



SHIP AUTOMATION SYSTEMS AND THEIR COMPONENTS

Product Catalog



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ABOUT THE COMPANY

Valcom is the only Russian developer and manufacturer of high-precision intelligent sensors and integrated automation systems for specialized vessels, bulk carriers, tankers and LPG/LNG gas carriers

The company's products are used in shipbuilding, military industrial complex, oil and gas and petrochemical industry, nuclear and thermal energy industry.

The company develops, designs and manufactures automation systems, sensors, marine electronics, supplies and puts into operation equipment at shipyards of Russia and the world. Valcom's products are approved for use in the most critical industries, including explosive and special industries.

Valcom manufactures and installs equipment for tankers, gas carriers, offshore oil and gas terminals, onshore oil storage facilities, offshore drilling platforms, floating docks, icebreakers, navy ships and vessels and other complex facilities.

Among the company's clients are the largest Russian shipbuilding companies and shipping companies.

The established network of representative offices allows delivering the equipment quickly worldwide — in the Western market, the equipment is manufactured and served by the Danish API Marine company under the license of Valcom.





PRODUCTION CAPACITY



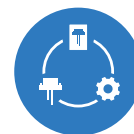
Research Center

The company develops and improves the created automation systems and sensors, which ensures high reliability of the systems.



Own Production

Production facilities of Valcom cover an area of 10,000 m² and have the necessary equipment to produce the full range of products.



Full Cycle of Works

The company carries out a full cycle of works on equipment with sensors and automation systems, from development to putting into operation.



Confirmed Quality

Valcom's products have been approved by the Russian Maritime Register of Shipping and the Russian River Register. The Quality Management System complies with ISO 9001-2015.



Operational Efficiency of Supply

Own production allows delivery within the shortest possible time.



We Work all over the World

Abroad, the equipment is produced and serviced by the Danish company API Marine under the license of Valcom.

EQUIPMENT BY VALCOM

Overview Layout

Valcom develops and manufactures automation systems and their components. All equipment can be either purchased separately, or a comprehensive project of ship automation system can be ordered

Ship Automation Systems

TSS/Cargo

Remote Control and Bulk Carrier Handling Operations Monitoring System

TSS/Cargo Gas

Cargo Operations Control System for LPG, LNG Gas Carriers

TSS/Alarm

95/98% Loading Alarm System

TSS/Alarm-T

Cargo Tank Temperature Control System

MasterLoad

Stability, Strength, Subdivision Calculation System

TSS/Watch Alarm

Deck Officer Ability Control System — DOACS

TSS/Bridge Alarm

Integrated Warning Alarm and Communication System — IWACS

ERPAMS

Engine Room Personnel Ability Monitoring System

TSS/Control

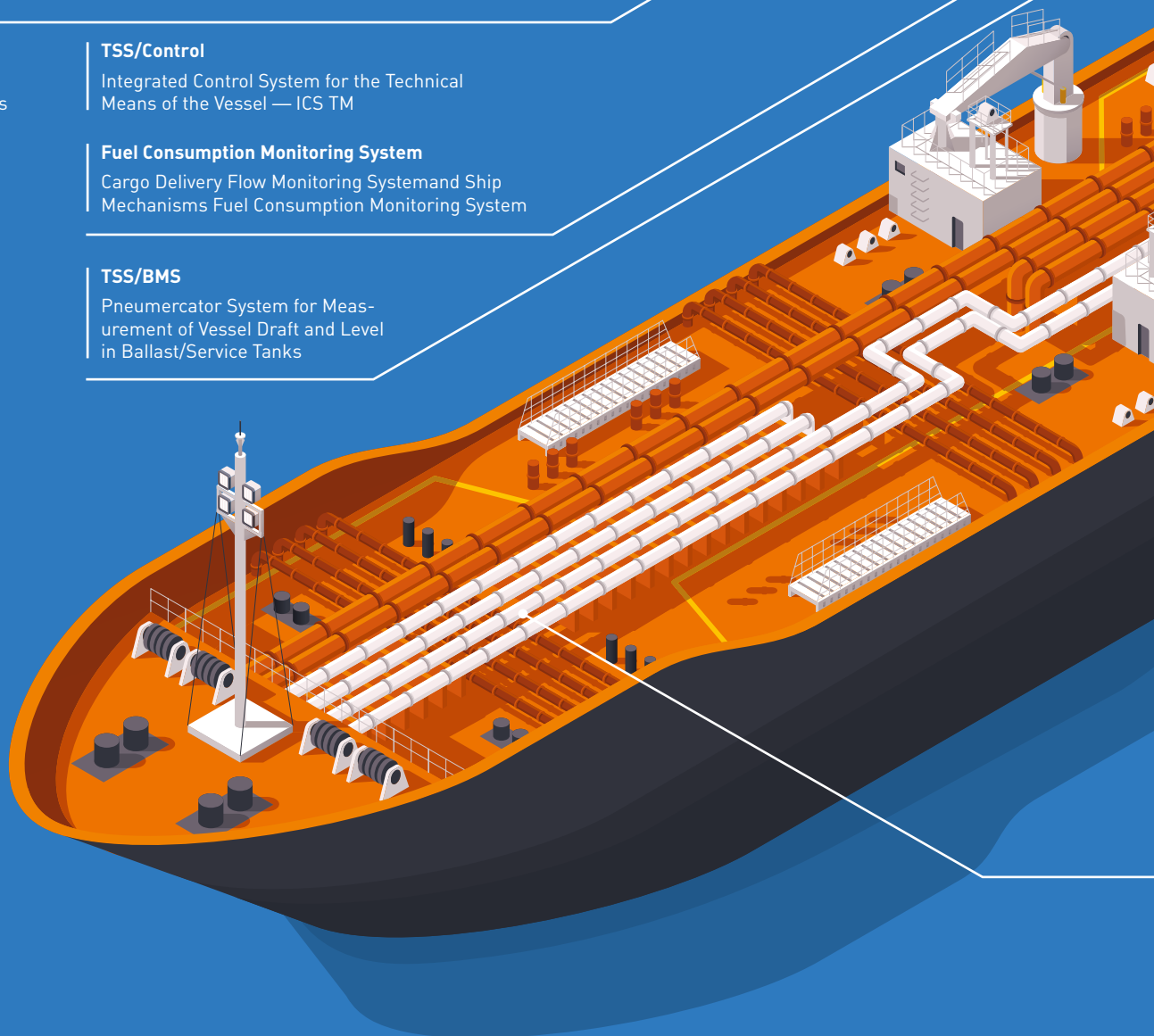
Integrated Control System for the Technical Means of the Vessel — ICS TM

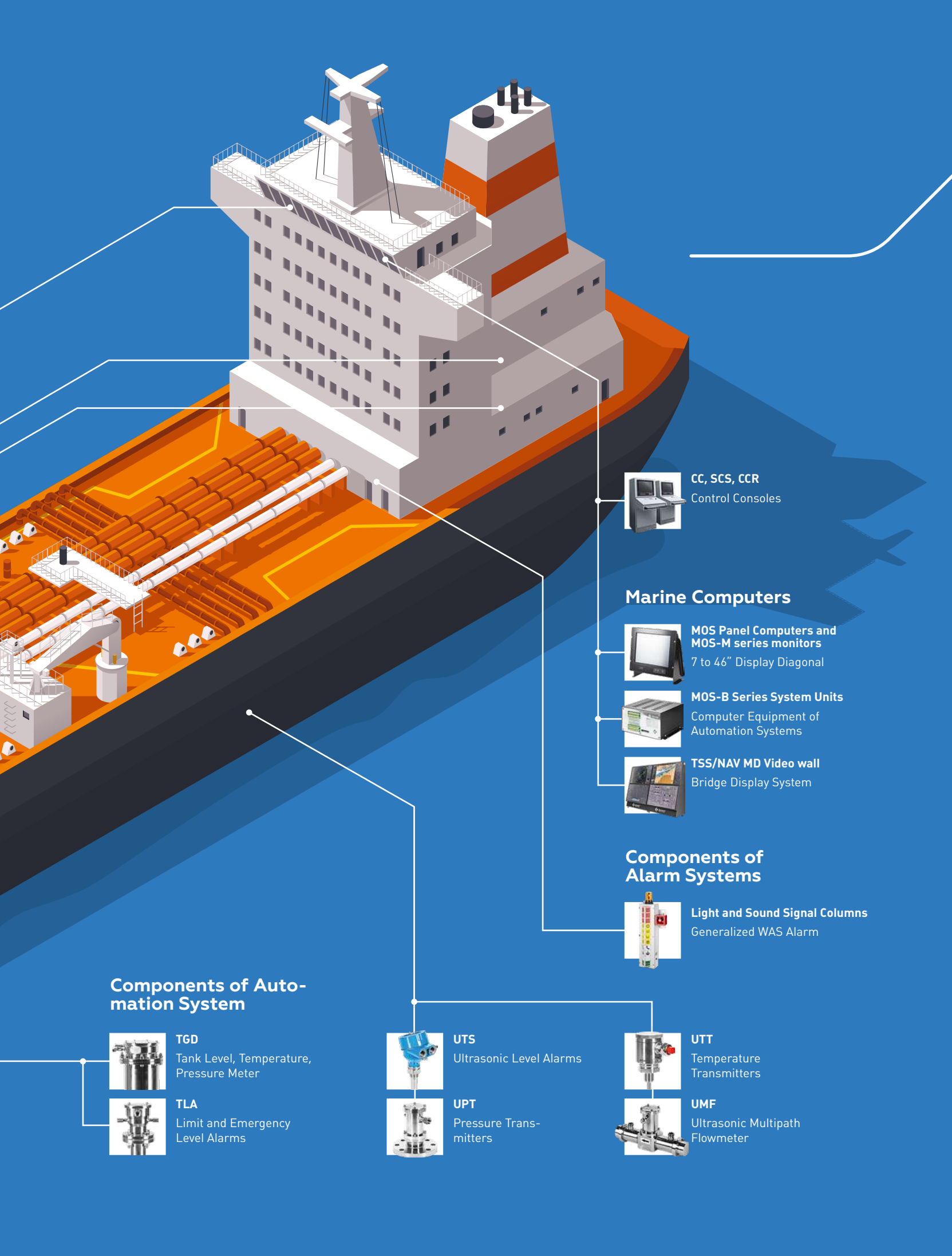
Fuel Consumption Monitoring System

Cargo Delivery Flow Monitoring System and Ship Mechanisms Fuel Consumption Monitoring System

TSS/BMS

Pneumercator System for Measurement of Vessel Draft and Level in Ballast/Service Tanks





CC, SCS, CCR
Control Consoles

Marine Computers



MOS Panel Computers and MOS-M series monitors
7 to 46" Display Diagonal



MOS-B Series System Units
Computer Equipment of Automation Systems



TSS/NAV MD Video wall
Bridge Display System

Components of Alarm Systems



Light and Sound Signal Columns
Generalized WAS Alarm

Components of Automation System



TGD
Tank Level, Temperature, Pressure Meter



TLA
Limit and Emergency Level Alarms



UTS
Ultrasonic Level Alarms



UPT
Pressure Transmitters



UTT
Temperature Transmitters



UMF
Ultrasonic Multipath Flowmeter



SHIP AUTOMATION SYSTEMS

TSS/Control • TSS/Control Docking • TSS/Cargo • TSS/Cargo Gas •
TSS/Alarm • TSS/Alarm-T • Fuel Consumption Monitoring System •
TSS/BMS • MasterLoad • DOACS • TSS/Watch Alarm • TSS/Bridge Alarm



TSS/CONTROL

Integrated Control System for the Technical Means of the Vessel (ICS TM)

TSS/Control is designed for installation on any types of vessels — tankers, bulk carriers, gas carriers, barges, floating docks, off-shore platforms, etc.

The system provides monitoring of operation of machines and mechanisms, warning alarm system (WAS) and monitoring of the following mechanisms and systems:

- ballast-drainage system;
- compressed air system;
- fuel system;
- wastewater system;
- utility and fresh water system;
- ventilation and air conditioning system;
- electric power system (EPS) and diesel generators (DG);
- main engines (ME);
- other.

The integrated monitoring, control and alarm system performs the following functions:

- acquisition, processing and transfer of information on main power plant, power plants, EPS and optical tracker;
- control of technical means (remote and automatic), including emergency protection of mechanisms and plants monitored by the system;
- signaling of operation, malfunctions and changes in operating modes of mechanisms and plants, on reaching limit values by controlled parameters (WAS);
- generalized warning alarm system (GWAS) in control rooms, cabins, service and public premises and group warning alarm system with output to light and sound columns;

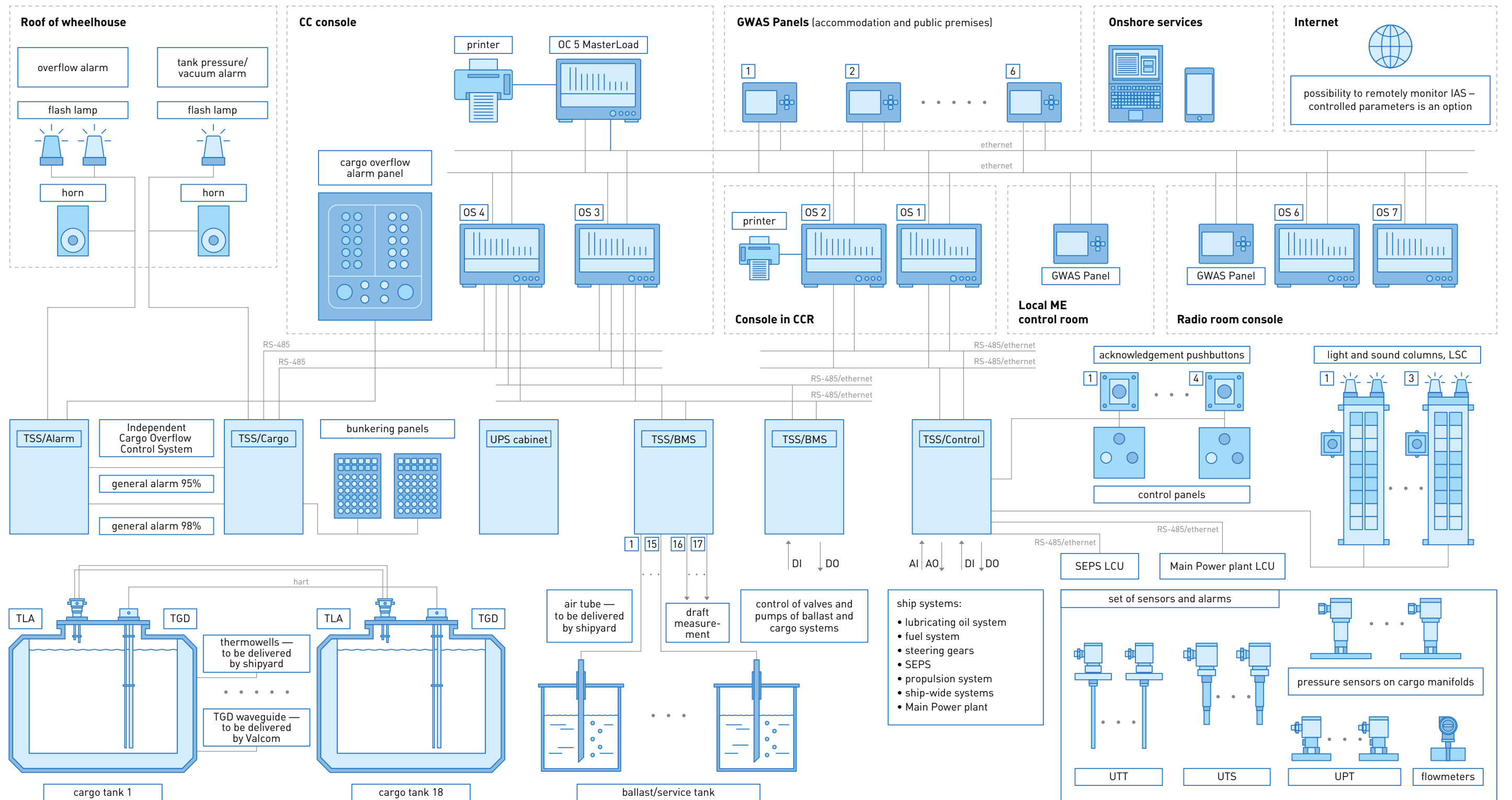
- presentation of information to the operator on screens of operator stations, light boards and other means of information display;
- locking of alarm for disabled mechanisms;
- data transfer to the voyage data recorder;
- monitoring of engine room personnel ability;
- call of watch mechanical engineer;
- self-monitoring of the system;
- WAS history storage;
- construction of trends in real time and for a certain period of time;
- possibility of appointment of watch mechanical engineer;
- monitoring, WAPS and ballast system control;
- monitoring of remotely controlled valves;
- monitoring of ship mechanism fuel consumption;
- other functions upon request of the customer.

TSS/Control (ICS TM) is a distributed redundant computing system built based on modern equipment and industrial automation.

The system has a type approval certificate of the Russian Maritime Registry of Shipping (RS) and is based on components of own production — computers, controllers, sensors, also having approval of the RS and the Russian River Register (RRR).



Flow chart of TSS/Control system





TSS/CONTROL DOCKING

Overview Diagram

MasterLoad

Stability, Strength, Subdivision Calculation System

ERPAMS

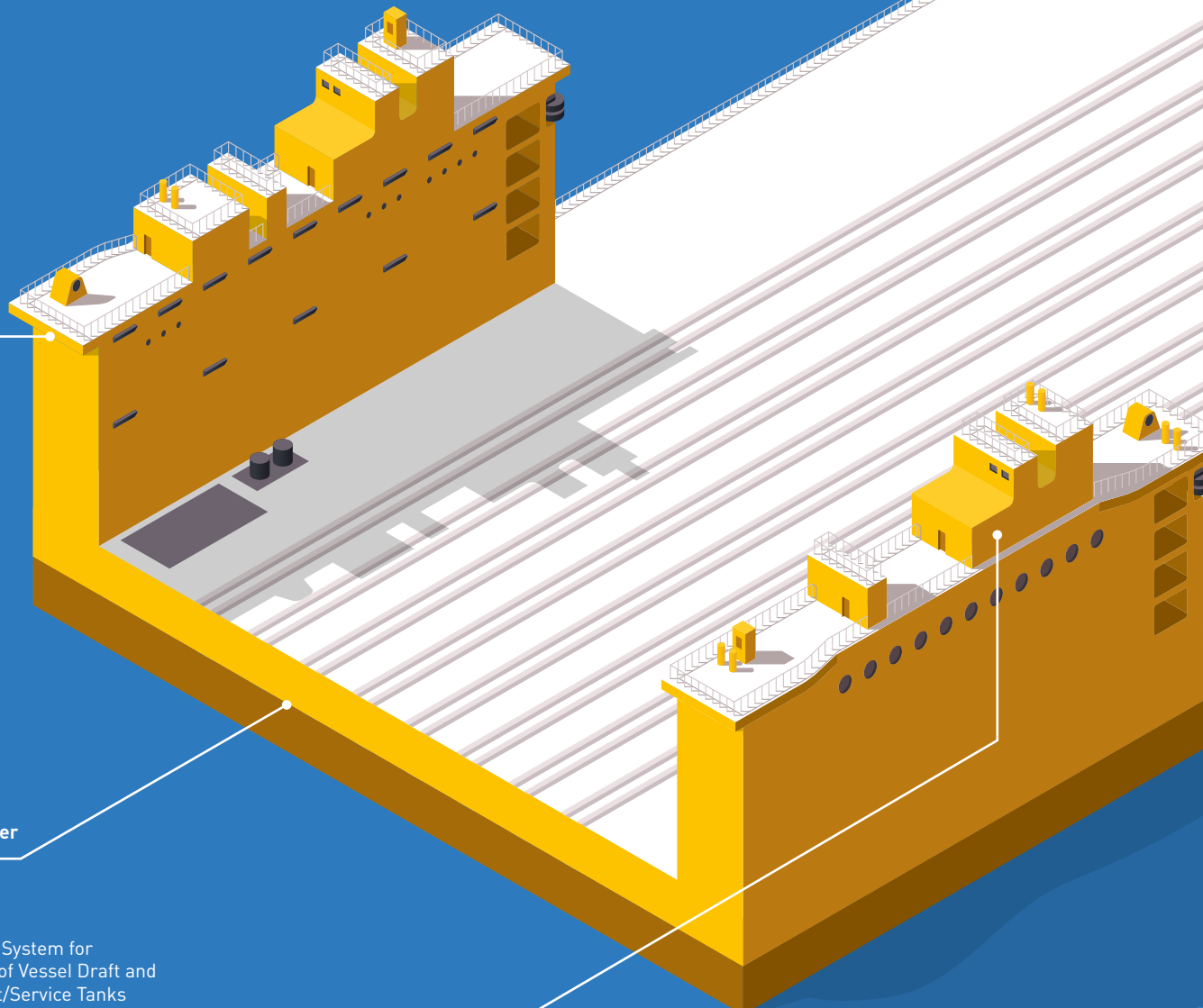
Engine Room Personnel Ability Monitoring System

TSS/Control

Integrated Control System for the Technical Means of the Dock — ICS TM

Fuel Consumption Monitoring System

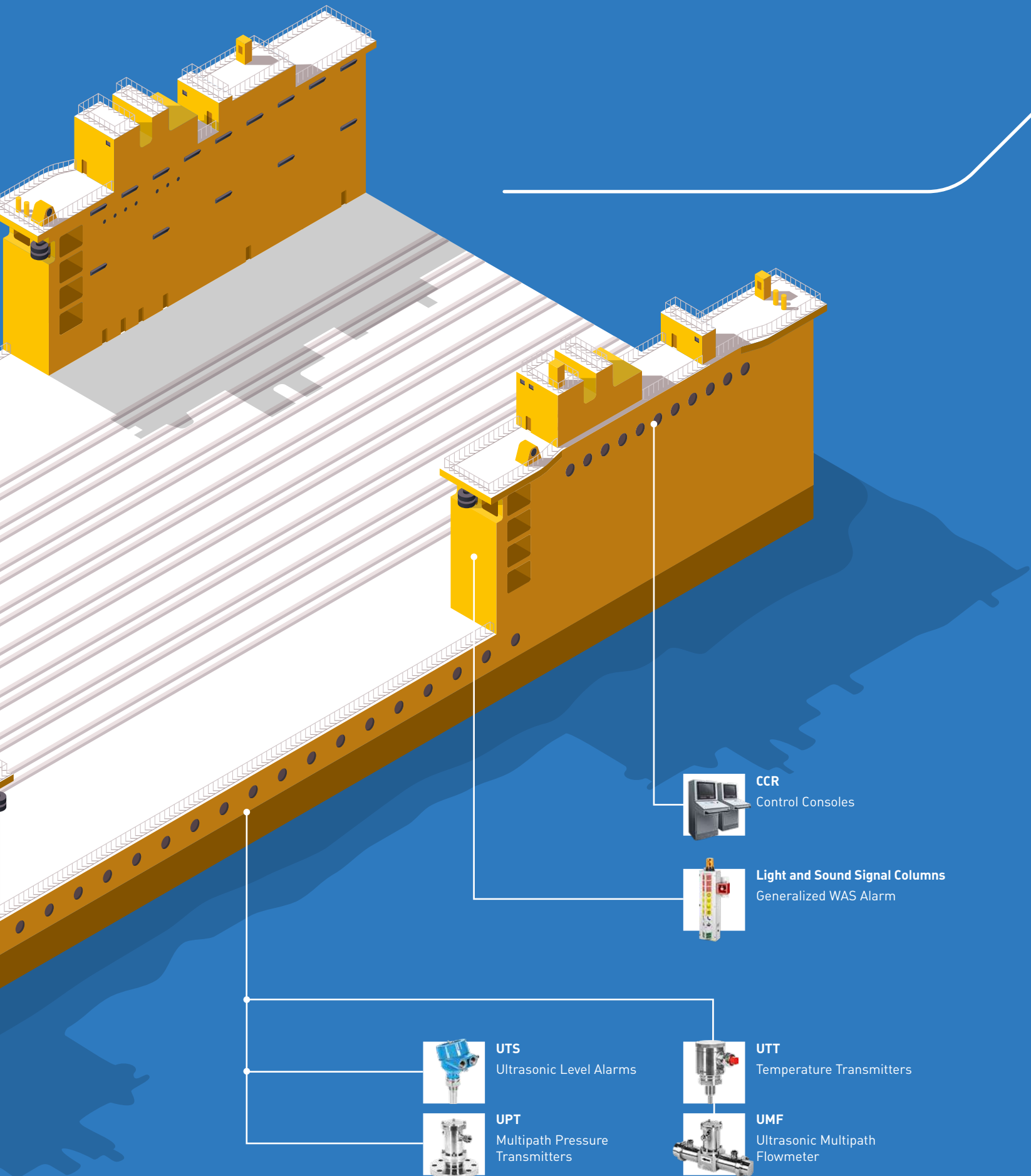
Cargo Delivery Flow Monitoring System and Ship Mechanisms Fuel Consumption Monitoring System



Hydraulic deflection meter

TSS/BMS

Pneumercator System for Measurement of Vessel Draft and Level in Ballast/Service Tanks



CCR
Control Consoles

Light and Sound Signal Columns
Generalized WAS Alarm

UTS
Ultrasonic Level Alarms

UTT
Temperature Transmitters

UPT
Multipath Pressure Transmitters

UMF
Ultrasonic Multipath Flowmeter

TSS/CONTROL DOCKING

Monitoring and Control System of Technical Means for Floating Docks

TSS/Control Docking system is a modification of TSS/Control system and is designed for installation on floating docks.

The system provides for control over technical means, control over submersion/surfacing, positioning of an object in the dock, as well as WAS alarm, stability and strength monitoring.

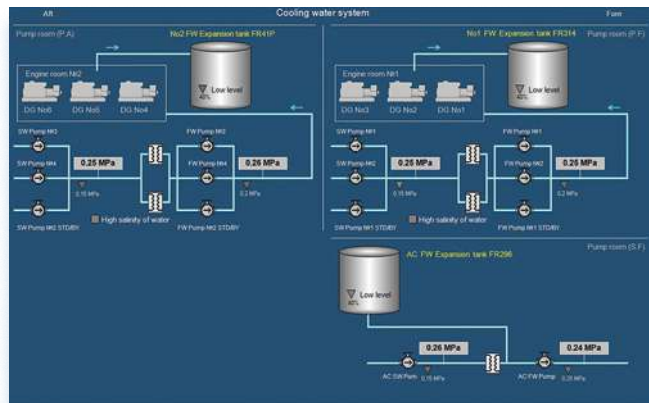
In addition to the standard features of TSS/Control system, TSS/Control Docking system provides for:

- dock level/draft measurement with possibility of using two independent level/ draft measurement systems;
- calculation of dock roll and trim difference;
- calculation of longitudinal and transverse deflection;
- generation of warning alarm at approach of monitored parameters to specified limits;
- generation of warning alarm when the monitored parameters get beyond the specified limits, with suspension of dock operations.

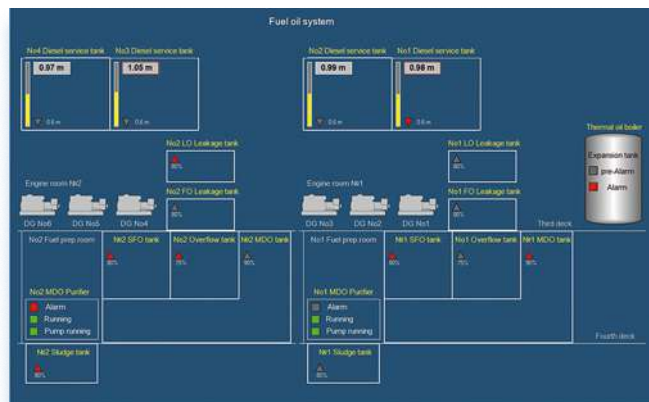
When MasterLoad stability and strength control device with calculations module for floating docks is included to TSS/Docking Control system, monitoring of stability and strength parameters in real time, and preliminary “play” of possible options of dock operations is available.

To monitor longitudinal and transverse deflection of the dock, a hydraulic deflection meter is included in TSS/Control Docking system.

Cooling system screen

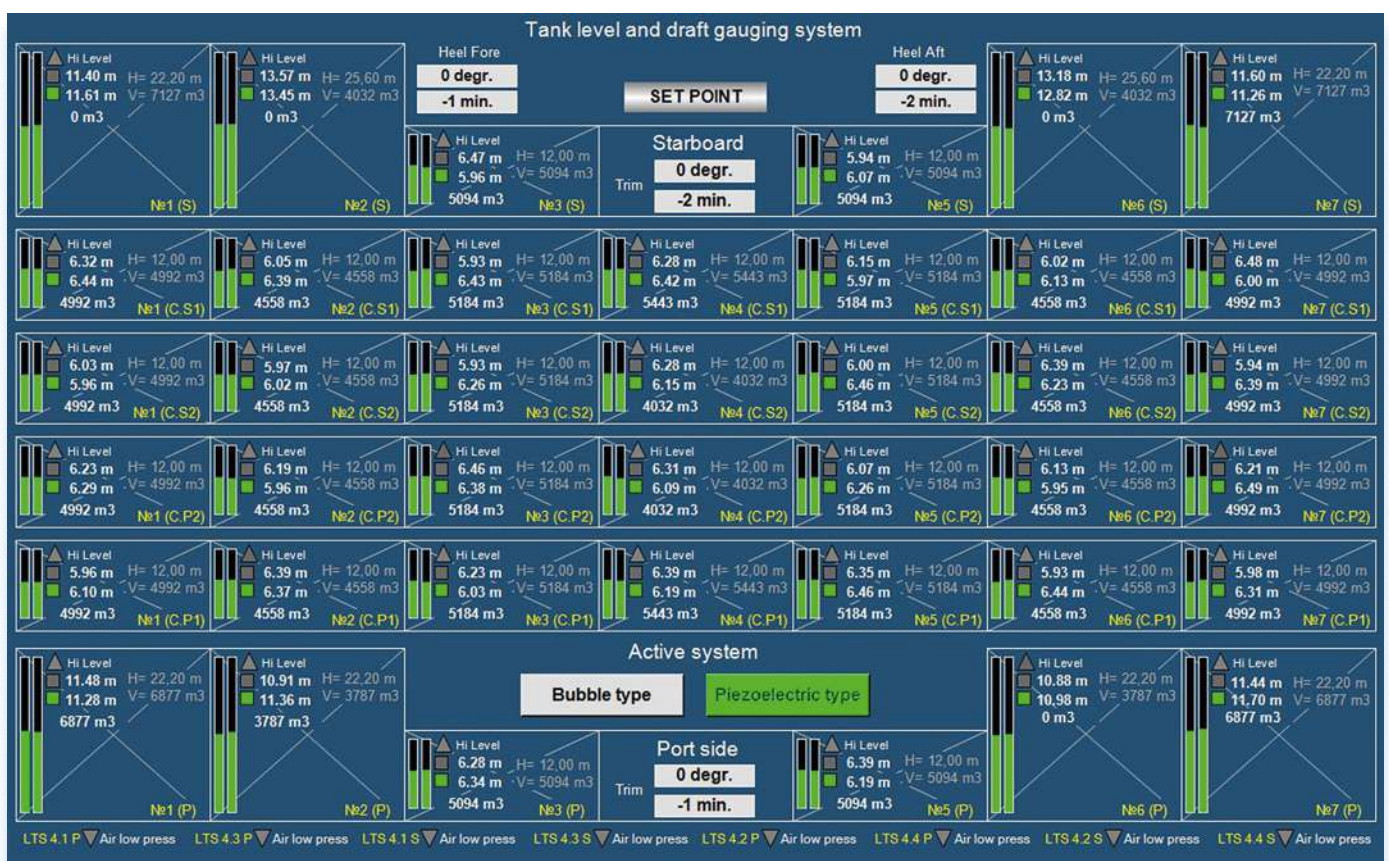


Fuel system screen

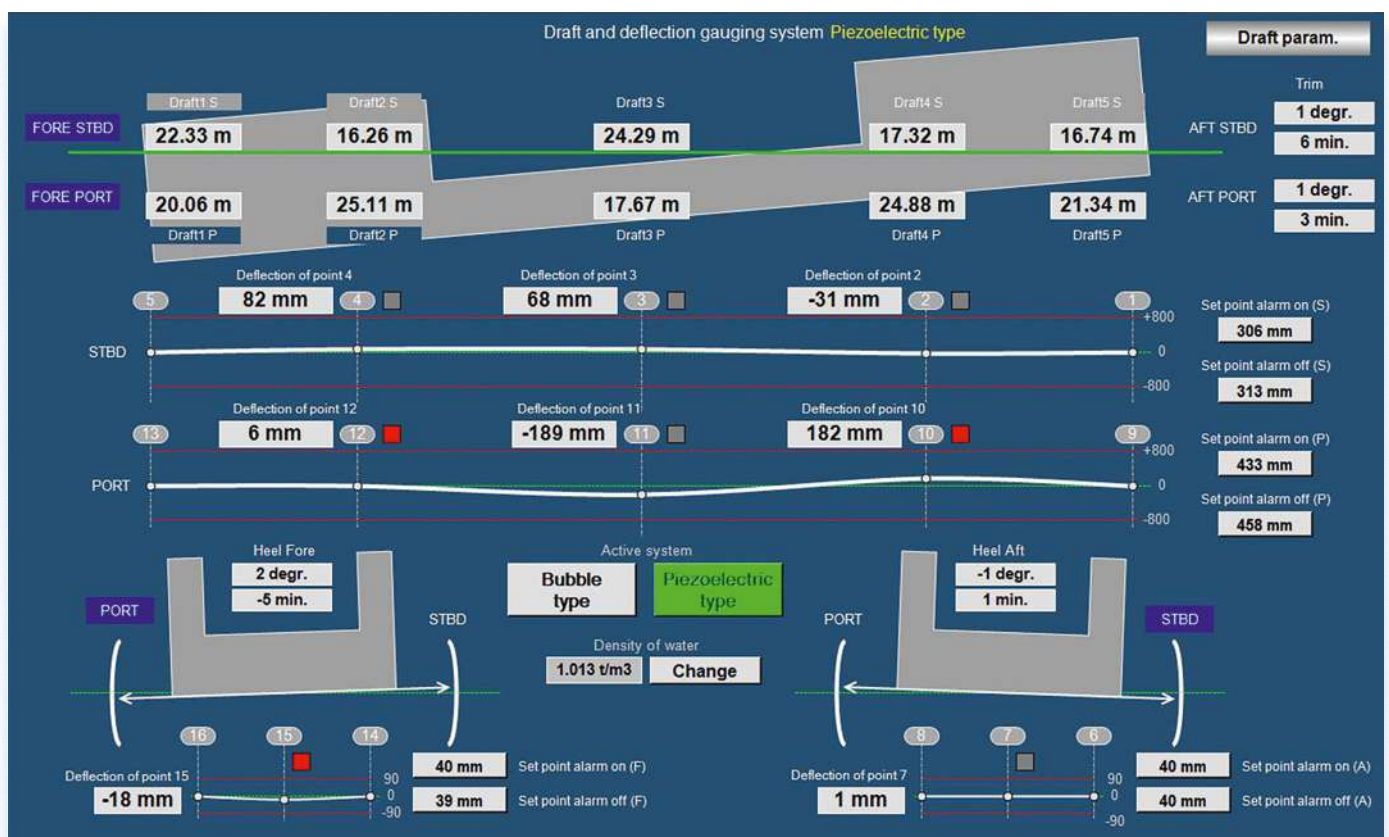


TSS/Control docking system is supplied with RRR and RS certificates.

Level indication in ballast tanks of floating dock



Floating dock draft and deflection display screen



HYDRAULIC DEFLECTION METER

Hydraulic deflection meter is designed to measure longitudinal and/or transverse deflection (deformation) of floating dock, and can also be used to calculate roll angles and dock trim difference.

Principle of operation of hydraulic deflection meter is based on measurement of difference in hydrostatic pressure (level) of medium in a single system of communicating tanks arising from flow of liquid from one tank to another as a result of the roll and/or trim difference.

Depending on the configuration of the system (number and location of measuring glasses), calculation of longitudinal deflection/inflexion, transverse deflection/inflexion, roll and trim difference of a dock is provided.

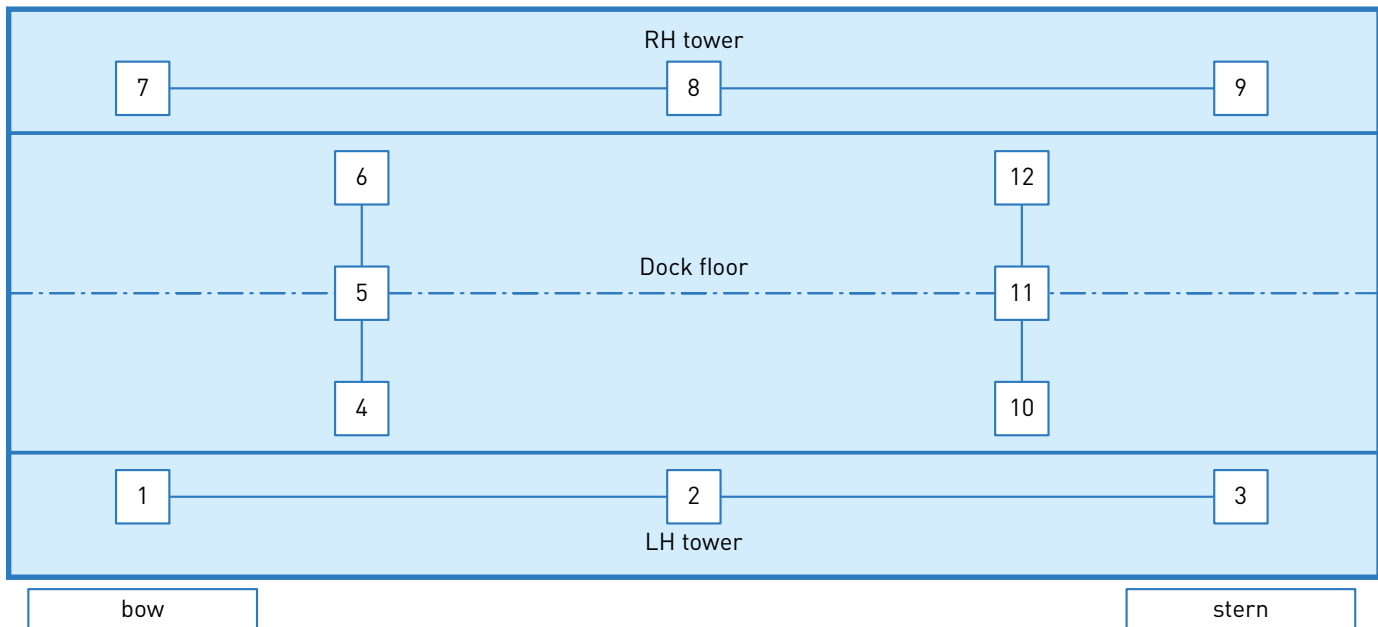
Data on measured parameters, depending on system configuration

Installation options for measuring glasses	Measured parameters
1, 2, 3 (7, 8, 9)	Longitudinal deflection/inflexion, trim difference
4, 5, 6 (10, 11, 12)	Transverse deflection/inflexion, roll
1, 2, 3, 4, 5, 6 (7, 8, 9, 10, 11, 12)	Longitudinal and transverse deflection/inflexion, roll and trim difference

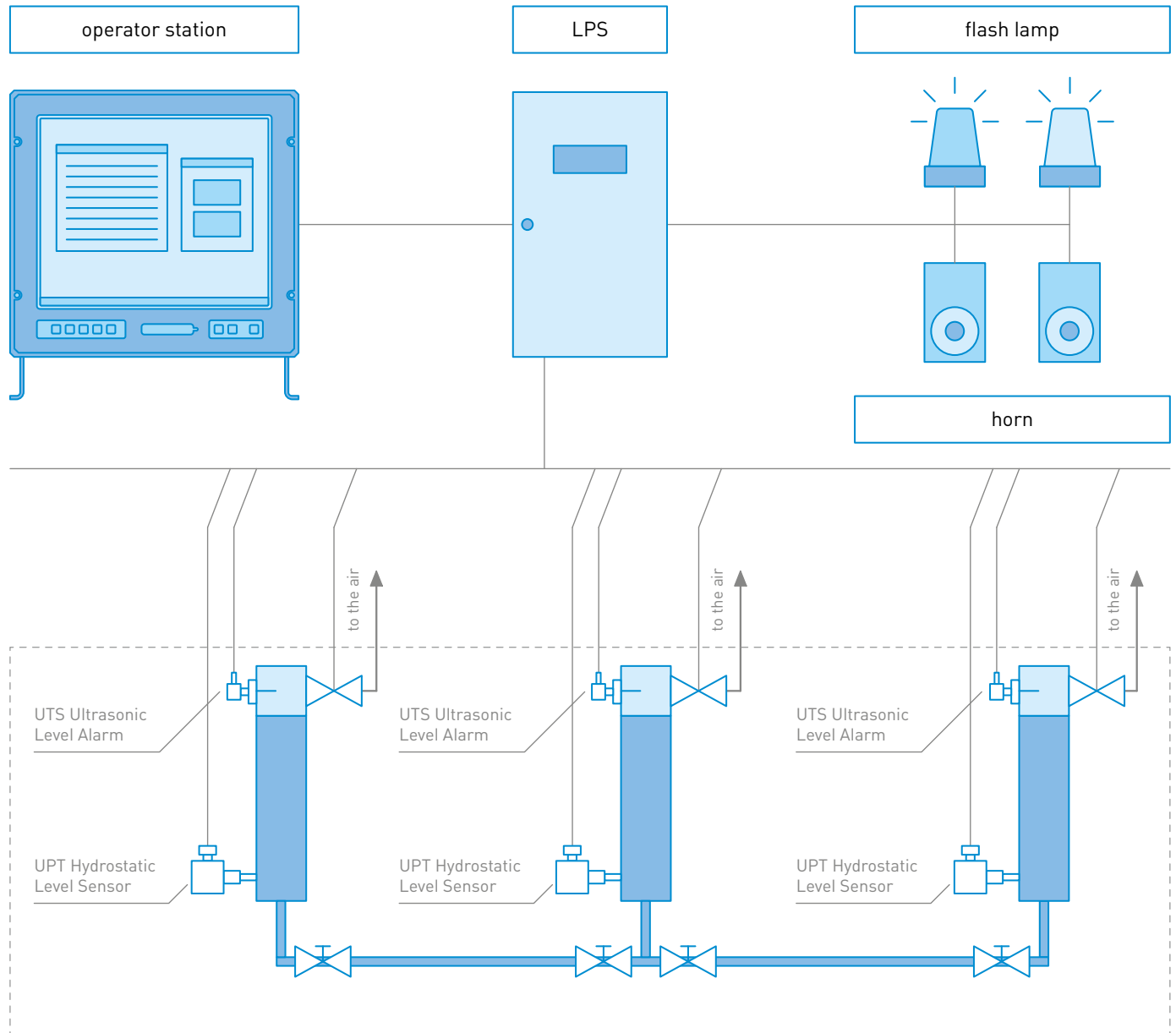


The deflection meter is supplied with RRR and RS certificates.

An example of layout of measuring glasses of deflection measuring system



Schematic diagram of deflection measuring system





MONITORING, CONTROL AND ALARM SYSTEM OF WARNING ALARM SYSTEM

For bulk carriers, tankers, LPG/LNG gas carriers,
floating docks and specialized vessels



TSS/CARGO

Remote Control and Bulk Carrier Handling Operations Monitoring System

The system is designed for installation on bulk carriers — tankers and bunkering vessels.

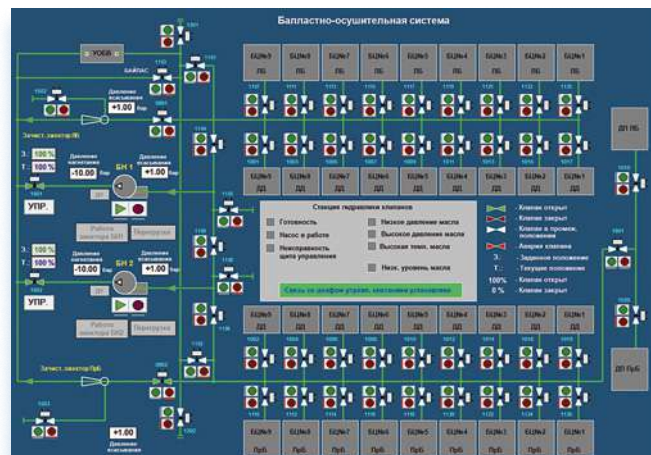
TSS/Cargo provides for:

- for each cargo/slop tank:
 - loading level measurement (closed method);
 - vapor or vacuum overpressure measurement (with indication and WAS);
 - cargo temperature (elevation of up to 15 measurement points);
- level/temperature measurement for each ballast tank;
- cargo manifold pressure/temperature monitoring;
- cargo movement monitoring during handling operations by means of flow meters;
- vessel roll and trim difference measurement;
- monitoring and control of cargo/ballast system valves and pumps;
- monitoring of inert gas system (IGS);
- warning alarm when the controlled parameters (level, pressure, temperature, flow) get beyond the specified limits or mechanisms (pumps, valves, IGS, etc.) fail to operate.

To measure the cargo parameters of in cargo and slop tanks, multifunctional TGD meters (44 lines) are used providing simultaneous high-precision measurement of level, temperature, pressure and density and having a digital output, which allows significant reducing the number of cables. The data from TSS/Cargo system are delivered in real time to Masterload cargo computer (24 lines).

The system is built based components of own production — computers, controllers, sensors approved by RS and RRR.

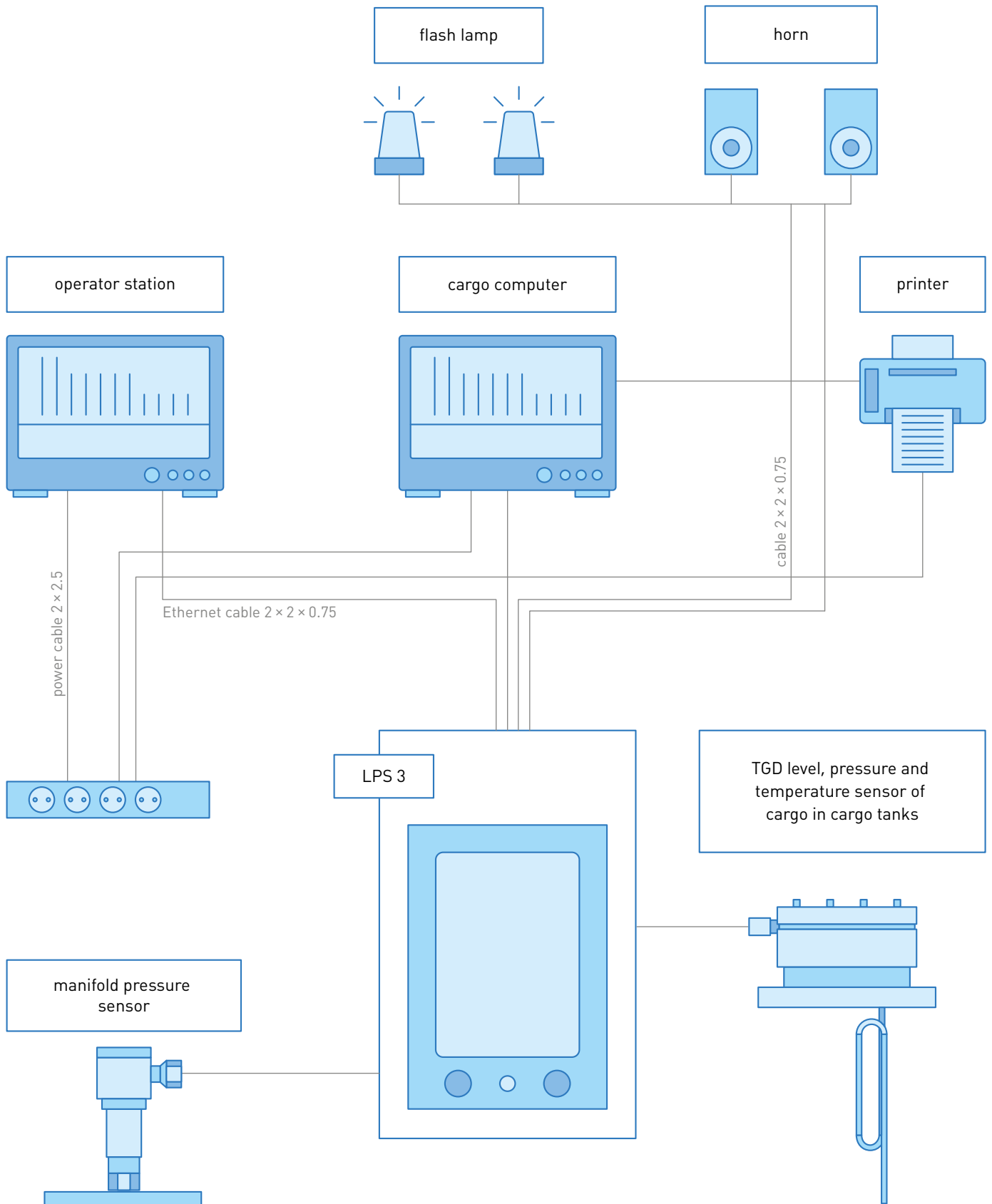
TSS/Cargo operator station screens



TSS/BMS system can be supplied either separately or as part of an integrated control system of the technical means (ICS TM) — TSS/Control.



Flow chart of TSS/Cargo system



TSS/CARGO GAS

Handling Operations Control System for LPG and LNG Gas Carriers

TSS/Cargo Gas is a modification of TSS/Cargo system for use on LPG/LNG gas carriers.

In addition to functions of TSS/Cargo system, TSS/Cargo Gas system provides for:

- monitoring of cargo phase composition;
- determination of nitrogen and gas percentage content;
- compressor control;
- emergency shutdown (ESD).

Valcom's set of meters and alarms installed on the cargo tank of LPG gas carrier



TSS/Cargo Gas operator station screen

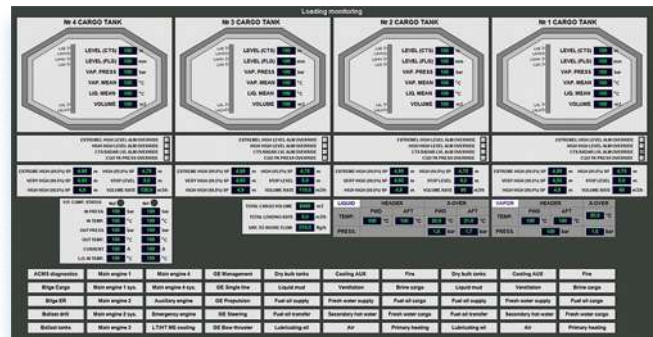
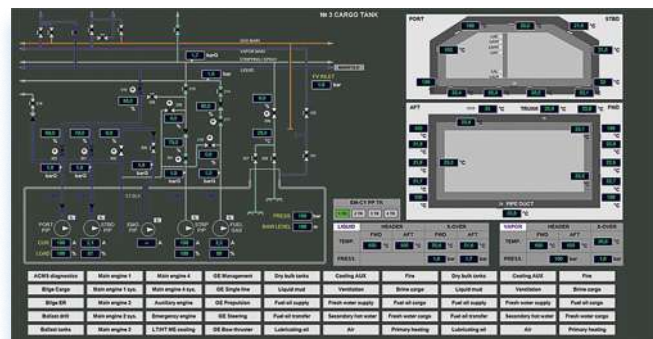
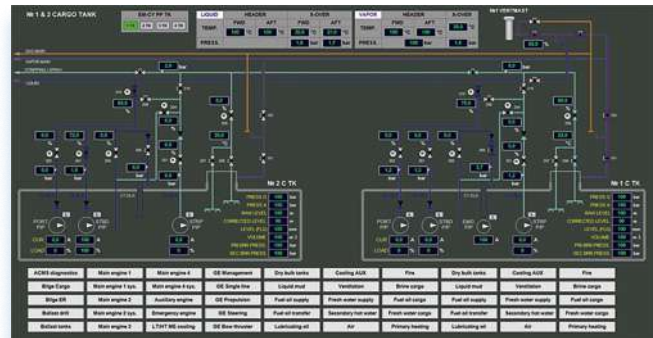
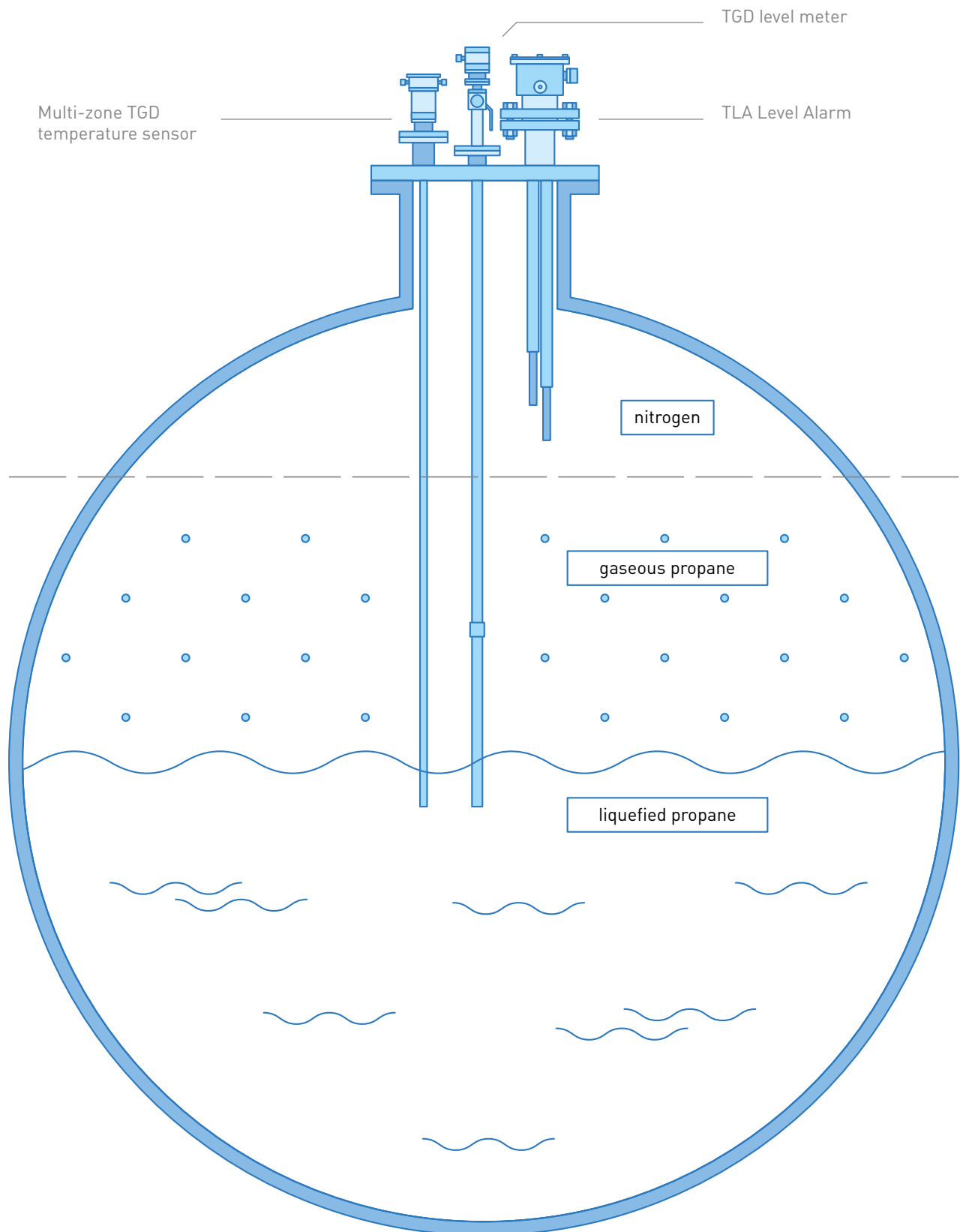


Diagram of a tank with gas

Measurement accuracy is based on use of high-precision level meters (GLFW technology). The level meter waveguide can be bent to bypass various obstacles inside the tank.



TSS/ALARM

Independent Cargo Overflow Control System

TSS/Alarm system is designed for installation on bulk carriers — tankers, bunkering vessels, oil barges, LNG/LPG gas carriers.

The system provides for level monitoring at two actuation points on each tank (typical actuation points of level are 95% and 98%).

TSS/Alarm provides for generation of sound and light alarm when the controlled levels are reached. The system provides for sound and light signals when critical levels are reached on deck and at the location of the alarm panel. Also, TSS/Alarm system generates two generalized 95% and 98% signals to TSS/Cargo and/or TSS/Control system. When the level reaches 95%, a yellow light alarm is generated, when the level reaches 98% — red one. Sound alarm for 95% and 98% levels has a different tone.

Level is monitored by a special deck sensor TLA (48 lines), which has:

- built-in diagnostics;
- test pushbuttons for “manual” actuation check before loading and unloading;
- housing and rods of sensitive elements in stainless steel;
- degree of protection IP67.

TSS/Alarm system has a type approval certificate of the RS and is based on components of own production — computers, controllers, sensors, also having approval of the Registry of Shipping and the Russian River Register.

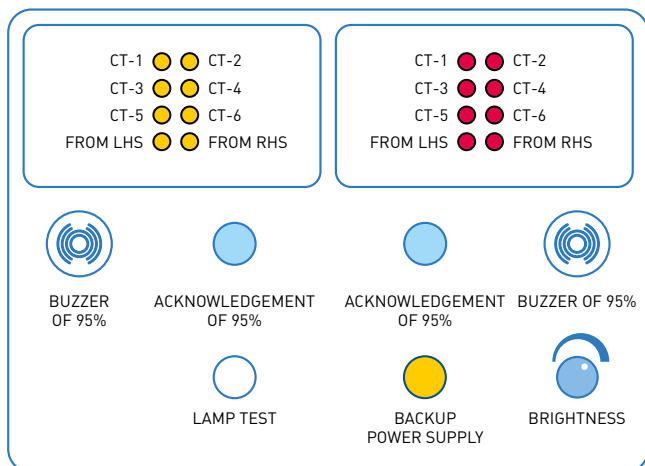
Technical specifications of TSS/Alarm system

Number of cargo/slop tanks	Not limited
Cabinet protection	IP44
Main power supply	220 V AC / 24 V DC
Backup power supply	220 V AC / 24 V DC

TLA Limit and Alarm Level Alarm

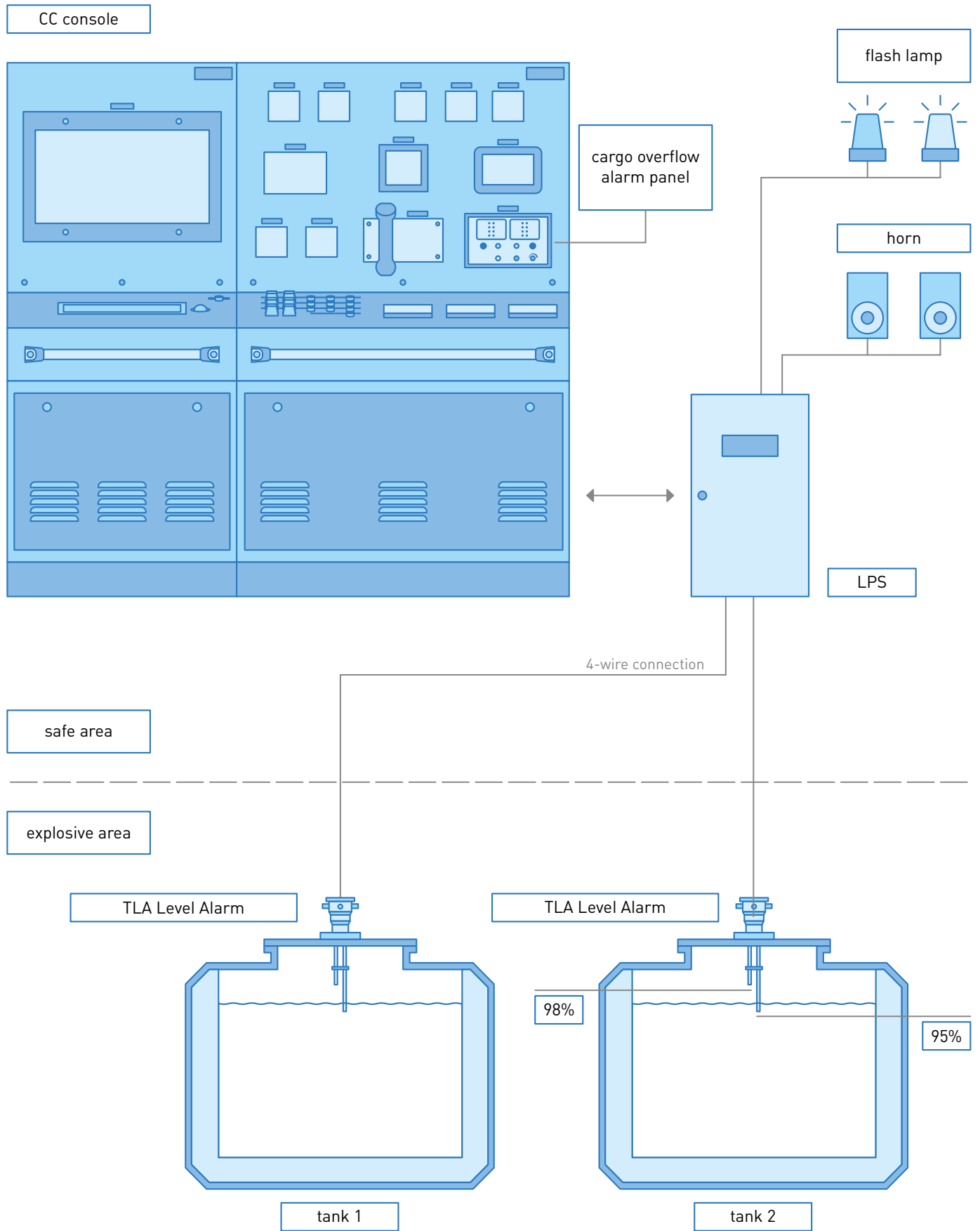
Number of monitoring points	2 points
Power supply	24 VDC
Material	Stainless steel AISI 316L
Explosion protection	OExialICT6X [EExia IIC T6]

Cargo overflow alarm panel



TSS/Alarm system can be supplied either separately or as part of an integrated control system of the technical means (ICS TM) — TSS/Control.

Flow chart of TSS/Alarm system



TSS/ALARM-T

Cargo Tank Temperature Alarm System

The cargo tank temperature alarm system is designed for installation on tankers (bulk barges) equipped with a cargo heating system.

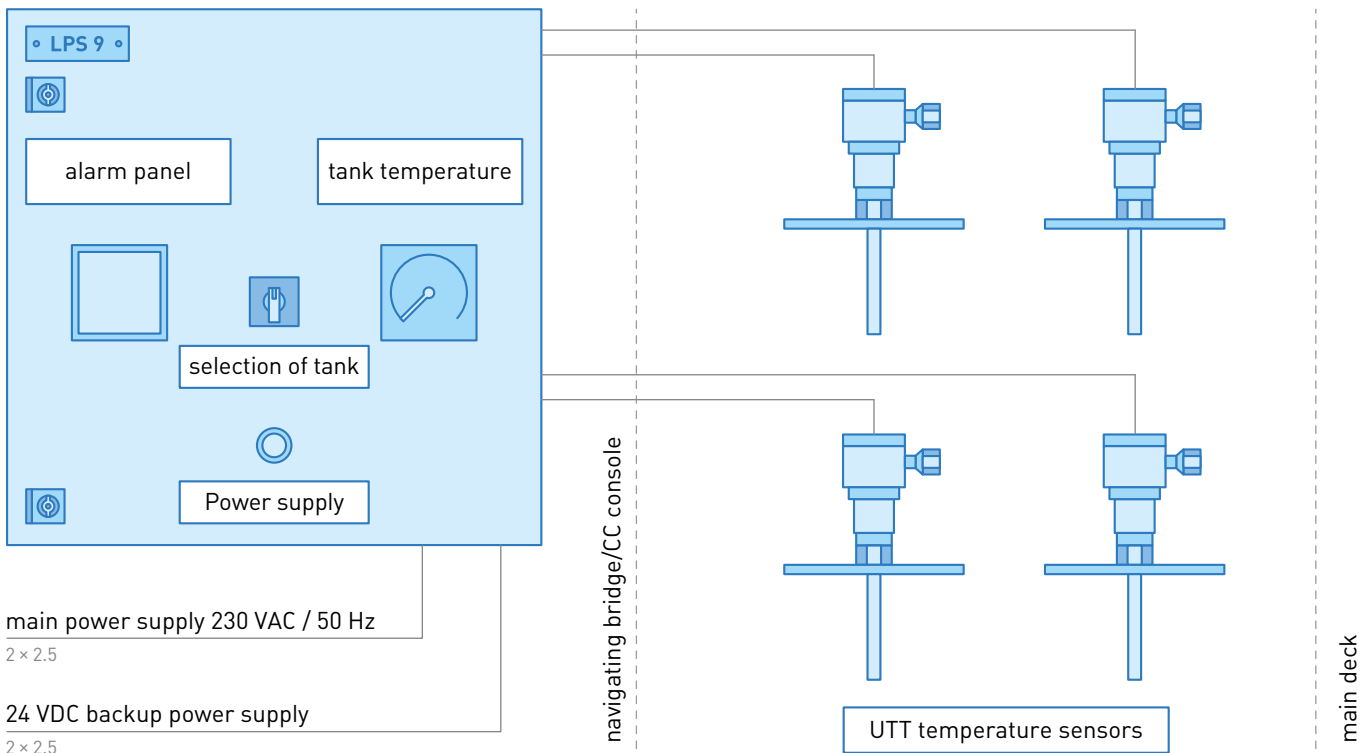
The system provides for each cargo and slop tank sound and light alarm for exceeding the maximum permissible temperature of the cargo.

Note: the function of monitoring and WAS for cargo temperature is also performed by the remote cargo operation control and monitoring system TSS/Cargo, so if there is a TSS/Cargo system on the vessel, installation of a separate TSS/Alarm-T temperature alarm system is not required.

TSS/Alarm-T system has a type approval certificate of the RS and is based on components of own production — computers, controllers, sensors, also having approval of the Registry of Shipping and the Russian River Register.



Flow chart of TSS/Alarm-T



FUEL CONSUMPTION MONITORING SYSTEM

Fuel Consumption Monitoring and Optimization

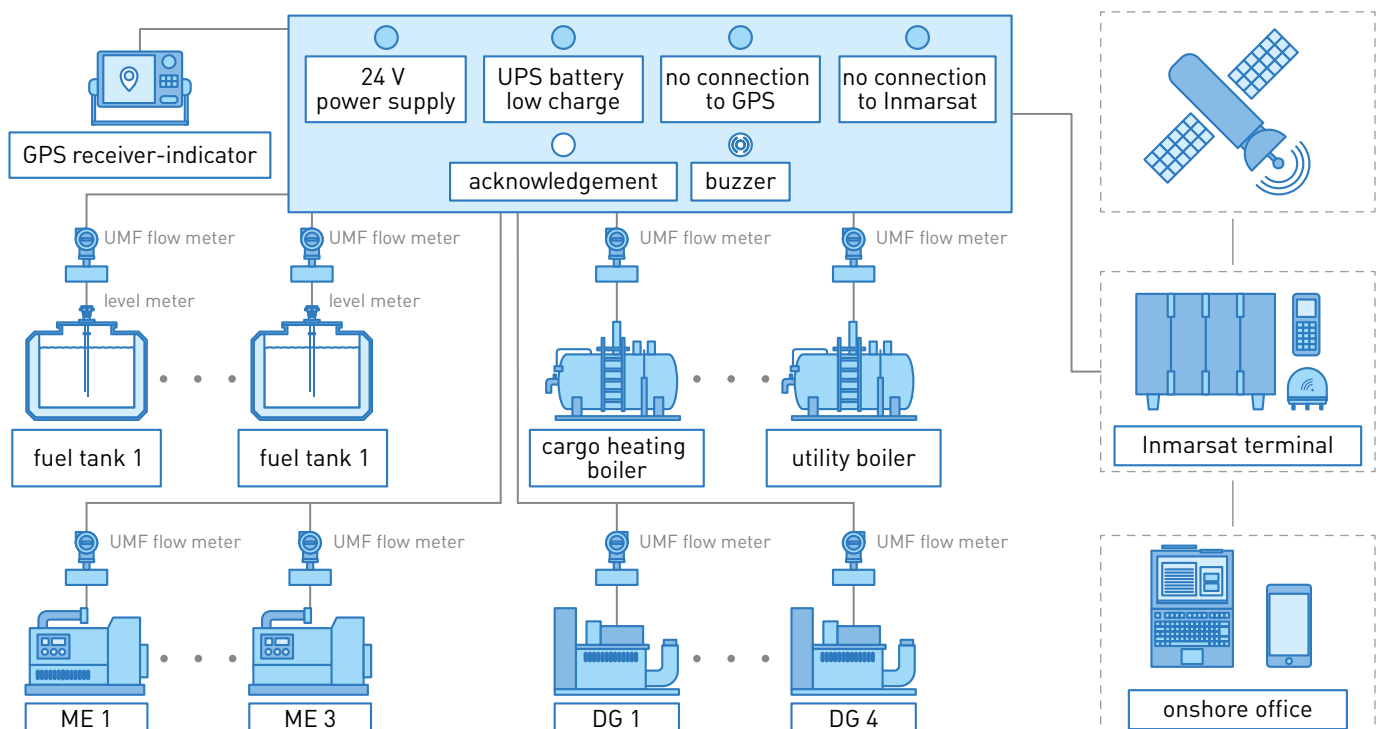
The fuel consumption monitoring system is an integral part of the TSS/Control and TSS/Cargo systems providing control of fuel and lubricants availability on board, their movement and consumption.

The system stores the values of the monitored parameters (fuel consumption by consumers, fuel level and temperature in tanks, operating time of mechanisms, etc.) in the ship database with a specified interval and allows further transfer of the accumulated data to the ship owner's office, as well as generate reports on fuel availability, movement and consumption (both on board and in the office).

The system includes:

- level meters for accounting the fuel stored in ship tanks;
- flow meters for accounting fuel consumption and movement;
- computing units and software providing storage and processing of the data, report generation;
- communication equipment providing remote connection and data transfer to the onshore server of the system.

Block diagram of the fuel consumption monitoring system



TSS/BMS

Pneumercator System for Measurement of Vessel Draft and Level in Ballast/Service Tanks

Pneumercator system (piezometric, electropneumatic) for measurement of level in ballast/service tanks and vessel draft is designed to be installed on all types of vessels — tankers, bulk carriers, gas carriers, barges, as well as floating docks.

The TSS/BMS system provides:

- measurement of level in ballast tanks of a vessel/dock;
- measurement of level in the service and day tanks of a vessel/dock — fuel, fresh water content, etc.;
- measurement of draft of a vessel/dock.

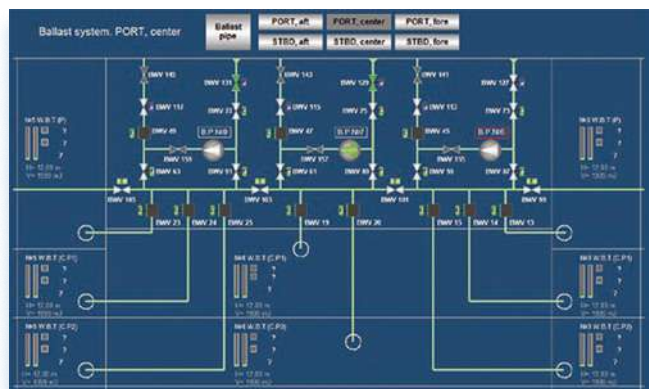
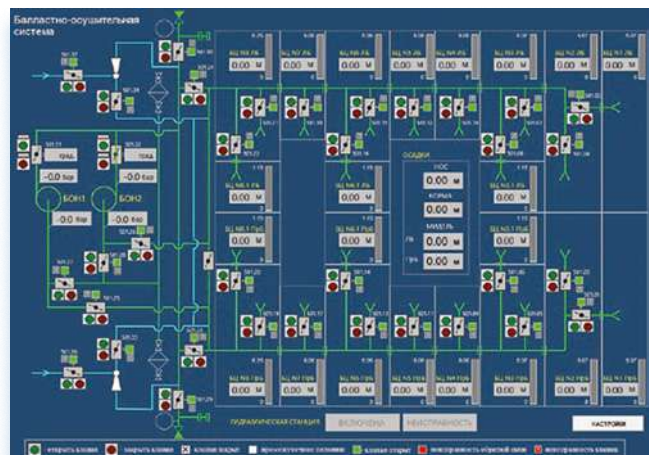
The measuring principle of level by the system is the periodic supply of compressed air to the tank through an air tube running from the measurement unit of the system to the bottom of the tank (refer to the Flow Chart). After the end of air supply to the tube, excess air pressure is discharged through the open end of the tube located at the bottom of the tank, and a pressure equal to the hydrostatic pressure of the liquid column in the tank is set in the tube. Thus, by measuring the steady-state air pressure in the tube, current level of liquid in the tank can be calculated if its density is known.

Measurement of the vessel's draft is similar to that of the liquid level in the tanks, in which case the air tube is removed from the system to the bottom of the vessel.

Due to the adaptive pulse mode, the system has very low air consumption, while providing high accuracy and efficiency of measurements regardless of length of air lines.

The TSS/BMS system has a type approval certificate of the RS and is based on components of own production — computers, controllers, sensors, also having approval of the Registry of Shipping and the Russian River Register.

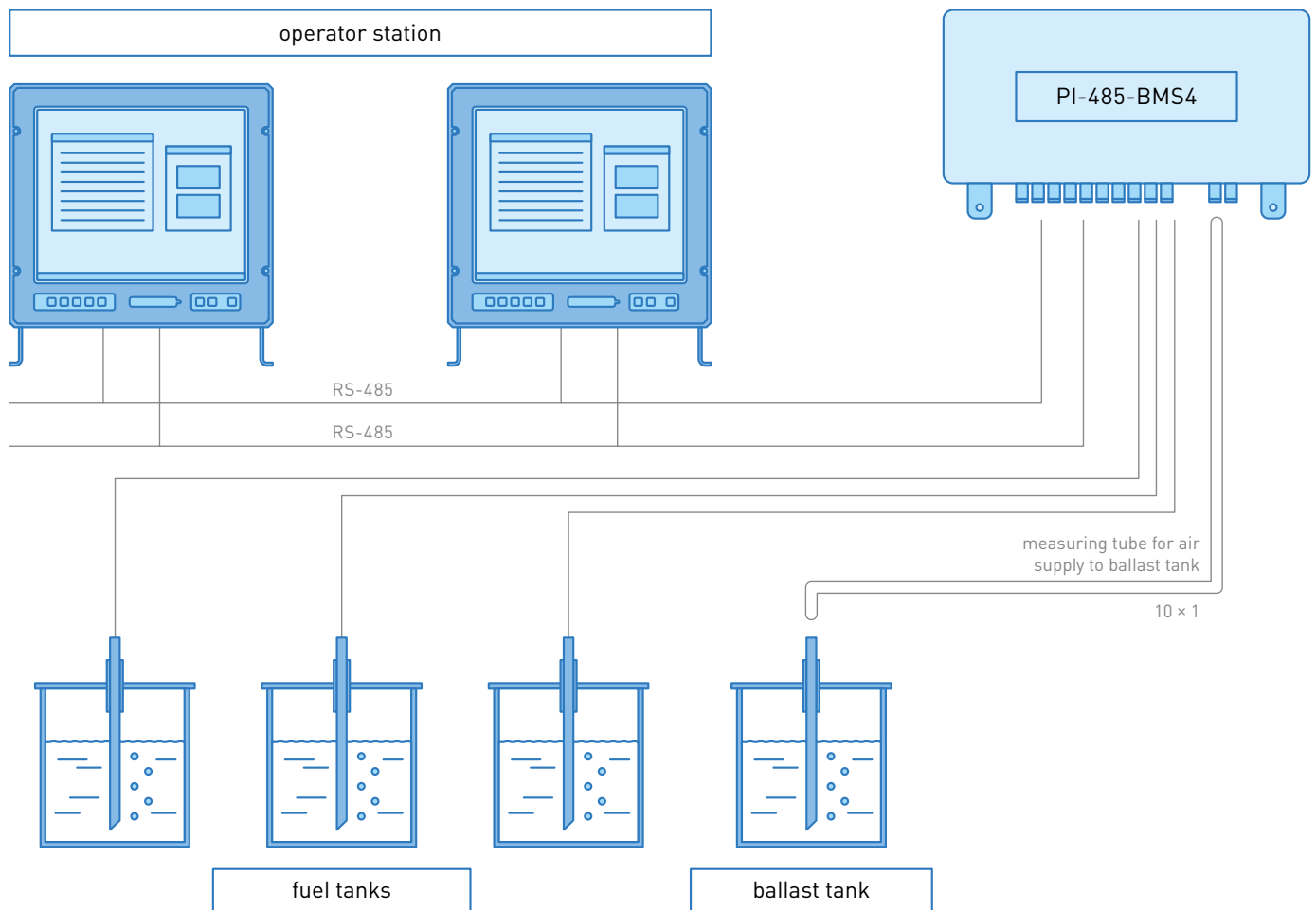
Examples of BMS operator station screen



The TSS/BMS system can be supplied either separately or as part of a technical means integrated control system — TSS/Control.



Flow Chart of BMS4 System



Technical parameters of TSS/BMS system

Measuring range	0...10 m, 0...20 m, 0...40 m
Basic error of level/draft measurement	±0.25% of measurement range
System power supply	220 VAC or 24 VDC
Power consumption	10 W max.
Air flow	0.2 NI/h per 1 channel
Number of measurement channels	12/16/20/24 channels for one 600×600×210 mm standard system cabinet, number of cabinets in the system is not limited
Interface	2×RS-485 Modbus RTU

Pneumercator system unit BMS4



MASTERLOAD

Stability, Strength, Subdivision Calculation System
(Strength Control Device)

Masterload cargo computer is designed for generation of transportation plans, checking the operational parameters of safe operation of vessels in the current state of loading.

MasterLoad is commercially installed on tankers, gas carriers, bulk carriers, container ships, floating cranes and drilling platforms.

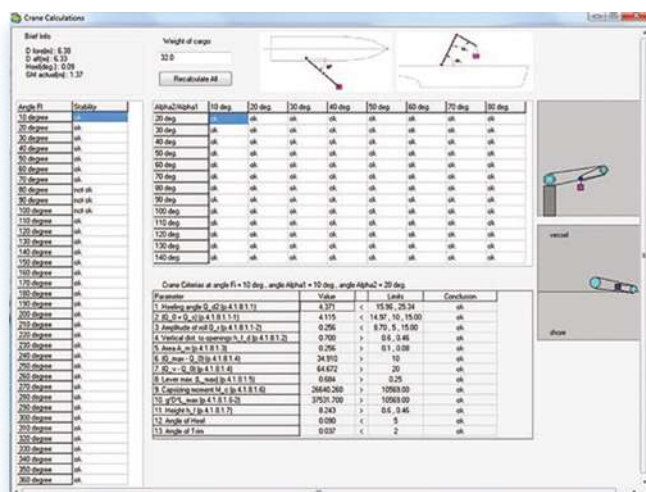
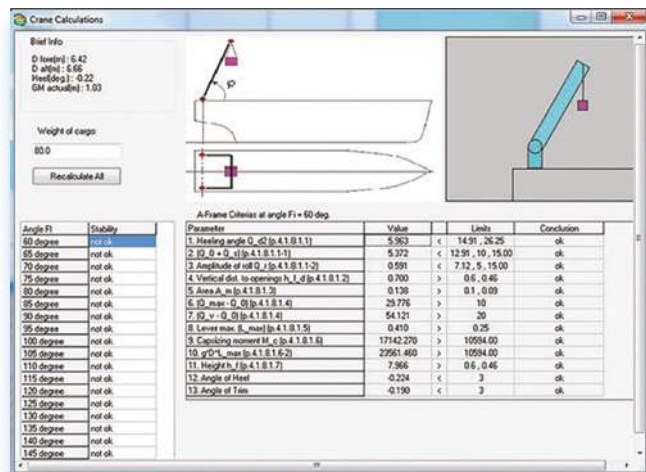
MasterLoad can operate both in stand-alone mode (for preparation of a transportation plan), and in conjunction with level sensors installed in the tanks and reservoirs of the vessel and is created by using the vessel's design documentation.

When calculating trim and stability in various load conditions, checks are carried out in accordance with stability criteria of the Russian Maritime Register of Shipping and IMO. Strength calculations are performed for "Ship at Sea" and "Ship at Port" cases.

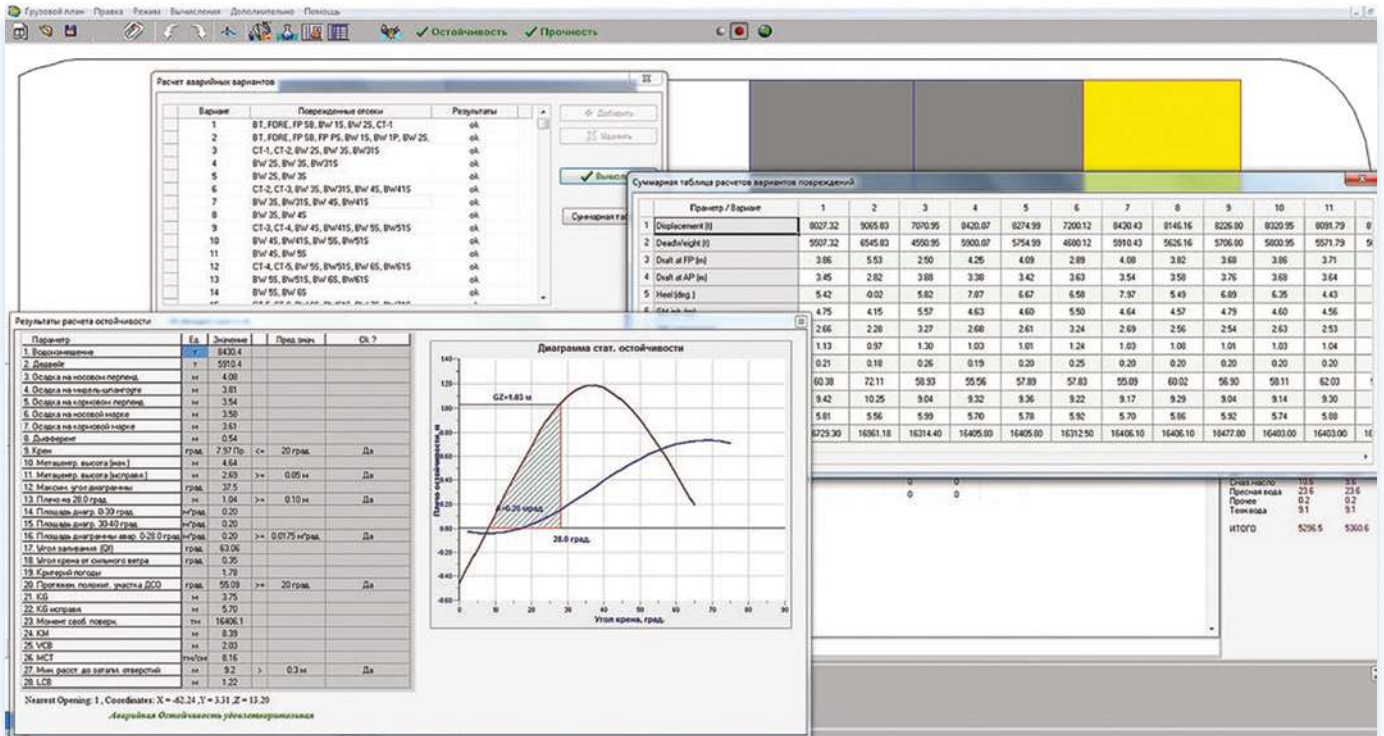
Purpose of MasterLoad strength monitoring device:

- assignment by the operator of tanker loading scheme and its display in graphical and tabular form;
- accounting for icing, seawater density and availability of additional dry cargo;
- calculation of trim, stability, strength of the tanker in the current loading status, comparison of calculations with the criteria set by IMO;
- generation of an option of loading the cargo tanks using information from the level alarms installed in them;
- calculation of crane or A-frame operations;
- offline mode display of cargo tanks filling status and tanker trim;
- storage of loading options and calculation parameters of these options;
- record of results of the performed calculations;
- calculation of dynamic stability during crane operation.

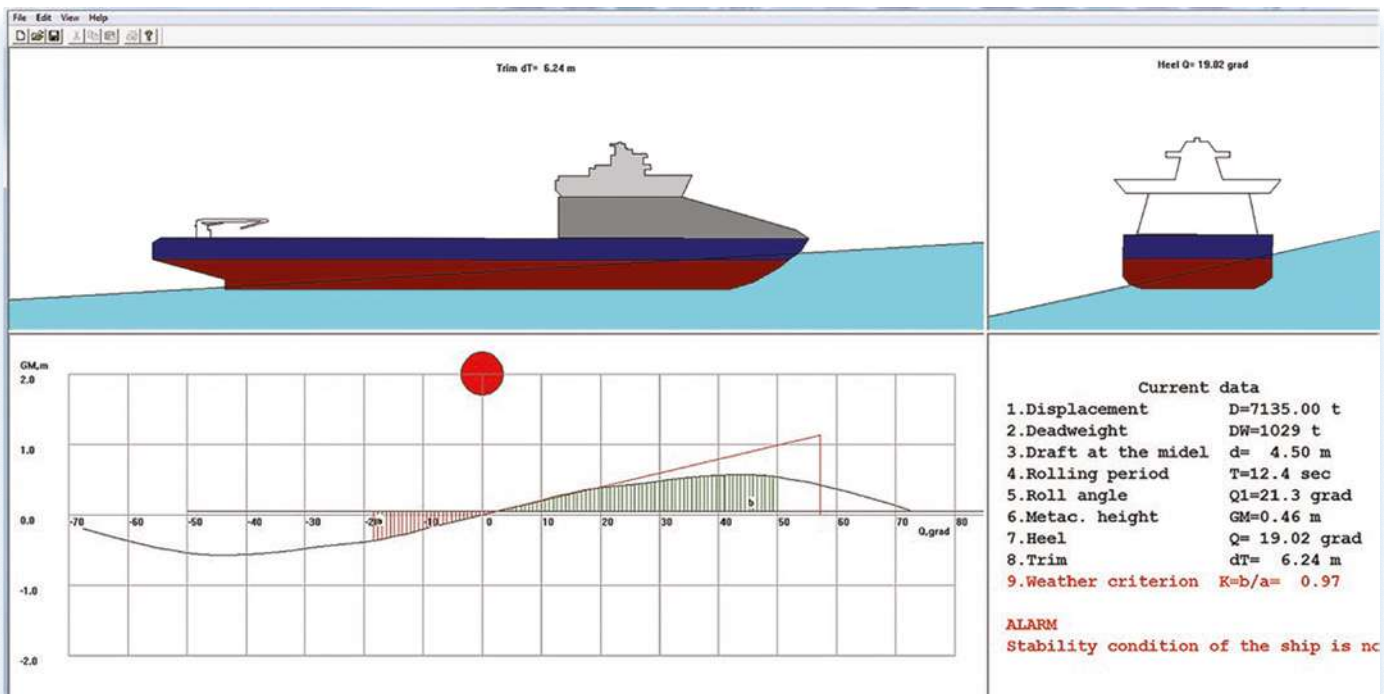
Calculation of crane operations and A-frame



Calculation of emergency stability as per the resolution of MEPC



Calculation of dynamic stability



ERPAMS

Engine Room Personnel Ability Monitoring System

ERPAMS system (“Engine Room Personnel”) is installed on vessels where the watch in the engine room is carried by one person or in unattended engine room maintenance.

The system provides for monitoring of engine room personnel ability with a periodicity of not more than 30 minutes. The engine room personnel shall prove their ability by pressing ERPAMS acknowledgement pushbuttons in the engine room.

When the specified time interval is reached, the system provides light and sound signals to attract attention of the per-

sonnel in the engine room, and in absence of their reaction, it announces in residential and public rooms.

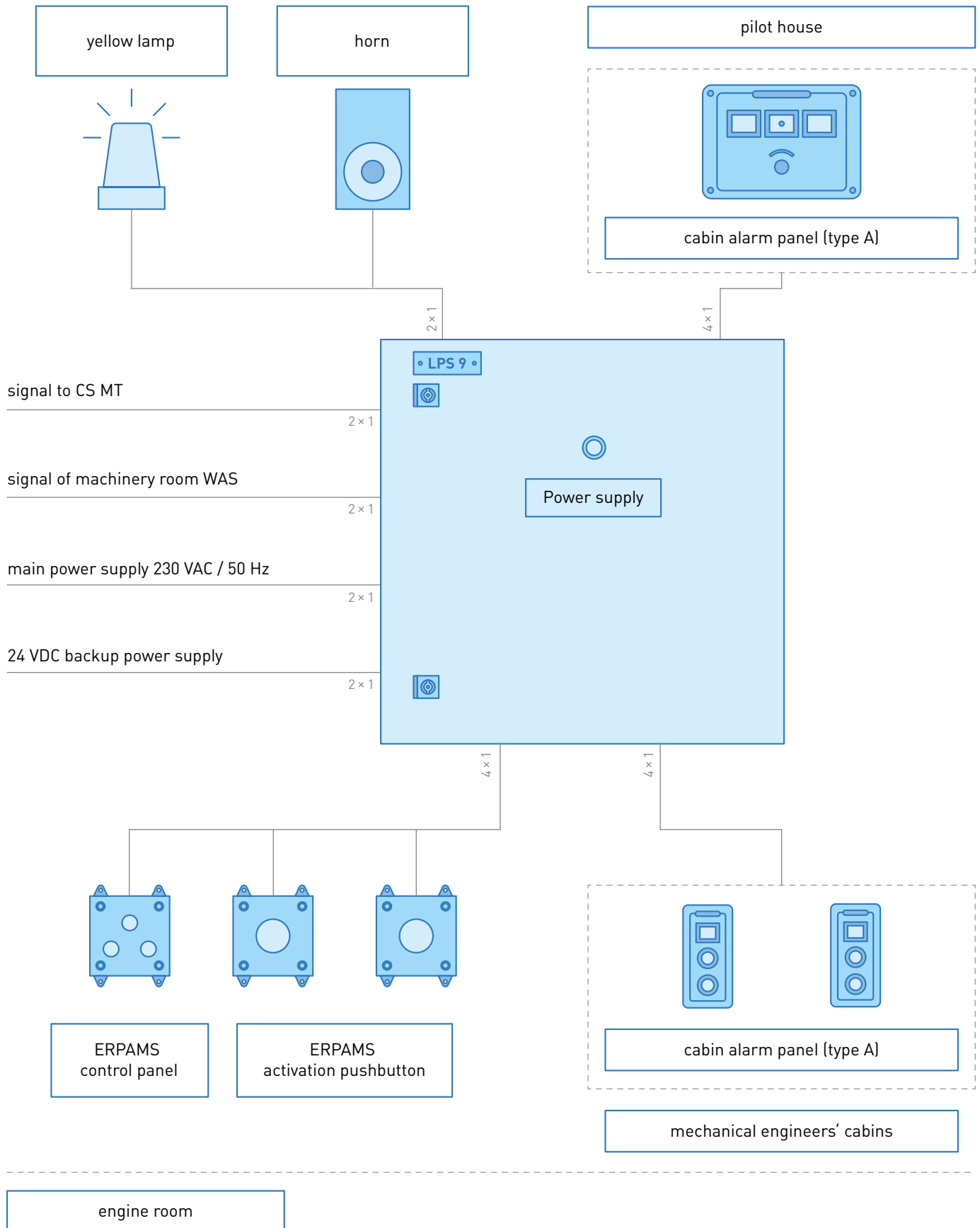


ERPAMS System meets the requirements of RS and RRR.

ERPAMS Control System Unit. It is located at the entrance to the engine room



Flow Chart of ERPAMS system



TSS/WATCH ALARM

Deck Officer Ability Control System (DOACS)

TSS/Watch Alarm is designed to monitor operation of the main control station of the vessel and reveal inability of the deck officer, which can lead to an accident.

TSS/Watch Alarm provides for light and sound signals to attract the attention of the deck officer. If there is no response, the system announces the vessel's captain and the second mate.

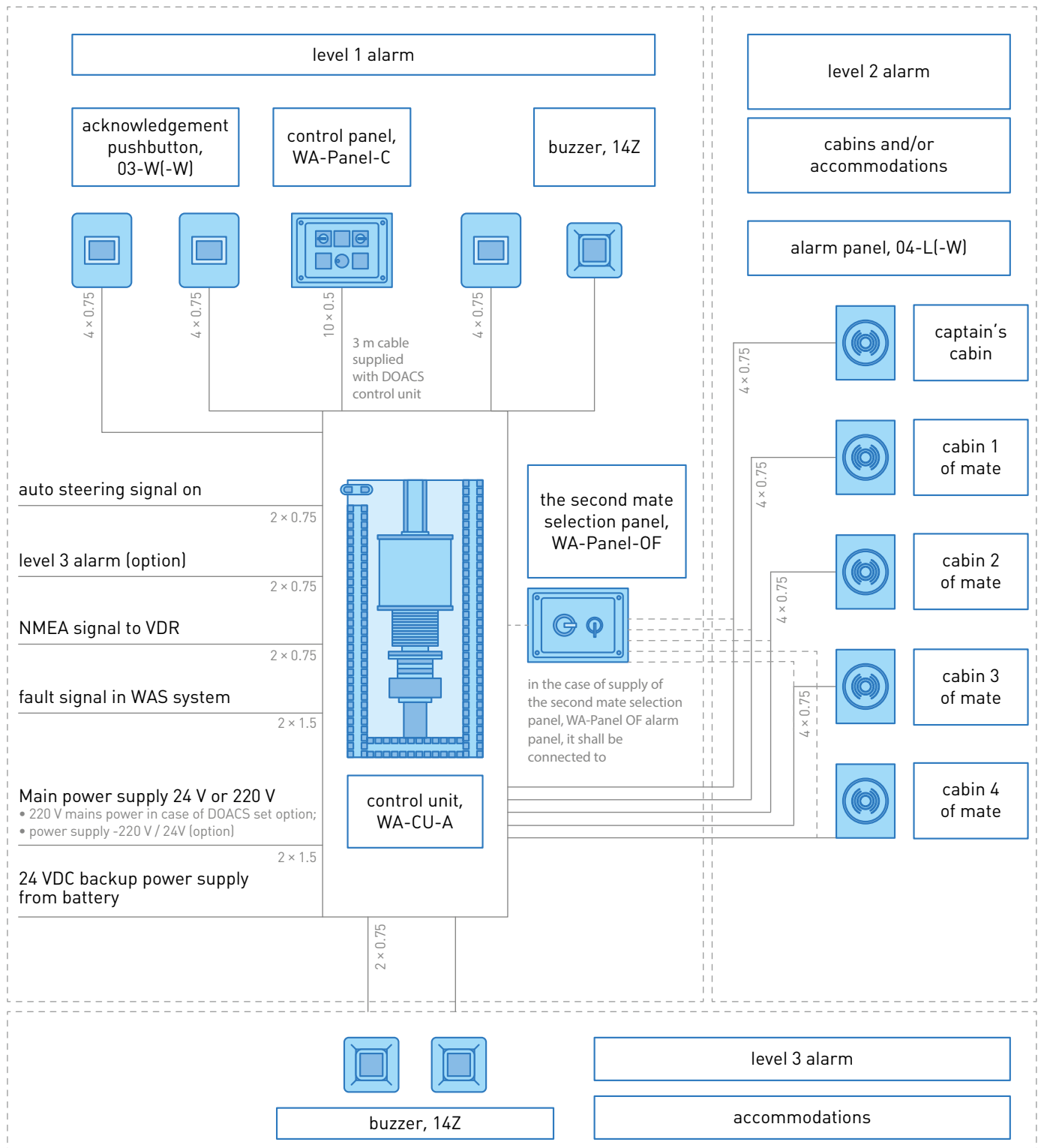
TSS/Watch Alarm provides the deck officer with an immediate alarm means for emergency call to the captain and the second mate to the navigating bridge. All vessels in service must be equipped with a DOACS in accordance with IMO resolution A. 694 (17), MSC.128 (75) and the rules of the Russian Maritime register of shipping and the Russian River Register.

TSS/Watch Alarm Control Panel (DOACS)



WA-Panel-C type

Flow chart of TSS/Watch Alarm system



Notes:

- up to five 03-W(-W) acknowledgement pushbuttons can be connected;
- up to eight 14Z buzzers can be connected;
- up to seven 03-L(-W) alarm panels can be connected.

Sound signaling unit (buzzer)



Type 14Z. It is installed on the navigating bridge

Acknowledgement pushbutton



Type 03-W (console version), or type 03-W-W (water-proof version). It is installed on the wings and all working places of the navigating bridge

Alarm button (option)



Type 02-C. It is installed on the control console section on the navigating bridge

DOACS set in suspended version



Type 04-L(-W). It is installed in the captain's cabin, in the cabins of the captain's second mates

TSS/BRIDGE ALARM

Integrated Warning Alarm and Communication System (IWACS)

TSS/Bridge Alarm system is designed to display information from external radio navigation devices in the form of light and sound signals.

TSS/Bridge Alarm provides for light and sound signals to attract attention of the deck officer, and in absence of his reaction, announces the vessel's captain and captain's second mate, etc. The system provides the deck officer with a means of immediate alarm for an emergency call to the captain and the captain's second mates to the navigating bridge.



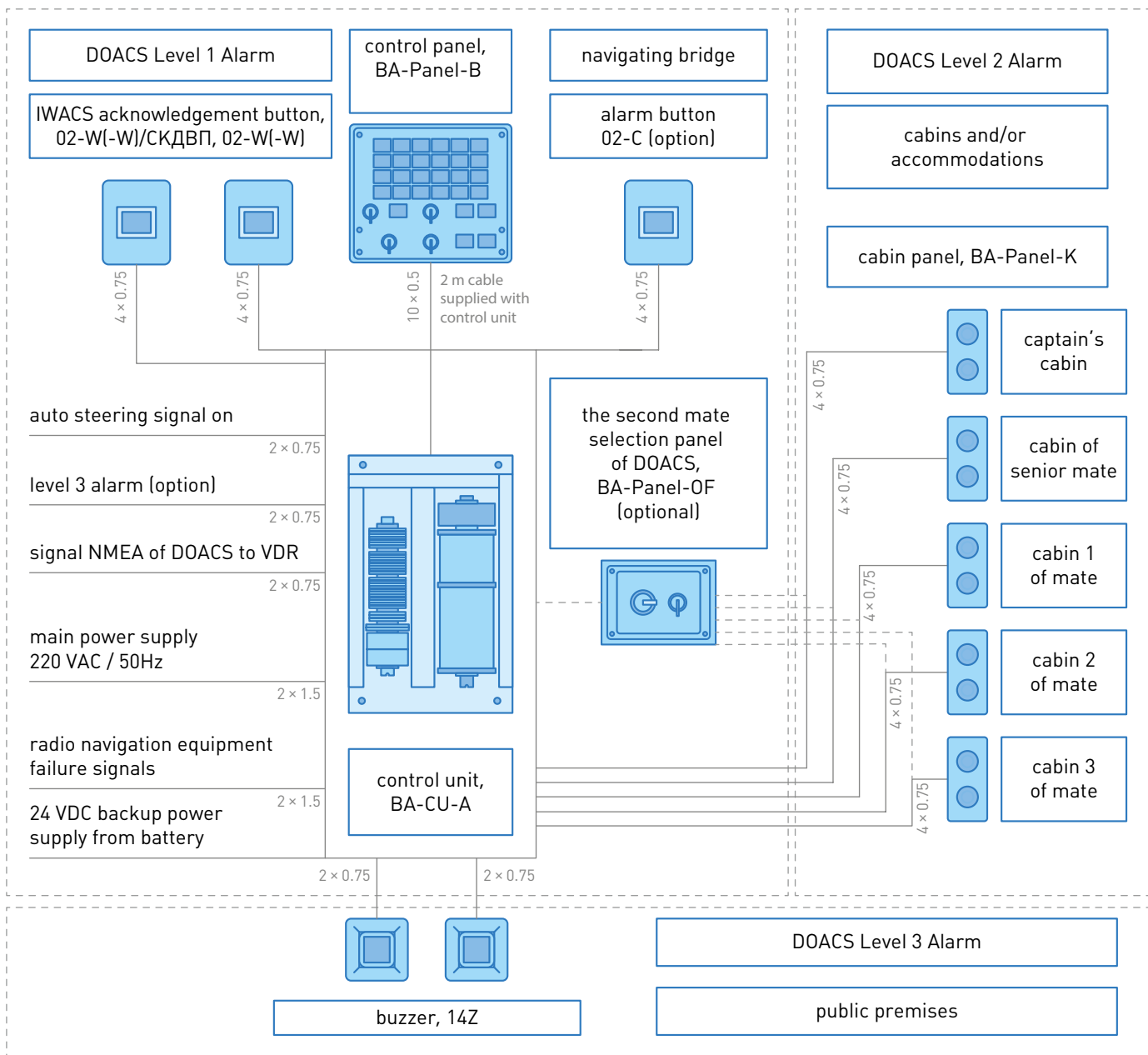
TSS/Bridge Alarm system complies with RS rules and IMO A.694 (17), MSC.128 (75) resolution.

Control panel



Type BA-Panel-B. As a part of IWACS system, it is installed in the vessel control console on the navigating bridge

Flow chart of TSS/Bridge Alarm system



Notes:

- up to five IWACS system 02-WA(-W) acknowledgement pushbuttons can be connected;
- up to five DOACS 02-WB(-W) acknowledgement pushbuttons can be connected;
- up to seven BA-Panel-K cabin panels can be connected in the absence of "the second mate selection panel of DOACS" option and DOACS level 3 alarm connection;
- up to four cabin panels BA-Panel-K can be connected for DOACS 2 level 2 alarm in case of connection of 14Z buzzers for DOACS level 3 alarm and "the second mate selection panel of DOACS" option.

Cabin panel



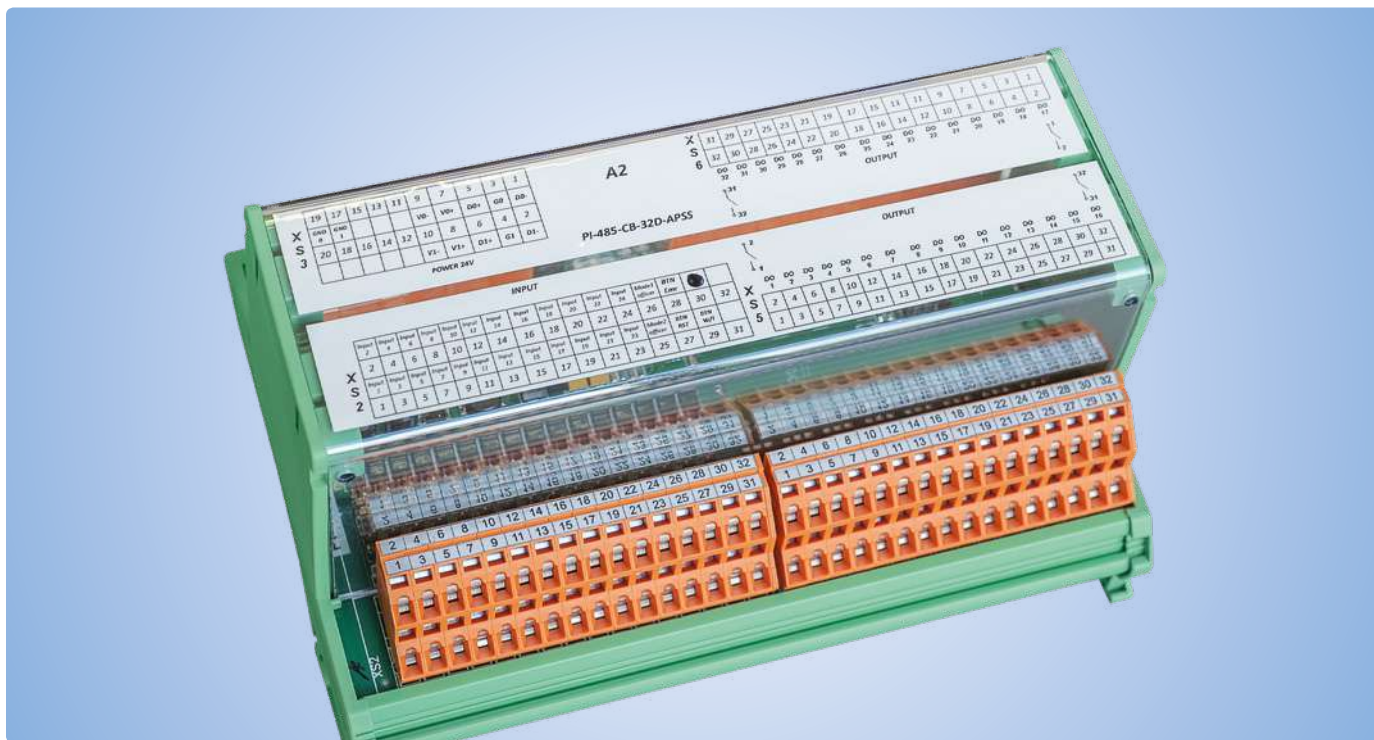
Type BA-Panel-K. As part of the IWACS system, it is installed in the captain's cabin, in cabins of the captain's second mates and public premises

TSS/Bridge Alarm system acknowledgement pushbutton



02-WA type (console version) and DOACS acknowledgement pushbutton, type 02-WA (water-proof version). As a part of the IWACS system, it is installed on all workplaces of the navigating bridge

TSS/Bridge Alarm System Control Unit (IWACS)

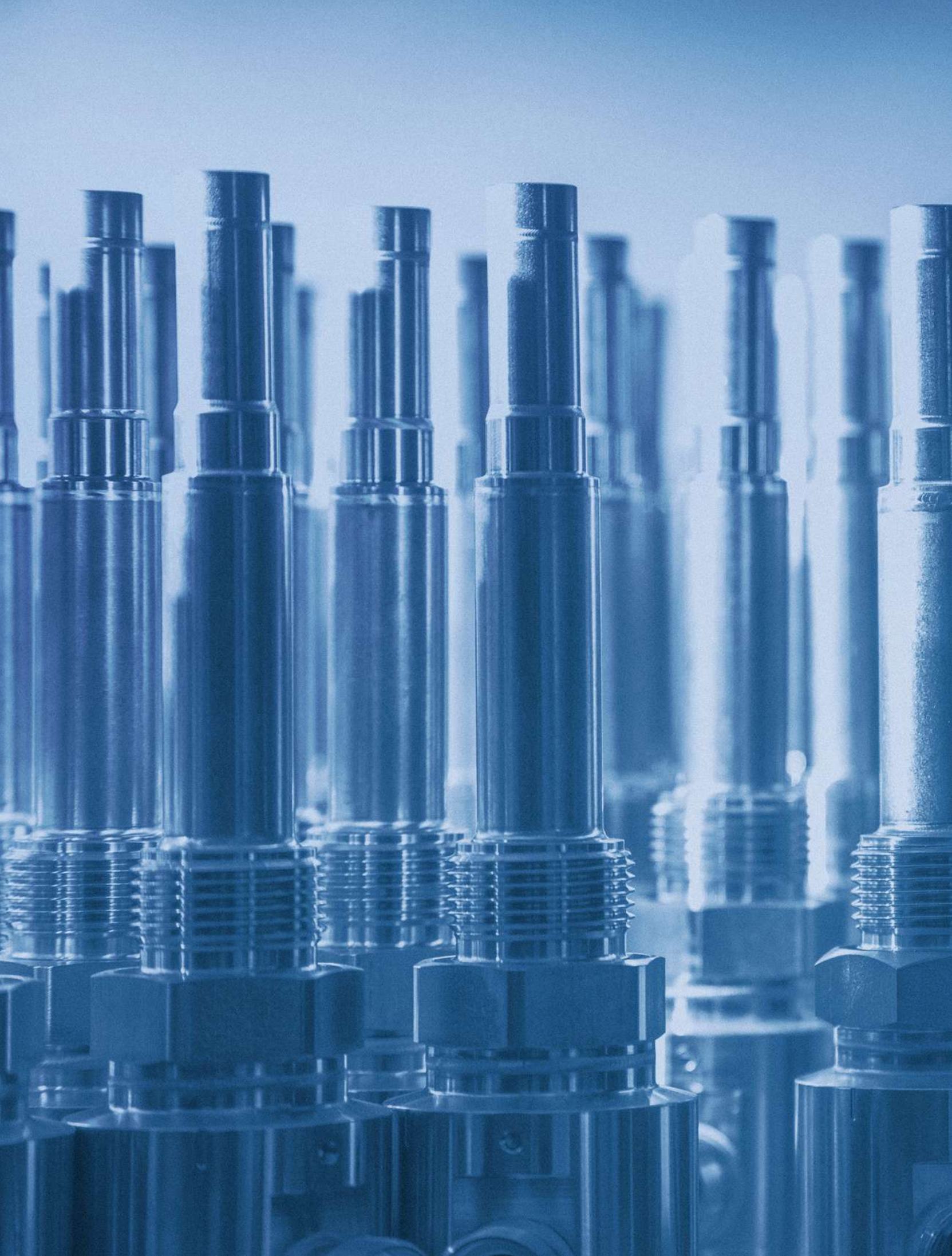




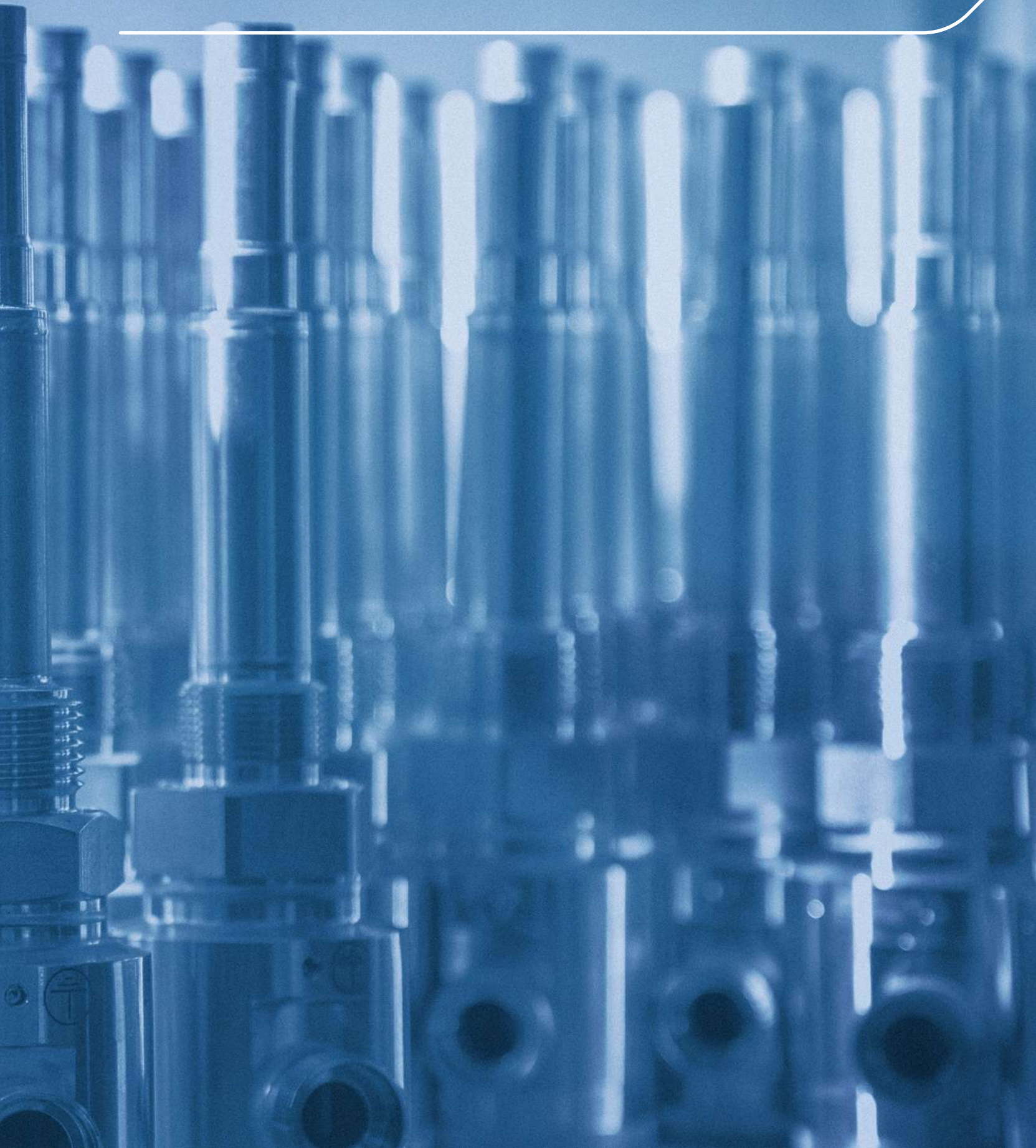
COMPONENTS OF AUTOMATION SYSTEMS

Meters and Alarms • Data Acquisition and Processing Devices •
Marine Computers • Control Panels and Alarm Systems





METERS AND ALARMS



TGD

Multifunctional Level, Pressure, Temperature, Density Meter

The multi-functional TGD meter is designed for simultaneous measurement of level, pressure of inert gases, temperature (up to 15 points) and density (optional) in cargo tanks of tankers, gas carriers, FSO, FPSO, offshore drilling and stationary platforms, as well as onshore storage facilities of oil, oil products or liquefied gases.

Depending on purpose, available in different versions:

- one-channel — measurement of level or temperature
- two-channel — measurement of level and temperature;
- three-channel — measurement of level, temperature, pressure and density.

Technical specifications of TGD meter

Housing material	Stainless steel AISI 316L or equivalent
Electrical connection	2-wire line (HART)
Explosion protection	EExia IIC T5
Degree of protection	IP67
Operating temperature	-55...+80 °C

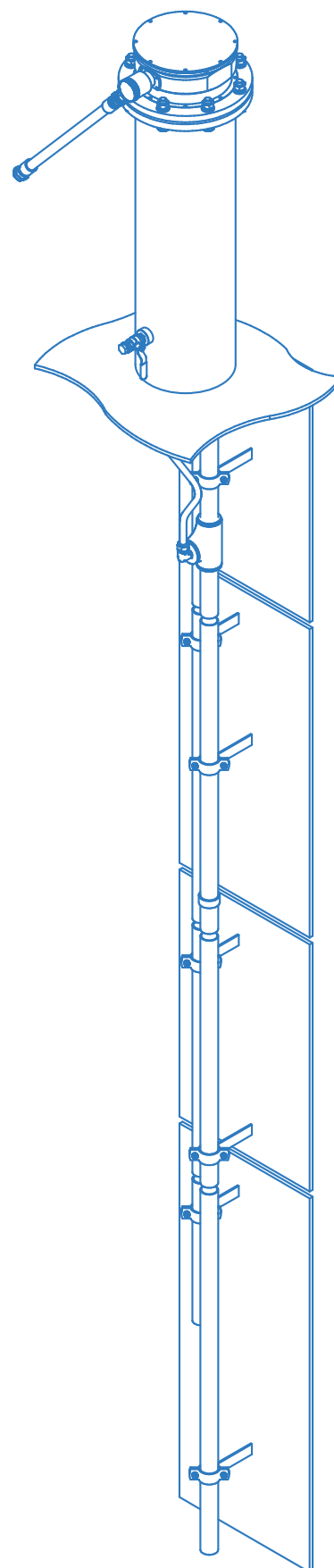
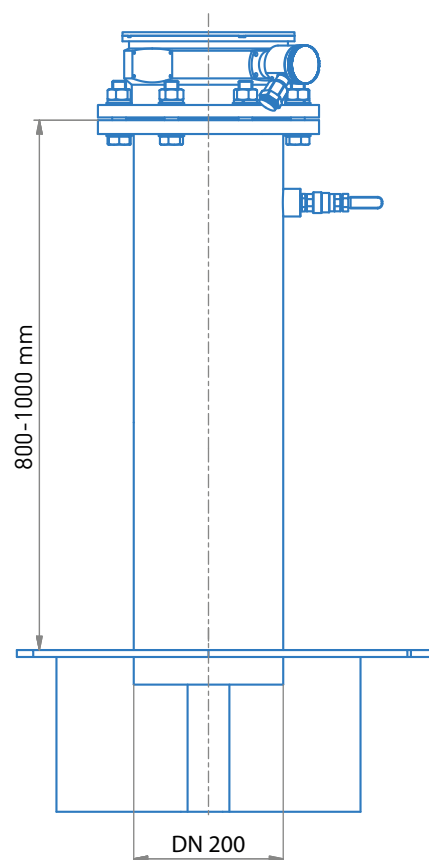
Multiparameter meter (TGD)



TGD meter has a certificate of class approval of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

Drawing of TGD meter and its installation


 TGD measurement channels

 L-level measurement

Measuring range	0...26 m
Basic error of measurement	+/-2 mm
Product temperature	-200...+150 °C

 T-temperature measurement

Number of measurement points	up to 15
Basic error of measurement	±0,05%
Measuring range	-200...+150 °C

 P-measurement of inert gas pressure

Basic error of measurement	0.1%
Measuring range	±100...±500 mbar

 S-density measurement

Measuring range	500–1500 kg/m ³
Measurement accuracy	0.1% of measured range

UTS

Ultrasonic Level Alarm

UTS ultrasonic level alarm is designed for discrete monitoring of level of liquids in vessel tanks, reservoirs, bilge wells, cofferdams, monitoring of water ingress to the compartments, etc.

UTS are widely used on sea and river vessels, tankers, chemical carriers, gas carriers, offshore drilling platforms and are commercially made of stainless steel or titanium (other materials upon request).

Technical specifications of UTS alarm

Housing material	Stainless steel AISI 316L or equivalent
Repeatability of operation	<1 mm
Output signal Explosion protection	NO/NC relay contacts 7/14 mA HART
Degree of protection	0ExiaIICT6 X 1 ExdIICT6 X
Operating temperature	IP67 or IP68
Process temperature	-55...+85 °C
Number of alarm points	-200...+450 °C
Power supply	1
Power supply	24 VDC

Principle of operation of ultrasonic alarms:

- ultrasonic level alarms have no moving parts. Principle of operation is based on the estimation of the damping value of the resonator located at the end of the waveguide rod, while the waveguide is not sensitive to contact with liquid;
- piezoelectric transmitter generating vibrations is placed inside the housing of the alarm taken out of the tank. This improves reliability and simplifies its maintenance;
- ultrasonic principle of operation is distinguished by increased protection from accretion, strength under dynamic loads, higher operation reliability.

Ultrasonic Level Alarm (UTS)



UTS alarm is made of stainless steel and is available with various types of threaded and flange connections, as well as with different waveguide lengths, including a flexible waveguide providing level signaling in places that are difficult to access.



UTS meter has a certificate of class approval of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

TLA

Ultrasonic Two-Point Level Alarm

TLA alarm is a modification of the ultrasonic UTS level alarm and provides two levels of loading signals. The main application of TLA level alarm is found in TSS/Alarm cargo overflow control systems for signaling the loading level of 95% and 98%.

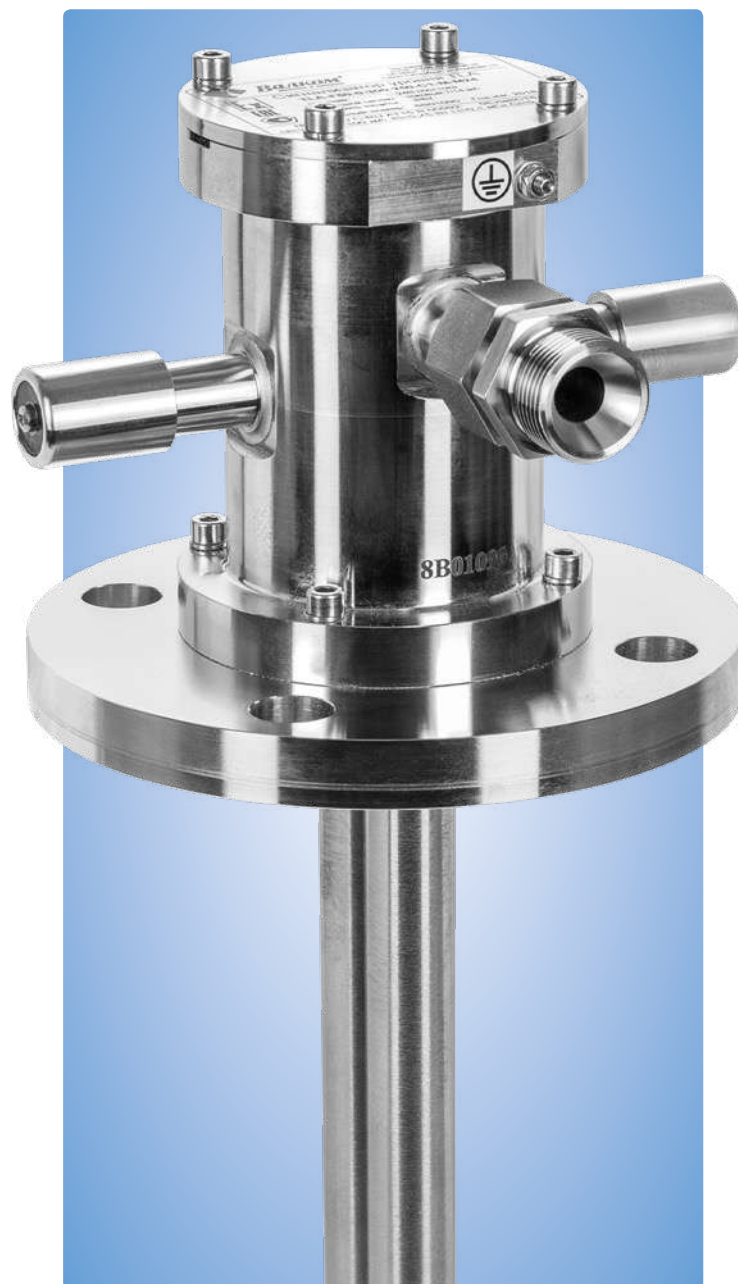
Alarms are used to signal the level of loading in cargo tanks of tankers, floating storages of FSO, FPSO, onshore storages of oil products.

TLA has two sensing elements (waveguides), providing two levels of response; length of the waveguides shall be determined by the customer taking into account the required levels of response. Design of the alarm provides pushbuttons to check operability of each alarm channel in accordance with requirements of classification agencies submitted to cargo overflow monitoring systems.

Technical specifications of TLA alarm

Housing material	Stainless steel AISI 316L or equivalent
Output	2 × 7/14 mA HART
Explosion protection	EExia IIC T6
Degree of protection	IP67
Operating temperature range	-55...+85 °C
Number of alarm points	2
Built-in check pushbuttons	2
Power supply	24 VDC

Ultrasonic Two-Point Level Alarm (TLA)



TLA level alarm has a certificate of class approval of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

UPT

Pressure Transmitter

UPT pressure transmitter is designed for continuous measurement and alarm of excess, absolute, differential pressure of liquids and gases, as well as liquid level measurement by hydrostatic method.

UPT transmitter is used to monitor the pressure upstream and downstream pumps in pipelines, in cargo tanks of tankers and gas carriers to measure the draft and level in ballast and service tanks, etc.

Housing and membrane of the sensing element are made of stainless steel. UPT transmitters are available with a variety of threaded and flange connections, as well as flexible and rigid extensions providing pressure monitoring in areas that are difficult to access.

Technical specifications of UPT transmitter

Housing material	Stainless steel AISI 316L or equivalent
Output	4-20 mA HART
Measuring range	upon request, 0.4 kPa to 100 MPa
Basic error of measurement	up to $\pm 0.15\%$
Explosion protection	0ExiaIICT5 X 1ExdIICT5 X
Degree of protection	IP67 or IP68
Power supply	24 VDC
Operating temperature	-60...+85 °C

Pressure transmitter (UPT)



UPT pressure transmitter has a certificate of class approval of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

UTT

Temperature Transmitter

UTT transmitter is designed to measure and signal the temperature of liquid and gaseous media — water, coolant, steam, oil and oil products, exhaust gases, etc.

UTT transmitter is available with a variety of threaded and flange connections, lengths of sensing elements, and flexible and rigid extensions providing temperature monitoring in areas that are difficult to access.

Technical specifications of transmitter

Housing material	Stainless steel AISI 316L or equivalent
Output	4-20 mA HART
Measuring range	upon request, -200 °C ... +700 °C
Basic error of measurement	up to ±0.5%
Explosion protection	0ExiaIICT5 X 1ExdIICT5 X
Degree of protection	IP67 or IP68
Power supply	24 VDC
Operating temperature	-60...+85 °C

UTT temperature transmitters



UTT temperature transmitter has a certificate of class approval of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

UMF

Ultrasonic Multipath Flowmeter

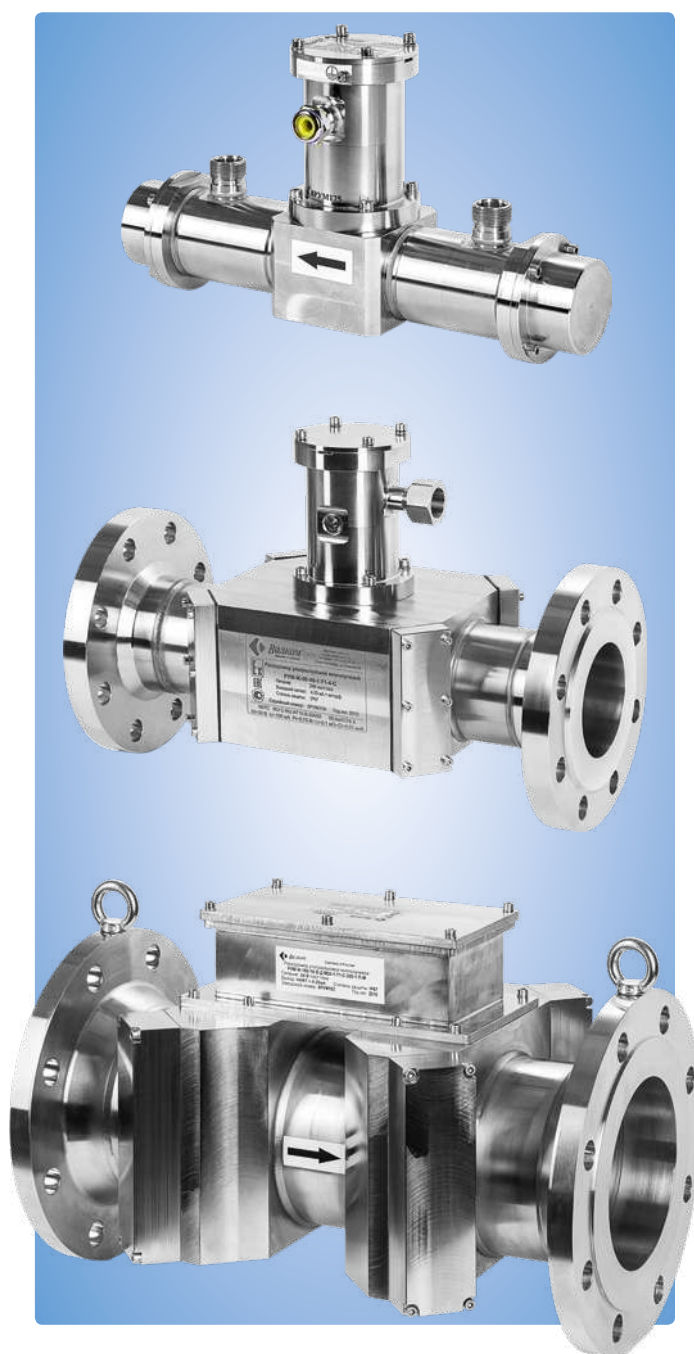
UMF flow meter provides measurement of volume or volume-mass flow of liquid media and is designed for use in metering and monitoring systems of fuel, oil, fresh water and other liquids in automatic control systems of technical means (ICS TM).

To measure the flow rate with an ultrasonic flow meter with a given error, certain conditions shall be observed during installation ensuring full filling of the flow meter chamber with flowing liquid and laminar flow. This can be achieved by installing flow meters on ascending or rectilinear sections of pipelines, as well as by providing straight sections upstream and downstream the flow meters, length of which depends on availability of valves on the pipelines, reducers, elbows, branches, etc.

Technical specifications of UMF flow meter

Housing material	Stainless steel AISI 316L or equivalent
Nominal diameter	DN10...DN300
Output	4-20 mA HART
Measuring range	depending on DN
Basic error of measurement	from 0.25%
Explosion protection	0ExialICT5/T6
Degree of protection	IP67
Power supply	24 VDC
Operating temperature	-55...+80 °C
Medium temperature	-200...+200°C

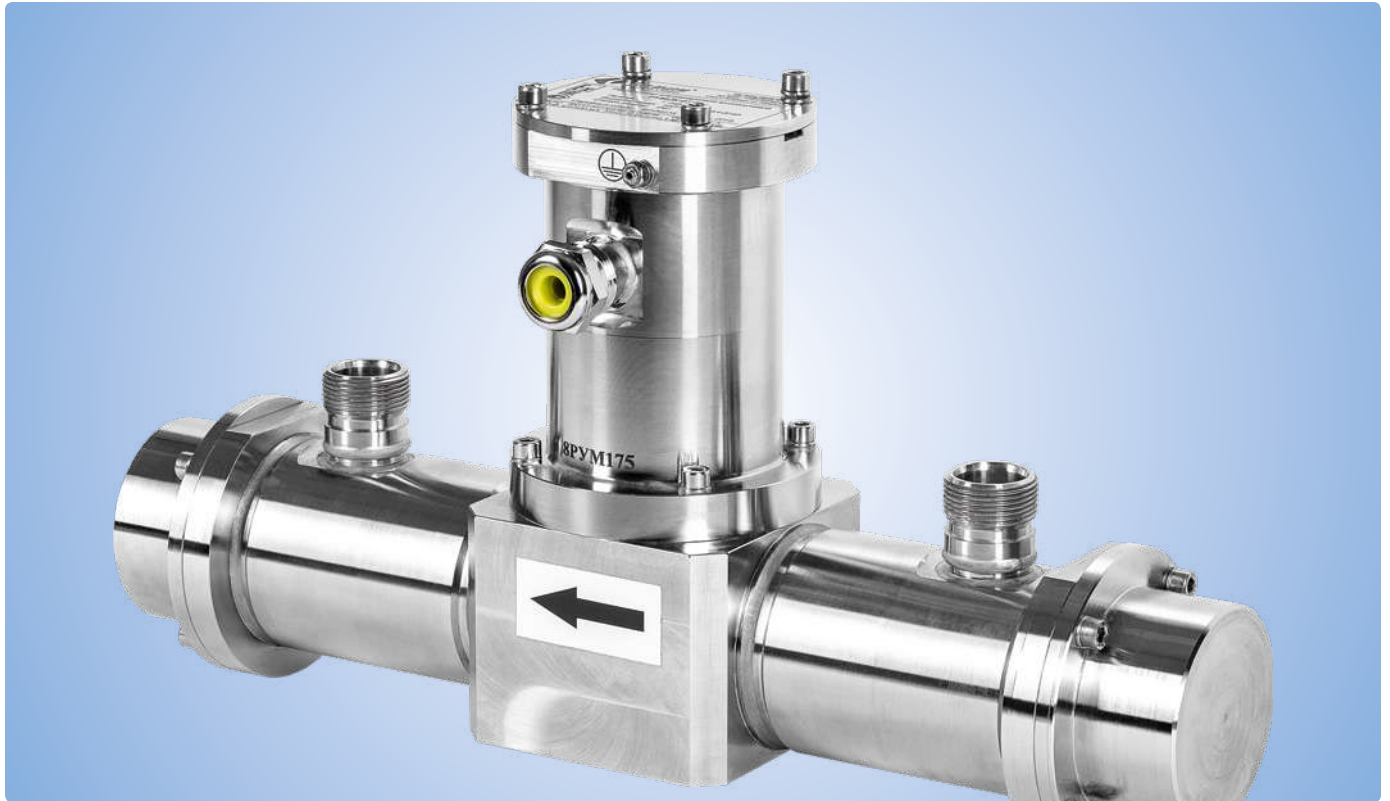
Multipath ultrasonic flow meters DN 15, 50, 125



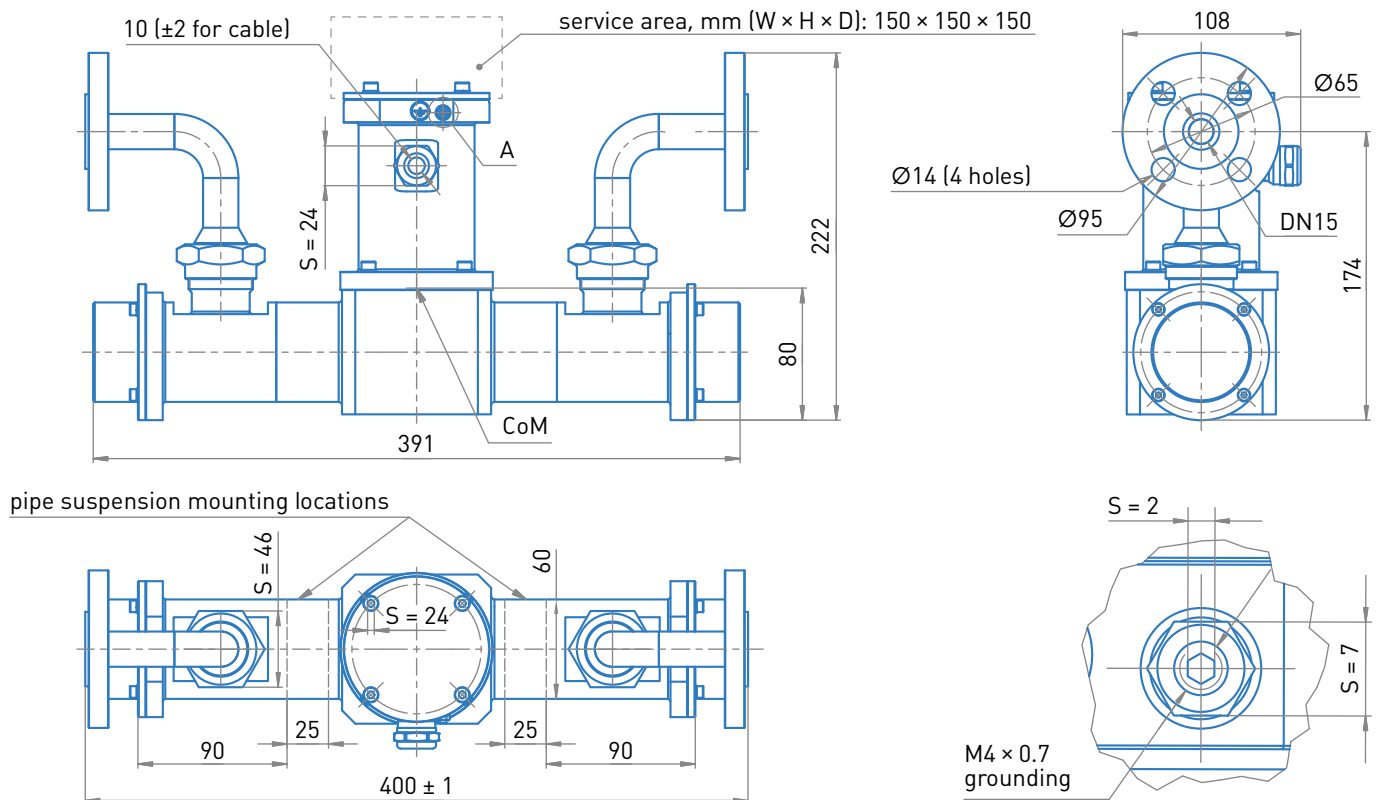
UMF flowmeter has a certificate of class approval of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

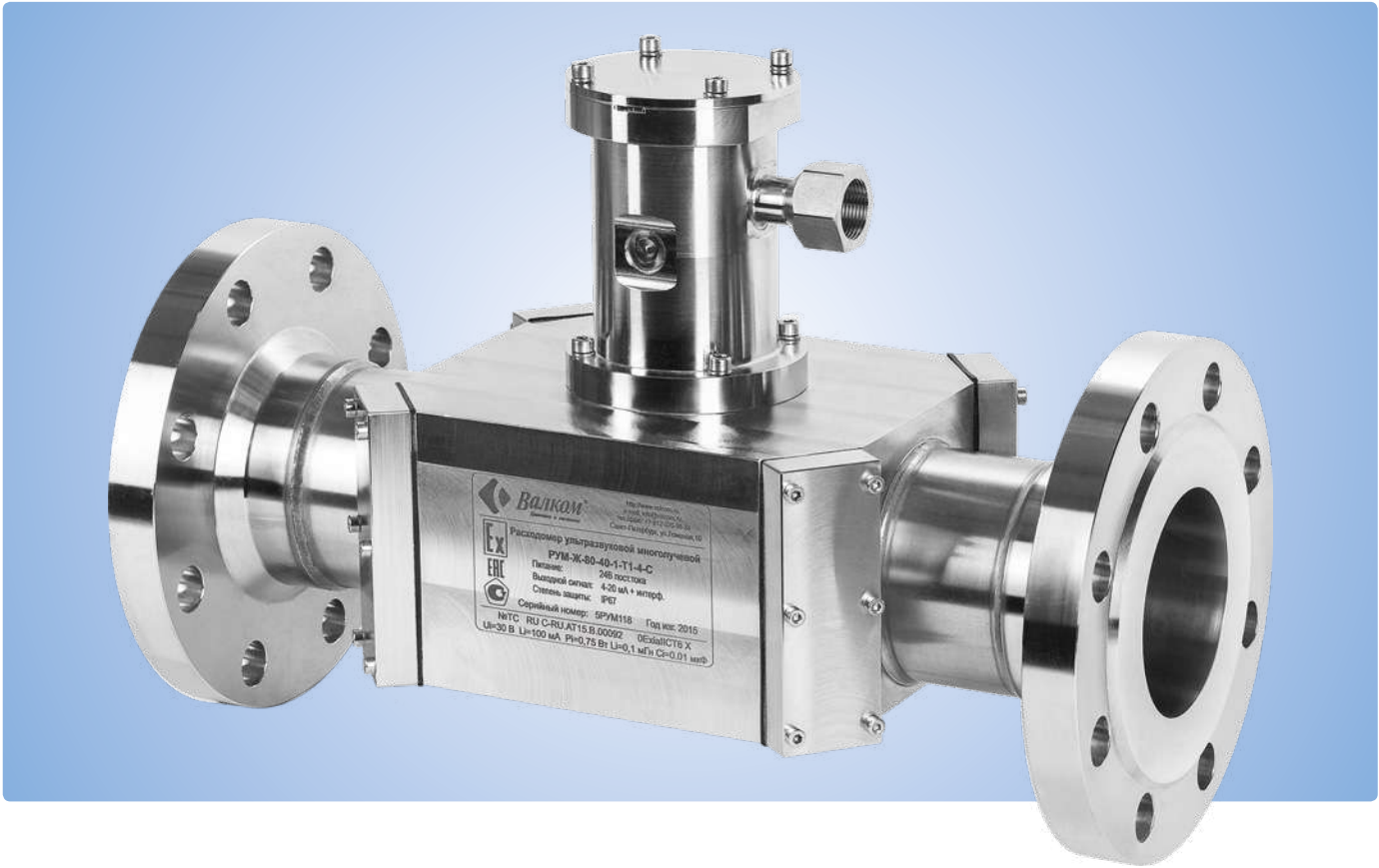
Ultrasonic multipath flowmeter DN15



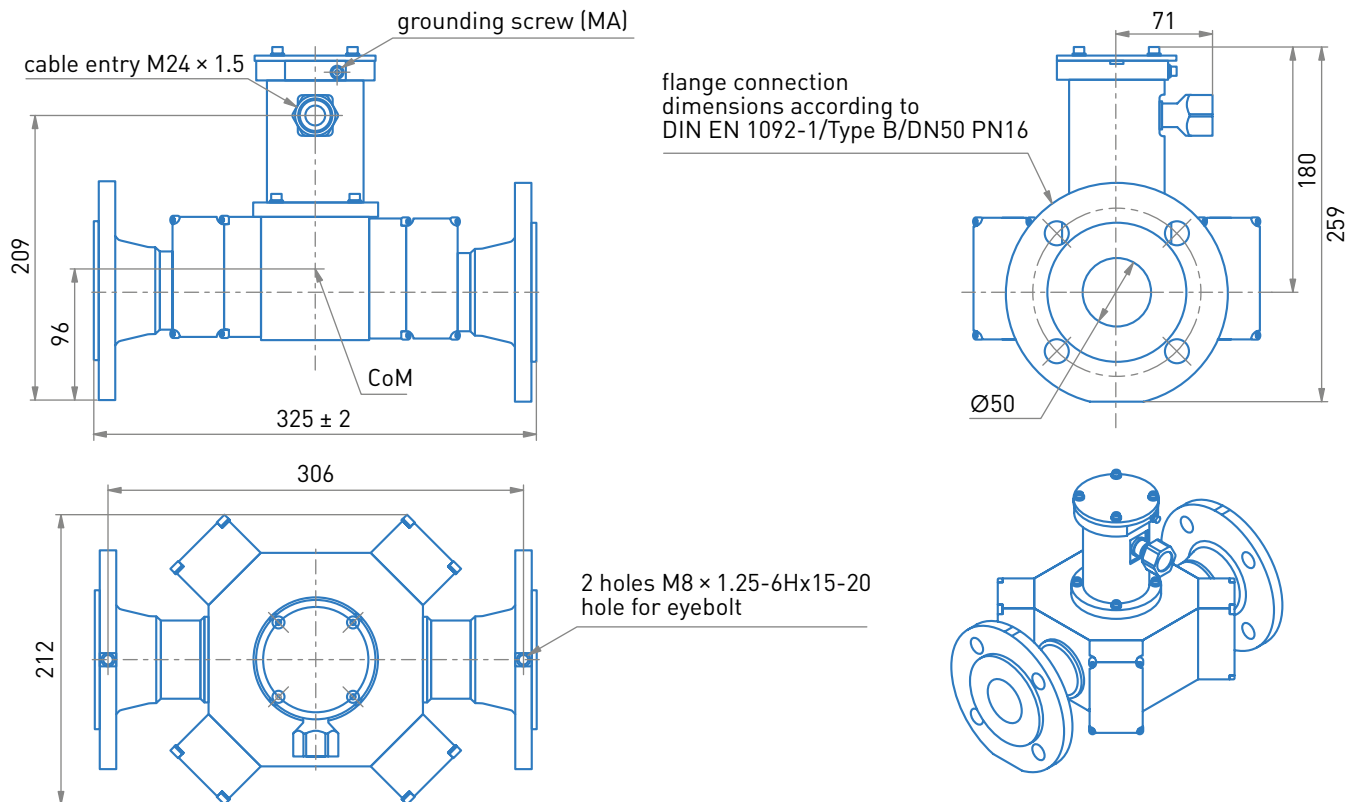
Dimensional drawing of flow meter DN15

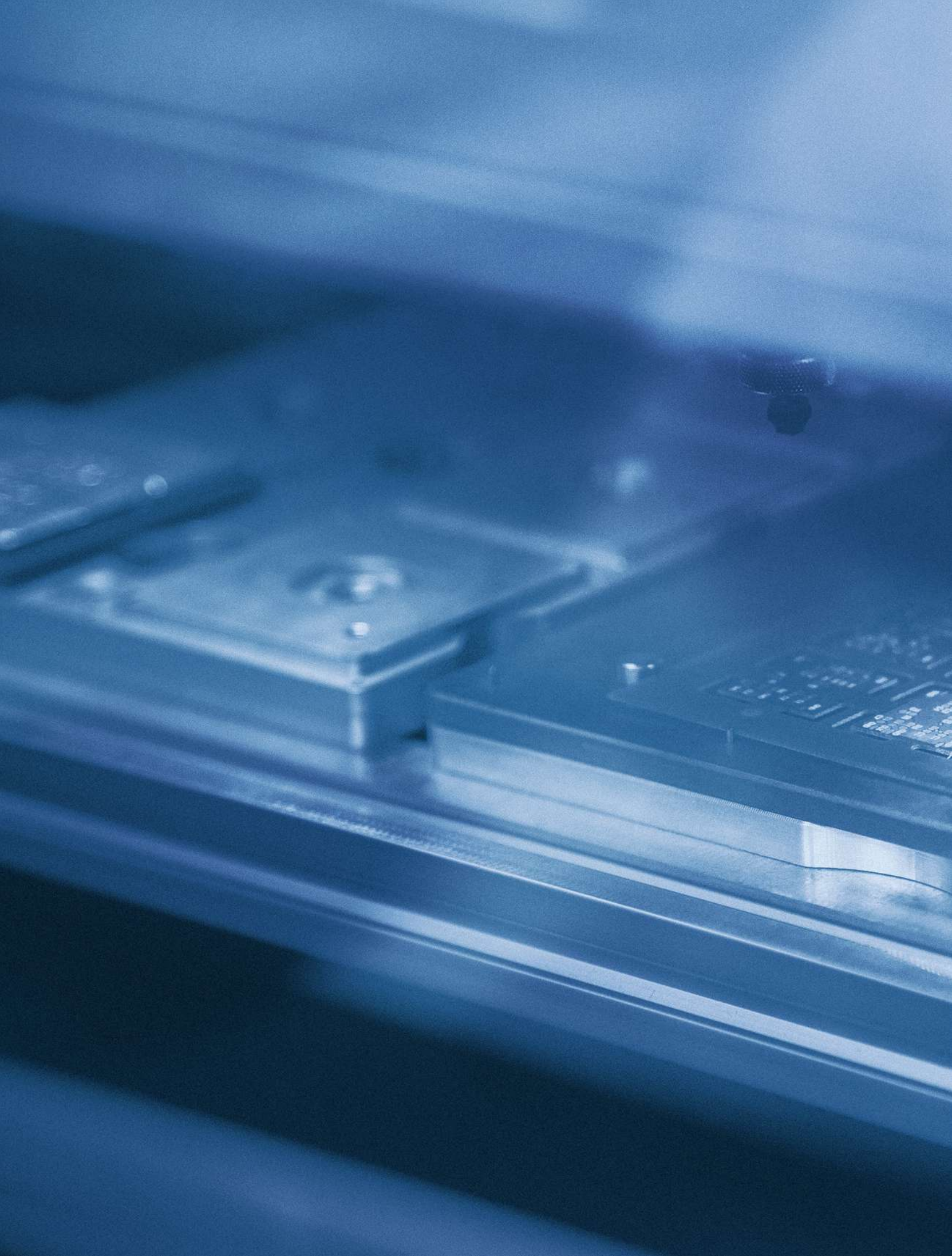


Ultrasonic multipath flowmeter DN50



Dimensional drawing of flow meter DN50





DATA ACQUISITION DEVICES



PI-485 SERIES INTERFACE CONVERTERS

PI-485 Series Products

PI-485 series interface converters are single-PCB microprocessor devices in plastic or metal housings and are used in automatic monitoring, regulation and process control systems in various industries, including marine automation systems.

PI-485 series devices provide for, depending on modification:

- acquisition and primary processing of signals from external sensors and devices;
- generation of output control signals;
- generation of WAS signals when the parameters get beyond the specified thresholds (warning or emergency);
- output of information about the measured values of signals and their parameters via interface communication lines;
- conversion of Ethernet<->RS-485, Hart<->ModbusRTU interfaces and protocols;
- providing explosion protection of the “intrinsically safe electrical circuit” type.

PI-485 series

Обозначение	Description
PI-485-CB-32A	It is designed for acquisition and processing of input analog and discrete signals, as well as generation of analog and discrete control output signals
PI-485-CB-32D, PI-485-CB-64D	They are designed for acquisition and processing of discrete input signals, as well as generation of discrete control output signals
PI-485-P35Ex, PI-485Ex	Designed to connect up to four TGD, TLA, UPT, UTT, UTS meters or alarms via HART protocol, data transfer from meters in the automation to the upper level system via redundant RS-485 ModbusRTU bus. Provide explosion protection of the “intrinsically safe electrical circuit Exia” type
PI-485-CB-16P	Provides interface conversion Ethernet<-> 16 × RS-485



All PI-485 series devices have class approval of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

PI-485-CB-32A, PI-485-CB-32D, PI-485-CB-64D

Signal Acquisition and Processing Devices

PI-485-SV-xxx controllers provide acquisition and processing (delay generation, hysteresis, comparison with set points) of input analog and discrete signals, generation of WAS signals when the signals get beyond the specified thresholds and generation of analog and discrete control output signals.

Interaction with the upper level automation systems is carried out via redundant RS-485 bus and via ModbusRTU protocol.

Technical specifications of controller

Designation	PI-485-CB-32A	PI-485-CB-32D	PI-485-CB-64D
Processed signals			
analog input (4-20 mA)	32	—	—
discrete input	28	32	64
analog output (4-20 mA)	2	—	—
discrete output (relay)	10	32	16
Discrete output signals			
signal type	Relay NO contacts		
maximum voltage	36 VDC		
maximum switching current	0.5 A at 36 VDC		
Power consumption	0.7 W max.		
Dimensions (H × W × D)	98 × 181 × 126 mm		
Communication			
interface type	2 × RS-485		
transfer rate	9600, 19 200, 38 400, 57 600, 115 200 bps		
protocol	ModbusRTU		

PI-485-SV-32A and PI-485-SV-640 controllers



PI-485-P35EX, PI-485EX

Intrinsic Safety Barriers

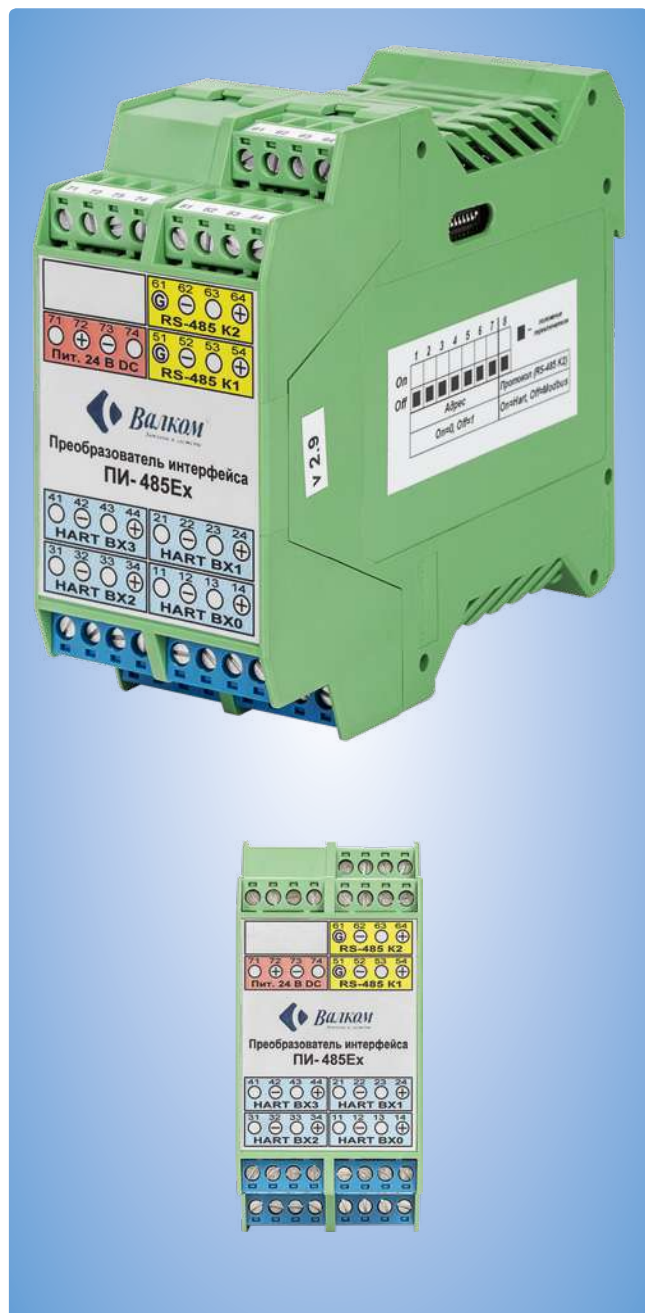
PI-485-P35Ex, PI-485Ex intrinsic safety barriers provide galvanically separated connection and power supply of up to four TGD TLA, UTS, UPT, UTT meters or alarms via HART protocol and data transfer from meters to the upper level automation system via redundant RS-485 Modbus RTU bus ensuring intrinsic safety of connected sensors.

PI-485-R35Ex, PI-485Ex modules additionally perform the functions of the intrinsic safety barrier providing explosion protection of the “intrinsically safe electrical circuit” type.

Technical specifications

Designation	PI-485-P35Ex	PI-485Ex
Power consumption	2 W max.	
Dimensions (H×W×D)	99×44×11 mm	81×241×120 mm
Explosion protection	[Exia]IIC	
Communication		
interface type	2xRS-485	
transfer rate	9600, 19 200, 38 400, 57 600, 115 200 bps	
protocol	ModbusRTU	
Version	Within plastic housing onto DIN-rack	

PI-485Ex Interface Converter



PI-485-CB-16P

Ethernet<->RS-485 Interface Converter

PI-485-CB-16P products are designed to connect devices with RS-485 output to Ethernet networks, as well as to convert RS-485 interfaces to USB.

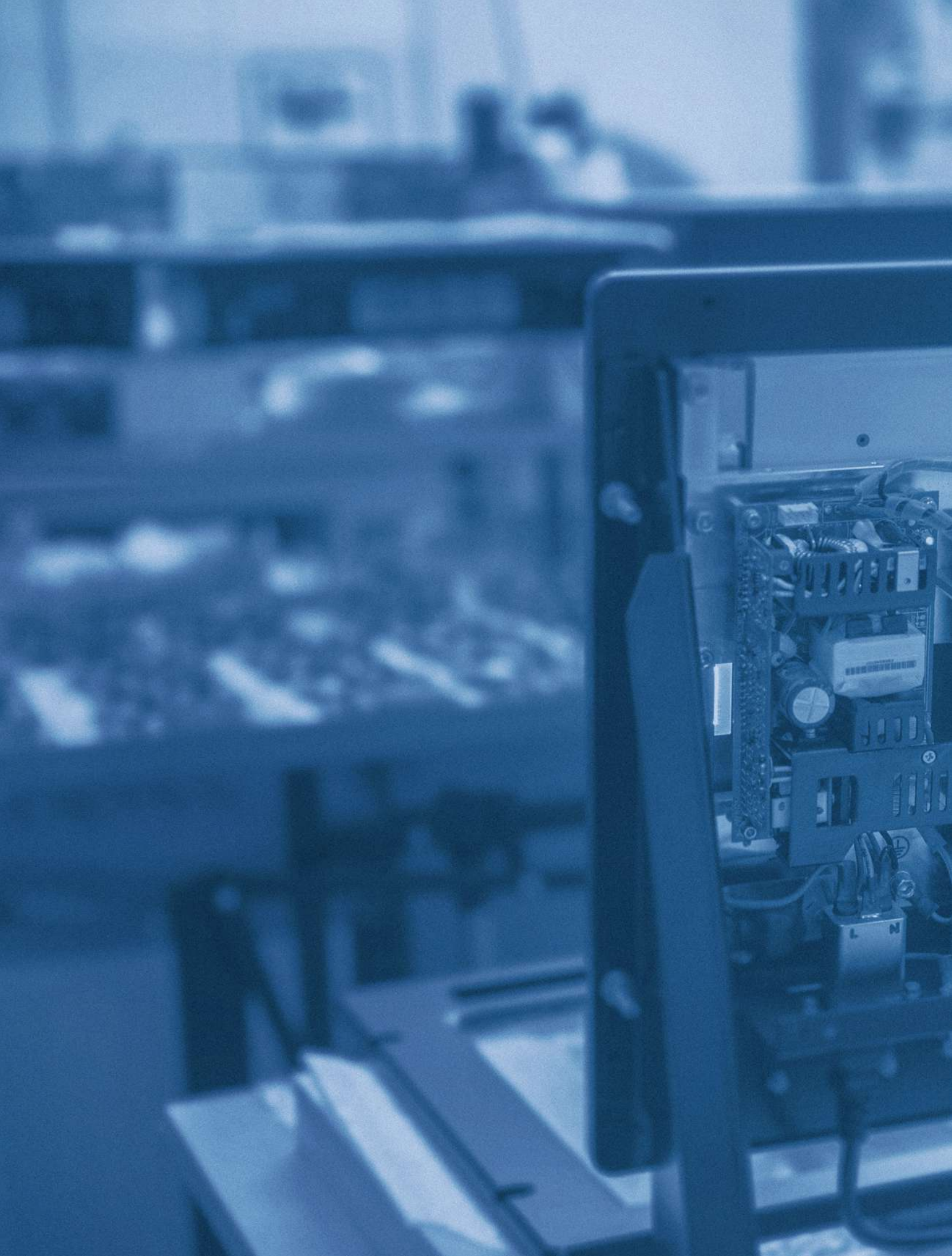
The product can work both in the mode RS-485<->Ethernet/USB physical interface conversion, and in the mode of ModbusRTU<->ModbusTCP gateway. The software supplied with the converter provides operation with devices connected to RS-485 ports via virtual COM ports.

PI-485-CB-16P interface converter

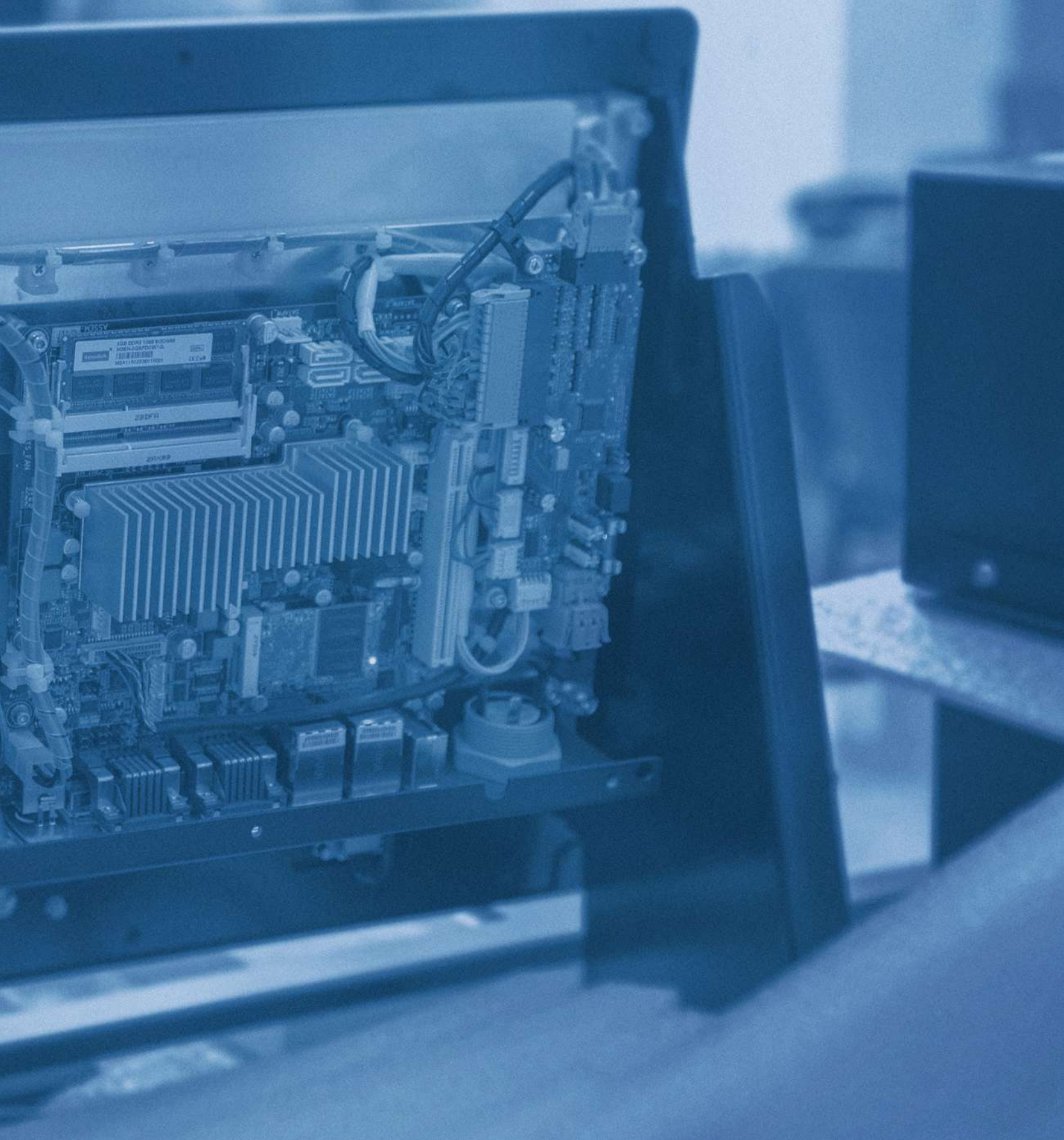
Technical specifications

Designation	PI-485-CB-16P
Power consumption	6 W max.
Dimensions (H × W × D)	128 × 203 × 73 mm
Explosion protection	IP20
Communication	
number of Ethernet ports	1
number of RS-485 ports	16
number of USB ports	1
Galvanic isolation of RS-485 ports	6 kV
ESD-protection of RS-485 ports	15 kV





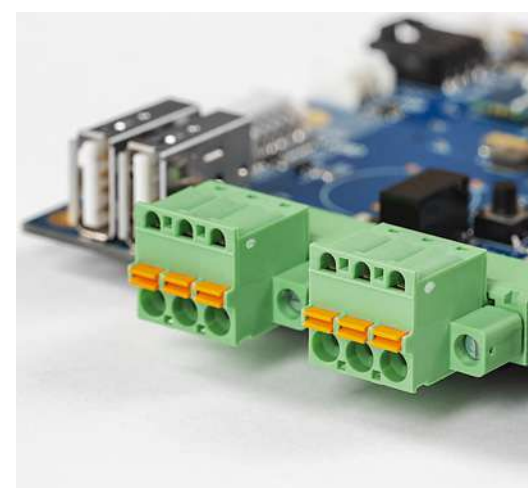
MARINE COMPUTERS AND MONITORS



Valcom develops and makes produces monitors, panel computers and software to them. All equipment can be either purchased separately or order a comprehensive project



MOS-B system unit



MOS-mini A-20 PCB



Marine panel computer MOS-24

Panel with connectors for connection of MOS-19 marine computer equipment



Software CD — SCADA OSSY-NG

MOS-7 marine panel computer

MOS PANEL COMPUTERS AND MOS-M SERIES MONITORS

7 to 46" Display Diagonal

MOS series panel computers and MOS-M series monitors are designed to operate in different vessel and ship automation systems as computing units being a part of automated workstations (AWS) of operator, as large screen displays under Linux, QNX and Windows operating system families.

MOS and MOS-M series computers and monitors are used in video surveillance, electronic cartography, warning alarm (WAS) systems, etc.

Design of panel computers provides possibility of installation in consoles, panels, cabinet doors, installation on counter-tops with brackets, suspension installation.

MOS and MOS-M series include panel computers and monitors with display diagonal sizes of 7, 10, 12, 15, 19, 24, 27 and 46 in. All products are provided with direct adjustment of brightness of display backlight, which allows them to be used in navigation systems and other systems that require installation of operator stations on the navigating bridges.

Various modifications of MOS computers and MOS-M monitors have:

- function pushbuttons with backlight F1-F5 with ability to configure their purpose and backlight control (for MOS series computers);
- built-in buzzer;
- output relay signals.

Technical specifications of panel computers

Power supply	220 VAC 50 Hz or 24 VDC
Degree of protection	IP44 for front side, IP22 for rear side
Processor	Intel Core i3 Intel Core i5 Intel Core i7 Intel Celeron ARM Allwinner A20, 1 GHz ARM Cortex-A72 (6 core), other
RAM	Up to 8 GB
Hard drive	Up to 1 TB
FLASH	available for some versions
Interfaces	HDMI, VGA, GigabitEthernet — up to 4 ea. USB 2.0/USB 3.0 (including of the front-panel) Audio Line-In/Line-Out/Mic-In RS-232/422/485 serial interfaces — up to 16 ea.
Touch screen interfaces	available
Built-in buzzer	available for some modifications
Output relays	available for some modifications of 4 ea. with loading capacity of 0.75 A at 18-36 V
Function buttons F1-F5	available for some modifications
Supported OS	Windows 7/8/10 Linux, including AstraLinux QNX



All produced panel PCs and monitors have class approvals of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

MOS Panel Computers and MOS-M series monitors



MOS-46 PANEL COMPUTERS AND MOS-M46 MONITORS

Display diagonal size of 46"

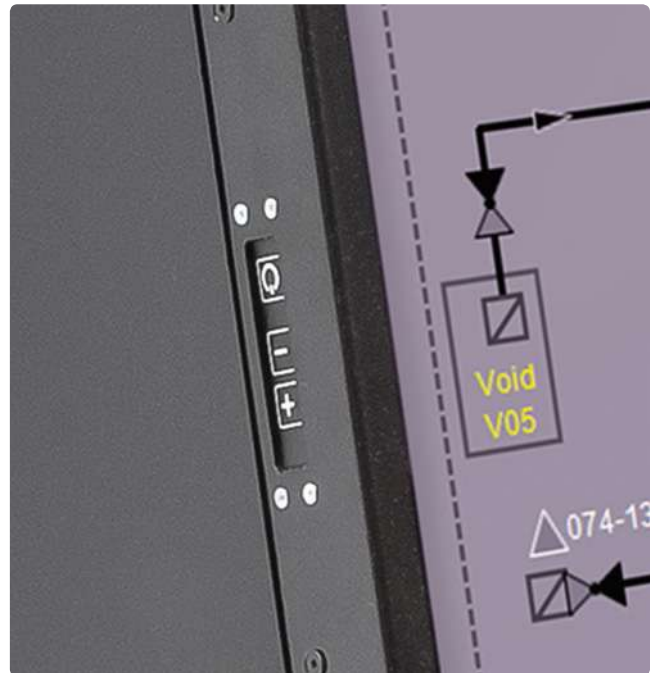
Panel computers and monitors with a display diagonal of 46" — MOS-46 and MOS-M46 are designed for use in automation systems, navigation systems, video surveillance systems.

Also used as large screen displays (LSD). Several MOS-M46 monitors can be combined into a single video wall (matrix display).

Anti-reflective glass is used to protect the LCD. During production of MOS-46 and MOS-M46, technology of optical gluing of the LCD display and protective glass is used to achieve high-definition images and increase rigidity of the structure. Versions with touch screens are possible.

Controls that enable on/off switching and adjust the brightness of backlight are located on the RH and LH ends of the monitor, which allows docking several monitors close to each other and forming a single video wall of several monitors. Brightness of the monitors can also be controlled remotely via digital interface.

Function keys. Located on the RH and LH ends of the monitor



MOS-M46 monitor of operator station



TSS/NAV VIDEO WALL

Bridge Display System

TSS/NAV system is designed to facilitate the work of the captain or deck officer in the vessel management.

TSS/NAV allows displaying up to 16 different sources of ship data simultaneously on a large screen display (video wall): radar, navigation sounder, fish finder, electronic maps, calculating device for vessel dynamic stability, engine parameters, data from the automated control system, video cameras, etc. TSS/NAV complex also makes it possible to quickly reconfigure the data type on the large screen display, depending on the task.

The main component of the video wall is a matrix display consisting of several MOS-M46 monitors of own production with a diagonal display of 46 inches. The matrix display can include from 2 to 10 MOS-M46 monitors.

Functions:

- ability to combine images;
- brightness control;
- video screen saving configurations;
- control of video sources from one console;
- ability to save and load individual display configurations.

The captain or deck officer has the ability to adjust and switch screens using the touch panel, as well as create and save the desired setting for any sailing, fishing conditions and time of day, as well as personal preferences. When changing the watch or working conditions, one only needs to select the desired display configuration from the list.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

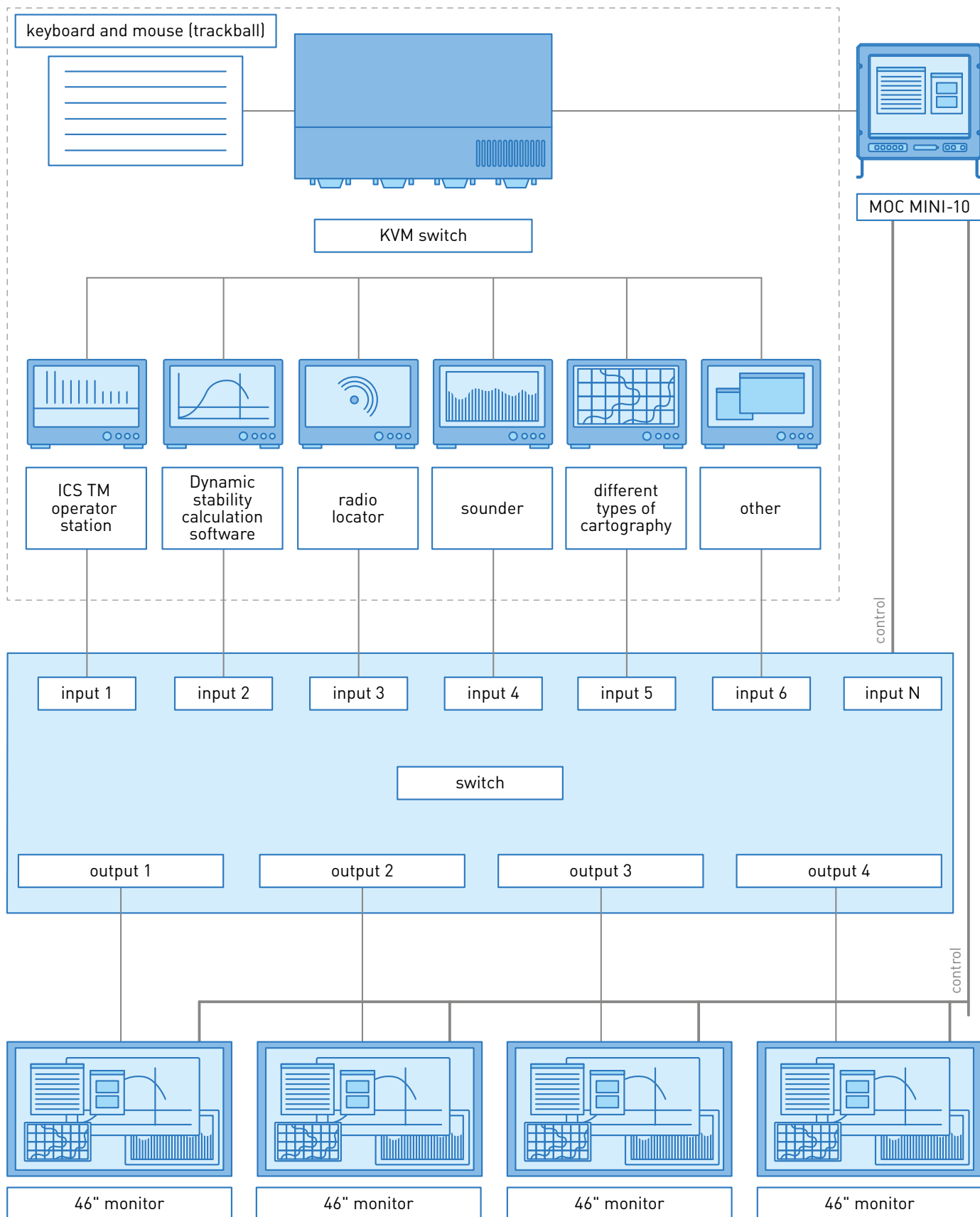
Key characteristics of TSS/NAV complex

Overall dimensions of MOS-M46 monitor	1051 × 605 × 149 mm
Resolution of MOS-M46 monitor	1920 × 1080 px
Power supply	220 VAC 50 Hz or 24 VDC
Weight of one MOS-M46 monitor	41 kg max.
Number of monitors in the video wall	2 to 10
Number of connected data sources	up to 16
Video inputs	VGA, DVI, HDMI

TSS/NAV complex



Flow chart of video signal sources to TSS/NAV video wall connection



MOS-B SERIES SYSTEM UNITS

Computer Equipment of Automation Systems

MOS-B series system units are designed to operate in various vessel and ship automation systems as computing units being a part of automated workstations (AWP) of the operator.

MOS-B series system units are used in video surveillance, electronic cartography, warning alarm (WAS) systems, etc.

Technical specifications of MOS-B series system units

Parameter	Value
Power supply	220 VAC 50 Hz or 24 VDC
Degree of protection	IP20
Overall dimensions	166×330×313 mm (W×H×D)
Weight	7.5 kg max.
Processor	Intel Core i3, Intel Core i5, Intel Core i7, Intel Celeron, ARM Allwinner A20 (1 GHz), ARM Cortex-A72 (6 core), other
RAM	Up to 8 GB
Hard drive	Up to 1 TB
Supported OS	Windows 7/8/10, Linux, including AstraLinux, QNX

Interfaces

RS-232 port	2 ea. (non-isolated ports)
RS-485 port	16 ea. — 2.5 kV galvanic isolation; EDS — 15 kV port protection
Output relays	4 ea. with a load capacity of 0.75 A at 18-36 V
GigabitEthernet port	2 ea.
USB 3.0 port	4 ea.
video	HDMI, DVI-D
audio	Line-in, Line-out, Mic-in

MOS-B series system unit, front and rear panel view



MOS-B system units have class approvals of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

SCADA OSSY-NG

Software

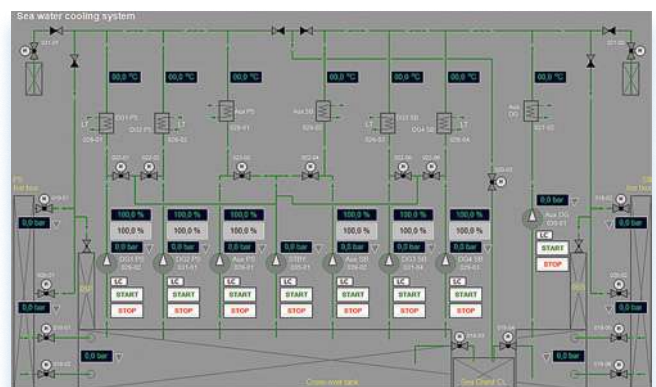
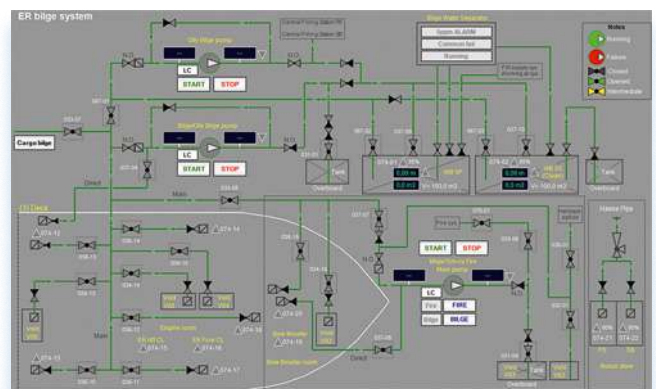
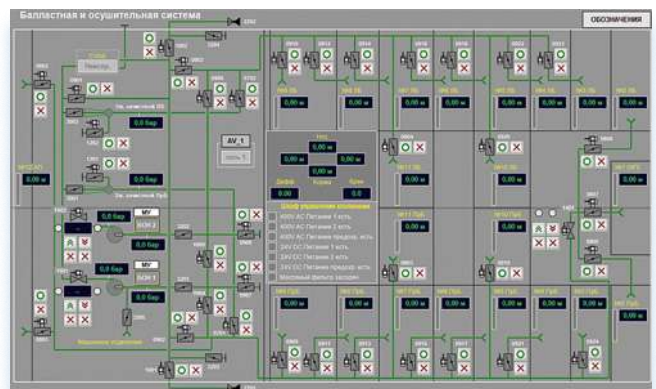
SCADA OSSY-NG is a modern Russian multi-operational development in the field of process control automation, which combines high operational performance, wide functionality and reasonable cost.

Distinctive features of SCADA OSSY-NG:

- fully Russian development;
- absence of excessive functionality inherent in almost all foreign universal systems;
- ability to quickly adapt to different process tasks;
- ability to create multi-level DCS of any complexity;
- ability to operate with the lower level automation manufactured by any manufacturer;
- powerful tools of graphic designing, filling of databases and linking of the system to implementation facility;
- stability of operation confirmed by practice;
- simulation of signals from the equipment.

Valcom's hardware and software — data acquisition and processing devices, sensors, SCADA OSSY-NG — are integrated into a single hardware-software complex, based on which TSS/Control, TSS/Cargo, TSS/Control Docking automation systems, fuel consumption control systems, and other automation system manufactured by Valcom are built.

An example of a SCADA OSSY-NG interface





CONTROL PANELS AND ALARM SYSTEMS



CC, CCR, SCS CONSOLES

Control Consoles

Control consoles designed to organize automated workplaces of operators (watch mechanical engineers) and are steelworks, in which operator station, controls, indicators, communications equipment, etc. are mounted.

Control consoles are composite, consisting of separate sections, equipped with handrails and are designed for operator sitting or standing work.

Inside the sections, electrical, communication and other equipment is installed to ensure the operation of embedded equipment and its interaction with external devices.

Any necessary equipment, both manufactured by Valcom and third-party suppliers, can be installed into the panels.

Control consoles can be supplied either as part of TSS/Control TSS/Cargo TSS/BMS TSS/Control Docking automation systems, and separately.

The consoles are designed and manufactured according to the customer's sketches and own projects.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.

Remote control on a project TSHD1000 dredger



Central control console on a transport and installation barge "YuryKuvykin"



LIGHT AND SOUND SIGNAL COLUMNS

Engine Room Generalized WAS Alarm

Signal columns are designed for generalized light (light and sound) warning alarm system in various premises, in particular in engine rooms.

The signal columns are equipped with rotating light signaling devices.

In the basic version, it is one yellow rotating lamp.

Several light signaling devices (rotary lamps) can be installed. Electrical diagram of the light signal column shall be as per the design documentation for a specific order.

Colors, symbols and the number of identifiers of the column light signals comply with requirements of the "Rules of Classification and Construction of Vessels" of the Russian Maritime Register of Shipping and the Russian River Register. A ship-wide general emergency alarm is output additionally.

Cabinets of light signal columns are available in two versions — standard and compact.



Light column in standard version

EMERGENCY ALARM SYSTEM

Ship-wide alarm signaling

The emergency alarm system provides for supply of a ship-wide alarm and other alarm signals emitted by light and sound devices, according to the rules of the Manual on Fight for Survivability of Ships.

The system includes:

- automatic emergency alarm;
- signal devices — light and sound.

The emergency alarm system has up to five alarm modes:

- manual mode;
- ship-wide/boat alert;
- man overboard;
- radiation hazard;
- gas alarm.

Number of operating modes of a particular system shall be determined by the customer. Operator switches on the required alarm mode by pressing the corresponding buttons on the control panel.

The control panels of the emergency alarm system shall be installed in the wheelhouse and in the room designed for keeping watch when the vessel is parked in the port, if any on the vessel. Light and sound devices are installed in the engine rooms, in public premises, on open decks, in corridors of accommodation, office and public premises in accordance with requirements of the relevant classification agency.

Remote control of the emergency alarm system



The emergency alarm system meets the requirements of RS and RRR.

Detailed information on possible versions, order codes and specifications can be found on the Valcom's website.



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