

iTHERM ModuLine thermometers for a wide range of hydrogen applications

Robust, flexible, and ready for your hydrogen measuring points

Benefits at a glance

- Pressure resistance: up to 500 bar
- Process safety: SIL & Ex-compliant
- Standardization: modular and scalable design
- Flexibility: suitable for diverse hydrogen applications

Process conditions

- Hazardous area: Ex-compliant environments
- Functional safety: SIL requirements
- Pressure range: up to 40 / 200 bar
- Temperature range: 80 °C / 150 °C (176 °F / 302 °F)



Temperature control plays a vital role in hydrogen production, ensuring efficiency and safety across all stages—from energy generation and electrolysis to compression and storage.

The process involves demanding conditions such as high pressures, hazardous areas, and strict safety standards like SIL compliance. Reliable temperature measurement

technology must withstand pressures up to 500 bar and operate safely in explosive environments. Standardized solutions with high flexibility are essential to meet diverse application needs.

With the right instrumentation, hydrogen production can support the energy transition and contribute to achieving climate goals like NetZero 2050.

The challenge Hydrogen production is a cornerstone of the global energy transition and essential for meeting long-term climate targets such as NetZero 2050. To ensure optimal efficiency and environmental sustainability, precise and reliable process instrumentation is required throughout the entire value chain—from renewable energy generation and electrolysis to compression, storage, and utilization. Temperature is a critical control parameter in nearly all stages of hydrogen production and must be continuously monitored and regulated. In electrolyzer systems, temperature sensors must comply with SIL (Safety Integrity Level) standards and be certified for use in hazardous areas, withstanding pressures up to 40 bar. In subsequent compression stages, the process pressure can rise significantly, reaching up to 200 bar, demanding robust and high-performance measurement solutions.



A wide variety of challenges in hydrogen production require flexible measuring devices.

Our solution Versatile temperature measurement across the hydrogen value chain. Hydrogen production involves a wide range of process conditions—from moderate to extreme pressures, hazardous environments, and strict safety requirements. The iTHERM ModuLine portfolio from Endress+Hauser offers a high variety from basic sensors with best price-performance ratio to best-in class thermometers for high demanding applications.

Electrolyzer Applications – iTHERM ModuLine TM131

In electrolyzer systems, precise temperature control is essential for process efficiency and safety. iTHERM ModuLine TM131 is equipped with a temperature transmitter that meets SIL and Ex requirements, making it ideal for use in hazardous areas. With pressure resistance up to 100 bar, it provides a robust and compliant solution for this critical stage.



iTHERM ModuLine TM131 Industrial modular thermometer in application

Compression Applications – iTHERM ModuLine TM151/152

Hydrogen compression involves significantly higher pressures, requiring instrumentation with exceptional mechanical strength. TM151/152 (metric/imperial) models feature a barstock thermowell design, engineered for pressure resistance up to 500 bar (7251 psi). These sensors ensure safe and reliable temperature measurement even under the most demanding conditions.

Result With its modular and scalable design, the iTHERM ModuLine portfolio provides a reliable and future-proof temperature measurement solution for hydrogen production. Whether used in standard applications or under extreme conditions involving high pressures, hazardous areas, and strict safety requirements, the sensors deliver consistent performance and compliance. The portfolio combines pressure resistance up to 500 bar, SIL and Ex certifications, and high flexibility to meet diverse process needs. This ensures safe, efficient, and cost-effective operation across the entire hydrogen value chain—supporting the industry's progress toward a sustainable energy future.

Components

- iTHERM ModuLine TM131 RTD/TC metric thermometer with protection tube
- iTHERM ModuLine TM151 (metric) / TM152 (imperial) RTD/TC thermometer with barstock thermowell
- QuickLink – Protection tube with patented design to control the process at peak efficiency and performance
- QuickSleeve – Insert for fast response times in combination with barstock thermowells
- iTHERM QuickSens – Insert for fastest response times
- iTHERM StrongSens – Insert with highest vibration resistance
- iTHERM TwistWell – Barstock thermowell with helix design for high velocity applications
- Dual Seal – Pressure-triggered safety valve for critical applications
- iTHERM QuickNeck – Divisible extension neck with tool-free quick release
- iTEMP temperature transmitter – The perfect solution for your measuring point



iTHERM ModuLine TM131, TM151/152



Further information

Temperature measurement:

Thermometers and transmitters for the process industry:

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