

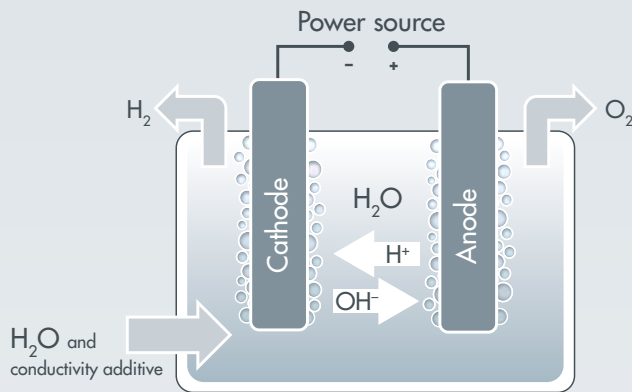
HYDROGEN VALUE CHAINS



Application Solutions
for Sustainable Value Chains

SMART IN FLOW CONTROL

SMART, SUSTAINABLE, HOLISTIC



HYDROGEN STRATEGY FOR THE FUTURE

Hydrogen plays a key role in energy transition. As a fuel or energy carrier, it will be used for clean mobility in the energy sector and as a process gas in industrial applications. Contrary to fossil fuels, however, no carbon dioxide is emitted as part of its usage. SAMSON continues to supply valves for hydrogen service to customers all across the world who are active in the generation, transport and supply of energy as well as in the chemical and petrochemical industries. The valve portfolio ranges from high-quality control and shut-off valves in small, medium and large valve sizes to specialized valves for pressure swing adsorption, low temperatures and/or high pressures as well as other challenging process conditions. Properly sized and selected, our valves operate reliably over many years and are capable of withstanding the material-embrittling properties of hydrogen.

DIGITAL SOLUTIONS TO MEET YOUR REQUIREMENTS

We are working on becoming the first choice for smart, networked valves, flexible production processes and challenging applications. Backed by over 100 years of experience in the field of valves, actuators and positioners, our engineers are able to analyze the relevant data and draw the right conclusions.



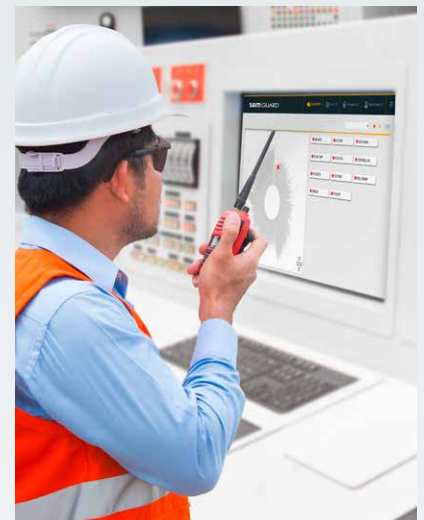
Plant data: updating of tag data either by file transfer or continuous data transmission



Data analysis: efficient monitoring of operating states and relevant diagnostic data through automatic or manual data analysis



Optimization: prevention of costly unplanned plant downtime and efficient planning of service work



GLOBAL SPARE PARTS AND SERVICE NETWORK

Benefit from our international service network and consulting services provided by our experienced engineers backed by over 100 years of valve engineering expertise.



Spare parts management: an international network of service centers allows us to quickly respond to critical plant outages

Centers of competence for positioner repairs: more than eight certified positioner repair centers

Technical support: technical support ensures plant availability and improves plant performance

Engineering services: customized solutions for our customers

Worldwide service network: our service engineers are at the ready to perform repairs on site around the globe.

Global Training Center (GTC): training of MRO staff to transfer specialized knowledge

Plant walk-downs: support provided by identifying critical valve applications

Turnaround planning services: significant reduction of costly plant downtime and avoidance of unforeseen problems

H₂ VALUE CHAINS



ENERGY SOURCES

The electricity required to produce green hydrogen is generated in solar-thermal power plants, for example. In such plants, solar radiation is bundled by reflectors (mirrors) to heat up oil, water or molten salt for the downstream generation of steam to generate electricity. SAMSON has the right solutions to meet the strict material and control accuracy requirements that apply throughout the entire process.

ELECTROLYSIS

Green hydrogen is generated by decomposing water into hydrogen and oxygen using renewable electricity. In the different procedures, precise, rugged control is necessary to guarantee the highest levels of efficiency and reliability in supply and the output stages across a wide load range. For years, products by SAMSON have been used successfully in our customers' plants.

LIQUEFACTION AND TRANSPORT

Hydrogen is cooled down in several stages to liquefy it. The two main methods used are the Joule-Thomson effect and Claude's process. Tanker ships or tank trucks are used for transport. The SAMSON control equipment necessary for liquefaction and transport, which comes with a design temperature of $-253\text{ }^{\circ}\text{C}$, has been proven in service for many years.

REFINERIES

In refineries, hydrogen is used in raw oil refining processes: In hydrocracking, hydrogen serves to break long-chain hydrocarbon molecules. In hydrotreating, hydrogen is used to remove sulfur and other unwanted compounds from petroleum products through hydrogenation. SAMSON has been supplying valves, actuators, explosion-protected positioners, limit switches and solenoid valves for these key applications for decades.

SUPPLY

Hydrogen generated from renewable energy sources can be fed into existing (natural) gas networks. Opportunities for its further use include applications such as electricity generation, heat supply and mobility. This presents a sustainable solution for the transport and the subsequent use in existing infrastructures.

AMMONIA PRODUCTION

Green hydrogen and nitrogen are fed into high-pressure reactors for the sustainable production of ammonia. Ammonia is more than an essential intermediate product in the production of fertilizers; it can also serve as a high-density fuel. To ensure proper control of the media at high temperatures and pressures, SAMSON valves are a proven, rugged choice.

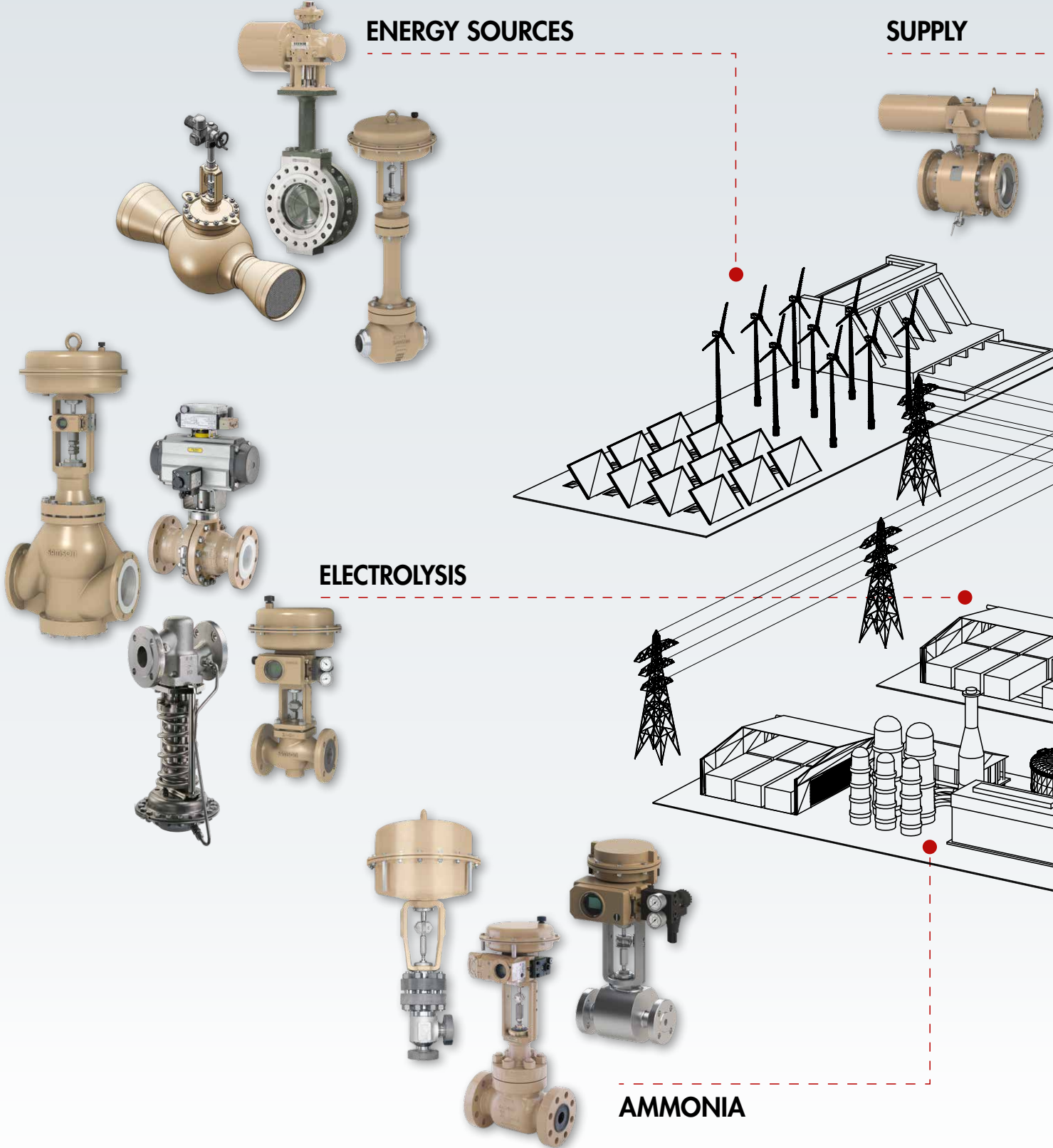
HYDROGEN REFUELING STATIONS

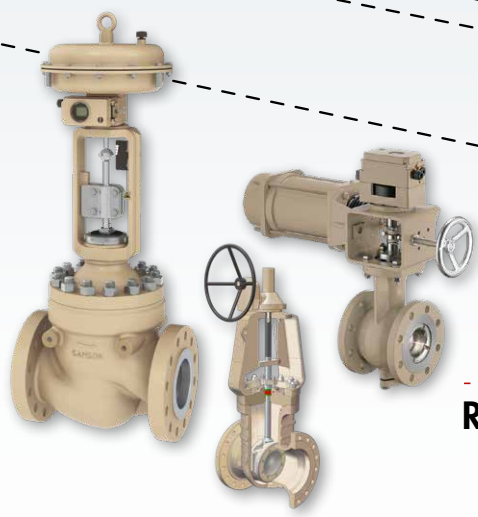
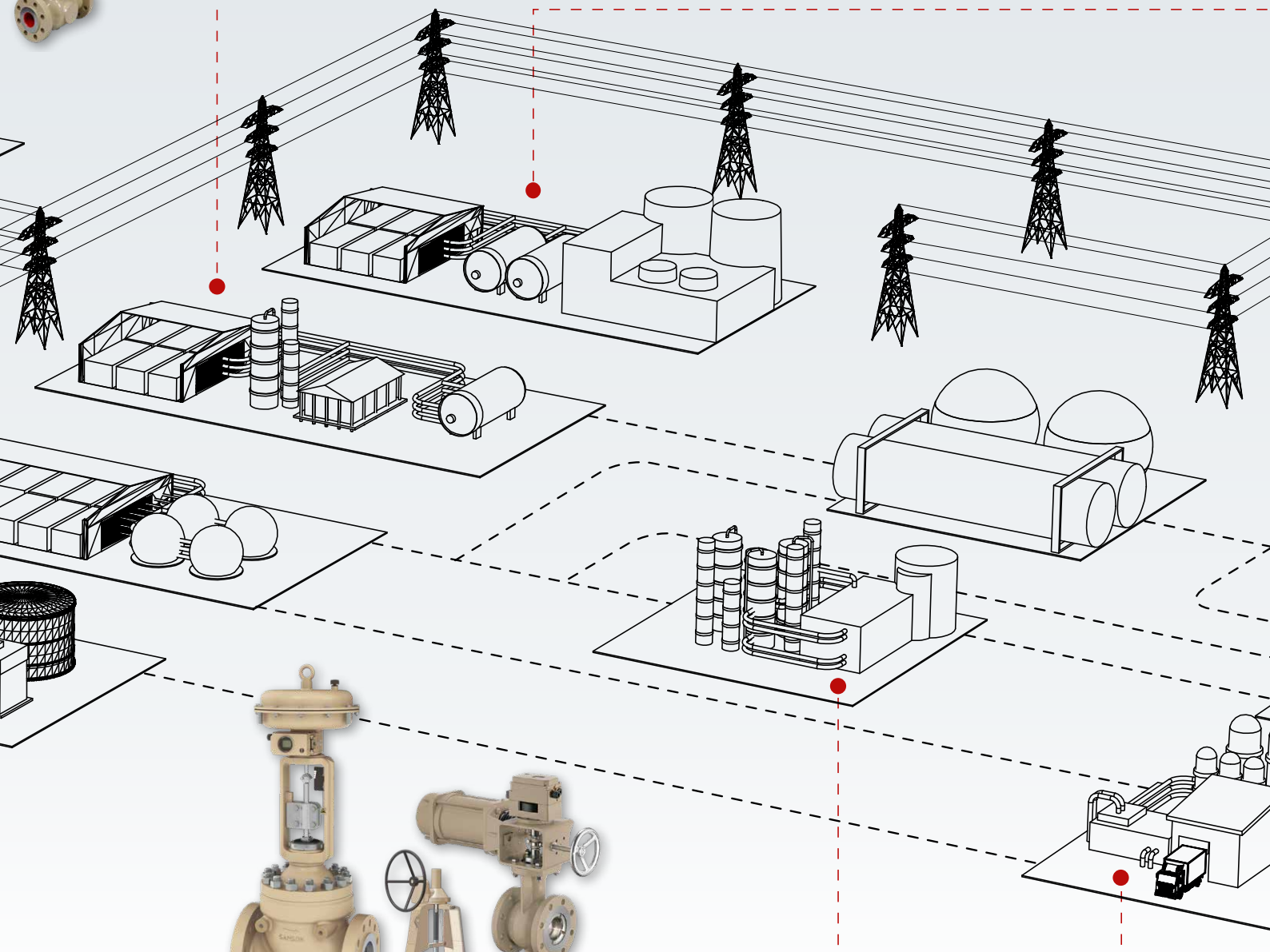
Hydrogen is stored as a liquid to reduce its volume. When refueling vehicles, the cryogenic hydrogen is evaporated and subsequently compressed before it is introduced into the vehicle tank. At many stations, SAMSON solutions are used to control the pressure during the evaporation process.

ARE YOU INTERESTED IN LEARNING MORE?

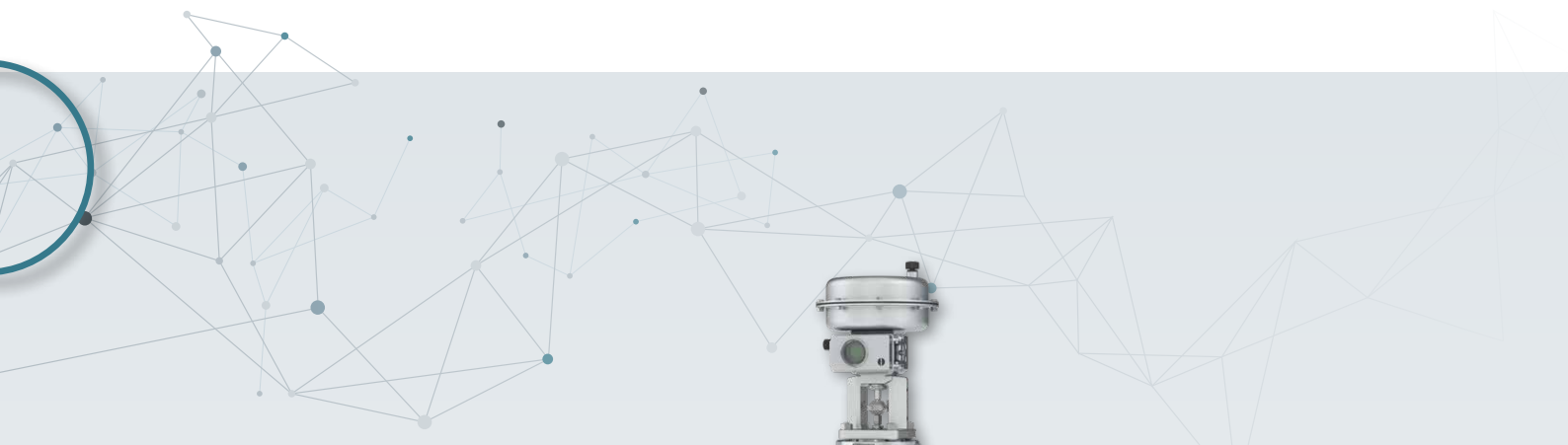
Simply e-mail us at info@samsongroup.com with "Hydrogen" in the subject line.

PROCESS ENGINEERING FROM A SINGLE SOURCE

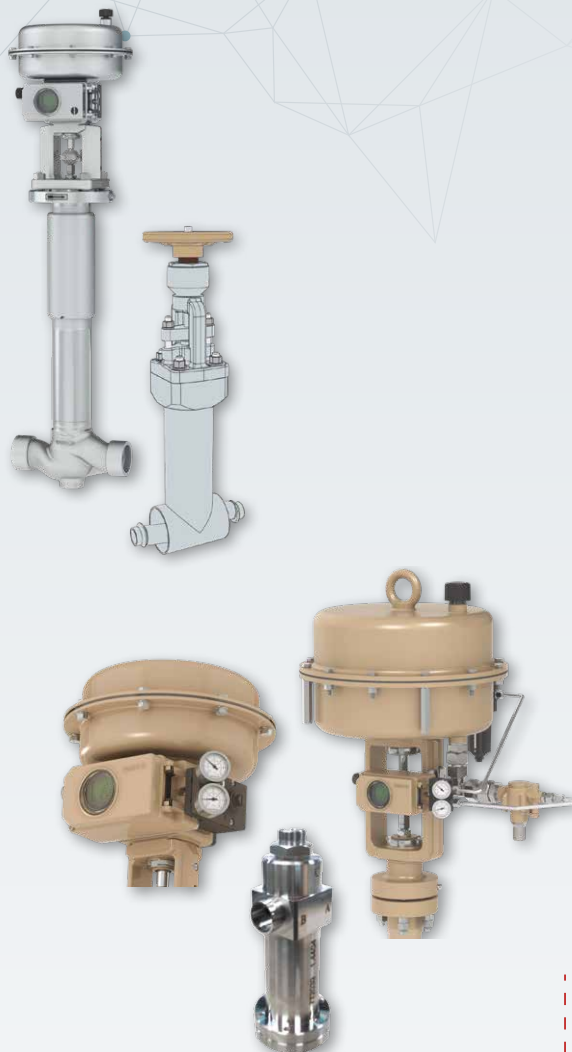
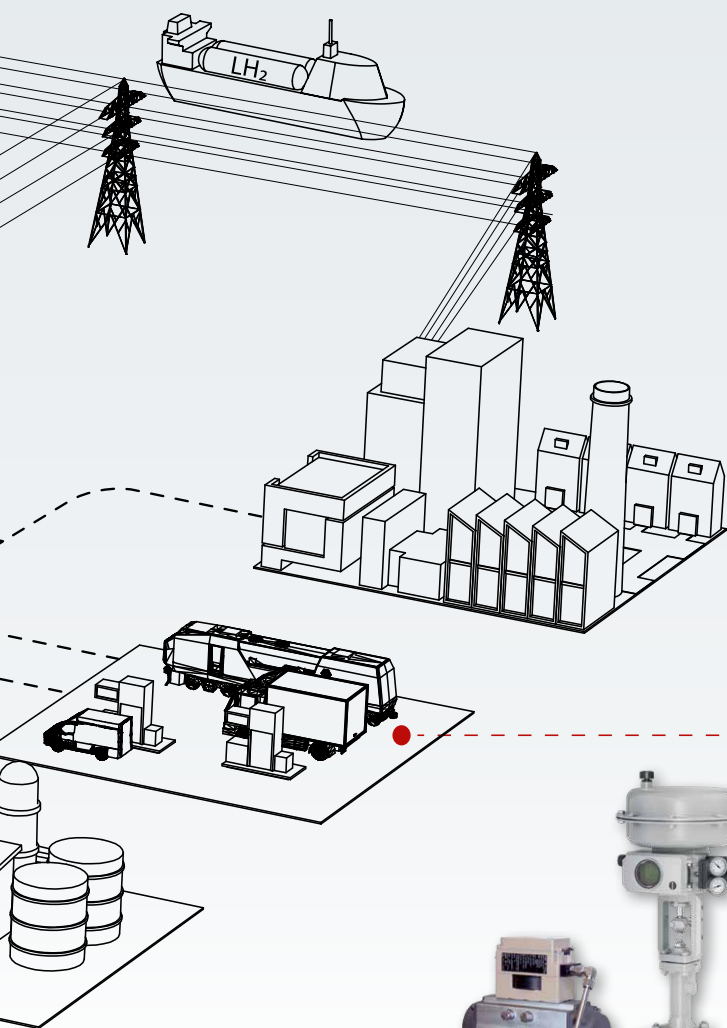




REFINERIES



LIQUEFACTION AND TRANSPORT



HYDROGEN REFUELING STATIONS

CHEMICALS



OUR PRODUCT RANGE



GLOBE VALVES

The modular design of our valves enables us to provide a wide variety of valves, such as globe valves, angle valves, three-way valves, in all commonly available valve sizes, pressure ratings and materials, with exchangeable trims, bellows seals or insulating sections. Our control valves can be tailored to almost any specific control task, which allows them to meet even the most challenging requirements under severe operating conditions.

BALL VALVES

SAMSON's product portfolio includes metal-seated and ceramic-lined control and shut-off ball valves as well as ball valves with and without PTFE or PFA linings for on/off service in all valve sizes.

ROTARY PLUG VALVES

SAMSON's rotary plug valves are available as wafer-type or flanged valves with short or long face-to-face dimensions. These valves can be delivered in valve sizes up to DN 600/NPS 24 and pressure ratings up to PN 320/Class 2500. The wide variety of versions, good control response and high flow capacity make SAMSON's rotary plug valves suitable for use in a broad range of applications as a universal control solution.

CONTROL AND SHUT-OFF BUTTERFLY VALVES

We offer double and triple-eccentric butterfly valves in valve sizes from DN 40/NPS 2 to DN 2400/NPS 96. The double-eccentric butterfly valves are also available with high-grade plastic linings. For process media at high or low temperatures, the valves can be fitted with a shaft extension to protect the actuator and valve accessories.

SELF-OPERATED REGULATORS

SAMSON's self-operated regulators are a cost-effective solution for handling control tasks with a fixed set point and steady-state errors. They control, monitor and limit the temperature and pressure or control differential pressures and flow rates.

ACTUATORS AND SMART VALVE ACCESSORIES

Standardized interfaces allow SAMSON's valves and actuators to be fitted with accessories, such as positioners, limit switches and solenoid valves. The Series 3730, 3731 and 3793 Smart Positioners allow control valves to be integrated into process control and asset management systems and connected to IIoT and Industry 4.0 applications.

SAMSON AT A GLANCE



STAFF

- Worldwide 4,500
- Europe 3,600
- Asia 600
- Americas 200
- Frankfurt am Main, Germany 1,900

INDUSTRIES AND APPLICATIONS

- Chemicals and petrochemicals
- Food and beverages
- Pharmaceuticals and biotechnology
- Oil and gas
- Liquefied Natural Gas (LNG)
- Marine equipment
- Power and energy
- Industrial gases
- Cryogenic applications
- District energy and building automation
- Metallurgy and mining
- Pulp and paper
- Water technology
- Other industries

PRODUCTS

- Valves
- Self-operated regulators
- Actuators
- Positioners and valve accessories
- Signal converters
- Controllers and automation systems
- Sensors and thermostats
- Digital solutions

SALES SITES

- More than 50 subsidiaries
in over 40 countries
- More than 200 representatives

PRODUCTION SITES

- SAMSON Germany, Frankfurt, established in 1916
Total plot and production area: 150,000 m²
- SAMSON France, Lyon, established in 1962
Total plot and production area: 23,400 m²
- SAMSON Turkey, Istanbul, established in 1984
Total plot and production area: 11,100 m²
- SAMSON USA, Baytown, TX, established in 1992
Total plot and production area: 20,000 m²
- SAMSON China, Beijing, established in 1998
Total plot and production area: 47,000 m²
- SAMSON India, Pune district, established in 1999
Total plot and production area: 28,000 m²
- SAMSON AIR TORQUE, Bergamo, Italy
Total plot and production area: 27,000 m²
- SAMSON CERA SYSTEM, Hermsdorf, Germany
Total plot and production area: 14,700 m²
- SAMSON KT-ELEKTRONIK, Berlin, Germany
Total plot and production area: 1,100 m²
- SAMSON LEUSCH, Neuss, Germany
Total plot and production area: 18,400 m²
- SAMSON PFEIFFER, Kempen, Germany
Total plot and production area: 20,300 m²
- SAMSON RINGO, Zaragoza, Spain
Total plot and production area: 19,000 m²
- SAMSON SED, Bad Rappenau, Germany
Total plot and production area: 10,400 m²
- SAMSON STARLINE, Bergamo, Italy
Total plot and production area: 27,000 m²
- SAMSON VDH PRODUCTS, the Netherlands
Total plot and production area: 12,000 m²
- SAMSON VETEC, Speyer, Germany
Total plot and production area: 27,100 m²

SAMSON AKTIENGESELLSCHAFT

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