JUMO

MORE THAN SENSORS
AND AUTOMATION

Hydrogen

The key element for clean energy of tomorrow

H2 READY

On the safe side with JUMO

Many sophisticated systems are being developed for the clean energy world around hydrogen. These range from electrolysers, storage and transport systems to fuel cells and synthesis plants. All these systems have one thing in common: In order for them to be operated safely and stably, modern sensors are required to monitor and measure pressure, temperature, level, and conductivity. JUMO has over 70 years of extensive experience in this field, which we are happy to share with you.

From 80 to 300 in 30 years

Clean energy in large quantities

The practical use of hydrogen has been tried and tested for many years - from rocket propulsion to fuel cells in trains, buses and passenger cars. However, by far the largest consumption of hydrogen today is still found as feedstock for the chemical and petrochemical industries. Worldwide, approximately 80 Mt of hydrogen was used in 2020. Due to its future use as a clean energy carrier for the energy transition, hydrogen consumption is forecast to reach 300 Mt per year by 2050.

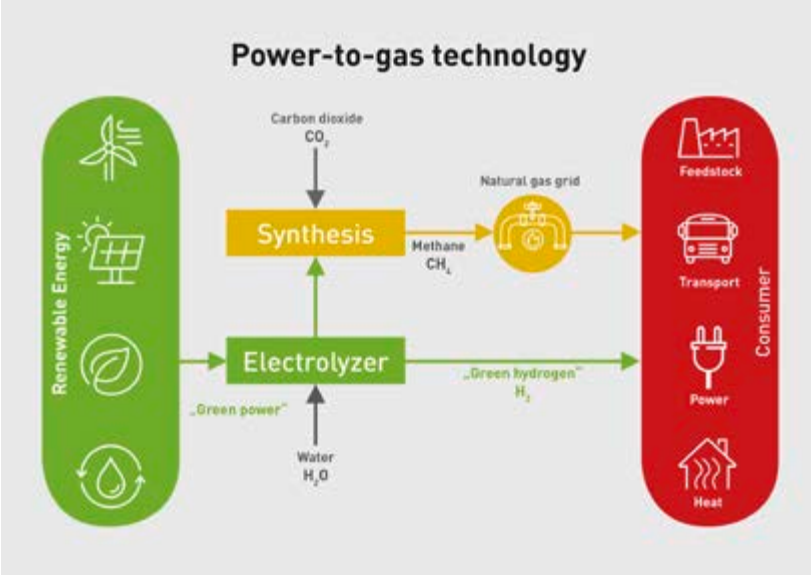
Hydrogen is the simplest chemical element with a high availability

Power to Gas

Green hydrogen for clean transport and heat

Green hydrogen is produced with green power from renewable energy sources in electrolyzers. The energy is used to split water (H2O) into its components hydrogen (H2) and oxygen (O2). The hydrogen can then be stored in various ways and used in different applications. With the help of fuel cells, trucks or ships, for example, can be operated CO2-free. Fuel cells can also be used to operate small combined heat and power plants to provide power and heat in residential buildings.

Hydrogen can also be added to the existing natural gas network, where it is then stored, transported and later burned in an industrial furnace, for example. Using CO2 from the air or exhaust gases, hydrogen can also be synthesized into methane (natural gas) or e-fuels (gasoline), allowing fossil fuels to be replaced even in applications that are difficult to operate electrically or with hydrogen.



Principle of hydrogen production

Product highlights for hydrogen

Pressure

- Universally applicable, for gases and liquids
- Compact dimensions
- Robust and stable over the long term
- SIL 2 approval
- Explosion protection
- Ship approval
- Adjustable, HART interface

Temperature

- For mobile applications
- Compact and vibration resistant
- Quick response time
- Stainless steel 316L (for use in hydrogen)
- Stainless steel 1.4305 (for water-glycol circuit)
- Customer-specific variants
- Thermocouples for high temperatures in SOFC (solid oxide fuel cell)
- Thermocouples for high pressure in CGH2 (compressed gaseous hydrogen)

Conductivity, flow

- For ultra-pure water in electrolysis plants
- For cooling liquids in fuel cells
- Conductivity measuring range: as of 0.05 µs/cm up to 1 mS/cm
- Interfaces: JUMO digiLine, IO-Link
- 4 to 20 mA or binary signal
- Digital Sensor Management

Product highlights for hydrogen

Level

- Suitable for ultra-pure water and cooling media
- Different measuring principles: capacitive or float technology
- Customer-specific versions
- Small design types
- Individual switching points
- SIL 2 approval
- Explosion protection
- Ship approval

Humidity

- For humidified hydrogen in PEM fuel cell systems and test benches
- Heated probe, condensation prevention
- High degree of accuracy, precise process control
- Robust metal case (IP65)

Monitoring

- For temperature signals and for 4 to 20 mA standard signal
- Explosion protection
- Ship approval
- SIL and PL approval
- Full certification for the combination of sensor and STB

JUMO Engineering

JUMO Engineering, the service division from JUMO GmbH & Co. KG, combines expertise and industry-specific experience in one team. Our engineers and technicians develop customized solutions that are strictly based on your specific requirements. The JUMO Engineering team strongly believes in personalized support and consulting for its customers – from initial contact and the development of a customized solution to its series production. When carrying out the many different industry applications we always strive for optimum results with maximum customer benefits. Our innovative engineering services allow us to achieve this goal.

Innovative system solutions which specific expertise

We always draw on the feedback from our customers around the world to improve our products. This strategy is reflected in our new developments. We view complex tasks as challenges that allow us to develop tailored solutions for you and at the same time improve our product portfolio. JUMO Engineering with its range of services completes this comprehensive approach.

Our services

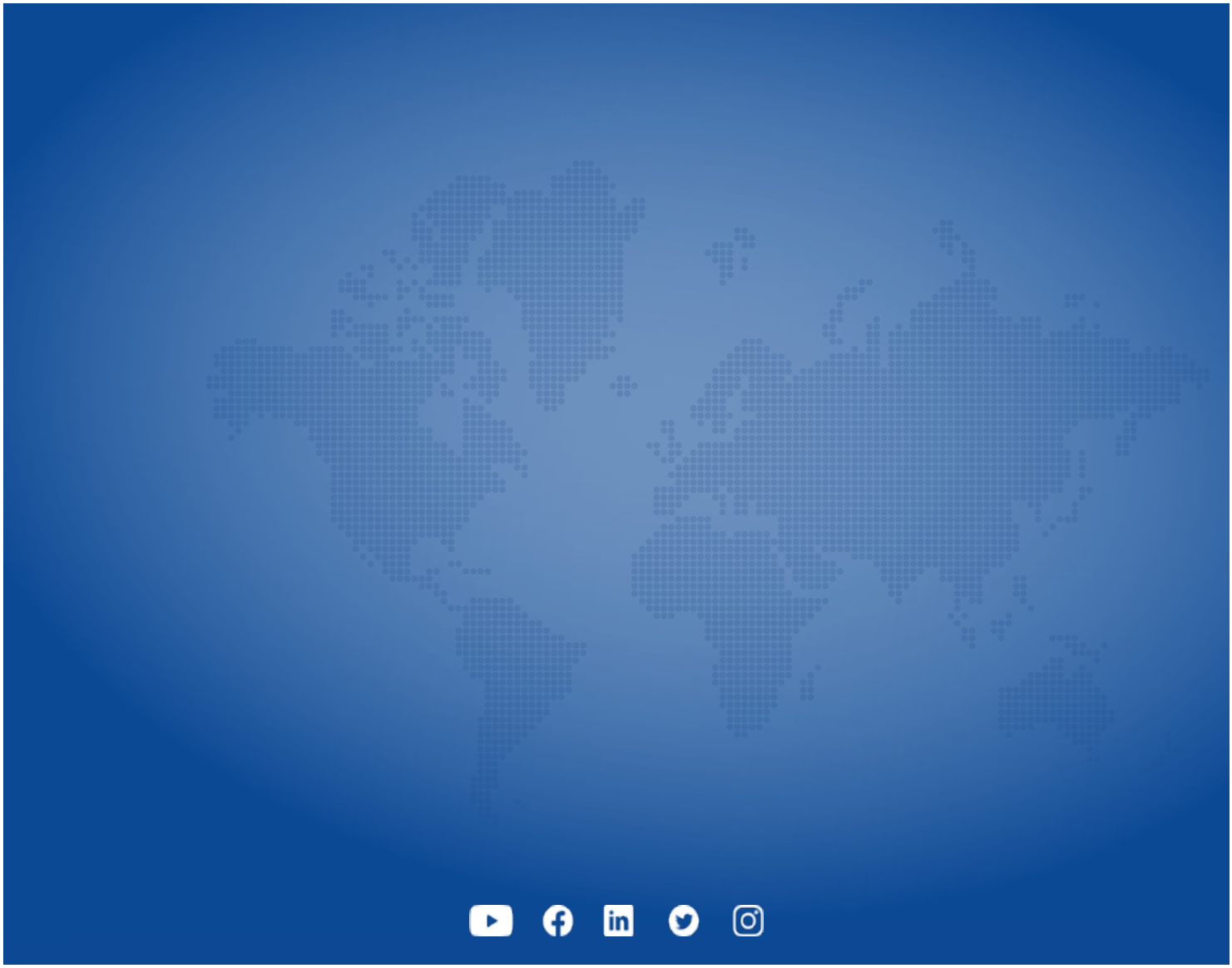
- Feasibility analysis
- Creating a technical concept including product requirements specifications and specification sheet
- Complete project planning and documentation
- Project planning including PLC programming, visualization, network technology, etc.
- Continuous project management
- On-site startup
- Training and support

Your advantages

- As a central contact partner JUMO develops technical system solutions
- Extensive expertise with all measurement and automation devices
- Global support through experienced specialists
- Flexible, tailored solutions to suit your individual needs and applications

In a nutshell

- Precise and prompt communication channels:
  This saves you time and prevents mistakes!
- Highly developed expertise for maximum flexibility:
  For fully reliable and proven project planning!
- Technology that has proven itself over decades reduces downtimes:
  For excellent plant availability and process reliability!



www.jumo.net

PR 00111 EN/V1-1