Cost-effective water purity monitoring with Memosens technology

Discover how Endress+Hauser's instrumentation solutions streamline operations and enhance efficiency in hydrogen production

Benefits at a glance

- Up to 25% savings on hardware costs
- Reduced footprint, wiring and installation complexity
- Onboard Intrinsically Safe barrier for safer operations
- Improved reliability and accuracy of water quality assessments
- Supports multiple digital protocols (EtherNet/IP, Modbus, PROFINET, PROFIBUS, etc.)
- Digital communication reduces ground loop risks and simplifies calibration

Summary As the demand for green energy solutions grow, Proton Exchange Membrane (PEM) electrolysis technology is undergoing significant scale-up. Transitioning from kilowatt-sized laboratory setups to multi-megawatt installations necessitates advanced systems that can manage increased operational scales while optimizing cost and efficiency.

Challenge PEM electrolyzers require ultrapure water, typically meeting ASTM type I or II standards, to ensure efficient hydrogen production. Conductivity measurements are crucial as they serve as a proxy for water purity. Other parameters such as pH, conductivity, dissolved oxygen, chlorides, sodium, silica and total organic carbon are also vital to maintaining water quality.

In hazardous areas, it is common to use two separate Class 1, Division 1 transmitters to monitor the electrolyzer feedwater and the recirculation where the water from the separators is repolished. This setup necessitates separate transmitters for each measurement point, leading to increased hardware costs and installation complexity.

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Solution The integration of Endress+Hauser's Liquiline transmitter technology, specifically using multiplexing transmitters like the Liquiline CM442, addresses these challenges. By consolidating the need for multiple devices, this approach can lead to hardware cost reductions of up to 25% along with decreases in footprint, wiring and installation efforts.

The Liquiline CM442 transmitter provides an onboard Intrinsically Safe barrier, allowing for placement in the Division 2 area of the electrolyzer module, while the sensor can remain in a Division 1 environment. This arrangement simplifies electrical connections by supporting digital protocols and offers the option to transmit two separate 4-20mA signals back to the control system. Additionally, the Liquiline transmitter supports various communication protocols such as EtherNet/IP, Modbus, PROFINET, PROFIBUS and more. The Liquiline transmitter also supports up to eight digital sensors on one transmitter to consolidate on space and allow for easier installation.

The use of Memosens technology paired with the Liquiline enhances the reliability and accuracy of water quality assessments, contributing to significant operational efficiencies. Digital communication reduces the risk of ground loops caused by analog sensors and simplifies maintenance tasks due to the inductive connection from sensor to cable.

Results By consolidating the measurement process and reducing the number of required transmitters and associated wiring, the integration of Memosens and Liquiline technology provide a streamlined, safer and more cost-effective solution for monitoring water purity in PEM electrolyzers.

This approach minimizes installation complexity and optimizes operational efficiency without compromising safety. The enhanced reliability and accuracy of water quality assessments ensure that the electrolyzer operates at peak efficiency, supporting the broader goal of scaling up PEM electrolysis technology to meet the growing demand for green energy solutions.

Learn more about the Liquiline CM442 transmitter

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AI01433V/24/EN/01.25-00

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