PERFORMANCE MONITORING SYSTEM

BETTER UTILISATION OF FUEL & POWER RESSOURCES ON BOARD THROUGH REAL-TIME MONITORING

www.insatechmarine.com
Introduction
Bunker prices, an increase in enforcement of environmental regulations, as well as smaller profit margins in the shipping industry have over the last couple of years made performance and efficiency two key topics within the maritime world. Since fuel costs constitute between 50% to 70% of a vessel’s operating costs, an insight into the fuel efficiency is key to saving money. The Insatech Marine Performance Monitoring System provides you with this insight.

How It Works
Insatech Marine’s Performance Monitoring System (PMoS) is based on high accuracy measurements of key factors such as Fuel Consumption measured by mass flow meters, shaft power by Torque meter and generator output by power meters. The data is collected, displayed, stored and distributed automatically by the system, and can be used for monitoring of the performance of the vessel as is and over time. Basic KPI values and combined with the experience the crew can gain from these data, new cost effective optimization projects can be implemented.

Operation
The performance measurements are displayed on a touch screen that gives you an easy overview. If you have chosen to measure the performance for each of your consumers, you will be able to compare the consumption of each up against the others. The Performance System is fully automated and does not need any hands-on operation.

Installation
The Performance Monitoring System is delivered fully calibrated with most of the system setup, in order to minimize installation time. On a typical installation the crew on board will mount the equipment under the guidance of Insatech Marine technicians for correct placement and electrical connection. Commissioning can also normally be done by the ships technician, but Insatech Marine do also assist with commissioning and tests as well as crew training.

Service and Support
The Performance Monitoring System does not have any moving parts and therefore the need for active maintenance is minimal. However if problems should arise Insatech Marine’s technicians are ready to perform both scheduled and unscheduled service and repair.

Contacts World Wide
Insatech Marine has a broad and international agent network, from Cyprus to India. We want to serve you the best possible way, and our agents are ready to receive your inquiries and questions. Find your local representative to learn more about Insatech Marine’s solutions.

A VALID BASELINE IS KEY TO PERFORMANCE OPTIMISATION AND SEEMP COMPLIANCE
Under the proposed amendments to MARPOL Annex VI, Regulation 22, all ships must have an International Energy Efficiency Certificate (IEEC). The IEEC requires, amongst other things, the presence of a Ship Energy Efficiency Management Plan (SEEMP) on board. SEEMP is a ship specific plan to be developed by the ship owner, operator or charterer. The objective of the plan is to improve the energy efficiency of a ships operation. By implementing the Insatech Performance Monitoring System you can continuous and consistent log performance data, establish a valid baseline and have an easy-to-use management tool that minimizes the administrative burden onboard related to the SEEMP. The system helps you evaluate your performance as well as providing you with input to setting new SEEMP goals. This enables you to track the benefits of each of your initiatives.
Fuel & cost
As bunker prices have gone up, so has the demand for a higher yield in performance from the fuel in the maritime world. Since the cost of fuel constitutes 50% to 70% of the total cost of operating a vessel today, any extra nautical mile drawn out of a fuel tank, means more money in the bank. Adding to this, better and more accurate monitoring of all aspects of the ships performance has become more interesting to most operators, as these also directly affect fuel performance.

Comply and ensure constant performance optimization
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A valid baseline is key to performance optimization
No performance system is better than the data it is based on. Scrap in – scrap out. At Insatech Marine we know that performance data are valuable to efficient management of the vessel. Performance management systems will be an integrated part of the majority of most ship’s systems within a foreseeable future. The reason for this is that the decision-making process is made easier and more tangible when based on real-time actual data-readings from the ship, as opposed to being based on manually gather data in noon reports and hard-to-transfer experiences of chiefs on board.

One level higher
The Insatech Performance Monitoring System (PMoS) is a further development of the simple Fuel Monitoring System (FMoS) which consists of “only” flow meter data. The additional data input provided to the PMoS are: torque meter, speed log and power meters from generators, as well as the PMoS is ready to draw and log existing NMEA signals, e.g. speed log, position, wind, gyro and underwater clearance.
Direct measurements of fuel efficiency
By installing one or more flow meters, depending on engine supply line layout and desired insight, the consumption can closely be monitored in real-time. The main principle is to measure the flow of fuel before the engine and/or generators and again after. Depending on how detailed readings you require, additional flow meters can be installed, for example one set of meters per consumer, one set for each consumer group or one set for the entire ship’s consumption. Furthermore, combined with on board data from a propeller shaft torque meter, speed log and power meters on generators, KPI’s for engine and hull performance is calculated and visualized.

• Fuel Consumption [ton/hour]
• Specific Fuel Oil Consumption (SFOC) [g/kWh]
• Slip [%]
• Fuel Oil per nautical mile [kg/Nm]
• Speed [Knots]
• Shaft Power [kW]
• Shaft Rotation [rpm]
• Torque [kN]

Measurement data is easy to access
The measurements from the Performance Monitoring System will be sent through Modbus signals to a collecting and processing cabinet, where the performance data will be calculated, logged and displayed on a touch screen. Furthermore, the resulting data can be sent to the ship’s own management system or to a display on the bridge. The results of the readings can also be sent by email to Head Quarters for further analysis or storage for future purposes as an automated “noon report” – or a number of times a day.

“Future-proof” expandable and modular system
If you already have Insatech’s Fuel Monitoring System (FMoS), then the upgrade to the PMoS can be done by a software upgrade and addition of instruments, such as the torque meter and energy meters.

The Performance Monitoring System can easily be expanded, for example from one set of meters to a set per consumer. The signals and readings from all instruments can be reused, and the upgrade can be done in cooperation with Insatech Marine without having to replace more than the cabinet and adding the new input that you should wish to include.

With 25 years of experience within the field of measurement and process optimization, it is the soul and core competence of Insatech. That is why we are confident that we provide some of the best measurements on the market with the best available components. This is also why we know, that we can provide any vessel with almost any reading you might desire, so if you can imagine it, we can measure it.

Simply put: We take the guesswork out of it!
As different owners, charters and operators have different requirements and needs, Insatech Marine Performance Monitoring System is manufactured in just as many different variations, all according to the needed and requested properties. All depending on which instruments and what level of insight is wanted.

On the left, some of the main components Insatech Marine uses in the Performance Monitoring System are shown. All instrument signals are collected centrally in the control cabinet, and here the processing of data is also carried out. There is no real limit to what data that can be collected, and Insatech Marine are also happy to use already installed instruments (to the extent is it possible).

The fuel consumption measurement is a key feature of the Performance Monitoring System, as the cost of operating a vessel typically is within the range of 50% to 70% of the total OPEX. This measurement can be done in different ways with different levels of insight.

The most simple way of measuring the fuel consumption, is by installing a single flow meter, which monitors the fuel transferred from the day tank to the mix tank. The level of fuel in the mix tank is typically maintained by level sensors, and therefore the flow to the mix tank is equal to what is consumed.

If a more elaborate monitoring is desired, then a 3-meter system can be introduced. With the 3-meter system, the total fuel consumption is monitored by flow from day tank to mix tank. A set of flow meters installed on the common auxiliary fuel supply line and one on the common auxiliary return line will give a total consumption measurement over the auxiliary engines. Then by subtraction, the main engine fuel consumption can then be calculated for monitoring.

By splitting the main engine and the auxiliary engines, the crew on board as well as the crew on shore has a much more detailed overview over how and when the consumer groups perform.

If a full understanding of the fuel consumption is wanted, then measuring on inlet and outlet of each consumer is a possibility. This will provide for complete insight into each consumers fuel consumption, and any deviances from expectations or norms in performance, can very easily be pinpointed. This can potentially aid in preventive maintenance planning and better utilisation of auxiliary engines.
A fully automated system

Depending on which measurement is included and which components are used, Insatech Marine’s Performance Monitoring System is generally a fully automated system which does not require any active operation during normal conditions. The screen that displays the measurement from around the vessel has different options making it possible for you to select which data to show and how to show them, but otherwise needs little attention.

Less operation of equipment and manual readings means more time for improving the current status of the vessel. This is why the Insatech Marine Performance Monitoring System draws all the signals from instruments to a central processing station. Here the values are used for calculations indicating the vessel’s real time performance and presents them in Key Performance Indexes, such as Specific Fuel Oil Consumption (SFOC) and kg. of fuel per nautical mile (kg/Nm).

Performing these data and processing them immediately with easily read presentations rather than relying on manual readings and noon-reports provides several advantages.

The immediate gain when moving away from the traditional noon reports, is the obsoleted manual check and reading of meters - which frees hands to do other more pressing work. The fact that it is automated, also eliminates the margin of error in readings, as the data is collected directly from the instruments.

Manually collected data used for noon reports are also coherent with delays and varying factors in the calculations on which the vessel is evaluated. Depending on the time that passes from when the instruments are read and to the time the noon report is sent, combined with the accuracy of the reading, can prove to cause deviations in numbers that makes monitoring a very inaccurate procedure.

Decision tool on board

Noon reports are a great tool for land based crew that analyse data over longer periods of time, but gives the crew on board little to act upon. By having the information ready at hand at any time necessary, allows the crew to view the immediate consequences of any actions affecting the vessel’s overall performance.

Using the KPIs as main indicators of the vessel’s performance, any change in condition or operation that affects the performance, will result in changes in the KPIs. As all readings are available centrally, running conditions of monitored vessel components can be checked right away, and troubleshooting, corrective and optimising actions can be identified a lot easier compared to manual visual inspections, potentially leading to savings in fuel as well as crew resources.
Insatech Marine’s modular Maritime Performance Concept is a flexible and fully integratable system concept, starting with measurements of performance relevant factors and ending with a complete fleet overview with data mining possibilities from land based operations. Each level can be customized to specific needs, and are constituted by measurements, data collection & logging, operational displays, on board advanced views, land based fleet database and land based fleet comparison & data mining views.

This is the system featured in this brochure.

ON BOARD PERFORMANCE MONITORING SYSTEM

ON BOARD COMPUTER WITH DATABASE CONTAINING SHIP DATA

ON SHORE DATABASE WITH DATA FROM ENTIRE FLEET CONNECTED TO THE SYSTEM

ON SHORE FLEET PERFORMANCE MANAGEMENT SYSTEM

THE MODULAR PERFORMANCE CONCEPT
Service and support is readily accessible

The equipment you carry on board is no better than anything else if it is not working properly, is not calibrated according to its purpose or there is no service to get in case of any issues that needs being resolved. This is why Insatech Marine at all times has its own technicians ready for service on board your vessel, be it a planned service visit or a more pressing and acute matter that needs immediate attention.

Minimal maintenance required

As the equipment used for the Performance Monitoring System is mostly constituted by components without moving parts, the need for active maintenance is minimal. Nonetheless there might be sensors and analysers that will need calibration or service from time to time, and depending on the specific setup, a service and maintenance plan will be issued with each individual Performance Monitoring System.

Do it yourself - or let us install

If most of the required equipment is already installed, the crew on board will in some cases be able to mount the equipment under the guidance of Insatech Marine technicians for correct placement and electrical placement. This installation method helps minimize cost and required man-hours, while ensuring that the crew gets the maximum benefit of the system during use. However, Insatech Marine can also provide installation with commissioning, tests and training of the crew in the system’s functionality.
Insatech Marine offer field-tested and proven solutions that meet international rules and regulations as well as helping you save money. We provide comprehensive installation, commissioning, training, service and maintenance, which ensure as little downtime as possible. Insatech was established in 1989 by Alan Christoffersen, and has since then grown to more than 70 employees.

With 25 years of experience in the field of automation and instrumentation we are a strong partner for both our customers and suppliers. As a result of our longstanding partnerships with some of the world’s leading manufacturers within instrumentation and automation, we are able to provide you with global service.

**WHAT WE DO**

**Fuel Consumption System**
The system works by installing high accuracy mass flow meters before and after consumers, for example the main engine and generators, giving an overview of instant fuel consumption and total fuel consumption over time. This information is a useful and money-saving tool used in the decision process on the bridge.

**Fuel Monitoring System**
The Fuel Monitoring System in addition to real-time fuel consumption display enables logging of fuel consumption data. Historical views and over time developed trend lines provides for better analysis of performance and effect of new initiatives. Furthermore, the Fuel Monitoring System is ready for upgrade to a Performance Monitoring System and/or addition of a database on board.

**Performance Monitoring System**
The system provides an overview of the ships performance based on direct on-line measurements. It is versatile and can be customized according to any measurements that you would like to monitor. Fuel consumption is measured with high accuracy mass flow meters, together with propeller shaft torque and rpm. For generators a power meter will be installed. This gives valuable information about fuel consumption, but also KPI values (Key Performance Indicator) as g/kWh & g/Nm.

**Bunker Management System**
A Coriolis Mass Flow Meter-based Bunker Management System with a highly accurate and volume insensitive measurement of transferred bunker. The system ensures an efficient bunker operation where you get the amount of bunker you pay for.

**ODME Systems/15 PPM Bilge Alarm**
By regulations under MARPOL, all vessels must be equipped with a system for Bilge Water Discharge Monitoring as well as Oil Discharge Monitoring and Control Equipment (ODME). Both systems monitor the oil content of over board discharged water from the bilge and the ballast tanks and controls the discharge allowance based on whether the level of oil content is below the set limits.

**Cargo Management System**
InsaCargo is a very flexible cargo and ballast management system which is ideal for retrofitting of either full or partial systems on board vessels. By using only known and proven suppliers with global service and marine experience and approvals, InsaCargo ensures very low down-time risk and high performance.

**Performance Management System**
An upgraded version of the PMoS with a much more decision making oriented and open input based concept, where more factors are taken into account when evaluating the ships performance. All included influents are converted into a KPI and the crew will experience a tool that effectively allows them to contribute to a more cost effective operation.

**A TRUSTWORTHY & COMPETENT PARTNER**

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In order to provide the best possible customer support, Insatech Marine work closely together with selected agents. This network of dedicated agents will help to ensure the best possible customer experience when new and existing customers require our support. This network of agents will be developed continuously to serve our customers locally wherever they operate.
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