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Leancat
Electrolyzers

Prof. Vladimir Matolin, CEO

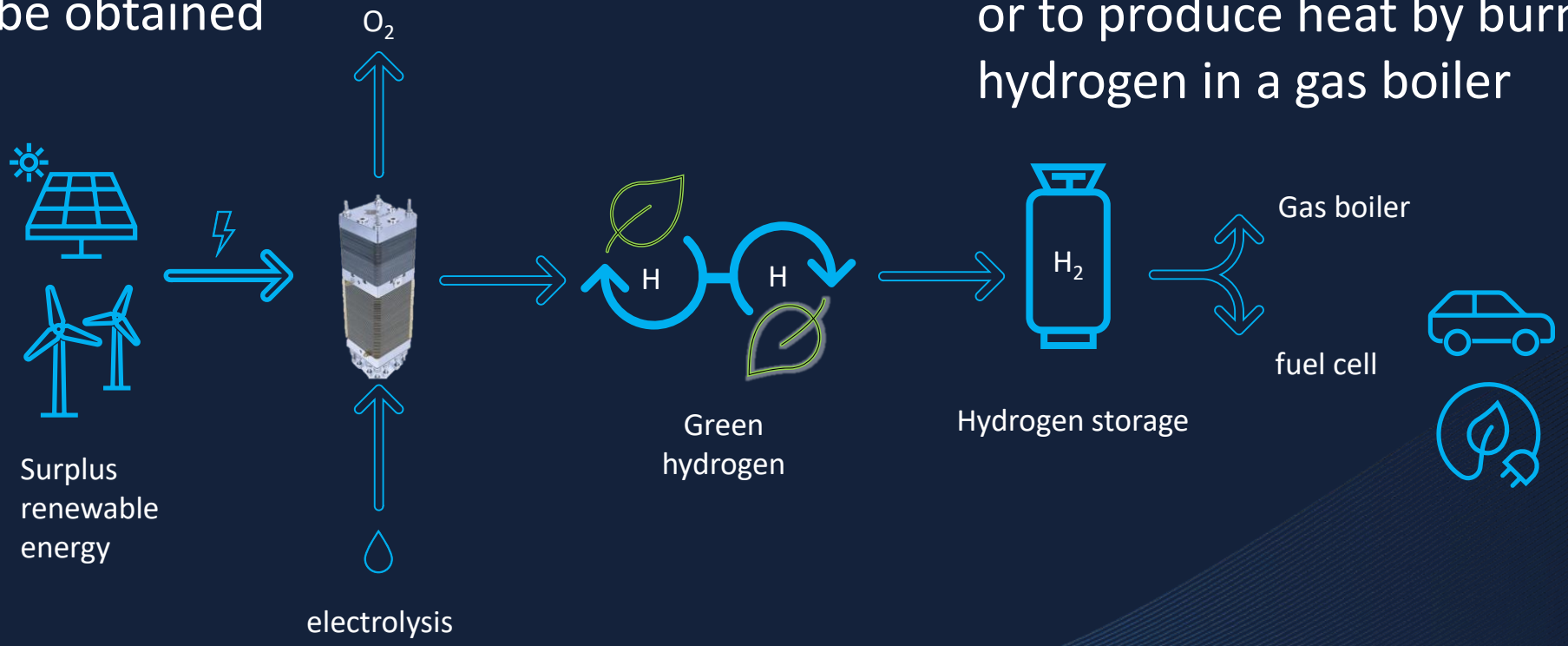
Development and production of PEM water electrolyzer stacks

Modular hydrogen generators

H_2 FÓRUM 3.-.4.6.2025

Production and use of hydrogen

- By using electricity from renewable energy sources for water electrolysis, green hydrogen can be obtained



Hydrogen can then be used in fuel cells to produce electricity back,

- in transport,
- in power balance system

or to produce heat by burning hydrogen in a gas boiler

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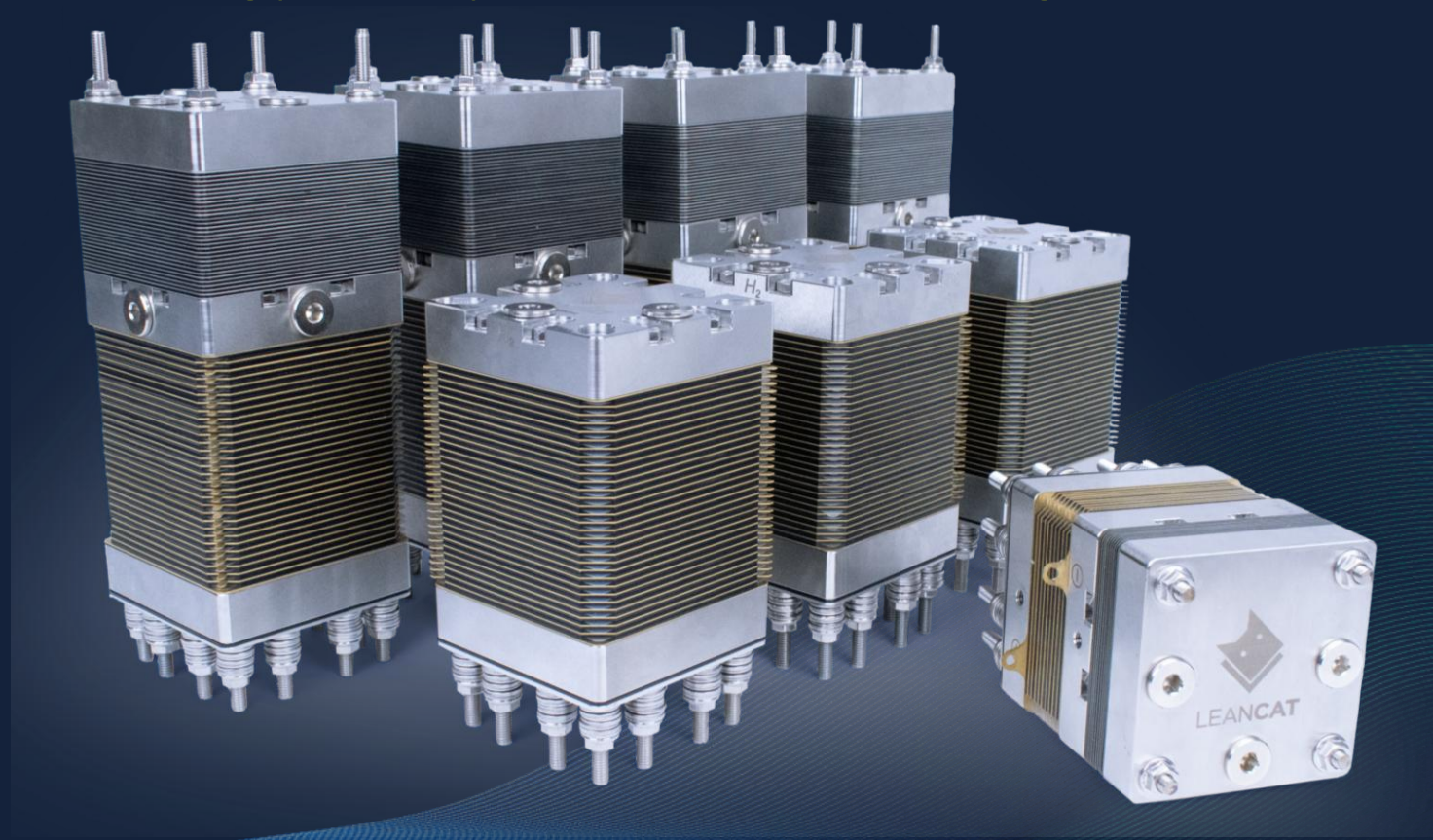
Development and production of PEM-based electrolyzer stacks

The beating heart of each water electrolyzer unit is a stack. We offer stacks based on the established PEM technology with proven record of high flexibility and durability.

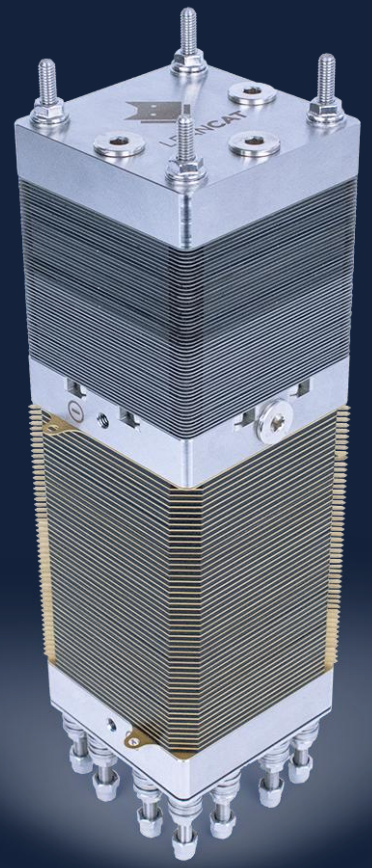


Key features

- Produces hydrogen at high pressure up to 35 Bar
- Designed for integration in H_2 modular systems
- Power range up to 5 kW
- Optional integrated heat exchanger for the stack cooling

Electrolyzer stack LCWE25-45-HEX

- The main component of the module is a 25cm^2 cell stack
- The stacks contain PEM (allow for high flexibility, durability and long life).
- Integrated heat exchanger – cooling and possibility of using waste heat
- Service life – at least 30,000 hours under operating conditions



- Maximum power 4,5 kW@50A
- I_{max} 65A
- $I_{nominal}$ 50A
- H_2 production ≤ 1000 NL/h
- H_2 output 35 Bar
- O2 output atmospheric P
- Working T ≤ 70°C
- Weight (5 kW) 7 kg

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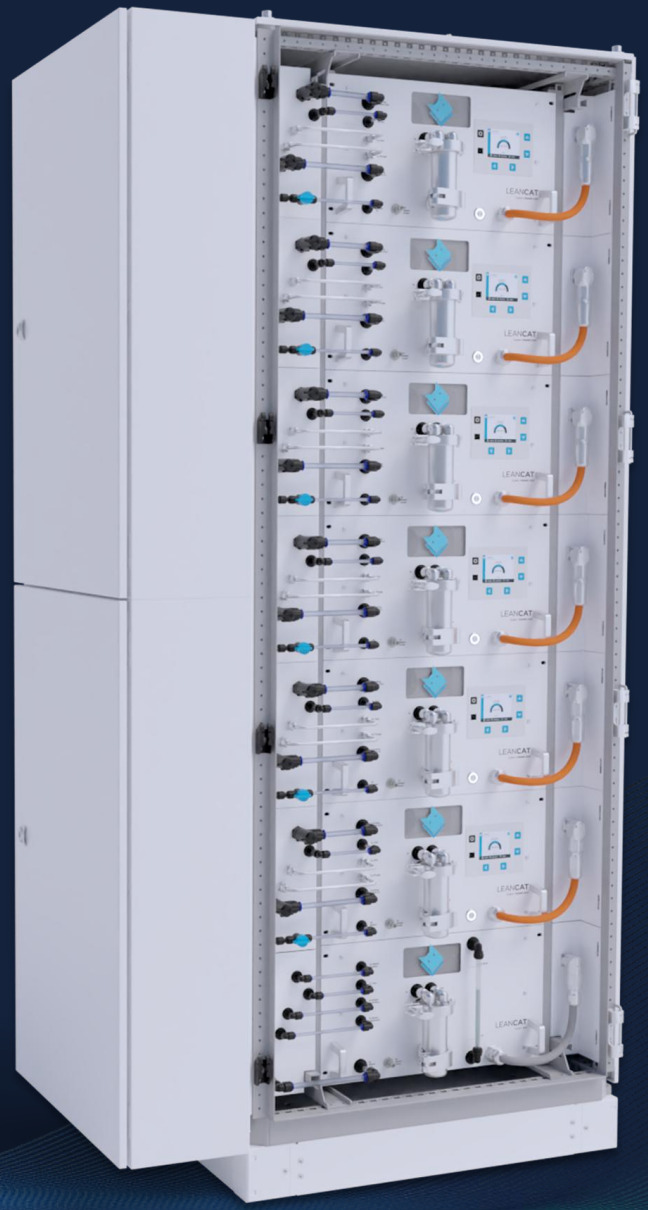
H_2Gem
Modular Hydrogen Generators

- We create Czech hydrogen generators
- Reliable and modern solutions for a sustainable future

H_2Gem

- Efficient and fast solution for construction - modular system can be easily adapted to customer requirements
- the output of the entire system can be continuously regulated in the range from 2.5 kW to the maximum power according to the configuration
- Dimensions (W×D×H): 1000×600×2100



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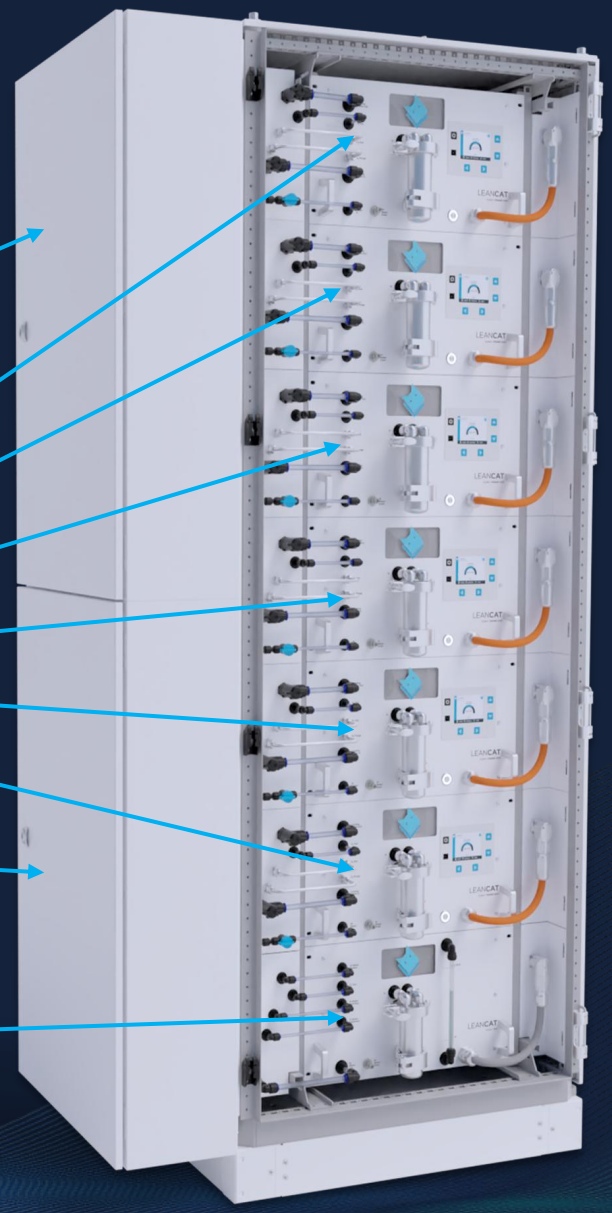
H_2Gem

Composition of the modular hydrogen generator:

- electrolyzer modules – 1 to 6 modules depending on the application
- Drying module
- Control of deionized water



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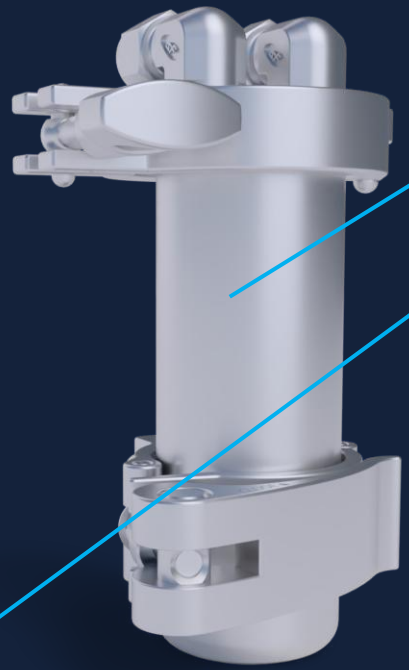
Electrolyser Module - PEMWE 1000

- Electrolyzer module components:
- Electrolyzer stack (LCWE25-45-HEX)
- 3-phase DC power supply WE
- Deionized water tank 5L
- Circulation pump
- DI water quality sensor
- ion trap
- Embedded control unit



Ion trap

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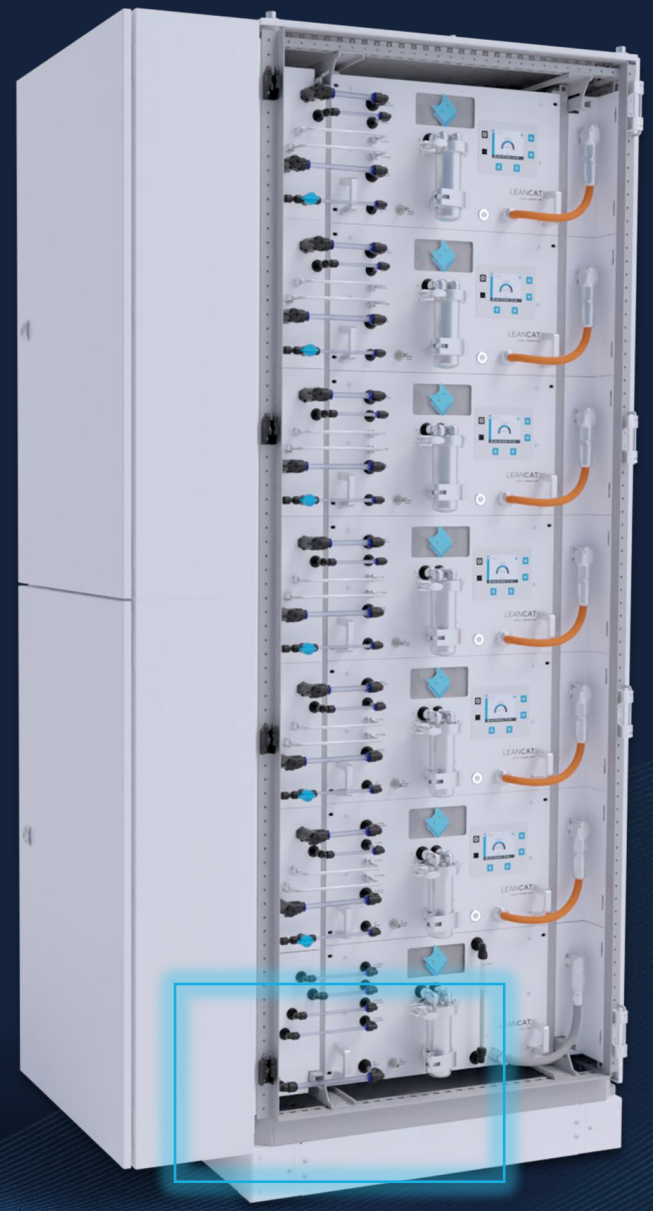
Water management module

- The water management module provides deionized water (DI) supply to the modules
- The DI tank has a volume of 20L and guarantees the operation of the system even in the event of a reverse osmosis failure for about 2 – 15 hours, depending on the configuration and production of hydrogen
- the tank with the DI supply is refilled from reverse osmosis (not included)
- The system controls reverse osmosis by a start/Stop relay based on the DI level



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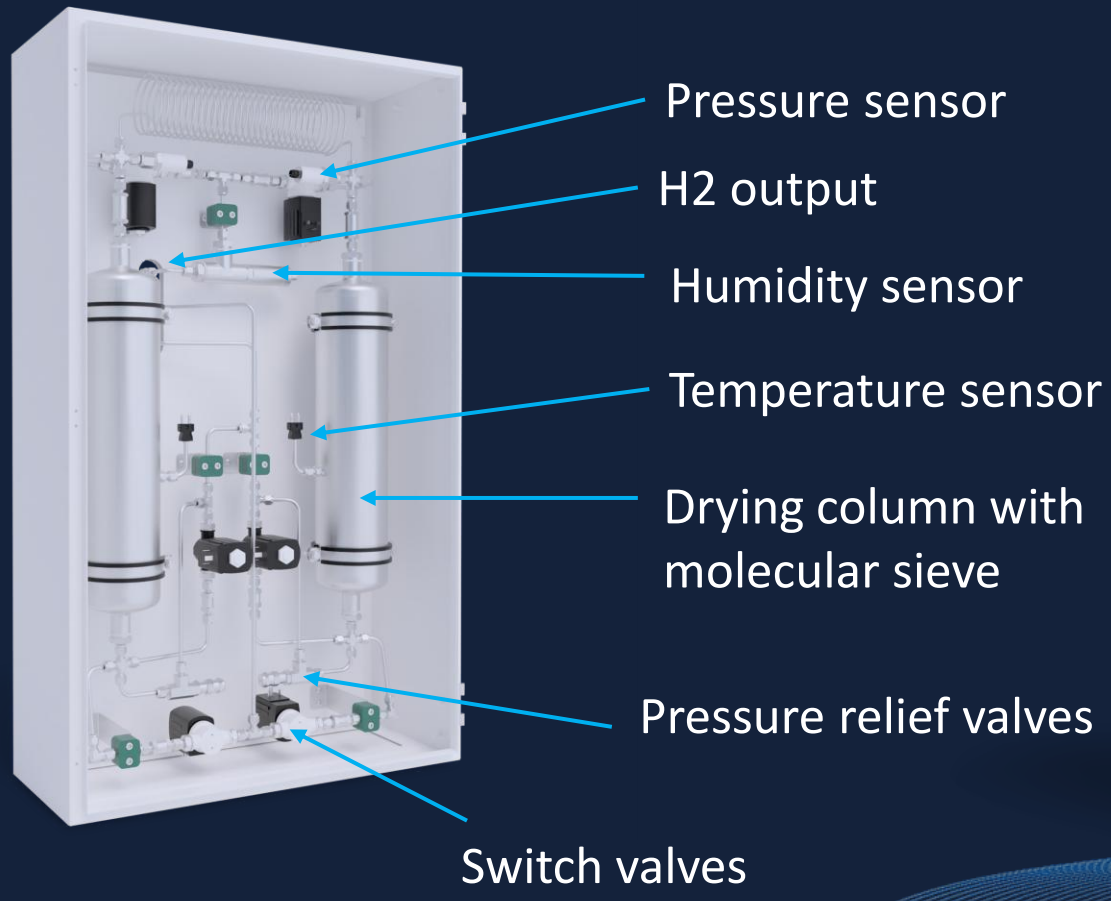
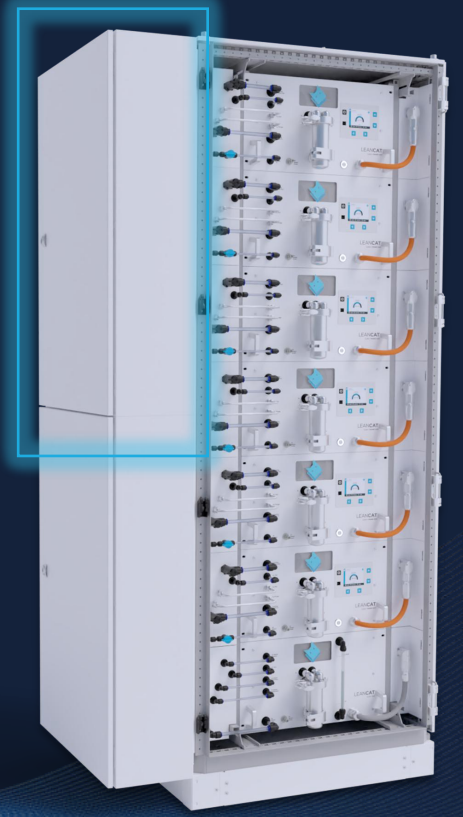
Adsorption hydrogen dryer

- The drying module is needed to dry the wet hydrogen leaving the electrolyser



- Automatic switching between drying and regeneration modes between columns to ensure continuous drying



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Driving, safety and service

Control

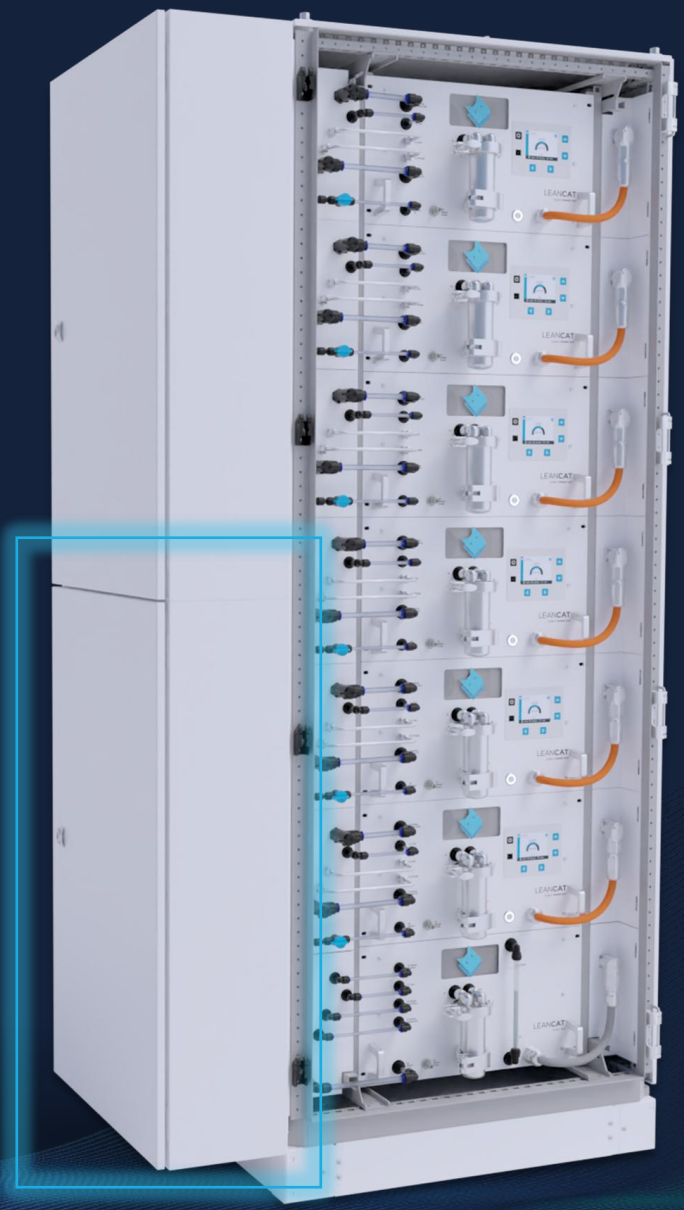
- Infinitely variable power control from 2.2 kW to full power
- Uniform utilization over time, response to faults, and other functions required for the operation of the generator system
- Communication with external systems
- Internal visualization based on a web page on the local network

Safety

- Separate shutdown of individual modules in case of failure of central systems
  - in the presence of hydrogen in space - shutting down the entire system
  - The system is equipped with an emergency stop button for emergency shutdown of the system

Servis

- The entire system is designed with regard to minimum maintenance
- Depending on the system load over time, a regular service inspection of 1× per year for the entire service life is recommended



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Animation of the production of modular electrolyzer

H_2Gem – Modular solutions for higher outputs

- The required power of the entire system can be expanded by soldering racks up to 1MW
- Maximum single rack performance
- 31 kW - without WM module (central system solution)
- 27.5 kW - with WM module
- H_2 drying and PLC control is handled centrally for the entire system
- 1 Rack Dimensions (W×D×H): 800×600×2100

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HDISYS Hydrogen Distribution Systems

For further information, please do not hesitate to contact us

H2Generator@leancatwe.com
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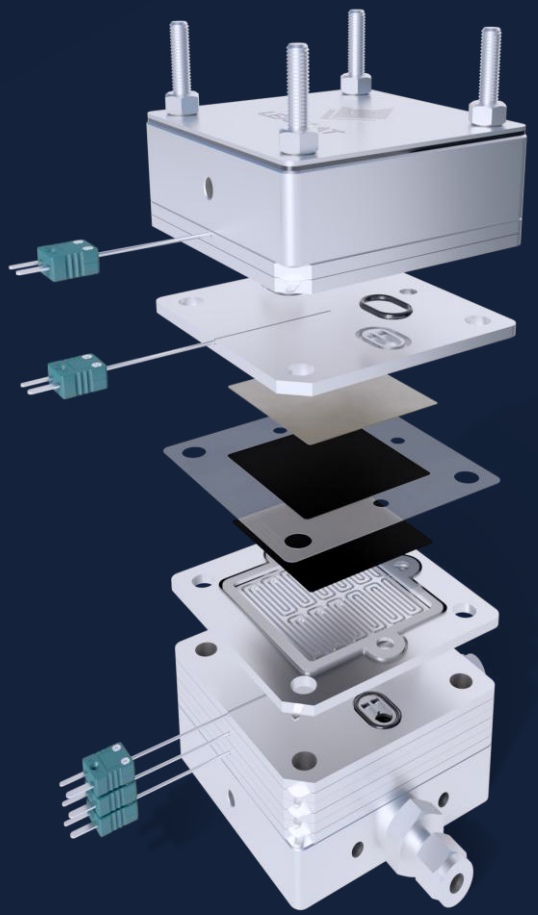
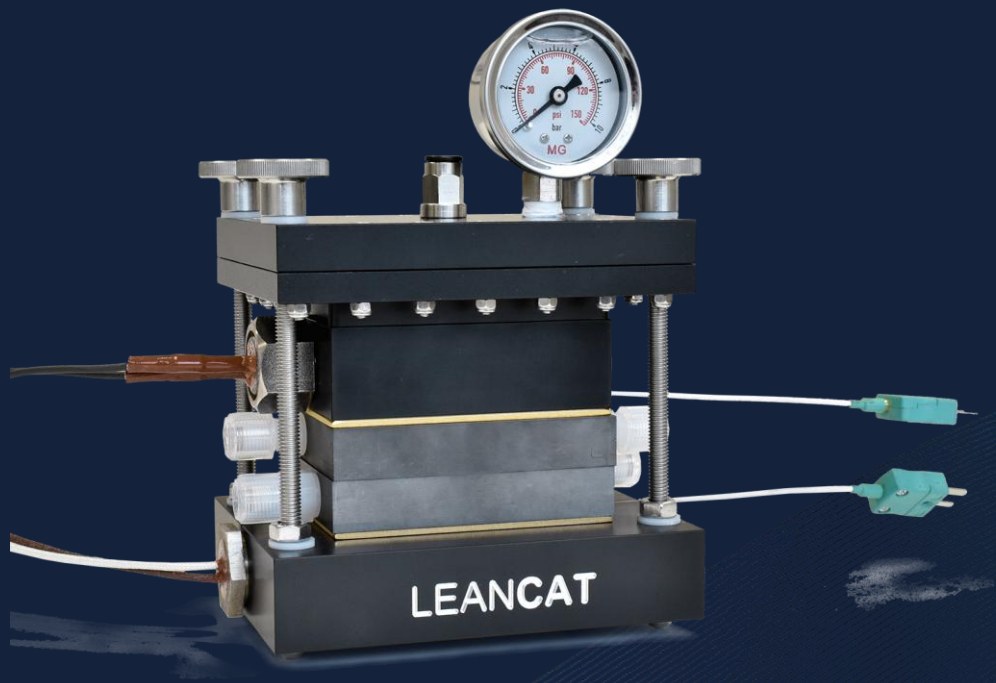
www.hdisys.eu

Testing Hardware

PEMWE Lab stacks

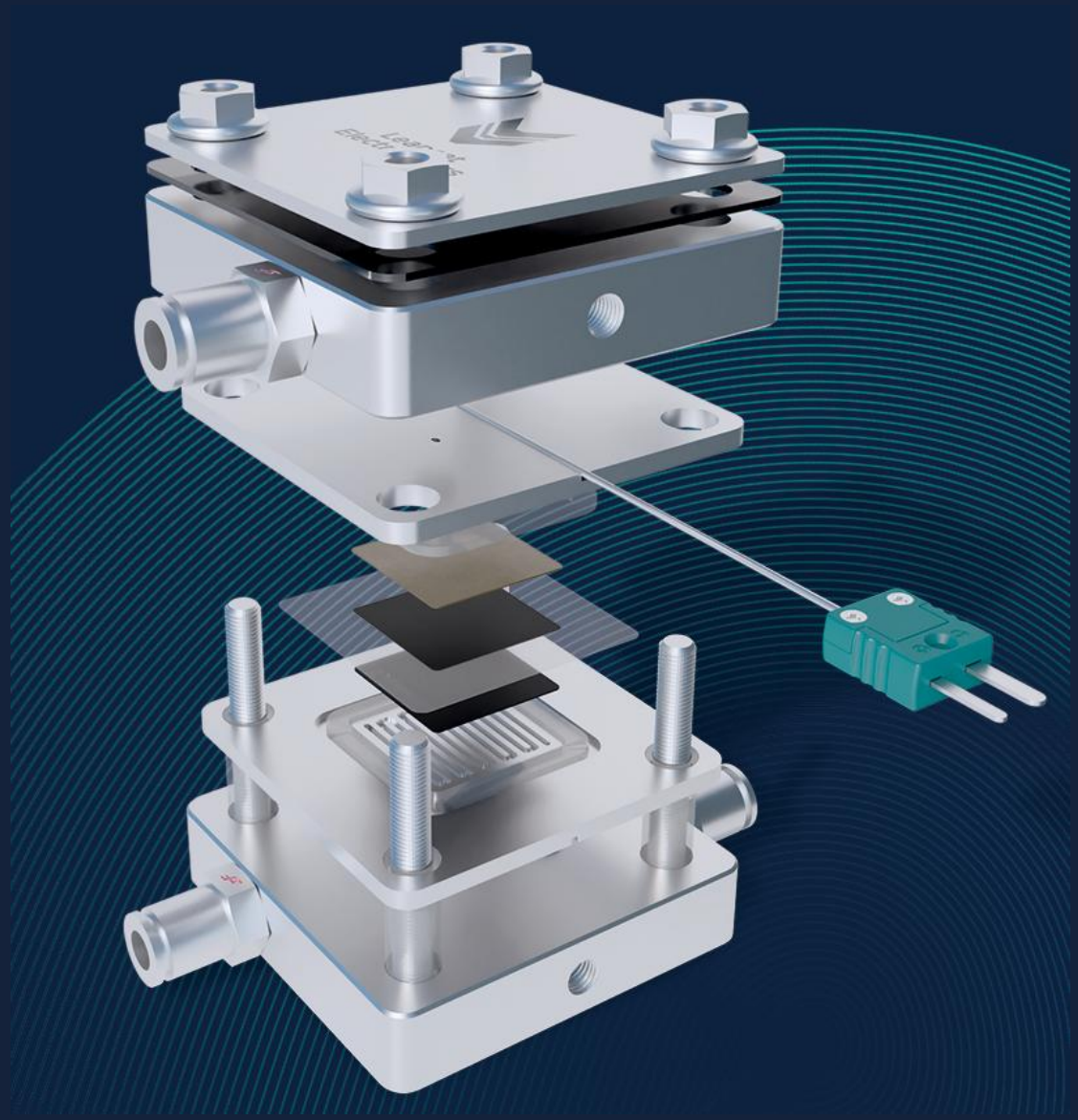


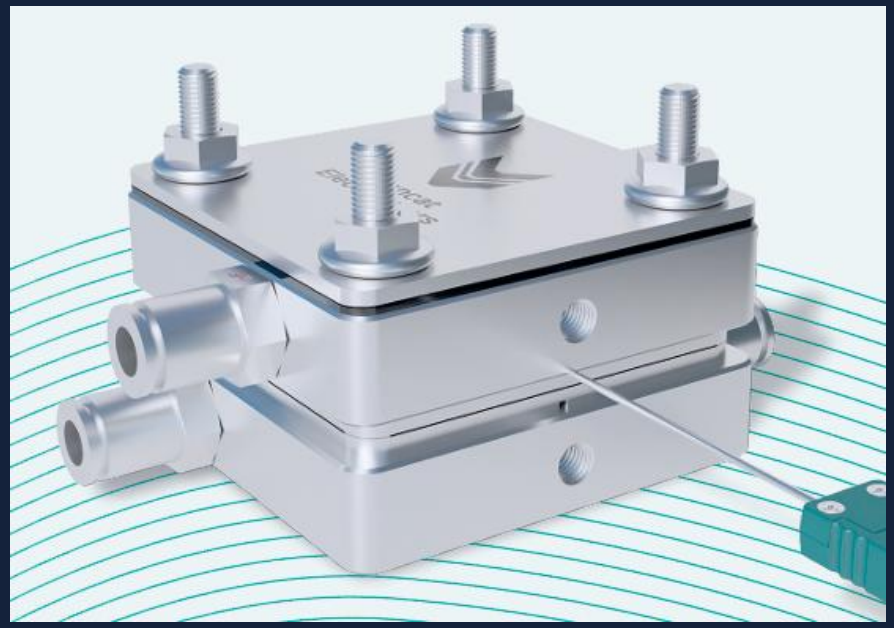
Test single cell (aircell WE/FC)



Key features

- test hardware for multi-cell testing
- testing up to 5 cells at the same time
- suitable for PEM or AEM electrolyzers
- possibility to pressurize up to 50 bar
- simple assembly and durable construction





Key features

- test hardware for MEA and porous layers
- suitable for PEM or AEM electrolyzers
- possibility to pressurize up to 50 bar
- simple assembly and durable construction