

A success story from the world of renewable energies - the Wudongde hydroelectric power plant. Dams have been built for thousands of years, serve as flood protection and, in conjunction with hydroelectric power plants, make an important contribution to the generation of renewable energies. After all, unlike fossil energy sources, hydroenergy generates only minor CO2 emissions. The People's Republic of China is also relying on hydroelectric power plants to cover the country's increasing energy consumption in a climate-friendly way. One of them is the Wudongde hydroelectric power plant, the seventh largest of its kind in the world.

By combining advanced technologies and JUMO expertise, JUMO was able to overcome special challenges. From temperature monitoring in turbines to humidity control in the generator rooms. The JUMO total solution, including high-performance sensors and measuring devices, guarantees safe and efficient energy generation and helps to save millions of tons of coal annually and drastically reduce CO2 and sulfur dioxide emissions.



ERFOLGSGESCHICHTE WASSERKRAFT

Stromerzeugung durch natürliche Energien

Hydropower success story

Electricity generation through natural energies

Dams have been built for thousands of years, serve as flood protection and, in conjunction with hydroelectric power plants, make an important contribution to the generation of renewable energies. After all, unlike fossil energy sources, hydroenergy generates only minor CO₂ emissions. The People's Republic of China is also relying on hydroelectric power plants to cover the country's increasing energy consumption in a climate-friendly way. One of them is the Wudongde hydropower plant on the lower reaches of the Jinsha River, which went into operation in June 2020.

Task

With a total installed capacity of 10.2 million kilowatts, Wudongde is the fourth largest hydropower plant in China and the seventh largest in the world. Consisting of several blocks, it has the largest single block capacity in the world and is said to be able to supply around 1.8 million Chinese households with energy with a single block. It is obvious that such a gigantic structure poses special technological requirements, which JUMO has implemented together with an international manufacturer of converter systems.

For example, the temperature of the oil hydraulics in the generators and turbines must be monitored and controlled in order to prevent machine damage, turbine failures and disruptions in power generation. The temperature sensors used must be suitable for pipes with oversized diameters, respond quickly to high-speed flows and measure stably and reliably even with large vibrations. Equally important are excellent sealing properties and low maintenance.

In addition, in order to avoid corrosion, electrical flashovers and damage to the electrical installations, the humidity and air temperature in the generator rooms must be checked and, if necessary, corrected.

Approach

The Chinese subsidiary of JUMO was responsible for the technical implementation of these requirements. Several clever solutions were used that easily master even the most extreme conditions.

Fail-safe hygro and hygrothermo encoders in duct design record the relative humidity and temperature at the installation points of the turbines. The humidity is detected by

a capacitive humidity element and converted into electricity (4 to 20 mA) or voltage signals (0 to 10 V DC). A platinum temperature sensor according to DIN EN 60751 is used to determine the temperature, the signal of which is also transformed. The temperature of the turbine cooling water is detected by screw-in resistance thermometers, which have a reliable tightness even under or over pressure.

To control the temperature of the supply and exhaust air of air coolers in the generators and generator rooms, plug-in resistance thermometers with SIL approval and metrological registration are used, which are available in several versions and with interchangeable measuring inserts.

In this way, malfunctions that occur can be detected at an early stage and adequate countermeasures can be taken, such as shutting down plant components or alerting technical personnel.



Die Staumauer von Wudongde von oben

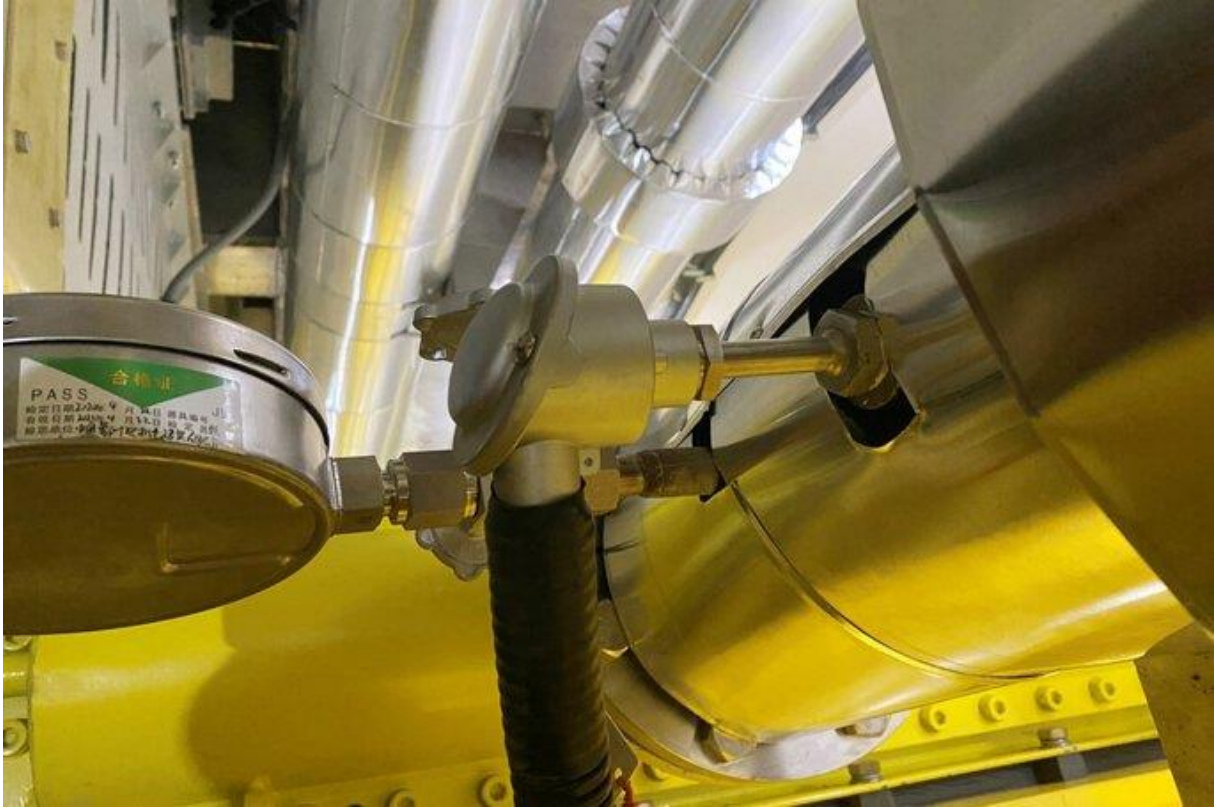


Überdimensionale Rohre im Inneren der Staumauer





The Wudongde Dam from above



Temperature measuring points with B-head including robust stainless steel screw-in sleeve.



Screw-in resistance thermometer from JUMO.

Extra box: Project result

The switch to renewable energies is more important than ever due to climatic changes. The example of Wudongde shows that JUMO makes an important contribution to the energy transition with its flexible and integrated metering and automation solutions and can realize large global projects through its subsidiaries. Even particularly tricky challenges can be implemented in tailor-made applications by the experienced engineers and JUMO Engineering; be it in China, [South America](#) or [India](#).

The hydropower plant itself is an important part of China's "West-East Power Transmission Project" and taps the energy resources of the Chinese west for the underserved east. This is expected to save around 12.2 million tons of coal annually and drastically reduce carbon dioxide and sulfur dioxide emissions.

Eingesetzte Komponenten



Hygro- und Hygrothermometer (kapazitiv)

für Anwendungen im Klimabereich

907020



Einsteckwiderstandsthermometer

mit Anschlusskopf Form B

902120



Einschraubwiderstandsthermometer

mit Anschlusskopf Form B

902020

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