

HYDROGEN MEASUREMENT

Safety for Electrolyser

Mechatest designed a pre-engineered SIL-2 rated analyzer solution for hydrogen in oxygen measurement suitable for water electrolysis process. Electrolysis is the process of using electricity to split water into hydrogen and oxygen. This reaction takes place in a unit called an electrolyser. Due to safety reasons, after splitting the streams of hydrogen and oxygen must be measured for purity and on safety explosion limits. The mixture of oxygen in the hydrogen stream can cause a dangerous situation, and vice versa.

**GREEN HYDROGEN SHALL MAKE
AN IMPORTANT CONTRIBUTION
TO THE ENERGY TRANSITION
AND CO₂ REDUCTION**



HYDROGEN ELECTROLYSER MEASUREMENT

Green hydrogen, also known as 'renewable Hydrogen', is Hydrogen that is produced with sustainable energy resources.

Electrolysis is the process of using green electricity to split water (H₂O) into Hydrogen (H₂) and Oxygen (O₂).

The output after the electrolyser splitting method (Polymer Electrolyte Membrane (PEM), Alkaline or Solid Oxide) is pure Hydrogen and Oxygen as a gas composition but saturated with water vapor.

Measuring a reliable Hydrogen concentration in a wet gas can be complex because laboratory analysis and most analyzer sensors are not suitable to measure in wet gases. To get around this problem Mechatest developed a sample conditioning system with a custom designed probe. This works together with a hydrophobic filter to block liquids and prevent the analyzer from free water droplets. The free water is returned to process through the probe automatically. Maintenance will be rare, but the system can be blocked from the process when needed or for calibration purposes.

- ▼ Pre-engineered complete solution (sample conditioning & analyzer)
- ▼ Explosion proof, Sil-2 rated
- ▼ Fast response and High accuracy
- ▼ Low drift
- ▼ Minimal and easy maintenance
- ▼ Optimized safety for electrolyser, operator, and environment



RELIABLE SENSOR TECHNOLOGY

Thermal Conductivity sensor technology is one of the best for Hydrogen applications. The Binary Gas Analyzer utilizes the difference in thermal conductivity to accurately measure the target gas in a single background or a background mixture of fixed proportions.

The analyzer displays confidence-inspiring stability of measurement, this is particularly important in safety applications such as Hydrogen in Oxygen and Oxygen in Hydrogen measurements at electrolysis.

| H2 Analyser | Specifications |
|--------------------|---|
| Measuring range | : 0-5 % H2 in O2 Available ranges from 0-1% to 0-100% |
| Response time | : ± 15 sec. T90 (from take-off to analysis) |
| Accuracy | : Better than ± 1 % of full scale |
| Repeatability | : ± 0,2 % of range or 0,02 % O2 |
| Linearity | : ± 0,5 % of range or 0,05 % O2 |
| Stabilization time | : 5 minutes (start/warm up 25 minutes) |
| Stability | : ± 0,5 % of range per month |
| Sample flow rate | : ± 300 ml/min |
| Outputs | : 2x 4-20 mA, Modbus RTU over RS485 |
| Alarms | : 2 off single pole relays |
| Display | : Backlit LCD Touch Screen, Touch-screen display allows calibration or adjustment |
| Temp. Rating | : Process from +5 °C to +45 °C Ambient from +5 °C to +60 °C |

Mechatest is an independent organization that focuses on analyzer solutions to support the decarbonization of the economy. We offer a range of analyzers for measurement of binary gas mixes such as Hydrogen in Air, H2 purity, Air in Hydrogen or Carbon Dioxide in Methane (Biomethane) applications, sampling and analyzing solutions that can improve the safety and efficiency.

MECHATEST SAMPLING SOLUTIONS

Mechatest (statutory name: Doedijns BV) is a certified industrial sampling systems division with 30 years of experience in design and manufacturing of sampling and analyzer systems for gas and liquid applications. Mechatest became part of the Vydraulics Group, is merged into Doedijns B.V. and relocated in Doedijns' premises in Zoetermeer.

Sampling group contact details:

Direct: +31 (0)88 091 2705 Email: sales@mechatest.com
www.mechatest.com



Pressure Rating

Design pressure max. 55 bar(g)

Wetted Parts

Standard SS316, Viton
(cleaned for oxygen service)

Hazardous Area Rating

ATEX, II 2GD Ex d IIB +H2 T6 Gb
IECEX, TC TR Ex & cCSAus rated
IEC61508 - SIL2

Power Supply

24 Vdc, 1,5 A max.

Connections

Bulkhead fitting 1/4" or 6 mm OD
Flange connection on request

Dimensions (HxWxD)

600 x 400 x 250 mm (cabinet model)
550 x 400 x 180 mm (plate model)

Weight

Approx. 50 kg (cabinet model)
Approx. 40 kg (plate model)

HS-Code

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**WE LIKE TO HELP TO
ACCELERATE THE
DEVELOPMENT OF
HYDROGEN SOLUTIONS
AS PART OF A CLIMATE-
NEUTRAL ECONOMY**

MANUAL SAMPLERS HYDROGEN GAS - HYDROGEN ANALYSER SYSTEMS - AUTOMATIC SAMPLING SYSTEMS

**Boosting your
motion & control**

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