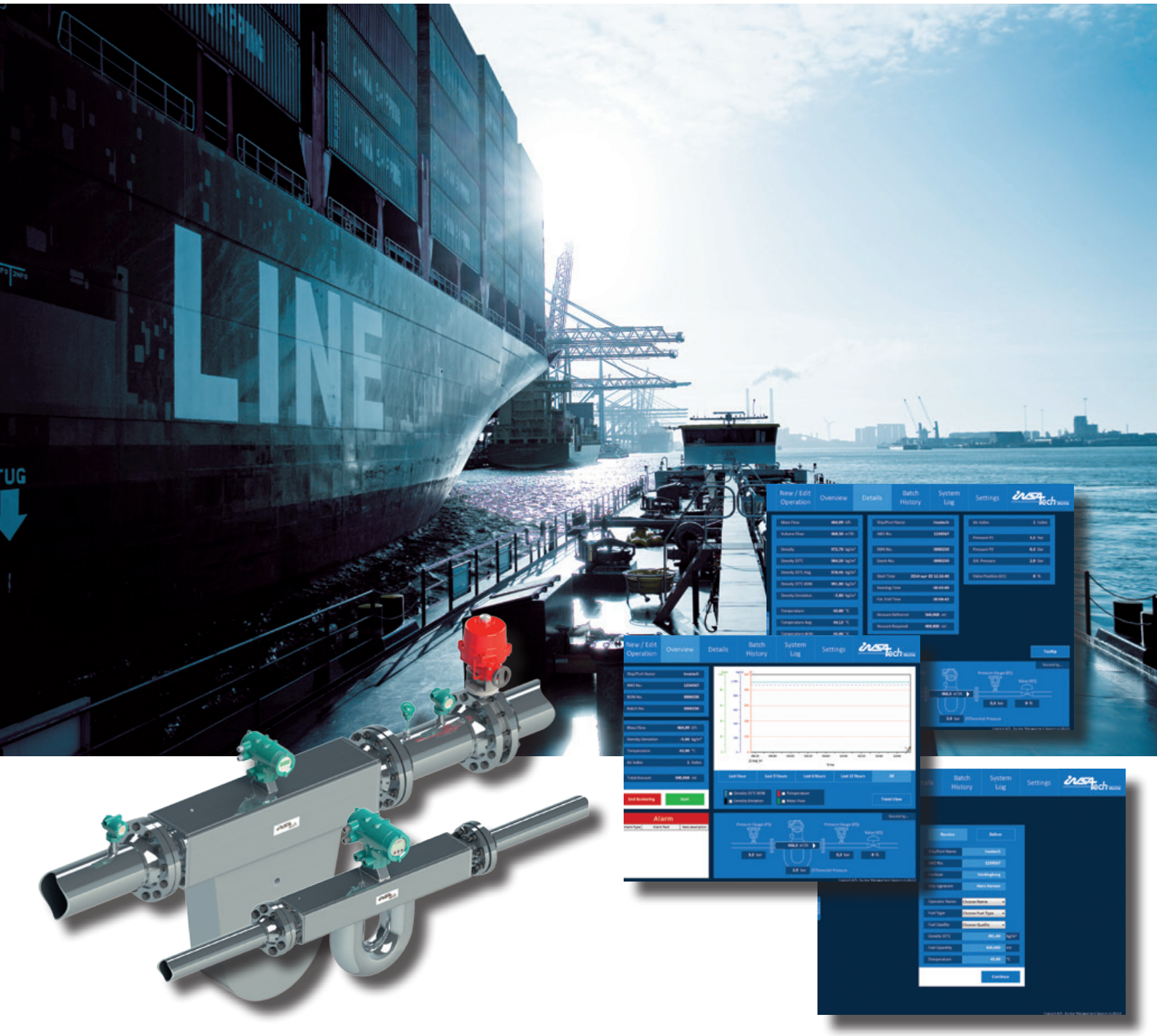
BUNKER MANAGEMENT SYSTEM

Bunker Mass Flow Measurement for Reliable Delivery



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Taking the guesswork out of it!

SAVE TIME AND MONEY ON THE BUNKER OPERATION

An increasing number of bunker barges are taking the necessary steps to ensure a fast and reliable bunker operation. This is done both to meet customer demands for mass flow measurements, but also to save time and thereby money. Furthermore, MPA in Singapore require that all Singapore-based bunker suppliers will have to use mass flow meters for fuel oil bunkering at the port from January 1, 2017. By installing a Coriolis Mass Flow Meter on the barge, operators are reporting that they have halved the time spent on the bunkering process.

The Insatech Bunker Management System consists of a flow meter solution based on the Coriolis principle which provides you with correct mass measurements, temperature and density. This ensures against fraudulent practice such as buy-back, bribes, signing off on false delivery notes etc. All data in the system is encrypted and tamper-proof.
The system has been installed on a large number of vessels over the last six years and has been proven in practice. When you have reliable data you save time and minimize the risk of claims.

THE BUNKER MANAGEMENT SYSTEM

Introduction
As the bunker prices have risen over the last decade so has the consumer's requirements for trustworthy and efficient bunkering. At Insatech Marine we build the Bunker Management System to meet these requirements as well as being at the forefront of rules and regulations set by authorities for example the MPA in Singapore.

How It Works
The Bunker Management System uses high accuracy Coriolis based mass flow meters to precisely measure the amount of fuel that is received or delivered. The system is unaffected by any air caught in the fuel oil and the system will compensate for any temperature variations during bunkering. Often more precise than conventional sounding of tanks and much faster, saving the operator valuable time.

Custody Transfer
The System is also available in a custody transfer version where all components comply with the OIML requirements. Furthermore a MID approval is under development and is expected soon, which means that the system will be able to generate a Bunker Delivery Note according to IMO requirements.

Operation
The operator interface has been designed to be easy to use and after a one-time setup the system is ready for bunkering. The "New Bunkering" functionality will let the operator swiftly enter the necessary information after which the system can be started by pressing one button. After the bunkering operation the system will generate the Bunker Delivery Note from the inputted and measured information.

Installation
The installation of the Bunker Management System is mostly done by the ships own crew. Instruments and transmitters are placed on deck in a hazardous zone close to the bunkering outlet, whereas a cabinet containing controls and logging, and the operator interface is placed in a safe zone. Once installed Insatech Marine technicians will do the final wiring connections, commissioning and tests to ensure the system works from first operation. The system requires minimum maintenance since there are no moving parts.

Service & Support
We pride ourselves in our skilled technicians, who will travel the world in order to solve any problems that you might face. However with our remote support we can help solve many of the problems as well as adjust the system and perform health checks. Furthermore we do re-certification of the system making sure the installed equipment always fulfills regulatory requirements.

INTRODUCTION

1

Be on the forefront of new requirements and regulations
As the bunker prices have risen over the last decade, so has the consumer's requirement for a trustworthy and efficient bunker operation. By installing Insatech Marine's Bunker Management System you will have equipment that place you on the forefront of new requirements and regulations, here amongst those of MPA (Singapore), where Coriolis based mass flow meters must be used in the near future for the bunker provider to obtain a trade certificate.

Fully-automated and reliable measurements
On a more practical level, Insatech Marine's Bunker Management System facilitates an easy and reliable measurements of the delivered bunker mass, even in rough and high seas where soundings of tanks can make for a more difficult task – Fully automated and without any hassle. Naturally, the Bunker Management System is made and programmed to work with both receiving and delivering fuel oil to and from the barge, which means only one system is needed on board for all bunker operations.

HOW IT WORKS

Coriolis flow meters ensures direct mass measurements
The main component of the Bunker Management System is the mass flow meter based on the Coriolis principle. This flow meter will directly measure the mass of the fluid that passes through it, and is therefore unaffected by any air there might be entrained in the fuel oil. The flow meter is equipped with an internal temperature transmitter which enables for automatic compensation for temperature variations during bunkering.

Pressure transmitters are placed before and after the flow meter. These pressure transmitters will aid in the regulation of line pressure and flow rate, by controlling a valve placed downstream of the flow meter. This valve is also used for slow start-up, enabling venting of bunker hose and pipes. Furthermore, the two pressure transmitters are needed for the calculation of viscosity and Reynold's number as well as for detection of air in the bunkered fuel oil. If the optional air detection feature is chosen, a separate temperature transmitter will be included for heightened precision.

All signals that are drawn from the above mentioned instruments are received, stored and processed within the control cabinet containing the electronics. All communication is handled and administrated from this cabinet as well.

BDN & CUSTODY TRANSFER

The Bunker Management System from Insatech
Marine is also available in a custody transfer version, with al components complying with OIML (International Organization of Legal Metrology) requirements and thereby also fulfilling the requirements from MPA (Marine Port Authority in Singapore). An MID (Measuring Instruments Directive) approval is under development and expected soon. This way the Bunker Management System will be all that is needed in order to generate and provide a Bunker Delivery Note according to IMO requirements and standards. This is especially interesting for owners and operators of Bunker ships, who want to be at the forefront of the latest development in high accuracy Bunker deliveries.


Bunker Delivery Note
The Oil Company
Desert Road 300
337-1500
Dubai
United Arab Emirates
+971 1234 4567
mail@theoilcompany.com
Licence No. 9876543321
Date: 03-09-2014
The Oil Company
BDN No. 250
Bunker Tanker
The Oil Company Tanker One
Harbour: Singapore
SB No.: 123456789
Recipient Vessel
Cargo Tanker
IMO No.: 1234567
Product Supplied
Pumping
Commenced 2014-APR-05 13:45:26
Completed 2014-APR-05 19:37:39
Samples
Vessel 123456789
Vessel (MARPOL) 123465789
Bunker Tanker 123456879
Surveyor 123456789
Product
Product Name HFO 380
Density at 15°C (ISO 3675 or ISO 12185) 991,00 kg/m³
Sulphur Content (ISO 14596 or ISO 8754) 5,00 %
Quantity
Gross Standard Volume 10000000,000 litres
Metric Tons 10000,000 mt
Remarks:
We hereby declare that the bunker fuel supplied conforms with Regulations 14(3) or (4) (a) and Regulation 18(1) of MARPOL 73/78 Annex VI.
We hereby acknowledge receipt of the above product and confirm that the samples were joindly taken by continuous drip sampler at the vessel's manifold, sealed and numbered.
Company Stamp
Tanker's Stamp
Bunker Tanker Signature
Vessel's Stamp
Vessel Signature
Powered by INSA Tech
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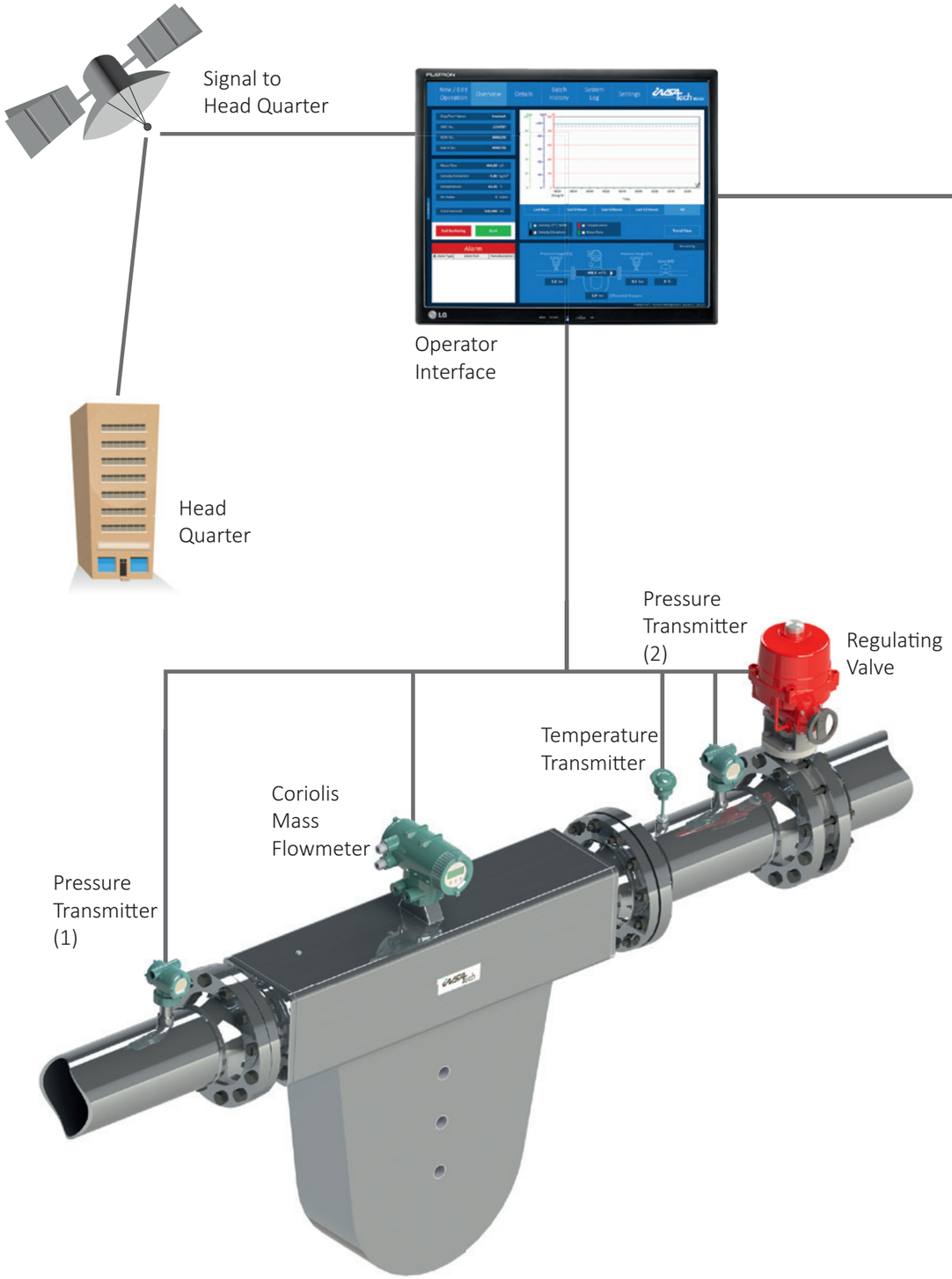
OVERVIEW



New / Edit Operation
The screen is the first you will encounter when you begin a new bunkering. You will be able to easily input information needed beginning a new bunkering for example ship name, IMO number, density of the fuel oil at 15 degrees (density15). The Bunker Management System can be used both when delivering and receiving fuel oil.

Overview
The overview screen gives you an overview of the oil transfer, with the most needed information. The trend will give you an easy view of the oil transfer where you will be able to see if any problems occur. At the bottom you have an alarm window as well as a system overview, showing information about pressure, flow and valve opening.

Trend View
The trend view gives you a more extensive view of your trends making it easier to see subtle changes it also has more trends available. The different trends can easily be turned on or off showing only the relevant data you want.

Details
The screen gives you all the bunker data in great detail. You will see bunker data on the left, such as density and temperature, batch data in the middle such as estimated end time and amount delivered, and system data on the right such as pressure and air index.

Settings
In the settings screen you enter the basic information about the ship/barge and company. You will also be able to easily add new operators and fuel types to the system. When entered they will be available on the New / Edit bunkering screen for quick selection. The data will also be used for the Bunker Delivery Note.

OPERATION

A system that is simple to operate
Insatech Marine has developed and designed the operator interface in-house with functionality and easy operation as main focus. We believe it is vital to have a system that is easy to use in order to optimize the benefits of it. By minimizing the possible challenges there might be in the operation of the equipment as well as by easing the processes related to any arising protests and claims from bunker recipient.

Simple operation of the Bunker Management System is achieved by a clean and minimalistic design, that eliminates confusing elements and unnecessary information, while in depth and full data is still readily available to any user. All without compromising the compatibility and regulatory requirements of the system, which Insatech Marine always seeks to meet and exceed.

One-time setup
When the system has been installed and is ready for use some basic information needs to be entered for future operational purposes. Once the ships name, IMO number and other obligatory data has been entered, the system will use these for bunker reports and displays. For faster and easier works procedures, operator names as well as fuel types can be entered into the system where they will be readily available for future operations.

User experience
When using the Insatech Marine Bunker Management System all information is readily available within one touch of the screen. All information that is needed during bunkering operations is presented in the overview display, including intuitive illustrations of current status within the different stages of the system.

When starting a new bunker delivery, the ”New Bunker” function will swiftly let the operator enter the necessary input and ready the Bunker Management System for the task at hand. Once recipient and product details are entered, the delivery is ready to begin, and by the press of one button the system is activated. During the operation the operator will be able to see information such as flow, density, viscosity and trends of the batch. An alarm will go off in case of any irregularities in density. When the delivery is completed, the system will ask for any information that is missing in order to issue the Bunker Delivery Note, i.e. the Sample Seal Numbers.

Once the final information has been given, the bunker report is ready for print and a PDF version is automatically stored. Via the network connection the ships own printer can be used to print a compliant and Custody Transfer valid Bunker Delivery Note.

PRODUCT VARIATIONS

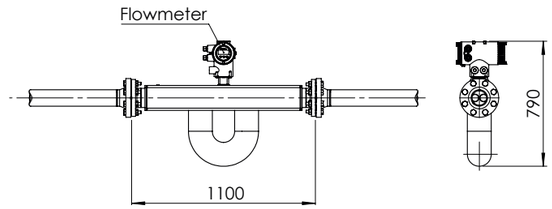
As different owners, charters and operators have different requirements and needs, Insatech Marine Bunker Management System is manufactured in just as many different variations, all according to the needed and requested properties. The chart table below describes the product code syntax of the variations.

Model	Suffix Code	Description	Comments
BMS		Bunker Management System	
System	-B	Bunker Ship	
	-R	Receiving Vessel	
Control Cabinet	S	Powder coated aluminium 500x500mm	
	L	Powder coated aluminium 760x760mm	Used with option /OI
	N	Not Selected	Only with Insatech Performance Management System
Explosion proof	-N	Non Ex	
	EX	Ex	Control cabinet in Safe Area
Converter - Type	C	Flowmeter mounted	
	R	Mounted in Control Cabinet	Only special applications, consult Insatech
Flow meter size	-T38	RCCT38	
	-T39	RCCT39	
	-T39IR	RCCT39IR	
	-T39XR	RCCT39XR	
	-S38	RCCS38	
	-S39	RCCS39	
	-S39IR	RCCS39IR	
	-S39XR	RCCS39XR	
Flow meter size 2nd. Meter	-N	Not Selected	
	-T38	RCCT38	
	-T39	RCCT39	
	-T39IR	RCCT39IR	
	-T39XR	RCCT39XR	
	-S38	RCCS38	
	-S39	RCCS39	
	-S39IR	RCCS39IR	
	-S39XR	RCCS39XR	
Flow meter size 3rd. Meter	-N	Not Selected	
	-T38	RCCT38	
	-T39	RCCT39	
	-T39IR	RCCT39IR	
	-T39XR	RCCT39XR	
	-S38	RCCS38	
	-S39	RCCS39	
	-S39IR	RCCS39IR	
	-S39XR	RCCS39XR	
Operator Interface	T	Touch screen 17"	For panel mount
	S	Standard 17" screen	Incl. Mouse & Keybord
	N	Not Selected	Only with Insatech Performance Management System
Bunker Report	ST	Standard acc. Insatech Layout	
	CS	Customer Specific	Price on request
Pressure Transmitters	PT	Two pressure transmitters	
	-N	Not Selected	Only special applications, consult Insatech
Temperatur transmitter	/TT	1 x Temperatur transmitter	Additionel sensor for increased accuracy
	-N	Note Selected	
Air Detection System	/Y	Advanced Air Detection System	Not without option /TT & /RV
	-N	Not Selected	
Regulating Valve	/RV	Regulating Valve	Not without option /Y & /TT
	-N	Not Selected	
Two product system	-N	Not Selected	
	/TP	Two seperate lines with commen Interface	Used for two seperate product lines (MGO/HFO)
OIML R117-1 compliancy	-N	Not Selected	
	/OI	Yes	OIML R117-1 Compliant system (Only system-B)
Special Options	-N	Not Selected	
	/Z	Special options	Option for special functions

DRAWINGS

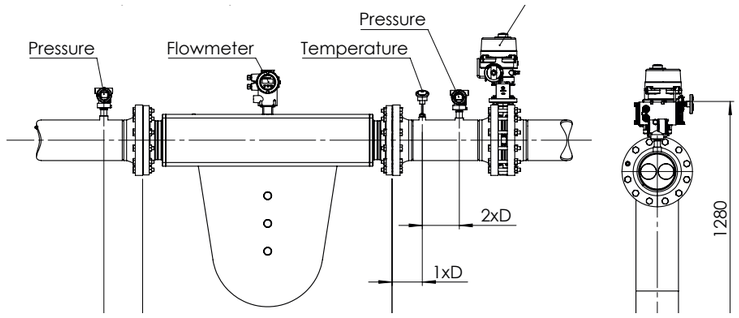
RCCT39IR (4”ANSI 150#)

Pressure	MGO	HFO 180 cSt	HFO 380 cSt	HFO 500 cSt
2 bar	245 t/h	150 t/h	135 t/h	125 t/h
4 bar	300 t/h	235 t/h	195 t/h	180 t/h
6 bar	300 t/h	295 t/h	250 t/h	230 t/h



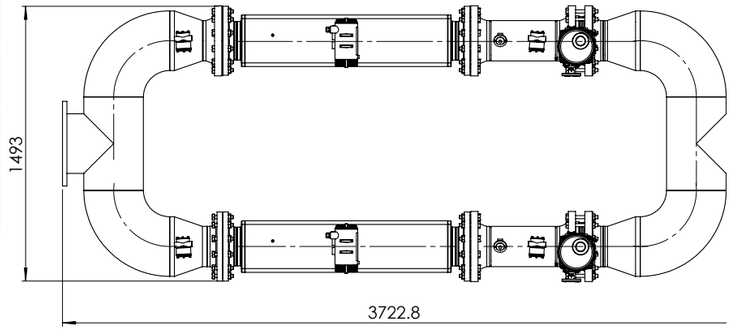
RCCT39XR (DN200/PN40)

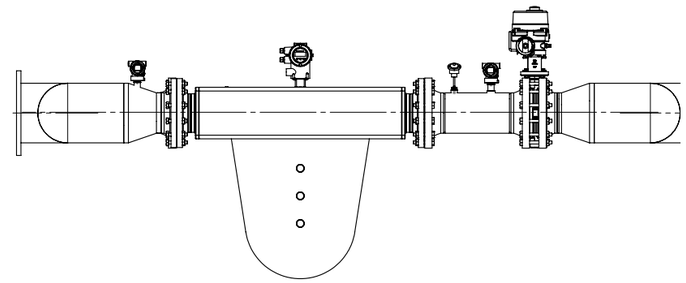
Pressure	MGO	HFO 180 cSt	HFO 380 cSt	HFO 500 cSt
2 bar	510 t/h	260 t/h	220 t/h	210 t/h
4 bar	600 t/h	365 t/h	310 t/h	295 t/h
6 bar	600 t/h	455 t/h	390 t/h	370 t/h



2 x RCCT39XR (DN200/PN40)

Pressure	MGO	HFO 180 cSt	HFO 380 cSt	HFO 500 cSt
2 bar	1020 t/h	520 t/h	440 t/h	420 t/h
4 bar	1200 t/h	730 t/h	620 t/h	590 t/h
6 bar	1200 t/h	910 t/h	780 t/h	740 t/h





Above figures are guidelines – Special pipe design for bunker piping can have influence on actual figures.

INSTALLATION

Insatech Marine provides you with turnkey solutions
A typical installation of an Insatech Marine Bunker Management System is mainly done by the ships own crew. The instruments and transmitters are most commonly placed on deck (in a hazardous zone), as close to the bunker outlet as possible, while the cabinet containing the controls and logging is placed in safe zone. The necessary wiring is drawn and prepared from the cabinet to the measurement equipment. Once everything is in place, Insatech Marine will send their technicians to do the final wiring connections and run tests and commissioning to ensure the functionality of the installation from first operation. Based on consultancies and exchange of information, Insatech will ensure the fit of the system on board, and all components will have been on Insatech Marine's facilities for setup and check. The Bunker Management System can optionally be fitted with piping containing the required connections for all transmitters in order to ease the installation as much as possible.

SERVICE, MAINTENANCE & SUPPORT

Minimal maintenance required
The Insatech Marine Bunker Management System requires a minimum of maintenance, as it contains almost no moving parts. Under normal conditions the maintenance of the bunker line on board will suffice. A specific maintenance guide will be included in the user manual delivered with the Bunker Management System.

Service and support is readily accessible
At Insatech Marine, we pride ourselves in our skilled technicians, and with our global services we are able to solve any issues there might arise, should we not be able to solve them by remote support. On operators request our programmers can remotely access to the system, and help with adjustments or perform health checks.
As a part of our services, we can aid in assuring successful re-certifications of the system in order to make sure that the installed equipment is always working and fulfilling all regulatory requirements put up by local authorities and notified bodies.
Once you have chosen the Insatech Marine Bunker Management System, our technicians are also able to do training of the crew on board – both as a part of the commissioning but also on a regular basis with a frequency set by your needs and wishes.

A TRUSTWORTHY & COMPETENT PARTNER

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, who is still CEO. Since then it has 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

Bunker Management Systems
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.

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.

Performance Management Systems
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.

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.

S3 Smart Sulphur Fuel Switch
The S3 can manage, control and log the entire changeover process from HFO to MGO/MDO or vice versa when entering or leaving an ECA. The S3 has real-time display and logging of sulphur levels as a built-in function. Furthermore, it can be combined with the scrubber on-board and help optimize its performance.

Cargo Management Systems
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.

OUR CUSTOMERS INCLUDE:

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