RELIABLE PRECISION FOR PIONEERING WORK IN HYDROGEN

BLUENERGY REVOLUTION RELIES ON PRESSURE AND TEMPERATURE MEASUREMENT TECHNOLOGY FROM WIKA

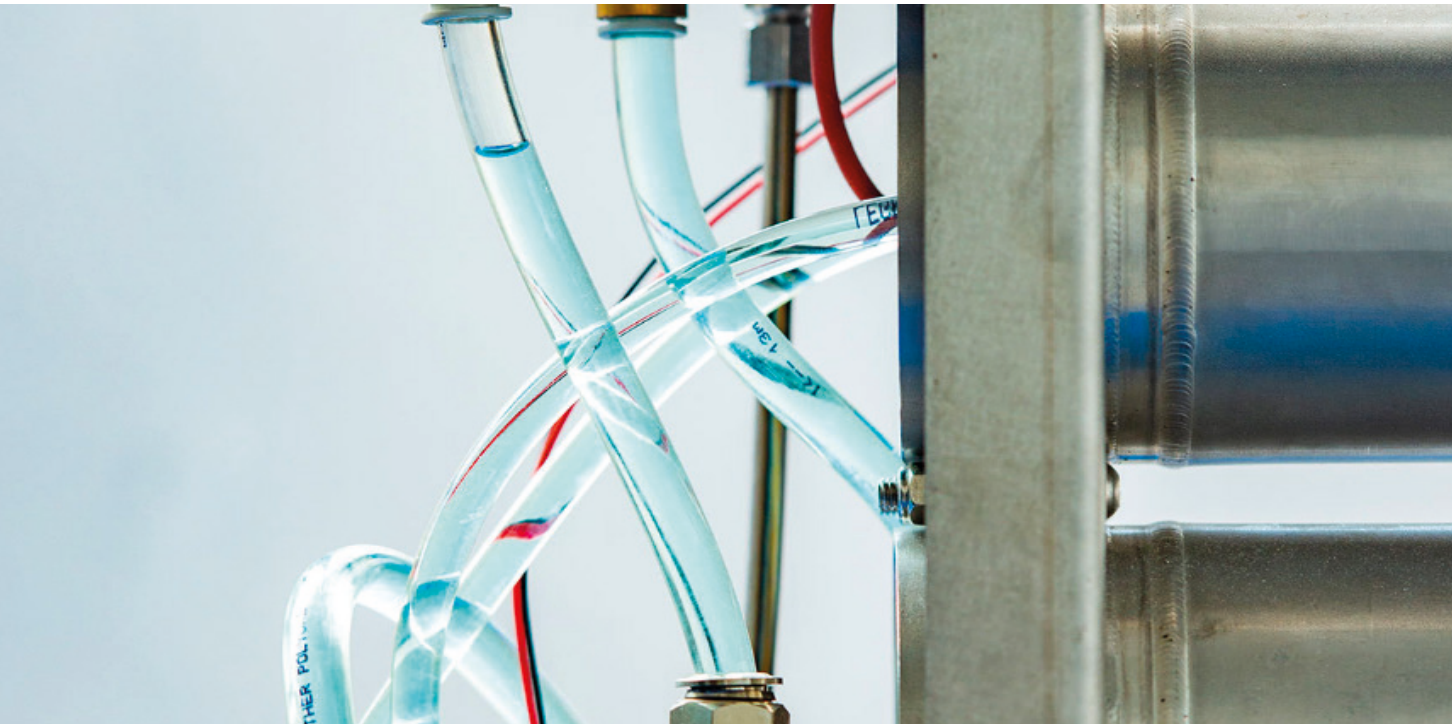

Image source: BluEnergy Revolution

BluEnergy Revolution relies on WIKA measurement technology in its modular hydrogen systems. Pressure and temperature sensors in electrolysers, fuel cells and storage systems monitor key process parameters under demanding conditions, ranging from high pressures to potentially explosive atmospheres. The precise measured data is fed directly into the plant control system, ensuring stable processes and enabling BluEnergy Revolution to implement hydrogen solutions in a practical, scalable and market-ready manner.

BluEnergy Revolution

WIKA

Smart in sensing

Challenge

Hydrogen as a key component of the energy transition

Hydrogen is regarded as a key component of a climate-neutral energy supply. As an energy carrier, it can decouple the generation and use of renewable energy, decarbonise industrial processes and also power applications that cannot be directly electrified. To this end, BluEnergy Revolution develops and integrates modular hydrogen systems – from electrolysis through storage to reconversion into electricity – and transforms innovative technologies into solutions suitable for industrial use.

From concept to safe system integration

The integration of electrolysers, storage systems and fuel cells places high demands on technology and safety. Processes operate at high pressures, under varying temperatures and, in some cases, in potentially explosive atmospheres. Systems must also be designed to be compact, scalable and compliant with standards. The aim is to create stable, cost-effective systems, reliable in the long-term, that can be adapted flexibly to a range of industrial and mobile applications.

Overview of the technical challenges

- **High pressures and dynamic processes**
  Monitoring sensitive pressure and temperature
- **Explosion protection**
  Safe design for potentially explosive atmospheres
- **Limited installation space**
  Integrating complex measurement technology into compact system architectures
- **Scalability and modularity**
  Adaptation to different performance requirements and deployment scenarios



Image source: BluEnergy Revolution

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Our systems combine the electrolysis, storage and use of hydrogen in a very confined space and under demanding conditions. To achieve this, we need continuous monitoring of pressure and temperature that is not only precise, but also operates reliably and safely over the long term.

Manuel Anselmo,
Member of the Executive Board and Project Manager for Research and Development at BluEnergy Revolution

Solution

Industrial reliability as a selection criterion

With project complexity increasing and demands on safety and process stability rising, BluEnergy Revolution was looking for an experienced measurement technology partner. As hydrogen systems are usually manufactured in small batches or to project-specific requirements, sensors must be individually selected, certified and integrated into existing safety and automation concepts. The decision was made for WIKA – thanks to its technical expertise, product quality and many years of industrial experience.

Certified measurement technology for the entire hydrogen value chain

WIKA supplies pressure and temperature measurement technology, as well as safety-relevant measuring instruments for electrolysers and storage, treatment and fuel cell systems. Products used include Ex d- and SIL-certified compact pressure switches (PCS, PCA), explosion-protected pressure sensors (E-10), universal pressure sensors (A-10), miniature and cable resistance thermometers (TR33, TR34, TR41) and optoelectronic level switches (OLS-C01).

BluEnergy Revolution – Company profile

- **Founded:** Around 10 years ago in Liguria, Italy
- **Business model:** A co-operatively organised systems integrator and EPC provider
- **Core competence:** Development and integration of modular hydrogen systems
- **Products:** Energy Pack (up to 3,000 kWh / 180 kg H_2), MOSE-PEM electrolyser (7–14 kW), ZEN Fuel Cell (45–60 kW), metal hydride storage
- **Objective:** Practical, safe and scalable hydrogen solutions for industry and transport



The WIKA TR33 resistance thermometer in use in BluEnergy Revolution's MOSE-PEM electrolyser.

Image source: BlueEnergy Revolution

> "Our systems only operate reliably if every measurement signal is correct. WIKA's sensors give us the confidence to monitor pressure and temperature precisely, even under demanding conditions – and thus to operate our hydrogen systems in a stable, safe and commercially viable manner.

Manuel Anselmo
Project Manager, Research and Development
at BluEnergy Revolution

Solution

PCS and PCA compact pressure switches for safety-critical applications

The PCS and PCA compact mechanical pressure switches monitor hydrogen pressures up to 1,000 bar and switch electrical loads directly – without the need for external auxiliary power. They are designed for safety-critical applications and are available, optionally, in Ex ia or Ex d versions, as well as with SIL 2 / SIL 3 approval. The robust case (IP66 / NEMA 4X) enables use in harsh industrial environments and where installation space is limited.

TR33, TR34 and TR41: Precise temperature monitoring in compact systems

The miniature and cable resistance thermometers cover measuring ranges from -50 to +250 °C and are designed to be vibration-resistant and moisture-proof. The TR34 is available in an intrinsically safe version for potentially explosive atmospheres. Optional integrated transmitters with a 4 … 20 mA output allow for flexible parameterisation and rapid integration into existing control systems.

The products

- TR33 and TR34 miniature resistance thermometers for precise temperature measurements in small pipes and compact hydrogen systems
- Measuring ranges from –50 to +250 °C and a vibration-resistant design ensure stable measured values, even under demanding conditions
- An optional integrated transmitter (4 … 20 mA) enables easy integration into control and automation systems
- PCS/PCA pressure switches as well as A-10 and E-10 pressure sensors monitor safety-relevant pressure values in the process
- The OLS-C01 level switch and accessories support precise process control and easy integration

A-10 and E-10 flexible pressure sensors for industrial and hazardous areas

The A-10 pressure sensor is a universally configurable all-rounder for measuring gauge and absolute pressure and vacuum, offering a long service life of up to 100 million load cycles. For potentially explosive atmospheres, the E-10 with flameproof enclosure, with ATEX, IECEx, CSA and FM approvals, is used. Both sensors provide stable measured values, even in the presence of vibrations and pressure spikes.

OLS-C01: Precise level monitoring with no moving parts

The OLS-C01 optoelectronic level switch uses infrared technology and detects liquid levels with an accuracy of ±2 mm. With no moving parts, it is particularly low-maintenance and robust. Its compact design and flexible electrical connections allow for easy integration into tanks, storage and processing units.

Comprehensive integration through mounting and connection accessories

Suitable connectors, protective caps, brackets and indication units ensure the safe mechanical integration of the measuring instruments. The range is complemented by power supply and control units, intrinsically safe repeater power supplies, and also preassembled cable and connector solutions. This creates a seamless, coordinated system from the measuring location right through to the display or control unit.



WIKA model A-10 pressure transmitter.
Image source: WIKA

Benefits

- **Reliable precision under demanding conditions**
  Stable temperature and pressure measurement, as well as operational reliability in the long term
- **Certified safety**
  Ex d-, Ex i- and SIL-compliant solutions for hydrogen applications
- **Easy integration**
  Suitable for confined installation spaces in modular system architectures
- **High engineering efficiency**
  Quick to design thanks to the availability of certificates, documentation and 3D data.
- **Rapid project delivery**
  From enquiry to delivery in less than two months
- **Consolidating market acceptance**
  Quality builds trust among end customers and partners

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In WIKA, we have a partner whose measuring instruments operate reliably, are fully certified and can be seamlessly integrated into our equipment – and with whom we work as equals to develop the best solution for our hydrogen systems.

Manuel Anselmo,
Member of the Executive Board and Project Manager for Research and Development at BluEnergy Revolution



Image source: BluEnergy Revolution

Precision as the foundation for hydrogen systems

The successful integration of certified pressure and temperature measurement technology enables BluEnergy Revolution to implement innovative hydrogen solutions that are safe, scalable and suitable for industrial use. The partnership with WIKA combines technological expertise with practical implementation experience – thereby laying the foundations for stable processes, regulatory compliance and sustainable growth in the hydrogen market.

Contact

Would you also like to optimise your hydrogen applications using reliable, certified measurement technology? Talk to our experts:

info@wika.com