

EMPOWERING THE TRANSITION TO GREEN HYDROGEN

Solutions from Honeywell to support
Green Hydrogen Production



Honeywell

OPTIMIZING GREEN HYDROGEN PRODUCTION

Enhanced Safety, Reliability and Efficiency for
Hydrogen Electrolyzer systems

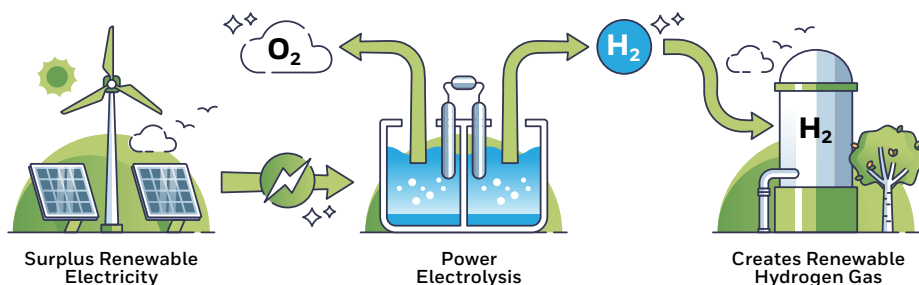
Across industries, Honeywell has a long history of helping businesses measure, monitor and reduce greenhouse gas emissions to achieve their sustainability goals. The transition to green hydrogen as a cleaner energy source is a critical part of that journey of decarbonizing industrial processes.



HYDROGEN ELECTROLYZERS

Water electrolysis using renewable energy like solar and wind is the fundamental step for production of Green Hydrogen. Electrolysis process splits water into hydrogen and oxygen.

Creating Hydrogen Gas



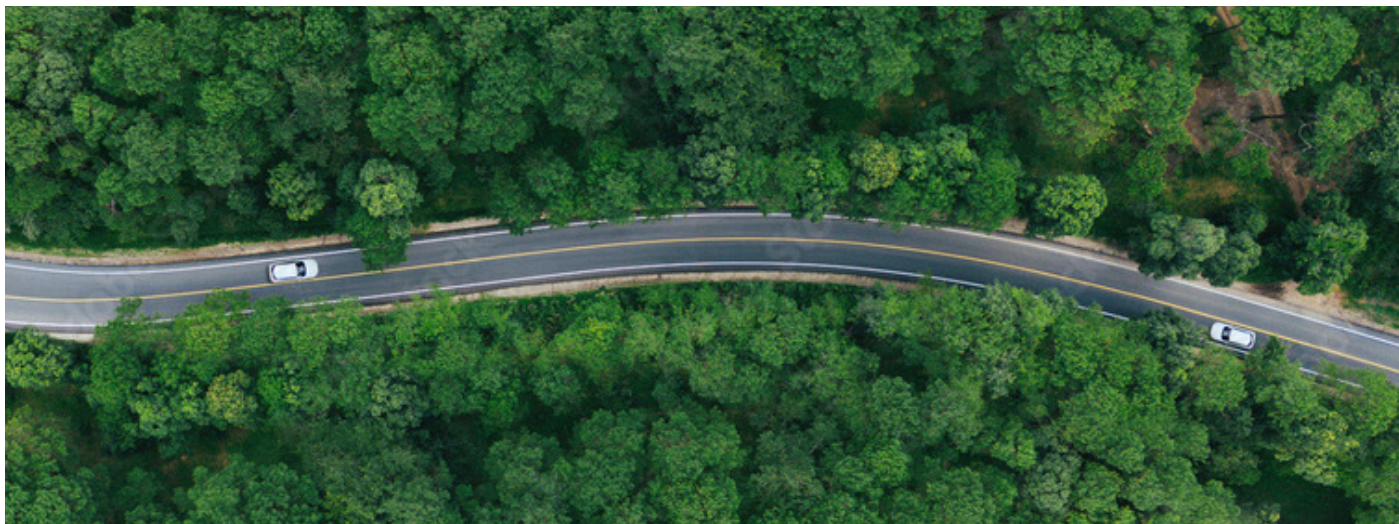
Widely used Hydrogen Electrolyzer technologies are Alkaline Electrolyzers and Proton exchange membrane (PEM) Electrolyzers. Hydrogen produced must meet the quality requirements while maintaining the safety of the operations.

HYDROGEN CHALLENGES

- Colorless, odorless and tasteless, hydrogen is undetectable to human senses and burns with a pale blue flame that is difficult to detect.
- With a low density, it diffuses quickly through porous materials and has a higher risk of leaking.
- It can cause carbon steel embrittlement to threaten the integrity of the pipeline and other wetted parts and assets.
- Mixed with air or pure oxygen, it is highly explosive.
- Lower densities and higher sound velocities can impair accuracy in some meter technologies.

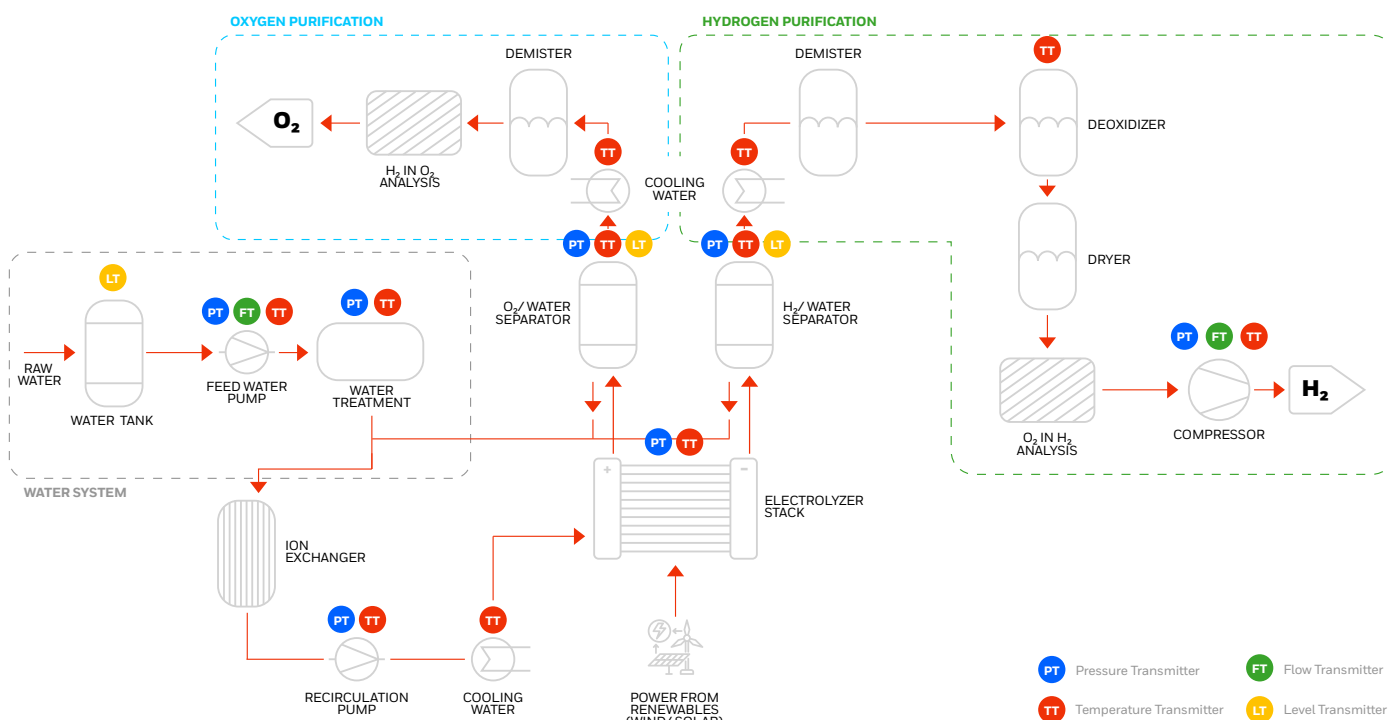
SMARTLINE[®] SOLUTION

- Helium leak tested transmitter assemblies with manifolds.
- SS316/316L MoC to manage hydrogen embrittlement.
- Employing gold-plated diaphragm materials that resist hydrogen permeation.
- Proven performance with thousands of devices successfully deployed worldwide.

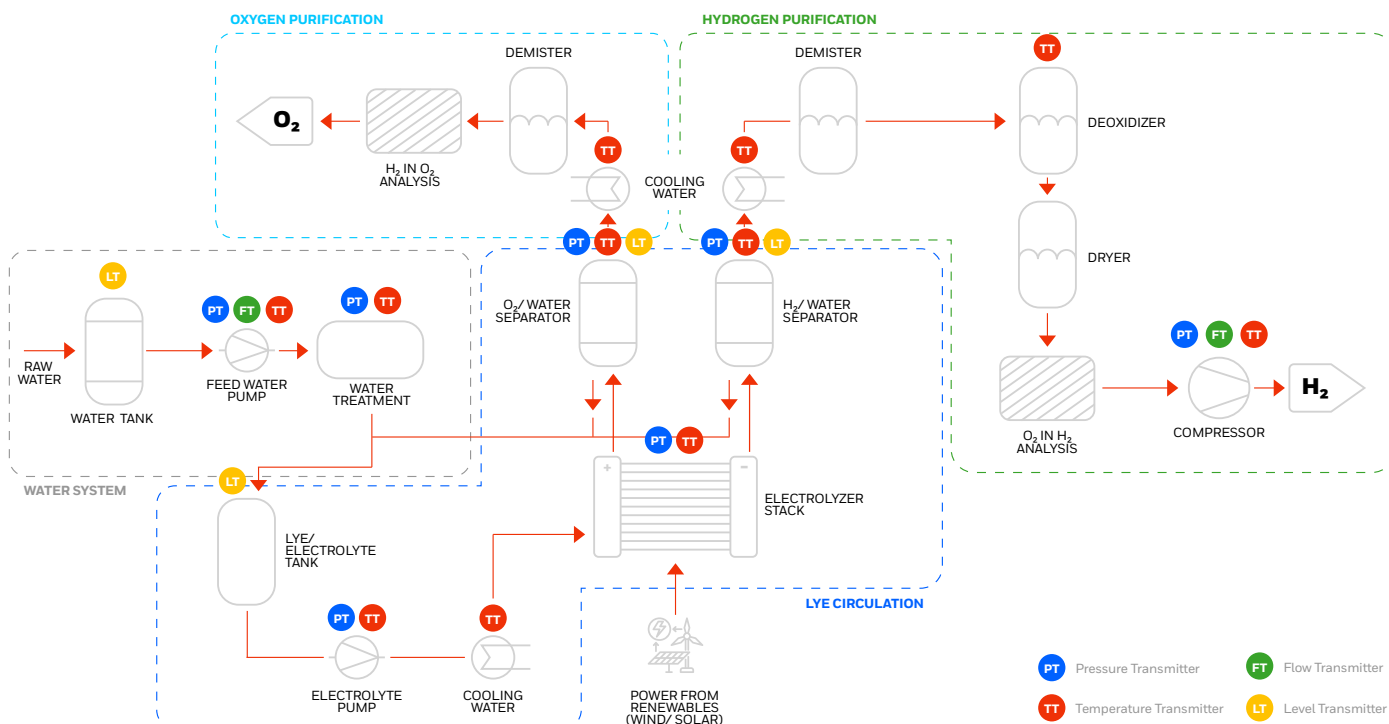


MEASUREMENT SOLUTIONS

PEM ELECTROLYZERS



ALKALINE ELECTROLYZERS



ENHANCING BUSINESS PERFORMANCE

At Honeywell, we combine our superior technology with global expertise and relevant experience to provide the support customers need in a fast changing market.

Honeywell's comprehensive portfolio of measurement and control solutions, enable you to manage your assets and optimize your operations by providing the bedrock system critical measurement, control and data acquisition. From the sensor to the control room—and everything in between—we can help you to improve your quality, productivity and safety and reduce total costs. The elements of a total measurement and control solution networked or stand-alone. We have them all.

SMARTLINE® TRANSMITTERS

Provide unparalleled value across the entire Hydrogen value chain. From enhancing efficiency in production and purification to ensuring safe storage and transportation, all the way to optimizing consumption and utilization, SmartLine transmitters are a comprehensive solution for hydrogen management.

- Innovative modular design for reduced maintenance and operating cost.
- Superior performance for improved quality.
- Dual certifications for reduced inventory.
- Intuitive cloud based SmartLine Application and Validation tool

- for error free instrument selection and application validation.
- Extended and Lifetime warranty options available.



Pressure Transmitters

- Proven in use, hydrogen compatible transmitters for improved reliability and uptime.
- Enhanced safety with factory leak tested, dual seal design and SIL capable transmitters.
- Integrated solution with SmartLine manifolds.
- Draft range to high pressure measurement for complete value chain.
- Global installed base of thousands of transmitters on hydrogen service.

Temperature Transmitters

- Comprehensive portfolio caters to application needs across Hydrogen value chain.
- Enhance safety and efficiency with accurate temperature measurement and SIL transmitters.
- Maximize uptime and reduce maintenance with superior performance specifications.
- Factory pre-tested, pre-calibrated and certified temperature probe assembly for out of box installation.
- Advanced diagnostics to gain visibility into the process, reduce variations and optimize energy.

Flowmeters

- Multiple flow measurement technologies for a variety of application needs; Coriolis, Multivariable, Vortex, Mag, Differential Pressure.
- Hydrogen permeation resistant diaphragm materials, dual seal design and SIL capable Multivariable low meters for dynamically compensated mass flow
- High performance Coriolis meters for demanding applications.
- Enhanced safety with fully welded, non-wearing SS construction of Vortex meters.

CONTROL SOLUTIONS



ControlEdge® PLC

- Seamless integration across the hydrogen value chain, minimizing hardware requirements.
- Built-in Cybersecurity protection with ISASecure EDSA Level 2 certified platform.
- Versatile connectivity to devices and HMI via open protocols like Modbus, Profinet, EtherNet/IP, OPC-UA, MQTT.

- Universal IO with HART compatibility and integrated Asset management for enhanced operational efficiency.
- Reliability with a redundant architecture and certifications for critical Hydrogen applications- ATEX, IECEx, and Marine.



Safety Manager SC

- Modular and multi-fault tolerant safety system for demanding applications, such as Emergency Shutdown (ESD) and Safety Instrumented System (SIS) requirements.
- TUV Rheinland-certified for SIL3 applications, ensuring compliance

and reliable performance e.g. in hydrogen production and transportation processes.

- Universal IO structure allowing electrolyzer manufacturers to design systems with maximum flexibility, facilitating seamless integration within the hydrogen value chain.



Experion® HS and PPC

- Allows operators in various industries to monitor and control plant environments using real-time data, leading to improved efficiency and productivity.
- Features an onboard historian that archives valuable plant data for analysis and decision-making purposes.
- Experion PPC is an industrial-grade Touch Panel PC based on a robust and easy-to-maintain hardware platform.

- Minimizes the need for proprietary, embedded Panel HMI mix, reducing maintenance overheads and simplifying data integration.
- Improves process data flow within the plant, enhancing operational efficiency and facilitating effective decision-making.



Experion® LX

- Based on Honeywell's proven Experion PKS technology which can be efficiently used for a variety of control system requirements in hydrogen applications.
- Integrated platform with comprehensive connectivity, advanced HMI and tools, and

software-enabled solutions that deliver operational efficiencies and new business outcomes.

- Extend your scope from process control and management to include personnel, assets and even the resources of your entire business operation.

SMARTLINE® APPLICATION AND VALIDATION TOOL (AVT)

AVT is a cloud-based tool that requires no license or passwords. It assists users in selecting the appropriate technology and configuring transmitters for their specific applications. The platform offers a variety of engineering tools

and resources, including material compatibility charts and a wake frequency calculator, designed to enhance your expertise and provide valuable insights.

Find the right Honeywell SmartLine® Transmitter for your application:



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