

CO₂ REDUCTION AND VALUE CREATION



SMART IN FLOW CONTROL

INTELLIGENT, COMPREHENSIVE SOLUTIONS



PRODUCTS, COMPONENTS AND SYSTEMS

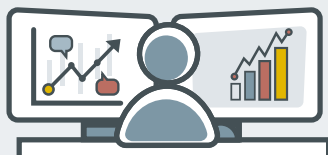
SAMSON operates wherever there is controlled flow of oils, gases, vapors or chemical substances. Valves are our core business. Quality is the key to achieving customer satisfaction. We support you throughout the entire manufacturing process.

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

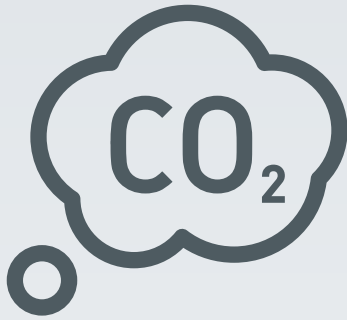
Worldwide service network: our service engineers are at the ready to perform repairs on site around the globe.

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

CO₂-RELATED CHALLENGES



In the process industry, carbon dioxide (CO₂) may exist as dry ice, a gas, a liquid or a supercritical fluid depending on the pressure and temperature. Its state of aggregation and changes of phase play an important role in engineering carbon dioxide applications because of the different properties the substance possesses at varying phases. SAMSON has comprehensive experience in sizing valves for CO₂ service at its liquid, gas and supercritical phase. Our specialists will gladly assist you.

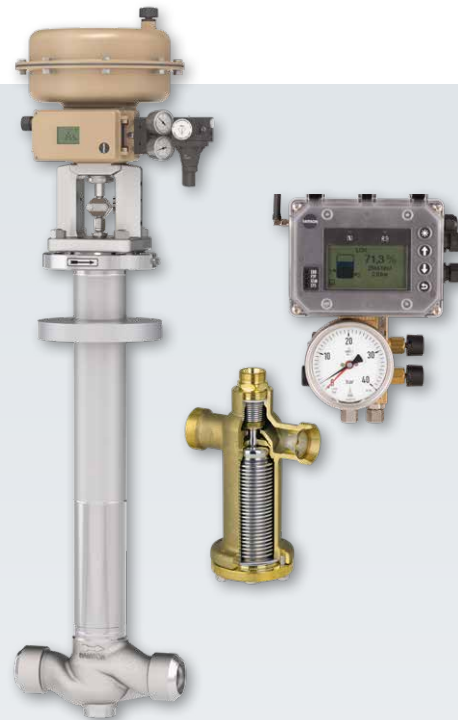


Carbon dioxide is generated when fuels (such as coal, crude oil, natural gas, biogas, wood) are burnt. This means that private households, traffic and industry contribute to the growing share of carbon dioxide in the atmosphere. CO₂ reduction can only be achieved if industrial processes are changed and made more sustainable. After all, industry is one of the largest producers of CO₂ emissions. Strategies to improve climate protection include the use of CCU and CCS technologies where CO₂ is captured, transported and stored or utilized as a raw material.

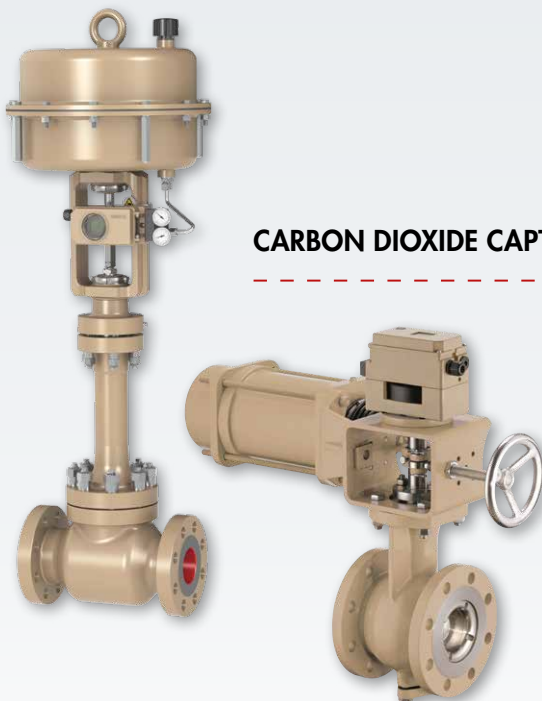


Apart from industry, traffic contributes considerably to the greenhouse effect by the combustion of fossil fuels. To change this, power-to-x technologies focus on generating synthetic fuels, such as kerosene, benzene and diesel no longer from fossil sources only. For this purpose, green electricity is used to split carbon dioxide and water into carbon monoxide and hydrogen to produce a raw material for fuels.

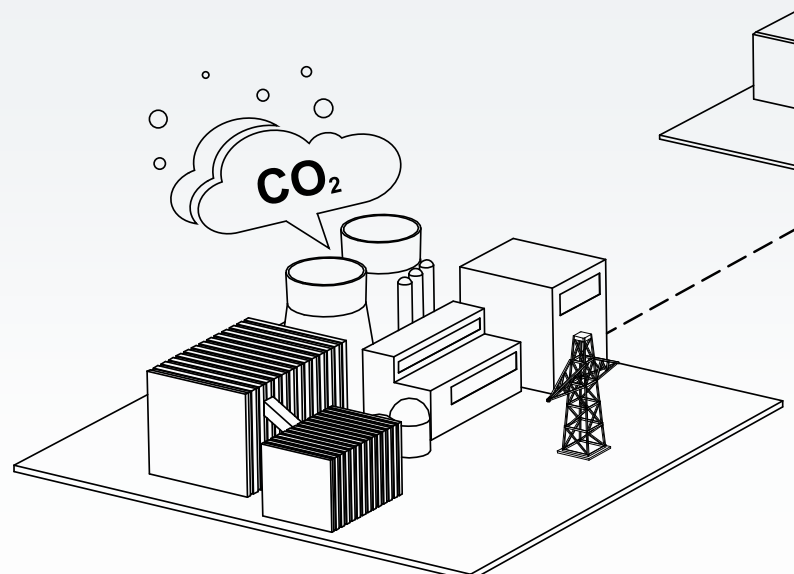
PROCESS ENGINEERING FROM A SINGLE SOURCE

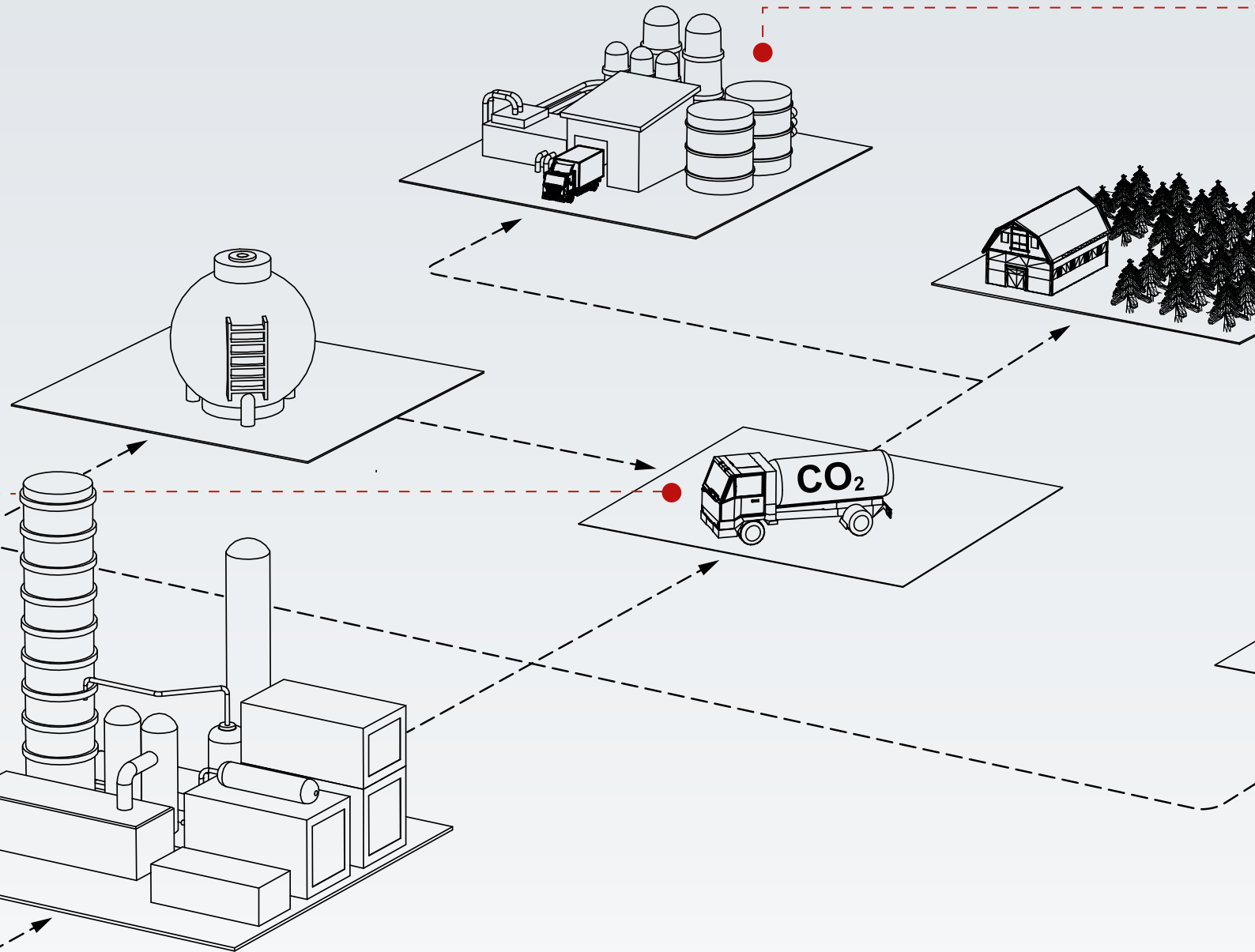


CARBON DIOXIDE TRANSPORT



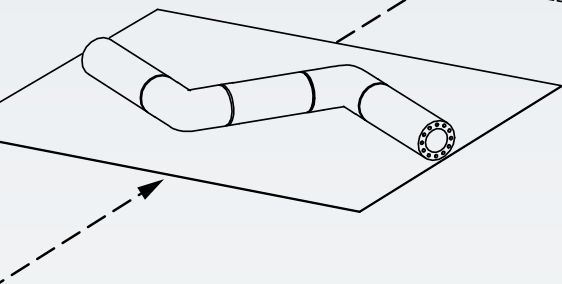
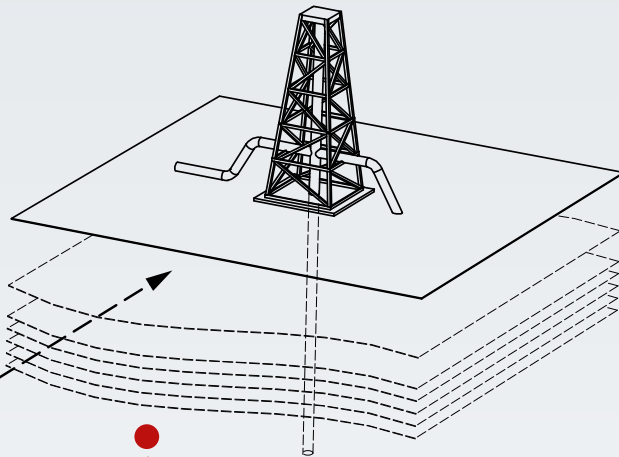
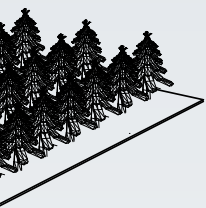
CARBON DIOXIDE CAPTURE



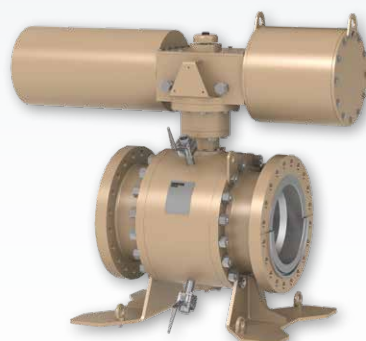




CARBON DIOXIDE UTILIZATION



CARBON DIOXIDE STORAGE



CO₂ VALUE CHAINS

1. Carbon dioxide capture

Due to the combustion of fossil fuels, power plants and industrial processes generate exhaust gases that contain high levels of carbon dioxide. Different procedures can be applied to reduce carbon dioxide emissions:

- **Pre-combustion capture:** CO₂ is removed from synthesis gases before combustion
- **Post-combustion capture:** CO₂ is removed from flue gases after combustion with air
- **Oxyfuel capture:** CO₂ is removed from flue gases after combustion with oxygen

Globe and rotary valves by SAMSON are already being used in these procedures around the globe. SAMSON supplies special valves for the oxyfuel capture process.

2. Carbon dioxide transport

The removed carbon dioxide must be cleaned before being transported. By removing water from the gas mixture, corrosion during transport can be prevented. For the actual transport, the CO₂-enriched gas is compressed or cooled down until it becomes liquid or reaches its supercritical phase. During transport, the pressure and temperature must be controlled accurately to prevent a phase transition and to stop the carbon dioxide from reaching its triple point (when there is a phase equilibrium between gaseous, liquid and solid phase).

SAMSON's product range includes different proven-in-use, corrosion-resistant valves to handle the pretreatment of the carbon dioxide and the actual CO₂ transport. Anti-surge valves, cryogenic valves, special HIPPS shut-off valves and ESD valves are reliable solutions for these applications.

3a. Carbon dioxide storage

In CCS processes, the removed carbon dioxide is fed into the wellhead and permanently stored in layers of rock deep beneath the ground. To properly function in the environment of the injection point, the valves in such applications must be rugged to withstand the most challenging conditions and come with field capabilities.

SAMSON valves fitted with valve trims optimized for the process conditions fulfil these requirements.

3b. Carbon dioxide utilization

In CCU processes, the captured carbon dioxide is put to further use. For example, it is utilized as a raw material in the chemical and petrochemical industries to produce polymers, building material and synthetic fuels. After it has been purified adequately, CO₂ can also be used in the production of foodstuffs and beverages.

The chemical industry and the food industry figure among SAMSON's key markets. As a one-stop shop, SAMSON provides light- and heavy-duty valves for chemical processes to meet all requirements. The same applies for special tasks, such as hygienic or sterile processes.

Innovative valve accessories, such as positioners and solenoid valves, round off SAMSON's product range. Smart instruments including our communication-enabled positioners allow for efficient asset management and predictive maintenance.

SAMSON AT A GLANCE



STAFF

- Worldwide 4,500
- Europe 3,700
- Asia 600
- Americas 200
- Frankfurt am Main, Germany 2,000

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 Russia, Rostov-on-Don, established in 2015
Total plot and production area: 24,000 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

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