



More than **sensors + automation**



Wind Power Plants

Innovative solutions for your success





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Dear Reader,

For more than 70 years JUMO has been one of the leading manufacturers of measurement and control technology as well as a professional partner for the manufacturers of wind power plants and their suppliers.

JUMO has established itself on the global markets with its products – supported by highly-qualified staff and leading-edge technology.

Maximum innovation is achieved by new developments, the improvement of existing products, and by more economical production methods.

JUMO will always meet the demands that are placed on measurement technology. Our sensor and automation technology ensures that your wind power plant is operated almost fully automatically.

This brochure provides an overview of how our products can be used in the different areas of a wind power plant.

Despite standardization, an application-specific proficiency test is always needed to select the right product for a specific area of wind power plant operation. JUMO specialists are available to answer all your practical and technical questions.

Dr. Thomas Reus

P. S. Detailed technical information about the measuring devices can be found under the specified type/product group number at www.industry.jumo.info.



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Wind power plants

In a wind power plant, kinetic energy in the form of wind is converted to electrical energy. The rotor receives the kinetic energy and passes it on to the generator to produce the electric current. A distinction is made between systems without a gearbox and those with a variable gearbox which adapts the wind-dependent speed of the rotor to the required constant speed of the generator. The generated current is then fed into the power grid through a transformer station.

A wind power plant is a complex technical system in which diverse measurement tasks need to be solved. Whether for offshore or mainland use, JUMO has the right devices to ensure the smooth operation of a wind power plant. In addition to its comprehensive product portfolio JUMO also offers extensive expertise and many years of experience in sensor technology for wind power plants as well as all the measurement and control components contained in it.



Rotor blade

A rotor blade mostly consists of epoxy resin fiber laminate or fiberglass laminate. A rotor blade is manufactured using the vacuum infusion process. Here, the fabric mats laid out in the mould are saturated with resin while in a vacuum and then heated in a controlled manner for hardening. Due to the very large rotor blade moulds many temperature control circuits are required. JUMO mTRON T system, with the appropriate number of temperature probes, handles the

control. Ideally, the temperature probes are connected to the control in a digital manner through CANopen or IO-Link so that the wiring effort is optimized. The electrical heat energy is controlled via the JUMO TYA series power controller, which is connected with the JUMO mTRON T through the system bus.

JUMO screw-in RTD temperature probe
With terminal head form J
Type 902030/80



JUMO CANtrans T
RTD temperature probe with CANopen output
Type 902910



JUMO dTRANS T1000
Temperature sensor with IO-Link
Type 902915



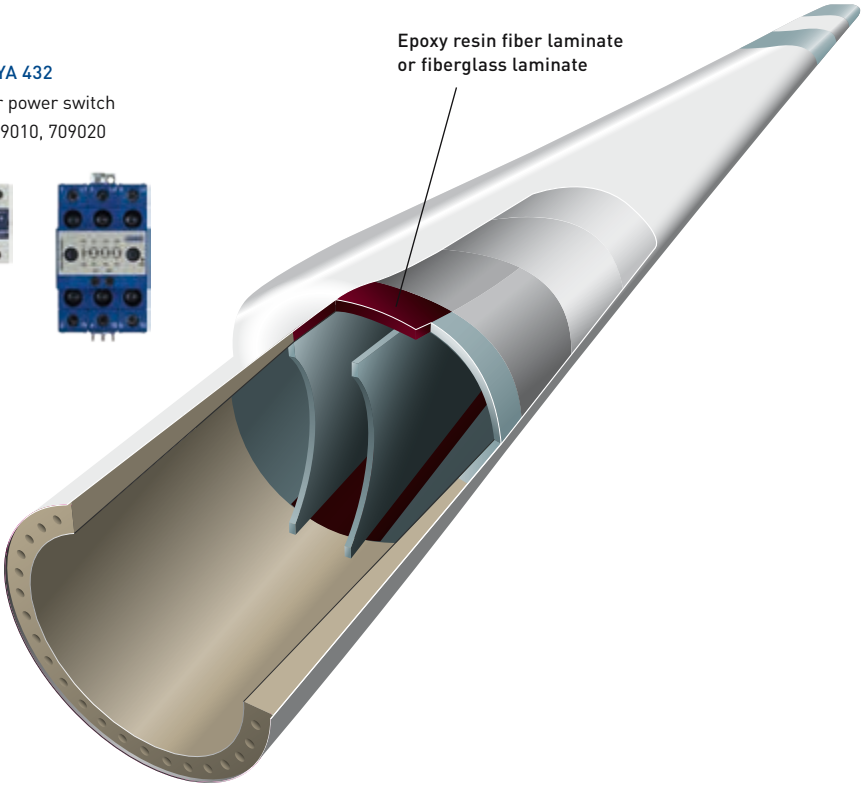
JUMO TYA 201/202
Thyristor power controller
Types 709061, 709062



JUMO TYA 432
Thyristor power switch
Types 709010, 709020



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





Rotor

Pitch system

The pressure in the hydraulic system is measured by the JUMO CANtrans p pressure transmitter while the temperature is measured by a screw-in RTD temperature probe.

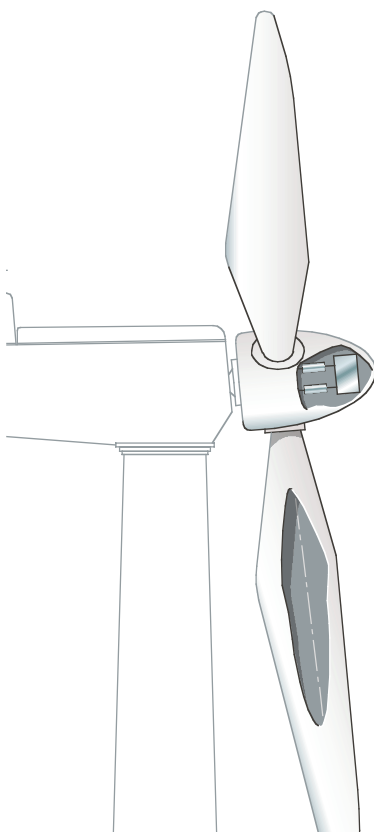
Temperature monitoring in the rotor

To prevent the rotor blades from icing up, which in turn could cause ice debris or imbalances in the circular runout, surface or push-in RTD temperature probes from JUMO measure the temperature. These temperature probes are very sturdy and resistant to withstand conditions related to

wind and weather. The temperature determines whether the rotor blade heating is switched on or off.

Rotor blade heater

If necessary, the rotor blades are heated with hot air to prevent icing. The rotor blade heater is monitored and secured with safety temperature limiters or thermostats.



JUMO CANtrans p
Pressure transmitter with
CANopen output
Type 402055



JUMO surface RTD temperature probe
Type 902550



JUMO push-in RTD temperature probe
With connecting cable
Type 902153



JUMO plastoSENS T02
With connecting cable
Type 904002



JUMO dTRANS T1000
Temperature sensor
with IO-Link
Type 902915



**JUMO screw-in RTD
temperature probe**
With terminal head form J
Type 902030/80



JUMO heatTHERM
Panel-mounted
thermostat
Type 602031





Climate control

Climate control in the nacelle

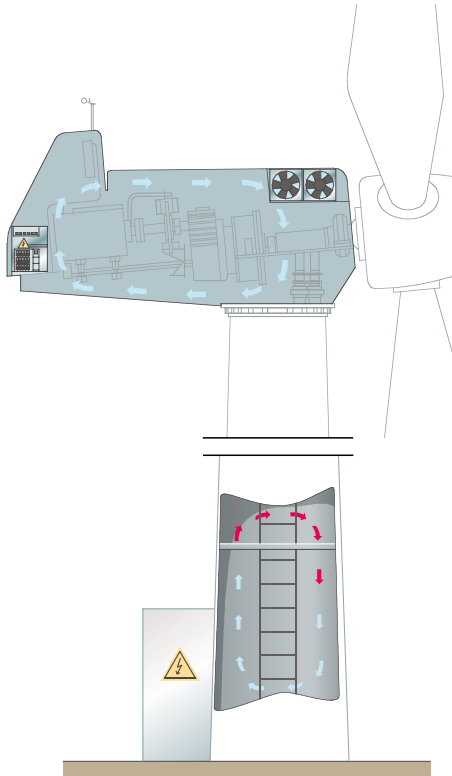
Temperature and humidity are monitored to avoid corrosion in the nacelle. Capacitive or hygrometric hygro and hygrothermal transducers are used for this purpose. To prevent potential icing of the heat exchanger the temperature is monitored by a push-in RTD temperature probe. To avoid temperatures falling below the dew point on the floor of the nacelle the floor temperature is measured by several surface RTD temperature probes in a heating plate. Temperature and pressure sensors are used to monitor filters and ventilation systems that remove the dissipated heat from

the nacelle and the control cabinets. Calorimetric flow sensors are used for flow and leakage monitoring of coolants, oil, and other liquids.

Tower climate control

Enormous physical forces are exerted on the tower, which bears the full weight of the nacelle.

In addition to the resulting construction demands, the steel tower must also meet specific climatic requirements on the inside to avoid damage caused by moisture deposits and the accompanying corrosion.



JUMO pressure and differential pressure transmitter
Type 404304



JUMO surface RTD temperature probe
Type 902550



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



JUMO hygro transducer and hygrothermal transducer (capacitive)
For climate monitoring
Type 907021/210

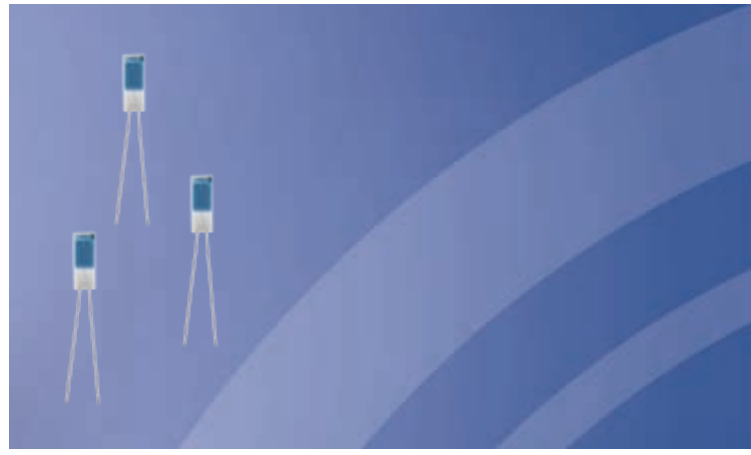


JUMO surface-mounted thermostat
ATH-SW series
Type 603035



JUMO PINOS L02
Flow sensor
Type 406041



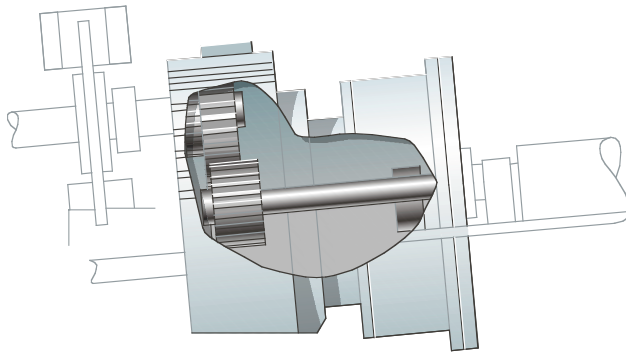


Gearbox

Measuring temperature, pressure, and level of oil.

In wind power plants with a gearbox the wind-dependent rotor speeds are adjusted to the rotational speed of the connected generator. The enormous loads on the tooth flanks of the gearbox are made manageable by the use of sophisticated lubrication technology. A reliable measurement of the pressure, temperature, and level for oil is essential. Temperature in large gearboxes is measured by push-in or screw-in RTD temperature probes (in variable lengths) with

spring-mounted probe tips or spring-mounted screw connection systems. These compensate for thermal expansion or production tolerances so that optimum thermal contact is ensured. The latest versions are currently fitted with a 4 to 20 mA two-wire output, CANopen output, or IO-Link. The JUMO NESOS float switch is used for point level measurement of oil in hydraulic and gearbox systems. As a special feature the device is also available with an additional temperature switch.



JUMO MIDAS H20 HP
Pressure transmitter
Type 401020



JUMO screw-in RTD temperature probe
With terminal head form J
Type 902030/80



JUMO bimetal temperature switch
Type 608301



JUMO NESOS R02 LS
Float switch
Type 408302



JUMO dTRANS T1000
Temperature sensor with IO-Link
Type 902915



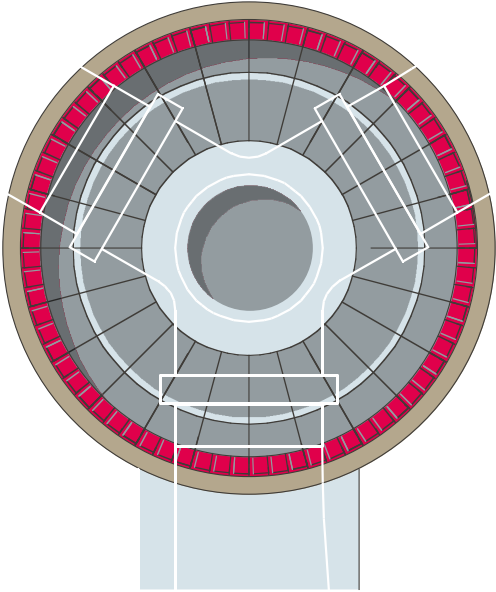


Generator

Temperature monitoring in systems without and with an adjustable gearbox

Especially in systems without a gearbox the inside temperature must be continuously monitored to avoid generator overload. To measure the temperature, temperature sensors with connecting leads are integrated into the pole shoes during construction of the generator. These sit directly on the rotor in systems without gearboxes. The front

ring-shaped nacelle housing is the stator. Between its three-pole winding phases several Pt100 temperature sensors are inserted and included in the casting. In wind power plants with adjustable gearboxes the generators are set up separately in the nacelle. The mentioned temperature sensors are also used here.



JUMO bimetal temperature switch
Type 608301



JUMO hygrostat (hygrometric)
Type 907032



JUMO push-in RTD temperature probe
With connecting cable
Type 902153

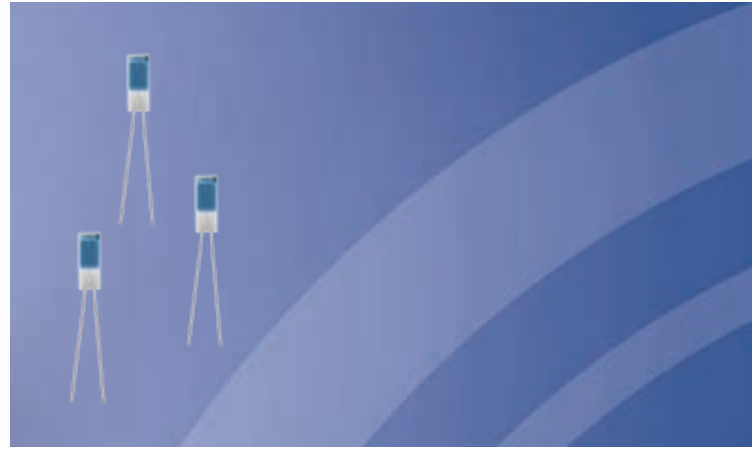


JUMO plastoSENS T01
With connecting cable
Type 904001



JUMO platinum-chip temperature sensors
With connection wires according to DIN EN 60751
Type 906121



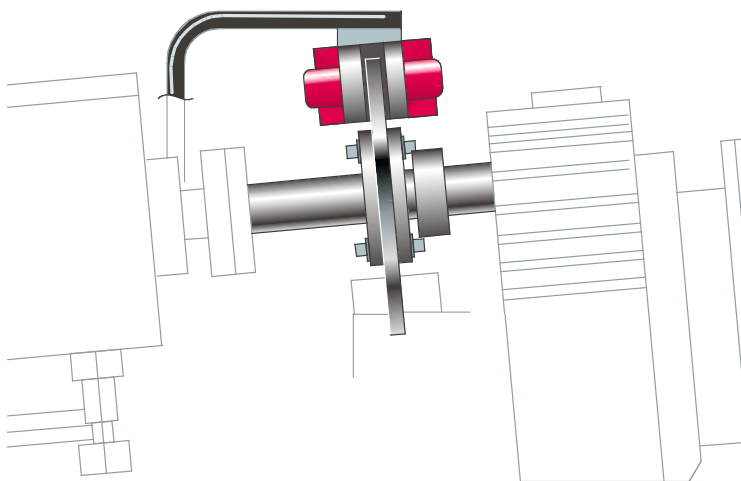


Braking system

Monitoring of the braking system with the JUMO MIDAS H20 HP pressure transmitter

During operation, the plant is decelerated through the change in the set angle of the rotor blade. For a safety or emergency shutdown, a manual stop, or maintenance and repair work, the shafts can also be stopped by a pressure-monitored disc brake. JUMO MIDAS H20 HP monitors the braking system.

The pressure transmitter has a mechanical, highly-resilient measuring system with thin film technology. The combination of a large measuring range and compact design type distinguishes the product for the application.



JUMO MIDAS H20 HP
Pressure transmitter
Type 401020



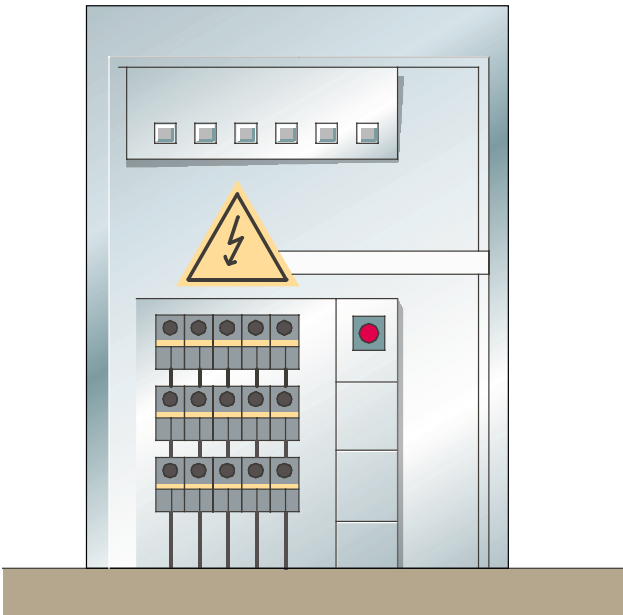


Transformer station

Monitoring temperature and moisture

To avoid overheating, heat that is generated as transformer power loss is dissipated to the outside by air conditioners. In addition, the temperature of the cooling and insulating transformer oil is monitored with a screw-in RTD temperature probe or a contact dial thermometer. The protection tube of the thermometer is available with a narrowed tip.

The control of humidity is also very important for safety in transformer stations. Hygrostats of type 907032 are ideal for the simple two-state control of relative air humidity. They require no separate mains voltage and are largely maintenance-free due to especially prepared plastic fibers.



JUMO screw-in RTD temperature probe
With terminal head form J
Type 902030



JUMO contact dial thermometer
Type 608540



JUMO hygrostat (hygrometric)
Type 907032



JUMO plastoSENS T01
With connecting cable
Type 904001





Innovations for wind power plants



JUMO dTRANS T1000 and JUMO dTRANS p35 IO-Link sensors for temperature and pressure measurement

Condition monitoring at the highest level has become standard procedure with modern wind power plants.

The latest JUMO temperature and pressure sensors with IO-Link provide an insight into your diagnostic data up to the sensor level.

First and foremost that enables an increase in plant efficiency. Furthermore, constant checking of the sensor availability provides more safety. Sensors can be easily and quickly exchanged during normal maintenance, as the necessary data from the higher-level system is automatically transferred.

Your benefits in a nutshell:

- Optimization of the production process through communication down to the lowest field level
- Reduction of mounting and startup times
- Increase of the diagnostic depth due to maximum transparency down to the sensor level
- Reduction of maintenance and service costs while plant availability increases at the same time
- High degree of process reliability due to long operating life and great accuracy
- Flexible use through compact design type and a variety of process connections



JUMO dTRANS T1000
Temperature sensor with IO-Link
Type 902915

JUMO dTRANS p35
Pressure sensor with IO-Link
Type 402058



JUMO Wtrans series

Wireless measurement of temperature, pressure, humidity, and CO₂

The JUMO Wtrans series is a system for wireless transmission of measured values using leading-edge wireless technology. The universally applicable sensors open up entirely new possibilities for measured value recording on moving and fixed parts. The measured value is initially transmitted to the JUMO Wtrans receiver. From there the signal can be passed on in digital or analog form for further processing to various systems for regulation, control, and automation as well as for display and recording.

Your benefits in a nutshell

- Wireless acquisition of measured values in moveable parts or areas which are hard to reach
- Suitable for permanent installation or temporary spontaneous measurements
- Complete spatial mobility (open air range up to 300 m)
- Unlimited flexibility for such uses as temporary measurements require no time-intensive mounting or installation
- Fail-safe, industry-standard data transmission for high process reliability
- Reduction of installation work
- Reduced costs for plant reinstallation, maintenance, and repair
- Optional online chart function enables recording of measured values directly on the PC
- Easy connection of additional devices for data evaluation



JUMO Wtrans E01
Measuring probe for humidity,
temperature, and CO₂
Type 402058



JUMO Wtrans T
RTD temperature probe
Type 902930



JUMO Wtrans p
Pressure transmitter
Type 402060



JUMO Wtrans B
Programmable head transmitter
Type 707060



JUMO Wtrans
Receiver
Type 902931



JUMO plastoSENS T Innovative temperature measurement technology in a unique plastic design

JUMO plastoSENS T products may look like conventional temperature probes but they are an innovation in temperature probe production. New types of thermoplastics offer almost infinite possibilities for the most diverse installation situations and probe properties. For example, thermally conductive and non-thermally conductive plastics can be combined to improve response times and reduce heat conduction errors. Sensors which are completely enclosed in plastic offer a solution for vibrations as they occur in moving parts of motors, gearboxes, generators, etc. Placing conventional probes in a vibration-resistant position can be very cumbersome. JUMO plastoSENS T02, on the other hand, can withstand even extreme vibrations.

Customized development process

The complete freedom of design and the composition of the thermoplastics allows customer-specific developments to be our great strength. The development process is just as individually adapted to the requirements. Design ideas can be implemented quickly and cost-effectively thanks to simulation software that allows the thermal features of the newly-designed product to be simulated.

Your benefits in a nutshell:

- Geometric freedom of design – almost any form is possible
- Application-specific composition of the thermoplastics
- User selectable sensor type (e.g. SMD, NTC, PTC, Pt sensor)
- Temperature range from -50 to +200 °C
- Software-supported development process customized to your needs
- Vibration-resistant, voltage-resistant, steam-tight, and surface-optimized temperature probes



Examples

JUMO plastoSENS T01
With connecting cable
Type 904001



JUMO plastoSENS T02
With connecting cable
Type 904002





JUMO NESOS Point level and level measurement

JUMO has been producing high-quality floats for over 40 years. In combination with our equally proven measurement technology they form the core of the JUMO NESOS point level and level measurement device. A float with integrated magnet switches one or more reed contacts through its magnetic field when the level rises or falls. As a result, the switching operation takes place without auxiliary energy while being contact-free and wear-free. In addition, the installation of a temperature switch and a Pt100 or Pt1000 temperature sensor is possible.

Your benefits in a nutshell:

- Proven, maintenance-free measuring principle – no wear and tear
- Also for small measuring ranges (e.g. oil reservoirs)
- Irrespective of the tank geometry and media properties
- Simple installation and mounting
- Quick check when servicing
- Available with Pt100 or Pt1000 temperature sensor and temperature switch as an optional extra
- Customized solutions can be implemented

JUMO NESOS R01 LS
Float switch
Type 408301



JUMO NESOS R02 LS
Float switch
Type 408302



JUMO NESOS R03 LS
Float switch
Type 408303





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