A. P. I.
marine

Advanced Tank Technology

Sensors and Automation Systems


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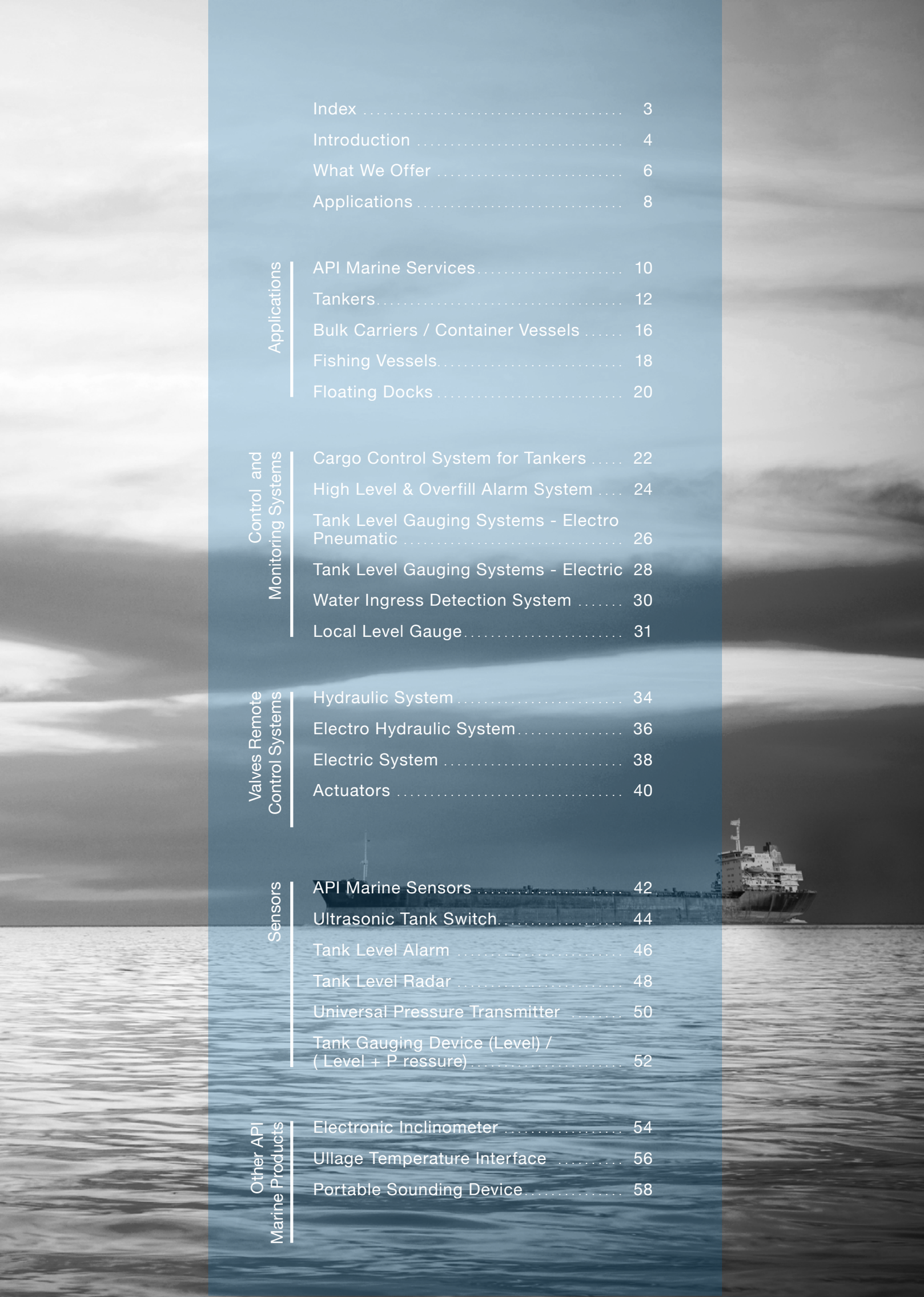
marine



Introduction

API Marine Profile and History

API Marine was established in 2004, and is today a leading manufacturer of cargo control, monitoring and alarm systems, full integrated automation systems, advanced ballast and service tanks measurement solutions, as well as valves and valves remote control systems – all combined and supported by our own cargo and stability software. We supply sensors and systems for virtually all types of ships, such as product oil & chemical tankers, bulk carriers, larger commercial fishing vessels and LNG carriers and offshore installations, including specialized supply vessels. Onshore tank farms, oil refineries, floating docks, nuclear power stations are among our other business areas.

New Standards for Tank Measuring Technology

API Marine develops and produces a range of cargo monitoring and control products. We supply a complete range of sensors needed for full cargo control, as well as calculation and administration software combining integrated solutions for smart tank cargo control. Our sensors are designed for precise measurement of level, temperature and pressure in harsh environments and heavy conditions for all types of liquids within marine and industry. Built on patented acoustic guided low frequency wave technology, precise measurements are ensured for continuous operation in any shape of tank, type of liquid and temperature.

Each of the sensors have a unique design with no electronics or moving parts inside the tank. This results in longer lifespan with all sensors and transmitters being virtually service-free. Should there however be a need for maintenance – all critical and electronic parts can be accessed from outside the tank.

ISO 9001 Certified

ExVeritas

What we offer

Supplier of Complete Systems

Complete cargo control systems and full automation solutions supplied by API Marine meet the strongest requirements of IMO, Coast Guard and comply with the rules of most international classification societies and precisely calculate main parameters in cargo, ballast and service tanks. Our systems can operate in any liquid and at any temperature, even in arctic regions, and provides the user with real-time information on cargo condition and status of vessel's mechanisms.

Reliable Cargo Handling

In order to exploit the full tanker capacity, it is important to ensure fast and reliable loading and unloading of cargo. Modern cargo control systems must be able to fill the tanks to the maximum, as well as prevent spills. API Marine systems are based on a set of advanced sensors of own production, measuring main cargo parameters with unmatched accuracy and efficiency.

User Friendly Control Software

Our designated software for controlling and calculating various data was developed especially for on-board operations in order to make cargo plans, update the state of carried cargo, calculation of weight, volume, drafts, stability, stresses and floatability of the ship in online, as well offline mode.

Bringing Efficiency with State-of-the-art Technology

API Marine sets the standard by bringing proven measurement technologies of the 21st century into use on tank installations within marine and industry. This provides customers with improved and new higher level of accuracy and efficiency in tank measurements.

We want to contribute to our customer's profitability supplying high quality products, excellent service and state-of-the-art high-tech solutions.

Scope of supply for **Chemical Tankers:**

- Tank Level Gauging System for Cargo Tanks
- High Level and Overfill Alarm System
- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System
- On-line Loading and Stability Computer System

Scope of supply for **Product Oil Tankers:**

- Tank Level Gauging System for Cargo Tanks
- High Level and Overfill Alarm System
- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System
- On-line Loading and Stability Computer System

Scope of supply for **Bulk Carriers:**

- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System

Scope of supply for **Container Vessels:**

- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System
- On-Line Loading and Stability Computer System

Scope of supply for **Fishing Vessels:**

- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System
- Dynamic Stability Computer System

Scope of supply for **Workboat/Tugboat:**

- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System
- Water Ingress Alarm System

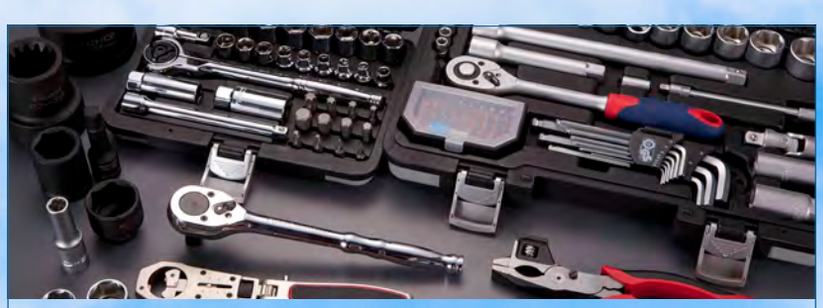
Scope of supply for **Retrofit:**

- Tank Level Gauging System for Ballast and Service Tanks
- Water Ingress System
- High Level Alarm Systems
- Valve and Remote Control System for BWTS upgrade
- Sensors, Actuators and other Components

New vessel constructions
API Marine offers integrated automation systems for shipyards around the world providing clients and shipowners the most modern system solutions within tank monitoring and control. API Marine sales and project team work closely with the shipyards project and design team, in order to ensure the requirements for the shipyards are fully met.

Retrofit solutions
API Marine offers a wide range of retrofit solutions to any type of existing vessels. Retrofit solutions are done in close coordination with the sales and project team at API Marine, ensuring the requirement of the shipowner and client are met to the full satisfaction.

Sensor sales
API Marine offers a wide range of fully generic sensors that are widely integrated into other systems and solutions. API Marine sensors are robust, highly reliable and can be used in “mission critical applications in harsh environments”



Sales Support
API Marine service and support team supports clients globally with pre-sales support, on-site commissioning as well as after-sales support – all securing the shipowners and clients a trouble free operation of the API marine systems and solutions.

Global Presence
API Marine aim to be close to our customers, by having a skilled and efficient network of sales and after-sales support representatives. Sensors, spare parts and critical components are readily available at short notice, securing prompt rectification of any issues onboard.

Industrial clients
API Marine are supplying various high end specialized sensors to the industrial segments such as Oil & Gas, Petrochemical and Power Plants – all applications that requires high end, robust and reliable sensors.

Integrated Solutions for Tankers

The Integrated Automation System (IAS) represents a hardware and software package providing full automation of the vessel's operations. It provides centralized remote automated control and monitoring, emergency alarm and status alarm of the following.

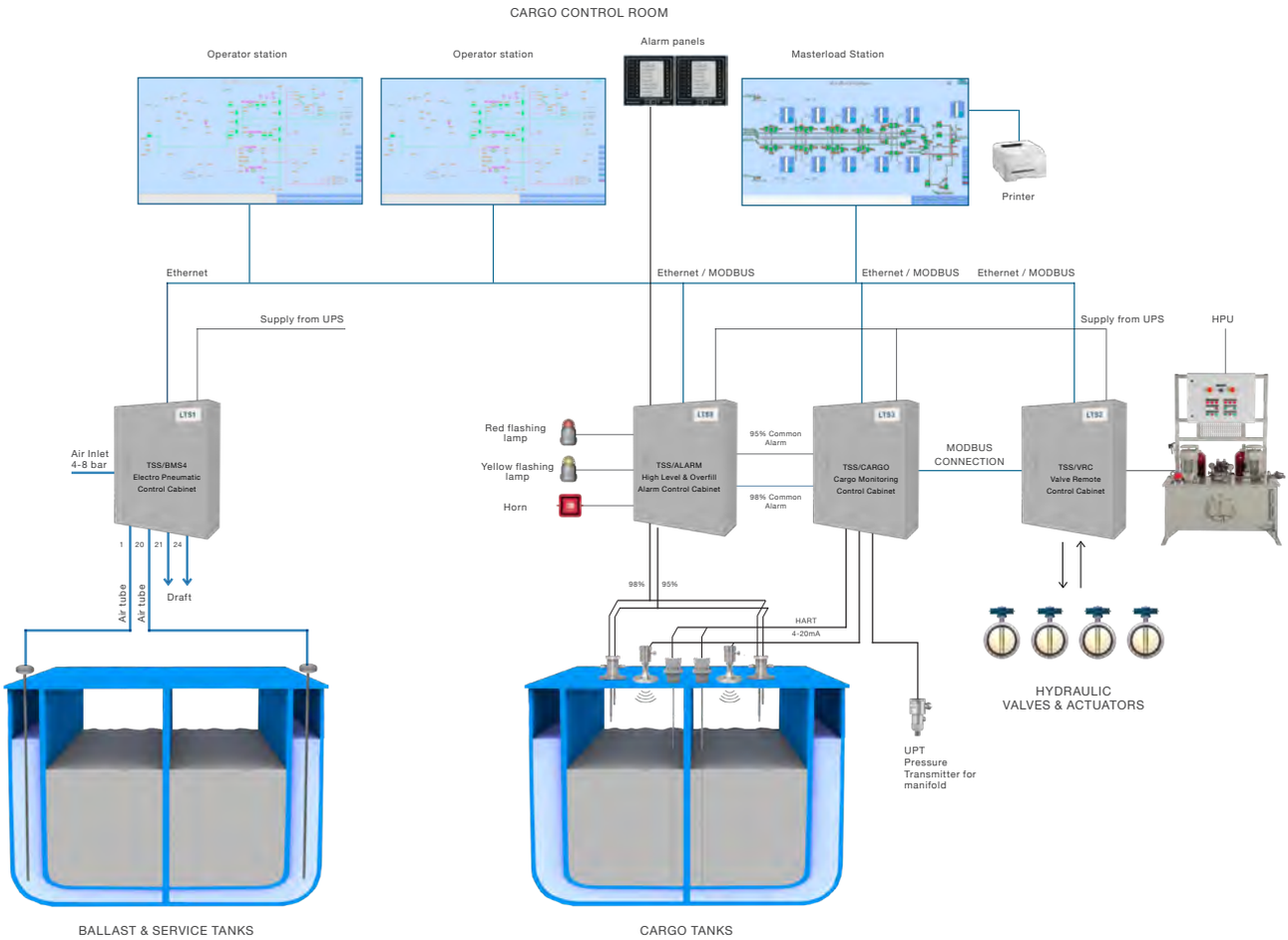
Main Functions:

- Cargo and ballast operations
- Cargo level, temperature and pressure monitoring
- Tank sounding system for ballast and service tanks
- High/Overfill system for cargo tanks
- Cargo and ballast pumps operation
- Monitoring and control valves
- Online monitoring of loading, stability and floatability
- Manifold pressure and temperature monitoring
- Overfill detection for service tanks
- Draft, trim/list monitoring

The Integrated Automation System is a reliable and powerful tool for safe and efficient vessel operation. The unique and modular design of the system enables tailor-made solutions for any type of tanker vessels. The system's hardware and software are 100% developed and manufactured by API Marine, and it is an "open source" system with the possibility of integrating third-party equipment.

System Configuration:

- Tank Level Gauging System for Cargo Tanks
- High Level and Overfill Alarm System
- Tank Level Gauging for Ballast and Service Tanks
- Valves and Remote Control System
- Loading Computer
- Sensors and transmitters



The API Marine Integrated Automation System is a reliable and powerful tool for safe and efficient vessel operation.

Integrated Solutions for Tankers

Tank Gauging Device

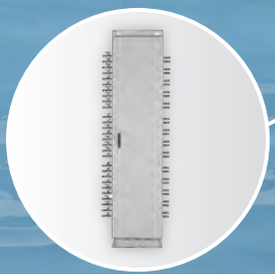
Universal Pressure Transmitter

Tank Level Alarm

Tank Level Radar

Valve with Hydraulic Actuator

Hydraulic Power Unit

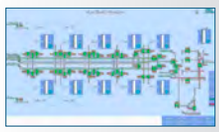


Solenoid Valve Cabinet

The API Marine complete Integrated Automation Solution has been used as the main system onboard oil/chemical tankers, gas carriers, bunker tankers, river-sea tankers by a number of shipyards worldwide, among which shipyards in Germany, Turkey, Russia, Spain, Azerbaijan, China, and South Korea.

Flashing lamps & horn

Operator station



Operator station

Alarm panel

Control cabinets

Signal light column

Alarm panel

Integrated Solutions for Bulk Carriers and Container Vessels

The API Marine Integrated Automation System provides full control of all activities related to tank monitoring and control on board bulk carriers and other commercial vessels.

The system is modular and applications can be tailor-made to meet requirements for most types of vessels. The Integrated Automation System provides easy monitoring and full control of ballast and service tanks.

User-friendly and modern operating software makes the system easy to operate and gives the user full control at any time. It is possible to monitor alarm and separate parameters such as level, pressure, temperature, as well as ship's draft, trim and heel.

The Integrated Automation System allows easy control of different equipment such as valves, pumps, actuators, and other equipment as required. The user interface can be adapted to match any application and customer's preferred layout.

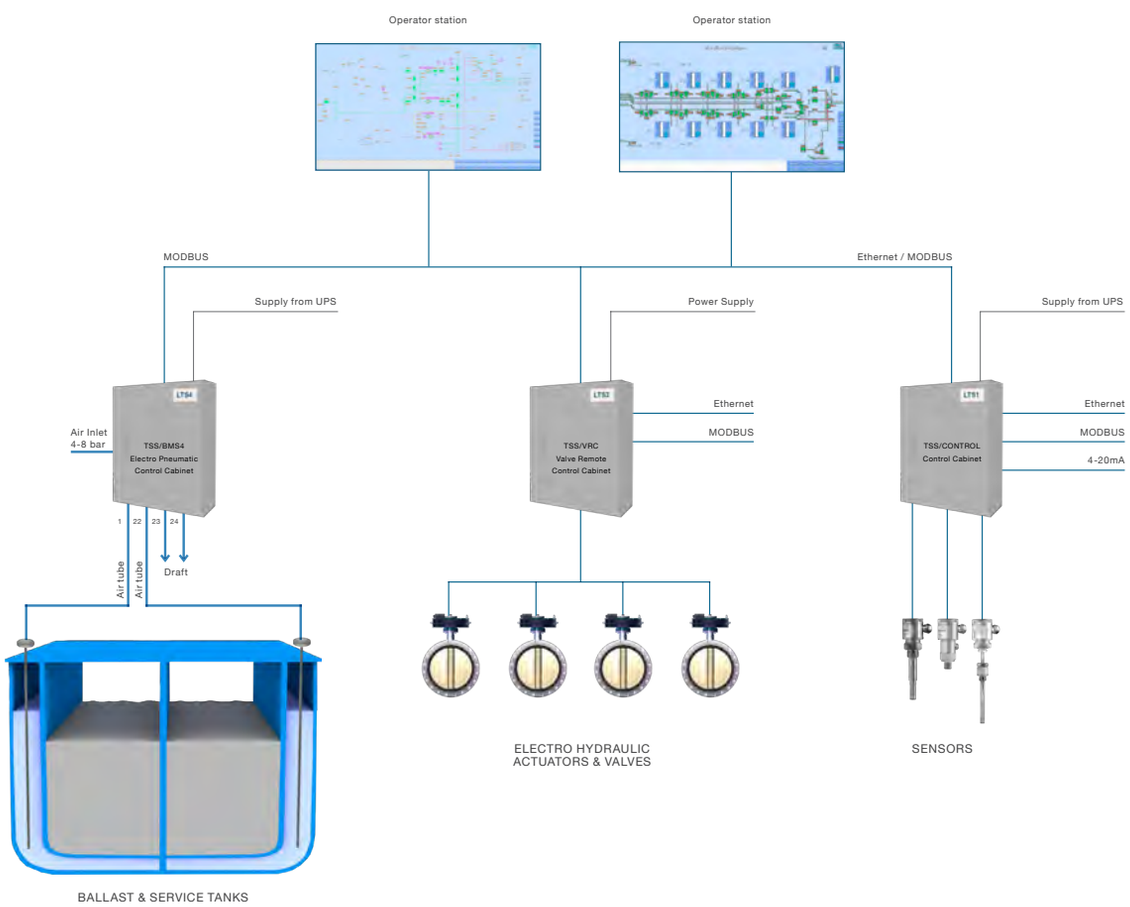
The unmatched design of the system hardware and software is 100% developed by API Marine.

System Configuration:

- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System
- Loading Computer
- Sensors and Transmitters

Main Functions:

- Monitoring and control valves and pumps
- Engine room monitoring and alarm system
- Tank sounding system for ballast and service tanks
- High level and overfill alarm
- Tank temperature alarm system
- Draft, trim/list monitoring



The API Marine integrated solution combining tank level gauging with full control of valves has proven to be a very attractive package for shipyards and shipowners.

Integrated Solutions for Fishing Vessels

The API Marine system and solution provides reliable and accurate monitoring and control of all types of tanks onboard modern industrial Fishing Vessels.

The system is modular and applications can be tailormade to meet requirements for most types of vessels. The solution can be easily integrated into third party Integrated Automation Systems.

The back-bone of the API Marine solutions for commercial and industrial fishing vessels is the API Marine TSS/BMS4™ Tank Level Gauging System.

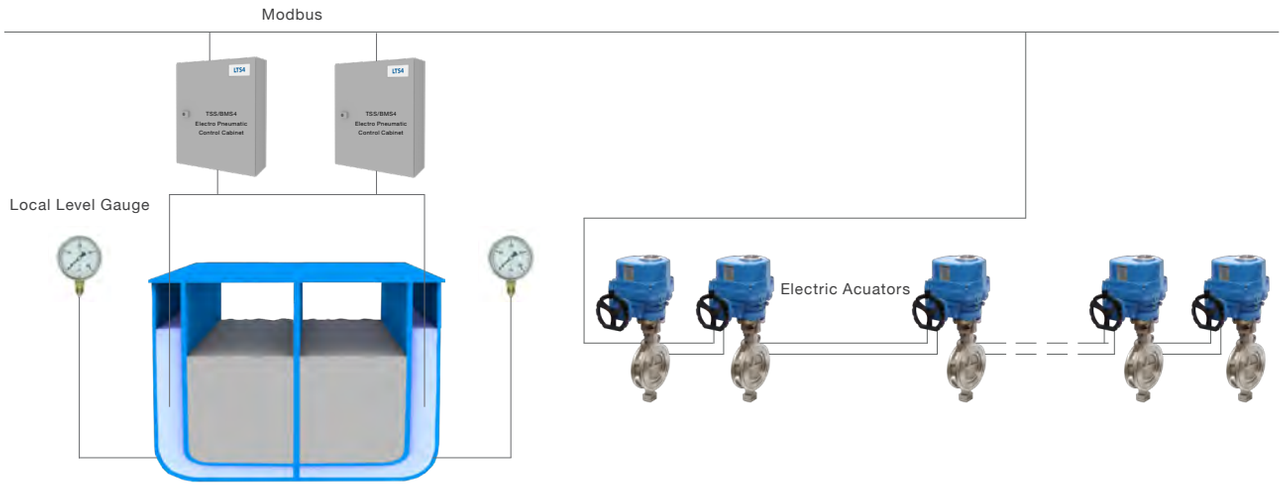
The TSS/BMS4™ is the next generation of electro-pneumatic systems for level and draft measurement, developed by API Marine and featuring improved modular design, enhanced capabilities and reduced costs.

System Configuration:

- Tank Level Gauging System for Ballast and Service Tanks
- Valve and Remote Control System
- Dynamic Stability Computer System

Main Functions:

- Monitoring and control valves and pumps
- Tank sounding system for ballast and service tanks
- The unmatched design of the system hardware and software is 100% developed by API Marine.



The API Marine remote sounding system for ballast and service tanks has proven to be a powerful tool for the modern industrial factory trawlers.

Integrated Solutions for Floating Docks

System Configuration:

- Tank Level Gauging System
- Deflection Measurement System
- Valve and Remote Control System
- Loading and stability Computer

Main Functions – Tank Level Gauging System:

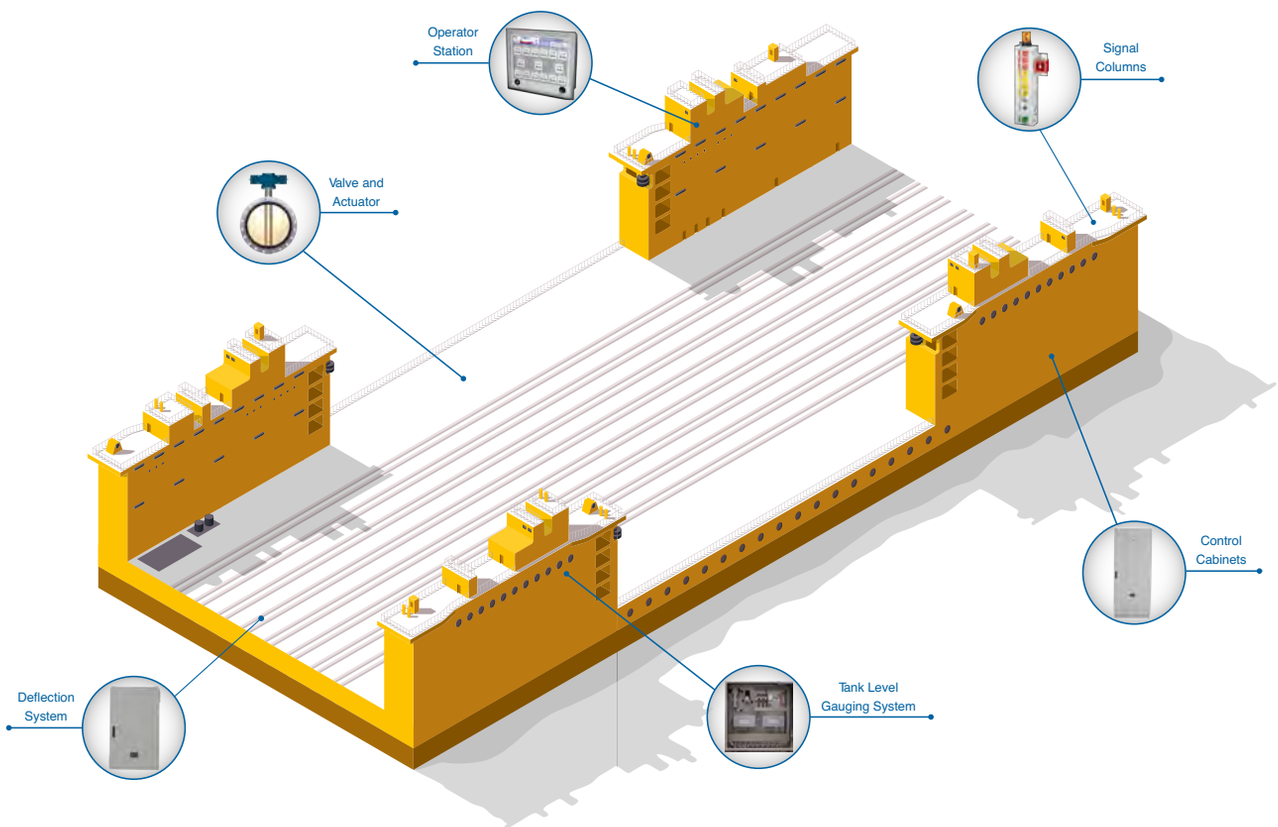
- Level measurement in ballast water tanks, fuel oil tanks, fresh water tanks, oily water tanks and wastewater holding tanks of floating dock;
- Draft measurement

Main Functions – Deflection Measurement System:

- Hydraulic deflectometer provides measuring of transverse and longitudinal deflection of floating dock.
- Longitudinal deflection is monitored on both port and starboard side of floating dock.
- Transverse deflection is monitored at aft and fore of floating dock.

Main Functions – Valve And Remote Control System:

- Provide remote operation of valves in ballast and service tanks
- Full control of all valves connected to the system
- Manual / Emergency operation of valves



The API Marine Solutions for Floating Docks is a modern and powerfull tool for shipyards docking operations.

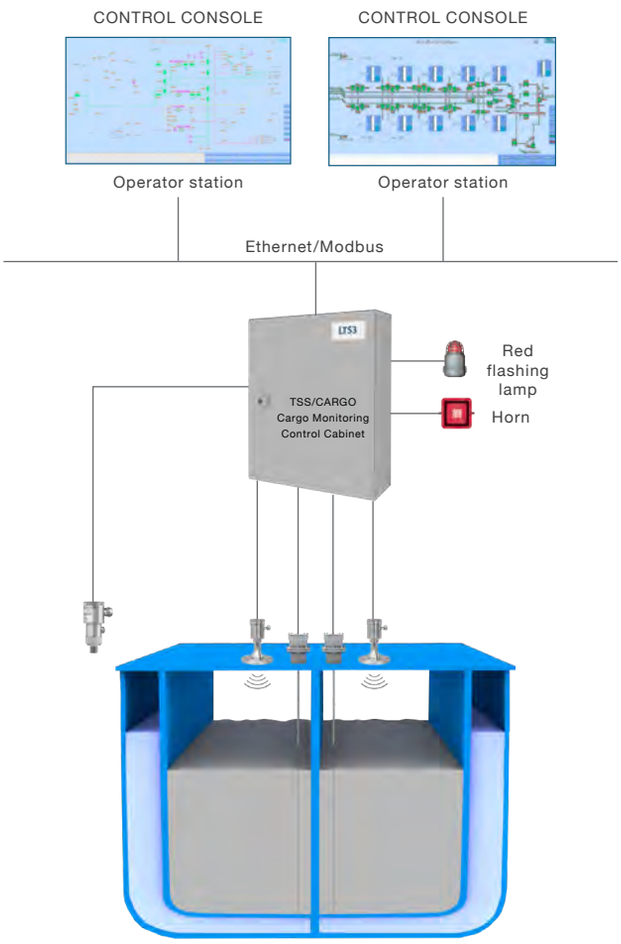
Cargo Control System for Tankers

Cargo control system for oil & chemical tankers TSS/Cargo™ is designed for monitoring all types of oil, oil products & chemicals in the cargo tanks and provides remote monitoring of the following parameters in cargo and slop tanks:

- Cargo level
- Cargo temperature
- Inert gas pressure
- Pressure & vacuum in the cargo tanks
- Manifold pressure monitoring

TSS/Cargo™ meets all IMO and classification societies' requirements for oil carriers and allows for a highly accurate calculation of the volume of stored and transferred cargo. The TSS/Cargo™ system provides online cargo information during cargo operations.

Information from TSS/Cargo cabinet transmitted to the MasterLoad™ cargo computer, where loading, strength and stability are calculated online and the safety of operation parameters for the current loading condition is being controlled. Preliminary preparation of the cargo plan



System Configuration:

- Tank level radar TGD-R
- Pressure and temperature measurement in one sensor TGD-TP
- Control cabinet(s) & operator station(s)
- Flashing lamp and horn
- Pressure measurement for manifold UPT™

Main Functions:

- New ruggedized and compact tank level radar
- Combined sensor for temperature and pressure measurement (less cabling)
- No moving parts or electronics inside the tank
- Service-friendly design
- Customizable solutions
- High accuracy and reliability

The API Marine cargo control system is a compact and flexible solution, utilizing the latest sensors technology giving the shipowner an superior tool for cargo monitoring and control

High Level & Overfil Alarm System

The TSS/Alarm™ is an independent high level and overfill alarm system that is used for level detection in oil & chemical tankers, FSO & FPSO, LPG & LNG carriers and oil barges.

The TSS/Alarm™ fits any new-build and retrofit installations and meets all IMO requirements for independent alarm systems of 95%/98% tank level.

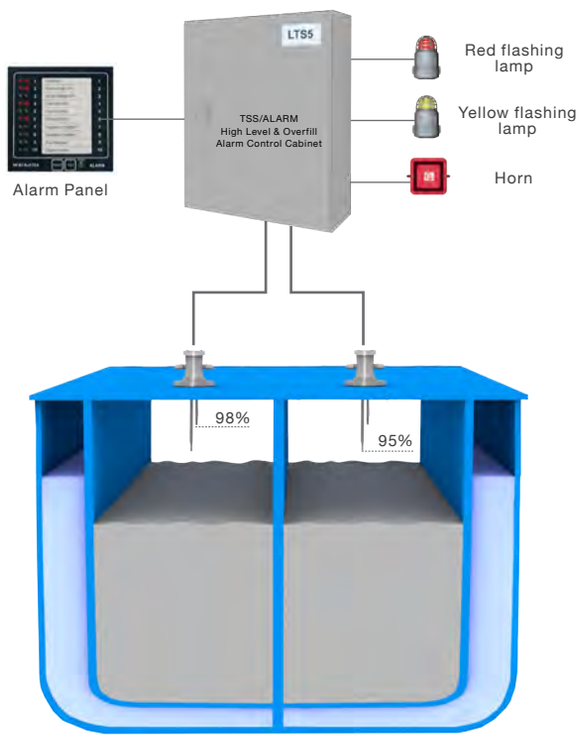
The TLA™ (Tank Level Alarm) has no moving parts or electronics inside the tank, so it requires much less maintenance than most conventional sensors. This makes it a perfect solution for retrofit installations, resulting in reduced service and maintenance costs.

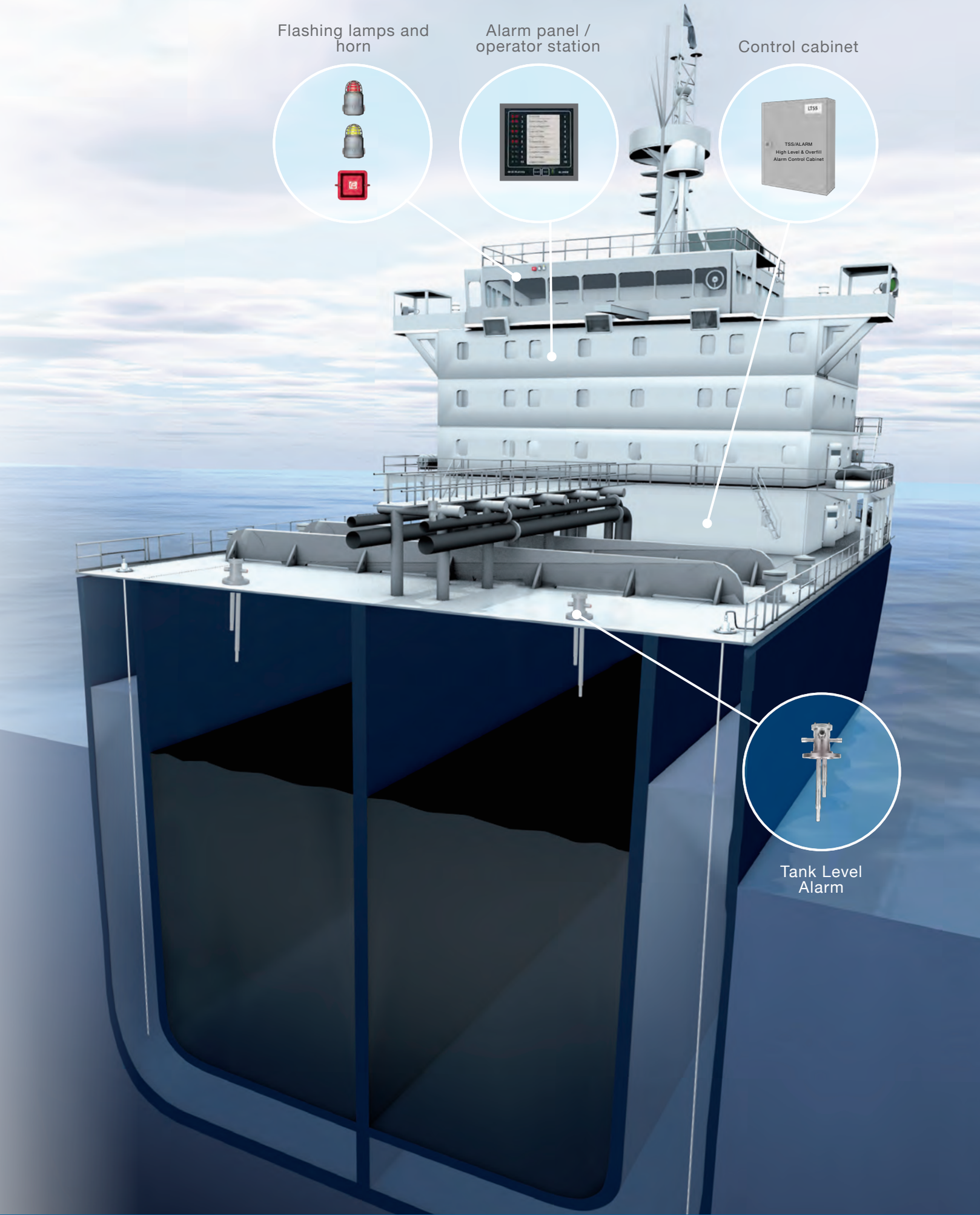
System Configuration:

- Control cabinet
- Tank level alarm TLA™
- Alarm panel
- Red flashing lamp
- Yellow flashing lamp
- Horn

Main Functions:

- Highly compact and economical solution
- Easy replacement of existing outdated systems
- Fits any tank and can be adapted to any installation
- New and improved state-of-the-art TLA™
- No moving parts or electronics inside the tank
- Low “total cost of ownership”




Flashing lamps and horn
Alarm panel / operator station
Control cabinet
TSS/ALARM
High Level & Overfill
Alarm Control Cabinet
Tank Level Alarm

Tank Level Gauging System (electro pneumatic)

TSS/BMS4™ is the next generation of electro-pneumatic systems for level and draft measurement, developed by API Marine and featuring improved modular design, enhanced capabilities and reduced costs.

TSS/BMS4™ is designed to measure the level in ballast and service tanks and the vessel's draft. The system can also be used for level measurement in onshore storage tanks.

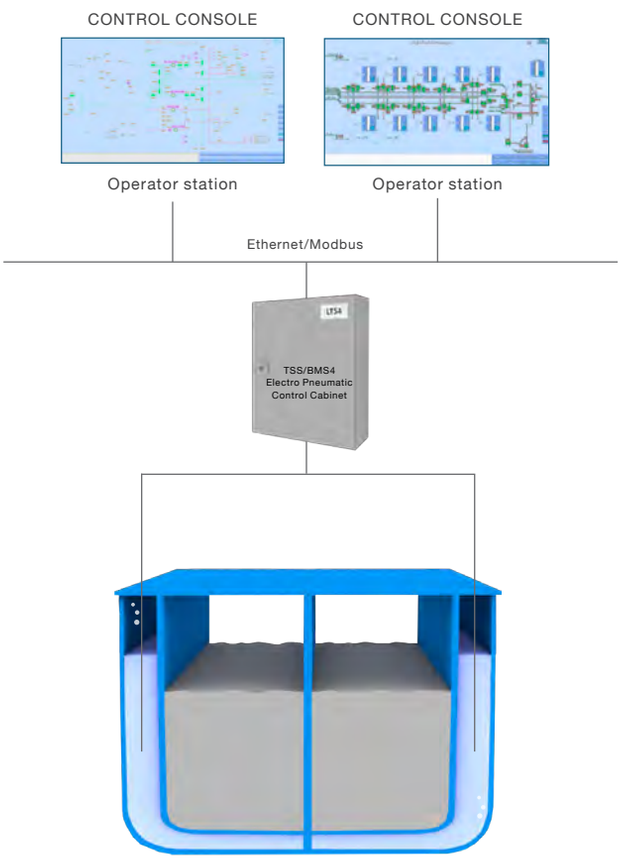
The level measurement principle of the TSS/BMS4™ is based on periodic purging of compressed air from the system to the tank bottom through an air tube and measurement of the settled air pressure in the tube. For draft measurement the air tube is led out to the bottom of the vessel. The density measurement principle of the system is based on differential pressure measurement between two air tubes, mounted in the tank and the known distance between these tubes.

System Configuration:

- Works with any pressure, level and temperature of liquid
- Control cabinet with 12, 24 or 36 channels
- Cabinet includes filter and regulator
- MODBUS output
- Operator stations & software (optional)

Main Functions:

- Automatic calibration and diagnostics during operation
- Automatic and continuous cleaning of pipes during operation
- Less dependent on air quality
- Adaptive sequence measurement
- Equipped with a back-up pressure sensor for continuous operation even if the main sensor fails
- Extremely compact and space-saving design
- Modular concept – standard configuration or tailormade solutions for any application
- Ideal for retrofit installations – can be easily adapted to existing/onboard installations

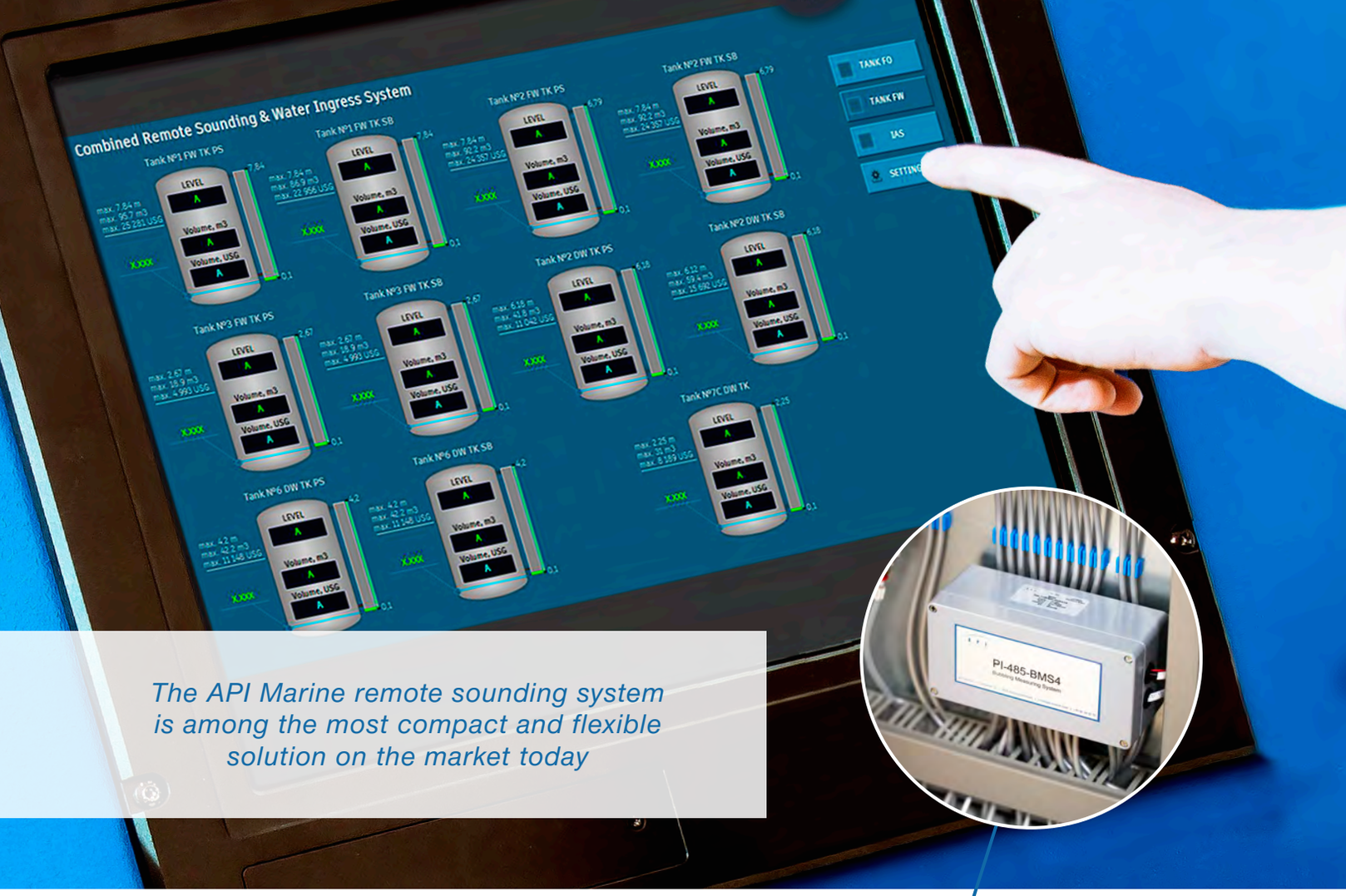


1:1 converter

In-line Non-return valve

Non- return-valve flange type

The API Marine remote sounding system is among the most compact and flexible solution on the market today



Electro Pneumatic Tank Level Gauging System - 96 Channels

Electro Pneumatic Tank Level Gauging System - 24 Channels

Tank Level Gauging System (electric)

TSS/UPT™ is a well proven system for level and draft measurement in ballast and service tanks. The system is based on electric type pressure transmitters, and fully developed by API Marine with modular design to meet specification and demand of most applications.

TSS/UPT™ is designed to measure the level in ballast and service tanks and the vessel's draft, with pressure sensors for both dry compartments as well as submerged applications.

The pressure transmitters provide a standard 4-20mA output, which are connected directly to the control cabinet. The system is fully integrated into API Marine's integrated solutions, however can also be supplied as a stand-alone system with local operation station.

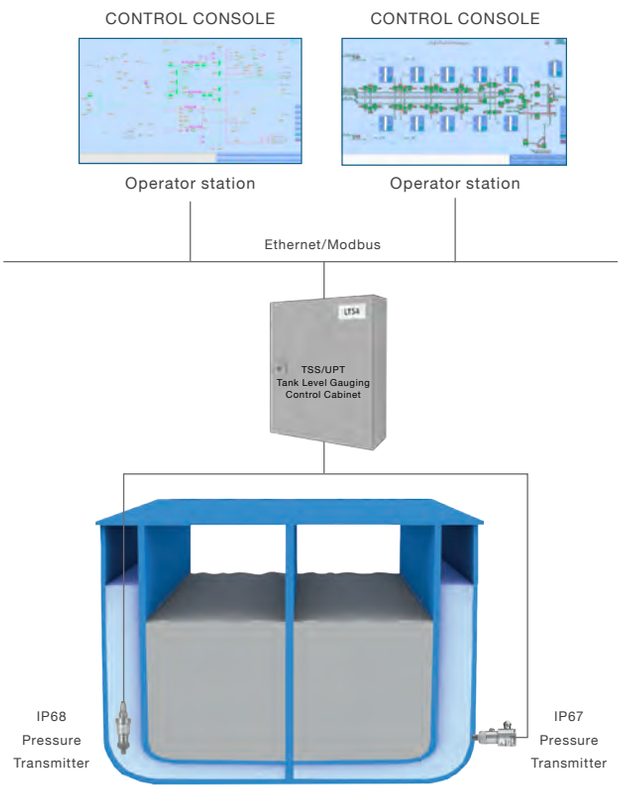
System Configuration:

- Electric pressure transmitters
- Cabinet including safety barriers and interfaces for other sensors
- MODBUS/Ethernet output
- Operator stations & software (optional)

Main Functions:

- Level measurement in ballast and service tanks
- Draft measurement
- Can be supplied as stand-alone system with local operator station, and is easily integrated to most automation systems
- Level alarm functionalities
- System can be easily extended with input from other sensors, such as temperature sensors and level switches
- Suitable for retrofit installations
- Sensors available in a wide variety of versions – both for dry as well as sub-merged applications

TSS/UPT™ can easily be extended to handle inputs from other measuring points i.e. temperature and/or pressure sensors and level switches. With its modular design the system is easily adapted to handle required numbers of tanks or inputs in a cost-effective manner. This makes the system well suited also for retrofit installation.



The API Marine remote sounding system based on electric type pressure transmitters is a proven and reliable system

Water Ingress Detection System

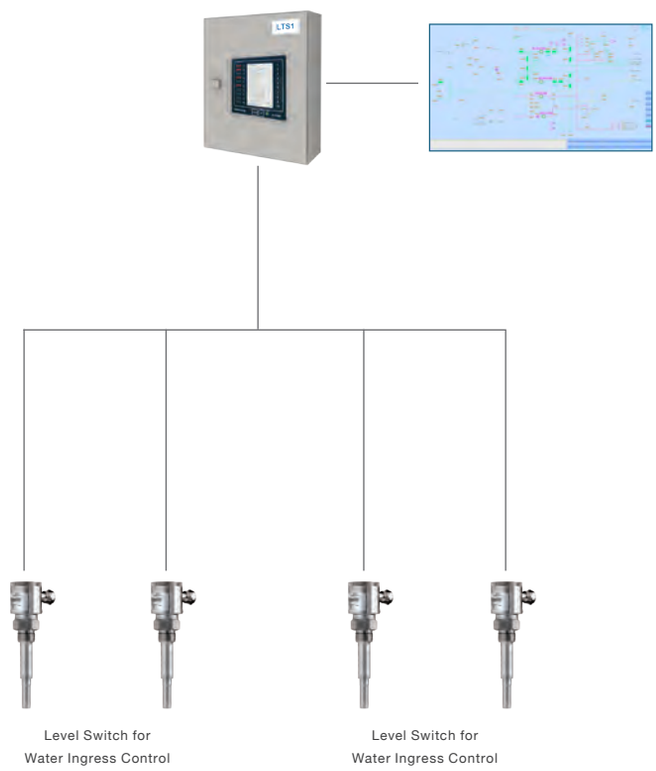
The system comprises of a central control cabinet with built-in alarm panel and interfacing to UTS Level switches.

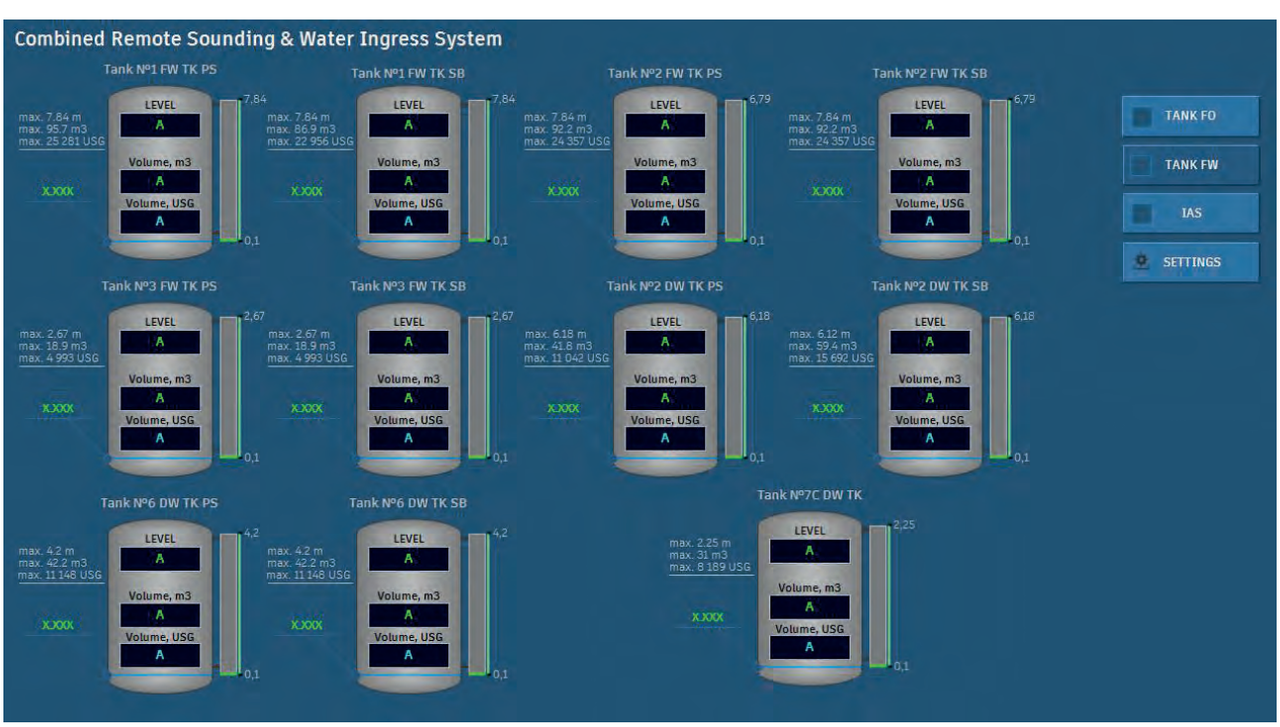
Audible and visual alarms can be provided on the bridge in case water being detected. The system can be interfaces to an Integrated Automation System or can operate as a stand-alone system.

The system can be combined with Tank Level Gauging System.

Main Functions:

- Unique and patented Ultrasonic Level Switches (UTS)
- UTS - Ruggedized design for harsh environments
- Flexible and modular design
- Can be combined with Tank Level Gauging System
- Low “total cost of ownership”
- Simple and user friendly operation
- Suitable for retrofit installations





Local Level Gauge

Application

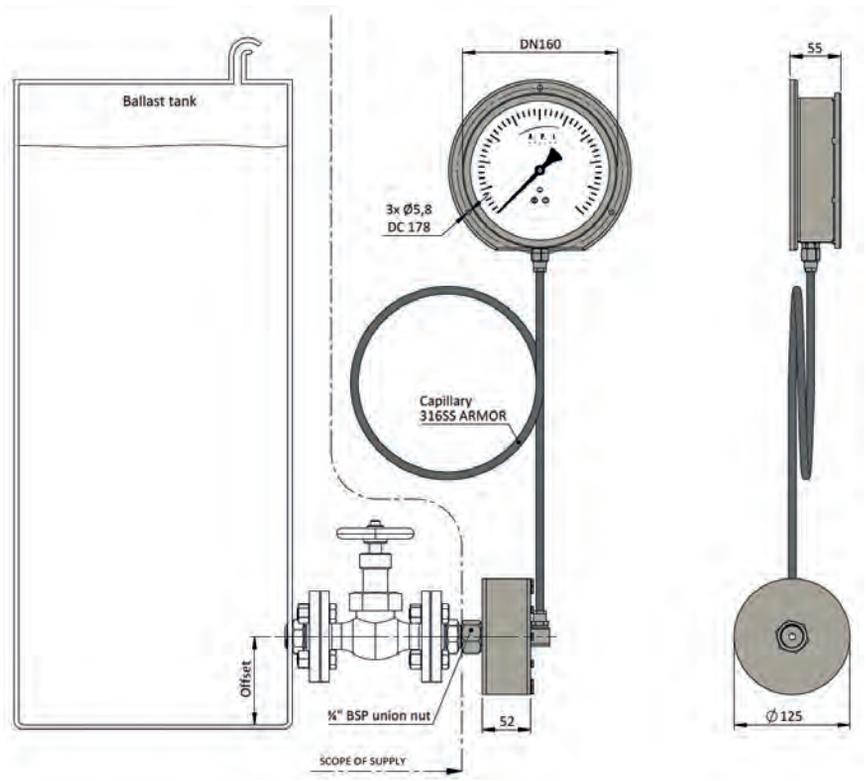
This Tank Level System is well suited for application in marine and general industry. The stainless steel sensor can be used for water, ballast water and other liquids.

System

The tank level system consists of a sensor, which is mounted on the tank. This converts the hydrostatic pressure of the liquid in the tank to a display on the manometer, thereby giving a continuous measurement of the contents of the tank. View can be calibrated to display pressure, fluid height and volume content.

Main Functions:

- The API Marine Local Levle Gauge has been designed and constructed using AISI 316 stainless and acid-proof steel
- Requires no power
- No floats or probes
- Completely automatic
- Can be used in all level applications with freely ventilated tanks
- Calibration after requirements



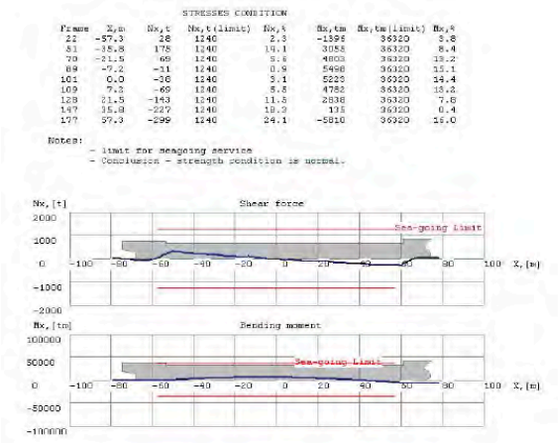
Loading Computer

MasterLoad™ is a solution for calculating the load, stability, strength and floatability of tankers, gas carriers, dry bulk cargo ships, container carriers, sea-river vessels, general cargo vessels, floating drilling platforms, floating dry docks, floating cranes and other types of floating structures.

MasterLoad™ is certified by international classification societies as an onboard loading computer for strength and stability assessment. It has a simple user-friendly interface and it allows for data input to the calculation program directly from sensors installed in cargo, ballast or service tanks (online mode), which ensures the accuracy of trim, stability and strength calculations. The offline mode makes it possible to compile a preliminary loading and ballasting scheme and to automatically generate output documents “for sailing/for arrival”.

Information on the vessel’s load condition can be transferred through mobile satellite networks to the shore centre or ship-owner. The program has an interface for communication with the Emergency Response Centre for immediate information transmission about emergency situations.

Example of MasterLoad™



Main Functions:

- Create loading and ballasting plan of the vessel in online mode and save it in the database
- Develop a ballasting scheme for the vessel (floating platform), based on specified draft
- Calculate trim/heel, stability and strength of undamaged vessel in the current load status
- Create a virtual model of emergency situation and calculate trim and stability when specified compartments are flooded
- Calculate dock operations (arrangement of ships in the dock, ballasting and strength calculation
- Arrange integration of separate modules of the floating object with calculation of trim-stability at each step of enlargement

Main Advantages:

- Online communication with sensors in cargo, ballast and service tanks
- Damage stability calculation
- Automatic calculation of the amount of loaded/unloaded cargo
- Calculation of free surface influence during cargo evaporation
- Calculation of acceleration from displacement of cargo masses
- Cargo plan for different types of cargo
- Draft correction
- SQUAT effect calculation
- Shallow-water effect calculation
- Special transportation features for different types of cargo
- Calculation of trim for passage under bridges
- Automation of ballasting operations

Onboard Software for Calculation of Stability/ Stresses/Damage Parameters – meets all requirements in Resolution MEPC.248 (66) Amendments to MARPOL Annex I

Valve Remote Control System - Hydraulic

The Valve Remote Control System provided by API Marine is designed according to shipyards specifications as well as meeting the full requirement quality and reliability of modern shipowner as well as the requirements of all major Classifications Societies.

The API Marine Valve Remote Control System provides a centralized and single point of view of all valve and actuator positions as well the capabilities and full control over the operation of the actuator and valves.

The mimics of the system is “taylor made” to the specific vessel and its operations, and gives the client flexibility and ability to manage and control at the same time.

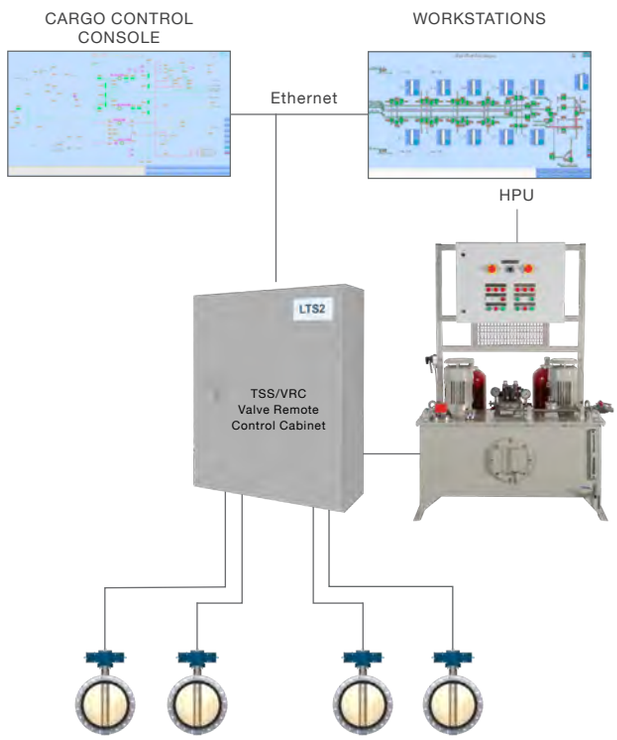
The Valve Remote Control System is fully integrated with the API Marine tank management system, and can be fully integrated with any shipyard specific tank management system.

System Configuration:

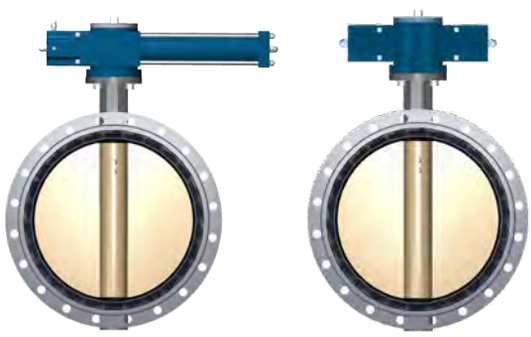
- Computerized Control / Operator Station
- Actuators and Valves
- Solenoid Valve Cabinet
- Hydraulic Power Unit

Main Functions:

- Compact and flexible solutions
- Fully compatible with API Marine, as well as most other tank management systems
- Modern hardware and software (mimic) for easy and flexible control
- Available with Hydraulic, Electro-hydraulic, Pneumatic and Electric actuators



Valves & Actuators



VALVE WITH SINGLE ACTING HYDRAULIC ACTUATOR

VALVE WITH DOUBLE ACTING HYDRAULIC ACTUATOR

Double Acting Hydraulic Actuator

Single Acting Hydraulic Actuator

SVC - Solenoid Valve Cabinet

HPU - Hydraulic Power Pack

Portable Hand Pump

Valve Remote Control System - Electro Hydraulic

The difference between the hydraulic and electro-hydraulic Valve Remote Control System is a compact electro-hydraulic power unit, that is mounted on the drives of valves. Therefore the system will not need any hydraulic piping.

The installation of electro hydraulic actuators and the compact design provides an easy and cost-saving installation.

The traditional hydraulic installation using extensive lengths of hydraulic piping needing intensive service and maintenance. The installation of an electro hydraulic Valve Remote Control System is done purely by standard electrical wiring

The compact unit consists of an electric motor, hydraulic pump and tank. Power units for various applications with different protection classes, hydraulic outputs and motor voltages are available. There are emergency terminals on the driver for manual operation.

The system could control the pumps such as fire pump, bilge pump, ballast pump, fuel transfer pump etc.

Valves can be operated directly from panel in control cabinet and/or from separate operator stations.

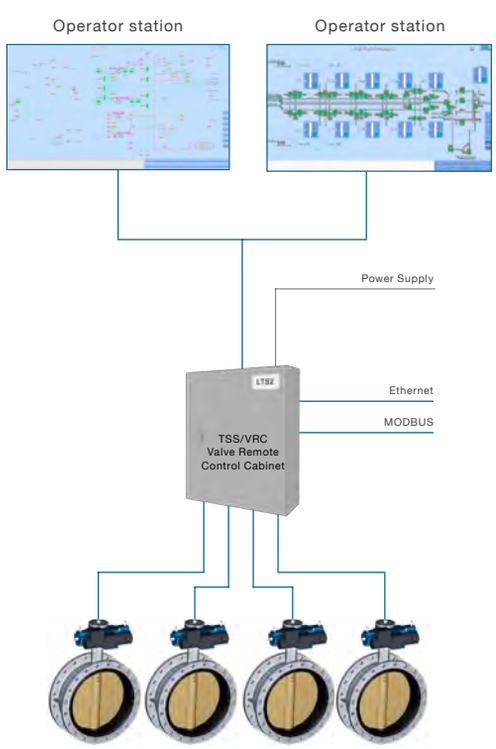
The API Marine Electro Hydraulic Valve and Remote Control system is an open source system making integration and interface to systems from

System Configuration:

- Computerized Control / Operator Station
- Control Cabinet
- Actuators and Valves
- Add-on Electro Hydraulic Power Unit for Actuator

Main Functions:

- Modular and flexible system – cost saving installation
- Electro hydraulic power – easy installation on API Marines standard actuators
- “Tailor made” mimic ensures shipowner flexible and easy operation of the entire system



ELECTRO HYDRAULIC
VALVES & ACTUATORS

Hydraulic actuators with add-on electro hydraulic power unit (UPU)

Electric Valve and Remote Control System

The Electric Valve Remote Control System consist of a series of electrical actuators that arewired together by CANBUS and / or MODBUS, and then connected to a control cabinet.

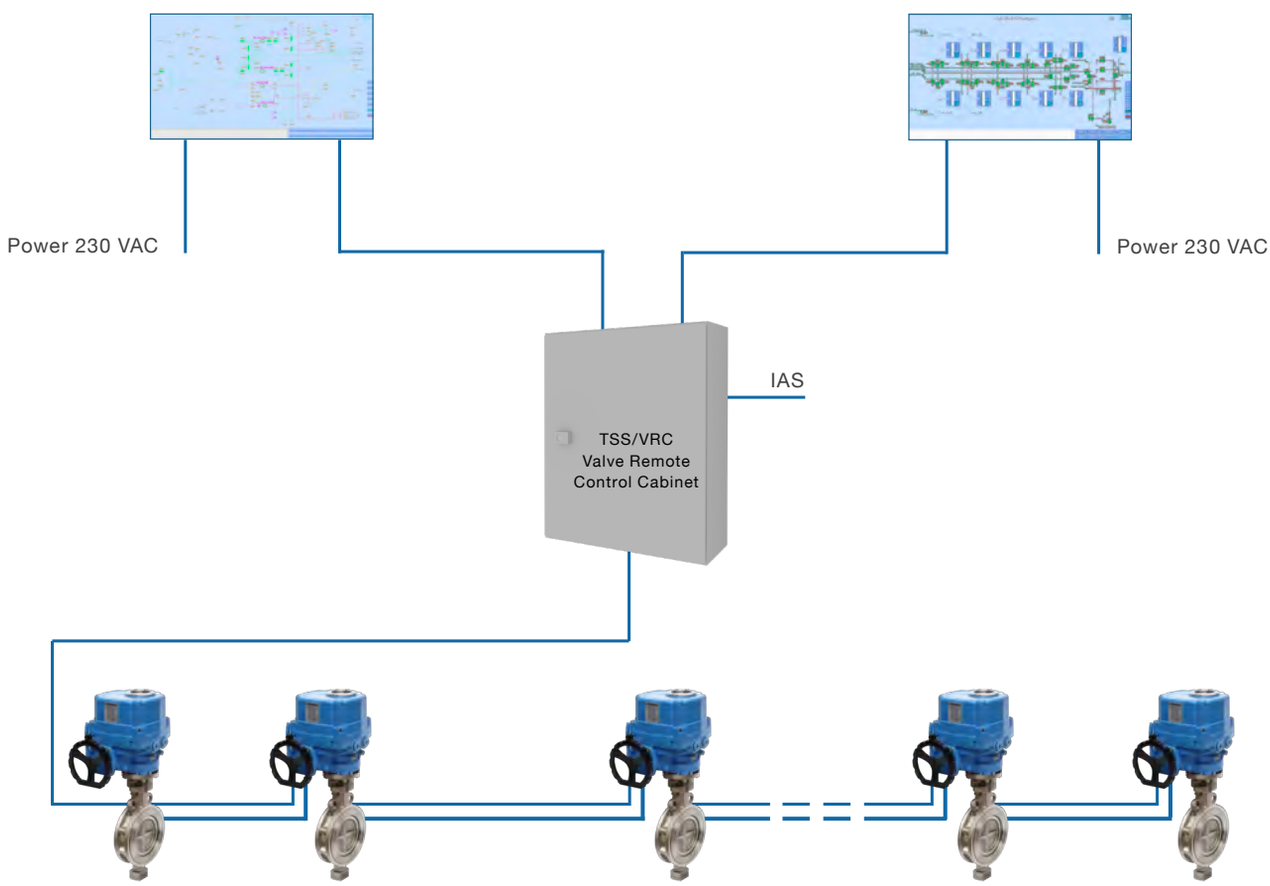
The system could control the pumps such as fire pump, bilge pump, ballast pump, fuel transfer pump etc.

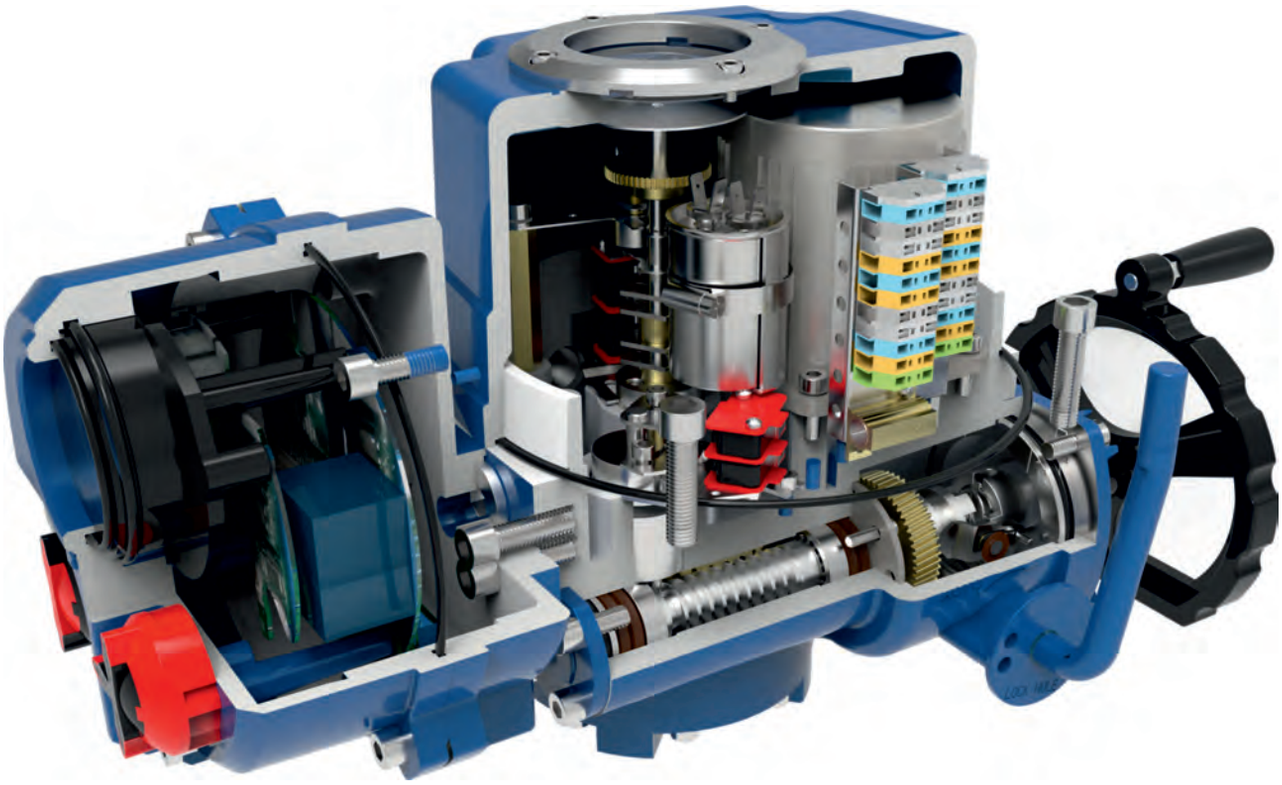
Valves can be operated directly from panel in control cabinet and/or from seperate operator stations.

The Electric Valve Remote Control System is ideal to meet cost effective and flexible requirements in the marine industry.

Main Functions:

- Individual configuration of actuator functions via CANBUS / MODBUS control
- Installation savings by cable loop design
- Space savings due to reduced cabinet dimensions





Actuator Enclosure

The anodized aluminum enclosure with powder coating is highly corrosion-resistant and explosion proof. Standard with IP67 protection and IP68 available as option.

Motor

Fully enclosed squirrel-cage motor with compact size, large torque, little inertia force and F class insulation rating. Built-in overheat protection switch avoids damaging of the motor.

Manual Handwheel

The compact and convenient handwheel would be used to operate the valve on/off when the actuator power off. Pulling the clutch to right side and then the handwheel could be operated (when the actuator power on the clutch would return to left side automatically).

Position Indicator

Installed on the top center for observing the position of valve. The convex lens design avoid condensation of the water.

Heater and Thermostat

To heat the actuator space in cold environment which let the actuator workable at a wide temperature range and protect the motor and the parts out of the damage.

Limit Switch

Both mechanical and electronic limit switch equipped. Mechanical limit screw is adjustable, safe and reliable.

Electronic limit switch SPDT controlled by the cam. Position of limit switch can be set accurately and conveniently by an easy adjustment.

Torque Switch

The built-in and preset torque switch provides overload protection (Except type UED-050/100) and to make the the valve and actuator out of damage by cutting off the power supply automatically when the valve is jammed.

Long Life and Maintenance Free

Precise worm gear transfer large torque efficiently with low noise (max. 50 dB) and long life. The self-lock function prevents inversion and insure stability and reliability. High effective lubricant oil has been filled in before the actuator dispatch, which keep the actuator running during the life circle.

Installation

The flange fitting the valve at the bottom of Electric Actuator meets ISO 5211 and DIN 3337 standard. The actuator can be installed vertically or horizontally.

Analog Signal and Bus Control

The analog signal and bus control offered by a separate module attached to the actuator by fixing screw with inner cable tunnel. Such design would be help for the control part out of the motor heat and electric interference.

Fail Safe

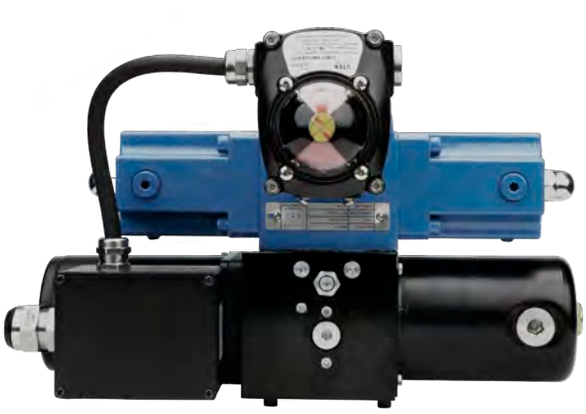
UED Series supply fail safe function as option that the actuator would be driven by a built-in battery to operate the valve open or close when the power off.

Actuators

Electric Actuators (UED)

Hydraulic Actuators (AVA)

Electro Hydraulic Power Unit (UPU)



Electric Actuators (UED)

UED Series Explosion-proof electric actuator is used for controlling quarter turn of the butterfly valve, ball valve and other types valve. It widely applies to marine industry as well as the other fields like petroleum, chemical, water treatment, paper making, power plant and etc. It can be driven by AC power or DC power, accept control signal of digital on/off or analog 4-20mA or 0-10V DC voltage signal and the bus control as option. It moves the valve to the right position by automatic control and the manual handwheel in emergency with maximum output torque 3000NM.

Main Functions:

- Individual configuration of actuator functions via CANBUS / MODBUS control
- Installation savings by cable loop design
- Space savings due to reduced cabinet dimensions

Hydraulic Actuators (AVA)

The hydraulic rotary actuator 90° quarter-turn AVA.HD series double acting and AVA.HS single acting designed and produced by API Marine to operate in the most severe environmental conditions, for a long life with minimal mechanical wear in way of bearings and anti-friction rings installed on rack and pinion.
The family of modular actuators is suitable for butterfly, ball and cock valves.

Main Functions:

- Unique and simple design
- Less footprint, less weight and lower
- Local position indication available
- Easy mounted to all quarter-turn valves
- Single acting with mechanical spring
- Any position mounting from horizon to
- Satisfies all requirements by major class
- Suit dry or submerged mounting

Electro Hydraulic Power Unit (UPU)

UPU series marine power unit is a cost effective solution designed specially working with UHD/UHS/AVA.HD hydraulic actuator double acting to apply in the quarter turn automation valves field. UPU series marine power unit could fit any other type hydraulic valve actuator with consideration on the matches of the hydraulic oil inlet and outlet location and the installation screws arrangement.

The electro-hydraulic actuators are a safety and compact solution due to their housing design where there is no need of tubing or hydraulic connections. The actuators consist in a closed hydraulic loop driven by a motor and hydraulic pump that through electric and hydraulic devices guide the oil to the desired position.
The basic function of the electro hydraulic actuators is to run the actuator electrically with a motor and hydraulic pump system to open / close the valve by quarter turn. Incase of failure of the power supply, the actuator would stay at the current position.

Main Functions:

- Specially designed for API Marina hydraulic actuators AVA type, but in general would be suitable for any type hydraulic actuator.
- Simple and economic construction
- Low maintenance cost
- Easy installation of the UPU to the actuator

API Marine Sensors

State-of-the-art sensors

The API Marine state-of-the-art range of sensors are designed and built to withstand the harsh environment and heavy conditions in marine applications.

The sensors are designed for precise measurements of level, temperature and pressure in most types of liquid.

All the sensors have a unique design with no electronics or moving parts inside the tank. This results in a longer lifespan with all sensors and transmitters being virtually service-free. Should there however be a need for maintenance – all critical and electronic parts can be accessed from outside the tank.

The majority of the API Marine sensors have “winterization” approval, and are as such ideal for application operating in the harsh arctic environment.

TGD SERIES

TGD™ Tank Gauging Device (Level, Pressure & 3 x Temperature)

TGD-R™ Tank Level Radar

TGD-L™ Tank Gauging Device (Level)

TGD-TP™ Tank Gauging Device (Temperature / Pressure)

LEVEL SWITCHES

UTS™ Ultrasonic Tank Switch

TLA™ Tank Level Alarm (95% / 98%)

TRANSMITTERS

UPT™ Universal Pressure Transmitter

UTT™ Universal Temperature Transmitter

Ultrasonic Tank Switch

The universal level switch UTS™ has an extended operating temperature range of –200°C to +450°C and is designed for level detection in cargo holds, wells and service tanks in sea and river ships, oil tankers, chemical tankers, gas carriers and offshore drilling platforms.

The Ultrasonic Tank Switch UTS™ is made of stainless steel and is used for level detection of liquids in vessel tanks, storage tanks, bilge water tanks and cofferdams, as well as for controlling water ingress into the vessel's compartments.

The operating principle of the UTS™ is based on a breakthrough patented acoustic wave technology, providing outstanding results in extreme operating temperatures. The accuracy of measurement is ensured regardless of the shape of the tank, type of liquid or liquid temperature.

The UTS™ is installed outside the tank/pipe with only a metal rod inside the tank/pipe. Acoustic waves in the metal rod created by a piezoelectric transducer ensure the transmission of signals. When liquid in the tank reaches the probe on the rod, the emission of sound waves is muffled.

Main Functions:

- Any type of liquid
- Only a steel rod inside the tank (electronics and connections outside)
- Fully welded construction
- No moving parts
- Extended temperature range
- No maintenance required
- Automatic self-test
- No calibration needed
- Explosion proof
- Pre-adjustable alarm points
- No sensitivity to foam
- More than 300 possible variations

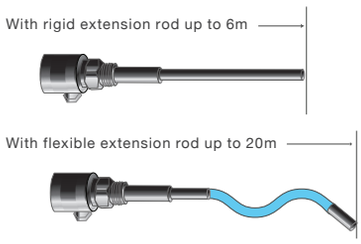
This change is picked up by the piezoelectric transducer and a signal is transmitted to the corresponding alarm. Having only the metal rod inside the tank and no mechanical or moving parts means no maintenance is required.

The UTS™ can be easily installed in vertical, horizontal or any inclined position and is tested for operation in a wide range of media, such as water, oil, petroleum, petrochemicals, acids and wastewater, as well as many others. Made of high-grade stainless steel, the UTS™ can also be used in tanks and reservoirs with food products.

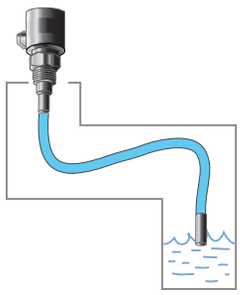
The UTS™ can be installed indoors, as well as outdoors, including explosive environments and harsh arctic conditions.

The UTS™ is characterized by a high resistance to sticky products, high robustness and shock resistance and increased reliability under dynamic load and vibrations due to a reinforced rod and electronic unit of new generation. The UTS™ is also supplied in a special "Arctic" version, for applications in harsh environments with ambient temperature of down to –60°C without heating the device.

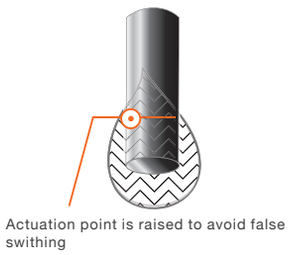
UTS - Extended length



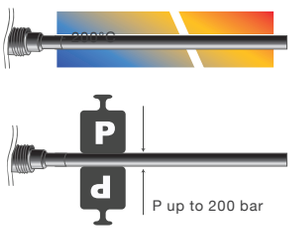
Wide length range



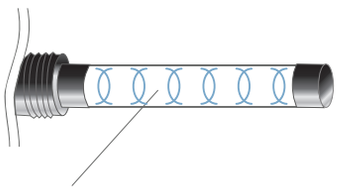
Possibility to bend



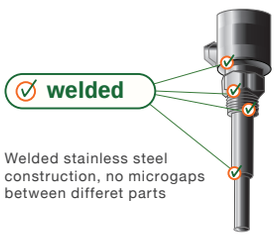
Resistance to sticking



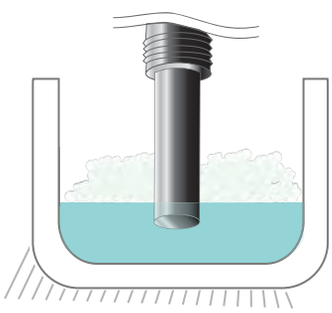
Wide temperature and pressure range



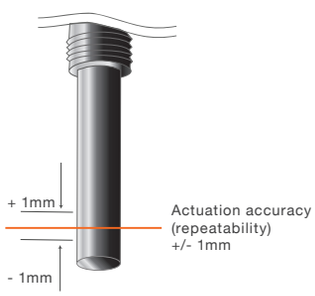
High reliability - no moving parts



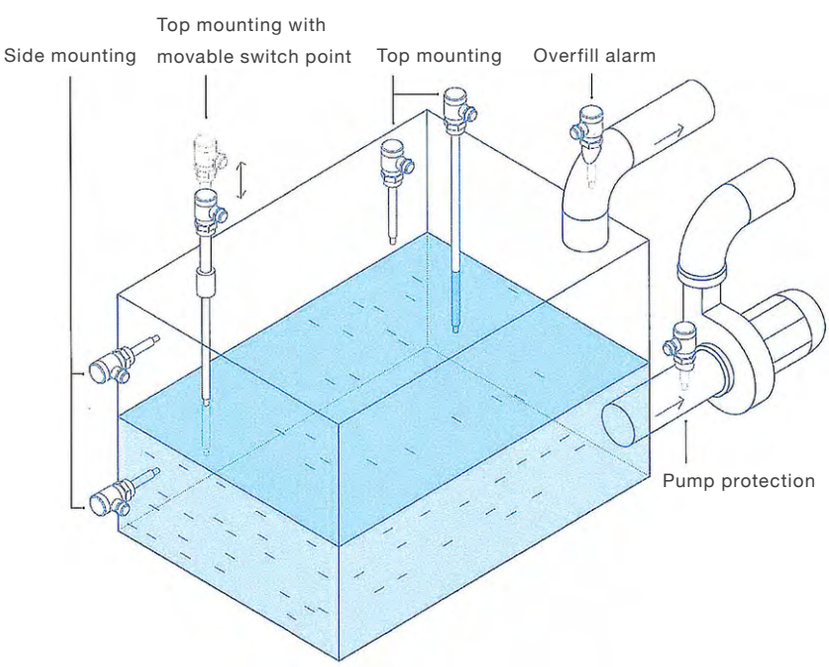
Reliable construction ensures safe application in harsh environments



No sensitivity to foam



High accuracy (repeatability)



Tank Level Alarm

The TLA™ (Tank Level Alarm) is used for the detection of high (95%) and high-high (98%) levels in tanks. The TLA™ is installed on the deck of tankers, gas carriers, floating storages, FSO, FPSO, onshore storage tanks for oil, petroleum products and liquefied gases.

Built on the same patented acoustic wave technology as UTS™, TLA™ features a high level of accuracy, reliability and customizability.

The TLA™ represents a two-point level switch with alarm levels defined by the length of rods, which are produced on request. Built-in test buttons are used for performing a functionality test before filling the liquid, in accordance with the requirements of classification societies. Being highly adjustable to customer's requirements, the TLA™ can also be supplied as a three-point version.

Main Functions:

- Works with any type of liquid and liquefied gas
- Easy installation
- No maintenance
- No moving parts
- No electronics inside the tank
- No sensitivity to vapour, moisture and foam
- Automatic self-test
- Lengths on request
- Only steel a rod inside the tank (electronics and connections outside)


NO SMO G
MOSCOW STARS

Tank Level Radar

The API Marine Tank Radar is especially designed for marine applications. The tank radar is a very compact solution with measuring range up to 35 meters. It can be delivered with flange size of DN80 and as such with small on-deck space requirements.

The tank radar is very easy to install and service friendly with easy access to main electronics from the main housing without having to access or open the tank. For ease of service and set-up the radar has the possibility for all necessary settings and adjustments through the main electronics. The tank radar provides a standard analogue output of 4-20mA to the control cabinet. The radar also has a built-in view glass which at all times gives the current level in the tanks.

The radar level transmitter antenna emits narrow pulses, which will be transmitted via the antenna. The micro wave will be reflected at the surface of a medium. The reflected wave will be received by the antenna system and fed into the electronic circuit, which automatically turns it into a level signal.

Measuring reference is the bottom surface of threads or the sealing surface of a flange.

Main Functions:

- Applicable for oil, product & chemical tankers
- Non-contact measuring, no wear and tear
- High accuracy
- Customized variations
- Easy installation & maintenance
- Measuring range 0-35m

TGD-R96™

Tank Gauging Device (Temperature)

TGD-T™ is a high-accuracy multipoint (up to 15 measurement points) temperature sensor, which can be used in almost any type of liquid.

As standard, the TGD-T™ is manufactured in stainless steel with an ingress protection of IP67. It consists of housing with a built-in multiplexer and a flexible temperature probe with up to 15 PT-100 thermometers inside the probe.

The measurement accuracy of the TGD-T™ is 0.15°C when using DIN A class resistance thermometers.

TGD-T™ ensures accurate measurements of average product temperature even when there is a vertical temperature gradient in the tank.

TGD-T™ is ATEX approved and can be directly mounted in hazardous areas. The multipoint solution is easy to install with a minimum of cables. The length of the temperature probe and the layout of the thermometers can be based on customer requirements and request.

Main Functions:

- Precise and reliable measurement in any liquids including aggressive media
- Wide temperature range (from -200 to 850°C)
- HART® 2-wire connection
- Less cabling – only 2 wires
- Up to 15 measurement points
- Easy installation (flexible probe)
- Easy maintenance
- Compact unit
- Any length on request

Universal Pressure Transmitter

The UPT™ (Universal Pressure Transmitter) is used for the measurement and detection of the pressure in tanks and pipeline installations onboard or ashore, for level measurement (hydrostatic method) in service, ballast and slop tanks, as well as for draught measurement.

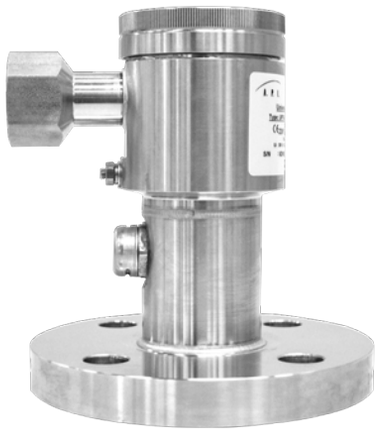
The housing and membrane of the UPT™ are made of stainless steel. The UPT™ can be supplied with various types of flange and thread connections, including a special extension for installation on top of tanks and reservoirs.

Special attention has been given to meeting demands for a high level of enclosure, robust, compact construction and resistance to shock and vibration where conditions of high overload and temperature variation are common.

The UPT™ is specially designed for IP68 applications and it meets the highest standards and extended requirements for arctic and cold climate operation within industrial equipment, marine and off-shore applications.

Main Functions:

- General purpose pressure transmitters
- Easy installation
- Customized solutions
- Superior performance
- Application versatility
- Plug-in electronic module



Universal Temperature Transmitter

The Universal Temperature Transmitter (UTT™) is used for the temperature measurement of various media – water, oil, petrochemicals, acids, alkalies, gases and steam.

The UTT™ is characterized by a reinforced housing manufactured in stainless steel and the option of open-air installation.

The option of ordering the sensor with the required probe length, with or without a thermowell, in explosion-proof or standard construction, with any thread or flange connection makes the UTT™ the most convenient solution for most ship applications.

Main Functions:

- General purpose pressure transmitters
- Easy installation
- Customized solutions
- Resistant to aggressive media
- Resistant to temperature drop
- Easy connection to most interfaces

Tank Gauging Device (Level) / (Level + Pressure)

The TGD-L™ level sensor is a non-contact level gauge that has been developed for measuring the level of liquids, slurries and sludge including solvents, acids and caustics, waste chemicals, oils, liquefied natural gas, liquefied petroleum gas, food products and most water based solutions. TGD-L™ uses the patented principle of Guided Low Frequency GLF™ wave propagation, which allows for equally precise measurement accuracy along the tank height for any shape of tank and at nearly any conditions in the tank.

The principle of operation of the TGD-L™ is based on the emission of an impulse acoustic signal to the liquid surface and receiving the signal reflected from the surface. The level in the tank is calculated based on the measured signal transit time to the surface of the liquid and back. The level in the tank is measured by using a number of reference reflectors, located along the height of the tank.

To avoid a negative influence from other acoustic signal reflectors in the tank, the acoustic signal is guided in a steel pipe going all the way down to the bottom of the tank. The tank geometry and objects inside the tank, such as ladders, heating pipes, etc., do not affect the signal. Reference points are located along the pipe.

The level sensor system includes a receiving and emitting unit (antenna), a system of reference reflectors located between the antenna and the liquid's surface, an electronic unit and a processing unit. The antenna emits an acoustic signal to the surface and receives signals reflected from the liquid surface, as well as the reference reflectors. A processing unit can then calculate the distance to the liquid

surface based on the 2-wire output signals enhanced by an amplifier circuit of the electronic unit.

TGD-LP™ is a TGD-L™ level sensor with a pressure sensor installed in the same housing. The pressure sensor is used for measuring the tank pressure in the tank.

The TGD-LP™ with level gauging device and pressure transmitter combined into one sensor has the advantage of only one deck penetration as well as only one cabling form the combined sensor to the control cabinet/system saving both time and installation cost. The sensor can be easily serviced and maintained from the sensor housing without the necessity to the tank.

The sensor can be easily serviced and maintained from the sensor housing without the necessity to access the tank.

Main Functions:

- Non-contact level gauge with high accuracy
- Automatic self-calibration every 2 seconds
- HART® 2-wire connection
- Less cabling – only 2 wires
- Compact unit
- Customized variations
- Easy maintenance

- Wide pressure measurement range -1 to 40 bar
- Non-contact level gauge with high accuracy
- Automatic self-calibration every 2 seconds
- HART® 2-wire connection
- Less cabling – only 2 wires
- Compact unit
- Customized variations
- Easy maintenance

Tank Gauging Device

TGD™ (Tank Gauging Device) is a multifunctional deck sensor designed for the simultaneous measurement of level, temperature (up to 3 points), pressure and density (option) in the cargo tanks of tankers, gas carriers, floating storages, FSO, FPSO, offshore drilling and fixed platforms, onshore oil, petroleum products and liquefied gas storage tanks.

Depending on the application type, the TGD™ can be supplied as a 1-channel (level or temperature measurement), 2-channel (level + temperature; temperature +density), 3-channel (level, temperature and pressure/density) or 4-channel version (level, temperature, pressure and density).

The operation principle of the TGD™ is based on the patented principle of Guided Low Frequency (GLF™) wave propagation, which allows for equally precise measurements along the tank height of any shape of tank and type of liquid.

The TGD™ series provides highly reliable and accurate measurements of all parameters. Based on its use of acoustical wave technology for level, it eliminates many of the limitations inherent in other methods of level measurement.

Operating principle and features of GLF™ Technology

- GLF™ technology measures the difference in density between air and liquid
- Tank geometry and objects inside the tank, such as ladders, heating pipes, etc., do not affect the signal
- GLF™ technology ensures equal measurement accuracy of the whole tank – from top to bottom
- Automatic calibration with high accuracy every 2 seconds
- GLF™ technology is not affected by foam
- GLF™ technology means a lower number of sensors have to be installed in the tank
- Flexible solution with the possibility for the waveguide to be bent/curved

Main Functions:

- Automatic calibration
- High level of accuracy
- Less cabling – only 2 wires
- No moving parts – longer lifetime
- Flexible and easy installation
- Explosion proof

Electronic Inclinometer

The SEANET Electronic Inclinometer is an advanced roll and pitch measuring device which is not sensitive to horizontal and vertical accelerations. This will provide information to a better understanding of the ship's movement and steering behavior, supervision of trim, cargo status and stability status.

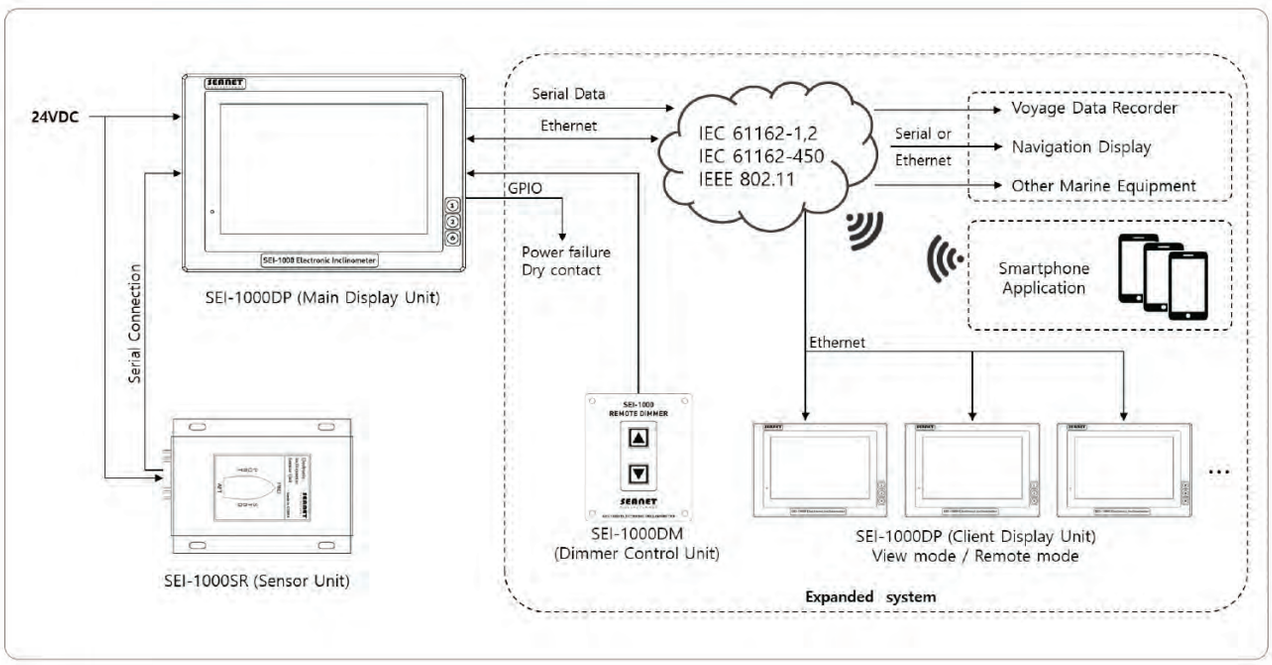
KC approved / IEC60945 EMC test passed

Main Functions:

- Roll-Pitch Angle, STBD-PORT Angle
- Selectable 3 display view mode (Main, Antique, Simple)
- Touch control panel
- Optional remote dimmer control unit
- Simplified operation
- Provides multiple interface system (IEC61162-1/2/450, Ethernet)
- Provides smart-phone App (only Android OS)

Electronic Inclinometer

System Configuration



API2002 UTI Portable Ullage Temperature Interface Gauging Device (Gas-Tight Type)

API2002 UTI is a gas-tight portable gauging system designed to measure ullage, oil/water interface level, and temperature in single operation.
It is used for tank level measurement on marine vessel.

Main Functions:

- Great accuracy and durability
- User friendly
- Tape cleaning function and tube protection
- Closed system (gas-tight)
- Modular design and low maintenance cost
- Designed for hydrocarbons and corrosive liquids application (oil/chemical tankers)

System Specification:

- **Ambient Operating Temperature**
  -20°C (minimum) to 50 °C (maximum)
  (-4°F to 122°F)
- **Ullage Measurement**
  Tape 30m ±1.5 mm (100ft ±1/16'')
  Minimum detectable liquid (bottom of tank), 4mm
  Maximum tank pressure 0.3 bar
  Metric or Inches reading
- **Oil/Water Interface**
  Display and audible indication with ±2mm accuracy
- **Temperature Measurement**
  -40°C to 70°C ± 0.2°, selectable °C or °F
  (-40°F to 158°F)
- **Battery**
  Duracell MN1604 9V Alkaline Battery
- **Weight and Dimensions (Device only)**
  Net weight of device: Approximately 5kg
  Net dimensions of device:
  Approximately 625mm x 260mm x 150mm


SHT2002 UTI METER
Ullage | Air/Oil/Water Interface | Temperature
30M
Buzzer:
Air - Uniform
Oil - Continuous
Water - Intermittent
Temperature - 40°C ~ 70°C
ON
OFF
Enter/ Exit
Menu/ Return
Select
Backlight
Buzzer Mute
Exia IIB T4 Ga (-20°C ≤ Ta ≤ 50°C)
Use only DURACELL MN1604
Sea Hover Technologies
www.seahover.com
SAFETY
Unlock
Clean Tape
BELIZE

Portable Sounding Device

Portable Sounding Device – for easy, quick and accurate measurement of liquid substance with high transparency and low connectivity for a broad range of applications.

API Marine Portable Sounding Device is a stand-alone device, that complies with IMO's new ship exhaust gas regulations as of January 1, 2020, in order to accurately measure the level to liquid in a tank.

API Marine Portable Sounding Device consist of a highly advanced and reliable sensor that streamlines the process of level measurement of the liquid in tanks, but also accurate measurements of bunkered oil in case of cappuccino bunker.

With API Marine Portable Sounding Device, you will be able to determine the distance from the point of measurement to the surface of the liquid with high accuracy as an alarm will sound when the liquid sensors comes into contact with the liquid inside the tank.

Operation Principle

API Marine Portable Sounding Device was developed to realize portable tank sounding with an ultrasonic sensor. When ultrasonic sensor tip is covered with liquid, an ultrasonic signal is sent through a measuring tape to the main unit, and a buzzer/a lamp in the body are activated at the same time. Then a level between a tank top and a liquid surface (ullage) can be measured by reading figures on a measuring tape.

Advantages

- No sensitivity to foam
- Short measuring time (ullage measurement)
- Possible to detect transparent liquid
- Portable type
- Weight : 1.36kg
- Compact size

Specifications

- Power Supply: 9V alkaline battery (Type 006P JIS/IEC 6LR/61 6LF/22)
- Sensor Accuracy: ± 2mm
- Sensor Material: SUS316L
- Measuring tape: Length(30m), Material(Glass fiber)
- Ambient temperature: -20~70°C
- Working temperature: -20~70°C
- Body Material: ABS

Fuel Tank Level Measurement for marine

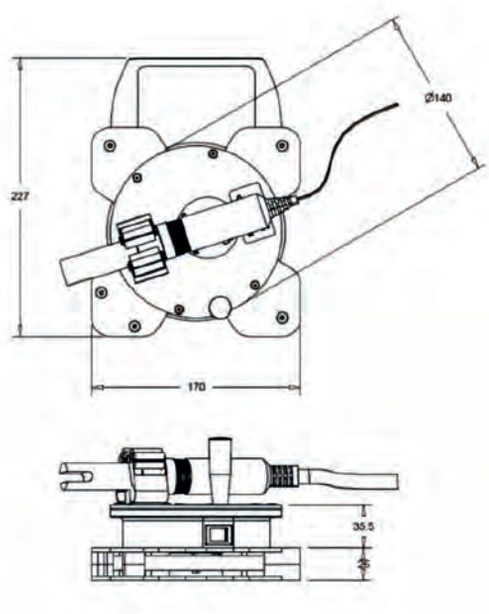
Ballast Tank Level Measurement (for marine)

Marine Draught Measurement

Inclining Experiment (for marine)

Well Water Level Measurement

River Water Level Measurement



Advantages

Portable type

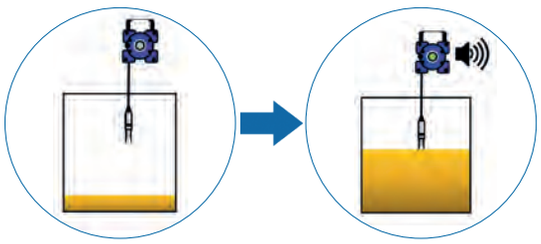
External power source is not necessary (9V battery)

Glass fiber type measuring tape

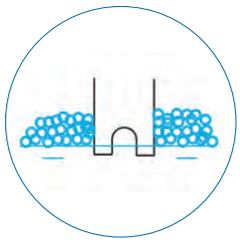
- Strong (Breaking load: abt. 1765N)
- Small expansion by change of temperature (abt. 0.15mm/°C)

Short measuring time (75% shorter than conventional type)

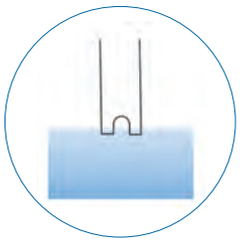
Overflow prevention



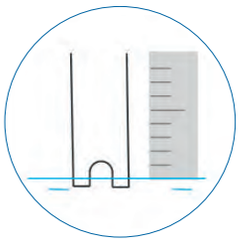
No sensitivity to foam



Possible to detect transparent liquid



High accuracy (±2mm)



As of January 1, 2020, the IMO (International Maritime Organization) will put into effect new regulations on sulfur oxide in maritime exhaust gas, in which the limit on sulfur oxide content in fuel oil that is mainly for maritime use will be changed from 3.5% to 0.5%

In complying with the new regulations, there will be an increasing number of cases in which high transparency and low viscosity compatible fuels such as MGO are supplemented.

In these cases, as is shown in the photo at right, there has been concern with conventional scales due to past experience measurement of tank contents.

< C Heavy oil>

<MGO>

With state-of-the-art technology we bring efficiency to our customers

API Marine is a house of competence, where development, design and production processes are united in unique solutions for advanced tank control. Complete liquid cargo control systems can be supplied – from sensors in the tank and operators' stations to the calculation software, all fulfilling IMO requirements. API Marine is certified according to ISO 9001:2015 and our products carry the ATEX PQAN approval.

We want to contribute to our customer's profitability by supplying high quality products, excellent service and state-of-the-art high-tech solutions, where reliability and durability are keywords!

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