SOLUTIONS FOR ECO-FRIENDLY MARINE TECHNOLOGY



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ENVIRONMENT

CONTROL O OTHERS

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World Leading Company For Sensor & Control System

"I am proud of seeing that Marsen is enlarging it's scope to the global, and it is obtaining universal recognition."

Hello, I am Kyung-su Kim, CEO of Marsen Co., Ltd.

Marsen is specialized in development and production of ship's measurement equipment and has been leading the growth of the global ship's equipment industries by continuous development and innovation.

I started this business in 2004 with the know-how and experiences in the relevant field.

The motive power of leading the company is endless development of the new technologies.

From the first, I thought that it is highly necessary to develop the ship's equipment industries into higher value-added industries. Marsen goes all-out to develop the new technologies such as Ex- proof device and measuring sensors.

In addition, we are pushing the localization of level, pressure, temperature, gas measurement that many companies are depending on the importation.

I try to practice transparent management. I lead Marsen with virtuous circulation in the way the revenue from running this company should be distributed to the each employee and invested to develop the new technologies.

Gradually the oversea market becomes more important and Marsen tries to open up overseas market in China, Indonesia and Europe by establishing the branch office and making agreement with agent.

I am proud of seeing that Marsen is enlarging its scope to the global, and it is obtaining universal recognition.

We are seeking ways to advance into offshore plant field and other industries. I promise that Marsen will be the first leading company in the field of ship & offshore equipment industries.

Please keep your attention and see how we grow. And it would be much appreciated if you provide us with sincerely warm encouragement.

Thank you.

Many thanks and wish for your health.

CEO K.S. KM.

THE WORLD FIRST LEADING COMPANY

SPECIALIZED IN MARINE **CONTROL & MEASUREMENT EQUIPMENT**

N1 LEVEL

- CARGO TANK MONITORING SYSTEM
- + CARGO PRESSURE MONITORING SYSTEML
- + CARGO TANK HIGH / OVERFILL ALARM SYSTEM
- + BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM

02 ENVIRONMENT + OIL DISCHARGE MONITORING SYSTEM

- + PORTABLE CARGO MEASURING SYSTEM
- + VAPOUR EMISSION & CONTROL SYSTEM
- + GAS DETECTION SYSTEM
- + GAS MONITORING UNIT
- + O2 ANALYZER

MARSEN

03 CONTROL

- + SALINITY METER
 - + WATER INGRESS ALARM SYSTEM
 - + DE-WATERING SYSTEM
 - + BILGE ALARM SYSTEM
 - + BRIDGE NAVIGATION WATCH ALARM SYSTEM
 - + AUTOMATIC VALVE CONTROLLER
 - + VISCOMETER
 - + MASS FLOWMETER
 - + PORTABLE GAS DETECTOR / GAS SENSOR
 - + OIL MIST DETECTOR

OTHERS 04

- ELECTRO-HYDRAULIC POWER PACK
- + TEMPERATURE CALIBRATOR
- + PRESSURE CALIBRATOR
- + PRESSURE INSTRUMENTS
- + EX PROOF INSTRUMENT

CARGO TANK MONITORING SYSTEM

CARGO-2000 (RADAR TYPE)

GENERAL INFORMATION

RADAR TYPE CARGO TANK MONITORING SYSTEM is basically designed to measure the liquid/solid level of cargo tanks from CCR. This system uses two types of radar sensors;

Radar beam type sensor using non-contact measurement with the objects and Guided wire type radar sensor protecting the radar impulse by guided wire.

This system is designed according to IMO Regulation 59, SOLAS Regulation II 6.3.2.

And ExxonMobil MESC 2010 Requirements.

OPERATION PRINCIPLE & SYSTEM COMPOSITION

CARGO-2000 is composed of radar sensors for measuring the level, control panel for monitoring the measured value by touch LCD and barrier for ex-proof.

RADAR BEAM TYPE SENSOR uses FMCW(frequency modulated continuous wave) electromagnetic signal to measure the distance between its antenna and the cargo tank's content surface.

GUIDED WIRE TYPE RADAR SENSOR uses the TDR principle. Radar impulses are emitted to the product surface and the sensor measures the time of the reflected impulses. Then sensor can measure the level by calculating the time and the speed of impulses.

		PC MONITORING DISPLAY		
	-			
FEATURE & ADVANTAGE	 High accuracy / Proper price Easy maintenance Alternative to pressure type & float type Non contact measurement Touch screen / Easy operation Measure for both liquid and solid 			
APPLICATION	+ All kinds of oil & chemical tank	kers		
TECHNICAL	SENSOR TYPE	RADAR BEAM TYPE	GUIDED WIRE TYPE	
SPECIFICATION	MEASURING RANGE	0~40m	0~40m (LIQUID)	
	ACCURACY	±2mm	Up to 10mm	
	POWER	DC 20~30V, 2-WIRE	DC24V, 2-WIRE	
	SIGNAL OUTPUT	4~20mA with HART	4~20 mA with HART	
	EX PROOF	Ex ia IICT6	Ex ia IICT6	
	AMBIENT TEMPERATURE	-40 ~ 80°C	-40 ~ 80°C	
	MATERIAL	SUS316L	SUS316L	
	IP GRADE	IP 68 (with housing)	IP 68 (with housing)	

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SPECIALIZED IN MARINE CONTROL & MEASUREMENT EQUIPMENT

CARGO TANK MONITORING SYSTEM

CARGO-2000 (MAGNETIC FLOAT TYPE)

GENERAL INFORMATION

MAGNETIC FLOAT TYPE CARGO TANK MONITORING SYSTEM is basically designed to measure the level inside cargo tanks and occur alarms when the measured value exceeds the limit. This system uses float type level sensors. Marsen's magnetic float level sensor has been developed based on the long time of the marine field experience and its performance and stability are proved already. This system is designed according to SOLAS & MARPOL 73/78 & IMO Rules.



OPERATION PRINCIPLE & SYSTEM COMPOSITION

CARGO-2000 is composed of float sensors for measuring the level, control panel for monitoring the measured value by touch LCD and barrier for ex-proof.

Sets of reed switches are positioned along the length of the guide pipe. As the float travels up and down the guide pipe in accordance with the level of the liquid in the tank, the flux emitted from magnets within the float works upon the reed switches ON or OFF. By measuring voltage across the transmitter circuit, the level of the liquid can be calculated according to the changes in circuit resistance. The converted signal is sent to the control box via I.S. barrier in the control room or to a local indicator as the case may be.



PC MONITORING DISPLAY



TECHNICAL SPECIFICATION	SENSOR TYPE	MAGNETIC FLOAT TYPE
	MEASURING RANGE	0~35m
	ACCURACY	±10mm
	POWER	AC 110/220V, 50/60Hz
	SIGNAL OUTPUT	4~20mADC (Loop power) / RS232, 422, 485 Contact signal (controller)
	EX PROOF	Ex ia IICT6
	AMBIENTTEMPERATURE	-25~75°C
	MAJOR MATERIAL	SUS316
	IP GRADE	IP 68

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PRESSURE MONITORING SYSTEM VIP-2000

GENERAL INFORMATION

PRESSURE MONITORING SYSTEM is designed for monitoring the pressure of cargo tank or manifold. The Rules that cargo tanks ullage space monitoring system including high & low pressure alarm are newly required by IMO SOLAS 74, Chap. II Reg. 59 became effective 1st July 1998 for preventing the serious deformation of the tank structure caused by change of cargo tank pressure due to the failure of the P/V valve.





OPERATION PRINCIPLE & SYSTEM COMPOSITION

VIP-2000 is composed of pressure transmitters, control panel for monitoring the measured value by touch panel and barrier for ex-proof. The transmitter measures the pressure by means of a semi-conductor sensor. The electrical signals from the pressure transmitter are connected to barrier. Then the signals are sent to the monitoring panel that is equipped with pressure alarm lamp & buzzer and LCD display in the cargo control room.

If the owner wants to add the function for measuring temp., it is possible to add temp. sensor.



TECHNICAL SPECIFICATION	SUBJECT	SPECIFICATION
	SENSOR TYPE	Diaphragm type pressure transmitter
	SENSOR MATERIAL	SUS 316L/PTFE
	MAX PRESSURE	Up to over pressure (range X2)
	MEASURING RANGE	500~1500mbar / 0~16bar
	WORKINGTEMP	-20 ~ 150°C
	ACCURACY	$\pm 0.5\%$ of F.S (or user's request $\pm 0.25\%$ of F.S
	IP GRADE	IP 68 (with housing)
	EX PROOF	Ex ia IICT6
	SIGNAL	4~20mA analog signal
	GAS KINDS	Oil/chemical
	DISPLAY	Touch Screen

CARGO TANK HIGH / OVERFILL ALARM SYSTEM

HAI-2000 (MAGNETIC FLOAT TYPE)

GENERAL INFORMATION

INDEPENDENT CARGO TANK HIGH/OVERFILL ALARM SYSTEM is designed to monitor cargo over flow when cargo tank is being loaded according to the rule of USCG (CFR 46 Part 39) for preventing marine pollution. We can get audible and visual alarm when the cargo tanks are loaded at 95% and 98% of cargo tank.





OPERATION PRINCIPLE & SYSTEM COMPOSITION

HAI-2000 is composed of magnetic float switches, a control panel, barriers and horns for the external alarm. When the liquid in the tank reaches a set point, the reed switch in the magnetic float moving up and down according to tank level makes signal and the controller receiving the signal makes audible and visual alarms.



FEATURE & ADVANTAGE	 Compatible unit for all kinds of liquid High reliability, durability and simple structure

APPLICATION

+ All kinds of oil & chemical tankers

TECHNICAL SPECIFICATION	SUBJECT	SPECIFICATION
	SENSORTYPE	Magnetic float (Single/Dual)
	MATERIAL	Sensor : SUS316 / Controller : SS400
	MAIN POWER	Controller : 110/220VAC, 60Hz
	WORKING PRESSURE	Max. 5bar
	AMBIENTTEMP.	-20~150°C
	IP GRADE	IP 68 (with housing)
	ACCURACY	±10mm (Option 5mm)

BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM

BAL-2000 (ELECTRO PNEUMATIC TYPE)

GENERAL INFORMATION

BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM is designed to measure the level of ballast tanks, draft and fuel oil tanks of ships. This system uses the pneumatic type level sensor and is used for measuring various kinds of tanks.



OPERATION PRINCIPLE & SYSTEM COMPOSITION

BAL–2000 is composed of an air purge unit, a dual check valve, a flow regulator, a 3-wau cock valve, a gauge saver, an analog indicator, P/I converter and a digital indicator for each tank.

The basic operating principle is same as PURE PNEUMATIC TYPE, but this system uses P/I converter and digital indicator additionally to indicate the level digital figure.



COMPONENTS / OUTLINE



TECHNICAL SPECIFICATION	SYSTEMTYPE	ELECTRO PNEUMATIC TYPE
	MEASURING RANGE	0~40m
_	ACCURACY	±1.0% of F.S
	SIGNAL PIPE	OD 8mm
	AMBIENTTEMPERATURE	-30~70°C
-	OPERATING AIR PRESSURE RATING	4~7bar

BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM

BAL-2000 (ELECTRIC PRESSURE TYPE)

GENERAL INFORMATION

BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM is designed to measure the level of ballast tanks, draft and fuel oil tanks of ships. This system uses the electric pressure transmitter and is used for measuring various kinds of tanks.



OPERATION PRINCIPLE & SYSTEM COMPOSITION

BAL-2000 is composed of pressure transmitters, a control panel, indicators and barriers.

The electric pressure type level sensor is to detect changes of the pressure and output the level of tanks as 4~20mA signal when the pressure of the object affects to it.



APPLICATION

- + Ballast tank remote reading
- + Draft remote reading
- + Fuel oil tank remote reading

TECHNICAL SPECIFICATION

SENSORTYPE	ELECTRIC PRESSURE TYPE
MEASURING RANGE	0~35M (or User's request)
ACCURACY	±0.2% of F.S
POWER	AC 110/220, 50/60Hz, / DC 12~30V
SIGNAL OUTPUT	4~20mA
EX PROOF	Ex ia IICT4
AMBIENTTEMPERATURE	-20~100°C
MATERIAL	SUS316
IP GRADE	Amplifier box : IP56 (IP 68 with housing) / Sensor : IP68

OIL DISCHARGE MONITORING SYSTEM ODM-2000

GENERAL INFORMATION

OIL DISCHARGE MONITORING SYSTEM is a system to determine and monitor the ship's oily water discharge according to the rule of MARPOL 73/78 and MEPC. 108(49). IMO regulated the installation obligation of this oil discharge monitoring system to prevent the environment pollution worsen by ships.

In addition, this equipment has successfully passed the calibration tests for Bio-fuel blends as specified in MEPC 240(65).



OPERATION PRINCIPLE & SYSTEM COMPOSITION

ODM-2000 is composed of a controller and an oil content meter, a hyd. package, a motor/pump and other fitting equipment. The OCM monitors the oily water concentration flowed by the sampling pump & hyd. package and sends this information to the controller. Then the controller receiving the data from OCM and GPS determines oily water discharging by processing the data.







APPLICATION

UANTITY: 10006 L OIL LIMIT: 655 OF CARGO: 1 0

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RECORDING DEVICE

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+ Oil tanker+ Oil & chemical tanker

USB

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INPUT AND OUTPUT SIGNAL	SUBJECT	VALUE	SIGNAL
	OIL CONTENT	0 to 1000ppm	Current loop
	DISCHARGE FLOWRATE	Max. 1,225m³/h	4~20mA
	SHIP SPEED	21knots max.	Impulses or GPS
	GPS		NMEA0183
	DISCHARGE VALVE		Dry contact
	VALVE POSITION		Dry contact

TECHNICAL SPECIFICATION	SUBJECT	VALUE
	CONTROLLER AND OIL CONTENT METER POWER	220V-60Hz / 110V-50Hz
	MOTOR PUMP POWER	440V-60Hz / 380 V - 50Hz (3PHASE)
	AMBIENT TEMPERATURE	0~55°C
	HUMIDITY	MAX 95% RH
	VIBRATION	2~13Hz Amplitude + 1mm
	AIR SUPPLY	4~7bar, dry clean air

OIL DISCHARGE MONITORING SYSTEM

ODM-2000





PORTABLE CARGO MEASURING SYSTEM ULLAGE TEMPERATURE INTERFACE DETECTOR

UTL-300

GENERAL INFORMATION

Ship(tanker) must be equipped with interface detector that approved by the government.

Compared to fixed type tank level gauging system, portable type tank level gauging System has many advantages, it is very useful to work of tank level gauging on the deck.

In case the Oil/Water Interface Detector is required for the chemical carrier installed in slop tank and is also loading oil products, The IMO MARPOL 1973/78 requirement is that slop tank must be provided to retain the slop tank generated by tank washing, Oil residues and dirty ballast residues in order to preserve the sea from pollution by oil.

Furthermore, IMO MARPOL Regulation 15,(3)(b) : Effective Oil/ Water Interface Detectors approved by the administration shall be provided for a rapid and accurate determination of Oil/Water Interface in slop tank and shall be available for use in other tanks where the separation of oil and water is effective and from which it is intended to discharge effluent direct to the sea.

UTL–300 is satisfied the requirements of MARPOL 1973/78, Regulation 15(3)(b) and Resolution MEPC.5(XIII) Annex 4.

OPERATION PRINCIPLE & SYSTEM COMPOSITION

ULLAGE TEMPERATURE INTERFACE DETECTOR is necessary for cargo tanker and it is designed for measuring the ullage level, the oil-water interface level, the temperature and sampling the cargo.

UTL–300 detects a change of the impedance by using ultrasonic technology and measures the difference of voltage according to the conductivity of the water. In addition, it can measure the temperature by the output voltage of the built-in semiconductor element.

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-	5K 50A SCS14	

VALPOUR LOCK VALVE

BALL VALVE WITH CAP			
VALVE (FLANGE)	L	CONNECTOR SIZE (M)	
1" (25A)	120	M70 * P1.5	
1" (50A)	120	M70 * P1.5	
2" (50A)	120	M70 * P1.5	
2" (80A)	120	M70 * P1.5	



ULTRASONIC SENSOR PROBE



PACKING CASE









VALVE CONNECTION For sailing vessel, Marsen can supply UTI with other maker's connecting fitting

APPLICATION

- + High accuracy and responsibility
- + Possible to protect the operator
- + Prevent the environmental pollution
- + Easy operation and maintenance

TECHNICAL SPECIFICATION	SUBJECT	SPECIFICATION		
	UTL - 300 - ULLAGE TEMPERATURE INTERFACE DETECTOR	ACCURACY	±2mm	
		TAPE GRADUATION	Metric	
		TAPE RESOLUTION	1mm	
		TAPE LENGTH	15m / 30m / 37m	
		MEASURING TEMP. RANGE	-10°C~90°C	
		EX GRADE	Ex ia IICT4	

PORTABLE CARGO MEASURING SYSTEM ACCESSORIES



MARSEN UTL–SPL is designed for closed sampling of liquids or chemicals that cause fire, air pollution. Gastight structure of the equipment is prevented from being exposed to pressure and smog emissions in the tank during operation.



MARSEN DIPPING ROD is designed for checking that the bottom of closed and inerted tanks is dry and free of deposits after crude oil washing. It consists of a graduated brass/stainless steel weight attached to a graduated stainless steel tape wound up on reel and an adapter for connecting a deck valve. The operation is carried out with negligible escape of gas from the tank to the atmosphere.



GAS SAMPLER

UTL–SPL–G is for sampling the gas such as oxygen, flammable and toxic gas inside the tank. It can help for operator to know what gas is in the tank and prevent an unexpected accident.



VAPOUR EMISSION & CONTROL SYSTEM

VECS-2000

GENERAL INFORMATION

A large quantity of vapour created by tankers is harmful to the environment. VAPOUR EMISSION & CONTROL SYSTEM is designed for measuring oxygen gas content in the vapour main collection lines during oil discharging of oil/chemical tankers. This system can also monitor the pressure of the waste vapour line by the pressure transmitter. All tankers should be equipped with this system from 19th May 2005 in compliance with IMO MSC/Circ 585. This system complies with USCG regulation for cargo vapour monitoring system for cargo tanks.





O2 SENSOR



I.S PRESS. TRANSMITTER

OPERATION PRINCIPLE & SYSTEM COMPOSITION

VECS-2000 is composed of a control panel and a sensing cabinet including an oxygen sensor, pressure tansmitters and a flow switch. This system has 4 sampling points and monitors the oxygen content of each point in order of precedence. The sampled gas is analyzed at the sensing cabinet in a hazardous area and emitted into the atmosphere. Pressure transmitter monitors the pressure of waste vapour and manifold line. All signals are sent to the control panel and the control panel shows the value and activates the alarms.





TECHNICAL SPECIFICATION	SUBJECT	VALUE
	SYSTEM	AC110/220V, 50~60Hz, DC 24V
		Air supply 4~7bar
	PRESS. TRANSMITTER	Range 0~400mbar
		Power supply DC 24V
		Output 4~20mADC (Loop power)
		Range 0~25% O2
	OXYGEN SENSOR	Output 4~20mADC (Loop power)

GAS DETECTION SYSTEM BGAS-2000

GENERAL INFORMATION

GAS DETECTION SYSTEM is designed for sampling and measuring the gas for a number of sampling points such as water ballast tanks and void spaces. This system is designed to sample the gas from each sampling point where the flammable and hydrogen sulphide gas content can be generated and deliver the gas to the analyzing unit what the flammable and hydrogen sulphide gas content can be measured. Therefore, this system can provide the alarms for the presence of flammable and hydrogen sulphide gas.

This system is designed according to the requirements of IMO/ SOLAS and the classification rules.

OPERATION PRINCIPLE & SYSTEM COMPOSITION

BGAS-2000 is composed of a number of sampling units and a control & analyzing unit that includes gas detectors, a pump and an indication monitor. A gas sampling is done from each sampling point in sequence and the gas is transported to the gas detectors through the pipe. Then gas analyzing is done in the control & analyzing unit. It is possible to send information to the AMS by using communication protocol which allows for a real time flow of information with the current location being sampled and the gas content level.





APPLICATION

+ Sampling of the ballast tanks and void spaces

TECHNICAL	SUBJECT	VALUE
SPECIFICATION	POWER SUPPLY	110~220VAC (50~60Hz), 2A
	PUMP CAPACITY	15lit/min
	GAS MEASUREMENT	HC, O2, H2S and etc. (up to 4 pieces)
	SAMPLING POINTS	Maximum 48 with or without counter pressure
	SUCTION PIPES	OD 8 or 10, ID approx. 6
	OUTPUTS	6 relays with 2 switching 5A contacts each standard or custom defined
	INSTALLATION ACCESSORIES	Flame arrester, shut off valves, filters, cones and etc.
	OPTION	Printer (RS232), modbus (RS485), Pre-suction pump 15lit/min, 1~4 Repeater units, pump redundancy, other special arrangements

GAS MONITORING UNIT GAS-200

GENERAL INFORMATION

IMO has strengthened the safety measure as bellows because of the frequent explosion accidents in the pump room of oil tankers. GAS-200 is designed according to 2000 SOLAS Chap. 2 Reg. 4. It can monitor HYDROCARBON GAS / O2 content and occur alarms.

- + To monitor continuously HYDROCARBON GAS concentration
- + To install SAMPLING POINT or DETECTOR HEAD at the proper location
- To activates audible and visual alarms in pump room, engine control room, CCR and bridge when the gas concentration reaches at the preset level (under 10% of LEL)







TECHNICAL		
SPECIFICATION	SUBJECT	VALUE
	SENSOR TYPE	Electro-Chemical sensor
	MATERIAL	Marine Aluminium / SUS316 / PTFE
	MAIN POWER	Controller 110/220VAC, 60Hz
· · · ·	EX PROOF	Ex ia IIB T4
	ACCURACY	±0.5% of F.S
	MEASURING RANGE	0~30% (Oxygen)
	AMBIENT TEMP.	-10°C~60°C
	IP GRADE	IP 56
	SIGNAL	4~20 mA Analog signal
	KIND OF GAS	Oxygen / Toxic / Flammable gas

O2 ANALYZER IGO-200

GENERAL INFORMATION

O2 analyzer measures the O2 content for BOILER's safety operating and activates audible and visual alarm and sends signals to ECR. It can be used as a sub O2 analyzer for other boiler system. So Marsen supplies this system with the selection switch.



OPERATION PRINCIPLE & SYSTEM COMPOSITION

IGO-200 is composed of a main controller with internal O2 sensor. The internal O2 sensor measures O2 content and the controller activates high/low alarms. Selection switch can be installed to be used with main analyzer as requests.

TECHNICAL SPECIFICATION	SUBJECT	VALUE
	O2 SENSOR RANGE	0~5/0~10/0~25%
	MATERIAL	SS400
	MAIN POWER	Controller 110/220VAC, 60Hz
	ALARM POINT	Low & High alarm (Adjustable)
	OUTPUT SIGNAL	4~20mA (DC)

SALINITY METER

SAL-200

GENERAL INFORMATION

SALINITY METER is designed to measure the salinity of the fresh water generator or boiler feed water.

OPERATION PRINCIPLE & SYSTEM COMPOSITION

The controller remotely controls valves by electric, pneumatic and hydraulic line. SAL-200 is composed of a controller for monitoring the measured value, salinity sensors and solenoid vales. The electrical signals from the salinity sensor are connected to the controller that is equipped with alarm lamps & buzzer, LCD indicator and keypad. Main function – F.P.T and bosun store discharge, Valve open/close indication, Direct/reverse operation, Another panel available.

COMPONENTS / OUTLINE



TECHNICAL SPECIFICATION

SUBJECT	VALUE
MEASURING RANGE	0~20ppm, 0~200ppm
ACCURACY	±2.5%
ALARM CONTACT	Dry contact
POWER	AC 100~240V / 50~60Hz
IP GRADE	IP 54
SENSORTYPE	Electrode type
TEMPERATURE	0~100°C

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SALINITY METER

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WATER INGRESS ALARM SYSTEM

WIA-3000



OPERATION PRINCIPLE & SYSTEM COMPOSITION

WIA-3000 is composed of a main alarm panel, repeat alarm panel, barriers, external alarm unit and water level switches (electrode/ pressure/ float type) installed at the cargo hold or the location complied by the rules. When the presence of water has reached the detecting point of level switch installed in the cargo holds or other space, the electric signals are transmitted to the main panel and main panel activates alarms and alarm signals to external unit.

GENERAL INFORMATION

WATER INGRESS ALARM SYSTEM is designed to detect the presence of water in the cargo holds and dry space or void space. This system is in accordance with SOLAS Reg. XII 12, IMO Res. MSC. 145(77) and IACS SCI 180. This sensor can also be used for detecting the water in LPG/LNG Carriers.



ALARM MODULE



INPUT AND OUTPUT SIGNAL	SUBJECT	VALUE	
	SENSORTYPE	Electrode / Pressure / Float	
	MATERIAL	Sensor : SUS304 / SUS316 Controller : SS400	
	MAIN POWER	110/220 VAC, 60 Hz / 24 VDC	
	PRESSURE	Max. 5Kgf/cm ²	
	AMBIENT TEMP.	Ambient temp. : -25°C ~ 70°C / Work temp. : -10°C ~ 60°C	
	IP GRADE	IP 68	
	ACCURACY	±5mm	
	EX. PROOF	Sensor : Ex ia IICT6 / Barrier : Ex ia IICT6	
	SIGNAL	4~20mA Analog signal	
	COMMUNICATION	RS485 (422)	
	MEASURING POINT	MAX. 80point	

DE-WATERING SYSTEM

WIP-2000

GENERAL INFORMATION

DE-WATERING SYSTEM is designed to discharge the water from dry spaces in fore of ship out of the deck. This system is in accordance with SOLAS Reg. XZI/13. WIP-2000 uses electric, pneumatic and hydraulic valves interlocking with WIA-3000.





OPERATION PRINCIPLE & SYSTEM COMPOSITION

The controller remotely controls valves by electric, pneumatic and hydraulic line. Main function – F.P.T and bosun store discharge, Valve open/close indication, Direct/reverse operation, Another panel available.

CONTROLLER	 Source : AC 110/220V, 50/60Hz Material : SS400 Function : Alarm function Valve operating function (open/close) 	 3) Power fail (option) 4) Power on/off 5) Horn/outdoor lamp (option) 6) Digital or Mimic type
PNEUMATIC	 Source : Pneumatic or Hydraulic Acting : Single or Double Connection : BSPT 1/4" Max press. : 10bar (Pneumatic), 350bar (Hyd.) Min press. : 4bar (Pneumatic), 80bar (Hyd.) 	 Connection valve : Butterfly or Ball Indication : Option Easy installation & Simple operation Short delivery time & Low price Minimum maintenance & Long life time
HYDRAULIC POWER PACK	 + Source : AC 220V / 60Hz + Max press. : 120bar + Port : 2port + IP Grade : IP68 	 + Emergency operation : Yes (hand pump) + Weight : 35kg + Option : Lock indication, Pneumatic operation
ELECTRIC ACTUATOR	 Source : AC 110/220V, 50/60Hz Valve : Butterfly or Ball IP Grade : IP68 Size : 40~800A 	 Manual : Available Indication : Visual indication Application : Dry space

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BILGE ALARM SYSTEM

BOA-2000

GENERAL INFORMATION

IMO MSC. 67 and OCIMF (Oil Companies International Marine Forum) regulate that all pump rooms of oil tankers for new shipbuilding and existing tankers should be equipped with high level alarm by audible and visual way.

OPERATION PRINCIPLE & SYSTEM COMPOSITION

BOA-2000 is composed of level switches and a controller. It monitors the level of bilge well and activates audible and visual alarms by sending signal to controller when the level reaches at the setting value.



TECHNICAL		SPECIFI	CATION
SPECIFICATION	SUBJECT	MAGNETIC FLOAT TYPE	CAPACITANCE TYPE
	POWER	Max. 250VAC, 0.5A	Max. 250VAC, 0.5A
	CONNECTION	JIS 5K 50A	JIS 5K 50A
	SET POINT	120~5000mm	120~5000mm
	ACCURACY	±5mm	±5mm
	Min. SPECIFIC GRAVITY	0.85	0.85
	IP GRADE	IP 56	IP 56
	EX PROOF	Ex ia IICT6	Ex ia IICT6
	SIGNAL	Dry contact	4~20mA

BRIDGE NAVIGATION WATCH ALARM SYSTEM

GENERAL INFORMATION

BRIDGE NAVIGATION WATCH ALARM SYSTEM is designed to monitor bridge activity and to alert the master of other qualified navigators if the bridge becomes unattended. This system conforms to the requirements of IMO resolution MCS. 128(75). DEAD MAN ALARM SYSTEM should be equipped inside the engine room and the pump room. This makes alarm for preventing the on-duty crews from napping or sleeping.



OPERATION PRINCIPLE & SYSTEM COMPOSITION

WATCH-2000 is composed of a main controller, reset button boxes, motion sensor boxes and alarm boxes. When the monitoring mode starts, the BNWAS enters into the "Dormant Period". This period lies between 180 and 720 seconds (3~12minuts). When the dormant time is expired without reset, the "Visual Indication" becomes active. If not reset within 15 seconds the internal buzzer turns on and the"1st Stage Alarm" becomes active. A period of 15 to 60 seconds later, if not reset, the "2nd Stage Alarm" becomes active. After a period of 90 to 180 seconds the "3rd Stage Alarm" becomes active.







COMPONENTS / OUTLINE



TECHNICAL SPECIFICATION

SUBJECT	VALUE		
	Cover	SS400	
IVIAI ENIAL	Body	SS400	
WEIGHT	8kg		
POWER SUPPLY VOLTAGE	AC 110/220V 50)/60Hz, DC 24V	
NUMBER OF INPUT	Reset	Adjustable	
	Start(touch screen)	1point	
	Alarm Buzzer	1point	
NUMBER OF OUTPUT	Extension Buzzer	Adjustable	
	Contact point signal (for the alarm Panel)	As per user's request	
	Serial Port	Max. 3port	

AUTOMATIC VALVE CONTROLLER

V-CON

GENERAL INFORMATION

AUTOMATIC VALVE CONTROLLER accepts various input signals caused by pressure, temperature, level and gas and it controls pneumatic, electric and hydraulic valves by sending open & close signals to valves.



OPERATION PRINCIPLE & SYSTEM COMPOSITION

V-CON is composed of CPU module, main control PCB, display module, push switch and buttons. V-CON outputs valve OPEN & CLOSE signals by processing the data such as input signals and setting value.



VISCOMETER

GENERAL INFORMATION

The measurement and control of heavy fuel viscosity are a known requirement within the marine and diesel engine industries. With the increasing pressure on operators to reduce costs, lower maintenance, viscometers are required to control their system. The viscometer is a major innovation in the measurement of all types of fuel oil that are supplied engines, turbines and marine burners. If it is correctly installed, the viscometer requires little or no maintenance and it is naturally tolerant of the harsh engine environments.







	ITEM	SPECIFICATION			
		ТҮРЕ	PNEUMATIC	ELECTRIC	
		VISCOSITY RANGE 0~50cSt		,	
		TEMPERATURE Fuel oil max. 180°C / Ambient max. 6		nt max. 60°C	
	SENSOR	MAX. FUEL FLOW RATE 35m3/h			
		OUTPUT DIFFERENTIAL PRESSURE approx. 0~0.5bar		ar	
		ACCURACY	better than ±2%		
	VISCOSITY CONTROL STATION	INPUT SIGNAL	0.2~1.0bar	4~20mA	
		OUTPUT SIGNAL	0.2~1.0bar	4~20mA	
		AIR SUPPLY	1.4bar	-	
		POWER	110V/220V 50/60Hz		

MASS FLOWMETER CMF-200

GENERAL INFORMATION

Mass flow meter is a device that measures the mass of fluid traveling through a tube, in accordance with Coriolis Principle.

Coriolis Mass flowmeter can directly measure the fluid mass flow, and has great influence on the processing and measuring methods in the energy and chemical industries. Compared with the traditional volume tric flow measurement.



INPUT

- + High accuracy and relibility
- + Wide range of flowrate.
- + Can measure density, temperature

+ Possible to measure the mass directly

+ Simple structure

TECHNICAL SPECIFICATION	SUBJECT	VALUE
	ACCURACY	Better than $\pm 0.2\%$ of Actual Flow (Range 1:10)
	AMBIENTTEMP	Part with LCD Display -30~+60°C
	RELATIVE HUMIDITY	5%~95%, Non Condensed
	FLUID	Liquid / Gas
	FLUIDTEMP	-200~+200°C
	NOMINAL PRESS	4Mpa // 25Mpa (High Pressure Model)
	SUPPLY VOLTAGE	DC 24V, 5W
	OUTPUT	4~20mA, Pulse 0~10KHz, RS-485

PORTABLE GAS DETECTOR / GAS SENSOR

Portable Gas Detector & Sensor

Portable Gas Detector & Sensor



MINIMAX X4 MEASURING GAS : O2, H2S, CO, Flammable TYPE : MULTI



GX-2009 MEASURING GAS : Flammable, Oxygen, Toxic TYPE : MULTI



GX-8000

MEASURING GAS : O2, H2S, HC, CO TYPE : MULTI / PUMP TYPE



RX-8000

MEASURING GAS : O2, HC, VOLUME TYPE : MULTI / PUMP TYPE



GV-100S



RX-8500



RX-8700



Calibration Can

LEVEI

 Fixed Gas
 Image: Sensors
 Image: Sen

OIL MIST DETECTOR

OMD-200

GENERAL INFORMATION

OIL MIST DETECTOR is a system to monitor the oil mist of CRANK CHAMBER, MAIN ENGINE and Hydraulic power pack and activates visual alarm for preventing explosion and fire. It can monitor 2 places for each monitor.





OPERATION PRINCIPLE & SYSTEM COMPOSITION

OMD sensor detects the oil mist included in the air by internal fan and sends electric signal to controller. Then the controller activates visual alarm.

APPLICATION

+ ENGINE ROOM, CRANK CHAMBER, HYDRAULIC POWER PACK room and Other machine room where the owner intends to install.

TECHNICAL SPECIFICATION	SUBJECT	VALUE
	MEASURABLE RANGE	0-2.2mg/L
	ACCURACY	±0.5%
	ALARM CONTACT	Dry Contact
	POWER SUPPLY	DC 24V
	IP GRADE	IP 54

ELECTRO-HYDRAULIC POWER PACK

EHP-200

GENERAL INFORMATION

EHP is a compact hydraulic actuator controller that integrated electric motor, relief valve, check valve and hydraulic gear pump inside of housing. It can operate by small quantity working fluid and minimize the pressure loss at power transmission by increasing responsiveness and simplification of hydraulic piping. Because of the communication expansion of not only RS232 but also 422/485, it can operate multi-drop. Thus, user can control multiple electro-hydraulic power packs in a remote place in accordance with specified protocol. And user can monitor the actual operating situation in real time by feedback of EHP-200's status controlled. User can control EHP-20 manually in local.



FEATURE & ADVANTAGE

- + Outstanding decrease of hydraulic piping
- + Easy to control the valve position and trace the opening and closing degree
- + Removal of the existing heavy parts
- + Easy installation and maintenance

TECHNICAL	SUBJECT	VALUE		
SPECIFICATION	POWER	220VAC, 60Hz / 24VDC		
	MOTOR POWER	0.35kw		
	VALVE POSITION RESOLUTION	Min. 1/100		
	DELAY TIME ADJUSTMENT	0~15Sec. (1 Step 1 Sec)		
	DUTY CYCLE (On-Off Duty)	S2 : Max 30 Minutes / S4 : 50%		
	EX PROOF	Ex d IICT4		
	IP GRADE	IP 68		
	AMBIENTTEMPERATURE	-20°C ~ 60°C		
	WORKING PRESSURE	120bar		
	DIMENSION	78 x 118 x 171 (mm)		
	WEIGHT	10kg		
	APPLICATION VALVE SIZE	40A ~ 900A		

TEMPERATURE CALIBRATOR

GENERAL INFORMATION

When it comes to ensuring the reliable functioning of machines and industrial plants, exact temperature measurement or

monitoring is necessary. Incorrectly displayed temperature readings increase the risk of failure. Temperature is one of the most important indicators for product quality. Exact measurement ensures consistency in the quality of products.



FEATURE & ADVANTAGE	 + Optimized burning efficiency & fuel consumption + Reduces engines maintenance costs, overhaul costs and pollution 			
APPLICATION	 Calibration for ship's temperature Research and development laboratories Testing and inspection department in production areas as standard equipment for service technicians 			
TECHNICAL	SUBJECT	VALUE		
SPECIFICATION	TEMPERATURE RANGE 30 TO 650 °C	40~650°C		
	RESOLUTION (DISPLAY)	0.1°C		
	ACCURACY	±1.5°C		
	STABILITY	±0.5°C		
	HEATING TIME TO MAX	40min		
	COOLING TIME TO MIN	65min		
	THERMOSTATTEST	Yes		
	WELL DEPTH	155mm		
	WELL DIAMETER	26mm		
	POWER SUPPLY	100~200VAC, 50~60Hz		
	POWER CONSUMPSION	1600W		
	OPERATING TEMPERATURE	0~40°C		
	DIMENSION	115 x 280 x 220		
	WEIGHT	abt. 5.5kgs		

PRESSURE CALIBRATOR

SIKA.

MPC-200

GENERAL INFORMATION

PRESSURE CALIBRATOR is designed for measuring pressure of various kinds of pressure devices. Pressure is one of the most important factors for product quality.

FEATURE & ADVANTAGE	+ Easy to use+ Competitive price and safety	

APPLICATION

- + Calibration for ship's pressure
- + Research and development laboratories
- + Testing and inspecting departments in production area

TECHNICAL SPECIFICATION

PRESSURE PUMP		DIGITAL REFERENCE TEST GAUGE		
SUBJECT	VALUE	SUBJECT	VALUE	
PRESSURE MEDIA	AIR	PRESSURE CONNECTION	G1/4" male thread	
PRESSURE RANGE	-1(-950mbar) ~ 40bar	DISPLAY	Multifunction LCD, 30 x 30mm	
REFERENCE : PROCESS G 3/8 A female, with quick connection	REFERENCE : G 3/8 A female, with quick connection	NCE : D = 70, L = 100, H = 30 quick connection HOUSING VICE : IP 68	D = 70, L = 100, H = 30mm weight app. 130g	
CONNECTION	TEST DEVICE :		IP 68	
	G 1/4 A female, with hose (1.0 m) & cap nut	POWER SUPPLY	3 V-battery	
HOUSING	220 x 105 x 63mm			
WEIGHT	abt. 500g	ACCURACY	±0.5% of F.S	
INCLUDING ACCESSORIES	seals, case	MEASURING RANGE	-1~ (30) 40bar / 0.01	

PRESSURE INSTRUMENTS

DIFFERENTIAL PRESSURE TRANSMITTER (MODEL : DPT-420)

GENERAL INFORMATION

DPT-420 is used to measure for flow rate of liquid, gas and steam. It outputs the analog signal of 4~20mA corresponding measured pressure.

SUBJECT	VALUE		
SUPPLY POWER	10~48VDC		
OUTPUT SIGNAL	4~20mA, HART		
ACCURACY	±0.05%		
STABILITY	±0.25%		
TEMPERATURE	-30°C ~ 85°C		
EX PROOF	Ex ia IICT5		
MAX STATIC PRESSURE	40bar		
PRESSURE RANGE	0~0.2, 0~0.4, 0~1, 0~4, 0~10bar, case		



AVERAGING PITOT TUBE (MODEL : APT-200)

GENERAL INFORMATION

APT-200 consists of a bluff body or probe of constant cross-section that spans the diameter of the pipe. The probe has ports that sense the pressure on both the front side and at the rear of the probe. The sensed pressures are averaged in the internal passages or plenums in the probe and brought to the exterior of the assembly, where there are connections to a DP transmitter.

SUBJECT	VALUE		
MEASURING FLUID	Liquid, Gas, Steam and etc.		
	STS316, 304		
MATLMAL	Option : STS 316L		
SIZE	100A ~ 800A		
	300°C		
IEIVIPENAIUNE	Option : -196°C		
WORKING PRESSURE	20bar		
ACCURACY	±1.0% of F.S		
REPEATABILITY	±1.0% of F.S		



EX PROOF INSTRUMENT

EX SOLENOID VALVE (MODEL : HAS12)

GENERAL INFORMATION

- + Ex Certification
- + KR Certification for Explosion Proof Equipment
- + Patent application

SUBJECT	VALUE	
RATED CURRENT	0.12A	
RATED VOLTAGE	DC 12V	
SAFETY PARAMETER	Ui = 13V, li = 2A, Li = 0mh, Ci = 0nF	
WMAX	4~5Watt	
ABSORPTION FORCE	MIN 0.5N, MAX 1.5N	
DUTY RATING	Continuous (100%)	
WORKING PRESSURE	160bar, Max. 250bar (busting)	
EX GRADE	-20 ~ 50°C	

EX POWER SUPPLY (MODEL : HAP12)

SUBJECT	VALUE
SUPPLY VOLTAGE	AC 220V
INPUT SIGNAL	DC 24V
OUTPUT VOLTAGE	DC 12V
STORAGE	$-20^{\circ}C \le Ta \le 60^{\circ}C$
EX PROOF	Ex ia IIC
	Po = 1W
	Uo = DC 14V
DEVICES PARAMETER	lo = 290mA
	Lo = 0.35mH
	Co = 450nF

CURRENT SIGNAL CONVERTER (MODEL: DAC420)

SUBJECT	VALUE
LOCATION OF UNIT	Safety Area
HOUSING MATERIAL	Polycarbonate (Light Gray)
CONNECTION	Blade Pin Terminals
PRINT CIRCUIT BOARD	FR-4
SUPPLY VOLTAGE	DC24V
INPUT SIGNAL	DC 4-20mA
OUTPUT VOLTAGE	Contact Point
STORAGETEMPERATURE	-20°C ≤Ta ≤ 60°C

I.S BARRIER

Model No.	Number of single	Faith	Max. permissible cable parameters			Match
	channels interconnected within haz.area	return uses				
			Capacitance	Inductance	L/R ratio	power
			(uF)	(mH)	uH/Q	
DMB-207+	Both	Yes	0.13	4.2	55	0.65
DMB-288+	Both	Yes	0.13	0.37	24	1.15
DMB-287S+	Both	Yes	0.13	4.2	55	0.65









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