



More than **sensors + automation**



Wind power plants

Innovative solutions for your success





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Dear Reader,

JUMO, a leading manufacturer of measurement and control systems for more than 60 years, has been a competent partner to manufacturers of wind power plants.

Highly qualified staff and state-of-the-art technology have established JUMO and its products in global markets.

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

Whatever is demanded of the measurement technology, JUMO will always meet every requirement. With our measurement and control system instruments, your wind power plants are guaranteed to be almost totally automated.

This brochure gives 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 on-hand, to answer all your practical and technical questions.

Precise, technical descriptions of our measuring instruments can be found on the Internet under the specified product number, at www.jumo.net.

Matthias Nau

P.S.: Detailed information about our products 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 generate the electric current. A distinction is made between gearless systems and those with variable-speed gears, to adapt 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 by a transformer station.

So a wind power plant is a complex technical system, in which there are diverse measurement tasks to be resolved. Whether offshore or on the mainland, JUMO has the right instrument to ensure that your wind power plant runs smoothly.

JUMO not only offers an extensive product range for temperature, pressure, and humidity measurement, but also has enormous expertise and many years of experience in sensor systems for wind power plants, as well as with regard to all the other measurement and control system components that make up the complete measurement chain.



Rotor assembly

Controlling the rotor blade pitch variation with JUMO CANtrans p

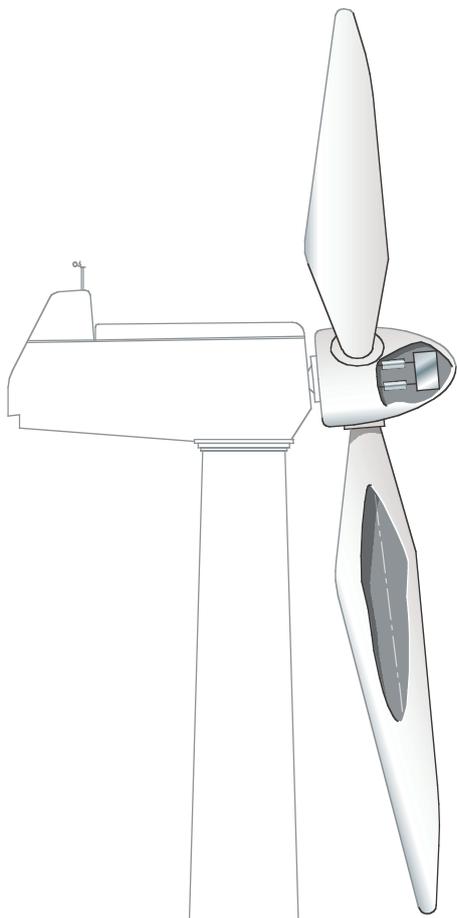
The rotor speed and generator speed must be constantly regulated. The set angle of the rotor blades is varied by a pitch or stall control.

The pressure in the hydraulic system for adjusting the set angle is measured by the JUMO CANtrans p pressure transmitter, and the temperature is measured by a screw-in resistance temperature probe with plug connector as per DIN EN 175301

Temperature monitoring in the rotor

Rotor heater systems are used to prevent the rotor blades icing up, and producing ice debris or running out-of-true. Surface or push-in resistance temperature probes from JUMO are responsible for measuring temperature.

These temperature probes are very sturdy and resistant, making them able to withstand conditions related to wind and weather.



JUMO CANtrans p
Pressure transmitter
with CANopen output
Type 402056



JUMO screw-in RTD temperature probe
with plug connector as per
DIN EN 175301
Type 902044



JUMO RTD surface temperature probes
Type 902550



JUMO push-in RTD temperature probe
with connecting cable for
the solar heating system
Type 902153





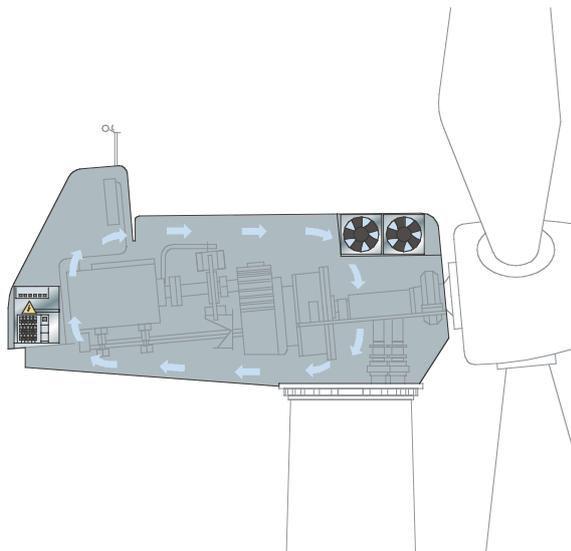
Climate control in the nacelle

Climate control in the nacelle

Capacitive or hygrometric hygro/hydrothermal transducers are used for one of the most important measurement tasks in the nacelle – monitoring temperature and humidity to avoid corrosion.

To prevent potential heat exchanger icing, the temperature is monitored by a push-in resistance temperature probe.

To prevent temperatures falling below the dew point on the floor of the nacelle, the floor temperature is measured by four surface resistance temperature probes in a heating plate. Temperature and pressure sensors are used to monitor the filters and fan systems that remove the dissipated heat from the nacelle and the switch cabinets.



JUMO pressure and differential pressure transmitters
Type 404304



JUMO hygro and hydrothermal transducers (capacitive) for climate monitoring
Type 907021/20



JUMO surface-RTD temperature probes
Type 902550



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



JUMO Surface-mounting thermostat
type series ATH-SW
Type 603035



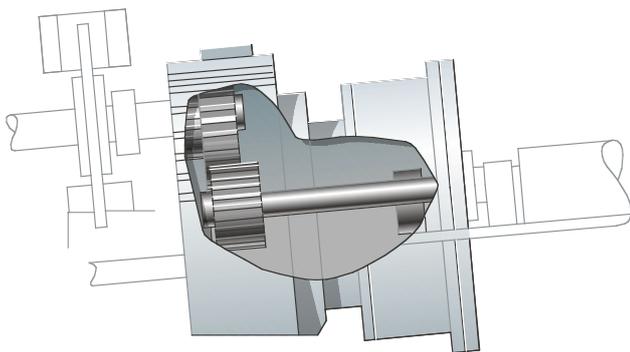


Gear

Measuring oil temperature and oil pressure in the gears

In wind power plants with variable-speed gears, the gears adjust the wind-dependent rotor speeds to the required constant speed of the generator, which is installed separately in the nacelle. The enormous loads on the gear tooth flanks are made manageable by the use of sophisticated lubrication technology. It is essential to measure the pressure and temperature of the oil here.

Temperature in the large gears is measured by adjustable length, push-in or screw-in resistance temperature probes with spring-mounted tips or spring-mounted screw connection systems, to compensate for thermal expansion or manufacturing tolerances and to achieve optimum thermal contact. The latest versions are fitted with a 4 – 20mA two-wire transmitter output or a CAN output.



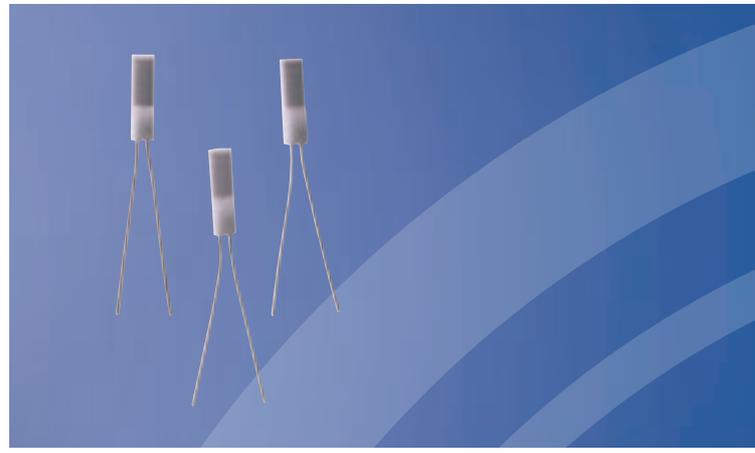
JUMO bimetal temperature switch
Type 608301



JUMO MIDAS HP pressure transmitter
Type 401005



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



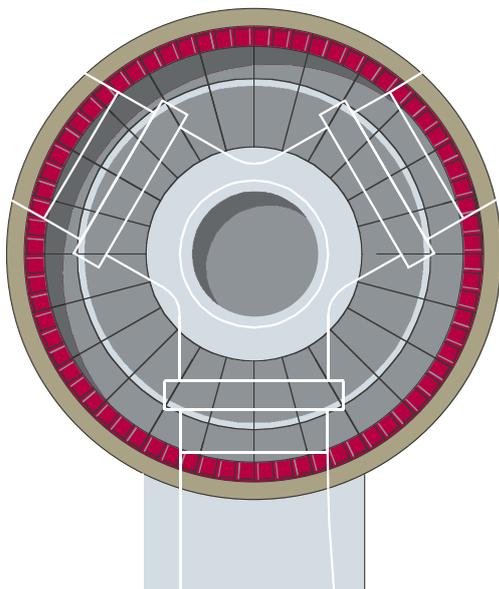
Generator

Temperature monitoring in the generator in a gearless system or in a system with variable-speed gears

In gearless systems, the pole shoes rest on the rotor, and the stator is the front, ring-shaped nacelle housing. To avoid overloading the generator, the inside temperature must be continuously monitored. To measure temperature, when the generator is built, temperature sensors with connecting

leads are integrated in the pole shoes, or several Pt100 temperature sensors are inserted between the three-pole phase windings of the stator, and encapsulated with it.

The generators of wind power plants with gears are installed separately in the nacelle. These temperature sensors can also be used here.



JUMO bimetal temperature switch
Type 608301



JUMO hygrostat (hygrometric)
Type 907032



JUMO push-in RTD temperature probe
with connecting cable for the solar heating system
Type 902153



JUMO platinum chip temperature sensors
with connecting wires to EN 60 751
Type 906121





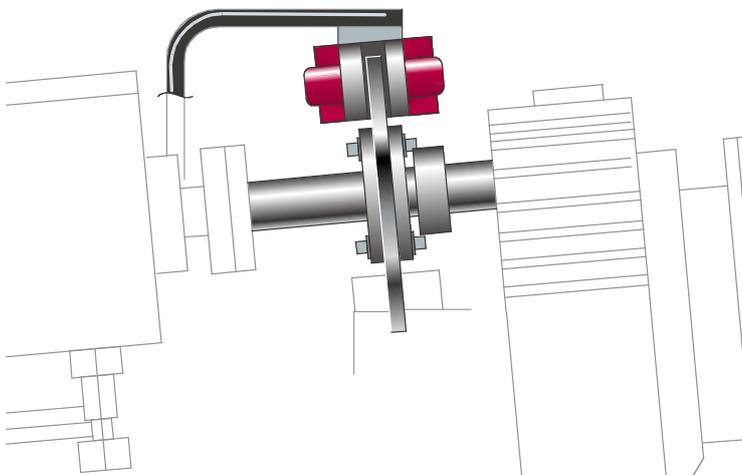
Braking system

Monitoring the braking system with JUMO MIDAS HP

During operation, the installation is braked by adjusting the set pitch angle of the rotor blade. For a safety or emergency shutdown, a manual stop, or maintenance and repair work, the shafts are also stopped by a pressure-monitored disc brake. The braking system is monitored by the JUMO MIDAS HP pressure transmitter.

The MIDAS HP measuring system with thin film technology is capable of withstanding high mechanical loading. The wide measuring range combined with a compact design make the product ideal for this application.

JUMO MIDAS HP
pressure transmitter
Type 401005



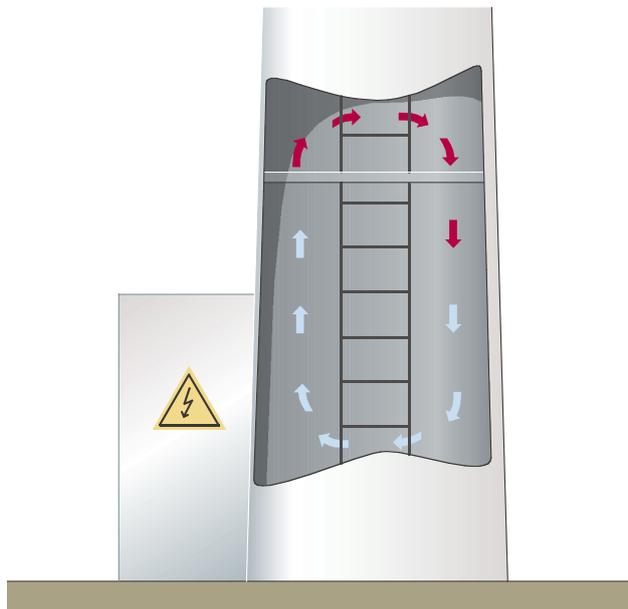


Tower climate control

Tower climate control

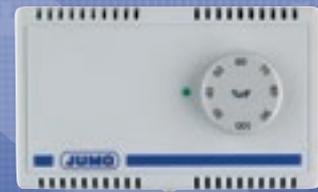
Enormous physical forces are exerted on the tower that bears several tons of nacelle. As well as the resultant demands on construction, the steel tower must also meet specific climatic requirements on the inside, to avoid the damage caused by moisture deposits and the accompanying corrosion. Temperature and humidity sensors designed for indoor use are attached inside the tower at different heights.

The combined temperature and humidity sensor with capacitive measurement process features high measuring accuracy, outstanding long-term stability and good chemical resistance. Should natural ventilation on its own be insufficient, there is an additional dehumidifier in the critical area at the foot of the tower, to keep the relative humidity in the tower below 60%.



JUMO hygro and hydrothermal transducers (capacitive)
for climate monitoring
Type 907021/20



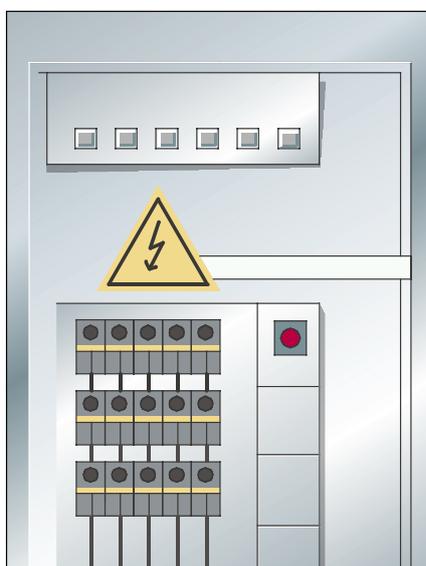


Transformer station

Monitoring temperature and humidity in the transformer station

Air conditioners dissipate the heat loss of the transformers by taking the heat outside, to avoid overheating. There is also a screw-in resistance temperature probe to monitor the oil temperature in the transformer station. The temperature probe protection tube is also available with a remote tip.

Hygrostats of type group 907032 are suitable for simple two-state control of relative air humidity in transformer stations. They require no separate line voltage and are largely maintenance-free thanks to the use of specially prepared plastic fibers.



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



JUMO hygrostat
(hygrometric)
Type 907032





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