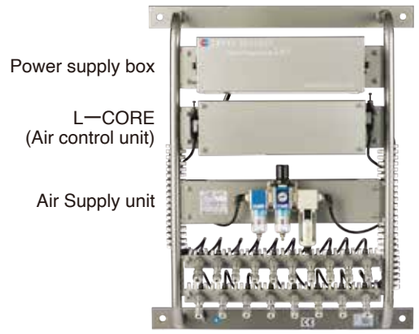
3 Easy maintenance

Achieves "simplification of outfitting/maintenance" while satisfying strict requirements

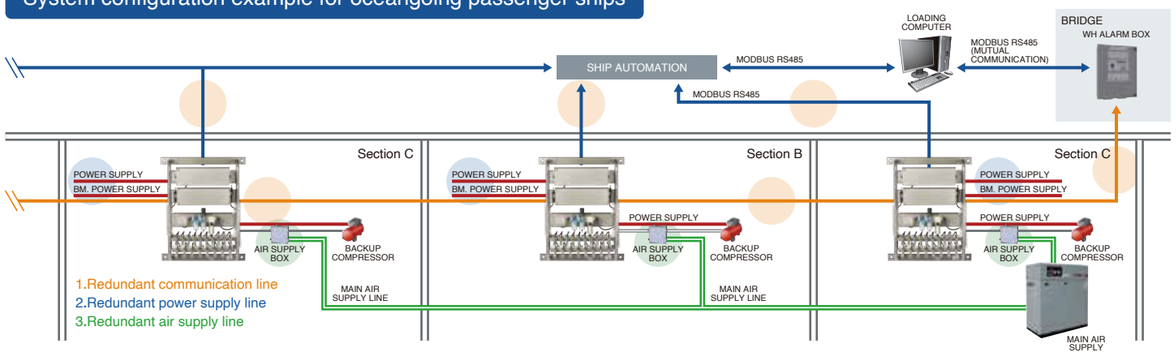
Rack structure

Normally, the duplexing of communication line/power supply/air supply line and the automatic switching function with backup are integrated into a large heavy control box, but in LAX, parts are modularized for each function and combined and placed on a rack, It is lightweight and compact while satisfying the required functions.
In addition, one L-CORE covers up to 16 tanks. It is possible to build a flexible system according to the structure of the ship. Even if you have a large number of measurement points such as a large passenger ship, you can handle it by connecting multiple MPP units.

LAX's core MPP unit (for 16 tanks)



System configuration example for oceangoing passenger ships



Specification

【MPP Unit (8/16 Tanks)】

Power Supply	: AC100～220V	Dimensions(mm)	: H740×W600×D220（8/16Tanks）
Electricity Consumption	: DC15V, 3A/16Tanks	Pressure Supply	: 0.4～1.0MPa
Ambient Temperature	: 5～55°C	Protection Class	: IP44
Air Consumption	: 0.3Nl/min	Communication Standard	: Modbus RTU/ASCII RS485
Weight	: 15kg	Air Filter / Regulator	: External Air Supply Box

【Flood Detection Monitoring unit (LAX-ADM】

Accuracy	: ±10mm
Air Consumption	: 0.3Nl/min
Weight	: 1kg

【LAX-WAC (1 : 1 Converter)】

Target of measurement	: Sea water, fresh water, fuel oil, lubricating oil
Measurement Range	: 0～20m
Accuracy	: ±25mm
Air Consumption	: 0.01Nl/min
Connection	: Flange : JIS 5K-40A
Weight	: 5kg

【Purge Head (LAX-PH)】

Target of measurement	: Sea water, fresh water, fuel oil, lubricating oil
Measurement Range	: 0～35m
Accuracy	: ±25mm
Air Consumption	: 0.3Nl/min
Connection	: Flange : JIS 5K-20A Inner screw (male screw) connection / outer screw (female screw) connection
Weight	: 0.2kg

【Draft Chamber】
Option

【Inclinometer】
Option

MUSASINO CO., LTD.
□Head Office
1-2-15 MinamiYukigaya, Ota-ku, Tokyo, 145-0066
Tel.+81-3-3726-4413 Fax.+81-3-3726-1557
E-mail：sales@musasino.co.jp / service1@musasino.co.jp
https//www.musasino.biz

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LEVEL MASTER

FLOODING DETECTION AND
TANK LEVEL GAUGING SYSTEM

LAX

MUSASINO CO., LTD.

FLOODING DETECTION AND TANK LEVEL GAUGING SYSTEM

High safety, Reducing outfitting works, Easy maintenance

MUSASINO made “High safety” as its utmost priority concept to imply when developing its level gauge for ferry and cruise ships.
We are contributing to the safe navigation of ships, with more than 60 years’ experience in the field of ships equipment. We provide you various merits from the “Long lasting stable precision”, the compact light weight and simple structure, which enable the “Easiness of outfitting & maintenance”.

1 High safety

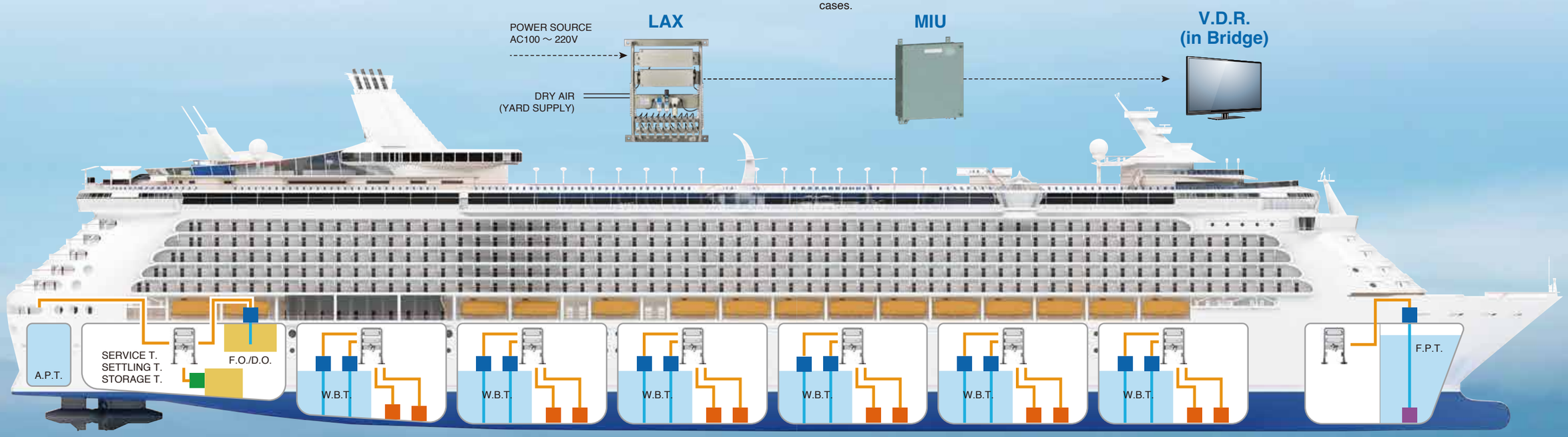
The water gauge LAX system from MUSASINO, is designed to fulfill strict global requirements. While SOLAS treaty/ IMO guidelines, are requiring all navigating cruise ship of more than 36 persons, to install ingress alarm system, and to maintain the functions of ingress alarm operational at fire free partitions at fire accidents, MUSASINO’s LAX is ensuring an optimum situation by coupling double communication wires between the control box at each partition, and the backup for the supply origin of electricity and air.
Also the unique pulse purge system, helps to reduce electricity consumption by cutting intermittently air costs through air discharge. This enables long hours’ operation at moments of electricity cut and emergency cases.

2 Long lasting stable precision

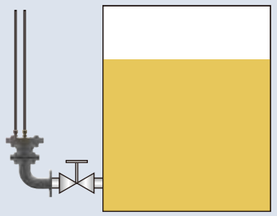
The system is required to show stable high performance, in order to ensure the safety. LAX system from MUSASINO, ensures higher precision than other ordinary air purge systems or the emitter-receiver diaphragm, thanks to its unique pulse purge system.
Also, we developed our own technology for LAX-WAC, equipped with 1:1 converter, to be used at fresh water tanks and E/R tanks, where air discharge inside is undesirable.
The detection part is equipped with air pocket in a structure that avoid the diaphragm pump being in direct contact with the liquid.
This helps to control the deterioration of the dial alarm, and to keep long lasting stable precision.

3 Easiness of outfitting & maintenance

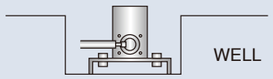
L-CORE, the main part of LAX, is complying to the strict global requirements thanks to its smaller, simpler and more compact structure than the ordinary air purge method level gauges.The compact and small one unit of L-CORE, with its integrated SV unit, power supply and air supply, makes outfitting simplification real, as it covers all kind of tanks on board of a ship starting from “installed tanks” at the engine room, to ballast tanks and ingress alarms.One other charactering point, is the modulated structure, that is made according to its function.
This means that in case of any trouble, repair can be done simply by changing the module.



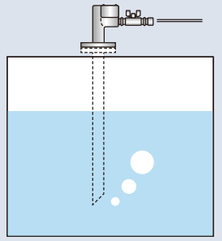
SERVICE TANK
SETTLING TANK
STORAGE TANK



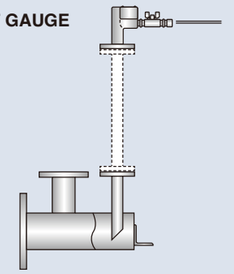
BILGE ALARM



W.B.T. / F.P.T. / A.P.T.



DRAFT GAUGE



1 Safety

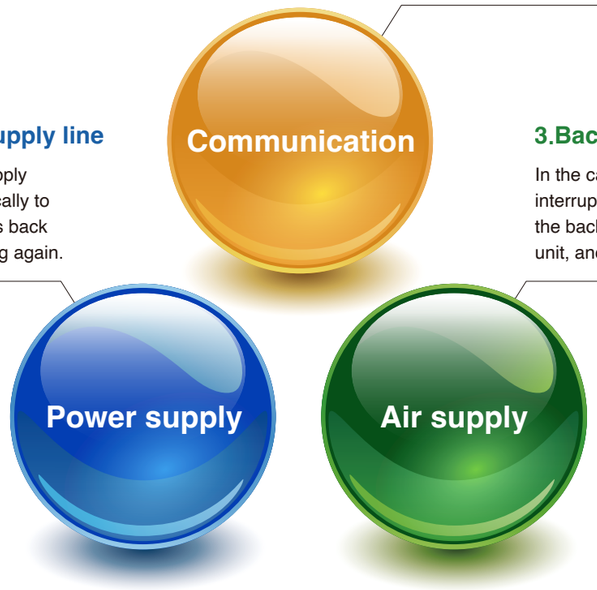
“High safety”, through the three backups and long operation at emergencies

■Three backups

In cruises navigating overseas, it backups are required for communication lines/ power and air supplies lines, as a method to meet the requirements of safety measures in case of fire accidents.Even if one partition got in fire, it is necessary to maintain the operation of the other partitions (Excluding the locally navigating cruises).

Especially, when the main operation of the power or air supply, get stopped, it is required that it shifts automatically to the backup, and then to move back to the main once it is operating again.

Three backups offering the high safety



1.Backup of communication line

Signals keep going to the ship automation, even after the line gets interrupted at an intermediate partition.

2.Backup of power supply line

In the case of main power supply interruption, it shifts automatically to the backup, and then it moves back to the main once it is operating again.

3.Backup of air supply line

In the case of main air supply interruption, it shifts automatically to the backup compressor from MPP unit, and keep air supplying.

■Fail safe function (LAX-ADM)

Not only the alarm function, but it allows as well to check the ingress level at every partition in real time with an Ultraprecision of +/-10mm.The inside network between the MPP unit till the detection part, is controlled automatically by regular air flow. Whenever an ingress happens, the detection part detects it, blow air, so the level measurement of the ingress is taking place.In addition to the alarm triggering in case the measured level, exceeded the alarming point, there is the function that detects air leak from pipes, in case it happened, as fail safe function.

■Reduction of usage of electricity and air, to provide a noiseless operation.

It differs from the conventional constant flow method that supplies air continuously, as the pulse purge method, regulate adjustment to the speed shifts of the level inside the tanks, to minimize the air supply to the least extent in an automatic control way. The reduction in air consumption is about the half of the constant flow method, when the tank is empty. In normal situation, the reduction of used air, means reduction of necessary electricity as well. Also the fact that is does not supply air at normal conditions, means no worry about possible noise it may cause at place of installation.

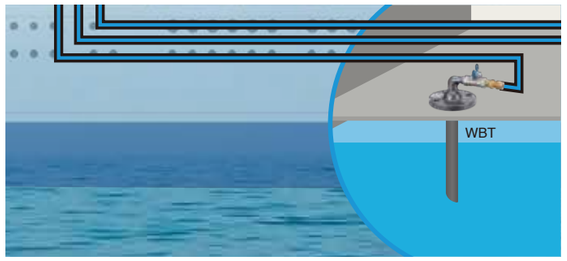
2 High accuracy

“Long lasting stable accuracy” to ensure the safety

■Method of pulse purge (Patented)

The method of pulse purge (Static measurement), as a patented technique exclusive to MUSASINO and the usage of digital measurement, enables hysteresis zero measurement.
While the ordinary measurement method of constant flow (dynamic pressure measurement), has fluctuation of the pressure value and loss of pressure, the pulse purge method, reduce the error caused by the dynamic pressure by measuring after stopping the air discharge, so it can measure the liquid level in a more accurate way by the static pressure.

Image of the installation of the pulse purge method



■LAX-WAC (1:1 Converter)

The LAX-WAC, 1:1 converter that doesn’t use the air flow inside the tank, combined with the diaphragm structure unique to the pulse purge method, enable a stable high precision measurement.The air pocket at the diaphragm is characteristic to this method, that makes difficult the contamination with liquid and sludge. Besides it makes a strong structure against deterioration compared to the ordinary 1:1 converter.

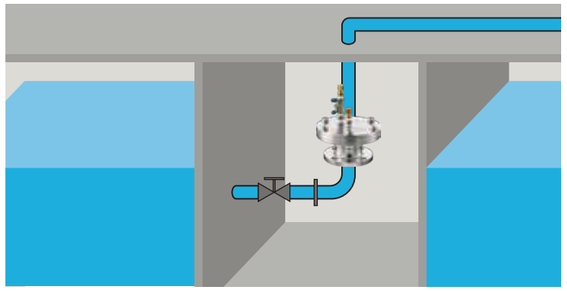
Example of applicable tanks

Fresh/ Drinking water tanks
LO tank (E/R tank)
Settling tank (E/R tank)
Storage tank (E/R tank)
Service tank (E/R tank)

■Automated correction of air pressure (Patented)

Data of air pressure is collected regularly, and usual zero set is done, when the air is not blown.As a result, it can be installed at the engine room that differs from other partitions air pressure without adjustment.Also no errors in readings may occur because of pressure detection part deterioration over years, so it enables maintaining high and stable precision for long years.

Bulkhead mounting type installation image



■Monitoring Software

It displays on screen where the alarm is launched at the whole cruise ship or at the partition, making it easy to understand the situation visually.
It is possible also to make adjustment for the details explanation through voice guidance.It supports the suitable convenient ballasting at high precision through the software application.
Also, it establishes a database that assembles data from different parts of the ship. It also provides necessary information about the ship control to the mainland through the communication line between ship and land.