



THE WORLD FIRST LEADING COMPANY IN THE FIELD OF SHIP &  
OFFSHORE MATERIAL INDUSTRIES

# MARSEN



- » OIL DISCHARGE MONITORING
- » ULLAGE INTERFACE DETECTOR
- » GAS MONITORING

- » LEVEL MONITORING
- » TEMP MONITORING
- » PRESSURE MONITORING

## World Leading Company For Sensor & Control System

*“ I am proud of seeing  
that Marsen is enlarging  
its 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. Kim.*



# Certificates

## MED



## IECEX



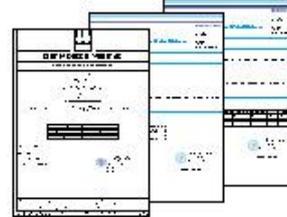
## ABS



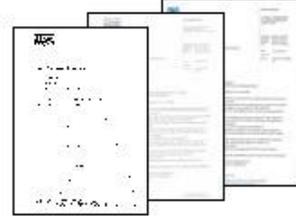
## BV



## DNV



## LR



## KR

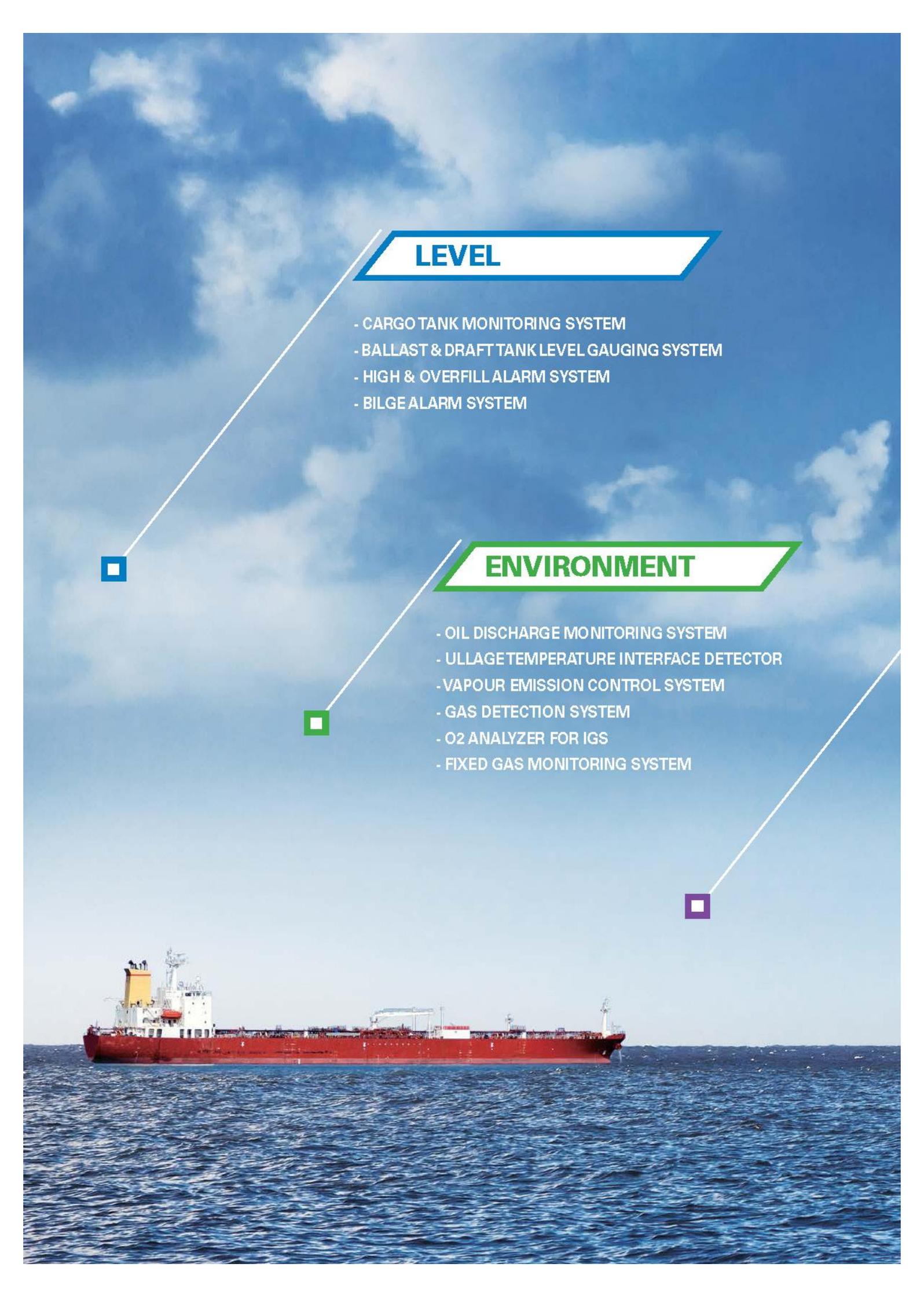


## KG



## COMPANY





## LEVEL

- CARGO TANK MONITORING SYSTEM
- BALLAST & DRAFT TANK LEVEL GAUGING SYSTEM
- HIGH & OVERFILL ALARM SYSTEM
- BILGE ALARM SYSTEM

## ENVIRONMENT

- OIL DISCHARGE MONITORING SYSTEM
- ULLAGE TEMPERATURE INTERFACE DETECTOR
- VAPOUR EMISSION CONTROL SYSTEM
- GAS DETECTION SYSTEM
- O2 ANALYZER FOR IGS
- FIXED GAS MONITORING SYSTEM

# WORLD LEADING COMPANY INSIDE

SPECIALIZED IN MARINE CONTROL &  
MEASUREMENT EQUIPMENT

## CONTROL

- WATER INGRESS ALARM SYSTEM
- DE-WATERING SYSTEM
- BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM
- DEAD MAN ALARM SYSTEM
- ANTI HEELING WITH INCLINOMETER SYSTEM
- VALVE REMOTE CONTROL SYSTEM
- AUTOMATIC VALVE CONTROLLER
- OIL MIST DETECTOR
- MGO-HFO CHANGEOVER SYSTEM
- VISCOMETER
- SALINITY METER

## OTHERS

- ELECTRO-HYDRAULIC POWER PACK
- TEMPERATURE CALIBRATOR
- PRESSURE CALIBRATOR
- IS BARRIER & ISOLATOR
- EX SOLENOID VALVE
- DIFFERENTIAL PRESSURE TRANSMITTER
- AVERAGING PITOT TUBE

# CARGO TANK MONITORING SYSTEM - LEVEL

## 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 the Rule of Classification Society, 46 CFR part 39.20-3.

And ExxonMobil MES-C 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.

## 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 tankers



# CARGO TANK MONITORING SYSTEM - LEVEL

## 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 the Rule of Classification Society, 46 CFR part 39.20-3.



## 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.

## FEATURE & ADVANTAGE

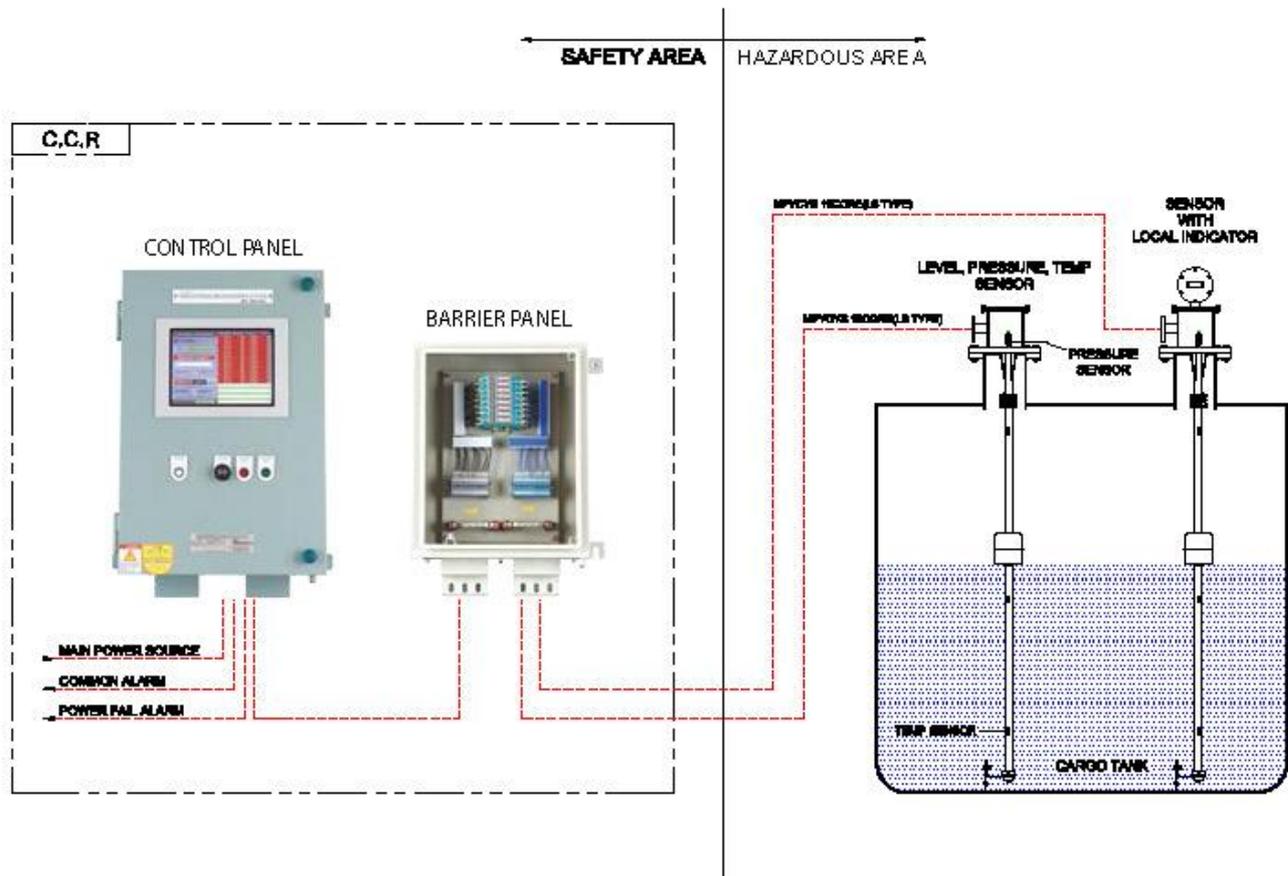
- Proper price
- Simple structure
- Easy maintenance and repair
- Contact measurement
- Touch screen / easy operation
- Measure for liquid

## APPLICATION

- All kinds of oil & chemical tankers

## CARGO-2000 (MAGNETIC FLOAT TYPE)

### I COMPONENTS / OUTLINE I



### I TECHNICAL SPECIFICATION I

SENSOR TYPE	MAGNETIC FLOAT TYPE
MEASURING RANGE	0~35m
ACCURACY	±10mm
POWER	AC110/220V, 50/60Hz
SIGNAL OUTPUT	4~20mA DC (Loop power) / RS232, 422, 485 Contact signal (controller)
EX PROOF	Ex ia II CT6
AMBIENT TEMPERATURE	-25 ~ 75 °C
MAJOR MATERIAL	SUS316
IP GRADE	IP 68

# CARGO PRESSURE MONITORING SYSTEM

## 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 Regulation 59, SOLAS regulation II.6.3.2 & IACS SC140 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.

## FEATURE & ADVANTAGE

High accuracy

Possible to install regardless of the number of cargo tank

Two types to monitor the pressure of tanks or manifolds (Individual type & Collective type)

## APPLICATION

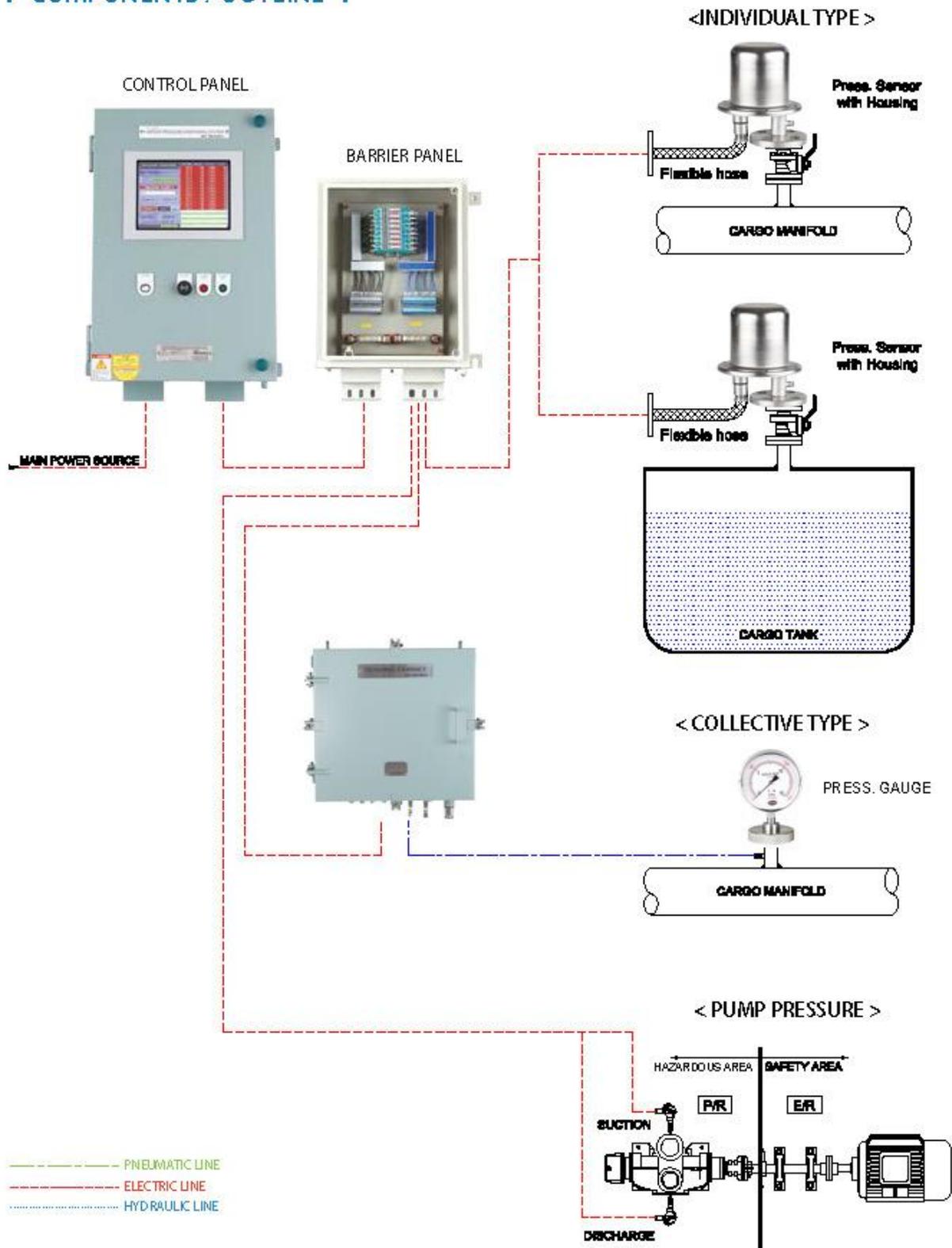
All kinds of oil & chemical tankers

## 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	500~1500 mbar / 0~16bar
WORKING TEMP	-20 ~ 150 °C
ACCURACY	±0.5% of F.S (or user's request ±0.25% of F.S)
IP GRADE	IP 68 (with housing)
EX PROOF	Ex ia IIC T6
SIGNAL	4~20 mA analog signal
GAS KINDS	Oil/chemical
DISPLAY	Touch Screen

# VIP-2000

## COMPONENTS / OUTLINE



# CARGO TANK HIGH / OVERFILL ALARM SYSTEM

## 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) and classification society. 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.



## I FEATURE & ADVANTAGE I

Compatible unit for all kinds of liquid

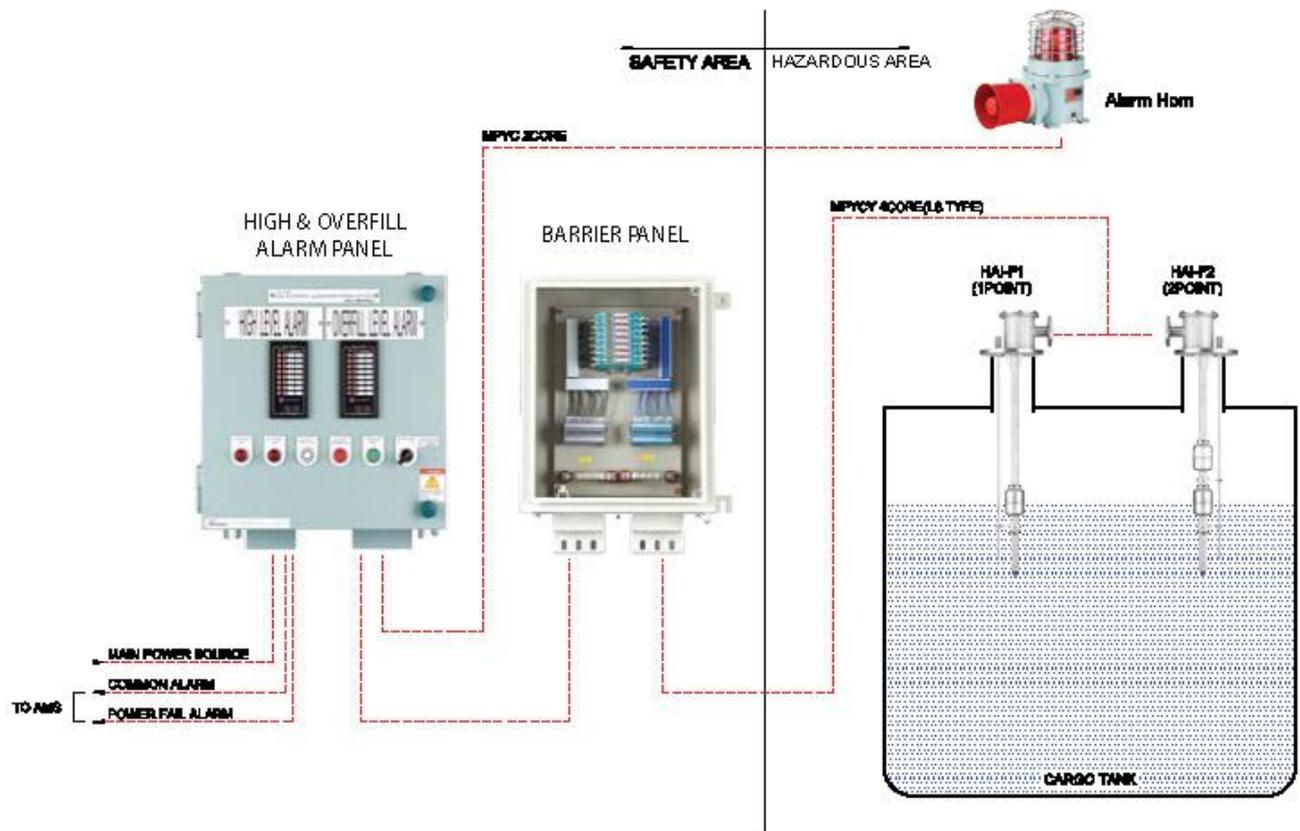
High reliability, durability and simple structure

## I APPLICATION I

All kinds of oil & chemical tankers

# HAI-2000 (MAGNETIC FLOAT TYPE)

## COMPONENTS / OUTLINE



## TECHNICAL SPECIFICATION

SUBJECT	SPECIFICATION
SENSOR TYPE	Magneticfloat (Single/Dual)
MATERIAL	Sensor : SUS316 / Controller : SS400
MAIN POWER	Controller : 110/220VAC, 60Hz
WORKING PRESSURE	Max. 5bar
AMBIENT TEMP.	-20 ~ 150°C
IP GRADE	IP 68 (with housing)
ACCURACY	±1.0mm (Option 5mm)

# BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM

## 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-way cock valve, a gauge saver and an analog indicator for each tank. The operating principle is based on the measuring the hydrostatic head of the liquid by providing constant low flow of air into a probe, called as sounding pipe, which opens at the bottom. When a light quantity of air is discharged through the purge mouth at the tank bottom, an air pressure corresponding to the liquid level will be built up in the sounding pipe. If the specific gravity of the liquid is known and pressure in the sounding pipe is measured, it is possible to calculate the distance from the pipe opening to the surface by means of the above expression. The pressure is read on the indicator graduated scale in meters or volume or percent of full tank.

## FEATURE & ADVANTAGE

- Simple principle and structure
- Easy maintenance
- Relatively inexpensive price
- No electrical equipment – No Ex-proof equipment

## APPLICATION

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



### LEVEL INDICATOR

- » MODEL : PLG-200
- » Dimension : 144 x 144 x 55.5mm
- » Accuracy : 1.5% of FS
- » Working Temperature Gas : -20 ~ 65°C



### GAUGE SAVER

- » MODEL : GSU-200
- » Body material : AL
- » Differential : Below 0.01 kg/cm<sup>2</sup>



### 3WAY COCK

- » MODEL : MCK-200
- » Fluid : Air/Inert Gas
- » Operating Pressure : 0 to 1.0 MPa
- » Ambient and Fluid Temperature : -5 ~ 60°C (No Freezing)
- » Effective Area : 19 cm<sup>2</sup>
- » Lubrication : Not Required  
(Use Turbine Oil Class 1 ISO VG32, If Lubricated)
- » Port Size : 1/4



### FLOW MODULATOR

- » MODEL : FRU-200
- » Body material : AL
- » Air supply : 4.5 kg/cm<sup>2</sup>
- » Flow rating : 10~80 NL/H
- » Blowing pressure : 4.5 kg/cm<sup>2</sup>

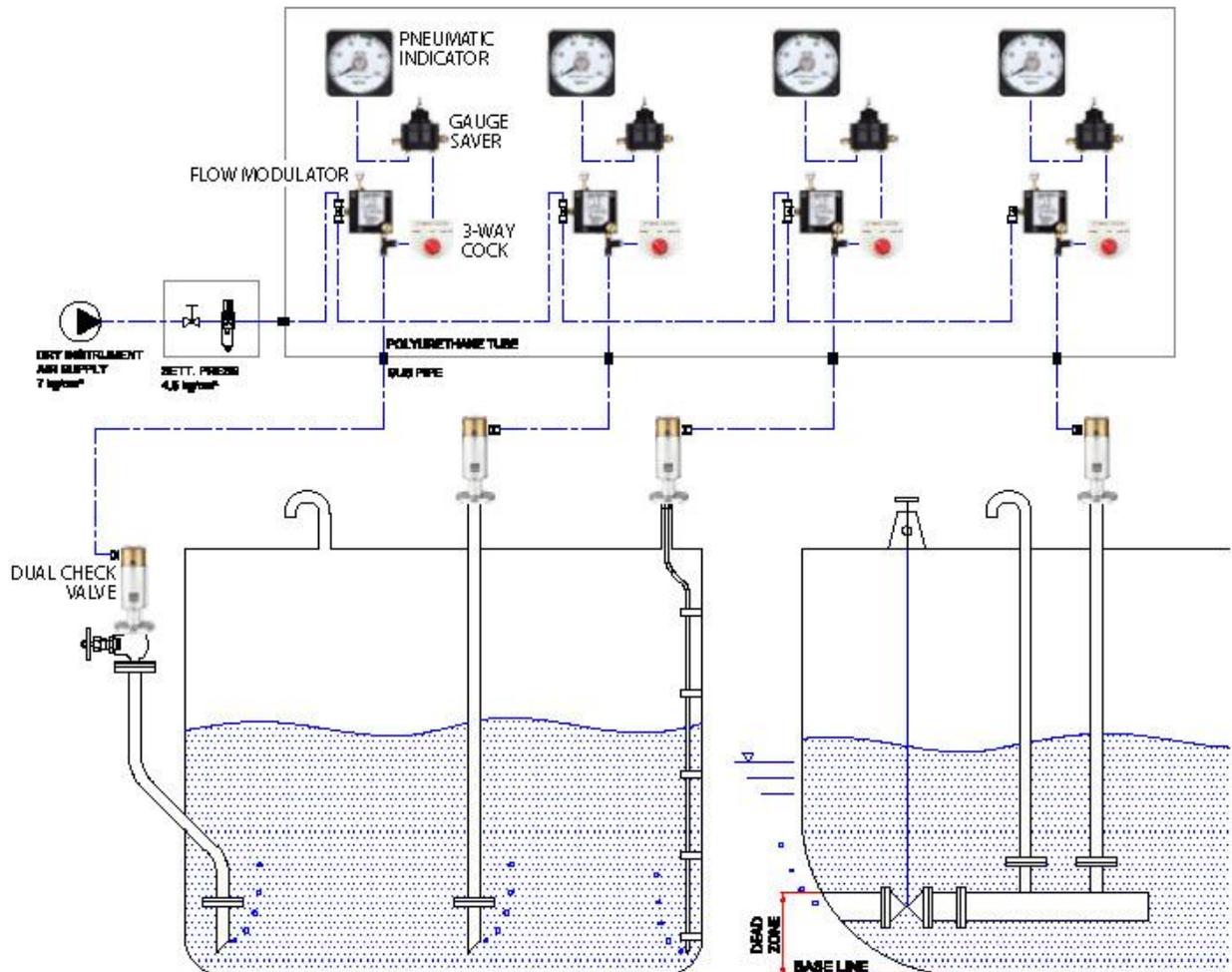


### DUAL CHECK VALVE

- » MODEL : DCV-200
- » Body material : Nabal brass / SUS316
- » Connection size : JIS 5K or 10K Flange
- » Working pressure : Max 10 kg/cm<sup>2</sup>

## BAL-2000 (PURE PNEUMATIC TYPE)

### COMPONENTS / OUTLINE



### TECHNICAL SPECIFICATION

SYSTEM TYPE	PURE PNEUMATIC TYPE
MEASURING RANGE	0~40m
ACCURACY	±1.0% of F.S
SIGNAL PIPE	OD 8mm or 10mm
AMBIENT TEMPERATURE	-30 ~ 70°C
AIR SUPPLY	4~7bar

# BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM

## 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-way 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.

## FEATURE & ADVANTAGE

Simple principle and structure

Easy installation and maintenance

Relatively inexpensive price

No electrical equipment – No Ex-proof equipment

Possible for digital indicating by P/I converter

## APPLICATION

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



### DIGITAL INDICATOR

- » MODEL : MAG-201
- » Input : 4~20mA



### ANALOGUE INDICATOR

- » MODEL : MAG-200
- » Input : 4~20mA
- » Internal resistance : 10 ohm
- » Indicating accuracy : High value of  $\pm 1.0$  OF FS
- » Dimension : 110x110mm



### P/I CONVERTER

- » MODEL : PHDH-200
- » Excitation (Calibration Voltage) : DC 24V
- » Excitation : DC 11~28V
- » Output : 4~20mA
- » Accuracy (RSS) :  $\pm 0.5\%$  OF FS
- » Compensated Temperature Range : 0~70°C
- » Operating Temperature Range : -20~80°C
- » Thermal Effect on Zero : 0.03% F.S./°C
- » Thermal Effect on Span : 0.03% F.S./°C



### FLOW MODULATOR

- » MODEL : FRU-200
- » Body material : AL
- » Air supply : 4.5 kg/cm<sup>2</sup>
- » Flow rating : 10~80 NL/H
- » Blowing pressure : 4.5 kg/cm<sup>2</sup>

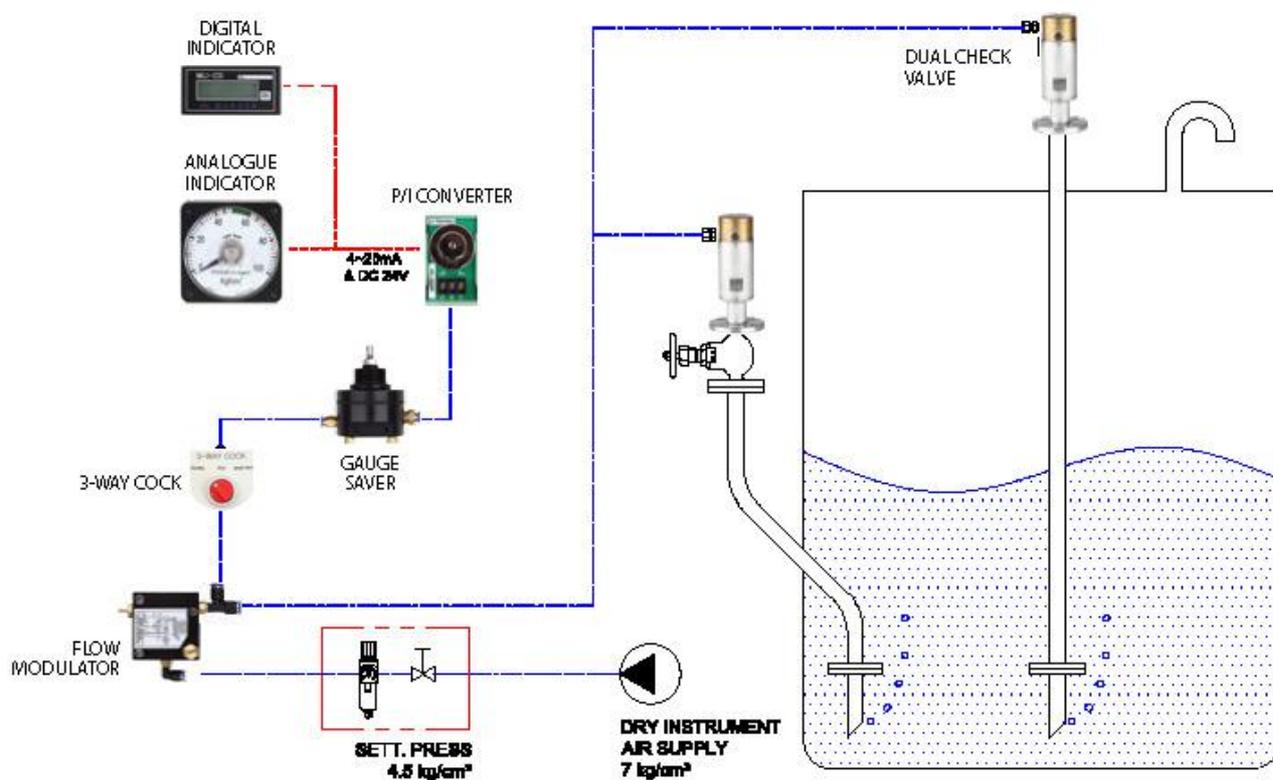


### DUAL CHECK VALVE

- » MODEL : DCV-200
- » Body material : Naval brass / SUS316
- » Connection size : JIS 5K or 10K Flange
- » Working pressure : Max 10 kg/cm<sup>2</sup>

## BAL-2000 (ELECTRO PNEUMATIC TYPE)

### I COMPONENTS / OUTLINE I



### I TECHNICAL SPECIFICATION I

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

# BALLAST TANK & DRAFT LEVEL GAUGING SYSTEM

## 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

## FEATURE & ADVANTAGE

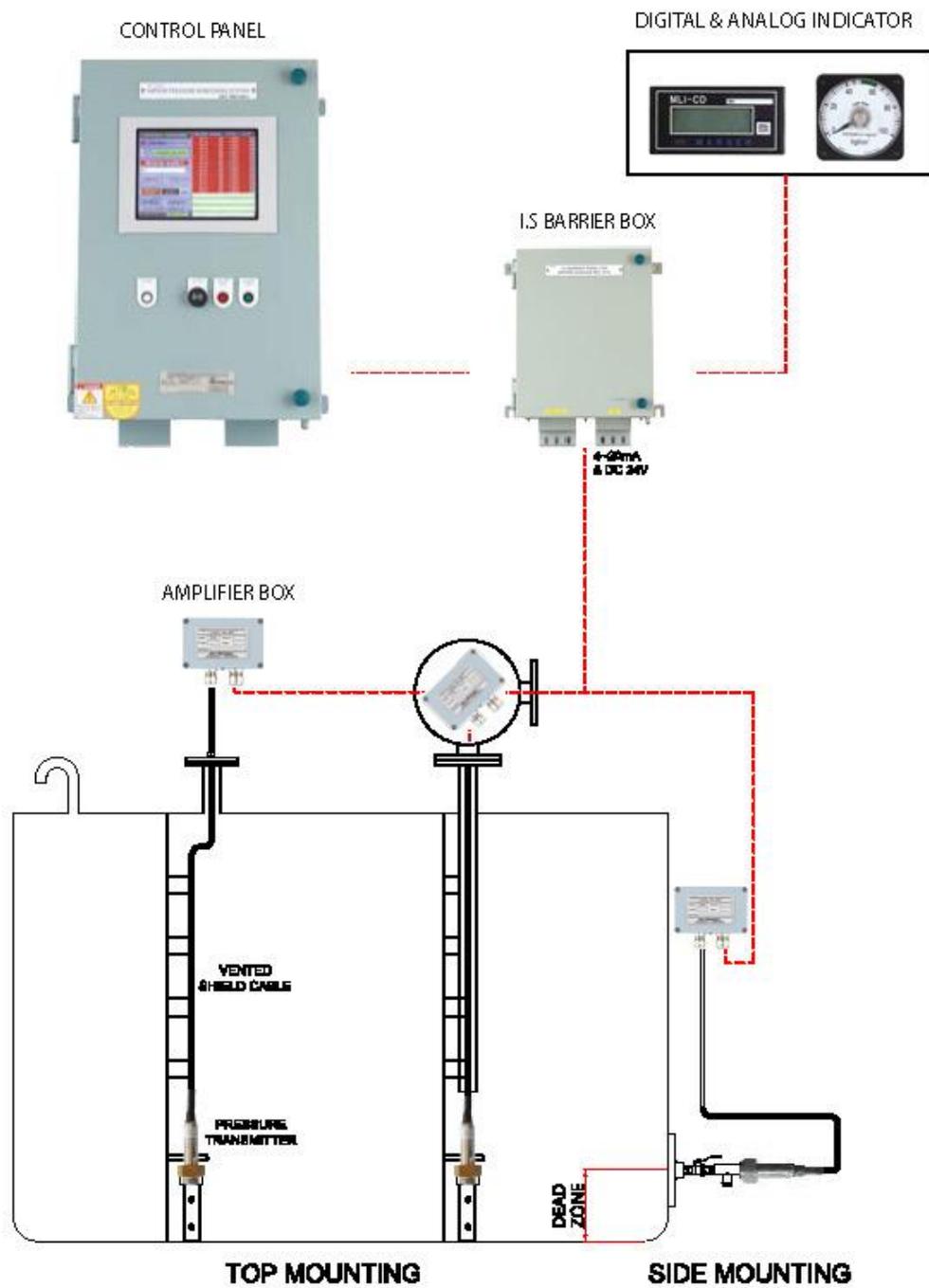
- Easy installation and replacement of sensor
- Proper price
- Simple structure
- Integrated monitoring by LCD display
- High accuracy for measuring
- Excellent stability

## TECHNICAL SPECIFICATION

SENSOR TYPE	ELECTRIC PRESSURE TYPE
MEASURING RANGE	0~35M (or User's request)
ACCURACY	±0.2% of F.S
POWER	AC110/220, 50/60Hz, / DC12~30V
SIGNAL OUTPUT	4~20mA
EX PROOF	Ex ia IICT4
AMBIENT TEMPERATURE	-20 ~ 100 °C
MATERIAL	SUS316 / TITANIUM (Option)
IP GRADE	Amplifier box : IP56 (IP 68 with housing) / Sensor : IP68

# BAL-2000 (ELECTRIC PRESSURE TYPE)

## I COMPONENTS / OUTLINE I



# OIL DISCHARGE MONITORING SYSTEM

## 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 performance 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 ODM 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

- Oil tanker
- Oil & chemical tanker

## FEATURE & ADVANTAGE

- Easy operation
- Easy installation and maintenance
- Unique self-cleaning function – manual cleaning is not necessary
- Intrinsically safe type, DP transmitter
- Short response time (15 sec)
- Insensitive to ship's motion and vibration
- Flowmeter working by different pressure
- HMI by touch screen LCD
- Record – Paper printer or USB

## INPUT AND OUTPUT SIGNAL

SUBJECT	VALUE	SIGNAL
OIL CONTENT	0 to 1000ppm	Current loop
DISCHARGE FLOWRATE	Max. 1,225 m <sup>3</sup> /h	4~20mA
SHIP SPEED	21 knots max.	Impulses or GPS
GPS		NMEA0183
DISCHARGE VALVE		Dry contact
VALVE POSITION		Dry contact

## ODM-2000

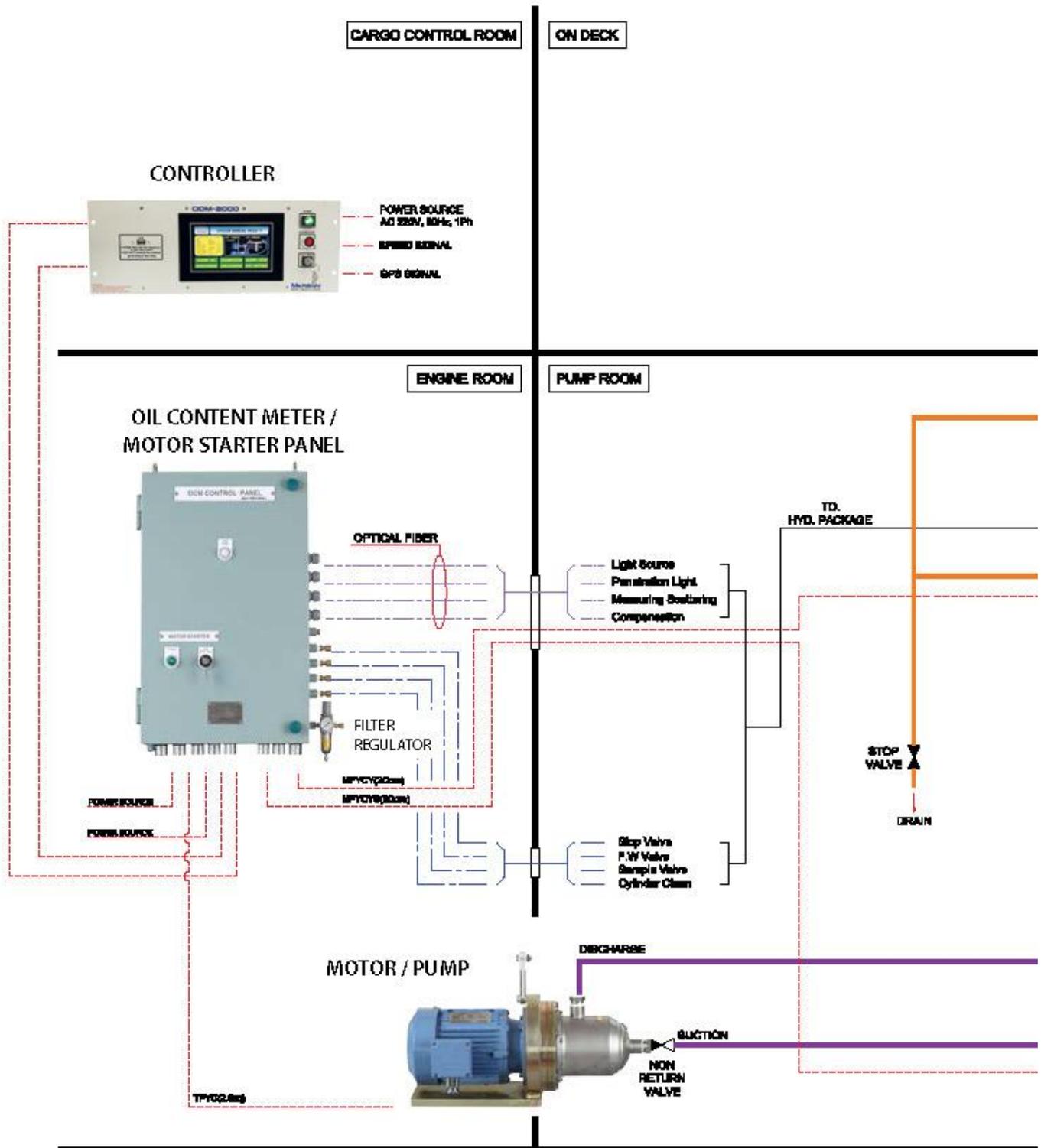
### I COMPONENTS / OUTLINE I



### I TECHNICAL SPECIFICATION I

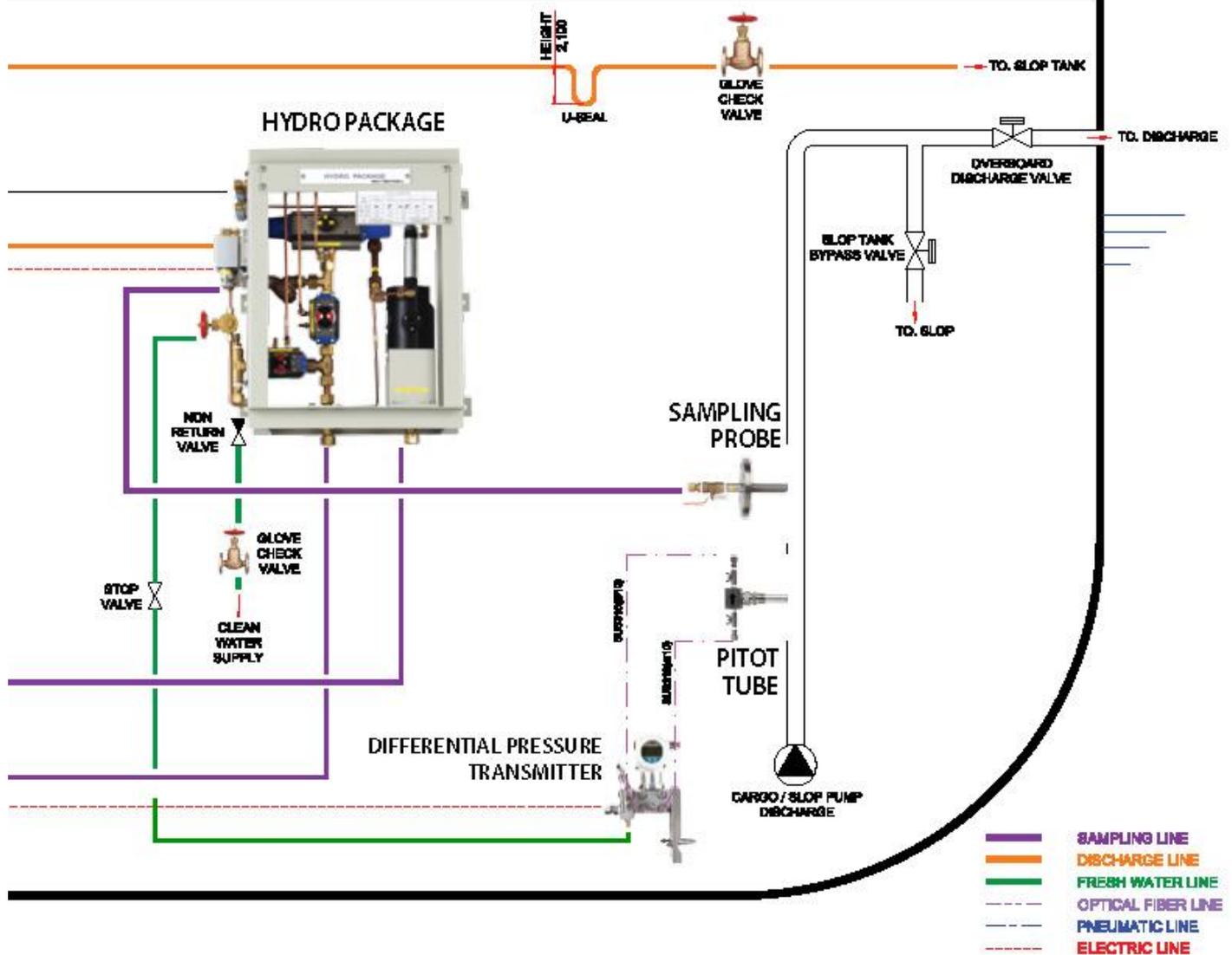
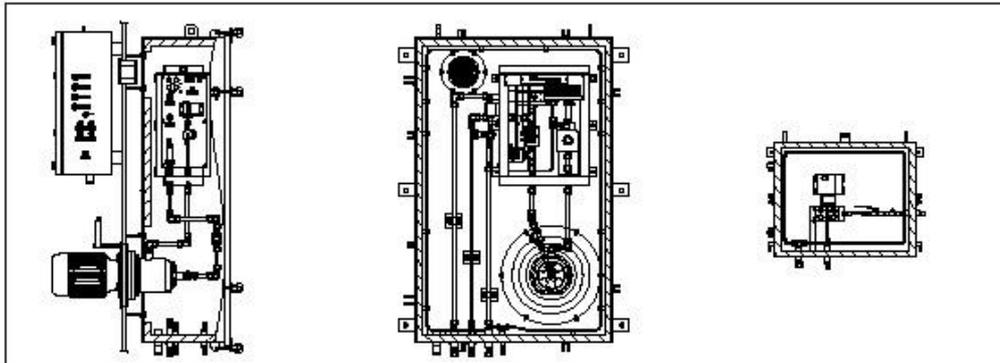
SUBJECT	VALUE
CONTROLLER AND OIL CONTENT METER POWER	220V-60Hz / 110V-50Hz
MOTOR PUMP POWER	440V-60Hz / 380V-50Hz (3 PHASE)
AMBIENT TEMPERATURE	0~55°C
HUMIDITY	MAX 95%RH
VIBRATION	2~13Hz Amplitude + 1mm
AIR SUPPLY	4~7bar, dry clean air

# OIL DISCHARGE MONITORING SYSTEM



# ODM-2000

ON DECK TYPE



# ULLAGE TEMPERATURE INTERFACE DETECTOR

## GENERAL INFORMATION

ULLAGE TEMPERATURE INTERFACE DETECTOR is necessary for cargo tanker and it is designed according to MEPC. 5C XIII for measuring the ullage level, the oil-water interface level, the temperature and sampling the cargo.

## OPERATION PRINCIPLE & SYSTEM COMPOSITION

UTL-200 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.

UTL-SPL-L is for sampling the liquid cargo. It can help for operator to know what is loaded in the tank.

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.

PRESSURE GAUGE for UTL has been patented for measuring the pressure directly.



## FEATURE & ADVANTAGE

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

## APPLICATION

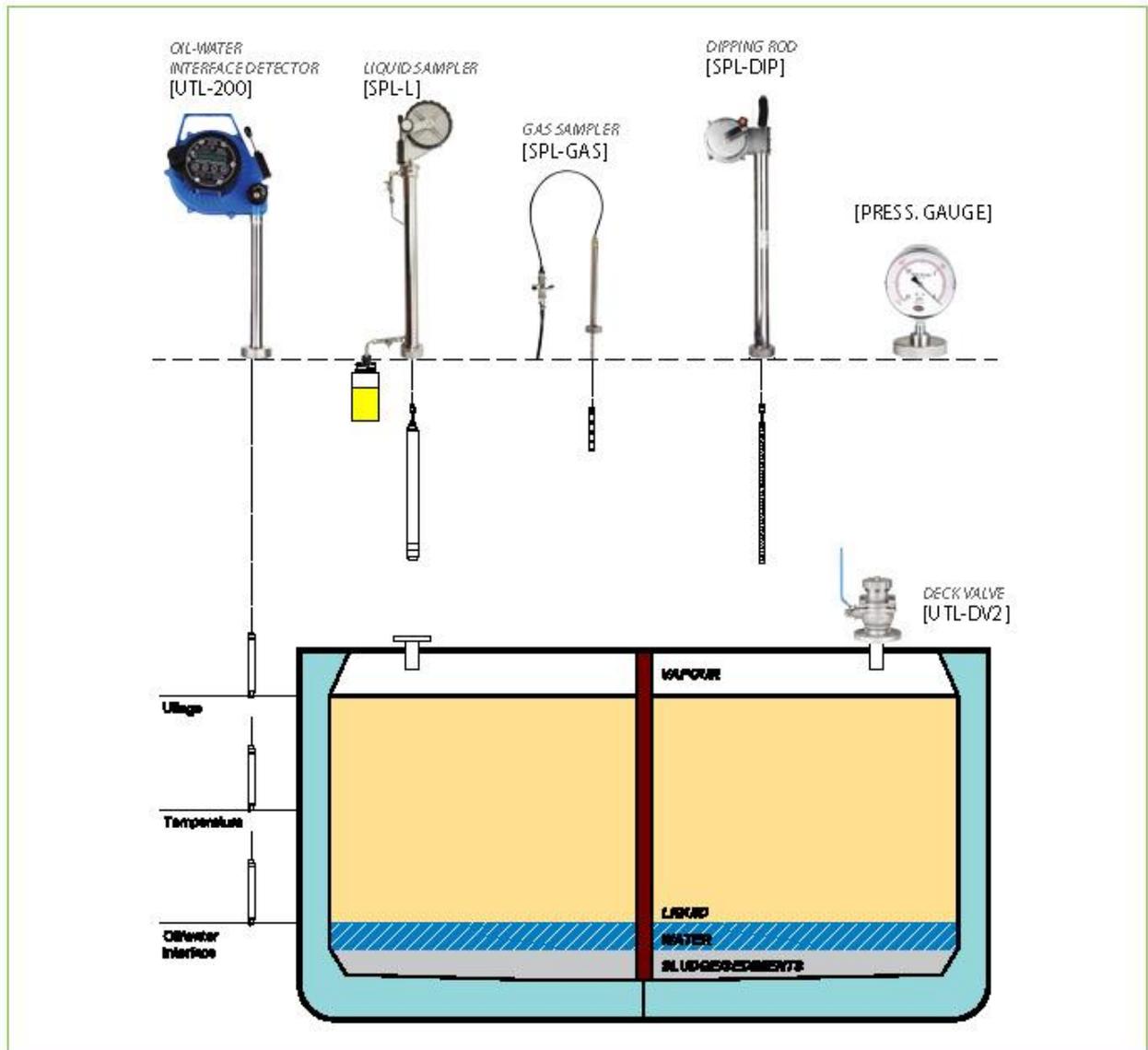
All kinds of oil & chemical tankers

## TECHNICAL SPECIFICATION

SUBJECT	SPECIFICATION	
UTL-200 - 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 II CT4
UTL-SPL-L - LIQUID SAMPLER	TAPE GRADUATION	Metric
	TAPE RESOLUTION	1mm
	TAPE LENGTH	15m / 30m / 37m
	BOTTLE SIZE	0.5 LITER
UTL-SPL-G - GAS SAMPLER	HOSE SIZE	OD 4mm
	HOSE LENGTH	15m ~ 30m
DECK VALVE	CONNECTION	50A(2") / 25A(1")
	MATERIAL	SUS316L

# UTL-200

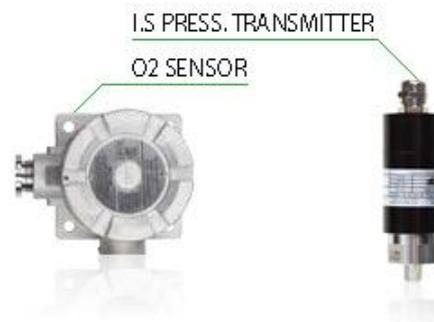
## I COMPONENTS / OUTLINE I



# VAPOUR EMISSION & CONTROL SYSTEM

## 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 CFR 46. PART 39.



## OPERATION PRINCIPLE & SYSTEM COMPOSITION

VECS-2000 is composed of a control panel and a sensing cabinet including an oxygen sensor, pressure transmitters 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.

## FEATURE & ADVANTAGE

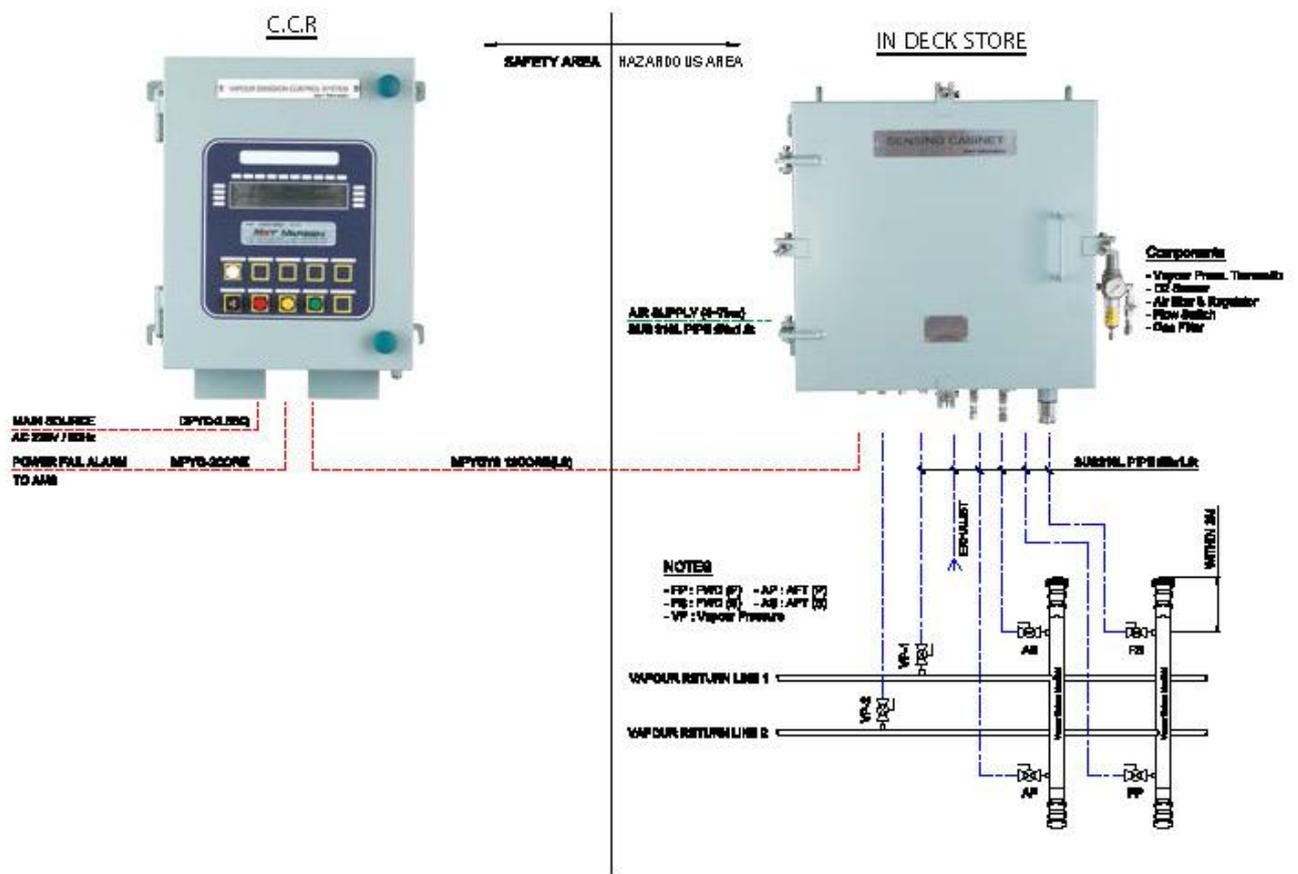
- Material is reliable to secure body
- Figure setting is adjustable in factory
- Program operating control (POC) type is easy to install and the size is small
- Selectable measurement of vapour oxygen content
- Other gas can be measured by replacing the sensor tip (option)
- Easy to expand and add the additional press.

## APPLICATION

All kinds of oil & chemical tankers

# VECS-2000

## COMPONENTS / OUTLINE



## TECHNICAL SPECIFICATION

SUBJECT	VALUE
SYSTEM	AC110/220V, 50~60Hz, DC 24V Air supply 4~7 bar
PRESS. TRANSMITTER	Range 0~400mbar Power supply DC24V Output 4~20mADC (Loop power)
OXYGEN SENSOR	Range 0~25% O <sub>2</sub> Output 4~20mADC (Loop power)

# GAS DETECTION SYSTEM

## 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 where 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.



## FEATURE & ADVANTAGE

Intrinsically safe type sample cabinet

Up to 48 sampling points

Expandable in the field of plug-in solenoid

Auto and manual purge cycles

Auto shut down and flow failure alarm

Multiple remote display

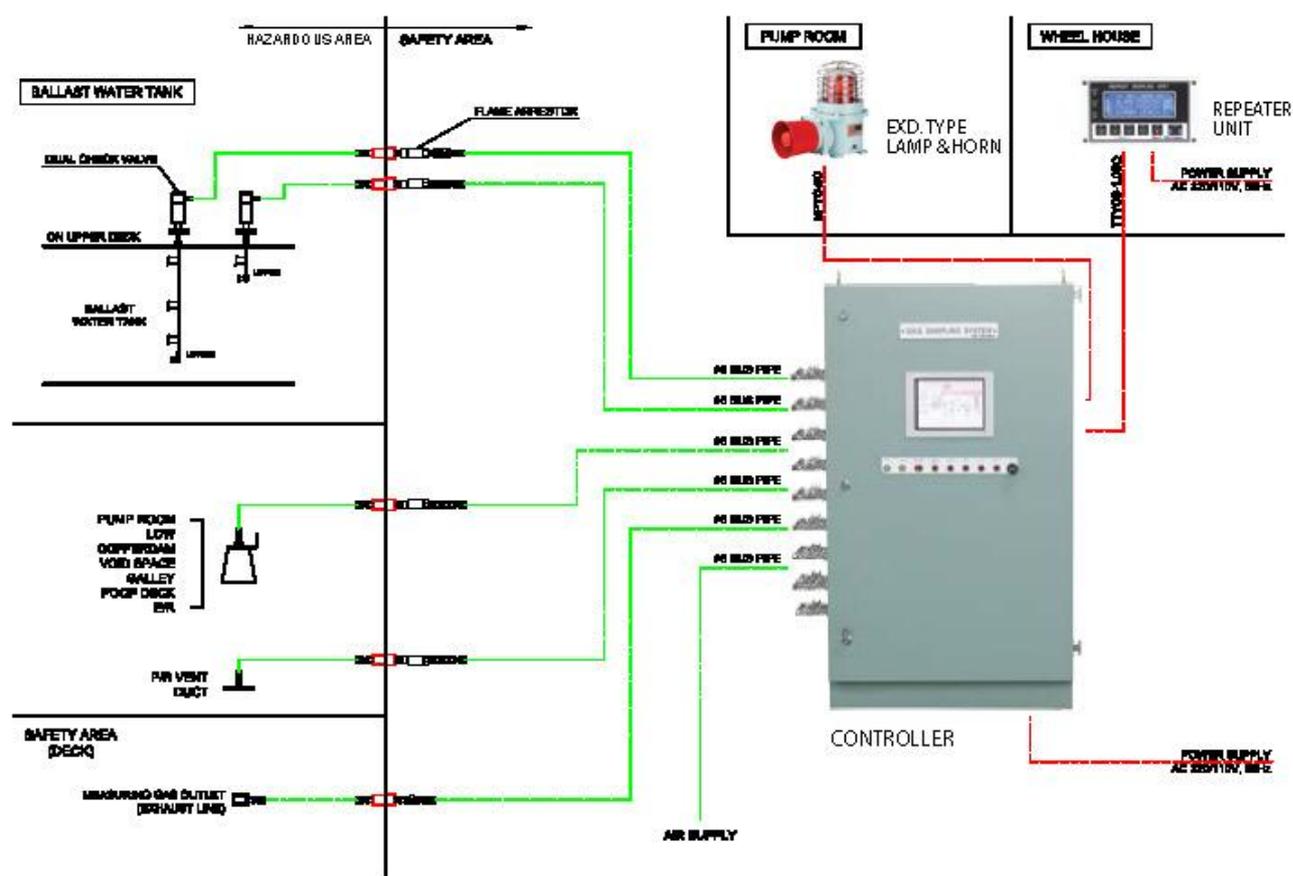
Connected to ship's computer network for monitoring by other authorized computer on the network

## APPLICATION

Sampling of the ballast tanks and void spaces

## BGAS-2000

### I COMPONENTS / OUTLINE I



### I TECHNICAL SPECIFICATION I

SUBJECT	VALUE
POWER SUPPLY	110~220VAC (50~60Hz), 2A
PUMP CAPACITY	15 lit/min
GAS MEASUREMENT	HC, O <sub>2</sub> , H <sub>2</sub> S 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 15 lit/min, 1~4 Repeater units, pump redundancy, other special arrangements

# GAS MONITORING UNIT

## 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 / O<sub>2</sub> 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)

## OPERATION PRINCIPLE & SYSTEM COMPOSITION

GAS-200 is composed of a controller, ex-proof gas detector (hazardous area), barriers which transfer the signal to safety area and additional alarms. When the gas and oxygen are detected by gas detector (ELECTRO CHEMICAL SENSOR), the detector sends electric signals to controller and then controller activates audible and visual alarm.

GAS DETECTOR  
- SUCTION TYPE



GAS DETECTOR  
- DIFFUSION TYPE



## FEATURE & ADVANTAGE

High accuracy and reliability of gas sensor

Long life sensor

Simple structure and easy maintenance

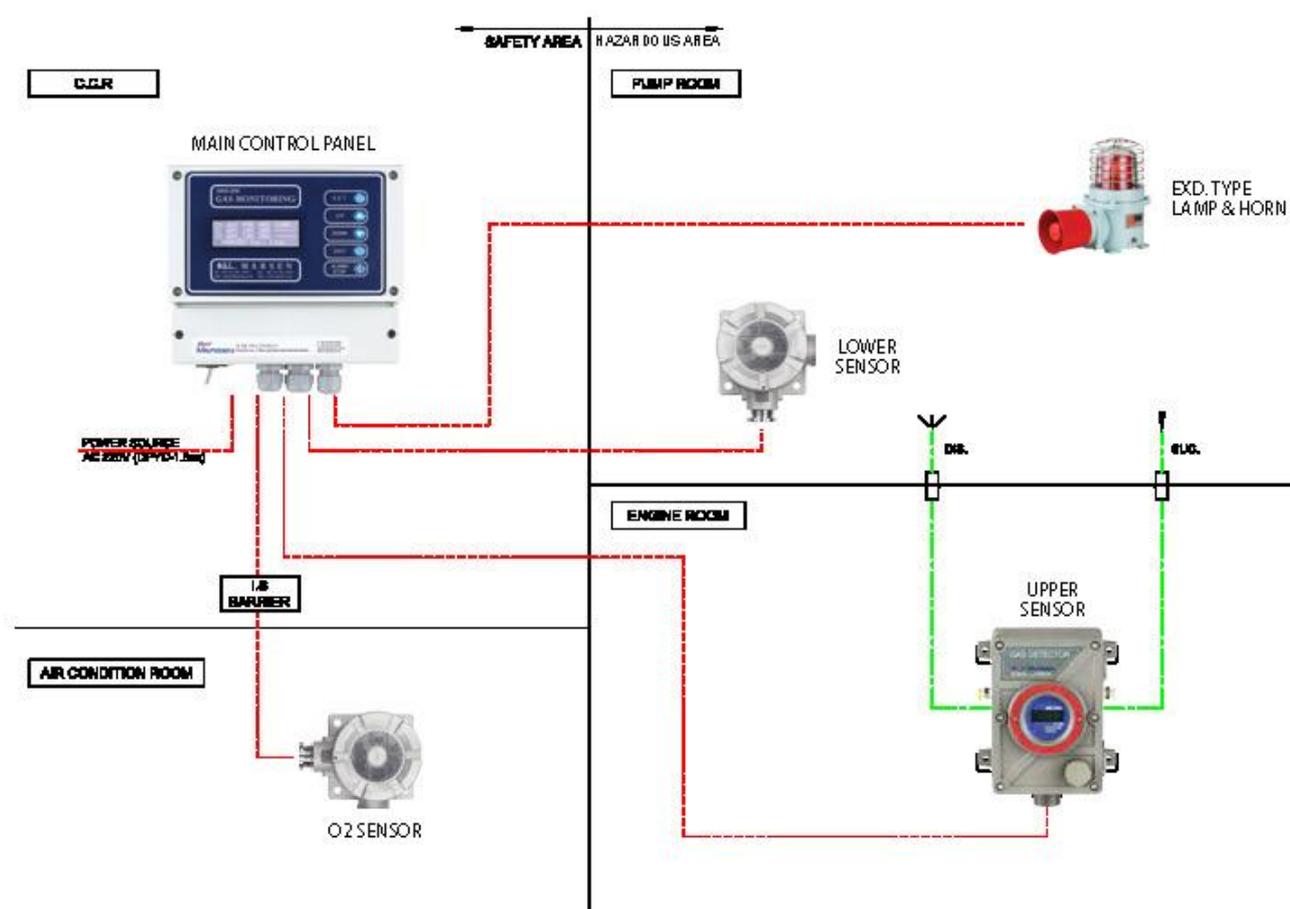
Ex-proof certificated and patented product

## APPLICATION

All kind of tankers/ Hazardous area for operators

## GAS-200

## I COMPONENTS / OUTLINE I



## I TECHNICAL SPECIFICATION I

SUBJECT	VALUE
SENSOR TYPE	Electro - Chemical sensor
MATERIAL	Marine Aluminium / SUS316 / PTFE
MAIN POWER	Controller 110/220 VAC, 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	4~20mA 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 box.

## 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 box can be installed to be used with main analyzer as requests.

## APPLICATION

- Boiler
- Explosive or potentially explosive area by O2 gas
- Inert gas system / Inert gas generator

## TECHNICAL SPECIFICATION

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

ANALYZER PANEL



SELECTION BOX



O2 SENSOR



# SALINITY METER

## SAL-200

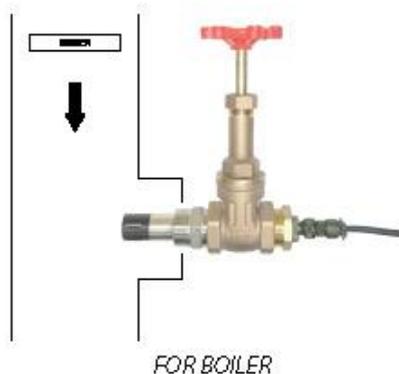
### GENERAL INFORMATION

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 valves. 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 boiler store discharge, Valve open/close indication, Direct/reverse operation, Another panel available.

### I COMPONENTS / OUTLINE I



### I TECHNICAL SPECIFICATION I

SUBJECT	VALUE
MEASURING RANGE	0~200ppm
ACCURACY	±2.5%
ALARM CONTACT	Dry contact (250V / 5A)
POWER	AC100~240V / 50~60Hz
IP GRADE	IP 54
SENSOR TYPE	Electrode type
TEMPERATURE	0~100°C

# WATER INGRESS ALARM SYSTEM

## 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. 188(79) and IACS UISC 180. This sensor can also be used for detecting the water in LPG/LNG Carriers.



## OPERATION PRINCIPLE & SYSTEM COMPOSITION

WIA-2000 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.

## FEATURE & ADVANTAGE

- Easy maintenance
- No failure due to no mechanical unit
- Possible to control a number of signals (max. 80 points)
- High reliability, durability and simple structure
- Passed EMI and EMC test

## APPLICATION

- All kind of bulkers
- LPG, LNG Carrier / PCTC

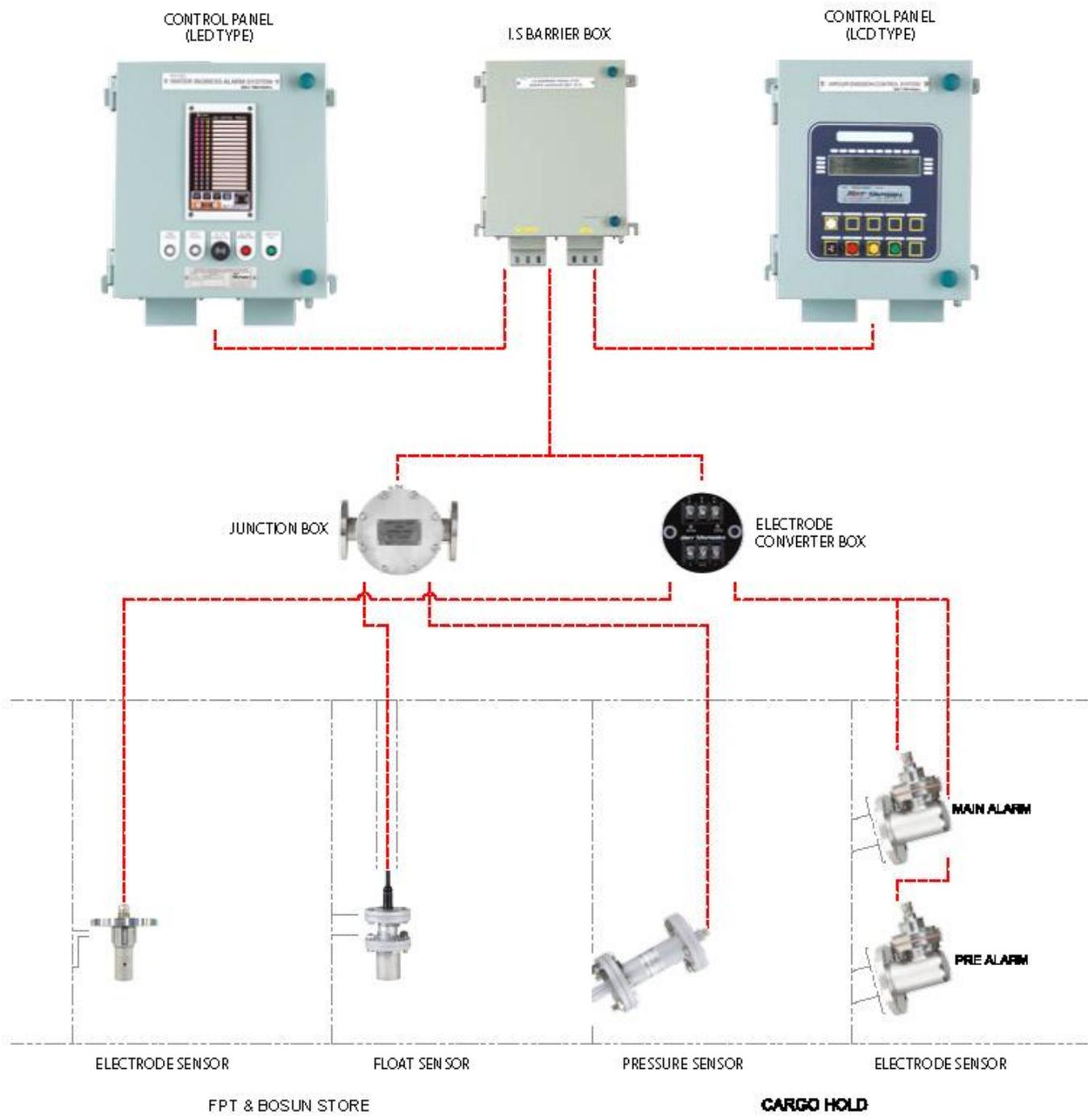
## TECHNICAL SPECIFICATION

SUBJECT	VALUE
SENSOR TYPE	Electrode / Pressure / Float
MATERIAL	Sensor : SUS304 / SUS316    Controller : SS400
MAIN POWER	110/220 VAC, 60Hz / 24VDC
PRESSURE	Max. 5Kgf/cm <sup>2</sup>
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 IIC T6    Barrier : Ex ia IIC T6
SIGNAL	4~20mA Analog signal
COMMUNICATION	RS485(422)
MEASURING POINT	MAX. 80 point

# WIA-2000

## COMPONENTS / OUTLINE

--- PNEUMATIC LINE  
--- ELECTRIC LINE  
--- HYDRAULIC LINE



# 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. XII/12. WIP-2000 uses electric, pneumatic and hydraulic valves interlocking with WIA-2000.



## OPERATION PRINCIPLE & SYSTEM COMPOSITION

The controller remotely controls valves by electric, pneumatic and hydraulic line.

Main function – FRT and bosun store discharge, Valve open/close indication, Direct/reverse operation, Another panel available.



### I CONTROLLER I

- » Source : AC 110V/220V, 50/60Hz
- » Material : SS400
- » Function :
  - 1) Alarm function
  - 2) Valve operating function (open/close)
  - 3) Power fail (option)
  - 4) Power on/off
  - 5) Horn/outdoor lamp (option)
  - 6) Digital or Mimic type

### I PNEUMATIC/HYDRAULIC ACTUATOR I

- » 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

### I HYDRAULIC POWER PACK I

- » Source : AC 220V/ 60Hz
- » Max press. : 120bar
- » Port : 2 port
- » IP Grade : IP68
- » Emergency operation : Yes (hand pump)
- » Weight : 35kg
- » Option : Lock indication, Pneumatic operation

### I ELECTRIC ACTUATOR I

- » Source : AC 110/220V, 50/60Hz
- » Valve : Butterfly or Ball
- » IP Grade : IP68
- » Size : 40 ~ 800 A
- » Manual : Available
- » Indication : Visual indication
- » Application : Dry space

# BILGE ALARM SYSTEM

## BOA-2000

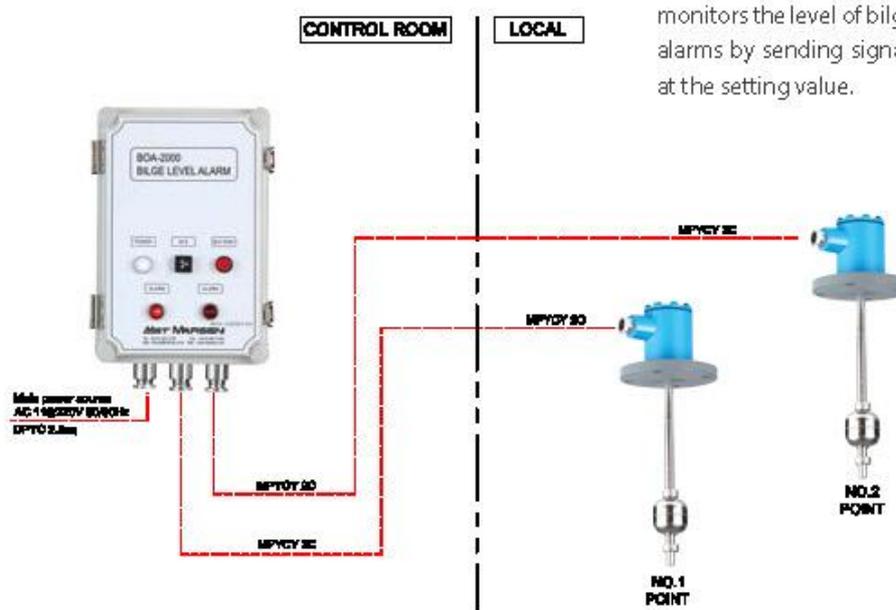
### GENERAL INFORMATION

IMO Regulation, SOLAS chapter II-2, Reg.4.5.10.1.4 and chapter XII-9 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.

### I COMPONENTS / OUTLINE I



### I TECHNICAL SPECIFICATION I

SUBJECT	SPECIFICATION	
	MAGNETIC FLOAT TYPE	CAPACITANCE TYPE
POWER	Max. 250VAC, 0.5A	Max. 250VAC, 0.5A
CONNECTION	JIS 5K 50A	JIS 5K 50A
SET POINT	120~5000 mm	120~5000 mm
ACCURACY	±5mm	±5mm
Min. SPECIFIC GRAVITY	0.85	0.85
IP GRADE	IP 56	IP 56
EX PROOF	Ex ia IIC T6	Ex ia IIC T6
SIGNAL	Dry contact	4~20mA

# BRIDGE NAVIGATION WATCH ALARM SYSTEM DEAD MAN 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) & IEC 62616.

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.

## APPLICATION

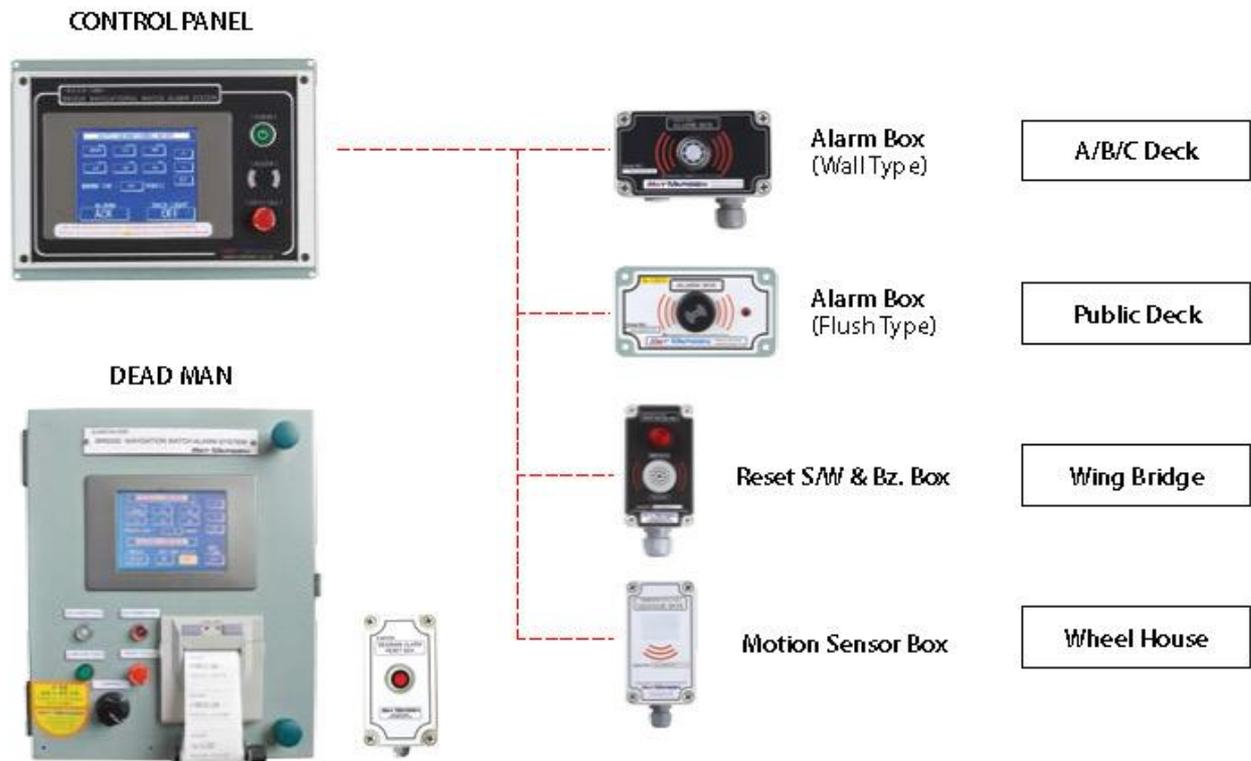
- All kinds of vessels
- General cargo / Container
- PCC / RO-RO
- Bulker / Tanker
- LPG/LNG
- Passenger ships irrespective of size

## FEATURE & ADVANTAGE

- Possible to adjust the timer (password protected)
- Audible and visual alarm indications
- Keys for sound off and a knowledge of alarms
- Selection of back-up navigator in duty
- Call back-up navigator
- Touch screen LCD

# B-WATCH-2000 E-WATCH-2000

## COMPONENTS / OUTLINE



## TECHNICAL SPECIFICATION

SUBJECT	VALUE	
MATERIAL	COVER	SS400
	BODY	SS400
WEIGHT	8kg	
POWER SUPPLY VOLTAGE	AC110/220V 50/60Hz, DC24V	
NUMBER OF INPUT	RESET	Adjustable
	START(TOUCH SCREEN)	1 point
	ALARM BUZZER	1 point
NUMBER OF OUTPUT	EXTENSION BUZZER	Adjustable
	CONTACT POINT SIGNAL (FOR THE ALARM PANEL)	As per user's request
	SERIAL PORT	Max. 3 port

# ANTI HEELING SYSTEM WITH INCLINOMETER AUTO HEELING SYSTEM WITH INCLINOMETER

## GENERAL INFORMATION

The heeling of a ship is often attributed to high winds, uneven cargo load and hard turns. The ANTI HEELING SYSTEM automatically compensates for list and trip of the ship. This system has functions of monitoring and measuring the inclination of vessels and tilting by digital automatic program. The ANTI HEELING SYSTEM enables safe and continuous loading or unloading operations for e.g. container vessels RO-RO carriers, ferries, project carriers, heavy lift and offshore construction vessels in much reduced time.



## OPERATION PRINCIPLE & SYSTEM COMPOSITION

AUTO HEELING SYSTEM is composed of a control panel, a heeling sensor, horns, a pump starter panel and two level switches for low tank level. This system is used to detect the heeling angle of the vessel and to rebalance the ship automatically by pumping ballast water from starboard to port or vice versa. The precise heeling sensor installed on the mounting plate will be placed in mid of ship. ANTI HEELING SYSTEM is composed of a heeling indicator unit, an inclinometer and a lamp indicator.



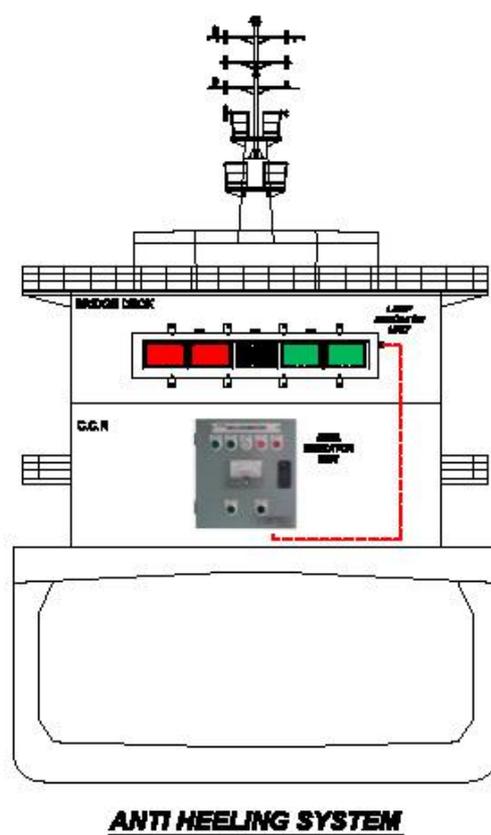
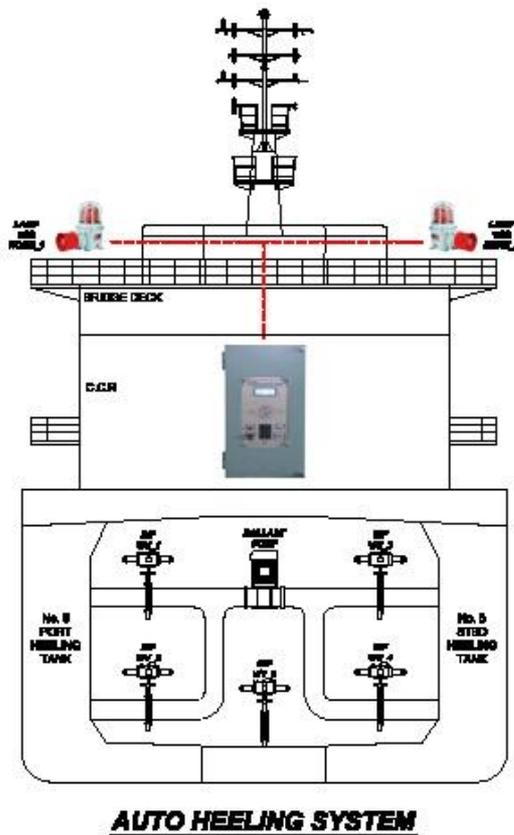
## I TECHNICAL SPECIFICATION I

### AUTO HEELING WITH INCLINOMETER SYSTEM (TIN-2000-P)

SUBJECT	VALUE
SENSOR TYPE	Analog or Digital type
DIRECTION	All direction (basic 2 direction)
MEASURING DEGREE	$\pm 1^\circ$ , $\pm 2^\circ$ , $\pm 3^\circ$ , $\pm 5^\circ$ , $\pm 10^\circ$ and user's request.
DISPLAY DEGREE	$\pm 1^\circ$ , $\pm 2^\circ$ , $\pm 3^\circ$ , $\pm 5^\circ$ , $\pm 10^\circ$ and user's request.
WORKING TEMP	-20 ~ 60°C
ACCURACY	$\pm 1\%$ of F.S (or User's request $\pm 0.5\%$ of F.S)
IP GRADE	IP 44(controller), IP 56 (horn & lamp)
MAX CHANNEL	16 channel
OUTPUT SIGNAL	4~20mA Analog signal
OUTPUT ALARM	2 Channel contact (widely available)
SOURCE	AC110V/220V, 50~60Hz or DC24V
ALARM SETTING	User's request

## TIN-2000

## I COMPONENTS / OUTLINE I



## I TECHNICAL SPECIFICATION I

## ANTI HEELING WITH INCLINOMETER SYSTEM (TIN-2000-A)

## &lt;HEEL INDICATOR UNIT&gt;

SUBJECT	VALUE
MODEL	TIN-2000-AH
MAIN POWER	AC100~240V
ACCURACY	±1.5% of FS
RESPONSE TIME	1.0 sec.
OPERATING TEMPERATURE	0~45°C
OPERATING HUMIDITY	25~90% RH (NO CONDENSATION)
MEASURING DEGREE	±1°, ±2°, ±3° and user's request
IP GRADE	IP 44

## &lt;LAMP INDICATOR UNIT&gt;

SUBJECT	VALUE
MODEL	TIN-2000-AL
USE VOLTAGE	DC24V
MATERIAL	SUS 304
OPERATING TEMPERATURE	-25°C~50°C
IP GRADE	IP 56

# VALVE REMOTE CONTROL SYSTEM

## GENERAL INFORMATION

VALVE REMOTE CONTROL SYSTEM is designed to control remotely on/off operation of many valves in cargo and ballast by hydraulic or electric power. To control a number of valves, butterfly valves, various kinds of actuators, hydraulic power pack and solenoid valves are necessary.

### APPLICATION

- Cargo tank
- Ballast tank

## OPERATION PRINCIPLE & SYSTEM COMPOSITION

VRC-2000 is composed of a control panel, hydraulic power pack, solenoid valve cabinet, hydraulic actuator and electric valve. The control panel controls the hydraulic power pack and solenoid valve cabinet for operating the valve or operating electric valve by electric signal output. As option, it is possible to install pneumatic or electro-pneumatic actuator.

## TECHNICAL SPECIFICATION

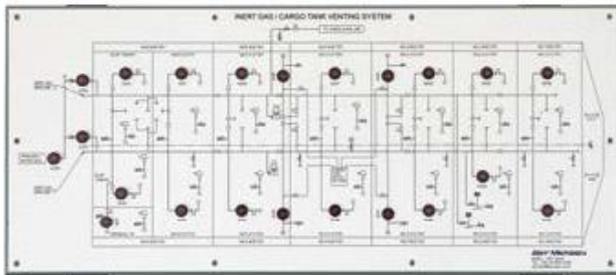
CONSOLE PANEL (MIMIC)		HYDRAULIC POWER PACK	
SUBJECT	VALUE	SUBJECT	VALUE
POWER	110/220VAC, 50/60Hz	POWER	110/220VAC, 50/60Hz
AMBIENT TEMPERATURE	-25°C ~ 70°C	WORKING PRESSURE	90~135bar
VOLTAGE	4.6 VDC ~ 30 VDC	PRESSURE ALARM	High : 150bar, Low : 80bar
CURRENT	Unswitched < 0.5A Switched > 2.0A	OIL TANK CAPACITY	100~200L
CERTIFIED	Class Drawing		

HYDRAULIC / PNEUMATIC ACTUATOR		ELECTRIC ACTUATOR	
SUBJECT	VALUE	SUBJECT	VALUE
SOURCE	Hydraulic / Pneumatic	POWER	110/220 VAC, 50/60Hz
ACTING	Single or Double	IP GRADE	IP 68
CONNECTION	G 1/2"	SIZE	40~100A
PRESSURE	Hyd. : MIN. 80bar~MAX. 135bar Pneu. : MIN. 4bar~MAX. 9bar	INDICATION	Visual indication
KIND OF VALVE	Butterfly valve	KIND OF VALVE	Butterfly valve

# VRC-2000

## I COMPONENTS / OUTLINE I

MAIN CONTROLLER



ELEC. ACTUATOR WITH VALVE



HYD. POWER PACK



PNEUMATIC ACTUATOR WITH VALVE



SOL. VALVE CABINET



HYD. ACTUATOR WITH VALVE

# AUTOMATIC VALVE CONTROLLER

## 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.

### I INPUT I

- » Ships and industrial facilities
- » Temp. Transmitter (4~20mA) / Temp. Sensor (RTD, PT-100)
- » Press. Transmitter (4~20mA) / Diff. Press. Transmitter (4~20mA)
- » Level Transmitter (4~20mA) / Level Resistance Transmitter (4~20mA)
- » Flow Transmitter (4~20mA) / Vibration Transmitter (4~20mA)
- » Ultrasonic Transmitter (4~20mA) / Gas Transmitter (4~20mA)
- » Magnetic Transmitter (4~20mA) / Opto Transmitter (4~20mA)

### I OUTPUT I

- » Contact signal / 4~20mA (option) / RS232 (option)

## I TECHNICAL SPECIFICATION I

SUBJECT	VALUE
CONTROL FLUIDS	Air, Water, Oil
CONTROL TARGET	Temp, Press, Level, Flow, Gas, Indino and etc
AMBIENT TEMP	0~60°C
WORKING VOLTAGE	AC110/220V 50/60Hz or DC24V
AIR PRESS	4~7kg/cm <sup>2</sup> (Max. 10 kg/cm <sup>2</sup> )
COMPONENTS	Controller, Sensor, Actuator
AUX. FUNCTION	Alarm, Valve Open/Close
OUTPUT	Contact, 4-20mA(Option), RS-232(Option), RS-485(Option)
OPTION/ACCESSORY	Shelter, Digital Valve Positioner (VOV_420)
ETC	Integration System, Actuator, Alarm



### I FEATURE & ADVANTAGE I

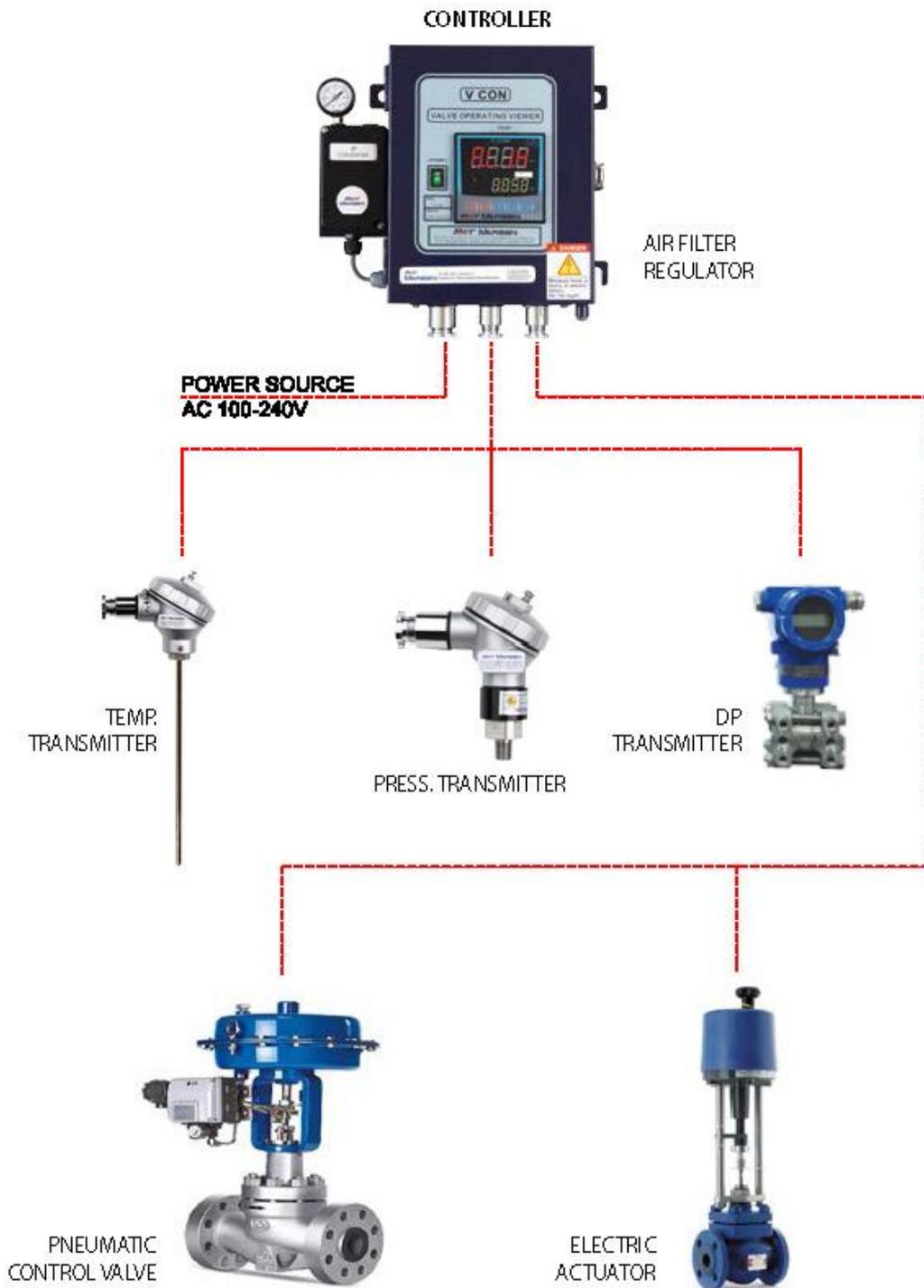
Possible to be applied in various industrial facilities because it can process various input signals.

User can input the value by keypad

I/P converter integrated unit-cost saving effect

# V-CON

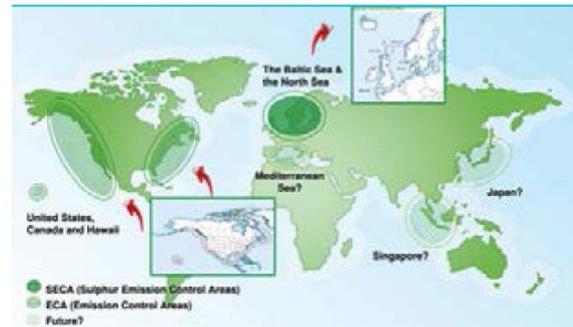
## I COMPONENTS / OUTLINE I



# MGO-HFO CHANGEOVER SYSTEM

## GENERAL INFORMATION

This system controls the changeover of low sulphur fuel oil to prevent marine air pollution caused by ships and meet the regulations for the prevention of air pollution from ships. Currently most of the ships sailing the oceans are using HFO (heavy fuel oil) as the primary fuel. It is being regulated to use the low sulphur fuel oil in certain areas due to sulphur dioxide (SO<sub>2</sub>) emissions regulations and these regulations will be strengthened.



IMO/EU/USA/CANADA Rule SO<sub>x</sub> Discharge Restricted Area.

## I FEATURE & ADVANTAGE I

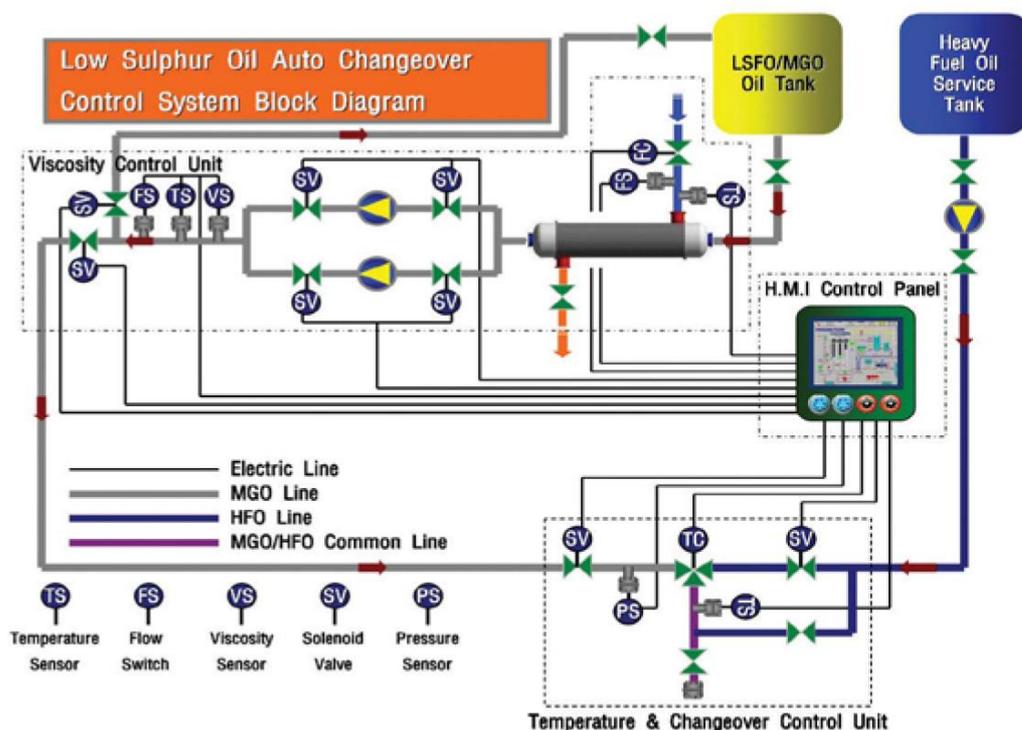
Viscosity sensor – 1~10cst measurable

Fuel oil pollution prevention

Auto-monitoring structure

Control 1 minute, 2°C temperature and variations to prevent thermal shock

Integrated control panel – H.M.I type



# PORTABLE GAS DETECTOR / GAS SENSOR

## PORTABLE GAS DETECTOR & SENSOR

### I Portable Gas Detector & Sensor I



**Gas Man (Single)**  
 MEASURING GAS :  
 Flammable, Oxygen, Toxic  
 TYPE : SINGLE



**MINIMAX X4**  
 MEASURING GAS :  
 O<sub>2</sub>, H<sub>2</sub>S, CO, Flammable  
 TYPE : MULTI



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



**Triple Plus IR (IR Multi)**  
 MEASURING GAS :  
 O<sub>2</sub>, H<sub>2</sub>S, HC, CO  
 TYPE : MULTI / PUMP TYPE

### I Suction Type I



**GV-100S**



**RX-415**



**RX-515**



**Calibration Can**

### I Fixed Gas Sensors I



**O<sub>2</sub>**



**H<sub>2</sub>S**



**HC**

# 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.



## I FEATURE & ADVANTAGE I

Optimized burning efficiency & fuel consumption

Reduces engines maintenance costs, overhaul costs and pollution

Simultaneous on-line control

Line pressure pulsations resistant

Long term reproducibility

Leak proof drive by magnet coupling

No clogging capillary

Designed for marine environments

Quality assurance certificates from all major classification authorities

Worldwide sales and service network

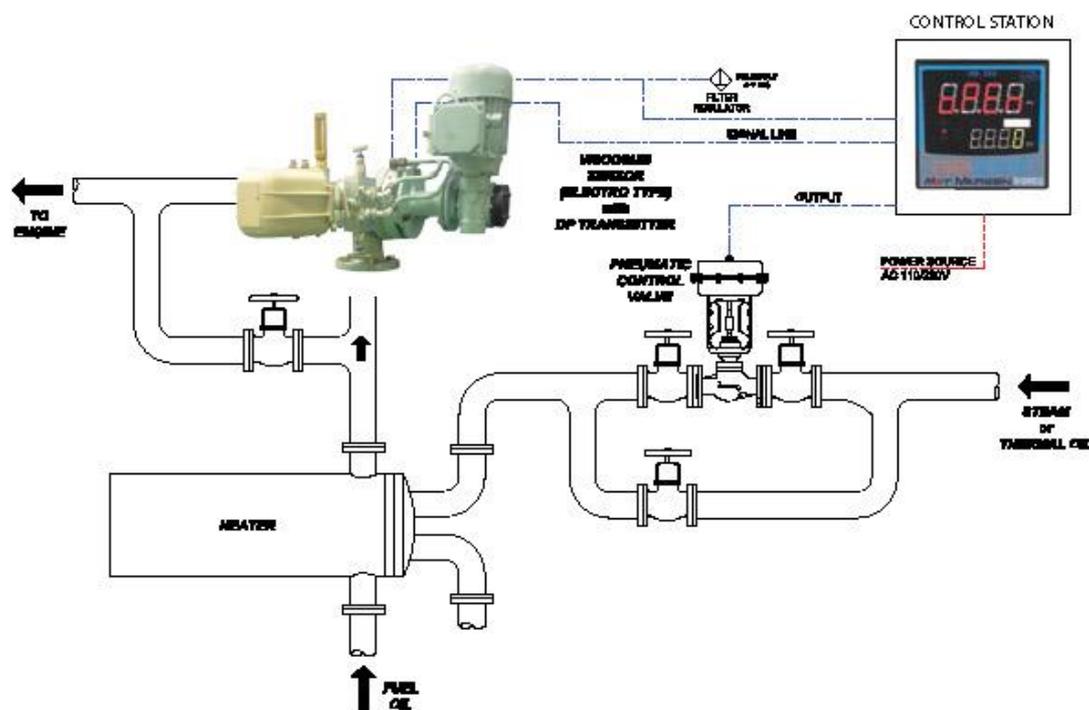
## I APPLICATION I

-Viscosity control of intermediate and heavy fuel oils used for main and auxiliary engine in marine propulsion

-Viscosity control in oil-fired power plants and other industrial applications using diesel engines on heavy or intermediate fuel oil

## VIS-200

## I COMPONENTS / OUTLINE I



## I TECHNICAL SPECIFICATION I

ITEM	TYPE	SPECIFICATION	
		PNEUMATIC	ELECTRIC
SENSOR	VISCOSITY RANGE	0~22 or 44 mPa·s / max 0~45 mPa·s	
	TEMPERATURE	Fuel oil max. 180°C / Ambient max. 60°C	
	MAX. FUEL FLOW RATE	35 m <sup>3</sup> /h	
	OUTPUT DIFFERENTIAL PRESSURE	approx. 0~0.5bar	
	ACCURACY	better than ±2%	
VISCOSITY CONTROL STATION	INPUT SIGNAL	0.2~1.0bar	4~20 mA
	OUTPUT SIGNAL	0.2~1.0bar	4~20 mA
	AIR SUPPLY	1.4bar	-
	POWER	110V/220V 50/60Hz	
DIFFERENTIAL PRESSURE TRANSMITTER	TEMP. INFLUENCE	<0.05% per °C	
	OUTPUT	0.2~1.0bar	4~20 mA
	AIR SUPPLY	1.4bar	-
	POWER	-	10.5-28VDC
	AMBIENT TEMP.	-40°C ~ 120°C	
	MAX. STATIC PRESSURE	100bar	
	CONNECTION SIZE	1", 1~1/2", 2"	
CONTROL VALVE	FLANGES	DIN PN 10/16/25/40 ANSI CLASS 150RF, 300RF JIS 10K, 16K, 20K	
	INPUT SIGNAL	0.2~1.0bar	4~20 mA
	AIR SUPPLY	1.4bar	-
	POWER		1PH 110/220V 50/60Hz 3PH 380/440V 50/60Hz 24VDC
			-

# OIL MIST DETECTOR OMD-200

## GENERAL INFORMATION

OIL MIST DETECTOR is a system to monitor the oil mist of CRANK CHAMBER, MAINENGINE 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 EHPP-200

## GENERAL INFORMATION

EHPP 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 EHPP-200's status controlled. User can control EHPP-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 SPECIFICATION

SUBJECT	VALUE
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
AMBIENT TEMPERATURE	-20°C ~ 60°C
WORKING PRESSURE	120bar
DIMENSION	78 x 118 x 171 (mm)
WEIGHT	10kg
APPLICATION VALVE SIZE	40A ~ 900A

# TEMPERATURE CALIBRATOR MTC-200

## 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 SPECIFICATION

SUBJECT	VALUE
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
THERMOSTAT TEST	Yes
WELL DEPTH	155mm
WELL DIAMETER	26mm
POWER SUPPLY	100~200VAC, 50~60Hz
POWER CONSUMPTION	1600W
OPERATING TEMPERATURE	0 ~ 40°C
DIMENSION	115 x 280 x 220
WEIGHT	abt. 5.5kgs



# PRESSURE CALIBRATOR 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>

SUBJECT	VALUE
PRESSURE MEDIA	AIR
PRESSURE RANGE	-1(-950mbar) ~ 40bar
PROCESS CONNECTION	REFERENCE G 3/8 A female, with quick connection TEST DEVICE G 1/4 A female, with hose(1.0m)& cap nut
HOUSING	220 x 105 x 63mm
WEIGHT	abt. 500g
INCLUDING ACCESSORIES	seals, case

### <DIGITAL REFERENCE TEST GAUGE>

SUBJECT	VALUE
PRESSURE CONNECTION	G 1/4" male thread
DISPLAY	Multifunction LCD, 30x30mm
HOUSING	D=70, L=100, H=30mm weight app. 130g IP 68
POWER SUPPLY	3 V-battery
ACCURACY	±0.5% of F.S
MEASURING RANGE	-1 ~ (30)40 bar / 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 IIC T5
MAX. STATIC PRESSURE	40 bar
PRESSURE RANGE	0~0.2, 0~0.4, 0~1, 0~4, 0~10 bar, 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.
MATERIAL	STS316, 304 Option : STS 316L
SIZE	100A ~ 800A
TEMPERATURE	300°C Option : -196°C
WORKING PRESSURE	20 bar
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	U <sub>i</sub> =13V, I <sub>i</sub> =2A, L <sub>i</sub> =0mH, C <sub>i</sub> =0nF
W MAX	4~5Watt
ABSORPTION FORCE	MIN 0.5N, MAX 1.5N
DUTY RATING	Continuous(100%)
WORKING PRESSURE	160 bar, Max. 250bar(busting)
EX GRADE	-20 ~ 50°C



## Ex Power Supply (Model : HAP12)

SUBJECT	VALUE
SUPPLY VOLTAGE	AC220V
INPUT SIGNAL	DC24V
OUTPUT VOLTAGE	DC12V
STORAGE	-20°C ≤ Ta ≤ 60°C
EX PROOF	Ex ia IIC
INTRINSIC ASSOCIATED DEVICES PARAMETER	P <sub>o</sub> = 1W
	U <sub>o</sub> = DC14V
	I <sub>o</sub> = 290mA
	L <sub>o</sub> = 0.35mH
	C <sub>o</sub> = 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
STORAGE TEMPERATURE	-20°C ≤ Ta ≤ 60°C



## I.S BARRIER

Model No.	Number of single channels interconnected within hazardous area	Earth return uses	Max. permissible cable parameters			Match power
			Group IIC			
			Capacitance(uF)	Inductance(mH)	L/R ratio 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-2875+	Both	Yes	0.13	4.2	55	0.65





## WORLD WIDE SERVICE NETWORK

### HEAD OFFICE

**KOREA MARSEN Co., Ltd.**  
5 Saejinmok-gil, Gangseo-gu, Busan, Korea  
Tel : +82-51-831-2108  
E-mail : marsen@marsen.co.kr

### BRANCH

**SINGAPORE DUNE SHIPPING Pte Ltd.**  
BLK524, Senja Road, #04-100, Singapore  
Tel : +65-6774-5377  
E-mail : dune@duneship.com

### AGENT - SOUTH-EAST ASIA

**CHINA HAI CHEUNG Limited**  
8/F Juyang Tower, No.1200 Pudong  
Avenue, Shanghai, China  
Tel : +86-21-5888-9889  
E-mail : terry\_feng@haicheung.com

**TAIWAN SUNTEQ GLOBAL Co., Ltd.**  
OF No. 88, Fodong Rd., Cianjhe n  
District, Kaohsiung City 806, Taiwan  
Tel : +886-7-805-9888  
E-mail : pstien88@ms25.hinet.net

**INDONESIA STX MARINE SERVICE**  
Rukan Grand Panglima Polim Kav. 79, Jl.  
Dharmawangsa No.1, Kebayoran Baru,  
Jakarta Selatan 12160, Indonesia  
Tel : +62-21-2751-6039  
E-mail : kimbr@onestx.com

**SINGAPORE SEA HOVER TECHNOLOGIES Pte Ltd**  
48 Toh Guan Road East, #04-154/155  
Enterprise Hub, Singapore  
Tel : +65-6267-8061  
E-mail : limjong@seahover.com

**INDIA ALTIS INSTRUMENT Pvt Ltd**  
BLK 9012 TAMPINES Street 93, #04-191  
Singapore  
Tel : +91-98-4333-0215  
E-mail : altis1998@live.com

**INDIA Penta Electromec Pvt. Ltd**  
602, Rajhans, Opp. Gaon Devi Bus Depot,  
Naupada, Thane (W), Mumbai - 400 602,  
Maharashtra, INDIA  
Tel : +91-22-2537-8734  
E-mail : manish@pentaIndia.co.in

### AGENT - MIDDLE EAST ASIA

**UAE / BAHRAIN / OMAN / QATAR  
V-TECH MARINE SERVICE LLC**  
P.O. Box: 13756, Ajman, U.A.E  
Tel : +971-6-743-0020  
E-mail : vtechgroup@vtech.ae

**IRAN SRS Co., Ltd.**  
Unit. 1 2, No.3, Noor St., Africa Bld.,  
Tehran - IRAN  
Tel : +98 21 88206365  
E-mail : info@rasa-services.com

**SAUDI ARABIA / SRI LANKA / GHANA  
KDU MARINE EQUIPMENT**  
P.O. Box: 90878, Shed #136 | Al Jadaf |  
Dubai  
Tel : +971-6-5578581  
E-mail : p.chandan@kduworld.com

### AGENT - EUROPE

**ITALY / BELGIUM  
UNISERVICE UNISAFE Srl**  
Via G. Bruzzone 2c 16162 Genoa, Italy  
Tel : +39-010-714647  
E-mail : info@uniservicesafety.com

**NETHERLAND RAVERO B.V.**  
t Woud 23232 LN Brielle The Netherlands  
Tel : +31-81-419419  
E-mail : marine@ravebo.nl

**GREECE / CYPRUS  
INTERNAFTIKI SA**  
6, Alipedeou str. GR 18531 PIRAEUS,  
GREECE  
Tel : +30-210-4126997  
E-mail : info@interaftiki.gr

### AGENT - AMERICA

**PERU RESET NAVAL**  
PLEXUS SAN MIGUEL BUSINESS  
CENTER Calle Martin de Murua 150 San  
Miguel Oficina 1004-1005  
Tel : +51-1-5781138  
E-mail : mmunoz@resetnaval.com

**VENEZUELA [CURACAO] MRCTECH B.V.**  
Tel : +5999-686-6617  
E-mail : mrcykim@gmail.com



5 Saejinmok-gil, Gangseo-gu, Busan, Republic of Korea  
TEL : +82-51-831-2108  
FAX : +82-51-831-2109  
E-mail : marsen@marsen.co.kr  
www.marsen.co.kr

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