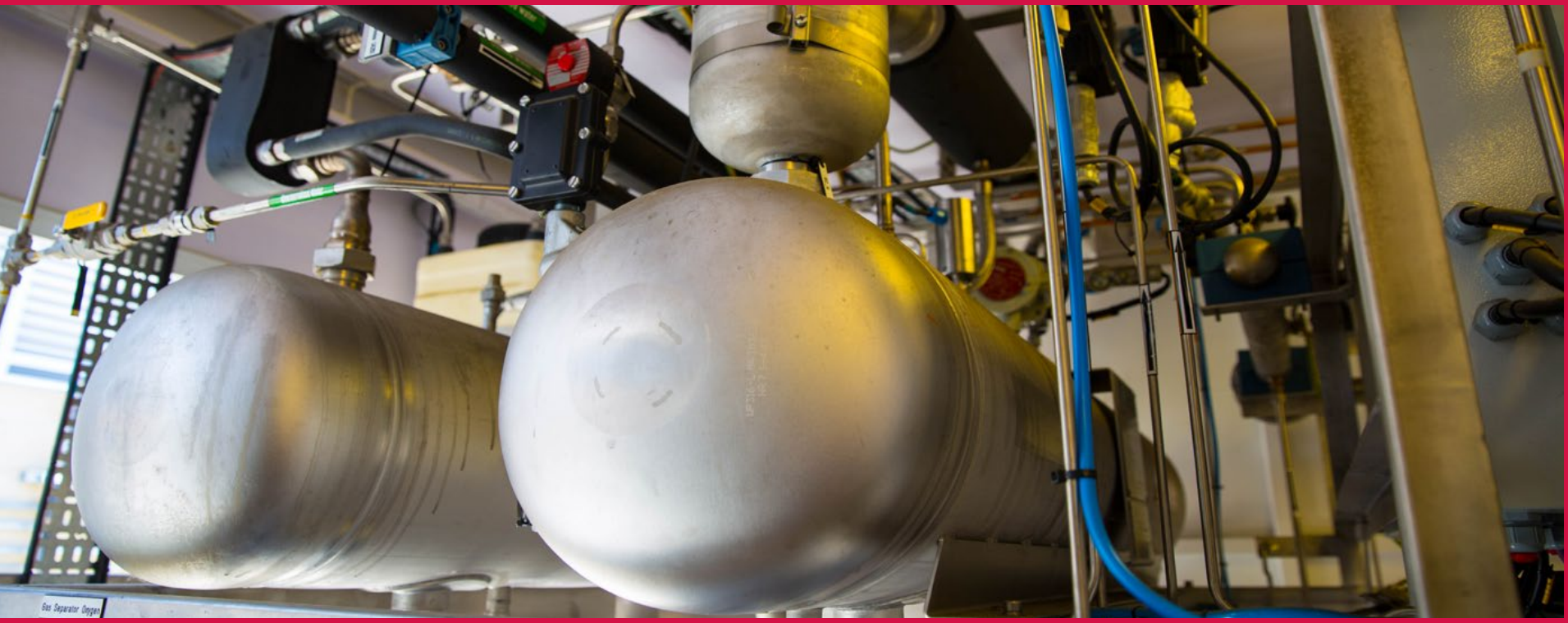


Proven solutions to optimize your system with higher safety, reliability and efficiency

Hydrogen Fuel Industry

Proven automation solutions and local expertise to help you overcome your toughest challenges

EMERSON™



In an increasingly competitive landscape, relationships with reliable experts and partners become critical for your success.

The time is now – strengthen your position against competitors and capitalize on the growth of hydrogen fuel

The hydrogen fuel industry is growing faster than ever before. Government and private investment continue to change the market landscape daily. We see more partners across the entire hydrogen fuel value chain, and you need expert suppliers who have the flexibility to meet a wide variety of designs and applications, from electrolyzers to fuel cells. In this evolving landscape, enhanced technology, deeper expertise and a stronger commitment to value-creating solutions guarantees a market advantage.

Need for the latest technologies. In emerging markets, the landscape is constantly changing. New technologies can be the difference between short-term and long-term success.

Need for truly expert partners. With new fuel and system standards, expert partners can help to ensure your systems operate safely in explosive environments.

Need for a simplified supply chain. As systems become more complex, partnering with suppliers with a broad portfolio can simplify your supply chain, creating time and cost savings.

Turn to Emerson for reliable products and solutions for your specific application

Emerson's extensive portfolio of measurement, control and electrical equipment for hazardous areas is designed to address the quality and performance needs required by companies within the growing hydrogen fuel market. Working with our brands such as Appleton™, ASCO™, Fisher™, Micro Motion™, Rosemount™ and TESCOM™ means you can expect innovative, extremely precise and reliable products designed specifically for your demanding hydrogen fuel applications. This technology is backed by global support from industry experts who understand your expectations relating to reliability, safety and cost.



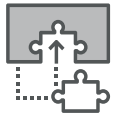
Leading measurement, control and electrical technologies

- Partner with us to develop safe, reliable and high-performance solutions optimized for your specific application
- Explore the industry's most complete portfolio of measurement, control and electrical equipment – from process and machine controllers to solenoid valves to increased safety and explosion-proof luminaires, enclosures and controls
- Apply innovative technologies that provide you with real-time insight, operational certainty and assured safety



Application experts around the globe

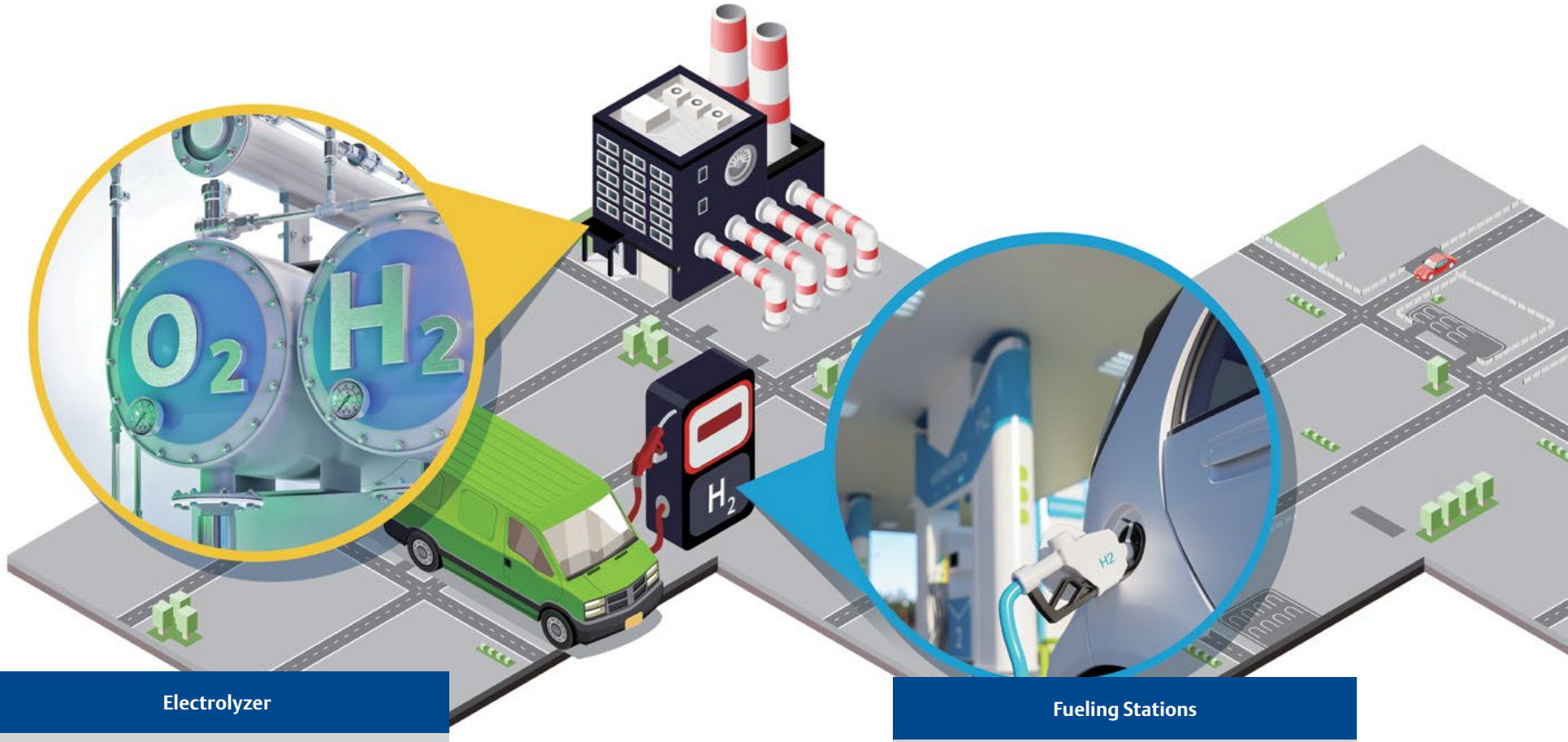
- Work with experts backed by over 100 years of experience in measurement, control and electrical equipment in hazardous areas
- Take advantage of our in-depth knowledge of hydrogen fuel component and system designs
- Free your resources by leveraging our global omnichannel support and localized distribution



Engineered solutions and services

- Train your employees to rapidly master solutions with the help of our engineers
- Obtain application consultation to help you optimize the performance of your product
- Implement flexible lifecycle servicing that matches your strategy

Your trusted partner across the entire hydrogen fuel value chain



Electrolyzer

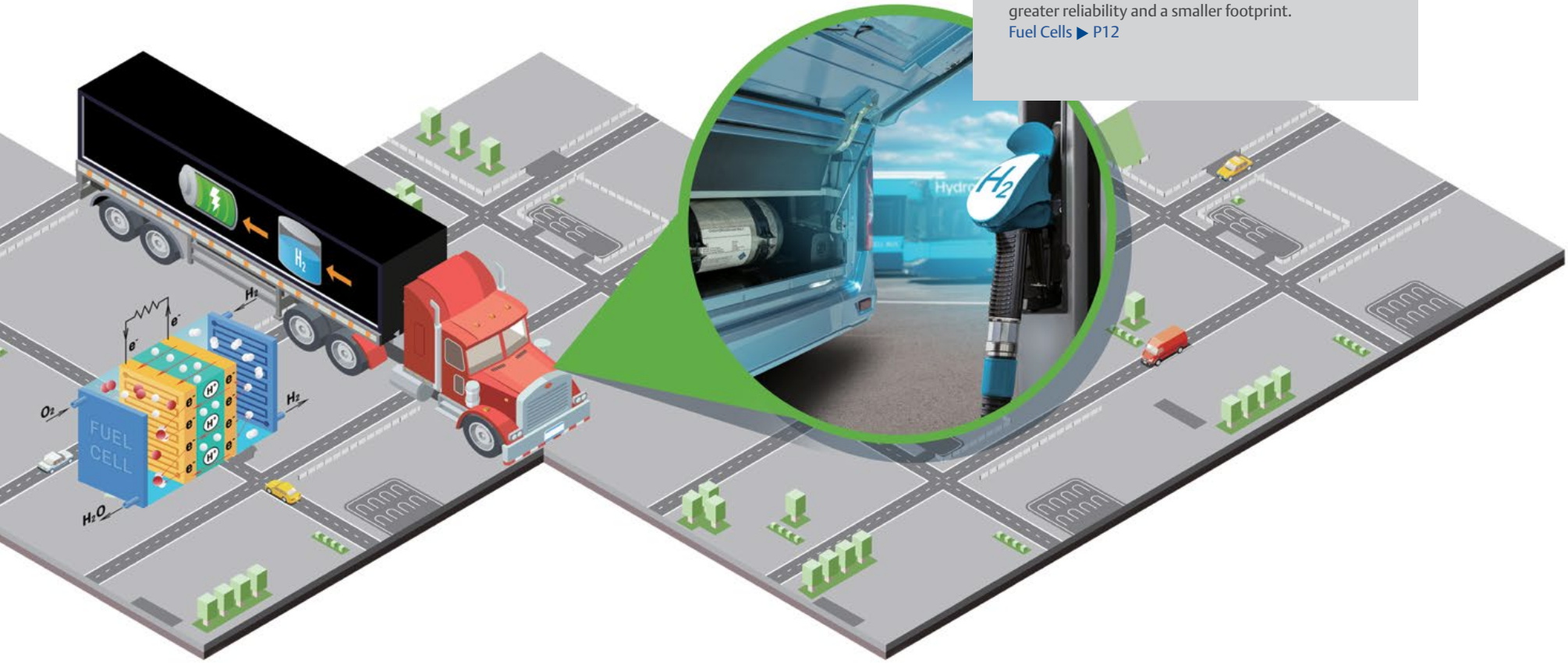
Electrolysis processes including chilling, hydrogen generation, hydrogen purification and water purification and other applications to produce high purity hydrogen need to be more efficient, reliable and safe than ever before. Hydrogen Production ▶ P6

Fueling Stations

Hydrogen filling stations are replacing traditional fuel filling stations, but still require systems that meet the highest performance and safety standards. Storage and Dispensing ▶ P10

Fuel Cells

Fuel cells converting hydrogen fuel into clean energy to power vehicles, UAVs and data centers must offer greater reliability and a smaller footprint.
Fuel Cells ▶ P12



Electrolyzer

With growing interest in hydrogen-powered vehicles and power systems, and the push for greener energy, the demand for hydrogen is greater than ever before. Producers of hydrogen fuel need electrolyzers to operate more efficiently and reliably to meet the increased market demand. Customers are also demanding hydrogen with higher purity.

Emerson offers an extensive range of measurement, control and electrical equipment suitable for installation in hazardous areas of the electrolyzer. Our solutions are designed to provide safe, reliable and precise process control, optimized production and the desired hydrogen purity.



What's your opportunity?

- Increase safety and reliability of flow control and electrical equipment in explosive environments
- Obtain high precision pressure regulation at high pressures
- Improve the efficiency of your equipment
- Emerson is a global solution provider with innovative products for emerging technologies and applications

Featured Measurement & Control Solutions

Level Measurement



Reliable level measurements in electrolysis of water ensures safe and efficient operations of the plant. Radar transmitters offers a maintenance free solution with high level of accuracy, resulting in improved product purity, through proper separation of hydrogen, oxygen and water and minimal risk of ionizing demineralized water.

- Unmatched accuracy, reliability and ease of use
- Advanced diagnostics enable process insight and proactive maintenance
- HART®, Foundation Fieldbus and WirelessHART® connectivity

Point Level Measurement



Rosemount Vortex flow meters are gasket-free, non-clogging instruments that eliminate downtime and maintenance costs associated with plugged impulse lines.

- Isolated sensor allows for inline replacement, improving worker safety
- SIL 2/3 certified for Safety Instrumented Systems
- Dual and quad meters eliminate need for multipleflow meters, reducing complexity and cost

Control Valves



The Fisher Control valves are your ideal solution for a wide range of process industry applications, providing users with high performance and reliability.

- Large temperature & pressure coverage
- General to severe service needs
- Low emissions packing
- Easy to maintain

On / Off Valves



Emerson manufactures a range of valves engineered to perform isolation and backflow prevention functions in electrolyzer units, from standard utility services to the more challenging caustic electrolytes.

These valves are designed for tight shutoff across a wide pressure and temperature range, with low fugitive emissions to improve system efficiency. The valves are also constructed for long-life performance and rapid servicing to maximize unit uptime.

Emerson's on / off valves are available as fully automated, integrated packages that are optimized for size and weight to minimize system capital costs. And all from a single manufacturer, with just one call for support.

Gas and Flame Detection



Rosemount catalytic bead combustible gas sensors provide continuous monitoring in extreme environments, helping to protect workers against exposure to high gas concentration.

- Very reliable, fast and accurate
- Explosion proof enclosure suitable for hazardous locations

Rosemount flame detectors use multi spectrum infrared technology to detect hydrocarbon and invisible hydrogen fires simultaneously.

- High sensitivity and long detection range
- High immunity to false alarms

Gas Analysis



From gas processing to final product quality, the Rosemount™ range of process gas analyzers provide a breadth of analytical technologies to meet your process requirements.

- Reduced installation costs with field mount design
- Minimal utility requirements
- Remote support and diagnostics

Featured Measurement & Control Solutions

Process Control and Asset Management



- The easy-to-use and scalable DeltaV™ and Ovation™ integrated control and safety platforms optimize green hydrogen production, reduce operational complexity, lower project risk and increase the performance of large-scale power-to-gas megawatt electrolyzers
- The multi-purpose, multi-functional DeltaV PK controller and Ovation compact controller enable smarter control for skid units and applications such as PEM and alkaline electrolyzers
- The AMS Device Manager software monitors the health of plant assets to improve safety, reliability, efficiency and sustainability
- The PACSystems™ family, including RX3i, RSTi-EP I/O and CPL410, provide scalable solutions for all aspects of hydrogen production and distribution

Safety System



Emerson's DeltaV™ and Ovation™ safety instrumented systems (SIS) – whether standalone or integrated with a control system – helps you reliably and safely protect your assets and improve your process availability with:

- Continuous monitoring of your safety devices' status
- Diagnostics of the health of safety loops to reduce risk
- Logic solvers certified to safety integrity level SIL3 (IEC 61508)
- Electronic Marshalling with LS-CHARMs (Logic Solver Characterization Module) technology that helps reduce complexity, footprint and maintenance cost

Fluid Control Valve Systems



ASCO and AVENTICS valve island systems provide precise and reliable control of pneumatic systems and feature class-leading valves, simplified commissioning and fault diagnosis.

- Modular, flexible, compact and lightweight
- Integrated diagnostic capability
- Wide range of electrical connection fieldbus communications

EMERSON is your global partner for innovative technology, providing reliable, integrated solutions like panels and cabinets. We can help to reduce complexity by offering simple box solutions to complex cabinet systems.

- we design and engineer the cabinet / panel to your needs so you receive a ready-to-install assembly
- all equipment undergoes is already tested and inspected and we take care of approvals and certifications

Flow Control



ASCO direct and pilot-operated solenoid valves for controlling liquids, corrosive and inert gases with high flow rates.

- Resilient materials provide long life and low internal leakage
- Wide range of explosion-proof operators
- ATEX certification available

ASCO pressure-operated, angle body piston valves for on/off or proportional control in demanding applications.

- ATEX and SIL accredited
- Available with optional position indicator

Visit **Emerson.com** to learn more about our technologies for hydrogen fuel applications.

Featured Measurement, Control & Electrical Solutions

Pressure and Safety Relief Valves



Pressure and safety relief valves for critical applications in the processing industry, including the largest range of spring safety relief valves.

- Complete range of spring-loaded safety relief valves from general pressure protection to extreme conditions
- Designed, certified and tested in accordance to most codes and standards around the world including ASME, PED, CU-TR, AD-2000, API, EN
- Available in a large array of materials: carbon steels, nickel alloys, duplexes, titanium and brass, with cast, forged or HIPS bodies
- Metal or soft seats, threaded, flanged, welded or hub connections

Gas Leak Detection



Emerson's Incus is an advanced ultrasonic gas leak detection system utilizing four ultra-sensitive acoustic sensors which constantly monitor wide areas for ultrasound generated from the release of pressurized gas. Ideally suited for monitoring well ventilated outdoor environments.

- Engineered to withstand even the most extreme conditions
- Unaffected by inclement weather, wind, leak direction, and gas dilution or stratification

High Pressure Regulators



- TESCOM Electropneumatic ER5000 Controller is a microprocessor-based PID controller that provides precise pressure control. The accuracy is provided through PID closed loop control and high frequency (25 msec) cycling solenoid valve. Operated by inert gas, it feeds the dome/air loader of the pressure regulator to provide precision pressure control for gas or liquid
- TESCOM Back Pressure Regulators offer highly accurate high flow, high pressure backpressure regulation for pressure management in electrolysis systems for the control of hydrogen and oxygen product streams

Pressure Regulating Valves



FISHER Pressure and Back Pressure Regulators offer highly accurate flow, low pressure backpressure regulation for use in electrolysis pressure system control of hydrogen and oxygen, covering larger size up to 12 inches and pressure control down to inches water column.

Temperature Measurement



Rosemount temperature measurement portfolio provides a range of solutions to meet your application needs.

- Rosemount X-well™ technology offers accurate non-invasive temperature measurement
- Twisted Square™ provides a solution for challenging applications
- SIL2 compliant
- HART®, Foundation Fieldbus and *Wireless*HART® connectivity

Hazardous Area Lighting, Enclosures and Controls



Emerson provides a complete solution for increased safety and explosion-proof LED lighting park and power distribution.

- Appleton LED indoor and outdoor linear fixtures and floodlights with wide range of lumen outputs provide light where needed with intensity up to 7000 lumens for indoor and 38000 lumens for outdoor lighting
- IP66 increased safety polyester junction boxes in wide range of sizes and configurations, fully equipped (standard or customized) to ensure correct power distribution to luminaires and other devices
- IP66 increased safety polyester switches and control stations to manage power on and shutdown of lighting park, including emergency situations
- All equipment is suitable for gas group IIC, providing Ex e or Ex d protection

Fueling Stations

As fueling stations transition to hydrogen fuel, you are encountering more risk. Your customer wants to ensure they are dispensing the right amount of fuel and at the right pressure, not only quickly but safely.

Let Emerson partner with you to develop high quality, precise, safe and easy to maintain fueling station systems, from the storage tank or tube trailer to the dispenser.



What's your opportunity?

- Ensure safe operation of your system in explosive environments
- Save cost by dispensing accurate fuel volumes and flow rates and reducing leakage probability
- Increase the reliability of your equipment
- Emerson is a global solution provider with innovative products for emerging technologies and applications

Featured Measurement & Control Solutions

Fueling Station Control



Emerson's programmable logic controller (PLC) with integrated edge capability enables complete control of the fuel dispensing process. This is combined with the ability to perform analysis and visualization of diagnostic and process data, provided locally to the fuel station operator and remotely to the hydrogen supplier.

- Advanced machine control ensures safe and reliable dispensing of fuel
- External communication simplifies supply chain logistics
- Integrated edge functionality reduces equipment footprint

Pressure and Safety Relief Valves



Pressure and safety relief valves for critical applications in the processing industry, including the largest range of spring safety relief valves.

- Complete range of spring-loaded safety relief valves from general pressure protection to extreme conditions
- Designed, certified and tested in accordance to most codes and standards around the world including ASME, PED, CU-TR, AD-2000, API, EN
- Available in a large array of materials: carbon steels, nickel alloys, duplexes, titanium and brass, with cast, forged or HIPS bodies
- Metal or soft seats, threaded, flanged, welded or hub connections

Flow Measurement



Micro Motion HPC015 Coriolis flow meters are compact and specifically designed for hydrogen dispensing applications.

- ±0.5% mass flow accuracy at operating conditions
- Meets SAE J2601-1 specifications
- Easy to install with no flow conditioning or straight piping runs required
- Very reliable design, no moving parts to wear out
- Smart Meter Verification checks meter integrity to extend or eliminate calibration intervals

Temperature Measurement



Rosemount X-well technology offers accurate non-invasive temperature measurement without thermowells or process penetrations that create potential leak points.

- Surface temperature sensor solution reduces complexity
- Easy to retrofit, reduced installation time

High Pressure Measurement



Rosemount pressure transmitters for high pressure applications enable increased safety and minimized downtime.

- Unmatched reliability and accuracy even in harsh environments
- Industry leading high pressure capabilities (up to 1379 bar)
- Reduced risk with a design tested to rigorous qualification requirements
- Gold-plated SST diaphragms to protect against hydrogen permeation

On/Off Valves



TESCOM VA air-operated valves are designed to shut the 15000psi hydrogen trailer storage tanks and isolate key components in the high pressure systems of the dispensers.

- Lightweight, small footprint, tested for high cycling, in-place maintenance

Applications:

- Tube trailer shutoff
- High pressure compressor isolation
- Buffer storage isolation
- Hydrogen dispenser shutoff and venting

Pressure Control



TESCOM Electropneumatic ER5000 Controller paired with the 26-2000 Series High Pressure Regulator provides precise algorithmic pressure control when controlling the flow and pressure of the hydrogen supply.

- Very accurate, precise, reliable and consistent
- Controls pressure up to 20,000 psi, ATEX approval, KOSHA certificate for Korea, METI certificate for Japan
- Data acquisition
- Enables controlled delivery of hydrogen pressure to a fuel tank, eliminating the risk of high pressure shocks to the vehicle fuel system

Solenoid and Dispensing Valves



ASCO 3/2-way and 5/2-way solenoid valves provide the piloting of larger valves that control the pipeline to the fuel stations.

- ATEX certification, up to SIL3 capable

ASCO dispensing valves are designed to meet the demands of hydrogen dispensing applications, providing very precise, safe and reliable flow control.

- Designed for high flow and pressure rating to 345 bar
- Constructed from resilient materials, lower internal leakage, long lifetime

Fuel Cell

Hydrogen is an important energy source of the future and can be used to power passenger cars, commercial vehicles, drones and forklifts, replacing traditional heavily polluted carbon fuels and chemical battery power. It can also provide back-up power supply for critical applications like data centers.

Emerson has a wide range of products that provide reliable and safe operation of any type of fuel cell including PEMFC, PAFC, SOFC and MCFC. Compact and lightweight designs permit you to create high power density systems. Robust and extremely reliable products mean longer life and reduced downtime. From high reliability flow control, compact and lightweight pressure regulators, to increased safety polyester junction boxes and flameproof cable glands, Emerson provides superior solutions for fuel cell power systems.



What's your opportunity?

- Lower your risk of fuel cell system failure by obtaining stable pressure regulation, safe distribution and connection between conducts and equipment
- Increase the reliability and accuracy of your flow regulation with varied output power capacity
- Build systems that last using our products designed for cold environments
- Reduce commissioning time through on-site/pre-settings
- Increase the flexibility of your system by using compact and lightweight products

Featured Measurement, Control & Electrical Solutions

Flow Control



- ASCO proportional valves provide precise flow control of fuel, supporting greater fuel cell efficiency and preventing high pressure from damaging the membrane. Very easy to mount
- ASCO direct and pilot-operated solenoid valves are ideal for controlling flow of fuel from a vehicle's storage tank to the fuel cell stack. Highly reliable, with resilient materials providing long lifetime, low internal leakage. Pressure rating to 30 bar. Available with optional heating module for cold start-up environment
- ASCO relief and compact, high flow check valves feature quiet operation, instantaneous shutoff against reverse flow and low forward pressure opening

High Pressure Hydrogen Control



TESCOM Onboard Pressure Reducing Regulators are specifically designed for the challenges of delivering precise hydrogen pressure to on-vehicle fuel cells.

- Two stage regulator designs minimize downstream pressure fluctuations resulting from changes in hydrogen tank pressure
- Proprietary designs ensure tight no-flow shutoff of pressure across common operating scenarios
- Wide operating flow ranges deliver consistent downstream pressure as fuel demand varies

Gas Valve



Low pressure solenoid pilot operated valves available in normally closed and normally open constructions.

- Solenoid valves with explosion proof operators (VC) EF for use in potentially explosive atmospheres
- Zero differential piloted diaphragm
- Ideal for low pressure applications
- Optional valve position indicator or feedback
- On-off control for varied fuel like natural gas, reforming gas, bio-gas

Modular Distribution Panel with Fiber Patch



Appleton PlexPower™ ATEX / IECEx Fiber Panel combines power and data in a single distribution solution suitable for the hazardous area of the fuel cell.

- Reduce the number of long dedicated cable runs and limit potential failure points
- Zone 1-2 and 21-22 IIB+H2 and IIC certifications
- Small lightweight footprint

Junction Boxes



Appleton ATX™ JBEP Series FRP Terminal Boxes are suitable for power distribution applications.

- Wide range of IP66 increased safety polyester junction boxes
- Multiple sizes, available fully equipped, standard or customized

Cable Glands



Appleton A2F Series Nickel Plated Brass Cable Glands are suitable for unarmored cables, certified for enclosures and junction boxes with the following protection modes:

- Ex d flameproof IIB or IIC
- Ex e increased safety IIC

Achieve your desired operational performance through flexible service support

With Emerson's Lifecycle Services you will have the flexible support you need to meet the demands of an expanding hydrogen fuels market. With the availability of thousands of engineers worldwide, you will have access to industry, application, OEM and hazardous area experts locally who can help you design, engineer and develop high performance and safe solutions, successfully implement systems and technologies and train personnel to achieve operational project certainty. From a broad network of local service centers, our experts can diagnose, troubleshoot and maintain your solution remotely helping to increase uptime and profitability. Whilst through our continuous improvement and optimization programs we can deliver the operational certainty you need over the lifetime of your asset.



Consulting Services

- On-site automation consultants
- Site audits
- Process optimization



Project Services

- OEM engineering resources and support
- Automation commissioning and start-up services
- Quick shipping of components to meet tight commissioning schedules



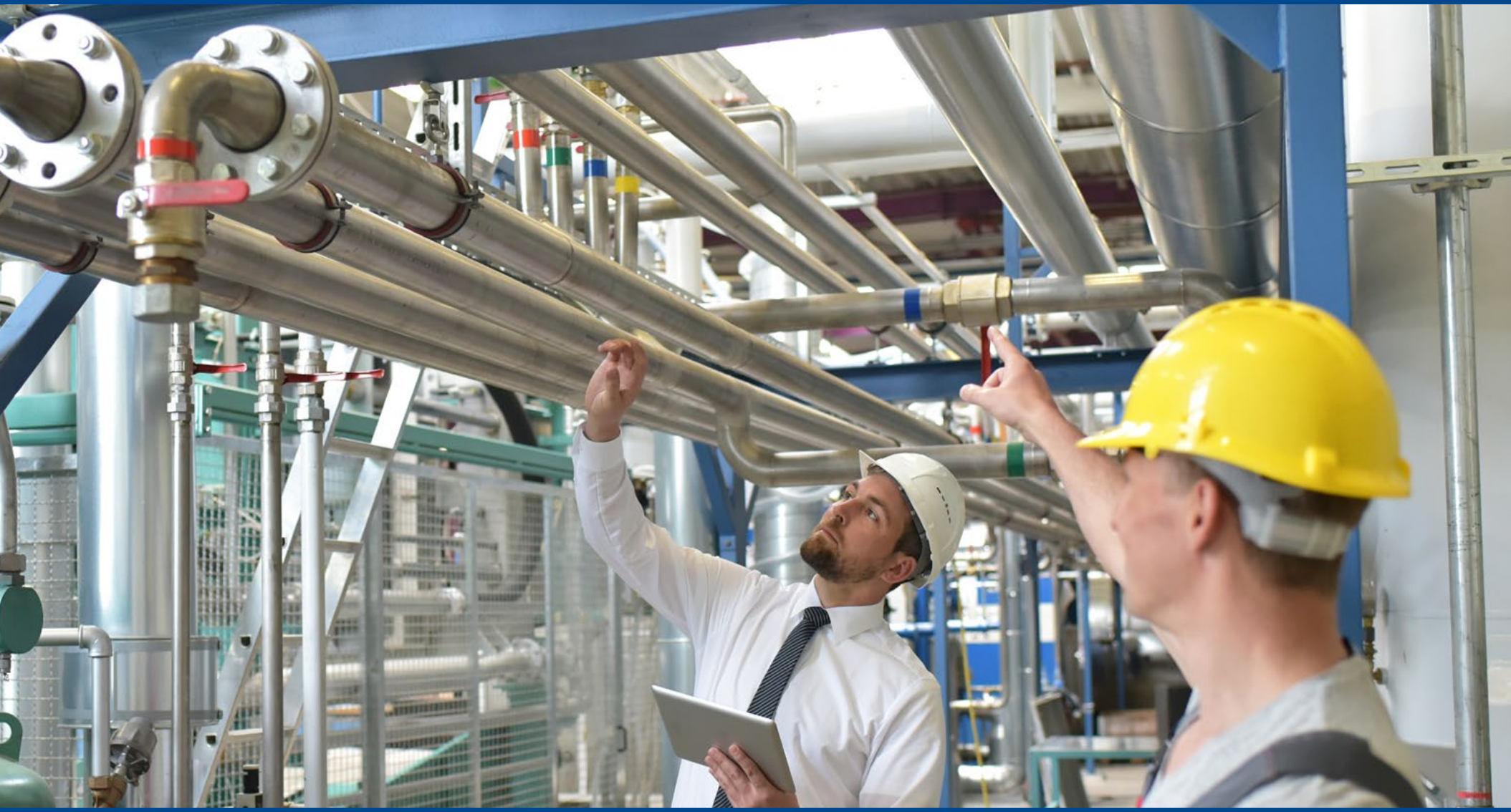
Lifecycle Services

- Calibration, rapid repairs and spares management
- Remote troubleshooting and repairs
- Turnaround assistance



Educational Services

- Consultant-led OEM/engineered solutions workshops
- Local training facilities
- On-site training



With locations all over the world we are always nearby to help solve your problems – no matter where you are. Contact us today!

Get started



Emerson delivers time-tested and innovative measurement and control solutions designed to help you maximize performance today and cut costs tomorrow. Contact us now for world-class technologies, and services that can optimize your operations. Getting started is easy. Visit **Emerson.com**

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