

Electrolyser EL 2.1



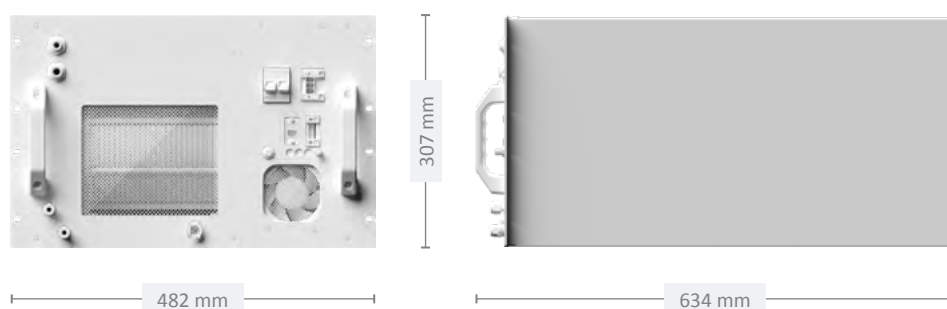
Enapter's patented anion exchange membrane (AEM) electrolyser is a standardized, stackable and flexible system to produce on-site hydrogen. The modular design – paired with advanced software integration – allows set up in minutes and remote control and management. Stack this electrolyser to achieve the required hydrogen flowrate.

KEY FEATURES

- ≡ High efficiency
- ≡ Automated & remote operation with Enapter's Energy Management System
- ≡ Low requirements for input water purity
- ≡ Ideal for on-site hydrogen production
- ≡ Modules can be easily integrated in 19" racks
- ≡ Safe operation
- ≡ Scalable and modular, add as many modules as needed
- ≡ Quick and easy installation
- ≡ Low maintenance requirements
- ≡ Small footprint thanks to compact design

Specifications

Enapter
Electrolyser EL 2.1



Production rate	500 NL/hr
Hydrogen output purity	35 bar: ~ 99.9% (Impurities: ~ 1000 ppm H ₂ O) 8 bar: > 1500 ppm H ₂ O
Output pressure	Up to 35 barg
Nominal power consumption per Nm³ of H₂ produced (beginning of life)	4.8 kWh/Nm ³
Operative power consumption	2400 W
Stand-by power consumption	15 W
Power supply	200-240 V, 50/60 Hz
Ambient operative temperature range	5°C to 45°C
Ambient operative humidity range	Up to 95% humidity, non-condensing
IP rating	IP 20
Control and monitoring	Fully automatic with Enapter's EMS, Modbus TCP via Ethernet
Water consumption	~400 ml/hr
Maximum water input conductivity	20 µS/cm at 25°C
Water input pressure range	1 - 4 barg
Weight	55 kg
Dimensions (W × D × H in mm)	W:482 mm D:634 mm H:307 mm
Space inside cabinet	7 U
Conformity	CE certified according to the machine directive 2006/42/CE

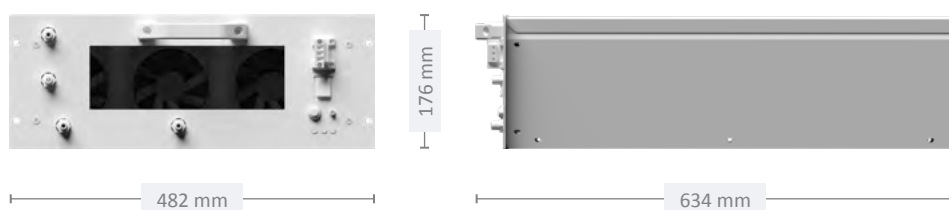
Dryer DRY 2.1



Enapter's dryer is a hybrid temperature/pressure swing adsorption system that comprises of cartridges filled with a highly adsorbent material. The dryer is maintenance-free. During operation, one cartridge catches the humidity from the hydrogen gas stream of the electrolyser, while the other cartridge is heated and regenerated. The dryer is rack-mountable in a standard 19" cabinet.

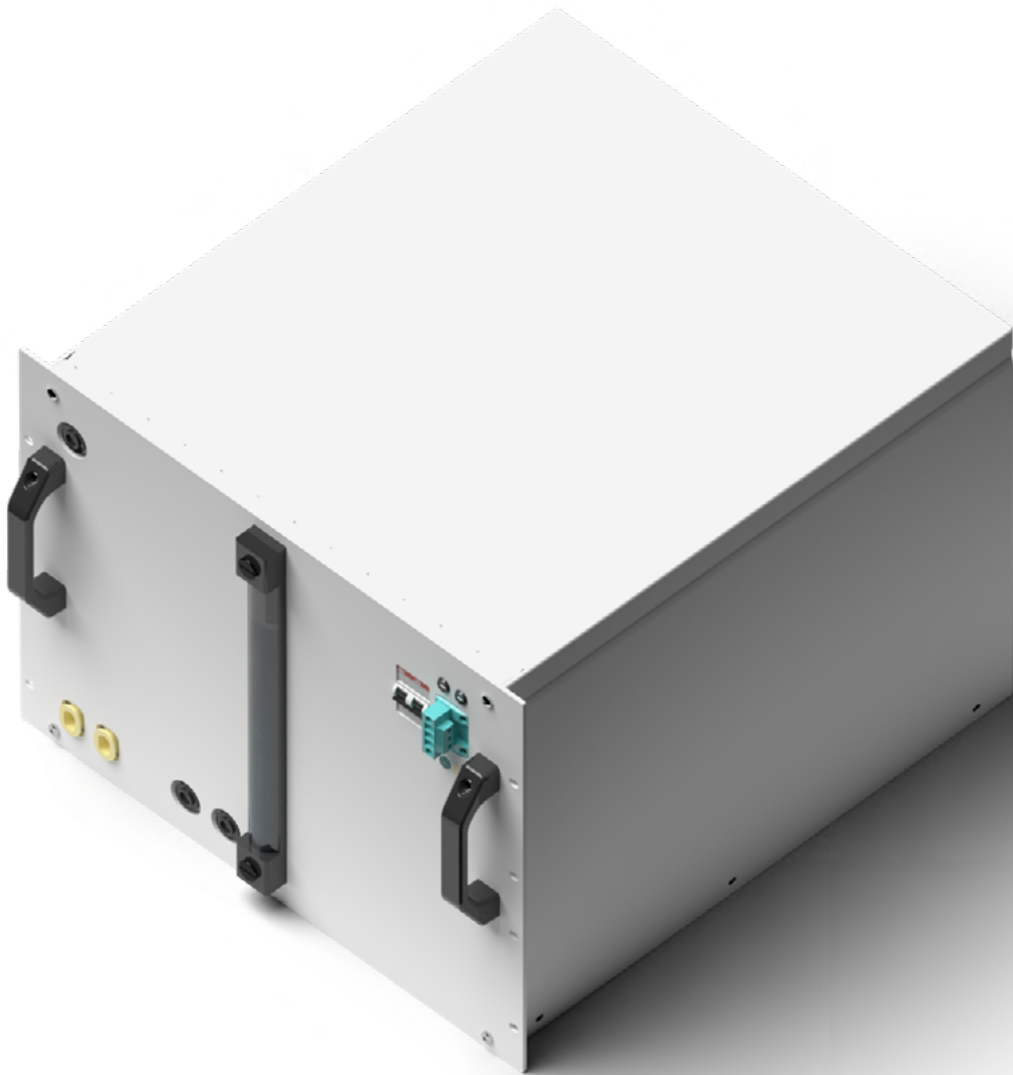
Specifications

Enapter
Dryer DRY 2.1



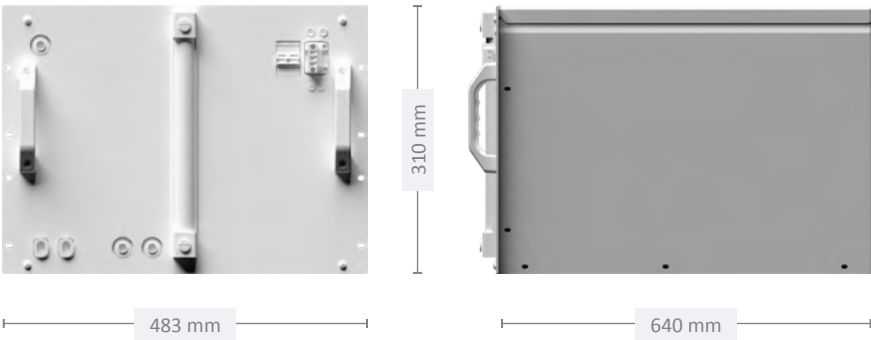
Hydrogen flow rate	35 bar version: 2,500 NL/h 8 bar version: 1,000 NL/h
Input pressure	35 bar version: 35 barg 8 bar version: 8 barg
Output pressure	Up to 35 barg/8 barg
Min. input purity	35 bar version: >99.8% 8 bar version: >99.0%
Hydrogen output purity	> 99.999% in molar fraction
Average dewpoint and impurities	< -70°C, compliant with ISO14687 (H ₂ O < 5 ppm, O ₂ < 5 ppm)
Weight	23 kg
Dimensions (W × D × H in mm)	482 × 634 × 176 mm
Space inside cabinet	4U
Operative power consumption	200 W
Stand-by power consumption	10 W
Power supply	AC 200-240 V, 50/60 Hz
Ambient operative temperature range	5 - 45°C
Ambient operative humidity range	Max 95% Rh, non-condensing
IP rating	IP 20
Maintenance	Maintenance-free
Control and monitoring	Fully automatic with Enapter's EMS

Water Tank Module WTM 2.0



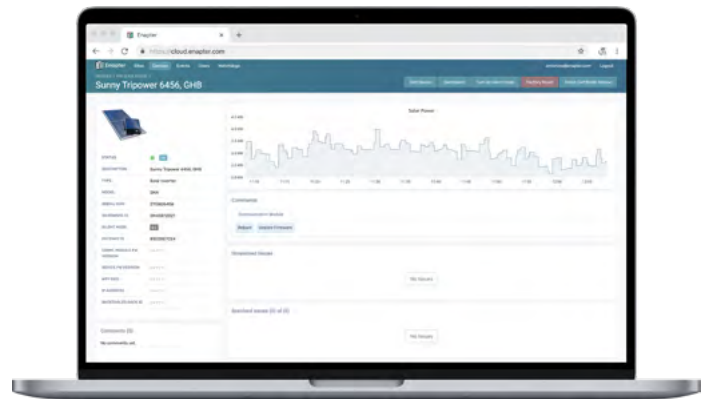
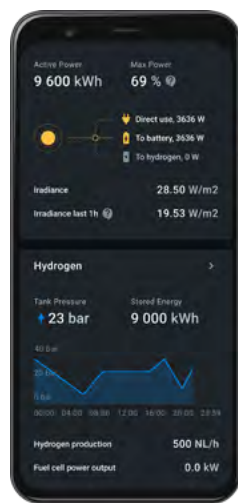
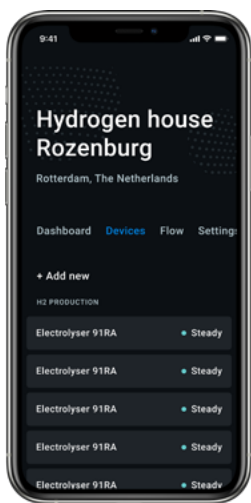
Enapter's Water Tank Module provides storage for 35 litres of clean water for the electrolyser. The water tank is rack mountable into a standard 19" cabinet. The tank can be fed by our Water Purification System or any other suitable clean water supply. The tank contains a pump system to supply up to 30 electrolysers with clean water.

Specifications

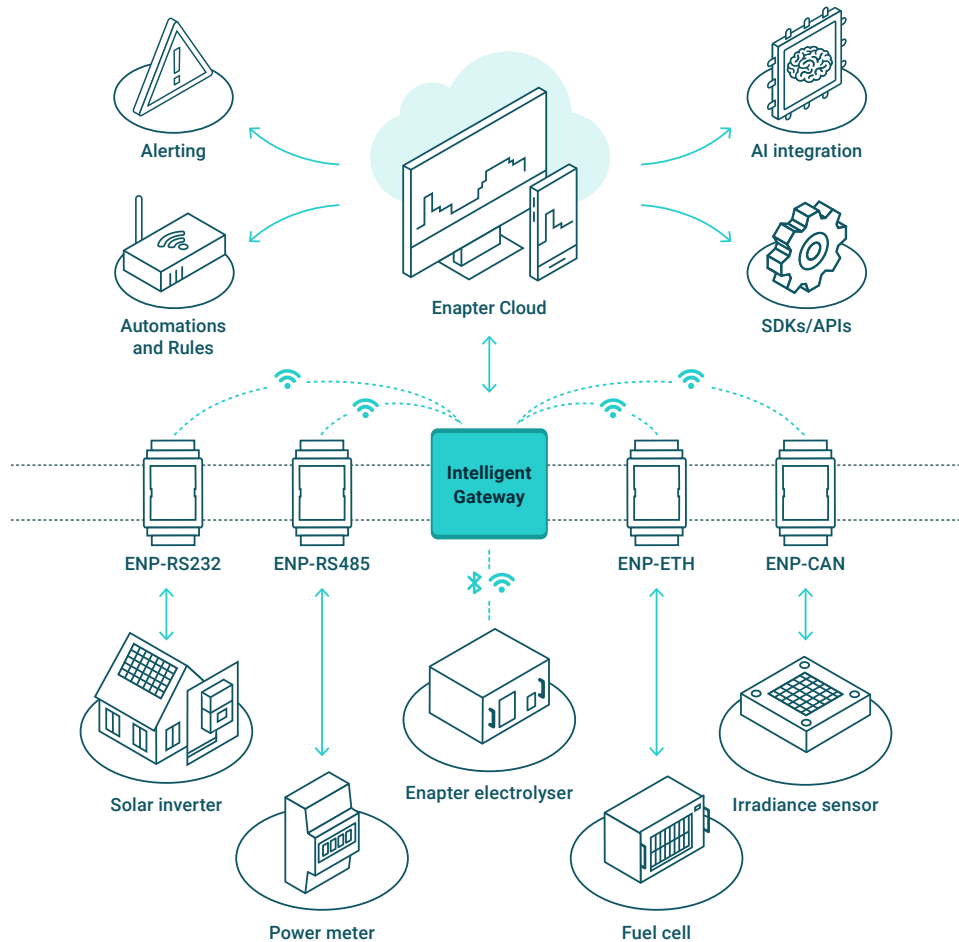


Capacity	35 L
Dimensions	W × D × H in mm = 483 × 640 × 310
Weight	25 kg (Empty)
Space requirement in cabinet	7U
Max outlet water flow rate	3.8 L/min
Water input conductivity	< 20 µS/cm (at 25°C)
Operative power consumption	50 W
Max power consumption	70 W
Standard power supply	AC 100-240 V, 50/60 Hz
Ambient temperature	5 - 45°C
Ambient humidity	20 - 95%, non-condensing
Maintenance	If in use, the water tank is maintenance-free. After any period without use exceeding 1-2 months, the tank must be washed before continuing usage.
Recommended number of AEM electrolyzers to be supplied	Up to 9

Energy Management System (EMS)



Enapter's unique Energy Management System (EMS) allows for intuitive monitoring and control of the electrolyzers and dryers, as well as easy integration with third-party devices (ie. fuel cells, sensors, tanks, solar, wind, etc.). The EMS takes energy system control software to a whole new level.



A comprehensive **web and mobile dashboard** is the face of the EMS. It provides full overview and control of all connected devices. It is not only the electrolyser that can be monitored and controlled; full analytics about the energy system are also available.

The EMS **maintains optimal performance** of the system, reducing both energy consumption and costs. If deviations are detected, customizable alerts (SMS, emails or calls) keep you informed to protect the energy system. A **rule-based management system** allows for the user to set and change the parameters of how different components of the energy system interact in an automated way. All Enapter products come with an **IoT communication module** for remote monitoring and control. Communication modules are also available to bring wireless connectivity to solar panels, hydrogen tanks, batteries, digital and analog sensors.

Industry grade standards: All software is equipped with MQTT and OPC-UA Interfaces to be Industry 4.0 compatible. Industry grade standards and protocols such

as RS-485, CAN, Modbus, SNMP, HTTP and others are available. Adding new devices to the EMS couldn't be any easier. Simply connect a communication device and scan a **QR code** to commission your new device. All data is stored in the cloud which is equipped with a **predictive 24/7 monitoring system**.

Mobile first. We build all features on mobile platforms to provide full flexibility to customers.

The autonomous **Enapter IoT Gateway** mitigates Internet connectivity issues and stores data locally for up to a year. The highly modular and scalable architecture collects and integrates custom sensor data into the system. The gateway is based on open source software, allowing customization, broad acceptance and collaborative work across the industry.

Use cases



The AEM electrolyser is a versatile building block currently in operation in more than 30 countries and numerous applications around the world. Hydrogen from the AEM electrolyser serves as long-term energy storage, fuel in vehicles, raw material in industry or fuel for heating.

Use cases

Hydrogen's versatility is showcased with our plug-and-play building blocks. Here are a few examples:



Electricity storage

France

Hydrogen keeps this refuge in the Alps operational year-round. Since 2015, it runs autonomously for up to 16 days without sunshine using a 2 kW fuel cell.

- ≡ Electrolyser: 500 NL/hr
- ≡ Storage: 5 kg



Mobility solutions

China

Enapter electrolyzers are integrated into a mobile drone refueling station. The electrolyser produces hydrogen right onsite to refuel drones that need to be in the air for long times.

- ≡ Electrolyser: 1,000 NL/hr
- ≡ Storage: 3.5 L



Power-to-Gas

Australia

Solar made hydrogen is combined with CO₂ which is extracted directly from the air to create renewable methane. Such "power fuel" can be used for heating and cooling, transport or industrial use.

- ≡ Electrolyser: 500 NL/hr
- ≡ Storage: none



Industrial solutions

Portugal

Enapter electrolyzers are being used to purify nitrogen that is contaminated with oxygen. Oxygen reacts with hydrogen to form water which can easily be dried.

- ≡ Electrolyser: 1,000 NL/hr
- ≡ Storage: none



Electricity storage

La Reunion

Only accessible by foot or helicopter, the community is energy independent with solar and hydrogen since 2017. The storage system provides 10 days of autonomy.

- ≡ Electrolyser: 500 NL/hr
- ≡ Storage: 3 kg



Power-to-Heat

The Netherlands

In June 2019, the first hydrogen project for residential heating was officially opened in Rozenburg near Rotterdam. Green hydrogen is directly used to generate heat.

- ≡ Electrolyser: 4,000 NL/hr
- ≡ Storage: none

See more Enapter use cases:
www.enapter.com