JUMO

Railway Technology

Innovative solutions for your success

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christof.hau@jumo.net

Dear Reader,

A large number of people use rail vehicles every day. But only the manufacturers of these vehicles or their components know the extreme demands to which they are exposed.

Regardless of whether high-speed traffic, local passenger services or freight transport is involved, JUMO, your reliable partner, is at your side. JUMO quickly provides solutions for all your temperature and pressure measurement technology requirements in the vehicles.

How do we accomplish that? By applying years of experience and professional expertise. JUMO has been a leading manufacturer of measurement and control systems for more than sixty years. This has helped us become an accomplished partner for the railway industry.

We place special importance on regular new development cycles, on constantly improving existing products and on continually making production methods more economical. This is the only way that we can achieve the highest level of innovation.

JUMO also offers you only the best in railway technology: a wide range of products for a large variety of solutions for the most diverse applications.

This brochure provides an overview of JUMO products and systems for railway technology. Of course we would also be happy to develop individual solutions that are, completely customized to your requirements.

Best regards,
Christof Hau

PS: You can find detailed information about our products in the specified type product group number at
www.industries.jumo.info

Contents

Drive technology

In rail vehicles, generating movement by means of power transmission imposes some extreme loads on the components of the drive system. The high temperatures this produces some of the mechanical components have to be constantly monitored. Reliable measurement technology from JUMO helps you monitor temperature and pressure in drive systems.

Electric traction

Temperature-dependent control of transformer cooling with AMTHF series surface-mounted thermostats

The electric driving motors of locomotives or railcars are designed for a far lower voltage than that present in the overhead contact wires of the traction lines. So transformers are used to transform the voltage down to a value that the motor can take.

The temperature of an oil-filled transformer will vary, depending on the power consumption during vehicle operation. To counteract overheating, a temperature-dependent cooling system that can incorporate the different power levels is used. The exact switching point of the cooling system is highly significant, particularly when there are vast fluctuations in ambient temperature, (e.g. when traveling through a tunnel). AMTHF series surface-mounted thermostats monitor the oil temperature of the transformer and reliably operate the individual cooling system power levels.

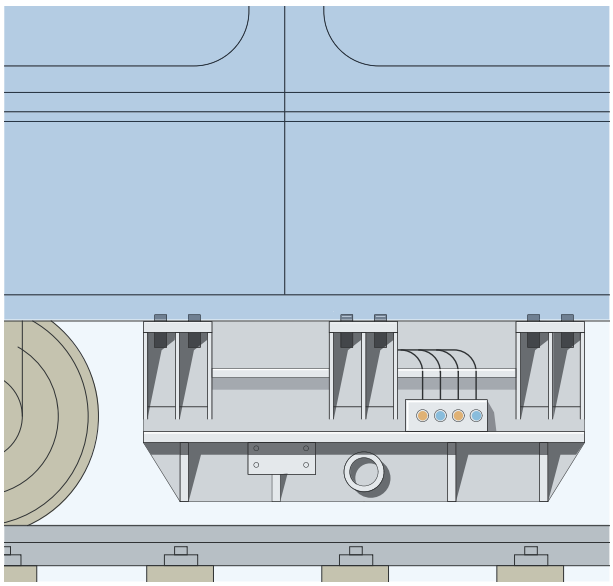
A further option is to use a temperature sensing element to regulate the motor power in accordance with the oil temperature, that is, to adjust the vehicle performance to the maximum operating temperature of the transformer. The pressure in the cooling system can be measured with the JUMO MIDAS S19R.

JJUMO surface-mounted thermostat

AMTHF series
Type 603051

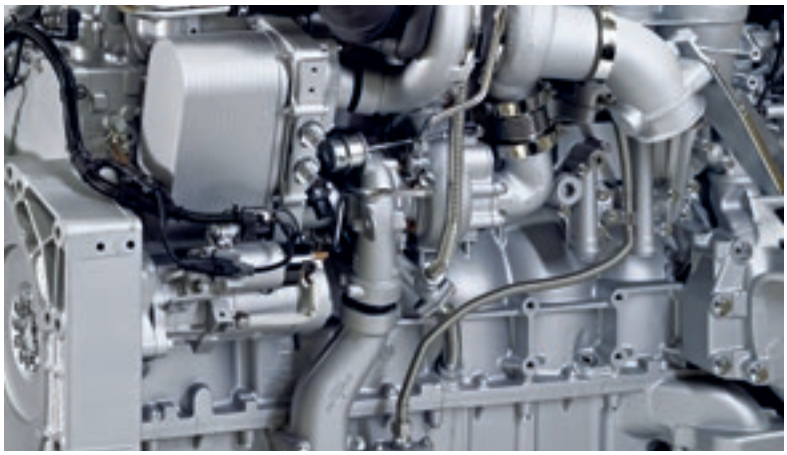
JUMO WTH

Screw-in RTD temperature probe with terminal head form J
Type 902030



JUMO MIDAS S19R

Pressure transmitter
Type 401008



Diesel traction

Monitoring temperature in diesel engines with the JUMO VIBROtemp

To achieve optimum drive power and best possible efficiency, the heat balance in modern diesel engines has to be appropriate. Precise temperature measurement is imperative, as tight restrictions are imposed on temperature. 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 the engine control charge-air. Data is also transmitted from the main cooling circuit to the controller for engine cooling management.

Fuel, lubricating oil, and charge-air pressure measurement in diesel engines with the JUMO MIDAS S19R

Common rail technology is increasingly being relied on as the method of fuel injection for diesel engines. Other than temperature measurement, pressure monitoring is primarily imperative for perfect engine operation.

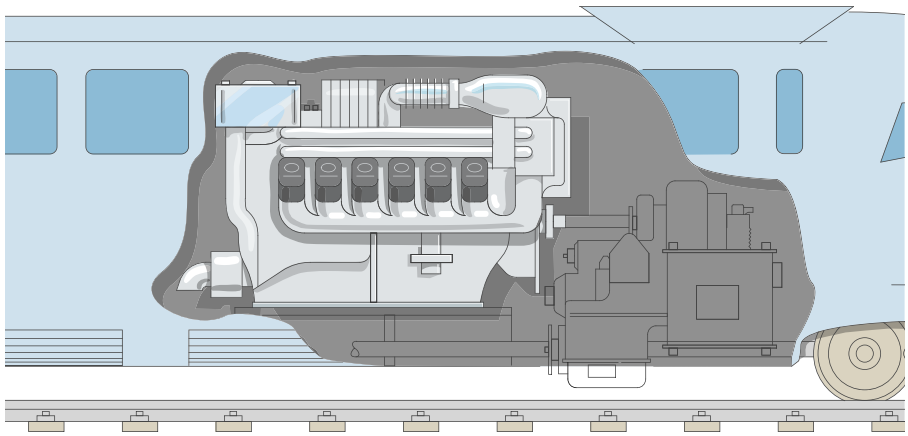
With the JUMO MIDAS S19R pressure transmitter, you can monitor the feed pressure and rail pressure of the fuel, the pressure of the lubricating oil, and the charge-air pressure of the turbocharger.

JUMO VIBROtemp

Screw-in RTD temperature probe with plug connector
Type 902040

JUMO MIDAS S19R

Pressure transmitter
Type 401008



Hydraulic power transfer

Monitoring of the oil temperature in hydrodynamic transmission

Hydrodynamic gear units are a combination of torque converters and fluid couplings, that convert the mechanical energy of the diesel engine into the fluid energy of a liquid, which is usually oil. The oil temperature must be continuously monitored to prevent an admissible maximum temperature value being exceeded. Use the particularly robust RTD temperature probe – the JUMO VIBROtemp – for measuring the temperature of the transmission oil.

Retarder monitoring with the JUMO MIDAS S19R and the JUMO VIBROtemp

You can use the JUMO MIDAS S19R pressure transmitter and the JUMO VIBROtemp to monitor hydrodynamic braking (retarder), the brake force of which acts on the vehicle drive shaft via a rotor by filling the retarder with oil.

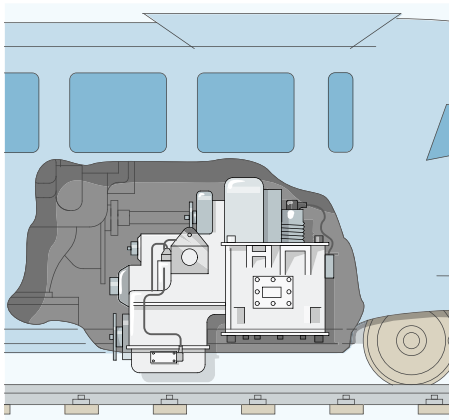
Wheelset transmission

Monitoring the bearing temperature in final drives

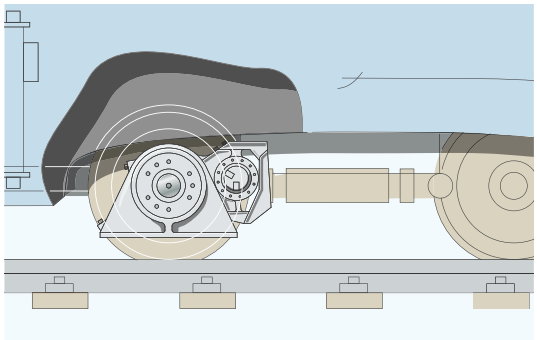
In diesel-powered vehicles, Wheelset transmission transfer the drive force coming from the main transmission to the drive axle, and in electrically-powered vehicles, they transfer the drive force coming from the driving motor to the drive axle. The enormous loads on the bearings and the gear tooth flanks generate heat and are made manageable by lubricating with oil. For safety reasons temperature monitoring is essential to ensure reliable transmission operation. The bearing temperature is measured by a temperature probe that has been specifically developed and certified for this demanding measurement task.

JUMO MIDAS S19R
Pressure transmitter
Type 401008

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



JUMO wheelset temperature probe
Type 902150



Climate control

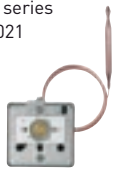
To provide passengers with the most comfortable journey possible, all modern railroad cars are now fitted with powerful air conditioners. High-quality measuring instruments from JUMO are the ideal solution to ensure that air conditioners perform their heating and cooling functions perfectly, when the outside temperature is extremely high and low.

Air conditioning system

Monitoring temperature and pressure in an air conditioning system

Modern air-conditioning systems are responsible for generating both hot and cold temperatures in passenger compartments. This makes it particularly important to monitor the pressure and temperature. Sensor technology from JUMO ensures that every air-conditioning system runs smoothly. Other than RTD temperature probes you can also use JUMO thermostats to monitor and control the temperature. Air heating, hot-water heating and convection heating are often used to assist the air-conditioning system. Here too, JUMO can provide reliable devices for you to monitor and control your heating system.

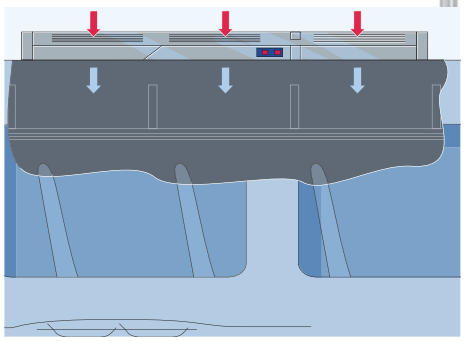
JUMO panel-mounted thermostat
EM/EMF series
Type 602021



JUMO MIDAS S19R
Pressure transmitter
Type 401008

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

JUMO surface-mounted thermostat
AMTHF series
Type 603051



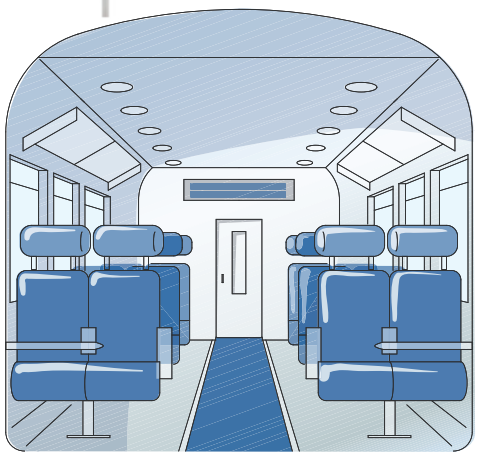
Climate monitoring

Indoor temperature monitoring with sensor technology from JUMO

For optimum control and regulation of air conditioning systems, reliable data about the climatic conditions inside the railroad cars or driver's cabs must be available. JUMO's RTD temperature probes provide reliable temperature values to help you maintain a pleasant ambient temperature.

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

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



Pneumatics

In virtually all rail vehicles, compressed air is the most important source of energy (along with electric current) because it is responsible for many of the basic functions of a train. Reliable pressure monitoring throughout the system is vital in the generation, distribution, and use of the compressed air. Pressure transmitters from JUMO can help you in this task.

Compressed-air system

Temperature and pressure monitoring in the compressor

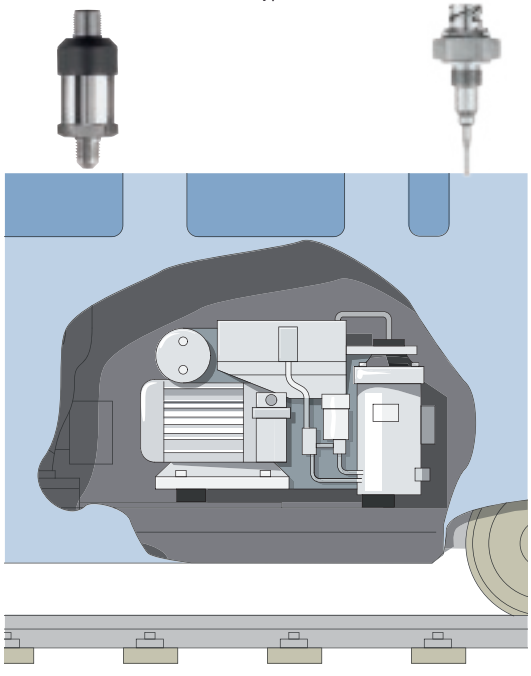
Compressors supply the compressed-air systems of rail vehicles with the compressed air they require. Regardless of whether you use screw or piston compressors as your main or auxiliary compressor, you can reliably monitor the pressure and temperature inside the compressor with JUMO sensor technology.

Monitoring the compressed-air system with the MIDAS C08

The pressure in the main air reservoir line and in the storage tanks can also be monitored using the JUMO MIDAS pressure transmitter. If the pressure falls below a certain value the compressor is switched on and switched off again once a maximum value is reached. This maintains a constant pressure in the storage tanks.

JUMO MIDAS C08
Pressure transmitter
Type 401002

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



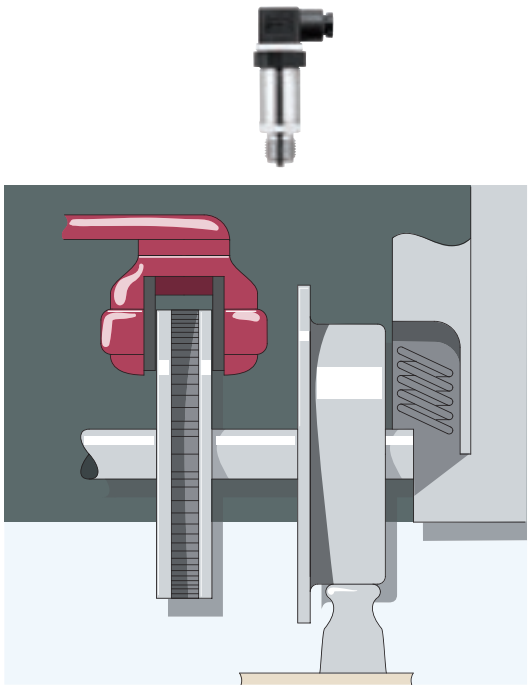
Brake

Pressure monitoring in the brake circuit with the JUMO MIDAS S19R

In rail vehicles, pneumatic wheel brakes take the form of block brakes or disc brakes. What both these design types have in common is that when the brake system operates, compressed air flows into the brake cylinder and acts on the piston via a brake linkage to push the brake blocks against the wheels or the brake shoes against the brake disc.

To monitor pressure in the brake circuit, use the JUMO MIDAS S19R which has been specifically developed and certified for the harsh ambient conditions found in rail vehicles.

JUMO MIDAS S19R
Pressure transmitter
Type 401008



Process, waste and fire-fighting water tanks

Vacuum toilets as an example of pressure condition monitoring with the JUMO MIDAS C08

The toilet systems in modern rail vehicles are cut off from the surrounding environment. In these airtight systems, it is a vacuum that brings the wastewater and feces to the wastewater tank.

When you flush, the vacuum pump generates a vacuum in an intermediate tank, the inlet valve opens, and the contents of the toilet bowl are sucked into the tank. The inlet valve then closes, excess pressure builds up in the intermediate tank, the outlet valve opens, and the content of the intermediate tank is pushed into the wastewater tank.

To ensure trouble-free flushing you can measure the system operating pressure in the compressed air supply line and the vacuum as well as excess pressures in the intermediate tank during the flush cycle with the JUMO MIDAS C08.

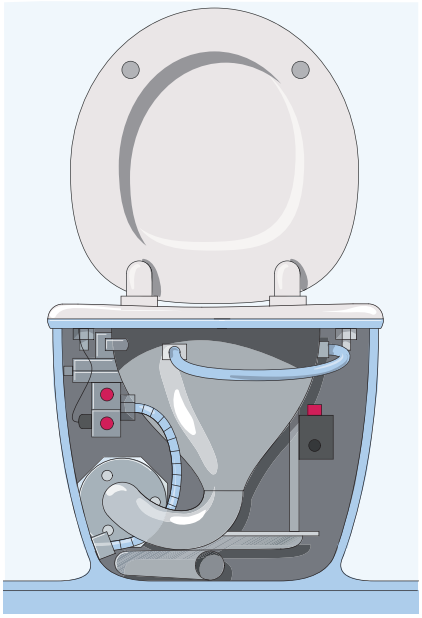
Anti-freeze protection monitoring in process water, wastewater, and fire-fighting water tanks

To protect rail vehicle water tanks against frost damage during the cold season, the heating systems in the tanks are switched on when the outdoor temperatures are low. JUMO thermostats ensure accurate and reliable temperature monitoring and heating element operation here.

Temperature values can also be recorded by RTD temperature probes and processed accordingly in the electronic controller.

JUMO surface-mounted thermostat

ATH-SW series
Type 603035



JUMO MIDAS C08

Pressure transmitter
Type 401002

JUMO panel-mounted thermostat

EM/EMF series
Type 602021

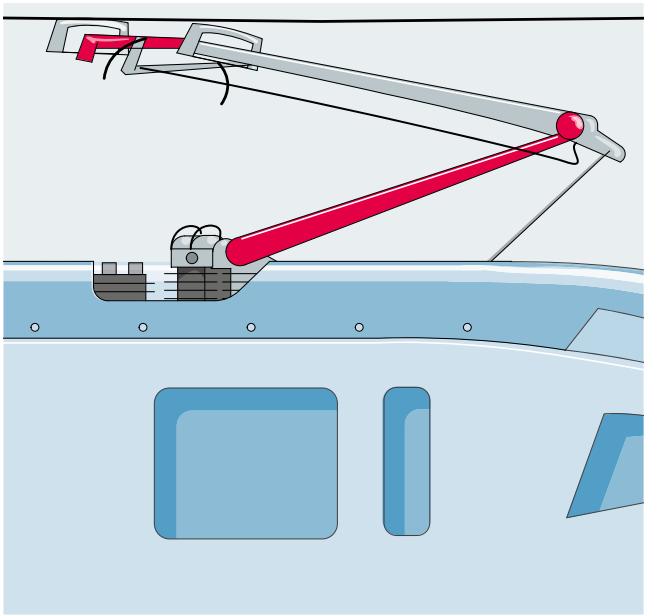
Other compressed air consuming units

Pressure monitoring on compressed air consuming units with the MIDAS C08

Other than the pneumatic brakingg system and the toilet systems there are other basic devices in a rail vehicle that are operated by compressed air. These include the current collector, the entry and intermediate doors, the pneumatic suspension, the wheel flange lubrication system, and the sander.

All these consuming units can be monitored with JUMO pressure transmitters. Two suitable models are available: the JUMO MIDAS C08, with its distinctive long-term stability and excellent price-performance ratio, or the JUMO MIDAS S19R, which has been specifically developed and certified for the special requirements of railway technology.

JUMO MIDAS S19R
Pressure transmitter
Type 401008



JUMO MIDAS C08
Pressure transmitter
Type 401002

Infrastructure

JUMO does not just provide devices for actual automotive technology applications in the field of railway technology, it also provides devices to be used outside the rail vehicles. Wherever temperatures have to be measured or pressure patterns monitored, JUMO, your competent partner, is at your side.

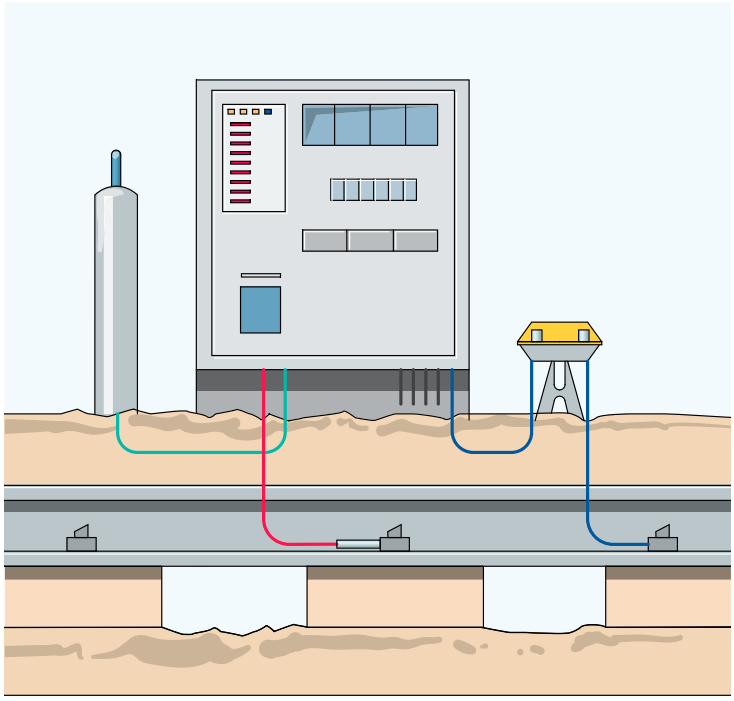
Point heating

Measuring the outdoor and rail temperatures with JUMO temperature probes

Cold outdoor temperatures as well as snowfall can cause the individual elements of the railway switches to freeze together if the railway switches are not heated.

In cold weather, heating comes into play to clear the ice and snow from between the switch rails and the stock rails or the movable point frog. They allow the railway switches to continue to operate, thus preventing disruptions to the service.

Modern electrical railway switch heating design types now work fully automatically. To do this, the system control unit needs reliable data about the local climatic conditions in the railway switch environment. Temperature sensors from JUMO provide measured values for the ambient and rail temperatures to ensure optimum control of the timing for switching the heating on and off.



JUMO push-in RTD temperature probe

with connecting cable
Type 902150

JUMO product highlights for railway technology at a glance

JUMO surface-mounted thermostat

with 2, 3, or 4 single-pole snap-action switches

- Protection type IP 65
- Tested acc. to DIN EN 14597 (replacing DIN 3440)
- Operating temperature (ambient temperature) –50 to +80 °C
- Microswitch with snap-action system
- Robust, versatile, and reliable

JUMO MIDAS S19R

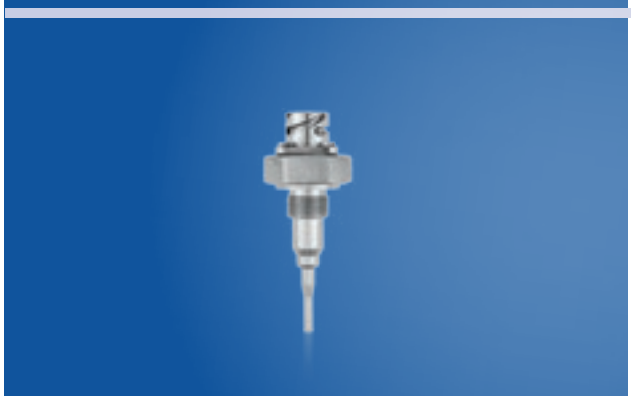
Pressure transmitter for railway applications

- Measuring ranges: 0 to 2.5 bar to 0 to 60 bar relative / 0 to 2.5 bar to 0 to 40 bar absolute
- Welded measuring system
- Vibration and shock resistant
- Tested acc. to railway standards
- Highly resistant to overload
- For maximum EMC requirements

JUMO wheelset temperature probe

Push-in RTD temperature probe with connecting cable

- For temperatures between –60 to +180 °C
- As single and double RTD temperature probes
- Vibration and shock resistant
- Tested acc. to railway standards
- In 2, 3, or 4-wire circuit
- Halogen-free connecting cable



JUMO VIBROtemp

Screw-in RTD temperature probe with plug connector

- For temperatures between –50 to +270 °C
- Vibration-resistant construction
- Connection locking ensures contact reliability, protection type IP 67 (IP 69K)

Extract from the reference list:

vossloh KIEPE
MAHLE Industry
ÖBB
SNCF
STADLER
mtu
ALMiG since 1923
ALSTOM
Rexroth Bosch Group
BOMBARDIER

Our portfolio includes even more products and services

JUMO provides you with the entire measuring chain, from sensor to automation solution for temperature, pressure, liquid analysis, flow rate, liquid level, and humidity. Our goal is always to offer our worldwide customers the optimum solution in matters of process reliability, energy efficiency and cost optimization.

We therefore rely on our perfectly functioning after-sales service for an extensive range of services.

Do you still have questions or would you like to know more about our products? If you do, please contact us.

Other industry brochures

If you are interested in one of the other industries we cover, you can now order a relevant brochure. Simply call 0661 6003-0 or send an e-mail to mail@jumo.net.

A selection

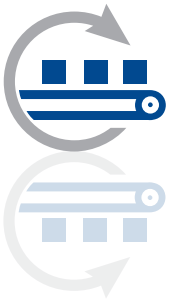
- Food technology
- Chemical engineering
- Pharmaceuticals and biotechnology
- Water and wastewater engineering
- Dairy technology
- Meat processing
- Wind power plants
- Plastics and packaging technology
- Heating and air conditioning
- Industrial furnace construction

Services & Support

It is the quality of our products that is responsible for such a high level of customer satisfaction. But our reliable after-sales service and comprehensive support are also appreciated. Let us introduce you to the key services we provide around our innovative JUMO products. You can count on them – anytime, anywhere.

JUMO services & support – so that it all comes together!

Production Service



Are you looking for a competitive and efficient system or component supplier? Whether you seek metal technology, electronic modules or perfectly fitting sensors, whether small batches or mass production – we will gladly be your partner. From development to production we can provide all the stages from a single source. Our experts will work together in close collaboration with your company to find the optimum solution for your application and will take on all the engineering. JUMO will then make the product for you. You will benefit from state-of-the-art production technologies as well as our uncompromising quality assurance systems.

Customized sensor technology

- Development of temperature probes, pressure transmitters, conductivity sensors, or pH and redox electrodes according to your requirements
- Numerous test and inspection systems
- Taking over qualification for the application
- Materials management
- Mechanical testing
- Thermal testing

Electronic modules

- Development
- Design
- Test concept
- Materials management
- Production
- Logistics and distribution
- After-sales service

Metal technology

- Tool manufacture
- Stamping and forming systems
- Flexible sheet metal working
- Float production
- Welding, jointing, and assembly systems
- Surface engineering
- Material testing service

Information & Training

Would you like to improve your process quality, or optimize one of your company plants? Then take us up on our offer on the JUMO homepage and participate in the expertise of a globally respected manufacturer. Under the "Services & Support" menu item, for example, you will find a highly diverse range of seminars. Available under the keyword "eLearning" are videos on specific measurement and control system topics. Under "Literature" you can find important information for beginners and practitioners. It goes without saying that you can also download the latest version of the JUMO software as well as technical documentation for old and new products.

Product Service

For competent support right across our product portfolio, our customers have recourse at any time to the efficient sales network we maintain on all five continents. Whether you seek advice, a selection of products, engineering or making optimum use of our products, there is always a team of competent JUMO colleagues somewhere nearby, ready to answer your questions. You can count on us after commissioning, as well. You will get a fast response from our telephone support hotline. If an on-site fault has to be eliminated, our express repair service and our 24-hour spare part service are at your disposal. That is real assurance.

Maintenance & Calibration

Our maintenance service helps you to maintain optimum system and equipment availability. This way you prevent failure and downtime. We will work out a far-sighted maintenance concept together with your company officers, and will happily prepare all the required reports, documentation, and protocols. Because we know how important precise measurement and control results are for your processes we naturally also undertake the professional calibration of your JUMO instruments on site, at your company premises. We then record the result in a calibration certificate as defined by EN 10204.

www.jumo.net

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