




**SAMSON**

AND  
EVERYTHING  
FLOWS



**HYDROGEN**  
VALUE  
**CHAINS**



**Net-zero Solutions**  
for Sustainable Value Chains



## H<sub>2</sub> 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 °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 is supplied to various consumers over a network. The control solutions by SAMSON are used in these networks for the reliable supply of hydrogen. Other applications include the feeding of hydrogen into (natural) gas networks, the intermediate storage of hydrogen underground and H<sub>2</sub> distribution at industrial sites. SAMSON's system solutions protect consumers from impermissible operating conditions and can shut off the hydrogen supply in case of emergency.

### **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.

### **Methanol production**

Methanol is already a key product in the chemical industry. In the future, it will also play a major role as an energy carrier. It is produced from hydrogen and carbon dioxide at high pressures and temperatures. SAMSON's control and on/off valves ensure a high plant availability and safe operation during the production process.

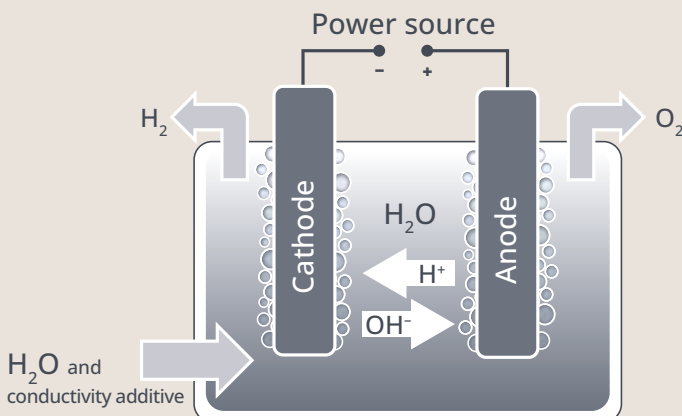
### **Blue hydrogen**

Hydrogen generation through the steam methane reforming process paired with carbon capture is a crucial bridge technology. This process involves the production of hydrogen from (bio)methane. The carbon dioxide emitted during production is captured. The captured carbon dioxide is either further used as an industrial product or stored underground. This prevents it from being released into the atmosphere as a greenhouse gas.

# 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

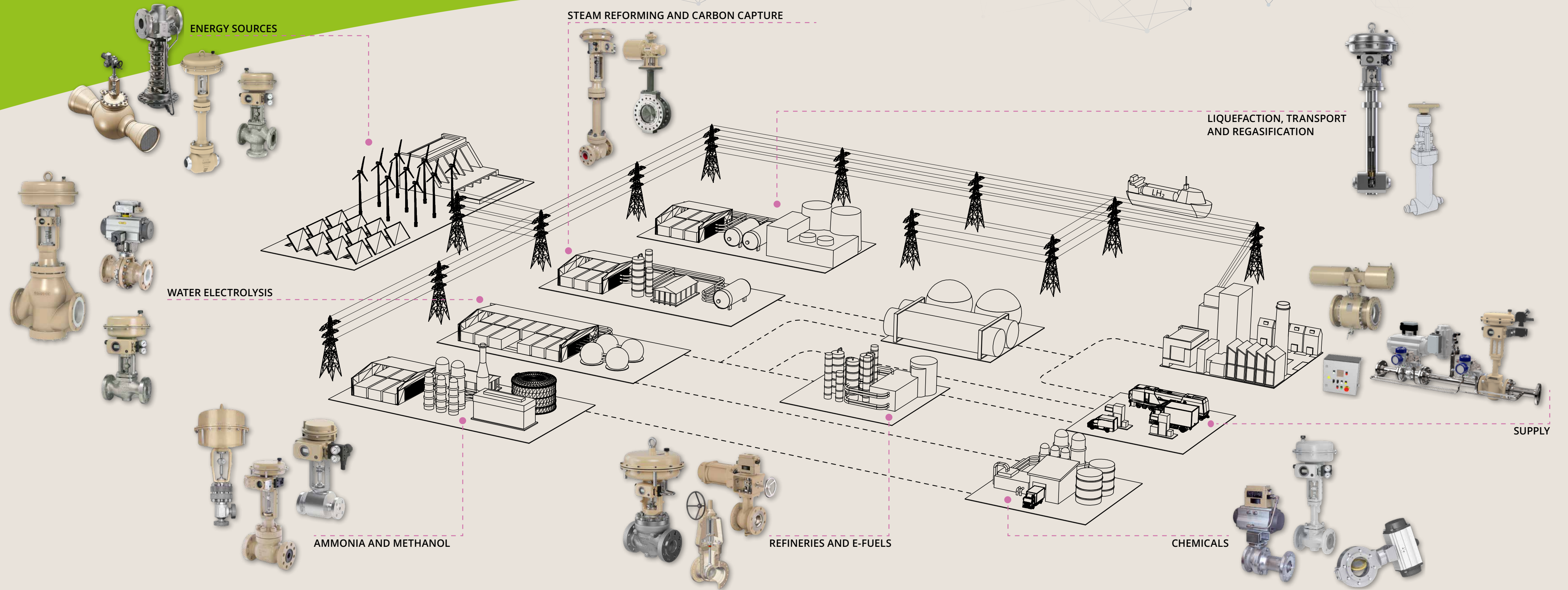
**Turnaround planning services:** significant reduction of costly plant downtime and avoidance of unforeseen problems



# NET-ZERO SOLUTIONS

FROM A SINGLE SOURCE

**SAM**<sup>®</sup>  
DIGITAL





## 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.

### **SAM Digital**

SAM VALVE MANAGEMENT is a web-based solution for the smart monitoring and management of control valves installed in process plants. Thanks to the clearly structured dashboard, users can easily keep track of all valves and immediately detect any malfunctions. It also supports users to plan plant shutdowns. SAM GUARD, our predictive monitoring and diagnostics system, detects failures days to weeks in advance and provides a few truly actionable alerts. Based on Precognize, SAM GUARD covers the topology of a plant, analyses the data and detects anomalies in the process. SAM GUARD is able to predict which of the sometimes thousands of field units in a plant will have to be inspected, replaced or repaired in the future.



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