on Engine level: Timing, power balancing, optimized ignition pressure, wear & tear **potential 1~3 %**
- Saving on Propeller & Hull efficiency: Fouling, Trim & autopilot optimization **potential 3~5 %**
- Saving on Nautical operation: e.g. reduce by 0.5 rpm, course change of 2º **potential 2~4 %**
- Trend analysis as a tool for Condition-Based Maintenance leads to lower spare consumption, less service expenses. Increased vessel availability and reliability enables higher charter rates.

Cost point of view:

- FEC uses existing sensors on board
- FEC uses existing communication structure fleet-to-shore
- FEC is designed for installation by vessel crew – no external service required

Accuracy point of view:

- **Full SFOC data correction according to ISO 3046 for accurate & effective fleet comparison**
- Vessel-specific system layout includes accuracy / tolerance calculation evaluating quality of existing sensors & systems on board

Efficiency point of view:

- Excellent due to unique concept

Future technical development point of view:

- Full flexibility as hardware/software interface design guarantees full compatibility with future software developments

Installation process point of view:

- Fill out vessel evaluation sheet (for pre-programming)
- Prepare sensor cabling according to cable plan
- Install FEC switch box, connect cables, switch on power supply
- Define network address for file saving location

Operational point of view:

- Full automated data collection & calculation
- Downgrading to manual data input possible for all values (to save sensors or install them later)

Evaluation point of view:

- Fleet level
- Identify non-satisfying overall performance (by comparison)
- Monitor hull efficiency (by trending)
- Emission management (e.g. carbon dioxide certificate trading)
- Vessel level
- Use for throttle optimization – improve SFOC vs. vessel speed
- Use for autopilot settings optimization
- Automatic level
- By SFOC deviation alarm (24h monitoring of main engine performance)
- By engine overload alarm (e.g. operation in shallow water)

Value-for-money point of view:

==> You decide!

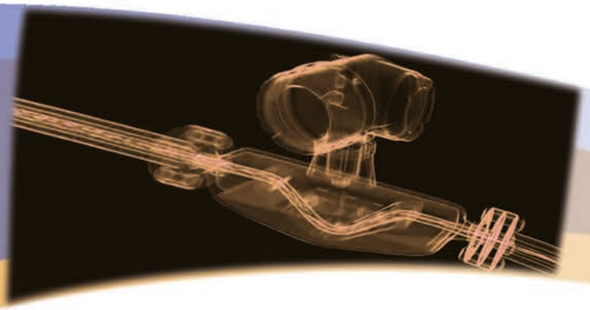
1.1.1 Flow meter

1.1.1.1 Mass Flow

Simultaneous measurement of mass, density, temperature and viscosity with high accuracy

The advantages of Coriolis massflow measurement are self-evident. It comes as no surprise, therefore, to find that this principle is used in a huge range of industries. One for all – multivariable metering Coriolis flowmeters have the ability to measure several process variables all at the same time. This opens up completely new perspectives in process control, quality assurance and plant protection. Mass flow, density and temperature, the primary measured variables, can be used to derive other values such as volume flow, solids content and complex density functions.

In marine Heavy Fuel applications changes in density reflecting change of fuel quality, which usually results in changing combustion characteristics. Essential savings in fuel consumption & wear rates can be achieved, if the density information is used to fine-tune the engine adjustments according to the actual fuel consumed.



1.1.1.2. Positive Displacement

Other providers of systems for fuel consumption measurement mainly advertise their electronic displays information. The measurement concept of the flow meter in the fuel systems are often not mentioned at all. It is not - the electronic display but the meter which defines the quality of the the measurement.

High quality Screw type flow meter providing incremental signal outputs to determine any short-term change of flow direction eventually caused by pressure pulses. The frequency of the pulse signals provided must be high enough to detect short pulses; thus requiring fast and therefore costly evaluation electronics, which are seldom found as marine fleet standards until today.

The sturdy design & materials based on the design of screw pumps ensuring minimum wear & tear, thus long-term accuracy.

Vane type flow meter are by design "without wear"; the vanes are sliding against the chamber walls. In case of wear the vanes just sliding "further out" thus ensuring constant sealing quality and long-term measurement stability.

Rotating piston flow meter are usually the most economic versions and therefore often standard equipment. But due to their larger internal tolerances they have in general lower accuracy.

Precision gear type flow meter are highly accurate, but can block easier due to temperature changes or particles inside the fluid as they have smaller internal tolerances. Thus, they are usually used in gas oil systems.

All volumetric flow meter require pre-filter to avoid blockages. Classification rules require a bypass pipe arrangement to ensure operational reliability even if the flowmeter fails.

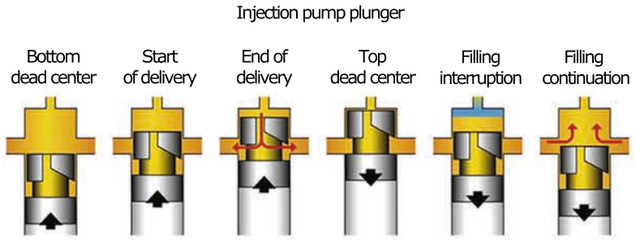
They also require Temperature Compensation to achieve comparable data:

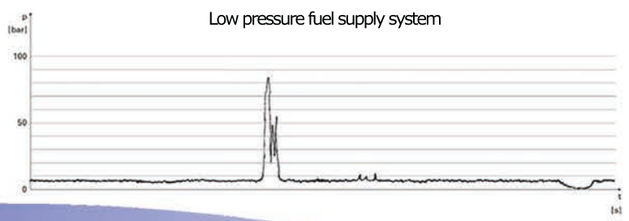
Fuel bunkered in volume units. Specific fuel consumption is a mass unit. Using the temperature sensor and density table, the measured values of the measured volume values can be converted into mass units and displayed.

Even if in case of preheated heavy oil, there are temperature differences between the forward and return flows. With temperature compensation, the temperature differences are taken into account in the precise measured value.

Pressure Pulse Compensation

Injection pumps cause pressure pulses in the fuel lines, which may cause a reversal of the direction of flow. With the flow direction sensor in addition to the flow sensor, a second signal of the spindle rotation is monitored. From the phase difference, the electronic system detects the direction of rotation of the meter. Flows in the wrong direction are measured correctly and substracted to calculate the consumption value precisely.



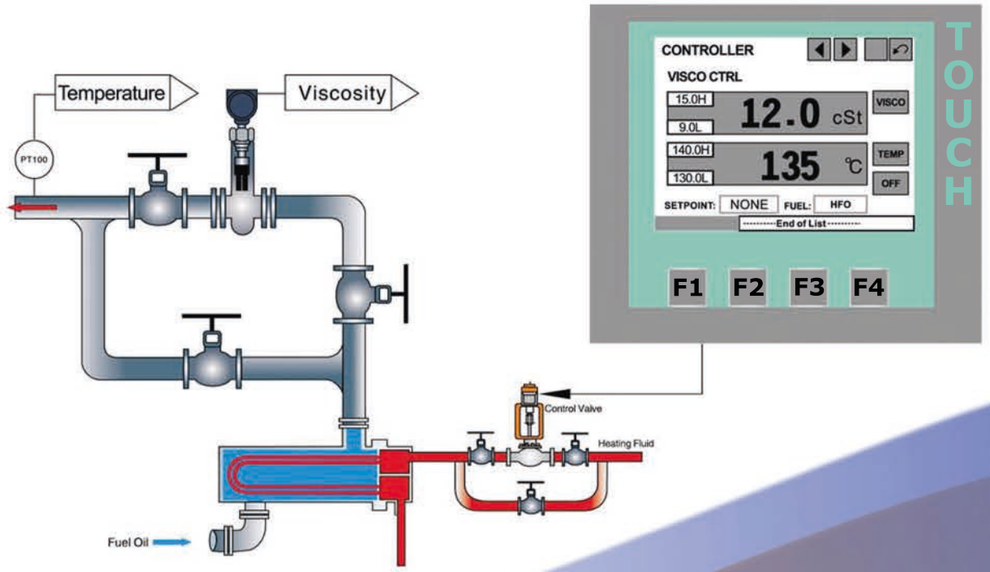


1.1.2 Density measurement by Viscosity Meter System upgrade

Viscometer & Viscosity controller

The **Viscosity Meter System** is designed for replacement in the marine industry as complete package including steam valve and controller without pipe modification avoiding costly service, maintenance & spares.
The outstanding features are:

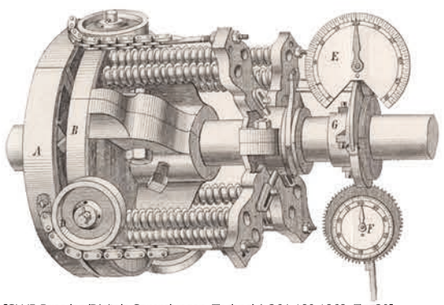
- Easy installation due to readily designed exchange flanges
- No moving parts
- Rugged and robust instrument
- High accuracy
- Fast response (response time takes only 1 second compared to other systems with up to 60 seconds)
- Excellent repeatability
- Data communications - Relatively low cost
- Nearly no maintenance
- Able to measure fuel density



1.2 FEC Shaft Power Meter Solutions

1.2.1 FEC -SP

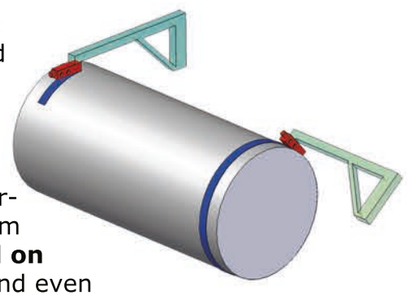
1. Historical Concept



[SLUB Dresden/Digitale Sammlungen, Technol.A.264-189.1868, Fig. 20]

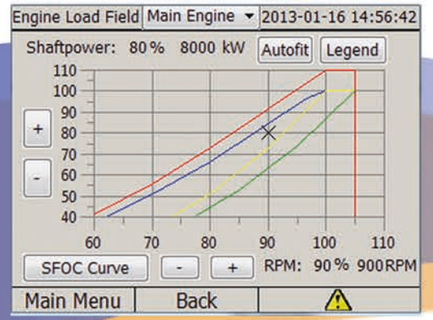
Referring to the first principle of measuring shaft power from 1867, we transmitted the simplicity of this method to modern technology. The so-called Dynamometer transforms the exerted power in spring force. It is realized with two discs, which are clamped on the shaft and connected via steel chains with each other. The chains transfer torsion to springs, which transmit it as signal to the measuring gauges.

2. Our New Development



With modern technology, we were able to reduce the old principle to two simple pick-ups combined with magnetic stripes. The whole torque and revolution measurement is realized by these sensors. This makes the installation and the maintenance feasible by every crew. **Fully automated calibration** ensures the utmost user-friendliness of the product.The shaft power system allows you to **monitor the KPIs of your vessel on every display on board via vessel network** and even onshore via internet connection.

Additional automatic averaged data export provides simplest long-term trending functionality and integration in other evaluation systems by minimizing data volume without compromising on quality.



Be always aware of:

- Revolution
- Shaft power
- Engine load & acutal operating point in the Engine load field

Benefit from the advantages of our system:

- **No sensors at the shaft**
- **No power connection to shaft required**
- **simplest Installation feasible without technical training**
- **minimum efforts required for sensor holder, as position can be chosen freely / use of existing structure**
- **Data recording for fleet or voyage comparison**

The **interoperability** between our systems allows you at any time to upgrade the shaft power system to our **FEC** (**F**uel **E**fficiency **C**ontroller). This enables the crew and the ship management to directly link the inputs (fuel consumption) with the output of your propulsion system and its efficiency.

1.2.2 FEC - Shaftpower on the GO!

To satisfy the needs of yards & engine repair companies, we put our efforts into the development of a portable Shaft Power Meter.

It has the advantages of our stationary system combined with the mobility needed in the service sector:

- Simplest installation
- two holders wherever they are easy to be installed vibration-free, e.g. at the bearing foundations. No limitations by the distance!
- Easy gluing of accurate & cost-effective magnetic stripes on the shaft

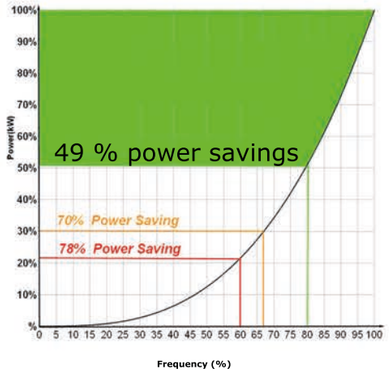
DIMAR-TEC's FEC - Shaftpower on the GO! Comes in an expedition hand-carry box of only 474x415x214 mm and only 8 kg.

The handy suitcase with 15 m cables to the sensor holders requires only 100-240 V power supply; ETHERNET connection is available to connect to the vessel network, if the data shall be monitored from bridge or ECR during sea trial

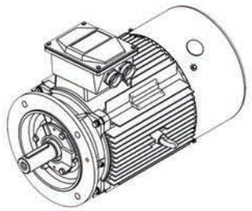
- **Data recording by second & average data files**
- **Unlimited displays**
- **Optional 4-20mA outputs available**
- **Optional additional data inputs available**

1.3 Energy Efficiency Controller EEC

Due to their physical characteristics, circulating pumps in cooling water applications provide a considerable saving potential. Small reductions of the pump speed leads to a major reduction in electric power usage. Consequently, it generates **energy and cost savings.** All pumps on board a vessel with engine load dependent operation are consuming a large amount of energy unnecessarily when the main engine is running on slow steaming or ultra slow steaming**.**



Minimum Frequency	Maximum Power Savings
80 %	49 %
66 %	70 %
60 %	78 %



1.3.1 Frequency Inverter

Integrated in the EEC DIMAR-TEC offers state-of-the-art Frequency Inverter. With their compact design and protection class IP54 they are perfectly suited for retrofit in existing engine rooms, where space limitations are critical. Without the need for separate switchboard cabinets the usual struggle for space and resulting high installation costs for retrofit solutions are avoided. Low overall costs guarantee a **fast Return Of Investment**.

Existing Vessel Standby Control System

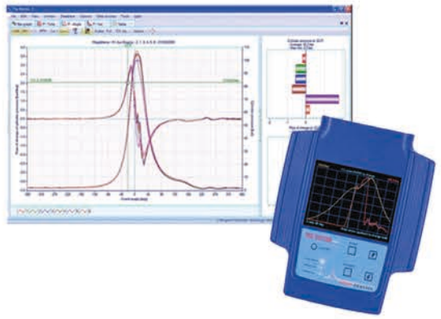
The existing class approved Start/Stop and stand-by control function for the pumps will be operated as before. Benefits for the crew:

- No switching between different operation modes
- Automated recording of temperatures in the cooling system
- Automated monitoring of power consumption

2. Condition Monitoring & Condition Based Maintenance

2.1 Electronic Cylinder Pressure Analysis

2.1.1 Handheld Unit



There are numbers of information sources available to indicate the working conditions of a diesel engine. There are, for example, the exhaust gas temperature, the charge air pressure and the cylinder fuel rack position. These parameters are only indirectly affected by the combustion revealing hints for possible error sources.

To gain real knowledge of the engine condition, it is of highest importance to analyze the combustion process. To do so, the one and only available measuring parameter is the cylinder pressure.

Only the cylinder pressure over time supplies the direct information about the combustion performance and indicates the possible required adjustment corrections as well as upcoming maintenance work on the engine. With this information, a marine engineer or engine specialist can schedule the necessary actions without delay.

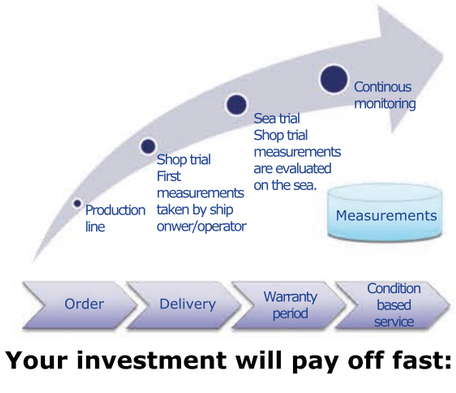
An electronic indicator does exactly this job measuring the combustion pressure in diesel and gas engine for the marine and power generating markets. It operates with a load cell-based pressure sensor which enables pressure measurements up to 250-bar. It is a mobile, simple, reliable and robust unit for daily routine diagnosis.

Benefits:

- Provides useful graphical analysis for troubleshooting engine condition and optimization of the engine performance
- Monitoring of engine parameters and fuel quality for condition - based & preventive maintenance
- Reduce unnecessary downtime and expensive maintenance cost
- Reduction of fuel consumption due to optimized timing
- In most cases, the cost of an electronic cylinder pressure indicator recovered within 1 - 2 months

2.1.2 ONLINE Cylinder Pressure Indicator

The Doctor's outstanding feature is its user-friendly PC software, which displays your measurements both numerically and graphically in a clear way. With its integrated database it can be used to analyze a single engine measurement or supervising your fleet on the seven seas via effective trending tools.
All The Doctor measurement devices use this same software which standardizes your engine monitoring procedures and makes possible to share data with all related parties in your organization.



An ONLINE system provides ship operators and owners with significant benefits by enabling operators to optimize engine performance, and to be aware of the condition of different engine components. The FUCHS system range from portable solutions via fix installations up to high end test bed applications will meet your requirements & budget.

Your investment will pay off fast:

FUEL COST SAVINGS
Fuel cost savings of up to two per cent or even more can be achieved compared to untuned engines. To reduce fuel consumption, the performance of the Engine must be tuned and the distribution of the power needs be optimized between the cylinders.

CONDITION BASED MAINTENANCE (CBM)
Monitoring the engine condition helps to manage the maintenance and prolong the life of components, minimizes the operating costs and improves the engine's reliability and performance.

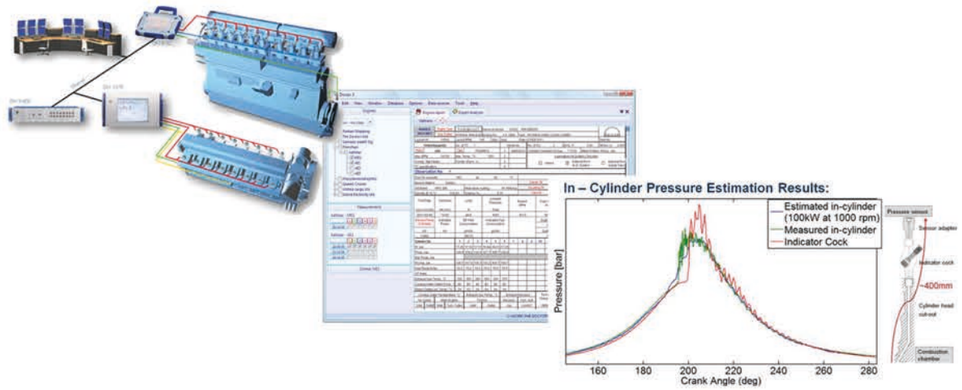
OPTIMIZE PERFORMANCE
Monitoring performance periodically or continuously 24/7 will recognize and identify possible coming failure in the engine at a very early stage.

REDUCE EMISSION
Well tuned engines avoid overloads and reduce emission. This can transparently be monitored by comparing different measurements to comply with environmental regulations.

ENGINE PROGNOSIS
Engine data will keep track of the history and predict what will happen with the engine condition in the future.

ONLINE - Covering all your needs

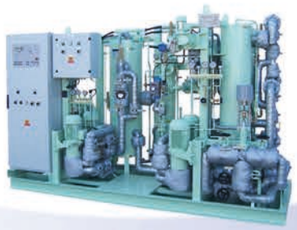
With the software-integrated Engine Report, automated Engine Analysis, Expert Analysis and THE DOCTOR Service Center as cloud solution with Engine Diagnostics as a service, you have the optimum choice of support levels for your operation.



2.2 Electronic Crankweb Deflection Indicator

Most engineers know the importance of regularly checking the deflection of the crankshaft on marine diesels. The usage of an indicator clock was time-consuming, unpleasant, dirty and yielded dubious measurement results. As a consequence, these checks were made less and less frequently, which increased the risk of an engine breakdown. The introduction of the electronic deflection indicator has made the task simpler, more effective and the measurement results are more accurate.

2.3 Fuel Oil Module Solutions - MAS



Produced by MAS maritime assembly systems GmbH, these fuel oil module solutions offer highest quality for lifelong trouble-free operation. The combination of in-house engineering, design, production and assembly leads to most competitive standard and custom-made solutions. We are your partner for new-buildings or modification of existing fuel systems (eg. upgrading from diesel oil to HFO operation).

transmitting recognition data - the result is a perfectly matched probe and gauge for enhanced performance That's not all - the AMVS (Automatic Measurement Verification System) ensures only true measurements are displayed, even on the most heavily corroded metals. Housed in purpose - designed cases and incorporating Triple Echo and Coating Plus+ to completely ignore coatings, Tritex Multigauges are the choice for the future!

2.5 Online Water-in-Oil-Monitor

PAJ developed and manufactured based on MAN Diesel & Turbo specifications the PAJ WIO sensor for marine user to measure water content in lubrication oil.

The water-in-oil sensor can be used to measure the water activity in the lubrication oil of marine engine and other applications, where it is crucial to measure the water content in oil. It is important to keep the quality of lubricating oil, on large 2-stroke engines at a constant high level. An essential part of this monitoring is to ensure that the water activity does not exceed specified limits.

Water lubricating oil can come from various sources, such as:

- leaking lub oil coolers

3. Lifeboat & Davit Survey, Repair & Maintenance

For inspection, repair and maintenance of your lifeboats, davits and cranes, we are your reliable partner in Singapore.

Our quality and safety awareness is proved by several certifications as:

- ISO 9001 &
- LSA by Loyds Register

Starting as lifeboat service partner licenced for:

- DH Marine
- Guangzhou Hai Hong
- Jiangyinshi Beihai
- NPT
- Oriental
- Sekigahara
- Stocznia Ustka Sp
- Wolong
- Wuxi Hai Hong
- ZMA

Class Type/Flag State
- ABS
- Lloyds Register
- Antigua & Barbuda
- Liberia

We have serviced more than 30 international brands within a short span of time. This success was attributed by continuous training, open workculture and team building resulting in an effective compact team.

3.1 Hydraulic Components

We offer high quality hydraulic components like:

- Industrial hydraulic valves

4. Quality Spare Parts

4.1 Diesel Engine OEM spare parts from European manufacturers

With our partner in Germany, we are not only providing OEM spares for European diesel engine brand but also,we offer technical support and service solutions at very competitive prices.This is achieved by maintaining our own extensive stock and OEM network. We provide you economic recondition - service solutions for your operation.

With products of highest quality made in Germany/Europe and our global technical support network, we are locally present for your needs.

Our extensive bearing stock for 4 - stroke and 2 - stroke engines ensures fast delivery to you. For unscheduled repairs, we hold a large backup stock of semi - shell bearings and blanks to meet your requirements within a few days for over-and undersized bearings.

4.2 Centrifuges

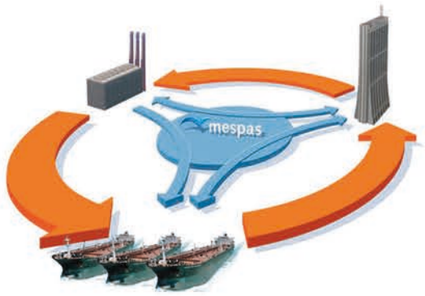
Centrifuges are already standard for many diesel engine types. Because of the high rotor speed (up to 10,000 rpm, depending on the size), the resulting centrifugal force (greater than 3,000g) causes the impurities to migrate to the outside where they form a dense layer on the inner wall of the rotor. The compacted impurities are then simply removed with an inserted paper liner.

For over 50 years the MANN+HUMMEL centrifuge has proved to be the key factor in reducing component wear whilst increasing the oil and engine life cycle. Through close collaboration with over 40 original equipment manufacturers (OEMs) in as many years, **MANN+HUMMEL** has gained an in-depth understanding of customer requirements. This wealth of experience has helped to further develop a product that is not only easy to install on existing applications, but also provides a cleanable, low maintenance and environment-friendly solution throughout the life span of the engines.

4.3 Filter spares

Safe, reliable and economical operation is ensured with filter spares made in Germany. In addition to all types of filter inserts, we are able to supply you with most of other consumables such as seals, valves, gaskets, o-rings, etc.

5. MESPAS Technical Fleet Management Software



The success of your company depends on solutions which reduce cost and improve the performance of your existing fleet. MESPAS software and services assist you in achieving exactly this.

A Unique Concept

MESPAS has developed the MESPAS R5 fleet management software system based on the following unique concept:

- We maintain a central server with unique machinery data for each product
- We take full responsibility for handling and managing the master data (service letters, manuals, ect.)
- The MESPAS R5 system is an all-in-one solution with planned maintenance, procurement, stock control, document management, budgeting and reports
- Ship to shore data transfer is cost-effective and efficient
- MESPAS provides IT support throughout the lifecycle of the system

Low Total Cost

MESPAS offers a complete software package, with initial implementation and ongoing support, all at a very competitive price.

Powerful Integration Capabilities

MESPAS R5 allows easy integration with other software (e.g. accounting systems). This important feature means that you can import data from existing software.

Speed of Implementation

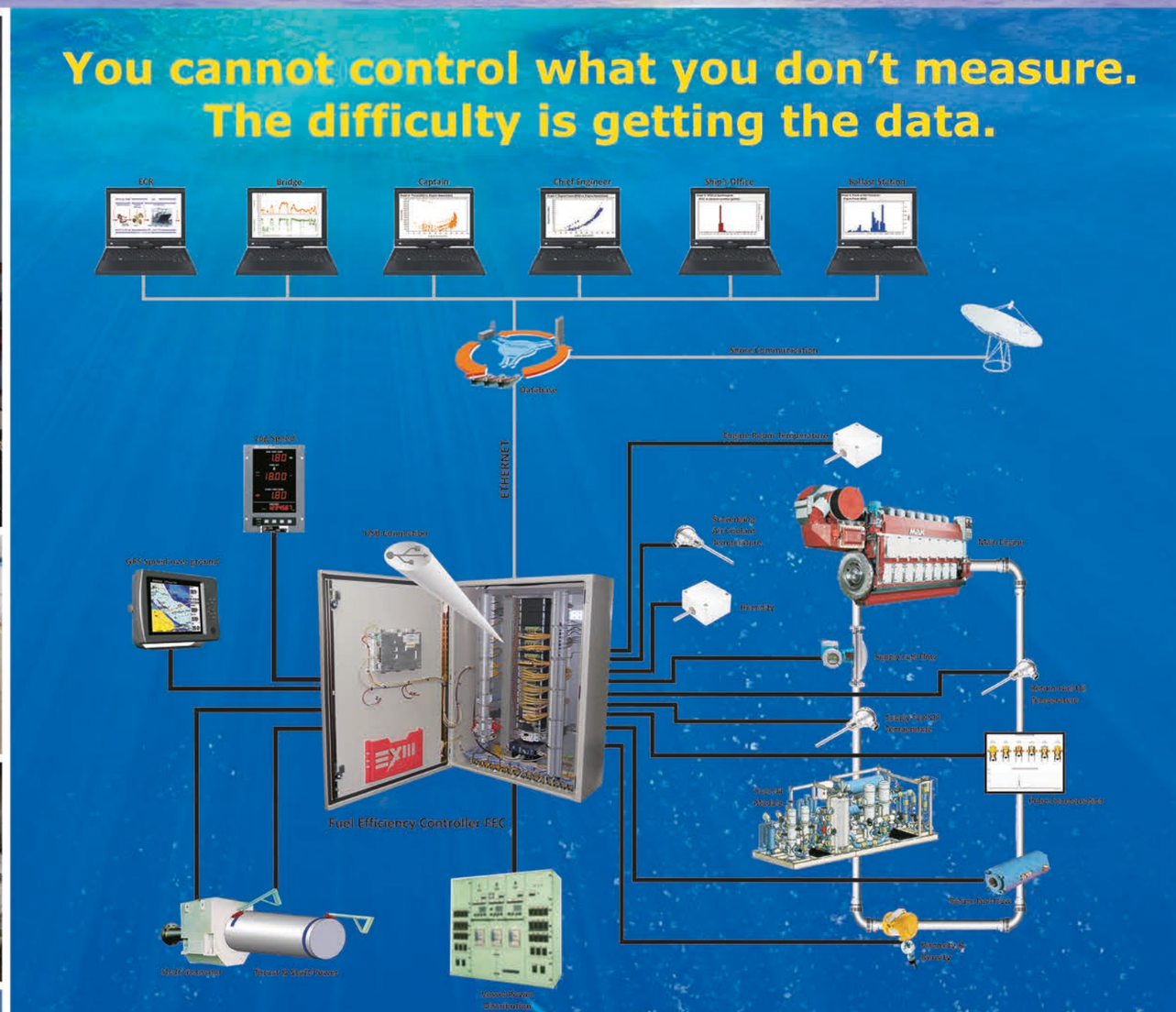
For the fleet of ten vessels, we can set up required software, enter the machinery data, spare parts lists, manuals and documents and set up the planned maintenance system for machinery PMS in accordance with OEM supplier, all within four to six months.

Ease of Use

As the crew onboard the vessel is constantly changing, it is essential that the software for completing tasks is quick and easy to use. It takes less than an hour to use the MESPAS R5 software solution, which means that when the crew changes, the new chief engineer can immediately start to use the software.

AT THE OPTIMUM. ANYTIME. ANYWHERE.

DIMAR-TEC PTE LTD **IN ACTION**



FUEL EFFICIENCY CONTROLLER - FEC
The Unique Concept

- Full ISO 3046 correction
- KPIs - Measure, control, save
- Integrate existing sensors
- Reliable & timely data

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