



More than **sensors + automation**



Shipbuilding Industry

Innovative solutions for your success





Dear Reader,

The shipbuilding industry has high and varied demands on measuring devices. Equipment for this industry must have a secure process, long-term stability, and be unsusceptible to the salty humid sea air. In addition to the salty air, the devices are exposed to strong vibration, shocks, heat, cold, and dust. Various country-specific guidelines (e.g. GL, Det Norske, or Bureau Veritas) develop and verify design and material standards for the construction and operation of ships. These standards ensure that the used equipment meets the above requirements.

For both cruise ships as well as cargo ships JUMO – as your reliable partner – is at your side, assists you with all your questions, and provides quick solutions.

So how do we do it? By applying our experience and professional expertise.

JUMO has already been a leading manufacturer of measurement and control systems for more than 60 years and, con-

sequently, has been a professional partner to the shipbuilding industries. New developments, improvements to existing products, and more economical production methods are particularly important to us because only by following this strategy can the highest level of innovation be ensured. JUMO provides the best for the shipbuilding industry with a number of solutions for a variety of different applications.

This brochure provides an overview of the JUMO products that are available for the shipbuilding industry. Of course we would be delighted to work out specific, individually customized solutions with you.

PS: Detailed information about our products can be found under the specified type/product group number at www.industry.jumo.info.



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Heating and cooling systems

Heat exchangers are technical devices which are used to transfer thermal energy from one medium to another. Usually heat exchangers use water to transfer heat, but sometimes other fluids and even solids may be used.

Normally the function of heat exchangers is to maintain heat during ventilation or passive cooling. In addition, heat exchangers are used to recycle heat from engines and exhaust gas.



Heating and cooling systems

Operation

A heat exchanger helps to transfer heat from one liquid or gas to another. Some types of heat exchangers mix the two different liquids, but other types include a solid wall which separates the liquids and prevents them from mixing. In addition, heat exchangers are available in which so-called fins are used in connection with the wall

to increase the surface while reducing the resistance. To make the most efficient heat exchangers possible usually the wall space between fluids has to be maximized while minimizing fluid flow resistance. JUMO's temperature and pressure sensors control and monitor the process.

JUMO DICON touch

Two-channel process and program controller with paperless recorder and touchscreen
Type 703571



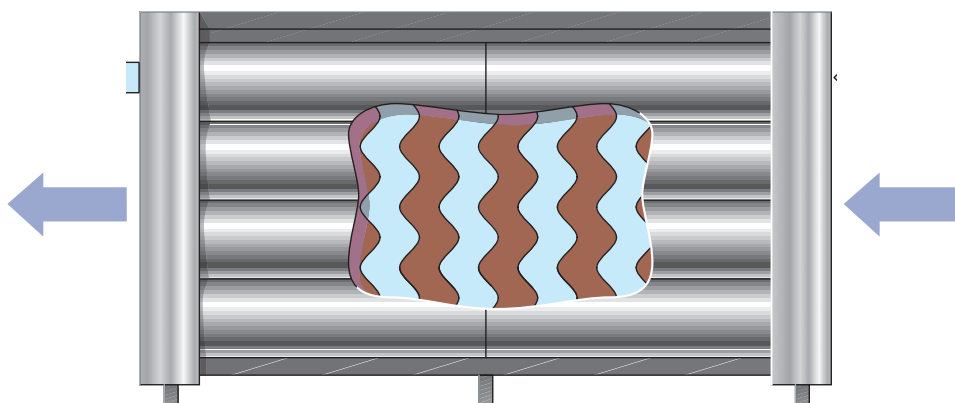
JUMO Etemp B

Screw-in RTD temperature probe
Type 902023



JUMO dTRANS p20

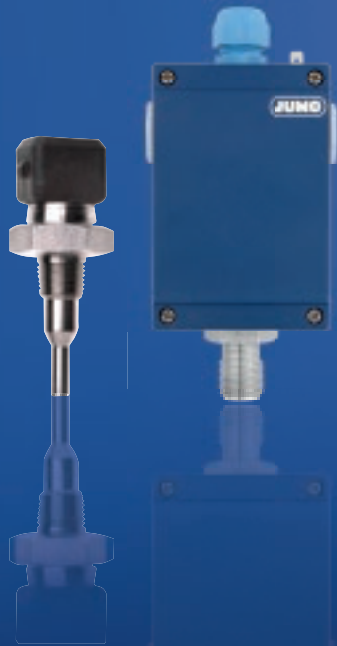
Process pressure transmitter with display
Type 403025





Engine room

Ships generate extreme loads on the components of the engines and compressors. The high temperatures this process produces mean that some of the mechanical components have to be constantly monitored. Reliable measurement technology from JUMO helps you monitor temperature and pressure in engines and compressors.



Engine room

The engine room of a ship typically contains several engines for different purposes. Main or propulsion engines are used to turn the ship's propeller and move the ship through the water. They typically burn diesel oil or heavy fuel oil and can sometimes switch between the two. Many propulsion arrangements for motor vessels are available. These include multiple engines, propellers, and gear-boxes.

The JUMO VIBROtemp screw-in RTD temperature probe stands out because of its robustness in demanding installation situations. It provides accurate temperature values for the engine and lubricating oil as well as for engine control.

Temperature and pressure monitoring in the compressor

Two generic principles for the compression of air (or gas) exist: positive displacement compression and dynamic com-

pression. Positive displacement compressors include, for example, reciprocating (piston) compressors, orbital (scroll) compressors, and different types of rotary compressors. Temperature and pressure measurement are important measurands in a compressor. JUMO Pt100 sensors are an excellent choice to maintain a secure process. The temperature probe recognizes if the temperature is too high or low and gives the control system a signal if something is wrong. A pressure sensing body such as a diaphragm is used to measure pressure. The mechanical signal from the diaphragm is then converted to an electrical signal (4 to 20 mA or 0 to 5 V). The JUMO MIDAS pressure transmitter series is a perfect choice to control the pressure in the compressor.

JUMO VIBROtemp

Screw-in RTD temperature probe with plug connector
Type 902040



JUMO MIDAS

Pressure transmitter
Type 401001



Single and double surface-mounted thermostat

With capillary or rigid thermowell
Type 605060



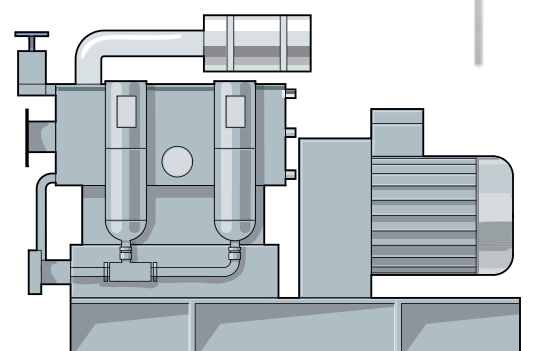
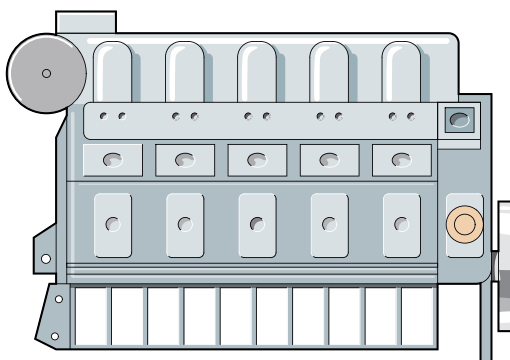
High precision pressure switch

HNSPX-Ex-1 - HNSPX-Ex-2 "i" and "t" series
Type 405071



RTD temperature probe

With BV (Bureau Veritas) marine certification
Type 903564





Separator

The separator is the principle component of a number of high-efficiency heavy fuel oil separation systems in the ship. Untreated oil that is heated to the correct temperature is fed continuously to the separator so that impurities can be cleaned. After centrifugal separation, cleaned oil is continuously pumped away and separated sludge as well as water accumulate at the bowl periphery.

A water transducer in the clean oil outlet measures the capacitive resistance and signals changes to a control unit. Depending on the water content, the control unit either opens the drain valve or expels the water through the bowl discharge ports during sludge discharge.

JUMO heatTHERM

Panel-mounted thermostat
Type 602031



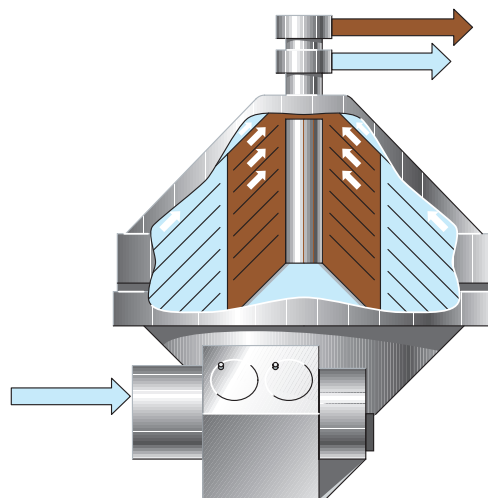
JUMO eTRON M

Electronic microstatat
Type 701060



JUMO screw-in RTD temperature probe

With form J terminal head
Type 902030





Gas and oil tanks

Temperature and level measurement in gas and oil tanks

The liquefaction of the gas can be carried out under a pressure of approximately 10 bar while cooling the medium at the same time. Due to the pressure and temperature stress on the material the tanks are made of special stainless steel and insulated from the hull. Usually spherical tanks that rise half-way out of the ship's deck line are used to transport oil or liquid gas.

LNG pressure measurement at low temperatures

The pressure inside the vessel must be continuously monitored because the liquefaction process strongly depends on it. To monitor the pressure inside the vessel at these extremely low temperatures, the medium must be heated to the pressure transducer via evaporation lines at $-40\text{ }^{\circ}\text{C}$. The JUMO dTRANS p20 DELTA masters this measuring task.



JUMO dTRANS p20 DELTA
Ex d differential pressure transmitter with flameproof enclosure
Type 403023



JUMO dTRANS p20
Process pressure transmitter with display
Type 403025



High precision pressure switch
HNSPX-Ex-1 - HNSPX-Ex-2 "i" and "t" series
Type 405071



JUMO dTRANS p33
Pressure transmitter and level measurement probe for application in explosive areas
Type 404753



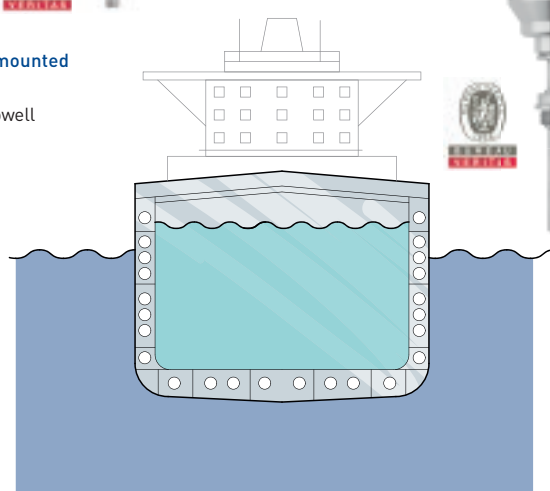
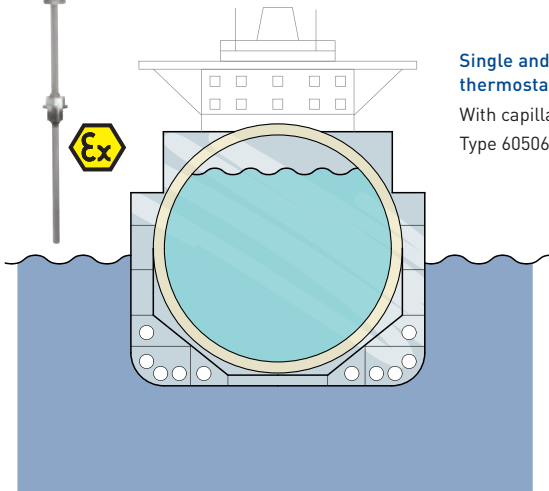
JUMO PROCESStemp
RTD temperature probe for process technology
Type 902820



RTD temperature probe
With BV (Bureau Veritas) marine certification
Type 903564



Single and double surface-mounted thermostat
With capillary or rigid thermowell
Type 605060





Water and wastewater treatment

Water is crucial on ships. Water must always be treated regardless of whether it will be stored or directly gained from seawater. JUMO probes for pH, conductivity, pressure, and level support the process while at the same time ensuring that the water has a consistently high quality.



Water and wastewater treatment

Pressure measurement before reverse osmosis

The crucial element in seawater desalination plants is the reverse osmosis (RO) unit. During reverse osmosis, the seawater is pushed through a semi-permeable membrane at high pressure. This membrane acts like a filter and only allows certain ions and molecules to pass through. Because seawater has such high salinity, a pressure of 60 to 80 bar is required. To ensure safe system operation, the pressure before reverse osmosis must be monitored. The obvious choice for this task is the JUMO MIDAS C18SW pressure transmitter.

Wastewater treatment

Depending on the size of the ship, wastewater is either stored or processed directly on board. The vessels that store waste dispose of it in the appropriate waste disposal facilities that are available at ports. Ships that handle wastewater directly use either membrane or biological treatment. The level needs to be monitored in all systems to prevent overflow. The pH-value and conductivity measurement is necessary to check the water quality before and after the water treatment in both systems. You can measure, control, record, and display all tasks of the water and wastewater treatment.

JUMO AQUIS touch S/P

Modular multichannel measuring devices for liquid analysis with integrated controller and paperless recorder
Type 202580/202581



JUMO tecLine CR

Electrolytic conductivity cell
Type 202924



JUMO MIDAS C18 SW

OEM seawater pressure transmitter
Type 401012



JUMO tecLine Cl2
Sensor for free chlorine
Type 202630

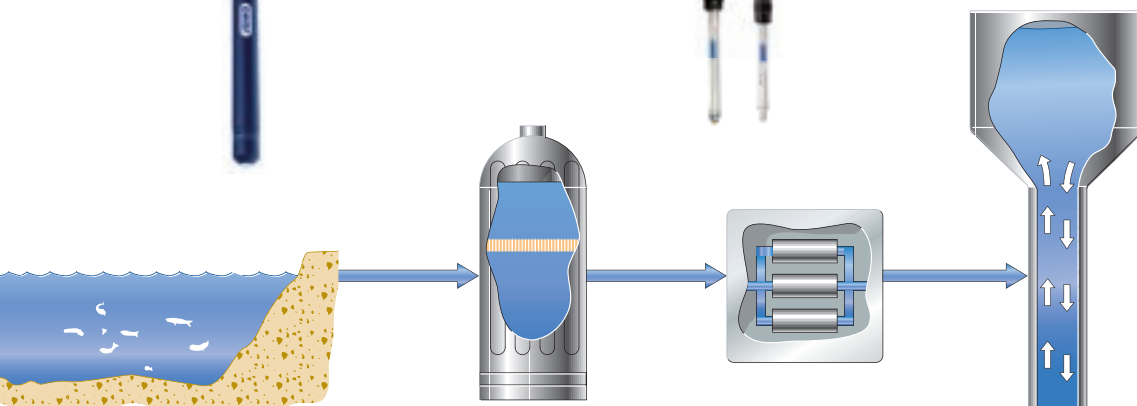


JUMO tecLine pH
Combination electrode
Type 201020



JUMO CTI-500

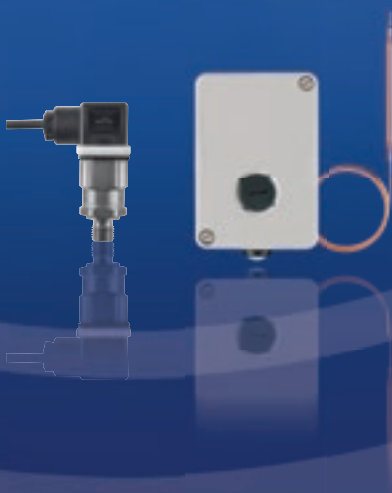
Inductive conductivity/concentration and temperature transmitter with switching contacts
Type 202755





Ballast water management systems

Cruise ships, large tankers, and bulk cargo carriers use a tremendous amount of ballast water. It is often taken on in the coastal waters in one region after ships discharge wastewater or unload cargo – and then the ballast water is discharged at the next port of call where more cargo is loaded. Ballast water typically contains a variety of biological materials including plants, animals, viruses, and microorganisms. These materials often include non-native, exotic species that can cause extensive ecological and economic damage to aquatic ecosystems. The reliable measurement of JUMO products provides support in the treatment of ballast water.



Ballast water management systems

Tank management with JUMO sensors for both level and temperature sensors gives you full control related to tank control and monitoring in all ship types and offshore installations. JUMO products can monitor the level in tankers, bulk carriers, passenger vessels, supply, and offshore rigs with JUMO pressure sensor JUMO MIDAS C18 SW or level probe JUMO MAERA F27.

The controlling systems (e.g. JUMO mTRON T) allow the monitoring of alarm and separate parameters such as

level, pressure, temperature, and flow. The system controls valves, pumps, actuators, motors, and other equipment as required. The user interface can be adapted to match any application and customer-preferred layout.

JUMO also provides conductivity sensors and sensors for chlorine to measure the quality of the ballast water.

JUMO dTRANS AS 02

Transmitter/controller for standard signals and temperature
Type 202553



JUMO screw-in RTD temperature probe

Probe with plug connector according to DIN EN 175301
Type 902044



JUMO surface-mounted thermostat

Model ATH.-SE
Type 603031



JUMO tecLine Cl2

Sensor for free chlorine
Type 202630



JUMO MAERA F27

Level probe
Type 404391



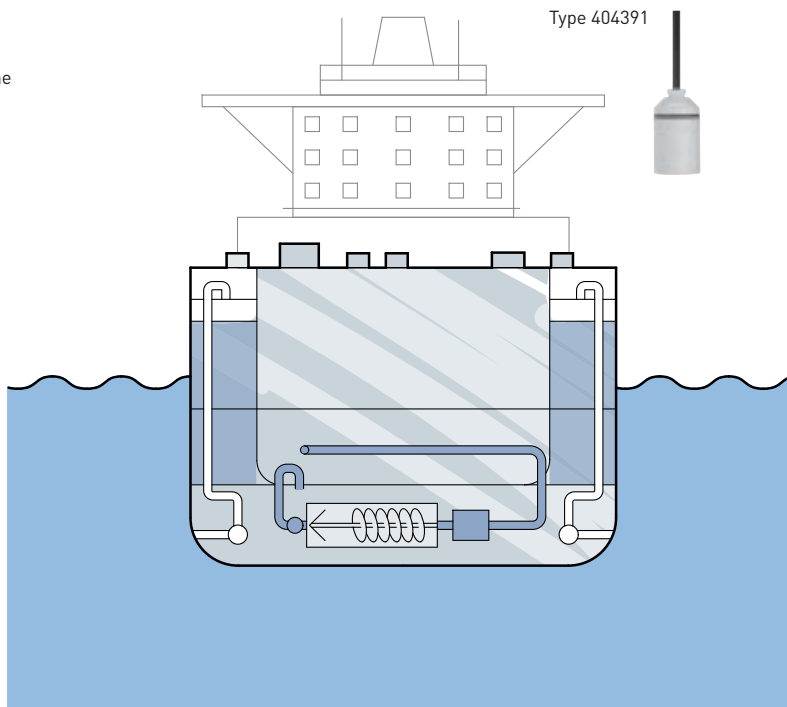
JUMO CTI-500

Inductive conductivity/concentration and temperature transmitter with switching contacts
Type 202755



JUMO MIDAS C18 SW

OEM seawater pressure transmitter
Type 401012



JUMO MIDAS S05

OEM pressure transmitter – universal
Type 401010





Heating, ventilation, and air-conditioning

Heating, ventilation, and air-conditioning (HVAC) – three closely related fundamental functions found in shipping.

HVAC is also known as a climate control system. This is because these three functions are essential in maintaining comfort in every dwelling and in every ship.

The primary use of HVAC is to regulate temperature, humidity, and air flow to ensure that these measured values remain within the normal range. High-quality measuring devices from JUMO are the ideal solution to ensure these applications.

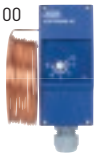


Heating, ventilation, and air-conditioning

Heating is significant in maintaining adequate temperature especially during colder weather conditions. Two classifications of heating exist: local and central. The latter is more commonly used because it is more economical. Furnace or boiler, heat pump, and radiator make up the heating system. **Ventilation**, on the other hand, is associated with air movement. Ventilation is necessary to allow carbon dioxide to go out and oxygen to get in, making sure that people are inhaling fresh air. Stagnant air causes the spreading of sickness (through airborne pathogens) and allergies. But it is also es-

sential to maintain an efficient ventilation system. Insufficient ventilation usually promotes the growth of bacteria and fungi such as molds because of high humidity. **The air-conditioning system** controls the heat as well as ventilation. Alternatively, the split system or remote coils can be used. However, air ducts must be properly cleaned as pathogens thrive there otherwise. Return-air grills are also vulnerable to chemical, microbiological, and radiological elements.

JUMO frostTHERM AT
Surface-mounted thermostat
Type 604100



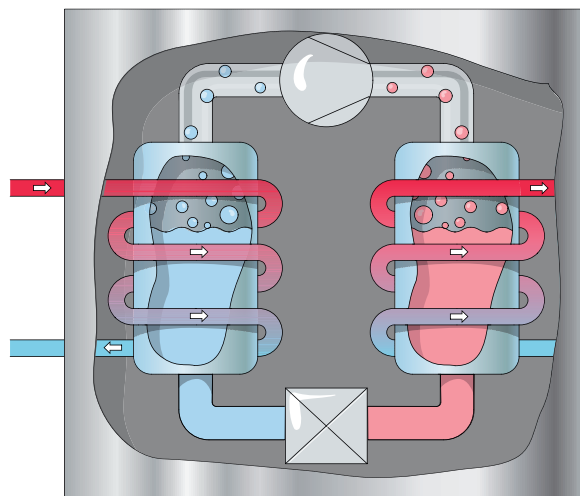
JUMO MIDAS S06
OEM pressure transmitter
Type 401011



JUMO safetyM STB/STW
Safety temperature limiter and safety temperature monitor according to DIN EN 14597
Type 701150



JUMO mTRON T
Measuring, control, and automation system
Type 705000



JUMO push-in RTD temperature probe
With connecting cable
Type 902150



JUMO safetyM STB/STW Ex
Safety temperature limiter and safety temperature monitor according to DIN 14597
Type 701155



JUMO surface-mounted thermostat
Model ATH.-SE
Type 603031



JUMO VIBROtemp
Screw-in RTD temperature probe with plug connector
Type 902040





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